EAST CENTRAL RAILWAY

HAJIPUR HQ

PROJECT REPORT

NETWORK CONNECTIONS AND REAL – TIME MONITORING

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Introduction

This project aims to provide a comprehensive overview of the network infrastructure at Hajipur HQ Railnet as of July 13, 2024. The primary objective is to document all the connections, servers, and switches that form the backbone of the organization's IT infrastructure. By offering a detailed representation of the network, this project seeks to facilitate better understanding, management, and optimization of network resources.

In the modern digital landscape, the efficiency and reliability of network infrastructure are critical to the seamless operation of any organization. For Hajipur HQ Railnet, the network supports a wide range of essential functions, from daily communication and data transfer to complex data processing tasks. Understanding the current network layout, including the specific details of each component and their interconnections, is vital for maintaining and improving network performance.

This project encompasses several key components:

1. *Network Layout Documentation* : A detailed description of the network components, including HP Aruba switches, Dlink switches, Juniper switches, Cisco switches, DSLAMs, FXS, and FXO ports. Each device's role within the network is documented, along with its port usage, IP address, and physical location.

2. *Pictographic Representation* : A visual diagram created using Network Notepad, providing a clear and accessible view of the network layout. This diagram is essential for network administrators and IT staff, aiding in effective network management and troubleshooting.

3. *Real-Time Monitoring Setup* : Implementation of a real-time monitoring solution to track the status of network components. By using advanced monitoring tools like Network Notepad and NN Monitor, the project ensures continuous oversight of the network, allowing for immediate detection and resolution of issues.

The introduction serves as a roadmap for the project, highlighting its goals, scope, and significance. By providing a detailed and organized view of the network, the project aims to enhance the operational efficiency and reliability of Hajipur HQ Railnet's IT infrastructure, ultimately supporting the organization's broader mission and objectives.

Network Layout

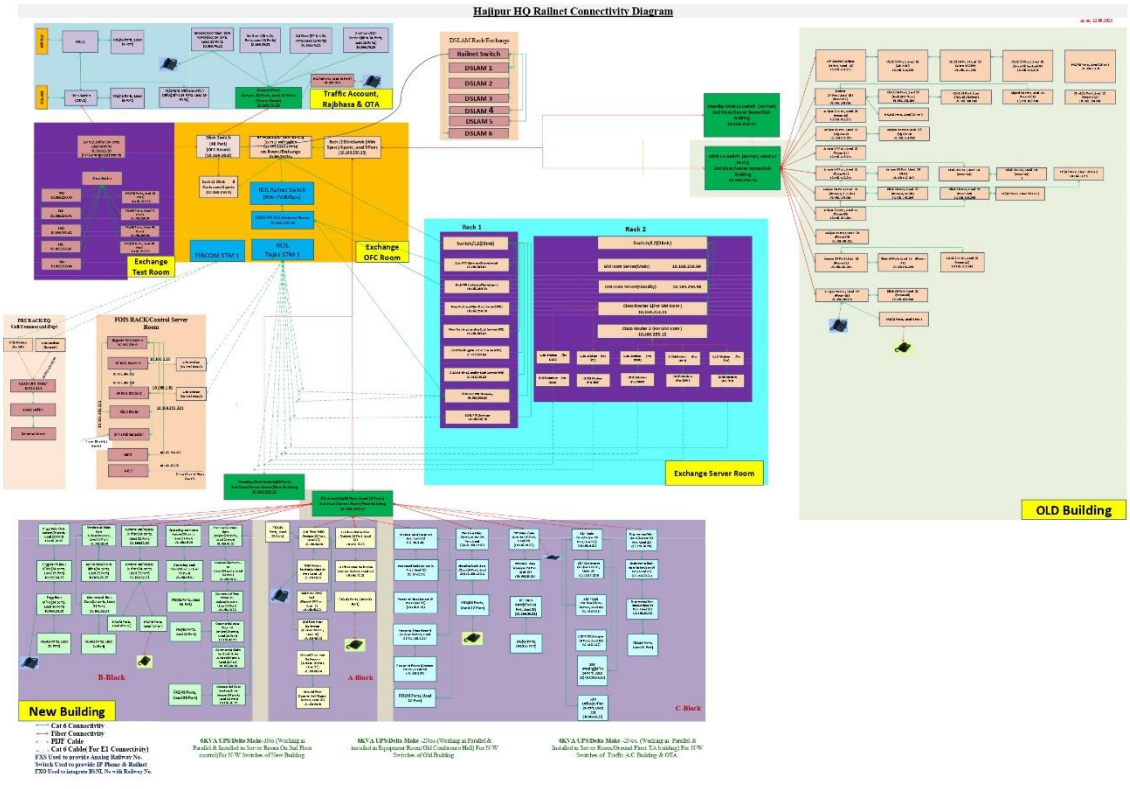
The network layout consists of various servers and switches distributed across different floors and rooms. Each device is identified by specific IP addresses and port usage.

