MOTOBRIDGE™ IP Interoperable Solution

Federal, state and local agencies with incompatible voice systems can communicate immediately with the MOTOBRIDGE IP Interoperable Solution. MOTOBRIDGE is an easy and fast way to establish communications between disparate systems in support of day-to-day operations and emergency response. The bridges between systems are standing by 24/7, ready to be activated the moment they are needed so communication is immediate. MOTOBRIDGE is a scalable IP-based solution, providing interoperability for small areas with only a few radio systems to statewide regions with thousands of systems.

MOTOBRIDGE can accommodate any number of users or agencies. The solution is available in on-site, transportable configurations that consist of 1 to 8 gateways with optional dispatch; or for larger applications, MOTOBRIDGE consists of gateways, dispatch, and servers for managing the network. The unique, distributed architecture of MOTOBRIDGE uses soft-switching gateways which establish peer-to-peer connections without a central server or single point of failure. The following components are used to customize a solution:

MOTOBRIDGE GATEWAY UNIT

The gateway unit is the primary hardware component in a MOTOBRIDGE interoperability network. The Gateway Unit can be configured to serve as either a Radio Gateway Unit (RGU) or a Workstation Gateway Unit (WSGU). In the single gateway configuration for transportable or on-site applications, one unit serves as both the RGU and WSGU.

Radio Gateway Unit

The Radio Gateway Unit (RGU) is used to connect up to 8 disparate systems into the MOTOBRIDGE Solution. Radio, phone or PC users access and share these radio systems through the RGU(s). Connections can be made dynamically through a dispatch application, or permanent connections can be established during system configuration with an easy to use software tool. All of the audio and signal processing is handled through the RGU in real time, meeting mission critical time constraints for unsurpassed audio quality. The RGU is small and robust, enabling it to be mounted at a remote tower site, at the command center, or in a transportable vehicle.

Workstation Gateway Unit / Dispatch Application

The Workstation Gateway Unit (WSGU) connects up to 8 PC clients into a MOTOBRIDGE Solution. Connected PCs are loaded with a graphical user interface Dispatch Application. Users access and control radio and telephone resources for interoperability. Radio-to-radio patches and radio-to-phone patches, intercom between PC users and conferencing are supported. Established connections are sustained by the gateways, even if a dispatcher disconnects. A software-only Remote Dispatch Application enables remote PC users to share the WSGU over IP.

OPERATIONS MANAGEMENT CENTER (OMC) SERVER

In MOTOBRIDGE systems with more than 8 gateway units, an OMC Server is used to help manage the network. The OMC Server contains the database for all resources and users in the system. It provides network and fault management, resource provisioning, and administrative functions. The OMC hosts an Administrator Control Panel (ACP) client. The ACP is used to view and monitor the status of the entire MOTOBRIDGE distributed network, as well as override any commands made at the dispatcher level for improved resource utilization. The ACP's reports and alarm statistics can be quickly recalled for post-mortem evaluations and protocol assessments. The OMC is available in a redundant, hot-standby configuration where an identical server can be run in parallel, ready to take over the database management.

SESSION INITIATION PROTOCOL (SIP) PROXY SERVER

SIP is a standard signaling protocol for establishing communication over IP networks between disparate devices. The SIP server manages the VoIP connections and interacts with the gateway units, which implement the SIP User Agent. The SIP Server is not a single point of failure in the system. If a gateway were temporarily unable to connect to the SIP Server, it would use the OMC to establish connections. If both the SIP and OMC were to fail for any reason, there is a third backup where the GU will connect through the last known IP of a given resource. Like the OMC, the SIP Server may be deployed in a redundant, hot-standby configuration. For systems with 8 or fewer gateways, a SIP Server is not required.

Mission Critical Interoperability

Motorola goes beyond Voice over IP (VoIP) to provide an interoperability solution designed with mission critical speed and reliability. MOTOBRIDGE uses both Real-time Transport Protocol (RTP) for VoIP, and Remote PTT Dedicated Framing Layer (RPDFL) for radio interoperability. Using RPDFL gives assurance to the user that when they press PTT it will be recognized at the other end, and provides the fastest end-to-end radio operation for highest quality voice. RPDFL, which uses less bandwidth than RTP, also adds all radio signaling, such as Unit IDs, Emergency Alerts, and Radio accept/deny, which can be passed between trunked networks from different providers and even between conventional and trunked networks.

