

# Data Communications and Networking

## Lab 7 - Further Exploration

Hani Ragab, Adam Sampson and Zi Hau Chin

School of Mathematical and Computer Sciences, Heriot-Watt University

### Exercise

Starting with the two topologies that you built in Labs 5 and 6, you should select and experiment with some additional network features of your choice. For example, you might:

- Experiment with more advanced inter-AS routing features in BGP (e.g. using route filtering to only advertise some routes, or building reliable redundant interconnections between multiple ASs).
- Add security devices (e.g. pfSense firewalls) to one of the topologies, and configure them to work within the network.
- Replace the routers with network devices from other manufacturers (e.g. Juniper).
- Replace the virtual PCs with more sophisticated end devices such as Linux and Windows hosts. (The emulations available will depend on the platform you're running GNS3 on.)
- Set up packet filtering within IOS to create a firewall between the two topologies.
- Add IPv6 support to one or both topologies, and set up IPv6 routing.
- Configure VRRP to allow the network to survive router failures.

The aim of this exercise is for you to explore new topics in networking. It's OK if you don't manage to get everything that you try working perfectly — but you should be able to explain what you've learned.

Write a document with screenshots and brief notes on the new features you have added to your network — 500 words maximum. You should include references (e.g. URLs) to any external resources you've used during this exercise.

### Marking scheme

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

- A: You have experimented with at least two features that you haven't previously used, and clearly explained these in your document.
- B: You have experimented with at least one feature that you haven't previously used, and clearly explained these in your document.
- C: You have experimented with at least one new feature, but your document doesn't clearly show what you've done.
- D: You have done some experimentation with at least one new feature, but there are serious flaws in your explanation.
- E: You haven't successfully experimented with any new features.

### Submission

You must submit a .zip file to the Lab 7 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.

For this lab, the GNS3 project may be very large — especially if you've added virtual machines to your project. **If it is more than 10 MiB**, and you are unable to reduce the size, then please upload your GNS3 project separately to OneDrive and include a link to it in your document.

We will mark the document with you in the lab and give you immediate feedback.