# Charon HASP Licensing Handbook Version 1.2

(Document version 3)

# Contents

# Introduction

# Goals of this Document

This document has the following goals:

- Enable users of the Charon software to manage Sentinel HASP licenses for Charon emulator products.
- Provide detailed procedures for frequently required tasks.
- Provide a consolidated source of information on Sentinel HASP licensing for current product versions.

This document does not address commercial licensing topics in any depth. Please contact the Stromasys Sales team (info@stromasys.com) for any commercial inquiries.

**Please note**: this document does not cover the new Virtual Environment licensing product offered by Stromasys. For details about VE licenses and the VE license server, please refer to the Virtual Environment (VE) License Server Documentation.

# Target Audience

This document is aimed at technical staff at Stromasys, at partners, and at customers who need to manage Sentinel HASP licenses for Stromasys emulator products. It assumes a basic technical knowledge of Linux and Microsoft Windows.

# Getting Additional Support

An end user must have a valid support contract in order to receive support from Stromasys.

Please visit http://www.stromasys.com/support/ for email, up-to-date support telephone numbers, and business hours.

If you purchased the Charon product through a Value-Added Reseller (VAR), please contact them directly.

# Document Structure

The document contains the following main sections:

- Sentinel HASP Licensing Overview: This section briefly describes the available license types and their main characteristics. It shows the content of the license, i.e., the parameters defining the license. It shows how an emulator checks for a valid license, and it provides a brief overview of operational procedures, such as license installation and update.
- Emulator Product Overview: Charon product overview, and overview of license driver versions included in products.
- License Management Tasks - Overview: Introduction to technical tasks that are described in detail in the sections that follow this overview. Overview of required permissions for certain license management actions.
- License Management Tools - Overview: Overview of license management tools that are described in detail in the section that follow this overview.
- License Management Tasks - Details: This section describes a number of common management tasks in detail for Linux and Microsoft Windows. It also describes the software packaging to show which parts of a full emulator product contain the license-specific parts that can be used to install a dedicated license server. The main tasks described are:
  - Sentinel HASP Software Packaging and Installation Overview: Overview of which packages in the regular product kits are required for licensing. Brief installation overview.
  - Installing and Updating a License: This section describes in detail how to install and update software and hardware licenses. It explains how to work with C2V (customer-to-vendor) and V2C (vendor-to-customer) files.
  - Viewing a License: This section describes how to display the different aspects and content details of a license.
  - Removing a License: Steps to remove a previously installed license from the system.
  - Handling Multiple License Keys and Product Licenses: This section describes the configuration options to control the use of multiple license keys and multiple product licenses. It also describes the backup key characteristics.
  - Tasks Specific to Network Licenses: When licenses are served to Charon emulator hosts by a license server, there are specific points that should be taken into account. This section describes these aspects and different configuration options.
  - Monitoring Licenses: The Charon emulator products write log files that also contain license specific information. This section describes the log files and provides some monitoring samples.
  - Removing the Sentinel Runtime Software: Steps to remove the Sentinel emulator software from the system.
- Tools Reference: Details about license management tools (OS-independent, Linux, Windows, Charon-SSP GUI, Sentinel ACC).
- Troubleshooting: Common error codes, description of typical licensing problems.
- Resources: Links to additional documentation.
- Appendix 1 - Product-Specific License Guides: Summary of license operation for Charon-AXP/VAX on Windows and Linux, and Charon-PAR.

# Conventions

## Throughout the document(s) these conventions are followed

| Notation | Description |
|---|---|
| $ | The dollar sign in interactive examples indicates an operating system prompt for VMS.<br><br>The dollar sign can also indicate non superuser prompt for UNIX / Linux. |
| # | The number sign represents the superuser prompt for UNIX / Linux. |
| > | The right angle bracket in interactive examples indicates an operating system prompt for Windows command (cmd.exe). |
| **User input** | Bold monospace type in interactive examples indicates typed user input. |
| **\<path\>** | Bold monospace type enclosed by angle brackets indicates command parameters and parameter values. |
| Output | Monospace type in interactive examples, indicates command response output. |
| [] | In syntax definitions, brackets indicate items that are optional. |
| ... | In syntax definitions, a horizontal ellipsis indicates that the preceding item can be repeated one or more times. |
| *dsk0* | Italic monospace type, in interactive examples, indicates typed context dependent user input. |

## The following definitions apply

| Term | Description |
|---|---|
| Host | The system on which the emulator runs, also called the Charon server |
| Guest | The operating system running on a Charon instance, for example, Tru64 UNIX, OpenVMS, Solaris, MPE or HP-UX |

⚠️ Throughout this document,

- the term **Windows** will be used to represent all supported variants and versions of **Microsoft Windows**, and
- the term **Linux** will be used to represent all supported Linux distributions and versions,

unless otherwise specified.

# Sentinel HASP Licensing Overview

Charon emulator products are protected by licenses issued for every customer by Stromasys Inc. A Charon product license defines all the specifics of a particular Charon product distribution and its usage. Charon emulator products cannot be used without a valid license.

**Please note**: this document does not cover the new Virtual Environment licensing product offered by Stromasys. For details about VE licenses and the VE license server, please refer to the Virtual Environment (VE) License Server Documentation.

This section provides a short overview of important aspects of Sentinel HASP licenses for Charon products. In particular, it covers the following topics:

- Sentinel HASP License Types
  - Local Hardware License Key
    - Hardware License Types
    - Local Hardware License Characteristics
    - Local Hardware Licenses in Virtual Environments
  - Software Licenses
  - Network Licenses
- License Content
- Emulator Requirements and Behavior
  - Sentinel HASP Runtime Environment
  - Emulator Behavior
    - Identifying the License
    - Checking the License and Detecting Removed or Invalid Licenses
- Operational Procedures Overview
  - General Information
  - Initial License Installation
  - License Updates
  - Basic License Installation Steps

# Sentinel HASP License Types

For more information about the advantages and disadvantages of the different licensing options based on Sentinel HASP licensing, please refer to Charon licensing options on the Stromasys website.

## Local Hardware License Key

Local hardware license keys are USB keys (dongles) connected to the Charon host system.

## Hardware License Types

All Stromasys **hardware license** options are from Sentinel (now owned by Thales). The current hardware licenses are distributed as USB dongles. Two of the most frequently used versions are the Sentinel HASP HL and the Sentinel HL USB keys. In general, the keys are backward compatible.

**Examples of the dongle variants most frequently used by Stromasys:**

| Hardware license type | Sentinel HASP | Sentinel HL |
|---|---|---|
| Network license | | |
| Time limited local license | Somewhat longer shape | |

Sentinel offers more variants for hardware keys than are displayed in the examples above. Please refer to the Sentinel web page (https://cpl.thalesgroup.com/software-monetization/all-products/sentinel-hasp) for up-to-date and complete information.

Newer Charon emulator versions (e.g., Charon-AXP/VAX 4.9 and higher, Charon-PAR 3.x, Charon-SSP 4.x and higher) also support the HL-MAX dongle without a battery.

## Local Hardware License Characteristics

Local hardware licenses are USB dongles and work on the system they are physically connected to. For Windows systems supporting AnywereUSB®, hardware licenses can also be connected over the network (similar products are available for Linux). They can easily be moved to a different system, if required. The content of the dongle can be updated if a change to the license or an extension of a time-based license is required. The necessary steps are described later in this document.

**Please note**:

- Hardware dongles require the Sentinel HASP run-time (driver) installation before the dongle can be connected to and used by the system.
- Hardware dongles, apart from HL-MAX dongles, are equipped with a **battery** and a clock, which makes them independent of the host clock. The battery is not rechargeable. However, the dongle can use the power provided by the host system while it is plugged in. By doing this, the depletion of the battery can be slowed down. Check the dongle at regular intervals if it is not permanently connected to a system. If the battery becomes completely depleted, the dongle will be permanently unusable and must be replaced. See also: How long does the license USB dongle battery last upon a full charge.
- Hardware dongles are not suited for running Charon emulator products in **cloud environments**. Stromasys provides other licensing solutions adapted to virtual environments (Charon VE licenses) for selected products. See Virtual Environment (VE) License Server Documentation.

## Local Hardware Licenses in Virtual Environments

A hardware license can be used by a Charon host system running as a virtual machine for example in VMware. The prerequisite is that the USB dongle must be passed through to the virtual machine, so it can be accessed by the host system running inside the virtual machine. If such a virtual machine is to be moved between different physical hardware (for example, vMotion), provisions must be made to maintain access to the hardware license.

Please refer to the following articles on the Stromasys page for more information: How-to configure a VMware virtual machine to make the dongle follow migration to another ESX server and Charon licensing options.

USB dongles can also be served over the network using network connected IP USB servers. However, not all such devices available will work without problems. Please contact your Stromasys representative or Stromasys VAR if you consider such a solution.

## Software Licenses

A software license is a "virtual" key with functionality very similar to a HASP network-enabled hardware dongle.

A software license does not require any special hardware but it still **requires installation of the Sentinel runtime environment**.

**Important information:**

- To avoid unexpected problems, do not use any Sentinel runtime software that was not provided by Stromasys without being advised to do so by your Stromasys representative.
- Software licenses are best suited for stable environments, because their correct function depends on certain characteristics of the host system. **Changing these characteristics will invalidate the license**.
  - If the Charon host runs on **real hardware**, software licenses are by default tightly bound to the hardware for which they were issued. If major hardware characteristics of the system are changed, the license will be disabled.
  - If the Charon host runs in a **virtual environment (e.g., VMware)**, software licenses are normally bound to the virtual machine ID and a set of additional characteristics of the virtual machine. If any of these parameters are changed, the license will be disabled.
  - For a more detailed description of the restrictions, please refer to Software Licensing restrictions or contact your Stromasys representative.
- Software licenses are very sensitive to even small changes on the host system. Therefore, it is especially important to provide for a backup license that will ensure continued operation should there be a problem with the software license. See Handling Multiple License Keys and Product Licenses for details.
- Standard software licenses are not suited for running Charon emulator products in **cloud environments**. Stromasys provides other licensing solutions adapted to virtual environments (Charon VE licenses) for selected products. See Virtual Environment (VE) License Server Documentation.

# Network Licenses

The network Sentinel HASP key (**red USB dongle**) can be shared between several hosts running a Charon emulator product (including the host on which the network license is installed).

**Please note**: all software licenses are also network licenses.

If the Charon emulator product is installed on the host where the network license is connected, no additional steps are required. The Sentinel driver is installed as part of the Charon product installation. If the host does not have a Charon emulator product installed, the host can still distribute the connected network license to emulator instances running on other hosts.

The Sentinel HASP runtime software must be installed on such a license server and on the client system. For details regarding the installation, please refer to the software installation section in this document. Once both the Sentinel runtime software and the network license are installed, the Charon emulator product can be started on any appropriate client host on the LAN, provided access to the license is enabled.

- The network license will be visible to all hosts that can access the license server over IP. Access to the license server must be possible on **port 1947** via **UDP** (discovery process) and **TCP** (actual access to license). Further information (e.g., use of **additional UDP ports**) can be found in the section *Firewall Considerations*.
- The license server and the client must both allow access to the network license using the appropriate management tools.

The maximum **number of concurrently active** Charon instances is determined by the parameters of the license.

**Please note**:

- In current Charon software versions, a network license controls the maximum overall number of active instances, which can be distributed across client host systems according to the preference of the customer.
- In old versions of the Charon software (e.g., Charon-AXP/VAX before version 4.7 build 171-01, Charon-SSP before version 1.4.1), a network license controlled the maximum number of client host systems and Charon instances per host system (station/instance mode).

# License Content

The license data on a license key, independent of whether it is a hardware or software license key, consists of **several parts:** the **license key text block** contains the **license section** and **one or more product section**s. The **license features** describe additional conditions and limitations for the emulator products contained on the license.

## A) License Key Text Block

### 1) License Section (one per license key)

The **license section** contains general license information related to ownership and administration.
There is **one license section** per license key.
Please note that in rare cases, you may receive an **empty USB dongle** for which command outputs will show that **no license information was detected**. In such cases, request a license update from Stromasys as described in *Updating a License*.

Relevant **license section parameters**:

- **License type**: type of the license, i.e., hardware or software license, network-enabled or local (added in newer Charon product versions, e.g., Charon-AXP/VAX 4.9)
- **License number**: assigned by Stromasys
- **License key ID***: unique**;** pre-programmed; unmodifiable; on physical keys same value as the Physical Key ID
- **Master key ID**: the software vendor ID used by Stromasys for issuing licenses
- **Release date**: the day on which the license was issued
- **Release time**: the time at which the license was issued
- **Update number**: the number of license updates that have been applied
- **End user name**: the name of the person to whom the license was issued
- **Purchasing company name**: usually the company to which the license was issued

### 2) Product Section (one or more per license key)

The text block also contains **product sections** that contain product specific licensing information.

- Several products can be combined on one license key. Stromasys may place restrictions on what products can be combined on a single license key.
- The product section also may include information about the support contract and the end of support. It may contain hardware specific limitations related to the types of devices that can be connected (e.g., serial interfaces).
- A checksum is inserted after the last product section of a license. This checksum is not visible in the show command output. Charon products/versions requiring such a checksum will not start if the license does not contain a checksum.
- Each product section is associated with a **feature defining additional conditions** for the product.

The following list shows the most important **parameters of a product section**.

Please note that not all of these parameters may be present for a particular Charon product.

- **Product License Number:** identification of specific product section (optional; new starting with Charon-AXP/VAX 4.9 and Charon-PAR 1.10). Corresponds to configuration parameter **license_id**.
- **Virtual Hardware**: range of virtual models available for running
- **Product Name**: commercial product name
- **Product Code**: commercial product code
- **Major Version, Minor Version, Maximum Build, Minimum Build:** commercial product version and range of build numbers suitable for running with this license. The parameters **Maximum** and **Minimum Build** are no longer displayed starting with Charon-AXP/VAX 4.9 and Charon-PAR 1.10.
  **Please note** that, depending on the product and product version, licenses have a limited backward compatibility (i.e., when the version on the license is newer than the product version).
  See *Operational Procedures Overview* in the Sentinel HASP Licensing Documentation for more information.
- **Host CPU supported** or **32bit and 64bit OS requirements:** type of host CPU required (for example, x64)
- **Host Operating System required**: Linux or Windows
- **CPUs allowed:** number of virtual CPUs enabled for virtual multiprocessor systems
- **Maximum virtual memory:** Maximum memory emulated. If not present the value defaults to the maximum memory possible for the particular virtual system. Note that the maximum memory may not be available to the virtual system if the host computer has insufficient physical memory.
- **CHAPI enabled:** whether or not CHAPI (Charon-AXP API) can be used with this product

- **Instances allowed:** maximum number of Charon emulator instances of this program/hardware model that are allowed to run concurrently on the local host. Relevant for local license keys that do not support the process count parameter. **See also** the parameter *Number of processes* in the feature section.
- **CPU Speed**: optional parameter to reduce the speed at which the program can run to a fraction of the maximum (e.g., to 25%)
- **HPSUSAN**: optional parameter. Specific to HP3000, overrides physical key ID. The HPSUSAN (HP System Unique Serially Assigned Number) is used for licensing purposes by HP. The parameter may be needed if a license on the physical system is tied to the original HPSUSAN.
- **Feature number:** number of the feature defining further limits/restrictions for the product license. Each product can use a separate feature, or the same feature can be used by several products.
  If using a **network license** and the same feature is shared by several products, the number of instances allowed by the feature is shared between the products (e.g., 2 allowed instances enable one Charon-AXP and one Charon-SSP instance to run concurrently). If using a **local license dongle** and the same feature is shared by several products, the number of allowed instances is counted separately for each product.
  The parameters defined in a feature are described below in the *Features* section.

## B) License Feature Section (one or more per license key)

Features define **product specific conditions**, for example expiration date and number of concurrent instances.

The following list describes these conditions:

- **Released product expiration date:** for time-based licenses. Note that at the time of writing the license of Charon-AXP/VAX products will expire at the end of the day of the expiration date, the license of Charon-SSP in the early morning of the expiration day. The exact behavior of the different versions can change without prior warning. Not supported for HL-MAX dongles.
- **Runtime counter:** number of license checks after which the license will be disabled. Default check interval is one hour. The counter will be decreased at the start of the emulator and then at every license check interval. Once the counter has been depleted, the license becomes invalid. This license type is typically used on licenses intended as backup licenses.
- **Login interval** or **Check interval:** frequency of license checking during emulator execution (default 1 hour). This parameter is not visible in the show command output in older Charon product version. It is visible in the show command output of newer versions, starting with Charon-AXP/VAX 4.9 and Charon-PAR 1.10.
- **Network license:** indicates that a physical license is a network license
- **Number of processes:** maximum overall number of Charon instances that are allowed to run concurrently.
  This parameter is set by Stromasys to the value matching the respective customer contract. For network dongles, the maximum possible value of this parameter is determined by the type of network dongle. For example: on a NetTime10 dongle this parameter can be set to a value between 1 and 10 (depending on the customer contract). The type of dongle can be viewed via Sentinel ACC.

**Example with Time-Based Parameters**

The parameters below describe the following limitations to the emulator:

- License permits running up to 2 instances of Charon at the same time.
- License expires on May 31, 2020, **or** after 360 license checks (with an interval of 60 minutes between the checks).

```
Expiration date: 31/5/2020
Runtime counter: 360
Login interval: 60 minutes
Instances allowed: 2
```

If any of the conditions are no longer met (too many instances, past expiration date, all checks exhausted), the feature becomes invalid and will not allow an emulator instance (or an additional instance) to run.

# Emulator Requirements and Behavior

The emulator needs some license-related components to use a HASP license. They are briefly described below.

# Sentinel HASP Runtime Environment

**Sentinel HASP Runtime Environment Overview:**

The Sentinel HASP runtime environment is a lightweight software package provided by license vendor and customized by Stromasys.

**Important note**: to avoid unexpected problems, do not use any Sentinel runtime software that was not provided by Stromasys without being advised to do so by your Stromasys representative.

The Sentinel HASP runtime software is **part of Charon product installation kit** (on both Windows and Linux). It is installed with the respective Charon products. The installation of the Charon products is documented in the respective users' guides (see Documentation).

If you do not want to install a full Charon product (for example when running a dedicated license server), you can install just the license driver:

- **Linux:** use the license driver RPM(s) of a current Charon emulator product. The relevant parts are described later in this document.
- **Microsoft Windows**: use the Charon License Utility which is available free of charge from Stromasys.

The HASP runtime software **must be installed on every system handling licenses** – be it as a Charon host server, a system for license updates, or a (non-)dedicated license server. Depending on the Charon product version the HASP runtime software may not always be required on a client system to find remote network licenses provided by a license server. However, the HASP runtime software must always be installed to take full advantage of all product features and to avoid unexpected problems.

**Sentinel HASP Runtime Environment Additional Information:**

A web-based management tool – Sentinel Admin Control Center – is installed as part of the HASP runtime software. After the installation, this management interface can be accessed using a browser and opening the URL `http://servername:1947/_int_/devices.html,` where *servername* points to the system running Sentinel HASP runtime software (**localhost** for the local system). Using this management application, licenses can be displayed and updated.

The image below is an example of the web-based GUI (prior to HASP runtime version 7.60).
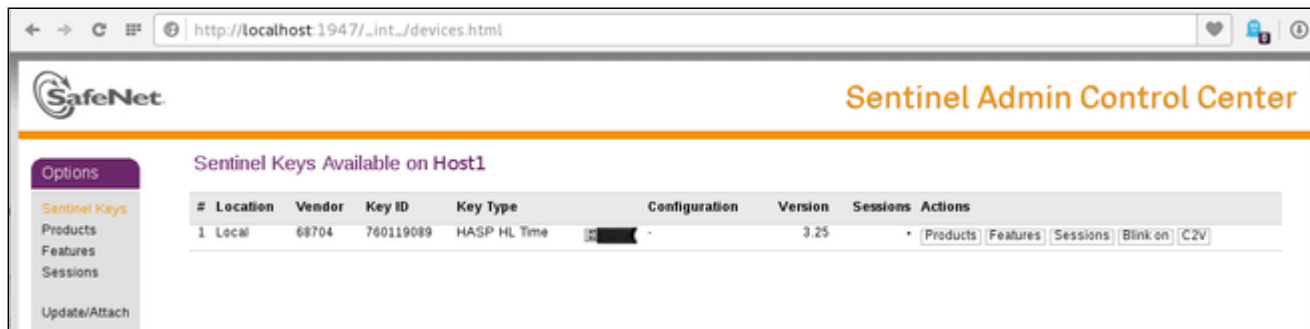
The image below shows an example of the web-based GUI starting with version 7.60.
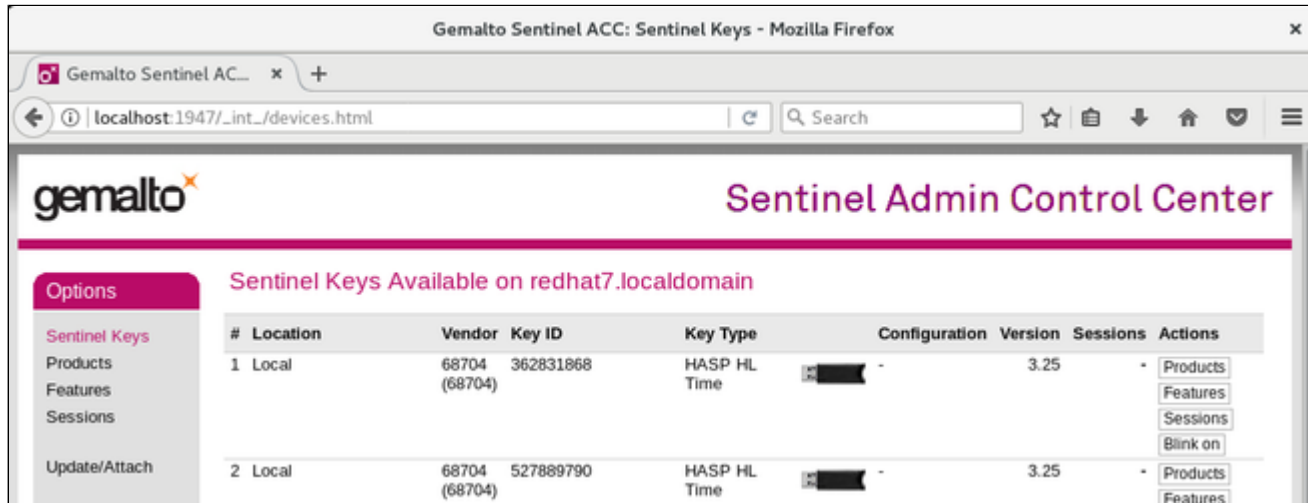


You can also go to the main page of Sentinel ACC by using the URL `http://servername:1947.` From there, you can display the key list by selecting the option *Sentinel Keys* on the left.

Details about the Sentinel Admin Control Center (ACC) are described later in the document.

# Emulator Behavior

This section describes the behavior of the emulator when identifying licenses and checking license validity.

## Identifying the License

The Charon emulator does not check the type of license available. It only verifies if a license is present and has the necessary characteristics that allow the emulator to run.

If more than one license is available, Charon will take the first one discovered. As this may lead to undesirable behavior, newer versions of the Charon emulator products have configuration parameters enabling a more deterministic license selection.

Charon production licenses are typically time restricted or unlimited. Backup licenses are typically limited by the number of license check executions (1 execution = 1 interval check). The initial check during the startup of the emulator counts as one execution. The default interval is 1 hour.The management of multiple keys is described in the section Handling Multiple License Keys and Product Licenses.

# Checking the License and Detecting Removed or Invalid Licenses

A Charon emulator product will not run without a valid license. For Sentinel HASP licenses (the topic of this guide) this license can be provided on a USB hardware dongle (a Sentinel HASP key) or as a software license bound to the hardware of the host system or the network license server. A loss or defect of a license will cause the emulator to stop.

To check the validity of a license, Charon performs the following steps:

- The Charon emulator checks the text block of the license to determine if it is allowed to run (if there is a product section which corresponds to the emulator).
- Then Charon checks the feature associated with the product to see if the feature is valid - that is, not expired, not counted to 0, and if there are still some instance-slots available to run the emulator.
- If there is no matching product section or if the feature is not valid, Charon reports the problem in the log and shuts down.

Charon products **check the availability of a valid license** at different points in time:

**1. At startup:**

> If no valid license is found, an error message will be written to the emulator log file and the emulator will not start.
>
> In some emulator products it is possible to configure the number of retries and the waiting time between them by adding parameters to the emulator configuration file. Please refer to the product documentation for the details regarding the relevant parameters:

- Charon-AXP/VAX: `license_key_lookup_retry` parameter
- Charon-PAR: `license_retry_period` and `license_retry_count` parameters (obsolete starting with version 1.10)
- For current Charon-SSP versions, a startup delay can be configured if the emulator is configured via the Charon Manager to be started with the host operating system start.

**2. At regular intervals** during the runtime of the emulator (the default license check period of 1 hour can be changed by Stromasys using the appropriate license parameters):

- If the previously used valid license has been removed, has disappeared, is defect, or has become invalid, the emulator will report the loss of the license in the log file and continue operation for a limited amount of time as described below.
- If there is another valid license, for example a backup license defined in the configuration file, it will be used.
- *Starting with Charon-AXP/VAX 4.9 and Charon-PAR 1.10*, Charon allows for a grace period of 12 hours during which the software checks for the presence of a valid license every 10 minutes until a valid license is found. If no valid license is found after the grace period has expired, the emulator will stop.
- *Earlier versions of the above products and other emulator products*: should there still be no valid license at the next regular license check (this default interval may be changed by individual Charon products), the emulator will stop.
- If a time-restricted license is used and it expires, the Charon instance tries to find its replacement automatically and, if found, proceeds using the replacement license.

**Important note for Windows installations**: any running emulators will be stopped if the license service is forced to stop despite existing service dependencies (i.e., running emulators). So any running guest systems must be cleanly shutdown before restarting the license service in order to avoid data loss. This is the behavior at the time of writing. It may change in future versions.

See Monitoring Licenses for more information about log file entries related to licensing problems.

# Operational Procedures Overview

## General Information

Stromasys issues Charon licenses for the customer. These licenses may be delivered to the customer directly or via an authorized Stromasys partner.

All Charon licenses are logged by Stromasys with end user and reseller/partner information. Charon licenses can be local or network, hardware or software licenses, they can be for a single product or a mix of product families (e.g., AXP and VAX). Products for different platforms (Windows, Linux) can be put on the same license.

This section briefly introduces the installation and update of licenses. Details are available in later sections of this document.

## Initial License Installation

Once the required drivers have been installed on a system, a license can be installed.

- Hardware Licenses are USB dongles that are simply plugged into an available USB port on the system.
- Software licenses require that a fingerprint of the system be taken that is then sent to Stromasys to create the license. The resulting license is then installed on the system using the license management tools.

## License Updates

Under certain circumstances existing licenses must be updated.

**License updates are required, for example, in the following cases**:

- Charon product version upgrade
- Product change
- License validity (time) extension

License updates, for example a new expiration date or a new execution counter, can be performed without interrupting operation, that is, without shutting down active Charon instances, **provided that the resulting license is valid for the running Charon instance**. If any parameters of the updated license are not valid for the running Charon instance (for example, the wrong model or version), the Charon instance will stop running.

Licenses are **backwards compatible to some extent**. A **license update to a more recent version** will allow some previous Charon versions to run as well. The details depend on the Charon product.

For the current licensing schema, the following rules apply regarding backward compatibility of a license:

If the **product version on the license is higher** than the one of the installed Charon version, **then**

- the license check on **Charon-AXP/VAX/PDP starting with version 4.4** will be successful if the major version (for example, the 4 in 4.7) is the same. In **version 4.3**, the emulator will start, but there are inconsistencies and incompatibilities especially in the associated tools (e.g., hasp_view). Product **versions 4.2 and earlier** are incompatible with the current license schema.
- the license check on **Charon-SSP** will be successful.
- the license check on **Charon-AXP/SMA** will normally accept the higher number on the license. **However, Charon-AXP/SMA emulator versions 2.2.x are incompatible with licenses for versions 2.3.x**, because Charon-AXP/SMA versions 2.3.x introduced the license checksum feature which is not understood by earlier versions. So an update of the license from 2.2.x to 2.3.x requires a corresponding product update, and a product downgrade from 2.3.x to 2.2.x also requires a corresponding license downgrade.
- the license check on **Charon-PAR** will be successful if the major version is the same.
  Please note: Charon-PAR version 2.0 and higher is **incompatible** with the license content of earlier product versions. Earlier product versions are incompatible with the license content of Charon-PAR 2.0 and higher. Charon-PAR 3.0 licensing again is **not compatible** with earlier versions.

**Please note**: the description above is based on the information available at the time of writing. The behavior may change in future versions. Please **always** check the release notes and the documentation of your product for any relevant changes that may impact the backward compatibility.

# Basic License Installation Steps

The basic steps to **update an existing** hardware or software license, or to **install a new software license** are as follows:

- Extract the C2V file (license characteristics to update an existing hardware or software license) or a fingerprint file (system characteristics needed to create a new software license).
- Send the C2V file to Stromasys.
- Receive the V2C file(s) from Stromasys.
- Apply the update.

The steps to update a license are described in detail in the section Installing and Updating a License.

# Emulator Product Overview

This section provides an overview of the different Charon emulator products available for Linux and Windows respectively. Details about every Charon emulator product can be found on the Stromasys product documentation page (Documentation).

## Products and Platforms

The following table shows the available emulator products and the platforms they run on.

**Please note** that this document only differentiates between the general platform types Linux and Windows. Please refer to the product documentation page to learn about the currently supported distributions and versions of the platform.

| Charon emulator product | Linux | Windows |
|---|:---:|:---:|
| Charon-AXP | x | x |
| Charon-AXP/SMA | | x |
| Charon-VAX | x | x |
| Charon-PDP | | x |
| Charon-SSP | x | Mgmt. interface only |
| Charon-PAR | x | |

## Products and Licensing Support

All products in their current version support local hardware USB keys, software licenses and network licenses.

Support for software licenses was added last. The following table shows the first product versions to fully support them:

| Charon emulator product | Software license support since |
|---|:---:|
| Charon-AXP | Charon-AXP V4.7 Build 171-01 |
| Charon-AXP/SMA | Charon-AXP/SMA V2.2.40 |
| Charon-VAX | Charon-VAX V4.7 Build 171-01 |
| Charon-PDP | Charon-PDP V4.8 Build 183-02 |
| Charon-SSP | from the beginning |
| Charon-PAR | Charon-PAR version 1.7.0 |

Some older versions of Charon-AXP and Charon-VAX/PDP can also use software licenses but may require manual intervention to do so. Contact your Stromasys representative or your VAR if you require a software license for versions prior to the ones listed above.

# Products and License Driver Versions

Different products are bundled with different license driver versions. Often, this is not visible to the user. However, with the change to license driver versions greater or equal to version 7.60, the ACC user interface has changed noticeably. The following table shows which products have the newer versions:

| License driver version | Charon emulator product |
|---|---|
| < 7.60 | Charon-AXP/VAX/PDP before version 4.9 |
| | Charon-SSP before version 3.0 |
| | Charon-PAR before version 1.10 |
| 7.63 and later | Charon-AXP/VAX for Linux starting with version 4.9 |
| | Charon-SSP starting with version 3.0 |
| | Charon-PAR version starting with 1.10 |

Another noticeable change for **Linux license driver versions** in the latest product versions was the **transition from the 32-bit license driver versions (*.i386.rpm) to the 64-bit versions (*.x86_64.rpm)**. The 64-bit versions no longer require the 32-bit glibc package. Typically, this change happened with license driver versions 7.103 and 8.13.

**Please always review** the product documentation of your Charon version for the exact version of the bundled license drivers.

# 🔶 License Management Tasks - Overview

The details of the following tasks are described in License Management Tasks - Details.

## Sentinel Software Installation Tasks

The Sentinel HASP runtime software must be installed on every system handling licenses – be it as a Charon host server, a system for license updates, or a (non-)dedicated license server. Depending on the Charon product version the HASP runtime software may not always be required on a client system to find remote network licenses provided by a license server. However, the HASP runtime software must always be installed to take full advantage of all product features and to avoid unexpected problems.

The necessary software is part of the individual Charon emulator product installation packages.

## License Installation and Update Tasks

Once the Sentinel HASP runtime software has been installed, licenses can be installed, used and updated. The necessary steps differ slightly between the different license types, but consist roughly of the following steps:

1. Generate a C2V file for an existing hardware or software license or a fingerprint file for a new software license. The resulting Customer-to-Vendor (C2V) file contains the license or system characteristics necessary for creating the license update or a new license. Please refer to Generating C2V and Fingerprint Files for details.
2. Send the C2V file to Stromasys. Stromasys will use the data to create the necessary license or license update. You will receive one (software license) or two (most hardware license updates) V2C file(s): the Vendor-to-Customer file. You will also receive a text file summarizing the license content. Please refer to Sending C2V File to Stromasys and Obtaining V2C File.
3. Apply the license data from the V2C file(s). This will install and activate your license or license update. Please refer to Applying/Updating License Data from V2C File(s) for details.

## Verifying License Details

The license details can be displayed using various graphical or command-line tools. Please refer to Viewing a License for details.

## Tasks Related to Network Licenses

Network licenses have additional requirements regarding firewall configurations and configuration of the Sentinel software. The required steps are described in Tasks Specific to Network Licenses.

## Miscellaneous Tasks

A license and the supporting Sentinel software can be removed from a system (see Removing a License and Removing the Sentinel Runtime Software).

Depending on the platform, there are different ways to monitor the license status (see Monitoring Licenses).

# User Rights Required for License-Related Tasks

The following table provides an overview of common tasks and the rights required to perform them:

| User Rights Required | | | | |
|---|---|---|---|---|
| **Action** | **All Charon host platforms** | | | |
| **Sentinel runtime installation, upgrade, and deinstallation** | Linux platforms: *root* user | | | |
| **Removing a software license** | Windows platforms: administrator rights | | | |
| **Action** | **Sentinel ACC** | **Linux command-line** | **Windows GUI\*** | **Charon-SSP GUI\*\*** |
| **Viewing licenses** | normal user | normal user | normal user | normal user |
| **Creating fingerprint** | n/a | normal user | normal user | normal user |
| **Creating C2V for update** | normal user | normal user | normal user | normal user |
| **Updating/attaching licenses (V2C)** | normal user | *root* user | normal user | normal user |

\* **Please note:** this is true for the individual license management tools. However, current Charon-AXP/VAX/PDP products on Windows platforms are managed using the Virtual Machine Manager (VMM) and all license management tools normally are also started from within VMM. VMM requires administrator privileges. Also the UAC function of Windows may require the user to enter an administrator password to start a program even if the action performed with the program would not require administrator rights.

\*\* The Charon-SSP Manager can be run by an unprivileged user. Privileged actions are performed by the Charon-SSP Agent that runs as a system process and receives the required commands from the Manager.

# License Management Tools - Overview

There are several different license management tools depending on the Charon emulator host system and the Charon emulator product. The following tools are discussed in detail in the section Tools Reference. The section License Management Tasks - Details shows how these tools are used to accomplish the specific task.

## Cross-Platform Tools

The web-based GUI – **Sentinel Admin Control Center** – is part of the Sentinel HASP runtime package. It is available on all systems on which this runtime software has been installed. Please refer to the Sentinel Admin Control Center section for details.

## Linux-Specific Tools

Tools available on Linux platforms include:

- Charon-AXP/VAX, Charon-SSP, and Charon-PAR:
  - hasp_srm_view – Used mainly to display license information and to export C2V and fingerprint files. The section hasp_srm_view provides more details.
  - hasp_update – Used mainly to apply V2C files for license updates. Please refer to hasp_update for details.
  - Charon license expiration check (Linux Toolkit component that can be used on all Linux-based Charon products).
- Charon-AXP/VAX:
  - Linux Toolkit – A comprehensive management interface for Charon emulator products on Linux. An overview of its licensing options and links to additional information are provided in the section Linux Toolkit.
- Charon-SSP:
  - Charon-SSP offers its own GUI-based management tool, the Charon-SSP Manager. As part of the Charon-SSP Manager, there are a GUI-based License Viewer, a License Update tool, and (starting with Charon-SSP version 2) a License Management tool. See License Management with Charon-SSP Manager for more information.

## Windows-Specific Tools

Tools available on all Windows platforms include:

- HASP View – Used to display license information. See HASP View Utility for more information.
- License Update Service (RUS) – A GUI-based tool for extracting C2V and fingerprint files and for installing and updating licenses. Please refer to License Update Utility (RUS) for more information.
- Charon License Utility – a separate utility available from Stromasys free of charge that facilitates the installation and management of license driver and licenses.

# License Management Tasks - Details

- Sentinel HASP Software Packaging and Installation Overview
- Installing and Updating a License
  - Generating C2V and Fingerprint Files
  - Sending C2V File to Stromasys and Obtaining V2C File
  - Applying/Updating License Data from V2C File(s)
- Viewing a License
  - Display Available Licenses with Sentinel Admin Control Center
  - Display License Content with Linux-Specific Tools
  - Display License Content with Windows-Specific Tools
- Removing a License
- Handling Multiple License Keys and Product Licenses
- Tasks Specific to Network Licenses
- Monitoring Licenses
- Removing the Sentinel Runtime Software

**Please note**: the sample outputs and screenshots used in the following sections are based on different emulator products and different software versions. So the outputs may differ somewhat from the emulator and version used by a customer. However, they should still provide a valid illustration of what the actual outputs may be.

# Sentinel HASP Software Packaging and Installation Overview

## Contents

## General Information

The software required to manage and use HASP licenses for Charon is included in every Charon emulator kit. It consists of

- the license drivers (the Sentinel HASP runtime software),
- and additional management utilities.

There are two **installation scenarios**:

- **If you plan to run a Charon emulator product on a system,** follow the installation steps listed in the respective user's guide (see Documentation). The user's guide of your emulator product will also lead you through the installation of the license drivers and the license management software. As part of the documentation for each Charon emulator product, you will also find a **release notes** document. The release notes contain important information about new features and restrictions of specific versions.
- **If you plan to use a system as a license server without running a Charon emulator product**, you can also install a full product package. **As an alternative**, the license-specific components can be extracted from the Charon emulator kit and installed separately (Linux), or they can be installed using the Charon License Utility (Windows).

The following sections provide more **detail on the license-specific packages** included in the respective Charon emulator kits for Linux and Windows.

Please refer to the respective product user's guides for full details on how to install these packages (see Documentation) or the full Charon emulator product.

**Important information for software upgrades:**

- Upgrading to new versions of Charon products requires a license update. Please contact your VAR or Stromasys representative to plan the update.
- Additional information for software licenses: new versions of Charon products contain a new Sentinel license runtime version 7.63 or higher provided by the license vendor (aksusbd package). The new version contains important updates. However **older software licenses** are not compatible with the new version. Upgrading to the new version of the runtime software in most cases requires the installation of a new software license (instead of just an update).
- Downgrading to an older license runtime version from version 7.63 or later can also cause the invalidation of a software license.
- Before an upgrade to the newer Sentinel runtime version, contact your VAR or Stromasys representative to discuss the best way to upgrade.
- A product upgrade may also contain changes to the HASP licensing components impacting compatibility between newer emulator products and license formats created for older products. This is not a frequent occurrence, but please always check the release notes for possible caveats.

**Please note**: To avoid unexpected problems, do not use any Sentinel runtime software that was not provided by Stromasys without being advised to do so by your Stromasys representative.

# License Drivers in Standalone Mode on Linux

This section describes the necessary steps to install the Sentinel HASP runtime software and additional management utilities on a Linux system without installing a complete emulator product. This involves extracting the license specific packages from a full product kit and install them on your Linux system.

## Sentinel HASP Runtime Packages in Charon Product Kits for Linux

All Charon product kits contain the necessary licensing software components. Below, you find an overview of these components for all Linux-based Charon products.

- **If you plan to install a complete Charon emulator product**, please consult the appropriate user's guide on the Stromasys Documentation page.
- If you plan to install the **Charon license drivers on a system that will not host emulator products,** you can install the full product or just use the license-specific packages contained in the complete product kit. Their installation is also described in the product-specific user's guides.

Even though every Charon emulator product kit contains the license specific software components, the packaging is not exactly the same for all products.

The following table provides an overview of the relevant packages in the individual kits at the time of writing:

| Charon emulator product | Licensing packages |
|---|---|
| Charon-AXP | aksusbd-<*version*>.i386.rpm **or**<br>aksusbd-<*version*>.x86_64.rpm (starting from version 4.11)<br><br>charon-license-<*version*>.x86_64.rpm |
| Charon-VAX | aksusbd-<*version*>.i386.rpm **or**<br>aksusbd-<*version*>.x86_64.rpm (starting from version 4.11)<br><br>charon-license-<*version*>.x86_64.rpm |
| Charon-SSP | aksusbd-<*version*>.i586.rpm **or**<br>aksusbd-<*version*>.x86_64.rpm (starting from version 4.2)<br><br>charon-agent-ssp-<*version*>-x86_64.rpm |
| Charon-PAR before version 1.10 | No separate packages; part of the tar-archive providing the kit. The Sentinel HASP drivers need to be installed by executing a separate script provided in the kit. |
| Charon-PAR version 1.10 and higher | aksusbd-<*version*>.i386.rpm **or**<br>aksusbd-<*version*>.x86_64.rpm (starting from version 3.0) |

**Package content**:

- The **aksusbd** package contains the *aksusbd* and *hasplmd* daemons which make up the runtime environment. If packaged with the Charon-SSP kit, it also contains the required *haspvlib* libraries.
- Charon-AXP/VAX: the **charon-license** package contains the *hasp_srm_view* and *hasp_update* utilities and the required *haspvlib* libraries.
- Charon-SSP: the **charon-agent-ssp** package contains the *hasp_srm_view* and *hasp_update* utilities.
- Charon-PAR: the license management utilities and the required *haspvlib* libraries are included in the Charon-PAR emulator RPM.

The above packages can be installed independently of the overall product to provide the Sentinel HASP runtime environment (standard RPM package installation; prerequisite for *.i586 and *.i386 packages: glibc.i686).

**Please note:** the Charon-SSP packages containing the licensing software components are not recommended for a standalone installation because they also contain SSP-specific additional functionality that would need to be disabled for a standalone installation.

# Installation Overview for License Packages on Linux

If the Charon license is a network license (red USB dongle or software license), you can either connect it to the Charon host USB port (to use it locally and provide it to other hosts on the local network at the same time) or to install it on a dedicated network license server that will serve the license to license clients.

Basic installation steps overview for a standalone installation (**example based on the Charon-AXP/VAX packages**):

- Copy aksusbd*.rpm and charon-license-<*version*>.x86_64.rpm (see above) to the system on which they will be installed, for example to */tmp*.
- Login as "*root*" on the server.
- Switch to the directory containing the packages.
- Install the RPM packages using **yum** (RHEL/CentOS 7.x) or **dnf** (RHEL/CentOS 8.x).
  Example:
  **# cd** */tmp*
  **# yum install** *aksusbd*.rpm charon-license-*.rpm*
- If using an USB dongle, connect the dongle to one of the available USB ports of the license server.
- If using a Software License, create a fingerprint of the license server system.

**Please refer to the the respective product user's guides for a complete description of the prerequisites, the installation steps, and the supported Linux versions and distributions.**

# License Drivers in Standalone Mode on Microsoft Windows

This section provides an overview of the necessary steps to install the Sentinel HASP runtime software on a Windows system without installing a complete Charon emulator product.

The recommended tool for installing the standalone license drivers on Microsoft Windows is the **CHARON on Windows - Charon License Utility**.

## Charon License Utility for Microsoft Windows

**Previously**, this involved  extracting the license specific packages from a full product kit and install them on your Microsoft Windows system.

**Now**, Stromasys provides a **Charon License Utility**. It is highly recommended to use this utility instead of the manual method. The Charon License Utility provides the following functions:

- Install/Uninstall Sentinel LDK License Manager (driver and service)
- Open the Sentinel Admin Control Center
- Display license content (also via RDP connection),
- Update license utility
- Start/stop Sentinel LDK License Manager service
- Easy software license removal

**The Charon License Utility is available free of charge and available for download from Stromasys**. Please contact your Stromasys representative if you need information about the download link.

The following sections are retained for information purposes. However, it is no longer the recommended way of installing the standalone license drivers on Windows.

## Deprecated Standalone License Driver Installation Method

### Sentinel HASP Runtime Packages in Charon Product Kits for Windows

All Charon product kits contain the necessary licensing software components. Below, you find an overview of these components.

- **If you plan to install a complete Charon emulator product**, please consult the appropriate user's guide on the Stromasys Documentation page.
- If you plan to install the **Charon license drivers on a system that will not host emulator products**, you can install the full product or just use the license-specific packages contained in the complete product kit. There installation is also described in the product-specific user's guides.

The license driver components for a standalone installation are provided in the Charon-AXP and Charon-VAX product kits for Windows in **separate zip-files included in the installation kit.** These files can be extracted and used to install the license driver components on a system that does not need the full Charon product installation, for example on a license server. The installation steps for these license-specific components are described in the respective product user's guide on the Stromasys Documentation page.

License driver components in the Charon-AXP/VAX product kits:

- Unpack the zip-file containing the Charon installation kit.
- Enter the folder with the unpacked kit.
- Go to the sub-folder hasp_install. It contains the zip-archive with the command-line tool for installing the Sentinel runtime software components. In Charon-AXP/VAX versions before version 4.9, the zip-file is called `Sentinel_LDK_Run-time_cmd_line_<version>.zip`. In Charon-AXP/VAX versions 4.9 and later it is called `haspdinst.zip`.
- Charon-AXP/VAX kits starting with version 4.9 have an additional zip-file: `hasplib.zip`.

**Please note**:

- The license driver zip-files contained in the Charon product kits for Windows does not contain the additional utilities to view and update licenses. If you need these utilities, either use the RUS_OQEDC and hasp_view programs from the unpacked product kit or install the full Charon product kit.
- Charon-AXP/SMA does not include a separate license driver zip-file.

## Installation Overview for License Packages on Microsoft Windows (Deprecated)

If the Charon license is a network license (red USB dongle or software license), it is possible either to connect it to the host USB port (to use it locally and provide it to other hosts on the local network at the same time) or to install it on a local network license server for remote access from this particular host.

If a remote license server is to be used:

- Copy the file "`hasp_install\haspdinst.zip`" from the CHARON distribution to any directory on the server, for example "`C:\Temp`".
- Extract the contents of this archive to the same directory.
- Login as "Administrator" on the server and open "`cmd.exe`" from the "Start" menu.
- Switch to that directory.
- Install the extracted file:
  Example:

```
...> cd c:\temp
c:\temp> haspdinst.exe -fr -kp -nomsg
c:\temp> haspdinst.exe -install -cm
```

- Copy the file "`hasp_install\hasplib.zip`" from the CHARON distribution to any directory on the server, for example "`C:\Temp`".
- Extract the contents of this archive to the same directory.
- Copy the file "`haspvlib_68704.dll`" to "`C:\Program Files (x86)\Common Files\Aladdin Shared\HASP`" (in case of x64 host) or "`C:\Program Files\Common Files\Aladdin Shared\HASP`" (in case of x86 host)
- If using an USB dongle, connect the dongle to one of the available USB ports of the license server.

**Please refer to the the respective user's guides for a complete description of the prerequisites, the installation steps and the supported Linux versions and distributions.**

## Post-Installation Tasks

The following post-installation tasks are strongly recommended to improve security and to enable additional trouble-shooting options:

- Protect remote access to the Sentinel Admin Control center: see Security Settings for Sentinel Admin Control Center
- Enable access and error logging for the license driver: see Enabling logging in Sentinel Admin Control Center

# Installing and Updating a License

Once the Sentinel HASP runtime software has been installed, licenses can be installed and updated on the system. The following sections

- Generating C2V and Fingerprint Files
- Sending C2V File to Stromasys and Obtaining V2C File
- Applying/Updating License Data from V2C File(s)

describe the necessary steps to accomplish these tasks. Before continuing to these sections, please read the short overview of the installation and update tasks for the different license types below.

## License Installation and Update Overview

### Hardware License Installation

Hardware licenses are simply inserted into a free USB port of the system they should be connected to. To verify that the license is available to the system, use the steps described in Viewing a License. **The hardware license should be inserted after the software has been installed**. Should you have inserted the USB dongle before installing the software and the license is not visible, please remove and reinsert the USB dongle.

### Software License Installation

For the installation of a **new** software license, create a fingerprint file as described in Generating C2V and Fingerprint Files. This file is sent to Stromasys to request a new software license. Once the requested license data is received, follow the steps in Applying/Updating License Data from V2C File(s).

### Network License Installation

On the license server, the network-enabled hardware or software license is installed in the same way as it would be for a local installation. To serve the license to clients over the network, the additional steps described in Tasks Specific to Network Licenses may be required. The Sentinel HASP runtime software should also be installed on the client systems to take advantage of all product features and to avoid unexpected problems.

### License Update Overview

For a license update, the steps are almost identical for hardware and software licenses. They are described in the chapters: Generating C2V and Fingerprint Files, Sending C2V File to Stromasys and Obtaining V2C File and Applying/Updating License Data from V2C File(s). Any changes to a new hardware license are treated as license updates as well.

# Generating C2V and Fingerprint Files

The Customer-to-Vendor (abbreviated C2V) file or a fingerprint file (also in C2V format) is used to provide the necessary information to Stromasys

- to **update an existing hardware or software license**, or
- to create a **new software license** respectively.

**Please note**: even if a hardware license (USB dongle) is installed for the first time, it is treated as an existing license.

This section covers the following aspects:

- Overview and Preparation
  - C2V File Creation Workflow
  - Verifying Sentinel Runtime Software State
  - Check for Available Licenses
- New Software License - Create a Fingerprint File
  - Creating a Fingerprint File on Linux
  - Creating a Fingerprint File on Microsoft Windows
- Existing Hardware or Software License Update - Create a C2V File
  - Creating a C2V File Using the Sentinel Admin Control Center (ACC)
  - Creating a C2V File Using Linux-Specific Tools
  - Creating a C2V File Using the License Update Utility on Windows

## Overview and Preparation

This section provides an overview of the workflow for creating a C2V file. It also describes some steps to be performed before creating the C2V file.

### C2V File Creation Workflow

There are **two different cases** that need to be handled differently when creating a C2V file:

- Preparing to request a **new software license**.
- Preparing to request an update for an **existing hardware or software license**.

**Please note**:

- Even if a hardware license (USB dongle) is installed for the first time, it is treated as an existing license.
- Some steps mentioned in the flowchart use the *hasp_srm_view* (Linux) or *hasp_view* (Windows) command. Unless a workaround is employed, these commands only work using a local connection to the system (that is, remote connections via RDP to Windows, or via SSH to Linux will cause problems). Possible workarounds for using remote connections are described in the detail sections of the individual tasks.

The following flowchart provides an overview of the workflow on Charon emulator products. The steps in the flowchart are explained in more detail below.
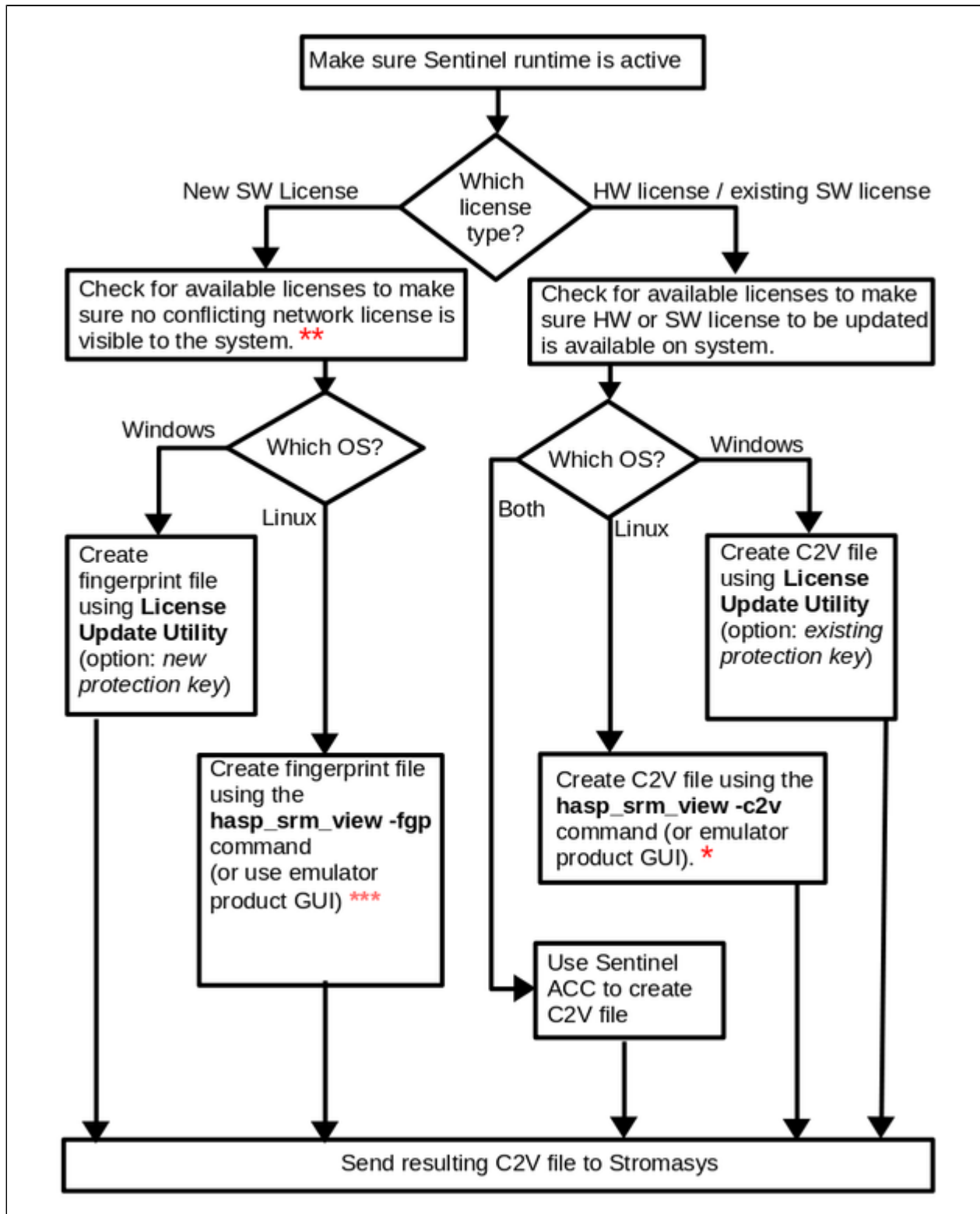


* Newer versions (starting with Charon-SSP version 2.0.1, Charon-AXP/VAX 4.8 Build 18302 for Linux, Charon-PAR 1.10) allow the **-key** parameter of the **hasp_srm_view** command to select between different available licenses when creating a C2V file. This selection is not possible in earlier versions, hence non-relevant license keys have to be temporarily removed or disabled when using the command in these older versions.

** Charon-AXP/VAX for Linux before version 4.9, Charon-PAR before version 1.10, and Charon-SSP before version 4.0 cannot create a fingerprint file if a remote network license (network-enabled dongle or software license) is visible to the system. Hence, these licenses must be temporarily removed or disabled when creating a fingerprint in such versions.

*** If using the **Charon-SSP GUI before version 5.x**, remove any hardware dongles first. Otherwise, the GUI will create an update C2V for an existing dongle.

Both paths, for new software license and for existing license, lead to the creation of a C2V file. However, in the case of a new software license, this file contains the fingerprint (or ID) of the current system. In the case of an existing hardware or software license, the file contains the characteristics of the existing license needed to update this license. To make the difference clear, the term **fingerprint** file will be used for new software licenses and **C2V** for updates of existing licenses respectively.

**Please note**:

- If the C2V file is not created using the appropriate steps for a new or existing license, Stromasys will not be able to create the correct license and the procedure will have to be repeated.
- If you use a license server, the steps described in this section must be performed on the license sever.
- Do not use Sentinel ACC to create a fingerprint for a new software license. The resulting file has a format that is incompatible with the Stromasys license creation tools.

## Verifying Sentinel Runtime Software State

The Sentinel license drivers (processes) must be active before any license related commands are executed. They must be active even for generating a valid fingerprint file for a new software license. Hence, it should be verified that the necessary processes are running, especially if there are any errors when trying to perform the tasks described in this chapter.

The following table shows typical error messages if the license drivers are not active:

| Typical errors observed if license drivers (aksusbd and/or hasplmd) are not active | |
|---|---|
| Error message when trying to **display a local license** (and network license in older products) using the Linux command-line tool or the Windows GUI | |
| Linux | `Sentinel HASP key not found or of improper type (33)` <br><br> **or** <br><br> `Sentinel HASP key not found or of improper type (7)` |
| Windows | `No HASP key detected` |
| Error message when trying to **create a fingerprint** file using the Linux command-line tool or the Windows GUI | |
| Linux (if running **versions lower** than Charon-AXP/VAX 4.9, Charon-PAR 1.10, or Charon-SSP 4.0) | `Can not retrieve the C2V (host fingerprint mode) data` <br><br> (some versions have a cosmetic bug causing the message to be misspelled as <br><br> `Can not retrive the C2V (host fingerprint mode) data`) |
| Linux (if running **versions equal to or higher than** Charon-AXP/VAX version 4.9, Charon-PAR version 1.10, or Charon-SSP 4.0) | The fingerprint file will be written without error message but its **contents will not be valid** (check: a valid fingerprint must contain the string " SL-AdminMode"). |
| Windows | The fingerprint file will be written without error message but its **contents will not be valid** (check: a valid fingerprint must contain the string " SL-AdminMode"). |
| Starting with Charon-SSP 5.2.6, Charon-PAR 3.0.4, and Charon-AXP/VAX 4.12 | If the license driver is not active, hasp_srm_view will stop with an error message similar to the following: <br><br> `The fingerprint does not contain the data required by the Stromasys licensing concept.` <br> `The possible reason: aksusbd not installed or not running.` |

Please refer to section Sentinel Runtime Software State in the Troubleshooting section for details.

**Please note**: the Charon-SSP Manager provides a GUI to manage licenses. Problem symptoms (e.g., invalid fingerprint files) will be the same as described above for Linux-based systems.

## Check for Available Licenses

To verify which licenses are available on the system, you can use any of the following:

- The Sentinel Admin Control Center (ACC)
- The license display programs on Windows and Linux
- The emulator-specific GUI.

Please refer to section Viewing a License for detailed instructions.

Before creating a fingerprint file to request a **new software license**: if running an old product version (lower than Charon-AXP/VAX version 4.9, Charon-PAR version 1.10, or Charon-SSP 4.0), make sure that there are no conflicting licenses available to the system. In particular, remote network licenses can cause conflicts for older emulator versions.

Before creating a C2V file to request an update to an **existing license**: make sure the license to be updated is attached to the system. Please refer to Viewing a License for details.

**Please note**: if an existing license interferes with the action of generating a fingerprint or C2V file, it can be **temporarily removed or disabled**. Refer to section Removing a License for more information.

# New Software License - Create a Fingerprint File

This section describes how to create fingerprint files which are needed to request a new software license.

## Creating a Fingerprint File on Linux

To request a new software license, you need to create a fingerprint file of the system on which the license is to be installed. The generated file has the extension ".c2v", but its contents and structure are different from the C2V files generated to update licenses.

On Linux-based Charon products, you can use the command-line tools to create a fingerprint file. Do not use Sentinel ACC to create a fingerprint for a new software license. The resulting file has a format that is incompatible with the Stromasys license creation tools.

For all Linux-based products, execute the following command to create the fingerprint file:

```
$ hasp_srm_view -fgp <filename.c2v>
```

The fingerprint will be written to the filename specified. If the command is not in the **PATH** variable of the user, the full path must be provided.

The full paths to the command are listed in the following table:

| Charon emulator product | Path to Commands |
| --- | --- |
| Charon-SSP | `/opt/charon-agent/ssp-agent/utils/license/hasp_srm_view` |
| Charon-PAR before version 1.10 | Installation directory |
| Charon-AXP/VAX, Charon-PAR version 1.10 and later | `/opt/charon/bin/hasp_srm_view` |

**Please note**:

- Charon-AXP/VAX before 4.9, Charon-PAR before 1.10, and Charon-SSP before 4.0: the above command will terminate with the error message "`Can not retrieve the C2V (host fingerprint mode) data`" or with (cosmetic bug) "`Can not retrive the C2V (host fingerprint mode) data`" if a remote network license is visible to the system. Access to these licenses must be temporarily disabled before creating the fingerprint file on such product versions. Please refer to section Tasks Specific to Network Licenses and section Removing a License for details.
- Newer versions can create a fingerprint file even in the presence of a remote network license (i.e., a red network-enabled dongle or a software license).

The commands described in this section also work on Charon-SSP. However, the Charon-SSP emulator product has its own GUI, the Charon-Manager, which also includes a license update tool that can create a fingerprint file. Please refer to the section License Management with Charon-SSP Manager for more information.

## Creating a Fingerprint File on Microsoft Windows

Perform the following steps to create a fingerprint file on Microsoft Windows:
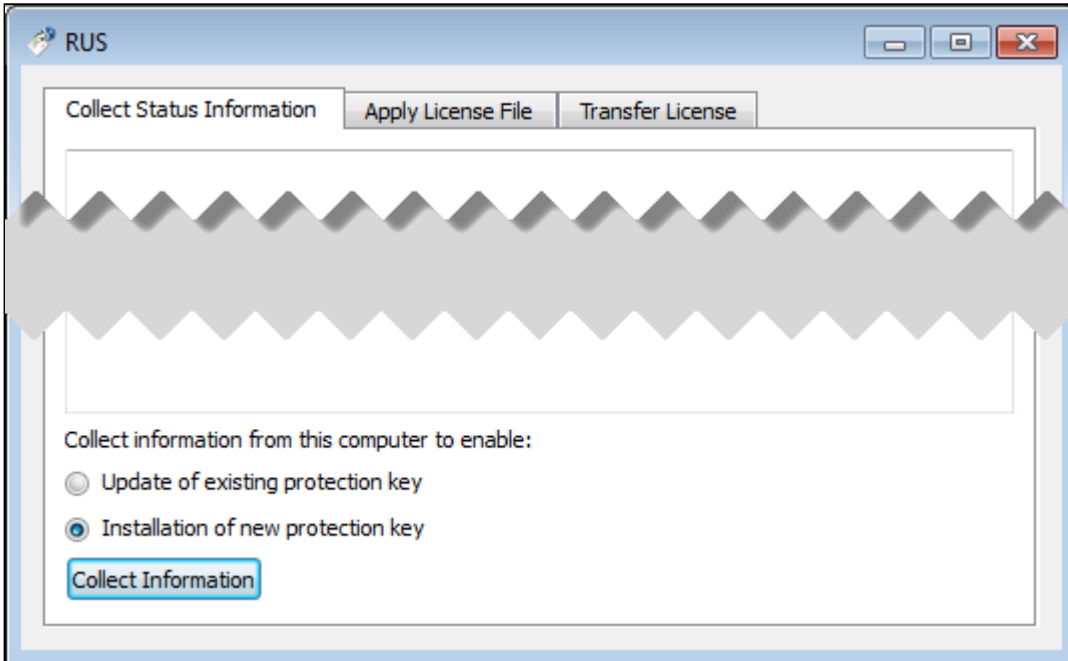
**Step 1**: start the License Update Utility

A fingerprint file on Windows is created using the License Update Service (also called HASPRUS). This tool is started in different ways, depending on which Charon product is used. Please refer to License Update Service (RUS) in the Tools Reference section for detailed information about this step.

**Step 2**: create the fingerprint file

The license update utility (HASPRUS) looks the same, independent of the product variant used.

The following image shows the **necessary options** for creating a fingerprint file: select the tab **Collect Status Information** and the option **Installation of new protection key**.



After pressing the **Collect Information** button, you will be prompted to enter a location for storing the fingerprint file. Select a location and filename and save the file.

Once a software license has been installed, current versions of the license update utility do not allow you to create another fingerprint without (temporarily) removing the installed software license. Therefore, save the created fingerprint file in case you need to create an additional software license for the same system (this will be the exception because in most cases the existing license can be updated with the required information). If you don't have the fingerprint file anymore and cannot create a second fingerprint because there is already a valid software license installed, please contact your Stromasys representative or VAR. If you have an obsolete/invalid software license on your system, you can remove it as described in Removing a License.

# Existing Hardware or Software License Update - Create a C2V File

The topics in this section describe how to create the C2V file needed to request an update of an existing hardware or software license.

**Please note**:

- Even if a hardware license is installed for the first time, it is treated as an existing license.
- The above is true even if a USB dongle should be empty (no license information detected).

The C2V file can be created in several ways as described below.

## Creating a C2V File Using the Sentinel Admin Control Center (ACC)

You can create a C2V file using the Sentinel ACC.

**Please note**:

- The C2V option in Sentinel ACC is **not available** in some older versions of the software. If this is the case, use the operating system and emulator specific tools for this task.
- **Starting with ACC version 7.60**, the option to create C2V files for USB dongles must first be enabled in the basic configuration section (under the Configuration menu item).

In order to **identify the Sentinel ACC version** and with it the available features, you can click on the **About** menu item on the left-hand side of the Sentinel ACC window. Also, versions starting from version 7.60 are easily recognized by the different color scheme and the name **gemalto** at the top of the page. The basic steps to create a C2V file using Sentinel ACC are the same in the old and the new version.

