

NETWORK EMULATOR INSTALLATION GUIDE



TELESAT™

SOFTWARE VERSION 2024.09.0

www.telesat.com/network-emulator

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1.0 INTRODUCTION

This document contains information and procedures for installing the Telesat Lightspeed Network Emulator.

1.1 Audience

The audience for this document is any customer unpacking and installing a Lightspeed Network Emulator for the first time. Additional details are available in the *Lightspeed Network Emulator User Guide*, which should accompany this Installation guide.



2.0 Network Emulator Hardware and Operating System

2.1 Hardware

The Telesat Lightspeed Network Emulator runs on a Dell 3460 PC. For detailed information, see Appendix A. The equipment is bench portable and operates stand alone in a normal laboratory environment.

Warning

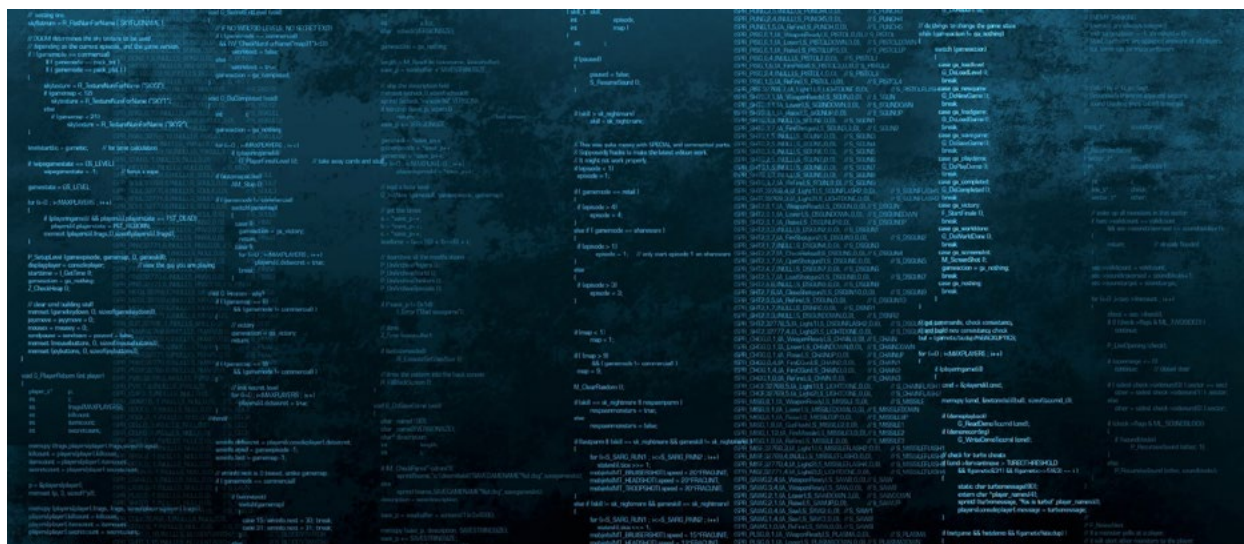
Use of this equipment in a manner not specified by Telesat may impair the protection afforded by the equipment and invalidate the warranty. Note that there are no user serviceable parts inside the Telesat Lightspeed Network Emulator. The instrument should be returned to Telesat for all repairs. Unauthorised opening of the machine will invalidate the warranty.

2.2 Operating System

The Telesat Lightspeed Network Emulator runs the Ubuntu 20.04.6 LTS Linux operating system, installed by Telesat. Network Emulator software is installed by Telesat.

2.3 Software Version

This guide is intended for use with Network Emulators running software version **2024.09.0 or Greater**.



