

EE 460 - Computer Communication Systems

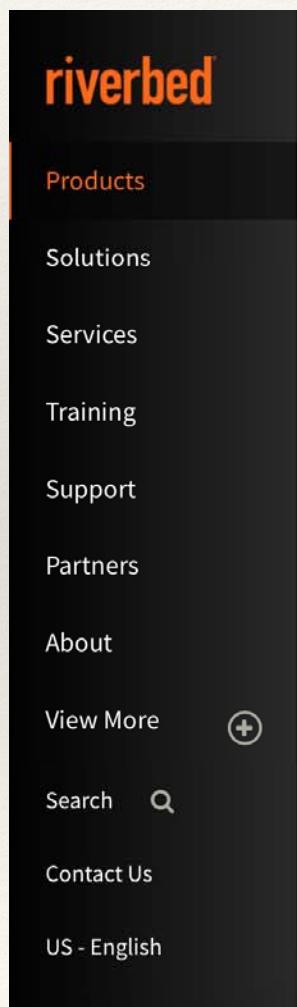
How to use OPNET

By Raqiul Choudhury

What is OPNET?

- ❖ OPNET is a very large and powerful network simulator used for research and analysis purposes.
- ❖ The version of OPNET that is used currently at City College is 17.5.
- ❖ In October of 2012, OPNET was bought by Riverbed for around \$1 billion dollars.

OPNET's new name



Old Name	New Name
OPNET Modeler® Suite	Riverbed Modeler A suite of protocols and technologies to design, model, and analyze communication networks.
OPNET ApplInternals Xpert®	SteelCentral™ ApplInternals Deep, granular monitoring of performance metrics across application components for a data-driven approach to analyzing performance.
OPNET AppResponse Xpert®	SteelCentral™ AppResponse Network-based APM to monitor end-user experience, web transaction analysis, and network performance to fix application performance issues faster.

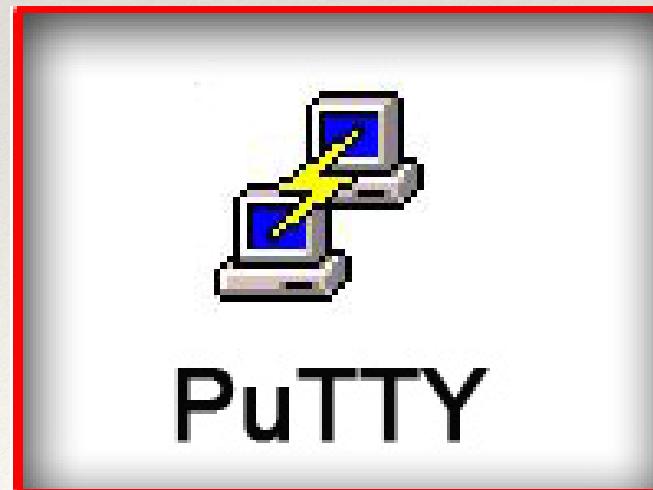
How to get started

- ❖ To access OPNET, you can go to the Steinman 2nd floor room 269.
- ❖ You can talk to someone there for a login username to access the linux computers.
- ❖ Or you can try downloading OPNET from riverbed.com



How to Remote Log in from Windows

- ❖ Once you get a user name for the Linux lab, you can remote log in from your home computer.
- ❖ On Windows you would need to download the following two programs.
- ❖ Putty and Xming





Category:

- Session
 - Logging
- Terminal
 - Keyboard
 - Bell
 - Features
- ExtraPuTTY
 - Settings
 - StatusBar
 - + FilesTransfer
- Window
 - Appearance
 - Behaviour
 - Translation
 - Selection
 - Colours
 - Hyperlinks
- Connection
 - Data
 - Proxy
 - Telnet
 - Rlogin
 - + SSH
 - Serial
 - Cygterm

Basic options for your PuTTY session

Specify the destination you want to connect to

Host Name (or IP address)

Port

22

Connection type:

- Raw
- Telnet
- Rlogin
- SSH
- Serial
- Cygterm

Load, save or delete a stored session

Saved Sessions

Default Settings

Load

Save

Delete

Close window on exit:

- Always
- Never
- Only on clean exit
- Never, Auto-Connect

About

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 - ... Serial
 - ... Cygterm

Basic options for your PuTTY session

Specify the destination you want to connect to

Host Name (or IP address)

134.74.228.65

Port

22

Connection type:

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Load, save or delete a stored session

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PuTTY Configuration (Save mode : File)



Category:

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 - Colours
 - Hyperlinks
- Connection
 - Data
 - Proxy
 - Telnet
 - Rlogin
 - + SSH
 - Serial
 - Runterm

Options controlling PuTTY's window

Set the size of the window

Columns

80

Rows

24

When window is resized:

- Change the number of rows and columns
- Change the size of the font
- Change font size only when maximised
- Forbid resizing completely

Control the scrollback in the window

Lines of scrollback

2000

- Display scrollbar
- Display scrollbar in full screen mode
- Reset scrollback on keypress
- Reset scrollback on display activity
- Push erased text into scrollback

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Category:

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 - ... Hyperlinks
- Connection
 - ... Data
 - ... Proxy
 - ... Telnet
 - ... Rlogin
 - + SSH
 - ... Serial
 - ... Gvterm

Options controlling PuTTY's window

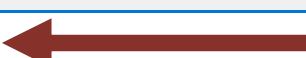
Set the size of the window

Columns

200

Rows

240



When window is resized:

- Change the number of rows and columns
- Change the size of the font
- Change font size only when maximised
- Forbid resizing completely

Control the scrollback in the window

Lines of scrollback

2000

- Display scrollbar
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- Connection
 - Data** ←
 - Proxy
 - Telnet
 - Rlogin
 - + SSH
 - Serial
 - Cygterm

Data to send to the server

Login details

Auto-login username

When username is not specified:

Prompt Use system username (Shaan)

Logging script file :

[Browse...](#)

No Prompt Logon

Terminal details

Terminal-type string

Terminal speeds

Environment variables

Variable

[Add](#)

Value

[Remove](#)

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Category:

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 - ... Keyboard
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 - ... Features
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 - ... Proxy
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 - ... Rlogin
 - + SSH
 - ... Serial
 - ... Cygterm

Data to send to the server

Login details

Auto-login username

YourUserName



When username is not specified:

 Prompt Use system username (Shaan)

Logging script file :

Browse...

 No Prompt Logon

Terminal details

Terminal-type string

xterm

Terminal speeds

38400,38400

Environment variables

Variable

Add

Value

Remove

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PuTTY Configuration (Save mode : File)



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 - Selection
 - Colours
 - Hyperlinks
- + Connection

Options controlling the connection

Sending of null packets to keep session active

Seconds between keepalives (0 to turn off)

Low-level TCP connection options

Disable Nagle's algorithm (TCP_NODELAY option)

Enable TCP keepalives (SO_KEEPALIVE option)

Internet protocol version

Auto

IPv4

IPv6

Logical name of remote host

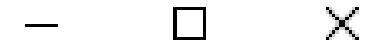
Logical name of remote host (e.g. for SSH key lookup):

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PuTTY Configuration (Save mode : File)



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Options controlling the connection

Sending of null packets to keep session active

Seconds between keepalives (0 to turn off)

0

Low-level TCP connection options

Disable Nagle's algorithm (TCP_NODELAY option)

Enable TCP keepalives (SO_KEEPALIVE option)

Internet protocol version

Auto

IPv4

IPv6

Logical name of remote host

Logical name of remote host (e.g. for SSH key lookup):

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Category:

+ FilesTransfer



- Window

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- Kex
- Cipher
- + Auth
- Pkcs11
- TTY
- X11
- Tunnels
- Bugs
- Serial
- Cygterm

About

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Options controlling SSH X11 forwarding

X11 forwarding

 Enable X11 forwarding

X display location

Remote X11 authentication protocol

 MIT-Magic-Cookie-1 XDM-Authorization-1

X authority file for local display





Category:

+ Files Transfer

- Window

... Appearance

... Behaviour

... Translation

... Selection

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- Connection

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... Telnet

... Rlogin

- SSH

... Kex

... Cipher

+ Auth

... Pkcs11

... TTY

... X11

... Tunnels

... Bugs

... Serial

... Cygterm

Options controlling SSH X11 forwarding

X11 forwarding

 Enable X11 forwarding

X display location

localhost:0.0

Remote X11 authentication protocol

 MIT-Magic-Cookie-1 XDM-Authorization-1

X authority file for local display

Browse...

About

Open

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 134.74.228.65 - PuTTY

Session Special Command Window Logging Files Transfer Hangup ?

Using username "rchoudh01".

rchoudh01@134.74.228.65's password: █

134.74.228.65 - PuTTY

Session Special Command Window Logging Files Transfer Hangup ?

Using username "rchoudh01".

rchoudh01@134.74.228.65's password:

Last login: Wed Nov 18 14:15:31 2015 from ool-4a58c78a.dyn.optonline.net

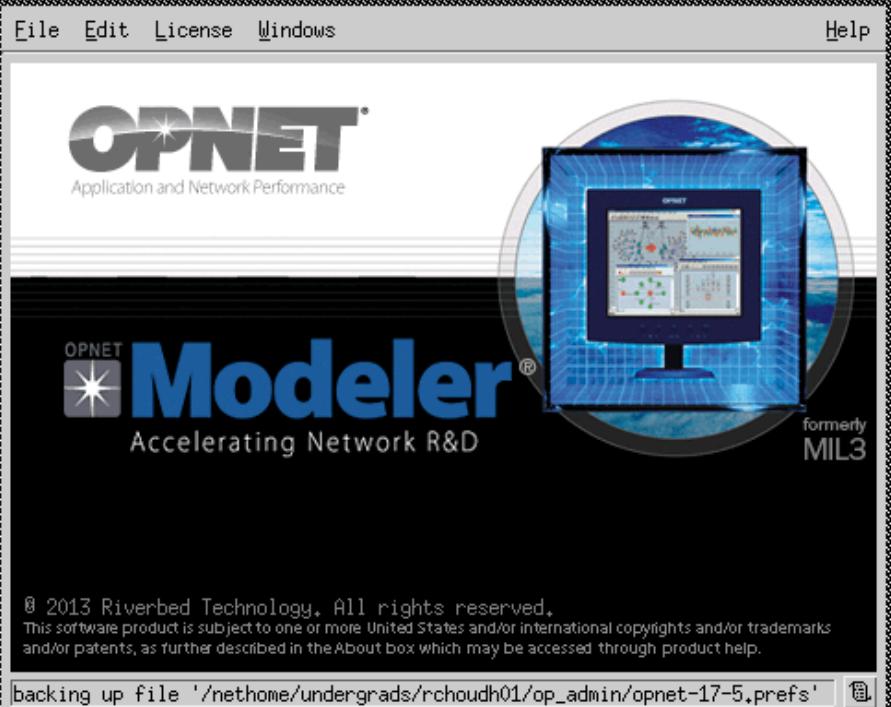
Running 'login.2.6'

[eesfc65.engr.ccny.cuny.edu:3] [rchoudh01]

134.74.228.65 - PuTTY

Session Special Command Window Logging Files Transfer Hangup ?

```
Using username "rchoudh01".
rchoudh01@134.74.228.65's password:
Last login: Wed Nov 18 14:15:31 2015 from ool-4a58c78a.dyn.optonline.net
Running 'login.2.6'
[eesfc65.engr.ccny.cuny.edu:3] [rchoudh01]opnet_remote
```



Now that you can access
OPNET



Building a simple network

File Edit License Windows

Help



Application and Network Performance



Modeler[®]

Accelerating Network R&D

Product Documentation F1

What's New in 17.5

Tutorials

Web - OPNET Home

Web - Support Center

Web - FAQs

Web - Contributed Models

Show All Logs...

Error Log

Session Log

Generate Support Info...

About This Application



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Open Product Documentation



Xming :0.0

Introduction Modeler Tutorials

file:///usr/local/opnet/17.5.A/doc/modeler/wwhelp/wwimpl/jsp/html/wwhelp.htm#Tutorial Google

Contents Index Search

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Modeler Tutorials

Basic Tutorials

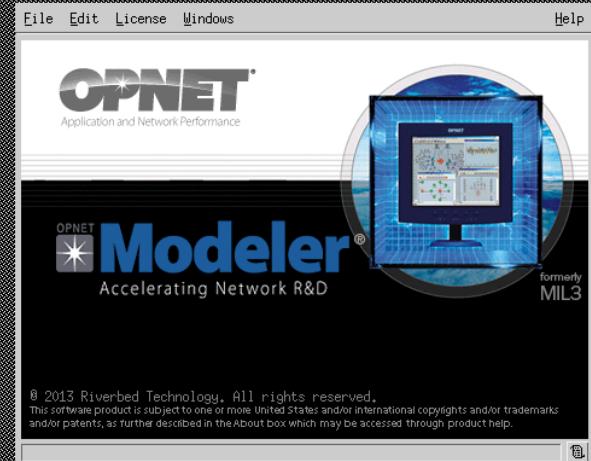
- [Introduction](#)
- [Small Internetworks](#)
- [Importing Traffic](#)
- [Productivity Features](#)

Advanced Tutorials

- [M/M/1 Queue](#)
- [Basic Processes](#)
- [Packet Switching I](#)
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File Edit License Windows Help

OPNET Application and Network Performance

OPNET Modeler Accelerating Network R&D formerly MIL3

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Help

- New... Ctrl+N
- Open... Ctrl+O
- VNE Server Web Console...
- Delete Projects...
- Delete Temporary Files...
- Manage Model Files ▾
- Recent Files ▾
- Exit



Modeler®

Accelerating Network R&D



formerly
MIL3

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New





OPNET
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formerly
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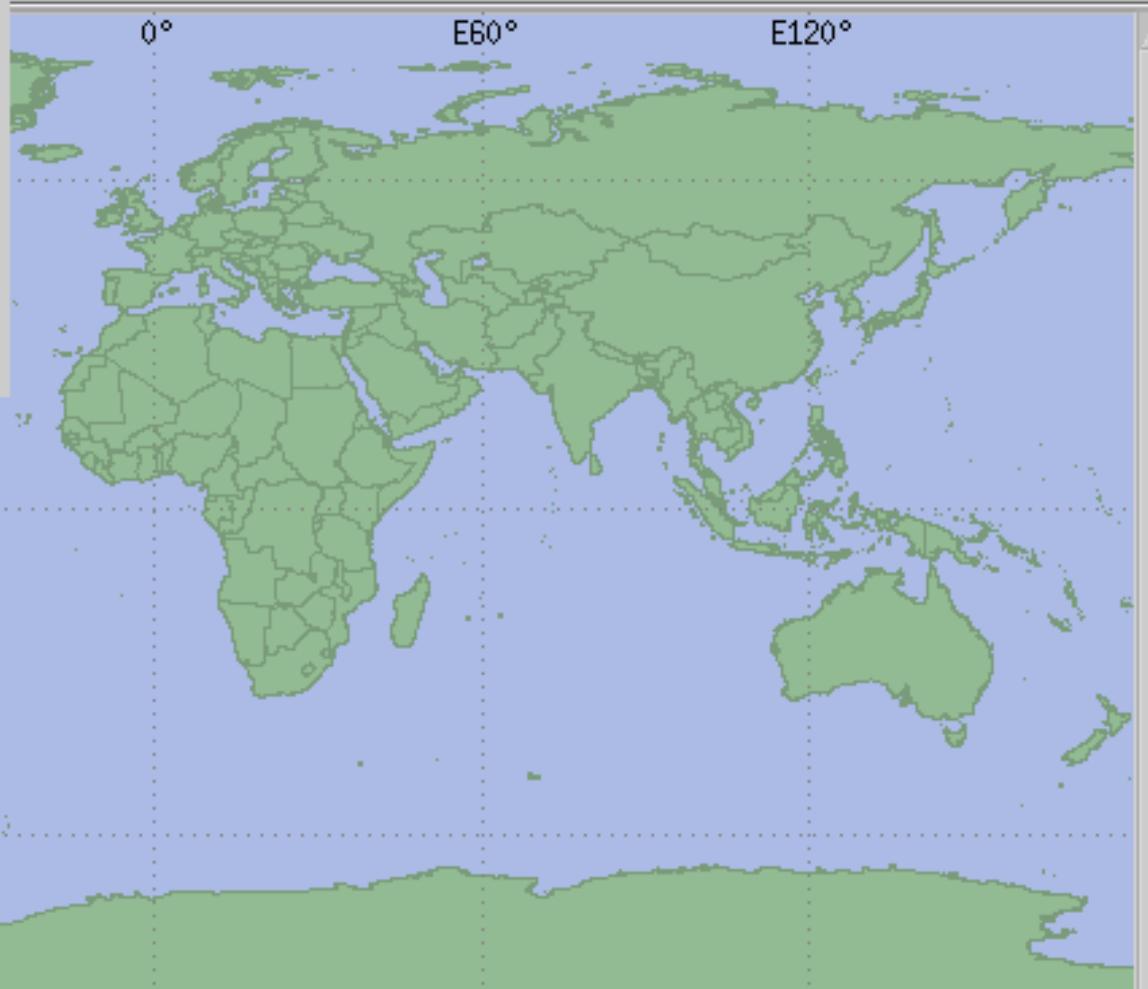
Project name: project1

Scenario name: scenario1

Use Startup Wizard when creating new scenarios

OK

Cancel



Difference between a project and a scenario

- ❖ A scenario is a part of the overall project.
- ❖ Each project can contain several scenarios.



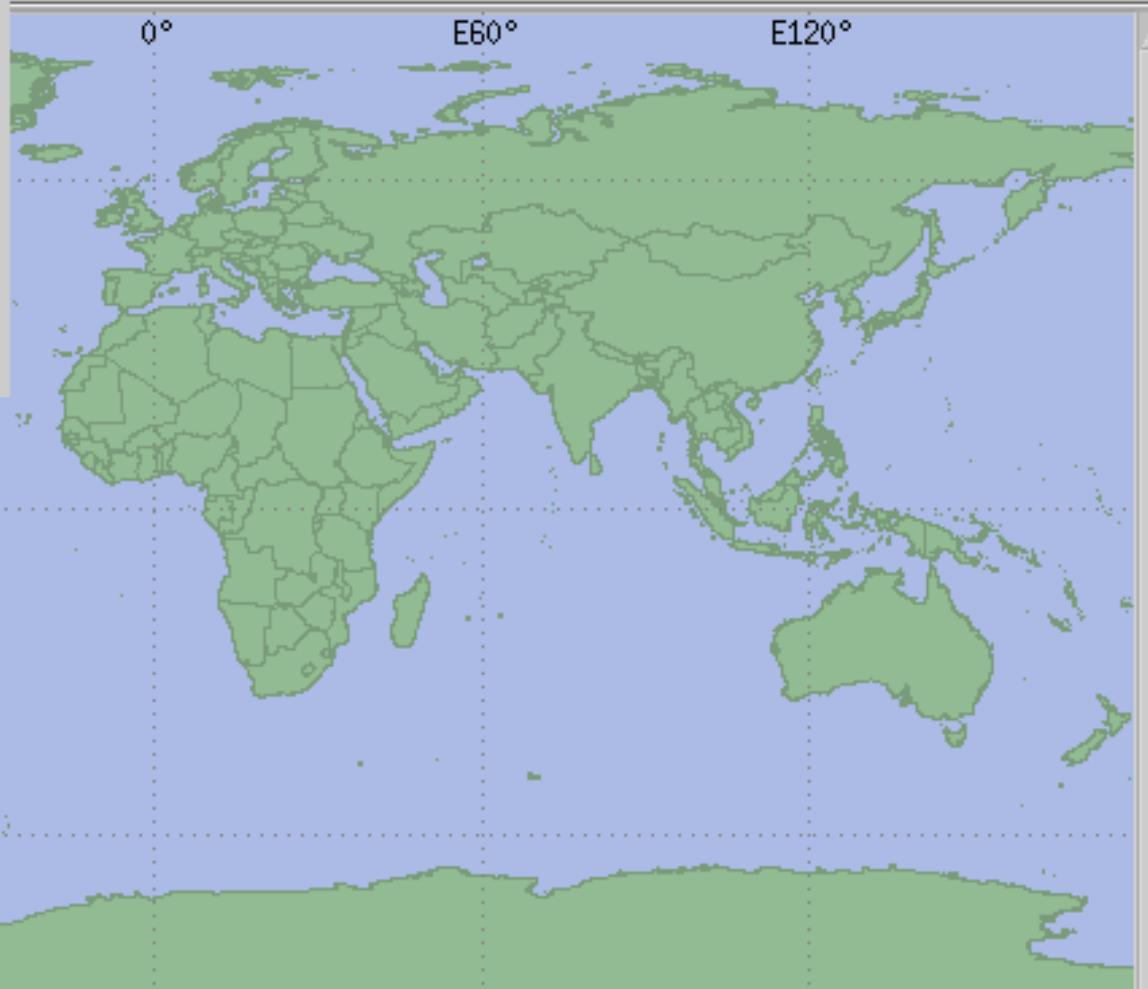
Project name: project1

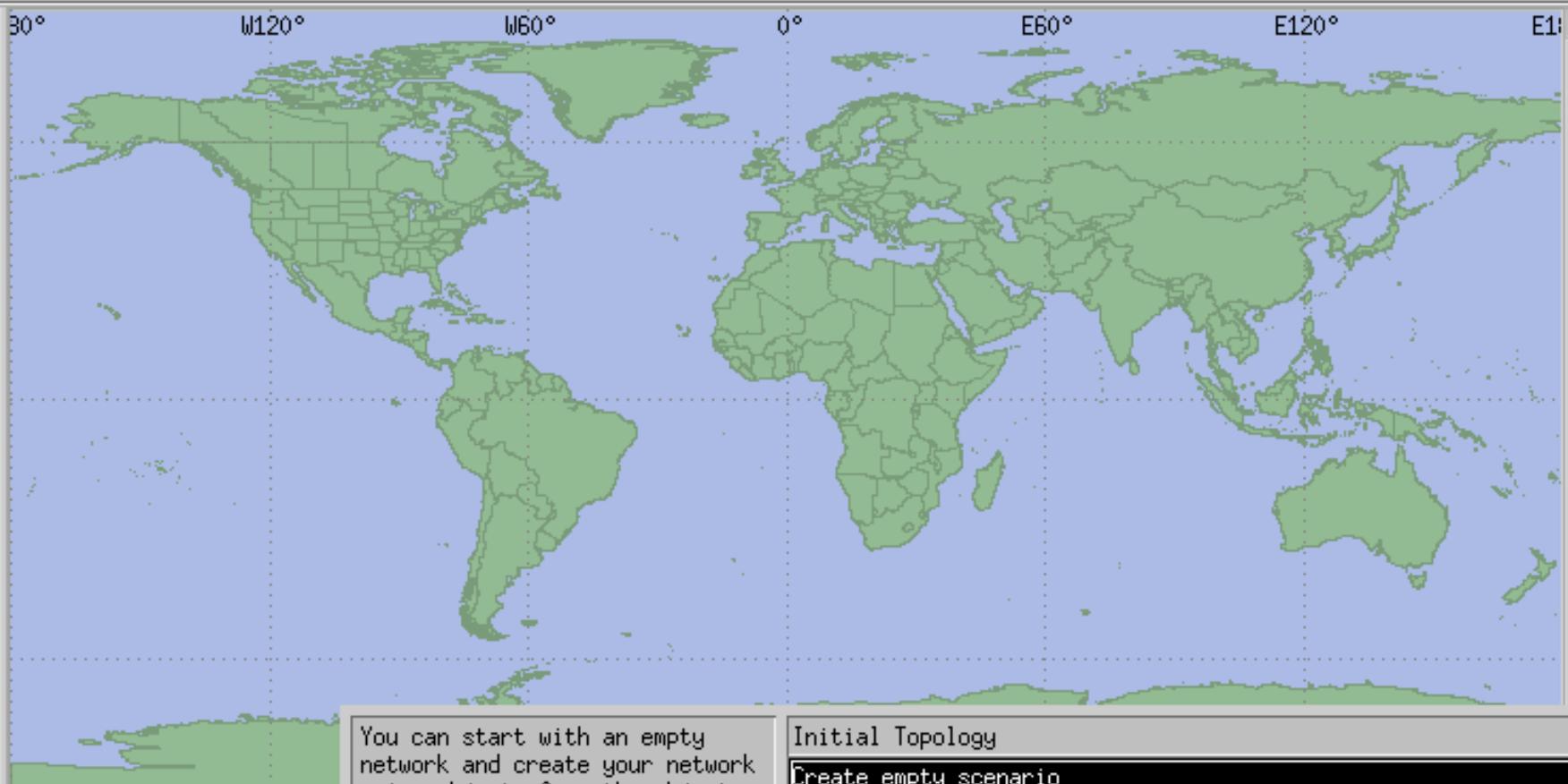
Scenario name: scenario1

Use Startup Wizard when creating new scenarios

OK

Cancel





You can start with an empty network and create your network using objects from the object palette or import directly from another data source.

Initial Topology

Create empty scenario

Import AppNetwork Paths

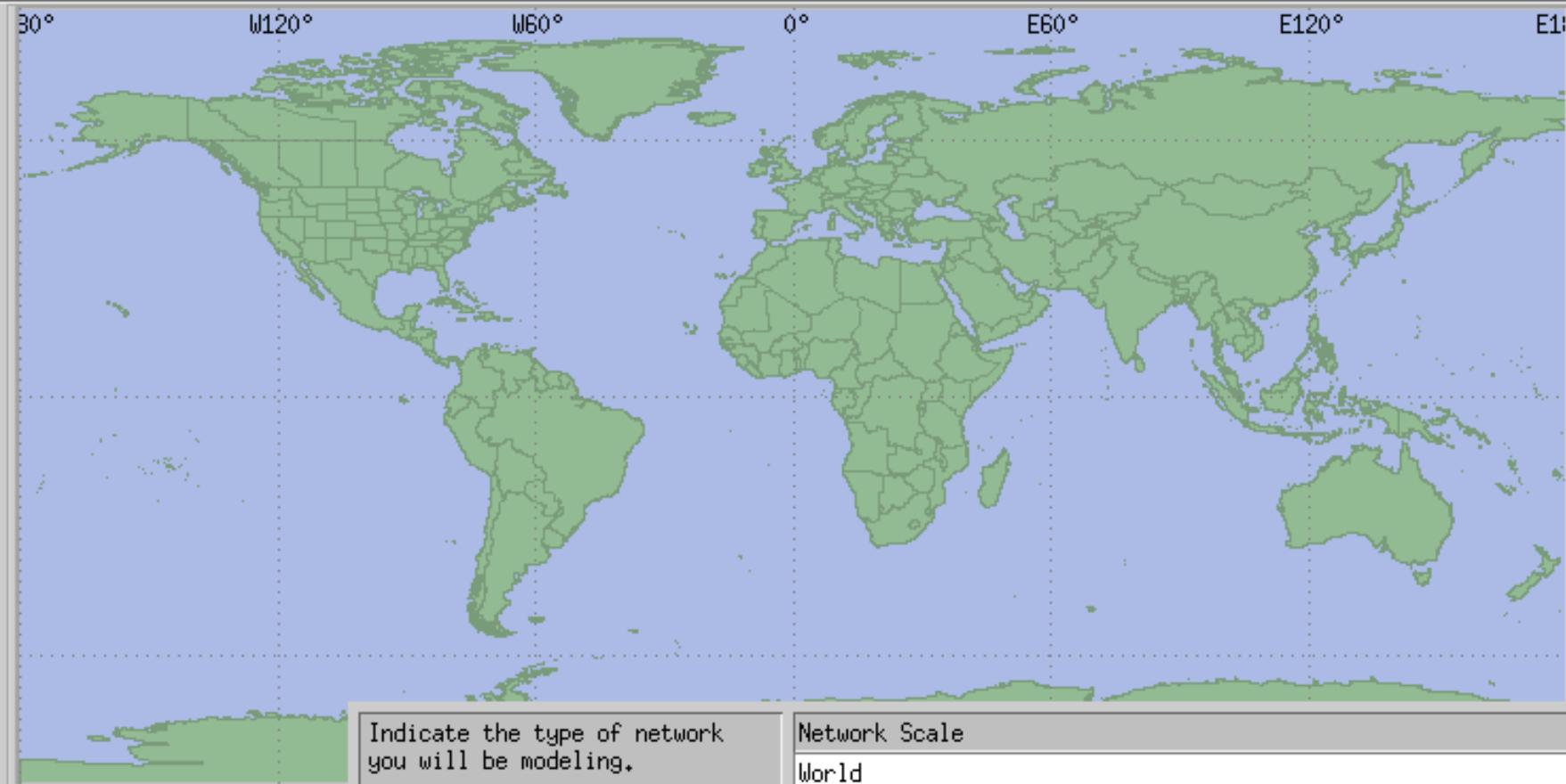
Import from Alcatel-Lucent 5650 CPAM Server

Import from AppTransaction Xpert

Import from CSV Text Files

Import from VNE Server

Import from XML



Indicate the type of network you will be modeling.

