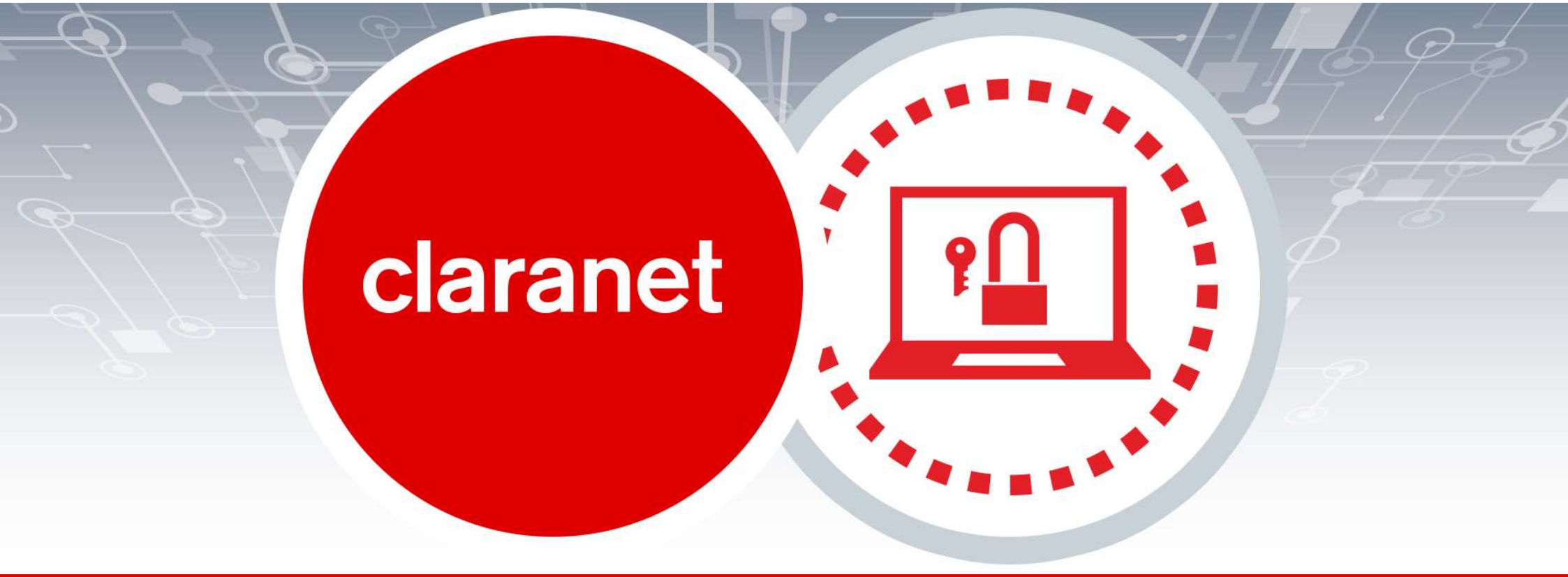

Datacenter Services Evolution

PTNOG::4 – December 5th 2019

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Datacenter Services Evolution

1) History

2) Case for Evolution

3) Automation

4) Migrating from Legacy

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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 …

