

TEIE ETTE ASTUB...



James (Hewlett Packard Enterprise Evangelist)

22
01
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*Back-up &
Storage*



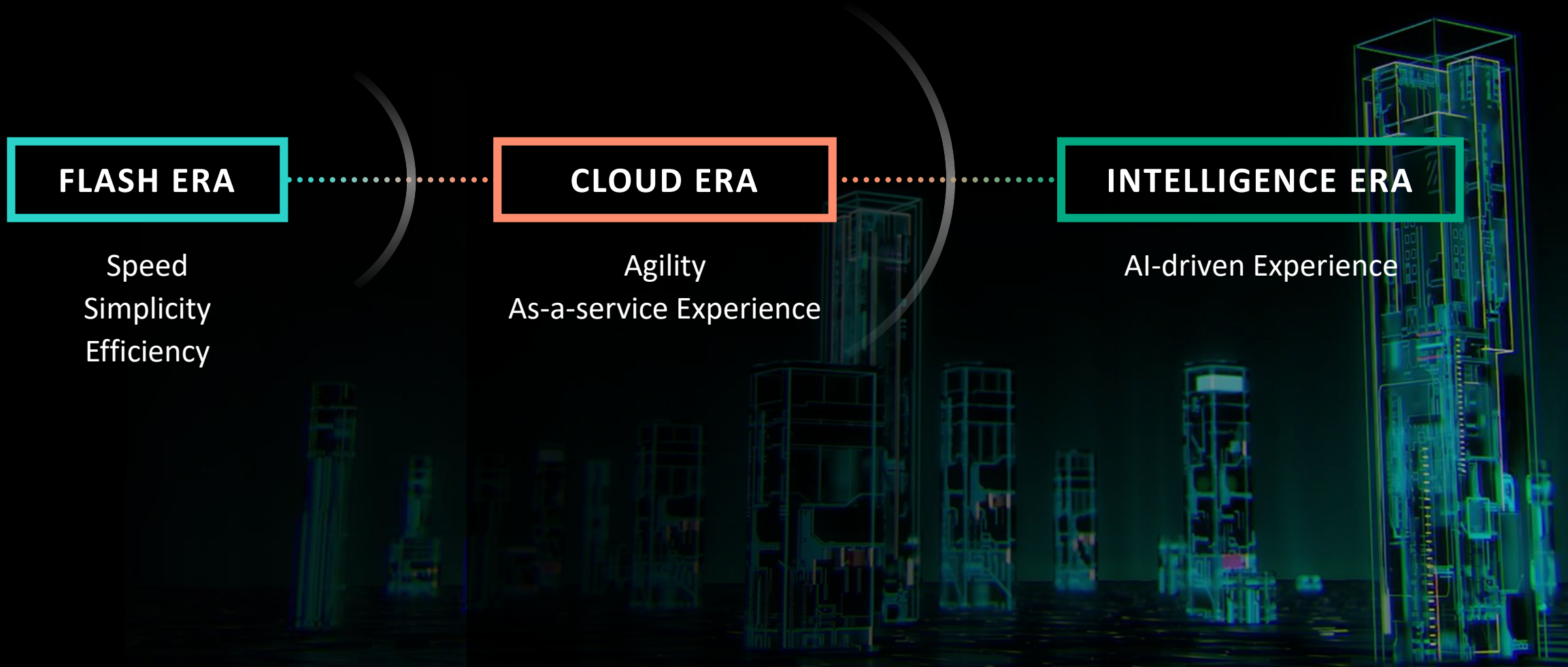
**Hewlett Packard
Enterprise**

HPE Primera Mission-Critical Storage Redefined

JAMES HALL – FIELD CTO WORLDWIDE PRESALES

August 2019

The Dawn of the Intelligence Era





PRIMERA FUNDAMENTAL DESIGN PRINCIPLES



Four Core Design Principles



**SIMPLICITY
MANAGEMENT**



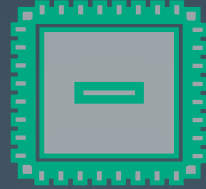
**DENSITY
PERFORMANCE**



**HARDWARE
SOFTWARE**

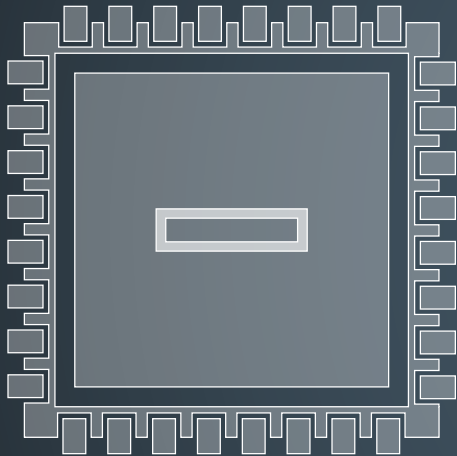


INTELLIGENT



PRIMERA HARDWARE

Hardware is Back



- Custom hardware solutions provide the **highest possible performance**, but **lack flexibility** and are **difficult to evolve** and maintain
- What if you could offer custom hardware that evolves along with commodity hardware?

