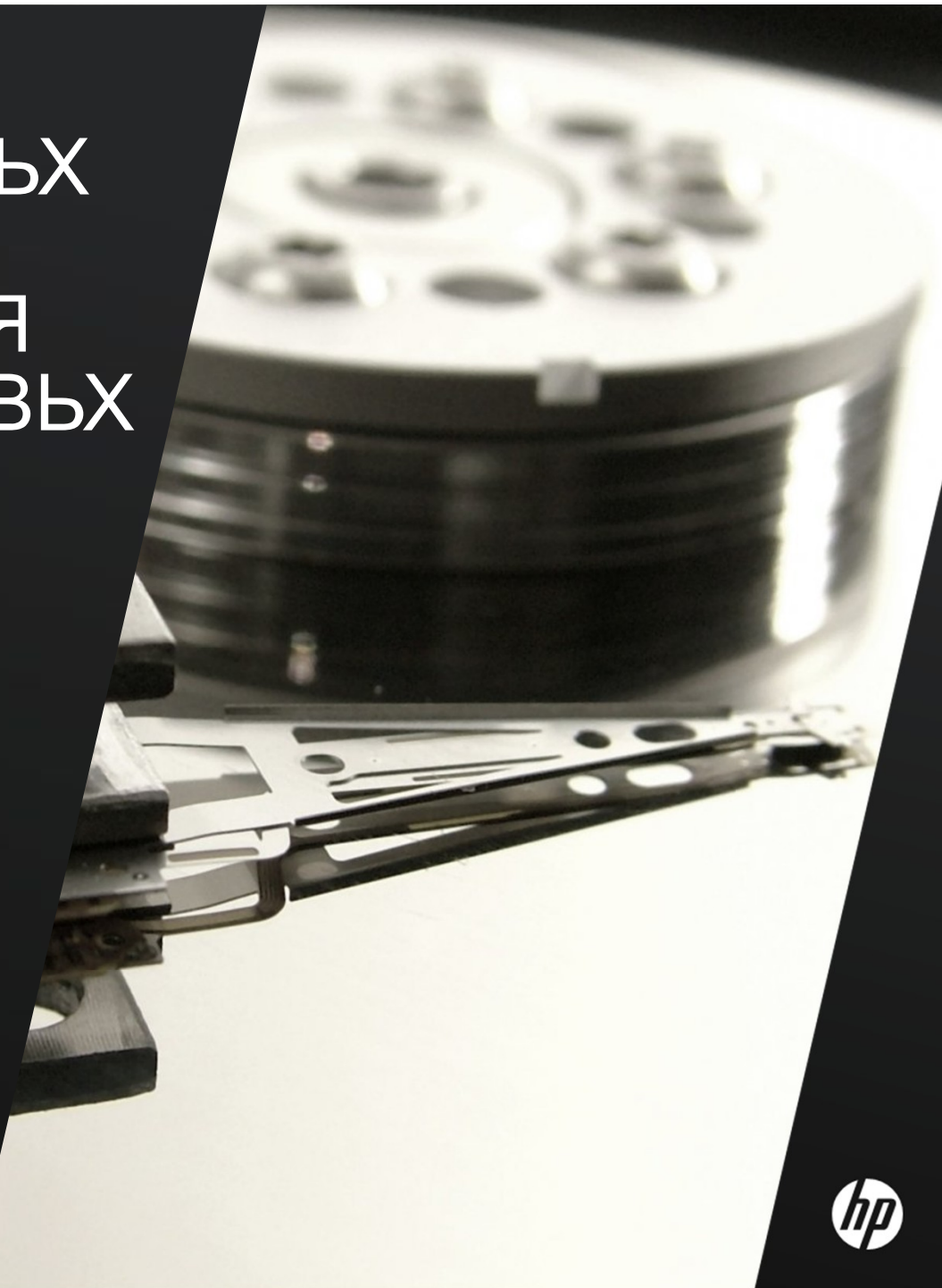# РЕШЕНИЯ ПО ХРАНЕНИЮ ДАННЬХ P2000 И P4000 ДЛЯ ПОСТРОЕНИЯ ОТКАЗОУСТОЙЧИВЬХ ЦОД

Олег Ревизцев
Технический консультант
29/07/2010

hp

HP D2200SB STORAGE BLADE

– Twelve hot plug SAS drives in a half height form factor

– P410i Smart Array controller onboard with 1GB FBWC

– Expand local storage capacity

– PCIe x4 to adjacent server

– DAS and SAN

  • Use as DAS to adjacent server
  • Or as part of a LeftHand SAN shared storage solution

HP StorageWorks P2000 G3 Modular Smart A...

Два варианта жестких дисков

SFF

LFF

Самые современные технологии, такие как fibre channel 8Гбит/с, комбинированные контроллеры FC/iSCSI, репликация средствами массива и улучшенная производительность являются характерными чертами нового поколения легендарных дисковых массивов начального уровня HP StorageWorks P2000 MSA

HP StorageWorks P2000 G3 Modular Smart A

G3!

Новые возможности

- Интерфейс подключения fibre channel 8Гбит/с (2 порта на контроллер)
- Кэш-память 2Гб на контроллер, новые мощные процессоры
- Комбинированные контроллеры FC/iSCSI "active-active"
- Внутренняя архитектура SAS 6Гбит/с (backend & HDD)
- Репликация средствами контроллера
- Новый уровень защиты информации – 512 «мгновенных копий»
- До семи внешних дисковых полок расширения
- До 149 жестких дисков SFF 2'5, до 99 жестких дисков LFF 3'5'
- До 57.6 Тб SAS до 192Тб SATA
- Форм-фактор 2U
- Улучшенное управление через web-браузер
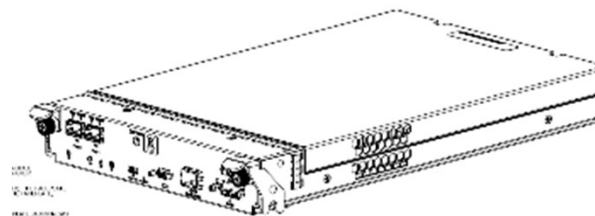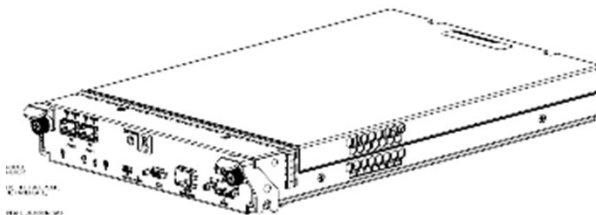
Выбор из двух вариантов контроллеров

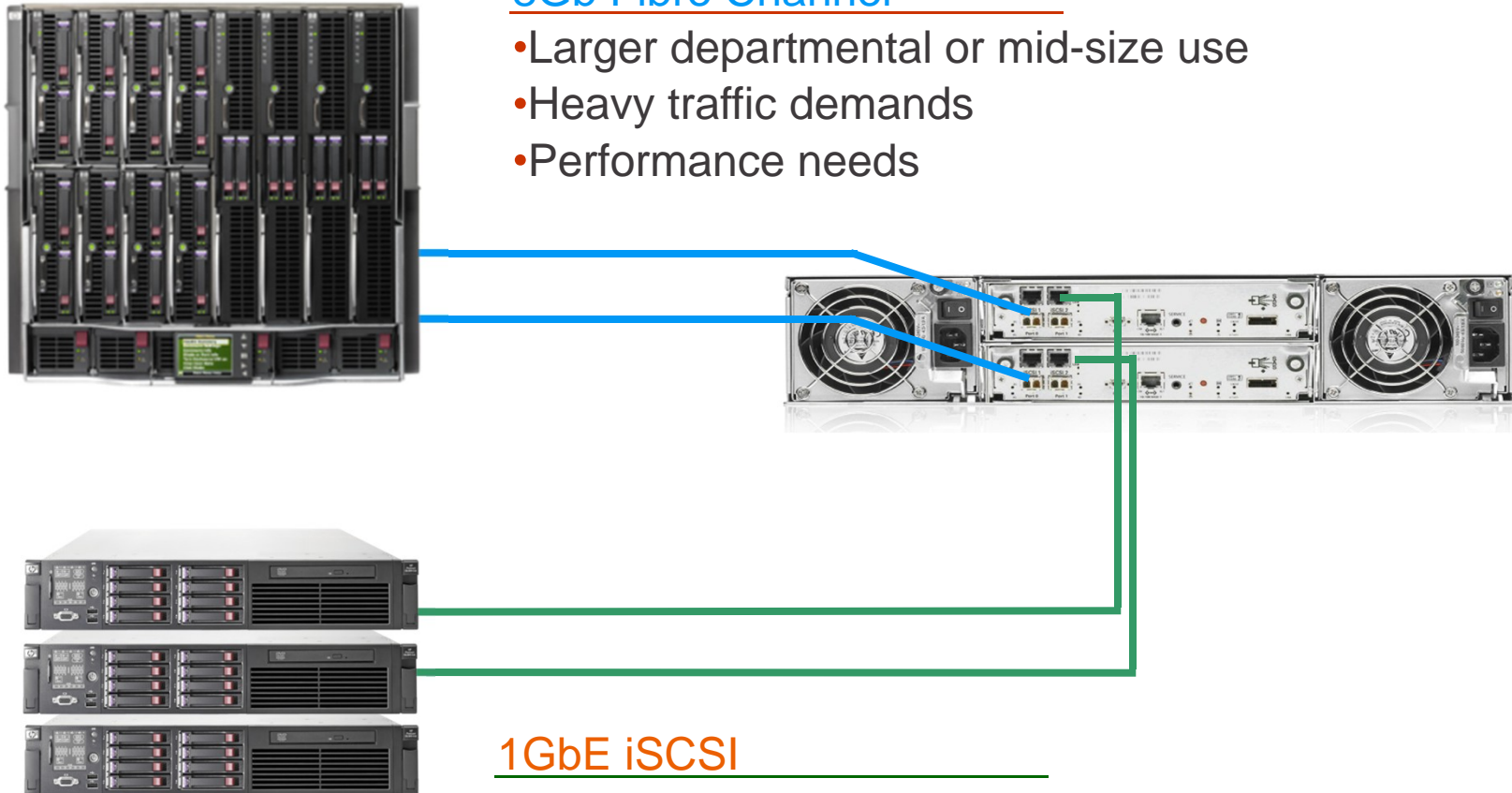# Ваш дисковый массив "a la carte…."