2.4 Physical Connection Mapping

2.4.1 Front Power Button

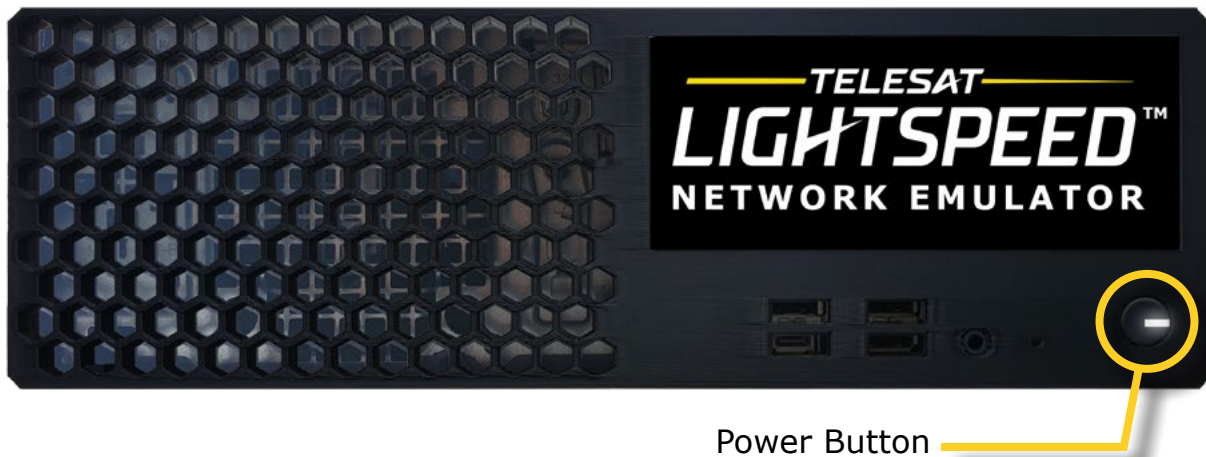


Figure 1: Front Ports

2.4.2 Rear Ports & Connectors

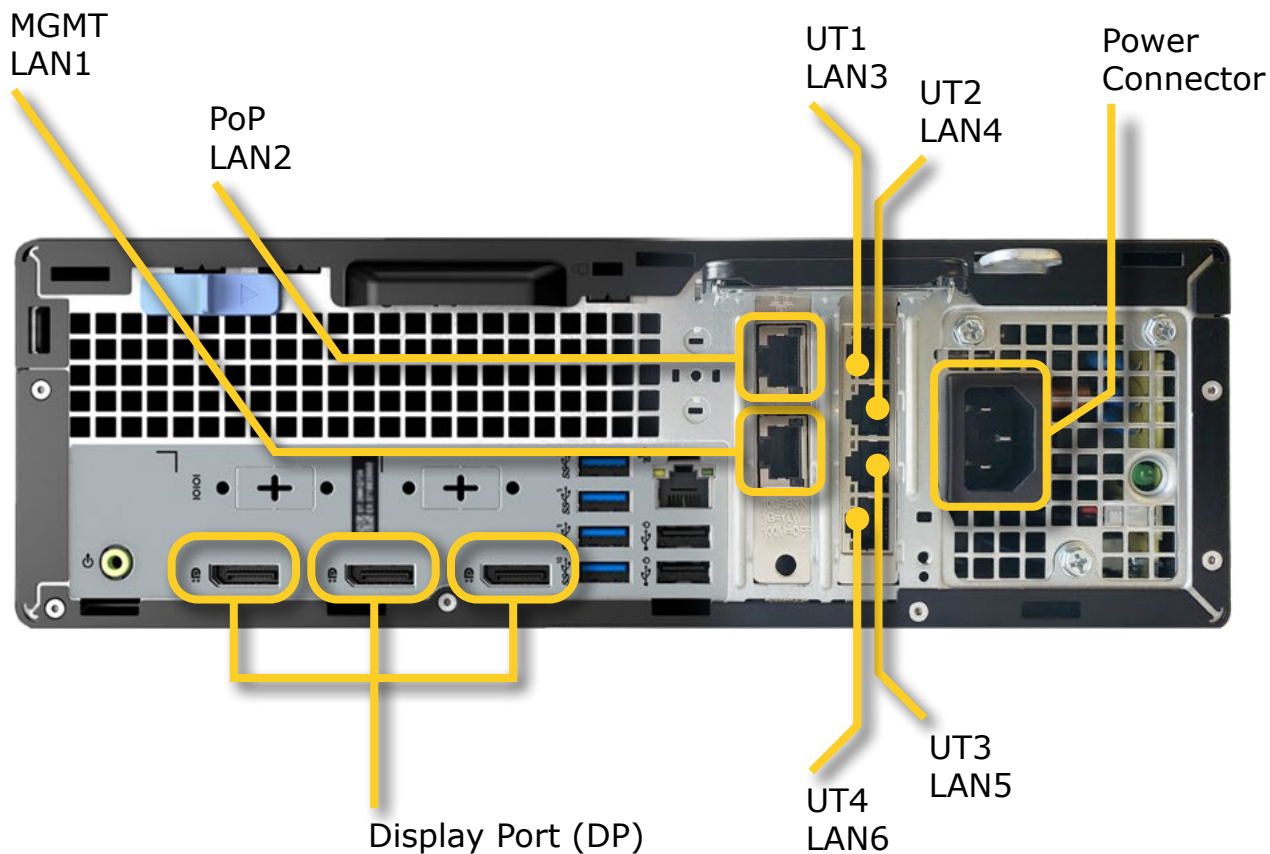


Figure 2: Rear Ports & Connectors

2.4.3 Port Assignments

The default network port IDs and assignments are listed in Table 1 and illustrated in Figure 3.

TABLE 1: PORT IDs		
Hardware ID	Linux Interface ID	Network Emulator Layer Two Connection
LAN1	enp1s0f1	Management
Wi-Fi	wlp4s0	Management
LAN2	enp1s0f0	PoP 1
LAN3	enp3s0f0	UT 1
LAN4	enp3s0f1	UT 2
LAN5	enp3s0f2	UT 3
LAN6	enp3s0f3	UT 4

