Using a DFSI Gateway on IPICS

November 8, 2016

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Using a DFSI Gateway on IPICS

This guide is intended to show an administrator how to:

- Configure Tait and Daniels DFSI fixed stations for DFSI interoperability
- Provision DFSI Gateways in IPICS
- Provision fixed stations in IPICS
- Use fixed stations on an IDC

Pre-requisites

DFSI Gateway Overview

The DFSIG is designed to serve as a gateway between IPICS and P25 DFSI capable Fixed Stations (FS). It is a proxy for all non-P25 clients within IPICS and is responsible for transcoding between multicast RTP streams (G.711) and SIP based P25 CAI frames (IMBE codec for digital communications and PCM for analog communications). It is also responsible for encryption and decryption when necessary.

Installing DFSIG

(Covered in the IPICS Installation Guide)

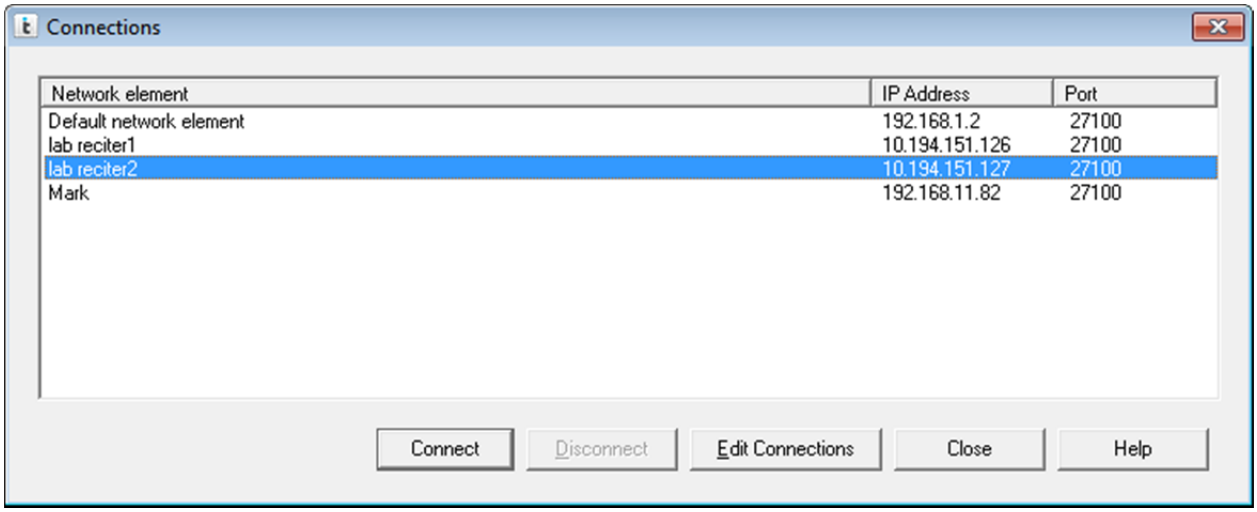
Configuring Fixed Stations

Before provisioning any fixed stations in IPICS, each one needs to be enabled for DFSI operation and configured with an IP address and port number for interoperability. IPICS currently supports DFSI interoperability with Tait and Daniels fixed stations. The sections below indicate how these are to be configured.

Tait Fixed Stations

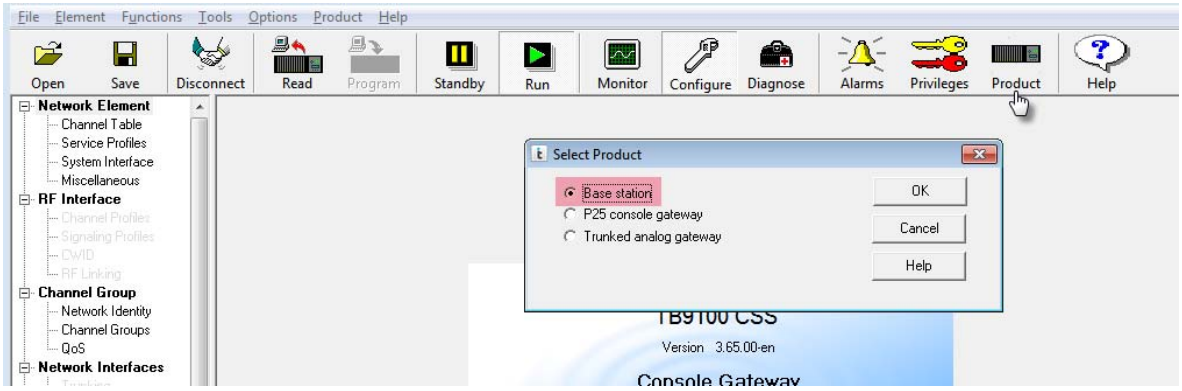
A Tait TB9100 fixed station may be configured with the ”Tait Communication software for TB9100”, also known as CSS. Tait stations are programmed over an IP connection. Refer to CSS documentation on how to initially connect to the fixed station. This guide assumes that the CSS can connect to the fixed station for programming.

Launch the CSS and click “Connect” icon from the toolbar. Select a fixed station to configure for DFSI and click “Connect”.



