

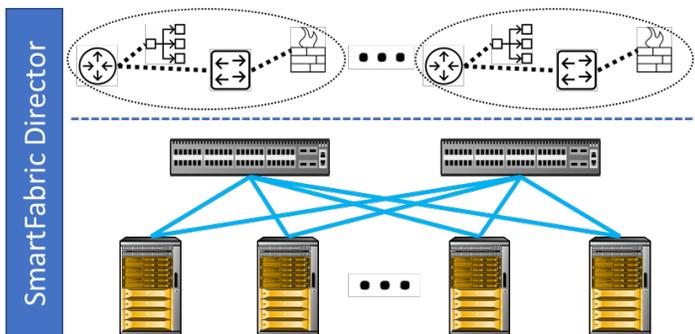
# Dell EMC SmartFabric Director: Enhanced Visibility Enabling Intent-defined Networks

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## Challenges

Implementing a software-defined data center strategy is one of surveyed organizations' three most-cited areas of data center modernization investment in 2019 according to ESG research.<sup>1</sup> A significant part of this transition will include virtualizing the network using an overlay technology (such as VMware NSX) to run on top of an underlay physical network. While this combination provides flexibility and agility, a lack of visibility between the two layers means that organizations either overprovision the underlay network or risk configuration errors when deploying virtual networks. Without unified visibility across the two network layers, organizations rely on multiple management screens and extensive, error-prone manual correlation to ensure the underlying physical infrastructure has been configured correctly to support the desired virtual network. They may also overprovision virtual networks without knowing if sufficient networking capacity exists and create areas of network congestion. Given the pace of business and mandate to accelerate new products and services as part of digital transformation initiatives, organizations must have the appropriate level of network visibility to ensure that they can bring up new network services quickly and efficiently.

## The Solution: Dell EMC SmartFabric Director



The Dell EMC SmartFabric Director is a network orchestration solution jointly developed with VMware that enables organizations to synchronize the deployment of a physical switch fabric with the virtual network and gain comprehensive visibility at both the physical and virtual network layers. Organizations can then potentially configure the network fabric in significantly less time than traditional methods. When integrating the SmartFabric Director with VMware vCenter or NSX/NSX-T, organizations can achieve end-to-end visibility of the physical network and all supported virtual overlays. To help

organizations continuously monitor fabric health, SmartFabric employs telemetry to collect switch operational data and display metrics graphically at both the network fabric and switch levels.

Because SmartFabric Director provides this end-to-end visibility, organizations can verify that the network fabric is configured and operating as intended. Organizations can then assess where in both the physical and virtual layers to apply the appropriate policies to segment and secure the network quickly and easily, eliminating time-consuming manual efforts. Recognizing that organizations support multi-vendor networks, SmartFabric Director supports Google-developed gNMI and OpenConfig standards, reinforcing Dell EMC's commitment to delivering open, simple, and efficient networking solutions.

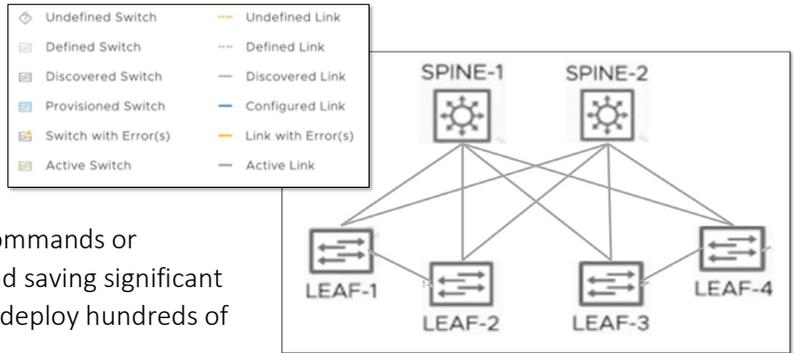
## ESG Demo Highlights

ESG performed hands-on testing of the Dell EMC SmartFabric Director via remote demos. We used a test network consisting of two Dell EMC Z-Series Spine switches and four S-Series Leaf switches. Each leaf was redundantly wired to both spine

<sup>1</sup> Source: ESG Master Survey Results, [2019 Technology Spending Intentions Survey](#), March 2019.

switches. Overall, ESG was impressed by how the SmartFabric Director can simplify the deployment and management of the network fabric and provide complete visibility into the configuration of both physical and virtual layers.

