Pivot3 Hyperconverged Technology

Simplifying Data Center and Surveillance Operations

Pivot3

Global Markets

Financial Services

HealthCare

Education

Transportation Entertainment

Manufacturing

Fed/State/Local Government

Safe Cities

Defense

Our Vision and Business Plan

Hyperconverged/software-defined technology is one of those big waves that happens every few decades in the IT industry

When these waves occur, several of the incumbent IT companies disappear and several new firms emerge as the incumbents for the next few decades

Pivot3 will be one of those firms which emerge and grow to be a dominant player for the next few decades – our deep storage knowledge and technology capabilities will power our success

Why Hyper-Convergence?

x86 Cost Curve
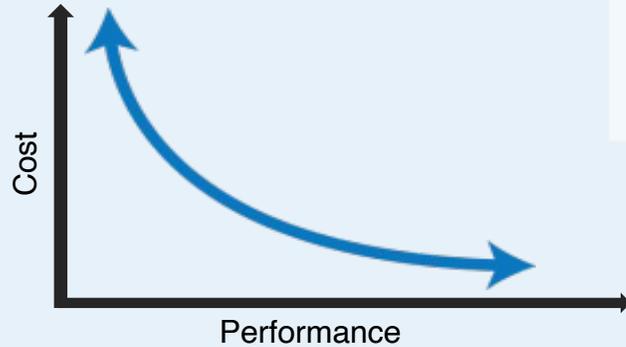
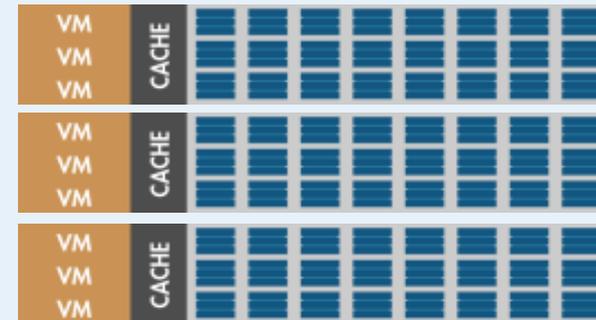>300Mil x86

>99% adoption

Virtualization + Shared Storage

Compelling Economics

HCI – Compute & Storage

Understanding the Economics

Pivot3 Hyperconverged Benefits

↓ Cost

Net Result

- Lower TCO

- Better Densities

- Investment Protection

- Pay as you grow

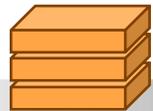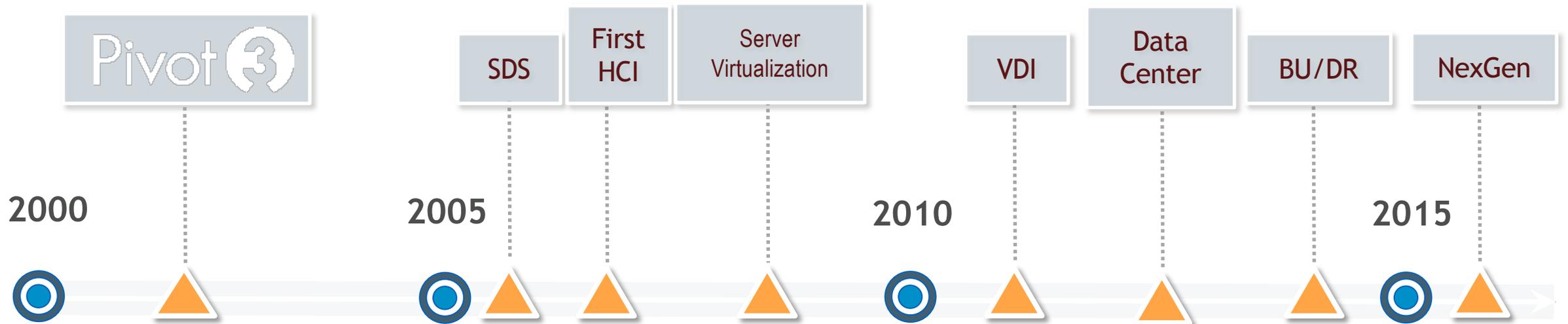*Enterprise Class Features*

↓ Complexity

Net Result

- Eliminate Silo's

- Effortless Management

- Faster Time to Market

- Better Support Experience

Enterprise Class Features

Proven Excellence for Better Business Outcomes

Pivot3

Best-in-class support
for enterprise

2,000 customers,
16,000 appliances,
53 countries

Boulder
Austin
Houston
Mexico City
London
Dubai
Singapore
Seoul

Innovation Timeline

2000 · 2005 · 2010 · 2015

SDS | First HCI | Server Virtualization | VDI | Data Center | BU/DR | NexGen

PATENTS

23 SDS → 3 HCI → 2 ERASURE CODING → 2 FLASHCACHE → 10 PENDING

30 Patents, 8 Pending

Proven Experience

Gaming

Commercial / Enterprise

Government

Transportation

Higher Education

Healthcare

Pivot3

Large Global Deployments

Choctaw Nation
- 6.6 PB storage
- 500+ appliances
- Genetec VMS

WMATA
- 5+ PB storage
- 140 appliances
- Verint VMS

Majid Al Futtain
- 5 PB storage
- 11 sites
- Milestone VMS

Casino Sentosa
- 3 PB storage
- Avigilon VMS

Madinat Jumeirah
- 1 PB storage
- 44 appliances
- Milestone VMS

Chicago Metra
- 7.5 PB storage
- 312 appliances
- Genetec VMS

MBTA
- 3 PB storage
- 130 appliances
- Genetec + Geutebruk

Isla Maria Prison
- 3.4 PB storage
- 100 appliances
- Genetec VMS

Souq Waqif
- 2.4 PB storage
- 70 appliances
- ONSSI VMS

Pivot
First In Hyper-Convergence

Correctional Svcs Canada
- 7+ PB storage
- 15 facilities
- Genetec VMS

FedEx Ground
- 600+ facilities
- 1000+ appliances
- Genetec VMS

NVIDIA
- 2 PB storage
- Multiple locations
- ONSSI VMS

Dallas Love Field
- 2 PB storage + VSS
- 48 appliances
- Avigilon VMS

Tampa Airport
- 1.4 PB storage
- Genetec VMS

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Who Relies on Pivot3?

4 of the **top 10** world's Most Admired companies

31 of the Biggest Public Companies in the world

3 of the **top 10** Best Global Brands

3 of the **top 5** world's biggest Energy companies

5 of the **Largest** US Federal Agencies

3 of the **top 5** global Telecoms companies

4 of the **top 5** global Aerospace & Defense companies

14 of the Most Valued Brands in the world

The **2** Largest Tech companies in the world

The **3** Largest Global Electronics & Office Equipment companies

2 of the **5** Branches of the US Armed Forces

2 of the **top 3** global Logistics companies

2 of the **top 5** Gaming companies in the world

6 of the world's biggest Pharmaceutical companies

ADVANTECH *Enabling an Intelligent Planet*

Advantech is one of the worlds leading PC machine manufactures and has an extensive distribution channel through out ASIA, EMEA and USA. Advantech is seeking to expand into the data center space, both in the US and Asia markets.

Pivot 3 is seeking a OEM relationship with Advantech in order to increase more X86/storage solutions for Vstac software and leverage a mature distribution channel in
ASIA, Africa and USA.

 For Pivot 3 , Advantech has an all flash, hybrid and data platforms at a lower price point. Pivot 3 can leverage these appliances in US market. For Asia, Advantech will be able to OEM our software to create solutions for their Retail, IOT, and healthcare architectures.

 For Advantech, this partnership will help merge the companies X86, storage, and video server groups into a new hyper-convergence product team.

