# Introduction to AllStar

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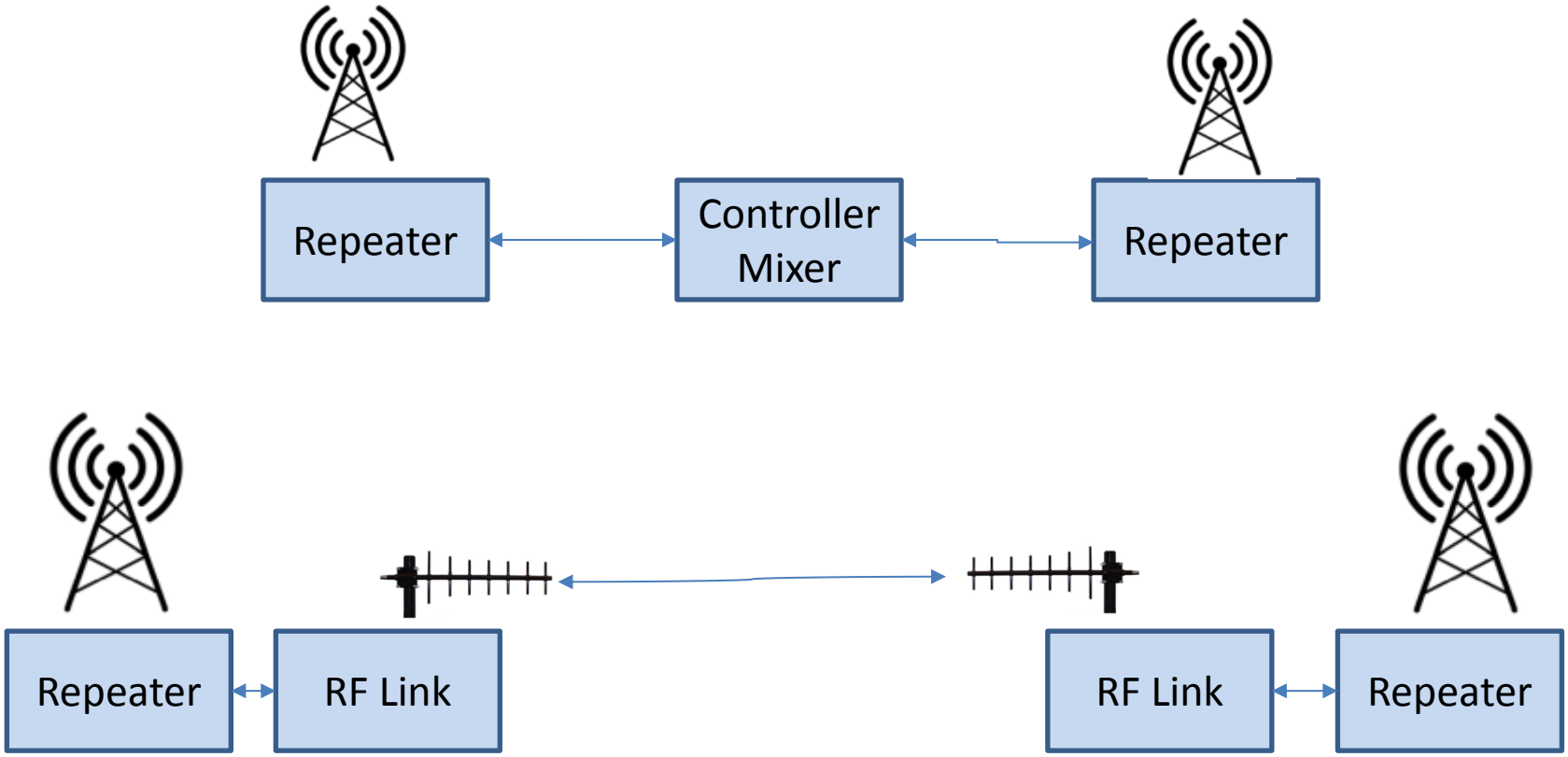
Sept 9, 2022

