



Programmability Command Reference for Cisco NCS 5500 Series Routers

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Preface

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grpc-commands

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port (gRPC)

To set custom ports for gNMI, gRIBI, and P4RT services within the defined range, including default IANA ports like 9339, 9340, and 9559 (respectively), use the **port** command under the service submode.

port portnum

Syntax Description	<i>portnum</i>	Specifies the server listening port for the gRPC service. <ul style="list-style-type: none"> • gNMI service port: default: 9339, range: 57344-57999 • gRIBI service port: default: 9340, range: 57344-57999 • p4RT service port: default: 9559, range: 57344-57999
Command Default	None	
Command History	Release	Modification
	Release 24.1.1	This command was introduced.
Usage Guidelines	Disabling the port command will cause the service to use the default or IANA port.	
Task ID	Task ID	Operations
	config-services	read, write

Examples

The following example shows how to configure a port for any available gRPC service (gNMI, P4RT, gRIBI) :

For P4RT service:

```
Router(config-grpc)#p4rt
Router(config-grpc-p4rt)#port 9559
Router(config-grpc-p4rt)#commit
```

Verify the port number.

```
Router#show running-config grpc
grpc
  p4rt
    port 9559
!
```

gnmi

To create a gRPC listener with the default or IANA ratified gNMI port of 9339, use the **gnmi** command in Global Configuration Mode.

gnmi port *portnum*

Syntax Description	<i>portnum</i>	Specifies the server listening port for the gRPC service. • gNMI service port: default: 9339, range: 57344-57999
Command Default	None	
Command Modes	Global Configuration Mode	
Command History	Release	Modification
	Release 24.1.1	This command was introduced.
Usage Guidelines	Unconfiguring gNMI will disable requests on port 9339. The allowed ports within this range are 9339 (IANA ratified port) and 57344-57999 (Linux application port range)	
Task ID	Task ID	Operations
	config-services	read, write

Examples

The following example shows how to configure gNMI as a submode under gRPC and committing this configuration would create a gRPC listener with the default or IANA ratified gNMI port of 9339.

```
Router(config-grpc)#gnmi
Router(config-grpc-gnmi)#commit
```

Verify the submode configuration.

```
Router#show running-config grpc
grpc
  gnmi
!
```

The **port** command under gNMI submode allows the port to be modified in the port range or IANA ratified port.

```
Router(config-grpc)#gnmi
Router(config-grpc-gnmi)#port 9339
Router(config-grpc-gnmi)#commit
```

Verify the port number.

```
Router#show running-config grpc
grpc
```

gnmi

```
gnmi
  port 9339
!
```

grpc

To configure network devices and view operational data, use the **grpc** command in the XR Config mode. To remove the **grpc** protocol, use the **no** form of this command.

```
grpc { address-family | certificate-authentication | dscp | local-connection | max-concurrent-streams | max-request-per-user | max-request-total | max-streams | max-streams-per-user | tls-max-version | tls-min-version | no-tls | tlsv1-disable | tls-cipher | tls-mutual | tls-trustpoint | service-layer | vrf }
```

Syntax Description	
address-family	Specifies the address family identifier type.
certificate-authentication	It enables certificate-based authentication.
dscp	Specifies QoS marking DSCP on transmitted gRPC.
local-connection	It enables grpc server over unix socket.
max-concurrent-streams	Specifies the limit on the maximum concurrent streams per gRPC connection to be applied on the server.
max-request-per-user	Specifies the maximum concurrent requests per user.
max-request-total	Specifies the maximum concurrent requests in total.
max-streams	Specifies the maximum number of concurrent gRPC requests. The maximum subscription limit is 128 requests. The default is 32 requests.
max-streams-per-user	Specifies the maximum concurrent gRPC requests for each user. The maximum subscription limit is 128 requests. The default is 32 requests.
tls-max-version	Specifies the maximum version that TLS supports. It supports 1.0, 1.1, 1.2, and 1.3
tls-min-version	Specifies the minimum version that TLS supports. It supports 1.0, 1.1, 1.2, and 1.3
no-tls	It disable transport layer security (TLS). The TLS is enabled by default.
tlsv1-disable	It disable TLS version 1.0
tls-cipher	It enable the gRPC TLS cipher suites.
tls-mutual	Specifies the mutual authentication.
tls-trustpoint	It configure trustpoint.
service-layer	It enable the grpc service layer configuration.
vrf	It enable server vrf.

