Storage Networking to Improve High Availability and DR

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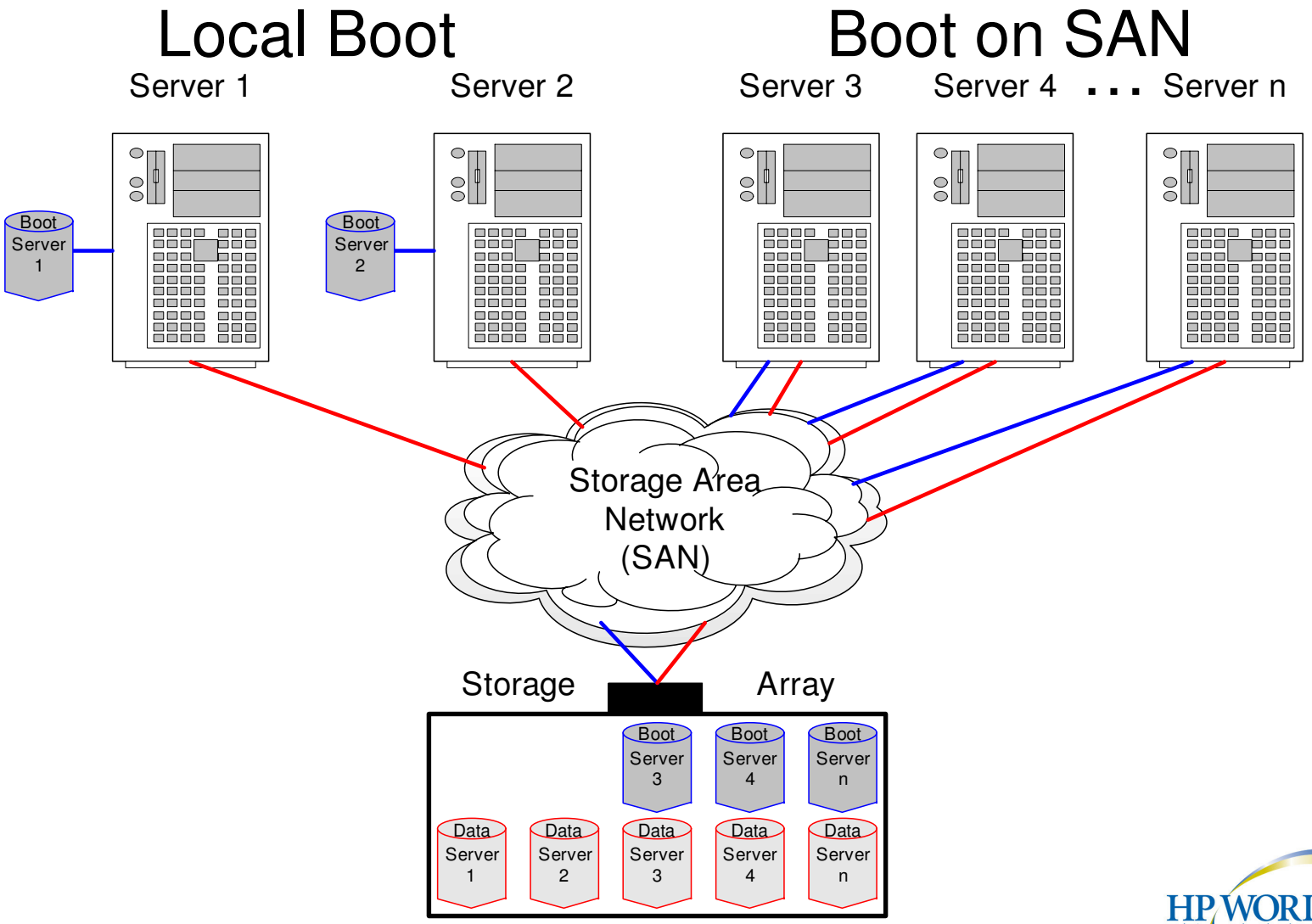
Storage Networking to Improve High Availability and DR

Agenda

- SAN and Storage Capabilities
  - Booting: Local versus SAN
  - Snaps: Demand Allocated, Fully Allocated, and Full Clone
  - Replication: Host Based, Network Based, Array Based
- High Availability
  - N+1 Architecture
  - Clustered Architecture
  - Clustered Architecture for Production and Quality Assurance
- Disaster Recovery
  - Recovery Point and Recovery Time
  - Examples for Disaster Recovery

SAN and Storage Capabilities
Booting: Local versus SAN



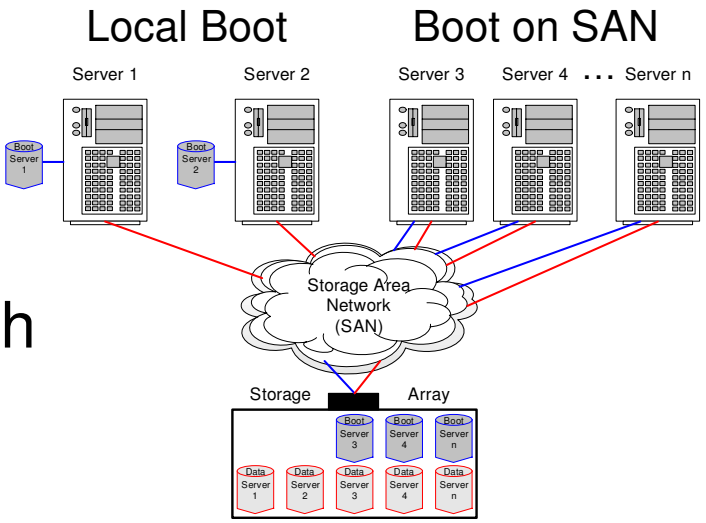
SAN and Storage Capabilities
Booting: SAN versus Local

Advantages

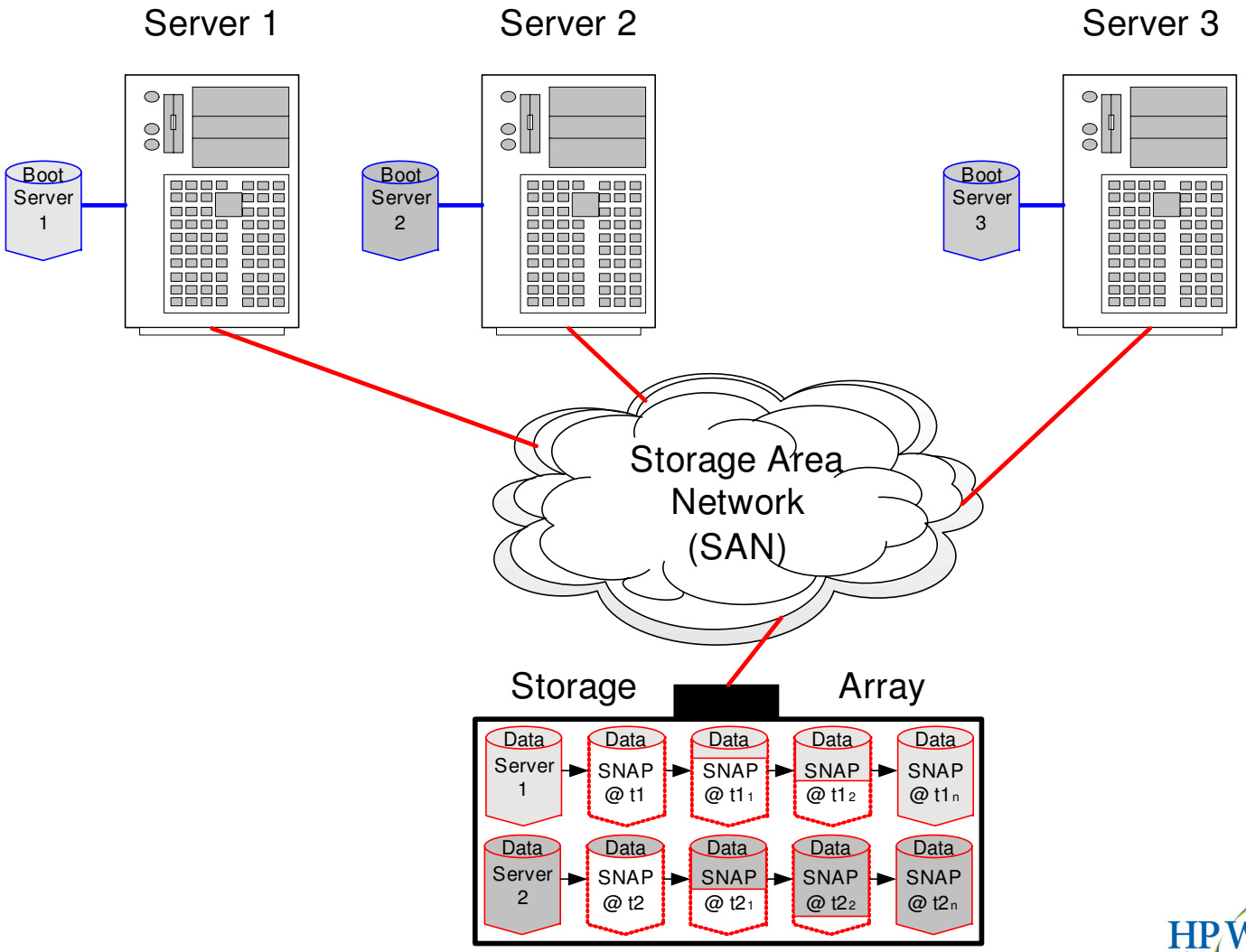
- Provides a variety of LUN sizes versus disk sizes
- Usually already protected in array with either mirrored or RAID, no need for mirroring software or configuration
- Ability to clone boot image for speedier repetitive deployment