# Repeater Linking - Analog

Analog

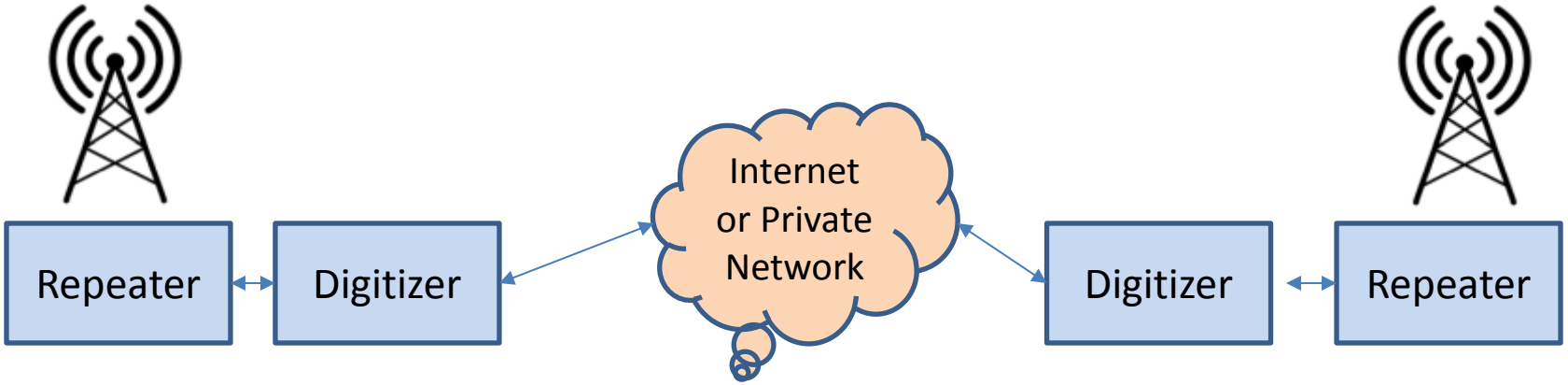
- Co-located repeaters using physical cables between them
- Separated repeaters with an analog RF link



# Repeater Linking - Digital

Digital (ROIP – Radio Over IP)

- Generally uses the internet to connect repeaters but can be linked over a private network (AREDN* for example)




*AREDN – Amateur Radio Emergency Data Network

# Pros and Cons of Linking Over the Internet

Pros

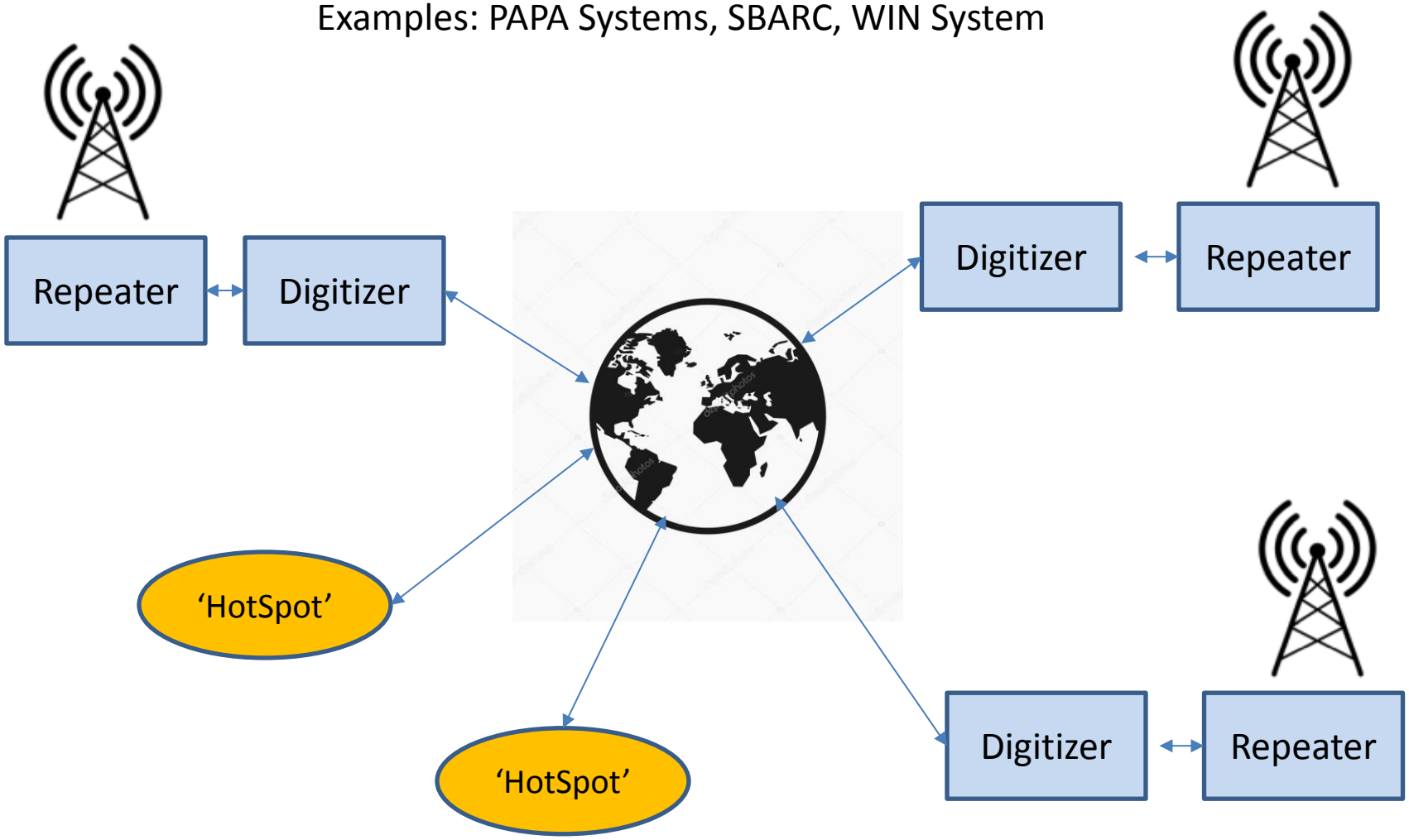
- Distance between repeaters is no longer an issue
- Links managed easily
- Multiple links could be made without additional hardware
- Repeaters can be accessed without a radio

