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Exercise No. 7

Peer-To-Peer Networks

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Exercise 12 *Hole punching*

Consider a peer-to-peer network where every peer resides behind a different NAT router. The following features may or may not be available:

1. an external web-server in the Internet, where a peer can retrieve its *own* external IP and port address;
2. a DynDNS service that provides each peer its DNS name. It automatically updates the peer's external IP adress;
3. port forwarding entries on the peers' NAT routers;
4. e-mail addresses of all participants and access to the email service;
5. a shared (web-based) forum, and
6. port scanning or prediction of foreign NAT routers.

a) Find all possible combinations of these features that enable peers to establish UDP message exchange or TCP connections. Especially, focus on minimal combinations, i.e. where as few as possible services are required.

b) Describe the type of NAT routers which are benign for your solution.

c) Discuss for each necessary feature whether all peers or at least one peer need to provide it.