NetApp Storage Solution for VDI

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Go further, faster®

Gartner: The VDI Storage Challenges

Gartner.

- More Cost-Effective Desktop Storage
- Performance and better end-user experience
- Provisioning of thousands of disk images
- Availability, data integrity and recovery

Source: http://www.gartner.com/technology/media-products/reprints/netapp/206668.html

NetApp Storage
Essential for Virtual Desktop Solutions

- Cost Efficiency at Better Performance
- Data Protection and High Availbility
- Rapid Thin Provisioning
- Reference Architectures
- Integrated Management

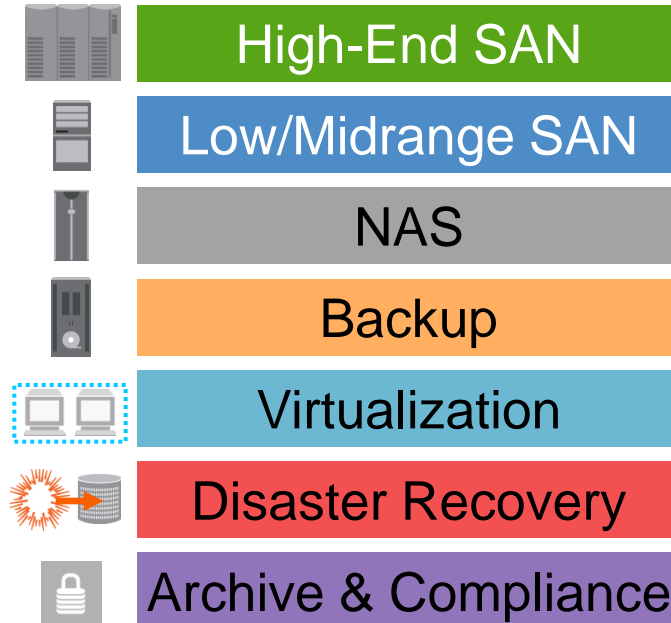# Cost-Effective Desktop Storage

AND

Better end-user experience

Cost Efficiency at Better Performance

- True Unified Storage
- Deduplication of Primary Data
- Improved Read Performance
- Write Optimization

The Benefits of TRUE Unified Storage

Industry Approach

| High-End SAN |
| Low/Midrange SAN |
| NAS |
| Backup |
| Virtualization |
| Disaster Recovery |
| Archive & Compliance |

Different hardware
Different software
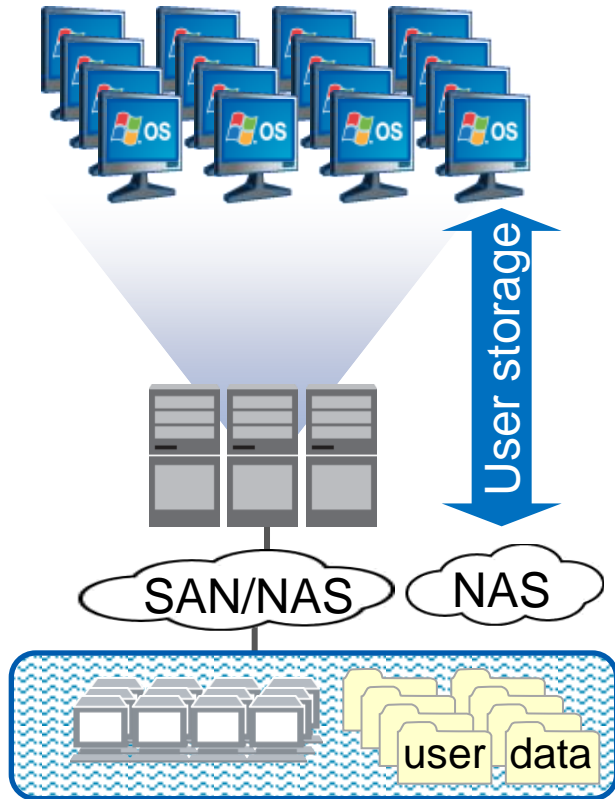Different people
Different processes