Pivot 3

Section V: MB illustration
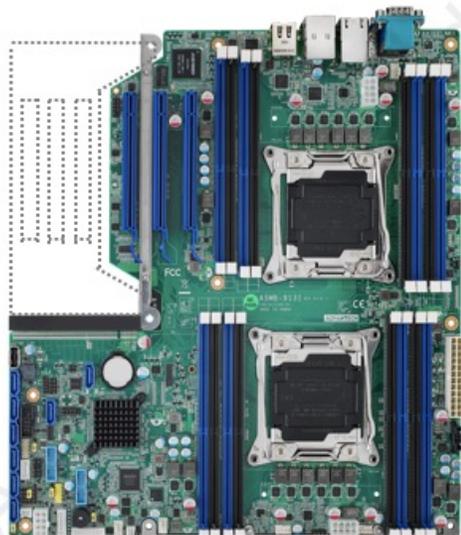
Section VI: Chassis Illustration

Front View

Rear View

7 x expansion slots for FH/FL add on cards.
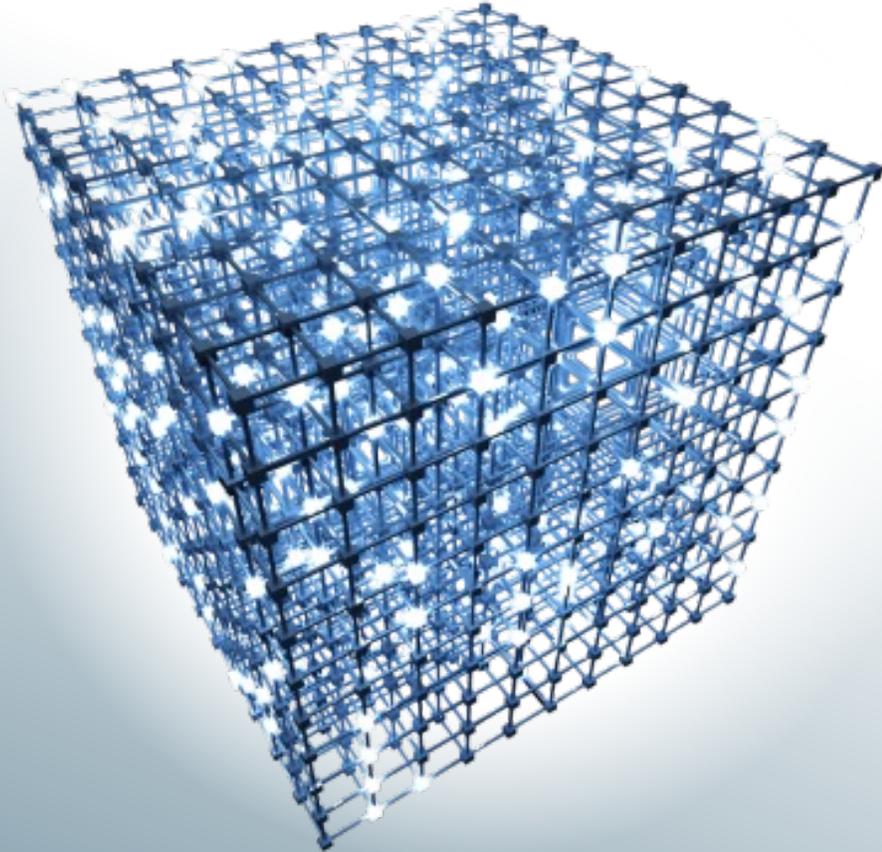e.g. NIC, nVIDIA card, RAID/HBA cards

