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April 12-15, 2010 | Rosen Shingle Creek Resort | Orlando, Florida



Simplifying Complex Migrations

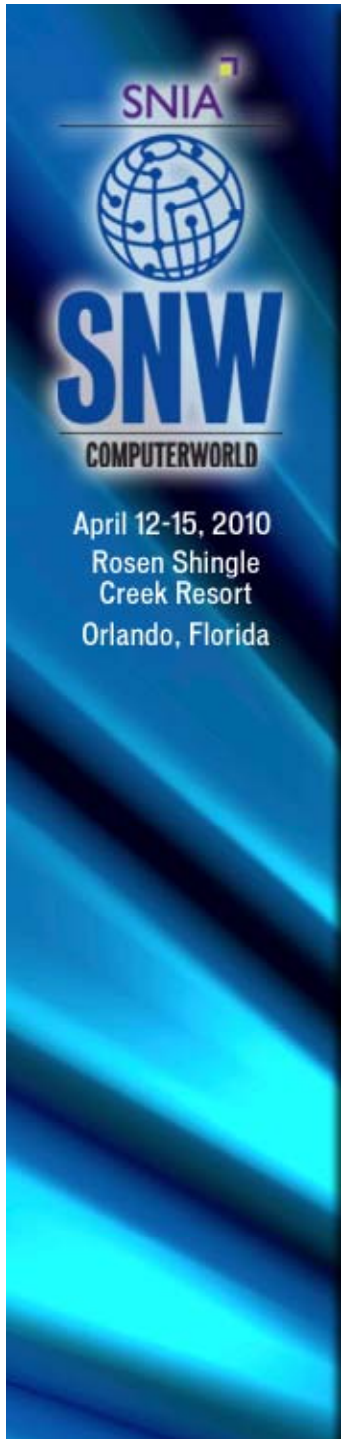
Andy Abbas
and
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Presenters

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About Data Agility Group...

- International IT **Professional Services provider** in the areas of data storage, data migration and technology refresh (SAN, NAS, DAS)
- Average Storage Experience = 12 years
- Migrated over 2PB SAN, NAS and Direct Attached Storage
- Platforms:
 - Windows, Solaris, HP/UX, AIX, Linux, VMware, Novell





About Data Agility Group...

- Historically Underutilized Business in the State of Texas (**HUB**)
 - Woman Owned Business Enterprise,
 - Minority Owned Business
- Headquarters in Irving, TX



Agenda

- Definition of Terms
- Types of Migrations
- Planning a Migration
- Data Migration Challenges
- What's needed for a successful migration?
- Scenarios of Complex Migrations (Case Studies)
- Q&A





Definition of Terms

■ Direct Connected Storage

- Internal or external storage which is direct connected to a specific host - not attached to a SAN Fabric

■ CDP – Continuous Data Protection

- A Service that automatically captures changes to data and stores it to a separate storage location. The technology allows for recovery to any point in time.



Definition of Terms

- **Host Based Logical Volume Mirroring (LVM)**
 - Host based mirroring method which copies data at a logical volume level

- **Physical to Virtual (P2V)**
 - The process of converting physical servers to virtual Servers

- **Replicate vs. Local Mirroring**
 - The process of migrating data between two different localities versus with in the same local.

