



Configure ISSI Gateway in IPICS Environment

November 8, 2016

Cisco Systems, Inc.

www.cisco.com

Cisco has more than 200 offices worldwide.

Addresses, phone numbers, and fax numbers are listed on the Cisco website at www.cisco.com/go/offices.

1. Table of Contents	
2. ISSI GATEWAY OVERVIEW	4
a. IPICS Implementation	4
b. P25 IDs	4
i. WACN ID	4
ii. System ID	4
iii. RFSS ID	4
iv. Proxy Subscriber ID	4
v. Site ID	4
vi. Subscriber IDs	5
vii. Group IDs	5
viii. Homed & Visiting Subscriber IDs	5
ix. Homed & Visiting Group IDs	5
3. ISSIG CONFIGURATIONS VIA CONSOLE	6
a. Network Configuration Utility	6
b. ISSIG Configuration Utility	6
c. Edit /etc/hosts file on ISSIG Server	7
4. ISSIG CONFIGURATIONS VIA NLR WEBPAGE	8
a. Subscriber HOME RFSSs	8
b. Group Home RFSSs	8
5. ISSIG DESCRIPTOR	9
a. XML Block	9
b. Channel Selector	9
c. Control Functions	9
d. Supplementary Services	12
e. Status Messages	12

f. Status Updates	12
6. PROVISIONING THE ISSIG IN IPICS SERVER	13
a. Add ISSIG (as a radio)	13
b. Configure ISSIG Parameters	13
c. Verify Successful Addition of ISSIG	13
d. Channel Selectors, Control Functions & Supplementary Services	14
e. Provisioning P25 Channels	15
f. Assigning P25 Subscriber Unit IDs to IPICS Users	16
7. ISSIG INTEROPERABILITY ON AN IDC	19
a. P25 Channel Modes	19
b. P25 Supplementary Services	19
c. P25 Channel Details Page	19
d. P25 Gateway Mode	22
e. Unit to Unit Calls	22
f. Supplementary Services	23
g. Call Alert	23
h. Radio Check	24
i. Radio Detach	24
j. Radio Inhibit/Uninhibit	25
k. Remote Monitor	26
l. Short Message	26
m. Status Query	27

2. ISSI Gateway Overview

a. IPICS Implementation

The ISSIG is designed to serve as a gateway between IPICS and P25 ISSI capable Radio Frequency Sub-systems (RFSS). It is composed of two parts; a P25G (or IPICSG) and a RFSSG (or RNC).

The P25G serves as a proxy for all non-P25 clients within IPICS and is responsible for transcoding between multicast RTP streams (using G.711 codec) and SIP based P25 CAI frames (using IMBE codec). It is also responsible for encryption and decryption when necessary.

The RFSSG serves as a local RFSS for IPICS and is responsible for interfacing with other RFSSs via ISSI. It can be a home RFSS to subscribers and groups or serving RFSS for subscribers and groups homed elsewhere. It performs all SIP based call processing between IPICS and remote RFSSs.

b. P25 IDs

When configuring an ISSIG within IPICS careful attention needs to be placed on determination of IDs. These include the following –

i. WACN ID

The wide area connection id would be determined by the overall RFSS system admin and is usually shared by multiple systems in a given logical area. Care must be taken to select this ID appropriately to avoid communication problems between RFSSs because of duplicate fully-qualified IDs (RFSS ID.SYSTEM ID. WACN ID)

ii. System ID

The system id would be determined by the RFSS system admin and is shared by multiple RFSSs belonging to the same logical system. Care must be taken to select this ID appropriately to avoid communication problems between RFSSs because of duplicate fully-qualified IDs (RFSS ID.SYSTEM ID. WACN ID)

iii. RFSS ID

The system id would be determined by the RFSS system admin and is unique to each RFSS. Care must be taken to select this ID appropriately to avoid communication problems between RFSSs because of duplicate fully-qualified IDs (RFSS ID.SYSTEM ID. WACN ID)

iv. Proxy Subscriber ID

Since the P25G serves as a proxy for all non-P25 clients within IPICS it needs a subscriber ID. This ID will appear on P25 clients when receiving calls from the P25G

v. Site ID

Within the ISSIG solution, each P25 endpoint is given a unique system ID. IPICS P25 endpoints include P25Gs and IDCs. IDC site IDs are automatically generated within IPICS by using the least significant 5 octets of the user's subscriber id. However P25G site IDs are manually configured after installation. See ISSIG installation procedure in the admin guide. One suggestion is to use the least significant 5 octets of the proxy

subscriber id assigned to the P25G. This follows the automatic site ID generation for IDC involved in native P25 calls.

vi. Subscriber IDs

IPICS users can be assigned P25 subscriber IDs. These IDs would be assumed by the IDC that they log into. When a user logs into an IDC and has a P25 subscriber ID assigned to the, the IDC is automatically capable of communicating as a native P25 client and therefore is also capable of end-to-end encryption. Care must be taken to assign these IDs appropriately such that there is no overlap with other users' fully qualified ids (USER ID.SYSTEM ID.WACN ID)

vii. Group IDs

P25 groups can be provisioned within IPICS that are either homed on the ISSIG or homed on other remote RFSSs.

viii. Homed & Visiting Subscriber IDs

Ranges of subscriber IDs along with the RFSSs they are homed on, need to be determined and provisioned in the ISSIG.

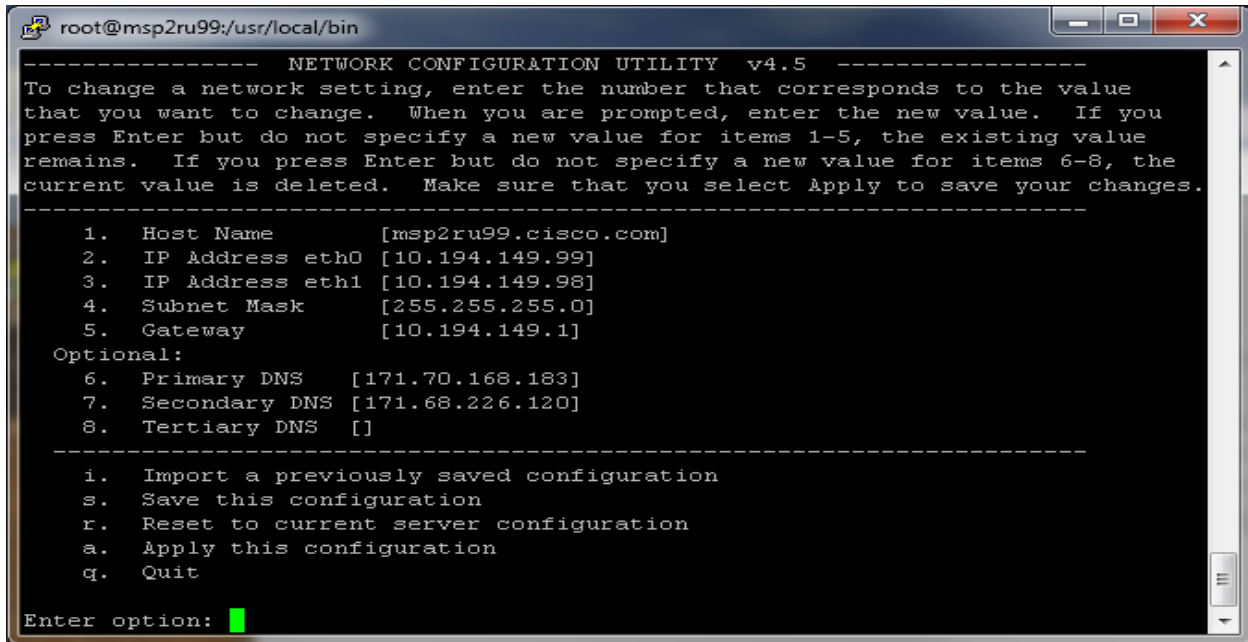
ix. Homed & Visiting Group IDs

Ranges of subscriber IDs along with the RFSSs they are homed on, need to be determined and provisioned in the ISSIG. See "Configuring ISSIG" below

