Lab Assignment-4

Indian Institute of Technology Roorkee Department of Computer Science and Engineering

CSN-361: Computer Networks Laboratory (Autumn 2019-2020)

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B.tech CSE 3rd Year.

Problem 1. Using OPNET create Bus topology among a set of N computer nodes out of which two nodes are the source and the rest are sink nodes. Model the traffic of source and sink nodes individually and demonstrate the packet transfer between them using Ethcoax (Ethernet using coaxial) cables. Use network scale as the "campus" of area 1km x 1km.

- **Procedure**:-

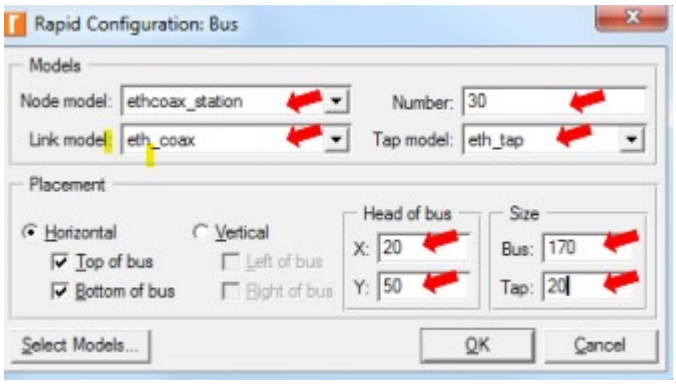
Create the Network

To create our coaxial Ethernet network:

1. To create the network configuration, select Topology ⇒ Rapid Configuration.
From the drop-down menu choose Bus and click Next.

2. Click the Select Models button in the Rapid Configuration dialog box. From the
Model List drop-down menu chooses ethcoax and click OK.

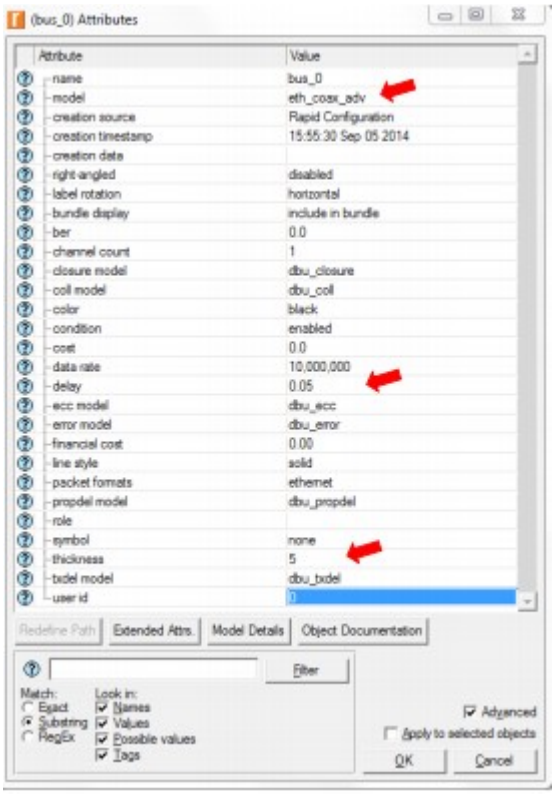
3. In the Rapid Configuration dialog box, set the following eight values and click OK.

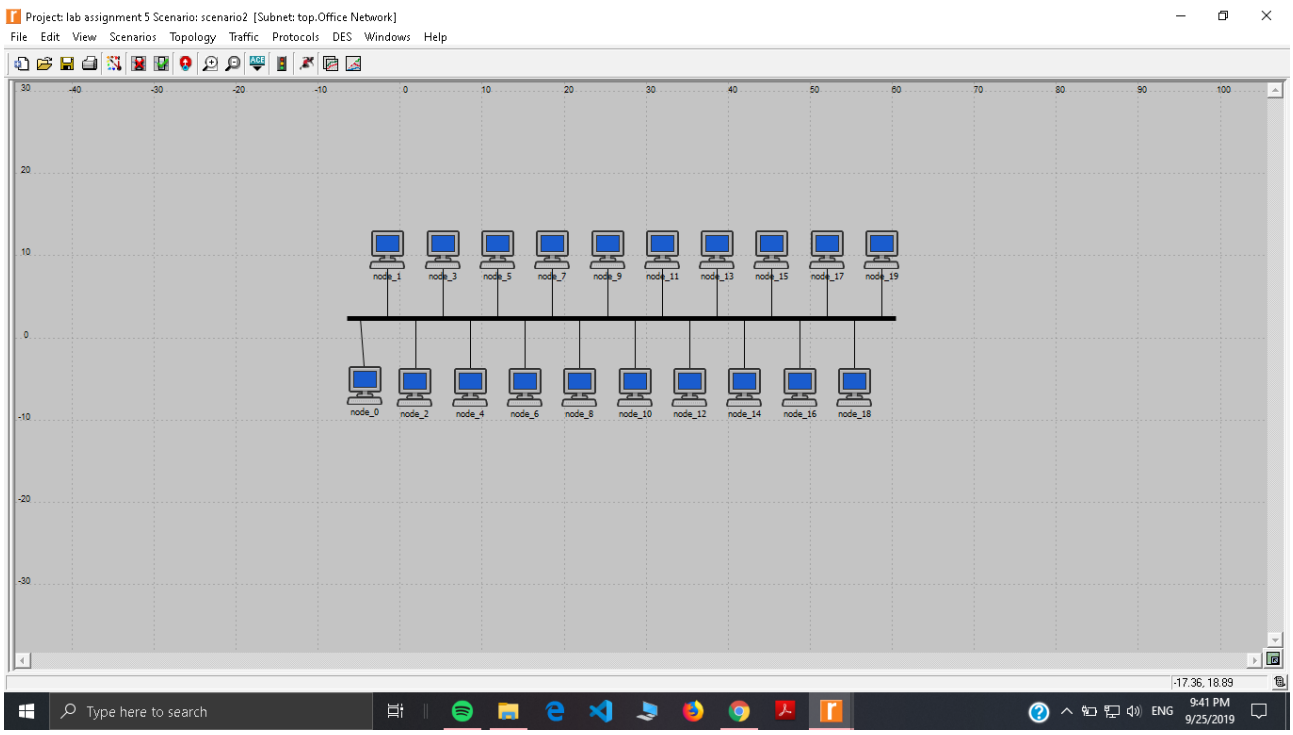


4. To configure the coaxial bus, right-click on the horizontal link ⇒ Select Edit Attributes (Advanced) from the menu: a. Click on the value of the model attribute ⇒ Select Edit from the dropdown menu ⇒ Choose the eth_coax_adv model. b. Assign the value 0.05 to the delay attribute (propagation delay in sec/m). c. Assign 5 to the thickness attribute. d. Click OK

5. Now you have created the network. It should look like the illustration below.

Traffic Received (in packets/sec) by the traffic sinks across all nodes.
Traffic Sent (in packets/sec) by the traffic sources across all nodes





Configure the Network Nodes

To configure the traffic generated by the nodes:

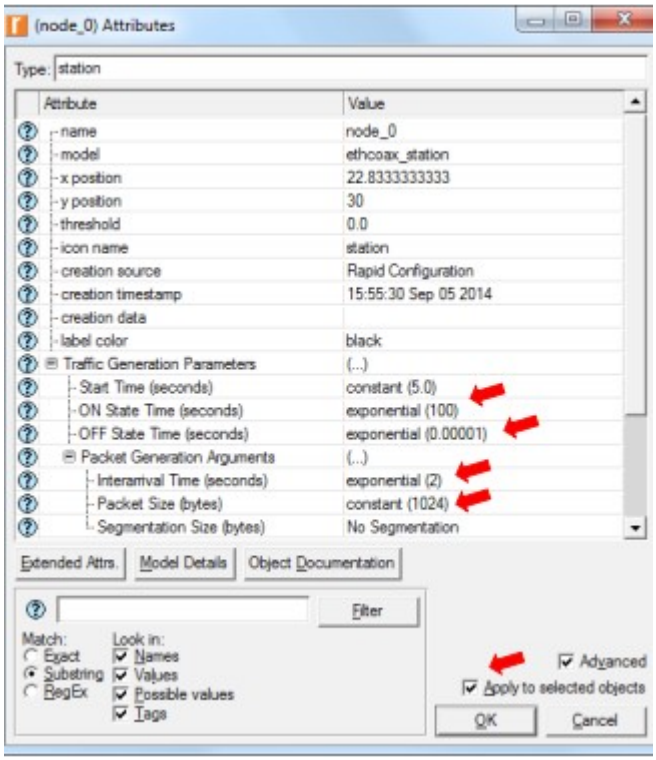
1. Right-click on any of the 20 nodes ⇒ Select Similar Nodes. Now all nodes in the

network are selected.

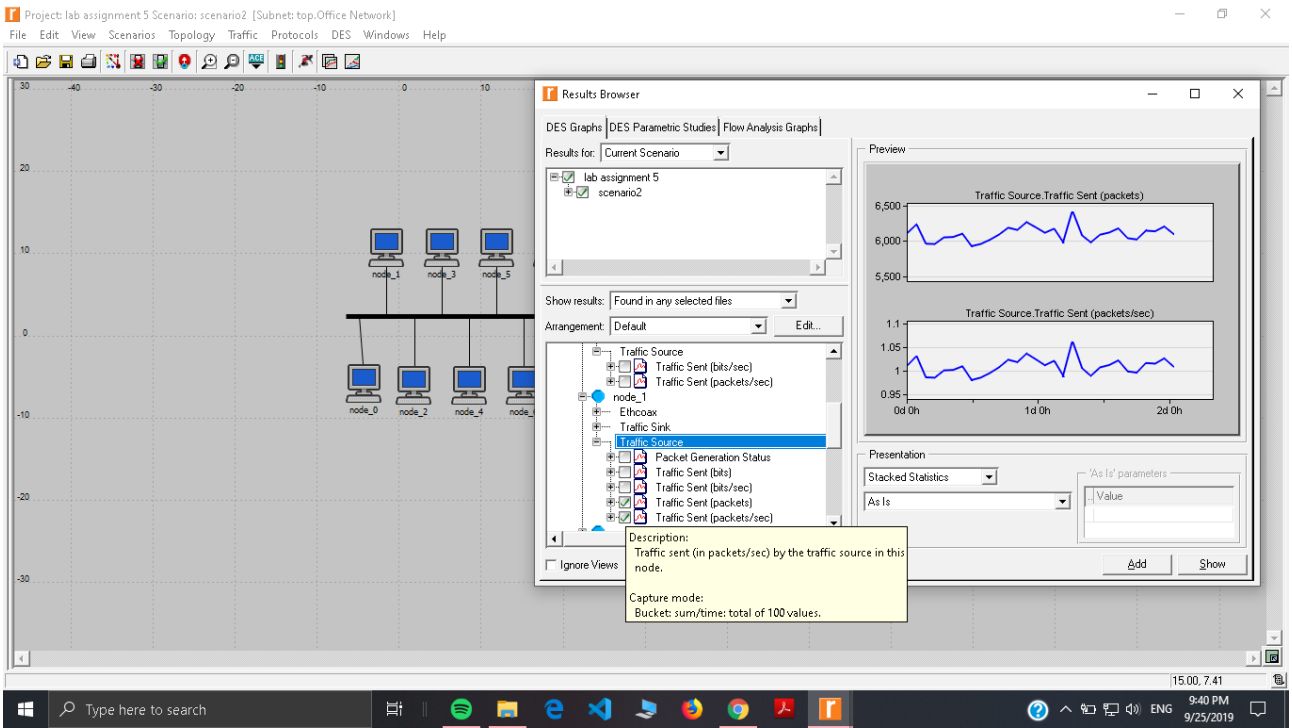
2. Right-click on any of the 20 nodes ⇒ Edit Attributes.

3. Check the Apply Changes to Selected Objects checkbox. This is important to avoid reconfiguring each node individually.
.
4. Expand the Traffic Generation Parameters hierarchy:
a. Change the value of the ON State Time to exponential (100) ⇒ Change the value of the OFF State Time to exponential (0.00001). (Note: Packets are generated only in the "ON" state.)

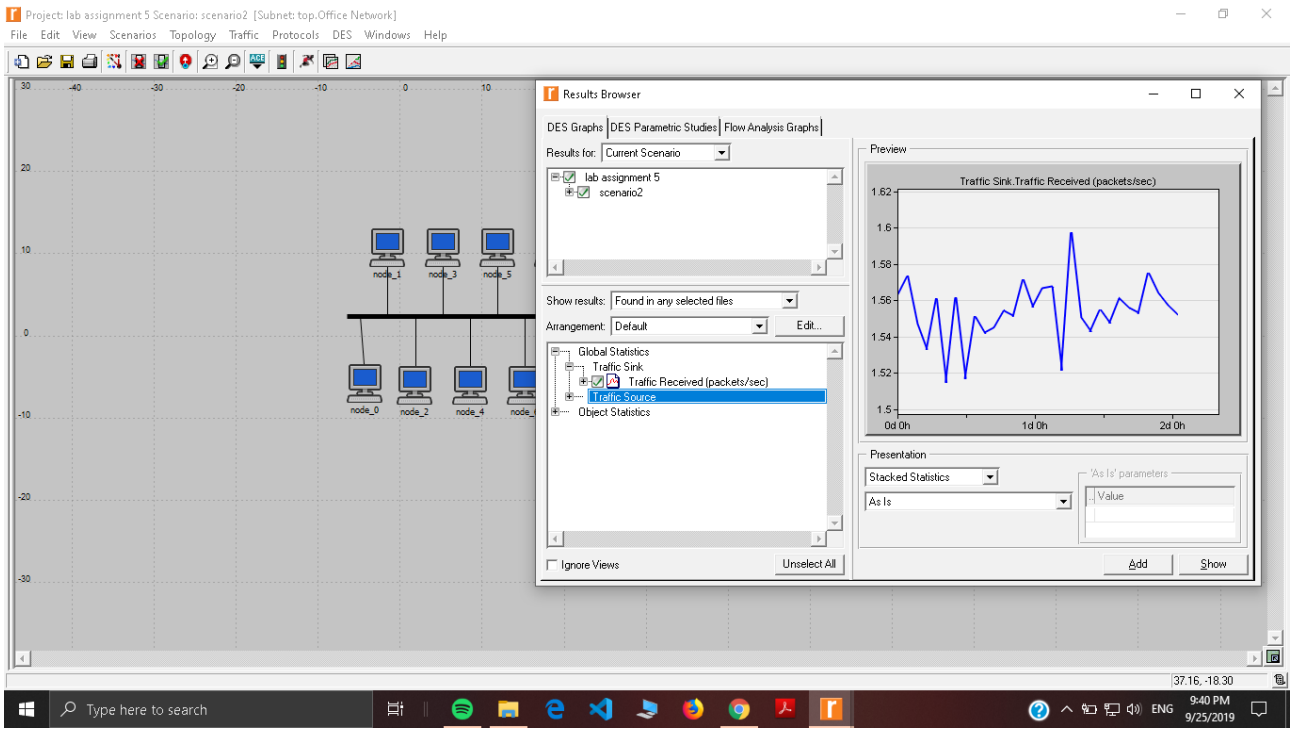
5. Expand the Packet Generation Arguments hierarchy: a. Change the value of the Packet Size attribute to constant (1024) ⇒Change the value of the

