Charon Linux Toolkit V1.52 Users Guide

Contents

🌀 Purpose of this document

This document is the user's guide of the "Charon Linux Toolkit".

The Toolkit provides the following features:

- **Manage start/stop guests at server boot with services and customized shutdown commands**:
    - Automatic start of the guests (virtual machines) at Linux server boot
    - Clean shutdown of the guests at Charon server shutdown
    - Clean shutdown of one guest at will using customized shutdown scripts (using 'ssh', 'expect' or any customized tool)

- **Monitor the CHARON guests log file**
    - Alert on removal of the license dongle
    - Send alerts for all INFO, WARN and ERROR messages found (depending on the error level setting)

- **Alert on license approaching termination**
    - Number of days before expiration alert is sent can be customized

- **Provide menu driven options and command lines to**:
    - Start/stop guests
    - Connect to guests console
    - Display license contents, gather license content and update (send C2V and apply V2C files)
    - Send configuration and log files by email
    - Edit configuration files
    - Gather Charon server information: Hardware, Operating System, Storage, Network interfaces, Charon version, Utilities version

Introduction

Table of contents

Important note

This document applies to Linux Toolkit version 1.52

Kit download

To download the kit, you must issue a request via email to the Stromasys support team (support@stromasys.com) or ask your reseller

Prerequisites

- Basic knowledge of Unix commands

- Basic knowledge of Charon products

- Charon qualified versions:

	Charon-AXP V4.6 Build 166-03 (+ patches)
	Charon-AXP V4.7 Build 171-01 (+ patches)
	Charon-AXP V4.8 Build 183-02 (+ patches)
	Charon-AXP V4.9 Build 194-02
	Charon-AXP V4.10 Build 202-03
	Charon-VAX V4.6 Build 165-02 (+ patches)
	Charon-VAX V4.7 Build 171-01 (+ patches)
	Charon-VAX V4.8 Build 183-02 (+ patches)
	Charon-VAX V4.9 Build 194-02
	Charon-VAX V4.10 Build 202-03

- Scripts have been tested and validated on the following Linux distributions/versions:

	CentOS 7
	Red Hat Enterprise Linux Server release 6.x Red Hat Enterprise Linux Server release 7.x

- Some packages have to be installed on the Charon server:

    - Mandatory packages:
        - `glibc.i686`
        - `bc`
        - `perl`
        - `at`

    - Recommended packages:
        - `telnet` : recommended for connection from the Charon server to the virtual machine console
        - `expect` : recommended if `ssh` cannot be used to execute shutdown commands from the console
        - `evince` : recommended for reading online documentation
        - `postfix` : recommended, Mail Transport Agent used to send emails
        - `firefox` : recommended for checking and updating licenses, accessing online documentation

- All described operations will have to be performed on the Charon server and logged in as '**root**' (no other user supported).
  ⚠ The 'menu' must be used by one user at a time only

- Charon-AXP and Charon-VAX installations are supported when installed in `/opt/charon` folder only

- Mail service must have been configured. Mail transfer agent can be postfix, sendmail, ...

- ⚠ Within the Charon virtual machines configuration files:
    - do not use spaces or tabs between a parameter and its value as the toolkit does not handle this correctly, i.e.: `parameter=value` is correct, `parameter = value` is not correct.
    - do not add devices parameters on the same line, please split the line in 2 lines

Unsupported	`set PKA container[600]= "/home/vdisk/axp/ALPHA084.iso" media_type[600]="RRD47"`
Supported	`set PKA container[600]="/home/vdisk/axp/ALPHA084.iso"` `set PKA media_type[600]="RRD47"`

Note related to display/edit options

Some menu options will allow you to display or edit files using available editors (if installed) between:

Editor	Interface	Description
`gedit`	Graphical	Windows notepad like
`emacs`	Graphical	Windows notepad like, advanced
`nano`	Text	Basic text editor
`vi`	Text	Advanced users
`vim`	Text	Advanced users with more features (colored & highlights)
`gvim`	Graphical	Advanced users with more features (colored & highlights)

Select the one you prefer or refer to 'man pages' for more information on available ones.

Note related to emails

There are 2 kinds of emails:

Type	Description
Results	Some menu options will allow you to send results via email. • Example: license display, log and configuration files. • The recipient will then be unique
Alerts	By default, the alert script will send alerts via email (plus 'wall' notifications if enabled). A recipients list can be defined in this case. • Wall notification can be enabled/disabled from the menu • The alert script can be customized. You can for example use command lines linked to your monitoring software and disable emails.

ℹ️ Do not use Stromasys email address to send results directly, for example to support@stromasys.com. The sender will be unknown to us, it is then recommended to send results to yourself first and to forward us the email you received.

⚠️ Both use 'sendmail' command to send emails. Mail transfer agent can be postfix, sendmail, ...

About this guide

Table of contents

Obtaining documentation

The latest released version of this manual and other related documentation are available on the Stromasys support website at Product Documentation and Knowledge Base.

Obtaining technical assistance

Several support channels are available to cover the Charon virtualization products.

If you have a support contract with Stromasys, please visit http://www.stromasys.com/support/ for up-to-date support telephone numbers and business hours. Alternatively, the support center is available via email at support@stromasys.com.

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

For further information on purchases and the product best suited to your requirements, please contact your regional sales team:

Region	Email address	Phone	Address
Australasia-Pacific	apac.sales@stromasys.com	+852 3520 1030	Room 1113, 11/F, Leighton Centre 77 Leighton Road, Causeway Bay, Hong Kong, China
Americas	ams.sales@stromasys.com	+1 919 239 8450	2840 Plaza Place, Ste 450 Raleigh, NC 27612 U.S.A.
Europe, Middle-East and Africa	emea.sales@stromasys.com	+41 22 794 1070	Avenue Louis-Casai 84 5th Floor 1216 Cointrin Switzerland

Throughout the document(s) these conventions are followed

Notation	Description
$	The dollar sign in interactive examples indicates an operating system prompt for VMS. 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

Related documents

- Charon Linux Toolkit - Users guide for kits 1.52
- Charon Linux Toolkit - Release notes for Kit 1.52

🪁 Setup

Table of contents

Installation

The tools are provided in a tar file that must be extracted into the `/opt/charon/utils` folder.

- If the folder does not exist, by default created at Charon installation, create it and copy the tar file in this directory. In the example below, we assume the tar file was downloaded in the `/charon` folder:

```
# mkdir -p /opt/charon/utils
# cp /charon/charon_linux_toolkit.V1.52.tar /opt/charon/utils
```

- Extract the files from the tar file to the Charon installation directory, subdirectory 'utils'

```
# cd /opt/charon/utils
# tar -xf charon_linux_toolkit.V1.52.tar
```

- Execute the installation script:

```
# ./menusetup
```

- The setup will check first your terminal settings, if set to `VT100` you will not be able to continue until you set the `TERM` value to `VT200`, dtterm or xterm (see how to here: Configuration)

- Mandatory and recommended packages installation will be checked.
    - ⚠️ If some mandatory packages are missing you will not be able to continue.
    - ℹ️ If some recommended packages are missing, installation will continue. Installation of these packages can be done later if needed

- If '`telnet`' is installed, you will be prompted to force the mode to character to avoid some input issues while connected to the guests consoles

- The '`menu`', '`logtail`', '`logview`' and '`vmlist`' aliases will be created. They will be the commands you'll use to access the menu or to view virtual machines states and log files.

- Preferences can be defined during the setup or later, they are related to the default editors used with text and graphical user interfaces, Out Of Memory (OOM) Killer settings and continuous log view when starting a guest (virtual machine)

- Recurring jobs will be added in the `crontab` file:
    - if the `crontab` file does not exist, it will be automatically filled
    - if it already exists, you will be prompted to update it via the selected editor: a check will be performed and the missing entries will be added

- Alerts parameters will now have to be filled (see Alerts management chapter for more if needed)
    - Select between HTML or pure TEXT emails
    - Mail recipients list (used for alerts, not for sending files like log and configuration files for example)
    - Mail sender (can be used to change the displayed name of the sender)
    - Customize emails footer: if needed, add here your disclaimer, information on the CHARON server or any information you think useful
    - Enable/disable wall alert messages
    - Install or update the alert script. It can be customized later, in this case it is recommended to do this once the virtual machines are installed
    - Select the alert level from guests log files: 0 = none, 1 = informational+warning+error entries, 2 = warning+error entries (default), 3 = error entries only
    - View alerts if any
    - Enable or disable license expiration alerts from guests logs: 1 alert per hour if enabled, 1 (default) or more alerts per day as defined per the recursive jobs settings
    - The alerts simulator can be used to send all the know alerts via email (for checks)

Example:

```
STROMASYS - Virtualization Technologies                                V1.7
Alerts management


No   Parameter                              Current value(s)
__   _____                              _____

1 - Mail mode (text/html)                   HTML
2 - Mail recipients list                               @stromasys.com
3 - Mail sender (optional)                  Charon LTK Geneva Lab
4 - Create/Update alert mail footer         Stromasys Geneva Lab - gvaesx55b (212) -
5 - 'wall' alert messages                   Disabled
6 - Update/reinstall alert script           Installed (from example)
7 - Select guests log alert level           WARNING + ERROR
8 - View alerts history (0 alerts)          Last update: Wed 18-Apr-2018 12:21:21
9 - Lic. expiration alerts from guests      Disabled
    (for Charon-AXP & VAX < V4.9)
10- Alerts simulator
11- Hardware specs warning message          Enabled
12- Immediate alert on dongle removal       Enabled

Enter your choice ('q' to quit): 
```

- When the setup is completed either log out and login again to define the command aliases or execute the following command:

```
# . /etc/profile.d/charon_menu.sh
```

Upgrade

Except if mentioned in the release notes, an upgrade does not require the Charon virtual machines to be stopped

To upgrade the kit, you will need to:

- read the CHARON Linux Toolkit - Release notes for kit 1.52 document

- copy and extract the files from the tar file to the CHARON installation directory, subdirectory `utils`

```
# cd /opt/charon/utils
# tar -xf charon_linux_toolkit.V1.52.tar
```

- To install newly defined aliases (logtail, logview, vmlist, ...), please run the following command:

```
# cd /opt/charon/utils (if not already done)
# ./menusetup -a
```

then either logout or execute the following command for the changes to take effect:

```
# . /etc/profile.d/charon_menu.sh
```

You can then run the 'menu' command as usual

In case of upgrade from a kit older than 41 on a CentOS 7 or Red Hat Enterprise Linux 7.x system, you must first stop all services, including the virtual machines running, and remove the services that were defined using the previous method as described below:

1. List installed services

```
# chkconfig --list | grep charon

charon_gstart     0:off    1:off    2:off    3:on    4:on    5:on    6:off

charon_logchk     0:off    1:off    2:off    3:on    4:on    5:on    6:off
```

2. Remove installed services

```
# chkconfig --del charon_gstart

# chkconfig --del charon_logchk
```

Once these services are removed, you can perform a standard kit upgrade

Services will have to be redefined or updated from the 'menu', they will then use the 'systemd' features

Menu options

Table of Contents

Menu launcher

Execute the following command:

```
# menu
```

to display the Toolkit menu:

```
                STROMASYS - Legacy server emulation
                   Charon Linux Toolkit V1.52
Charon installation
  1 - Install/Upgrade/Remove Charon
  2 - Network Configuration Utility (ncu)
License management
  3 - HASP license details
  4 - Sentinel Admin Control Center (firefox)
  5 - License driver management (aksusbd)
  6 - Request for new license or license update (send C2V file)
  7 - License update tool (apply V2C file)
  8 - License expiration check
Virtual Machines (guests)
  9 - VM Management (add/remove VM, start, stop, console connection, ...)
 10 - Manage monitored guests logs
 11 - Send configuration and log files via email
Miscellaneous
 12 - Preferences
 13 - Manage recurring jobs: license expiration check, log events, etc... (cron)
 14 - Alerts management
 15 + Show host information (OS, HW, Charon version, utilities and services)
 16 + Documentation

Enter your choice ('q' to quit): █
```

Configuration

If the menu does not correctly display line drawing, change the terminal settings. If set to vt100 for example, you will see lowercase characters in place of menu borders.

To correct this, enter the following commands:

```
# echo $TERM
vt100
# TERM=vt200
# export TERM
# menu
```

Notes:

- New TERM value can also be set to `xterm`
- 🟡 Starting with version 1.48, it is possible to disable line drawing (semi-graphics) from the preferences menu
- If you're using putty, you'll maybe have to force the **Terminal-type string**:
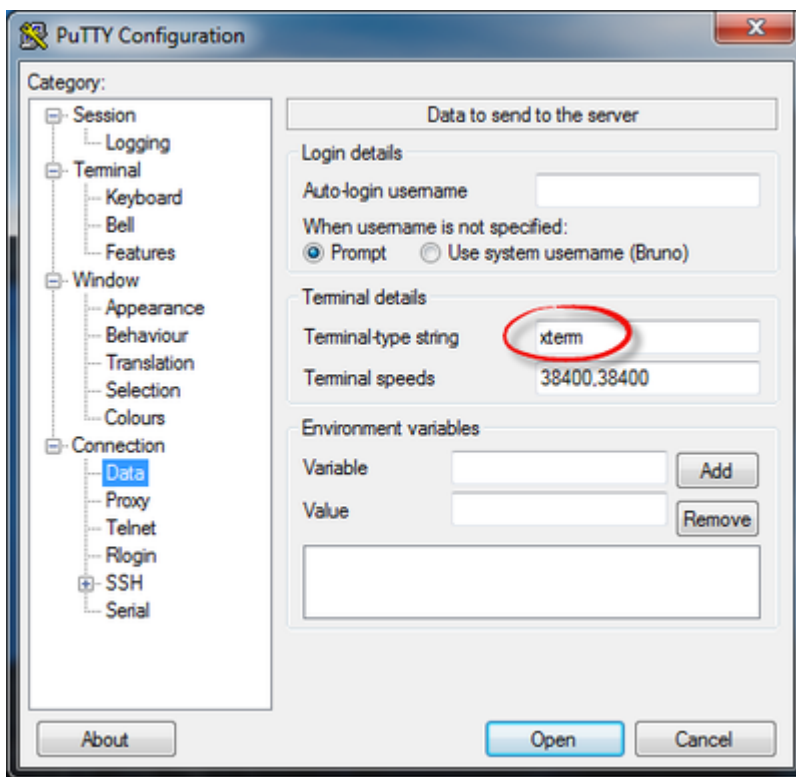
and maybe **Remote character set** parameter:
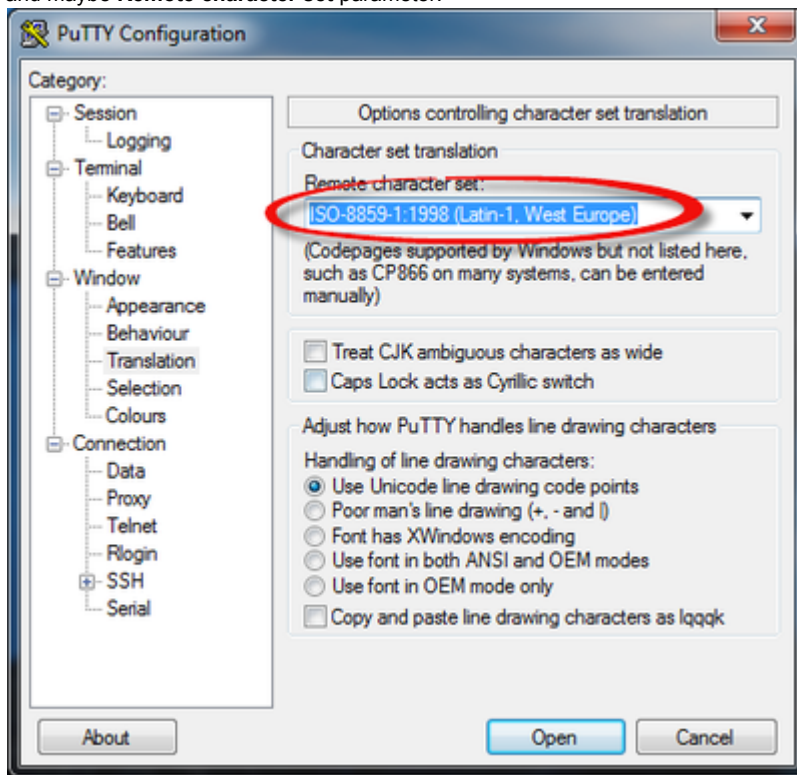
💡 If you have issues with some characters that are not displayed correctly, please see this article: Cannot get correct line drawing on Linux/UNIX with Putty

Recommended color scheme for '`putty`' is (all other values can remain as they are by default):

Color to adjust	Red	Green	Blue
Default Foreground	0	0	0
Default Foreground Bold	0	0	160
Default Background	255	255	255
Default Background Bold	192	192	192
ANSI White	223	223	223

Menu Options

- Install/Upgrade/Remove Charon
- Network Configuration Utility
- HASP license details
- Sentinel Admin Control Center
- License driver management (aksusbd)
- Request for New or Update license (send C2V file)
- License update tool (apply V2C file)
- License expiration check
- VM Management (add/remove VM, start, stop, console connection, ...)
    - VM management - Update guests list
    - VM management - Start/stop guests
    - VM management - View guest log file
    - VM management - Install, update or manage service
    - VM management - Create/Edit guest stop script
    - VM management - Connect to guest console
    - VM management - Edit configuration files
    - VM management - Create/Edit guest pre-start script
- Manage monitored guests logs
- Send configuration and log files via mail
- Preferences
- Manage recurring jobs: license expiration check, log events (cron)
- Alerts management
- Show host information (OS, HW, Charon version, utils and services)
- Documentation

Install/Upgrade/Remove Charon

Table of contents

Description

This option helps in installing and uninstalling Charon. You have to provide the .tar.gz file (kit) location, the .tar file if it has been unzipped or the folder where the kit was unzipped and extracted, the tool will install all packages. You can also provide a software license kit location if any, .tar or folder, the script will also perform the setup.

💡 It is recommended to locate all Charon kits in the same folder as this menu will remind the last folder you used in the previous session (if not, you will be prompted to select the folder)

Notes:

- .tar.gz kit files will be uncompressed automatically
- .tar files will be removed once extracted into their destination folder
- If the kit is provided with a .md5sum file and this file is present in the same folder as the kit, the md5sum check will be automatically performed.
- To display the options available, type "?" and press enter:

```
Enter:
  i       - to install or upgrade
  u       - to uninstall (available if a product is at least installed)
  r       - to reload the screen (refresh)
  s       - to install/uninstall Software license provided as a kit
  clean   - to remove all installed CHARON products
  q       - to quit
  ? or h  - to display this message
```

- ℹ️ To upgrade Charon-AXP or Charon-VAX, you will need to stop the running virtual machines (AXP and VAX), uninstall the current version and install the new one.
  - If you only upgrade the Charon Linux Toolkit, you will not have to stop the running virtual machines except if notified in the Release notes document.
- ⚠️ To remove Charon-AXP or Charon-VAX, you must ensure there is no running virtual machine related to the product
- The installation log will be stored in the `/opt/Charon/log` folder with names `yum.install.<date>` (name is given at the end of the installation process)

Fresh Charon installation example

Context:

- Operating system used is Red Hat Enterprise Linux 7.7
- We will install Charon-AXP V4.10 Build 202-03
- License key is based on USB dongle
- We assume Charon kits have been downloaded to the `/charon` folder

Example:

```
[root@rhel70 charon]# ls -l charon*4.10*
-rw-r-----. 1 root root 83155031 Sep 10 11:12 charon-axp-4.10-20203.el74.tar.gz
-rw-r--r--. 1 root root       68 Sep 10 11:12 charon-axp-4.10-20203.el74.tar.gz.md5sum
-rw-r-----. 1 root root 59572096 Sep 10 11:12 charon-vax-4.10-20203.el74.tar.gz
-rw-r--r--. 1 root root       68 Sep 10 11:12 charon-vax-4.10-20203.el74.tar.gz.md5sum
```

For a fresh installation the setup does not know where you use to store the Charon kits so enter the kit location (**2**) and select the kit you want to install (**3**):

```
┌STROMASYS - Legacy server emulation─────────────────────────────V2.11─┐
│  Install/Upgrade/Remove CHARON                                       │
│                                                                      │
│ Hostname:            rhel70.stromasys.com                            │
│ Linux version:       Red Hat Enterprise Linux Server release 7.7 (Maipo) │
│                      Linux 3.10.0-957.21.3.el7.x86_64                │
│                                                                      │
│ Installed packages                                                   │
│ - License driver:    Not installed or Software license               │
│ - Base products:     No one installed                                │
│                                                                      │
│ Note: If you perform an upgrade uninstall the current build first    │
│                                                                      │
│ Enter your choice (i/r/s/q/?): i      ◖ 1                            │
│                                                                      │
│ Enter kit location (folder), . for current folder, q to quit        │
│ [/charon] :           2                                              │
│                                                                      │
│ Searching for complete packs in /charon ...                          │
│ Done.                                                                │
│                                                                      │
│                                                                      │
│ No  Product              Version Build  Installed Container  md5sum  │
│ ──  ───────              ─────── ─────  ───────── ─────────  ──────  │
│   1 charon-axp               4.7  17113 no        folder      -      │
│   2 charon-vax               4.7  17113 -         tar.gz      OK     │
│ ────────────────────────────────────────────────────────────────   │
│   3 charon-axp               4.8  18309 -         tar.gz      OK     │
│   4 charon-vax               4.8  18309 -         tar.gz      OK     │
│ ────────────────────────────────────────────────────────────────   │
│   5 charon-axp               4.9  19408 no        folder      -      │
│   6 charon-vax               4.9  19408 no        folder      -      │
│ ────────────────────────────────────────────────────────────────   │
│   7 charon-axp              4.10  20203 -         tar.gz      OK     │
│   8 charon-vax              4.10  20203 -         tar.gz      OK     │
│                                                                      │
│ Select the kit you want to use (q to quit): 7    3                   │
└──────────────────────────────────────────────────────────────────────┘
```

The kit will then be unzipped, extracted and installed.

```
┌──────────────────────────────────────────────────────────────────────┐
│ Checking charon-axp-4.10-20203.el74.tar.gz file (md5sum) ...         │
│ Success. ✔                                                           │
│ Unzipping file...                                                    │
│ Extracting tar file...                                               │
│ Done.                                                                │
│ Removing tar file...                                                 │
│                                                                      │
│                                                                      │
│ Notes: - Starting with V4.6 B16603, if you're installing both       │
│           CHARON-AXP and CHARON-VAX, they must be the same build number │
│                                                                      │
│                                                                      │
│ Loaded plugins: langpacks, product-id, search-disabled-repos, subscription- │
│              : manager                                               │
│ Examining aksusbd-7.63-1.i386.rpm: aksusbd-7.63-1.i386              │
│ Marking aksusbd-7.63-1.i386.rpm to be installed                     │
│ Examining charon-axp-4.10-20203.el74.x86_64.rpm: charon-axp-4.10-20203.x86_64 │
│ Marking charon-axp-4.10-20203.el74.x86_64.rpm to be installed       │
│ Examining charon-license-4.10-20203.el74.x86_64.rpm: charon-license-4.10-20203.x │
│ 86_64                                                                │
│ Marking charon-license-4.10-20203.el74.x86_64.rpm to be installed   │
│ Examining charon-mtd-4.10-20203.el74.x86_64.rpm: charon-mtd-4.10-20203.x86_64 │
│ Marking charon-mtd-4.10-20203.el74.x86_64.rpm to be installed       │
│ Examining charon-utils-4.10-20203.el74.x86_64.rpm: charon-utils-4.10-20203.x86_6 │
│ 4                                                                    │
│ Marking charon-utils-4.10-20203.el74.x86_64.rpm to be installed     │
│ Resolving Dependencies                                               │
└──────────────────────────────────────────────────────────────────────┘
```

...

```
  Verifying   : charon-axp-4.10-20203.x86_64                                    4/5
  Verifying   : charon-mtd-4.10-20203.x86_64                                    5/5

Installed:
  aksusbd.i386 0:7.63-1                        charon-axp.x86_64 0:4.10-20203
  charon-license.x86_64 0:4.10-20203          charon-mtd.x86_64 0:4.10-20203
  charon-utils.x86_64 0:4.10-20203

Complete!
 Installation completed (error code 0)

Output saved to /opt/charon/log/yum.install.20190910_111951
```

Charon-AXP is now installed as shown below:

```
 STROMASYS - Legacy server emulation                              V2.11
   Install/Upgrade/Remove CHARON


Hostname:              rhel70.stromasys.com
Linux version:         Red Hat Enterprise Linux Server release 7.7 (Maipo)
                       Linux 3.10.0-957.21.3.el7.x86_64

Installed packages
- License driver:      aksusbd-7.63-1.i386
- Base products:       charon-axp V4.10 B20203  ✔
- Packages :           axp/4.10 license/4.10 mtd/4.10 utils/4.10

Note: If you perform an upgrade uninstall the current build first

Enter your choice (i/u/r/s/q/?): q
```

Charon upgrade installation

To upgrade a Charon product version or to install patches, please refer to the appropriate release notes first.

