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IT at the speed of business
VDI Deployments Large and Small, 60-second Deployments to Extreme Availability on Vblock™ Infrastructure Platforms
agility made possible™
ca technologies

Data Center Transformation

TD104SN

VDI: 60-second Deployments to Extreme Availability on Vblock™ Infrastructure Platforms

Jae Ellers
VCE

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Overview & Agenda

abstract

Jae Ellers

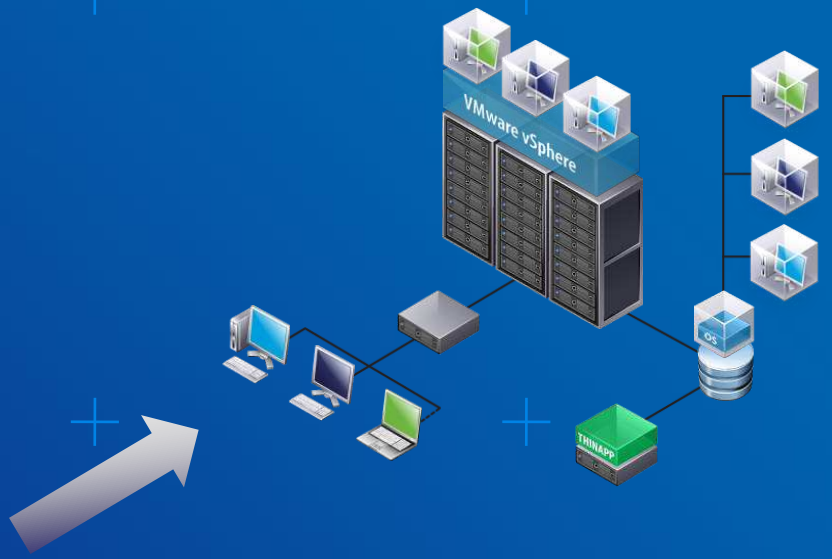
VCE, Principal Architect

Business needs dictate the requirements for Virtual Desktop resources. These requirements can vary wildly from very agile, quick deployments to use cases where extreme high availability is critical. With converged infrastructure, rapid provisioning and deployment, time to the first virtual desktop can be reduced from weeks to hours. In this session, we will present a rapid deployment model for VMware View™ on Vblock platforms on one end of the use case spectrum, and an extreme high availability model on the other.

agenda

- Overview & Agenda
- Introduction to VCE, FastPath, and AlwaysON
- AlwaysON Technical Architecture & Design
- FastPath Technical Architecture & Design
- Combining the Solutions
- Q&A

Introduction to VCE, FastPath, & AlwaysON



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VCE Charter

Accelerate adoption
of converged infrastructure and
cloud-based computing models
that dramatically reduce the cost
of IT while improving time to
market for our customers.

SIMPLIFYING THE DATA CENTER EXPERIENCE

Traditional Data Center Experience
90-120 Days From Order to Production

Receive Components

Program & Provision

Staging

Rack & Cable

January

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

February

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29			

March

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

April

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

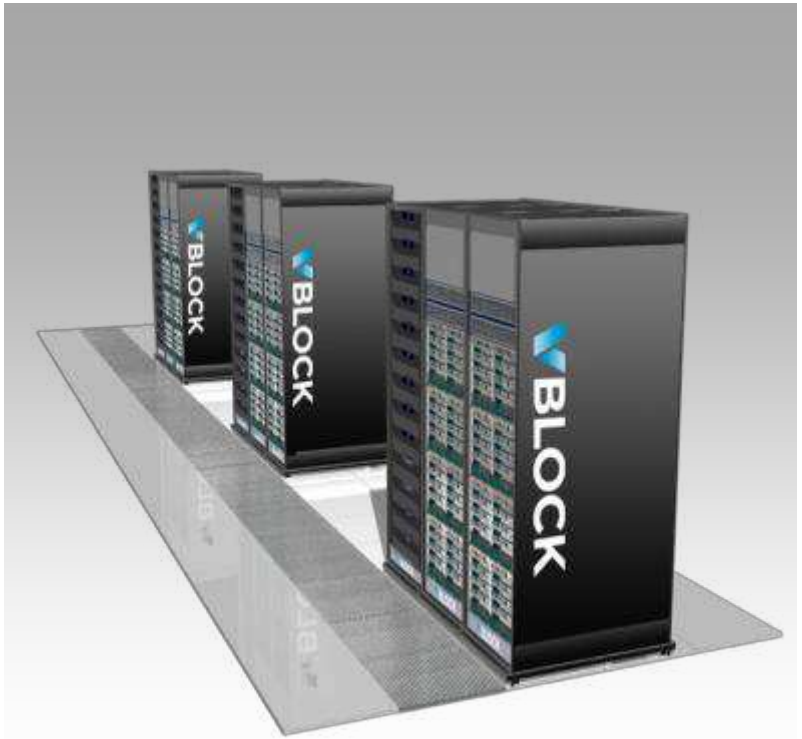
VCE Data Center Experience
~30 Days From Order to Production

January

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Vblock Infrastructure Platforms

- Vblock Series 700
  - Storage: **EMC Symmetrix Vmax**
  - Compute: Cisco UCS
  - Virtualization: VMware
  - Orchestration:
    Unified Infrastructure Manager (UIM)
  - Vblock Series 700 model MX
- Vblock Series 300
  - Storage**: EMC VNX**
  - Compute: Cisco UCS
  - Virtualization: VMware
  - Orchestration:
    Unified Infrastructure Manager (UIM)
  - Models: EX, FX, GX, HX

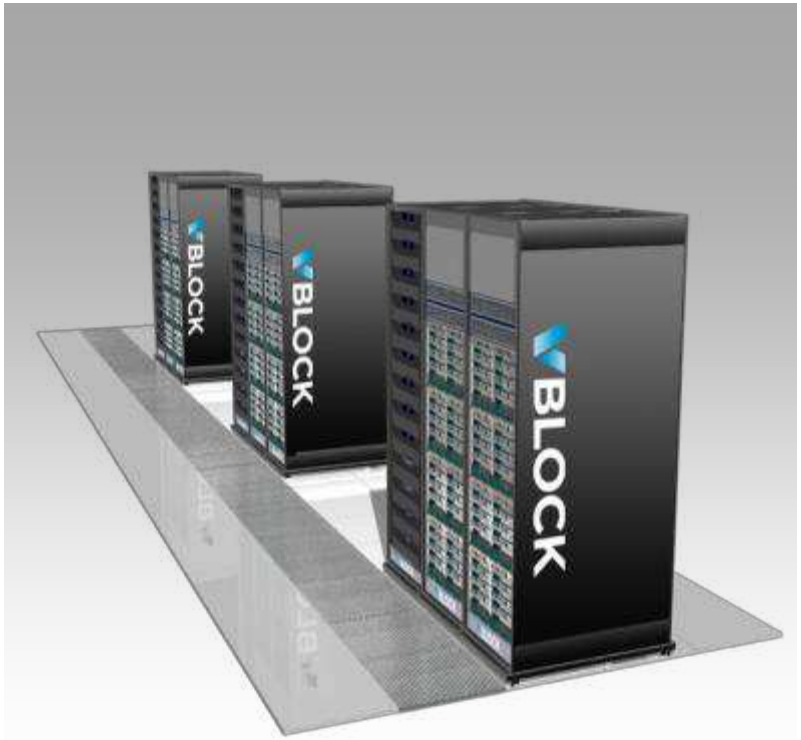


**Pre-Engineered,
Pre-Integrated and Validated**

Vblock Platforms

Key Value Proposition

- Complete System Integration
- Optimized Solutions
- Seamless Support



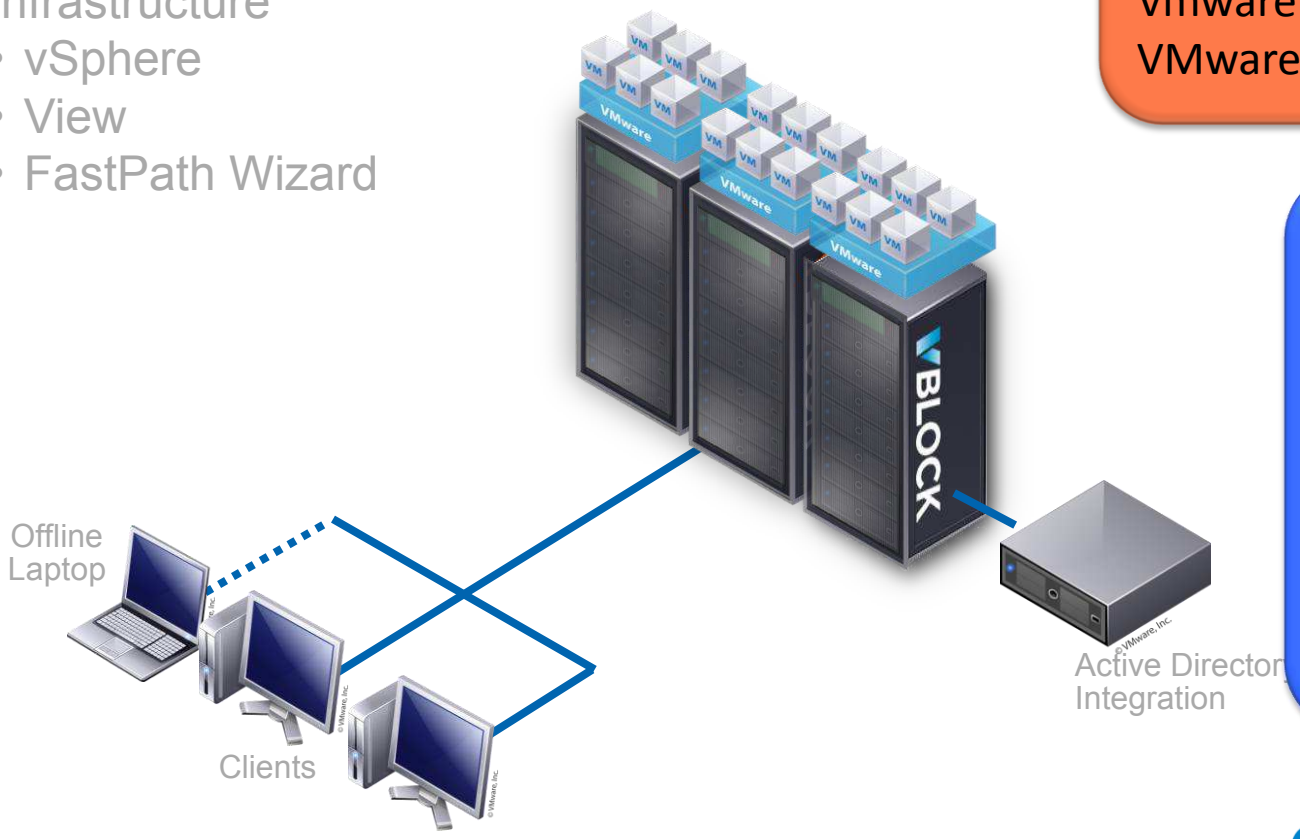
Pre-Engineered,
Pre-Integrated and Validated

VMWARE VIEW : ARCHITECTURE AND COMPONENTS

VCE Vblock Infrastructure
- vSphere
- View
- FastPath Wizard

Platform
VMware vSphere
VMware View

Management
Vmware vCenter
VMware View Manager
Vmware View Composer
VMware ThinApp



User Experience
PCoIP,
MultiMonitor
Print,
Multimedia
USB redirection
Offline Support

emerging Customer Use Cases for desktop virtualization

Windows 7 Migration

- Reduce migration costs
- Minimize application incompatibility
- Extend life of existing desktop software

Business Process Outsourcing

- Reduce costs by managing desktop applications and users centrally
- Centrally control sensitive data
- Streamline desktop and application deployment

Remote Office/Branch Office

- Reduce costs by managing desktops and users centrally
- Centrally control sensitive data
- Streamline desktop and application deployment

Mobile Users

- Enable desktop access regardless of network connection
- Extend security and control of offline users
- Leverage local device resources

Contractors/EOIT/BYOPC

- Deploy and manage a desktop image on employee owned assets
- Centrally control desktops and data
- Separation between corporate and personal desktop

Business Continuity/Disaster Recovery

- Support end-users working from remote locations
- Ensure desktops are available 24 x 7
- Quickly provision new desktops

WHERE'S THE PAIN?

- Windows 7 is here, we need to be prepared for it
- We spend too much time on desktop support calls
- Managing diverse end point devices is overwhelming & expensive
- We spent too much time recovering lost data from stolen laptops
- We are constantly patching and upgrading applications & OS
- It is difficult to respond quickly to a mobile & international workforce

at the desktop… …in the Infrastructure?

- For every $1 spend on hardware, we spend $3 to manage it
- We want to deploy VDI in different workgroups
- We don't have several months for POCs, we need VDI now
- It is too difficult to manage the multiple vendors in a VDI solution
- We need better security for our desktops and our datacenter
- We do not know how to architect a VDI solution
- We do not know the real total cost $$$ of the solution
- We need highly available desktops for critical users/apps

ADOPTING VIEW: THINGS TO CONSIDER

Infrastructure …

- Price Per Desktop
- End-to-End Support
- Choice of Compute
  - Memory/CPU trade-offs
- Choice of Network
  - Converged Infrastructure benefits
  - Simpler management
- Choice of Storage
  - Disks, RAID, Storage Controller
  - Automated Tiering, Cache and VAAI
- Administration and Management
  - Unified Management and templates
  - Integration with vSphere / View
- Security, Business Continuity
- Continuously improving best practices

We simplify this…

End User Experience …

- Choice of End Point
  - Traditional
- Gold Image Optimization
  - Choice of operating system
  - End User Applications
- User Segmentation
  - Task, Knowledge, Power User
- Help Desk and Support

…so that you can focus here…

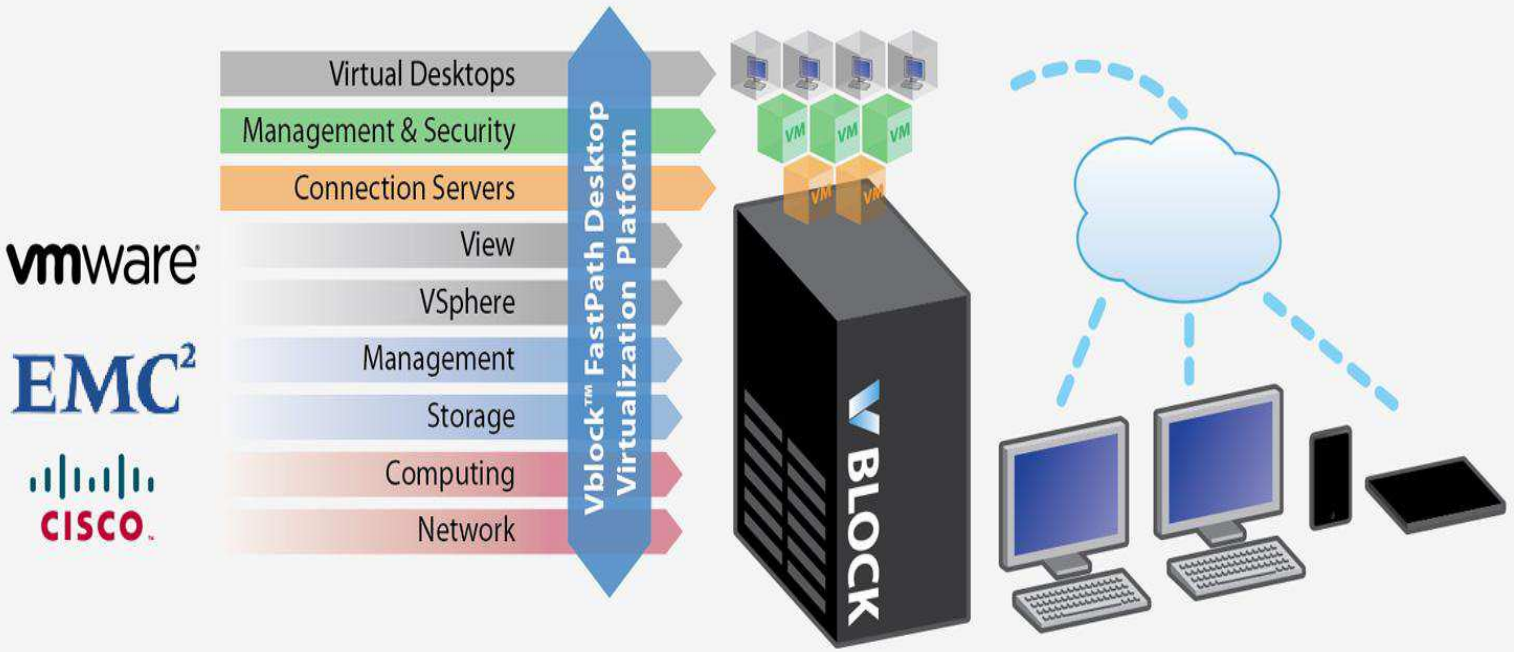
Vblock™ Fastpath desktop virtualization platform