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History

Cisco **7200**

Cisco **6500**

Cisco **7600**

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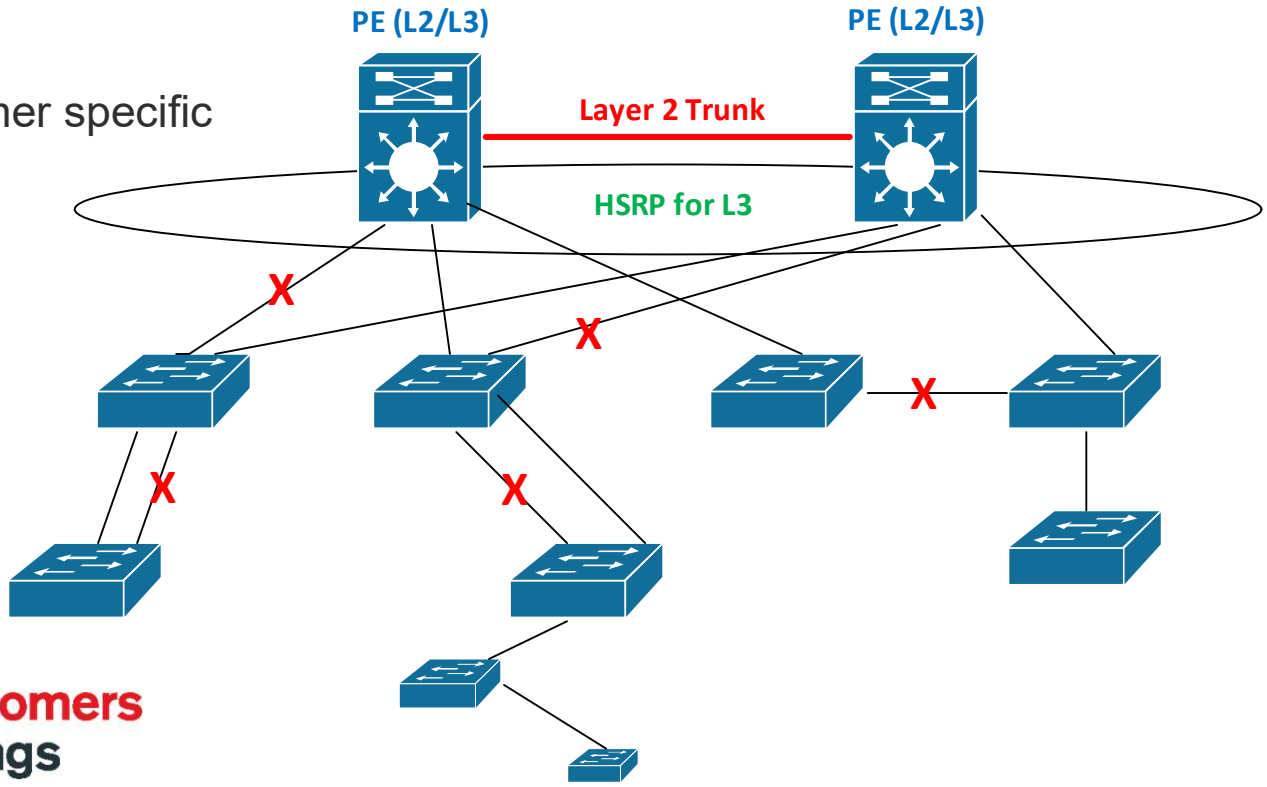
History

- 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**



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The Case For Evolution

- Datacenter services evolution was already on PT roadmap for **FY20** (start July/2019)
- Recent events warrented 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 sollutions, 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

Lets go GOLF !

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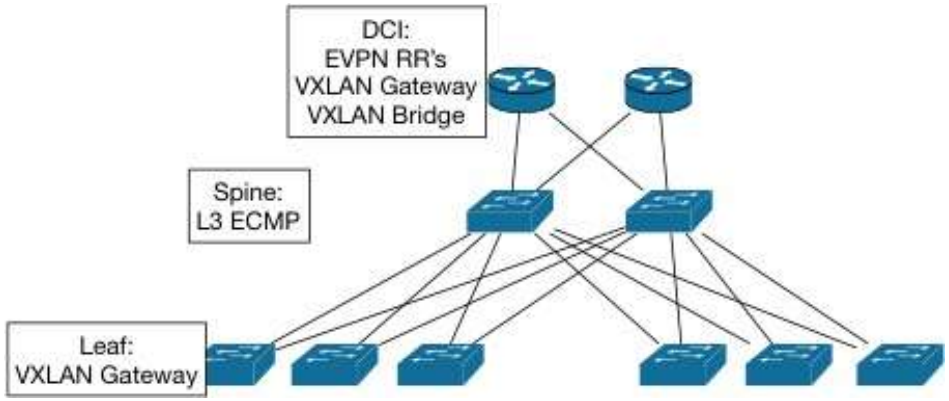
GOLF

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
- Devloped internally by **Claranet Technology Group**