- All running virtual machines have to be shutdown before upgrade
- Upgrading to a new version requires all previous versions to be uninstalled

Installation of Charon-AXP and Charon-VAX on the same Linux server

Starting with build 16803, if you install Charon-AXP and Charon-VAX on the same server, they must be the same build

Context:

- Operating system used is Red Hat Enterprise Linux 7.7
- We will install Charon-VAX V4.10 Build 202-03 on a server where Charon-AXP V4.10 Build 202-03 is already installed
- We assume the kits have been downloaded to the `/charon` folder

Execute the "`menu`" command and select option 1 and ensure the already installed Charon-AXP build matches the Charon-VAX:

```
┌─STROMASYS - Legacy server emulation────────────────────────────────V2.11─┐
│ Install/Upgrade/Remove CHARON                                            │
└──────────────────────────────────────────────────────────────────────────┘

Hostname:          rhel70.stromasys.com
Linux version:     Red Hat Enterprise Linux Server release 7.7 (Maipo)
                   Linux 3.10.0-957.21.3.el7.x86_64

Installed packages
- License driver:   aksusbd-7.63-1.i386
- Base products:    charon-axp V4.10 B20203
- Packages :        axp/4.10 license/4.10 mtd/4.10 utils/4.10

Note: If you perform an upgrade uninstall the current build first

Enter your choice (i/u/r/s/q/?): i      1

Enter kit location (folder), . for current folder, q to quit
[/charon] :       2

Searching for complete packs in /charon ...
Done.


No  Product              Version Build  Installed Container  md5sum
    ───────────────────  ─────── ─────  ───────── ─────────  ──────
  1 charon-axp              4.7   17113  no        folder     -
  2 charon-vax              4.7   17113  -         tar.gz     OK

  3 charon-axp              4.8   18309  -         tar.gz     OK
  4 charon-vax              4.8   18309  -         tar.gz     OK

  5 charon-axp              4.9   19408  no        folder     -
  6 charon-vax              4.9   19408  no        folder     -

  7 charon-axp              4.10  20203  yes       folder     -
  8 charon-vax              4.10  20203  -         tar.gz     OK

Select the kit you want to use (q to quit): 8      3
```

ℹ (**2**): The program remembers the folder (container) where you stored the kit during previous installation so just press enter.

Charon-VAX installation begins. Once completed, the installed packages are listed:

```
┌─STROMASYS - Legacy server emulation─────────────────────V2.11─┐
│  Install/Upgrade/Remove CHARON                                │
└───────────────────────────────────────────────────────────────┘
Hostname:           rhel70.stromasys.com
Linux version:      Red Hat Enterprise Linux Server release 7.7 (Maipo)
                    Linux 3.10.0-957.21.3.el7.x86_64

Installed packages
- License driver:   aksusbd-7.63-1.i386
- Base products:    charon-axp V4.10 B20203
                    charon-vax V4.10 B20203  ✔
- Packages :        axp/4.10 license/4.10 mtd/4.10 utils/4.10 vax/4.10


Note: If you perform an upgrade uninstall the current build first

Enter your choice (i/u/r/s/q/?): ▯
```

Network Configuration Utility

Table of contents

Description

Executes the "Network Configuration Utility" (`ncu`) if installed (Linux distribution/version and Charon product version dependent).

Refer to the corresponding Charon product version documentation for more information on '`ncu`' ("Installation" chapter then "Configuration with NCU utility")

Example

One network adapter, "eno50332216" is dedicated to Charon:

```
┌─STROMASYS - Virtualization Technologies──────────────────────V1.1──┐
│ Network Configuration Utility                                      │
│                                                                    │
└────────────────────────────────────────────────────────────────────┘

CHARON Network Configuration Utility, STROMASYS (c) 2016 Version 1.6

Interfaces         Dedicated to        State
----------         ------------        -----
virbr0             host                connected to host
eno16777736        host                connected to host
eno67109440        host                connected to host
eno50332216        CHARON              unmanaged by host
lo                 host                unmanaged by host
virbr0-nic         bridge              unmanaged by bridge
====================================================================
bridge name     bridge id              STP enabled     interfaces
====================================================================
virbr0  8000.525400aa3ad4         yes               virbr0-nic
====================================================================
 select action:
1 - Dedicate to CHARON
2 - Release to host
3 - Create Bridge with TAPs
4 - Remove Bridge
5 - Add VLAN                (disabled, because vlan control package is not found
)
6 - Remove VLAN            (disabled, because vlan control package is not found
)
7 - Print status
8 - Exit
:>█
```

HASP license details

Description

Displays the license content and optionally can be used to send the license content, human readable format, via email.

💡 It will work even if you are logged in via 'ssh' . See CHARON on Linux - Cannot get license information or run guests over ssh for more information.

ℹ️ Licenses descriptions (usage, location, etc...) can be added to the display list by manually creating the following file: /opt/charon/utils/charon_licenses.list

This optional file must contain the license number followed by a description and an ANSI color code (see "# man terminfo" and search for "Color Handling"), each parameter separated by a semicolon. One line per license.

Example: We describe here the licenses 1000.800 as "Main license (path 3/0)" with a green color (ANSI code 2) and 1000.806 as "Backup license (path 3/1)" with a magenta color (ANSI code 5)

```
# cat /opt/charon/utils/charon_licenses.list
1000.800;Main license (path 3/0);2
1000.806;Backup license (path 3/1);5
```

Example

Once the file is generated, you'll either be prompted to select the editor you want to use or the editor will be opened automatically is you did setup your preferences.
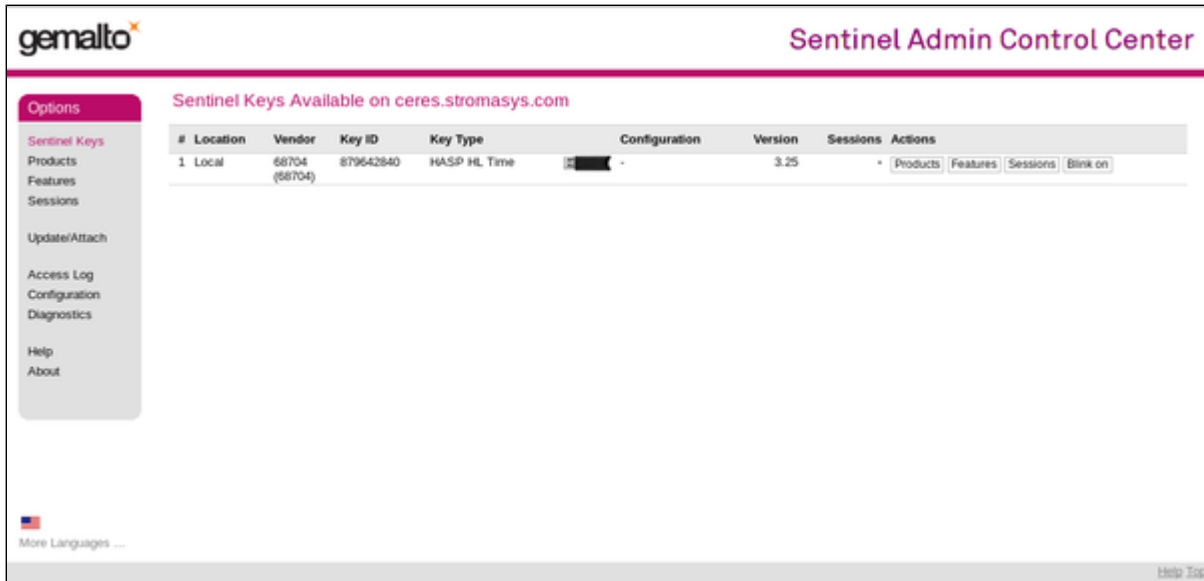

ℹ️ If you decide to send the result via email, you will receive one with subject: "[CHARON] View license HASP_SRM_VIEW"

Sentinel Admin Control Center

Description

Opens the Sentinel Admin Control Center (localhost:1947) with firefox.

Example

License driver management (aksusbd)

Description

Displays the license driver service status and gives the option to restart it if needed.

Example

```
┌STROMASYS - Legacy server emulation───────────────────────────V1.1─┐
│ License driver management (aksusbd)                               │
│                                                                   │
└───────────────────────────────────────────────────────────────────┘

HASP dongles connected:
Bus 003 Device 015: ID 0529:0001 Aladdin Knowledge Systems HASP copy protection
dongle
  idProduct              0x0001 HASP copy protection dongle
  iProduct                    2 HASP HL 3.25

Driver service status:
● aksusbd.service - LSB: Sentinel LDK RTE
   Loaded: loaded (/etc/rc.d/init.d/aksusbd; bad; vendor preset: disabled)
   Active: active (running) since Tue 2019-06-04 18:00:05 CEST; 4 weeks 0 days a
go
     Docs: man:systemd-sysv-generator(8)
    Tasks: 10
   CGroup: /system.slice/aksusbd.service
           ├─119791 /usr/sbin/aksusbd
           ├─119803 /usr/sbin/winehasp
           └─119831 /usr/sbin/hasplmd -s

Do you want to restart the service (y/n) ?
```

Request for New or Update license (send C2V file)

Description

Creates a C2V (Customer to Vendor) file to be sent to Stromasys in order to update a license.

💡 Send it first to yourself and not directly to Stromasys as mentioned in the Note related to emails

Notes:

- If the installed Charon-AXP or Charon-VAX version has the `hasp_srm_view` executable allowing the generation of C2V file per KeyId, the C2V files for all attached licenses will be created (use of `-c2v` combined with `-key` parameter)
- If the version of `hasp_srm_view` does not contain this functionality, a C2V file will be created the 1st detected license only.

Example

```
STROMASYS - Virtualization Technologies                    V1.9
Request for new license or license update (send C2V file)


Collect information to:
1 - Update a license (dongles detected: 2)
2 - Generate a Software License (fingerprint)

Enter your choice (q to quit) : 1        1

License numbers:   1000.800 1000.806

Please wait, generating C2V file for license 1000.800......
Please wait, generating C2V file for license 1000.806......

C2V file generated:   /tmp/1000.800_20180419_095349.c2v /tmp/1000.806_20180419_09
5404.c2v

Do you want to send file via mail (y/n) ? y        2

Enter the email recipient (q to quit) [          @stromasys.com]:        3

Sending mail to          @stromasys.com...
  adding: 1000.800_20180419_095349.c2v (deflated 55%)
  adding: 1000.806_20180419_095404.c2v (deflated 59%)
Done.
```

Enter the email recipient or press enter to use the latest recipient entered from any other menu option that sends emails.

You will then receive an email with subject: "[CHARON] C2V file / HASP License" or "[CHARON] C2V file / Collect for Software License" if option 2 was used.

License update tool (apply V2C file)

Table of contents

Description

License update with GUI or CUI. Opens Firefox Web browser (Graphical User Interface) in order to apply the V2C (Vendor to Customer) file received from Stromasys or if the 'hasp_update' executable file is present, coming from the Charon kit (starting with V4.6) or from a provided HASP SL (Software License) runtime package, allows you to apply updates from a Character User Interface.

Using Graphical User Interface (GUI)

Select option 1 from the menu:

and click on the Browse button to select and apply the V2C files:

⚠ In case of update, install the `_fmt.v2c` file first (_fmt = format)

Using Character User Interface (CUI)

Select option 2 from the menu:
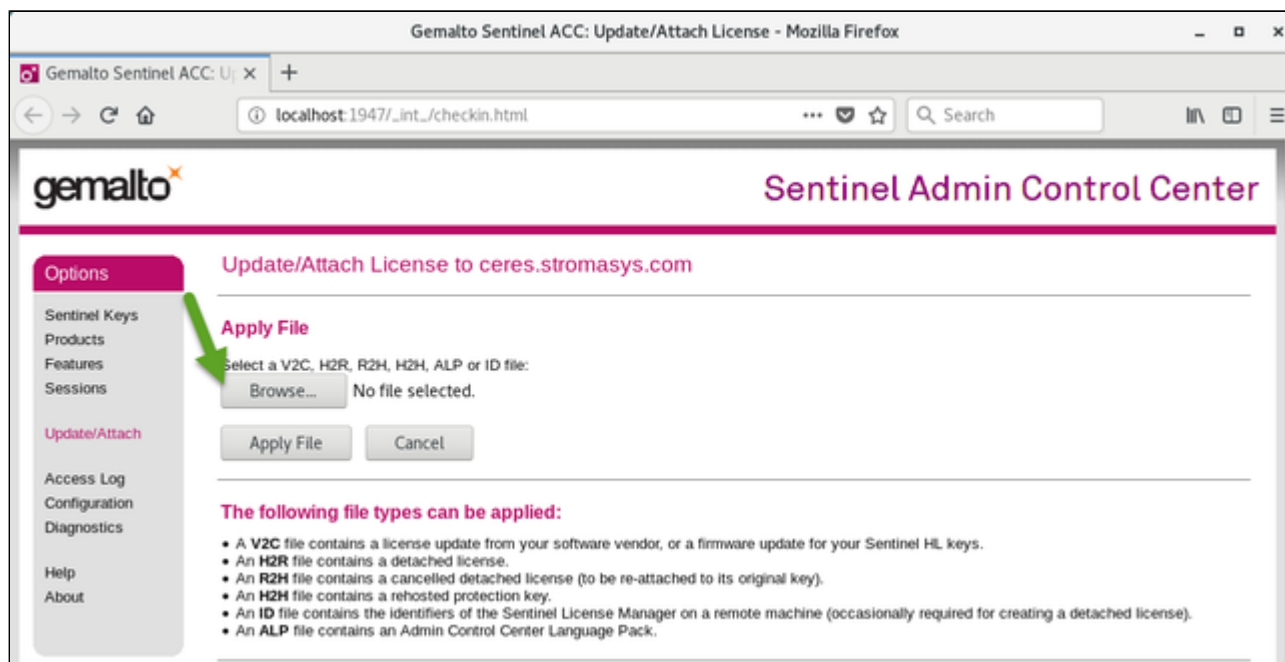
```
STROMASYS - Virtualization Technologies                    V1.3
License update tool (apply V2C file)


1 - Use Firefox for license update/install (GUI)
2 - Use the Character User Interface (CUI)
q - quit

Enter your choice: 2
```

If not already done, specify the container (folder) where the .v2c files are stored.

⚠ The specified folder must already exist. In the example below, the "# **mkdir -p** /charon/licenses" command was used to create the container

Example:

```
STROMASYS - Virtualization Technologies                    V1.3
License update tool (apply V2C file)


 Available options
1 - Install or update license
2 - Set license files folder
q - Quit

Enter your choice: 2      1

Enter the folder name [] (q to quit): /charon/licenses   2
```

Example:

```
┌─STROMASYS - Virtualization Technologies────────────────────────────V1.3─┐
│ License update tool (apply V2C file)                                    │
└─────────────────────────────────────────────────────────────────────────┘


 Available options
1 - Install or update license
2 - Change license files folder [/charon/licenses]
q - Quit


Enter your choice: 1                    ①
 Available license files
  1 - 0028_1000.800_18-Oct-2017_fmt.v2c
  2 - 0028_1000.800_18-Oct-2017.v2c
  3 - 0030_1000.800_03-Oct-2018_fmt.v2c
  4 - 0030_1000.800_03-Oct-2018.v2c
  5 - 0031_1000.800_14-Apr-2018_fmt.v2c
  6 - 0031_1000.800_14-Apr-2018.v2c
  7 - 0032_1000.800_17-Oct-2018_fmt.v2c
  8 - 0032_1000.800_17-Oct-2018.v2c          Files are sorted by
  9 - 0016_1000.806_720_fmt.v2c             license number then
 10 - 0016_1000.806_720.v2c                 sequence number
 11 - 0017_1000.806_360_fmt.v2c             and then  type (_fmt
 12 - 0017_1000.806_360.v2c                       first)
 13 - 0019_1000.806_4320_fmt.v2c
 14 - 0019_1000.806_4320.v2c
 15 - 0021_1000.806_4320_fmt.v2c
 16 - 0021_1000.806_4320.v2c
 17 - 0022_1000.806_4320_fmt.v2c
 18 - 0022_1000.806_4320.v2c

Note: To update a license, please install the '_fmt' file first.

Multiple selections available / comma or blank separated
Enter your choice (q to quit) : 7 8      ②

Error codes explanations::
- Code 18 means the dongle is not connected
- Code 55 means you tried to apply a V2C file with an update counter that
  is out of sequence with update counter in the Sentinel protection key
- Code 65 means the (software) license has already been applied

Applying 0032_1000.800_17-Oct-2018_fmt.v2c ...
```

The license updates will be applied in the order specified.

Common errors codes translations are displayed. If the error code is not listed here, please have a look at this article: hasp_update utility returns error message (if the code is not listed in this page, please contact our support)

License expiration check

Description

Checks the license expiration interactively. This check is also performed automatically, by default everyday at 09:00 AM, and starts sending alerts 15 days before expiration. See Manage recursive jobs: license expiration check, log events (cron) for more and customization.

Alert levels are defined as follows:

Days before expiration (date limited license)	Hours before expiration (time limited license)	Alert Level
More than 7	More than 72 hours	INFORMATIONAL
Between 4 and 7	Between 49 and 72 hours	MINOR
Between 2 and 3	Between 25 and 48 hours	MAJOR
Less than 2	Between 0 and 24 hours	CRITICAL
< 0	0 hours and 0 minutes	EXPIRED

Example

```
STROMASYS - Legacy server emulation                           V1.18
  License expiration check


Product Name                          Expiration      Vers. AlertLvl
_____  _____      _____ _____
License: 1003415 (USB) KeyID: 1234352905  Main license
CHARON-AXP                                21-Nov-2019     4.10 -
CHARON-VAX                                21-Nov-2019     4.10 -
CHARON-AXP/SMA VAR all Signatures for Windows 21-Nov-2019  2.3 -
CHARON-SSP/4M, CHARON-SSP/4U, CHARON-SSP/4U+  21-Nov-2019  3.1 -

License: 1003751 (USB) KeyID: 1286618818  Backup license
CHARON-AXP                                17-Oct-2019     4.10 -
CHARON-VAX                                17-Oct-2019     4.10 -
CHARON-AXP/SMA VAR all Signatures for Windows 17-Oct-2019  2.3 -
CHARON-SSP/4M, CHARON-SSP/4U, CHARON-SSP/4U+  17-Oct-2019  3.1 -
CHARON-HPA/A400                           17-Oct-2019     1.0 -
```

Command line parameters

The script can be executed in command line or from the crontab (see: Manage recurring jobs: license expiration check, log events (cron)) using the following command:

```
# /opt/charon/utils/charon_expchk
```

Some parameters are available:

- Number of days before the license expires that will generate an alert → specify a number of days (default = 7)
- Prevent from sending default email → `-nomail` . This option is useful when a custom script is created to send alerts (see further)
- Force the expiration date for debugging → `-expdat=<DD-MMM-YYYY>` where DD = day of the month, MMM = month (3 characters, 1st letter uppercase), YYYY = year

Example:

```
# /opt/charon/utils/charon_expchk 15 -nomail -expdat=13-Jul-2019
```

Custom alert script

A customer script can be created to send alerts for example when a monitoring software is installed.

The script has to be created in /opt/charon/utils folder and named charon_expchk.custom with "execute" permission.

It is invoked for each product and has the following parameters:

- $1 = level that can be (case sensitive): Informational, Minor, MAJOR, CRITITAL, EXPIRED or NEUTRAL
    - **Note**: NEUTRAL is sent when no alert is detected, used to send counter alert.
- $2 = message starting with ":" followed by the license expiration date, the license number and the product.
    - **Example**: : 13-Jul-2019. License: 1003415. Product: CHARON-AXP

Script example using Zabbix software:

/opt/charon/utils/charon_expchk.custom

```sh
#!/bin/sh
#-----------------------------------------------------------------------------
# charon_expchk.custom
#-----------------------------------------------------------------------------
ZABSEND=/usr/bin/zabbix_sender
ZABCONF=/etc/zabbix/zabbix_agentd.conf

if test -x ${ZABSEND}
then
  if test -s ${ZABCONF}
  then
    case "$1"
    in
      Informational)   LVL="INFORMATION";;
      Minor)           LVL="WARNING";;
      MAJOR)           LVL="AVERAGE";;
      CRITICAL)        LVL="HIGH";;
      EXPIRED)         LVL="DISASTER";;
      *)               LVL="NEUTRAL";;
    esac
    ${ZABSEND} -c ${ZABCONF} -k charon_expchk -o "${LVL};$2" >/dev/null
  else
    echo "The Zabbix agent configuration file is missing. Cannot send alert!"
  fi
fi
```

VM Management (add/remove VM, start, stop, console connection, ...)

Table of Contents

Description

Manages the Charon virtual machines (guests) defined as services, used to create, delete, start and stop virtual machines on user request or upon system request (Linux server boot & shutdown).

The service works with a guests list containing the emulator executable file name, configuration file and, optionally, the auto_boot on server startup parameter (⚠ at service level, not the same as SRM console level).

- **Startup**: the virtual machine is executed in detached mode (using '-d' parameter) and then requires the console to be set as virtual serial line.
  - Connection to the console will be performed using `telnet` on the defined localhost / port. This can also be performed using other utilities like `putty`. If there is more than one guest on the server, guests are started in parallel.
  - Before the guest starts, the network interfaces used will be checked and all the offload parameters will be set offline.

- **Shutdown**: a common shutdown script can be created for guests shutdown. See "Service management - Create/Edit guest stop script" for details.
  - If the script does not exist, the virtual machine process is killed without proper guest shutdown. This is the equivalent of a power off on Tru64 or OpenVMS side.
  - If the script exists, it executes the customer defined command lines to perform a proper shutdown (using 'ssh', 'rsh' or 'expect' for example). If the virtual machine process is still running after execution, the stop operation is considered as failed so for Linux systems not using `systemd` (Red Hat 6) the script must stop the emulator either by sending a "power off" at SRM prompt (AXP) or F6 key (VAX) with 'expect' or just by killing the process. For Linux systems using `systemd` (Red Hat 7 and CentOS 7), the process is killed by the system.
  - If there is more than one guest on the server, guests are stopped in sequential mode during server shutdown based on their order in the guests list. This order can be modified from the menu. ⚠ This is valid only for Linux systems not using `systemd` (Red Hat 6), for other systems, the services description files will have to be modified to add dependencies using `Before=` or `After=` for example. ℹ For more information, see manpages: # **man systemd.unit**

Menu description

- The first part of the menu displays **server information**: server boot time, number of CPUs and Memory Free / Total.
- This description is valid for all menu options displaying the virtual machines list and for the "`vmlist`" command line.
- The second part displays the **list of virtual machines** (guests) managed. Column details:

Column	Description
Emulator	Emulator used
Configuration File	Configuration file name (shortened)
CPU	Displays the number of CPUs by looking into configuration file settings (set n_of_cpus ...) first then using default value for the selected hardware. If no information is available, "-" is displayed instead. ⚠ The number of CPUs displayed does represent the number defined in the configuration file or the default number of cpus for this hardware model. The real number of CPUs the virtual machine owns depends on the CHARON server hardware limitations, CHARON licenses and also licenses on the virtual machine side (Tru64 or OpenVMS)
Memory	Displays the amount of memory defined in the configuration file (if defined). If no information is available, "-" is displayed instead.

State	• **For Red Hat Enterprise Linux 6.x** 　• can be either RUNNING, STARTING, STARTING/ALL (if all guests have been started at the same time), STOPPED. 　• If the guest is in STOPPED state, an additional information will be displayed: 　　• REQUESTED: the service has been stopped by user request or has not been started on Linux server boot due to boot parameter set to off 　　• FAILURE: the guest process failed • **For Red Hat Enterprise Linux 7.x and CentOS 7** (using both `systemd`) 　• can be either ACTIVE, ACTIVATING, INACTIVE, DEACTIVATING, FAILED or UNKNOWN 　• If the guest is in STOPPED state, an additional information will be displayed: 　　• REQUESTED: the service has been stopped by user request or has not been started on Linux server boot due to boot parameter set to off 　　• FAILURE: the guest process failed
OnBoot	Displays the automatic boot on server startup value, YES or NO. ⚠ This means the Charon virtual machine will be started. To automatically boot the virtual machine on startup, please refer to the Charon-AXP or Charon-VAX users guides and console settings.

- Depending on settings and virtual machine state, more information can be displayed
  - Auto-restart settings (feature managed by `systemd`, described here: How to restart Charon-VAX/AXP on Linux automatically on failure)
  - Service start and/or stop timeouts
  - Description (not available on Red Hat Enterprise Linux 6.x as it is defined in the `systemd` service)
  - Start/stop date
  - Stop script - Displays the status of the stop script used to perform a clean shutdown of the guest. Can be:
    - Not found: the script has not been created. ⚠ If not found, a service stop request will induce a kill of the emulator process
    - To customize: the script exists and a case line has been added for the specified configuration file. It must however be customized with some commands to perform a clean shutdown of the guest (OpenVMS or Tru64 virtual machine).
      - ℹ For more information and examples, see VM management - Create/Edit guest stop script
    - Case not set : the script exists but does not relate to the specified configuration file. This means it has either been created manually or initialized automatically by the menu and a new guest has been added after initialization.
    - [Using *XXX*] where *XXX* can be EXPECT, RSH or SSH: the script exists and a case line has been added for the specified configuration file and it uses the shutdown scripts provided with the kit
    - Customized : a customized script or command lines is/are used
  - Protected against Out Of Memory Killer (OOM Killer)
  - Pre-start script if defined (the 3 first lines are displayed)
  - Guest OS response (optional, see Service management - Create/Edit guest stop script / Optional guest display status script)
  - If the virtual machine is running and is using Charon-AXP or Charon-VAX version 4.9 minimum, the license status is displayed (license found, communication lost/restored, connection lost/application will stop, license expiration information)
  - Network Interfaces settings with some checks performed. A NIC displayed followed by a number between parenthesis means an issue has been discovered: (1)=NIC does not exist, (2)=NIC is not managed by ncu, (3)=NIC is already used, (4)=NIC has an IP address.