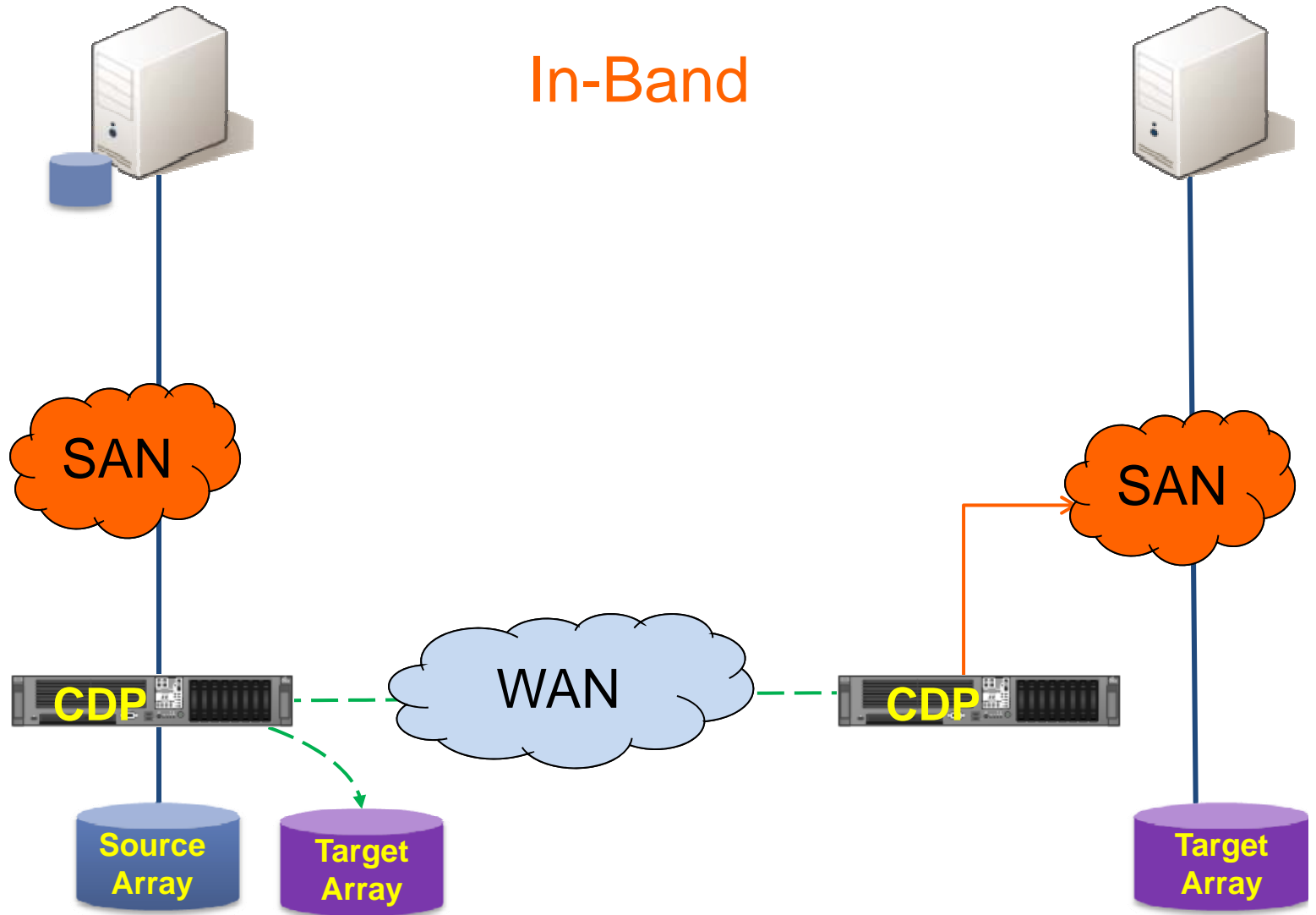


Types of Migrations

- Side-Band (Host Agents or Volume Mirroring)
- In-Band
- Offline
- Physical to Virtual (P2V)

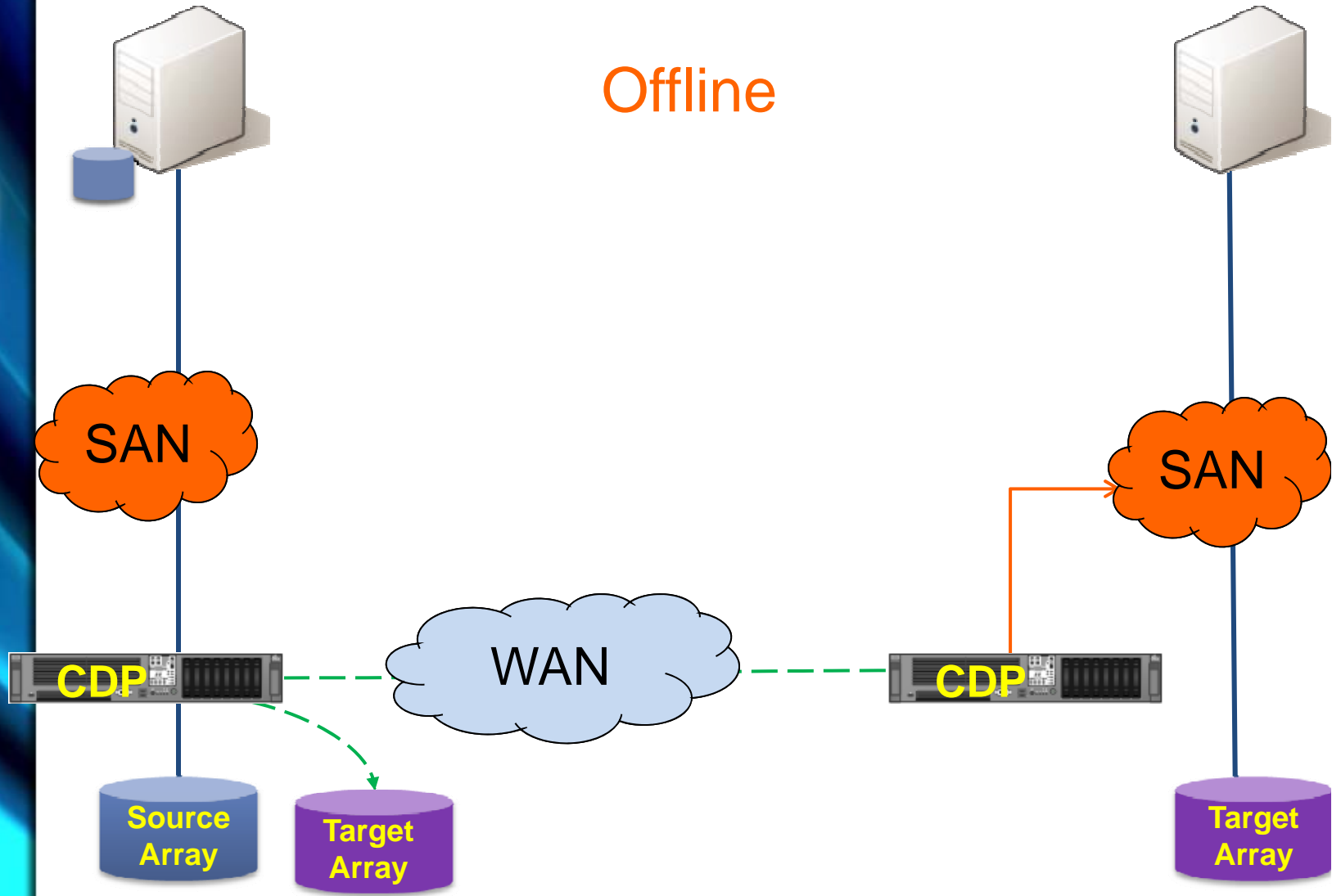
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In-Band



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Offline





Physical to Virtual (P2V)

- Similar to In-Band, introduce Virtualization Platform (e.g. ESX) in the fabric.
- Use Native Virtual Machine Conversion Utility to perform P2V.
- Capture LUNs on CDP
- Mirror/Replicate to Target Storage



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Planning



Planning a Migration

- Decide on appropriate type(s) of migration(s)
- Determine necessary maintenance windows
- Simulate the migration in a lab setting
- Determine migration sequence (Dev/Test, Stage, Production, etc.)
- Document pre-migration environment



Planning a Migration (cont.)

