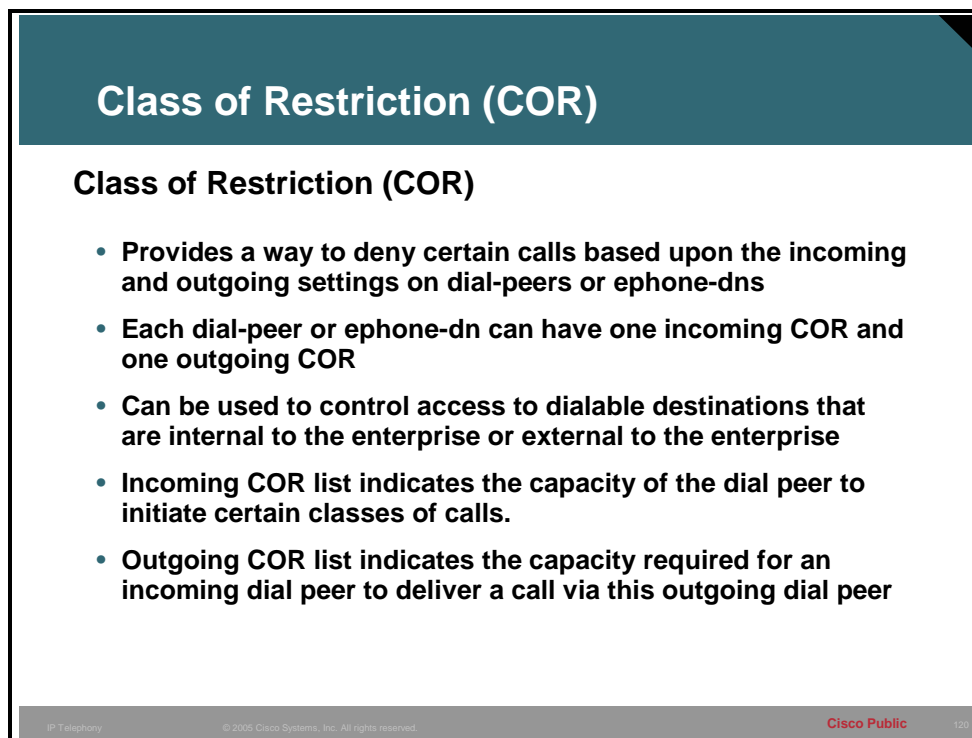# Class of Restriction

Class of Restriction (COR)

This topic describes Class of Restriction (COR).

The Class of Restrictions (COR) feature provides the ability to deny certain call attempts based on the incoming and outgoing CORs provisioned on the dial peers.

COR is used to specify which incoming dial peer can use which outgoing dial peer to make a call. Each dial peer can be provisioned with an incoming and an outgoing COR list. The COR command sets the dial peer COR parameter for dial peers and the directory numbers that are created for Cisco IP phones associated with the Cisco CME router. COR functionality provides the ability to deny certain call attempts on the basis of the incoming and outgoing class of restrictions that are provisioned on the dial peers. This functionality provides flexibility in network design, allows users to block calls (for example, calls to 900 numbers), and applies different restrictions to call attempts from different originators.

If the COR applied on an incoming dial peer (for incoming calls) is a superset or equal to the COR applied to the outgoing dial peer (for outgoing calls), the call will go through. Incoming and outgoing are with respect to the "voice ports."

Example: Incoming and Outgoing COR example

For example, if a phone is attached to one of the Foreign Exchange Station (FXS) ports of the router and an attempt is made to place a call from that phone, it is an incoming call and uses the

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incoming COR for the router/voice-port. Similarly, if you make a call to that FXS phone, then it is an outgoing call and will use the outgoing COR for the voice-port.
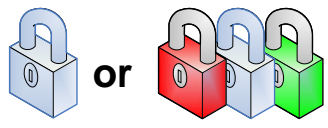

When the incoming COR list is applied to an ephone-dn or dial-peer, the members of the COR list will be similar to keys. These keys will be used to unlock the outgoing COR list that is applied to the ephone-dn or dial peer that matches the digits of the destination pattern. The outgoing COR list is similar to having a lock or locks on it. In order to use the dial peer or ephone-dn with an outgoing COR list, the incoming COR list must have all the members (keys) that the outgoing COR list has.