3. ISSIG Configurations via Console

a. Network Configuration Utility

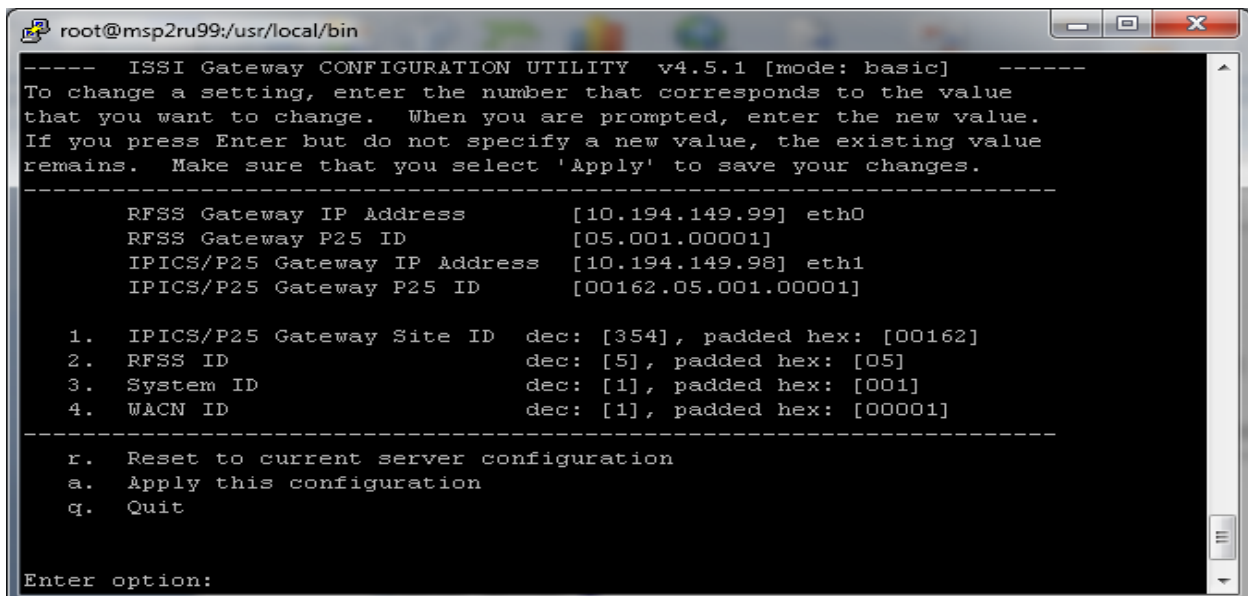
Once the IPICS ISSIG application is installed (IPICS Installation Guide), run the network configuration utility script (`/usr/local/bin/network_config`) to configure the network parameters of the ISSIG Server. Be aware that 'eth0' serves as the RFSS-G IP address and 'eth1' serves as the IPICS-P25G IP address.



```
root@msp2ru99:/usr/local/bin
----- NETWORK CONFIGURATION UTILITY v4.5 -----
To change a network setting, enter the number that corresponds to the value
that you want to change.  When you are prompted, enter the new value.  If you
press Enter but do not specify a new value for items 1-5, the existing value
remains.  If you press Enter but do not specify a new value for items 6-8, the
current value is deleted.  Make sure that you select Apply to save your changes.
-----
1. Host Name [msp2ru99.cisco.com]
2. IP Address eth0 [10.194.149.99]
3. IP Address eth1 [10.194.149.98]
4. Subnet Mask [255.255.255.0]
5. Gateway [10.194.149.1]
Optional:
6. Primary DNS [171.70.168.183]
7. Secondary DNS [171.68.226.120]
8. Tertiary DNS []
-----
1. Import a previously saved configuration
s. Save this configuration
r. Reset to current server configuration
a. Apply this configuration
q. Quit
Enter option: █
```

b. ISSIG Configuration Utility

This script allows you to configure the individual parameters of the fully qualified P25 ID of the ISSIG. This script is located at `/usr/local/bin/issig_config`

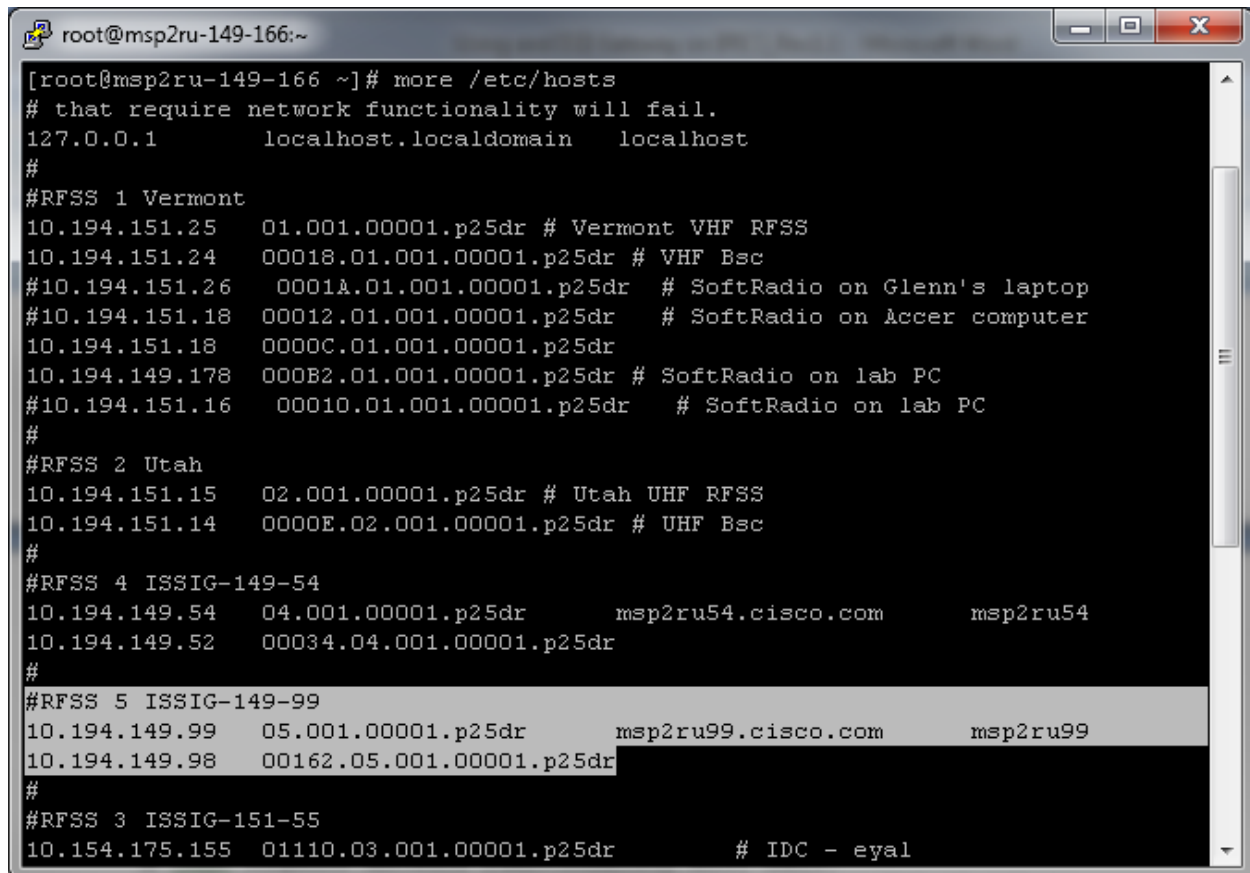


```
root@msp2ru99:/usr/local/bin
----- ISSI Gateway CONFIGURATION UTILITY v4.5.1 [mode: basic] -----
To change a setting, enter the number that corresponds to the value
that you want to change.  When you are prompted, enter the new value.
If you press Enter but do not specify a new value, the existing value
remains.  Make sure that you select 'Apply' to save your changes.
-----
RFSS Gateway IP Address [10.194.149.99] eth0
RFSS Gateway P25 ID [05.001.00001]
IPICS/P25 Gateway IP Address [10.194.149.98] eth1
IPICS/P25 Gateway P25 ID [00162.05.001.00001]

1. IPICS/P25 Gateway Site ID dec: [354], padded hex: [00162]
2. RFSS ID dec: [5], padded hex: [05]
3. System ID dec: [1], padded hex: [001]
4. WACN ID dec: [1], padded hex: [00001]
-----
r. Reset to current server configuration
a. Apply this configuration
q. Quit
Enter option:
```