- The third part displays the available options that are detailed in the VM Management (add/remove VM, start, stop, console connection, ...)#Menuoptions chapter further.

Example

```
[root@rhel70 charon]# vmlist
Installed: Charon-AXP V4.10 B20203, Charon-VAX V4.10 B20203
Server boot: 19-Aug-2019 00:00   CPUs: 8   Memory(free/tot): 2.3G/7.6G (30%)


Emulator           Configuration File    Cpu Memory State                         OnBoot
_____

* as4100           pluto                   1    1G  ACTIVE                         NO
   Auto-restart:      on-failure after 30s, max 3 times in 600 seconds
   Service Timeouts: Stop=3min
   Description:       CHARON as4100/pluto - Tru64 V5.1B
   Stop script:      [Using SSH]
   Started:        [ Tue 2019-09-10 11:39:27 CEST PID=2824 Memory=4,244M
                     Protected against OOM Killer.
   Guest OS answer:  11:50 up 2 mins
   Log file:         /charon/logs/pluto.log
   License:        [ Found license key 1619329274, license number 1000.806
                     Event date/time: 10-Sep-2019 11:39:33
   Network:          EWA0/eno67109424

- ds20             myds20vms               2    2G  INACTIVE    REQUESTED          NO
   Service Timeouts: Start=3min Stop=3min
   Description:       CHARON ds20/myds20vms - OpenVMS 8.4
   Stop script:      [Using RSH]
   Stopped:          Fri 2019-08-30 10:52:52 CEST (success)
   Log file:         /charon/logs/myds20vms.log
   Network:          EWA0/charon-myds20 EWB0/charon-mvax4106

- vx4k106          mvax4106                1   128M INACTIVE    REQUESTED          NO
   Description:       CHARON vx4k106/mvax4106
   Stop script:      [Using EXPECT]
   Stopped:          Fri 2019-08-30 14:23:42 CEST (success)
   Log file:         /charon/mvax4106.log
   Network:          EZA0/charon-mvax4106(3)

Caption: (3)=NIC already used
```

Notes:

- The star besides the "as4100 / pluto" virtual machine means it has been started using the "`vmstart pluto`" command and next commands lines like `vmstop`, `vmcfg`, `vmconsole` will use this virtual machine if no other one is specified.
- Enabling auto restart on failure is managed by `systemd` (not available on Red Hat Enterprise Linux 6.X) and is described here: How to restart Charon-VAX/AXP on Linux automatically on failure.
- The guest OS response is based on an optional script performing an ssh connection to the Tru64 system. For more, see: VM management - Create/Edit guest stop script. If the guest OS response returns error code 255, this means Tru64 or OpenVMS system is not booted (still at SRM prompt).
- The caption at the end of the list tells us one network interface card is used by different virtual machines: here "myds20vms" and "mvax4106" use the same NIC charon-mvax4106 (this should not occur in a production environment)

Menu options

- VM management - Update guests list
- VM management - Start/stop guests
- VM management - View guest log file
- VM management - Install, update or manage service
- VM management - Create/Edit guest stop script
- VM management - Connect to guest console
- VM management - Edit configuration files
- VM management - Create/Edit guest pre-start script

VM management - Update guests list

Table of Contents

Description

Add, remove and enable/disable auto start virtual machines (guests) at server boot.

Add guest

Available emulated hardware is displayed based on installed packages. A list of available hardware emulators can be displayed based on the attached license by entering "v".

Select the emulator to add based on the "Available emulated hardware" list then enter the name of the configuration file previously created/edited (out of the menu) or clone (c) an existing one based on the list that can be displayed by entering "l".

Once cloned, the configuration file <u>must</u> be edited to change settings like disks, network interface(s), etc..

ⓘ Some checks are performed to verify the same network interface and same console ports are not already used, vdisk files if used exist or not, etc...
⚠ This does not guarantee the configuration file is correct. Please refer to the corresponding CHARON product and version for configuration file details.

Once added, the guest can be started directly.

ⓘ If the Charon log monitoring (global) option is set to enabled (default) in the preferences, the log monitoring service is created automatically when creating a virtual machine from menu option VM Management (add/remove VM, start, stop, console connection, ...).

Example: Red Hat Enterprise Linux 7.5 server with Charon-AXP V4.9 installed

We are now going to update the guests list and add a virtual machine:

```
Server boot: 18-Apr-2018 00:00  CPUs: 8  Memory(free/tot): 5.7G/7.6G (74%)

Emulator         Config File     Cpu Mem  State                Stop script     B
_____        _____     ___ ___  _____                _____     _
None.

Available options
_____

1 - Add guest  ◄
2 - Remove guest
3 - Enable/Disable start at server boot
4 - Edit guests list (for stop order)
q - quit

Enter your choice: 1  ◄
```

An AlphaServer 4100 (**1**) will be added by cloning the as4100 configuration file template (**2** & **3**) to the `/charon/pluto.cfg` (**4** & **5**):

```
Available emulated hardware
_____

as1000 as1000a as1200 as2000 as2100 as400 as4000 as4100 as800 ds10 ds10l ds15 ds
20 ds25 es40 es45 gs160 gs320 gs80 mv3k196 mv3k198 mv3k6 mv3k9 mvii vs4k90 vx3k6
 vx3k6_128 vx3k6_512 vx3k9 vx3k9_128 vx3k9_512 vx4k106 vx4k108 vx4k700 vx4k705 v
x6k310 vx6k610 vx6k620 vx6k630 vx6k640 vx6k650 vx6k660

Select virtual HW model, license conditionned
(v to view HW on license key, q to quit): as4100 ◄ 1

Virtual Hardware selected: CHARON-AXP, Version 4.9 (Build 19103)

Configuration file selection
_____

Please enter the configuration file full path or:
- 'l' to list available ones in the default directory
- 'c' to clone an existing file or template
- 'q' to quit
Your choice: c ◄ 2


Enter source file (q to quit) : /opt/charon/cfg/as4100.cfg.template ◄ 3
Last modified on Feb 16 10:11

Enter target file (q to quit) : /charon/pluto.cfg ◄ 4

Please confirm (y/n) ? y ◄ 5
```

💡 Use the 'l' option to list available configuration files and templates

Once the clone is completed, we can leave the clone utility (**1** & **2** below) then use (**3**) and customize the newly created file:

```
Copying '/opt/charon/cfg/as4100.cfg.template' to '/charon/pluto.cfg' ...
Done.

Enter target file (q to quit) : q          1

Enter source file (q to quit) : q          2

Configuration file selection
_____

Please enter the configuration file full path or:
- 'l' to list available ones in the default directory
- 'c' to clone an existing file or template
- 'q' to quit
Your choice: /charon/pluto.cfg          3

Console settings not set to 'virtual_serial_line'. Please check.
Guest added.
Service charon_pluto.service is enabled.

Configuration file must be updated before starting the guest. ⭐

Do you want to edit this file (y/n) ? y          4
```

⚠️ If you don't edit the file now, you won't be prompted to start the guest (virtual machine).

💡 The editor will be asked if you did not set your favorite one in the preferences option.

Using the selected editor, here '`vim`' with syntax highlighting, the configuration file can be customized:

```
#-----------------------------------------------------------
#INFO: AS4100 / pluto - demo for documentation purpose
#-----------------------------------------------------------
set session hw_model = AlphaServer_4100
set session configuration_name = "pluto"

set session license_key_id[0]=367006676
set session license_key_id[1]=1619329274

set session log = "/charon/logs"  1

set ace cpu_architecture = EV56
set rom dsrdb[0] = 1408 system_name = "AlphaServer 4100 5/400"

set session n_of_cpus=1
#set ram size=256
set ram size=1024

set rom container="/charon/pluto.bin"
set toy container="/charon/pluto.dat"

set COM1 alias = OPA0 port = 10003  3
set OPA0 stop_on = F6
set OPA0 break_on = "Ctrl-P"
set OPA0 log = "/charon/logs"  2

load DE500BA/dec21x4x EWA interface=EWA0
load packet_port/chnetwrk EWA0 interface="eno67109424"

#INFO: DKA0   = Tru64 V5.1b system disk
set PKA container[0] = "/data/disks/pluto_tru64.vdisk"  4

#INFO: DKA400 = Tru64 V5.1b installation CDROM O1 (iso)
set PKA container[400] = "/kits/V5.1Br2650_O1.iso"  5
```

Notes on the above example:

- **1** & **2** : The log rotation mechanism will be used in this example. Ensure the corresponding folder, here `/charon/logs`, exists before starting the virtual machine
- **3** : The console is defined as a virtual serial line on port 10003 (default). Ensure the port number is unique if multiple virtual machines will run on the same server
- **4** : The iso file will be used to install Tru64 V5.1B r2650. The virtual disk that will be used as the system disk, `pluto_tru64`, has to be created using the "`mkdskcmd`" command. Ensure the virtual disk exists before starting the virtual machine.
  Example:

```
[root@rhel71 Desktop]# mkdir -p /data/disks

[root@rhel71 Desktop]# mkdskcmd -o /data/disks/pluto_tru64.vdisk -d rz29

Please wait...


100% done


Success.

[root@rhel71 Desktop]# ls -l /data/disks/pluto_tru64.vdisk

-rw-r--r--. 1 root root 4290600960 Nov 26 15:49 /data/disks/pluto_tru64.vdisk
```

- **5** : Lines starting with "`#INFO:`" are comments that will be displayed when accessing the console

When leaving the editor, the guest log file name is extracted and the monitoring service is automatically enabled (installed).

We can now start the guest. If the preferences have been set to have a continuous view of the log file, the log will be displayed:

```
Starting charon_logmon_pluto.service at 08-Jun-2018 14:26:23
Status: active
Restarting aksusbd log monitor service...
Starting charon_pluto.service at 08-Jun-2018 14:26:27
Jun 08 14:26:27 Starting CHARON as4100/pluto...
Jun 08 14:26:27 [INFO ] aksusbd monitor service status is: active
Jun 08 14:26:27 [INFO ] Log monitor service status is: active
Jun 08 14:26:27 [INFO ] Verifying license presence
Jun 08 14:26:33 [INFO ] License found.
Jun 08 14:26:33 [INFO ] Checking network settings...
Jun 08 14:26:33 [INFO ] Switching off all offload parameters for interface eno67
109424
Jun 08 14:26:33 [INFO ] Checking vdisk files if any...
Jun 08 14:26:33 [INFO ] Starting emulator: /opt/charon/bin/as4100 -d /charon/plu
to.cfg
Jun 08 14:26:33 [INFO ] Executing pre-start script.
Jun 08 14:26:33 [INFO ] Success.
Jun 08 14:26:33 [INFO ] OOM process killing prevention is enabled
Jun 08 14:26:33 [INFO ] Process 14507 is now protected
Jun 08 14:26:33 Started CHARON as4100/pluto.
Continuous view of /charon/logs/pluto.log
Press CTRL-C to stop (it is recommended to enlarge screen to 132 cols minimum)
```

...

```
20180608:143441:INFO :0:000003A5:hexane.cxx(5938):  session: loading built-in co
nfiguration "AlphaServer_4100"...
20180608:143441:INFO :0:000003A6:hexane.cxx(5959):  session: ... done loading bu
ilt-in configuration "AlphaServer_4100"
20180608:143441:INFO :0:000003AA:hexane.cxx(5988):  session: loading configurati
on file "/charon/pluto.cfg"...
20180608:143441:INFO :0:000003AB:hexane.cxx(6012):  session: ... done loading co
nfiguration file "/charon/pluto.cfg"
20180608:143441:INFO :0:000003F2:sesmgr.cxx(1488):  session: default log file si
ze limit is 4194304 bytes
20180608:143441:INFO :0:0000032B:hexane.cxx(2698):  Start request received.
20180608:143442:INFO :0:000003AC:hexane.cxx(1424):  session: process affinity is
 00000000000000FF, system affinity is 00000000000000FF
20180608:143442:INFO :0:000003D1:hexane.cxx(1686):  session: I/O domain affinity
 is 0000000000000003, CPU domain affinity is 00000000000000FC
20180608:143442:INFO :0:0000024D:licenseman(1823):  Checking the available licen
se key "367006676".
20180608:143442:INFO :0:0000024D:licenseman(1823):  Found license key: "36700667
6".
20180608:143445:INFO :0:0000024D:licenseman(1823):  Checking product section 0.
20180608:143448:INFO :0:0000024D:licenseman(1823):  License number: "1000.800".
20180608:143448:INFO :0:0000024D:licenseman(1823):  CHARON product code: "CHAXP-
470xx-WI-LI".
20180608:143448:INFO :0:0000024D:licenseman(1823):  HASP Date limited license, l
imited to: 18-Oct-2018 01:55:00.
20180608:143448:INFO :0:0000024D:licenseman(1823):  Feature 2 check interval 5 m
inute(s).
20180608:143448:INFO :0:0000024D:hexane.cxx(2848):  STROMASYS SA, (C) 2009-2018
20180608:143448:INFO :0:00000408:hexane.cxx(2892):  CHARON-AXP (AlphaServer 4100
), V 4.9 B 19103, Feb 16 2018 / 1000.800 / 367006676
20180608:143448:INFO :0:00000336:hexane.cxx(2924):  The end user of this softwar
e has agreed to STROMASYS' Terms and Conditions for Software License and Limited
 Warranty, as described at: http://www.stromasys.com/pub/doc/30-17-033.pdf
20180608:143448:INFO :0:00000097:hexane.cxx(2999):  OS Environment: Linux 3.10.0
-862.2.3.el7.x86_64 #1 SMP Mon Apr 30 12:37:51 EDT 2018 x86_64.
20180608:143448:INFO :0:00000098:hexane.cxx(3004):  Host CPU:        GenuineIntel
, Family 6, Model 60, Stepping 3, Intel(R) Core(TM) i7-4771 CPU @ 3.50GHz, 1 Soc
kets, 4 Cores per Socket, 2 Threads per Core, at ~3498 MHz, 8 cpu's available
20180608:143448:INFO :0:00000099:hexane.cxx(3009):  Host Memory:    7936Mb
20180608:143448:INFO :0:0000041F:hexane.cxx(3224):  Configuration dump::
. session:
. . configuration_name = "pluto"
. . log = "/charon/logs"
```

...

```
.  EWA0:
. . interface = "eno67109424"
. . disabled_mode = "10BaseT-HD"
. . port_show_driver_statistics = "false"
. . port_enable_mac_addr_change = "true"
. . port_snd_sock_buf_size_kb = "0"
20180608:143450:ERROR:2:00000352:axprom.cxx( 585):  ROM: Unable to read containe
r file "/charon/pluto.bin". It is out-of-date, not readable or not valid for the
 specified hardware model. Check settings of console environment and/or date and
 time.
20180608:143450:INFO :0:00000420:dit_server(1036):  ACE:  CF is on, Running 2 tr
anslators.
20180608:143450:INFO :0:0000034B:scsi_disk.( 427):  PKA_0 is being se  ONLINE
container = "/data/disks/pluto_tru64.vdisk"
20180608:143450:INFO :0:0000034B:scsi_cdrom( 211):  PKA_400 is being set ONLINE
container = "/kits/V5.1Br2650_O1.iso"
20180608:143450:INFO :0:00000400:ethdev.cxx( 388):  EWA: RX FIFO size is 512KB.
20180608:143450:INFO :0:0000032C:hexane.cxx(2740):  "pluto" started.
```

ℹ The error message above (white/red) is expected the first time the virtual machine is started. It tells the `.bin` file does not exist as it is initialized when console parameters are set

Press **CTRL-C** at any time to leave the log file view.

ℹ The `"pluto" started` message above, code `32C` means the guest is UP and ready to be installed/booted

Enter 'q' twice to reach the "Service management" menu:

```
┌STROMASYS - Virtualization Technologies─────────────────────────V2.7─┐
│ Virtual Machines Management                                         │
└─────────────────────────────────────────────────────────────────────┘


Available emulated hardware
─────────────────────────────────────────────────────────────────────

as1000 as1000a as1200 as2000 as2100 as400 as4000 as4100 as800 ds10 ds10l ds15 ds
20 ds25 es40 es45 gs160 gs320 gs80 mv3k196 mv3k198 mv3k6 mv3k9 mvii vs4k90 vx3k6
 vx3k6_128 vx3k6_512 vx3k9 vx3k9_128 vx3k9_512 vx4k106 vx4k108 vx4k700 vx4k705 v
x6k310 vx6k610 vx6k620 vx6k630 vx6k640 vx6k650 vx6k660

Select virtual HW model, license conditionned
(v to view HW on license key, q to quit): q    ◄ 1

Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 3.8G/7.6G (49%)

Emulator        Configuration File      Cpu Memory State             OnBoot
────────────    ───────────────────     ─── ────── ─────             ──────

 1* as4100      pluto                     1    1G  ACTIVE            YES
    Description:        CHARON as4100/pluto
    Stop script:       Not found
    Started:         ┌ Fri 2018-06-08 14:40:33 CEST PID=10130
                     └ Protected against OOM Killer.
    License:         ┌ Found license key 367006676, license number 1000.800
                     └ Event date/time: 08-Jun-2018 14:40:38
    Network:           EWA0/eno67109424

Available options
─────────────────────────────────────────────────────────────────────

1 - Add guest
2 - Remove guest
3 - Enable/Disable start at server boot
4 - Edit guests list (for stop order)
q - quit

Enter your choice: q▯  ◄ 2
```

We can see below the service is active, meaning the emulator is running (⚠ this does not mean "booted") and will be automatically started at Linux server boot ("OnBoot" column on the right side)

The "Stop script" line shows the script has not been initialized meaning the guest will receive a SIGKILL signal upon stop request. This will be explained further (see Service management - Create/Edit guest stop script)

```
┌STROMASYS - Virtualization Technologies──────────────────────V2.7─┐
│ Virtual Machines Management                                      │
└──────────────────────────────────────────────────────────────────┘


Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 3.8G/7.6G (49%)


Emulator        Configuration File    Cpu Memory State              OnBoot
_____         _____    ___ _____ _____              _____

* as4100        pluto                  1     1G  ACTIVE             YES
   Description:        CHARON_as4100/pluto
   Stop script:       Not found
   Started:          ⌈ Fri 2018-06-08 14:40:33 CEST PID=10130
                     ⌊ Protected against OOM Killer.
   License:          ⌈ Found license key 367006676, license number 1000.800
                     ⌊ Event date/time: 08-Jun-2018 14:40:38
   Network:           EWA0/eno67109424

Available options
_____

1 - Update guests list        5 - Create/Edit guest stop script
2 - Start/stop guests         6 - Connect to guest console
3 - View latest guest log file 7 - Edit configuration files
4 - Manage 'systemd' services  8 - Create/Edit guest pre-start script

Enter your choice (enter to refresh, q to quit): ▯
```

Remove guest

⚠ Before removing a guest, please ensure it has been properly stopped (a check will automatically be performed before removal). The way the guest is stopped depends on the "Stop script" existence and settings (see Service management - Create/Edit guest stop script)

ℹ If the guest log is monitored, you will be proposed to stop and remove the monitoring service

Example: Red Hat Enterprise Linux 7.5 server with Charon-AXP V4.9 installed, virtual machine as4100/pluto installed

We are now going to remove (**1** & **2**) the as4100/pluto guest, currently in active state:

```
Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 3.8G/7.6G (49%)

Emulator        Configuration File      Cpu Memory State            OnBoot

1* as4100      pluto                     1    1G  ACTIVE            YES
     Description:        CHARON as4100/pluto
     Stop script:       Not found
     Started:         [ Fri 2018-06-08 14:40:33 CEST PID=10130
                       [ Protected against OOM Killer.
     License:         [ Found license key 367006676, license number 1000.800
                       [ Event date/time: 08-Jun-2018 14:40:38
     Network:           EWA0/eno67109424

Available options
_____

1 - Add guest
2 - Remove guest
3 - Enable/Disable start at server boot
4 - Edit guests list (for stop order)
q - quit

Enter your choice: 2   ◄ 1


Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 3.8G/7.6G (49%)

Emulator        Configuration File      Cpu Memory State            OnBoot

1* as4100      pluto                     1    1G  ACTIVE            YES
     Description:        CHARON as4100/pluto
     Stop script:       Not found
     Started:         [ Fri 2018-06-08 14:40:33 CEST PID=10130
                       [ Protected against OOM Killer.
     License:         [ Found license key 367006676, license number 1000.800
                       [ Event date/time: 08-Jun-2018 14:40:38
     Network:           EWA0/eno67109424

                                                         2

Please confirm the removal of as4100/pluto.cfg (y/n) : y
```

No stop script has been defined so this guest will be stopped (see below) without proper shutdown (emulator process will receive a SIGKILL). The service status will then be considered as failed (last line in the screenshot below) and deleted:

```
No stop script found, emulator will be killed without proper shutdown !!! ✗
Do you want to stop the guest now (y/n) ? y ⟵
 Stopping charon_pluto.service at 08-Jun-2018 14:52:57
Jun 08 14:40:33 Started CHARON as4100/pluto.
Jun 08 14:52:57 Stopping CHARON as4100/pluto...
Jun 08 14:52:57 [INFO ] Stopping...
Jun 08 14:52:57 [WARN ] No stop script defined, sending KILL signal to emulator,
 pid 10130
Jun 08 14:52:57 [INFO ] Waiting for process id 10130 termination
Jun 08 14:52:57 charon_pluto.service: main process exited, code=killed, status=9
/KILL
Jun 08 14:53:02 [INFO ] Process id 10130 has terminated
Jun 08 14:53:09 Stopped CHARON as4100/pluto.
Jun 08 14:53:09 Unit charon_pluto.service entered failed state.
Jun 08 14:53:09 charon_pluto.service failed.
```

As the guest has been deleted, the log monitoring service can also be removed (**1** below):

```
Removing from guests list...
Done.
Configuration file is kept in place.
Do you want to remove the log monitoring service (y/n) ? y ⟵ 1
Removed symlink /etc/systemd/system/multi-user.target.wants/charon_logmon_pluto.
service.

Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 6.0G/7.6G (79%)

Emulator       Configuration File     Cpu Memory State              OnBoot

None virtual machine defined.

Guests list is empty.

Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 6.0G/7.6G (78%)

Emulator       Configuration File     Cpu Memory State              OnBoot

None virtual machine defined.

Available options
_____

1 - Add guest  ⟵ 2
2 - Remove guest
3 - Enable/Disable start at server boot
4 - Edit guests list (for stop order)
q - quit

Enter your choice: ▯
```

Another guest can be added if needed (**2**).

ℹ️ Multiple CHARON guests can be added on the Linux server. This is however limited by the license (available products and instances allowed) and the Linux server hardware configuration.

Enable/Disable start at server boot

Use this option if you want (default) or do not want a guest to be started at Linux server boot

ℹ️ By default newly added guests are started automatically at Linux server boot (⚠️ this does not mean "booted")

Example: Red Hat Enterprise Linux 7.5 server with Charon-AXP V4.9 installed, virtual machine as4100/pluto installed

```
┌STROMASYS - Virtualization Technologies─────────────────────V2.7─┐
│ Virtual Machines Management                                     │
└────────────────────────────────────────────────────────────────┘

Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 3.8G/7.6G (49%)

Emulator        Configuration File    Cpu Memory State              OnBoot
────────────    ─────────────────     ─── ────── ──────             ──────
* as4100        pluto                  1    1G   ACTIVE             YES
   Description:        CHARON as4100/pluto
   Stop script:        Not found
   Started:          ┌ Fri 2018-06-08 14:55:59 CEST PID=25652
                     └ Protected against OOM Killer.
   License:          ┌ Found license key 367006676, license number 1000.800
                     └ Event date/time: 08-Jun-2018 14:56:05
   Network:            EWA0/eno67109424

Available options
─────────────────────────────────────────────────────────────────

1 - Update guests list           5 - Create/Edit guest stop script
2 - Start/stop guests            6 - Connect to guest console
3 - View latest guest log file   7 - Edit configuration files
4 - Manage 'systemd' services    8 - Create/Edit guest pre-start script

Enter your choice (enter to refresh, q to quit): 1    (1)


Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 3.8G/7.6G (49%)

Emulator        Configuration File    Cpu Memory State              OnBoot
────────────    ─────────────────     ─── ────── ──────             ──────
 1* as4100      pluto                  1    1G   ACTIVE             YES
   Description:        CHARON as4100/pluto
   Stop script:        Not found
   Started:          ┌ Fri 2018-06-08 14:55:59 CEST PID=25652
                     └ Protected against OOM Killer.
   License:          ┌ Found license key 367006676, license number 1000.800
                     └ Event date/time: 08-Jun-2018 14:56:05
   Network:            EWA0/eno67109424

Available options
─────────────────────────────────────────────────────────────────

1 - Add guest
2 - Remove guest
3 - Enable/Disable start at server boot
4 - Edit guests list (for stop order)
q - quit

Enter your choice: 3    (2)
```

We are now going to prevent from the as4100/pluto guest to be started automatically (**1**). Once completed enter 'n' to return to the previous menu (**2**):

```
Server boot: 08-Jun-2018 00:00   CPUs: 8   Memory(free/tot): 3.8G/7.6G (49%)

Emulator          Configuration File      Cpu Memory State                    OnBoot
_____       _____     ___ _____ _____                    _____

 1* as4100        pluto                    1    1G   ACTIVE                    YES
    Description:          CHARON as4100/pluto
    Stop script:         Not found
    Started:         ┌ Fri 2018-06-08 14:55:59 CEST PID=25652
                     └ Protected against OOM Killer.
    License:         ┌ Found license key 367006676, license number 1000.800
                     └ Event date/time: 08-Jun-2018 14:56:05
    Network:             EWA0/eno67109424


Please confirm as4100/pluto boot change to NO (y/n) : y
Server boot: 08-Jun-2018 00:00   CPUs: 8   Memory(free/tot): 3.8G/7.6G (49%)

Emulator          Configuration File      Cpu Memory State                    OnBoot
_____       _____     ___ _____ _____                    _____

 1* as4100        pluto                    1    1G   ACTIVE                    NO
    Description:          CHARON as4100/pluto
    Stop script:         Not found
    Started:         ┌ Fri 2018-06-08 14:55:59 CEST PID=25652
                     └ Protected against OOM Killer.
    License:         ┌ Found license key 367006676, license number 1000.800
                     └ Event date/time: 08-Jun-2018 14:56:05
    Network:             EWA0/eno67109424


Please confirm as4100/pluto boot change to YES (y/n) : n
```

Edit guests lists (for stop order)

Use this option to change the order of managed guests using the text editor of your choice

⚠️ Use with caution, do not add nor delete lines (or at your own risk)

❌ This option is not active for Linux systems using `systemd` (Red Hat Enterprise Linux 7 and Fedora).