+

 ? Жесткие диски   **?**

+

Внешние дисковые полки

HP STORAGEWORKS P2000 G3
FIBRE CHANNEL/ISCSI COMBO ARRAY SYSTEM CONTROLLER

8Gb Fibre Channel

- Larger departmental or mid-size use
- Heavy traffic demands
- Performance needs

1GbE iSCSI

- Smaller departmental use
- Moderate traffic demands
- Tight budget consideration

HP STORAGEWORKS P2000 G3
FIBRE CHANNEL/ISCSI COMBO ARRAY SYSTEM CONTROLLER

Disaster Recovery

8Gb Fibre Channel

- Larger departmental or mid-size use
- Heavy traffic demands
- Performance needs

1GbE iSCSI

- Remote Snap (replication)

HP StorageWorks P2000 G3 Modular Smart Array

Новые возможности программного обеспечения

- ПО Remote Snap Replication позволяет заказчикам осуществлять копирование критичных данных на другой дисковый массив MSA:

  — репликация средствами дискового массива

  — репликация на основе технологии «мгновенных копий»

  — интеллектуальный подход к репликации данных

  — репликация по FC или iSCSI каналам

  — удобный интерфейс настройки репликации

- Лицензии на 64 «мгновенные копии» и Volume Copy БЕСПЛАТНО!

- Увеличенное количество «мгновенных копий»

  — опционально HP P2000 Snapshot 512 Software LTU

- Технология HDD Spin Down

  — при этом не нужно покупать лицензию, технология интегрирована в firmware жестких дисков

Открытая миграция с MSA G1 и MSA G2 до P2000 G3 MSA

ПОЗИЦИОНИРОВАНИЕ HP P4000 LEFTHAND

XP

EVA

HP P4000

MSA2000

X-Series NAS

XP24000

XP20000

Simple Unified Storage

Low cost consolidation

Scalable, Clustered IP SAN

Outstanding TCO

Always-on availability

- iSCSI SAN and Optimized NAS with integrated snapshots, backup, replication, and simple management.
- Windows, Linux, VMware, more.

- 4GB FC, 1GbE iSCSI, and 3Gb SAS
- SAS & SATA together
- Controller-based snapshot/clone
- Windows, Linux, HP-UX, VMware + more
- WEB, Exchange, SQL

- iSCSI, 10GbE optional
- Scalable Performance
- SATA & SAS HDD
- Cost effective high availability
- VMware, Citrix, Hyper-V, Windows, Linux

- FC & iSCSI host ports
- FC & FATA HDD
- Storage consolidation + disaster recovery
- Simplification through virtualization
- HP-UX, Windows, Linux, VMware + more
- Mid Market MS, Oracle & SAP applications

- Data center consolidation + disaster recovery
- Large-scale Oracle/SAP applications
- HP-UX, Windows, + 20 more, including NonStop & mainframe

Консолидация и производительность

Масштабируемость, доступность и отказоустойчивость
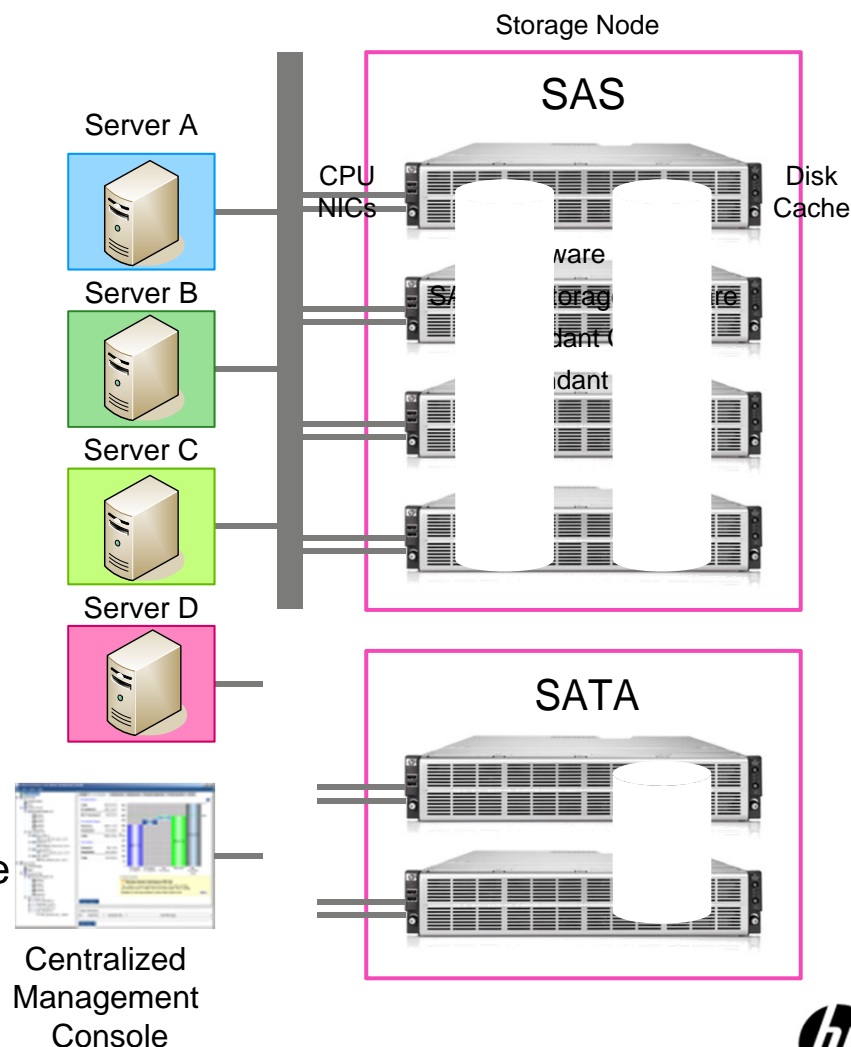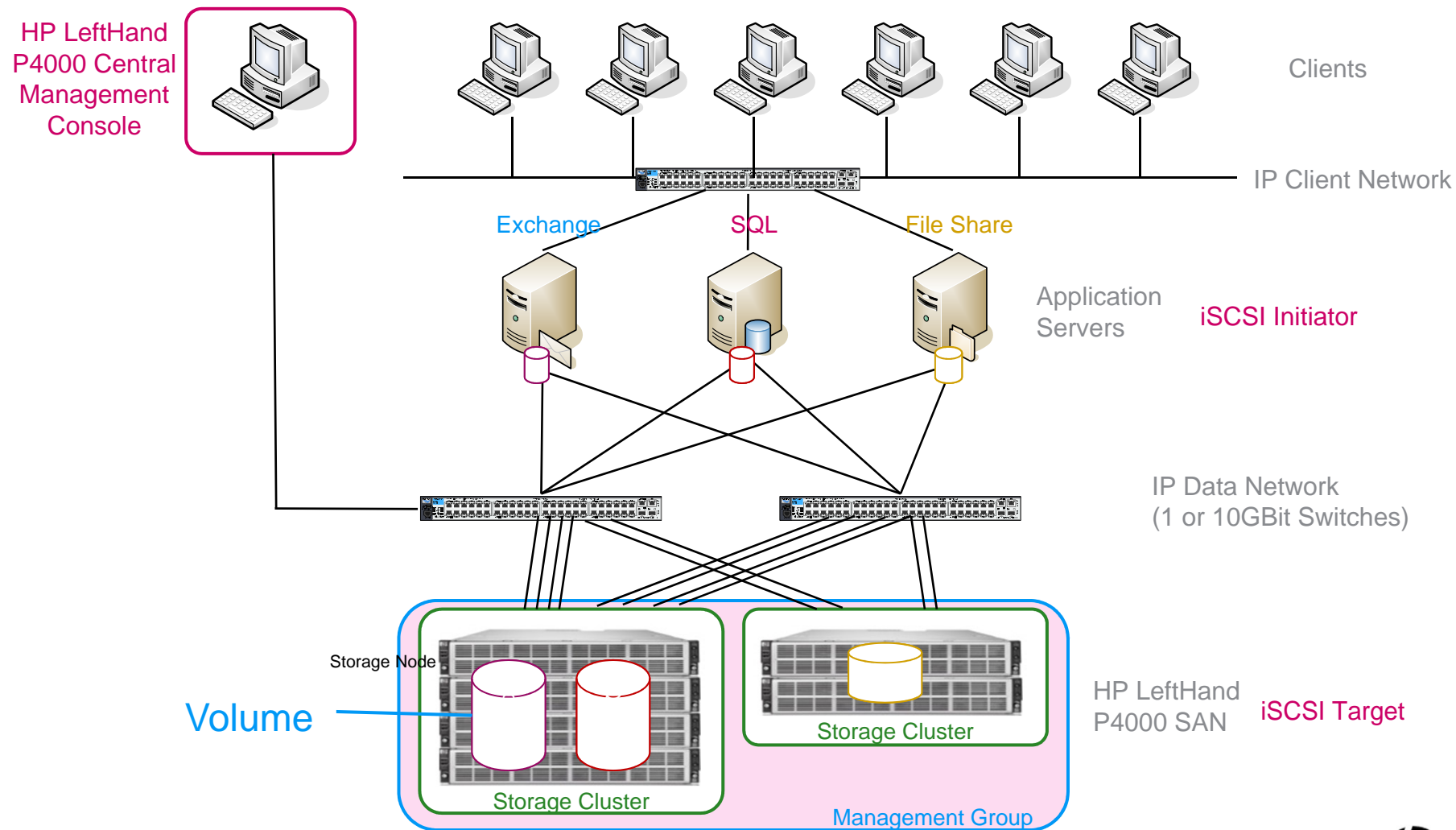
АРХИТЕКТУРА ХРАНЕНИЯ ДАННЫХ P4000