- ESG observed how easily an administrator can begin to configure a network by uploading a manually created wiremap via a JSON file. The wiremap contained device inventory with specified access credentials and connections between switches.
- Upon uploading the JSON file, SmartFabric Director discovered the switches and displayed a network topology. ESG noted how easily an administrator can physically configure a network topology using SmartFabric Director rather than configuring switches individually via multiple CLI commands or management interfaces, simplifying the process and saving significant time. This especially helps as large enterprises can deploy hundreds of switches and interconnects.
- Legends aided ESG in correcting errors in the physical network configuration, as they immediately revealed the status of each switch and link. We could also zoom into the network diagram to view additional details such as port numbers on which the links exist. ESG saw that the switch *LEAF-4* remained undiscovered, as we did not power up *LEAF-4* to simulate a failed switch. After powering the switch, SmartFabric Director discovered it and its connected links, along with *SPINE-2*. SmartFabric Director also did not discover the link between *SPINE-2* and *LEAF-3* due to an error in the wiremap. Once we corrected the error, the link was discovered. ESG noted how SmartFabric Director can save valuable time in ensuring that the network topology has been configured correctly, minimizing any errors made if switch and link configurations were completed on a per-switch basis.



| ASN   | Loopback    | Interlinks & LAGs                                     |
|-------|-------------|---|
| 64803 | 10.0.0.4/32 | ..._ort1/V/6-I2-Port1/V/25 ..._ort1/V/6-I2-Port1/V/26 |
| 64804 | 10.0.0.5/32 | ..._ort1/V/3-I4-Port1/V/3 ..._ort1/V/7-I3-Port1/V/25  |
| 64601 | 10.0.0.0/32 | ..._ort1/V/9-I4-Port1/V/19 ..._ort1/V/7-I3-Port1/V/26 |
| 64602 | 10.0.0.1/32 | ..._ort1/V/5-I1-Port1/V/25 ..._ort1/V/6-I2-Port1/V/25 |
|       |             | ..._ort1/V/9-I4-Port1/V/19 ..._ort1/V/8-I4-Port1/V/25 |
|       |             | ..._ort1/V/7-I3-Port1/V/26 ..._ort1/V/5-I1-Port1/V/26 |

- ESG then observed how easily an administrator can create a switch fabric. Using the SmartFabric wizard, we found that we could apply a template to create either a Layer-2 (L2) or Layer-3 (L3) BGP network fabric. After choosing to create the L3 fabric, we entered critical details such as AS number ranges and loopback addresses to be assigned to the physical underlay. When we

examined the detailed configuration, SmartFabric Director automatically assigned the AS numbers and addresses to the appropriate switch ports. We also saw details related to point-to-point L3 connections (source and destination port numbers and IP addresses) and leaf switches capable of virtual link trunking configuration. We noted how the wizard can help to further minimize configuration errors, saving additional time in having to correct them if the errors were encountered in a production environment.

- ESG observed how an administrator can correlate the physical network with the virtual overlay with minimal manual intervention. Using the wizard, we assigned VLANs to specific network locations via switched virtual interfaces (SVI) on leaf switch pairs. We entered relevant SVI configuration details for each VLAN ID, then integrated vCenter Server with SmartFabric Director. Once SmartFabric Director connected with vCenter Server, SVIs were synchronized with the proper virtual switch port groups and configured host interfaces with the proper trunking.

| VLAN ID | Leaf Pair     | VRRP VIP       |
|---------|---------------|----------------|
| 10      | LEAF-1:LEAF-2 | 10.0.10.254/24 |
| 20      | LEAF-3:LEAF-4 | 10.0.20.254/24 |

Add VMware Manager

Type: vCenter Server

IP Address/FQDN: 10.192.174.244

Username: administrator@vsphere.local

Password: .....

- Before deploying the switch fabric, ESG submitted the fabric configuration for approval. This would also go under change management control. We noted how an administrator can verify with the organization that the network fabric is free of any configuration errors before deployment.
- With a few clicks, ESG noted how simple the process is for creating and deploying a physical network topology and correlating it with its virtual overlays. The initial testing impressed upon ESG how the SmartFabric Director can significantly save time and effort typically required to configure individual switches, verify that the switch network will work as intended, then manually correlate the physical layer with the existing virtual overlays. By significantly reducing the number of commands, interfaces, and amount of coordination within the organization, the SmartFabric Director simplifies the deployment of network fabrics in a highly efficient and scalable manner.

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## First Impressions

While organizations continue to embrace software-defined networking to increase their business agility by simplifying the deployment of virtual networks, they remain challenged in not possessing full visibility of the underlying physical network and its correlation with the supported virtual overlays. Lacking this visibility can lead to time wasted on correcting mistakes encountered when attempting to deploy virtual networks, such as correcting network configuration errors or overprovisioning virtual overlays when the physical network capacity is insufficient. Organizations also lose the ability to apply the necessary policies to segment and secure both the physical and virtual network layers, increasing their risk exposure.

ESG was impressed with how the Dell EMC SmartFabric Director can help organizations to gain comprehensive visibility into the physical and virtual layers of their core networks and ensure that they are synchronized. We see how the SmartFabric Director can significantly ease the time-consuming process of creating and deploying an open, simple, and efficient network fabric, while simultaneously verifying it will operate as intended. Should you wish to facilitate a process that will minimize configuration errors and ensure that the physical layer can properly support the virtual overlay, we suggest looking closely at the Dell EMC SmartFabric Director.

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