✔️ For Linux systems using `systemd` (Red Hat Enterprise Linux 7 and Fedora), the services description files will have to be modified to add dependencies using `Before=` or `After=` for example if you want to define a start and stop order.

ℹ️ For more information, see manpages: # **man systemd.unit**

VM management - Start/stop guests

Table of Contents

Description

Manual start and stop of managed guests.

Examples

Example1 - Guest stop with no stop script defined

Context: Red Hat Enterprise Linux 7.5 server with Charon-AXP V4.9 installed, as4100/pluto guest running

```
┌STROMASYS - Virtualization Technologies─────────────V2.7─┐
│ Virtual Machines Management                              │
└─────────────────────────────────────────────────────────┘

Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 3.8G/7.6G (49%)

Emulator        Configuration File    Cpu Memory State              OnBoot
─────────       ──────────────────    ─── ────── ─────              ──────
* as4100        pluto                  1    1G   ACTIVE             NO
   Description:       CHARON as4100/pluto
   Stop script:      Not found
   Started:        ┌ Fri 2018-06-08 14:55:59 CEST PID=25652
                   └ Protected against OOM Killer.
   License:       ┌ Found license key 367006676, license number 1000.800
                  └ Event date/time: 08-Jun-2018 14:56:05
   Network:          EWA0/eno67109424

Available options
─────────────────────────────────────────────────────────

1 - Update guests list          5 - Create/Edit guest stop script
2 - Start/stop guests           6 - Connect to guest console
3 - View latest guest log file  7 - Edit configuration files
4 - Manage 'systemd' services   8 - Create/Edit guest pre-start script

Enter your choice (enter to refresh, q to quit): 2    1

Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 3.8G/7.6G (49%)

Emulator        Configuration File    Cpu Memory State              OnBoot
─────────       ──────────────────    ─── ────── ─────              ──────
 1* as4100      pluto                  1    1G   ACTIVE             NO
    Description:       CHARON as4100/pluto
    Stop script:      Not found
    Started:        ┌ Fri 2018-06-08 14:55:59 CEST PID=25652
                    └ Protected against OOM Killer.
    License:       ┌ Found license key 367006676, license number 1000.800
                   └ Event date/time: 08-Jun-2018 14:56:05
    Network:          EWA0/eno67109424

No stop script found, emulator will be killed without proper shutdown !!!

Please confirm you want to stop as4100/pluto.cfg (y/n) : y    2
```

Due to the absence of stop script, the service receives a SIGKILL signal and then, once stopped, is considered as failed:

```
 Stopping charon_pluto.service at 08-Jun-2018 15:24:39
Jun 08 14:55:59 Started CHARON as4100/pluto.
Jun 08 15:24:39 Stopping CHARON as4100/pluto...
Jun 08 15:24:39 [INFO ] Stopping...
Jun 08 15:24:39 [WARN ] No stop script defined, sending KILL signal to emulator,
 pid 25652
Jun 08 15:24:39 [INFO ] Waiting for process id 25652 termination
Jun 08 15:24:40 charon_pluto.service: main process exited, code=killed, status=9
/KILL
Jun 08 15:24:44 [INFO ] Process id 25652 has terminated  <---
Jun 08 15:24:51 Stopped CHARON as4100/pluto.
Jun 08 15:24:51 Unit charon_pluto.service entered failed state.
Jun 08 15:24:51 charon_pluto.service failed. ✖
```

```
┌STROMASYS - Virtualization Technologies─────────────────V2.7─┐
│  Virtual Machines Management                                │
└─────────────────────────────────────────────────────────────┘
┌STROMASYS - Virtualization Technologies─────────────────V2.7─┐
│  Virtual Machines Management                                │
└─────────────────────────────────────────────────────────────┘


Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 6.0G/7.6G (78%)

Emulator        Configuration File   Cpu Memory State              OnBoot
────────        ──────────────────   ─── ────── ─────              ──────
* as4100        pluto                 1     1G  FAILED   <---      NO
  Description:      CHARON as4100/pluto
  Stop script:     Not found
  Stopped:         Fri 2018-06-08 15:24:51 CEST (signal/KILL)  <---
  Network:         EWA0/eno67109424

Available options
─────────────────────────────────────────────────────────────

1 - Update guests list           5 - Create/Edit guest stop script
2 - Start/stop guests            6 - Connect to guest console
3 - View latest guest log file   7 - Edit configuration files
4 - Manage 'systemd' services    8 - Create/Edit guest pre-start script

Enter your choice (enter to refresh, q to quit): █
```

Example2 - Guest stop with stop script defined

Context: Red Hat Enterprise Linux 7.5 server with Charon-AXP V4.9 installed, as4100/pluto guest running Tru64 and booted. Stop script created and customized, using the "ssh" method (see "VM management - Create/Edit guest stop script") with example provided in the kit.

```
 STROMASYS - Virtualization Technologies                          V2.7
 Virtual Machines Management


 Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 3.8G/7.6G (49%)

 Emulator       Configuration File      Cpu Memory State               OnBoot
 _____

 * as4100       pluto                    1    1G  ACTIVE               NO
    Description:        CHARON as4100/pluto
    Stop script:       [Using SSH]
    Started:          [ Fri 2018-06-08 15:31:35 CEST PID=12136
                      [ Protected against OOM Killer.
    License:          [ Found license key 367006676, license number 1000.800
                      [ Event date/time: 08-Jun-2018 15:31:40
    Network:           EWA0/eno67109424

 Available options
 _____

 1 - Update guests list          5 - Create/Edit guest stop script
 2 - Start/stop guests           6 - Connect to guest console
 3 - View latest guest log file  7 - Edit configuration files
 4 - Manage 'systemd' services   8 - Create/Edit guest pre-start script

 Enter your choice (enter to refresh, q to quit): 2   ◄ 1

 Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 3.8G/7.6G (49%)

 Emulator       Configuration File      Cpu Memory State               OnBoot
 _____

  1* as4100      pluto                   1    1G  ACTIVE               NO
     Description:        CHARON as4100/pluto
     Stop script:       [Using SSH]
     Started:          [ Fri 2018-06-08 15:31:35 CEST PID=12136
                       [ Protected against OOM Killer.
     License:          [ Found license key 367006676, license number 1000.800
                       [ Event date/time: 08-Jun-2018 15:31:40
     Network:           EWA0/eno67109424


 Please confirm you want to stop as4100/pluto.cfg (y/n) : y  ◄ 2
```

```
Stopping charon_pluto.service at 08-Jun-2018 15:36:51
Jun 08 15:31:35 Started CHARON as4100/pluto.
Jun 08 15:36:51 Stopping CHARON as4100/pluto...
Jun 08 15:36:51 [INFO ] Stopping...
Jun 08 15:36:51 [INFO ] Executing stop script. Emulator pid is 12136.
Jun 08 15:36:51 [INFO ] Initiating pluto5 system shutdown via SSH
Jun 08 15:36:55 [INFO ] pluto5 is alive (responds to ping). ✔
Jun 08 15:36:55 [INFO ] Initiating system shutdown
Jun 08 15:36:56 [INFO ] Waiting for shutdown completion... ✔
Jun 08 15:36:57 [INFO ] pluto5 still responds to ping...
Jun 08 15:37:03 [INFO ] pluto5 still responds to ping...
Jun 08 15:37:09 [INFO ] pluto5 still responds to ping...
Jun 08 15:37:25 [INFO ] pluto5 does not respond to ping anymore. ✔
Jun 08 15:37:35 [INFO ] Killing charon_pluto service
Jun 08 15:37:35 Stopped CHARON as4100/pluto.
```

We can see below the guest has been properly stopped and is now in INACTIVE / REQUESTED state:

```
┌STROMASYS - Virtualization Technologies───────────────V2.7─┐
│ Virtual Machines Management                               │
└───────────────────────────────────────────────────────────┘

Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 6.0G/7.6G (78%)

Emulator        Configuration File      Cpu Memory State              OnBoot
───────         ──────────────────      ─── ────── ─────              ──────
* as4100        pluto                    1    1G  INACTIVE  REQUESTED  NO
  Description:       CHARON as4100/pluto
  Stop script:      [Using SSH]
  Stopped:          Fri 2018-06-08 15:37:35 CEST (success)
  Network:          EWA0/eno67109424

Available options
─────────────────────────────────────────────────────────────────────────────

1 - Update guests list          5 - Create/Edit guest stop script
2 - Start/stop guests           6 - Connect to guest console
3 - View latest guest log file  7 - Edit configuration files
4 - Manage 'systemd' services   8 - Create/Edit guest pre-start script

Enter your choice (enter to refresh, q to quit): █
```

Note:

- As we are running Red Hat Enterprise Linux 7.5 server, `systemd` allows us to check the status of the service.
- Use option 4 of the menu can help seeing the result of the shutdown commands
- Editing the .service file allows you to specify the service description, the auto-restart settings, etc... For more, see "# **man systemd.service**"

ⓘ With Linux systems not using `systemd` (Red Hat Enterprise Linux 6.x), we would have to look into a log file defined in the stop script / output redirection. For more information, see "VM management - Create/Edit guest stop script".

VM management - View guest log file

Table of Contents

Description

Use this option to either edit the log files using a selected text editor or to have a continuous view ("live") of the log file for the selected guest.

Notes:

- Rotating log files are supported only with CHARON-AXP and CHARON-VAX V4.7 minimum and Linux Toolkit 42 minimum
- Log files are automatically archived at guest start whatever the log_method parameter is set in the configuration file so a new one is created each time.
- The logs are kept for 60 days by default. See "Manage recursive jobs: license expiration check, log events (cron)" to change settings.
- When using the log file edition, only 16 most recent ones are displayed in the list. To get older files, you will need to find them in the log file folder with name identical to the defined log file and with extension:
    - ".upto<YYYY-MM-DD-HHMNSE>" (example: `/charon/pluto.log.upto2015-07-02-172824`) if the virtual machine is not using rotating log files or
    - as defined by the log rotation mechanism (example: `/charon/logs/pluto-2015-11-30-14-13-55-000000000.log`)

Example:

```
┌─STROMASYS - Virtualization Technologies─────────────────V2.7─┐
│ Virtual Machines Management                                  │
└──────────────────────────────────────────────────────────────┘


Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 6.0G/7.6G (78%)

Emulator        Configuration File    Cpu Memory State              OnBoot
────────────────────────────────────────────────────────────────────────
* as4100        pluto                  1    1G  INACTIVE  REQUESTED   NO
   Description:        CHARON as4100/pluto
   Stop script:       [Using SSH]
   Stopped:           Fri 2018-06-08 15:37:35 CEST (success)
   Network:           EWA0/eno67109424

Available options
────────────────────────────────────────────────────────────────────────
1 - Update guests list          5 - Create/Edit guest stop script
2 - Start/stop guests           6 - Connect to guest console
3 - View latest guest log file  7 - Edit configuration files
4 - Manage 'systemd' services   8 - Create/Edit guest pre-start script

Enter your choice (enter to refresh, q to quit): 3 ◄───────

Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 6.0G/7.6G (78%)

Emulator        Configuration File    Cpu Memory State              OnBoot
────────────────────────────────────────────────────────────────────────
1* as4100       pluto                  1    1G  INACTIVE  REQUESTED   NO
    Description:        CHARON as4100/pluto
    Stop script:       [Using SSH]
    Stopped:           Fri 2018-06-08 15:37:35 CEST (success)
    Network:           EWA0/eno67109424


Found definition of log file: /charon/logs/pluto.log

Do you want a continuous view (1) or an editor view (2) (q to quit) ? ▯
```

Examples

Example1 - Continuous view

We can see below at point:

(**1**) The utility displays the last 12 lines of the current log file. In this case the guest was in stopped state.

(**2**) The log file became inaccessible. Reason the guest has been started hence the current log file was archived and a new one was created

(**3**) The continuous view continues with the newly detected log file

```
Continuous view of /charon/logs/pluto.log
Press CTRL-C to stop (it is recommended to enlarge screen to 132 cols minimum)

20180608:153459:INFO :0:0000041A:uart_16550(2231):  COM1: Disconnected.
20180608:153640:INFO :0:0000024D:licenseman(1823):  Performing regular check of
the current license.
20180608:153642:INFO :0:0000024D:licenseman(1823):  Successfully passed the chec
k for license feature 2.
20180608:153651:INFO :0:SERVICE STOP REQUEST
20180608:153709:INFO :0:000003C3:21264_True( 752):  CPU0 Halted (HALT INSTRUCTIO
N @PC = FFFFFC00.00697C70)
20180608:153735:INFO :0:000003D7:hexane.cxx(5534):  All virtual CPUs of "pluto"
have been stopped by now.
20180608:153735:INFO :0:0000032D:hexane.cxx(2784):  "AlphaServer 4100" stop requ
est received.
20180608:153735:INFO :0:0000014C:lnxpackpor( 427):  EWA0: Stopping network inter
face ... please wait.
20180608:153735:INFO :0:00000348:scsi_disk.( 415):  PKA_0 is being set OFFLINE
20180608:153735:INFO :0:00000348:scsi_cdrom( 199):  PKA_400 is being set OFFLINE
20180608:153735:INFO :0:0000024D:licenseman(1823):  Licensing component received
 stop request.
20180608:153735:INFO :0:0000032E:hexane.cxx(2811):  Stopped.
tail: '/charon/logs/pluto.log' has been replaced;  following end of new file
20180608:154620:INFO :0:000003A5:hexane.cxx(5938):  session: loading built-in co
nfiguration "AlphaServer_4100"...
20180608:154620:INFO :0:000003A6:hexane.cxx(5959):  session: ... done loading bu
ilt-in configuration "AlphaServer_4100"
20180608:154620:INFO :0:000003AA:hexane.cxx(5988):  session: loading configurati
on file "/charon/pluto.cfg"...
20180608:154620:INFO :0:000003AB:hexane.cxx(6012):  session: ... done loading co
nfiguration file "/charon/pluto.cfg"
20180608:154620:INFO :0:000003F2:sesmgr.cxx(1488):  session: default log file si
ze limit is 4194304 bytes
20180608:154620:INFO :0:0000032B:hexane.cxx(2698):  Start request received.
20180608:154621:INFO :0:000003AC:hexane.cxx(1424):  session: process affinity is
 00000000000000FF, system affinity is 00000000000000FF
20180608:154621:INFO :0:000003D1:hexane.cxx(1686):  session: I/O domain affinity
 is 0000000000000003, CPU domain affinity is 00000000000000FC
20180608:154621:INFO :0:0000024D:licenseman(1823):  Checking the available licen
se key "367006676".
20180608:154621:INFO :0:0000024D:licenseman(1823):  Found license key: "36700667
6".
```

💡 The continuous log view can be called using the command line "`logtail`", see Additional command lines

Example2 - Log edition

Select editor view (**1**), the log file (**2**). The editor will be selected depending on the preferences defined:

```
Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 3.8G/7.6G (49%)

Emulator        Configuration File     Cpu Memory State                   OnBoot

 1* as4100      pluto                    1    1G  ACTIVE                    NO
      Description:       CHARON as4100/pluto
      Stop script:      [Using SSH]
      Started:       ┌ Fri 2018-06-08 15:46:20 CEST PID=29757
                     └ Protected against OOM Killer.
      License:       ┌ Found license key 367006676, license number 1000.800
                     └ Event date/time: 08-Jun-2018 15:46:25
      Network:         EWA0/eno67109424


Found definition of log file: /charon/logs/pluto.log

Do you want a continuous view (1) or an editor view (2) (q to quit) ? 2    ◀ 1
Log files found (most recent ones):

No  From                          To                          Size        Lines
──  ────────────────────────      ────────────────────────    ────        ─────
 1  Fri 20-Apr-2018 15:25:00  Fri 20-Apr-2018 15:33:26        6642         123
 2  Fri 20-Apr-2018 17:11:41  Fri 20-Apr-2018 17:21:04        5746         112
 3  Mon 23-Apr-2018 14:32:50  Mon 23-Apr-2018 15:27:52        7870         135
 4  Mon 23-Apr-2018 15:34:32  Mon 23-Apr-2018 16:01:15        6840         125
 5  Thu 26-Apr-2018 15:33:05  Thu 26-Apr-2018 15:49:27        7646         134
 6  Wed 06-Jun-2018 12:00:43  Wed 06-Jun-2018 12:03:40        6705         123
 7  Fri 08-Jun-2018 14:26:33  Fri 08-Jun-2018 14:30:25        5952         113
 8  Fri 08-Jun-2018 14:30:57  Fri 08-Jun-2018 14:31:40        5952         113
 9  Fri 08-Jun-2018 14:33:11  Fri 08-Jun-2018 14:34:00        5424         108
10  Fri 08-Jun-2018 14:34:41  Fri 08-Jun-2018 14:39:21        5671         109
11  Fri 08-Jun-2018 14:40:33  Fri 08-Jun-2018 14:52:57        5218         105
12  Fri 08-Jun-2018 14:55:59  Fri 08-Jun-2018 15:24:39        5836         111
13  Fri 08-Jun-2018 15:31:34  Fri 08-Jun-2018 15:37:35        6432         120
14  Fri 08-Jun-2018 15:46:20  Fri 08-Jun-2018 15:46:27        4761         100
      Lock status: <Monitored> <Guest running>

Select the log file you want to view (q to quit, r to refresh): 14    ◀ 2
```

Notes:

- '**From**' date is either based on the first line including a date found in the log file or on file creation time
- '**To**' date corresponds to the date time the file was archived (renamed before guest start)
- It is highly recommended to use 'vim' or 'gvim' (if possible and if installed) to have the benefits of log highlighting

💡 The log edition can be called using the command line "logview", see Additional command lines

VM management - Install, update or manage service

Description

Depending on Linux distribution and version, this option has different names and functions:

Red Hat Enterprise Linux 6.x

Option name: **Install or update service**

Allows you to install (after a fresh install) or update guests management service (kit upgrade).

Updating the service does not require the guests to be shutdown & restarted

Red Hat Enterprise Linux 7.x and CentOS 7

Option name: **Manage 'systemd' services**

Allows you to view the service status and update the service configuration file to add dependencies, description, etc...

⚠ Be extremely cautious when updating the file. Preferably limit updates to:

- `Description=`, `After=`, `Before=`, `Wants=` parameters in the `Unit` section
- `TimeoutStopSec=` in the `Service` section
- `Restart=`, `RestartSec=`, `StartLimitInterval=`, `StartLimitBurst=` parameters in the `Service` section as described in the How to restart CHARON-VAX/AXP on Linux automatically on failure chapter.

Example:

In this example the default description has been updated, restart on failure parameters have been added and the service stop timeout has been set to 3 minutes.

```
[Unit]
Description=CHARON as4100/pluto - Tru64 V5.1B
After=charon_logmon_pluto.service atd.service postfix.service ncu.service aksusb
Wants=aksusbd.service

[Service]
Type=forking
WorkingDirectory=/opt/charon/log
ExecStart=/opt/charon/utils/charon_gstart start /charon/pluto.cfg
ExecStop=/opt/charon/utils/charon_gstart stop /charon/pluto.cfg
Restart=on-failure
RestartSec=30
StartLimitInterval=600
StartLimitBurst=3
TimeoutStopSec=3min

[Install]
WantedBy=multi-user.target
```

Result example:

```
[root@rhel70 utils]# vmlist
Server boot: 08-Jun-2018 00:00   CPUs: 8   Memory(free/tot): 3.8G/7.6G (49%)


Emulator          Configuration File     Cpu Memory State                      OnBoot


* as4100          pluto                   1     1G  ACTIVE                      NO
  Auto-restart:       on-failure after 30s, max 3 times in 600 seconds
  Service Timeouts: Stop=3min
  Description:        CHARON as4100/pluto - Tru64 V5.1B
  Stop script:       [Using SSH]
  Started:         [ Fri 2018-06-08 15:46:20 CEST PID=29757
                   [ Protected against OOM Killer.
  License:         [ Found license key 367006676, license number 1000.800
                   [ Event date/time: 08-Jun-2018 15:46:25
  Network:           EWA0/eno67109424
```

VM management - Create/Edit guest stop script

Table of Contents

Description

Use this option to edit the stop script that will be executed at service shutdown upon manual request or during the Charon Linux server shutdown procedure.

The script is unique and uses the configuration file (full name) to select commands to be executed at guest shutdown (selected by "case in...").

If the script does not exist, it will be generated automatically based on existing guests list and will by default do nothing except preparing the script skeleton with commands using the provided script examples to perform the shutdown via either "`expect`", "`rsh`" or "`ssh`". Newly added virtual machines will have their "case" added to the script when it will be edited.

To be able to perform a clean shutdown of your Tru64 or OpenVMS virtual machine, you will have either to use the provided scripts (see above) or to add your own shutdown scripts.

If you plan to use the "expect" utility, please read Tips and Tricks - Shutdown guests with Expect tool for more.

💡 Basic knowledge of shell programming is needed to implement the clean shutdown / stop script.

Method	Comments
`expect`	Requires you pass user and password to the script so that it can connect to the OPA0 console via "`telnet`" and execute the shutdown commands. The "`guest_shutdown.exp`" script, located in the `/opt/charon/utils` folder, can perform operations to: • log off a user connected on the console if the prompt is detected, • enter a username/password to login if "`login:`" or "`username:`" is detected, • execute the shutdown command if the prompt is detected, • detect the SRM prompt (`>>>`) to issue the "`power off`" command (AXP) or send the F6 key (AXP & VAX) if enabled. This method is useful if the virtual machine has no telnet connection available and cannot handle "`rsh`" and "`ssh`" remote connections. **Important notes**: ■ Note any local existing connection to the console has to be killed before executing the expect script. ■ If the console is locked from an external connection or if the prompt is not detected after sending a carriage return, the expect script will fail.
`rsh`	Requires: ■ a trust to be created between the Linux server and the Tru64 or OpenVMS guest (proxy) to issue password free remote commands ■ if the virtual machine is running OpenVMS, the CHARON_SHUTDOWN.COM script, located in the /opt/charon/utils folder, has to be copied in the SYS$MANAGER folder on the OpenVMS machine.
`ssh`	Requires: ■ a secured trust to be created between the Linux server and the Tru64 or OpenVMS guest (key pair) to issue password and passphrase free remote commands ■ if the virtual machine is running OpenVMS, the CHARON_SHUTDOWN.COM script, located in the /opt/charon/utils folder, has to be copied in the SYS$MANAGER folder on the OpenVMS machine.

Note for Red Hat Enterprise Linux 7.x and CentOS 7.x
If your application and server need time to shutdown, it could be necessary to give more time in the service definition to prevent from the service stop procedure to fail due to timeout.

To do so, open the "`Manage 'systemd' services`" option and edit the service configuration file. You can then add the `TimeoutStopSec=` parameter in the `Service` section.

Example:

```
[Service]

...

TimeoutStopSec=3min
```

ℹ️ More information can be found using the "`# man systemd.service`" command on your Linux server

Options

```
STROMASYS - Virtualization Technologies                          V1.0
 Edit Virtual Machines stop script


 Important notes:
- Comments & commands must be on separate lines
- Respect the structure of the file with case/in/esac
- Only place your commands between the selection and the ';;' line
- Some scripts are provided to ease the setup of 'rsh', 'ssh' and 'expect'.
  Users can obviously use their own commands to shutdown their systems.

 Available options
1 - Read how-to setup 'expect' file
2 - Read how-to setup 'rsh' with Tru64 UNIX file
3 - Read how-to setup 'rsh' with OpenVMS file
4 - Read how-to setup 'ssh' with Tru64 UNIX file
5 - Read how-to setup 'ssh' with OpenVMS file

6 - Edit the stop script
7 - Stop script test

Select your option or 'q' to quit: █
```

- Options 1 to 5 are explanations on how to setup and prepare the virtual machine and the Charon Linux server (if necessary) to use the three available methods.
- Option 6 edits the script. This script is in a form of "case in <configuration filename> do ..."
- Option 7 is used to test the script. Use with caution on production machines.

You'll find in options 1 to 5 all the details to setup the remote connection: packages to install, proxy settings for rsh, key pair definition for ssh (password and passphrase free), the necessary firewall settings if needed, etc...