Network Scale

- World
- Enterprise
- Campus
- Office**
- Logical
- Choose from maps

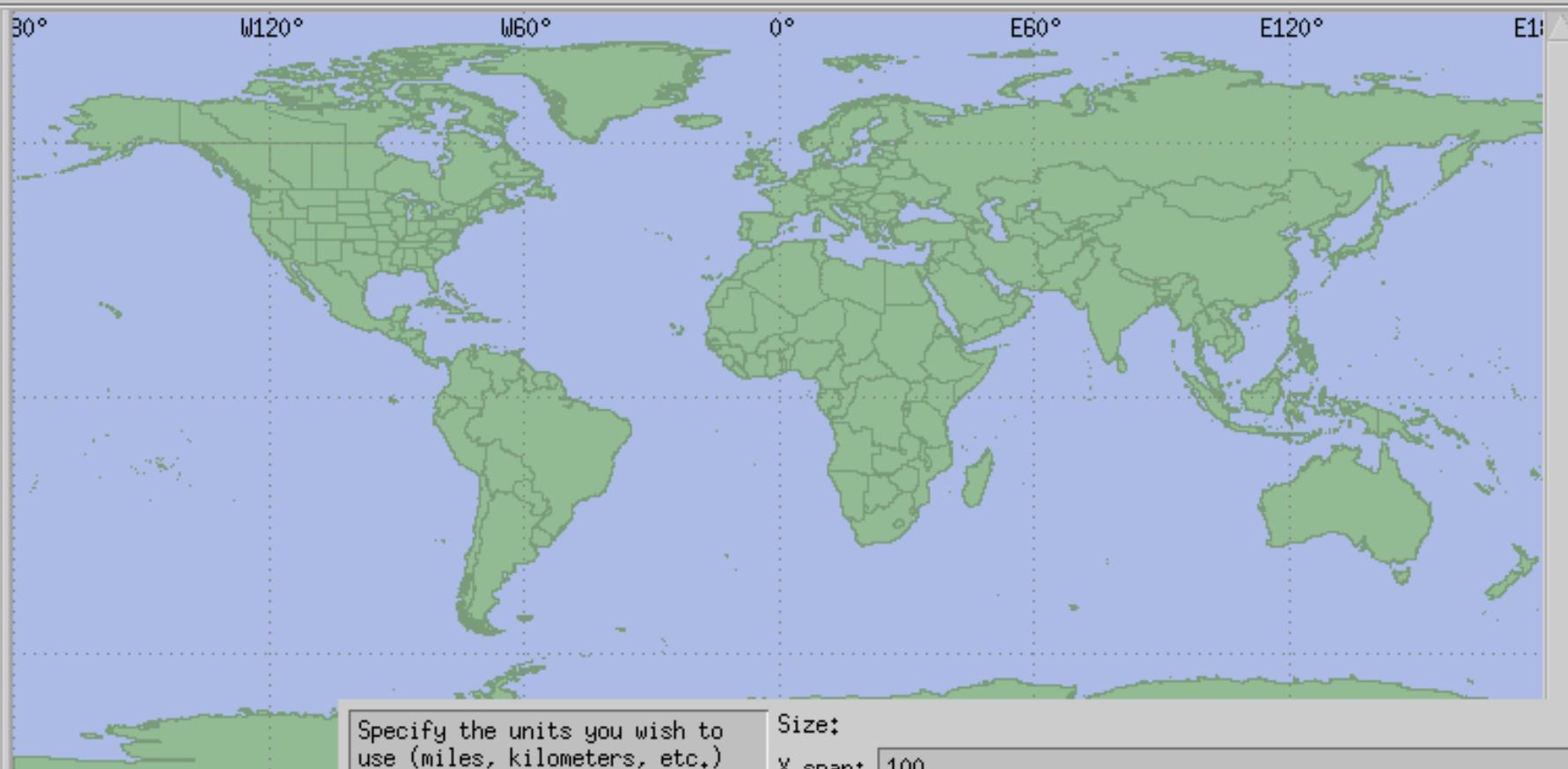
Use metric units

Copyright (c) 2015 MapInfo

< Back

Next >

Quit



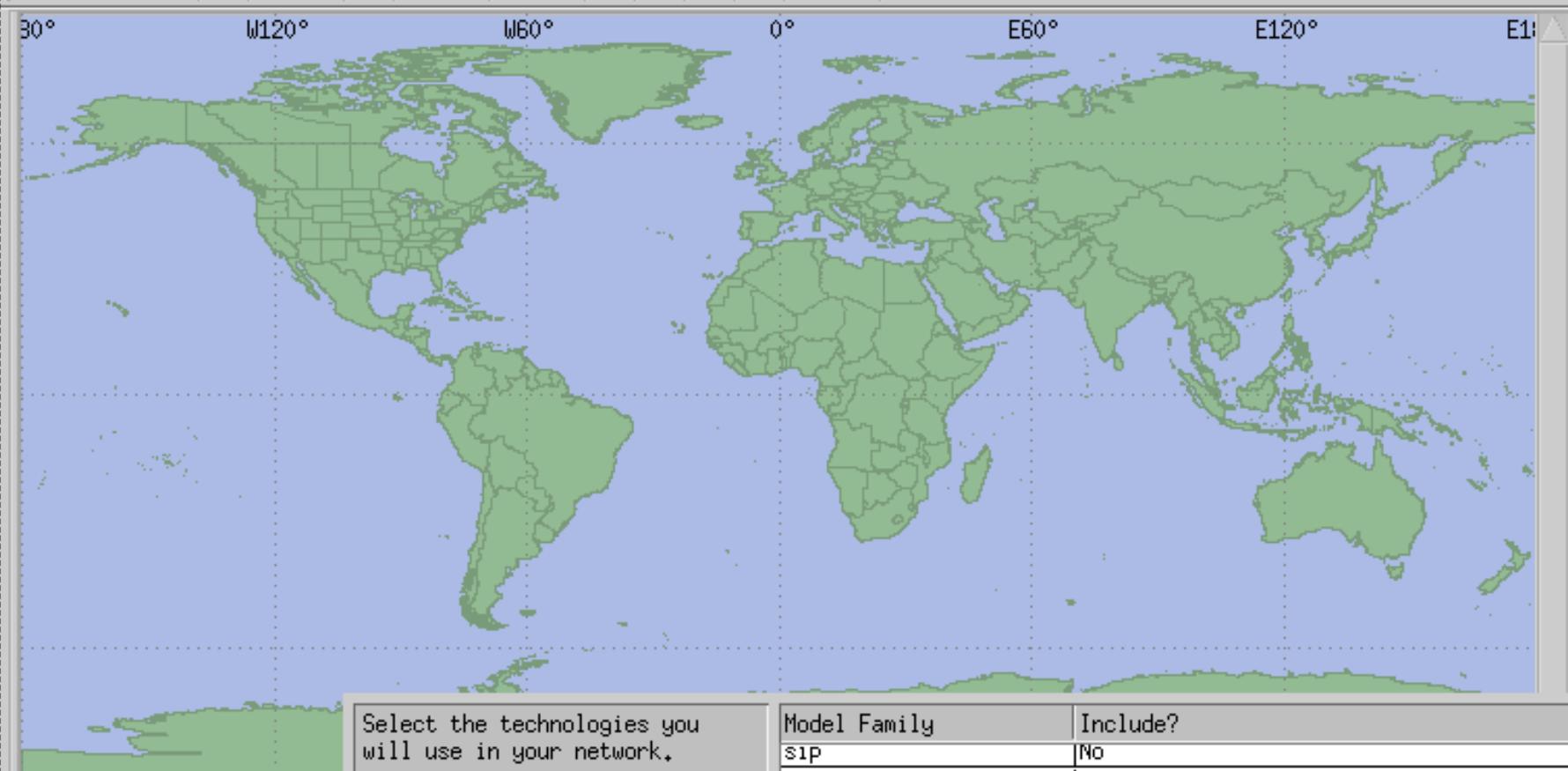
Specify the units you wish to use (miles, kilometers, etc.) and the extent of your network.

Size:

X span:

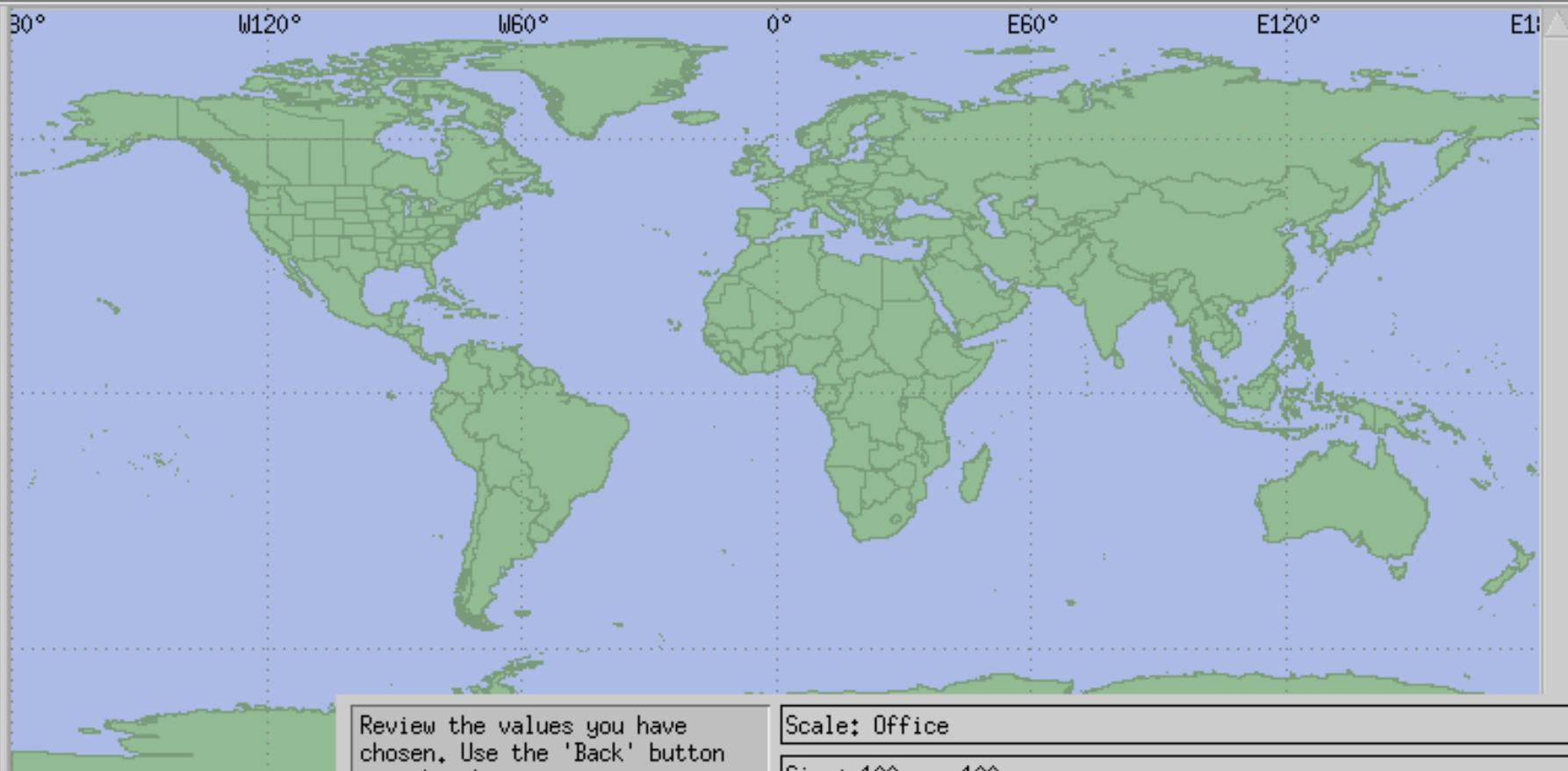
Y span:

Units:



Select the technologies you will use in your network.

Model Family	Include?
sip	No
SITL	No
Sm_Int_Model_List	Yes
SMART_MAC	No
starburst_palette	No
tdma	No
tdma_adv	No
token_ring	No
Transaction_Models	No
UMTS	No
UMTS_advanced	No



Review the values you have chosen. Use the 'Back' button to make changes.

Scale: Office

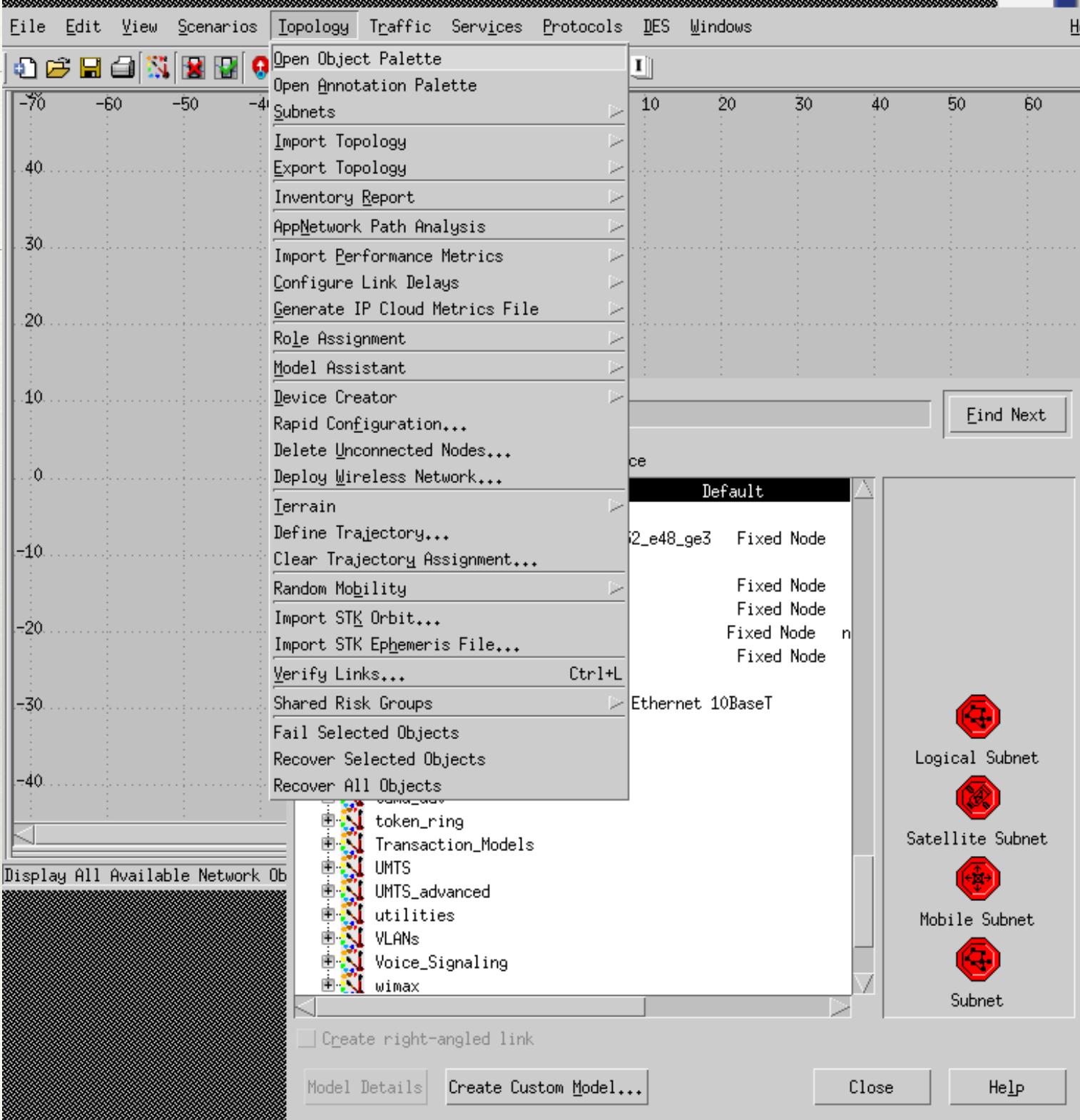
Size: 100 m x 100 m

Model Family

Sm_Int_Model_List

MapInfo Maps (background first)

None selected

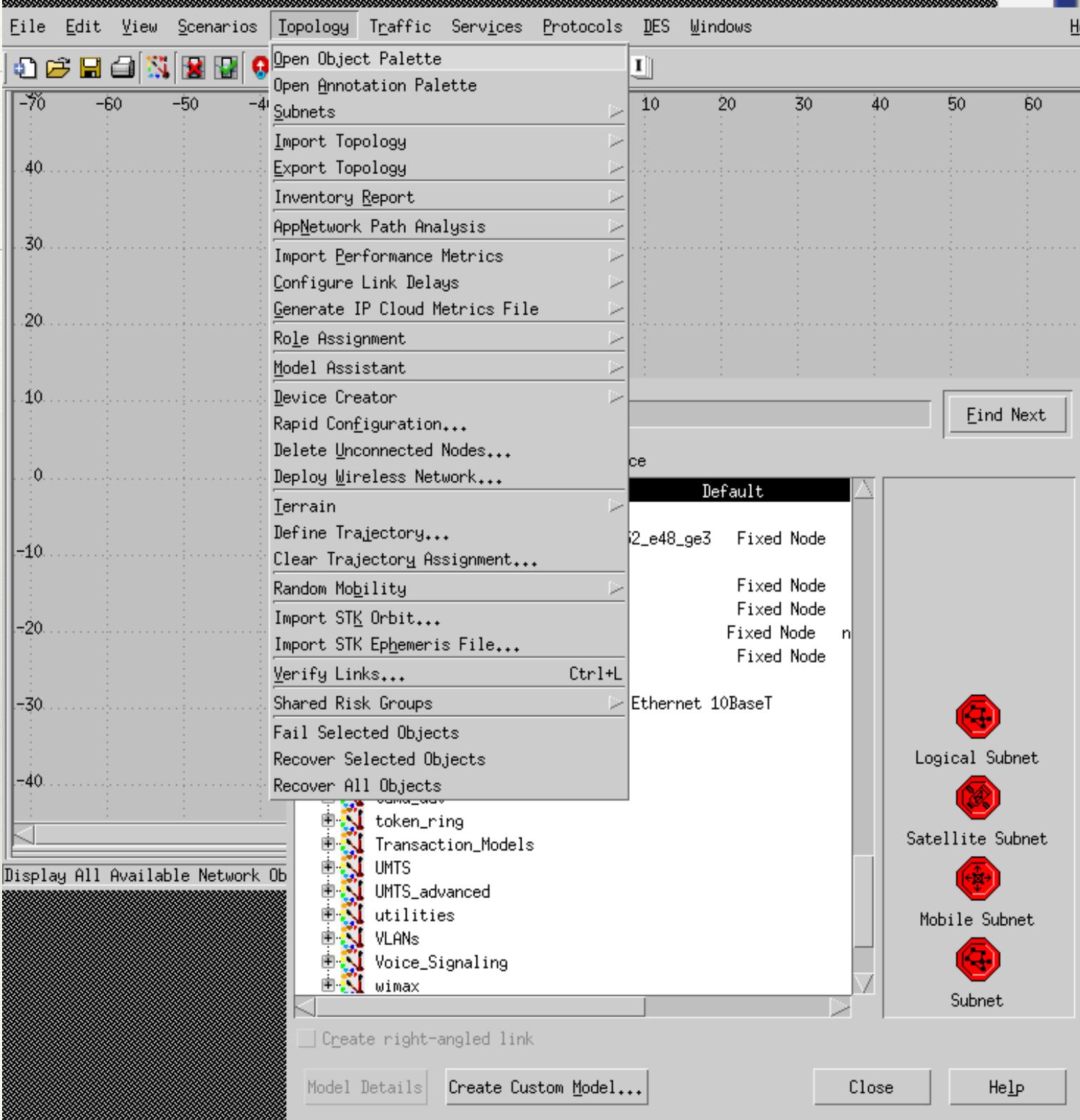


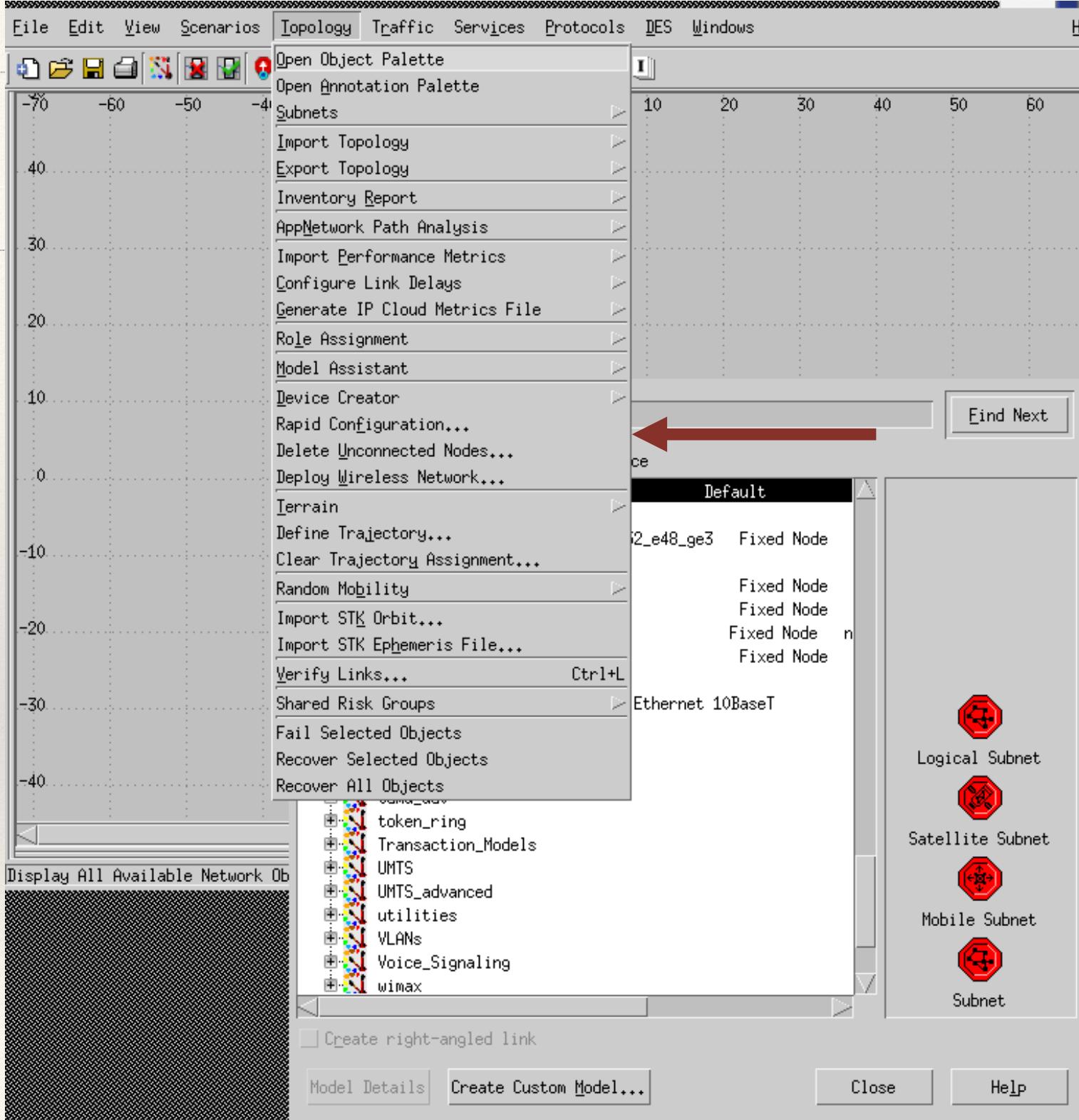
Parts of a network

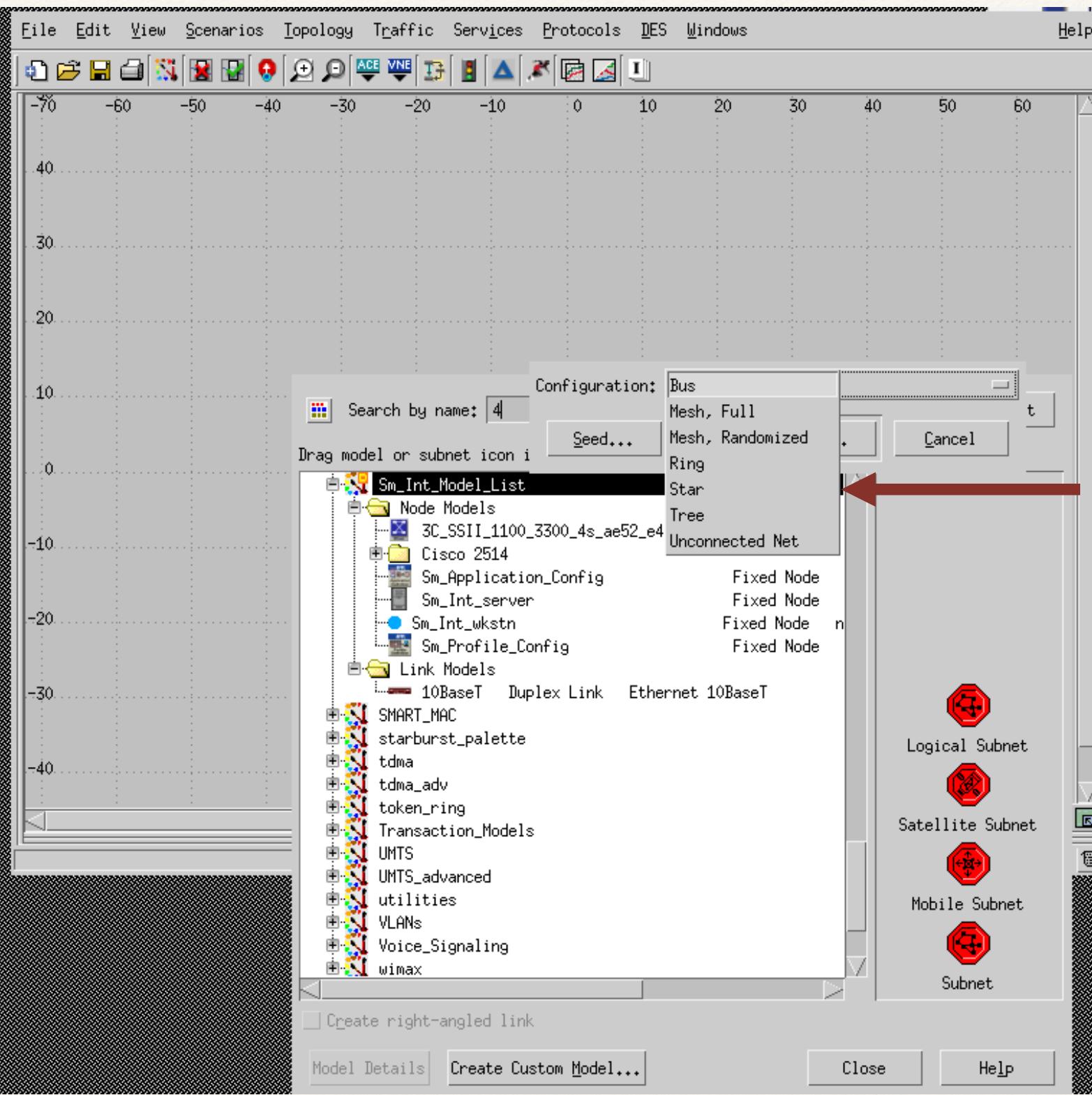
- ❖ Network models are made using nodes and links.
- ❖ A node is an object that can transmit and receive information.
- ❖ A link is used to connect two nodes together in order to allow them to communicate with each other.

