Charon-VAX/XK PLUS and /XL PLUS for Windows

Product version 4.12

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DESCRIPTION

Stromasys **Charon-VAX/XK PLUS and Charon-VAX/XL PLUS** are members of the Charon-VAX cross-platform hardware virtualization product family. They are designed to replace **VAXserver, VAXstation, and MicroVAX models 3600 and 3900; VAX 3100-98; VAX 4000-108; VAX 4000-700 and 4000-705; and VAX 6000-310** systems by their virtual equivalents running on an x86-64 compatible standard computer system. Charon-VAX creates a virtual replica of the original DEC VAX hardware, allowing the VAX/VMS operating system and all software running in that environment to continue to work as before in their existing, binary form. No or only minimal configuration changes to the original software (operating system, layered products, and applications), operational procedures, and management are required.

NETWORK

Charon-VAX virtualizes the Ethernet controllers present in the original VAX hardware. Any protocol supported on these controllers (DECnet, TCP/IP, LAT) will work on the virtualized network link. The network performance depends on CPU performance delivered by the host hardware and design limitations of the guest OS.

STORAGE

Charon-VAX/XK/XL (PLUS) provides support for the following VAX storage device types: (T)MSCP, DSSI and SCSI. Charon translates the VAX storage to 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.

HOST SYSTEM REQUIREMENTS

A physical system or virtual appliance with a dual-core CPU (Intel Xeon Gold and Platinum CPUs, Intel core 12th generation CPUs or above, AMD EPYC 4th generation processors for servers, or Ryzen latest generation for workstations 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 VAX/VMS data. Charon-VAX/XL requires a minimum of 3 GB host memory; Charon-VAX/XK PLUS and /XL PLUS require 4 GB.

The Charon-VAX device drivers for an external PCI to QBUS adapter, an FPGA Cesys board, and some serial interfaces require Windows 7 32 bit and cannot be used on other versions. Those devices also cannot be used if the host system runs on hypervisors like VMware.

OPERATING SYSTEM REQUIREMENTS

	Microsoft Windows Server	Microsoft Windows (32-bit and 64-bit)	Physical host or Hypervisor
Host operating system (on-premises or on AWS, Azure, OCI, and GCP clouds)	2008 R2 (SP1) *, 2012 R2 *, 2016, 2019, and 2022 (Standard, Datacenter)	Microsoft Windows 7 SP1 Professional, Ultimate * Microsoft Windows 8.1 Professional * Microsoft Windows 10 Professional, Enterprise Microsoft Windows 11 Professional, Enterprise	VMware ESXi 5.5–8.0; Microsoft Hyper-V; KVM
* Charon can be installed and will run, but Microsoft Windows versions are EOL and are not recommended for deployment.			

PERFORMANCE

Charon-VAX is available in a standard and a PLUS version. The PLUS version includes Advanced CPU Emulation (ACE) providing 4 – 6 times better CPU performance compared to the Standard product. On a system based on Intel Core 7th generation (3.0 GHz) CPUs, the PLUS version virtual CPU delivers approximately 125 VUPS, the standard version provides about a quarter of this number. For the reference: the original hardware VAX CPU provided from 1 VUP (MicroVAX II) up to 38 VUPS (VAX3100-96). Therefore, the VAX virtualization will deliver a major performance improvement.

CHARON APPLICATION PROGRAM INTERFACE (CHAPI)

CHAPI is an open API to the emulated QBUS bus, thus available for QBUS based emulators. It allows the creation of emulated QBUS devices and connects emulated peripherals, which are implemented by external C++ modules, to the emulator kernel. CHAPI library functions provide standard device elements like registers, interrupt logic, etc. CHAPI is delivered as is, without support. CHAPI reference is available upon request.

SYSTEM MAINTENANCE

Once installed and configured, the Charon system behaves like the original VAX system, and can be treated as a VAX. 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.

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-VAX 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 providing configuration assistance for directly connected host devices
- **Virtual Disk Tool** for creating empty disk image files (.vdisk)

The following command line utilities are also available:

- **Virtual Disk Tool** for creating empty disk image files (.vdisk)
- **MTD** for transferring data between physical tapes and Charon tape container files
- **HOSTprint** for redirecting an emulated QBUS LPV11 device (parallel port) output to a Windows local or network printer

The **Charon Windows Toolkit** consists of several utilities. They assist with **license management**, **automated license expiration checks/alerts, clean Charon instance shutdown** to ensure that VMS or Tru64 had been shut down before stopping Charon, **log file** monitoring and clean-up.

