



X.25 Throughput Negotiation

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This feature enables a router to negotiate X.25 throughput parameters on behalf of end devices, thereby making it possible for X.25 calls to reach devices that may not themselves be able to negotiate throughput.

History for the X.25 Throughput Negotiation Feature

Release	Modification
12.3(11)YN	This feature was introduced.
12.4(4)T	This feature was integrated into Cisco IOS 12.4(4)T.

Finding Support Information for Platforms and Cisco IOS Software Images

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the Feature Information Table at the end of this document.

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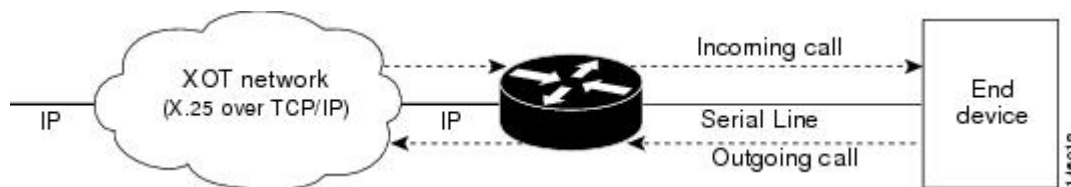
Restrictions for X.25 Throughput Negotiation

This feature currently supports only basic throughput classes; extended throughput classes are not supported.

Information about X.25 Throughput Negotiation

In order for end devices in a network to support X.25 calls, they need to be able to negotiate X.25 throughput parameters. This feature enables a router to handle that negotiation on behalf of end devices that cannot do it themselves.

Figure 1 Router Negotiating Throughput Between a Network and an End Device



The router does this by stripping out or inserting values, as appropriate for each case, in the "throughput facility field" of the X.25 calls' setup and confirmed messages (specifically, in the Call Request, Incoming Call, Call Accepted, and Call Confirmed packets).

In order to insert values appropriately, the router interface connected to the end device must earlier have been configured with the input and output bit rates that are intended to be used by the eventual X.25 call.

The rules according to which the router removes or inserts those bit rates are set by the **x25 subscribe throughput** command, which can have three distinct states: **no**, **basic** or **never**. These forms of the command work as follows when the router receives a call from the network and forwards that call onward to the end device:

- If the router has been configured by the command **no x25 subscribe throughput**, it will make *no change* to the values it receives in the call's facility field. The router merely forwards the message, and those values, onward.
- If the router has been configured by the **25 subscribe throughput basic** form of this command, the router will *insert* the bit rate values previously configured on its interface into the call's facility field. (The only exception is when those values are larger than the call's values, in which case the router will leave the call's smaller values in place when it forwards the message.)

In cases when the router has substituted its own configured values for the values it detected in the incoming call, the router also reports those new values in a Call Confirmed packet back out through the network to the source device.

- If the **x25 subscribe throughput never** form of the command has been entered, the router will *remove* the values it receives in the call's facility field. (And if the values previously configured on the router's interface are *smaller* than those contained in the call, the router will also replace the call's values with those smaller ones when it forwards the end device's Call Confirmed packet back out to the network.)

How these behavior rules apply to each possible case is presented in the first table below.

When calls originate not in the network but in the end device, this command's three states can have somewhat different results, which are detailed in the second table below.

Table 1 Router Treatment of Throughput Facility Field in Incoming Call

Incoming call's 'Call Request' packet	Cisco IOS commands applied	Results	
Is interface configured with throughput values?	How is Serial Line's throughput subscription configured?	Within 'Incoming Call' packet	Within 'Call Confirmed' packet
Contains throughput facility field	YES : "x25 facility throughput xxx yyy"	no x25 sub throughput	Facility field in message from network is sent to end device unmodified. End device includes no facility field in its Call Accepted packet to the router. And the router includes no facility field in the Call Confirmed packet it sends out to the network.
		x25 sub throughput never	Router strips out facility field, then forwards message to end device. Router sends values out to network only if the values configured on its interface are <i>smaller</i> than those received in network call.
		x25 sub throughput basic	Router compares values in message with those configured on its interface, and sends to end device the lower set. Router sends that lower set out to the network.
Has no throughput facility field		no x25 sub throughput	No facility field sent to end device. No facility field sent out to network.
		x25 sub throughput never	No facility field sent to end device. No facility field sent back out to network.
		x25 sub throughput basic	Router inserts facility field into message, and forwards that to the end device. No facility field sent back out to network.
Contains throughput facility field	NO : "no x25 facility throughput"	no x25 sub throughput	Facility field sent to end device. End device includes no facility field in its Call Accepted packet to the router. And the router includes no facility field in the Call Confirmed packet it sends out to the network.

Incoming call's 'Call Request' packet	Cisco IOS commands applied	Results		
Has no throughput facility field		x25 sub throughput never	Router strips out facility field, then forwards message to end device.	No facility field sent back out to network.
		x25 sub throughput basic	Facility field sent on to end device.	No facility field sent back out to network.
		no x25 sub throughput	No facility field sent to end device.	No facility field sent out to network.
		x25 sub throughput never	No facility field sent to end device.	No facility field sent back out to network.
		x25 sub throughput basic	No facility field sent to end device.	No facility field sent out to network.

*Shaded rows (in PDF version) describe calls that contain no throughput facility field before they reach the router.

Table 2 Router Treatment of Throughput Facility Field in Outgoing Call

Outgoing call's 'Call Request' packet	Cisco IOS commands applied	Results		
Is interface configured with throughput values?	How is Serial Line's throughput subscription configured?	Within outgoing 'Call Request' packet	Within received 'Call Confirmed' packet	
Contains throughput facility field	YES : "x25 facility throughput xxx yyy	no x25 sub throughput	Router forwards facility field it receives in the end device's Call Request packet out to the network unmodified.	Router forwards facility field it receives in the Call Confirmed packet from the network on to the end device unmodified.

