

Virtualizing Tier 1 Applications

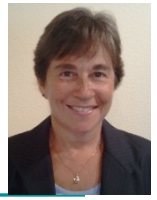
Barb Goldworm
President and Chief Analyst
Focus LLC

Ravi Venkat
Data Center Architect
vExpert 2013,VCAP5-DCA

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Barb Goldworm



- President & chief analyst, **FOCUS, LLC**, an analyst firm focused on virtualization, cloud, systems, storage, & transformational technologies for SMB, enterprise and government organizations
- 30 years in technical, marketing & analyst roles with IBM, StorageTek, Novell, Enterprise Management Associates &multiple successful startups, started with virtualization late 1970s, built 1st ESD (electronic SW Distribution) solution late 1980s
- **Expert Columnist/Speaker** since 1990s – NetworkWorld, ComputerWorld SNWOnline, IDG, TechTarget SearchServerVirtualization, Information Week, Network Computing, Ziff-Davis
- **Author:** 100s of research reports, surveys, white papers, columns, Wiley book **Blade Servers & Virtualization**



- **Conference Keynote Speaker/Chair/Advisory Board:**

  Chair/Advisor: *Interop :* Virtualization and Private Cloud, Desktop Transformation*, Enterprise Cloud Summit:* Private Cloud, *Cloud Connect:* Private & Hybrid Cloud*, Comdex, Data Center Insights, Blade Systems Insights, Server Blade Summit*

  Judge: Best of *VMworld,* Product of the Year

  Keynote speaker: *Interop, Tech Target Data Center Decisions, Storage Decisions, IT Sessions, Avnet Road2Virtualization, Road2Storage Optimization, VirtualPath & StoragePath Universities, Avnet/Cisco The Way Forward, Educomm CIO Summit*

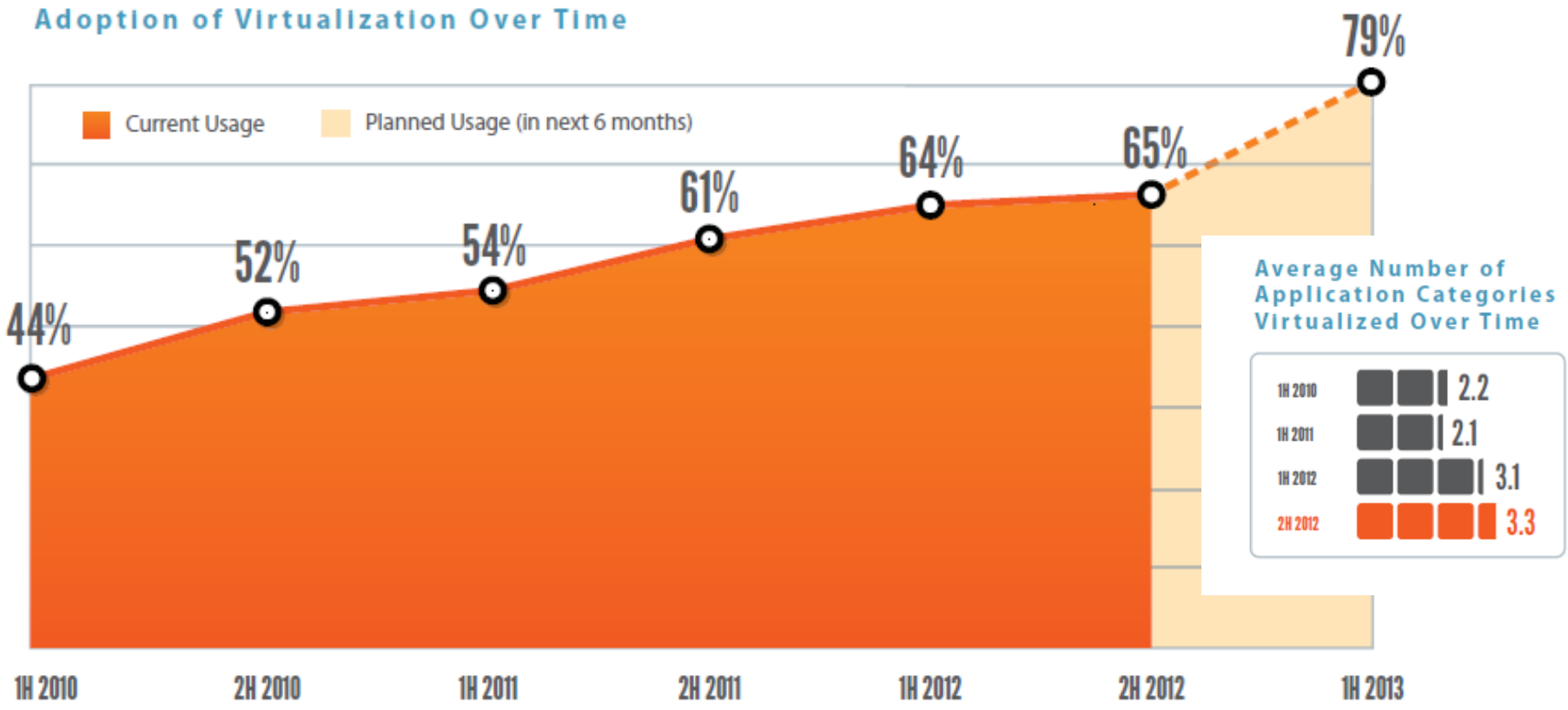
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State of the Industry: Virtualization

- 90% of organizations have implemented server virtualization
- 50-60% all server workloads virtualized
- Organizations looking beyond low hanging fruit apps to business critical apps
- Virtualization efforts expanded beyond server virtualization to desktop, storage and network virtualization
- 75% of all x86 workloads will be virtualized by 2015