Key Components:

- **HP Aruba Switch** (Exch L3 Main Switch): 28 ports, 8 ports used
- **Dlink Switches** (Various locations): 24 to 48 ports, varying port usage
- **Juniper Switches** (Various locations): 24 ports, varying port usage
- **Cisco Switches** (Various locations): 24 ports, varying port usage
- **DSLAMs**: Multiple DSLAMs for digital subscriber line access
- **FXS and FXO Ports**: Used for analog voice and fax services

Pictographic Representation

Below is the representation of all the network connections at HAJIPUR HQ.



Real-Time Monitoring Setup

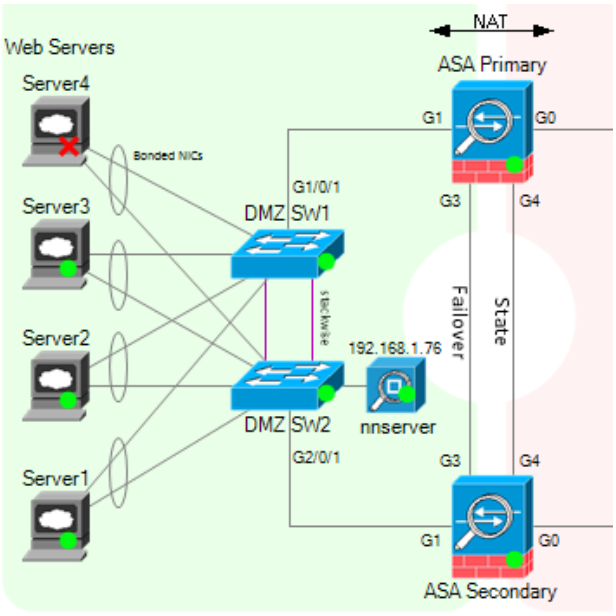
To ensure continuous monitoring of the network components, we recommend using a robust monitoring tool such as Network Notepad and NN Monitor. This tool will provide real-time updates on the status of each server and switch, helping to quickly identify and address any issues.

Monitoring Tool Configuration

1. **Install the monitoring tool:**
    - Download the tool from the official website.
    - Follow the installation instructions provided in the user manual.
2. **Configure monitoring for servers and switches:**
    - Add each server and switch with their respective IP addresses.
    - Set up alerts for port usage thresholds.
    - Customize dashboards for visual monitoring.

Example Configuration:

- **Server Room Switch:** IP 10.169.76.20
- **Ground Floor Switch:** IP 10.169.76.21
- **1st Floor Switches:** IP 10.169.76.22, 10.169.76.23
- **2nd Floor Switch:** IP 10.169.76.24
- **Other Switches and Servers:** As per the detailed connections list above

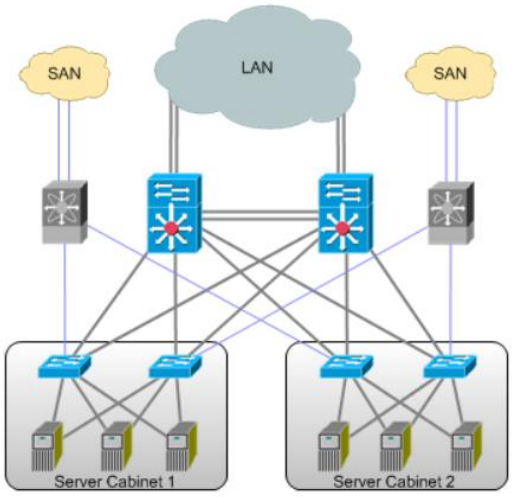


Network Diagram Creation Using Network Notepad

Creating a detailed and organized network diagram in Network Notepad involves several steps. Here's a comprehensive guide on how to achieve this:

Install Network Notepad

To begin, you need to install Network Notepad. Visit the [Network Notepad website] (http://www.networknotepad.com/) to download the software. Follow the installation instructions provided on the website to install Network Notepad on your computer. Once installed, you are ready to start creating your network diagram.