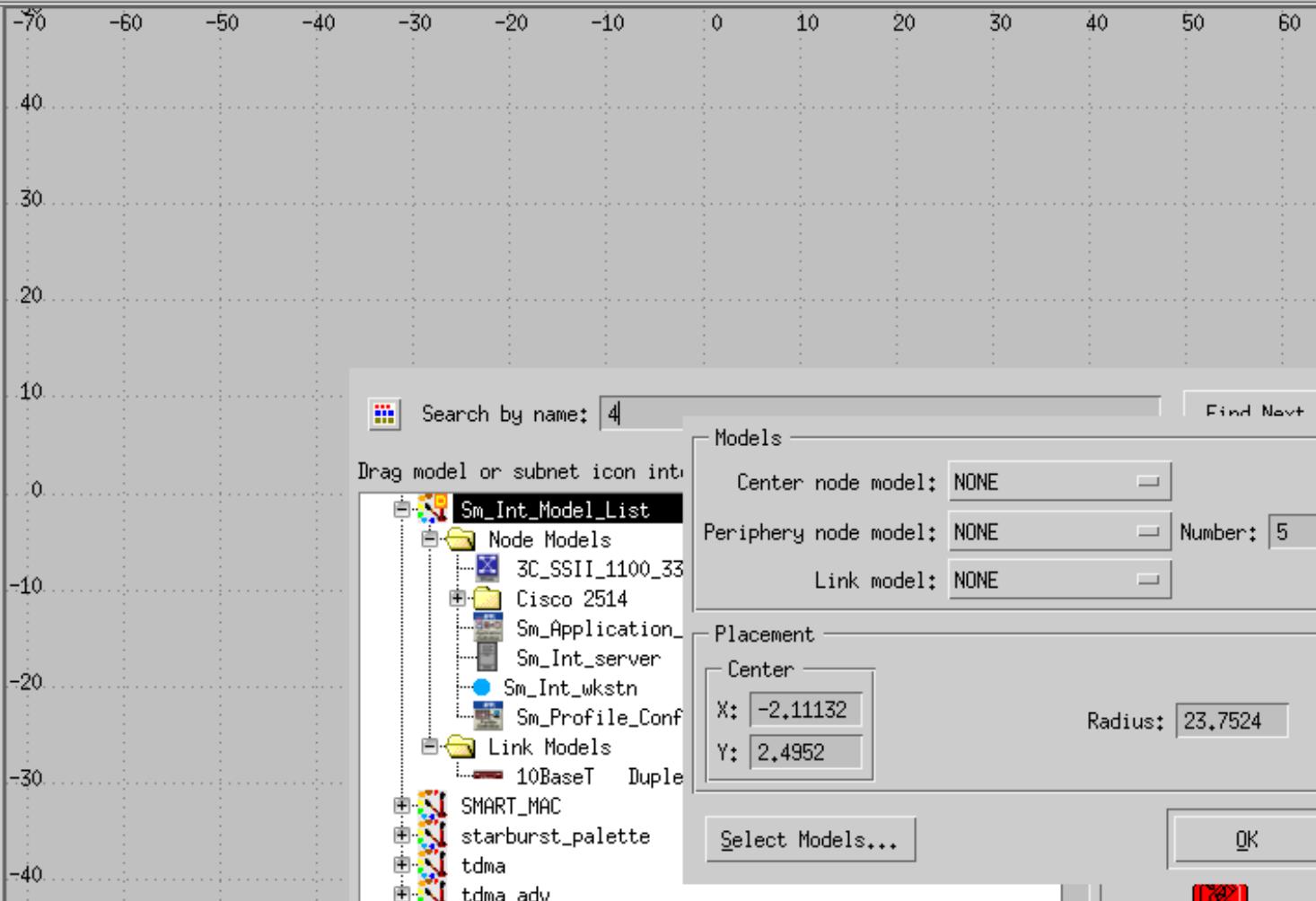
Parts of a network continued...

- ❖ These objects can be found within the object palette.
- ❖ To create a network quickly, we will use Rapid Configuration.
- ❖ This allows us to create a network in one step after we establish our configuration.

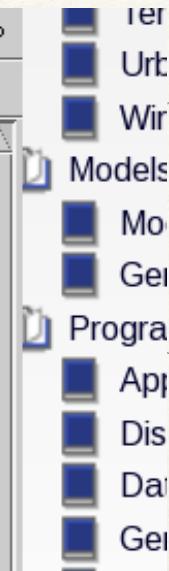








- Satellite Subnet
- Mobile Subnet
- Subnet





Search by name: 4 Find Next

- Drag model or subnet icon into the workspace
- Sm_Int_Model_List
 - Node Models
 - 3C_SSII_1100_33
 - Cisco 2514
 - Sm_Application_Config
 - Sm_Int_server
 - Sm_Int_wkstn
 - Sm_Profile_Config
 - Link Models
 - 10BaseT
 - Duplex
 - SMART_MAC
 - starburst_palette
 - tdma
 - tdma_adv
 - token_ring
 - Transaction_Models
 - UMTS
 - UMTS_advanced
 - utilities
 - VLANs
 - Voice_Signaling
 - wimax

Models

Center node model:

NONE

3C_SSII_1100_3300_4s_ae52_e48_ge3

CS_2514_1s_e2_s12

Sm_Application_Config

Sm_Int_server

Sm_Int_wkstn

Sm_Profile_Config

Placement

Center

X: -2.11132

Radius: 23.7524

Y: 2.4952

Select Models...

OK

Cancel



Satellite Subnet



Mobile Subnet



Subnet

Create right-angled link

Model Details

Create Custom Model...

Close

Help

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Search by name: 4 Find Next

Drag model or subnet icon into the workspace.

Models

Center node model: 3C_SSII_1100_3300_4
Periphery node model: NONE Number: 5
Link model: NONE

Placement

Center X: -2.11132 Radius: 23.7524
Y: 2.4952

Select Models...

OK Cancel

Sm_Int_Model_List

- Node Models
 - 3C_SSII_1100_33 Cisco 2514
 - Sm_Application_Sm_Int_server
 - Sm_Int_wkstn
 - Sm_Profile_Conf
- Link Models
 - 10BaseT Duplex
- SMART_MAC
- starburst_palette
- tdma
- tdma_adv
- token_ring
- Transaction_Models
- UMTS
- UMTS_advanced
- utilities
- VLANs
- Voice_Signaling
- wimax

Create right-angled link

Model Details Create Custom Model... Close Help

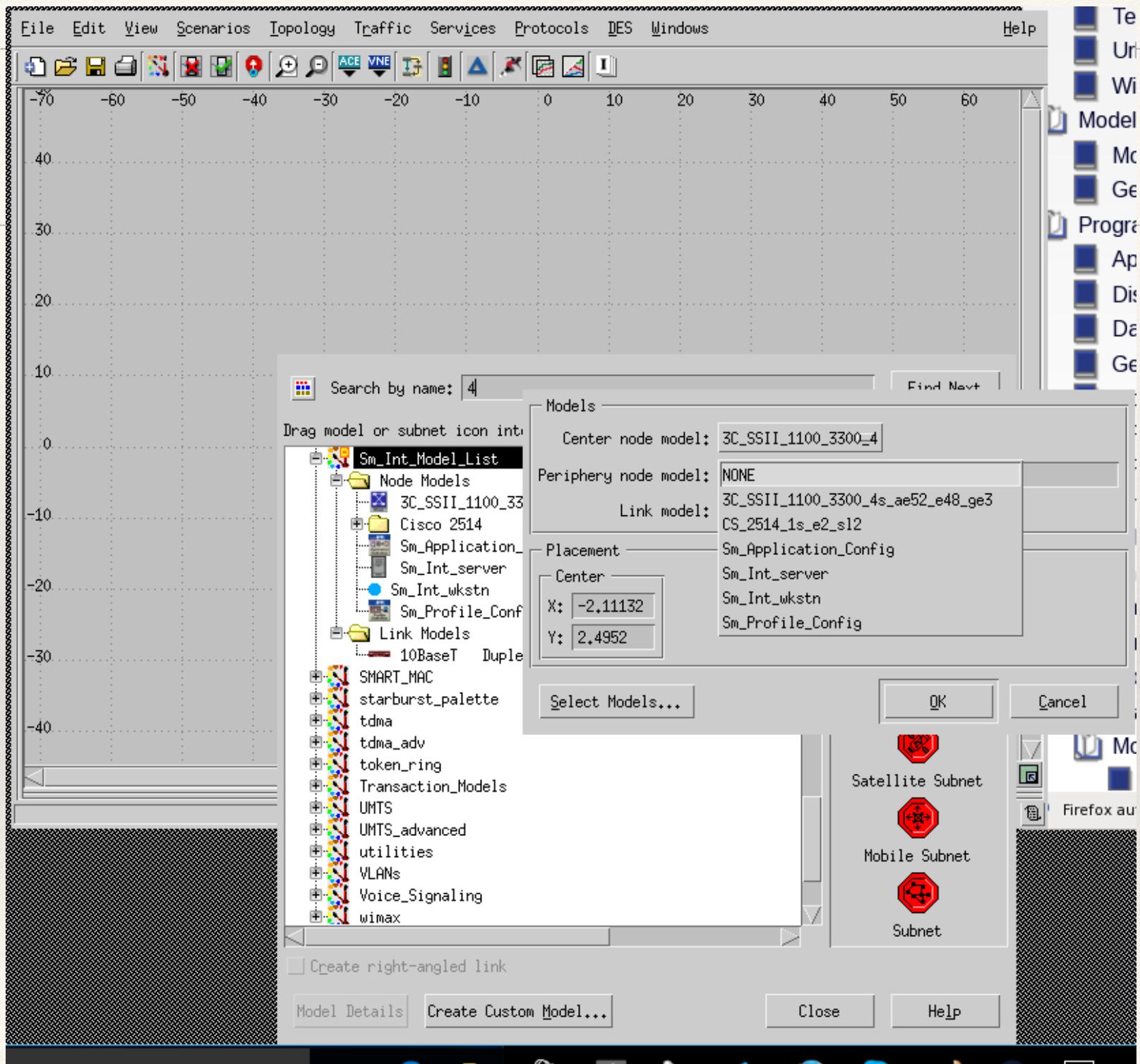
Satellite Subnet

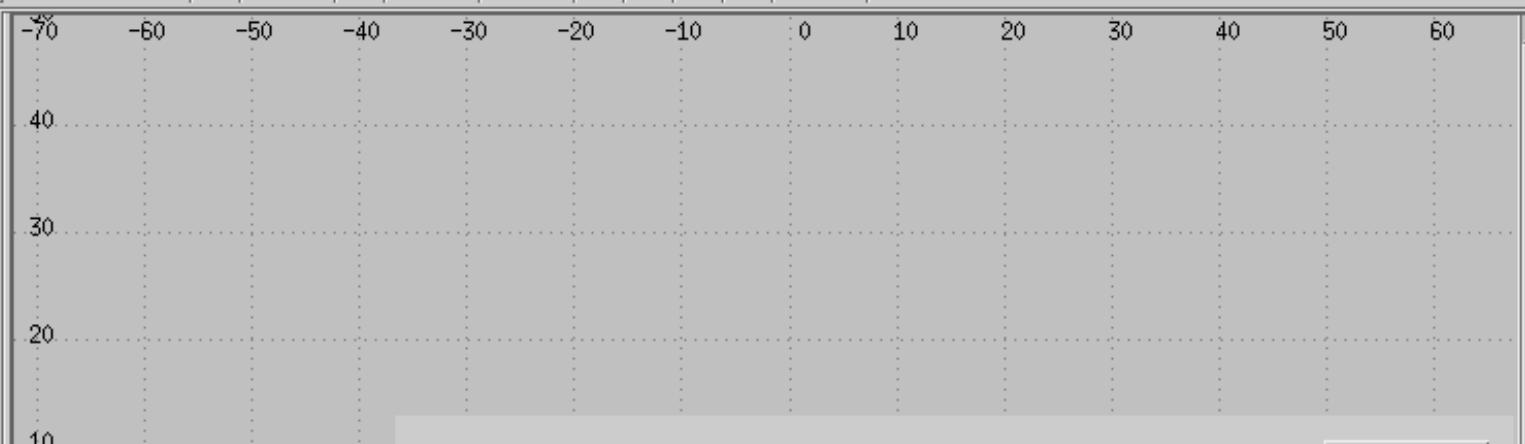
Mobile Subnet

Subnet

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Search by name: 4

Drag model or subnet icon into workspace

Create right-angled link

Create Custom Model...

Models

Center node model: 3C_SSII_1100_3300_4
Periphery node model: Sm_Int_wkstn Number: 30
Link model: NONE

Placement

Center X: -2.11132 Radius: 23.7524
Y: 2.4952

Sm_Int_Model_List

- Node Models
 - 3C_SSII_1100_33
 - Cisco 2514
 - Sm_Application
 - Sm_Int_server
 - Sm_Int_wkstn
 - Sm_Profile_Conf
- Link Models
 - 10BaseT Duple
 - SMART_MAC
 - starburst_palette
 - tdma
 - tdma_adv
 - token_ring
 - Transaction_Models
 - UMTS
 - UMTS_advanced
 - utilities
 - VLANs
 - Voice_Signaling
 - wimax

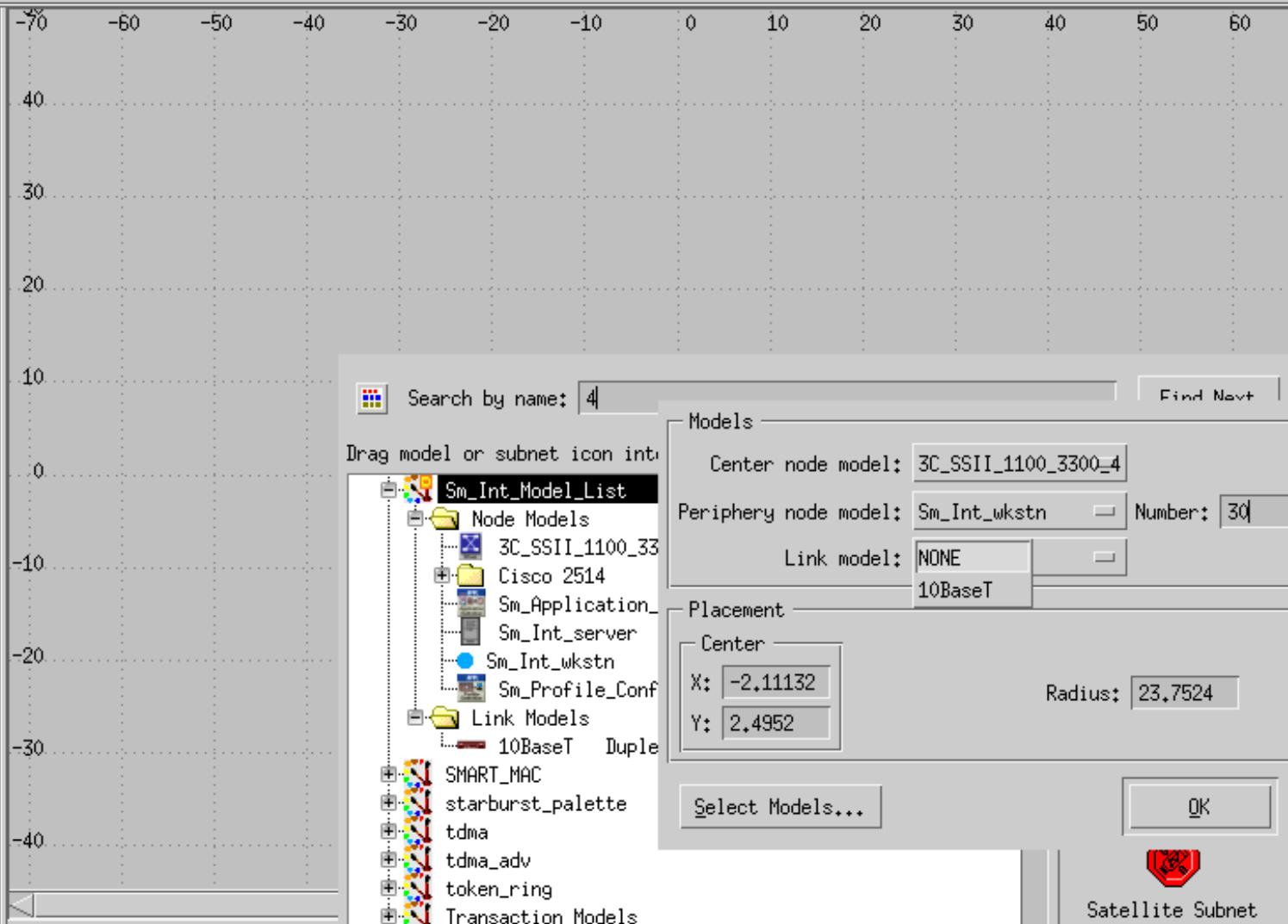
Subnet Icons

- Satellite Subnet
- Mobile Subnet
- Subnet

Mode: M G P A D Da Ge

Firefox au

File Edit View Scenarios Topology Traffic Services Protocols IES Windows Help



Model Details

Create Custom Model...

Close

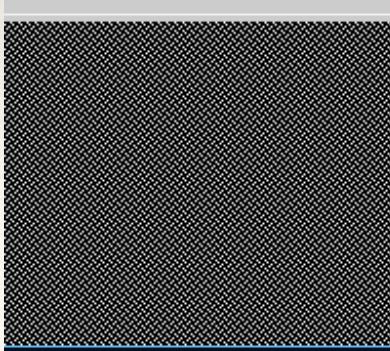
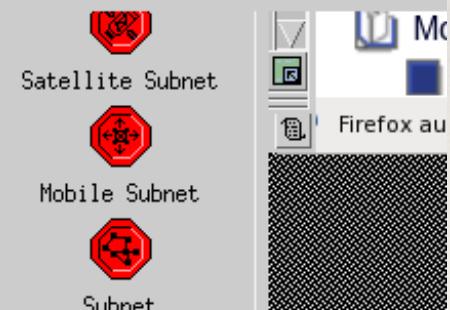
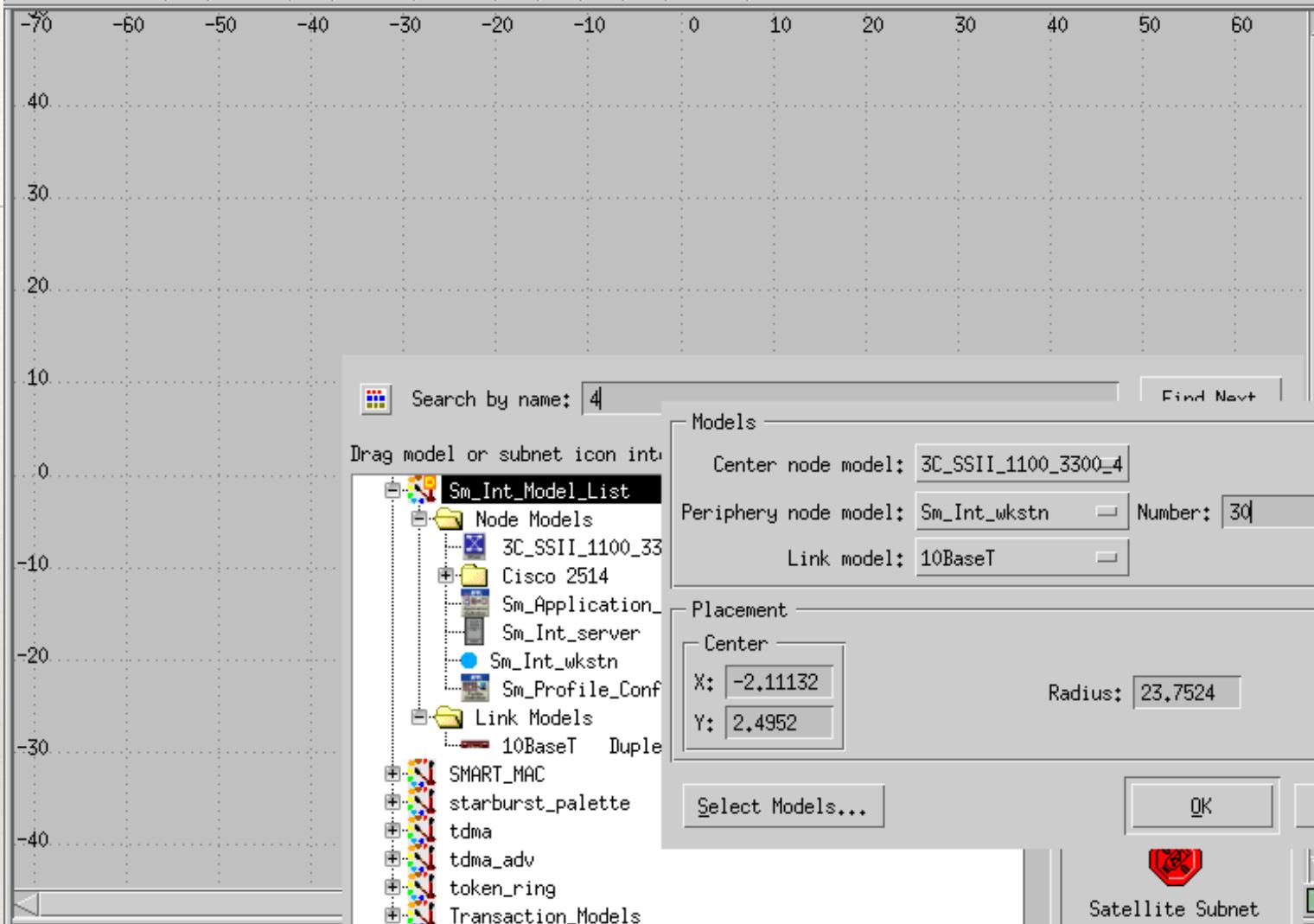
Help

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File Edit View Scenarios Topology Traffic Services Protocols IES Windows Help



Create right-angled link

Model Details

Create Custom Model...

Close

Help

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Search by name: 4

Drag model or subnet icon into the workspace.

Models

- Center node model: 3C_SSII_1100_3300_4
- Periphery node model: Sm_Int_wkstn Number: 30
- Link model: 10BaseT

Placement

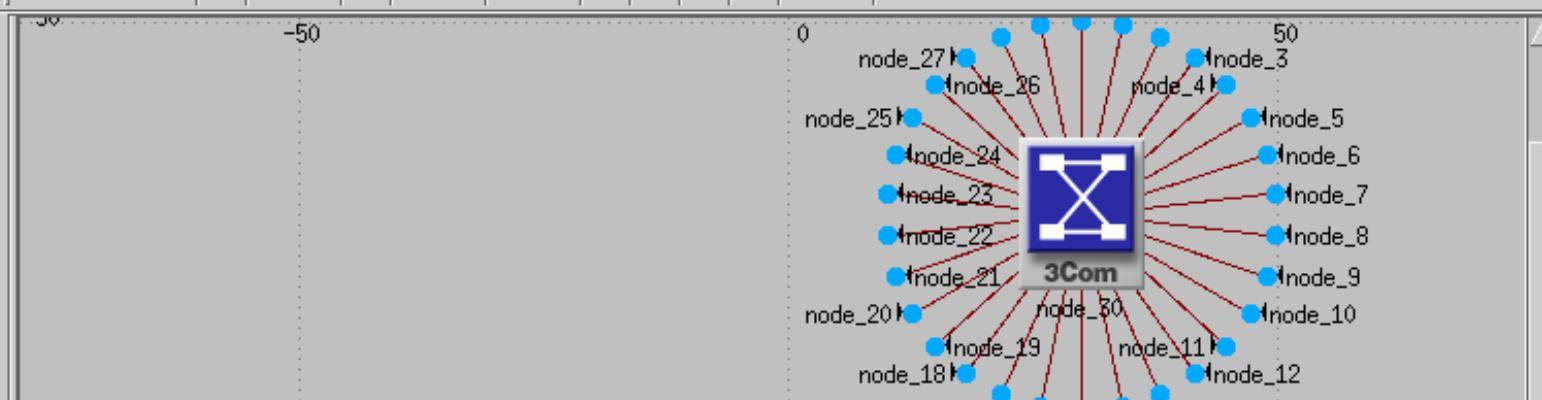
Center

X: 30 Radius: 20
Y: 30

Sm_Int_Model_List

- Node Models
 - 3C_SSII_1100_33
 - Cisco 2514
 - Sm_Application
 - Sm_Int_server
 - Sm_Int_wkstn
 - Sm_Profile_Conf
- Link Models
 - 10BaseT
 - Duple
- SMART_MAC
- starburst_palette
- tdma
- tdma_adv
- token_ring
- Transaction_Models
- UMTS
- UMTS_advanced
- utilities
- VLANs
- Voice_Signaling
- wimax

Create right-angled link



Search by name: 4

Find Next

Drag model or subnet icon into workspace

Sm_Int_Model_List Default

- Node Models
 - 3C_SSII_1100_3300_4s_ae52_e48_ge3 Fixed Node
 - Cisco 2514
 - Sm_Application_Config Fixed Node
 - Sm_Int_server Fixed Node
 - Sm_Int_wkstn Fixed Node
 - Sm_Profile_Config Fixed Node
- Link Models
 - 10BaseT Duplex Link Ethernet 10BaseT
- SMART_MAC
- starburst_palette
- tdma
- tdma_adv
- token_ring
- Transaction_Models
- UMTS
- UMTS_advanced
- utilities
- VLANs
- Voice_Signaling
- wimax

Logical Subnet

Satellite Subnet

Mobile Subnet

Subnet

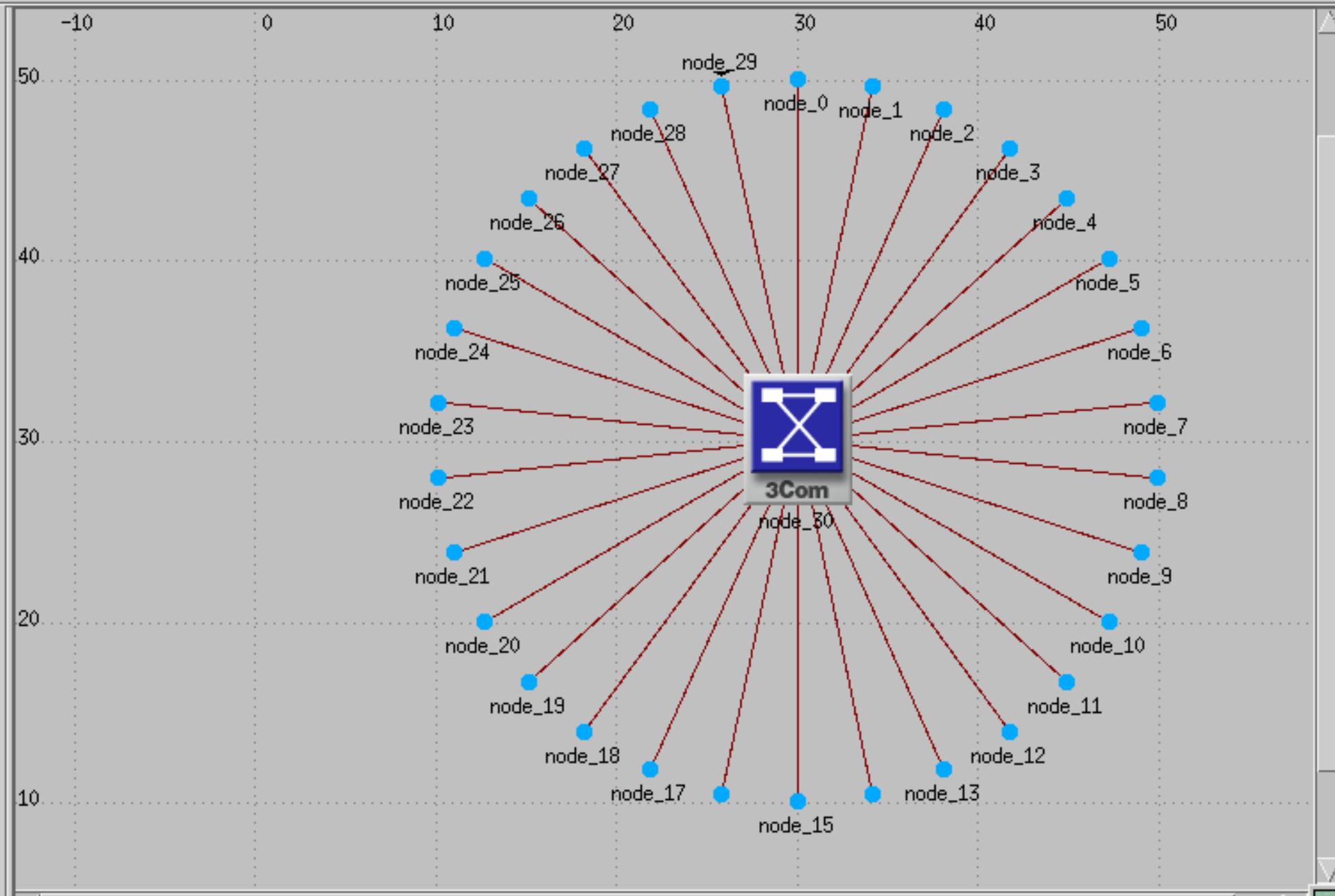
Create right-angled link

Model Details

Create Custom Model...

