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More Weak Signal Q's and less Blues with some help from ROIP

Steve Sedgwick_WB8GRS

April 6, 2013

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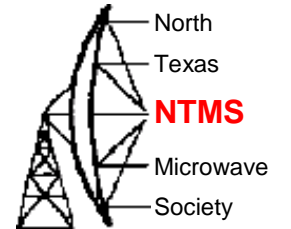
So What's Needed to make a Two-Way Weak Signal Contact?

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A Good Line-of-Sight Location

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A Tall Tower

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A High Gain Antenna

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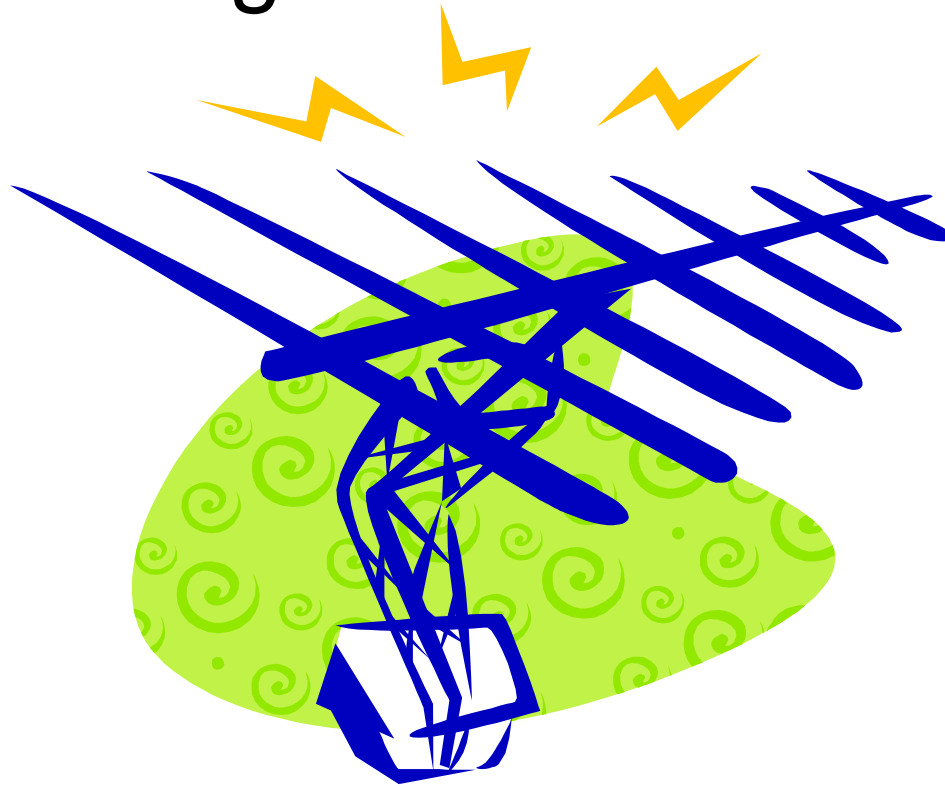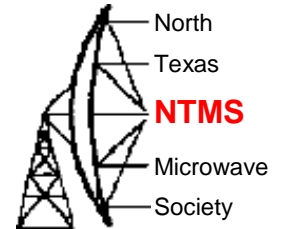
The Lowest Noise LNA

A Low Loss Feedline

A High Power Amplifier

A Well Designed Transverter

The Latest and Greatest Radio

Yes, all these help….

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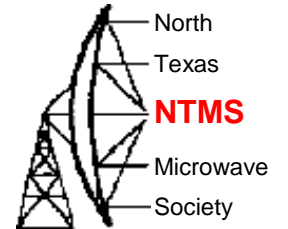**NTMS**
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So What's Missing?

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Hours Later

cq, cq, cq, cq

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Someone to Talk Too !!!

