1 / 99

Charon-PAR Linux Toolkit V1.3
Users Guide

Contents

Purpose of this document

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

The Toolkit provides the following features:

- Manage start/stop virtual (emulated) machines, also named "guests" with services and customized shutdown commands:
    - Automatic start of the guests at Charon Linux server boot
    - Clean shutdown of the guests at Charon Linux 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 :warn: and :err: 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 Charon-PAR Linux Toolkit version 1.3.

> ⊘ The Charon-PAR Linux Toolkit must be used for Charon-PAR products only. It cannot be used for other Charon products. One must not install Linux toolkits for different Charon products on the same server.

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-PAR 2.0
    - Charon-PAR 2.1
    - Charon-PAR 3.0.0
    - Charon-PAR 3.0.1

- Scripts have been tested and validated on the following Linux distributions/versions:
    - CentOS 7 & 8
    - Red Hat Enterprise Linux Server release 7 & 8

- 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 (text mode)
        - `putty` : recommended for connection from the Charon server to the virtual machine console (GUI)
        - `expect` : recommended if `ssh` cannot be used to execute shutdown commands from the console
        - `rsh`: recommended if rsh method is to be used for Charon instance clean shutdown
        - `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' can be executed as a non root user but with limited possibilities. In this case "Not root!" will be displayed on the top left on the menu.
    - To run the 'menu' via a sudo command, so without the restrictions mentioned above, use: `$ sudo /opt/charon/utils /charon_menu`
    - 🛈 It is also possible to allow non root users to run the 'menu' and other related command lines without being 'root'. This must be enabled first as root in the "12 - Preferences" menu option then "8 - Access 'menu' using 'sudo'"
    - The 'menu' must be used by one user at a time only
- Mail service must have been configured. Mail transfer agent can be postfix, sendmail, ...

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.

ⓘ 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 or General Product Information

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.

Obtaining General Product Information

If you require information in addition to what is available on the Stromasys Product Documentation and Knowledge Base and on the Stromasys web site you can contact the Stromasys team using https://www.stromasys.com/contact/, or by sending an email to info@stromasys.com.

For further information on purchases and the product best suited to your requirements, you can also contact your regional sales team by phone:

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

Conventions

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.

Definitions

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-PAR Linux Toolkit V1.3 - User's Guide
- Charon-PAR Linux Toolkit - Release notes for Kit 1.3

🍂 Setup

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-PAR_Linux_Toolkit.V1.3.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-PAR_Linux_Toolkit.V1.3.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`', '`vmlist`', '`vmstart`', '`vmstop`', '`vmconsole`' and '`vmcfg`' aliases will be created. They will be the commands you'll use to access the menu or to view and manage virtual machines using command lines.

- 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
  - Send immediate alert on dongle removal or not (with counter alert)
  - ℹ️ The alerts simulator can be used to send all the know alerts via email (for checks)
  - Reduce the number of warning messages sent on dongle removal or not

    Example:

```
┌STROMASYS - Legacy server emulation────────────────────────────V1.10─┐
│ Alerts management                                                    │
└──────────────────────────────────────────────────────────────────────┘

No  Parameter                          Current value(s)
___ _____                          _____
1 - Mail mode (text/html)             HTML
2 - Mail recipients list                              @stromasys.com
3 - Mail sender (optional)                           @stromasys.com
4 - Create/Update alert mail footer   Stromasys Geneva Lab - ESXi
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: Mon 18-Jan-2021 00:00:01
9 - Immediate alert on dongle removal Enabled
10- Alerts simulator
11- Reduce WARN msgs 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
```

Menu options

Table of Contents

Menu launcher

Execute the following command:

```
# menu
```

to display the Toolkit menu:

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

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

Putty configuration

Colors

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

Line drawing

If the menu does not correctly display line drawing, you can change some parameters in putty.

Putty version 0.71 and above

Set the new parameter "**UTF8linedraw=1**"

- on Linux, add a line in .putty/sessions/yoursession containing this parameter (above)
- on Windows, change settings from "Window" → "Translation" pane and check the button "Enable VT100 line drawing even in UTF-8 mode"

ⓘ you can keep your locale / codepage as UTF-8

Putty version 0.70 and below

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:

```
# TERM=xterm
# export TERM
# menu
```

Notes:

- It is possible to disable line drawing (semi-graphics) from the preferences menu if necessary
- If you're using putty, you'll maybe have to force the **Terminal-type string**:
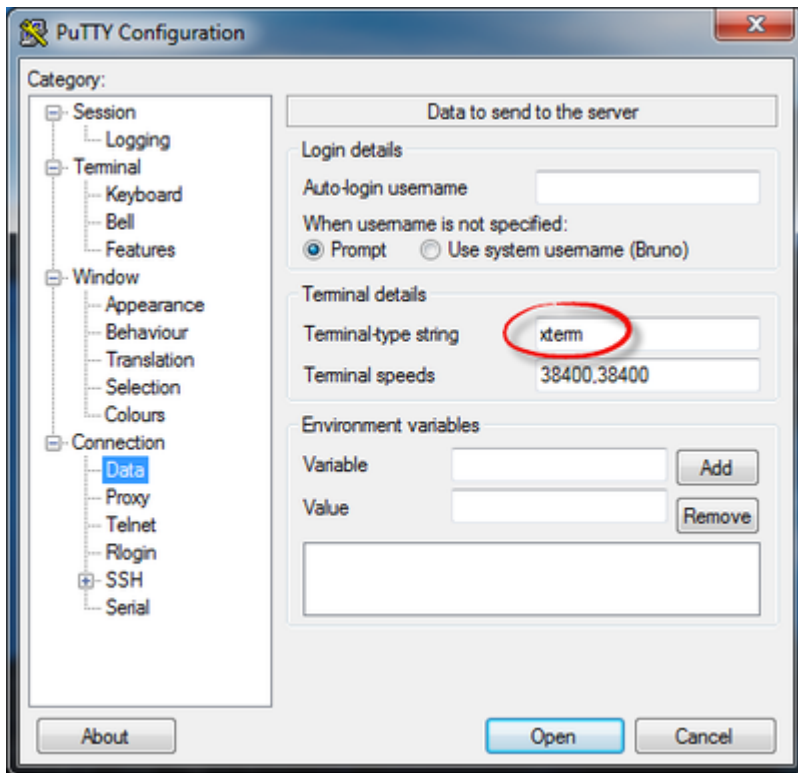
and maybe **Remote character set** parameter:
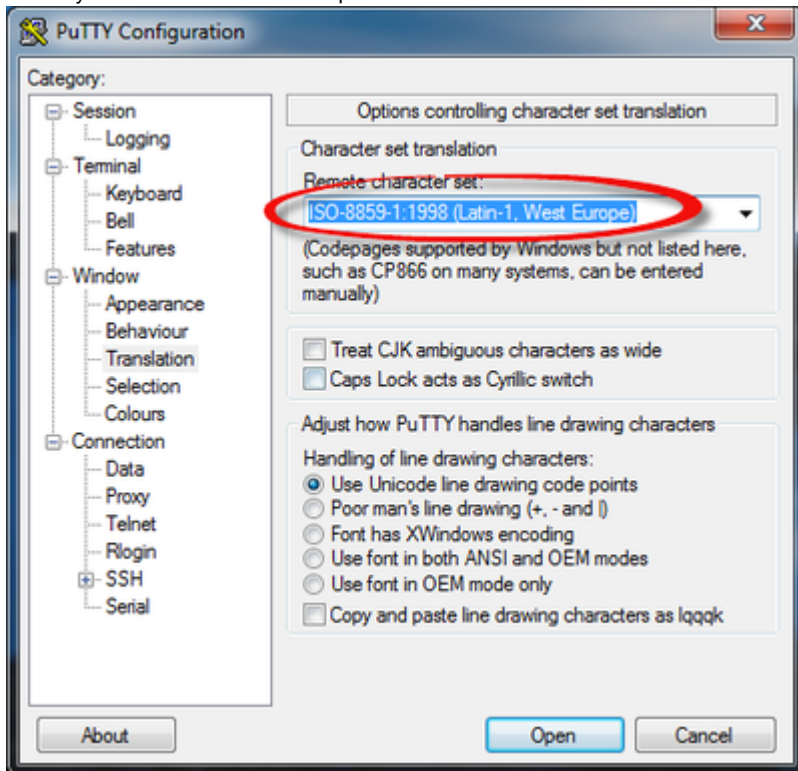
💡 If you have issues with some characters that are not displayed correctly, please see this article: Cannot get correct line drawing on Linux /UNIX with Putty

Menu Options

- Install/Upgrade/Remove Charon
- 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 - Connect to guest console
  - VM management - Edit configuration files
  - VM management - Manage 'systemd' services
  - VM management - View guest log file
  - VM management - Create/Edit guest stop script
  - VM management - Create/Edit guest pre-start script
  - VM management - Create/Edit guest check/run 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-PAR, you will need to stop the running virtual machines, 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.
- ⚠️ To remove Charon-PAR, 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 CentOS 7.9
- We will install Charon-PAR 3.0.1 Build 21500
- License key is based on USB dongle
- We assume Charon kits have been downloaded to the `/charon` folder

Example:

```
# ll /charon/*.tar*
-rw-r--r--. 1 root root 11182154 Sep  1 15:49 /charon/charon-par-2.1.0-21301.el7.tar.gz
-rw-r--r--. 1 root root       76 Sep  1 15:51 /charon/charon-par-2.1.0-21301.el7.tar.gz.md5sum
-rw-r--r--. 1 root root 16612844 Jan 21 14:18 /charon/charon-par-3.0.1-21500.el7.tar.gz
-rw-r--r--. 1 root root       68 Jan 21 14:22 /charon/charon-par-3.0.1-21500.el7.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──────────────────────────────────V1.3─┐
│  Install/Upgrade/Remove CHARON                                            │
└───────────────────────────────────────────────────────────────────────────┘

Hostname:              charonparltk.stromasys.com
Linux version:         CentOS Linux release 7.9.2009 (Core)
                       Linux 3.10.0-1160.11.1.el7.x86_64

Installed packages
No one installed

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

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

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

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


No  Product                 Version  Build   Installed Container  md5sum
─── ──────────────────────  ───────  ─────   ───────── ─────────  ──────
  1 charon-par                2.1.0   21301   -         tar.gz      OK
    ──────────────────────  ───────  ─────   ───────── ─────────
  2 charon-par                3.0.1   21500   -         tar.gz      OK

Select the kit you want to use (q to quit): 2▯          3
```

ℹ On next installation, the kit location will be proposed as default (2)

The kit will then be unzipped, extracted and installed.

```
Checking charon-par-3.0.1-21500.el7.tar.gz file (md5sum) ...
Success.
Unzipping file...
Extracting tar file...
Done.
Removing tar file...

Loaded plugins: fastestmirror, langpacks
Examining charon-mtd-4.11-20500.el7.x86_64.rpm: charon-mtd-4.11-20500.x86_64
Marking charon-mtd-4.11-20500.el7.x86_64.rpm to be installed
Examining charon-par-3.0.1-21500.0229672.el7.x86_64.rpm: charon-par-3.0.1-21500.
0229672.el7.x86_64
Marking charon-par-3.0.1-21500.0229672.el7.x86_64.rpm to be installed
Examining aksusbd-7.63-1.i386.rpm: aksusbd-7.63-1.i386
Marking aksusbd-7.63-1.i386.rpm to be installed
Resolving Dependencies
--> Running transaction check
---> Package aksusbd.i386 0:7.63-1 will be installed
---> Package charon-mtd.x86_64 0:4.11-20500 will be installed
---> Package charon-par.x86_64 0:3.0.1-21500.0229672.el7 will be installed
--> Finished Dependency Resolution

Dependencies Resolved
```

...

```
==========================================================================
 Package      Arch    Version      Repository                        Size
==========================================================================
Installing:
 aksusbd      i386    7.63-1       /aksusbd-7.63-1.i386              2.7 M
 charon-mtd x86_64  4.11-20500   /charon-mtd-4.11-20500.el7.x86_64   173 k
 charon-par x86_64  3.0.1-21500.0229672.el7
                              /charon-par-3.0.1-21500.0229672.el7.x86_64  33 M

Transaction Summary
==========================================================================
Install   3 Packages

Total size: 36 M
Installed size: 36 M
Downloading packages:
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : charon-mtd-4.11-20500.x86_64                       1/3
  Installing : aksusbd-7.63-1.i386                                2/3
Starting aksusbd (via systemctl):  [  OK  ]
  Installing : charon-par-3.0.1-21500.0229672.el7.x86_64          3/3
  Verifying  : charon-mtd-4.11-20500.x86_64                       1/3
  Verifying  : aksusbd-7.63-1.i386                                2/3
  Verifying  : charon-par-3.0.1-21500.0229672.el7.x86_64          3/3

Installed:
  aksusbd.i386 0:7.63-1                     charon-mtd.x86_64 0:4.11-20500
  charon-par.x86_64 0:3.0.1-21500.0229672.el7

Complete!
 Installation completed 

Output saved to /opt/charon/log/yum.install.20210121_143244


Press enter
```

Charon-PAR is now installed as shown below:

```
 ┌STROMASYS - Legacy server emulation───────────────────────V1.3─┐
 │  Install/Upgrade/Remove CHARON                                │
 └──────────────────────────────────────────────────────────────┘
Hostname:              charonparltk.stromasys.com
Linux version:         CentOS Linux release 7.9.2009 (Core)
                       Linux 3.10.0-1160.11.1.el7.x86_64

Installed packages
- aksusbd-7.63-1
- charon-mtd-4.11-20500
- charon-par-3.0.1-21500.0229672.el7     ✔

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

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

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.

Example