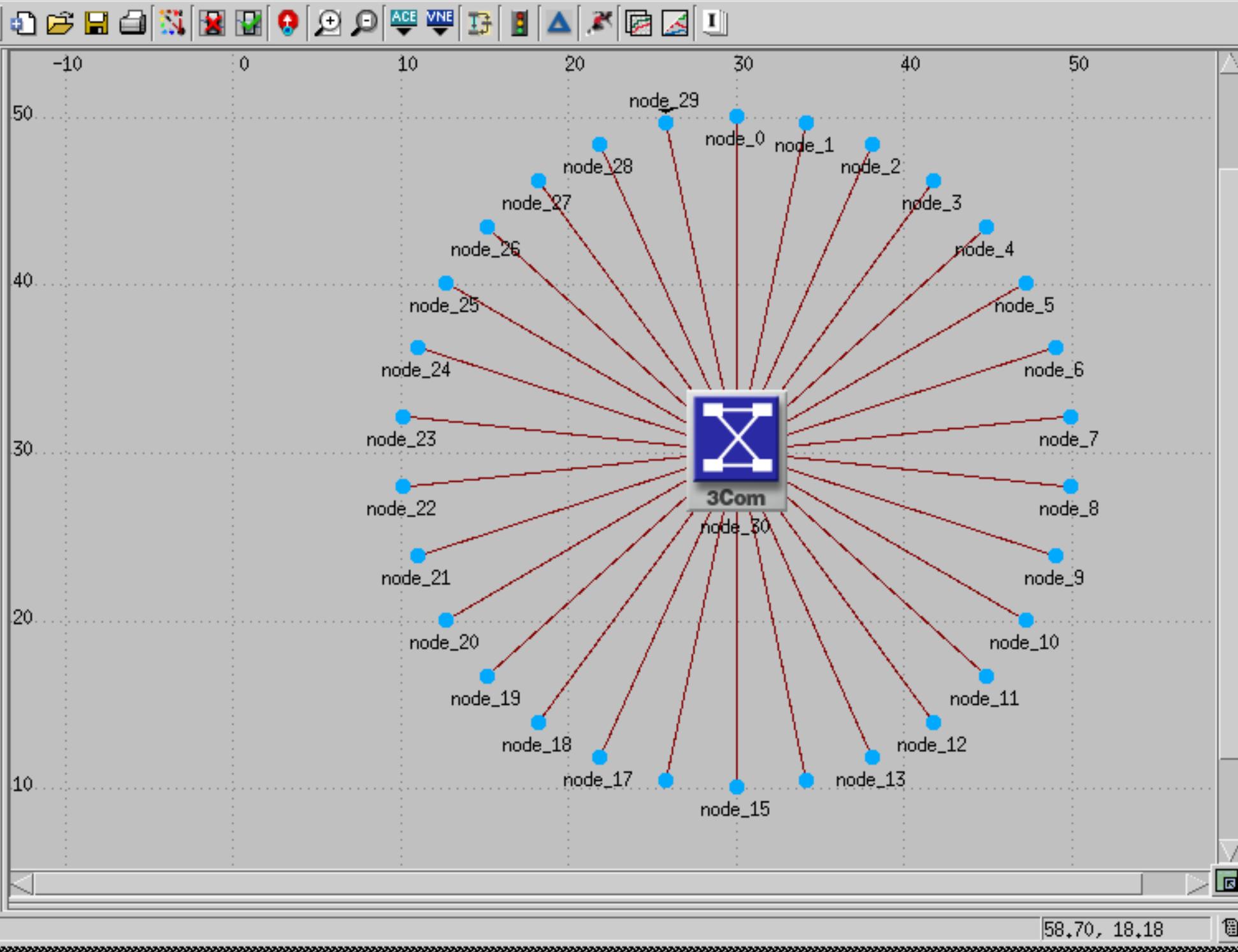
Close

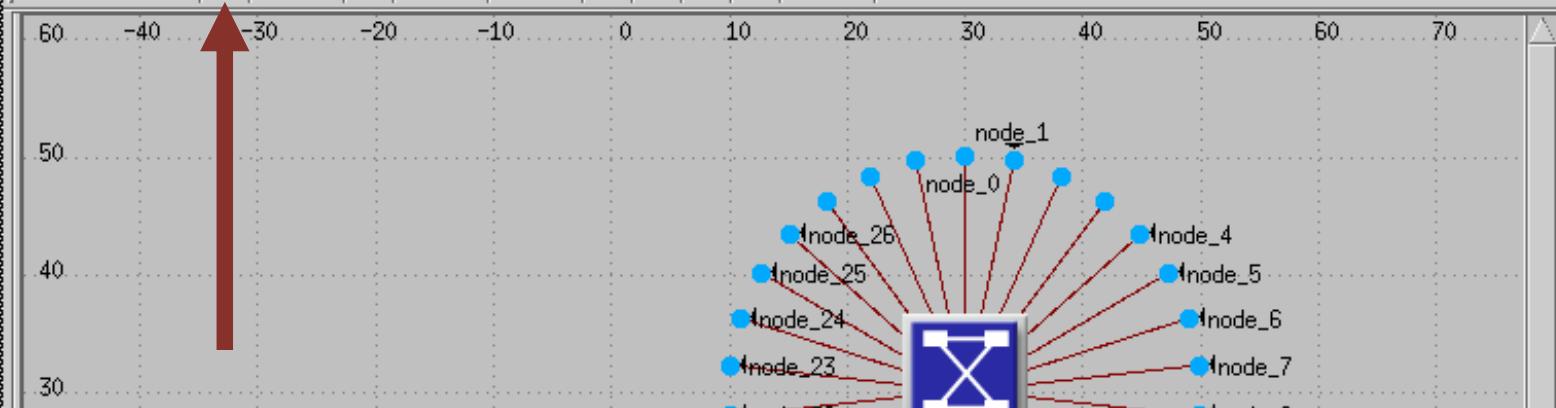
Help



The network is built

- ❖ Now we need to add a server.
- ❖ We are going to add a Sm_Int_server object, an application definition object, and a profile definition object.
- ❖ We are then going to draw a link from the server object to the network that we built.





Search by name:

Find Next

Drag model or subnet icon into workspace

Sm_Int_Model_List Default

- Node Models
 - 3C_SSII_1100_3300_4s_ae52_e48_ge3 Fixed Node
 - Cisco 2514
 - Sm_Application_Config Fixed Node
 - Sm_Int_server Fixed Node
 - Sm_Int_wkstn Fixed Node
- Sm_Profil Shared Object Palettes
- Link Models
 - 10BaseT Node Models
 - SMART_MAC
 - starburst_palette
 - tdma
 - tdma_adv
 - token_ring
 - Transaction_Models
 - UMTS
 - UMTS_advanced
 - utilities
 - VLANs
 - Voice_Signaling
 - wimax

 Create right-angled link

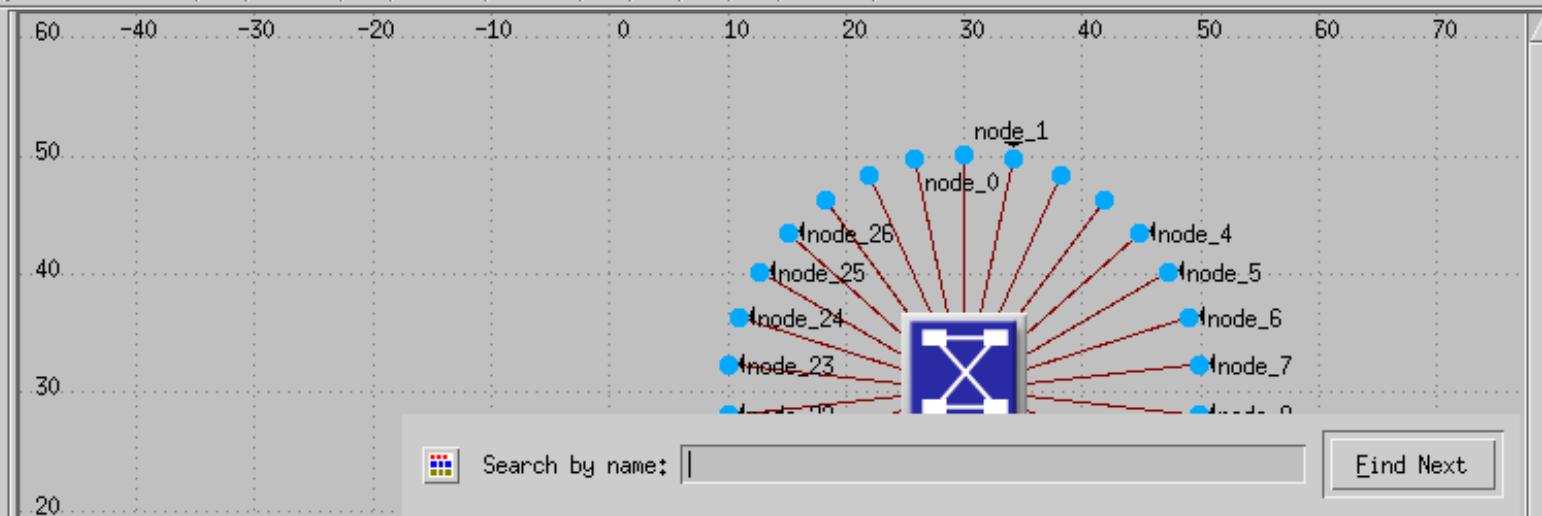
Model Details

Create Custom Model...

Close

Help

- Logical Subnet
- Satellite Subnet
- Mobile Subnet
- Subnet



Drag model or subnet icon into workspace

Sm_Int_Model_List Default

- Node Models
 - 3C_SSII_1100_3300_4s_ae52_e48_ge3 Fixed Node
 - Cisco 2514
 - Sm_Application_Config Fixed Node
 - Sm_Int_server Fixed Node**
 - Sm_Int_wkstn
 - Sm_Profile_Config
- Link Models
 - 10BaseT Duplex Link
 - SMART_MAC
 - starburst_palette
 - tdma
 - tdma_adv
 - token_ring
 - Transaction_Models
 - UMTS
 - UMTS_advanced
 - utilities
 - VLANs
 - Voice_Signaling
 - wimax

Shared Object Palettes
Sm_Int_Model_List Default
Node Models
Sm_Int_server Fixed Node network node

Logical Subnet

Satellite Subnet

Mobile Subnet

Subnet

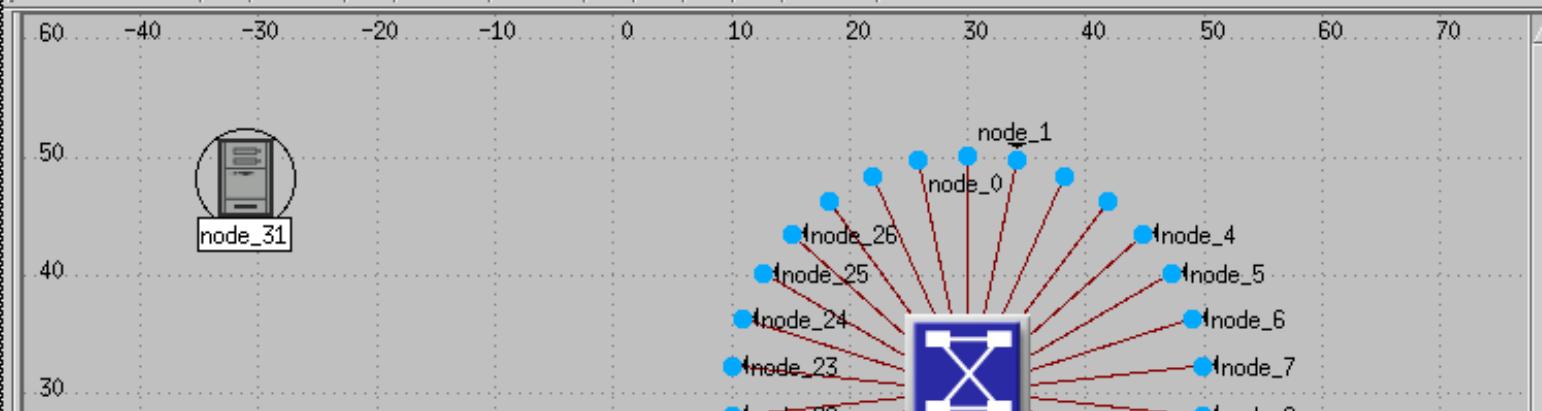
Create right-angled link

Model Details

Create Custom Model...

Close

Help

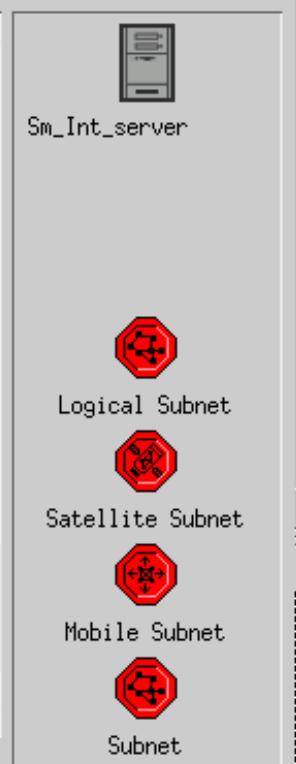


Search by name: Find Next

Drag model or subnet icon into workspace

Sm_Int_Model_List Default

- Node Models
 - 3C_SSII_1100_3300_4s_ae52_e48_ge3 Fixed Node
 - Cisco 2514
 - Sm_Application_Config Fixed Node
 - Sm_Int_server Fixed Node
 - Sm_Int_wkstn Fixed Node
 - Sm_Profile_Config Fixed Node
- Link Models
 - 10BaseT Duplex Link Ethernet 10BaseT
- SMART_MAC
- starburst_palette
- tdma
- tdma_adv
- token_ring
- Transaction_Models
- UMTS
- UMTS_advanced
- utilities
- VLANs
- Voice_Signaling
- wimax



Defining new object. [Sm_Int_ser

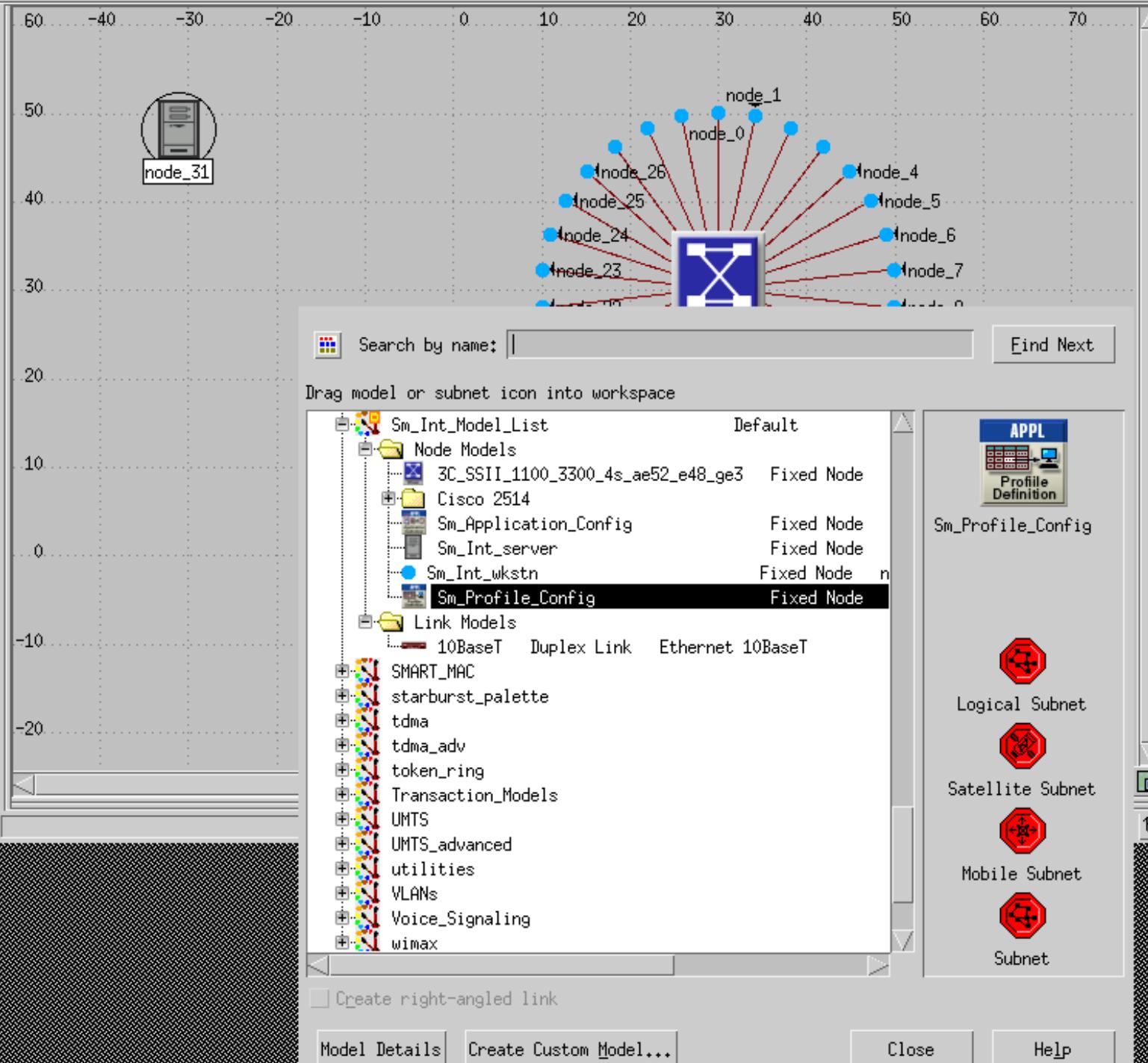
Create right-angled link

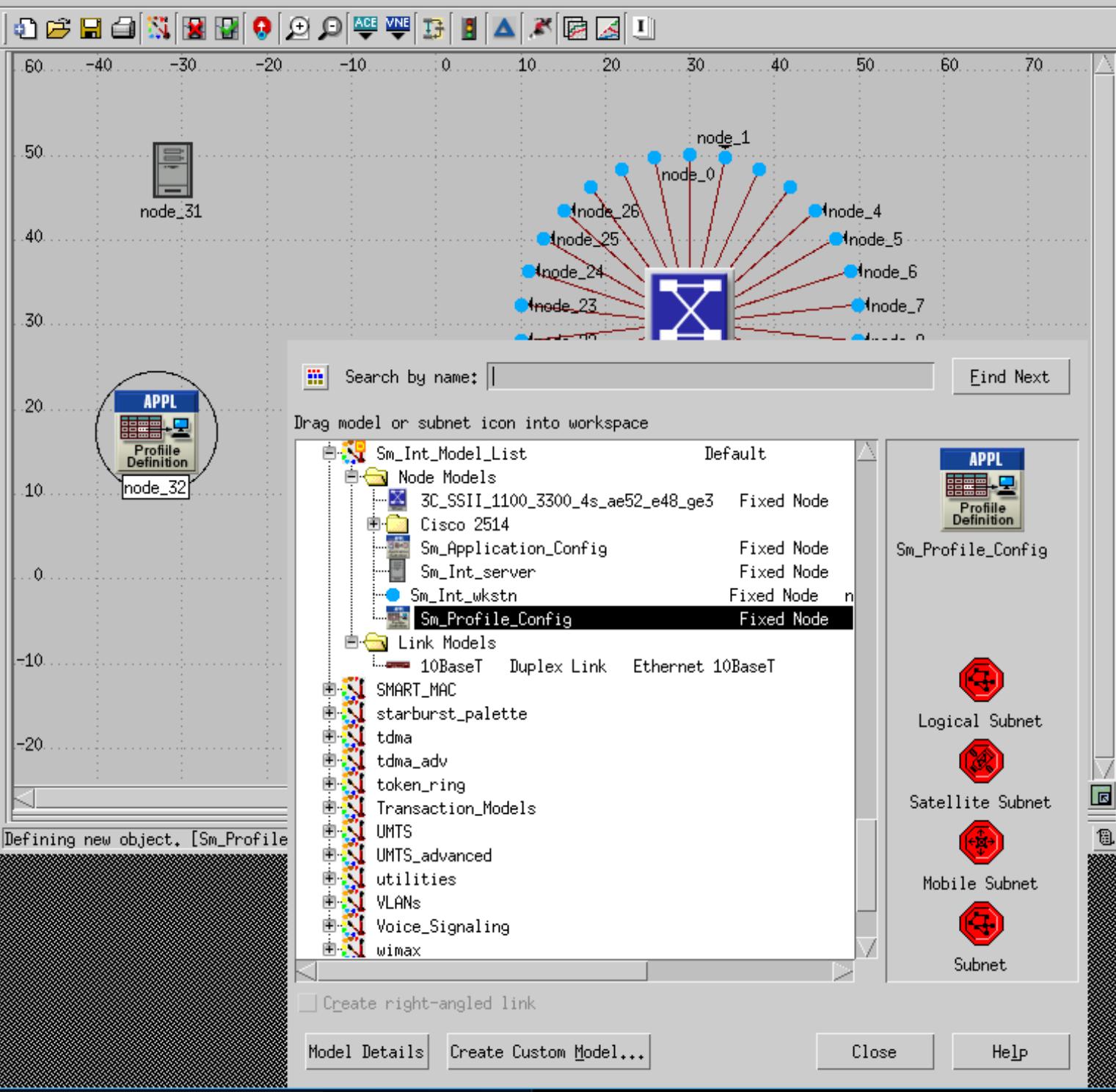
Model Details

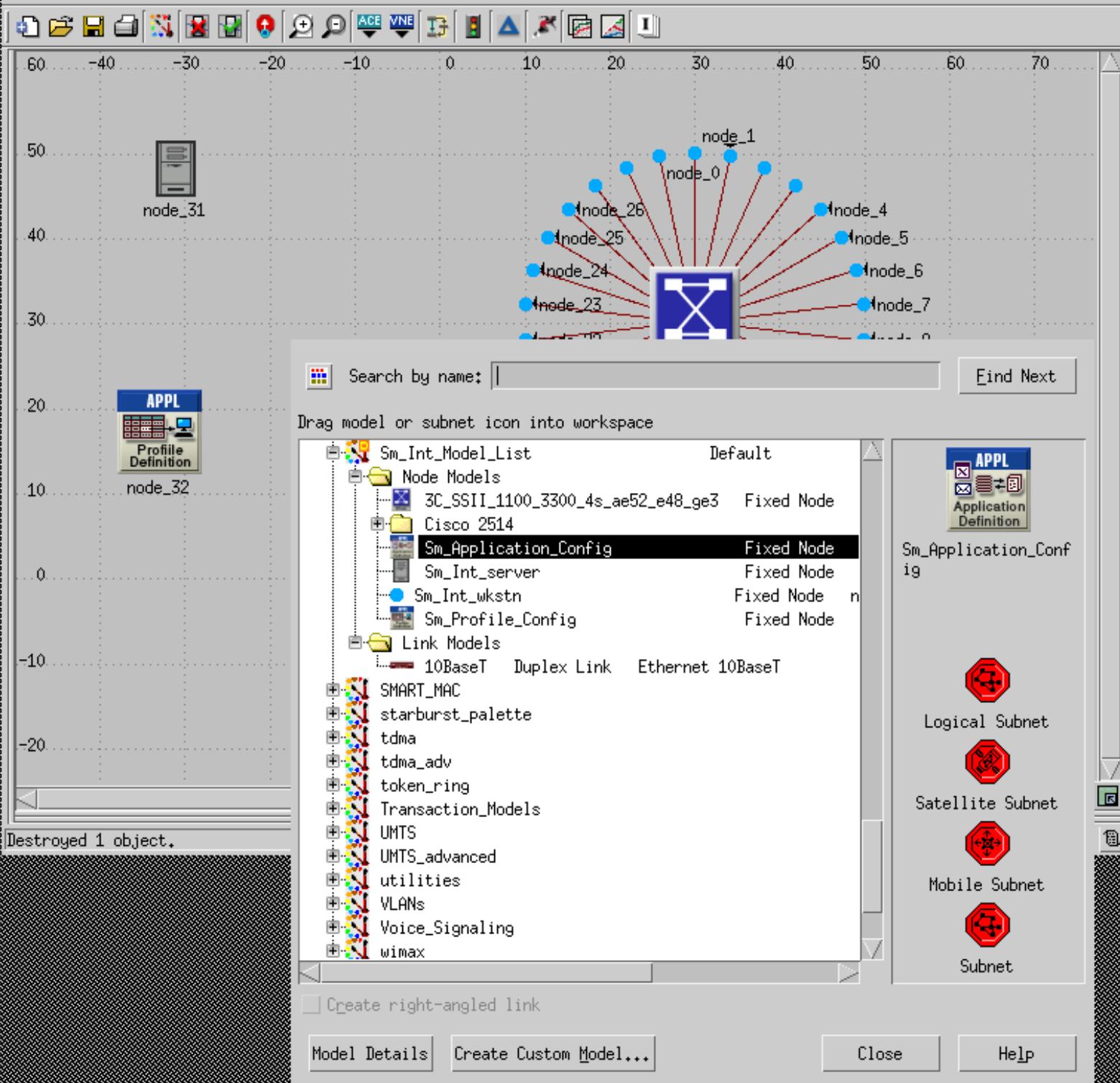
Create Custom Model...