The HPE Primera Portfolio

Three models to redefine Mission Critical



HPE Primera 630

2 Nodes and 24 drives in 2U

8 NVMe/SAS slots



HPE Primera 650

4 Nodes and 48 drives in 4U

16 NVMe/SAS slots



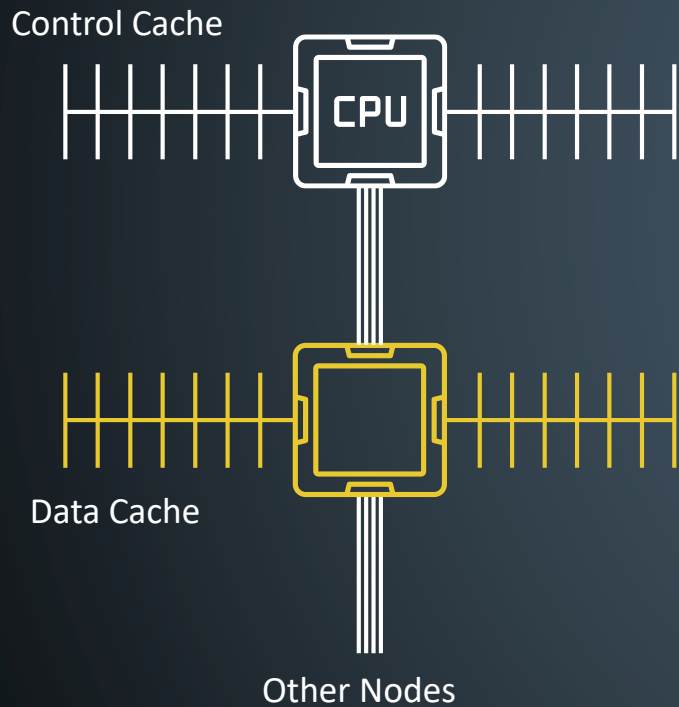
HPE Primera 670

4 Nodes and 48 drives in 4U

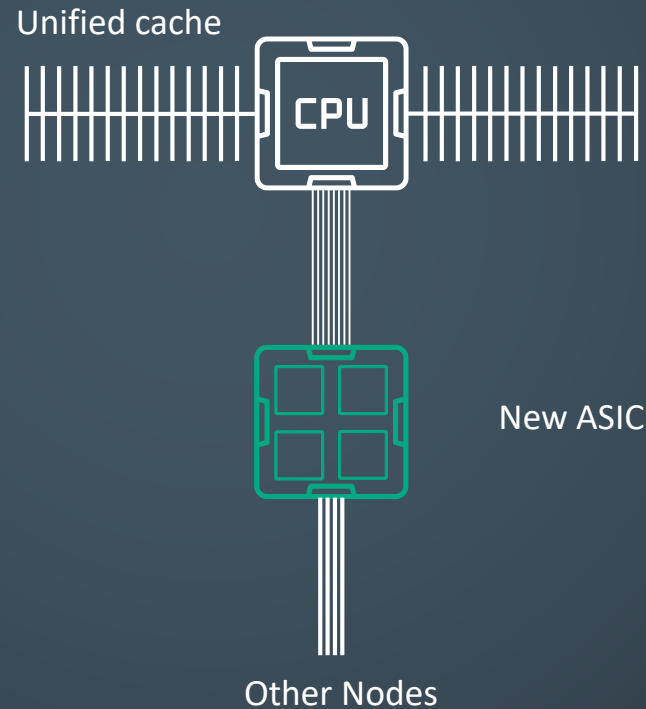
16 NVMe/SAS slots

Architecture has never been so important...

Current ASIC architecture



HPE Primera architecture



Unified cache

CPU and memory can evolve independently from the ASIC

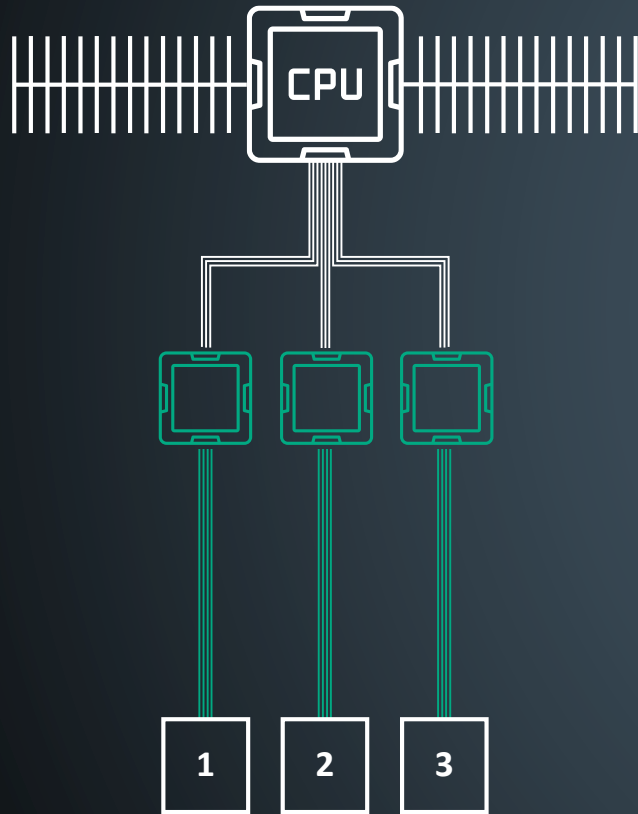
Simpler node design

Fewer memory DIMMs, more space, better board density

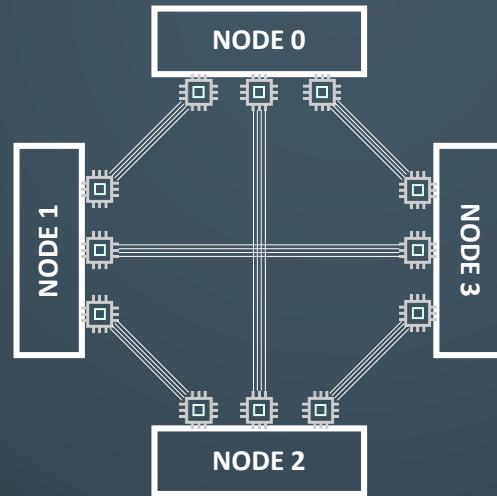
Modular ASIC architecture

More parallelization and design flexibility

An architecture built for an NVMe era



NON-BLOCKING ACCESS FOR REMOTE NODE I/O



Active/Active host connections

All host ports active for all volumes with no reliance on MPIO DSM or proprietary drivers and plugins