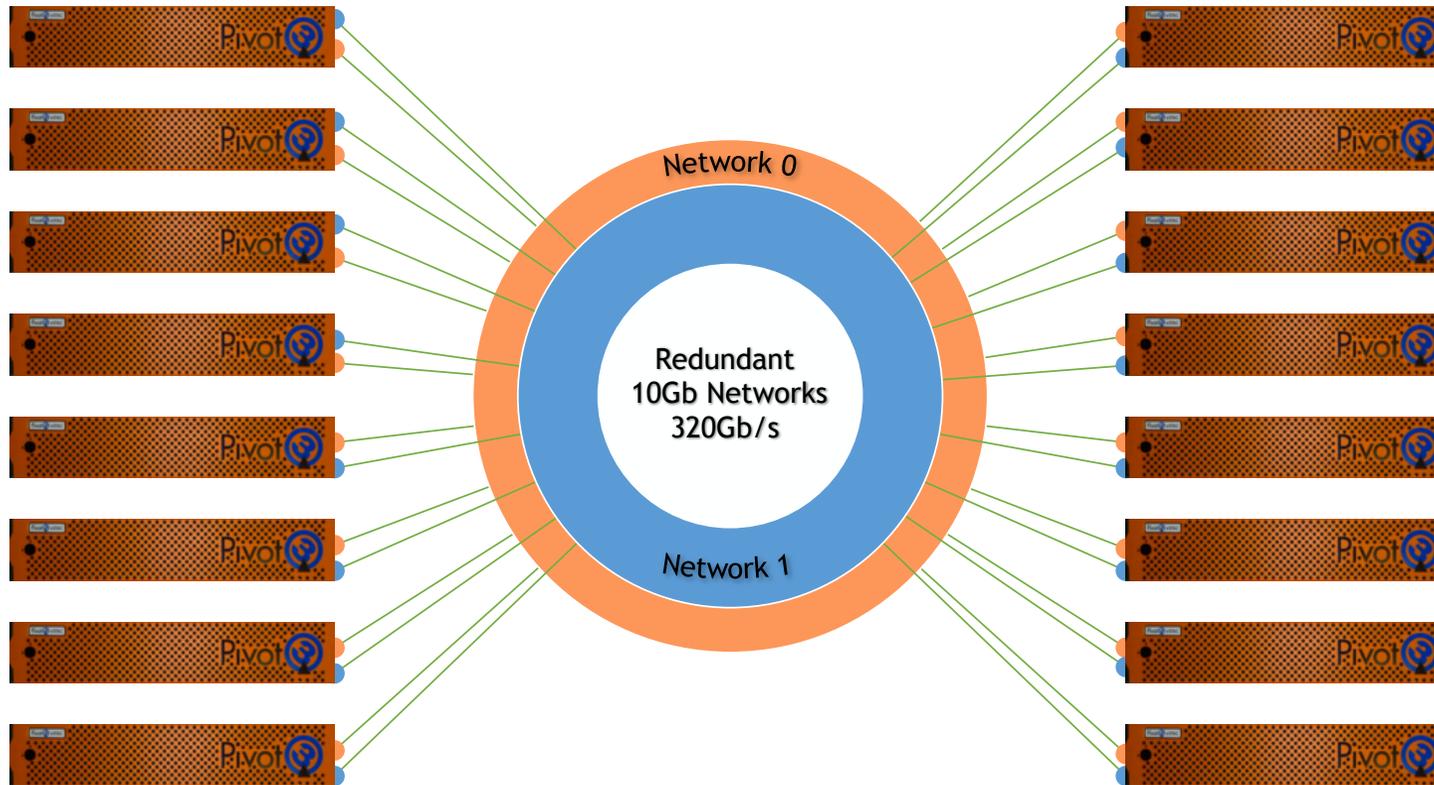# Hyperconverged Solutions

Pivot3 Unique Architecture

Scalable

Effortless

Resilient
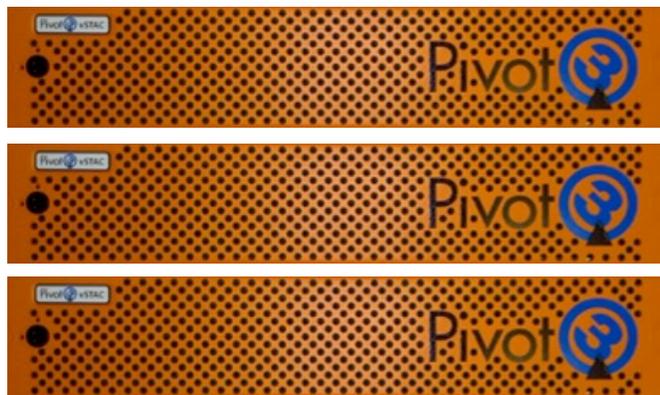
Efficient

Performance

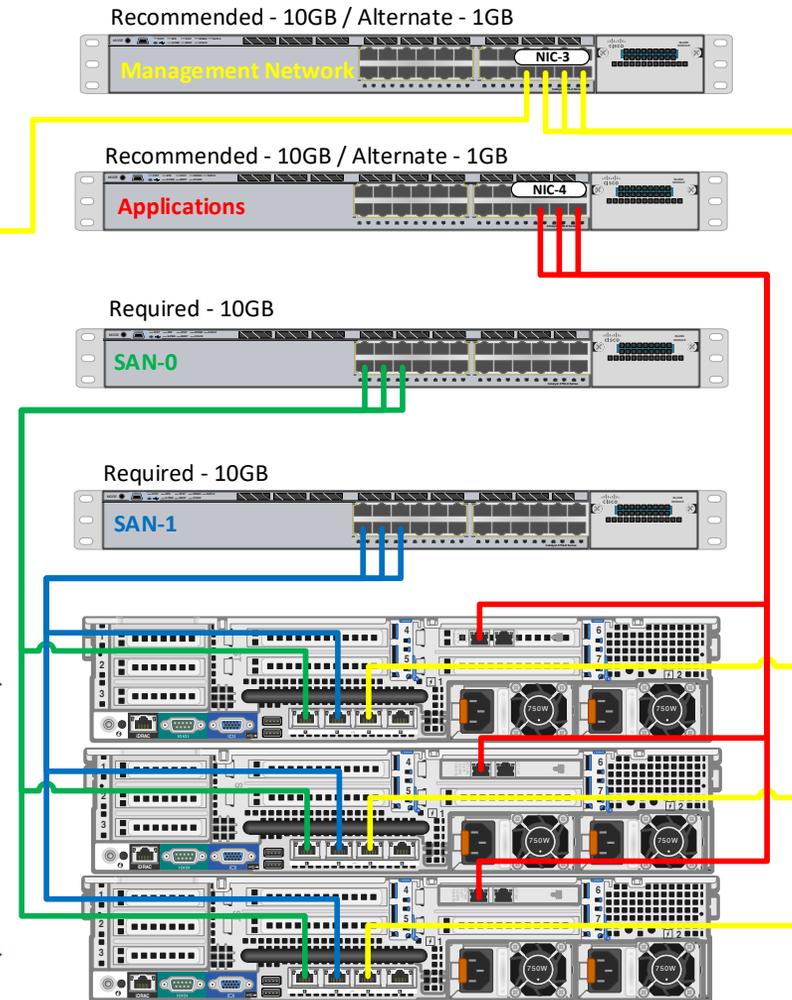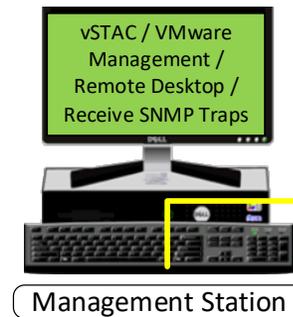Enterprise Class Compute & Storage
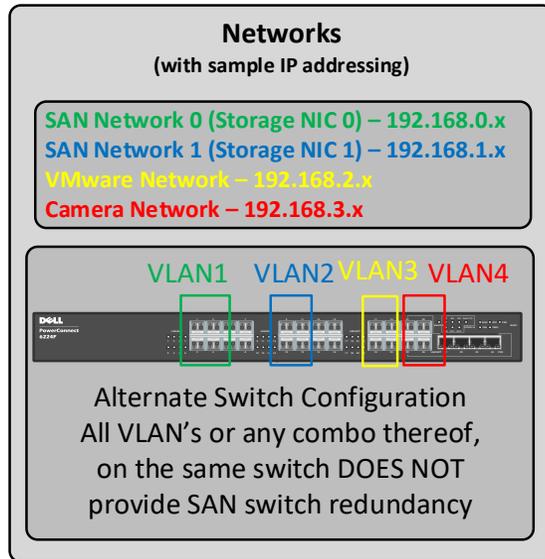
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Pivot3's HyperConnect

HyperConnect Benefits

- Peer to Peer Communication

- Non-blocking switch architecture

- No Master Node to be a bottleneck

- Maximizes bandwidth and IOPs

- Max Parallel bandwidth 320Gb/s
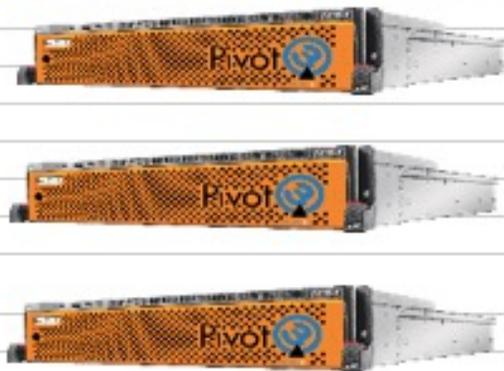
Typical Wiring and Hardware Requirements

Networks
(with sample IP addressing)

SAN Network 0 (Storage NIC 0) – 192.168.0.x
SAN Network 1 (Storage NIC 1) – 192.168.1.x
VMware Network – 192.168.2.x
Camera Network – 192.168.3.x

VLAN1   VLAN2   VLAN3   VLAN4

Alternate Switch Configuration
All VLAN's or any combo thereof,
on the same switch DOES NOT
provide SAN switch redundancy

vSTAC / VMware
Management /
Remote Desktop /
Receive SNMP Traps

Management Station

Recommended - 10GB / Alternate - 1GB
Management Network   NIC-3

Recommended - 10GB / Alternate - 1GB
Applications   NIC-4

Required - 10GB
SAN-0

Required - 10GB
SAN-1

vSTAC Hybrid Server

vSTAC Hybrid Server

vSTAC Hybrid Server

Front View

Rear View

Pivot3

Huntington- Business Intelligence – Hyper-convergence Infrastructure

Huntington Hybrid NODE - QTY 3 - Deployed Today
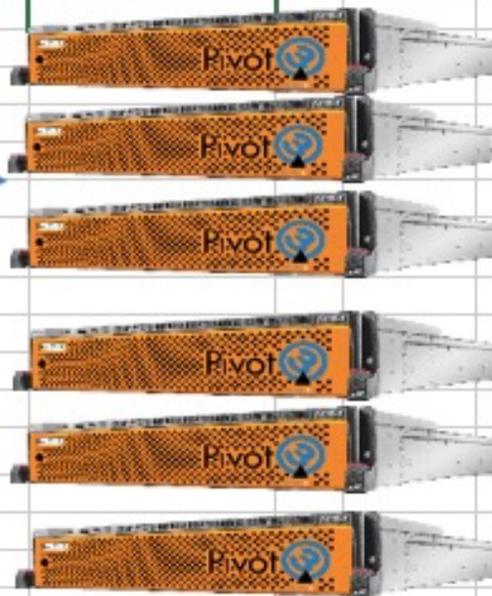640 GB RAM - 2 (8) Core Dual CPU - 48 TB Per Node (120 TB usable)

Huntington All FLASH - QTY 6 - POC Stage
640 GB RAM - 2 (14) Core Dual CPU - 12.8 TB Per Node (67 TB usable storage)

VMOTION DataFlow

Staging - Development Testing for Business Intelligence

Production Business Intelligence Platform

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Claim Extract 12 TB

	Avg	Max	Min	Improvement
DELL Compellent SAN	0:52	1:17	0:24	0.00%
Pivot 3 Hybrid Hyperconvergence	0:45	0:45	0:45	14.00%
Pivot 3 Flash Hyperconvergence	0:06	0:14	0:04	82.00%

Weekly Rebuilds / Quarterly 12 TB Data Set

	Avg	Max	Min	
DELL Compellent SAN	20:57	33:46	1:03	0.00%
Hybrid Hyperconvergence	18:38	18:38	18:38	12.00%
Flash Hyperconvergence	9:19	9:28	9:13	56.00%

PDL Combo - Legacy IBM DB

	Avg	Max	Min	
DELL Compellent SAN	1:37	2:28	1:02	0.00%
Hybrid Hyperconvergence	0:55	0:55	0:55	44.00%
Flash Hyperconvergence	2:20	30:35	0:23	-144.12%

WeeklyCA - 15 TB processing SQL

	Avg	Max	Min	
DELL Compellent SAN	5:28	9:26	3:07	0.00%
Hybrid Hyperconvergence	4:26	4:26	4:26	19.00%
Flash Hyperconvergence	2:17	2:44	2:06	59.00%

WeeklyOT - 10 TB - SQL

	Avg	Max	Min	
DELL Compellent SAN	5:10	7:59	0:00	0.00%
Hybrid Hyperconvergence	2:57	2:57	2:57	57.03%
Flash Hyperconvergence	1:56	2:01	1:47	63.00%