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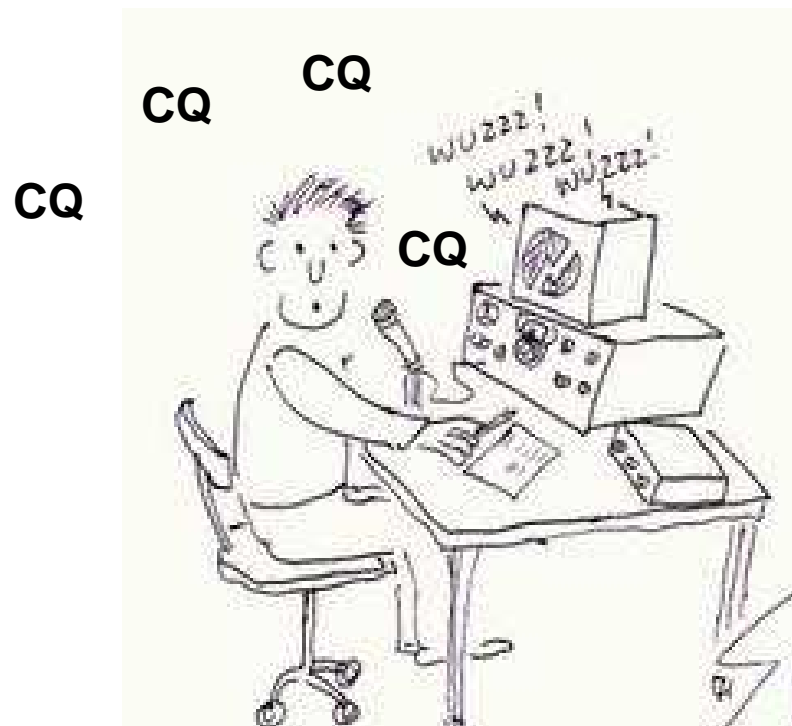
What Are Some Ways to Find Someone to Talk Too?
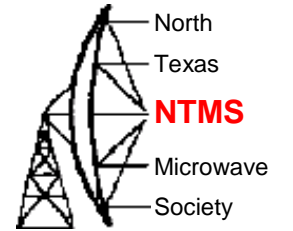
Listen, Tune, listen, tune, listen, tune
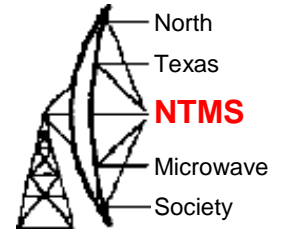
Call CQ, CQ, CQ, CQ, cq, cq, cq, cq

Make a Phone Call

Send an Email or Text

Wait for the next Net Night

Add your own here_____

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There is Another Way!

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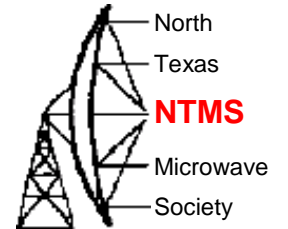
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What if we Leveraged Existing Technology as a Tool that

Connected Weak Signal Operators and Groups together instantly

Allows us to make more Q's

Provides a way to exchange technical knowledge / idea's

Generates interest and excitement

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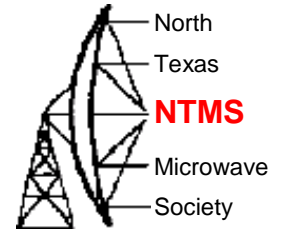
What if this Technology

was low cost, you may already have what you need

was easy to implement and fun to build

only needs a small group to make it useful AND

could be expanded locally, statewide, nationally, even internationally…

was a club project

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So what is the marvelous technology?

