Cross-Network Gateway

(Radio-VoIP-GSM-Public Announce)

xTrunk302

www.manasrekha.com

What is a Cross-Network Gateway?

- ✓ It enables voice communications among the Radio, VoIP, GSM, and Public Announce (PA) networks.
- ✓ It incorporates Radio over Internet Protocol (RoIP) which converts radio voice communications into VoIP.
- ✓ It links up various radio networks together in order to extend the geographical coverage.
- ✓ It is a GSM voice gateway by enabling voice communications to and from the telephone networks (GSM and PSTN)
- ✓ It enables a voice connection to the public announce system for general and emergency broadcast.
- ✓ It makes recording of voice communications among various networks simple and easy.

Who needs a Cross-Network Gateway?

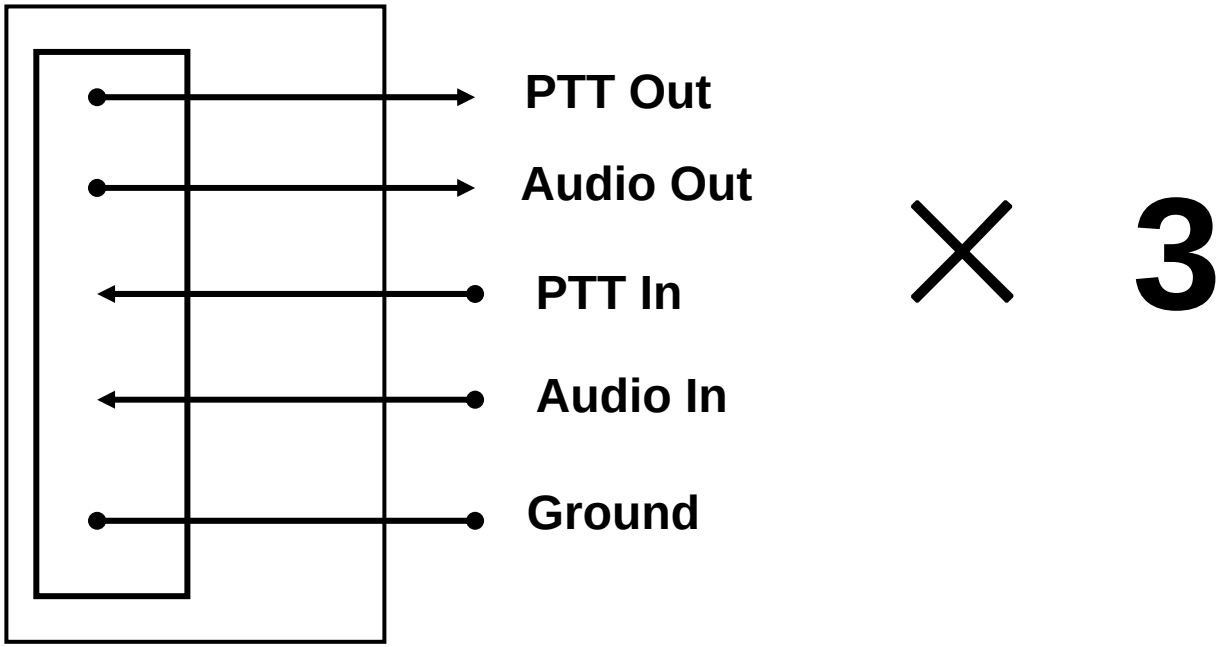
- ✓ Radio Service Operators who would like to expands their geographical coverage.
- ✓ Radio User who would like to make and receive calls from the telephone networks.
- ✓ System administrators who would like to monitor and maintain good control over the existing radio networks.
- ✓ System Integrator who would like to build or deploy a reliable voice communication network in timely manner.

Who are the targeted customers?

- ✓ Traditional “first”: police, fire and EMS (ones with LMR)
- ✓ Volunteer first responders
- ✓ Emergency response: 9-1-1, hospitals, emergency management, public health, transportation, public works, coroner, etc.
- ✓ Federal: Coast Guard, Customs and Border, Forest Service
- ✓ Military; National Guard
- ✓ Elected and supervisory officials
- ✓ NGOs: Red Cross, Salvation Army
- ✓ Critical Infrastructure: gas, electric, water

Hardware Interface

- 3 Sets of Standard PTT Control Interface:



Hardware Interface

- GSM Module

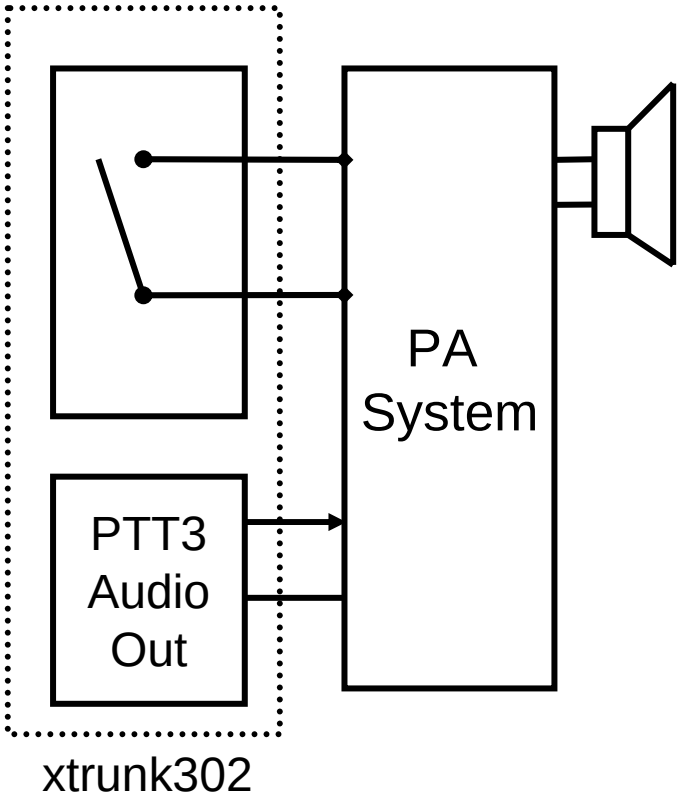
➢The built-in GSM module enables a user to monitor and / or communicate with the radio network via a PSTN or GSM phone.

➢A PTT user can make and receive calls via the GSM network. This is very critical for emergency.

➢When abnormal conditions or events occur, instance SMS can be sent to the system controller for via the GSM network for immediate attention.

Hardware Interface

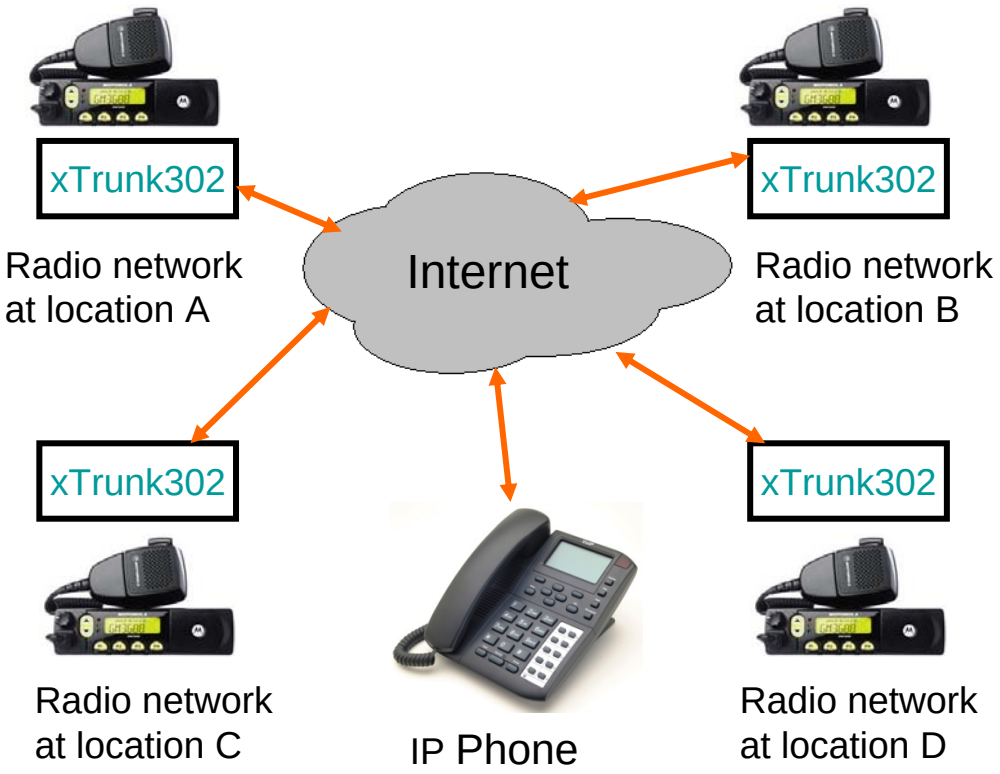
- Remote Control for PA System



Dial a DTMF access code on your PTT handset to activate the PA System in order to make an announcement / broadcast.