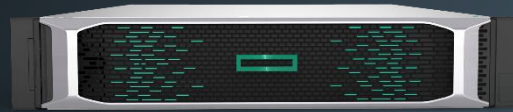
Active/Active controller architecture

All compute resources are evenly balanced for optimal performance with zero tuning required

Active/Active media access

All drives active for all volumes to drive performance and improve efficiency

Primera Technical Specifications



HPE Primera A630



HPE PRIMERA 630

CONTROLLER DETAILS



CONTROLLER NODES
2-node only (2U Chassis)
2 x PCIe expansion slots



CONTROLLER CPUs (PER NODE)
Single 10-Core CPU



UNIFIED MEMORY (PER NODE)
128 GB (256 GB system total)



ON-BOARD SAS PORTS (PER NODE)
2 x 12 Gb SAS ports



ON-BOARD ETHERNET PORTS (PER NODE)
2 x 10 GbE ports, 1 x 1 GbE port



OPTIONAL FIBRE CHANNEL HBAs
4-port 16Gb FC adapter
4-port 32Gb FC adapter



OPTIONAL ETHERNET ADAPTERS
4-port 10/25Gb adapter
4-port 10Gb Base-T adapter



OPTIONAL SAS HBA
no optional SAS adapter

STORAGE DETAILS



MAXIMUM DRIVE ENCLOSURES
5 – 24 x SFF slot enclosures (2U)



MAXIMUM NUMBER OF SSDs
144 x SAS SSDs



MAXIMUM RAW SSD CAPACITY
250 TiB



SAS SSD MODEL OPTIONS (AT LAUNCH)
1.92TB | 3.84TB | 7.68TB | 15.36TB
FIPS Self-Encrypting Drives ONLY*

Primera Technical Specifications



HPE Primera A650



HPE PRIMERA 650

CONTROLLER DETAILS



CONTROLLER NODES
2-node or 4-node (4U Chassis)
3 x PCIe expansion slots



CONTROLLER CPUs (PER NODE)
Dual 10-Core CPU



UNIFIED MEMORY (PER NODE)
256 GB (512 GB / 1 TB system total)



ON-BOARD SAS PORTS (PER NODE)
4 x 12 Gb SAS ports



ON-BOARD ETHERNET PORTS (PER NODE)
2 x 10 GbE ports, 1 x 1 GbE port



OPTIONAL FIBRE CHANNEL HBAs
4-port 16Gb FC adapter
4-port 32Gb FC adapter



OPTIONAL ETHERNET ADAPTERS
4-port 10/25Gb adapter
4-port 10Gb Base-T adapter



OPTIONAL SAS HBA
4-port 12 Gb SAS adapter

STORAGE DETAILS



MAXIMUM DRIVE ENCLOSURES
14 – 24 x SFF slot enclosures (2U)



MAXIMUM NUMBER OF SSDs
384 x SAS SSDs



MAXIMUM RAW SSD CAPACITY
800 TiB



SAS SSD MODEL OPTIONS (AT LAUNCH)
1.92TB | 3.84TB | 7.68TB | 15.36TB
FIPS Self-Encrypting Drives ONLY*

Primera Technical Specifications



HPE Primera A670

HPE PRIMERA 670

CONTROLLER DETAILS



CONTROLLER NODES
2-node or 4-node (4U Chassis)
3 x PCIe expansion slots



CONTROLLER CPUs (PER NODE)
Dual 20-Core CPU



UNIFIED MEMORY (PER NODE)
512 GB or 1 TB (up to 4 TB system total)



ON-BOARD SAS PORTS (PER NODE)
4 x 12 Gb SAS ports



ON-BOARD ETHERNET PORTS (PER NODE)
2 x 10 GbE ports, 1 x 1 GbE port



OPTIONAL FIBRE CHANNEL HBAs
4-port 16Gb FC adapter
4-port 32Gb FC adapter



OPTIONAL ETHERNET ADAPTERS
4-port 10/25Gb adapter
4-port 10Gb Base-T adapter



OPTIONAL SAS HBA
4-port 12 Gb SAS adapter

STORAGE DETAILS



MAXIMUM DRIVE ENCLOSURES
22 – 24 x SFF slot enclosures (2U)



MAXIMUM NUMBER OF SSDs
576 x SAS SSDs



MAXIMUM RAW SSD CAPACITY
1600 TiB (1.6 PiB)



SAS SSD MODEL OPTIONS (AT LAUNCH)
1.92TB | 3.84TB | 7.68TB | 15.36TB
FIPS Self-Encrypting Drives ONLY*

Primera Drive Options

SAS SSD

- 1.92TB** (*FIPS self-encrypting drives)
- 3.84TB** (*FIPS self-encrypting drives)
- 7.68TB** (*FIPS self-encrypting drives)
- 15.36TB** (*FIPS self-encrypting drives)

available at initial release

NVMe SSD**

- 1.92TB** (*FIPS self-encrypting drives)
- 3.84TB** (*FIPS self-encrypting drives)
- 7.68TB** (*FIPS self-encrypting drives)
- 15.36TB** (*FIPS self-encrypting drives)

** Not available at initial release

SCM**

- 375GB** (*FIPS self-encrypting drives)
- 750GB** (*FIPS self-encrypting drives)

** Not available at initial release

Built in Investment Protection

Scenario 1

(2N in 2U)



HPE Primera 630 in 2U



Controller Conversion



HPE Primera 650/670 in 2U



Not possible to upgrade to 4N

Scenario 2

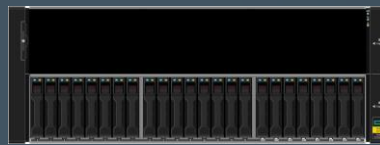
(2N in 4U)



HPE Primera 630 in 4U



Controller Conversion



HPE Primera 650/670



Node pair upgrade



HPE Primera 650/670

Scenario 3

(4N in 4U)