Network Notepad

NN Monitor

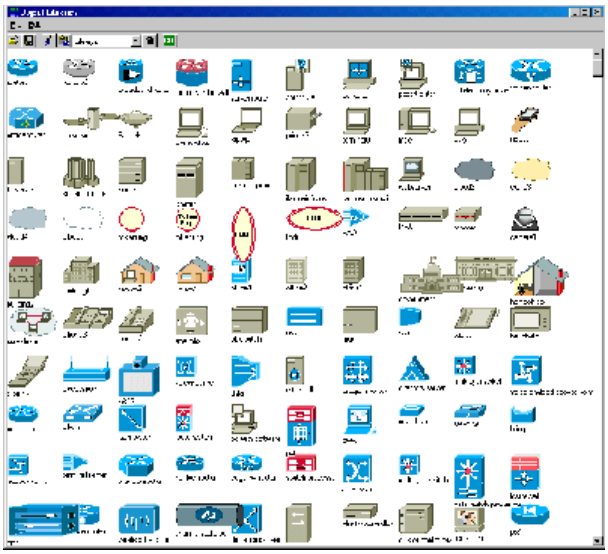
Create a New Diagram

Launch Network Notepad from your desktop or start menu. Once the software is open, initiate a new diagram by clicking on `File` in the menu bar and selecting `New`. This action will create a blank canvas where you can start building your network layout.

Add Network Components

Next, you'll need to add the various network components to your diagram. From the symbol library on the left side of the screen, select the necessary network components such as switches, servers, and routers. Simply drag and drop these selected symbols onto the canvas, positioning them where you want them in your network layout. This

intuitive process allows you to easily visualize the physical layout of your network infrastructure.

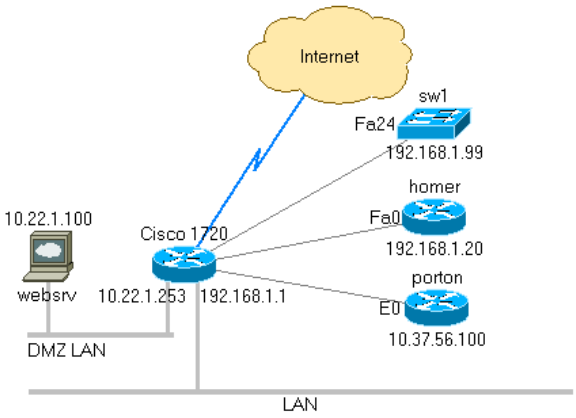


Arrange Network Components

Once all the necessary components are added to the canvas, it's important to arrange them logically to represent your network layout accurately. Position the symbols in a manner that reflects their physical locations or logical groupings within your network. After arranging the components, right-click on each symbol and select `Properties` to add relevant labels, such as IP addresses and device names. This step ensures that each component is easily identifiable and provides necessary details at a glance.

Make Connections

With the network components in place, you can now establish the connections between them. Select the `Line` tool from the toolbar at the top of the screen to start drawing connections. Click on the starting point of the connection, such as a port on a switch, then drag the line to the endpoint, such as a port on a server. Release the mouse button to create the connection. To add more context to these connections, right-click on the line and select `Properties` to label them with details like port numbers or connection types.

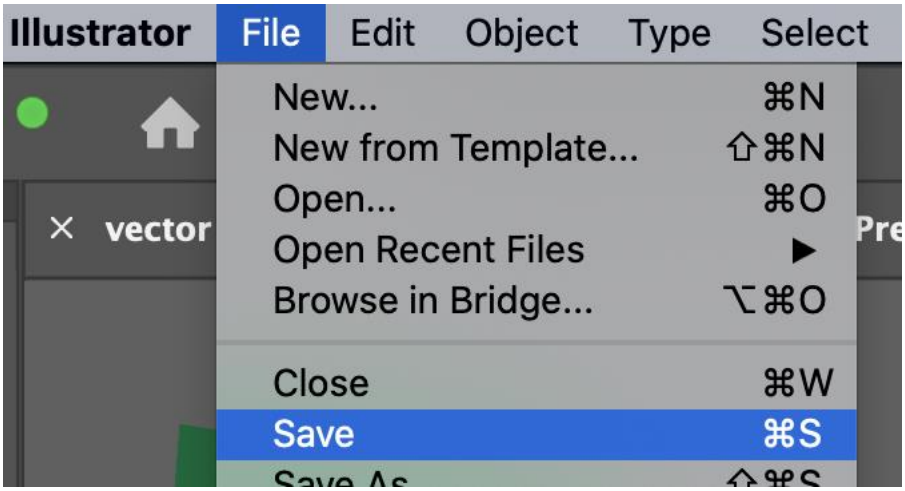


Customize Connections

Customizing the connections can significantly enhance the clarity of your diagram. Double-click on any connection line to change its properties, such as color, line style, or thickness. This customization helps in visually distinguishing different types of connections, making the diagram easier to interpret. Additionally, you can use the `Text` tool from the toolbar to add notes or comments directly on the diagram, providing further context or explanations where needed.