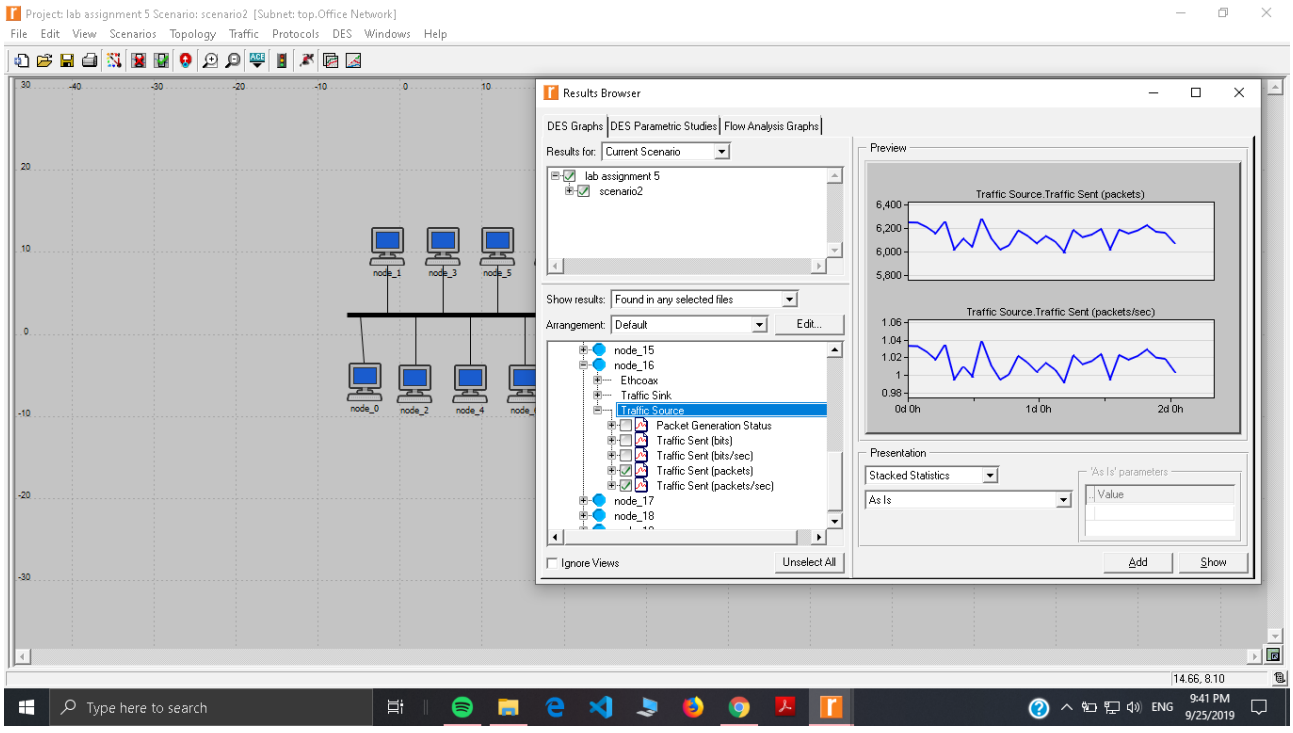


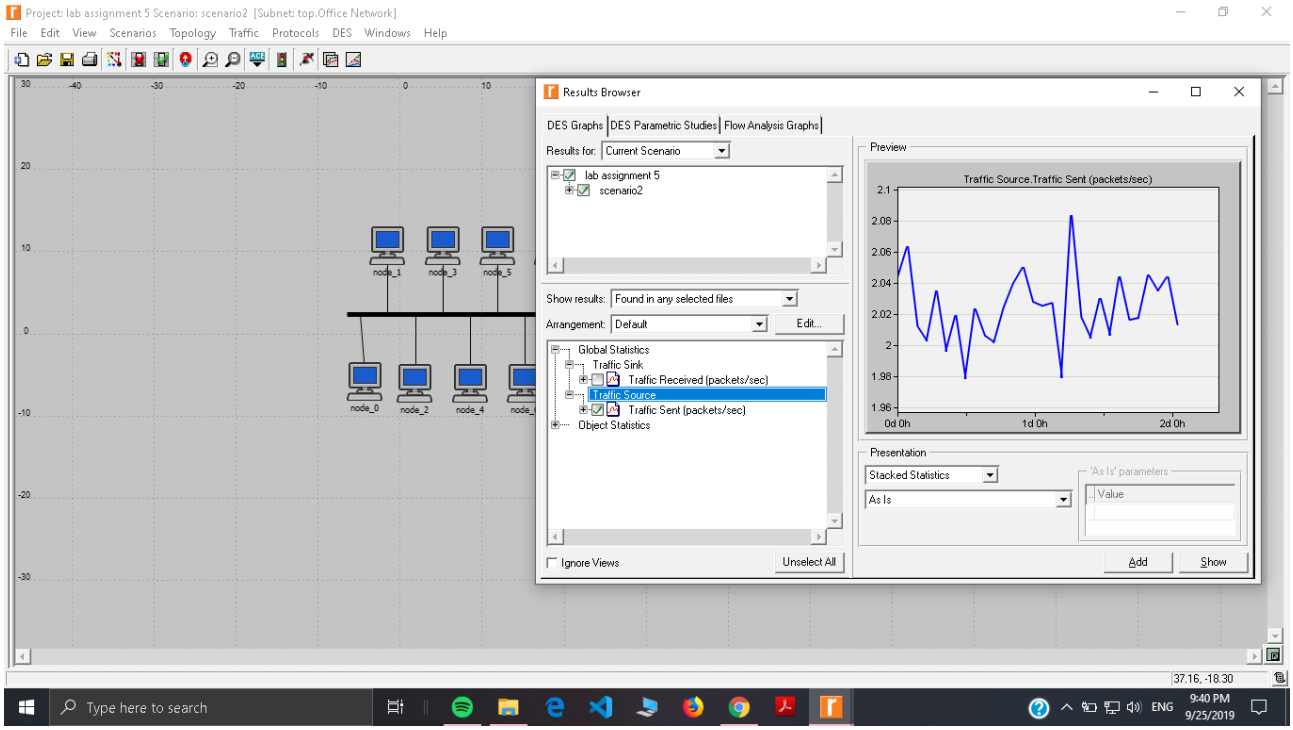
Interarrival Time attribute to exponential (2)