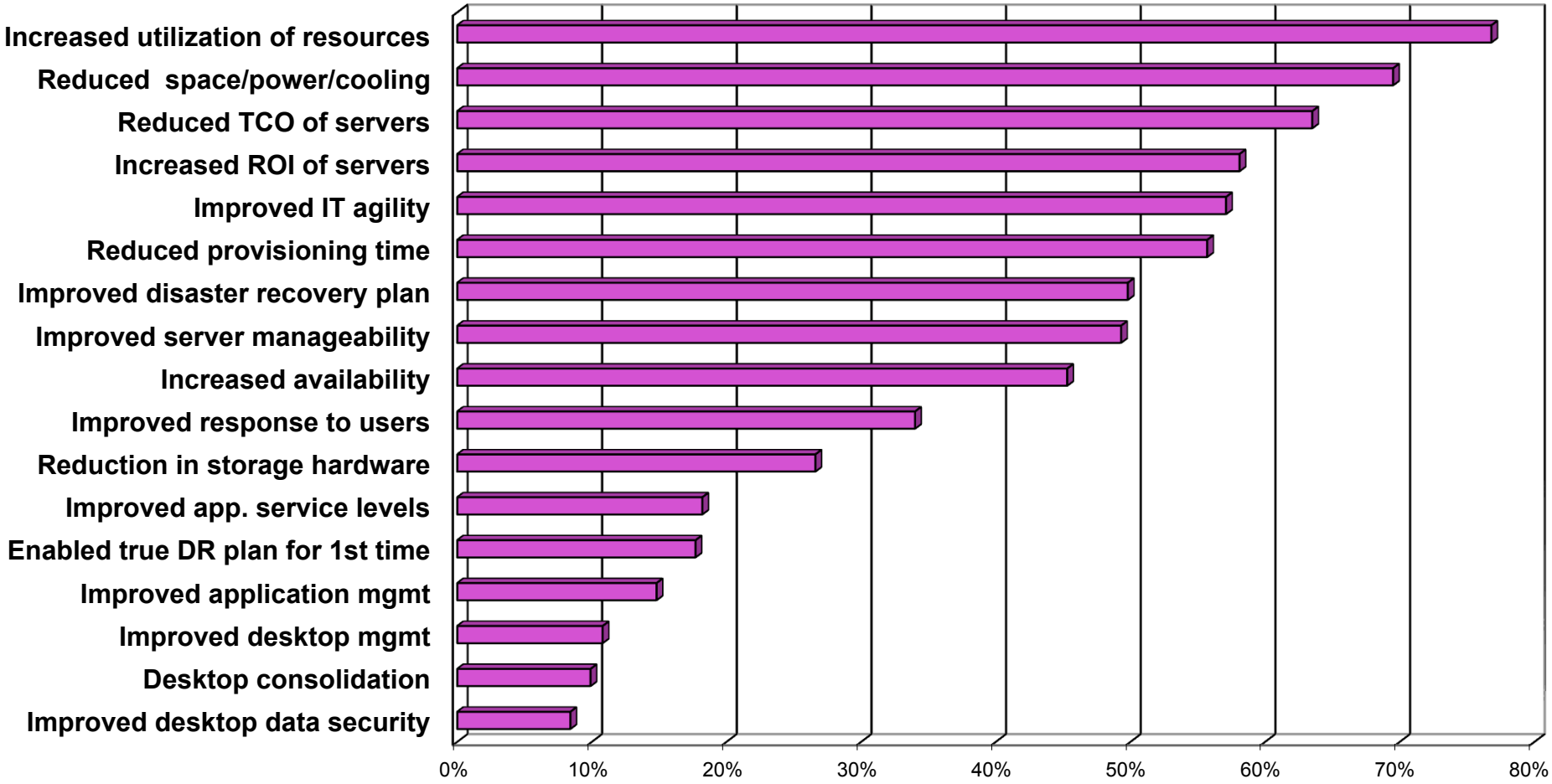
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Virtualization Adoption



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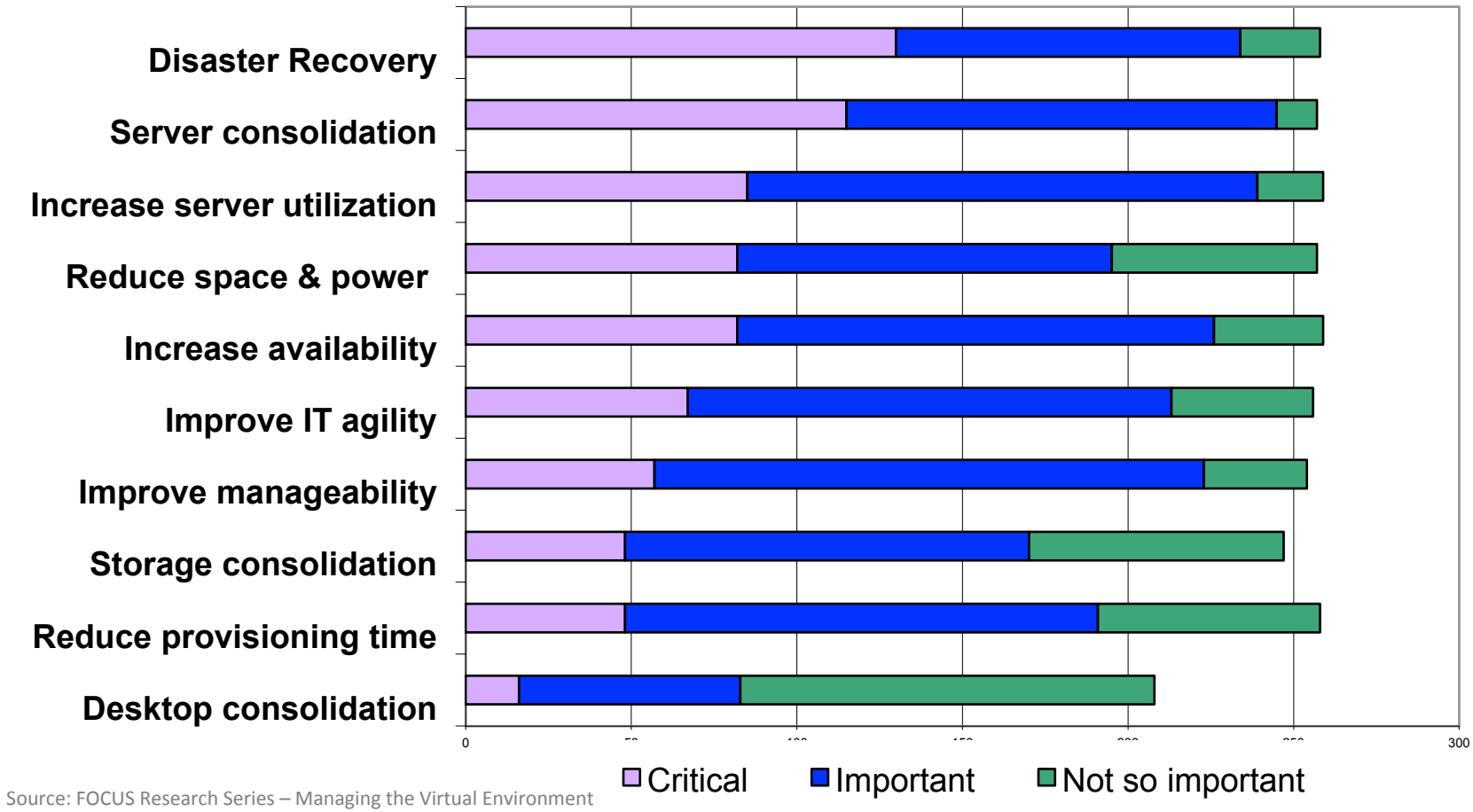
Actual Benefits Achieved