Hardware Interface

- IP Network



➢Cross-Network Gateway (xTrunk) connects the radio network at different locations via the IP network. No expensive wireless repeaters are required.

➢VoIP devices can also be communicate to the joined radio networks at no extra cost.

➢Additional capabilities can also be added via customized software enhancements.

Software Interface

- Low Level Drivers

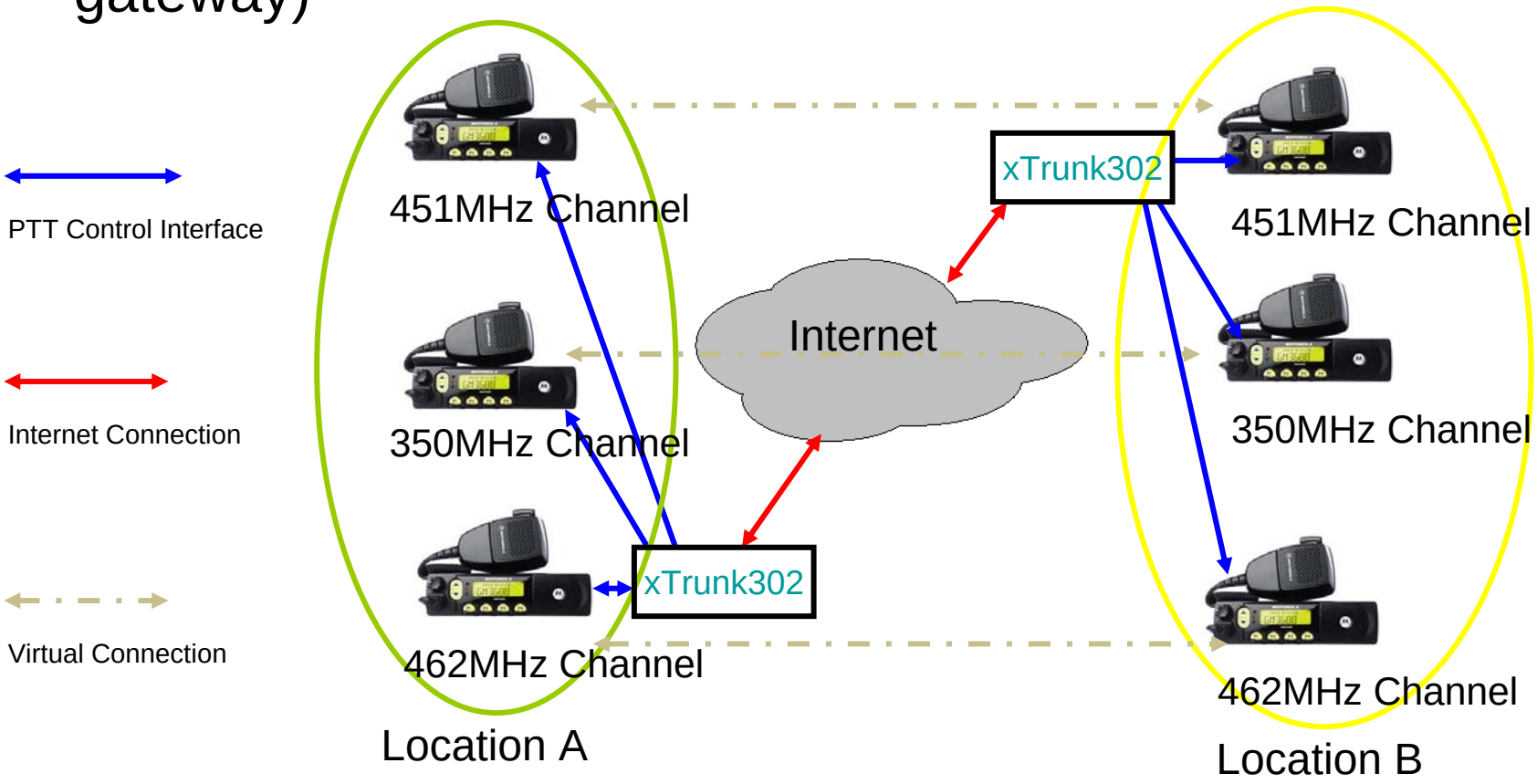
```
snprintf(dev, 64, "/tmp/.ippui%d", fxo->channel_
if(!callback_create((struct channel *)fxo, dev))
        DLOG("FXO callback create unsuccessfully
        free(fxo);
        return NULL;
}

register_audio(&fxo->audio, channel_id);

register_channel(channel_id, FXO, (struct channe
fxo->led=create_led(fxo->io.led_id);
fxo->pled=create_led(fxo->io.pled_id);
(struct channel *)fxo->pstn_ring=pstn_ring_creat
fxo->pre_key=20;

fxo->ecfilter=create_timer(15000, (struct channe
fxo_hook_down(fxo);
loop_detect_create((struct channel *)fxo);

dtmf_cid_timer_create(fxo);

passwd=get_syscfg("L%d_FW_TO_PSTN_PASSWD", fxo->
if(passwd && strlen(passwd)) fxo->voip_auth_pass
```

xTrunk302 offers a feature-rich low level Application Programming Interface (API) via its Ethernet port. It enables user to further develop customerized applications.