```
STROMASYS - Legacy server emulation                              V1.10
 HASP license details

Licenses found on this server:
- USB dongles: 1
- Software licenses (SL): 0

Please wait, generating output....
```

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.

Example with "vim" and its syntax highlighting:

```
Trying to connect to the key: 1619329274
License Manager running at host: charonparltk.stromasys.com
License Manager IP address: 127.0.0.1


The Physical KeyId: 1619329274
License type: License Dongle (Local)
CHARON Sentinel HASP License key section
Reading 4032 bytes

The License Number: 1000.806
The License KeyId: 1619329274
The Master KeyId: 1645066348
Release date: 02-SEP-2020
Release time: 11:12:53
Update number: 30
End User name: Stromasys
Purchasing Customer name: Stromasys
```

When exiting the editor, it is possible to send the license content (text file) by email:

```
┌─STROMASYS - Legacy server emulation──────────────────────────V1.10─┐
│  HASP license details                                              │
└────────────────────────────────────────────────────────────────────┘
Licenses found on this server:
- USB dongles: 1
- Software licenses (SL): 0

License number  Type  Key ID              Description
─────────────────────────────────────────────────────────────────────

1000.806        USB   1619329274          ESX server, path:3/5


Do you want to send file via mail (y/n) ? y        1

Enter the email recipient (q to quit) []:          @stromasys.com    2
Confirm (y/n) : y        3

Sending mail to                .@stromasys.com as '              @stromasys.com'
...
Done.
```

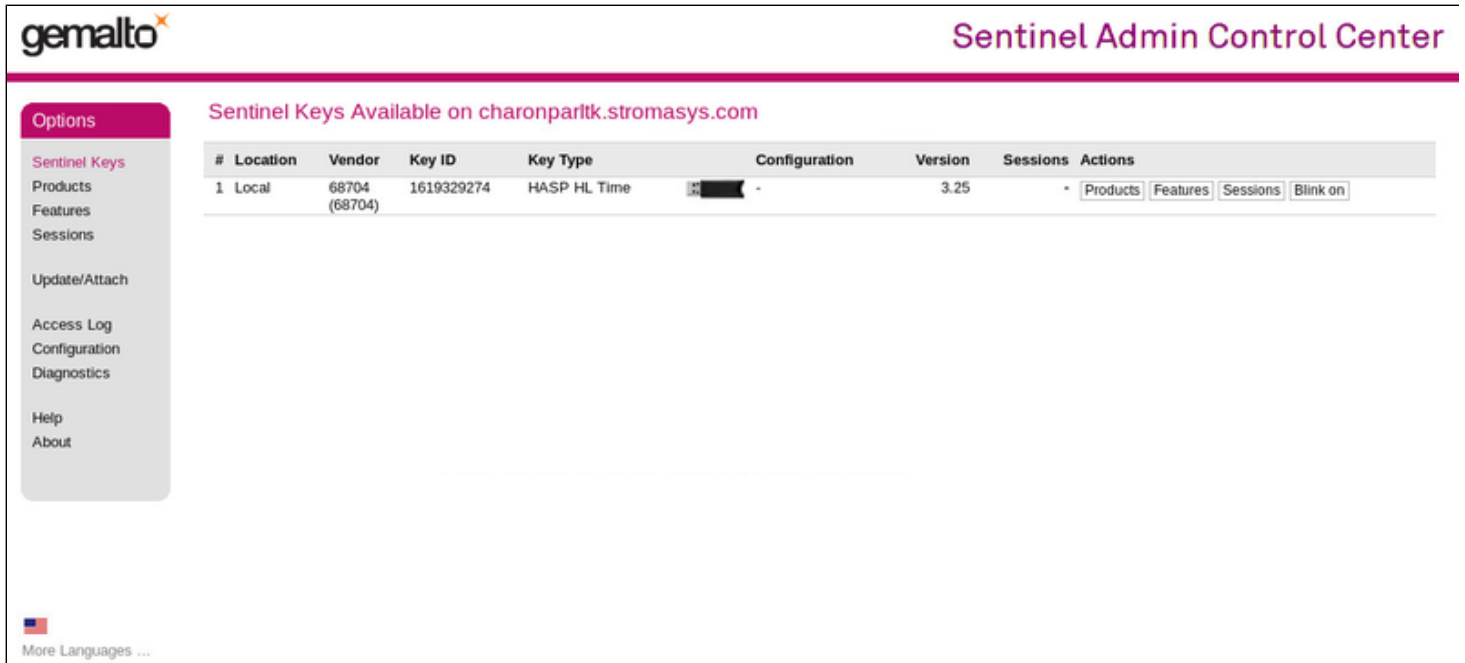ℹ If you decide to send the result via email, you will receive one with subject: "[CHARON] View license HASP_SRM_VIEW"

💡 Licenses descriptions (usage, location, etc...) can be added to the display list by using the menu option "7 - License update tool" then "6 - Update license description".

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──────────────────────────V1.4─┐
│ License driver management (aksusbd)                               │
└───────────────────────────────────────────────────────────────────┘

Licenses found on this server:
- USB dongles: 1
    Bus 002 Device 004: ID 0529:0001 Aladdin Knowledge Systems HASP copy protect
ion dongle
        iProduct                  2 HASP HL 3.25
- Software licenses (SL): 0

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 Thu 2021-01-21 14:32:46 CET; 12min ago
     Docs: man:systemd-sysv-generator(8)
  Process: 14162 ExecStart=/etc/rc.d/init.d/aksusbd start (code=exited, status=0
/SUCCESS)
    Tasks: 10
   CGroup: /system.slice/aksusbd.service
           ├─14177 /usr/sbin/aksusbd
           ├─14198 /usr/sbin/winehasp
           └─14217 /usr/sbin/hasplmd -s

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

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

Note: the C2V files for all attached licenses will be created and zipped into a single file

Example

```
┌─STROMASYS – Legacy server emulation───────────────────────V1.15─┐
│ Request for new license or license update (send C2V file)       │
└─────────────────────────────────────────────────────────────────┘
Licenses found on this server:
- USB dongles: 1
- Software licenses (SL): 0

Collect information to:
1 - Update a license (dongle or software license)
2 - Generate a Software License (fingerprint)

Enter your choice (q to quit) : 1      1

License number:   1000.806

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

C2V file generated:   /tmp/1000.806_20210121_144717.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: 1000.806_20210121_144717.c2v (deflated 53%)
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:
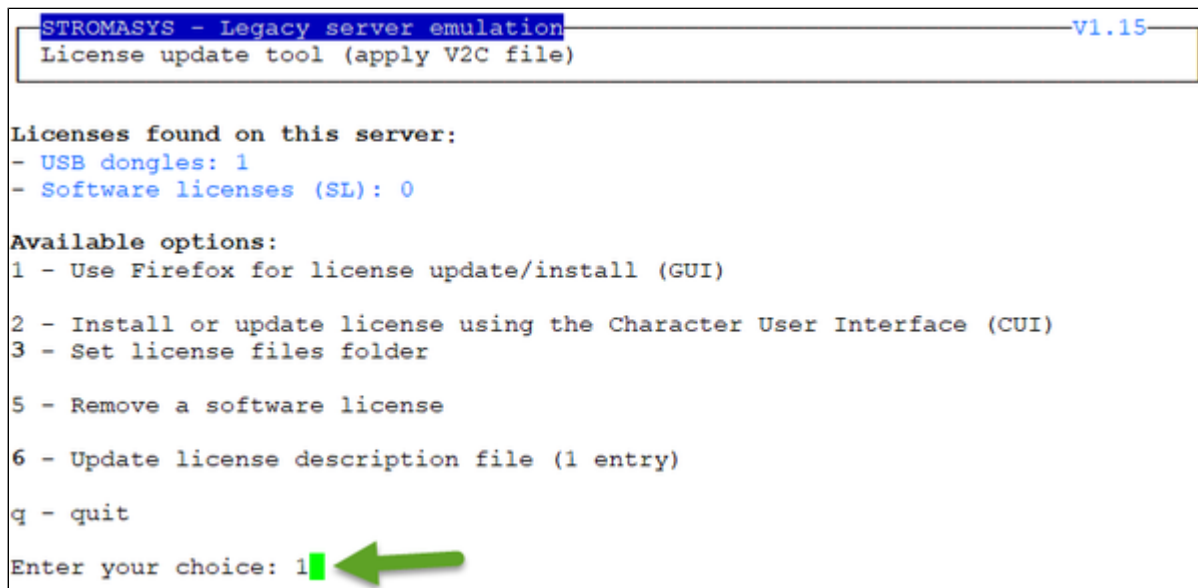
```
┌─STROMASYS - Legacy server emulation─────────────────────────────V1.15─┐
│ License update tool (apply V2C file)                                  │
└───────────────────────────────────────────────────────────────────────┘

Licenses found on this server:
- USB dongles: 1
- Software licenses (SL): 0

Available options:
1 - Use Firefox for license update/install (GUI)

2 - Install or update license using the Character User Interface (CUI)
3 - Set license files folder

5 - Remove a software license

6 - Update license description file (1 entry)

q - quit

Enter your choice: 1
```

and click on the Browse button to select and apply the V2C files:
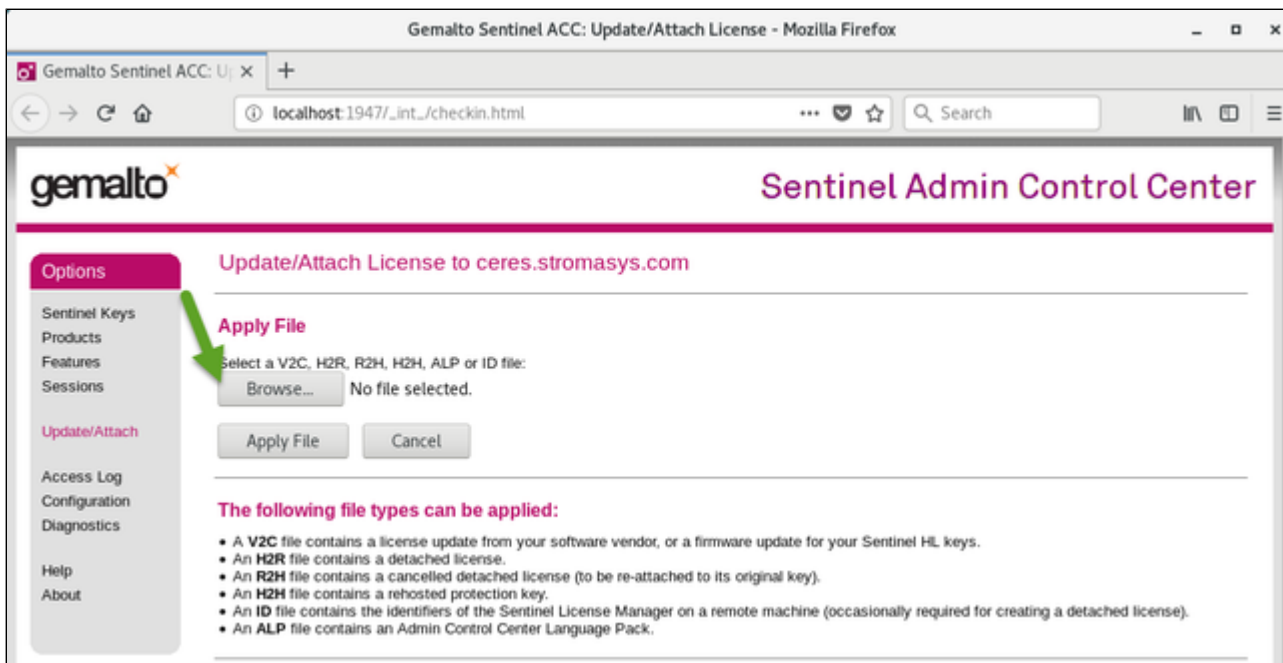
⚠️ In case of update, install the `_fmt.v2c` file first (_fmt = format)

Using Character User Interface (CUI)

Select option 2 from the menu:

```
STROMASYS - Legacy server emulation                          V1.15
License update tool (apply V2C file)


Licenses found on this server:
- USB dongles: 1
- Software licenses (SL): 0

Available options:
1 - Use Firefox for license update/install (GUI)

2 - Install or update license using the Character User Interface (CUI)
3 - Set license files folder

5 - Remove a software license

6 - Update license description file (1 entry)

q - quit

Enter your choice: 3      1

Enter the folder name [] (q to quit): /charon/licenses   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 - Legacy server emulation────────────────────────────────V1.9─┐
│  License update tool (apply V2C file)                                    │
└──────────────────────────────────────────────────────────────────────────┘


Licenses found on this server:
- USB dongles: 1
- Software licenses (SL): 0

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 - Legacy server emulation────────────────────────────────V1.9─┐
│  License update tool (apply V2C file)                                    │
└──────────────────────────────────────────────────────────────────────────┘


Licenses found on this server:
- USB dongles: 1
- Software licenses (SL): 0

Available options
1 - Install or update license
2 - Change license files folder [/charon/licenses]
3 - Delete license files older than 'n' days
q - Quit

Enter your choice: 1        1
 Available license files
  1 - 0026_1000.806_31-MAR-2021_fmt.v2c
  2 - 0026_1000.806_31-MAR-2021.v2c
  3 - 0027_1000.806_31-MAR-2021_fmt.v2c
  4 - 0027_1000.806_31-MAR-2021.v2c
  5 - 0028_1000.806_31-MAR-2021_fmt.v2c
  6 - 0028_1000.806_31-MAR-2021.v2c
  7 - 0029_1000.806_31-MAR-2021_fmt.v2c
  8 - 0029_1000.806_31-MAR-2021.v2c
  9 - 0030_1000.806_07-APR-2021_fmt.v2c
 10 - 0030_1000.806_07-APR-2021.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) : 9 10        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 0030_1000.806_07-APR-2021_fmt.v2c ...
The Sentinel protection key updated successfully.
Applying 0030_1000.806_07-APR-2021.v2c ...
The Sentinel protection key updated successfully.

Press enter
```

The license updates will be applied in the order specified.

