

BBHN HSMM

Amateur Radio Mesh Data Network

**An introductory talk by Peter 2E0PGS, Martin G7NSY and Rob 2E0RPT (via Video Link)
at The North Bristol Amateur Radio Club (NBARC)**

Contents

- 🌐 **What is BroadBand-HamNet (BBHN)**
- 🌐 **What is a Mesh?**
- 🌐 **Why BBHN? What is in it for me?**
- 🌐 **Demonstrations of Practical Use of BBHN**
- 🌐 **How do I get started?**
- 🌐 **Where do I get help?**
- 🌐 **BBHN Membership is FREE!!**

What is BBHN ?

- **BroadBand-HamNet (BBHN) was known as High Speed Multi-Media (HSMM) Mesh by ARRL**
- **High Speed 54 Mbps vs Packet 1200bps (45,000 x) 9,6kbps (5,625 x)**
- **Special Firmware based on OpenWRT (developed by HAM) that transforms consumer Wi-Fi Routers for specialised ham radio functions - Open Source! FREE!**
- **Channels 1-6 of Wi-Fi are within Ham Bands**
- **A Mesh Network - Data can be transferred at high speed. Over RF (on Microwave Bands)**
- **Standard TCP/IP Data Network with Automatic Configuration and Neighbor Discovery (OSLR)**

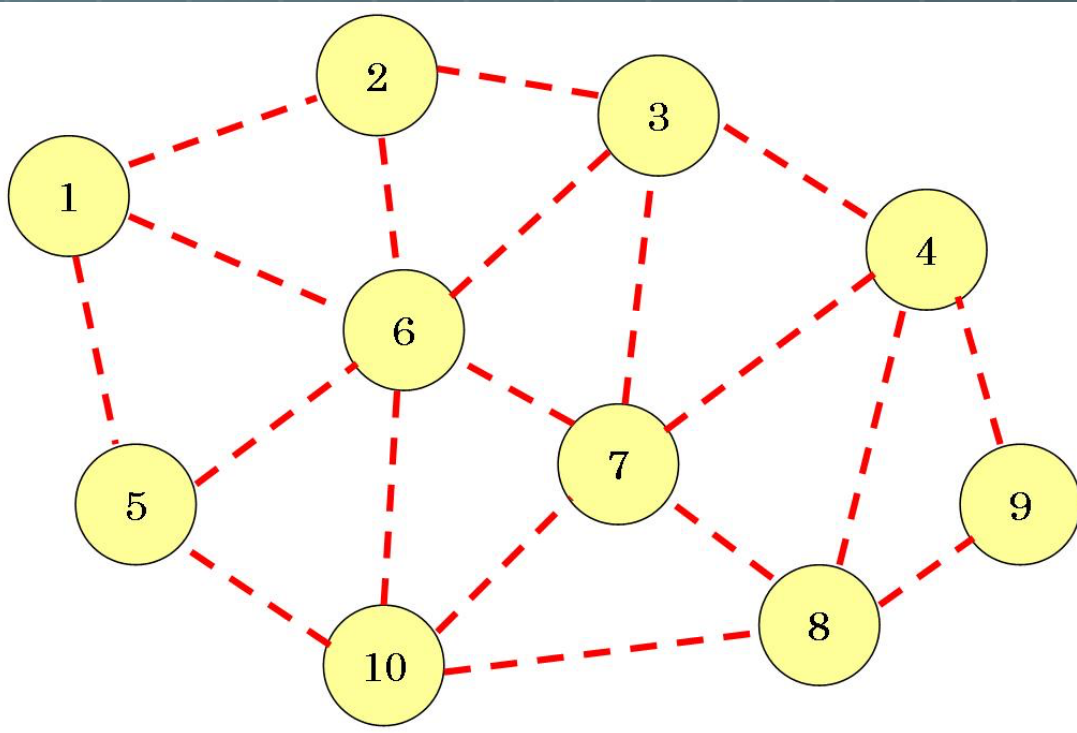


**LOW COST
HARDWARE**
Cheap to get
started in
Microwave
Communications

What is a MESH ?