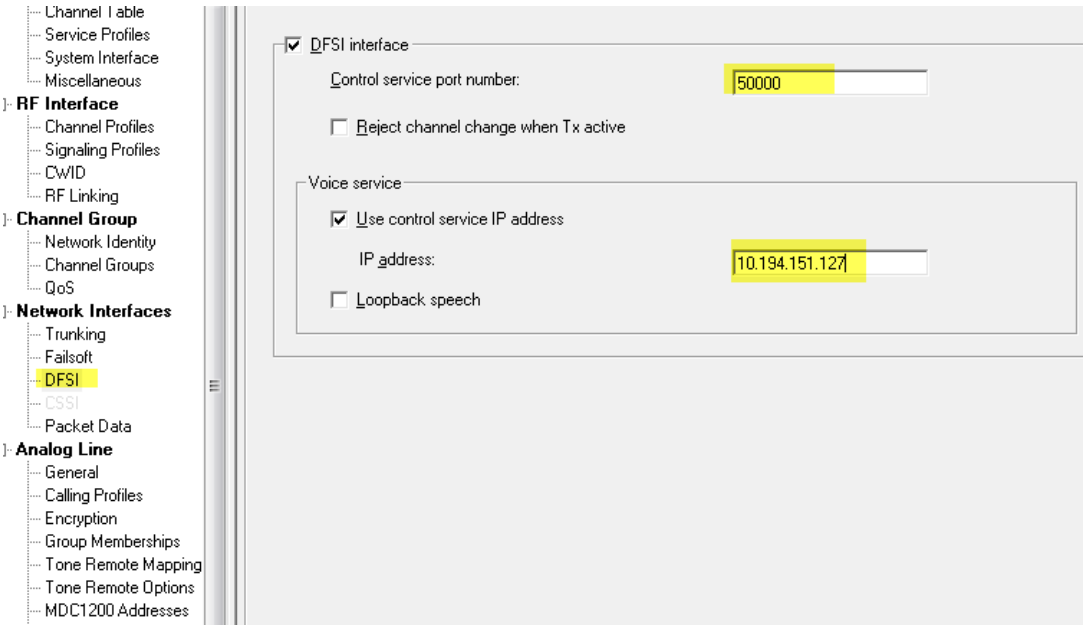
Proceed with the password prompt as previously configured. Once connected, click the “Read” icon from the toolbar. Click “Ok” if the CSS warns about overwriting a previously loaded configuration. This will load the configuration for the selected fixed station.

Click the “Product” icon from the toolbar. Then select “Base Station” and click “Ok”. This is the only way to enable DFSI operation for the fixed station. Otherwise the DFSI link on the navigation bar on the left is disabled.



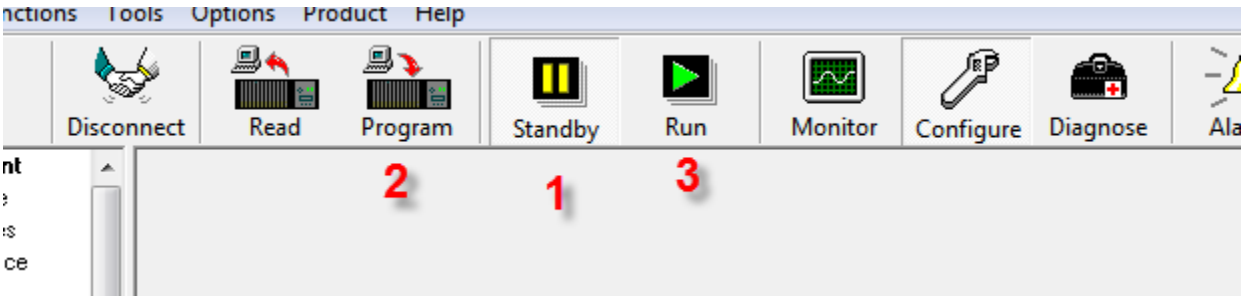
Click on the “DFSI” link on the navigation bar to display the current configuration. To enable DFSI operation, do the following:

- Check the “DFSI Interface” checkbox.
- For the “Control service port number”, enter 50000.
- Make sure that the “Use control service IP address” checkbox is checked.
- Enter the IP address of this fixed station,



Click ok when done.

In order to program these changes to the fixed station, it needs to be put in standby mode. Click the "Standby" icon on the toolbar, followed by the "Program" icon. When programming is complete, click on the "Run" icon to bring the fixed station back to an operational state.



Daniels Fixed Stations

(Coming Soon)

DFSIG & Fixed Station Descriptors

Before a DFSIG or fixed station is provisioned within the IPICS Server, a descriptor needs to be created for the DFSIG and one or more for the fixed stations. The fixed station descriptor(s) describes channels programmed on the fixed station(s) and the control functions that are needed by a dispatcher.

An example DFSIG descriptor is available on the IPICS Server in Configuration > Descriptors. Below is an explanation of the format of the descriptors (XML file).

DFSIG Descriptor

A DFSIG descriptor is identified by the controlType and controlModule as shown in following XML block:

```
<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="DFSIG-Example"
controlType="P25DFSIG"
controlModule="P25DFSIGateway">
```

DFSI descriptors are not required to have any blocks for channel selectors, control functions, etc., as it simply is a gateway to fixed stations. These attributes are a function of the fixed station the DFSIG is interoperating with.