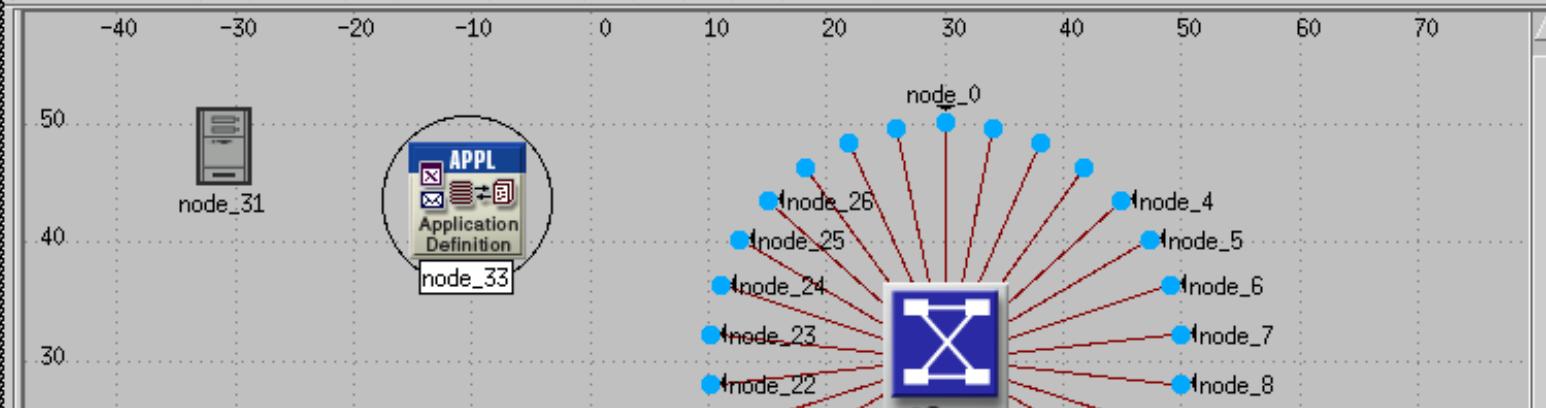
Close

Help









Drag model or subnet icon into workspace

Sm_Int_Model_List Default

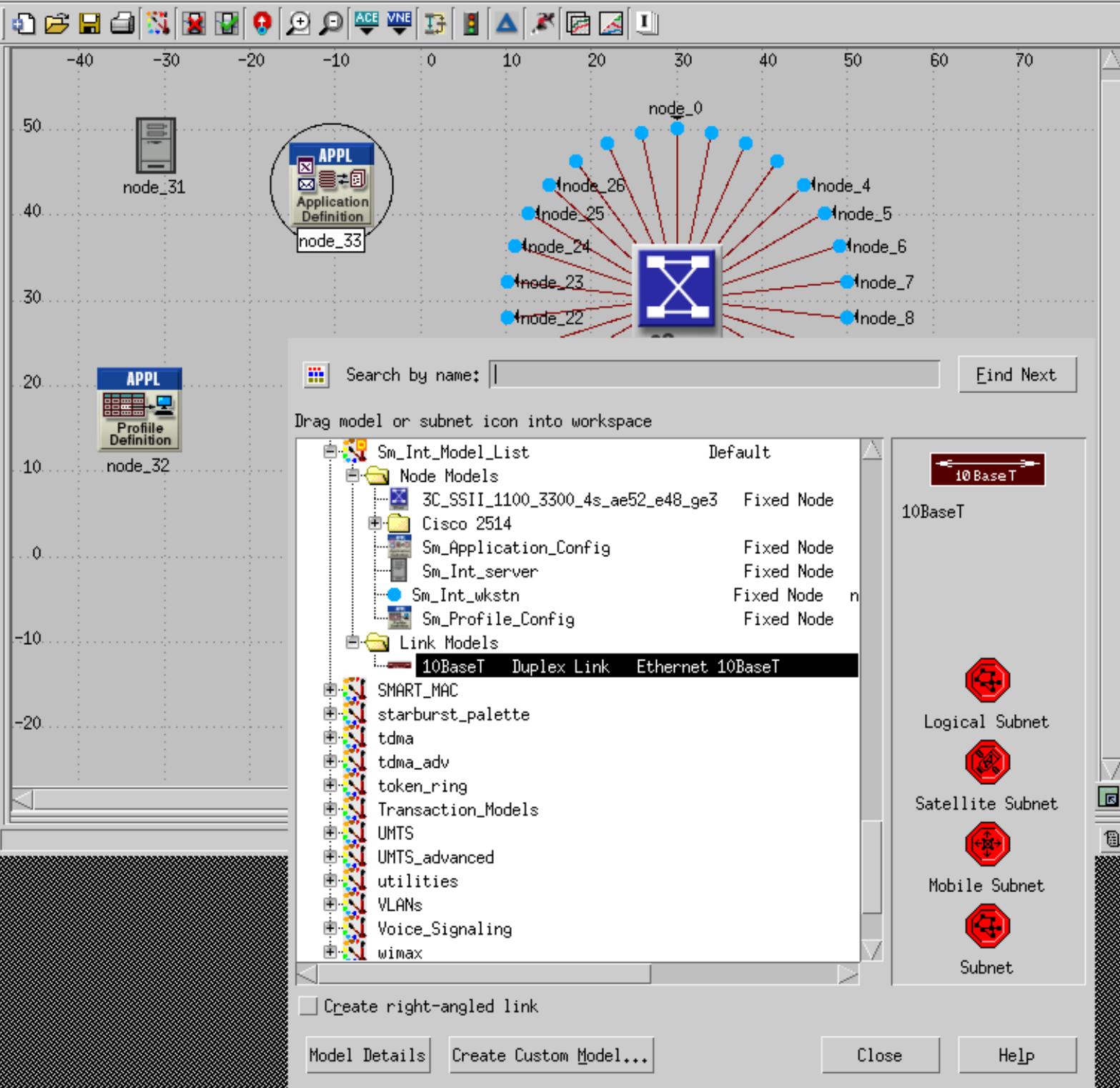
- + Node Models
 - 3C_SSII_1100_3300_4s_ae52_e48_ge3 Fixed Node
 - + Cisco 2514
 - Sm_Application_Config Fixed Node
 - Sm_Int_server Fixed Node
 - Sm_Int_wkstn Fixed Node
 - Sm_Profile_Config Fixed Node
 - + Link Models
 - 10BaseT Duplex Link Ethernet 10BaseT
- Sm_Application_Config

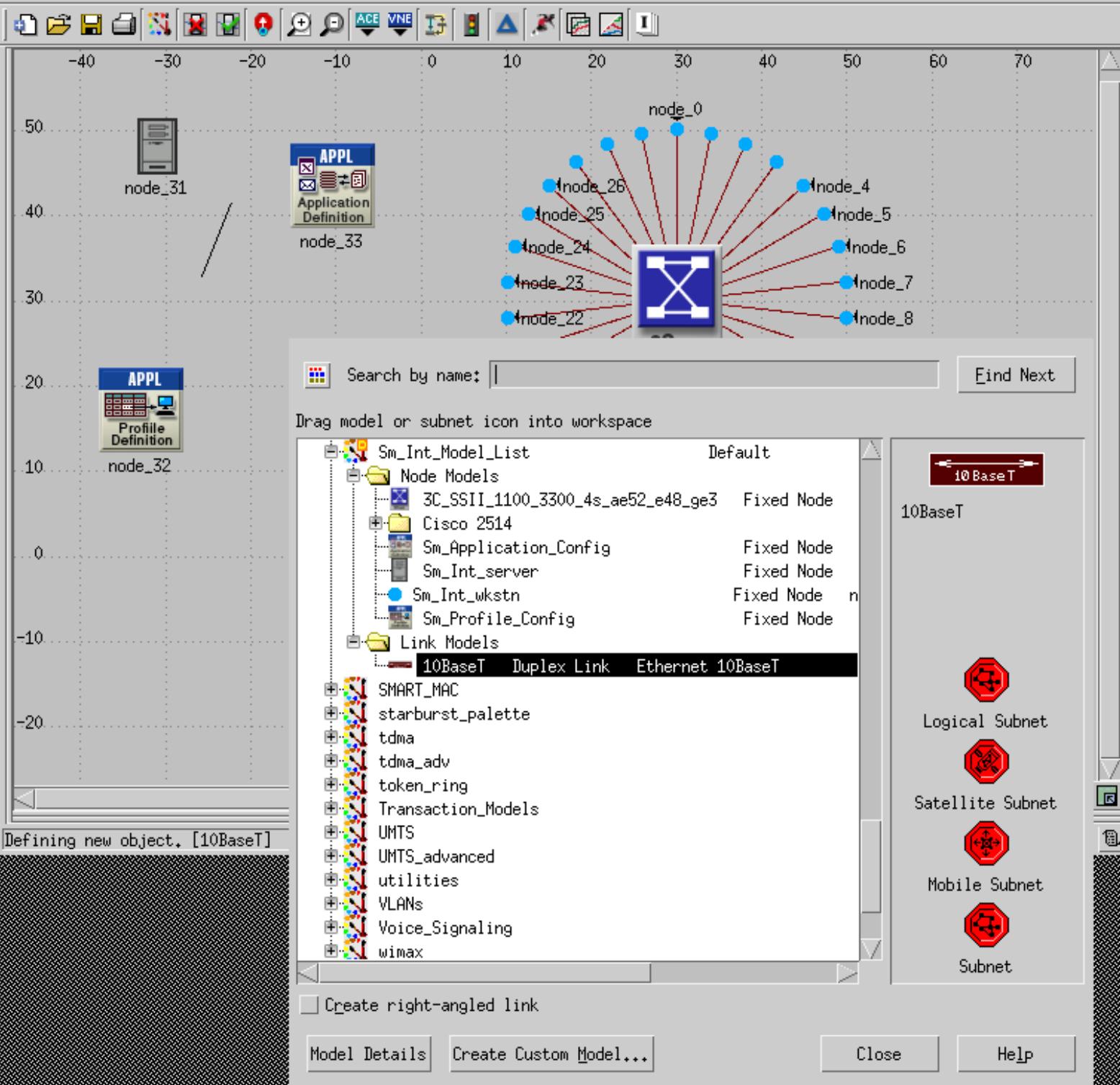
 -
 -
 -
 -

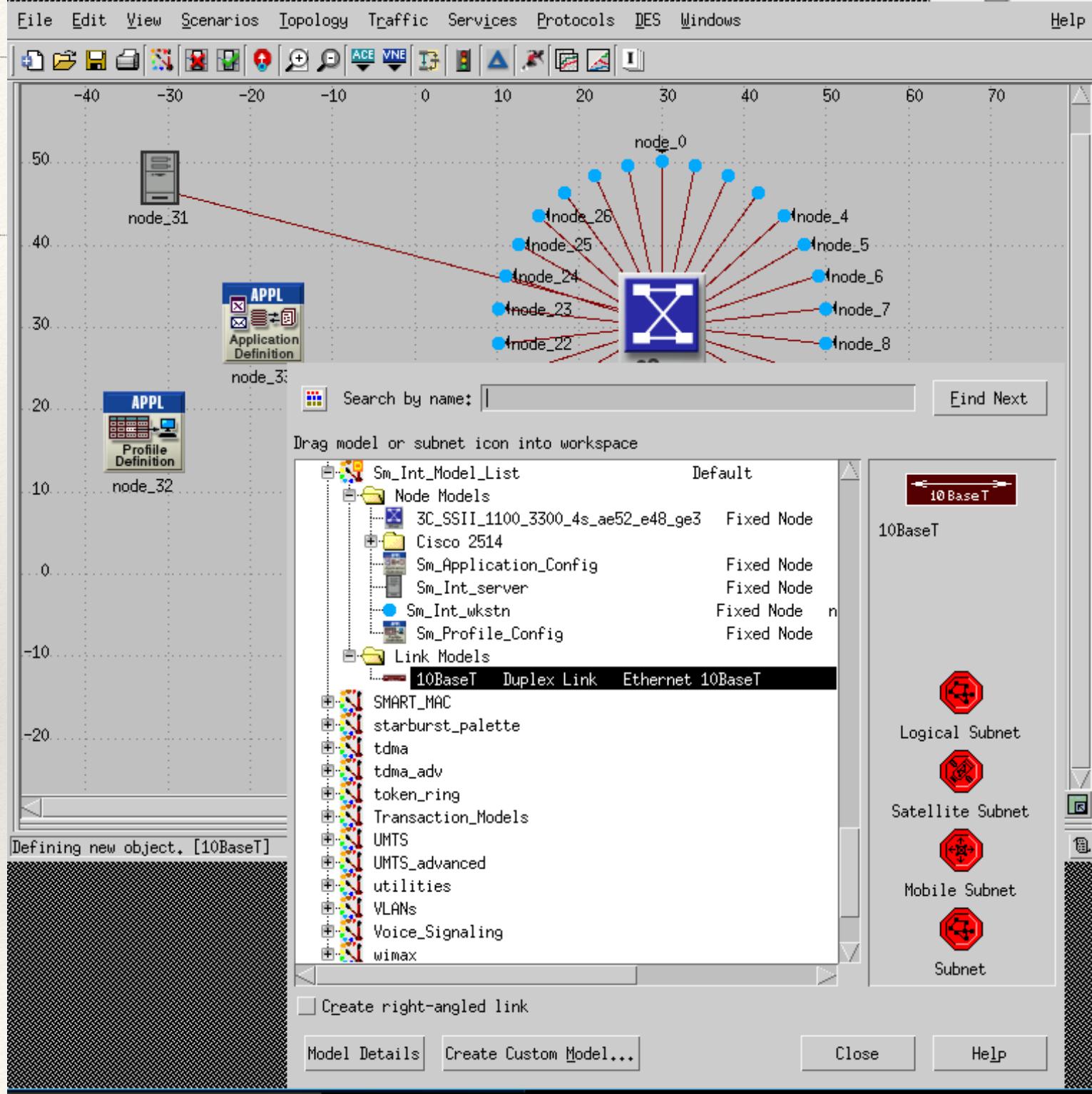
Defining new object. [Sm_Applica

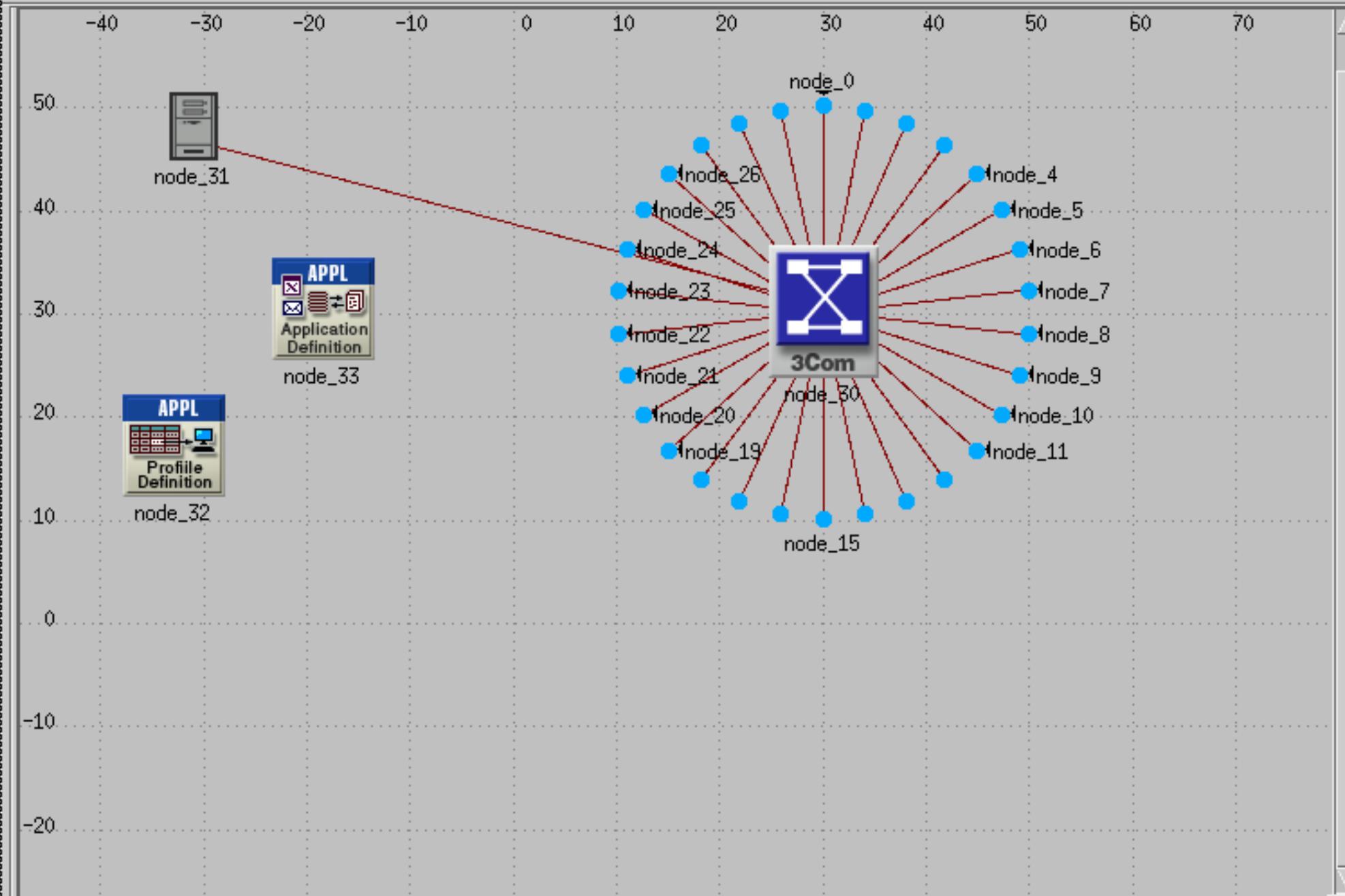
Create right-angled link

Model Details Create Custom Model... Close Help



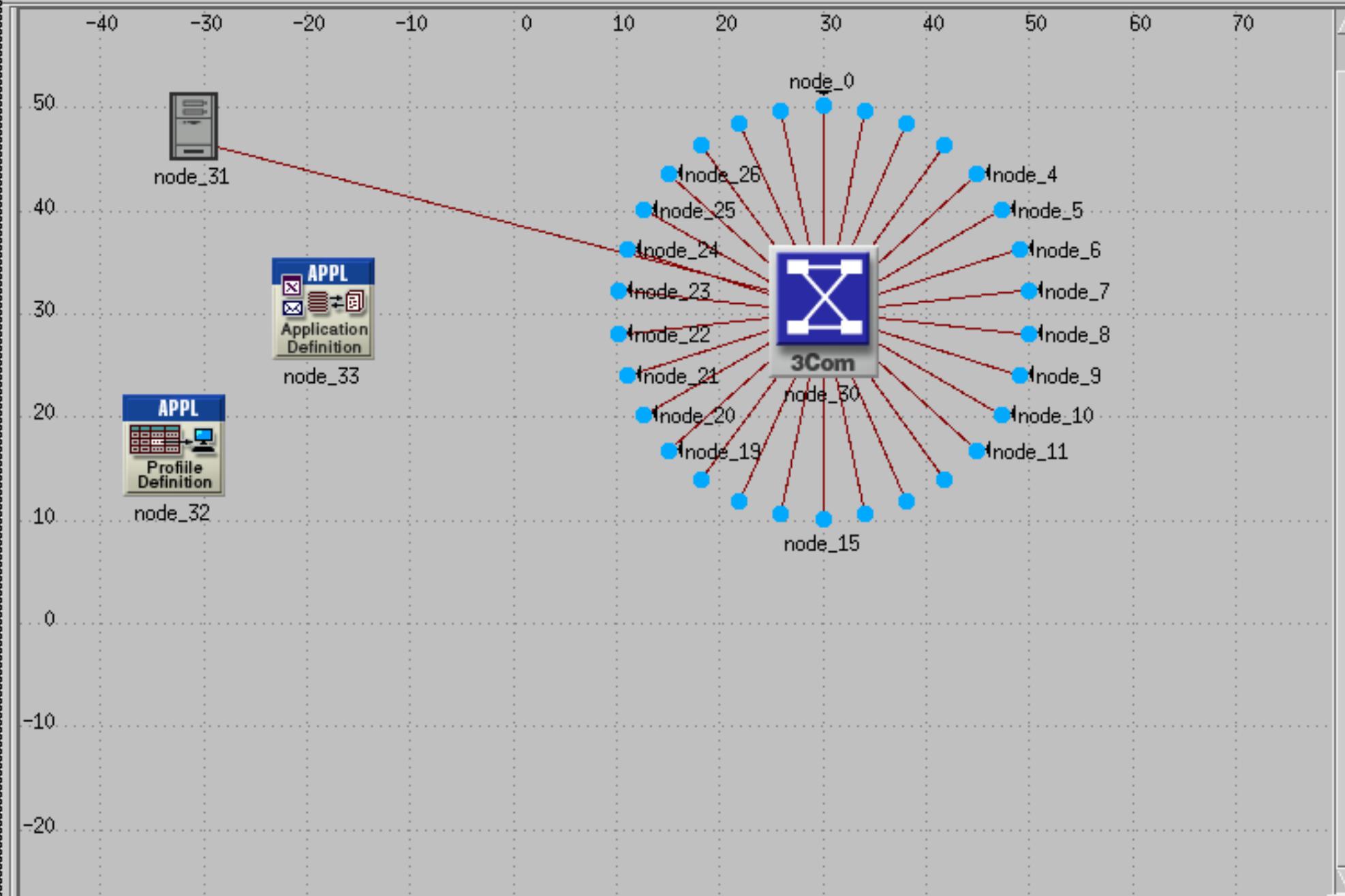


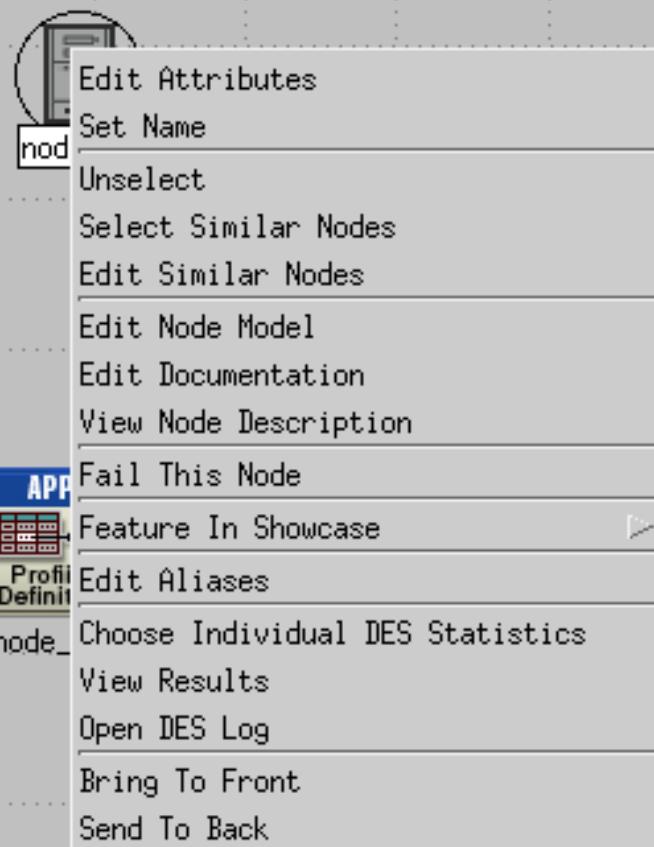
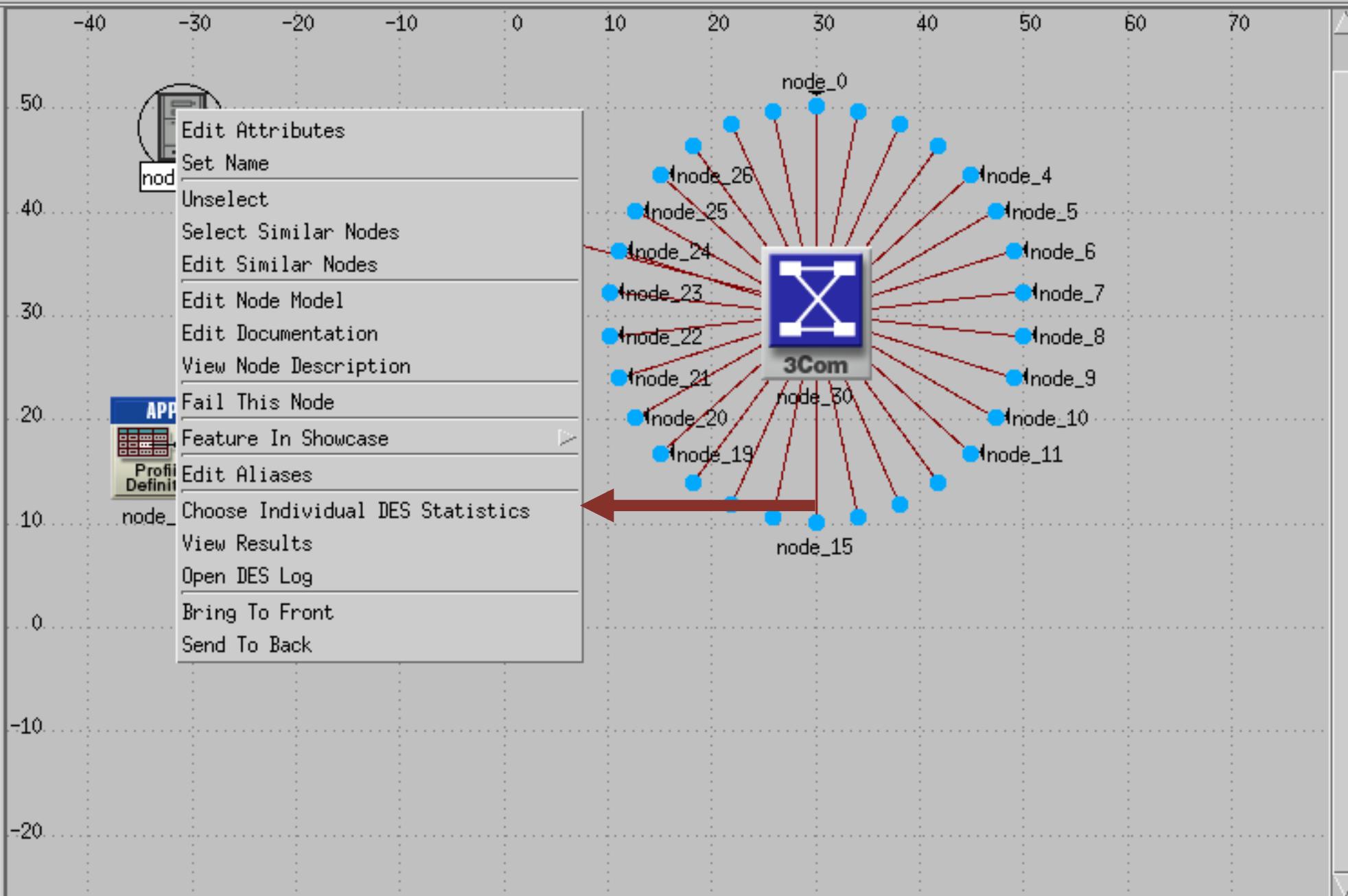


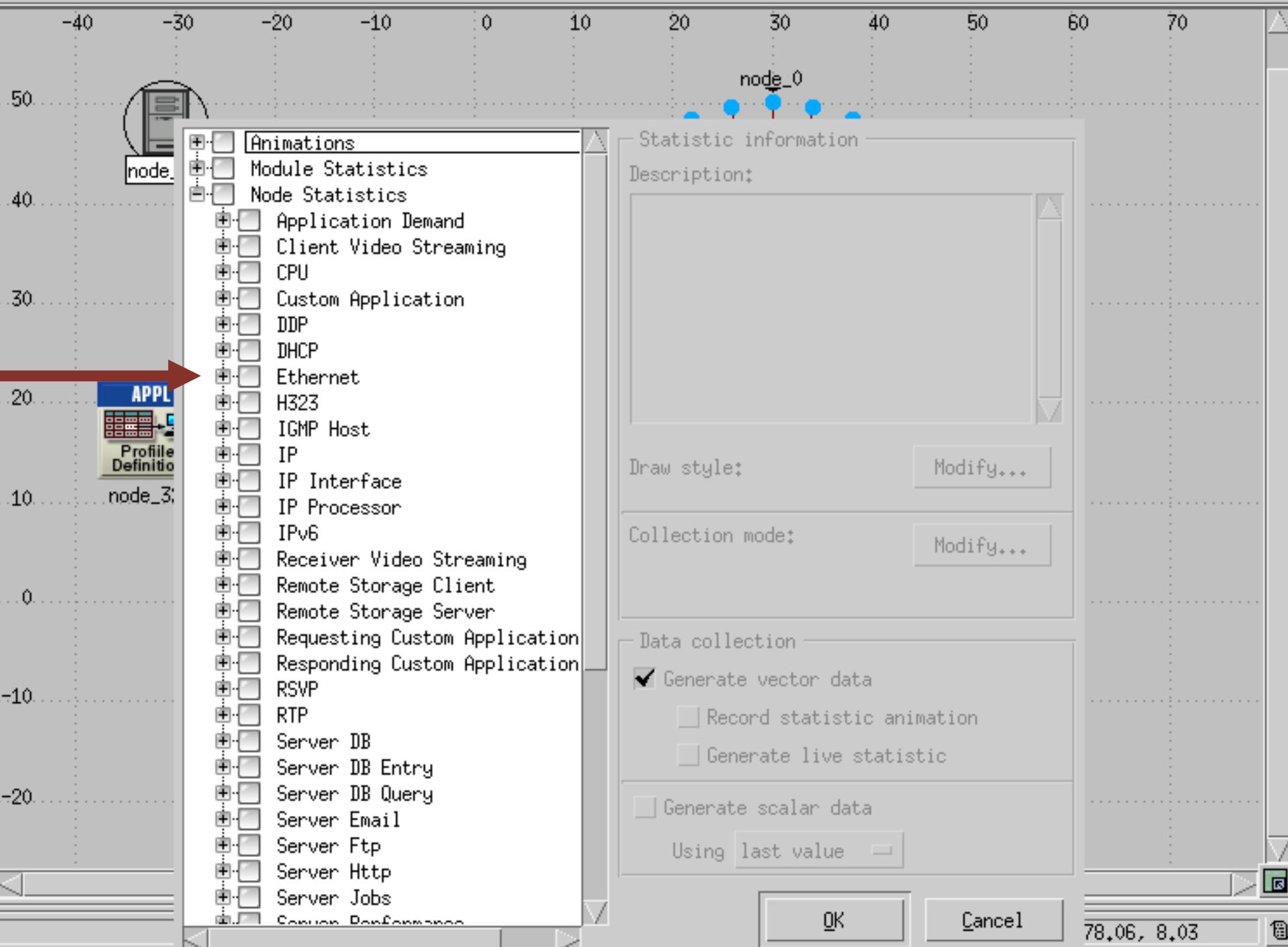


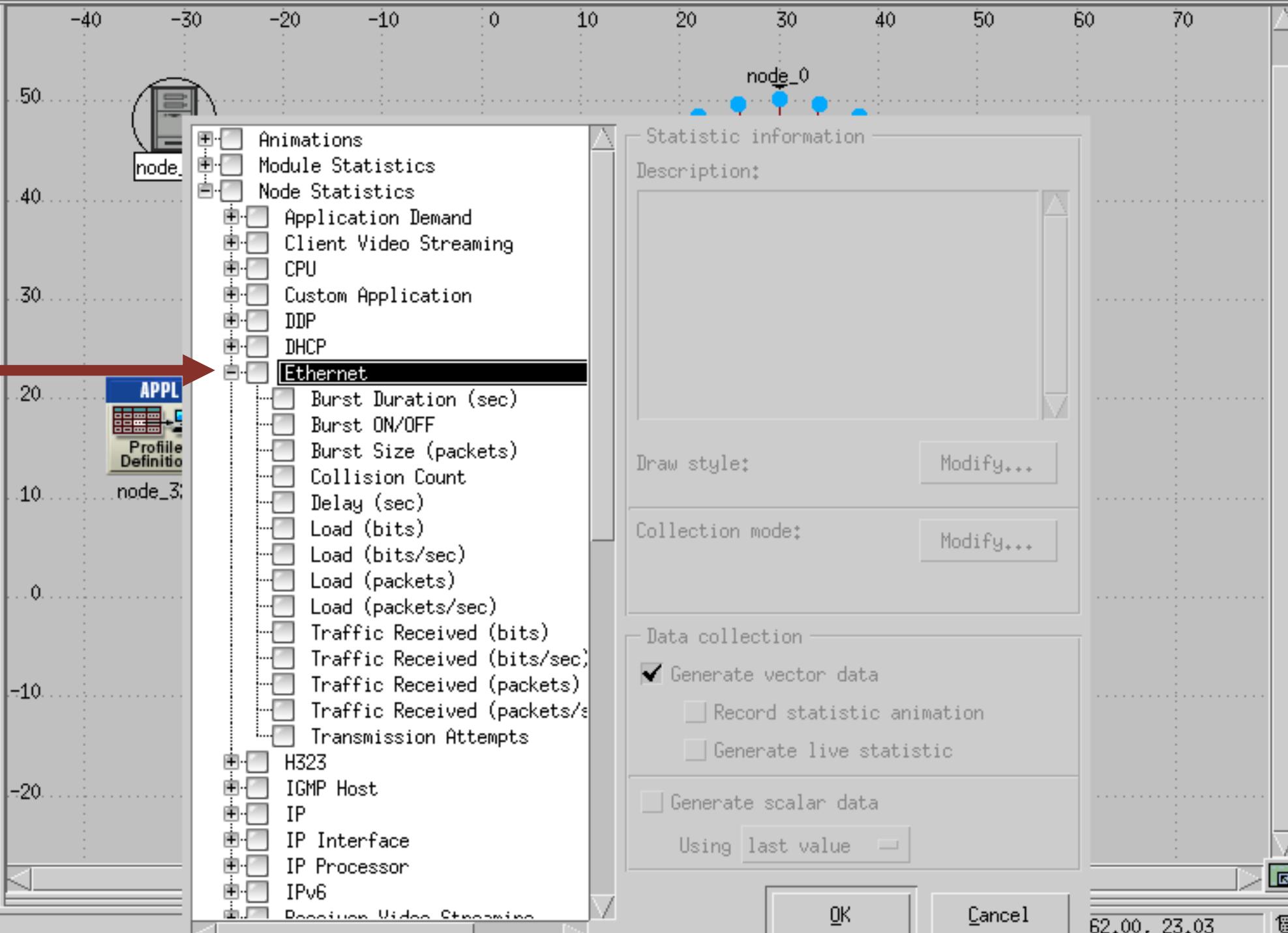
We are now ready to collect Statistics

- ❖ Statistics are very important in determining how stable and functional a network is.
- ❖ We can use OPNET to collect many statistics such as delay, bit rate (load), traffic, and many more.
- ❖ One essential statistic is the server load.
- ❖ The server load reflects the performance of the whole network.











node_0

node

APPL

Profile Definition

node_3

Delay (sec)

Load (bits/sec)

Load (packets)

Load (packets/sec)

Traffic Received (bits)

Traffic Received (packet)

Traffic Received (packet/sec)

Transmission Attempts

H323

IGMP Host

IP

IP Interface

IP Processor

IPv6

Dynamic Video Streaming

Statistic information

Description:

Load (in packets) submitted to ethernet layer by all other higher layers in this node.

