

TechNote

VMware Virtual Machines

February 1, 2016





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 XC-API 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 XC-API license invalid. Please avoid Mac address manipulation in any circumstances after requesting a XC-API 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 XC-API license will become invalid.

You can avoid such issues in advance by allocating a fixed Mac address for the virtual machine before installing the XC-API. 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 XC-API installation, the MAC address can be reverted to the manually defined value afterwards for appropriate use of the original XC-API license, presuming an untouched virtual machine.

Before determining the hardware ID it is necessary to run a complete XC-API 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.

The image displays three screenshots of the XCAPI - Edit Settings dialog box, illustrating the configuration for CPU, Memory, and VM Options.

- Top Left Screenshot (CPU Tab):** Shows the 'CPU' configuration. Key settings include:
 - Cores per Socket (*): 4
 - Sockets: 2
 - Reservation (*): 100%
 - Limit (*): 0 MHz
 - Shares: 4000
 - Hyperthreading Status: Active
 - Available CPUs: 24 (logical CPUs)
- Top Right Screenshot (Memory Tab):** Shows the 'Memory' configuration. Key settings include:
 - RAM (*): 4096 MB
 - Reservation (*): 100%
 - Limit: Normal
 - Shares: 327600
 - Memory Hot Plug: Disabled
 - NUMA Memory Affinity: No affinity
- Bottom Screenshot (VM Options Tab):** Shows the 'VM Options' configuration. Key settings include:
 - VM Name: XCAPI
 - VMware Remote Console Options: Lock the guest operating system when the last remote user disconnects (checked)
 - Advanced Settings:
 - Disable acceleration: Disabled
 - Enable logging: Enabled (checked)
 - Debugging and statistics: Run normally
 - Swap file location: Default (selected)
 - Configuration Parameters (*):
 - Latency Sensitivity: High



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.

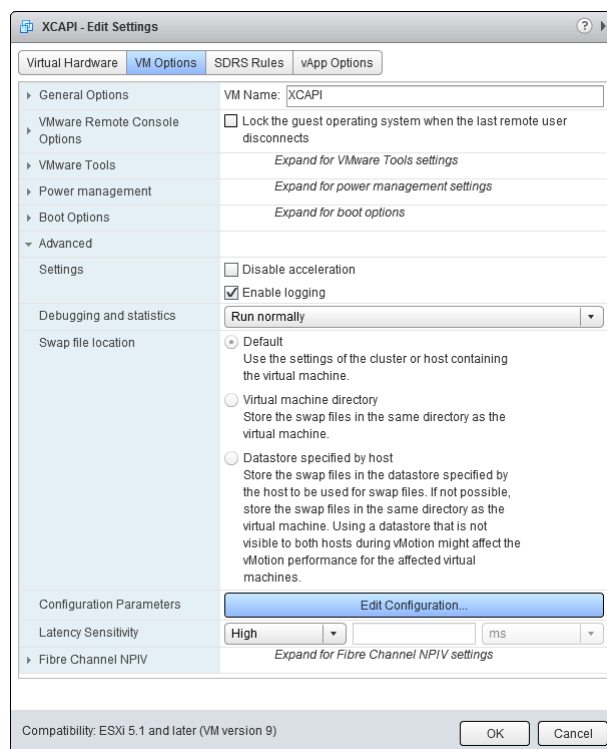


3.3 Improving Real-Time Performance

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.

Configuration Parameters

Modify or add configuration parameters as needed for experimental features or as instructed by technical support. Entries cannot be removed.