Command Default	None
-----------------	------

Command Modes	XR Config mode	
Command History	Release	Modification
	Release 24.1.1	This command was introduced.
Usage Guidelines	This command is supported on Cisco IOS XR 64-bit OS.	
Task ID	Task ID	Operations
		config-services read

The following example shows how to enable gRPC over an HTTP/2 connection:

```
Router#configure
Router(config)#grpc
Router(config-grpc)#port <port-number>
```

grpc aaa accounting queue-size

To configure the number of accounting records in a queue, use the **grpc aaa accounting queue-size** command in the .

grpc aaa accounting queue-size *size*

Syntax Description	<i>size</i>	Specifies the number of accounting history records in a queue. The default value is 40, and it ranges from 1—512.
Command Default	None	
Command Modes	Global Configuration mode	
Command History	Release	Modification
	Release 24.3.1	The command was introduced.
Usage Guidelines	None	
Task ID	Task ID	Operation
	config-services	read, write

This example configures the maximum size for history record processing queues to the specified value.

```
Router# configure
Router(config)# grpc aaa accounting queue-size 30
Router(config)# end
```

grpc certificate common-name

grpc certificate common-name

To allow the router (tunnel client) to dial out to a collector (tunnel server), use the **grpc** command in the . To remove the gRPC service, use the **no** form of this command.

grpc certificate common-name WORD

Syntax Description	<i>WORD</i>	Specifies the common name when certificate is generated, default: ems.cisco.com .
Command Default	None	
Command Modes		
Command History	Release	Modification
	Release 24.1.1	This command was introduced.
Usage Guidelines	No specific guidelines impact the use of this command.	
Task ID	Task ID	Operations
	config-services	read, write
Examples	The following example shows how to specify a common-name:	

```
Router(config)#grpc
Router(config-grpc)#certificate common-name
Router(config-grpc)#commit
```

gnsi load service authorization policy

To instruct the router to load the service authorization policy file into its memory and update the policy, use the **gnsi load service authorization policy** command in Global Configuration Mode.

gnsi load service authorization policy *file_path*

Syntax Description	<i>file-path</i> Specifies the path of the policy file.	
Command Default	Enabled, by default	
Command Modes	Global Configuration Mode	
Command History	Release	Modification
	Release 7.11.1	This command was introduced.
Usage Guidelines	A policy file which has no specified or the policy is invalid, the default behavior will transition to the zero-policy behavior. Zero-policy allows all gRPC services to all the users if their profiles are configured.	
Task ID	Task ID	Operation
	config-services	read, write

This example shows how to activate the authorization policy test.json in the router.

```
Router(config)#gnsi load service authorization policy /disk0:/test.json
Successfully loaded policy
```

```
■ grpc gnsi service certz ssl-profile-id
```

grpc gnsi service certz ssl-profile-id

To instruct the router to load the certz.proto, use the **grpc gnsi service certz ssl-profile-id** command in Global Configuration Mode. To disable the SSL profiles configured with certz.proto, use the no form of the command.

grpc gnsi service certz ssl-profile-id *ssl-profile name*

Syntax Description	<i>ssl-profile name</i> Specifies the SSL-profile name for which certz.proto needs to be activated.				
Command Default	None				
Command Modes	Global Configuration Mode				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 24.1.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 24.1.1	This command was introduced.
Release	Modification				
Release 24.1.1	This command was introduced.				
Usage Guidelines	If Certz.proto is not active, then gNOI cert.proto is taken into consideration. If neither certz.proto nor cert.proto is active, then TLS trustpoint's data is considered.				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>config-services</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operation	config-services	read, write
Task ID	Operation				
config-services	read, write				