Draw style: linear

Modify...

Collection mode: Bucket

Total of <default> values

sum

Modify...

Data collection

Generate vector data

Record statistic animation

Generate live statistic

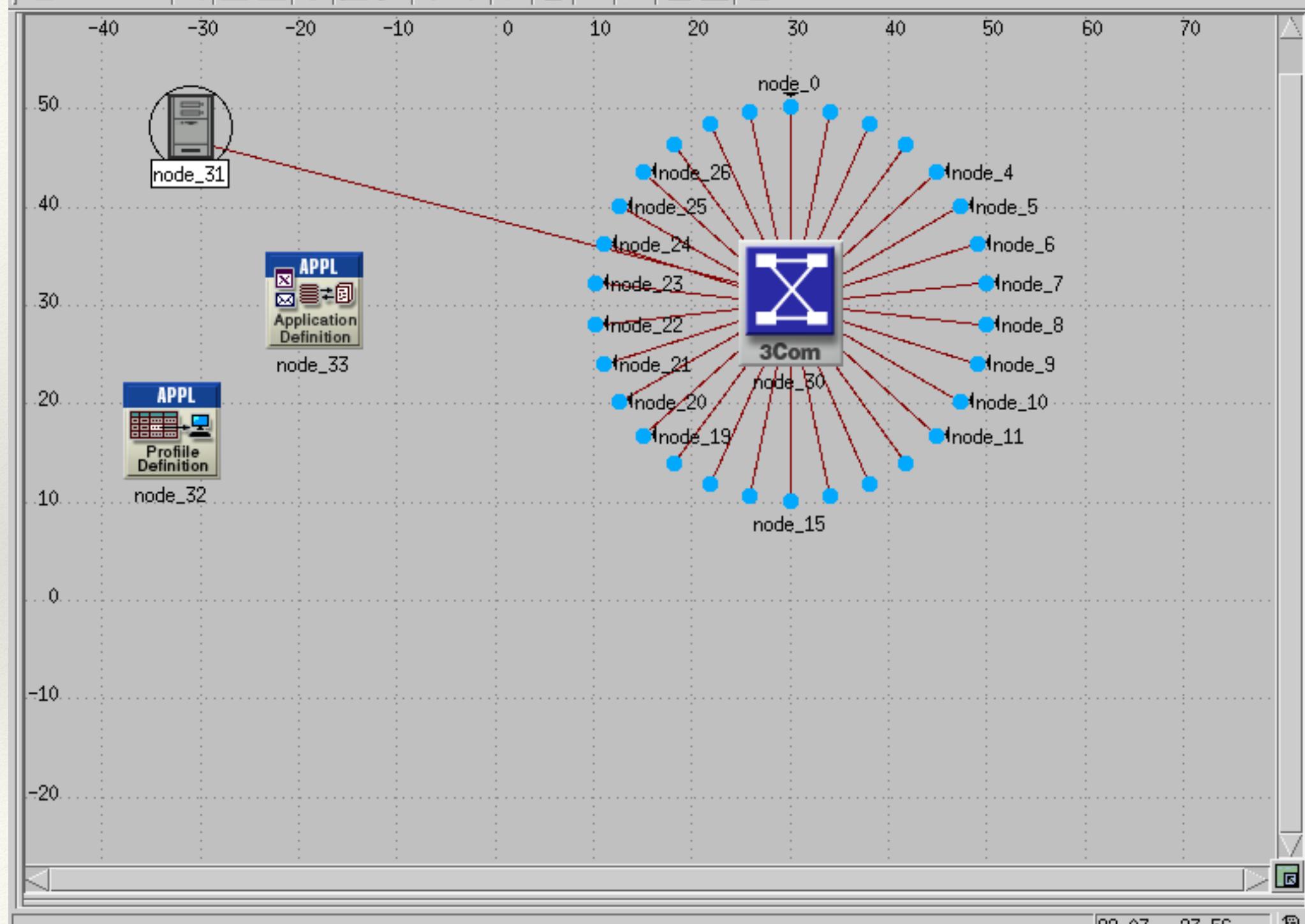
Generate scalar data

Using last value

OK Cancel

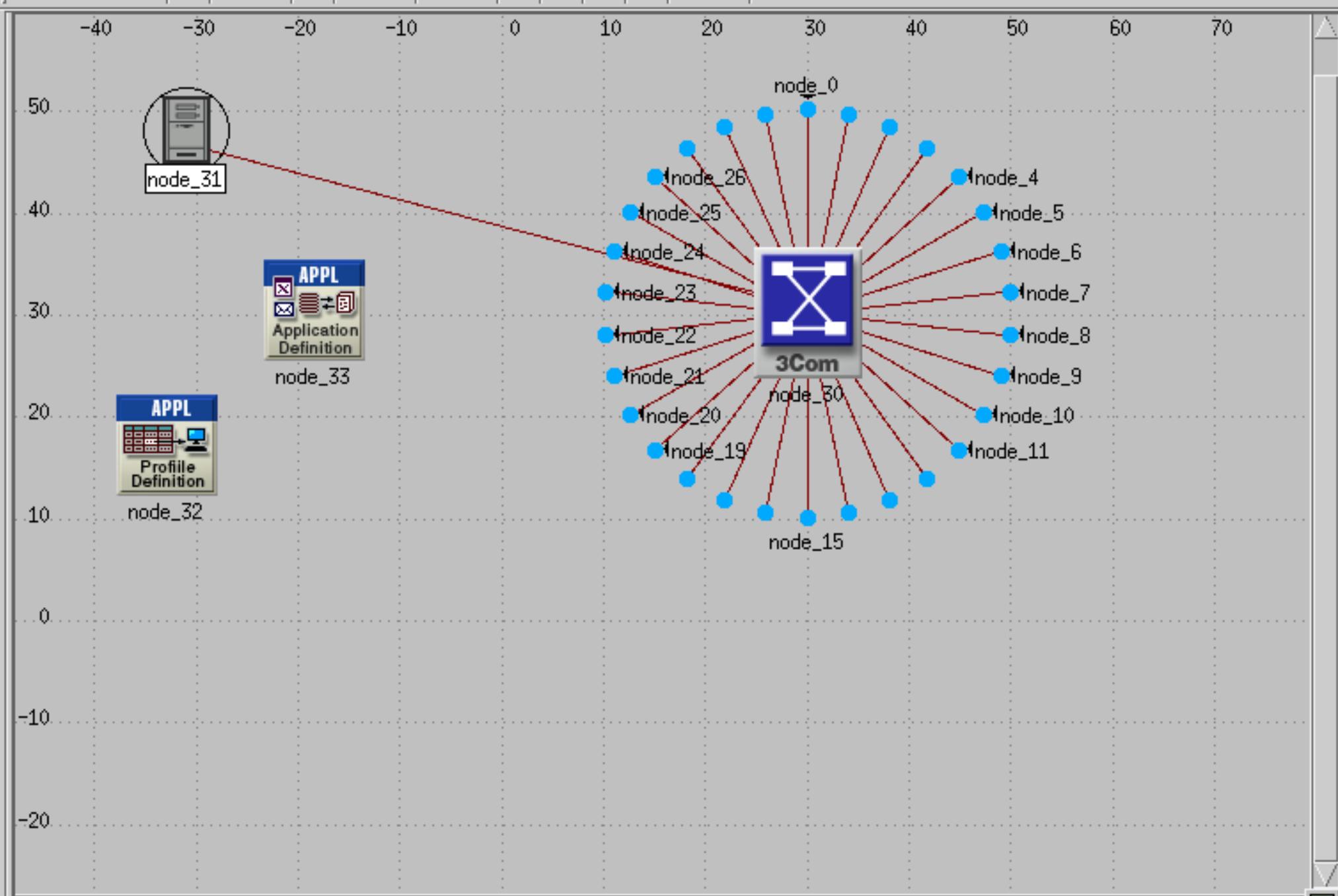
61.83, -2.62

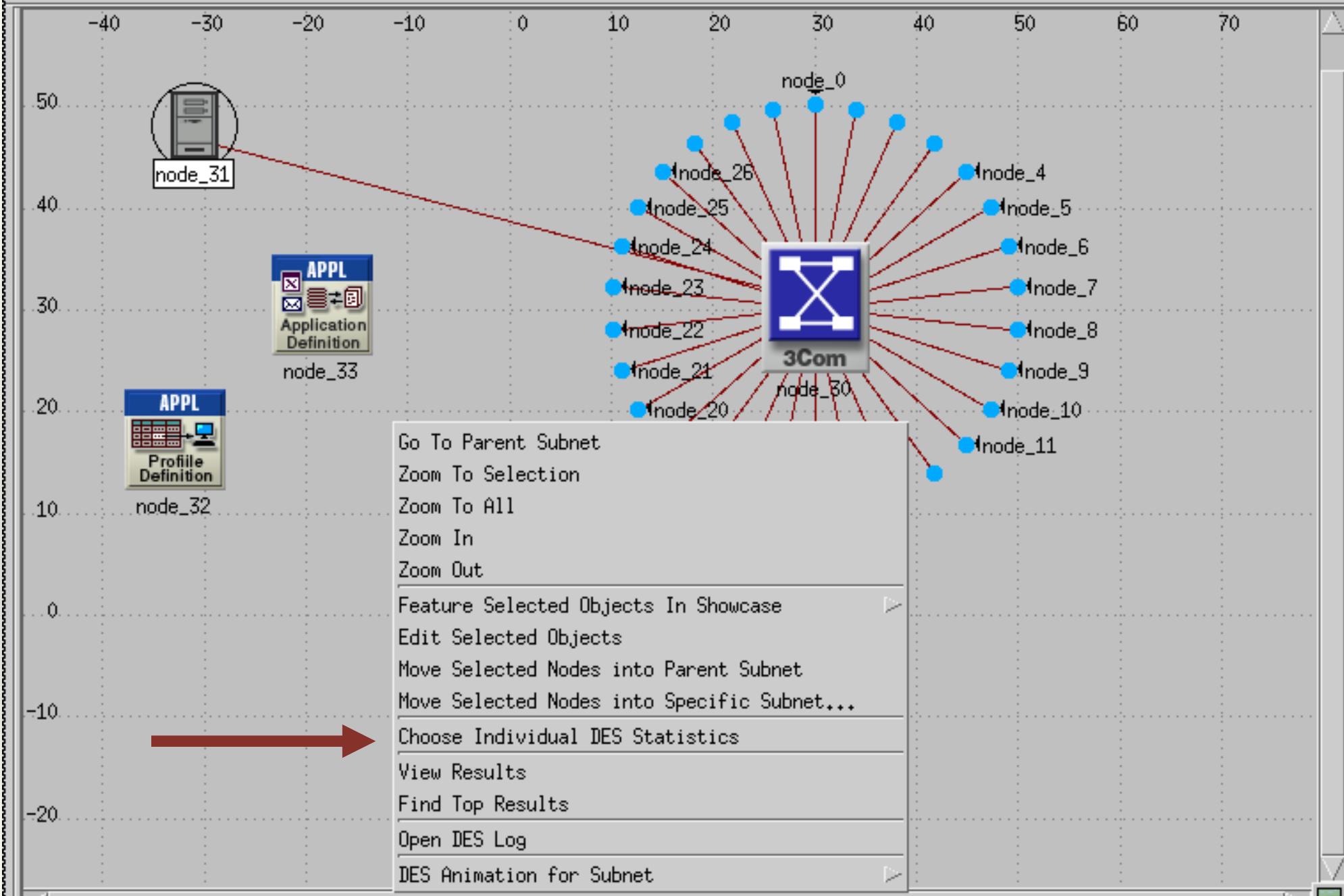
A screenshot of a network simulation software interface. The top menu bar includes File, Edit, View, Scenarios, Topology, Traffic, Services, Protocols, DES, Windows, and Help. Below the menu is a toolbar with various icons for file operations and network analysis. The main workspace shows a 2D coordinate system with nodes labeled node_0, node, APPL, Profile Definition, and node_3. A red arrow points to the 'Delay (sec)' item in the 'Node Statistics' section of the left sidebar. A context menu is open over node_0, displaying sections like Animations, Module Statistics, Node Statistics, Ethernet, and others. The 'Ethernet' section is expanded, showing options like Burst Duration (sec), Burst ON/OFF, Burst Size (packets), Collision Count, Delay (sec), Load (bits), Load (bits/sec), Load (packets), Load (packets/sec), Traffic Received (bits), Traffic Received (packet), Traffic Received (packet/sec), and Transmission Attempts. The 'Delay (sec)' option is selected. The right side of the screen displays a 'Statistic information' dialog box with fields for Description, Draw style (set to linear), Collection mode (Bucket), Data collection (with checkboxes for vector, scalar, and live statistics), and a Using dropdown set to 'last value'. At the bottom right is a status bar showing coordinates (61.83, -2.62).

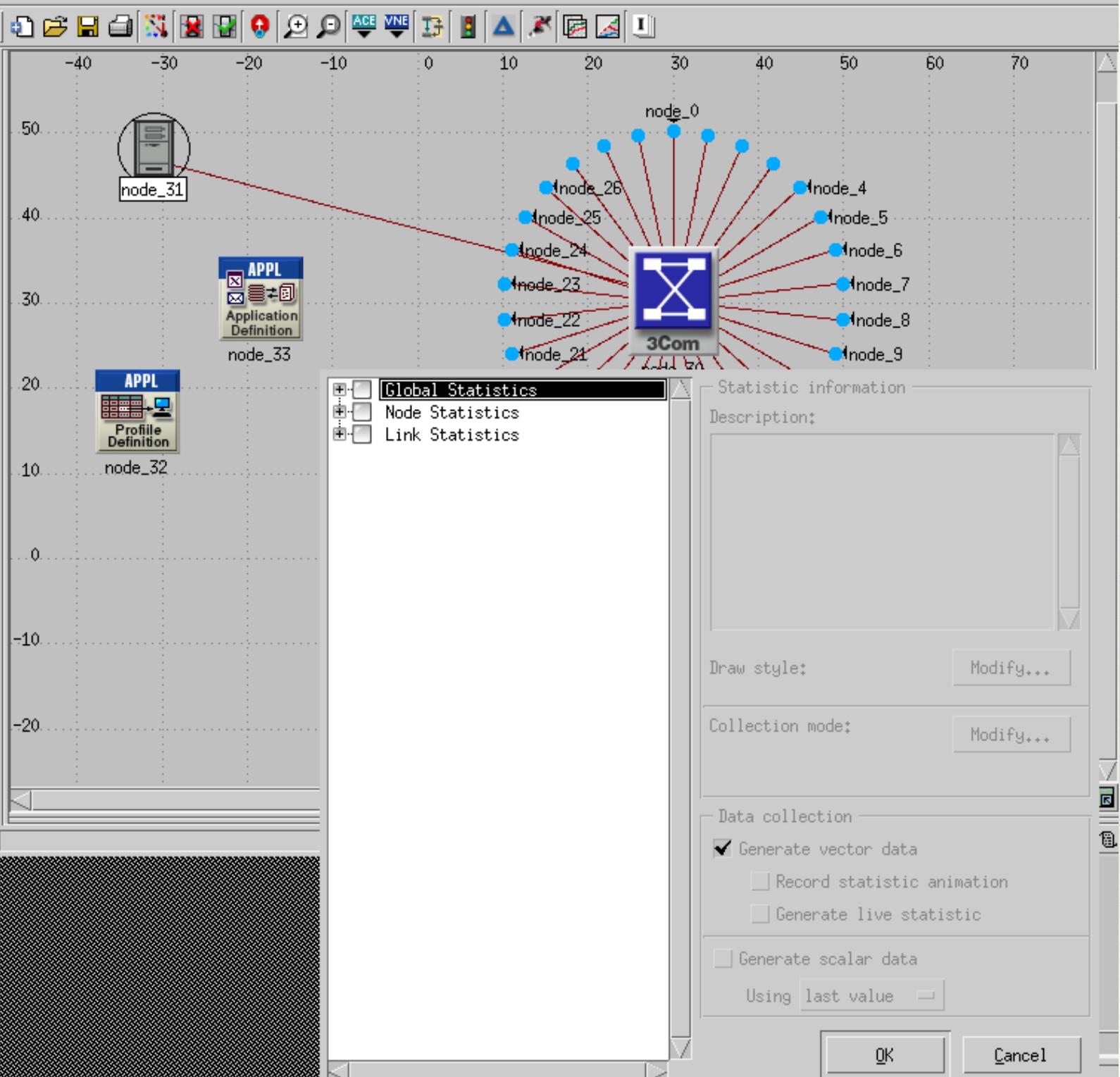


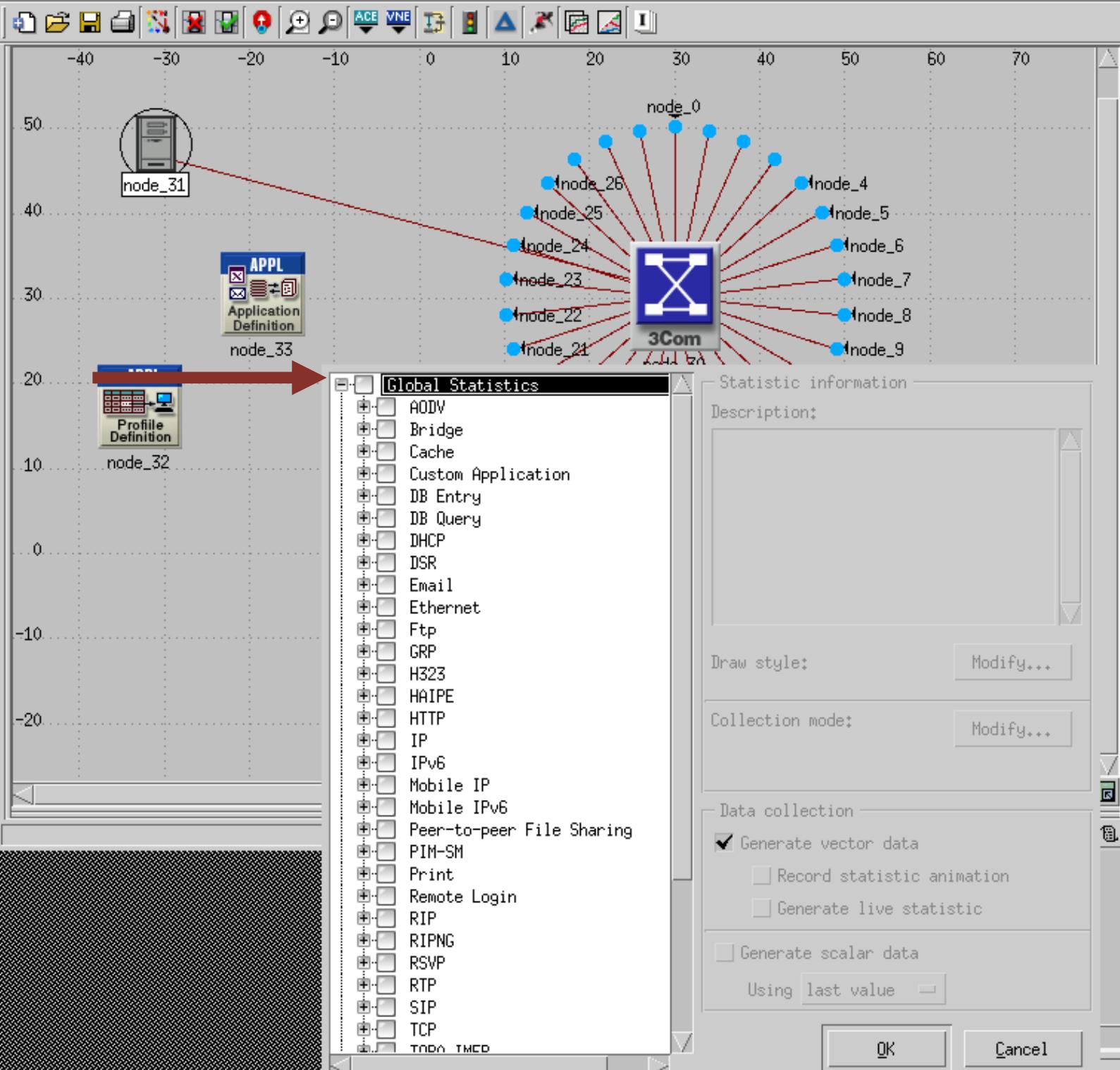
Object Statistics and Global Statistics

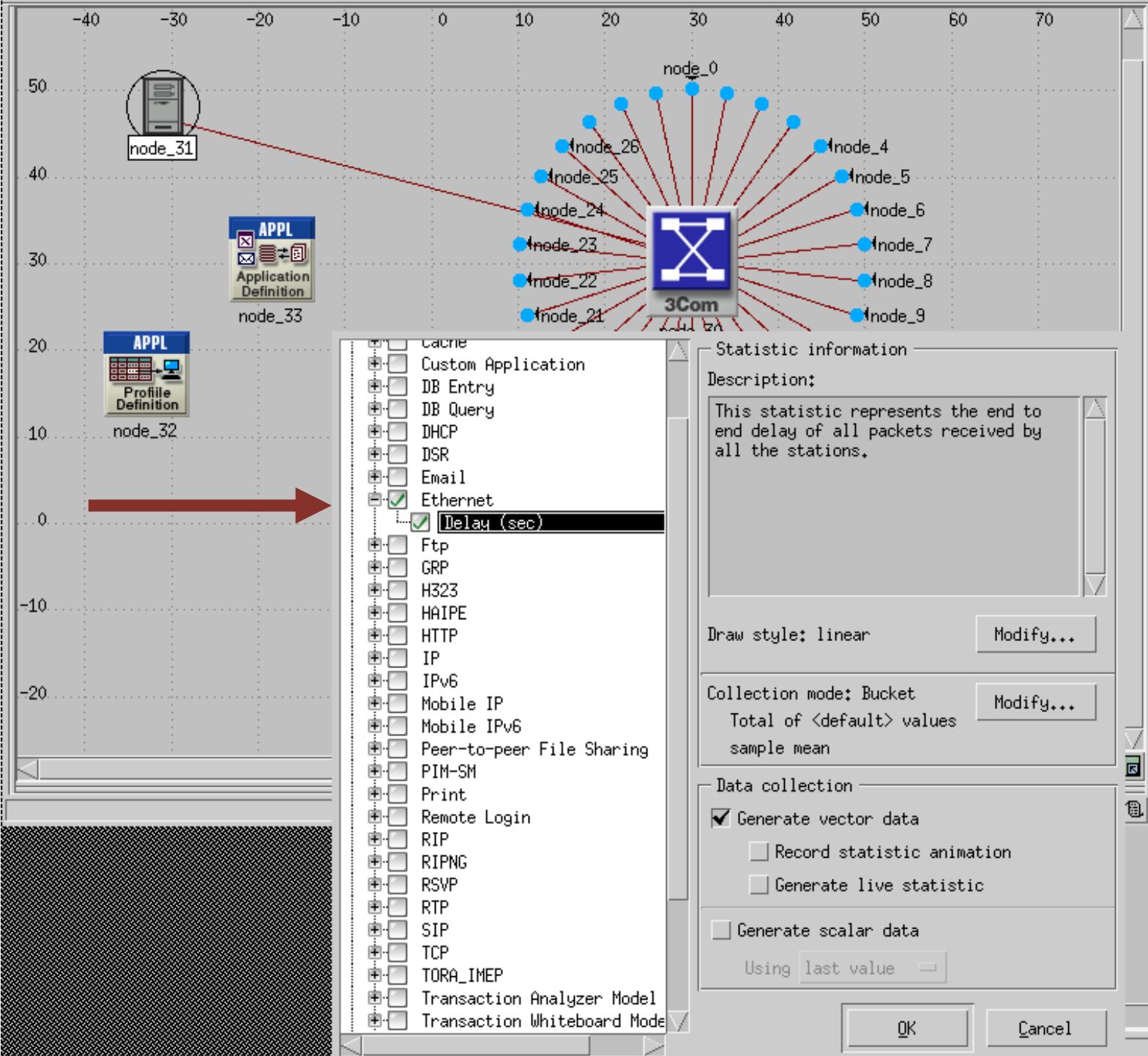
- ❖ The statistic that we just collected was an object statistic.
- ❖ Object statistics are statistics collected from a single or even multiple network objects (nodes).
- ❖ Global statistics are statistics collected from the entire network.