Notes:

- In case of update, install the `_fmt.v2c` file first (_fmt = format)
- Files are sorted by license number then sequence number and then type with _fmt first. Files dated the current day are displayed in bold.
- 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)
- The option to delete license files .v2c older than a number of days is to be executed at will to cleanup the folder
- It is recommended to run the License expiration check utility or the HASP license details utility and check updates have been correctly applied.

Remove a software license

Use this option to remove existing or cloned software licence.

Update license description file

Use this option to define a description for the license. For example, if this is a USB dongle, its location.

This is performed using the editor defined in the preferences, format is as described below:

`<license number>;<description>;<color code>`

Color code can be:

1. Red
2. Green
3. Yellow
4. Blue
5. Magenta
6. Cyan
7. White

Example:

```
1000.806;ESX server, path:3/5;2
```

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                              V1.23
License expiration check


Product Name                          Expiration        Vers. AlertLvl

License: 1000.806 (USB) KeyID: 1619329274   ESX server, path:3/5
CHARON-AXP                            08-Apr-2021        4.12 NEUTRAL
CHARON-VAX                            08-Apr-2021        4.12 NEUTRAL
CHARON-SSP/4M, CHARON-SSP/4U, CHARON-SSP/4U+, 08-Apr-2021   4.2 NEUTRAL
7000-720                              08-Apr-2021         2.1 NEUTRAL
CHARON-HPA/A410X                      08-Apr-2021         2.0 NEUTRAL
CHARON-HPA/N4040X                     08-Apr-2021         2.0 NEUTRAL
Charon-PA9-64-L4                      08-Apr-2021         3.0 NEUTRAL

Press ENTER to continue.
```

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 (command executed on 21-Jul-2020):

```
# /opt/charon/utils/charon_expchk 15 -nomail -expdat=23-Jan-2021
```

This command, with forced expiration date, will provide the following results:

```
STROMASYS - Legacy server emulation                                    V1.23
License expiration check


Product Name                              Expiration        Vers. AlertLvl
                                          _____        _____ _____

License: 1000.806 (USB) KeyID: 1619329274  ESX server, path:3/5
CHARON-AXP                                23-Jan-2021        4.12 MAJOR
CHARON-VAX                                23-Jan-2021        4.12 MAJOR
CHARON-SSP/4M, CHARON-SSP/4U, CHARON-SSP/4U+, 23-Jan-2021    4.2 MAJOR
7000-720                                  23-Jan-2021         2.1 MAJOR
CHARON-HPA/A410X                          23-Jan-2021         2.0 MAJOR
CHARON-HPA/N4040X                         23-Jan-2021         2.0 MAJOR
Charon-PA9-64-L4                          23-Jan-2021         3.0 MAJOR
```

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, CRITICAL, 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**: `: 23-Jan-2021. License: 1001687. Product: CHARON-PA9-64-L4`

Script example using Zabbix software:

```
#!/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 the emulated machine).

- **Startup**: the virtual machine is executed in detached mode (using '-x' parameter) and then requires the console port to be set.
    - 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 server power off.
    - 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 process is killed by the system (SIGKILL).
    - If there is more than one guest on the server, guests are stopped in parallel mode during server shutdown. If a specific order is required, the services description files will have to be modified to add dependencies using `Before=` or `After=` for example. 🛈 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
Configuration File	Configuration file name.
CPU	Displays the number of CPUs by looking for the 'model' parameter into configuration file settings and searching in a predefined file containing the list of models and cpu numbers. If no information is available, "-" is displayed instead.
Memory	Displays the amount of memory defined in the configuration file (if defined). If no information is available, "-" is displayed instead.
State	- 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

- Depending on settings and virtual machine state, more information can be displayed
    - Emulator
    - Description
    - Auto-restart settings. This feature is managed by `systemd` and described in the Tips and Tricks chapter.

- Service start and/or stop timeouts and Start on boot. ⓘ Start on boot value means the Charon virtual machine will be started on Linux server boot but not necessarily booted. To automatically boot the virtual machine on startup, please refer to the Charon-PAR and console settings.
- Start/stop date if available
- 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 (HP-UX or MPE/iX virtual machine).
    ⓘ 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)
- Console port
- Guest OS response (optional, see Service management - Create/Edit guest stop script / Optional guest display status script)
- The license status is displayed in case of events: communication lost/restored, license found, ...
- 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 (if installed), (3)=NIC is already used, (4)=NIC has an IP address.

- The third part displays the available options that are detailed further.

Example

```
[root@charonparltk utils]# vmlist
Server boot: 22-Dec-2020 10:02   CPUs: 6  Memory(free/tot): 8.3G/15G (53%)

Configuration File                          Cpu Memory State/Uptime: d hh:mm:ss

- /charonRP7400/rp7400.cfg                   1    2G  ACTIVE              05:47
  Model:                rp7400-1-650
  Description:          CHARON charon-par/rp7400
  Startup type:        Manual  / Service Timeouts: Start=20min Stop=20min
  Stop script:         Not found
  Started:            [ Thu 2021-01-21 15:24:24 CET PID=25037 Memory=5,874M
                      [ Protected against OOM Killer.
  Console port:        30001
  Log file:            /charonRP7400/logs/rp7400.log
  Network:             EWA0/ens224
[root@charonparltk utils]#
```

Notes:

- A star besides the emulator name means next commands lines like `vmstop`, `vmcfg` and `vmconsole` will use this virtual machine if no other one is specified.
- If Auto-restart needs to be set for this service, please read the Tips and Tricks chapter.
- "Description" and "Service Timeouts" are defined at service level. This is described here: VM management - Manage 'systemd' services.
- "Guest OS answer" is based on an optional script performing an ssh connection to the HP-UX system. This is described here: VM management - Create/Edit guest stop script. If the guest OS response returns error code 255, this means the legacy system is not booted or there is a network problem.

Menu options

- VM management - Update guests list
- VM management - Start/stop guests
- VM management - Connect to guest console
- VM management - Edit configuration files
- VM management - Manage 'systemd' services
- VM management - View guest log file
- VM management - Create/Edit guest stop script
- VM management - Create/Edit guest pre-start script
- VM management - Create/Edit guest check/run 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

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 must be edited to change settings like disks, network interface(s), etc..

ℹ️ 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.

ℹ️ 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: CentOS 7.9 server with Charon-PAR V3.0.1 installed

```
STROMASYS - Legacy server emulation                              V1.5
 Virtual Machines Management


Server boot: 22-Dec-2020 10:02   CPUs: 6   Memory(free/tot): 7.6G/15G (48%)

Configuration File                        Cpu Memory State/Uptime: d hh:mm:ss

No virtual machine defined.

Available options

1 - Update guests list              6 - View latest guest log file
2 - Start/stop guests               7 - Create/Edit guest stop script
3 - Connect to guest console        8 - Create/Edit guest pre-start script
4 - Edit configuration files        9 - Create/Edit guest check/run script
5 - Manage 'systemd' services

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

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

```
Server boot: 22-Dec-2020 10:02  CPUs: 6  Memory(free/tot): 7.6G/15G (48%)

Configuration File                        Cpu Memory State/Uptime: d hh:mm:ss
_____  ___ _____ _____

No virtual machine defined.

Available options
_____

1 - Add guest
2 - Remove guest
3 - Enable/Disable start at server boot
q - quit

Enter your choice: 1
```
◀ 1

We will add here the /charon/rp7400.cfg already prepared configuration file:

```
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: /charonRP7400/rp7400.cfg
                                                1

Select the startup type (1=Manual, 2=Automatic, q to quit) [1]:
                                                              2
Log file forced to: /charonRP7400/logs/rp7400.log
Folder /charonRP7400/logs already exists...
Guest added.
Service charon_rp7400.service is enabled.

Configuration file must be updated before starting the guest.

Do you want to edit this file (y/n) ? y
                              3
```

Notes:

- Use the 'l' option to list available configuration files and templates
- Use the 'c' option to clone provided templates
- ⚠️ 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.
- The location of the log file is forced to be under the configuration file folder and named "logs/". If the folder does not exist, it will be automatically created.

Using the selected editor or the one defined in the preferences, the configuration file can be customized.

Notes:

- The log.name value is not taken into account, it is forced as explained above
- Ensure the port number is unique if multiple virtual machines will run on the same server. An alert will be displayed while displaying the managed virtual machines in case.
- If .dsk and .iso files are defined, their existence will be checked upon editor exit
- Network settings will be checked upon editor exit
- ℹ️ Lines starting with "`#INFO:`" are comments that will be displayed when accessing the console

When leaving the editor, the log monitoring service is automatically enabled (installed) unless globally disabled in the preferences:

```
Console port correctly set to: 30001 ✔
Log file is set to: /charonRP7400/logs/rp7400.log ✔

Log file /charonRP7400/logs/rp7400.log added to log monitor service.
Service charon_logmon_rp7400.service is enabled. ✔

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

 Checking network interfaces...
Done. ✔

Do you want to start this guest (y/n) or re-edit the file (e) ? y▮    1
```

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_rp7400.service at 21-Jan-2021 15:24:17
Status: active
Restarting aksusbd log monitor service...
 Starting charon_rp7400.service at 21-Jan-2021 15:24:21
Jan 21 15:24:21 Starting CHARON charon-par/rp7400...
Jan 21 15:24:21 [INFO ] aksusbd monitor service status is: active
Jan 21 15:24:21 [INFO ] Log monitor service status is: active
Jan 21 15:24:21 [INFO ] Log monitor is active.
Jan 21 15:24:21 [INFO ] Checking network settings...
Jan 21 15:24:21 [INFO ] Switching off all offload parameters for interface ens22
4
Jan 21 15:24:21 [INFO ] Starting emulator: /opt/charon/bin/charon-par -x -l /cha
ronRP7400/logs/rp7400.log -f /charonRP7400/rp7400.cfg -p /var/run/rp7400.pid
Jan 21 15:24:24 started: /opt/charon/bin/charon-par -x -l /charonRP7400/logs/rp7
400.log -f /charonRP7400/rp7400.cfg -p /var/run/rp7400.pid
Jan 21 15:24:24 cwd: /charonRP7400
Jan 21 15:24:24 Charon-PAR
Jan 21 15:24:24 Version 3.0.1, build 21.500 0229672 Nov 17 2020 21:08:33 Prod
Jan 21 15:24:24 Copyright (c) 2011-2020 by Stromasys.
Jan 21 15:24:24 20210121:152424.293378:Charon-PAR
Jan 21 15:24:24 20210121:152424.293421:Version 3.0.1, build 21.500 0229672 Nov 1
7 2020 21:08:33 Prod
Jan 21 15:24:24 20210121:152424.293430:Copyright (c) 2011-2020 by Stromasys.
```

...

```
c.cpp(212): init (): init tx fifo off
20210121:152441.802863:EWA0:827eafc0:1611239081802:src/ethernet/dec21x4x/etherne
t.cpp(934): iface_initialization_command (): ens224: command 'IFACE="ens224" ; e
xport eth=ens37; ethtool -K $eth rx off ; ethtool -K $eth tx off ; ethtool -K $e
th sg off ; ethtool -K $eth gso off ; ethtool -K $eth gro off ; ethtool -K $eth
txvlan off ; ethtool -K $eth rxvlan off' completed with status 256
20210121:152441.803237:EWA0:827eafc0:1611239081803:src/ethernet/dec21x4x/lnx_por
t.cpp(104): config (): ens224: Guest Mac address: 00-0c-29-f0-df-75, taken from
the interface
20210121:152441.803673:EWA0:827eafc0:1611239081803:src/ethernet/dec21x4x/lnx_por
t.cpp(140): config (): ens224: Runninng in promiscuous mode
20210121:152441.803757:EWA0:827eafc0:1611239081803:src/ethernet/dec21x4x/dec21x4
x.cpp(1545): init (): EWA0: Initialize 'DE500-BA'
20210121:152441.809034:uart2: port address: 0.0.0.0:30002
20210121:152441.809495:uart0: port address: 0.0.0.0:30001
20210121:152441.964197:cpu0: run cpu loop

Emulator started, use the 'vmconsole' command or use the 'Connect to guest
console' menu option to open the console.
20210121:152441.964317:Host CPU freq: 3498

Press enter
```

ℹ The continuous log file stops itself as this was defined in the preferences: "Automatically stop continuous log view: Yes"

💡 Press **CTRL-C** at any time to leave the log file view if the preference was set to not automatically stop or if the startup failed.

