

Fibre Channel Zoning Fundamentals

All You Need to Know

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Today's Speakers



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About the FCIA

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About the Fibre Channel Industry Association (FCIA)



25+ Years
Promoting Fibre
Channel Technology



Industry Leading
Member Companies



142M+ FC Ports
Shipped Since 2001

Agenda

- What is Zoning
- Different types of zones
- How Zoning works
- Using Zoning



What is Zoning?

Zoning is a Partition

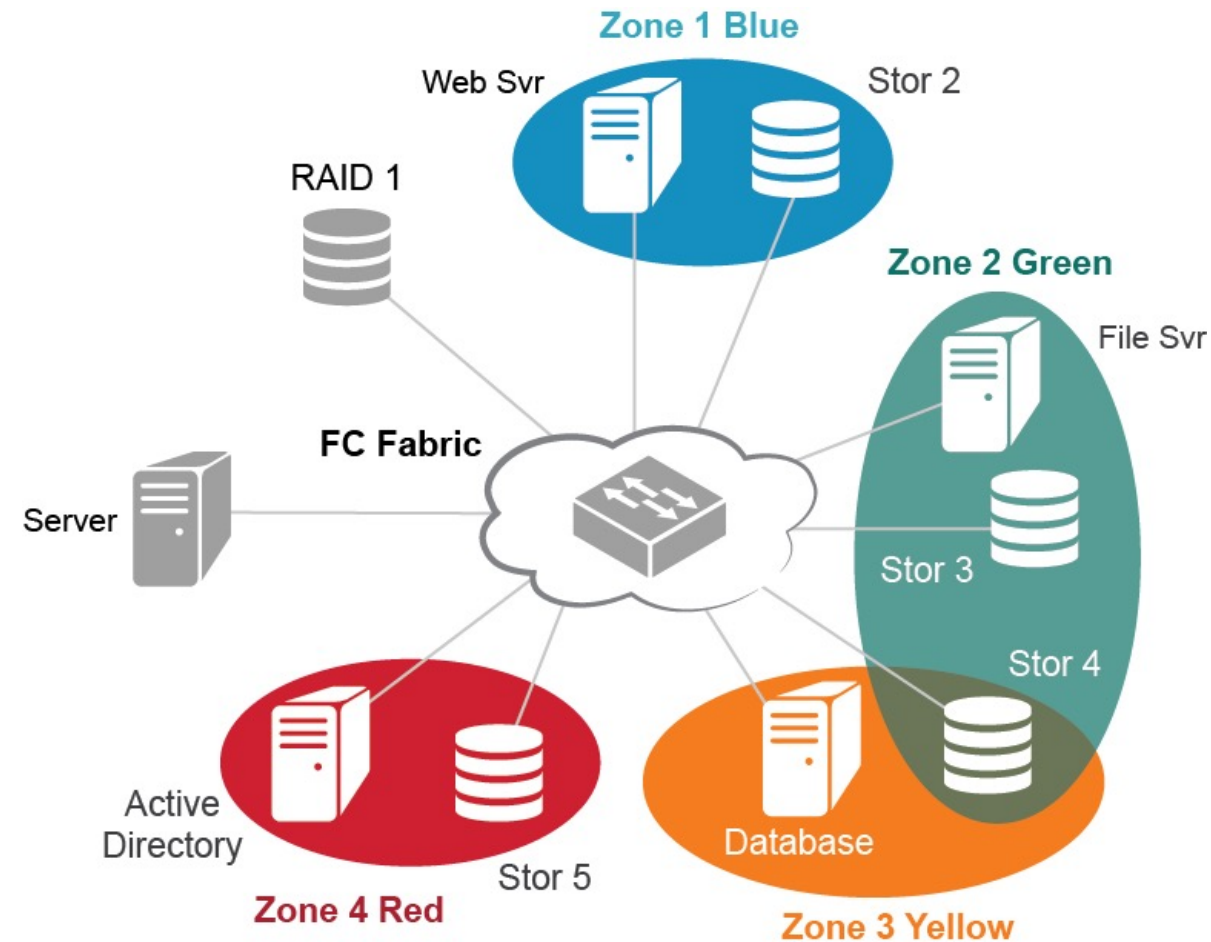
- SAN partitioning came about over time
 - Isolation of functional groups
 - Isolation of operating systems
 - Isolation of protocols
 - Isolation of vendors
- Zoning is a distributed fabric service
 - Highly resilient
 - Explicit access

What About Now?