**Follow the steps below to create the C2V file:**

1. Open the web-browser on the **Sentinel Key** page of the Sentinel ACC (URL: **http://localhost:1947/_int_/devices.html**):

Old version:
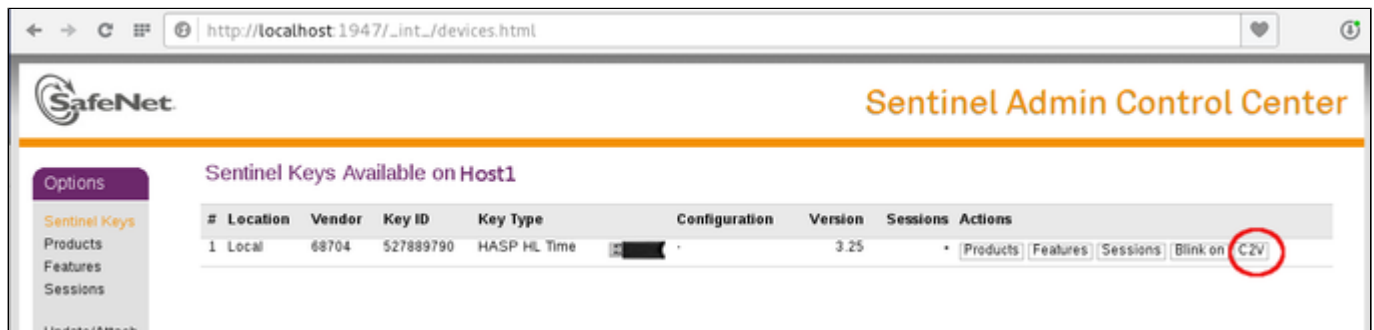


New version:
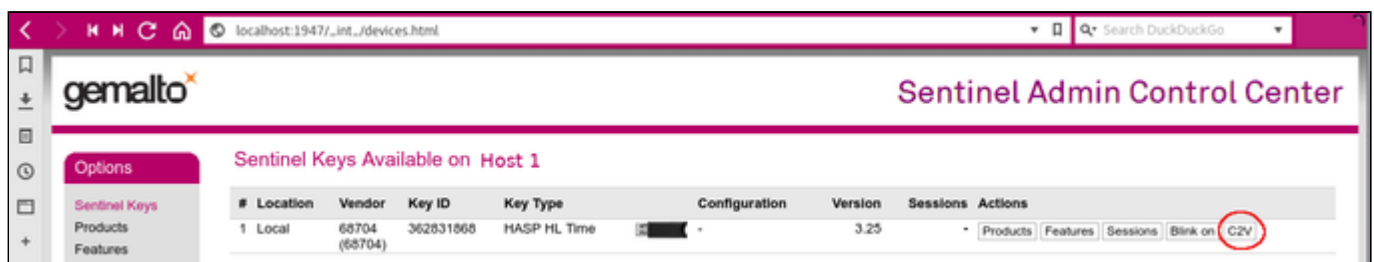


2. Click on the option **C2V** at the right-hand side of the window for the key you plan to update.

3. A new screen will be displayed to download the C2V file:

Old version:
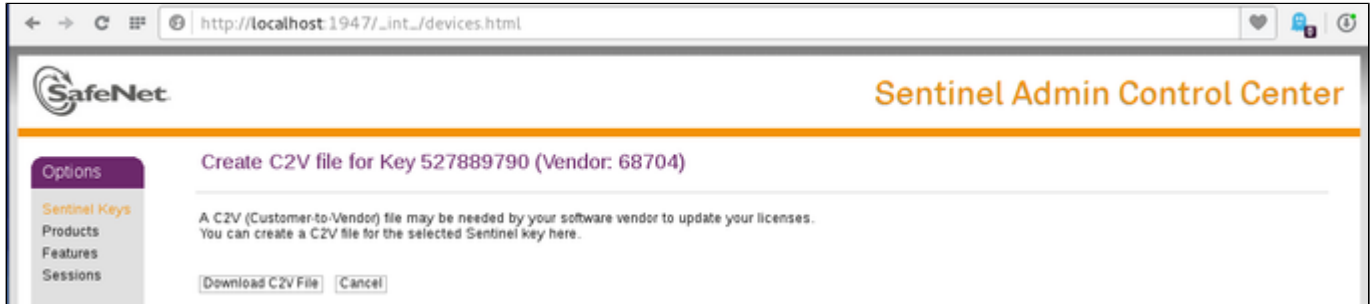


New version:
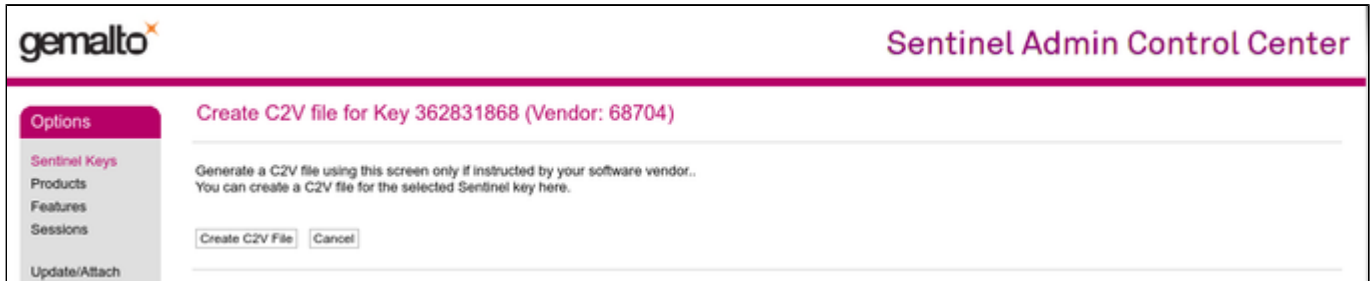


4. Click on **Create/Download C2V File** and save the C2V file.

**Please note**: you can also use the Sentinel ACC to retrieve the C2V file of a license connected to a different system. To do this, use the name of the target system instead of localhost in the URL.

- The C2V file will be stored on the system on which you start the browser.
- Remote access to the Sentinel ACC of the target system must be enabled (see Security Settings for Sentinel Admin Control Center).
- The firewall settings must allow access to the Sentinel ACC of the target system over the network (TCP port 1947 must be open).

## Creating a C2V File Using Linux-Specific Tools

To request a license update, you need to create a C2V file on the system on which the license is currently installed. The resulting file contains the information Stromasys needs to issue a license update. Before you create a C2V file, make sure the license that needs to be updated is available to the system, as described above.

On Linux-based Charon products, you can use the command-line tools to create a C2V file. The commands described in this section also work on Charon-SSP. However, the Charon-SSP emulator product has its own GUI, the Charon-Manager, which also includes a license update tool that can create a C2V file.

For all Linux-based products, execute the following command to create the C2V file:

```
$ hasp_srm_view -c2v <filename.c2v>
```

If there is more than one license visible to the system, newer product versions (starting from Charon-SSP 2.0.1, Charon-AXP/VAX 4.8 Build 18302, Charon-PAR 1.10) allow selecting a specific license using the **-key** parameter:

```
$ hasp_srm_view -key <license-id> -c2v <filename.c2v>
```

The C2V file will be written to the filename specified. If the command is not in the PATH variable of the user, the full path must be provided.

**Please note**: the license content cannot be read if you are connected to the system via a **remote connection (for example, ssh)**. The **hasp_srm_view** command will return an error.

You can use the following workaround:
```
$ ssh localhost /opt/charon/bin/hasp_srm_view -c2v <filename>
```

The full paths to the command are listed in the following table:

| Charon emulator product | Path to Commands |
| --- | --- |
| Charon-SSP | `/opt/charon-agent/ssp-agent/utils/license/hasp_srm_view` |
| Charon-PAR before version 1.10 | Installation directory |
| Charon-AXP/VAX, Charon-PAR version 1.10 and later | `/opt/charon/bin/hasp_srm_view` |

**Please note**: in older product versions, the **hasp_srm_view** command cannot be instructed to select a particular key for creating the C2V file. The **-key** parameter in these versions is only honored when displaying a license, but not for creating a C2V file. The **hasp_srm_view** command will select one of the available licenses to create a C2V file. This selection cannot be influenced. If you are running a Charon product with this restriction and more than one license is visible to the system, either use Sentinel ACC to create the C2V file for the correct license key or disconnect the other licenses temporarily (this may cause problems for emulators running on the system).

## Creating a C2V File Using the License Update Utility on Windows

**Step 1**: start the License Update Utility.

A C2V file on Windows is created using the License Update Utility (also called HASPRUS). This tool is started in different ways, depending on which Charon product is used. Please refer to License Update Service (RUS) in the Tools Reference section for detailed information about this step.

**Step 2:** create the C2V File.

The License Update Utility (HASPRUS) looks the same, independent of the product variant used.

The following image shows the **necessary options** for generating a C2V file for an existing license: select the tab **Collect Status Information** and the option **Update of existing protection key**.
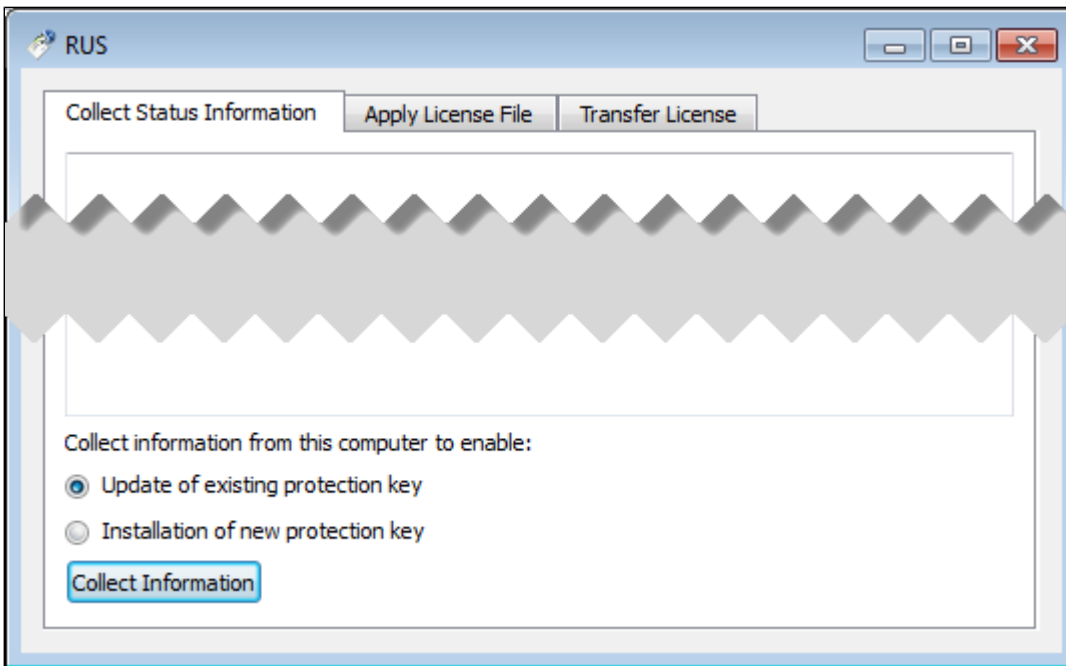


After pressing the **Collect Information** button, you will be prompted to enter a location for storing the C2V file. Select a location and filename and save the file.

If there is more than one license key available on the system, the tool will allow you to select the appropriate key to update as shown in the screenshot below:
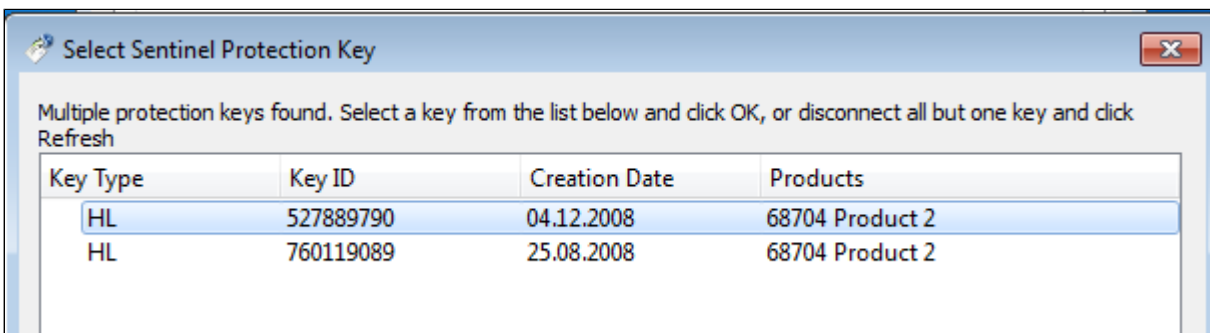
# Sending C2V File to Stromasys and Obtaining V2C File

## Sending C2V or fingerprint file to Stromasys

In order to receive a new software license or a license update from Stromasys, you must send the **C2V or fingerprint file** created in Generating C2V and Fingerprint Files to the **Stromasys Orders Administration** department.

**Stromasys will provide you with the current email address to which you can send the file.**

## Obtaining V2C file from Stromasys Order Administration

Stromasys Order Administration will create either a new software license or an update for the existing license depending on the C2V file received. They will return one or more V2C files (Vendor-to-Customer), which contain(s) the required data. You will also receive a text file with a description of the license content.

**Important**:

- If a hardware USB key is to be updated, you will in most cases receive **two** files: a **\*_fmt.v2c** file and a **\*.v2c** file. The \*_fmt.v2c file formats the dongle and the \*.v2c file contains the updated license data.
- In such cases the **\*_fmt.v2c** file must be applied **first**.

Details about importing the V2C file(s) are described in Applying/Updating License Data from V2C File(s).

**Save the received V2C file(s)** to the filesystem of the system where the license will be installed or updated, before proceeding to the next step.

# Applying/Updating License Data from V2C File(s)

After sending the C2V file to Stromasys Orders Administration and receiving one or more V2C files from Stromasys, the file(s) must be installed on the emulator host system or the license server. This section describes the steps of this task:

- Applying V2C Files Using the Sentinel Admin Control Center
- Applying V2C Files Using Linux-Specific Tools
- Applying V2C Files Using the License Update Utility on Windows
- Verifying the License

For recent product versions, the license update can be performed without interrupting the operation of the Charon instance. Please refer to the release notes of your product version to determine if this applies to your version. Charon will normally recognize the updated license at the next periodic license check and start to use it.

**Please note**:

- In most cases, the update of the V2C file(s) will be performed on the system where the license is to be installed. However, the license update for a **hardware license** can be performed on any system where the license drivers are installed. After the license update, the USB dongle can be moved to the target system. This is **not possible** for software licenses. However, for both software and hardware licenses updates for licenses on a remote system can be performed via the Sentinel ACC web GUI (if the connection to the remote system is allowed).
- Before continuing with the steps below, make sure the relevant V2C file(s) are stored on the filesystem of the system where the license will be installed or updated.

**Important**:

- If a hardware USB key is to be updated, you will in most cases receive **two** files: a **\*_fmt.v2c** file and a **\*.v2c** file. The \*_fmt.v2c file formats the dongle and the \*.v2c file contains the updated license data.
- In such cases the **\*_fmt.v2c file** must be applied **first**.

# Applying V2C Files Using the Sentinel Admin Control Center

The steps described in this section are the same for the older Sentinel ACC versions and the newer (greater or equal 7.60) versions.
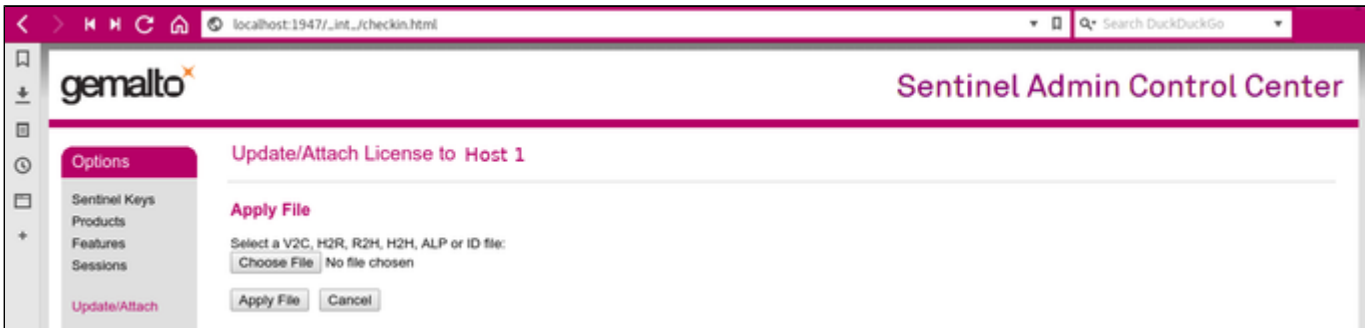
To use the Sentinel ACC on the local system to apply V2C files, open the URL **http://localhost:1947/_int_/checkin.html** (this is the link for the option **Update/Attach**).

The page displayed will be similar the following images:

Old version:
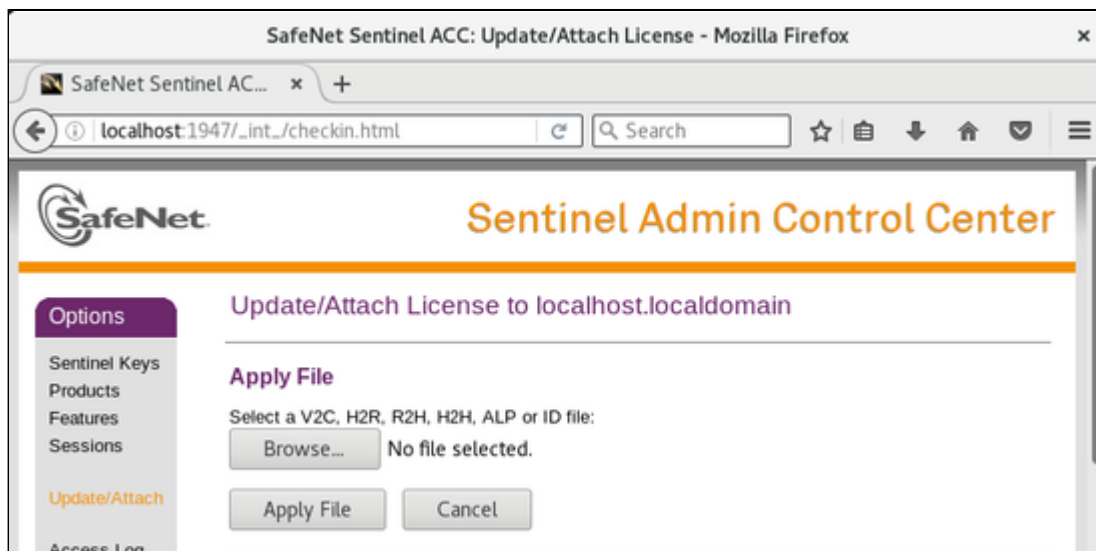
New version:



Click on the button **Browse** (or **Choose File** depending on products/version) and select the appropriate file in the file browser window that opens.

Click on **Apply File** to apply the V2C file. If you received two files, start with the *_fmt.v2c file and repeat the step for the second .v2c file.

**Please note:** you can also use this method to update a license connected to a different system. To do this, use the name of the target system instead of localhost in the URL and take the following points into account:

- The V2C file(s) must be located on the system on which you start the browser.
- Remote access to the Sentinel ACC of the target system must be enabled (see section Security Settings for Sentinel Admin Control Center).
- The firewall settings must allow access to the Sentinel ACC of the target system over the network (TCP port 1947 must be open).

## Applying V2C Files Using Linux-Specific Tools

In addition to the Sentinel ACC, the command **hasp_update** can be used on Linux to apply V2C files.

The following example shows the use of the **hasp_update** command:

```
# hasp_update u /path/filename.v2c
```

If you received two V2C files, perform this command for both files (remember to **first** apply the *_fmt.v2c file).

The full paths to the command are listed in the following table:

| Charon emulator product | Path to Commands |
|---|---|
| Charon-AXP/VAX, | `/opt/charon/bin/hasp_update` |
| Charon-SSP | `/opt/charon-agent/ssp-agent/utils/license/hasp_update` |
| Charon-PAR before version 1.10 | `./Sentinel_HASP_Linux_Run-time_Installer_script/hasp_update`<br><br>under the installation directory |
| Charon-PAR version 1.10 and later | `/opt/charon/bin/hasp_update` |

The commands described in this section also work for Charon-SSP. However, the Charon-SSP emulator product has its own GUI, the Charon-Manager, which also includes a license update tool that can apply a V2C file. Please refer to the section License Management with Charon-SSP Manager for more information.

## Applying V2C Files Using the License Update Utility on Windows

**Step 1**: start the License Update Utility.

The V2C files on Windows are applied using the License Update Utility (also called HASPRUS). This tool is started in different ways, depending on which Charon product is used. Please refer to License Update Service (RUS) in the Tools Reference section for detailed information about this step.

**Step 2**: apply the V2C File(s).

1. To install the V2C file(s) for hardware **and** software licenses, select the tab **Apply License File**.
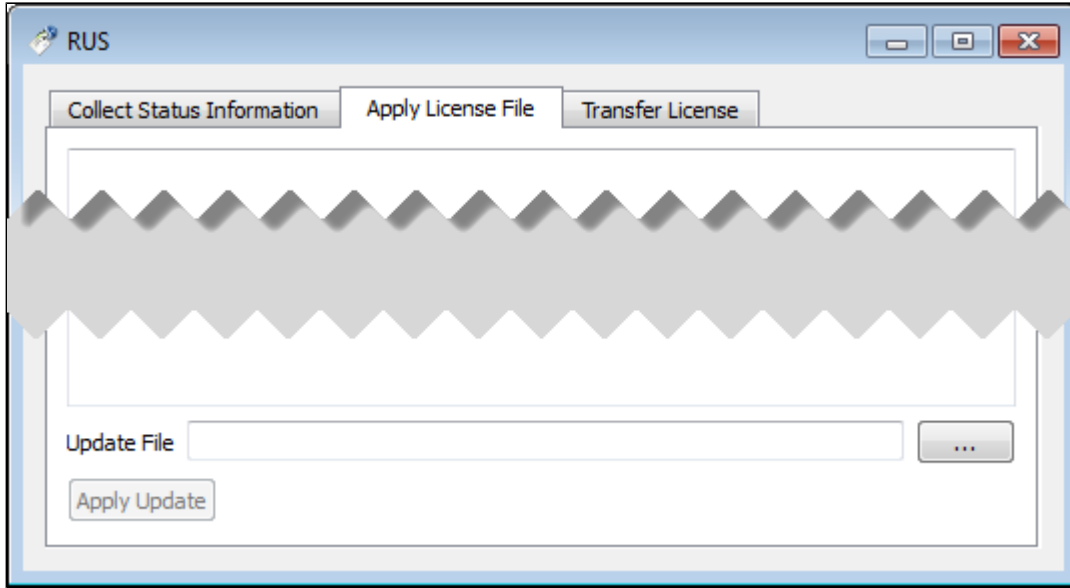


2. Press the **"..."** button next to the **Update File** field. This will open a file browser.

3. Select the V2C file to be applied.

4. Click on **Apply Update** to complete the operation.

If you received two V2C files, perform these steps for both files (remember to **first** apply the **\*_fmt.v2c** file).

## Verifying the License

Use the steps described in Viewing a License to verify the successful application of the V2C file.

# Viewing a License

This section describes how to display licenses and their content with the tools available on different platforms:

- Display Available Licenses with Sentinel Admin Control Center
- Display License Content with Linux-Specific Tools
- Display License Content with Windows-Specific Tools

# Display Available Licenses with Sentinel Admin Control Center

The Sentinel Admin Control Center (ACC) is available on all platforms where the license drivers are installed. It provides an overview of the available licenses and shows some important license information. To run, it requires a graphical user interface or web access to the system on which the license is installed. For firewall considerations, see *Firewall Considerations* in Tasks Specific to Network Licenses. Remote access requires specific ACC settings. If there is no local GUI access to use a web-browser, please refer to  How-to enable remote connection to Sentinel Admin Control Center without GUI.
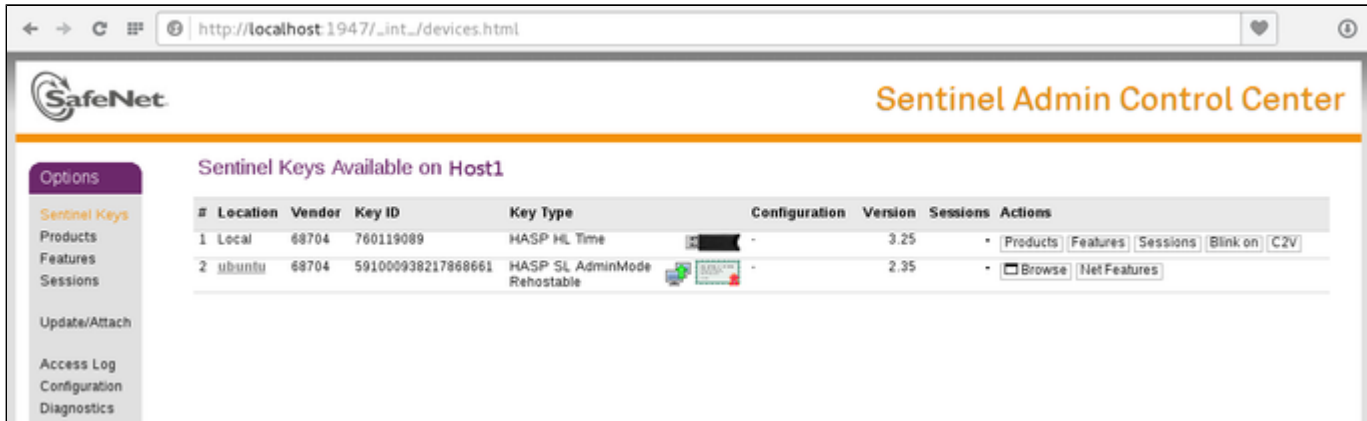
Different Charon products are bundled with different versions of the Sentinel drivers and thus different versions of Sentinel ACC. In order to **identify the Sentinel ACC version** and with it the available features, you can click on the **About** menu item on the left-hand side of the Sentinel ACC window. You can also easily recognize versions starting from version 7.60 by the different color scheme and the name **gemalto** (instead of SafeNet) at the top of the page.

**Please note**: the Sentinel ACC does not display the Charon product details. For displaying the detailed license content, please proceed to the Linux or Windows section respectively.

To display the licenses available on the local system with the Sentinel ACC, perform the following steps:

1. Open a web-browser
2. Go to the URL: **http://localhost:1947/_int_/devices.html**. This corresponds to the menu entry **Sentinel Keys**. If you want to display the licenses available on a remote system, replace *localhost* with the correct hostname.

You will see a screen similar to the following using one of the pre-7.60 versions of Sentinel ACC:



The sample shows a time-limited local USB key (Key Type: HASP HL Time) and a network license based on a software license (Key Type: HASP SL).

The following image shows a sample of the new Sentinel ACC version >= 7.60 bundled, for example, with Charon-AXP/VAX 4.9 and Charon-PAR 1.10 and later:
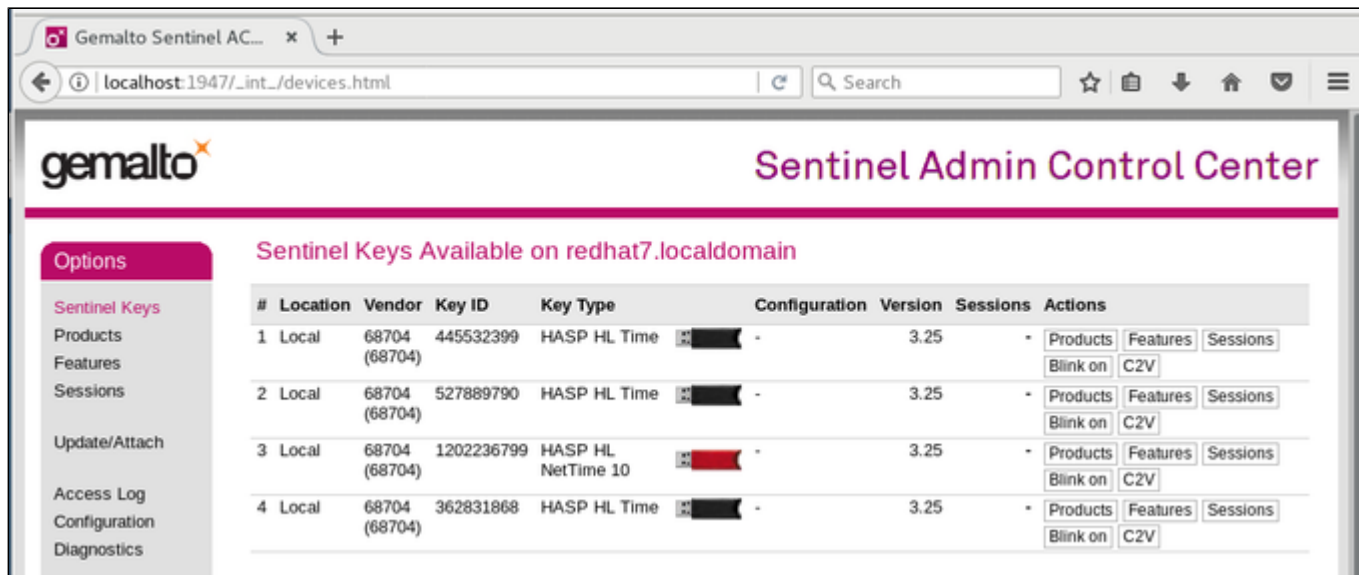


The sample above shows 3 local time-limited hardware license dongles and one time-limited network-enabled dongle.

Using the actions **Features** (for local licenses) and Browse (for network licenses), you can display the features associated with the respective license. The following example shows the output for the local, time-limited license dongle:
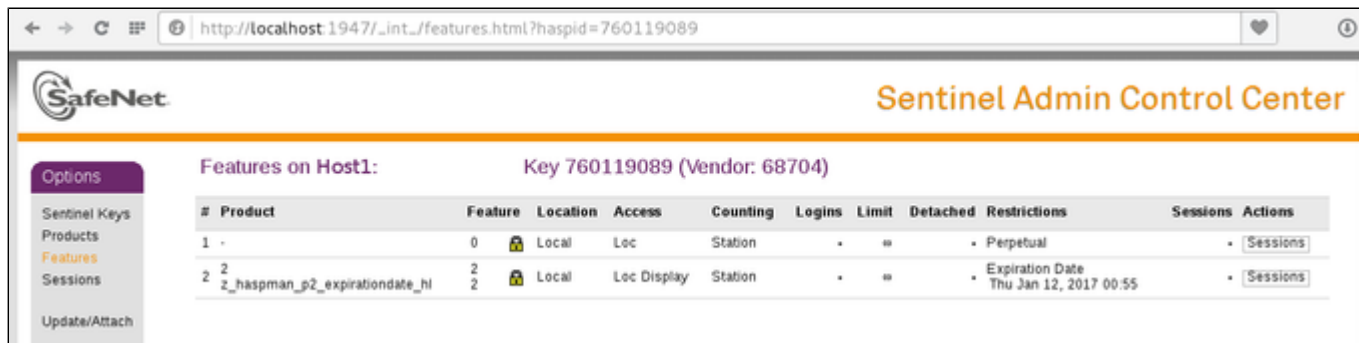


The feature associated with the license displayed above is an expiration date.

The following shows the features typically associated with a license used as a backup key. It is limited to 720 hours of runtime in addition to having an expiration time set:
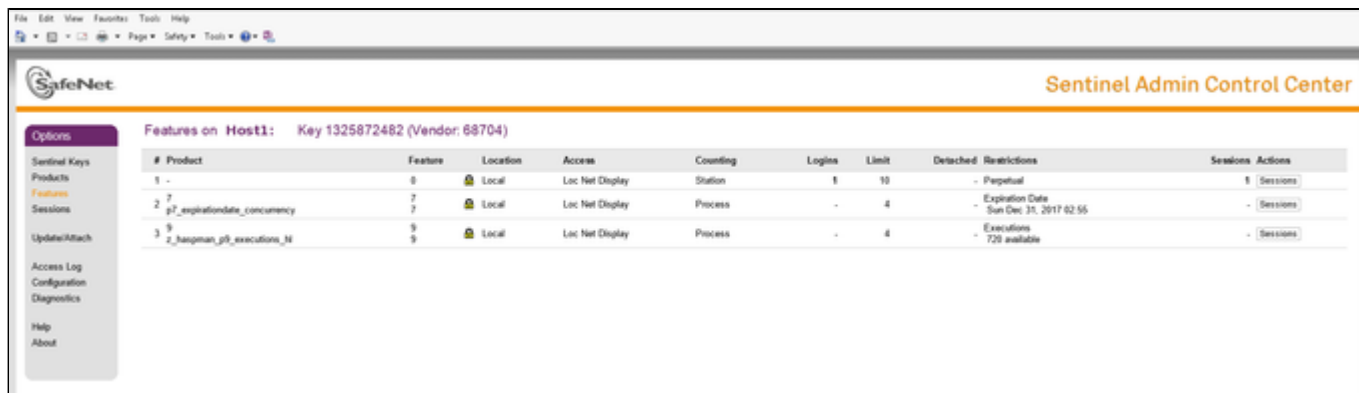
# Display License Content with Linux-Specific Tools

The license content on Linux systems can be displayed using the **hasp_srm_view** command.

If the command is not in your PATH variable, the full path has to be specified:

- Path to image for Charon-AXP/VAX and Charon-PAR 1.10 and later: `/opt/charon/bin/hasp_srm_view`
- Path to image for Charon-SSP: `/opt/charon-agent/ssp-agent/utils/license/hasp_srm_view`

Example of a hasp_srm_view command that will show all licenses visible on the system:

```
$ /opt/charon/bin/hasp_srm_view -all
```

A complete list of the parameters of the **hasp_srm_view** command is shown in hasp_srm_view.

The commands described in this section also work on **Charon-SSP.** However, Charon-SSP has its own GUI, the Charon-Manager, which also includes a license viewer. Please refer to the section License Management with Charon-SSP Manager for more information.

**Displaying the license content when connected via the network:**

Local hardware licenses can only be displayed from a local connection to the system, for example via the console. If you are connected via a remote connection, for example via **ssh**, the **hasp_srm_view** command will return an error. Network licenses (network-enabled dongles and software licenses) do not have this problem.

Workaround when logged in via a remote connection**:**

When connected to the system via a remote connection, the command to display a local hardware license will return an error. As a workaround, you can display the license contents with the following command (adapt the path of the command if your installation location is different):
```
$ ssh localhost /opt/charon/bin/hasp_srm_view
```

**Please note**: starting with Charon-AXP/VAX 4.9 and Charon-PAR 1.10, the **hasp_srm_view** utility on Linux does not follow the settings in the Sentinel ACC with respect to querying remote license servers and network visibility. The utility performs a **broadcast search** for network licenses even if this has been disabled in the Sentinel ACC. If this behavior has to be prevented for specific reasons, the network access of the system must be temporarily restricted or disabled, for example by blocking the relevant traffic with a firewall. Alternatively, access to the network license at the license server side can be blocked. Note that such methods can negatively impact other functions of the system or, in case of blocking access to a network license on the server, even the functions on other client host systems.

**Please note**: in rare cases, you may have received an **empty dongle** without a license section. The hasp_srm_view command will show that no license information was detected. In such cases, please refer to the steps on how to request a license update for a USB dongle.

The following shows sample output of the **hasp_srm_view** command on Linux (to display all available licenses, use the `-all` parameter):

```
$ hasp_srm_view
Trying to connect to the key: 527889790
License Manager running at host: host1
License Manager IP address: 127.0.0.1


The Physical KeyId: 527889790
License type: License Dongle (Local)
CHARON Sentinel HASP License key section
Reading 4032 bytes

The License Number: 1000.826
The License KeyId: 527889790
The Master KeyId: 1645066348
Release date: 15-MAR-2021
Release time: 11:58:42
Update number: 20
End User name: Stromasys
Purchasing Customer name: Stromasys

Virtual Hardware: AlphaServer_DS10, AlphaServer_DS10L, AlphaServer_DS15, AlphaServer_DS20, AlphaServer_DS25,
AlphaServer_ES40, AlphaServer_ES45, AlphaServer_GS80, AlphaServer_GS160, AlphaServer_GS320, AlphaServer_400,
AlphaServer_800, AlphaServer_1000, AlphaServer_1000A, AlphaServer_1200, AlphaServer_2000, AlphaServer_2100,
AlphaServer_4000, AlphaServer_4100
Product Name: CHARON-AXP
Product Code: CHAXP-470xx-WI-LI
Major Version: 4
Minor Version: 12
32bit and 64bit OS requirements: 64bit
Host Operating System required: WINDOWS, LINUX
CPU's allowed: 32
Maximum virtual memory: 262144MB
License expiration date: 25-Nov-2021
Instances allowed: 10
Feature number: 1
Check interval: 60 minutes
```

**<output truncated>**

**Starting with license driver versions >= 7.60**, for example, in Charon-AXP/VAX version 4.9 and Charon-PAR version 1.11, there are some small changes in the output of **hasp_srm_view**. The parameters are described in the *License Content* section of the *Licensing Handbook*. The following sample shows the most important changes (in blue):

```
License Manager running at host: Host1

License Manager IP address: 192.168.1.111

HASP Net key detected

The Physical KeyId: 1015925129

License type: License Dongle (Network capable)

CHARON Sentinel HASP License key section

Reading 4032 bytes

The License Number: 000.TEST.CENTER

The License KeyId: 1015925129

The Master KeyId: 827774524

Release date: 11-APR-2018

Release time: 16:52:33

Update number: 68

End User name: STROMASYS

Purchasing Customer name: STROMASYS

Product License Number: AXP_4_9_TEST

Virtual Hardware: AlphaServer_DS10, AlphaServer_DS10L, AlphaServer_DS15, <items removed>

Product Name: CHARON-AXP

Product Code: CHAXP-490xx-LI

Major Version: 4

Minor Version: 9

< Parameters Maximum Build and Minimum Build are no longer shown>

32bit and 64bit OS requirements: 64bit <replaces parameter Host CPU supported>

Host Operating System required: LINUX

CPU's allowed: 16

Maximum virtual memory: 65536MB

CHAPI enabled

License expiration date: 01-Nov-2018

Instances allowed: 3

Feature number: 1

Check interval: 15 minutes
```

The following shows sample **hasp_srm_view** output for a network-enabled backup key limited to 720 hours of runtime:

```
Trying to connect to the key: 1325872482

License Manager running at host: HOST1

License Manager IP address: 10.1.1.1

HASP Net key detected

The Physical KeyId: 1325872482

CHARON Sentinel HASP License key section

Reading 4032 bytes

The License Number: 000.backup.license.example

The License KeyId: 1325872482

The Master KeyId: 827774524

Release date: 07-OCT-2016

Release time: 11:38:20

Update number: 15

End User name: STROMASYS

Purchasing Customer name: STROMASYS

Virtual Hardware: AlphaServer_DS10, AlphaServer_DS20

Product Name: CHARON-AXP

Product Code: CHAXP-480xx-WI-LI

Major Version: 4

Minor Version: 8

Maximum Build: 99999

Minimum Build: 1

Host CPU supported: X64

Host Operating System required: WINDOWS, LINUX

CPU's allowed: 16

Maximum virtual memory: 65536MB

CHAPI enabled

License time remaining: 720 hours and 0 minutes (slot number 9, up to 4 processes allowed)

License expiration date: 31-Dec-2017 (slot number 7, up to 4 processes allowed)
```

# Display License Content with Windows-Specific Tools

This section describes how to display licenses and their content with the tools available on Windows:

- Charon-AXP and Charon-VAX
  - Starting the Utility on Charon-AXP/VAX Version 4.7
  - Starting the Utility on Charon-AXP/VAX Version 4.8 or Higher
  - HASP View Utility Window
- Charon-AXP/SMA

**Displaying the license content when connected via the network:**

> The local HASP key cannot be read via a remote connection (for example, RDP).
> One possible workaround is described in detail in the document How to read a HASP key over RDP on Windows. It shows, how to setup a scheduled task for this purpose.
> Alternatively, use the Charon License Utility (see CHARON on Windows - Charon License Utility).

**Please note:**

- The *hasp_view* utility on Windows does not follow the settings in the Sentinel ACC with respect to querying remote license servers and network visibility. The utility performs a **broadcast search** for network licenses even if this has been disabled in the Sentinel ACC. If this behavior has to be prevented for specific reasons, the network access of the system must be temporarily restricted or disabled, for example by blocking the relevant traffic with a firewall. Alternatively, access to the network license at the license server side can be blocked. Note that such methods can negatively impact other functions of the system or, in case of blocking access to a network license on the server, even the functions on other client host systems
- Starting with Charon-AXP/VAX version 4.9, the *hasp_view* output for this Charon emulator product shows some additional license parameters (e.g., license type, feature number,  check interval, product license number if present), changes in parameter names (e.g., "32bit and 64bit OS requirements" instead of "host CPU supported"), and some parameters have been removed from the output (e.g., maximum and minimum build). Please refer to the *License Content* section of the *Licensing Handbook* for a description of these parameters.
- In rare cases, you may have received an **empty dongle** without a license section. The HASP view utility will show that **no license information** was detected. In such cases, please refer to the steps on how to request a license update for a USB dongle.

# Charon-AXP and Charon-VAX

## Starting the Utility on Charon-AXP/VAX Version 4.7

To display the license content, proceed as follows:

- Open the start menu.
- Select the menu entry **Charon**, then **Charon-AXP** or **Charon-VAX/PDP.**
- Select the **Utilities** subfolder in the menu.
- Click on the **HASP View** utility in the menu shown in the following image.
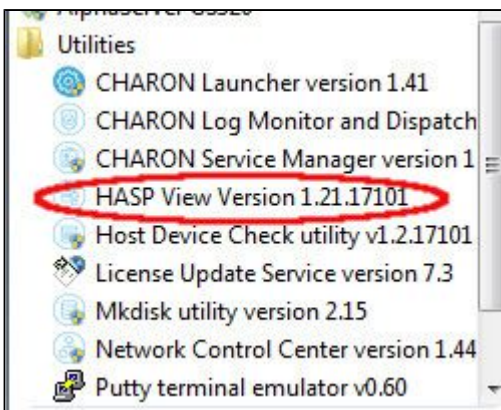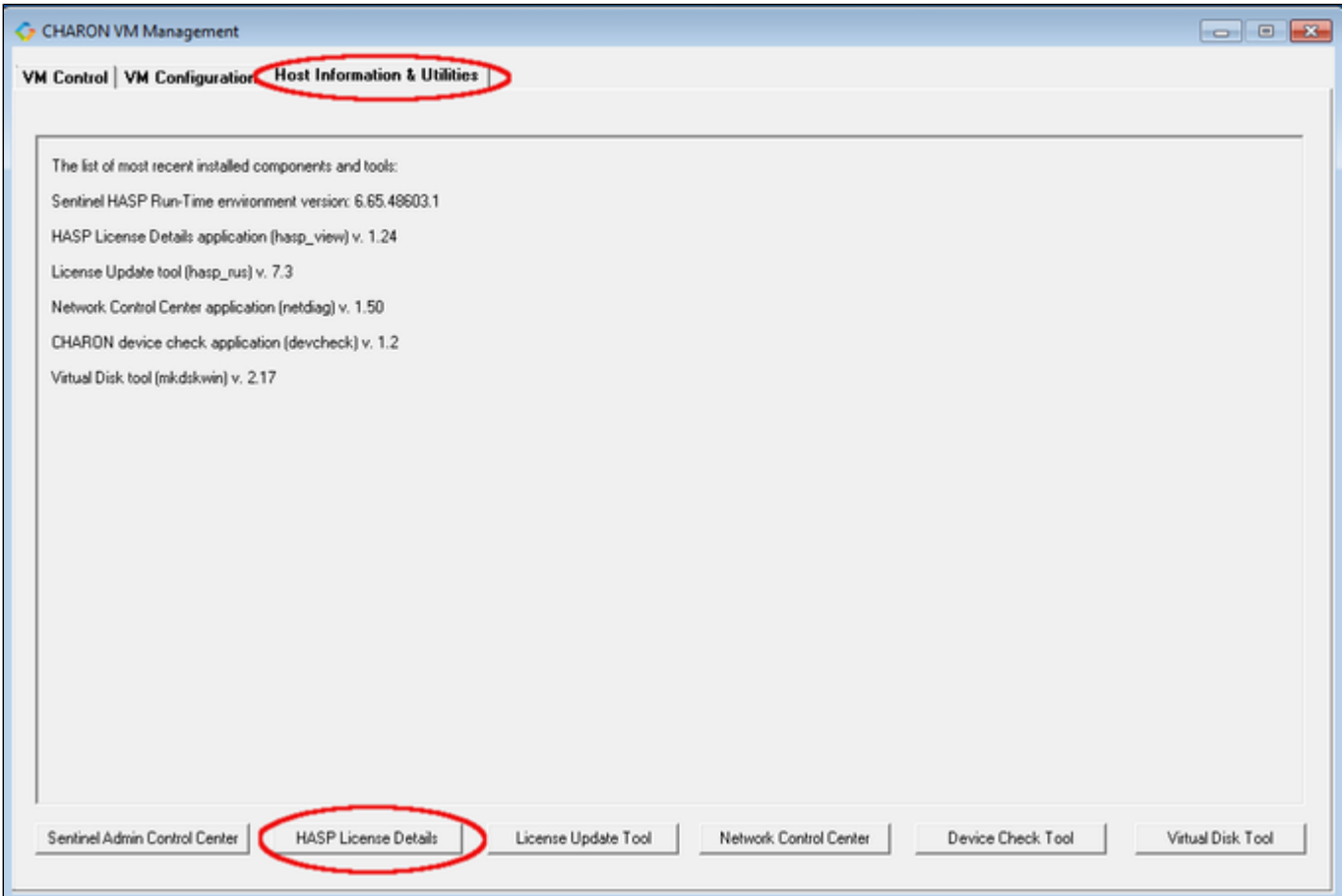
## Starting the Utility on Charon-AXP/VAX Version 4.8 or Higher

To display the license content, proceed as follows:

Open the **Charon Virtual Machines Manager** via the **desktop icon** or the **start menu**:
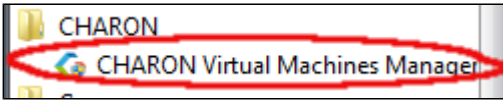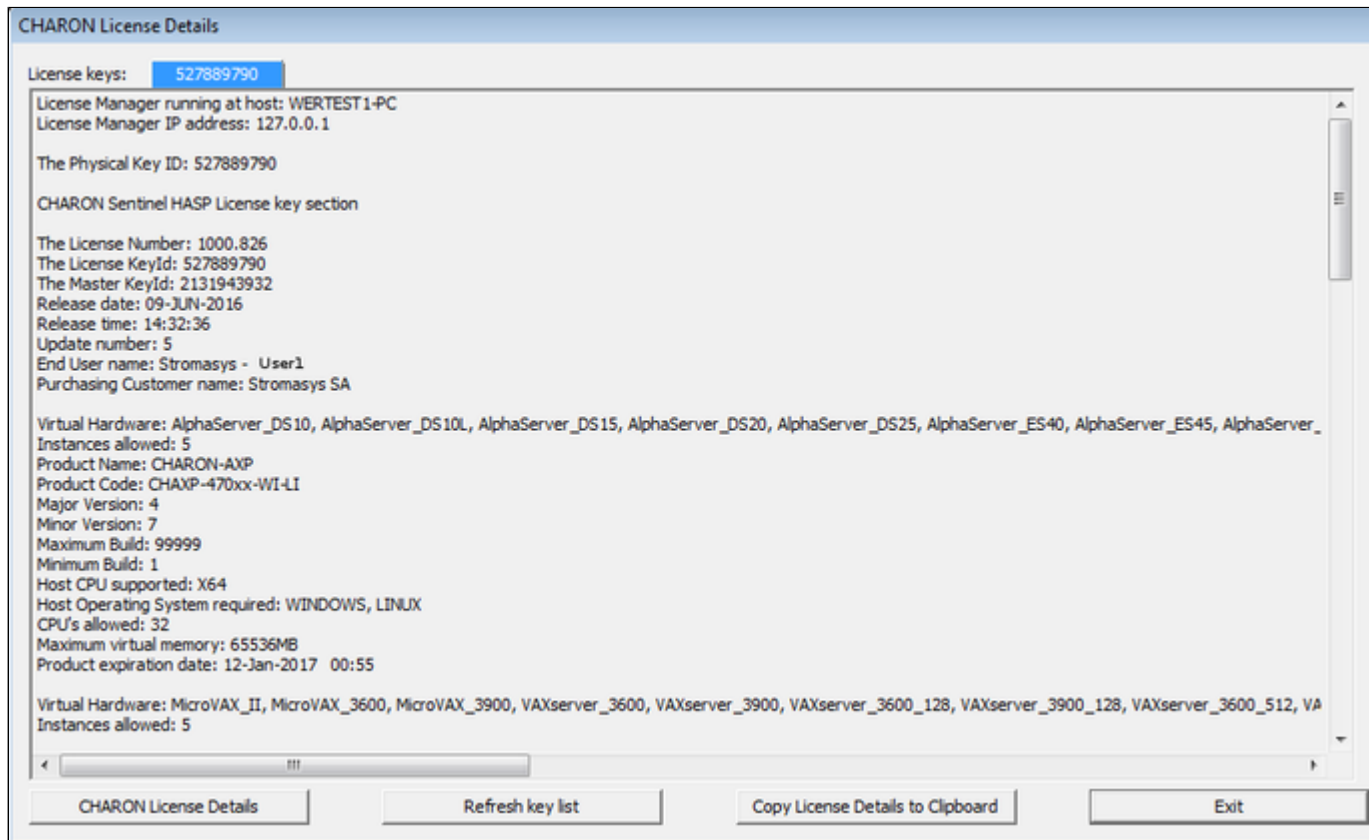


Go to the **Host Information & Utilities** tab and click on the **HASP License Details** button:

## HASP View Utility Window

The following shows sample output:



The buttons at the bottom of the window provide some additional functions:

- **Charon License Details** (re-)queries the selected license key (the highlighted tab) and displays the contents.
- **Refresh** the key list. This is useful if a key has just been added or removed.
- Copy license details to **clipboard**, for example to paste into to a support e-mail.
- **Exit** the utility.

Please note that starting with Charon-AXP/VAX version 4.9, the button **Charon License Details** has been renamed to **Refresh current license**.

## Charon-AXP/SMA

To display a license, right-click on the Charon icon in the system tray. This will open the management menu as shown below:
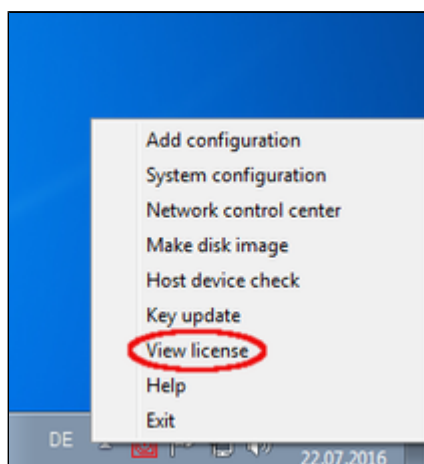
Selecting *View License* from this menu will start the HASP view program and open the license details window as shown below:
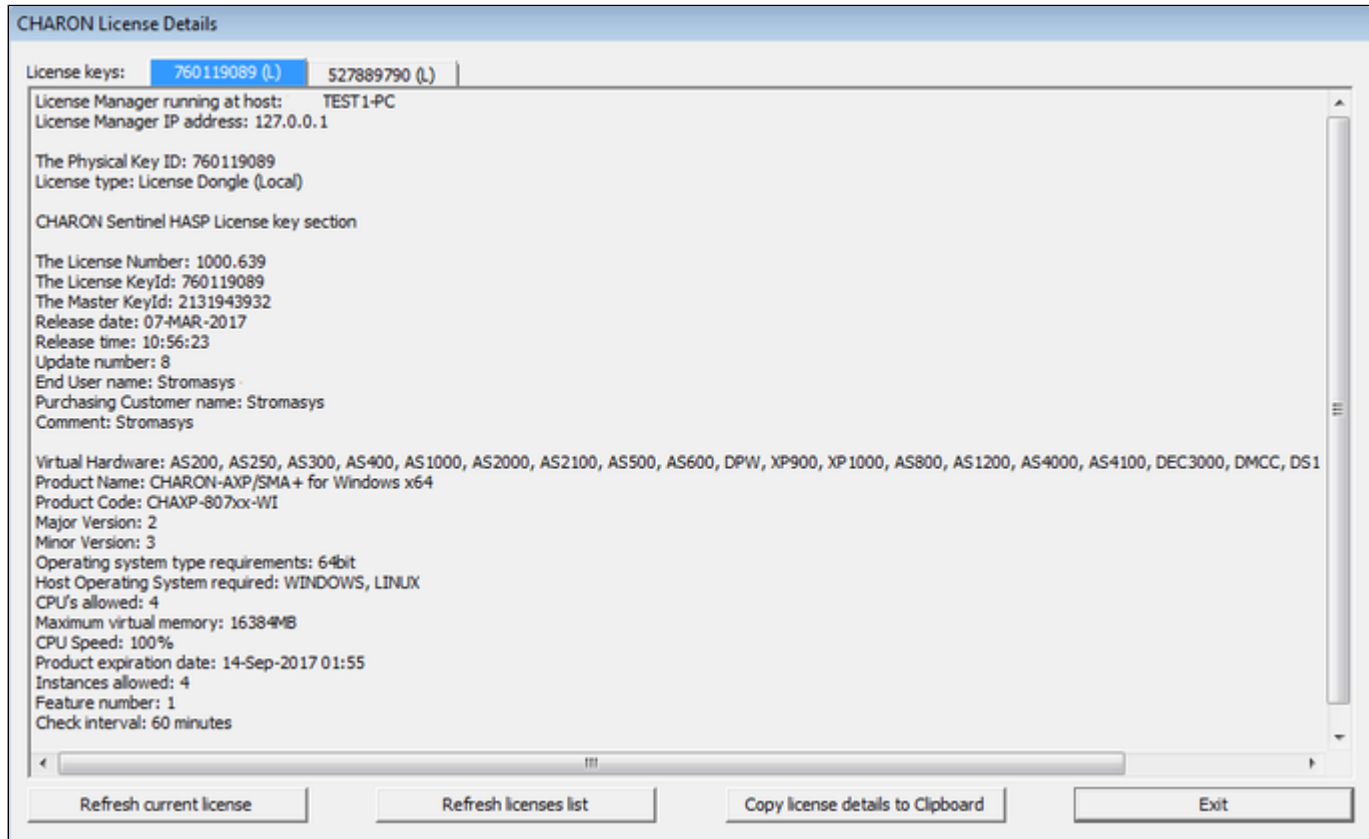


The buttons at the bottom of the window provide some additional functions:

- **Refresh current license** will reload the content of the license currently displayed.
- **Refresh license list**. This is useful if a key has just been added or removed.
- Copy license details to **clipboard**, for example to paste into a support e-mail.
- **Exit** from the utility.

# Removing a License

If a license needs to be **removed** from a system or the access to the license needs to be **disabled**, the steps are different for the different license types:

- Removing a Hardware License from a System
- Removing a Software License from a System
- Removing Access to Network Licenses from a System
  - Full Removal of Network License
  - Block Access of Remote Emulator Hosts to Network License
  - Block Access to Network Licenses on Client System

**Important**: before removing a license from a system or disabling access to a license, take to following points into consideration:

- Make sure that there is a valid replacement license for all emulator instances depending on the license to be removed, or make sure the emulated systems have been cleanly shut down,
- Make sure that this step will not negatively impact your production environment.

## Removing a Hardware License from a System

To remove a hardware license from a system, simply unplug it from the system.

## Removing a Software License from a System

**Please note**:

> The old method for removing a software license from a system depended on the license transfer functionality. **This functionality is no longer available in the current versions of the Charon products.** The only way to remove a non-transferable obsolete software license is the method described below. On Microsoft Windows, you can use the **Charon License Utility** (see CHARON on Windows - Charon License Utility) to perform the necessary steps.

To remove an **obsolete software license or a software license in cloned state** (a software license goes into a cloned state, for example, if a VM is cloned to a different Virtual Machine UUID) from the system, perform the following basic steps:

- Start the Sentinel Admin Control Center (ACC) (for local system: URL **http://localhost:1947**).
- Identify the software license that is to be removed.
- Identify the name of the certificate file(s) and the path of the base directory where they are stored.
- Remove the certificate file(s).
- Restart the Sentinel runtime service.

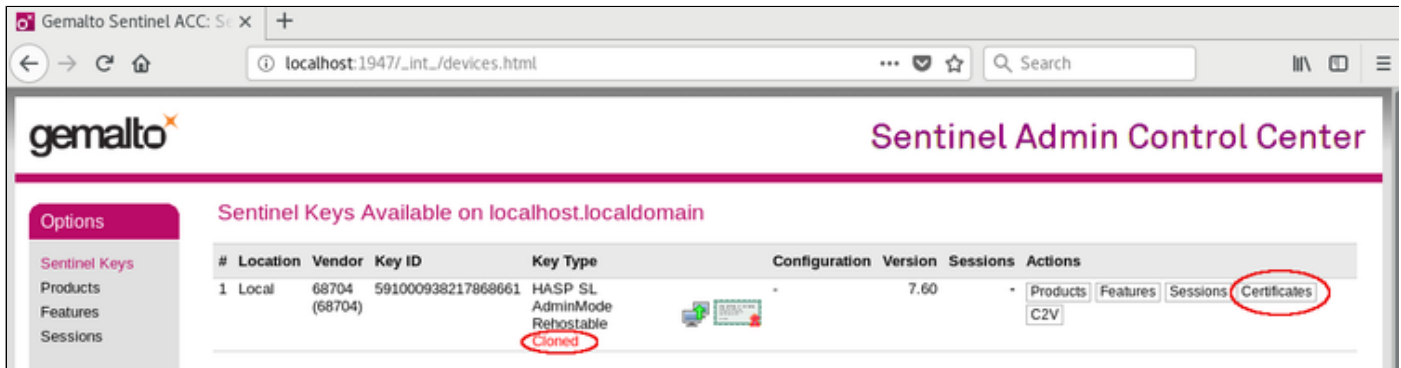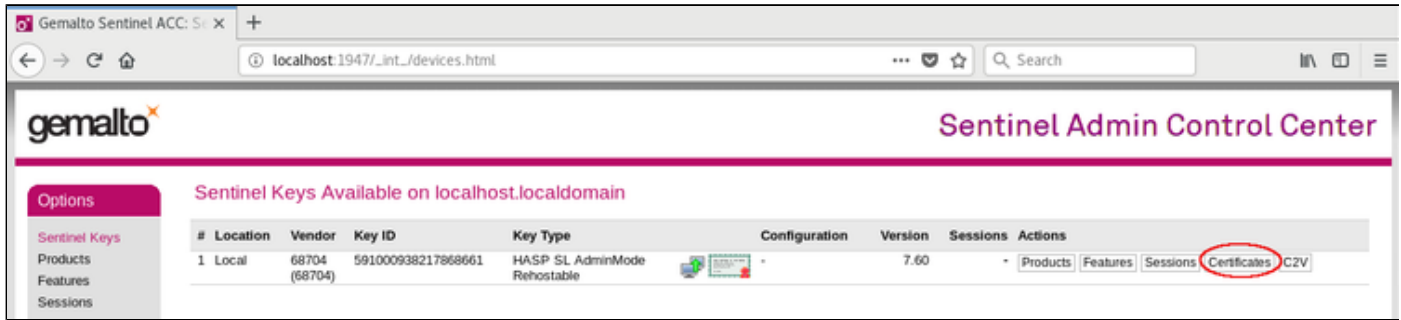**The following example shows the required steps in detail:**

1. Go to **http://localhost:1947/** to access the Sentinel HASP ACC and select **Sentinel Keys** on the left.

2. In the Sentinel Admin Control Center (ACC), go to **Sentinel Keys** and locate the target "Sentinel SL AdminMode" license to be removed.

3. Click on the **Certificates** button at the right side of the SL description:

**Old version** (showing a software license in cloned state):

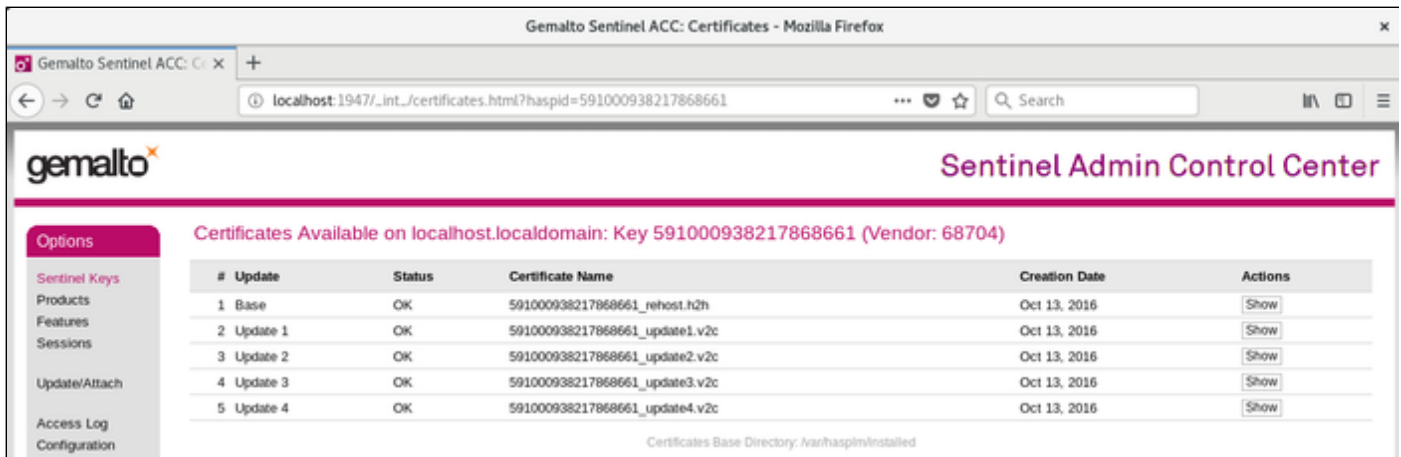**New version** (showing an active software license **and** a cloned software license):





4. Note the name of the corresponding **certificate file(s) and the path to the certificates base directory** as shown in the "Certificates" section:

Example using old ACC version:



**Please note:** the certificate display screen can look slightly different depending on the type of software license and the actions performed on this license in the past.
The following example shows the certificates of a software license after several updates. The screenshot is based on Sentinel ACC version equal or higher than version 7.60.

5. **Remove the certificate file(s)** using operating system tools.

> a. In the first example above (Windows), there is one file to be removed. It is in *C:\Program Files (x86)\Common Files\SafeNet Sentinel\Sentinel LDK\installed\68704*.
> b. In the second example (Linux) there are several files created by a series of license updates. On Linux, the certificate files are typically stored in */var/hasplm/installed/68704/*.
> c. **All certificate files in the identified directory must be removed**.

6. After removing the certificate file, **restart the Sentinel license service** or reboot the system. To restart the service, proceed as follows:

> a. On Windows, restart the "**Sentinel LDK License Manager**" service (hasplms) either using the `services.msc` program or via a command line (as administrator) then enter the "`sc stop hasplms`" command followed by "`sc start hasplms`".
> **Important**: any running emulators will be stopped if the license service is forced to stop despite existing service dependencies (i.e., running emulators). So any running guest systems **must be cleanly shutdown** before restarting the license service in order to avoid data loss.
>
> b. On Red Hat Enterprise Linux 7.x and higher (and compatible Linux systems) restart the aksusbd service: `# systemctl restart aksusbd`
> This also will automatically restart the **hasplmd** service (separate service for this daemon was introduced in newer runtime driver versions).
>
> c. On Red Hat Enterprise Linux 6.x, restart the aksusbd service: `# service aksusbd restart`

7. Start the Sentinel ACC again to verify that the software license has been removed.

# Removing Access to Network Licenses from a System

There are three different ways to remove a network license. They have different implications and are described below:

## Full Removal of Network License

To completely remove a network license, follow the steps above for hardware or software licenses respectively. The steps must be performed on the license server.

**Please note**: this will remove the license for all emulator hosts on the network using this license and also for the local host. Make sure that this is in fact intended.

## Block Access of Remote Emulator Hosts to Network License

You can use the Sentinel Admin Control Center on the license server

- to **allow** access to a network license for all or specific hosts on the network, or
- to **block** access from remote hosts completely.

Please refer to the section *Controlling Access to Network License on Server Side* in Tasks Specific to Network Licenses for more information.

## Block Access to Network Licenses on Client System

If access of the local system to network licenses is not desired, this can be disabled in the Sentinel ACC for certain products and product versions. Blocking access at the server side is the safer way.

Please refer to the section *Controlling Access to Network License on Client Side* in Tasks Specific to Network Licenses for more information.

# Handling Multiple License Keys and Product Licenses

A Charon host system can have access to several local and remote license keys. Each license key can contain one or more product licenses.

The Charon emulator products can only use one **active** license at one time. Without additional configuration, they cannot make decisions about which product license or license key to use. If there is more than one available license key, the default license key will be used. The default license key is determined by the Sentinel software. As this can lead to undesirable effects, newer Charon emulator products have configuration parameters that allow the definition of a **primary** (or production) and a **secondary** (or backup) key, or the creation of a **list of license keys or product licenses sorted** by priority.

The following sections describe the options available to achieve a more deterministic license selection. If only one license is available, either locally installed or via the network, this section does not apply.

**Please note**: for Charon-AXP/VAX before version 4.9, Charon-PAR before version 1.10, and other older Charon products: the parameters described in this section can **only** be used to define a primary key and a backup key, or to specify the correct key if there is a conflicting license for a different Charon product on the same system. It is **not possible** with these versions of Charon to combine a local license (black dongle) with other licenses (local or network) to increase the number of concurrent instances of the same Charon product on one host system. Newer versions allow a more flexible use of multiple licenses. Both variants are described in the following sections.

## Contents

- Backup License Key Characteristics
- Support for Multiple License Keys and Product Licenses
- System Behavior Depending on Parameter Settings
  - Relevant Parameters in License View Output
  - Old Behavior (Only Primary and Secondary Keys are Possible)
  - New Behavior (License Keys and Product Sections can be Prioritized)
    - License Key ID Parameter
    - Product License ID Parameter
- Additional Information

## Backup License Key Characteristics

It is strongly recommended to order a backup key to recover immediately from damage or loss of the main license key. A backup license key can also help in situations where the Charon host hardware fails and the software must be moved to a different system, thus invalidating the original software license.

Backup keys typically use a counter (integer) value programmed in the key. This integer value corresponds to a number of hours the Charon software is allowed to run. Each time the Charon software checks the license (at start and then every hour), the value is decreased (by 1 hour). Please note that backup keys can have additional restrictions:

- The runtime is typically limited to 720 hours (30 days). This is the time available to get a replacement license from Stromasys.
- A backup license key may be valid only until a certain date.

**Please note**: if you start and stop the emulator frequently (e.g., frequent runs with a duration of under one hour), the runtime may be significantly less than 30 days, because the license check during the start of an emulator will reduce the counter by one.

# Support for Multiple License Keys and Product Licenses

The following table provides an overview of the license key and product license ID parameters supported by the different products as well as the names of the applicable configuration parameters. The behavior of the system when such parameters are defined is described in the next section *System Behavior Depending on Parameter Settings*.

| Product | Configuration Parameters |
|---|---|
| Charon-AXP/VAX on Linux and Charon-AXP/VAX/PDP on Windows<br>***before version 4.9*** | Options to define primary and backup license key:<br><br>`set session license_key_id[0]=<primary-key-id>`<br><br>`set session license_key_id[1]=<secondary-key-id>` |
| Charon-AXP/VAX on Linux and Charon-AXP/VAX/PDP on Windows<br>***starting with version 4.9*** | Option to define a prioritized list of license keys:<br><br>`set session license_key_id = "<key-id-prio1>, <key-id-prio2>,...[,any]"`<br><br>Option to define a prioritized list of product license IDs:<br><br>`set session license_id = "<lic-id-prio1>, <lic-id-prio2>,..."` |
| Charon-SSP on Linux<br>***starting with version 1.4.1*** | Options to define primary and backup license key:<br><br>`regular_key_id = <primary-key-id>`<br><br>`backup_key_id = <secondary-key-id>` |
| Charon-AXP/SMA on Windows<br>***starting with version 2.3.3*** | Options to define primary and backup license key:<br><br>`regular_key_id <primary-key-id>`<br><br>`backup_key_id <secondary-key-id>` |
| Charon-PAR on Linux<br>***before version 1.10*** | Options to define primary and backup license key:<br><br>`primary_license <primary-key-id>`<br><br>`secondary_license <secondary-key-id>` |
| Charon-PAR on Linux<br>***starting with version 1.10*** | Define a prioritized list of license keys:<br><br>`license_key_id <key-id-prio1>`<br><br>`license_key_id <key-id-prio2>`    (more than two key ID entries are possible)<br><br>`license_use_any_key false|true`   (optional parameter, default = false)<br><br>Option to define a prioritized list of product license IDs:<br><br>`license_id "<lic-id-prio1>"`<br><br>`license_id "<lic-id-prio2>"`        (more than two entries are possible) |

The parameters listed above must be added to the emulator configuration file and the emulator must be restarted for the parameters to become active. Please refer to the respective product user's guides (Documentation) for more information about modifying configuration files.