A purpose-built solution that:

- Automates desktop and application management
- Enables rapid deployment
- Scales at Enterprise-class
- Reduces costs multifold
- Improves security through desktop centralization
- Delivers high availability

Vblock™ Fastpath desktop virtualization platform

Top to bottom—a faster, cheaper, better solution for the enterprise

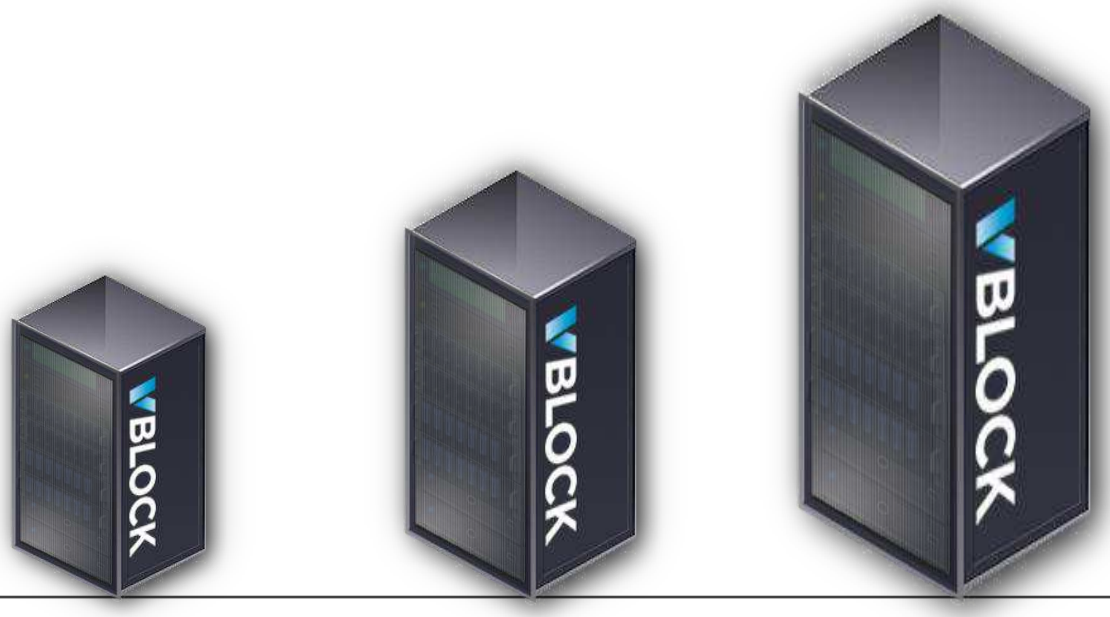


- Enterprise-class, 1000s of Users
- Automation Facilitates Rapid Deployment
- Price Transparency
- Support: Simple, Seamless, Smart

Vblock™ FastPath Virtual Desktop Platform Offerings:

3 Sizes :

- Vblock™ 300 EX
- VMware View Premier Bundle
  - VMware View, vShield, ThinApp
  - VMware vSphere
- VCE Deployment Wizard



500 Concurrent Users	1000 Concurrent Users	1500 Concurrent Users
6 Blades	12 Blades	16 Blades
24 TB	33 TB	36 TB
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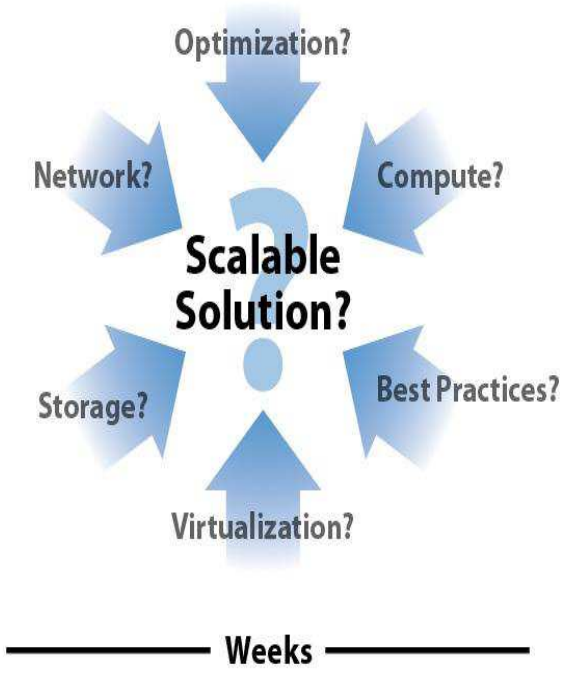
FastPath Solution Benefits

- Rapid provisioning of infrastructure and desktops
- Simplified procurement with transparent pricing
- Enhanced security
- Modular and scalable virtual desktop growth
- Resilient and validated architecture
- Seamless support extended to VMware View™

FastPath SIMPLIFIES OPERATIONAL COMPLEXITY

Without Vblock™ FastPath



Over 40 complex interdependent steps.

With Vblock™ FastPath

Two steps and you are good to go.

It is really this simple…

- Receive a pre-configured, pre-validated, pre-integrated VMware View optimized Vblock
- Provide power, cooling and connectivity!
- Launch the web-based software and input network/domain values
- Upload a Gold Image
- Desktops Deployed!!!

VMware-VCE *AlwaysOn* Desktop

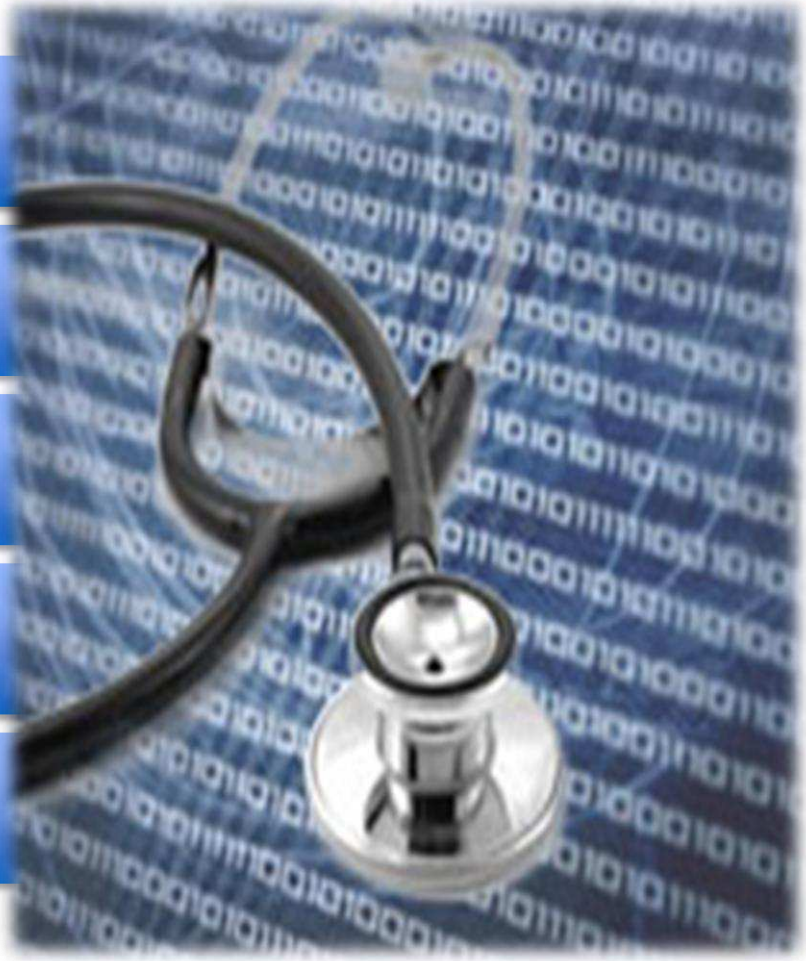
Meets the Reliability & Accessibility Needs of Clinicians

- *Always On, Fast Logon*
- *Follows User*
- *Any Device*
- *Familiar Interface*
- *All apps on same desktop*

VMware-VCE *AlwaysOn* Desktop

Meets the Management & Administration Needs

- Quickly Provision
- Easily Manage
- Maintain Security
- Lower Costs
- High Availability



VMware-VCE *AlwaysOn* Point-of-Care Platform

Use Case Rationale:

- Healthcare providers and caregivers require very high availability of desktops and apps, because most activity on their desktop is related to time-sensitive delivery of patient care
- A large segment (30%-40%) of the desktops in a typical provider environment are located in the following areas:
    - Exam Rooms
    - Emergency Rooms
    - Operating Rooms
    - Nurses Stations
    - Carts on Wheels
- Every device must support anyone from the clinical staff as they perform their routine clinical functions – i.e. no embedded personal context (shared usage mode)
- Experience must be fast, secure, HIPAA compliant, include access to all primary applications

VMware-VCE *AlwaysOn* Desktop Business Drivers

- Increasing adoption of EHR causing rapid increase in distributed locations where point-of-care desktops MUST be available
- Tier-1 critical desktop requires fast recovery and application continuity during disasters of any kind
- Point-of-care access must be more fluid than traditional PC experience, especially in transitioning successfully after a disaster
- Session mobility is a required feature tied to patient care and clinical productivity – VDI is the only way to meet this requirement
- Ideal opportunity to rapidly roll-out a fully managed desktop platform
- Effective way to implement managed printing service

Disaster Recovery Concerns

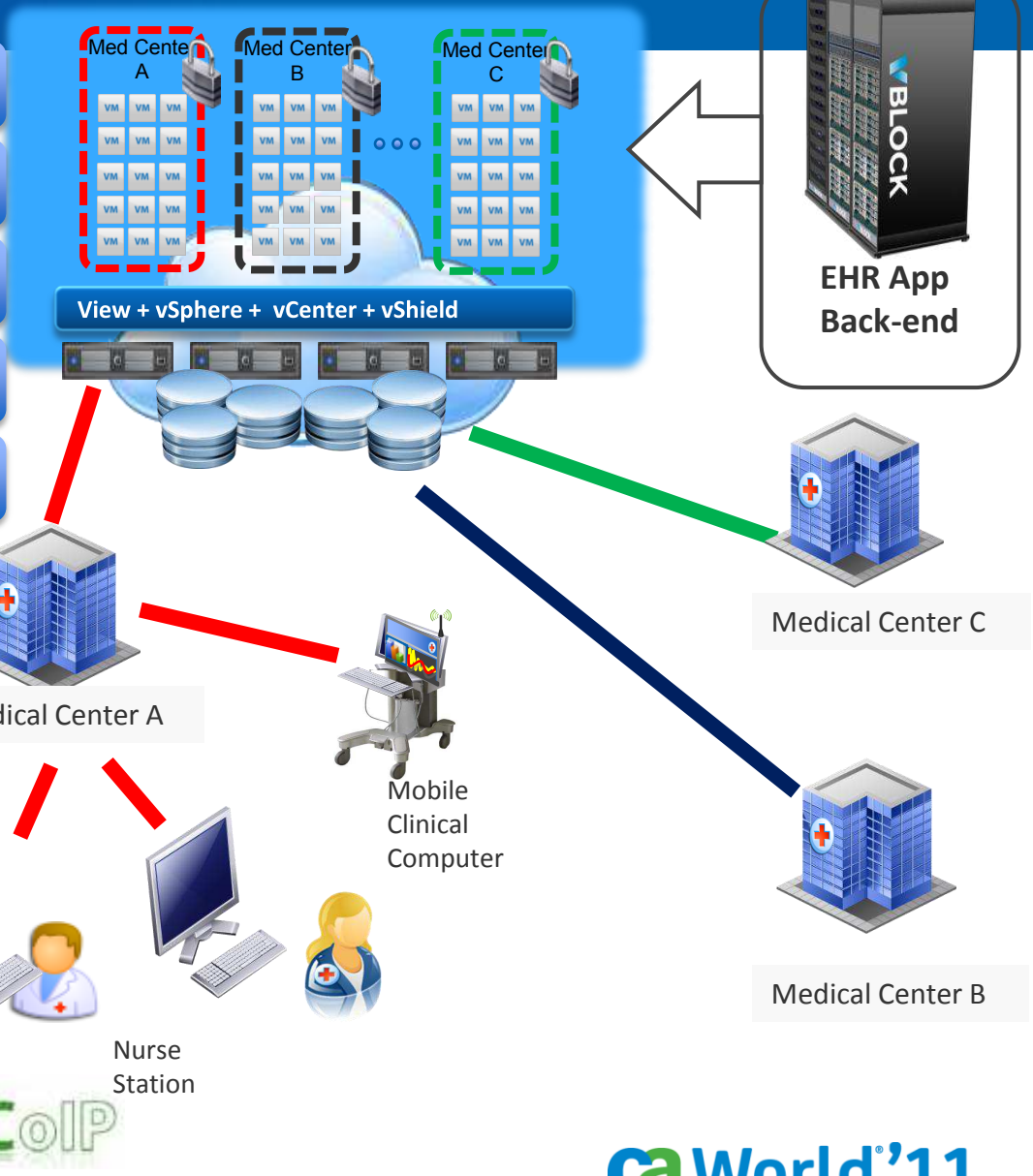
- Uptime - Corresponds closely to RTOs. DR solutions should offer quick restores with minimal or no manual steps after the recovery
- Reliability - Corresponds closely to RPOs. Addressing database transactional consistence, avoiding corrupted file systems, and ensuring systems boot when restored are key to addressing this concern
- Cost – Solution need to be affordable. The cost of many different software solutions or replicating storage arrays can prevent DR solutions from getting off the ground
- Complexity - How to reduce complexity? How many different systems are involved with the strategy? DR plan typically is thick and complicated in procedures

AlwaysOn Desktop Answers…

- Uptime – Full desktop recovery including application SSO in seconds
- Reliability – Running Active-Active configuration with identical stateless desktop golden image and profile replication to ensure full application access
- Cost **–** Full redundancy with master image cross replication. Applicable to full range of hardware
- Complexity **– Simple components deployment from VCE and ISVs**
  - Complete end-to-end solution from load-balancer configuration to application HA
  - Covers the use cases for 3rd witness site and SaaS application hosting
  - Cross stateless desktop master image replication and consistent compose / recompose policy from View Manager

VMWARE-VCE *ALWAYSON* DESKTOP USE CASE

- Non-Persistent Desktop Usage
- Multiple Active-Active View Sites
- Web or Server Based Apps
- App Servers Outside Scope
- Profile Management May Be Desirable