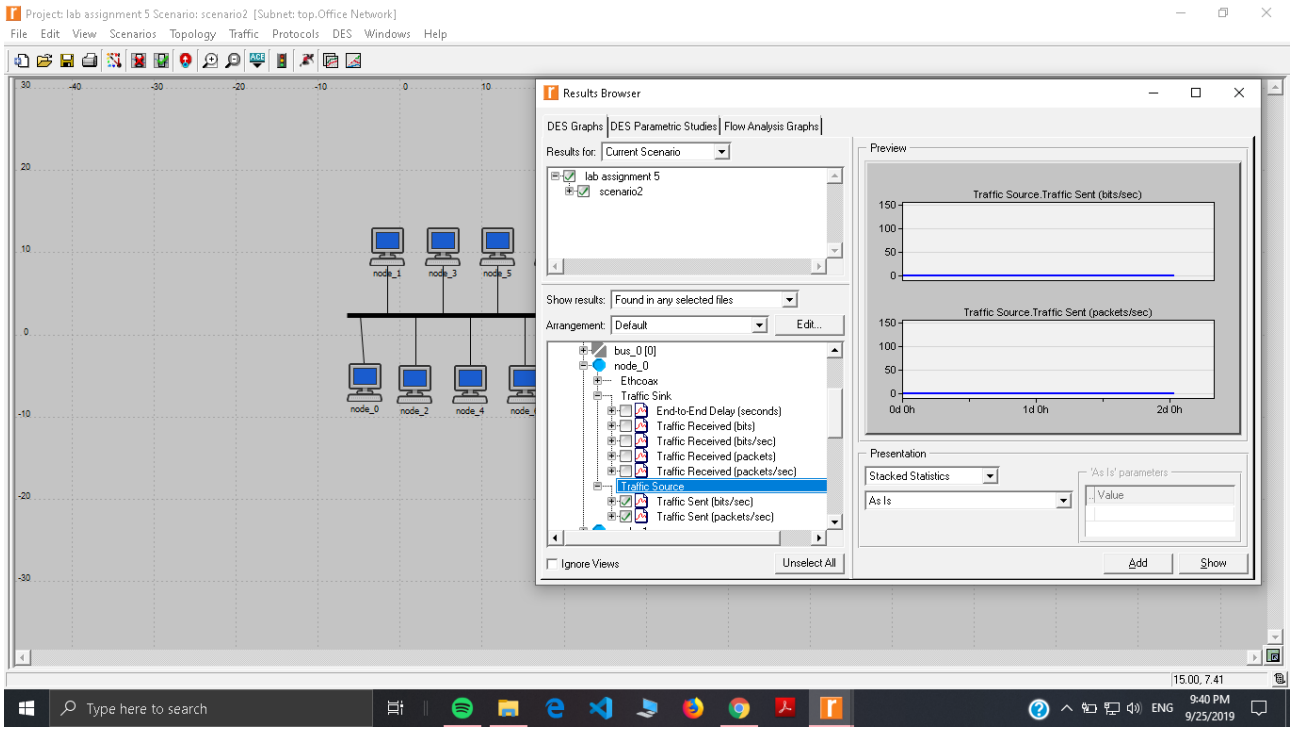


Result:-
Source:-node 1 and node 16
Sink:- rest all






Project: lab assignment 5 Scenario: scenario2 [Subnet: top.Office Network]
File Edit View Scenarios Topology Traffic Protocols DES Windows Help
Results Browser
DES Graphs DES Parametric Studies Flow Analysis Graphs
Results for: Current Scenario
lab assignment 5
scenario2
Show results: Found in any selected files
Arrangement: Default
Edit...
Global Statistics
Traffic Sink
Traffic Received (packets/sec)
Traffic Source
Traffic Sent (packets/sec)
Object Statistics
Ignore Views
Unselect All
Preview
Traffic Source.Traffic Sent (packets/sec)
Presentation
Stacked Statistics
As Is
'As Is' parameters
Value
Add
Show
node_0
node_1
node_2
node_3
node_4
node_5
37.16, -18.30
Type here to search
ENG
9:40 PM
9/25/2019


Project: lab assignment 5 Scenario: scenario2 [Subnet: top.Office Network]
File Edit View Scenarios Topology Traffic Protocols DES Windows Help
Results Browser
DES Graphs DES Parametric Studies Flow Analysis Graphs
Results for: Current Scenario
lab assignment 5
scenario2
Show results: Found in any selected files
Arrangement: Default
Edit...
bus_0 [0]
node_0
Ethcoax
Traffic Sink
End-to-End Delay (seconds)
Traffic Received (bits)
Traffic Received (bits/sec)
Traffic Received (packets)
Traffic Received (packets/sec)
Traffic Source
Traffic Sent (bits/sec)
Traffic Sent (packets/sec)
Ignore Views
Unselect All
Preview
Traffic Source.Traffic Sent (bits/sec)
Traffic Source.Traffic Sent (packets/sec)
Presentation
Stacked Statistics
As Is
'As Is' parameters
Value
Add
Show
node_0
node_1
node_2
node_3
node_4
node_5
15.00, 7.41
Type here to search
ENG
9:40 PM
9/25/2019

Problem Statement 2:
Using OPNET create Star topology among a set of N computer nodes out of which one node is the source and the rest are sink nodes. Model the traffic of source and sink nodes individually and demonstrate the packet transfer between them using Ethcoax (Ethernet using coaxial) cables. Use network scale as the "campus" of area 1km x 1km.

- **Procedure**: -

  To create Star :

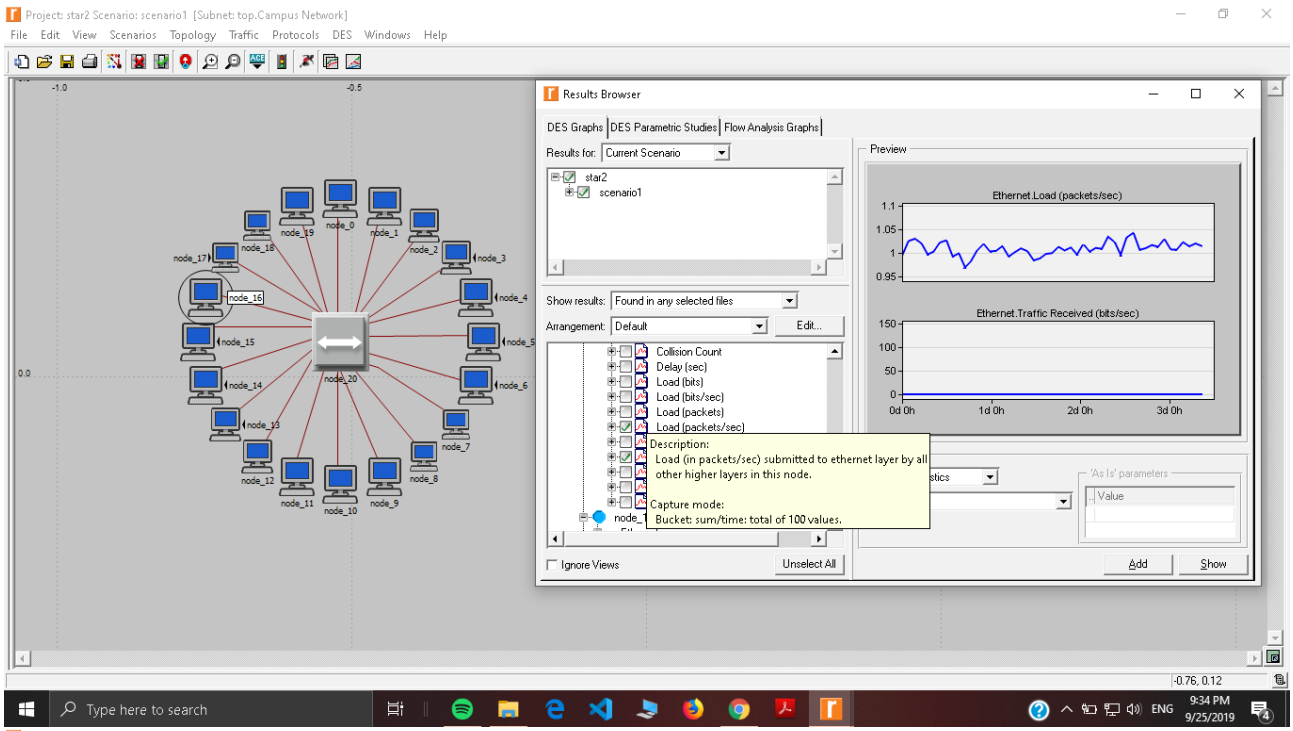
  1. Select Topology Rapid Configuration. From the drop-down menu choose Star
  and click OK.
  2. Click the Select Models button in the Rapid Configuration dialog box. From the
  Mod List drop-down menu choose Ethernet and click OK.
  3. In the Rapid Configuration dialog box, set the following six values: Center Node
  Mod= ethernet16_hub, Periphery Node Model = Ethernet station, Link Model =
  10BaseT, Number =16, Y=50, and Radius = 42 Click OK.
  The 10BaseT link represents an Ethernet connection operating at 10Mbps.