c. Edit /etc/hosts file on ISSIG Server

The P25 IDs and IP addresses of all other ISSIG servers need to be configured in **/etc/hosts** file. Note that the IP addresses, P25 and Site IDs of the 'server under configuration' will also need to be added to the other ISSIG servers **/etc/hosts** files. Entries for the local RFSS-G and P25-G are automatically created after running the ISSIG configuration script post installation. Entries for IDCs are automatically configured by IPICS. These must not be manually edited. However, entries for remote RFSSs that this ISSI-G will communicate with, need to be added. In the example below, the Site/P25 IDs and IP addresses of the ISSIG-149-99 server are added to the **/etc/hosts** file of the ISSIG-149-166 ISSIG **/etc/hosts** file.



```
root@msp2ru-149-166:~  
[root@msp2ru-149-166 ~]# more /etc/hosts  
# that require network functionality will fail.  
127.0.0.1    localhost.localdomain    localhost  
#  
#RFSS 1 Vermont  
10.194.151.25 01.001.00001.p25dr # Vermont VHF RFSS  
10.194.151.24 00018.01.001.00001.p25dr # VHF Bsc  
#10.194.151.26 0001A.01.001.00001.p25dr # SoftRadio on Glenn's laptop  
#10.194.151.18 00012.01.001.00001.p25dr # SoftRadio on Accer computer  
10.194.151.18 0000C.01.001.00001.p25dr  
10.194.149.178 000B2.01.001.00001.p25dr # SoftRadio on lab PC  
#10.194.151.16 00010.01.001.00001.p25dr # SoftRadio on lab PC  
#  
#RFSS 2 Utah  
10.194.151.15 02.001.00001.p25dr # Utah UHF RFSS  
10.194.151.14 0000E.02.001.00001.p25dr # UHF Bsc  
#  
#RFSS 4 ISSIG-149-54  
10.194.149.54 04.001.00001.p25dr      msp2ru54.cisco.com      msp2ru54  
10.194.149.52 00034.04.001.00001.p25dr  
#  
#RFSS 5 ISSIG-149-99  
10.194.149.99 05.001.00001.p25dr      msp2ru99.cisco.com      msp2ru99  
10.194.149.98 00162.05.001.00001.p25dr  
#  
#RFSS 3 ISSIG-151-55  
10.154.175.155 01110.03.001.00001.p25dr      # IDC - eyal
```

4. ISSIG Configurations via NLR Webpage

Certain simple manual configuration tasks need to be performed so that the ISSIG knows about other remote RFSSs and ranges of IDs homed on their respective RFSSs. Without this step, the ISSIG will not be able to communicate with remote RFSSs.

Consequently, remote RFSS will also need to be manually configured with similar information regarding the IPICS ISSIG. These configurations will be vendor dependent.


Once the ISSIG and remote RFSSs have been configured with this mutual information, the system is ready for provisioning and use.

The NLR webpage of the ISSIG server can be reached at <https://serveripaddress/nlr>

The sections that need to be manually configured are

a. Subscriber HOME RFSSs

The Subscriber ID ranges for the 'ISSIG under configuration' & neighbor ISSIGs are added here



Subscribers
Groups
Locations
Subscriber Home RFSSs
Group Home RFSSs
Maintenance Operations
Users/Roles
Audit Log

NLR: (03.001.00001.p25dr)

Add New Subscriber Range to Home RFSS Mapping


Subscriber Range to Home RFSS Mappings

Showing all 3. Show 100 per page

System ID	WACN ID	RFSS ID	Unit ID Min	Unit ID Max	Alias		
001 (1)	00001 (1)	01	001000	0010FF	Vermont	Edit	Delete
001 (1)	00001 (1)	03	001100	0011FF	ISSIG-149-166	Edit	Delete
001 (1)	00001 (1)	01	FFFFFC	FFFFFC	Vermont FNE	Edit	Delete

b. Group Home RFSSs

The Talkgroup ranges for the 'ISSIG under configuration' neighbor ISSIGs are added



Subscribers
Groups
Locations
Subscriber Home RFSSs
Group Home RFSSs
Maintenance Operations
Users/Roles
Audit Log

NLR: (03.001.00001.p25dr)

Add New Group Range to Home RFSS Mapping

Group Range to RFSS Home Mappings

Showing all 2. Show 100 per page

System ID	WACN ID	RFSS ID	Group ID Min	Group ID Max	Alias		
001 (1)	00001 (1)	01	0001	0005	Vermont	Edit	Delete
001 (1)	00001 (1)	03	0010	0014	ISSIG-149-166	Edit	Delete

5. ISSIG Descriptor

Before an ISSIG is provisioned within the IPICS Server, a descriptor needs to be created that describes groups that a given ISSIG may need to affiliate and supplementary services that are available via the ISSIG.

An example ISSIG descriptor is available on the IPICS Server in **Configuration > Descriptors**.

Below is an explanation of the format of the descriptor (XML file).

a. XML Block

An ISSIG descriptor is identified by the following XML block. The controlType and controlModule determine that it is an ISSIG descriptor.

```
<ipics:SerialRadioTypeDescriptor xmlns:ipics="urn:com.cisco.ipics.RadioDescriptor"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="urn:com.cisco.ipics.RadioDescriptor
../SerialRadioTypeDescriptor.xsd "
name="ISSIG-Example" controlType="P25G"
controlModule="P25Gateway">
```

b. Channel Selector

Each group accessible by the ISSIG is defined as channel selectors in the following format:

```
<ChannelSelector label="TG 1R DES">
<Action type="tune">
<Command>
<P25GroupCall groupId="0001" systemId="001" wacnId="00001" alias="TG 1R DES"
type="Standard" sln="1" strapping="Selectable" />
</Command>
</Action>
</ChannelSelector>
```

The “P25GroupCall” element describes the subscriber group. The “groupId” attribute describes the subscriber group id and is always a four character hexadecimal value. The “systemId” attribute is always three hexadecimal characters and is equal to that of the RFSS where the group is “homed”, i.e. provisioned. The “wacnId” attribute is always five hexadecimal characters and is that of the RFSS where the group is “homed”. The “alias” attribute is similar to other channel selectors. The “type” attribute indicates whether it is a “standard” talkgroup and is currently the only valid option. The encryption key is indicated by the “sln” attribute and refers to the Storage Location Number in the encryption module and the encryption “strapping” indicates whether the transmit mode secure/clear selection is “selectable”, meaning whether the IDC user can select secure or clear mode for transmissions, “secure”, meaning that a channel associated with this talkgroup shall always transmit in secure mode, and “clear”, meaning that a channel associated with this talkgroup shall always transmit in clear mode.