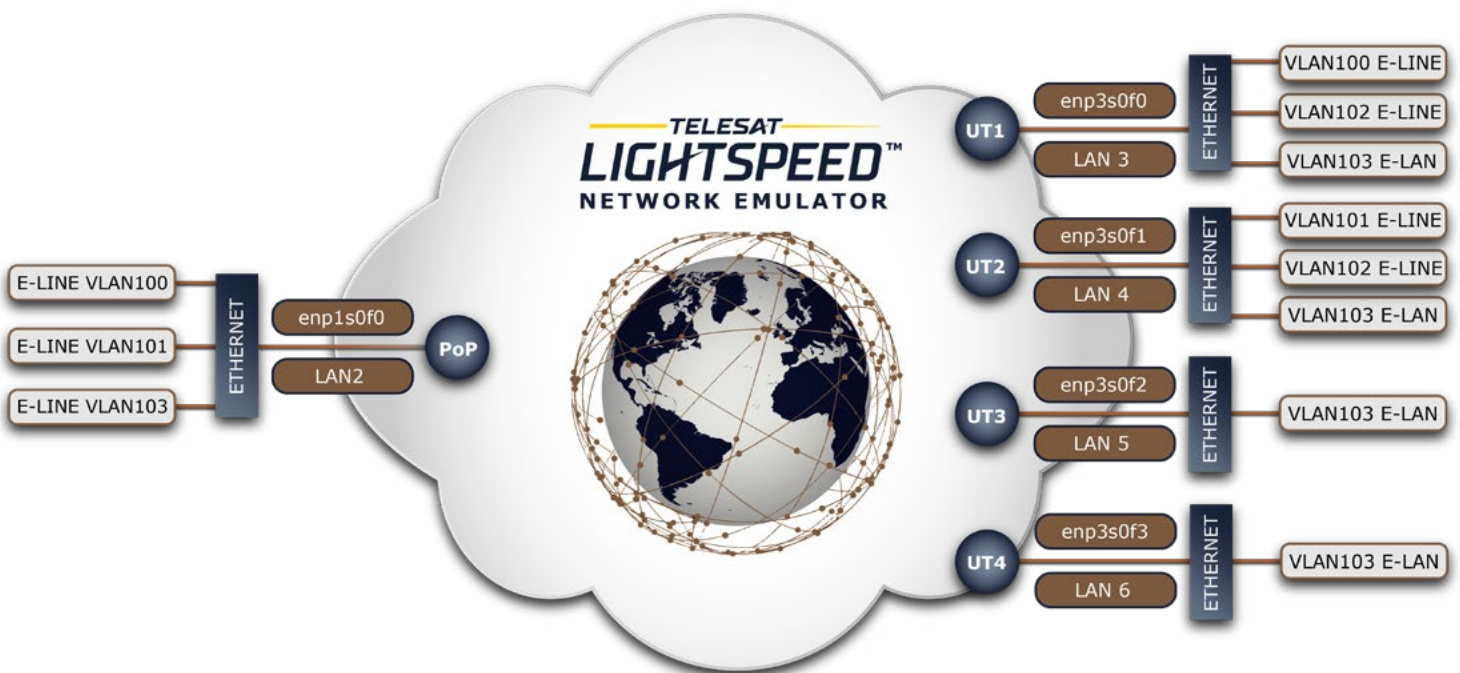


Figure 3: Default Network Port Mapping

3.0 Installing the Network Emulator

3.1 Plug In and Turn On Network Emulator

Prerequisites

Installation of the Network Emulator requires:

- A power cable suitable for your region (Network Emulator comes equipped with a North American power cable).
- Access to a power source.

Steps

1. Connect the AC power cord to power supply connector. Connect the AC plug to a power source.
2. Use the power button to turn on the Network Emulator device. The device takes approximately two minutes to boot.
3. The solid-state hard drive on the Emulator is securely encrypted. On start up the user will be prompted with 'Please unlock disk dm_crypt-0:'. Your Telesat account representative will provide you with the required credentials.



3.2 Connecting a PC to the Network Emulator Management Port

Note: A management LAN connection is not required to run the Network Emulator default scenarios, Users can connect a monitor, keyboard and mouse directly to the device to use it.

The Telesat Lightspeed Network Emulator can be managed through a browser-based GUI on a PC over an Ethernet or Wi-Fi connection to the Network Emulator management interface (LAN 1 or Wi-Fi). The customer network or device to be directly connected must be configured with appropriate settings prior to operation.

The Network Emulator must be connected to a private network, where internet routable IP addresses are blocked. At minimum, the Emulator should be connected behind a firewall device.

Dynamic Network Configuration (DHCP)

By default, the Network Emulator will be configured with DHCP enabled. In this mode, users can simply connect the Emulator to their test network with a DHCP server and the Emulator will acquire an IP address to participate on customer's selected network automatically. The Network Emulator is intended to be installed in Data Centre or Laboratory test environments. It is not recommended to connect the device to a corporate network without appropriate design considered. Contact Telesat for additional network design details.