AlwaysON Technical Architecture & Design

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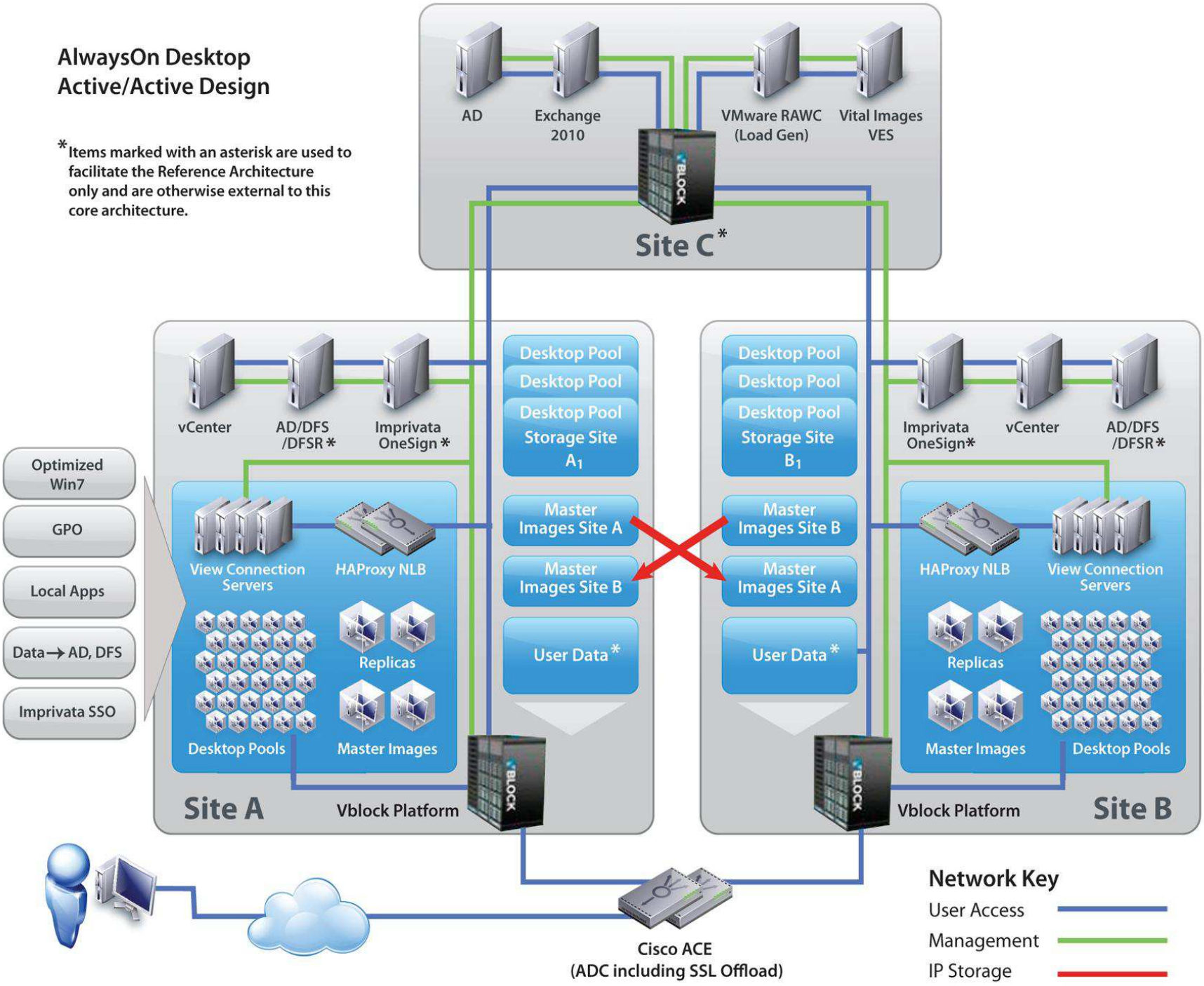
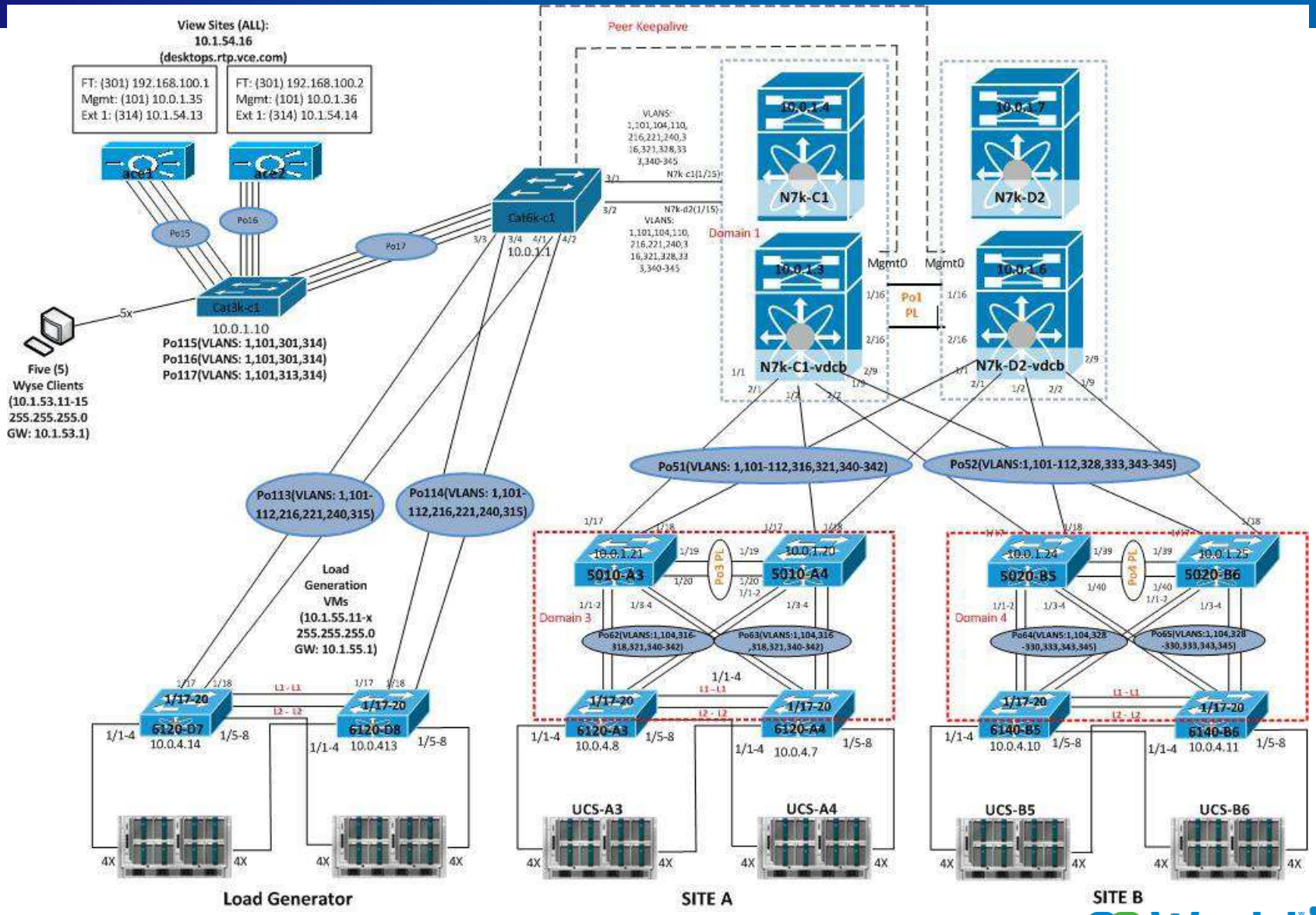
AlwaysOn Desktop Active/Active Design

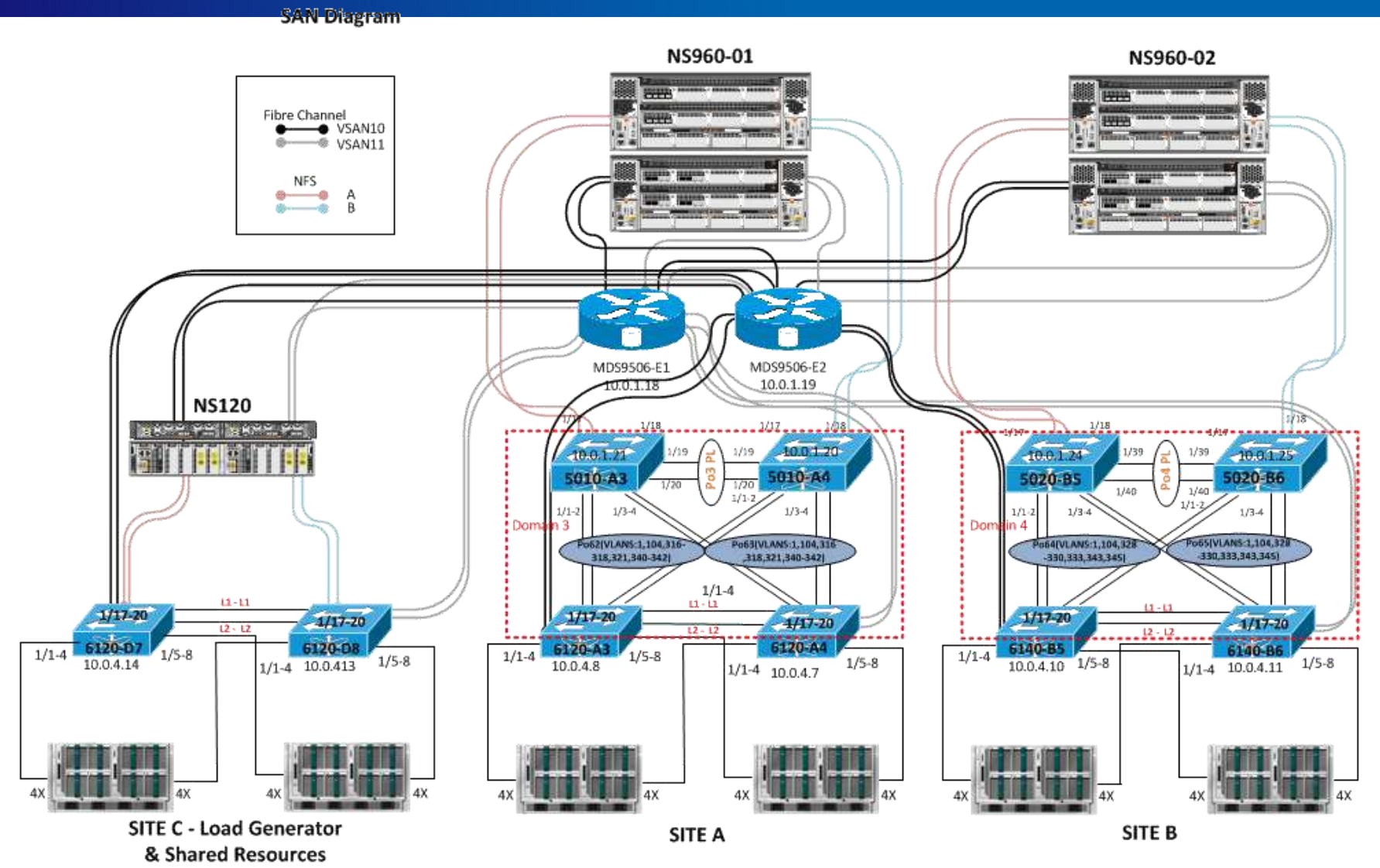
*Items marked with an asterisk are used to facilitate the Reference Architecture only and are otherwise external to this core architecture.



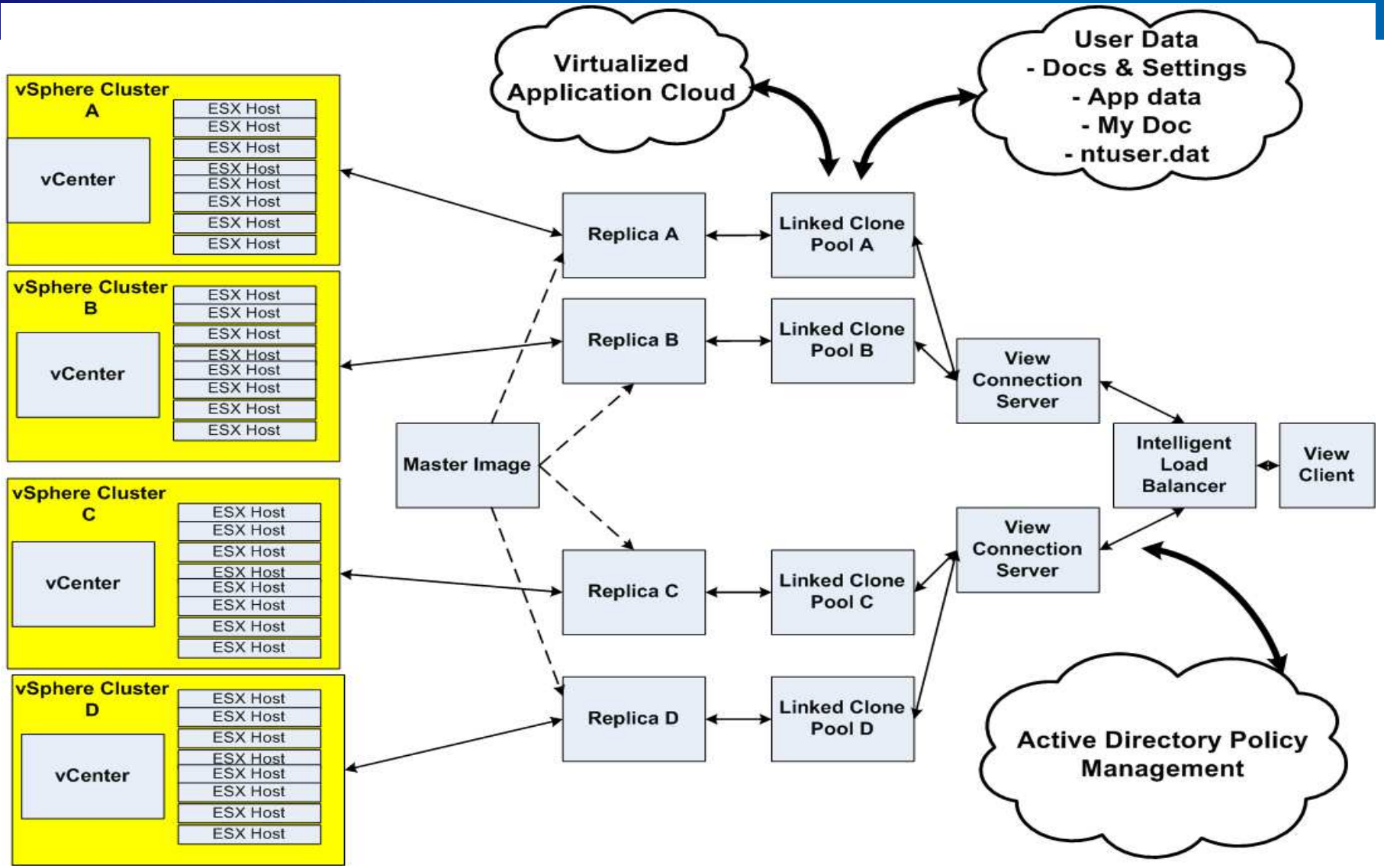
AlwaysOn Desktop Network Diagram



AlwaysOn Desktop Storage Diagram

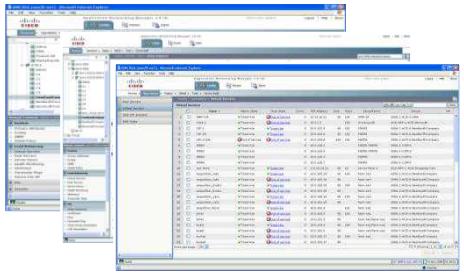


SHARED CLINICAL UTILITY DESKTOP – COMPONENT ARCHITECTURE



ACE Module, Appliance & ANM
Virtualized Product for A Virtualized Data Center

ACE Module & Appliance



Application Networking Manager (ANM)

Service Delivery
- Integrates load balancing, server offload, compression, app optimization & app security

Virtualized Architecture
- Industry proven virtualized Application Delivery Controller (ADC)

Investment Protection
- "Pay as you grow" licensing model. increase performance & scale without deploying new hardware