Common stop script explanation

When the script is initialized using option 6 or when a new virtual machine is added, the following lines are added:

```
...

case "$1"

in

  <configuration file>)

    #-- Uncomment and complete one of the following lines:

    #${CHARONDIR}/utils/charon_gstop_expect \$1 \$2 root <password> "<prompt>" <TRU64/VMS>

    #${CHARONDIR}/utils/charon_gstop_rsh \$1 \$2 <hostname> <TRU64/VMS>

    #${CHARONDIR}/utils/charon_gstop_ssh \$1 \$2 <hostname> <TRU64/VMS>

    #/<path>/<myscript>

  ;;

...

esac
```

One of the blue colored lines above has to be uncommented depending on the method chosen. Other lines can remain in the script or can be deleted.

Notes:

- The values between the < and > signs have to be filled manually.
- The operating system must be set to either TRU64 or VMS (case insensitive).
- If the "rsh" or "ssh" method is used, the <hostname>, corresponding to the virtual machine hostname, must be known by the Charon Linux server.

Stop script content example:

The editor defined in the Preferences is used to edit the script.

```
#!/bin/sh
#
# Parameter $1: contains full path to cfg file
# Parameter $2: contains full path to emulator exe file
#
#   Important notes:
#   - comments & commands must be on separate lines
#   - respect the structure of the file with case/in/esac
#   - only place your commands between the selection and the ';;' line
#
. /opt/charon/utils/charon_common
#
case "$1"
in
  /charon/pluto.cfg)
    ${CHARONDIR}/utils/charon_gstop_ssh $1 $2 pluto5 TRU64
    ;;
  *)
    echo "Invalid parameter '$1'"
    exit 1
    ;;
esac
```

Stop script execution example with "ssh" on Red Hat Enterprise Linux 7.5:

```
[root@rhel70 utils]# vmstop
Please confirm you want to stop as4100/pluto.cfg (y/n) : y ✔


Stopping charon_pluto.service at 08-Jun-2018 16:04:37
Jun 08 15:46:20 Started CHARON as4100/pluto.
Jun 08 16:04:37 Stopping CHARON as4100/pluto - Tru64 V5.1B...
Jun 08 16:04:37 [INFO ] Stopping...
Jun 08 16:04:37 [INFO ] Executing stop script. Emulator pid is 29757.
Jun 08 16:04:37 [INFO ] Initiating pluto5 system shutdown via SSH
Jun 08 16:04:41 [INFO ] pluto5 is alive (responds to ping). ✔
Jun 08 16:04:41 [INFO ] Initiating system shutdown
Jun 08 16:04:42 [INFO ] Waiting for shutdown completion... ✔
Jun 08 16:04:43 [INFO ] pluto5 still responds to ping...
Jun 08 16:04:49 [INFO ] pluto5 still responds to ping...
Jun 08 16:04:55 [INFO ] pluto5 still responds to ping...
Jun 08 16:05:11 [INFO ] pluto5 does not respond to ping anymore.
Jun 08 16:05:21 [INFO ] Killing charon_pluto service ✔
Jun 08 16:05:22 Stopped CHARON as4100/pluto - Tru64 V5.1B.
```

Provided shutdown scripts explanation

> **Note for Red Hat Enterprise Linux 7.x and CentOS 7.x**
> Whatever the shutdown script execution result is, the stop request sent by the `systemctl` command will stop the emulator. It is very important then to ensure the stop script has been tested and validated.

charon_gstop_expect

- Check if there's an active connection to the console on the local host, kill if any.
- Execute the /opt/charon/utils/guest_shutdown.exp expect script with the values provided: username (root), password, prompt, operating system (either TRU64 or VMS). This script is able to send the shutdown command depending on the returned characters on the console. This can be the SRM prompt ">>>", the "login:" or "username:" prompts or the prompt of the logged in user.
- Report all output to /opt/charon/log/console.stop.*<guest name>*.log.

Notes:

- With Charon-AXP, the "`power off`" command is sent at the SRM prompt
- With Charon-VAX, the "`power off`" command does not exist. To power off the virtual machine, the F6 key has to be enabled in the configuration file (`set OPA0 stop_on="F6"`). If not set, the emulator process is killed.
- ⚠ If the console is locked from an external connection or if the prompt is not detected after sending a carriage return, the expect script will fail.

charon_gstop_rsh

- Check the guest can be reached via ping, if yes:
    - Issue the `shutdown` command via "rsh" (depends on the operating system),
    - Wait for a few seconds
    - Check if the guest can be "pinged" and repeat with an interval of 5 seconds
    - If the guest cannot be pinged, assume the shutdown procedure is complete
- Kill the emulator process (Red Hat Enterprise Linux 6.x) or use the `service kill` command (RHEL 7.x and CentOS 7.x). ❓ The shutdown commands does not power off nor stop the emulator process, that's why this operation is needed
- Report the stop information within the guest log file

charon_gstop_ssh

- Check the guest can be reached via ping, if yes:
    - Issue the `shutdown` command via "ssh" (depends on the operating system),
    - Wait for a few seconds

- Check if the guest can be "pinged" and repeat with an interval of 5 seconds
- If the guest cannot be pinged, assume the shutdown procedure is complete
- Kill the emulator process (Red Hat Enterprise Linux 6.x) or use the `service kill` command (RHEL 7.x and CentOS 7.x). ❓ The shutdown commands does not power off nor stop the emulator process, that's why this operation is needed
- Report the stop information within the guest log file

Optional guest display status script

It is possible to create a script, "`/opt/charon/utils/charon_gstart.chkrun`" (an example is provided in the '`charon_gstart.chkrun.example`' file) that will add a status line while displaying the guests list for running guests only. This script, if needed, has to be created <u>manually</u> and must be executable.

This status line is the result of the command you executed for that guest (known by its configuration file), for example a `ping`, an `ssh` command displaying `uptime` (Tru64) or `boottime` (OpenVMS).

Display output example from the "vmlist" command:

```
[root@rhel70 utils]# vmlist
Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 3.8G/7.6G (49%)


Emulator          Configuration File     Cpu Memory State                    OnBoot

* as4100        pluto                    1     1G  ACTIVE                     NO
   Auto-restart:     on-failure after 30s, max 3 times in 600 seconds
   Service Timeouts: Stop=3min
   Description:      CHARON as4100/pluto - Tru64 V5.1B
   Stop script:      [Using SSH]
   Started:        ⌐ Fri 2018-06-08 16:07:03 CEST PID=20339
                   L Protected against OOM Killer.
   Guest OS answer:  16:11 up 3 mins
   License:        ⌐ Found license key 367006676, license number 1000.800
                   L Event date/time: 08-Jun-2018 16:07:09
   Network:          EWA0/eno67109424
```

Script example:

💡 In this example, we use "`ssh`" to display the guest "`uptime`".

⚠️ The last 2 lines containing the RETVAL variable are mandatory

To create the script, the following commands were executed to copy the provided example to the one that will be used:

```
# cp /opt/charon/utils/charon_gstart.chkrun.example /opt/charon/utils/charon_gstart.chkrun

# vim /opt/charon/utils/charon_gstart.chkrun

# chmod 744 /opt/charon/utils/charon_gstart.chkrun
```

```
[root@rhel70 ~]# cat /opt/charon/utils/charon_gstart.chkrun
#!/bin/sh
#
case "$1"
in
  /charon/pluto.cfg)
    ssh -o ConnectTimeout=2 pluto5 "uptime|cut -f1 -d','" 2>/dev/null
    RETVAL=$?
    ;;
  *)
    echo "Invalid parameter '$1'"
    RETVAL=1
    ;;
esac
echo "==RETVAL=${RETVAL}=="
exit ${RETVAL}
```

Example file provided (contains example for Tru64 and OpenVMS):

```
[root@rhel70 utils]# cat charon_gstart.chkrun.example
#!/bin/sh
#
# Parameter $1: contains full path to cfg file
#
case "$1"
in
  /opt/charon/cfg/pluto.cfg)                    Tru64
    ssh -o ConnectTimeout=2 pluto "uptime cut -f1 -d','" 2>/dev/null
    RETVAL=$?
    ;;
  /opt/charon/cfg/vms.cfg)                  OpenVMS
    ssh -o ConnectTimeout=2 system@vm "write sys\$output \"Booted ''f\$getsyi(\"boottime\")''\" 2>/dev/null
    RETVAL=$?
    ;;
  *)
    echo "Invalid parameter '$1'"
    RETVAL=1
    ;;
esac
echo "==RETVAL=${RETVAL}=="
exit ${RETVAL}
```

VM management - Connect to guest console

Table of contents

Description

Use this option to connect to the guests consoles, kill active connections if any and to view console log files.

Notes:

- ⚠️ "`telnet`" package must be installed, it will be used to connect from the CHARON server to the virtual machine console
- The session will be recorded in a log file:
  - If '`set OPA0 log=`' is found in the configuration file (not available with all CHARON products versions), the log will be stored in the temporary folder: '`/tmp/console.<configuration file name shortened>.tmp.log`' and will be overwritten for each session. It is just kept for information as the console log is managed by the CHARON emulator itself. ℹ️ For Charon-AXP and Charon-VAX version 4.9 and above, the line "`set COM1 alias = OPA0 port = <port>`" (new syntax) is also checked.
  - If there is no '`set OPA0 log=`' line in the configuration file, the file will be located in '`/opt/charon/log/console.<configuration file name shortened>.log`'
- If '`stop_on`' and/or '`break_on`' features are enabled in the configuration file, this will be reminded before starting the telnet session
- To leave the telnet session, press the escape character which is by default **CTRL** + **]** . This character can be changed in the `/root/.telnetrc` file by defining the '`set escape`' parameter:
  Example:

```
# cat /root/.telnetrc
DEFAULT
  mode char
  set escape ²
#
```

  ℹ️ Pressing the escape key will lead you to the '`telnet> `' prompt. To leave the session, enter '`quit`'
- If a connection to the console is active from the server, you will be prompted to kill the previous one.
- If a connection to the console is active from another location, it will be displayed but will not be killed. This will have to be done manually.
- Emulator termination check:
  - For CHARON-AXP, if the '`power off`' command is detected (or shortened command), the guest STOP state will be set to REQUESTED. ⚠️ If a telnet connection to the console is performed without this utility, the REQUESTED state will not be set.
  - If the emulator is no more running when you leave the session, you will have to confirm that is requested or not
- ℹ️ The console port number is displayed per guest. If a port number is used more than once, an alert will be displayed

Special comments in configuration file

For ease of use, it is possible to add formatted comments in the configuration file. These comments will appear before connecting to the console and can be used to describe the configuration, disks usage, etc...

To enable this feature, edit the configuration file and add comments starting with "`#INFO:`"

Example:

```
#
#-------------------------------------------------------------
#INFO: AS4100 / pluto - demo for documentation purpose       ⬅
#-------------------------------------------------------------
set session hw_model = AlphaServer_4100
set session configuration_name = "pluto"

set session license_key_id[0]=367006676
set session license_key_id[1]=1619329274

set session log = "/charon/logs"

set ace cpu_architecture = EV56
set rom dsrdb[0] = 1408 system_name = "AlphaServer 4100 5/400"

set session n_of_cpus=1
#set ram size=256
set ram size=1024

set rom container="/charon/pluto.bin"
set toy container="/charon/pluto.dat"

set COM1 alias = OPA0 port = 10003  ✔
set OPA0 stop_on = F6
set OPA0 break_on = "Ctrl-P"
set OPA0 log = "/charon/logs"

load DE500BA/dec21x4x EWA interface=EWA0
load packet_port/chnetwrk EWA0 interface="eno67109424"

#INFO: DKA0   = Tru64 V5.1b system disk    ⬅
set PKA container[0] = "/data/disks/pluto_tru64.vdisk"

#INFO: DKA400 = Tru64 V5.1b installation CDROM O1 (iso)  ⬅
set PKA container[400] = "/kits/V5.1Br2650_O1.iso"
```

Example

```
┌─STROMASYS - Virtualization Technologies─────────────────────V1.22─┐
│ Connection to guest console                                        │
└────────────────────────────────────────────────────────────────────┘

Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 3.8G/7.6G (49%)

Emulator          Configuration File     Cpu Memory State               OnBoot

 1* as4100        pluto                    1    1G  ACTIVE                 NO
     Auto-restart:      on-failure after 30s, max 3 times in 600 seconds
     Service Timeouts: Stop=3min
     Description:       CHARON as4100/pluto - Tru64 V5.1B
     Stop script:      [Using SSH]
     Started:        ┌ Fri 2018-06-08 16:07:03 CEST PID=20339
                     └ Protected against OOM Killer.
     Guest OS answer:  16:21 up 13 mins
     Port:             10003
     Console log:      /charon/logs/pluto-OPA0.log
     Network:          EWA0/eno67109424

  k- Kill active telnet connection(s) on console(s)
  v- View console log files

Choice ('q' to quit): 1  ⬅

─────────────────────────────────────────────────────────────────────

Configuration description:
 AS4100 / pluto - demo for documentation purpose
 DKA0   = Tru64 V5.1b system disk
 DKA400 = Tru64 V5.1b installation CDROM 01 (iso)

─────────────────────────────────────────────────────────────────────


Press enter
```

These lines are extracted from the configuration file. All lines starting with "#INFO:" are displayed

...

```
Console settings correctly set to:
set COM1 alias = OPA0 port = 10003

To leave the console, press the escape character as shown below in the
line 'Escape character is...' and enter 'quit' at the 'telnet>' prompt.

Default escape character can be changed in the $HOME/.telnetrc file under the
machine or DEFAULT paragraph with the command: set escape <newchar>

 WARNING  The virtual machine can be powered off by pressing F6
 WARNING  The virtual machine can be stopped by pressing CTRL-P
Script started, file is /tmp/console.pluto.tmp.log
Trying ::1...
telnet: connect to address ::1: Connection refused
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.


Password:
```

VM management - Edit configuration files

Description

Use this option to edit the virtual machine(s) configuration file(s).

<u>Notes</u>:

- ■ ⚠ Changes will be applied on emulator restart
- ■ ✅ Some checks will be performed on network interface upon exit:
    - ■ If virtual disk files (`.vdisk`) are used then their existence will be checked.
    - ■ If the log file defined is a folder, an error message is displayed (currently not supported)
      ⚠ If you change the log file name, you must remove the previous log monitoring service associated with this log file and recreate the service. See Manage monitored guests logs
    - ■ If the network interface does not exist, an error message is displayed
    - ■ If the network interface has an assigned IP address, an error message is displayed
    - ■ If the network interface is not managed by 'ncu', an error message will be displayed
    - ■ If the network interface is used in another configuration file, an error message will be displayed
- ■ 💡 All offload parameters will be switched off automatically at guest start.
- ■ ⚠ Rotating log files are supported only with Charon-AXP and Charon-VAX V4.7 minimum and Linux Toolkit 42 minimum
- ■ Do not use blank characters (spaces) in folders and file names for log and OPA0 log files

Example

We will add several issues in the "pluto" virtual machine configuration file:

- ■ the log file will be changed from a rotating log file set to "`/charon/logs`" to another one which is a folder or a file that does not exist: "`/charon/logsINEX`"
- ■ a network interface will be disabled,
- ■ a virtual disk that does not exist will be added

```
┌─STROMASYS - Virtualization Technologies────────────────V1.9─┐
│ Edit configuration files                                    │
└─────────────────────────────────────────────────────────────┘

Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 5.9G/7.6G (76%)

Emulator        Configuration File     Cpu Memory State            OnBoot
_____

1* as4100       pluto                    1    1G  INACTIVE REQUESTED  NO
    Auto-restart:     on-failure after 30s, max 3 times in 600 seconds
    Service Timeouts: Stop=3min
    Description:      CHARON as4100/pluto - Tru64 V5.1B
    Stop script:     [Using SSH]
    Stopped:         Fri 2018-06-08 16:26:41 CEST (success)
    Network:         EWA0/eno67109424


Note: changes will be taken into account on service/guest restart
```

Depending on preferences, the file will be edited in the preferred editor or you will be prompted to select the editor.

When the editor will be closed, in our case 'gvim', some checks will be performed:

```
┌─STROMASYS - Virtualization Technologies────────────────────V1.9─┐
│ Edit configuration files                                        │
└─────────────────────────────────────────────────────────────────┘


 Configuration description
Configuration file: /charon/pluto.cfg

 AS4100 / pluto - demo for documentation purpose
 DKA0   = Tru64 V5.1b system disk
 DKA400 = Tru64 V5.1b installation CDROM 01 (iso)

Log file is set to: /charon/logsINEX/pluto.log (plain file) ✘
 ERROR  The path or the filename is incorrect.
         Please update the configuration file.


Console log file is set to: /charon/logs/pluto-OPA0.log (rotating log file)

 Checking virtual disks and iso files...
- /data/disks/pluto_tru64INEX.vdisk: file does not exist or is empty ✘
Done.

 Checking network interfaces...
Warning/dis: Found disabled interface (EWA0) ⚠
Done.

Press enter
```

When the issue have been solved, the following output is displayed:

```
┌─STROMASYS - Virtualization Technologies─────────────────────V1.9─┐
│  Edit configuration files                                        │
│                                                                  │
└──────────────────────────────────────────────────────────────────┘


 Configuration description
Configuration file: /charon/pluto.cfg

 AS4100 / pluto - demo for documentation purpose
 DKA0   = Tru64 V5.1b system disk
 DKA400 = Tru64 V5.1b installation CDROM 01 (iso)

Log file is set to: /charon/logs/pluto.log (rotating log file) ✔

Console log file is set to: /charon/logs/pluto-OPA0.log (rotating log file)✔

 Checking virtual disks and iso files...
Done.✔

 Checking network interfaces...
Done.✔

Press enter
```

VM management - Create/Edit guest pre-start script

Description

Allows to add commands to be executed before the virtual machine is started.

The script will be initialized upon first edition and will be prepared for the existing virtual machines. Newly added virtual machines will be automatically added upon edition.

Usage

⚠️ It is important to respect the rules described in the menu or inside the script.

```
STROMASYS - Virtualization Technologies──────────────────────V1.0─
 Edit Virtual Machines pre-start script


 Important notes:
- Comments & commands must be on separate lines
- Respect the structure of the file with case/in/esac
- Only place your commands between the selection and the ';;' line
- do not add any 'exit' command in the script unless you want the virtual
  machine not to be started if the script fails

 Available options
1 - Edit the pre-start script

Select your option or 'q' to quit: █
```

Example:

```
#!/bin/sh
#
# Parameter $1: contains full path to cfg file
# Parameter $2: contains full path to emulator exe file
#
#  Important notes:
#  - comments & commands must be on separate lines
#  - respect the structure of the file with case/in/esac
#  - only place your commands between the selection and the ';;' line
#  - do not add any 'exit' command in the script unless you want the
#    virtual machine not to be started if the script fails
#
. /opt/charon/utils/charon_common
#
case "$1"
in
  /charon/pluto.cfg)
    ulimit -v 4000000
    ;;
  *)
    echo "Invalid parameter '$1'"
    exit 1
    ;;
esac
```

> If the script has been initialized and a new virtual machine is added, it must be edited for the case related to the new configuration file to be added otherwise the "Invalid parameter" case will be activated and the "exit 1" will prevent the virtual machine from starting.

When displaying the list of defined virtual machines, the first 3 lines of the pre-start commands are displayed:

```
[root@rhel70 ~]# vmlist
Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 5.9G/7.6G (76%)

Emulator         Configuration File    Cpu Memory State                    OnBoot
_____      _____    ___ _____ _____       _____
* as4100         pluto                  1    1G  INACTIVE  REQUESTED        NO
   Auto-restart:      on-failure after 30s, max 3 times in 600 seconds
   Service Timeouts: Stop=3min
   Description:       CHARON as4100/pluto - Tru64 V5.1B
   Stop script:      [Using SSH]
   Pre-start:        ulimit -v 4000000
   Stopped:          Fri 2018-06-08 16:26:41 CEST (success)
   Network:          EWA0/eno67109424
```

Manage monitored guests logs

Description

A service can be defined in order to monitor the guests log files to look for key removal messages (based on interval defined on the dongle) and/or informational, warning and error messages. It also monitors in parallel dongle removal (immediate mode).

The service works with a list of log files to be monitored.

⚠ The log file name must be defined with full path within the configuration file.

⚠ Rotating log files are supported only with Charon-AXP and Charon-VAX V4.7 minimum

ℹ If the Charon log monitoring (global) option is set to enabled (default) in the preferences, the log monitoring service is created automatically when creating a virtual machine from menu option VM Management (add/remove VM, start, stop, console connection, ...).

Management

This option offers the possibility to edit the log file list, start/stop monitoring for a guest, view the guest log file, view the monitoring log file, install or update log monitoring service for Linux servers without "systemd" feature (Red Hat 6) or to manage "systemd" services for Linux servers with "systemd" (Red Hat 7 and CentOS) and to start/restart the aksusb log monitoring.

Example1 - Red Hat Enterprise Linux 6:

```
┌─STROMASYS - Virtualization Technologies────────────────────────V2.0a─┐
│ Manage monitored guests logs                                         │
└──────────────────────────────────────────────────────────────────────┘

Service status
─────────────────────────────────────────────────────────────────────────
aksusbd monitoring service is running ✔

Logs checked / Monitoring status
─────────────────────────────────────────────────────────────────────────
/opt/charon/log/pluto.log, running, last modified on Jul 9 16:26 ✔
/opt/charon/log/myvax.log, running, last modified on Jul 9 16:26 ✔

Available options
─────────────────────────────────────────────────────────────────────────
1 - Update log files list           5 - Install or update service
2 - Start/stop monitoring log file  6 - Start or Restart aksusbd log monitor
3 - View guest log files            7 - Send/mail configuration and log files
4 - View monitoring log file        q - quit

Enter your choice (enter to refresh): █
```

Example2 - Red Hat Enterprise Linux 7:

```
┌STROMASYS - Virtualization Technologies─────────────────V2.4─┐
│ Manage monitored guests logs                                │
└─────────────────────────────────────────────────────────────┘


Service status
───────────────────────────────────────────────────────────────
aksusbd monitoring service is enabled, running ✔

Logs checked / Monitoring status
───────────────────────────────────────────────────────────────
/charon/logs/pluto.log, enabled, running, last modified on Apr 20 15:25 ✔
   Rotating log file / pluto-2018-04-20-15-25-00-000000000.log

Available options
───────────────────────────────────────────────────────────────
1 - Update log files list        5 - Manage 'systemd' services
2 - Start/stop monitoring log file  6 - Start or Restart aksusbd log monitor
3 - View guest log files         7 - Send/mail configuration and log files
4 - View monitoring log file     8 - Restart all log monitoring services

Enter your choice (enter to refresh, 'q' to quit): ▯
```

Notes:

- The list of monitored log files is automatically filled with the log files found in the configuration files for guests defined with the Manage monitored guests logs menu option when selecting the "Update log files list" option 1.
- The install/update service option will just restart the log monitoring service and not the guest.
- The aksusbd log monitoring will look into the "/var/log/messages" log file (Red Hat 6) or will check the journalctl (Red Hat 7 and CentOS) and will send an alert on dongle removal and dongle detected quite immediately
- The guest log monitoring:
  - will send alerts when information, warning and error messages will be detected depending on the alert level defined at Alerts management - Select guests log alert level. Note alerts will be send in a bulk email message by default: one alert every 1 minute based on crontab entry settings for '/opt/charon/utils/charon_logevent' (see Manage recursive jobs: license expiration check, log events (cron))
  - It will also send alerts on guest start and stop
  - Dongle removal and detection alert messages will be sent based on license check interval defined with the license (default is 1 hour).
  - Each time a license is detected in the guest log file, an expiration check will occur and will send alerts if necessary
  - On rare cases, the dongle can be seen as unplugged whereas it is still plugged in leading the virtual machine to stop. The log monitoring feature is then able to detect this case and perform the necessary actions. More information is available in our Knowledge base in this article: CHARON for Linux - Detected removal of the license whereas dongle is connected
- ℹ If you remove a guest from the "Service management - Update guests list" option, the log monitoring service will be removed from the list
- In case you're using regular (main) and backup license dongles, you will receive a "License dongle found" alert on dongle switch.
  ⚠ If the alert tells you the license detected is a "Runtime limited license", you'll have to replace your regular dongle as soon as possible.
- ⛔ If you have more than one virtual machine running on the same server, do not use the same log file name more than once even if the log folders are different
- 💡 If you change the folder of an existing virtual machine, you'll have to update the service manually (Red Hat Enterprise Linux 7+ and CentOS)

Example

Connection lost with the active license:

```
[root@rhel70 utils]# vmlist
Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 3.6G/7.6G (47%)


Emulator          Configuration File    Cpu Memory State                        OnBoot

* as4100         pluto                   1     1G  ACTIVE                        NO
  Auto-restart:       on-failure after 30s, max 3 times in 600 seconds
  Service Timeouts: Stop=3min
  Description:        CHARON as4100/pluto - Tru64 V5.1B
  Stop script:       [Using SSH]
  Started:           Fri 2018-06-08 16:46:08 CEST PID=27750
                     Protected against OOM Killer.
  Guest OS answer:   16:49 up 1 min
  License:           Communication lost with key id 367006676 ✖
                     License number 1000.800.
                     Event date/time: 08-Jun-2018 16:47:14
  Network:           EWA0/eno67109424

- ds20          myds20vms               2     2G  INACTIVE   REQUESTED          YES
  Description:        CHARON ds20/myds20vms
  Stop script:       [Using RSH]
  Stopped:           Fri 2018-06-08 16:45:49 CEST (success)
  Network:           EWA0/charon-myds20 EWB0/charon-mvax4106
```

💡 The license status is monitored if:

- The log monitoring is active
- Charon-AXP and/or Charon-VAX version 4.9 minimum is/are installed
- The Linux server is running Red Hat Enterprise Linux 7.x or CentOS 7.x

Alert mail sent (if configured):

[CHARON] Communication lost with license for pluto

C Charon LTK Geneva Lab <   >
Today, 16:47
Bruno Miretti ⩔

Inbox

Severity Level: **CRITICAL**
License number: 1000.800
Key ID: 367006676
Virtual machine (guest): pluto

Stromasys Geneva Lab - gvaesx55b (212) - RHEL 7.4 - Toolkit tests (153)

Connection established with the backup license:

```
[root@rhel70 utils]# vmlist
Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 3.6G/7.6G (47%)

Emulator          Configuration File      Cpu Memory State                    OnBoot
_____          _____      ___ _____ _____                    _____

* as4100         pluto                     1    1G  ACTIVE                     NO
  Auto-restart:     on-failure after 30s, max 3 times in 600 seconds
  Service Timeouts: Stop=3min
  Description:      CHARON as4100/pluto - Tru64 V5.1B
  Stop script:     [Using SSH]
  Started:       ┌ Fri 2018-06-08 16:46:08 CEST PID=27750
                 └ Protected against OOM Killer.
  Guest OS answer:  16:52 up 4 mins
  License:       ┌ Found license key 1619329274, license number 1000.806
                 └ Event date/time: 08-Jun-2018 16:51:19
  Network:          EWA0/eno67109424

- ds20           myds20vms                 2    2G  INACTIVE   REQUESTED       YES
  Description:      CHARON ds20/myds20vms
  Stop script:     [Using RSH]
  Stopped:          Fri 2018-06-08 16:45:49 CEST (success)
  Network:          EWA0/charon-myds20 EWB0/charon-mvax4106
```

Send configuration and log files via mail

Description

Use this option to send configuration and log files to an email recipient.