Fixed Station Descriptor

A fixed station descriptor is identified by the controlType and controlModule as shown in following XML block:

```
<?xml version="1.0" encoding="UTF-8"?>
<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="FixedStation-Tait"
controlType="FIXED_STATION"
controlModule="P25DFSIGateway">
```

Channel Selectors

Channel selectors are defined for fixed stations in ChannelSelector blocks. Each channel selector has an attribute called "label" that is a maximum of 12 characters in length. The Action element within each channel selector element contains the command represented by the channel selector. The attribute "type" for Action elements must always be "tune". The Command element defines the behavior of the channel selector.

Below is an example of a channel selector for a fixed station:

```
<ChannelSelector label="CHAN 1 DIG">
  <Action type="tune">
    <Command>
      <Channel zone="" channel="1/1" txMode="DIGITAL" talkgroup="0001"
nac="659"/>
    </Command>
  </Action>
</ChannelSelector>
```

The "zone" attribute must always be blank as it isn't relevant to fixed stations.

The "channel" attribute represents the rx/tx channel numbers in that particular order. **NOTE: For Tait channels are numbered starting at 1, while in Daniels start at 0. Refer to the fixed station configuration for correct channel numbers.**

The "txMode" attribute indicates whether the channel is configured for "ANALOG" or "DIGITAL" transmit.

The "talkgroup" attribute represents the hex value for a conventional talkgroup. This is needed for analog channels as well, because they may be setup for mixed mode rx.

The "nac" attribute is the Network Access Code for a P25 conventional channel and is represented in hex. This is needed for analog channels as well, because they may be setup for mixed mode rx.

Control Functions

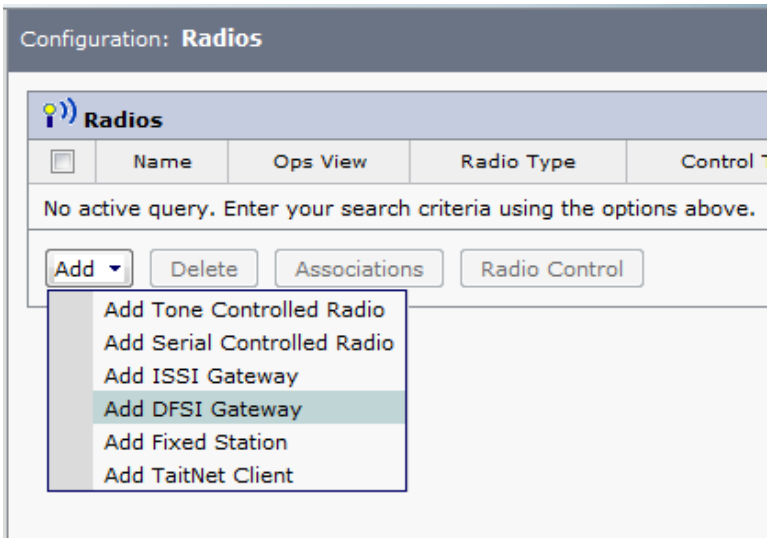
Control functions represent functions on that can be toggled between their respective states. The control functions supported by IPICS for DFSI interoperability are:

- Monitor: Allows a dispatch to turn squelch on/off
- Repeater Mode: Allows a dispatcher to enable/disable repeater mode
- Secure Tx Mode: Allows a dispatcher to encrypt outbound audio
- Emergency: Allows a dispatcher to make emergency calls
- Key: Allows a dispatcher to view the current key when using encryption

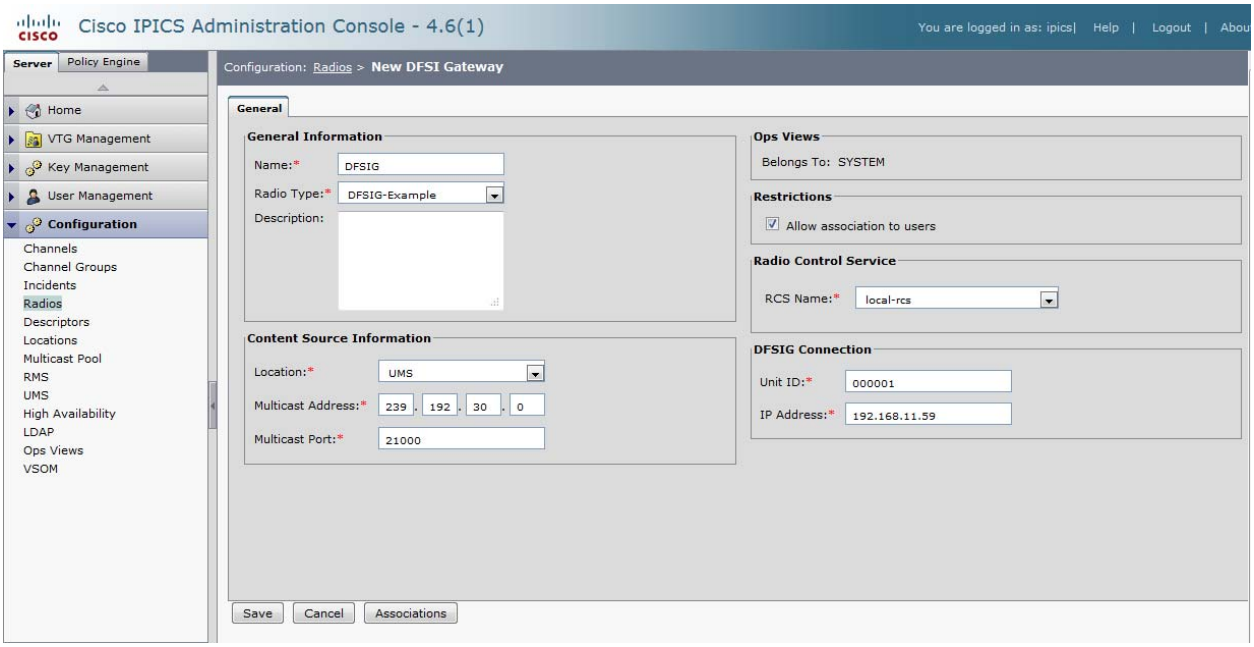
Control functions are predefined and should be included as-is in the descriptor without modification.