Static Network Configuration

The Network Emulator management port can be configured with a static IP address, for this example 192.168.0.2 with a subnet mask of 255.255.255.0 will be used.

Prerequisites

- A PC:
 - o With an Ethernet port that can be configured and placed on the 192.168.0.0/24 subnet
 - o Running any modern web browser (Chrome, Firefox, or Edge).
- Ethernet cable
- The IP address to configure on the PC Ethernet port.

STEPS

1. Connect the Ethernet cable to the LAN1 management port on Network Emulator and to the Ethernet port on the PC.
2. Log in to the PC.
3. Click on the Windows Start icon and type: **View Network Connection**. The Ethernet Properties window opens.
4. Right click on the Ethernet port icon and select **Properties**.
5. Double click on **Internet Protocol Version 4 (TCP/IPv4)**. The Internet Protocol Version 4 (TCP/IPv4) Properties window opens.
6. Select **Use the following IP address**.
7. In the **IP address:** field, enter **192.168.0.3**
8. The subnet mask field auto-fills with **255.255.255.0** once clicked on. Gateway and DNS addresses are not required.
9. Click **OK**.
10. To test the connection, open a command prompt window. Click on the Windows **Start** icon, type **cmd** and press **Enter**.
A command prompt window opens.
11. Type **ping 192.168.0.2** (Network Emulator IP address) and press Enter. If the destination host is unreachable or the connection times out, the IP address configuration is not correct.
12. Open a browser window and enter **192.168.0.2** (Network Emulator IP address) in the address field.
13. The Network Emulator interface opens. On the initial start-up, you receive a prompt with the Telesat Lightspeed Network Emulator Terms of Use. Read the terms of use and click **Close**.
14. The Telesat Lightspeed Network Emulator is now ready for use. Refer to the *Telesat Lightspeed Network Emulator Release # User Guide* for information on operation.