This example shows how to activate the certz.proto in the router.

```
Router(config)#grpc gnsi service certz ssl-profile-id gNxi
Router(config)#commit
```

grpc max-concurrent-streams

To specify a limit on the number of concurrent streams per gRPC connection to be applied on the server, use the **grpc max-concurrent-streams** command in the Global Configuration mode. To restore the default value, use the **no** form of this command.

grpc max-concurrent-streams *limit*

Syntax Description	max-concurrent-streams <i>limit</i>	Specifies the limit on the number of concurrent streams per gRPC connection to be applied on the server. The range is from 1 to 128. The command default is 32.
Command Default	By default, the maximum concurrent streams per gRPC connection is 32.	
Command Modes	Global Configuration mode	
Command History	Release	Modification
	Release 24.1.1	This command was introduced.
Usage Guidelines	No specific guidelines impact the use of this command.	
Task ID	Task ID	Operations
	config-services	read, write

Examples

The following example shows how to set the limit of the number of concurrent streams per gRPC connection to 40:

```
Router#configure
Router(config)#grpc max-concurrent-streams 40
```

show gnsi acctz statistics

show gnsi acctz statistics

To display the detailed statistics for GNSI Acctz accounting, use the **show gnsi acctz statistics** command in the .

This command provides these information:

- per service counter
- drop counter
- rate of accounting events
- history
- connected collectors
- collector per service record counters

show gnsi acctz statistics

Syntax Description	This command has no keywords or arguments.
---------------------------	--

Command Default	None
------------------------	------

Command Modes	
----------------------	--

Command History	
------------------------	--

Release	Modification
24.3.1	The command was introduced.

Usage Guidelines	No specific guidelines impact the use of this command.
-------------------------	--

Task ID	Task ID	Operation
	config-services	read, write

This example displays detailed statistics for GNSI Acctz accounting with the maximum queue size specified in the [grpc aaa accounting queue-size](#) command configuration examples respectively.

```
Router#show gnsi acctz statistics
Tue Jul 23 05:59:28.755 UTC
Acctz History Buffer:
    Total Records : 80029
    Total History Truncation : 0
    Grpc Service Records:
        GNMI : 80002
        GNOI : 0
        GNSI : 4
        GRIBI : 0
        P4RT : 0
        Unspecified : 0
```

```

Cmd Service Records:
    Shell          : 0
    Cli           : 23
    Netconf        : 0
    Unspecified    : 0
History snapshot:
    Max Memory Size      : 20 MB
    Memory Used          : 0 MB
    Max Number Of Records: 30
    Records Used         : 30
gRPC Accounting Queue:
Grpc services:
    GNMI          : 80002 sent, 0 dropped, 0 truncated
    GNOI          : 0 sent, 0 dropped, 0 truncated
    GNSI          : 4 sent, 0 dropped, 4 truncated
    GRIBI         : 0 sent, 0 dropped, 0 truncated
    P4RT          : 0 sent, 0 dropped, 0 truncated
    Unspecified    : 0 sent, 0 dropped, 0 truncated
Queue Rate:
    Input          : 80000
    Output         : 80000
    Drop           : 0
Stats:
    Queue Buffer Used   : 0 MB
    Queue Enqueue       : 80006
    Queue Dequeue       : 80006
    Queue Drops         : 0
    Queue Max Time     : 14311 usec
    Queue Min Time     : 1 usec
    Queue Avg Time     : 504 usec
Channel Stats:
    Queue Channel Size  : 512
    Queue Channel Length: 0
    Queue Inuse Size    : 0
    Queue Size          : 30
    Queue Low Water Mark: 1
    Queue Water Mark    : false
    Queue Channel Closed: false
    Queue Status         : 2
    Queue Enqueue Count  : 80006
    Queue Decrement Count: 80006
    Queue Retry Count    : 0
    Queue Retry Full Count: 0
Errors:
    Queue Init Failure  : 0
    Queue Update Failure: 0
    Queue Dequeue Failure: 0
    Queue Invalid Parameters: 0
SendtoAAA Accounting Queue:
Grpc services:
    GNMI          : 80002 sent, 0 dropped, 0 truncated
    GNOI          : 0 sent, 0 dropped, 0 truncated
    GNSI          : 4 sent, 0 dropped, 0 truncated
    GRIBI         : 0 sent, 0 dropped, 0 truncated
    P4RT          : 0 sent, 0 dropped, 0 truncated
    Unspecified    : 0 sent, 0 dropped, 0 truncated
Queue Rate:
    Input          : 80000
    Output         : 80000
    Drop           : 0
Stats:
    Queue Buffer Used   : 0 MB
    Queue Enqueue       : 80006
    Queue Dequeue       : 80006