ROIP

(Radio Over IP)

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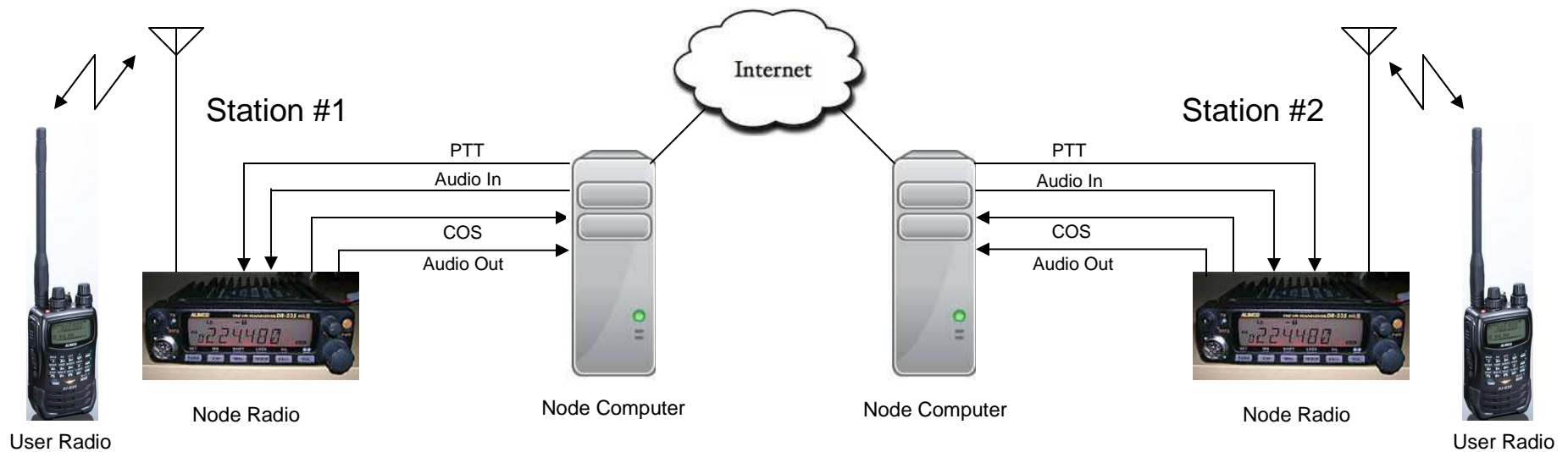Society

What Does ROIP Linking Offer?

Provides all the benefits outlines in the previous slides by allowing amateur radio operators to connect to each other in real-time using radios and hardware nodes interconnected via the internet

Interconnect ROIP and VOIP or voice over IP using computers, mobile phones, even POTs are possible, **but can also be restricted as desired**

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ROIP Connections can be made in Many Ways?

➤ One operator directly to another operator using simplex nodes

Station #1

PTT
Audio In
COS
Audio Out

Internet

Station #2

PTT
Audio In
COS
Audio Out

Node Radio

Node Computer

Node Computer

Node Radio

User Radio

User Radio

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How are ROIP connections made?

➢ Many operators to many operators using simplex nodes
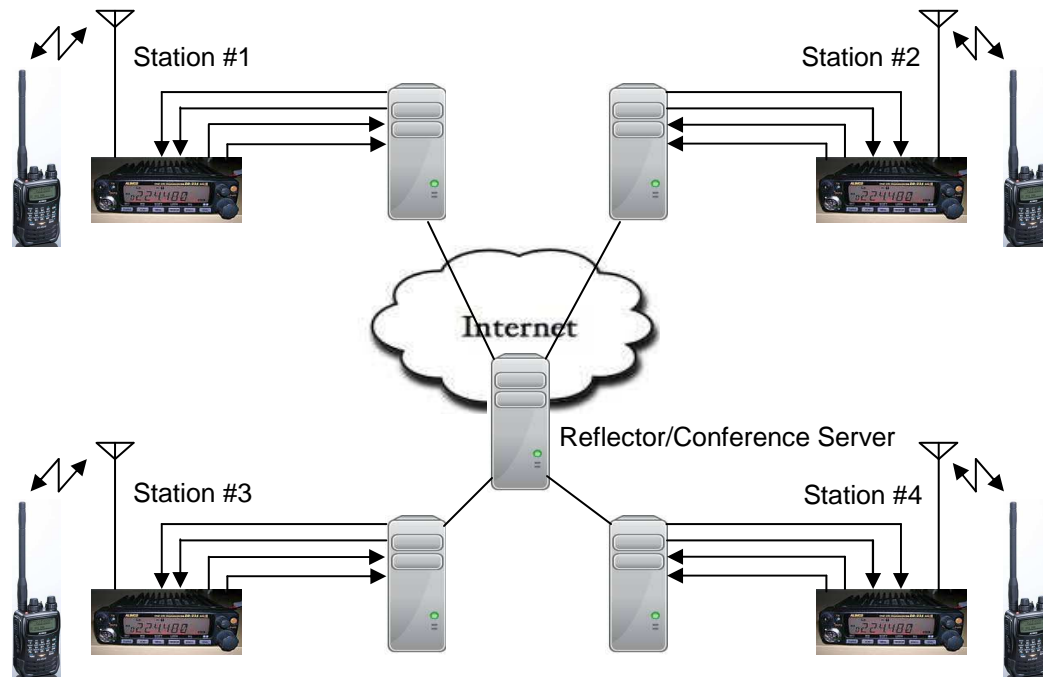
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How are ROIP connections made?