OPERATIONS MANAGEMENT CENTER (OMC) AND SESSION INITIATION PROTOCOL (SIP) PROXY SERVER(S)

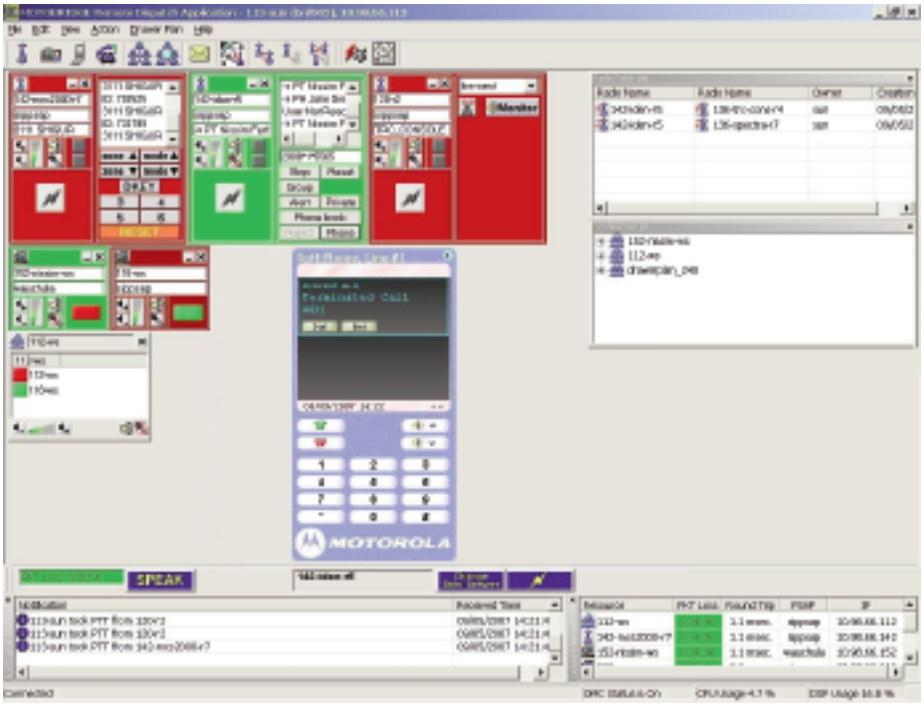
- Provides a central location for management of system configuration, resources and users (Add, Delete, Edit)
- Services up to 10 concurrent administrator control panel client applications
- Services up to 1000 concurrent dispatcher client applications
- Manages up to 4000 concurrent resources (radios, workstations)
- Provides a central point for system audio-encryption-keyload management
- Provides a central point for remote software download to a selected gateway unit, or to all gateway units; keeps images of last two gateway software versions
- Supports 8 Push-to-Talk priority levels and 9 user privilege levels
- Provides centralized fault monitoring capabilities
- Available in Main/Redundant Configuration (Optional)

RADIO GATEWAY UNIT (RGU)

- Voice and data connection for up to 8 disparate radio systems and Nextel/cellular phones
- Each RGU supports up to 60 simultaneous talk-path connections
- Enables each connected radio system to be linked through a talkpath to up to 15 parallel destinations (dispatch, phone or radio systems)
- End-to-end audio encryption
- Manages PTT priority levels assigned to each radio connected to the system
- Supports Quality of Service (QoS) which ensures real-time audio gets highest priority over other types of traffic
- Supports Decode Permit/Denial Tones for Motorola and non-Motorola trunking systems
- Connects a Nextel/cellular phone for full-duplex calls. Can also serve as an SMS gateway, enabling authorized cellular phone users to patch radio systems using SMS signaling
- Configurable remotely or locally
- S/W upgraded centrally and remotely
- Maintains talkpaths in the absence of SIP / OMC servers and dispatch
- Multiple vocoders allow for efficient use of bandwidth
- Uses Standards-based protocols
- Supports Emergency message transfer
- Supports transmitting DTMF tones
- Standard EIA 19" rack mount configuration

Front and back view of Gateway Unit (RGU or WSGU)

MOTOBRIDGE DISPATCH APPLICATION (DA)



- Displays interoperability connections, resource status
- Windows-based, graphical user interface (GUI) application
- Connects to system through Workstation Gateway Unit
- Up to 24 talkpath modules with separate volume controls
- Four soft phone modules to make/receive up to 4 simultaneous PSTN or IP phone calls
- Displays real-time talkpath IP network statistics, such as packet loss rate and round trip delay
- Dynamic setup and tear down of talkpaths: dispatch to radio(s), radio to radio(s), dispatch to dispatch(ers), telephone to radio, conferencing and phone call
- Automatic setup of patch between new phone call and existing radio talkpath (configurable)
- Initiate a pre-defined talkpath plan (drawer plan) in response to various emergency scenarios
- Video display. Supports video pull and push through Mobile Video Sharing network, enabling user in dispatch center or command vehicle to visually monitor activities and provide situational awareness to first responders
- Supports Emergency, Alert tones, Multi-Select, Takeover, DTMF, TRC Repeater control, and I/O signaling
- Supports Remote Control Head operations (Mode select, PTT ID, Emergency ID, Call Alert, Private Call) of a remote radio from the DA (control protocol required for non-Motorola radios)
- Supports SMS messaging to/from cellular phone
- Supports dynamic interoperability connections initiated from radio users' PL/DPL tones
- Up to 8 external speakers separating resource audio (Not available for Compact WSGU)
- User Authentication (PTT priority)
- Audio replay per module
- End-to-end audio encryption
- Configurable remotely or locally
- Shut down or failure of DA does not impact previously configured patches/talkpaths since all voice processing is done at the WSGU
- Can host up to 7 Remote Dispatch Applications