- Confirm required state of configuration, post migration
- Develop process and risk assessment documents
- Coordinate migration dates and activities with all affected groups
- Request appropriate outage windows



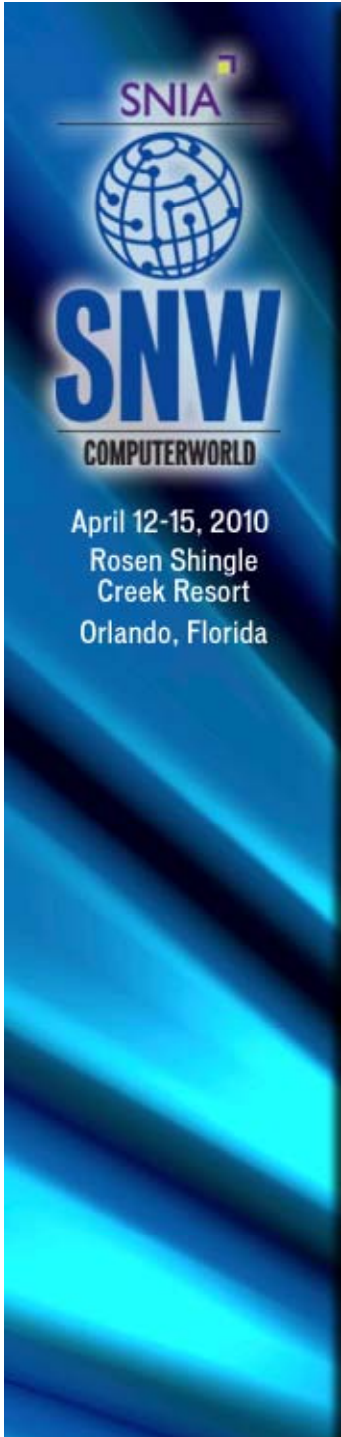
Data Migration Challenges

- Limited Support from teams involved (clients, application teams, SA's, DBA's etc.)
- Heterogeneous environments
- Non-standard storage environments
- Different LUN Sizes and Types
- Direct Connected Storage vs. SAN
- Tiering
- De-centralized management
- Resource limitations



What's needed for a successful migration?

- Planning
- Communication
- Versatile migration tool
- Experienced Technical Team
(Storage/Systems Admins, DBA's, etc)



Scenario A



Scenario A

Overview


- Company was relocating their DC from one geographic location to another.
- Servers were either direct connected to JBOD's / Storage Array's or only had local storage (No SAN).
- Server platforms
 - HP/UX
 - Windows.

Overview

- Customer wanted to virtualize a large portion of their Windows servers at the Target site.
- Outage windows needed to be very short.
- WAN Link between the Source and Target site was limited



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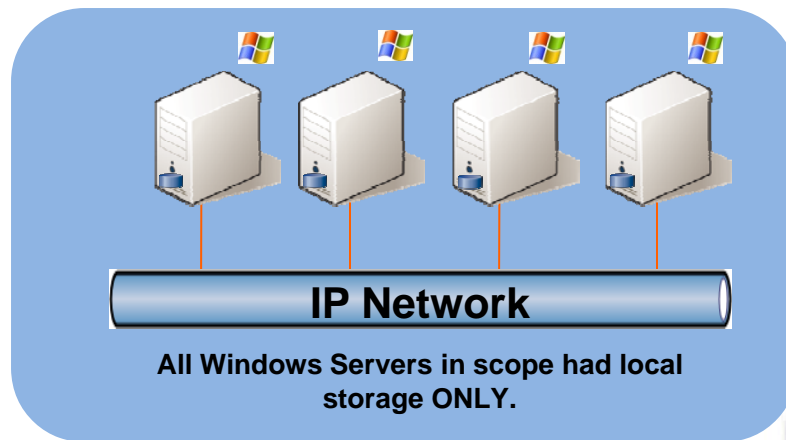
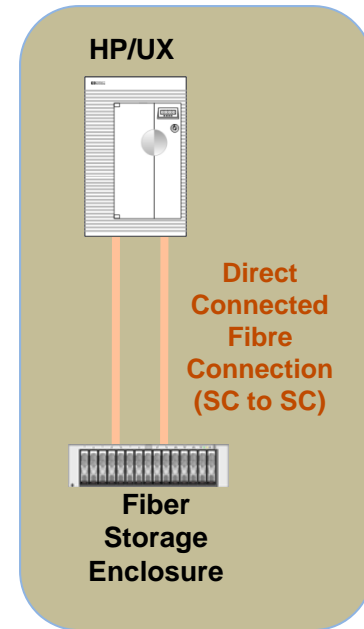
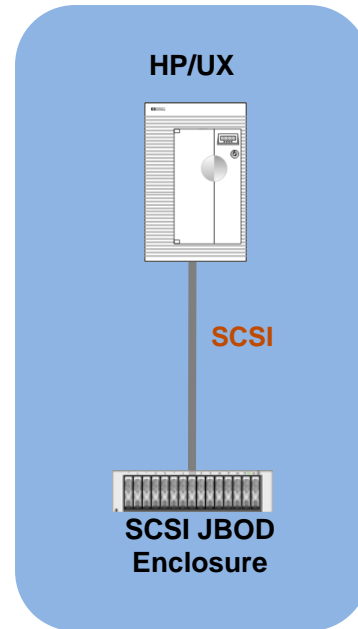
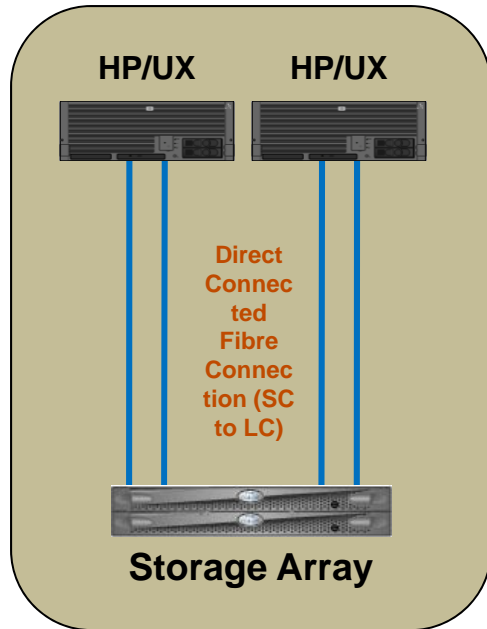
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Current Configuration