Disadvantages

- Additional cost
- Additional complexity



SAN and Storage Capabilities
Snaps: Demand Allocated



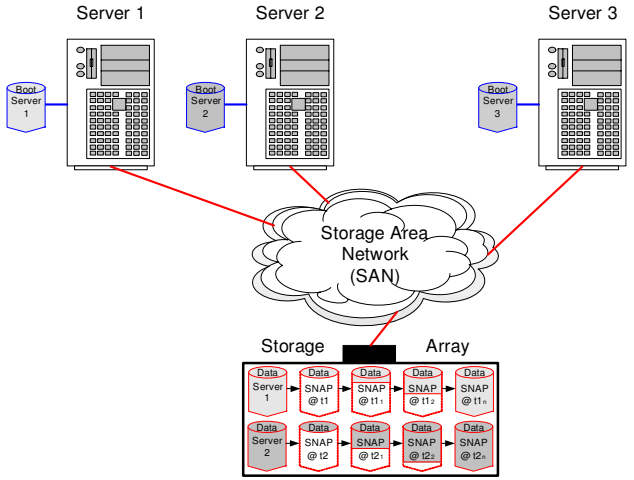
SAN and Storage Capabilities
Snaps: Demand Allocated

Advantages

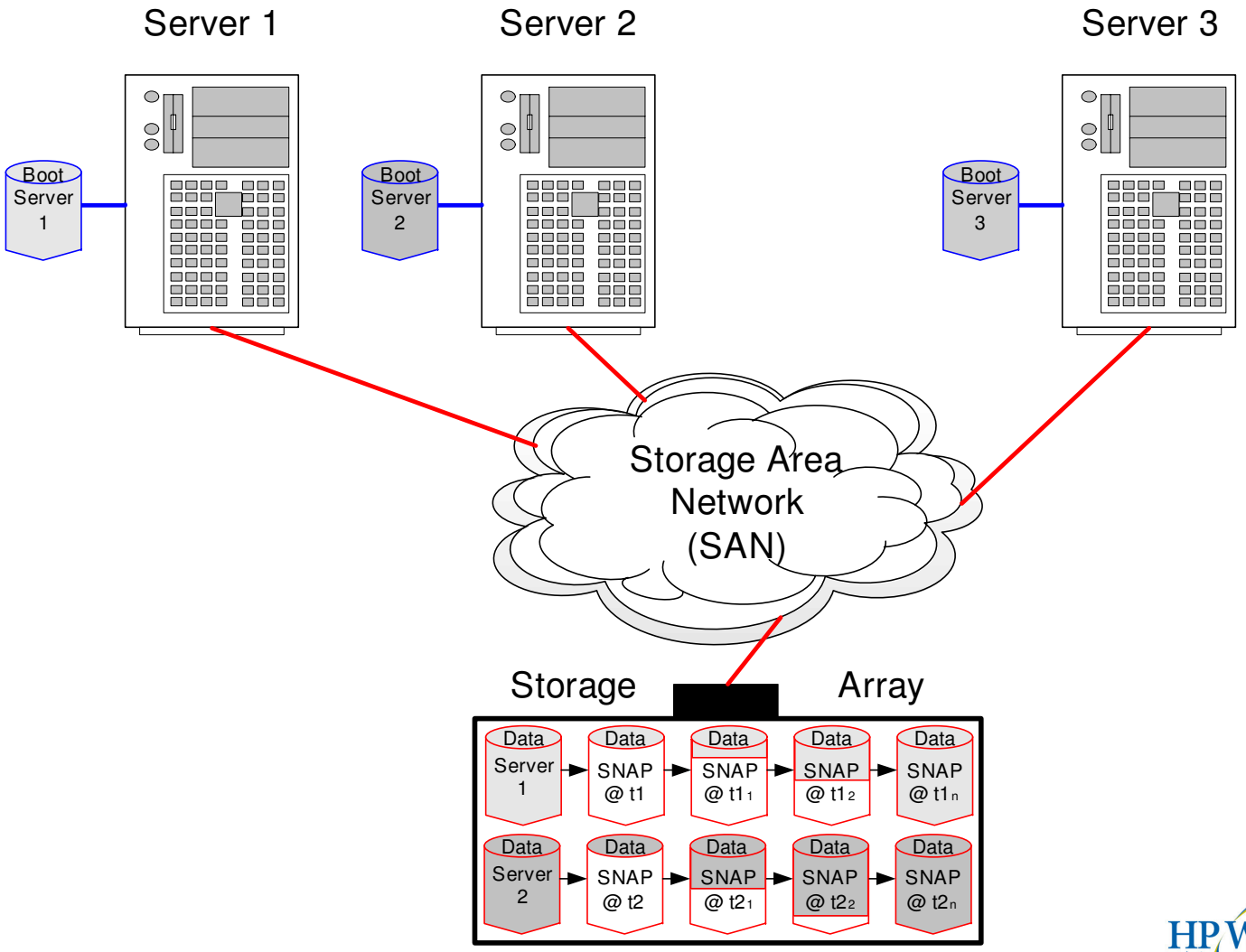
- Allocates space as needed, grows as changes occur
- Not constrained by overall capacity
- Available immediately

Disadvantages

- Access to snap still contends with source data
- Snaps may become unusable if storage capacity is achieved
- Read only access to snap



SAN and Storage Capabilities
Snaps: Fully Allocated



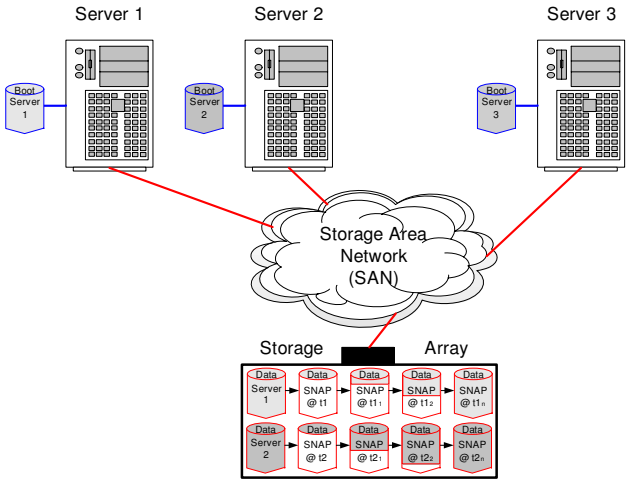
SAN and Storage Capabilities
Snaps: Fully Allocated

