Communication Architectures
Project

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Objective: Perform the technical design, configure and test a CDN network with multiple entreprise clients.

Description:
- The company CDNRUS LLC is a CDN company that provides Infrastructure-as-a-Service (IaaS), where virtual and bare metal server clusters are hosted and interconnected seamless.
- The company has different PoP (Points of Presence) at different geographic locations (Aveiro, Lisboa, Madrid , and New York). Each PoP may provide access to multiple clients.
- The company has large clients with distributed server clusters that require specific connectivity. Also, the company has an association of SME clients that require the interconnection of single servers in multiple geographic locations. Each client infrastructure is directly connect to the CDN PoP.
- The company has its main datacenter in Madrid.
- The different PoPs are interconnected by a proprietary network and devices (depicted below).
- The company is an Internet Autonomous System with number 33900, with peering BGP relations with other AS, in Lisboa and New York, that provide interconnection with the Internet core (out of the scope of his project).
- The company has the IPv4 network 10.1.0.0/24 for use in the interconnection infrastructure.
- The company has two large clients (LA and LB) and one SME industrial association:
    - Clients SME1, SME2, and SME3 belong to the same industrial association that will share the same CDN server clusters: S1 (10.9.1.0/24), S2 (10.9.2.0/24) and S3 (10.9.3.0/24) connected to the respective PoPs. They have also requested a geographic based service routing for its servers/services.
    - Client LB, has two server clusters B1 and B3, subdivided in three Ethernet VLANs (VLAN 10: 10.9.1.0/24, VLAN 20: 10.9.2.0/24, VLAN 30: 10.9.3.0/24).
    - Client LA, has three server clusters A1, A2, and A3 (that share the same IPv4 network 10.7.0.0/16) connected to the respective PoPs.
- None of the clients require Internet connection.
- SME1, SME2, and SME3 association, requested a MPLS Layer 3 VPN to interconnect its server clusters.
- Client LB, requested a Layer 2 point-to-point overlay network between its server locations, with 10 Mbps of guaranteed bandwidth between its sites. The client has three different VLAN (10, 20 and 30).
- Client LA, requested a Layer 2 VPN between its server cluster locations.

Implementation points:
- ✔ Basic assembly and core connectivity - 3 points;
- ✔ SME1, SME2, and SME3 association MPLS Layer 3 VPN – 3 points;
- ✔ SME1, SME2, and SME3 association geographic based service routing– 3 points;
- ✔ Client LB Layer 2 point-to-point overlay network – 3 points;
- ✔ Client LB bandwidth reservation and usage/routing – 3 points;
- ✔ Client LA Layer 2 VPN – 5 points;

Notes: VyOS devices only support MPLS VPN on the latest versions of the OS (1.4 rolling, late 2022), this mechanism should be deployed with Cisco C7200 devices. Cisco C7200 devices do not support VXLAN or BGP EVPN, these mechanisms must be deployed with VyOS devices. The core should be implemented with Cisco C7200 devices.

Lisbon PoP

Client LA (A2) — RL1

SME PoP S2 — RL2

Lisbon

Internet Core

Aveiro PoP

Client LA (A1)

RA1

Client LB (B1)

RA2 — SME PoP S1

Aveiro

New York PoP

Client LB (B3) — RN1

Client LA (A3)

NewYork

Internet Core

Madrid PoP

Madrid — RM1 — SME PoP S3

Main DC