NetApp®

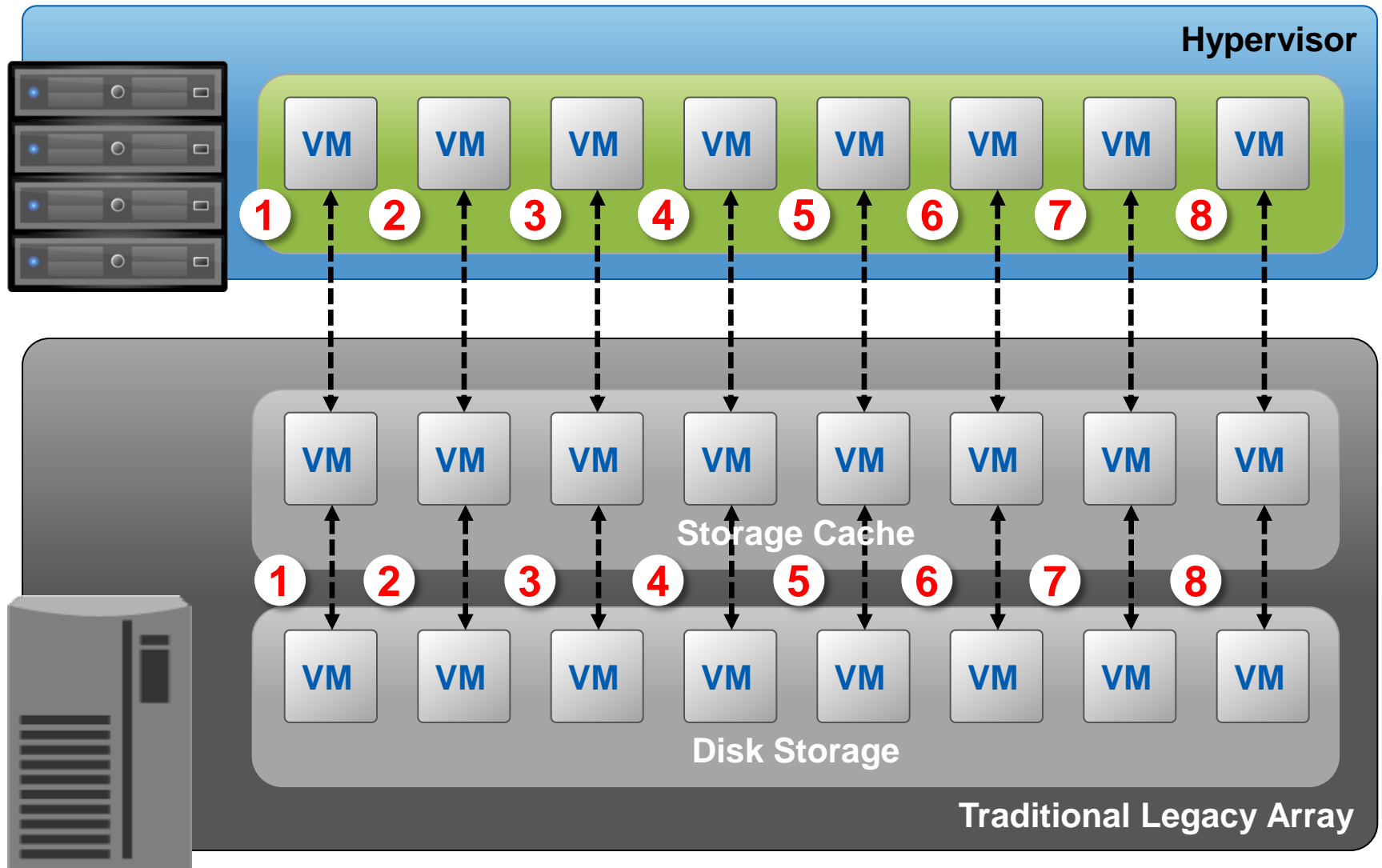FAS family
Data ONTAP®

Flexibility
Efficiency
Agility
Value

Same hardware
Same software
Same people
Same processes

Unified Storage for Desktop and Data

- **Unified Storage for Virtual Desktops**

  – SAN/NAS for desktops

  – NAS for user data

  – Efficient for both individual and pooled desktops

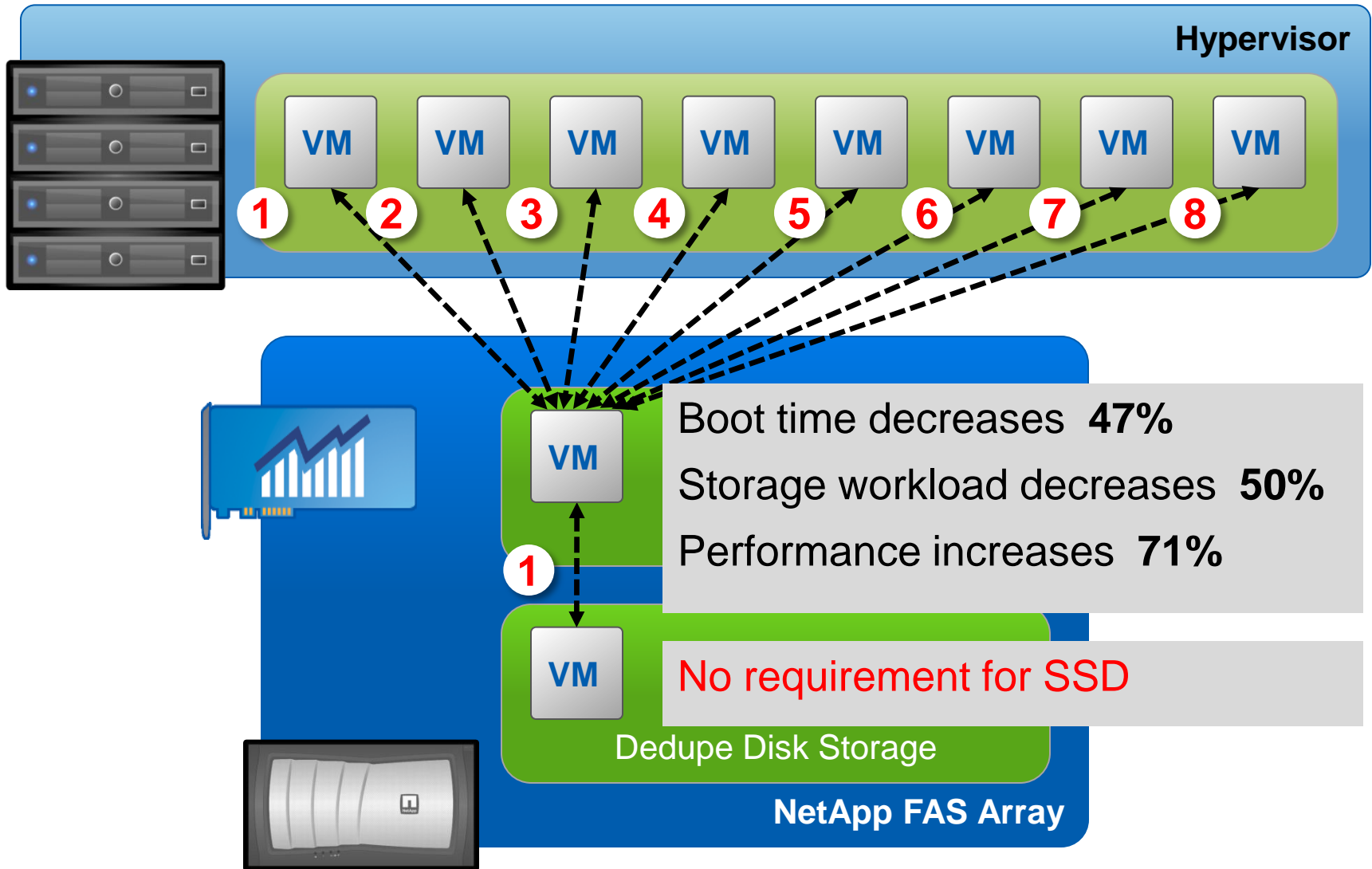- **Scale Capacity in Real-Time**

  – Support 1000's of desktops per system
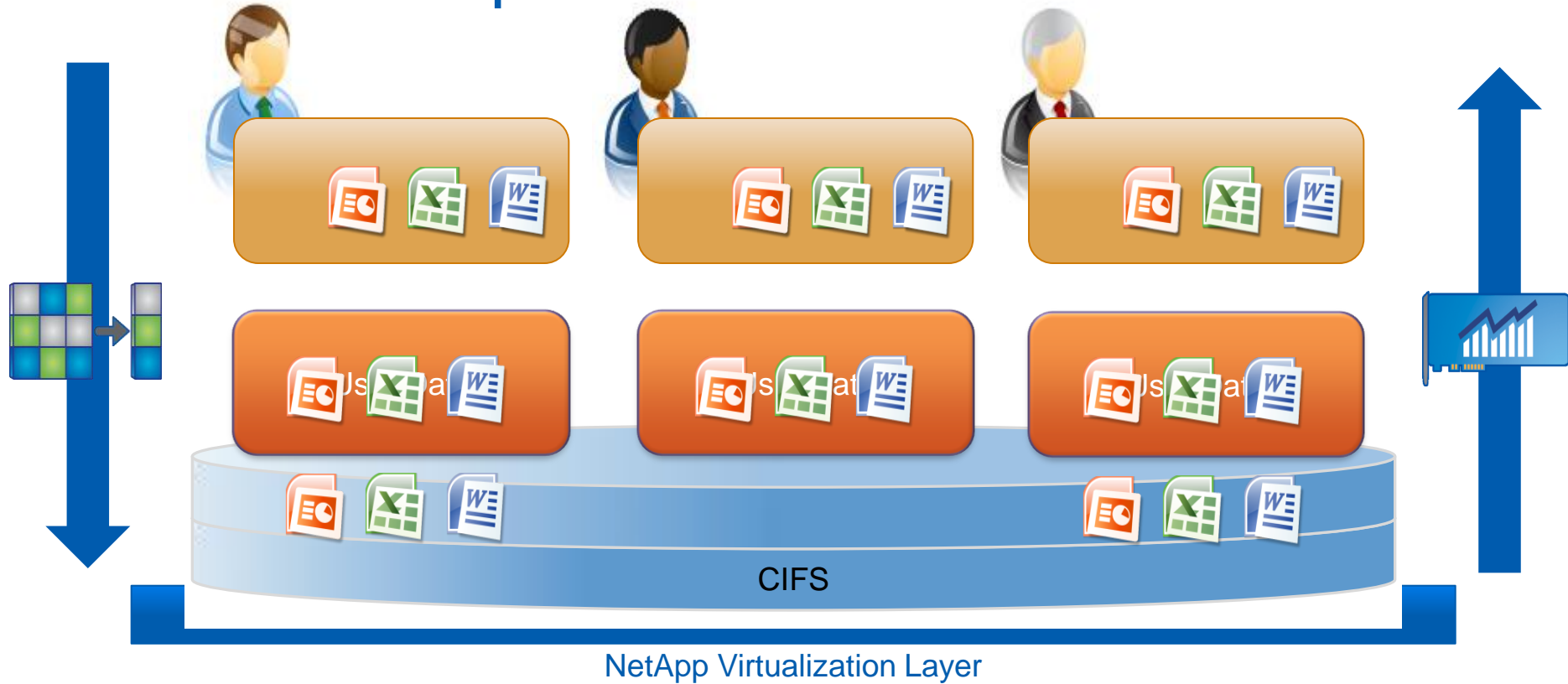
Traditional Legacy Storage Array