Established Product
- Introduced 3+ years ago, over 18000 units deployed

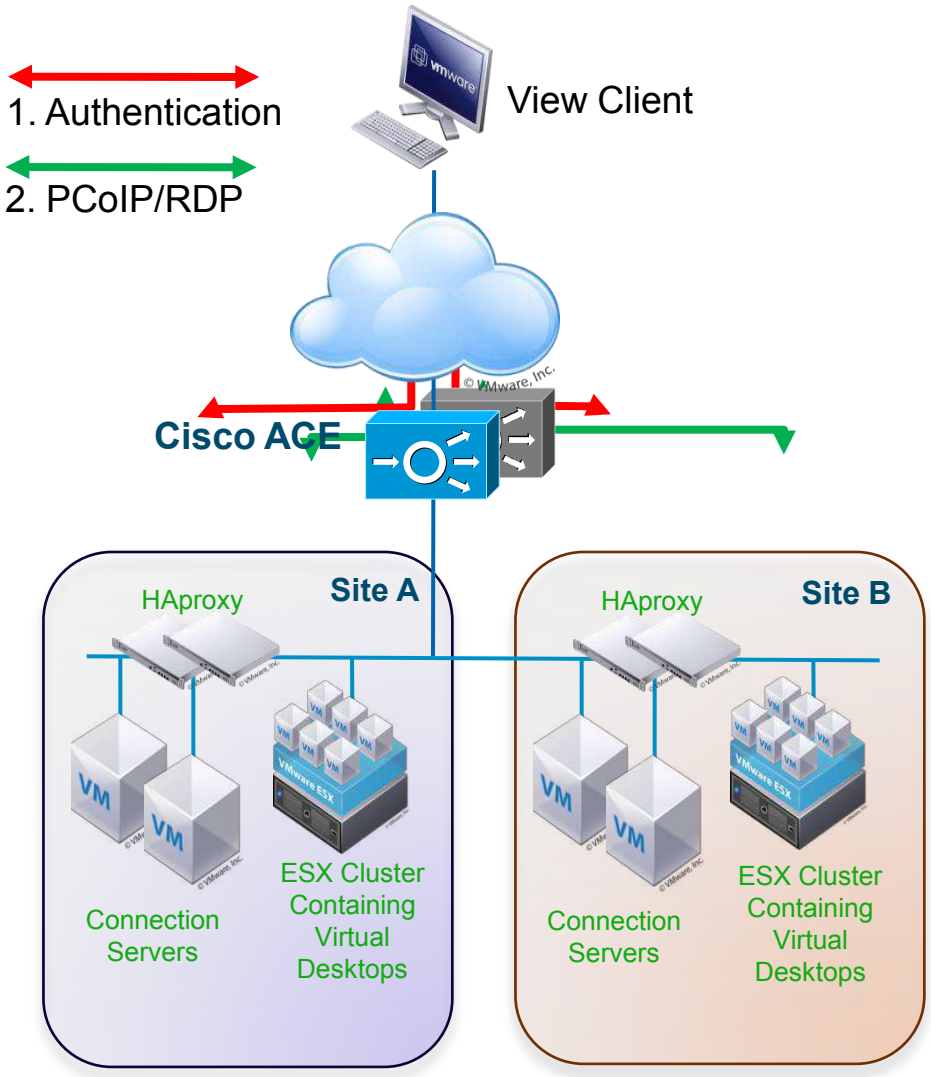
Centralized Management
- Configuration, operations, and monitoring of ACE equipment & services

Simplified Management
- GUI-driven ACE multi-service, virtualized provisioning, configuration, maintenance

Operations Excellence
- Secure delegation of service & server tasks for ACE, CSS, CSM, GSS

IT Agility
- Granular role based access control with user activity logging supports managing multi-tenant/use

AlwaysOn Desktop deployment with Cisco ACE



- User connects to a virtual IP address configured on the Cisco ACE
- Health monitoring of VMware View Connection Servers - direct the user request with the best performance and availability
- Session persistence - based on client IP address
- ACE performs SSL termination – offload CPU intensive task from the VMware View Connection Server
- High Availability – stateful redundant active-standby replicates both connection and persistence information

“Follow Me Desktop” Across Clusters and Sites

Nurses Station Desktop

Wireless WOW Thin Client

Laptop Remote Physicians Office

Multiple OneSign Appliances with HA configuration

- Sustains site failover and with continuous SSO within seconds

Streamline Workflow – Tap and Go

- User taps badge or swipes finger to reconnect to desktop
- Single click SSO to all Clinical Applications
- User disconnects from desktop with card tap
- Desktop maintained on server as user roams

Also Includes

- Password Management/Reset
- Automatic Compliance Reporting
- Support for various authentication modalities
- Re-authentication support for ePrescribing

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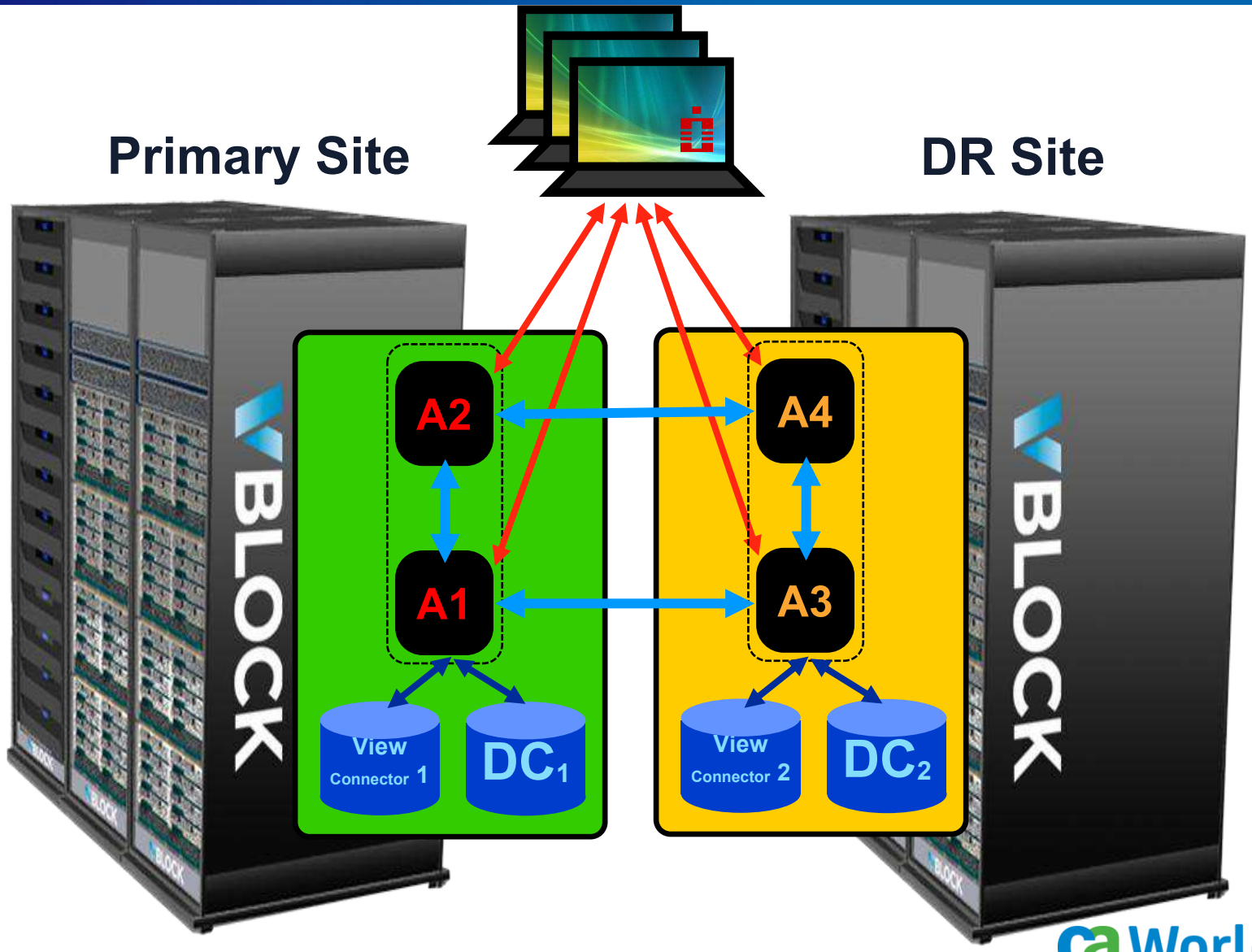
Imprivata SSO for Failover and Redundancy

- OneSign Enterprise
  - Cluster of 4 active appliances over 2 sites
  - Connected over LAN & WAN
  - DB is replicated & synchronized
  - Agents can failover across WAN
- High end-user performance (400 Users)
- Hot-standby DR
  - No action required by the end user
  - Instant switch over to disaster recover

Distributed Primary & DR Implementation



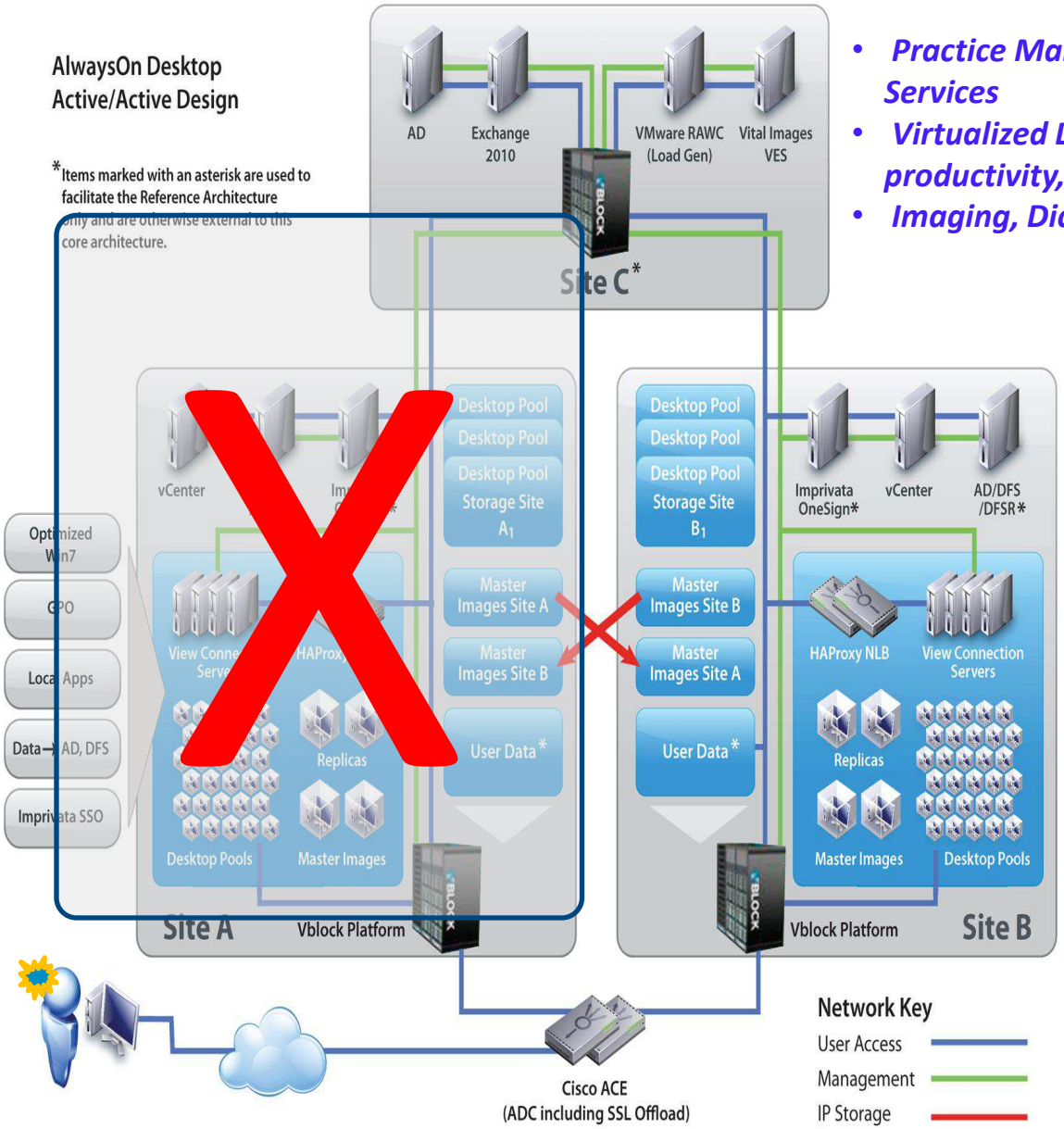
AlwaysOn Desktop Logical Diagram

User Initial Connection to Site A

Site A Fails

View Session Fails

User Reconnects to Site B



- ***Practice Management / EHR Services***
- ***Virtualized Desktops, Office productivity, Mail***
- ***Imaging, Dictation, Billing***

Extending AlwaysOn to Multi-Site

- Design Considerations
  - Symmetrical or Asymmetrical
    - Symmetrical is simpler, keep scaling Reference Architecture
    - Asymmetrical may be more cost effective
      - Careful design & impact analysis necessary
      - Site failures can result in some users without desktops according to design
  - Storage Replication
    - Simple to extend NFS based replication to additional sites
    - FC synchronous or asynchronous available options
  - Load Balancing
    - Current design uses incoming IP of client for site direction
    - This must be mapped to user pools and entitlement during design
      - For an asymmetrical design,
        - number of failover sites per source IP is variable
        - Number of user entitlements per pool is variable
      - This provides or a financial model of resiliency value.
        - Critical Desktops can have multiple failure protection

AlwaysOn Asymmetrical Example

Site A	Site B	Site C
Doctors 100	Doctors 100	Doctors 100
Nurses 100	Nurses100	Nurses 50
Diags 100	Diags 100	Diags 50
Admin 150	Admin 50	Admin 50
Doctors 100	Doctors 100	Doctors 100
Nurses 50	Nurses 50	Nurses 20
Diags 30	Diags 30	Diags 10
Admin 10	Admin 30	Admin 10
Doctors 50	Doctors 50	Doctors 50
Nurses 30	Nurses 20	Nurses 50
Diags 20	Diags 20	Diags 20
Admin 5	Admin 5	Admin 15

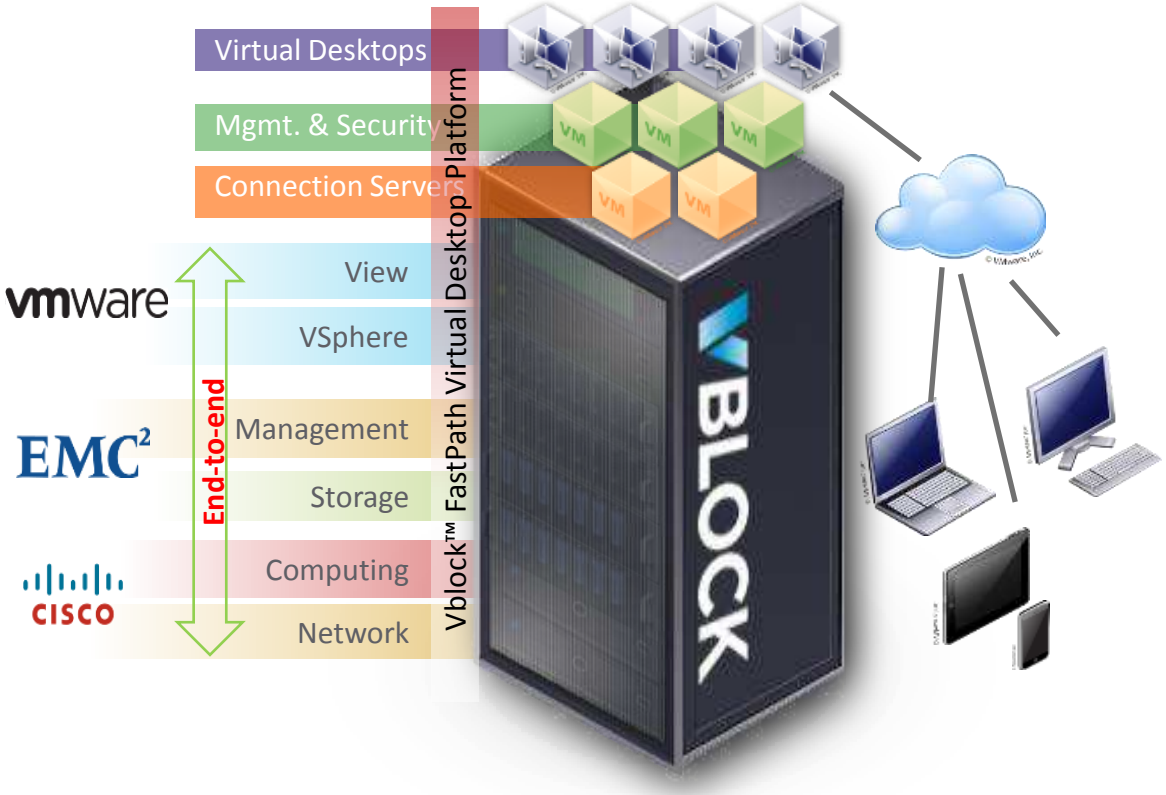
Variables

- Incoming IP
- User
- Primary Site

Site Users

FastPath Technical Architecture & Design

The Complete Solution – Vblock™ FastPath Virtual Desktop Platform



Enterprise-class, 1000s of Users

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Price Transparency

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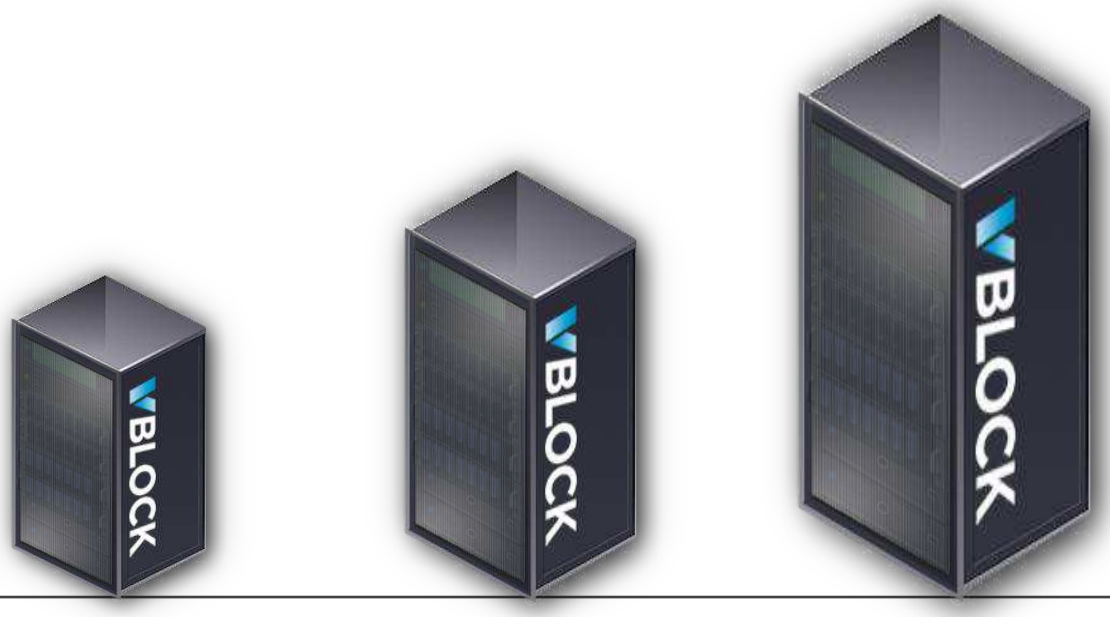

