

Project Type D

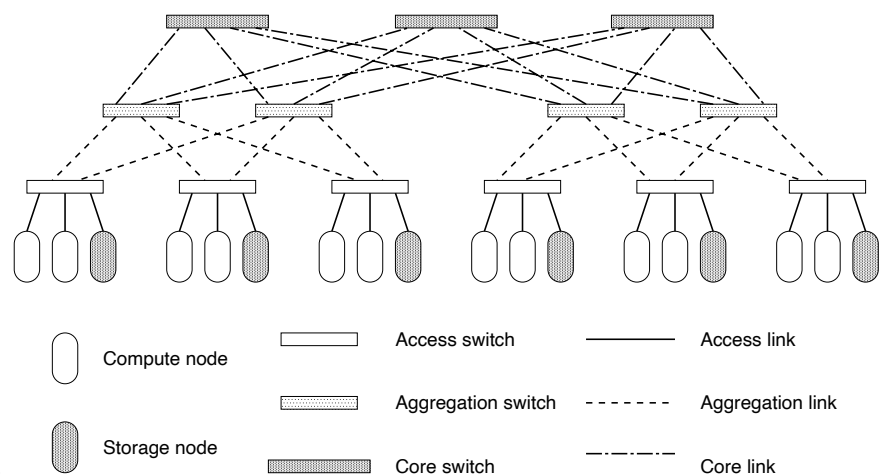
For students with ID (Codice Persona) ending with 4 or 6

Performance of the LAN in a cloud datacenter

A three layer cloud architecture is composed by three layers of switches:

- Access – **112 MB/s**
- Aggregation – **280 MB/s**
- Core – **1.12 GB/s**

Services can be considered exponentially distributed. Data can be routed among different parallel redundant paths.



Performance of the LAN in a cloud datacenter

Consider two nodes per layer, and four type of traffic:

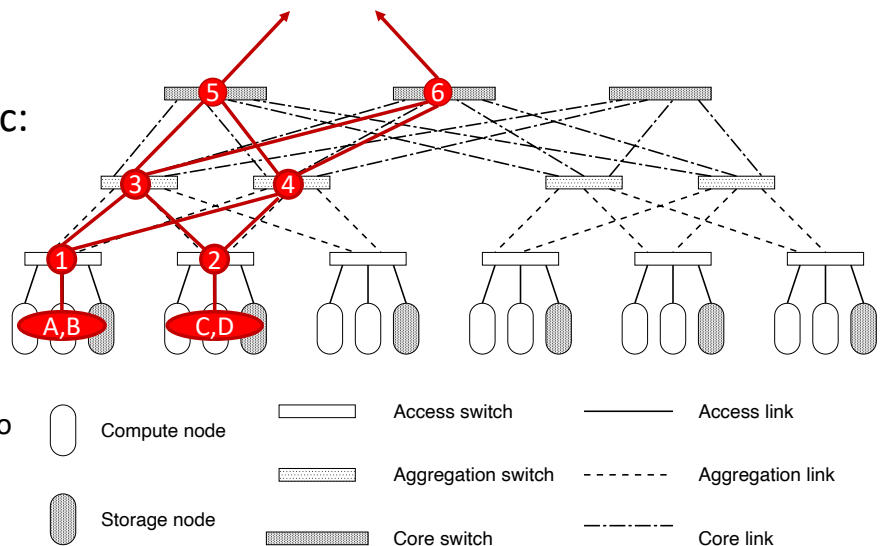
A: 1 -> 3 -> 5

B: 1 -> 4 -> 5

C: 2 -> 4 -> 6

D: 2 -> 3 -> 6

Data traces in files TraceD-D.txt to TraceD-D.txt shows *the time instant* when a 1MB block of data is received for each of the traffic types, expressed in milliseconds from the start of the logging.



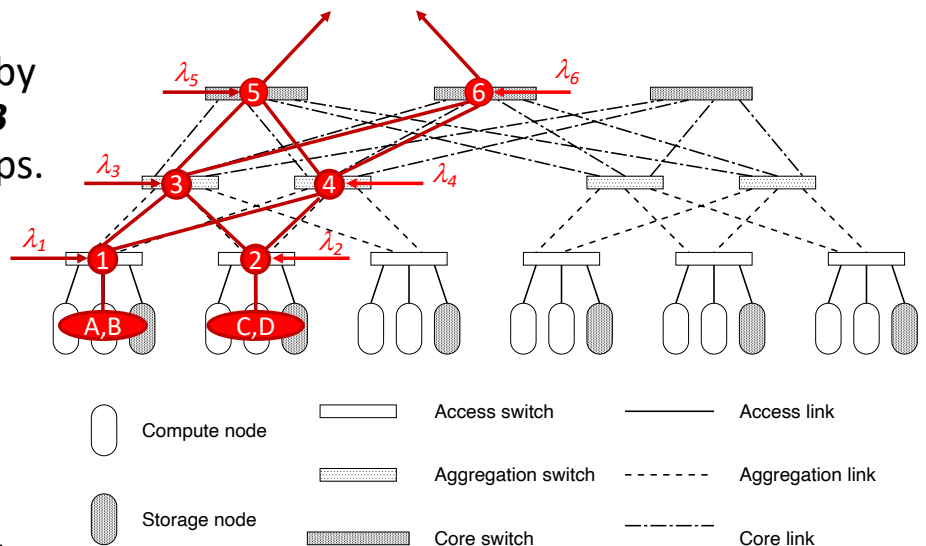
Performance of the LAN in a cloud datacenter

Nodes are characterized by a finite capacity of **16 MB** (at all the levels) and drops.

Nodes are also characterized by background traffic, λ_1 to λ_6 :

- $\lambda_1 = \lambda_2 = 40 \text{ MB/s}$
- $\lambda_1 = \lambda_2 = 180 \text{ MB/s}$
- $\lambda_1 = \lambda_2 = 600 \text{ MB/s}$

Background traffic is routed to the two upstream nodes with equal probability. It can be considered a Poisson process.



Performance of the LAN in a cloud datacenter

The system is experiencing too many losses: the manager would like to add an extra link, with the same characteristics as the existing nodes.

- Which type of link (access, aggregation or core) should be added? How traffic of the four classes should be re-routed to take advantage of the new node?