



Mutual TLS (mTLS) Support and Validation

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Feature Summary and Revision History

Summary Data

Table 1: Summary Data

Applicable Products or Functional Area	AMF
Applicable Platforms	SMI
Feature Default Setting	Disabled – Configuration required to enable
Related Documentation	For related information, see the <i>TLS Transport Support</i> chapter in this document.

Revision History

Table 2: Revision History

Revision Details	Release
First introduced.	2022.04.0

Feature Description

The AMF supports the mutual TLS secure channel for SBI interfaces. With the mTLS Support for SBI interfaces, the AMF performs the following:

- Handles mutual TLS requests from the server and the client
- Supports HTTP2 over the TLS secure channel for all NF interfaces

This feature also supports in generating alarms when the certificates expire within a configured threshold period.

Relationships

The mTLS support for SBI interfaces feature has the relationship with TLS transport support feature. The following are the roles associated with the AMF:

- [Server Configuration in AMF, on page 3](#)
- [Client Configuration in AMF, on page 4](#)

For related information, see the *TLS Transport Support* chapter in this document.

Prerequisites

The mTLS Support for SBI interfaces feature has the following prerequisite:

- The user must procure and configure the following:
 - Certificate Authority (CA) certificates
 - Other certificates or keys necessary for the server and the client
- For more information on the following topics, see the *TLS Transport Support* chapter in this document.
 - For the client, and the server certificate configuration
 - For the ca-certificate configuration
 - For uri-scheme https, in the profile nf-client configuration

How it Works

This section describes how this feature works. It has the following synopsis:

- The TLS protocol is used for transport layer protection.
- The AMF supports TLS versions 1.2 and 1.3 for all inbound and outbound HTTPS, and outbound TCP transport.
- The AMF supports enabling mutual TLS for the SBI endpoint.

Limitations

This feature has the following limitations:

- The mTLS secure channel support feature for the AMF provides transport layer encryption between nodes for security compliance purposes only.
- The AMF doesn't support NF security requirements as per 3GPP specifications of 5G.
- The AMF supports L1-X1 over the UDP in Cisco format only. As a result, the AMF doesn't support the mTLS on the L1-X1 interface.
- The AMF doesn't support dynamic mTLS CLI change configuration.

Server Configuration in AMF

The AMF acts as the server for all peer NFs over the SBI interface.

The SBI interface servers characteristics are determined by **instance instance-id endpoint sbi** configurations.

The server certificates get configured at the SBI endpoint.

Feature Configuration

To configure this feature, use the following configuration:

```
config
  instance instance-id instance_id
    endpoint sbi
      uri-scheme {http | https}
      mtls-enable {false | true}
      certificate-name certificate_name
    end
```

NOTES:

- **instance instance-id instance_id**—Specify the instance ID.
- **endpoint sbi**—Specify the endpoint as *sbi*.
- **uri-scheme {http | https}**—Specify the uri-scheme as https. The default value is http.
- **mtls-enable {false | true}**—Specify the mTLS configuration as either true or false.
- **certificate-name certificate_name**—Specify the certificate name for the server which is used by AMF for HTTPS messages. The list of certificate names is obtained from the **nf-tls** command.

Configuration Example

The following is an example configuration.

```
config
  instance instance-id 1
    endpoint sbi
      uri-scheme https
```

```
mtls-enable true
certificate-name serv-cert
exit
exit
exit
```

Configuration Verification

To verify the configuration, use the following command:

```
amf# show running-config instance instance-id 1 endpoint sbi
```

Client Configuration in AMF

The AMF acts as client-to-peer NFs while sending notifications or updates. The characteristics of the client configurations are determined by using the **endpoint-profile** configuration. The server name gets configured, when the URI scheme is in a secured (HTTPS) environment for locally configured NF profiles and NRF-related configurations.

Feature Configuration

To configure this feature, use the following configuration. The following commands help in enabling the mTLS option along with the server name at the NF and NRF-related configurations:

```
config
  profile nf-client
    nf-type ausf
    ausf-profile AUP1
    locality LOC1
    service type nausf-auth
    endpoint-profile ep_profile_name
    type EP1
    locality LOC1
    uri-scheme https
    server-name server_name
  group nrf
    mgmt MGMT_name
    service type nrf nnrf-nfm
    endpoint-profile ep_profile_name
    name mgmt-prof
    uri-scheme https
    server-name server_name
  group nrf
    discovery udmdiscovery
    service type nrf nnrf-disc
    endpoint-profile ep_profile_name
    name EP1
    uri-scheme https
    server-name server_name
  end
```

NOTES:

- **profile nf-client nf-type ausf ausf-profile AUP1**—Specify the required NF client profiles and provide the local configuration.
- **service type nausf-auth | service type nrf nnrf-nfm | service type nrf nnrf-disc**—Specify the service names as per the 3GPP standards.
- **group nrf mgmt MGMT_name**—Specify the NRF self-management group configurations.
- **instance instance-id instance_id**—Specify the instance ID.
- **endpoint-profile ep_profile_name**—Specify the endpoint-profile name.
- **uri-scheme {http | https}**—Specify the uri-scheme as https. The default value is http.
- **server-name server_name**—Specify the **DNS name** (FQDN) of the peer NF and the **server-name** must match the DNS attribute of the **subjectAltName** field in the peer NF certificates.

Configuration Example

The following is an example configuration.

```
config
group nrf mgmt MGMT
  service type nrf nnrf-nfm
  endpoint-profile
    name mgmt-prof
    uri-scheme https
    server-name server_name
    endpoint-name mgmt-1
    primary ip-address ipv4 209.165.201.1
    primary ip-address port 9051
  exit
exit
exit
exit
profile nf-client nf-type ausf
ausf-profile AUP1
  locality LOC1
  priority 30
  service name type nausf-auth
  endpoint-profile EP1
  capacity 30
  uri-scheme https
  server-name server_name
  endpoint-name EP1
  priority 56
  primary ip-address ipv4 209.165.201.1
  primary ip-address port 9047
  exit
exit
exit
exit
exit
exit
```

Configuration Verification

To verify the configuration, use the following command:

```
amf(config)# show full-configuration profile
```

