

Exercise 5: PNNI and Multicast

S-38.121 Routing in Communications Networks

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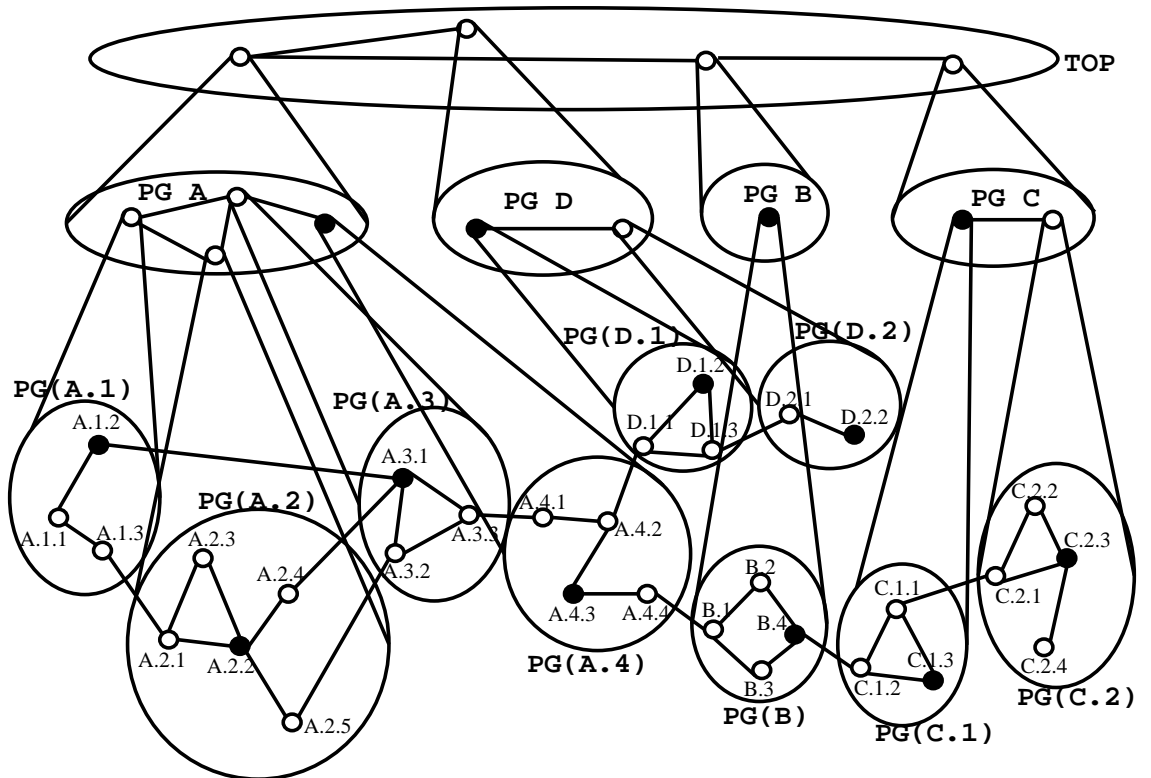
1 Forming hierarchical networks

Illustrate how the PNNI-protocol forms hierarchical peer groups in the network in Figure 1.

First, the nodes discover their neighbours and form their peer groups, e.g. PG(C.2). In each group a peer group leader is elected.

Then each peer group leader in the lowest layer aggregates the topology information of its peer group, forming the upper hierarchy. A peer group is elected in each upper peer group.

And finally a final highest level network is formed from the lower level.



2 Connection setup with crankback

Based on question 1, a connection is to be setup from an end system A.1.1.x (attached to switching system A.1.1) to another end system D.1.2.x (attached to switching system D.1.2). Assume A.1.1 chooses the shortest path to reach the destination firstly. But after setup starts, just find that the physical link between A.1.2 and A.3.1 is blocked. Describe the procedure in the call setup with crankback and list the DTLs at different stages

First A.1.1 selects the shortest path:

DTL: [A.1.1,A.1.2], ptr=2
DTL: [A.1,A.3,A.4,D.1], ptr=1
DTL: [A,D], ptr=1

Then A.1.2 updates the path:

DTL: [A.1,A.3,A.4,D.1], ptr=2
DTL: [A,B], ptr=1

Then a failed link is found between A.1 and A.3, RELEASE is sent back to the source node.

When the source node receive it, calculates a new route:

DTL: [A.1.1,A.1.3], ptr=2
DTL: [A.1,A.2,A.3,A.4,D.1], ptr=1
DTL: [A,D]

And start the communication again...

3 Why cannot TCP be used in multicast?

Because TCP works establishing a connection between two nodes and exchanging streams of data between them. Multicast uses UDP because it is used primarily for broadcasting messages over a network.

UDP would be preferred over TCP where the following characteristics hold true:

- Messages that require no acknowledgement
- Messages between hosts are sporadic or irregular
- Reliability is implemented at the process level

And this is what multicast needs, frame losses are much tolerable, and multicast servers don't be concerned about re-transmitting packets.

4 Feedback

- **Do you think the amount of these exercises is moderate?**

I think that the number of exercises is perfect.

- **Do you feel these questions useful and helpful to gain knowledge?**

Yes, I think that most of them are useful.

- **Did they encompass the main topics in this course?**

Yes, I think so.

- **How about the difficult level of these exercises?**

I think is good too, neither too easy nor too hard.

- **Are the contents of the exercise lectures suitable or good?**

I think is good.