

OpenVMS Technical Update

Berlin, April 2024

Camiel Vanderhoeven | Chief Architect & Strategist

Vision

By linking the past to the future, we help OpenVMS users to protect and realize the full value of their application investments.

Mission

We combine leading edge technology and new industry standards with OpenVMS systems to provide our customers and partners with choice and opportunity to profitably prioritize business needs.

About Me



The Netherlands, 1977

Kernel developer since 2015

SWIS, Scheduler, Pthreads, etc.

Now Chief Architect and Strategist

Computer collection: www.vaxbarn.com

Agenda

1 9.2-3 Release Contents (December 2024)

2 New Roadmap Process

3 Getting to x86

4 Virtual Machines vs. Bare Metal

9.2-3 Release Contents (December 2024)

Version 9.2-3 (December 2024)

VM Improvements

- Guest Console
- VMware DirectPath
- VMware vMotion

Other Improvements

- Automatic TCP/IP + SSH
- Signed Execlets
- ACME Agent
- AM Data Collector

Guest Console

```
##### VSI OpenVMS (tm) x86-64 Guest Console #####

THE GUEST CONSOLE IS ENABLED
AND WILL BE USED FOR OPA0 ACCESS

VSI Primary Kernel SYSB00T Feb 19 2024 07:16:22
%SYSB00T-I-VMATYPE, Booting as a VirtualBox (tm) Guest

VMS Software, Inc. OpenVMS (TM) x86_64 Operating
Copyright 2024 VMS Software, Inc

%SMP-I-CPUTRN, CPU #1 has joined the active set.
%STDRV-I-STARTUP, OpenVMS startup begun at 1-APR-2024

VSI OpenVMS X86 64 bit
USING GUEST CONSOLE WINDOW FOR OPA0

%RUN-S-PROC_ID, identification of created process is 00
%RUN-S-PROC_ID, identification of created process is 00
##### OPCOM 1-APR-2024 16:00:32.45 #####
Operator _XGMQ$0PA0: has been enabled, username SYSTEM

%SET-I-NEWAUDSRV, identification of new audit server pr
##### OPCOM 1-APR-2024 16:00:32.45 #####
Operator status for operator _XGMQ$0PA0:
CENTRAL, PRINTER, TAPES, DISKS, DEVICES, CARDS, NETWORK
LICENSE, OPER1, OPER2, OPER3, OPER4, OPER5, OPER6, OPER
OPER11, OPER12
```

Eliminates need
for serial port

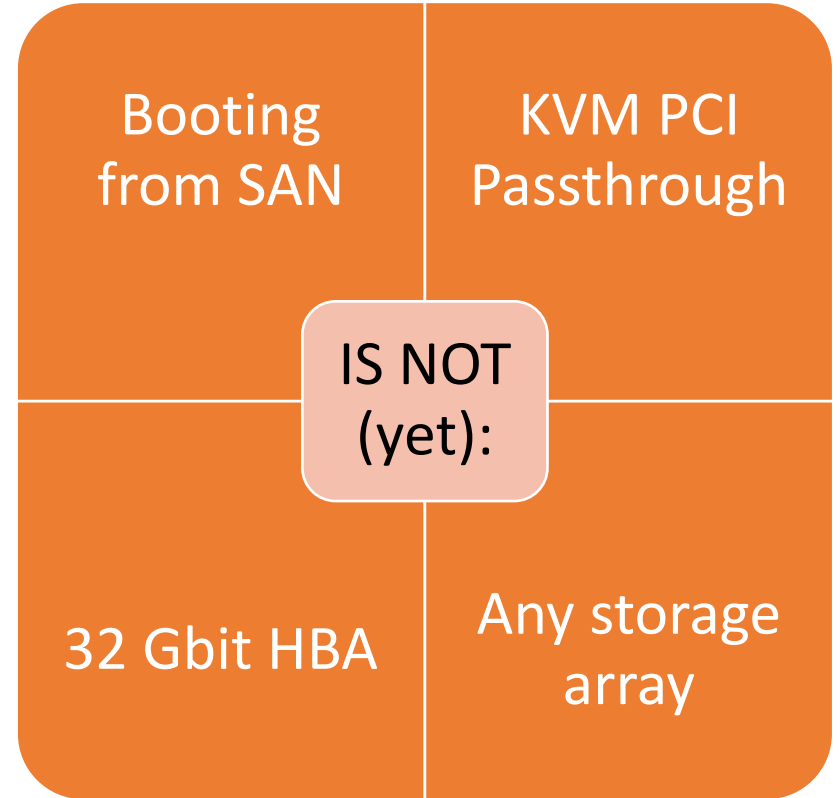
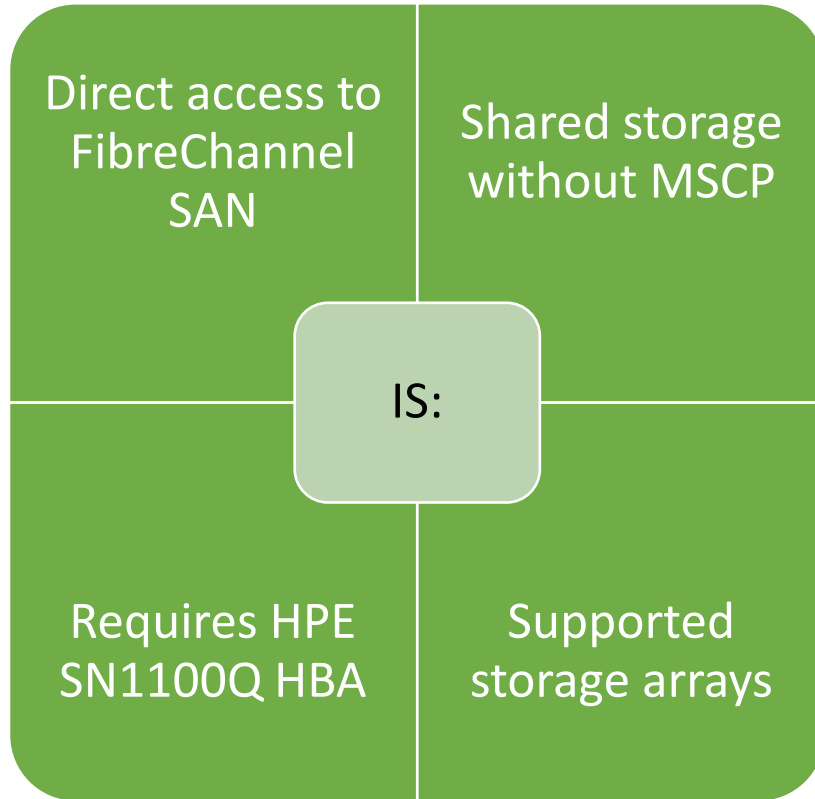
Makes vMotion
possible

