# Charon-AXP/400, /2000, and /4100 for Windows

**Product version 4.11**

Document version 1

## DESCRIPTION

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

| Charon-AXP product | Hardware to replace |
| --- | --- |
| **Charon-AXP/400** | AlphaServer 400, 1000, 1000A |
| **Charon-AXP/2000** | AlphaServer 800, 1200, 2000, 4000 (and also 400, 1000, 1000A) |
| **Charon-AXP/4100** | AlphaServer 2100, 4100 (and also 400, 1000, 1000A, 800, 1200, 2000, 4000) |

Charon-AXP emulates most of the original Alpha-specific hardware. It runs the original Alpha binary code, including the operating systems OpenVMS and Tru64 UNIX, the layered products, and applications, which all continue to work as before. A small number of changes to the original software (operating system, layered products, or applications) may be required. The Tru64 kernel may have to be rebuilt.

## NETWORK

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

## 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 the original AlphaServer hardware (FC KGPSA), serial line PBXDA adapters, and FDDI DEPFA adapters can be used by Charon-AXP to provide direct access to SAN infrastructure, serial lines, and FDDI networks, equivalent to the physical Alpha access. Using PCI Passthrough enables up to 50% disk I/O performance improvement compared to using virtual storage controllers. It is recommended for high performance configurations with access to SAN infrastructures.

## HOST SYSTEM REQUIREMENTS

A physical system or virtual appliance with multi-core CPUs (Intel Xeon Gold and Platinum 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. For each emulated Alpha system, Charon-AXP requires at least 2 GB of RAM plus the amount of RAM assigned to the emulated Alpha system.

## PERFORMANCE

SPEC2000 tests running on Tru64 5.1B on Charon-AXP emulating an AlphaServer 4100 deliver about **SINT2000 867** and **SFP2000 678** on a system with Intel Xeon Gold 6137 3.9GHz CPUs. 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, the Charon system behaves like the original Alpha system, and can be treated as an Alpha. Guest OS and applications operating procedures remain the same. The host operating system does not require a network connection and regular patching after the installation. See user's guide for requirements regarding any updates to the host OS.

## LICENSE PROTECTION

A valid license should be permanently available to Charon in the form of a local or network attached USB HASP license dongle, or a Software License. The license contains customer specific parameters and allows remote electronic updates. USB dongles enable a rapid switch-over to another host system as the Charon executable itself can be installed on multiple systems for disaster recovery purposes. Flexible licensing options allow 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 Windows is delivered with the **Charon Virtual Machines Manager**, a single-window application which consolidates all Charon management tasks: creating and configuring Charon instances, managing Charon licenses, configuring host hardware resources for Charon needs, etc. The following applications are invoked from Charon VM manager:

- **HASP License Details, License Update Tool,** and **Sentinel Admin Control Center** for Charon license management
- **Network Control Center** for managing Charon network drivers and settings
- **Device Check** for configuring directly connected host devices
- **Virtual Disk Tool** for creating empty disk image files (.vdisk)

The following utilities are available in command line mode:

- **Virtual Disk Tool** for creating empty disk image files (.vdisk)
- **MTD** for transferring data between physical tapes and Charon tape container files, and for converting virtual tape formats between Charon-AXP variants

**Charon Windows Toolkit** consists of two sets of scripts to assist with **automated license expiration checks/alerts** and **clean Charon instance shutdown** to ensure that VMS or Tru64 had been shut down before stopping Charon

**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 saving mode when a virtual AXP CPU is idle

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# VIRTUALIZED HARDWARE

| Charon Product | Charon-AXP/400 | | Charon-AXP/2000 1) | | | | Charon-AXP/4100 2) | |
|---|---|---|---|---|---|---|---|---|
| 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 | Virtual: disk images on a local and remote Windows file system (.vdisk container files); Logical: iSCSI disks; SAN attached storage volumes (\\PhysicalDriveX and \\DevID devices) Physical: physically attached SCSI disks and partitions (original Alpha SCSI disks can be used) | | | | | | | |
| Tape storage support | Virtual tape images on a local and remote Windows file system (.vtape container files); physical SCSI tape drives (\.\\TapeX or \.\\SCSI devices) | | | | | | | |
| CDROM / Floppy disk support | Virtual CD/DVDs images (.iso container files); physical CD/DVD drives (\.\\CdRomX devices) / Physical floppy drive 1.44 MB (\.\\A: device) | | | | | | | |
| 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 4 Gbps) in Pass Through mode; direct connection to SAN with Windows supported FC HBA adapters in Presentation mode / Direct connection to FDDI network with physical DEFPA adapters | | | | | | | |
| Console / Serial lines | OPA0 console attached to a Windows terminal emulator, a physical serial port (COMxx: device), or a TCP/IP socket / Emulated PCI 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) | | | | | | | |

1) Charon-AXP/2000 also includes all Alpha hardware models emulated by Charon-AXP/400

2) Charon-AXP/4100 also includes all Alpha hardware models emulated by Charon-AXP/400 and /2000

## Host system requirements

| Host operating system | Microsoft Windows Server (64 bit) | | Microsoft Windows (64 bit) | | | Physical host or Hypervisor |
|---|---|---|---|---|---|---|
| | 2012 R2, 2016 and 2019 (Standard, Datacenter) | 2008 R2 SP1 (Standard, Enterprise) | 7 SP1 (Professional, Ultimate) | 8.1 Professional | 10 (Professional, Enterprise) | VMware ESXi 5.5 – 6.7 Microsoft Hyper-V (Server 2012 R2, 2016 and 2019) Oracle VM 3.4.5 |
| Host CPU / RAM | Number of host system CPU cores ≥ 2 * (number of emulated AXP CPU cores); host RAM = (4 GB + AXP RAM) per emulated AXP instance | | | | | |
| Recommended hardware | HP ProLiant G10 servers or their equivalent; Intel Xeon Gold or Platinum CPUs; Intel Core 8th generation CPUs; with frequency 3 GHz and above | | | | | |

## Ordering information

| Charon Product | Charon-AXP/400 (single CPU) | Charon-AXP/2000 (single CPU) | Charon-AXP/4100 (single CPU) | Charon-AXP/4100 (dual CPU) |
|---|---|---|---|---|
| Perpetual license 3) | CHAXP-616IP | CHAXP-626IP | CHAXP-606IP | CHAXP-806IP |
| Annual license 3) | CHAXP-616IY | CHAXP-626IY | CHAXP-606IY | CHAXP-806IY |
| Annual GOLD / PLATINUM support 4) | CHAXP-616IU / CHAXP-616IT | CHAXP-626IU / CHAXP-626IT | CHAXP-606IU / CHAXP-606IT | CHAXP-806IU / CHAXP-806IT |
| Annual GOLD / PLATINUM subscription 3) | CHAXP-616ICG / CHAXP-616ICP | CHAXP-626ICG / CHAXP-626ICP | CHAXP-606ICG / CHAXP-606ICP | CHAXP-806ICG / CHAXP-806ICP |
| Backup license 3) | CHAXP-616IK | CHAXP-626IK | CHAXP-606IK | CHAXP-806IK |
| Additional CPU 3) | N/A | CHAXP-CPUIP | CHAXP-CPUIP | CHAXP-CPUIP |

3) Please contact Stromasys Sales team for Charon licensing details

4) Please refer to Charon Service Descriptions for GOLD and PLATINUM terms, conditions, and SLAs

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