Save and Export

After completing your diagram, it's crucial to save your work. Click on `File` and select `Save As` to save your diagram in Network Notepad format (.ndg), which allows for future editing. To share the diagram or include it in reports, click on `File` and select `Export`. This option lets you save the diagram as an image file (e.g., PNG, JPEG) or PDF, making it easy to distribute or embed in other documents.



Tips for Effective Diagrams

To ensure your network diagrams are effective, follow these best practices:

Keep It Organized : Arrange symbols and connections neatly to avoid clutter. A well-organized diagram is easier to understand and interpret.

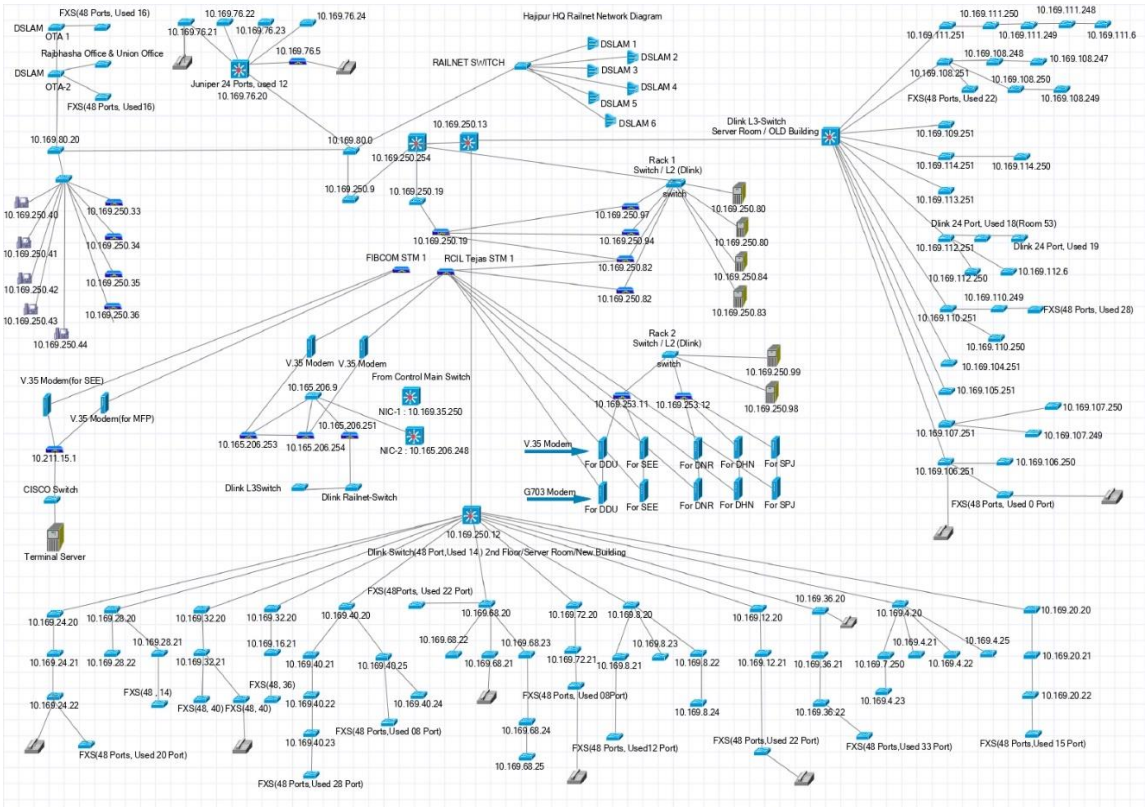
Use Colors and Labels : Differentiate between various types of connections and devices using distinct colors and labels. This visual differentiation helps in quickly identifying different components and their roles.

Regular Updates : Update the diagram regularly to reflect any changes in the network infrastructure. Keeping the diagram up-to-date ensures it remains a reliable reference for network management and troubleshooting.

