



Cisco IOS Voice Features on IGX 8400 Series Universal Router Module

Feature History

Release	Modification
12.1(5)YA	Support for selected Cisco IOS voice features was introduced in Cisco IGX 8400 Series Universal Router Module (URM).

This feature module provides an overview of Cisco IOS voice features supported on the Cisco IGX 8400 Series Universal Router Module (URM), Release 12.1(5)YA. This document provides links to Cisco IOS Release 12.1 voice feature documentation, and contains examples to configure Voice over IP (VoIP) and Voice over ATM (VoATM).

This document includes the following sections:

- Feature Overview, page 1
- Configuration Tasks, page 3
- Configuration Examples, page 7

Feature Overview

The URM is a Cisco IOS-based IP router blade that enables users to provision Voice over IP (VoIP) and Voice over ATM (VoATM) on a Cisco IGX 8400 series platform. The voice and routing capabilities of the URM have been derived from the Cisco 3660 series routers, while the ATM capabilities of the URM have been derived from the ATM OC/3 network module for the 2600 and 3600 Series routers. The embedded UXM-E processor supports one OC3 ATM port and the embedded router supports one OC3 ATM port similar to the 1-port OC-3/STM-1 ATM Circuit Emulation Service network module for the Cisco 3600 series routers. These ATM ports are connected to each other internally.

In addition to VoIP and VoATM, IP routing and Cisco IOS command language interface (CLI) commands—which allow configuration of the voice ports and dial peers—are now available on the Cisco IGX 8400 series platforms.

The URM interoperates with all Cisco IOS-based voice products and supports 30 voice channels with high-complexity codec types and 60 voice channels with medium-complexity codec types. Note that only digital voice ports are supported on the URM; analog ports are not supported.

Cisco IOS Release 12.1(5)YA is the first release supported on the Cisco IGX 8400 URM.

Benefits

Cisco IOS voice software on the Cisco IGX 8400 Series Universal Router Module provides the following benefits:

- High-performance, high-density, scalable, digital voice traffic on the Cisco IGX 8400 series platforms.
- The Universal Router Module (URM) delivers high-density voice interfaces, Fast Ethernet connectivity and ATM switching through a combination of Cisco IOS Release 12.1(5)YA and Switched Software (SWSW) Version 9.3 functionality.
- The URM lets you provision VoIP and VoATM using Cisco IGX 8400 series platforms. Basic routing and Cisco IOS command-language interface (CLI) commands, which allow configuration of the voice ports and dial peers, are now available on the Cisco IGX 8400 series platforms.
- The URM interoperates with all Cisco IOS-based voice products and supports 30 voice channels with high-complexity codec types and 60 voice channels with medium-complexity codec types.
- The URM supports the Cisco WAN Manager (CWM), CiscoWorks 2000, and Cisco Voice Manager (CVM)—all of which are management applications running on external stations.

Restrictions

The following restrictions apply when configuring Cisco IOS voice software features on Cisco IGX 8400 Series Universal Router Module:

- Only digital voice ports are supported on the URM. Analog ports are not supported.
- BRI interfaces are not supported.
- The slots to configure voice features are fixed. You can configure T1/E1 on slots 2/0 and 2/1, Fast Ethernet on slots 1/0 and 1/1, and ATM on slot 0/0.
- You cannot shut down the ATM port. The **shutdown** command is not supported.
- Voice over Frame Relay (VoFR) is not supported.

Related Documents

- *Release Notes for Cisco IGX 8400 Series URM for Cisco IOS Release 12.1(5)YA*
- *Update to Cisco IGX 8400 Series Installation and Configuration and Reference*
- *Cisco IOS Configuration Fundamentals Configuration Guide, Release 12.1*
- *Cisco IOS Configuration Fundamentals Command Reference, Release 12.1*
- *Cisco IOS Interface Configuration Guide, Release 12.1*
- *Cisco IOS Interface Command Reference, Release 12.1*
- *Cisco IOS Multiservice Applications Configuration Guide, Release 12.1*
- *Cisco IOS Multiservice Applications Command Reference, Release 12.1*
- Online *New Feature* documentation for 12.1T Features (See the “Configuration Tasks” *section on page 3* for more information.)