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Project GOLF

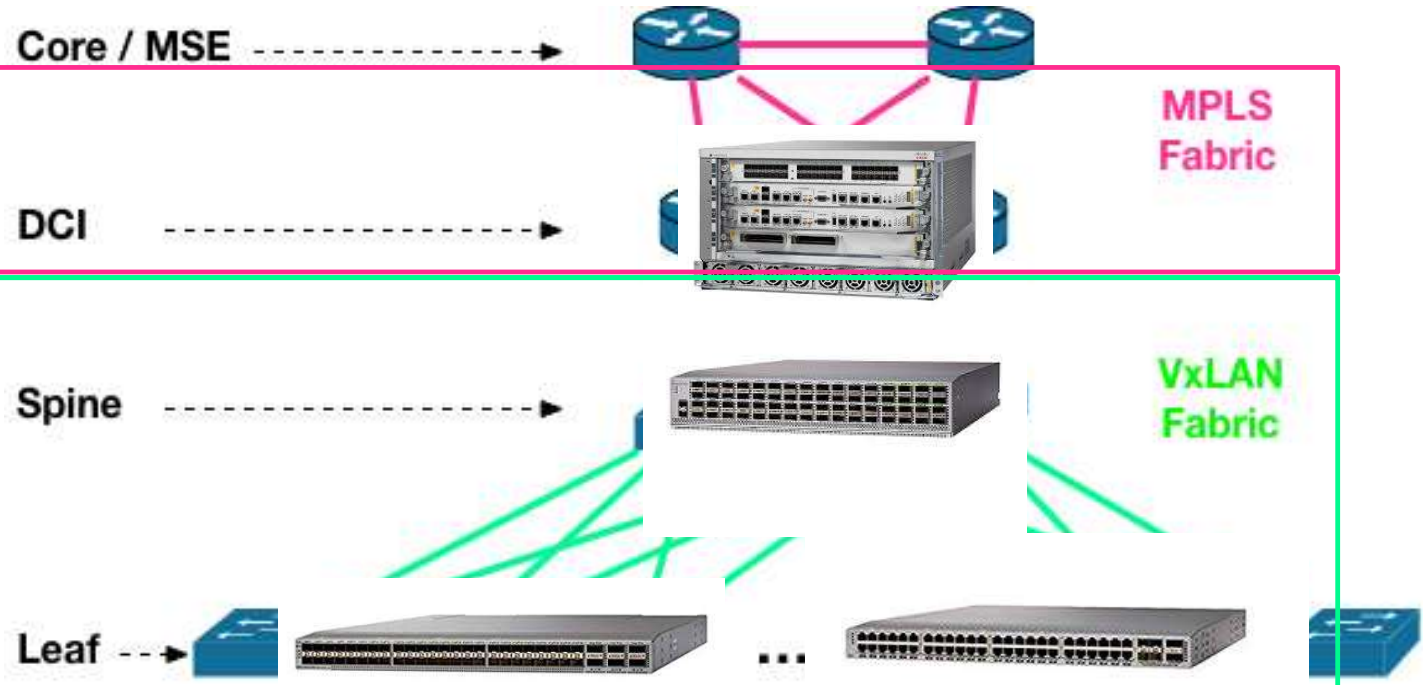
- Open **standards based** sollution
- Does not rely on a controller or proprietary features
- Support for multiple vendors (Ex.: Cisco, Arista)
- Interop with **existing** MPLS L3VPN/L2VPN services
- Leaf-Spine model
- VxLAN **data-plane** with BGP EVPN **control-plane** (draft-ietf-bess-dci-evpn-overlay)

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)



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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
- …

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Automation

I won't be needed anymore!

What if it goes wrong?