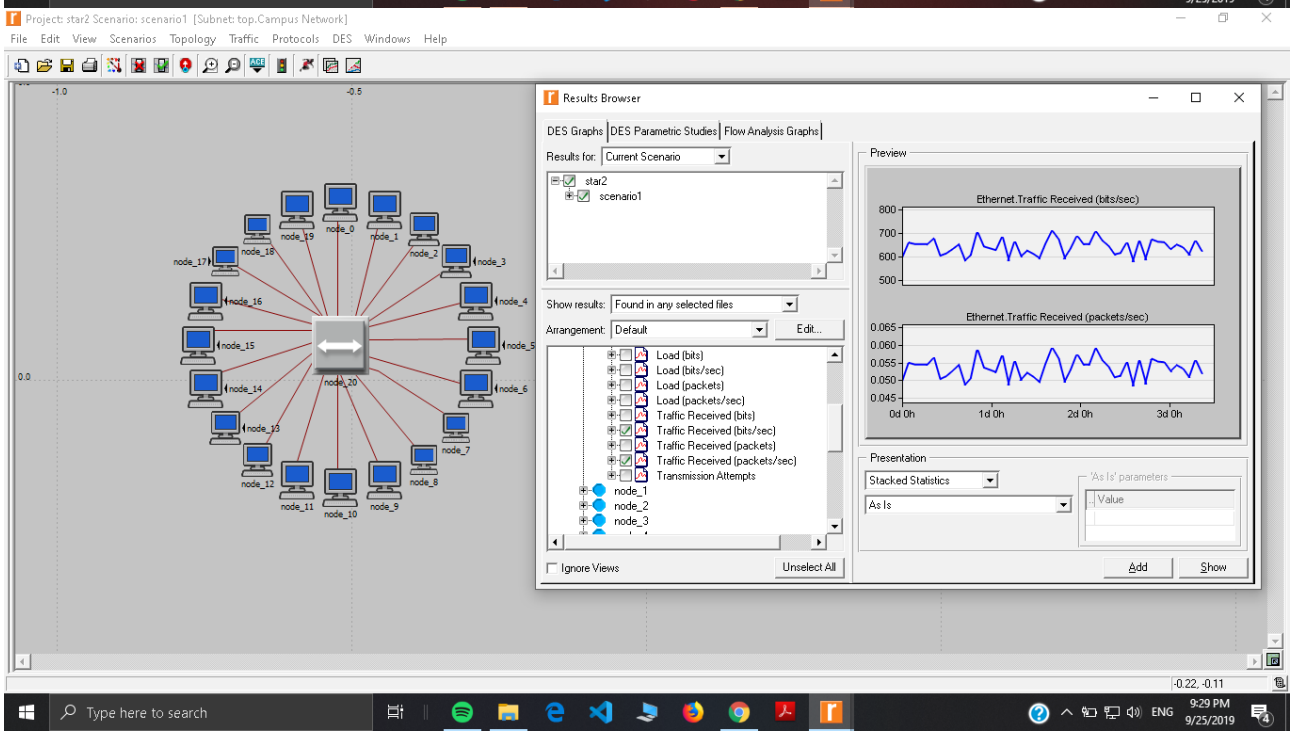
  4. Now that the network has been created, it should look like the network on Figure
  below. (rest is same as bus topology).

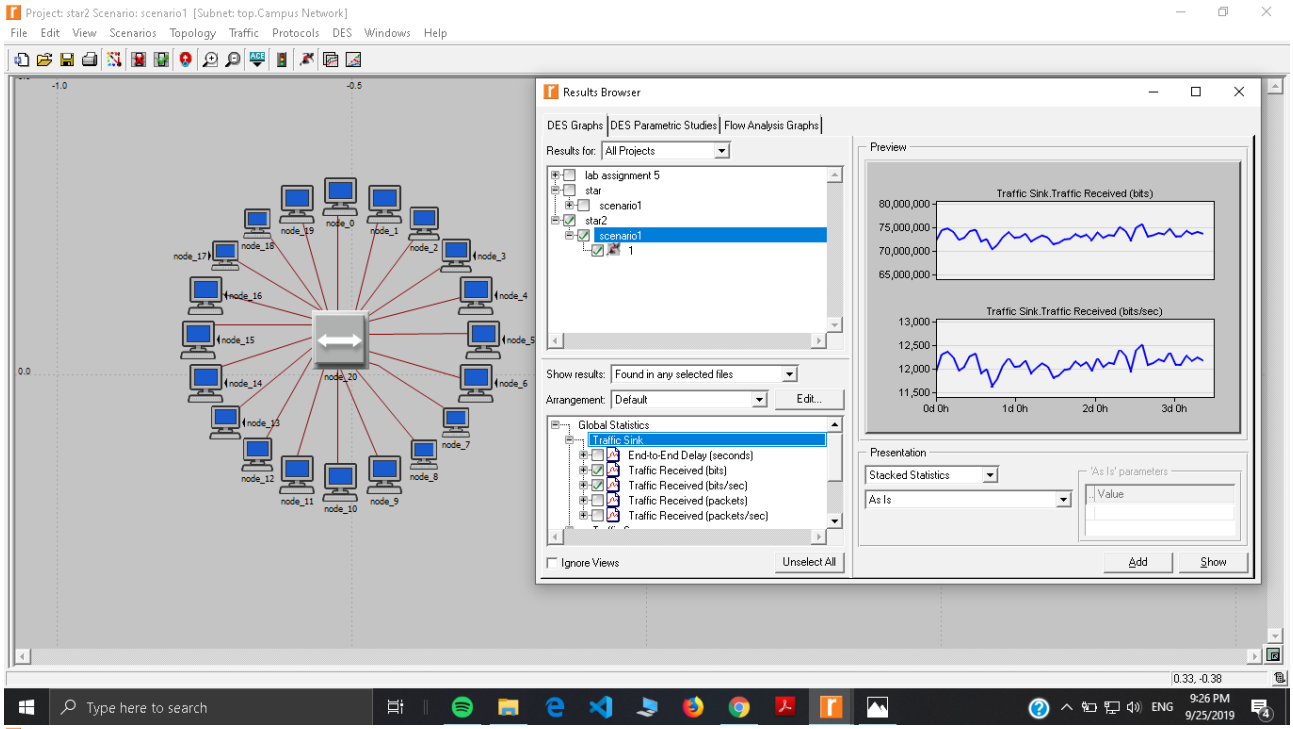
  Traffic Received (in packets/sec) by the traffic sinks across all nodes.
  Traffic Sent (in packets/sec) by the traffic sources across all nodes