Provisioning DFSIG

A DFSIG is provisioned via the “Configuration > Radios” page. A DFSIG can be added by selecting “Add DFSI Gateway” from the ADD button when pressed.

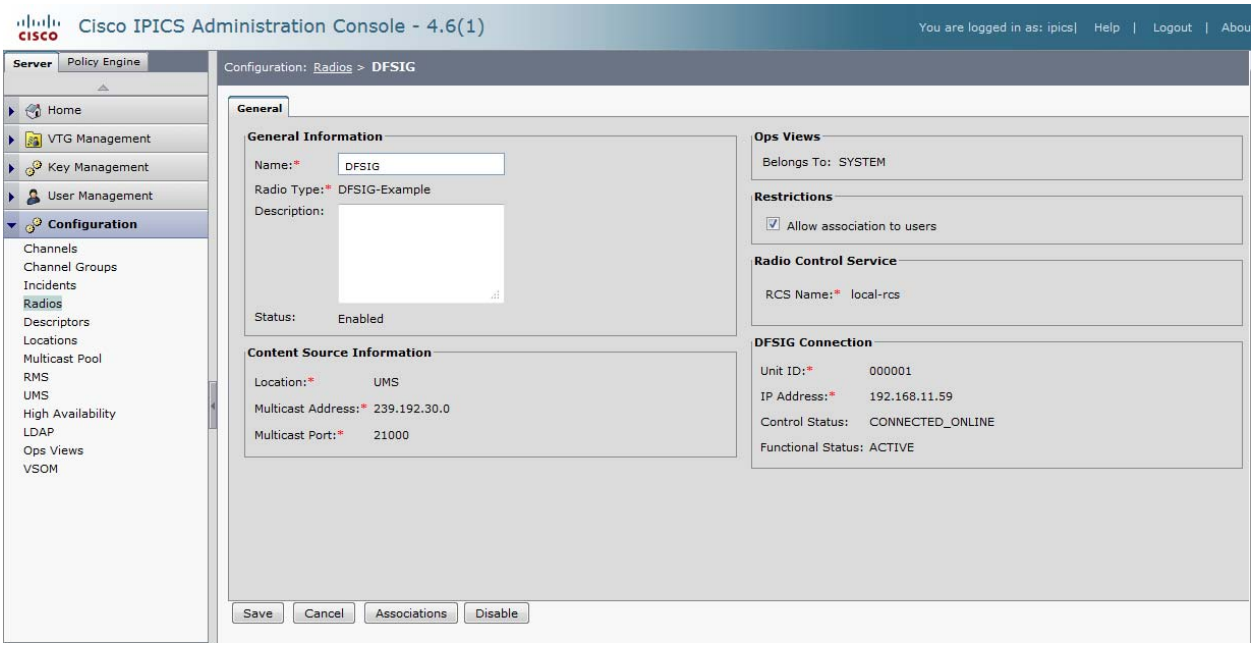


The form below allows the provisioning of a DFSIG:



The “Unit ID” is the proxy subscriber ID of the DFSIG and is what appears on P25 radios when a dispatcher or other IPICS endpoint is talking. The “IP Address” needs to match the IP address configured for the Eth1 controller after the DFSIG was installed.