Supported Platform

Cisco IGX 8400 Series Universal Router Module (URM)

Supported Standards, MIBs, and RFCs

For more information, refer to the documentation listed in the “Configuration Tasks” section.

Configuration Tasks

The IOS voice features supported on the Cisco IGX 8400 URM are already supported on other Cisco router models. The voice implementation on the URM has been adapted from the Cisco 3600 series routers. Configuration tasks for IOS voice features are described in many different documents.

For more information, see the following two manuals at the following URLs:

- Cisco IOS Multiservice Applications Configuration Guide, Release 12.1*
http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121cgcr/multi_c/index.htm
 This guide provides configuration procedures for IOS voice software features. See Table 1 for information regarding specific chapters to reference.
- Cisco IOS Multiservice Applications Command Reference, Release 12.1*
http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121cgcr/multi_r/index.htm
 This guide provides an alphabetical reference to voice commands used to configure voice software features.



Note

References to analog models in the Configuring Voice over IP documentation are not applicable to the Cisco IGX 8400 Series Universal Router Module, Release 12.1(5)YA.

Table 1 *Chapters to Reference in Cisco IOS Multiservice Applications Configuration Guide, Release 12.1*

Chapter Title	Location on Cisco.com
Configuring Voice over IP	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121cgcr/multi_c/mcprt1/mcdvoip.htm
Configuring Voice Ports for Voice over IP	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121cgcr/multi_c/mcprt1/mcd5voip.htm
Configuring Gatekeepers (Multimedia Conference Manager)	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121cgcr/multi_c/mcprt1/mcdmcm.htm
Configuring Interactive Voice Response	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121cgcr/multi_c/mcprt1/mcd2voip.htm

Table 1 Chapters to Reference in Cisco IOS Multiservice Applications Configuration Guide, Release 12.1

Chapter Title	Location on Cisco.com
Configuring Debit Card for Packet Telephony	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121cgcr/multi_c/mcprt1/mcd3voip.htm
Configuring Settlement for Packet Telephony	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121cgcr/multi_c/mcprt1/mcd4voip.htm

Additional Voice Feature Documentation

The Cisco IGX 8400 Series URM also supports voice features that were introduced in software versions released after Cisco IOS 12.1. These features are not included in the *12.1 IOS Multiservice Applications Configuration Guide* listed above, but are described in online feature module documentation.



Note

The online feature modules may supersede information contained in the *Cisco IOS Multiservice Applications Configuration Guide, Release 12.1* and the *Cisco IOS Multiservice Applications Command Reference, Release 12.1*. Note also that these referenced documents do not list the Cisco IGX 8400 Series URM as one of the supported platforms.

Table 2, Table 3, Table 4, and Table 5 list the additional voice features introduced in releases after version 12.1 that are supported on the Cisco IGX 8400 Series URM.

Table 2 Cisco IOS Release 12.1(1)T Features Supported on the Cisco IGX 8400 URM

Online Feature Module Document	Location on Cisco.com
Answer Supervision Reporting	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t1/asreport.htm
Asynchronous Rotary Line Queueing	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t1/dtasyncq.htm
Cisco H.323 Version 2 Phase 2	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t1/h323v2p2.htm
Configuring Redundant H.323 Zone Support	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t1/multlrq.htm
Enhancement to Cisco H.323 to Support RSVP Slow Connect	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t1/dt_rsvp.htm
Gateway-to-Gatekeeper Billing Redundancy	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t1/gwgkbill.htm
Session Initiation Protocol for Voice over IP on Cisco Access Platforms	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t1/0251clmb.htm
Settlements for Packet Voice, Phase 2	http://www.cisco.com/univercd/cc/td/doc/product/access/acs_serv/5300/cfios/cfselfea/0123box2.htm