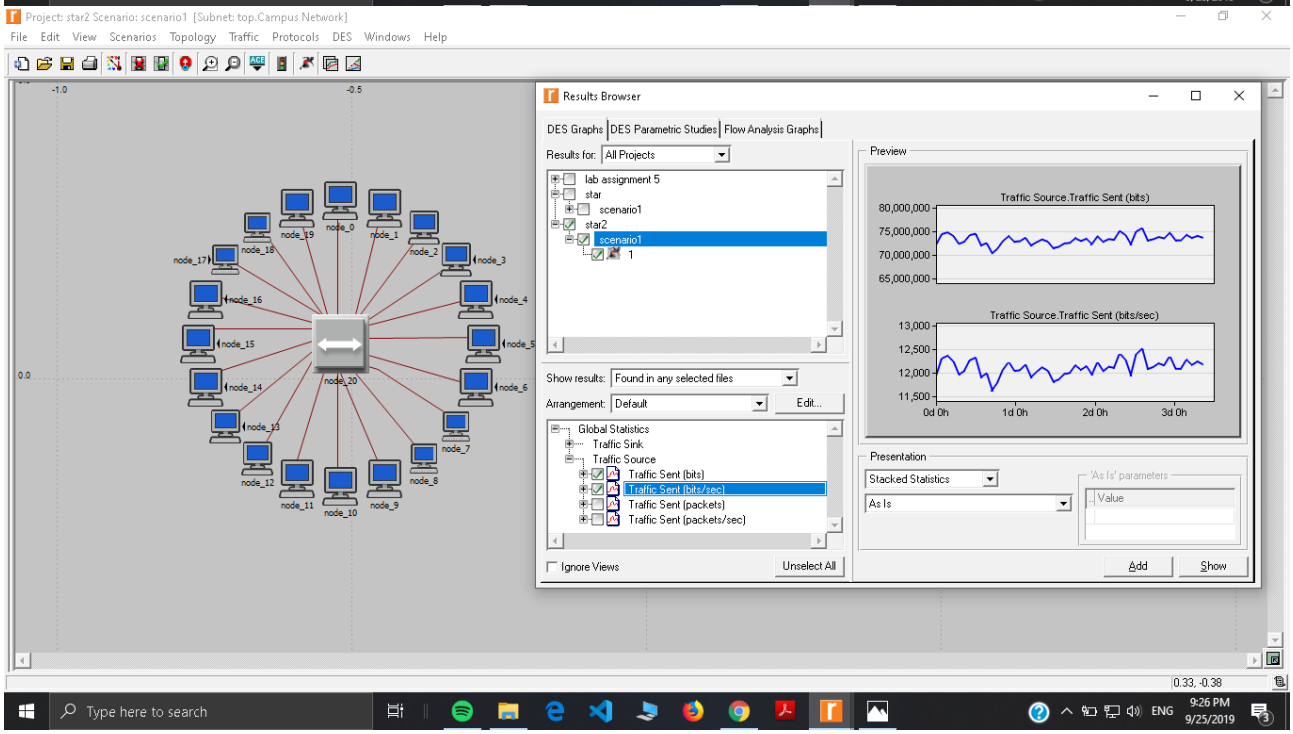
- **Result:-**

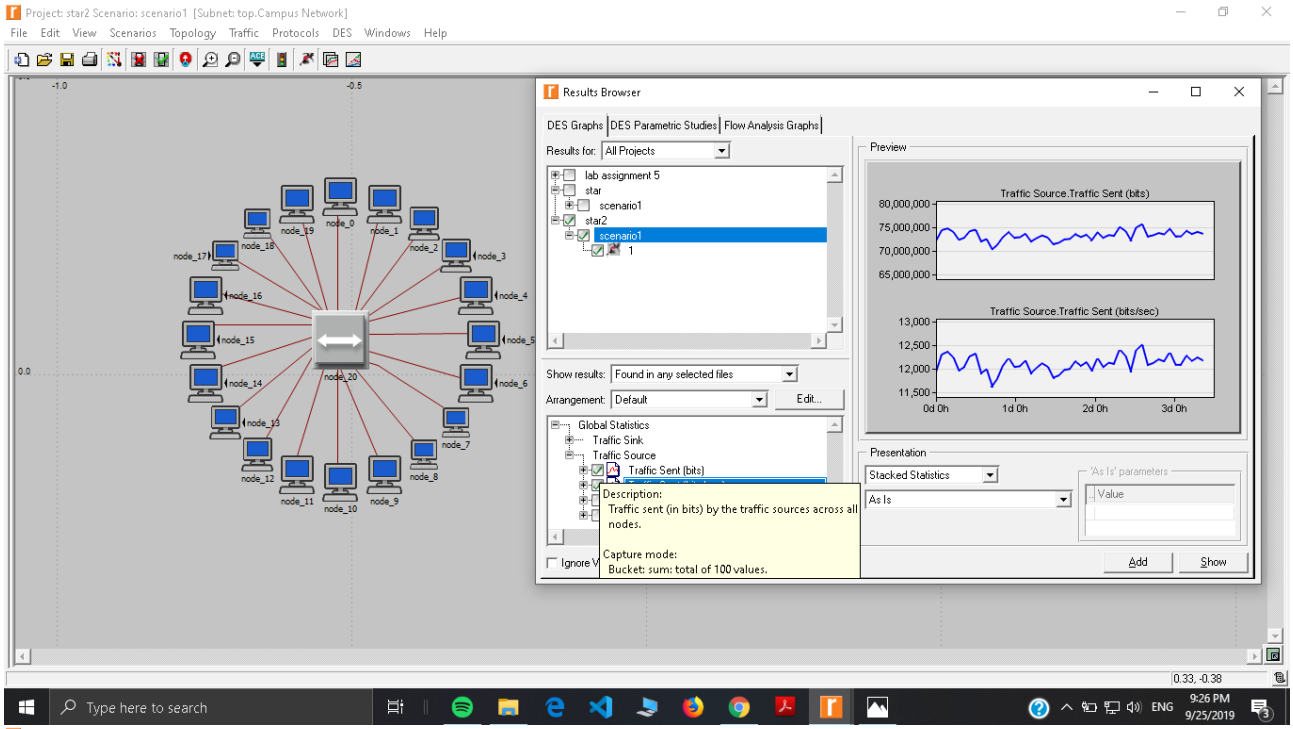
Source:- node 16






Project: star2 Scenario: scenario1 [Subnet: top.Campus Network]
File Edit View Scenarios Topology Traffic Protocols DES Windows Help
Results Browser
DES Graphs | DES Parametric Studies | Flow Analysis Graphs
Results for: All Projects
lab assignment 5
star
scenario1
star2
scenario1
1
Show results: Found in any selected files
Arrangement: Default
Edit...
Global Statistics
Traffic Sink
End-to-End Delay (seconds)
Traffic Received (bits)
Traffic Received (bits/sec)
Traffic Received (packets)
Traffic Received (packets/sec)
Ignore Views
Unselect All
Preview
Traffic Sink.Traffic Received (bits)
80,000,000
75,000,000
70,000,000
65,000,000
Traffic Sink.Traffic Received (bits/sec)
13,000
12,500
12,000
11,500
0d 0h
1d 0h
2d 0h
3d 0h
Presentation
Stacked Statistics
As Is
'As Is' parameters
Value
Add
Show
node_0
node_1
node_2
node_3
node_4
node_5
node_6
node_7
node_8
node_9
node_10
node_11
node_12
node_13
node_14
node_15
node_16
node_17
node_18
node_19
node_20
0.33, -0.38
Type here to search
ENG
9:26 PM
9/25/2019