500 Concurrent Users	1000 Concurrent Users	1500 Concurrent Users
6 Blades	12 Blades	16 Blades
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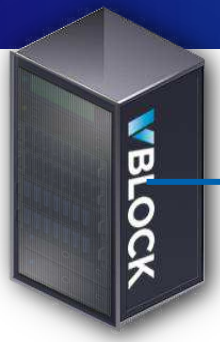
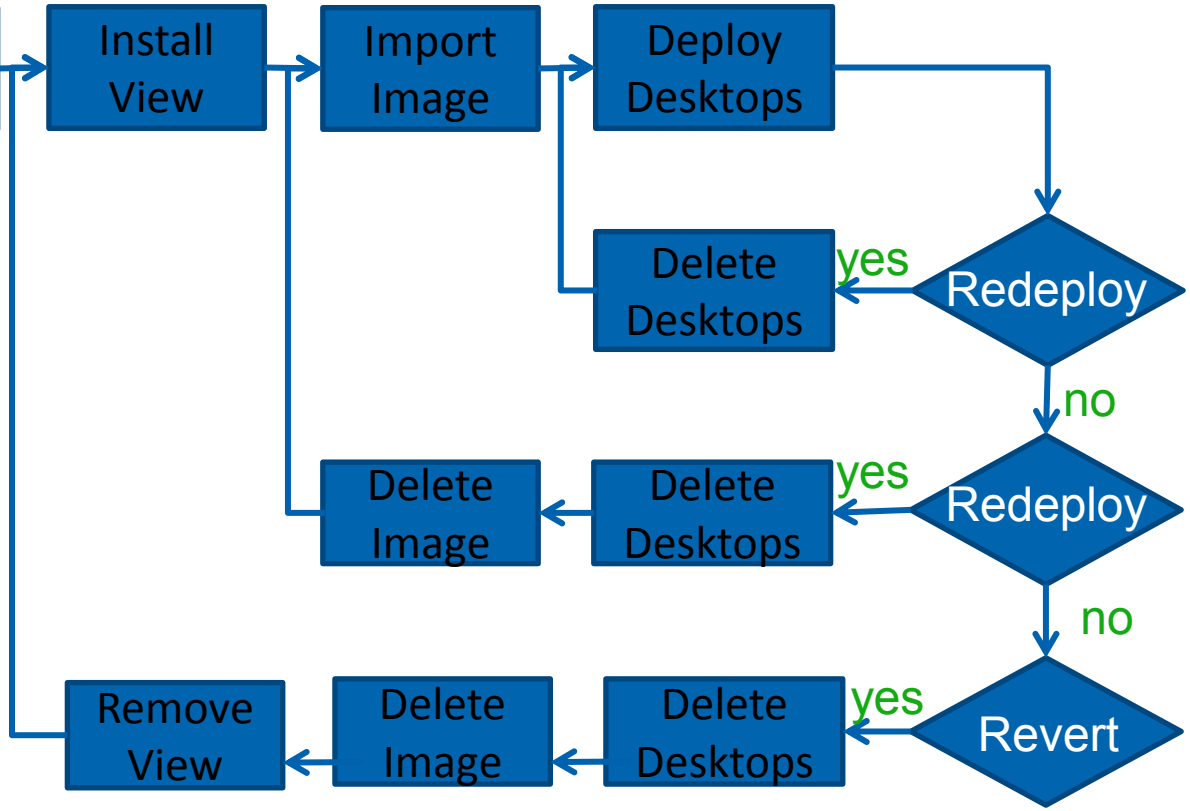
Overview of Field deployment (Quick and easy)

- Connect Nexus 5K in customer network
- Power on Vblock and wait until all the components to boot up
- Connect any laptop in to CAT 3560 switch present in the AMP and point browser to the wizard link
- Perform initialization and deployment operations using FastPath wizard
- Done!!!! Virtual Desktop environment is ready to use ☺ (within a few hours instead of days or weeks)

Core workflows for the FastPath wizard



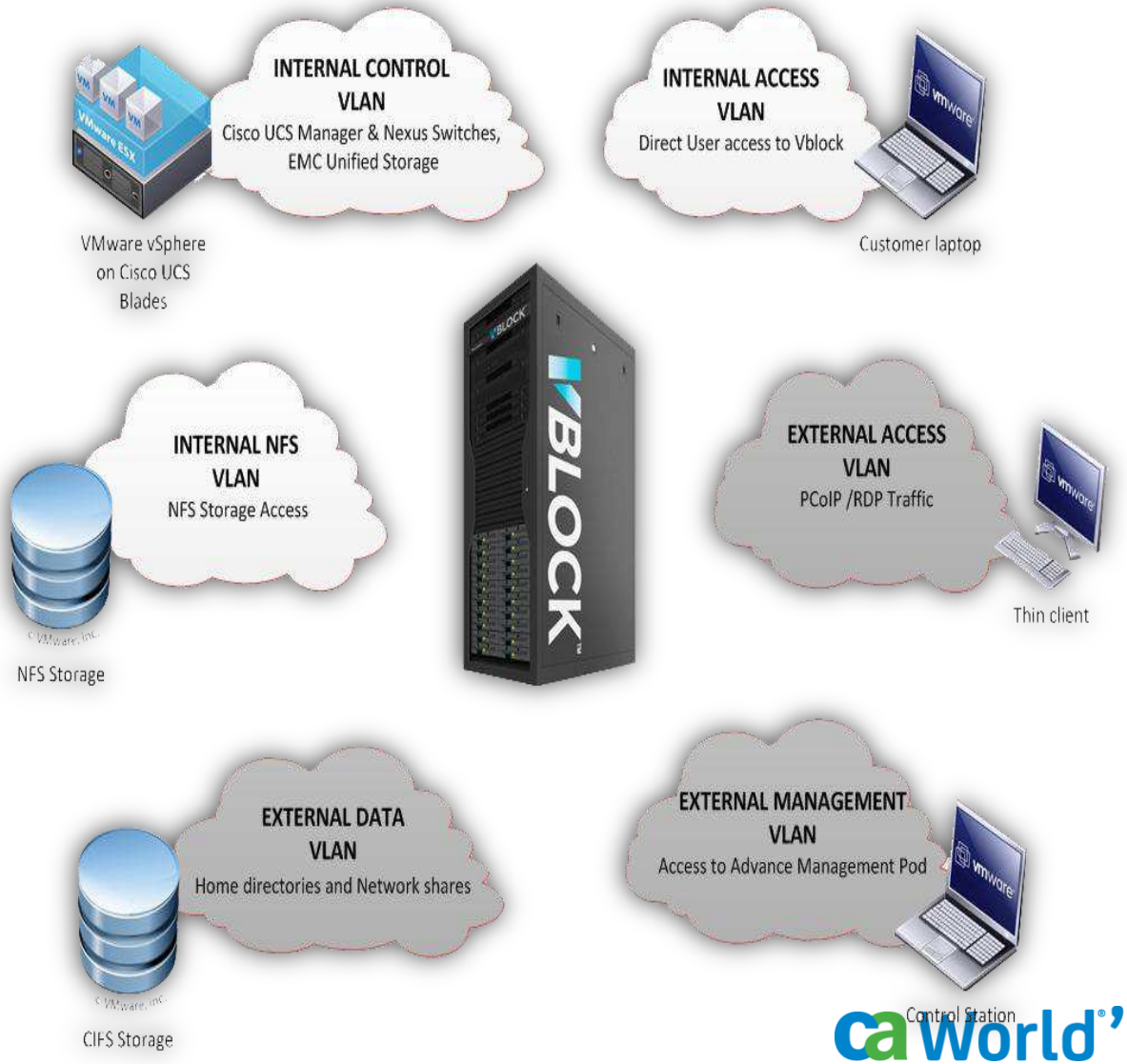
- System Initialization
- Install and Configure VMware View Environment
- Gold image Import
- Desktop Deployment
- Desktop Deletion
- Factory Reset



AUTOMATED OPTIMIZED LOGICAL CONFIGURATION

- Software automates network configuration and provisioning tasks
- Follows proven best practices!
- Reduces the time, effort and cost

4 Easy Steps:
- Initialization
- Installation
- Configuration
- Reset



Vblock™ FastPath Deployment
Initialization, Installation and Configuration

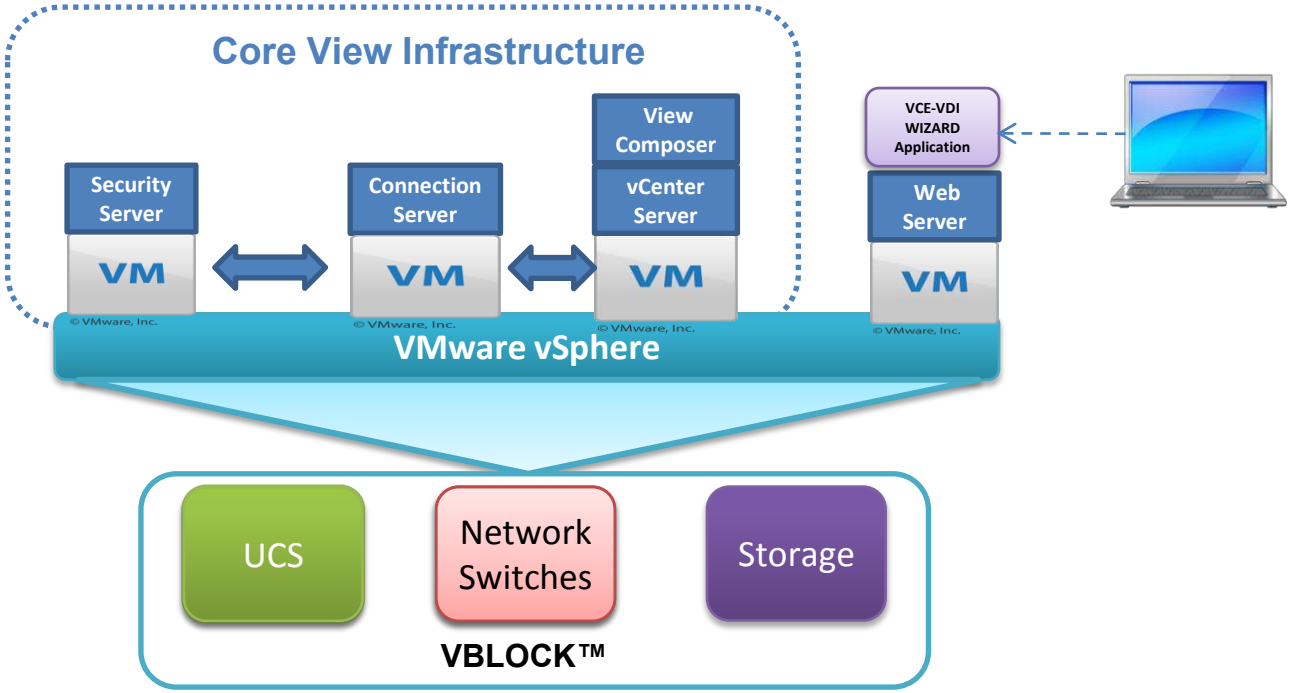
1) Add customer network information on Nexus switches

2) Add Customer network information on Cisco UCS fabric interconnect switches

3) Add Customer network information on Cisco UCS service profile templates

4) Configure VMware vSphere infrastructure components

5) Configure VMware View infrastructure components to work with each other and rest of the infrastructure

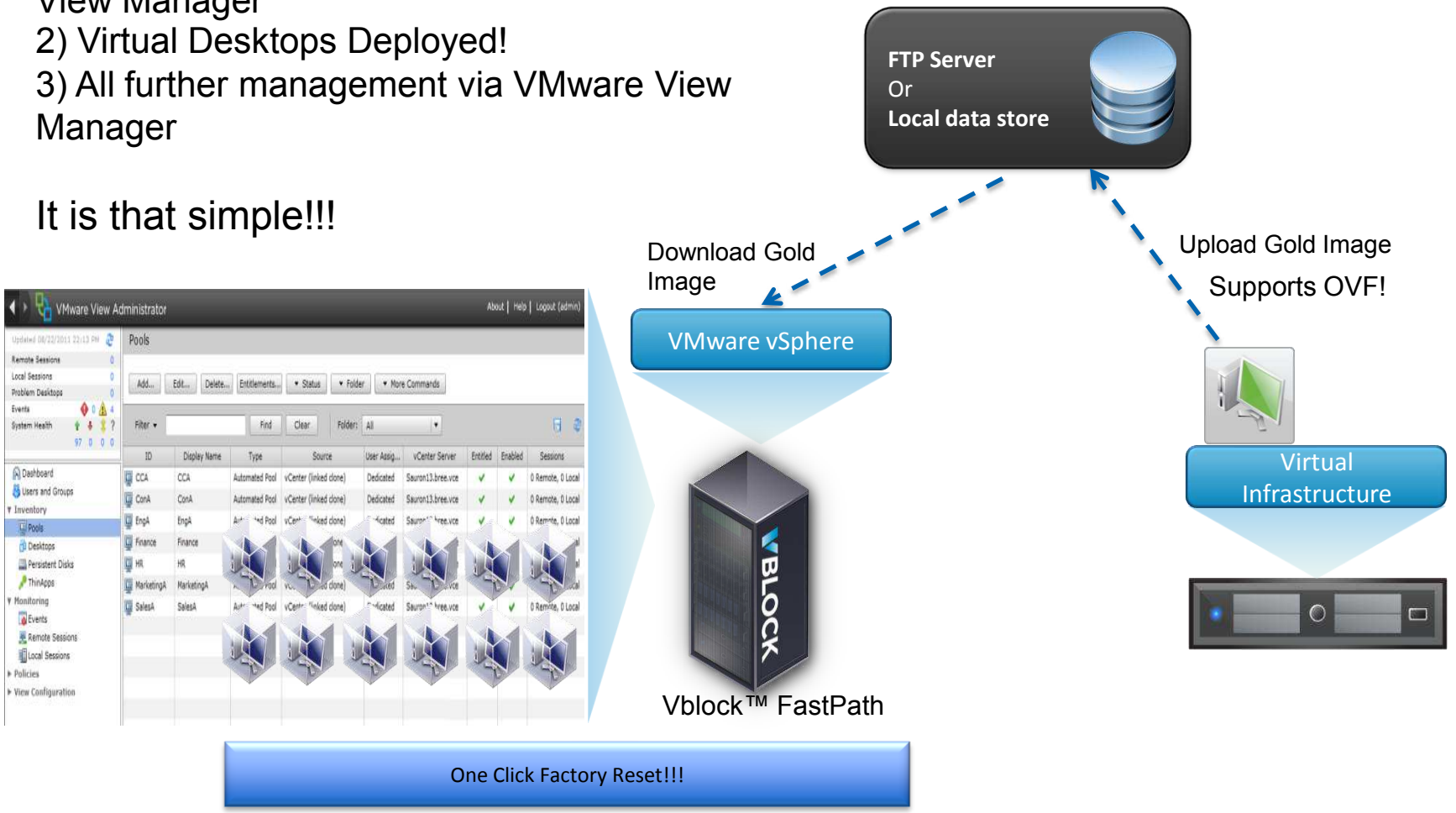


Entire Operation takes less than 75 minutes!

