SOLUTION OVERVIEW

Cisco IPICS

INTEGRATED COMMUNICATIONS INTEROPERABILITY

Today’s myriad options for instantaneous communications allow organizations of all kinds to establish and maintain real-time voice contact between users—but only if users employ similar devices and are on the same network. Although this capability is critical in emergency situations and for organizational efficiency, the inability of users with disparate devices or on separate networks to communicate with each other can cause potentially serious consequences. There is a need for true communications interoperability to address these concerns.

Incompatible devices and networks mean that first responders, such as fire and police personnel, often cannot communicate with each other when an emergency occurs. Recent events have demonstrated the unfortunate results of such communication problems. In emergencies, various organizations’ network and operational silos can preclude the immediate interagency communication that is essential to effective incident management.

Additionally, as events develop, different types of information become relevant and appropriate. Often, voice communication through push-to-talk (PTT) service interoperability is the initial requirement for incident managers and first responders. But as a situation unfolds, additional data such as geographic-information-system (GIS) information, building plans, maps, or surveillance camera images can become increasingly important. Voice alone cannot provide this type of information—it is more effectively shared through methods such as instant messaging and videoconferencing.

The ability to incorporate and convey information contextually, so that it can be delivered when, where, how, and to whom it is needed, requires robust communications interoperability. And communications interoperability facilitates real-time interagency collaboration, which is a critical component in the successful and efficient management of many incidents and events.

THE CISCO IPICS VISION

The Cisco® IP Interoperability and Collaboration System (IPICS) provides a systems approach to communications interoperability, operations, and emergency management that delivers the right information to the right person in the right format at the right time. Based upon proven IP standards and technology, Cisco IPICS transparently integrates disparate PTT networks, providing advanced features without requiring a change in existing operating procedures. It offers a flexible, dynamic, and secure platform that facilitates immediate sharing of information, improves daily enterprise operations, and provides a robust framework for real-time event management, while protecting investments in traditional PTT and Land Mobile Radio (LMR) systems.

Cisco IPICS is designed not only to meet the immediate tactical needs of public safety and enterprise organizations, but also to establish a foundation for additional layers of powerful capabilities. The initial release of Cisco IPICS focuses on voice interoperability across multiple networks, and provides services for user management, policy creation, and integration of diverse PTT devices. But its underlying architecture will allow Cisco IPICS to extend well beyond voice interoperability to provide complete information-based interoperability and collaboration, with the contextual integration of voice, video, and data resources.

As the system continues to expand, subsequent phases of Cisco IPICS will provide rich-media services such as data and video collaboration, policy-based incident management, event-based operations and control, visualization, operations integrity, and reporting.
CISCO IPICS: PHASE 1

In its first phase, Cisco IPICS delivers voice interoperability across wired and wireless networks, subsuming LMR interoperability and PTT devices and providing enterprise businesses, safety and security operations, and emergency management personnel with real-time information sharing and powerful incident management tools. By extending PTT functions from the LMR world to the IP world, Cisco IPICS combines public switched telephone network (PSTN), cellular, and voice inputs, providing transparent communications interoperability with contextual voice integration. Cisco IPICS captures information through diverse networks, gateways, and other access points, and delivers this information as appropriate based on the roles and responsibilities of users.

Designed for routine operations and emergency situations, Cisco IPICS offers advanced functions through an intuitive and adaptive user interface. It allows administrators, incident commanders, and dispatchers to focus on operations and control, rather than on the underlying network technology. The same capabilities that increase the daily efficiency of enterprise organizations can be employed on an as-needed basis for efficient management of emergency events. This powerful solution is suitable for:

- Enterprise operations, including retail, transportation, healthcare, and financial
- Enterprise safety and security
- Public safety and first responders
- Federal, state, and local government agencies

Cisco IPICS can be deployed in headquarter facilities, branch offices, operations centers, or mobile command units to improve the effectiveness, flexibility, and efficiency of operations, and to streamline organizational decision making during both critical and routine incidents.

SYSTEM HIGHLIGHTS

Delivering effective, intuitive, and comprehensive operations management and communications options makes Cisco IPICS ideal for organizations that regularly use disparate and incompatible modes of communication, and require the flexibility to rapidly combine multiple communications systems for improved coordination and efficiency. Because it employs the same operating procedures and network infrastructure for daily operations and emergency events, Cisco IPICS provides a consistent and dependable environment for business and operations managers, simplifying daily operations while providing critical information needed for immediate decision making and responsiveness.

