802.1Qbp – ECMP Multicast Load Spreading

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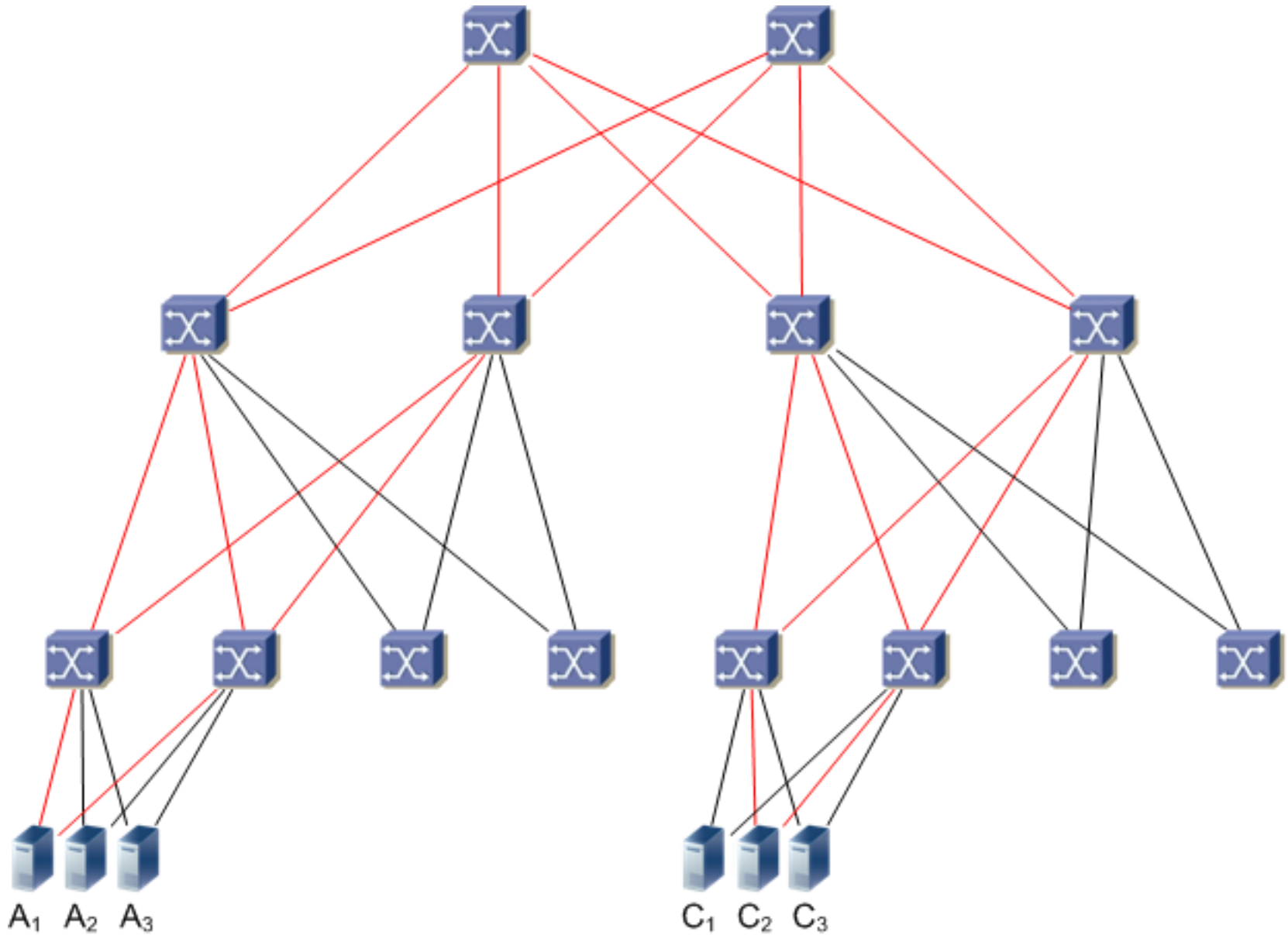
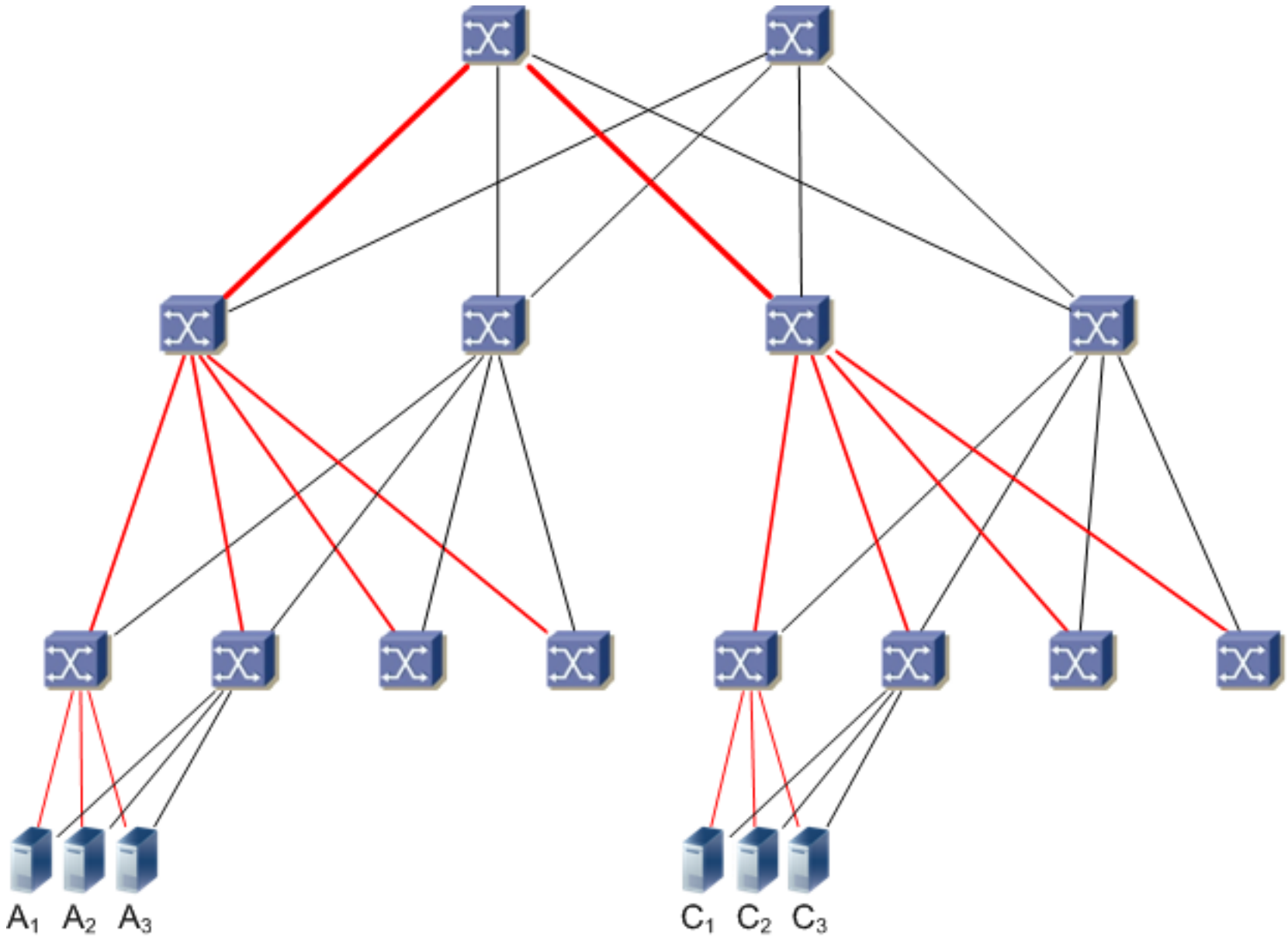
Unicast ECMP, e.g. between A_1 and C_2