Source: FOCUS Research Series – Managing the Virtual Environment

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Virtualization Drivers

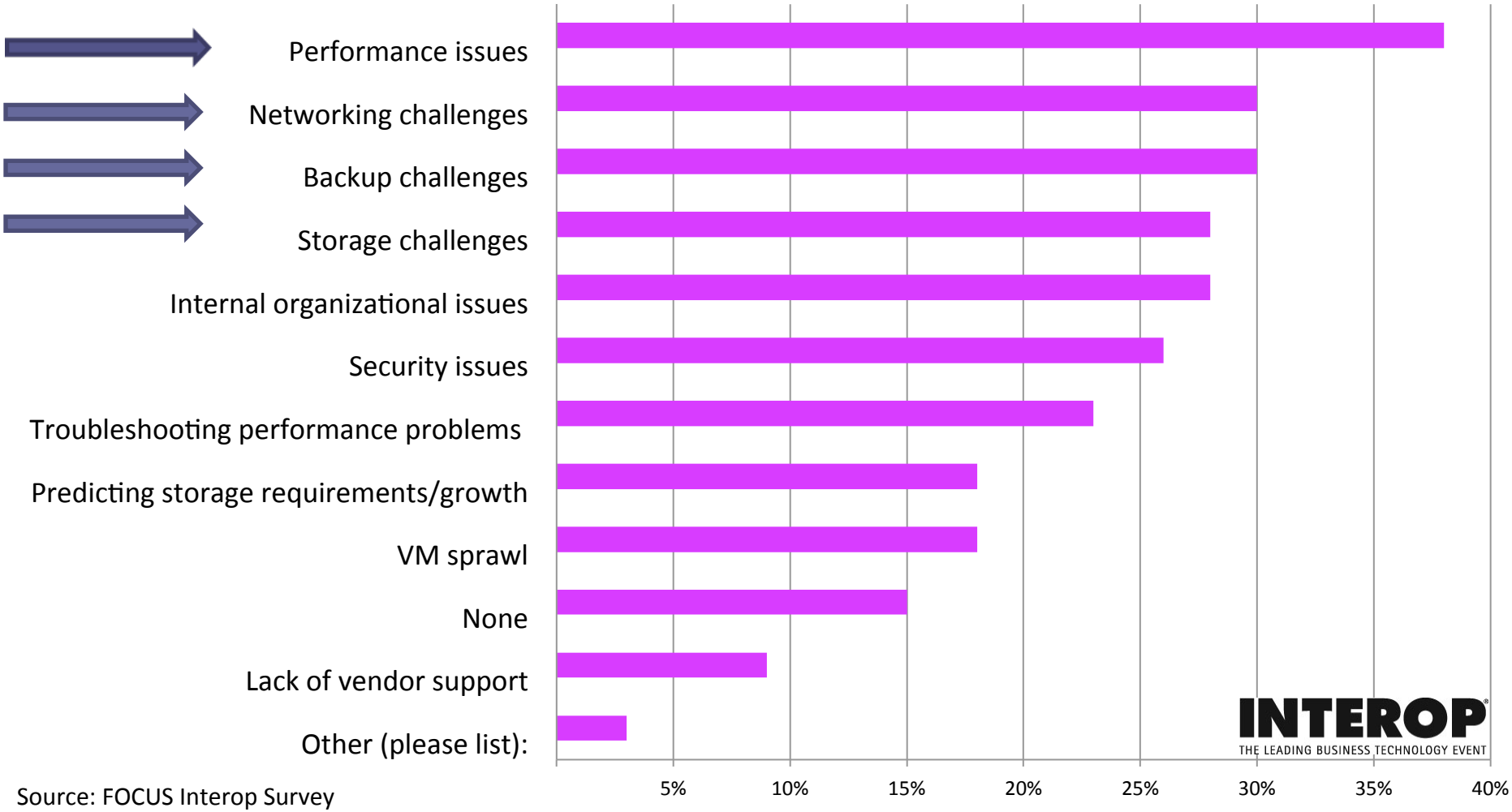


Source: FOCUS Research Series – Managing the Virtual Environment

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Virtualization Expansion Pain Points

Virtualization Implementation Pain Points



Source: FOCUS Interop Survey

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Effects of virtualization on infrastructure

- Virtualization, consolidation, big data, Tier 1 applications and cloud put additional load & speed requirements on the storage infrastructure requiring dynamic & high performing storage
- I/O blender – sequential I/O of many servers becomes random access, very sensitive to I/O latency & response time
- Virtualizing Tier 1 apps requires highly performant storage architected appropriately for the virtual environment
- Virtualization / cloud break old backup/DR paradigm & enable new options for backup, disaster recovery, disaster avoidance

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Virtualizing Tier 1 Apps

- Virtualizing for consolidation completed
- Organizations moved to next set of apps
  - Virtualizing DB apps even if 1:1 consolidation ratio
  - Virtualizing for DR/BC, HA
  - Previous storage issues greatly improved
    - Performance improvements in hypervisor
    - Performance options in hardware
      - Converged storage
      - Converged infrastructure
      - Tiered storage
      - Flash

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Virtualization and Storage:
Things Are Getting Better

- Shared nothing storage / live migration
- Lower overhead (DirectPath I/O…)
- More granular management (Storage I/O Control, policy-driven storage)
- Performance improvements (iSCSI)
- Storage APIs / add'l storage features
- Storage hypervisors
- Image Backup and Virtual Appliances
- SR-IOV
- Converged infrastructure
- Flash /SSD improvements and decreasing costs

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Flash / SSD

- Potential for changing the way enterprises do storage
  - Key features and benefits of flash/SSD

    (IOPS, latency, power, reliability, space)
  - Impact storage solution architecture
  - Price/performance of flash memory versus traditional disk
  - Deduplication and compression
  - Applications and characteristics best suited for flash

    (high performance I/O, random I/O, server/desktop virtualization, DB, real time analytics, cloud…)
  - Flash for acceleration (tiering or caching) versus all-flash arrays

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Conclusions & Recommendations

- Consider virtualization for more than consolidation – availability, disaster recovery, business continuity and the road to cloud
- Advanced virtualization bringing benefits beyond low-hanging fruit applications to apps like DBs, Exchange…
- Top virtualization pain points are rooted in the infrastructure – storage and networking infrastructure must evolve beyond traditional approaches