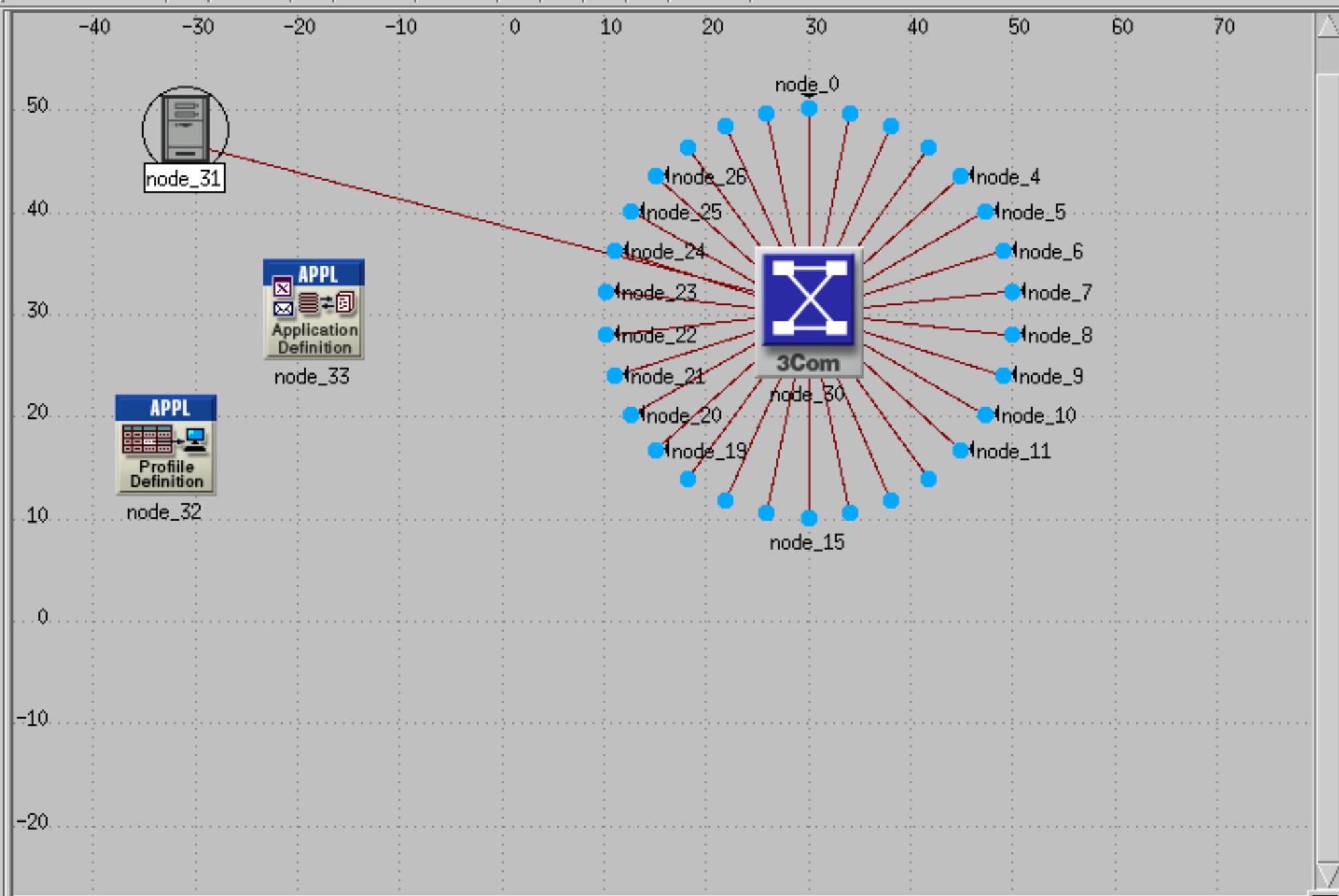






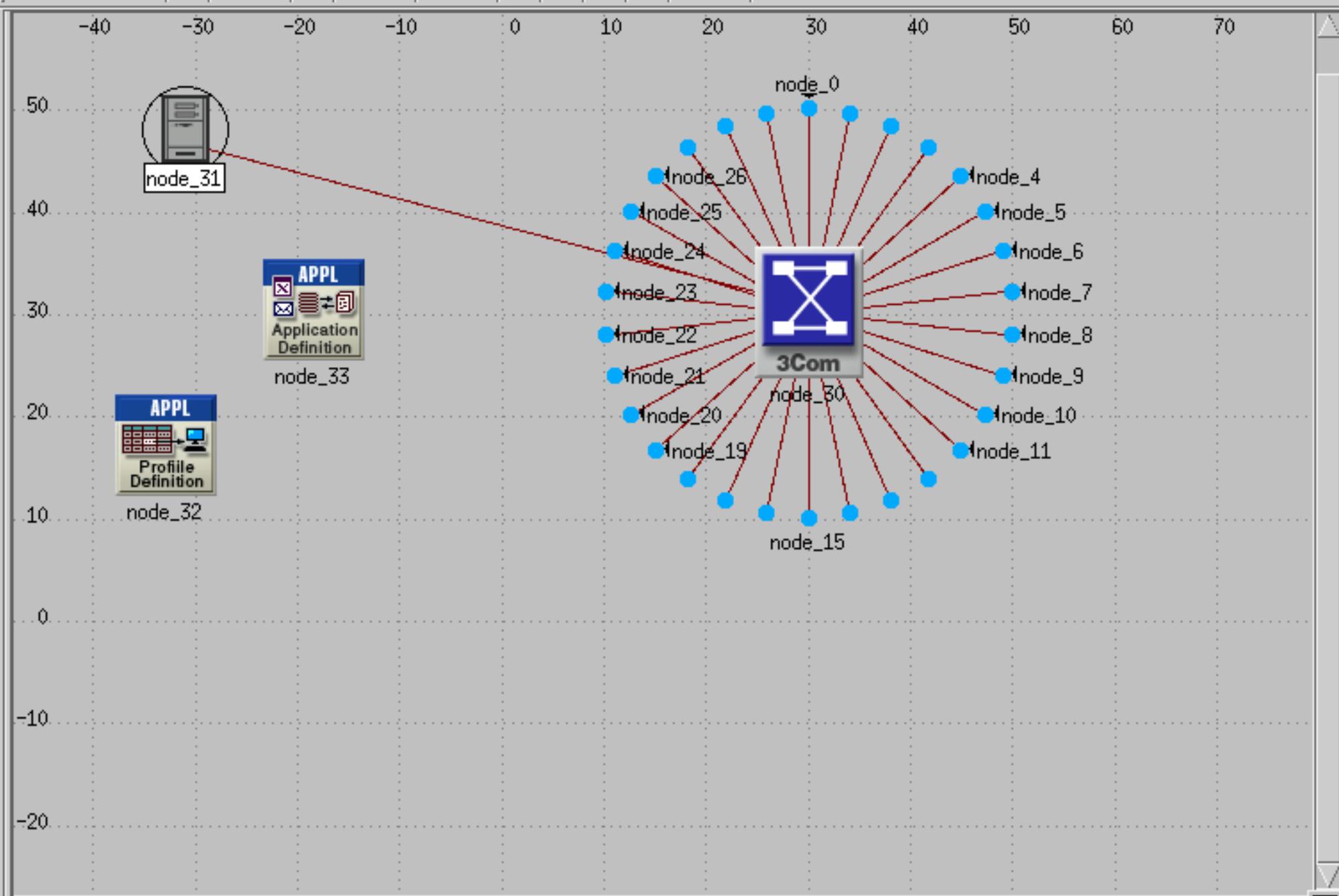






Make sure to fix the Network Repositories

- ❖ Set the Network Repositories to stdmod.



Undo Move

Ctrl+Z

Redo

Ctrl+Y

Cut

Ctrl+X

Copy

Ctrl+C

Paste

Ctrl+V

Paste Special...

Delete

Del

Select All In Subnet

Ctrl+A

Select Attached In Subnet

Ctrl+Shift+A

Clear Model

Find Node/Link...

Ctrl+F

Select Objects...

Ctrl+Shift+F

Save Object Selection Set...

Load Object Selection Set...

Edit Objects Using Template...

Edit Attribute Template...

Open Edit Pad

Find in Models...

Preferences

Ctrl+Alt+P



10 20 30 40 50 60 70

node_0

node_26

node_25

node_24

node_23

node_22

node_21

node_20

node_19



3Com

node_30

node_15

node_4

node_5

node_6

node_7

node_8

node_9

node_10

node_11





Search for:

Anywhere

Find

Arrange by Groups

 Highlight changed preferences Advanced view

- All
 - + 3DNV
 - + AppNetwork
 - + Automation
 - + Dashboard
 - + Design Act:
 - + Discrete Ev
 - + Export
 - + Flow Analys
 - + Import
 - + Licensing
 - + Miscellaneous
 - + Model Comp
 - + NetDoctor
 - + NetMapper
 - + Network Vis
 - + Node Upgrad
 - + Product Per
 - + Project Ed
 - + Provisioner
 - + Reachabilit
 - + Reporting

Name	Value
3DNV	
Delay for Entity Creation	1
Destroy Decorations at End	TRUE
Earth Geocentric Model	right_sphere
Entity Mapping Library	opnet_3dnv_default_mapping
HLA Fed File Name	<null>
HLA Federation Name	OPNET_3DNV
HLA Standard	DOD 1.3
Mapping Library Initialization Argument	<null>
Maximum 3DNV Messages per Second	0
RPR FOM Version	1

Preference Information

Name: Delay for Entity Creation

Value: 1

Description: Number of seconds to wait between the creation of RTI objects and the generation of the objects' initial position.

Tag: 3dnv.initialization_delay

OK

Cancel

Apply

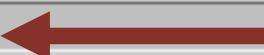
Help



Search for: network sim

Anywhere

Find



Arrange by Groups

 Highlight changed preferences Advanced view

- All
 - + 3DNV
 - + AppNetwork
 - + Automation
 - + Dashboard
 - + Design Act:
 - + Discrete Ev
 - + Export
 - + Flow Analys
 - + Import
 - + Licensing
 - + Miscellaneous
 - + Model Comp
 - + NetDoctor
 - + NetMapper
 - + Network Vis
 - + Node Upgrad
 - + Product Per
 - + Project Ed:
 - + Provisioner
 - + Reachabilit
 - + Reporting

Name	Value
3DNV	
Delay for Entity Creation	1
Destroy Decorations at End	TRUE
Earth Geocentric Model	right_sphere
Entity Mapping Library	opnet_3dnv_default_mapping
HLA Fed File Name	<null>
HLA Federation Name	OPNET_3DNV
HLA Standard	DOD 1.3
Mapping Library Initialization Argument	<null>
Maximum 3DNV Messages per Second	0
RPR FOM Version	1

Preference Information

Name: Delay for Entity Creation

Value: 1

Description: Number of seconds to wait between the creation of RTI objects and the generation of the objects' initial position.

Tag: 3dnv.initialization_delay

OK

Cancel

Apply

Help



Search for: network sim

Anywhere

Find

Arrange by Groups

 Highlight changed preferences Advanced view

All

Discrete Event

Name	Value
Discrete Event Simulation	
Network Simulation Repositories	()



Preference Information

Name: Network Simulation Repositories

Value: ()

Description: Set of code repositories to load for simulation.

Tag: repositories

Type: String list

OK

Cancel

Apply

Help



Search for: network sim

Anywhere

Find

Editing preference <Network Simulation Repositories>:

Insert

Delete

Move Up

Move Down

nged preferences Advanced view

OK

Cancel

OK

Cancel

Apply

Help



Search for: network sim

Anywhere

Find

Editing preference <Network Simulation Repositories>:

Insert

Delete

Move Up

Move Down

nged preferences

Advanced view

OK

Cancel

ulation.

0 stdmod

OK

Cancel

Apply

Help



Search for: network sim

Anywhere

Find

50.

Arrange by Groups

 Highlight changed preferences Advanced view

- All
- Discrete Event Simulation

Name	Value
Discrete Event Simulation	
Network Simulation Repositories	(stdmod)

40.

30.

20.

10.

0.

-10.

-20.

Preference Information

Name: Network Simulation Repositories

Value: (stdmod)

Description: Set of code repositories to load for simulation.

Tag: repositories

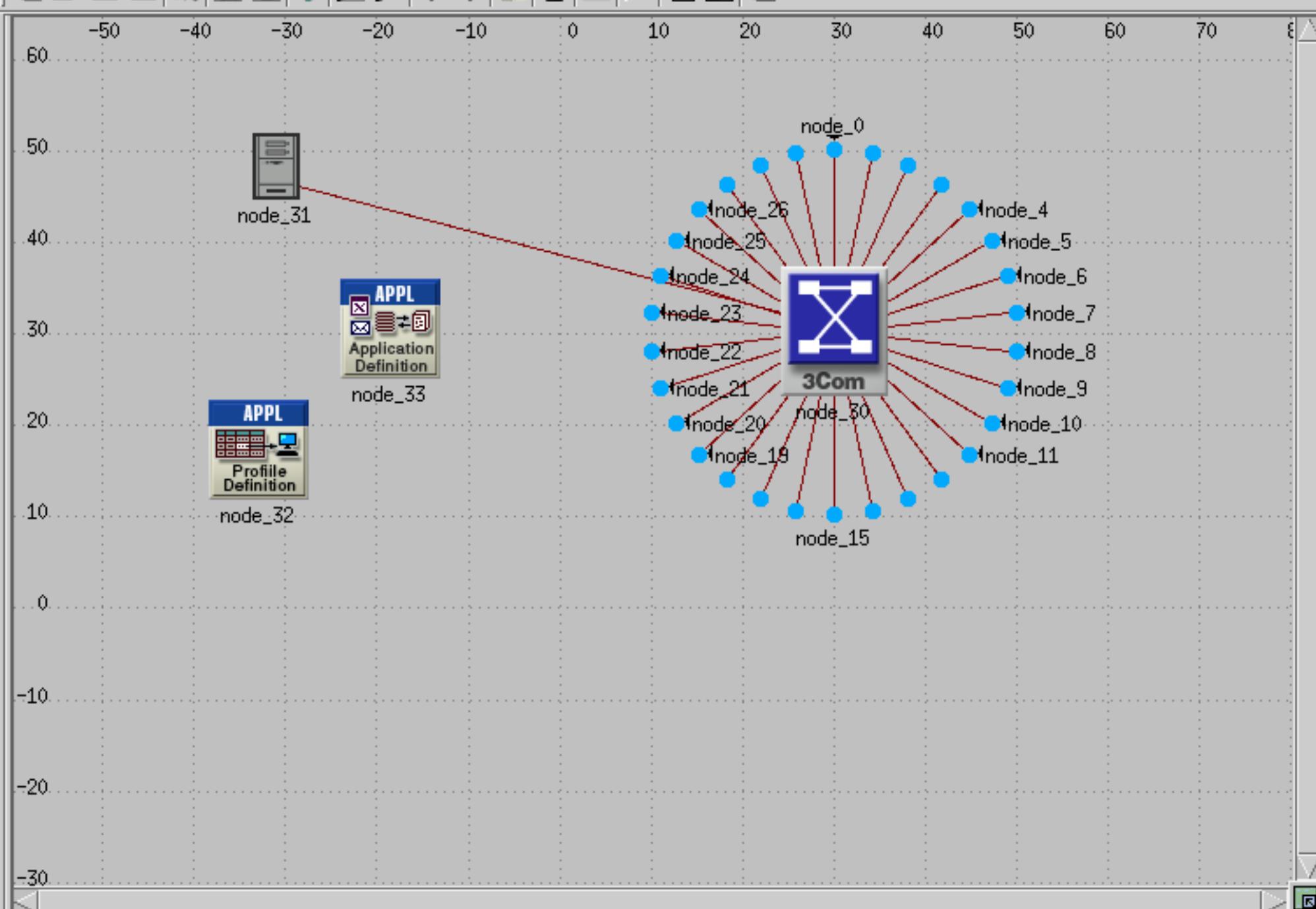
Type: String list

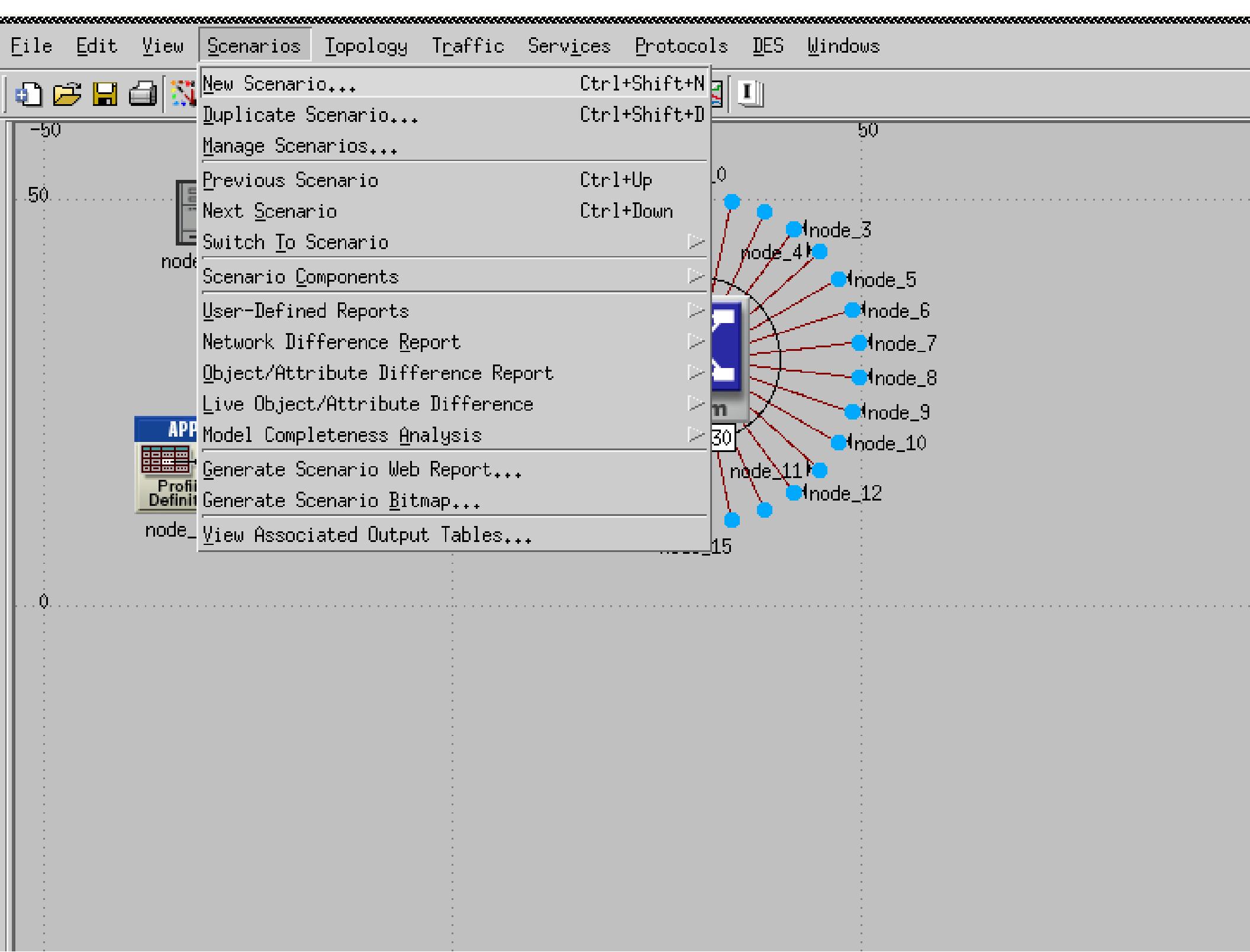
OK

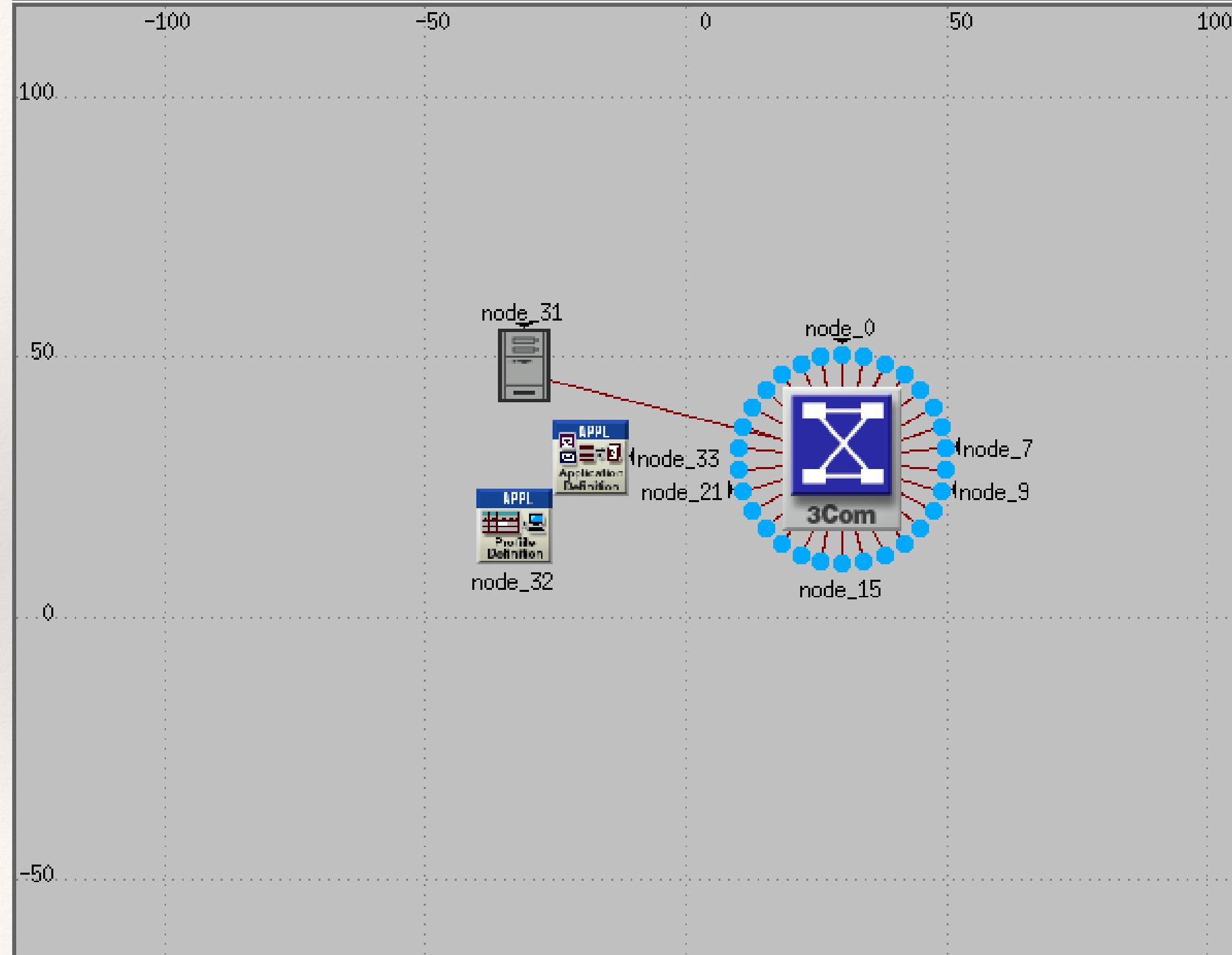
Cancel

Apply

Help





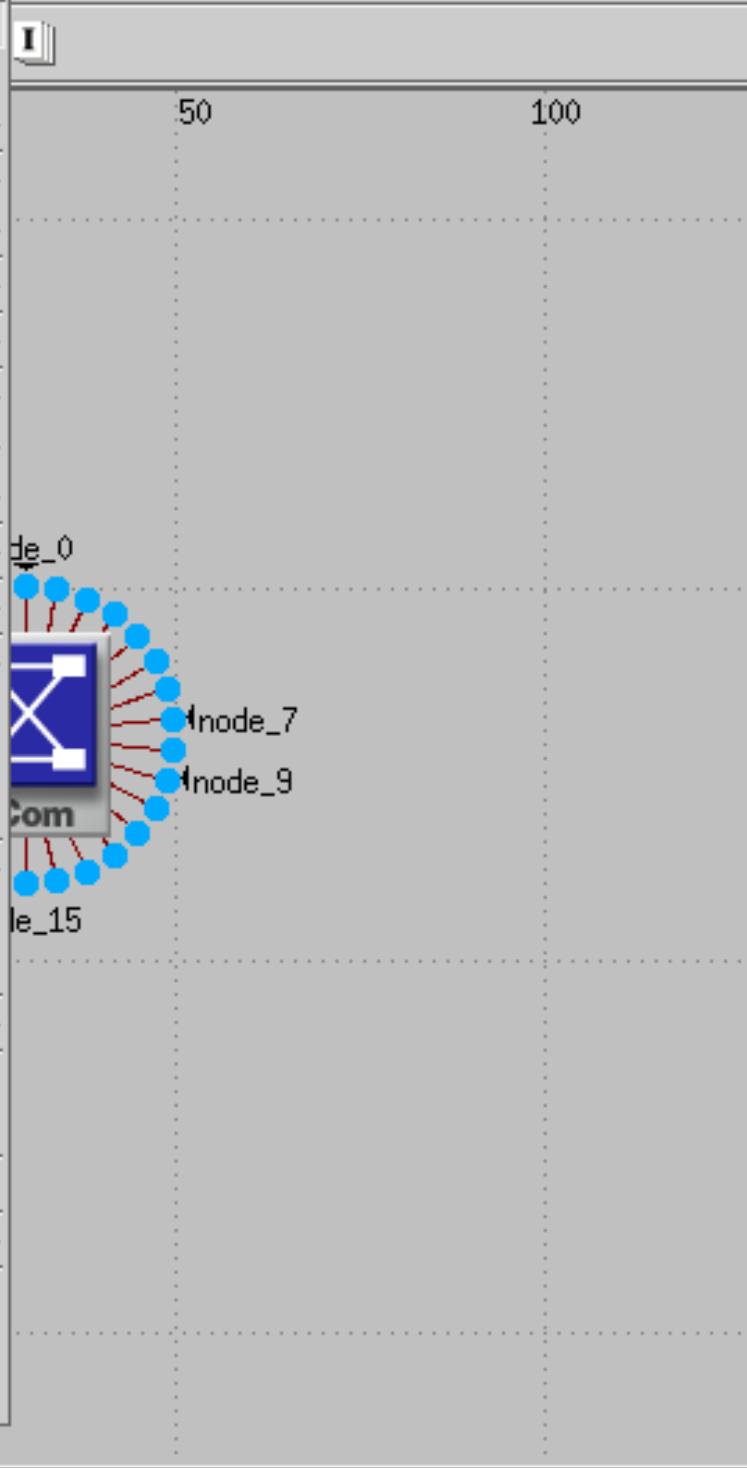


File Edit View Scenarios

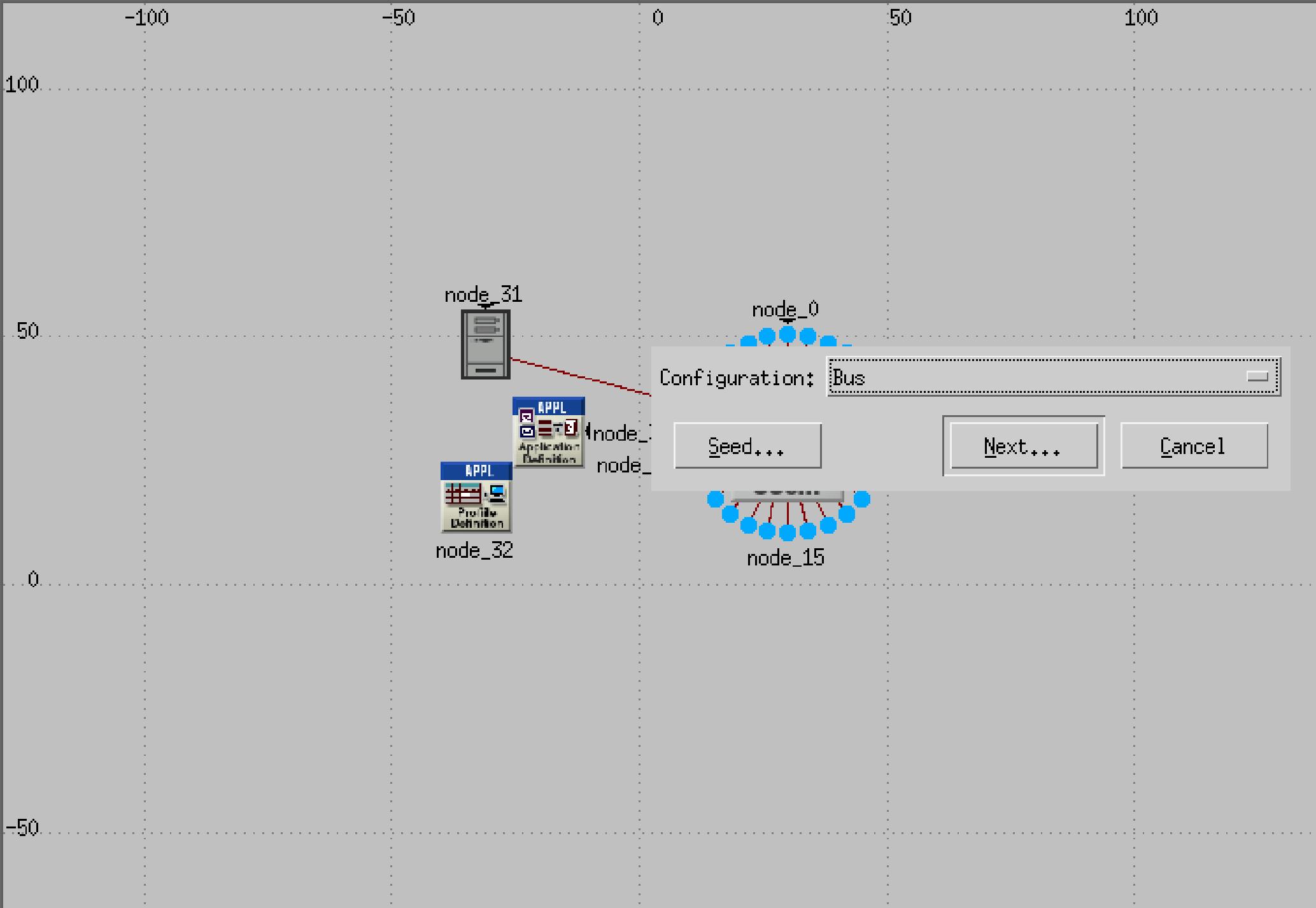
Topology Traffic Services Protocols DES Windows



- Open Object Palette
- Open Annotation Palette
- Subnets
- Import Topology
- Export Topology
- Inventory Report
- AppNetwork Path Analysis
- Import Performance Metrics
- Configure Link Delays
- Generate IP Cloud Metrics File
- Role Assignment
- Model Assistant
- Device Creator
- Rapid Configuration...
- Delete Unconnected Nodes...
- Deploy Wireless Network...
- Terrain
- Define Trajectory...
- Clear Trajectory Assignment...
- Random Mobility
- Import STK Orbit...
- Import STK Ephemeris File...
- Verify Links... Ctrl+L
- Shared Risk Groups
- Fail Selected Objects
- Recover Selected Objects
- Recover All Objects



File Edit View Scenarios Topology Traffic Services Protocols DES Windows





-100 -50 0 50 100

100

50

node_31



node_0



Configuration:

Bus

Mesh, Full

Mesh, Randomized

Ring

Star

Tree

Unconnected Net

Seed...