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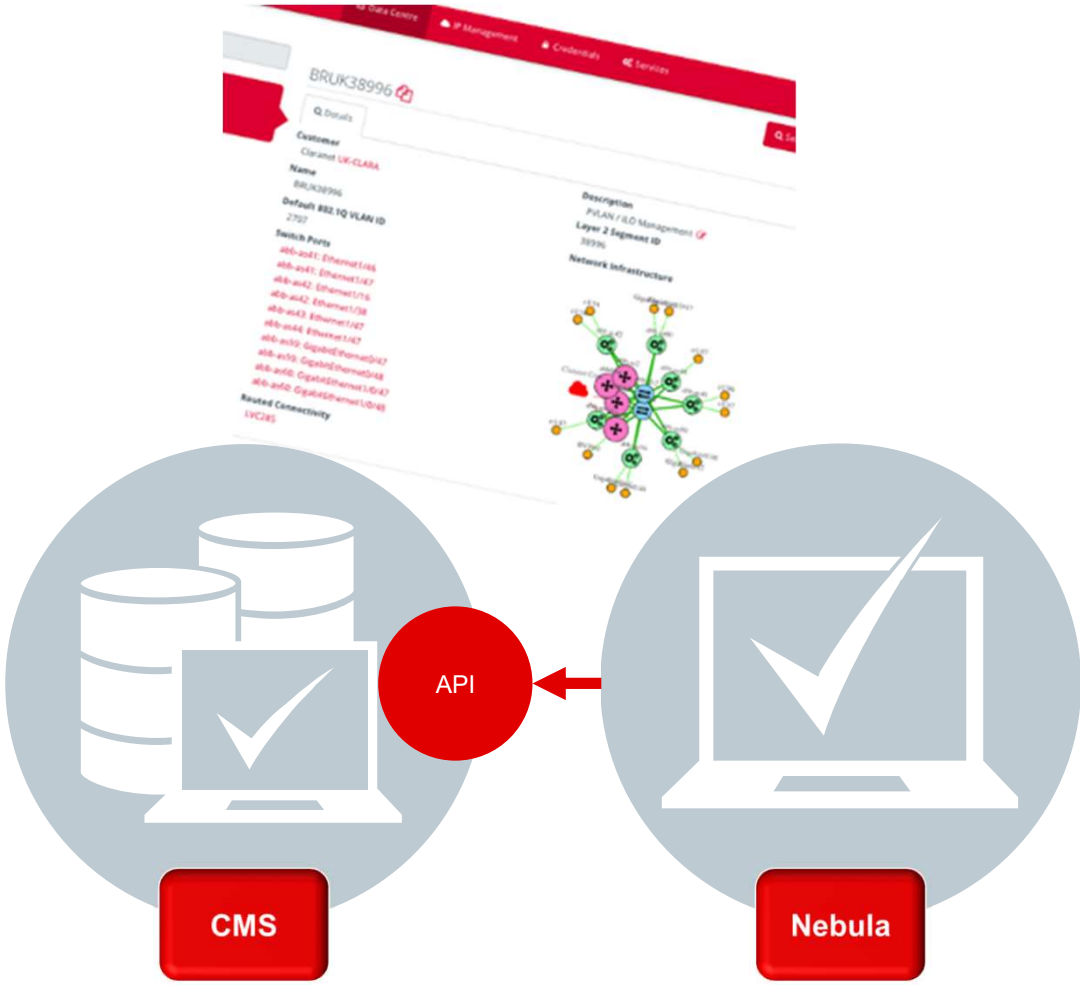
Claranet Automation Stack

- 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 be fully acomplished by site Engineer



