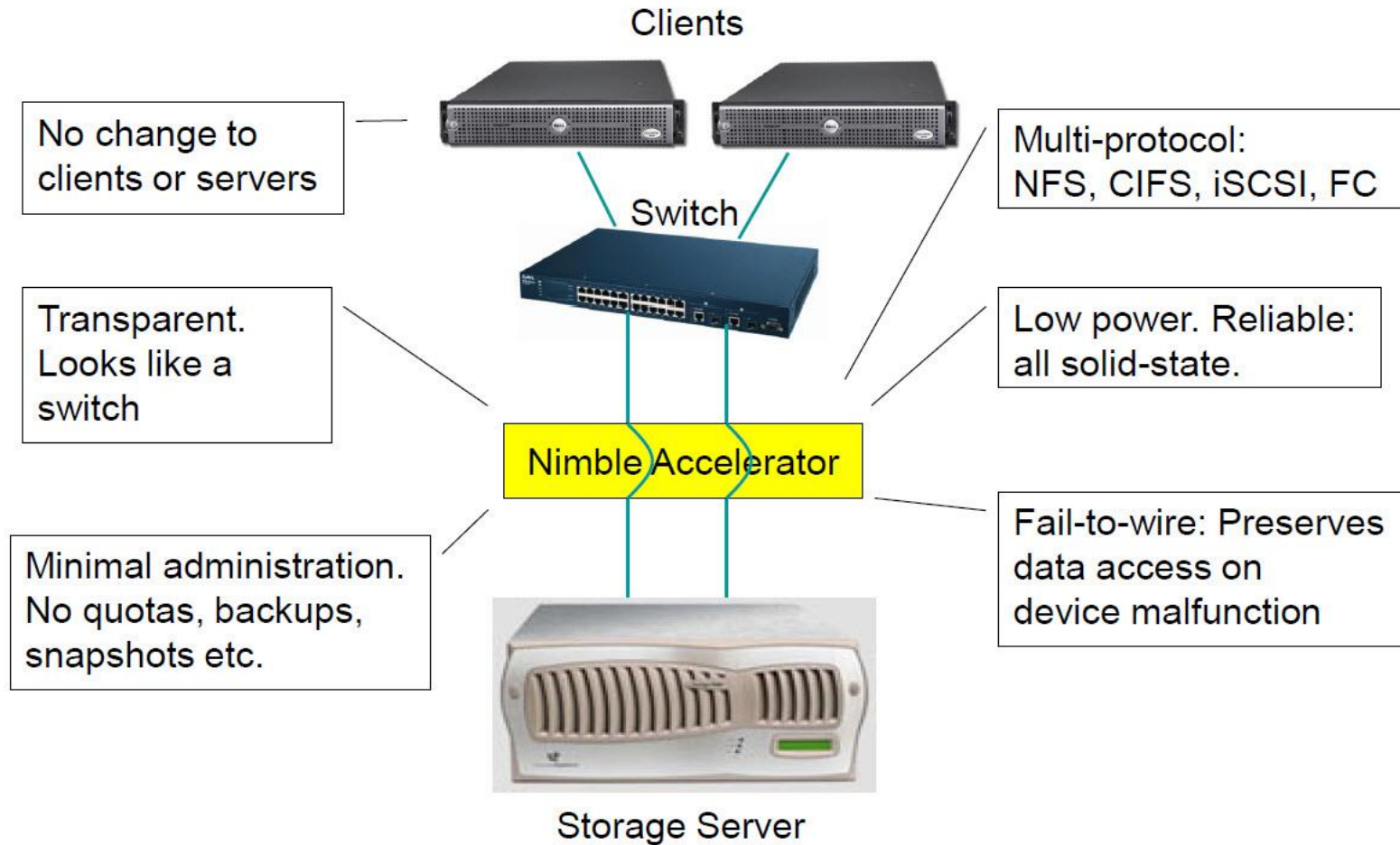**Hewlett Packard Enterprise**

Accelerating Business Outcomes by leveraging Intelligent Storage
