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Aim: Analyzing various parameters for TCP protocol in action.

Theory: Simulation mode in Packet Tracer allows users to visualize network protocol, breaking down data into PDUs for analysis. It facilitates understanding TCP & UDP functionalities, highlighting the role of port numbers in application data exchange. TCP, a reliable transport protocol over IP, resolves packet-related issues via a connection-oriented approach. Its Three-way Handshake initiates & four-way Handshake terminates session with SYN, SYN-ACK, & ACK message carrying relevant flags. This mechanism ensures orderly communication, reducing errors like packet loss & duplication. Simulation mode guides users through service requests, demonstrating multiplexing & PDU association with protocols layers. It's a valuable tool for comprehending network operations & troubleshooting.

Steps to Configure TCP & UDP protocol Simulation in Cisco Packet Tracer.

1. Open Cisco Packet Tracer
2. Make a topology by selecting 4 PCs, 1 2960 Switch and 1 server.

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3. Connect all the devices using copper straight through cable, Connecting all using fast Ethernet port.

4. Assign IP address to all devices.

5. Double click on Multi-Server, from the pop-up window, select services tab and go to DNS service. Turn on DNS service and name record to be www.google.com; address - 192.168.11.5. Click on Add record.

6. Double click on Multi-Server, select service tab, Under which, select HTTP Service and Turn on HTTP & HTTPs option ON. Select index.html & click on edit option.
Type the following text.
<html>
Welcome to Computer Networks Lab.
We are Learning about Simulation of TCP.
<html>
Click save, click on yes

7. Double click on DNS Client.
within the DeskTop select Command Prompt Option Type nslookup www.google.com.
This Statement lets us know whether DNS Client can connect to server or not & resolve the IP address issues.

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within the Desktop Tab select web browser Option
In url type www.google.com

8. Double click on web client and select Email option. In the configure mail dialog box write:
Name : Vikram
Email address: vikram812@gmain.com
Incoming mail server : 192.168.11.5
Outgoing Mail server : 192.168.11.5
User name : vikram
Password : Cisco_aids
Click on Save

9. Double click on Email client.
Within the Desktom Tab select Email Option.
In the configure mail dialog box. write:
Name : Ranjan
Email : Ranjan@gmail.com
IMS : 192.168.11.5
OMS : 192.168.11.5
User Name : Ranjan
Password : Cisco_aids
Click on Save.

10. Double click on Multi-Server and select Email Option. Switch on SMTP & POP3 service
Type domain name : gmail.com

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Under user setup: Name: Vikram; Password: Cisco_cids
Click on Add.
Under user setup: Name: Ranjan; Password: Cisco_cids
click on add.

11. Double click on web client
within the ~~Desktop~~ Desktop tab, select Email Option.
Send a mail by composing mail.
In the To section write: Ranjan@gmail.com
Subject: Hi, Mail Box: Hellow; Click Send Mail.

12. Double click on EMail Client.
within Deckhop tab, select Email option
In the pop-up window; select Recieve Option

13. Double click on Email Client. & select Email Option.
Send a mail by composing a mail.
In the To section write: vikram812@gmail.com
Subject: Hi, Mail Box: I recieved the mail.
Click on Send Mail.

14. Double click on Web Client. Select Email option
In the pop-up window, Select Receive Option.

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Experiment 8.7

Aim: Introduction to Datadog tool for data monitoring in network.

Theory:

- Datadog is a monitoring service for cloud scale application, providing monitoring of servers database tools & services through a SaaS-based data analytics platform.
- It is used for log management, infrastructure monitoring & application monitoring.
- It can collect data from servers, databases, containers & cloud services.
- With Datadog, users can monitor their Network in real-time & get alerts when anomalies occur.
- Datadog make it easy to integrate services such as ~~ele~~ slack & Pager Duty for notification.
- Datadog was build to a cloud infrastructure monitoring service, with a dashboard, alerting & visualization of metrics.
- Datadog was found in 2010 by Oliver Pomel & Alexis Le-Quoc.
- It provides functionalities in an easy-to-use manner that would be difficult to build & maitain ourselves.

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Procedure to download Data Dog Agent.

1. Register for Datadog - Monitoring as a service.
   Go to website: https://www.datadoghq.com/
   Click "start free trial" button
   Fill form & click "Create Account" button.

2. Installation of agent on Windows.
   - Log in to Datadog account.
   - Go to Agents Download page.
   - Download the Datadog Agent installer
   - Run the installer by opening datadog-agent-7-latest.amd64.msi.
   - follow the prompts & enter Datadog API key.
   - Then enter your Datadog Region: datadoghq.com
   - follow the on-screen instructions to install Datadog.

3. Log in to Datadog account.
   Navigate to Integration page.
   Select the corresponding Window services that we want to monitor.

4. Navigate to Monitoring Page.
   Customize the dashboard as per requirement.
   Add weights to the services that we want to monitor.

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Configure alerts for anomalies in network data.

Result: Successfully installed Datadog to monitor network data using it. It was observed how Datadog helps analyze the data trends to identifies anomalies in real-time.

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Experiment 8

Aim: Introduction to network bandwidth analyser tool for network monitoring.

Overview:

Network bandwidth analyzer tools play a critical role in modern network monitoring & management. These tools provide administrators with invaluable insights into network performance, traffic patterns, and resource utilization. By capturing and analyzing network data in real time, bandwidth analyzer tool help optimize network efficiency, troubleshoot issues, & ensure smooth operation of network infrastructure.

Network Bandwidth Analyser Tools:

It comes in various forms, ranging from open-source software like Wireshark to enterprise-grade solutions with advanced features and reporting capabilities. These tools typically offer the following functionalities.

1. Packet Capture & Analysis: Bandwidth analyzer tools capture network packets traversing the network & provide detailed Analysis of packet headers, payload,

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and protocols. This allows administrators to inspect network traffic at a granular level & identify the source, destination & type of traffic

2. Traffic Visualization: Many bandwidth analyzer tools offer intuitive graphical interfaces for visualizing network traffic patterns. Graphs, charts and dashboards provide administrators with a clear understanding of network utilization, ~~them~~ trends & anomalies.

3. ~~Alerting &~~

3. Alerting & Notification:
Advanced bandwidth analyzer tools can be configured to generate ~~tools~~ alerts & notifications based on predefined thresholds or anomalous network behaviour.

1. Reporting & Historical Analysis:
Bandwidth analyzer tools often include reporting features that allow administrators to generate comprehensive reports on network performances utilization & trends over time.

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