# System Behavior Depending on Parameter Settings

This section describes how Charon emulator products behave in the presence or absence of the configuration parameters specifying how multiple licenses are to be used.

## Relevant Parameters in License View Output

The two parameters identified by license key id and product key ID can be viewed in the output of `hasp_srm_view` (Linux) and `hasp_view` (Microsoft Windows). The system behavior when including these parameters in the emulator configuration file is described below. The following image shows a sample of the parameters in question:

```
Trying to connect to the key: 445532399
License Manager running at host: host1
License Manager IP address: 127.0.0.1


The Physical KeyId: 445532399
License type: License Dongle (Local)
CHARON Sentinel HASP License key section
Reading 4032 bytes                                        license_key_id

The License Number: 1001688
The License KeyId: 445532399
The Master KeyId: 2131943932
Release date: 19-JUN-2018
Release time: 16:10:36

<lines removed>                                  Product section without
                                                 license_id

Virtual Hardware: HP3000
HP/PA Physical Key ID: 12345678
Product Name: CHARON-HPA/A410                    Product section with
Product Code: CHHP-100xx-LI                      license_id
Major Version: 1
Minor Version: 0

<lines removed>

Product License Number: STROMAYS-TEST-19-JUN-2018-1
Virtual Hardware: HP3000
HP/PA Physical Key ID: 12345678
Product Name: CHARON-HP9K/1C
Product Code: CHHPPA-111xx-LI
Major Version: 1
Minor Version: 11

<lines removed>
```

## Old Behavior (Only Primary and Secondary Keys are Possible)

Depending on the presence of the primary and/or secondary **license key IDs** in the configuration file, the emulator system behaves differently:

1. **No keys are specified**
   The Charon software performs an unqualified search for any suitable key. If no suitable key is found, the emulator exits.
2. **Both keys are specified**
   The Charon software performs a qualified search for the primary license key. If it is not found, the system performs a qualified search for secondary license key. If it is not found, the emulator exits.
3. **Only the primary key is specified**
   The Charon software performs a qualified search for the primary license key. If it is not found, the system performs an unqualified search for any suitable key. If none is found, the emulator exits.
4. **Only the backup key is specified**
   The Charon software performs an unqualified search for any suitable key. If no suitable key is found, the emulator exits.

If the primary key is no longer present, the Charon software switches to the secondary key. If the **primary key becomes available again**, the system reverts automatically to this key to avoid depleting the backup key counters unnecessarily.

## New Behavior (License Keys and Product Sections can be Prioritized)

Newer Charon emulator products (e.g., version 4.9 of Charon-AXP/VAX and Charon-PAR version 1.10 and higher) have parameters to specify

- either a prioritized list of license key IDs (i.e., IDs of dongles or software licenses), or
- a prioritized list of product license IDs (i.e., IDs of specific product sections stored on a license key).

Depending on the settings of these parameters, the emulator system behaves differently as described below.

### License Key ID Parameter

1. **No keys are specified**
   The Charon software performs an unqualified search for any suitable key. If no suitable key is found, the emulator exits.
2. **One or more keys are specified without the keyword "`any`" or "license_use_any_key" set to "true"**
   The Charon software performs a qualified search for the first (highest priority) key in the list. If it is not found, the emulator performs a qualified search for the next key in the list. If none of the keys in the list is found, the emulator exits.
3. **One or more keys are specified with the keyword "`any`" or "license_use_any_key" set to "true"**
   The Charon software performs a qualified search for the first (highest priority) key in the list. If it is not found, the emulator performs a qualified search for the next key in the list. If none of the keys in the list is found, the emulator performs an unqualified search for any suitable key. If no suitable key is found the emulator exits.

If the highest priority key is no longer present, the Charon software switches to the next key in the list. If **a higher priority key becomes available again**, the system reverts automatically to this key to avoid depleting backup key counters unnecessarily.

### Product License ID Parameter

1. **One or more product license IDs are specified**
   All available license keys are searched for a product section with the product specified license IDs. The first entry in the product license ID list has the highest priority. If a product section with this ID is found, it is used by the emulator. If no product section with this ID is found, the next product license ID in the list is used (if found during search). If none of the specified product license IDs are found, the emulator exits.
2. **One or more product license IDs and one or more license key IDs are specified**
   Similar to the procedure described in point 1. However, only the product licenses specified in the list of license key IDs are searched for the relevant product license IDs (unless the keyword `any` is specified). **Please note**: this option can currently be configured but will only be fully supported in a later product version.

## Additional Information

The article Charon licensing options on the Stromasys web-page provides additional information for licenses in complex environments.

- Have 2 licenses per Charon instance – a **production** and a **backup** key.
- Configure them explicitly in the Charon configuration files.
- Mix the license types. Physical dongles are recommended as **backup** licenses, because they are much more flexible in all disaster recovery scenarios. The **production** license can be served over the network or be a software license.

# Tasks Specific to Network Licenses

A license server can serve network licenses to other systems on the network.

Note that software licenses are always network licenses. Hardware license keys can be either local or network-enabled. The network-enabled hardware license keys are red.

There are configuration steps and settings that only apply to network licenses. These are described in this section:

- Communication Between License Server and Client
- Firewall Considerations
  - Ports Used for Communication
  - Firewall Example on Linux
  - Firewall Example on Windows
- Controlling Access to Network License on Server Side
- Controlling Access to Network License on Client Side

## Communication Between License Server and Client

The communication between license server and client systems uses the IP protocol. This means that **IP connectivity** must be established between client and server. If client and server are not on the same network, they need the correct routing entry (or default route) to enable this communication. **Port 1947** is used as the destination port for the communication between the License Managers. The communication uses both UDP and TCP. These protocols are used for different purposes:

- **UDP:** This protocol is used by the client hosts to discover a license server on the network. If the option **Broadcast Search for Remote Licenses** is enabled in ACC (**Access to Remote License Managers** tab), the Sentinel License Manager on the client host sends UDP broadcasts to port 1947 to discover a license server and the license server replies to the client from UDP port 1947. Alternatively, search parameters can be specified, in which case the Sentinel License Manager on the client will send UDP "pings" to the addresses listed. UDP is also used to notify connected License Managers in case the local License Manager is stopped.
- **TCP:** This protocol is used to connect to the discovered license servers via port 1947 and to transfer license data from them.

The Sentinel License Manager can use both IPv4 and IPv6.

## Firewall Considerations

When using a license server to provide Charon licenses to client hosts on the network, any firewall installed between client and server must be configured to permit the required communication. The following sections provide information about the requirements.

### Ports Used for Communication

The following ports are used for the communication between license server and client hosts:

- On the **server side** (where network license has been installed), port 1947 must be open for incoming TCP and UDP traffic to allow client access to the license.
- On the **client side**, traffic is initiated using ports 30000 through 65535 as the source ports and port 1947 as the target port. If broadcast search for remote licenses is to be used, the client must also permit UDP traffic initiated from port 1947 of the license server to ports 30000 through 65535 of the client.

If a host on the network cannot find the license server even though the server is operational, you can **temporarily** disable the firewall to determine whether it blocks the traffic.

### Firewall Example on Linux

**Important**: the firewall configuration examples provided in this section do not constitute a recommendation of how the firewall in a specific customer network should be configured. They are provided exclusively for illustration purposes. The reader is responsible for configuring any applicable firewalls in a way that is consistent with the security policy of his/her organization.

As firewall configurations differ depending on other requirements of the environment, the following serves purely as an example of how the above settings could be implemented on Linux.

By default, most Linux firewalls allow the return traffic for any communication started at the local host. So, on a **client host**, the default firewall configuration will most likely be sufficient for the communication with the server unless broadcast search for remote licenses is to be used. In this case, the traffic from the license server to the client UDP ports described above also must be permitted.

The following example shows how to add a firewall service for the Sentinel communication on a **license server** using **firewalld** as the firewall:

```
# firewall-cmd --permanent --new-service=sentinelsrv

# firewall-cmd --permanent --service=sentinelsrv --add-port=1947/tcp

# firewall-cmd --permanent --service=sentinelsrv --add-port=1947/udp

# firewall-cmd --get-active-zones

# firewall-cmd --zone=<zonename> --permanent --add-service=sentinelsrv

# firewall-cmd --reload
```

The example above creates a new service named *sentinelsrv*, adds the necessary ports to the service, and activates the service in the zone associated with the correct interface (this information retrieved via the **--get-active-zones**) parameter. A final reload of the firewall activates the configuration.

**Please note**: the example above does not restrict the access to the license server to specific client IP addresses. If this is needed, a more sophisticated configuration is required. Please refer to the firewall documentation of your system for more information.

The following example shows how to add permission on the client to accept the UDP packets from the license server. This is needed if the broadcast search for remote licenses is to be used:

```
# firewall-cmd --zone=<zonename> --permanent \

    --add-rich-rule='rule family=ipv4 source address=<licenseserver-IP>/32 \

    port protocol=udp port=30000-65535 accept'

# firewall-cmd --reload
```

The example above adds a rich firewall rule permitting traffic from the IP address *licenseserver-IP* to the UDP ports 30000-65535 on the client. The reload of the firewall activates the configuration.

**Please note**: the example above does not restrict the access by the license server IP address to a specific source port. If this is needed, a more sophisticated configuration is required. Please refer to the firewall documentation of your system for more information.

To verify that the service and the rich rule have been added, use the following command:

```
# firewall-cmd --zone=<zonename> --list-all
```

An alternative to the command-line example above is the GUI tool **firewall-config** for **firewalld**.

# Firewall Example on Windows

**Important**: the firewall configuration example provided in this section does not constitute a recommendation of how the firewall in a specific customer network should be configured. It is provided exclusively for illustration purposes. The reader is responsible for configuring any applicable firewalls in a way that is consistent with the security policy of his/her organization.

After the installation of the Sentinel runtime software, the firewall on Windows is configured to allow the necessary connections to the License Manager. The configuration allows incoming connections to the **hasplms.exe** program via all ports and from all addresses (program specific rule).

To verify and, if needed, to change the configuration perform the following steps:

1. Log in as a user with administrator rights.
2. Press **WIN+R** and enter the command **WF.msc.**
3. Select **Inbound Rules** in the right-hand panel.
4. Look for the entry Sentinel License Manager.
5. Select the entry above and then click on **Properties** in the left-hand panel.

This will display the properties of the **Sentinel License Manager** rule. Please refer to the Windows documentation if you need to modify the rule.
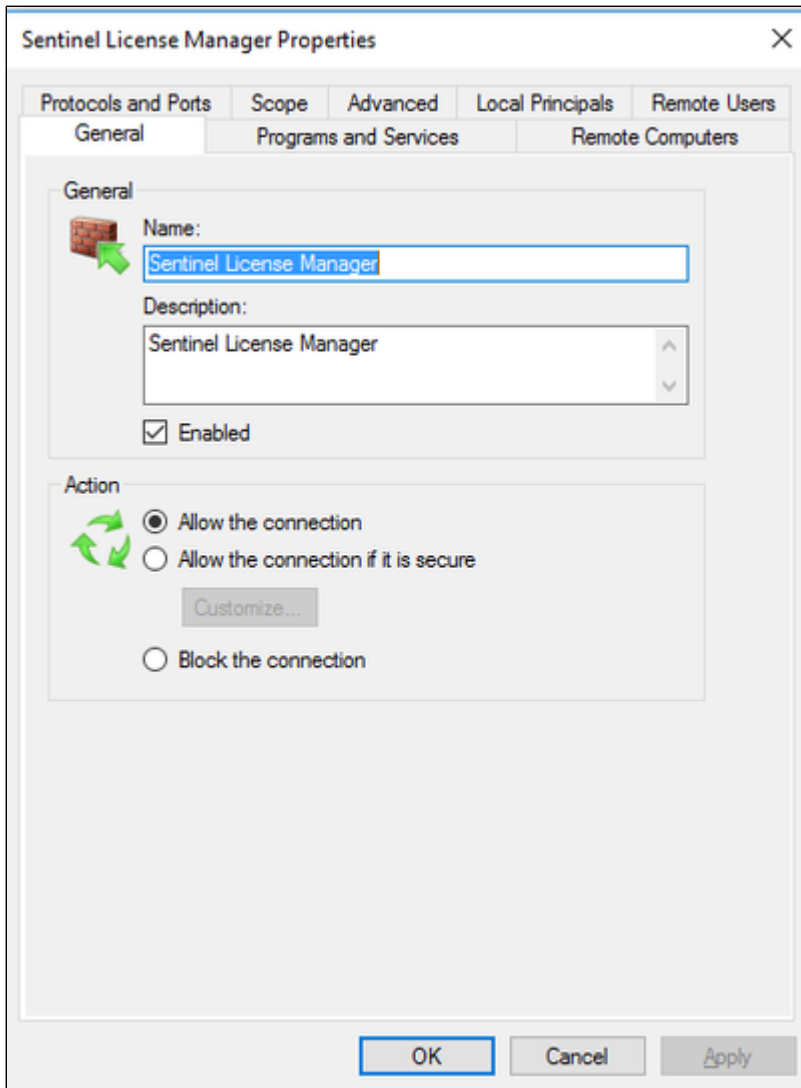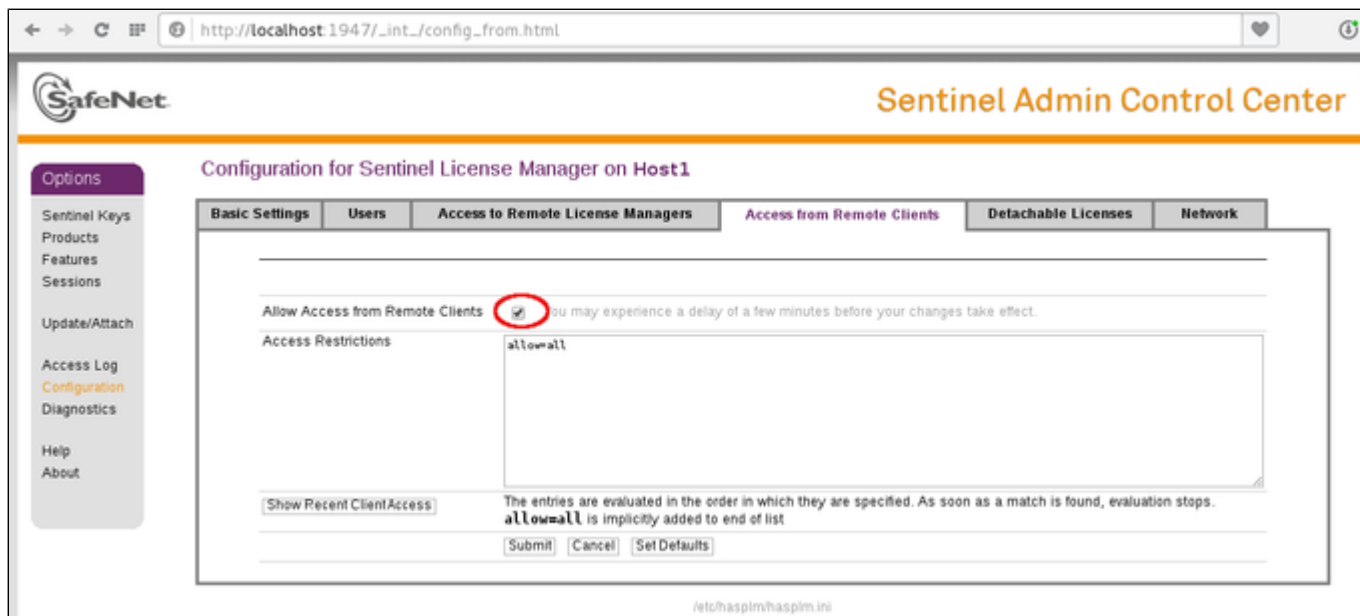
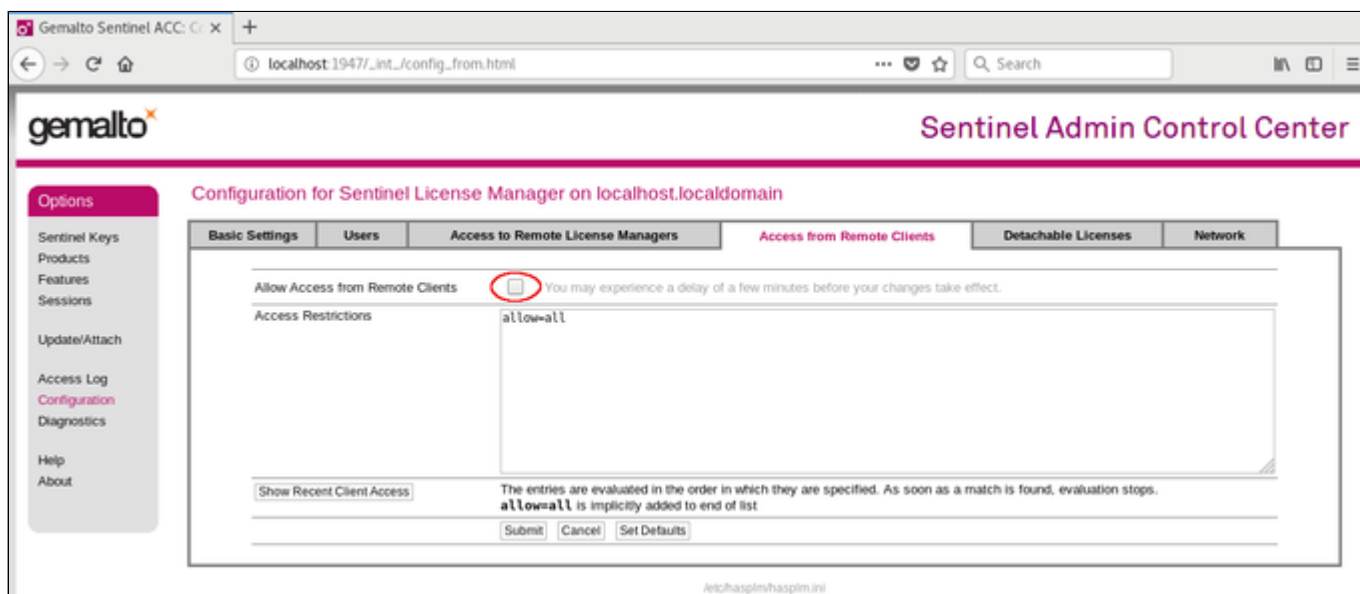# Controlling Access to Network License on Server Side

The Sentinel license manager on the license server can be configured to **allow** or **disallow** access from remote clients to the network licenses installed on the license server. To access this configuration option, perform the following steps **on the license server**:
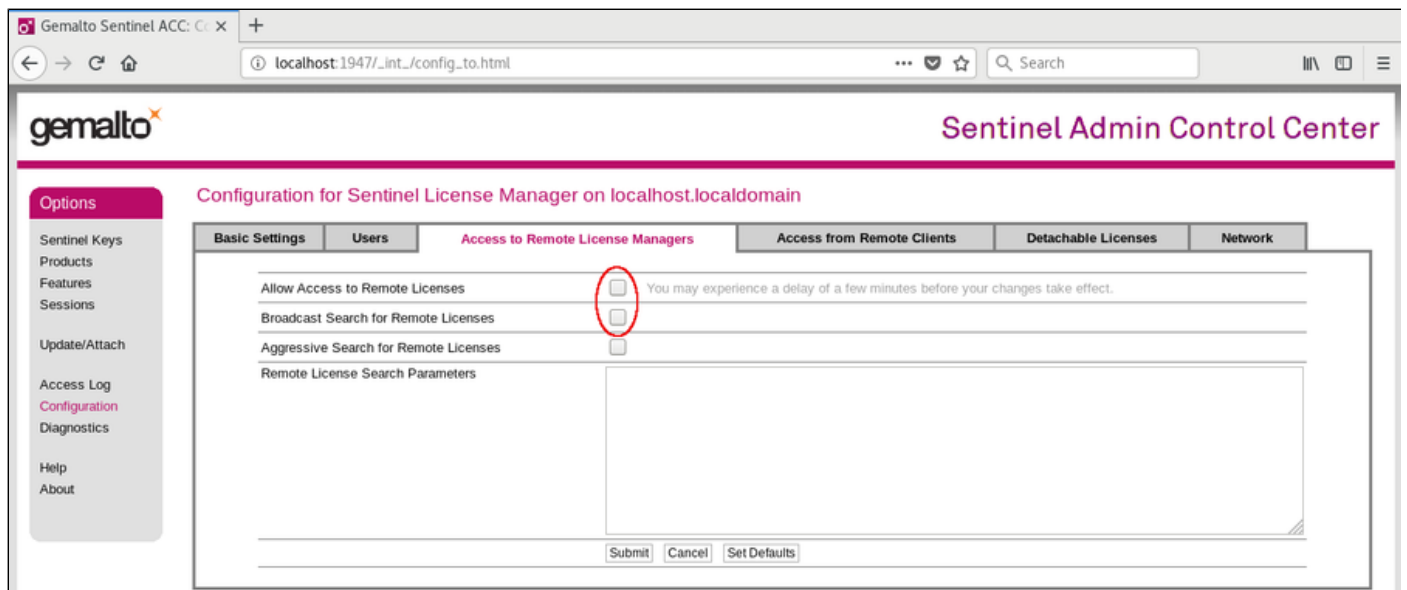
1. Open a web-browser and go to the URL **http://localhost:1947/_int_/config_from.html** (option: Configuration / Access from Remote Clients).

2. This opens a page similar to the following. **Please note**: newer Charon emulator products (e.g., Charon-AXP/VAX version 4.9 and Charon-PAR 1.10) have newer versions of Sentinel ACC. The pages of these versions look different, but the functionality remains mostly the same.

Old ACC version:

New ACC version:



Or for versions starting with 8.x:

3. Possible actions:

- To **allow access** from remote clients, *activate* the check-box next to the field **Allow Access from Remote Clients** or **Anyone and cloud licenses can be consumed without identity** and press **Submit** at the bottom of the page.
  To allow access from remote clients, network visibility on the "Network" tab must be set to **All Network Adapters.**
- To **refuse access** from remote clients, *clear* the check-box next to the field **Allow Access from Remote Clients** or select **No one**, and press **Submit**.
- **Access Restrictions** allow refining access rules, e.g., by specifying IP addresses. Please refer to Sentinel ACC help for details.

Sentinel ACC versions 8.x and higher have additional configuration options on this screen (mostly cloud related). These options are not relevant to Charon emulator products.

# Controlling Access to Network License on Client Side

The Sentinel ACC can be configured to enable or prevent that the client host discovers network licenses and to change the options used to discover and access network licenses provided by a license server.

1. Open a web-browser on the **client host** and go to the URL **http://localhost:1947/_int_/config_to.html** (option: Configuration / Access to Remote License Managers).

2. This will open a configuration page similar to the following. **Please note**: newer Charon emulator products (e.g., Charon-AXP/VAX version 4.9 and Charon-PAR 1.10 and higher) have newer versions of the Sentinel license drivers. The Sentinel ACC pages of these versions look different, but the functionality remains mostly the same

Old ACC version:



New ACC version:

3. Possible actions:

- *Activate* the check-box next to the field **Allow Access to Remote Licenses** to **enable** access to license servers. Press **Submit** to save the setting.
- *Clear* the check-box next to the field **Allow Access to Remote Licenses** to **disable** access to license servers. Press **Submit** to save the setting.
- The option **Broadcast Search for Remote Licenses**, when activated, enables a broadcast search for license servers on the local network without having to enter the address of a license server.

    **Please note**:

- If the option **Broadcast Search for Remote Licenses** is not enabled or cannot be used in the customer specific setting, you can enter specific IP addresses or host names that should be queried for network licenses in the **Remote License Search Parameters** field. Please refer to the Sentinel ACC help function for more information.
- To allow access to remote license managers, network visibility on the "Network" tab must be set to **All Network Adapters**.
- Starting with Charon-AXP/VAX 4.9 for Linux, Charon-AXP/VAX version 4.8 for Windows, and Charon-PAR 1.10, these Charon emulator products do not follow the settings in the Sentinel ACC with respect to querying remote license servers and network visibility. They perform a **broadcast search** for network licenses even if this has been disabled in the local Sentinel ACC configuration. If this behavior has to be prevented for specific reasons, the access of the system to the license server has to be temporarily restricted or disabled, for example by blocking the relevant traffic in a firewall. Another possibility would be to block access to the network license at the license server side. Note that such methods can negatively impact other functions of the system or, in the case of blocking access to a network license on the server, even the functions on other license clients.

# Monitoring Licenses

This section describes how certain aspects of the license status can be monitored.

- Introduction
- Monitoring the Emulator on Linux
  - Emulator Log Files on Linux
  - Emulator Log Examples
  - Monitoring Tools
    - Linux Toolkit for Charon-AXP/VAX and Charon-PAR
    - Samples of Open Source Tools for Charon-SSP Hosts and other Linux Hosts
    - Charon License Expiration Check
  - Monitoring aksusbd Messages in the Linux System Log
  - Charon-PAR Special Monitoring Options
- Monitoring the Emulator Log File on Microsoft Windows
  - Emulator Log Files on Windows
  - Emulator Log File Examples
  - Monitoring Tools
    - Charon Log Monitor for Microsoft Windows
    - License Expiration Check on Microsoft Windows

# Introduction

The emulator periodically checks the presence of a valid license. The checking period is specified on the license (default: once per hour) and can be different for the different Charon emulator products. Should no valid license be found, this will be logged in the emulator log file. As the emulator continues to run only for a limited time without the license, it is important to receive timely information about the license problem. This section describes some methods for monitoring the log file on Linux and Windows.

**Please note**: Charon-AXP/VAX 4.9 and Charon-PAR 1.10 and newer will grant a grace period of 12 hours after all valid licenses have disappeared. Older versions of these products and other emulator products will continue to run without a license until the next scheduled license check (default 1 hour). Charon-SSP starting with version 3.0 will continue to run for two license check periods. **The grace period varies significantly between products and versions of the same product!**

# Monitoring the Emulator on Linux

## Emulator Log Files on Linux

If the log file location is not specified explicitly in the configuration, the default log file location on host-based Charon emulator products is as shown in the table below:

| Charon Product | Default Log file Location |
|---|---|
| Charon-AXP/VAX | If the setting of the template configuration is used: directory from which the emulator instance was started. |
| Charon-SSP | If instance was created using Charon-SSP Manager:<br>`/opt/charon-agent/ssp-agent/ssp/[sun-4m\|sun-4u]/<configuration-name>/` |
| Charon-PAR | The default location of the log file is the directory in which the emulator is started. Filename format:<br><br>Old versions:<br><br>`hppa_log-<date-and-time>-000000000.log`<br><br>New versions:<br><br>`charon-par.<date-and-time>-0000.log` |

# Emulator Log Examples

The log-file contents differ depending on Charon products and versions as shown in the following examples.

The following Charon-AXP/VAX log file excerpt shows the message written after the license dongle has been removed for Charon-AXP/VAX versions **before version 4.9**:

```
20160809:185509:INFO :0:000003E6:ll_sentine(1820): Performing regular license check ...
20160809:185509:ERROR:2:000003E8:ll_sentine( 379): Sentinel HASP RunTime Error 7.
20160809:185509:INFO :0:00000351:ethane.cxx(3056): session: Detected removal of the license. Normal operation is supported
for 59 minutes from now.
```

The following Charon-AXP/VAX log file excerpt shows the message written after the license dongle has been removed for Charon-AXP/VAX version 4.12. It shows the 12 hour grace-period introduced in version 4.9.

```
20220825:190522:WARN :1:0000024D:licenseman(1988): Communication with the license key "527889790" lost.
20220825:200323:INFO :0:0000024D:licenseman(1981): Performing regular check of the current license.
20220825:200323:WARN :1:0000024D:licenseman(1988): Unable to log in to the key "527889790", feature 0.
20220825:200323:ERROR:2:0000024D:licenseman(1996): HASP runtime (50): Unable to locate any Feature matching scope.
20220825:200323:WARN :1:0000024D:licenseman(1988): Failed to login at the Sentinel HASP key: "527889790".
20220825:200323:INFO :0:0000024D:licenseman(1981): Checking the available license key "527889790".
20220825:200323:WARN :1:0000024D:licenseman(1988): Unable to log in to the key "527889790", feature 0.
20220825:200323:ERROR:2:0000024D:licenseman(1996): HASP runtime (50): Unable to locate any Feature matching scope.
20220825:200323:WARN :1:0000024D:licenseman(1988): Failed to log in to the Sentinel HASP key: "527889790".
20220825:200323:WARN :1:0000024D:licenseman(1988): Connection to license key:"527889790" id:"1000.826" lost. Application will
stop at 26-Aug-2022 08:03:23.
20220825:200323:INFO :0:00000424:licenseman(2068): session: Detected removal of the license. Normal operation is supported
till 26-Aug-2022 08:03:23.
```

The following Charon-SSP log file excerpt shows the message written after the license dongle has been removed:

```
2017-02-17 12:27:23 ERROR License There is no valid license key.

2017-02-17 12:27:25 WARNING License CHARON will be shutdown within 120 minutes!
```

The following **Charon-PAR version 1.7.4** log file excerpt show the message written after the connection to the license dongle has been lost or the dongle has been removed:

```
20160927:150512.34743:PDC CHASSIS:0XCE0F State=  INITIALIZE

20160927:150619.152882:Device EWA0 (enp6s0) : RX up

20161009:200646.683932:err:Contact with license key lost ...


20161009:200646.684279:err:Please reinsert the key within 15 minutes

otherwise emulator will stop.
```

The following **Charon-PAR version 1.11** log file excerpt show the message written after the connection to the license dongle has been lost or the dongle has been removed:

```
20180530:111134.451689:warn:Communication with the license key "445532399" lost.

....

20180530:121042.834152:Checking the available license key "445532399".

20180530:121042.837140:warn:Unable to log in to the key "445532399", feature 0.

20180530:121042.837198:err:HASP runtime (50): Unable to locate any Feature matching scope.
```

```
20180530:121042.837250:warn:Failed to log in to the Sentinel HASP key: "445532399".

20180530:121042.837295:warn:Connection to license key:"445532399" id:"1001688" lost.

Application will stop at 31-May-2018 00:10:42.
```

# Monitoring Tools

## Linux Toolkit for Charon-AXP/VAX and Charon-PAR

The **Linux Toolkit** provides monitoring functions covering the license-specific log information. For example:

- License connecting/disconnecting (license lost/restored messages and license removal)
- Change of a license
- License expiration warning
- The next version of the Toolkit will also enable monitoring the Sentinel runtime error log

Please refer to Charon Linux Toolkit for more information.

## Samples of Open Source Tools for Charon-SSP Hosts and other Linux Hosts

There are commercial tools that can be adapted to monitor the Charon emulator log files. However, there are also some Open Source tools that can be used (with the proper customization). Two examples are listed below (**this does not constitute a recommendation** - but is meant to illustrate what may be available in the Open Source area):

- **Logwatch**
  Logwatch is a customizable, pluggable log-monitoring system. It will go through your logs for a given period of time and create a report in the areas that you wish providing the detail that you wish. It is easy to use, but will have to be customized for use with the Charon emulator log files.
- **Zabbix**
  A professional comprehensive monitoring tool that can be adapted to most customers' needs. There are also companies providing professional support for customization and implementation.

## Charon License Expiration Check

The Charon Linux Toolkit includes a license expiration check utility that can send alert emails, and/or execute a custom script, a specified number of days before the license expires.
This utility can be installed in standalone-mode to be used on **Charon-AXP**, **Charon-VAX**, **Charon-SSP** and **Charon-PAR** without installing the Charon Linux Toolkit.

To download the utility, you must issue a request via email to the Stromasys support team or ask your reseller.

Please refer to How-to install Charon license expiration check on a Linux server for detailed installation and configuration instructions.

# Monitoring aksusbd Messages in the Linux System Log

The background process **aksusbd** and **hasplmd** log their messages via the **journald** daemon. **These logs can be monitored by the Linux Toolkit.** Alternatively, they can be extracted using the **journalctl** command.

**Example**: to extract messages specific to the aksusbd software for the last five minutes, use the following command:

```
$ journalctl --since="$(date '+%Y-%m-%d %H:%M:%S' -d '5 minutes ago')" -t aksusbd --no-pager
```

If a dongle had been removed within this time span, the output is similar to the following:

```
Aug 12 14:57:49 host1 aksusbd[17450]: aksusbd_usb_dev_remove: device '/dev/aks/hasp/1-14.2'
```

If a dongle is connected, a message similar to the following will be displayed:

```
Apr 11 19:44:37 redhat7.localdomain aksusbd[15047]: aksusbd_usb_dev_connect: device '/dev/aks/hasp/2-1'
```

A **journalctl** command similar to the one above can be run regularly within a cron-job that sends an alert if the license has been removed. This method of monitoring has the advantage of being independent of different emulator log file formats and the different check periods set for the individual products.

**Charon-AXP/VAX version 4.9** and **Charon-PAR version 1.10** and newer also show messages corresponding to the **journalctl** messages in the emulator log file (with a delay of about one minute) that can be captured by log monitoring tool such as logwatch. Below is a sample for the Charon-AXP /VAX product:

```
20180413:100557:WARN :1:0000024D:licenseman(1830): Communication with the license key "527889790" lost.

20180413:182106:WARN :1:0000024D:licenseman(1830): Communication with the license key "527889790" restored.
```

**Please note**: If you use Charon-AXP/VAX, the Linux Toolkit can be used to implement this monitoring option.

## Charon-PAR Special Monitoring Options

Charon-PAR versions 1.10 and higher offer an additional feature to support alerts in the case of license problems.

The Charon-PAR configuration file supports the following new parameters that can be used to alert the user to potential license problems:

| Parameter | Description |
|---|---|
| **hasp_lost_usr_cmd** | Runs a user-defined script or a executable if Charon disconnects from current valid license and no other valid license is found. This action is called every hour during the 12 hours grace period (at the end of which Charon-PAR stops unless a license has been found). <br><br> The script or command started receives three parameters from Charon-PAR: <br> *key-id*, *product-license-id*, and *termination time*. <br><br> Usage example: <br> `hasp_lost_usr_cmd="./my-license_connection_lost.sh"` |
| **license_changed_usr_cmd** | Runs a user-defined script or an executable when Charon-PAR disconnects from one license and connects to another for any reason. <br><br> The script or command started receives four parameters from Charon-PAR: *old-key-id*, *old-product-license-id*, *new-key-id*, and *new-product-license-id*. <br><br> Usage example: <br> `license_changed_usr_cmd="./my-license_changed.sh"` |
| **license_expiration_warning_usr_cmd** | Runs a user-defined script or an executable when the license expiration time is within few hours. The default setup is: starting 24 hours before expiration this script is invoked each hour. <br><br> The script or command started receives three parameters from Charon-PAR: <br> *key-id*, *product-license-id*, *expiration time*. <br><br> Usage example: <br> `license_expiration_warning_usr_cmd="./my-license_expiration_warning.sh"` |

**License logging level**:

Starting with Charon-PAR version 1.11, periodic (once per hour) log messages indicating a successful periodic license check are disabled by default to avoid cluttering the log file. They can be re-enabled by adding the parameter

```
system.license_logging_level = 2
```

to the emulator configuration file. Setting the parameter to 0 or 1 will disable the messages.

**Please note** that this parameter must be placed towards the end of the configuration file and will not work if placed before the memory configuration.

# Monitoring the Emulator Log File on Microsoft Windows

## Emulator Log Files on Windows

| Version | As Service | Log File Location |
|---------|-----------|-------------------|
| < 4.8 | Yes | Log files are stored in the home directory of the service. |
| < 4.8 | No | The log file is stored in the same directory as the configuration file of the Charon instance. |
| >= 4.8 | Yes | The log file is stored in the home directory defined when creating the Charon instance via the Virtual Machines Manager. (The Virtual Machines Manager always starts an emulator instance as a service.) |

## Emulator Log File Examples

The following Charon-AXP/VAX log file excerpt (before version 4.9) shows the message written after the license dongle has been removed:

```
20160809:185509:INFO :0:000003E6:ll_sentine(1820): Performing regular license check ...
20160809:185509:ERROR:2:000003E8:ll_sentine( 379): Sentinel HASP RunTime Error 7.
20160809:185509:INFO :0:00000351:ethane.cxx(3056): session: Detected removal of the license. Normal operation
is supported for 59 minutes from now.
```

The following log file excerpt from Charon-AXP/VAX 4.9 shows the messages written after the license has been removed, the periodic checks to verify whether the license has become available again, and finally the message to indicate the stop of the emulator due to the missing license:

```
20180425:215721:WARN :1:0000024D:licenseman(1830): Communication with the license key "527889790" lost.

20180425:225625:INFO :0:0000024D:licenseman(1823): Performing regular check of the current license.

The previous message has been repeated 9 times.

20180425:225625:INFO :0:00000424:ethane.cxx(3514): session: Detected removal of the license.

<lines removed>

20180426:090634:INFO :0:0000024D:licenseman(1823): Checking the available license key "527889790".

The previous message has been repeated 25 times.

20180426:095635:INFO :0:00000424:ethane.cxx(3514): session: Detected removal of the license.

20180426:100636:INFO :0:0000024D:licenseman(1823): Checking the available license key "527889790".

The previous message has been repeated 25 times.

20180426:105637:ERROR:2:000002E5:ethane.cxx(3472): session: Product or license has terminated.

Please, see the reason above.

20180426:105637:INFO :0:0000024D:licenseman(1823): Licensing component received stop request.

20180426:105637:INFO :0:0000032D:ethane.cxx(2776): "AlphaServer 1000" stop request received.

20180426:105637:INFO :0:0000032E:ethane.cxx(2794): Stopped.
```

Please note that not all messages are shown in the log excerpt above because the configuration parameter **log_repeat_filter** was set to **on** (default).

To receive all messages, this parameter must be set to **off** in the emulator configuration file. This will create a more detailed output as shown below. In particular, it shows the grace period after which the emulator will stop:

```
20180612:132038:WARN :1:0000024D:licenseman(1830): Communication with the license key "879642840" lost.

20180612:132438:INFO :0:0000024D:licenseman(1823): Performing regular check of the current license.

20180612:132438:WARN :1:0000024D:licenseman(1830): Unable to log in to the key "879642840", feature 0.

20180612:132438:WARN :1:0000024D:licenseman(1830): HASP runtime (7): Sentinel protection key not available.

20180612:132438:WARN :1:0000024D:licenseman(1830): Failed to login at the Sentinel HASP key: "879642840".

20180612:132438:WARN :1:0000024D:licenseman(1830): Connection to license key:"879642840" id:"1002922" lost.

Application will stop at 13-Jun-2018 01:24:38.

20180612:132438:INFO :0:00000424:ethane.cxx(3514): session: Detected removal of the license.
```

The following Charon-AXP/SMA log file excerpt shows the message written after the dongle has been removed:

```
2016-10-04 01:43:15:231: ES40-1: license: Error 7, CHARON can't detect HASP key and will shutdown within 60
minutes
2016-10-04 01:58:15:243: ES40-1: license: Error 7, CHARON can't detect HASP key and will shutdown within 45
minutes
2016-10-04 02:13:15:253: ES40-1: license: Error 7, CHARON can't detect HASP key and will shutdown within 30
minutes
2016-10-04 02:28:15:260: ES40-1: license: Error 7, CHARON can't detect HASP key and will shutdown within 15
minutes
2016-10-04 02:43:15:269: ES40-1: license: Emulator stopped on error 7...Appropriate license key is not present
```

# Monitoring Tools

## Charon Log Monitor for Microsoft Windows

Charon-AXP/VAX/PDP come with the **logmond** (Log Monitor & Dispatcher) utility. This utility can monitor the emulator log for events indicating that the license has been removed.
Please refer to CHARON on Windows - Charon Log Monitor. It contains detailed descriptions for using this tool on all supported Charon product versions.

There is no comparable utility for the Charon-AXP/SMA product.

## License Expiration Check on Microsoft Windows

Starting with Charon-AXP/VAX/PDP version 4.8 the **license expiration check** utility is installed with the Charon emulator kit. The details of this utility are described in the user's guides of the Charon-AXP/VAX/PDP for Windows. This section provides a short overview.

This utility is executed once a day at 09:00 AM and will send Windows Application Events 15 days before license expiration. No other action will be taken unless you customize the `expiredlicense.bat` script.

The installation process installs the utility and the default `expiredlicense.bat` file under the Charon installation folder, usually in `C:\Program Files\CHARON\Redistributables\Stromasys`. It also provides examples on how to send alerts via email.

**Please note**:

- If you installed this utility manually before installing Charon-AXP V4.8, the scheduled task will remain unchanged.
- If you remove all Charon emulator products from the server, the scheduled task will be disabled. It will not be deleted.
- For versions prior to Charon-AXP/VAX 4.8 the utility can be installed manually. Please refer to Charon on Windows - Automated License Expiration Check for details on the use of this tool.

# Removing the Sentinel Runtime Software

To completely remove the Sentinel runtime software from the system, the software must be deinstalled. Depending on whether a full Charon emulator product or only the license-specific packages of the installation kit were installed, the steps maybe slightly different.

**On Linux,** the related RPM packages must be deinstalled (using the **yum erase** or **rpm -e** command).

**On Windows**, the deinstallation will be performed in **one** of the following methods:

- Via the GUI option to deinstall the Charon emulator product.
- Via the CHARON on Windows - Charon License Utility (in case of a standalone installation); Stromasys provides the utility for download free of charge.
- The command `haspdinst.exe -fr -kp -nomsg` to deinstall only the license driver (deprecated - use the Charon Licensing Utility).

Please refer to the appropriate user's guide of your Charon product (see Documentation) for detailed instructions on how to remove the license driver software from the system

Please note:

- After removing the license drivers, the installed licenses will no longer be available to the local system or to clients of a license server.
- Make sure that this will not negatively impact your production environment before actually removing the license drivers.

# Tools Reference

The tools described in this section were already introduced in the task specific sections. This section provides more detail about these tools.

- Sentinel Admin Control Center
    - Security Settings for Sentinel Admin Control Center
    - Sentinel ACC Screens - Overview
        - Starting the Sentinel Admin Control Center (ACC)
        - Sentinel ACC Main Help Screen
        - Sentinel Keys Screen
        - Update/Attach Screen
        - Access Log Screen
        - Configuration Screens
            - Basic Settings
            - Users
            - Access to Remote License Managers
            - Access from Remote Clients
            - Cloud Identities
            - Detachable Licenses
            - Network
        - Diagnostics
    - Selected Configuration File Parameters (hasplm.ini)
- Linux specific tools
    - hasp_srm_view
    - hasp_update
    - Linux Toolkit
- Windows specific tools
    - HASP View Utility
        - Hasp View on Charon-AXP and Charon-VAX for Windows
        - Hasp View on Charon-AXP/SMA
    - License Update Utility (RUS)
    - Additional License Related Tools
- License Management with Charon-SSP Manager
    - Charon-SSP License Viewer
    - Charon-SSP License Update Tool
    - Charon-SSP License Configuration Options

# Sentinel Admin Control Center

The Sentinel Admin Control Center (ACC) is a web-based GUI to manage many aspects of Sentinel license keys. It is installed as part of the Sentinel license driver installation. This chapter describes the following points in more detail:

- Security Settings for Sentinel Admin Control Center
- Sentinel ACC Screens - Overview
- Selected Configuration File Parameters (hasplm.ini)

**Please note**: the license solution vendor provided a new version of the Sentinel license drivers (version 7.60 and higher). The new version is included in products starting with Charon-AXP/VAX 4.9, Charon-PAR 1.10, and Charon-SSP version 3.0. The following descriptions show important differences between the old and new version, where required. The screenshots used are based on either version - unless a change in functionality requires a particular version.

# Security Settings for Sentinel Admin Control Center

**Stromasys strongly recommends performing the steps described below to reduce the risk of unauthorized access to the Sentinel ACC**.

To improve the security of the Sentinel Admin Control Center, perform the following steps:

- Setting a GUI Password
- Protecting the Sentinel HASP Configuration File on Linux

## Setting a GUI Password

By default, anyone on the local system with access to port 1947 can access the GUI. If remote access is enabled, users on the network with access to port 1947 can also access the GUI. To protect access to the GUI with a password, perform the following steps:

| Step | Description |
|------|-------------|
| 1 | Open a web browser and navigate to **http://localhost:1947/.** |
| 2 | **Click** on the left-hand menu item labeled **Configuration**. |
| 3 | **Click** on the **Basic Settings** tab. |
| 4 | Under the entry labeled **Password Protection, click** the **Change Password** button. |
| 5 | At the **Change Password** window:<br><br>• Leave the **Current Admin Password** field blank (there is no password set by default).<br>• Enter the desired password into the **New Admin Password** field.<br>• Repeat the desired password in the **Re-enter new Admin Password** field**.**<br>• **Click** the **Submit** button**.** |
| 6 | Back at the **Basic Settings** tab:<br><br>• Under the section labeled **Password Protection,** select the **All ACC Pages** radio button**.**<br>• **Click** the **Submit** button to save this change. |
| 7 | Optional: to allow **remote access** to the Sentinel HASP GUI:<br><br>• **Click** the **Basic Settings** tab.<br>• **Select** the **Allow Remote Access to ACC** check box.<br>• **Click** the **Submit** button**.**<br><br>**Additional information for remote access to the Sentinel HASP GUI:**<br><br>• The firewall must permit access to port 1947/TCP, and<br>• network visibility on the ACC network configuration tab must be set to **All Network Adapters.**<br><br>If required, remote access can also be enabled on Linux by editing the file */etc/hasplm/hasplm.ini* and setting the parameter **ACCremote** to **1**. Should the file not yet exist, refer to How-to enable remote connection to Sentinel Admin Control Center without GUI, or to the Sentinel ACC *Selected Configuration File Parameters* chapter in the Tools Reference section of the licensing handbook.<br>The parameter to enable network visibility is **bind_local_only**. It must be set to **0** to enable all adapters. Changed settings are recognized automatically by aksusbd. |

## Protecting the Sentinel HASP Configuration File on Linux

To prevent unprivileged access and modifications to the Sentinel HASP configuration file on Linux, enter the following commands:

```
# chmod 0700 /etc/hasplm
# chmod 0600 /etc/hasplm/*
```

The file **hasplm.ini** on Windows is readable by normal users but cannot be modified. Password information is encrypted.

# Sentinel ACC Screens - Overview

This section provides an overview of the different screens of the Sentinel Admin Control Center (ACC) and their most common use in a Charon environment:

- Starting the Sentinel Admin Control Center (ACC)
- Sentinel ACC Main Help Screen
- Sentinel Keys Screen
- Update/Attach Screen
- Access Log Screen
- Configuration Screens
  - Basic Settings
  - Users
  - Access to Remote License Managers
  - Access from Remote Clients
  - Cloud Identities
  - Detachable Licenses
  - Network
- Diagnostics

**Please note**:

- The hostname specified in the URL used in the following sections is **localhost**. If the Sentinel ACC running on a different host needs to be accessed, replace **localhost** with the correct hostname or address.
- The license solution vendor provided a new version of the Sentinel license drivers (version 7.60 and higher). The new version is included in products starting with Charon-AXP/VAX 4.9, Charon-PAR 1.10, and Charon-SSP version 3.0. The following descriptions show important differences between the old and new version, where required.

# Starting the Sentinel Admin Control Center (ACC)

**For any product and any operating system**, the Sentinel ACC can be started by **opening a browser** and visiting the URL **http://localhost:1947/** (replace localhost with host address or name for remote access).

In **Charon-AXP/VAX 4.8 and higher for Windows**, it can also be started via the Virtual Machines Manager:

Open the Virtual Machines Manager by clicking on the desktop icon or via the start menu as shown below:
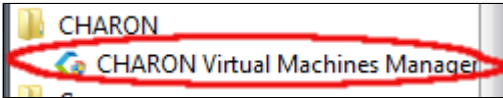


After the Virtual Machines Manager opens, go to the **Host Information & Utilities** tab and click on the button **Sentinel Admin Control Center**. This will open a browser on the main page of the Sentinel ACC.
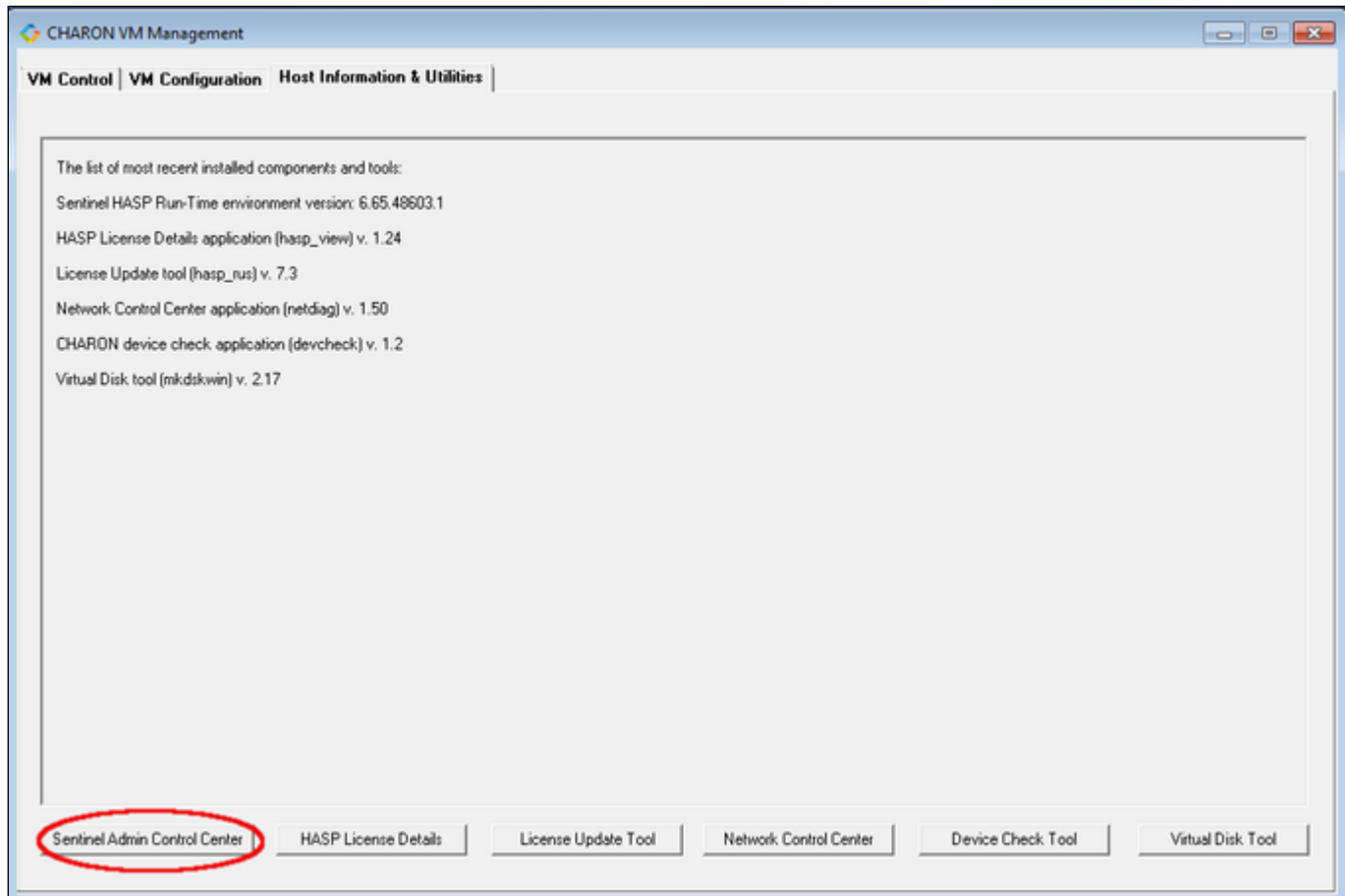
# Sentinel ACC Main Help Screen

If you direct the browser to **http://localhost:1947/**, the main help page opens:
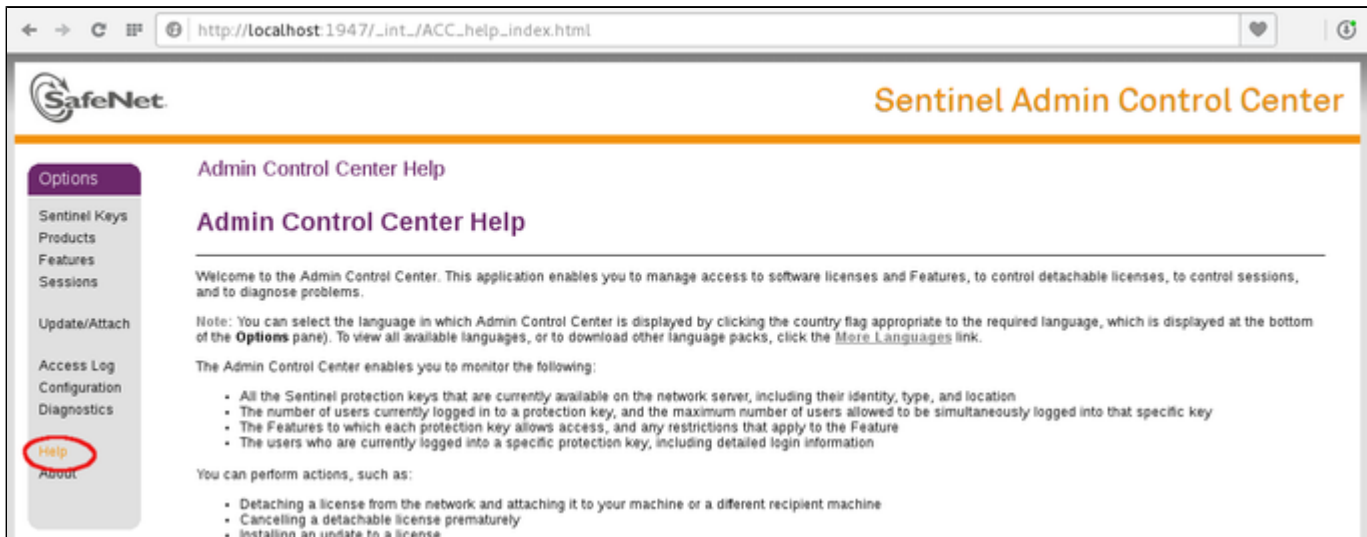


Starting with ACC version 7.60, the appearance of the application has changed:
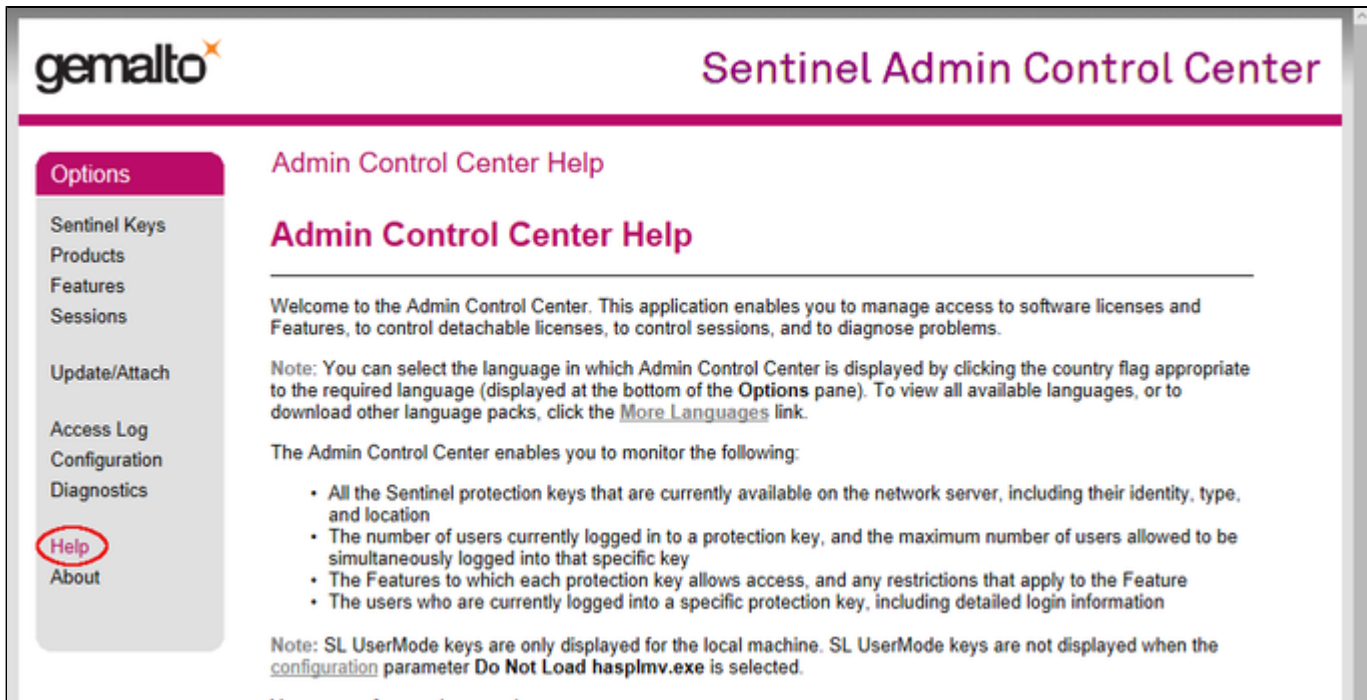


The help page provides a short overview of actions that can be performed using Sentinel ACC. For more detail one of the categories at the bottom of the page can be selected.

**Please note**: help is available on all pages by clicking on the help menu choice on the left-hand side or at the bottom of each page. It provides a lot of helpful information and examples.

# Sentinel Keys Screen

To get to the **Sentinel Keys** screen, click on the corresponding menu item or access the URL **http://localhost:1947/_int_/devices.html** directly. A screen similar to the following opens and displays the available license keys:



For Sentinel drivers version 7.60 and above, this screen looks similar to the following:



This page displays important information about the available licenses, including

- **Location**: Shows whether the license is local or remote. If the license is a network license, the hostname of the remote system is specified. You can access the remote license manager by clicking on the hostname, provided that access is permitted.
- **Key ID**: The unique identification of the license.
- **Key Type**: Hardware keys are marked by the abbreviation HL (hardware license) and a picture of the license dongle. Software licenses are marked by the abbreviation SL (software license).
- **Sessions**: Shows the number of active sessions opened for the specific key.

The buttons on the right-hand side can be used to retrieve more information about the license or to extract the C2V file for a license update. The **Browse** button shown for network licenses will connect to the remote license manager to show the license features.

A C2V file can only be extracted if the license in question is local to the current license manager, i.e., the license manager to which the web browser is connected. You can connect to a remote license manager by clicking on the hostname in the **Location** column (if connections are allowed).

**Please note**:

- The option to create a C2V file is not available in older versions of the license software.
- Starting with ACC version 7.60, the **option to create C2V files** for USB dongles is only available if it has been **enabled in the basic configuration** section (under the *Configuration* menu item).
- Newer versions of ACC also offer the option to create a fingerprint for a new SW license.
- Some newer versions of ACC show the option on this screen to create a DEMOMA fingerprint. This is a demo key for development purposes and not relevant for Charon products.
- Some newer versions of ACC offer to create a fingerprint for a software license if such a license does not exist yet. Do not use this option. The resulting file has a format that is incompatible with the Stromasys license creation tools. Instead use the tools described in Generating C2V and Fingerprint Files.

The menu options *Products*, *Features* and *Sessions* on the left-hand side provide the same information as the buttons. However, they show the information for all licenses.

# Update/Attach Screen

To open the **Update/Attach** screen, click on the corresponding menu item or access the URL **http://localhost:1947/_int_/checkin.html** directly. A screen similar to the following will be displayed:
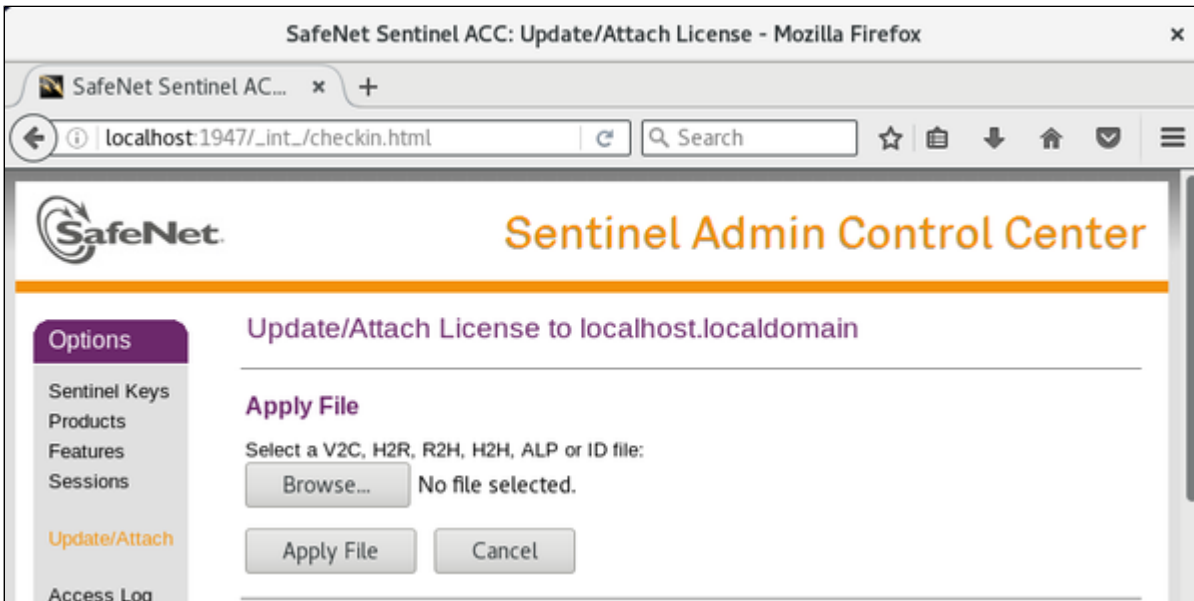


The following image shows the same screen on a Windows system running Charon-AXP 4.9 with the new Sentinel ACC version. It looks slightly different, but the functionality is the same:
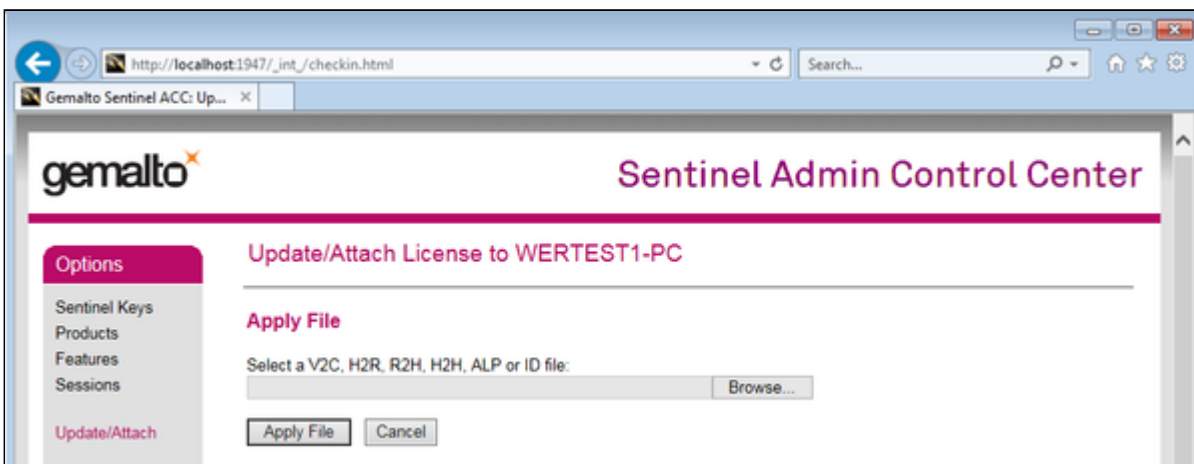


This screen enables the application of a V2C file to install or update a license.

The basic steps to install or update a license include:

- selecting a V2C file
- applying a V2C file (make sure to **apply the \*_fmt.v2c file first** should you have received two V2C files).

**Please note**: the **Browse** option is called **Choose File** on some products/versions.

See also section Applying/Updating License Data from V2C File(s).

# Access Log Screen

After the access log has been enabled in the **Configuration** section, you can see a history of license access operations on this host. The log file is stored in the same directory as the one containing the *hasplm.ini* file, which is shown at the bottom of the web-page.

The following images show examples of the access-log page.

Old ACC version:
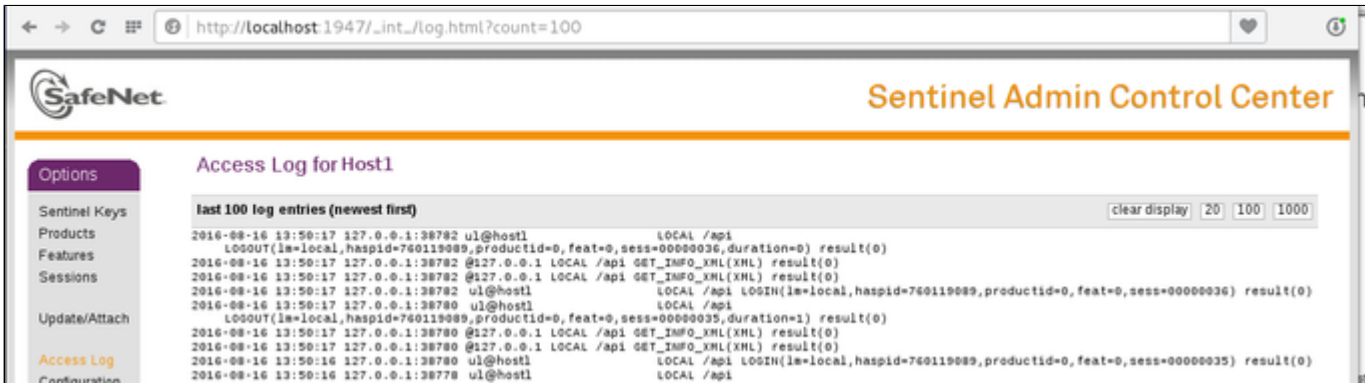


New ACC version:
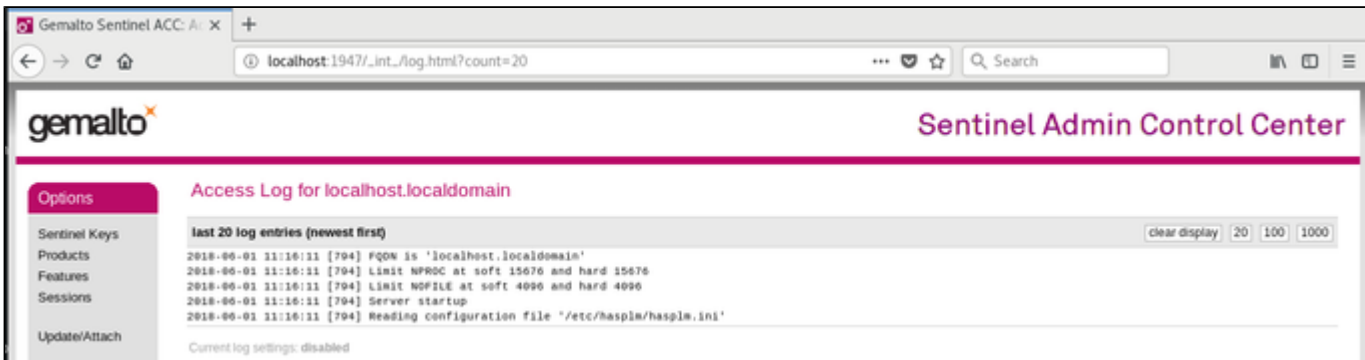
# Configuration Screens

Clicking on the menu choice **Configuration** or opening the URL **http://localhost:1947/_int_/config.html** opens the first of the configuration screens. This section provides a short overview of the available configuration options that are relevant for the Charon environment. The configuration settings are stored in the *hasplm.ini* file. The location of this file is shown at the bottom of the Sentinel ACC configuration screen.

