

Datcenter Services Evolution

PTNOG::4 – December 5th 2019

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Datacenter Services Evolution

- 1) History
- 2) Case for Evolution
- 3) Automation
- 4) Migrating from Legacy

History

- Present day **Claranet Portugal** (2019) is the result of several **acquisitions** in the past decade:
 - Esoterica (1995)
 - VIA NET.WORKS* (1999)
 - Claranet* (Group) (2005)
 - ITEN (2013)
- Evolution of **Service Provider** portfolio:
 - Webhosting, Email, ADSL
 - Datacenter Co-location
 - L3VPN / L2VPN, Hybrid Cloud
- Legacy, Legacy, Legacy ...



History



Cisco **7200**



Cisco **6500**

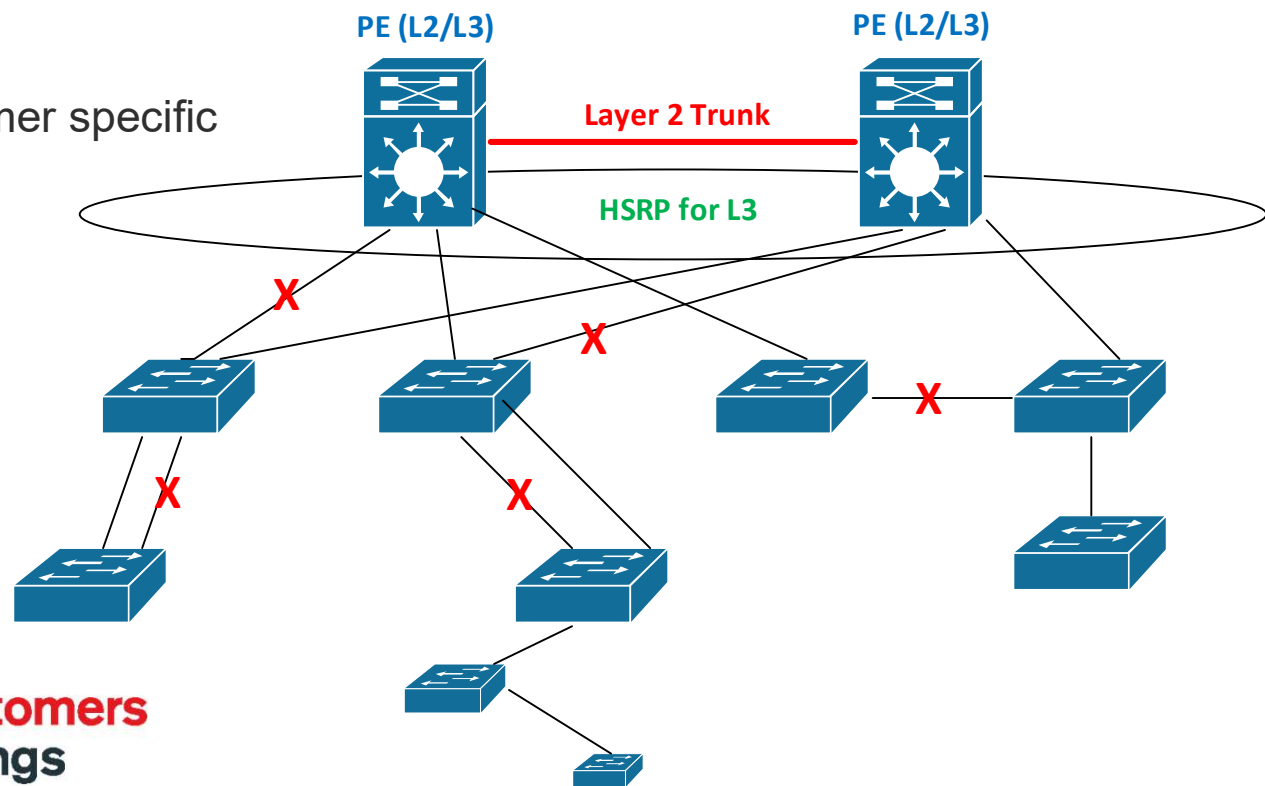


Cisco **7600**

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History

- For **Datacenter services**, standard CLOS model
- Cisco **7600/6500** are part of **STP topology!** (i.e. L2 switching)
- **PVST+** from Edge down to Access layer
- **Mix** of Cisco and non-Cisco hardware
- No de-facto **template** for services, customer specific **customizations**
- **Edge** devices running **FRT**
- Many **operational constraints**:
 - Provider Edge in STP topology
 - FIB and VLAN scale
 - Very **fragile** control-plane
- January / 2019, **major service outage**