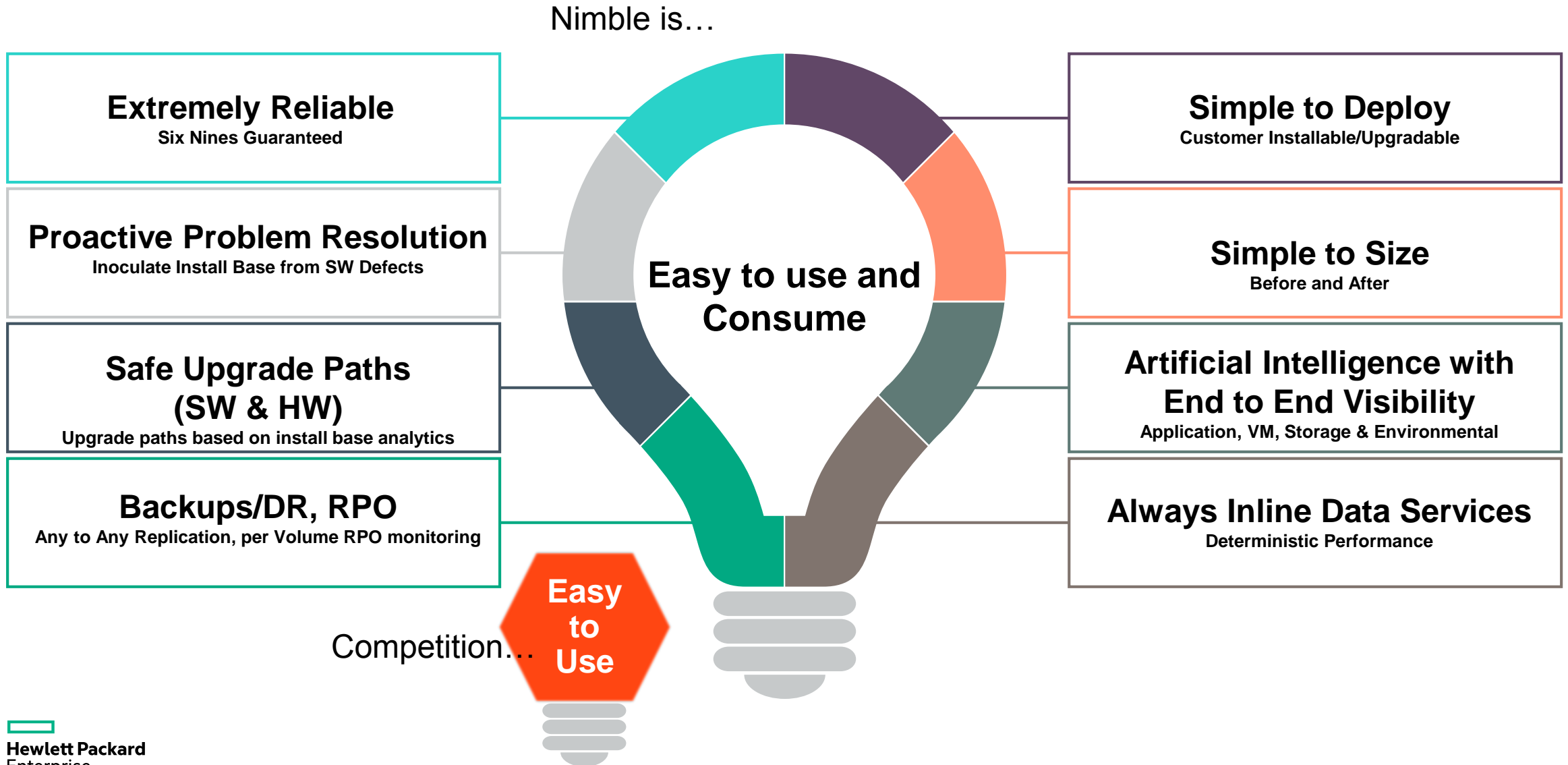
Nimble Storage 101: The Early Days
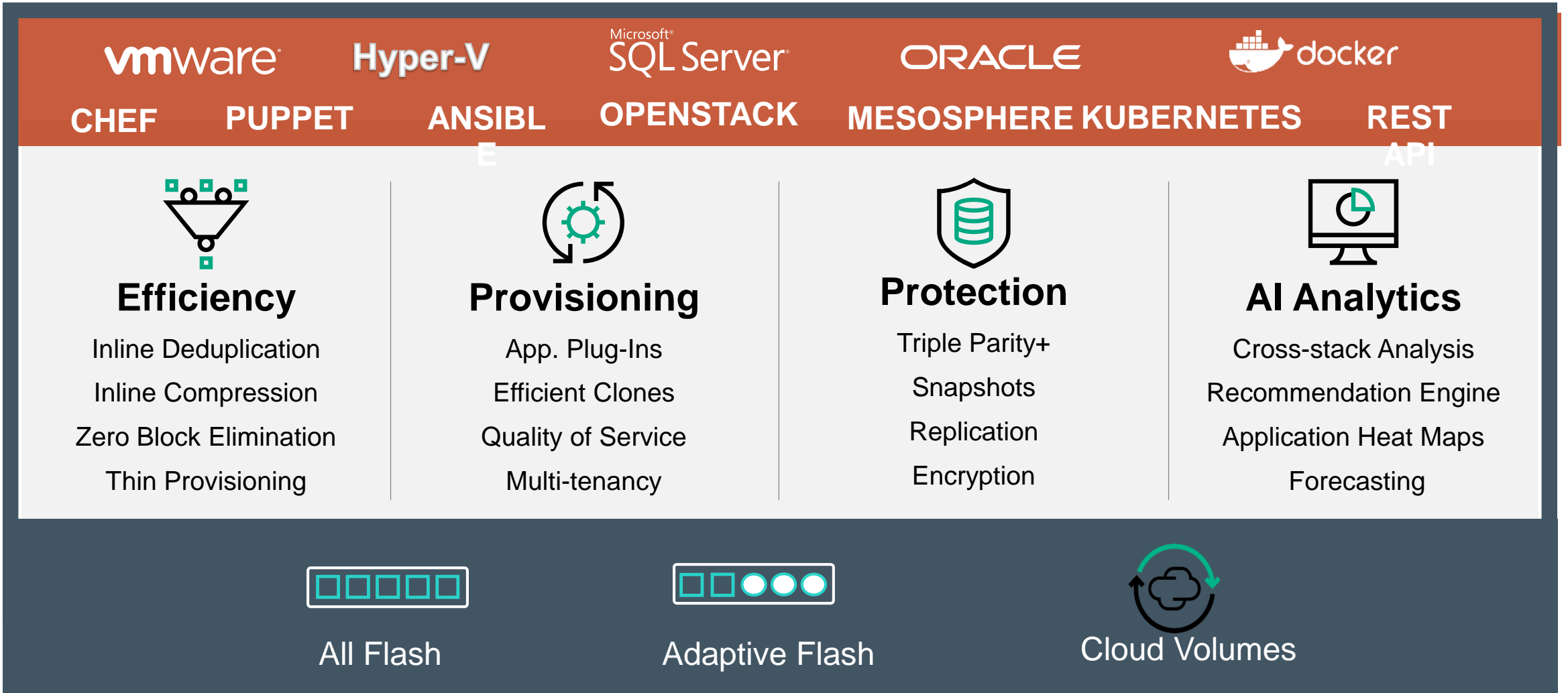

