LAB3 - Let's Built Topologies
CS169: Mobile Wireless Networks - Winter 2017

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January 30-31, 2017

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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 *nCsma* 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 promiscuos 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

Exercises

- 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

```
// 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
```

Exercises

- Get pcap files from mythird.cc and open all of them. Look at ARP and explain to yourself what is happenning.
- 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 long distance propagation model).

Hint!

tshark may help...
channel.AddPropagationLoss ... may also help.

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Questions?