Advantages

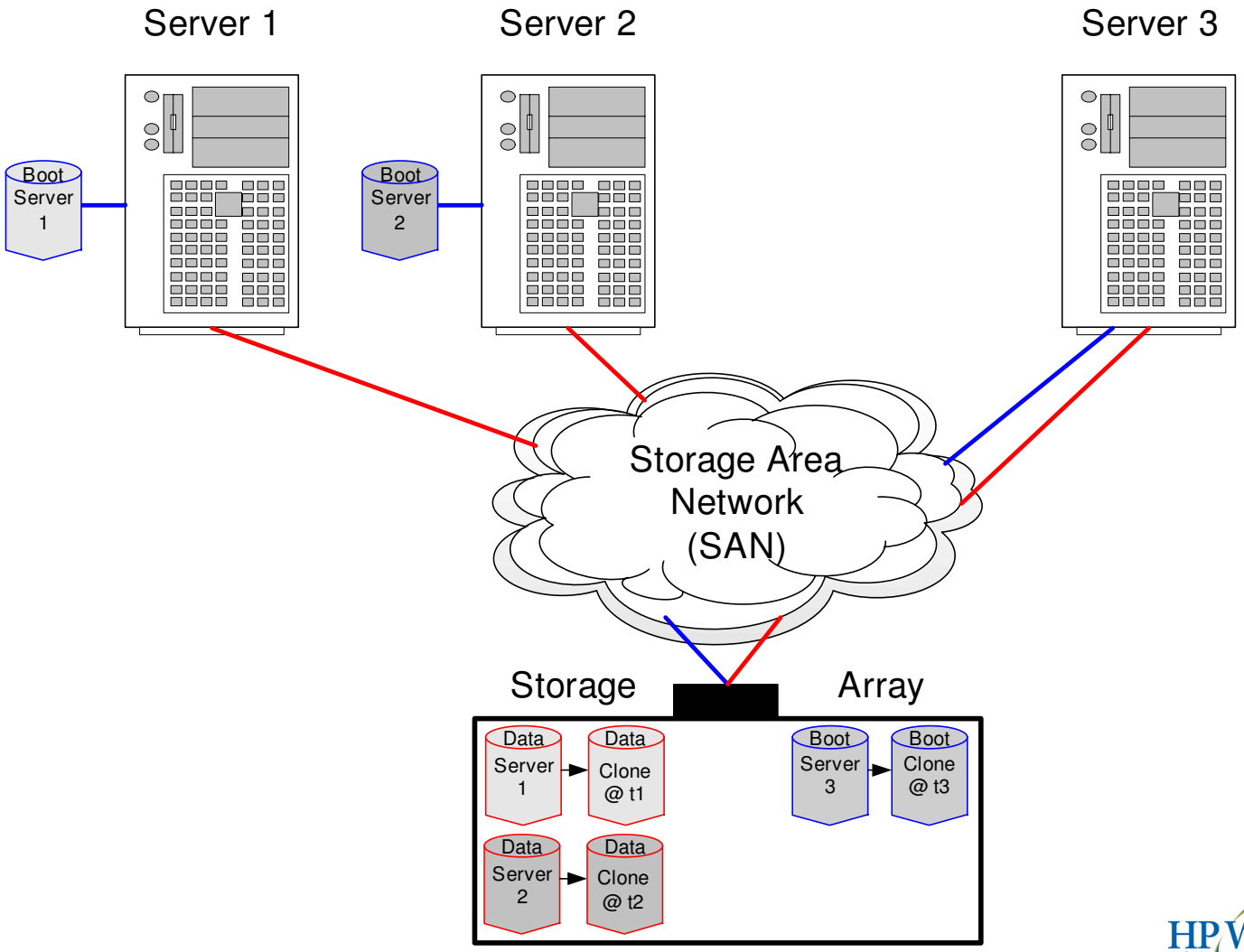
- Full allocates space, therefore space for snap is guaranteed
- Fills as changes occur
- Available immediately

Disadvantages

- Access to snap still contends with source data
- Constrained by overall capacity
- Read only access to snap



SAN and Storage Capabilities
Snaps: Full Clone



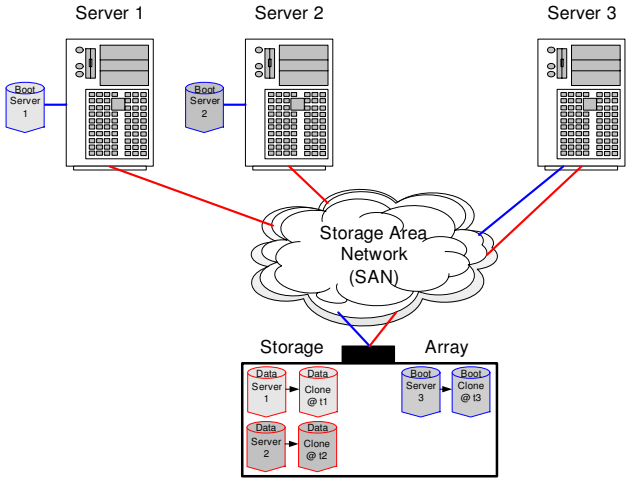
SAN and Storage Capabilities Snaps: Full Clone

Advantages

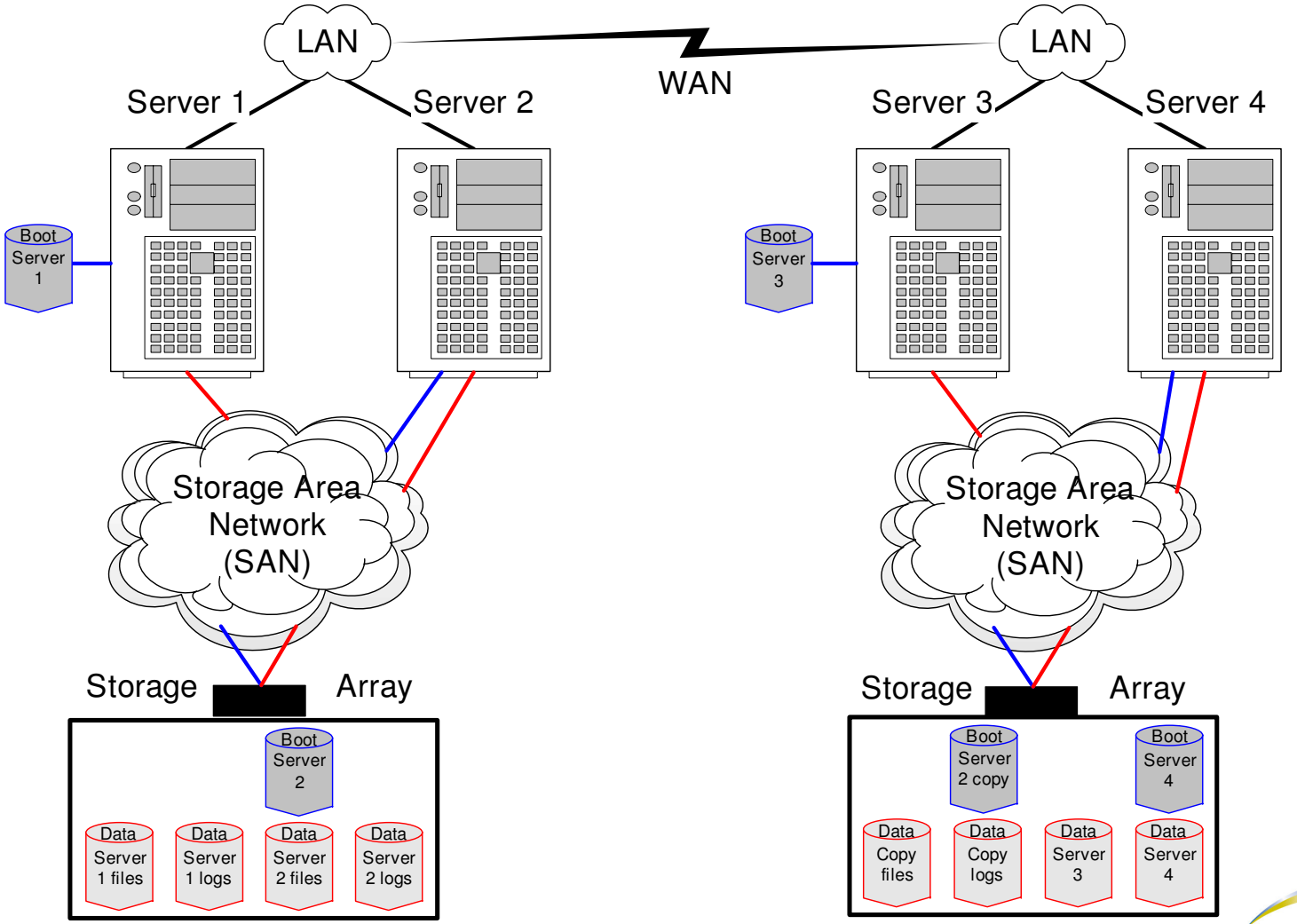
- Full allocates space, therefore space for snap is guaranteed
- Complete copy can be mounted read/write
- Can be resynchronized in many cases with only changes being propagated
- Does not contend with source data

Disadvantages

- Not available immediately, takes time to clone
- Constrained by overall capacity