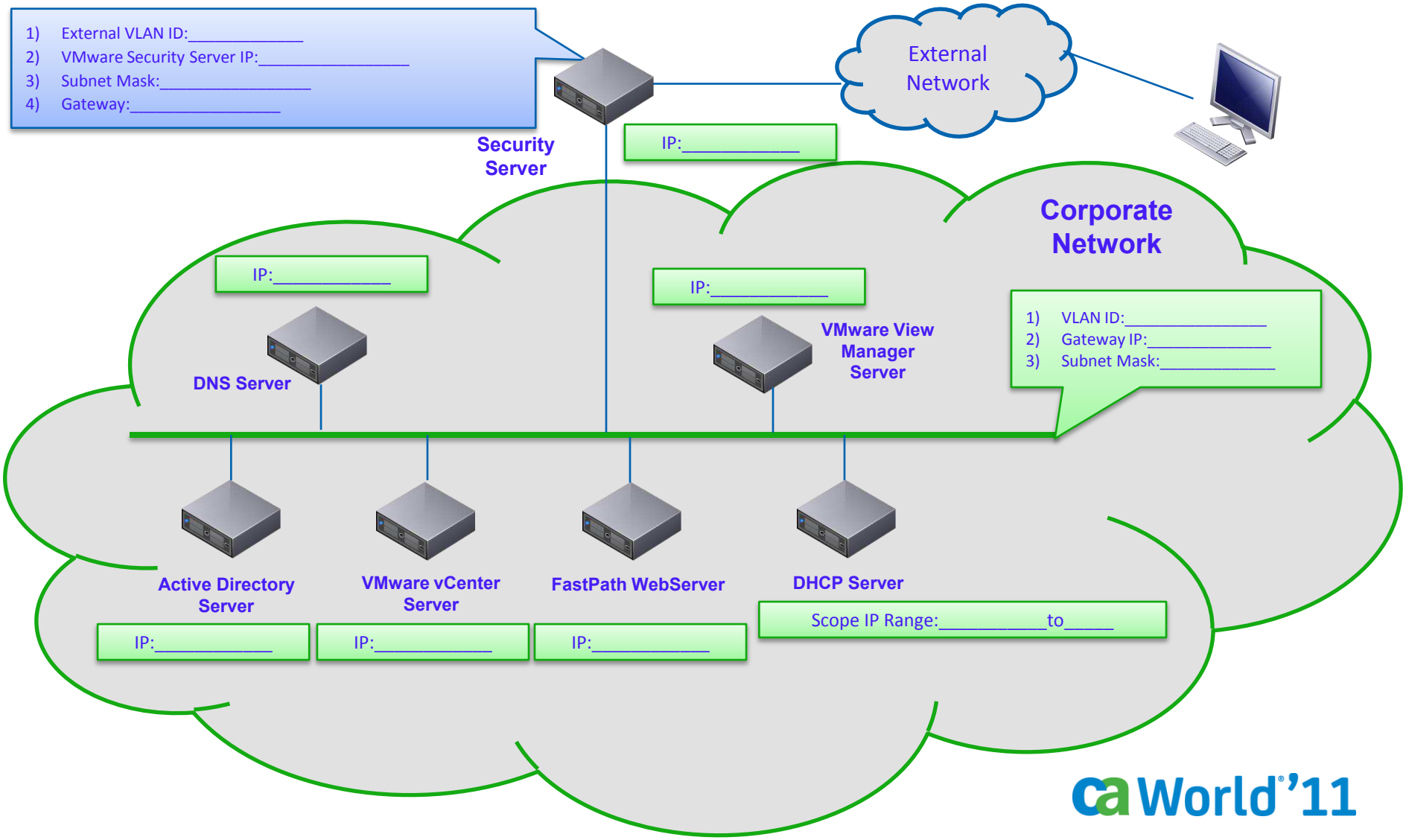
Vblock™ FastPath Deployment Software:
Rapid Desktop Deployment

1) Supply the Gold Image to FastPath Wizard / or View Manager
2) Virtual Desktops Deployed!
3) All further management via VMware View Manager

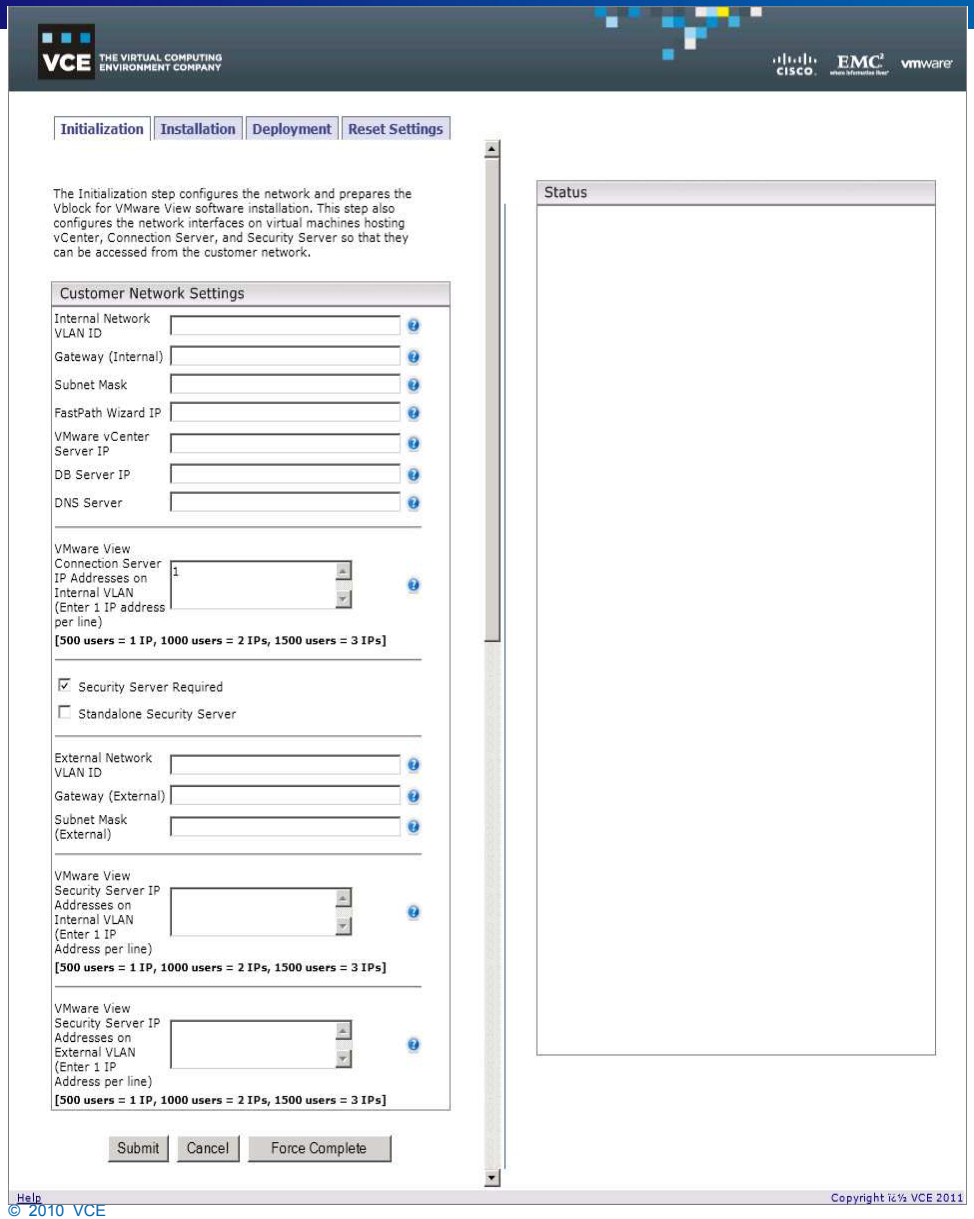
It is that simple!!!



SIMPLE SITE PREP SURVEY:



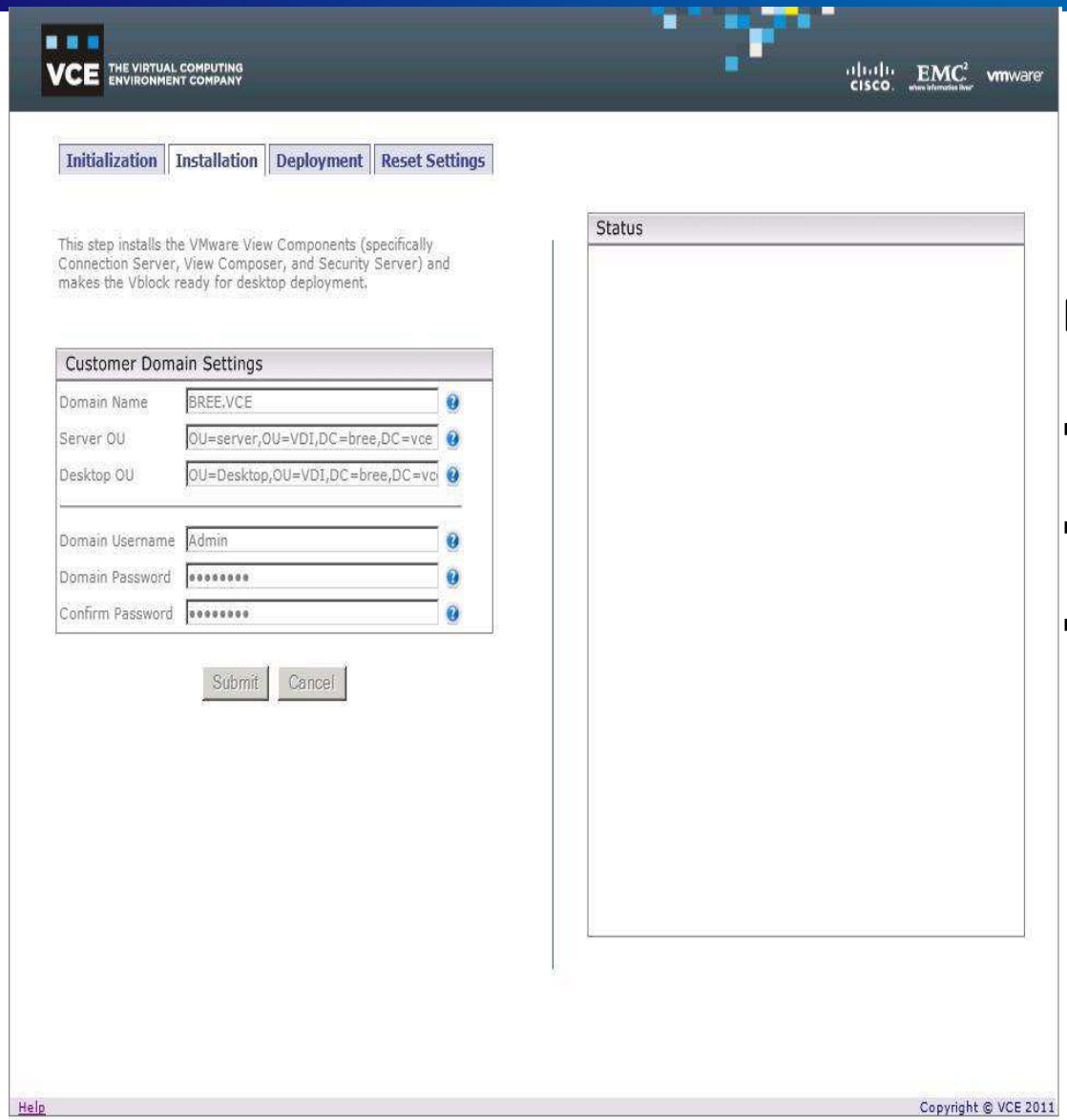
… INITIALIZATION…



Behind the scenes: (Best Practices!)

- Vblock™ Platform Configuration
- Network Configuration (FC/10GB/FCoE)
  - Internal and External Connectivity
  - Data/Access/Control Plane Definition
- UCS Compute and ESXi Configuration
- Storage, PowerPath, NFS Configuration
- Active Directory, DNS, DHCP Integration

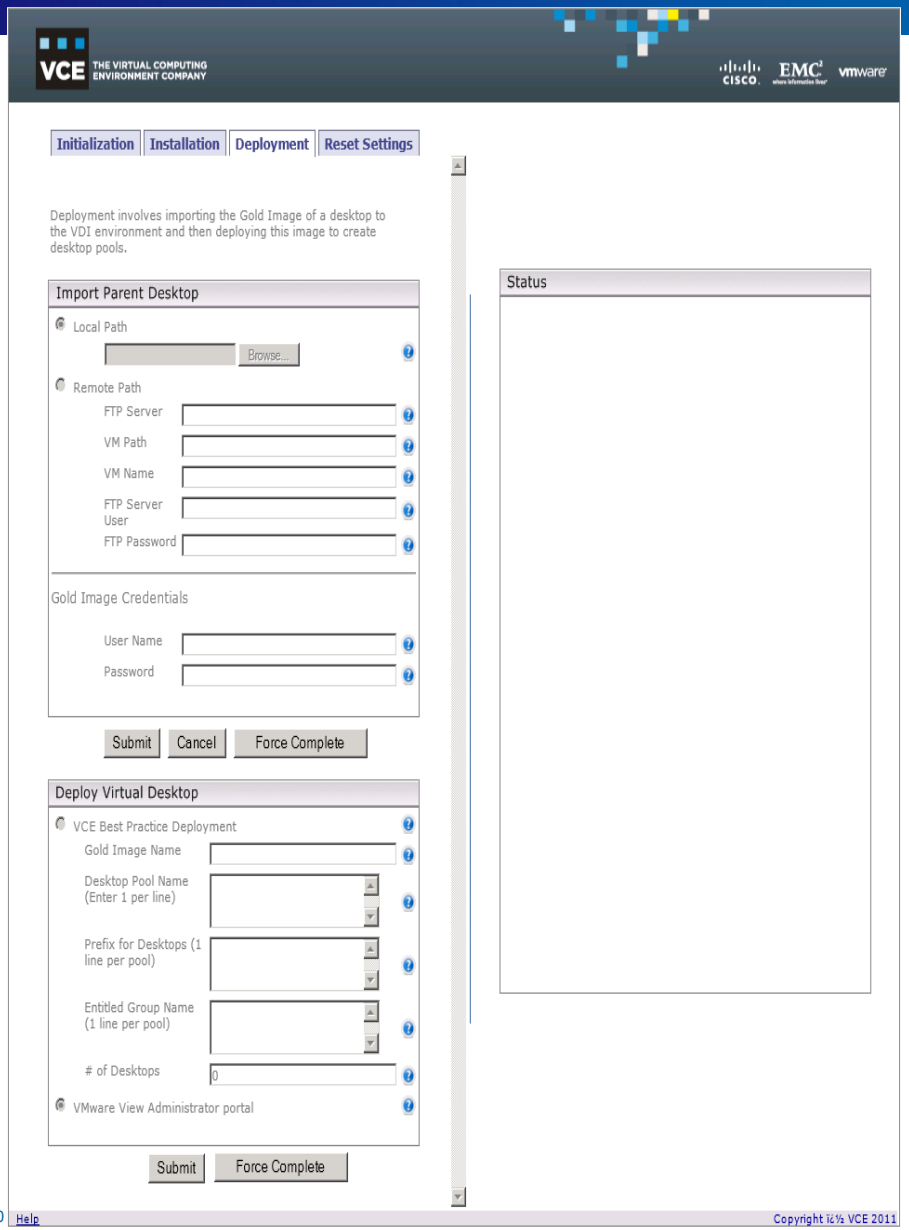
… INSTALLATION…



Behind the scenes: (Best Practices!)