The Case For Evolution

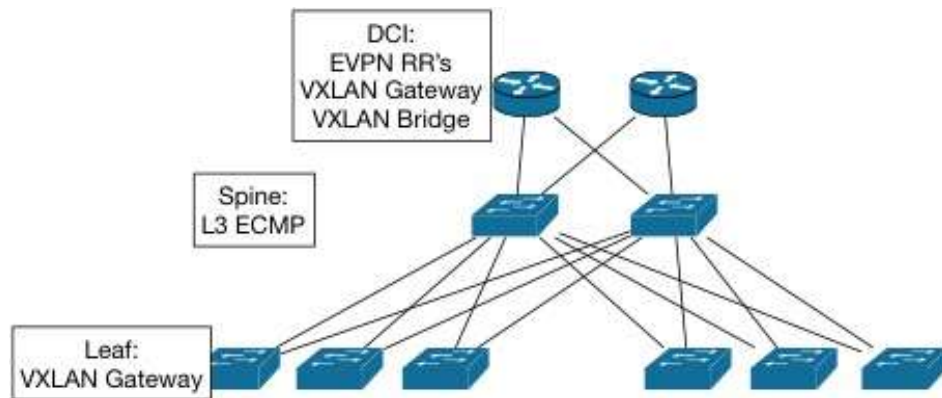
- Datacenter services evolution was already on PT roadmap for **FY20** (start July/2019)
- Recent events warranted a **major change** in plans
- We needed a technology change:
 - Underlying infrastructure that will scale out
 - Customers increasingly moving away from traditional on-prem to private / public cloud based solutions, automation
 - Traffic patterns shifting from traditional North/South to East/West
- Claranet UK had gone through a similar process in 2014/2015
- DCE was **brought forward to FY19**
- **Large** Investment for 3 datacenters



GOLF

What is GOLF ?

- An acronym for **G**iant **O**ver**L**ay **F**abric
- *Project GOLF* is the internal name for Claranet Ltd datacenter evolution to **VxLAN** based L2
- Developed internally by **Claranet Technology Group**



Project GOLF

- Open **standards based** solution
- Does not rely on a controller or proprietary features
- Support for multiple vendors (Ex.: Cisco, Arista)
- Interop with **existing** MPLS L3VPN/L2VPN services
- Leaf-Spine model
- VxLAN **data-plane** with BGP EVPN **control-plane** (draft-ietf-bess-dci-evpn-overlay)

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GOLF

DCI → **D**ata**c**enter **I**nterconnect gateways (stitching) between VxLAN and MPLS forwarding planes

- L3 p2p links, ECMP
- IGP
- Full mesh iBGP
- Locally terminated L2 and L3
- No more HSRP ! → Anycast Gateway
- Reduced flood and learn (MAC reachability via EBGP VPN)

Core / MSE

DCI

Spine

Leaf

MPLS
Fabric

VxLAN
Fabric

The Next Hurdle

On average **20 lines** of
config for a L3VPN
service over **1-2 devices**

Legacy Datacenter

- VLANs
- STP Priorities
- IPv4/IPv6 Address space
- VRFs

On average **90+ lines** of
config for a L3VPN service
over **2 devices**

Next Gen Datacenter

- VLANs
- ~~STP Priorities~~
- IPv4/v6 Address space
- VRFs
- VNI allocation
- Port VLAN mapping
- VNI to MPLS mapping
- ...

Automation



I won't be needed anymore!

What if it goes wrong?