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" or "OnB" column on the right side)

The "Stop script" line (see below) 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 - Legacy server emulation──────────────────────V1.5─┐
│ Virtual Machines Management                                   │
└───────────────────────────────────────────────────────────────┘

Server boot: 22-Dec-2020 10:02   CPUs: 6   Memory(free/tot): 8.3G/15G (53%)

Configuration File                        Cpu Memory State/Uptime: d hh:mm:ss
─────────────────────────────────────────────────────────────────────────────
1- /charonRP7400/rp7400.cfg                 1    2G ACTIVE             02:10
     Model:              rp7400-1-650
     Description:        CHARON charon-par/rp7400
     Startup type:       Manual  / Service Timeouts: Start=20min Stop=20min
     Stop script:        Not found
     Started:          ┌ Thu 2021-01-21 15:24:24 CET PID=25037 Memory=5,746M
                       └ Protected against OOM Killer.
     Console port:       30001
     Log file:           /charonRP7400/logs/rp7400.log
     Network:            EWA0/ens224
```

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)

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

Example: CentOS 7.9 server with Charon-PAR 3.0.1 installed, virtual machine rp7400 installed

We are now going to remove (**1** & **2**) the rp7400 guest, currently in active state:

```
Server boot: 22-Dec-2020 10:02   CPUs: 6   Memory(free/tot): 8.3G/15G (53%)

Configuration File                        Cpu Memory State/Uptime: d hh:mm:ss
 ─────────────────────────────────────────────────────────────────────────────
 1- /charonRP7400/rp7400.cfg              1    2G ACTIVE                08:31
    Model:             rp7400-1-650
    Description:       CHARON charon-par/rp7400
    Startup type:      Manual  / Service Timeouts: Start=20min Stop=20min
    Stop script:       Not found
    Started:         ┌ Thu 2021-01-21 15:24:24 CET PID=25037 Memory=5,874M
                     └ Protected against OOM Killer.
    Console port:      30001
    Log file:          /charonRP7400/logs/rp7400.log
    Network:           EWA0/ens224

Available options
 ─────────────────────────────────────────────────────────────────────────────
1 - Add guest
2 - Remove guest
3 - Enable/Disable start at server boot
q - quit

Enter your choice: 2    ◄ 1

Server boot: 22-Dec-2020 10:02   CPUs: 6   Memory(free/tot): 8.3G/15G (53%)

Configuration File                        Cpu Memory State/Uptime: d hh:mm:ss
 ─────────────────────────────────────────────────────────────────────────────
 1- /charonRP7400/rp7400.cfg              1    2G ACTIVE                08:36
    Model:             rp7400-1-650
    Description:       CHARON charon-par/rp7400
    Startup type:      Manual  / Service Timeouts: Start=20min Stop=20min
    Stop script:       Not found
    Started:         ┌ Thu 2021-01-21 15:24:24 CET PID=25037 Memory=5,874M
                     └ Protected against OOM Killer.
    Console port:      30001
    Log file:          /charonRP7400/logs/rp7400.log
    Network:           EWA0/ens224
                                                          2
Please confirm the removal of charon-par/rp7400.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        1
 Stopping charon_rp7400.service at 21-Jan-2021    :34:09
Jan 21 15:24:41 Host CPU freq: 3498
Jan 21 15:34:09 Stopping CHARON charon-par/rp7400...
Jan 21 15:34:09 [INFO ] Stopping...
Jan 21 15:34:09 [WARN ] No stop script defined, sending KILL signal to emulator,
 pid 25037
Jan 21 15:34:09 [INFO ] Waiting for process id 25037 termination
Jan 21 15:34:09 charon_rp7400.service: main process exited, code=killed, status=
9/KILL
Jan 21 15:34:14 [INFO ] Process id 25037 has terminated
Jan 21 15:34:21 job 251 at Thu Jan 21 15:34:00 2021
Jan 21 15:34:21 Stopped CHARON charon-par/rp7400.
Jan 21 15:34:21 Unit charon_rp7400.service entered failed state.
Jan 21 15:34:21 charon_rp7400.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_rp7400
.service.

Server boot: 22-Dec-2020 10:02   CPUs: 6   Memory(free/tot): 13G/15G (84%)

Configuration File                          Cpu Memory State/Uptime: d hh:mm:ss
_____    ___ _____  _____
No virtual machine defined.

Guests list is empty.

Server boot: 22-Dec-2020 10:02   CPUs: 6   Memory(free/tot): 13G/15G (84%)

Configuration File                          Cpu Memory State/Uptime: d hh:mm:ss
_____    ___ _____  _____
No virtual machine defined.

Available options

1 - Add guest
2 - Remove guest
3 - Enable/Disable start at server boot
q - quit

Enter your choice: █        2
```

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

ℹ 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: CentOS 7.9 server with Charon-PAR 3.0.1 installed, virtual machine rp7400 installed

```
STROMASYS - Legacy server emulation                          V1.5
 Virtual Machines Management


Server boot: 22-Dec-2020 10:02  CPUs: 6  Memory(free/tot): 8.3G/15G (53%)

Configuration File                   Cpu Memory State/Uptime: d hh:mm:ss

- /charonRP7400/rp7400.cfg             1    2G ACTIVE           01:08
  Model:             rp7400-1-650
  Description:       CHARON charon-par/rp7400
  Startup type:      Manual  / Service Timeouts: Start=20min Stop=20min
  Stop script:       Not found
  Started:         ⌈ Thu 2021-01-21 15:38:19 CET PID=8633 Memory=5,682M
                   ⌊ Protected against OOM Killer.
  Console port:      30001
  Log file:          /charonRP7400/logs/rp7400.log
  Network:           EWA0/ens224

Available options

1 - Update guests list          6 - View latest guest log file
2 - Start/stop guests           7 - Create/Edit guest stop script
3 - Connect to guest console    8 - Create/Edit guest pre-start script
4 - Edit configuration files    9 - Create/Edit guest check/run script
5 - Manage 'systemd' services

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


Server boot: 22-Dec-2020 10:02  CPUs: 6  Memory(free/tot): 8.3G/15G (53%)

Configuration File                   Cpu Memory State/Uptime: d hh:mm:ss

1- /charonRP7400/rp7400.cfg            1    2G ACTIVE           01:11
   Model:            rp7400-1-650
   Description:      CHARON charon-par/rp7400
   Startup type:     Manual  / Service Timeouts: Start=20min Stop=20min
   Stop script:      Not found
   Started:        ⌈ Thu 2021-01-21 15:38:19 CET PID=8633 Memory=5,682M
                   ⌊ Protected against OOM Killer.
   Console port:     30001
   Log file:         /charonRP7400/logs/rp7400.log
   Network:          EWA0/ens224

Available options

1 - Add guest
2 - Remove guest
3 - Enable/Disable start at server boot
q - quit

Enter your choice: 3     2
```

We are now going to prevent from the rp7400 guest to be started automatically (**1**). Once completed enter 'n' to return to the previous menu (**2**):

```
Server boot: 22-Dec-2020 10:02   CPUs: 6  Memory(free/tot): 8.3G/15G (53%)

Configuration File                        Cpu Memory State/Uptime: d hh:mm:ss
_____

 1- /charonRP7400/rp7400.cfg              1     2G ACTIVE              02:13
     Model:              rp7400-1-650
     Description:        CHARON charon-par/rp7400
     Startup type:       Manual  / Service Timeouts: Start=20min Stop=20min
     Stop script:        Not foun
     Started:          ┌ Thu 2021-01-   15:38:19 CET PID=8633 Memory=5,746M
                       └ Protected against  OM Killer.
     Console port:       30001
     Log file:           /charonRP7400/logs/rp7400.
     Network:            EWA0/ens224


Please confirm charon-par/rp7400 boot change to 'Automatic' (y/n) : y        1
Server boot: 22-Dec-2020 10:02   CPUs: 6  Memory(free/tot): 8.3G/15  (53%)

Configuration File                        Cpu Memory  ate/Uptime: d hh:mm:ss
_____

 1- /charonRP7400/rp7400.cfg                    2G ACTIVE              02:25
     Model:              rp7400-1-650
     Description:        CHARON charo    ar/rp7400
     Startup type:       Automatic  / Service Timeouts: Start=20min Stop=20min
     Stop script:        Not found
     Started:          ┌ Thu 2021-01-21 15:38:19 CET PID=8633 Memory=5,746M
                       └ Protected against OOM Killer.
     Console port:       30001
     Log file:           /charonRP7400/logs/rp7400.log
     Network:            EWA0/ens224


Please confirm charon-par/rp7400 boot change to 'Manual' (y/n) : n        2
```

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: CentOS 7.9 server with Charon-PAR 3.0.1 installed, rp7400 guest running

```
STROMASYS - Legacy server emulation                              V1.5
 Virtual Machines Management


Server boot: 22-Dec-2020 10:02   CPUs: 6   Memory(free/tot): 8.3G/15G (53%)

Configuration File                          Cpu Memory State/Uptime: d hh:mm:ss

- /charonRP7400/rp7400.cfg                    1    2G ACTIVE              05:39
   Model:              rp7400-1-650
   Description:        CHARON charon-par/rp7400
   Startup type:       Manual  / Service Timeouts: Start=20min Stop=20min
   Stop script:        Not found
   Started:         [ Thu 2021-01-21 15:38:19 CET PID=8633 Memory=5,938M
                    [ Protected against OOM Killer.
   Console port:       30001
   Log file:           /charonRP7400/logs/rp7400.log
   Network:            EWA0/ens224

Available options

1 - Update guests list           6 - View latest guest log file
2 - Start/stop guests            7 - Create/Edit guest stop script
3 - Connect to guest console     8 - Create/Edit guest pre-start script
4 - Edit configuration files     9 - Create/Edit guest check/run script
5 - Manage 'systemd' services

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

Server boot: 22-Dec-2020 10:02   CPUs: 6   Memory(free/tot): 8.3G/15G (53%)

Configuration File                          Cpu Memory State/Uptime: d hh:mm:ss

 1- /charonRP7400/rp7400.cfg                   1    2G ACTIVE              05:43
     Model:              rp7400-1-650
     Description:        CHARON charon-par/rp7400
     Startup type:       Manual  / Service Timeouts: Start=20min Stop=20min
     Stop script:        Not found
     Started:         [ Thu 2021-01-21 15:38:19 CET PID=8633 Memory=5,938M
                      [ Protected against OOM Killer.
     Console port:       30001
     Log file:           /charonRP7400/logs/rp7400.log
     Network:            EWA0/ens224


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

Please confirm you want to stop charon-par/rp7400.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_rp7400.service at 21-Jan-2021 15:46:54
Jan 21 15:38:25 Host CPU freq: 3498
Jan 21 15:46:54 Stopping CHARON charon-par/rp7400...
Jan 21 15:46:54 [INFO ] Stopping...
Jan 21 15:46:54 [WARN ] No stop script defined, sending KILL signal to emulator,
 pid 8633
Jan 21 15:46:54 [INFO ] Waiting for process id 8633 termination
Jan 21 15:46:54 charon_rp7400.service: main process exited, code=killed, status=
9/KILL
Jan 21 15:46:59 [INFO ] Process id 8633 has terminated
Jan 21 15:47:06 job 255 at Thu Jan 21 15:47:00 2021
Jan 21 15:47:06 Stopped CHARON charon-par/rp7400.
Jan 21 15:47:06 Unit charon_rp7400.service entered failed state.
Jan 21 15:47:06 charon_rp7400.service failed.
```

```
STROMASYS - Legacy server emulation                          V1.5
  Virtual Machines Management


Server boot: 22-Dec-2020 10:02  CPUs: 6  Memory(free/tot): 13G/15G (84%)

Configuration File                      Cpu Memory State/Uptime: d hh:mm:ss

- /charonRP7400/rp7400.cfg                1    2G FAILED
  Model:             rp7400-1-650
  Description:       CHARON charon-par/rp7400
  Startup type:      Manual  / Service Timeouts: Start=20min Stop=20min
  Stop script:       Not found
  Stopped:           Thu 2021-01-21 15:47:06 CET (signal/KILL)
  Console port:      30001
  Log file:          /charonRP7400/logs/rp7400.log
  Network:           EWA0/ens224

Available options

1 - Update guests list          6 - View latest guest log file
2 - Start/stop guests           7 - Create/Edit guest stop script
3 - Connect to guest console    8 - Create/Edit guest pre-start script
4 - Edit configuration files    9 - Create/Edit guest check/run script
5 - Manage 'systemd' services

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

Example2 - Guest stop with stop script defined

Context: CentOS 7.9 server with Charon-PAR 3.0.1 installed, rp7400 guest running HP-UX 11.23 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 - Legacy server emulation─────────────────────────────────V1.5─┐
│ Virtual Machines Management                                             │
└─────────────────────────────────────────────────────────────────────────┘


Server boot: 22-Dec-2020 10:02  CPUs: 6  Memory(free/tot): 7.1G/15G (45%)

Configuration File                        Cpu Memory State/Uptime: d hh:mm:ss
_____ ___ _____ _____
- /charonRP7400/rp7400.cfg                  1    2G  ACTIVE              05:05
   Model:              rp7400-1-650
   Description:        CHARON charon-par/rp7400
   Startup type:       Manual  / Service Timeouts: Start=20min Stop=20min
   Stop script:        [Using SSH]
   Started:          ┌ Thu 2021-01-21 16:09:51 CET PID=30448 Memory=6,322M
                     └ Protected against OOM Killer.
   Console port:       30001
   Log file:           /charonRP7400/logs/rp7400.log
   Network:            EWA0/ens224