The real time recording system offered by DBL is developed based on the same API. For future enhancements, DBL will develop more API functions upon customer requests.

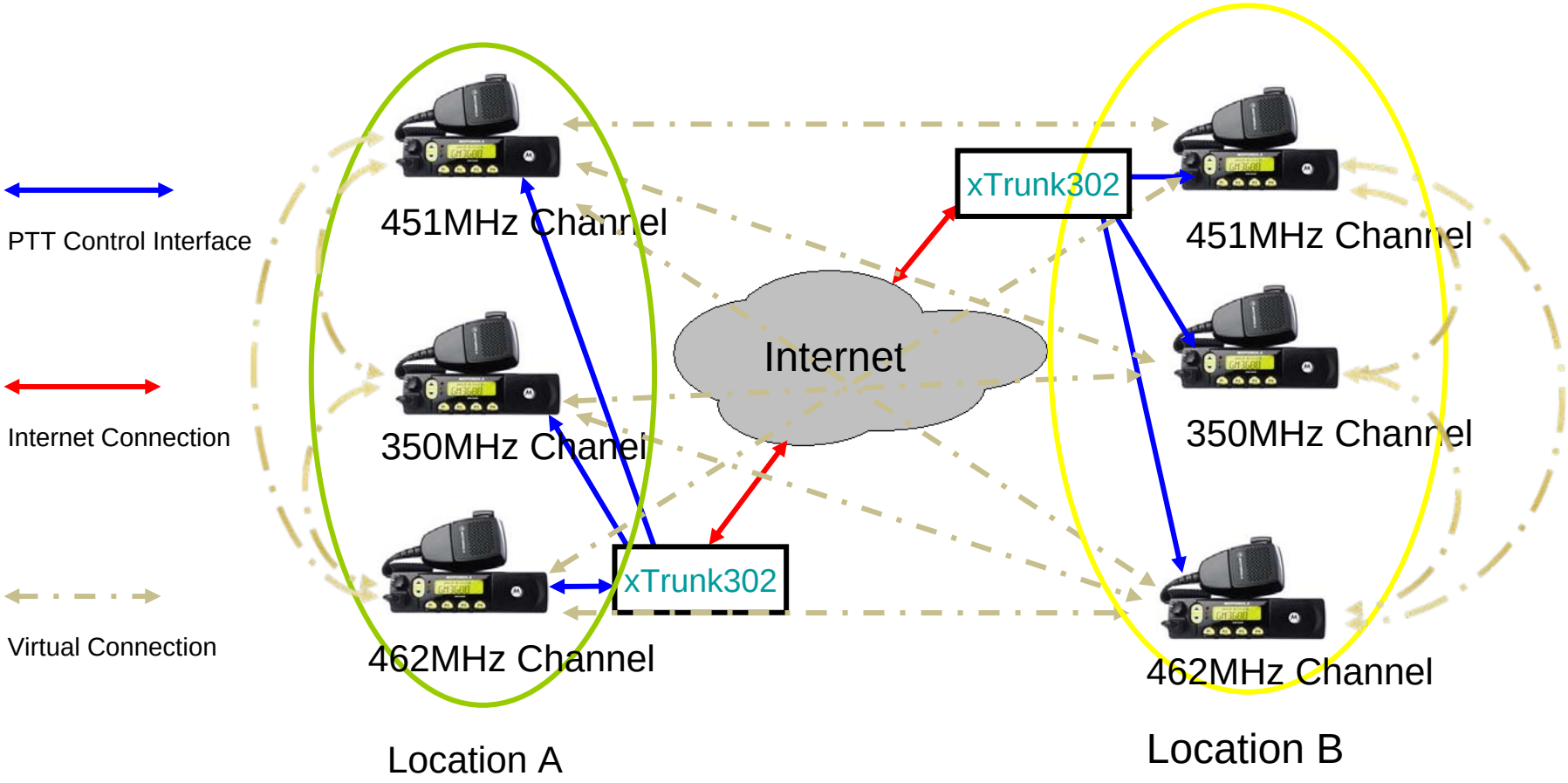
Network Topology

- Direct mode to link up the same radio channel at 2 different locations (up to 3 channels are supported by each gateway)