The Accelerator Appliance

Clients

No change to clients or servers

Switch

Multi-protocol: NFS, CIFS, iSCSI, FC

Transparent. Looks like a switch

Low power. Reliable: all solid-state.

Nimble Accelerator

Minimal administration. No quotas, backups, snapshots etc.

Fail-to-wire: Preserves data access on device malfunction

Storage Server

Hewlett Packard Enterprise

Why does Nimble win?

Nimble is…

Extremely Reliable
Six Nines Guaranteed

Proactive Problem Resolution
Inoculate Install Base from SW Defects

Safe Upgrade Paths (SW & HW)
Upgrade paths based on install base analytics

Backups/DR, RPO
Any to Any Replication, per Volume RPO monitoring

Easy to use and Consume

Simple to Deploy
Customer Installable/Upgradable

Simple to Size
Before and After

Artificial Intelligence with End to End Visibility
Application, VM, Storage & Environmental

Always Inline Data Services
Deterministic Performance

Easy to Use

Competition…

Hewlett Packard Enterprise

Always-On App-Centric Data Services

vmware **Hyper-V** Microsoft® **SQL Server®** **ORACLE** **docker**

CHEF **PUPPET** **ANSIBLE** **OPENSTACK** **MESOSPHERE KUBERNETES** **REST API**

Efficiency
Inline Deduplication

Inline Compression

Zero Block Elimination

Thin Provisioning

Provisioning
App. Plug-Ins

Efficient Clones

Quality of Service

Multi-tenancy

Protection
Triple Parity+

Snapshots

Replication

Encryption

AI Analytics
Cross-stack Analysis

Recommendation Engine

Application Heat Maps

Forecasting

All Flash

Adaptive Flash

Cloud Volumes

Multicloud Flash Fabric

Leading AI for Hybrid Cloud

Collecting and Analyzing Millions of Sensors per Second

Customer Impact

Predictive Support Automation	Preemptive Recommendations	Proactive Management	Continuous Improvement