- Zoning is the default mechanism for SAN deployment
 - Allows the partition of a single server to its assigned storage
 - Provides a very granular security mechanism that is HW enforced
 - Isolates broadcast traffic to local elements (RSCN within zone)

Regular Zoning Overview

- Web Server in Zone 1 sees disk array (Stor 2)
- File server in Zone 2 sees the two disk arrays
- Data Base Server in Zone 3 sees one disk array
- Active Directory in Zone 4 sees only one disk array (Stor 5)
- Generic Server sees no disks
- No servers see disk array RAID 1



Zone Deployments

- Addressing
 - World Wide Name (WWN) zones (sometimes referred to as (“soft”))
 - Port Zones (sometimes referred to as “hard”)
- Deployment
 - Always driven through Fabric configuration
 - Source can be:
 - Management tools
 - Scripting
 - Target

Different Types of Zones



Type of Zones

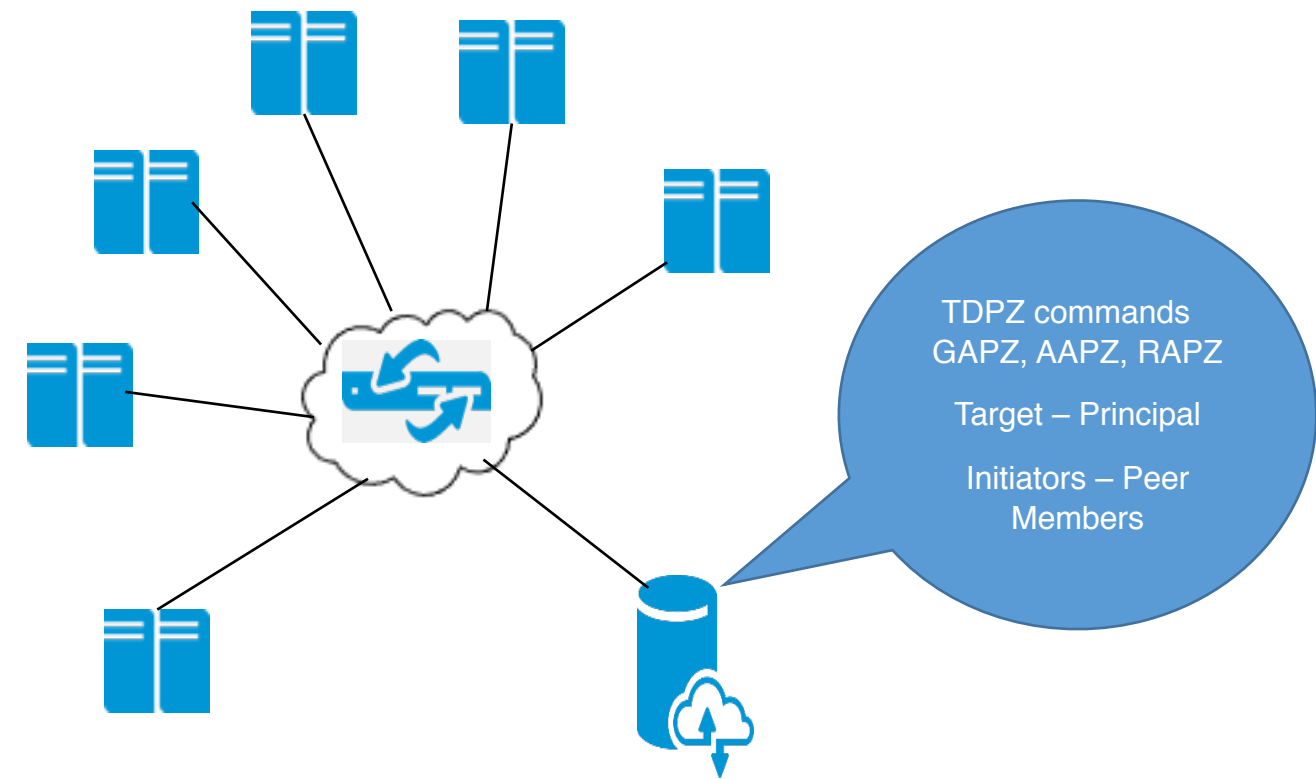
- Single Initiator Based Zones
- Peer Zones and Target Driven Peer Zones
- Switch Port Based Zoning