VGA/keyboard
based console

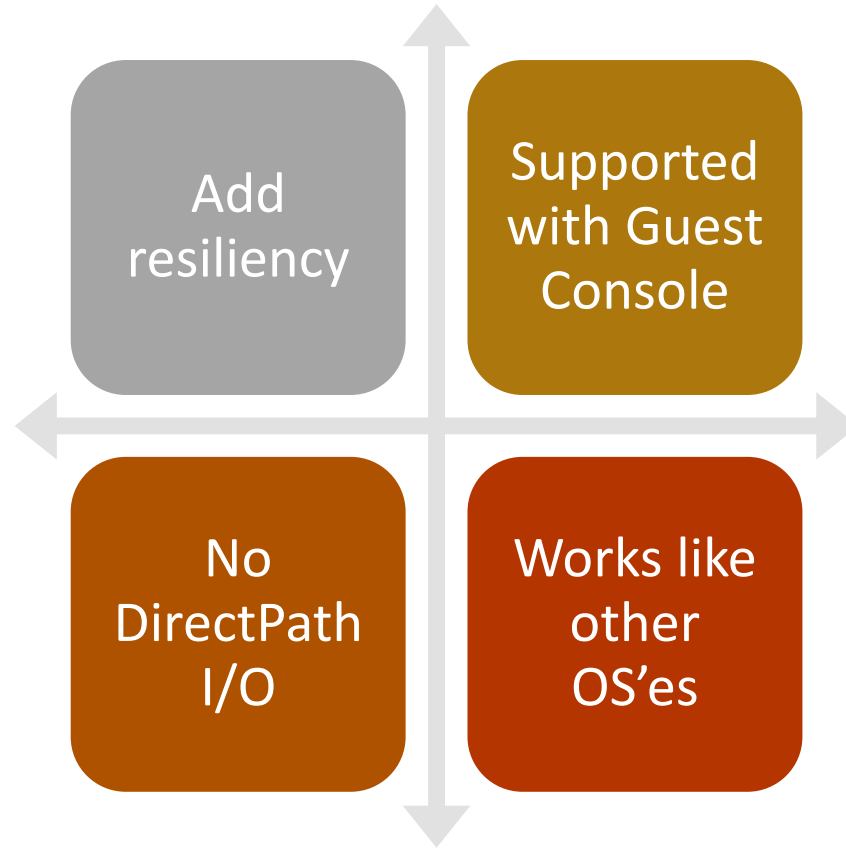
Works like
other OS'es

Cheaper VMware
licenses

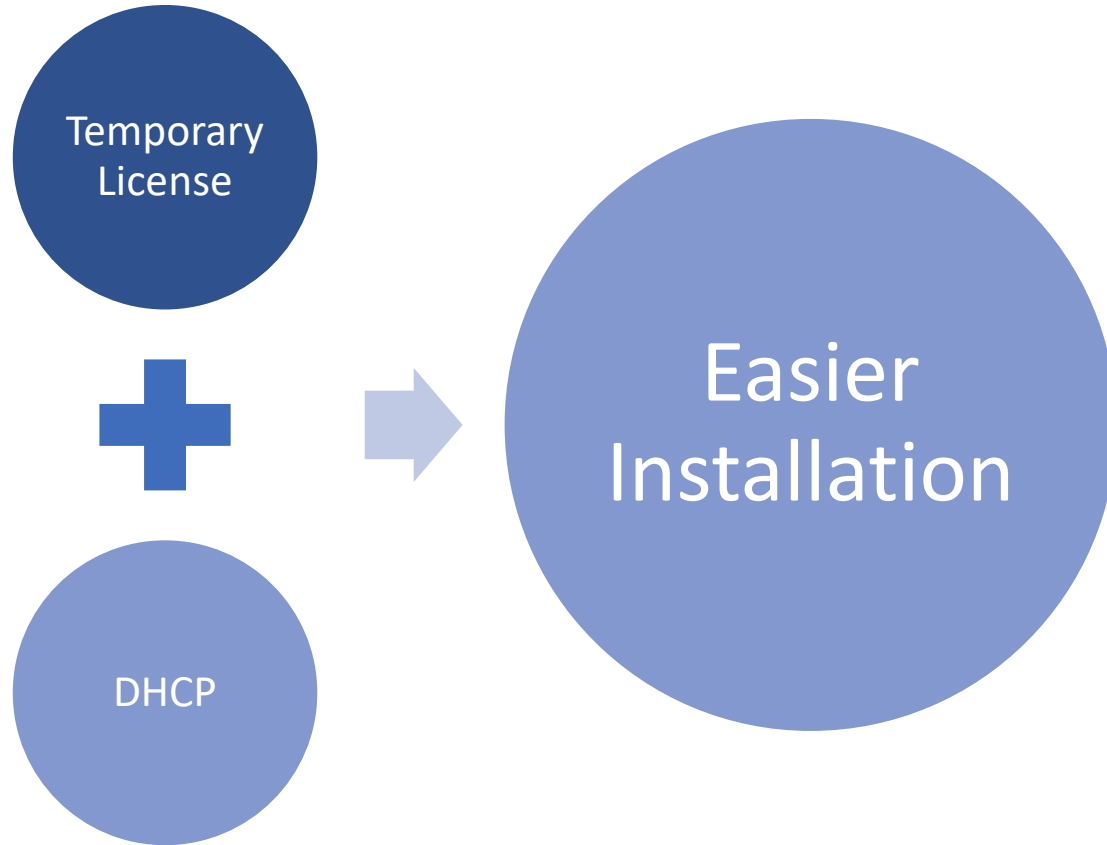
VMware DirectPath



VMware VMotion



Automatic TCP/IP+SSH



Signed Execlets



New Roadmap Process

New Roadmap Process

1

- Dynamically Generated from Jira

2

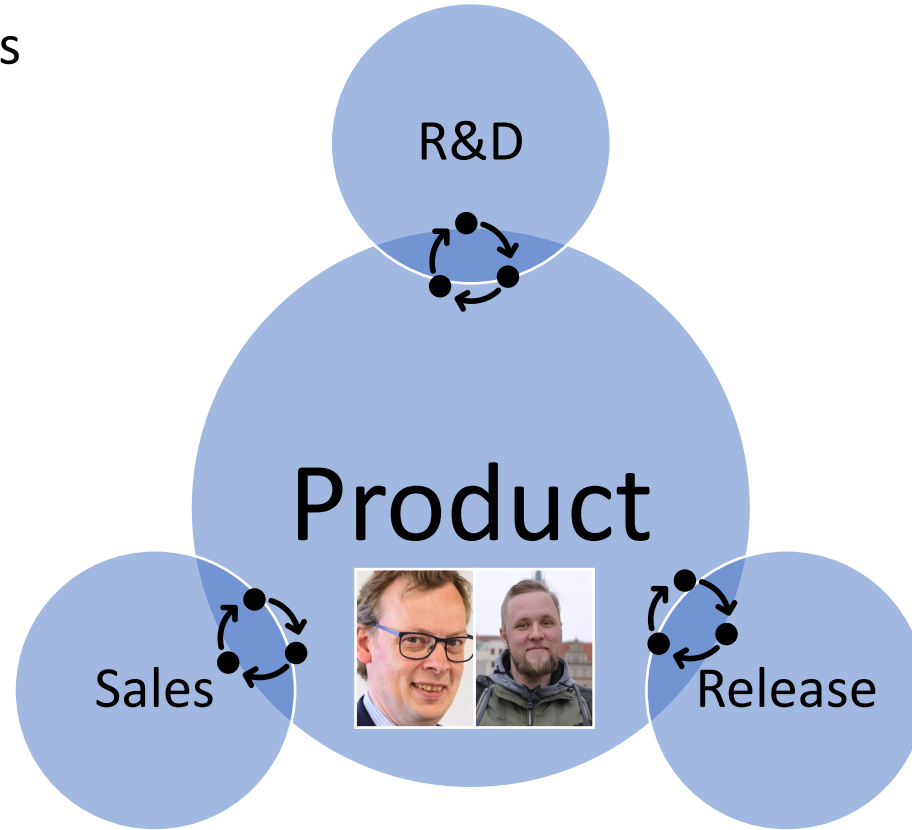
- Monthly Update Cycle

3

- Fewer Customer Surprises

Roadmap review cycle

- Strategic Goals
- Customers
- Partners
- Sales
- Support
- R&D & QA



New Roadmap

H2 CY2024

VSI OpenVMS Software Rolling Roadmap

OpenVMS V9.2-3

- VMDirectPath I/O (FC Passthrough) support
- ACME agent
- Guest console (eliminating dependency)
- vMotion support and other virtualization
- Signed executels
- A possibility of TCP/IP and OpenSSH architecture
- Availability Manager Data Collector
- Performance improvements
- Security improvements