```

show gnsi acctz statistics

```

Queue Drops : 0
Queue Max Time : 66549 usec
Queue Min Time : 1 usec
Queue Avg Time : 2544 usec
Channel Stats:
  Queue Channel Size : 512
  Queue Channel Length : 0
  Queue Inuse Size : 0
  Queue Size : 40
  Queue Low Water Mark : 1
  Queue Water Mark : false
  Queue Channel Closed : false
  Queue Status : 2
  Queue Enqueue Count : 80006
  Queue Decrement Count : 80006
  Queue Retry Count : 0
  Queue Retry Full Count : 0
Errors:
  Queue Init Failure : 0
  Queue Update Failure : 0
  Queue Dequeue Failure : 0
  Queue Invalid Parameters : 0
Cmd Accounting Queue:
  Cmd services:
    Shell : 0 sent, 0 dropped, 0 truncated
    Cli : 23 sent, 0 dropped, 0 truncated
    Netconf : 0 sent, 0 dropped, 0 truncated
    Unspecified : 0 sent, 0 dropped, 0 truncated
  Queue Rate:
    Input : 2
    Output : 2
    Drop : 0
  Stats:
    Queue Buffer Used : 0 MB
    Queue Enqueue : 23
    Queue Dequeue : 23
    Queue Drops : 0
    Queue Max Time : 248 usec
    Queue Min Time : 26 usec
    Queue Avg Time : 94 usec
  Channel Stats:
    Queue Channel Size : 512
    Queue Channel Length : 0
    Queue Inuse Size : 0
    Queue Size : 40
    Queue Low Water Mark : 1
    Queue Water Mark : false
    Queue Channel Closed : false
    Queue Status : 2
    Queue Enqueue Count : 23
    Queue Decrement Count : 23
    Queue Retry Count : 0
    Queue Retry Full Count : 0
  Errors:
    Queue Init Failure : 0
    Queue Update Failure : 0
    Queue Dequeue Failure : 0
    Queue Invalid Parameters : 0
Client Stats:
  Number Of Clients : 2
  History Truncation Events : 0
  Client Idle Timeouts : 0
  Record Requests : 4
  Record Responses : 80029

```

```

Collectors:
  Collector Statistics:
    IP : 192.168.122.1
    Port : 25906
    Total : Records: 80029, Drops: 0
    Total History Truncation : 0
    Grpc Service Records:
      gNMI : Records: 80002, Drops: 0
      gNOI : Records: 0, Drops: 0
      gNSI : Records: 4, Drops: 0
      gRIBI : Records: 0, Drops: 0
      P4RT : Records: 0, Drops: 0
      Unspecified : Records: 0, Drops: 0
    Cmd Service Records:
      Shell : Records: 0, Drops: 0
      CLI : Records: 23, Drops: 0
      Netconf : Records: 0, Drops: 0
      Unspecified : Records: 0, Drops: 0
    gRPC Stream Stats:
      gRPC Stream Status : 2
      gRPC Send Status : 1
      gRPC Send Error Channel Length : 0
      gRPC Send Errors : 0
      gRPC Send Enqueue Count : 80029
      gRPC Send Close Count : 0
      gRPC Stream Send Count : 80029
      gRPC Stream Send Error Count : 0
    Send Channel Stats:
      Queue Channel Size : 512
      Queue Channel Length : 0
      Queue Inuse Size : 0
      Queue Size : 40
      Queue Low Water Mark : 0
      Queue Water Mark : false
      Queue Channel Closed : false
      Queue Status : 2
      Queue Enqueue Count : 80029
      Queue Decrement Count : 80029
      Queue Retry Count : 0
      Queue Retry Full Count : 0
  Collector Statistics:
    IP : 192.168.122.1
    Port : 25912
    Total : Records: 80029, Drops: 0
    Total History Truncation : 0
    Grpc Service Records:
      gNMI : Records: 80002, Drops: 0
      gNOI : Records: 0, Drops: 0
      gNSI : Records: 4, Drops: 0
      gRIBI : Records: 0, Drops: 0
      P4RT : Records: 0, Drops: 0
      Unspecified : Records: 0, Drops: 0
    Cmd Service Records:
      Shell : Records: 0, Drops: 0
      CLI : Records: 23, Drops: 0
      Netconf : Records: 0, Drops: 0
      Unspecified : Records: 0, Drops: 0
  gRPC Stream Stats:
    gRPC Stream Status : 2
    gRPC Send Status : 1
    gRPC Send Error Channel Length : 0
    gRPC Send Errors : 0
    gRPC Send Enqueue Count : 80029
    gRPC Send Close Count : 0

