

## Icon-5066 Evaluation Guide

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Configuring R3.0 release of Isode's Icon-5066 Server on Windows and Linux Platforms for use with applications requiring a single STANAG 5066 node or multiple STANAG 5066 nodes.

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## Introduction

This guide is intended to give the reader basic information on how to configure Isode's Icon-5066 Server Product. Icon-5066 is a STANAG 5066 Server that can support multiple STANAG 5066 nodes on a single server.

Supporting multiple nodes on a single server is very helpful in lab environments which this guide is aimed at. In a live environment it is likely that different nodes will be on different networks and locations, as such in this scenario an Icon-5066 Server will be required for each node.

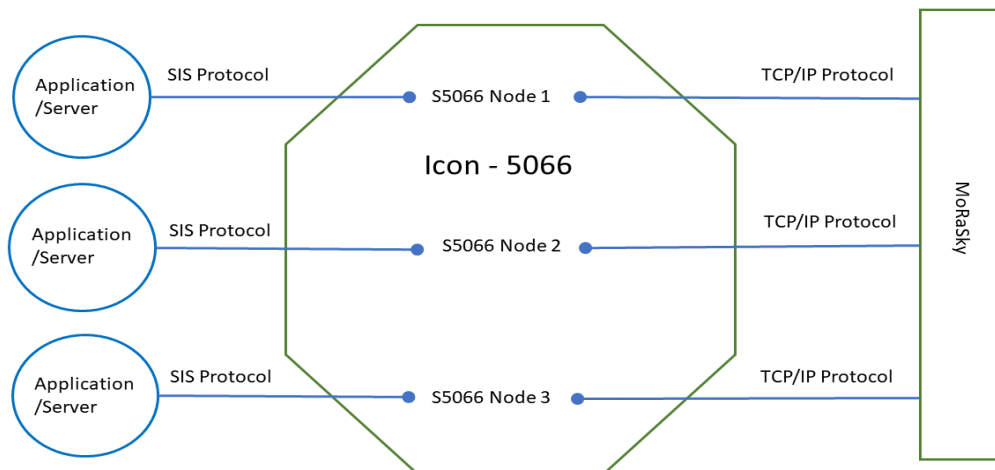
More information on Icon-5066 can be found at [www.isode.com/products/icon-5066.html](http://www.isode.com/products/icon-5066.html).

## Objectives

In this guide you will be shown how to configure three STANAG 5066 nodes that are connected to Isode's Modem Radio Sky Simulator (MoRaSky) in a Wireless Token ring configuration.

The diagram below gives an overview of this setup.

Image 1: System Overview



By the end of this guide you will have:

1. Installed the Icon-5066 server software and started the Icon-5066 Services
2. Used the web based user interface to configure S5066 Node 1, S5066 Node 2 and S5066 Node 3 that are connected to each other via a local Isode MoRaSky instance.
3. Connected the S5066 Console GUI to S5066 Node 1 , S5066 Node 2 and S5066 Node 3 to test data throughput and chat.

For the purposes of this evaluation we have assumed this is a "clean" installation of Icon-5066 on to a physical or virtual machine. If you have previously installed Icon-5066 on the hardware or VM you are using for this evaluation, please make sure you have completely uninstalled that version before proceeding.

## **Using Isode Support**

You will be given access to Isode support resources when carrying out your evaluation. Any queries you have during your evaluation should be sent to [support@isode.com](mailto:support@isode.com). Please note that access to the Self-Service Portal for web-based ticket submission and tracking is not available to evaluators.

## Preparing the Server Environment

You should visit [www.isode.com/products/supported-platforms.html](http://www.isode.com/products/supported-platforms.html) to discover which operating systems are supported for Isode evaluations.

### Naming the Server

Make the machine name : ICON5066SERVER

Make the primary dns suffix for the server HEADQUARTERS.NET

Alternatively, you may use your own names or add dns entries in a dns server or hosts file.

### Install the Isode Software

Follow the instructions in the release notes for the appropriate platform for the products. For this guide, the following products were used:

Icon-5066 3.0v1

M-Switch 19.0v1

MAS 1.1

On Windows, select the default install options when executing the installer for icon-5066 and MAS. For M-Switch, more detailed instructions are provided later in the guide.

On Linux, install all the RPMs with the command:

```
# sudo rpm -i ISD*.rpm
```

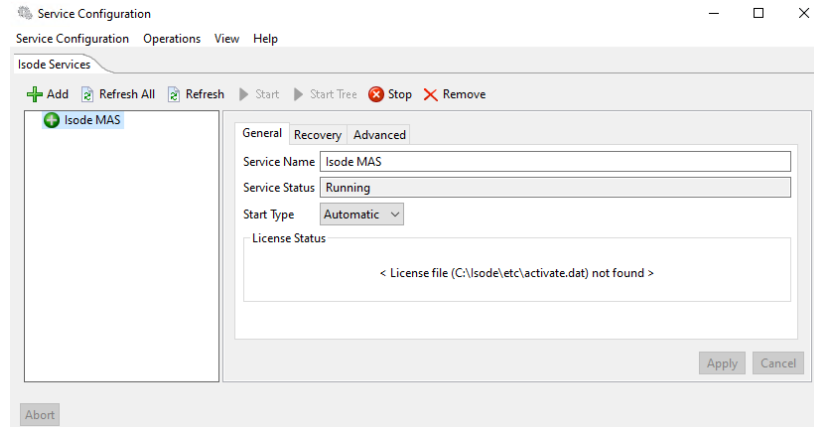
Remember to install an appropriate java runtime engine (refer to product release notes) and in a Windows environment the visual c++ redistributable package.

Please use a supported web browser as documented in the product release notes.

## Activating the Isode Products

Ensure the MAS server has started by using the Isode Service configuration tool.

### Isode Service Configuration - MAS



Browse to “https://localhost:9000”

The browser will provide a security warning. Choose an option to override the warning

In “Username” type “masadmin”

In “Password” type “Secret1+”

In “Confirm Password” type “Secret1+”

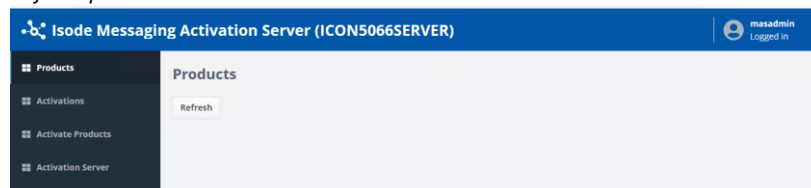
Press “Register”

### MAS First Time Log in

The screenshot shows the 'Messaging Activation Server' first time login page. The page includes the following fields and buttons:

- Username:** Required field containing 'masadmin'.
- Password:** Required field containing 'Secret1+' (masked with dots).
- Confirm Password:** Required field containing 'Secret1+' (masked with dots).
- Register:** A blue button to submit the registration form.

### Refresh product list



Select “Activate Products”  
In “Reference” type “Icon 5066 Eval”

*Populate Activation Reference*

Press “Submit”

Copy the activation request code to your clipboard.

*Generate Activation Request*

Send an email to Isode support asking for an activation for Icon-5066 Evaluation. Include the activation request code.

Isode support will supply a Product Activation key

It is likely that the session between the browser and MAS will have timed out between requesting the product activation and receiving the keys. It is therefore sensible, once the keys have been received, to close the browser window and log back into MAS again.

Select “Activate Products”

Paste the keys into the “Activation Key” field  
Press “Submit”.