- Bugfix

Layered and open-source products

- ACMS field test (x86)
- DECset SCA (Source Code Analyzer; x86)
- OMNI-API (OMNI API; x86)
- OSAP (OSAP H1, S7, AP; x86)
- WSIT (Web Services Integration Toolkit; x86)

OpenVMS

- > V9.2-2 Update V1 (x86) March 2024
- ✓ V9.2-3 (x86) December 2024
 - Automatic configuration and startup of TCP/IP and OpenSSH
 - VMware VMDirectPath for Fibre Channel Passthrough - Data disk support
 - Guest Console
 - ACME Agent implementation for x86
 - Signed Execlets
 - VMware vMotion support
 - Availability Manager Data Collector on x86
- > V9.2-2 Update V2 (x86) TBD

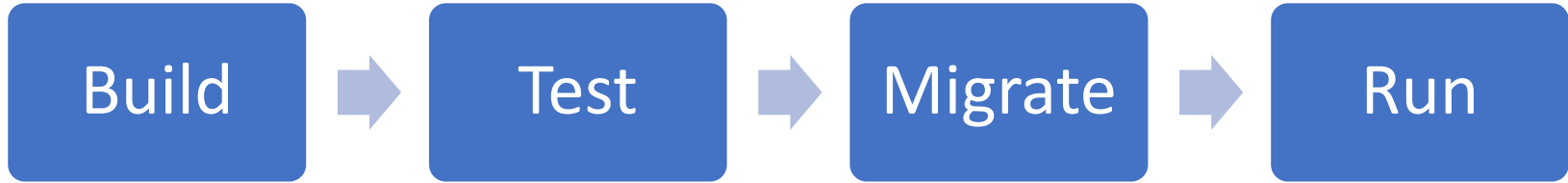
Apache Tomcat

- > V9.0-84 (IA-64, Alpha, x86) March 2024

COBOL Compiler

Getting to X86

Getting to X86



Successful build on Alpha or Itanium

3rd Party Software Availability

OS & LP Features

Attention needed in case of...