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



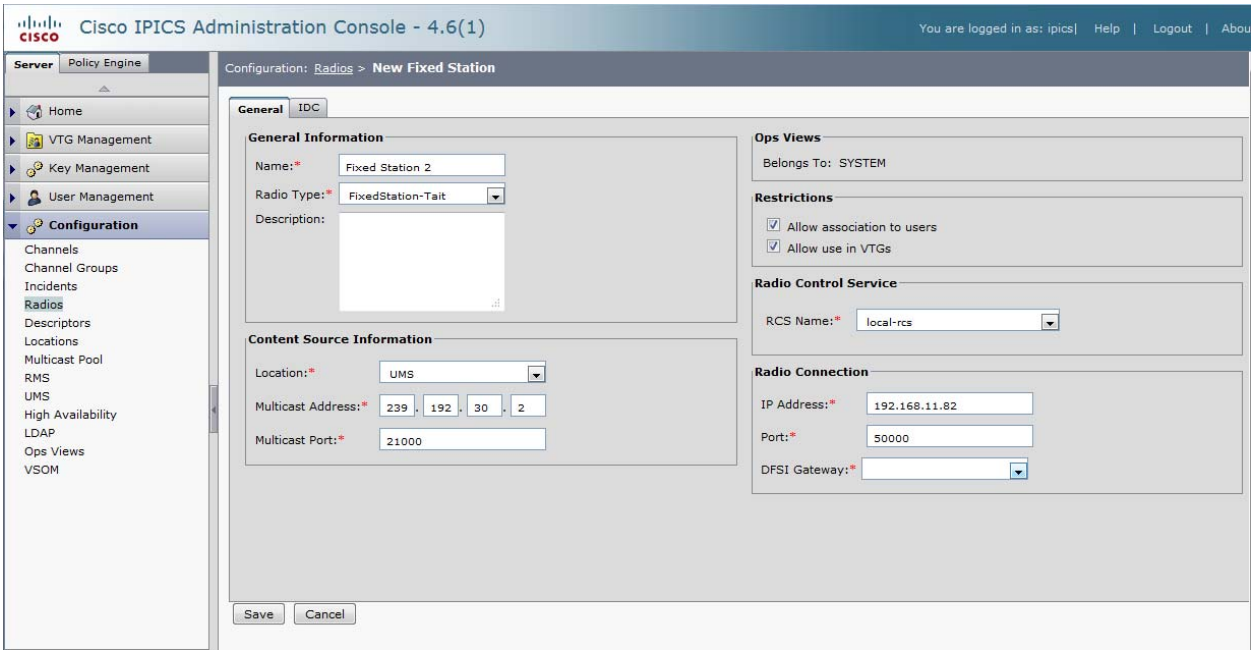
A “Control Status” of “CONNECTED_ONLINE” means that the IPICS Server can communicate with the DFSIG. “CONNECTED_OFFLINE” usually means that the server has connected to an application that is not a DFSIG or the DFSIG is not responding to commands. “SOCKET_FAILURE” means that the server was not able to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

A “Functional Status” of “ACTIVE” means that the DFSIG is ready for use. If the functional status indicates “ERROR_NO_SERVICE”, it will need to be resolved in order to proceed further.

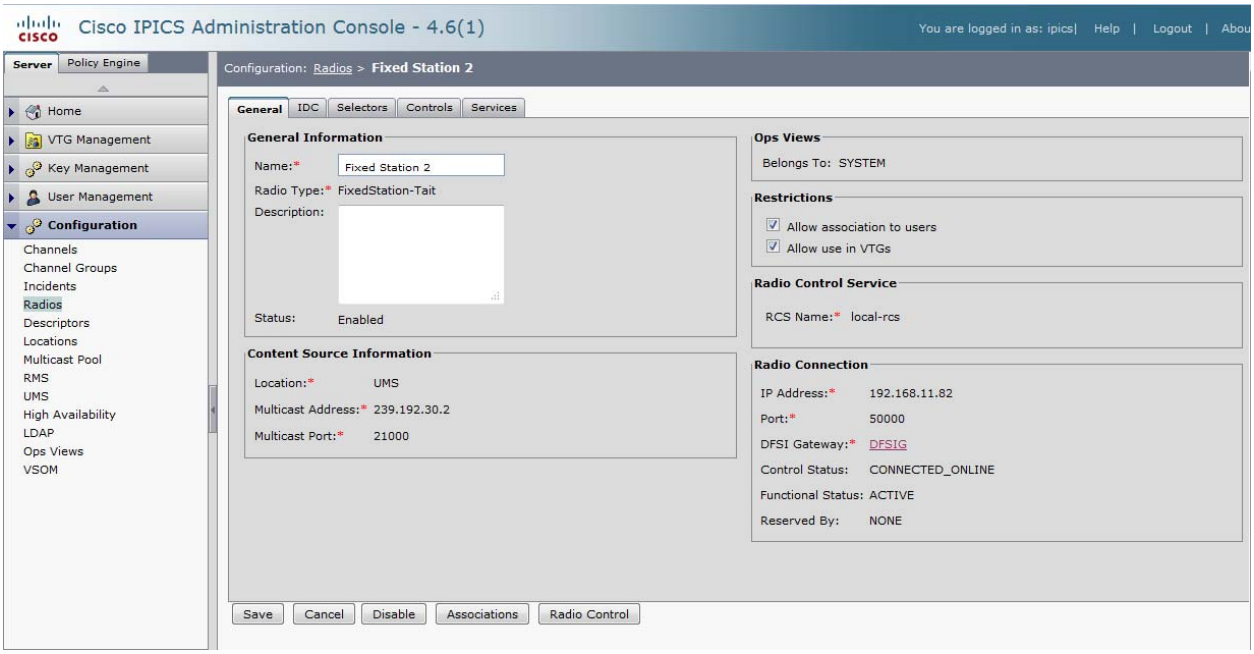
Provisioning Fixed Stations

Fixed stations are provisioned similar to other serial radios in IPICS via the Configuration > Radios page on the IPICS Admin console.

The difference in this case is that the “Radio Connection” block contains the IP address and of the fixed station as configured in the fixed station itself, as well as the DFSIG that is to control this fixed station.

