

Automated Network Management Using ServiceNow

Introduction

In modern enterprise environments, managing network infrastructure manually is inefficient, error-prone, and unable to scale with increasing demand. Automated Network Management (ANM) integrated with ServiceNow provides a streamlined, proactive, and data-driven approach to network operations. This solution leverages ServiceNow's IT Service Management (ITSM) and orchestration capabilities to automate common network tasks, improve incident resolution times, and enhance overall network reliability.

Background & Problem Statement

In many organizations, network requests are handled through emails, spreadsheets, or ad-hoc ticket systems, leading to:

- Delayed responses due to manual approvals.
- Inconsistent request formats.
- Lack of visibility into request status.
- Errors in configuration changes.

Solution:

Implement a ServiceNow-based automated workflow for network requests that routes, approves, and fulfills tasks seamlessly, reducing human intervention and ensuring compliance.

Objectives

The primary objectives of implementing Automated Network Management with ServiceNow are:

Reduce Mean Time to Resolution (MTTR) for network incidents.

Automate repetitive tasks such as device configuration backups, port resets, and monitoring alerts.

Provide real-time visibility into network health and performance.

Enhance compliance with configuration and security policies.

Improve collaboration between Network Operations Center (NOC) teams and IT support.

Scope

This project covers: Automated Incident Detection – Integrating network monitoring tools (e.g., SolarWinds, Nagios, Cisco DNA Center) with ServiceNow for real-time incident creation.

Automated Remediation – Using ServiceNow workflows and orchestration to trigger scripts or API calls for common fixes.

Change Management Automation – Auto-generating change requests for network upgrades or configuration changes.

Reporting and Analytics – Dashboards for network KPIs such as uptime, incident trends, and SLA compliance.

Self-Service Portal – End-users can request network services (e.g., VLAN changes, access point resets) via ServiceNow.

System Architecture

Technical Design

Architecture Diagram:

User → ServiceNow Service Catalog → Approval Workflow →
Network Tool Integration → CMDB Update → Completion
Notification

Key Components:

Network Monitoring Tools – Detect and alert network events.

ServiceNow ITSM – Centralized ticketing, workflow automation, and reporting.

Orchestration Engine – Executes automated remediation scripts via
ServiceNow Orchestration or IntegrationHub.

Configuration Management Database (CMDB) – Stores network device
inventory and relationships.

APIs and Webhooks – Enable real-time data exchange between monitoring
tools and ServiceNow.

Workflow Example:

Network monitoring tool detects high CPU usage on a core switch.

Alert is sent via webhook/API to ServiceNow.

ServiceNow creates an incident ticket with device details from CMDB.

Automated workflow checks for known issues and runs a remediation script.

If resolved, ticket is automatically closed and a summary is sent to NOC.

If unresolved, ticket is escalated to a network engineer.

Benefits

Proactive Issue Resolution – Problems can be fixed before users notice them.

Reduced Downtime – Faster remediation of network faults.

Operational Efficiency – NOC staff focus on complex tasks instead of repetitive work.

Improved SLA Compliance – Automated escalation ensures timely responses.

Better Data Accuracy – CMDB remains up-to-date with automated discovery.

Security and Compliance

Access Controls – Only authorized personnel can trigger automation workflows.

Audit Trails – All automated changes are logged in ServiceNow.

Policy Enforcement – Automated scripts ensure network configurations comply with security policies.

Functional Requirements

1. Service Catalog Forms

- Custom forms for each network request type.
- Mandatory fields for request details (e.g., IP range, VLAN ID, rule justification).

2. Workflow Automation

- Automatic assignment to appropriate network team.
- Conditional approvals based on request type.

3. Integration

- API calls to network tools (e.g., Cisco DNA Center, Infoblox) for automated execution.

- Auto-update CMDB entries post-implementation.

4. **Notifications & SLAs**

- Email/SMS notifications at each stage.
- SLA timers for request handling.