ECMP load spreading utilizes all links on equal cost paths for unicast traffic.

Multicast Restricted to Single ECT

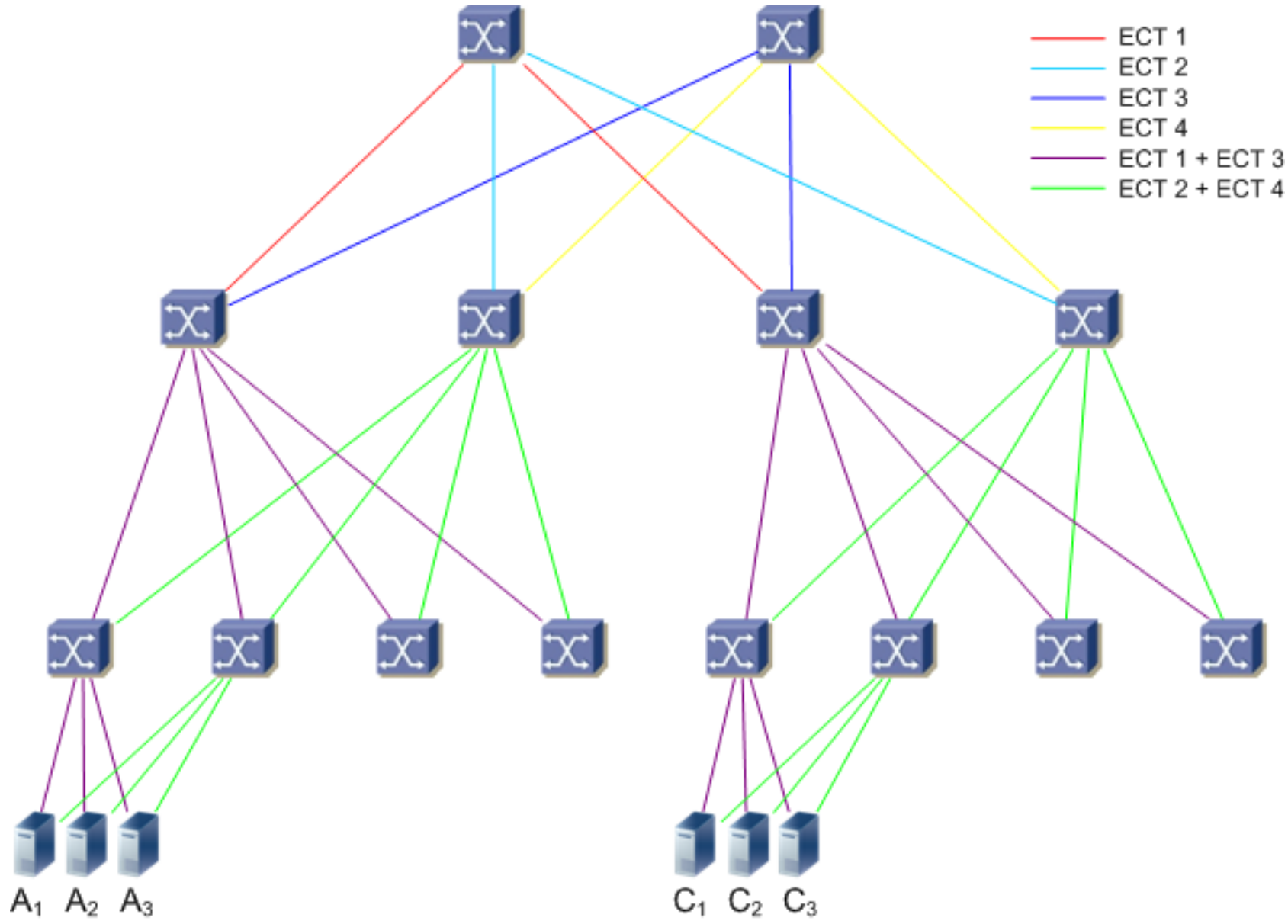


Using only one ECT-algorithm for all multicast traffic (for all service instances) can focus multicast load on a few links.

Observations on Multicast ECMP

- Multicast traffic cannot use the same load spreading mechanism used for unicast traffic
  - FDB has multiple forwarding ports (cannot select just one)
  - Random selection and replication at each hop can lead to looping
- ECMP for unicast traffic makes congruence (unicast-multicast and bi-directional) either easy or impractical (depending on how the definition is adjusted)
  - In either case congruence is not a concern in ECMP path calculations
- Multicast traffic must be constrained to a tree (to avoid loops and duplicate frames)
  - However, different multicast addresses may use different trees

Multicast Load Spreading



Since congruence is not a concern with ECMP, multicast traffic can be assigned to several ECTs in the same VLAN .

Spreading Multicast Traffic

- In SPBM each service instance (I-SID) has its own set of group addresses used to carry client multicast/broadcast traffic
  - Group addresses composed from SPSourceID & I-SID
  - # multicast flows = #service instances * #edge nodes
- Each multicast flow can be independently assigned to an ECT
- For example, can use 16 standard ECTs (tie-breaker functions) to create 16 ECTs to which multicast flows can be assigned
- Assign flow to ECT using standard hash algorithm (so all nodes will agree on assignment and produce consistent forwarding state)

Options for Multicast Spreading

- There may be many ways to provide multicast load spreading
- Need to analyze possible approaches and develop selection criteria
- Ideas welcome!
- I will collect ideas and present analysis at the next meeting (also can be discussed on the ECMP conference calls)