Directory Assisted RBridge Edge

with optimization

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Characteristics of Internet/Cloud Data Center

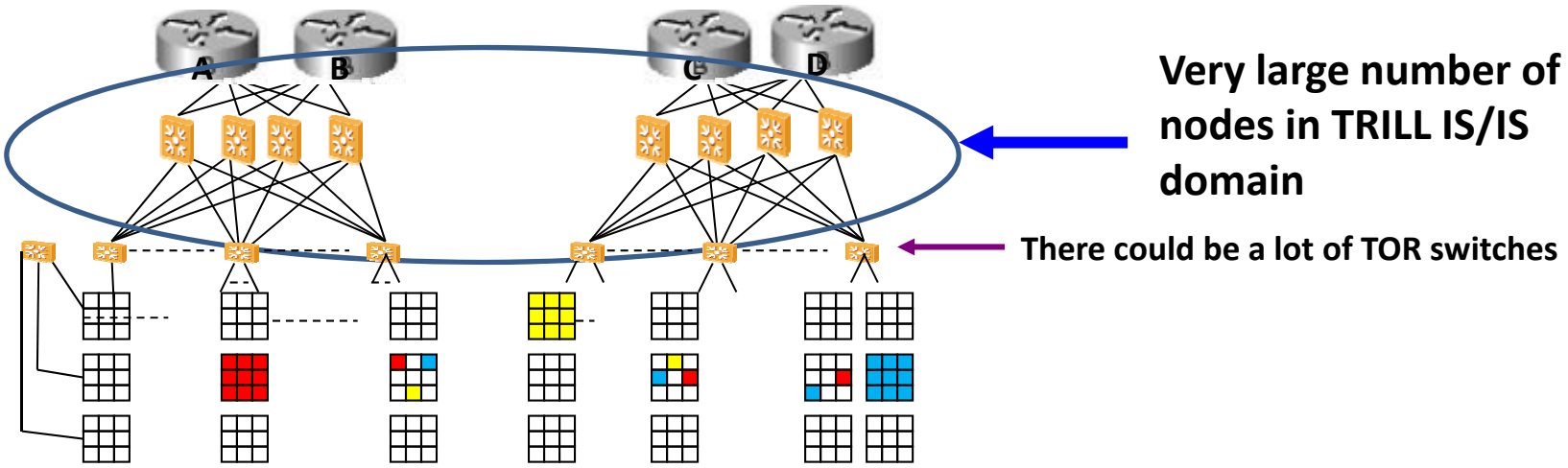
- Large number of hosts
- Topology is based on racks, rows.
- Ever increasing desire by Data Center operators to be able to place hosts anywhere in a data center.

When TRILL is used in Data Center..

- Unnecessary filling of slots in MAC table of edge RBridges,
- The current TRILL protocol requires a MAC address to only be accessible from one RBridge edge port (AF port).
- More flooding when a VLAN is enabled on multiple RBridge edge ports.