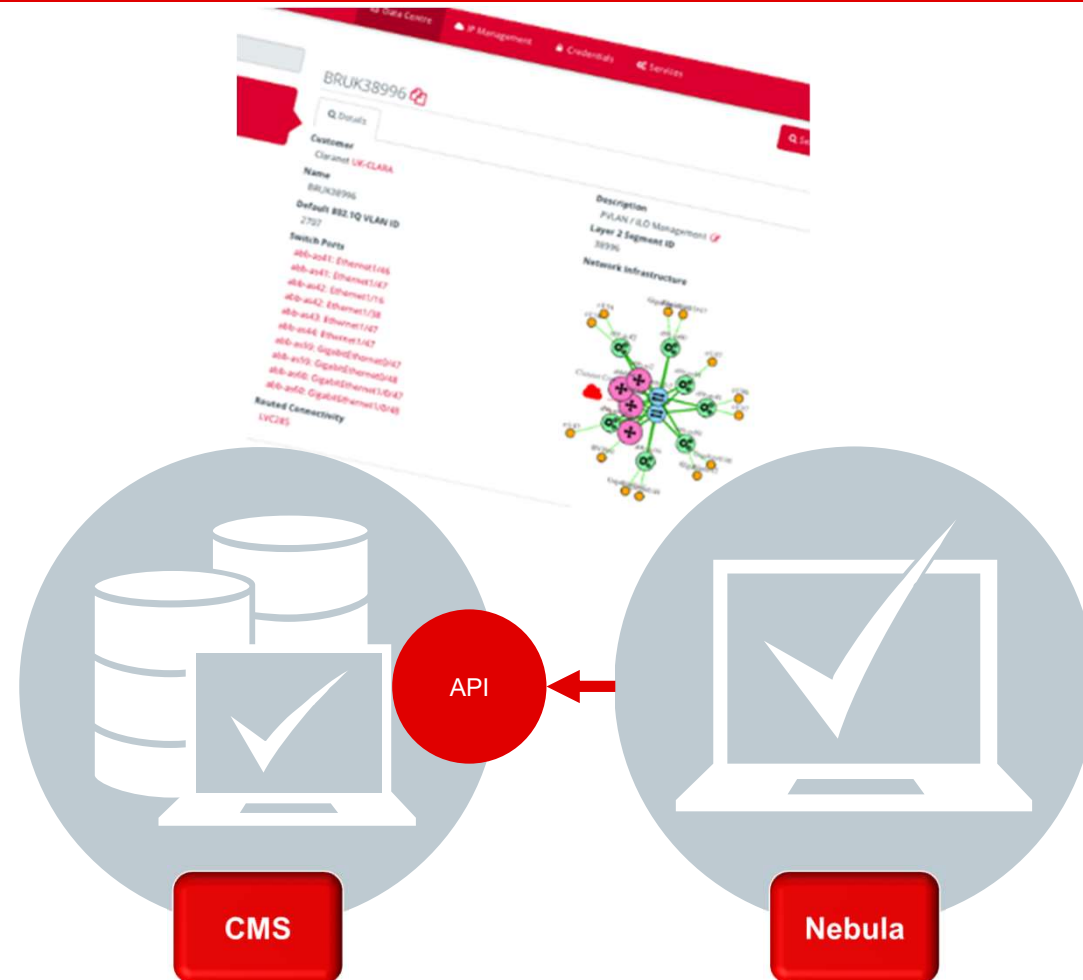


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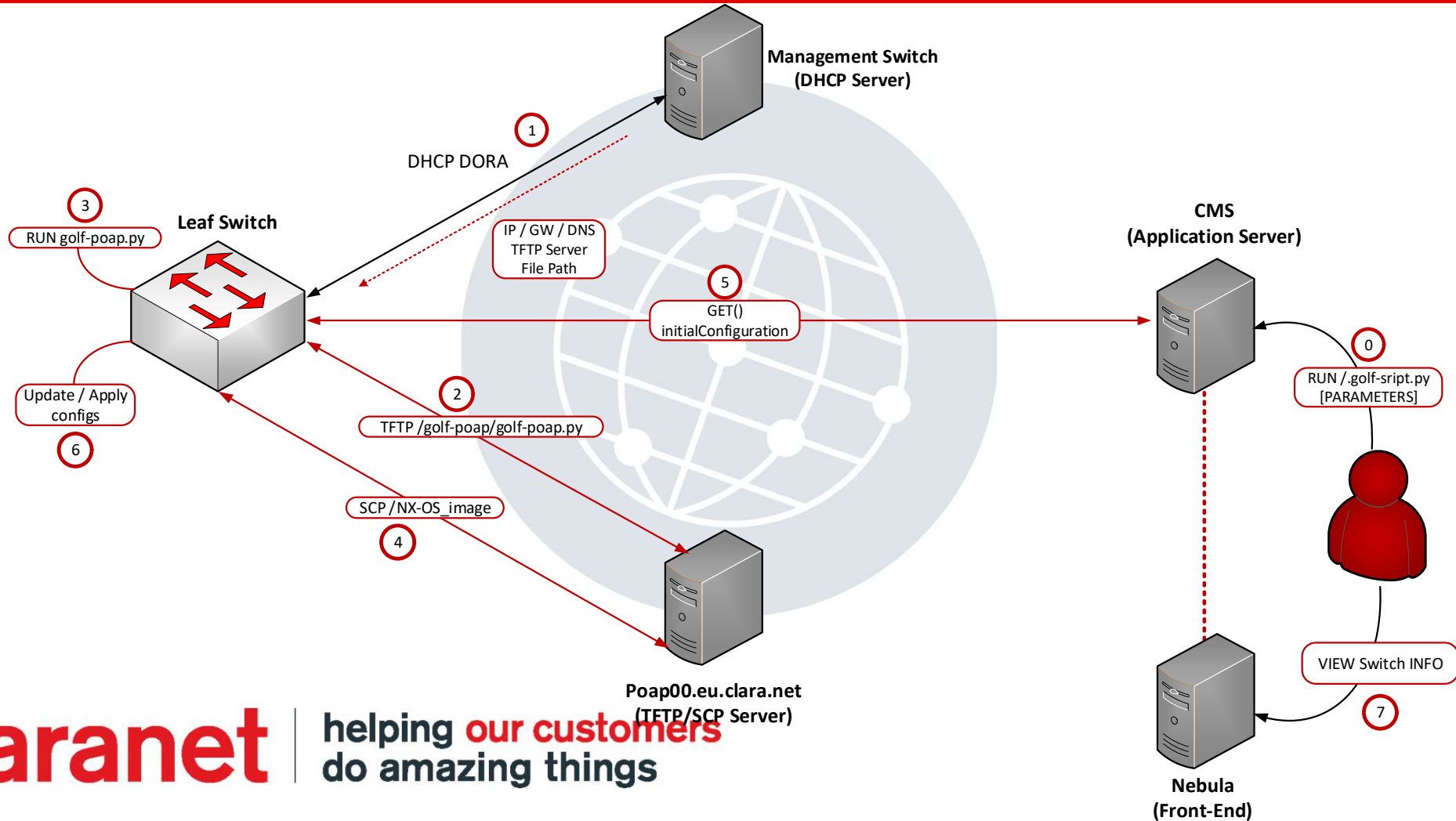
Claranet Automation Stack

- Claranet Ltd has over **12 years experience** in network automation
- Entirely developed **in-house**, called **CMS** (Configuration Management System)
- Abstract model of network services that handles **resource allocation** and **understands network topology** such as:
 - Customers, VLANs, IPv4/IPv4, etc
- Web interface (**Nebula**) for Service Provisioning
- **REST API** available for scripting
- Provisioning of ToR via Nexus ZTP (**POAP**), can almost be fully accomplished by site Engineer