SAN and Storage Capabilities Replication: Host Based



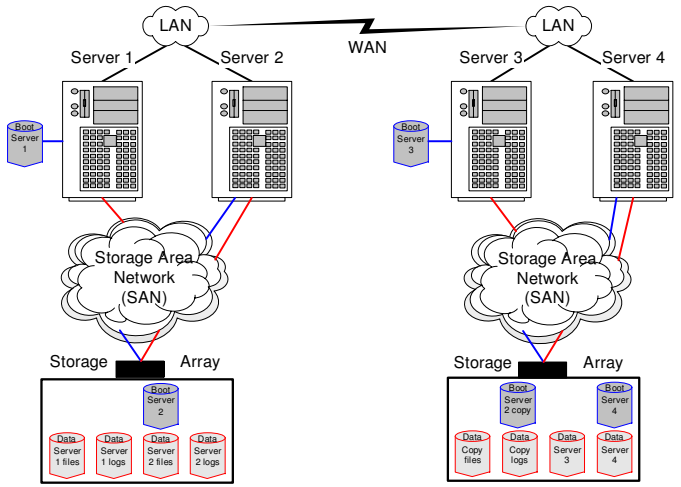
SAN and Storage Capabilities Replication: Host Based

Advantages

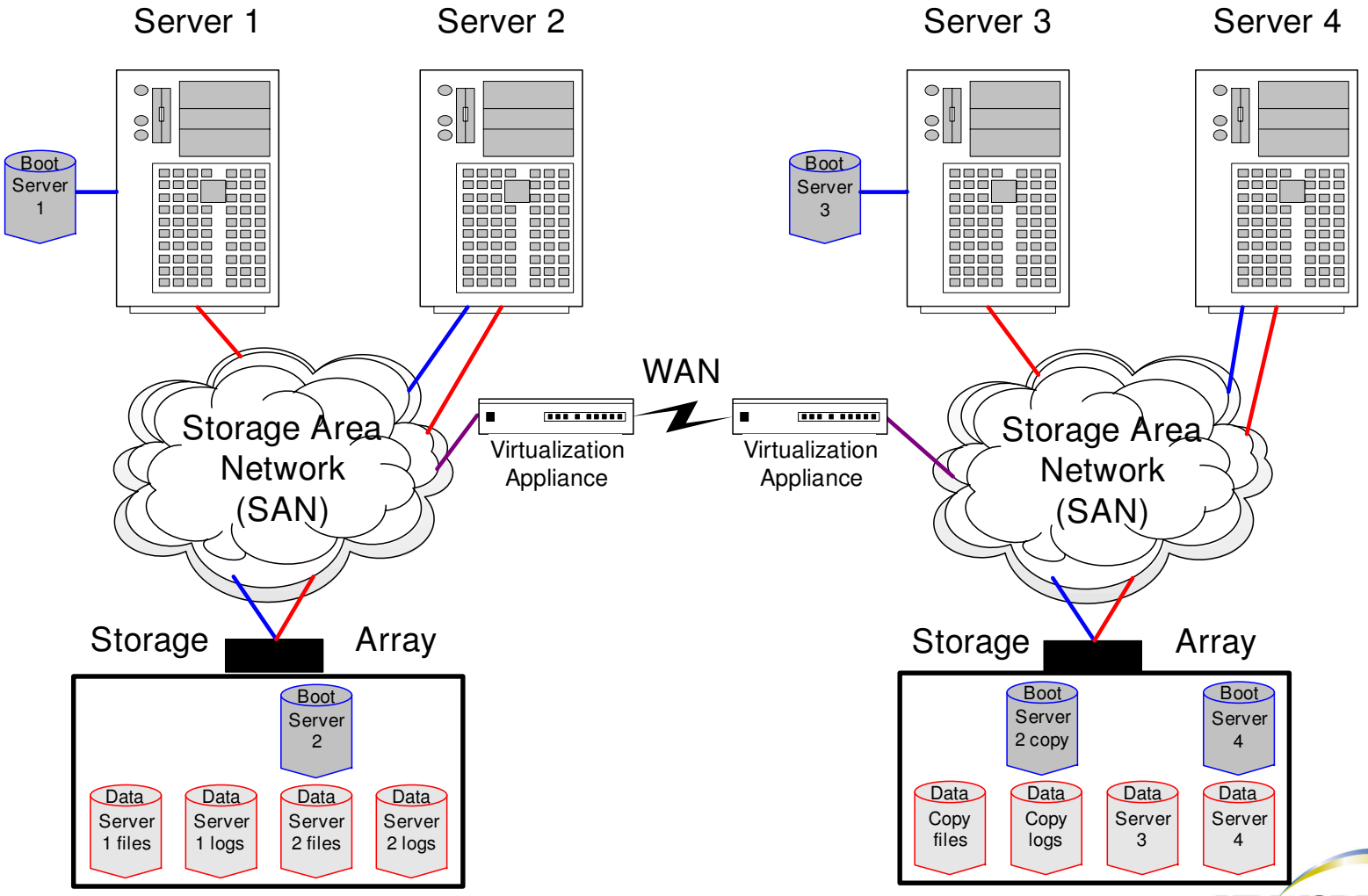
- Lower cost in small configurations
- Storage agnostic
- Many to one relationship is capable
- Flexible to be for file/volume/storage

Disadvantages

- Server(s), usually same OS, required at both locations to replicate data
- Have to manage software revisions
- Contends with production processing resources



SAN and Storage Capabilities Replication: Network Based



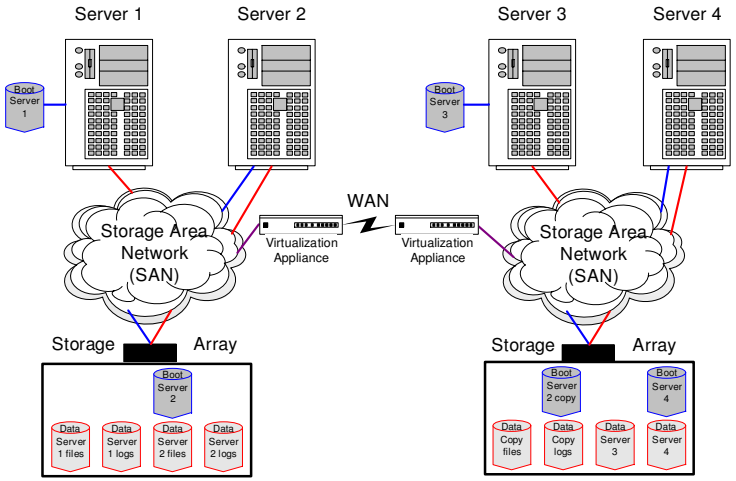
SAN and Storage Capabilities Replication: Network Based

Advantages

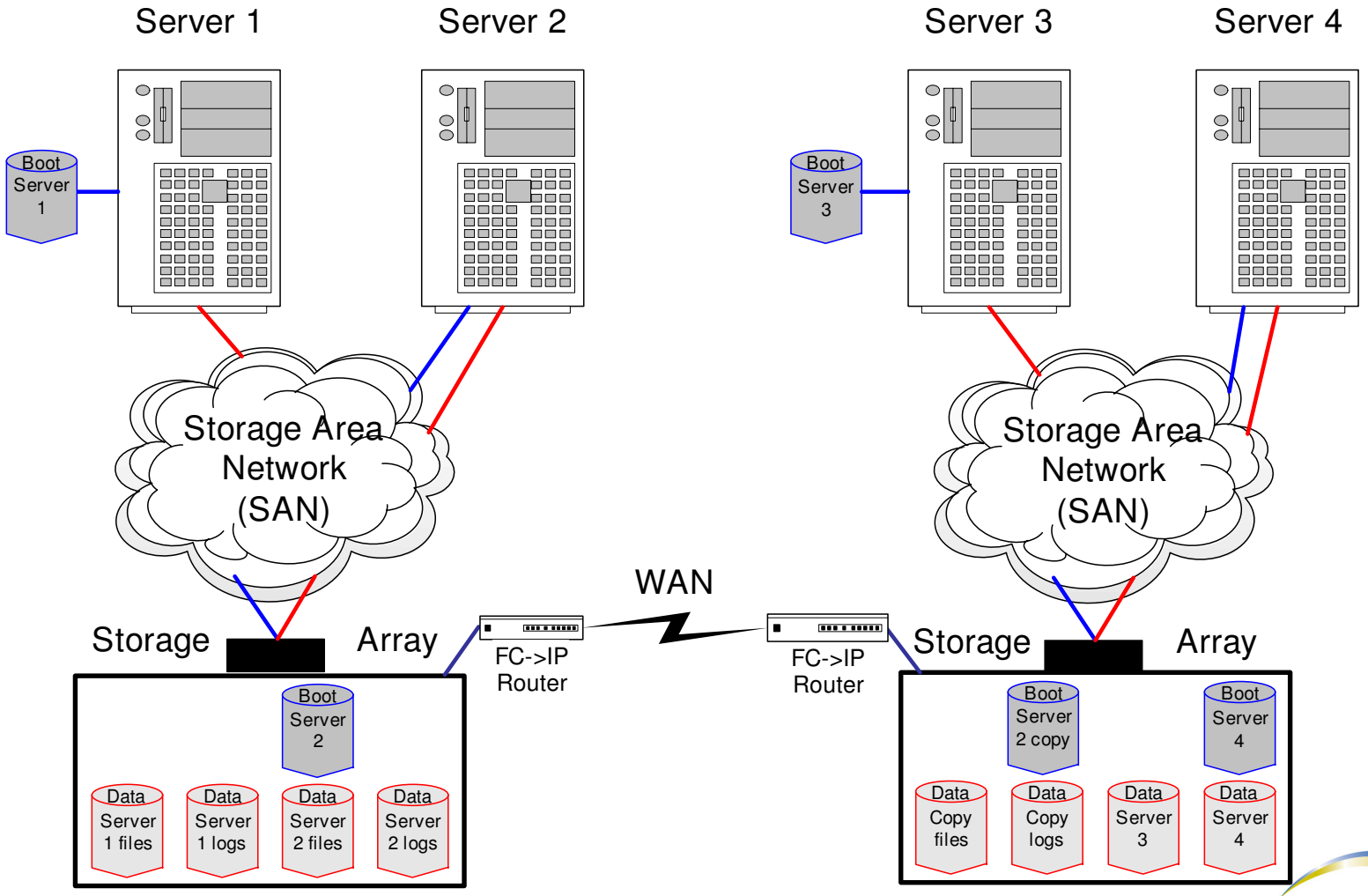
- No servers needed to replicate data
- Storage and server agnostic
- Many to one relationship is capable
- LUN level replication
- No contention with production processing resources

