Cisco MDS 9000 Family Virtual SANs Advantages

The Need for Virtual Fabrics

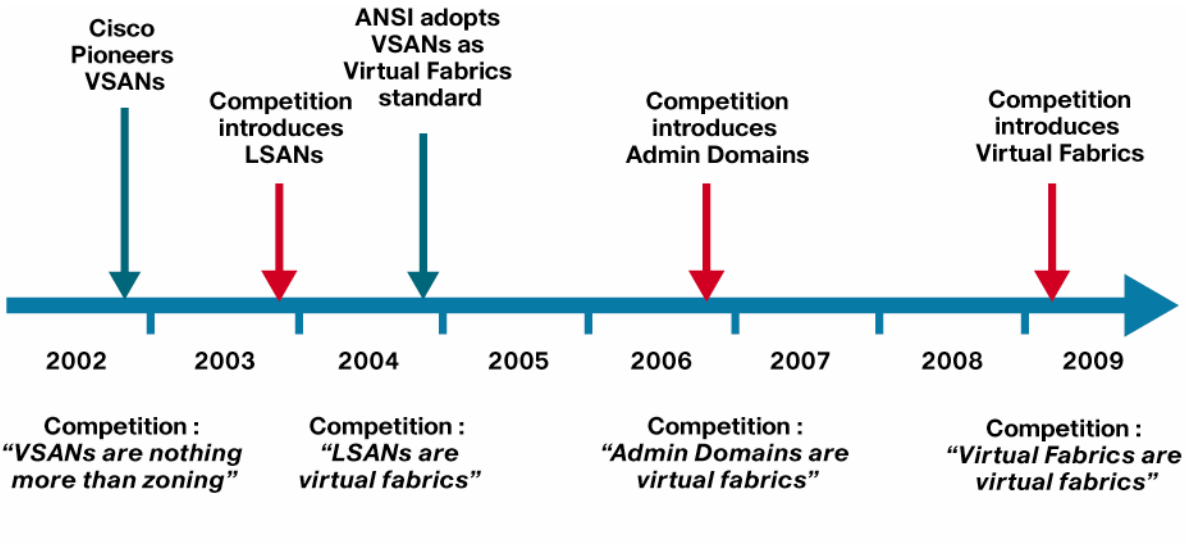
Today's data centers are faced with many challenges such as consolidation, resources optimization, power, cooling, cost reduction and more. Cisco foresaw these requirements and developed Virtual Storage Area Networks (VSANs) in 2002 to address these issues in the data center. VSANs are integral to the Cisco MDS 9000 Family of Multilayer Switches and have been engineered into the product as it was designed. VSANs are logical SANs built on a common physical infrastructure. Each VSAN provides its own fabric services (zoning, name server ...) and is functionally isolated from other VSANs on the same switch. Sharing of common resources across VSANs may be accomplished using Inter-VSAN Routing (IVR). IVR is integrated on any port and incurs no additional resources on the switch.

By using VSANs, customers can consolidate separate physical SAN fabrics into one large fabric for ease of management and reduced Total Cost of Ownership (TCO) while providing secure and reliable isolation of different storage islands. Additionally, the use of IVR and VSANs allows the sharing of common infrastructure and resources like tape libraries, further reducing storage and network expenditures.

Fact #1: MDS 9000 Family has 7 years of technology advantage and maturity

Cisco pioneered Virtual Fabrics with the introduction of VSANs in 2002. This technology was adopted by the ASNI T.11 committee and is now part of Fibre Channel standards as Virtual Fabrics.

Figure 1. Competition is 7-years late in supporting limited Virtual Fabrics



Competition has tried many different ways to first minimize the value or then emulate the concept of VSANs and Virtual Fabrics. When Cisco first introduced VSANs, competition said that VSANs didn't provide any benefits and were nothing more than zoning.

In late 2003, competition announced LSANs. This was the first unsuccessful attempt at claiming virtual fabric support. Though providing physical isolation through routing, LSANs do not allow the sharing of physical resources that is possible with VSANs and requires additional management overhead.

In late 2006, competition introduced a new feature called Administration Domains (ADs). They now claimed this as their latest version of a virtual fabric solution. ADs do allow ports in a single switch to be part of unique domains, but these domains are for management purposes only: they can be compared to VSAN Role Based Access Control (RBAC), feature that Cisco offered back in 2003. In fact, the underlying fabric is still one physical fabric with no isolation of Fibre Channel services or provides no fault isolation.

With FOS 6.2, released in 2009, competition has finally introduced *their* implementation of standards based Virtual Fabrics.

Fact #2: MDS 9000 implementation of Virtual Fabrics delivers superior capabilities, flexibility and no limitations

When comparing Virtual Fabrics, one must look at the implementation details. Though features may sound similar, their use and implementation can distinguish a well integrated solution from an added-on limited feature.