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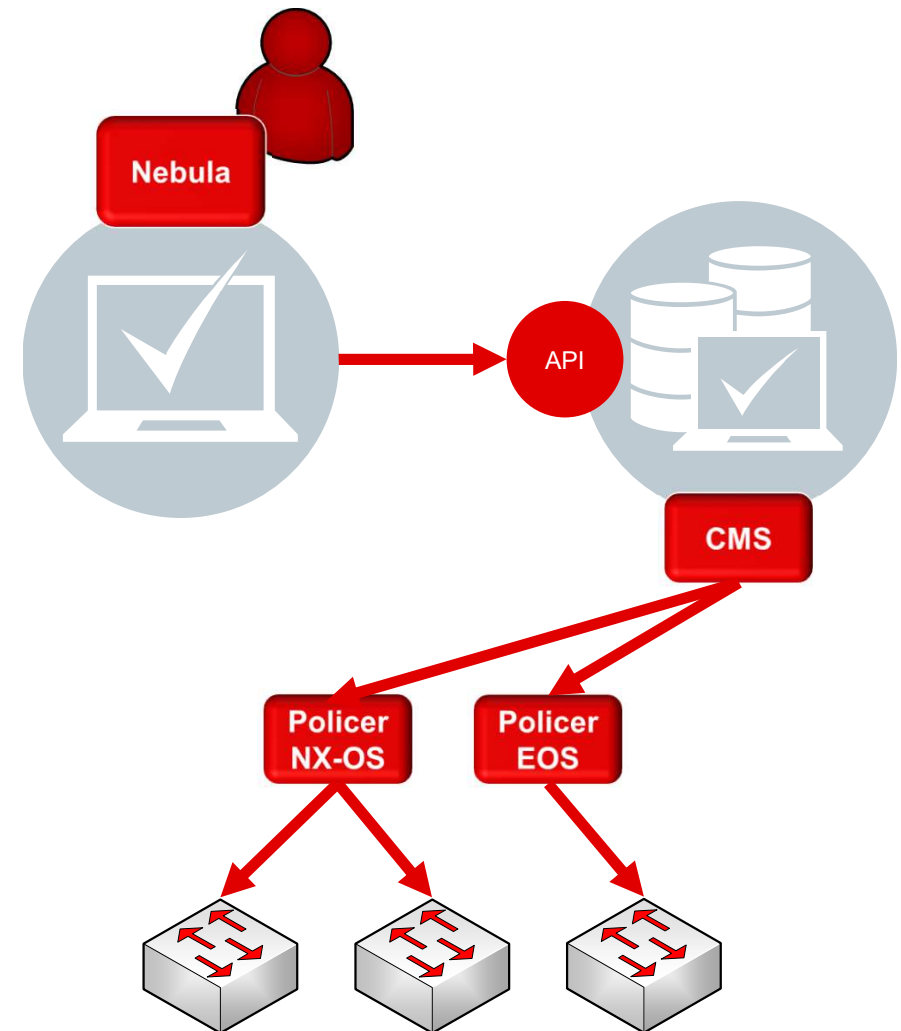


Claranet Automation Stack



Claranet Automation Stack

- Configuration **M**anagement **S**ystem is **authoritative** for all managed resources
- Modular components called ***policers*** build and **sync configuration** to network devices based on the target device type
- Policers can talk to devices either via API or CLI
- **Manual changes** to configurations on ToR switches get **policed** (rewritten)



Claranet Automation Stack - Demo

Basic Internet Service

Step 1: Create L2 Segment ; **Step 2:** Create L3 Connectivity ; **Step 3:** Assign L2 Segment to a Port

The screenshot shows the Claranet Nebula web interface in a browser window. The browser's address bar displays the URL `https://nebula-staging.uk.clara.net/#datacentre/create:`. The interface has a red header bar with the 'claranet Nebula' logo and navigation links: Home, Connectivity, Data Centre, IP Management, Credentials, and Services. The user's name, 'Jaime Fordham', is visible in the top right corner. Below the header, the 'Data Centre' section is active, showing tabs for Search, Create, and Browse. A message prompts the user to select the type of item to create. The options are organized into four columns: Switch Port, Layer 2 Segment, Firewall, and Infrastructure. The 'Layer 2 Segment' column is highlighted, showing options like 'VLAN / Bridge Domain'. Other columns include 'Firewall' (Physical Firewall, Fortinet Virtual Domain), 'Infrastructure' (vChassis Cluster, vChassis Hypervisor, Fortinet Virtual Appliance), and 'Dedicated Cluster' (vPlatform Cluster, Dedicated vChassis Cluster, Hypervisor). A 'SSL VPN' section is also visible at the bottom left, with options like Dedicated, Dedicated with instances, Shared, and Instance.