Hypervisor

VM 1 VM 2 VM 3 VM 4 VM 5 VM 6 VM 7 VM 8

VM VM VM VM VM VM VM VM

Storage Cache

1 2 3 4 5 6 7 8

VM VM VM VM VM VM VM VM

Disk Storage

Traditional Legacy Array

NetApp Storage Array

Hypervisor

VM VM VM VM VM VM VM VM

1 2 3 4 5 6 7 8

VM

1

VM

Boot time decreases **47%**

Storage workload decreases **50%**

Performance increases **71%**

No requirement for SSD

Dedupe Disk Storage

NetApp FAS Array
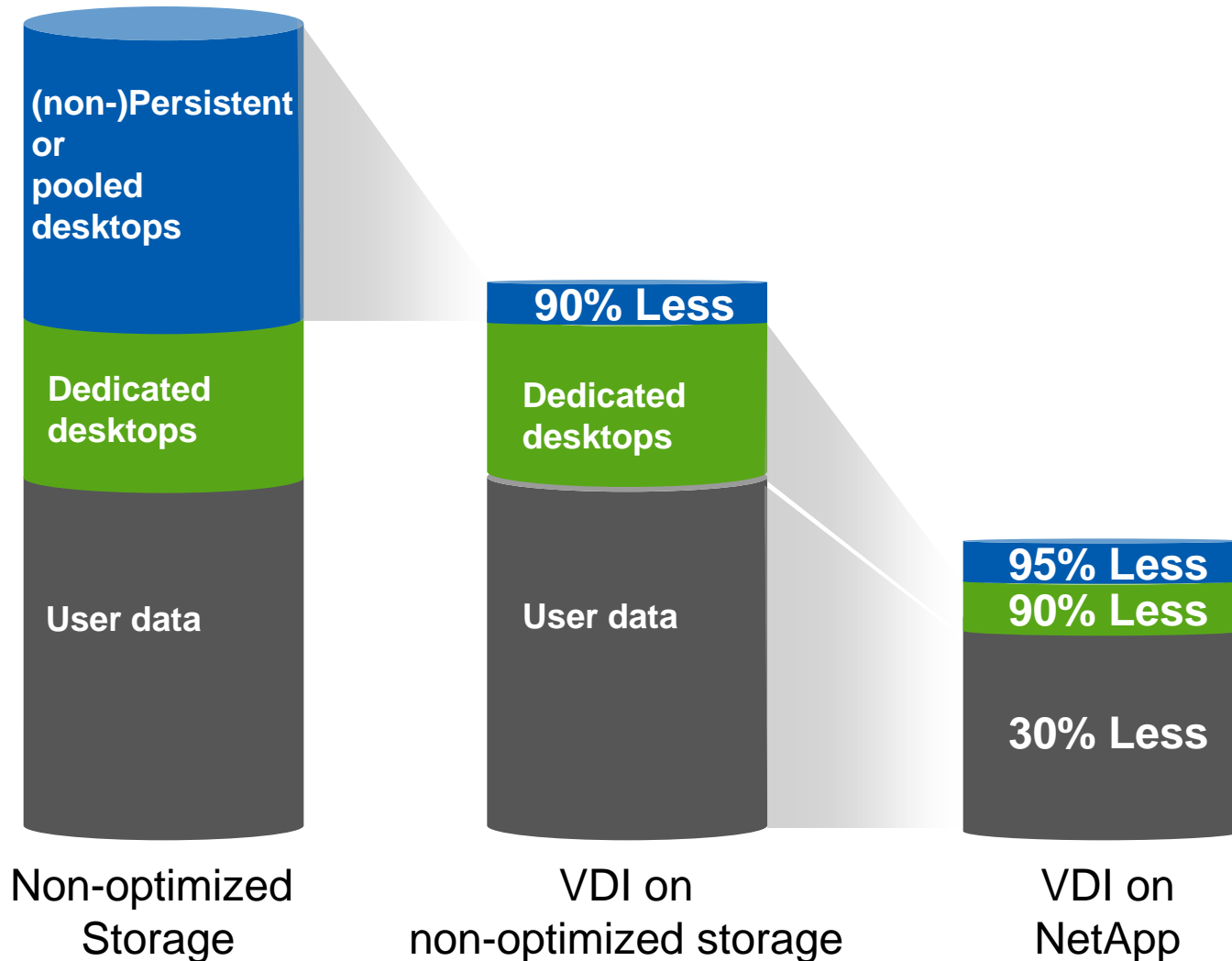
User Data (CIFS)

Deduplicate **AND** Accelerate

CIFS

NetApp Virtualization Layer

Transparent to Users

Psst… It's not file level dedupe, it's block based

Optimizing Capacity for Virtual Desktops

Non-optimized Storage:
- (non-)Persistent or pooled desktops
- Dedicated desktops
- User data

VDI on non-optimized storage:
- 90% Less
- Dedicated desktops
- User data

VDI on NetApp:
- 95% Less
- 90% Less
- 30% Less

Use 50% Less Storage. Guaranteed*.

Use NetApp for your virtual environments, and we guarantee* you will use 50% less storage

"We now see an average of 83% reductions in redundant data on our VMware® system."

- Jonathan Davis, Duke Institute for Genome Sciences and Policy

- Implement our standard best practices
- Use our industry-leading features
    - Thin provisioning
    - Deduplication
    - RAID-DP®
    - NetApp Snapshot™ copies
- Have us help you install
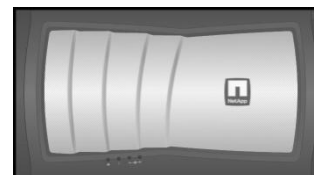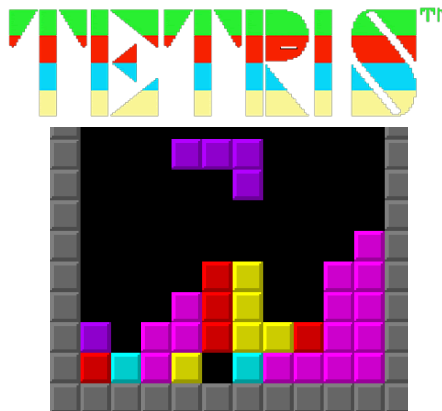- If you don't use 50% less storage, get the required capacity at no additional charge

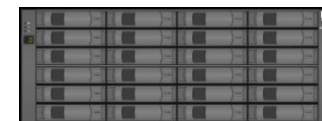*For terms and conditions, go to netapp.com/guarantee

NetApp Write Optimization

VM VM VM VM

Hypervisor
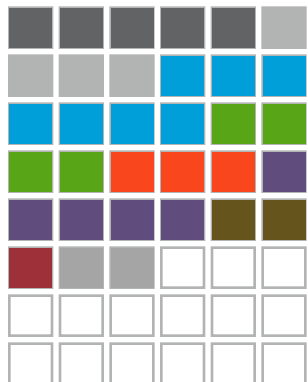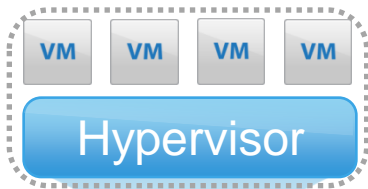
Controller Memory