Assembly
Language

Calling Standard
Dependencies

VAX/Alpha/IA64
Conditionals

Internal Data
Structure
Dependencies

Device Driver
Code

Non-Pthreads
Threading

Undocumented
Interfaces

Variable
Argument Lists

Privileged
Interfaces

Non-User-Mode
Code

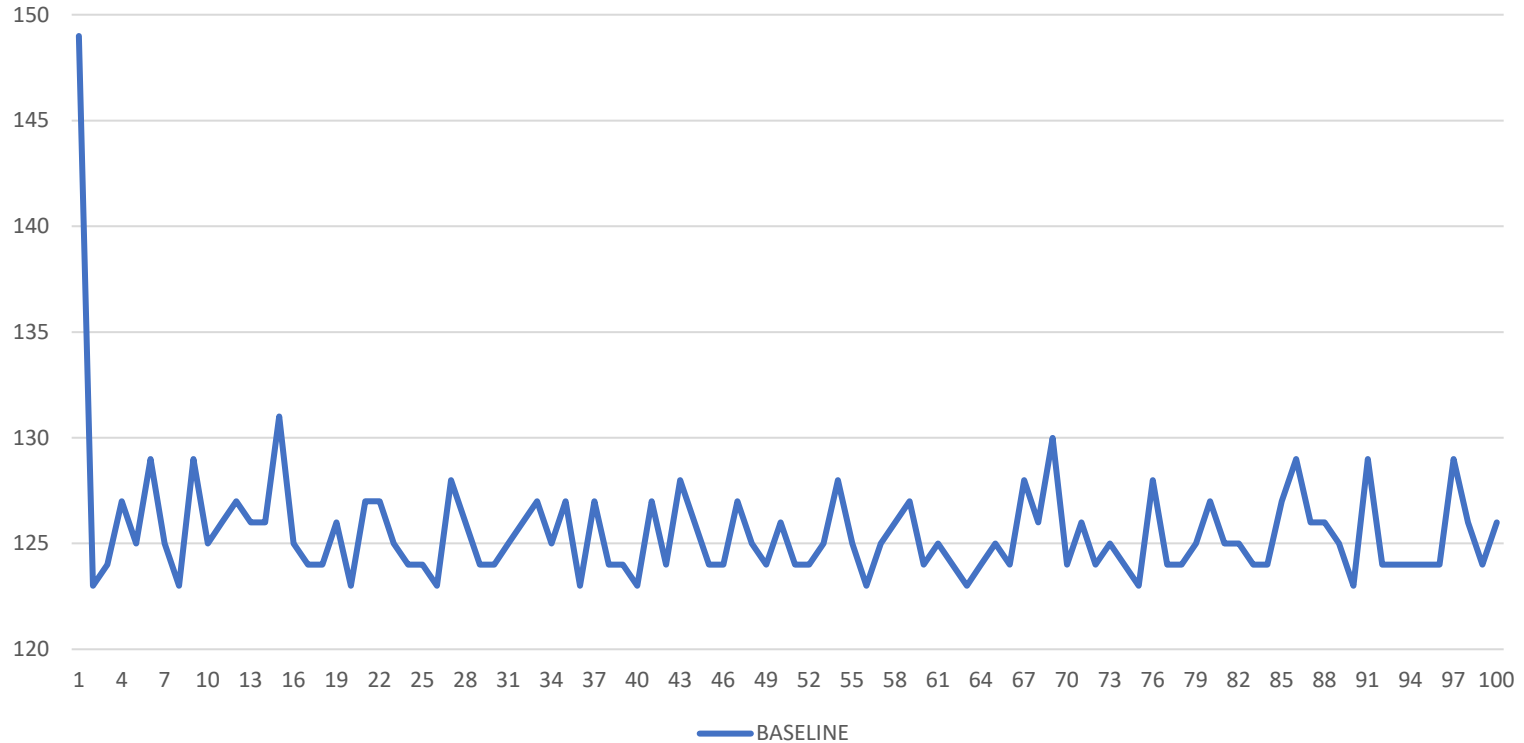
Virtual Machines vs Bare Metal

The Issue

```
$ start_cputime = f$getjpi(0,"CPUTIM")
$ set process/priority=16
$ loop_index = 0
$ 30$:
$   throwaway = f$getjpi(0,"CURPRIV")
$   loop_index = loop_index + 1
$   if loop_index .ne. loop_maximum then goto 30$
$ end_cputime = f$getjpi(0,"CPUTIM")
$ set process/priority='process_priority'
$ write sys$output end_cputime - start_cputime
```

The Issue

ESXi Virtual Machine Performance



Possible Causes



CPU Frequency Fluctuation



Oversubscription



Locking in the Hypervisor

Step 1: Power Profile

BIOS/Platform Configuration (RBSU)

Hewlett Packard Enterprise

BIOS/Platform Configuration (RBSU)

- System Options
- Boot Options
- Network Options
- Storage Options
- Embedded UEFI Shell
- **Power Management**
- Performance Options
- Server Security
- PCI Device Enable/Disable
- Server Availability
- BIOS Serial Console and EMS
- Server Asset Information
- Advanced Options

Date and Time
System Default Options



Scan for Online Help

↑↓ Change Selection Enter Select Entry ESC Back F1 Help F7 Defaults F10 Save

Step 1: Power Profile

BIOS/Platform Configuration (RBSU)

Hewlett Packard Enterprise

BIOS/Platform Configuration (RBSU)

Power Management


► Power Profile [Balanced Power and Performance]

Power Regulator [Dynamic Power Savings Model]
Minimum Processor Idle Power Core C-State [C6 State]
Minimum Processor Idle Power Package C-State [Package C6 (retention) State]