c. Control Functions

Control functions represent functions on that can be toggled between their respective states. Two control functions supported by IPICS for ISSI interoperability; namely emergency and secure transmit mode. Each control function element is call Simple and has two required attributes. The "shortName" attribute is the label that will appear on the radio control user interface within IPICS, while the "description" attribute appears as a description for the respective control function in the

radio details screen in IPICS. The actual control function is represented within the Command element. Below are examples of how these control functions are to appear in a descriptor.

```
<ControlFunctions>
<Stateful shortName="SEC" longName="Secure Tx Mode" description="Select Between
Secure and Clear Transmit Modes" presentation="multiple">
  <State shortName="SEC" longName="SECURE" description="Secure transmit mode is
set to SECURE" user_selectable="true">
    <Action type="pressed">
      <Command>
        <SetSecureTxMode value="SECURE" />
      </Command>
    </Action>
  </State>
  <State shortName="CLR" longName="CLEAR" description="Secure transmit mode is
set to CLEAR" user_selectable="true">
    <Action type="pressed">
      <Command>
        <SetSecureTxMode value="CLEAR" />
      </Command>
    </Action>
  </State>
  <State shortName="KEYFL" longName="KEYFAIL" description="Keyfail. Key
required for encryption is not present" user_selectable="false">
    <Action type="pressed">
      <Command>
        <SetSecureTxMode value="KEYFAIL" />
      </Command>
    </Action>
  </State>
  <State shortName="NOENC" longName="NO_ENCRYPT" description="No encryption
module present" user_selectable="false">
    <Action type="pressed">
      <Command>
        <SetSecureTxMode value="NO_ENCRYPT" />
      </Command>
    </Action>
  </State>
  <State shortName="MSMTCH" longName="MISMATCH" description="Mismatch
between user selected secure transmit mode and actual fixed/strapped tx mode"
user_selectable="false">
    <Action type="pressed">
      <Command>
        <SetSecureTxMode value="MISMATCH" />
      </Command>
    </Action>
  </State>
  <State shortName="UNKWN" longName="UNKNOWN" description="Secure/Clear
Transmit mode is in an unknown state" user_selectable="false">
```

```

<Action type="pressed">
<Command>
<SetSecureTxMode value="UNKNOWN" />
</Command>
</Action>
</State>
<State shortName="UNSPRT" longName="UNSUPPORTED" description="Encryption
is not supported" user_selectable="false">
<Action type="pressed">
<Command>
<SetSecureTxMode value="UNSUPPORTED" />
</Command>
</Action>
</State>
</Stateful>
<Stateful shortName="EMG" longName="Emergency" description="Enable/Disable
Emergency Mode" presentation="multiple">
<State shortName="ON" longName="ON" description="Emergency mode is on"
user_selectable="true">
<Action type="pressed">
<Command>
<SetEmergencyMode value="ON" />
</Command>
</Action>
</State>
<State shortName="OFF" longName="OFF" description="Emergency mode is off"
user_selectable="true">
<Action type="pressed">
<Command>
<SetEmergencyMode value="OFF" />
</Command>
</Action>
</State>
<State shortName="UNKWN" longName="UNKNOWN" description="Emergency
mode is in an unknown state" user_selectable="false">
<Action type="pressed">
<Command>
<SetEmergencyMode value="UNKNOWN" />
</Command>
</Action>
</State>
<State shortName="UNSPRT" longName="UNSUPPORTED" description="Emergency
mode is not supported" user_selectable="false">
<Action type="pressed">
<Command>
<SetEmergencyMode value="UNSUPPORTED" />
</Command>
</Action>
</State>

```

```
</Stateful>
</ControlFunctions>
```

d. Supplementary Services

Supplementary Services represent features that require user interaction and are directed to one or more remote units. They have their own user interface on the dispatch console for processing the service, where the dispatcher will be able to select from a list of units or enter a unit id.

```
<SupplementaryServices>
  <SupplementaryService shortName="ALRT" longName="Call Alert" />
  <SupplementaryService shortName="CALL" longName="Individual Call" />
  <SupplementaryService shortName="MSSG" longName="Status Message" />
  <SupplementaryService shortName="QERY" longName="Status Query" />
  <SupplementaryService shortName="RMON" longName="Radio Unit Monitor" />
  <SupplementaryService shortName="CHEK" longName="Radio Check" />
  <SupplementaryService shortName="DTCH" longName="Radio Detach" />
  <SupplementaryService shortName="INHB" longName="Radio Inhibit" />
  <SupplementaryService shortName="UNHB" longName="Radio Uninhibit" />
```

e. Status Messages

Status Messages are a list of pre-defined short messages intended to be used on a system capable of sending such messages. These are not considered Short Message Service (SMS) where a text message is sent. In this case, the system sends a numeric value that represents a text message. All radios in the system must be provisioned with the same set of ids for the respective messages. The example below uses a 16 bit value (in hex) to represent the numeric value as the "id" & the alias as the "longName" per the P25 short message specification.

```
<StatusMessages>
  <StatusMessage id="01" alias="Request To Talk" />
  <StatusMessage id="02" alias="Request To Patch" />
  <StatusMessage id="03" alias="NCIC Check" />
  <StatusMessage id="04" alias="License Check" />
</StatusMessages>
```

f. Status Updates

Status Updates are a list of pre-defined update messages intended to be used on a system capable of sending such messages. It is intended to represent the status of a radio or radio user. In this case, the system sends a numeric value that represents a specific status. The example below uses two 8 bit values (in hexadecimal) as the "id" and the alias as the "longName" per the P25 status update specification.

```
<StatusUpdates>
  <StatusUpdate id="10" alias="On Duty" />
  <StatusUpdate id="20" alias="Off Duty" />
  <StatusUpdate id="30" alias="Lunch Break" />
  <StatusUpdate id="40" alias="Do No Disturb" />
</StatusUpdates>
```

6. Provisioning the ISSIG in IPICS Server

a. Add ISSIG (as a radio)

An ISSIG is provisioned much like a serial radio within IPICS and is accessible via the “**Configuration > Radios**” page. The main difference is that the “ISSIG Connection” block has information unique to ISSIGs. An ISSIG can be added by selecting “Add ISSI Gateway” from the ADD button when pressed.



The form below allows the provisioning of an ISSIG –

A screenshot of the 'New ISSI Gateway' configuration form in the IPICS Server. The form is titled 'Configuration: Radios > New ISSI Gateway'. It has two tabs: 'General' and 'IDC'. The 'General' tab is active. The form is divided into several sections: 'General Information' with fields for 'Name:*' (text input), 'Radio Type:*' (dropdown menu showing 'Select...'), and 'Description:' (text area); 'Content Source Information' with fields for 'Location:*' (dropdown menu showing 'ALL'), 'Multicast Address:*' (four input boxes with values '239', '192', '0', '0'), and 'Multicast Port:*' (input box with value '21000'); 'Ops Views' with a 'Belongs To:' field showing 'SYSTEM'; 'Restrictions' with a checked checkbox 'Allow association to users'; 'Radio Control Service' with an 'RCS Name:*' dropdown menu showing 'Auto Select'; and 'ISSIG Connection' with fields for 'P25G Unit ID:*' (text input), 'P25G IP Address:*' (text input), 'RFSSG ID:*' (three input boxes), and 'RFSSG IP Address:*' (text input). At the bottom of the form are three buttons: 'Save', 'Cancel', and 'Associations'.