Free Block Map

TETRIS™
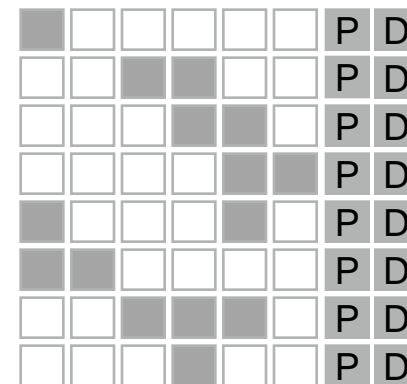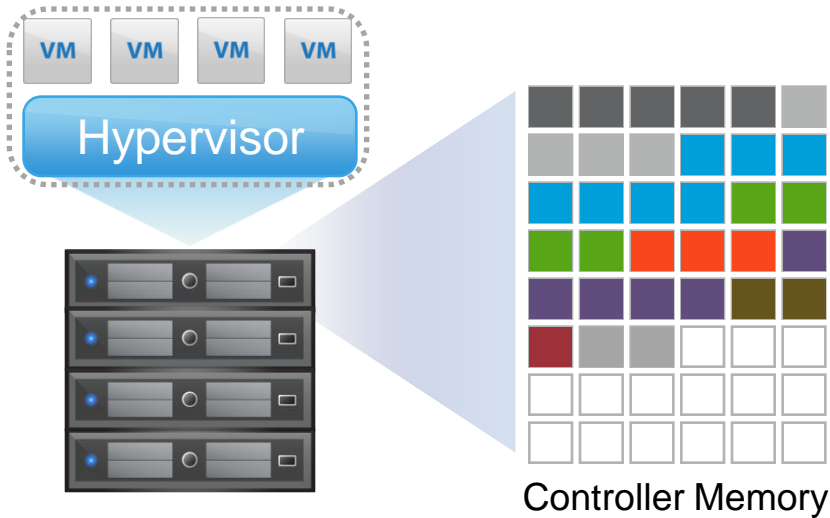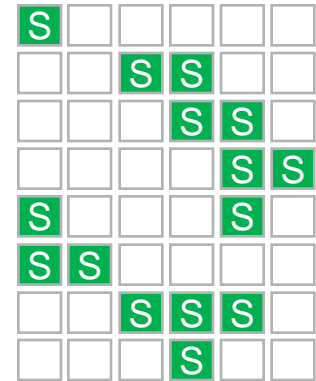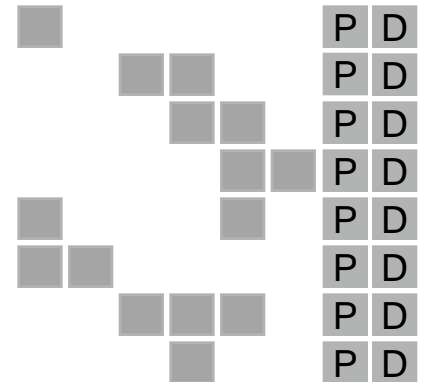
NetApp Write Optimization

Free Block Map

Controller Memory

- Random -> Sequential
- Skip Occupied Blocks
  - Saves extra disk rotation
- Less Disk IO / Less Spindles
- No Requirement for SSD
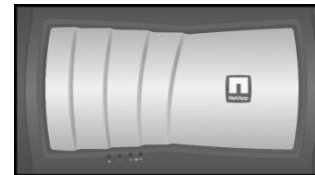
Sizing for Performance and Capacity

Performance (IOPS) vs Capacity (TB)

16000 · · · · 8 AM Peak Load

Dedupe-aware solid state cache and write optimized OS

2

8000 · · · · Steady State

VDI and NetApp **1**

10 · · · 20
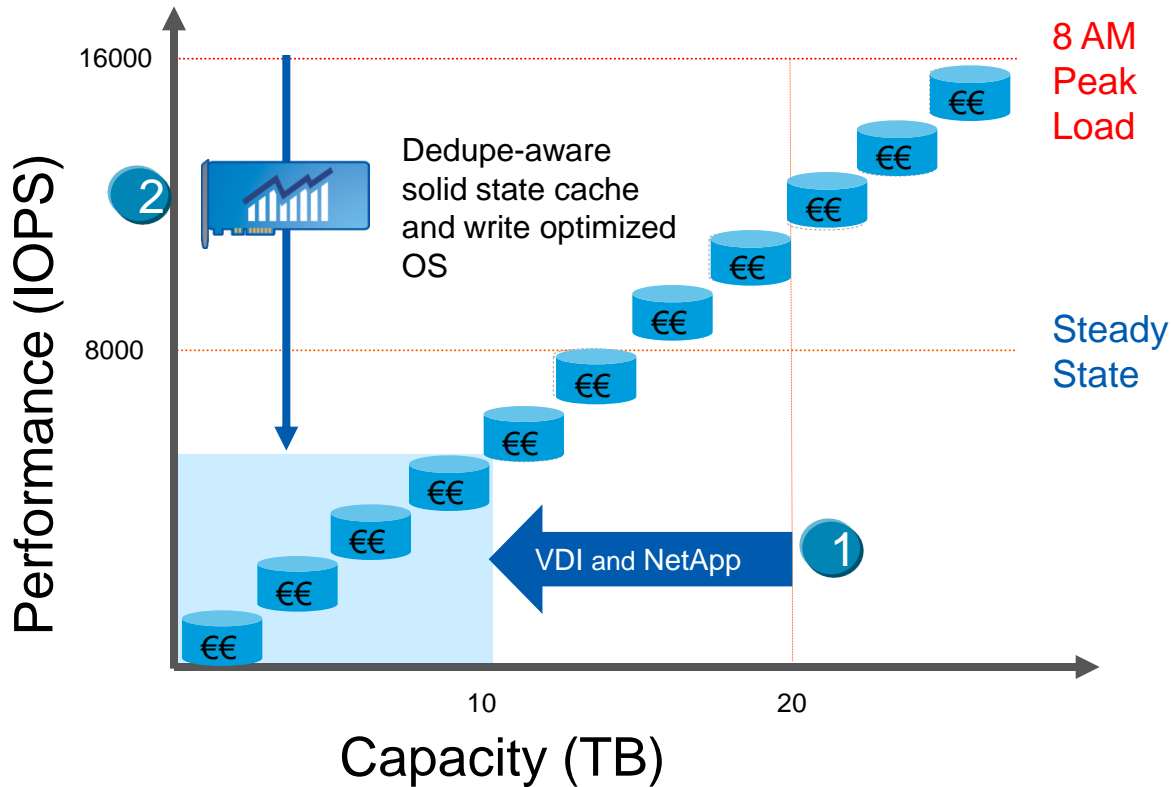
Capacity (TB)

Example: 1000 Users

- 20 GB per user
- 8 IOPS/user

1 Optimize Capacity

2 Optimize Performance

VDI Storage starting around € 50 per desktop

Solving the VDI Performance challenge

Customer Example | Regional bank running 1000+ View Desktops with major performance issues directly related to storage

Previous Storage	NetApp Solution
300 Disks	56 Disks
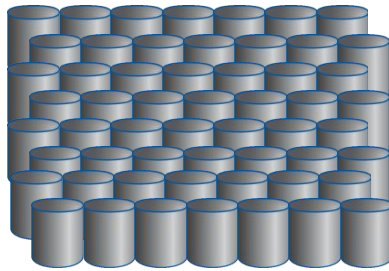
	Previous Storage	NetApp Solution
Reboot operations:	4-5 hour outage	10 minute outage
Boot Storms:	VDI servers non responsive	Non-existent
Login Storm:	Logins staggered	4 second login

Better Performance AND Less Cost

The Essential for Storage for VDI

Data Protection

and

High Availability

Cost-Effective Data Reliability

Traditional Legacy Storage

- RAID 5 (single parity disk)
  - Insufficient protection
- RAID 10 (mirrored copy)
 - Double the cost

NetApp RAID-DP™ Solution

- Protects against double- disk failure
- Same protection and performance as RAID 10 at half the cost

|	RAID 5	RAID 6	RAID 10	RAID-DP
Cost	Low	Low	High	Low
Performance	Low	Low	High	High
Resiliency	Low	High	Med	High

Centralized Backup and Recovery

- Underlying technology: snapshots, typically hourly
- Granular Backup & Restores
- Restore desktop to previous state
- Integrated plug-ins (VMware, XenServer & Hyper-V)
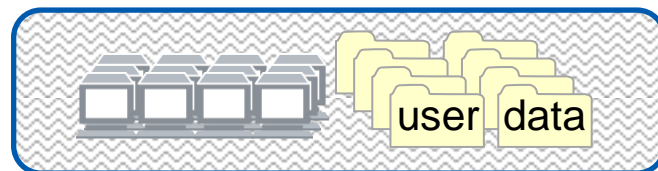
user data

