# Exercise: Routing

Instructions
- Students may work in groups in terms of analyzing and discussing the exercise, but each student must do the exercise independently and deliver a unique report. Any copy & paste attempts between students are easily discovered, and will lead to a failure.

Learning objectives
- Learn how to make an IPv4 plan for a network
- To gain hands-on experience with configuration of real-life equipment (in this case Cisco 7200 routers)
- To gain experience with commonly used routing protocols (BGP, OSPF, EIGRP, RIP)
- Understand some of strengths and weaknesses of routing protocols

Getting Started:
- Use GNS3 to create and configure the network illustrated below.
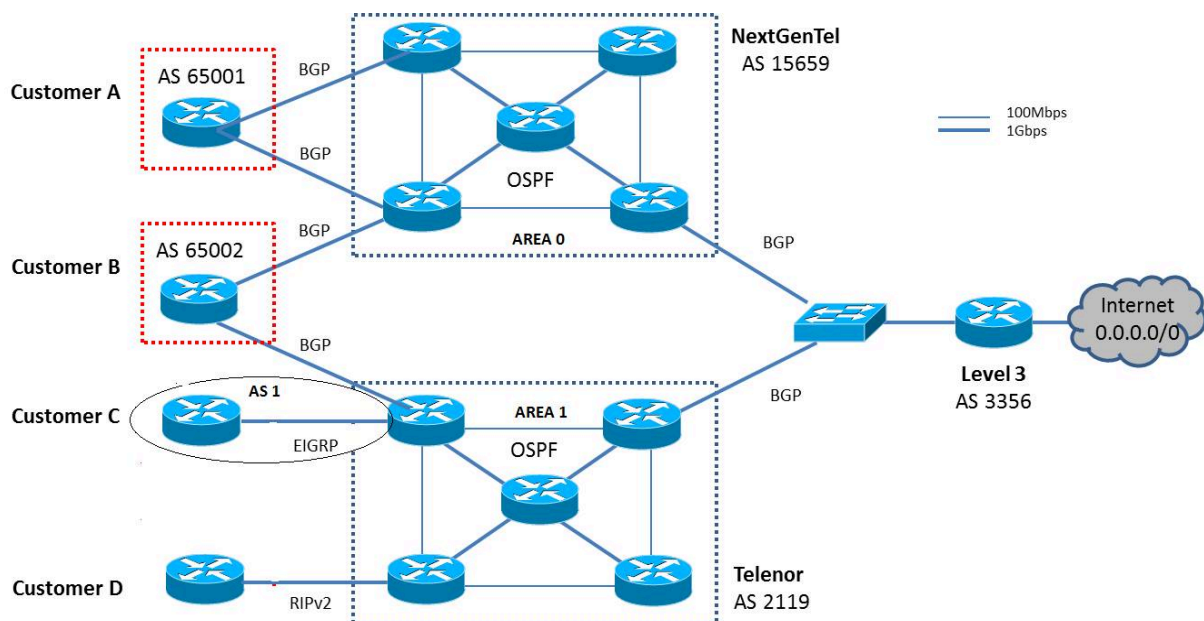
Tasks
1. Assign names to routers and assign interfaces to all links shown.
2. Make an IP addressing plan for all links involved in the network shown.
   a. All customer routers should have two loopback interfaces. A loopback interface has an IP address assigned and configured with a /32 mask (255.255.255.255)
   b. NextGenTel should use the IP subnet 10.10.10.0/24 for all internal links, the subnet 100.100.100.0/24 for external links (i.e. toward customers) and towards Level3 the 172.16.1.0/24 network should be used. Links normally used subnets with /30 mask (255.255.255.252). Loopback interfaces are taken from 192.168.10.0/24 (loopback0) and 192.168.100.0/24 (loopback1).

     c. Telenor should use the IP subnet 20.20.20.0/24 for all internal links, the subnet 200.200.200.0/24 for external links (i.e. toward customers) and towards Level3 the 172.16.1.0/24 network should be used. Loopback interface addresses are taken from 192.168.20.0/24 (loopback0) and 192.168.200.0/24 (loopback 1).

     d. For Level3, a single loopback interface should be configured using IP address 1.1.1.1/32. The Internet route is injected by a staticNull0 route

3. Configure all routing protocols as indicated. When completed, all routers should have a routing table containing all IP addresses used in the network (all loopback interface, all link addresses) and the route to Internet (0.0.0.0/0)

4. Inside the OSPF domains for both NextGenTel and Telenor, the routing should be changed / modified so that GE links are preferred instead of the FE links. This change should be done without using static routes.

5. Re-configure the OSPF processes so that they use the loopback0 address as their router-id, and thereafter prevent the advertisement of theses addresses outside of their respective AS.