0

-50

APPL

Application
Definition



node_1

node_2

Profile
Definition



node_32

node_15





-100

-50

0

50

100

100

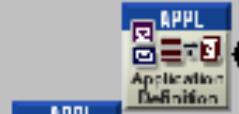
50

0

-50



node_31



APPL
Profile Definition

node_31

node_32

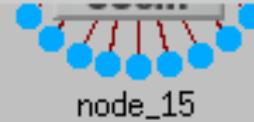
node_0

Configuration: Star

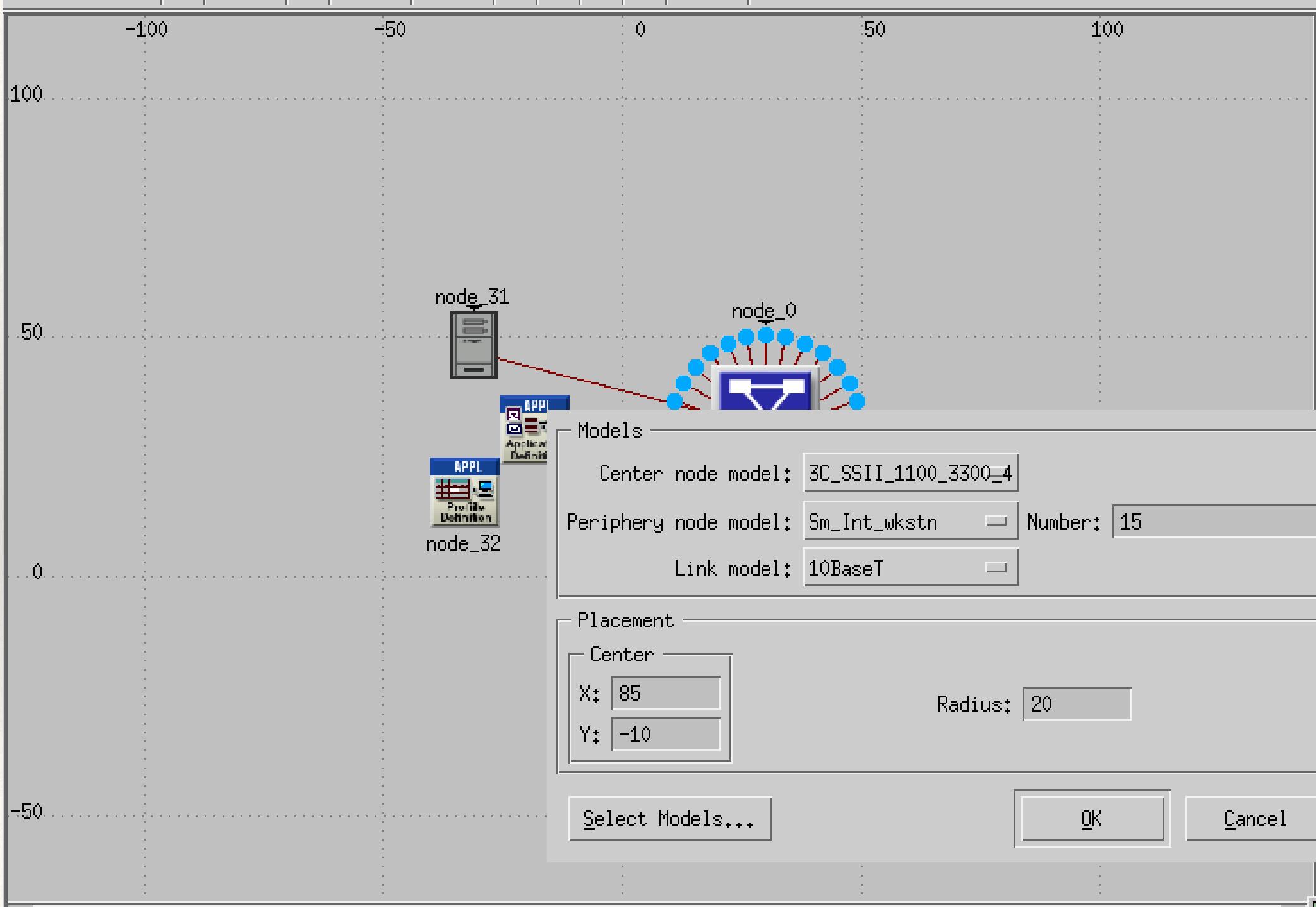
Seed...

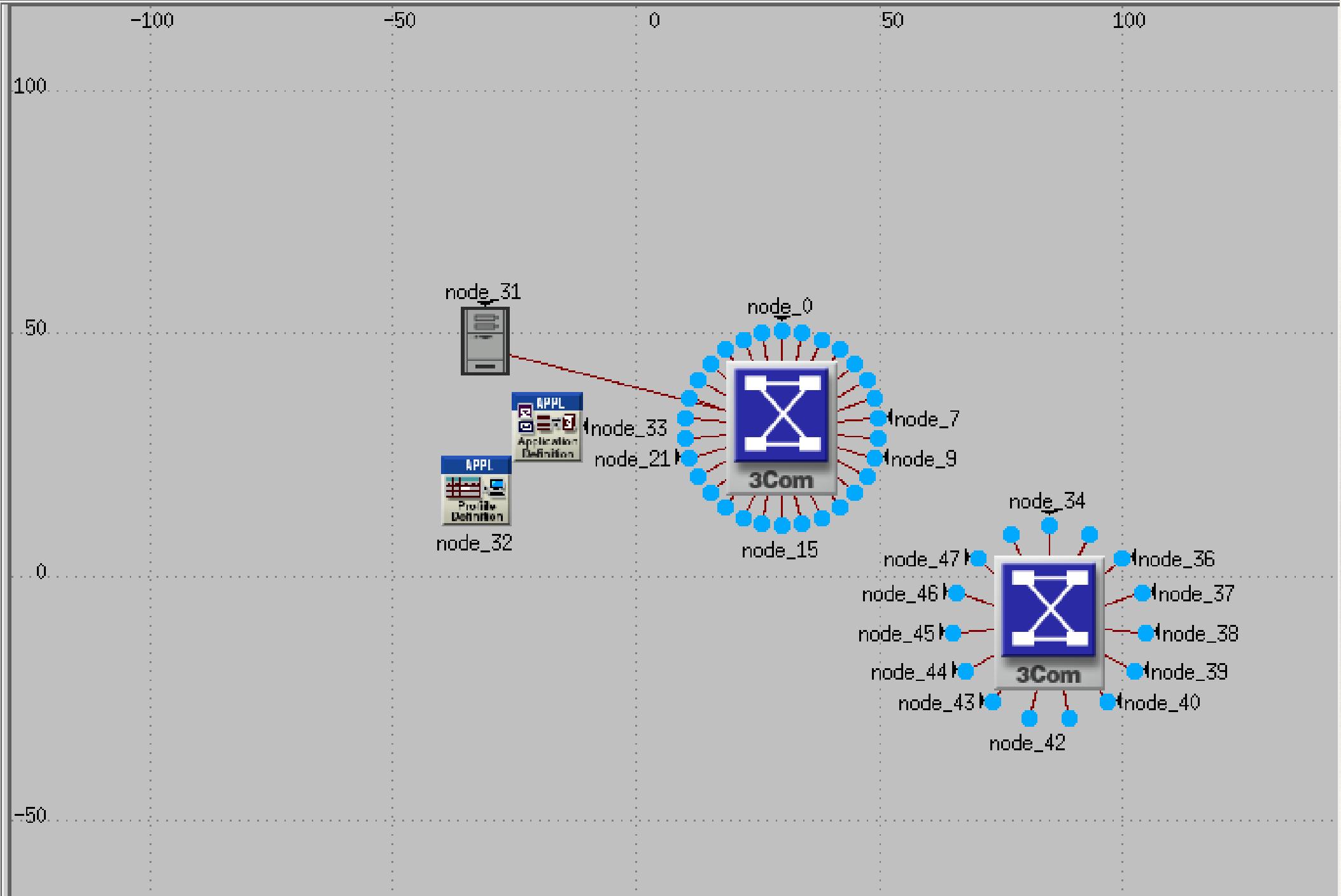
Next...

Cancel



node_15







-100



-50

0

50

100

Search by name:

Find Next

Drag model or subnet icon into workspace

Sm_Int_Model_List Default

Node Models

- 3C_SSII_1100_3300_4s_ae52_e48_ge3 Fixed Node
- + Cisco 2514
- + Sm_Application_Config Fixed Node
- + Sm_Int_server Fixed Node
- + Sm_Int_wkstn Fixed Node
- + Sm_Profile_Config Fixed Node

Link Models

- 10BaseT Duplex Link Ethernet 10BaseT

SMART_MAC

starburst_palette

tdma

tdma_adv

token_ring

Transaction_Models

UMTS

UMTS_advanced

utilities

VLANs

Voice_Signaling

wimax



Logical Subnet



Satellite Subnet



Mobile Subnet



Subnet

Create right-angled link

Model Details

Create Custom Model...

Close

Help

Search by name: Find Next

Drag model or subnet icon into workspace

Sm_Int_Model_List Default

- + Sm_Int_Model_List
 - + Node Models
 - + 3C_SSII_1100_3300_4s_ae52_e48_ge3 Fixed Node
 - + Cisco 2514
 - + CS_2514_1s_e2_s12 Fixed Node Cisco 2514 Router
 - + Sm_Application_Config Fixed Node
 - + Sm_Int_server Fixed Node
 - + Sm_Int_wkstn Fixed Node n
 - + Sm_Profile_Config Fixed Node
 - + Link Models
 - + 10BaseT Duplex Link Ethernet 10BaseT
 - + SMART_MAC
 - + starburst_palette
 - + tdma
 - + tdma_adv
 - + token_ring
 - + Transaction_Models
 - + UMTS
 - + UMTS_advanced
 - + utilities
 - + VLANs
 - + Voice_Signaling

Create right-angled link

Model Details Create Custom Model... Close Help

-100 -50 0 50 100

50 0 -50

CS_2514_1s_e2_s12

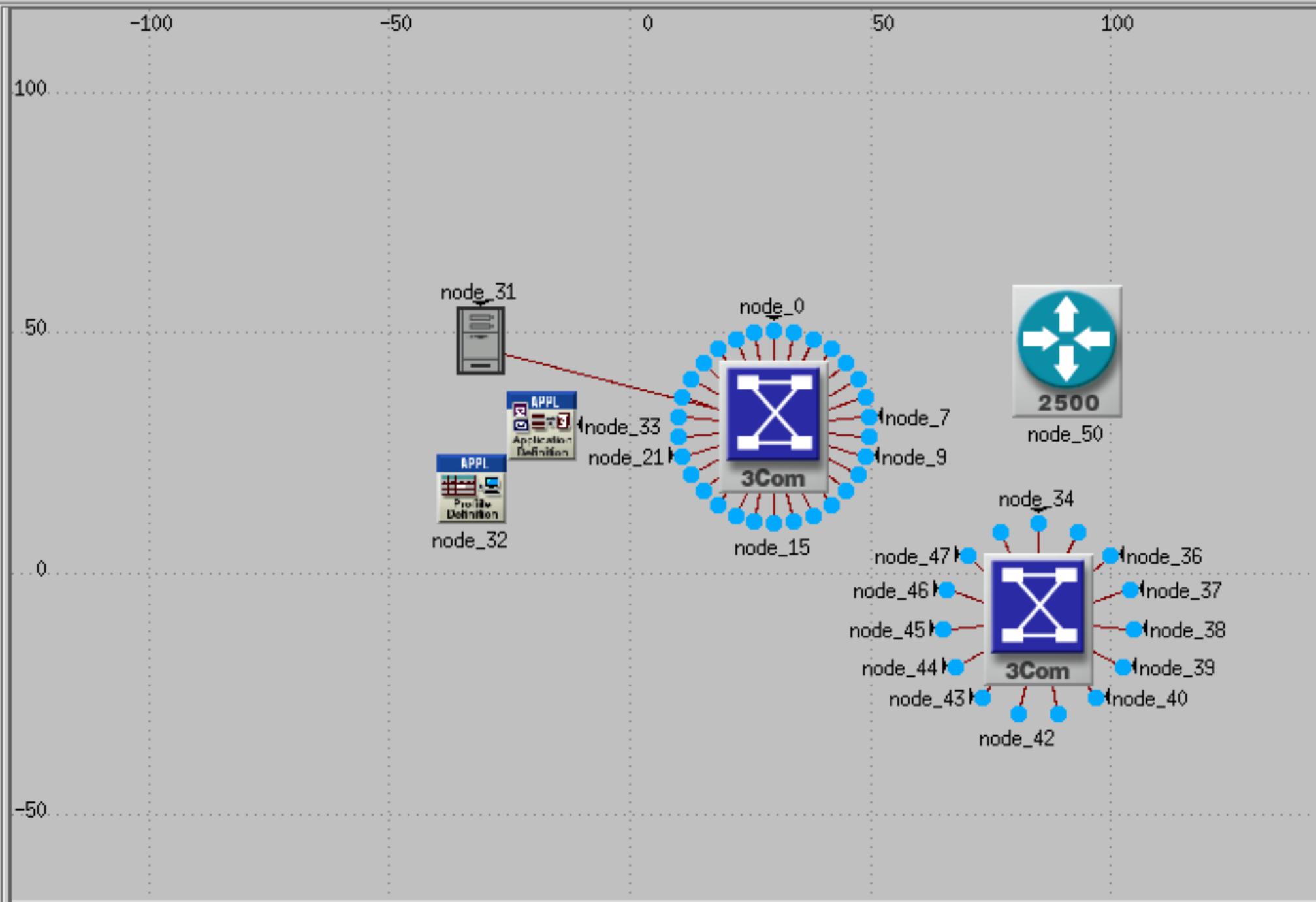
Logical Subnet

Satellite Subnet

Mobile Subnet

Subnet

The screenshot shows a software application for network modeling. At the top is a menu bar with File, Edit, View, Scenarios, Topology, Traffic, Services, Protocols, DES, Windows, and Help. Below the menu is a toolbar with various icons. The main area has a coordinate system (-100 to 100 on both axes). A search bar with placeholder 'Search by name:' and a 'Find Next' button is at the top right. Below it is a text input field with placeholder 'Drag model or subnet icon into workspace'. A large tree view on the left lists models and subnets. A red arrow points from the left towards the 'Node Models' section. The tree includes sections like Sm_Int_Model_List (Default), Node Models (containing 3C_SSII_1100_3300_4s_ae52_e48_ge3, Cisco 2514 with its submodel CS_2514_1s_e2_s12, and several configuration and server models), and Link Models (containing 10BaseT). The Cisco 2514 model is currently selected. The right side of the interface shows icons for different subnet types: Logical Subnet (red octagon with a circle), Satellite Subnet (red octagon with a cross), Mobile Subnet (red octagon with a plus sign), and Subnet (red octagon with a circle). At the bottom are buttons for Model Details, Create Custom Model..., Close, and Help.





-100 -50 0 50 100

100

Search by name:

Drag model or subnet icon into workspace

Sm_Int_Model_List		Default
Node Models		
3C_SSII_1100_3300_4s_ae52_e48_ge3	Fixed Node	
Cisco 2514		
Sm_Application_Config	Fixed Node	
Sm_Int_server	Fixed Node	
Sm_Int_wkstn	Fixed Node	
Sm_Profile_Config	Fixed Node	
Link Models		
10BaseT Duplex Link Ethernet	10BaseT	
SMART_MAC		
starburst_palette		
tdma		
tdma_adv		
token_ring		
Transaction_Models		
UMTS		
UMTS_advanced		
utilities		
VLANs		
Voice_Signaling		
wimax		

Create right-angled link



10BaseT



Logical Subnet



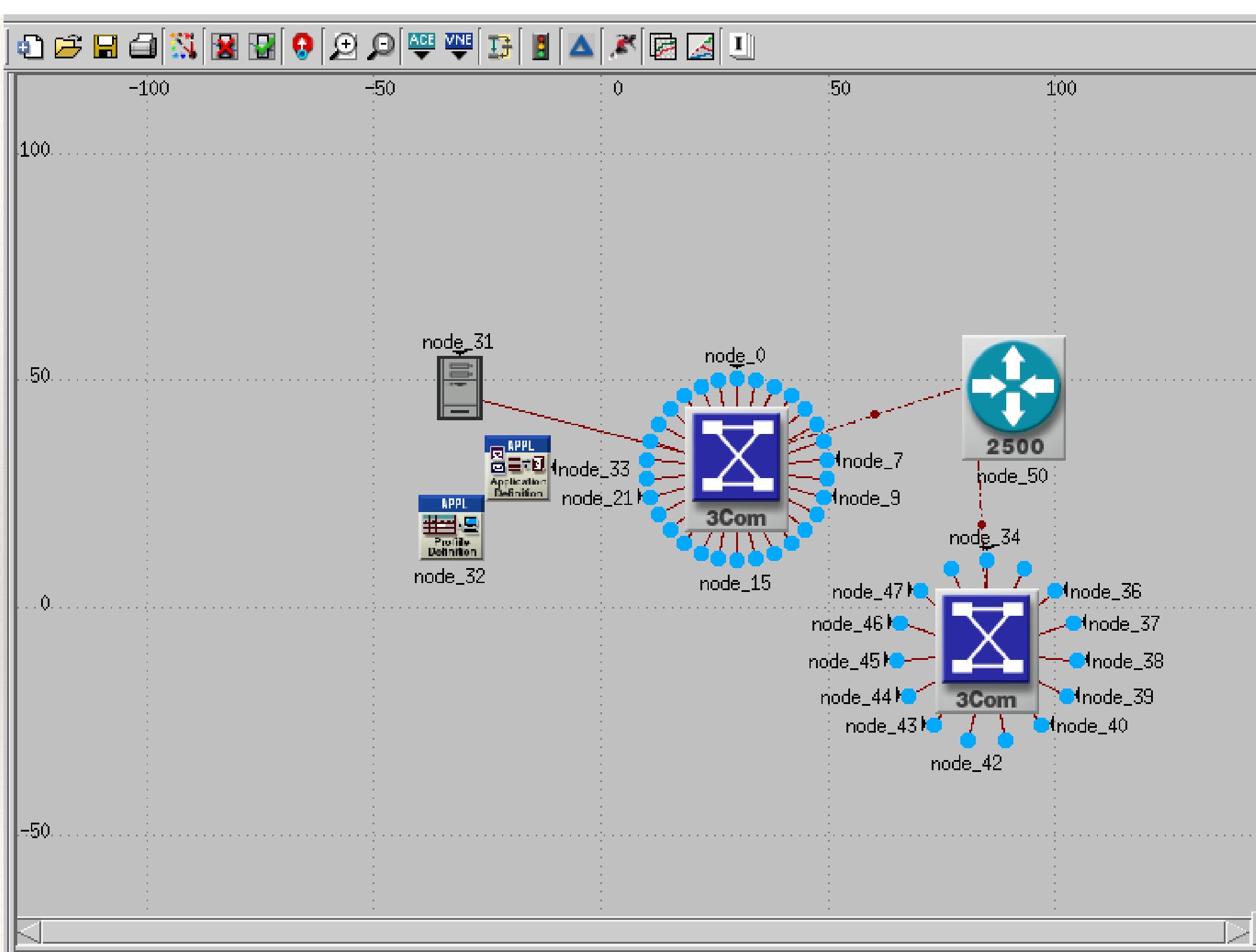
Satellite Subnet



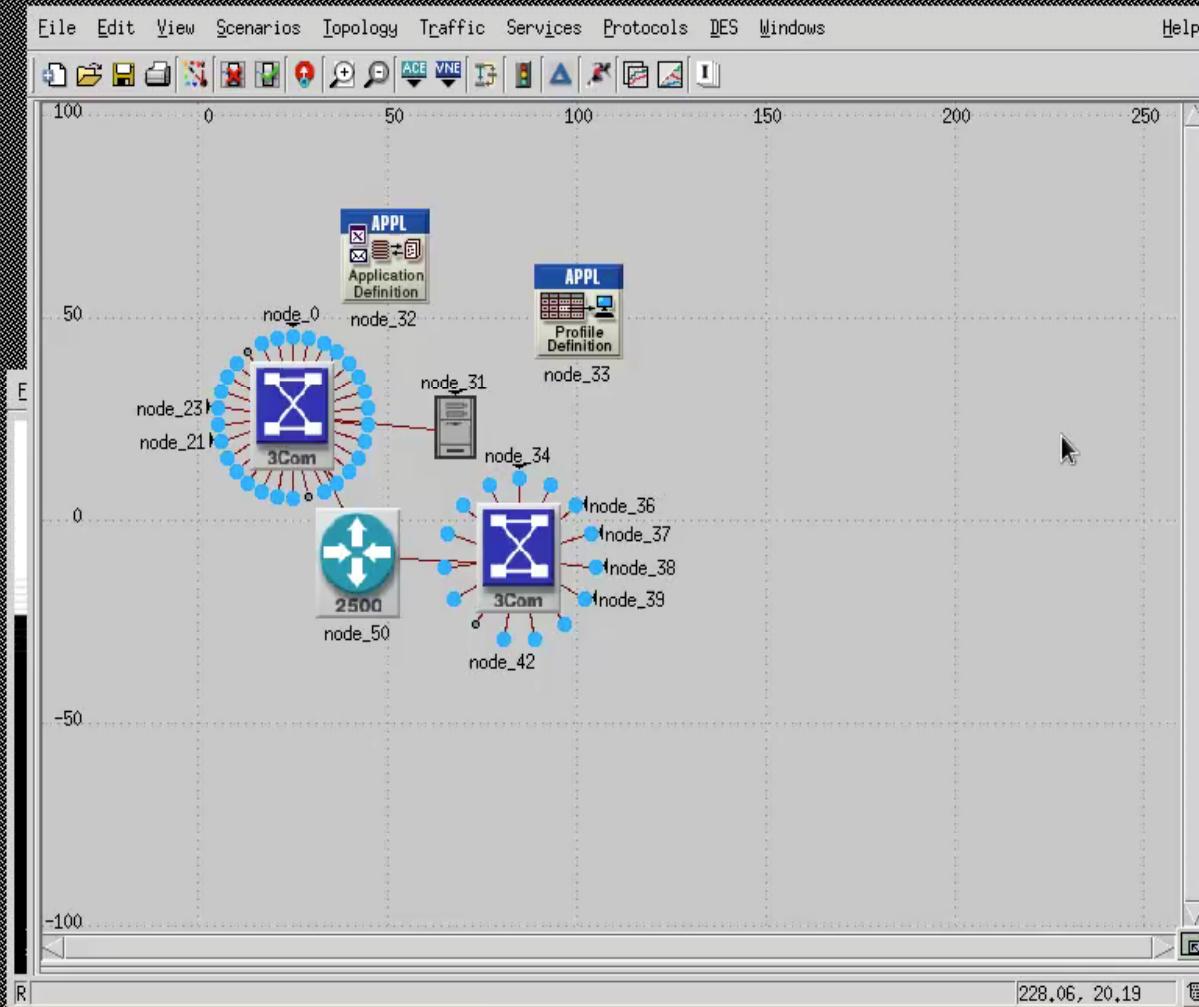
Mobile Subnet



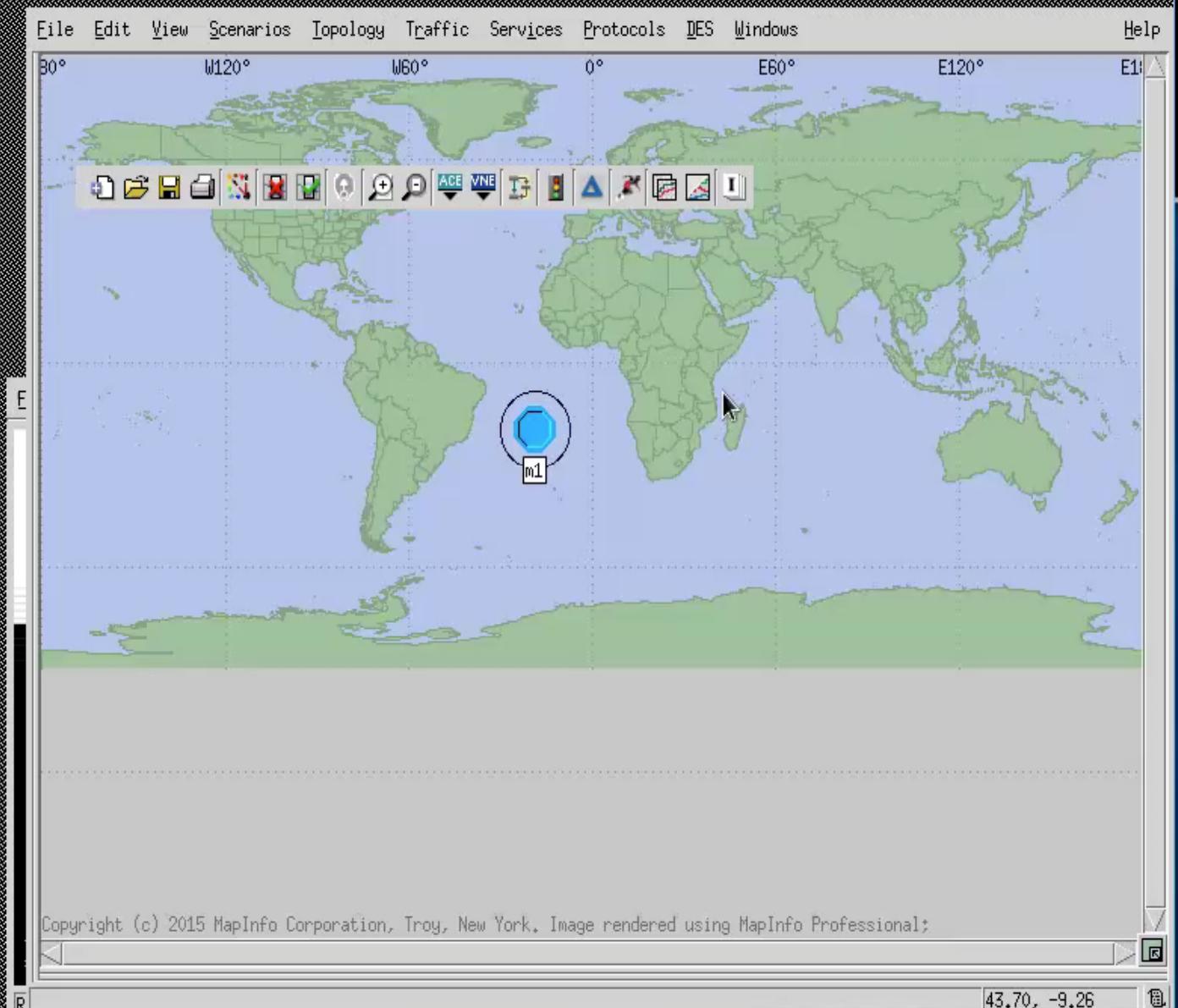
Subnet



Now to run simulations!



An example of an MM1 Queue simulation



Hope this helped Thank You

- ❖ To get started on the project, it's better to try out the tutorials on OPNET, and then to play around with OPNET to get comfortable with it.

Works Cited

- ❖ <http://www2.ensc.sfu.ca/~ljilja/cnl/presentations/ricky/presentation/tsld011.htm>
- ❖ http://www.telecomlab.oulu.fi/kurssit/521365A_tietoliiken_neteenkiikan_simuloinnit_ja_tyokalut/Opnet_esittely_07.pdf
- ❖ OPNET version 17.5 Built in Tutorial