Disadvantages

- Requires appliance (HW/SW)
- Is usually inserted into I/O path



SAN and Storage Capabilities
Replication: Array (Controller) Based



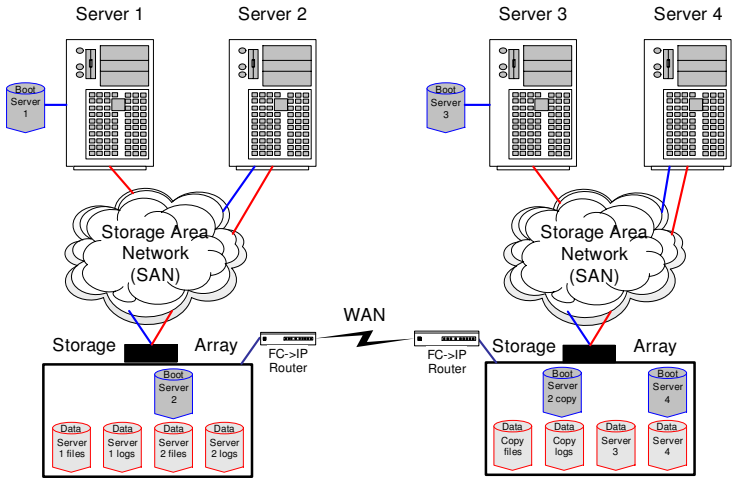
SAN and Storage Capabilities Replication: Array (Controller) Based

Advantages

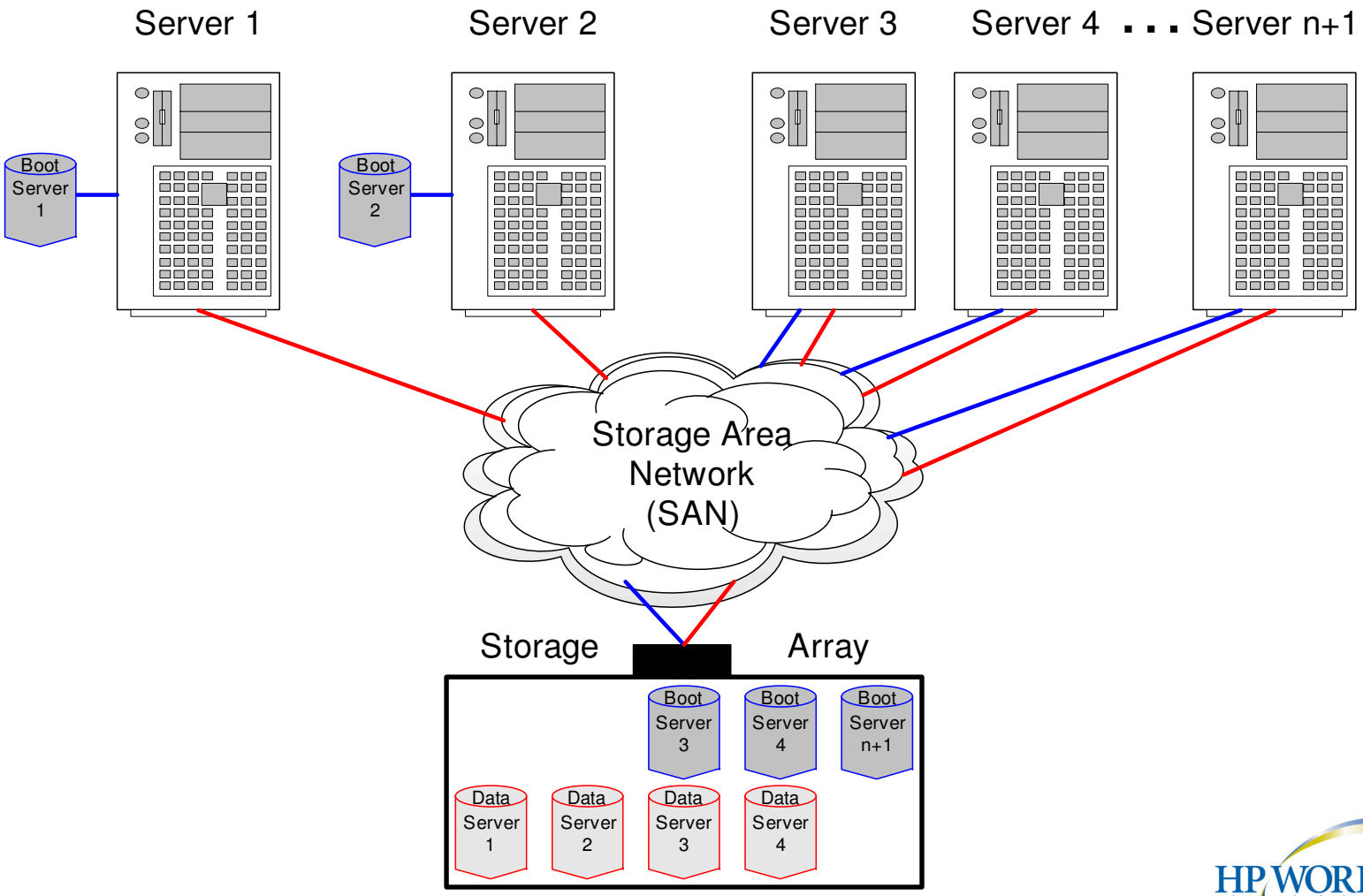
- No servers needed to replicate data
- Server agnostic
- LUN level replication
- No contention with production processing resources

Disadvantages

- Requires same array and configuration or at least same software
- Usually requires FC to IP routing conversion



High Availability
N+1 Server Architecture



High Availability
N+1 Server Architecture

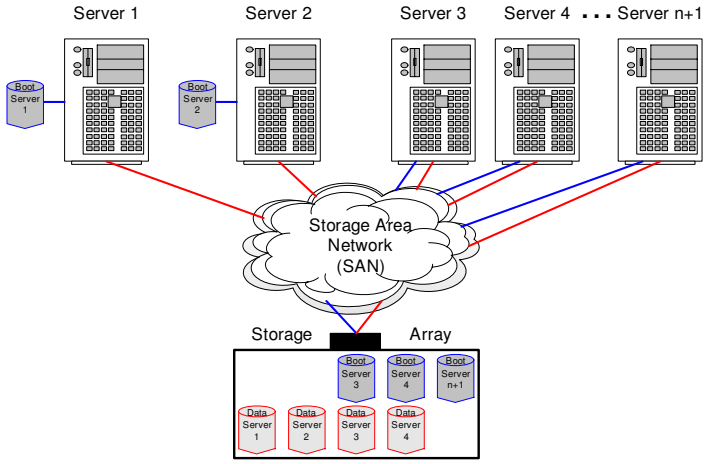
Without Boot on SAN

Advantages

- Ability to have standby (N+1) server take over for failed server
- Reduced cost over clustering

Disadvantages

- Requires rebuild of boot for N+1 server
- Not automatic, requires administrator intervention