*Submit Activation key*

You should receive confirmation of licence update:

*Activation added*

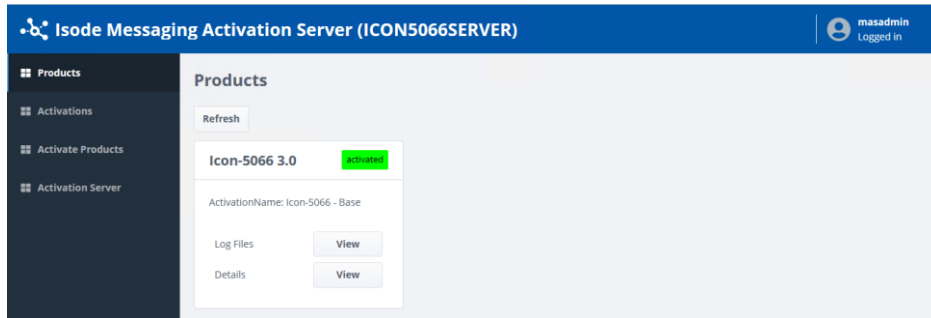
No.	Processing Status	Product	Activation and Installed Status
1	Added	Icon-5066 3.0	OK



Select “Products”  
Press “Refresh”

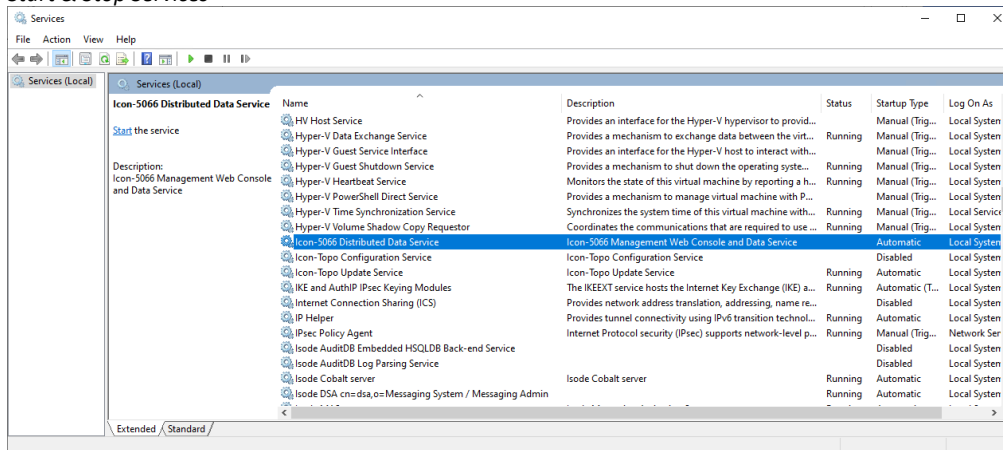
The products that have been activated should be highlighted:

Activated Product List



Start the service using the Windows Services Administrative Tool.

Start & Stop Services



## Creating & Starting Services (Linux)

To start the Icon-5066 Distributed Data Service on Linux run the command :

```
# sudo systemctl start isode.icon.ddsd
```

## Adding & Configuring Nodes

The Icon-5066 Server can support multiple S5066 Nodes (on separate ports) on a single server. These nodes are configured using the **Icon-5066 Console**, a Web-based management tool. In this section we're going to add 3 Nodes.

---

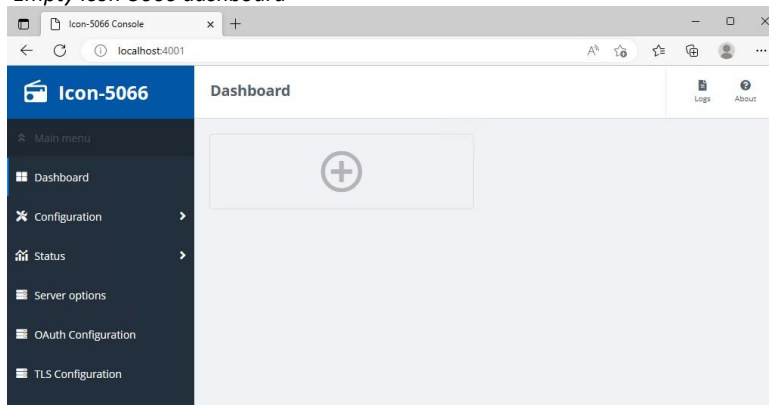
*In this guide we're going to configure nodes to use Isode's MoRaSky (Modem Radio Sky), a software tool provided by Isode to help test Isode HF products. MoRaSky provides a service equivalent to HF modems connected to Radios and operating over the Ionosphere. It enables sophisticated testing of Icon-5066 and the applications it supports, without use of hardware or over the air transmission.*

*If your intention is to use physical modems in place of MoRaSky, please consult Section 3.7.2 of the Icon-5066 Administration Guide in conjunction with this section.*

---

Launch the Icon-5066 console by launching a web browser and entering `http://myserver.hostname:4001`

Empty Icon-5066 dashboard



### Adding Node 1

Click the “+” Button.

In the “Add Node” dialogue, enter the following information :

- Enter a Friendly Name for **Name**, we will use "Node 1 MoRaSky - 1"
- Enter the **Node Address** (typically 10.50.66.0 for the first node). Node addresses must be unique and are similar to IPv4 syntax, but the first octet has max value of 15. The choice for demos is arbitrary, but live deployments have rules for international allocation.
- Enter the **SIS Host** (the hostname of your Icon-5066 Server), this is optional and if left blank Icon-5066 will listen on all IP Addresses. If your server has multiple IP Addresses and you want each node to listen on a specific IP Address then you should enter the IP Address or hostname here.
- Enter the **SIS Port**, 5066 is the standard port for this protocol but if you are configuring multiple nodes on the same server you will need different Ports for each node.
- The remaining fields can be left with their default values.

## Configure Node information

The screenshot shows a web browser window with the URL `localhost:4001/configuration/?add=true`. The page title is "Add node". On the left, there is a blue sidebar with the "Icon-5066" logo and a "Main menu" link. The main content area contains the following fields:

- node options** (information icon)
- Name**: A name for easier identification of the Node by operators. Input: "Node 1 MoRaSky - 1".
- Node Address**: The 5066 Address of the Node. Input: "10.50.66.0". A "Required" label is present.
- SIS Host**: The host name or IP address of the server. Input field is empty.
- SIS Port**: TCP port number for a SIS connection. Input: "5066". A "Required" label is present.

Then Scroll to the bottom

### Add New Node

The screenshot shows the bottom part of the configuration page. It includes a section for "TLS on SIS streams" with the following options:

- Enable TLS on SIS connections
- Radio buttons for "Disable" (selected), "Enable", and "Use default" (checked).
- A green "Add" button and a grey "Cancel" button.

and Click "Add".

## Configuring Node 1

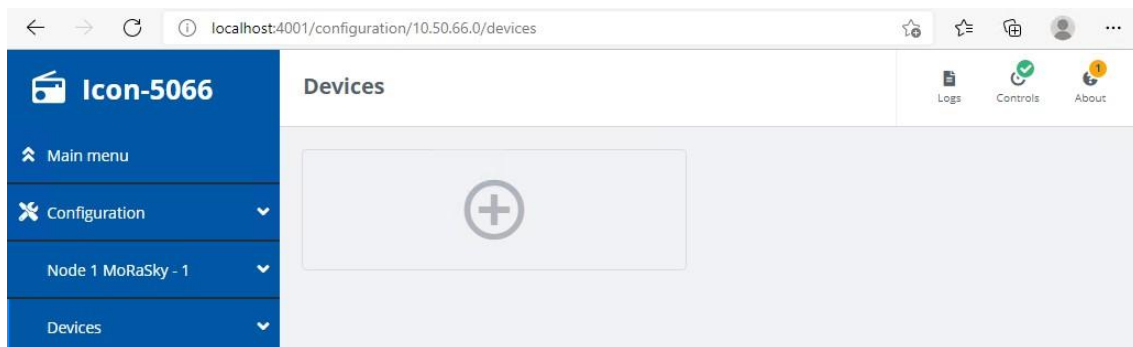
Each node consists of a core configuration together with a number of devices that are used by, or control the behaviour of, the S5066 node. Each working node configuration must define the following set of mandatory devices.

- **Modem** device that defines how to communicate with the underlying modem (simulated or real).
- **Rate Change** device controls the rate at which data can be sent to the modem.
- **Transmission Control** device controls the pattern of data transmission.

From the left hand pane, select “Devices”.