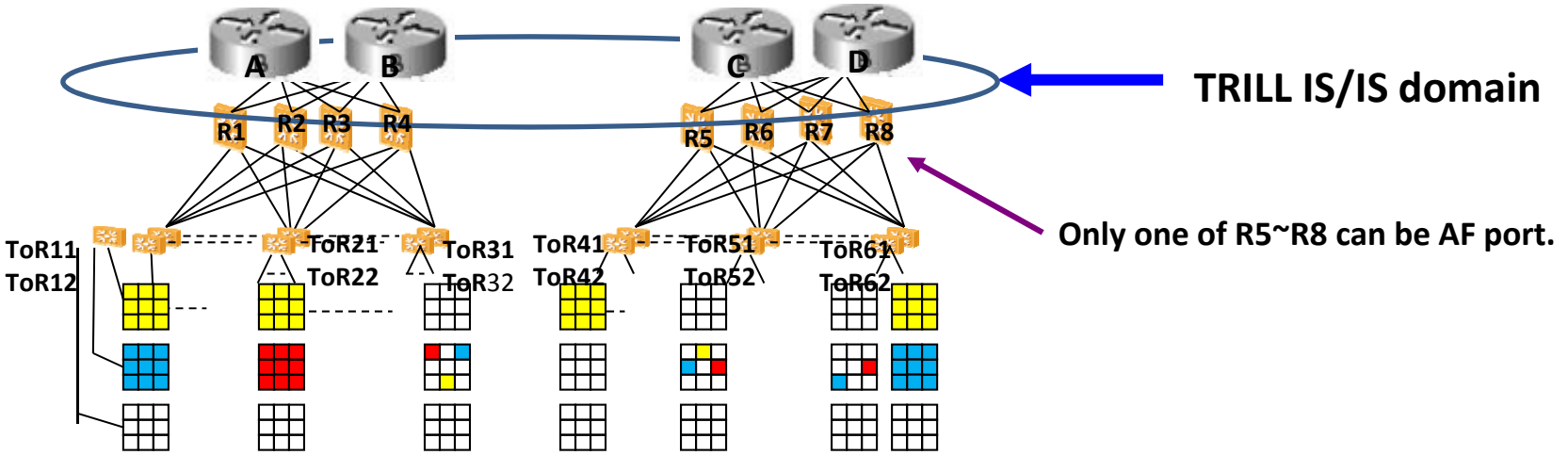
TRILL Boundary – Scenario #1

- TOR switches are TRILL domain boundary :
  - **very large number of nodes in this RBridge IS/IS domain.**



TRILL Boundary – Scenario #2

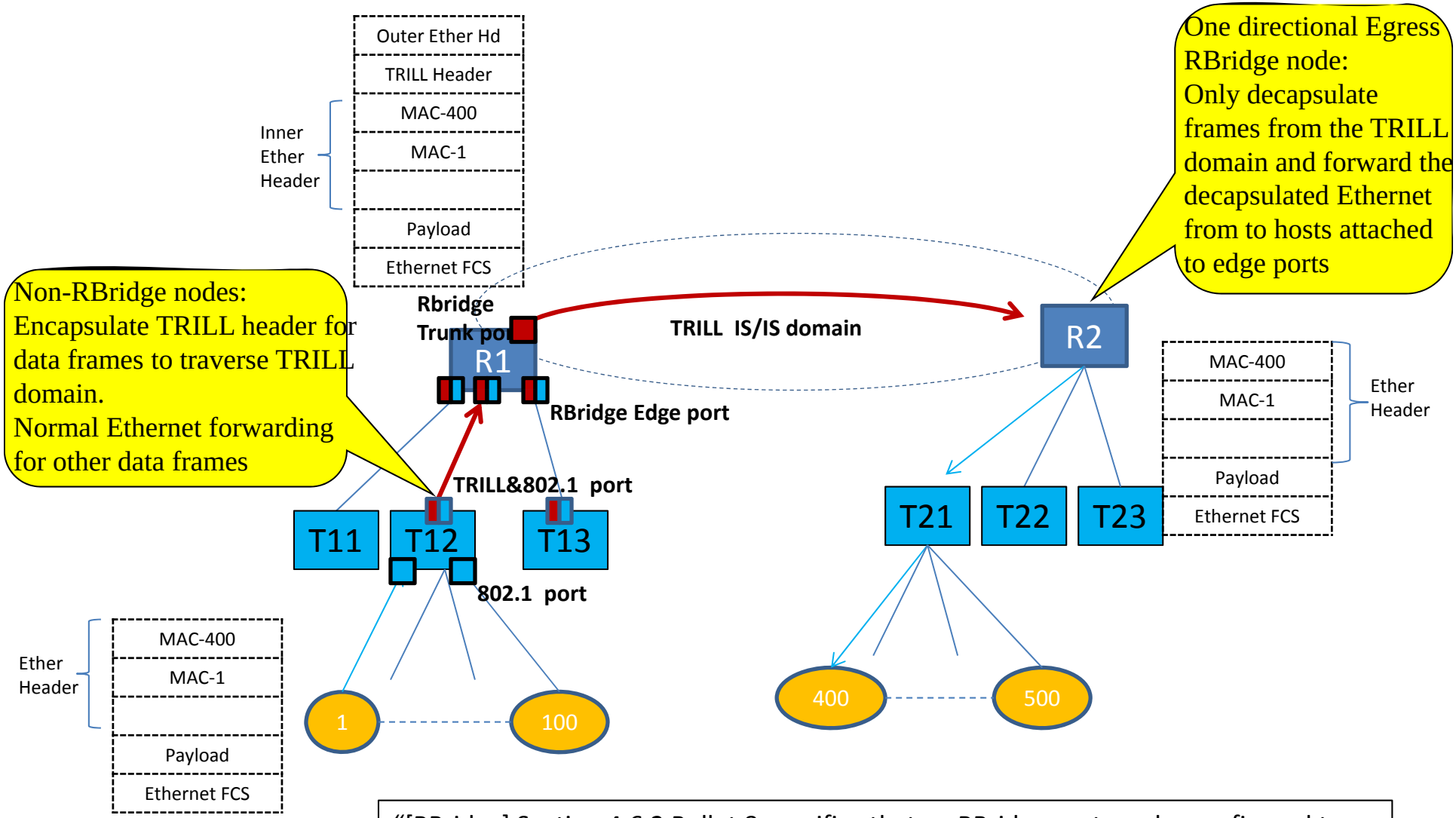
- Aggregation (End of Row) switches are the TRILL boundary
  - Very reasonable sized IS/IS domain
  - Issues:
    - Multiple Rbridge edge ports being connected to one Bridge LAN → Only one of them can forward traffic (AF port).
    - Very large number of MAC&VLAN <-> RBridge Edge mapping to be maintained by RBridge edge node:
    - Might need some mechanism on the Bridged LAN for loop prevention