Project: star2 Scenario: scenario1 [Subnet: top.Campus Network]
File Edit View Scenarios Topology Traffic Protocols DES Windows Help
Results Browser
DES Graphs | DES Parametric Studies | Flow Analysis Graphs
Results for: All Projects
lab assignment 5
star
scenario1
star2
scenario1
1
Show results: Found in any selected files
Arrangement: Default
Edit...
Global Statistics
Traffic Sink
Traffic Source
Traffic Sent (bits)
Traffic Sent (bits/sec)
Traffic Sent (packets)
Traffic Sent (packets/sec)
Ignore Views
Unselect All
Preview
Traffic Source.Traffic Sent (bits)
80,000,000
75,000,000
70,000,000
65,000,000
Traffic Source.Traffic Sent (bits/sec)
13,000
12,500
12,000
11,500
0d 0h
1d 0h
2d 0h
3d 0h
Presentation
Stacked Statistics
As Is
'As Is' parameters
Value
Add
Show
node_0
node_1
node_2
node_3
node_4
node_5
node_6
node_7
node_8
node_9
node_10
node_11
node_12
node_13
node_14
node_15
node_16
node_17
node_18
node_19
node_20
0.33, -0.38
Type here to search
ENG
9:26 PM
9/25/2019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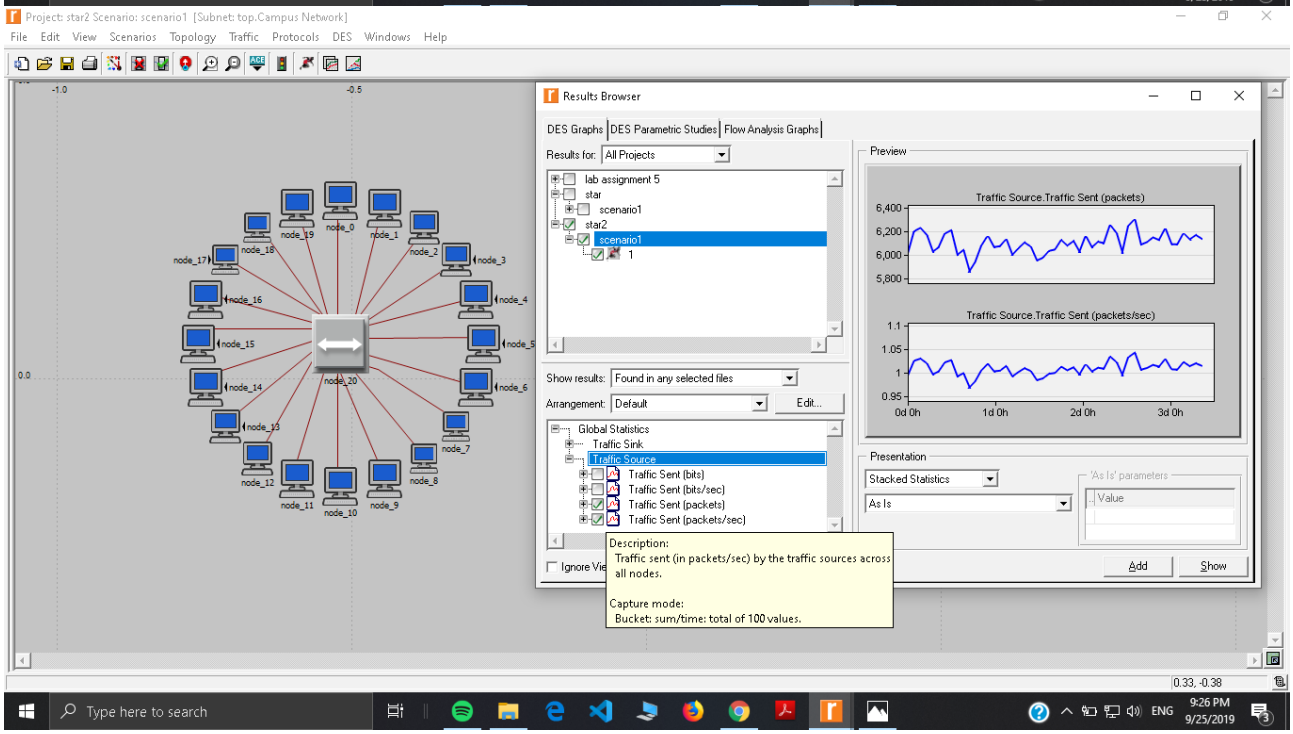
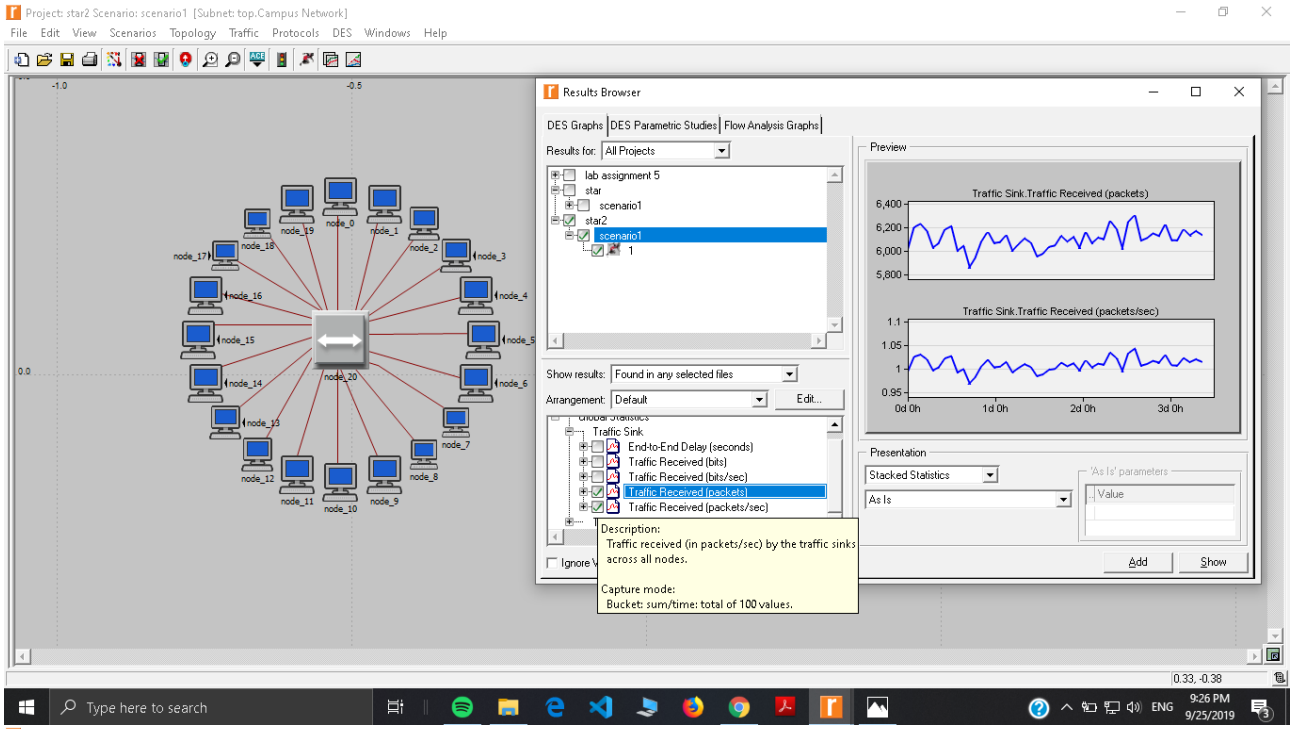
Results for: All Projects
lab assignment 5
star
scenario1
star2
scenario1
1
Show results: Found in any selected files
Arrangement: Default
Edit...
Global Statistics
Traffic Sink
Traffic Source
Traffic Sent (bits)
Description:
Traffic sent (in bits) by the traffic sources across all nodes.
Capture mode:
Bucket: sum: total of 100 values.
Preview
Traffic Source.Traffic Sent (bits)
80,000,000
75,000,000
70,000,000
65,000,000
Traffic Source.Traffic Sent (bits/sec)
13,000
12,500
12,000
11,500
0d 0h
1d 0h
2d 0h
3d 0h
Presentation
Stacked Statistics
As Is
'As Is' parameters
Value
Add
Show
Type here to search
ENG
9:26 PM
9/25/2019