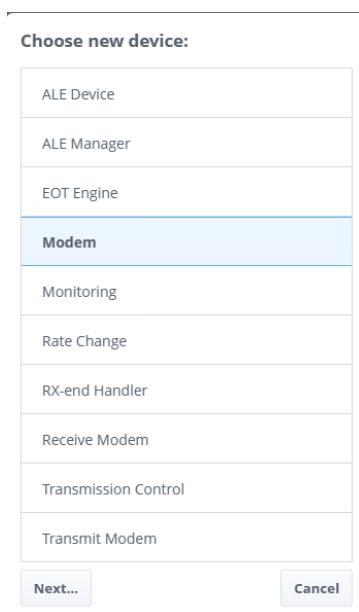
In this evaluation we will be using the MoRaSky GUI to create a clear channel, 3 Radio configuration using Waveform 5069, Bandwidth 24, 38400 bps and small Interleaver.

*Add first device*



Click the “+” button.

*Choose a new device*



Select “Modem” and Click “Next...”.


### Choose Device Driver

Choose new device driver:

data_only
loop
<b>morasky</b>
rapidm
thales
xml_gcxp_proxy

Select the “morasky” modem and click “Select”.

### Configure Modem ip address

 **Icon-5066**

[Main menu](#)

#### Add device

⊙ Morasky modem simulator driver

**IP address** Required

RAP1 interface IP address. [More...](#)

**Port number**

RAP1 interface port number

  Use default

**Streaming configuration**

'clock' is fine for half-duplex communication, but risks und... [More...](#)

  Use default

**Serial driver configuration**

If not specified, then the driver will send and receive data ... [More...](#)

**RX-active source**

RX-active (carrier) information may be sourced either over... [More...](#)

  Use default

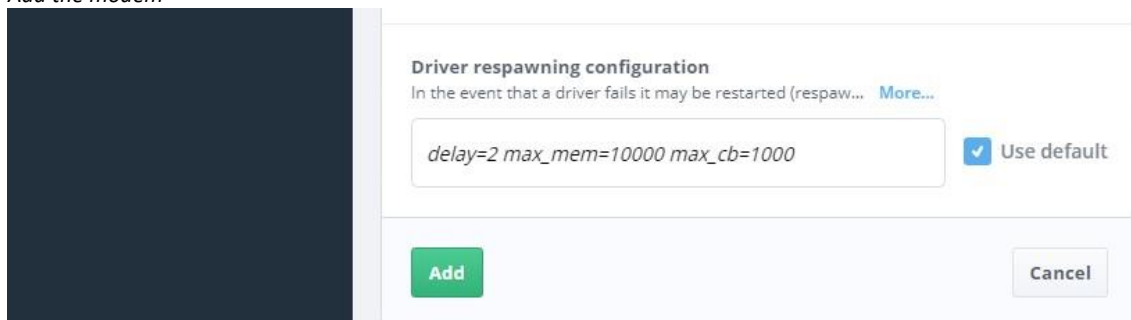
**TX-active source**

TX-active (transmitting) information may be sourced eithe... [More...](#)

  Use default

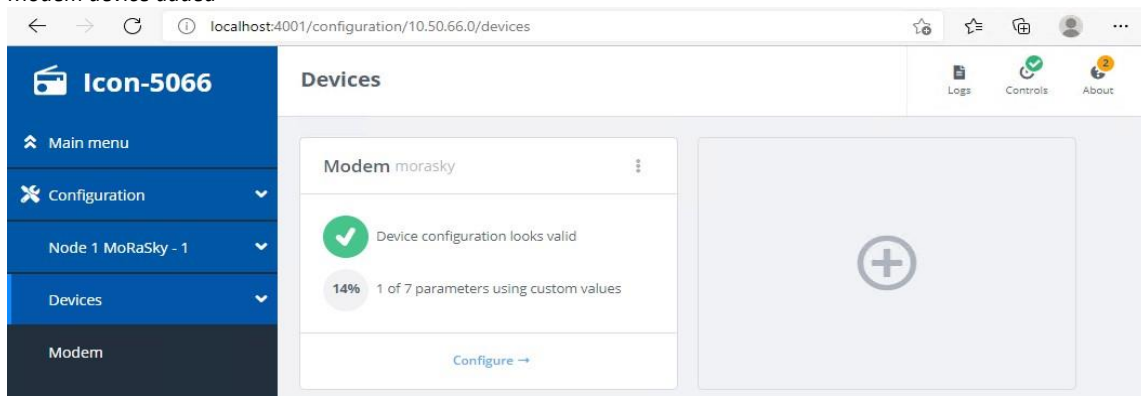
Enter 127.0.0.1 for the IP Address, all other values are default, and scroll to the bottom.

*Add the modem*



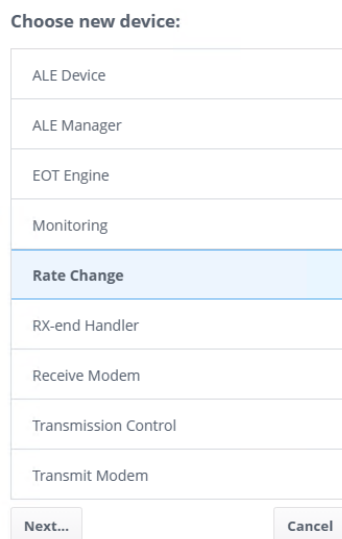
Click “Add”  
Click “Devices”.

*Modem device added*



Click the “+” Button.

*Select rate change device*



Select “Rate Change” and Click “Next...”.

*Select fixed driver*

**Choose new device driver:**

fer

**fixed**

snr

Select Back...

Select “fixed” and Click “Select”.

Select a waveform

**Icon-5066** Add device

Main menu

Fixed waveform and parameters

**Waveform** Required

Waveform to configure in modem

wf=5069 bw=24 bps=38400 ilv=S

wf=5069 bw=24 bps=12000 ilv=M  
wf=5069 bw=24 bps=12800 ilv=L  
wf=5069 bw=24 bps=25600 ilv=US  
wf=5069 bw=24 bps=25600 ilv=S  
wf=5069 bw=24 bps=25600 ilv=M  
wf=5069 bw=24 bps=25600 ilv=L  
wf=5069 bw=24 bps=38400 ilv=US  
wf=5069 bw=24 bps=38400 ilv=S  
wf=5069 bw=24 bps=38400 ilv=M  
wf=5069 bw=24 bps=38400 ilv=L  
wf=5069 bw=24 bps=51200 ilv=US  
wf=5069 bw=24 bps=51200 ilv=S  
wf=5069 bw=24 bps=51200 ilv=M  
wf=5069 bw=24 bps=51200 ilv=L  
wf=5069 bw=24 bps=64000 ilv=US  
wf=5069 bw=24 bps=64000 ilv=S  
wf=5069 bw=24 bps=64000 ilv=M  
wf=5069 bw=24 bps=64000 ilv=L  
wf=5069 bw=24 bps=76800 ilv=US  
wf=5069 bw=24 bps=76800 ilv=S  
wf=5069 bw=24 bps=76800 ilv=M

Use default

Use default

Use default

**FEC**

Constraint length for 5069 (7 or 9)

9  Use default

From the “Waveform” drop-down select wf=5069 bw=24 bps=38400 ilv=S”. All other values are default. Then scroll to the bottom.

