Charon-PDP for Windows
Product version 4.12
Document version 1

DESCRIPTION

Stromasys **Charon-PDP** is a member of the Charon cross-platform hardware virtualization product family. It is designed to replace **DEC PDP-11/93 and PDP-11/94 systems** by their virtual equivalents running on an x86-64 compatible standard computer system. Charon-PDP creates a virtual replica of the original PDP-11 hardware, allowing the RT-11, RSX-11, RSTS, and other operating systems and all software from the original 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-PDP virtualizes the Ethernet controllers present in the original PDP hardware. Any protocol supported on these controllers (DECnet, LAT) will work on the virtualized network link.

STORAGE

Charon-PDP provides support for (T)MSCP storage devices. Charon translates the PDP11 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.

GPIB

Emulation for General Purpose Interface Bus (GPIB, also known as IEEE-488) interface IEP-11 is supported with Pass Through method based on a National Instruments PCI or PCIe GPIB adapter.

HOST SYSTEM REQUIREMENTS

A physical system or virtual VMware appliance with a dual CPU of at least 2 GHz, one dedicated Ethernet adapter, an optional USB port for the license key and enough disk space to keep the PDP data. Charon-PDP requires a minimum of 2 GB host memory.

The Charon-PDP device drivers for an external PCI to QBUS adapter, an FPGA Cesys board, and some serial line 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-PDP provides options to fine tune the virtual PDP performance by setting the emulated PDP-11 CPU frequency and defining individual PDP CPU instructions timings. Please refer to the user manual for details.

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 PDP11 system, and can be treated as a PDP11. 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-PDP 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 the 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.

VIRTUALIZED HARDWARE

	PDP-11/93	PDP-11/94
Virtualized PDP CPU	J11	
Virtual PDP memory	2MB or 4MB	
Operating systems	RSX-11M, RT11, RSTS	RSX-11M, RT11, RSTS
Internal bus	QBUS [1]	UNIBUS [2]
Emulated disks	Container files; local, iSCSI and SAN partitions; physical SCSI disks	
Emulated tapes	Container files, Windows tape drives, physical SCSI tape drives	
Network	1 QBUS Ethernet controller	1 UNIBUS Ethernet controller
Network performance	10 Mbps	
Asynchronous serial lines	UART (console), DHV11, DLV11(-J)	UART (console), DHU11, DL11
KW11 line clock	50, 60 and 70 Hz	
GPIB (IEEE-488)	IEQ11 (emulation requires National Instruments PCI or PCIe based GPIB adapter)	-
Connection to physical peripherals	Physical QBUS (additional hardware is required) [3]	-

[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.

[2] Configurable UNIBUS components are: the MSCP disk controller UDA50, the TMSCP tape controller TUK50, the serial line controllers as above and the Ethernet controllers DEUNA and DELUA.

[3] QBUS basket hardware (original VAX QBUS basket or custom 3rd party custom QBUS basket) and PCI to QBUS hardware and software interface are required. Please contact Stromasys for details.

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

Ordering information	
Item	**Part Number**
Charon-PDP 5-year license [4]	P1-PDP-AAAA-5y
Gold support annual subscription [5]	P1-PDP-AAAG-1y
Platinum support annual subscription [5]	P1-PDP-AAAP-1y

[4] Please contact the Stromasys Sales team for Charon licensing details and commercial discussions.

[5] Please refer to the Charon Service Descriptions for GOLD and PLATINUM terms, conditions, and SLAs.

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