Key Features

1. **Service Catalog Item** – Custom catalog item for “Network Request” with dynamic fields.
2. **Workflow Automation** – End-to-end automated workflow in ServiceNow Flow Designer.
3. **Approval Chains** – Conditional approvals based on request type, department, or cost.
4. **Integration** – API integration with network automation tools for configuration execution.
5. **Notifications** – Automated email/SMS updates for every stage.
6. **Reporting & Analytics** – SLA performance, request trends, and backlog insights.

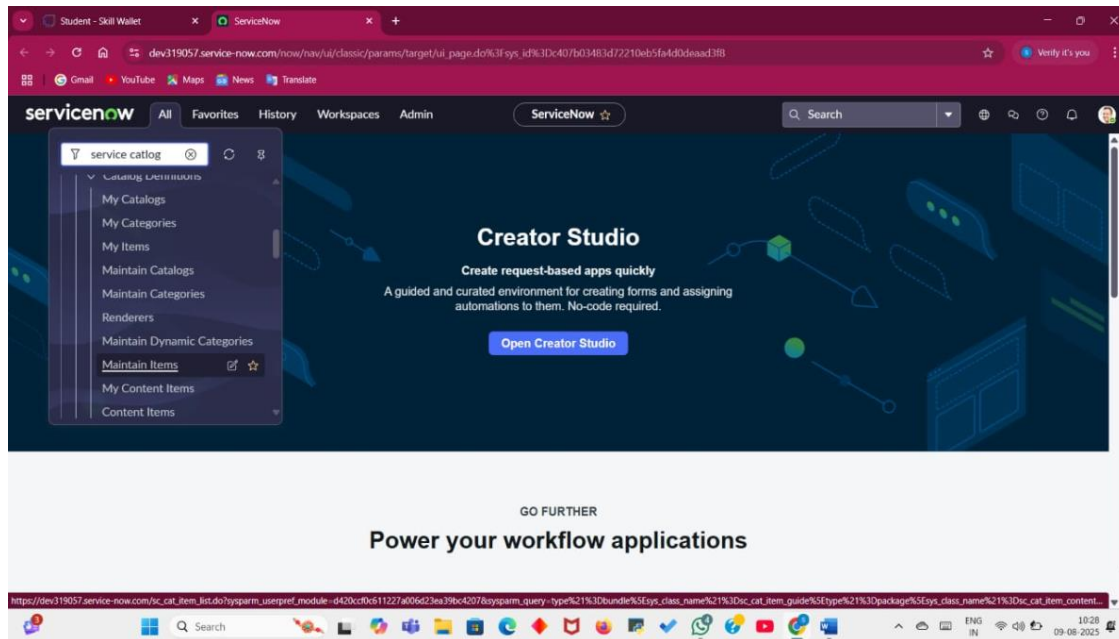
Results

Output Screenshots

- ServiceNow Catalogue
- Creation of Table
- Request Approvals Creation(Related List)
- Overview of flows,Actions in Flow Designer
- Creation & Implementation of flows, Actions in Flow Designer