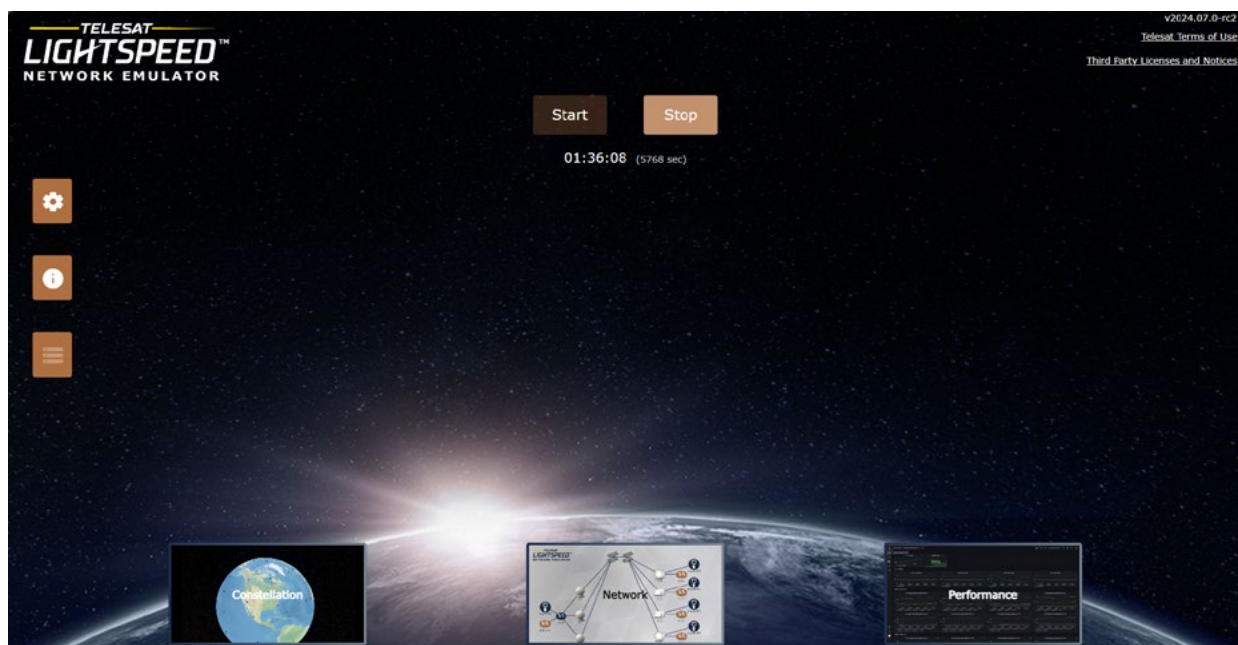


Figure 4: Network Emulator Home Screen

Appendix A: Baseline and Recommended Hardware Specifications

SPECIFICATION	TELESAT LIGHTSPEED NETWORK EMULATOR
RJ45 Management Ports	1
GE RJ45 Data Ports	4 (OR 8 with expansion)
10GE RJ45 Data Ports	2 (OR zero(0) with expansion)
Internal Wi-Fi + Ant.	Intel Dual Band Wireless-AC 9260
CPU	14th Generation Intel Core i7-14700 (33MB Cache, 20 Cores, 28 threads, 2.1GHz to 5.4GHz (65W))
Memory	16 GB: 2 x 8 GB, DDR5, 5600MT/s, SO-DIMM
Onboard Storage	M.2 256GB PCIe NVMe Class 35 Solid State Drive
Video	Intel Integrated Graphics
L x W x H Dimensions	11.53" x 11.42" x 3.65"
Weight	PC 8.52 lbs
Operating Temperature	5°C to 45°C (41°F to 113°F)
Operating System	Ubuntu 20.04.6 LTS
Power	SFF with 300W (80 Plus Platinum) PSU, RPL-R compatible

Appendix B: System Performance

Users should refer to the Platform dashboard or the Network View Desktop when assessing the Emulator performance.

The Platform dashboard can be accessed in Grafana via the 'Home > Platform > API Response Time, Pass File Timer'.