➢ Many operators to many operators using a combination of simplex nodes and FM repeaters with nodes

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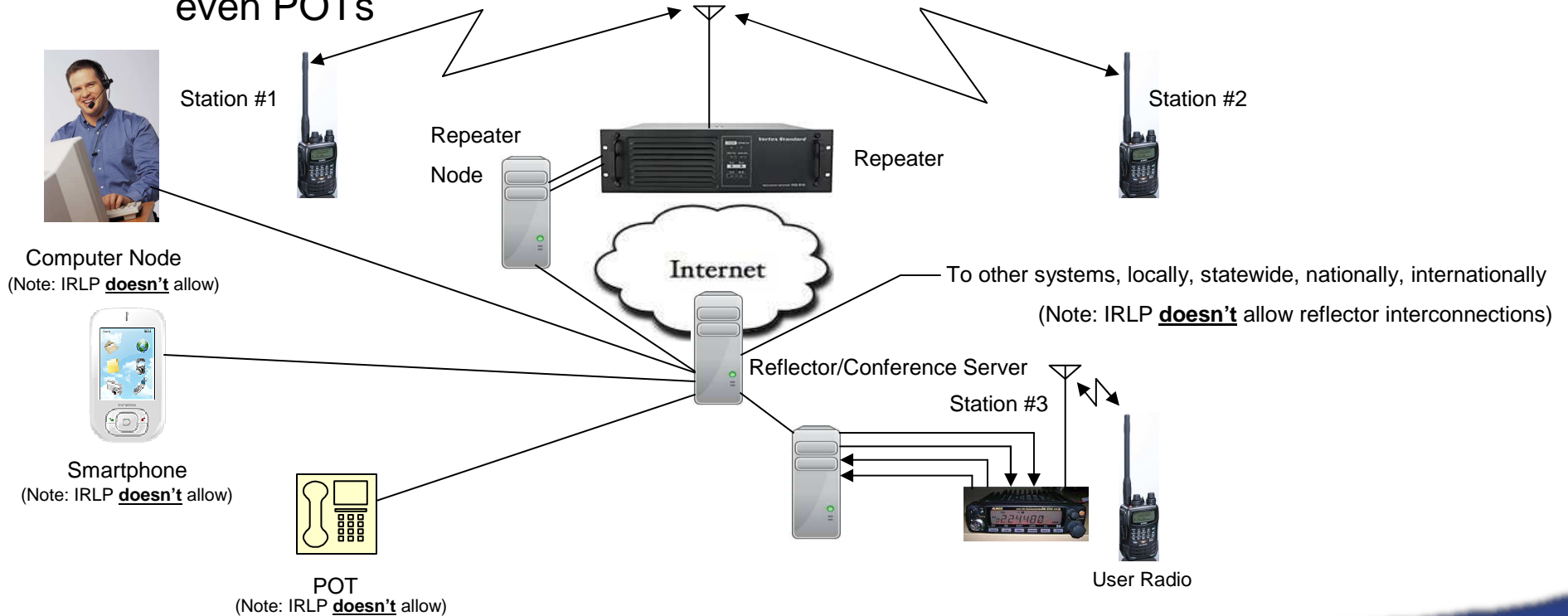**NTMS**
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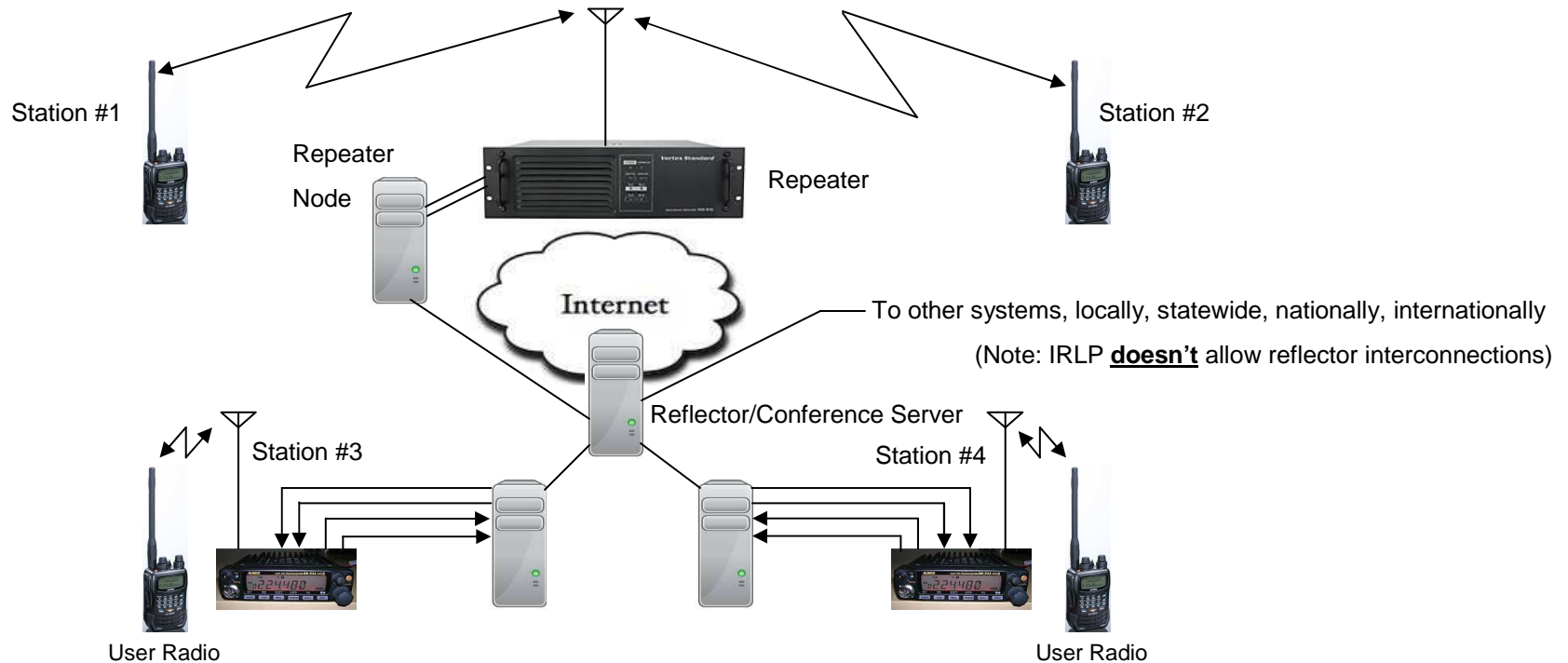
How are ROIP/VOIP Connections Made?

➤ Many operators to many operators using a combination of simplex nodes, FM repeaters with nodes, Computer nodes, Smartphone's, even POTs

Station #1

Repeater
Node

Repeater

Station #2

Computer Node
(Note: IRLP **doesn't** allow)

Internet

To other systems, locally, statewide, nationally, internationally

(Note: IRLP **doesn't** allow reflector interconnections)

Reflector/Conference Server

Station #3

Smartphone
(Note: IRLP **doesn't** allow)

POT
(Note: IRLP **doesn't** allow)

User Radio

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What Makes up a Typical ROIP User Node?