Cons

- Internet linked repeaters become standalone when internet is down
- Internet quality can cause audio problems (delays, dropped or garbled audio)

# Multiple Digital Links via Internet

Examples: PAPA Systems, SBARC, WIN System



# What is AllStar ?

AllStar is a digital way to link 2 or more repeaters together

- High quality audio, support many different codecs
- Supports full duplex operation
- Free, open source software
- Uses inexpensive hardware (Raspberry Pi)
- Extensive linking capability
- Linking control is easily made via the radio or web page
- Full repeater control built in
- Repeater can be configured as open, closed or private

# AllStar is Based on Asterisk

From Wikipedia:

> **Asterisk** is a software implementation of a private branch exchange (PBX). In conjunction with suitable telephony hardware interfaces and network applications, Asterisk is used to establish and control telephone calls between telecommunication endpoints, such as customary telephone sets, destinations on the public switched telephone network (PSTN), and devices or services on voice over Internet Protocol (VoIP) networks.

- Started in 1999, Asterisk has become a very popular, powerful PBX software
- Asterisk is rich with features, supports many codecs

# How Did AllStar Start ?

Jim Dixon WB6NIL (SK) and Steve Rodgers WA6ZFT wrote an extension to Asterisk to provide hardware control of repeaters

From https://wiki.allstarlink.org/wiki/ASLCorporate:History

*From its very onset, I saw that Asterisk was not only a good telephony switch, but also makes a good application implementation platform for virtually any telecommunication application that requires use of many of the things that Asterisk provides.*

*App_Rpt was started, not only to demonstrate this feature of Asterisk, but to essentially provide an outlet of nearly 30 years of experience and frustration with repeater and remote base systems, in the form of designing a system essentially "the way I think a system should be." – Jim Dixon*

# Compared to Other Digital Linking Solutions

Echolink

- Half duplex only
- Lower audio quality
- Not open source
- Easy to use, but usually phone or PC based
- Personally I find the audio delays unbearable.  Also app users cannot key up until the repeater drops the carrier

IRLP

- Not open source
- Specialized hardware required
- Originates from the radio only (no web access)
- Limited linking capability

# AllStar Nodes 26,000 Users, 25,000 Nodes

# “Why Would I Care About AllStar?”

Use repeaters you cannot normally access

- In a bad location?  Want to talk to someone in another state or country?