b. Configure ISSIG Parameters

The “P25G Unit ID” is the proxy subscriber ID of the P25G as described in the overview above. The “RFSSG ID” needs to match the RFSS ID, System ID and WACN ID configured after the ISSIG was installed. The “P25G IP Address” and the “RFSSG IP Address” need to match the IP addresses configured after the ISSIG was installed. . It is very important that the IDs and IP Addresses match what is configured in the ISSIG.

c. Verify Successful Addition of ISSIG

Upon saving the ISSIG, the “Control Status” and “Functional Status” for the ISSIG is displayed in the radio details page as shown below

CISCO IPICS Administration Console - 4.5(0.028) You are logged in as: ipics | Help | Logout

Server Policy Engine

Configuration: **Radios** > **ISSIG-Kyle**

General IDC Selectors Controls Services

General Information

Name:* ISSIG-Kyle

Radio Type:* ISSIG-Kyle

Description:

Status: Enabled

Content Source Information

Location:* UMS

Multicast Address:* 239.192.10.255

Multicast Port:* 21000

Channel Assignments

Channel Name	Channel Status
ISSI TG 1L	Enabled
ISSI TG 2L	Enabled
ISSI TG 3L	Disabled
ISSI TG 4L	Disabled

Ops Views

Belongs To: SYSTEM

Restrictions

☒ Allow association to users

Radio Control Service

RCS Name:* local-rcs

ISSIG Connection

P25G Unit ID:* 000001

P25G IP Address:* 10.19.160.27

RFSSG ID:* 11 222 33333

RFSSG IP Address:* 10.19.160.28

Control Status: CONNECTED_ONLINE

Functional Status: ACTIVE

A “Control Status” of “CONNECTED_ONLINE” means that the IPICS Server can communicate with the ISSIG. “CONNECTED_OFFLINE” usually means that the server has connected to an application that is not an ISSIG or the ISSIG is not responding to commands. “SOCKET_FAILURE” means that the server was not able to establish an IP connection probably due to network issues or an incorrect ip address.

A “Functional Status” of “ACTIVE” means that the proxy unit ID has been registered and is ready for use. If the P25G was unable to register its proxy ID, then the functional status will indicate “ERROR_NO_SERVICE”. This will need to be resolved in order to proceed further.

d. Channel Selectors, Control Functions & Supplementary Services

After the ISSIG has been properly provisioned, make sure that needed channel selectors, control functions and supplementary services are enabled via their respective tables in the radio details page as indicated below.

CISCO IPICS Administration Console - 4.5(0.028)

Server Policy Engine

Configuration: **Radios** > **ISSIG-Kyle**

General IDC **Selectors** Controls Services

Channel Selectors

Label	Enabled	Associated Channel
TG 1R DES	<input checked="" type="checkbox"/>	
TG 2R AES	<input checked="" type="checkbox"/>	
TG 1L DES	<input checked="" type="checkbox"/>	
TG 2L AES	<input checked="" type="checkbox"/>	
TG 3L SEC	<input checked="" type="checkbox"/>	
TG 4L CLR	<input checked="" type="checkbox"/>	
TG 5X BAD	<input checked="" type="checkbox"/>	
TG 1R	<input checked="" type="checkbox"/>	
TG 2R	<input checked="" type="checkbox"/>	

Once an ISSIG has been provisioned, it can be associated with IPICS users and privileges can be assigned for channel selectors, control functions and supplementary services. This association gives IDC users the ability to control functions for a given channel and supplementary services via the ISSIG (for IDC users with P25 IDs).

The screenshot shows the 'Services' tab in the configuration for 'ISSIG-Kyle'. The 'Controls' section is expanded, showing a table of controls with their labels, enabled status, and descriptions.

Label	Enabled	
ALRT	<input checked="" type="checkbox"/>	Call Alert
CALL	<input checked="" type="checkbox"/>	Individual Call
MSSG	<input checked="" type="checkbox"/>	Status Message
QERY	<input checked="" type="checkbox"/>	Status Query
RMON	<input checked="" type="checkbox"/>	Radio Unit Monitor
CHEK	<input checked="" type="checkbox"/>	Radio Check
DTCH	<input checked="" type="checkbox"/>	Radio Detach
INHIB	<input checked="" type="checkbox"/>	Radio Inhibit
UNINHIB	<input checked="" type="checkbox"/>	Radio Uninhibit

e. Provisioning P25 Channels

Channels representing P25 Groups are provisioned similar to other channels via the Configuration > Channels page on the IPICS Admin console. The difference in this case is that the “Media Connection Assignment” should be ISSIG as show below –

The screenshot shows the 'New Channel' configuration page. The 'General' tab is selected, and the 'Media Connection Assignments*' section is expanded, showing a dropdown menu for 'Type 1' with 'ISSIG' selected.

Channel Information

Name: *

Short Name: *

Description:

Secure Channel:

☒ Allow association to users

☒ Allow use in VTGs

Status: **Enabled**

Media Connection Assignments*

Type 1.

Save Cancel

Upon selecting ISSIG, one of the provisioned ISSIGs can be selected to serve this channel. Only ISSIGs with enabled channel selectors will be available in the list –

Media Connection Assignments*

Type 1. Address: Port: ISSIG: Selector: Not In Use

ISSIG-Kyle

Following this, a channel selector representing a P25 group may be selected:

Media Connection Assignments*

Type 1. Address: Port: ISSIG: Selector: Not In Use

TG 1R DES
TG 2R AES
TG 1L DES
TG 2L AES

Once an ISSIG channel has been created, the channel details page will indicate the status of the channel. If affiliation to the group was successful, the media connection assignment will indicate “In User (IDLE). If affiliation has failed, then it will indicate “In Use (ERROR_UNABLE_TO_JOIN)”. An indication of “In Use (Unknown)” usually means that the group affiliation has not been completed because the registration of the proxy id is being attempted, so the status of this group is unknown. The group may still be available for IDCs un native end-to-end P25 mode.

Media Connection Assignments*

Type 1. Location: Address: Port: ISSIG: Selector: In Use (IDLE)

2.

Once an ISSIG channel has been provisioned, it can be associated with IPICS users. This allows the ISSIG channels to appear on an IDC for communication. An IDC user can communicate on an ISSIG channel in proxy (or P25 Gateway) mode or in native (or End to End P25) mode. Proxy mode refers to communication by the IDC as a multicast client, and the ISSIG transcodes to interoperate with other RFSSs and P25 clients. Native mode refers to communication by the IDC as a P25 client using the IMBE codec. This is only available for IPICS users with a P25 subscriber unit ID.

f. Assigning P25 Subscriber Unit IDs to IPICS Users

An existing IPICS user can be assigned a P25 subscriber unit ID via the communications tab of the user details page accessible via User Management on the IPICS Admin Console.

Cisco IPICS Administration Console - 4.5(0.028)

Server Policy Engine

Home

VTG Management

User Management

Users

User Groups

User Management: Users > n1

General Address Dial Login IDC **Communications**

Notification Preferences

<input type="checkbox"/>	Type	Number/Address
Add... Edit... Delete		

Radio Preferences

	<input type="checkbox"/>	Type	Value
1	<input type="checkbox"/>	ISSIG-Kyle	000111

↑ ↓ Add... Edit... Delete

Save Cancel Disable Lock Associations

IDC Dialer Preference

IDC Dialer Phone Numl

End User Name:

End User Password:

Confirm End User Pass

Maximum Concurrent C

Dial Preferences

<input type="checkbox"/>	Type
↑ ↓ Add...	
<input type="checkbox"/> Dial after sending n	

A P25 ID can be assigned by pressing the “Add” button in the “Radio Preferences” block.