Add the Fixed rate change device

**Driver respawning configuration**

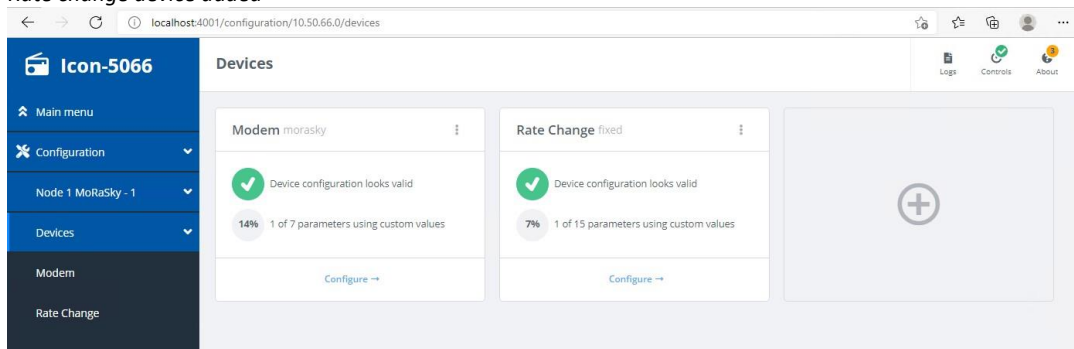
In the event that a driver fails it may be restarted (respaw... [More...](#))

delay=2 max\_mem=10000 max\_cb=1000  Use default

Add Cancel

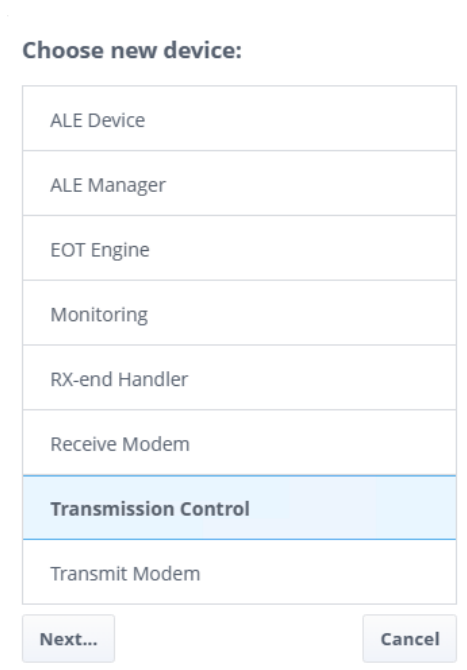
Click “Add”.  
Click “Devices”.

*Rate change device added*



Click the “+” Button.

*Select the transmission control device*



Select “Transmission Control” and Click “Next...”.



Select wtrp transmission control

Choose new device driver:

ale_121
bc_cont
bc_gaps
csma
notx
si_cont
si_gaps
wtrp

Select Back...

Select “wtrp” and Click “Select”.

Configure and add WTRP

localhost:4001/configuration/10.50.66.0/devices/?add=txctrl%2Fwtrp

Icon-5066

Main menu

### Add device

WTRP

**Seconds to wait for modem to drop RX-active after EOT**  
This is for recovery from unexpected modem behaviour, o... More...

10  Use default

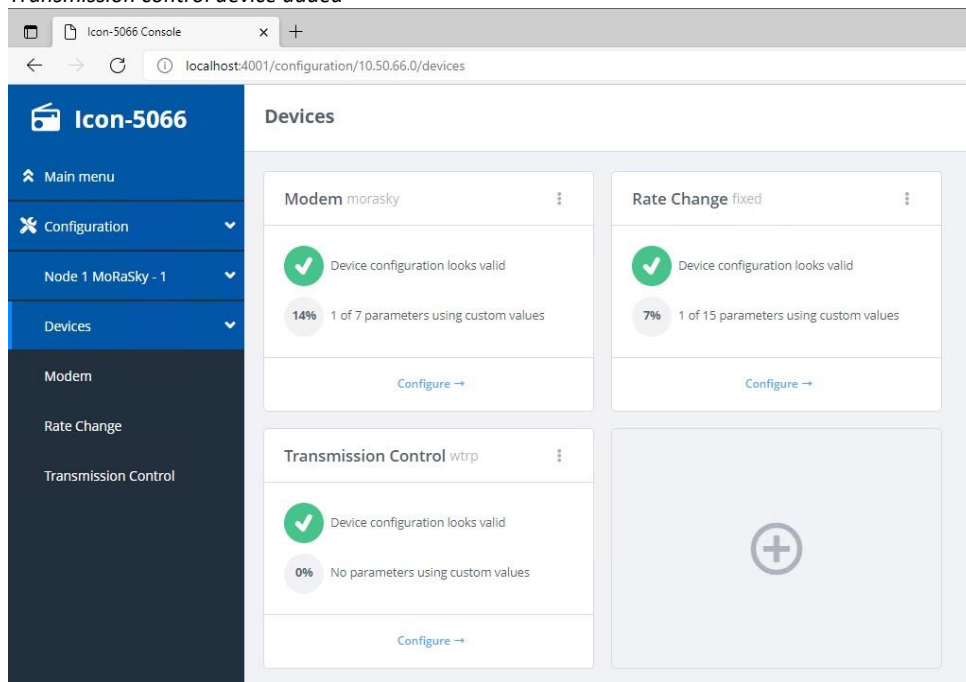
**Seconds to wait before aborting transmission (both Rx and Tx)**  
This is for recovery from unexpected modem behaviour

150  Use default

Add Cancel

Leave the default values and Click “Add”, then Click “Devices”.

*Transmission control device added*



You have now completed configuration of Node 1.

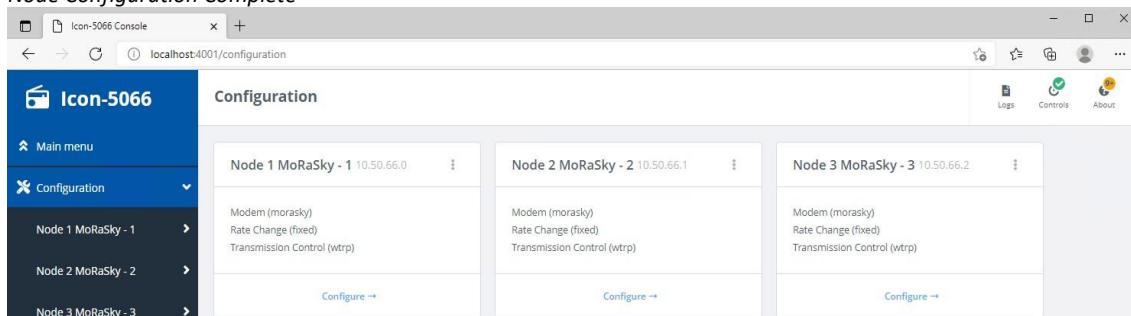
## Adding & Configuring Node 2 and 3

Add and configure Node 2 and 3 in the same way as Node 1 but using the following parameters:

- Node 2 Name : Node 2 MoRaSky - 2
- Node 2 Address: 10.50.66.1
- Node 2 Port: 6066
- Node 2 MoRaSky Port: 58002
  
- Node 3 Name : Node 3 MoRaSky - 3
- Node 3 Address: 10.50.66.2
- Node 3 Port: 7066
- Node 3 MoRaSky Port: 58003

At the end of this process, Icon-5066 Console should display 3 Nodes as below :

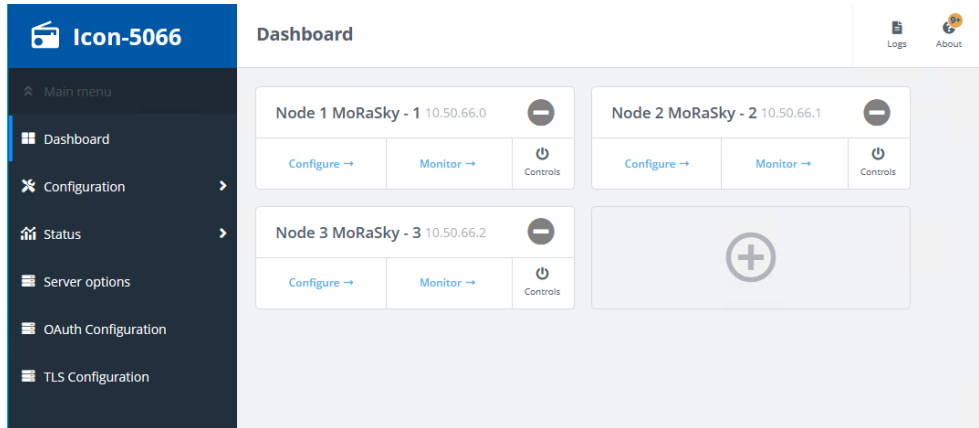
### Node Configuration Complete



## Enabling the Nodes

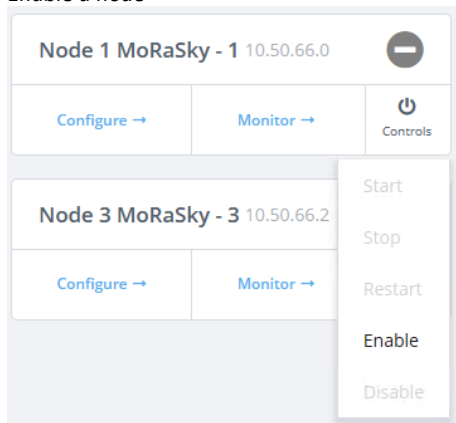
Select “Main Menu”. Each node should be displayed on the dashboard:

*Nodes to be enabled*



Press the “Controls” button in the “Node 1 MoRaSky – 1” pane and on the dropdown, select “Enable”

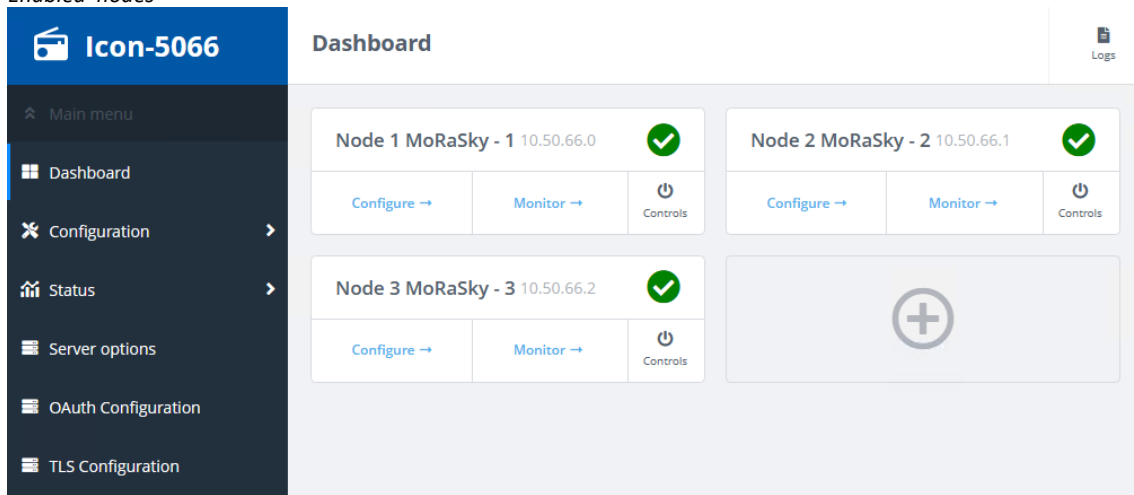
*Enable a node*



Repeat for nodes 2 and 3.

A green tick should now indicate each node has been enabled:

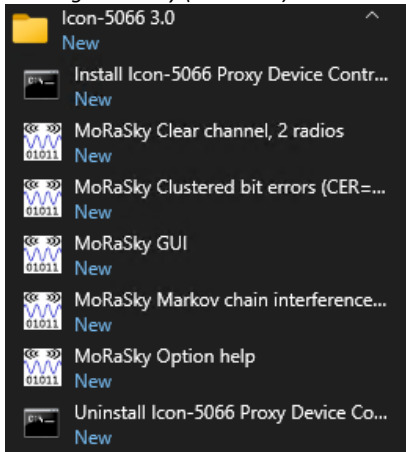
*Enabled nodes*



## Configuring and Starting MoRaSky

On Windows open the MoRaSky GUI from the Windows Start menu

### Starting MoRaSky (Windows)

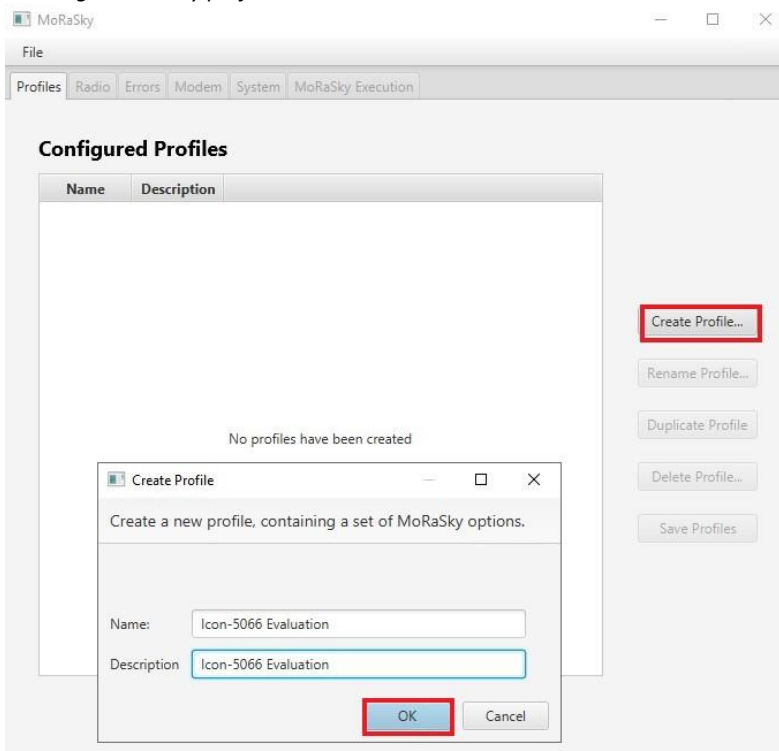


On Linux start the MoRaSky GUI by :

```
# /opt/isode/sbin/moraskyGUI
```

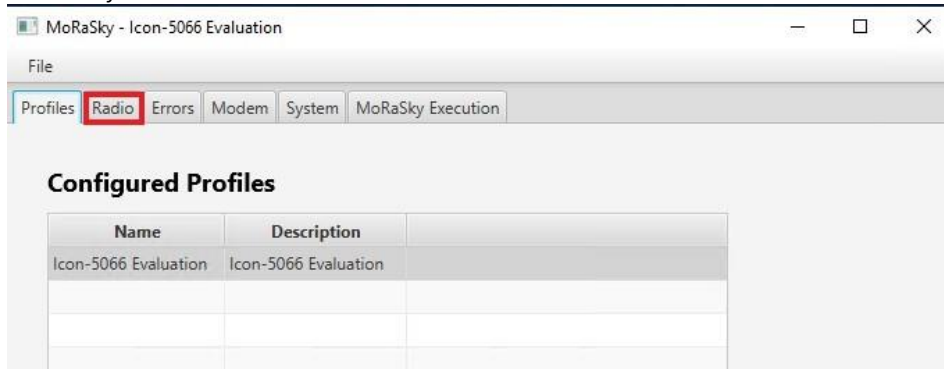
Press “Create Profile ...”, provide a profile name and description and press “OK”.

### Creating a MoRaSky profile



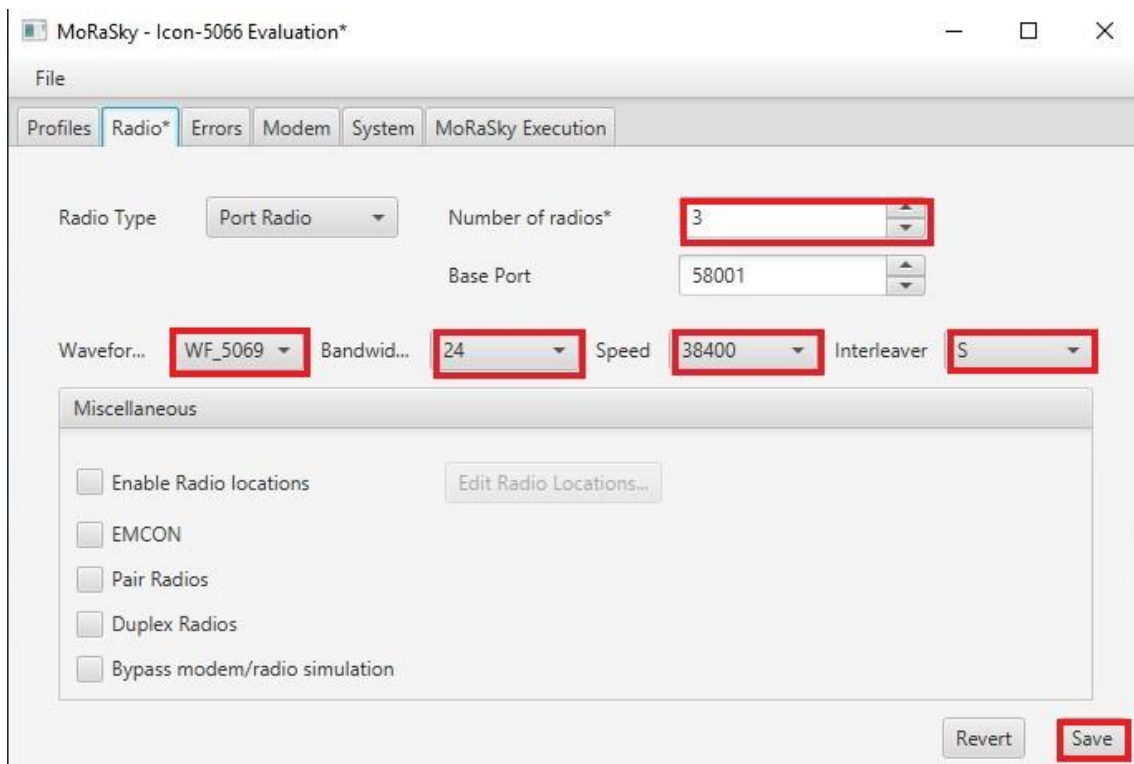
Select “Radio” tab :