Advanced Power Options

Balanced Power and Performance
Minimum Power Usage
Maximum Performance
Custom

↑↓ Change Selection Enter Select Entry ESC Back F1 Help F7 Defaults F10 Save

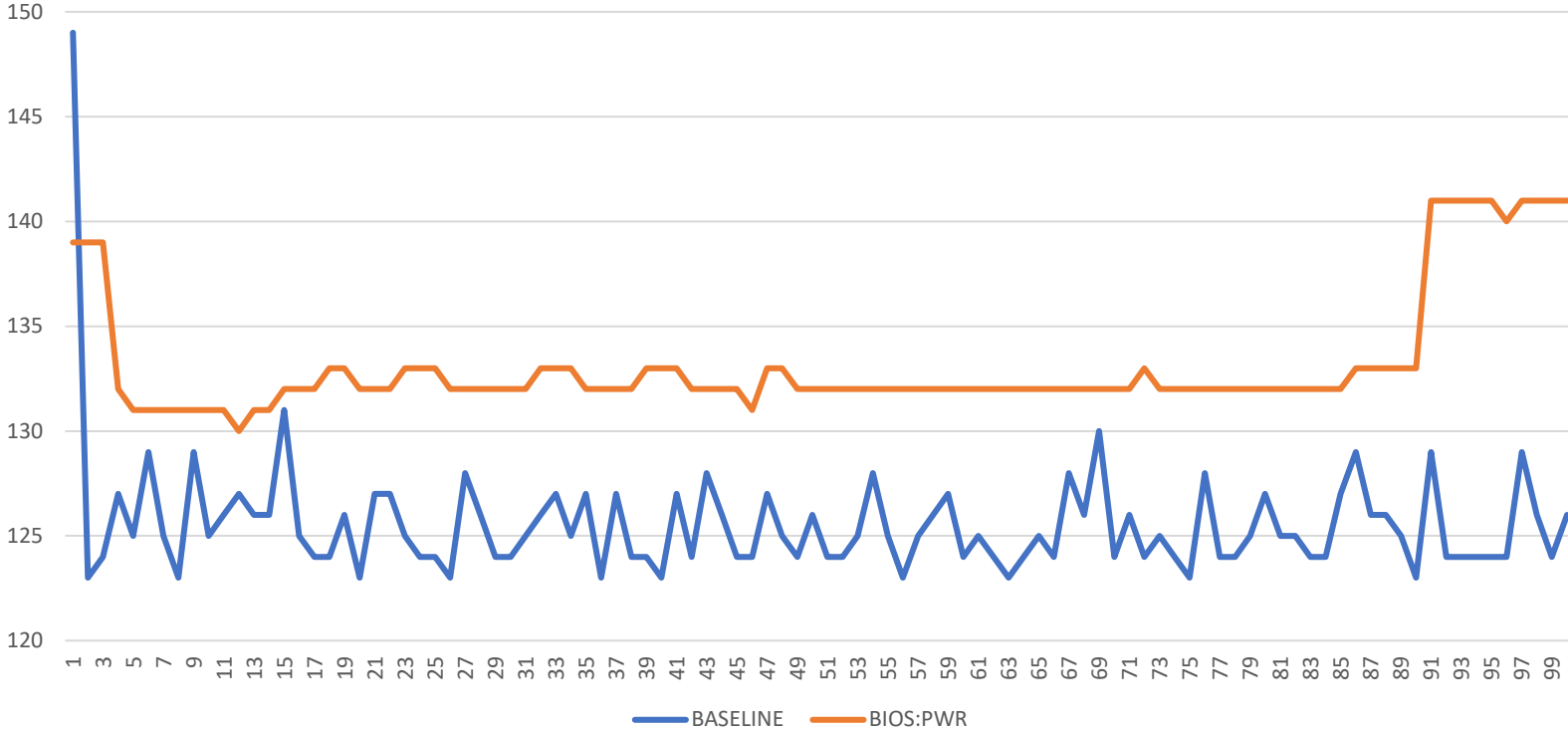


Scan for Online Help



Step 1: Power Profile

ESXi Virtual Machine Performance



Step 2: Collaborative Power Management



BIOS/Platform Configuration (RBSU)

Hewlett Packard Enterprise

BIOS/Platform Configuration (RBSU)

- System Options
- Boot Options
- Network Options
- Storage Options
- Embedded UEFI Shell
- **Power Management**
- Performance Options
- Server Security
- PCI Device Enable/Disable
- Server Availability
- BIOS Serial Console and EMS
- Server Asset Information
- Advanced Options

Date and Time
System Default Options

Scan for Online Help

↑↓ Change Selection Enter Select Entry ESC Back F1 Help F7 Defaults F10 Save

Step 2: Collaborative Power Management



BIOS/Platform Configuration (RBSU) Hewlett Packard Enterprise

BIOS/Platform Configuration (RBSU)

Power Management → Advanced Power Options

Intel QPI Link Power Management	[Disabled]
Intel QPI Link Frequency	[Auto]
Intel QPI Link Enablement	[Auto]
Energy/Performance Bias	[Maximum Performance]
Maximum Memory Bus Frequency	[Auto]
Channel Interleaving	[Enabled]
Maximum PCI Express Speed	[Maximum Supported]
Dynamic Power Savings Mode Response	[Fast]
▶ Collaborative Power Control	[Enabled]
Intel DMI Link Frequency	[Auto]