Radio Preferences

<input type="checkbox"/>	Type	Value
↑ ↓ Add... Edit... Delete		

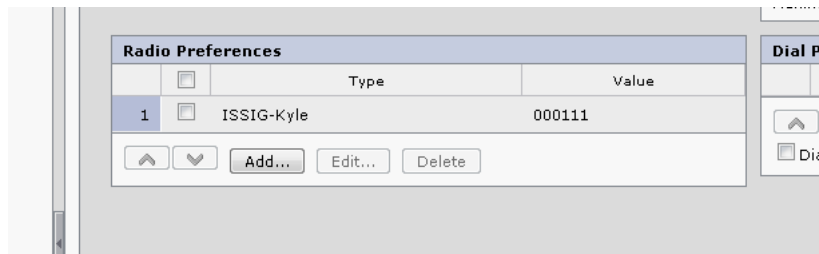
This will display a box where the ISSIG where this user needs to be homed can be selected, followed by entering a six octet P25 subscriber unit id in hexadecimal.

Radio Preferences

<input type="checkbox"/>	Type	Value
↑ ↓ Add... Edit... Delete		
	ISSIG-Kyle	000111

Done Cancel

Pressing “Done” adds the entry into the radio preferences, but does not save it.



The image shows a 'Radio Preferences' dialog box. It features a table with columns for an index, a checkbox, a 'Type' field, and a 'Value' field. The first row is selected, showing index '1', a checked checkbox, 'ISSIG-Kyle' as the type, and '000111' as the value. Below the table are buttons for navigation (up/down arrows), 'Add...', 'Edit...', and 'Delete'. To the right of the dialog, a 'Dial P' section is partially visible, containing a checkbox and the label 'Dial P'.

	<input type="checkbox"/>	Type	Value
1	<input checked="" type="checkbox"/>	ISSIG-Kyle	000111

Buttons:

Right panel: **Dial P**
☐ Dial P

The “Save” button must be pressed to save the unit id for this user.

7. ISSIG Interoperability on an IDC

a. P25 Channel Modes

When an IPICS user with a P25 unit ID logs into the IDC, they will have the option of activating ISSIG channels that represent talkgroups, in Gateway P25 (proxy) or End to End P25 (Native) modes. If they don't have a P25 unit id, then the ISSIG channel will only activate in Gateway P25 mode.

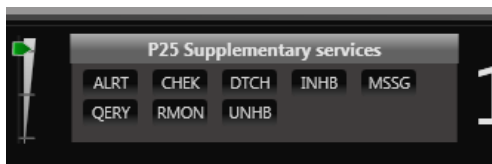


When activated in “End to End P25” mode, the channel appears with a P25 icon to indicate it is an ISSIG channel capable of interoperating as a native P25 client.



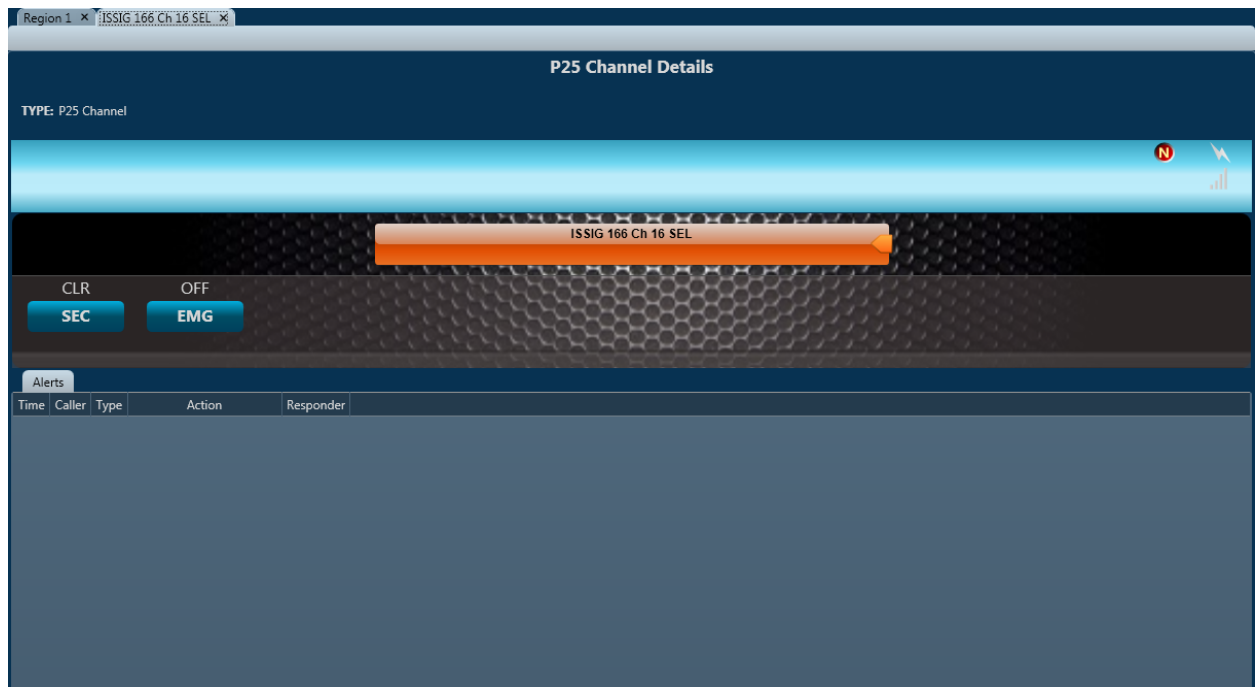
b. P25 Supplementary Services

P25 Supplementary Services are available to IDC users that have a P25 unit Id if these are enabled and the user has appropriate privileges.