By following these steps and tips, you can create detailed, clear, and effective network diagrams in Network Notepad. This not only helps in understanding and managing your network better but also aids in quick troubleshooting and efficient communication among IT staff.

ECR Hajipur HQ Network Diagram

Network Notepad



NN Monitor

10.165.206.248 Unknown.	10.165.206.251 Unknown.	10.165.206.253 Unknown.	10.165.206.254 Unknown.	10.165.206.9 Unknown.	10.169.104.251 Unknown.	10.169.105.251 Unknown.	10.169.106.250 Unknown.	10.169.106.251 Unknown.	10.169.107.249 Unknown.	10.169.107.250 Unknown.
10.169.107.251 Unknown.	10.169.108.247 Unknown.	10.169.108.248 Unknown.	10.169.108.249 Unknown.	10.169.108.250 Unknown.	10.169.108.251 Unknown.	10.169.109.251 Unknown.	10.169.110.249 Unknown.	10.169.110.250 Unknown.	10.169.110.251 Unknown.	10.169.111.248 Unknown.
10.169.111.249 Unknown.	10.169.111.250 Unknown.	10.169.111.251 Unknown.	10.169.111.6 Unknown.	10.169.112.250 Unknown.	10.169.112.251 Unknown.	10.169.112.6 Unknown.	10.169.113.251 Unknown.	10.169.114.250 Unknown.	10.169.114.251 Unknown.	10.169.12.20 Unknown.
10.169.12.21 Unknown.	10.169.16.21 Unknown.	10.169.20.20 Unknown.	10.169.20.21 Unknown.	10.169.20.22 Unknown.	10.169.24.20 Unknown.	10.169.24.21 Unknown.	10.169.24.22 Unknown.	10.169.250.12 Unknown.	10.169.250.13 Unknown.	10.169.250.14 Unknown.