The lack of an incoming COR list allows that ephone-dn or dial peer to call any other ephone-dn or dial peer regardless of the outgoing COR list. This is like having a master key for all locks. The lack of an outgoing COR list allows any ephone-dn or dial peer to complete calls to this ephone-dn or dial peer regardless of the incoming COR setting.

Class of Restriction

COR List on Incoming dial-peer or ephone-dn	COR List on Outgoing dial-peer or ephone-dn	Result	Reason
No COR	No COR	Call Succeeds	COR not applied
No COR	Outgoing COR applied	Call Succeeds	The no (null) incoming COR condition has the highest COR priority
Incoming COR applied	No COR	Call Succeeds	The incoming COR list is a superset of the no (null) outgoing COR list
Incoming COR applied is a superset of outgoing COR	Outgoing COR applied	Call Succeeds	The incoming COR list is a superset of the outgoing COR list
Incoming COR applied not a superset of outgoing COR	Outgoing COR applied	Call cannot be completed	The incoming COR list is NOT a superset of the outgoing COR list

By default, an incoming call leg has the highest COR priority and the outgoing COR list has the lowest COR priority. This means that if there is no COR configuration for incoming calls on a dial peer, then you can make a call from this dial peer (a phone attached to this dial peer) going out of any other dial peer, irrespective of the COR configuration on that dial peer.

Steps to Configure Class of Restriction

This topic presents the steps to configure Class of Restriction (COR).

- **Step 1 – Configure the Class of Restriction names**
- **Step 2 – Configure the Class of Restriction lists and members**
- **Step 3 – Assign the COR list to the dial peers**
- **Step 4 - Assign the COR to the ephone-dns**

Step 1 – Configure the Class of Restriction names

CMERouter(config)#

```
dial-peer cor custom
```

- **Enters COR config mode where classes of restrictions are specified**

CMERouter(config-dp-cor)#

```
name class-name
```

- **Used to specify a class of restriction**

Step 1   Define the name of the COR

Before relating a COR to a dial peer, it needs to be named. This is important because the COR list needs to refer to these names to apply the COR to dial peers or ephone-dns. Multiple names can be added to represent various COR criteria. The 'dial-peer cor custom' and 'name' commands define the COR functionality. Possible names: call1900, call527, call9. Up to 64 COR names can be defined under a dial peer cor custom. This means that a configuration cannot have more than 64 COR names and A COR list would have a limitation of 64 members.

Example: COR naming and list

CMERouter(config)#dial-peer cor custom

CMERouter(config-dp-cor)#name local_call

CMERouter(config-dp-cor)#name 911

CMERouter(config-dp-cor)#name 1800

CMERouter(config-dp-cor)#name 1900

Steps to Configure Class of Restriction

Step 2 – Configure the Class of Restriction lists and members

CMERouter(config)#

```
dial-peer cor list list-name
```

• **Provides a name for a list of restrictions**

CMERouter(config-dp-corlist)#

```
member class-name
```

• **Adds a COR class to this list of restrictions**

Step 2   Dial peer COR list and member commands set the capabilities of a COR list. COR list is used in dial peers to indicate the restriction that a dial peer has as an outgoing dial peer. The order of entering the members is not important and the list can be appended or made shorter by removing the members.

Example: Define the COR lists

CMERouter(config)#dial-peer list callLocal

CMERouter(config-dp-corlist)member local_call

CMERouter(config)#dial-peer list call911

CMERouter(config-dp-corlist)member 911

CMERouter(config)#dial-peer list call1800

CMERouter(config-dp-corlist)member 1800

CMERouter(config)#dial-peer list call1900

CMERouter(config-dp-corlist)member 1900

This is the third step to configure Class of Restriction (COR).