High Availability
N+1 Server Architecture

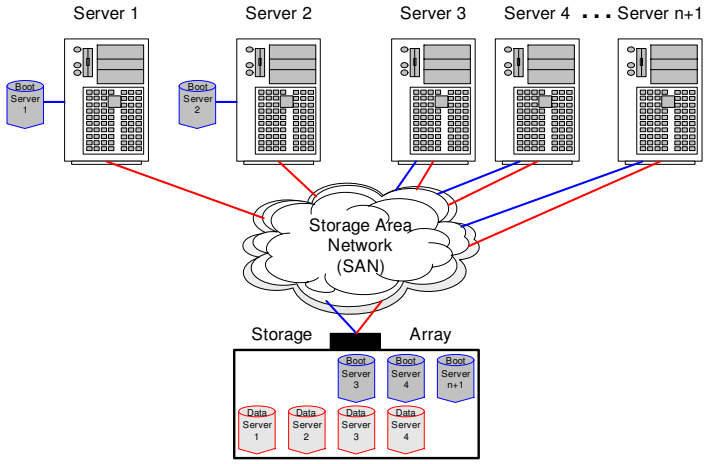
With Boot on SAN

Advantages

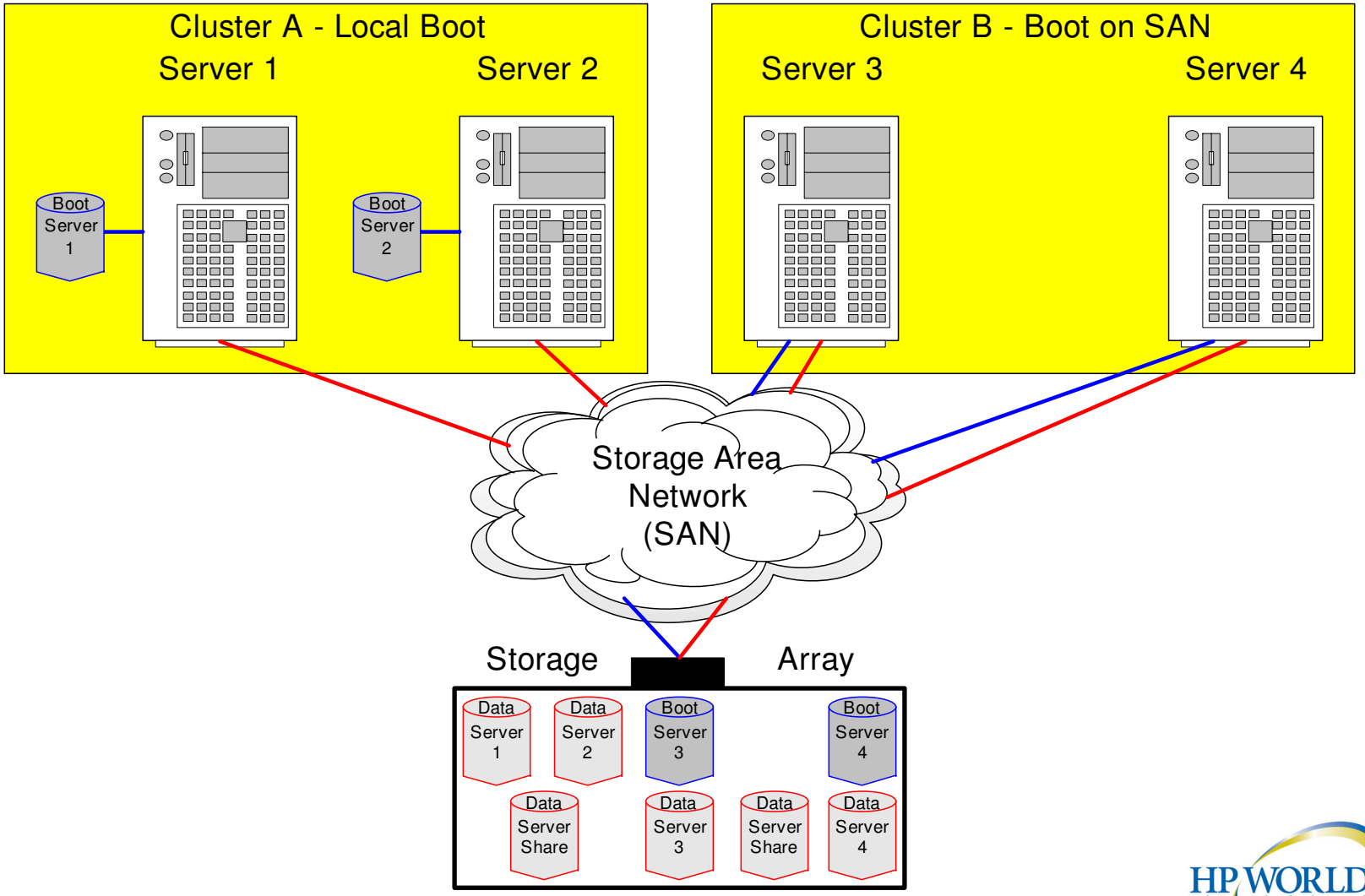
- Ability to have standby (N+1) server take over expediently for failed server
- Reduced cost over clustering

Disadvantages

- Requires consistency of server hardware
- Not automatic, requires administrator intervention

