Communication Architectures
Project

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

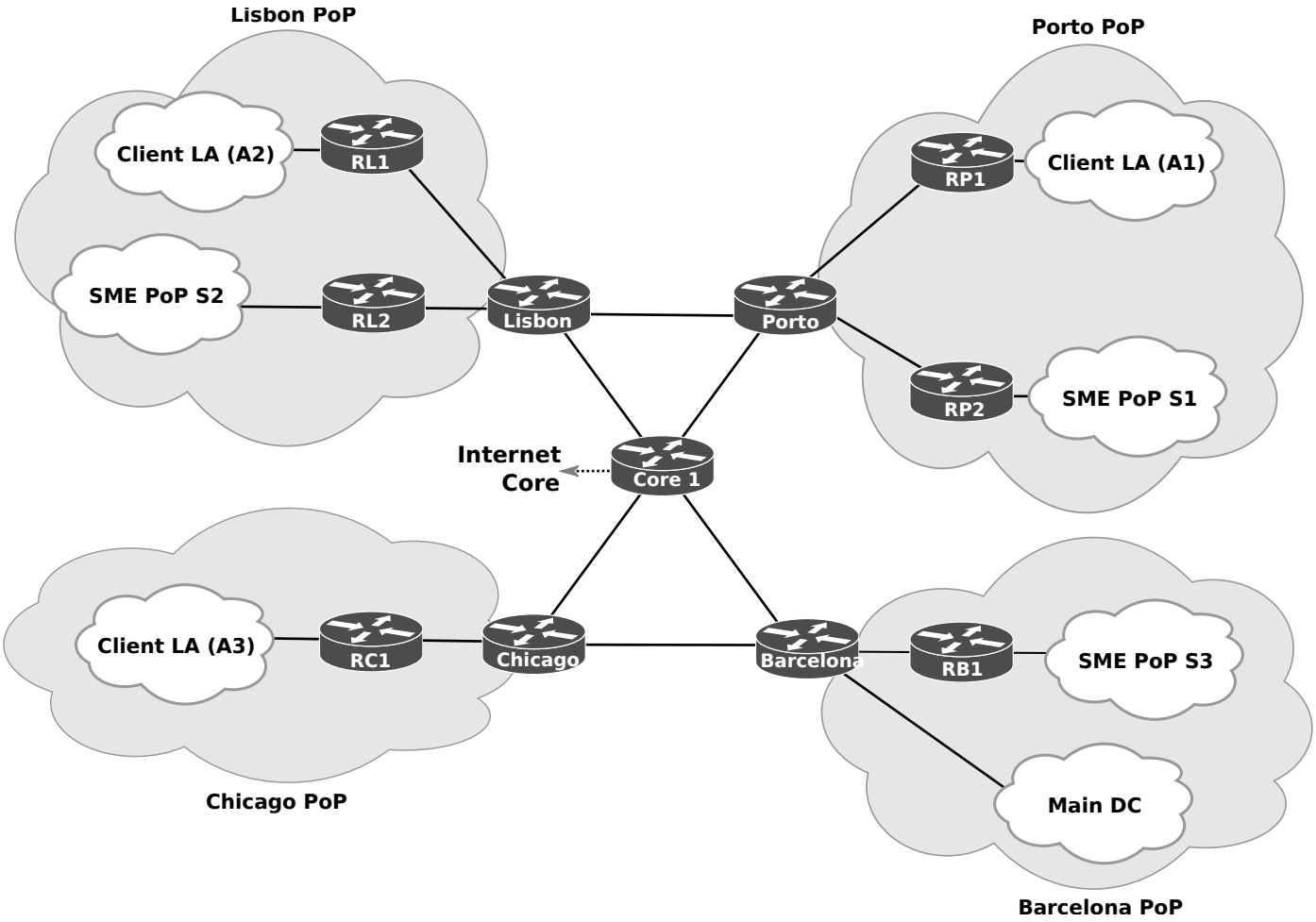
Description:

- The company CDN4ALL 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 (Porto, Lisboa, Barcelona , and Chicago). 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 different PoPs are interconnected by a proprietary network and devices (depicted below).
- The company is an Internet Autonomous System with number 21200, 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 10.0.0.0/24 for use in the interconnection infrastructure.
- The company has one large client (LA) 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 (10.0.1.0/24), S2 (10.0.2.0/24) and S3 (10.0.3.0/24) connected to the respective PoPs.
  - Client LA, has three server clusters A1 to A3, each cluster subdivided in three Ethernet VLANs (VLAN 10: 10.10.0.0/24, VLAN 20: 10.20.0.0/24, VLAN 30: 10.30.0.0/24).
- None of the clients require Internet connection.
- SME1, SME2, and SME3 association, requested:
  (i) A private network to interconnect its server clusters. The interconnection between each pair of PoPs must use a channel with a guaranteed bandwidth of 10Mbps (shared by all private client networks);
  (ii) An advanced service routing for its CDN servers/services, providing efficient access to the services at the different clusters (deployed at Barcelona's Main DC).
- Client LA, requested an Ethernet private network between its server locations. All private Ethernet traffic should be differentiated (at the network core) with a predefined Assured Forwarding policy (guaranteed up to 10 Mbps).

Implementation points:

- ✔ Basic assembly and core connectivity - 4 points;
- ✔ SME1, SME2, and SME3 association private network – 4 points;
- ✔ SME1, SME2, and SME3 private networks traffic reserves – 4 points;
- ✔ SME1, SME2, and SME3 CDN advanced service routing – 2 points;
- ✔ Client LA Layer 2 private network – 4 points;
- ✔ Client LA Layer 2 traffic differentiation – 2 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
Porto PoP
Client LA (A2)
RL1
Client LA (A1)
RP1
SME PoP S2
RL2
Lisbon
Porto
RP2
SME PoP S1
Internet
Core
Core 1
Client LA (A3)
RC1
Chicago
Barcelona
RB1
SME PoP S3
Main DC
Chicago PoP
Barcelona PoP