

Configure CPU Hyperthreading on vCenter ESXi Hosts

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Introduction

This document describes the configuration steps to enable CPU Hyperthreading in a UCS server.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics.

- Basic understanding of UCSM, Service Profiles and Bios Policy settings.
- Basic understanding of CIMC Bios settings.
- Basic understanding of vmware vCenter and ESXi administration.

Components Used

The information in this document is based on these software and hardware versions:

- UCS Family Servers M5, M6, M7 and higher.
- vmware vCenter 7.0(x) and higher
- vmware ESXi 7.0(x) and higher

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Background Information

Hyperthreading technology allows a single physical processor core to behave like two logical processors. The processor can run two independent applications at the same time.

Intel Corporation developed hyperthreading technology to enhance the performance of its Pentium IV and Xeon processor lines. Hyperthreading technology allows a single processor core to execute two independent threads simultaneously.

While hyperthreading does not double the performance of a system, it can increase performance by better utilizing idle resources leading to greater throughput for certain important workload types. An application running on one logical processor of a busy core can expect slightly more than half of the throughput that it obtains while running alone on a non-hyperthreaded processor. Hyperthreading performance improvements are highly application-dependent, and some applications can see performance degradation with hyperthreading because many processor resources (such as the cache) are shared between logical processors.

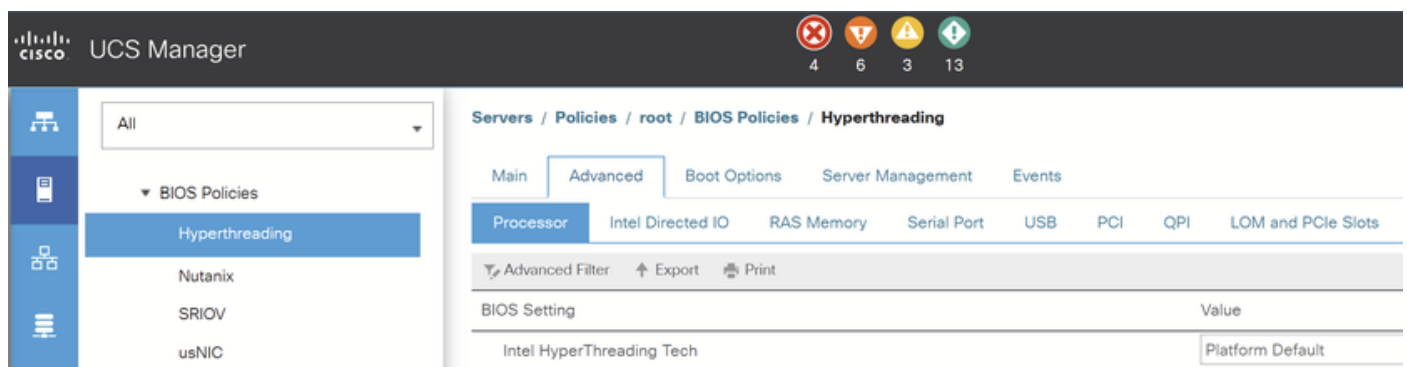
Configure

Enable Hyperthreading in the Bios

Ensure that the Intel Hyperthreading feature is enabled at Bios Policy when the host are UCSM managed or Advance Bios settings at CIMC for stand-alone hosts.

UCSM Bios Policy Configuration for Hyperthreading

1. In the Navigation pane, click the Servers tab.
2. Expand Bios policies menu and select your current Bios policy.
3. Click on Advanced tab and then Processor.
4. Under the Processor tab, locate **Intel Hyperthreading Tech**.
5. Ensure the value is set to **Enabled** or **Platform Default**.



CIMC Bios Configuration for Hyperthreading

1. In the Navigation pane, click the Compute tab.
2. In the Bios tab, click the Configure Bios tab.
3. Click on the advanced tab and ensure the **Intel Hyperthreading Technology** combo is **Enabled**.

Chassis

Compute

Networking

Storage

Admin

Cisco

Cisco Integrated Management Controller

Home

Compute

BIOS

Star

Refresh

BIOS

Remote Management

Troubleshooting

Power Policies

PID Catalog

Enter BIOS Setup

Clear BIOS CMOS

Restore Manufacturing Custom Settings

Configure BIOS

Configure Boot Order

Configure BIOS Profile

Main

Advanced

Server Management

Note: Default values are shown in bold.