Scenario A






Scenario A

Challenges

- Limited access to the data to be replicated (Direct Connect or Internal Storage Only – No SAN Environment)
- Short outage windows
- Multiple testing required at remote site prior to final cutover (while data is continually replicated)
- Migrate physical Windows servers to Virtual Machines on an ESX environment prior to replicating to target datacenter
- Optimize bandwidth utilization

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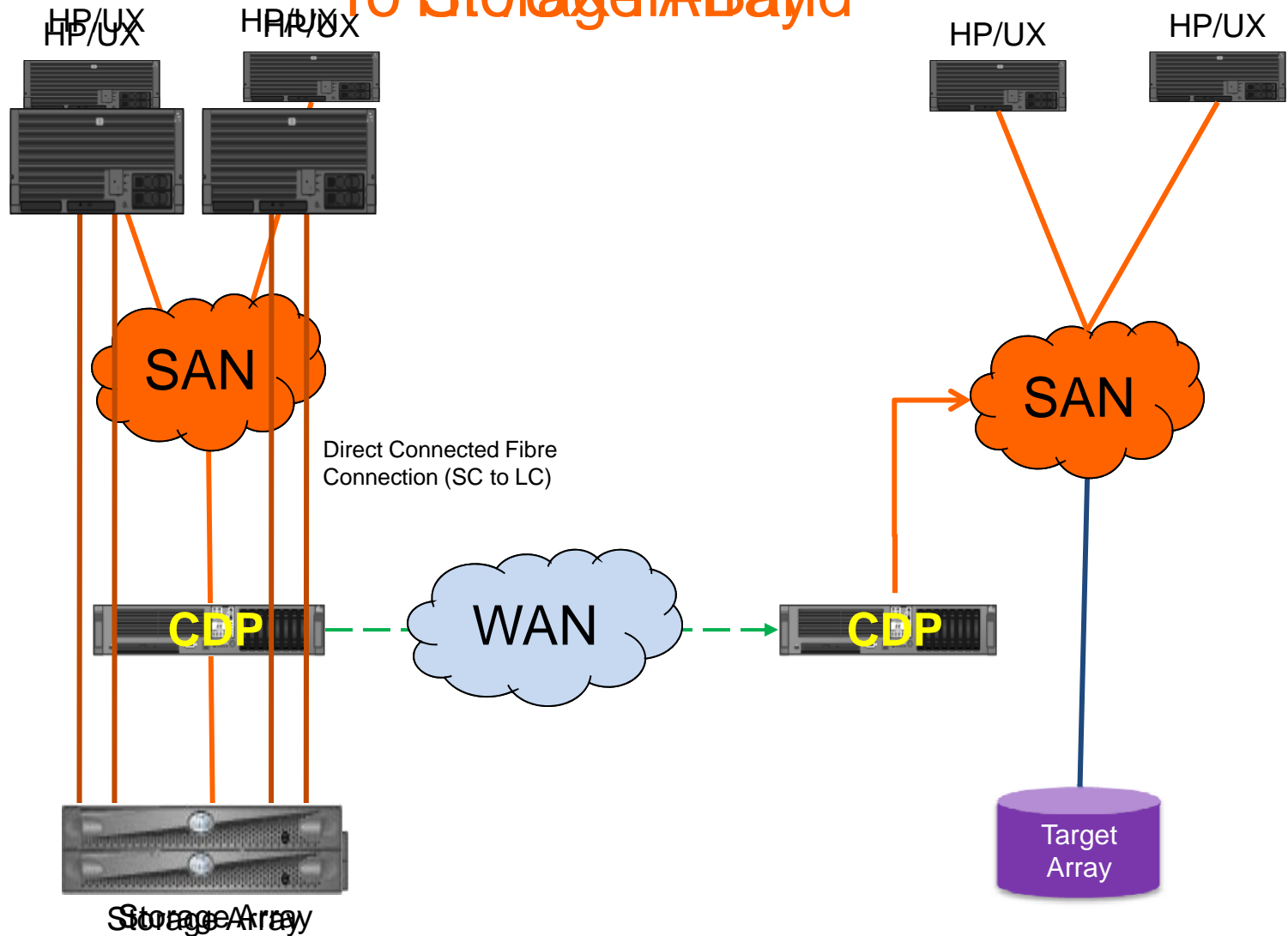
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Direct Connected To Storage Array