Table 3 Cisco IOS Release 12.1(2)T Features Supported on the Cisco IGX 8400 URM

Online Feature Module Document	Location on Cisco.com
Configurable Timers in H.225	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t2/dtcfgtim.htm
Dial Peer Enhancements	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t2/dtdpeer.htm
Ecosystem Gatekeeper Interoperability Enhancements, Phase 2	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t2/dtgkarj.htm
FRF.12 Support on Additional Platforms ¹	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t2/dtfr12ap.htm
Configuring the Gatekeeper to Gatekeeper Redundancy and Load-Sharing Mechanism	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t2/dtseqlrq.htm
Configuring H.323 Support for Virtual Interfaces	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t2/dt323bnd.htm
OC-3/STM-1 ATM Circuit Emulation Service Network Module	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t2/dtoc3vpd.htm
PRI and BRI QSIG Protocol Support on Cisco 2600, 3600, and MC3810 Series Routers and PRI QSIG on the Cisco 7200	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t2/dt_qsig.htm
Voice over ATM on Cisco 3600 Series Routers	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t2/dtvoatm.htm
Voice Port Testing Enhancements in Cisco 2600 and 3600 Series Routers and MC3810 Series Concentrators	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t2/dt_tstvp.htm

1. The Cisco IGX 8400 URM does not support Voice over Frame Relay in this release. However, this feature can be used in conjunction with VoIP.

Table 4 Cisco IOS Release 12.1(3)T Features Supported on the Cisco IGX 8400 URM

Online Feature Module Document	Location on Cisco.com
Advanced Voice Busyout	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t3/dt_avbo.htm
Caller ID on Cisco 2600 and 3600 Series Routers and Cisco MC3810 Series Concentrators	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t3/clid_t4.htm
E1 R2 and Channel-Associated Signaling Configuration	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t3/dt_r2cas.htm

Table 4 Cisco IOS Release 12.1(3)T Features Supported on the Cisco IGX 8400 URM (continued)

Online Feature Module Document	Location on Cisco.com
Enhancements to the Session Initiation Protocol for VoIP on Cisco Access Platforms	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t3/dtsipgv2.htm
Feature Group D Support	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t3/dt_fgd.htm
PSTN Fallback	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t3/dtpstnfb.htm
Q.931 User-Side and Network-Side Switch Support	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t3/dt_q931.htm
T.38 Fax Relay for Voice over IP H.323	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t3/dt_t38fx.htm
T1/E1 Alarm Conditioning for Switched Calls and Permanent Connection Trunks	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t3/dtte1alm.htm
Transparent Common Channel Signaling	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t3/dt_tccs.htm
Trunk Conditioning for FRF.11 and Cisco Trunks	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t3/dt_tcond.htm

Table 5 Cisco IOS Release 12.1(5)T Features Supported on the Cisco IGX 8400 URM

Online Feature Module Document	Location on Cisco.com
Interworking Signaling Enhancements for H.323 and SIP VoIP	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t5/dt4t323.htm
Multimedia Conference Manager with Voice Gateway Image with RSVP to ATM SVC Mapping	http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121t/121t5/dt_mcm5t.htm
Prepaid Distributed Calling Card via Packet Telephony	http://www.cisco.com/univercd/cc/td/doc/product/access/acs_serv/as5800/12_2t/pul0134x.htm

Configuration Examples

This section provides the following configuration examples:

- Configuring CAS Calls Over VoATM, page 7
- Configuring QSIG Calls Over VoATM, page 8
- Configuring CAS Calls Using VoIP Over ATM Example, page 9
- Configuring QSIG Calls Using VoIP Over ATM, page 11
- Configuring CAS Calls Over VoIP, page 13
- Configuring QSIG Calls Over VoIP, page 14

**Note**

IP addresses and host names used in these examples are fictitious.