Participate in nets or connect to hubs outside of your local repeaters

- BlindHams, Hawaiian Hub, East Coast Reflector, Philadelphia Hub

Keep in touch with your local repeater when away from home

- Just need an internet connection and it’s as if you’re home

# AllStar vs DMR?

Similarities

- Need to be connected to another source to be useful
- Allow you to talk over great distances

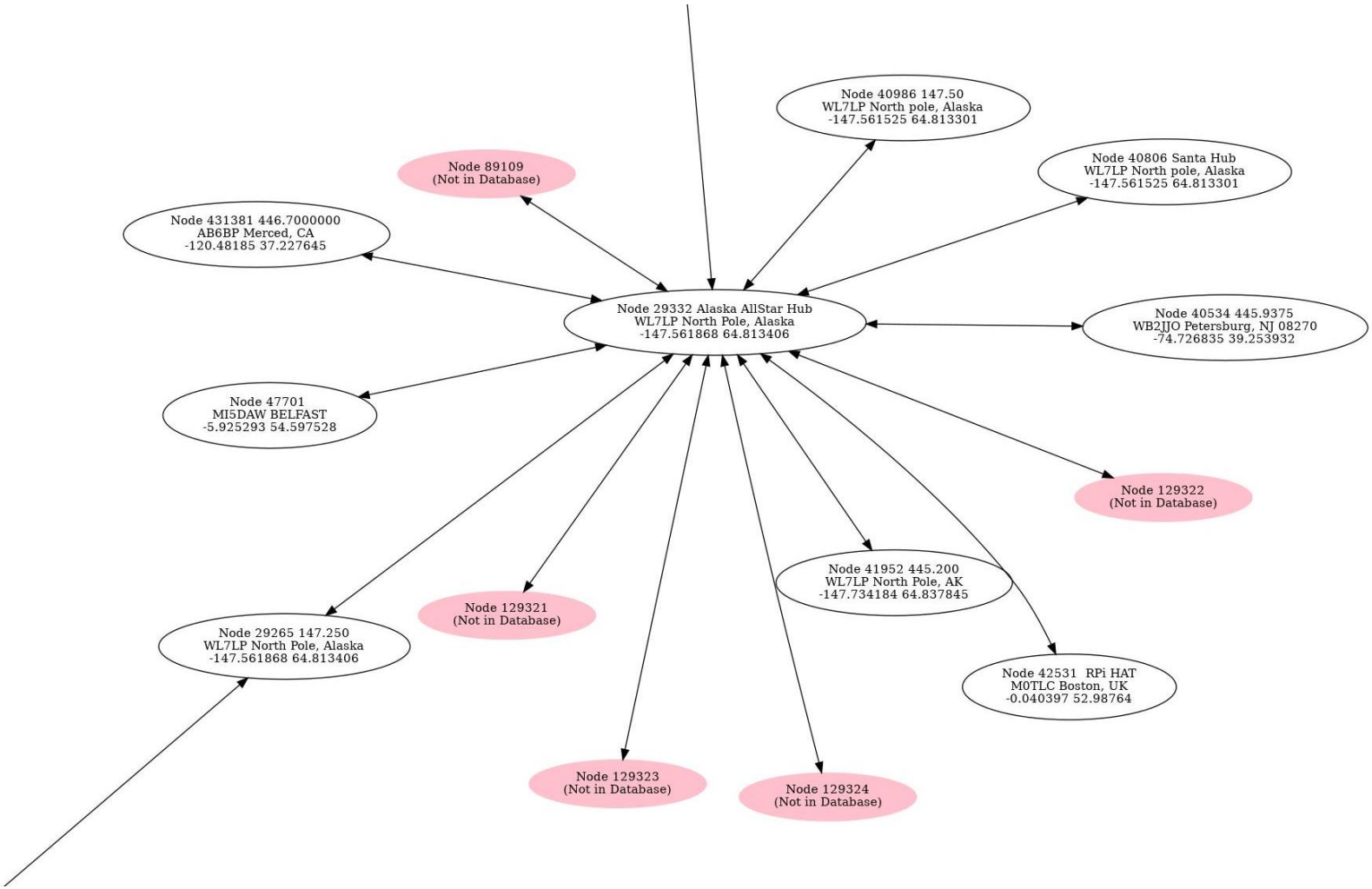
AllStar Pros

- Use radios you already have
- Audio sounds better (it's wide FM)
- Personal nodes/hotspots have less issues
- Possibly greater audience since it is analog FM at the repeater