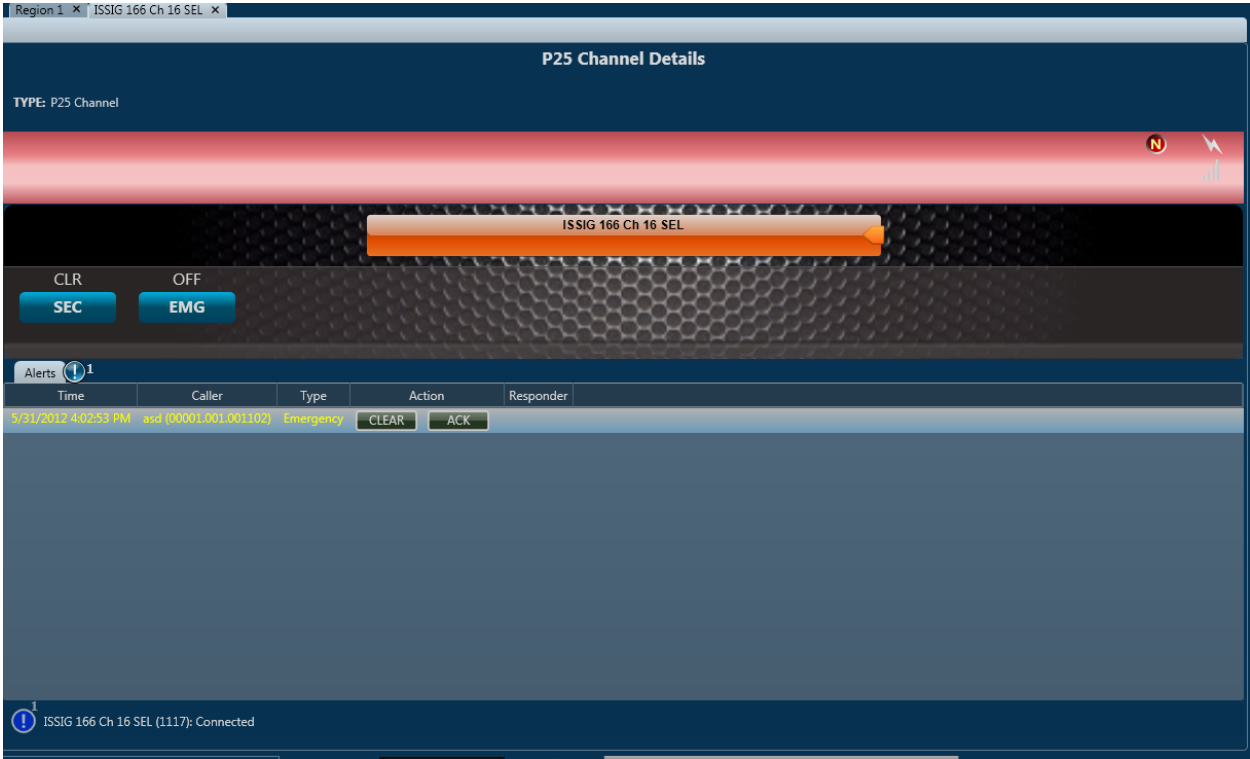
c. P25 Channel Details Page

Clicking on the page icon on the channel displays the details page for this channel. This page contains the channel name, an indication that this is setup for native interoperability, control function along with their states as well as an alert history box.

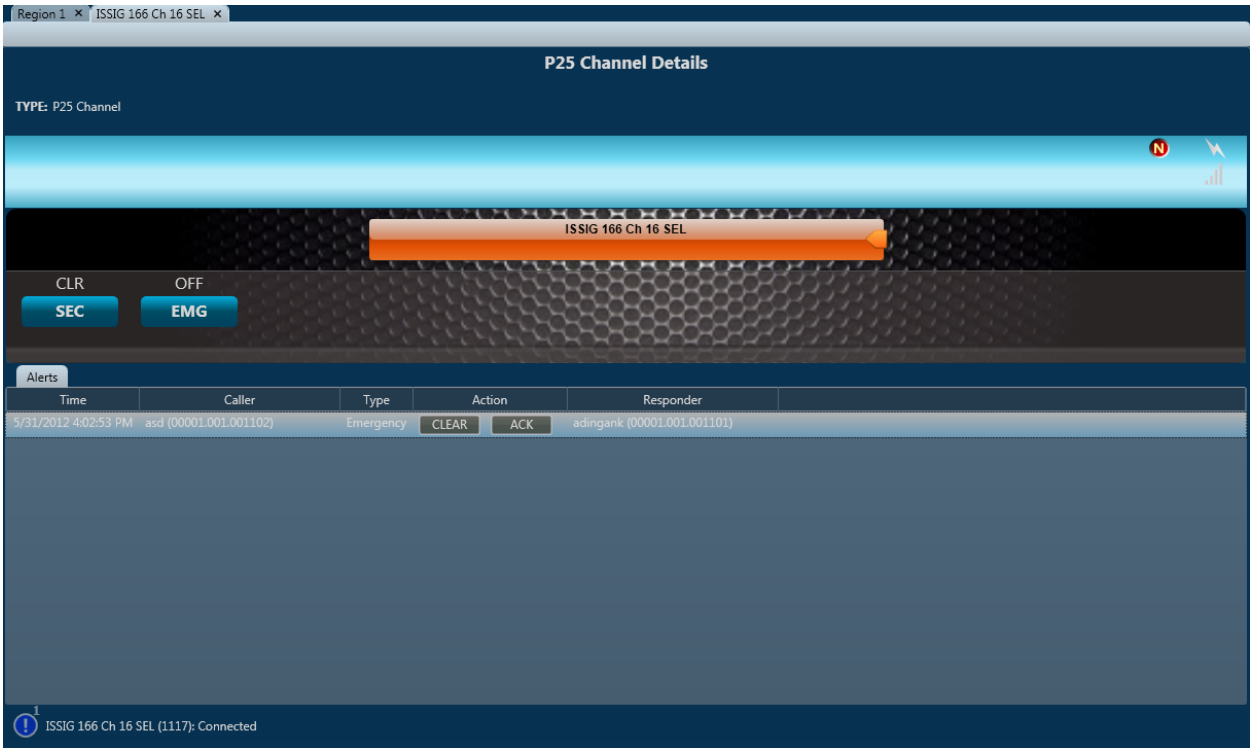


Clicking on the control functions allows the IDC user to select the state of a desired control function for that user only. This is in contrast to selecting control functions in Gateway P25 mode. The alerts box allows the IDC user to view and respond to alerts at the IDC.

The example below shows an emergency alarm received from another user where the IDC plays a tone and flashes. All IDCs with this channel will exhibit the same behavior.



The alarm can be acknowledged and cleared using the ‘ACK’ & ‘CLEAR’ buttons.



Other IDC users will also see the alarm information and their IDCs will stop playing the audible emergency alarm when acknowledged and end the flashing when cleared.

d. P25 Gateway Mode

When activated in “Gateway P25” mode, the channel appears with a P25 icon to indicate it is an ISSIG channel, not without the native icon.



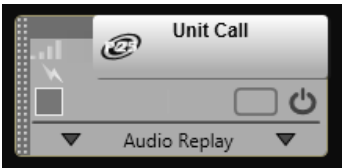
Similar capabilities can be invoked by the IDC user in Gateway P25 mode, with the difference being that the control function affects all IDC users operating in proxy mode for this channel. This is because the function is set on the ISSIG itself.



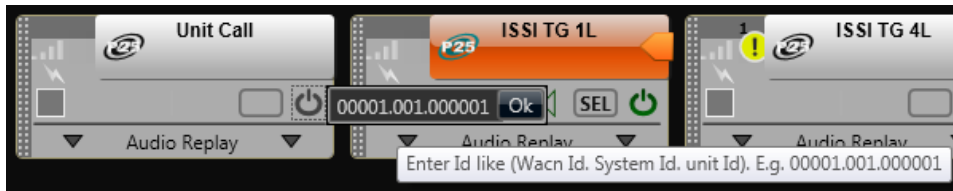
e. Unit to Unit Calls

IPICS supports all unit to unit calls that are initiated by the IDC only. In order to initiate a unit call, the IDC user must have a P25 unit id and the privilege to make such calls. Unit calls are always made in native end to end P25 mode.

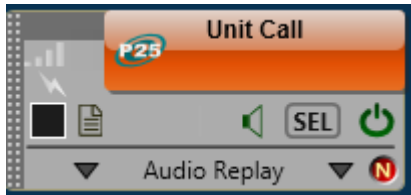
In order to setup a unit call, the IDC user much activate the ISSIG channel marked “Unit Call”.



At this point the IDC user will need to enter the fully qualified P25 id of the P25 client being called.



In case the unit is reachable, the unit call channel appearance is activated.