- Кластер из узлов хранения
- Каждый узел представляет собой ресурс хранения (жёсткие диски) и сторадж-контроллер (процессор, память)
- Такой массив масштабируется от 2-х до более 30-ти узлов, управляемых как единая система
- Логические тома располагаются на всех жёстких дисках узлов хранения
- С добавлением новых узлов производительность возрастает
- Автоматическое перераспределение данных по узлам
- Поддержка множества площадок и миграция данных в режиме «онлайн»
- Единая консоль управления
- Попадает под классификации «Облачное хранение» и «Грид-архитектура»

Server A

Server B

Server C

Server D

Centralized
Management
Console

Storage Node

SAS

CPU
NICs

Disk
Cache

SATA

КОМПОНЕНТЫ СЕТИ ХРАНЕНИЯ HP P4000 ISCSI SAN

HP LeftHand P4000 Central Management Console

Clients

IP Client Network

Exchange   SQL   File Share

Application Servers   iSCSI Initiator

IP Data Network (1 or 10GBit Switches)

Storage Node

Volume

HP LeftHand P4000 SAN   iSCSI Target

Storage Cluster

Storage Cluster

Management Group

APPLICATION INTEGRATION

Application Server

– P4000 application-managed snapshots

  • Integrate P4000 features with the common application

    – Provide simple application-aware data protection

    – All P4000 SAN/iQ features: Snapshots, SmartClone, Remote Copy

    – First release focused on Microsoft applications

  • Fully integrated

    – No additional cost (all-inclusive)

    – No additional software, agents or hardware required

    – No need to learning new management infrastructure on the SAN or application server

    – It's all done from the P4000 Central Management Console (CMC) or CLI
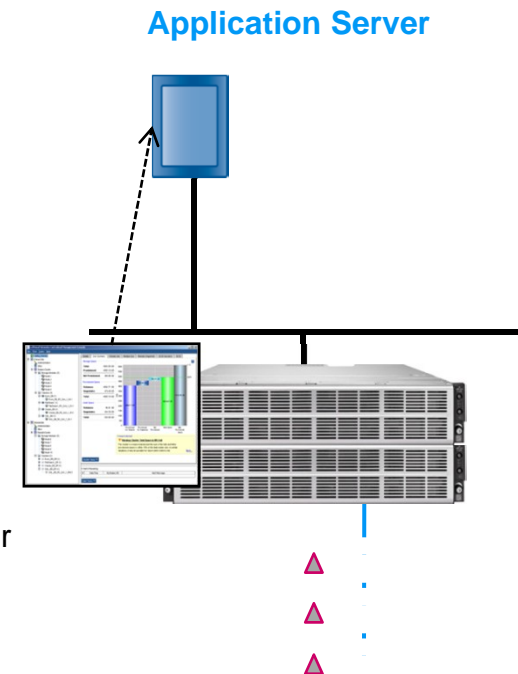
– Enhancements with SAN/iQ 8.5

  • Simple GUI integration

  • Full scheduler integration

New!

APPLICATION INTEGRATION

- HP StorageWorks P4000 application-managed snapshots are enabled by
  - P4000 VSS Provider
  - Centralized Management Console or CLiQ

- HP tested various Microsoft VSS-aware applications, and specifically supports
  - Microsoft Exchange
  - Microsoft SQL Server
  - Microsoft SharePoint
  - NTFS file system
  - Microsoft Hyper-V supported by SAN/iQ 8.5 release

- No software required on the application server; apart from P4000 VSS Provider

SQL Server   Exchange

Centralized
Management
Console
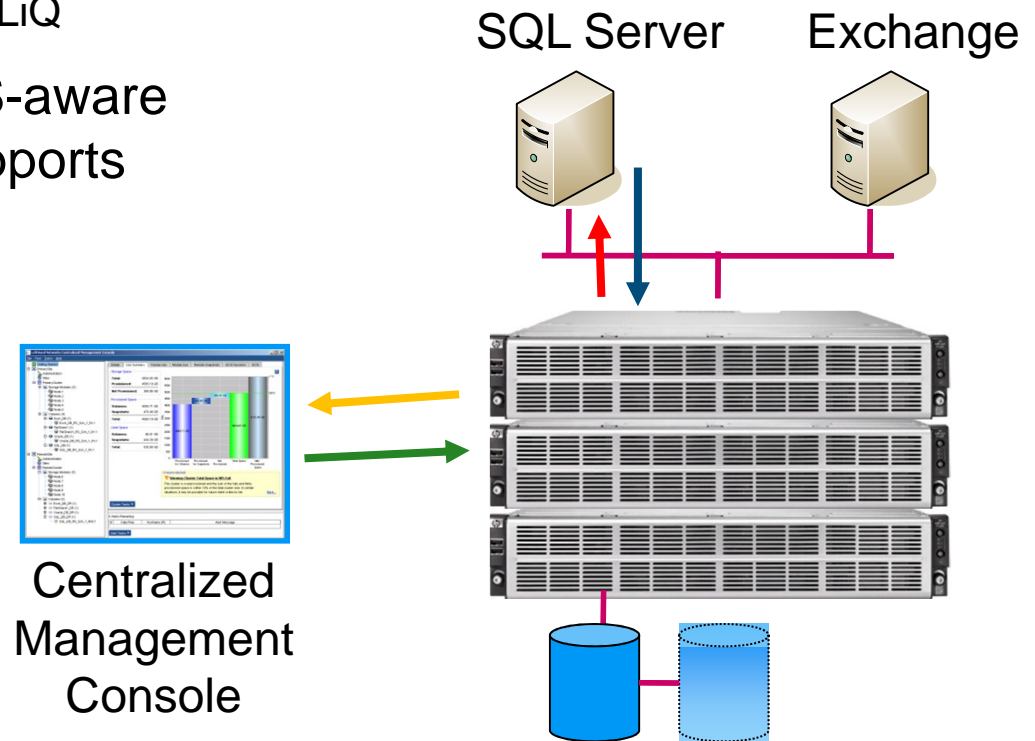
APPLICATION INTEGRATION

– Ground breaking ease of use

  • No third party VSS requestor required for quiesced snapshots

  • No additional agents or applications to install

  • No hardware required

  • No additional cost

  • No changes required to scripts

  • No new management to learn

  • Same functionality in the CMC and CLI

New Snapshot ☒

Volume Name: SQL_Log

Application Managed Snapshot: More...

Snapshot Name: SQL_Log_SS_7

Description: (Description will be Assigned)

Servers: Assign and Unassign Servers...