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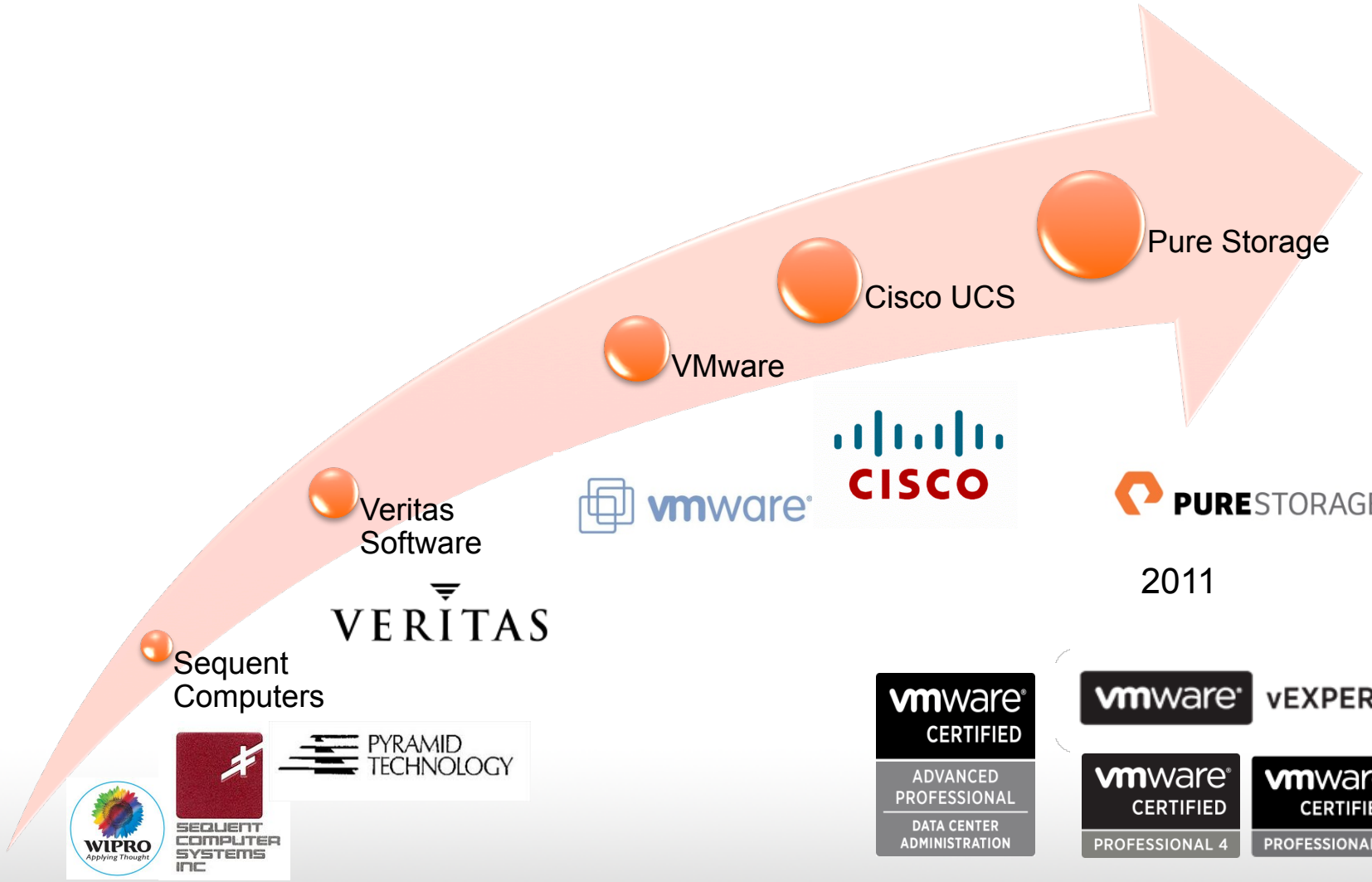
Virtualization Benefits of Pure Storage

Ravi Venkat, @ravivenk,
Data Center Architect,
vExpert 2013,VCAP5-DCA

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Why Should You Listen to me?



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The Pure Storage FlashArray

All-Flash Storage, Less than the Cost of Disk



Game-changing performance

100% MLC flash, <1ms latency

Less cost than disk

Inline deduplication & compression

Enterprise reliability

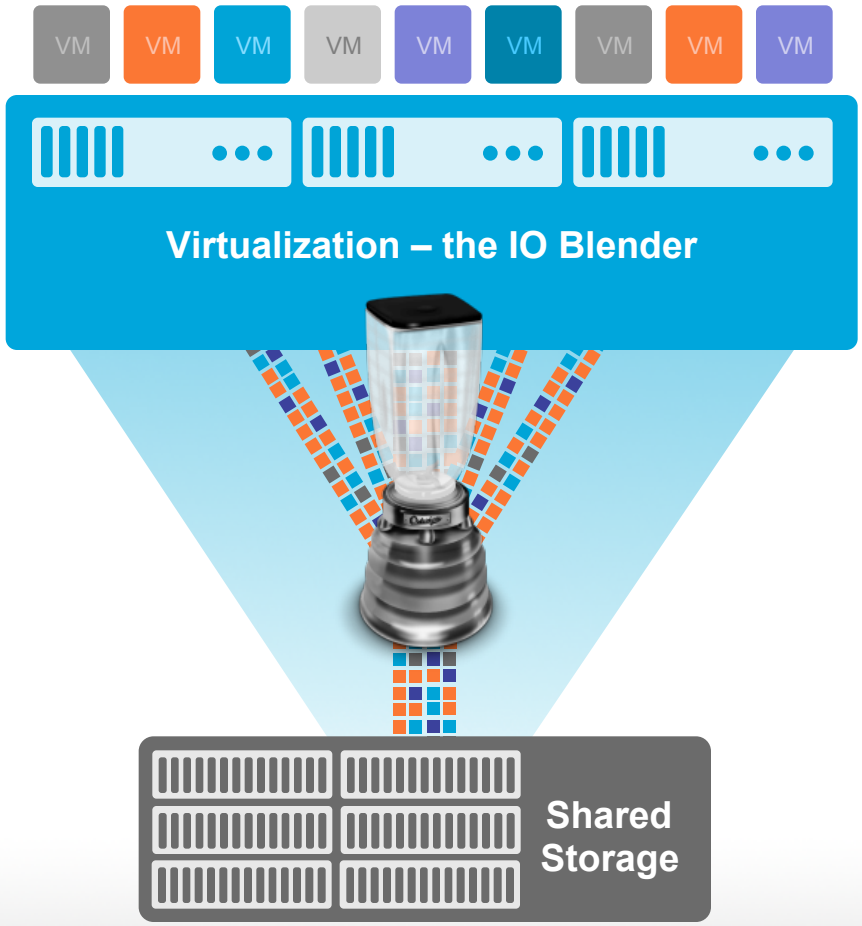
Full high availability, 5+ year lifespan

Unexpected simplicity

Free your team to accomplish more

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Storage is the Achilles Heel of Virtualization