Project: star2 Scenario: scenario1 [Subnet: top.Campus Network]
File Edit View Scenarios Topology Traffic Protocols DES Windows Help
Results Browser
DES Graphs | DES Parametric Studies | Flow Analysis Graphs
Results for: All Projects
lab assignment 5
star
scenario1
star2
scenario1
1
Show results: Found in any selected files
Arrangement: Default
Edit...
Global Statistics
Traffic Sink
Traffic Source
Traffic Sent (bits)
Traffic Sent (bits/sec)
Traffic Sent (packets)
Traffic Sent (packets/sec)
Description:
Traffic sent (in packets/sec) by the traffic sources across all nodes.
Capture mode:
Bucket: sum/time: total of 100 values.
Preview
Traffic Source.Traffic Sent (packets)
6,400
6,200
6,000
5,800
Traffic Source.Traffic Sent (packets/sec)
1.1
1.05
1
0.95
0d 0h
1d 0h
2d 0h
3d 0h
Presentation
Stacked Statistics
As Is
'As Is' parameters
Value
Add
Show
Type here to search
ENG
9:26 PM
9/25/2019


Project: star2 Scenario: scenario1 [Subnet: top.Campus Network]
File Edit View Scenarios Topology Traffic Protocols DES Windows Help
Results Browser
DES Graphs | DES Parametric Studies | Flow Analysis Graphs
Results for: All Projects
lab assignment 5
star
scenario1
star2
scenario1
1
Show results: Found in any selected files
Arrangement: Default
Edit...
Traffic Sink
End-to-End Delay (seconds)
Traffic Received (bits)
Traffic Received (bits/sec)
Traffic Received (packets)
Traffic Received (packets/sec)
Description:
Traffic received (in packets/sec) by the traffic sinks across all nodes.
Capture mode:
Bucket: sum/time: total of 100 values.
Preview
Traffic Sink.Traffic Received (packets)
6,400
6,200
6,000
5,800
Traffic Sink.Traffic Received (packets/sec)
1.1
1.05
1
0.95
0d 0h
1d 0h
2d 0h
3d 0h
Presentation
Stacked Statistics
As Is
'As Is' parameters
Value
Add
Show
node_0
node_1
node_2
node_3
node_4
node_5
node_6
node_7
node_8
node_9
node_10
node_11
node_12
node_13
node_14
node_15
node_16
node_17
node_18
node_19
node_20
0.33, -0.38
Type here to search
ENG
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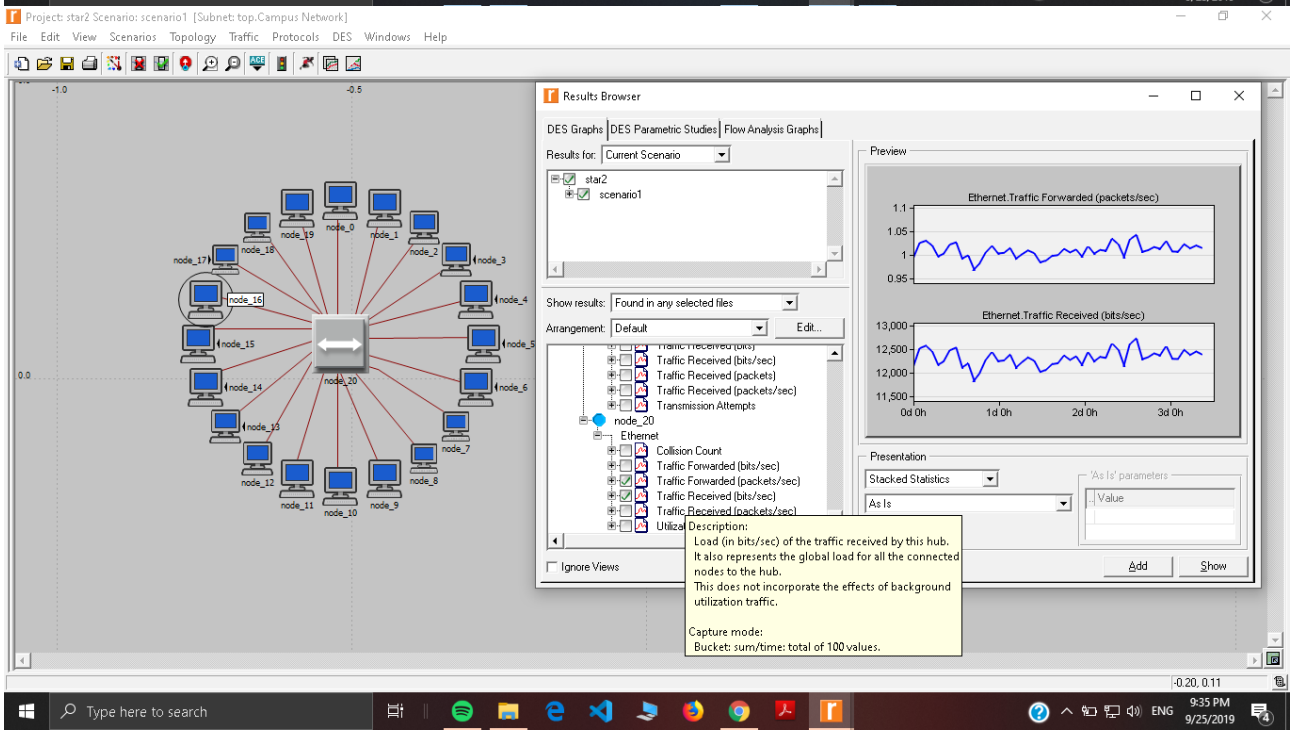
9/25/2019


Project: star2 Scenario: scenario1 [Subnet: top.Campus Network]
File Edit View Scenarios Topology Traffic Protocols DES Windows Help
Results Browser
DES Graphs | DES Parametric Studies | Flow Analysis Graphs
Results for: Current Scenario
star2
scenario1
Show results: Found in any selected files
Arrangement: Default
Edit...
Traffic Received (bits/sec)
Traffic Received (packets)
Traffic Received (packets/sec)
Transmission Attempts
node_20
Ethernet
Collision Count
Traffic Forwarded (bits/sec)
Traffic Forwarded (packets/sec)
Traffic Received (bits/sec)
Traffic Received (packets/sec)
Description:
Load (in bits/sec) of the traffic received by this hub. It also represents the global load for all the connected nodes to the hub.
This does not incorporate the effects of background utilization traffic.
Capture mode:
Bucket: sum/time: total of 100 values.
Ignore Views
Preview
Ethernet.Traffic Forwarded (packets/sec)
1.1
1.05
1
0.95
Ethernet.Traffic Received (bits/sec)
13,000
12,500
12,000
11,500
0d 0h
1d 0h
2d 0h
3d 0h
Presentation
Stacked Statistics
As Is
'As Is' parameters
Value
Add
Show
node_0
node_1
node_2
node_3
node_4
node_5
node_6
node_7
node_8
node_9
node_10
node_11
node_12
node_13
node_14
node_15
node_16
node_17
node_18
node_19
node_20
-0.20, 0.11
Type here to search
ENG
9:35 PM
9/25/2019

GitHub link:-https://github.com/jaiswalaman/Assignment-5-CSN-361