*Location of radio tab*



Increase the number of radios to “3”, change the waveform to “WF\_5069”, set the bandwidth to 24, the speed to “38400”, the Interleaver to “S” and press “Save”.

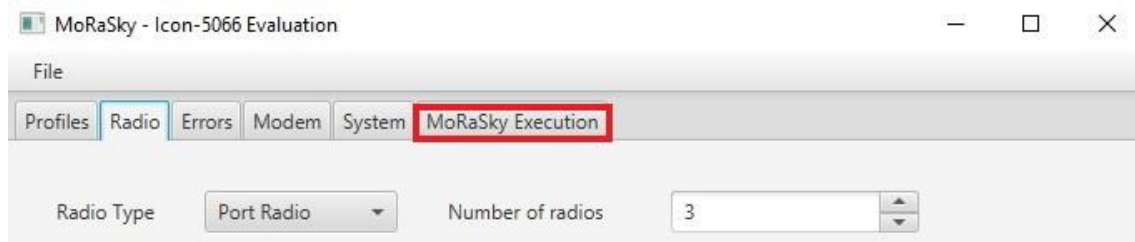
*Configure radio parameters*



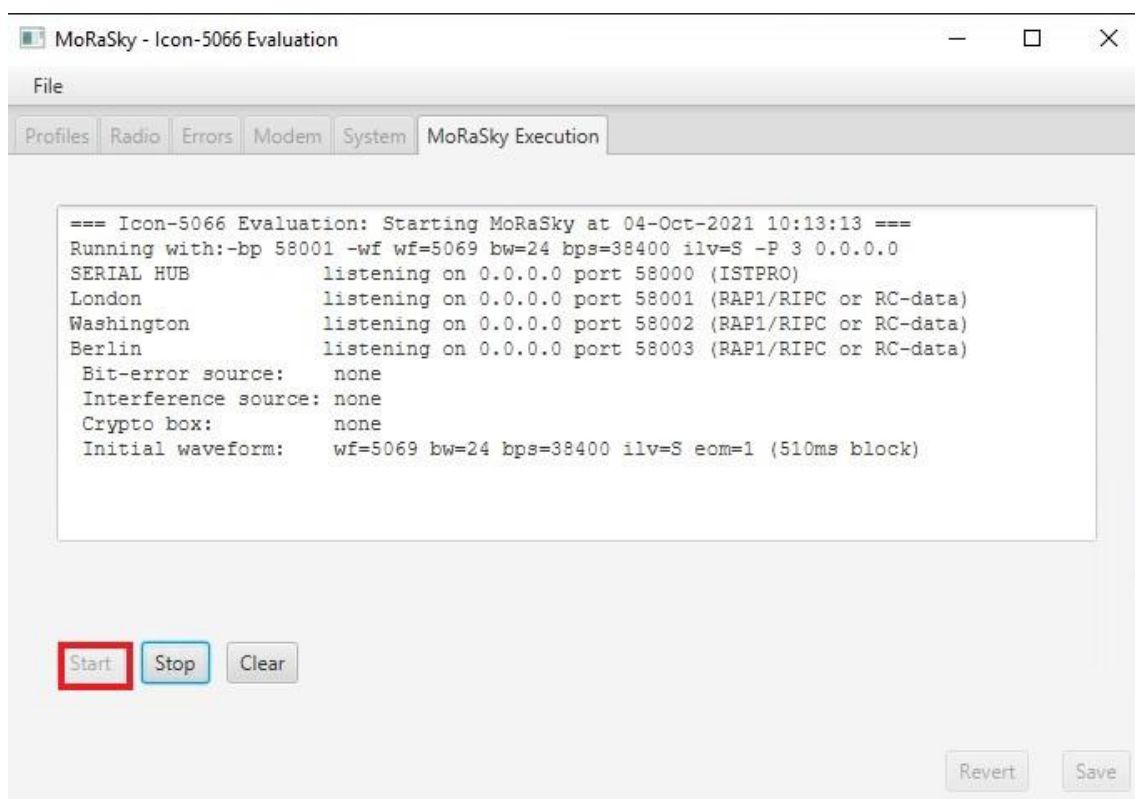
Acknowledge the “Profiles Saved” information dialogue.

Select “MoRaSky Execution” tab :

## MoRaSky Execution tab



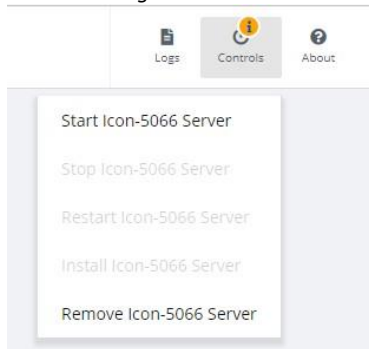
Press “Start” and note MoRaSky listening on ports 58000 – 58003.

*MoRaSkyExecution*

On Linux you should now install the “Icon-5066 Core Protocol Server” service by clicking on the “Controls” icon in the top right of the configuration UI and selecting [**Install Icon-5066 Server**]. This last step is not needed on Windows.

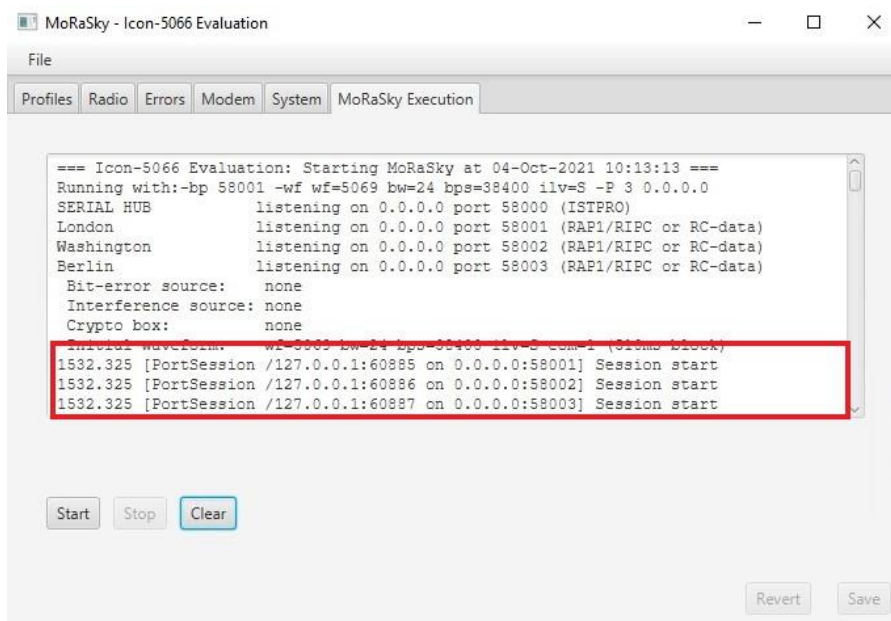
You can then start the service by selecting [**Start Icon-5066 Server**] from the same location.