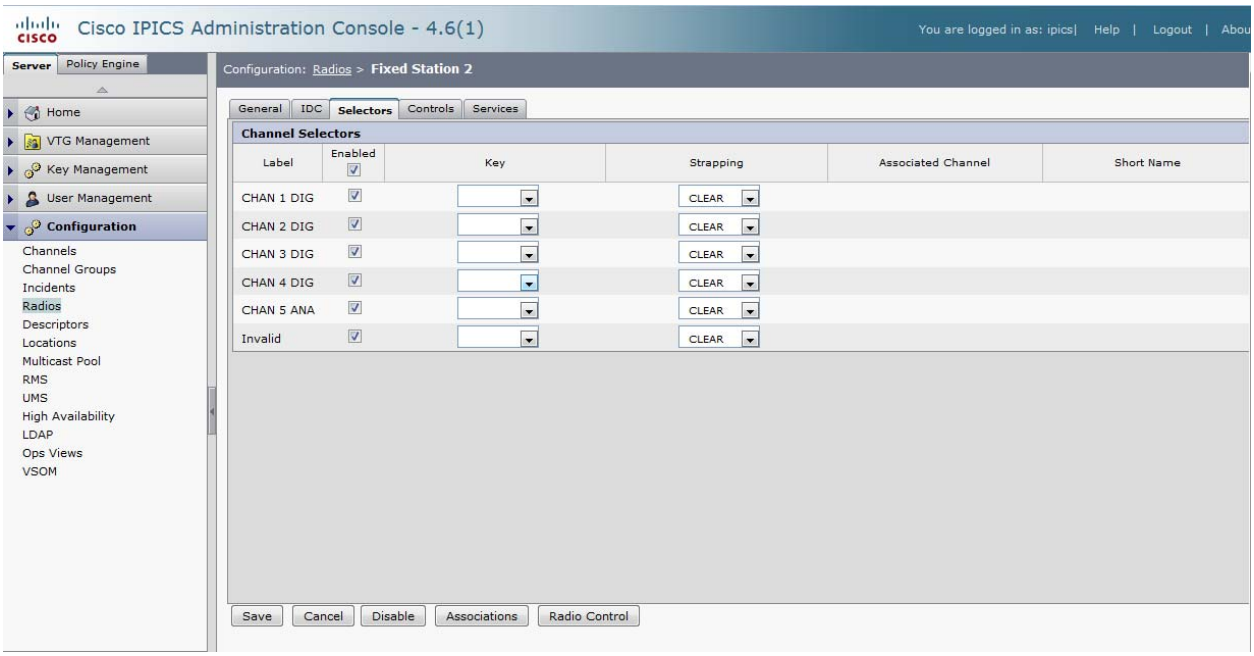


Once saved, the fixed station should have “Control Status” as CONNECTED_ONLINE and “Functional Status” as ACTIVE.

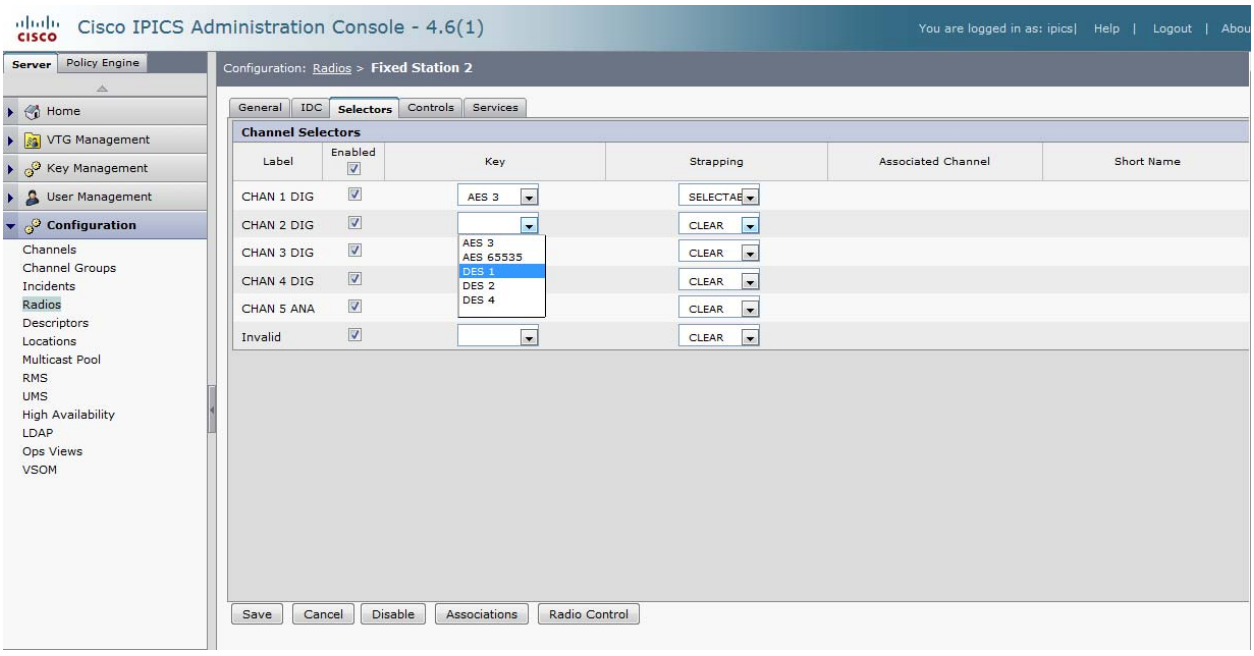


In the event the control status is something else, check the DFSIG. It means that there is a problem with the DFSIG. If the functional status is ERROR_NO_SERVICE, then it means that the DFSIG was not able to connect to the fixed station. This could be because the ip/port information is incorrect, a network issue or DFSI has not been enabled on the fixed station.