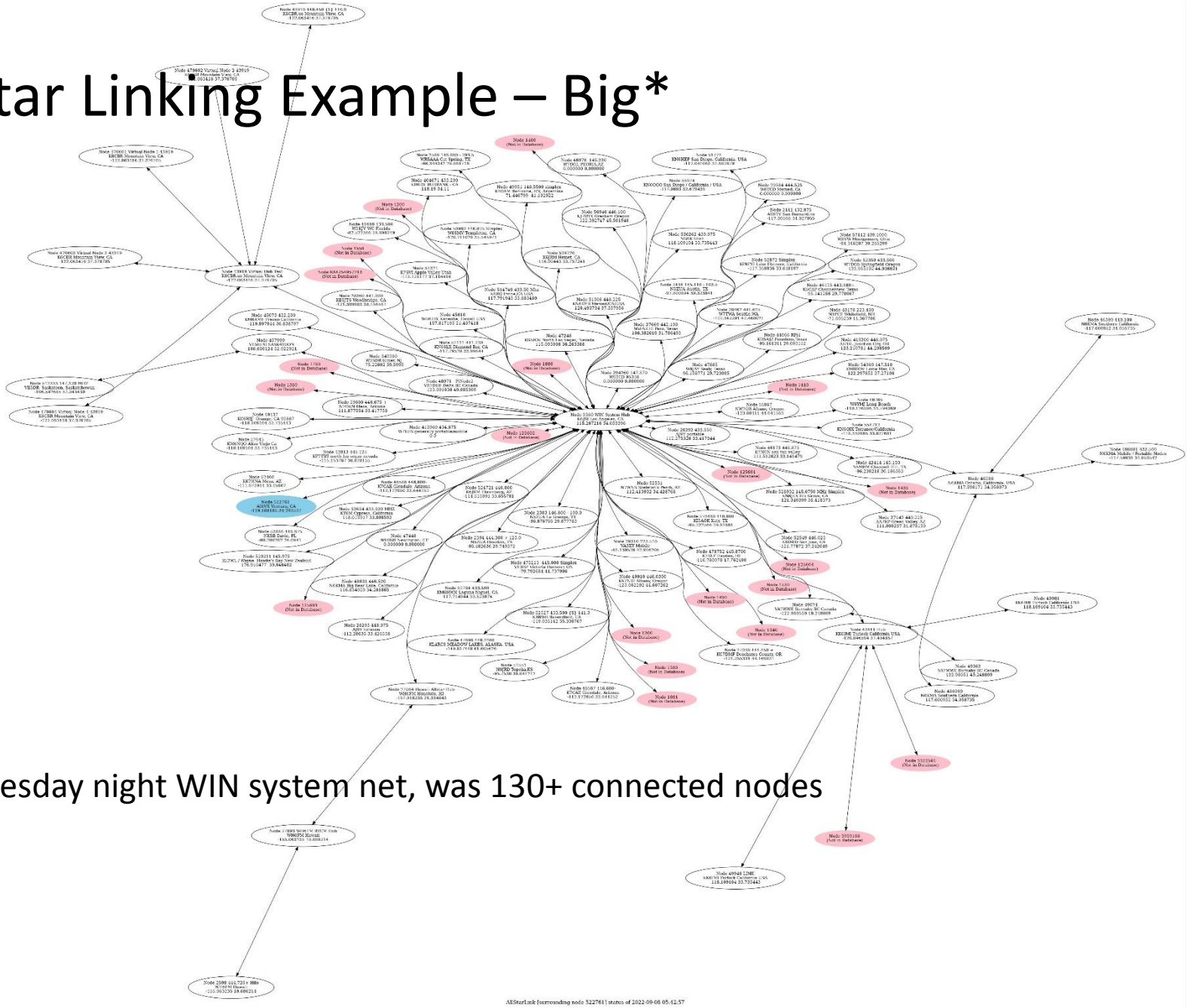
DMR Pros

- Thinking. . . .

# AllStar Linking Examples – Small (Alaska Hub)



# AllStar Linking Example – Big*



*Wednesday night WIN system net, was 130+ connected nodes

# AllStar Access – RF AllStar Capable Repeater

Repeater RF Accessible and ‘Open’ (Configurable)

- Use the radio you have and control the repeater using DTMF tones.