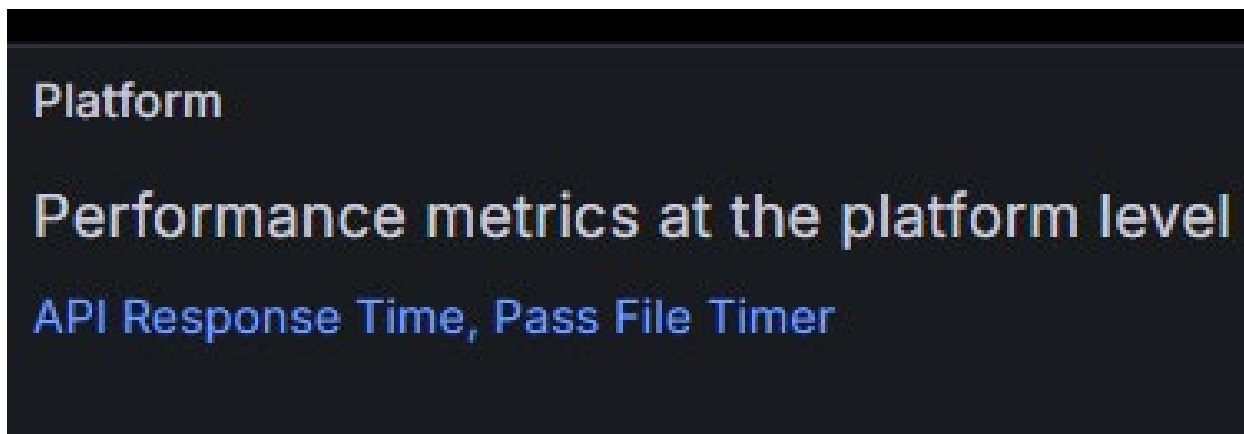


Figure 5: Accessing Performance Metrics at the Platform Level

Pass File Time in Seconds, the trended value should be linear representing second by second time steps. If the linearity of this line deviates it could indicate a system loading issue.

Response Time – Status API Endpoint (ms), is a real time measurement of the Emulator endpoints, show in the figure below (right) is expected behaviour. If API response times meet or exceed 1 second consistently it could indicate a system loading issue.

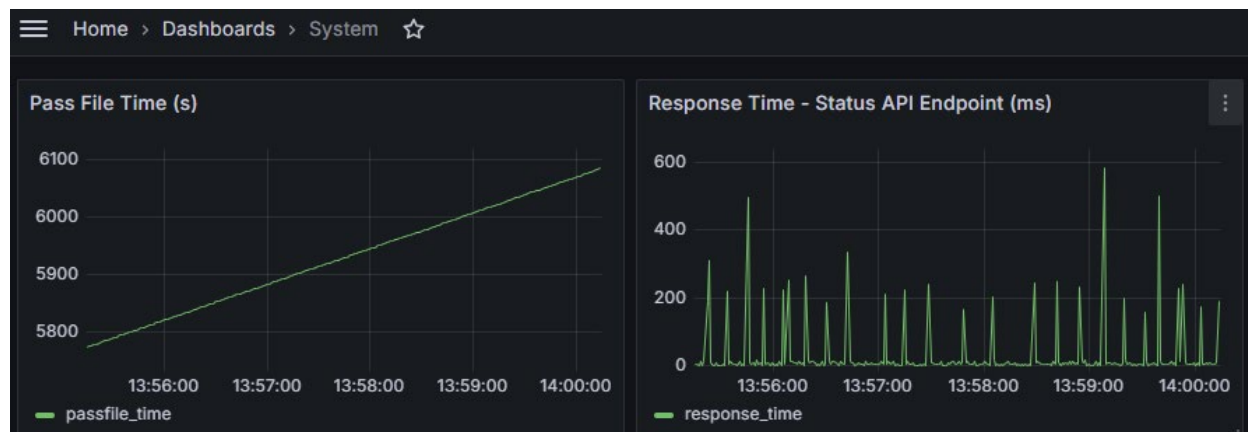


Figure 6: System Dashboard

Report system performance related issues to your Telesat account representative including a snapshot of this Dashboard.

Network View Desktop can be accessed in Network View by toggling the 'CORE Session(98) topology.xml icon on the task tray at the bottom of the view as illustrated in the following figure.