Single Initiator Based Zones

- Most popular before introduction of Peer Zones / Target Driven Peer Zones
- Functionally similar to SCSI bus way of connecting Single Initiator to Target Ports
 - A zone is created for the HBA and storage array Target ports are added. If the same HBA accesses a tape device then a second zone is created for the same HBA and associated tape device port
- Functionally very sound as Fabric Rescans (RSCN's) are targeted and do not impact the fabric
- Downside is the large number of zones that can get created which can lead to exceeding zone database limits

Peer Zones and Target Driven Peer Zones

- Peer Zones introduces a concept of Principal device which is usually the Target Port on the storage array
- N number of initiators can be zoned in the a single zone with a Target Port
- Principal device can communicate with all non-principal devices in the Peer Zone
 - However, principal AND non-principal devices cannot communicate with each other respectively therefore reducing RSCN impact
- Provides the efficiency of single initiator based zones which significantly reduces the number of zones that are required to be created / managed
- Target Driven Peer Zones are Peer Zones that can be created and managed directly by storage arrays



Target Driven Peer Zoning Example

Switch Port Based Zoning

- Zoning can be applied to the switch port a device is connected
- Port based zoning restricts traffic flow based on the specific switch port a device is connected to
- This type of zoning is very restrictive - if a device is moved to a different port on the switch, it can lose access.
- Many storage array advanced software features like peer persistence do not support port based zoning
- Very limited use with customers. Not recommended

How Zoning Works



How Does Zoning Work?

- From a high level
 - Zoning is like a privacy/security wall
- But, how does zoning work?
 - Combination of
 - Hardware
 - Software

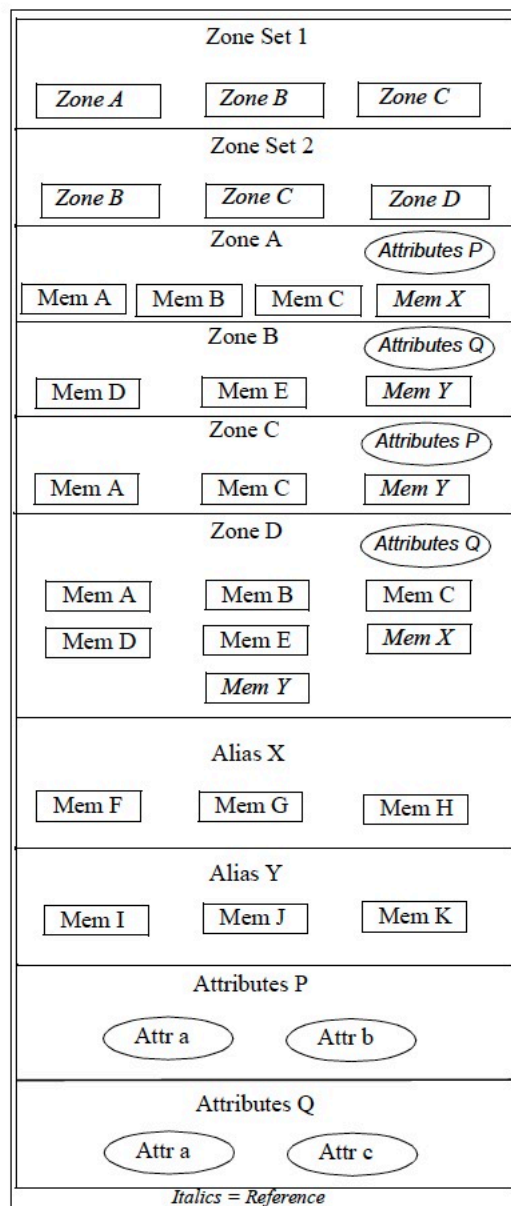
The Hardware

- The most secure type of zoning is “Hard” Zoning
 - Access is enforced by hardware
 - If a device is not on the list of allowed devices, access is denied
 - Highest security since hardware will prohibit access by devices which are not on the “allowed” list
 - No performance impact
 - Hardware details vary by implementation
 - Typically there is a hardware lookup table of devices which are allowed access