```

```
show gnsi acctz statistics
```

```
gRPC Stream Send Count      : 80029
gRPC Stream Send Error Count : 0
Send Channel Stats:
  Queue Channel Size        : 512
  Queue Channel Length      : 0
  Queue Inuse Size          : 0
  Queue Size                : 40
  Queue Low Water Mark      : 0
  Queue Water Mark          : false
  Queue Channel Closed      : false
  Queue Status               : 2
  Queue Enqueue Count       : 80029
  Queue Decrement Count     : 80029
  Queue Retry Count          : 0
  Queue Retry Full Count    : 0
Accounting Stats:
  Grpc Accounting           : 80006
  Cmd Accounting             : 23
Error Stats:
  AAA Dequeue Failed        : 0
  AAA Payload Failed        : 0
  Send To AAA Failed        : 0
  gRPC Dequeue Failed       : 0
  Cmd Dequeue Failed        : 0
  Accounting Payload Failed : 0
  Record Create Failed      : 0
  Get RPC Failed             : 0
  Get Method Failed          : 0
  Serialize Payload Failed   : 0
  Record Response Payload Failed : 0
  Get Local Info Failed      : 0
  Get Remote Info Failed     : 0
  Get Username Failed        : 0
  Locald Invalid Service Type : 0
```

show grpc certificate

To display the active gRPC certificate management policies on the router, use the **show grpc certificate** command in EXEC mode.

show grpc certificate

Syntax Description	This command has no keywords or arguments.	
Command Default	None	
Command Modes	EXEC mode	
Command History	Release	Modification
	Release 24.1.1	The command was introduced.
Usage Guidelines	No specific guidelines impact the use of this command.	
Task ID	Task ID	Operation
	config-services	read

This example displays the active gRPC certificate management policies on the router. The below-mentioned command output is truncated version.

```
Router#show grpc certificate
Certificate:
Data:
  Version: 3 (0x2)
  Serial Number: 32 (0x20)
  Signature Algorithm: sha256WithRSAEncryption
  Issuer: CN=localhost,O=OpenConfig,C=US
  Validity
    Not Before: Nov 8 08:49:38 2023 GMT
    Not After : Mar 22 08:49:38 2025 GMT
  Subject: CN=ems,O=OpenConfig,C=US
  Subject Public Key Info:
    Public Key Algorithm: rsaEncryption
      RSA Public-Key: (4096 bit)
        Modulus:
          00:ea:6a:6c:25:be:9f:15:71:ce:74:89:03:ec:ef:
          0b:3b:de:58:a8:7e:28:b8:cf:b3:82:91:b4:5c:42:
          e7:d8:28:98:35:bd:35:60:a7:4e:f8:77:02:46:5f:
          27:a4:16:cf:3c:e3:24:28:69:9c:22:1e:e3:52:96:
          71:87:7c:40:0c:1f:dd:30:ea:dc:40:ca:93:00:54:
          5e:de:20:54:5b:f4:2f:9f:19:6f:71:61:28:69:3d:
          97:26:ab:e1:5f:53:3c:f1:a2:c3:14:f4:01:90:1a:
        .
        .
        .