Outgoing call's 'Call Request' packet	Cisco IOS commands applied	Results	
		x25 sub throughput never	Router refuses to forward call on to the network, and cancels it, sending back to the end device a Clear Request packet with the Cause Code field set to 3 ('3' stands for "Invalid Facility Request"). Router also sends to the end device a Diagnostic Code field set to 65 (which stands for "Facility Code Not Allowed").
		x25 sub throughput basic	Router compares values in message with those configured on its interface, and sends to network the lower set. Router sends that lower set to the end device, unless still different values are received in <i>the Call Confirmed message</i> from the network. In that case, the router forwards that network set to the end device.
Has no throughput facility field		no x25 sub throughput	No facility field sent to network. No facility field sent to end device.
		x25 sub throughput never	Router sends values configured on its interface out to the network. No facility field sent to end device.
		x25 sub throughput basic	Router inserts facility field into message, and forwards that to the network. Router sends the inserted facility field to the end device.
Contains throughput facility field	NO : "no x25 facility throughput"	no x25 sub throughput	Router forwards facility field it receives in the end device's Call Request packet out to the network unmodified. Router forwards facility field it receives in the Call Confirmed packet from the network on to the end device unmodified.

Outgoing call's 'Call Request' packet	Cisco IOS commands applied	Results	
		x25 sub throughput never	Router refuses to forward call on to the network, and cancels it, sending back to the end device a Clear Request packet with the Cause Code field set to 3 ('3' stands for "Invalid Facility Request"). Router also sends to the end device a Diagnostic Code field set to 65 (which stands for "Facility Code Not Allowed").
		x25 sub throughput basic	Facility field sent on to network. Facility field sent back to end device.
Has no throughput facility field		no x25 sub throughput	No facility field sent to network. No facility field sent to end device.
		x25 sub throughput never	No facility field sent to network. No facility field sent to end device.
		x25 sub throughput basic	No facility field sent to network. No facility field sent to end device.

*Shaded rows (in PDF version) describe calls that contain no throughput facility field before they reach the router.

How to Configure X.25 Throughput Negotiation

- [Configuring X.25 Throughput Negotiation, page 6](#)

Configuring X.25 Throughput Negotiation

If you choose the **basic** keyword of the **x25 subscribe throughput** command below, you must first configure the interface with the appropriate class negotiation values for input and output throughput across the network by using the **throughput in out** keyword and arguments of the **x25 facility command**. For more information about the **x25 facility** command, see the Cisco IOS Wide-Area Networking Command Reference.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface *interface-id***
4. **x25 subscribe throughput { never | basic }**
5. **exit**

DETAILED STEPS

Command or Action	Purpose
<p>Step 1 enable</p> <p>Example:</p> <pre>Router> enable</pre>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> • Enter your password if prompted.
<p>Step 2 configure terminal</p> <p>Example:</p> <pre>Router# configure terminal</pre>	<p>Enters global configuration mode.</p>
<p>Step 3 interface <i>interface-id</i></p> <p>Example:</p> <pre>Router(config)# interface serial2/0</pre>	<p>Specifies the interface which is connected to the end device, and enters interface configuration mode.</p>
<p>Step 4 x25 subscribe throughput { never basic }</p> <p>Example:</p> <pre>Router(config-if)# x25 subscribe throughput basic</pre>	<p>Enables the router to negotiate X.25 throughput for the end device.</p> <p>(In this example, the end device always expects the throughput facility field to be present in incoming call setup packets).</p>
<p>Step 5 exit</p> <p>Example:</p> <pre>Router(config-if)# exit</pre>	<p>Exits interface configuration mode.</p>

Examples

In this example, the end device never expects the throughput facility field to be present in incoming call setup packets:

```
Router>
```

```
enable
Router# configure terminal
Router(config)# interface serial2/0
Router(config-if)# x25 subscribe throughput never
Router(config-if)# exit
```

In this example, the end device always expects the throughput facility field to be present in incoming call setup packets:

```
Router>
enable
Router# configure terminal
Router(config)# interface serial0/0
Router(config-if)# x25 subscribe throughput basic
Router(config-if)# exit
```

In this example, the active throughput negotiation capability on the just-illustrated interface (Serial 0/0) gets turned off:

```
Router(config)# interface serial0/0
Router(config-if)# no x25 subscribe throughput
Router(config-if)# exit
```

Configuration Examples for X.25 Throughput Negotiation

- [Basic example, page 8](#)
- [Never example, page 8](#)

Basic example

In this example, the end device always expects the throughput facility field to be present in Incoming Call packets. The router inserts its configured bit rate values--unless they are larger than the values in the incoming call.

```
Router# configure terminal
Router(config)# interface serial2/0
Router(config-if)# x25 facility throughput 300 300
Router(config-if)# x25 subscribe throughput basic
Router(config-if)# end
Router#
```

Never example

In this example, the end device never expects the throughput facility field to be present in Incoming Call packets. The router removes the facility field from incoming calls.

```
Router# configure terminal
Router(config)# interface serial2/0
Router(config-if)# x25 facility throughput 300 300
Router(config-if)# x25 subscribe throughput never
Router(config-if)# end
Router#
```


Additional References

Related Documents

Related Topic	Document Title
Configuring X.25 throughput facilities	<i>Cisco IOS Wide-Area Networking Command Reference</i>

Technical Assistance

Description	Link
The Cisco Technical Support website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/techsupport

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