Solution being Deployed

QTY (6) 12 TB - 640 GB 10 GE SFP +   Qty (4) - 6.4 TB 384 GB All Flash
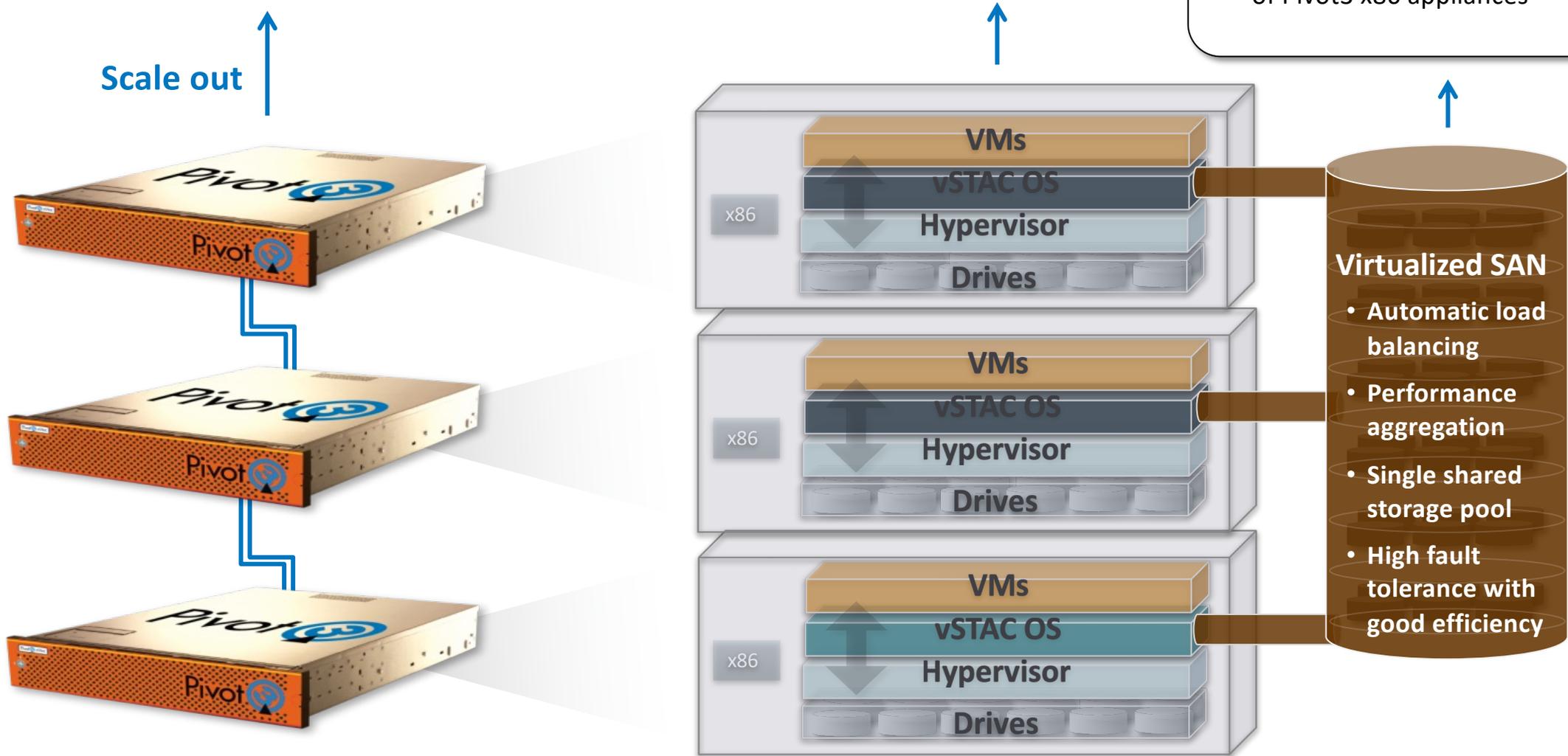
Globally Hyperconverged Infrastructure

Pivot3 implements patented *Scalar Erasure Coding* to:

- Unify hardware resources: RAM cache, SSD and HDD across nodes

- Wide Stripes data across all unified hardware

- Data written once and only moved when new nodes are added

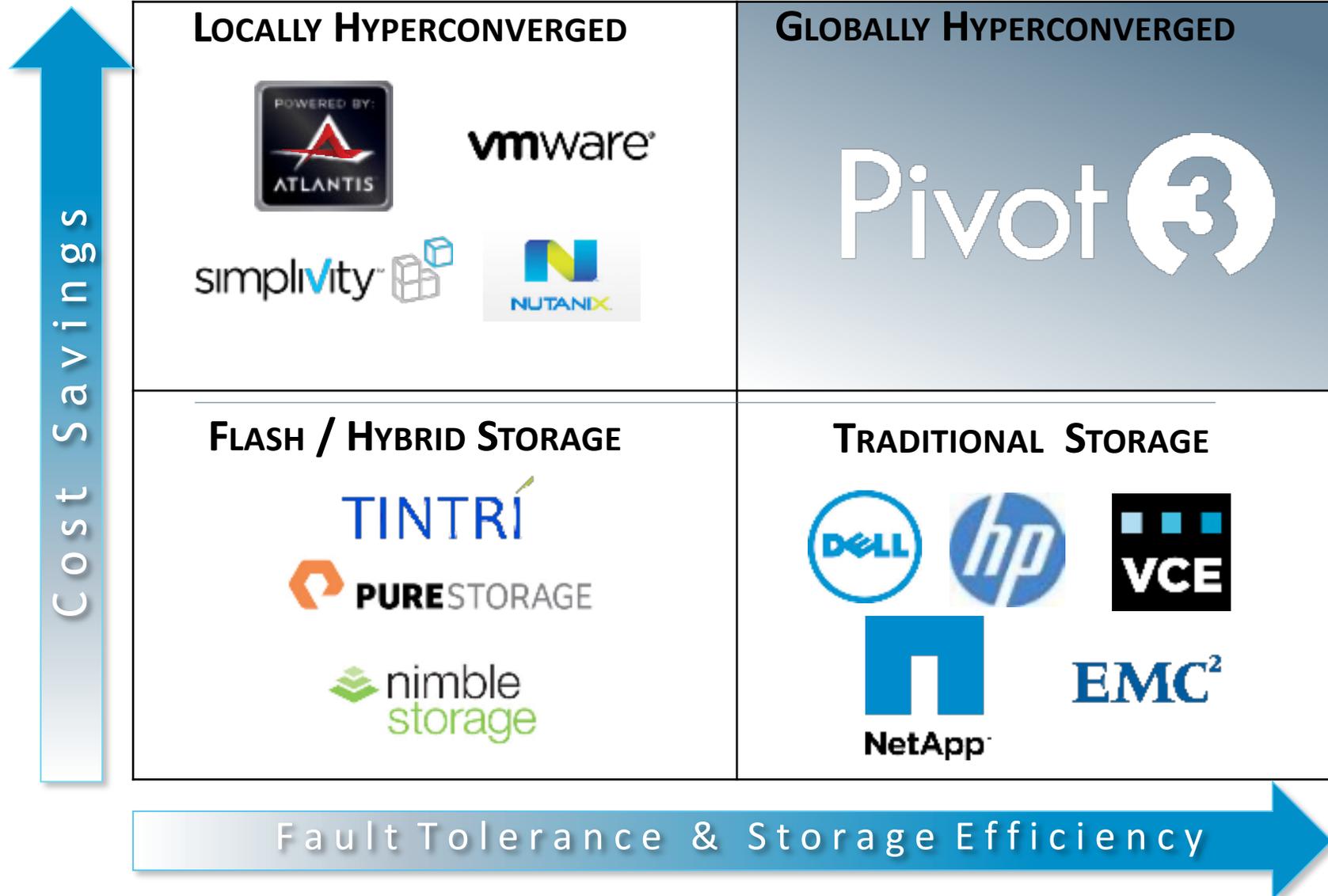- Aggregate IOPs and Bandwidth as nodes are added
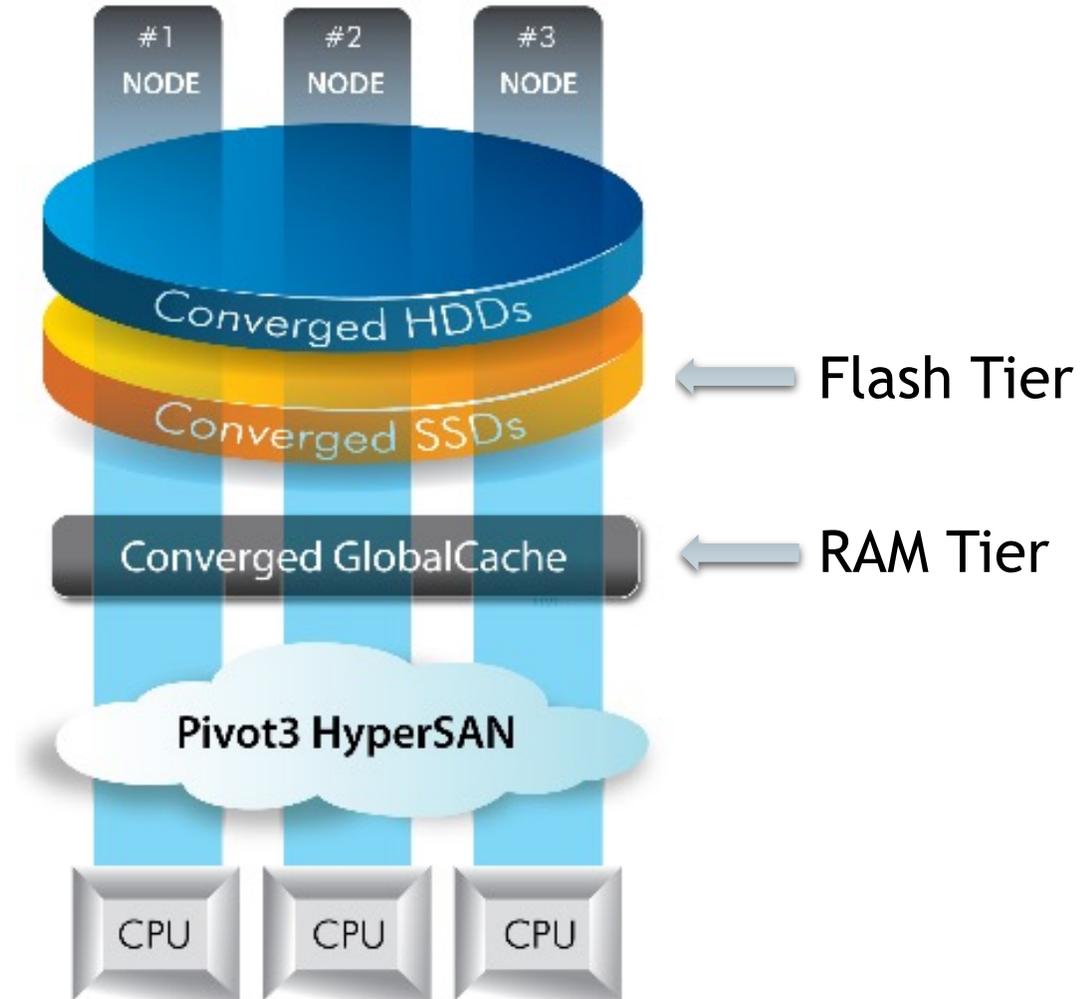
Pivot3 vSTAC Dynamic Scale Out

