Analysing Networks

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Lab Tasks

1. Creating a new project
2. Create network topology
3. Edit node attributes
4. Specify traffic from users
5. Select statistics to collect
6. Run the simulation
7. View the results
Create a New Project

Task 1
Use an empty scenario, create an office network of 100x100m and select the ethernet and wireless_lan model families.

Projects and Scenarios
A project may have multiple scenarios.

Model Families
The Model Families selected gives you quick access to these models. You can still access all other models.
Create Network Topology

Task 2

1. Create a switched Ethernet LAN that has: two workstations, one server and a 16-port switch
2. Create a Wireless LAN that has: two wireless clients and an integrated access point/IP router
3. Connect the Ethernet hosts and router via the switch using 100 Base–T links

Node/link models: ethernet_wkstn, ethernet_server, ethernet16_switch, 100BaseT, wlan_wkstn, wlan_ethernet_router

Stations vs Workstations

- Workstations are full IP clients; stations are simple hosts without IP support
Edit Attributes

Task 3

1. Give the nodes meaningful names
2. Set the three wireless nodes to use IEEE 802.11g at 54Mb/s

Addressing

By default, IP addresses are *Auto Assigned*: OPNET assigns IP addresses to each node when the simulation starts.
Specify Traffic From Users

Task 4

1. Add the Profile Definition and Application Definition objects
2. Add two applications:
   2.1 WebBrowsing: Http is Image Browsing
   2.2 FileTransfer: Ftp is High Load
3. Add two profiles:
   3.1 Student: using WebBrowsing application
   3.2 Lecturer: using all three applications, where the profile starts within uniform(300,310) and operation mode is Simultaneous
4. Set the server to support all services
5. Set one wireless LAN client to have Student profile and other clients to have Lecturer profile
Select Statistics to Collect

Task 5

1. On nodes, Choose Individual DES Statistics:
   - Server: ServerFtp, ServerHttp
   - Switch: Switch
   - Laptops: ClientHttp, WirelessLAN
   - Switch—WirelessRouter: Utilization

2. From DES menu, Choose Individual Statistics:
   Ethernet, WirelessLAN, Ftp

OPNET Statistics
Node/link statistics: recorded for individual nodes/links
Global statistics: recorded for entire network
Configure and Run the Simulations

Task 6

1. From DES menu, Configure/Run Discrete Event Simulation
2. Set duration to 10 minutes
3. Run!

What does OPNET do?

- Processes are compiled (if changed since last simulation)
- Displays simulation progress, including number of events and simulated time
- DES Log: warnings and errors will be recorded (open via DES menu)
View the Results

Task 7

1. From DES menu, Results→View Results...
   1.1 HTTP statistics: Laptop1 page response time; Server load; Server task processing time
   1.2 Global wireless LAN throughput
   1.3 Wireless Router→Switch utilization

Hide plots leaves them available for viewing later
Results can be shown As Is or with mathematical operators applied