Not Mesh (Mashed) Potato !!

A network made up of Inter-connected nodes over RF (or over other types of medium) allowing data to be sent from **ANY** one Node to **ANY OTHER** Node.



- Data can be sent directly between neighboring nodes
- Data can **ALSO** be sent via one or more “transit” node(s)

What is in it for me ?

🌐 Data ? More than just Data

🌐 Voice (Echo Link, VoIP)

🌐 Text Chat

🌐 APRS

🌐 Web Pages

🌐 Video Streaming (DATV)

🌐 Repeaters Linking (DMR, D-STAR)

🌐 Personal Radio Hotspot

🌐 Software Defined Radio (SDR)

🌐 Remote Control / Remote Station

🌐 SDR-Based Signal Directional Finding (Simultaneous RX + Analysis
Realtime Triangulation and Positioning) - Proposed by Martin G7NSY

Endless

Possibilities

**Not to replace
traditional HAM
operations BUT add
MORE FUN**

Guest Presenter Rob 2E0RPT








Over to ROB 2E0RPT

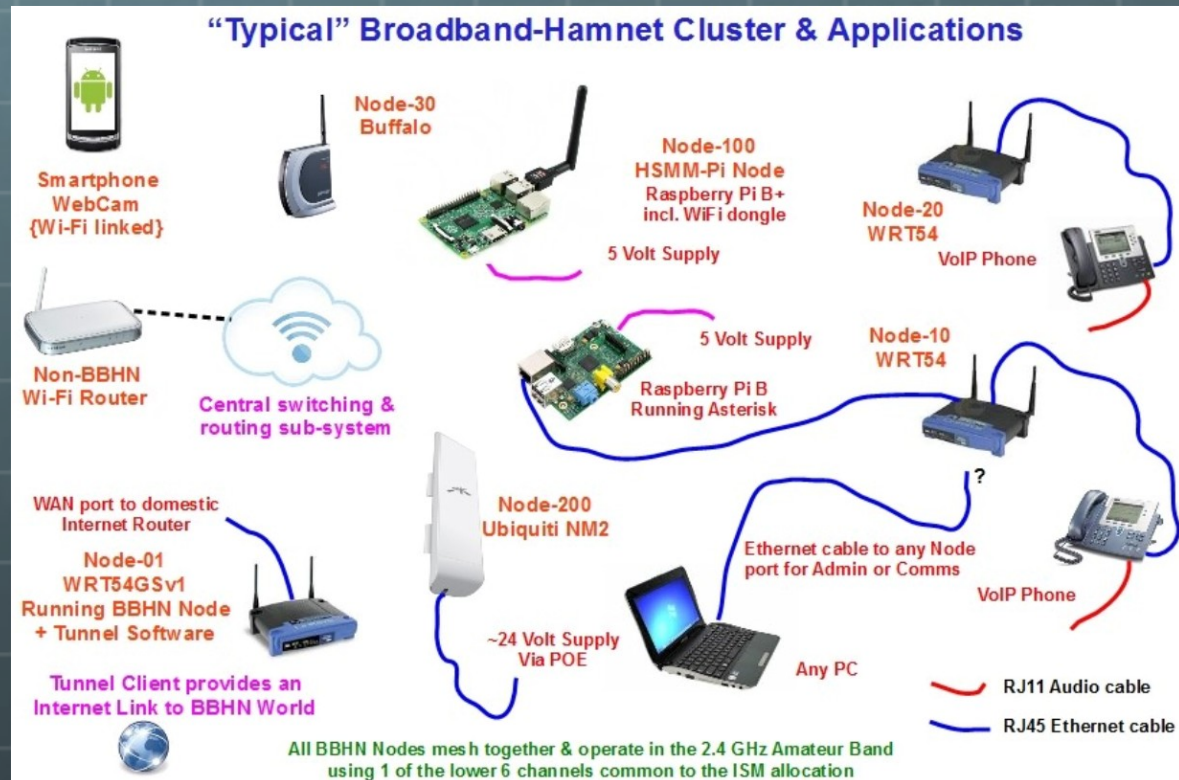


**VIDEO LINK over
BBHN**

Demonstrations







-  **A Typical BBHN Node**
-  **Webpages**
-  **TowerCam**
-  **Weather Station**
-  **Video Streaming**

Be Part of the fun....