10.169.250.19 Unknown.	10.169.250.254 Unknown.	10.169.250.33 Unknown.	10.169.250.34 Unknown.	10.169.250.35 Unknown.	10.169.250.36 Unknown.	10.169.250.40 Unknown.	10.169.250.41 Unknown.	10.169.250.42 Unknown.	10.169.250.43 Unknown.	10.169.250.44 Unknown.
10.169.250.80 Unknown.	10.169.250.82 Unknown.	10.169.250.83 Unknown.	10.169.250.84 Unknown.	10.169.250.9 Unknown.	10.169.250.94 Unknown.	10.169.250.97 Unknown.	10.169.250.98 Unknown.	10.169.250.99 Unknown.	10.169.253.11 Unknown.	10.169.253.12 Unknown.
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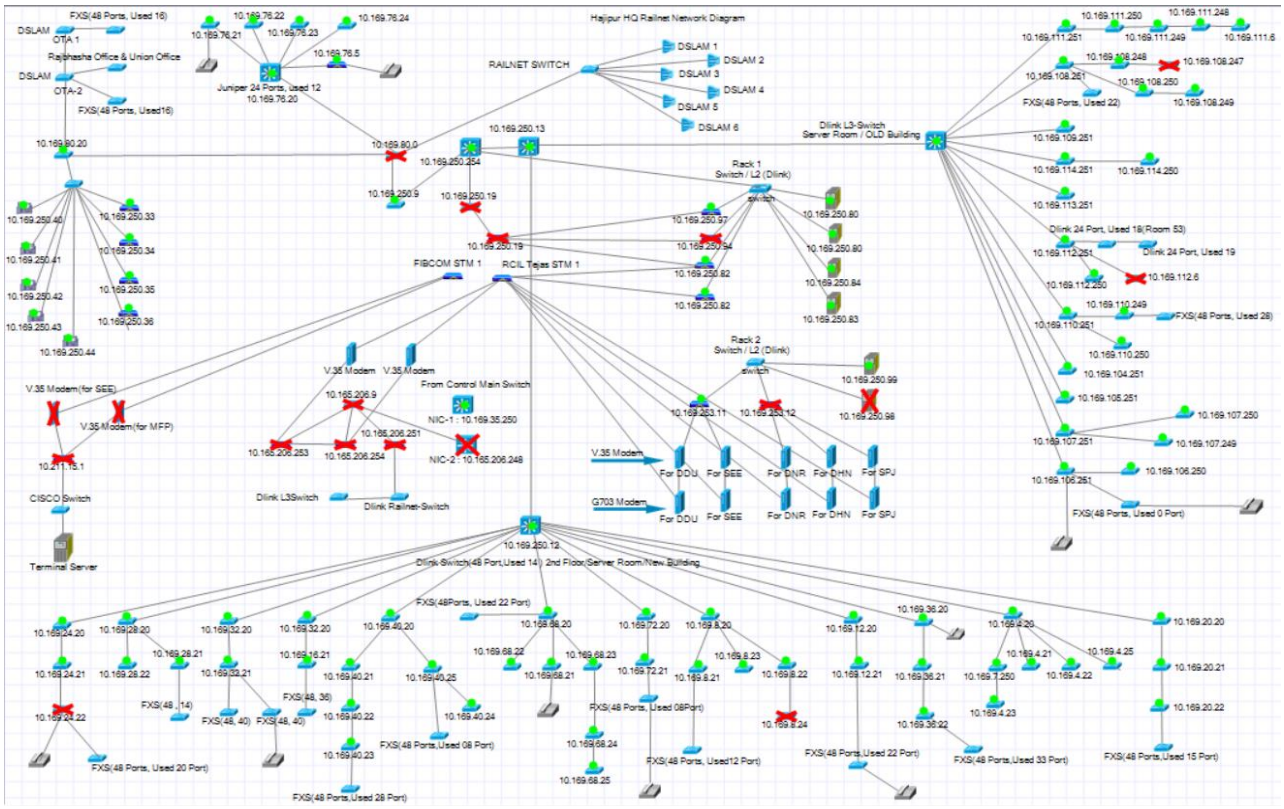
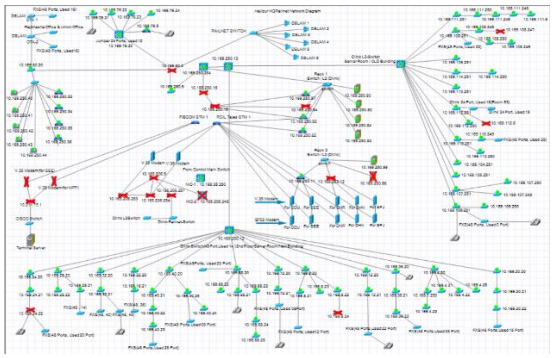
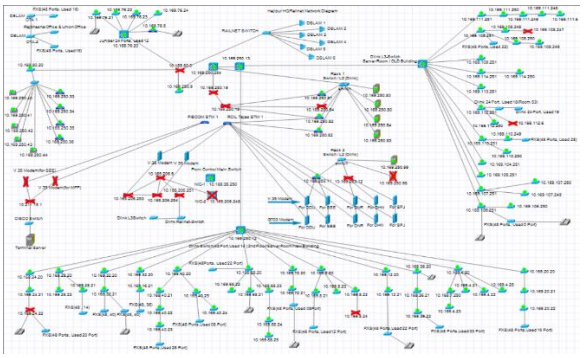
10.169.68.22 Unknown.	10.169.68.23 Unknown.	10.169.68.24 Unknown.	10.169.68.25 Unknown.	10.169.7.250 Unknown.	10.169.72.20 Unknown.	10.169.72.21 Unknown.	10.169.76.20 Unknown.	10.169.76.21 Unknown.	10.169.76.22 Unknown.	10.169.76.23 Unknown.
10.169.76.24 Unknown.	10.169.76.5 Unknown.	10.169.8.20 Unknown.	10.169.8.21 Unknown.	10.169.8.22 Unknown.	10.169.8.23 Unknown.	10.169.8.24 Unknown.	10.169.80.0 Unknown.	10.169.80.20 Unknown.	10.211.123.30 Unknown.	10.211.123.34 Unknown.
10.211.15.1 Unknown.										