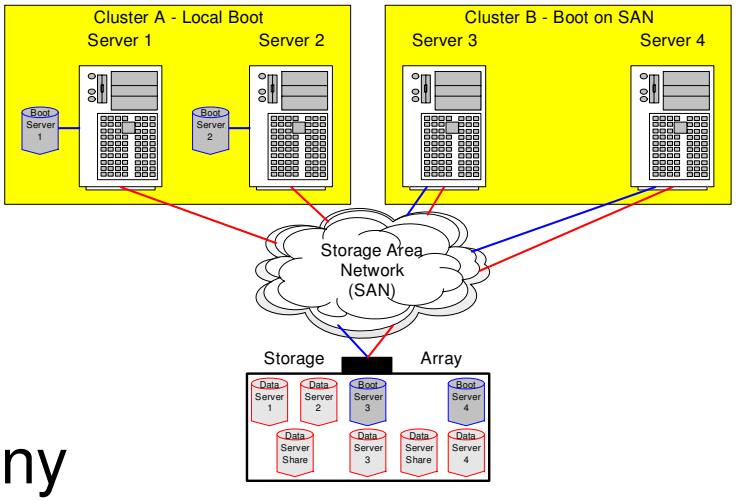


High Availability Clustered Architecture



High Availability Clustered Architecture

Without Boot on SAN



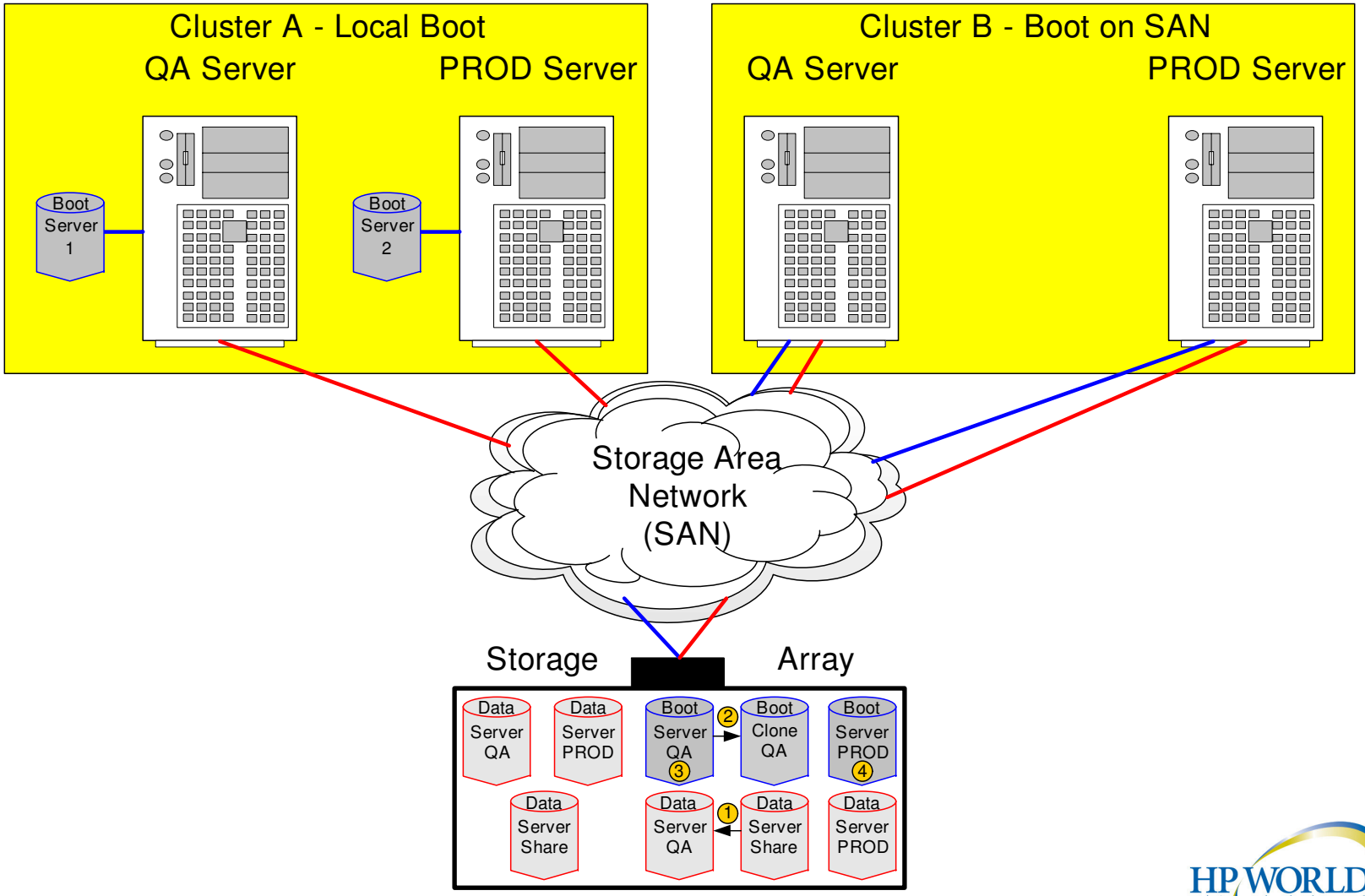
Advantages

- Automatic server failover
- Can have multiple applications in cluster, one failover can support many
- Does not require servers to be consistent hardware, just same operating system

Disadvantages

- More costly than N+1 with the additional clustering software
- Clustering software needs maintaining

High Availability Clustered Architecture

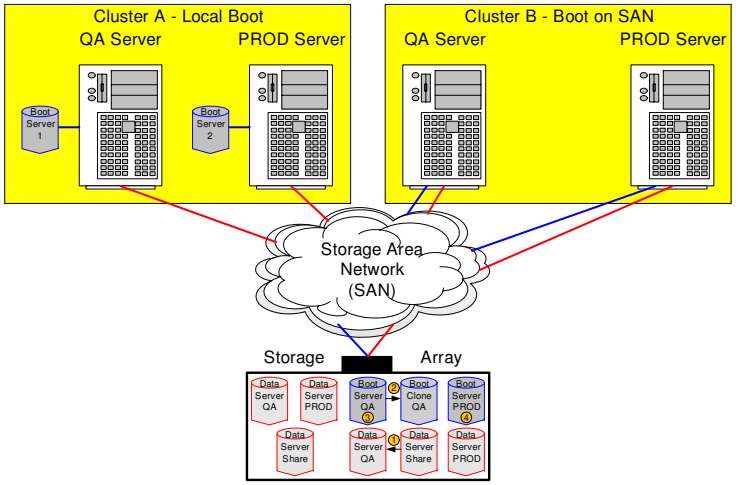


High Availability Clustered Architecture

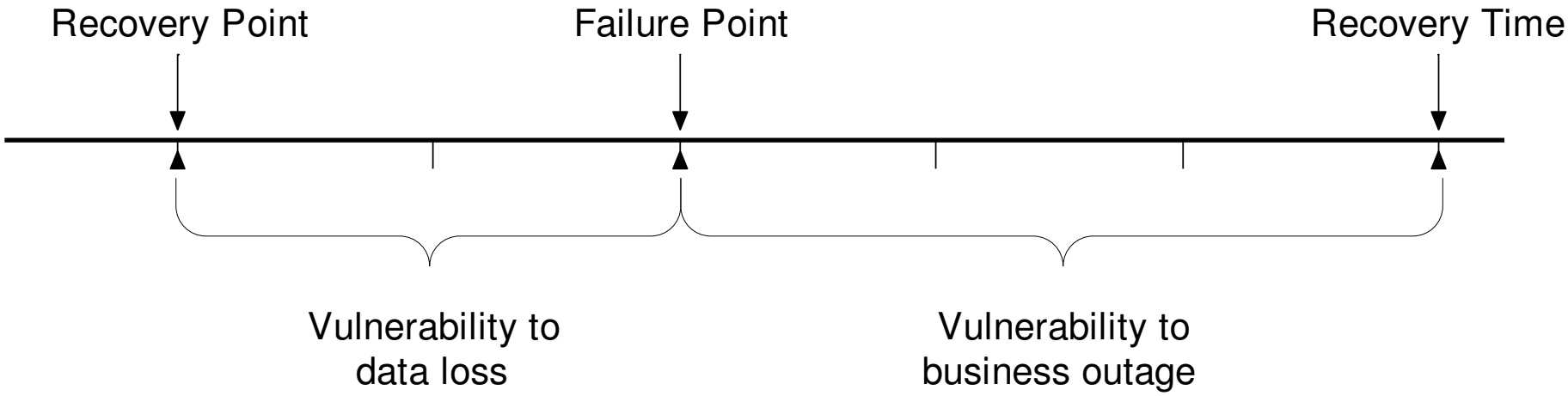
With Boot on SAN

Rolling upgrade with QA and PROD

- Copy PROD data to QA – Step 1
- Deactivate cluster
- Clone QA boot – Step 2
- Upgrade QA boot (source) – Step 3
- Qualify/Validate QA
- Move production to QA server
- Upgrade PROD boot (source) – Step 4
- Reactivate cluster
- Move production to PROD server



Disaster Recovery
Recovery Point and Recovery Time



Recovery Point

- The point in time to when the data can be recovered, i.e. last backup, last archived snap, last transaction in log

Recovery Time

- The time it takes to recover the data and be processing transactions again

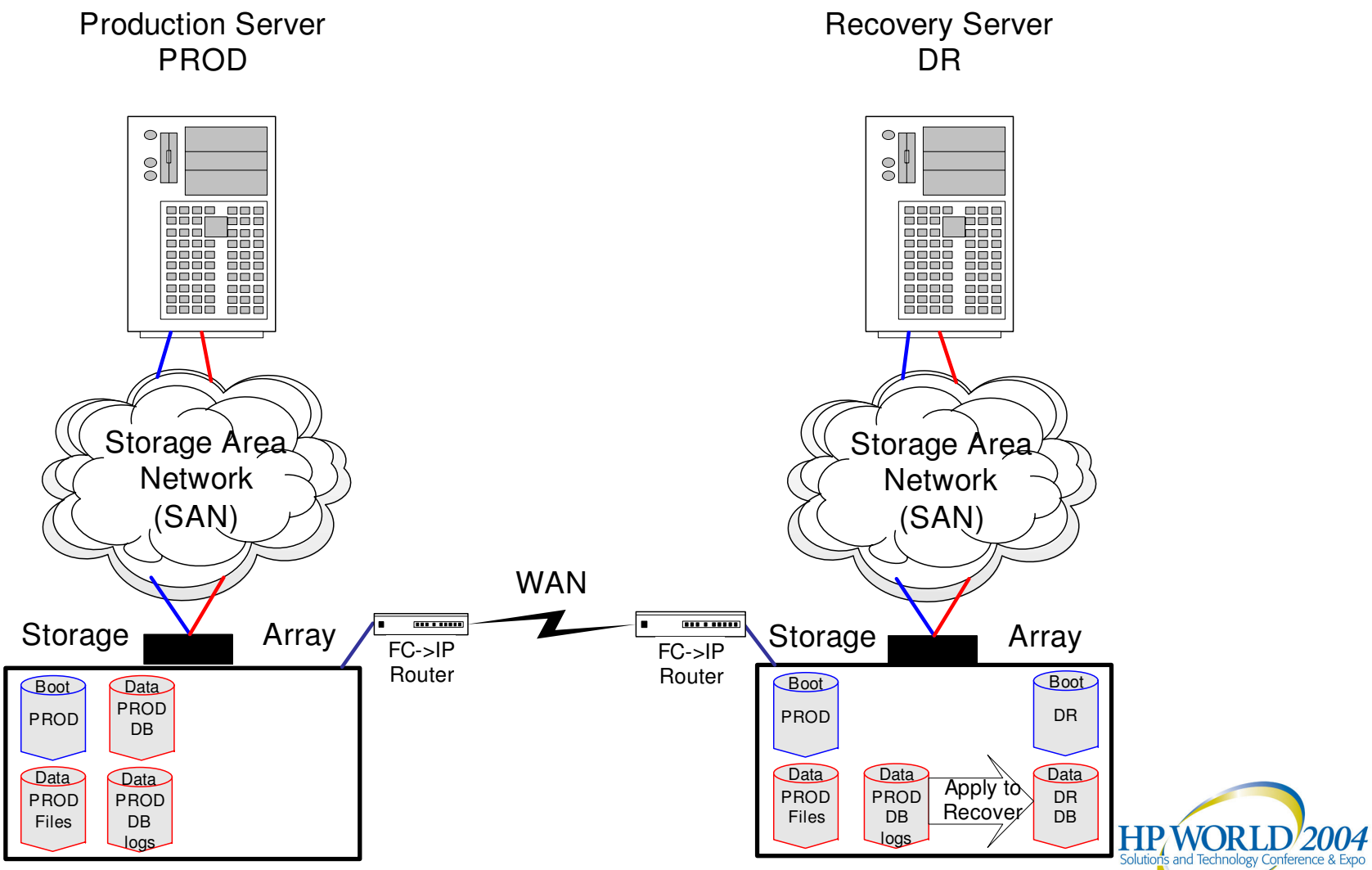
Disaster Recovery
Recovery Point Objective