Available options
_____
1 - Update guests list            6 - View latest guest log file
2 - Start/stop guests             7 - Create/Edit guest stop script
3 - Connect to guest console      8 - Create/Edit guest pre-start script
4 - Edit configuration files      9 - Create/Edit guest check/run script
5 - Manage 'systemd' services

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

Server boot: 22-Dec-2020 10:02  CPUs: 6  Memory(free/tot): 7.1G/15G (45%)

Configuration File                        Cpu Memory State/Uptime: d hh:mm:ss
_____ ___ _____ _____
1- /charonRP7400/rp7400.cfg                 1    2G  ACTIVE              05:09
    Model:              rp7400-1-650
    Description:        CHARON charon-par/rp7400
    Startup type:       Manual  / Service Timeouts: Start=20min Stop=20min
    Stop script:        [Using SSH]
    Started:          ┌ Thu 2021-01-21 16:09:51 CET PID=30448 Memory=6,514M
                      └ Protected against OOM Killer.
    Console port:       30001
    Log file:           /charonRP7400/logs/rp7400.log
    Network:            EWA0/ens224


Please confirm you want to stop charon-par/rp7400.cfg (y/n) : y ◄ 2
```

```
 Stopping charon_rp7400.service at 21-Jan-2021 16:16:09
Jan 21 16:14:03 uart0: Client disconnected
Jan 21 16:16:09 Stopping CHARON charon-par/rp7400...
Jan 21 16:16:09 [INFO ] Stopping...
Jan 21 16:16:09 [INFO ] Executing stop script. Emulator pid is 30448.
Jan 21 16:16:09 [INFO ] Initiating rp7400 system shutdown via SSH
Jan 21 16:16:13 [INFO ] rp7400 is alive (responds to ping).✔
Jan 21 16:16:13 [INFO ] Initiating system shutdown ✔
Jan 21 16:16:16 [INFO ] Waiting for shutdown completion...
Jan 21 16:16:17 [INFO ] rp7400 still responds to ping...
Jan 21 16:16:23 [INFO ] rp7400 still responds to ping...
Jan 21 16:16:29 [INFO ] rp7400 still responds to ping...
Jan 21 16:16:35 [INFO ] rp7400 still responds to ping...
Jan 21 16:16:41 [INFO ] rp7400 still responds to ping...
Jan 21 16:16:47 [INFO ] rp7400 still responds to ping...
Jan 21 16:16:53 [INFO ] rp7400 still responds to ping...
Jan 21 16:16:59 [INFO ] rp7400 still responds to ping...
Jan 21 16:17:05 [INFO ] rp7400 still responds to ping...
Jan 21 16:17:11 [INFO ] rp7400 still responds to ping...
Jan 21 16:17:17 [INFO ] rp7400 still responds to ping...
Jan 21 16:17:23 [INFO ] rp7400 still responds to ping...
Jan 21 16:17:39 [INFO ] rp7400 does not respond to ping anymore.✔
Jan 21 16:17:49 [INFO ] Killing charon_rp7400 service
Jan 21 16:17:49 charon_rp7400.service: main process exited, code=killed, status=
9/KILL
Jan 21 16:17:51 [INFO ] Success.✔
Jan 21 16:17:51 [INFO ] Process id 30448 has terminated
Jan 21 16:17:58 job 262 at Thu Jan 21 16:17:00 2021
Jan 21 16:17:58 Stopped CHARON charon-par/rp7400.
```

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

```
 STROMASYS - Legacy server emulation                              V1.5
  Virtual Machines Management


Server boot: 22-Dec-2020 10:02   CPUs: 6  Memory(free/tot): 11G/15G (76%)

Configuration File                      Cpu Memory State/Uptime: d hh:mm:ss

- /charonRP7400/rp7400.cfg                1    2G INACTIVE ✔
  Model:             rp7400-1-650
  Description:       CHARON charon-par/rp7400
  Startup type:      Manual  / Service Timeouts: Start=20min Stop=20min
  Stop script:       [Using SSH]
  Stopped:           Thu 2021-01-21 16:17:58 CET (success)✔
  Console port:      30001
  Log file:          /charonRP7400/logs/rp7400.log
  Network:           EWA0/ens224

Available options

1 - Update guests list          6 - View latest guest log file
2 - Start/stop guests           7 - Create/Edit guest stop script
3 - Connect to guest console    8 - Create/Edit guest pre-start script
4 - Edit configuration files    9 - Create/Edit guest check/run script
5 - Manage 'systemd' services

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

Note:

- Option 5 of the menu can help seeing the result of the shutdown commands
- Option 5 can also be used to edit the .service file to allow you to specify the service description, the auto-restart settings, etc... For more, see "# **man systemd.service**"

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`" and/or "`putty`" package must be installed, they will be used to connect from the CHARON server to the virtual machine console

- The session will be recorded in a log file as '`/opt/charon/log/console.<configuration file name shortened>.log`'

- 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
  #
  ```

  ℹ 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:
  - If the '`exit`' command is detected at Main menu prompt, 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

- To leave the "putty" session, close the window. Note this will not stop the virtual machine as it is running in the background.

- ℹ 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:

```
# Load Disk Device on Controller "A", SCSI ID 0, LUN 0:
#
#
# Map virtual HP9000 device to a physical disk image file:
#
#INFO: At "menu", enter "boot" and do not interact with IPL to boot HP-UX 11.23
#
#    DKA0.image="ldev1.dsk"
#INFO: DKA0    = HP-UX 11.23 system disk
  load DKA0
  DKA0.image="/data/disks/rp7400_ldev1.dsk"

#INFO: DKA100 = HP-UX 11.23 iso DVD
  load DKA100
  DKA100.image="/data/iso/hpux-11.23-foe-05.2005-dvd.iso"

#INFO: DKA200 = MPEiX (tests)
  load DKA200
  DKA200.image="/data/disks/mpe_ldev1.dsk"
```

Example

```
 ┌STROMASYS - Legacy server emulation───────────────────V1.29──┐
 │ Connection to guest console                                 │
 └─────────────────────────────────────────────────────────────┘
Server boot: 22-Dec-2020 10:02   CPUs: 6  Memory(free/tot): 7.0G/15G (45%)

Configuration File                      Cpu Memory State/Uptime: d hh:mm:ss
─────────────────────────────────────────────────────────────────────────
 1- /charonRP7400/rp7400.cfg               1    2G ACTIVE              00:19
    Model:              rp7400-1-650
    Description:        CHARON charon-par/rp7400
    Startup type:       Manual  / Service Timeouts: Start=20min Stop=20min
    Stop script:        [Using SSH]
    Started:          ┌ Thu 2021-01-21 16:29:05 CET PID=20176 Memory=5,554M
                      └ Protected against OOM Killer.
    Console port:       30001
    Network:            EWA0/ens224

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

Choice ('q' to quit): 1

Configuration description:
 At "menu", enter "boot" and do not interact with IPL to boot HP-UX 11.23
 DKA0   = HP-UX 11.23 system disk
 DKA100 = HP-UX 11.23 iso DVD
 DKA200 = MPEiX (tests)

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

Press enter
```

All lines starting with "#INFO:" in the configuration file are displayed before opening the console

ⓘ If the configuration file is updated after the virtual machine is started, a warning message is displayed.

```
Console settings correctly set to:
serial.uart0.device.port=":30001"

Console mode: 'putty' defined in preferences but no DISPLAY
Console mode: 'telnet' will be used instead
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>

Moved '/opt/charon/log/console.rp7400.log' to '/opt/charon/log/console.rp7400.lo
g.upto2021-01-21-163149'.
Script started, file is /opt/charon/log/console.rp7400.log
Trying ::1...
telnet: connect to address ::1: Connection refused
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.


Main Menu: Enter command or menu >boot          1
Booting from primary device

Interact with IPL (Y or N)?> N          2
booting from 0/0/1/0
booted

ISL Revision A.00.44  Mar 12, 2003

ISL booting  hpux

Boot
: disk(0/0/1/0.0.0.0.0.0.0;0)/stand/vmunix
12464128 + 6250496 + 2022344 start 0x22c168
```

...

```
       Start kwdbd ............................................................ N/A
       Start NDDB Comm Server ................................................. N/A
       Starting the System Management HomePage server ........................ OK
       Start CDE login server ................................................. OK
       Starting PRNGD (Pseudo Random Number Generator Daemon) ................ N/A
       ....................................................................... OK

The system is ready. ✔

GenericSysName [HP Release B.11.23] (see /etc/issue)
Console Login: ▮
```

VM management - Edit configuration files

Description

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

Notes:

- Changes will be applied on emulator restart
- The 'model' parameter defined will be checked
- '.dsk' and '.iso' files existence, if defined, will be checked
- Some checks will be performed on network interface upon exit:
    - 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' and if 'ncu' is installed, 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.

Example

We will add several issues in the "rp7400" virtual machine configuration file:

- a network interface will be disabled,
- a virtual disk that does not exist will be added

```
STROMASYS - Legacy server emulation                          V1.11
 Edit configuration files

Server boot: 22-Dec-2020 10:02   CPUs: 6  Memory(free/tot): 7.0G/15G (45%)

Configuration File                      Cpu Memory State/Uptime: d hh:mm:ss

1- /charonRP7400/rp7400.cfg               1    2G ACTIVE            08:00
   Model:            rp7400-1-650
   Description:      CHARON charon-par/rp7400
   Startup type:     Manual  / Service Timeouts: Start=20min Stop=20min
   Stop script:      [Using SSH]
   Started:        [ Thu 2021-01-21 16:29:05 CET PID=20176 Memory=6,514M
                     Protected against OOM Killer.
                     Configuration file updated after process started !
   Console port:     30001
   Log file:         /charonRP7400/logs/rp7400.log
   Network:          EWA0/ens224

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, some checks will be performed:

```
┌STROMASYS - Legacy server emulation────────────────────────────────V1.11─┐
│  Edit configuration files                                                │
└──────────────────────────────────────────────────────────────────────────┘

 Configuration description
Configuration file: /charonRP7400/rp7400.cfg

 At "menu", enter "boot" and do not interact with IPL to boot HP-UX 11.23
 DKA0   = HP-UX 11.23 system disk
 DKA100 = HP-UX 11.23 iso DVD
 DKA200 = MPEiX (tests)

Model: rp7400-1-650 with 1 CPU ✔

Log file is set to: /charonRP7400/logs/rp7400.log (plain file)


 Checking virtual disks and iso files...
- /data/disks/mpe_ldev1_INEX.dsk: 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 - Legacy server emulation────────────────────────────────V1.11─┐
│  Edit configuration files                                                │
└──────────────────────────────────────────────────────────────────────────┘

 Configuration description
Configuration file: /charonRP7400/rp7400.cfg

 At "menu", enter "boot" and do not interact with IPL to boot HP-UX 11.23
 DKA0   = HP-UX 11.23 system disk
 DKA100 = HP-UX 11.23 iso DVD
 DKA200 = MPEiX (tests)

Model: rp7400-1-650 with 1 CPU ✔

Log file is set to: /charonRP7400/logs/rp7400.log (plain file)


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

 Checking network interfaces...
Done. ✔

Press enter
```

VM management - Manage 'systemd' services

Description

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 Tips and Tricks chapter.

Example

In this example the default description has been updated, restart on failure parameters have been added, the service stop timeout has been set to 5 minutes and the start timeout has been set to 10 minutes.

```
[Unit]
Description=CHARON charon-par/rp7400 - HP-UX 11.23
After=charon_logmon_rp7400.service atd.service postfix.service aksusbd.service n
etwork.service
Wants=aksusbd.service

[Service]
Type=forking
WorkingDirectory=/charonRP7400
ExecStart=/opt/charon/utils/charon_gstart start /charonRP7400/rp7400.cfg
ExecStop=/opt/charon/utils/charon_gstart stop /charonRP7400/rp7400.cfg
ExecStopPost=/opt/charon/utils/charon_gstart check /charonRP7400/rp7400.cfg
TimeoutStartSec=5min
TimeoutStopSec=10min
Restart=on-failure
RestartSec=30
StartLimitInterval=600
StartLimitBurst=3

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

Note: by default service start and stop timeouts are set to 20 minutes

Result example:

```
[root@charonparltk utils]# vmlist
Server boot: 22-Dec-2020 10:02  CPUs: 6  Memory(free/tot): 11G/15G (76%)

Configuration File                      Cpu Memory State/Uptime: d hh:mm:ss

- /charonRP7400/rp7400.cfg                1    2G INACTIVE
   Model:            rp7400-1-650
   Description:      CHARON charon-par/rp7400 - HP-UX 11.23
   Auto-restart:     on-failure after 30s, max 3 times in 600 seconds
   Startup type:     Manual   / Service Timeouts: Start=5min Stop=10min
   Stop script:      [Using SSH]
   Stopped:          Thu 2021-01-21 16:48:26 CET (success)
   Console port:     30001
   Log file:         /charonRP7400/logs/rp7400.log
   Network:          EWA0/ens224
```

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:

- Log files are automatically archived at guest start whatever the log parameters are in the configuration file so a new one is created each time.
- The logs are kept for 60 days by default. See "Manage recurring jobs: license expiration check, log events (cron)" to change settings.

Example:

```
┌─STROMASYS - Legacy server emulation─────────────────────────────────V1.5─┐
│ Virtual Machines Management                                              │
└──────────────────────────────────────────────────────────────────────────┘