- Final Testing in End User portal & Instance

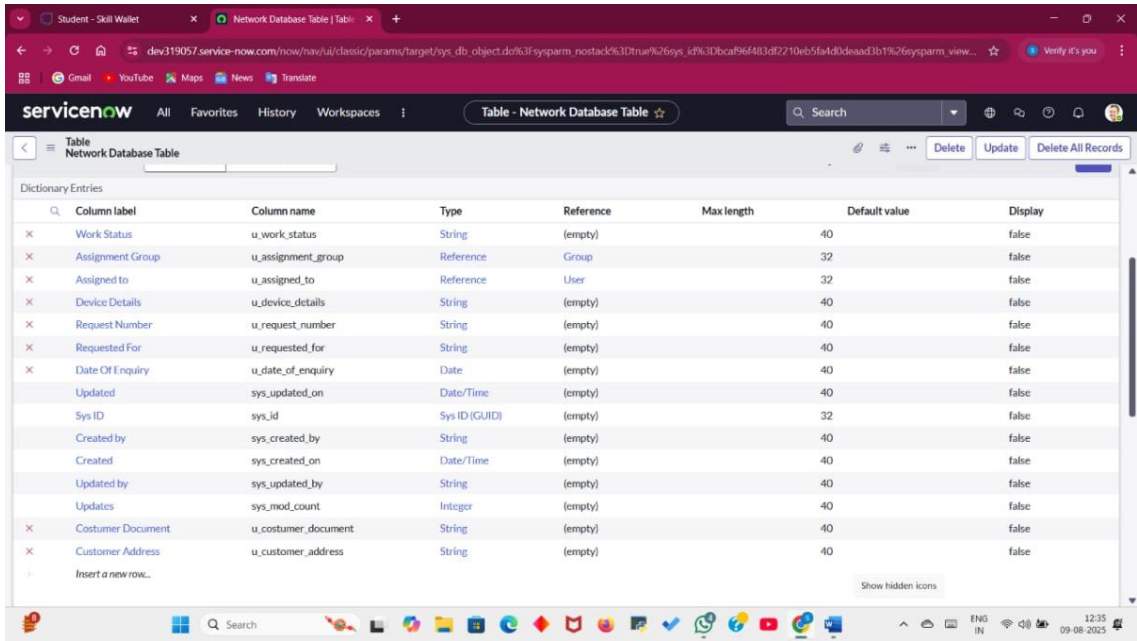
ServiceNow Catalogue



Creation of Table

The screenshot shows the 'Table - New Record' form in ServiceNow. The form includes fields for 'Label' (Network Database Table), 'Name' (u_network_database_table), and 'Extends table'. The 'Application' is set to 'Global'. There are checkboxes for 'Create module' and 'Create mobile module', both of which are checked. The 'Add module to menu' dropdown is set to '-- Create new --'. The 'New menu name' is 'Network Database Table'. The 'Remote Table' checkbox is unchecked. Below the form, there is a section for 'Columns' with a 'Table Columns' dropdown set to 'for text'. A table titled 'Dictionary Entries' is shown with columns: 'Column label', 'Type', 'Reference', 'Max length', 'Default value', and 'Display'. The table is currently empty, with a row for 'Insert a new row...'. The bottom of the page has a navigation bar with 'Submit' and 'Cancel' buttons.