Scale out

vSTAC OS seamlessly creates a <u>virtual</u> SAN with distributed RAID protection across a local network of Pivot3 x86 appliances

x86

VMs

vSTAC OS

Hypervisor

Drives

Virtualized SAN

- **Automatic load balancing**

- **Performance aggregation**

- **Single shared storage pool**

- **High fault tolerance with good efficiency**

ADVANTECH *Enabling an Intelligent Planet*

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Pivot3 Differentiation

Pivot3 Surveillance Series

The <u>only</u> HCI platform built to solve the unique challenges of video surveillance

Server + Storage Consolidation

Video Recording

Mobile Access

Workstation Consolidation

Purpose-Built Performance
Prevents video loss and preserves image quality

Extreme Resiliency
99.9999% availability, no single points of failure

Reduced Costs
Eliminate proprietary hardware and complexity

Effective Mobility
Full-function clients on any device

Scalability
Grow storage and compute linearly and w/out disruption

Surveillance Expertise

1 Million Cameras today recording to Pivot 3 HCI

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RESILIENCY

Pivot3

Resilient

Performance During Failures
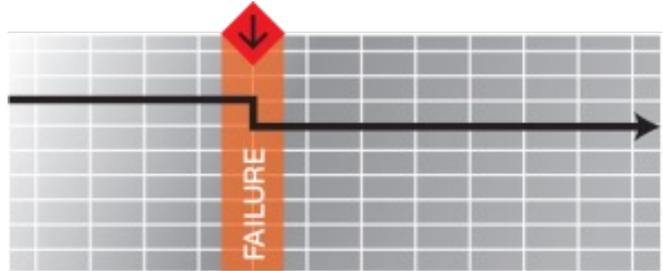
High Availability Erasure Coding

Predictive Failures

Online Everything
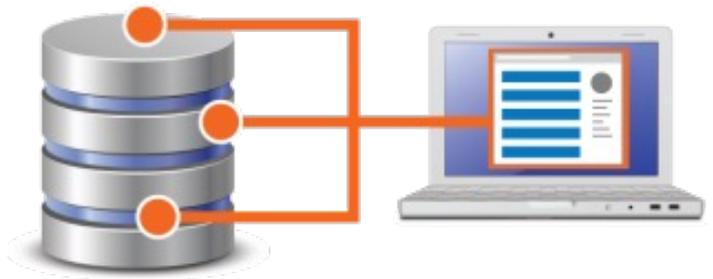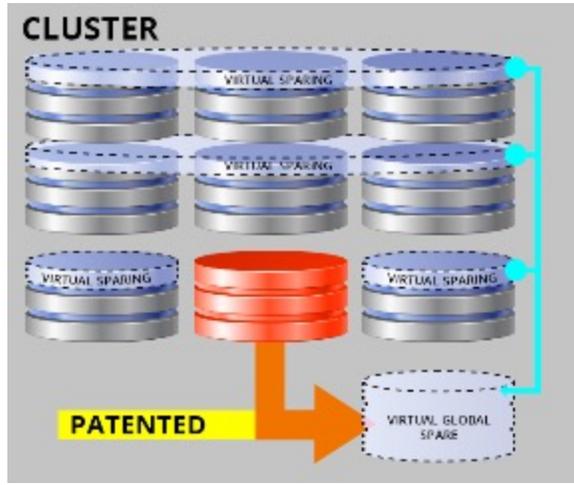
Tier 1 Availability

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Storage Efficiency

Pivot3 Scalar Erasure Coding
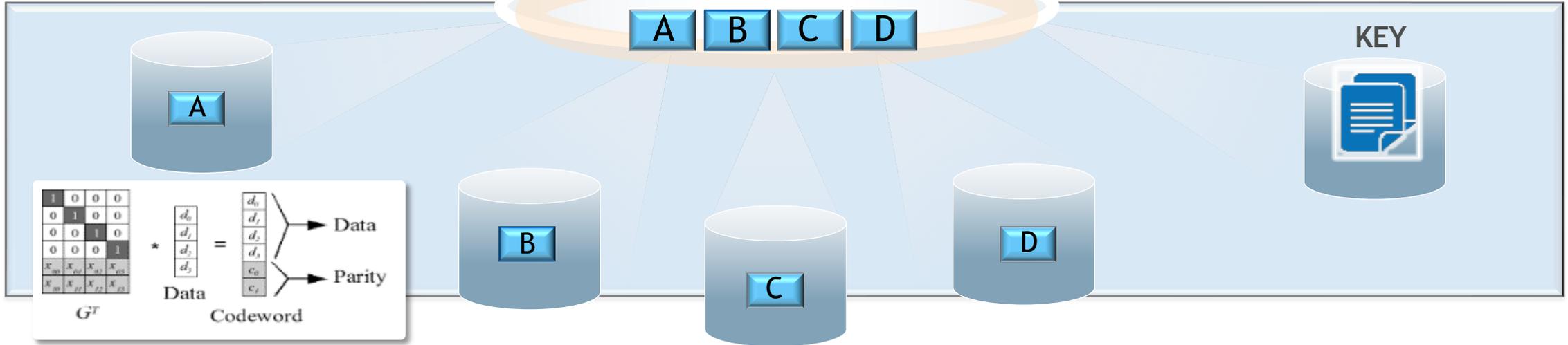
Replication