Courtesy of Ted G4ELM

How do I get started

-  Find the suitable Wi-Fi Router (Linksys on Ebay from less than £10, Raspberry Pi £30, Ubiquiti Devices £80)
-  Load the correct firmware onto the router
www.broadband-hamnet.org
-  Find an appropriate antenna (Directional Yagi £8, Directional Panel Antenna £9, Omni-directional White-Stick £30, or even a Dish £50)
-  Plug-in your computer, setup your callsign as per instructions, then you are done!
-  Rob, 2E0RPT runs BBHN-UK support website: bbhnuk.onthewifi.com
-  Peter 2E0PGS and Martin G7NSY offer help locally in Bristol, bring in your hardware and we will help you out.

Hardware



Linksys WRT-54GS/GL

WRT-54GS v1, v2, v3 are the best ones to get as they have more flash memory and system memory.

Approx 19dBm (69mW)
Power

Needs RP-TNC adapters if you wish to use external antenna.

A cheaper Buffalo WHR-HP-G54 will also



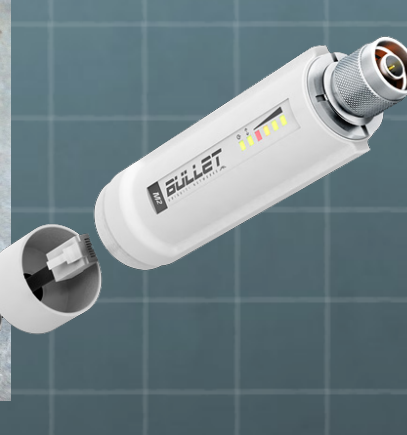
Raspberry Pi

Any Raspberry Pi

USB Wi-Fi Dongle

Power will depend on the Wi-Fi Dongle

Uses HSMM-Pi Firmware



Ubiquiti Bullet M2

N-Type Connector

Plenty of flash memory and Flash Memory

High Power 28dBm (630mW)

Beware of stock firmware new than version 5.5.X.
Downgrade firmware first before installing BBHN-Firmware



Ubiquiti Nanostation M2

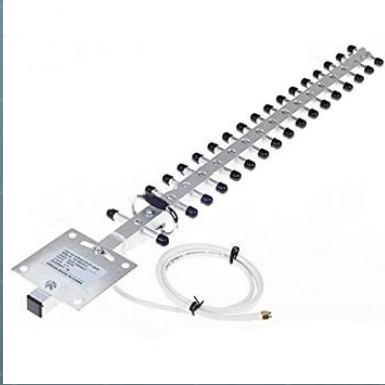
Internal Antenna 10dBi

Plenty of flash memory and Flash Memory

High Power 28dBm (630mW)

Beware of stock firmware new than version 5.5.X.
Downgrade firmware first before installing BBHN-Firmware

Antenna



Yagi Antenna

Directional

Typical Gain for a meter long boom length is approx 18dBi or higher



Panel Antenna

Directional

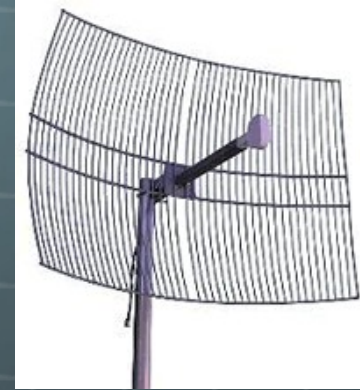
Small, typical gain 6 – 18dBi



Co-linear Antenna

Omni Directional

Typical Gain 10-15dBi



Dish Antenna

Directional

Very narrow beam width
Very High Gain >24dBi

Announcing your presence

- 🌐 Once you have got everything setup, it would be the best to make your node known...
- 🌐 Peter 2E0PGS will talk about how this is done
- 🌐 Over to Peter...