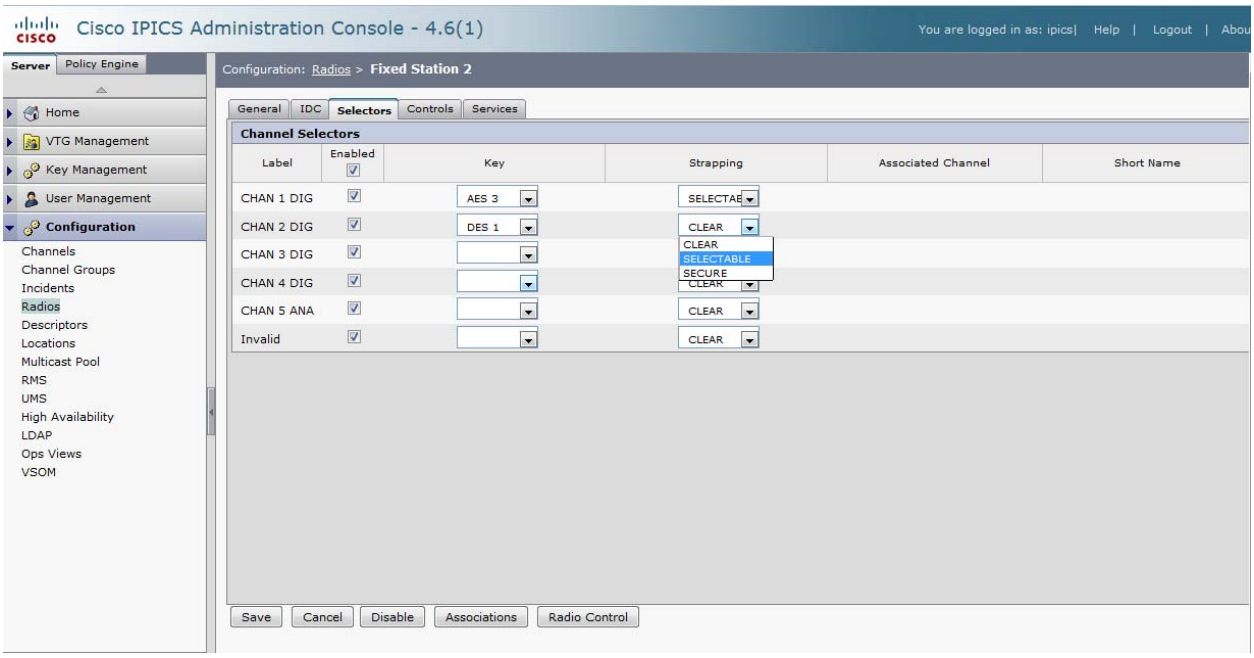
After the fixed station has been properly provisioned, make sure that needed channel selectors and control functions are enabled via their respective tables in the radio details page.



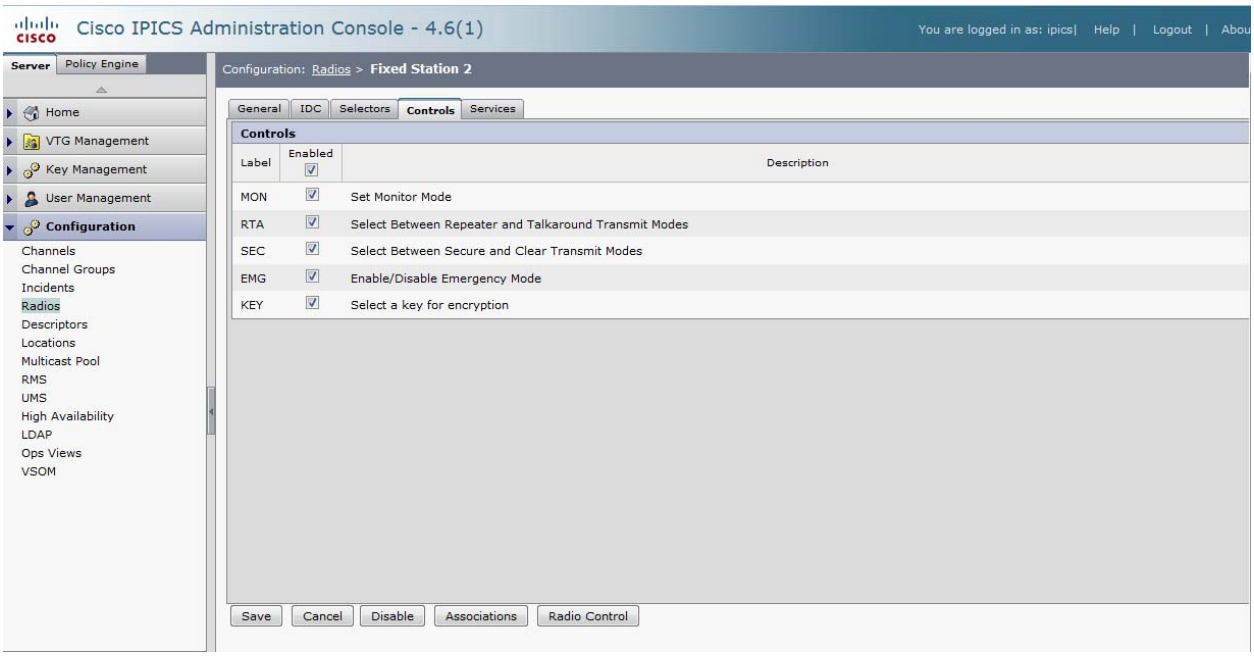
Additionally, the administrator can assign encryption keys to each channel selector as well as whether the channel selector is selectable for secure/clear transmission or whether it is to be strapped in secure only or clear only mode.