Server boot: 22-Dec-2020 10:02   CPUs: 6   Memory(free/tot): 11G/15G (76%)

Configuration File                         Cpu Memory State/Uptime: d hh:mm:ss
───────────────────────────────────────────  ─── ──────  ─────────────────────
- /charonRP7400/rp7400.cfg                   1     2G  INACTIVE
  Model:              rp7400-1-650
  Description:        CHARON charon-par/rp7400 - HP-UX 11.23
  Auto-restart:       on-failure after 30s, max 3 times in 600 seconds
  Startup type:       Manual  / Service Timeouts: Start=5min Stop=10min
  Stop script:        [Using SSH]
  Stopped:            Thu 2021-01-21 16:48:26 CET (success)
  Console port:       30001
  Log file:           /charonRP7400/logs/rp7400.log
  Network:            EWA0/ens224

Available options
───────────────────────────────────────────────────────────────────────────
1 - Update guests list            6 - View latest guest log file
2 - Start/stop guests             7 - Create/Edit guest stop script
3 - Connect to guest console      8 - Create/Edit guest pre-start script
4 - Edit configuration files      9 - Create/Edit guest check/run script
5 - Manage 'systemd' services

Enter your choice (enter to refresh, q to quit): 6  ◀ ( 1 )

Server boot: 22-Dec-2020 10:02   CPUs: 6   Memory(free/tot): 11G/15G (76%)

Configuration File                         Cpu Memory State/Uptime: d hh:mm:ss
───────────────────────────────────────────  ─── ──────  ─────────────────────
 1- /charonRP7400/rp7400.cfg                  1     2G  INACTIVE
    Model:              rp7400-1-650
    Description:        CHARON charon-par/rp7400 - HP-UX 11.23
    Auto-restart:       on-failure after 30s, max 3 times in 600 seconds
    Startup type:       Manual  / Service Timeouts: Start=5min Stop=10min
    Stop script:        [Using SSH]
    Stopped:            Thu 2021-01-21 16:48:26 CET (success)
    Console port:       30001
    Log file:           /charonRP7400/logs/rp7400.log
    Network:            EWA0/ens224


Found definition of log file: /charonRP7400/logs/rp7400.log

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

Continuous view

- The utility displays the last 12 lines of the current log file if it exists and will display newly added lines with color highlighting
- If the log file becomes inaccessible, the reason can be the guest has been started hence the current log file was archived and a new one was created and the continuous view continues with the newly detected log file
- This option can work even if the guest is not started
- The continuous log view can be called using the command line "`logtail`", see Additional command lines
- To stop the continuous log view, press <CTRL-C>

Log edition

Select editor view then the log file. The editor will be selected depending on the preferences defined:

Notes:

- Only the 16 most recent log files 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/logs/rp7400.log.upto2020-09-02-150824`)
- When selecting the log file:
    - the '**From**' date is either based on the first line including a date found in the log file or on file creation time
    - the '**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 - 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 virtual machine, you will have either to use the provided scripts (see above) or to add your own shutdown scripts.

💡 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 console via "`telnet`" and execute the shutdown commands. The "`guest_shutdown.exp`" script, located in the `/opt/charon/utils` folder, can perform operations to: - run the shutdown if the prompt is detected, - enter a username/password to login if "Console `Login:`" is detected, - execute the shutdown command if the prompt is detected, - detect the Main Menu or ISL prompt to issue the "`exit`" command. This method is useful if the virtual machine has no telnet connection available and cannot handle "`rsh`" and "`ssh`" remote connections. For more, please read Tips and Tricks - Shutdown guests with Expect tool. **Important notes**: - For MPE/iX systems, this is the only available method. Username and password are then not necessary. A <CTRL-A> will be sent on the console then if the "=" prompt is detected the "SHUTDOWN SYSTEM" command will be sent (other cases are also taken into account like Main menu prompt, ISL> prompt or text garbage on the console) - 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 HP-UX guest to issue password free remote commands. For more, please read the Tips and Tricks chapter dedicated to rsh trusts.
`ssh`	Requires a secured trust to be created between the Linux server and the HP-UX guest (key pair) to issue password and passphrase free remote commands. For more, please read the Tips and Tricks chapter dedicated to ssh trusts.

ⓘ **Shutdown timeout**
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. The default value is 20 minutes and can be changed in the preferences menu options.

Example:

```
[Service]
...
TimeoutStopSec=3min
```

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

Options

```
┌─STROMASYS - Legacy server emulation──────────────────────────V1.1─┐
│ 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 HP-UX file
3 - Read how-to setup 'ssh' with HP-UX file

4 - Edit the stop script
5 - Stop script test

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

- Options 1 to 3 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 4 edits the script. This script is in a form of "case in <configuration filename> do ..."
- Option 5 is used to test the script. Use with caution on production machines.

ⓘ You'll find in options 1 to 3 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:

```
...

# 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 "$1"
in
   <configuration file>)
     #-- Uncomment and complete one of the following lines:
     #${CHARONDIR}/utils/charon_gstop_expect $1 $2 root <password> "<prompt>" <HPUX/MPEIX>
     #${CHARONDIR}/utils/charon_gstop_rsh $1 $2 <hostname> <HPUX/MPEIX>
     #${CHARONDIR}/utils/charon_gstop_ssh $1 $2 <hostname> <HPUX/MPEIX>
     #/<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 HPUX or MPEIX (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.
- if MPEIX is defined, only the "expect" method can be used. Username, password and prompt can be set to "X" as they are not needed. **Example**:
  ${CHARONDIR}/utils/charon_gstop_expect \$1 \$2 X X X MPEIX

Stop script content example:

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

```
...

#
. /opt/charon/utils/charon_common
#
case "$1"
in
   /charonRP7400/rp7400.cfg)
     ${CHARONDIR}/utils/charon_gstop_ssh $1 $2 rp7400 HPUX
     ;;
   *)
     echo "Invalid parameter '$1'"
     exit 1
     ;;
  esac
```

Stop script execution example with "ssh" / HP-UX 11.23:

```
[root@charonparltk ~]# vmstop -f
Please confirm you want to stop charon-par/rp7400.cfg (y/n) :
 Stopping charon_rp7400.service at 02-Sep-2020 17:22:14
Sep 02 16:18:16 Communication with the license key "1619329274" restored.
Sep 02 17:22:14 Stopping CHARON charon-par/rp7400 - HP-UX 11.23...
Sep 02 17:22:15 [INFO ] Stopping...
Sep 02 17:22:15 [INFO ] Executing stop script. Emulator pid is 12941.
Sep 02 17:22:15 [INFO ] Initiating rp7400 system shutdown via SSH
Sep 02 17:22:19 [INFO ] rp7400 is alive (responds to ping). ✔
Sep 02 17:22:19 [INFO ] Initiating system shutdown ✔
Sep 02 17:22:22 [INFO ] Waiting for shutdown completion... ✔
Sep 02 17:22:23 [INFO ] rp7400 still responds to ping...
Sep 02 17:22:29 [INFO ] rp7400 still responds to ping...
Sep 02 17:22:35 [INFO ] rp7400 still responds to ping...
Sep 02 17:22:41 [INFO ] rp7400 still responds to ping...
Sep 02 17:22:47 [INFO ] rp7400 still responds to ping...
Sep 02 17:22:53 [INFO ] rp7400 still responds to ping...
Sep 02 17:22:59 [INFO ] rp7400 still responds to ping...
Sep 02 17:23:05 [INFO ] rp7400 still responds to ping...
Sep 02 17:23:11 [INFO ] rp7400 still responds to ping...
Sep 02 17:23:17 [INFO ] rp7400 still responds to ping...
Sep 02 17:23:23 [INFO ] rp7400 still responds to ping...
Sep 02 17:23:29 [INFO ] rp7400 still responds to ping...
Sep 02 17:23:45 [INFO ] rp7400 does not respond to ping anymore. ✔
Sep 02 17:23:55 [INFO ] Killing charon_rp7400 service
Sep 02 17:23:55 charon_rp7400.service: main process exited, code=killed, status=
9/KILL
Sep 02 17:23:57 [INFO ] Success.
Sep 02 17:23:57 [INFO ] Process id 12941 has terminated
Sep 02 17:24:04 Stopped CHARON charon-par/rp7400 - HP-UX 11.23. ✔
```

Stop script execution example with "expect" / MPEiX:

```
[root@titan utils]# vmstop -f
Please confirm you want to stop hppa/hp3kmpe.cfg (y/n) :
Stopping charon hp3kmpe.service at 02-Sep-2020 17:40:33
Sep 02 17:36:56 20200902:173656.078962:PDC CHASSIS:0XCE44 State= INITIALIZE
Sep 02 17:40:33 Stopping CHARON charon-par/hp3kmpe...
Sep 02 17:40:33 [INFO ] Stopping...
Sep 02 17:40:33 [INFO ] Executing stop script. Emulator pid is 38776.
Sep 02 17:40:33 [INFO ] Initiating system shutdown via EXPECT
Sep 02 17:40:33 [INFO ] Killing active connection to console if any
Sep 02 17:40:33 [INFO ] Executing the expect script
Sep 02 17:40:33 %EXPECT-I-BEGIN, Starting / MPEiX... [2020-09-02 17:40:33] ✓
Sep 02 17:40:33 spawn which telnet
Sep 02 17:40:33 /bin/telnet
Sep 02 17:40:33 %EXPECT-I-SPAWN, Running telnet on localhost, port 30010 [2020-09-02 17:40:33] ✓
Sep 02 17:40:33 spawn telnet localhost 30010
Sep 02 17:40:33 Trying ::1...
Sep 02 17:40:33 telnet: connect to address ::1: Connection refused
Sep 02 17:40:33 Trying 127.0.0.1...
Sep 02 17:40:33 Connected to localhost.
Sep 02 17:40:33 Escape character is '^]'.
Sep 02 17:40:33 %EXPECT-I-SNDRET, Sending carriage return (x2)... [2020-09-02 17:40:33]
Sep 02 17:40:35
Sep 02 17:40:35 %EXPECT-I-FOUND, Found MPEiX prompt [2020-09-02 17:40:35] ✓
Sep 02 17:40:35 %EXPECT-S-SHUTDWN, Sending MPEiX 'SHUTDOWN SYSTEM' command... [2020-09-02 17:40:35] ✓
Sep 02 17:40:38
Sep 02 17:40:38 xeq snmputil.net.sys;info="SNMPCONTROL STOP"
Sep 02 17:40:39 The SNMP/XL subsystem has already been stopped. (SNMPWARN 857)
Sep 02 17:40:39 xeq stmshut.diag.sys
Sep 02 17:40:39 diagmond has been stopped
Sep 02 17:40:39 pause 5
Sep 02 17:40:46 shutdown SYSTEM
Sep 02 17:40:47
Sep 02 17:40:47 CPU=1. Connect=3. WED, SEP 2, 2020, 5:40 PM.
Sep 02 17:40:47 17:40/#S1/51/LOGOFF ON LDEV #20.
Sep 02 17:40:47 17:40/#J2/57/LOGOFF ON LDEV #10.
Sep 02 17:40:47 Spoolers notified of a shutdown. (Shut 16)
Sep 02 17:40:47 17:40/47/The Spooling system has been shutdown.
```

```
Sep 02 17:41:04 Shutdown of system managers begins. (Shut 5)
Sep 02 17:41:13 Shutdown of operating system complete. (Shut 6) ✓
Sep 02 17:41:13 %EXPECT-S-SHUTDWN, Shutdown completed. [2020-09-02 17:41:13] ✓
Sep 02 17:41:15 %EXPECT-E-END, Exited with code 9. [2020-09-02 17:41:15]
Sep 02 17:41:15 [INFO ] Killing charon_hp3kmpe service
Sep 02 17:41:15 20200902:173656.079000:PDC CHASSIS:0XCE50 S
Sep 02 17:41:15 charon_hp3kmpe.service: main process exited, code=killed, status=9/KILL
Sep 02 17:41:17 [INFO ] Success. ✓
Sep 02 17:41:17 [INFO ] Process id 38776 has terminated
Sep 02 17:41:24 Stopped CHARON charon-par/hp3kmpe.
```

Provided shutdown scripts explanation

⚠️ 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 (for HP-UX only), operating system (either HPUX or MPEIX). This script is able to send the shutdown command depending on the returned characters on the console.
- Report all output to `/opt/charon/log/console.stop.<guest name>.log`.

Notes:

- If the "Main Menu" prompt is found, the "`exit`" command is sent to stop the emulator.
- If the "ISL>" prompt is found, a "`reset`" command is sent then waits for the "Main Menu" prompt and sends the "exit" command is sent to stop the emulator.
- ⚠️ 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 and reset the service state. ❓ 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 and reset the service state. ❓ 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

VM management - Create/Edit guest pre-start script

Description

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

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.

```
[root@charonparltk utils]# vmlist
Server boot: 22-Dec-2020 10:02   CPUs: 6   Memory(free/tot): 11G/15G (76%)

Configuration File                          Cpu Memory State/Uptime: d hh:mm:ss

- /charonRP7400/rp7400.cfg                   1    2G  INACTIVE
  Model:               rp7400-1-650
  Description:         CHARON charon-par/rp7400 - HP-UX 11.23
  Auto-restart:       on-failure after 30s, max 3 times in 600 seconds
  Startup type:       Manual   / Service Timeouts: Start=5min Stop=10min
  Stop script:        [Using SSH]
  Pre-start:          /usr/bin/utnm -c "activate utn50agvalab 1"
  Stopped:            Thu 2021-01-21 16:48:26 CET (success)
  Console port:       30001
  Log file:           /charonRP7400/logs/rp7400.log
  Network:            EWA0/ens224
```

Example: activation of port 1 on the SEH myUTN-50a USB/Ethernet box before starting the Charon emulator

```sh
#!/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
   /charonRP7400/rp7400.cfg)
     /usr/bin/utnm -c "activate utn50agvalab 1"
     ;;
  *)
     echo "Invalid parameter '$1' for prestart"
     exit 1
     ;;
esac
```

❓ The example above would need enhancement as if the port is already connected, an error will be returned. A test before activation is then welcome.