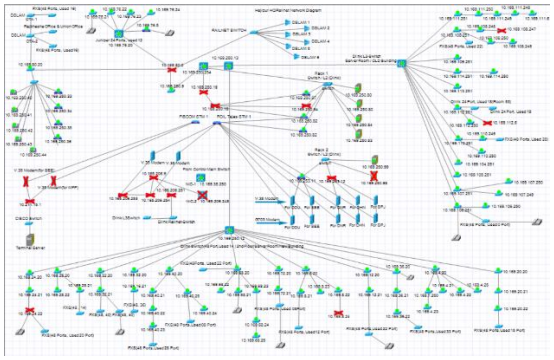
Real Time Screenshots

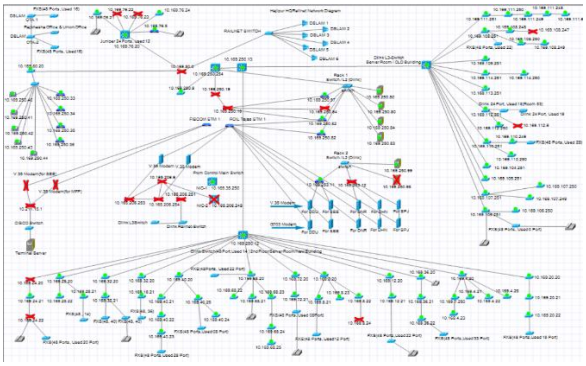
Network Notepad



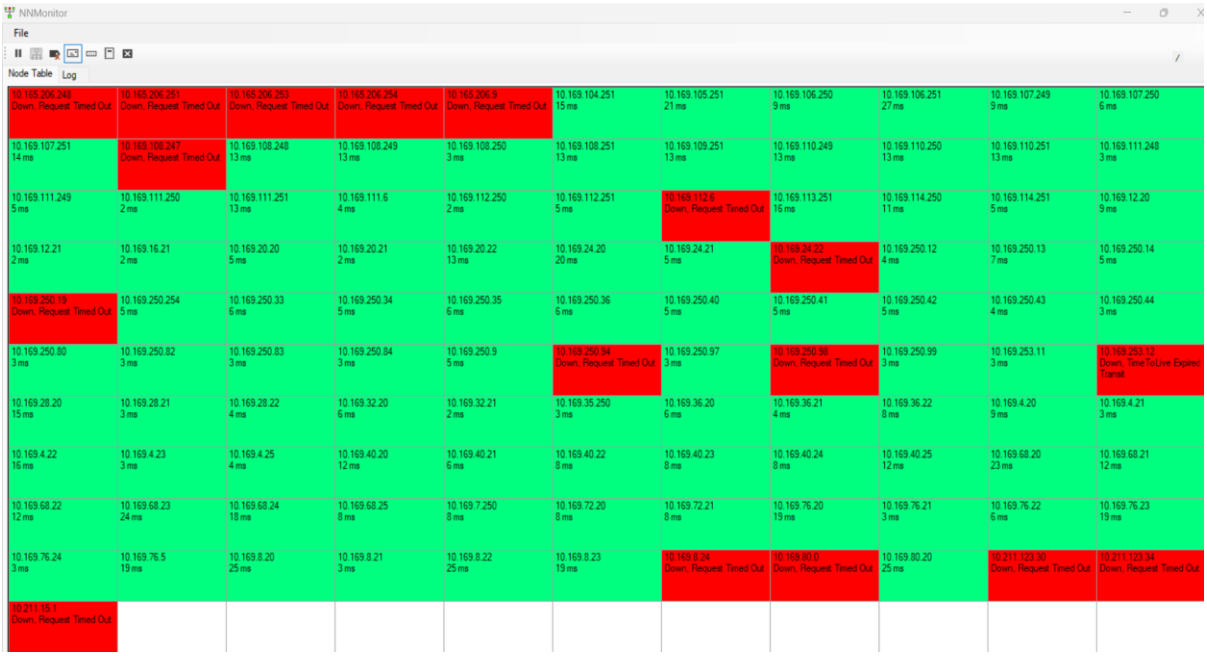








NN Monitor


NNMonitor
File
Node Table
Log
10.165.206.248 Down, Request Timed Out
10.165.206.251 Down, Request Timed Out
10.165.206.253 Down, Request Timed Out
10.165.206.254 Down, Request Timed Out
10.165.206.9 Down, Request Timed Out
10.169.104.251 15 ms
10.169.105.251 21 ms
10.169.106.250 9 ms
10.169.106.251 27 ms
10.169.107.249 9 ms
10.169.107.250 6 ms
10.169.107.251 14 ms
10.169.108.247 Down, Request Timed Out
10.169.108.248 13 ms
10.169.108.249 13 ms
10.169.108.250 3 ms
10.169.108.251 13 ms
10.169.109.251 13 ms
10.169.110.249 13 ms
10.169.110.250 13 ms
10.169.110.251 13 ms
10.169.111.248 3 ms
10.169.111.249 5 ms
10.169.111.250 2 ms
10.169.111.251 13 ms
10.169.111.6 4 ms
10.169.112.250 2 ms
10.169.112.251 5 ms
10.169.112.6 Down, Request Timed Out
10.169.113.251 16 ms
10.169.114.250 11 ms
10.169.114.251 5 ms
10.169.12.20 9 ms
10.169.12.21 2 ms
10.169.16.21 2 ms
10.169.20.20 5 ms
10.169.20.21 2 ms
10.169.20.22 13 ms
10.169.24.20 20 ms
10.169.24.21 5 ms
10.169.24.22 Down, Request Timed Out
10.169.250.12 4 ms
10.169.250.13 7 ms
10.169.250.14 5 ms
10.169.250.19 Down, Request Timed Out
10.169.250.254 5 ms
10.169.250.33 6 ms
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10.169.250.80 3 ms
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10.169.250.83 3 ms
10.169.250.84 3 ms
10.169.250.9 5 ms
10.169.250.94 Down, Request Timed Out
10.169.250.97 3 ms
10.169.250.98 Down, Request Timed Out
10.169.250.99 3 ms
10.169.253.11 3 ms
10.169.253.12 Down, TimeToLive Expired Transit
10.169.28.20 15 ms
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10.169.28.22 4 ms
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10.169.32.21 2 ms
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10.169.40.20 12 ms
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10.169.68.21 12 ms
10.169.68.22 12 ms
10.169.68.23 24 ms
10.169.68.24 18 ms
10.169.68.25 8 ms
10.169.7.250 8 ms
10.169.72.20 8 ms