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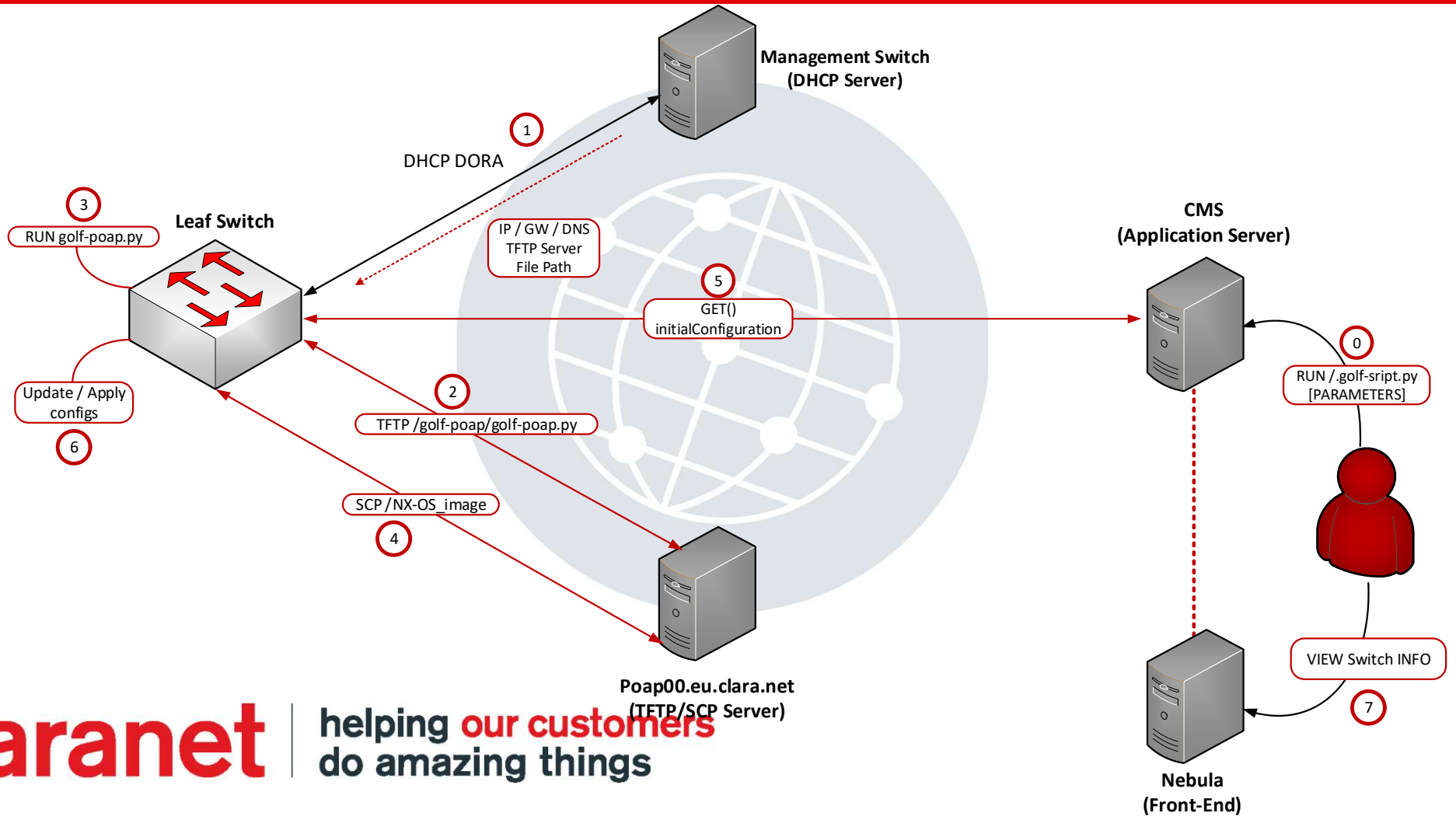
Claranet Automation Stack



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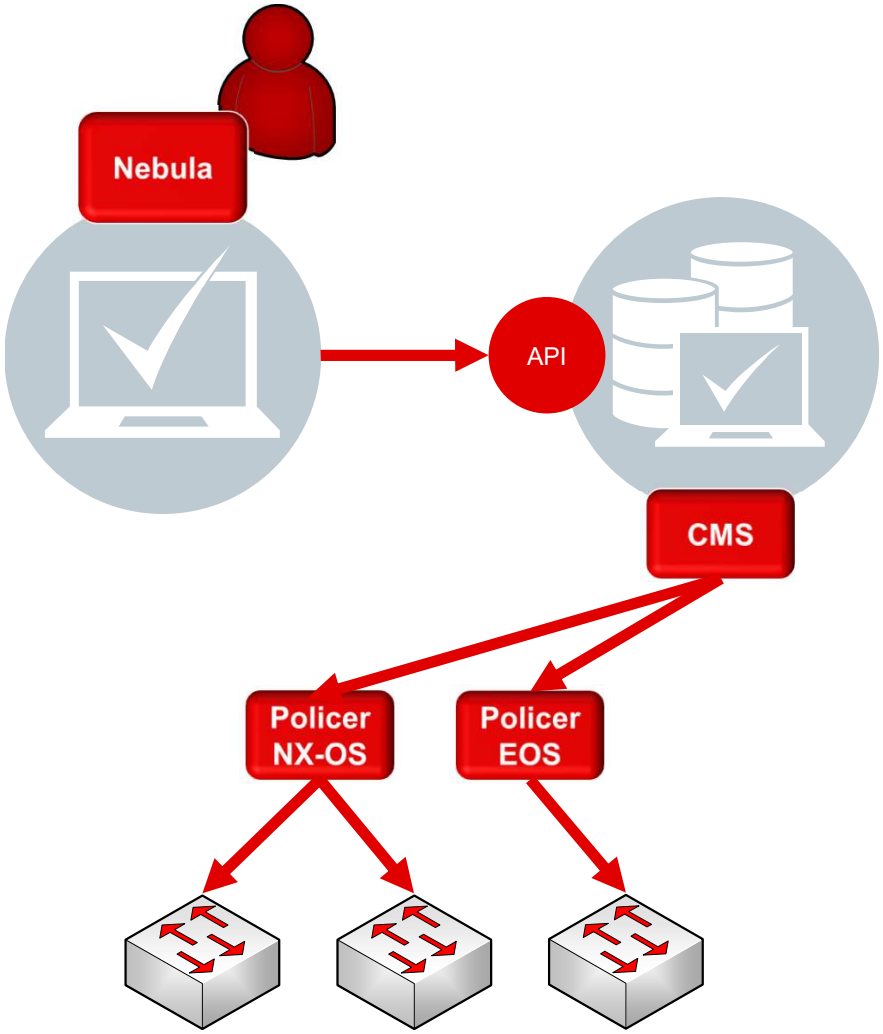
Claranet Automation Stack

