To efficiently address trouble tickets, the NOC team follows a systematic approach, adhering to a set of predefined steps. These steps involve identifying and diagnosing the possible issues, analyzing the corresponding status code responses, and taking appropriate actions to resolve the problem. By following this structured process, the NOC team can efficiently troubleshoot and restore SIP trunk and VoIP services, ensuring uninterrupted communication for the organization and its users.

Step-by-Step Troubleshooting Process:

1. Network Connectivity:

* The NOC team begins by checking the network connectivity, ensuring that there is no network outage or firewall blocking SIP traffic.
* If there is a network issue, the team investigates and takes necessary measures to restore the connection.
* The team also considers network congestion or DNS resolution failures as potential causes and addresses them accordingly.

1. SIP Server Availability:

* The NOC team verifies the availability of the SIP server, ensuring it is not experiencing any hardware or software failures.
* In case of server capacity issues, the team takes appropriate actions to allocate sufficient resources or scale up the server capacity.
* If there are configuration-related problems, the team reviews and updates the SIP server settings accordingly.

1. SIP Signaling:

* The team examines SIP signaling to identify any issues such as timeouts, invalid messages, or unsupported methods.
* Authentication failures or improper headers and parameters are also considered during the analysis.
* The team troubleshoots these signaling issues by adjusting server configurations, addressing authentication problems, or validating the SIP message structure.

1. Media Transmission and Quality:

* The NOC team investigates audio-related issues, including one-way audio, dropped calls, echo, latency, and codec compatibility.
* Problems such as network packet loss, jitter, and delay are analyzed to ensure smooth media transmission.
* By diagnosing and addressing these issues, the team ensures high-quality audio and a satisfactory user experience.

1. SIP Trunk Configuration and Authentication:

* The team examines the configuration settings of SIP trunks, ensuring they are valid and compatible.
* Authentication failures due to incorrect credentials are resolved by verifying and updating the authentication details.
* The NOC team also addresses issues related to SIP trunk routing, NAT traversal, Dial Plan settings, and port/channel availability.

**Troubleshooting Process**

|  |  |  |
| --- | --- | --- |
| **Process** | **Possible Issues** | **Status Code Response** |
| **Network Connectivity** | Network outage | 503 Service Unavailable |
|  | Firewall blocking SIP traffic | 403 Forbidden |
|  | Network congestion | 486 Busy Here |
|  | DNS resolution failure | 502 Bad Gateway |
| **SIP Server Availability** | SIP server hardware failure | 503 Service Unavailable |
|  | SIP server software failure | 500 Internal Server Error |
|  | Insufficient SIP server capacity | 503 Service Unavailable |
|  | Invalid SIP server configuration | 500 Internal Server Error |
| **SIP Signaling** | SIP request timeout | 408 Request Timeout |
|  | Invalid SIP message | 400 Bad Request |
|  | Unsupported SIP method | 405 Method Not Allowed |
|  | Authentication failure | 401 Unauthorized |
|  | Invalid SIP headers or parameters | 400 Bad Request |
|  | SIP session negotiation failure | 488 Not Acceptable Here |
| **Media Transmission and Quality** | One-way audio | 183 Session Progress or 488 Not Acceptable Here |
|  | Dropped or choppy audio | 503 Service Unavailable or 486 Busy Here |
|  | Echo or excessive latency | 503 Service Unavailable or 486 Busy Here |
|  | Audio codec compatibility issues | 488 Not Acceptable Here |
|  | Network packet loss | 503 Service Unavailable |
|  | Jitter and packet delay | 503 Service Unavailable |
| **SIP Trunk Configuration and Authentication** | Invalid SIP trunk configuration | 500 Internal Server Error |
|  | Incorrect authentication credentials | 401 Unauthorized |
|  | Incompatible SIP trunk settings | 488 Not Acceptable Here |
|  | Insufficient SIP trunk capacity | 503 Service Unavailable |
|  | Incorrect SIP trunk routing | 404 Not Found |
|  | Improper NAT traversal configuration | 503 Service Unavailable |
|  | Incorrect Dial Plan or number translation | 404 Not Found |
|  | Insufficient SIP trunk ports or channels | 503 Service Unavailable |

Depending on the trouble reported/observed, the below Table describes the usual steps taken towards the resolution of the ticket logged or issue observed

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Step** | **Action** | **Decision** | **Yes** | **No** |
| **Start** |  |  |  |  |
|  | Check network connectivity | Network connection OK? | Proceed | Troubleshoot network connection |
|  |  |  |  |  |
| **Troubleshoot network connection** | Resolve network issue and retry | Network connection OK? | Proceed | Continue |
|  |  |  |  |  |
| **Continue** | Check DNS settings | DNS settings correct? | Proceed | Update DNS settings and retry |
|  |  |  |  |  |
| **Continue** | Check firewall settings | Firewall settings correct? | Proceed | Update firewall settings and retry |
|  |  |  |  |  |
| **Continue** | Check SIP server status | SIP server reachable? | Proceed | Troubleshoot SIP server issue |
|  |  |  |  |  |
| **Continue** | Check SIP credentials | Credentials correct? | Proceed | Update credentials and retry |
|  |  |  |  |  |
| **Continue** | Check SIP signaling | Signaling correct? | Proceed | Troubleshoot signaling issue |
|  |  |  |  |  |
| **Continue** | Check media settings | Media settings correct? | Proceed | Update media settings and retry |
|  |  |  |  |  |
| **Continue** |  |  |  | Unable to resolve the issue |
|  |  |  |  |  |
| **Check SIP status codes** |  | Known issue? | Apply known solution | Continue |
|  |  |  |  |  |
| **Apply known solution** | Issue resolved? |  |  | Continue |
|  |  |  |  |  |
|  |  |  |  |  |