- Basic Settings
- Users
- Access to Remote License Managers
- Access from Remote Clients
- Cloud Identities
- Detachable Licenses
- Network

## Basic Settings

The following picture shows an example of the Basic Settings screen (ACC version < 7.60):
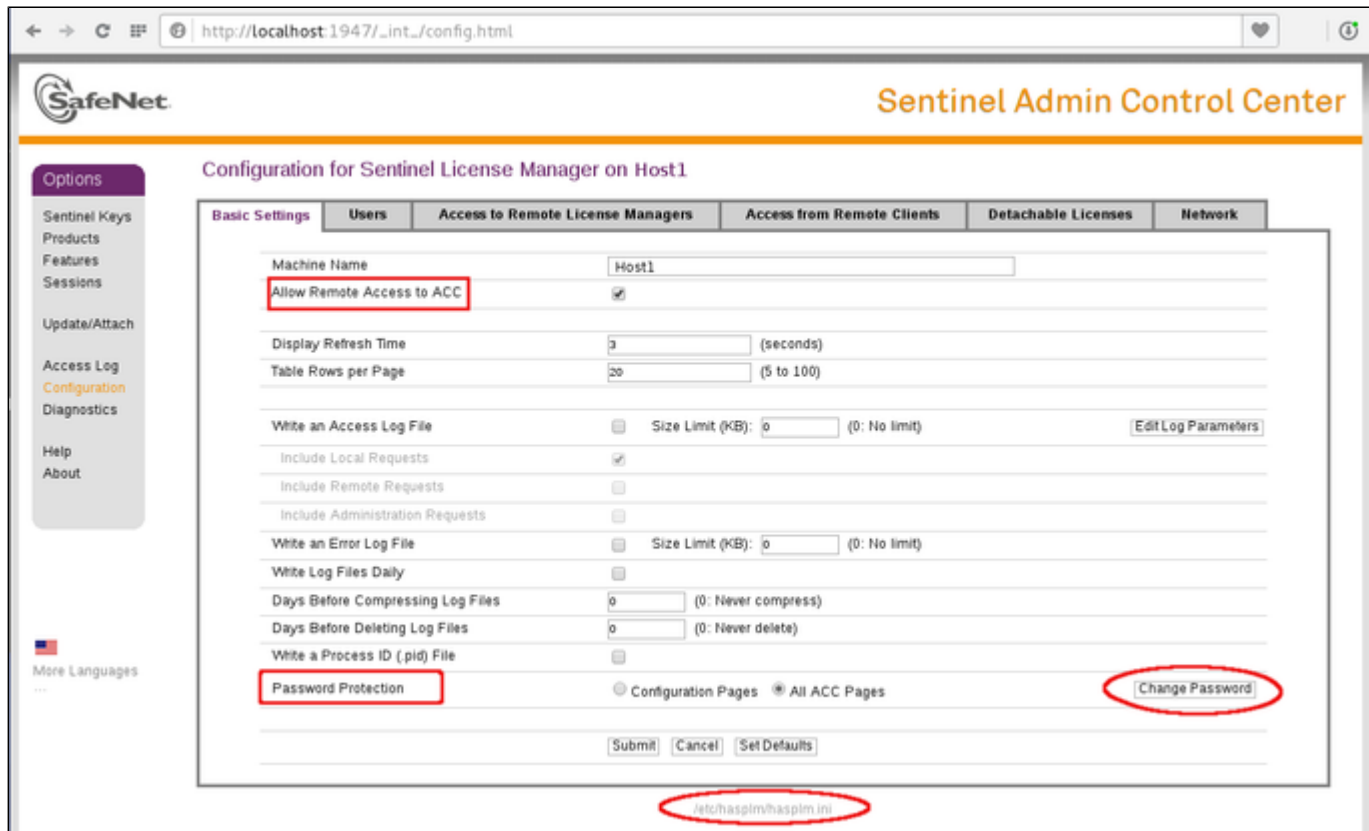


The Basic Settings screen contains a number of important configuration options, including the ones marked above:

- **Allow Remote Access to ACC**: If activated, the Sentinel ACC can be accessed over the network. If this parameter is set, the **Network Visibility** on the *Network* tab must be set to **All Network Adapters**. If you have no graphical access, you can edit the configuration file from the command-line. See Selected Configuration File Parameters (hasplm.ini) and How-to enable remote connection to Sentinel Admin Control Center without GUI.
- The **Change Password** button allows you to set or change a password (see Security Settings for Sentinel Admin Control Center).
- **Password Protection**: Defines which pages should be protected by the password.

In addition to the above, the various log files can be enabled on this screen. The file in which the settings are stored is indicated at the bottom of the screen.

Starting with version 7.60, this screen contains a new configuration option relevant to the Charon environment: If ACC should allow C2V-file creation from the *Sentinel Keys* page, the feature must be enabled here. See screenshot below:



Another new option in versions > 7.63 is the possibility to select either HTTPS or HTTP for remote access. HTTPS requires that a certificate be configured in the *Network* section.

Configuration options that are recommended for all versions, are the settings for the **access and error log files**. Please refer to Enabling logging in Sentinel Admin Control Center for additional information and configuration recommendations.

## Users

This screen allows the definition of users from specific hosts who are either allowed or prohibited from accessing licenses on the local system.

This screen is not relevant for controlling remote access to the local Sentinel ACC.

**This screen does not contain options that are currently used in a Charon environment, thus no screenshot is provided.**
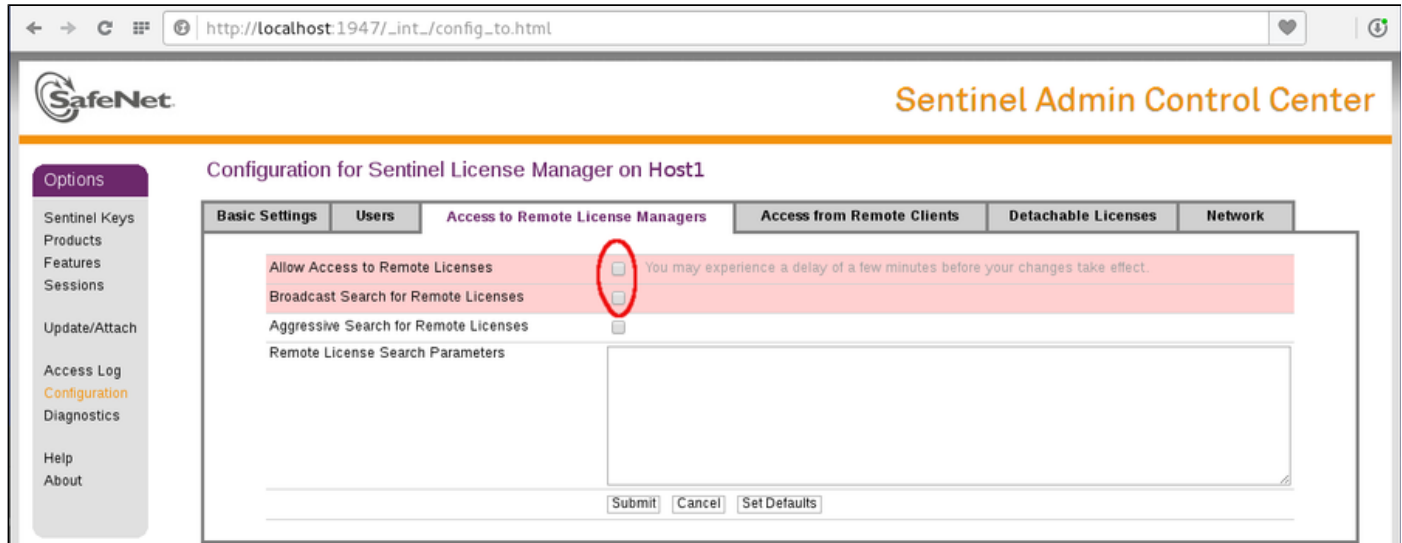
## Users

## Access to Remote License Managers

This screen enables the system manager of the local system to allow or disallow access to remote license servers.

The Sentinel ACC can be configured to enable or prevent that the client host discovers network licenses and to change the options used to discover and access network licenses provided by a license server.
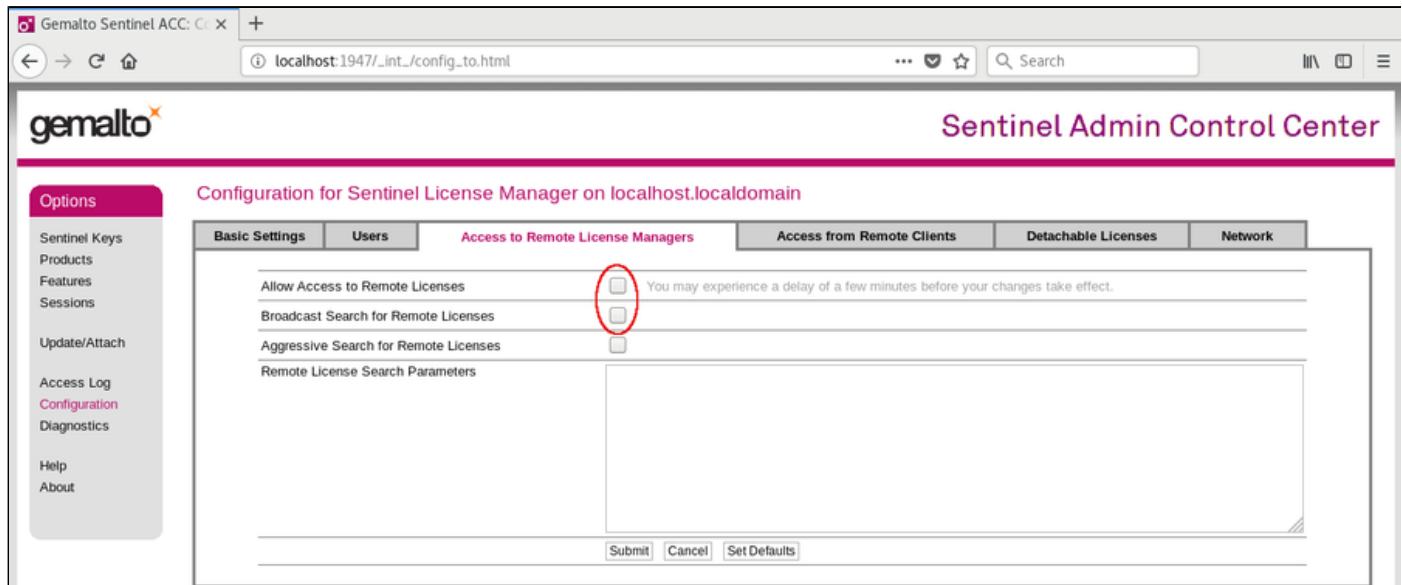
1. Open a web-browser on the **client host** and go to the URL **http://localhost:1947/_int_/config_to.html**
   (option: Configuration / Access to Remote License Managers).

2. This will open a configuration page similar to the following. **Please note**: newer Charon emulator products (e.g., Charon-AXP/VAX version 4.9 and Charon-PAR 1.10 and higher) have newer versions of the Sentinel license drivers. The Sentinel ACC pages of these versions look different, but the functionality remains mostly the same

Old ACC version:



New ACC version:



3. Possible actions:

- *Activate* the check-box next to the field **Allow Access to Remote Licenses** to **enable** access to license servers. Press **Submit** to save the setting.
- *Clear* the check-box next to the field **Allow Access to Remote Licenses** to **disable** access to license servers. Press **Submit** to save the setting.
- The option **Broadcast Search for Remote Licenses**, when activated, enables a broadcast search for license servers on the local network without having to enter the address of a license server.
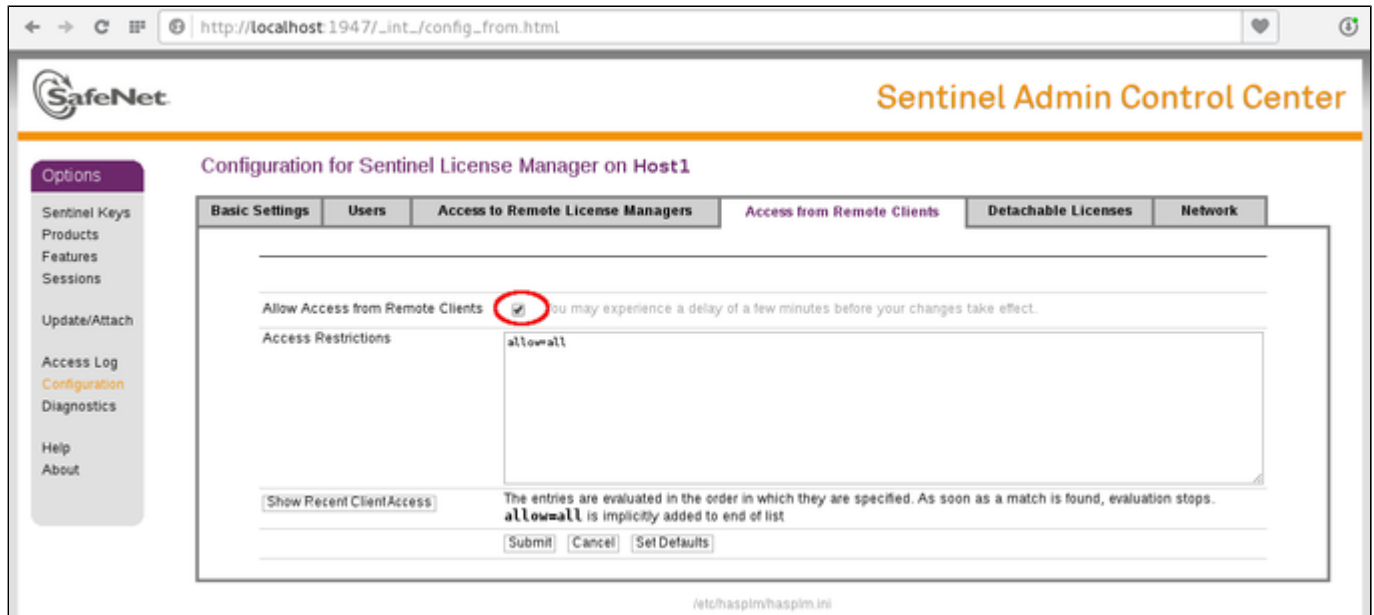
**Please note**:

- If the option **Broadcast Search for Remote Licenses** is not enabled or cannot be used in the customer specific setting, you can enter specific IP addresses or host names that should be queried for network licenses in the **Remote License Search Parameters** field. Please refer to the Sentinel ACC help function for more information.
- To allow access to remote license managers, network visibility on the "Network" tab must be set to **All Network Adapters**.
- Starting with Charon-AXP/VAX 4.9 for Linux, Charon-AXP/VAX version 4.8 for Windows, and Charon-PAR 1.10, these Charon emulator products do not follow the settings in the Sentinel ACC with respect to querying remote license servers and network visibility. They perform a **broadcast search** for network licenses even if this has been disabled in the local Sentinel ACC configuration. If this behavior has to be prevented for specific reasons, the access of the system to the license server has to be temporarily restricted or disabled, for example by blocking the relevant traffic in a firewall. Another possibility would be to block access to the network license at the license server side. Note that such methods can negatively impact other functions of the system or, in the case of blocking access to a network license on the server, even the functions on other license clients.
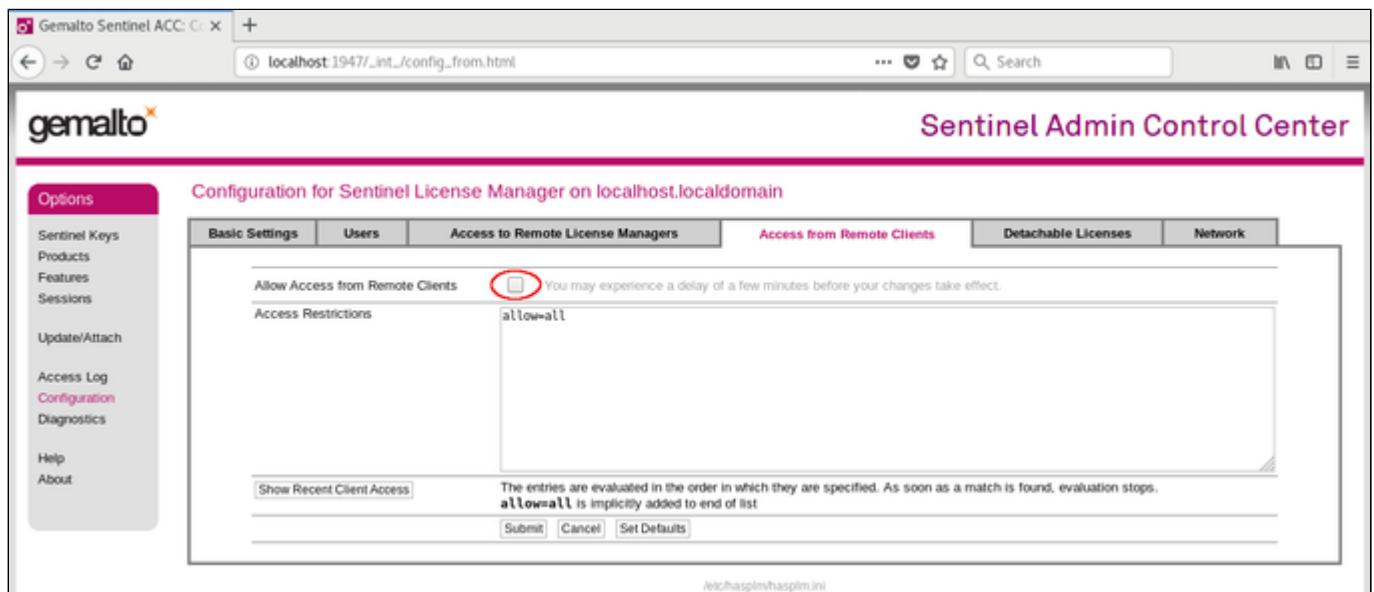
## Access from Remote Clients

The Sentinel license manager on the license server can be configured to **allow** or **disallow** access from remote clients to the network licenses installed on the license server. To access this configuration option, perform the following steps **on the license server**:

1. Open a web-browser and go to the URL **http://localhost:1947/_int_/config_from.html** (option: Configuration / Access from Remote Clients).

2. This opens a page similar to the following. **Please note**: newer Charon emulator products (e.g., Charon-AXP/VAX version 4.9 and Charon-PAR 1.10) have newer versions of Sentinel ACC. The pages of these versions look different, but the functionality remains mostly the same.

Old ACC version:



New ACC version:



Or for versions starting with 8.x:

3. Possible actions:

- To **allow access** from remote clients, *activate* the check-box next to the field **Allow Access from Remote Clients** or **Anyone and cloud licenses can be consumed without identity** and press **Submit** at the bottom of the page.
  To allow access from remote clients, network visibility on the "Network" tab must be set to **All Network Adapters.**
- To **refuse access** from remote clients, *clear* the check-box next to the field **Allow Access from Remote Clients** or select **No one**, and press **Submit**.
- **Access Restrictions** allow refining access rules, e.g., by specifying IP addresses. Please refer to Sentinel ACC help for details.

Sentinel ACC versions 8.x and higher have additional configuration options on this screen (mostly cloud related). These options are not relevant to Charon emulator products.

## Cloud Identities

Available starting with Sentinel driver version 8.x. The Cloud Identities screen is used to manage unique identities of license clients in cloud identities.

**This feature is currently not used in Charon environments, thus no screenshot is provided.**

## Detachable Licenses

The Detachable License feature allows a system administrator at the end-user site to detach an individual license from a Sentinel HASP SL Net license pool for use on a single machine outside of the network for a limited amount of time.

**This feature is currently not used in Charon environments, thus no screenshot is provided.**

## Network

The **Network Visibility** setting defines whether ACC and the License Manager service are available over the network (**None** blocks network access).
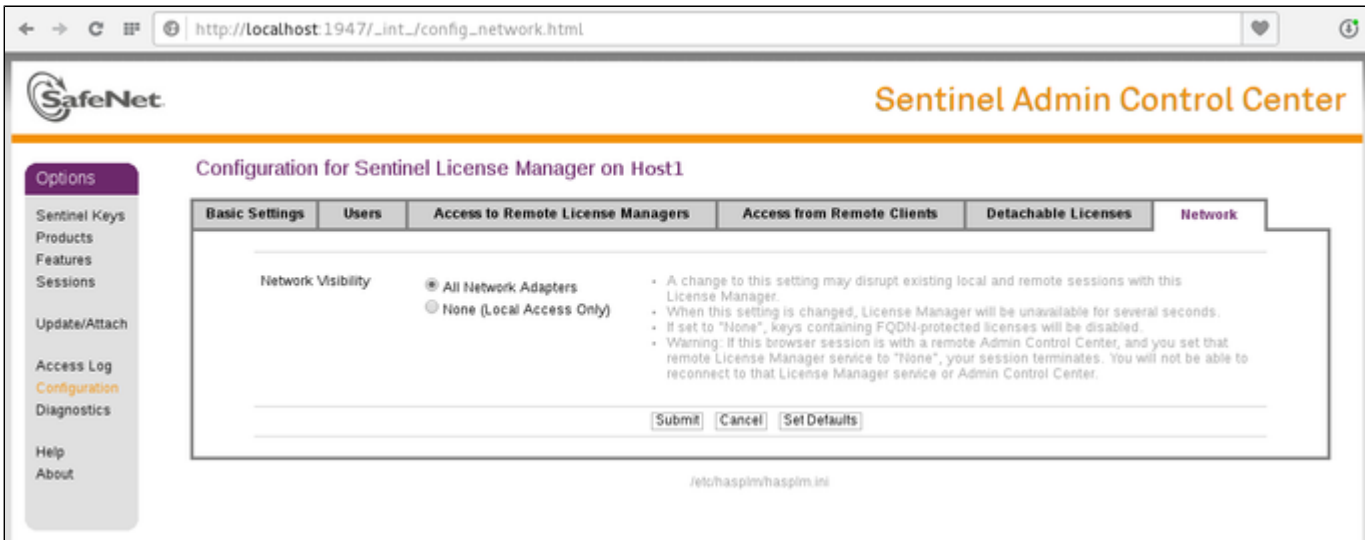


**Please note**: Sentinel ACC starting with version 7.60 (more options starting with version 8.x) provides additional network configuration options.
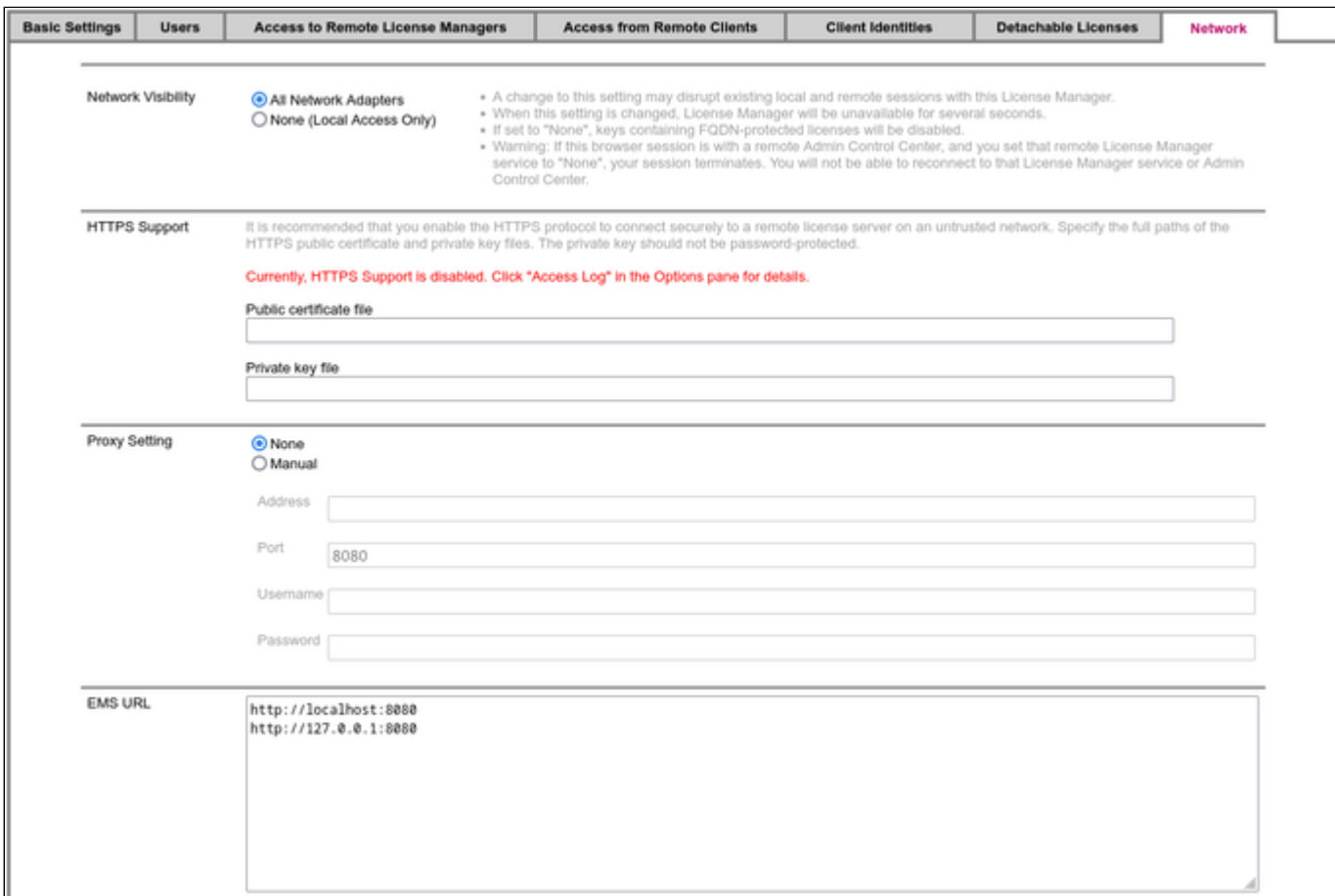


The additional options are not directly related to a Charon emulator environment, but could be helpful in some situations. For example:

- Define the certificate and key to use for a HTTPS connection to the ACC license manager.
- Define a network proxy.

## Diagnostics

The diagnostics page provides information about the system and enables the generation of a diagnostics report, which can be used to support troubleshooting. In addition, the page allows the creation of a system ID file, which can be used for transferring a software license to the system.

**Transferring licenses is no longer supported in newer versions of the Charon products:**

- Charon-SSP versions 1.0.36 and higher as well as Charon-AXP/VAX versions 4.8 and higher no longer support the transfer of software licenses.
- Newly issued software licenses are generally not transferable.

The following image shows an example of the diagnostics page using an older product version:

The following image shows the same menu item displayed when using versions starting with version 7.60 of Sentinel ACC:
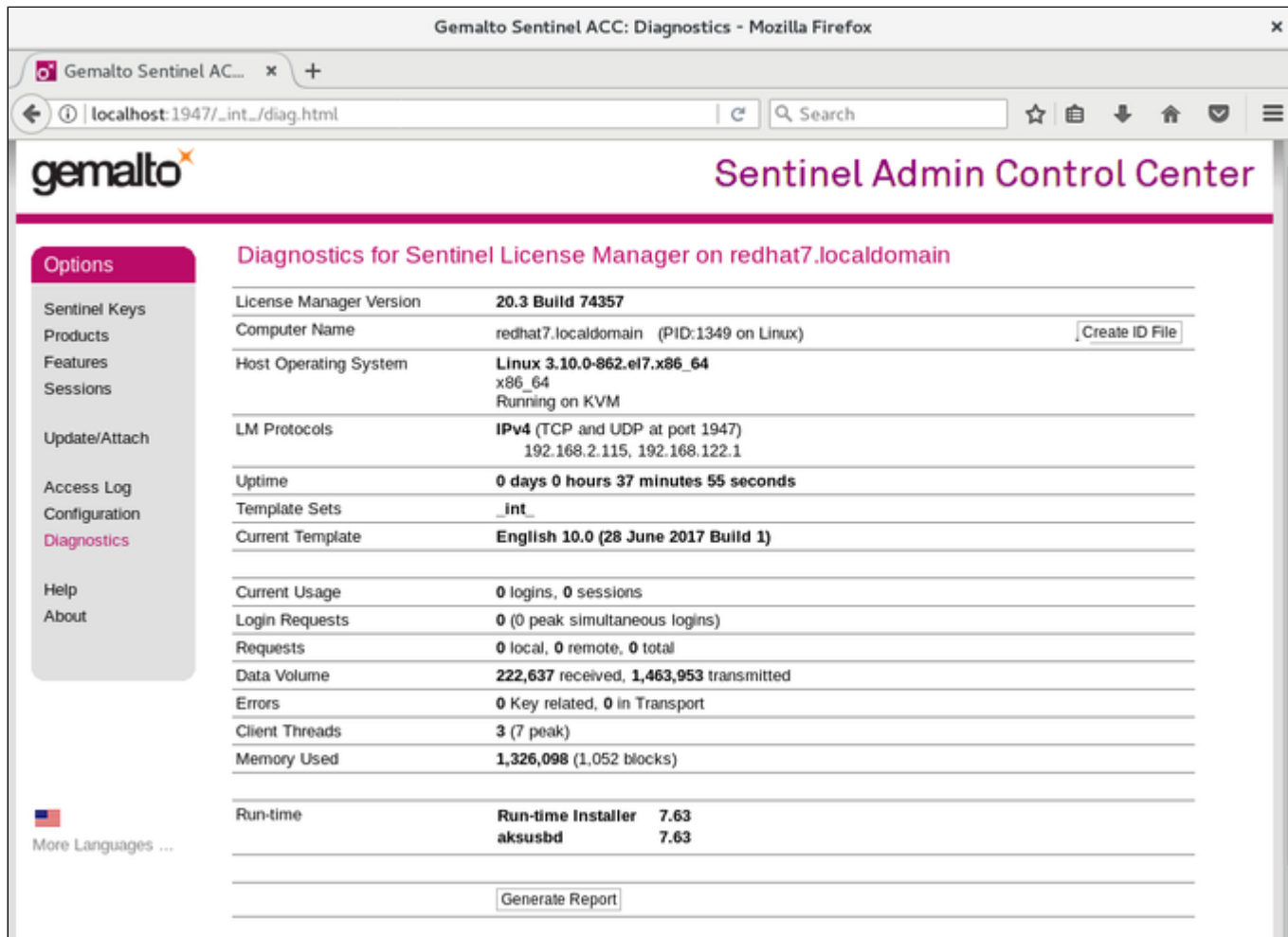
# Selected Configuration File Parameters (hasplm.ini)

If the Charon host system does not have a graphical user interface, it can be useful to modify the Sentinel ACC configuration via the configuration file, for example to allow remote access. The following table lists some of the more frequently used parameters in the **hasplm.ini** file that are normally set via the ACC web interface. The location of the file is shown on the bottom of the ACC configuration windows. The default location on Linux is **/etc/hasplm**. The default location on Windows is `C:\Program Files (x86)\Common Files\Aladdin Shared\HASP`.

If you have to edit this file manually, please refer to the article How-to enable remote connection to Sentinel Admin Control Center without GUI. It provides a lot of helpful information.

| Parameter | Description |
|---|---|
| `accremote`<br>allow remote access to ACC | The Sentinel ACC provides a web-based user interface for license management. If access is enabled, it can be accessed from a remote system via a browser (URL:*<target-system>:1947*).<br><br>**Default**: disabled (= 0). Remote access to the Sentinel ACC is blocked.<br><br>**Older driver versions**: to enable this function, set the parameter to `1`<br><br>**Driver versions >=7.100**: to enable this function, set the parameter to `1` (=**http)** or to the string **https**.<br><br>General ACC access to the network must be enabled to allow remote access.<br>For this, make sure the parameter `bind_local_only` is set to **0**. |
| `accessfromremote`<br>allow license access from remote clients | If enabled, remote systems can access licenses managed by this Sentinel License Manager. This is needed if the system acts as a license server for clients on the network.<br><br>**Disabled**: 0 (enabled is the default)<br><br>**Older driver versions**: to enable remote license access, set the parameter to `1`.<br><br>**Driver versions >7.100**: to enable, chose<br><br>&bull; **anyone**,<br>&bull; **split** (anyone, but cloud licenses require client identity), or<br>&bull; **secure** (identifiable clients only).<br><br>For **Charon emulator** environments, **anyone** should be used to enable the function. |
| `accesstoremote`<br>allow access to remote licenses | If set to `1` (default), this system will search for remote Sentinel License Managers on the network. Needed, if the system is to use a license served by a license manager on the network. Please note that not all products respect this setting for broadcast search. |
| `broadcastsearch` broadcast search for remote licenses | If set to `1`, this system will search for remote Sentinel License Managers on the local network via broadcasts. Note that the broadcast uses a random UDP port from 30000 to 65535. Any firewall between the client and the server must be configured to allow these ports in addition to the TCP port 1947. If this is disabled, the addresses of systems to search must be defined in the search parameter field. Please note that not all products respect this setting. |
| `serveraddr`<br>remote license search parameters | Defines the specific systems that will be searched by this system in order to detect remote Sentinel License Managers and licenses served by them. Systems are specified by their IP addresses (for example, 10.1.1.17), by the broadcast addresses of an address range (for example, 10.1.1.255), or by the system name (for example, system1.example.com). When using the IPv6 protocol, use the IPv6 address format. For example, type FF02::1 to access all remote Sentinel License Managers that are part of the default local group defined in the IPv6 subnet. |
| `bind_local_only`<br>define if ACC should only be accessible from localhost | **Default**: 0 = all network adapters<br><br>Localhost-only = 1 |

**Please note**: by default the hasplm.ini file does not exist. It is created by Sentinel ACC when the first configuration change is performed via the web GUI. Should it be necessary to create this file manually, the following example shows the structure of the file.

**Please note**: he example is not a recommendation for actual settings. It is for informational purposes only.

<table>
<tr><th colspan="2">Sample hasplm.ini</th></tr>
<tr><td>

```
[SERVER]
name = myhostname
pagerefresh = 3
linesperpage = 20
ACCremote = 0

enabledetach = 0
reservedseats = 0
reservedpercent = 0
detachmaxdays = 14
commuter_delete_days = 7

requestlog = 0
loglocal = 0
logremote = 0
logadmin = 0
errorlog = 0
rotatelogs = 0
access_log_maxsize = 0 ;kB
error_log_maxsize = 0 ;kB
zip_logs_days = 0
delete_logs_days = 0
pidfile = 0
passacc = 0
```

</td><td>

```
accessfromremote = 1
accesstoremote = 1
bind_local_only = 0 ; 0=all adapters, 1=localhost only

[UPDATE]
download_url = www.safenet-inc.com/hasp/language_packs/end-
user
update_host = www3.safenet-inc.com
language_url = /hasp/language_packs/end-user/

[REMOTE]
broadcastsearch = 0
aggressive = 0
serversearchinterval = 30
serveraddr = 192.168.2.115

[ACCESS]
allow=all

[USERS]
allow = all@all


[LOGPARAMETERS]
text = {timestamp} {clientaddr}:{clientport} {clientid}
{method} {url} {function}({functionparams}) result
({statuscode}){newline}
```

</td></tr>
</table>

# Linux specific tools

Linux provides two command-line tools for managing licenses. This section describes those in more detail. Additionally, there is a comprehensive management environment for Charon-AXP and Charon-VAX on Linux called the Linux Toolkit with its own user's guide. This toolkit also provides license management capabilities.

- hasp_srm_view
- hasp_update
- Linux Toolkit

# hasp_srm_view

## General Notes

The `hasp_srm_view` utility provides a simple command-line utility for gathering Sentinel license information.

**Please note**: local hardware licenses can only be displayed from a **local connection** to the system, for example via the console. If you are connected via a remote connection, for example **ssh**, the **hasp_srm_view** command will return an error. Network licenses (i.e., network dongles and software licenses) do not have this problem.

> **Workaround:**
> When connected to the system via a remote connection you can display the license contents with the following command (adapt the path of the command if your installation location is different):

```
$ ssh localhost /opt/charon/bin/hasp_srm_view [OPTION]
```

**Please note**: starting with Charon-AXP/VAX 4.9, Charon-PAR 1.10, and Charon-SSP 4.0 the hasp_srm_view utility on Linux does not follow the settings in the Sentinel ACC with respect to querying remote license servers and network visibility. The utility performs a broadcast search for network licenses even if this has been disabled in the Sentinel ACC. If this behavior has to be prevented for specific reasons, the network access of the system must be temporarily restricted or disabled, for example by blocking the relevant traffic with a firewall. Alternatively, access to the network license at the license server side can be blocked. Note that such methods can negatively impact other functions of the system or, in case of blocking access to a network license on the server, even the functions on other client host systems.

## Name

**hasp_srm_view** – Charon Sentinel HASP Utility

## Basic Syntax

```
hasp_srm_view [OPTION]
```

## Description

The command options of the `hasp_srm_view` utility are listed below. If no options are specified, `-l` is assumed.

| Option | Description |
|--------|-------------|
| `-?, -h, -help` | Display the utility usage message. |
| `-all` | Show the product license details for all available keys. |
| `-c2v FILENAME` | • Collect the Sentinel HASP key status information for the default key and write it to `FILENAME`. This C2V file is used to request an update for an existing license.<br>• In newer product versions (starting with Charon-SSP version 2 and Charon-AXP/VAX version 4.8 Build 18302) this parameter can be used together with the `-key` option to select a specific license for which a C2V file should be created. Required when creating a C2V-file if more than one license is visible to the system. |
| `-fgp FILENAME` | Collect the host fingerprint information for generating a Sentinel software license to `FILENAME`. |
| `-key KEYNUMBER` | • Used alone, the keyword assumes a show command and displays only the product license details for the key with the ID specified in **KEYNUMBER**.<br>• In newer product versions (starting with Charon-SSP version 2 and Charon-AXP/VAX version 4.8 Build 18302) this parameter can be used together with the `-c2v` option to select a specific license for which a C2V file should be created. Required when creating a C2V file if more than one license is visible to the system. |
| `-l` | Show the product license details for the default key attached to the host. |
| `-tfr LICENSEID [ FILENAME ]`<br><br>(Obsolete) | Transfer HASP SL license (V2C file) from the local host to the host with the specified recipient ID.<br><br>This option is no longer available in newer product versions. |
| `-idf`<br><br>(Obsolete) | Create transfer recipient (ID) file *recipient.id*. The file is required if a software license is to be transferred from another system to this system.<br><br>This option is no longer available in newer product versions. |

Please note that the options `-trf` and `-idf` are no longer available in Charon-SSP 1.0.36 and higher and in Charon-AXP/VAX version 4.8 and higher.

## Exit Status

The `hasp_srm_view` utility exits with `0` on success and with a **non-zero** value if an error occurs:

| Action | Exit codes |
|--------|-----------|
| Retrieve C2V data | 0 – success<br>1 – failure |
| Create a host fingerprint | 0 – success<br>1 – failure |
| Command line argument processing | 0 – success<br>1 – missing argument<br>2 – unknown argument |

The command also returns return code zero if the command itself ran successfully, but a Sentinel restriction was encountered (e.g., trying to display a license over a remote connection). In such cases an error message will be displayed.

## Examples

The following example shows a partial output of the `-l` qualifier for an attached Sentinel USB HASP key (Charon-AXP before version 4.9).

```
$ /opt/charon/bin/hasp_srm_view -l

License Manager running at host: Host1

License Manager IP address: 127.0.0.1


The Physical KeyId: 760119089

CHARON Sentinel HASP License key section

Reading 4032 bytes

The License Number: 1000.639

The License KeyId: 760119089

The Master KeyId: 2131943932

Release date: 09-JUN-2016

Release time: 14:33:59

Update number: 6

End User name: Stromasys - User1

Purchasing Customer name: Stromasys SA

Virtual Hardware: AlphaServer_DS10, AlphaServer_DS10L, AlphaServer_DS15, AlphaServer_DS20, <items removed>

Instances allowed: 5

Product Name: CHARON-AXP

Product Code: CHAXP-470xx-WI-LI

Major Version: 4

Minor Version: 7

Maximum Build: 99999

Minimum Build: 1

Host CPU supported: X64

Host Operating System required: WINDOWS, LINUX

CPU's allowed: 32

Maximum virtual memory: 65536MB

Released product expiration date: 12-Jan-2017
```

The following example shows a partial output for a hardware USB dongle using the **Charon-AXP/VAX 4.9** version of **hasp_srm_view** the most important changes are marked in blue:

```
License Manager running at host: Host1

License Manager IP address: 192.168.1.111

HASP Net key detected

The Physical KeyId: 1015925129

License type: License Dongle (Network capable)

CHARON Sentinel HASP License key section

Reading 4032 bytes

The License Number: 000.TEST.CENTER

The License KeyId: 1015925129

The Master KeyId: 827774524

Release date: 11-APR-2018

Release time: 16:52:33

Update number: 68

End User name: STROMASYS

Purchasing Customer name: STROMASYS

Product License Number: AXP_4_9_TEST

Virtual Hardware: AlphaServer_DS10, AlphaServer_DS10L, AlphaServer_DS15,<items removed>

Product Name: CHARON-AXP

Product Code: CHAXP-490xx-LI

Major Version: 4

Minor Version: 9

< Parameters Maximum Build and Minimum Build are no longer shown>

32bit and 64bit OS requirements: 64bit  <replaces parameter Host CPU supported>

Host Operating System required: LINUX

CPU's allowed: 16

Maximum virtual memory: 65536MB

CHAPI enabled

License expiration date: 01-Nov-2018

Instances allowed: 3

Feature number: 1

Check interval: 15 minutes
```

# hasp_update

## Name

**hasp_update** – Sentinel HASP Update and Transfer Utility

## Basic Syntax

```
hasp_update u filename
```

## Description

The `hasp_update` utility provides a simple command-line interface for manipulating the HASP License Key.

| Option | Description |
|--------|-------------|
| `u` | Apply the HASP key update found in `filename` |
| **Obsolete** | |
| `i` | Retrieve Sentinel protection key information and write it to **filename**. Not used for Charon products. |
| `d` | Detach a license from a Sentinel Software License (SL). Not used for Charon products |
| `r` | Rehost a license from a Sentinel Software License (SL) key. Not used for Charon products. |

**Please note**:

- Only the **u** option of this command should be used.
- For all other functions, please use the Sentinel Admin Control Center or the **hasp_srm_view** utility.

## Exit Status

The `hasp_update` command exits with `0` on success and `255` if an error occurs.

## Example

The following example demonstrates the application of a V2C (vendor-to-customer) license key file.

```
# hasp_update u mylicenseupdate.v2c
```

If you received two V2C files as part of a license update, the **\*_fmt.v2c** file must be applied **first**!

# Linux Toolkit

The Charon Linux Toolkit is a comprehensive management environment for Charon-AXP and Charon-VAX on Linux. It also provides functions to manage and monitor licenses.

The following image shows the main menu providing an overview of the available functions:



Please refer to the full documentation under Charon Linux Toolkit for more information.

# Windows specific tools

This section describes the following windows specific license management tools in detail.

- HASP View Utility
- License Update Utility (RUS)
- Additional License Related Tools

# HASP View Utility

The **HASP View** utility provides information about the licenses available on a system. Depending on the Charon version used, it is started in different ways and the display may be slightly different. The following sections provide a description.

- Hasp View on Charon-AXP and Charon-VAX for Windows
- Hasp View on Charon-AXP/SMA

Please note:

- The local HASP key cannot be read via a remote connection (for example, RDP). One possible workaround has been described in detail in the document How to read a HASP key over RDP on Windows. It shows how to setup a scheduled task for this purpose.
  Alternatively, you can use the Charon License Utility.
- The **hasp_view utility** on Windows does not follow the settings in the Sentinel ACC with respect to querying remote license servers and network visibility. The utility performs a broadcast search for network licenses even if this has been disabled in the Sentinel ACC. If this has to be prevented for specific reasons, the network access of the system has to be temporarily restricted or disabled, for example by blocking the relevant traffic in a firewall, by disconnecting the network cable, or by disabling the network interface. Alternatively, access to the network license can be blocked on the license server side. Note that all these methods can negatively impact other functions of the system or, in case of blocking access to a network license on the server, even the functions on other client host systems.

# Hasp View on Charon-AXP and Charon-VAX for Windows

This section covers the following topics:

-
-
-

## Starting the Utility on Charon-AXP/VAX Version 4.7

To display the license content, proceed as follows:

- Open the start menu.
- Select the menu entry **Charon**, then **Charon-AXP** or **Charon-VAX/PDP**.
- Select the **Utilities** subfolder in the menu.
- Click on the **HASP View** utility as shown in the following image.
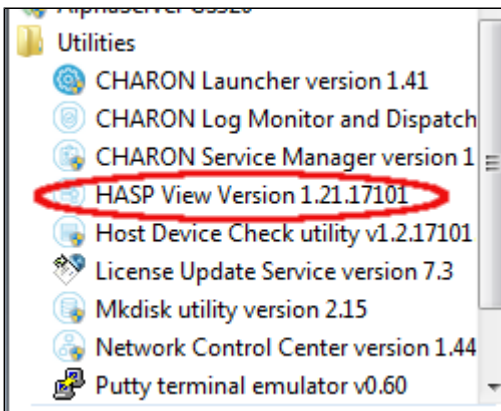
## Starting the Utility on Charon-AXP/VAX Version 4.8 and Later

To display the license content, proceed as follows:

Open the **CHARON Virtual Machines Manager** via the corresponding **desktop icon** or the **start menu**:



Once the CHARON Virtual Machines Manager has been started,

- go to the **Host Information & Utilities** tab and
- click on the **HASP License Details** button:

## HASP View Utility Window

The following image shows sample output:



The buttons at the bottom of the window provide additional functions:

- **Charon License Details** (re-)queries the selected license key (the highlighted tab) and displays the contents**.**
- **Refresh** the key list. This is useful if a key has just been added or removed.
- Copy license details to **clipboard**, for example to paste into a support e-mail.
- **Exit** from the utility.

**If there is more than one license, the data for each license is shown on a separate tab.**

**Please note**: starting with Charon-AXP/VAX version 4.9, the button **Charon License Details** has been renamed to **Refresh current license**. The names of some parameters have changed, new parameters were added, and other parameters removed. See the following sample output:

# Hasp View on Charon-AXP/SMA

To display a license, right-click on the Charon icon in the system tray. This will open the management menu as shown in the following image:



Selecting *View License* from this menu will open the license viewer window as shown below:
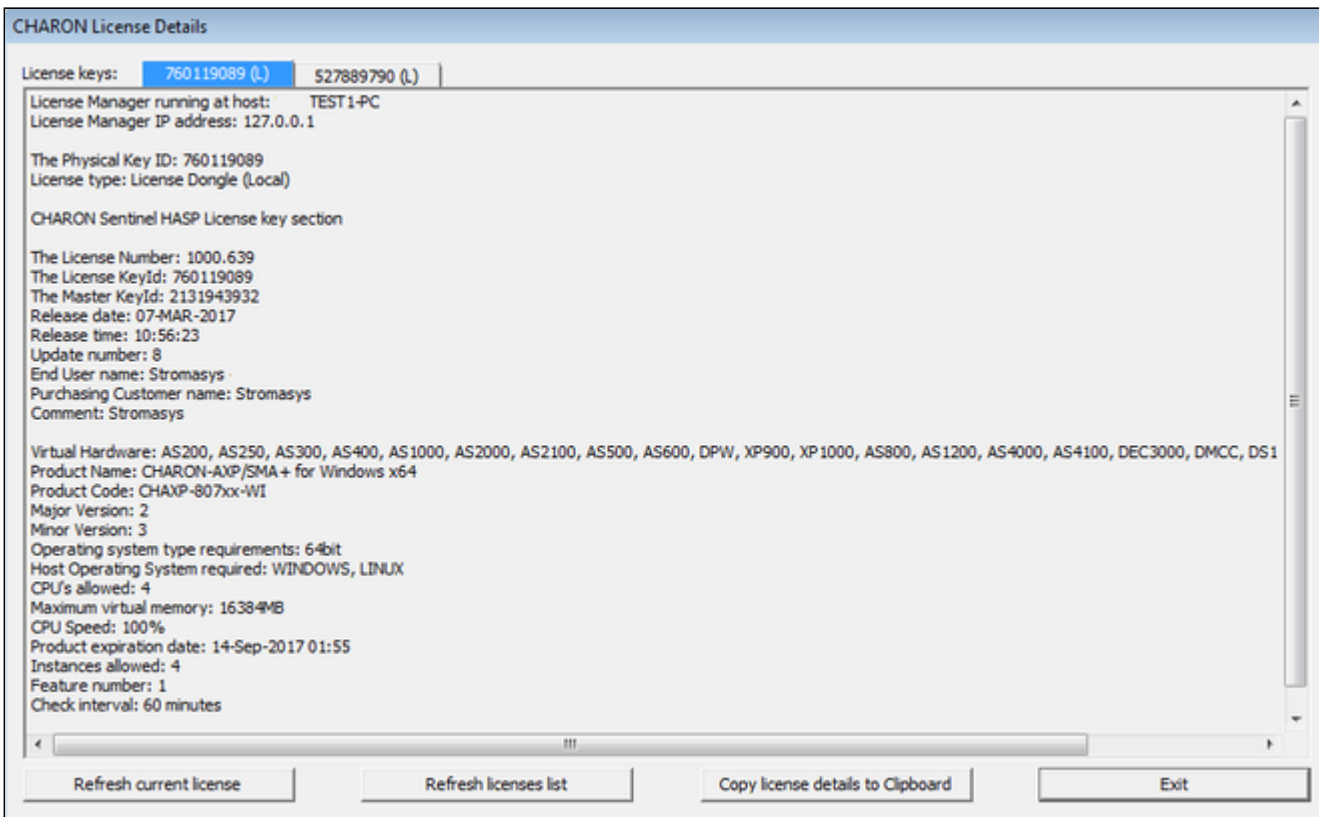


The buttons at the bottom of the window provide additional functions:

- **Refresh current license** will reload the content of the license currently displayed.
- **Refresh license list**. This is useful if a key has just been added or removed.
- Copy license details to **clipboard**, for example to paste into a support e-mail.
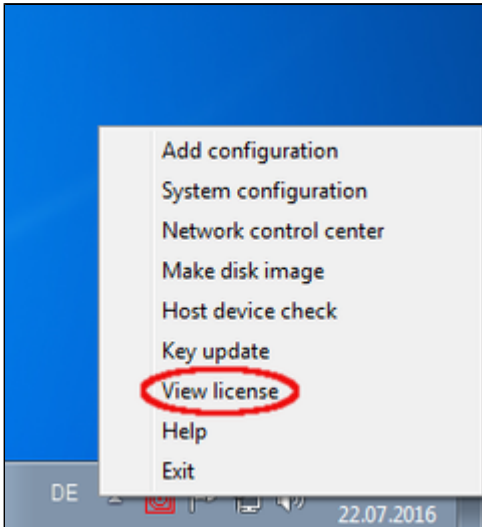- **Exit** from the utility.

# License Update Utility (RUS)

The license update utility (RUS) is a GUI-based license management tool on Windows. It allows the user to

- collect status information about existing licenses on the system in order to request a license update or a new software license,
- apply license updates,
- transfer and remove software licenses (no longer supported in current Charon product versions).

This section provides the following information:

- Starting the License Update Utility
    - Starting the License Update Utility for Charon-AXP/VAX/PDP
        - Charon-AXP/VAX/PDP Version 4.7
        - Charon-AXP/VAX/PDP Version 4.8 and Later
    - Starting the License Update Utility for Charon-AXP/SMA
- Features of the License Update Utility
    - The Collect Status Information Tab
        - Creating the Fingerprint File
        - Creating a C2V File
    - The Apply License File Tab
        - Applying V2C File(s)
    - The Transfer License Tab

## Starting the License Update Utility

The license update utility (also called HASPRUS) is started in different ways depending on the Charon product used.

### Starting the License Update Utility for Charon-AXP/VAX/PDP

On versions **before** Charon-AXP/VAX/PDP version 4.8 this utility is called License Update Service. On versions 4.8 and higher it is called License Update Tool.

#### Charon-AXP/VAX/PDP Version 4.7

The license update utility is started via **Start** -> **Charon** -> **Utilities** -> **License Update Service**:
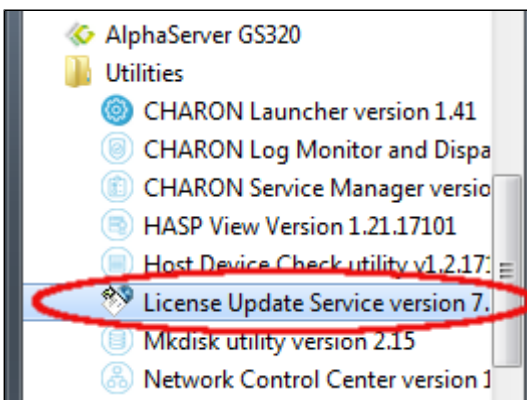


#### Charon-AXP/VAX/PDP Version 4.8 and Later

The license update utility is started from the **CHARON Virtual Machines Manager**. The CHARON Virtual Machines Manager is started either via the **desk top icon** or from the **start menu**:
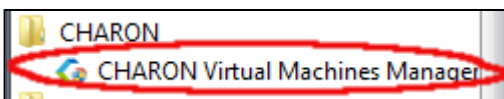
Once the CHARON Virtual Machines Manager has been started, go to the **Host Information & Utilities** tab and click on the **License Update Tool** button:
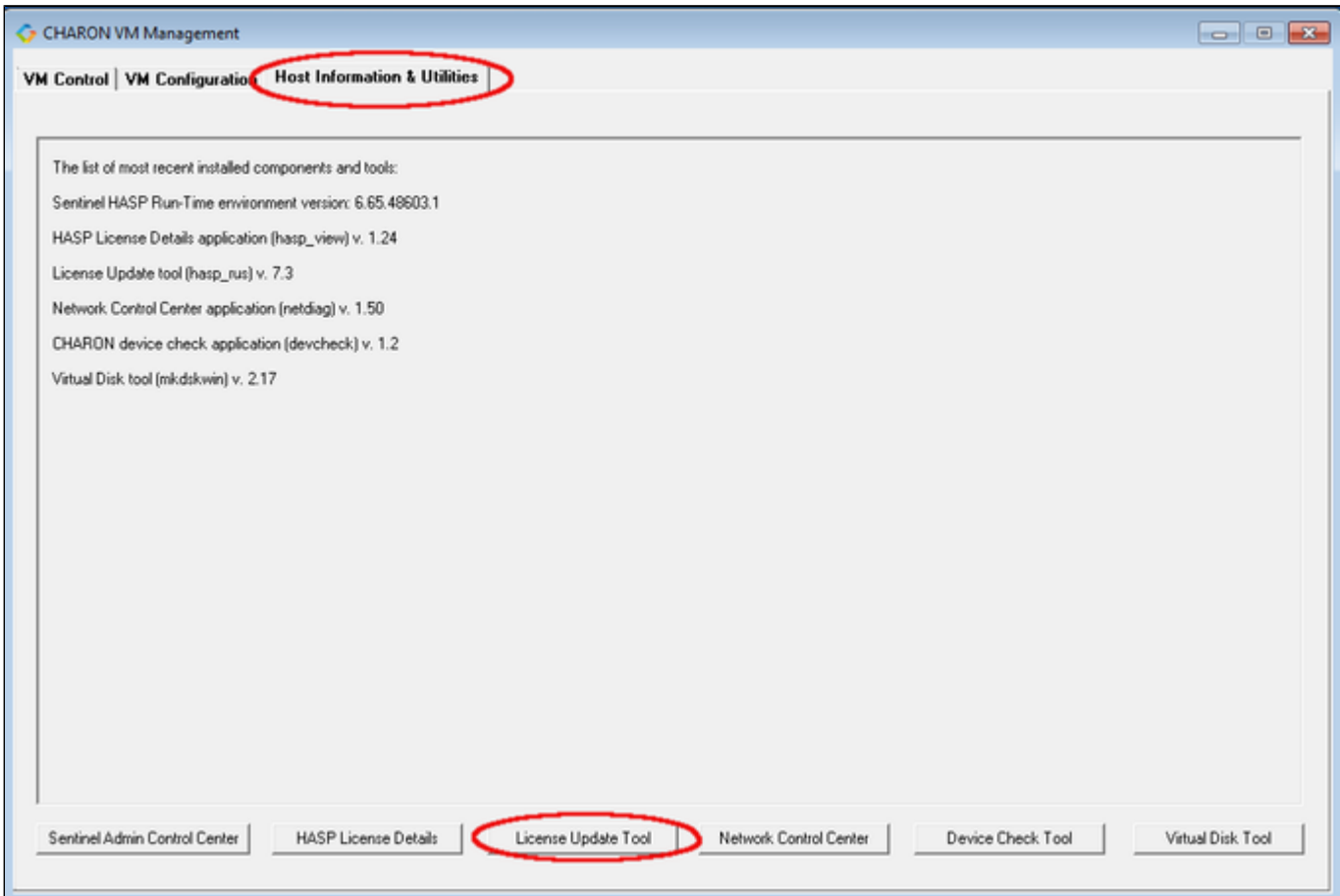
## Starting the License Update Utility for Charon-AXP/SMA

The license update utility is started via the system tray icon. Clicking on the icon will open a menu similar to the following:
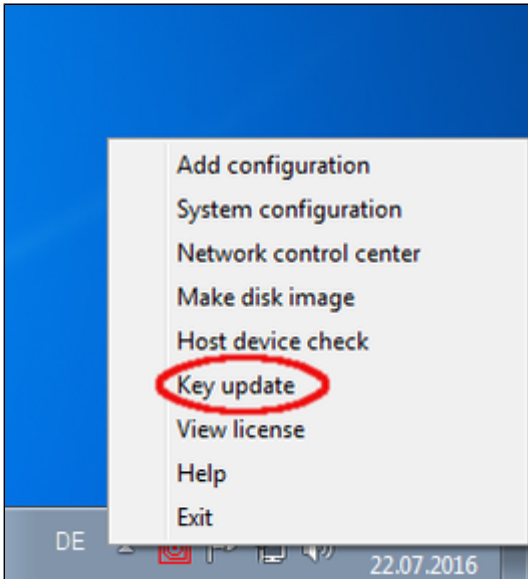


Click on the **Key update** menu item to start the utility.

## Features of the License Update Utility

The license update utility (HASPRUS) provides the following functions:

- Creating a fingerprint file for requesting a new software license
- Creating a C2V file to update an existing license
- Applying a license file (new or update)
- Transferring and removing a software license (no longer supported in current Charon product versions)

The user interface provided by the tool is the same, independent of the Charon emulator product used. The following sections describe the functions provided by the individual tabs of the tool.

## The Collect Status Information Tab

On this tab you can extract the data needed to

- request a new software license (fingerprint file),
- update an existing license (C2V file).

## Creating the Fingerprint File

To request a new software license, a fingerprint file has to be collected from the system.

The following image shows the tab **Collect Status Information** with the option **Installation of new protection key** selected. This is the setting for creating a fingerprint file.
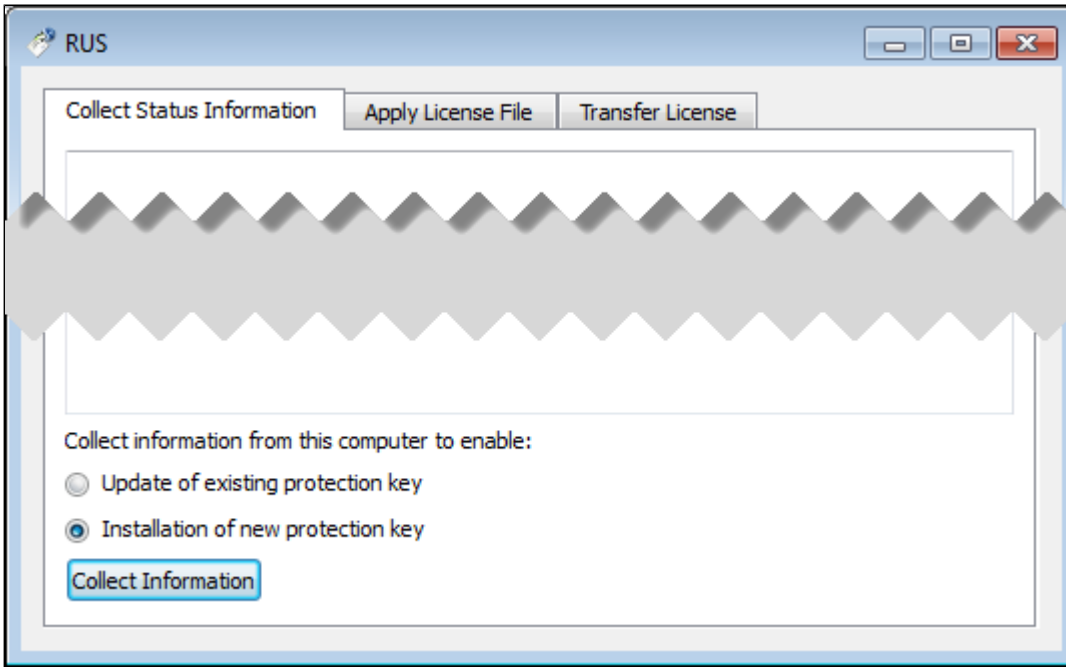


After pressing the **Collect Information** button, you will be prompted to enter a location for storing the fingerprint file. Select a location and filename and save the file.

Please note: once a software license has been installed, current versions of the license update utility do not allow you to create another fingerprint without (temporarily) removing the installed software license. Therefore, save the created fingerprint file in case you need to create an additional software license for the same system (this will be the exception because in most cases the existing license can be updated with the required information). If you don't have the fingerprint file anymore and cannot create a second fingerprint because there is already a valid software license installed, please contact your Stromasys representative or VAR. If you have an obsolete/invalid software license on your system, you can remove it as described in Removing a License.

## Creating a C2V File

To update an existing license, a C2V file must be created.

The following image shows the tab **Collect Status Information** with the option **Update of existing product key** selected. This is the setting for creating a C2V file for an existing software license and all hardware licenses.



After pressing the **Collect Information** button, you will be prompted to enter a location for storing the C2V file. Select a location and filename and save the file.

If there is more than one license key available on the system, the tool allows you to select the appropriate key to update as shown in the image below:
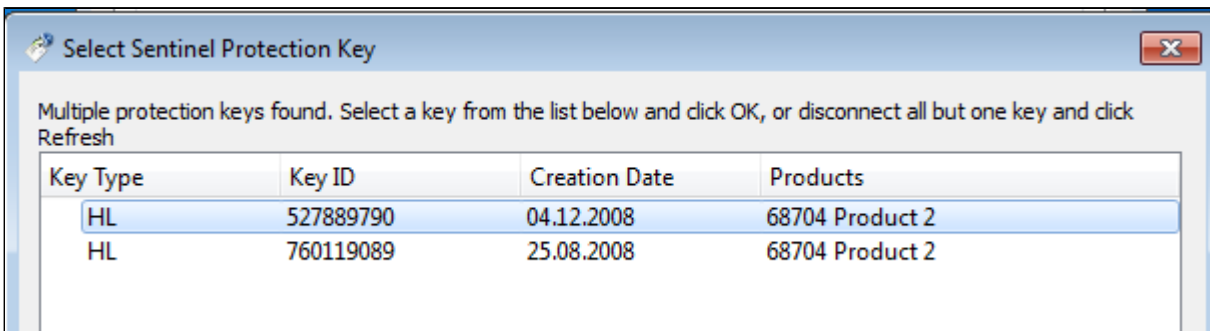
## The Apply License File Tab

The function of this tab is to select and apply V2C files.

### Applying V2C File(s)

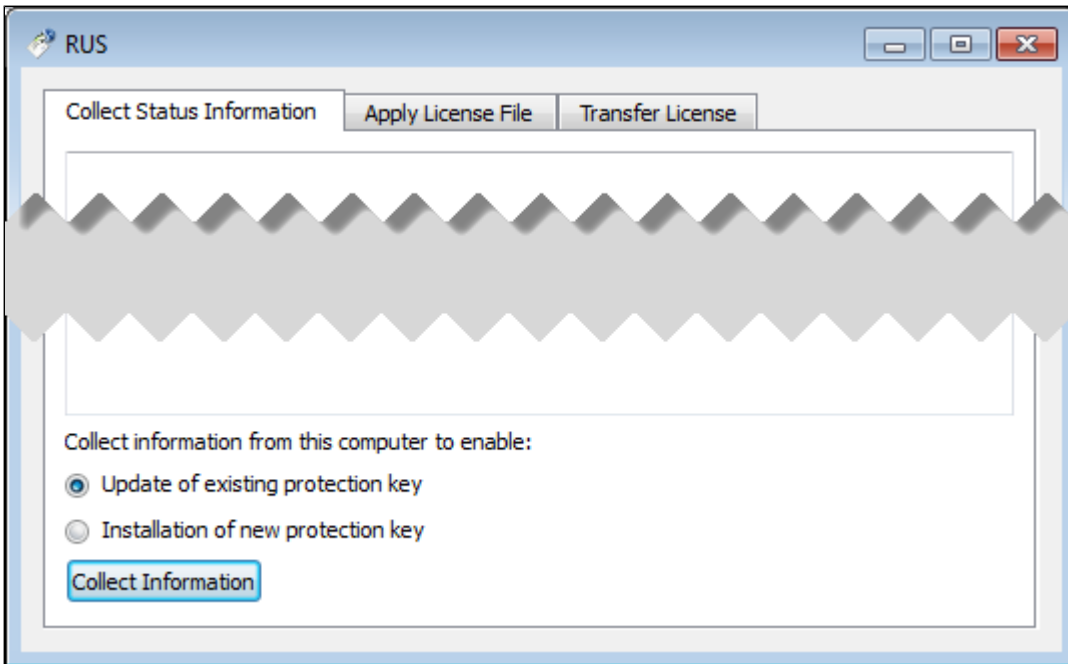This option installs a new software license or updates an existing license.

**Important**:

- If a hardware USB key is to be updated, you will in most cases receive **two** files: a **\*_fmt.v2c** file and a **\*.v2c** file. The *_fmt.v2c file formats the dongle and the *.v2c file contains the updated license data.
- In such cases the **\*_fmt.v2c file** must be applied **first**.