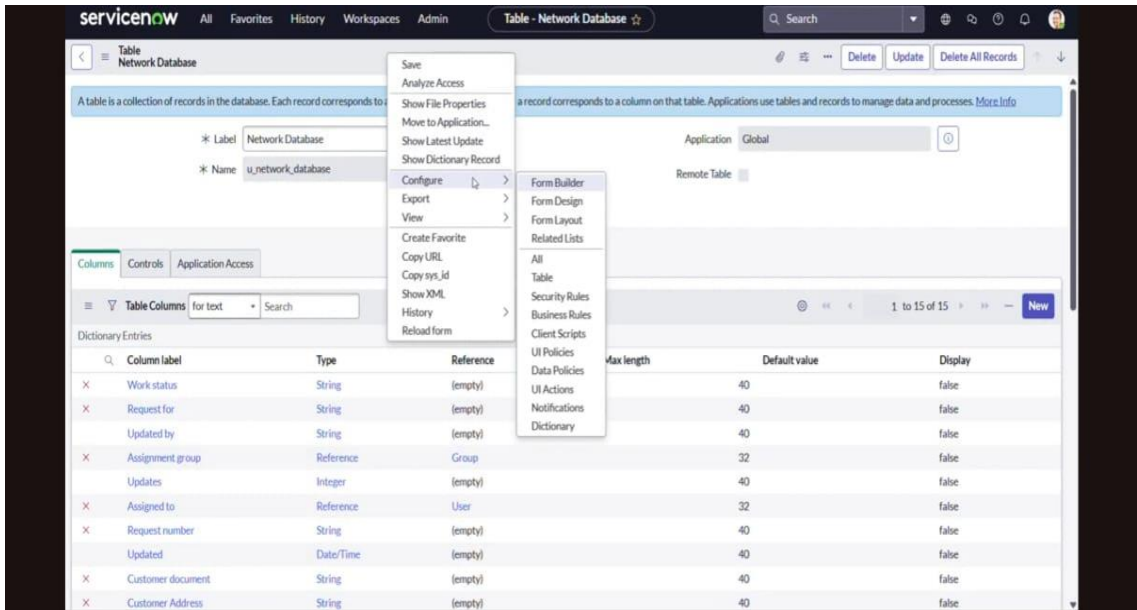
Creation of fields



The screenshot shows the ServiceNow interface for the 'Table - Network Database Table'. The table lists various dictionary entries with columns for Column label, Column name, Type, Reference, Max length, Default value, and Display. The entries include Work Status, Assignment Group, Assigned to, Device Details, Request Number, Requested For, Date Of Enquiry, Updated, Sys ID, Created by, Created, Updated by, Updates, Customer Document, and Customer Address.

Column label	Column name	Type	Reference	Max length	Default value	Display
Work Status	u_work_status	String	(empty)	40		false
Assignment Group	u_assignment_group	Reference	Group	32		false
Assigned to	u_assigned_to	Reference	User	32		false
Device Details	u_device_details	String	(empty)	40		false
Request Number	u_request_number	String	(empty)	40		false
Requested For	u_requested_for	String	(empty)	40		false
Date Of Enquiry	u_date_of_enquiry	Date	(empty)	40		false
Updated	sys_updated_on	Date/Time	(empty)	40		false
Sys ID	sys_id	Sys ID (GUID)	(empty)	32		false
Created by	sys_created_by	String	(empty)	40		false
Created	sys_created_on	Date/Time	(empty)	40		false
Updated by	sys_updated_by	String	(empty)	40		false
Updates	sys_mod_count	Integer	(empty)	40		false
Customer Document	u_customer_document	String	(empty)	40		false
Customer Address	u_customer_address	String	(empty)	40		false

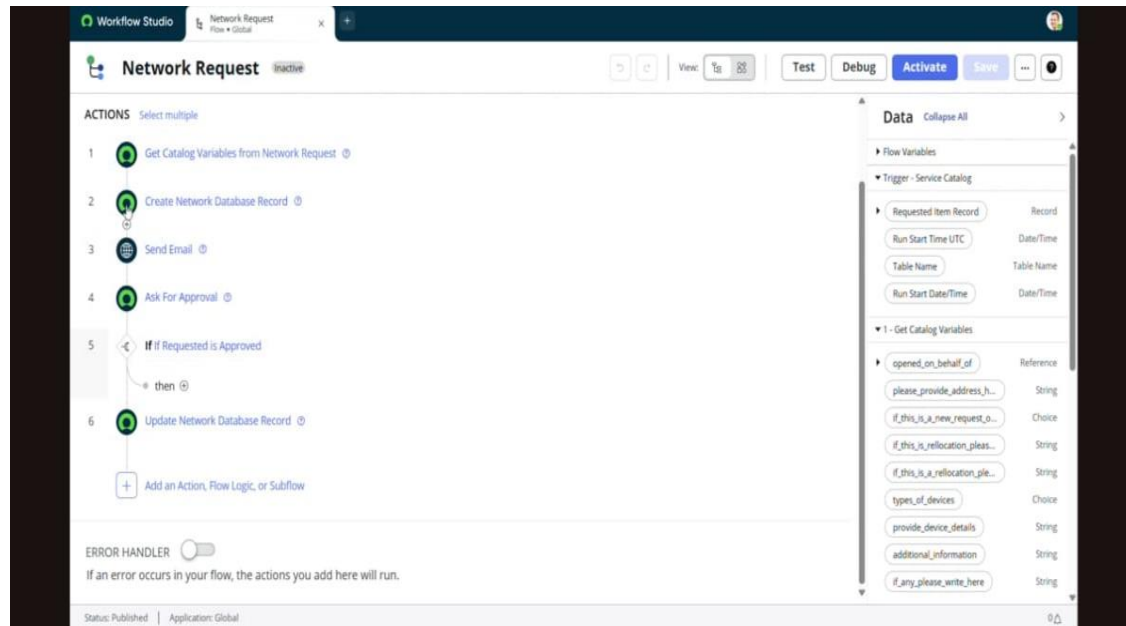
Request Approvals Creation(Related List)