Cloud-Based AI Platform

Predictive Analytics Engine	Global Learning	Recommendation Engine

Cross-Stack Telemetry

vmware	ORACLE	Microsoft SQL Server	E Exchange
Compute	Network		Storage

Hewlett Packard Enterprise

Identifying Root Cause & Solution

VM Details
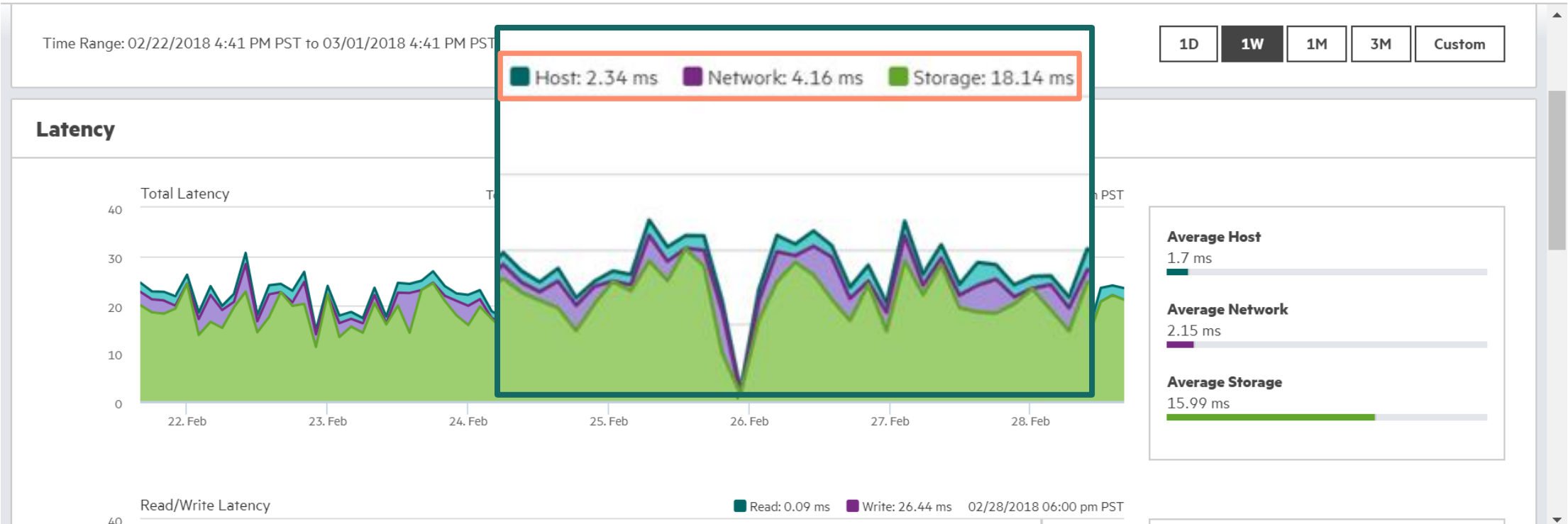
Identifying Source of Latency
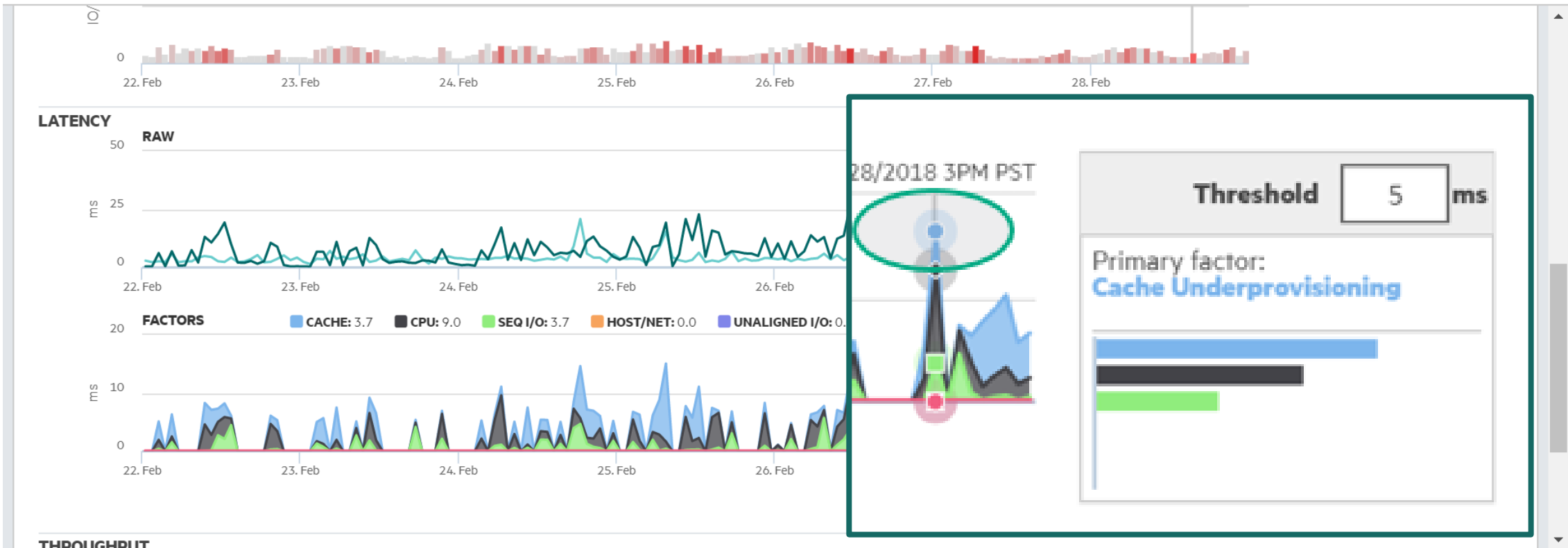
AI Engine: Recommendation