What is in the directory

- IP, MAC, {nickname, nickname,,,}

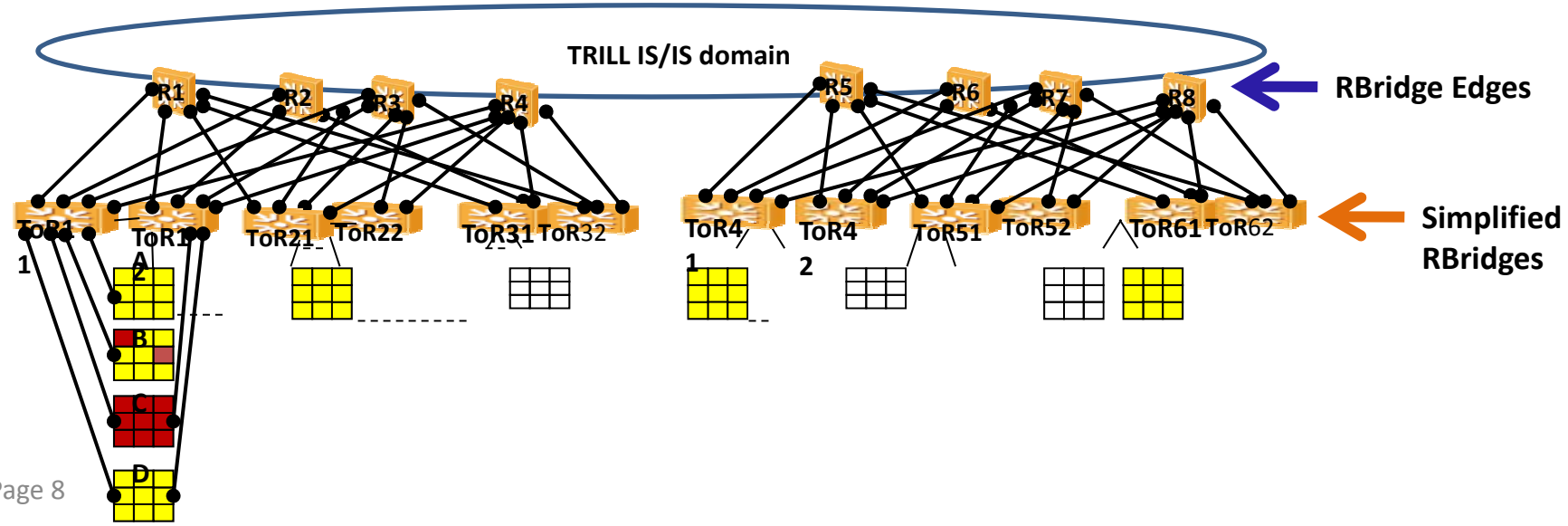
DR Assisted Non-RBridge for TRILL Encapsulation (Simplified RBridge)



"[RBridge] Section 4.6.2 Bullet 8 specifies that an RBridge port can be configured to accept a frame that has been TRILL encapsulated from a neighbor that is not an RBridge..