Configuring CAS Calls Over VoATM

The following example shows how to configure voice over ATM channel associated signaling (CAS) calls on the Cisco IGX 8400 Series Universal Router Module. Voice over ATM enables a URM to carry voice traffic (for example, telephone calls and faxes) over an ATM network by using ATM encapsulation ATM adaptation layer (AAL) 5. AAL2 is not supported.

```
! Configurations on URM1
controller T1 2/0
  framing esf
  linecode b8zs
  ds0-group 0 timeslots 1-24 type e&m-wink-start
  no shutdown

interface ATM 0/0
  pvc 10/61
  vbr-rt 1536 768 192
  encapsulation aal5mux voice

dial-peer voice 100 pots
  destination-pattern 100527....
  port 2/0:0

dial-peer voice 120 voatm
  destination-pattern 120678....
  session target atm0/0 pvc 10/61
  codec g729r8
```

```

! Configurations on URM2

controller T1 2/0
  framing esf
  linecode b8zs
  ds0-group 0 timeslots 1-24 type e&m-wink-start
  no shutdown

interface ATM 0/0
  pvc 10/61
  vbr-rt 1536 768 192
  encapsulation aal5mux voice

dial-peer voice 120 pots
  destination-pattern 120678....
  port 2/0:0

dial-peer voice 100 voatm
  destination-pattern 100527....
  session target atm0/0 pvc 10/61
  codec g729r8

```

Configuring QSIG Calls Over VoATM

The following example shows how to configure VoATM QSIG calls on the Cisco IGX 8400 Series Universal Router Module.

```

! Configurations on URM1

isdn switch-type primary-qsig

controller T1 2/0
  framing esf
  linecode b8zs
  pri-group timeslots 1-24
  no shutdown

interface ATM 0/0
  pvc 10/61
  vbr-rt 1536 768 192
  encapsulation aal5mux voice

interface serial 2/0:23
  no ip address
  isdn switch-type primary-qsig
  isdn incoming-voice voice
  no cdp enable

dial-peer voice 100 pots
  destination-pattern 100527....
  port 2/0:0
  direct-inward-dial

dial-peer voice 120 voatm
  destination-pattern 120678....
  session target atm0/0 pvc 10/61
  codec g729r8

```

```
! Configurations on URM2

isdn switch-type primary-qsig

controller T1 2/0
  framing esf
  linecode b8zs
  pri-group timeslots 1-24
  no shutdown

interface ATM 0/0
  pvc 10/61
  vbr-rt 1536 768 192
  encapsulation aal5mux voice

interface serial 2/0:23
  no ip address
  isdn switch-type primary-qsig
  isdn incoming-voice voice
  no cdp enable

dial-peer voice 100 pots
  destination-pattern 100678....
  port 2/0:0
  direct-inward-dial

dial-peer voice 120 voatm
  destination-pattern 120527....
  session target atm0/0 pvc 10/61
  codec g729r8
```

Configuring CAS Calls Using VoIP Over ATM Example

The following example shows how to configure CAS calls using VoIP over ATM on the Cisco IGX 8400 Series Universal Router Module.

```
! Configurations on URM1

ip routing

controller T1 2/0
  framing esf
  linecode b8zs
  ds0-group 0 timeslots 1-24 type fxs-loop-start
  no shutdown

interface ATM 0/0
  ip address 172.16.1.1 255.0.0.0
  pvc 10/60
  cbr 1536
  encapsulation aal5snap
  protocol ip 172.16.1.2

dial-peer voice 100 pots
  destination-pattern 100527....
  port 2/0:0
```

```
dial-peer voice 120 voip
  destination-pattern 120678....
  session target ipv4:172.16.1.2
  codec g729r8

! Configurations on URM2

ip routing

controller T1 2/0
  framing esf
  linecode b8zs
  ds0-group 0 timeslots 1-24 type fxs-loop-start
  no shutdown

interface ATM 0/0
  ip address 172.16.1.2 255.0.0.0
  pvc 10/60
    cbr 1536
    encapsulation aal5snap
    protocol ip 172.16.1.1

dial-peer voice 120 pots
  destination-pattern 120678....
  port 2/0:0

dial-peer voice 100 voip
  destination-pattern 100527....
  session target ipv4:172.16.1.1
  codec g729r8
```

