SOFTWARE PRODUCT DESCRIPTION

Charon-VAX/XM and /XM PLUS for Windows

Product version 4.11

Document version 2

DESCRIPTION

Stromasys **Charon-VAX/XM** and **Charon-VAX/XM PLUS** are members of the Charon-VAX cross-platform hardware virtualization product family. They are designed to replace **MicroVAX II; VAXserver, VAXstation, and MicroVAX models 3600 and 3900; VAX 3100-96; VAX 4000-106; and VAXstation 4000-90** 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.

STORAGE

Charon-VAX/XM (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 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/XM requires a minimum of 2 GB host memory; Charon-VAX/XM PLUS requires 3 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 on top of physical hardware or on a hypervisor; on-premises or on AWS, Azure, OCI, and GCP clouds.

- Server 2012 R2, 2016, 2019 (Standard and Datacenter editions)
- Windows 7 SP1, Windows 8.1, Windows 10 32bit and 64bit; (Professional and Enterprise editions)

Supported hypervisors: VMware ESXi 5.5 – 8.0; Microsoft Hyper-V (Server 2012 R2, 2016 and 2019); KVM

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 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.

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-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 4000-106	VAX 3100-96	VAX 4000-90	MicroVAX, VAXserver, VAXstation 3600/3900	MicroVAX II
Virtualized VAX CPU	KA54-A	KA56-A	KA49-A	KA650-A/B KA655-A/B	KA630-A
Earliest VMS version	5.5-2 (5.5-2H4 if second SCSI adapter is used)			4.5	
Max. virtual VAX memory	128 MB				16 MB
QBUS subsystem	Yes [1) 3)]	No		Yes [1) 3)]	
DSSI subsystem	Yes (HSD50)	No			
SCSI subsystem	2 controllers (1 controller only in 4000-90), each supports 7 SCSI IDs. Each SCSI ID could be used with up to 8 LUNs			No	
Emulated VAX disks	Container files; local, iSCSI and SAN partitions; physical SCSI disks			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	1 built-in Ethernet controller SGEC	2 Ethernet controllers: built-in SGEC and TurboChannel PMAD-AA	Up to 4 QBUS Ethernet controllers	1 QBUS Ethernet controller
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 DSSI or MSCP controllers	NI Cluster		NI or Shared Disk Cluster with emulated MSCP controllers	No
Asynchronous serial lines	QUART (4 lines), CXA16, CXB16, CXY08, DHQ11, DHV11, DHW42-AA, -BA, -CA	QUART (4 lines), DHW42-AA, -BA, -CA	QUART (4 lines)	UART, CXA16, CXB16, CXY08, DHQ11, DHV11	UART, CXA16, CXB16, CXY08, DHQ11, DHV11
GPIB (IEEE-488)	IEQ11 [4)]	No		IEQ11 [4)]	IEQ11 [4)]
Graphics subsystem	No		Dummy graphics for VMS to accept D type licenses [2)]	Dummy VCB02 for VMS to accept D type licenses [2)]	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 delays to simulate mechanical device behavior, diagnostic, and maintenance modes.

Ordering Information [1)]

License Name	Product Code	Description
Charon-VAX/XM	P1-VAX-XM0A-5y	MicroVAX II, 3000, 4000. 1 VAX CPU (no acceleration), 128MB RAM (5-year license term)
Charon-VAX/XM+	P1-VAX-XMPA-5y	MicroVAX II, 3000, 4000. 1 accelerated VAX CPU, 128MB RAM (5-year license term)
Gold support annual subscription [2)]	For XM: P1-VAX-XM0G-1y; for XM+: P1-VAX-XMPG-1y	
Platinum support annual subscription [2)]	For XM: P1-VAX-XM0P-1y; for XM+: P1-VAX-XMPP-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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