Recovery Point Objective	Methods	Boot	Files	Database
1 day	Daily backup archived to recovery site	Yes	Yes	Yes
Several hours	Periodic snaps taken, archived, and exported to recovery site	Yes	Yes	Yes
< 1 hour	Log files archived and exported to recovery site	No	No	Yes
One transaction or less	Synchronized data	Yes	Yes	Yes

Disaster Recovery
Recovery Time Objective

Recovery Time Objective	Transport	Boot	Files	Database
24/48 hours	Tape	Tape	Tape	Tape
< 24 hours	Replication Network	Ignite Ghost	Files snapped and sync'd	Log Files sync'd and applied daily
< 24 hours w/o server costs	Replication Network	Ignite Ghost	Files snapped and sync'd	Database snapped and sync'd daily Log Files sync'd and saved
< 4 hours	Replication Network	Sync'd	Sync'd	Log Files sync'd and applied continuously

Disaster Recovery Architecture Example 1



Disaster Recovery Architecture Example 1

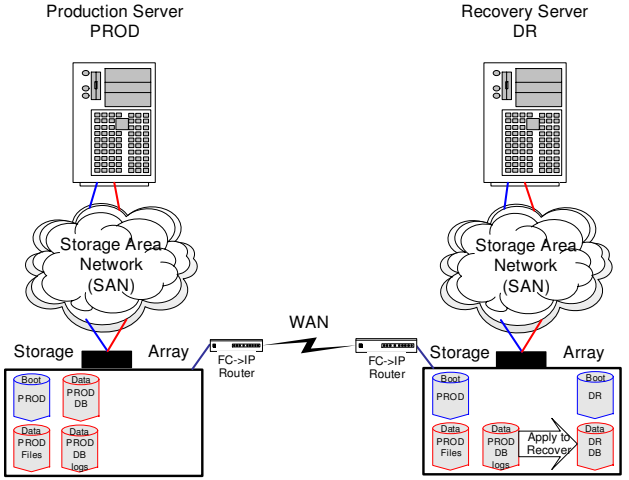
Boot – Synchronized continuously

Files – Synchronized continuously

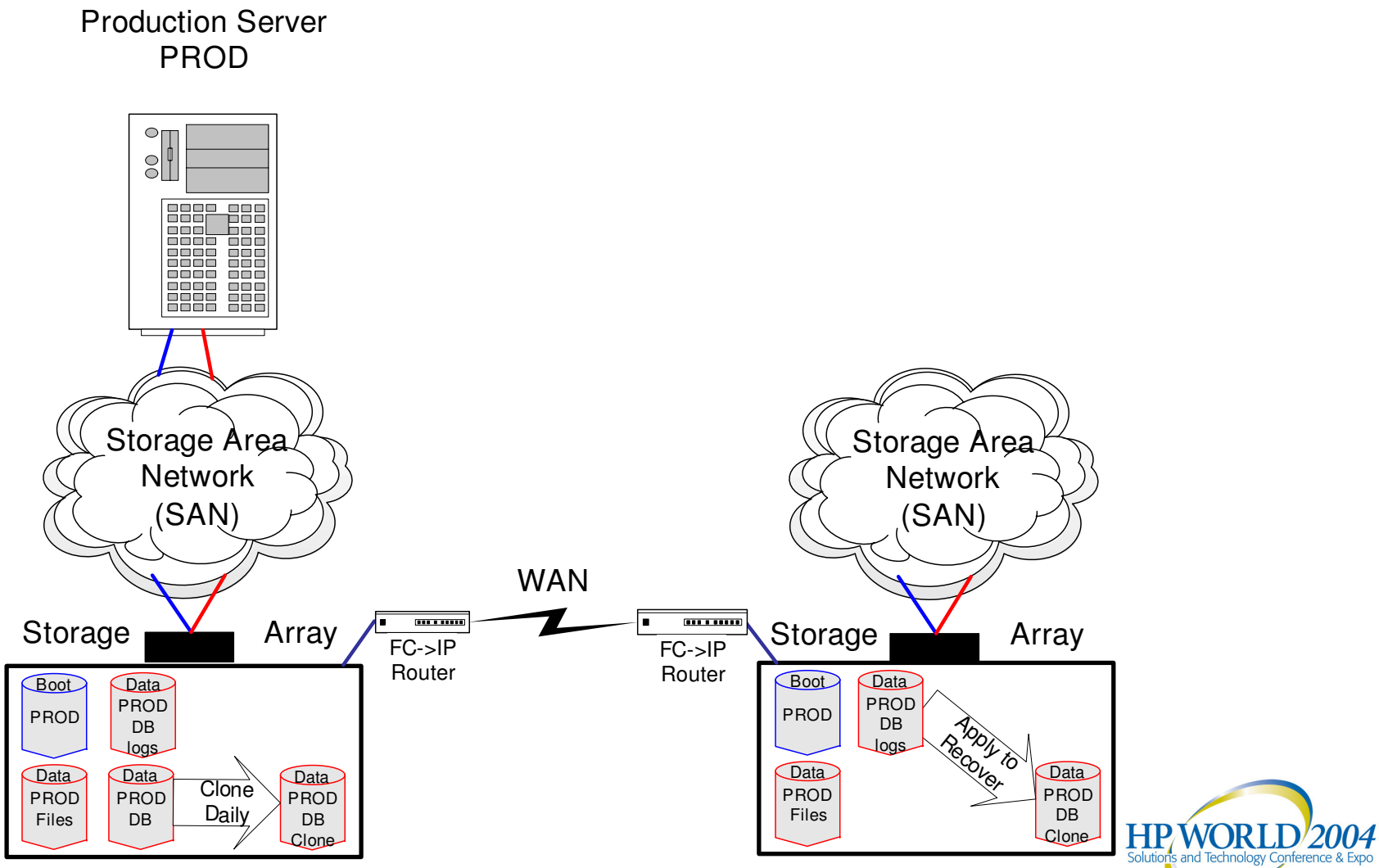
Database – Not synchronized, however restored once in beginning

Database Logs – Synchronized continuously

- Logs applied to recovery database upon closure of redo log as archive log
- Need recovery host



Disaster Recovery Architecture Example 2



Disaster Recovery Architecture Example 2

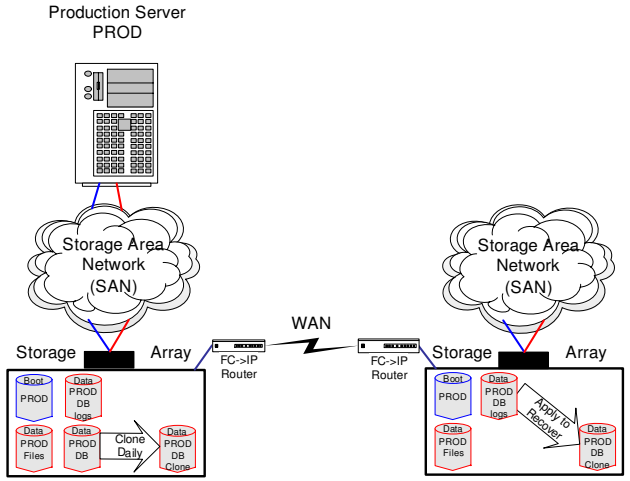
Boot – Synchronized continuously

Files – Synchronized continuously

Database – Cloned and synchronized once per day

Database Logs – Synchronized continuously

- Logs only applied to recovery database upon disaster, maximum of one day's worth of logs
- Need recovery host only at time of disaster



Questions and Answers

Thank you for attending

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