Storage Efficiency

Pivot3 Scalar Erasure Coding
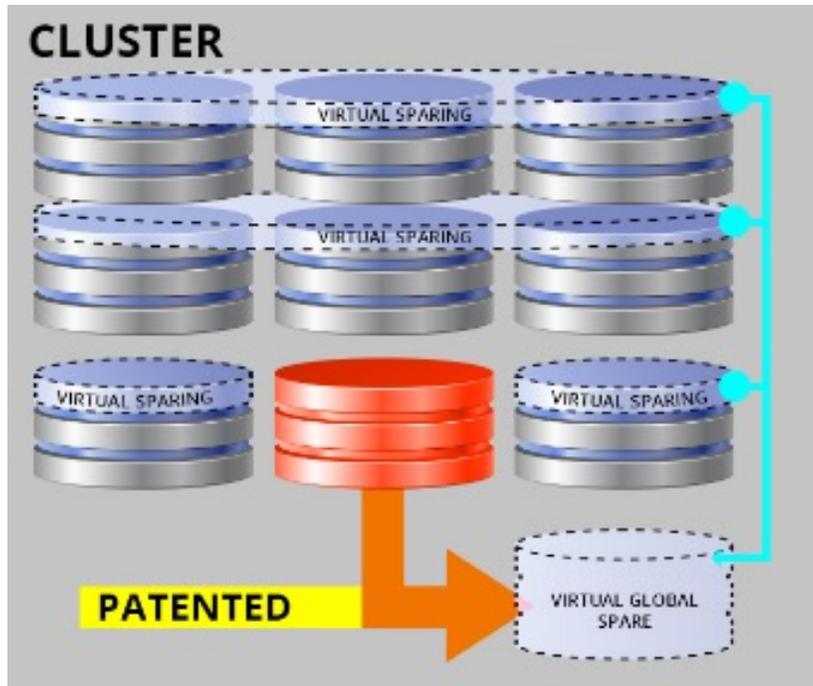

KEY
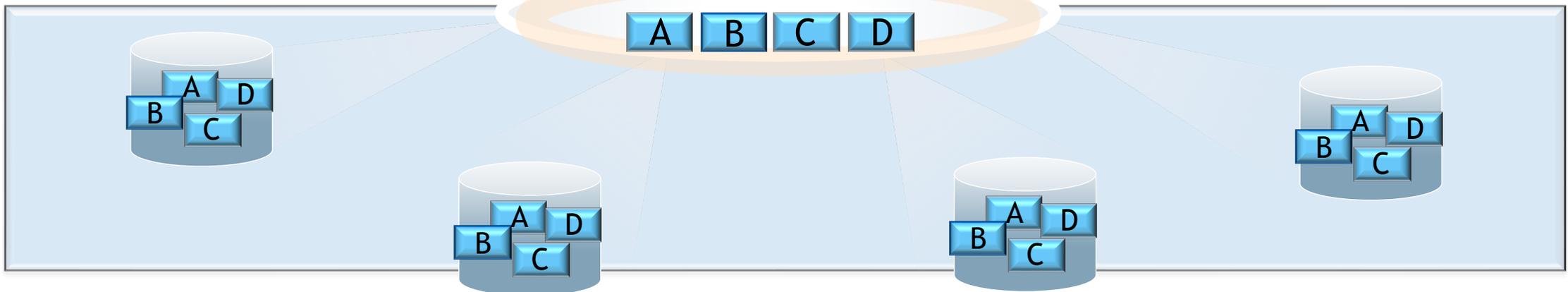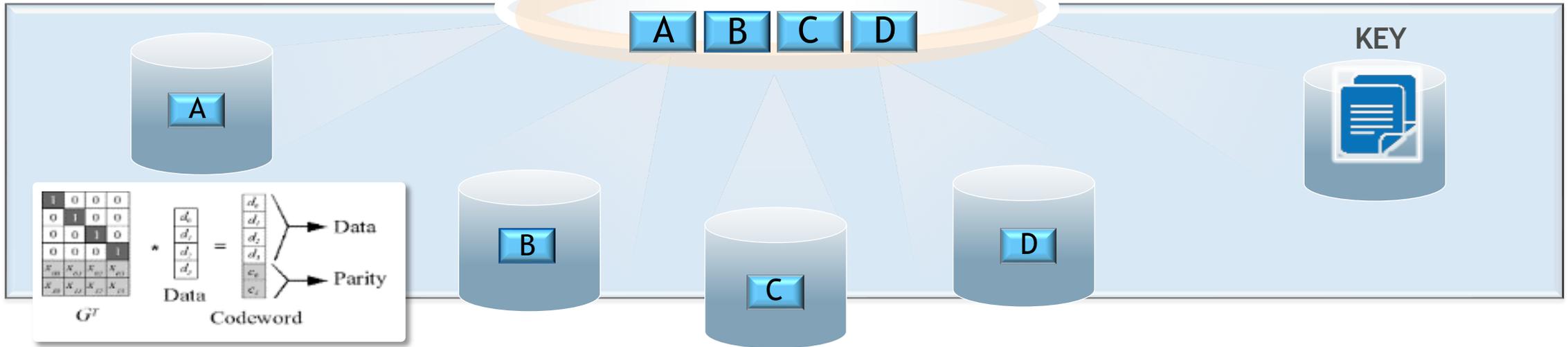
Traditional Hardware RAID

3x Parity Disks

Pivot3
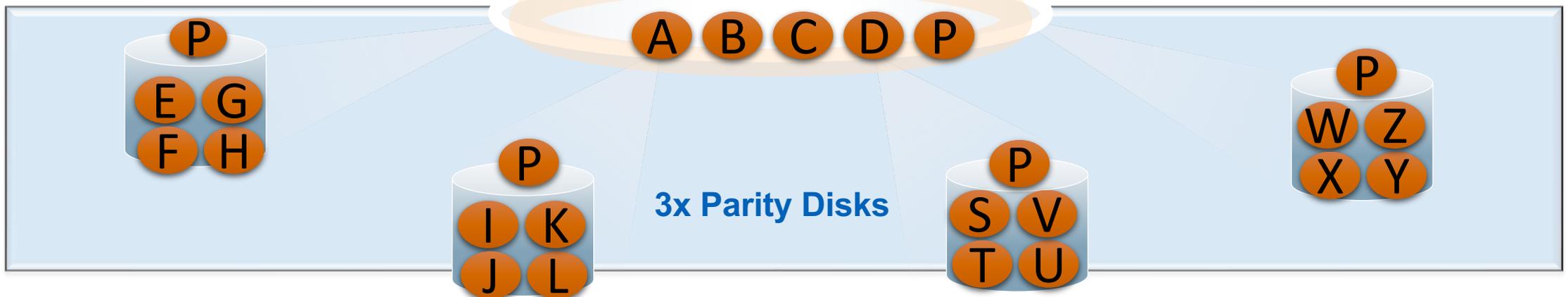
Storage Efficiency Matters
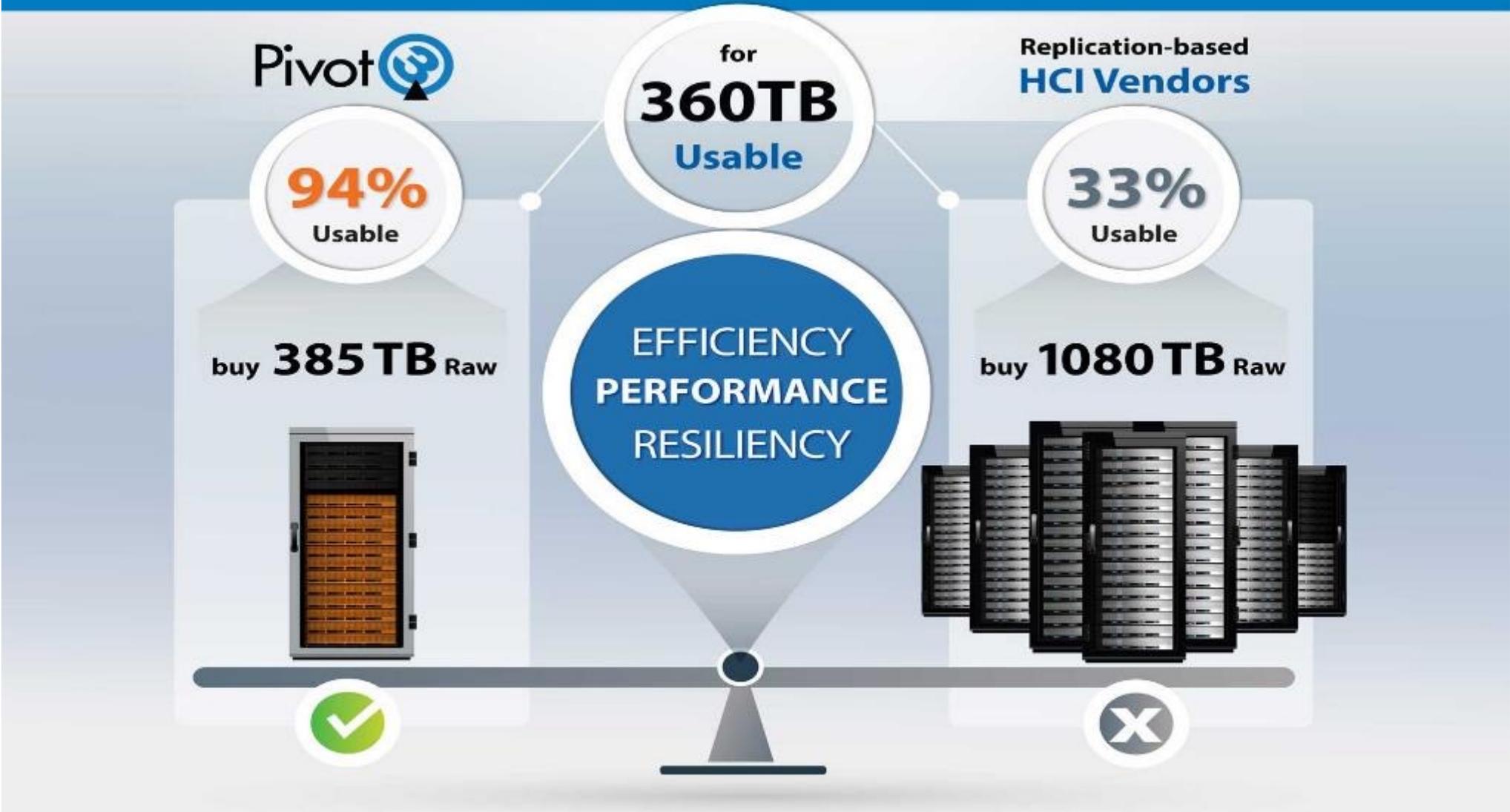
Virtual Global Sparing