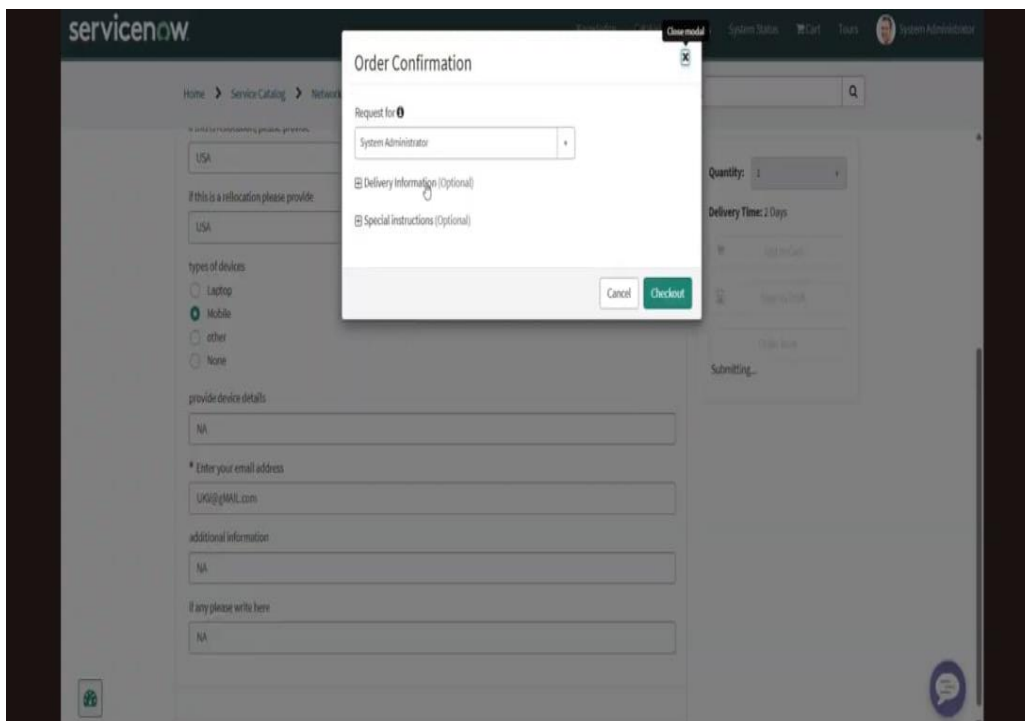
The screenshot shows the ServiceNow interface for the 'Table - Network Database'. A context menu is open over the 'Table Columns' tab, displaying options such as Save, Analyze Access, Show File Properties, Move to Application..., Show Latest Update, Show Dictionary Record, Configure, Export, View, Create Favorite, Copy URL, Copy sys_id, Show XML, History, and Reload form. The 'Table Columns' tab is active, showing a list of columns with their types and references. The 'Dictionary Entries' tab is also visible, showing a list of entries with their labels, names, and types.