Key Assignment



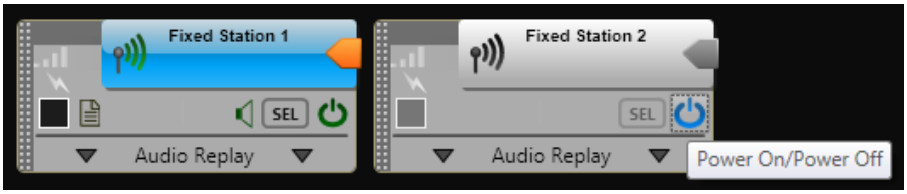
Secure Mode Operation



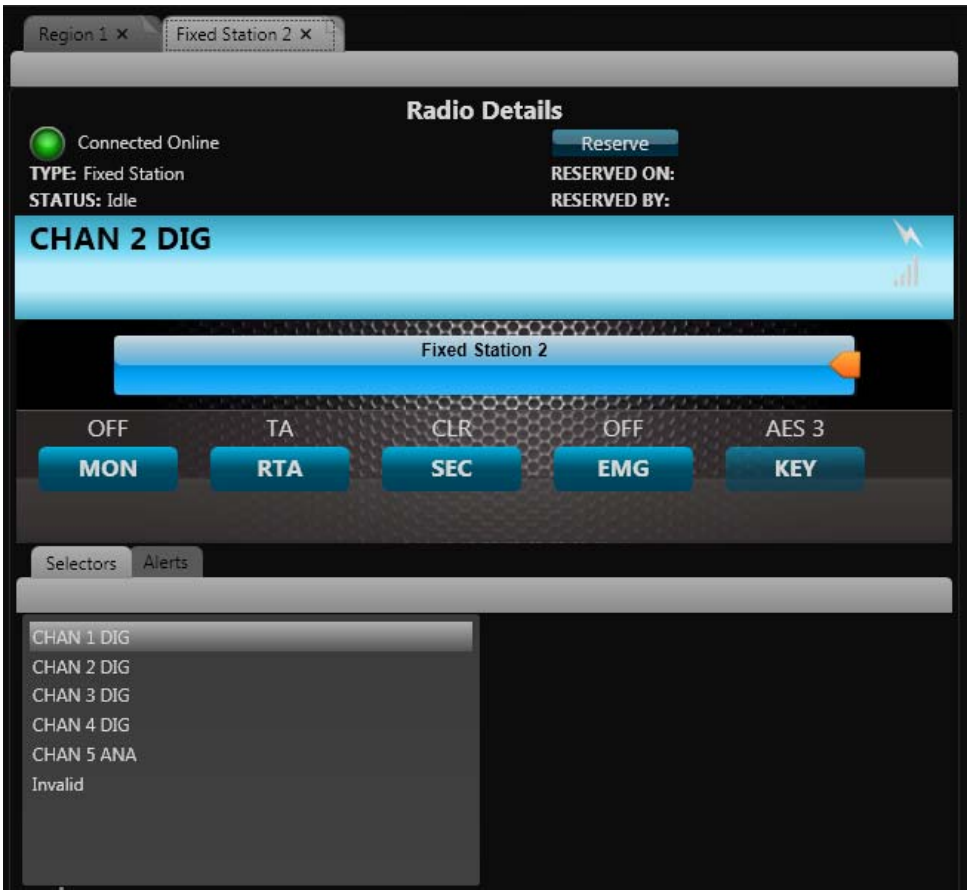
Control Functions

DFSIG Interoperability on an IDC

In IPICS 4.6, DFSI interoperability is only available in gateway (proxy) mode. Therefore, activating a fixed station in the IDC simply requires clicking on the power icon.



Clicking on the page icon on the talkgroup displays the details page for this fixed station. This page is used to control the fixed station.



Clicking on a channel selector, causes the fixed station to switch to that channel selector. Clicking on the control functions allows the IDC user to select the state of a desired control function on the fixed station.

The alerts box allows the IDC user to view and respond to alerts at the IDC. These could be emergency alarms or call alerts and function similar to other types of controlled radios and gateways.

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