The Software

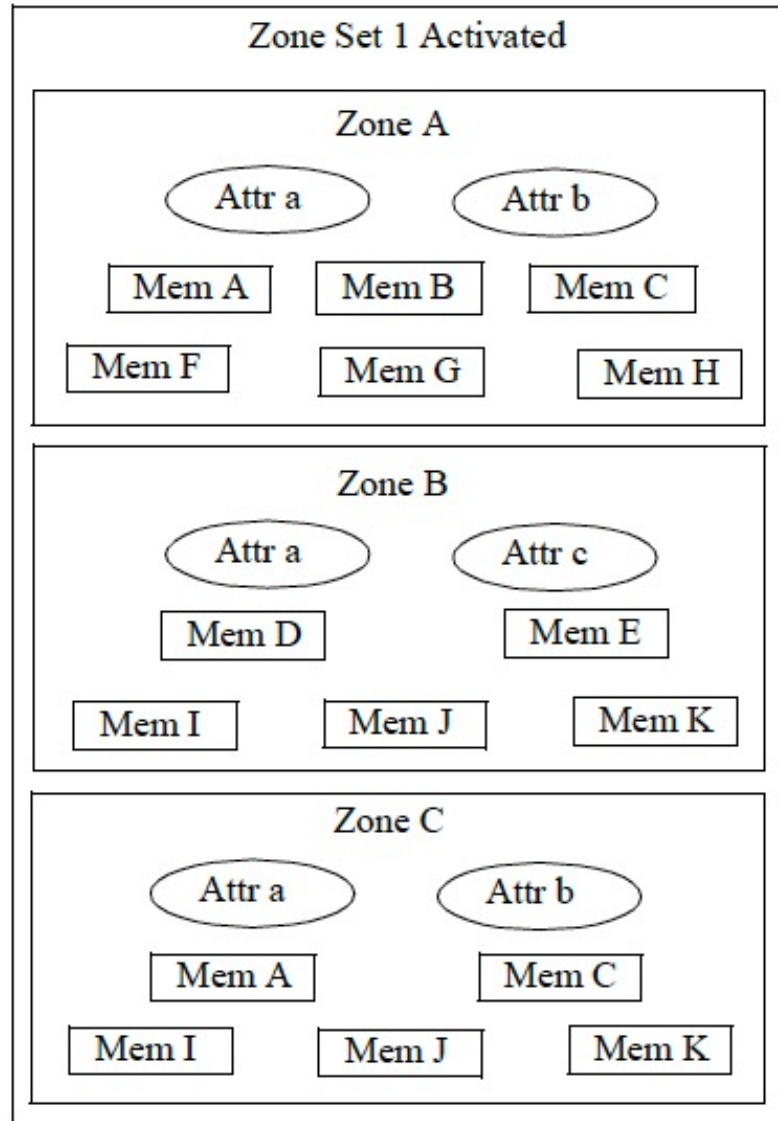
- Software provides the interoperability component
 - Holds list and types of Zones
 - Allows for distribution throughout the Fabric
 - Distributed database – loss of one Fabric component will not result in loss of Zoning data
- Standardized!
 - Zoning configuration and distribution defined in T11 Fibre Channel Standards
 - FC-SW and FC-GS
 - Standards have existed for more than a decade
 - Mature/tested implementations

