



MPP for Third-Party Applications

MPP for Third-Party Applications (TPA) provides a mechanism for securing management traffic on the router. Without MPP for TPA, if the service is enabled, the Cisco IOS XR allows the service traffic to pass through any interface with a network address.

MPP for TPA enables to filter the traffic of TPA component. The addition of gRPC component controls the management protocol traffic and supports the management protocols for the TPA. It also helps to control the gRPC application and filter the gRPC traffic through MPP configuration.

MPP for TPA helps in rate limiting or throttling the traffic through configuration with the help of LPTS. MPP for TPA filters traffic based on the following tuples: address family, vrf, port, interface, local address and remote address.



Note It is mandatory to configure address family, protocol, local port, and vrf, as well as at least one of interface or local or remote address.

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gRPC Protocol

Google-defined Remote Procedure Calls (gRPC) is an open-source RPC framework. It is based on Protocol Buffers (Protobuf), which is an open source binary serialization protocol. gRPC provides a flexible, efficient, automated mechanism for serializing structured data, like XML, but is smaller and simpler to use. The user needs to define the structure by defining protocol buffer message types in .proto files. Each protocol buffer message is a small logical record of information, containing a series of name-value pairs.

Cisco gRPC Interface Definition Language (IDL) uses a set of supported RPCs such as get-config, merge-config, replace-config, cli-config, delete-config, cli-show, get-models, action-json, commit, and commit-replace. gRPC server runs in Extensible Manageability Services Daemon (emsd) process. gRPC client can be on any machine.

gRPC encodes requests and responses in binary. gRPC is extensible to other content types along with Protobuf. The Protobuf binary data object in gRPC is transported over HTTP/2.



Note It is recommended to configure TLS before enabling gRPC. Enabling gRPC protocol uses the default HTTP/2 transport with no TLS enabled on TCP. gRPC mandates AAA authentication and authorization for all gRPC requests. If TLS is not configured, the authentication credentials are transferred over the network unencrypted. Non-TLS mode can only be used in secure internal network.

gRPC supports distributed applications and services between a client and server. gRPC provides the infrastructure to build a device management service to exchange configuration and operational data between a client and a server. The structure of the data is defined by YANG models.

Limitations for MPP for TPA

The following limitations are applicable for the MPP for TPA:

- If multiple MPP entries are configured with the combination of same local-port and different remote-addresses or interfaces, then only the latest entry is valid and available.

Prerequisites for MPP for TPA Over GRPC

Ensure that the gRPC is configured.

gRPC Configuration

```
Router(config)# grpc port port-number
Router(config)# grpc no-tls
Router(config-grpc)# commit
```

Running Configuration

```
Router# show running-config grpc

grpc port 57600
no-tls
!
```

Configuring MPP Over gRPC With TPA

The following task shows how to configure MPP over gRPC with TPA.

```
Router# configure
Router(config)# control-plane
Router(config-ctrl)# management-plane
Router(config-mpp)# tpa
Router(config-mpp-tpa)# vrf default
Router(config-mpp-tpa-vrf)# address-family [ipv4 | ipv6]
Router(config-mpp-tpa-vrf)# allow local-port port-number protocol protocol-number
[interface interface-name] local-address IP local address |
remote-address IP remote address]
```

Running Configuration

```
Router# show running-config control-plane

control-plane
management-plane
 tpa
  vrf default
    address-family ipv4
      allow local-port 57600 protocol tcp interface any remote-address 2.2.2.2/32 local-address
1.1.1.1/32
    !
  !
  !
```

For more information on **tpa** and **allow local-port** commands, see *Management Plane Protection Commands* Chapter of the *System Security Command Reference for Cisco NCS 5500 Series Routers*.

Troubleshooting MPP Over gRPC

The following show command output verifies whether gRPC is configured or not.

```
Router# show running-config grpc

grpc
no-tls
!
```

The following show command output displays the gRPC configuration.

```
Router# show running-config control-plane

control-plane
management-plane
 tpa
  vrf default
    address-family ipv4
      allow local-port 57600 protocol tcp inter mgmtEth 0/RP0/CPU0/0 local-address 1.1.1.1/32
remote-address 2.2.2.2/32
    !
```

gRPC Configuration without MPP

```
Router# show kim lpts database
```

```
State:
Prog - Programmed in hardware
Cfg - Configured, not yet programmed
Ovr - Not programmed, overridden by user configuration
Intf - Not programmed, interface does not exist
```

Owner	AF	Proto	State	Interface	VRF	Local ip,port	>	Remote ip,port
Linux	2	6	Prog			global-vrf		any,57600
				> any,0				

```
Router# show lpts bindings brief | include TPA
0/RP0/CPU0 TPA LR IPV4 TCP default any any,57600 any
```

gRPC Configuration with MPP TPA

The following show command output displays the things that are configured in the LPTS database. It also checks if gRPC configuration is owned by Linux without using any filters.

```
Router# show kim lpts database
```

```
State:
```

```
  Prog - Programmed in hardware
  Cfg  - Configured, not yet programmed
  Ovr  - Not programmed, overridden by user configuration
  Intf - Not programmed, interface does not exist
```

```
Owner  AF Proto State Interface      VRF          Local ip,port > Remote ip,port
-----
Client  2     6 Prog          default      192.168.0.1/32,57600 > 10.0.0.2/32,0
Linux   2     6 Ovr          global-vrf   any,57600 > any,0
```

```
Router# show lpts bindings brief | include TPA
```

```
  0/RP0/CPU0 TPA LR IPV4 TCP default Mg0/RP0/CPU0/0 192.168.0.1,57600 10.0.0.2
```

```
Router#
```

```
Router# 0/RP0/ADMIN0:Mar 19 15:22:26.837 IST: pm[2433]:
```

```
%INFRA-Process_Manager-3-PROCESS_RESTART : Process tams (IID: 0) restarted
```