Where can I see the nodes on a map?

- **2E0PGS Website:**

<http://2e0pgs.com/>

ml

Node locations:

2E0PGS-BULLET



Status: **ONLINE**

Device: Ubiquiti Bullet M2

Antenna: Beam vertical polarization pointing to G7NSY-BULLET

Services:

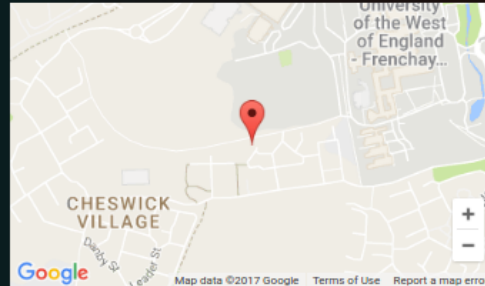
* Overham_IRC: **OFFLINE**

* IRC: **OFFLINE**

* Chat Server with video: **ONLINE**

* IP Cam: **ONLINE**

G7NSY-BULLET



Status: **ONLINE**

Device: Ubiquiti Bullet M2

Antenna: Omnidirectional 2.4G whitestick

Services:

* Weather Station: **ONLINE**

* OpenWebSDR: **ONLINE**

* GB3ZZ DATV Stream: **ONLINE**

G8KUW-1



Status: **ONLINE**

Device: Linksys WRT54G

Antenna: Beam vertical polarization pointing to 2E0PGS-BULLET

Services:

* MeshChat: **ONLINE**

Placeholder



Status: **OFFLINE**

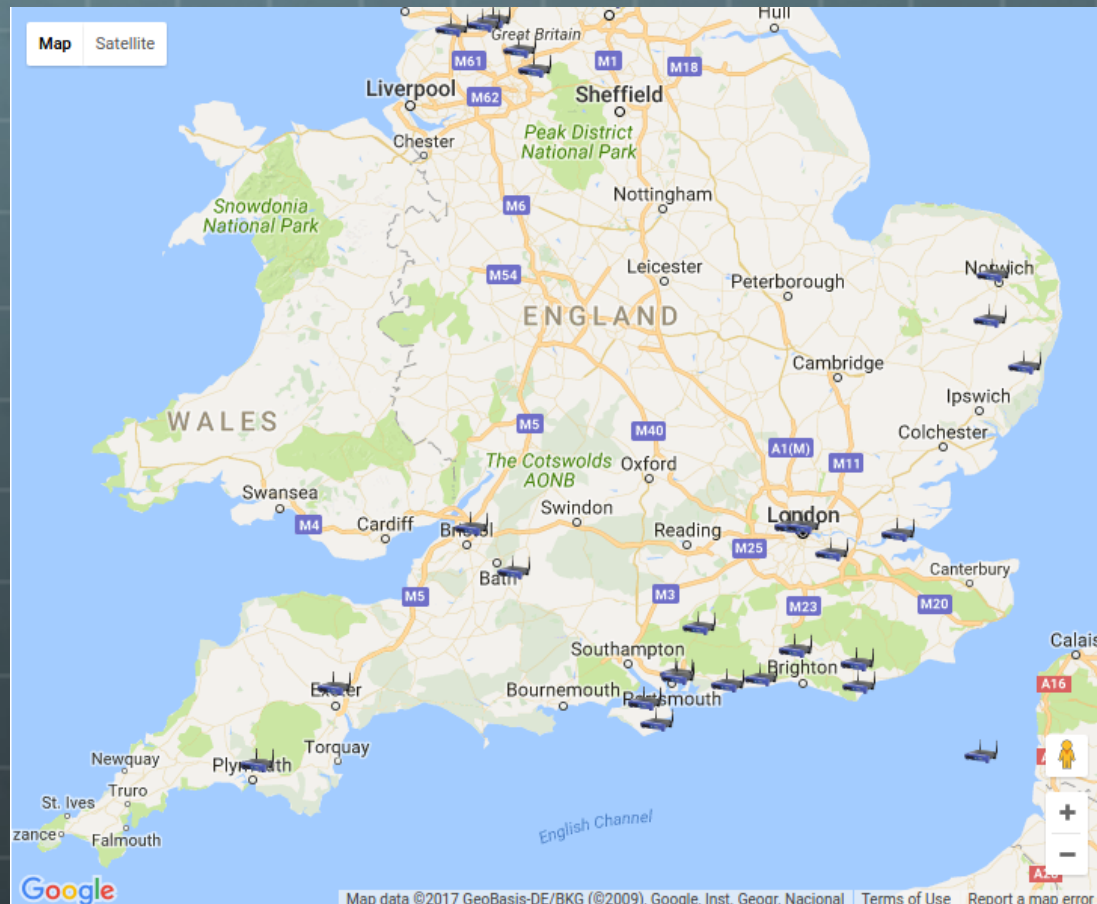
Device: ?