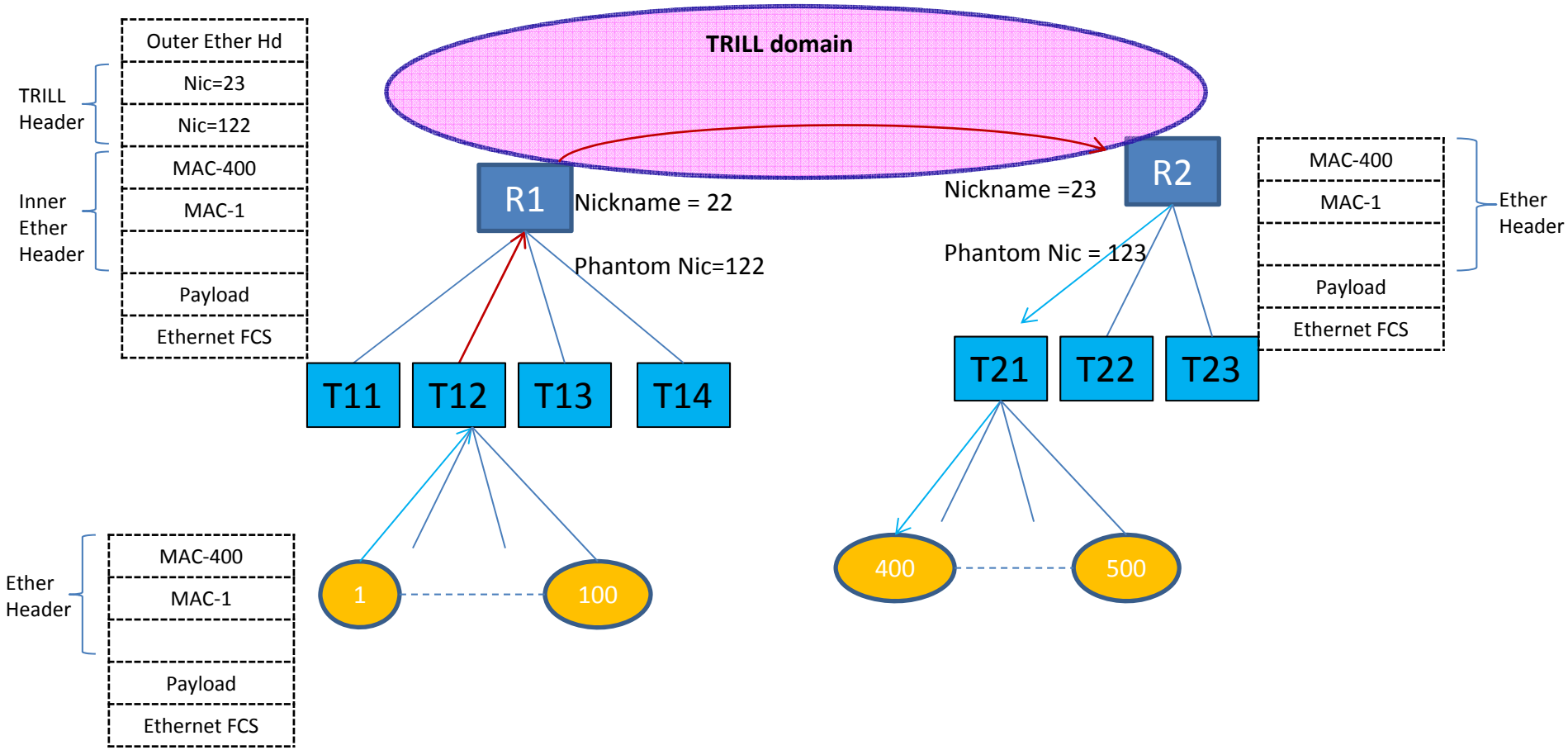
Benefits of Directory Assisted Simplified RBridge

- Allow all RBridge edge ports to forward traffic (instead of a single AF port)
- Avoid flooding frames with unknown DA to RBridge domain.
- Much smaller MAC<-> RBridge Edge mapping maintained by Simplified RBridge.
- both ToRs can be active in forwarding traffic for any VLAN. When there are redundant ToR per rack,



Directory can assist Simplified RBridge in various ways

- Push Model:
  - Only push down the mapping table for VLANs which have hosts attached to the switch (simplified Rbridge).
  - Incremental update can be pushed down when hosts are deleted/added/moved
- Pull Model:
  - Switch node (simplified Rbridge) re-directs all ARP/ND to Directory Server and get the MAC&VLAN <-> RBridge edge mapping as reply, or
- Others

Phantom Nickname

to avoid R1 receiving a data frame with its own Nickname as SA.
Phantom Nickname represents a group of non-RBridge nodes attached to the Rbridge edge node which perform the TRILL encapsulation.