

## CHARON-AXP/400, /2000, and /4100 for Linux

Product version 4.8

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### DESCRIPTION

Stromasys **CHARON-AXP/400, CHARON-AXP/2000, and CHARON-AXP/4100** are members of CHARON-AXP cross-platform hardware virtualization product family. They are designed to replace the following DEC AlphaServer computer systems by its virtual equivalent running on an x86-64 compatible standard computer system:

CHARON-AXP product	Hardware to replace
<b>CHARON-AXP/400</b>	AlphaServer 400, 1000, 1000A
<b>CHARON-AXP/2000</b>	AlphaServer 800, 1200, 2000, 4000 (and also 400, 1000, 1000A)
<b>CHARON-AXP/4100</b>	AlphaServer 2100, 4100 (and also 400, 1000, 1000A, 800, 1200, 2000, 4000)

Most of the original Alpha-hardware is virtualized by CHARON-AXP. It runs the original Alpha binary code, including operating systems OpenVMS and Tru64 UNIX, the layered products, and applications, which remaining working as always. Very few changes might be required to the original software (operating system, layered products, or applications). The Tru64 kernel might require a rebuild.

### NETWORK

CHARON-AXP virtualizes the 10/100 Mbps Ethernet controllers from DEC 21x4x and Intel 8255x families, ensuring support of any AlphaServer installation. Any protocol that ran over a physical Alpha Ethernet link (DECnet, TCP/IP, and LAT) will run over a virtualized CHARON link. The CHARON network adapter is recognized by the operating system which assumes it will run at 10/100Mbps, but since it's virtualized, it may exceed that speed when connected to a 1Gbps / 10Gbps adapter in the host system. The network performance also depends on design limitations of the guest VMS/Tru64 OS.

### STORAGE

CHARON-AXP provides support for Alpha disk, tape, and CD/DVD storage devices via virtual KZPBA SCSI and KGPSA FC adapters, translating them into any modern technology (SCSI, SATA, SAS) by means of virtual disk images on a Windows filesystem or physical LUNs attached locally or remotely by iSCSI, SAN, or NAS.

### PCI PASSTHROUGH

Emulex FC adapters compatible with original AlphaServer hardware (FC KGPSA) and serial line PBXDA adapter can be used by CHARON-AXP to provide direct access to SAN infrastructure and serial lines, equivalent to physical Alpha access. Using PCI Passthrough method allows gaining up to 50% performance improvement on the disk I/O compared to using virtual storage controllers. It is recommended for high performance configurations with access to SAN infrastructure.

### HOST SYSTEM REQUIREMENTS

A physical system or virtual appliance with multi core CPUs (Intel Xeon v4 E3, E5, and E7 CPUs with a clock frequency of 3GHz and above are recommended), dedicated Ethernet adapters, an optional USB port for the license key and enough disk space to keep the OpenVMS or Tru64 data. For every emulated AXP CPU, CHARON must have exclusive access to at least 2 CPU cores on the host system. CHARON-AXP requires a minimum of 2 GB host RAM (base) plus 2 GB in addition to the amount of AXP RAM per emulated AXP.

### PERFORMANCE

SPEC2000 test running on Tru64 5.1B on CHARON-AXP emulating AlphaServer 4100 delivers about **SPEC2000 INT 633** and **SPEC2000 FP 526 per CPU** on an HP ProLiant DL380 G9 server equipped with

Intel Xeon v4 E5-2643 3.4 GHz CPU. CHARON-AXP benefits from the newer, faster hardware, offering equal or better performance compared to most Alpha systems. The constant improvements Stromasys makes to the CHARON products, together with rapidly developing faster hardware, will further shift the balance in favor of cross-platform virtualization. Full SPEC2000 data for all physical Alpha systems can be accessed online at <https://www.spec.org/cpu2000/>

### SYSTEM MAINTENANCE

Once installed and configured, CHARON system will behave like the original Alpha system, and can be treated like Alpha. Guest OS and applications operating procedures will remain the same, and it's advised not to treat the system as a Linux box, despite the fact it runs on a Linux kernel. Hosting OS does not require maintenance or patching; it can be cut off the network completely.

### LICENSE PROTECTION

A valid license should be permanently available to CHARON. It can be represented by a local or network attached USB HASP license dongle, or a Software License. The license preserves customer specific parameters and allows remote electronic updates. USB dongle enables rapid change of host systems as the CHARON executable itself can be installed on multiple systems for disaster recovery purposes. License flexibility allows combining multiple instances of different CHARON products on a single host system.

### DISTRIBUTION

CHARON Release notes, User manuals and Software Product Descriptions are available for download from the Stromasys Product Documentation and Knowledge Base web pages. Downloading installation kits and patches requires a partner account or credentials provided by Stromasys on an individual basis.