Scenario A





Solution

Scenario A

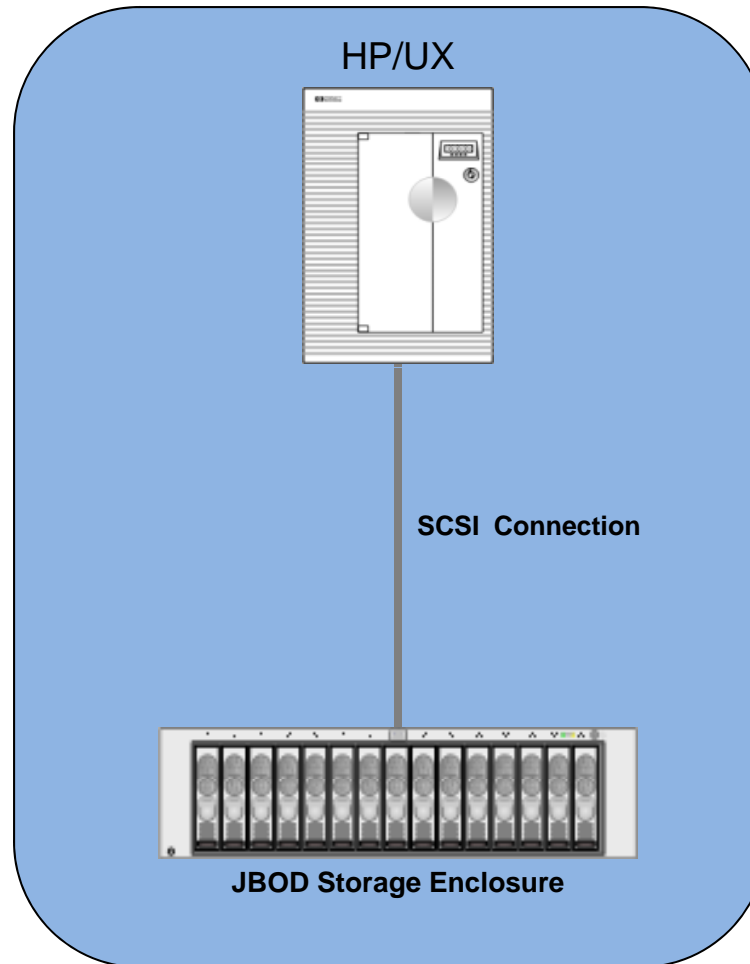
Solution – HPUX (In-Band):

*Servers direct connected to **Storage** arrays:*

- Introduced a pair of SAN switches into the customer environment
- Reconfigured the connectivity of the hosts from Direct Attached to a dual SAN Fabric (via the CDP Appliances)
- Once the data was on the SAN and accessible by the CDP Appliances, we were able to replicate the data to the target datacenter.
- Once the baseline data is migrated perform tests using snapshots
- During final cutover, servers were shutdown at the source. Target storage presented directly from the array to the servers.
- Servers were started and placed back into production.

Current Configuration

Scenario A



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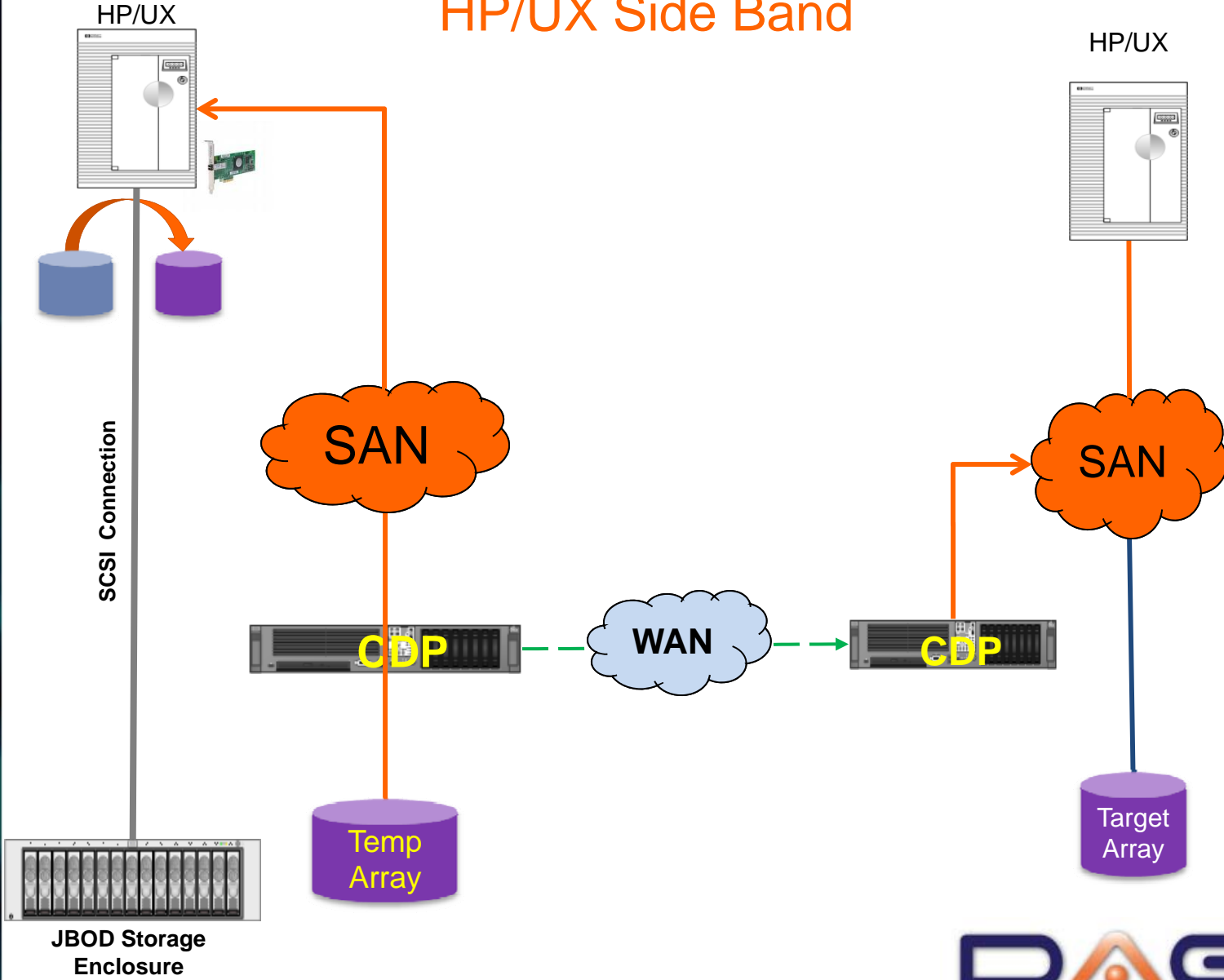
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Solution