10.169.72.21 8 ms
10.169.76.20 19 ms
10.169.76.21 3 ms
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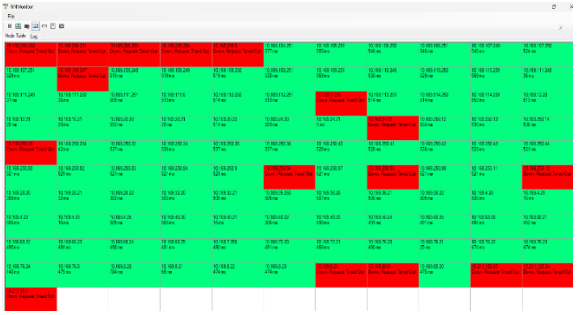
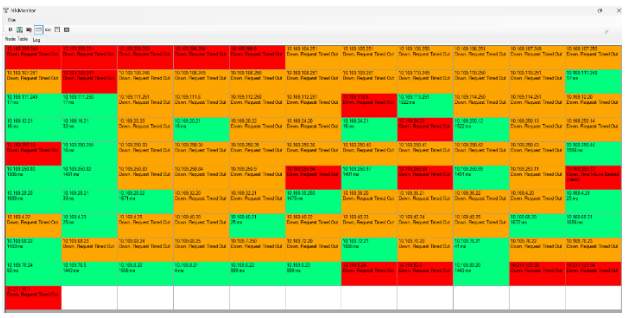
10.169.76.23 19 ms
10.169.76.24 3 ms
10.169.76.5 19 ms
10.169.8.20 25 ms
10.169.8.21 3 ms
10.169.8.22 25 ms
10.169.8.23 19 ms
10.169.8.24 Down, Request Timed Out
10.169.80.0 Down, Request Timed Out
10.169.80.20 25 ms
10.211.123.30 Down, Request Timed Out
10.211.123.34 Down, Request Timed Out
10.211.15.1 Down, Request Timed Out





Conclusion

The network infrastructure at Hajipur HQ Railnet is a robust and complex system designed to support the organization's diverse IT needs. This project has provided comprehensive documentation of the network components, including switches, servers, routers, DSLAMs, and various port connections. By using Network Notepad, we have created a detailed and organized visual representation of the network, highlighting the connections and interdependencies between different components.

The thorough documentation of the network layout ensures that all stakeholders, including network administrators and IT staff, have a clear understanding of the network's structure. This understanding is crucial for effective network management, allowing for efficient troubleshooting, maintenance, and optimization of network performance.

Additionally, the implementation of NN Monitor enhances the network's reliability and performance. NN Monitor enables continuous oversight of the network components, facilitating immediate detection and resolution of any issues that may arise. This proactive approach to network management ensures minimal downtime and maintains the smooth operation of Hajipur HQ Railnet's IT infrastructure.

In conclusion, the documented network diagram and the setup for real-time monitoring represent significant steps toward ensuring the efficiency and reliability of the network at Hajipur HQ Railnet. Regular updates and adherence to best practices will further enhance the network's performance, supporting the organization's broader mission and objectives.