OK   Cancel

```
CLIQ>createsnapshot volumename=SQL_Log snapshotname=App_Managed_2          login=192.168.145.128 keyfile=keyfile

SAN/iQ Command Line Interface, v8.1.0.194
(C) Copyright 2007-2009 Hewlett-Packard Development Company, L.P.

RESPONSE
 result          0
 processingTime  11969
 name            CliqSuccess
 description     Operation succeeded

CLIQ>_
```
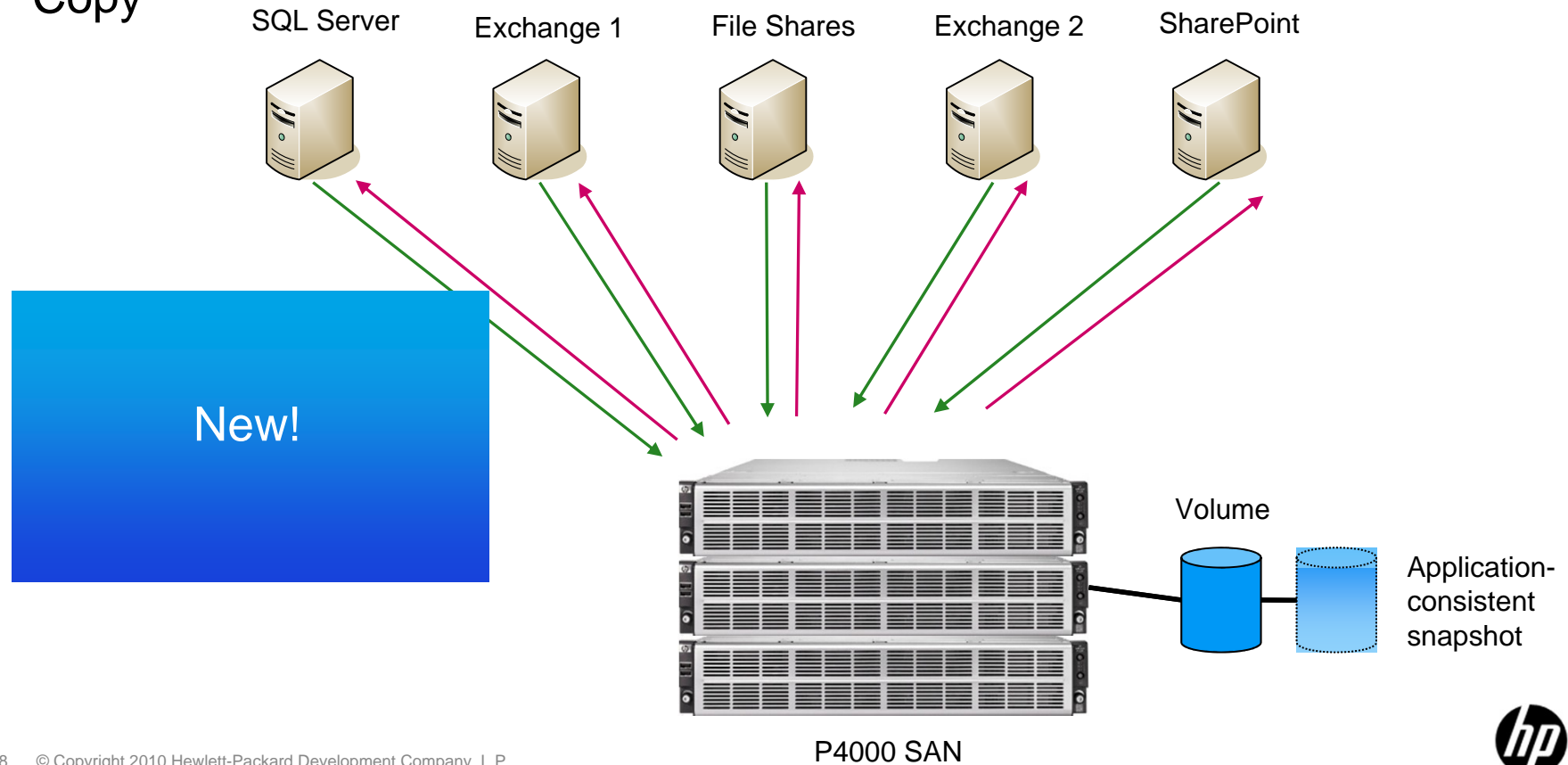
APPLICATION INTEGRATION 1.0

– Snapshots of all enterprise applications are created from a single station using a simple CLiQ script

SQL Server   Exchange 1   File Shares   Exchange 2   SharePoint

Management Tools
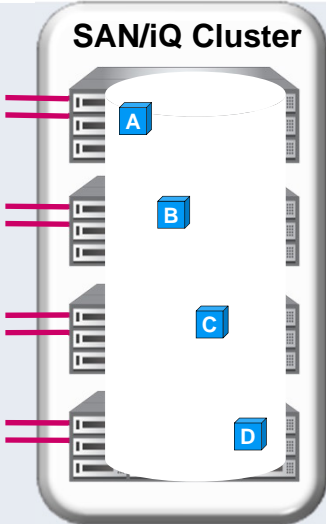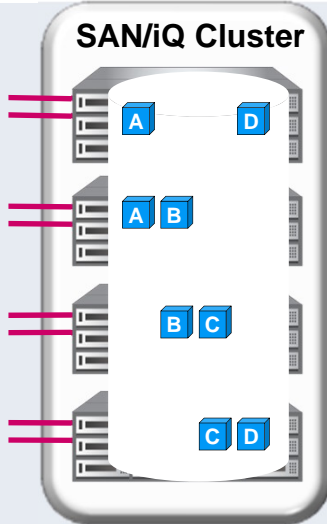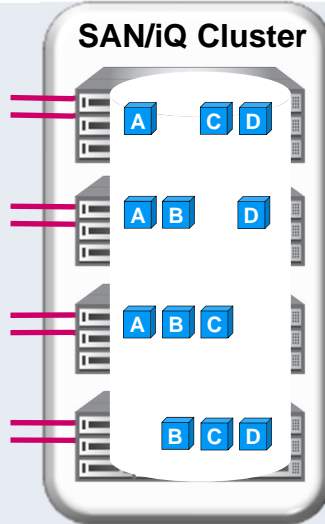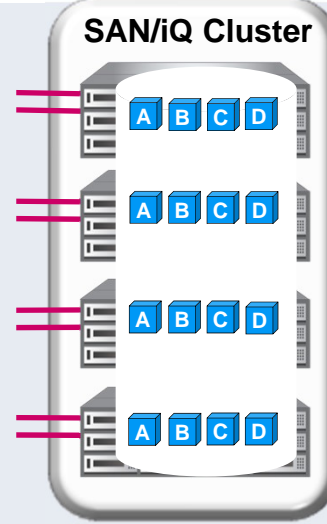
P4000 SAN

Volume

Application-consistent snapshot
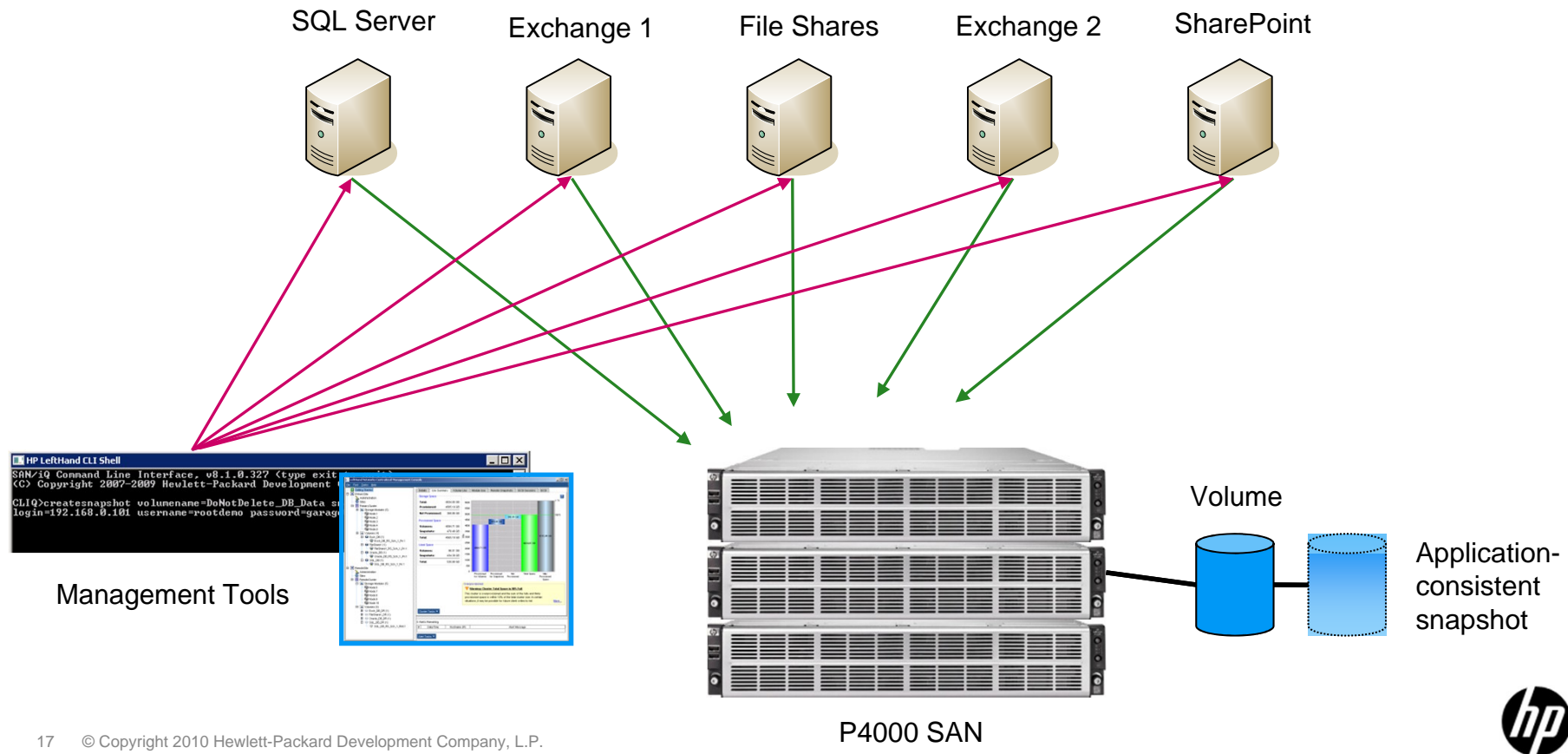
APPLICATION INTEGRATION 1.1

– Snapshots of all enterprise applications are created by the SAN itself
   • SAN/iQ 8.5 back-end serves as requestor for VSS snapshots

– Scheduled „application-managed snapshots"; integration with Remote Copy

SQL Server   Exchange 1   File Shares   Exchange 2   SharePoint

New!