Steps to Configure Class of Restriction

Step 3 – Assign the COR list to the dial peers

```
CMERouter(config)#
dial-peer voice number {pots | voip}
```

• **Defines a dial-peer and enters dial-peer config mode**

```
CMERouter(config-dial-peer)#
corlist {incoming | outgoing} list-name
```

• **Specifies a COR list to be used when the dial-peer is either the incoming or outgoing dial-peer**

Step 3 Apply the incoming or outgoing COR list to the dial peer. The incoming COR list specifies the capacity of dial-peer to initiate a certain series or Class of Calls. The outgoing COR list specifies the restriction on dial peers able to place calls to a given number range or port.

Example: Apply the COR to the dial peer

CMERouter(config)#dial-peer voice 1 pots

CMERouter(config-dial-peer)#destination-pattern 1500

CMERouter(config-dial-peer)#port 1/0/0

CMERouter(config-dial-peer)#corlist incoming call911

CMERouter(config)#dial-peer voice 2pots

CMERouter(config-dial-peer)#destination-pattern 1800.......

CMERouter(config-dial-peer)#port 2//1

CMERouter(config-dial-peer)#corlist outgoing call1800

Steps to Configure Class of Restriction

Step 4 – Assign the COR list to the ephone-dns

```
CMERouter(config)#
ephone-dn tag
```

• **Defines an ephone-dn and enters ephone-dn mode**

```
CMERouter(config-ephone-dn)#
cor {incoming | outgoing} list-name
```

• **Specifies a COR list to be used when the ephone-dn is used as either the incoming or outgoing part of a call**

Step 4   Apply the incoming or outgoing COR list to an ephone-dn. The Incoming COR list specifies the capacity of ephone-dn to initiate a certain series or Class of Calls. The outgoing COR list specifies the restriction on the ephone-dn to be able to place calls to a given number range or port.
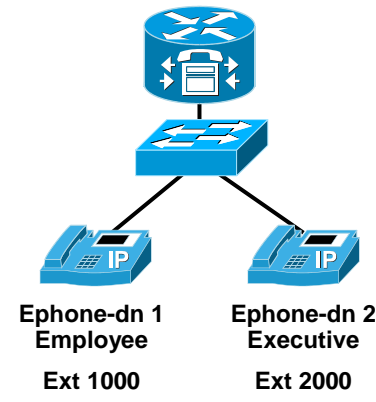
Example: Apply the COR to ephone-dns

CMERouter(config)#ephone-dn 1

CMERouter(config-ephone-dn)#number 1000

CMERouter(config-ephone-dn)#description LobbyPhone

CMERouter(config-ephone-dn)#cor incoming call911

CMERouter(config)#ephone-dn 2

CMERouter(config-ephone-dn)#number 1001

CMERouter(config-ephone-dn)#description ConfRoomPhone

CMERouter(config-ephone-dn)#cor incoming callLocal

This is an example of Class of Restriction (COR).

Class of Restriction (COR)

```
dial-peer cor custom
 name 1xxx
 name 2xxx
dial-peer cor list Executive
 member 1xxx
 member 2xxx
dial-peer cor list Employee
 member 1xxx
ephone-dn 1
 number 1000
 cor incoming Employee
ephone-dn 2
 number 2000
 cor outgoing Executives
```

- The executive can call the employee but the employee cannot call the executive
- The incoming COR Employee is not a superset of the Executive, so the call will not succeed

Ephone-dn 1
Employee
Ext 1000

Ephone-dn 2
Executive
Ext 2000

Example: COR used to restrict access internally within Cisco CME

COR can be used to regulate internal calls and whether they are allowed or not. This example shows two IP phones with an employee and an executive. In this company, the executive should be able to call anyone but employees should not be able to call the executive. Notice that to accomplish the required results, both an incoming COR on the employee must be configured as well as an outgoing COR on the executive. There is no outgoing COR on the employee and as a result anyone can call the employee phone regardless if the phone calling has an incoming COR set or not. The lack of an incoming COR on the executive will allow the executive to call any phone regardless of the outgoing COR setting on the phone called.

This topic describes Class of Restriction case study.