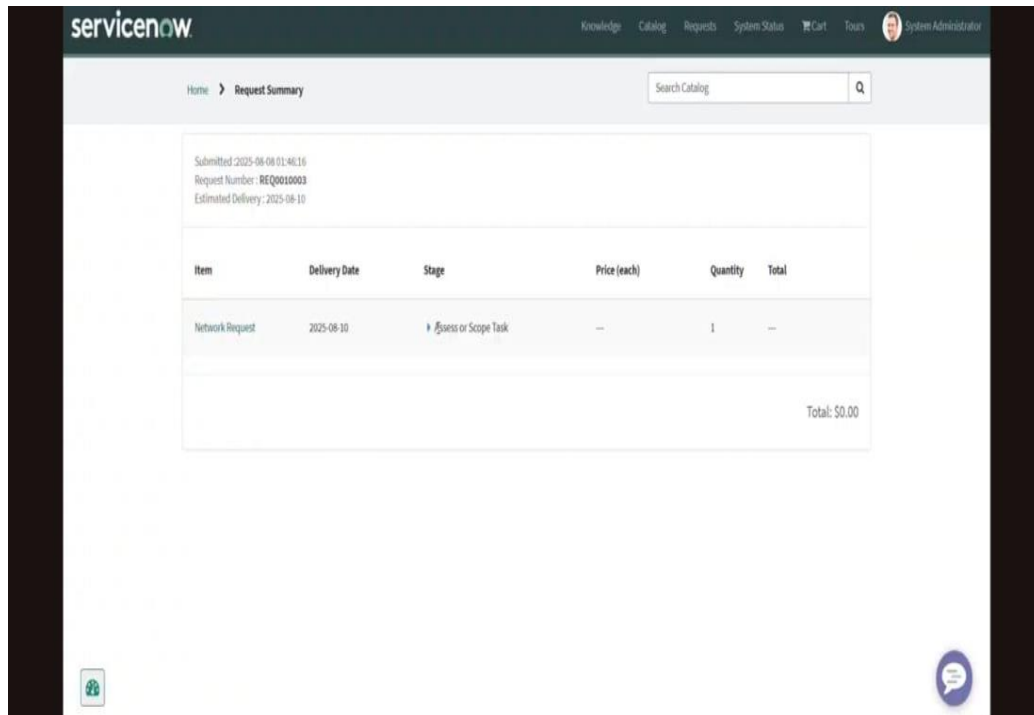
Column label	Type	Reference	Max length	Default value	Display
Work status	String	(empty)	40		false
Request for	String	(empty)	40		false
Updated by	String	(empty)	40		false
Assignment group	Reference	Group	32		false
Updates	Integer	(empty)	40		false
Assigned to	Reference	User	32		false
Request number	String	(empty)	40		false
Updated	Date/Time	(empty)	40		false
Customer document	String	(empty)	40		false
Customer Address	String	(empty)	40		false

Overview of flows , Actions in Flow Designer



Testing in Service Portal(End User)





Implementation Plan

Phase Activities Duration

Phase 1: Assessment Requirements gathering, tool inventory, CMDB audit 2 weeks

Phase 2: Integration Setup API/webhook integration between monitoring tools and ServiceNow 3 weeks

Phase 3: Workflow Development Build and test automated remediation workflows 4 weeks

Phase 4: Pilot Run Deploy automation for selected network segments 2 weeks

Phase 5: Full Deployment Expand automation across all network devices 3 weeks

Phase 6: Optimization Refine workflows, add new automation use cases

Ongoing

Phase	Activities	Deliverables
1. Requirement Gathering	Meet stakeholders, identify request types, approval chains.	Requirement Document
2. Design	Create catalog forms, workflows, integration plans.	Design Document
3. Development	Configure ServiceNow catalog items, workflows, APIs.	Configured Instance
4. Testing	Unit testing, UAT with network team.	Test Report
5. Deployment	Move configuration to production.	Go-Live Checklist
6. Training & Handover	Train network team and helpdesk.	Training Materials

Risk Management

Risk	Impact	Mitigation
API failure with network tools	Medium	Retry mechanism, fallback to manual
Incorrect request data	High	Mandatory field validation

Risk	Impact	Mitigation
Approval delays	Medium	Auto-reminders, escalation rules

Project Scope

In Scope:

- Network service request types:
 - IP address allocation/release
 - VLAN creation/modification
 - Firewall rule creation/removal
 - Network port activation/deactivation
- Service Catalog integration.
- Automated approval workflows.
- CMDB updates for network assets.
- Integration with network management tools via API.