Configuring QSIG Calls Using VoIP Over ATM

The following example shows how to configure QSIG channel calls using VoIP over ATM on the Cisco IGX 8400 Series Universal Router Module.

```
! Configurations on URM1

ip routing

isdn switch-type primary-qsig

controller T1 2/0
  framing esf
  linecode b8zs
  pri-group timeslots 1-24
  no shutdown

interface ATM 0/0
  ip address 172.16.1.1 255.0.0.0
  pvc 10/60
    cbr 1536
    encapsulation aal5snap
    protocol ip 172.16.1.2

interface serial 2/0:23
  no ip address
  isdn switch-type primary-qsig
  isdn incoming-voice voice
  no cdp enable

dial-peer voice 100 pots
  destination-pattern 100527....
  port 2/0:0
  direct-inward-dial

dial-peer voice 120 voip
  destination-pattern 120678....
  session target ipv4:172.16.1.2
  codec g729r8

! Configurations on URM2

ip routing

isdn switch-type primary-qsig

controller T1 2/0
  framing esf
  linecode b8zs
  pri-group timeslots 1-24
  no shutdown

interface ATM 0/0
  ip address 172.16.1.2 255.0.0.0
  pvc 10/60
    cbr 1536
    encapsulation aal5snap
    protocol ip 172.16.1.1
```

```
interface serial 2/0:23
  no ip address
  isdn switch-type primary-qsig
  isdn incoming-voice voice
  no cdp enable

dial-peer voice 120 pots
  destination-pattern 120678....
  port 2/0:0
  direct-inward-dial

dial-peer voice 100 voip
  destination-pattern 100527....
  session target ipv4:172.16.1.1
  codec g729r8
```

Configuring CAS Calls Over VoIP

The following example shows how to configure VoIP CAS channel calls on the Cisco IGX 8400 Series Universal Router Module.

```
! Configurations on URM1

ip routing

controller T1 2/0
  framing esf
  linecode b8zs
  ds0-group 0 timeslots 1-24 type e&m-wink-start
  no shutdown

interface fastethernet 1/0
  ip address 23.0.0.1 255.0.0.0
  ip route-cache
  no shutdown

dial-peer voice 100 pots
  destination-pattern 100527....
  port 2/0:0

dial-peer voice 120 voip
  destination-pattern 120678....
  session target ipv4:23.0.0.2
  codec g729r8

! Configurations on URM2

ip routing

controller T1 2/0
  framing esf
  linecode b8zs
  ds0-group 0 timeslots 1-24 type e&m-wink-start
  no shutdown

interface fastethernet 1/0
  ip address 23.0.0.2 255.0.0.0
  ip route-cache
  no shutdown

dial-peer voice 120 pots
  destination-pattern 120678....
  port 2/0:0

dial-peer voice 100 voip
  destination-pattern 100527....
  session target ipv4:23.0.0.1
  codec g729r8
```

Configuring QSIG Calls Over VoIP

The following example shows how to configure QSIG calls using VoIP.

```
! Configurations on URM1

ip routing

isdn switch-type primary-qsig

controller T1 2/0
  framing esf
  linecode b8zs
  pri-group timeslots 1-24
  no shutdown

interface fastethernet 1/0
  ip address 23.0.0.1 255.0.0.0
  ip route-cache
  no shutdown

interface serial 2/0:23
  no ip address
  isdn switch-type primary-qsig
  isdn incoming-voice voice
  no cdp enable

dial-peer voice 100 pots
  destination-pattern 100527....
  port 2/0:0
  direct-inward-dial

dial-peer voice 120 voip
  destination-pattern 120678....
  session target ipv4:23.0.0.2
  codec g729r8
```

```
! Configurations on URM2

ip routing

isdn switch-type primary-qsig

controller T1 2/0
  framing esf
  linecode b8zs
  pri-group timeslots 1-24
  no shutdown

interface fastethernet 1/0
  ip address 23.0.0.2 255.0.0.0
  ip route-cache
  no shutdown

interface serial 2/0:23
  no ip address
  isdn switch-type primary-qsig
  isdn incoming-voice voice
  no cdp enable

dial-peer voice 120 pots
  destination-pattern 120678....
  port 2/0:0
  direct-inward-dial

dial-peer voice 100 voip
  destination-pattern 100527....
  session target ipv4:23.0.0.1
  codec g729r8
```

Command Reference

There are no new or modified commands on the Cisco IGX 8400 URM. All IOS commands used on the module are documented in the Cisco IOS Release 12.1 command reference publications, and in the documents listed in the “Additional Voice Feature Documentation” section on page 4.