Reboot Host Immediately: ☐

Processor Configuration

Intel(R) Hyper-Threading Technology

Disabled

Execute Disable

Enabled

Intel(R) VT-d

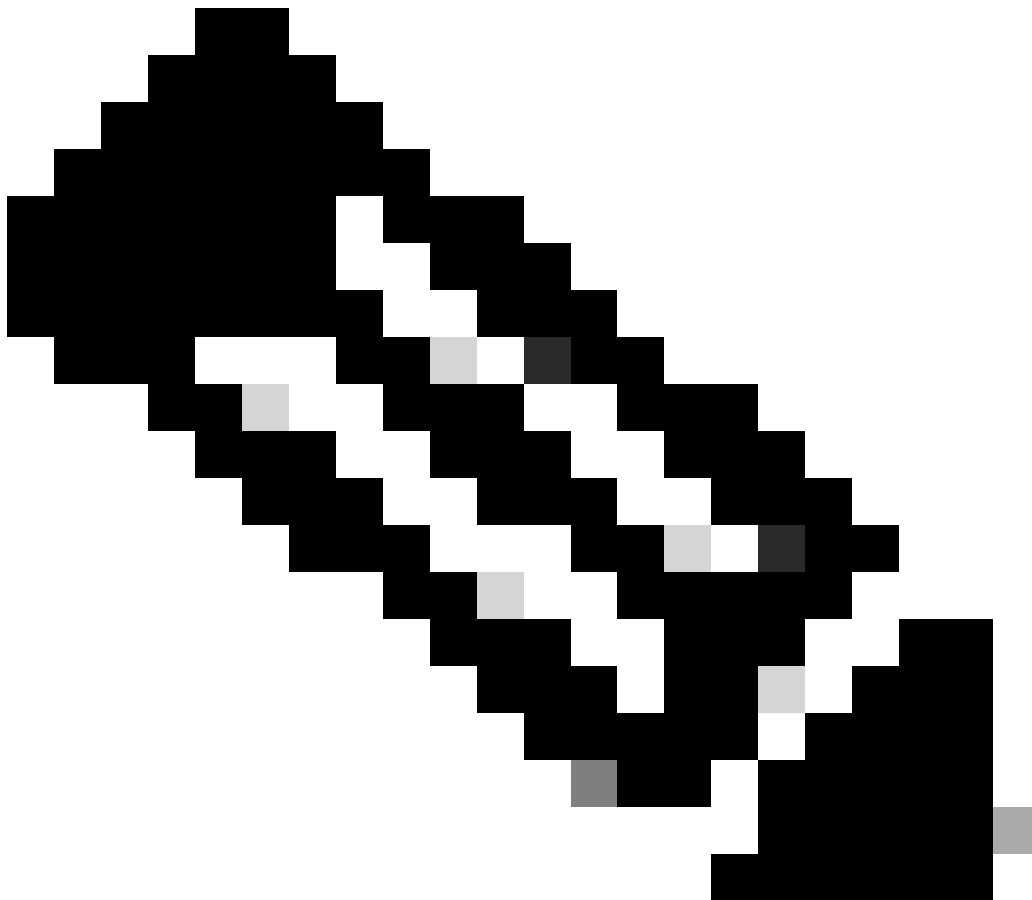
Enabled

Intel(R) Pass Through DMA

Disabled

Intel(R) Pass Through DMA \ITS Support

Enabled



Note: When you change any of these options, a server reboot it's required for the changes to take effect.



Note: Cisco recommends making these changes during a planned maintenance window since a reboot it's required for the changes to take effect.

Enable Hyperthreading in the Host

Ensure that hyperthreading is enabled for the ESXi host.

1. Browse to the host in the vSphere Client.
2. Click Configure.
3. Under System, click Advanced System Settings and select **VMkernel.Boot.hyperthreading**.
4. Proceed to restart the ESXi host for the setting to take effect.
5. Hyperthreading is enabled if the value is set to **true**.