1. To install the V2C file(s) for hardware **and** software licenses, select the option **Apply License File**.
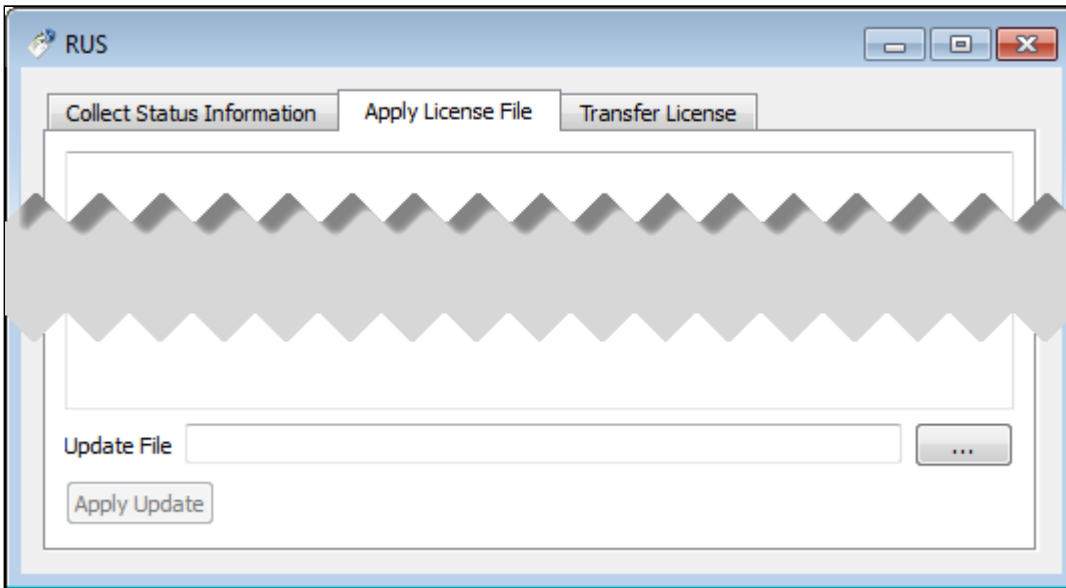


2. Press the **"..."** button next to the **Update File** field. This will open a file browser.

3. Select the V2C file to be applied.

4. Click on **Apply Update** to complete the installation of the file.

## The Transfer License Tab

This tab provides the functions for transferring and removing software licenses if the license parameters allow it.

However, this functionality is **no longer supported** by current Charon product versions. Also, all new software licenses are not transferable.

Hence, the detailed documentation of this tab has been removed.

# Additional License Related Tools

Stromasys provides additional tools for the Charon-AXP/VAX/PDP emulator products on Windows. These tools are described in detail in the respective user's guides on the Stromasys documentation page (see Documentation).

This section provides a short overview of the following tools:

- Charon License Utility for Windows
- Legacy Log Monitor and Charon Log Monitor
- Automatic License Expiration Check

## Charon License Utility for Windows

This utility allows the installation/uninstallation of the 'Sentinel LDK License Manager' service and drivers. It enables the use of USB license dongles and Software Licenses (SL) management. It can be used to install a Windows server as a license server with software licenses or USB network licenses (red dongles) or simply to easily update USB dongle licenses from a server/laptop/desktop where Charon-AXP/VAX/PDP is not installed.

It can also be installed if Charon-AXP/VAX/PDP is already installed and offers the following features:

- Easy installation/uninstallation of the driver
- Read license content
  - working even from a remote desktop connection (RDP) → this requires the utility to be executed as Administrator
  - highlights on license expiration date
- Removing a Software License (SL)
- Access to Sentinel Admin Control Center
- Access to update license utility
- Stop/start 'Sentinel LDK License Manager' service

See CHARON on Windows - Charon License Utility for more information.

## Legacy Log Monitor and Charon Log Monitor

The Charon-AXP/VAX/PDP products come with the **logmond** (Log Monitor & Dispatcher) utility. This utility can monitor the emulator log for events indicating that the license has been removed. The knowledge base article CHARON Log monitoring on Windows (logmond) - Best practices describes the use of this tool in detail.

The program runs in the background either as a normal program or as a Windows service and monitors the emulator log files for events indicating the removal of the license (message code 0000002A, 00000351, or 00000424 - depending on product version). The latest version of the program can also monitor message code 0000040B to detect if the emulator switched to a different license.

Once such a remove event is detected, **logmond** runs a file named *nolicense.bat*. This file contains the custom actions to be performed when the event is detected. For example, it can be used to create an entry in the Windows event log or to send an email. If a license switch event is detected, **logmond** runs a file named *license_changed.bat*.

In addition, there is the Charon Log Monitor for Windows. Please refer to the linked document for more information.

## Automatic License Expiration Check

Starting with Charon-AXP/VAX/PDP version 4.8 the **license expiration check** utility is installed with the Charon emulator kit. The details of this utility are described in the knowledge base article CHARON on Windows - Automated License Expiration Check. This section provides a short overview.

This utility is executed once a day at 09:00 AM and will send Windows Application Events 15 days before license expiration. No other action will be taken unless you customize the `expiredlicense.bat` script.

The installation process installs the utility and the default `expiredlicense.bat` file under the Charon installation folder, usually in `C:\Program Files\CHARON\Redistributables\Stromasys`. It also provides examples on how to send alerts via email.

- If you installed this utility manually before installing Charon-AXP V4.8, the scheduled task will remain unchanged.
- If you remove all Charon emulator products from the server, the scheduled task will be disabled. It will not be deleted.

Please refer to the *License Expiration Check* chapter of the respective user's guide for more information. For versions **prior to Charon-AXP/VAX 4.8** the utility can be installed manually. Please refer to Charon on Windows - Automated License Expiration Check for detail.

# License Management with Charon-SSP Manager

With the exception of Charon-SSP Baremetal, Charon-SSP uses the same command-line tools on Linux as the other host-based Charon emulator products. However, Charon-SSP comes with the Charon-SSP Manager, a GUI-based tool to manage the emulator configuration and other aspects, including licensing. On Charon-SSP Baremetal, this is only access to the detailed license management functions. This section describes the options Charon-SSP Manager offers for license management.

- Charon-SSP License Viewer
- Charon-SSP License Update Tool
- Charon-SSP License Configuration Options

**Starting the Charon-SSP Manager**

- Start the Charon-SSP Manager with the following command (if using command-line access):

  ```
  $ /opt/charon-manager/ssp-manager/ssp-manager
  ```
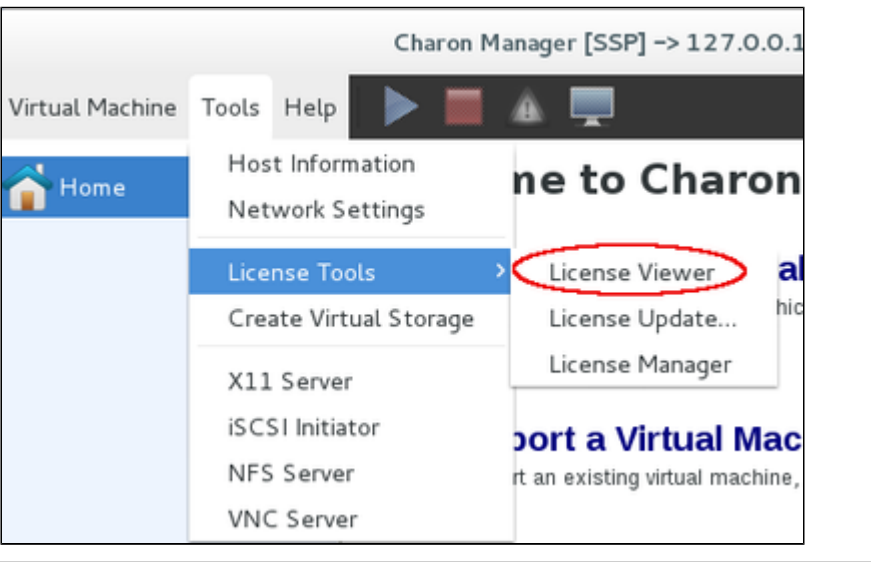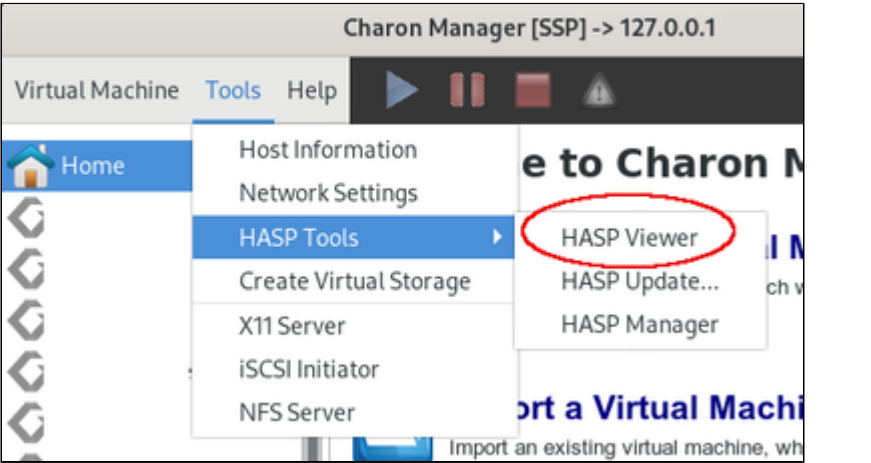
- On **Charon-SSP Baremetal,** the Charon Manager is started via the Charon tab of the GUI as shown below:
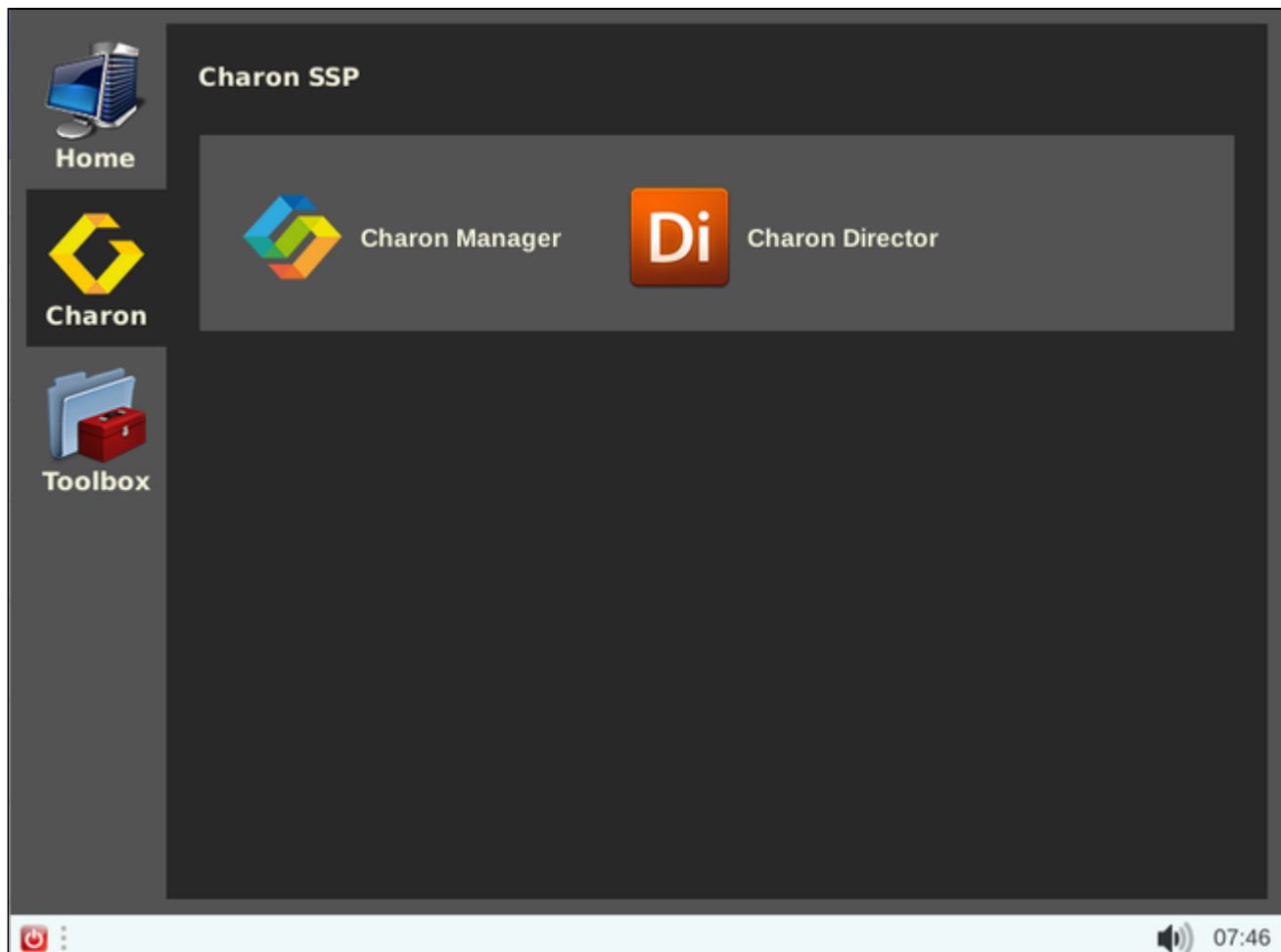
# Charon-SSP License Viewer

The Charon-SSP license viewer allows you to view the detailed license content.

The Charon-SSP license viewer is started from the Charon-SSP Manager as shown below. The exact menu position varies slightly between product versions.

| | |
|---|---|
| **In older versions of Charon-SSP**, the license viewer is started via **Tools > License Tools > License Viewer** as shown here: |  |
| In current versions of Charon-SSP, the license viewer is started via **Tools > HASP Tools > HASP Viewer** as shown here: |  |

This will open the **License Viewer** window, similar to the following.
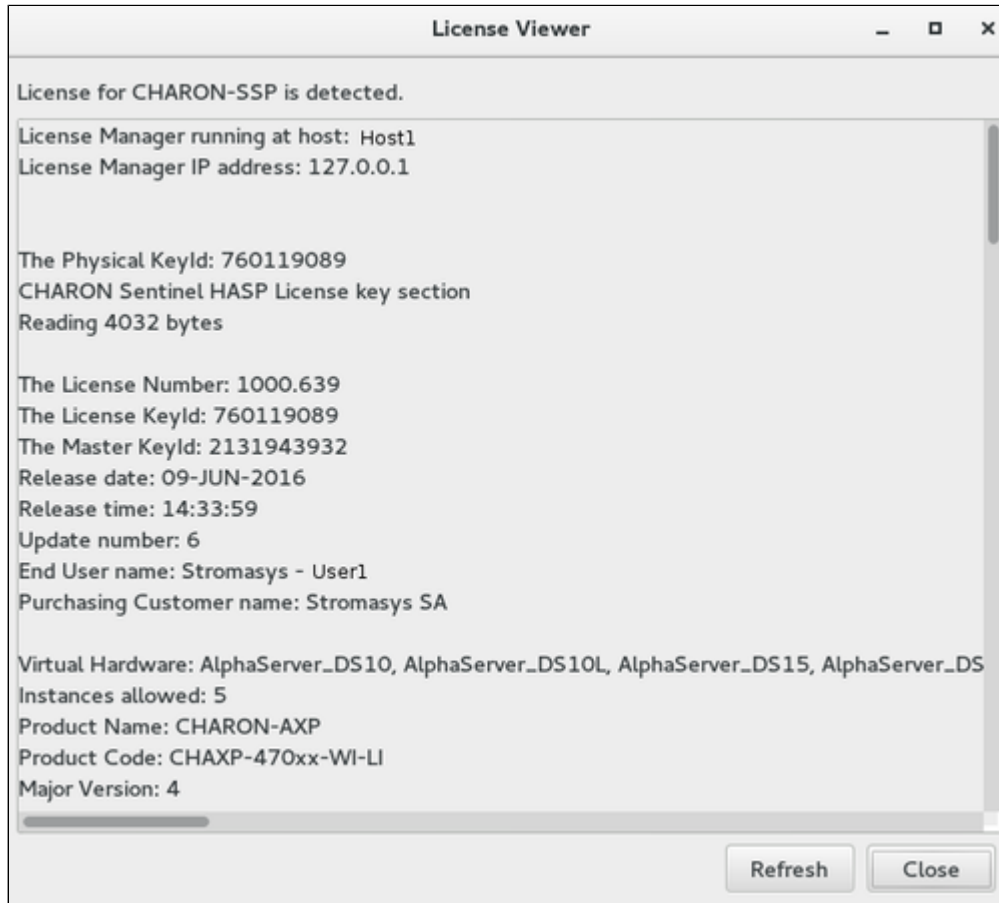


If the license details are not displayed and the USB HASP has recently been disconnected or exchanged, it may be necessary to **click** on the **Refresh** button. To close the window, **click** on the **Close** button.

Please note:
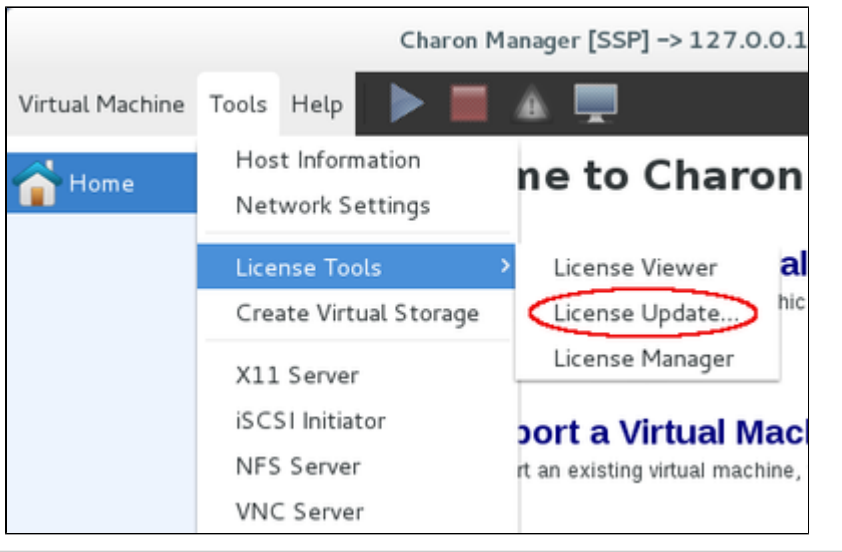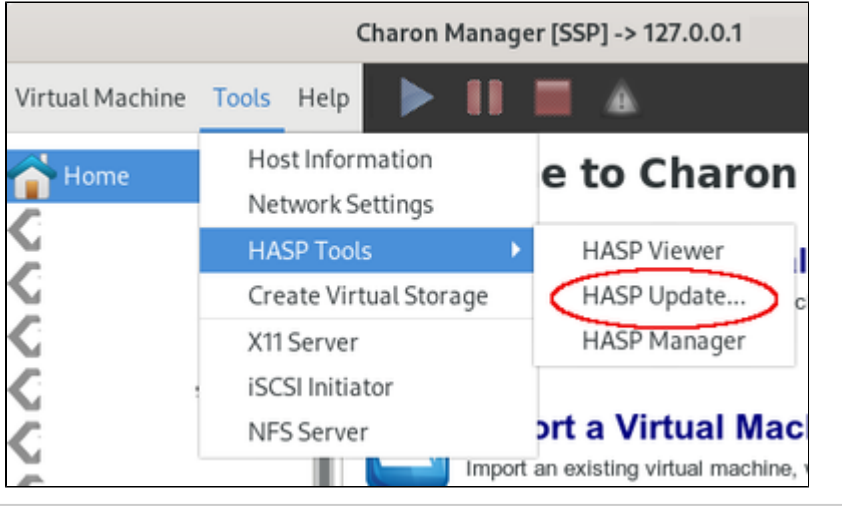
- If there is more than one license key installed, you have to scroll down to see all the licenses.
- Starting with version 4.0, the license viewer in Charon-SSP performs a broadcast search for network licenses even if this is disabled in ACC or the license manager.

# Charon-SSP License Update Tool

The Charon-SSP License Update tool provides the following options:

- Create a C2V or a fingerprint file.
- Apply a V2C file (new software license or update of existing license).
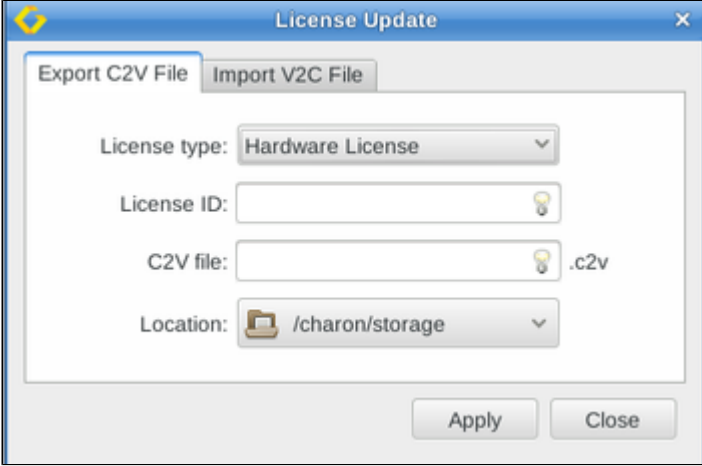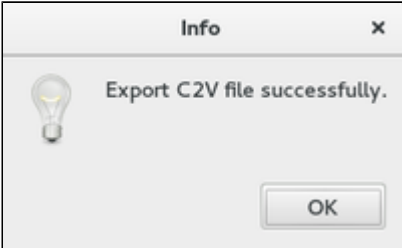
Accessing the License Update tool is slightly different in different versions of Charon-SSP, as shown below:

| | |
|---|---|
| **In older versions of Charon-SSP**, The license updater is started via **Tools > License Tools > License Update**: |  |
| In current versions, the license updater is started via **Tools > HASP Tools > HASP Update**: |  |

# Generating Customer to Vendor (C2V) Information
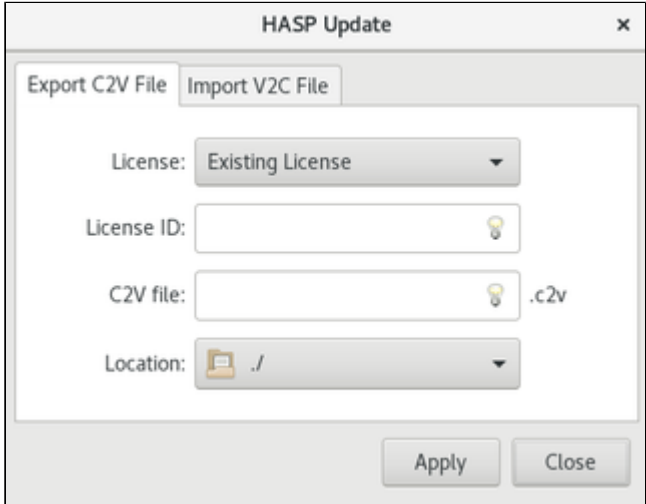
## Charon-SSP before Version 5.x

Perform the following steps to generate a C2V or fingerprint file:

| Step | Description for Generating a C2V File |
|---|---|
| 1 | Open the license (or HASP) update tool as described above: |
| 2 | **Click** the tab labeled **Export C2V File.** Then **select** the type of license in **License type** drop-down box. There are two options to choose from:<br><br>• **Hardware License** – ensure that the USB HASP key is connected to the host system. If several hardware licenses are connected and you need to create a C2V file for a specific one,<br>    ○ use Sentinel ACC to create the C2V file, **or**<br>    ○ temporarily remove all but the one relevant dongle (versions before version 2.0), **or**<br>    ○ enter the license ID of the relevant license in the **License ID** field (available starting with version 2.0).<br>• **Software License** – ensure that no conflicting licenses are attached.<br>    ○ If this option is selected, the Charon-SSP Manager assumes that a fingerprint for a new software license or a C2V to update an existing software license should be created. It checks if there is already an existing license.<br>        ■ **If yes**, the steps below will create a C2V file to request an update to this existing license.<br>        ■ **If no**, the steps below will create a fingerprint file to request a new software license.<br>    ○ In versions before version 4.0, remote network licenses (software or hardware licenses) impact correct fingerprint creation. They can be temporarily disabled via the license manager or in Sentinel ACC.<br>    ○ If a conflicting USB HASP key is attached, a C2V file may be created for the existing USB dongle instead of a fingerprint file. If the dongle cannot be removed and you need to create a fingerprint file, please use the `hasp_srm_view -fgp` command instead (not available on Baremetal).<br>    ○ The option to select a specific license for C2V (update) creation is not available if the software license option is selected. Alternative options to select a specific license are C2V creation using Sentinel ACC or the command-line tool `hasp_srm_view -c2v -key <license-id> <filename>`. |
| 3 | • Provide a file name in the **C2V file** field.<br>• Specify where the C2V file should be saved on the local system (where the manager is running) by **clicking** the path adjacent to the **Location** label.<br>• **Click** the button labeled **Apply**. |
| 4 | After a few moments the utility will respond with a confirmation box similar to the example.<br><br>**Click** the button labeled **OK** to proceed. |
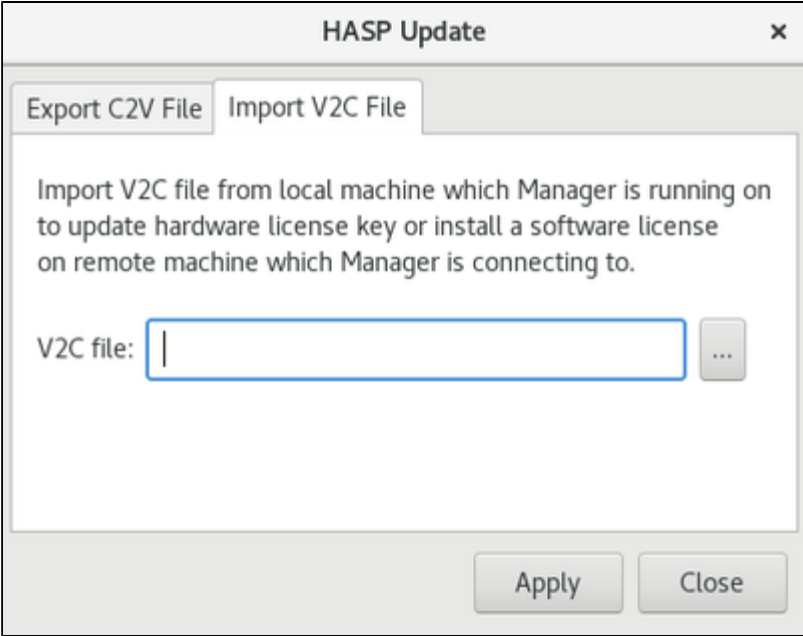
## Charon-SSP Version 5.x and Higher

Perform the following steps to generate a C2V or fingerprint file:

| Step | Description |
|------|-------------|
| 1 | Open the HSAP update tool as described above: |
| |  |
| 2 | Select the **Export C2V File** tab.<br><br>Select the type of operation in License drop-down box. There are **two options** to choose from: |
| | a) Option **Existing License**: used to create the C2V file required for license updates (for hardware and software license updates). USB dongles are always considered to be existing licenses even at initial installation.<br><br>Enter the ID of the license in question into the **License ID** field. The license ID can be found using the license viewer tool. |
| | b) Option **New Software License**: used to create a fingerprint for a new software license. |
| 3 | <ul><li>Provide a file name in the **C2V file** field.</li><li>Specify where the C2V file should be saved on the local system (where the manager is running) by **clicking** the path adjacent to the **Location** label.</li><li>**Click** the button labeled **Apply**.</li></ul> |
| 4 | After a few moments the utility will respond with a confirmation box similar to the example.<br><br>**Click** the button labeled **OK** to proceed. |

## Applying Vendor to Customer (V2C) License Update

After sending the C2V (customer to vendor) file to Stromasys Orders Administration (see Sending C2V File to Stromasys and Obtaining V2C File), you will receive the necessary license files (V2C file(s)) from Stromasys. Depending on certain factors you will receive one or two V2C files. Once you have received the response from Stromasys Orders Administration, follow the instructions below to apply the V2C (vendor to customer) files and license the software.

| Step | Description for Applying a V2C File |
|---|---|
| 1 | Save the V2C (vendor to customer) files received from Stromasys Orders Administration. Depending on the license type, this may be one or two files:<br><br>1. A license file to format the key (for hardware licenses only). The file name is of the format **\*_fmt.v2c**.<br>2. The license key file. The file name is of the format **\*.v2c**.<br><br>Steps **2** to **4** must be performed for each of the V2C files, **starting with the format key** file (if it exists). |
| 2 | • Open the **License Update** (or **HASP Update**) window as described above.<br>• Select the tab **Import V2C File**.<br><br> |
| 3 | Locate the saved V2C files by **clicking** on the button labeled "…". If a format key file exists, select this file first. |
| 4 | Apply the license file by clicking on the button labeled **Apply**. |
| 5 | If a second license key file was supplied, repeat the process for the second file. |

# Charon-SSP License Configuration Options

## Charon-SSP Host-specific Configuration

The HASP manager in the Charon-SSP Manager provides quick access to selected license configuration parameters. Depending on the product version **Tools > License Tools > License Manager** or **Tools > HASP Tools > HASP Manager** will open the license manager window:
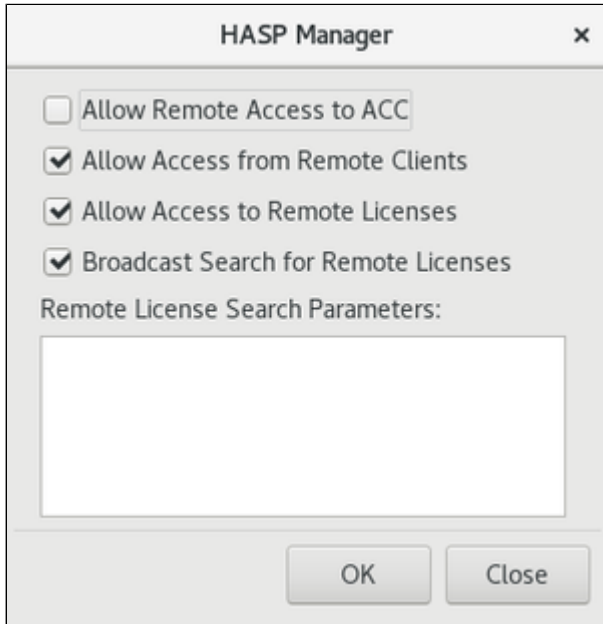


Description of the available parameters:

| Parameters available via the license manager | |
|---|---|
| **Parameter** | **Description** |
| Allow Remote Access to ACC | When selected, other network users can access the Sentinel Admin Control Center (ACC) and perform actions on this system. Unselected by default. The Sentinel ACC provides a web-based user interface for license management. If access is enabled, it can be accessed from a remote system via a browser (URL: *<target-system>:1947*). For remote access ensure that a password is set for **ACC in Configuration > Basic Settings**. Corresponds to the parameter **ACCremote** in the **[SERVER]** section of **hasplm.ini**. |
| Allow Access from Remote Clients | Selecting this check box will enable remote systems to access this Sentinel License Manager. This is needed if the system acts as a license server for clients on the network. Corresponds to the parameter **accessfromremote** in the **[SERVER]** section of **hasplm.ini**. |
| Allow Access to Remote Licenses | When selected, this system will search for remote Sentinel License Managers on the network. Needed, if the system is to use a license served by a license manager on the network. Corresponds to the parameter **accesstoremote** in the **[SERVER]** section of **hasplm.ini**. |
| Broadcast Search for Remote Licenses | When selected this system will search for remote Sentinel License Managers on the local network via broadcasts. Note that the broadcast uses a random UDP port from 30000 to 65535. Any firewall between the client and the server must be configured to allow these ports in addition to the TCP port 1947. If this is disabled, the addresses of systems to search must be defined in the search parameter field. Starting with version 4.0, the license viewer in Charon-SSP performs a broadcast search independent of this parameter. Corresponds to the parameter **broadcastsearch** in the **[REMOTE]** section of **hasplm.ini**. |
| Remote License Search Parameters | Defines the specific systems that will be searched by this system in order to detect remote Sentinel License Managers and licenses served by them. Systems are specified by their IP addresses (for example, 10.1.1.17), by the broadcast addresses of an address range (for example, 10.1.1.255), or by the system name (for example, system1.example.com). When using the IPv6 protocol, use the IPv6 address format. For example, type FF02::1 to access all remote Sentinel License Managers that are part of the default local group defined in the IPv6 subnet. Corresponds to the parameter **serveraddr** in the **[REMOTE]** section of **hasplm.ini**. |

# Charon-SSP Instance-specific Configuration

The Charon-SSP Manager offers a graphical interface for the management of Charon-SSP instances and some parts of their license requirements.

Start the Charon-SSP Manager with the following command as described above.

Click on the **License** option in the left-hand panel. In this section, a primary and a backup license key can be defined. This is useful if there is a permanent license and a backup license limited to a certain number of hours runtime. In this case, the parameters in this section avoid the unintentional depletion of the backup key hours. The parameters can also be used to define the correct key should Charon-SSP identify the key for a different product as the default key by mistake.

The following example shows the configuration window of a current Charon-SSP version. Older versions may not show all the configuration fields.



**For HASP licenses**, add the desired license IDs for the primary and backup key (**Regular license ID** and **Backup license ID**). To identify the license ID of all installed licenses on non-Baremetal installations, run the command:

```
$ /opt/charon-agent/ssp-agent/utils/license/hasp_srm_view -all
```

Alternatively, use the **license viewer tool in Charon-SSP Manager** to display the licenses.

The **Virtual Environment** fields are used to configure the VE license server(s) to be used. Please refer to Virtual Environment (VE) License Server Documentation.

# Troubleshooting

This section provides some information regarding licensing problems. In particular, the following aspects are described:

- Sentinel Runtime Software State
- Log Files
- Sentinel Error Codes
- Miscellaneous License Problems

# Sentinel Runtime Software State

If the Sentinel runtime driver processes are not running, licenses are unavailable to the emulator and the license management tools will return errors.

Typical problems that occur if the license drivers are not running:

- Licenses installed on the system are not found even though they are connected/installed. Sample error message "Sentinel HASP key not found or of improper type (33)."
- The creation of a fingerprint file for a new software license fails with "Can not retrieve the C2V (host fingerprint mode) data." or creates an invalid fingerprint file.

This section describes how to verify that the processes are running and how to restart them, if needed.

- Check if License Drivers are Running
  - Linux Tasks
  - Windows Tasks
- Start License Drivers
  - Linux Tasks
    - Current Versions
    - Older Versions
  - Windows Tasks

# Check if License Drivers are Running

## Linux Tasks

The following example shows how to check if the relevant processes **aksusbd** and **hasplmd** are active:

```
$ ps -ef | grep -i aksusb

root 728 1 0 13:08 ? 00:00:00 /usr/sbin/aksusbd

$ ps -ef | grep -i hasplmd

root 740 1 0 13:08 ? 00:00:00 /usr/sbin/hasplmd -s
```

You can also check the status of the services using the systemctl command. Please note that in the current versions of the license drivers, there are **two services**. Older versions only used one *systemd* service (aksusbd).

```
# systemctl status aksusbd
# systemctl status hasplmd
```

If you do not see the two processes in the output, the license drivers are not in the correct state. Please restart them as described below.

## Windows Tasks

To check the state of the Sentinel runtime software on Windows perform the following steps:

1. Press **WIN+R** and enter the command **services.msc** into the command window.
2. Look for the service named **Sentinel LDK License Manager** (Charon-AXP/VAX/PDP) or **Sentinel HASP License Manager** (Charon-AXP/SMA) in the list of services that is displayed. The service corresponds to the *hasplms.exe* process.
3. If the service is not in the **started** state, the Sentinel license drivers are not in the proper state. Restart the service as described below.

# Start License Drivers

## Linux Tasks

### Current Versions

The current versions of the runtime drivers use two **systemd** services: **aksusbd.service** and **hasplmd.service**.

You can **start**, **stop**, and **restart** the service.

Starting and stopping the services (as the root user:

- The two services have a dependency such that **starting one of them will start the other, stopping one of them will stop the other, and restarting one of them will restart the other.**

- Starting the services:
  **# systemctl start aksusbd**
  **# systemctl start hasplmd**

- Stopping the services:
  **# systemctl stop aksusbd**
  **# systemctl stop hasplmd**

### Older Versions

The script to start and stop the license drivers is **/etc/init.d/aksusbd**.

It takes the parameters **start**, **stop** and **restart**.

If you need to start the license drivers, execute the following command as the root user:

```
# /etc/init.d/aksusbd restart
```

## Windows Tasks

If you need to restart the Sentinel license drivers, perform the following steps:

1. Log in as a user with administrative rights.
2. Press **WIN+R** and enter the command **services.msc** into the command window.
3. Look for the service named **Sentinel LDK License Manager** (Charon-AXP/VAX/PDP) or **Sentinel HASP License Manager** (Charon-AXP/SMA) in the list of services that will be displayed.
4. Right-click on the service status and select **Start**.

**Important**: any running emulators will be stopped if the license service is forced to stop despite existing service dependencies (i.e., running emulators). So any running guest systems must be cleanly shutdown before restarting the license service in order to avoid data loss.

# Log Files

This section identifies the log files relevant for Charon licensing operation.

- Charon Emulator Log File
  - Default Log File Location on Linux
  - Default Log File Location on Windows
    - Charon-AXP/VAX/PDP Product
    - Charon-AXP/SMA Product
  - Examples
- System Log Files
  - System Log File on Linux
- Sentinel Runtime Driver Log Files

## Charon Emulator Log File

The configuration of each Charon emulator instance contains the definition and location of an emulator log file, which contains important information about the emulator's activities. It also contains information about which license was found and error messages, for example if a license was removed. The log files are text files and can be viewed using a text editor.

**Please note**:

- For a full description of configuration parameters pertaining to log files, please refer to the respective user's guide of your Charon product.
- For the actual location of the emulator log file, check the emulator configuration.
- For some hints regarding monitoring tools, please refer to Monitoring Licenses.

## Default Log File Location on Linux

If the log file location is not specified explicitly in the configuration, the default log file location on host-based Charon emulator products is as shown in the table below:

| Charon Product | Default Log file Location |
|---|---|
| Charon-AXP/VAX | If the setting of the template configuration is used: directory from which the emulator instance was started. |
| Charon-SSP | If instance was created using Charon-SSP Manager:<br>`/opt/charon-agent/ssp-agent/ssp/[sun-4m\|sun-4u]/<configuration-name>/` |
| Charon-PAR | The default location of the log file is the directory in which the emulator is started. Filename format:<br><br>Old versions:<br><br>`hppa_log-<date-and-time>-000000000.log`<br><br>New versions:<br><br>`charon-par.<date-and-time>-0000.log` |

# Default Log File Location on Windows

## Charon-AXP/VAX/PDP Product

| Version | As Service | Log File Location |
|---------|-----------|-------------------|
| < 4.8 | Yes | Log files are stored in the home directory of the service. |
| < 4.8 | No | The log file is stored in the same directory as the configuration file of the Charon instance. |
| >= 4.8 | Yes | The log file is stored in the home directory defined when creating the Charon instance via the Virtual Machines Manager. (The Virtual Machines Manager always starts an emulator instance as a service.) |

## Charon-AXP/SMA Product

There is no default. The parameter must be specified when an emulator instance is created.

## Examples

The following shows the **license related log entries at the startup** of **Charon-AXP** for Windows versions up to version 4.8:

```
20160809:175757:INFO :0:000003BA:ll_sentine( 725): Looking for a license key ...

20160809:175801:INFO :0:000003DC:ll_sentine( 820): ... found license key 527889790.

20160809:175801:INFO :0:0000024D:ethane.cxx(2651): STROMASYS SA, (C) 2009-2015

20160809:175801:INFO :0:00000350:ethane.cxx(2697): CHARON-AXP (AlphaServer DS15), V 4.7 B 17101, Sep 18 2015
/ 1000.826 / 527889790

20160809:175801:INFO :0:00000336:ethane.cxx(2724): The end user of this software has agreed (...)

20160809:175801:INFO :0:0000009D:ethane.cxx(2801): License info:

CHARON product code: "CHAXP-470xx-WI-LI".

Licensed to: "Stromasys - User1".

Date limited license, limited to: 12/Jan/2017 00:55:00.

Warning: setting the host system date back will permanently invalidate the license key.

License KEY driver is installed as hasplms and is running.

Executable "C:\Windows\system32\hasplms.exe", version 17.0.1.48248.
```

The following shows a **periodic license check** on the same system after the **license has been removed**:

```
20160809:185509:INFO :0:000003E6:ll_sentine(1820): Performing regular license check ...

20160809:185509:ERROR:2:000003E8:ll_sentine( 379): Sentinel HASP RunTime Error 7.

20160809:185509:INFO :0:00000351:ethane.cxx(3056): session: Detected removal of the license.

Normal operation is supported for 59 minutes from now.
```

And the following shows another **periodic license check** where the **license is present** again:

```
20160809:195505:INFO :0:000003E6:ll_sentine(1820): Performing regular license check ...

20160809:195508:INFO :0:000003DC:ll_sentine(1913): ... found license key 760119089.

20160809:195508:INFO :0:0000039D:ethane.cxx(2970): License detected and online.

20160809:195508:INFO :0:0000009D:ethane.cxx(2989): License info:
```
<lines removed>

**Please note**: the system used to collect the examples above has two USB dongles installed. You can see that in the first sample Charon-AXP selects one of the dongles and in the last example it selects the other one, because no primary key has been defined.

The log file format in version Charon-AXP/VAX on Windows version 4.9 and above has changed. Below is a sample output showing the removal of a license key:

```
20180425:215721:WARN :1:0000024D:licenseman(1830): Communication with the license key "527889790" lost.
```
<lines removed>
```
20180425:225625:INFO :0:00000424:ethane.cxx(3514): session: Detected removal of the license.
```

**Please note** that the configuration parameter **log_repeat_filter** is set to **on** by default for Charon-AXP/VAX on Windows. To receive all messages, this parameter must be set to **off** in the emulator configuration file. This will create a more detailed output as shown below. In particular, it shows the grace period after which the emulator will stop:

```
20180612:132038:WARN :1:0000024D:licenseman(1830): Communication with the license key "879642840" lost.

20180612:132438:INFO :0:0000024D:licenseman(1823): Performing regular check of the current license.

20180612:132438:WARN :1:0000024D:licenseman(1830): Unable to log in to the key "879642840", feature 0.

20180612:132438:WARN :1:0000024D:licenseman(1830): HASP runtime (7): Sentinel protection key not available.

20180612:132438:WARN :1:0000024D:licenseman(1830): Failed to login at the Sentinel HASP key: "879642840".

20180612:132438:WARN :1:0000024D:licenseman(1830): Connection to license key:"879642840" id:"1002922" lost.

Application will stop at 13-Jun-2018 01:24:38.

20180612:132438:INFO :0:00000424:ethane.cxx(3514): session: Detected removal of the license.
```

**Please note**: the format of the log files is different for the various Charon emulator products, but they provide very similar information.

The following shows the log entries of a **Charon-SSP** instance on Linux for a situation similar to above (emulator start, license missing at periodic check and found again at next check):

```
2017-02-17 14:27:36 INFO License Found new license key (ID: 527889790).

2017-02-17 14:27:36 INFO License The license key is physical key.

2017-02-17 14:27:36 INFO License Customer name: "Stromasys"

<lines removed>

2017-02-17 12:27:15 WARNING License License key 527889790: Unable to locate any Feature matching scope!

2017-02-17 12:27:17 WARNING License Regular license key (ID: 527889790) doesn't exist/match, skipped.

2017-02-17 12:27:19 WARNING License License key 760119089: Unable to locate any Feature matching scope!

2017-02-17 12:27:21 WARNING License Backup license key (ID: 760119089) doesn't exist/match, skipped.

2017-02-17 12:27:23 ERROR License There is no valid license key.

2017-02-17 12:27:25 WARNING License  CHARON will be shutdown within 120 minutes!

<lines removed>

2017-02-17 14:27:36 INFO License Found new license key (ID: 527889790).

2017-02-17 14:27:36 INFO License The license key is physical key.

2017-02-17 14:27:36 INFO License Customer name: "Stromasys"
```

# System Log Files

## System Log File on Linux

On systems using **systemd**, which uses the **journald** utility to log messages, the messages for the Sentinel runtime software (**aksusbd**) can be viewed using the **journalctl** command.

On systems using syslog or a variant thereof the Sentinel messages can be found in the file */var/log/messages*.

The following is an example for Sentinel runtime messages logged via **journald** showing the **aksusbd** startup and the adding and removing of a HASP dongle.

```
Aug 10 20:27:01 host1 aksusbd[1357]: Starting AKSUSB daemon: [ OK ]

Aug 10 20:27:01 host1 aksusbd[1389]: loaded, daemon version: 2.5.1.46317, key API (USB) version: 3.88 (...)

Aug 10 20:27:01 host1 aksusbd[1357]: Starting WINEHASP daemon: [ OK ]

Aug 10 20:27:01 host1 aksusbd[1357]: Starting HASPLM daemon: [ OK ]

Aug 11 16:07:02 host1 aksusbd[16559]: aksusbd_usb_dev_remove: device '/dev/aks/hasp/1-6.3'

Aug 11 16:07:02 host1 aksusbd[1389]: registerHASPDevices: pipe read() failed: 20, Success

Aug 11 16:07:03 host1 aksusbd[16569]: aksusbd_usb_dev_remove: device '/dev/aks/hasp/1-14.2'

Aug 11 16:07:03 host1 aksusbd[1389]: registerHASPDevices: pipe read() failed: 21, No such device

Aug 11 17:07:24 host1 aksusbd[22376]: aksusbd_usb_dev_connect: device '/dev/aks/hasp/1-14.2'

Aug 11 17:07:24 host1 aksusbd[1389]: registerHASPDevices: pipe read() failed: 21, No such device

Aug 11 17:07:30 host1 aksusbd[22409]: aksusbd_usb_dev_connect: device '/dev/aks/hasp/1-6.3'
```

# Sentinel Runtime Driver Log Files

You can enable access and error logging in Sentinel ACC. Please refer to the following article: Enabling logging in Sentinel Admin Control Center.

# Sentinel Error Codes

This section describes important Sentinel error codes, their meaning, and possible remediation actions. There are several other documents on the Stromasys web-page dealing with specific Sentinel error codes in more detail (see Resources).

## Common HASP error codes

The following table provides an overview of HASP error codes commonly seen in a Charon environment and their meaning.

A complete list with Sentinel License API status codes can also be found on the Sentinel web page under Sentinel Licensing API Status Codes.

| Error code | Description | Solution |
|---|---|---|
| 4 | **HASP_TMOF**<br><br>Too many open sessions.<br><br>Displayed *hasp_srm_view* message:<br><br>"Sentinel HASP key not found or of improper type (4).<br><br>Warning! Program running on a terminal server, license access might be limited!" | This error occurs when trying to create a .c2v file via a remote connection.<br><br>**Possible workaround on Windows**: See How to read a HASP key over RDP on Windows.<br><br>**Possible workaround on Linux**: Run the command via **ssh** to localhost, for example:<br><br>```ssh localhost /opt/charon/bin/hasp_srm_view -c2v <filename>``` |
| 7 | **HASP_HASP_NOT_FOUND**<br><br>Sentinel protection key not available.<br><br>Displayed *hasp_srm_view* message:<br><br>"Sentinel HASP key not found or of improper type (7)." | Connect the license dongle or install a software license.<br><br>Due to a software bug, this error can also occur when the license is connected. Please refer to Charon-AXP and Charon-VAX license not found error for a detailed description and a workaround. |
| 18 | **HASP_KEYID_NOT_FOUND**<br><br>Sentinel protection key with the specified key ID not found.<br><br>Displayed *hasp_srm_view message*:<br><br>"Sentinel HASP key not found or of improper type (50)." | Connect the license dongle with the correct key ID or correct the parameter specifying the key ID. |
| 19 | **HASP_INV_UPDATE_DATA**<br>Required XML tags not found, or<br>contents in binary data are missing or invalid | If this error occurs when trying to apply a V2C file to a system, the most likely cause is a corruption of the V2C file content. For example, an XML tag may be invalid. In some cases it is possible to edit the V2C file and fix the problem. Please refer to Unable to apply license file, V2C file data is invalid for more details. |
| 27 | **HASP_TS_DETECTED**<br><br>Program running on a terminal server.<br><br>Displayed *hasp_srm_view* message:<br><br><br>Sentinel HASP key not found or of improper type (27). Warning! Program running on a terminal server, license access might be limited! | The Sentinel key content cannot be displayed when connected via a remote connection.<br><br>**Possible workaround on Windows**: See How to read a HASP key over RDP on Windows.<br><br>**Possible workaround on Linux**: Run the command via **ssh** to localhost, for example:<br><br>```ssh localhost /opt/charon/bin/hasp_srm_view``` |
| 31 | **HASP_FEATURE_NOT_FOUND**<br><br>Requested Feature not found | In addition to a required feature missing on the key, this error can also occur if proper connection to the key is lost. Removing and reinserting solves the problem in this case. A solution without removing the dongle is described in Charon for Linux - Detected removal of the license whereas dongle is connected. |
| 33 | **HASP_LOCAL_COMM_ERR**<br><br>Communication error between API and local Sentinel License Manager | This error code indicates that the Sentinel license manager software is not running. |

| 38 | **HASP_TOO_MANY_USERS** | Too many users are currently connected. This error occurs, when more than the allowed number of license clients try to connect to a license (typically a network license). |
|---|---|---|
| | | Workarounds: |
| | | • Define the correct license key to use in the emulator configuration. This should work in most cases. As this is different for different products, please refer to the user's guide of your product.<br>• If the above does not work for some reason, block access to the license for unauthorized license clients (via Sentinel ACC or firewall entries). |
| 39 | **HASP_BROKEN_SESSION**<br><br>Session was interrupted. | This can occur when certain updates are applied to the license while a session is active. For example:<br><br>• A Feature required by the session was deleted.<br>• The license was canceled.<br>• The network (remote license) support setting for a required Feature was changed. (In this case, all sessions will be interrupted, including local sessions.)<br><br>This may also indicate that the protection key is not available. |
| 42 | **HASP_OLD_LM**<br><br>The Sentinel License Manager version is too old. | There is a version mismatch. Check if your Sentinel Runtime version is the correct one for your Charon product. In case of questions, contact your VAR or your Stromasys representative for guidance. |
| 43 | **HASP_DEVICE_ERR**<br><br>For a Sentinel SL key, an input/output error occurred in the secure storage area.<br>OR<br>For a Sentinel HL key, a USB communication error occurred. | For a hardware dongle, verify the USB connection. If the USB port works and the **aksusbd** is running, consider a possible failure of the dongle.<br><br>For a software license, this very likely indicates a software license problem caused by a change on the host system. You can try to revert any changes, but this will not necessarily make the license operational again (see Software Licensing restrictions). |
| 48 | **HASP_NO_VLIB**<br><br>Unable to find Vendor library. | If this error occurs when you try to install a software license with the Sentinel Admin Control Center, refer to the following document for a possible workaround: HASP_NO_VLIB error 48 message when installing a software license. |
| 50 | **HASP_SCOPE_RESULTS_EMPTY**<br><br>Unable to locate any Feature matching scope. | This error can occur when you have specified a license key id in the configuration file and this license key cannot be read (unplugged)<br><br>**Configuration file example**:<br><br>```<br>set session license_key_id[0]=367006676<br><br>set session license_key_id[1]=1619329274<br>```<br><br>**Log file example**:<br><br>```<br>20151210:161139:INFO :0:000003BB:ll_sentine(<br>736):  Looking for regular license key 367006676 ...<br><br>20151210:161139:ERROR:2:000003E8:ll_sentine(<br>379):  Sentinel HASP RunTime Error 50.<br><br>20151210:161139:INFO :0:000003BC:ll_sentine(<br>736):  Looking for backup license key 1619329274 ...<br>```<br><br>**Possible solutions**:<br><br>• Reconnect the missing license<br>• Update the configuration file by either removing the faulty license key id (in the case above, id 367006676) or by updating with the new one (this requires Charon to be restarted) |
| 54 | **HASP_UPDATE_TOO_OLD**<br><br>Trying to install a V2C (vendor to customer) file with an update counter that is out of sequence with the update counter on the Sentinel protection key. The update counter value in the V2C file is lower than the value in Sentinel protection key. | Apply all other license key updates, even if they have expired, then attempt to reapply the failed update. If this still does not resolve the problem, contact Stromasys Orders Administration with a new C2V (customer to vendor) file. |

| 55 | **HASP_UPDATE_TOO_NEW**<br><br>Trying to install a V2C file with an update counter that is out of sequence with update counter in the Sentinel protection key.<br><br>The first value in the V2C file is greater than the value in the Sentinel protection key. | Apply the V2C files in the correct sequence or request an update which disregards the unapplied update. See also Sentinel Admin Control Center - Attach/Update errors. |
|---|---|---|
| 64 | **HASP_CLONE_DETECTED**<br><br>Cloned Sentinel SL storage was detected. Feature is unavailable. | Indicates that the system on which the fingerprint was created was changed in a way that affects the validity of the license (e.g., cloning a VM).<br><br>**For more, see**:<br><br>• Software Licensing restrictions<br>• Cloned Software License Removal |
| 65 | **HASP_UPDATE_ALREADY_ADDED**<br><br>The message indicates you are trying to update the license with a V2C file that has already been applied, either the V2C format file ( _fmt ) or the update file. | Check the current applied license or request for new V2C files. See also License Update Service utility reports "update was already installed". |
| 78 | **HASP_SECURE_STORE_ID_MISMATCH**<br><br>A secure storage ID mismatch occurred. If a software license is used, this error can occur if host system hardware characteristics are changed. | To avoid the problem, do not change any hardware characteristics of a host system when using software licenses. If the error occurs, try to revert any changes. However, this may not solve the problem. In this case, contact your partner or Stromasys support. |
| 84 | **HASP_SHARING_VIOLATION**<br><br>An HL key is being shared between several systems. When this error occurs, a "sharing violation" message is also displayed on the relevant page in Admin Control Center. | This error can happen, for example, if a license key is passed through to a virtual machine and used by the Hypervisor system at the same time. |

# Miscellaneous License Problems

This section describes potential problems regarding licensing in the Charon environment which are not yet described in the other troubleshooting sections.

- Reading License or Starting Guest via Remote Connection
  - Workaround on Linux
  - Workaround on Windows
- Error Message Sentinel HASP RunTime Error 38 (Too Many Users)
  - Problem Symptoms
  - Problem Cause
  - Problem Solution
- License not Sufficient for Configuration
- License Removal is Reported Erroneously
- Error Message License Checksum not Found in Emulator Log File
  - Problem Symptoms
  - Problem Cause
  - Problem Solution
- Fingerprint Creation Fails on Linux
  - Problem Symptom
  - Problem Cause
  - Problem Solution
- HP3000 before Version 1.10 Selects Wrong Product License
  - Problem Symptom
  - Problem Cause
  - Problem Solution
- Error Message: Instance limit exceeded
  - Problem Symptoms
  - Problem Cause
  - Problem Solution
- Sentinel ACC Shows Duplicate Key ID or Sharing Violation
  - Problem Symptom
  - Problem Cause
  - Problem Solution
- Network License Lost After Second NIC Added to License Server
  - Problem Symptom
  - Problem Cause
  - Problem Solution
- Unable to Find Vendor Library even though Library Exists
  - Problem Symptom
  - Problem Cause
  - Problem Solution

# Reading License or Starting Guest via Remote Connection

The license content cannot be read if the user is connected to the system over a remote connection, for example RDP on Windows or ssh on Linux. This also means a Charon instance cannot be started directly.

## Workaround on Linux

To **display** the license content when connected over a remote connection, one possible workaround is to run the command via **ssh** on localhost:

```
$ ssh localhost /opt/charon/bin/hasp_srm_view
```

To **start** the emulator when connected over a remote connection, the Charon instance can be started as a detached process or as a service at system startup.

The document Charon on Linux - Cannot get license information or run guests over ssh provides more details for starting the emulator and also a second workaround for displaying the license details.
Detailed instructions for starting Charon as a service are provided in the respective user's guides (Documentation).

## Workaround on Windows

Please refer to How to read a HASP key over RDP on Windows for details on how to **retrieve** the license content when connected over a remote connection. You can also use the Charon License Utility  that provides this functionality.

To **start** the Charon instance in such environments, it should be defined as a service. Detailed instructions for starting Charon as a service are provided in the respective user guides (Documentation).

# Error Message *Sentinel HASP RunTime Error 38 (Too Many Users)*

**Version affected**: probably all emulator products and versions.

**Conditions**: the emulator does not have a license ID definition in the configuration file and tries to use a network license intended for another emulator.

## Problem Symptoms

A running emulator shows messages similar to the following in the log file:

```
20220722:230002:INFO :0:000003E6:ll_sentine(1829): Performing regular license check ...

20220722:230002:INFO :0:000003DC:ll_sentine(1922): ... found license key <license ID of network license>

20220722:230002:ERROR:2:000003E8:ll_sentine( 430): Sentinel HASP RunTime Error 38.

20220722:230002:INFO :0:00000351:ethane.cxx(3127): session: Detected removal of the license. Normal operation
is supported for 59 minutes from now.
```

If the emulator finds the correct local license again at the next license check, it will continue to run normally. If it again finds the network license first, it will log the error again and terminate.

## Problem Cause

- If an emulator configuration does not define the ID(s) of the correct license(s) to use, the emulator will try to use the first license found.
- If the first license found is a network license, the emulator will also try to use it.
- However, **if this license is already used by another system and does not have any available slots for additional emulators,** the error 38 (too many users) will be logged.
- If no usable license is found during the next license check (or after the product-specific grace period as shown in the emulator log file), the emulator will stop.

## Problem Solution

Prevent the emulator from accessing the incorrect network license. There are several ways to do this:

- Define the correct license ID(s) in the emulator configuration file. This is different for the different products. For details see Handling Multiple License Keys and Product Licenses. This solution requires that guest system and emulator be restarted.
- If the incorrect license is a network license served by another host, you can also block the access to this license either using an Sentinel ACC entry or by a firewall configuration. If using ACC, it is best to disallow the address of the emulator host incorrectly accessing the license in
  **Sentinel ACC > Configuration > Access from remote clients on the license server side**,
  because newer emulator products do not follow the Sentinel ACC settings to disable access to remote licenses configured on the client side.

# License not Sufficient for Configuration

If the installed license does not provide the number of CPUs required by the emulator configuration, the log file may contain the error message

```
License not found, not valid, expired or prohibits use of cpu_1.
```

A detailed description of this message can be found in License not found, not valid, expired or prohibits use of cpu_N.

There is a similar error message in cases where the configured memory is not supported by the license. Example:

```
License not found, not valid, expired or prohibits use of 256MB for ram.
```

# License Removal is Reported Erroneously

In rare cases, the connection to a hardware license (USB dongle) is lost even though it has not been removed and the light indicates that it is available. To solve this problem there are two options:

- Remove and re-insert the dongle.
- Follow the steps described in Charon for Linux - Detected removal of the license whereas dongle is connected.

# Error Message *License Checksum not Found* in Emulator Log File

**Version affected:** Charon emulator products requiring a checksum as part of the license content.

**Conditions:** license medium does not contain a checksum.

## Problem Symptoms

The emulator does not start and the following error message is reported in the emulator log file:

```
20160907:103831:ERROR:2:000003FE:ll_sentine(3694):  License checksum not found. Please, update the license.
```

## Problem Cause

A Charon product requiring the license to have a checksum does not find a checksum on the license.

## Problem Solution

Contact your Stromasys representative to update the license with the correct content.

**Please note**: in the unlikely case that you are running a pre-release of Charon-AXP 4.8 that requires a checksum, please contact your Stromasys representative to receive an updated version of the software.

# Fingerprint Creation Fails on Linux

**Versisys affected**: Charon-AXP/VAX before version 4.9, Charon-PAR before version 1.10, and Charon-SSP before version 4.

**Conditions**: fingerprint is to be created for the system while a network license (hardware or software license) served by another system is visible.

## Problem Symptom

When trying to create a fingerprint file, the system displays the message:

```
Can not retrieve the C2V (host fingerprint mode) data.
```

**Please note**: in some older product versions this message is misspelled as "Can not retrive the C2V (host fingerprint mode) data".

## Problem Cause

The license utilities on Linux cannot create a fingerprint of the local system as long as a network license served by another system is visible.

## Problem Solution

Permanently or temporarily disable the network license, for example by disabling the access to remote license servers in the Sentinel ACC configuration menu.

**Please note**: starting with Charon-AXP/VAX 4.9 for Linux, Charon-AXP/VAX version 4.8 for Windows, and Charon-PAR 1.10, these Charon emulator products do not follow the settings in the Sentinel ACC with respect to querying remote license servers and network visibility. They perform a **broadcast search** for network licenses even if this has been disabled in the local Sentinel ACC configuration. However, these versions are not affected by the problem described in this section.

# HP3000 before Version 1.10 Selects Wrong Product License

**Versions affected**: the HP3000 emulator product before version 1.10

**Conditions**: the license key contains more than one product section suitable for the HP3000 product.

## Problem Symptom

The emulator chooses the wrong product license section on the license key and may not start.

## Problem Cause

The affected versions of the HP3000 emulator always use the first suitable product section found on the license key.

## Problem Solution

Select the correct product section on the license key by adding the parameter

```
sub_license <number of product section>
```

 to the emulator configuration.

**Please note**: this parameter is obsolete in Charon-PAR versions 1.10 and higher. If this functionality is needed, use the new `license_id` parameter that provides more configuration flexibility.

# Error Message: *Instance limit exceeded*

**Versions affected**: Charon-AXP/VAX before version 4.9, Charon-PAR before version 1.10, and other older Charon products

**Conditions**: attempt to combine a local license (black dongle) with another license (local or network) to increase the number of active instances for the same product running on one host system.

**Please note**: this error is displayed any time Charon believes the number of allowed instances has been exceeded. This section describes only one specific case.

## Problem Symptoms

The emulator instance does not start with the error **Instance limit exceeded** even though the overall number of instances allowed by the installed licenses seems to be sufficient.

## Problem Cause

In the versions listed above, Charon performs the following checks when verifying a **local** license (black dongle):

- Charon reads the number of instances allowed by the selected local license for the specific product code.
- Then, Charon checks if there are other instances of the same product running on the host (independent of which license keys these other instances use).
- If there are more instances than are allowed by the selected local license, it will stop with the error message described above.

Checks for **network licenses** use a different mechanism. Charon employs the Sentinel runtime software to attempt a license login. If this succeeds, the emulator will start.

## Problem Solution

Contact your partner or Stromasys representative for options to

- upgrade the Charon software to a version supporting the combination of local licenses to increase the instance number (versions starting with Charon-AXP/VAX 4.9 and Charon-PAR 1.10), **or**
- combine the required instances on one license dongle and change the second dongle to be a backup for the first dongle.

**Please note**: Stromasys may require the customer to cover operational costs associated with the license updates or other incurred cost.

# Sentinel ACC Shows *Duplicate Key ID* or *Sharing Violation*

**Versions affected**: all Charon emulator products that use HASP licenses

**Conditions**:

- A Charon system on which a software license is installed, is duplicated.
- A USB network dongle is served by a host system and passed into a VM (e.g. VMware) where it is also served over the network.
- A non-network USB dongle is used by a host system and passed into a VM (e.g. VMware) where it is also used.

## Problem Symptom

In case of a *Duplicate Key ID*, the emulator on the original system may start normally (see section regarding *Sentinel HASP RunTime Error 38* above for possible additional problem). However, Sentinel ACC shows that there is a duplicate license.

## Problem Cause

The problem can have several causes:

1. A cloned system with a software license that is brought up in the same LAN as the original system with the license service active and without having removed the software license.
   a. By default, both systems will serve the software license on the network.
   b. If the original system sees the license served by the cloned system, it will report a duplicate license ID.
   c. If the cloned system sees the license served by the original system, it will also report a duplicate license ID. But in addition, the software license will be in **cloned** state and unusable on the cloned system.
2. A USB network dongle that is served over the network by a host system and passed into a VM (e.g. VMware) from where it is also served over the network will lead to a **duplicate license ID** being reported.
3. A non-network USB dongle is used by the host operating system and passed on to a VM, ACC shows a **Sharing violation** on the host system and the license will become unusable (error logged that license cannot be used due to sharing).

## Problem Solution

If the problem is caused by cloning a system with a software license, follow the steps described in Removing a License to remove the cloned license.

For hardware dongles, ensure that only one system can use the dongle.

# Network License Lost After Second NIC Added to License Server

**Versions affected**: all Charon emulator products that use HASP licenses

**Conditions**:

- An additional NIC is added to a license server and connected to the same LAN on which the license is served.
- The additional NIC receives an IP address in the same LAN.
- A license client is configured to access the license via the IP address of the first NIC.

## Problem Symptom

License clients can no longer access the license served across the network.

## Problem Cause

When two NICs with an IP address are connected to the same LAN, it can happen that the license requests are received on one interface and answered on the second. Thus the license client receives an answer from an unexpected address causing the license to be rejected.

## Problem Solution

If the second NIC is not required, it can be disabled to fix the problem.

If the second NIC is required, policy routing rules and a non-default routing table must be configured. See RedHat policy-based routing description.

# Unable to Find Vendor Library even though Library Exists

**Versions affected**: all Charon emulator products that use HASP licenses

**Conditions**:

- Loading a license fails with the message that the vendor library cannot be found.
- The libraries are correctly installed in **/var/hasplm/** (haspvlib_68704.so and haspvlib_x86_64_68704.so).

## Problem Symptom

A new or updated license cannot be installed with the error that the vendor library cannot be found.

## Problem Cause

The **/var** filesystem was mounted with the **noexec** flag. This may be required by a company's security policies.

## Problem Solution

Remove the mount flag in the **/etc/fstab** entry for the **/var** filesystem and reboot the system.

# Resources

This section provides information about license related resources external to this document.

- Resources on Stromasys Documentation Server
- List of Error Codes on the Sentinel Webpage

# Resources on Stromasys Documentation Server

There are several additional documents and articles on the Stromasys website dealing with specific aspects of licensing in more detail than can be covered in this documentation. The main resource for product questions is the Stromasys product documentation page: see Documentation. The following table shows additional articles providing information about certain Charon aspects or solutions to common problems:

| Document Link | Comments |
|---|---|
| **Tool Descriptions** | |
| Charon on Windows - Automated License Expiration Check | Description and use of a PowerShell script to read the license content and send alerts before the license expires. |
| Charon Log monitoring on Windows (logmond) - Best practices | Best practice recommendation for alerting the system administrator after the license has been removed from a system. |
| CHARON on Windows - Charon License Utility | This utility allows the installation/uninstallation of the 'Sentinel LDK License Manager' service and drivers. It enables the use of USB license dongles and Software Licenses (SL) management. |
| Charon on Linux - Automated license expiration check | Checks the license content on a system and sends configurable alerts in the time period before a license expires. |
| **Troubleshooting** | |
| How to read a HASP key over RDP on Windows | Execute hasp_view as a scheduled service and write output to file. |
| License Update Service utility reports "update was already installed" | Steps to solve the problem when V2C files were applied in the wrong sequence or the C2V file sent to Stromasys was not current. |
| HASP Common Error codes translation | License error codes common in Charon environments and their description. |
| How long does the license USB dongle battery last upon a full charge | |
| Sentinel Admin Control Center - Attach/Update errors | Describes errors that can occur while applying a V2C file using the Sentinel Admin Control Center. |
| HASP_NO_VLIB error 48 message when installing a software license | Installing HASP SL package on certain older versions of Charon-AXP without built-in support for software licenses. |
| License not found, not valid, expired or prohibits use of cpu_N | The license does not allow the configured number of CPUs for an emulator instance. |
| hasp_update utility returns error message | Description of error which can occur when a v2c file is re-applied. |
| Charon Launcher - License not found, not valid or expired | Description of error when user attempts to start emulator over RDP. |
| Charon for Linux - Detected removal of the license whereas dongle is connected | How to fix „disappearing dongle" problem without actually unplugging and plugging in again. |
| Charon on Linux - Cannot get license information or run guests over ssh | One possible workaround for displaying license content (hasp_srm_view) or running the Charon emulator when connected via ssh. |
| Charon-AXP and Charon-VAX license not found error | Detailed description of problem and workaround. |
| **Configuration** | |
| How-to configure a VMware virtual machine to make the dongle follow migration to another ESX server | Relevant, for example, if vMotion is used. |
| Charon licensing options | Recommendations for Charon licensing in complex environments. |
| Software Licensing restrictions | Parameters to which a software license is tied to on a host system. |
| How-to enable remote connection to Sentinel Admin Control Center without GUI | Sentinel ACC remote access must be enabled before use. This document describes how to do this if the host system does not have a graphical user interface. It also provides a description of additional interesting parameters. |
| Enabling logging in Sentinel Admin Control Center | Recommended settings to enable logging for the Sentinel Runtime driver. |

# List of Error Codes on the Sentinel Webpage

A complete list of error codes is available on the Sentinel webpage (https://docs.sentinel.thalesgroup.com/softwareandservices/ldk/LDKdocs/API-licensing/Licensing_API/Enumerations/Licensing_API_Status_Codes.htm).