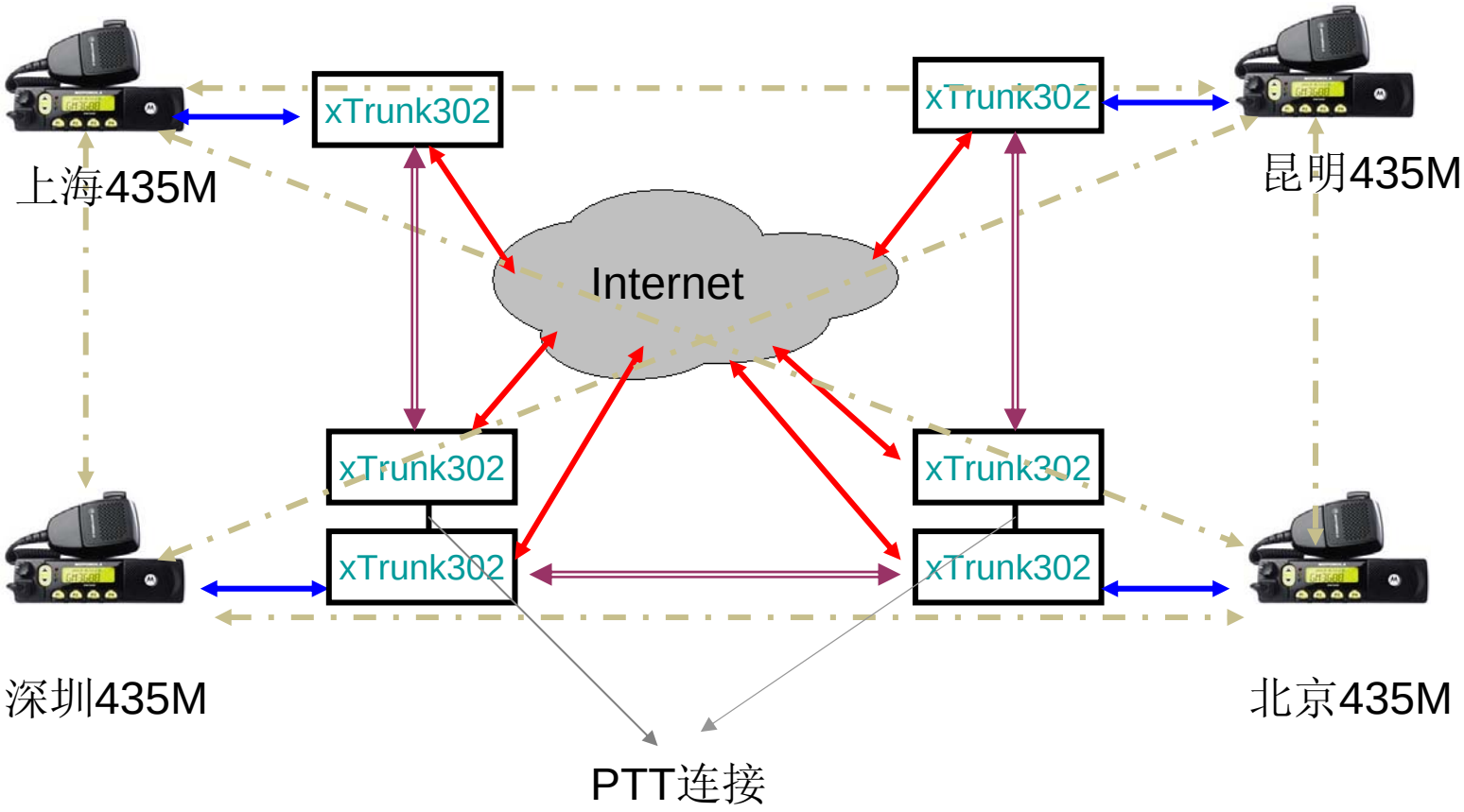
Network Topology

- Mixed mode to link up different radio channels (voice cross over between different channels)



Network Topology

- Expanded mode to link up more than 6 radio channels



Applications

- Extending Service Coverage

Radio service coverage is often affected by the geographical landscape, like high hills. The traditional method is to build expensive radio repeaters on the hills in order to extend the radio service coverage. In addition, its maintenance cost is high and its performance is affected by the weather. In this case, the Xtrunk gateways are the perfect solution. They are low cost and easy to install and maintain. They offer a very stable and reliable link between the two sites.