- Virtual Infrastructure Creation and Integration
- VMware View Installation and Configuration
- Connection Broker/Security Server Integration

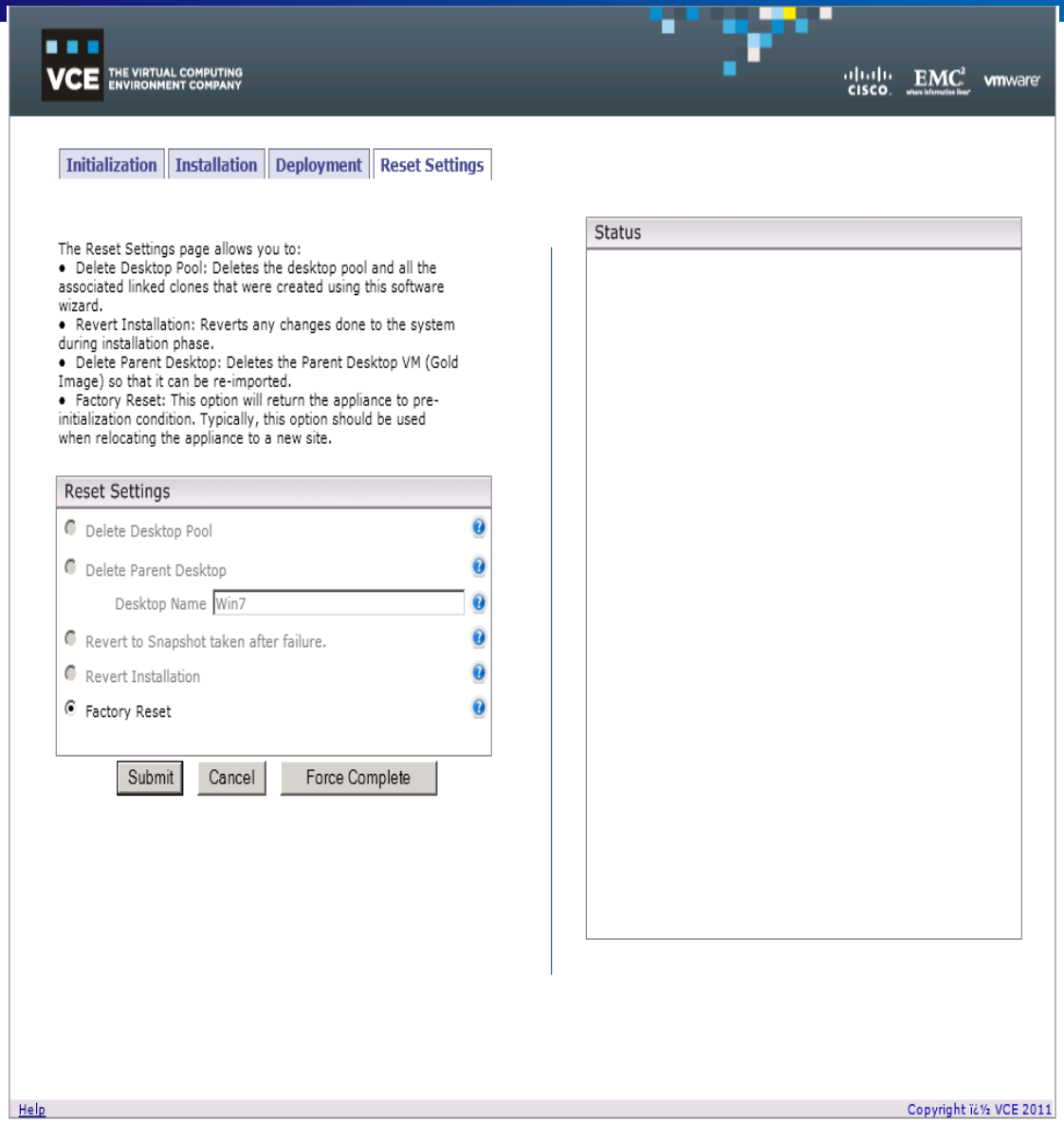
… DEPLOYMENT …



Behind the scenes: (Best Practices!)

- Data store layout for Virtual Desktop Users
- Gold/Parent Image Import and prep for replica
- Virtual Desktop deployment
- View Manager hand-off

… RESET/RECLAIM …

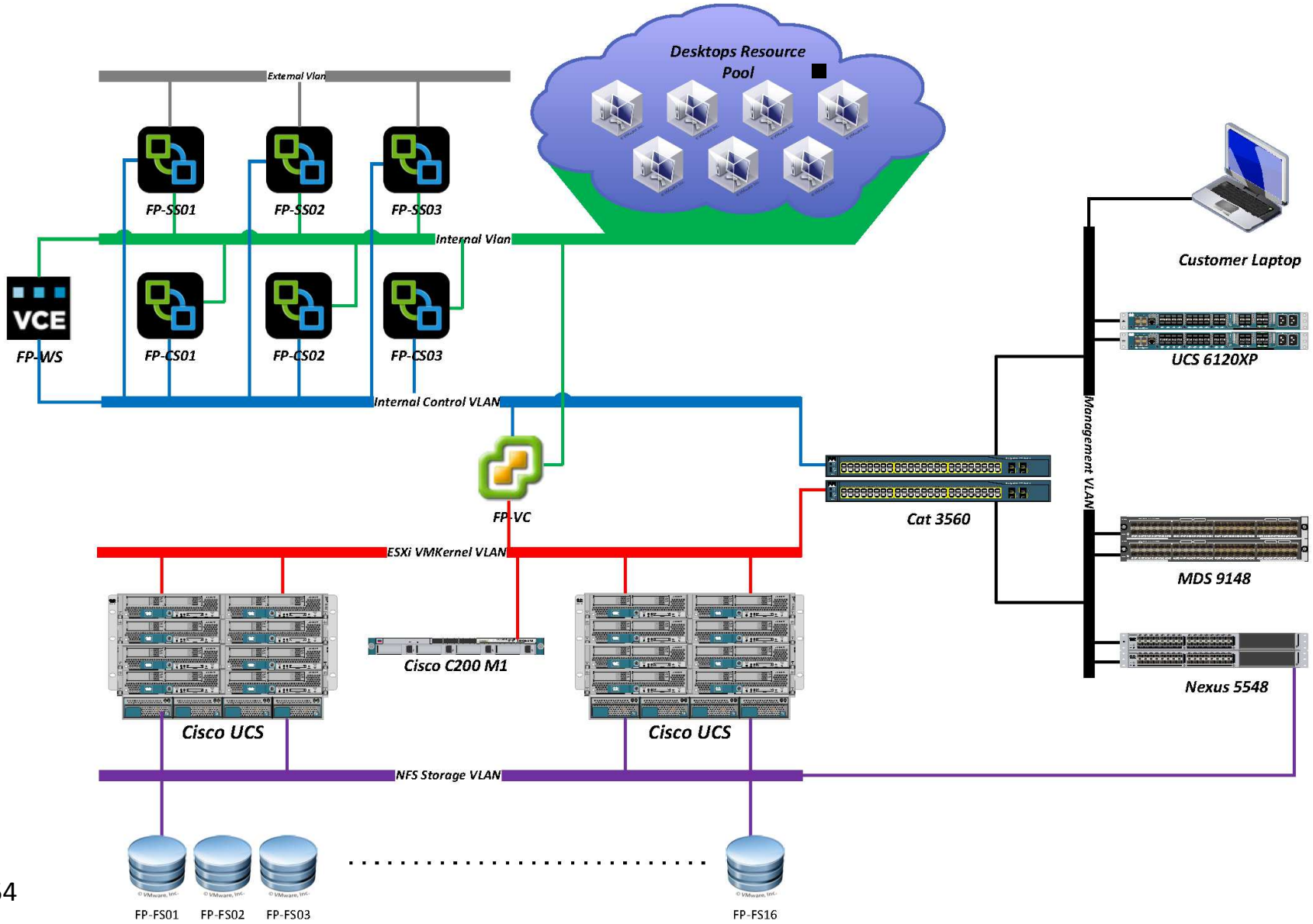


Behind the scenes: (Best Practices!)

- Delete desktop pools and redeploy a different gold image while maintaining configuration
- Reset FastPath to factory settings

Vblock™ FastPath Logical Diagram

Rapid Desktop Deployment



FastPath

Desktop Sizing Assumptions

Virtual Desktop Requirements and Assumptions, taken from Use cases (page 34-35)	
Operating System	Microsoft Windows 7 (64 bit)
vRAM per desktop	2GB
Desktop base image size	20GB
vCPUs per desktop	1
Estimated IOPS per desktop (Max)	Range from 15-25 IOPS, at the high end. Based on the VCE Solution Architecture, a knowledge worker type desktop required an average of 22 IOPS. The below calculations are based on 25 IOPS per desktop so a high end configuration.
Estimated Desktop Read/Write Ratios	Starting at 90/10 during power up an logon, gradually changing to 20/80
Concurrency	Calculations based on 100% concurrency
Linked Clones or Full Clones	Linked Clones
Number of Linked Clones per Replica	Based on config: 547, 1200, and 1640 virtual desktops (87% concurrency)
Number of Linked Clones per datastore	125
Separate storage (LUN) for Linked Clones from Base image	No
VM Swap file storage location (LUN)	Can be separated or kept in same location

FastPath

Desktop Sizing Assumptions

- The majority of desktop environments would have a mixture of users using the appliance. For instance we can assume 20% Light, 50% Normal, 20% Power and 10% Heavy users.
- Assuming the following IOPs requirements based on the user types:
- Light user: ~6 IOPS per concurrent user. This user is working in a single application and is not browsing the web.
- Normal user: ~10 IOPS per concurrent user. This user is probably working in a few applications with minimal web browsing.
- Power user: ~25 IOPS per concurrent user. This user usually runs multiple applications concurrently and spends considerable time browsing the web.
- Heavy user: ~ 50 IOPS per concurrent user. This user is busy doing tasks that have high I/O requirements like compiling code or working with images or video.

Desktop Sizing (cont'd)

Using the above percentages on the appliance and our test results, within any given environment the 350 users would consist of the following numbers:

- 70 Light users
- 175 Normal users
- 70 Power users
- 35 Heavy users
- Total 350 desktop Users

Total IOPs can be calculated as follows:

- Loading IOPS = Light (.20*6) + Normal (.5*10) + Power (.2*25) + Heavy (.1*50) = 16.2 IOPs

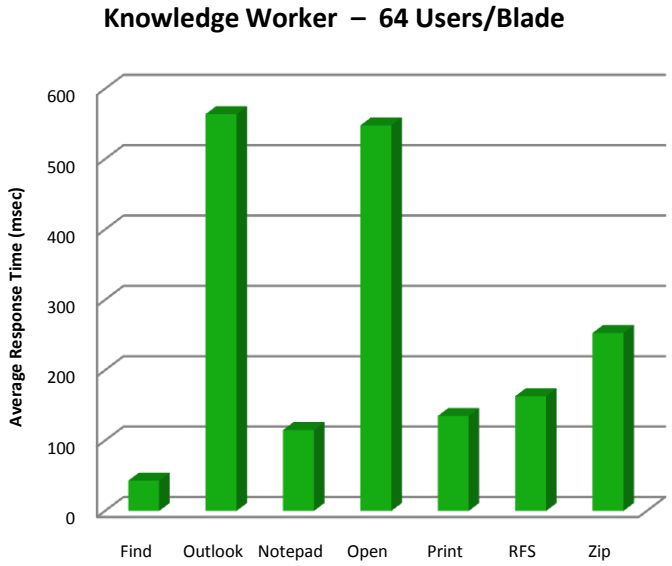
VALIDATED PERFORMANCE:
END USER APPLICATION RESPONSE TIME

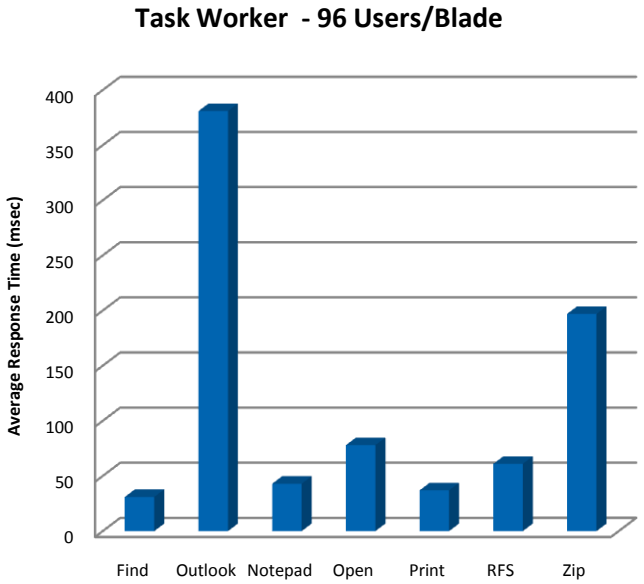
User Profile

- Windows 7 64-bit
- 2GB RAM, 1vCPU
- 22GB Application/OS Disk
- Withstand 22 Steady State IOPS

Applications Tested

- MS Word, PowerPoint, Excel
- MS Outlook
- 7-zip, PDF Reader, Web Browser
- Media Streaming





Vblock™ FASTPATH:

Desktop Sizing

- **Additional Assumptions**
- 64 linked Clones per Replica
- Each replica is 20GB in size (Windows 7 desktops).
- **Virtual Desktop Requirement**

- **OS: Win7 64-bit Desktop**
- Desktop Type: Thin (Linked Clones)
- Desktop Replica size: 20GB image
- RAM assigned to virtual desktop: 2 GB vRAM
- CPU(s) assigned to Virtual desktop: 1vCPU
- Read/Write Ratio: 40:60 (actually varies)
- Linked Clone Growth: 15%
- Assume Concurrency 87%
- Approx. 18 IOPs per desktop

Vblock™ FASTPATH:

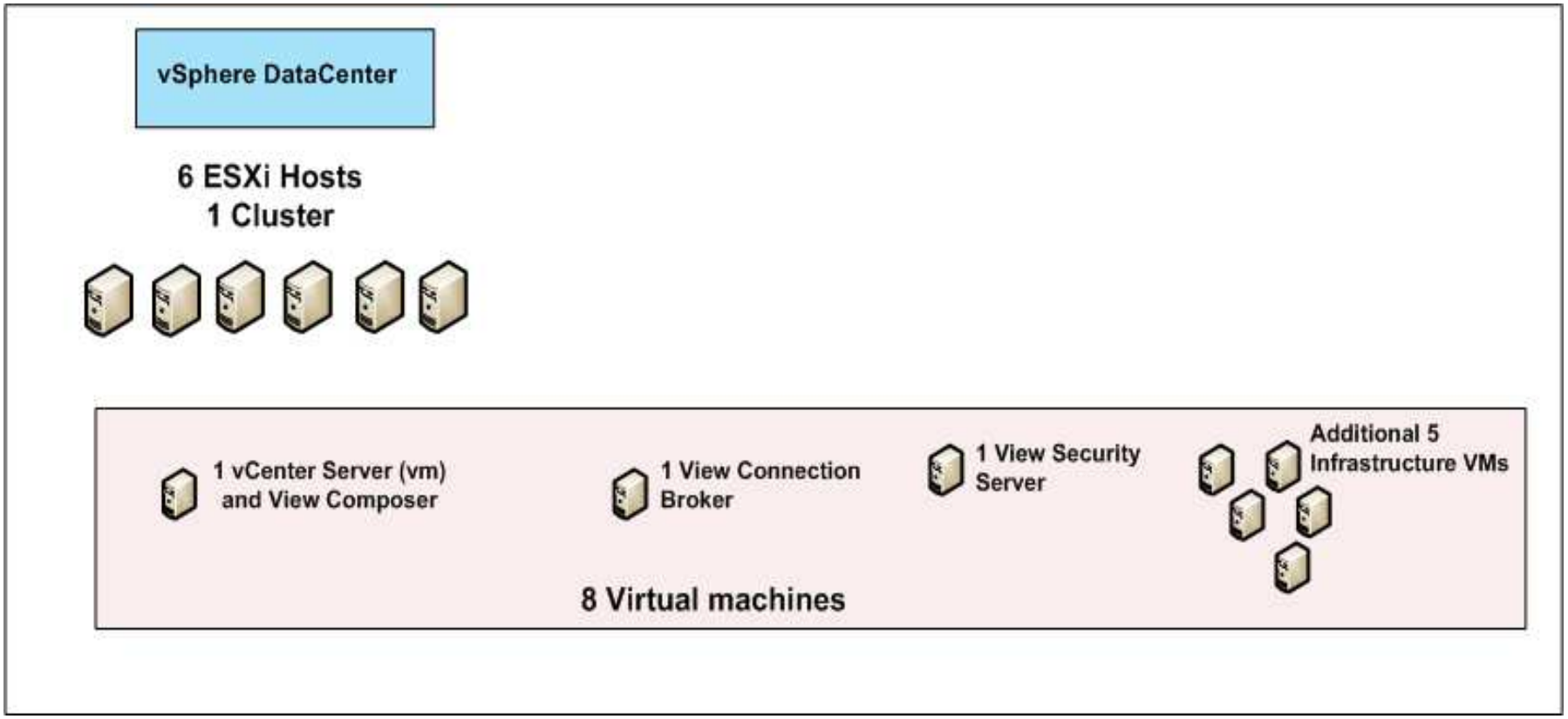
User sizing and Software Environment

- **User Related Data**
- User Profile size per user: 8GB per user.
- User data: stored on CIFs server (VNX)
- User data size: 5GB per user.