```

```
show grpc certificate
```

```
        Exponent: 65537 (0x10001)
X509v3 extensions:
    X509v3 Key Usage: critical
        Digital Signature
    X509v3 Extended Key Usage:
        TLS Web Client Authentication, TLS Web Server Authentication
    X509v3 Authority Key Identifier:
        keyid:0A:A8:9A:6A:23:34:AE:CA:96:00:2C:F3:04:38:14:E3:D4:8D:77:BD

    X509v3 Subject Alternative Name:
        DNS, IP Address:64.103.223.56
Signature Algorithm: sha256WithRSAEncryption
b9:89:ec:60:3d:8d:7d:9c:dc:08:56:89:99:44:92:98:45:b6:
97:ba:e3:e5:f2:48:b2:44:8d:db:23:bb:a1:c0:62:79:78:18:
d7:55:f6:4a:67:5b:75:e0:c0:0b:52:51:07:36:d5:6c:c7:67:
48:86:8d:dd:70:1c:9f:7c:a1:7b:aa:a5:4e:e1:ad:cf:4c:e5:
81:db:92:cf:88:70:5a:1c:8d:de:0d:e8:b3:05:de:b9:04:4d:
23:e1:de:66:e5:08:bd:2e:31:0a:07:a6:c0:00:3a:38:2f:00:
.
.
.
```

show gnsi service authorization policy

To display the active gRPC service authorization policies on the router, use the **show gnsi service authorization policy** command in Global Configuration mode.

show gnsi service authorization policy

Syntax Description	This command has no keywords or arguments.	
Command Default	Enabled, by default	
Command Modes	Global Configuration mode	
Command History	Release	Modification
	7.11.1	The command was introduced.
Usage Guidelines	No specific guidelines impact the use of this command.	
Task ID	Task ID	Operation
	config-services read	

This example displays the policy which is active on the router:

```
Router#show gnsi service authorization policy
Wed Jul 19 10:56:14.509 UTC{
    "version": "1.0",
    "created_on": 1700816204,
    "policy": {
        "name": "authz",
        "allow_rules": [
            {
                "name": "allow all gNMI for all users",
                "request": {
                    "paths": [
                        "*"
                    ]
                },
                "source": {
                    "principals": [
                        "*"
                    ]
                }
            }
        ],
        "deny_rules": [
            {
                "name": "deny gNMI set for oper users",
                "request": {
                    "paths": [
                        "/gnmi.gNMI/*"
                    ]
                }
            }
        ]
    }
}
```

```
■ show gnsi service authorization policy
```

```
        ]
    },
    "source": {
        "principals": [
            "User1"
        ]
    }
}
]
```



YANG Commands

This module outlines the commands necessary to utilize the YANG server module configuration protocol, which defines network operations using data models.

For detailed information about YANG data model concepts, configuration tasks, and examples, see the *Drive Network Automation Using Programmable YANG Data Models in the Cisco 8000 Series Router* module in the *Programmability Configuration Guide for Cisco 8000 Series Routers*.

- [yang-server module-set, on page 22](#)

yang-server module-set

To enable a certain set of YANG models, use the **yang-server module-set** command in the Global Configuration mode.

yang-server module-set

Syntax Description	UM-preferred	This set uses applicable unified models.				
	XR-only	This set uses native models.				
Command Default	None					
Command Modes	Global Configuration mode					
Command History	<table border="1"> <thead> <tr> <th>Release</th><th>Modification</th></tr> </thead> <tbody> <tr> <td>Release 5.3.1</td><td>This command was introduced.</td></tr> </tbody> </table>		Release	Modification	Release 5.3.1	This command was introduced.
Release	Modification					
Release 5.3.1	This command was introduced.					
Usage Guidelines	The yang-server module-set command is applied to only config models. When this command is configured, all externally defined YANG models, including OpenConfig models, are disabled.					
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th><th>Operation</th></tr> </thead> <tbody> <tr> <td>config-services</td><td>read, write</td></tr> </tbody> </table>		Task ID	Operation	config-services	read, write
Task ID	Operation					
config-services	read, write					

Example

This command shows how to use the **yang-server module-set** command:

```
Router# config
Router(config)# yang-server module-set XR-only
Router# end
```