

LAB3 - Let's Build Topologies

CS169: Mobile Wireless Networks - Winter 2018

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Let's get started

- Go to working directory
- `$ cd /extra/CSUserName/cs169lab/ns-allinone-3.25/ns-3.25`
- `$ cp examples/tutorial/second.cc scratch/mysecond.cc`

Looking at the second script...

- `$ vim scratch/mysecond.cc`
- Press ESC and type `:set number`
- What are the additional headers included?
- Do you see the topology drawing?
- What are *nCsm*a and *verbose* for?
- How can we set DataRate and Delay for CSMA channel?
- How can we set routing functionality?
- How can we enable pcap logging for specific devices?
- How can we set a promiscuous mode and why do we need it?

A Bus Topology

```
// Default Network Topology
//
//      10.1.1.0
// n0 ----- n1    n2    n3    n4
// point-to-point |    |    |    |
//                =====
//                LAN 10.1.2.0
```

Running the second script...

- `$./waf`
- `$ export NS_LOG=`
- `$./waf --run scratch/mysecond`
- `$ tcpdump -nn -tt -r second-0-0.pcap`
`$ tshark -n -t d -r second-0-0.pcap`

- Run `mysecond` with number of extra `cdma` nodes = 5
- Set `MaxPackets` of `echo` client to 4 and run the script again. Now observe ARP protocol and how many ARP request/reply do you see?
- Add one more `echo` client on `csma` with similar attributes and start the two clients at the same time (2s). Observe RTT of each node and each transmission.
- Add another argument called `nEchoClients` to set the number of nodes installing `echo` client application and implement this in the code. Again, observe RTT of each node and each transmission.

Adding a Wireless Topology

- `$ cp examples/tutorial/third.cc scratch/mythird.cc`
- `$ vim scratch/mythird.cc`

A Wireless Topology

```
// Default Network Topology
//
//   Wifi 10.1.3.0
//
//           AP
// *       *       *       *
// |       |       |       |   10.1.1.0
// n5     n6     n7     n0 ----- n1     n2     n3     n4
//
//           point-to-point |     |     |     |
//
//                               =====
//                               LAN 10.1.2.0
```

- Get pcap files from mythird.cc and open all of them. Look at ARP and explain to yourself what is happening.
- Swap client and server (server running on wifi and client running on csma) and observe the RTT difference.
- Pass *nPackets* and *nEchoClients* (as we did on mysecond) and observe the impacts of adding more echo clients to the RTT.
- **Hard!** Change wifi propagation model to random (default is log distance propagation model).

Hint!

`channel.AddPropagationLoss ...` may help.

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Questions?