**Please note**: not all codes in this list are applicable to the Charon product. This link is for information purposes only and may be changed at any time by Sentinel.

# Licensing Glossary

This page contains the definition of commonly used licensing terms.

| Term | Description |
| --- | --- |
| Baremetal product | The underlying host operating system of the Charon emulator product is not visible to users. Licenses must be managed via the provided product GUI. |
| Cloned software license | A software license is in cloned state if relevant hardware parameters of the host system have been changed. A cloned license is invalid. |
| Customer-to-Vendor (C2V) file | File containing information about the currently installed license. Sent to Stromasys to request a license update. |
| Fingerprint file | File containing the hardware characteristics of the system – required for requesting a software license. |
| Hardware license (HL) | USB dongle containing the license data. Can be easily moved between systems. |
| HASP | Hardware-assisted software protection (Name of Sentinel/Gemalto licensing products). |
| Host-based product | The underlying host operating system of the Charon emulator product is visible to users and must be managed by them. Licenses often can be managed via the command-line and a provided product GUI. |
| Network license | License that a license server can provide to clients on the network. Hardware-based network licenses are red. Software licenses are always network-enabled. |
| RUS, HASPRUS | License Update Service (Remote Update Service) on Windows. |
| Sentinel Admin Control Center (ACC) | Web-based GUI to view and manage licenses. |
| Sentinel Runtime Software | Drivers needed to access a hardware or software license. |
| Software license (SL) | License installed without a USB dongle. Tied to the hardware of the system for which it was requested. |
| Vendor-to-Customer (V2C) file | File containing the information needed to install a new software license or to update an existing license. Sent to the customer by Stromasys in response to receiving a C2V file. |
| Virtual Environment (VE) License server | Licensing alternative optimized for cloud environments. Please refer to Virtual Environment (VE) License Server Documentation. |

# Appendix 1 - Product-Specific License Guides

This appendix contains license management overview guides specific to particular Charon products. The content is an excerpt of the product specific details from the full licensing handbook.

- License Management Overview for Charon-AXP and Charon-VAX for Windows
- License Management Overview for Charon-AXP/VAX for Linux
- License Management Overview for Charon-PAR for Linux

# License Management Overview for Charon-AXP and Charon-VAX for Windows

Please refer to the other sections of the *Charon Licensing Handbook* and your product documentation for any topics not covered in this overview guide and for more detailed information on the topics discussed here.

This page provides an overview of the basic steps to set up the licensing environment on a system running Charon-AXP or Charon-VAX for Windows:

- General Description
  - Charon License Checks
  - Charon License Updates
  - License Content
- License Type Overview
  - Local Hardware License
  - Software License
  - Network License
- Overview of Initial License Installation Steps
- Overview of License Management Tools
  - Accessing the License Management Tools on Charon Version 4.7 and older
  - Accessing the License Management Tools on Charon Version 4.8 and Higher
- Define a Password for the Sentinel Admin Control Center (ACC)
- View Existing Licenses
  - Viewing a License with Sentinel ACC
  - Viewing a License with the License Viewing Utility
    - HASP View Utility Window
- Installing the License
  - Preparation
  - Installing a Local Hardware License
  - Installing a Software License
  - Installing a Network License
    - Firewall Considerations
    - Allowing Client Access on the License Server
    - Allowing Access to a License Server on the Client
  - Verifying License Availability
- Handling Multiple Keys
  - Backup License Characteristics
  - Primary and Backup License for Charon-AXP/VAX prior to Version 4.9
  - Prioritized List of License Keys or License IDs for Charon-AXP/VAX 4.9 and Higher
    - Prioritized List of License Keys
    - Prioritized List of Product License IDs
- Update an Existing License
- Removing a License
  - Removing a Hardware License from a System
  - Removing a Software License from a System
  - Removing Access to Network Licenses from a System
    - Full Removal of Network License
    - Block Access of Remote Emulator Hosts to Network License
    - Block Access to Network Licenses on Client System

# General Description

A Charon emulator product will not run without a valid license. For Sentinel HASP licenses (the topic of this chapter) this license can be provided on a **US B hardware dongle** (a Sentinel HASP key) or as a **software license** bound to the hardware of the host system or the network license server. A loss or defect of a license will cause the emulator to stop.

For extra protection, Stromasys recommends the use of a backup license key (purchased separately) that can replace the main license key for a limited period of time. It is possible to specify the backup license in the Charon configuration file to prevent the emulator from stopping in case its main license is no longer accessible.

To check the validity of a license, Charon performs the following steps:

- The Charon emulator checks the text block of the license to determine if it is allowed to run (if there is a product section which corresponds to the emulator).
- Then Charon checks the feature associated with the product to see if the feature is valid - that is, it is not expired, the available runtime hours are not exhausted, and if there are still some instance-slots available to run the emulator.
- If there is no matching product section or if the feature is not valid, Charon reports the problem in the log and shuts down.

# Charon License Checks

Charon products **check the availability of a valid license** at different points in time:

**1. At startup:**

If no valid license is found, an error message will be written to the emulator log file and the emulator will not start.

Charon-AXP/VAX has a configuration parameter to define the number of retries (`license_key_lookup_retry`). Please refer to the product configuration documentation for more details.

**2. At regular intervals** during the runtime of the emulator (the default license check period of 1 hour can be changed by Stromasys using the appropriate license parameters):

- If the previously used valid license has been removed, has disappeared, is defect, or has become invalid, the emulator will report the loss of the license in the log file and continue operation for a limited amount of time as described below.
- If there is another valid license, for example a backup license defined in the configuration file, it will be used.
- _Starting with Charon-AXP/VAX 4.9_, Charon allows for a grace period of 12 hours during which the software checks for the presence of a valid license every 10 minutes until a valid license is found. If no valid license is found after the grace period has expired, the emulator will stop.
- _Earlier versions of the above products and other emulator products_: should there still be no valid license at the next regular license check (this default interval may be changed by individual Charon products), the emulator will stop.
- If a time-restricted license is used and it expires, the Charon instance tries to find its replacement automatically and, if found, proceeds using the replacement license.

**Important note for Windows installations**: any running emulators will be stopped if the license service is forced to stop despite existing service dependencies (i.e., running emulators). So any running guest systems must be cleanly shutdown before restarting the license service in order to avoid data loss. This is the behavior at the time of writing. It may change in future versions.

# Charon License Updates

Under certain circumstances existing licenses must be updated.

**License updates are required, for example, in the following cases**:

- Charon product version upgrade
- Product change
- License validity (time) extension

License updates, for example a new expiration date or a new execution counter, can be performed without interrupting operation, that is, without shutting down active Charon instances, **provided that the resulting license is valid for the running Charon instance**. If any parameters of the updated license are not valid for the running Charon instance (for example, the wrong model or version), the Charon instance will stop running.

Licenses are **backwards compatible to some extent**. A **license update to a more recent version** will allow some previous Charon versions to run as well. The details depend on the Charon product.

The license check on **Charon-AXP/VAX/PDP starting with version 4.4** will be successful for a newer license if the major version (for example, the 4 in 4.7) is the same. In **version 4.3**, the emulator will start, but there are inconsistencies and incompatibilities especially in the associated tools (e.g., hasp_view). Product **versions 4.2 and earlier** are incompatible with the current license schema.

# License Content

The license data on a license key, independent of whether it is a hardware or software license key, consists of **several parts:** the **license key text block** contains the **license section** and **one or more product section**s. The **license features** describe additional conditions and limitations for the emulator products contained on the license.

## A) License Key Text Block

### 1) License Section (one per license key)

The **license section** contains general license information related to ownership and administration.
There is **one license section** per license key.
Please note that in rare cases, you may receive an **empty USB dongle** for which command outputs will show that **no license information was detected**. In such cases, request a license update from Stromasys as described in *Updating a License*.

Relevant **license section parameters**:

- **License type**: type of the license, i.e., hardware or software license, network-enabled or local (added in newer Charon product versions, e.g., Charon-AXP/VAX 4.9)
- **License number**: assigned by Stromasys
- **License key ID***: unique**;** pre-programmed; unmodifiable; on physical keys same value as the Physical Key ID
- **Master key ID**: the software vendor ID used by Stromasys for issuing licenses
- **Release date**: the day on which the license was issued
- **Release time**: the time at which the license was issued
- **Update number**: the number of license updates that have been applied
- **End user name**: the name of the person to whom the license was issued
- **Purchasing company name**: usually the company to which the license was issued

### 2) Product Section (one or more per license key)

The text block also contains **product sections** that contain product specific licensing information.

- Several products can be combined on one license key. Stromasys may place restrictions on what products can be combined on a single license key.
- The product section also may include information about the support contract and the end of support. It may contain hardware specific limitations related to the types of devices that can be connected (e.g., serial interfaces).
- A checksum is inserted after the last product section of a license. This checksum is not visible in the show command output. Charon products/versions requiring such a checksum will not start if the license does not contain a checksum.
- Each product section is associated with a **feature defining additional conditions** for the product.

The following list shows the most important **parameters of a product section**.

Please note that not all of these parameters may be present for a particular Charon product.

- **Product License Number:** identification of specific product section (optional; new starting with Charon-AXP/VAX 4.9 and Charon-PAR 1.10). Corresponds to configuration parameter **license_id**.
- **Virtual Hardware**: range of virtual models available for running
- **Product Name**: commercial product name
- **Product Code**: commercial product code
- **Major Version, Minor Version, Maximum Build, Minimum Build:** commercial product version and range of build numbers suitable for running with this license. The parameters **Maximum** and **Minimum Build** are no longer displayed starting with Charon-AXP/VAX 4.9 and Charon-PAR 1.10.
  **Please note** that, depending on the product and product version, licenses have a limited backward compatibility (i.e., when the version on the license is newer than the product version).
  See *Operational Procedures Overview* in the Sentinel HASP Licensing Documentation for more information.
- **Host CPU supported** or **32bit and 64bit OS requirements:** type of host CPU required (for example, x64)
- **Host Operating System required**: Linux or Windows
- **CPUs allowed:** number of virtual CPUs enabled for virtual multiprocessor systems
- **Maximum virtual memory:** Maximum memory emulated. If not present the value defaults to the maximum memory possible for the particular virtual system. Note that the maximum memory may not be available to the virtual system if the host computer has insufficient physical memory.
- **CHAPI enabled:** whether or not CHAPI (Charon-AXP API) can be used with this product
- **Instances allowed:** maximum number of Charon emulator instances of this program/hardware model that are allowed to run concurrently on the local host. Relevant for local license keys that do not support the process count parameter. **See also** the parameter *Number of processes* in the feature section.

- **CPU Speed**: optional parameter to reduce the speed at which the program can run to a fraction of the maximum (e.g., to 25%)
- **HPSUSAN**: optional parameter. Specific to HP3000, overrides physical key ID. The HPSUSAN (HP System Unique Serially Assigned Number) is used for licensing purposes by HP. The parameter may be needed if a license on the physical system is tied to the original HPSUSAN.
- **Feature number:** number of the feature defining further limits/restrictions for the product license. Each product can use a separate feature, or the same feature can be used by several products.
  If using a **network license** and the same feature is shared by several products, the number of instances allowed by the feature is shared between the products (e.g., 2 allowed instances enable one Charon-AXP and one Charon-SSP instance to run concurrently). If using a **local license dongle** and the same feature is shared by several products, the number of allowed instances is counted separately for each product.
  The parameters defined in a feature are described below in the *Features* section.

**B) License Feature Section** (one or more per license key)

Features define **product specific conditions**, for example expiration date and number of concurrent instances.

The following list describes these conditions:

- **Released product expiration date:** for time-based licenses. Note that at the time of writing the license of Charon-AXP/VAX products will expire at the end of the day of the expiration date, the license of Charon-SSP in the early morning of the expiration day. The exact behavior of the different versions can change without prior warning. Not supported for HL-MAX dongles.
- **Runtime counter:** number of license checks after which the license will be disabled. Default check interval is one hour. The counter will be decreased at the start of the emulator and then at every license check interval. Once the counter has been depleted, the license becomes invalid. This license type is typically used on licenses intended as backup licenses.
- **Login interval** or **Check interval:** frequency of license checking during emulator execution (default 1 hour). This parameter is not visible in the show command output in older Charon product version. It is visible in the show command output of newer versions, starting with Charon-AXP/VAX 4.9 and Charon-PAR 1.10.
- **Network license:** indicates that a physical license is a network license
- **Number of processes:** maximum overall number of Charon instances that are allowed to run concurrently.
  This parameter is set by Stromasys to the value matching the respective customer contract. For network dongles, the maximum possible value of this parameter is determined by the type of network dongle. For example: on a NetTime10 dongle this parameter can be set to a value between 1 and 10 (depending on the customer contract). The type of dongle can be viewed via Sentinel ACC.

**Example with Time-Based Parameters**

The parameters below describe the following limitations to the emulator:

- License permits running up to 2 instances of Charon at the same time.
- License expires on May 31, 2020, **or** after 360 license checks (with an interval of 60 minutes between the checks).

```
Expiration date: 31/5/2020
Runtime counter: 360
Login interval: 60 minutes
Instances allowed: 2
```

If any of the conditions are no longer met (too many instances, past expiration date, all checks exhausted), the feature becomes invalid and will not allow an emulator instance (or an additional instance) to run.

# License Type Overview

Depending on customer requirements, Stromasys can provide several different license types.

## Local Hardware License

Local hardware licenses are USB dongles and work on the system they are physically connected to. For Windows systems supporting AnywereUSB®, hardware licenses can also be connected over the network (similar products are available for Linux). They can easily be moved to a different system, if required. The content of the dongle can be updated if a change to the license or an extension of a time-based license is required. The necessary steps are described later in this document.

**Please note**:

- Hardware dongles require the Sentinel HASP run-time (driver) installation before the dongle can be connected to and used by the system.
- Hardware dongles, apart from HL-MAX dongles, are equipped with a **battery** and a clock, which makes them independent of the host clock. The battery is not rechargeable. However, the dongle can use the power provided by the host system while it is plugged in. By doing this, the depletion of the battery can be slowed down. Check the dongle at regular intervals if it is not permanently connected to a system. If the battery becomes completely depleted, the dongle will be permanently unusable and must be replaced. See also: How long does the license USB dongle battery last upon a full charge.
- Hardware dongles are not suited for running Charon emulator products in **cloud environments**. Stromasys provides other licensing solutions adapted to virtual environments (Charon VE licenses) for selected products. See Virtual Environment (VE) License Server Documentation.

## Software License

A software license is a "virtual" key with functionality very similar to a HASP network-enabled hardware dongle.

A software license does not require any special hardware but it still **requires installation of the Sentinel runtime environment**.

**Important information:**

- To avoid unexpected problems, do not use any Sentinel runtime software that was not provided by Stromasys without being advised to do so by your Stromasys representative.
- Software licenses are best suited for stable environments, because their correct function depends on certain characteristics of the host system. **Changing these characteristics will invalidate the license**.
  - If the Charon host runs on **real hardware**, software licenses are by default tightly bound to the hardware for which they were issued. If major hardware characteristics of the system are changed, the license will be disabled.
  - If the Charon host runs in a **virtual environment (e.g., VMware)**, software licenses are normally bound to the virtual machine ID and a set of additional characteristics of the virtual machine. If any of these parameters are changed, the license will be disabled.
  - For a more detailed description of the restrictions, please refer to Software Licensing restrictions or contact your Stromasys representative.
- Software licenses are very sensitive to even small changes on the host system. Therefore, it is especially important to provide for a backup license that will ensure continued operation should there be a problem with the software license. See *Handling Multiple License Keys* for details.
- Standard software licenses are not suited for running Charon emulator products in **cloud environments**. Stromasys provides other licensing solutions adapted to virtual environments (Charon VE licenses) for selected products. See Virtual Environment (VE) License Server Documentation.

## Network License

The network Sentinel HASP key (**red USB dongle**) can be shared between several hosts running a Charon emulator product (including the host on which the network license is installed).

**Please note**: all software licenses are also network licenses.

If the Charon emulator product is installed on the host where the network license is connected, no additional steps are required. The Sentinel driver is installed as part of the Charon product installation. If the host does not have a Charon emulator product installed, the host can still distribute the connected network license to emulator instances running on other hosts.

The Sentinel HASP runtime software must be installed on such a license server and on the client system. For details regarding the installation, please refer to the software installation section in this document. Once both the Sentinel runtime software and the network license are installed, the Charon emulator product can be started on any appropriate client host on the LAN, provided access to the license is enabled.

- The network license will be visible to all hosts that can access the license server over IP. Access to the license server must be possible on **port 1947** via **UDP** (discovery process) and **TCP** (actual access to license). Further information (e.g., use of **additional UDP ports**) can be found in the section *Firewall Considerations*.
- The license server and the client must both allow access to the network license using the appropriate management tools.

The maximum **number of concurrently active** Charon instances is determined by the parameters of the license.

**Please note**: Charon-AXP/VAX version 4.7 build 171-01 introduced a change with respect to network licenses. In previous versions of Charon-AXP/VAX a network license controlled the maximum number of client host systems and Charon instances per host system (station/instance mode). In the current Charon-AXP/VAX versions a network license controls the maximum overall number of active instances, which can be distributed across client host systems according to the preference of the customer.

# Overview of Initial License Installation Steps

Each Charon emulator product requires a valid license to run. To access a Sentinel HASP license, the emulator needs the Sentinel runtime software. This software is part of the Charon-AXP/Charon-VAX for Windows installation kits. Refer to the software installation section of the Charon product user's guide for software installation instructions.

After the installation of this software, the license can be installed on the system. The following steps are described in more detail below:

1. Add a password for the Sentinel Admin Control Center (ACC).
2. If you purchased a **hardware license**, you can simply plug the dongle into a free USB port on the system.
3. If you purchased a **software license**, you need to create a fingerprint file in C2V (customer-to-vendor) format containing the system characteristics. Use this file to request a license for your Charon product from Stromasys.
4. If your license is a **network license** served by a license server, make sure that the access of the client system to the license server is not blocked by the configuration or a firewall.
5. Optionally, define how **multiple licenses** will be used (selecting primary/backup license, defining license priorities).
6. If you have an **existing license** that needs to be updated, you need to create a customer-to-vendor (C2V) file and use this file to request a license update from Stromasys.

# Overview of License Management Tools

The following list shows the main tools used to manage licenses on Windows:

- **Sentinel Admin Control Center (ACC)**: A web-based interface providing important configuration options with respect to licenses.
- The **license viewing utility**: A GUI-based tool to display the detailed license contents. Cannot be used over a remote connection when using local hardware licenses.
- **The license update utility**: A GUI-based tool to extract the information required for creating and updating licenses, and to install the resulting license data.

## Accessing the License Management Tools on Charon Version 4.7 and older

The **Sentinel ACC** on the local system is accessed by starting a web-browser and pointing it to the URL: **http://localhost:1947**.

The **license viewing utility** and the **license update utility** are accessed via

    **Start > All programs > Charon > Charon product folder > Utilities** as shown in the image below.
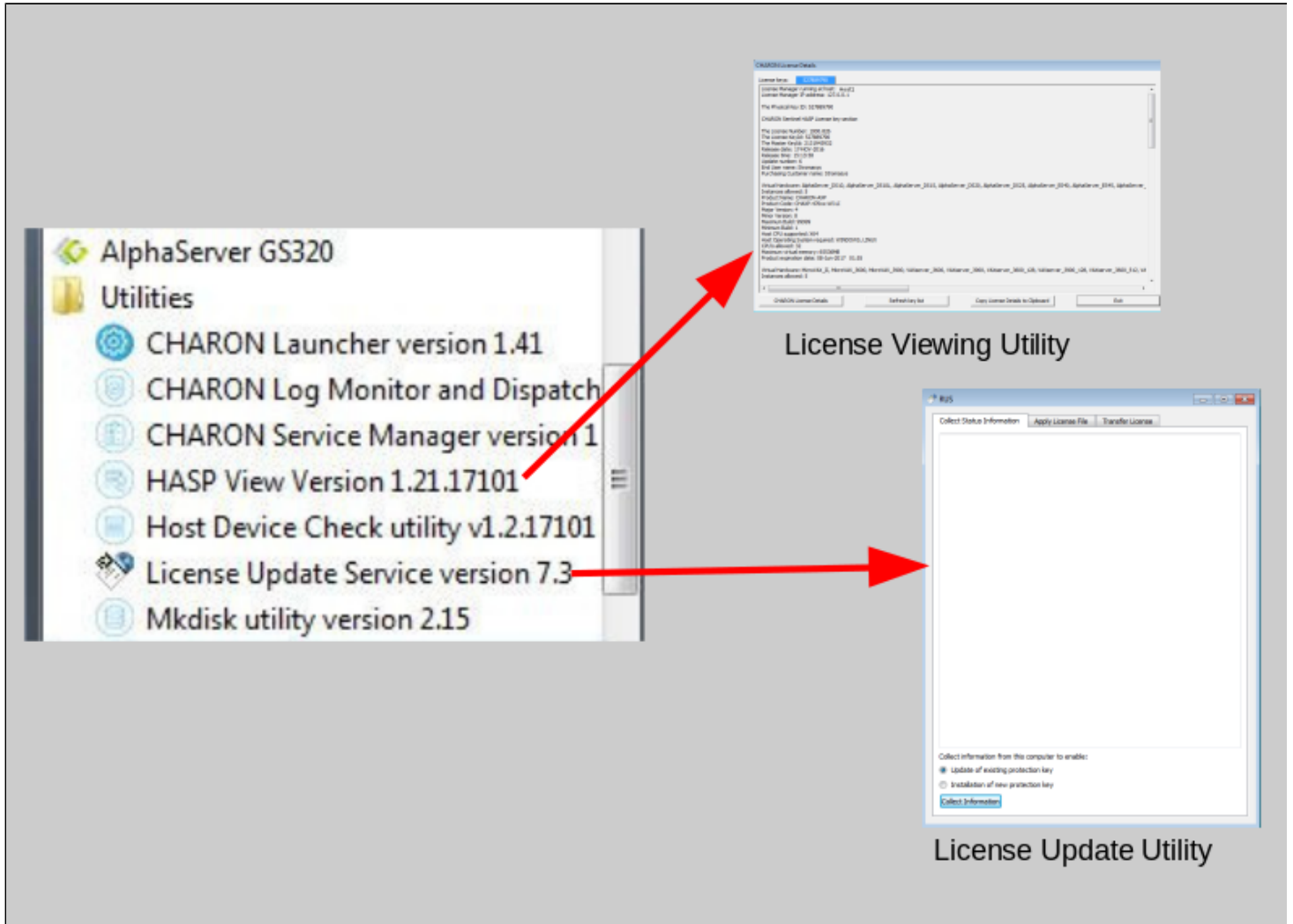
## Accessing the License Management Tools on Charon Version 4.8 and Higher

All license management tools are accessed via the Charon Virtual Machines Manager (VMM) as shown in the image below.

The CHARON VMM is started via **Start > Charon > CHARON Virtual Machines Manager** or by clicking on the associated desktop icon.
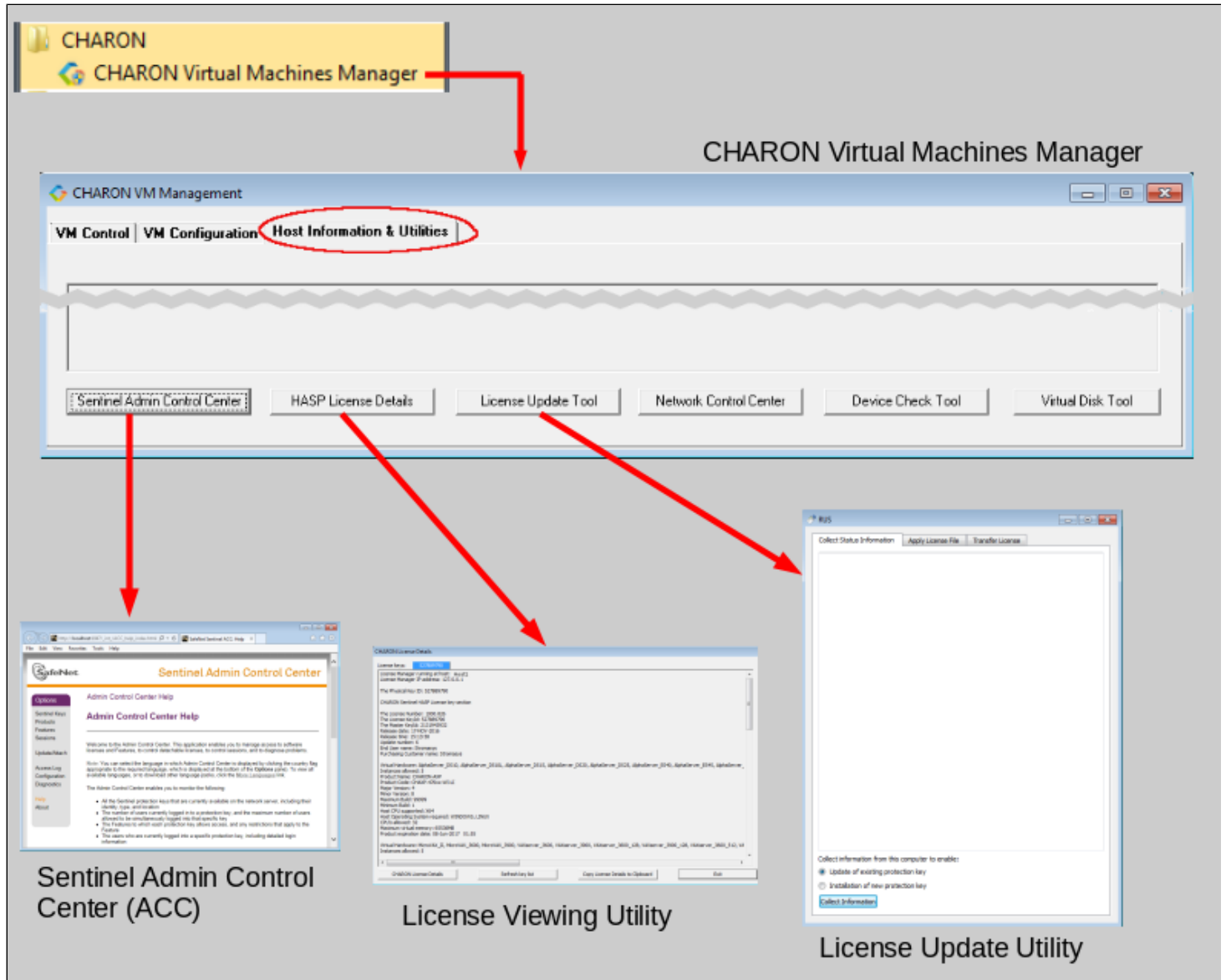
# Define a Password for the Sentinel Admin Control Center (ACC)

**Please note**: Stromasys strongly recommends performing the steps described below to reduce the risk of unauthorized access to the Sentinel ACC.

By default, anyone on the local system with access to port 1947 can access the GUI. If remote access is enabled, users on the network with access to port 1947 can also access the GUI. To protect access to the GUI with a password, perform the following steps:

| Step | Description |
|---|---|
| 1 | Open a web browser and navigate to **http://localhost:1947/.** |
| 2 | **Click** on the left-hand menu item labeled **Configuration**. |
| 3 | **Click** on the **Basic Settings** tab. |
| 4 | Under the entry labeled **Password Protection, click** the **Change Password** button. |
| 5 | At the **Change Password** window:<br><br>• Leave the **Current Admin Password** field blank (there is no password set by default).<br>• Enter the desired password into the **New Admin Password** field.<br>• Repeat the desired password in the **Re-enter new Admin Password** field**.**<br>• **Click** the **Submit** button**.** |
| 6 | Back at the **Basic Settings** tab:<br><br>• Under the section labeled **Password Protection,** select the **All ACC Pages** radio button**.**<br>• **Click** the **Submit** button to save this change. |
| 7 | Optional: to allow **remote access** to the Sentinel HASP GUI:<br><br>• **Click** the **Basic Settings** tab.<br>• **Select** the **Allow Remote Access to ACC** check box.<br>• **Click** the **Submit** button**.**<br><br>**Additional information for remote access to the Sentinel HASP GUI:**<br><br>• The firewall must permit access to port 1947/TCP, and<br>• network visibility on the ACC network configuration tab must be set to **All Network Adapters.**<br><br>If required, remote access can also be enabled on Linux by editing the file */etc/hasplm/hasplm.ini* and setting the parameter **ACCremote** to **1**. Should the file not yet exist, refer to How-to enable remote connection to Sentinel Admin Control Center without GUI. The parameter to enable network visibility is **bind_local_only**. It must be set to **0** to enable all adapters. Changed settings are recognized automatically by aksusbd. |

# View Existing Licenses

It is important to know which licenses are visible on a system. For example, the user can

• determine if the correct license is installed,
• identify the expiration date on time-based licenses,
• identify the remaining hours of run-time on backup licenses,
• identify the license ID of primary and backup license which are needed for the emulator configuration file.

Licenses can be viewed using two tools:

• Sentinel ACC: shows important information, but not the product specific license parameters.
• License viewing utility: shows all product details contained on the license. Can only be run from a local connection for local hardware licenses.

## Viewing a License with Sentinel ACC

To view available licenses using Sentinel ACC, start the web interface as described above.

**Please note**: starting with Charon-AXP/VAX 4.9 a new Sentinel ACC version (>= 7.60) has been included in the product. The functionality is very similar but the appearance is somewhat different.

o get to the **Sentinel Keys** screen, click on the corresponding menu item or access the URL **http://localhost:1947/_int_/devices.html** directly. A screen similar to the following opens and displays the available license keys:



For Sentinel drivers version 7.60 and above, this screen looks similar to the following:



This page displays important information about the available licenses, including

- **Location**: Shows whether the license is local or remote. If the license is a network license, the hostname of the remote system is specified. You can access the remote license manager by clicking on the hostname, provided that access is permitted.
- **Key ID**: The unique identification of the license.
- **Key Type**: Hardware keys are marked by the abbreviation HL (hardware license) and a picture of the license dongle. Software licenses are marked by the abbreviation SL (software license).
- **Sessions**: Shows the number of active sessions opened for the specific key.

The buttons on the right-hand side can be used to retrieve more information about the license or to extract the C2V file for a license update. The **Browse** button shown for network licenses will connect to the remote license manager to show the license features.

A C2V file can only be extracted if the license in question is local to the current license manager, i.e., the license manager to which the web browser is connected. You can connect to a remote license manager by clicking on the hostname in the **Location** column (if connections are allowed).

**Please note**:

- The option to create a C2V file is not available in older versions of the license software.
- Starting with ACC version 7.60, the **option to create C2V files** for USB dongles is only available if it has been **enabled in the basic configuration** section (under the *Configuration* menu item).
- Newer versions of ACC also offer the option to create a fingerprint for a new SW license.

- Some newer versions of ACC show the option on this screen to create a DEMOMA fingerprint. This is a demo key for development purposes and not relevant for Charon products.
- Some newer versions of ACC offer to create a fingerprint for a software license if such a license does not exist yet. Do not use this option. The resulting file has a format that is incompatible with the Stromasys license creation tools. Instead use the tools described in *Installing the License*.

The menu options *Products*, *Features* and *Sessions* on the left-hand side provide the same information as the buttons. However, they show the information for all licenses.

# Viewing a License with the License Viewing Utility

To view available licenses using the license viewing utility, start the program as described above.

Please note: a local hardware key cannot be read via a remote connection (e.g., via RDP). One possible workaround is described in detail in the document How to read a HASP key over RDP on Windows. It shows, how to setup a scheduled task for this purpose.

## HASP View Utility Window

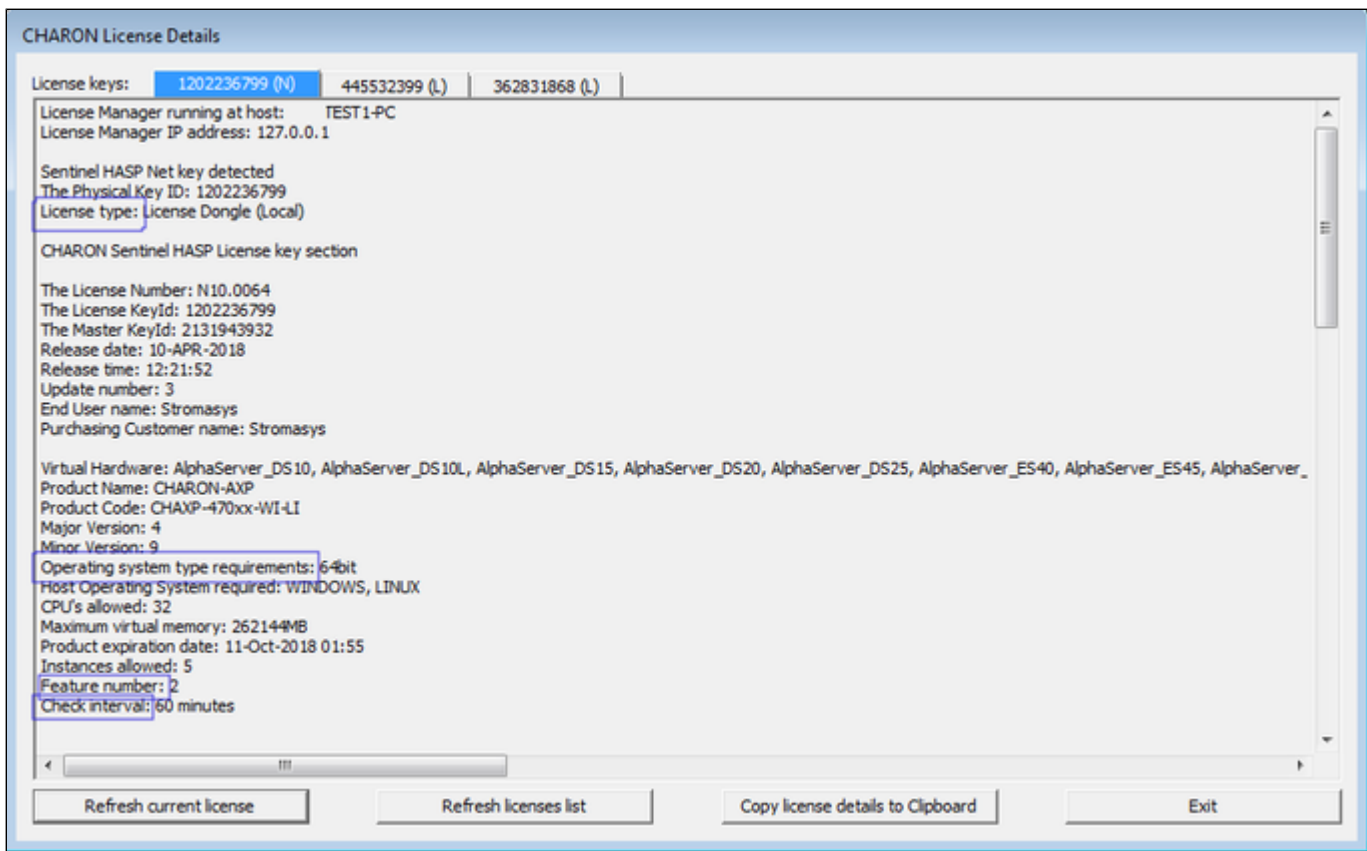The following image shows sample output:



The buttons at the bottom of the window provide additional functions:

- **Charon License Details** (re-)queries the selected license key (the highlighted tab) and displays the contents.
- **Refresh** the key list. This is useful if a key has just been added or removed.
- Copy license details to **clipboard**, for example to paste into a support e-mail.
- **Exit** from the utility.

**If there is more than one license, the data for each license is shown on a separate tab.**

**Please note**: starting with Charon-AXP/VAX version 4.9, the button **Charon License Details** has been renamed to **Refresh current license**. The names of some parameters have changed, new parameters were added, and other parameters removed. See the following sample output:

# Installing the License

This section provides a short overview of the initial license installation. For more in-depth information about licensing, please refer to the licensing handbook.

## Preparation

Before a license can be installed, some preparatory steps are required.

1. Ensure that the correct Sentinel Runtime software is installed. Please refer to the **installation section of your Charon emulator user's guide** for details.
2. If a conflicting or obsolete license is available on the system it may be necessary to **(temporarily) remove or disable** it. If you need to remove a hardware license, simply unplug it. If you need to remove a software license or disable access to a network license, please refer to the relevant chapter in the licensing handbook. Before removing a license or disabling access to it ensure that it is not required by another currently active product.

## Installing a Local Hardware License

A local hardware license (USB dongle) is installed by inserting the USB license key into a free USB port of the host system after the Sentinel runtime software has been installed.

After this step, verify that the license is visible to the system by following the steps for viewing a license as described above. Please bear in mind that a local hardware license cannot be read when connected to the system via a remote connection (e.g., via RDP).
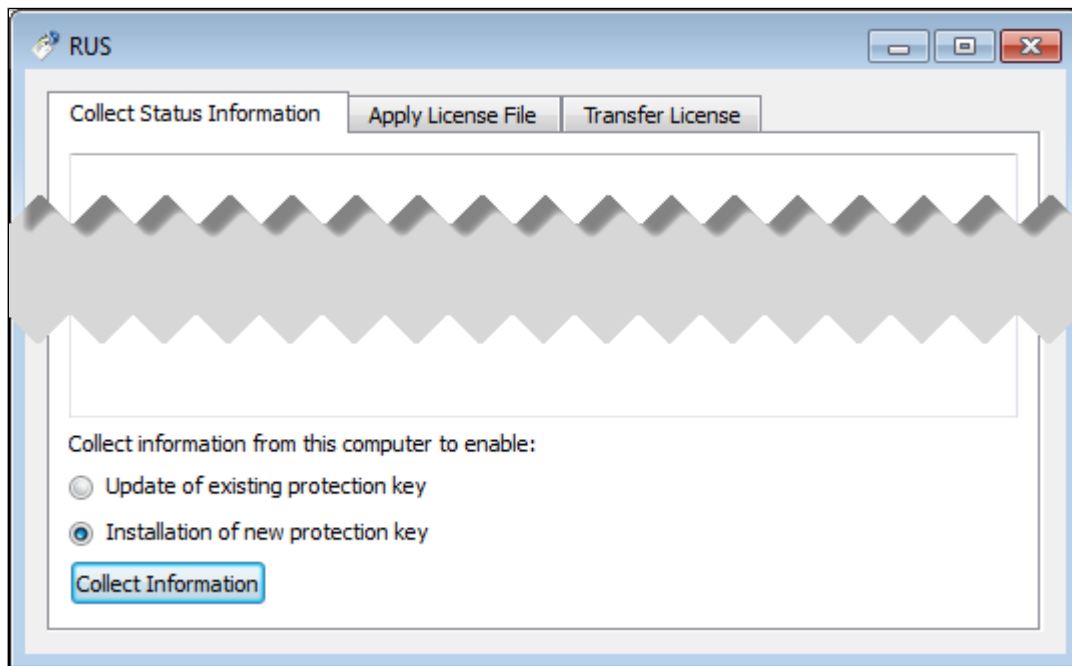
## Installing a Software License

To install a new software license, perform the following steps:

**Step 1**:  Start the license update utility as described above and create a fingerprint file:

The license update utility (HASPRUS) looks the same, independent of the product variant used.

The following image shows the **necessary options** for creating a fingerprint file: select the tab **Collect Status Information** and the option **Installation of new protection key**.



After pressing the **Collect Information** button, you will be prompted to enter a location for storing the fingerprint file. Select a location and filename and save the file.

Once a software license has been installed, current versions of the license update utility do not allow you to create another fingerprint without (temporarily) removing the installed software license. Therefore, save the created fingerprint file in case you need to create an additional software license for the same system (this will be the exception because in most cases the existing license can be updated with the required information). If you don't have the fingerprint file anymore and cannot create a second fingerprint because there is already a valid software license installed, please contact your Stromasys representative or VAR. If you have an obsolete/invalid software license on your system, you can remove it as described in *Removing a License*.

**Step 2**:  Send the resulting fingerprint file to Stromasys orders administration using the email address that Stromasys will provide to you.

**Step 3**: After receiving the V2C file from Stromasys, copy the file to the system where the license needs to be installed, start the license update utility as described above, and install the new license:

1. To install the V2C file(s) for hardware **and** software licenses, select the tab **Apply License File**.
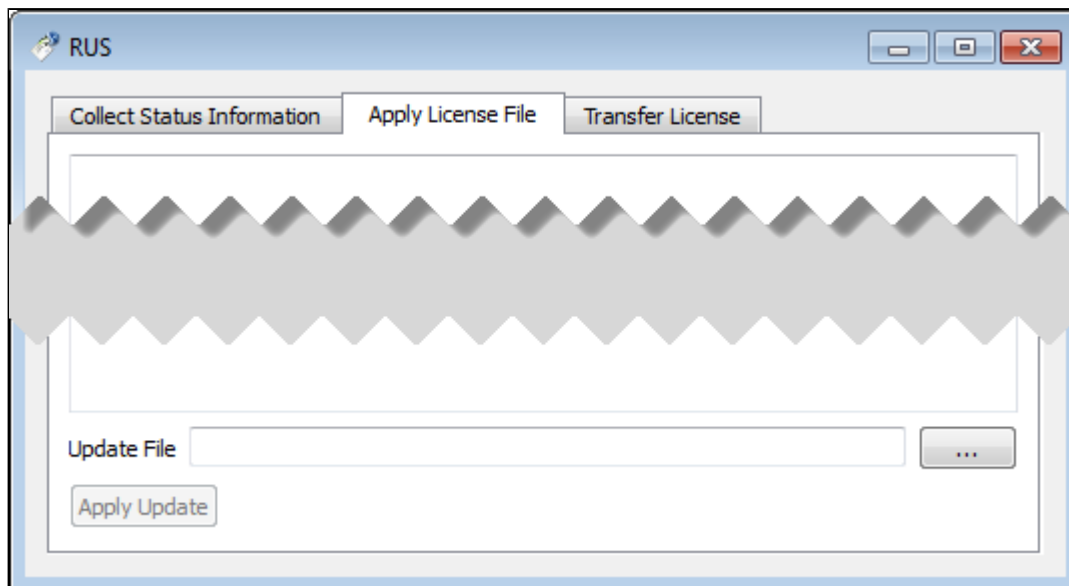


2. Press the **"..."** button next to the **Update File** field. This will open a file browser.

3. Select the V2C file to be applied.

4. Click on **Apply Update** to complete the operation.

**Please note**: This section describes the installation of a new software license. However, the installation procedure for a V2C file is identical when updating a hardware license.

**Important caveat:** When updating a hardware license, you will in most cases receive two V2C files, a **\*_fmt.v2c** file and a **\*.v2c** file. The \*_fmt.v2c file formats the dongle and the \*.v2c file contains the updated license data. In such cases the **\*_fmt.v2c file** must be applied **first**.

## Installing a Network License

For a network license to be provided to a client host on the network, a license server must have been set up either with a network-enabled hardware license (red dongle) or a software license (software licenses are always network enabled).

If the license server also runs a Charon emulator product, follow the software installation steps in the user's guide. Additionally, the licensing handbook contains additional information about setting up a dedicated license server without installing the full product kit using the license-specific packages of a product kit.

For the client to access a license on a license server the following steps are required:

- Any firewall between license server and client must permit the necessary communication.
- The license server must be configured to allow access from the client.
- The client must be configured to allow access to the license server.

### Firewall Considerations

The following ports are used for the communication between license server and client hosts:

- On the **server side** (where network license has been installed), port 1947 must be open for incoming TCP and UDP traffic to allow client access to the license.
- On the **client side**, traffic is initiated using ports 30000 through 65535 as the source ports and port 1947 as the target port. If broadcast search for remote licenses is to be used, the client must also permit UDP traffic initiated from port 1947 of the license server to ports 30000 through 65535 of the client.

If a host on the network cannot find the license server even though the server is operational, you can **temporarily** disable the firewall to determine whether it blocks the traffic.
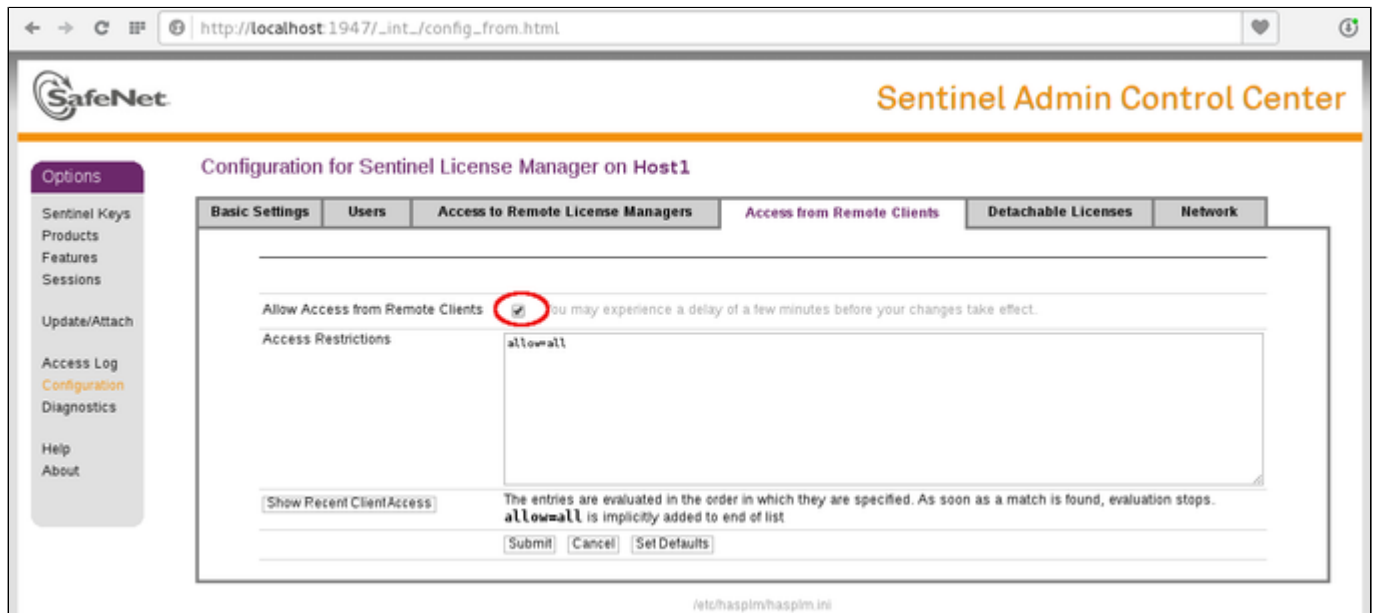
For details on how to configure the firewall in your network, please consult your operating system documentation and make sure to adhere to your company's security policies.

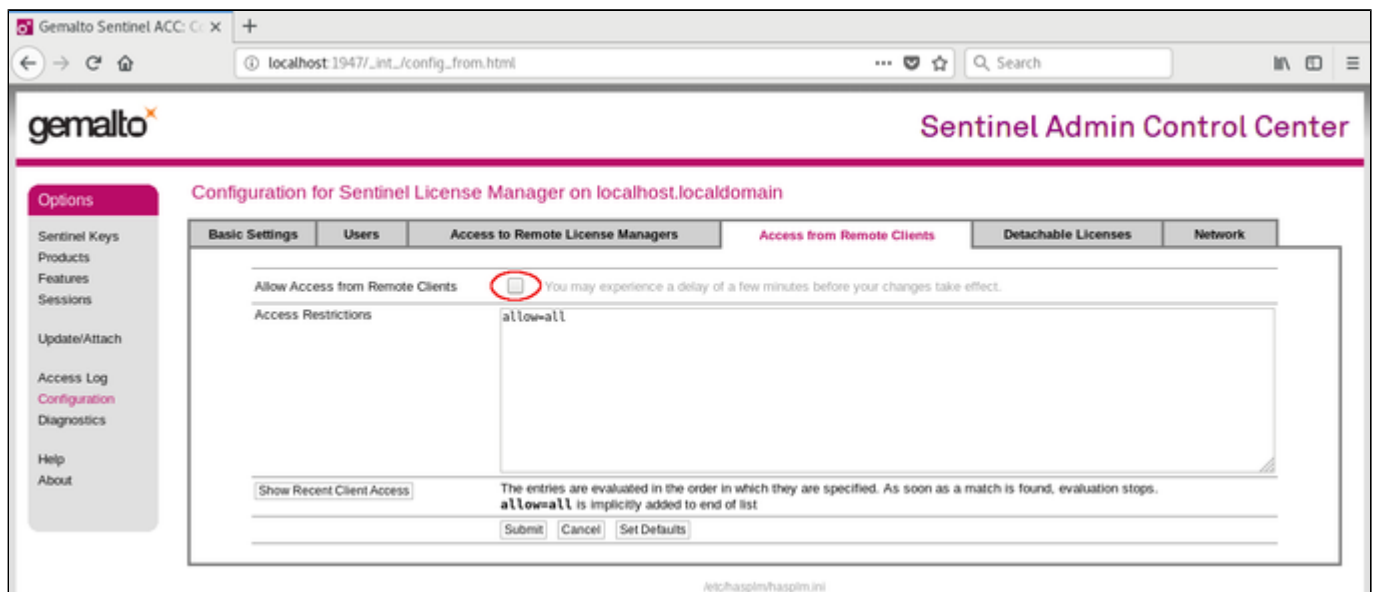## Allowing Client Access on the License Server

The Sentinel license manager on the license server can be configured to **allow** or **disallow** access from remote clients to the network licenses installed on the license server. To access this configuration option, perform the following steps **on the license server**:

1. Open a web-browser and go to the URL **http://localhost:1947/_int_/config_from.html** (option: Configuration / Access from Remote Clients).

2. This opens a page similar to the following. **Please note**: newer Charon emulator products (e.g., Charon-AXP/VAX version 4.9) have newer versions of Sentinel ACC. The pages of these versions look different, but the functionality remains mostly the same.

Old ACC version:



New ACC version:



Or for versions starting with 8.x:

3. Possible actions:

- To **allow access** from remote clients, *activate* the check-box next to the field **Allow Access from Remote Clients** or **Anyone and cloud licenses can be consumed without identity** and press **Submit** at the bottom of the page.
  To allow access from remote clients, network visibility on the "Network" tab must be set to **All Network Adapters.**
- To **refuse access** from remote clients, *clear* the check-box next to the field **Allow Access from Remote Clients** or select **No one**, and press **Submit**.
- **Access Restrictions** allow refining access rules, e.g., by specifying IP addresses. Please refer to Sentinel ACC help for details.

Sentinel ACC versions 8.x and higher have additional configuration options on this screen (mostly cloud related). These options are not relevant to Charon emulator products.
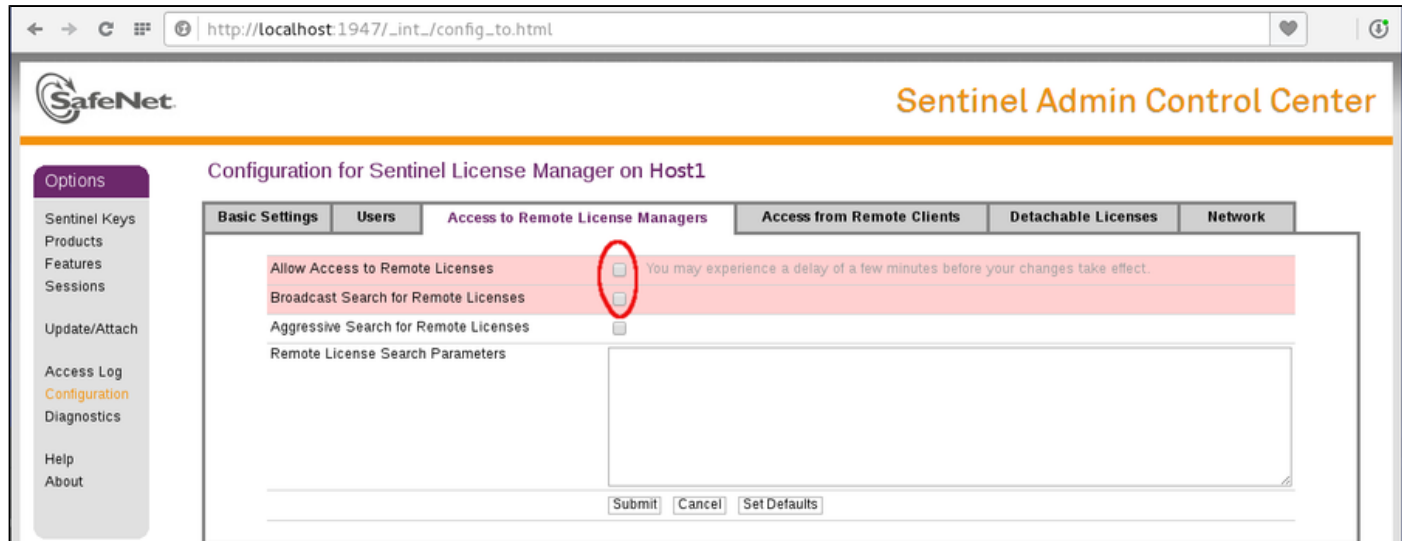
## Allowing Access to a License Server on the Client

The Sentinel ACC can be configured to enable or prevent that the client host discovers network licenses and to change the options used to discover and access network licenses provided by a license server.
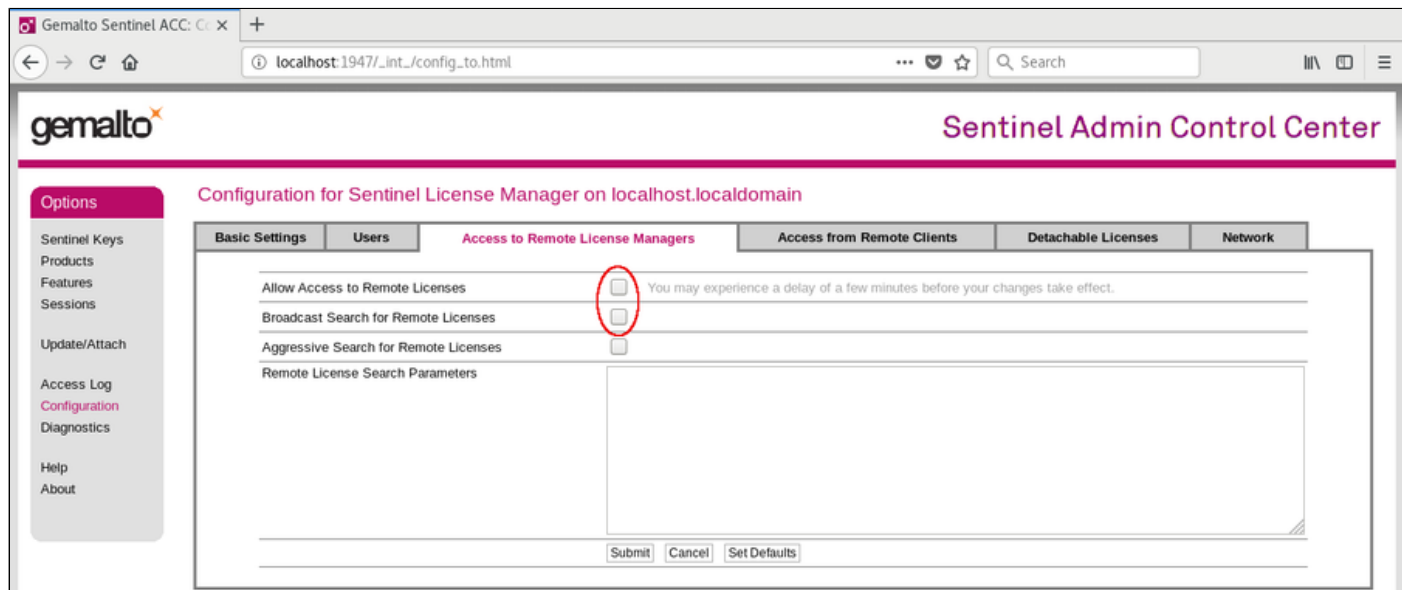
1. Open a web-browser on the **client host** and go to the URL **http://localhost:1947/_int_/config_to.html** (option: Configuration / Access to Remote License Managers).

2. This will open a configuration page similar to the following. **Please note**: newer Charon emulator products (e.g., Charon-AXP/VAX version 4.9) have newer versions of the Sentinel license drivers. The Sentinel ACC pages of these versions look different, but the functionality remains mostly the same

Old ACC version:



New ACC version:



3. Possible actions:

- *Activate* the check-box next to the field **Allow Access to Remote Licenses** to **enable** access to license servers. Press **Submit** to save the setting.
- *Clear* the check-box next to the field **Allow Access to Remote Licenses** to **disable** access to license servers. Press **Submit** to save the setting.
- The option **Broadcast Search for Remote Licenses**, when activated, enables a broadcast search for license servers on the local network without having to enter the address of a license server.

**Please note**:

- If the option **Broadcast Search for Remote Licenses** is not enabled or cannot be used in the customer specific setting, you can enter specific IP addresses or host names that should be queried for network licenses in the **Remote License Search Parameters** field. Please refer to the Sentinel ACC help function for more information.
- To allow access to remote license managers, network visibility on the "Network" tab must be set to **All Network Adapters**.
- Starting with Charon-AXP/VAX 4.9 for Linux and Charon-AXP/VAX version 4.8 for Windows, these Charon emulator products do not follow the settings in the Sentinel ACC with respect to querying remote license servers and network visibility. They perform a **broadcast search** for network licenses even if this has been disabled in the local Sentinel ACC configuration. If this behavior has to be prevented for specific reasons, the access of the system to the license server has to be temporarily restricted or disabled, for example by blocking the relevant traffic in a firewall. Another possibility would be to block access to the network license at the license server side. Note that such methods can negatively impact other functions of the system or, in the case of blocking access to a network license on the server, even the functions on other license clients.

## Verifying License Availability

After installing a license on the system, verify the availability of the license as described in the section *View Existing Licenses*.

Check if the license shows the correct product, expiration date etc.

# Handling Multiple Keys

A Charon host system can have access to several local and remote license keys. Each license key can contain one or more product licenses.

The Charon emulator products can only use one **active** license at one time. Without additional configuration, they cannot make decisions about which product license or license key to use. If there is more than one available license key, the default license key will be used. The default license key is determined by the Sentinel software. As this can lead to undesirable effects, newer Charon emulator products have configuration parameters that allow the definition of a **primary** (or production) and a **secondary** (or backup) key, or the creation of a **list of license keys or product licenses sorted** by priority.

The following sections describe the options available to achieve a more deterministic license selection. If only one license is available, either locally installed or via the network, this section does not apply.

**Please note**: for Charon-AXP/VAX before version 4.9 and other older Charon products: the parameters described in this section can **only** be used to define a primary key and a backup key, or to specify the correct key if there is a conflicting license for a different Charon product on the same system. It is **not possible** with these versions of Charon to combine a local license (black dongle) with other licenses (local or network) to increase the number of concurrent instances of the same Charon product on one host system. Newer versions allow a more flexible use of multiple licenses. Both variants are described in the following sections.

# Backup License Characteristics

It is strongly recommended to order a backup key to recover immediately from damage or loss of the main license key. A backup license key can also help in situations where the Charon host hardware fails and the software must be moved to a different system, thus invalidating the original software license.

Backup keys typically use a counter (integer) value programmed in the key. This integer value corresponds to a number of hours the Charon software is allowed to run. Each time the Charon software checks the license (at start and then every hour), the value is decreased (by 1 hour). Please note that backup keys have may have additional restrictions:

- The runtime is typically limited to 720 hours (30 days). This is the time available to get a replacement license from Stromasys.
- A backup license key may be valid only until a certain date.

**Please note**: if you start and stop the emulator frequently (e.g., frequent runs with a duration of under one hour), the runtime may be significantly less than 30 days, because the license check during the start of an emulator will reduce the counter by one.

# Primary and Backup License for Charon-AXP/VAX prior to Version 4.9

If more than one key is visible to the system, you can define which is the primary and which the backup key. To do this, add the following parameters to the configuration file of the Charon instance:

```
set session license_key_id[0]=<primary-key-id>

set session license_key_id[1]=<secondary-key-id>
```

The entry with index 0 denotes the primary key, the entry with index 1 the backup key.

To identify the relevant key IDs, display the available licenses as described in section *View Existing Licenses*.

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To get information about modifying the Charon configuration files, refer to the appropriate sections in the user's guide.

# Prioritized List of License Keys or License IDs for Charon-AXP/VAX 4.9 and Higher

## Prioritized List of License Keys

If more than one key is visible to the system, you can define a prioritized list of license keys. To do this, add the following parameter to the configuration file of the Charon instance:

```
set session license_key_id = "<key-id prio1>, <key-id prio2>,...[,any]"
```

The **first entry** in the list has the highest priority. The emulator instance will try to use this key first. **If it is not available**, it will try the second key in the list and so on. If the parameter **any** is added to the end of the list, the emulator instance will search for any keys not part of the list should none of the listed keys be available. If the parameter is not defined, an unqualified search for a suitable license will be performed and the first one found (if any) will be used. If no usable license is found, the emulator will stop.

To identify the relevant key IDs, display the available licenses as described in section *View Existing Licenses*.

To get information about modifying the Charon configuration files, refer to the appropriate sections in the user's guide.

## Prioritized List of Product License IDs

Every license key can contain one or more product sections. Newer licenses can contain a product license ID identifying each product section. A prioritized list of product license IDs can be added to the emulator instance configuration file to specify which product sections to use and which should have the highest priority. To do this, add the following parameter to the configuration file of the Charon instance:

```
set session license_id = "<lic-id prio1>, <lic-id prio2>,..."
```

The emulator instance will scan the available license keys for the listed product license IDs. Then it will try to use the first defined product section. If it is not available, it will try the next and so on. If none of the listed product license IDs are found, the emulator will stop.

To identify the relevant product license IDs, display the available licenses as described in section *View  Existing Licenses*.

To get information about modifying the Charon configuration files, refer to the appropriate sections in the user's guide.

# Update an Existing License

If you need to update an **existing hardware or software** license, for example because the time limit on the license has expired or to upgrade to a new product version, perform the following tasks:

1. Generate the C2V file for the existing license. This step is the same for a hardware license or an existing software license. This Customer-to-Vendor (C2V) file contains the license characteristics necessary for creating the license update.
2. Send the C2V file to Stromasys. Stromasys will use the data to create the necessary license update. You will receive one (software license) or two (most hardware license updates) V2C files (the Vendor-to-Customer file).
3. Apply the license data from the V2C file(s). This will install and activate the update for your license.

These tasks are described below:

**Step 1**:  Start the license update utility as described above and generate the C2V file:
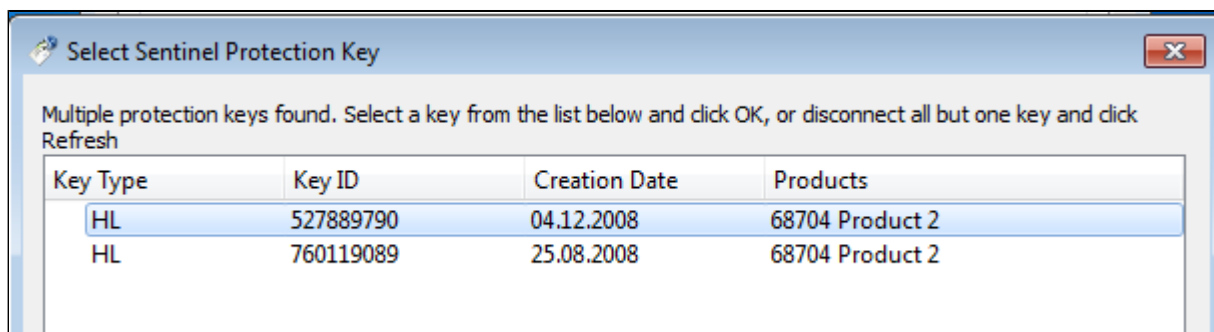
The License Update Utility (HASPRUS) looks the same, independent of the product variant used.

The following image shows the **necessary options** for generating a C2V file for an existing license: select the tab **Collect Status Information** and the option **Update of existing protection key**.
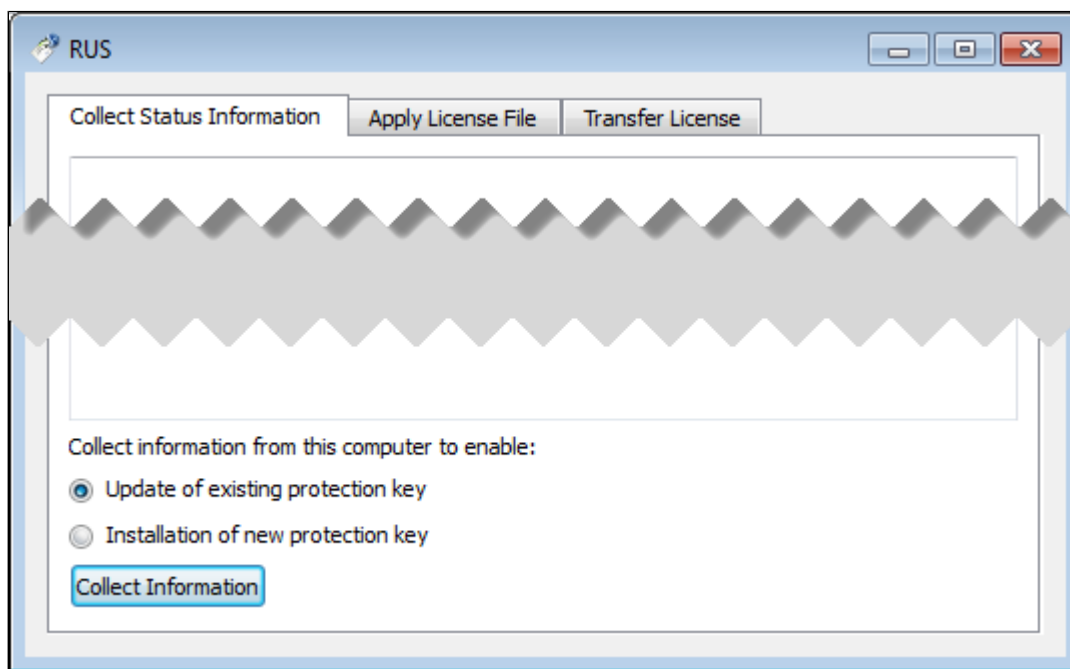


After pressing the **Collect Information** button, you will be prompted to enter a location for storing the C2V file. Select a location and filename and save the file.

If there is more than one license key available on the system, the tool will allow you to select the appropriate key to update as shown in the screenshot below:



**Step 2**:  Send the resulting C2V file to Stromasys orders administration using the email address that Stromasys will provide to you.

**Step 3**: After receiving the V2C file(s) from Stromasys, copy the file(s) to the system where the license needs to be installed, start the license update utility as described above, and install the new license:

**Important caveat**: if a hardware USB key is to be updated, you will in most cases have received **two** files: a **\*_fmt.v2c** file and a **\*.v2c** file. The \*_fmt.v2c file formats the dongle and the \*.v2c file contains the updated license data. In such cases the **\*_fmt.v2c** file must be applied **first**.