Class of Restriction – Case Study

Class of Restriction Case Study – XYZ company

- The XYZ company wishes to prevent toll fraud by restricting the destinations on the PSTN that IP phones and analog phones attached to FXS port can call.
- There should be no restrictions internally; everyone internal should be able to call anyone else internal
- All phones MUST be able to call 911
- Within the XYZ company there are Lobby phones, Employee phones, Sales, and Executive phones
- The Lobby phone should be able to call only 911 on the PSTN
- The Employee phones should be able to call 911 and local calls on the PSTN
- The Sales phones should be able to call 911, local calls, and domestic long distance on the PSTN
- The executives should be able to call 911, local call, domestic long distance, and international on the PSTN
- No one should be able to call 900 numbers

Case Study of the XYZ Company.

Class of Restriction – Case Study

```
dial-peer cor custom
 name 911
 name local
 name long_distance
 name international
 name 900
```

911

local

long_distance

international

900

- **Step 1 - Define the classes of restriction**

Step 1   The first step will be to define the COR names.

Class of Restriction – Case Study

```
dial-peer cor list call911
 member 911
dial-peer cor list callLocal
 member local
dial-peer cor list callLD
 member long_distance
dial-peer cor list callInt
 member international
dial-peer cor list call900
 member 900
```

```
dial-peer cor list Lobby
 member 911
dial-peer cor list Employee
 member 911
 member local
dial-peer cor list Sales
 member 911
 member local
 member long_distance
dial-peer cor list Executive
 member 911
 member local
 member long_distance
 member international
```

- **Step 2 – Define the COR lists and members**

Step 2   The second step will be to define the COR list and its member or members. Notice that none of the COR lists contain the member 900.

Class of Restriction – Case Study

- **Step 3 – Assign the COR to the PSTN dial-peers**

  Dial-peer 1 – COR out call911

  Dial-peer 2 – COR out callLD

  Dial-peer 3 – COR out callLocal

  Dial-peer 4 – COR out callInt

  Dial-peer 5 – COR out call900

```
dial-peer voice 1 pots
 destination-pattern 911
 port 1/0/0
 corlist outgoing call911
dial-peer voice 2 pots
 destination-pattern 1[2-9]..[2-9]......
 port 1/0/0
 corlist outgoing callLD
dial-peer voice 3 pots
 destination-pattern [2-9]......
 port 1/0/0
 corlist outgoing callLocal
dial-peer voice 5 pots
 destination-pattern 1011T
 port 1/0/0
 corlist outgoing callInt
dial-peer voice 6 pots
 destination-pattern 1900.......
 port 1/0/0
 corlist outgoing call900
```

Step 3   Assign the COR to the dial peers that govern PSTN access. To restrict calls to the PSTN destinations, the outbound COR setting will be defined.

Note	Although not shown here, the inbound COR can be set to regulate where calls arriving from the PSTN will be allowed to connect internally.

Class of Restriction – Case Study

- **Step 4 – Assign the COR to the ephone-dns**

Ephone-dn 1
COR in Lobby
Ext 1001

Ephone-dn 2
COR in Employee
Ext 1002

Ephone-dn 3
COR in Sales
Ext 1003

Ephone-dn 4
COR in Executive
Ext 1004

```
ephone-dn 1
 number 1001
 cor incoming Lobby
ephone-dn 2
 number 1002
 cor incoming Employee
ephone-dn 3
 number 1003
 cor incoming Sales
ephone-dn 4
 number 1004
 cor incoming Executive
```

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Step 4 Assign the incoming COR to the Lobby, Employee, Sales, and Executive ephone-dns. Notice that no ephone-dn has the ability to call 900 numbers.

Class of Restriction – Case Study

Results:

- **The Lobby ephone-dn can only call 911 on the PSTN**
- **The Employee ephone-dn can call 911 and local calls on the PSTN**
- **The Sales ephone-dn can call 911, local calls, and long distance on the PSTN**
- **The Executive ephone-dn can call 911, local calls, long distance, and international on the PSTN**
- **No one can call 900 numbers**

**Ephone-dn 1
COR in Lobby
Ext 1001**

**Ephone-dn 2
COR in Employee
Ext 1002**

**Ephone-dn 3
COR in Sales
Ext 1003**

**Ephone-dn 4
COR in Executive
Ext 1004**

The result of the configuration is shown.