

All Beginnings are Difficult

You have started a new job as the network operator for a small startup.

There's no network infrastructure yet except for a connection to the Internet provided by the local ISP. Seems like you will have to build the network from scratch.

You will simulate the network build using GNS3, so start up GNS3 in the lab VM and create a new project.

18.1 Laying the Groundwork

To start your deployment you decide to set up the gateway router and the Internet connection first.

- Place a cloud node. (It is automatically configured to be bridged to eth0 of the lab VM.)
- Place a HONLinux node and connect one of its interfaces to the cloud.

Start the nodes in your network and configure the HONLinux node:

- Change its hostname to gateway
- Setup the Internet connection (the ISP uses a DHCP server)
- Verify your configuration by checking whether IP and DNS are working properly.

18.2 Departments

Next you decide to start setting up the internal network. You decide to setup two separate networks, one for the *engineering* team and one for the *accounting* department.

- Design a simple address plan using any of the RFC1918-ranges.
- Update your network by adding the required nodes (switches, hosts) to represent the new department networks. Create *at least two workstations* per department.
You can use *webterm*-nodes to represent workstations. You can edit the network configuration of the nodes from their GNS3 configuration dialog.
- Setup the gateway for the new networks.
- Configure the workstations with a static IP address according to your address plan.
- Verify that the IP configuration is correct by making sure workstations in the same network can connect to each other and to the gateway.

18.3 The Route(r) to Success

After returning from lunch the first complaints are coming in.

Your colleagues are complaining there's something wrong with the network. Both departments are complaining they are unable to access workstations in the other department

- Update your configuration, so that workstations from either department can communicate with each other.

18.4 Making things more Dynamic

Meanwhile the engineering department started their work. They brought in a lot of additional hardware which needs to be connected to the network. In order to make it easier for them to add new devices to the network, they ask you to set up some form of dynamic address configuration. You decide to set up a DHCP service for all the departments, since this will make your job easier as well.

- Setup DHCP service to provide IP addresses for both departments.
- Reconfigure the workstations to use DHCP to obtain IP addresses and verify your setup.

18.5 Watch your Six

You recently met with Scott, a friend from your old job. He tells you about a network protocol all of the techies at the old place are talking about. Intrigued about the idea of a new shiny toy, you inquire further and find out he is talking about IPv6. After reading up a little bit about IPv6 you decide to implement it at the office.

Since your ISP is not offering IPv6 at the moment you decide to run IPv6 **locally on your network** using unique local addresses.

- Generate a random prefix in the ULA-range (e.g. using <http://simplifiedns.com/private-ipv6>).
- Update your address plan for IPv6 using the generated prefix. Make sure the subnets can be used for IPv6 autoconfiguration using SLAAC.
- Configure your gateway to support IPv6 (i.e. configure IPv6 addresses for its internal interfaces).
- Update your Dnsmasq configuration to support IPv6 using SLAAC. You can find more information on how to setup dynamic IPv6 addressing in `/etc/dnsmasq.conf` or in the Dnsmasq manpage (available only in the lab VM, not in the HONLinux appliance).
- Verify your setup. Also make sure departments can communicate with each other using IPv6.