# Cisco P25 Gateway

The Cisco® IP Interoperability and Collaboration System (IPICS) solution now includes a direct IP connection to Project 25 (P25) radio networks using standard TCP/IP communications. Cisco IPICS also connects smart devices such as the Apple iPhone® with mission-critical users on the same P25 radio network. The Cisco Inter-RF Subsystem Interface (ISSI), Digital Fixed Station Interface (DFSI), and Console Subsystem Interface (CSSI) gateways provide communications interoperability, regardless of technology and jurisdiction boundaries.

The Cisco P25 Gateway uses TCP/IP standardized communications to bridge P25 networks to Cisco IPICS. The gateway connects to the first open IP radio network standard. Customers no longer have to be locked into a proprietary interface between their communications dispatch system and the radio network. The Cisco P25 Gateway is based on the ISSI standard TIA-102.BACA specification, the DFSI standard TIA-BAHA, and the CSSI standard TIA-102.BACA-2, all issued by the Telecommunications Industry Association (TIA).

Cisco P25 Gateways can be deployed on the Cisco Physical Security Multiservices Platform. They can also be virtualized on the Cisco Unified Computing System™, representing a new generation of virtualized appliances for use with the Cisco IPICS product line. Figures 1 and 2 show examples of these implementations.

**Figure 1.** Cisco P25 Gateway on 2-RU Cisco Physical Security Multiservices Platform

**Figure 2.** Cisco Unified Computing System for Virtualized ISSI Gateway

## Product Specifications

Table 1 describes some of the features of the Cisco ISSI Gateway.

**Table 1.** Cisco ISSI Gateway Features and Descriptions

| Feature | Description |
|---|---|
| **Standard network-level communications** | Provides TIA standard network-level communications between P25 trunking radio systems and P25 conventional systems, regardless of radio system manufacturer. |
| **Authorized roaming** | Allows authorized roaming between P25 systems. |
| **Radio controller** | Coordinates calls and traffic from a common database of all subscribers in the system. |
| **Radio signaling** | Users can communicate using P25 supplemental services, including:<br>• Group calls<br>• Individual calls<br>• Emergency calls<br>• Call alert<br>• Radio check<br>• Radio detach<br>• Radio inhibit/uninhibit<br>• Radio unit monitor<br>• Short message<br>• Status query |
| **Secure communications** | Encrypts and decrypts P25 audio in two different modes. Gateway mode allows for system-level encryption coming from G.711/G.729 audio streams, and end-to end mode allows for end-to-end encryption from radios to the dispatchers without transcoding. |
| **Internet protocol compliance (IANA)** | IPv4 |

The Cisco P25 Gateway comprises two functional parts: a radio controller and a subsystem interface.

The radio controller manages P25 subscribers, enabling administration of user and group IDs for the home and affiliated radio system. This ensures talkgroup communications while radio users roam away from their home P25 network onto an affiliated P25 network without a console patch.

The Console Subsystem Interface (CSSI) standard allows for dispatchers from different vendors to communicate to one or many P25 radio systems. The arbitration CSSI and Digital Fixed Station Interface (DFSI) enables multiple endpoints to connect to the same channel or talk group for a multivendor approach. The DFSI standard provides the ability to connect directly to conventional base stations, which are typically on mountaintops. This allows customers to replace expensive circuit switched interfaces with IP backhaul directly to the base-station. DFSI allows for analogue or digital mode where customers can migrate subscribers from analogue talk groups to P25 digital talk groups.Customers can now buy multiple endpoints that can talk to the DFSI base station on the same system.

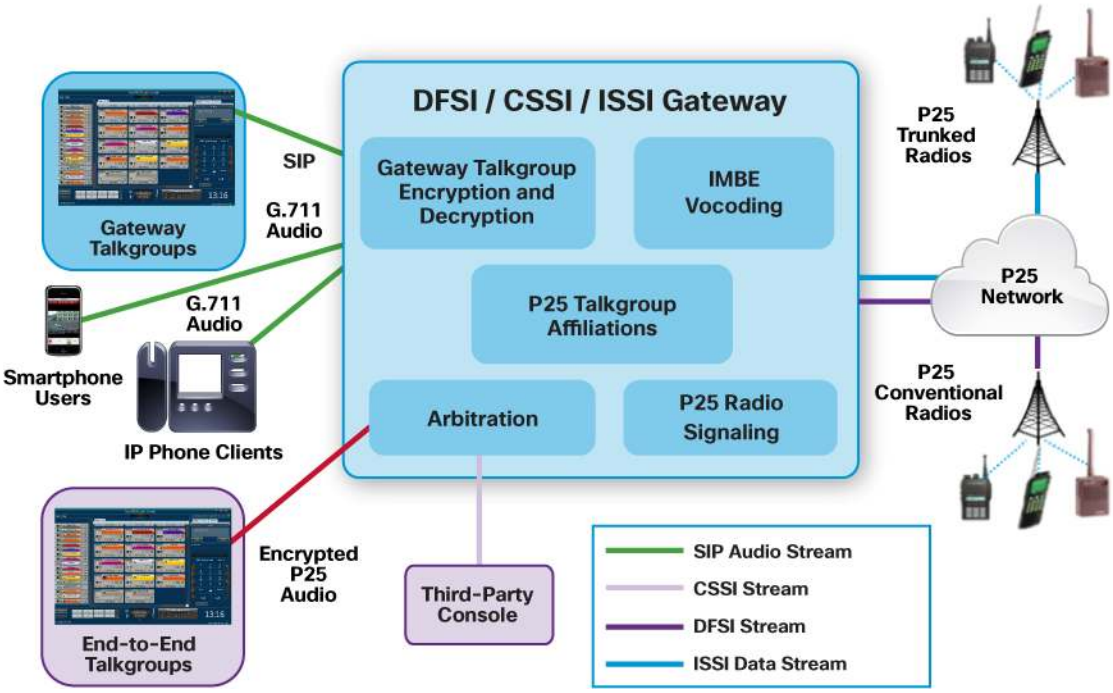
## Architecture

The Cisco P25 Gateway comprises the following functional building blocks (Figure 3).