InfoSight: Host & VM Recommendation Engine

Environment Status

VM performance is degraded due to the overprovisioning of virtual CPU cores, which is creating scheduling contention. VM latency is elevated.

● Virtual CPU Overprovisioning   ● Elevated Latency

Diagnosis

VM performance is degraded due to the overprovisioning of virtual CPU cores, which is creating scheduling contention.

Recommendations

Move `impacted` VMs to a Host with a significantly lower ratio of virtual CPU to physical CPU cores.

Reduce the number of virtual CPUs allocated to `overprovisioned` VMs.

Reduce the overall number of virtual CPUs provisioned on the Host(s) used by `impacted` VMs.
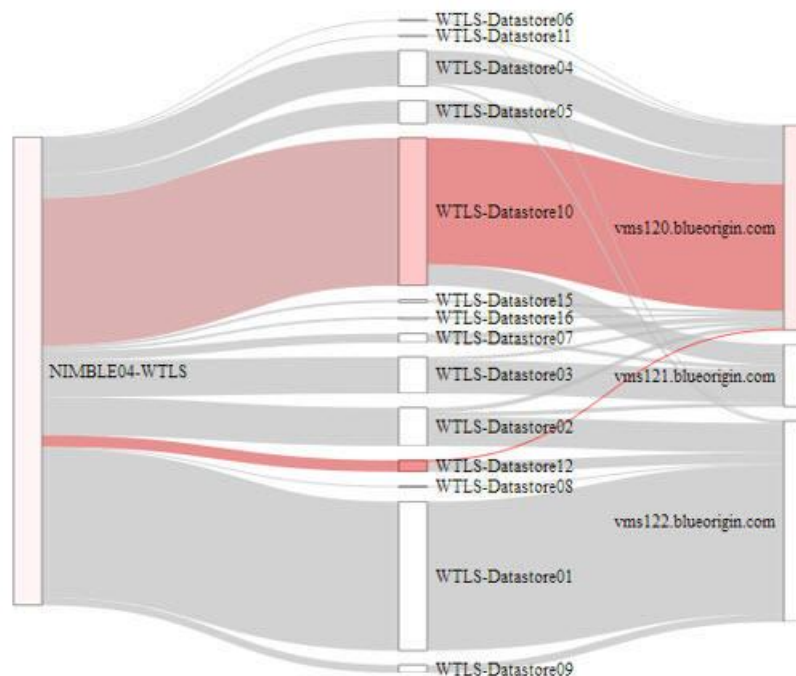
VM Details

The virtual machines below are first sorted by recommendation `label` and then in order of descending cpu contention. Only virtual machines with recommended actions are displayed.

Name	Status	CPU CoStop+Ready %	vCPU Count	CPU Usage %
TXITR-SKYDB-v01	`impacted` `overprovisioned`	4.92	8	1.73
TXITR-SWFNSQL-V01	`impacted` `overprovisioned`	4.11	8	4.41
TXITR-SKYMON-v01	`overprovisioned`	2.04	4	1.85
wtls-bdms07	`overprovisioned`	0.87	8	0.83

Treemap   Sankey

This sankey chart shows the relationships between storage arrays (left), datastores (center), and hosts (right); the width of the lines connecting them represents the amount of IO traffic. The color of each array, datastore, and host denotes how much CPU contention (i.e. CPU ready and costop) is occuring on the associated virtual machines.

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InfoSight: Host & VM Recommendation Engine

HPE InfoSight: AI for the Data Center

Extending HPE InfoSight Across HPE

Storage Servers Networking Converged

Thank You

Tony Huk, Senior Storage Technical Architect