⚠ 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@charonparltk ~]# vmlist
Server boot: 27-Aug-2020 11:16   CPUs: 6   Memory(free/tot):  163M/11G (1%)

Emulator          Configuration File        Cpu Memory State                         OnBoot

- rp7400-1-650 /charon/rp7400.cfg       1      2G  ACTIVE                           NO
   Service Timeouts: Start=5min Stop=10min
   Description:      CHARON charon-par/rp7400 - HP-UX 11.23
   Stop script:     [Using SSH]
   Pre-start:       /usr/bin/utnm -c "activate utn50agvalab 1"
   Started:      ┌ Thu 2020-09-03 09:43:58 CEST PID=15103 Memory=8,663M
                 └ Protected against OOM Killer.
   Guest OS answer: 9:41am up 50 mins
                    Configuration file updated after process started !
   Console port:    30001
   Log file:        /charon/logs/rp7400.log
   Network:         EWA0/ens224
```

VM management - Create/Edit guest check/run script

Description

It is possible to display a line that is the result of a command sent to the legacy operating system running on the guest or a result of a "ping" done locally that can give information on the guest system. For example, the uptime can be returned (rsh or ssh needed) and added to the displayed guests list.

Display output example from the "vmlist" command:

```
[root@charonparltk utils]# vmlist
Server boot: 22-Dec-2020 10:02  CPUs: 6  Memory(free/tot): 7.0G/15G (45%)

Configuration File                          Cpu Memory State/Uptime: d hh:mm:ss
_____
- /charonRP7400/rp7400.cfg                   1     2G ACTIVE              03:49
   Model:              rp7400-1-650
   Description:        CHARON charon-par/rp7400 - HP-UX 11.23
   Auto-restart:       on-failure after 30s, max 3 times in 600 seconds
   Startup type:       Manual  / Service Timeouts: Start=5min Stop=10min
   Stop script:        [Using SSH]
   Pre-start:          /usr/bin/utnm -c "activate utn50agvalab 1"
   Started:          [ Thu 2021-01-21 17:00:50 CET PID=17261 Memory=6,322M
                       Protected against OOM Killer.
   Guest OS answer:    4:04pm up 3 mins
   Console port:       30001 / Console locked by 'telnet' pid(s) 26602
   Log file:           /charonRP7400/logs/rp7400.log
   Network:            EWA0/ens224
```

⚠️ 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 displayed (this does not prevent the script from running).

Usage

Select option 1 to edit the script and option 2 to verify the commands entered work correctly:

```
STROMASYS - Legacy server emulation                        V1.2
 Edit Virtual Machines check/run 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
- let the 'RETVAL' lines untouched

 Available options
1 - Edit the check/run script
2 - Virtual machines list (check script execution)

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

Script example

In this example, "ssh" is used to display the guest "uptime" for the rp7400 HP-UX system.

The last 2 lines containing the RETVAL variable are mandatory.

Example:

```
#!/bin/sh
#
case "$1"
in
  /charonRP7400/rp7400.cfg)
    ssh -o ConnectTimeout=2 rp7400 "uptime|cut -f1 -d','" 2>/dev/null
    #rsh rp7400 "uptime|cut -f1 -d','" 2>/dev/null
    RETVAL=$?
    ;;
  *)
    echo "Invalid parameter '$1'"
    RETVAL=1
    ;;
esac
echo "==RETVAL=${RETVAL}=="
exit ${RETVAL}
```

Note: when the script is initialized, examples are provided and comments need to be removed depending on your needs. It is of course possible to add your own commands.

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 files location is forced under the configuration file folder as "logs/" and with the same name as the configuration file and extension ".log".

ℹ️ 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, manage "`systemd`" services and to start/restart the aksusbd log monitoring.

Example:

```
┌─STROMASYS - Legacy server emulation─────────────────────────────V2.8─┐
│ Manage monitored guests logs                                          │
└───────────────────────────────────────────────────────────────────────┘

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

Logs checked / Monitoring status
──────────────────────────────────────────────────────────────────────
/charonRP7400/logs/rp7400.log, enabled, running, last modified on Jan 21 17:01 ✔


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 aksusbd log monitoring will check the `journalctl` 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
- ℹ️ If you remove a guest from the "Service management - Update guests list" option, the log monitoring service will be removed from the list
- 👆 If you change the folder of an existing virtual machine, you'll have to update the service manually

Example

Connection lost with the active license:

```
[root@charonparltk utils]# vmlist
Server boot: 22-Dec-2020 10:02   CPUs: 6   Memory(free/tot): 7.0G/15G (45%)

Configuration File                      Cpu Memory State/Uptime: d hh:mm:ss
_____
- /charonRP7400/rp7400.cfg                1    2G ACTIVE              13:05
  Model:              rp7400-1-650
  Description:        CHARON charon-par/rp7400 - HP-UX 11.23
  Auto-restart:       on-failure after 30s, max 3 times in 600 seconds
  Startup type:       Manual  / Service Timeouts: Start=5min Stop=10min
  Stop script:        [Using SSH]
  Started:          [ Thu 2021-01-21 17:00:50 CET PID=17261 Memory=6,450M
                    [ Protected against OOM Killer.
  Guest OS answer:    4:13pm up 12 mins
  Console port:       30001
  Log file:           /charonRP7400/logs/rp7400.log
  License:          [ Communication lost with key id 1619329274
                    [ License number 1000.806.
                    [ Event date/time: 21-Jan-2021 17:13:57
  Network:            EWA0/ens224
```

Alert mail sent (if configured):

[CHARON] Communication lost with license for rp7400 (charonparltk.stromasys.com)

ⓘ This message was sent with High importance.

CM **Charon Monitoring**
Thu 21-Jan-21 17:14
To:

Severity Level: **CRITICAL**
License number: 1000.806
Key ID: 1619329274
Virtual machine (guest): rp7400
Description: CHARON charon-par/rp7400 - HP-UX 11.23

Stromasys Geneva Lab - ESXi   - CentOS 7 Charon-PAR/HPA Toolkit tests

Reply | Forward

Connection restored with the license:

```
[root@charonparltk utils]# vmlist
Server boot: 22-Dec-2020 10:02   CPUs: 6   Memory(free/tot): 7.0G/15G (45%)

Configuration File                         Cpu Memory State/Uptime: d hh:mm:ss
_____                        ___ _____ _____
- /charonRP7400/rp7400.cfg                  1    2G  ACTIVE              14:22
  Model:              rp7400-1-650
  Description:        CHARON charon-par/rp7400 - HP-UX 11.23
  Auto-restart:       on-failure after 30s, max 3 times in 600 seconds
  Startup type:       Manual  / Service Timeouts: Start=5min Stop=10min
  Stop script:        [Using SSH]
  Started:          ┌ Thu 2021-01-21 17:00:50 CET PID=17261 Memory=6,450M
                    └ Protected against OOM Killer.
  Guest OS answer:    4:15pm up 14 mins
  Console port:       30001
  Log file:           /charonRP7400/logs/rp7400.log
  License:          ┌ Communication restored with key id 1619329274
                    │ License number 1000.806.
                    └ Event date/time: 21-Jan-2021 17:14:58
  Network:            EWA0/ens224
```

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 - Legacy server emulation──────────────────────────V1.10─┐
│  Send configuration and log files via mail                        │
│                                                                   │
└───────────────────────────────────────────────────────────────────┘

Server boot: 22-Dec-2020 10:02  CPUs: 6  Memory(free/tot): 7.0G/15G (45%)

Configuration File                        Cpu Memory State/Uptime: d hh:mm:ss
_____
 1- /charonRP7400/rp7400.cfg              1    2G ACTIVE              20:26
    Model:              rp7400-1-650
    Description:        CHARON charon-par/rp7400 - HP-UX 11.23
    Auto-restart:       on-failure after 30s, max 3 times in 600 seconds
    Startup type:       Manual  / Service Timeouts: Start=5min Stop=10min
    Stop script:        [Using SSH]
    Started:          ┌ Thu 2021-01-21 17:00:50 CET PID=17261 Memory=6,450M
                      └ Protected against OOM Killer.
    Guest OS answer:    4:21pm up 20 mins
    Console port:       30001
    Log file:           /charonRP7400/logs/rp7400.log
    License:          ┌ Communication restored with key id 1619329274
                      │ License number 1000.806.
                      └ Event date/time: 21-Jan-2021 17:14:58
    Network:            EWA0/ens224


Enter the email recipient (q to quit) [              @stromasys.com]:   1

Number of logs to send [default = 3 latest] '('q' to quit) :     2

Preparing email...
Generating the charon-report...
Enter issue description: Just for the documentation    3
Include files to report: /charonRP7400
Collecting system information...
Adding the file /tmp/report-20210121-172127.tgz to attachments...
Sending files to              @stromasys.com...
Done.

Press enter
```
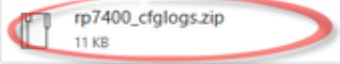
Below is an example of email received:

...

Syntax highlighting is active if emails are sent in HTML mode (see: Preferences)

```
20210121:170128.419160: read cache: off,
20210121:170128.419174: write cache: off,
20210121:170128.419188: mapped: off,
20210121:170128.419202: direct IO: off.
20210121:170128.419220:set physical geometry bps=200 spt=c0 tpc=c0 cyls=400
20210121:171224.610705:uart0: Client disconnected
20210121:171357.732361:warn:Communication with the license key "1619329274" lost.
20210121:171458.357918:warn:Communication with the license key "1619329274" restored.

Log file -1: /charonRP7400/logs/rp7400.log.upto2021-01-21-170047
(truncated to last 64 lines)
20210121:163209.988898:set physical geometry bps=200 spt=c0 tpc=c0 cyls=400
20210121:163211.927700:START STOP UNIT start=1 loej=0
```

Preferences

Description

This option allows the users to define the following settings:

1. 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.
2. 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).
   - automatically stop the continuous log view when the virtual machine is started or stopped.
3. 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.
4. Semi-graphics enabled/disabled
5. Display guests separator: can be none, blank line or separation line (useful if more than one virtual machine is configured on the server)
6. 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
7. Charon VM service default timeout: define the default start and stop timeout for newly created virtual machines
8. Access 'menu' using 'sudo': allows non root users to access the 'menu' with 'sudo'. Once enabled, a user with sudo provilege can enter 'menu' directly (password request and timeouts depending on your sudo settings)
9. Console access mode: defines how the console will be accessed. It can be either:
   - 'telnet' if installed
   - 'putty' if installed and available (Xserver). If no DISPLAY available, 'telnet', if installed, will be used
   - always ask
10. Blue color adjust for white/black background: switches from different blue colors. Default should work with white background and black background. If the blue color is not easily readable, try to switch using this option (requires 256 colors terminal emulator capability)

Example

```
┌STROMASYS - Legacy server emulation──────────────────────────────V1.10─┐
│ Preferences                                                           │
└───────────────────────────────────────────────────────────────────────┘

 1 - Default editor:
        Character User Interface (CUI) = vim
        Graphical User Interface (GUI) = none
        Selection mode = auto
 2 - Continuous log view:
        Automatically start with guest start: true
        Press CTRL-C line display/reminder: enabled
        Automatically stop continuous log view: Yes
         └ when started interactively from the 'menu' or with 'vmstart'.
 3 - Out Of Memory (OOM) settings
        Charon VM process killing prevention = enabled
        VM overcommit_memory value = 0 (Heuristic overcommit handling [default])
        VM panic_on_oom = 0 (disabled)
 4 - Semi-graphics (drawing tables): enabled
 5 - Display guests separator:       Blank line
 6 - Charon log monitoring (global): enabled
 7 - Charon VM service default timeout: Start=20 minutes / Stop=20 minutes
 8 - Access 'menu' using 'sudo': Enabled
 9 - Console access mode: 'putty' preferred when possible
10 - Blue color adjust for white/black background: NORMAL - BOLD
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
#
# 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.

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 - Legacy server emulation――――――――――――――――――――V1.10―
Alerts management

No   Parameter                            Current value(s)

1 - Mail mode (text/html)                 HTML
2 - Mail recipients list                           @stromasys.com
3 - Mail sender (optional)                         :@stromasys.com
4 - Create/Update alert mail footer       Stromasys Geneva Lab - ESXi
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 (21 alerts)       Last update: Thu 21-Jan-2021 17:14:58
9 - Immediate alert on dongle removal     Enabled
10- Alerts simulator
11- Reduce WARN msgs on dongle removal    Enabled

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.

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.

ℹ 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.

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

ℹ 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
COMMLOST	CRITICAL	Communication lost with the license
COMMREST	INFORMATIONAL	Communication restored with the license
EMULSTART	INFORMATIONAL	Emulator has been started
EXPCHK	CRITICAL, MAJOR, MINOR, INFORMATION	The license is about to expire
FOUND	INFORMATIONAL	License dongle found at startup
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)
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
USBCONNECT	CRITICAL	Dongle has been connected (immediate detection)
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)"

ℹ️ 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 is used to view the alerts history sent via the alert script. Alerts can be viewed in a continuous way or using a text editor.

Immediate alert on dongle removal

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.

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 COMMLOST            Communication lost with license for <TEST>
 5 COMMREST            Communication restored with license for <TEST>
 6 EMULSTART           Emulator <TEST> started
 7 EXPCHK              License expiration check
 8 FOUND               License dongle found for <TEST>
 9 IFCFGADDR           Network configuration issue for guest <TEST>, interface <TES
T>
10 IFCFGCRIT           Network configuration issue for guest <TEST>, interface <TES
T>
11 IFCFGUNKN           Network configuration issue for guest <TEST>, interface <TES
T>
12 IFCFGWARN           Network configuration issue for guest <TEST>, interface <TES
T>
13 NCUWARN             Network configuration issue for guest <TEST>, interface <TES
T>
14 REMOVED             License dongle removed
15 REMOVRESET          License dongle removed or connection issue
16 STOPPED             Emulator <TEST> stopped
17 STOPPEDREQ          Emulator <TEST> stopped
18 TESTMAIL            Linux Toolkit Test mail
19 USBCONNECT          License dongle connected
20 USBDISCONNECT       License dongle disconnected
Enter the code number to send a simulated alert ('q' to quit) :
```