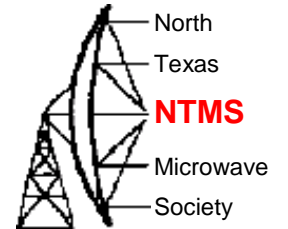Standard x86 computer (the type normally used with Windows)

Computer should be P4 or faster

Linux or Windows operating system depending on the node linking program

Soundcard to receive and send audio between linking radio and Internet

Hardware interface between radio and computer

DSL / Cable / broadband internet connection
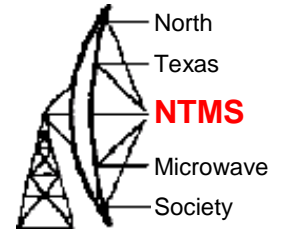
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What Makes up a Typical ROIP Repeater Node?

Same basic requirements as a user node, except the user node radio is replaced with a repeater

Typically a repeater is located at a remote site. For stability, a newer, fanless computer is a better choice

Repeater sites without internet access can be linked using a remote base node located at a site with internet access (typically a user home)

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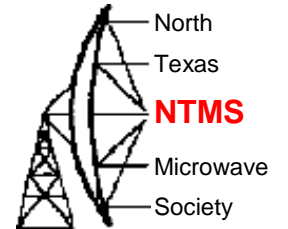# What Makes up a Typical Reflector/Conference Server/Hub?

First off, different ROIP linking programs have different names for the ROIP server. More on this in a minute

A Reflector, Conference Server or Hub all perform the same function.   They allow multiple nodes to be connected together at the same time

A typical server is nothing more than an x86 computer. For stability, a newer, fanless computer is a better choice

There is no radio or antenna connected to the server, so the server can be located anywhere a constant-on high speed broadband Internet connection exist

Many of the larger ROIP servers are located inside a data center, but many are also located at someone home that has a fat internet pipe…

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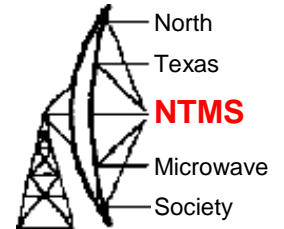
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What are the different ROIP Programs / Solutions?

There are several different ROIP programs to choose from:

IRLP, Allstar and Echolink are the most popular

There is also: Wires II (Yaesu), EQSO & Hamsphere

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IRLP (Internet Radio Linking Project) Node Overview

Uses X86 computer with parallel port and sound card as node computer (1)

Uses a modified version of the Linux operating system

Node owner required to register and purchase "radio to computer interface hardware" to acquire node number (cost helps offset DNS server cost)

Users and node owner access the system via radio only (no PC, phone or Smartphone access)

Node access is controlled via DTMF codes

A node can link to other nodes directly
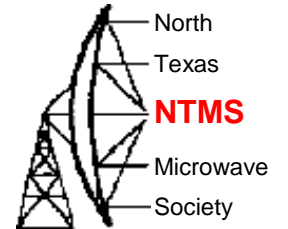
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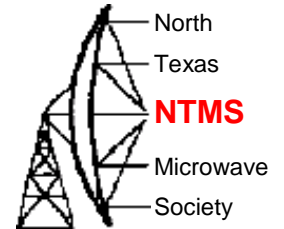
IRLP (Internet Radio Linking Project) Node Overview

To link more than two nodes requires nodes to connect through a reflector server

IRLP supports one node per pubic IP address. For example, you cannot run two IRLP nodes without acquiring a second pubic IP from your Internet provider

If the node is located behind a router/firewall, a few ports must be opened in the router/firewall during operation

note 1: A Raspberry Pi version is currently being tested

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Allstar Node Overview

Uses X86 computer with USB port

Uses modified version of the Linux operating system

Uses modified, low cost USB sound dongle to interface between radio and computer

Node owner required to register to receive free node number

Users access to the system is via radio only

Registered node owner can access the system via radio, PC web-transceiver and POT