Applications

- Traditional Telephone Services in remote area with only radio service coverage

The xTrunk gateway enables VoIP and / or GSM calls to and from the radio network. A user can dial VoIP or GSM calls via the dial pad on the PTT terminal; incoming calls are also supported. This is utmost important in the case of emergency. This makes the radio network reachable from any part of the world.

No GSM coverage

GSM Coverage

Applications

- Remote Control and Monitor

Office at a different location can monitor the on-site activities and issue instant commands for more efficient control and management.

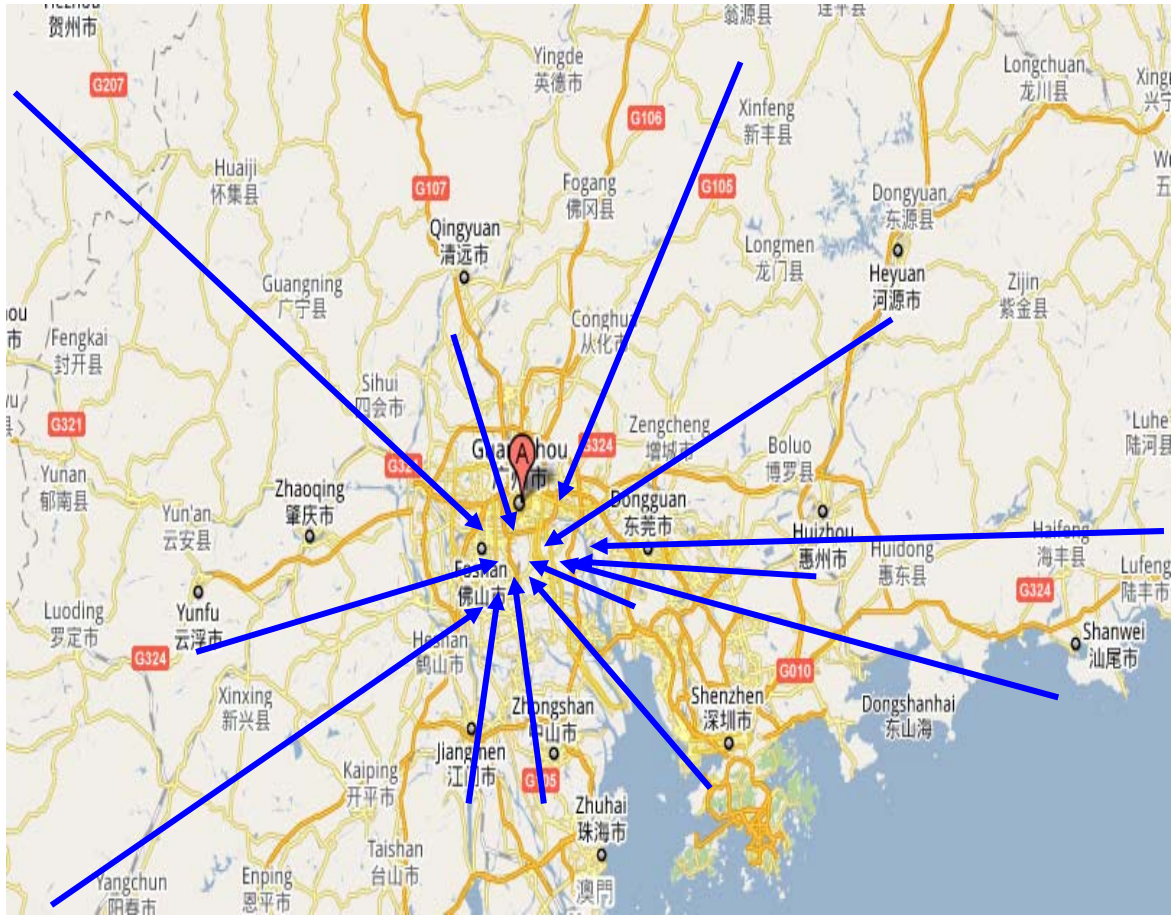
Ocean Freight Office in the City

Sea Terminal

Applications

- Centralized Command Center

A centralized command center can easily be realized by using the xTrunk gateways to link up all radio services at different locations to the headquarter. In the case of a major event, the headquarter can directly monitor and react immediately in order to get full control.



Applications

- Public Safety

Public safety agencies in Clallam County must cover all the towns and roads, 150 miles of coastline, part of the Olympic National Park, the Canadian border, two marine ferries, and several Native American Nations.