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
- **Power consumption optimization (IDLE) VMS utility** for implementing energy saving mode when a virtual VAX CPU is idle
- **Slowdown VMS utility** for slowing down Charon virtual CPU to match hardware VAX performance level
- **Shutdown VMS utility** for an orderly shutdown (Charon after VMS)

VIRTUALIZED HARDWARE

	VAX 4000-108	VAX 3100-98	MicroVAX, VAXserver, VAXstation 3600/3900	VAX 4700/4705	VAX 6310
Virtualized VAX CPU	KA54-A	KA56-A	KA650-A/B / KA655-A/B	KA692-A/KA694-A	KA-62B
Earliest VMS version	5.5-2 (5.5-2H4 if second SCSI adapter is used)		4.5	5.5-2	5.5-2
Max. virtual VAX memory	XK PLUS: 256 MB; XL and XL PLUS: 512 MB				
XMI and BI subsystems	No			No	Yes (KDB50)
QBUS subsystem	Yes [1] [3]	No	Yes [1] [3]	Yes [1] [3]	No
UNIBUS subsystem	No			No	Yes (TUK50)
DSSI subsystem	Yes (HSD50)	No	No	YES (two built-in PAA/PAB and two optional PAC/PAD DSSI adapters, HSD50 storage controller)	No
SCSI subsystem	2 controllers, each supports 7 SCSI IDs. Each SCSI ID could be used with up to 8 LUNs	No	No	No	
Emulated VAX disks	Container files; local, iSCSI and SAN partitions; physical SCSI disks	Container files; local, iSCSI and SAN partitions		Container files; local disk drives, iSCSI and SAN partitions	Container files; local, iSCSI and SAN partitions
Emulated VAX tapes	Container files, Windows tape drives, physical SCSI tape drives				
Network	Up to 5 Ethernet controllers in total including a built-in SGEC and QBUS controllers: DEQNA, DELQA, DESQA	1 built-in Ethernet controller SGEC	Up to 4 QBUS Ethernet controllers: DEQNA, DELQA DESQA	Up to 5 Ethernet controllers in total including a built-in SGEC and QBUS controllers: DEQNA, DELQA, DESQA	Multiple BI DEBNI Ethernet controllers (limited by number of available virtual bus slots)
Network performance	Standard version supports 10 Mbps connections; PLUS version supports 100 Mbps connections. PLUS version could be used with 1 Gbps connections provided it is tested in advance.				
VAX/VMS clustering	NI or Shared Disk Cluster with emulated MSCP or DSSI controllers	NI Cluster	NI cluster or Shared Disk Cluster with emulated MSCP controllers	NI or Shared Disk Cluster with emulated MSCP or DSSI controllers	NI Cluster
Asynchronous serial lines	QUART (4 lines), CXA16, CXB16, CXY08, DHQ11, DHV11, DHW42-AA, -BA, -CA	QUART (4 lines), DHW42-AA, -BA, -CA	UART, CXA16, CXB16, CXY08, DHQ11, DHV11	CXA16, CXB16, CXY08, DHQ11, DHV11	UART
GPIB (IEEE-488)	IEQ11 [4]	No	IEQ11 [4]	IEQ11 [4]	No
Graphics subsystem	No	No	Dummy VCB_02 can be loaded in order to force VMS to accept D type licenses [2]	No	No

[1] Configurable QBUS components are the MSCP disk controller RQDX3, the TMSCP tape controller TQK50, the serial line controllers as above and the Ethernet controllers DEQNA, DELQA and DESQA. MSCP disk emulation is the preferred storage device emulation in case of heavy disk I/O.

[2] An X-Windows emulator on an MS Windows or a Linux system can be used to display graphics provided by an X Client running on Charon.

[3] A 3rd party PCI to QBUS adapter can be ordered to connect a physical QBUS basket to Charon-VAX.

[4] IEQ11 emulation requires National Instruments PCI or PCIe based GPIB adapter

Each virtual VAX model follows the characteristics of its VAX hardware equivalent. It requires the corresponding level of license units and supports the peripherals particular to that VAX model. The virtual VAX does not include diagnostic and maintenance modes or delays to simulate mechanical device behavior.

Ordering Information [1]

License Name	Product Code	Description
Charon-VAX/XK+	P1-VAX-XKPA-5y	3000, 4000, 6310. 1 accelerated VAX CPU, 256MB RAM (5-year license term)
Charon-VAX/XL+	P1-VAX-XLPA-5y	3000, 4000, 6310. 1 accelerated VAX CPU, 512MB RAM (5-year license term)
Gold support annual subscription [2]	For XK+: P1-VAX-XKPG-1y; for XL+: P1-VAX-XLPG-1y	
Platinum support annual subscription [2]	For XK+: P1-VAX-XKPP-1y; for XL+: P1-VAX-XLPP-1y	
[1] Please contact the Stromasys Sales team for Charon licensing details and commercial discussions.		
[2] Please refer to the Charon Service Descriptions for GOLD and PLATINUM terms, conditions, and SLAs.		

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