**Important caveat**: if a hardware USB key is to be updated, you will in most cases have received **two** files: a **\*_fmt.v2c** file and a **\*.v2c** file. The \*_fmt.v2c file formats the dongle and the \*.v2c file contains the updated license data. In such cases the **\*_fmt.v2c** file must be applied **first**.

1. To install the V2C file(s) for hardware **and** software licenses, select the tab **Apply License File**.
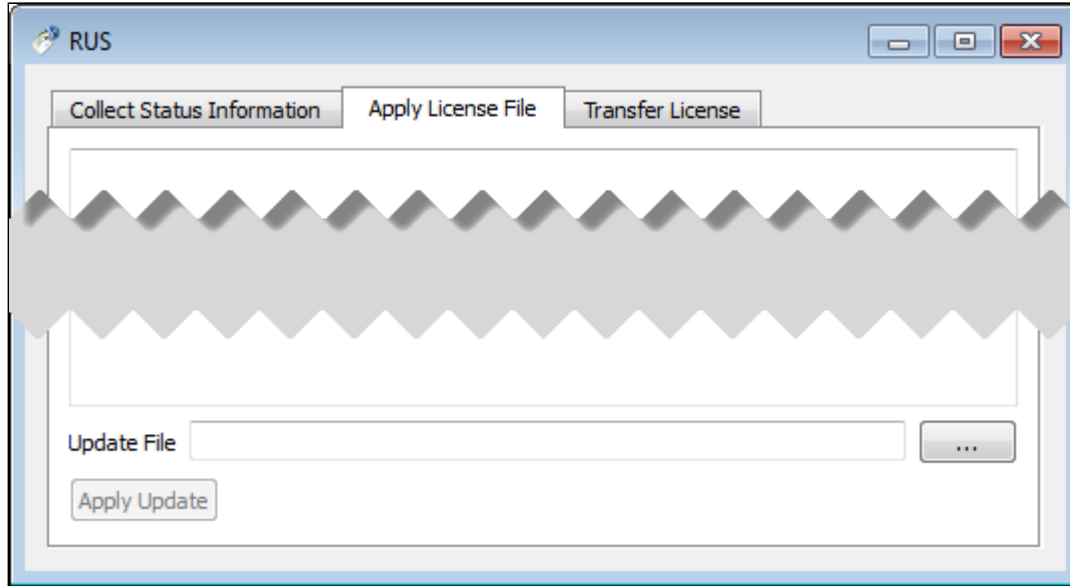


2. Press the **"..."** button next to the **Update File** field. This will open a file browser.

3. Select the V2C file to be applied.

4. Click on **Apply Update** to complete the operation.

If you received two V2C files, perform these steps for both files (remember to **first** apply the **\*_fmt.v2c** file).

Alternatively, you can use the Sentinel ACC to apply V2C files (use the section Update/Attach). Refer to the license handbook for more details.

# Removing a License

If a license needs to be **removed** from a system or the access to the license needs to be **disabled**, the steps are different for the different license types and are described in the next sections:

- Removing a hardware license from a system
- Removing a software license from a system
- Removing access to a network license from a system

**Important**: before removing a license from a system or disabling access to a license, take to following points into consideration:

- Make sure that there is a valid replacement license for all emulator instances depending on the license to be removed, or make sure the emulated systems have been cleanly shut down,
- Make sure that this step will not negatively impact your production environment.

## Removing a Hardware License from a System

To remove a hardware license from a system, simply unplug it from the system.

## Removing a Software License from a System

**Please note**:

> The old method for removing a software license from a system depended on the license transfer functionality. **This functionality is no longer available in the current versions of the Charon products.** The only way to remove a non-transferable obsolete software license is the method described below. On Microsoft Windows, you can use the **Charon License Utility** (see CHARON on Windows - Charon License Utility) to perform the necessary steps.
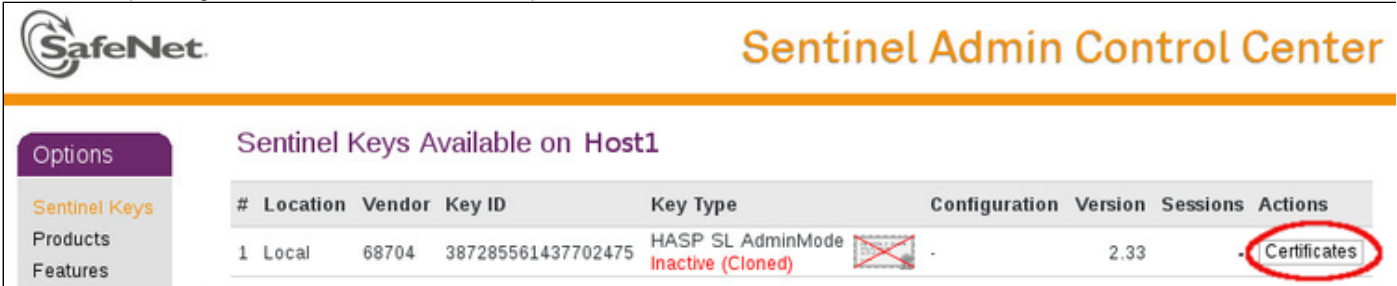
To remove an **obsolete software license or a software license in cloned state** (a software license goes into a cloned state, for example, if a VM is cloned to a different Virtual Machine UUID) from the system, perform the following basic steps:

- Start the Sentinel Admin Control Center (ACC) (for local system: URL **http://localhost:1947**).
- Identify the software license that is to be removed.
- Identify the name of the certificate file and the path of the base directory where it is stored.
- Remove the certificate file(s).
- Restart the Sentinel runtime service.

**The following example shows the required steps in detail:**

1. Go to **http://localhost:1947/** to access the Sentinel HASP ACC and select **Sentinel Keys** on the left.

2. In the Sentinel Admin Control Center (ACC), go to **Sentinel Keys** and locate the target "Sentinel SL AdminMode" license to be removed.

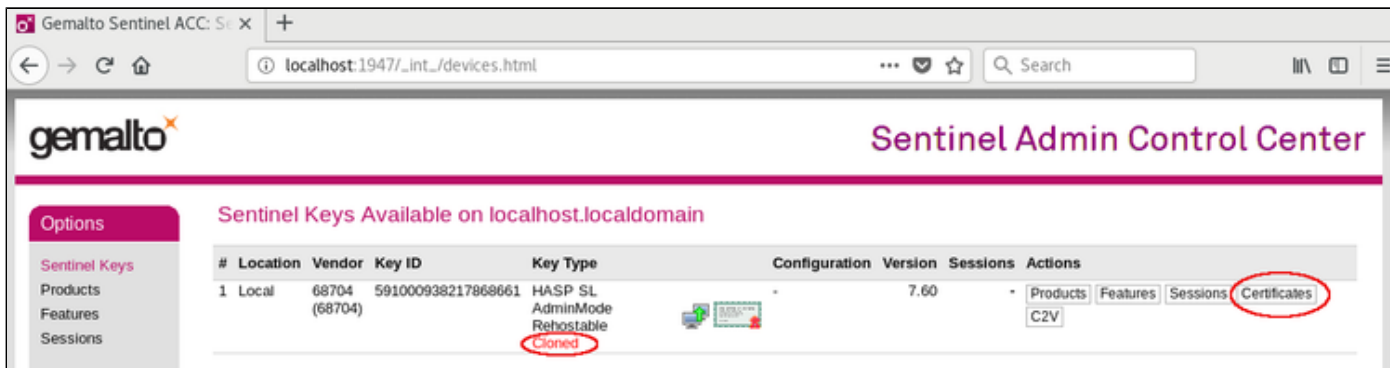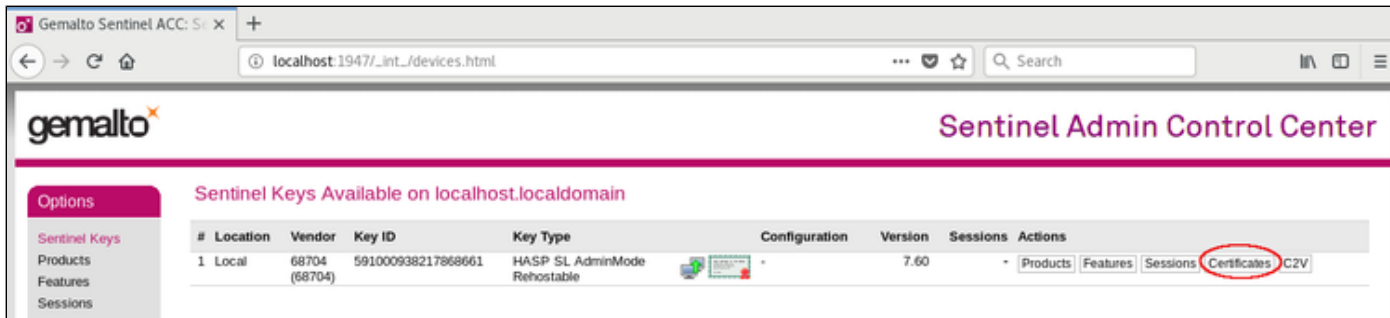3. Click on the **Certificates** button at the right side of the SL description:

**Old version** (showing a software license in cloned state):



**New version** (showing an active software license **and** a cloned software license):

4. Note the name of the corresponding certificate file and the path to the certificates base directory as shown in the "Certificates" section:

Example using old ACC version:



**Please note:** the certificate display screen can look slightly different depending on the type of software license and the actions performed on this license in the past. The following example shows the **certificates of a software license after several updates**. The screenshot is based on Sentinel ACC version equal or higher than version 7.60.

5. **Remove the certificate file(s)** using operating system tools.

   a. In the first example above (Windows), there is one file to be removed. It is in *C:\Program Files (x86)\Common Files\SafeNet Sentinel\Sentinel LDK\installed\68704*.
   b. In the second example (Linux) there are several files created by a series of license updates. On Linux, the certificate files are typically stored in */var/hasplm/installed/68704/*.
   c. **All certificate files in the identified directory must be removed**.

6. After removing the certificate file, **restart the Sentinel license service** or reboot the system. To restart the service, proceed as follows:

   a. On Windows, restart the "**Sentinel LDK License Manager**" service (hasplms) either using the `services.msc` program or via a command line (as administrator) then enter the "`sc stop hasplms`" command followed by "`sc start hasplms`".
   **Important**: any running emulators will be stopped if the license service is forced to stop despite existing service dependencies (i.e., running emulators). So any running guest systems **must be cleanly shutdown** before restarting the license service in order to avoid data loss.

   b. On Red Hat Enterprise Linux 7.x and 8.x (and compatible Linux systems) restart the aksusbd service: # `systemctl restart aksusbd` This also will automatically restart the **hasplmd** service (separate service for this daemon was introduced in newer runtime driver versions).

   c. On Red Hat Enterprise Linux 6.x, restart the aksusbd service: # `service aksusbd restart`

7. Start the Sentinel ACC again to verify that the software license has been removed.

# Removing Access to Network Licenses from a System

There are three different ways to remove a network license. They have different implications and are described below:

## Full Removal of Network License

To completely remove a network license, follow the steps above for hardware or software licenses respectively. The steps must be performed on the license server.

**Please note**: this will remove the license for all emulator hosts on the network using this license and also for the local host. Make sure that this is in fact intended.

## Block Access of Remote Emulator Hosts to Network License

You can use the Sentinel Admin Control Center on the license server

- to **allow** access to a network license for all or specific hosts on the network, or
- to **block** access from remote hosts completely.

Please refer to the section *Controlling Access to Network License on Server Side* in *Installing a Network License* for more information.

## Block Access to Network Licenses on Client System

If access of the local system to network licenses is not desired, this can be disabled in the Sentinel ACC for certain products and product versions. Blocking access at the server side is the safer way.

Please refer to the section *Controlling Access to Network License on Client Side* in *Installing a Network License* for more information.

# License Management Overview for Charon-AXP/VAX for Linux

Please refer to the other sections of the *Charon Licensing Handbook* and your product documentation for any topics not covered in this overview guide and for more detailed information on the topics discussed here.

This page provides an overview of the basic steps to set up the licensing environment on a system running Charon-AXP or Charon-VAX for Linux.

# General Description

A Charon emulator product will not run without a valid license. For Sentinel HASP licenses (the topic of this chapter) this license can be provided on a **US B hardware dongle** (a Sentinel HASP key) or as a **software license** bound to the hardware of the host system or the network license server. A loss or defect of a license will cause the emulator to stop.

For extra protection, Stromasys recommends the use of a backup license key (purchased separately) that can replace the main license key for a limited period of time. It is possible to specify the backup license in the Charon configuration file to prevent the emulator from stopping in case its main license is no longer accessible.

To check the validity of a license, Charon performs the following steps:

- The Charon emulator checks the license to determine if there is a product definition that will allowed it to run.
- Then Charon checks the feature definition associated with the product to see if the feature definition is valid - that is, it is not expired, the available runtime hours are not exhausted, and if there are still some instance-slots available to run the emulator.
- If there is no matching product definition or if the feature is not valid, Charon reports the problem in the log and shuts down.

# Charon License Checks

Charon products **check the availability of a valid license** at different points in time:

**1. At startup:**

If no valid license is found, an error message will be written to the emulator log file and the emulator will not start.

Charon-AXP/VAX has a configuration parameter to define the number of retries (`license_key_lookup_retry`). Please refer to the product configuration documentation for more details.

**2. At regular intervals** during the runtime of the emulator (the default license check period of 1 hour can be changed by Stromasys using the appropriate license parameters):

- If the previously used valid license has been removed, has disappeared, is defect, or has become invalid, the emulator will report the loss of the license in the log file and continue operation for a limited amount of time as described below.
- If there is another valid license, for example a backup license defined in the configuration file, it will be used.
- *Starting with Charon-AXP/VAX 4.9*, Charon allows for a grace period of 12 hours during which the software checks for the presence of a valid license every 10 minutes until a valid license is found. If no valid license is found after the grace period has expired, the emulator will stop.
- *Earlier versions of the above products and other emulator products*: should there still be no valid license at the next regular license check (this default interval may be changed by individual Charon products), the emulator will stop.
- If a time-restricted license is used and it expires, the Charon instance tries to find its replacement automatically and, if found, proceeds using the replacement license.

**Important note for Windows installations**: any running emulators will be stopped if the license service is forced to stop despite existing service dependencies (i.e., running emulators). So any running guest systems must be cleanly shutdown before restarting the license service in order to avoid data loss. This is the behavior at the time of writing. It may change in future versions.

# Charon License Updates

Under certain circumstances existing licenses must be updated. **License updates are required, for example, in the following cases**:

- Charon product version upgrade
- Product change
- License validity (time) extension

License updates, for example a new expiration date or a new execution counter, can be performed without interrupting operation, that is, without shutting down active Charon instances, **provided that the resulting license is valid for the running Charon instance**. If any parameters of the updated license are not valid for the running Charon instance (for example, the wrong model or version), the Charon instance will stop running.

Licenses are **backwards compatible to some extent**. A **license update to a more recent version** will allow some previous Charon versions to run as well. The details depend on the Charon product.

The license check on **Charon-AXP/VAX/PDP starting with version 4.4** will be successful for a newer license if the major version (for example, the 4 in 4.7) is the same. In **version 4.3**, the emulator will start, but there are inconsistencies and incompatibilities especially in the associated tools (e.g., hasp_view). Product **versions 4.2 and earlier** are incompatible with the current license schema.

# License Content

The license data on a license key, independent of whether it is a hardware or software license key, consists of **several parts:** the **license key text block** contains the **license section** and **one or more product section**s. The **license features** describe additional conditions and limitations for the emulator products contained on the license.

## A) License Key Text Block

### 1) License Section (one per license key)

The **license section** contains general license information related to ownership and administration.
There is **one license section** per license key.
Please note that in rare cases, you may receive an **empty USB dongle** for which command outputs will show that **no license information was detected**. In such cases, request a license update from Stromasys as described in *Updating a License*.

Relevant **license section parameters**:

- **License type**: type of the license, i.e., hardware or software license, network-enabled or local (added in newer Charon product versions, e.g., Charon-AXP/VAX 4.9)
- **License number**: assigned by Stromasys
- **License key ID***:* unique**;** pre-programmed; unmodifiable; on physical keys same value as the Physical Key ID
- **Master key ID**: the software vendor ID used by Stromasys for issuing licenses
- **Release date**: the day on which the license was issued
- **Release time**: the time at which the license was issued
- **Update number**: the number of license updates that have been applied
- **End user name**: the name of the person to whom the license was issued
- **Purchasing company name**: usually the company to which the license was issued

### 2) Product Section (one or more per license key)

The text block also contains **product sections** that contain product specific licensing information.

- Several products can be combined on one license key. Stromasys may place restrictions on what products can be combined on a single license key.
- The product section also may include information about the support contract and the end of support. It may contain hardware specific limitations related to the types of devices that can be connected (e.g., serial interfaces).
- A checksum is inserted after the last product section of a license. This checksum is not visible in the show command output. Charon products/versions requiring such a checksum will not start if the license does not contain a checksum.
- Each product section is associated with a **feature defining additional conditions** for the product.

The following list shows the most important **parameters of a product section**.

Please note that not all of these parameters may be present for a particular Charon product.

- **Product License Number:** identification of specific product section (optional; new starting with Charon-AXP/VAX 4.9 and Charon-PAR 1.10). Corresponds to configuration parameter **license_id**.
- **Virtual Hardware**: range of virtual models available for running
- **Product Name**: commercial product name
- **Product Code**: commercial product code
- **Major Version, Minor Version, Maximum Build, Minimum Build:** commercial product version and range of build numbers suitable for running with this license. The parameters **Maximum** and **Minimum Build** are no longer displayed starting with Charon-AXP/VAX 4.9 and Charon-PAR 1.10.
  **Please note** that, depending on the product and product version, licenses have a limited backward compatibility (i.e., when the version on the license is newer than the product version).
  See *Operational Procedures Overview* in the Sentinel HASP Licensing Documentation for more information.
- **Host CPU supported** or **32bit and 64bit OS requirements:** type of host CPU required (for example, x64)
- **Host Operating System required**: Linux or Windows
- **CPUs allowed:** number of virtual CPUs enabled for virtual multiprocessor systems
- **Maximum virtual memory:** Maximum memory emulated. If not present the value defaults to the maximum memory possible for the particular virtual system. Note that the maximum memory may not be available to the virtual system if the host computer has insufficient physical memory.
- **CHAPI enabled:** whether or not CHAPI (Charon-AXP API) can be used with this product
- **Instances allowed**: maximum number of Charon emulator instances of this program/hardware model that are allowed to run concurrently on the local host. Relevant for local license keys that do not support the process count parameter. **See also** the parameter *Number of processes* in the feature section.

- **CPU Speed**: optional parameter to reduce the speed at which the program can run to a fraction of the maximum (e.g., to 25%)
- **HPSUSAN**: optional parameter. Specific to HP3000, overrides physical key ID. The HPSUSAN (HP System Unique Serially Assigned Number) is used for licensing purposes by HP. The parameter may be needed if a license on the physical system is tied to the original HPSUSAN.
- **Feature number:** number of the feature defining further limits/restrictions for the product license. Each product can use a separate feature, or the same feature can be used by several products.
  If using a **network license** and the same feature is shared by several products, the number of instances allowed by the feature is shared between the products (e.g., 2 allowed instances enable one Charon-AXP and one Charon-SSP instance to run concurrently). If using a **local license dongle** and the same feature is shared by several products, the number of allowed instances is counted separately for each product.
  The parameters defined in a feature are described below in the *Features* section.

## B) License Feature Section (one or more per license key)

Features define **product specific conditions**, for example expiration date and number of concurrent instances.

The following list describes these conditions:

- **Released product expiration date:** for time-based licenses. Note that at the time of writing the license of Charon-AXP/VAX products will expire at the end of the day of the expiration date, the license of Charon-SSP in the early morning of the expiration day. The exact behavior of the different versions can change without prior warning. Not supported for HL-MAX dongles.
- **Runtime counter:** number of license checks after which the license will be disabled. Default check interval is one hour. The counter will be decreased at the start of the emulator and then at every license check interval. Once the counter has been depleted, the license becomes invalid. This license type is typically used on licenses intended as backup licenses.
- **Login interval** or **Check interval:** frequency of license checking during emulator execution (default 1 hour). This parameter is not visible in the show command output in older Charon product version. It is visible in the show command output of newer versions, starting with Charon-AXP/VAX 4.9 and Charon-PAR 1.10.
- **Network license:** indicates that a physical license is a network license
- **Number of processes:** maximum overall number of Charon instances that are allowed to run concurrently.
  This parameter is set by Stromasys to the value matching the respective customer contract. For network dongles, the maximum possible value of this parameter is determined by the type of network dongle. For example: on a NetTime10 dongle this parameter can be set to a value between 1 and 10 (depending on the customer contract). The type of dongle can be viewed via Sentinel ACC.

**Example with Time-Based Parameters**

The parameters below describe the following limitations to the emulator:

- License permits running up to 2 instances of Charon at the same time.
- License expires on May 31, 2020, **or** after 360 license checks (with an interval of 60 minutes between the checks).

```
Expiration date: 31/5/2020
Runtime counter: 360
Login interval: 60 minutes
Instances allowed: 2
```

If any of the conditions are no longer met (too many instances, past expiration date, all checks exhausted), the feature becomes invalid and will not allow an emulator instance (or an additional instance) to run.

# License Type Overview

Depending on customer requirements, Stromasys can provide several different license types.

## Local Hardware License

Local hardware licenses are USB dongles and work on the system they are physically connected to. For Windows systems supporting AnywereUSB®, hardware licenses can also be connected over the network (similar products are available for Linux). They can easily be moved to a different system, if required. The content of the dongle can be updated if a change to the license or an extension of a time-based license is required. The necessary steps are described later in this document.

**Please note**:

- Hardware dongles require the Sentinel HASP run-time (driver) installation before the dongle can be connected to and used by the system.
- Hardware dongles, apart from HL-MAX dongles, are equipped with a **battery** and a clock, which makes them independent of the host clock. The battery is not rechargeable. However, the dongle can use the power provided by the host system while it is plugged in. By doing this, the depletion of the battery can be slowed down. Check the dongle at regular intervals if it is not permanently connected to a system. If the battery becomes completely depleted, the dongle will be permanently unusable and must be replaced. See also: How long does the license USB dongle battery last upon a full charge.
- Hardware dongles are not suited for running Charon emulator products in **cloud environments**. Stromasys provides other licensing solutions adapted to virtual environments (Charon VE licenses) for selected products. See Virtual Environment (VE) License Server Documentation.

## Software License

A software license is a "virtual" key with functionality very similar to a HASP network-enabled hardware dongle.

A software license does not require any special hardware but it still **requires installation of the Sentinel runtime environment**.

**Important information:**

- To avoid unexpected problems, do not use any Sentinel runtime software that was not provided by Stromasys without being advised to do so by your Stromasys representative.
- Software licenses are best suited for stable environments, because their correct function depends on certain characteristics of the host system. **Changing these characteristics will invalidate the license**.
  - If the Charon host runs on **real hardware**, software licenses are by default tightly bound to the hardware for which they were issued. If major hardware characteristics of the system are changed, the license will be disabled.
  - If the Charon host runs in a **virtual environment (e.g., VMware)**, software licenses are normally bound to the virtual machine ID and a set of additional characteristics of the virtual machine. If any of these parameters are changed, the license will be disabled.
  - For a more detailed description of the restrictions, please refer to Software Licensing restrictions or contact your Stromasys representative.
- Software licenses are very sensitive to even small changes on the host system. Therefore, it is especially important to provide for a backup license that will ensure continued operation should there be a problem with the software license. See *Handling Multiple Keys* for details.
- Standard software licenses are not suited for running Charon emulator products in **cloud environments**. Stromasys provides other licensing solutions adapted to virtual environments (Charon VE licenses) for selected products. See Virtual Environment (VE) License Server Documentation.

## Network License

The network Sentinel HASP key (**red USB dongle**) can be shared between several hosts running a Charon emulator product (including the host on which the network license is installed).

**Please note**: all software licenses are also network licenses.

If the Charon emulator product is installed on the host where the network license is connected, no additional steps are required. The Sentinel driver is installed as part of the Charon product installation. If the host does not have a Charon emulator product installed, the host can still distribute the connected network license to emulator instances running on other hosts.

The Sentinel HASP runtime software must be installed on such a license server and on the client system. For details regarding the installation, please refer to the software installation section in this document. Once both the Sentinel runtime software and the network license are installed, the Charon emulator product can be started on any appropriate client host on the LAN, provided access to the license is enabled.

- The network license will be visible to all hosts that can access the license server over IP. Access to the license server must be possible on **port 1947** via **UDP** (discovery process) and **TCP** (actual access to license). Further information (e.g., use of **additional UDP ports**) can be found in the section *Firewall Considerations*.
- The license server and the client must both allow access to the network license using the appropriate management tools.

The maximum **number of concurrently active** Charon instances is determined by the parameters of the license.

**Please note**: Charon-AXP/VAX version 4.7 build 171-01 introduced a change with respect to network licenses. In previous versions of Charon-AXP/VAX a network license controlled the maximum number of client host systems and Charon instances per host system (station/instance mode). In the current Charon-AXP/VAX versions a network license controls the maximum overall number of active instances, which can be distributed across client host systems according to the preference of the customer.

# Overview of Initial License Installation Steps

Each Charon emulator product requires a valid license to run. To access a Sentinel HASP license, the emulator needs the Sentinel runtime software. This software is part of the Charon-AXP/Charon-VAX for Linux installation kits. Refer to the software installation section of the Charon product user's guide for software installation instructions.

After the installation of the runtime software, the license can be installed on the system. The following steps will be described in more detail below:

1. Add a password for the Sentinel Admin Control Center (ACC).
2. If you purchased a **hardware license**, you can simply plug the dongle into a free USB port on the system.
3. If you purchased a **software license**, you must create a fingerprint file in C2V (customer-to-vendor) format containing the system characteristics. Use this file to request a license for your Charon product from Stromasys.
4. If your license is a **network license** served by a license server, make sure that the access of the client system to the license server is not blocked by the configuration or a firewall.
5. Optionally, define how **multiple licenses** will be used (selecting primary/backup license, defining license priorities).
6. If you have an **existing license** that needs to be updated, you need to create a customer-to-vendor (C2V) file and use this file to request a license update from Stromasys.

# Overview of License Management Tools

The following list shows the main tools used to manage licenses on Linux:

- **Sentinel Admin Control Center (ACC)**: a web-based interface providing important configuration options with respect to licenses.
- The **hasp_srm_view** program: a command-line tool to display the detailed license contents and generate C2V and fingerprint files. Cannot be used over a remote connection when using local hardware licenses.
- The **hasp_update** program: a command-line tool to install new and update existing licenses.

# Accessing the License Management Tools

The command-line tools are installed under `/opt/charon/bin/`. If this directory is not part of your PATH variable, you have to specify the full path to access the command.

To run the commands, use the following syntax for **hasp_srm_view** and **hasp_update** respectively.

```
# /opt/charon/bin/hasp_srm_view <option>

                    and

# /opt/charon/bin/hasp_update <option>
```

The relevant options will be specified with the tasks described below, as needed.

The **Sentinel ACC** on the local system is accessed by starting a web-browser and pointing it to the URL: **http://localhost:1947**.

# Sentinel Admin Control Center (ACC) Security Settings

**Please note**: Stromasys strongly recommends performing the steps described below to reduce the risk of unauthorized access to the Sentinel ACC.

## Define a Password for the Sentinel ACC

By default, anyone on the local system with access to port 1947 can access the GUI. If remote access is enabled, users on the network with access to port 1947 can also access the GUI. To protect access to the GUI with a password, perform the following steps:

| Step | Description |
|------|-------------|
| 1 | Open a web browser and navigate to **http://localhost:1947/.** |
| 2 | **Click** on the left-hand menu item labeled **Configuration**. |
| 3 | **Click** on the **Basic Settings** tab. |
| 4 | Under the entry labeled **Password Protection, click** the **Change Password** button. |
| 5 | At the **Change Password** window: <br><br> • Leave the **Current Admin Password** field blank (there is no password set by default). <br> • Enter the desired password into the **New Admin Password** field. <br> • Repeat the desired password in the **Re-enter new Admin Password** field**. <br> • **Click** the **Submit** button**. |
| 6 | Back at the **Basic Settings** tab: <br><br> • Under the section labeled **Password Protection,** select the **All ACC Pages** radio button**. <br> • **Click** the **Submit** button to save this change. |
| 7 | Optional: to allow **remote access** to the Sentinel HASP GUI: <br><br> • **Click** the **Basic Settings** tab. <br> • **Select** the **Allow Remote Access to ACC** check box. <br> • **Click** the **Submit** button**. <br><br> **Additional information for remote access to the Sentinel HASP GUI:** <br><br> • The firewall must permit access to port 1947/TCP, and <br> • network visibility on the ACC network configuration tab must be set to **All Network Adapters.** <br><br> If required, remote access can also be enabled on Linux by editing the file */etc/hasplm/hasplm.ini* and setting the parameter **ACCremote** to **1**. Should the file not yet exist, please refer to How-to enable remote connection to Sentinel Admin Control Center without GUI. |

**Please note**: With these settings, when you connect to the HASP GUI from a remote system, you may be prompted for a username and password. It is enough to just enter the configured password and leave the username field empty.

## Set Linux File Protections

To prevent unprivileged access and modifications to the Sentinel HASP configuration file on Linux, enter the following commands:

```
# chmod 0700 /etc/hasplm
# chmod 0600 /etc/hasplm/*
```

# Viewing Existing Licenses

It is important to know which licenses are visible on a system. For example, the user can

- determine if the correct license is installed,
- identify the expiration date on time-based licenses,
- identify the remaining hours of run-time on backup licenses,
- identify the license ID of primary and backup license which are needed for the emulator configuration file,
- identify licenses that conflict with the currently used product and therefore may need to be removed.

Licenses can be viewed using two tools:

- Sentinel ACC: shows important information, but not the product specific license parameters.
- Command-line tool **hasp_srm_view**: shows all product details contained on the license. Can only be run from a local connection for local hardware licenses (workaround described in the *hasp-srm_view* section).
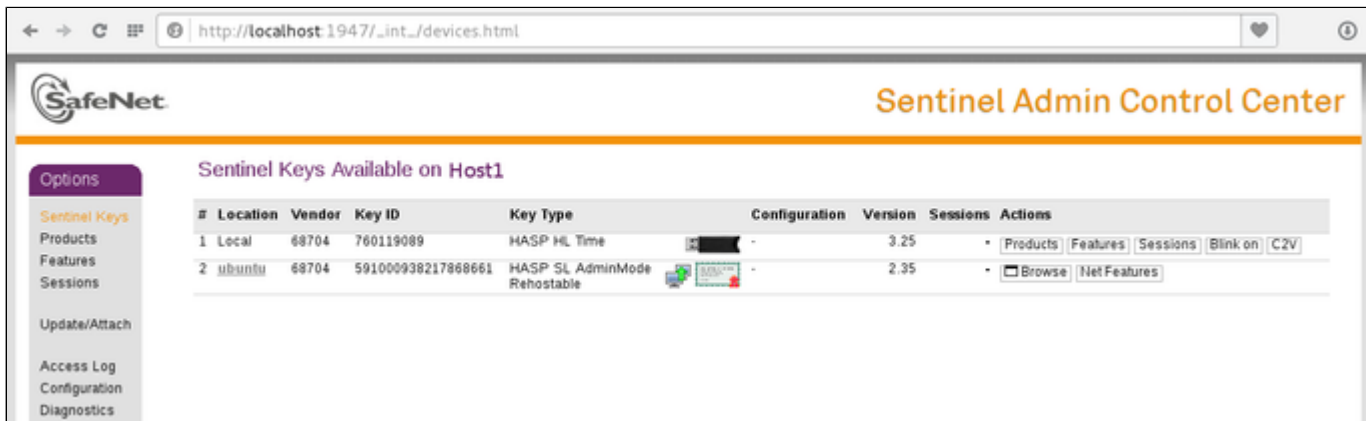
# Viewing a License with Sentinel ACC

To view available licenses using Sentinel ACC, start the web interface by pointing a web-browser to the URL **http://localhost:1947**.

**Please note**: starting with Charon-AXP/VAX 4.9 a new Sentinel ACC version (>= 7.60) has been included in the product. The functionality is very similar but the appearance is somewhat different.

To view available licenses using Sentinel ACC, start the web interface by pointing a web-browser to the URL **http://localhost:1947**.

**Please note**: starting with Charon-AXP/VAX 4.9 a new Sentinel ACC version (>= 7.60) has been included in the product. The functionality is very similar but the appearance is somewhat different.
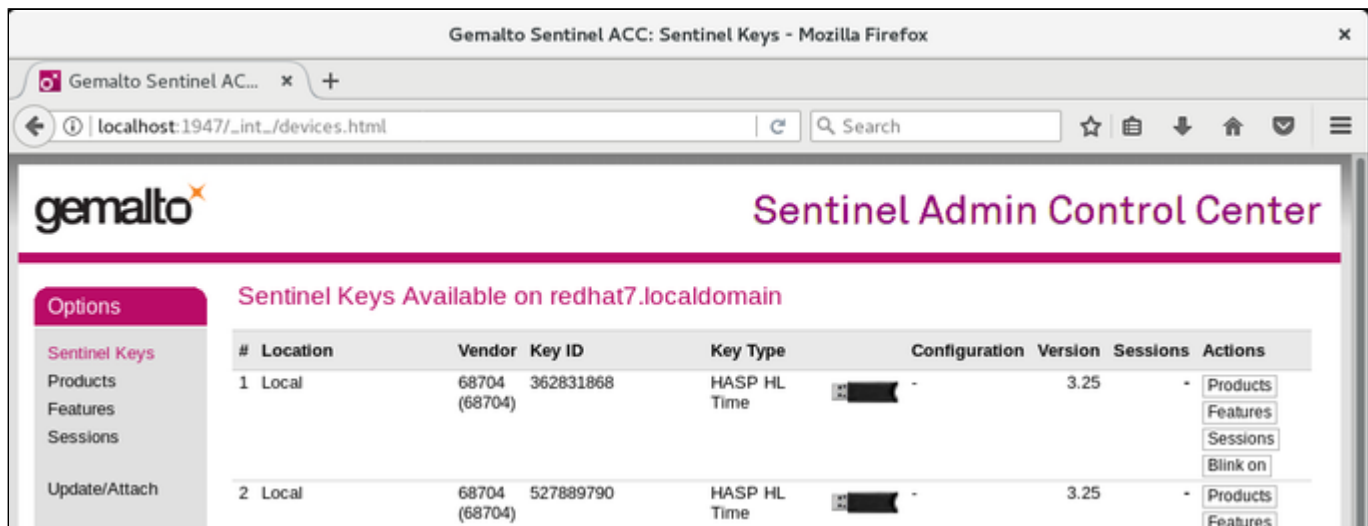
To get to the **Sentinel Keys** screen, click on the corresponding menu item or access the URL **http://localhost:1947/_int_/devices.html** directly. A screen similar to the following opens and displays the available license keys:

For Sentinel drivers version 7.60 and above, this screen looks similar to the following:



This page displays important information about the available licenses, including

- **Location**: Shows whether the license is local or remote. If the license is a network license, the hostname of the remote system is specified. You can access the remote license manager by clicking on the hostname, provided that access is permitted.
- **Key ID**: The unique identification of the license.
- **Key Type**: Hardware keys are marked by the abbreviation HL (hardware license) and a picture of the license dongle. Software licenses are marked by the abbreviation SL (software license).
- **Sessions**: Shows the number of active sessions opened for the specific key.

The buttons on the right-hand side can be used to retrieve more information about the license or to extract the C2V file for a license update. The **Browse** button shown for network licenses will connect to the remote license manager to show the license features.

A C2V file can only be extracted if the license in question is local to the current license manager, i.e., the license manager to which the web browser is connected. You can connect to a remote license manager by clicking on the hostname in the **Location** column (if connections are allowed).

**Please note**:

- The option to create a C2V file is not available in older versions of the license software.
- Starting with ACC version 7.60, the **option to create C2V files** for USB dongles is only available if it has been **enabled in the basic configuration** section (under the *Configuration* menu item).
- Newer versions of ACC also offer the option to create a fingerprint for a new SW license.
- Some newer versions of ACC show the option on this screen to create a DEMOMA fingerprint. This is a demo key for development purposes and not relevant for Charon products.
- Some newer versions of ACC offer to create a fingerprint for a software license if such a license does not exist yet. Do not use this option. The resulting file has a format that is incompatible with the Stromasys license creation tools. Instead use the tools described in *Installing a License*.

The menu options *Products*, *Features* and *Sessions* on the left-hand side provide the same information as the buttons. However, they show the information for all licenses.

## Viewing a License with hasp_srm_view

On Linux, the license content is displayed using the **hasp_srm_view** command. For displaying the license, the following parameters are relevant:

- Display the default license: run the command without options or with `-l`
- Display all licenses: run the command with the option `-all`
- Display a license with a specific ID: run the command with the option `-key`

**Displaying the license content when connected via the network:**

> Local hardware licenses can only be displayed from a local connection to the system, for example via the console. If you are connected via a remote connection, for example via **ssh**, the **hasp_srm_view** command will return an error. Network licenses (network-enabled dongles and software licenses) do not have this problem.

> <u>Workaround when logged in via a remote connection</u>:

> When connected to the system via a remote connection, the command to display a local hardware license will return an error. As a workaround, you can display the license contents with the following command (adapt the path of the command if your installation location is different):
> `$ ssh localhost /opt/charon/bin/hasp_srm_view`

**Please note**: starting with Charon-AXP/VAX 4.9, the **hasp_srm_view** utility on Linux does not follow the settings in the Sentinel ACC with respect to querying remote license servers and network visibility. The utility performs a **broadcast search** for network licenses even if this has been disabled in the Sentinel ACC. If this behavior has to be prevented for specific reasons, the network access of the system must be temporarily restricted or disabled, for example by blocking the relevant traffic with a firewall. Alternatively, access to the network license at the license server side can be blocked. Note that such methods can negatively impact other functions of the system or, in case of blocking access to a network license on the server, even the functions on other client host systems.

**Please note**: in rare cases, you may have received an **empty dongle** without a license section. The hasp_srm_view command will show that no license information was detected. In such cases, please refer to the steps on how to request a license update for a USB dongle.

The following shows sample output of the **hasp_srm_view** command on Linux (to display all available licenses, use the `-all` parameter):

```
$ hasp_srm_view
Trying to connect to the key: 527889790
License Manager running at host: host1
License Manager IP address: 127.0.0.1


The Physical KeyId: 527889790
License type: License Dongle (Local)
CHARON Sentinel HASP License key section
Reading 4032 bytes

The License Number: 1000.826
The License KeyId: 527889790
The Master KeyId: 1645066348
Release date: 15-MAR-2021
Release time: 11:58:42
Update number: 20
End User name: Stromasys
Purchasing Customer name: Stromasys

Virtual Hardware: AlphaServer_DS10, AlphaServer_DS10L, AlphaServer_DS15, AlphaServer_DS20, AlphaServer_DS25,
AlphaServer_ES40, AlphaServer_ES45, AlphaServer_GS80, AlphaServer_GS160, AlphaServer_GS320, AlphaServer_400,
AlphaServer_800, AlphaServer_1000, AlphaServer_1000A, AlphaServer_1200, AlphaServer_2000, AlphaServer_2100,
AlphaServer_4000, AlphaServer_4100
Product Name: CHARON-AXP
Product Code: CHAXP-470xx-WI-LI
Major Version: 4
Minor Version: 12
32bit and 64bit OS requirements: 64bit
Host Operating System required: WINDOWS, LINUX
CPU's allowed: 32
Maximum virtual memory: 262144MB
License expiration date: 25-Nov-2021
```

```
Instances allowed: 10
Feature number: 1
Check interval: 60 minutes
```

**<output truncated>**

**Starting with license driver versions >= 7.60**, for example, in Charon-AXP/VAX version 4.9, there are some small changes in the output of **hasp_srm_view**. The parameters are described in the *License Content* section of the *Licensing Handbook*. The following sample shows the most important changes (in blue):

```
License Manager running at host: Host1

License Manager IP address: 192.168.1.111

HASP Net key detected

The Physical KeyId: 1015925129

License type: License Dongle (Network capable)

CHARON Sentinel HASP License key section

Reading 4032 bytes

The License Number: 000.TEST.CENTER

The License KeyId: 1015925129

The Master KeyId: 827774524

Release date: 11-APR-2018

Release time: 16:52:33

Update number: 68

End User name: STROMASYS

Purchasing Customer name: STROMASYS

Product License Number: AXP_4_9_TEST

Virtual Hardware: AlphaServer_DS10, AlphaServer_DS10L, AlphaServer_DS15, <items removed>

Product Name: CHARON-AXP

Product Code: CHAXP-490xx-LI

Major Version: 4

Minor Version: 9

< Parameters Maximum Build and Minimum Build are no longer shown>

32bit and 64bit OS requirements: 64bit <replaces parameter Host CPU supported>

Host Operating System required: LINUX

CPU's allowed: 16

Maximum virtual memory: 65536MB

CHAPI enabled

License expiration date: 01-Nov-2018

Instances allowed: 3

Feature number: 1

Check interval: 15 minutes
```

# Installing a License

This section provides a short overview of the initial license installation. For more in-depth information about licensing, please refer to the licensing handbook.

## Preparation

Before a license can be installed, some preparatory steps are required.

1. Ensure that the correct Sentinel Runtime software is installed. Please refer to the **installation section of your Charon emulator user's guide** for details.
2. If a conflicting or obsolete license is available on the system it may be necessary to **(temporarily) remove or disable** it. If you need to remove a hardware license, simply unplug it. If you need to remove a software license or disable access to a network license, please refer to the relevant chapter in the licensing handbook. Before removing a license or disabling access to it ensure that it is not required by another currently active product.

## Installing a Local Hardware License

A local hardware license (USB dongle) is installed by inserting the USB license key into a free USB port of the host system after the Sentinel runtime software has been installed.

After this step, verify that the license is visible to the system by following the steps for viewing a license as described above. Please bear in mind that a local hardware license cannot be read when connected to the system via a remote connection (for example, ssh).

## Installing a Software License

To install a new software license, perform the following steps:

**Step 1**:  Create a fingerprint file using the **hasp_srm_view** command:

Execute the following command to create the fingerprint file:

```
# /opt/charon/bin/hasp_srm_view -fgp <filename.c2v>
```

The fingerprint will be written to the filename specified.

**Please note**:

- **Charon-AXP/VAX before 4.9**: the above command will terminate with the error message "`Can not retrieve the C2V (host fingerprint mode) data`" or with "`Can not retrieve the C2V (host fingerprint mode) data`" if a remote network license is visible to the system. Access to such a license needs to be temporarily disabled before creating the fingerprint file. Please refer to section *Installing a Network License* and section *Removing a License* for details.
- **Charon-AXP/VAX version 4.9** can create a fingerprint file even in the presence of a remote network license (i.e., a red network-enabled dongle or a software license).

**Step 2**:  Send the resulting fingerprint file to Stromasys orders administration using the email address that Stromasys will provide to you.

**Step 3**: After receiving the V2C file from Stromasys, copy the file to the system where the license needs to be installed and install the new license:

In addition to the Sentinel ACC, the command **hasp_update** can be used on Linux to apply V2C files.

The following example shows the use of the **hasp_update** command:

```
# /opt/charon/bin/hasp_update u /path/filename.v2c
```

**Please note**: this section describes the installation of a new software license. However, the commands to install a V2C file are identical when updating a hardware license.

**Important caveat:** When updating a hardware license, you will in most cases receive two V2C files, a **\*_fmt.v2c** file and a **\*.v2c** file. The \*_fmt.v2c file formats the dongle and the \*.v2c file contains the updated license data. In such cases the **\*_fmt.v2c file** must be applied **first**.

# Installing a Network License

For a network license to be provided to a client host on the network, a license server must have been set up either with a network-enabled hardware license (red dongle) or a software license (software licenses are always network enabled).

If the license server also runs a Charon emulator product, follow the software installation steps in the user's guide. Additionally, the licensing handbook contains additional information about setting up a dedicated license server without installing the full product kit using the license-specific packages of a product kit.

For the client to access a license on a license server the following steps are required:

- Any firewall between license server and client must permit the necessary communication.
- The license server must be configured to allow access from the client.
- The client must be configured to allow access to the license server.

## Firewall Considerations

The following ports are used for the communication between license server and client hosts:

- On the **server side** (where network license has been installed), port 1947 must be open for incoming TCP and UDP traffic to allow client access to the license.
- On the **client side**, traffic is initiated using ports 30000 through 65535 as the source ports and port 1947 as the target port. If broadcast search for remote licenses is to be used, the client must also permit UDP traffic initiated from port 1947 of the license server to ports 30000 through 65535 of the client.

If a host on the network cannot find the license server even though the server is operational, you can **temporarily** disable the firewall to determine whether it blocks the traffic.
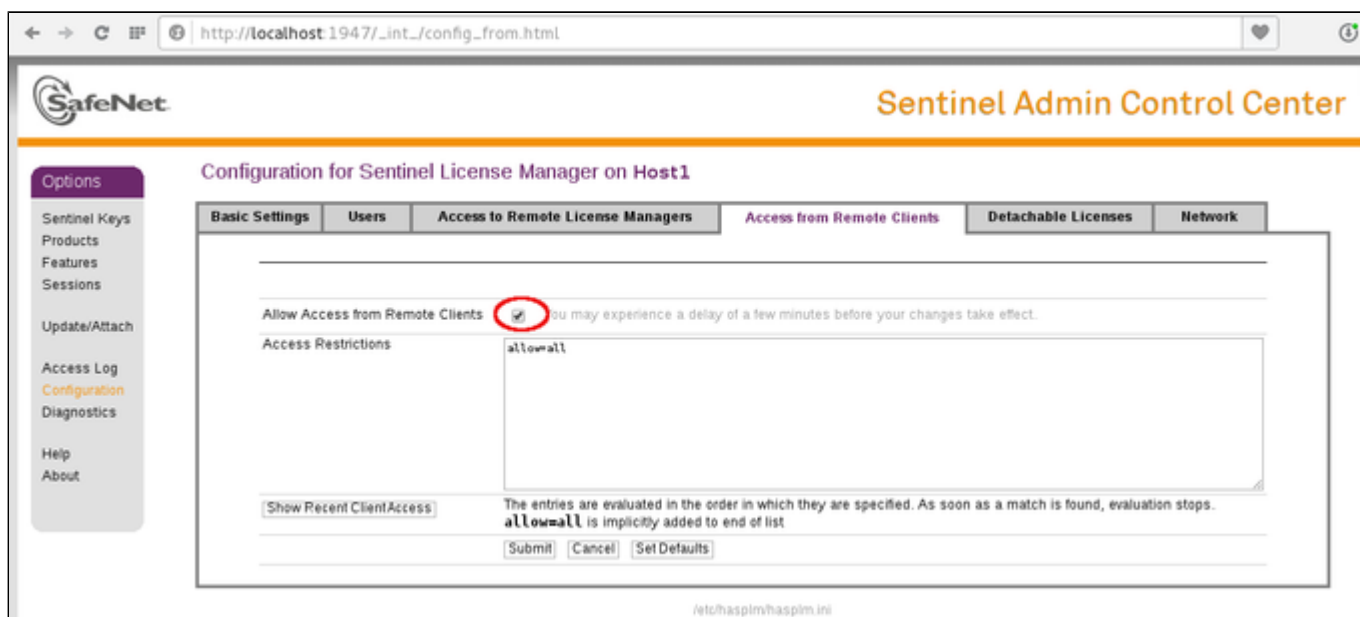
For details on how to configure the firewall in your network, please consult your operating system documentation and make sure to adhere to your company's security policies.
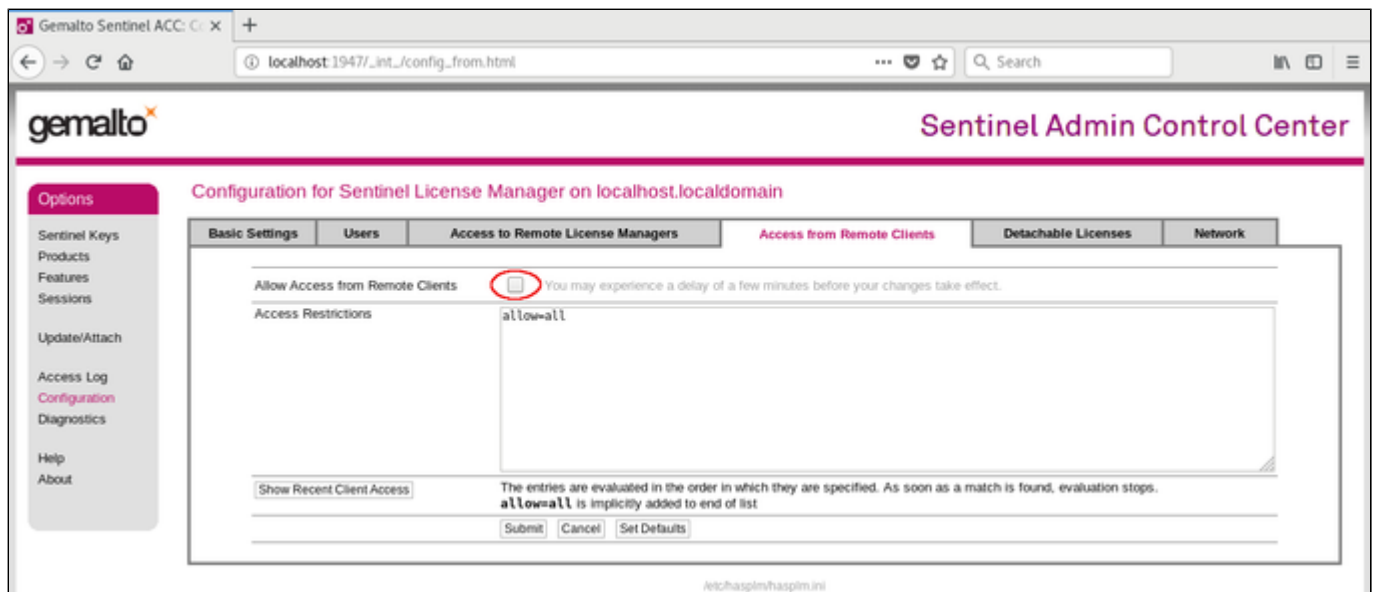
## Allowing Client Access on the License Server

The Sentinel license manager on the license server can be configured to **allow** or **disallow** access from remote clients to the network licenses installed on the license server. To access this configuration option, perform the following steps **on the license server**:

1. Open a web-browser and go to the URL **http://localhost:1947/_int_/config_from.html** (option: Configuration / Access from Remote Clients).

2. This opens a page similar to the following. **Please note**: newer Charon emulator products (e.g., Charon-AXP/VAX version 4.9) have newer versions of Sentinel ACC. The pages of these versions look different, but the functionality remains mostly the same.

Old ACC version:



New ACC version:

Or for versions starting with 8.x:



3. Possible actions:

- To **allow access** from remote clients, *activate* the check-box next to the field **Allow Access from Remote Clients** or **Anyone and cloud licenses can be consumed without identity** and press **Submit** at the bottom of the page.
  To allow access from remote clients, network visibility on the "Network" tab must be set to **All Network Adapters.**
- To **refuse access** from remote clients, *clear* the check-box next to the field **Allow Access from Remote Clients** or select **No one**, and press **Submit**.
- **Access Restrictions** allow refining access rules, e.g., by specifying IP addresses. Please refer to Sentinel ACC help for details.

Sentinel ACC versions 8.x and higher have additional configuration options on this screen (mostly cloud related). These options are not relevant to Charon emulator products.
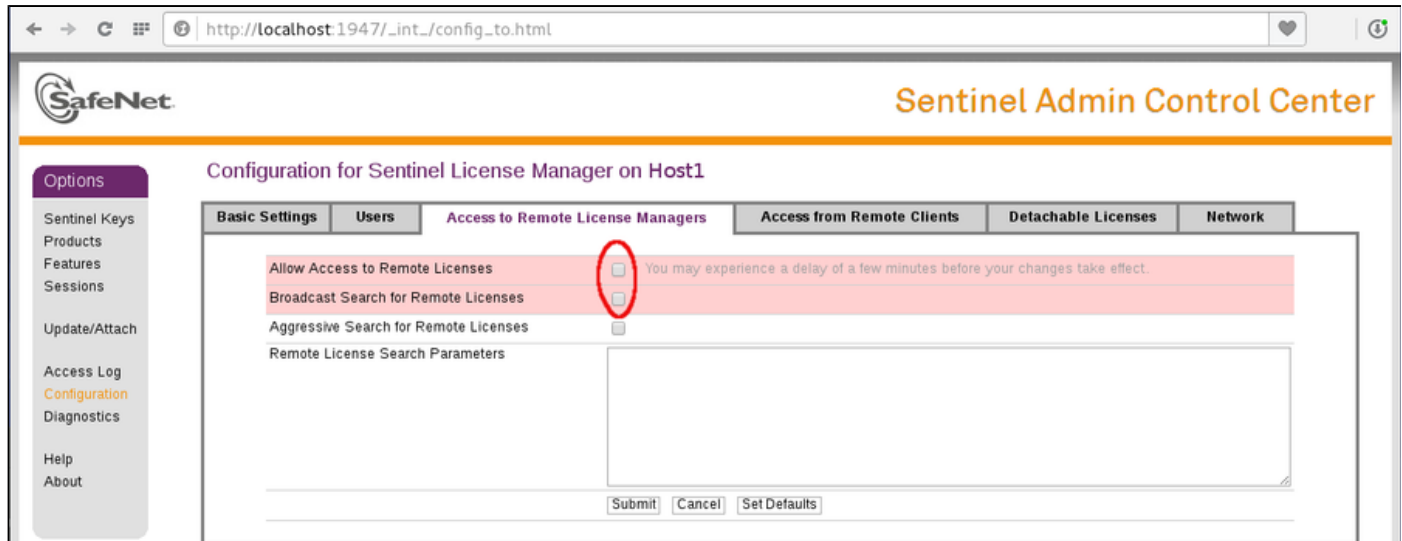
## Allowing Access to a License Server on the Client

The Sentinel ACC can be configured to enable or prevent that the client host discovers network licenses and to change the options used to discover and access network licenses provided by a license server.
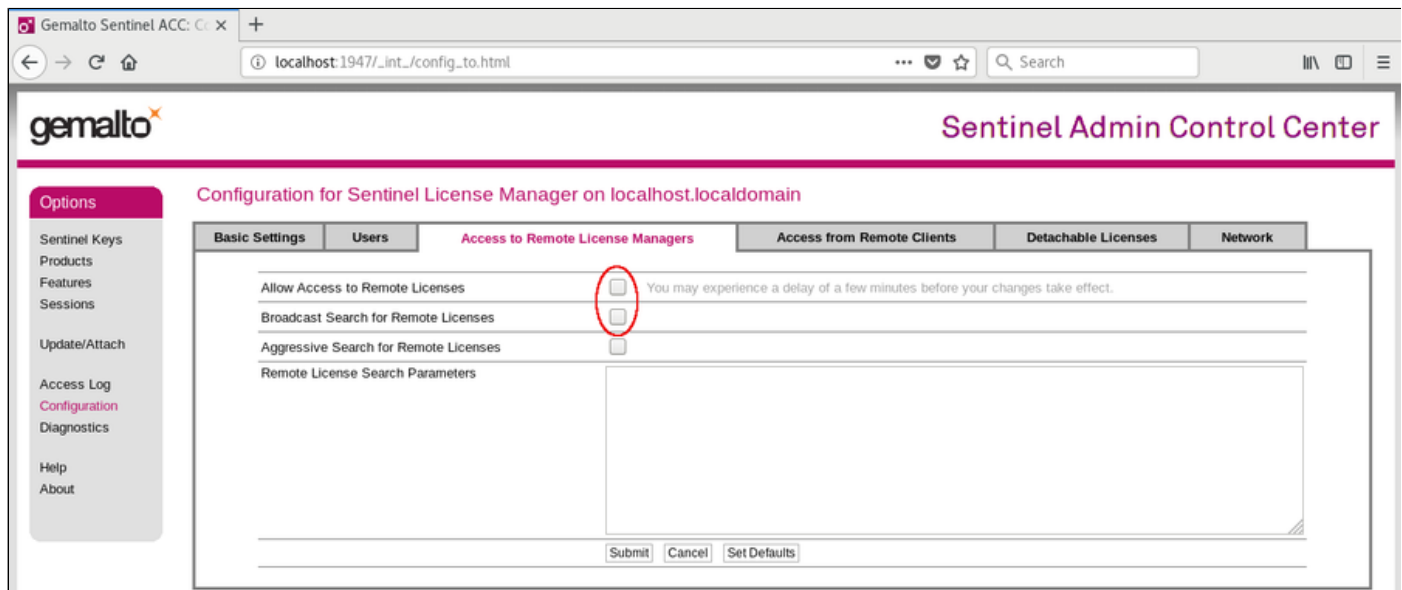
1. Open a web-browser on the **client host** and go to the URL **http://localhost:1947/_int_/config_to.html**
 (option: Configuration / Access to Remote License Managers).

2. This will open a configuration page similar to the following. **Please note**: newer Charon emulator products (e.g., Charon-AXP/VAX version 4.9) have newer versions of the Sentinel license drivers. The Sentinel ACC pages of these versions look different, but the functionality remains mostly the same

Old ACC version:



New ACC version:



3. Possible actions:

- *Activate* the check-box next to the field **Allow Access to Remote Licenses** to **enable** access to license servers. Press **Submit** to save the setting.
- *Clear* the check-box next to the field **Allow Access to Remote Licenses** to **disable** access to license servers. Press **Submit** to save the setting.
- The option **Broadcast Search for Remote Licenses**, when activated, enables a broadcast search for license servers on the local network without having to enter the address of a license server.

**Please note**:

- If the option **Broadcast Search for Remote Licenses** is not enabled or cannot be used in the customer specific setting, you can enter specific IP addresses or host names that should be queried for network licenses in the **Remote License Search Parameters** field. Please refer to the Sentinel ACC help function for more information.
- To allow access to remote license managers, network visibility on the "Network" tab must be set to **All Network Adapters**.
- Starting with Charon-AXP/VAX 4.9 for Linux, Charon-AXP/VAX version 4.8 for Windows, these Charon emulator products do not follow the settings in the Sentinel ACC with respect to querying remote license servers and network visibility. They perform a **broadcast search** for network licenses even if this has been disabled in the local Sentinel ACC configuration. If this behavior has to be prevented for specific reasons, the access of the system to the license server has to be temporarily restricted or disabled, for example by blocking the relevant traffic in a firewall. Another possibility would be to block access to the network license at the license server side. Note that such methods can negatively impact other functions of the system or, in the case of blocking access to a network license on the server, even the functions on other license clients.

## Verifying License Availability

After installing a license on the system, verify the availability of the license as described in the section *Viewing a License*.

Check if the license shows the correct product, expiration date etc.

## Handling Multiple Keys

A Charon host system can have access to several local and remote license keys. Each license key can contain one or more product licenses.

The Charon emulator products can only use one **active** license at one time. Without additional configuration, they cannot make decisions about which product license or license key to use. If there is more than one available license key, the default license key will be used. The default license key is determined by the Sentinel software. As this can lead to undesirable effects, newer Charon emulator products have configuration parameters that allow the definition of a **primary** (or production) and a **secondary** (or backup) key, or the creation of a **list of license keys or product licenses sorted** by priority.

The following sections describe the options available to achieve a more deterministic license selection. If only one license is available, either locally installed or via the network, this section does not apply.

**Please note**: for Charon-AXP/VAX before version 4.9 and other older Charon products: the parameters described in this section can **only** be used to define a primary key and a backup key, or to specify the correct key if there is a conflicting license for a different Charon product on the same system. It is **not possible** with these versions of Charon to combine a local license (black dongle) with other licenses (local or network) to increase the number of concurrent instances of the same Charon product on one host system. Newer versions allow a more flexible use of multiple licenses. Both variants are described in the following sections.

## Backup License Characteristics

It is strongly recommended to order a backup key to recover immediately from damage or loss of the main license key. A backup license key can also help in situations where the Charon host hardware fails and the software must be moved to a different system, thus invalidating the original software license.

Backup keys typically use a counter (integer) value programmed in the key. This integer value corresponds to a number of hours the Charon software is allowed to run. Each time the Charon software checks the license (at start and then every hour), the value is decreased (by 1 hour). Please note that backup keys may have additional restrictions:

- The runtime is typically limited to 720 hours (30 days). This is the time available to get a replacement license from Stromasys.
- A backup license key may be valid only until a certain date.

**Please note**: if you start and stop the emulator frequently (e.g., frequent runs with a duration of under one hour), the runtime may be significantly less than 30 days, because the license check during the start of an emulator will reduce the counter by one.

# Primary and Backup License for Charon-AXP/VAX prior to Version 4.9

If more than one key is visible to the system, you can define which is the primary and which the backup key. To do this, add the following parameters to the configuration file of the Charon instance:

```
set session license_key_id[0]=<primary-key-id>

set session license_key_id[1]=<secondary-key-id>
```

The entry with index 0 denotes the primary key, the entry with index 1 the backup key.

To identify the relevant key IDs, display the available licenses as described in section *Viewing a License*.

To get information about modifying the Charon configuration files, refer to the appropriate sections in the user's guide.

# Prioritized Licenses - Charon-AXP/VAX 4.9 and Higher

## Prioritized List of License Keys

If more than one key is visible to the system, you can define a prioritized list of license keys. To do this, add the following parameter to the configuration file of the Charon instance:

```
set session license_key_id = "<key-id prio1>, <key-id prio2>,...[,any]"
```

The **first entry** in the list has the highest priority. The emulator instance will try to use this key first. **If it is not available**, it will try the second key in the list and so on. If the parameter **any** is added to the end of the list, the emulator instance will search for any keys not part of the list should none of the listed keys be available. If the parameter is not defined, an unqualified search for a suitable license will be performed and the first one found (if any) will be used. If no usable license is found, the emulator will stop.

To identify the relevant key IDs, display the available licenses as described in section *Viewing a License*.

To get information about modifying the Charon configuration files, refer to the appropriate sections in the user's guide.

## Prioritized List of Product License IDs

Every license key can contain one or more product sections. Newer licenses can contain a product license ID identifying each product section. A prioritized list of product license IDs can be added to the emulator instance configuration file to specify which product sections to use and which should have the highest priority. To do this, add the following parameter to the configuration file of the Charon instance:

```
set session license_id = "<lic-id prio1>, <lic-id prio2>,..."
```

The emulator instance will scan the available license keys for the listed product license IDs. Then it will try to use the first defined product section. If it is not available, it will try the next and so on. If none of the listed product license IDs are found, the emulator will stop.

To identify the relevant product license IDs, display the available licenses as described in section *Viewing a License*.

To get information about modifying the Charon configuration files, refer to the appropriate sections in the user's guide.

# Updating an Existing License

If you need to update an **existing hardware or software** license, for example because the time limit on the license has expired or to upgrade to a new product version, perform the following tasks:

1. Generate the C2V file for the existing license. This step is the same for a hardware license or an existing software license. This Customer-to-Vendor (C2V) file contains the license characteristics necessary for creating the license update.
2. Send the C2V file to Stromasys. Stromasys will use the data to create the necessary license update. You will receive one (software license) or two (most hardware license updates) V2C files (the Vendor-to-Customer file).
3. Apply the license data from the V2C file(s). This will install and activate the update for your license.

These tasks are described below:

**Step 1**:  Generate the C2V file using the **hasp_srm_view** command:

Execute the following command to create the C2V file:

```
# /opt/charon/bin/hasp_srm_view -c2v <filename.c2v>
```

If there is more than one license visible to the system, newer product versions (starting from Charon-SSP 2.0.1, Charon-AXP/VAX 4.8 Build 18302) allow selecting a specific license using the **-key** parameter:

```
$ hasp_srm_view -key <license-id> -c2v <filename.c2v>
```

The C2V file will be written to the filename specified.

**Please note**: the license content cannot be read if you are connected to the system via a **remote connection (e.g., via ssh).** The hasp_srm_view command will return an error. You can use the following workaround:

```
$ ssh localhost /opt/charon/bin/hasp_srm_view -c2v <filename>
```

**Please note**: in older product versions, the **hasp_srm_view** command cannot be instructed to select a particular key for creating the C2V file. The **-key** parameter in these versions is only honored when displaying a license, but not for creating a C2V file. The **hasp_srm_view** command will select one of the available licenses to create a C2V file. This selection cannot be influenced. If you are running a Charon product with this restriction and more than one license is visible to the system, either use Sentinel ACC to create the C2V file for the correct license key or disconnect the other licenses temporarily (this may cause problems for emulators running on the system).

**Step 2**:  Send the resulting C2V file to Stromasys orders administration using the email address that Stromasys will provide to you.

**Step 3**: After receiving the V2C file(s) from Stromasys, copy the file(s) to the system where the license needs to be installed and install the new license:

**Important caveat**: if a hardware USB key is to be updated, in most cases you will have received **two** files: a **\*_fmt.v2c** file and a **\*.v2c** file. The \*_fmt.v2c file formats the dongle and the \*.v2c file contains the updated license data. In such cases the **\*_fmt.v2c** file must be applied **first**.

On Linux, the command **hasp_update** can be used to apply V2C files.

The following example shows the use of the **hasp_update** command:

```
# /opt/charon/bin/hasp_update u /path/filename.v2c
```

Alternatively, you can use the Sentinel ACC to apply V2C files (use the section Update/Attach). Refer to the license handbook for more details.

# Removing a License

If a license needs to be **removed** from a system or the access to the license needs to be **disabled**, the steps are different for the different license types and are described in the next sections:

- Removing a hardware license from a system
- Removing a software license from a system
- Removing access to network licenses from a system

**Important**: before removing a license from a system or disabling access to a license, take to following points into consideration:

- Make sure that there is a valid replacement license for all emulator instances depending on the license to be removed, or make sure the emulated systems have been cleanly shut down,
- Make sure that this step will not negatively impact your production environment.

## Removing a Hardware License from a System

To remove a hardware license from a system, simply unplug it from the system.

## Removing a Software License from a System

**Please note**:

The old method for removing a software license from a system depended on the license transfer functionality. **This functionality is no longer available in the current versions of the Charon products.** The only way to remove a non-transferable obsolete software license is the method described below. On **Microsoft Windows**, you can also use the **Charon License Utility** (see CHARON on Windows - Charon License Utility) to perform the necessary steps.
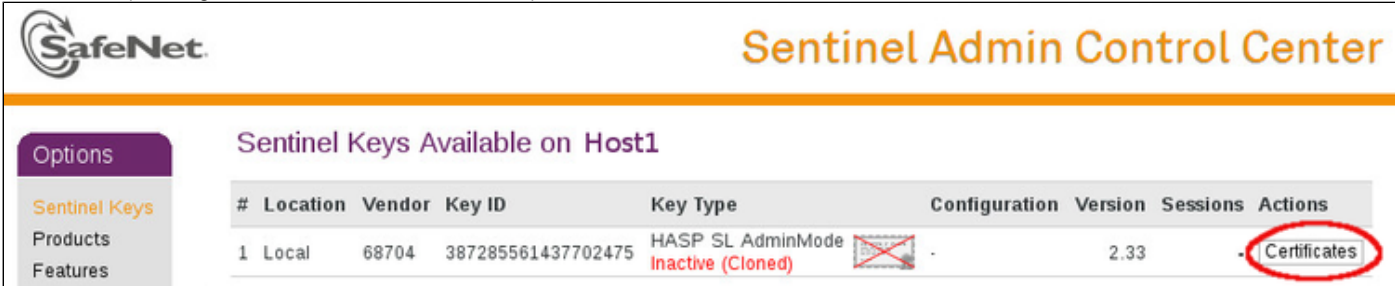
To remove an **obsolete software license or a software license in cloned state** (a software license goes into a cloned state, for example, if a VM is cloned to a different Virtual Machine UUID) from the system, perform the following basic steps:

- Start the Sentinel Admin Control Center (ACC) (for local system: URL **http://localhost:1947**).
- Identify the software license that is to be removed.
- Identify the name of the certificate file and the path of the base directory where it is stored.
- Remove the certificate file(s).
- Restart the Sentinel runtime service.