Volume

P4000 SAN

Application-consistent snapshot

ВАРИАНТЫ СЕТЕВОГО RAID
SAN/IQ NETWORK RAID

Network RAID Level-0	Network RAID Level-2	Network RAID Level-3	Network RAID Level-4
• Aka: 0-way replication in the UI • 1-copy (Stripe) of the data for the volume	• Aka: 2-way replication in the UI • 2-copies (Mirror) of the data for the volume	• Aka: 3-way replication in the UI • 3-copies (triple-Mirror) of the data for the volume	• Aka: 4-way replication in the UI • 4-copies (quad-Mirror) of the data for the volume

SAN/iQ 8.5 release
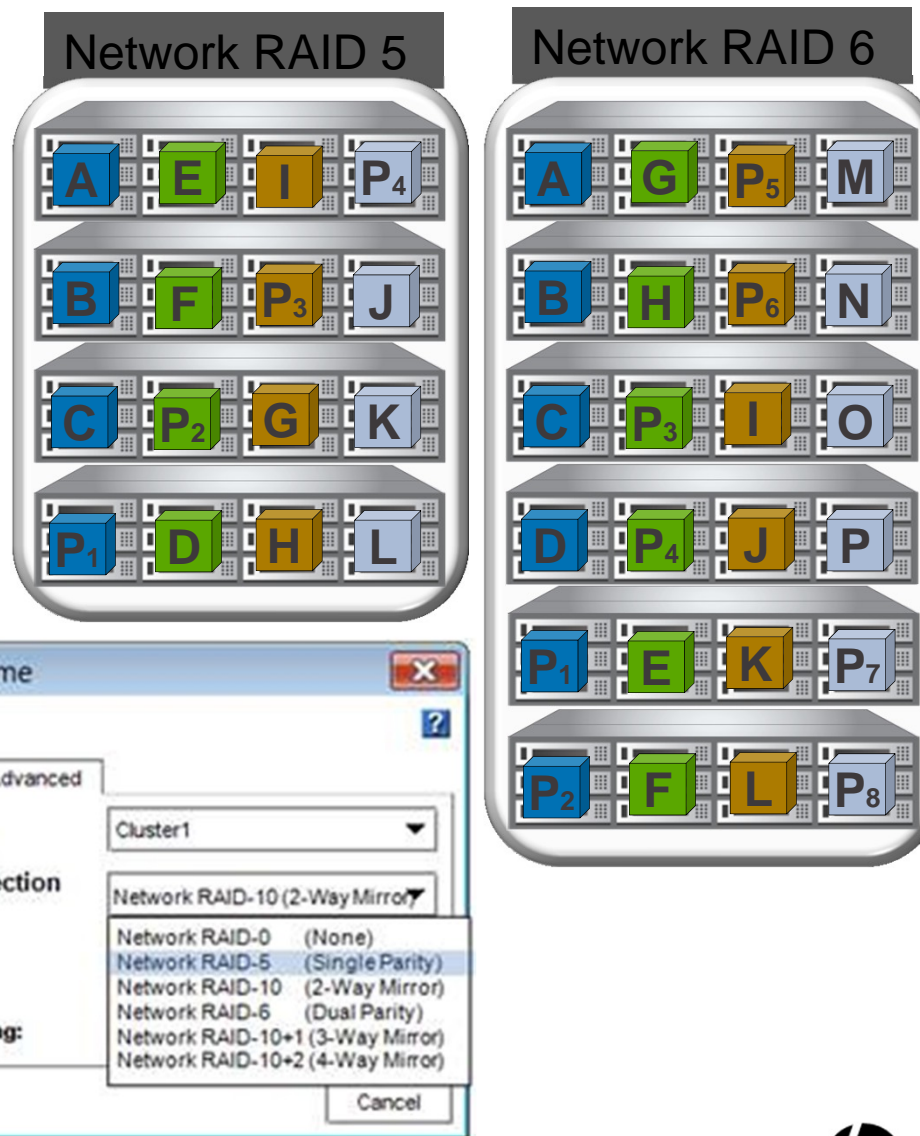# Network RAID 5 & 6

Description

- Two new Network RAID levels:
  - Network RAID-5 (single parity)
  - Network RAID-6 (dual parity)

- Storage High Availability with Higher Storage Utilization Rates

- Configured on a per-volume basis

- Existing customers can reclaim storage capacity via new Network RAID levels (*):
  Network RAID 10 = 50%
  Network RAID 5 = 75%
  Network RAID 6 = 66%

High Availability

- Multiple disks, controllers, or arrays

- Zero disruption of data access

- Ensures "high availability" for data with more efficient $/GB

Network RAID 5

Network RAID 6

New Volume

Basic | Advanced

Cluster: Cluster1

Data Protection Level: Network RAID-10 (2-Way Mirror)

Type:

Provisioning:

Network RAID-0 (None)
Network RAID-5 (Single Parity)
Network RAID-10 (2-Way Mirror)
Network RAID-6 (Dual Parity)
Network RAID-10+1 (3-Way Mirror)
Network RAID-10+2 (4-Way Mirror)

OK | Cancel

HP P4000 STORAGE CLUSTERING

– Beyond component redundancy

- Protects data from array failure

- Integrated synchronous replication at no additional cost

- Configure on a per-volume basis

- Storage modules can be physically separated across the IP network
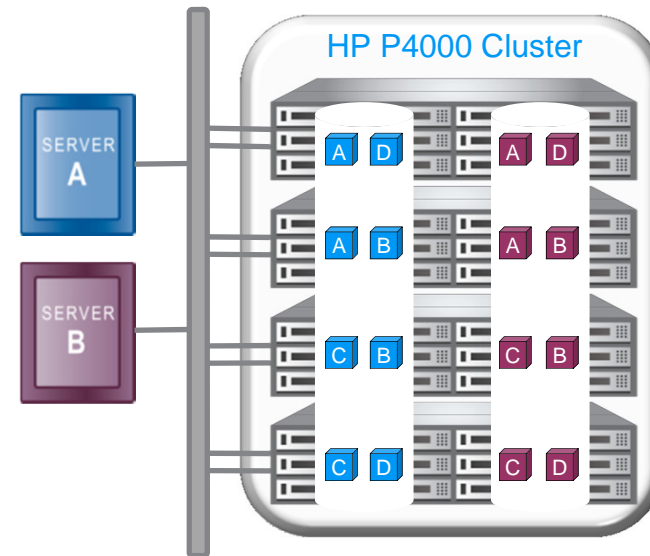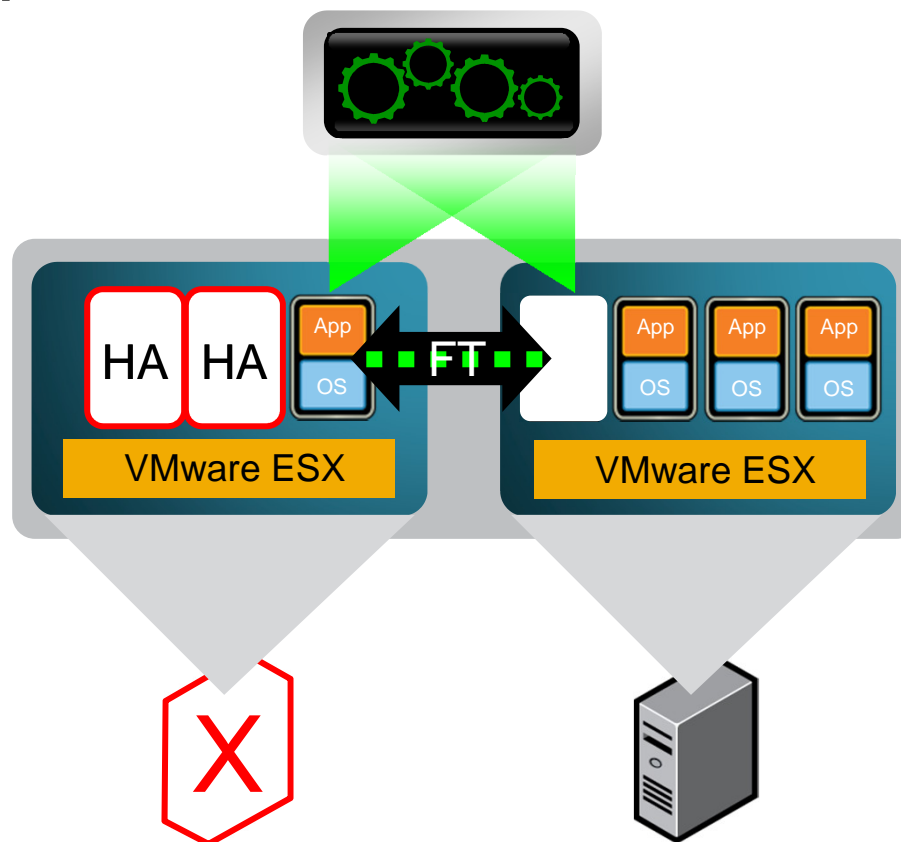
– High availability