### CHARON UTILITIES

CHARON-AXP on Linux is delivered with the **CHARON Linux Toolkit** which consolidates all CHARON management tasks: creating and configuring CHARON instances, monitoring and managing CHARON licenses and logs, configuring hosting hardware resources for CHARON needs, synchronized host and guest OS shutdown, etc. The following functional applications are invoked from the CHARON Linux Toolkit:

- **menu** is a text based interactive menu system for setting up / configuring / monitoring / managing CHARON instances
- **hasp\_srm\_view** displays content of CHARON-AXP license
- **ncu** ("Network Control Utility") is used to dedicate a host network interface to CHARON-AXP, to release it back to the host, and to manage CHARON virtual interfaces (TAPs)

The following command line utilities are also available:

- **mkdiskcmd** is used to create empty disk images and extend existing disk images
- **mtd** for transferring data between physical tapes and CHARON tape container files

Stromasys **CHARON Guest Utilities for OpenVMS** version 6.1 and above are supplied on a disk image to provide the following functionality:

- **Tape Utilities Package** for manipulating virtual tape images and managing a virtual SCSI tape changer
- **VMS bypass driver** for emulating DU/DR/DG/DQ/DI disk devices
- **Power consumption optimization (IDLE) VMS utility** for implementing energy save mode when virtual AXP CPU is idle



## VIRTUALIZED HARDWARE

CHARON Product	CHARON-AXP/400		CHARON-AXP/2000 <sup>1)</sup>				CHARON-AXP/4100 <sup>2)</sup>	
Emulated hardware model	AlphaServer 400	AlphaServer 1000 / 1000A	AlphaServer 800	AlphaServer 1200	AlphaServer 2000	AlphaServer 4000	AlphaServer 2100	AlphaServer 4100
Alpha CPUs (base / maximum)	1 / 1	1 / 1	1 / 1	1 / 2	1 / 2	1 / 2	1 or 2 / 4	1 or 2 / 4
Emulated RAM	Up to 1GB	Up to 1 GB	Up to 8 GB	Up to 8 GB	Up to 2 GB	Up to 2 GB	Up to 32 GB	Up to 32 GB
Virtual PCI slots	3	3/7	4	6	3	16	3	8
Virtual CPU performance level	50%		Full (100%)				Full (100%)	
Storage adapter support	Emulated PCI SCSI KZPBA adapters (1 preloaded); emulated PCI FC KGPSA adapters; Up to 120 storage units (disks, tapes, and CD/DVD) supported simultaneously							
Disk storage support	<b>Virtual</b> disk images on a local and remote Linux file system (.vdisk container files); <b>Logical and Physical</b> SCSI disks (/dev/sdN) and partitions (/dev/sdNL); iSCSI disks; SAN attached storage volumes identified by WWID (/dev/id)							
Tape storage support	<b>Virtual</b> tape images on a local and remote Linux file system (.vtape container files); <b>physical</b> SCSI tape drives (/dev/sgN devices)							
CDROM / Floppy disk support	<b>Virtual</b> CD/DVDs images a local and remote Linux file system (.iso container files); <b>physical</b> CD/DVD drives (/dev/cdrom, /dev/srN devices) / Floppy not supported							
Ethernet Network support	Emulated PCI DEC 21x4x adapters: DE435, DE450, DE500AA, and DE500BA (1 preloaded DEC TULIP 21040 for AS2x00); Emulated PCI Intel 82558 10/100 Mbps adapters: DE602 and DE602AA							
Fiber Channel / FDDI support	Direct connection to SAN with physical KGPSA or compatible FC EMULEX HBA adapters (up to 8 Gbps) in Passthrough mode; Direct connection to SAN with Linux supported FC HBA adapters in Presentation mode / No FDDI physical DEFPA adapter support							
Console / Serial lines	OPA0 console attached to a Windows terminal emulator, a physical serial port (COMxx: device), or a TCP/IP socket / PCI Passthrough serial line controller PBXDA (8 serial lines)							
Supported operating systems	OpenVMS 6.2-1H3 – OpenVMS 8.4; Digital UNIX 3.2 – 4.0E; Tru64 UNIX 4.0F – 5.1B (also known as: Compaq or HP Tru64 UNIX)							

<sup>1)</sup> CHARON-AXP/2000 also includes all Alpha hardware models emulated by CHARON-AXP/400

<sup>2)</sup> CHARON-AXP/4100 also includes all Alpha hardware models emulated by CHARON-AXP/400 and /2000

### Host system requirements

Host operating system	Linux Red Hat Enterprise (RHEL) 6.5 and above; RHEL 7.x, and CentOS 7.x (32 bit or 64 bit) on top of a physical host or VMware ESXi 5.5 and 6.x
Host CPU / RAM	Amount of host system CPU cores $\geq 2 * (\text{amount of emulated AXP CPU cores})$ ; Host RAM = 2 GB + ( 2 GB + AXP RAM ) per emulated AXP ) minimum
Recommended Hardware	HP ProLiant G9 servers; Intel Xeon v4 E3, E5 and E7 CPUs; Intel Core 7 <sup>th</sup> generation CPUs; CPU frequency 3 GHz and above

### Ordering information

CHARON Product	CHARON-AXP/400 (single CPU)	CHARON-AXP/2000 (single CPU)	CHARON-AXP/4100 (single CPU / dual CPU)
Perpetual license	CHAXP-616IP	CHAXP-626IP	CHAXP-606IP / CHAXP-806IP
Annual license	CHAXP-616IY	CHAXP-626IY	CHAXP-606IY / CHAXP-806IY
Annual GOLD Support (9*5)	CHAXP-616IU	CHAXP-626IU	CHAXP-606IU / CHAXP-806IU
Annual PLATINUM Support (24*7)	CHAXP-616IT	CHAXP-626IT	CHAXP-606IT / CHAXP-806IT
Backup license	CHAXP-616IK	CHAXP-626IK	CHAXP-606IK / CHAXP-806IK
Additional CPU	N/A	CHAXP-CPUIP	CHAXP-CPUIP

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