Legacy Storage is…

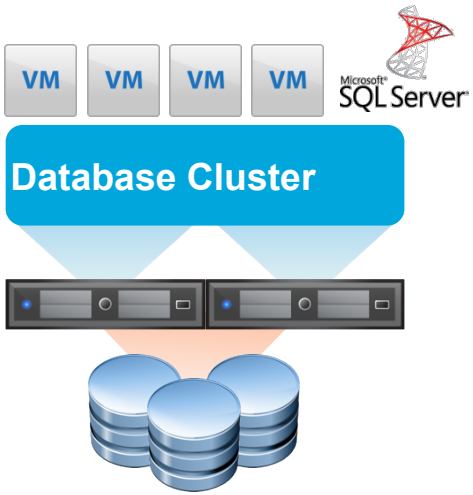
Biggest VM Performance Bottleneck
- Limits # of VMs/server
- Prevents virtualizing Tier 1 applications
- Constrains VM agility

Nearly Impossible for VM Admins to Manage
- LUNs, RAID, IOPS
- Hard to create and grow datastores
- Troubleshooting performance painful

Expensive, Blunting the Virtualization ROI
- Server consolidation requires higher-performance storage
- Savings handed back to storage vendor

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The Result: $torage $henanigans



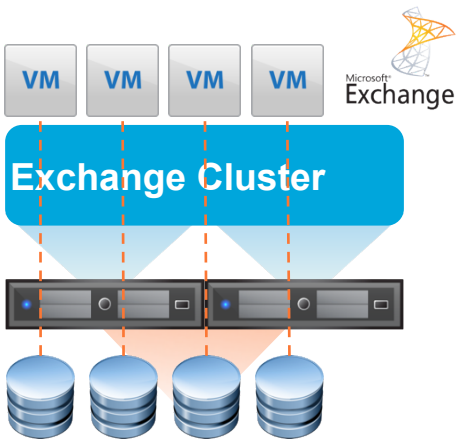
Application Islands w/ Dedicated Storage

Over-Provisioning of Disk to Get Performance



Many Small LUNs & Datastores

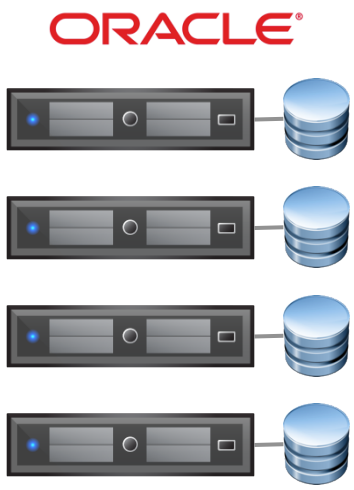
Over-Provisioning of Server DRAM



Dedicated RDM LUNs for VMs

Multi-Layer Caching to Improve Performance

Not Using Dedupe / Compression Because of Performance Hit

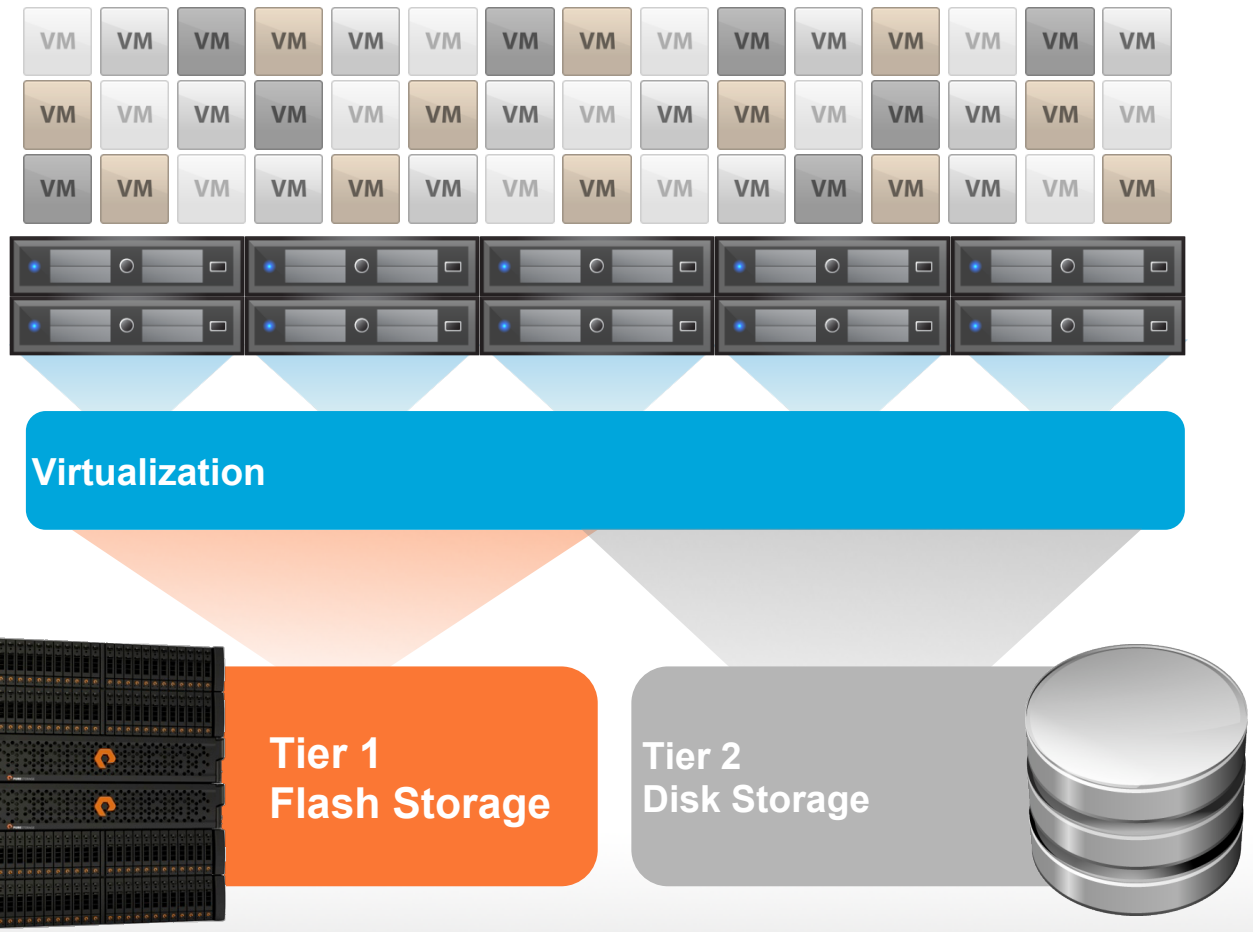


Keeping Physical Machines for Tier 1 Apps

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The Potential of Flash:

Enable Virtualization to the Fullest



- ✓ Virtualize 100% of Applications
- ✓ Run a Fully-Shared Infrastructure
- ✓ Make Virtual Perform *Better* Than Physical
- ✓ Have Storage *Contribute* to the Space & Power Savings of Virtualization
- ✓ Dramatically Simplify Operations

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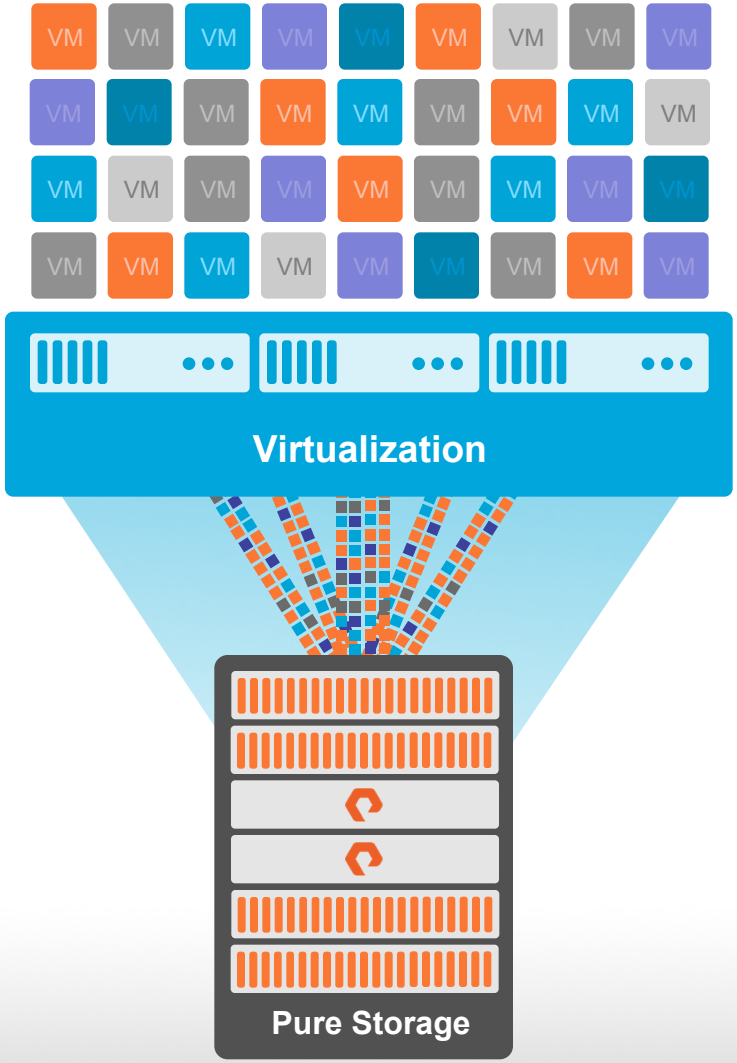
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Pure Storage Accelerates Virtualization

Highest Performance
– More VMs/Server
– Virtualize Tier 1 applications
– Never worry about array performance

Zero Administration
– 100% automated datastore creation
– No LUNs, no RAID, no WWNs
– Completely managed in vCenter

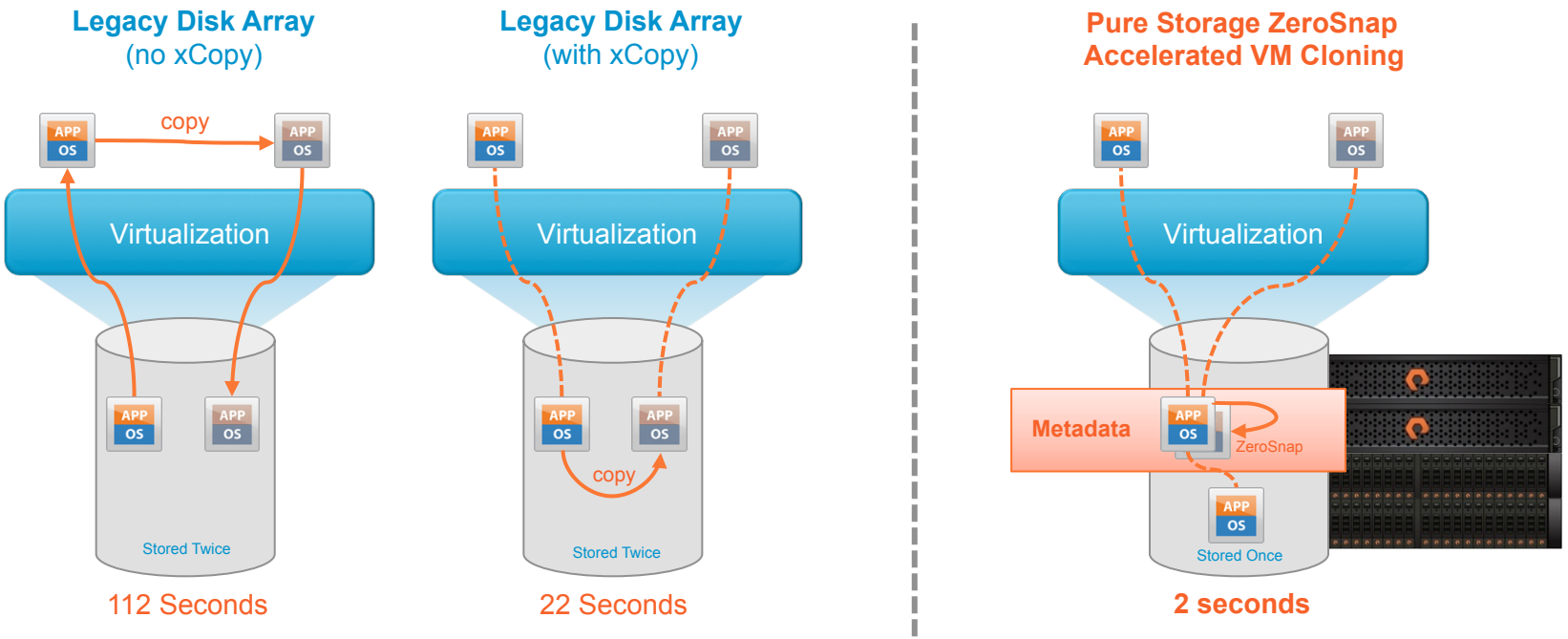
Ultimate Efficiency
– Always thin, deduped, compressed
– Lowest watts/VM



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ZeroSnap™ Accelerated VM Cloning