## Server Management



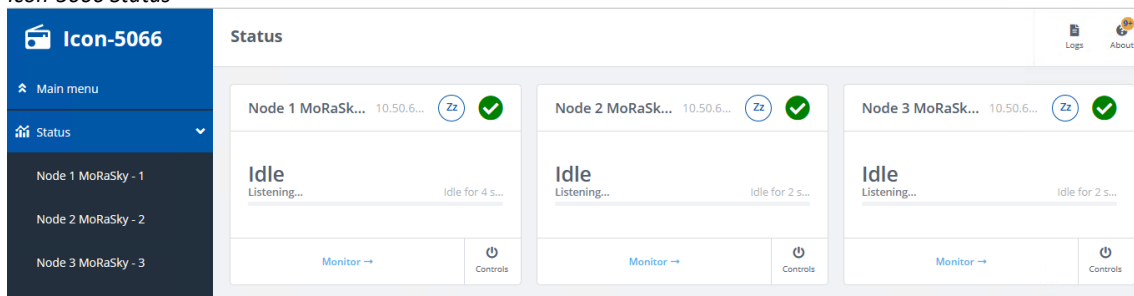
You'll see the nodes connect, as below:

## Connected Nodes



In the Icon-5066 Console, select “Status” and all three nodes should appear.

## Icon-5066 Status



Press “Monitor” under “Node 1 MoRaSky” to see a description of the node status including the current state of the “Wireless Token Ring”.



## Node 1 Status

The screenshot displays the 'Node 1 Status' interface for 'Node 1 MoRaSky - 1 (10.50.66.0)'. The interface includes a sidebar with navigation options like 'Main menu' and 'Status', and a main content area with several panels:

- Current status:** A table showing various system metrics:
 

<b>Modem</b>	Speed: n/a	Interleaver: n/a	Waveform: n/a
<b>ALE</b>	Bandwidth: n/a	Setup time: n/a	Attempts: n/a
<b>Radio</b>	Frequency: n/a	Power: 4 dBm	PA type: n/a
- Device health:** Shows health indicators for '/modem' and '/ratechg', both with green checkmarks.
- Recent activity (10s):** A table showing activity metrics:
 

Volume: n/a	Utilization: n/a
Good data: n/a	Bad data: n/a
Error rate: n/a	
- Wireless Token Ring (IDL):** A diagram showing a token ring network with three nodes: 'local node' (10.50.66.0), 10.50.66.2, and 10.50.66.1. A blue arrow indicates 'Token transferred' from the local node to 10.50.66.2. A red dotted arrow indicates 'Token transfer pending' from 10.50.66.2 to 10.50.66.1. The text above the diagram states: 'Local node waiting for right to transmit. Last timeout: TPST (10/4/2021, 10:55:41 AM)'. A legend at the bottom explains the arrow types.

It may take a short amount of time for the “Wireless Token Ring” to appear exactly as in the above image.

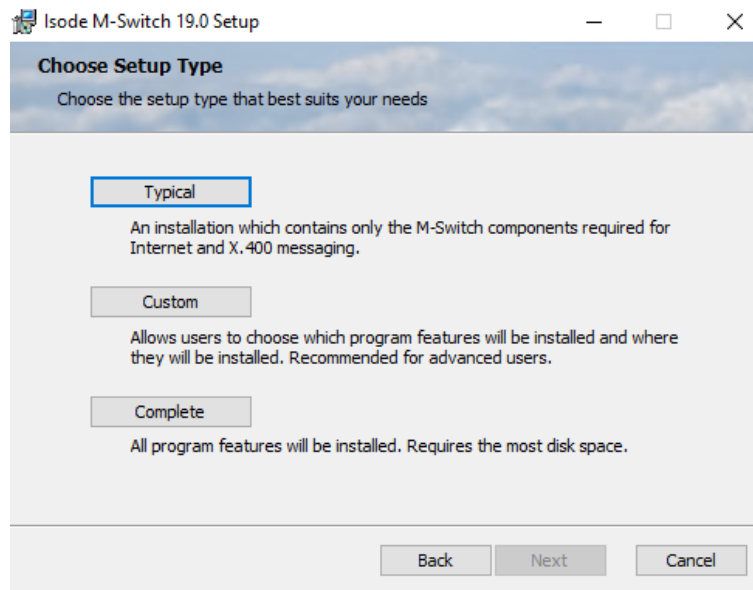
## Testing the Configuration with the S5066 Console

To test that the three nodes connect, we're going to use the S5066 Console, which is installed as part of Isode's M-Switch MTA.

### Install the S5066 Console

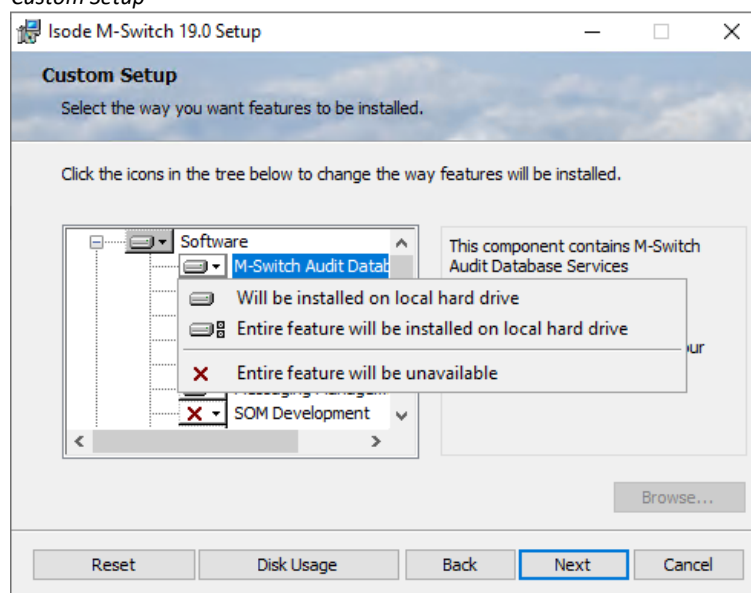
Start the M-Switch installer and, when asked for a Setup Type, choose [Custom]

#### Custom M-Switch Installation



In the **Custom Setup** screen disable all of the features except for “Messaging Graphical Tools” and “Messaging Management Tools” by selecting, for every other option, the “Entire Feature will be unavailable” option.

#### Custom Setup

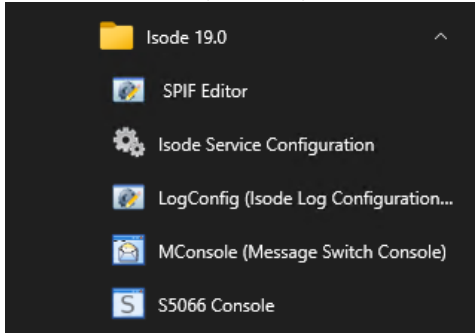


Click “Next” on this screen and “Install” on the next. On the “Completed” screen click “Finish”.

## Start the S5066 Console

Start the S5066 Console on Windows by selecting it from the menu

*Start S5066 Console (Windows)*



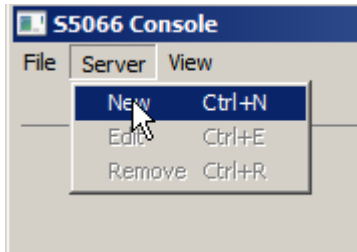
To start S5066 Console on Linux, run the command:

```
# /opt/isode/bin/s5066console
```

## Configure the S5066 Console

From the main S5066 Console screen select “Server > New”.

*Add new Server*



In the **New S5066 Server** screen enter the following details:

- Friendly Name: Icon 5066 Node 1
- Hostname: localhost
- Port: 5066

Tick the "Auto-discover" Checkbox and then click [OK].

