TechNote

VMware Virtual Machines
February 1, 2016

XCAPI
voiceoverIP

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competence in e-communications.

Introduction

This document is intended to support you with the configuration of the VMware ESXi Server version 5 for optimal XCAPI interoperability. In this guide, we are going to adjust the resource management of the VMware ESXi Server for sufficient system resources that will be assigned exclusively to XCAPI, assuring an operation without the disruptions that are common when sharing hardware resources between several guest operating systems.

At this point, we suppose that the hardware the VMware ESXi Server is running on and the software installations, particularly the VMware ESXi Server itself and the guest operating systems, are already installed properly. Here the vSphere client is used for configuring the VMware ESXi Server that has to be installed separately on a workstation, assuring access to the VMware ESXi Server.

For some extended information on installation procedures regarding the VMware ESXi Server and the virtual machines, please refer to the respective manuals. The document **XCAPI TechNote (en) - Quick Start Guide.pdf** is available for registered community users at http://www.xcapi.de.

> Using the latest VMware ESXi server version, at least version 5.5, is recommended.

Requirements for VMware environments

Transmitting facsimile data in real-time requires the activation of the **Pseudo Performance Counters** for VMware and XCAPI. This will be described in the chapter **Improving Real-time Performance** starting on page 6.

Please note that VMware **Snapshots** significantly impact the performance and thus interfere the real-time behavior of the media stream within a virtual environment. For this reason VMware point-out that Snapshots shouldn't run in production on a permanent basis for virtual machines. Thus it's necessarily required that Snapshots won't be used on the guest systems. For more details please review the VMware knowledge base entry http://kb.vmware.com/kb/1009402

Please review the knowledge base entry http://kb.vmware.com/kb/1008360 for additional information about VMware performance.

Please take note of the following requirements for VMware environments:

- No VMware Snapshots utilization.

- Enabling the VMware performance counter for real-time based applications and protocols.

- Disabling of the Power Management in the host Bios and vSphere.

Further information, especially in the case of high channel and fax usage, are given in the following documents:

- Deploying Extremely Latency-Sensitive Applications in VMware vSphere® 5.5

- Best Practices for Performance Tuning of Latency-Sensitive Workloads in vSphere® VMs

- Performance Best Practices for VMware vSphere® 6.0

- Power Management and Performance in VMware vSphere® 5.1 and 5.5

Configuring VMware ESXi Server

This guide describes the configuration of the VMware ESXi Server using the vSphere client. We suppose that up to now, the configuration of the VMware ESXi Server was limited to the installation of virtual guest operating systems on the server.

3.1 XCAPI License

A license key is commonly bound to unique MAC addresses of a network interface or hardware dongle. This does not apply to virtual machines as the Mac address can be easily manipulated and thereby this would make an XCAPI license invalid. Please avoid Mac address manipulation in any circumstances after requesting a XCAPI license.

Please bear in mind that this also includes virtual machines movements. At this juncture you will be asked to choose a new **Identifier** at the first reboot. Without exception you have to select the option **Keep its old identifier**.
For ESXi server requests about **Did you move this virtual machine, or did you copy it?** has always to be confirmed with **I moved it**. When generating a new identifier by means of **Create**, the Mac address of the virtual machine will be changed and thus the XCAPI license will become invalid.

You can avoid such issues in advance by allocating a fixed Mac address for the virtual machine before installing the XCAPI. The Mac address must be set to **00:50:56:XX:YY:ZZ** (http://kb.vmware.com/kb/507).

The variables **XX**, **YY** and **ZZ** can be valued with:
$XX : 00h{-}3Fh$, $YY : 00h{-}FFh$, $ZZ : 00h{-}FFh$.

If the virtual machine will be moved after XCAPI installation, the MAC address can be reverted to the manually defined value afterwards for appropriate use of the original XCAPI license, presuming an untouched virtual machine.

Before determining the hardware ID it is necessary to run a complete XCAPI installation.

```
ethernet0.address = "00:50:56:38:43:43"
ethernet0.addressType = "static"
ethernet0.generatedAddressOffset = "0"
ethernet0.present = "true"
```

Take note of the **uuid.location** and **uuid.bios** parameters which might have to be adjusted too.

```
ethernet0.address = "00:50:56:38:43:43"
uuid.location = "56 4d c4 97 53 f9 9c da-a6 67 0a d2 31 38 43 43"
uuid.bios = "56 4d c4 97 53 f9 9c da-a6 67 0a d2 31 38 43 43"
```

The last three octets must carry the same value.

3.2 CPU, Memory, Latency Sensitivity

Latency Sensitivity must be set to **High**. This requires 100% memory reservation.