**The following example shows the required steps in detail:**

1. Go to **http://localhost:1947/** to access the Sentinel HASP ACC and select **Sentinel Keys** on the left.

2. In the Sentinel Admin Control Center (ACC), go to **Sentinel Keys** and locate the target "Sentinel SL AdminMode" license to be removed.

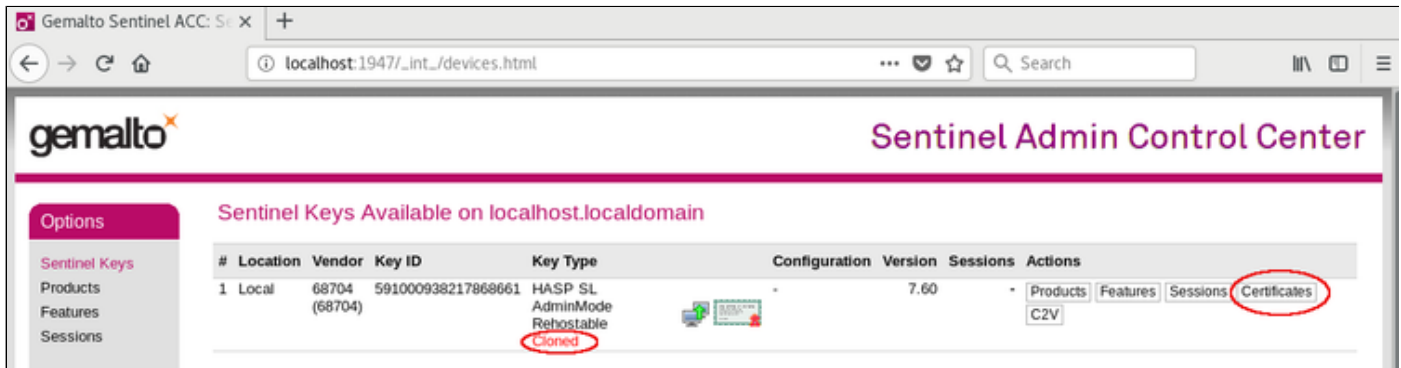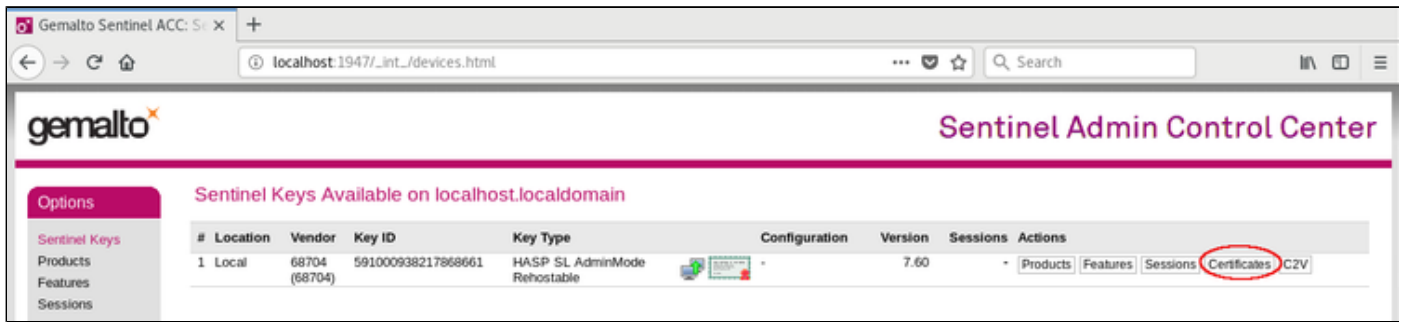3. Click on the **Certificates** button at the right side of the SL description:

**Old version** (showing a software license in cloned state):

**New version** (showing an active software license **and** a cloned software license):





4. Note the name of the corresponding certificate file and the path to the certificates base directory as shown in the "Certificates" section:

Example using old ACC version:



**Please note:** the certificate display screen can look slightly different depending on the type of software license and the actions performed on this license in the past. The following example shows the certificates of a software license after several updates. The screenshot is based on Sentinel ACC version equal or higher than version 7.60.

5. **Remove the certificate file(s)** using operating system tools.

   a. In the first example above (Windows), there is one file to be removed. It is in *C:\Program Files (x86)\Common Files\SafeNet Sentinel\Sentinel LDK\installed\68704*.
   b. In the second example (Linux) there are several files created by a series of license updates. On Linux, the certificate files are typically stored in */var/hasplm/installed/68704/*.
   c. **All certificate files in the identified directory must be removed**.

6. After removing the certificate file, **restart the Sentinel license service** or reboot the system. To restart the service, proceed as follows:

   a. On Windows, restart the "**Sentinel LDK License Manager**" service (hasplms) either using the `services.msc` program or via a command line (as administrator) then enter the "`sc stop hasplms`" command followed by "`sc start hasplms`".
   **Important**: any running emulators will be stopped if the license service is forced to stop despite existing service dependencies (i.e., running emulators). So any running guest systems **must be cleanly shutdown** before restarting the license service in order to avoid data loss.

   b. On Red Hat Enterprise Linux 7.x and 8.x (and compatible Linux systems) restart the aksusbd service: # `systemctl restart aksusbd` This also will automatically restart the **hasplmd** service (separate service for this daemon was introduced in newer runtime driver versions).

   c. On Red Hat Enterprise Linux 6.x, restart the aksusbd service: # `service aksusbd restart`

7. Start the Sentinel ACC again to verify that the software license has been removed.

# Removing Access to Network Licenses from a System

There are three different ways to remove a network license. They have different implications and are described below:

## Full Removal of Network License

To completely remove a network license, follow the steps above for hardware or software licenses respectively. The steps must be performed on the license server.

**Please note**: this will remove the license for all emulator hosts on the network using this license and also for the local host. Make sure that this is in fact intended.

## Block Access of Remote Emulator Hosts to Network License

You can use the Sentinel Admin Control Center on the license server

- to **allow** access to a network license for all or specific hosts on the network, or
- to **block** access from remote hosts completely.

Please refer to the section *Controlling Access to Network License on Server Side* in *Installing a Network License* for more information.

## Block Access to Network Licenses on Client System

If access of the local system to network licenses is not desired, this can be disabled in the Sentinel ACC for certain products and product versions. Blocking access at the server side is the safer way.

Please refer to the section *Controlling Access to Network License on Client Side* in *Installing a Network License* for more information.

# License Management Overview for Charon-PAR for Linux

Please refer to the other sections of the *Charon Licensing Handbook* and your product documentation for any topics not covered in this overview guide and for more detailed information on the topics discussed here.

This page provides an overview of the basic steps to set up the HASP licensing environment on a system running Charon-PAR for Linux.

- General Description
  - Charon License Checks
  - Charon License Updates
  - License Content
- License Type Overview
  - Local Hardware License
  - Software License
  - Network License
- Overview of Initial License Installation Steps
- Overview of License Management Tools
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  - Sentinel Admin Control Center (ACC) Security Settings
    - Define a Password for the Sentinel ACC
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- Installing the License
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    - Firewall Considerations
    - Allowing Client Access on the License Server
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  - Verifying License Availability
- Handling Multiple License Keys and Multiple Products per License
  - Backup License Characteristics
  - Primary and Backup License for Charon-PAR prior to Version 1.10
  - Prioritizing Licenses - Charon-PAR Version 1.10 and Higher
    - Prioritized List of License Keys
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- Updating an Existing License
- Removing a License
  - Removing a Hardware License from a System
  - Removing a Software License from a System
  - Removing Access to Network Licenses from a System
    - Full Removal of Network License
    - Block Access of Remote Emulator Hosts to Network License
    - Block Access to Network Licenses on Client System

# General Description

A Charon emulator product will not run without a valid license. For Sentinel HASP licenses (the topic of this chapter) this license can be provided on a **US B hardware dongle** (a Sentinel HASP key) or as a **software license** bound to the hardware of the host system or the network license server. A loss or defect of a license will cause the emulator to stop.

For extra protection, Stromasys recommends the use of a backup license key (purchased separately) that can replace the main license key for a limited period of time. It is possible to specify the backup license in the Charon configuration file to prevent the emulator from stopping in case its main license is no longer accessible.

To check the validity of a license, Charon performs the following steps:

- The Charon emulator checks the license to determine if there is a product definition that will allowed it to run.
- Then Charon checks the feature definition associated with the product to see if the feature definition is valid - that is, it is not expired, the available runtime hours are not exhausted, and if there are still some instance-slots available to run the emulator.
- If there is no matching product definition or if the feature is not valid, Charon reports the problem in the log and shuts down.

# Charon License Checks

Charon products **check the availability of a valid license** at different points in time:

**1. At startup:**

> If no valid license is found, an error message will be written to the emulator log file and the emulator will not start.

**2. At regular intervals** during the runtime of the emulator (the default license check period of 1 hour can be changed by Stromasys using the appropriate license parameters):

- If the previously used valid license has been removed, has disappeared, is defect, or has become invalid, the emulator will report the loss of the license in the log file and continue operation for a limited amount of time as described below.
- If there is another valid license, for example a backup license defined in the configuration file, it will be used.
- _Starting with Charon-PAR 1.10:_ Charon allows for a grace period of 12 hours during which the software checks for the presence of a valid license every 10 minutes until a valid license is found. If no valid license is found after the grace period has expired, the emulator will stop.
- _Earlier versions of the above products and other emulator products_: should there still be no valid license at the next regular license check (this default interval may be changed by individual Charon products), the emulator will stop.
- If a time-restricted license is used and it expires, the Charon instance tries to find its replacement automatically and, if found, proceeds using the replacement license.

**Important note for Windows installations**: any running emulators will be stopped if the license service is forced to stop despite existing service dependencies (i.e., running emulators). So any running guest systems must be cleanly shutdown before restarting the license service in order to avoid data loss. This is the behavior at the time of writing. It may change in future versions.

# Charon License Updates

Under certain circumstances existing licenses must be updated. **License updates are required, for example, in the following cases**:

- Charon product version upgrade
- Product change
- License validity (time) extension

License updates, for example a new expiration date or a new execution counter, can be performed without interrupting operation, that is, without shutting down active Charon instances, **provided that the resulting license is valid for the running Charon instance**. If any parameters of the updated license are not valid for the running Charon instance (for example, the wrong model or version), the Charon instance will stop running.

Licenses are **backwards compatible to some extent**. A **license update to a more recent version** will allow some previous Charon versions to run as well. The details depend on the Charon product.

The license check for Charon-PAR will pass if the version on the license is higher than the one of the running Charon instance, **as long as** the major version (e.g., the 2 in 2.00) is the same. Please note that license are not compatible between product versions 1.x, 2.x, and 3.x.

# License Content

The license data on a license key, independent of whether it is a hardware or software license key, consists of **several parts:** the **license key text block** contains the **license section** and **one or more product section**s. The **license features** describe additional conditions and limitations for the emulator products contained on the license.

## A) License Key Text Block

### 1) License Section (one per license key)

The **license section** contains general license information related to ownership and administration.
There is **one license section** per license key.
Please note that in rare cases, you may receive an **empty USB dongle** for which command outputs will show that **no license information was detected**. In such cases, request a license update from Stromasys as described in *Updating a License*.

Relevant **license section parameters**:

- **License type**: type of the license, i.e., hardware or software license, network-enabled or local (added in newer Charon product versions, e.g., Charon-AXP/VAX 4.9)
- **License number**: assigned by Stromasys
- **License key ID***: unique**;** pre-programmed; unmodifiable; on physical keys same value as the Physical Key ID
- **Master key ID**: the software vendor ID used by Stromasys for issuing licenses
- **Release date**: the day on which the license was issued
- **Release time**: the time at which the license was issued
- **Update number**: the number of license updates that have been applied
- **End user name**: the name of the person to whom the license was issued
- **Purchasing company name**: usually the company to which the license was issued

### 2) Product Section (one or more per license key)

The text block also contains **product sections** that contain product specific licensing information.

- Several products can be combined on one license key. Stromasys may place restrictions on what products can be combined on a single license key.
- The product section also may include information about the support contract and the end of support. It may contain hardware specific limitations related to the types of devices that can be connected (e.g., serial interfaces).
- A checksum is inserted after the last product section of a license. This checksum is not visible in the show command output. Charon products/versions requiring such a checksum will not start if the license does not contain a checksum.
- Each product section is associated with a **feature defining additional conditions** for the product.

The following list shows the most important **parameters of a product section**.

Please note that not all of these parameters may be present for a particular Charon product.

- **Product License Number:** identification of specific product section (optional; new starting with Charon-AXP/VAX 4.9 and Charon-PAR 1.10). Corresponds to configuration parameter **license_id**.
- **Virtual Hardware**: range of virtual models available for running
- **Product Name**: commercial product name
- **Product Code**: commercial product code
- **Major Version, Minor Version, Maximum Build, Minimum Build:** commercial product version and range of build numbers suitable for running with this license. The parameters **Maximum** and **Minimum Build** are no longer displayed starting with Charon-AXP/VAX 4.9 and Charon-PAR 1.10.
  **Please note** that, depending on the product and product version, licenses have a limited backward compatibility (i.e., when the version on the license is newer than the product version).
  See *Operational Procedures Overview* in the Sentinel HASP Licensing Documentation for more information.
- **Host CPU supported** or **32bit and 64bit OS requirements:** type of host CPU required (for example, x64)
- **Host Operating System required**: Linux or Windows
- **CPUs allowed:** number of virtual CPUs enabled for virtual multiprocessor systems
- **Maximum virtual memory:** Maximum memory emulated. If not present the value defaults to the maximum memory possible for the particular virtual system. Note that the maximum memory may not be available to the virtual system if the host computer has insufficient physical memory.
- **CHAPI enabled:** whether or not CHAPI (Charon-AXP API) can be used with this product
- **Instances allowed:** maximum number of Charon emulator instances of this program/hardware model that are allowed to run concurrently on the local host. Relevant for local license keys that do not support the process count parameter. **See also** the parameter *Number of processes* in the feature section.

- **CPU Speed**: optional parameter to reduce the speed at which the program can run to a fraction of the maximum (e.g., to 25%)
- **HPSUSAN**: optional parameter. Specific to HP3000, overrides physical key ID. The HPSUSAN (HP System Unique Serially Assigned Number) is used for licensing purposes by HP. The parameter may be needed if a license on the physical system is tied to the original HPSUSAN.
- **Feature number:** number of the feature defining further limits/restrictions for the product license. Each product can use a separate feature, or the same feature can be used by several products.
  If using a **network license** and the same feature is shared by several products, the number of instances allowed by the feature is shared between the products (e.g., 2 allowed instances enable one Charon-AXP and one Charon-SSP instance to run concurrently). If using a **local license dongle** and the same feature is shared by several products, the number of allowed instances is counted separately for each product.
  The parameters defined in a feature are described below in the *Features* section.

## B) License Feature Section (one or more per license key)

Features define **product specific conditions**, for example expiration date and number of concurrent instances.

The following list describes these conditions:

- **Released product expiration date:** for time-based licenses. Note that at the time of writing the license of Charon-AXP/VAX products will expire at the end of the day of the expiration date, the license of Charon-SSP in the early morning of the expiration day. The exact behavior of the different versions can change without prior warning. Not supported for HL-MAX dongles.
- **Runtime counter:** number of license checks after which the license will be disabled. Default check interval is one hour. The counter will be decreased at the start of the emulator and then at every license check interval. Once the counter has been depleted, the license becomes invalid. This license type is typically used on licenses intended as backup licenses.
- **Login interval** or **Check interval:** frequency of license checking during emulator execution (default 1 hour). This parameter is not visible in the show command output in older Charon product version. It is visible in the show command output of newer versions, starting with Charon-AXP/VAX 4.9 and Charon-PAR 1.10.
- **Network license:** indicates that a physical license is a network license
- **Number of processes:** maximum overall number of Charon instances that are allowed to run concurrently.
  This parameter is set by Stromasys to the value matching the respective customer contract. For network dongles, the maximum possible value of this parameter is determined by the type of network dongle. For example: on a NetTime10 dongle this parameter can be set to a value between 1 and 10 (depending on the customer contract). The type of dongle can be viewed via Sentinel ACC.

**Example with Time-Based Parameters**

The parameters below describe the following limitations to the emulator:

- License permits running up to 2 instances of Charon at the same time.
- License expires on May 31, 2020, **or** after 360 license checks (with an interval of 60 minutes between the checks).

```
Expiration date: 31/5/2020
Runtime counter: 360
Login interval: 60 minutes
Instances allowed: 2
```

If any of the conditions are no longer met (too many instances, past expiration date, all checks exhausted), the feature becomes invalid and will not allow an emulator instance (or an additional instance) to run.

# License Type Overview

Depending on customer requirements, Stromasys can provide several different license types.

## Local Hardware License

Local hardware licenses are USB dongles and work on the system they are physically connected to. For Windows systems supporting AnywereUSB®, hardware licenses can also be connected over the network. They can easily be moved to a different system, if required. The content of the dongle can be updated if a change to the license or an extension of a time-based license is required. The necessary steps will be described later in this document.

**Please note**:

- Hardware dongles require the Sentinel HASP run-time (driver) installation before the dongle can be connected to and used by the system.
- Hardware dongles, apart from HL-MAX dongles, are equipped with a **battery** and a clock, which makes them independent of the host clock. The battery is not rechargeable. However, the dongle can use the power provided by the host system while it is plugged in. By doing this, the depletion of the battery can be slowed down. Check the dongle at regular intervals if it is not permanently connected to a system. If the battery becomes completely depleted, the dongle will be permanently unusable and must be replaced. See also: How long does the license USB dongle battery last upon a full charge.

## Software License

A software license is a "virtual" key with functionality very similar to a HASP network-enabled hardware dongle.

A software license does not require any special hardware but it still **requires installation of the Sentinel runtime environment**.

**Please note**:

- To avoid unexpected problems, do not use any Sentinel runtime software that was not provided by Stromasys without being advised to do so by your Stromasys representative.
- Software licenses are best suited for stable environments, because their correct function depends on certain characteristics of the host system. Changing any of these characteristics will invalidate the license.
  - If the Charon host runs on real hardware, software licenses are by default **tightly bound to the hardware** for which they were issued. If major hardware characteristics of the system are changed, the license will be disabled.
  - If the Charon host runs in a **virtual environment** (e.g., VMware), software licenses are normally bound to the virtual machine ID and a set of additional characteristics of the virtual machine. If any of these parameters are changed, the license will be disabled.
- Software licenses are very sensitive to even small changes on the host system. Therefore, it is especially important to provide for a backup license that will ensure continued operation should there be a problem with the software license. See *Handling Multiple License Keys and Product Licenses* for details.

  For a more detailed description of the restrictions, please refer to Software Licensing restrictions or contact your Stromasys representative.

# Network License

The network Sentinel HASP key (**red USB dongle**) can be shared between several hosts running a Charon emulator product (including the host on which the network license is installed).

All **software licenses** are also network licenses.

If the Charon emulator product is installed on the host where the network license is connected, no additional steps are required. The Sentinel driver is installed as part of the Charon product installation. If the host does not have a Charon emulator product installed, the host can still distribute the connected network license to emulator instances running on other hosts.

The Sentinel HASP runtime software must be installed on such a "license server" and on the client system. For details regarding the installation, please refer to the software installation section in this document. Once both the Sentinel runtime software and the network license are installed, the Charon emulator product can be started on any appropriate client host on the LAN, provided access to the license is enabled.

- The network license will be visible to all hosts that can access the license server over IP. Access to the license server must be possible on **port 1947** via **UDP** (discovery process) and **TCP** (actual access to license). Further information (e.g., use of additional UDP ports) can be found in the section Firewall Considerations.
- The license server and the client must both allow access to the network license using the appropriate management tools.

The maximum **number of concurrently active** Charon instances is determined by the parameters of the license.

If you need to install a **standalone license server**, please refer to the installation section of the Licensing Handbook.

# Overview of Initial License Installation Steps

Each Charon emulator product requires a valid license to run. To access the license, the emulator needs the Sentinel runtime software. This software is part of the Charon-PAR for Linux installation kits. Refer to the software installation section of the Charon product user's guide for software installation instructions.

After the installation of this software, the license can be installed on the system. The following steps will be described in more detail below:

1. Add a password for the Sentinel Admin Control Center (ACC).
2. If you purchased a **hardware license**, you can simply plug the dongle into a free USB port on the system.
3. If you purchased a **software license**, you need to create a fingerprint file in C2V (customer-to-vendor) format containing the system characteristics. Use this file to request a license for your Charon product from Stromasys.
4. If your license is a **network license** served by a license server, make sure that the access of the client system to the license server is not blocked by the configuration or a firewall.
5. Optionally, define how **multiple licenses** will be used (selecting primary/backup license, defining license priorities).
6. If you have an **existing license** that needs to be updated, you need to create a customer-to-vendor (C2V) file and use this file to request a license update from Stromasys.

# Overview of License Management Tools

The following list shows the main tools used to manage licenses on Linux:

- **Sentinel Admin Control Center (ACC)**: A web-based interface providing important configuration options with respect to licenses.
- The **hasp_srm_view** program: A command-line tool to display the detailed license contents and generate C2V and fingerprint files. Cannot be used over a remote connection when using local hardware licenses.
- The **hasp_update** program: A command-line tool to install new and update existing licenses.

# Accessing the License Management Tools

The command-line tools are installed under `/opt/charon/bin/`. If this directory is not part of your PATH variable, you have to specify the full path to access the command.

To run the commands, use the following syntax for **hasp_srm_view** and **hasp_update** respectively.

```
# /opt/charon/bin/hasp_srm_view <option>

                              and

# /opt/charon/bin/hasp_update <option>
```

The relevant options will be specified with the tasks described below, as needed.

The **Sentinel ACC** on the local system is accessed by starting a web-browser and pointing it to the URL: **http://localhost:1947**.

# Sentinel Admin Control Center (ACC) Security Settings

Stromasys strongly recommends performing the steps described below to reduce the risk of unauthorized access to the Sentinel ACC.

## Define a Password for the Sentinel ACC

By default, anyone on the local system with access to port 1947 can access the GUI. If remote access is enabled, users on the network with access to port 1947 can also access the GUI. To protect access to the GUI with a password, perform the following steps:

| Step | Description |
|------|-------------|
| 1 | Open a web browser and navigate to **http://localhost:1947/.** |
| 2 | **Click** on the left-hand menu item labeled **Configuration**. |
| 3 | **Click** on the **Basic Settings** tab. |
| 4 | Under the entry labeled **Password Protection, click** the **Change Password** button. |
| 5 | At the **Change Password** window:<br><br>• Leave the **Current Admin Password** field blank (there is no password set by default).<br>• Enter the desired password into the **New Admin Password** field.<br>• Repeat the desired password in the **Re-enter new Admin Password** field**.**<br>• **Click** the **Submit** button**.** |
| 6 | Back at the **Basic Settings** tab:<br><br>• Under the section labeled **Password Protection,** select the **All ACC Pages** radio button**.**<br>• **Click** the **Submit** button to save this change. |
| 7 | Optional: to allow **remote access** to the Sentinel HASP GUI:<br><br>• **Click** the **Basic Settings** tab.<br>• **Select** the **Allow Remote Access to ACC** check box.<br>• **Click** the **Submit** button**.**<br><br>**Additional information:**<br><br>For remote access to the Sentinel HASP GUI,<br><br>• the firewall must permit access to port 1947/TCP, and<br>• network visibility on the ACC network configuration tab must be set to **All Network Adapters.**<br><br>If required, remote access can also be enabled on Linux by editing the file */etc/hasplm/hasplm.ini* and setting the parameter **ACCremote** to **1**. Should the file not yet exist, please refer to How-to enable remote connection to Sentinel Admin Control Center without GUI. |

**Please note**: With these settings, when you connect to the HASP GUI from a remote system, you may be prompted for a username and password. It is enough to just enter the configured password and leave the username field empty.

## Setting Linux File Protections

To prevent unprivileged access and modifications to the Sentinel HASP configuration file on Linux, enter the following commands:

```
# chmod 0700 /etc/hasplm

# chmod 0600 /etc/hasplm/*
```

# Viewing Existing Licenses

It is important to know which licenses are visible on a system. For example, the user can

- determine if the correct license is installed,
- identify the expiration date on time-based licenses,
- identify the remaining hours of run-time on backup licenses,
- identify the license ID of primary and backup license which are needed for the emulator configuration file,
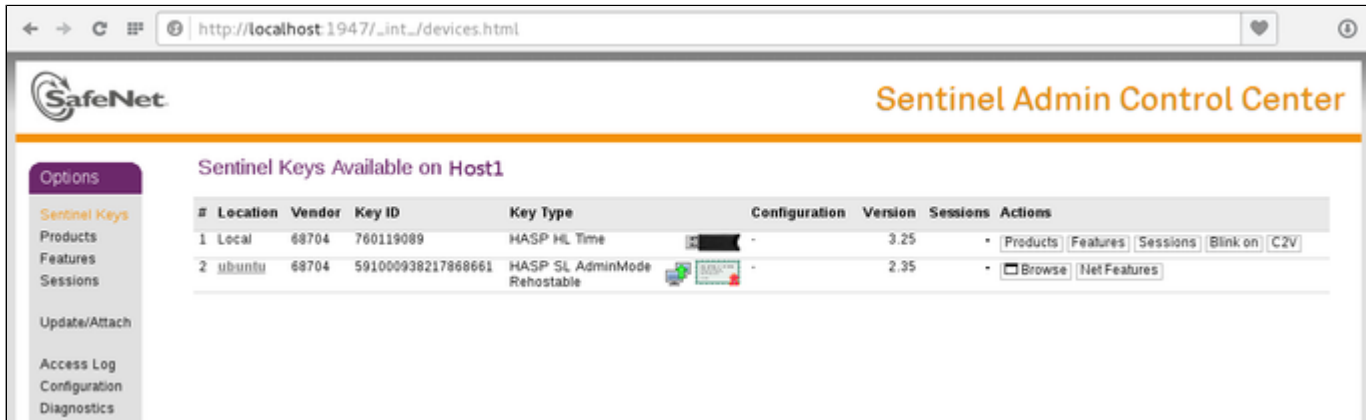- identify licenses that conflict with the currently used product and therefore may need to be removed.

Licenses can be viewed using two tools:

- Sentinel ACC: shows important information, but not the product specific license parameters.
- Command-line tool **hasp_srm_view**: shows all product details contained on the license. Can only be run from a local connection for local hardware licenses.

# Viewing a License with Sentinel ACC

To view available licenses using Sentinel ACC, start the web interface as described above.

To get to the Sentinel Keys screen, click on the corresponding menu item or access the URL **http://localhost:1947/_int_/devices.html** directly. A screen similar to the following opens and displays the available license keys:

For Sentinel drivers version 7.60 and above, this screen looks similar to the following:



This page displays important information about the available licenses, including

- **Location**: Shows whether the license is local or remote. If the license is a network license, the hostname of the remote system is specified. You can access the remote license manager by clicking on the hostname, provided that access is permitted.
- **Key ID**: The unique identification of the license.
- **Key Type**: Hardware keys are marked by the abbreviation HL (hardware license) and a picture of the license dongle. Software licenses are marked by the abbreviation SL (software license).
- **Sessions**: Shows the number of active sessions opened for the specific key.

The buttons on the right-hand side can be used to retrieve more information about the license or to extract the C2V file for a license update. The **Browse** button shown for network licenses will connect to the remote license manager to show the license features.

A C2V file can only be extracted if the license in question is local to the current license manager, i.e., the license manager to which the web browser is connected. In the example above, the network license on a different host does not have the option to create a C2V file. You can connect to the remote license manager clicking on the hostname in the **Location** column (if connections are allowed).

**Please note**:

- The option to create a C2V file is not available in older versions of the Charon emulator software.
- Starting with ACC version 7.60, the option to create C2V files for USB dongles is only available if it has been enabled in the basic configuration section (under the *Configuration* menu item).

The menu options *Products*, *Features* and *Sessions* on the left-hand side provide the same information as the buttons. However, they show the information for all licenses.

## Viewing a License with hasp_srm_view

On Linux, the license content is displayed using the **hasp_srm_view** command. For displaying the license, the following parameters are relevant:

- Display the default license: run the command without options or with **-l**
- Display all licenses: run the command with the option **-all**
- Display a license with a specific ID: run the command with the option **-key**

**Please note**: Local hardware licenses can only be displayed from a local connection to the system, for example via the console. If you are connected via a remote connection, for example via **ssh**, the **hasp_srm_view** command will return an error. Network licenses do not have this problem. A workaround is described below.

**Workaround when logged in via a remote connection:**

When connected to the system via a remote connection, the command to display a local hardware license will return an error. As a workaround, you can display the license contents with the following command (adapt the path of the command if your installation location is different):

```
$ ssh localhost /opt/charon/bin/hasp_srm_view
```

**Please note**: Starting with Charon-PAR 1.10, the hasp_srm_view utility on Linux does not follow the settings in the Sentinel ACC with respect to querying remote license servers and network visibility. The utility performs a broadcast search for network licenses even if this has been disabled in the Sentinel ACC. If this behavior has to be prevented for specific reasons, the network access of the system must be temporarily restricted or disabled, for example by blocking the relevant traffic with a firewall. Alternatively, access to the network license at the license server side can be blocked. Note that such methods can negatively impact other functions of the system or, in case of blocking access to a network license on the server, even the functions on other client host systems.

The following shows sample output of the **hasp_srm_view** command on Linux (to display all available licenses, use the **-all** parameter):

```
$ hasp_srm_view

License Manager running at host: host1.example.com

License Manager IP address: 127.0.0.1

The Physical KeyId: 760119089

CHARON Sentinel HASP License key section

Reading 4032 bytes

The License Number: 1000.639

The License KeyId: 760119089

The Master KeyId: 2131943932

Release date: 09-JUN-2016

Release time: 14:33:59

Update number: 6

End User name: Stromasys - User1

Purchasing Customer name: Stromasys SA

Virtual Hardware: AlphaServer_DS10, AlphaServer_DS10L, AlphaServer_DS15, AlphaServer_DS20

Instances allowed: 5

Product Name: CHARON-AXP

Product Code: CHAXP-470xx-WI-LI

Major Version: 4

Minor Version: 7

Maximum Build: 99999

Minimum Build: 1

Host CPU supported: X64

Host Operating System required: WINDOWS, LINUX
```

```
CPU's allowed: 32

Maximum virtual memory: 65536MB

Released product expiration date: 12-Jan-2017
```

--- output truncated --

**Starting with license driver versions >= 7.60**, for example, in Charon-PAR version 2.00, there are some small changes in the output of **hasp_srm_view**. The parameters are described in the License Content section of the Licensing Handbook. The following sample shows the most important changes (in blue):

```
License Manager running at host: Host1

License Manager IP address: 192.168.2.001

HASP Net key detected

The Physical KeyId: 1015925129

License type: License Dongle (Network capable)

CHARON Sentinel HASP License key section

Reading 4032 bytes

The License Number: 000.TEST.CENTER

The License KeyId: 1015925129

The Master KeyId: 827774524

Release date: 11-APR-2018

Release time: 16:52:33

Update number: 68

End User name: STROMASYS

Purchasing Customer name: STROMASYS

Product License Number: AXP_4_9_TEST

Virtual Hardware: AlphaServer_DS10, AlphaServer_DS10L, AlphaServer_DS15, <items removed>

Product Name: CHARON-AXP

Product Code: CHAXP-490xx-LI

Major Version: 4

Minor Version: 9
```

< Parameters Maximum Build and Minimum Build are no longer shown>

**32bit and 64bit OS requirements:** 64bit <replaces parameter **Host CPU supported**>

```
Host Operating System required: LINUX

CPU's allowed: 16

Maximum virtual memory: 65536MB

CHAPI enabled

License expiration date: 01-Nov-2018

Instances allowed: 3
```

**Feature number:** 1

**Check interval:** 15 minutes

# Installing the License

This section provides a short overview of the initial license installation. For more in-depth information, please refer to the licensing handbook.

## Preparation

Before a license can be installed, some preparatory steps are required.

1. Ensure that the correct Sentinel Runtime software is installed. Please refer to the **installation section of your Charon emulator user's guide** for details.
2. If a conflicting or obsolete license is available on the system it may be necessary to **(temporarily) remove or disable** it. If you need to remove a hardware license, simply unplug it. If you need to remove a software license or disable access to a network license, please refer to the relevant chapter in the licensing handbook. Before removing a license or disabling access to it ensure that it is not required by another currently active product.

## Installing a Local Hardware License

A local hardware license (USB dongle) is installed by inserting the USB license key into a free USB port of the host system.

After this step, verify that the license is visible to the system by following the steps for viewing a license as described above. Please bear in mind that a local hardware license cannot be read when connected to the system via a remote connection (for example, ssh).

## Installing a Software License

To install a new software license, perform the following steps:

**Step 1**:  Create a fingerprint file using the **hasp_srm_view** command:

Execute the following command to create the fingerprint file:

```
# /opt/charon/bin/hasp_srm_view -fgp <filename.c2v>
```

The fingerprint will be written to the filename specified.

**Please note:**

- **Charon-PAR before 1.10**: the above command will terminate with the error message "`Can not retrieve the C2V (host fingerprint mode) data`" or with "`Can not retrieve the C2V (host fingerprint mode) data`" if a network-wide software license is visible to the system. Access to such a license needs to be temporarily disabled before creating the fingerprint file.
- **Charon-PAR versions 1.10 and higher** can create a fingerprint file even in the presence of a network-wide software license.

**Step 2**:  Send the resulting fingerprint file to Stromasys orders administration using the email address that Stromasys will provide to you.

**Step 3**: After receiving the V2C file from Stromasys, copy the file to the system where the license needs to be installed and install the new license:

In addition to the Sentinel ACC, the command **hasp_update** can be used on Linux to apply V2C files.

The following example shows the use of the **hasp_update** command:

```
# /opt/charon/bin/hasp_update u /path/filename.v2c
```

This section describes the installation of a new software license. However, the commands to install a V2C file are identical when updating a hardware license.

**Important caveat:**

- When updating a hardware license you will in most cases receive two V2C files, a **\*_fmt.v2c** file and a **\*.v2c** file. The \*_fmt.v2c file formats the dongle and the \*.v2c file contains the updated license data. In such cases the **\*_fmt.v2c file** must be applied **first**.

# Installing a Network License

For a network license to be provided to a client host on the network, a license server must have been set up either with a network-enabled hardware license (red dongle) or a software license (software licenses are always network enabled).

If the license server also runs a Charon emulator product, follow the steps in the user's guide to install the software. To set up a standalone license server, please refer to the licensing handbook.

For the client to access a license on a license server the following steps are required:

- Any firewall between license server and client must permit the necessary communication.
- The license server must be configured to allow access from the client.
- The client must be configured to allow access to the license server.

## Firewall Considerations

The following ports are used for the communication between license server and client hosts:

- On the **server side** (where network license has been installed), port 1947 must be open for incoming TCP and UDP traffic to allow client access to the license.
- On the **client side**, traffic is initiated using ports 30000 through 65535 as the source ports and port 1947 as the target port. If broadcast search for remote licenses is to be used, the client must also permit UDP traffic initiated from port 1947 of the license server to ports 30000 through 65535 of the client.

If a host on the network cannot find the license server even though the server is operational, you can **temporarily** disable the firewall to determine whether it blocks the traffic.
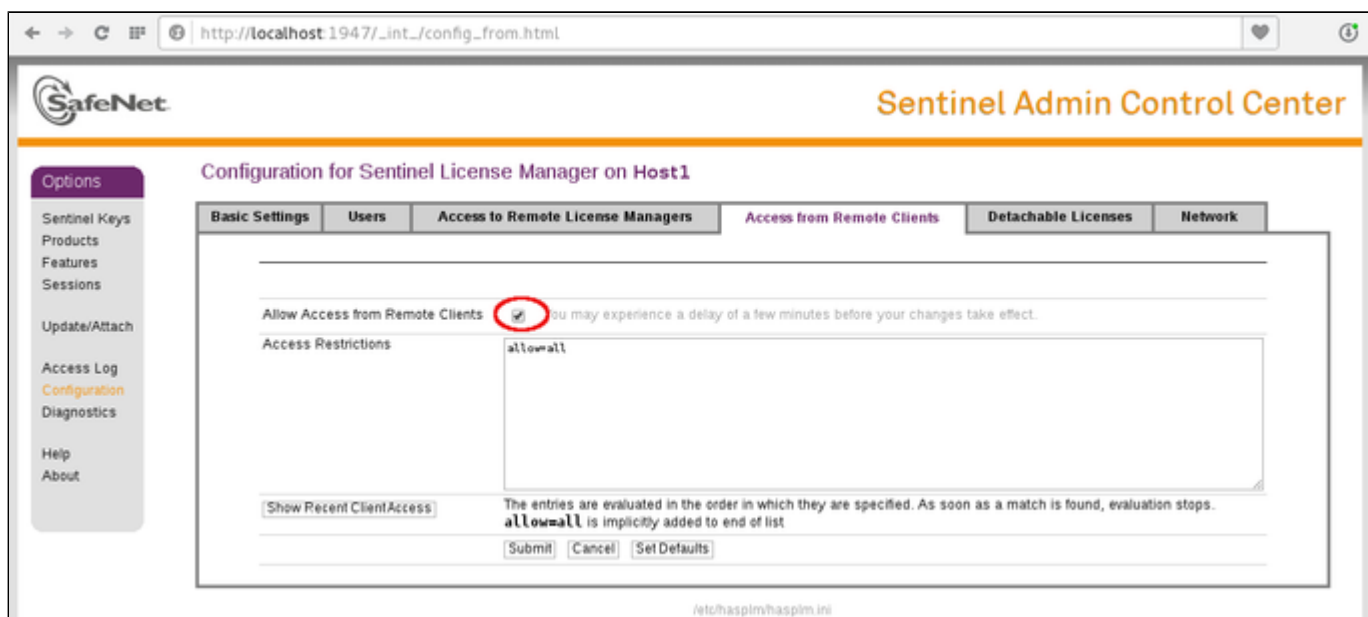
For details on how to configure the firewall in your network, please consult your operating system documentation and make sure to adhere to your company's security policies.
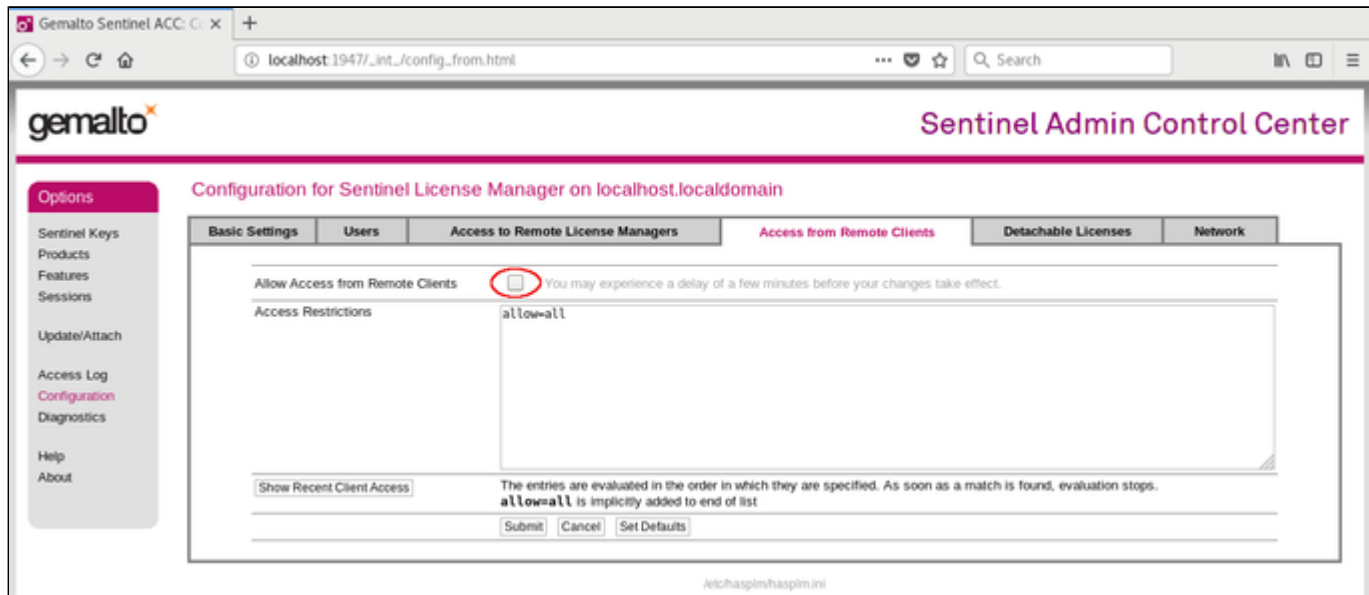
## Allowing Client Access on the License Server

The Sentinel license manager on the license server can be configured to **allow** or **disallow** access from remote clients to the network licenses installed on the license server. To access this configuration option, perform the following steps **on the license server**:

1. Open a web-browser and go to the URL **http://localhost:1947/_int_/config_from.html** (option: Configuration / Access from Remote Clients).

2. This will open a configuration page similar to the following. **Please note**: newer Charon emulator products (e.g., Charon-AXP/VAX version 4.9 and Charon-PAR 1.10 and higher) have newer versions of the Sentinel license drivers. The Sentinel ACC pages of these versions look different, but the functionality remains mostly the same.

Old ACC version:

New ACC version:



Or for versions starting with 8.x:



3. Possible actions:

- To **allow access** from remote clients, *activate* the check-box next to the field **Allow Access from Remote Clients** and press **Submit** at the bottom of the page.
  <u>Please note</u>: to allow access from remote clients, network visibility on the "Network" tab must be set to **All Network Adapters.**
- To **refuse access** from remote clients, *clear* the check-box next to the field **Allow Access from Remote Clients** and press **Submit** at the bottom of the page.
- **Access Restrictions** allow refining access rules, e.g., by specifying IP addresses. Please refer to Sentinel ACC help for details.

Sentinel ACC versions 8.x and higher have additional configuration options on this screen (mostly cloud related). These options are not relevant to Charon emulator products.
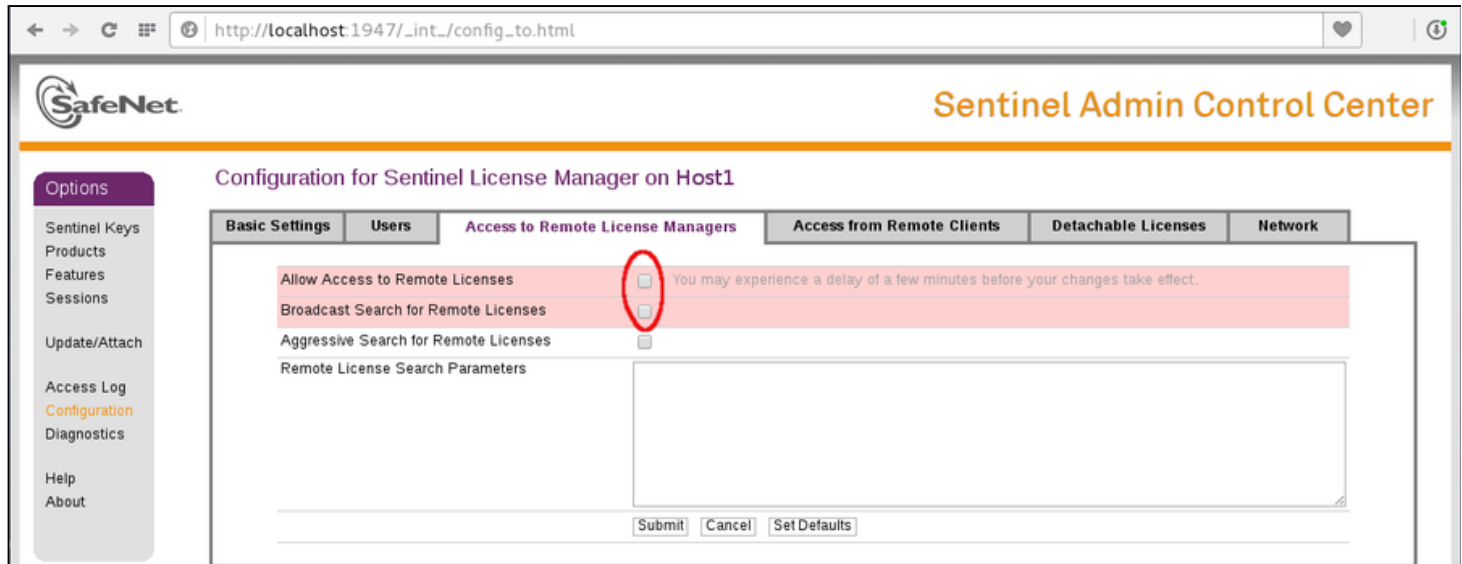
## Allowing Access to a License Server on the Client

The Sentinel ACC can be configured to enable or prevent that the client host discovers network licenses and to change the options used to discover and access network licenses provided by a license server.
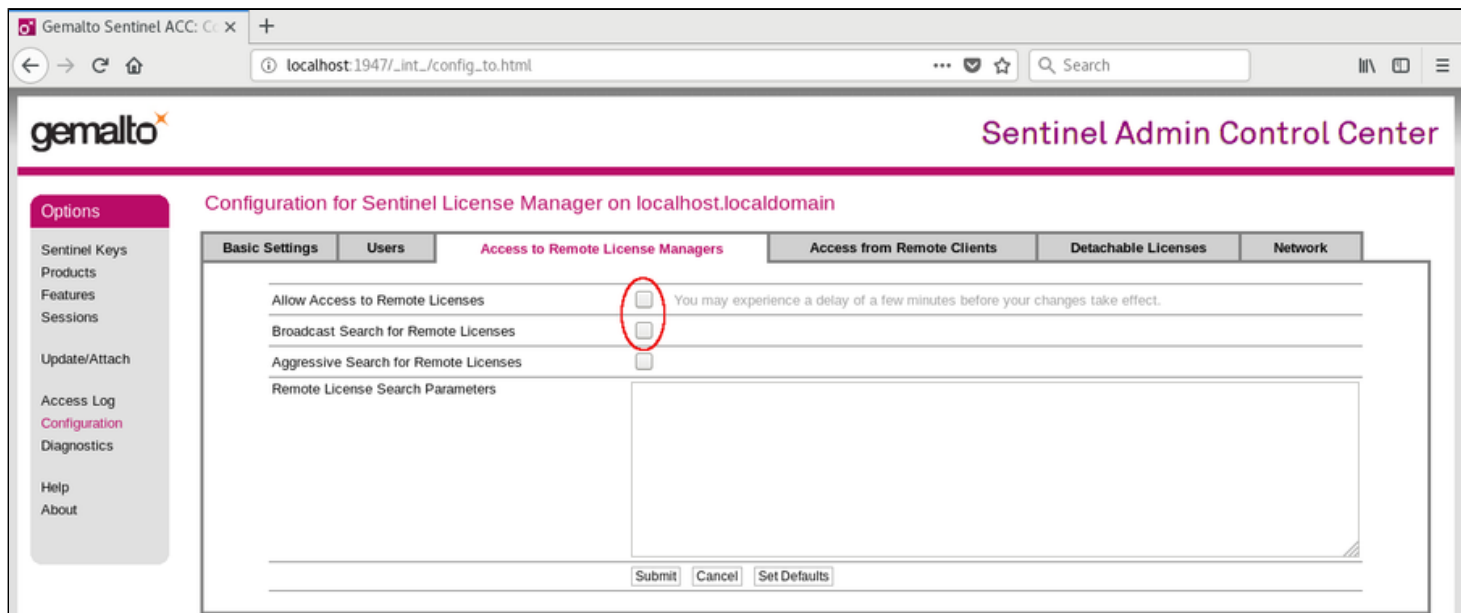
1. Open a web-browser on the **client host** and go to the URL **http://localhost:1947/_int_/config_to.html**
 (option: Configuration / Access to Remote License Managers).

2. This will open a configuration page similar to the following. **Please note**: newer Charon emulator products (e.g., Charon-AXP/VAX version 4.9 and Charon-PAR 1.10 and higher) have newer versions of the Sentinel license drivers. The Sentinel ACC pages of these versions look different, but the functionality remains mostly the same

Old ACC version:



New ACC version:



3. Possible actions:

- *Activate* the check-box next to the field **Allow Access to Remote Licenses** to **enable** access to license servers. Press **Submit** to save the setting.
- *Clear* the check-box next to the field **Allow Access to Remote Licenses** to **disable** access to license servers. Press **Submit** to save the setting.
- The option **Broadcast Search for Remote Licenses**, when activated, enables a broadcast search for license servers on the local network without having to enter the address of a license server.

**Please note**:

- If the option **Broadcast Search for Remote Licenses** is not enabled or cannot be used in the customer specific setting, you can enter specific IP addresses or host names that should be queried for network licenses in the **Remote License Search Parameters** field. Please refer to the Sentinel ACC help function for more information.
- To allow access to remote license managers, network visibility on the "Network" tab must be set to **All Network Adapters**.
- Starting with Charon-PAR 1.10, the Charon emulator products do not follow the settings in the Sentinel ACC with respect to querying remote license servers and network visibility. They perform a **broadcast search** for network licenses even if this has been disabled in the Sentinel ACC. If this behavior has to be prevented for specific reasons, the network access of the system has to be temporarily restricted or disabled, for example by blocking the relevant traffic in a firewall. Another possibility would be to block access to the network license at the license server side. Note that such methods can negatively impact other functions of the system or, in the case of blocking access to a network license on the server, even the functions on other license clients.

## Verifying License Availability

After installing a license on the system, verify the availability of the license as described in the section *View Existing Licenses*.

Check if the license shows the correct product, expiration date etc.

## Handling Multiple License Keys and Multiple Products per License

A Charon host system can have access to several local and remote license keys. Each license key can contain one or more product licenses.

The Charon emulator products can only use one **active** license at one time. Without additional configuration, they cannot make decisions about which product license or license key to use. If there is more than one available license key, the default license key will be used. The default license key is determined by the Sentinel software. As this can lead to undesirable effects, newer Charon emulator products have configuration parameters that allow the definition of a **primary** (or production) and a **secondary** (or backup) key, or the creation of a **list of license keys or product licenses sorted** by priority.

The following sections describe the options available to achieve a more deterministic license selection. If only one license is available, either locally installed or via the network, this section does not apply.

**Please note**: For Charon-PAR before version 1.10: the parameters described in this section can **only** be used to define a primary key and a backup key, or to specify the correct key if there is a conflicting license for a different Charon product on the same system. It is **not possible** with these versions of Charon to combine a local license (black dongle) with other licenses (local or network) to increase the number of concurrent instances of the same Charon product on one host system. Newer versions allow a more flexible use of multiple licenses. Both variants are described in the following sections.

## Backup License Characteristics

It is strongly recommended to order a backup key to recover immediately from damage or loss of the main license key. A backup license key can also help in situations where the Charon host hardware fails and the software must be moved to a different system, thus invalidating the original software license.

Backup keys typically use a counter (integer) value programmed in the key. This integer value corresponds to a number of hours the Charon software is allowed to run. Each time the Charon software checks the license (at start and then every hour), the value is decreased (by 1 hour). Please note that backup keys may have additional restrictions:

- The runtime is typically limited to 720 hours (30 days). This is the time available to get a replacement license from Stromasys.
- A backup license key may be valid only until a certain date.
- If you start and stop the emulator frequently (e.g., frequent runs with a duration of under one hour), the runtime may be significantly less than 30 days, because the license check during the start of an emulator will reduce the counter by one.

# Primary and Backup License for Charon-PAR prior to Version 1.10

If more than one key is visible to the system, you can define which is the primary and which the backup key. To do this, add the following parameters to the configuration file of the Charon instance:

```
primary_license <primary-key-id>
secondary_license <secondary-key-id>
```

To identify the relevant key IDs, display the available licenses as described in section *View Existing Licenses*.

To get information about modifying the Charon configuration files, refer to the appropriate sections in the user's guide.

# Prioritizing Licenses - Charon-PAR Version 1.10 and Higher

## Prioritized List of License Keys

If more than one key is visible to the system, you can define a prioritized list of license keys.  To do this, add the following parameter to the configuration file of the Charon instance:

```
license_key_id <key-id prio1>

license_key_id <key-id prio2>     (more than two key ID entries are possible)

license_use_any_key false|true   (optional parameter, default = false
```

The first entry in the configuration file has the highest priority. The emulator instance will try to use this key first. If it is not available, it will try the second key in the list and so on. If the parameter `license_use_any_key` is set to **true**, the emulator instance will search for any keys not part of the list should none of the listed keys be available.

To identify the relevant key IDs, display the available licenses as described in section *View Existing Licenses*.

To get information about modifying the Charon configuration files, refer to the appropriate sections in the user's guide.

## Prioritized List of Product License IDs

Every license key can contain one or more product sections. Newer licenses can contain a product license ID identifying each product section. A prioritized list of product license IDs can be added to the emulator instance configuration file to specify which product sections to use and which should have the highest priority. To do this, add the following parameter to the configuration file of the Charon instance:

```
license_id "<lic-id-prio1>"

license_id "<lic-id-prio2>"         (more than two entries are possible
```

The emulator instance will scan the available license keys for the listed product license IDs. Then it will try to use the first defined product section. If it is not available, it will try the next and so on. If none of the listed product license IDs are found, the emulator will stop.

**Please note**: without this parameter, the emulator will try to use the first applicable product section found. If this is not the correct one, the emulator may not start.

To identify the relevant product license IDs, display the available licenses as described in section *View Existing Licenses*.

To get information about modifying the Charon configuration files, refer to the appropriate sections in the user's guide.

# Updating an Existing License

If you need to update an **existing hardware or software** license, for example because the time limit on the license has expired or to upgrade to a new product versions, perform the following tasks:

1. Generate the C2V file for the existing license. This step is the same for a hardware license or an existing software license. This Customer-to-Vendor (C2V) file contains the license characteristics necessary for creating the license update.
2. Send the C2V file to Stromasys. Stromasys will use the data to create the necessary license update. You will receive one (software license) or two (most hardware license updates) V2C files (the Vendor-to-Customer file).
3. Apply the license data from the V2C file(s). This will install and activate the update for your license.

These tasks are described below:

**Step 1**: Generate the C2V file using the **hasp_srm_view** command:

Execute the following command to create the C2V file:

```
#  /opt/charon/bin/hasp_srm_view -c2v <filename.c2v>
```

If there is more than one license visible to the system, newer product versions (starting from Charon-PAR 1.10) allow selecting a specific license using the **-key** parameter:

```
$  hasp_srm_view -key <license-id> -c2v <filename.c2v>
```

The C2V file will be written to the filename specified.

**Please note:** The license content cannot be read if you are connected to the system via a remote connection (e.g., via ssh). The hasp_srm_view command will return an error. You can use the following workaround:

```
$  ssh localhost /opt/charon/bin/hasp_srm_view -c2v <filename>
```

**Step 2**: Send the resulting C2V file to Stromasys orders administration using the email address that Stromasys will provide to you.

**Step 3**: After receiving the V2C file(s) from Stromasys, copy the file(s) to the system where the license needs to be installed and install the new license:

**Important caveat:**

- If a hardware USB key is to be updated, in most cases you will have received **two** files: a **\*_fmt.v2c** file and a **\*.v2c** file. The \*_fmt.v2c file formats the dongle and the \*.v2c file contains the updated license data. In such cases the **\*_fmt.v2c** file must be applied **first**.

On Linux, the command **hasp_update** can be used to apply V2C files.

The following example shows the use of the **hasp_update** command:

```
#  /opt/charon/bin/hasp_update u /path/filename.v2c
```

Alternatively, you can use the Sentinel ACC to apply V2C files (use the section Update/Attach). Refer to the license handbook for more details.

# Removing a License

If a license needs to be **removed** from a system or the access to the license needs to be **disabled**, the steps are different for the different license types and are described in the next sections:

- Removing a hardware license from a system
- Removing a software license from a system
- Removing access to network licenses from a system

**Important**: before removing a license from a system or disabling access to a license, take to following points into consideration:

- Make sure that there is a valid replacement license for all emulator instances depending on the license to be removed, or make sure the emulated systems have been cleanly shut down,
- Make sure that this step will not negatively impact your production environment.

## Removing a Hardware License from a System

To remove a hardware license from a system, simply unplug it from the system.

## Removing a Software License from a System

**Please note**:

> The old method for removing a software license from a system depended on the license transfer functionality. **This functionality is no longer available in the current versions of the Charon products.** The only way to remove a non-transferable obsolete software license is the method described below. On Microsoft Windows, you can use the **Charon License Utility** (see CHARON on Windows - Charon License Utility) to perform the necessary steps.
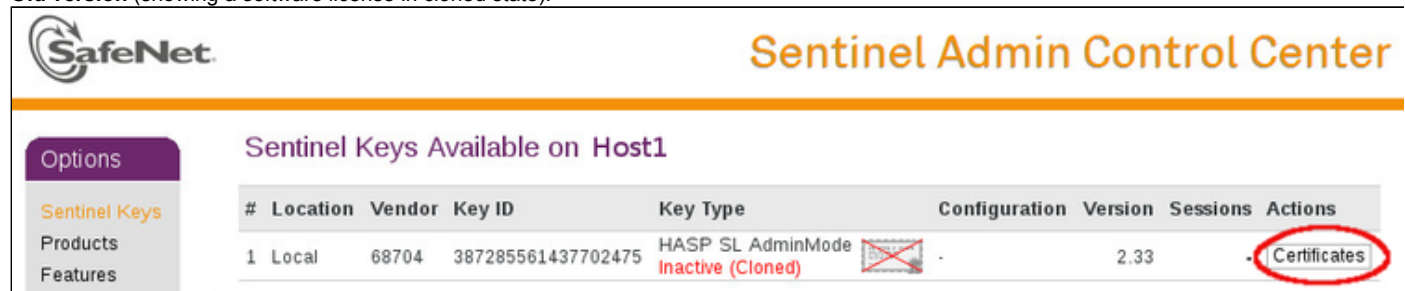
To remove an **obsolete software license or a software license in cloned state** (a software license goes into a cloned state, for example, if a VM is cloned to a different Virtual Machine UUID) from the system, perform the following basic steps:

- Start the Sentinel Admin Control Center (ACC) (for local system: URL **http://localhost:1947**).
- Identify the software license that is to be removed.
- Identify the name of the certificate file and the path of the base directory where it is stored.
- Remove the certificate file(s).
- Restart the Sentinel runtime service.

**The following example shows the required steps in detail:**

1. Go to **http://localhost:1947/** to access the Sentinel HASP ACC and select **Sentinel Keys** on the left.

2. In the Sentinel Admin Control Center (ACC), go to **Sentinel Keys** and locate the target "Sentinel SL AdminMode" license to be removed.

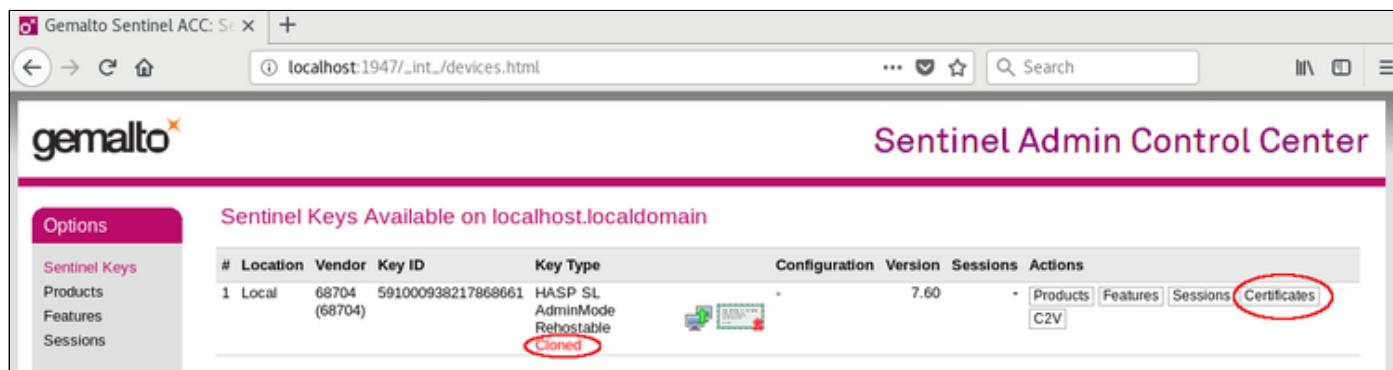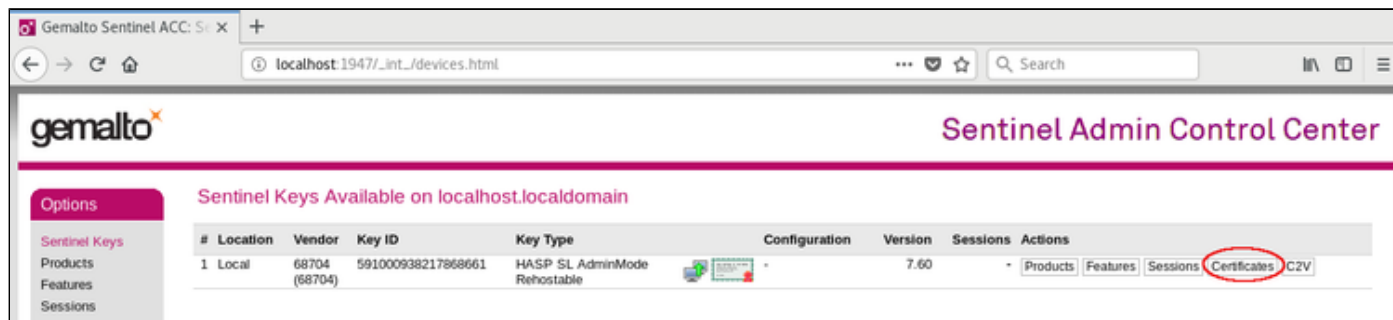3. Click on the **Certificates** button at the right side of the SL description:

**Old version** (showing a software license in cloned state):

**New version** (showing an active software license **and** a cloned software license):
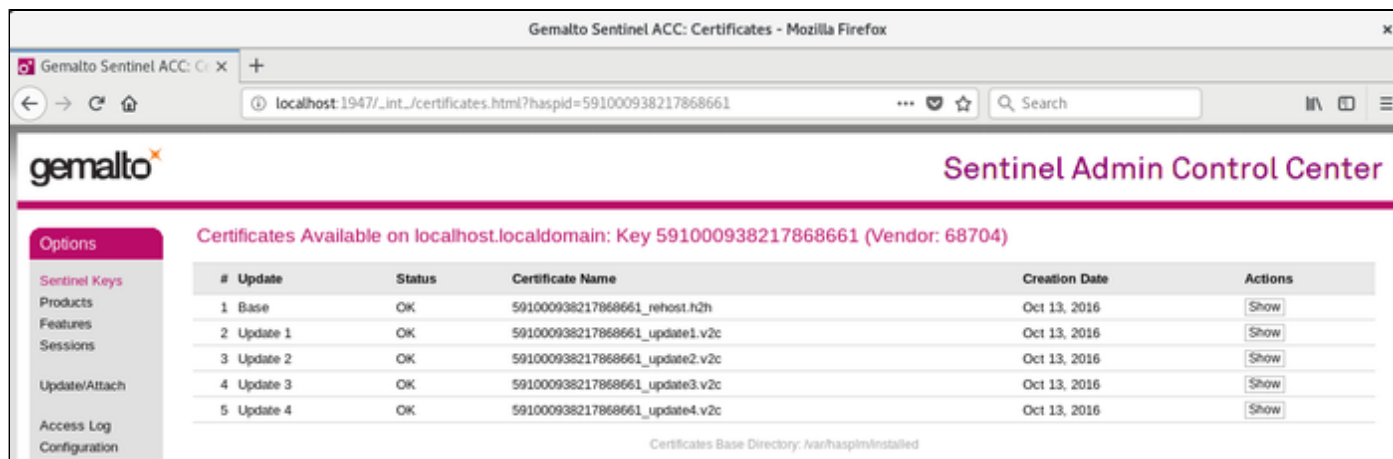




4. Note the name of the corresponding certificate file and the path to the certificates base directory as shown in the "Certificates" section:

Example using old ACC version:



**Please note:** the certificate display screen can look slightly different depending on the type of software license and the actions performed on this license in the past. The following example shows the certificates of a software license after several updates. The screenshot is based on Sentinel ACC version equal or higher than version 7.60.

5. **Remove the certificate file(s)** using operating system tools.

   a. In the first example above (Windows), there is one file to be removed. It is in *C:\Program Files (x86)\Common Files\SafeNet Sentinel\Sentinel LDK\installed\68704*.

   b. In the second example (Linux) there are several files created by a series of license updates. On Linux, the certificate files are typically stored in */var/hasplm/installed/68704/*.

   c. **All certificate files in the identified directory must be removed**.

6. After removing the certificate file, **restart the Sentinel license service** or reboot the system. To restart the service, proceed as follows:

   a. On Windows, restart the "**Sentinel LDK License Manager**" service (hasplms) either using the `services.msc` program or via a command line (as administrator) then enter the "`sc stop hasplms`" command followed by "`sc start hasplms`".
   **Important**: any running emulators will be stopped if the license service is forced to stop despite existing service dependencies (i.e., running emulators). So any running guest systems **must be cleanly shutdown** before restarting the license service in order to avoid data loss.

   b. On Red Hat Enterprise Linux 7.x and 8.x (and compatible Linux systems) restart the aksusbd service: # `systemctl restart aksusbd` This also will automatically restart the **hasplmd** service (separate service for this daemon was introduced in newer runtime driver versions).

   c. On Red Hat Enterprise Linux 6.x, restart the aksusbd service: # `service aksusbd restart`

7. Start the Sentinel ACC again to verify that the software license has been removed.

# Removing Access to Network Licenses from a System

There are three different ways to remove a network license. They have different implications and are described below:

## Full Removal of Network License

To completely remove a network license, follow the steps above for hardware or software licenses respectively. The steps must be performed on the license server.

**Please note**: this will remove the license for all emulator hosts on the network using this license and also for the local host. Make sure that this is in fact intended.

## Block Access of Remote Emulator Hosts to Network License

You can use the Sentinel Admin Control Center on the license server

- to **allow** access to a network license for all or specific hosts on the network, or
- to **block** access from remote hosts completely.

Please refer to the section *Controlling Access to Network License on Server Side* in *Installing a Network License* for more information.

## Block Access to Network Licenses on Client System

If access of the local system to network licenses is not desired, this can be disabled in the Sentinel ACC for certain products and product versions. Blocking access at the server side is the safer way.

Please refer to the section *Controlling Access to Network License on Client Side* in *Installing a Network License* for more information.