- Survive multiple disks, controllers, or arrays failures

- Zero disruption of data access

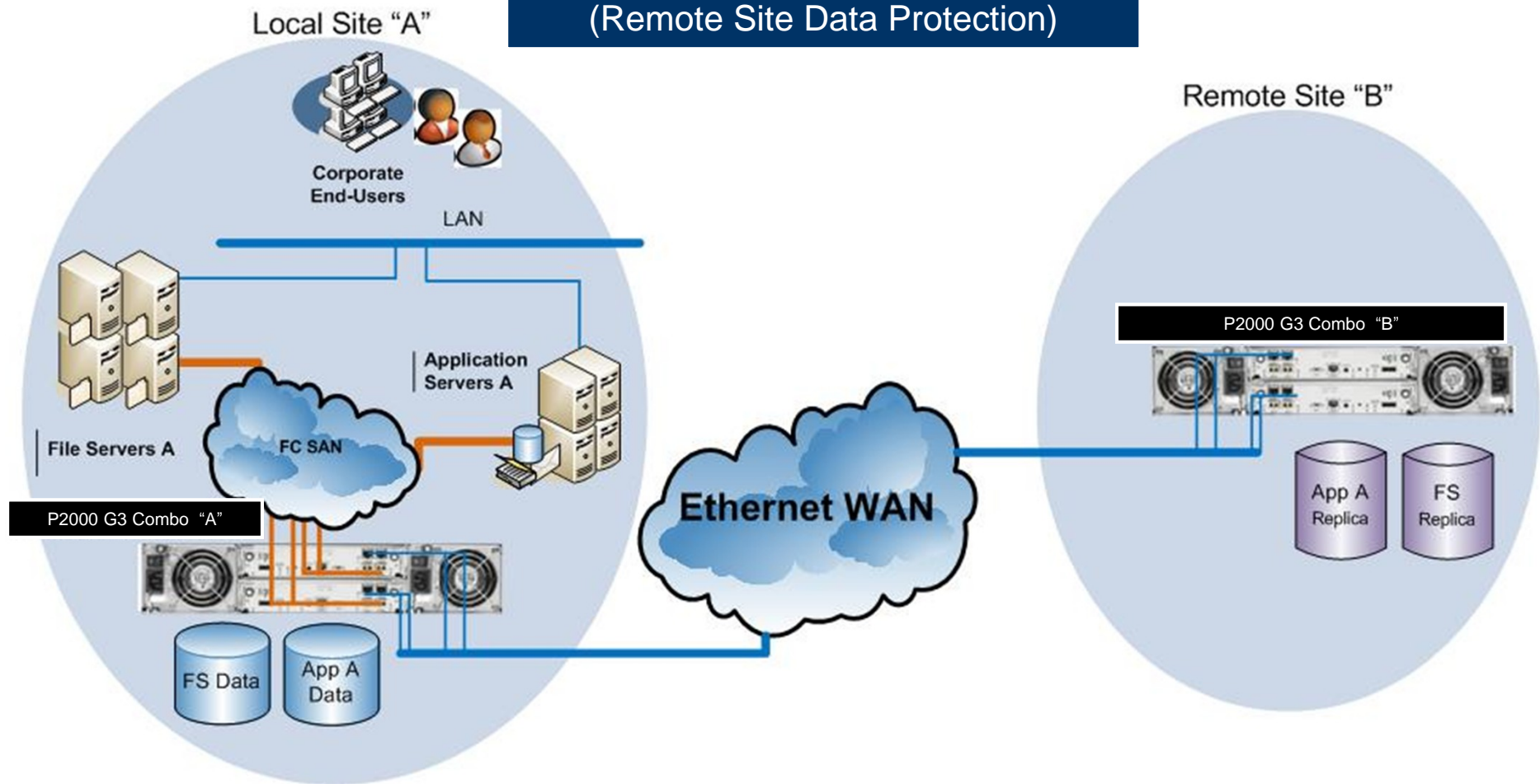- Ensures "high availability" for data volumes

HP P4000 Cluster

SERVER A

SERVER B

Works with VMware High Availability (HA) and Fault Tolerance (FT) to deliver total application availability!

ВЬСОКАЯ ДОСТУПНОСТЫ С ВИРТУАЛИЗАЦИЕЙ

– Single identical VMs running in lockstep on separate hosts

– Zero downtime, zero data loss failover for all virtual machines in case of hardware failures
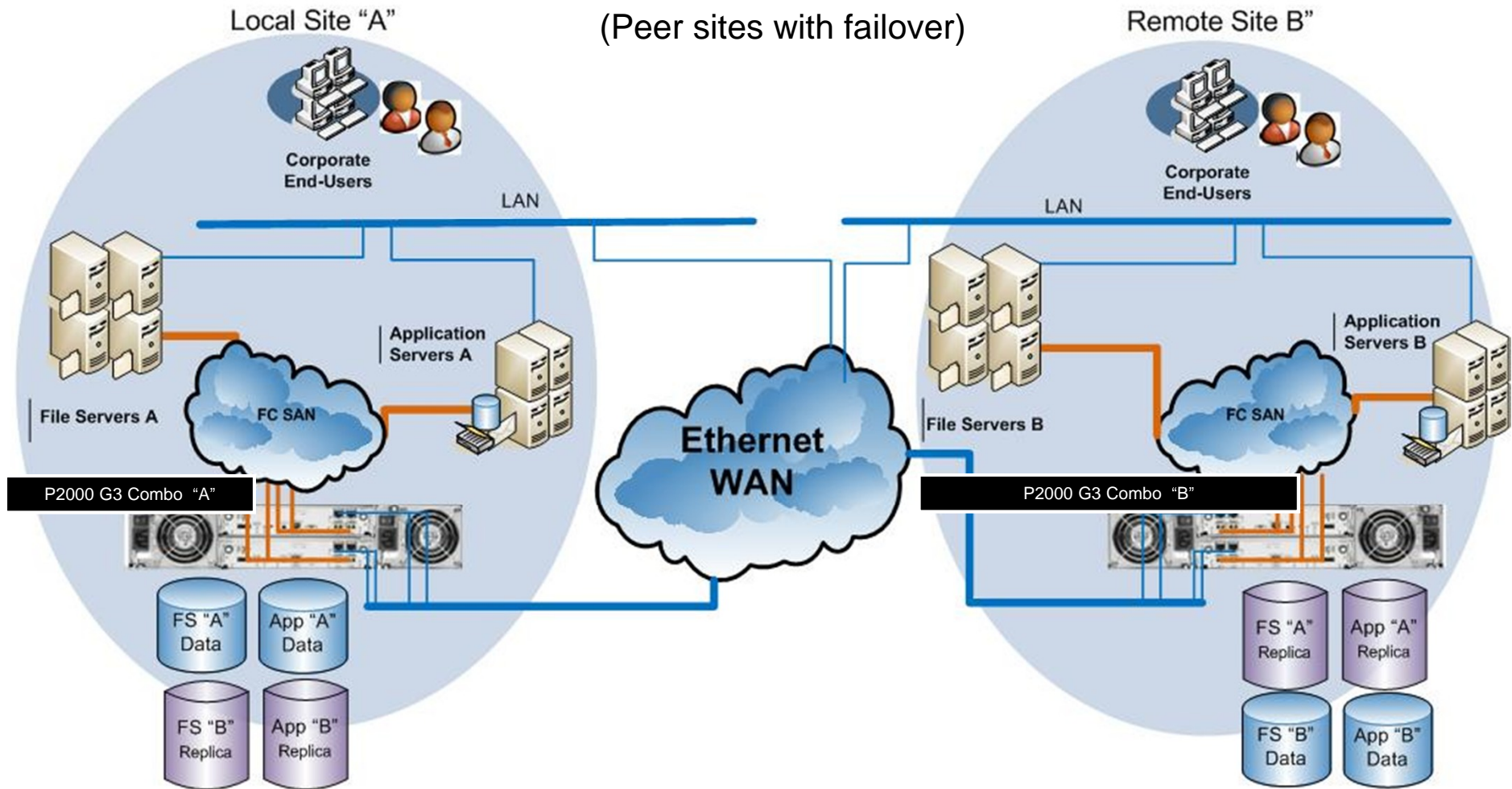
– Integrated with VMware HA/DRS

Remote Snap Use Case #1
(Remote Site Data Protection)

Local Site "A"

Corporate End-Users

LAN

Application Servers A

File Servers A

FC SAN

P2000 G3 Combo "A"

FS Data

App A Data

Ethernet WAN

Remote Site "B"

P2000 G3 Combo "B"

App A Replica

FS Replica

- Benefits: Remote disaster Recovery for Local disaster; Backup is off-site (Tape may be local)
- Data Restore Modes: Replicate back over WAN, manually transporting the data, replace Array
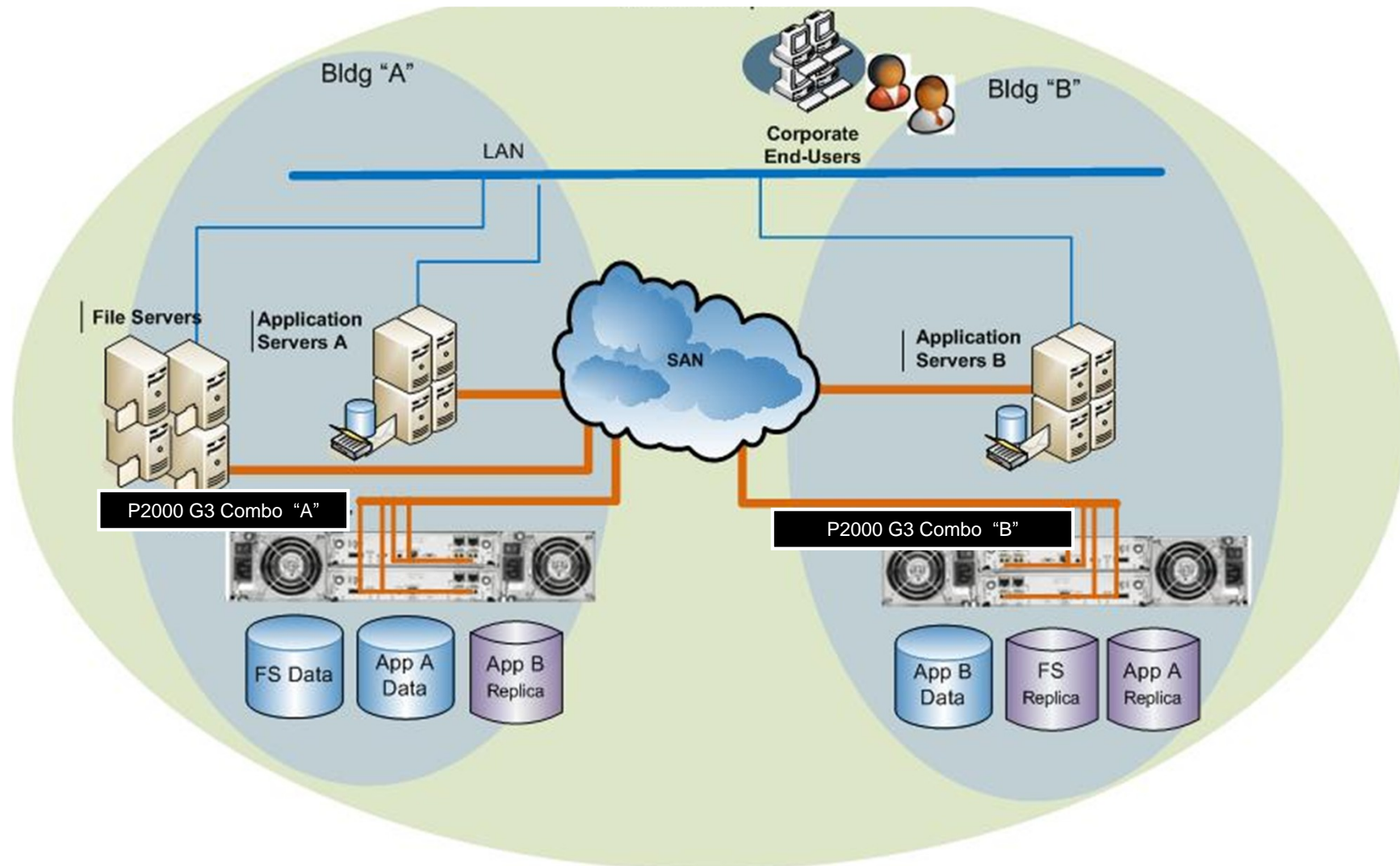
Remote Snap Use Case #2