- Radio signaling interface
- Improved Multi-Band Excitation (IMBE) vocoding
- P25 talkgroup encryption/decryption at the gateway or dispatcher
- P25 talkgroup affiliations (trunking)

- Arbitration

**Figure 3.** Cisco P25 Gateway Functional Diagram




Cisco's P25 solution allows for two modes of communications:

- **P25 gateway mode** is a proxy mode that encodes/encrypts and decodes/decrypts P25 audio on the Cisco P25 Gateway. In this mode, the P25 Gateway transcodes multicast Real-Time Transport Protocol (RTP) streams using G.711 into Session Initiation Protocol (SIP), then using IMBE and/or AMBE, sending the streams throughout the IP network. Gateway mode allows IP phones, mobile clients, and other SIP endpoints to talk with P25 radios.
- **P25 end-to-end mode** is a native mode that allows for end-to-end encryption of audio using IMBE and/or AMBE. In end-to-end mode, the ISSI gateway routes the audio directly to the IPICS dispatch console, where it encodes/encrypts and decodes/decrypts the P25 audio.

## Software System Capabilities

Table 2 describes some of the software features of the Cisco P25 Gateway.

**Table 2.** Cisco P25 Gateway Software Features

| | |
|---|---|
| **Maximum simultaneous P25 group calls or conventional P25 streams** | 50 |
| **Maximum concurrent end-to-end P25 talkgroups** | 50 |
| **Maximum P25 talkgroups per ISSI gateway** | 2000 |
| **Encryption** | 256-bit AES and 64-bit DES-OFB; contact Cisco for other encryption formats |
| **Arbitration** | Connect multiple endpoints to the same DFSI base station |
| **CSSI** | Connect multiple CSSI-compliant consoles to one or many P25 systems |

## Hardware Specifications and Hardware Part Numbers

For hardware specifications and part numbers, visit the Cisco Multiservices Platform and Unified Computing System product sites.

- http://www.cisco.com/en/US/prod/collateral/ps6712/ps10491/ps10823/datasheet_c78-584660.pdf
- http://www.cisco.com/en/US/products/ps10265/index.html

Table 3 lists ordering information for the Cisco P25 Gateway.

**Table 3.** Ordering Information

| Part Number | Description |
|---|---|
| **CIS-ISSI-GWY-K9** | IPICS P25 ISSI Gateway; includes four CIS-P25-TG licenses. Order as an option for the 2-RU MSP, for the CIS-IPICS-VM for physical delivery, or for the L-CIS-IPICS-VM= for eDelivery. This gateway supports P25 trunking systems. |
| **CIS-P25-TG** | IPICS P25 talkgroup. Order one for each talkgroup in the gateway. The options are for P25 trunking talkgroups. |
| **CIS-DFSI-GWY-K9** | IPICS P25 DFSI Gateway. Order one for each 50 channels that need to be connected to conventional DFSI base stations. The gateway comes with 10 conventional P25 channel licenses. Order as an option for the 2-RU MSP,for the CIS-IPICS-VM for physical delivery, or for the L-CIS-IPICS-VM= for eDelivery. |
| **CIS-P25-DFSI-CH-10** | IPICS P25 DFSI Channel (10-pack). Order one software option to expand 10 channels to the CIS-DFSI-GWY-K9. A maximum of four can be ordered for the DFSI gateway. |
| **CIS-NATIVE-IDC** | IPICS dispatch console P25 dispatcher license. Order one IPICS native license for each dispatcher that needs end-to-end secure communications for conventional or trunking P25 talkgroups or channels. |
| **CIS-IPICS-VM** | Order this for a virtualized version of the P25 Gateway and structure all previous software as options to this part number. This will generate a physical license delivery. |
| **L-CIS-IPICS-VM=** | Order this for a virtualized version of the P25 Gateway and structure all the previous software options to this part number. This will generate an e-Delivery license. |

## Services and Support

Cisco and our certified partners can help you accelerate success and improve the return on your investment in a Cisco IPICS solution. The Cisco lifecycle approach to services defines the requisite activities at each phase of the solution lifecycle:

- Reduce deployment costs by identifying the features that will best meet your business requirements
- Accelerate migration by assessing the readiness of your network to support the system and by developing a sound design
- Support smooth implementation through effective planning and expert installation, configuration, and integration
- Increase operational efficiency and extend the value of your investment with award-winning technical support

For more information about Cisco services, visit http://www.cisco.com/go/services.

## For More Information

For more information about Cisco IPICS, visit http://www.cisco.com/go/ipics or contact your local account representative.

For more information about APCO Project 25, visit

http://apcointl.org/spectrum-management/resources/interoperability/p25.html.

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