CHARON-VAX application note

AN-038 Replacing legacy removable storage with CHARON-VAX

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Applies to: CHARON-VAX products for the Windows platform

Modern removable PC storage components - for instance USB 'dongles' - were created long after VAX system development was terminated. For VAX systems, such removable storage needs were often met by - much more expensive and much slower - magnetic or optical removable drives, and these configurations are still in use on VAX systems today.

When replacing VAX systems with CHARON-VAX, the SCSI versions of such legacy storage devices can be connected to the emulator, but this implies retaining the old drive hardware with its maintenance implications. An elegant alternative in CHARON-VAX is to replace the removable storage media with compact modern devices, for instance USB or SD card storage devices, which are available with capacities >1 GB. They offer additional advantages: low-cost per MB, rugged construction and high operational speed.

Since CHARON-VAX can store VAX disk as disk images, the removable media could be represented as a disk image (essentially a Windows file) on a USB solid state disk. However, this relies on the Windows file system, and requires that the specific Windows file name is included in the CHARON-VAX configuration. For a general exchange method this is inconvenient, as a different file name would require a CHARON-VAX reconfiguration and restart.

Solution

An exact operational equivalent for the legacy VAX removable drives can be created by using PC removable storage directly as a VAX/VMS formatted medium. The MSCP controllers in CHARON-VAX (V3 and later) are designed to completely bypass Windows and directly access a PC removable storage device via its 'PhysicalDriveN' identification. As with legacy removable storage, device connection and removal are detected, the VMS INIT, MOUNT and DISMOUNT operations can be performed and the device information (drive size, label, etc) is available to VAX/VMS.

Implementation

Obtain the removable storage device ID by inserting the storage device and use the Windows disk manager (Right-click on "my Computer", manage, disk-management. In the list of devices you will find e.g. Disk 1, Removable). Configure in your CHARON-VAX system an MSCP drive as PhysicalDriveN, where N is the number of the disk drive as displayed in the Windows disk manager.

CHARON-VAX will configure a drive, even if the storage device is not connected at boot time. Once CHARON-VAX is loaded and VAX/VMS started you can insert and mount the USB disk (the VAX/VMS INIT command will format a new device as usual). After any R/W operations you can dismount and physically unplug it. Subsequently you can insert any other USB disk (even of very different size) and mount it as usual.

If you issue a VMS mount command for the drive without the drive being connected, VMS will generate as usual an operator request to mount the drive. Inserting the USB device will be reported to VAX/VMS and the drive is mounted.

A certain protection is provided in case the device is unplugged without dismounting in VMS. The device will remain visible, but R/W operations generate device errors (such errors are noted in the CHARON error log). However, it is possible to recover gracefully by simply issuing a VMS dismount command, even after the device is physically removed.

Note that the USB storage device used this way has an ODS-2 format and cannot be read by the Windows operating system.

The following is an extract from a CHARON-VAX/6610 configuration file, showing the definition of a removable physical drive (A USB Jetflash disk in this case) as DUA4: in VAX/VMS:

 # Define the VAX 6610 disk controller

Load KDM70 PUA xmi_node_id=10

Set PUA container[0]="C:\Program Files\CHARON-VAX\webdemo 6610\vms73.vdisk"

Set PUA container[2]="C:\Program Files\CHARON-VAX\webdemo 6610\users.vdisk"

Set PUA container[3]="C:\Program Files\CHARON-VAX\webdemo 6610\archive.vdisk"

 # The next drive is a USB storage device

Set PUA container[4]="\\.\PhysicalDrive1"

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