HPE Primera 650



Controller Conversion



HPE Primera 670

Online
Non-disruptive



RADICALLY SIMPLE

Making High End EASY



SIMPLE INSTALLATION

SELF INSTALLATION

TOOL-FREE DISCOVERY AND
CONFIGURATION

SETUP BY ANYONE



STATELESS MANAGEMENT

REQUIRES NO TOOLS

USES NO ARRAY RESOURCES

LIGHTNING FAST



DESIGNED FOR INTEGRATION

WSAPI NOW A KING OF
MANAGEMENT

VERY STRONG 3PAR TOOLS AT
DEV.HPE.COM

READY MADE PLUG-INS

Simplicity throughout



APPLICATION AWARE

- SELF TUNING VOLUMES
- BUILT IN BEST PRACTICES
- WORKLOAD PLANNING
- PERFORMANCE INSIGHTS



CUSTOMER SELF UPDATE

- BAKED IN PRE AND POST CHECKS
- ROLL BACK
- ONLINE ROLLING



RAID 6 ERASURE CODING

- AUTO CPG
- AUTO HARDWARE CONFIGURATION
- NO RAID 0, 1 OR 5

Simplified Provisioning



DATA REDUCTION

Data Reduction (DECO) volumes have both dedup and compression enabled. They offer the best cost, sacrificing max performance.



THIN PROVISIONED

TPVV (thin volumes) have both dedup and compression disabled. They offer the best performance, sacrificing cost

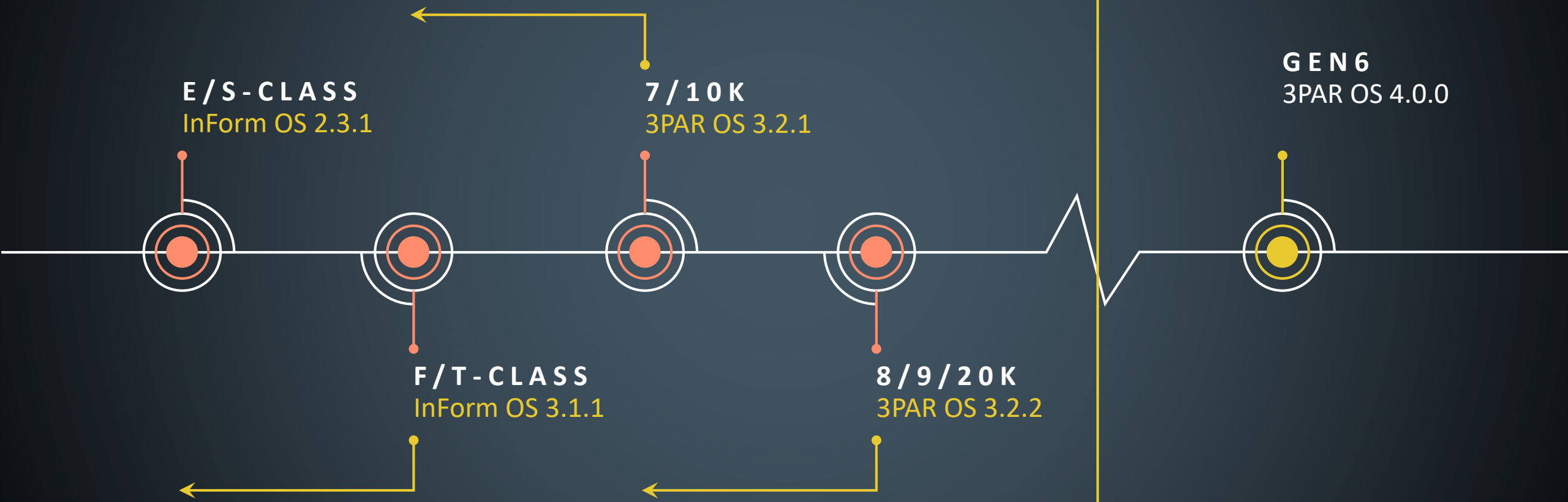
Dedup and compression are enabled together rather than separately. This enables easier sizing and deployment for customers. Selection is per volume.