Hardware-Driven VM Cloning via xCopy



Example: Comparing Pure Storage vs. EMC Symmetrix cloning 1,000 40GB VMs*

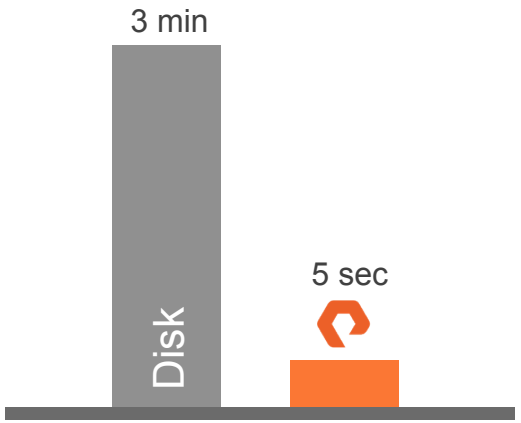
Cloning Time:	**31 hours**	**6.1 hours**	**33 minutes**	**11x faster!**
Space Consumed:	**25 TBs**	**25 TBs**	**<10 GBs!**	**>1,000x smaller!**

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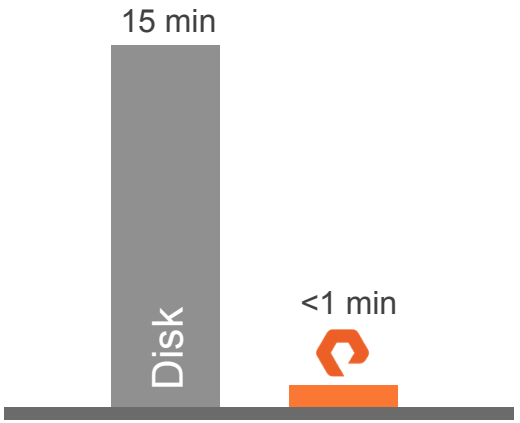
* http://virtualgeek.typepad.com/virtual_geek/2012/12/vmax-and-vsphere-vaai-xcopy-update.html

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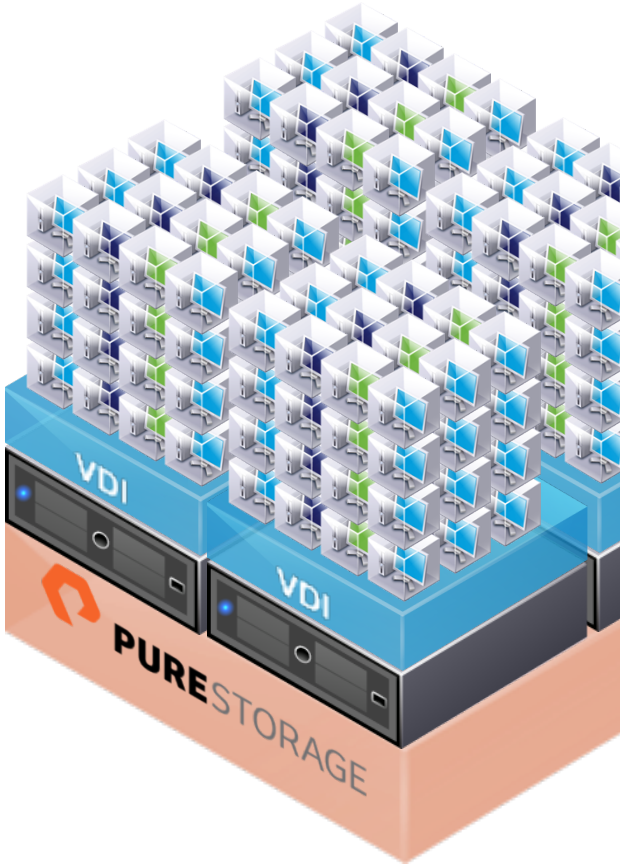
Flash Makes Virtual Administration Faster

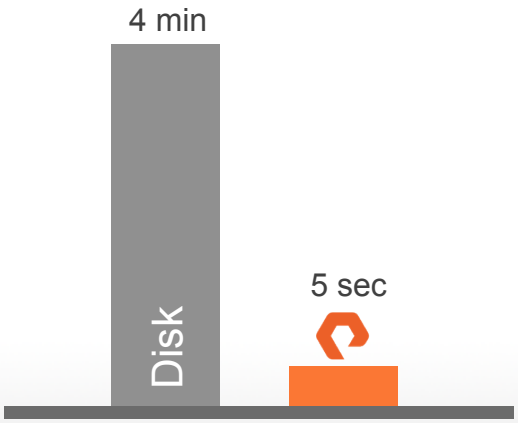


Provision 50GB VM
From Template

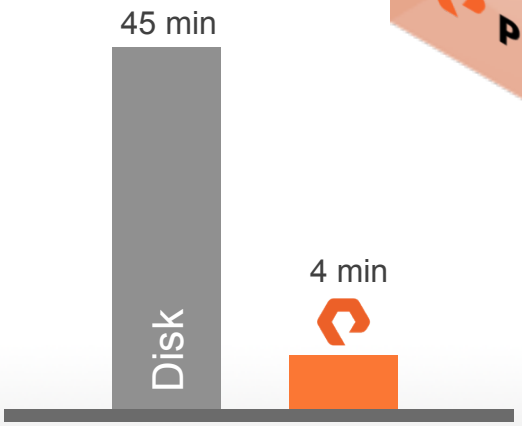


Boot 100 VDI desktops





SvMotion 50GB VM



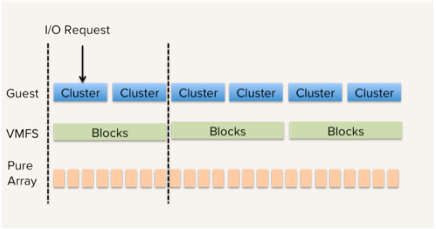
Recompose 100 VMs

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Simplifying VM Provisioning



Large LUNs, Large Datastores (up to 64TB)



No VM Alignment Issues



Thin or Thick: Both Provision Instantly Both Run Fast

Stop Thinking About Storage!



- No IOP calculations
- No RAID decisions
- No performance balancing
- No workload isolation
- No wasted space

Source: http://www.purestorage.com/blog/vm-performance-on-flash-part-2-thin-vs-thick-provisioning-does-it-matter/

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Complete Management within vSphere

vCenter Web Client Plugin
Complete management of FlashArray from within vCenter.

Automated Datastore Creation
Just specify size and done. No LUNs, no RAID, no WWNs, no rescanning.

Complete Capacity Visibility
See through deduplication, compression, and thin provisioning to understand real capacity.

Complete Performance Visibility
Correlate IOPS, latency, and bandwidth on a per-datastore basis.

VMware Ready and VAAI Certified
Highest performance possible, jointly supported by Pure Storage and VMware.



