Data Communications and Networking
Lab 5 - Network Topologies

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Exercise

Using GNS3, create two network topologies A and B such that:

- Requirement 1: Each topology has at least 15 end-user hosts and at least 4 routers, using RIP or static routing. There must be at least 5 subnets in each topology.
- Requirement 2: Any two hosts are able to communicate using at least two different protocols (e.g. ping, TCP, UDP — the virtual PC `ping` command has options to test different protocols).
- Requirement 3: Topology A has a router acting as a single point-of-failure, whereas topology B should be able to survive the loss of any one router. (That is, if you disable one router in topology B, all the subnets that are not directly connected to that router will still be able to communicate with each other.)

Some hints:

- Use different sets of subnet addresses for the two topologies. We will connect them together in a later lab, so this will save reconfiguring them.
- Try to use network components in a “realistic” way (e.g. don't connect routers together using switches, or connect PCs directly to routers).

Write a document that contains:

- Clear screenshots of your two completed topologies. It must be clear what subnets you've used — either label them on the diagram, or include a table showing the addresses.
- A short explanation, with screenshots, of how you have met requirement 2. (You don't need to show screenshots of communication between every possible pair of subnets, but you should show enough to convince the marker that you've met the requirement. You might like to try `traceroute` on your networks.)
- A short explanation, with screenshots, of how you have met requirement 3 — show what happens when you remove individual routers from the two topologies in terms of connectivity.

You shouldn't need to write a lot of text — maximum 300 words.

Marking scheme

This assessed lab exercise is worth 10% of your final mark for F29DC.

- A: Your networks meet all the requirements above, and your document clearly demonstrates this.
- B: Your networks meet all the requirements, with some minor flaws in your demonstration.
- C: Your networks meet all the requirements, with some serious flaws in your demonstration.
- D: Your networks meet two of the three requirements.
- E: Your networks meet fewer than two of the requirements.

Submission

You must submit a `.zip` file to the Lab 5 assignment on Canvas, containing:

- Your GNS3 project(s), including topologies and configurations. Make sure that all your configuration files have been saved correctly (e.g. using the `write` command).
- Your document, in PDF format.

We will mark the document with you in the lab and give you immediate feedback. You will need the GNS3 project(s) for the next two labs, so please save a copy.