Summary Monitor Configure Permissions VMs Datastores Networks Updates			
<ul style="list-style-type: none"> VMkernel adapters Physical adapters TCPIP configuration Virtual Machines <ul style="list-style-type: none"> VM Startup/Shutdown Agent VM Settings Default VM Compatibility Swap File Location System <ul style="list-style-type: none"> Licensing Host Profile Time Configuration Authentication Services Certificate Power Management Advanced System Settings 	Advanced System Settings		
	Key	Value	Summary
	Misc.HyperClock.AllowSystemTime	0	Allow auxiliary input to system time HyperClock.
	Syslog.loggers.sshypervisorSec.no	8	Number of older log files to keep for this logger.
	Syslog.loggers.sshypervisorSec.siz	1024	Size of each log file before switching to another for this logger (in KiB).
	UserVars.SuppressorhyperthreadW	1	Do not show warning for potential security vulnerability due to hyperthreading
	VMkernel.Boot.forcehyperthreadi	false	Restrict the simultaneous use of logical processors from the same hyperthreaded core regardless of detected security vulnerabilities.
	VMkernel.Boot.hyperthreadingMit	false	Restrict the simultaneous use of logical processors from the same hyperthreaded core as necessary to mitigate a security vulnerability.
	VMkernel.Boot.hyperthreadingMit	true	Restrict the simultaneous use of logical processors from the same hyperthreaded core as necessary to mitigate a security vulnerability within a single VM
	gationintraVM		

For this scenario, this host has 2 Processor sockets, and 20 Processor cores per socket. As we can see, the Hyperthreading configuration is shown as Inactive.

> Select the ESXi host > Hardware > Overview > Processors > Hyperthreading

<ul style="list-style-type: none"> Security Profile System Swap Packages Hardware <ul style="list-style-type: none"> Overview Graphics PCI Devices Firmware Virtual Flash 	<h2>Processors</h2> <table> <tr> <td>Model</td><td>Intel(R) Xeon(R) Gold 6148 CPU @ 2.40GHz</td></tr> <tr> <td>Processor speed</td><td>2.39 GHz</td></tr> <tr> <td>Processor sockets</td><td>2</td></tr> <tr> <td>Processor cores per socket</td><td>20</td></tr> <tr> <td>Logical processors</td><td>40</td></tr> <tr> <td>Hyperthreading</td><td>Inactive</td></tr> </table>	Model	Intel(R) Xeon(R) Gold 6148 CPU @ 2.40GHz	Processor speed	2.39 GHz	Processor sockets	2	Processor cores per socket	20	Logical processors	40	Hyperthreading	Inactive
Model	Intel(R) Xeon(R) Gold 6148 CPU @ 2.40GHz												
Processor speed	2.39 GHz												
Processor sockets	2												
Processor cores per socket	20												
Logical processors	40												
Hyperthreading	Inactive												

6. Select the ESXi host > Hardware > Overview > Processors > Hyperthreading. Click **Edit Hyperthreading** and select the checkbox for Hyperthreading, then check the box to enable it.

Processors		X
Model	Intel(R) Xeon(R) Gold 6148 CPU @ 2.40GHz	
Processor speed	2.39 GHz	
Processor sockets	2	
Processor cores per socket	20	
Logical processors	40	
Hyperthreading	<input type="checkbox"/> Enabled	

7. Browse to the host in the vSphere Client; Click Configure; Under System, click Advanced System

Settings and change the *VMkernel.Boot.hyperthreadingMitigation* metric to **false**.

Edit Advanced System Settings ✕

⚠ Modifying configuration parameters is unsupported and can cause instability. Continue only if you know what you are doing.

Key	Value
VMkernel.Boot.forceHyperthreadingMitigation	true
VMkernel.Boot.hyperthreading	true
VMkernel.Boot.hyperthreadingMitigation	false
VMkernel.Boot.hyperthreadingMitigationIntraVM	true

8. Now reboot the ESXi host for the changes to take effect.

Processors ✕

Model	Intel(R) Xeon(R) Gold 6148 CPU @ 2.40GHz
Processor speed	2.39 GHz
Processor sockets	2
Processor cores per socket	20
Logical processors	40
Hyperthreading	<input checked="" type="checkbox"/> Enabled

Verify

After the reboot, the Logical Processor count has doubled. and the Hyperthreading status has changed to **ACTIVE**.

Processors

Model	Intel(R) Xeon(R) Gold 6148 CPU @ 2.40GHz
Processor speed	2.39 GHz
Processor sockets	2
Processor cores per socket	20
Logical processors	80
Hyperthreading	Active

Now the Logical processors have been increased from 40 to 80 since the Hyperthreading has been successfully enabled on the required ESXi host.

Related Info

- [Hyperthreading with vSphere](#)
- [Performance Tuning Guide for Cisco UCS M6 Servers](#)
- [Performance Tuning Best Practices Guide for Cisco UCS M7 Platforms](#)