Enabled
Disabled

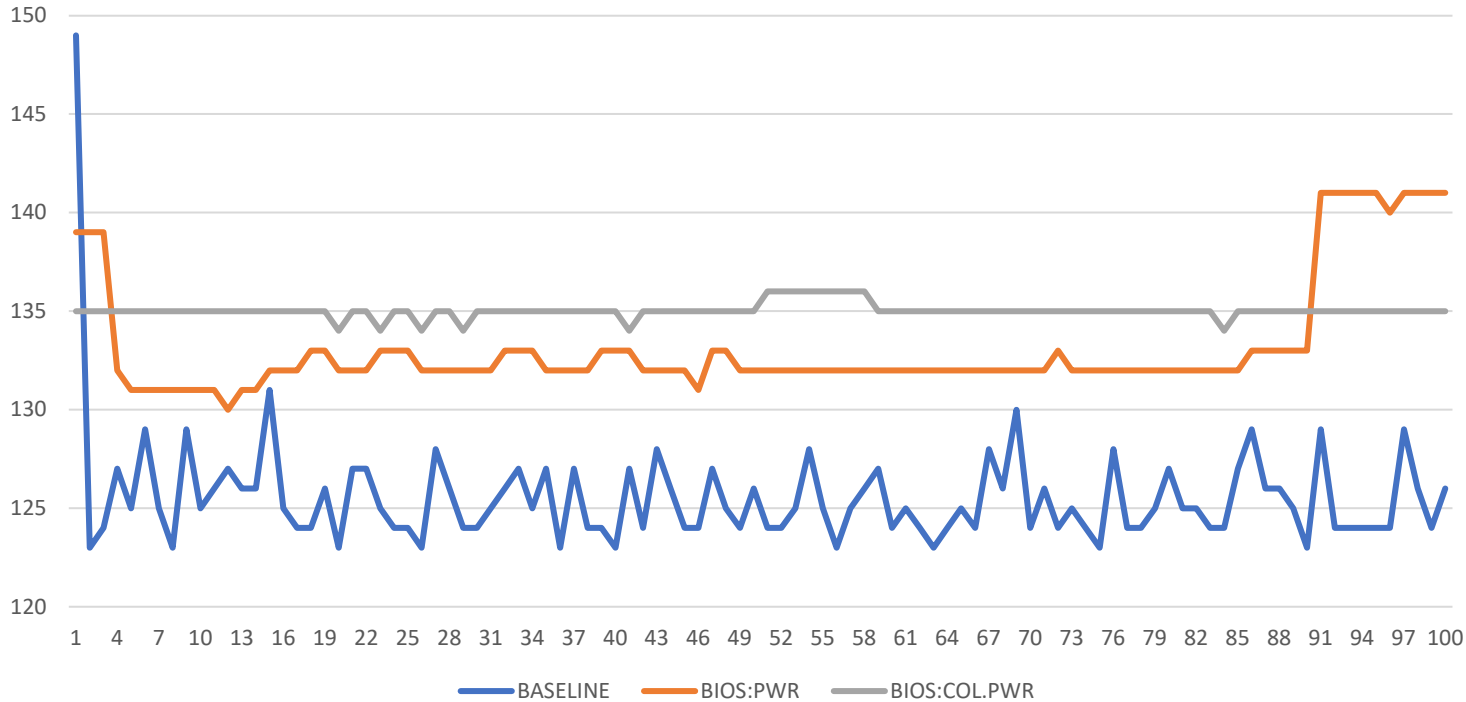


Scan for Online Help

↑↓ Change Selection Enter Select Entry ESC Back F1 Help F7 Defaults F10 Save

Step 2: Collaborative Power Management

ESXi Virtual Machine Performance



Step 3: Virtual Machine Settings

The screenshot displays the vSphere Client interface with the 'Edit Settings' dialog box open for virtual machine 'vms86'. The 'CPU' tab is selected, showing the following settings:

- CPU:** 2 sockets
- Cores per Socket:** 1 (highlighted with an orange circle). Sockets: 2.
- CPU Hot Plug:** Enable CPU Hot Add.
- Reservation:** 4296 MHz (highlighted with an orange circle).
- Limit:** Unlimited.
- Shares:** Normal, 2000.
- Hardware virtualization:** Expose hardware assisted virtualization to the guest OS.
- Performance Counters:** Enable virtualized CPU performance counters.

At the bottom of the dialog are 'CANCEL' and 'OK' buttons. The background shows the vSphere Client interface with the VM 'vms86' selected in the left-hand navigation pane. On the right, a summary panel shows usage statistics: CPU at 0 MHz used and Memory at 0 MB used. Storage usage is shown as 15 GB used.