Full point-in-time virtual copy

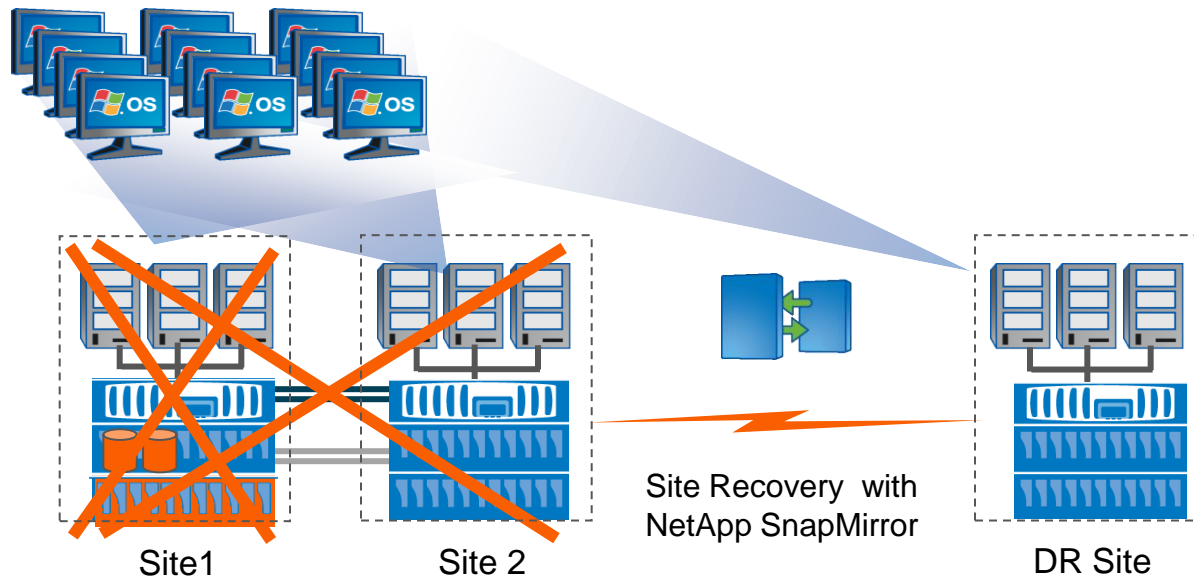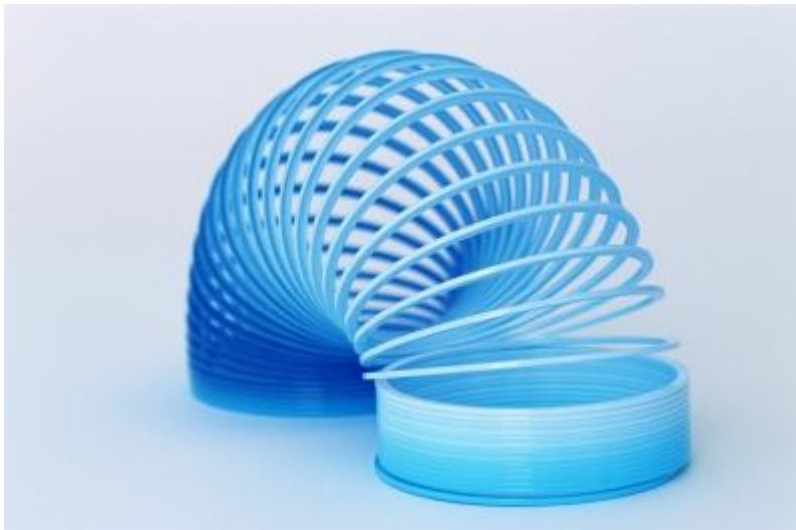# Self-Service Restore of user data
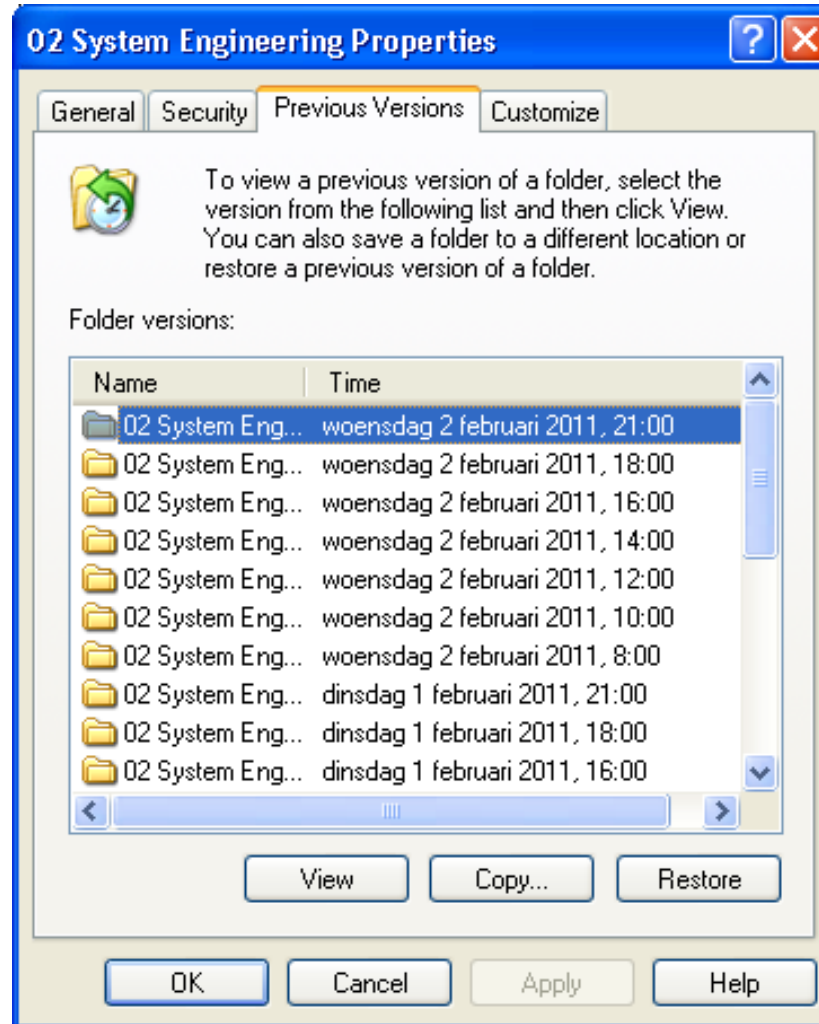
Business Continuance for Desktops

- Instant backup and recovery

- Transparent recovery from component failure

- Auto failover for system and site failure (MetroCluster)