- **C**onfiguration **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)



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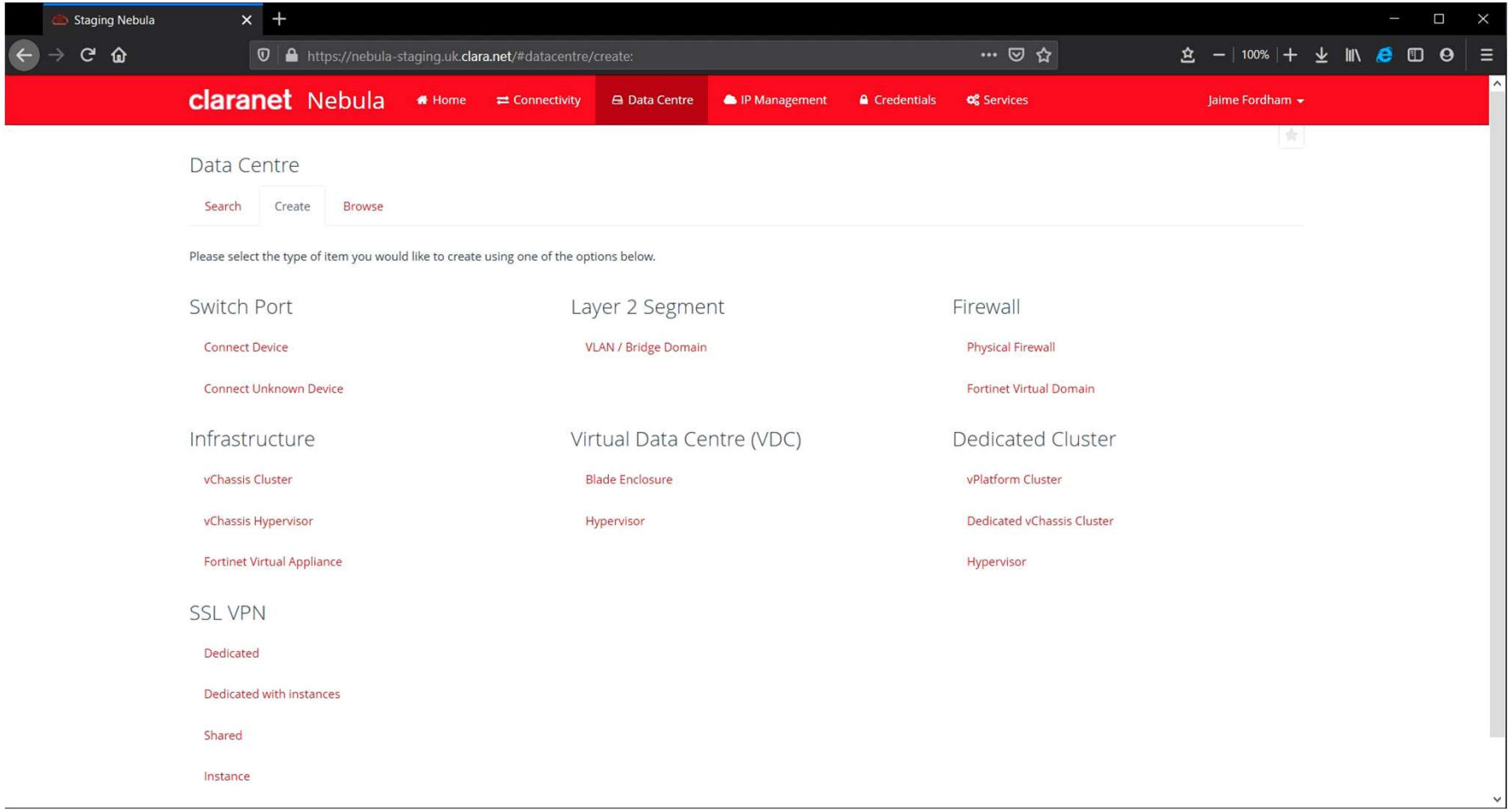
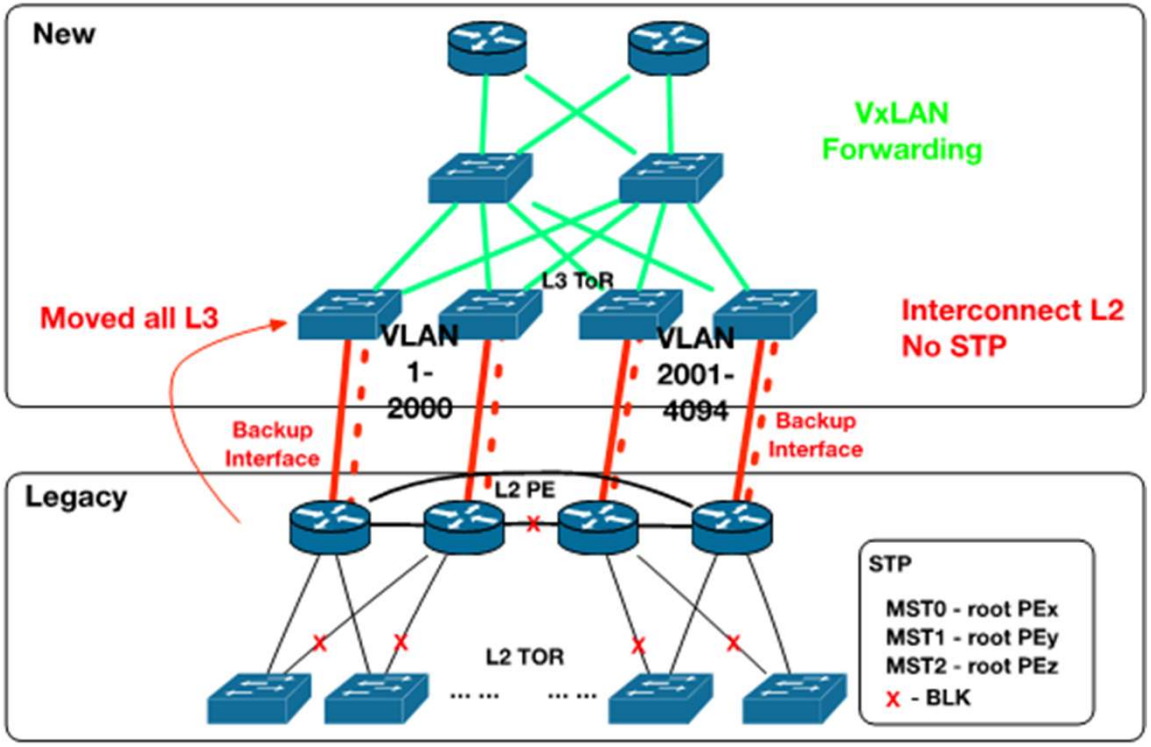
Claranet Automation Stack - Demo

Basic Internet Service

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



Migrating from Legacy



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

Logical Services	Physical Ports
Batch 1	Batch 1
Batch 2	…
Batch 3	Batch N
Batch 4	

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