Heterogeneous Hybrid Networks Reliability Simulation (HeNReS)

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What is it?

Reliability and delays data network simulation.

What does it offer?

- Hybrid wired/wireless networks based on the IEEE 802.3 “Ethernet” and IEEE 802.11 “WiFi” PHY.
- Real-time (time-triggered) and non-real time traffic support.
- Using state of the art tools: OMNeT++ for network simulator, SMT solver for traffic scheduling.
- Scenario creator: topology, traffic and interference. Easy to use, several scenarios simulated at once.
- Simulation results verification.

How does it work?

Step 1: Network creator and traffic generator

Step 2: Traffic scheduler

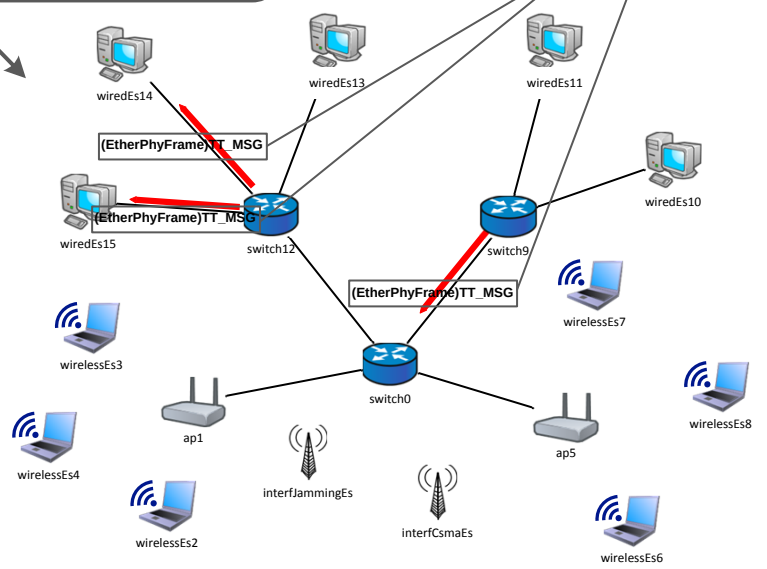
Step 3: OMNeT++ simulation scenarios generator

Step 4: OMNeT++ simulation

Step 5: Results verification

Any topology without cycles and different traffic classes

Traffic is scheduled avoiding collisions between wireless transmissions



Different scenarios and configurations generated at once

```
[Config RPSprd-NumReTx1-ToICsma-LoI10-IBS2000-ScS100-ScP50000]
BigHybridTTE.switch4.eth[0].mac.interfaceScheduleFile ="schedules/69267/interface_7"
BigHybridTTE.switch4.eth[1].mac.interfaceScheduleFile ="schedules/69267/interface_8"
BigHybridTTE.switch4.eth[2].mac.interfaceScheduleFile ="schedules/69267/interface_10"
...

[Config RPSprd-NumReTx1-ToICsma-LoI30-IBS2000-ScS100-ScP50000]
BigHybridTTE.switch4.eth[0].mac.interfaceScheduleFile ="schedules/69267/interface_7"
BigHybridTTE.switch4.eth[1].mac.interfaceScheduleFile ="schedules/69267/interface_8"
BigHybridTTE.switch4.eth[2].mac.interfaceScheduleFile ="schedules/69267/interface_10"
...
```

Module	Name	Value
BigHybridTTE.interfCsmaEs[0].wlan.radio	packetErrorRate:histogram:count	31.0
BigHybridTTE.ap7.wlan.radio	packetErrorRate:histogram:count	32.0
BigHybridTTE.wirelessEs8.wlan.radio	packetErrorRate:histogram:count	7.0
BigHybridTTE.wirelessEs9.wlan.radio	packetErrorRate:histogram:count	33.0
BigHybridTTE.wirelessEs10.wlan.radio	packetErrorRate:histogram:count	19.0

Results on reliability and delays

Checks if the logged simulation events are compliant with the protocols definition

```
Event=Msg; Action=SendStart; LinkMedium=Wired; TrafficClass=TT; FrameId=35;
Event=Msg; Action=SendStart; LinkMedium=Wired; TrafficClass=TT; FrameId=5;
Event=Msg; Action=SendStart; LinkMedium=Wired; TrafficClass=TT; FrameId=63;
Event=Msg; Action=SendFinish; LinkMedium=Wired; TrafficClass=TT; FrameId=35;
Event=Msg; Action=WaitIFGStart; LinkMedium=Wired; Descr=Waiting post-transm
Event=Msg; Action=SendFinish; LinkMedium=Wired; TrafficClass=TT; FrameId=5;
```

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