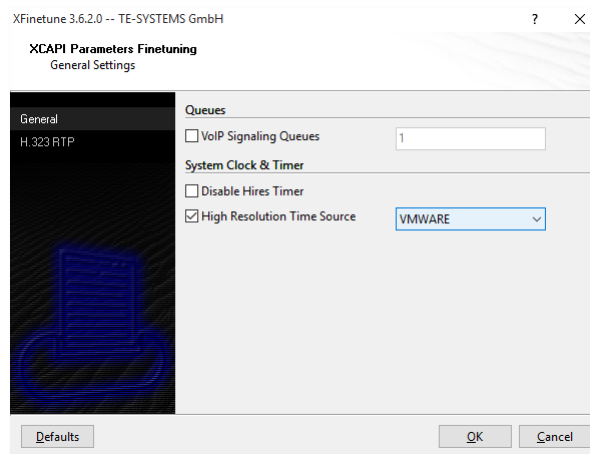
Name	Value
pciBridge7.virtualDev	pcieRootPort
pciBridge7.functions	8
vmware.tools.internalversion	9216
vmware.tools.requiredversion	9216
vmware.tools.installstate	none
vmware.tools.lastInstallStatus	unknown
migrate.hostLogState	none
migrate.migrationId	0
sched.cpu.latencySensitivity	high
monitor_control.pseudo_perfctr	TRUE



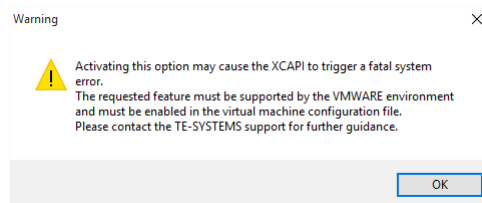
3.5 Pseudo Performance Counter support for XCAPI

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.



Exclusion of Liability

Copyright © 2016 TE-SYSTEMS GmbH

All rights reserved

This document, in part or in its entirety, may not be reproduced in any form without the prior consent of TE-SYSTEMS GmbH.

The information contained in this document was correct at the time of writing. TE-SYSTEMS GmbH reserves the right to make any alterations without prior notice.

The utmost care was applied during the compilation of texts and images, as well as during the creation of the software. Nevertheless, no responsibility can be taken for the content being accurate, up to date or complete, nor for the efficient or error-free operation of the software for a particular purpose. Therefore, TE-SYSTEMS GmbH cannot be held liable for any damages resulting directly or indirectly from the use of this document.

Trademarks

All names of products or services used are trademarks or registered trademarks (also without specified indication) of the respective private or legal persons and are therefore subject to legal regulations.

Third Party Disclaimer and Limitations

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. (<http://www.openssl.org/>)

This product includes cryptographic software written by Eric Young (ey@cryptsoft.com).

This product includes software written by Tim Hudson (tjh@cryptsoft.com).

This product includes source code derived from the RSA Data Security, Inc. MD2, MD4 and MD5 Message Digest Algorithms.

This product includes source code derived from the RFC 4634 Secure Hash Algorithm software.

Copyright-Notices

All files included in this sample are copyrighted by TE-SYSTEMS GmbH.

All samples and the SDK may only be used in combination with the XC-API-product.

The SDK contains code from libtiff with the following copyright-notice:

Copyright (c) 1988-1997 Sam Leffler

Copyright (c) 1991-1997 Silicon Graphics, Inc.

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that (i) the above copyright notices and this permission notice appear in all copies of the software and related documentation, and (ii) the names of Sam Leffler and Silicon Graphics may not be used in any advertising or publicity relating to the software without the specific, prior written permission of Sam Leffler and Silicon Graphics.

THE SOFTWARE IS PROVIDED „AS-IS“ AND WITHOUT WARRANTY OF ANY KIND, EXPRESS, IMPLIED OR OTHERWISE, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT SHALL SAM LEFFLER OR SILICON GRAPHICS BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER OR NOT ADVISED OF THE POSSIBILITY OF DAMAGE, AND ON ANY THEORY OF LIABILITY, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

TE-SYSTEMS GmbH

Managing Directors Andreas Geiger
Oliver Körber

Address Max-von-Laue-Weg 19
D-38448 Wolfsburg
Germany

Tel. +49 5363 8195-0
Fax +49 5363 8195-999

E-Mail info@te-systems.de
Internet www.te-systems.de
www.xcapi.de