- Recover in minutes from larger regional disasters

Site1

Site 2

Site Recovery with
NetApp SnapMirror

DR Site

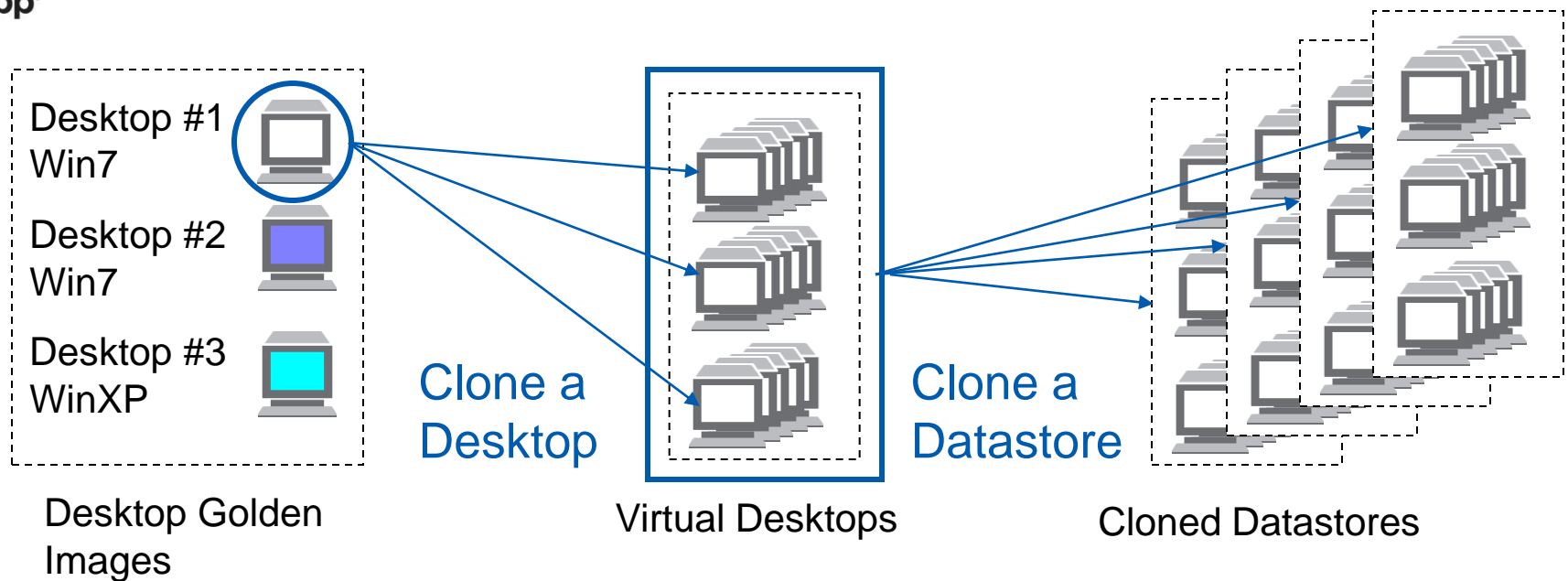# The Essential for Storage for VDI

Storage as Flexible as Virtual Desktops

Provision 1000's of VMs in Minutes

Desktop #1
Win7

Desktop #2
Win7

Desktop #3
WinXP

Clone a
Desktop

Clone a
Datastore

Desktop Golden
Images

Virtual Desktops

Cloned Datastores

- Rapid cloning of individual desktops

- Thin clone technology minimizes storage use

- Provision 1000 VMs in less than 10 minutes

Automated Desktop Provisioning

NetApp Rapid Cloning Utility
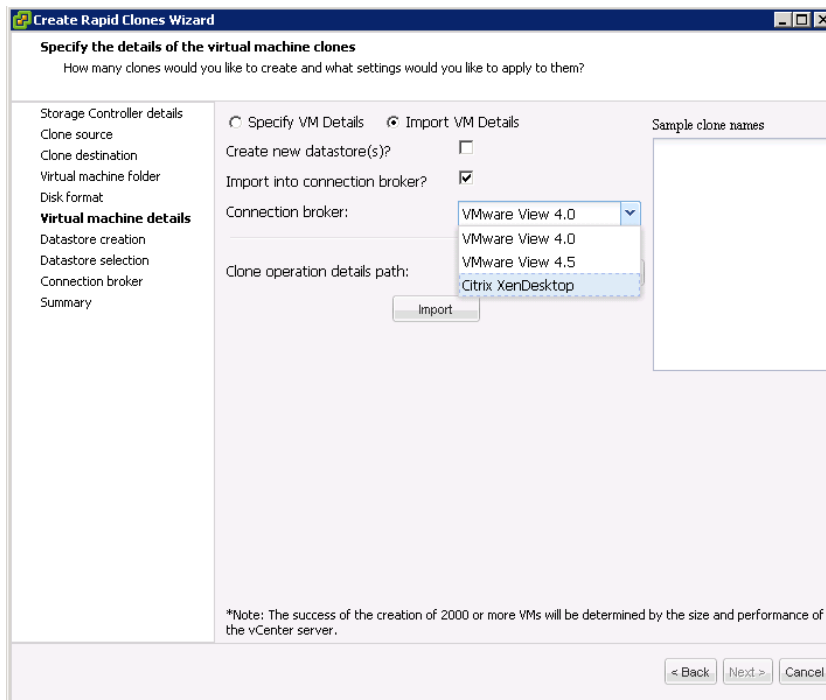
- vCenter Plug-in

- Integrated cloning and provisioning utility for VMware virtual machines

- Import VM's into VMware View and Citrix XenDesktop

- Provided free of charge to NetApp customers

Reference Architectures
Essential for Virtual Desktop Solutions

NetApp Best Practices &

Cisco Validated Designs:

XenDesktop

AND

VMware View

NetApp Best Practices

http://www.netapp.com/us/library/

- TR3749 NetApp and VMware vSphere Storage Best Practices
- TR3705 NetApp and VMware View Solution Guide

- TR3748 NetApp and Citrix VDI Best Practices

NetApp
Go further, faster

NETAPP TECHNICAL REPORT

NetApp and VMware VDI Best Practices

Abhinav Joshi and Chris Gebhardt | NetApp
November 2008 | TR-3705 | Version 2.0
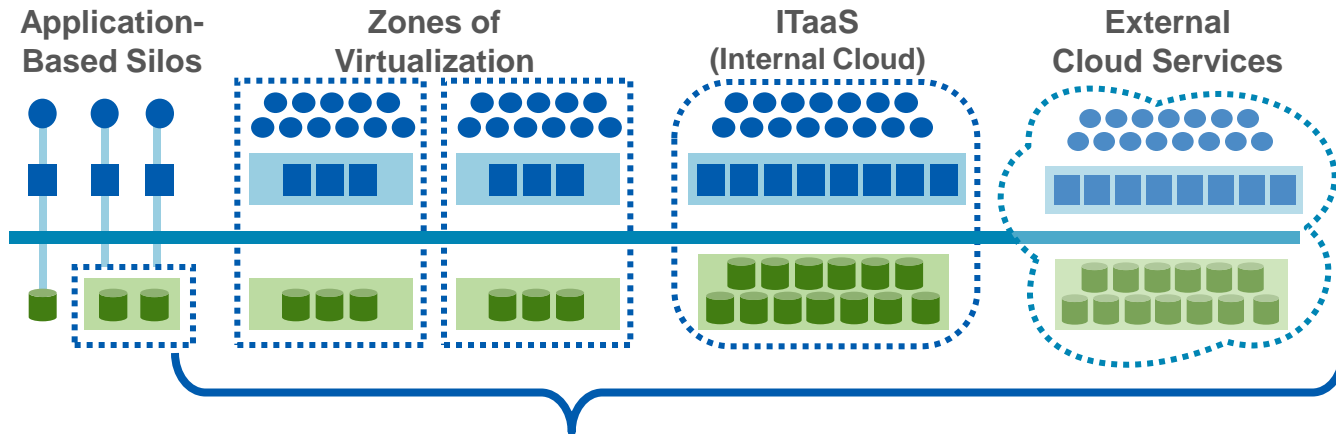
Cisco Validated Designs (CVD)

Desktop Virtualization with
Cisco UCS, NetApp Storage and:

- Citrix XenDesktop and XenServer
- Citrix XenDesktop and Hyper-V
- Citrix XenDesktop and vSphere
- VMware View 4.5

- And …. FlexPod

Standardized Infrastructure
The Proven Approach

Application-Based Silos

Zones of Virtualization

ITaaS (Internal Cloud)

External Cloud Services

Standardized shared infrastructure for the journey

Scale with your business
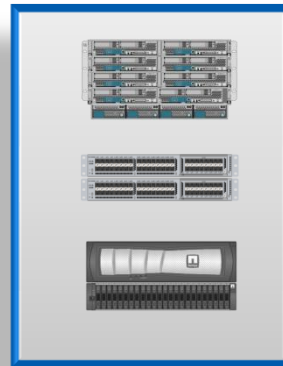
Standardized FlexPod:
scale out with right-sized FlexPods