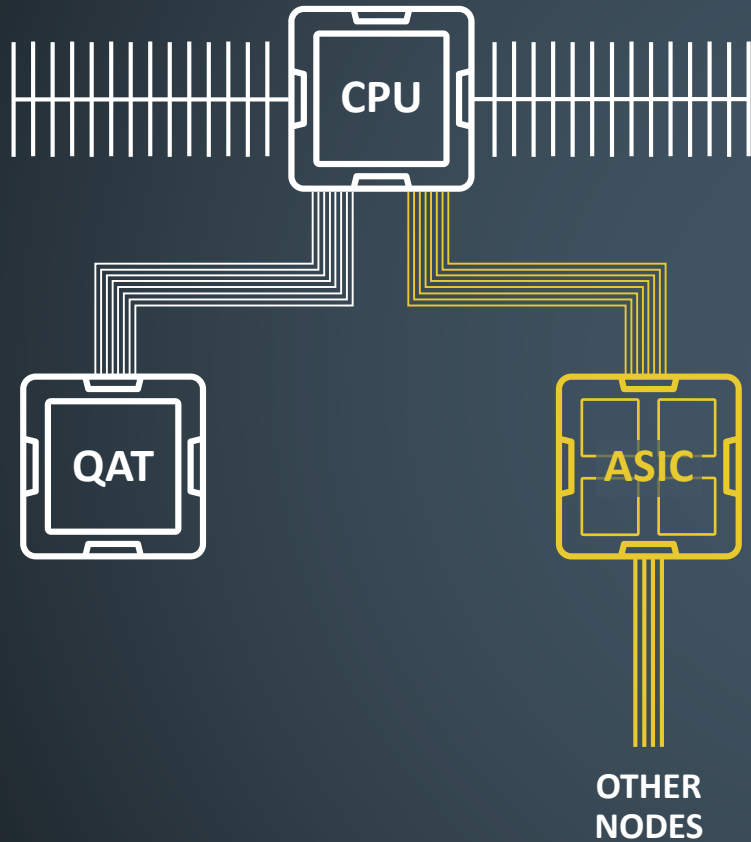
PRIMERA SOFTWARE



OS support for past models



Intelligent use of resources



WHERE TO RUN

CPU

CAN DO ANYTHING
NOT WILDLY EFFICIENT

ASIC

XOR, SHA-256, CLUSTER COMMS
EXTREMELY EFFICIENT

QAT

XOR, SHA-256, COMPRESSION + MORE
VERY EFFICIENT

Software licensing



All-Inclusive Software

All software is included as part of the array at no additional cost



Encryption license

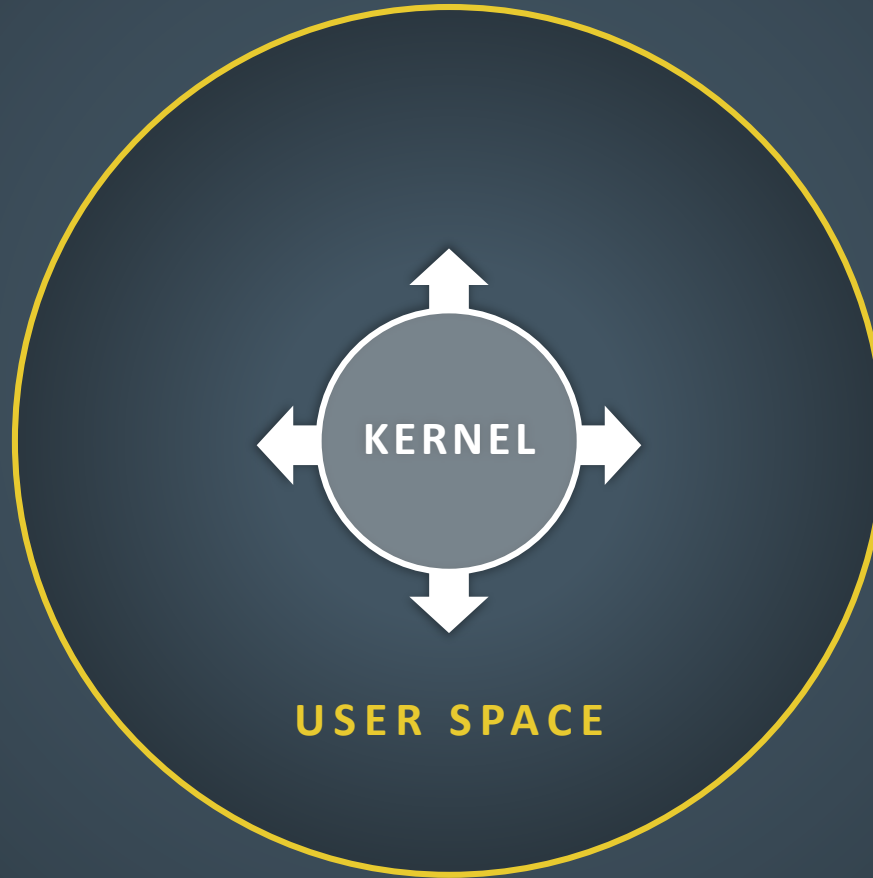
Encryption is a separate LTU

Same LTU common to all HPE Primera models priced at a nominal value

What's inside an operating system

KERNEL

CORE OF THE OS
ACCESS TO HW
TRUSTED
HIGH SPEED



USER

ON TOP OF KERNEL
NO ACCESS TO HW
UNTRUSTED
API-DRIVEN

Rich set of data services for workload availability and business continuity



DISASTER RECOVERY BUSINESS CONTINUITY

- MEET THE MOST STRINGENT RPO'S (ZERO)
- SUPPORT APPLICATION LED FAILOVER NOT JUST LUN FAILOVER
- SUPPORT MANUAL, SCRIPTED OR APPLICATION/ AUTOMATION FAILOVER
- SUPPORT TRANSPARENT FAILOVER WITH INBUILT TOOLS AND SOFTWARE



PROTECT AND RAPIDLY RESTORE

- USE SNAPSHOTS TO AUGMENT BACKUP AND RECOVERY – MEET STRINGENT RTO
- PROVIDE DATABASE AWARE DATA PROTECTION
- SUPPORT ADVANCED HIGH SPEED BACKUP TO SECONDARY BACKUP TARGET
- SUPPORT ISV INTEGRATED BACKUP AND RECOVERY



CONTROL AND MANAGE

- INTEGRATE WITH 3RD PART AUTOMATION AND DEPLOYMENT TOOLS (VMWARE ETC)
- USE ADVANCED PLUGIN FOR “OUT OF THE BOX” INTEGRATION
- CONTROL WORKLOADS WITH QUALITY OF SERVICE
- SIMPLE MANAGEMENT THROUGH UI AND 3RD PARTY TOOLS

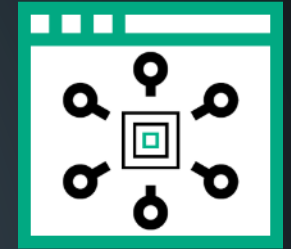
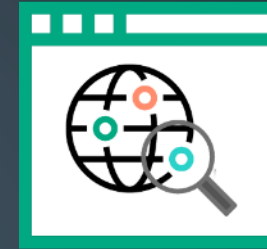
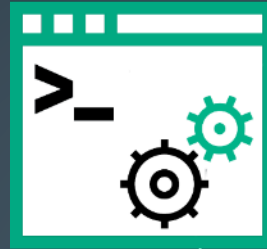
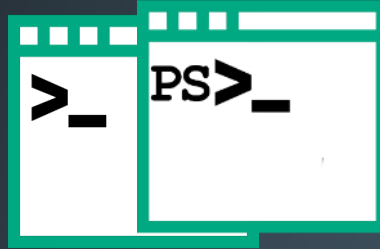