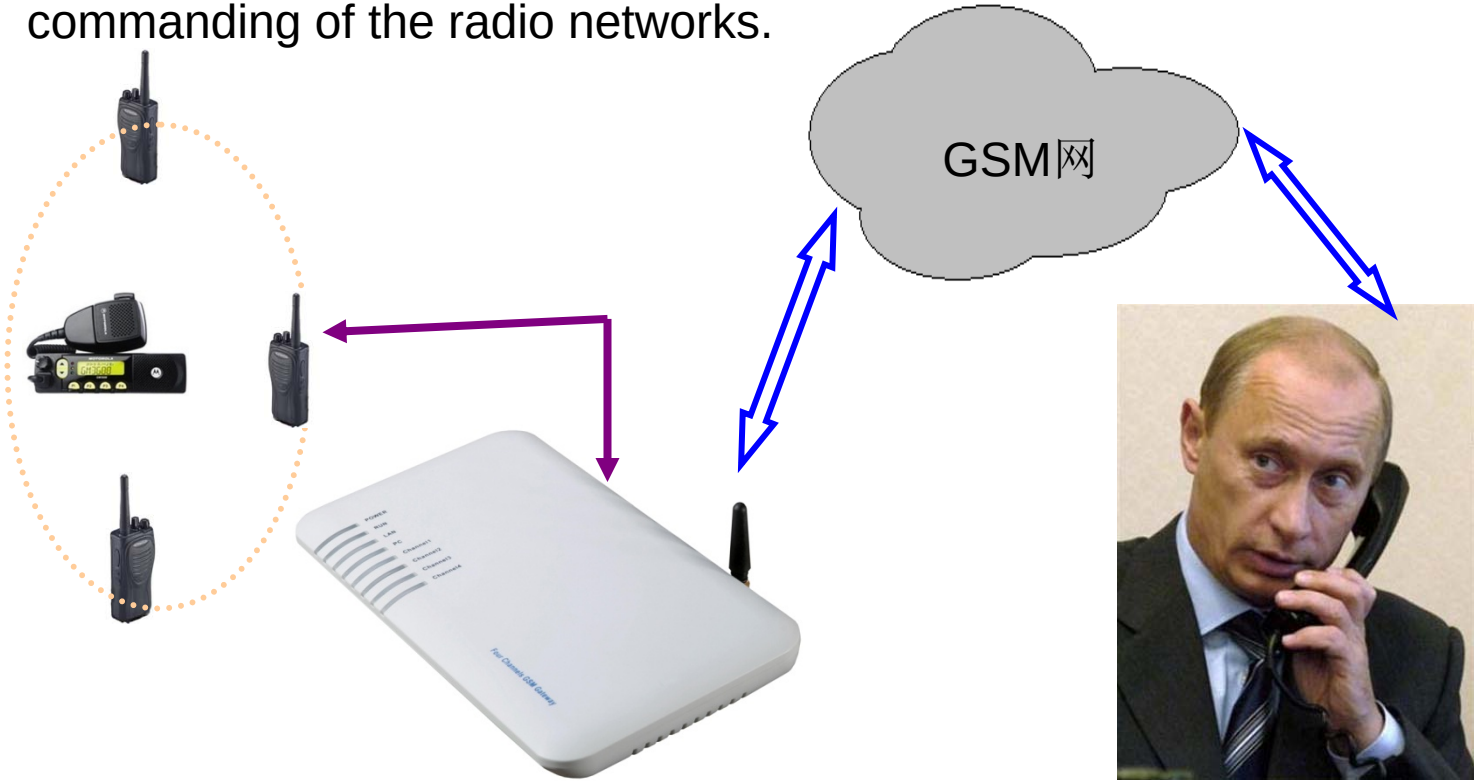
- Highway Control

Using the existing broadband network available at each tollbooth, it is simple to link up all radio networks along the highway to improve communications in order achieve better control and monitoring.

Applications

- Monitoring and Commanding Radio Users via a Phone

The GSM channel in the xTrunk gateway enables direct access to the radio networks connected via any phone in the existing telephone networks (PSTN and Cellular). This greatly facilitates the monitoring and commanding of the radio networks.