Or base foundation:
scale up within FlexPod

Scalability: Right Size – Then Scale out with Pod
The standardized building block for YOUR DC
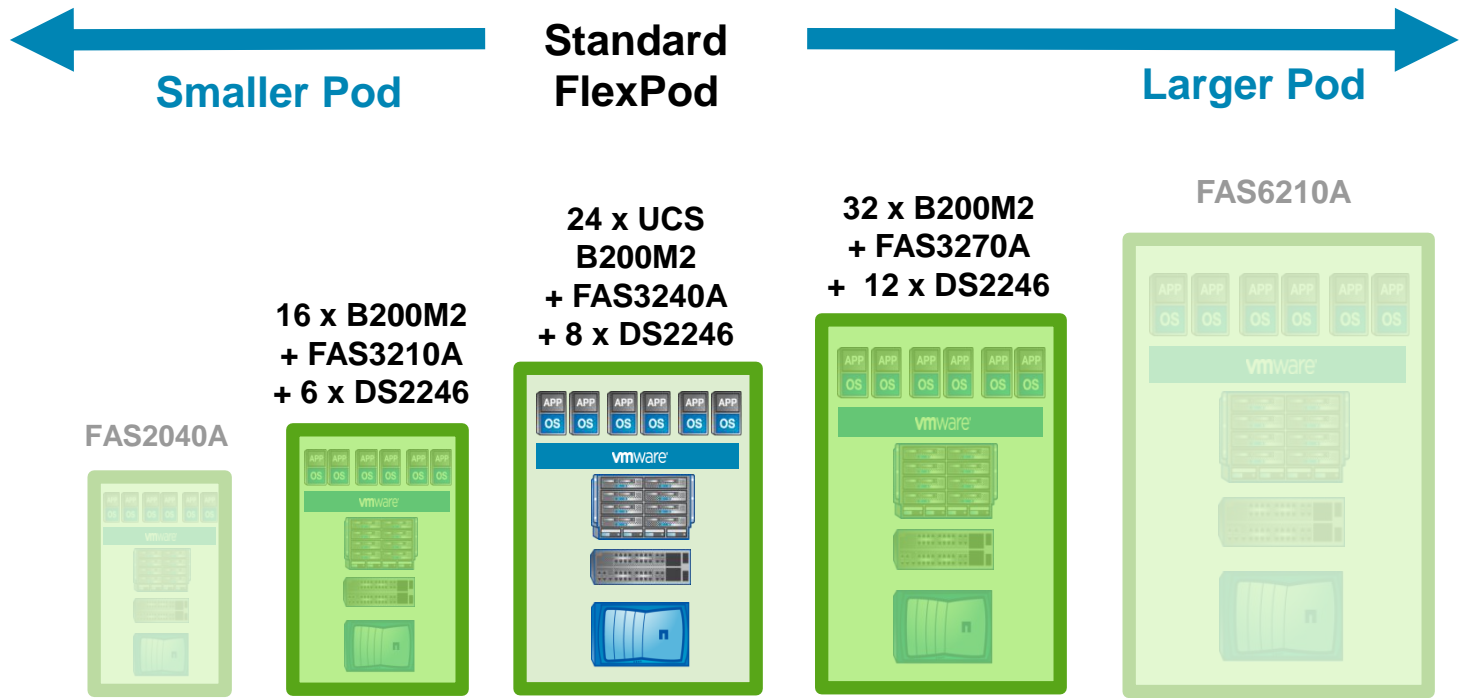

Smaller Pod

Standard FlexPod

Larger Pod

FAS2040A

16 x B200M2
+ FAS3210A
+ 6 x DS2246

24 x UCS
B200M2
+ FAS3240A
+ 8 x DS2246

32 x B200M2
+ FAS3270A
+ 12 x DS2246

FAS6210A

29

FlexPod for VMware
Example

VMware vSphere
VMware vSphere Enterprise Plus
VMware vCenter Standard

Cisco Unified Fabric
2 Cisco Nexus® 5548 with fabric services
        (per 3 FlexPod configurations)
2 Cisco Nexus 1010 and 1000V

Cisco UCS Platform
2 Cisco UCS 6120XP Fabric Interconnect
3 Cisco UCS 5108 Blade Server Chassis
9 Cisco UCS B-250 M2 plus VIC
6 Cisco UCS B-200 M2 plus VIC

NetApp FAS3210A
4 NetApp DS2246 450-GB SAS shelves
2 256-GB flash cache
2 10-Gbps IP interfaces
4 4-Gbps Fibre Channel interfaces
NetApp complete bundle
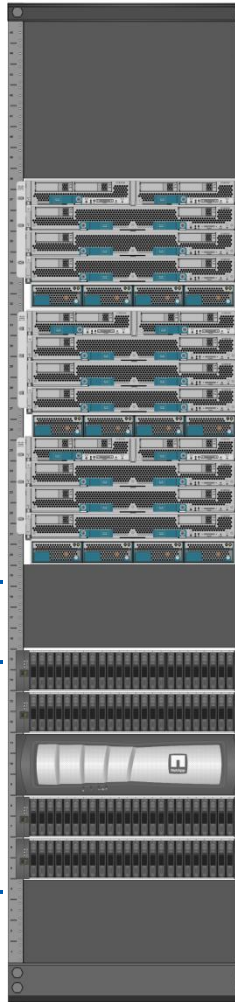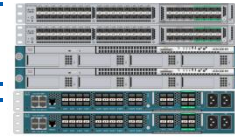
1 Rack Data Center Solution
30 Westmere CPUs (180 cores)
2 TB server memory (up to 4 TB)
40-Gbps interconnect (4x 10 GE)
512-GB SSD storage cache
42 TB storage

1 Enterprise IT Infrastructure
For an organization of 1500 users
with a mixed workload of:
- VMware View 4.5 (MS Windows 7)
- MS Exchange 2010
- MS SharePoint 2010
- MS SQL Server 2008 R2
- Plus headroom for more applications

Customer Case - KORTON

KORTON Group
makes it possible

Customer Case
Telindus-ISIT voorziet Korton van nieuwe datacenter-architectuur op basis van Cisco UCS en NetApp

De Korton Group levert vanuit drie werkmaatschappijen diverse ICT-diensten. Eén daarvan is het hosten van applicaties en services onder de noemer Korton Application Services Provider (KASPer). Omdat deze tak snel groeit, ging het bedrijf op zoek naar een schaalbare datacenterarchitectuur die de komende jaren de benodigde flexibiliteit kan bieden. Telindus-ISIT adviseerde niet alleen een ander hostingplatform, maar ook een nieuwe storage-omgeving die daar naadloos op aansluit.