Staging Nebula

Home Connectivity Data Centre IP Management Credentials Services Jaime Fordham

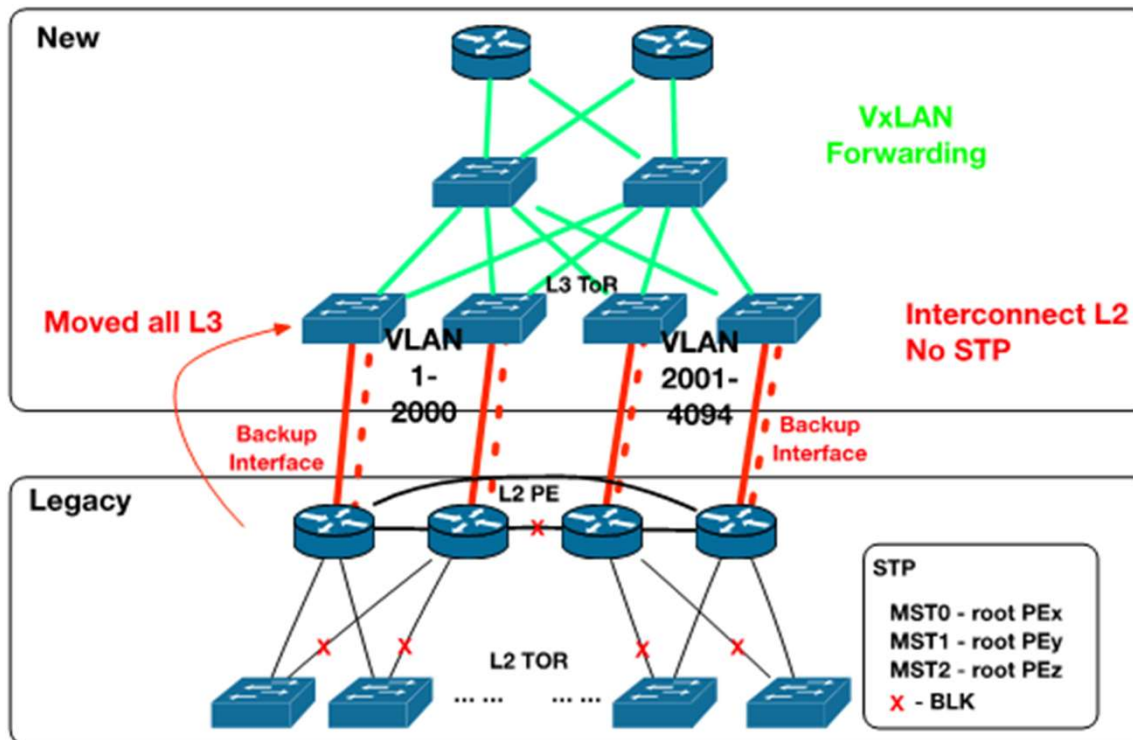
Data Centre

Search Create Browse

Please select the type of item you would like to create using one of the options below.

Switch Port	Layer 2 Segment	Firewall	
Connect Device	VLAN / Bridge Domain	Physical Firewall	
Connect Unknown Device		Fortinet Virtual Domain	
Infrastructure	Virtual Data Centre (VDC)	Dedicated Cluster	
vChassis Cluster	Blade Enclosure	vPlatform Cluster	
vChassis Hypervisor	Hypervisor	Dedicated vChassis Cluster	
Fortinet Virtual Appliance		Hypervisor	
SSL VPN			
Dedicated			
Dedicated with instances			
Shared			
Instance			

Migrating from Legacy



- Batch 1:** SVI on Legacy Nexus
- Batch 2:** SVI on 7600
- Batch 3:** Dot1Q Interfaces
- Batch 4:** Routed Interfaces

Logical Services

Batch 1

Batch 2

Batch 3

Batch 4

Physical Ports

Batch 1

...

Batch N



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