As a full-featured, comprehensive solution based on established IP standards, Cisco IPICS provides features that meet a wide range of requirements:

- **Standards based**—Taking advantage of industry-standard hardware devices and proven IP architecture, Cisco IPICS provides a true unified systems framework for voice, video, and data communications interoperability. Organizations that currently deploy a multitude of wireless (PTT, cellular, or WLAN) devices can effectively integrate the Cisco IPICS approach, which provides the infrastructure and feature set needed to achieve wide-ranging business and service goals.

- **Flexible and efficient operations and incident management**—Cisco IPICS delivers flexible and intuitive resource management capabilities to meet the needs of any event. By providing interoperability for disparate resources, whether users, user groups, or radio channels, across multiple networks and operational domains, Cisco IPICS facilitates the management of events based on policies, roles, and responsibilities. Resources can be incorporated as needed, and can be easily removed when they are no longer necessary, allowing graceful escalation and de-escalation based on the scope of an incident.

- **PTT everywhere**—By extending PTT and voice services from the LMR world to IP networks, Cisco IPICS provides voice interoperability between wired and wireless (LMR, Wi-Fi, and cellular) networks.

- **Business logic and policy engine**—Cisco IPICS helps enable the integration of business logic and policy principles. Organizations can develop and implement templates that incorporate standard procedures for the execution of operations or incident management functions.

- **Customization**—An array of hooks and templates allows Cisco IPICS to be customized to the specific requirements of a particular organization. As an organization’s needs change over time, Cisco IPICS can adapt with them.

- **Cost and investment protection**—Cisco IPICS provides a comprehensive interoperability solution at a fraction of the cost of replacing existing radio systems. By providing the communications mechanism for existing and traditional equipment, Cisco IPICS offers robust interoperability and...
communications, while eliminating the need for wide-scale upgrades of radio endpoints and LMR networks. This graceful migration to IP networks and services protects what can be a significant investment in traditional radio networks and devices. And because its architecture supports the integration of voice, video, data, and more, Cisco IPICS provides a smooth path for future enhancements while ensuring the protection of an initial investment.

**A SYSTEMS APPROACH BASED ON IP STANDARDS**

Cisco IPICS takes a systems-based approach to communications interoperability, using established and proven IP standards to offer flexible, dynamic, and secure communications interoperability, a robust applications platform, real-time information sharing, and effective operations management. This systems perspective uses Cisco gateways, voice over IP (VoIP), rich-media services, and related technologies, taking full advantage of Cisco’s extensive experience in delivering the products, solutions, partners, and support that help organizations transform communications.

A true systems-based solution offers significant tactical and strategic benefits, including:

- An intelligent IP network infrastructure that meets critical scalability, security, and resiliency requirements
- Flexible migration options from existing networks and devices
- Extensive customization and integration capabilities to meet current and ongoing needs
- Established growth path to accommodate new requirements and future technologies

**CISCO IPICS SERVER**

As the cornerstone of Cisco IPICS, the Cisco IPICS Server provides an intuitive suite of applications that help enable communications and interoperability, and effectively manage incidents. With these applications, resources across multiple operational domains can be engaged based on the needs of an event, and policies for handling routine actions or incidents can be activated as needed. The Cisco IPICS Server manages resources that can include LMR channels (mapped to agencies or roles), multicast audio channels, cellular devices, and PSTN devices, and it:

- Provides authentication and security services
- Hosts the system database, which maintains data required for operation
- Helps enable integration with various media resources, such as Cisco Router Media Services (RMSs), Cisco IPICS Push-to-Talk Management Centers (PMCs), and Cisco IP phones
- Hosts the Cisco Policy Engine, which provides a set of rules for selected operations of Cisco IPICS
- Administers PMC client versions, configurations, and updates
- Collects audit information, which can be used for analysis, training, and operations management

The Cisco IPICS Server includes an elegant Web-based application that exposes appropriate system features and capabilities based on user roles. Through this application:

- End users maintain personal information, download the PMC client application, and specify communication preferences that are used to configure audio devices.
- Dispatchers have access to a powerful incident management application, which provides intuitive, drag-and-drop functions for setting virtual-talk-group (VTG) templates, activating VTGs to begin conferences, adding or removing participants in VTG templates and active VTGs, monitoring active VTGs and events, and muting and unmuting users (Figure 1).
- Operators set up and manage users, including granting users access to Cisco IPICS and to the PMC, assigning user channels and roles, and setting up system policies.
- Administrators install and configure Cisco IPICS resources, including servers, routers, multicast addresses, locations, and PTT channels; create operations views; manage system licenses and PMC versions; and monitor the status of the system and its users through activity log files.
Figure 1. Cisco IPICS Incident Management Application

CISCO IPICS PMC
The IPICS PMC client is a server-administered, PC-based application that extends radio into the IP world. Acting as a PTT audio application, the IPICS PMC client helps users participate, through an IP network, in one or more talk groups or VTGs at the same time. Through an easy-to-use, customizable interface, the PMC application lets users monitor and participate in up to 8 PTT channels simultaneously, based on policy and privileges assigned by the Cisco IPICS operator. An IPICS PMC client accesses channels through multicast or Session Initiation Protocol (SIP), depending on user location and network design and capabilities.

Featuring a straightforward and intuitive user interface, the PMC allows users to easily select a channel; adjust channel volume; and view, transmit, and receive indicators, helping improve floor control and talk group participation. For maximum flexibility, the PMC supports 4- and 8-channel skins, offers mouse-driven and touch-screen interfaces, and provides the ability for organizations to create skins for a customized design (Figure 2).
Figure 2. Cisco IPICS PMC Client with a Four-Channel Mouse Skin

SYSTEM ARCHITECTURE
Cisco IPICS takes advantage of existing standards and technologies to provide a systems-level, network-based solution to voice communications and interoperability. This approach provides an interoperability framework that allows elegant migration from traditional networks and devices to rich IP services and features, while preserving existing investments in traditional systems, applications, and training. It offers a complete solution to the immediate tactical needs of an organization, yet it provides the customization and integration capabilities needed to meet long-term, strategic requirements and goals.

A quality-of-service (QoS)-ready, IP Multicast-enabled network is critical to providing scalability and performance when integrating traditional hoot-and-holler systems and handheld radio or LMR traffic. Cisco LMR gateways and routers convert such analog radio traffic to IP traffic, mapping each radio channel to an IP Multicast address. Similarly, in hoot-and-holler systems, each talk group is mapped to an IP Multicast address. Users of IP-connected devices, such as the Cisco IPICS PMC, can communicate with users of other types of devices through either an IP connection or a SIP (unicast) remote connection.

A Cisco IPICS deployment can include a variety of hardware devices and applications to expand the functions and capabilities of the system.

- **Gateways**—LMR gateways and application gateways provide radio network interoperability and integration with traditional applications.
- **Networking components**—Switches, routers, firewalls, MAR, access points, and wireless bridges provide efficient and secure network operations.
• Cisco CallManager functions and VoIP services—These services extend PTT to IP networks and enable voice interoperability across radio and nonradio networks.

• Cisco IP Phone—With Extensible Markup Language (XML) services, Cisco IP Phone IP Phone 7970G model allow users to log in and gain secure access to Cisco IPICS channels and talk groups.

THE CISCO IPICS SOLUTION

An integrated, flexible, and scalable communication and collaboration system, Cisco IPICS delivers state-of-the-art features, an industry-standard architectural framework, and full compatibility with existing technologies. Powered by Cisco Systems®, the global leader in networking systems and the emerging leader in interoperable communications solutions, Cisco IPICS provides enterprise and public safety organizations with integrated and adaptable systems that deliver reliable and resilient communications interoperability across various networks, devices, and operational domains.

Cisco IPICS is a powerful and comprehensive communication interoperability and collaboration solution that will meet your needs today and into the future.

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

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Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters
Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: 31 0 20 357 1000
Fax: 31 0 20 357 1100

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

Asia Pacific Headquarters
Cisco Systems, Inc.
168 Robinson Road
#28-01 Capital Tower
Singapore 068912
www.cisco.com
Tel: +65 6317 7777
Fax: +65 6317 7799

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