> *Totaaloplossing Cisco UCS en NetApp biedt maximale flexibiliteit*
> *Diensten eenvoudiger en daardoor sneller aan te bieden*
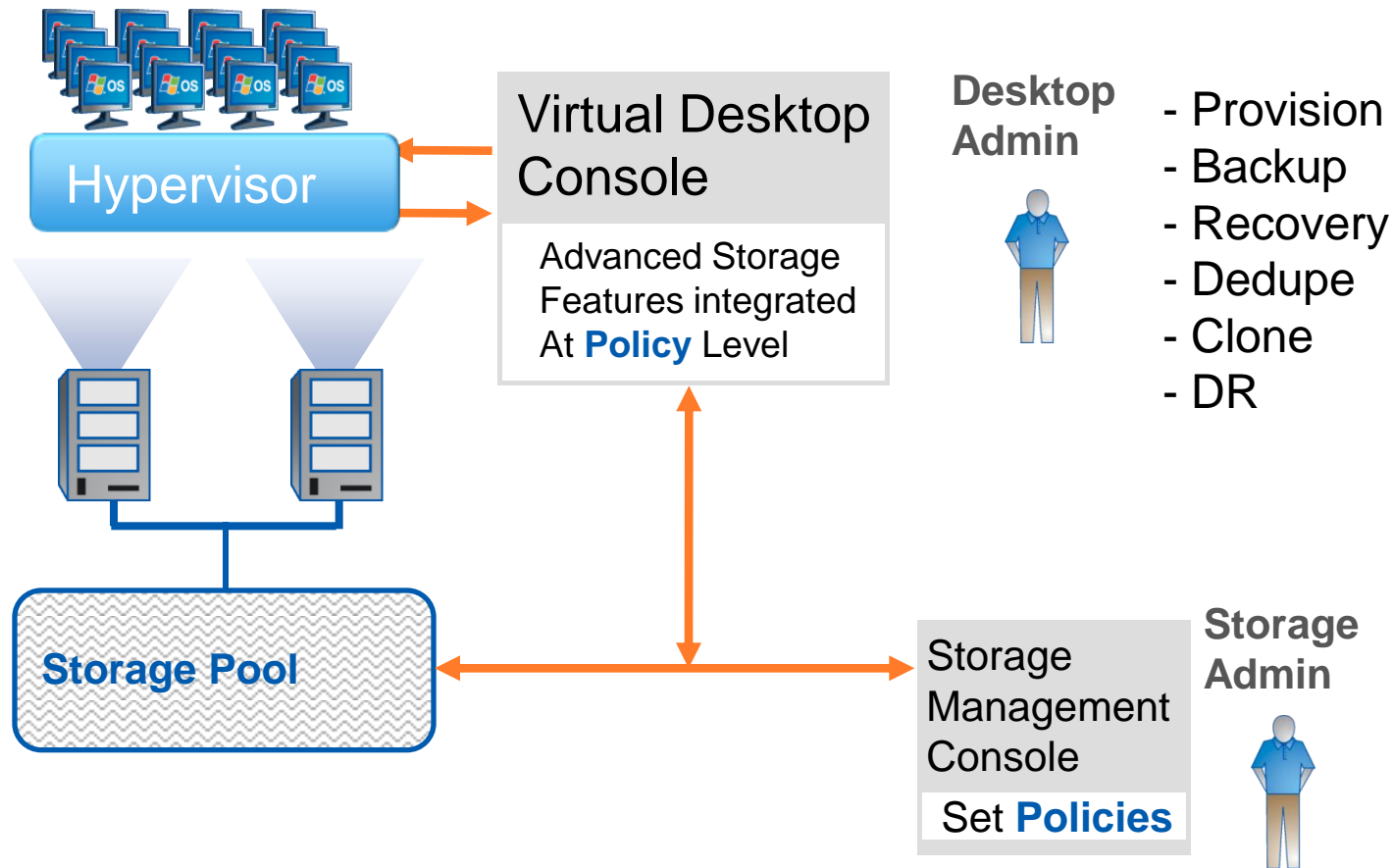> *Schaalbaar platform biedt doorgroeimogelijkheden op langere termijn*

together with

telindus
belgacom ICT

ISIT
THE STORAGE COMPANY

The Essential for Storage for VDI

Integrated

Management

Integrated Storage Management

Hypervisor

Virtual Desktop Console

Advanced Storage Features integrated At **Policy** Level

Desktop Admin

- Provision
- Backup
- Recovery
- Dedupe
- Clone
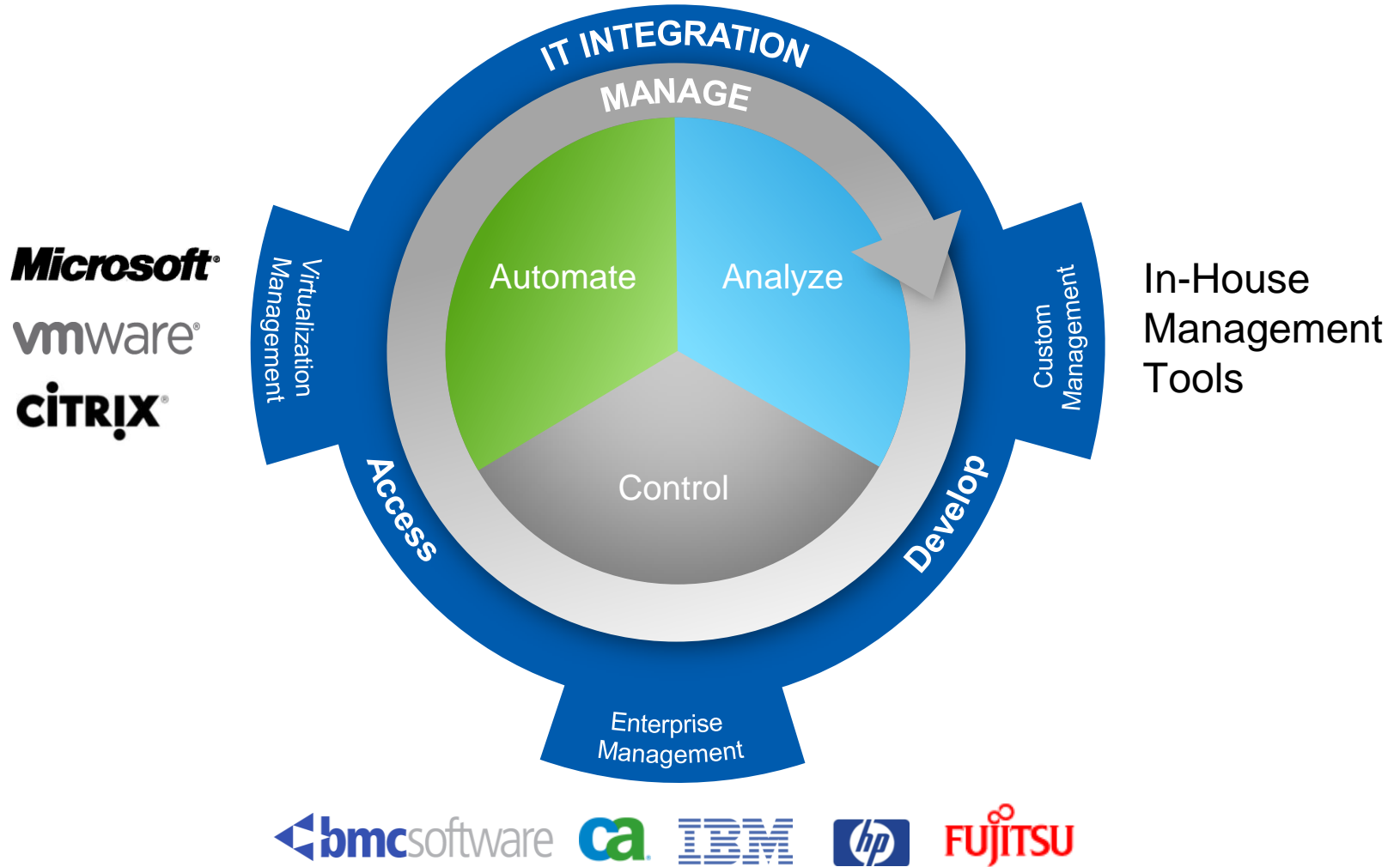- DR

Storage Pool

Storage Admin

Storage Management Console

Set **Policies**

NetApp Open Management Interfaces
Flexibility to Choose the Right Solution

Live Demo

- Live Demo available now on NetApp booth
  - Integrated Storage Management with VMware
  - Virtual Storage Console (VSC)

- Also available via your Telindus-ISIT Account Manager

Summary
Essential for Virtual Desktop Solutions

- Better End-User Experience

- Use At Least 50% Less Storage

- Provision 1000's of Desktops in Minutes

- Backup & Restores in Minutes

- High-Availability Solutions

- Integrated Management

- Based on Validated Designs

Thank You !

Q & A

AND

Demo Available at NetApp Booth by Rogier Moers