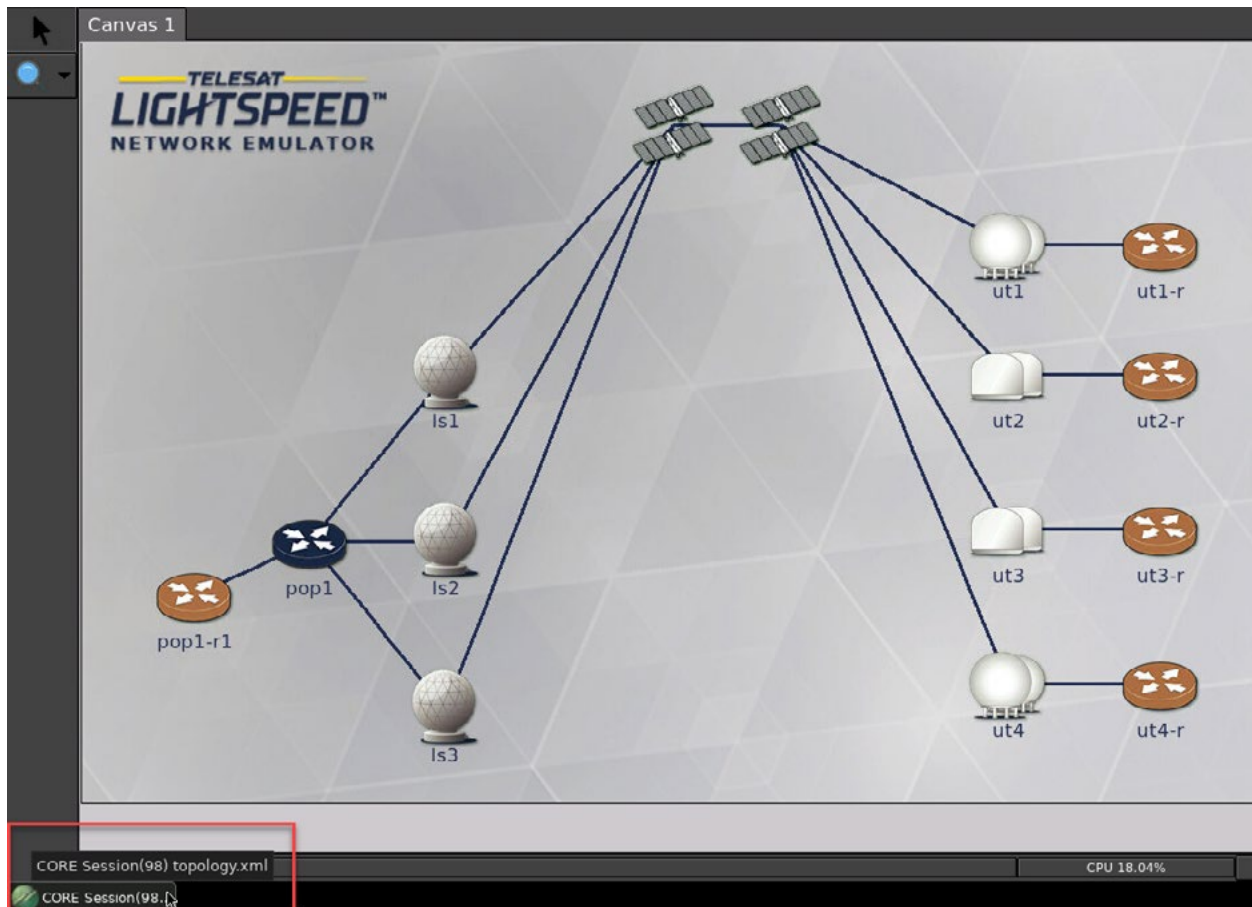


Figure 7: Toggle Core Session Icon in Task Tray

Performing this action will show the Network Emulator desktop which hosts widgets that indicate various system performance metrics.



Figure 8: Network View Desktop System Performance

Users can determine the System Uptime, CPU loading, RAM Utilization, Disk Utilization, Drive Swap space as well management interface statistics.

Network Interface Performance

The maximum throughput at ingress of the external PoP interface (LAN2/enp1s0f0) is up to 10Gbps, User Terminal interfaces (LAN2,3,4,5/enp3s0f0-4) provide up to 1Gbps each. Note that this performance is of the physical interfaces, data bandwidth available for traffic flowing through the Emulator is subject to the User Terminal terminal performance characteristics based on the future Telesat Lightspeed network performances.



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