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

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Table of Contents

1 Building Bus Topologies

2 Building Wireless Topologies
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 \textit{nCsma} and \textit{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 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 long distance propagation model).

Hint!

$tshark$ may help...
$channel.AddPropagationLoss$ ... may also help.
1 Building Bus Topologies

2 Building Wireless Topologies
Questions?