- **Software and OS**
- ESXi 4.1
- vCenter 4.1
- VMware View 4.6
- VMware View Composer

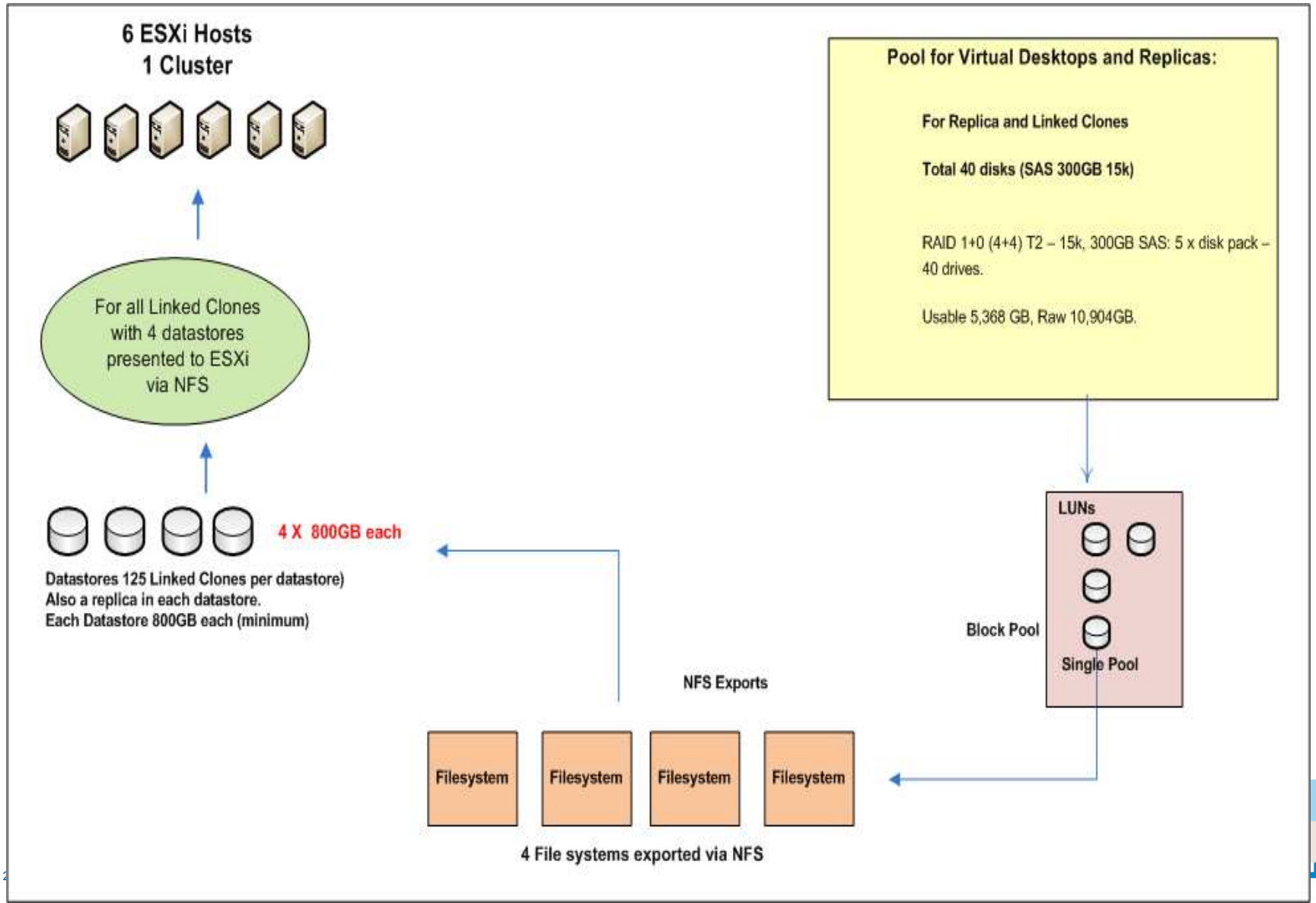
STORAGE LAYOUT

6 Blade FastPath Config, 500 Desktops,



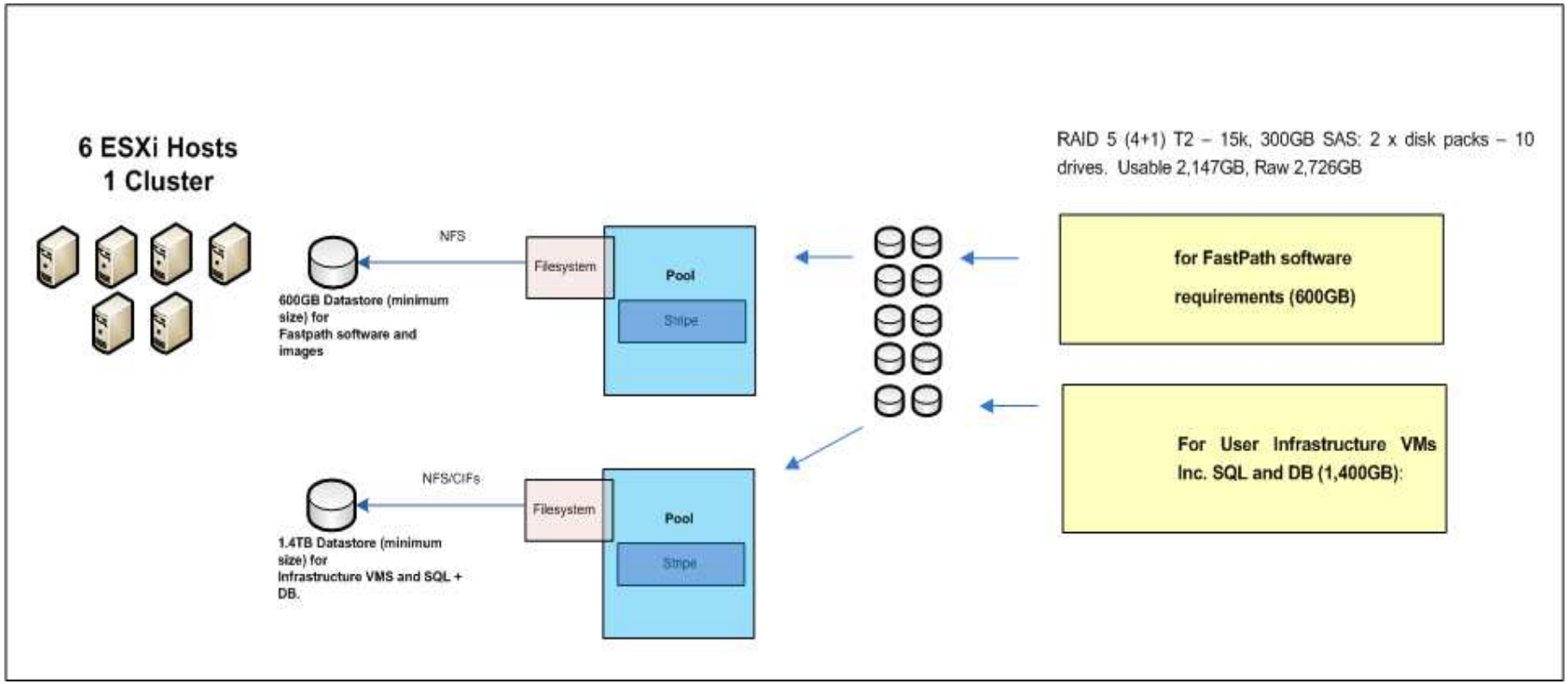
STORAGE LAYOUT

6 Blade FastPath Config, 500 Desktops,



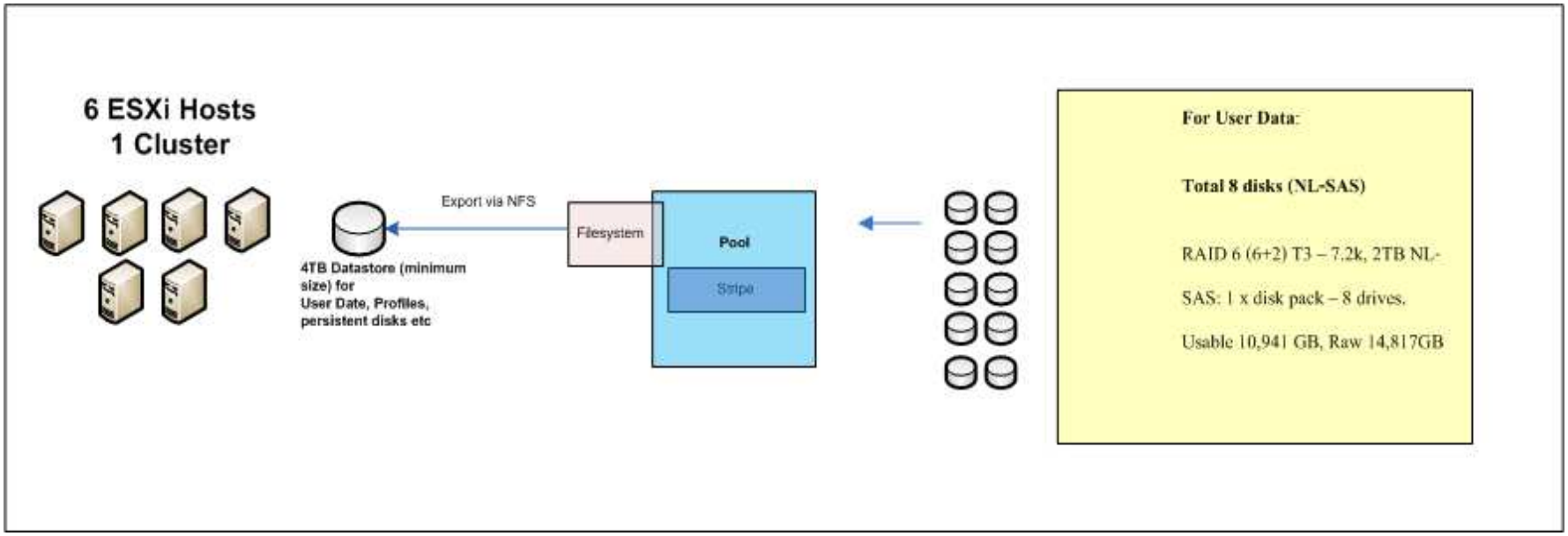
STORAGE LAYOUT

6 Blade FastPath Config, 500 Desktops,



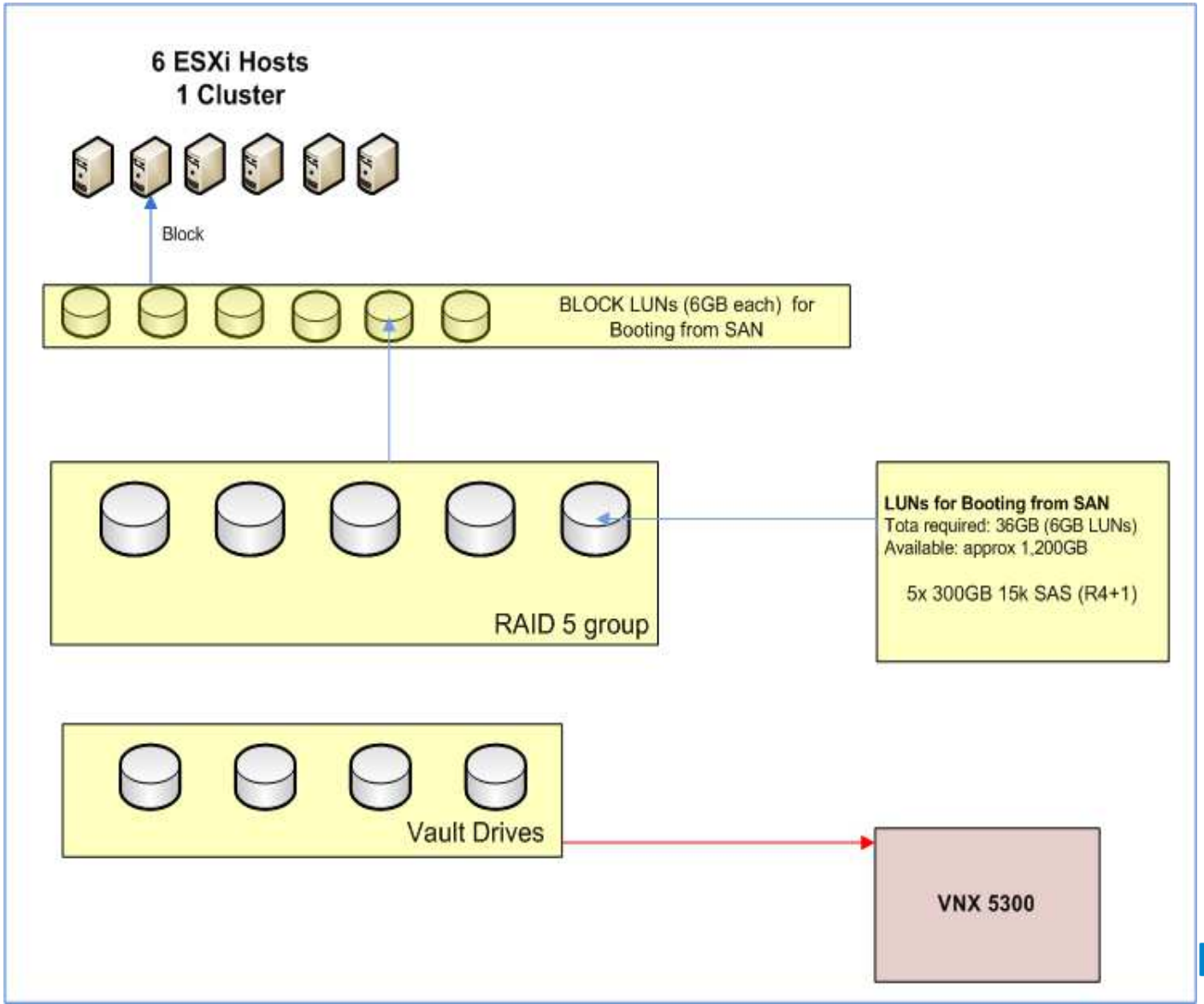
STORAGE LAYOUT

6 Blade FastPath Config, 500 Desktops,



STORAGE LAYOUT

6 Blade FastPath Config, 500 Desktops,



FastPath

Storage Spec Roll-Up

All Blades (B200-M2, 3.33Ghz, 12x8 (96G))				Drive Count			Raid Group/VP Specs	
Users	Blades	Storage	Raid	T1 100G EFD	T2 300G SAS 15k	T3 2T NL-SAS 7.2k	Raw (G)	Usable (G)
500	6	FastCache	1 (1+1)	6				
		Desktop	10 (4+4)		40		10,904	5,368
		User	6 (6+2)			8	14,817	10,941
		Infra	5 (4+1)		10		2,726	2,147
		Vault/Boot			8			
1000	12	FastCache	1 (1+1)	8				
		Desktop	1+0 (4+4)		64		17,446	8,588
		User	6 (6+2)			8	14,817	10,941
		Infra	5 (4+1)		10		2,726	2,147
		Vault/Boot			8			
1500	16	FastCache	1 (1+1)	8				
		Desktop	1+0 (4+4)		72		19,627	9,662
		User	6 (6+2)			8	14,817	10,941
		Infra	5 (4+1)		10		2,726	2,147
		Vault/Boot		8				

summary

- FastPath is a great accelerator to reduce “time to first desktop”
- AlwaysON is a proven, reliable architecture for high availability
- Both solutions have been lab tested and are custom designed for VCE Vblock Infrastructure Platforms
- Pre-tested, pre-integrated, ready to run following the VCE philosophy.

Q&A

thank you

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