MOTOBRIDGE REMOTE DISPATCH APPLICATION (RDA)

Software application which allows a PC user to connect remotely to the MOTOBRIDGE network over IP. These software-only dispatch positions have full dispatch functionality, subject to user privileges. Up to 7 Remote Dispatch Application users can connect to each WSGU in the system. Optional 30-day Logging records the last 30 days of dispatch activity and replays it in the same GUI format.

COMPACT WORKSTATION GATEWAY UNIT (COMPACT WSGU)

The Compact WSGU provides the same basic functionality as the WSGU in a reduced hardware footprint. It is designed to be placed on a desktop in an office environment and uses a standard stereo headset connector and speaker output. The Compact WSGU cannot be reconfigured for use as an RGU. The Compact WSGU provides connectivity for one local and one Remote Dispatch Application.

MOTOBRIDGE is available in four configurations that allow you to expand your solution as your interoperability needs grow, with 100% equipment re-use. See table for a basic guideline:

MOTOBRIDGE CONFIGURATION	RADIO SYSTEM CONNECTIONS	GATEWAY UNITS	OMC/SIP SERVER	ACP CLIENT	EXAMPLE APPLICATIONS
MOTOBRIDGE G1	Up to 8, co-located	1 serves as both RSU and WSGU (if dispatch needed)	0	0	• Daily operations or Event Management with neighboring agencies • Small scale Emergency Response, Disaster Management, Search and Rescue
MOTOBRIDGE G8	Up to 64	Up to 8 total RGU and WSGU	0	0	• Transportable (optionally can connect to GX/MX via satellite)
MOTOBRIDGE GX	To 392	Up to 50	1* for both OMC and SIP	1	• Daily operations or emergency response from multi-county/state agencies (Hurricanes, wildfires, interstate police chase…)
MOTOBRIDGE MX	Tens of thousands	Up to 4000	1* each for OMC and SIP (2 total)	1	• On-site communications involving federal, state, and local agencies (disaster management, terrorism…)

** 2 or more for optional redundancy*

OMC AND SIP SERVER SPECIFICATIONS

Processor	Xeon 3.2 GHz/1MB Cache
Memory	2 GB
Operating System	Red Hat Enterprise Linux
Hard Disk	72 GB
Input Voltage	100 to 240 VAC

RGU AND WSGU SPECIFICATIONS

DIMENSIONS

Height	1 rack unit
Width	Desk mount – 17˝ Wall/Rack mount – 19˝
Depth	9.5˝

ENVIRONMENT

Operating	0° to 50°C
Non-operating	–20° to 80°C
Humidity	10% to 90%

POWER

GU Input Power	+20 to +60 VDC, –20 to –60 VDC
Dispassion	20W

RADIO

Output Voltage	–25dBm to +10dBm @ 600Ω
Output Impedance	600Ω
Input Voltage	20mV to 3V RMS @ 10K Ω
Input Impedance	600-10K Ω

AUDIO

Mic	+10V, 2K Ω pull-up
Headset	
Input Impedance (Mic)	2K Ω
Output Impedance (Earpiece)	50 Ω
Speaker Output	600

COMMUNICATIONS / PORTS

8 DB25 Audio Ports
2 RJ45 10/100Mb Ethernet Ports
1 DB9 MMI local configuration port
1 Speaker output
1 Headset Stereo/Mono connection
1 PTT connection

COMPACT WSGU SPECIFICATIONS

DIMENSIONS

Height:	1.52"
Width:	8.96"
Depth:	6.06"

ENVIRONMENT

Operating	0° to 50°C
Non-operating	–20° to 80°C
Humidity	10% to 90%

POWER

Input Power	9 to 15 VDC
Dissipation	10W

AUDIO

Mic	8V, 2k Ohm pull-up
Headset	
Input Impedance (Mic)	2K Ohm
Output Impedance (Earpiece)	10 Ohm
Speaker Output	1K Ohm

COMMUNICATIONS / PORTS

2 RJ45 10/100 MB Ethernet Ports
1 DB9 MMI local configuration port
1 3.5mm mini-jack Speaker output
1 3.5mm mini-jack Headset stereo output connection
1 3.5mm mini-jack Mic connection
1 RJ45 PTT/MIC connection

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