Virtual Global Sparing

Benefits:
- Storage Efficiency: No dedicated drives for sparing
- Performance: Parallel rebuilds from all drives in the system
- Easy Management: Never worry about global hotspare management

Traditional Sparing

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Predictive Drive Sparing

Pro-active Drive Replacement

- Drives often times do not fail completely. Performance degrades over time, slowing down the entire system.
- Pivot3 technology allows for predictive drive sparing…

Step 1
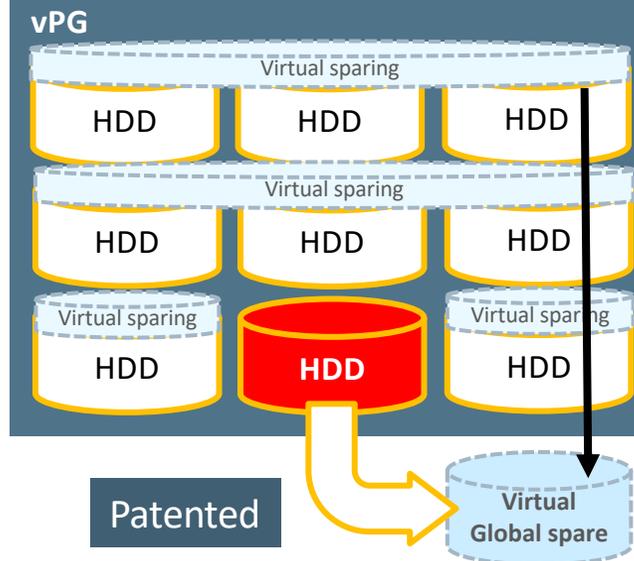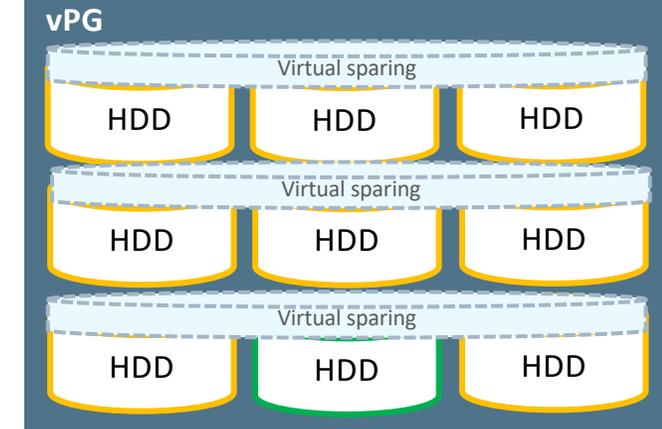Detect the response time degradation of a specific physical drive

Step 2
Rebuild the failing drive within the Global Spare. Pro-actively fail the drive and remove it.

Step 3
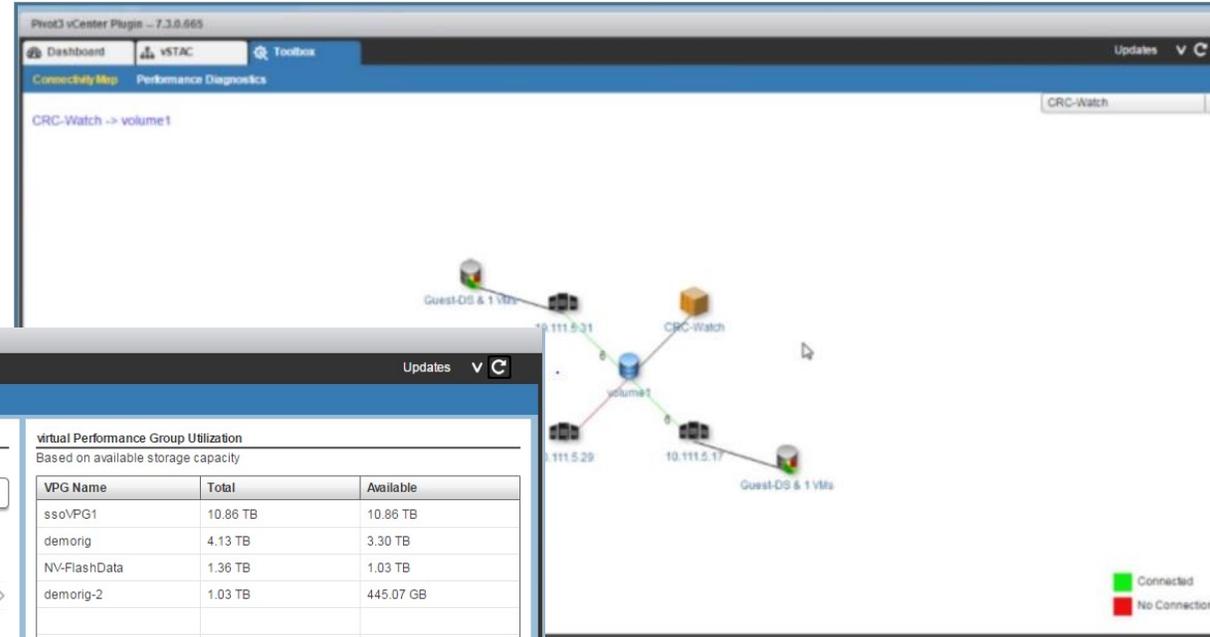Replace the physical drive without interruption of regular operations.

Node #1

Virtual sparing — HDD | HDD | Virtual sparing — HDD

Drive Response time		
Drive 1	Drive 2	Drive n
→	↘	→

vPG

Virtual sparing — HDD | HDD | HDD
Virtual sparing — HDD | HDD | HDD
Virtual sparing — HDD | HDD | Virtual sparing — HDD

Patented

Virtual Global spare

vPG

Virtual sparing — HDD | HDD | HDD
Virtual sparing — HDD | HDD | HDD
Virtual sparing — HDD | HDD | HDD

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Designed to be Effortless

vSphere web client Plugin
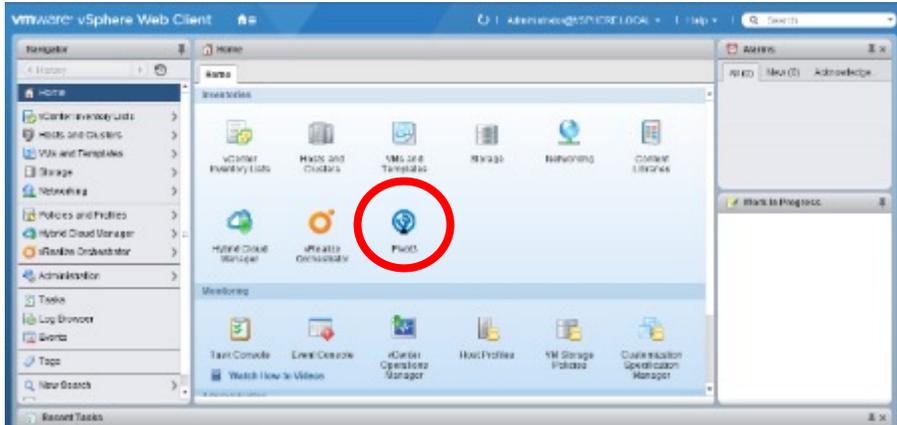
Connectivity Maps for monitoring the health of systems

Dashboard for environmental information

Proactive Diagnostics Setup

Configure Pivot3 Proactive Diagnostics   ⊗

| **Enable Proactive Diagnosti...** | Contact Information | Status Reporting | Monitored Discovery Paths |

The Pivots Proactive Diagnostics(PPD) service is currently disabled.When the PPD service is enabled, the status of your vSTAC domain will be uploaded to Pivot3 support automatically once every 24 hours. Pivot3 will notify the registered contact when there are condition that may lead to potential data loss or reduced performance. The PPD service must be enabled on a computer that will have continuous access to both the vSTAC Domain and the Internet.

A valid proactive Diagnostic ID is required to receive notifications from Pivot3. A free PPD ID will be provided to enable notifications on all vSTAC Nodes that have Pivot3 Premium Support (or better). Complete the Contact Information tab and check the Enable box on this tab to receive a PPD ID. An email with the PPD ID will be sent to the specified contact once eligibility has been verified. Pivot3 Support will not send out notifications untill the PPD ID has been registered.