Reduce WARN msgs on dongle removal

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

- `Unable to log in to the key "XXXXXXXX", feature X.`
- `HASP runtime (7): Sentinel protection key not available.`
- `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-PAR Linux Toolkit V1.3─────
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-PAR Linux Toolkit V1.3─────────────────────┐
Documentation
  1 - Local PDF document (evince)
  2 - Online documentation (firefox)
  3 - Product documentation and Knowledge Base (firefox)
CHARON Linux Toolkit version 1.3 (14-Jan-2021 14:36)
  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

`-l or --lite` : display only configuration file name, service status, model and description.

Example

```
[root@charonparltk utils]# vmlist
Server boot: 22-Dec-2020 10:02   CPUs: 6   Memory(free/tot): 7.0G/15G (45%)

Configuration File                              Cpu Memory State/Uptime: d hh:mm:ss

- /charonRP7400/rp7400.cfg                       1     2G ACTIVE                 34:59
  Model:              rp7400-1-650
  Description:        CHARON charon-par/rp7400 - HP-UX 11.23
  Auto-restart:       on-failure after 30s, max 3 times in 600 seconds
  Startup type:       Manual  / Service Timeouts: Start=5min Stop=10min
  Stop script:        [Using SSH]
  Started:           ┌ Thu 2021-01-21 17:00:50 CET PID=17261 Memory=6,450M
                     └ Protected against OOM Killer.
  Guest OS answer:    4:35pm up 34 mins
  Console port:       30001
  Log file:           /charonRP7400/logs/rp7400.log
  License:           ┌ Communication restored with key id 1619329274
                     │ License number 1000.806.
                     └ Event date/time: 21-Jan-2021 17:14:58
  Network:            EWA0/ens224
```

Virtual machine log view (logview)

Usage

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

ⓘ The log files can also be viewed 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.

ⓘ 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

```
# logview
```

💡 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]
```

ⓘ 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.

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

Parameters

`-h` : display help text

Example

```
# logtail
```

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/rp7400.cfg`, the command can be "`vmstart rp7400`").
- 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

Virtual machine stop (vmstop)

Usage

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

Description

Stops the virtual machine specified (confirmation required if -f is not specified). 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/rp7400.cfg, the command can be "`vmstop rp7400`")
- 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

`-f` : force the virtual machine to stop without asking confirmation

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/rp7400.cfg, the command can be "vmconsole rp7400")
- 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

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/rp7400.cfg, the command can be "vmcfg rp7400").
- 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

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'

'vim' has also a graphical version named 'gvim'. If not installed, you can run: `# yum -y install gvim`

'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 HP-UX

> ⓘ **Notes**
> - The prompts will tell you where to execute the commands, "`HPUX#`" (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)
> - *hpuxhost* represents the hostname of your HP-UX virtual machine

On the HP-UX system, enter the following commands if the folder does not already exist:

```
HPUX# mkdir /.ssh
HPUX# chmod 600 /.ssh
```

On the Linux server, enter:

```
Linux# ssh-keygen -t rsa

→ Do not specify any passphrase.

Linux# chmod 600 id_rsa*
Linux# scp id_rsa.pub hpuxhost:/.ssh/linuxhost_rsa.pub

→ Enter the password for the copy operation to complete
```

On the HP-UX system, add the Linux server key to the authorized keys:

```
HPUX# cd /.ssh
HPUX# cat linuxhost_rsa.pub >>authorized_keys
HPUX# chmod 600 authorized_keys
```

Perform a simple test on the Linux server:

```
Linux# ssh hpuxhost hostname
hpuxhost
```

❓ If trying to execute a remote command on the HP-UX 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:

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

Host hpuxhost
  Hostname hpuxhost
  KexAlgorithms +diffie-hellman-group1-sha1
  HostKeyAlgorithms +ssh-dss
  Ciphers +3des-cbc
```

How to setup 'rsh' trusts between Linux and HP-UX

> ⓘ **Notes**
> - The prompts will tell you where to execute the commands, "`HPUX#`" (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)
> - *hpuxhost* represents the hostname of your HP-UX virtual machine

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:

```
Linux# yum install rsh
```

Notes

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

Example:

```
HPUX# echo "linuxhost 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 HP-UX system from the Charon server.

Example:

```
Linux# rsh linuxhost date
```

If a "poll: protocol failure in circuit setup" is returned, the firewall settings have to be set to open ports 1011 to 1023.

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

Example:

```
# firewall-cmd --permanent --new-service=Charon
# firewall-cmd --permanent --service=Charon --add-port=1011-1023/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 nor RSH can not 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.

The operations performed during the "`expect`" script execution are detailed in the VM management - Create/Edit guest stop script chapter.

⚠ 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.

Script usage

Usage:

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

Parameters:

Parameter	Description
<port>	telnet port number (example: 30001)
<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>	HPUX or MPEIX (case sensitive)

Example for HP-UX:

```
# /opt/charon/utils/guest_shutdown.exp 30001 root 12345 "# " HPUX
```

Example for MPEIX:

```
# /opt/charon/utils/guest_shutdown.exp 30001 X X X MPEIX
```

How to restart CHARON-PAR on Linux automatically on failure

Automatic restart on failure is managed by `systemd` at Linux level, please refer to `systemd` man pages.

For example, 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	

🔶 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 (see the Charon-PAR user's guide).

- 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 virtual disk files (see the Charon-PAR user's guide) if needed.

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)

    - 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

    - ℹ 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

Virtual machine(s) management

To avoid navigating in the 'menu' options, use the Additional command lines for ease of management:

Command	Description
# vmlist	Virtual machines list and status
# logview	Virtual machine log view
# logtail	Virtual machine log tail (continuous view)
# vmstart	Virtual machine start
# vmstop	Virtual machine stop ('# vmstop -f' to avoid confirmation)
# vmconsole	Connection to the virtual machine console
# vmcfg	Virtual machine configuration file editing

Appendixes

Contents

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/CentOS7 7 and 8 (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 8 - Enhancing system security with a firewall
- Red Hat Enterprise Linux 7 - Using firewalls
- Red Hat Enterprise Linux 6 - Using firewalls

Related articles

- Charon-AXP and Tru64 - "System does not have a console configured" error message when booting
- CHARON Linux server - Connection to guest console blocked by firewall
- Charon-AXP console does not show all devices at SRM prompt
- 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
- Solutions
  - Solution 1 - using xterm settings
  - Solution 2 - using putty and Linux locale settings
- Links
- Related articles

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 <u>only</u> be defined to **vt200** for Tru64
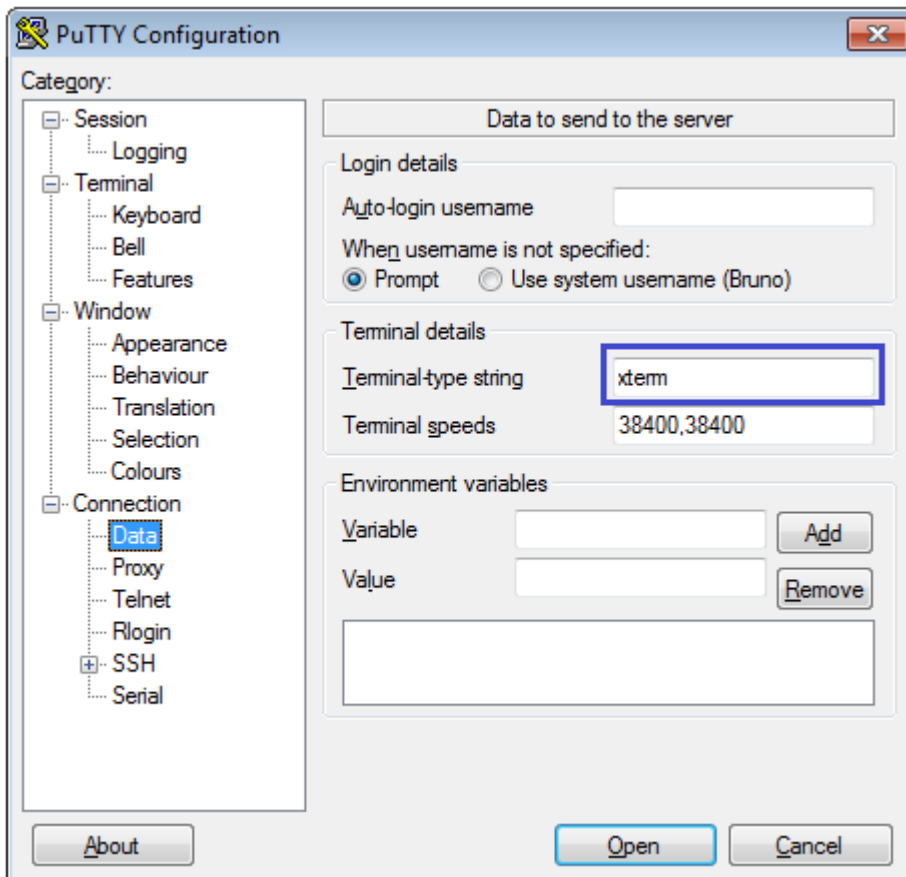
- The "Remote character set" must be something else than the default UTF-8 depending on your location. Example: **ISO-8859-1:1998 (Latin-1, West Europe)**
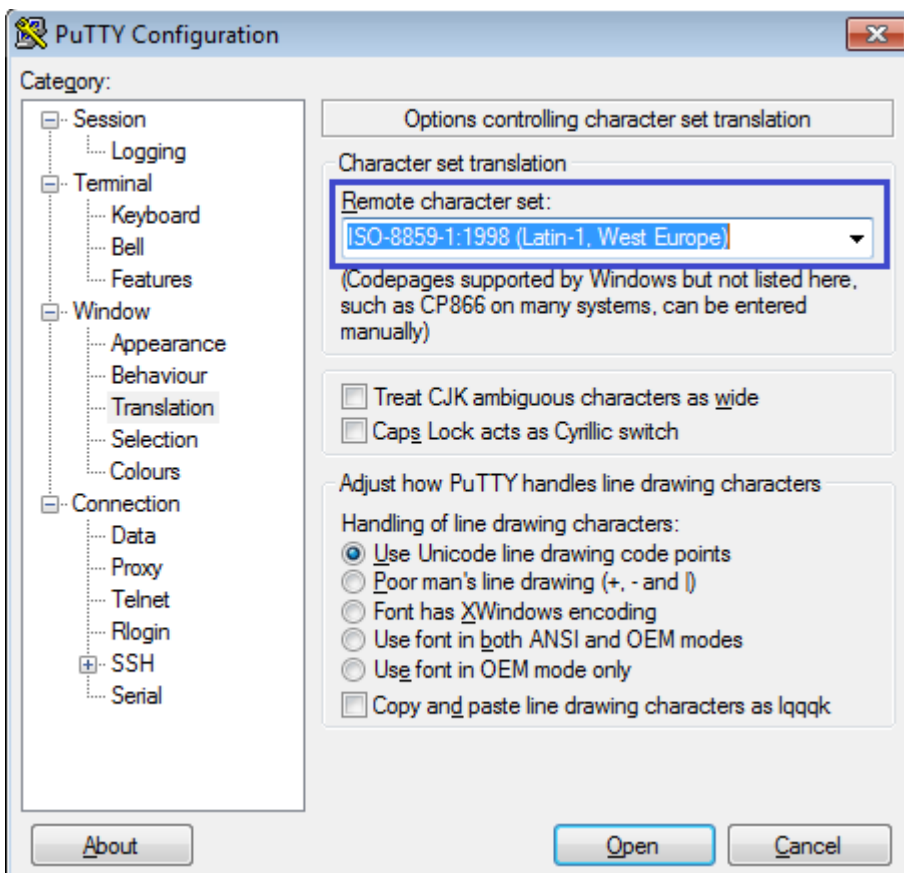
⚠️ It is possible some characters will not be displayed correctly using this method. Example:

```
[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