(Peer sites with failover)

Local Site "A"

Corporate End-Users

LAN

File Servers A

Application Servers A

FC SAN

P2000 G3 Combo "A"

FS "A" Data | App "A" Data

FS "B" Replica | App "B" Replica

Ethernet WAN

Remote Site B"

Corporate End-Users

LAN

File Servers B

Application Servers B

FC SAN

P2000 G3 Combo "B"

FS "A" Replica | App "A" Replica

FS "B" Data | App "B" Data

- Benefits: Remote DR for Local disaster of servers and storage; Local infrastructure for online access;

- Data Restore Modes: Replicate back over WAN, Manually transport the data, Replace Array

- Failover Modes Example: VMware, Hyper V fail over to Remote Servers

Remote Snap Use Case #3
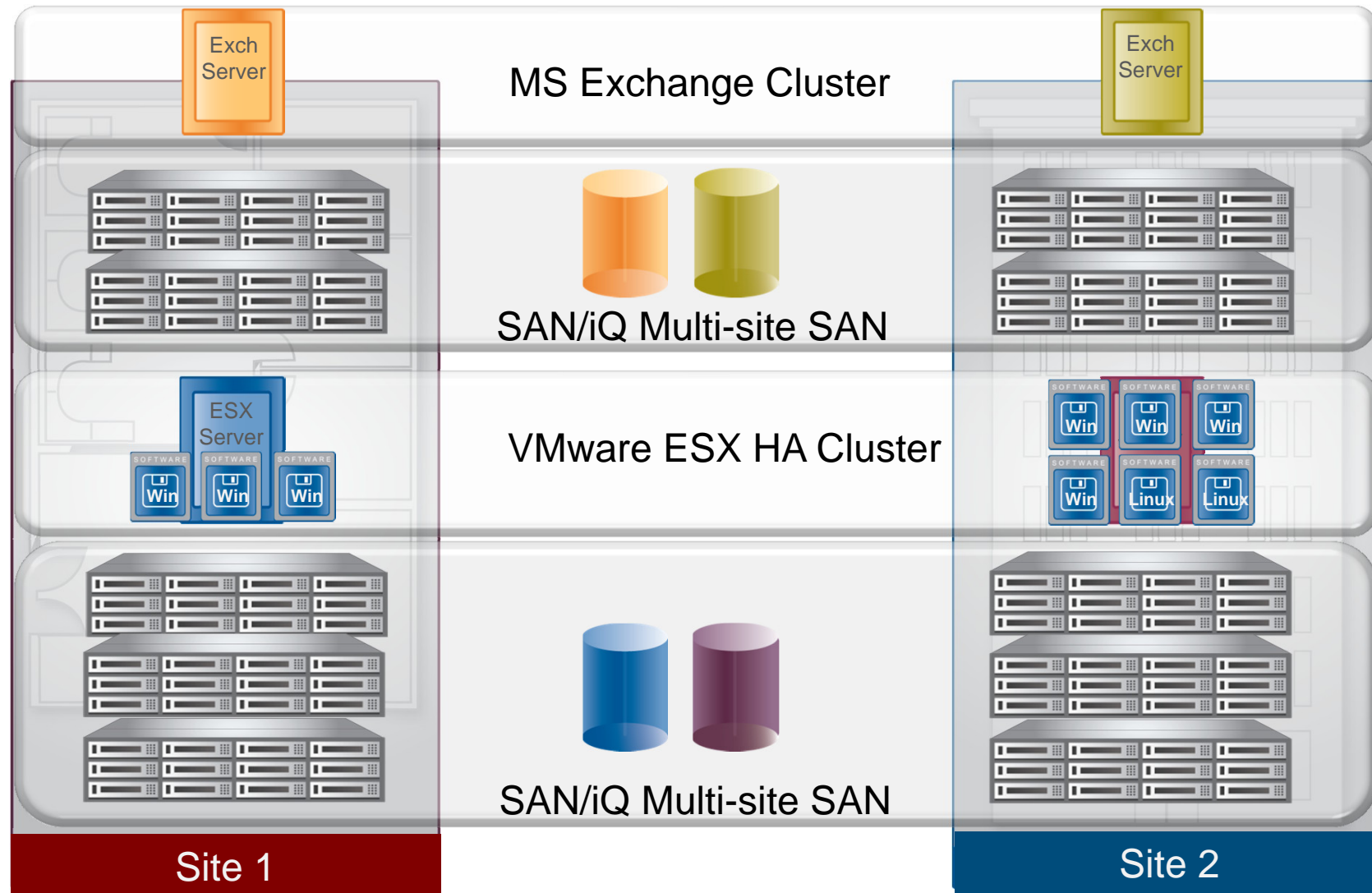
(Local Campus DR with FC)

- Benefits: DR for disaster of servers and storage; Fast replication over FC
- Data Restore Modes: Replicate back over FC, Manual transport of the data
- Failover Modes example: VMware, Hyper V fail over to Remote Servers