Notes:

⭐ Only for guests defined in the Service management (Start, Stop, Manage automatic boot & shutdown) menu option

🟡 Do not send these files directly to our support team otherwise the sender will not be recognized by our ticketing tool. Please send it to you then forward it to our support team.

✅ By default, the 3 most recent log files and the configuration file will be included in the email, zipped

ℹ️ Email subject will be "[CHARON] Configuration and log files for XXXX" where "XXXX" represents the shortened configuration file name (without extension).

ℹ️ Configuration and log files (latest 64 lines) will be displayed within the message body and will also be attached to the email as a zip file.

Example

```
┌─STROMASYS - Virtualization Technologies──────────────────────────V1.7─┐
│ Send configuration and log files via mail                             │
└───────────────────────────────────────────────────────────────────────┘


Server boot: 08-Jun-2018 00:00  CPUs: 8  Memory(free/tot): 3.6G/7.6G (47%)


Emulator        Configuration File    Cpu Memory State                 OnBoot
───────────     ──────────────────    ─── ────── ─────                 ──────
 1* as4100      pluto                  1    1G   ACTIVE                   NO
     Auto-restart:     on-failure after 30s, max 3 times in 600 seconds
     Service Timeouts: Stop=3min
     Description:      CHARON as4100/pluto - Tru64 V5.1B
     Stop script:     [Using SSH]
     Started:         ┌ Fri 2018-06-08 16:46:08 CEST PID=27750
                      └ Protected against OOM Killer.
     Guest OS answer: 16:55 up 7 mins
     License:         ┌ Found license key 1619329274, license number 1000.806
                      └ Event date/time: 08-Jun-2018 16:51:19
     Network:         EWA0/eno67109424

 2- ds20        myds20vms              2    2G   INACTIVE  REQUESTED     YES
     Description:     CHARON ds20/myds20vms
     Stop script:    [Using RSH]
     Stopped:        Fri 2018-06-08 16:45:49 CEST (success)
     Network:        EWA0/charon-myds20 EWB0/charon-mvax4106

Select the guest (q to quit): 1      1


Enter the email recipient (q to quit) [            @stromasys.com]:      2

Number of logs to send [default = 3 latest] '('q' to quit) :      3

Sending configuration and log files to            @stromasys.com...
Done.

Press enter
```

Below is an example of email received:

[CHARON] Configuration and log files for pluto

C Charon LTK Geneva Lab < _____ >
   Today, 16:55
   _____ i ⌄

Inbox

📎 pluto_cfglogs.zip   ⌄
    8 KB

⌄ Show all 1 attachments (8 KB)   Download   Save to OneDrive - Stromasys Inc

Please find attached configuration and log files for pluto

Configuration file

```
#-----------------------------------------------------------------------
#INFO: AS4100 / pluto - demo for documentation purpose
#-----------------------------------------------------------------------
set session hw_model = AlphaServer_4100
set session configuration_name = "pluto"

set session license_key_id[0]=367006676
set session license_key_id[1]=1619329274

set session log = "/charon/logs"

set ace cpu_architecture = EV56
set rom dsrdb[0] = 1408 system_name = "AlphaServer 4100 5/400"

set session n_of_cpus=1
#set ram size=256
set ram size=1024

set rom container="/charon/pluto.bin"
set toy container="/charon/pluto.dat"

set COM1 alias = OPA0 port = 10003
set OPA0 stop_on = F6
```

Preferences

Description

This option allows the users to define the following settings:

- Default editor for Character User Interface and Graphical User Interface with the selection mode, automatic or on demand. Automatic means the GUI will be preferred (if defined) if available otherwise the CUI editor will be used.
- Continuous log view:
    - start or not when the virtual machine is started from the menu.
    - display or not a reminder to tell how to exit from the view (CTRL-C).
- Out Of Memory killer settings. The following settings are used to prevent OOM Killer to kill the processes if the available memory is low.
    - Charon VM process killing prevention → if enabled, when displaying the list of Virtual Machines, a message will be displayed to confirm the running VM is protected against OOM Killer ("`Protected/OOM Killer`")
    - VM overcommit_memory value → we recommend settings this value to 2.
    - VM panic_on_oom:
        - if set to 0 / disabled (recommended) → the kernel will kill some rogue process, by calling oom_kill().
        - if set to 1 / enabled → the kernel panics when out-of-memory happens.
- Semi-graphics enabled/disabled
- Display guests separator: can be none, blank line or separation line (useful if more than one virtual machine is configured on the server)
- Charon log monitoring (global):
    - if enabled (default), the Linux Toolkit will create a log monitoring service when adding a new virtual machine and will report warning & error messages plus messages related to license, etc...
    - if disabled, this service will not be created. This is useful if a monitoring software monitors the Charon log files and the license driver processes.

Example

```
┌─STROMASYS - Legacy server emulation──────────────────────────V1.5─┐
│ Preferences                                                       │
└───────────────────────────────────────────────────────────────────┘

1 - Default editor:
        Character User Interface (CUI) = vim
        Graphical User Interface (GUI) = gvim
        Selection mode = auto

2 - Continuous log view:
        Automatically start with guest start: true
        Press CTRL-C line display/reminder: enabled

3 - Out Of Memory (OOM) settings
        Charon VM process killing prevention = enabled
        VM overcommit_memory value = 2 (Don't overcommit [recommended])
        VM panic_on_oom = 0 (disabled)

4 - Semi-graphics (drawing tables): enabled

5 - Display guests separator:       Blank line

6 - Charon log monitoring (global): enabled

Enter your choice ('q' to quit): █
```

Manage recurring jobs: license expiration check, log events (cron)

Table of Contents

Description

Use this option to check and open the `root`'s `"crontab"` file in order to schedule recursive jobs.

Example:

```
STROMASYS - Virtualization Technologies                         V1.7
 Manage recurring jobs (cron)


 Checking...
Checking 'charon_expchk' presence in crontab file...
Checking 'charon_logevent' presence in crontab file...
Checking 'charon_logarchive' presence in crontab file...
Done.

Updating crontab...
crontab: no changes made to crontab

 Checking...
Checking 'charon_expchk' presence in crontab file...
Checking 'charon_logevent' presence in crontab file...
Checking 'charon_logarchive' presence in crontab file...
Done.
Press ENTER to continue.
```

Notes:

- Alerts will be sent using the common alert script, see chapter Alerts management - Update/reinstall common alert script
- License expiration alert levels are explained here: License expiration check
- If the "`crontab`" file does not exist, it is initialized with comments in order to facilitate settings like this:

```
# root crontab
#-------------------------------------------------------------------------------
# Syntax:
#
# *     *     *     *     * command to execute
# |     |     |     |     |
# |     |     |     |     |
# |     |     |     |     +----- day of week (0 - 6) (0 to 6 are Sunday to Saturday, or use names)
# |     |     |     +---------- month (1 - 12)
# |     |     +-------------- day of month (1 - 31)
# |     +------------------- hour (0 - 23)
# +----------------------- min (0 - 59)
#
# Checks for license expiration: runs everyday at 09:00 with alert set to 15 days before expiration
0 9 * * * /opt/charon/utils/charon_expchk 15
#
# Monitor unrequested guests stop
* * * * * /opt/charon/utils/charon_mongstop
#
# Log events report
* * * * * /opt/charon/utils/charon_logevent
#
# Logs archiving utility (each Monday 00:00)
0 0 * * 1 /opt/charon/utils/charon_logarchive -keep=60 -zip
```

Scheduled jobs details

Expiration check alert (charon_expchk)

The expiration check alert sends alerts by default 15 days before expiration (7 days in interactive mode).

This number of days can be changed using parameter 1 as number of days

Example for 21 days, running everyday at 08:00AM and 04:00PM (16:00):

```
0 8,16 * * * /opt/charon/utils/charon_expchk 21
```

More details on crontab at: http://en.wikipedia.org/wiki/Crontab (credits: wikipedia)

The '-nomail' parameter can be used to make the script check if the license dongle can be read: if not or if a timeout is detected, the aksusbd drivers are restarted. This is mainly used for debugging.

Monitor abnormal termination of the guests (charon_mongstop)

This job is active by default, it is recommended not to prevent it from running. It's goal is to send alerts if a guest has been stopped whereas it was not requested.

It is used only with Red Hat Enterprise Linux 6.x.

Red Hat Enterprise Linux 7.x and CentOS 7.x are using systemd feature to monitor service abnormal termination so the corresponding lines will not be added in the crontab.

Log events (charon_logevent)

This job is active by default, it is recommended not to prevent it from running. It's goal is to scan for events in the guests active log files and send alerts based on alert level defined by the administrator. It runs by default every 1 minute so alerts will be sent in bulk mode rather than one alert per error detected. The interval can be updated at your convenience.

Logs archiving utility

This utility will archive services log files and guests console log files (if not managed by the emulator itself)

Default from the `crontab` entry is to keep files for 60 days and then zip older log files. Zipped files will be kept for 6 months

Alerts management

Table of contents

Description

Use this option to change alert management settings as shown below:

```
┌─STROMASYS - Virtualization Technologies──────────────────V1.7─┐
│ Alerts management                                              │
└────────────────────────────────────────────────────────────────┘

No   Parameter                        Current value(s)
     ─────────────────                ─────────────────
1 -  Mail mode (text/html)            HTML
2 -  Mail recipients list                        @stromasys.com
3 -  Mail sender (optional)           Charon LTK Geneva Lab
4 -  Create/Update alert mail footer  Stromasys Geneva Lab - gvaesx55b (212) -
5 -  'wall' alert messages            Disabled
6 -  Update/reinstall alert script    Installed (from example)
7 -  Select guests log alert level    WARNING + ERROR
8 -  View alerts history (23 alerts)  Last update: Fri 20-Apr-2018 15:33:00
9 -  Lic. expiration alerts from guests  Disabled
     (for Charon-AXP & VAX < V4.9)
10-  Alerts simulator
11-  Hardware specs warning message   Enabled
12-  Immediate alert on dongle removal Enabled
13-  Reduce WARN msgs on dongle removal Disabled

Enter your choice ('q' to quit): []
```

Settings

Mail mode (TEXT/HTML)

Alerts are by default sent in HTML format. With some mail clients, HTML mails are not correctly displayed or even rejected. This option is used to switch between HTML format and pure TEXT format.

HTML mail example:

TEXT mail example:

Mail recipients list

All alerts coming from monitoring scripts and checks scripts are sent using a common alert script that sends emails (via "`sendmail`") to the recipients list that can be defined using this option.

ℹ️ The common alert script can be customized too if you prefer not to receive emails and use commands from your monitoring software for example.

⚠️ Do not add blank lines and set one recipient per line

Mail sender

This optional option allows you to define the sender name instead of the default one (root@hostname)

Create/update alert mail footer

Used to add comments at the end of the mail.

💡 HTML tags like new line, font and bold can be added within the file. In case the format is switched to TEXT, these tags will be automatically removed from the text mail.

Example:
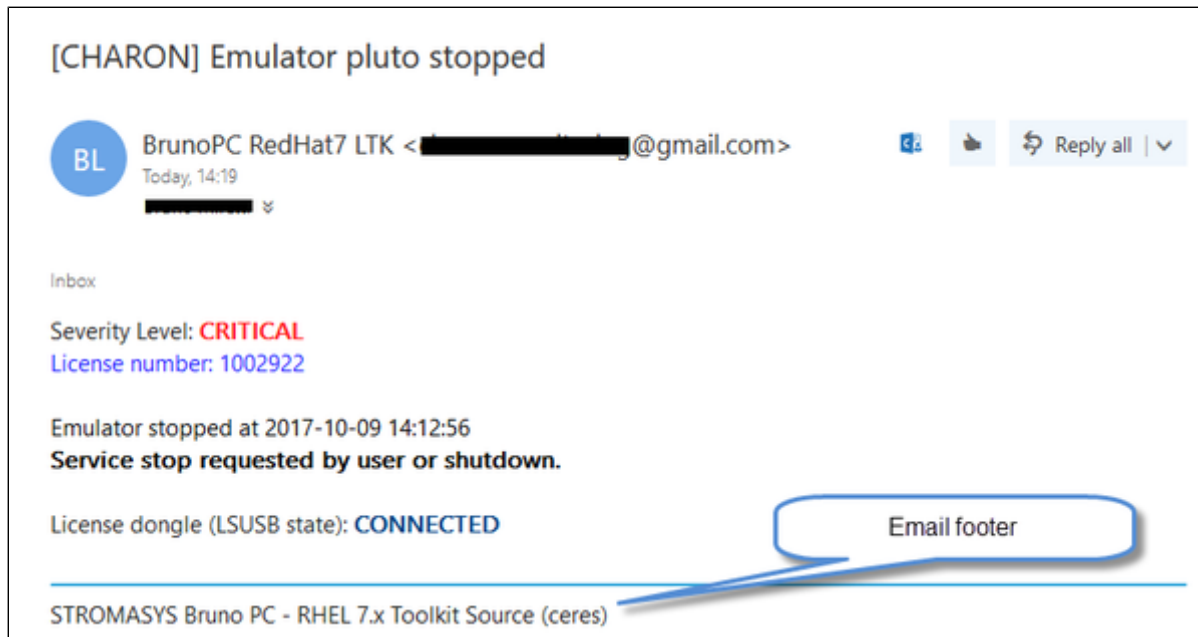
Enable/disable wall alert messages

This option enables or disables (default) the "wall" messages sent via the alert script.

Update/reinstall common alert script

All alerts coming from monitoring scripts and checks scripts are sent using a common alert script.

If this script does not exist, it is initialized by copying an example provided in the kit.

If it exists and is different from the original one, you are invited to reinitialize it from the default one:

- Answer "`yes`" if you did not change the original script file and you have updated the Linux Toolkit (read the corresponding release notes)
- Do not answer "`yes`" if you customized your own alert script.
  - 🟡 In case you've overwritten the existing alert script, the previous version can be restored from the "`/charon/archive`" folder

Example:

```
 STROMASYS - Virtualization Technologies                              V1.7
 Alerts management


No   Parameter                        Current value(s)

1 - Mail mode (text/html)            HTML
2 - Mail recipients list                              @stromasys.com
3 - Mail sender (optional)           Charon LTK Geneva Lab
4 - Create/Update alert mail footer  Stromasys Geneva Lab - gvaesx55b (212) -
5 - 'wall' alert messages            Disabled
6 - Update/reinstall alert script    Customized
                                     Last update: Fri 20-Apr-2018 16:19:25
7 - Select guests log alert level    WARNING + ERROR
8 - View alerts history (23 alerts)  Last update: Fri 20-Apr-2018 15:33:00
9 - Lic. expiration alerts from guests  Disabled
    (for Charon-AXP & VAX < V4.9)
10- Alerts simulator
11- Hardware specs warning message   Enabled
12- Immediate alert on dongle removal  Enabled
13- Reduce WARN msgs on dongle removal  Disabled


Enter your choice ('q' to quit): 6

Do you want to reinstall the alert script from the kit ?
If you customized it, it will be saved and overwritten (y/n) : y
```

This script can be customized to send alerts the way you want, adding for example commands to link with your monitoring tool. It is based on an alert code passed as parameter 1.

All other parameters are information related to the alert. The script uses templates in order to send emails and `wall` messages (see "`/opt/charon/utils/templates/*.mail`" and "`/opt/charon/utils/templates/*.wall`" files if needed).

The table below lists all available values for parameter 1 in case you plan to customize the scripts and send alerts by your own (monitoring software lines of commands, `snmptrap`, etc...)

Parameter 1 can have the following values:

Parameter 1	Severity	Description
ABORTED	CRITICAL	Guest has stopped without user or service request
AKSUSBFAIL	CRITICAL	If the dongle is detected as removed whereas it is disconnected, the askusb daemons are restarted. If the restart fails after 15 tries, this message is sent
BOOTDUPL	WARNING	Tried to start a guest that is already running or a guest is found more than once in the guests list
BOOTNOTFND	CRITICAL	The file containing the guests to start is empty or not found
EMULSTART	INFORMATIONAL	Emulator has been started
EXPCHK	CRITICAL, MAJOR, MINOR, INFORMATION	The license is about to expire
FOUND	INFORMATIONAL	License dongle found at startup
HASPWARN	CRITICAL	Warning messages found in the license, guests cannot start
IFCFGADDR	CRITICAL	The network interface defined in the configuration has already an assigned IP address, cannot be used for guest
IFCFGCRIT	CRITICAL	One parameter in the ifcfg-eth$N$ file is not configured correctly (mandatory value)
IFCFGUNKN	CRITICAL	The interface name defined in the configuration file is not valid (not found with 'ifconfig <eth>' command)
IFCFGWARN	WARNING	One parameter in the ifcfg-eth$N$ file is not configured correctly (recommended value)
INVALID	CRITICAL	Invalid configuration on dongle to start the guest
NOTFOUND	CRITICAL	The guests have not been able to start at boot due to dongle disconnected
REMOVED	CRITICAL	Dongle has been removed: the guest sees the dongle as disconnected and will stop after the defined interval if the dongle is not replaced
REMOVRESET	ERROR	Dongle seen as removed whereas not disconnected (aksusb driver failure). In this case the USB is reset and drivers are restarted (⚠ Not valid if the dongle is a network dongle and then located on another server)
STOPPED	CRITICAL	Guest has been stopped, reasons explained in parameters 4, 5 and 6
STOPPEDREQ	INFORMATIONAL	Guest has been stopped, requested by user or shutdown
TESTMAIL	INFORMATIONAL	Used to test email mode when setting HTML or pure TEXT
TOEXIT	CRITICAL	The guest is about to exit, reasons explained in parameters 4 and 5
USBDISCONNECT	MAJOR	Dongle has been removed (immediate detection)

Select guests log alert level

Select the alert level to send alerts when events are found in the guest log file:

Level	Information	Warning	Error
0	❌	❌	❌
1	✅	✅	✅
2	❌	✅	✅
3	❌	❌	✅

⭐ Requires the "`charon_logevent`" entry activated in the "`crontab`" file => menu option "Manage recursive jobs: license expiration check, log events (cron)"

ℹ This does not affect guest startup alerts. You will receive alerts when a guest starts or stop whatever the level is.

View alerts history

This option will allow you to view the alerts history sent via the alert script. Alerts can be viewed in a continuous way or using a text editor.

Example - Continuous view:

```
 Continuous view of /opt/charon/log/charon_alerts.log
Press CTRL-C to stop
─────────────────────────────────────────────────────
20171009:142736:ALERT:Emulator pluto started          1
Severity Level: INFORMATIONAL
License number: 1002922
Virtual machine (guest): pluto

Emulator start request on 2017-10-09 14:27:26


20171009:142741:ALERT:License dongle found for pluto  2
Severity Level: INFORMATIONAL
License number: 1002922
Key ID: 879642840
Description: Main license, front of the tower
Virtual machine (guest): pluto

Date limited license, limited to: 26/Oct/2017 01:55:00.


20171009:142751:ALERT:License dongle disconnected     3
Severity Level: MAJOR

Disconnection of a USB license dongle detected (0 connected)
This can be due to physical disconnection or USB and/or HASP driver reset (aksus
bd)
Please check.


20171009:142801:ALERT:                                4
Events count:
INFORMATIONAL: Not monitored
WARNING: 2
ERROR: 0

Events:

20171009:142730:WARN :1:00000354:hexane.cxx(3014):  4 host CPUs detected but 8 r
ecommended, performance might be limited.
20171009:142730:WARN :1:00000353:hexane.cxx(3032):  The host system is below rec
ommended specifications.
```

```
20171009:142815:ALERT:License dongle found for all CHARON virtual machines on se
rver ceres.stromasys.com
Severity Level: INFORMATIONAL                          5
License number: 1002922
Key ID: NA
Description: NA
Virtual machine (guest): all CHARON virtual machines on server ceres.stromasys.c
om

Detected connection of a USB license dongle
Connected: 1
▉
```

We can see above:

1. A message telling the emulator is started
2. A message telling the license (main one) is found and that also displays its expiration date
3. The main license dongle has been unplugged and the `aksusbd` monitor reported the alert (immediate). We can see one license (backup one) is still connected
4. Warning messages are sent for the hardware requirements
5. The license dongle was plugged in again.

   ℹ️ We do not see here any dongle removal alert reported by the emulator itself, this is because by default the emulator checks for dongle presence every 1 hour (deferred)

💡 Press CTRL-C to get back to the previous menu

License expiration alerts from guests

This option will toggle on/off the WARNING alerts sent from the guest log file. By default these alerts are sent once per hour 120 hours before expiration whatever the license interval check is set to.

If you have setup the log level alert option to receive WARNING messages then you will receive one alert per hour. This option can be disabled if the expiration check entry is set in the crontab (by default).

⚠️ Backup licenses (time limited): please take care of the time remaining that will be reported in the license detection alert, if the number of remaining hours is less than 24, you could not receive any alert from the license expiration check that runs everyday at 09:00 AM by default. It is possible to make it run more than once a day in this case.

Alerts simulator

This option allows you to send all the available alerts for testing:

```
Enter your choice ('q' to quit): 10

No Code             Subject / Description
__ _____      _____
 1 LOGEVENT         Alerts found in Charon VM log
 2 ABORTED          Emulator <TEST> failed
 3 AKSUSBFAIL       AKSUSB daemons restart failure
 4 BOOTDUPL         Boot file duplicate found
 5 BOOTNOTFND       Boot file error
 6 COMMLOST         Communication lost with license for <TEST>
 7 COMMREST         Communication restored with license for <TEST>
 8 EMULSTART        Emulator <TEST> started
 9 EXPCHK           License expiration check
10 FOUND            License dongle found for <TEST>
11 HASPWARN         License dongle found and Warning messages detected
12 IFCFGADDR        Network configuration issue for guest <TEST>, interface <TES
T>
13 IFCFGCRIT        Network configuration issue for guest <TEST>, interface <TES
T>
14 IFCFGUNKN        Network configuration issue for guest <TEST>, interface <TES
T>
15 IFCFGWARN        Network configuration issue for guest <TEST>, interface <TES
T>
16 INVALID          Invalid configuration for <TEST>
17 LICEXP           License is about to expire for <TEST>
18 NCUWARN          Network configuration issue for guest <TEST>, interface <TES
T>
19 NOTFOUND         License dongle not found at boot
20 REMOVED          License dongle removed
21 REMOVRESET       License dongle removed or connection issue
22 STOPPED          Emulator <TEST> stopped
23 STOPPEDREQ       Emulator <TEST> stopped
24 TESTMAIL         Linux Toolkit Test mail
25 TOEXIT           Emulator <TEST> about to exit
26 USBCONNECT       License dongle connected
27 USBDISCONNECT    License dongle disconnected
Enter the code number to send a simulated alert ('q' to quit) : []
```

Hardware specs warning message Enabled

Enable or disable hardware specifications warning messages to be sent on Charon boot. Depending on Charon version, wrong messages can be sent. This this option prevents from sending warning alerts in case harwdare specifications warning messages are displayed in the log file.

Immediate alert on dongle removal Enabled

Enable or disable immediate alert on dongle removal. These alerts are monitored by the aksusbd log monitoring which is totally independent from the Charon virtual machine log files monitoring.

Since Charon version V4.9, the license communications are checked more often than they were in previous versions.

This option, if disabled, prevents from sending too many alerts in case of dongle removal and re-connection but be aware that if no Charon virtual machine is running, the removal and re-connection will not generate any alert.

Reduce WARN msgs on dongle removal

This option is valid for Charon-AXP and Charon-VAX V4.9 and above.

If enabled, it will prevent from sending too many alerts on dongle removal thus the following messages will not generate an alert:

- `:0000024D:licenseman(1830): Unable to log in to the key "`*XXXXXXXX*`", feature `*X*`.`
- `:0000024D:licenseman(1830): HASP runtime (7): Sentinel protection key not available.`
- `:0000024D:licenseman(1830): Failed to login at the Sentinel HASP key: "`*XXXXXXXX*`".`

Show host information (OS, HW, Charon version, utils and services)

Description

Opens a submenu that provides information on the CHARON server:

- Hostname
- Operating system name, kernel version, uptime
- Hardware: CPU, memory, USB devices
- Storage: file systems
- Network interfaces
- CHARON version: programs found and installed packages
- CHARON utils and services: scripts version, services status, content of configuration files, etc...