Please consider to reserve **100%** of the CPU to guarantee exclusive PCPU access. This helps to reduce CPU halt/wake-up states.

Please note that the number of physical CPUs in the host are above the amount of allocated virtual CPUs. If this is ensured and detected by the VMware ESX Server, no CPU affinity has to be assigned.

3.3 Improving Real-Time Performance

Up to a certain degree, the XCAPI can cope with time shifts in the virtual machine which is a general problem when a virtual machine does not have sufficient CPU time due to other time-consuming processes on the host. Without this adjustment, real-time applications like Softfax are not feasible because of gaps in the audio stream which can lead to aborted fax transmission.

3.4 Pseudo Performance Counter for VMware ESXi Servers

For setting up the pseudo performance counter for an ESXi server, you need to stop the VM with the running XCAPI and open the property configuration dialog. Beneath the **Advanced** settings, please open the **Configuration Parameters** dialog.
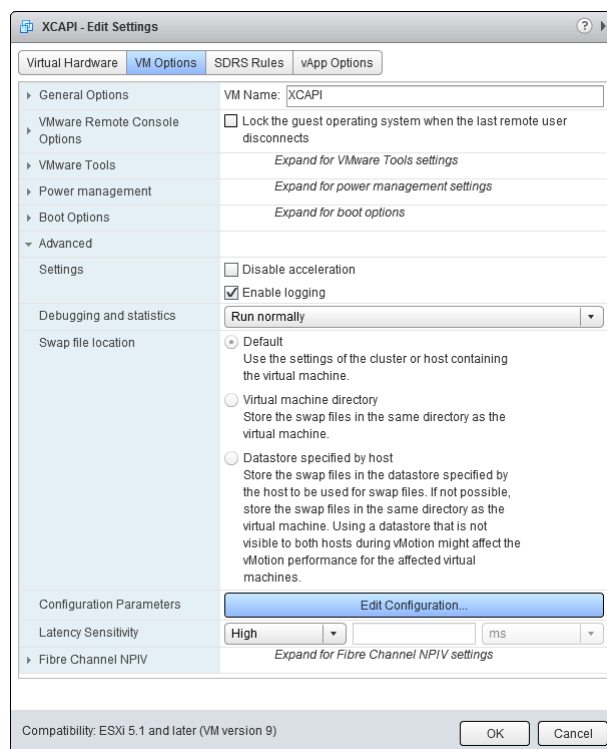
Next, please use the **Add Row** button for entering the command **monitor_control.pseudo_perfctr**. Enable this parameter with value **TRUE**. Afterwards you can start the VM again.

3.5 Pseudo Performance Counter support for XCAPI

For enabling XCAPI pseudo performance counter support, you need to run the configuration tool **xfinetune.exe**. This executable can be found in the installation folder of the XCAPI. There, you have to activate the option **High Resolution Time Source** within the **General Settings**.

Please select the option **VMWARE** for the time source parameter.
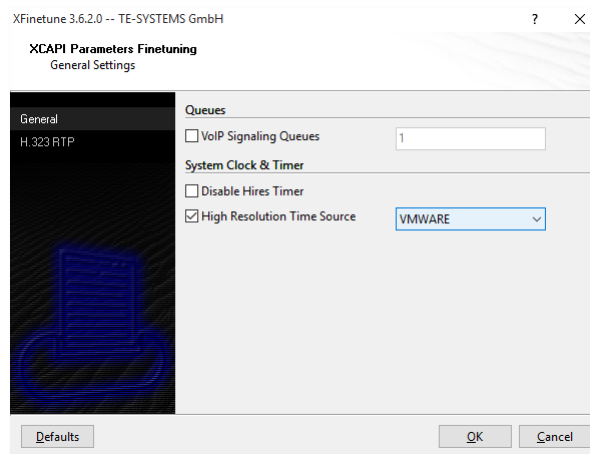
Afterwards, you will be informed about the fact that this configuration can only be made when the pseudo performance configurations were made previously.
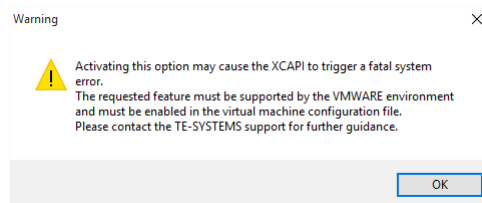
If the pseudo performance counter has not been enabled, but the XCAPI timer source has been set to VMWARE, this function call will instantly lead to a system error within the related VMware session. Please ensure that the pseudo performance configurations are done before switching the timer source.

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