Remote Snap Use Case #4

(FC/iSCSI target mode)
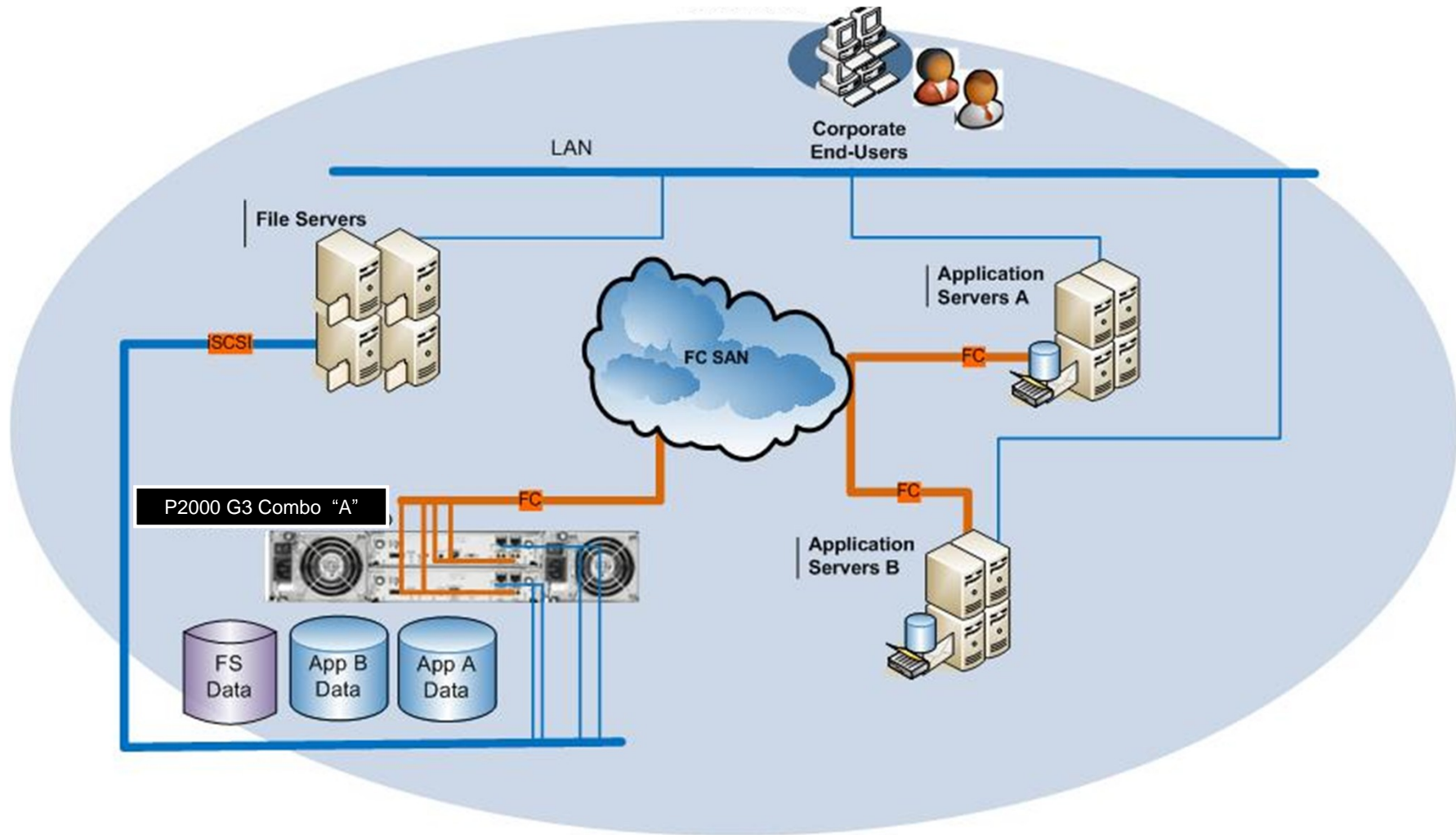
Benefits: Extend reach of SAN to servers that don't have FC HBA's or FC SAN access;
Provide IP-based centralized backup of FC SAN
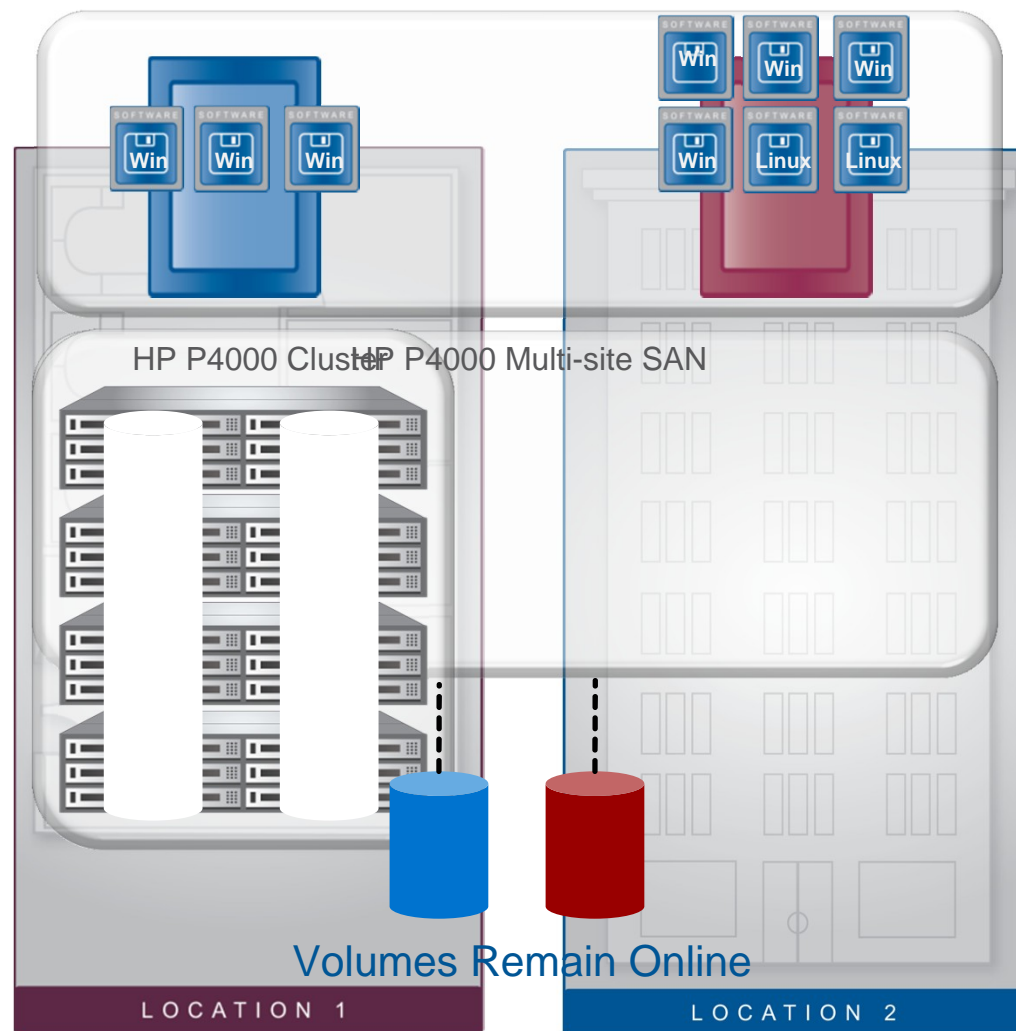
MULTI-SITE SAN SOLUTION

Exch Server

Exch Server

MS Exchange Cluster

SAN/iQ Multi-site SAN

ESX Server

VMware ESX HA Cluster

SAN/iQ Multi-site SAN

Site 1

Site 2

10 Gb Private Fibre

HIGH AVAILABILITY AND FAULT TOLERANCE COSTLY AND COMPLEX

- – Data protection limited to:
  - Redundant Components

- – What it takes for HA
  - Additional storage system
  - Add-on synchronous replication software
  - Professional services

- – How well does it work?
  - Failover/failback is manual
  - Some don't support multi-site
  - Time consuming
  - May result in excessive downtime

LOCATION 1

LOCATION 2
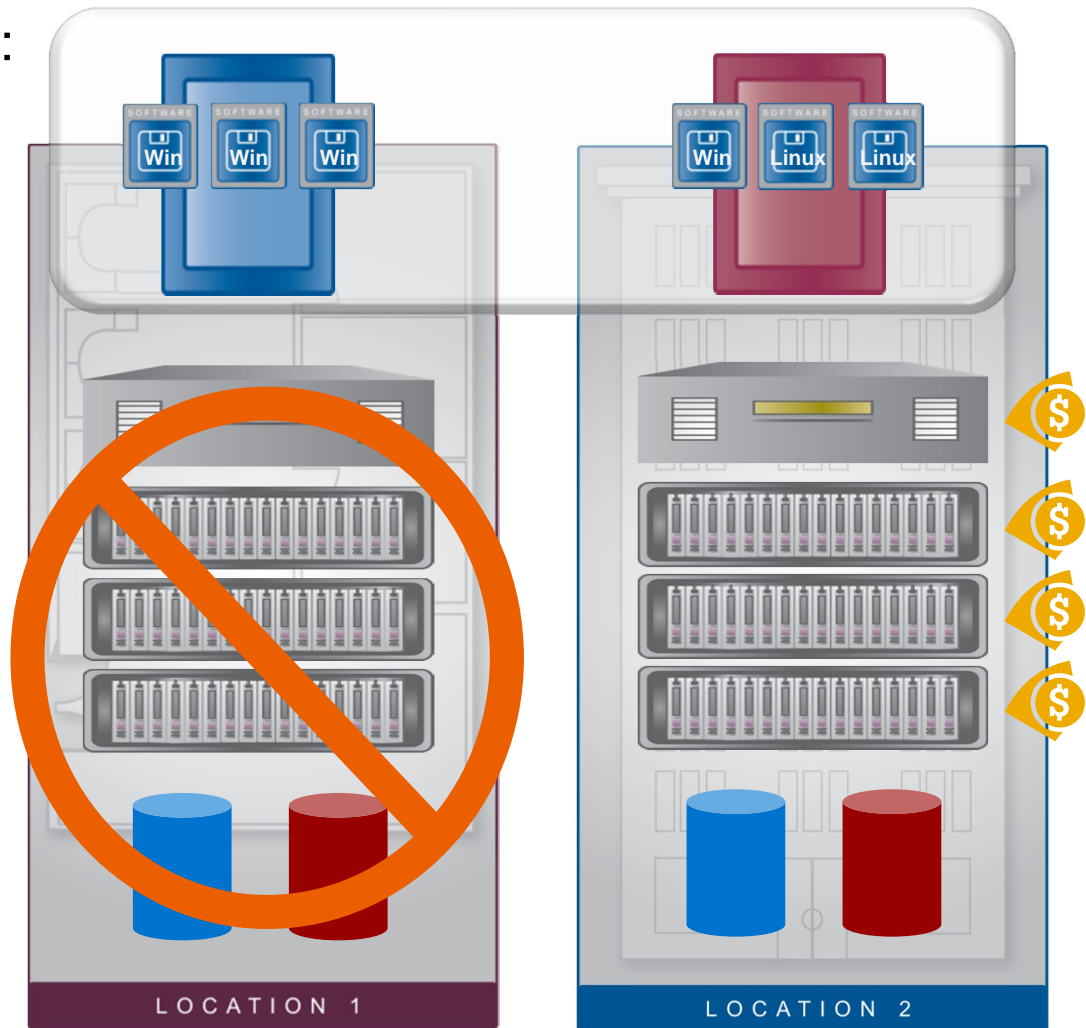
SIMPLIFY HIGH AVAILABILITY ACROSS DATA CENTERS WITH HP P4000

– Single SAN deployment
  - Hardware RAID
  - Built-in synchronous replication
  - Built-in multi-site HA protection

– No extra software for HA
  - Everything is included

– Simple to setup and maintain
  - Continuous availability is automatic
  - Failover/failback is automatic
  - Data/VMs are always on-line

HP P4000 Cluster   HP P4000 Multi-site SAN

Volumes Remain Online

LOCATION 1   LOCATION 2

СПАСИБО!