PRIMERA MANAGEMENT



Comprehensive manageability

Capabilities at low to zero cost



GUI

- HPE Primera on-node management **Free**
- SSMC Includes SSMC Microsoft Excel add-in **Free**
- RMC **Free**
- HPE OneView **Free**

CLI

- CLI Installable client for selected operating systems **Free**
- SSH From any supported operating system **Free**
- PowerShell Toolkit **Free**

API

- WEB API (RESTful) **Free**
 - HPE SDK for Ruby
 - HPE SDK for Python
 - HPE Cookbook for Chef
 - HPE Volume Plug-in for Docker
 - Kubernetes FlexVolume Driver
 - Mesos Docker Volume Driver Isolator (DVDI)
- SMI-S (SNIA) **Free**

Management integrations

- VMware Multiple integrations **Free**
- Microsoft SCOM **Free**
- OpenStack Cinder/Manila drivers **Free**
- Containers Docker **Free**
 - Kubernetes
 - Mesos
 - OpenShift

Predictive analytics

- InfoSight Portal **Free**

Third-party integration

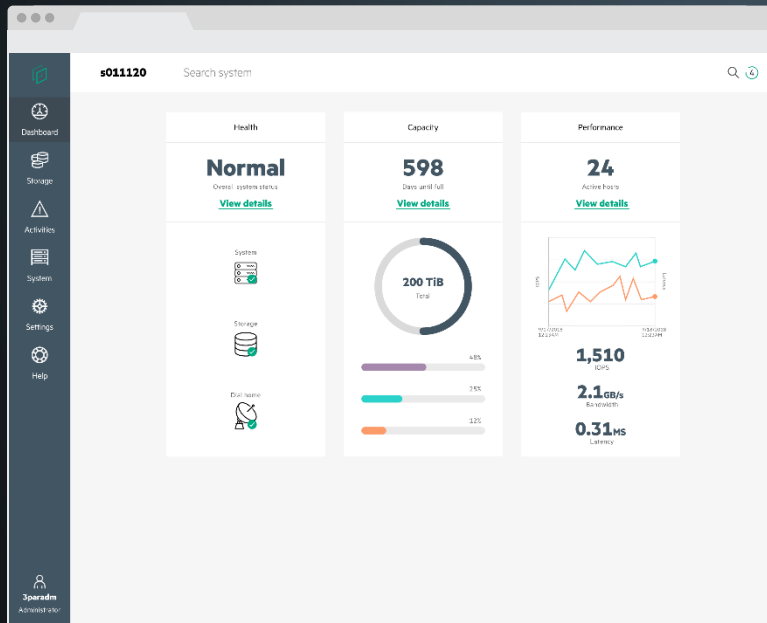
- ArxScan ArxView
- NetApp OnCommand Insight
- Nagios **Free**
- Quest Foglight
- Others

- Simple, comprehensive, consolidated
- Scriptable, with highly consistent syntax
- LDAP and IPv6 support
- Multiple assignable roles

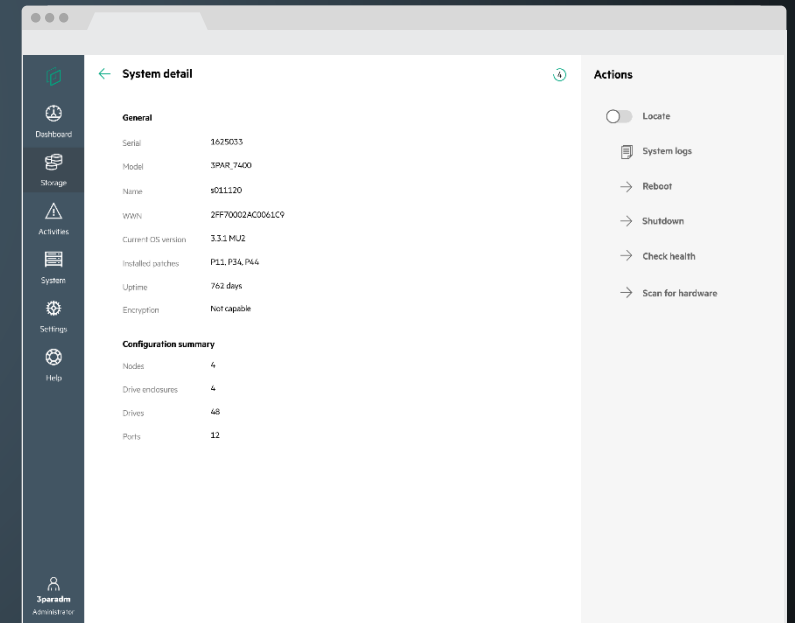
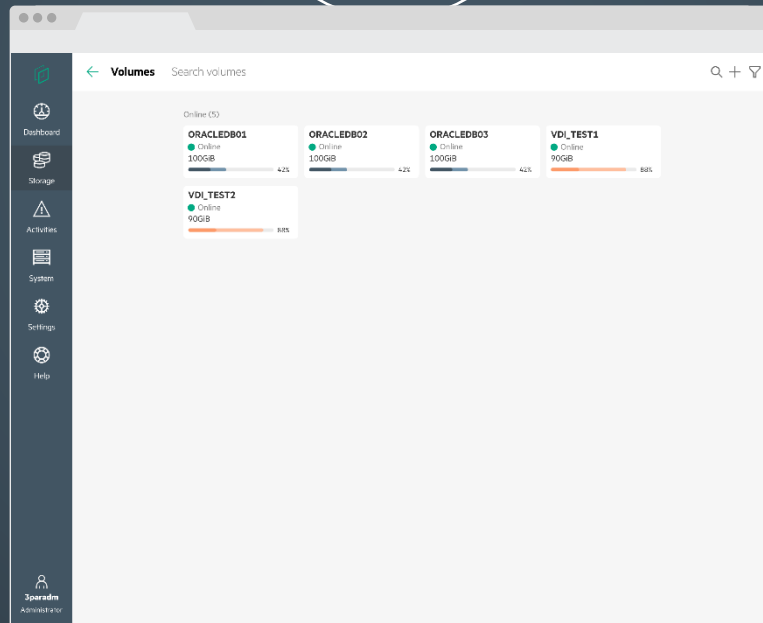
On Array Management and UI