HP/UX Side Band

Scenario A






Solution

Solution – HPUX (Side-Band):

Servers direct connected to JBOD via SCSI:

- Installed temporary HBA's using open slots
- Installed temporary storage in to the client environment
- Connected HBA into new SAN environment and presented temporary LUNs from Temporary storage via CDP.
- Using LVM, mirrored data onto temporary LUNs.
- Replicate data to target datacenter.
- Once the baseline data is migrated perform tests using snapshots
- During final cutover, servers were shutdown at the source. Target storage presented directly from the array to the servers.
- Servers were started and placed back into production.

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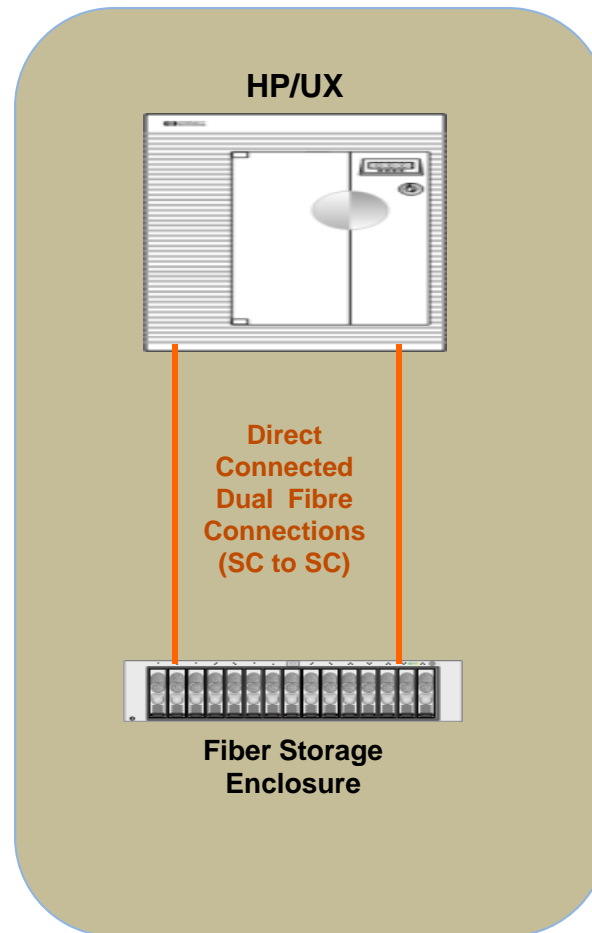
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Current Configuration

Scenario A



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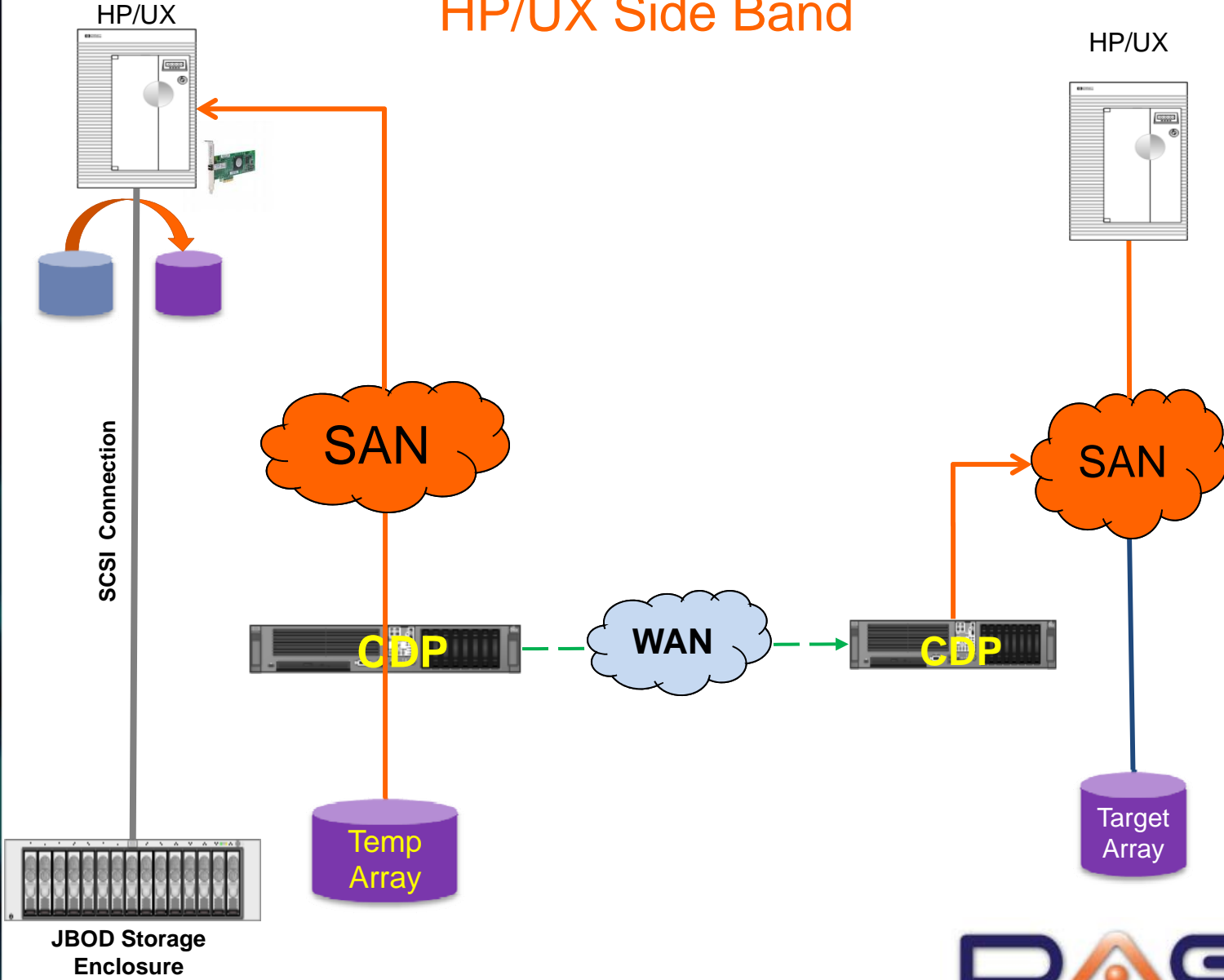
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Solution