Table 1. Comparison of Virtual Fabrics implementations

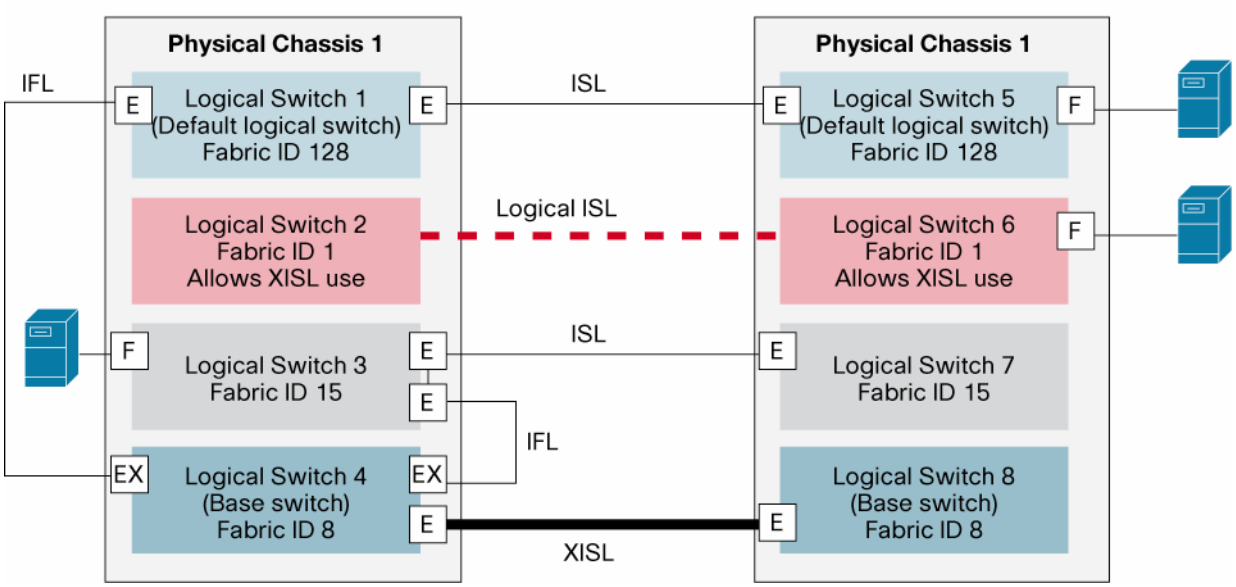
Feature	Cisco VSANs	Competition Virtual Fabrics	Cisco MDS Advantage
Virtual Fabric Hardware Support	MDS 9100 series Fabric and Blade, MDS 9200 series, MDS 9500 series	DCX/DCX-4S, 5300 and 5100 only	**All Cisco MDS switches support VSANs**
Number of Virtual Fabrics per switch	All platforms—1024	DCX/DCX-4S – 8 5300 – 4 5100 – 3	**Cisco MDS offers more Virtual Fabrics to support any customer requirements**
Frame Tagging for Shared ISLs	Yes	Yes—with caveats Not supported with FICON, Virtual Fabric Routing, McDATA interop, Inter Chassis Link (ICL) ports, FC Router Edge switch, GbE FCIP ports	**Cisco MDS imposes no limitations on fabric-wide Virtual Fabrics deployments**
FICON Support	Yes	Yes – with caveats Only 2 FICON Virtual Fabrics per switch, no support for ISL sharing (XISL)	**Cisco MDS imposes no limitations on FICON deployments**
Isolation Virtual Fabrics	Yes	No If a Virtual Fabric is removed, all devices must be moved to an active Virtual Fabric	**Cisco MDS has an isolation VSAN for devices that were part of a deleted VSAN**
Default Virtual Fabrics	Yes	No Must manually turn on Virtual Fabrics	**Cisco MDS VSANs are integral to the switch and not an added on feature**
Feature Limitations	No	Yes The following features have limited or no support when VF enabled: • Admin Domain—No support • Encryption—Only in default logical switch • Port Mirroring—No support • Traffic Isolation Zoning—No support	**Cisco MDS support any NX-OS feature, with no limitation**
Routing between Virtual Fabrics	Yes Inter-VSAN Routing (IVR) from any port to any port across backplane	Yes—with caveats Requires using external ports, SFPs, cables between Virtual Fabrics and Base Switch. Requires using module ports (4 per connection) to route between Virtual Fabrics (8-Gbps of bandwidth). If more bandwidth is required, more ports must be used (4 ports for every 8-Gbps of bandwidth required)	**Cisco MDS IVR is integrated in each port and has available entire backplane capacity**

Fact#2: MDS 9000 Family Inter-VSAN Routing is flexible and easy to deploy

Cisco MDS 9000 Inter-VSAN Routing is a totally integrated feature, available to any port, and it is easy to use. All traffic being routed traverses the switch backplane as part of the normal traffic switching function, requiring no additional cost and management for extra modules, ports, optics and cables.

Figure 1 is an example from ***competition's own documentation*** (FOS 6.2 Administrator's Guide). It clearly demonstrates how cumbersome it is to use competitive solution for routing between Virtual Fabrics. All connections between Virtual Fabrics that use routing require the consumption of modules ports, SFPs and cables that have to be manually added. Moreover, when routing is used, XISLs may not be used for those virtual fabrics, requiring additional ISLs to be deployed. This means the consumption of four ports for Inter-Fabric Links (IFLs) and four additional ports for XISLs. If more bandwidth is required between virtual fabrics or between switches, additional ports must be used.

Figure 2. Competitive Virtual Fabrics are cumbersome to use



Summary

With VSANs, only the Cisco MDS 9000 Family of Multilayer Switches can provide a mature, integrated virtual fabric solution that meets the needs of today's and tomorrow's Data Center. In particular, Cisco MDS 9000 Family supports:

- VSANs on *any* MDS 9000 switch to deliver truly fabric-wide virtualization
- Advanced scalability, over 1000 more VSANs vs. competition
- VSANs across switches without any limitations
- FICON deployments with no limitations
- Isolation of devices previously belonging to deleted VSAN
- Coexistence with any existing and future NX-OS features
- Inter-VSAN Routing from any port to any port in the switch, simply using the backplane

The fact is that competition's Virtual Fabric solution is 7-year late, restrictive in capabilities and cumbersome to use.

By providing a completely integrated virtual fabric implementation, Cisco's VSANs are the only solution that can scale to customer requirements and provide all features without limitations.

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