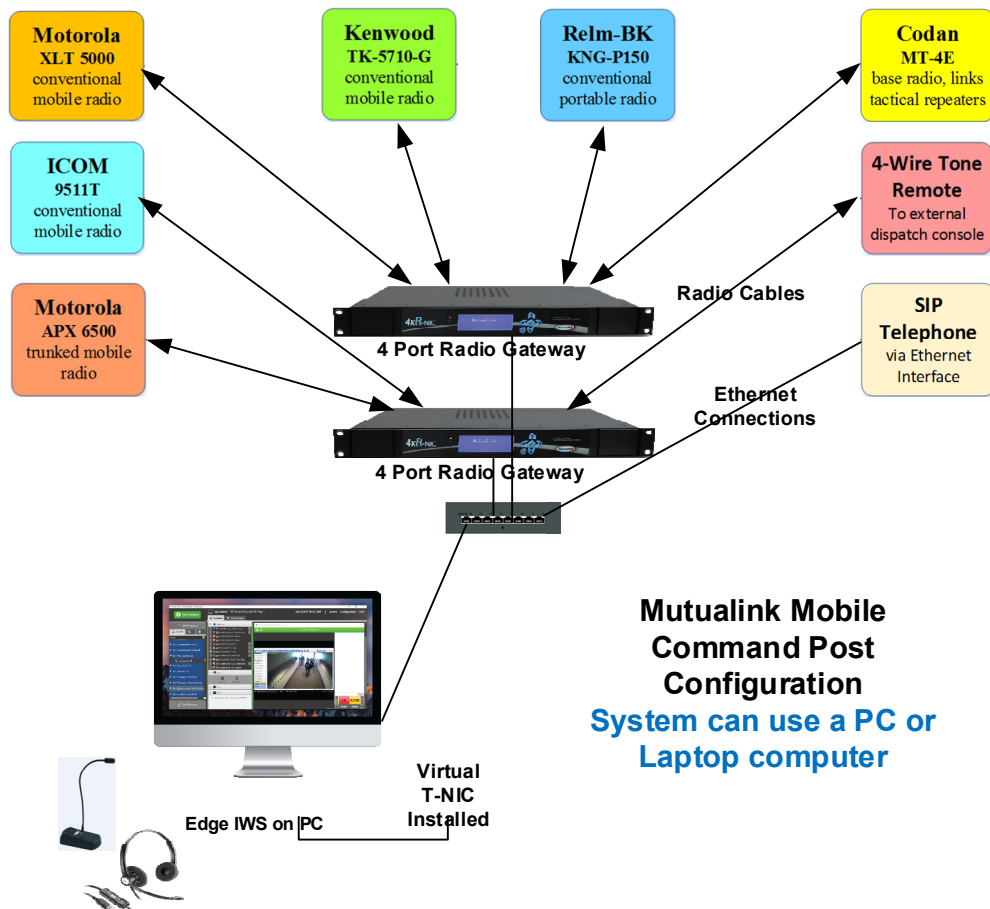


Category-Interoperability-Gateway

Mutualink Mobile Command Post configuration utilizes a standard PC or Laptop. The diagram below contains all the required Mutualink components as part of the Kit.



One integration radio cable is supplied per port as part of the solution. The donor radio or console needs to be identified once the order is placed.

Mutualink Gateways and Capabilities

There are many different types of Mutualink gateways, but they all have a common purpose: To enable media/data from non-Mutualink systems/devices to be selectively shared with and interoperate with other agencies via the Mutualink system.