HP/UX Side Band

Scenario A



Solution

Scenario A


Solution – HPUX (Side-Band):

Servers direct connected to local Raid Storage via Fibre:

- Disconnected passive fibre connection from existing raid storage.
- Connected available HBA port into new SAN environment and presented temporary LUNs from Temporary storage via CDP.
- Using LVM, mirrored data onto temporary LUNs.
- Replicate data to target datacenter.
- Once the baseline data is migrated perform tests using snapshots
- During final cutover, servers were shutdown at the source. Target storage presented directly from the array to the servers.
- Servers were started and placed back into production.



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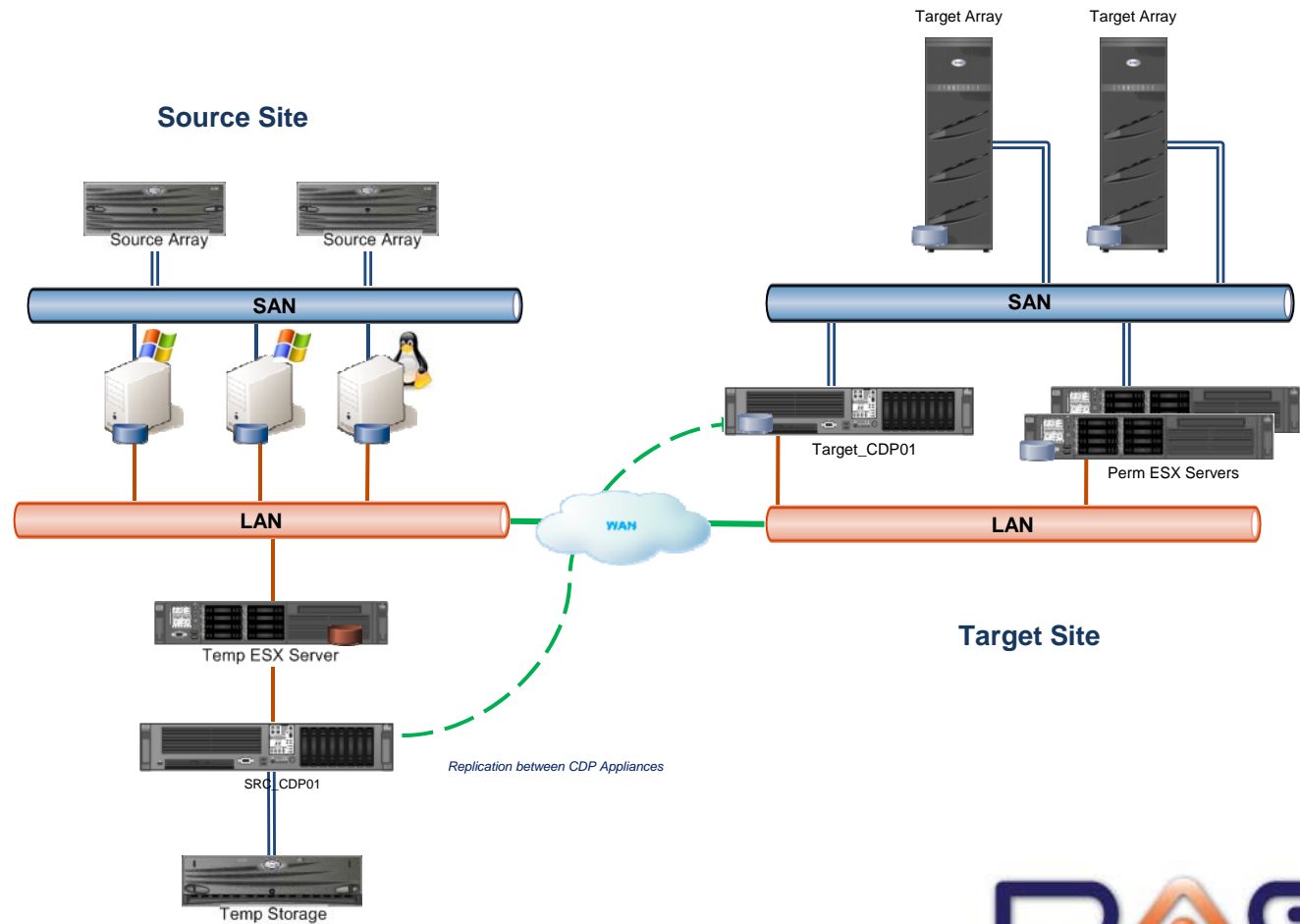


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Physical to Virtual (P2V)





Scenario A

Solution

Solution - Windows P2V (In-Band):

We decided to perform a P2V migration locally and then replicate the storage (e.g. data store) to the target datacenter:

- Installed a pair of temporary Virtual Server environment (storage presented through CDP using temporary storage).
- Perform P2V migration using native tool.
- Started Virtual Machine in production.
- Replicated storage to target CDP appliance.
- Once the baseline data is migrated, perform tests using snapshots.
- During final cutover, servers were shutdown at the source. Target storage presented directly from the array to the servers.
- Servers were started and placed back into production.