Example using SBARC’s 446.400 AllStar Repeater

- *2 + AllStarLink node = Connect AllStar Link in monitor-only mode
- *3 + AllStarLink node = Connect AllStar Link in transcieve mode
- *1 + AllStarLink node = Disconnect AllStarLink
- *10 = Disconnect most recent AllStarLink
- *4 + node = Enter command mode on a remote node
- *70 = Speak local connection status
- *71 = Disconnect all links (AllStarLink)
- [acknowledged by two short beeps]

# AllStar Access - Fully Built Personal Node

Really only 1 option - ClearNode https://www.node-ventures.com/ ~$350

- Built in RF radio
- Custom App uses AWS for coordination
- Can be operated wired or wireless to Internet
- Affected by Raspberry Pi shortages

# Personal AllStar Node - Kits

Best selection from Ham Projects [https://hamprojects.info/](https://hamprojects.info/)

- Adapters for a ‘bring your own transceiver’ node/repeater
- Self contained RF based nodes ($65-$80)
- You supply the Raspberry Pi

# Personal AllStar Node – DIY From ‘Scratch’

Radio-Less (Full Duplex)

- Very specific USB Headphones ($15)
- USB Sound Card + Mic and Headphones ($7)

Radio Based Half Duplex

- USB Sound Card + single HT ($7 + HT price)

Radio Based Full Duplex

- USB Sound Card + 2 HTs ($7 + 2 HTs)

**CM108 USB Drive Free USB Sound Card Laptop Computer External Sound Card Module**

Condition: New

Quantity: 1 More than 10 available
510 sold / See feedback

Price: US $3.30

Buy It Now

Add to cart

Add to Watchlist

510 sold | Returns accepted | 11 watchers

Shipping: US $3.00 SpeedPAK Standard | See details
International shipment of items may be subject to customs processing and additional charges.
Located in: 深圳, 廣東省, China

# Creating Your Own AllStar Personal Node

- Buy your parts!  (Pi's in short supply)
  - Modify USB soundcard if needed
- Register for an AllStar number at https://www.allstarlink.org/portal/register.php
- Download HamVoip* or AllStarLink software and write to microSD card
- Boot Pi from microSD card, configure your account settings
- Adjust software settings for COS (carrier detect) and PTT (push to talk)
- Adjust USB sound levels for your hardware
- Enable AllMon if you want to control your device from a webpage or app
- Connect to the internet

That's it!

*All my nodes are Hamvoip based

# Controlling Your Self-Built AllStar Personal Node

- Use DTMF Signaling from Mic
  - Poor success for me
- Use Allmon/Supermon
  - Web Based Configuration
  - Need to know your IP address
- Use a cellphone app
  - I use Node Remote
  - Need to know your IP address

# Supermon

522761 1999 All Nodes lsNodes IRLP Status HAMVOIP

Permanent

Connect | Disconnect | Monitor | Local Monitor | DTMF | Lookup | Rpt Stats | Bubble Chart | Control | Favorites

Configuration Editor | Iax/Rpt/DP RELOAD | AST START | AST STOP | RESTART | Server REBOOT | SW Update?

AllStar How To's | AllStar Wiki | CPU Status | AllStar Status | Node Info | Active Nodes | All Nodes

GPIO | Linux Log | AST Log | Connection Log | Web Access Log | Web Error Log | Restrict

[ AI6VX-522761 ] [ WAN IP: 104.32.0.132 ] [ WLAN IP: 192.168.78.166 ] [ AstP: 4568 ] [ MgrP: 5038 ] [ SShP: 222 ]
[ Thursday, September 8, 2022 PDT 22:47:07 up 15 days, 7:13, 0 users, load average: 0.71, 0.44, 0.38 ]

Display Configuration [ CPU: 132°F, 56°C @ 22:47 ]

[ Weather conditions for Ventura CA 93004: 70°F, 21°C / Mostly Clear ]

| *Private Node 522761 => Node not in database* lsNodes | | | | | | |
|---|---|---|---|---|---|---|
| **Node** | **Node Information** | **Received** | **Link** | **Direction** | **Connected** | **Mode** |
| **522761** | **Idle** | | | | | |
| 2560 | Node not in database | 000:00:47 | ESTABLISHED | OUT | 00:11:11 | Transceive |