## Configuring Node 1 in S5066 Console

Edit S5066 Server ✕

Friendly name:	Icon 5066 Node 1		
Hostname:	localhost		
Port:	5066		
Broadcast address:	31	255	255
Auto-discover:	<input checked="" type="checkbox"/>		
Throughput test PDU size:	500		
Bind timeout (milliseconds):	1000		
Rank:	0		
Transmission mode:	Broadcast		
	Ignore		
	ARQ		
Data delivery confirmation:	Node confirmation		
	No confirmation		
	Node confirmation		
Delivery order:	As they arrive		
	In order		
	As they arrive		
Extended field:	Not extended		
	Extended		
	Not extended		
Number of retries:	0		

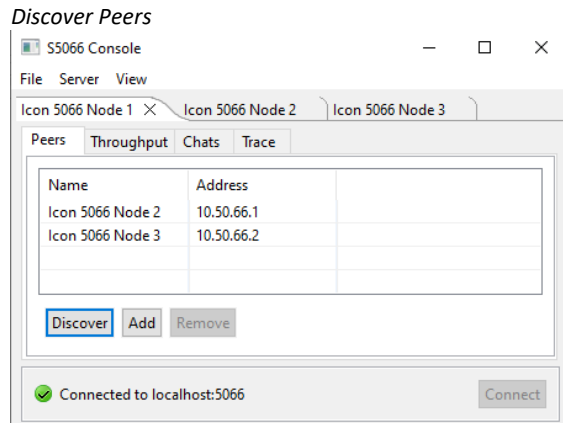
Now repeat this New Server process for Node 2 and 3 , using the details that follow:

- Friendly Name: Icon 5066 Node 2
- Hostname: localhost
- Port: 6066
  
- Friendly Name: Icon 5066 Node 3
- Hostname: localhost
- Port: 7066

The three nodes will now appear as separate tabs in the S5066 Console.

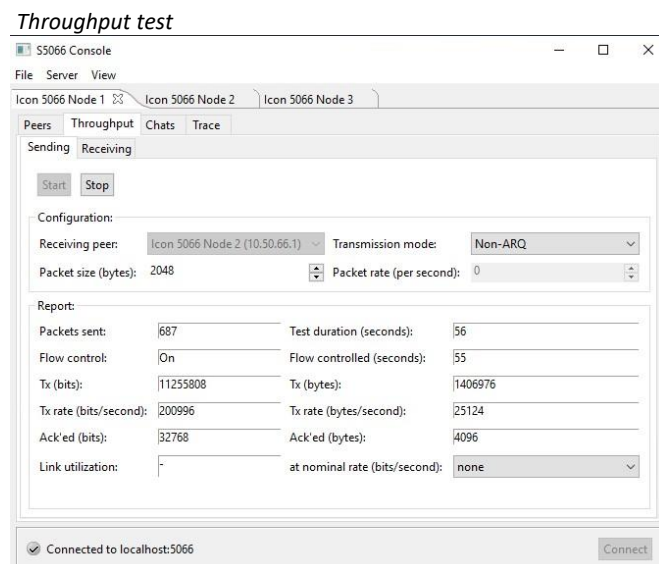
## Testing with the S5066 Console

Clicking “Discover” on the Node 1 tab will allow you to see Icon 5066 Node 2 and Icon 5066 Node 3 on the Icon 5066 Node 1 tab and Icon5066 Node 1 on the Node 2 and Node 3 tabs.



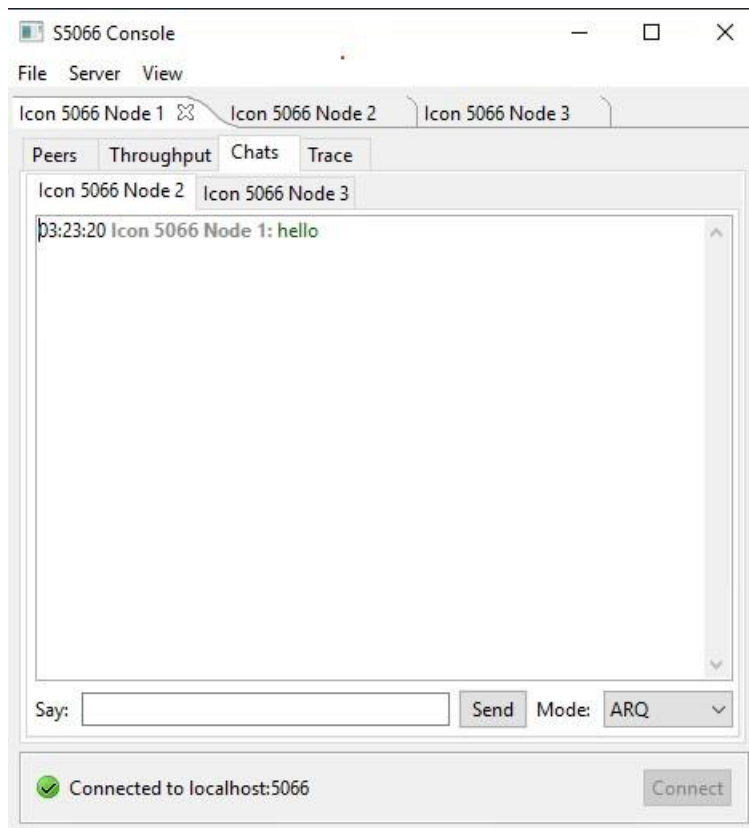
Changing to Icon 5066 Node 3 tab and clicking “Discover” will result in the “Icon5066 Node 3” tab showing “Icon 5066 Node 2” and the remaining two tabs showing “Icon 5066 Node3”. Now each node in the S5066 Console has the ability to communicate with the other two nodes.

You may like to show that the connectivity exists by running a throughput test. Select a node (in image 43 – Icon 5066 Node 1) , select the “Throughput” sub tab, pick a “receiving peer” in the dropdown and click “Start”. The GUI reports pertinent link statistics.

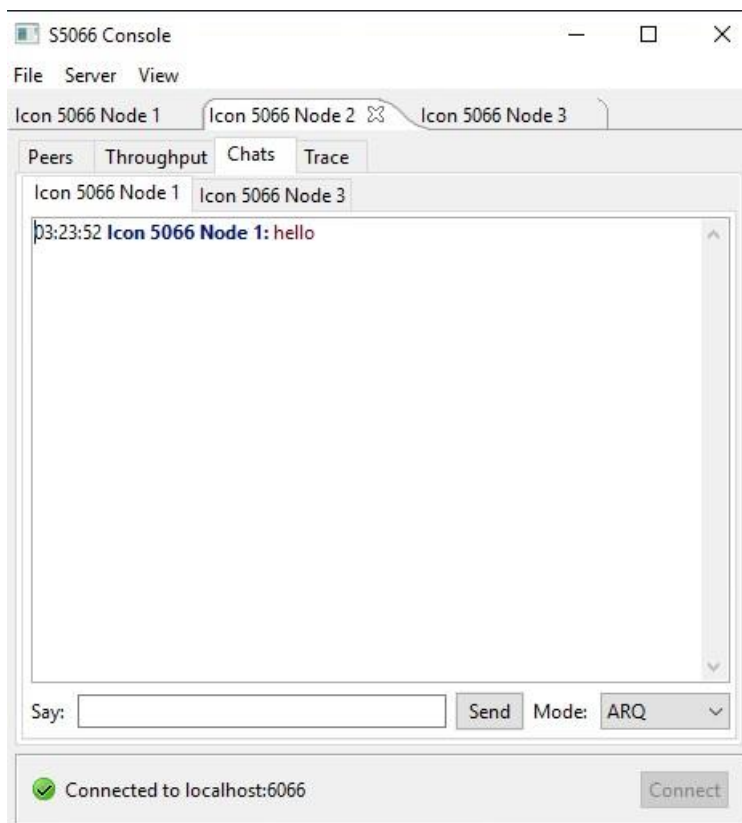


You may also like to use the operator chat functionality to message between nodes. Type your message in the “say” box and press “Send”.

## Send Operator Chat Message from Node 1



## Receive Operator Chat Message at Node 2



## What Next?

More information on Icon-5066 can be found on the Isode website at [www.isode.com/products/icon-5066.html](http://www.isode.com/products/icon-5066.html).

## Whitepapers

Isode regularly publishes whitepapers on technical and market topics related to its products. A full list of these can be found at [www.isode.com/whitepapers/](http://www.isode.com/whitepapers/).

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