

Creating TCP/UDP flow with Star Topology

Spoken Tutorial Project

<https://spoken-tutorial.org>

National Mission on Education through ICT

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Learning Objectives

In this tutorial, we will learn to



Learning Objectives

In this tutorial, we will learn to

- Create a Star topology



Learning Objectives

In this tutorial, we will learn to

- ▶ Create a Star topology
- ▶ Create an on-off application to send TCP traffic



Learning Objectives

In this tutorial, we will learn to

- ▶ Create a Star topology
- ▶ Create an on-off application to send TCP traffic
- ▶ Create an on-off application to send UDP traffic



Learning Objectives

- Calculate throughput and Delay



Learning Objectives

- ▶ Calculate throughput and Delay
- ▶ Analyze the flow using a flow monitor



System Requirements

To record this tutorial, I am using



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► **Ubuntu Linux OS version 22.04**



System Requirements

To record this tutorial, I am using

- ▶ **Ubuntu Linux OS version 22.04**
- ▶ **ns-3 version 3.38**



Pre-requisites

To follow this tutorial



Pre-requisites

To follow this tutorial

- ▶ The learner must have basic knowledge of using Linux terminal



Pre-requisites

To follow this tutorial

- ▶ The learner must have basic knowledge of using Linux terminal
- ▶ The learner must have understanding of network topologies



Pre-requisites

- For pre-requisite Linux and ns-3 tutorials, please visit this website <https://spoken-tutorial.org>



Code Files

- The files used in this tutorial are provided in the Code Files link



Code Files

- ▶ The files used in this tutorial are provided in the Code Files link
- ▶ Please download and extract the files

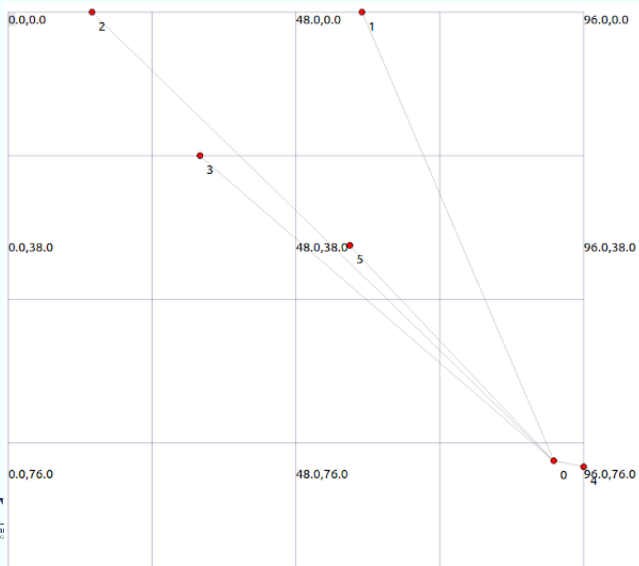


Code Files

- ▶ The files used in this tutorial are provided in the Code Files link
- ▶ Please download and extract the files
- ▶ Make a copy and then use them while practicing



Star Topology



Classes and Methods

- ▶ **PacketSinkHelper** class is used to create a packet sink on the hub



Classes and Methods

- ▶ **PacketSinkHelper** class is used to create a packet sink on the hub
- ▶ **OnOffHelper** class is used to send a particular traffic to the hub



Classes and Methods

- ▶ **PacketSinkHelper** class is used to create a packet sink on the hub
- ▶ **OnOffHelper** class is used to send a particular traffic to the hub
- ▶ **PointToPointStarHelper** class is used to create star topology using p2p links



Summary

In this tutorial, we have

- ▶ Created a star topology
- ▶ Created a TCP flow with star topology
- ▶ Created a UDP flow with star topology



Summary

- ▶ **Calculated throughput and delay**
- ▶ **Analyzed the flow using a flow monitor**



Assignment

As an assignment, please do the following

- ▶ **Create a star topology with 10 spoke nodes**
- ▶ **Create an on-off application**



Assignment

- ▶ **Send TCP traffic through the on-off application**
- ▶ **Set the attribute to Remote**
- ▶ **Analyze the flow using a flow monitor**



Assignment-Observation

```
arun@arun-dot-com:~/ns-allinone-3.38/ns-3.38$ ./ns3 run scratch/exp7.cc
[0/2] Re-checking globbed directories...
[2/2] Linking CXX executable ../build/scratch/ns3.38-exp7-default
Flow ID: 1 Source addr: 10.1.3.2 Dest Addr: 10.1.3.1
Type: TCP Flow
Sent Packets = 11493
Received Packets = 11490
Delay of current flow: +2.64909e+10ns
Throughput of current flow: 1884.85 Kbps
Flow ID: 2 Source addr: 10.1.3.1 Dest Addr: 10.1.3.2
Type: TCP Flow
Sent Packets = 5745
Received Packets = 5744
Delay of current flow: +1.19843e+10ns
Throughput of current flow: 259.35 Kbps
arun@arun-dot-com:~/ns-allinone-3.38/ns-3.38$
```



About the Spoken Tutorial Project

- ▶ Watch the video available at http://spoken-tutorial.org/What_is_a_Spoken_Tutorial
- ▶ It summarises the Spoken Tutorial project
- ▶ If you do not have good bandwidth, you can download and watch it



Spoken Tutorial Workshops

The Spoken Tutorial Project Team

- ▶ Conducts workshops using spoken tutorials
- ▶ Gives certificates to those who pass an online test
- ▶ For more details, please write to contact@spoken-tutorial.org



Answers for THIS spoken tutorial

- ▶ Questions in THIS Spoken Tutorial
- ▶ Visit <https://forums.spoken-tutorial.org>
- ▶ Choose the minute and second where you have the question
- ▶ Explain your question briefly
- ▶ The Spoken Tutorial project will ensure an answer
- ▶ You will have to register to ask questions



- ▶ For any general or technical questions on ns-3, visit the FOSSEE forum and post your question

<https://forums.fossee.in/>



Acknowledgement

- ▶ **The Spoken Tutorial project was established by Ministry of Education, Govt. of India**



Acknowledgement

- ▶ We thank Dr.Moyukh Laha from IIT Kharagpur for his domain support
- ▶ We would also like to thank Dr. R. Radha, Dr. X. Anita, and Dr. T. Subbulakshmi from VIT Chennai for their support



Thank you

- This is Arun Santhosh, a FOSSEE Summer Fellow 2023, IIT Bombay signing off