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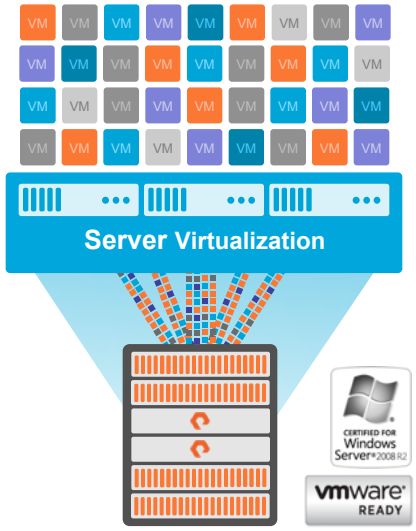
Customer Case Studies

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Example Customer Successes

Server Virtualization



Fortune 100 Computer HW Vendor

Top 5 US Telco

Top 5 Software ISV

Typical Reduction: **4-5x**

Database & Analatics

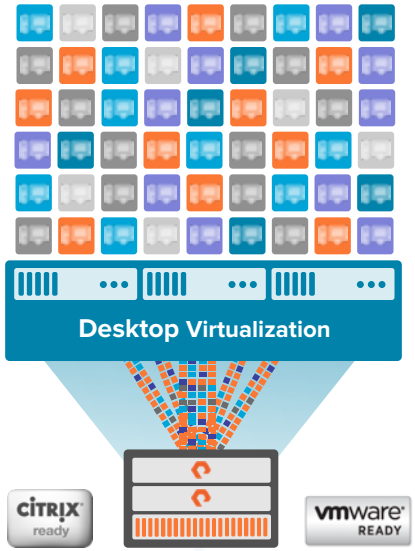


Top 5 Investment Bank

Two Top Hedge Funds

Typical Reduction: **2-4x**

VDI



US Military Branch

Typical Reduction: **5-10x**

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TripPak Accelerates Virtualized OLTP



15 Physical Servers



> 200 Virtual Servers

ORACLE

Microsoft SQL Server

OLTP Databases



NetApp SAN + PCIe Server Flash

- Capped a ~7,000 IOPS
- 8ms write latency
- 3ms read latency



Pure Storage FA-420

- 200,000 IOPS
- <1ms write latency
- <1ms read latency
- Moving all production VMs to Pure Storage
- 4:1 reduction for Oracle & SQL

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Pure Storage: The Ultimate Storage for VDI



The Best User Experience

- Better performance than local SSD
- 100Ks of IOPS at the ready
- Handles peak boot/login workloads

Affordable: 100% flash for <$100/desktop

- Inline dedupe/compression
- 5-10x data reduction
- Persistent desktop = linked clones

Scale & Reliability

- Scale from 100s to 5,000+ users in one array
- High availability, resiliency, and non-disruptive upgrades

Simplest Administration

- Completely managed inside vSphere
- Designed for VM admins
- High availability, resiliency, and non-disruptive upgrades

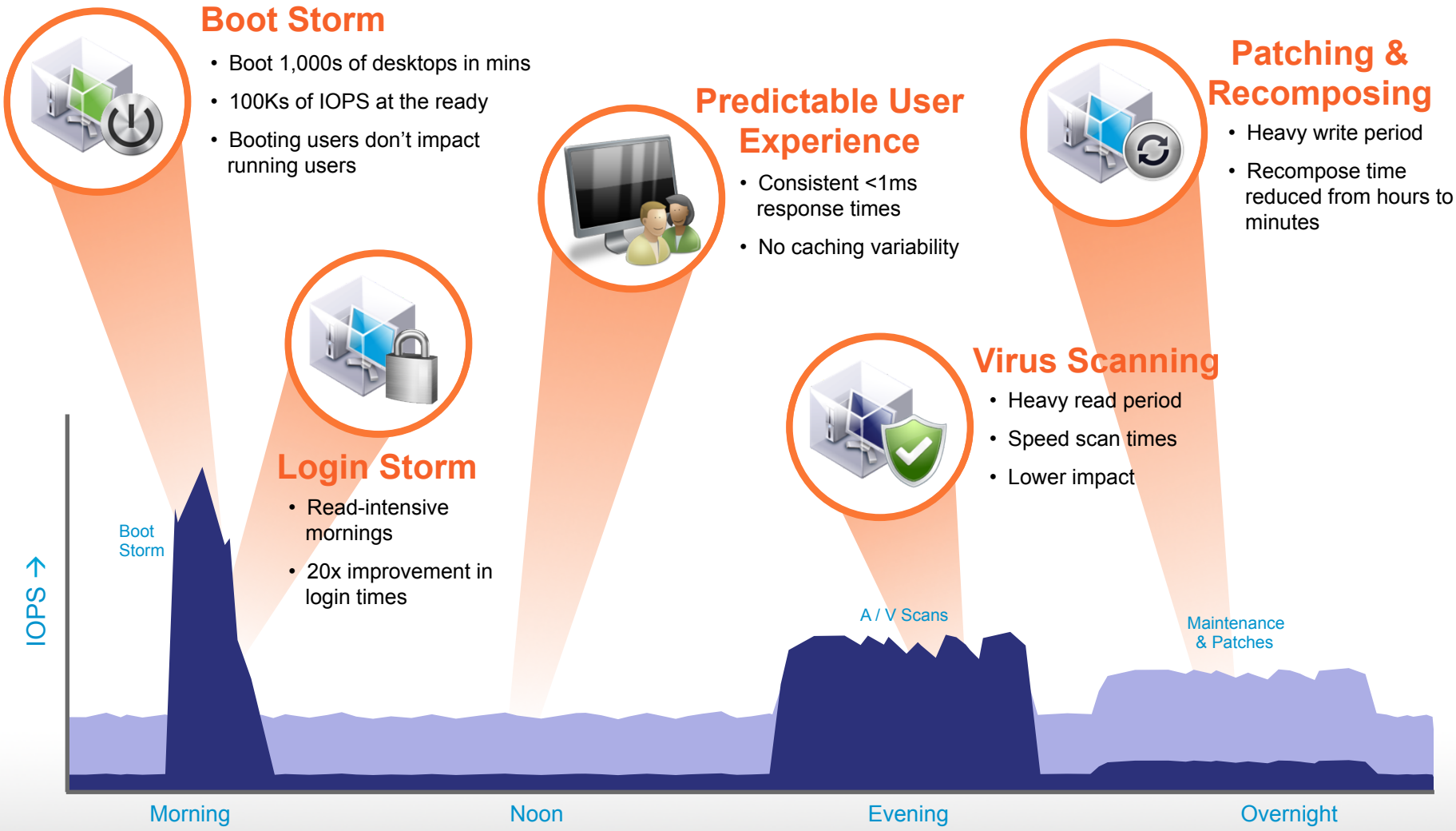
vmware READY

CITRIX ready

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Pure Storage Benefits Throughout the VDI Day



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Discussion



- **Barb Goldworm**
  - FOCUS, President, Chief Analyst



- **Ravi Venkat**
  - Pure Storage, Data Center Architect

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