Enable Pivot3 Proactive Diagnostics

☐ Enable Proactive Diagnostics

Proactive Diagnostics ID: [   ]

| Apply | Cancel | | Help |

→ **Remote Dial Home setup integrated into the web plugin**

→ **Simple Configuration**

→ **Identify who gets notified**

Pivot3

Always-On Mobil Workstations

HORIZON | *Partner Success* | Pivot3 | TERADICI vmware | imprivata

Challenges	Solution	Benefits

Challenges

Slow logging in and out of applications multiple times a day

Complex maze of disparate local and national clinical information systems

IT operations is strained and budgets are decreasing

Regulatory and patient data privacy issues are growing

Restrictions created by PCs often located in the wrong places

Solution

Pivot3 Hybrid Nodes (30+) with Teradici cards

Initial deployment of 1000 Horizon View desktops in two teaching hospitals in 4 months

Added additional 1000 desktops 3 months later

3000 more planned 2015

Benefits

Clinical:
- ✓ Fast logon, secure and seamless access
- ✓ Full session persistency and genuine 'follow me' mobile healthcare workspace
- ✓ Anywhere anytime secure role based access for clinicians, administrators and managers
- ✓ Secure access to NHS applications from anywhere, at any time and on any device
- ✓ Increased productivity and patient facing time

Financial:
- ✓ Reduced Total Cost of Ownership (TTO) and extended desktop hardware lifecycles
- ✓ Demonstrable ROI, and year on year cost savings

Operational:
- ✓ Increased availability
- ✓ Mobility without compromising performance
- ✓ Centralized IT management and control
- ✓ Simplified desktop management

Pivot3

High-End Remote & Secure Graphics Workstations

Large Defense Contractor
Advanced remote workstations
& storage for E/EM engineering

Pivot3 · XenDesktop citrix · CLEARCUBE · vmware · nVIDIA

Challenges	Solution	Benefits

Challenges
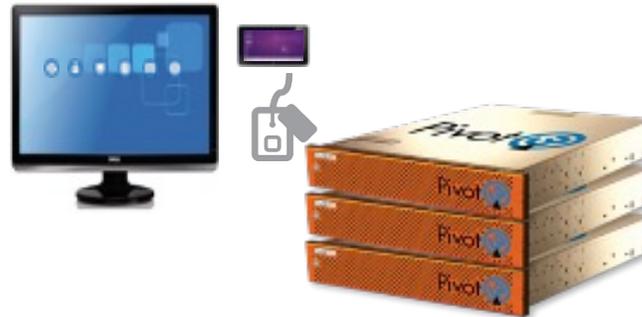
Data security

High cost of graphics workstations

High cost of travel for remote workers with security restrictions

Need support for a wide Range of user types and up to 10000 users

Needed scale out infrastructure for offering desktops as a Cloud service

Solution

Pivot3 global HCI Nodes with K2 Grid cards
& PCoIP
Total of 9 Hybrid vPGs

iSCSI Virtual SAN for all users and VDI
platform for 70+ CAD users

600 Clear Cube CAD users
3000 Reviewer Workstations
6000 Office workers
XenDesktop 7.6 with vSphere 6.0

Benefits

Financial:

✓ Multi-Million annualized savings due to travel and hardware reduction

✓ Lower cost per virtualized workstation than cost of a conventional CAD workstation

✓ Able to store massive designs and engineering renderings cost effectively with Pivot3's high storage efficiency

Operational:

✓ All CAD users access the virtual HyperSAN for high performance from aggregated IOPS

✓ Sensitive data is protected by Scalar Erasure Coding-based fault tolerance (systems can withstand simultaneous failure of one Node + 2 HDDs);

✓ Enables heavy graphic remote workstation work, with high data security of stateless clients;

✓ Broad range of PCs can serve as clients and become a workstation

Pivot3

Disaster Recovery powered by Global HCI

Twin Rivers
Enterprise Disaster Recovery (DR) storage, 1PB array

Challenges	Solution	Benefits

Challenges

Protection of sensitive and regulated data

High cost of backup storage

High requirements for sustained IOPS

Solution

Pivot3 Global HCI Nodes for Backup, Disaster Recovery;

Used as standalone Software Defined Storage for Enterprise.

Benefits

Financial:
- ✓ 30-40% reduction in cost for TB storage via high storage efficiency
- ✓ Combined BU + DR: No need for separate recovery servers lowered DR costs

Operational:
- ✓ Sensitive data is protected by Scalar Erasure Coding-based fault tolerance (one Node + 2 HDDs)
- ✓ Replaced traditional storage solution from legacy SAN vendor – no need for like for like hardware
- ✓ Simplified DR site by eliminating Servers, storage, networking and management at DR
- ✓ Simplified recoveries by using Pivot3's HCI system to backup and restore to

Mobile Healthcare Workspace

Partner Success Pivot3 TERADICI vmware

Challenges	Solution	Benefits

Challenges

Improve business and financial results

Reduce boot-up time

Securty of patient information

Increase productivity of health care providers on the move

Reduce cost of storing massive medical imagery datasets

Solution

Pivot3 Virtualized Mobile Medical Workspace based on HCI Nodes that scale and secure medical data records and access
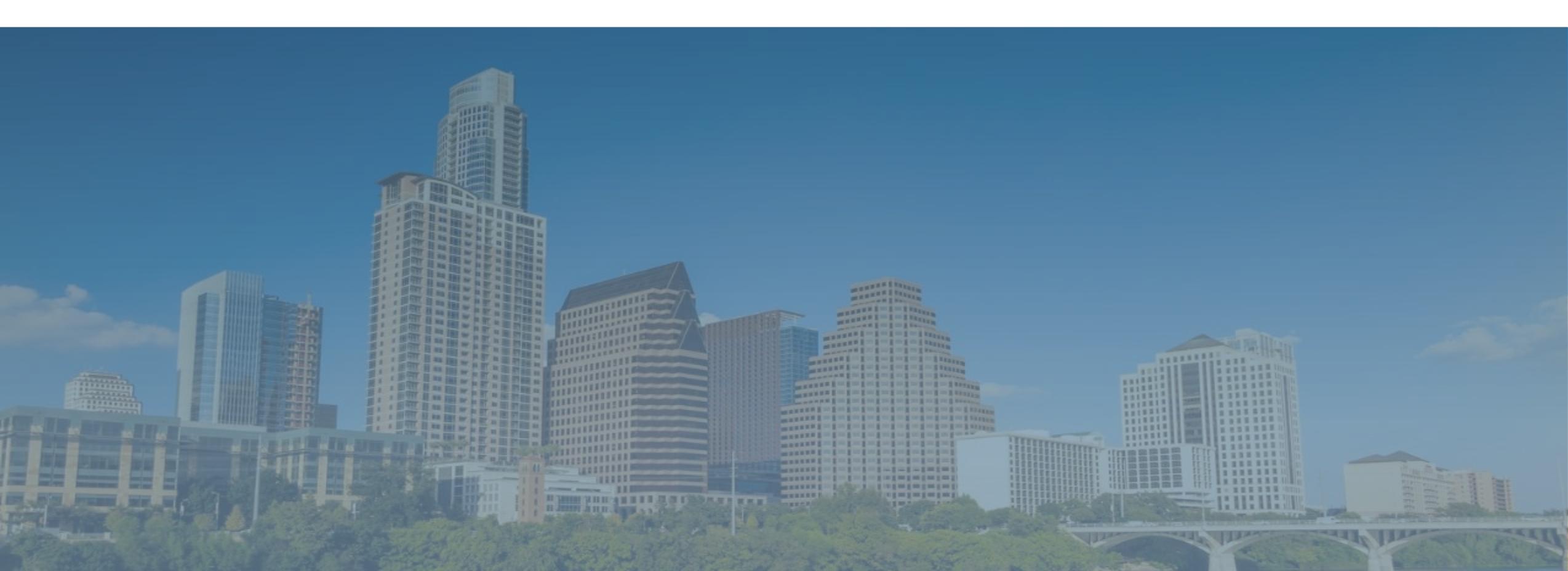
Benefits

Financial:

✓ Pay-as-you-grow Node model enables easy scaling of the number of mobile stations supported.

✓ 30-40% reduction in cost /TB of storage and decrease of 25% per connected user

✓ TCO reduction by 15% per server by increasing user density per server

Operational:

✓ 80% reduction in logon time, increasing staff productivity (5 minutes to 6 seconds)

✓ Mobility: Securely extend systems access to clinicians and doctors to collaborate from home or other facilities while data never leaves the hospital infrastructure;

✓ Scalar Erasure coding-based fault tolerance ensure protection of medical data. Can withstand simultaneous failure of one Node + 2 HDDs

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First in Hyperconvergence

Pivot 3