DASHBOARD



SYSTEM



Workload insights

PERFORMANCE MONITORING
AND ANALYSIS

GET PERFORMANCE
OPTIMIZATIONS

VOLUME GRANULARITY
APPLICATION TAGGING

The screenshot shows a 'Select System' dialog box. At the top, there are radio buttons for 'All Flash Systems' (selected) and 'Others'. Below this is a search bar and a note: 'Select a All Flash System on which to create the new volumes. Systems are ranked by best fit.' A table lists the top systems:

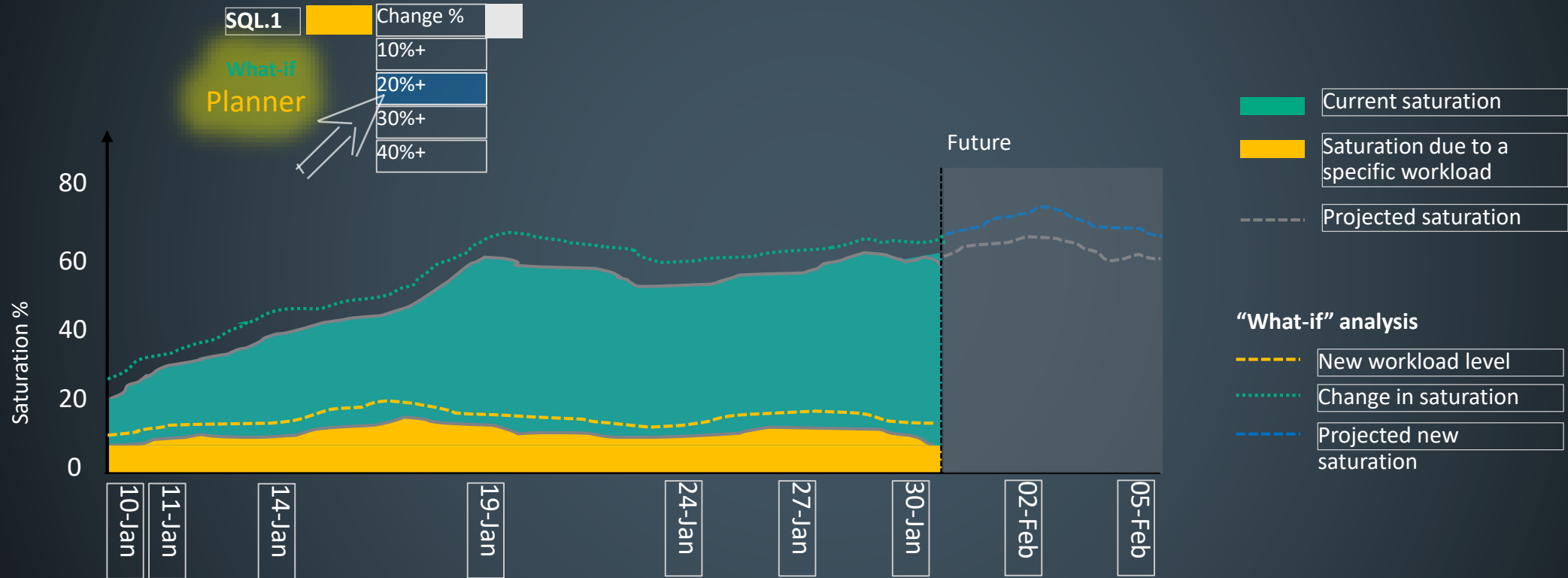
Rank	System Name	Saturation Score	Free Space (GB)
1	CB2109_20450_47	2.83	168 (RAID 6)
2	CSSL	2.83	168 (RAID 6)
3	CSSL_Sha	21.07	23 (RAID 6)
4	CSSL_S	21.07	2340 (RAID 6)

Below the table is a 'Saturation Forecasting' graph for the selected system 'CSSL'. The graph shows a line chart with a red line representing the current saturation and a green shaded area representing the forecast. The x-axis is labeled 'Time' and the y-axis is labeled 'Saturation'. A legend indicates 'Forecast (30 - 60 8000000)'. At the bottom of the dialog are 'Select' and 'Cancel' buttons.