If an analog interface is required to integrate to an external system/device, then a physical gateway appliance is typically required. This is most common for analog radio, telephony,

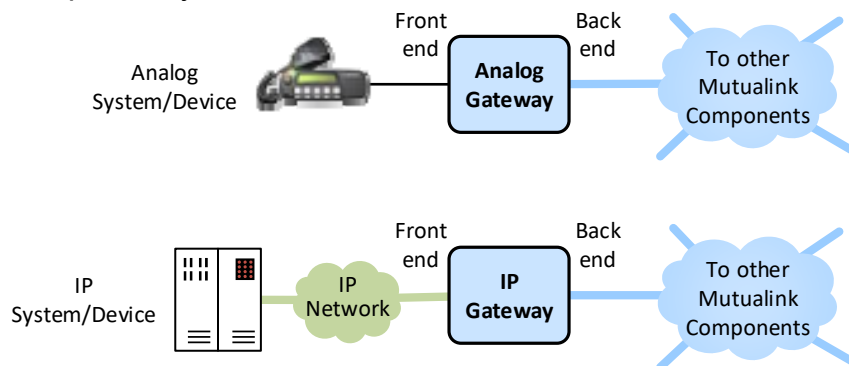
or video interfaces. If the interface to an external system/device can be accomplished using an IP network connection, then the “IP gateway” can be realized as a software module running on an approved platform.

Multiple gateway functions can reside on the same physical host. The maximum number of analog gateways in one host depends on how many analog interfaces can physically fit into a chassis, whereas the maximum number of IP gateways in one host depends primarily on the CPU and memory capacity of that host. When mixing both analog and IP gateways on one host, both limits come into play.

Gateways also have two logical interfaces:

- The back-end, which is the IP network interface that it uses to connect to other Mutualink components
- The front-end, which is the interface that connects to the external system or device. For analog gateways this will be an analog interface; for IP gateways this will be an IP network interface.

For IP gateways, a single network interface could be used for both the back-end and front-end functions, but it's frequently desirable to insulate external devices/systems from the interoperability traffic.



Land Mobile Radio (LMR) Gateways

Mutualink LMR/radio gateways may be either analog gateways or IP gateways depending on the capabilities of the radio system requiring integration.

Analog Radio Gateways

These gateways provide the following capabilities when connected to an analog radio interface:

- Analog Rx & Tx voice: Balanced/unbalanced, 2-wire/4-wire, various terminations
- Tone Remote Control (TRC): Channel select, monitor
- Control I/O: E&M, PTT/COR, Monitor, TxGrant, Channel select
- Serial and USB control: Channel select, PTT-ID, Monitor, Text Messaging

Supported analog interfaces include: Portable radios, mobile radios, base stations, console systems, intercoms, PA systems, any 2-wire/4-wire voice interface.

Analog radio gateways are available in 1-, 2-, and 4-channel capacities, and in standalone, rack-mount, and rugged tactical chassis.

Additionally, analog radio gateways can perform any function that an IP radio gateway can since the analog gateway is essentially an IP gateway with analog interfaces added.

IP Radio Gateways

These gateways provide the following capabilities over an IP radio interface:

- Radio-over-IP (RoIP): SIP or RTP; unicast or multicast; G.711, G.729, and linear-16 codecs
- P25: ISSI or CSSI
- DMR: AIS
- Bridging System Interface (BSI): SIP + RTP
- Various proprietary radio vendor interfaces
- Coming soon: Mission Critical Push-to-Talk (MC-PTT)

For larger-capacity IP radio gateways (i.e. P25, DMR, BSI, and MC-PTT) redundant gateways may be deployed for additional resiliency. It is recommended that these gateways be deployed in different locations for enhanced geo-redundancy.

Video Gateways

Mutualink video gateways may be either analog gateways or IP gateways depending on the video system/device requiring integration. Furthermore, video gateways may be configured to operate in one of two modes:

- **Input Mode:** Input video gateways receive video feeds from external sources and send those feeds to Mutualink sharing groups.
- **Output Mode:** Output video gateways receive video feeds from Mutualink sharing groups and send those feeds to external video systems/displays.

Video gateways can also include bidirectional voice/audio capability as part of the integration if desired.

Analog Video Gateways

More properly called non-IP gateways, these gateways provide the following capabilities:

- Input: Composite, VGA, DVI, HDMI
- Output: VGA, DVI, HDMI

Additionally, analog video gateways can perform any function that an IP video gateway can since the analog gateway is essentially an IP gateway with analog interfaces added.