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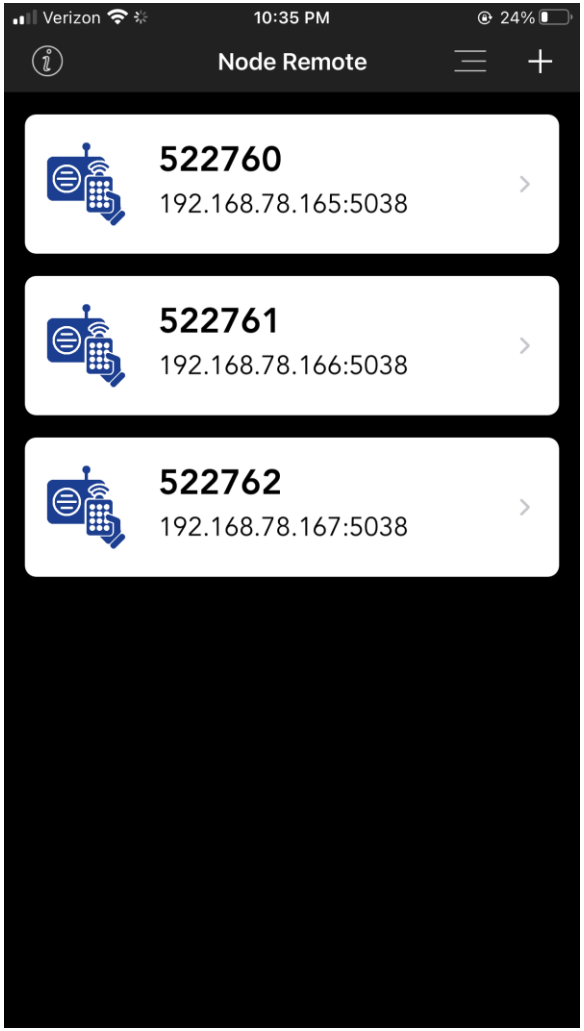
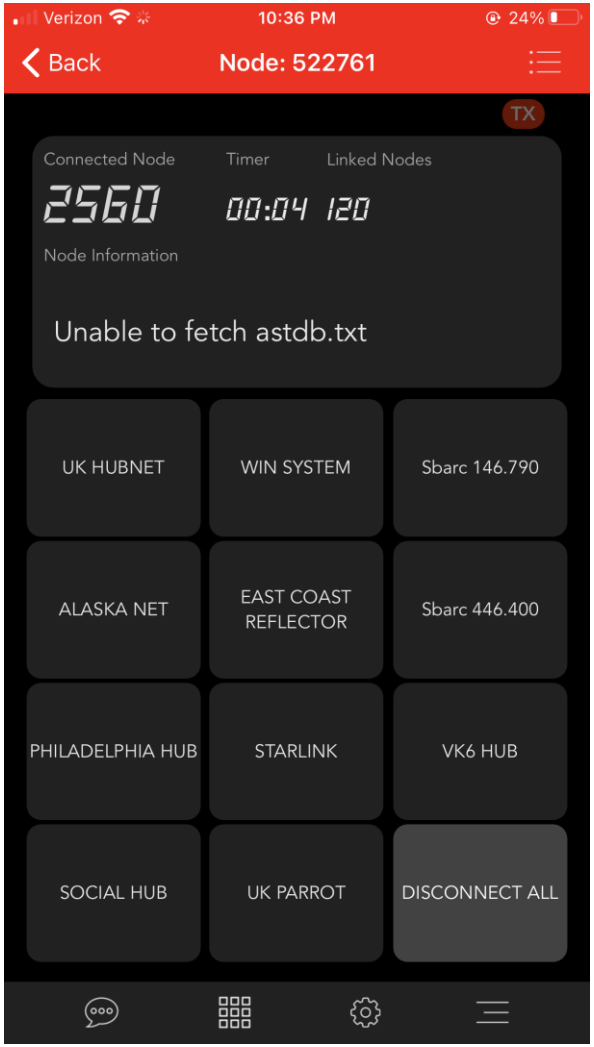
**System maintained by:** *David Schmidt, AI6VX-522761*

# Node Remote App



# Resources

- AllStarLink https://www.allstarlink.org/
  - Register for AllStar #, Pi image if you want to use AllStarLink based SW
- HamVoip https://hamvoip.org/
  - Source for HamVoip based Pi image
- ClearNode https://www.node-ventures.com/buy-clearnode/
  - Maker and seller for fully assembled ClearNode AllStar node
- HamProjects https://hamprojects.info/
  - Source for partial AllStar Kits (bring your own Pi, HT)
  - Also a good source for how to configure HamVoip
- AllStar Setup https://allstarsetup.com/
  - Modifying CM108 USB Sound Card
  - Modifying Baofeng 888
  - Configuring AllStar
  - Enabling Allmon