Following this, the IDC user can communicate with the target unit until the channel is deactivated.

f. Supplementary Services

IPICS supports all P25 supplementary services via the IDC for users that have a P25 unit Id and appropriate privileges. Each of these services involves selecting a target unit id from a list of available id culled from within IPICS, or directly entering the target unit's fully qualified unit id. They can be invoked via the interface shown below:



g. Call Alert

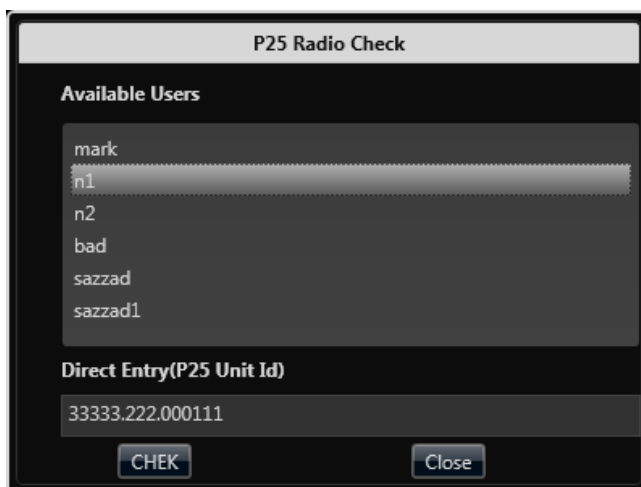
An IDC user can use the "ALRT" button to send a call alert (or page) to another P25 client via the following interface:



In the event this capability is enabled on the target unit, the subscriber will generate audible and or visual indications as configured un the unit.

h. Radio Check

An IDC user can use the “CHECK” button to send a radio check to another P25 client via the following interface:



There are no indications at the target unit, and is successful if the unit is reachable.

i. Radio Detach

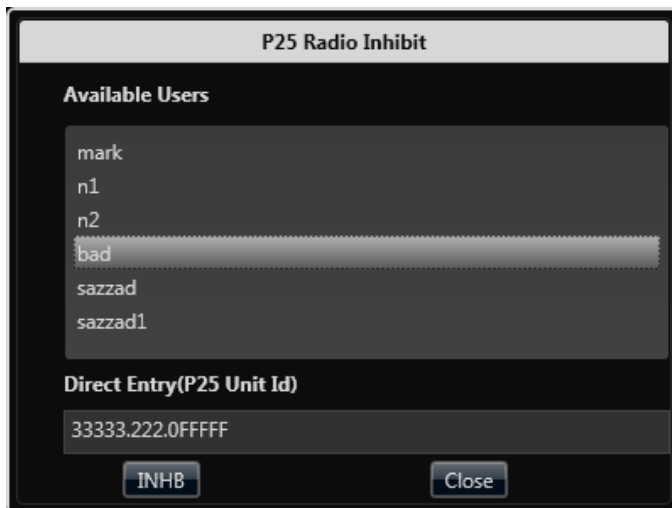
An IDC user can use the “DTCH” button to deregister a target unit from the RFSS via the radio detach command. This can be accomplished via the following interface:

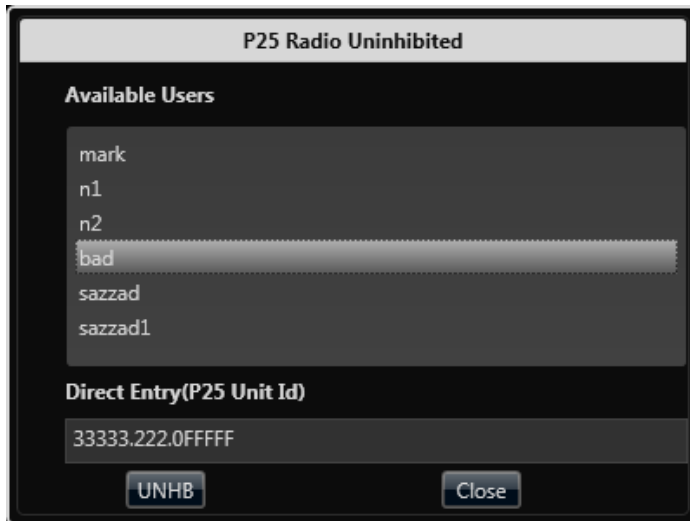


The target unit may generate audible and or visual warnings indicating that it is no longer registered.

j. Radio Inhibit/Uninhibit

An IDC user can use the "INHB" button to inhibit a target unit or use the "UNHB" button to uninhibit an already inhibited unit. This can be accomplished via the following interface:

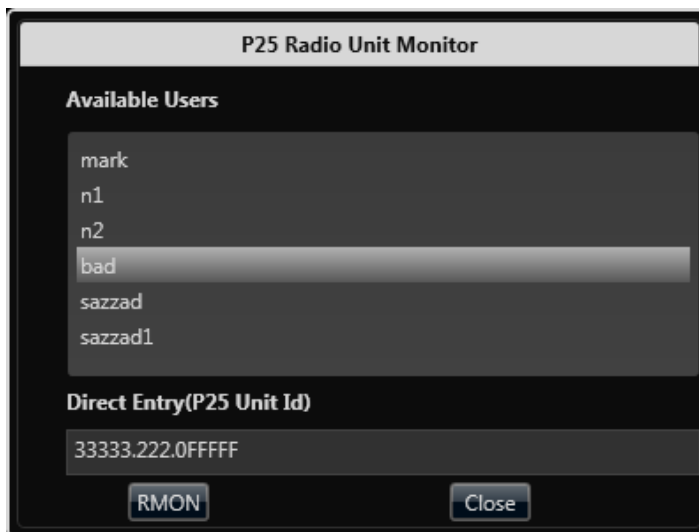




The target unit will simply appear to power itself off and will be unusable, until it is uninhibited. This capability must be enabled on the target unit.

k. Remote Monitor


An IDC user can use the “RMON” button to remotely monitor a target unit for a configured period of time. This can be accomplished via the following interface:



This capability must be enabled on the target unit.

l. Short Message

An IDC user can use the “MSSG” button to send a predefined short message to a target unit. This can be accomplished via the following interface:



P25 Short Message

Available Users

- mark
- n1
- n2
- bad

Direct Entry(P25 Unit Id)

33333.222.000111

Select Short Message

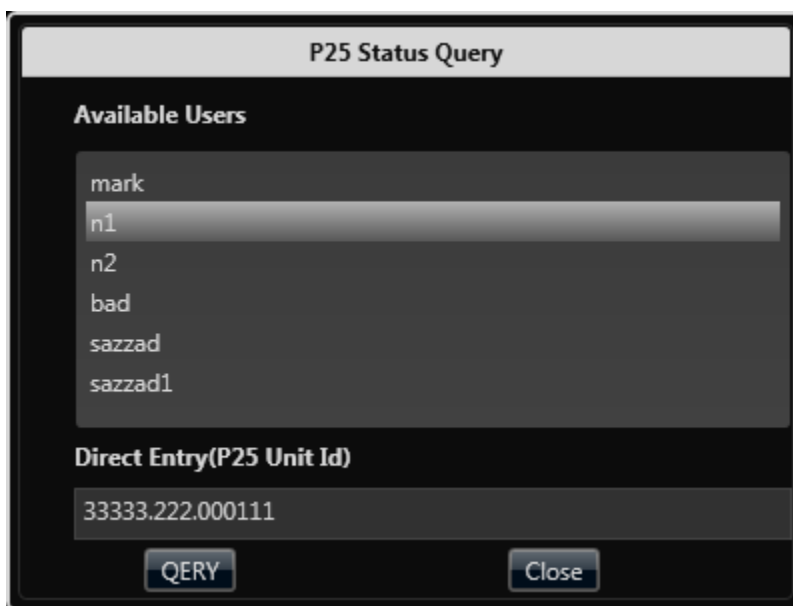
Request To Talk

MSSG Close

This capability must be enabled on the target unit and both parties must have them configured the same way. The specification for short message allows for sending an id and not the actual text. With the result, all parties involved must have the same id to text mappings.

m. Status Query

An IDC user can use the “QERY” button to send to request a status update from a target unit. This can be accomplished via the following interface:



P25 Status Query

Available Users

- mark
- n1
- n2
- bad
- sazzad
- sazzad1

Direct Entry(P25 Unit Id)

33333.222.000111

QERY Close

This capability must be enabled on the target unit. Upon receipt of the status query, the target unit will send back a short message containing its status.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: www.cisco.com/go/trademarks. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1110R)

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

© 2016 Cisco Systems, Inc. All rights reserved.