Enhancement

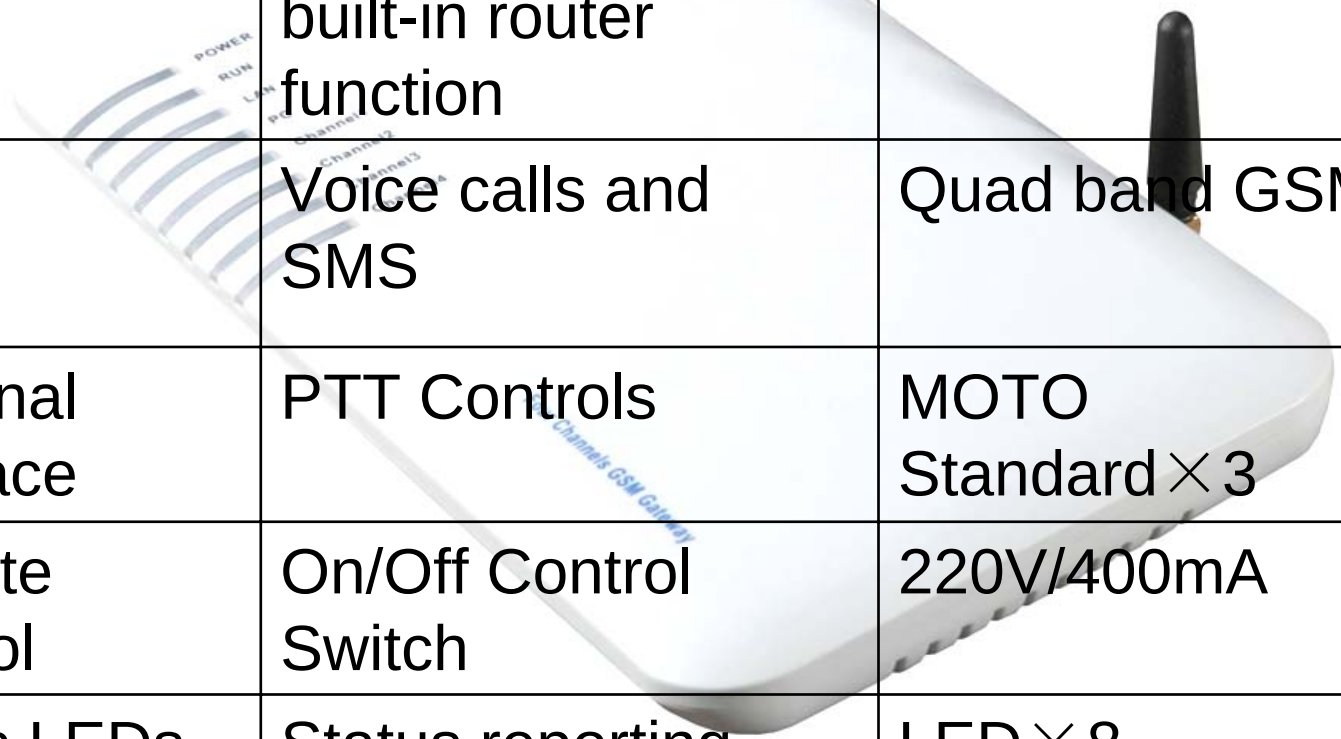
- Radio Recording

Together with a third party IP based voice recording software, xTrunk gateway enables radio recording with no extra hardware cost. This unique features becomes the “Black Box” in radio communications.

- Cross-Network Gateway Product Series
  - RoIP302：3 x PTT ports，1 x On/Off output control
  - RoIP302G: 3 xPTT ports，1 x On/Off output switch，1 x GSM channel
  - RoIP302M：3 x PTT ports，1 x digital output control, built-in conference group (up to 3 groups), max. 16 SIP registrations
  - RoIP302GM： 3 x PTT ports, 1 x On/Off output control, 1 x GSM Channel, built-in conference group (up to 3 groups), max. 16 SIP registrations
- Terminals:
  - VP102R：VoIP Phone: Handsfree, Handset, Headset.
  - HT312R：VoIP FXO Gateway (1-line)
  - HT322R：VoIP FXO Gateway (2-lines)

Hardware Specifications

Item	Feature	Remark
Network	Ethernet switch with built-in router function	10/100M ×2
GSM	Voice calls and SMS	Quad band GSM
Terminal Interface	PTT Controls	MOTO Standard×3
Remote Control	On/Off Control Switch	220V/400mA
Status LEDs	Status reporting	LED×8



Software Specifiations

Item	Feature	Remark
Configuration	Built-in Web Server	Manage via http browser
CODEC	GSM、G.729、G.711、G.723	26K、8K、64K、6.3K BPS voice bandwidth
VoIP Protocol	SIP2.0	SIP INFO Supplementary
TCP/IP Protocol	UDP	
Time Protocol	NTP	Programmable time server
Communication Model	Peer-to-Peer, Relay Proxy (proprietary)	Relay Proxy Server is available for free.
Network Dial up	PPPoE、DHCP、Fixed IP	Flexible network environment

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Thank you!

Cross-Network Gateway
- Product Introduction