Example – How it Works – Zone Database



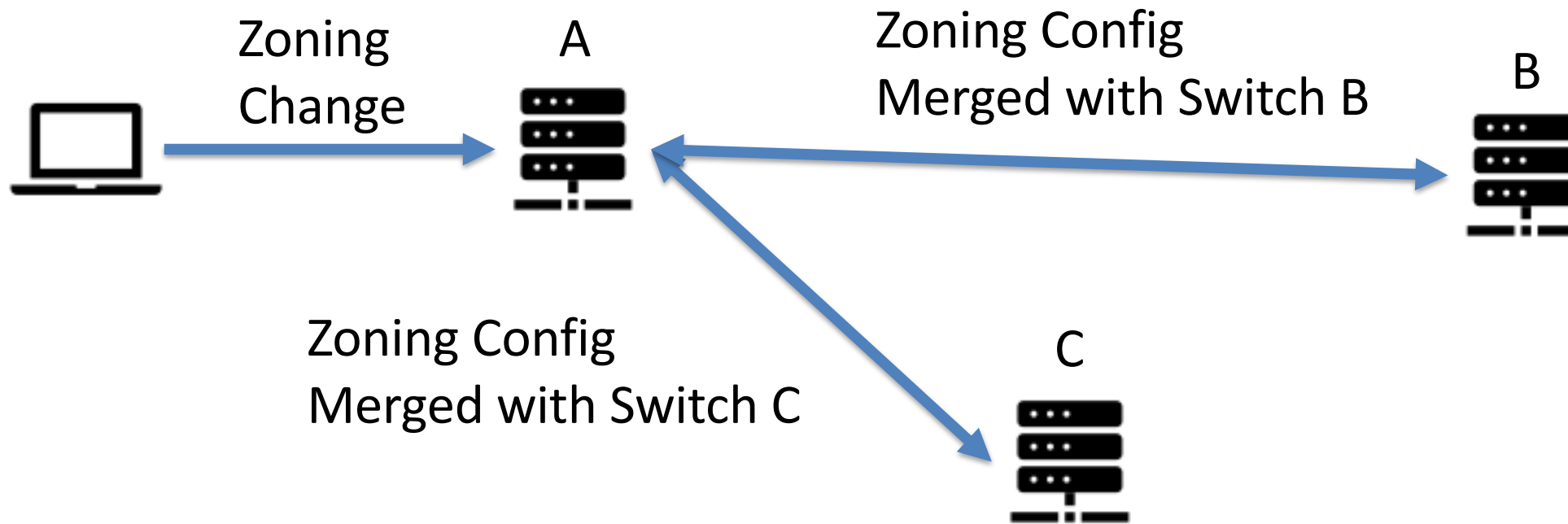
- Zone database consists of one or more Zone Sets along with Zones, Aliases, and Attributes
 - Zone Set allows grouping of Zones
 - Zones define access lists and attributes
 - Aliases define aliases to zone members
 - Attributes define zone attributes such as zone type and protocols

Example – How it Works – Active Zone Set



- Different Zone Sets may be created for different Fabric configurations
 - For example: one Zone Set for normal operation, and another Zone Set for backup operations
 - Backup Zone Set could then be activated at night for nightly backups

Zone Setup and Activation



- If there are any inconsistencies this will result in a Switch being isolated
- Inconsistencies can be eliminated by changing switch (A) "Reserving" the Fabric for changes

Using Zoning



Zoning Best Practices

- Keep it simple
 - One zone per application or a zone per function (Engineering, IT etc); OR
 - Use automatic zoning that reduces management time
- Use *automation* where possible
 - Its easy to zone with central management or available utilities
 - There are many options available from both vendors
- Regular maintenance
 - Adjust zones as requirements change
 - Remove zones that are no longer used

Zoning Example: Virtualization

- Use restrictive zoning practices to limit visibility
 - Avoid configuration errors that can lead to data loss
 - Segment ESXi clusters by storage
 - Helps traffic shaping between VMs and FC storage
 - Predictable storage network performance
 - VAAI/VASA and Storage Vmotion continue to work through zoning
- Use centralized management console/APIs to manage zones
 - Storage management tasks are simplified
 - VM administrators need not worry about storage or storage network

Zoning Example: Databases

- Use zoning per database cluster
 - Similar to earlier virtualization example
- Separate DB administrator and storage administrator tasks
- Use restrictive zoning for security and traffic shaping
- Create separate zones that include backup servers/tapes etc
- Use automation wherever possible for ease of management and error-free operation

Questions?



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 - FC Zoning Basics

Thank You