Scenario B



Scenario B

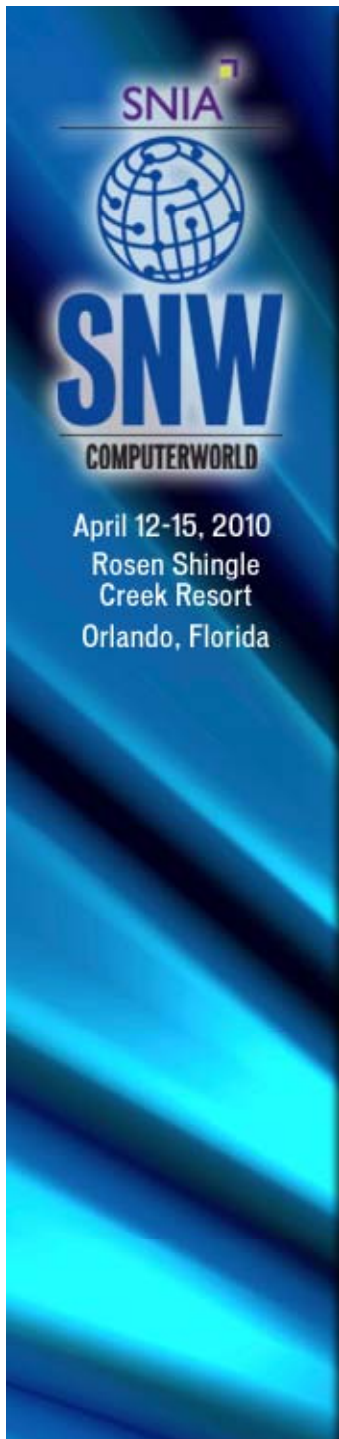
Overview

- Company was refreshing their existing storage arrays with new arrays.
- Servers were connected via SAN (Dual Fabrics)
- Outage windows needed to be very short.
- Server Platforms were
 - AIX (VIO),
 - Solaris,
 - ESX,
 - Windows



Challenges

- Short outage windows
- Several virtual servers in the AIX VIO environment had storage presented directly from the array (via dedicated HBAs) as well as storage presented (virtually) through the VIO servers (shared HBAs) on the same system.
- Solaris servers currently on Solaris 8 and 9, would need to be migrated to Solaris 10 (on new HW). Target LUN size needed to be larger than source LUNs
- Several Windows servers had volumes, spanned using Dynamic disks (created with several smaller LUNs) from the source array. Client wanted to use fewer target LUNs on the target array and switch to Basic disks.



Scenario B

Solution

Solution – AIX and ESX (In-Band):

- Introduced a pair of HA CDP Appliances in to the customers environment.
- Reconfigured the connectivity of the hosts to receive primary storage from the CDP Appliance (In-Banding)
- (AIX ONLY) Special care was taken to make sure the VIO mapping was documented and re-applied during the in-banding process.
- (ESX ONLY) Special care was taken to make sure the paths were rebalanced during the in-banding process.
- Once the data was accessible by the CDP Appliances, the source LUNs were mirrored with the target LUNs.
- During final cutover, servers were shutdown and target storage presented directly from the target array
- Servers were started and placed back into production.

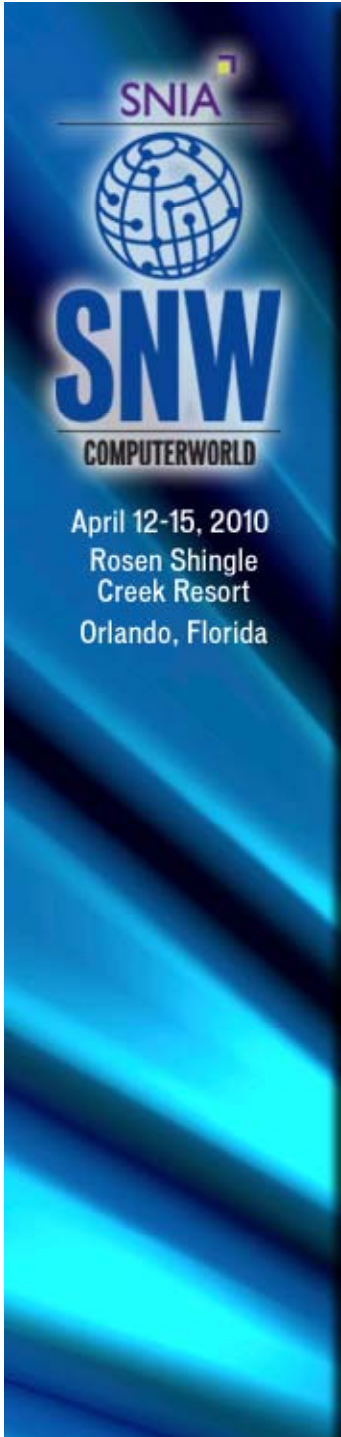


Scenario B

Solution

Solution – Windows (Side-Band):

- Introduced a Volume Mirroring Appliances in to the customers environment
- Presented target LUNs to Windows hosts (larger size LUNs than the source LUNs) and created a volume per LUN as Basic Disk.
- Installed Volume Mirroring agent on the host.
- Using the Volume Mirroring Appliance, mirrored source volumes to target volumes.
- During final cutover, Applications were quised and mirror released.
- Servers were shutdown and the target LUNs were presented directly from the target array.
- Servers were started and placed back into production.



Conclusion



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Questions