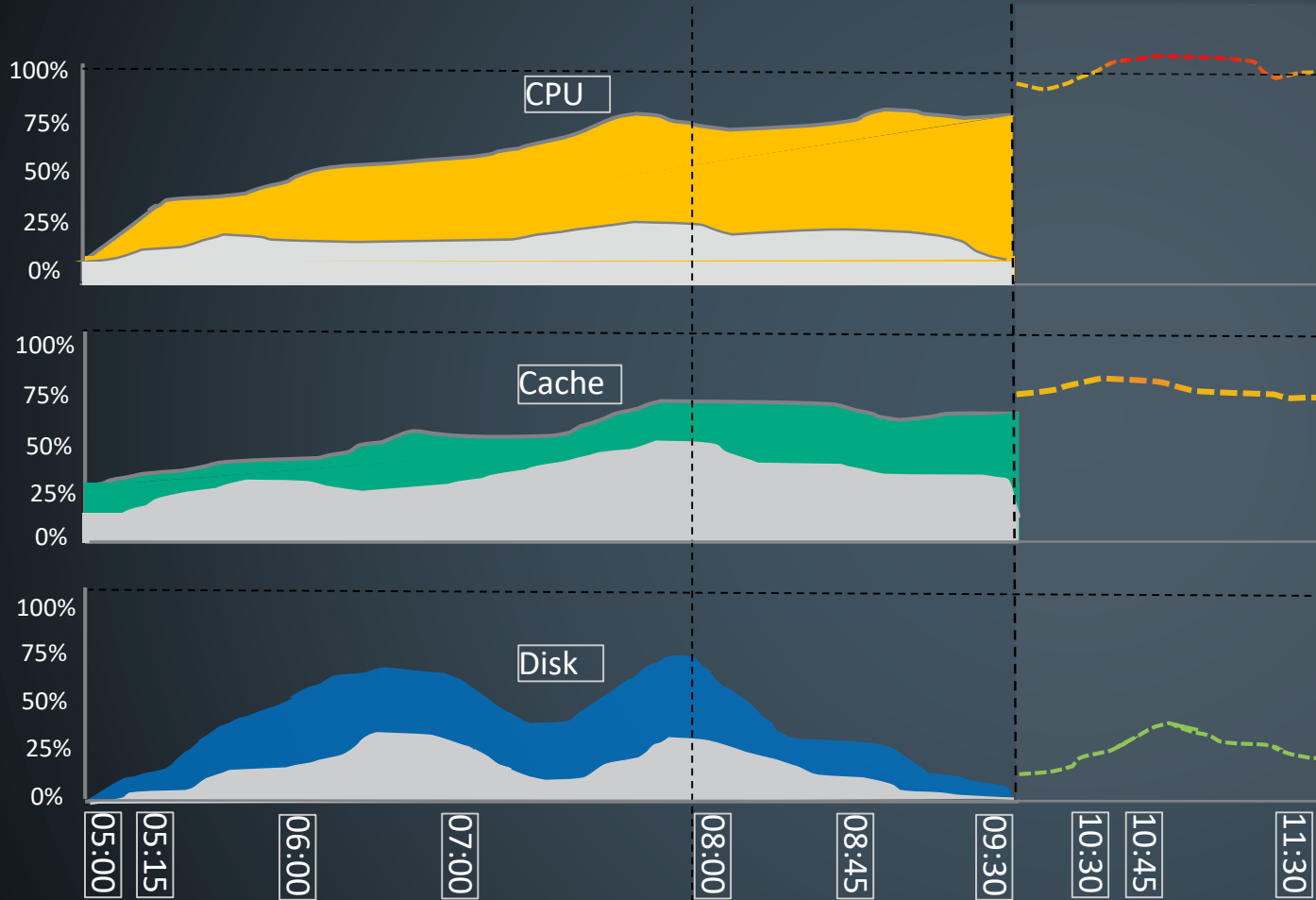
EVENLY DISTRIBUTE
WORKLOADS BASED ON
THE SATURATION OF EACH
ARRAY

INTEGRATED WORKLOAD
PLANNING WITH WHAT-IF
SITUATION ANALYSIS

Workload insights - planning



Recommendation Engine



SQL.1 (workload)
Projected saturation

What-if Planner

SQL.1	Change %
10%+	
20%+	
30%+	
40%+	

Summary ⚠️

Simulation failed. You cannot increase the IOPs on the workload SQL.1 on the storage system without over subscribing the CPU.

Recommendation

You have the following options

- **Upgrade** to a 8450 ([Buy now](#))
- Move SQL.1 to storage system **wxndhg4657**

PRIMERA STORAGE | MANAGEMENT DETAILS

On Array Cross Stack Analytics

The screenshot displays the 3PAR StoreServ management interface, divided into several sections:

- Virtual Machines List:** A table listing 45 VMs with columns for Name and System. The last entry, "New Virtual Machine", is selected.
- New Virtual Machine Details:** A sidebar showing general information for the selected VM, including Name, VM ID, VM state, System, Domain, Storage Containers, Last host, VMware VVols, VM snapshots, Guest OS, Remote Copy, and Group names.
- View Menu:** A dropdown menu with options: Overview, VMware VVols, Performance, and Topology.
- VM Performance Metrics:** A central dashboard showing performance for VMs (ad_vm20nFullIDS, ad_vm123IIDS, ad_vm23434IDS), VMDKs, Data Store, Hosts (ad_host1, ad_host2), Virtual Volumes (ad_v123IIDS), and System (Lincon, Spring). Metrics include Capacity, CPU usage, Memory usage, Bandwidth, Latency, and IOPS.
- System Performance:** Two system performance cards for "Lincon" and "Spring", showing Saturation (30% and 90%), Performance score (5 and 4/7), and Current values.



PRIMERA SERVICES



Enterprise storage ownership transformed

Proactive or Datacentre Care
Support 24x7x4

Flat Support Pricing

100% Uptime Guarantee

StoreMore Guarantee

HPE Primera is

TIMELESS

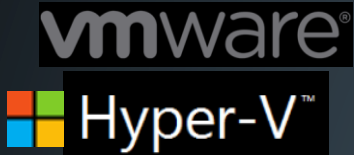




USE CASES

MISSION CRITICAL WORKLOADS ON HPE'S INTELLIGENT DATA PLATFORMS

Across all Industry Verticals and Customer Segments



**>80% 3PAR
and Nimble
Installed-Base
powers
VMware and
Hyper-V**

55% market-share for VVol adoption.

2x compared to Pure!

**>65% Nimble
and >30%
3PAR
Installed-Base
powers SQL
Server and
Exchange**

SQL Server is the most virtualized workload.

**>40% 3PAR
and >25%
Nimble
Installed-Base
run Oracle,
SAP HANA or
DB2**

#1 vendor of choice for SAP HANA deployments.

More systems than the next three system vendors combined

**Rapidly
surging co-
adoption of
emerging
workloads
embellishing
multi-tenancy**

10-15% of Installed-Base being utilized for emerging workloads already!

More emphasis in FY20E than ever!



**Hewlett Packard
Enterprise**

Thank You

ENGAGE WITH HPE STORAGE



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