Antenna: ?

Where can I see the nodes on a map continue...

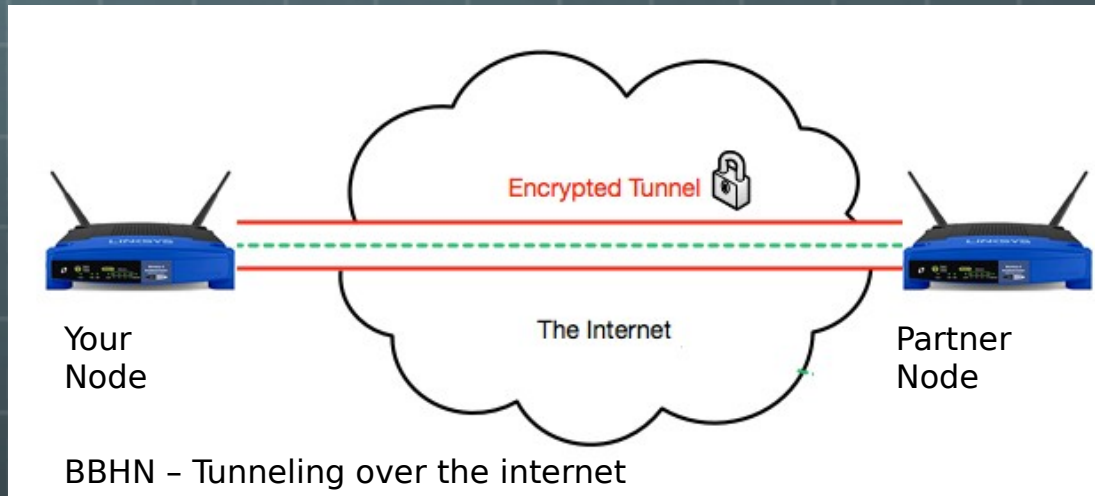
Broadband-Hamnet.org:

<http://www.broadband-hamnet.org/googlemapped-mesh-nodes.html>



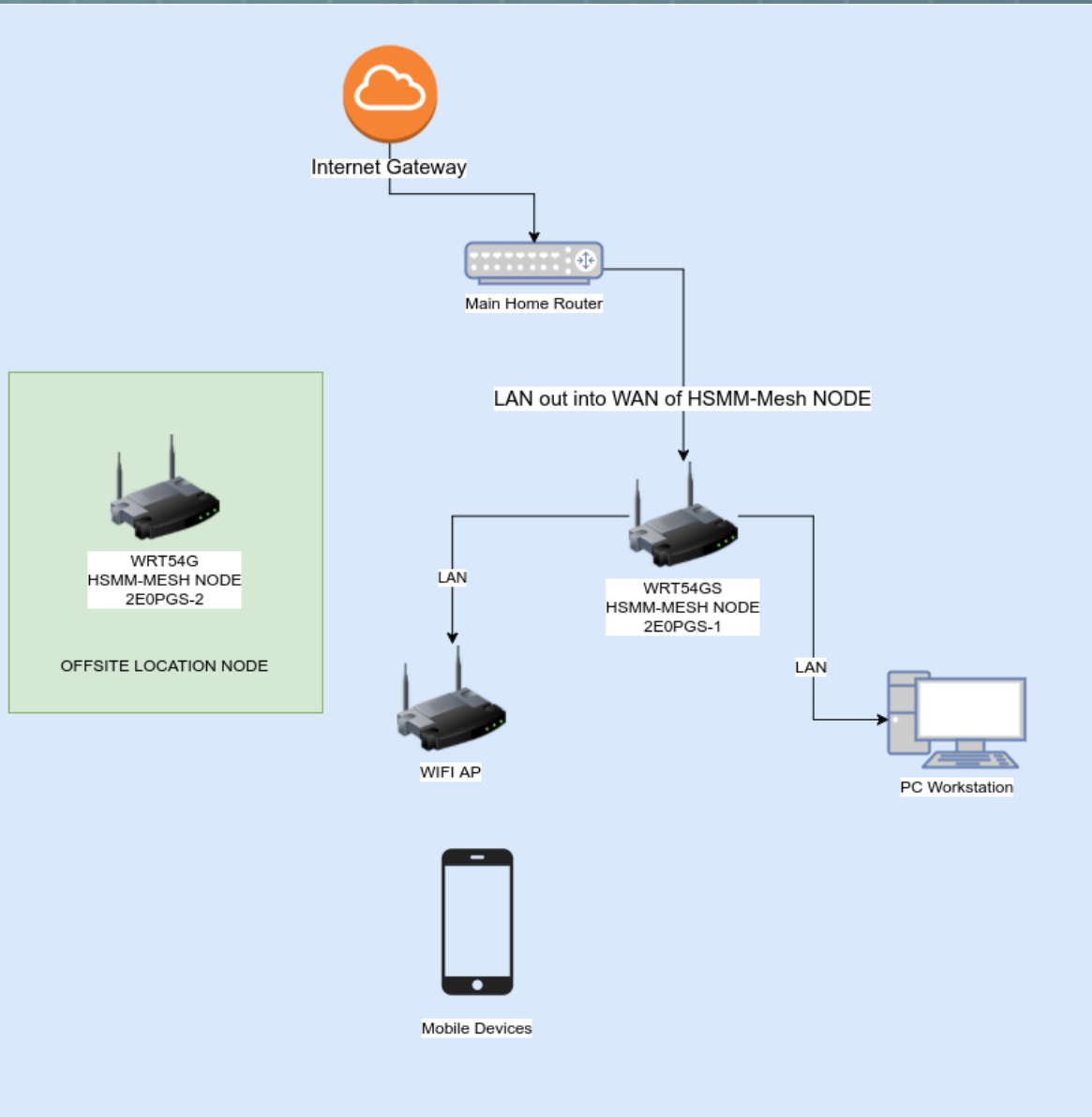
Join the world

- 🌐 **via RF Beam and hunt for the nearest node**
- 🌐 **if no near-by node can be found, you can connect still get yourself connected via Tunneling over the Internet**



- 🌐 **You can of course do both RF + Tunneling to maximise your reach....**

Example basic setup





BBHN UK

bbhnuk.onthewifi

.com

-  **Driving Force behind Amateur Radio Mesh Network in UK**
-  **Free Membership**
-  **Commitment Free**
-  **Promote BBHN**
-  **Free Support**
-  **A cheap way to start microwave and advanced digital communications**

Special Thanks

-  **Ted, G4ELM - One of the first pioneers to start and to promote BBHN in UK, also help us to revise this talk**
-  **Rob, 2E0RPT - Thanks for his remote presentation as well as running BBHN UK Support Site**
-  **And Everyone who joined the talk**