CERN-CNAF Collaboration

Topic-1.4: Network

Few slides to introduce the discussion

Scouting activity for the new datacenter

General requirements for the new datacenter network

- Performance requirements
  - Network should be able to sustain the high throughput needed by Experiments workflows.
- Resiliency
  - No single point of failure
  - Service continuity (Hitless upgradability)
- Scalability
  - The network should be able to scale in terms of throughput needed by HEP experiments and other projects CNAF will be involved in next 3-5 years
- Network virtualization and overlay protocols
  - Network infrastructure should be an enabling factor for the virtualization technologies that will be implemented in the datacenter.
    - VMs and containers deployment and mobility
    - VXLAN routing and E-VPN: Any experience on it?
  - Possible interaction with the orchestration platforms used in the datacenter
  - Automation should be improved
    - Auto deployment (ZTP implementation ?)
    - Configuration automation via network Management tools (Open source and/or proprietary while effective)
- Context segregation
  - In case of a multi tenant environment, how to realize network segregation has to be understood

New datacenter network infrastructure design ongoing activity at CNAF.

- Definition of main data flows inside the Datacenter
  - Dimensioning in terms of bandwidth needed from/to WAN and between the compute and storage nodes (numbers available)
    - Definition of ”Traffic flows” between the different elements (Still not clearly defined)
    - Datalake DCIs has to be taken in care
- Definition of the network topology (Edge-Core, Spine Leaf, Spine Leaf + Superspine, others?)
  - Technology tracking activity ongoing with main vendors
- Cabling
    - Estimate the number of connections per Rack
    - Identify the correct type of fiber and connectors to be used:
      - SM, MM (OM4 or OM5)
      - MPO-12, MPO-24, Duplex, etc…

DCI related activities CNAF is working on

Use of «Transponder technology» to interconnect resources of three different datacenters (800 and 400Km far) introducing software automation on link resizing.

It could be seen as an underlay technology for a data lake implementation (IDDLS project in collaboration with GARR)

Started studying possible High speed interconnection between CINECA next HPC Pre Exascale cluster and next CNAF datacenter (Data halls will be adjacent but the technologies used in the two datacenters could be different).

Possible fields of collaboration

The simple information exchange on networking technological solutions adopted could be valuable.

As CNAF is a multi experiment Datacenter could be a natural candidate to be a test site for ”Traffic marking” activities in the context of the net-wg@cern.ch and/or “Multi One” project leaded by CERN.

Interested on evaluating a possible high speed Datacenter Interconnection between CERN and CNAF (involving GARR and GEANT) possibly using a dynamic Packet/Optical transponder technology.