Output can be:

- displayed to terminal or
- sent to an html file and opened with Firefox or
- sent via email with the content of the `/opt/charon/log` folder (zipped) for debugging

Menu options list

```
             STROMASYS - Legacy server emulation
                    Charon Linux Toolkit V1.50
Show host Information (full)
  1 - Display with enhanced video
  2 - Display pure text
  3 - Send pure text file to recipient
  4 - Generate and open HTML file
  5 - Send HTML file to recipient
Show host Information (by group)
  6 - Operating system
  7 - Hardware
  8 - Storage
  9 - Network
 10 - CHARON version
 11 - CHARON utils and services

Enter your choice ('q' to quit): █
```

Documentation

Description

Use this option to:

- either open the attached documents: users guide (PDF file / "`evince`" required) or release notes (text file / using "`vi`")
- or to access our online Product Documentation and Knowledge Base space (using "`firefox`")

> **Note**
> Please note the users guide and the release notes latest versions will be available first on our online product documentation web site. The documents provided with the kit could be outdated.

Menu options

```
                   STROMASYS - Legacy server emulation
                 ─────Charon Linux Toolkit V1.52─────
Documentation
   1 - Local PDF document (evince)
   2 - Online documentation (firefox)
   3 - Product documentation and Knowledge Base (firefox)
CHARON Linux Toolkit version 1.52 (10-Sep-2019 11:42)
   4 - View release notes (vi)
Other command lines
   5 - vmlist   - displays the status of defined guests
   6 - logtail  - continuous display of guest log files
   7 - logview  - editor view of guest log files
   8 - vmstart  - starts a guest
   9 - vmstop   - stops  a guest
  10 - vmconsole - connection to the virtual console
  11 - vmcfg - configuration file editing
PuTTY
  12 - Settings recommendations

Enter your choice ('q' to quit): █
```

Additional command lines

Table of Contents

Virtual machines list and status (vmlist)

Usage

```
# vmlist
```

Description

Display the list of managed virtual machines and their status

Parameters

-h   : display help text

Example

```
[root@rhel70 charon]# vmlist
Installed: Charon-AXP V4.10 B20203, Charon-VAX V4.10 B20203
Server boot: 19-Aug-2019 00:00  CPUs: 8  Memory(free/tot): 166M/7.6G (2%)

Emulator          Configuration File        Cpu Memory State                       OnBoot
─────────         ──────────────────        ─── ────── ─────                       ──────
- as4100          pluto                       1     1G  ACTIVE                       NO
  Auto-restart:      on-failure after 30s, max 3 times in 600 seconds
  Service Timeouts:  Stop=3min
  Description:       CHARON as4100/pluto - Tru64 V5.1B
  Stop script:       [Using SSH]
  Started:         ⌈ Tue 2019-09-10 11:39:27 CEST PID=2824 Memory=4,244M
                   ⌊ Protected against OOM Killer.
  Guest OS answer:  11:57 up 10 mins
  Log file:         /charon/logs/pluto.log
  License:         ⌈ Found license key 1619329274, license number 1000.806
                   ⌊ Event date/time: 10-Sep-2019 11:39:33
  Network:          EWA0/eno67109424

* ds20            myds20vms                   2     2G  ACTIVE                       NO
  Service Timeouts: Start=3min Stop=3min
  Description:       CHARON ds20/myds20vms - OpenVMS 8.4
  Stop script:       [Using RSH]
  Started:         ⌈ Tue 2019-09-10 11:55:21 CEST PID=19698 Memory=6,846M
                   ⌊ Protected against OOM Killer.
  Guest OS answer:  Booted 10-SEP-2019 12:01:59.00
  Log file:         /charon/logs/myds20vms.log
  License:         ⌈ Found license key 1619329274, license number 1000.806
                   ⌊ Event date/time: 10-Sep-2019 11:55:26
  Network:          EWA0/charon-myds20 EWB0/charon-mvax4106

- vx4k106         mvax4106                    1   128M  INACTIVE      REQUESTED      NO
  Description:       CHARON vx4k106/mvax4106
  Stop script:       [Using EXPECT]
  Stopped:          Fri 2019-08-30 14:23:42 CEST (success)
  Log file:         /charon/mvax4106.log
  Network:          EZA0/charon-mvax4106(3)

Caption: (3)=NIC already used
```

Virtual machine log view (logview)

Usage

```
# logview [options] [logfile]
```

ℹ The log files can also be edited from the menu → "Service management" → "View latest guest log file"

Description

Uses 'vim' editor to view a CHARON virtual machine log file with highlights.

If <logfile> is empty, the script will look for available log files in the virtual machines list managed by the Toolkit. If only one is managed, the current log will be selected, if more than one virtual machine is present, a selection menu will appear.

ℹ It is recommended to enlarge the current terminal window to at least 132 columns. If using the graphical version of 'vim' (# logview -g) the window size is set to 32 lines and 160 columns by default.

Parameters

`-h`   : display help text

`-g or --gui`   : use 'gvim' instead of 'vim' (if installed)

`-s or --short` : edit a copy of the log file without 'regular license check' messages

Example

```
[root@rhel70 utils]# logview
 Log files found
 1 - /charon/mvax4106.log
        Configuration: /charon/mvax4106.cfg
        Lines: 79 - Dated 2016-03-11 15:55:10

 2 - /charon/logs/myds20.log
        Configuration: /charon/myds20.cfg
        Lines: 232 - Dated 2016-03-14 12:32:32 (rotating log file)

Select the log file (q to quit): 2
```

```
20160314:123232:INFO :0:000003A5:hexane.cxx(5312):   session is loading built-in configuration "AlphaServer_DS20"...
20160314:123232:INFO :0:000003A6:hexane.cxx(5336):   session has finished loading built-in configuration "AlphaServer_DS20".
20160314:123232:INFO :0:000003AA:hexane.cxx(5425):   session is loading configuration file "/charon/myds20.cfg"...
20160314:123232:INFO :0:000003AB:hexane.cxx(5455):   session has finished loading configuration file "/charon/myds20.cfg".
20160314:123232:INFO :0:000003F2:sesmgr.cxx(1471):   session: default log file size limit is 4194304 bytes
20160314:123232:INFO :0:0000032B:hexane.cxx(2547):   Start request received.
20160314:123233:INFO :0:000003AC:hexane.cxx(1287):   session's process affinity is 00000000000000FF, system affinity is 0000000000000
0FF.
20160314:123233:INFO :0:000003D1:hexane.cxx(1541):   session's I/O domain affinity is 0000000000000003, CPU domain affinity is 000000
00000000FC
20160314:123235:INFO :0:000003BA:ll_sentine( 725):   Looking for a license key ...
20160314:123235:INFO :0:000003DC:ll_sentine( 820):   ... found license key 1619329274.
20160314:123235:INFO :0:0000024D:hexane.cxx(2688):   STROMASYS SA, (C) 2009-2015
20160314:123235:INFO :0:00000350:hexane.cxx(2734):   CHARON-AXP/DS20 (AlphaServer DS20), V 4.7 B 17101, Sep 22 2015 / 1000.806 / 1619
329274
20160314:123235:INFO :0:00000336:hexane.cxx(2761):   The end user of this software has agreed to STROMASYS' Terms and Conditions for
Software License and Limited Warranty, as described at: http://www.stromasys.com/pub/doc/30-17-033.pdf
20160314:123235:INFO :0:0000009D:hexane.cxx(2838):   License info:
CHARON product code: "CHAXP-802xx-xI".
Licensed to: "Stromasys - Bruno Miretti".
Date limited license, limited to: 11/Aug/2016 01:55:00.
Warning: setting the host system date back will permanently invalidate the license key.
```

💡 For ease of use, it is also possible to copy the `charonlog.vimrc` file to `$HOME/.vimrc`. Doing so will make 'vim' highlight log lines by default (if you prefer to use 'vim' rather than 'logview')

Virtual machine log tail (logtail)

Usage

```
# logtail [options] [logfile]
```

ℹ The log files can also be continuously viewed from the menu → "Service management" → "View latest guest log file"

Description

Continuous view of a CHARON virtual machine log file with highlights.

Press <CTRL-C> to stop the view.

If <logfile> is empty, the script will look for available log files in the virtual machines list managed by the Toolkit. If only one is managed, the current log will be selected, if more than one virtual machine is present, a selection menu will appear.

ℹ It is recommended to enlarge the current terminal window to at least 132 columns.

Parameters

-h : display help text

Example

```
# logtail /charon/logs/pluto.log
```

```
Continuous view of /charon/logs/pluto.log
Press CTRL-C to stop (it is recommended to enlarge screen to 132 cols minimum)

20180525:111311:INFO :0:000003D7:hexane.cxx(5534):  All virtual CPUs of "pluto"
have been stopped by now.
20180525:111311:INFO :0:0000032D:hexane.cxx(2784):  "AlphaServer 4100" stop requ
est received.
20180525:111311:INFO :0:0000014C:lnxpackpor( 427):  EWB0: Stopping network inter
face ... please wait.
20180525:111311:INFO :0:0000014C:lnxpackpor( 427):  EWA0: Stopping network inter
face ... please wait.
20180525:111311:INFO :0:00000348:scsi_disk.( 415):  PKA_0 is being set OFFLINE
20180525:111311:INFO :0:00000348:scsi_disk.( 415):  PKA_100 is being set OFFLINE
20180525:111311:INFO :0:00000348:scsi_disk.( 415):  PKA_101 is being set OFFLINE
20180525:111311:INFO :0:00000348:scsi_cdrom( 199):  PKA_400 is being set OFFLINE
20180525:111311:INFO :0:00000348:scsi_tape.( 336):  PKA_601 is being set OFFLINE
20180525:111311:INFO :0:00000348:scsi_tape.( 336):  PKA_602 is being set OFFLINE
20180525:111312:INFO :0:0000024D:licenseman(1823):  Licensing component received
 stop request.
20180525:111312:INFO :0:0000032E:hexane.cxx(2811):  Stopped.
```

Virtual machine start (vmstart)

Usage

```
# vmstart [configuration file shortened]
```

Description

Starts the virtual machine specified. If only one virtual machine exists on the server there is no need to specify it (so "vmstart" is enough). If there is more than one virtual machine defined:

- the configuration file name that can be shortened must be passed (Example: to start the virtual machine corresponding to /charon/pluto.cfg, the command can be "vmstart pluto").
- if the virtual machine is not specified the latest specified one is used (it is highlighted with a star in the "vmlist" command)

Parameters

-h : display help text

Example

```
# vmstart


 Starting charon pluto.service at 20-Feb-2018 15:44:20
Feb 19 15:51:18 [WARN ] Service stopped (requested)
Feb 20 15:44:20 Starting CHARON as4100/pluto - Tru64 V5.1B...
Feb 20 15:44:20 [INFO ] aksusbd monitor service status is: active
Feb 20 15:44:20 [INFO ] Log monitor service status is: active
Feb 20 15:44:20 [INFO ] Verifying license presence
Feb 20 15:44:20 [WARN ] License not found or of improper type. Retrying in 20 se
conds (#1)
Feb 20 15:44:44 [INFO ] License found.
Feb 20 15:44:44 [INFO ] Checking network settings...
Feb 20 15:44:44 [INFO ] Switching off all offload parameters for interface eno50
332216
Feb 20 15:44:44 [INFO ] Switching off all offload parameters for interface ens43
Feb 20 15:44:44 [INFO ] Checking vdisk files if any...
Feb 20 15:44:44 [INFO ] Starting emulator: /opt/charon/bin/as4100 -d /charon/plu
to.cfg
Feb 20 15:44:44 [INFO ] Executing pre-start script.
Feb 20 15:44:44 [INFO ] Success.
Feb 20 15:44:45 [INFO ] OOM process killing prevention is enabled
Feb 20 15:44:45 [INFO ] Process 44086 is now protected
Feb 20 15:44:45 Started CHARON as4100/pluto - Tru64 V5.1B.

 Continuous view of /charon/logs/pluto.log
Press CTRL-C to stop (it is recommended to enlarge screen to 132 cols minimum)
_____
20180220:154445:INFO :0:000003A5:hexane.cxx(5352):  session: loading built-in co
nfiguration "AlphaServer 4100"...
20180220:154445:INFO :0:000003A6:hexane.cxx(5376):  session: ... done loading bu
ilt-in configuration "AlphaServer_4100"
20180220:154445:INFO :0:000003AA:hexane.cxx(5450):  session: loading configurati
on file "/charon/pluto.cfg"
```

Virtual machine stop (vmstop)

Usage

```
# vmstop [configuration file shortened]
```

Description

Stops the virtual machine specified (confirmation required). If only one virtual machine exists on the server there is no need to specify it (so "vmstop" is enough). If there is more than one virtual machine defined:

- the configuration file name that can be shortened must be passed (Example: to stop the virtual machine corresponding to /charon/pluto.cfg, the command can be "vmstop pluto")
- if the virtual machine is not specified the latest specified one is used (it is highlighted with a star in the "vmlist" command)

ⓘ If a shutdown script has been defined (see VM management - Create/Edit guest stop script), it will be executed before the service is stopped.

Parameters

-h : display help text

Example

```
# vmstop
Please confirm you want to stop as4100/pluto.cfg (y/n) : y ⬅

 Stopping charon pluto.service at 20-Feb-2018 15:47:44
Feb 20 15:44:45 Started CHARON as4100/pluto - Tru64 V5.1B.
Feb 20 15:47:44 Stopping CHARON as4100/pluto - Tru64 V5.1B...
Feb 20 15:47:44 [INFO ] Stopping...
Feb 20 15:47:44 [INFO ] Executing stop script. Emulator pid is 44086.
Feb 20 15:47:44 [INFO ] Initiating pluto system shutdown via RSH
Feb 20 15:47:48 [INFO ] pluto is alive (responds to ping).
Feb 20 15:47:48 [INFO ] Initiating system shutdown
Feb 20 15:48:03 [INFO ] Success. Now waiting for shutdown completion...
Feb 20 15:48:19 [INFO ] pluto does not respond to ping anymore.
Feb 20 15:48:29 [INFO ] Killing charon_pluto service
Feb 20 15:48:29 Stopped CHARON as4100/pluto - Tru64 V5.1B.
```

Connection to console (vmconsole)

Usage

```
# vmconsole [configuration file shortened]
```

Description

Connects to the running virtual machine console specified. If only one virtual machine exists on the server there is no need to specify it (so "vmconsole" is enough). If there is more than one virtual machine defined:

- the configuration file name that can be shortened must be passed (Example: to connect to the virtual machine console corresponding to /charon/pluto.cfg, the command can be "vmconsole pluto")
- if the virtual machine is not specified the latest specified one is used (it is highlighted with a star in the "vmlist" command)
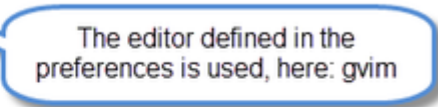
💡 If the corresponding virtual machine is running, updates in the configuration file will be taken into account on Charon emulator restart.

Parameters

-h : display help text

Example

```
# vmconsole


Configuration description:
 AS4100 pluto demo - Development server
 DKA0   = Tru64 system disk
 DKA100 = Data 1
 DKA101 = Data 2
 DKA400 = CDROM Tru64 01
 MKA601 = Tape 1
 MKA602 = Tape 2


Console settings correctly set to:
load virtual_serial_line OPA0 port=10012

To leave the console, press the escape character as shown below in the
line 'Escape character is...' and enter 'quit' at the 'telnet>' prompt.

Default escape character can be changed in the $HOME/.telnetrc file under the
machine or DEFAULT paragraph with the command: set escape <newchar>

 WARNING   The virtual machine can be powered off by pressing F6
 WARNING   The virtual machine can be stopped by pressing CTRL-P
Script started, file is /tmp/console.pluto.tmp.log
Trying ::1...
telnet: connect to address ::1: Connection refused
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.

P00>>>boot
```

Configuration file editing (vmcfg)

Usage

```
# vmcfg [configuration file shortened]
```

Description

Edits the virtual machine configuration file specified and perform some checks upon exit. If only one virtual machine exists on the server there is no need to specify it (so "vmcfg" is enough). If there is more than one virtual machine defined:

- the configuration file name that can be shortened must be passed (Example: to edit virtual machine configuration file /charon/pluto.cfg, the command can be "vmcfg pluto").
- if the virtual machine is not specified the latest specified one is used (it is highlighted with a star in the "vmlist" command)

Parameters

-h : display help text

Example

```
# vmcfg

Note: changes will be taken into account on service/guest restart
 Configuration description
Configuration file: /charon/pluto.cfg

 AS4100 pluto demo - Development server
 DKA0   = Tru64 system disk
 DKA100 = Data 1
 DKA101 = Data 2
 DKA400 = CDROM Tru64 O1
 MKA601 = Tape 1
 MKA602 = Tape 2

Log file is set to: /charon/logs/pluto.log (rotating log file)

Console log file is set to: /charon/logs/pluto-OPA0.log (rotating log file)

 Checking virtual disks and iso files...
Done.

 Checking network interfaces...
Done.
```

The editor defined in the preferences is used, here: gvim

Tips and Tricks

Table of contents

'vi' and 'vim' text editors

Notes:

- When typing text, press <ESC> once finished. In case you're blocked, press also <ESC> before executing commands described below
- both editors use case sensitive commands

Request	Command
To quit without saving	Press ':' then enter 'q!'
To quit with saving	Press ':' then enter 'x' or 'wq'
Go to top of file	Press ':' then enter '0'
Go to last line	Press 'G'
Search pattern	Press '/' then enter your search text. Press then 'n' for next (forward) or 'N' for backward
Remove current character	Press 'x'
Insert text	Press 'i' (press ESC once text completed)
Insert line	Press 'o' for a line below cursor, 'O' for a line above cursor (press ESC once text completed)
Delete a line	Press 'dd'

'gedit' graphical editor

'gedit' is a graphical text editor, users familiar with Windows notepad should not encounter difficulties to use it.

Request	Command
To quit	close the window by clicking on the cross top right corner
Save file	Press <CTRL-S>

'nano' text editor

'nano' is a basic text editor, very simple to use and displaying available commands at the bottom of the screen. For example, to leave 'nano' , use ^X (press CTRL + X)

How to setup 'ssh' trusts between Linux and Tru64

Notes
- The prompts will tell you where to execute the commands, "`Tru64#`" (root user) or "`Linux#`" (root user)
- Remember Linux/Unix is case sensitive
- If hosts are not known by each other, fill the `/etc/hosts` file for example (using `vi` for example)
- *linuxhost* represents the name of your CHARON server (can be any name you want)
- *tru64host* represents the hostname of your Tru64 virtual machine

- Generate the key

```
Linux# cd /root/.ssh
Linux# ssh-keygen -t rsa
```
→ Do not specify a passphrase
```
Linux# ssh-keygen -e -f id_rsa.pub > linuxhost.pub
```

- Copy the *linuxhost***.pub** file, or use copy/paste, in the **/.ssh2** folder on the Tru64 host

- Define the **authorization** file:

```
Tru64# cd /.ssh2
Tru64# echo "Key linuxhost.pub" >> authorization
```

- Initialize the first ssh connection (answer '`yes`' to confirm)

```
Linux# ssh tru64host date
```

then retry the same command to verify the trust is working.

💡 If an error occurs, you can check and clean the `/root/.ssh/known_host` file on the Linux host

❓ If trying to execute a remote command on the Tru64 system, a message telling "no matching cipher found" is displayed, the cipher has to be setup on the Linux server side in the `/root/.ssh/config` file:

```
# cat /root/.ssh/config

Host tru64host

  Hostname tru64host

  KexAlgorithms +diffie-hellman-group1-sha1

  HostKeyAlgorithms +ssh-dss

  Ciphers +3des-cbc
```

How to setup 'ssh' trusts between Linux and VMS

Notes
- The prompts will tell you where to execute the commands, "`VMS$`" (system user) or "`Linux#`" (root user)
- Remember Linux/Unix is case sensitive, VMS is not
- Linux: if VMS host is not known, add it to `/etc/hosts` for example
- VMS: if Linux is not known, add it using: `$ UCX SET HOST LINUX /ADDR=xx.xx.xx.xx`

- Enable SSH on the VMS server:

```
VMS$ SET DEF SYS$LOGIN
VMS$ @TCPIP$CONFIG
```

- Select then:
    - Option 3 - Server components then enable and start service SSH, option 19
    - then Option 2 - Enable & Start service on this node

```
...
* Create a new default server host key? YES: YES
      Creating private key file: TCPIP$SSH_DEVICE:TCPIP$SSH.SSH2]HOSTKEY
      Creating public key file: TCPIP$SSH_DEVICE:TCPIP$SSH.SSH2]HOSTKEY.PUB
...
```

- Generate the key on the Linux server and convert it to be readable by VMS

```
Linux# ssh-keygen -t rsa

→ Do not specify a passphrase
Linux# ssh-keygen -e -f /root/.ssh/id_rsa.pub > /root/.ssh/linuxserver.pub
```

- Copy the generated file **/root/.ssh/**_linux_**server.pub** (or use copy/paste between putty session for example) to the VMS system in the **SYS $SYSROOT:[SYSMGR.SSH2]** directory
  💡 If this folder does not exist, create it using the following command: $ **CREATE /DIRECTORY SYS$SYSROOT:[SYSMGR.SSH2]**

- On the VMS system add the Linux server key to the authorized keys:

```
VMS$ SET DEF SYS$SYSLOGIN
VMS$ SET DEF SYS$SYSROOT:[.SSH2]
VMS$ OPEN/WRITE TMP AUTHORIZATION.

⚠ If the file already exists, use /APPEND instead of /WRITE
VMS$ WRITE TMP "KEY LINUXSERVER.PUB"
VMS$ CLOSE TMP
```

⚠ Do not forget the dot at the end of the authorization file name

- Perform some tests (examples)
  ℹ Charon server name "charon", vms system name "pluto":

```
charon# ssh system@pluto "show system /noproc"
OpenVMS V7.3-2 on node PLUTO 27-SEP-2013 11:50:14.37 Uptime 0 19:20:07
```

How to setup 'rsh' trusts between Linux and Tru64

Introduction

RSH executes commands on a remote host. It can be used to issue a shutdown on the Charon Tru64 virtual machine.

Pre-requisites

The RSH method requires the 'rsh' package. It can be installed using the following command:

```
# yum install rsh
```

Notes

On the Tru64 system issuing the shutdown, create a proxy between the root user of the Charon server and the user.

Example ('ceres' is the Charon server name):

```
# echo "ceres root" >>~/.rhosts
```

If the Charon server name is not known to the TCPIP database, edit the `/etc/hosts` file and add the server ip address and its name.

Ensure manual commands can be passed to the Tru64 system from the Charon server.

Example ('pluto' is the Tru64 hostname):

```
# rsh pluto date
```

If a "poll: protocol failure in circuit setup" is returned, the firewall settings have to be set to open ports 113 and 1022.

Please always refer to your network administrator when changing the firewall rules, commands below are given as example only.