Step 3: Virtual Machine Settings

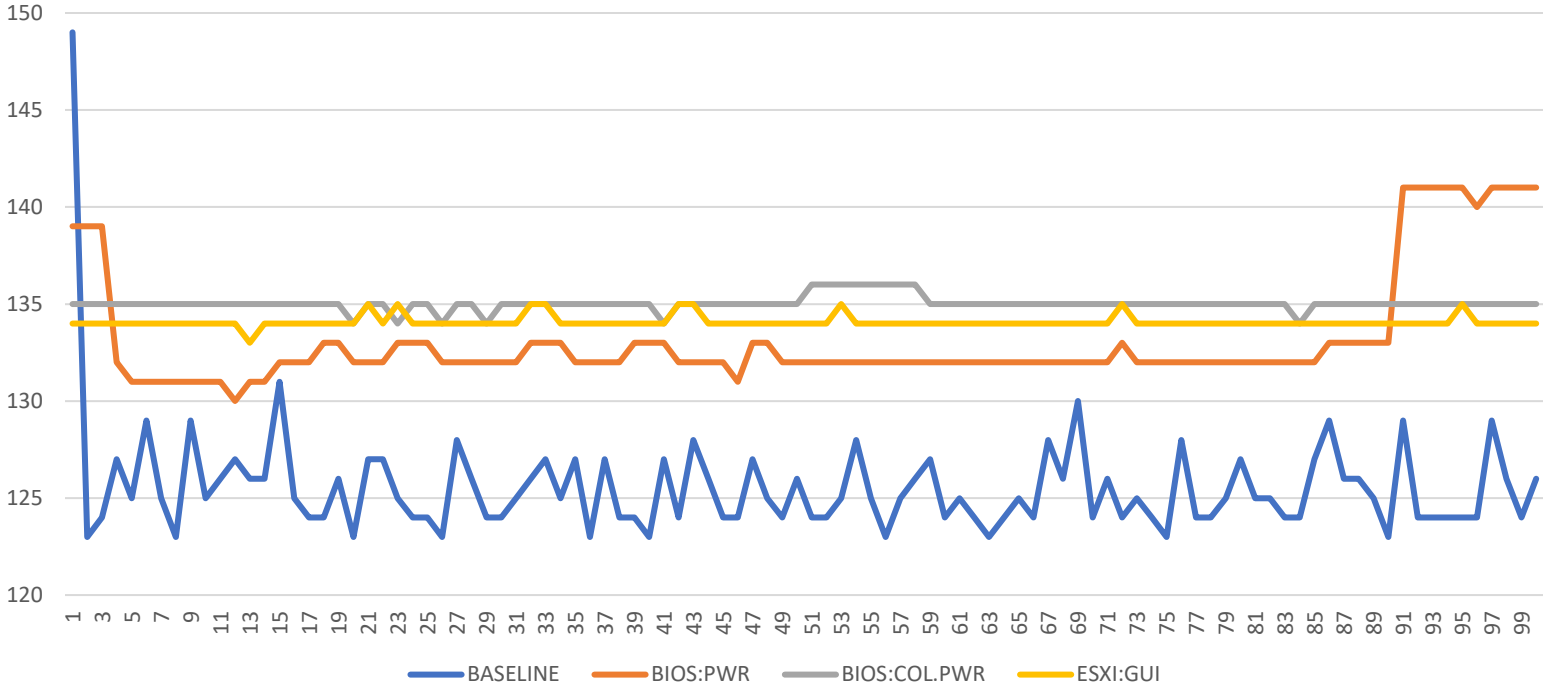
The screenshot shows the vSphere Client interface with the 'Edit Settings' dialog box open for virtual machine 'vms86'. The dialog is divided into several sections:

- Settings:** Contains two checkboxes: 'Disable acceleration' and 'Enable logging', both of which are circled in orange.
- Debugging and statistics:** A dropdown menu is set to 'Run normally'.
- Swap file location:** Three radio button options are present: 'Default' (selected), 'Virtual machine directory', and 'Datastore specified by host'. Each option has a descriptive text block below it.
- Latency Sensitivity:** A dropdown menu is set to 'High', also circled in orange.
- Expandable sections:** At the bottom, there are two expandable sections: 'Fibre Channel NPIV' and 'CPU Topology', each with a right-pointing arrow and a description.

At the bottom right of the dialog, there are 'CANCEL' and 'OK' buttons.

Step 3: Virtual Machine Settings

ESXi Virtual Machine Performance



Overall Results

	Baseline	Step 1	Step 2	Step 3
AVG	125,57	133,17	135,02	134,08
STD	2,96	2,91	0,38	0,31
STD%	2,35%	2,18%	0,28%	0,23%

Additional Steps



Disable Hyperthreading



Lock vCPUs to specific CPUs



Advanced settings in VMware

Thank you