Out of Scope:

- Physical network hardware procurement.
- End-user device configuration.

Functional Requirements

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3. Integration

- API calls to network tools (e.g., Cisco DNA Center, Infoblox) for automated execution.
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4. Notifications & SLAs

- Email/SMS notifications at each stage.
- SLA timers for request handling.

Example Use Cases

Automated switch port reset when a port is down.

Automatic configuration backup after a change is made.

Dynamic VLAN assignment based on ServiceNow request approvals.

Incident auto-resolution when a link recovers.

Firewall Rule Automation

Bandwidth Optimization

IP Address Management (IPAM)

Automated Device Onboarding

Proactive Hardware Replacement Alerts

Change Management for Firmware Upgrades

Monitoring & Maintenance

- Regular workflow audit.
- SLA performance reporting.
- Integration health checks.
- Periodic updates for catalog items.

Conclusion

The implementation of Automated Network Management using ServiceNow represents a significant leap from traditional, reactive IT operations to a proactive, intelligence-driven approach. By integrating network monitoring tools, orchestration workflows, and the CMDB into a unified ServiceNow ecosystem, the project not only accelerates incident resolution but also ensures higher accuracy, compliance, and visibility across the network infrastructure.

Through automated remediation, repetitive and error-prone manual tasks are eliminated, allowing Network Operations Center (NOC) teams to focus on complex, value-driven initiatives. The solution's real-time dashboards and SLA tracking mechanisms empower management with actionable insights, ensuring that performance standards are consistently met or exceeded.

From a business perspective, this approach reduces downtime, lowers operational costs, and enhances end-user satisfaction by delivering faster, more reliable network services. Furthermore, the integration of security policies and

audit trails ensures that every network change aligns with organizational compliance requirements, minimizing risks.

With its modular design, the system is built to adapt and scale — future enhancements could include AI-driven predictive maintenance, advanced analytics for capacity planning, and mobile-friendly self-service options for greater accessibility. Ultimately, this project lays the groundwork for a more agile, resilient, and intelligent IT infrastructure, aligning with modern digital transformation goals and positioning the organization for long-term operational excellence.

Future Scope

- **AI-Powered Predictive Maintenance** – Integrate AI/ML algorithms with ServiceNow’s data feeds to predict potential network failures before they occur, enabling preemptive actions and further reducing downtime.
- **Advanced Analytics Dashboards** – Expand existing dashboards to include trend analysis, capacity planning, and anomaly detection, giving IT leaders deeper insights into performance patterns and resource utilization.
- **Mobile-First Access & Control** – Develop a mobile-optimized self-service portal and admin interface, allowing end-users and NOC staff to request, approve, and monitor network services from any device.
- **Role-Based and Context-Aware Access** – Enhance security by implementing granular, context-based access controls where permissions adapt based on location, device, and time.

- **Integration with Cloud Networking Platforms** – Extend automation capabilities to hybrid and multi-cloud environments (e.g., AWS, Azure, Google Cloud) for unified network management.
- **Chatbot-Driven Self-Service** – Deploy AI chatbots integrated with ServiceNow Virtual Agent to guide users through network requests, troubleshooting steps, and status checks without human intervention.
- **Automated Compliance Audits** – Schedule and execute regular compliance scans for network configurations, with automated reporting to satisfy internal audits and regulatory requirements.
- **Zero-Touch Provisioning** – Enable fully automated provisioning of new network devices via API integration, ensuring instant setup and configuration without manual input.
- **Disaster Recovery Automation** – Incorporate automated failover and recovery workflows to minimize impact during critical outages or disasters.

Appendix

- Source Code: No external code; used ServiceNow platform
- Dataset Link: Not applicable
- GitHub Link: <https://github.com/Pavithra281004>