Example for Red Hat Enterprise Linux 6.x servers:

```
# iptables -I INPUT -p tcp --dport 113 --syn -j ACCEPT

# iptables -I INPUT -p tcp --dport 1022 --syn -j ACCEPT

# service iptables save
```

Example for Red Hat Enterprise Linux 7.x and CentOS 7.x servers:

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

# firewall-cmd --permanent --service=Charon --add-port=113/tcp

# firewall-cmd --permanent --service=Charon --add-port=1022/tcp

# firewall-cmd --get-active-zones
public
interfaces: ens34 ens35

# firewall-cmd --zone=public --permanent --add-service=Charon

# firewall-cmd --reload
```

How to setup 'rsh' trusts between Linux and OpenVMS

Introduction

RSH executes commands on a remote host. It can be used to issue a shutdown on the Charon OpenVMS virtual machine.

Pre-requisites

The RSH method requires the 'rsh' package. It can be installed using the following command:

```
# yum install rsh
```

Notes

RSH and REXEC services must be available on the OpenVMS virtual machine. This depends on the OpenVMS version and a valid UCX license is required.

To enable these services, run @SYS$MANAGER:TCPIP$CONFIG, select the "Client components" and then enable and start "REXEC and RSH" services.

Create a proxy between the root user of the Charon server and the user on the OpenVMS system issuing the shutdown.

Example ('ceres' is the Charon server name):

```
$ tcpip add proxy system /remote="root" /host=ceres
```

If the Charon server name is not known to the TCPIP database, use the following command to add it.

Example:

```
$ tcpip set host ceres /address=1.2.3.4
```

Copy charon_shutdown.com script located in the /opt/charon/utils folder to SYS$MANAGER:CHARON_SHUTDOWN.COM on the OpenVMS system (using copy/paste for example). This is required as if the shutdown is executed directly from the 'rsh' command directly, 'rsh' will not timeout when the shutdown will be completed and the virtual machine will not be stopped cleanly, it will timeout depending on the service settings.

Ensure manual commands can be passed to the OpenVMS system from the Charon server.

Example ('vms084' is the OpenVMS hostname):

```
# rsh -l system vms084 "show time"
```

If a "poll: protocol failure in circuit setup" is returned, the firewall settings have to be set to open ports 113 and 1022.

Please always refer to your network administrator when changing the firewall rules, commands below are given as example only.

Example for Red Hat Enterprise Linux 6.x servers:

```
# iptables -I INPUT -p tcp --dport 113 --syn -j ACCEPT
# iptables -I INPUT -p tcp --dport 1022 --syn -j ACCEPT
# service iptables save
```

Example for Red Hat Enterprise Linux 7.x and CentOS 7.x servers:

```
# firewall-cmd --permanent --new-service=Charon
# firewall-cmd --permanent --service=Charon --add-port=113/tcp
# firewall-cmd --permanent --service=Charon --add-port=1022/tcp
# firewall-cmd --get-active-zones
public
  interfaces: ens34 ens35
# firewall-cmd --zone=public --permanent --add-service=Charon
# firewall-cmd --reload
```

Shutdown guests with Expect tool

Introduction

In case SSH cannot be used to perform clean shutdown of the guests, the "`expect`" tool can be used to connect to the console, perform the login operation and execute the shutdown command depending on the console status (at login prompt, shell prompt or SRM prompt)

⚠ In this case the password is sent without encryption.

To facilitate use of "`expect`" for shutdown, an example is provided in the "`guest_shutdown.exp`" script located in the `/opt/charon/utils` folder. If you plan to customize the script, you'll have to create a copy and not use it directly as it will be overwritten in case of Toolkit upgrade.

> '`telnet`' and '`expect`' packages must be installed in order to use this feature.
>
> The following error message can be returned when stopping the virtual machine when trying to use the expect script example:
>
> - if expect package is not installed: "`Stop script returned error code 126`".
> - if telnet is not installed: "`%EXPECT-F-NOSRM, Cannot continue, 'telnet' is not installed`" then "`Stop script returned error code 4`"
>
> Caution: the virtual machine process will be however killed by service management process

> **Console locked:**
>
> Any active session to the console must be killed before the "`expect`" script is executed.
>
> ℹ For example, if you are connected via "`telnet`" on the localhost/port (the kill is not done inside the `expect` script). Using the "`/opt/charon/utils/charon_gstart_expect`" script file the necessary operations will be performed.
>
> ⚠ If the console is locked from another host (if you use `putty` for example), you will have to cancel the connection by yourself otherwise the shutdown will not be performed cleanly.

This script can handle the following situations:

- No user connected on the console:
  - Expect: "`Username: `" (VMS) or "`login: `" (Tru64)
  - Action: An interactive session will be initiated based on <user> and <password> provided in the parameters
- A user is connected on the console:
  - Expect: <prompt> provided in the parameters
  - ⚠ This user must have privileges to perform shutdown as no logout will be issued
  - Action: Depending on the Operating system parameter (see <opsys> below), the shutdown command will be sent
- Console is at SRM prompt:
  - Expect: '>>>' (so works with VAX and Alpha with "`P00>>>`")
  - Action: A '`power off`' command will be issued. If the command is not recognized, the F6 key will be sent (this must be enabled within the configuration file). If the F6 key did not stop the emulator, the script will exit with error code 9 meaning you will have to kill the emulator process yourself. Using the "`/opt/charon/utils/charon_gstart_expect`" script file the necessary operations will be performed.
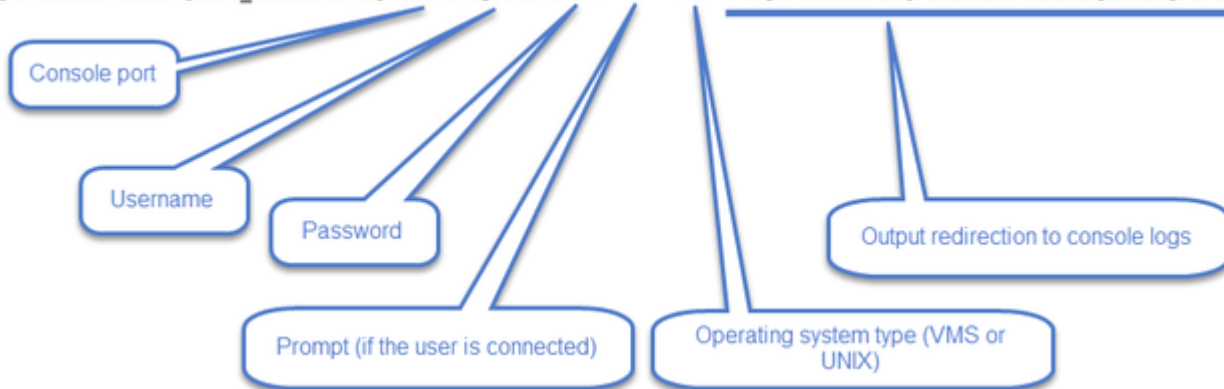
Script usage

Usage:

```
# path/script <port> <user> <password> <prompt> <opsys>
```

Parameters:

Parameter	Description
<port>	telnet port number (example: 10003)
<user>	username for login (must be able to perform shutdown)
<password>	password
<prompt>	shell prompt (including end space) or last characters of the prompt
<opsys>	VMS or UNIX

Example:

```
/opt/charon/utils/guest_shutdown.exp 10004 system 12345 "> " VMS >>/opt/charon/log/console.vmsexample.log 2>&1
```

Console port

Username

Password

Prompt (if the user is connected)

Operating system type (VMS or UNIX)

Output redirection to console logs

How to restart CHARON-VAX/AXP on Linux automatically on failure

⚠ This part only applies to Linux distributions using `systemd` thus Red Hat Enterprise Linux 6.x versions are not concerned.

- Edit the service configuration file and add the following parameters using the "VM Management" option from the menu then "Manage 'systemd services".

- Update the service and server boot parameters as described in the appendix How to restart Charon-VAX/AXP on Linux automatically on failure

🔶 Quick Setup Guide

Introduction

This article summarizes the operations to be performed to make your emulator running with the CHARON Linux Toolkit.

Preparation

- Create a folder to store the CHARON products and CHARON Linux Toolkit(s)
  Example:

  ```
  # mkdir /charon
  ```

- Download the kits in this folder from the Stromasys sftp server using 'sftp' or your browser with the link provided by Stromasys.

- Optionally create a folder where to store your licenses (C2V and V2C files)
  Example:

  ```
  # mkdir /charon/licenses
  ```

- Install the CHARON Linux Toolkit as described in the Setup page.

- Install the CHARON product(s) you need from menu option "Install/Upgrade/Remove Charon"

- Dedicate network interfaces to CHARON using menu option "Network Configuration Utility" (see your CHARON product documentation / networking chapter).

- Check the license can be read using the "HASP license details" menu option

- Prepare your configuration file(s) or use the clone utility available from the "VM management - Update guests list" menu (see further).

- Prepare your storage configuration and create your vdisk files using the "mkdskcmd" command if needed.
  Example:

  ```
  # mkdskcmd -o /data/vms0_rz28.dsk -d rz28
  ```

Virtual machines creation

- Use the "VM management - Update guests list" option from the "VM Management (add/remove VM, start, stop, console connection, ...)" menu option to add and start your new virtual machine (guest)

    - If you're running Red Hat Enterprise Linux 6, first install the service using the "Install or update service" option.

    - Optionally, use option "Enable/Disable start at server boot" to prevent the guest from starting automatically when the Linux server is booted

    - Optionally (but highly recommended), use option "Create/Edit guest stop script" to define the stop script that will be used to perform a clean shutdown of the virtual machine at service stop.
      💡 It is recommended to test your shutdown scripts before going on production

    - ℹ️ The log file monitoring service is created automatically.

- Connect to the guest console using the "Connect to guest console" menu option (from the "VM Management" menu) and install or restore the operating system. If `telnet` is not installed, you can connect via `putty` for example (⚠️ in this case some firewall settings will have to be set, see Connection to guest console blocked by firewall)

Post installation checks

- You can remove the USB dongle, if any, to verify the dongle removal is identified by the askusbd log monitor service:

    - If you enabled the `'wall'` alerts from the "Alerts management" menu, you should receive an immediate '`wall`' message.

    - If you disabled the `'wall'` alerts from the "Alerts management" menu (default), you can have a look at the alerts history from the "Alerts management" menu

    - If the mail has been correctly configured, you will receive an alert with subject: "[CHARON] License dongle disconnected" quite immediately (please ensure the email has not been moved to the junk folder). The immediate alert can be followed by an alert coming from the virtual machine log monitoring announcing the time remaining before stop

Appendixes

Contents

- Connection to guest console blocked by firewall
- Cannot get correct line drawing on Linux/UNIX with Putty
- How to restart Charon-VAX/AXP on Linux automatically on failure

Connection to guest console blocked by firewall

Problem

Connections refused to guests console when connecting via telnet to localhost with the port number specified in the configuration file (10003, 10004, ...).

This can be caused by firewall settings.

Example1:

```
# telnet charonserver 10003
telnet: connect to address 192.168.42.42: Connection refused
```

Example2:

```
# telnet charonserver 10003

Trying 192.168.42.42...
telnet: connect to address 192.168.42.42: No route to host
```

Solution

To ensure the TCP ports are not blocked by the firewall, please execute the following commands

Red Enterprise Linux Server 6.x

```
# iptables -I INPUT -p tcp --dport <port> --syn -j ACCEPT

# iptables -I INPUT -p udp --dport <port> -j ACCEPT

# service iptables save
```

Example:

```
# iptables -I INPUT -p tcp --dport 10003 --syn -j ACCEPT

# iptables -I INPUT -p udp --dport 10003 -j ACCEPT

# iptables -I INPUT -p tcp --dport 10004 --syn -j ACCEPT

# iptables -I INPUT -p udp --dport 10004 -j ACCEPT

# service iptables save
```

Red Enterprise Linux Server 7.x and CentOS7 (using firewalld service)

As "firewalld" is installed by default, the commands used are those given in the example below.

Example with console on port 10003:

```
# firewall-cmd --permanent --new-service=Charon
success
# firewall-cmd --permanent --service=Charon --add-port=10003/tcp
success
# firewall-cmd --permanent --service=Charon --add-port=10003/udp
success
# firewall-cmd --get-active-zones
public
  interfaces: ens34 ens35
# firewall-cmd --zone=public --permanent --add-service=Charon
success
# firewall-cmd --reload
success
```

Links

- Red Hat Enterprise Linux 7 - Using firewalls
- Red Hat Enterprise Linux 6 - Using firewalls

Related articles

- Charon-AXP/Tru64 - "System does not have a console configured" error message when booting

- CHARON Linux server - Connection to guest console blocked by firewall

- Guest system hangs with TX overflow messages in the log file

- Enabling TCP keepalive for console connections

Cannot get correct line drawing on Linux/UNIX with Putty

Table of contents

Problem

Line drawing not correctly displayed using Putty:

Wrong line drawing

```
[root@charonrhel64 ~]# tput smacs;echo lqqqk;echo mqqqj;tput rmacs
lqqqk
mqqqj
[root@charonrhel64 ~]#
```

Expected line drawing

```
[root@charonrhel64 ~]# tput smacs;echo lqqqk;echo mqqqj;tput rmacs

[root@charonrhel64 ~]#
```

Solutions

Solution 1 - using xterm settings

Before opening the terminal session, load the saved session you want to use and update the following parameters:

- Terminal-type string can be set to either **xterm** or **vt200** for Linux or VMS and can only be defined to **vt200** for Tru64
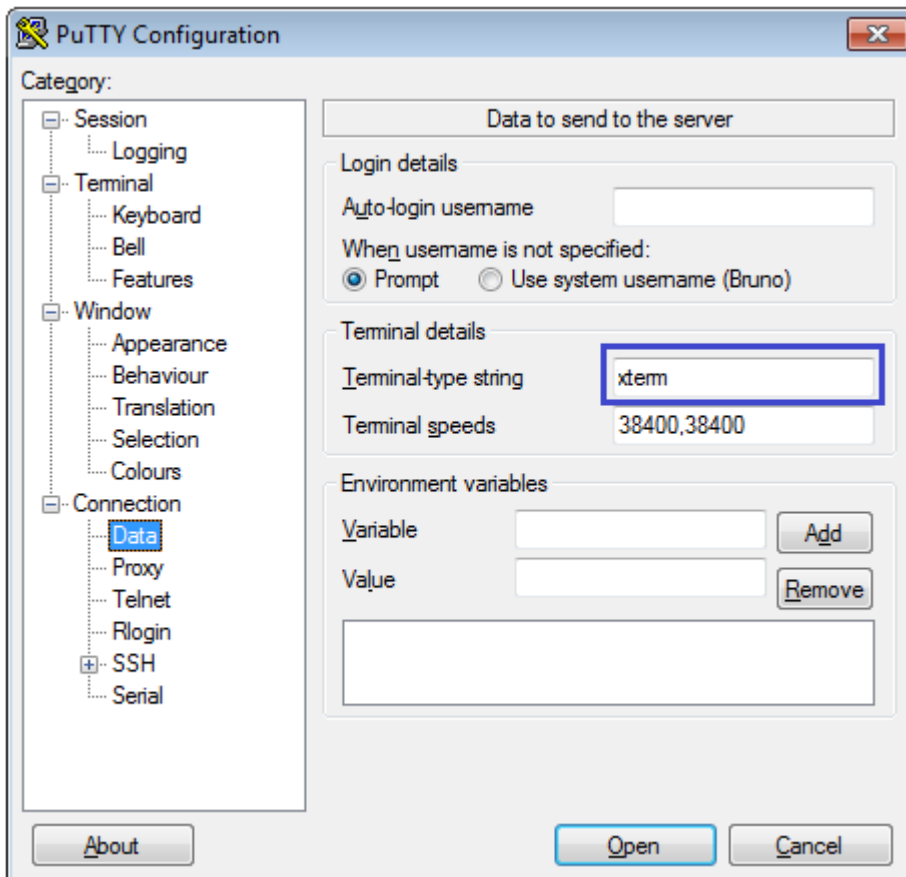
- The "Remote character set" must be something else than the default UTF-8 depending on your location. Example: **ISO-8859-1:1998 (Latin-1, West Europe)**
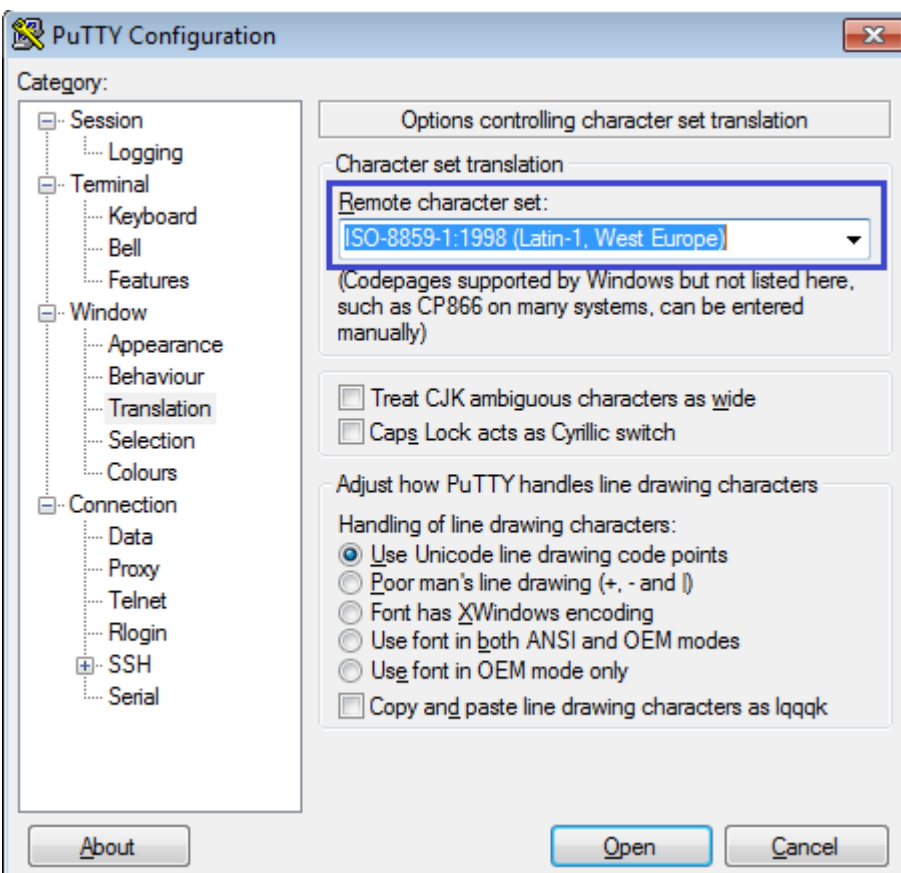
⚠️ It is possible some characters will not be displayed correctly using this method. Example:

```
[root@ceres ~]# rm nothing
rm: cannot remove ânothingâ: No such file or directory
```

💡 The default font does not display boxes correctly. If you want to have a better look, please change the font in the "Window → Appearance" option and select either Consolas, Lucida Console or Terminal fonts rather than Courier New.

Solution 2 - using putty and Linux locale settings

On the Linux host:

Add these lines in your .bashrc file (if you're using bash):

```
test "$TERM" = "putty" && export LC_ALL=C || export LC_ALL=en_US.utf8

export TERM=xterm
```

In putty:

- Window → Translation → Remote Character set: the default ISO-8859-1

- Connection → Data → Terminal-type string "`putty`"

ℹ️ This solution solves the problem mentioned above

💡 The default font does not display boxes correctly. If you want to have a better look, please change the font in the "Window → Appearance" option and select either Consolas, Lucida Console or Terminal fonts rather than Courier New.

Links

Download putty

Related articles

- Input issues with telnet
- Cannot find OPA0 console session in PuTTY on Windows
- DRAFT - How to run X11 applications with Charon
- Cannot get correct line drawing on Linux/UNIX with Putty
- Escape sequences, arrow and special keys are not interpreted with PuTTY

How to restart Charon-VAX/AXP on Linux automatically on failure

Table of contents

Description

In case of unrequested Charon virtual machine stop, it is possible, using the `systemd` features, to restart Charon emulator automatically

Step-by-step guide

> **Additional considerations**
> - To perform this procedure, you must have the necessary privileges to handle `systemd` service and execute `systemctl` commands
> - This documentation applies only to Linux distributions including the `systemd` feature. ⚠ This does not apply to Red Hat Enterprise Linux 6

1. Setup your CHARON virtual machine as a service. To do so, refer to the corresponding documentation or install and use the CHARON Linux Toolkit.

2. Edit the service configuration file and add the following parameters:

Parameter	Type	Description
Restart	text	Configures whether the service shall be restarted when the service process exits, is killed, or a timeout is reached
RestartSec	numeric	Configures the time to sleep before restarting a service (as configured with `Restart=`). Takes a unit-less value in seconds, or a time span value such as "5min 20s". Defaults to 100ms.
StartLimitInterval	numeric	Configure service start rate limiting. By default, services which are started more than 5 times within 10 seconds are not permitted to start any more times until the 10 second interval ends. With these two options, this rate limiting may be modified. Use `StartLimitInterval=` to configure the checking interval (defaults to `DefaultStartLimitInterval=` in manager configuration file, set to 0 to disable any kind of rate limiting). Use `StartLimitBurst=` to configure how many starts per interval are allowed (defaults to `DefaultStartLimitBurst=` in manager configuration file).
StartLimitBurst	numeric	

💡 More parameters can be defined for auto-restart. Please refer to your Linux distribution documentation (see Links further)

Example: The following service will restart in case of failure (`Restart=on-failure`) after 30 seconds (`RestartSec=30`) with a limit of 2 (`StartLimitBurst=2`) within 10 minutes (`StartLimitInterval=600`)

```
# vim /usr/lib/systemd/system/as4100.service

[Unit]

Description=DEMO as4100

After=atd.service postfix.service ncu.service aksusbd.service

Wants=aksusbd.service


[Service]

Type=forking

WorkingDirectory=/charon/log

ExecStart=/opt/charon/bin/as4100 -d /my_services/as4100-service.cfg

ExecStop=/charon/scripts/mystopscript /my_services/as4100-service.cfg

Restart=on-failure

RestartSec=30

StartLimitInterval=600

StartLimitBurst=2


[Install]

WantedBy=multi-user.target
```

3. Reload systemd manager configuration:

```
# systemctl daemon-reload
```

Notes

Autoboot

Restarting Charon emulator does not mean booting the OpenVMS or Tru64 virtual system. You will need to setup the flags at SRM level for autoboot.

🟡 See the related documentation of your emulator

Charon-AXP

The default boot device and the action to be performed on boot have to be set

Example for Charon-AXP:

```
P00>>> set bootdef_dev dka0

P00>>> set auto_action restart
```

Charon-VAX

CHARON-VAX can be configured to automatically boot an operating system at start up.

The MicroVAX 3100, VAX 6310 and VAX 4000 models boot automatically if the correct boot flags are set at the VAX console level:

```
>>>set halt reboot
```

Please check that the TOY, EEPROM and ROM containers (see above) are enabled so the console changes are saved upon reboots.

The ROM of certain VAX models (MicroVAX II, MicroVAX 3600, MicroVAX 3900, VAXserver 3600 and VAXserver 3900) does not allow the SRM console to accept the above command to enable auto booting. As a workaround, a specific setting can be defined in the configuration file:

```
set bdr boot=auto
```

The Charon-VAX 6000 models have a similar configuration setting:

```
set xmi boot=auto
```

Restart limit reached

In case the StartLimitBurst is reached during the interval, you will not be able to restart the service until you reset the failure counter.

Example:

```
# systemctl start charon_pluto
Job for charon_pluto.service failed. See 'systemctl status charon_pluto.service' and 'journalctl -xn' for
details.

# systemctl status charon_pluto
charon_pluto.service - DEMO as4100 pluto

   Loaded: loaded (/etc/systemd/system/charon_pluto.service; disabled)

   Active: failed (Result: start-limit) since Mon 2015-09-28 15:59:36 CEST; 3min 10s ago

  Process: 67122 ExecStop=/opt/charon/utils/charon_gstart stop /charon/pluto.cfg (code=exited,
status=0/SUCCESS)

  Process: 62391 ExecStart=/opt/charon/utils/charon_gstart start /charon/pluto.cfg (code=exited,
status=0/SUCCESS)

 Main PID: 62795 (code=killed, signal=KILL)


Sep 28 15:59:16 rhel71.localdomain systemd[1]: Unit charon_pluto.service entered failed state.

Sep 28 15:59:36 rhel71.localdomain systemd[1]: charon_pluto.service holdoff time over, scheduling restart.

Sep 28 15:59:36 rhel71.localdomain systemd[1]: Stopping DEMO as4100 pluto...

Sep 28 15:59:36 rhel71.localdomain systemd[1]: Starting DEMO as4100 pluto...

Sep 28 15:59:36 rhel71.localdomain systemd[1]: charon_pluto.service start request repeated too quickly,
refusing to start.
Sep 28 15:59:36 rhel71.localdomain systemd[1]: Failed to start DEMO as4100 pluto.

Sep 28 15:59:36 rhel71.localdomain systemd[1]: Unit charon_pluto.service entered failed state.

Sep 28 15:59:54 rhel71.localdomain systemd[1]: Starting DEMO as4100 pluto...

Sep 28 15:59:54 rhel71.localdomain systemd[1]: charon_pluto.service start request repeated too quickly,
refusing to start.

Sep 28 15:59:54 rhel71.localdomain systemd[1]: Failed to start DEMO as4100 pluto.

# systemctl reset-failed charon_pluto

# systemctl start charon_pluto

# systemctl is-active charon_pluto

active
```

Charon Linux Toolkit integration

The CHARON Linux Toolkit, starting version 41, is able to manage the auto-restart settings.

ℹ️ Starting with kit version 42, if auto-restart settings are defined they will be displayed in the virtual machines lists while navigating in the menu options and the failure counter will be reset on each start (from the menu)

Example:

```
┌STROMASYS - Virtualization Technologies────────────────────────────V2.2b─┐
│ Service management (Start, Stop, Manage automatic boot & shutdown)       │
│                                                                          │
│ Server booted on: Wed 29-Jul-2015 13:43:00 - Current: Mon 28-Sep-2015 16:11:32│
│ Number of CPUs: 3 - Memory(free/tot): 832,136kB / 3,868,776kB (21%)     │
│                                                                          │
│ Emulator/Config File        Cpu Mem  State            Stop script     B │
│                                                                          │
│ - as4100/pluto               1 256M  ACTIVE           Customized      N │
│   Auto-restart on-failure after 20s, max 2 times in 600 seconds          │
│   Description: DEMO as4100 pluto                                          │
│   Started: Mon 2015-09-28 16:03:39 CEST (PID=70658)                      │
│                                                                          │
│ Available options                                                        │
├──────────────────────────────────────────────────────────────────────────┤
│ 1 - Update guests list         6 - Create/Edit guest stop script         │
│ 2 - Start/stop guests          7 - Connect to guest console              │
│ 3 - View latest guest log file 8 - Edit configuration files              │
│ 4 - View guest manager log file 9 - Manage monitored guests logs         │
│ 5 - Manage 'systemd' services  q - quit                                  │
│                                                                          │
│ Enter your choice (enter to refresh): █                                  │
└──────────────────────────────────────────────────────────────────────────┘
```

Links

- Red Hat Enterprise Linux 7 - Managing System Services: https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/7/html/System_Administrators_Guide/sect-Managing_Services_with_systemd-Services.html
- FreeDesktop.org - systemd.service: http://www.freedesktop.org/software/systemd/man/systemd.service.html

Related articles

- Alphaserver DS15 and DS25 fail to start after migration to Charon-AXP V4.9 and above
- How to restart CHARON-VAX/AXP on Windows automatically on failure
- Tru64 system stops with fan failure message