IP Video Gateways

These gateways provide the following capabilities:

- Input: MP2T or RTP, RTSP client, MPEG2, MPEG4, H.263, H.264, H.265, unicast or multicast
- Output: MP2T or RTP, RTSP server, H.264, unicast or multicast

Telephony Gateways

Mutualink telephony gateways may be either analog gateways or IP gateways depending on the telephony system/device requiring integration. These gateways may be used to make outgoing calls and accept incoming calls to/from the PSTN or a PBX.

For incoming calls, an optional PIN may be assigned to the line so that only authorized users may call in on the line. When an incoming call comes in to a telephony gateway, that call may be routed to a specific user, set of users, or a group depending on the configuration of the gateway.

Analog Telephony Gateways

This gateway includes an FXO port to connect an analog POTS line from the PSTBN or a PBX.

IP Telephony Gateways

The IP telephony gateway is really a subset of the IP radio gateway; it provides the following capabilities:

- Signaling: SIP (or none for just RTP)
- Voice: RTP unicast or multicast
- Codecs: G.711, G.729, and linear-16

IP Gateways

System gateways are IP-only gateways that provide an interface to a variety of multimedia communications systems. This includes Unified Communication (UC) systems as well as other group PTT voice systems. For interfacing to specific channels or talkgroups on voice-only systems, an IP radio gateway will usually suffice. For systems that include other media such as video, or require enhanced integration beyond specific channels or talkgroups (e.g. unit-to-unit calls), a System Gateway is used.

The capability provided by a System Gateway depends greatly on the capabilities of the external system under integration.

Intelligent Sensor Gateways

These gateways typically integrate to event sources such as alert/panic-button systems, notification systems, etc. and initiate various actions with other Mutualink components when events occur. The event gateway therefore is a generic “trigger mechanism” for automated actions in the Mutualink system.

When the external system sends an event notification to the event gateway, there is typically additional information associated with the event that is also sent. For example, the location of the event (e.g. lat/long or building ID), the type of event (e.g. police, fire, medical), and the priority (e.g. emergency, urgent, routine).

The event gateway includes a sophisticated rules engine that can trigger a complex sequence of actions. These actions may be any action that an IWS user can perform, and can be customized according to the event info for that specific event. Examples of actions the event gateway can perform:

- Create a sharing group and invite all law enforcement users within a 1-mile radius
- When a panic button is pressed in a school, create a sharing group and invite the school security officers as well as the local PSAP. Automatically send them the video feed from the video camera closest to where the panic button was pressed.

- When a fire alarm activates, automatically send the alarm company the closest video feed and live audio.

The Interoperable Response and Preparedness Platform (IRAPP)

Mutualink operates a nationwide private secure network known as IRAPP. Access to this network is via secure VPN only (software or hardware) and is limited to authorized Mutualink customers. IRAPP provides the following value to our customers:

- 1) **Ubiquitous connectivity.** Secure networking connectivity between all IRAPP participants. Once an agency connects to IRAPP, they instantly have interoperability access to all other agencies on IRAPP. This solves the above problem of many point-to-point VPNs between agencies – connect once to IRAPP and you have secure on-demand connectivity to anyone else in the network.
- 2) **Hosted Edge Service.** If an agency does not wish to deploy their own ME server on-premise, Mutualink provides a hosted service that allows users to use their Edge IWS clients wherever there is Internet connectivity.
- 3) **Hosted Telephony Service.** Mutualink offers a PSTN telephony gateway service that allows agencies to dynamically connect outgoing and incoming PSTN calls to sharing groups.
- 4) **Hosted Alert Notification Service.** If an agency does not wish to deploy their own event/alert gateway on-premise, Mutualink offers a hosted service that provides the same functionality. This service receives events from an agency's alert/notification system and executes the sequence of actions defined by that agency's configured rules.
- 5) **Remote Monitoring and Support.** Mutualink Customer Support is able to monitor connected components for loss of connectivity or other issues and work with the agency to correct the problem before it leads to an outage. Additionally, they are able to perform patches and upgrades on an ongoing basis at the agency's discretion.