Node access is controlled via DTMF codes

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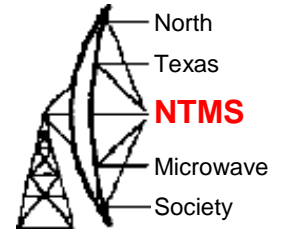**NTMS**
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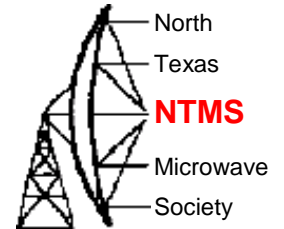
Allstar Node Overview

A node can link to other nodes directly

A node can connect to more than one node **<u>without</u>** going through a hub. The only limitation is Internet bandwidth

AllStar can be configured to also connect to Echolink and AllStar nodes simultaneously. This allows Echolink nodes and Echolink Smartphone app to work on AllStar

If the node is located behind a router/firewall, a few ports must be opened in the router/firewall during operation

AllStar support as many nodes per one pubic IP address as Internet bandwidth allows

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Echolink Node Overview

Uses X86 computer with soundcard and serial port
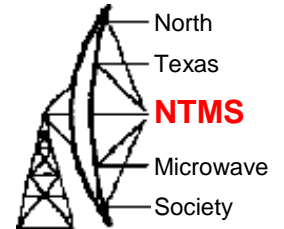
Uses standard Windows operating system (1)

Node owner required to register to receive free node number

Users access to the system is via radio only

Registered node owner can access the system via radio, PC and Smartphone app

Node access is controlled via DTMF codes

A node can link to other nodes directly

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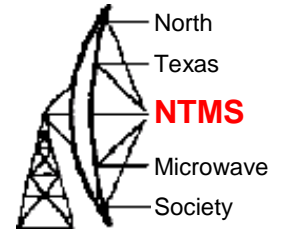**NTMS**
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Echolink Node Overview

To link more than two nodes requires nodes to connect through a conference server

Echolink allows three types of nodes for each callsign. For example, WB8GRS-R for repeater, WB8GRS-L for link and WB8GRS for a normal computer or Smartphone user. Three is the maximum

Echolink supports one node per pubic IP address. For example, you cannot run two Echolink nodes without acquiring a second pubic IP from your Internet provider

If the node is located behind a router/firewall, a few ports must be opened in the router/firewall during operation

Note 1: EchoMac for Mac and Echolink for Linux are available, but are not supported by Echolink developers
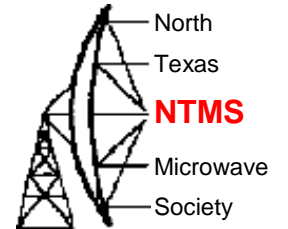
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Summary

I use ROIP everyday. I use it to stay in-touch, exchange technical information, talk about new projects, etc with ham friends that have a small network of ROIP connected repeaters and simplex nodes in Ohio, Montana, Arizona, North Carolina and Texas. My main simplex node is on 145.76 MHz, 123pl. It's a low profile node that is open to all user. You can also listen at http://www.nw7rg.org/ . Click on the "live link" button.

ROIP is a great TOOL that we can use to help make more contacts, exchange technical knowledge / idea's, generates interest and excitement, and yes, just chew the fat from time to time

Grab that old 2 meter radio and retired computer out of the closet, buy a $12 dollar USB sound dongle, wire it up, load some software and get your node running.

It won't happen overnight, but if enough club members build and use nodes, spread the word about it's benefits, it will grow…

Links to Additional Information

AllStar - https://allstarlink.org/
AllStar USB Interface - http://www.qsl.net/kb9mwr/projects/voip/usbfob-119.pdf

IRLP - http://www.irlp.net/

Echolink - http://www.echolink.org/

K5TRA 927 MHz Repeater Presentation – http://www.k5rmg.com/ click on the presentations tab to see K5TRA's 927 Mhz Repeater Presentation

Google AllStar, IRLP & Echolink will provide days worth of reading

Thanks to Neal, NG8Y for helping me with this presentation

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