

All Things Digital

Amateur Radio for the 21st Century

014

Robert C. Mazur, VA3ROM

E: va3rom@gmail.com

W: www.va3rom.com

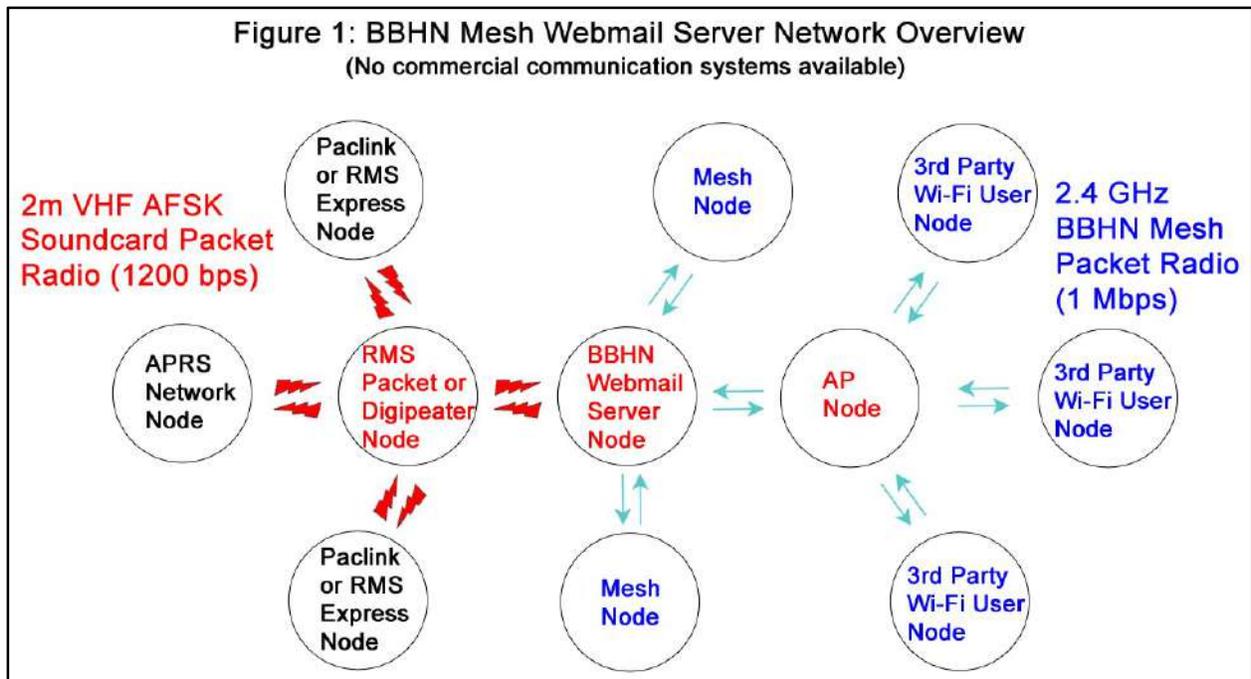


Article first published in the Jul-Aug 2014 issue of The Canadian Amateur

THE BROADBAND HAMRADIO [MESH] NETWORK (BBHN)—Part 2

The BBHN isn't limited to exchanging data with other mesh nodes, it can also connect to the WL2K (Winlink 2000) global radio email messaging system, and Chris von Gorp, PA7RHM, has written an excellent tutorial (a copy is on my website) on how to integrate the them using Paclink, combined with the free Apache SQL Server and WebMail Lite programs.

I'll only discuss the overall concept (see Figure 1) because the WL2K system was covered in my *TCA* March-April 2013 column, and I won't go into the specifics of Chris' detailed, step-by-step instructions. *Note: The WL2K RMS Packet and Paclink programs support the AGW PE (packet engine) as now does RMS Express thanks to Jim Muli, W2YG, and his AGW Express Interface, allowing more Amateurs to participate because only a soundcard-to-radio interface is needed which many digital mode Hams have. RMS Express also supports the soundcard WINMOR HF protocol so you can use a combination of VHF/HF WL2K with the BBHN!*



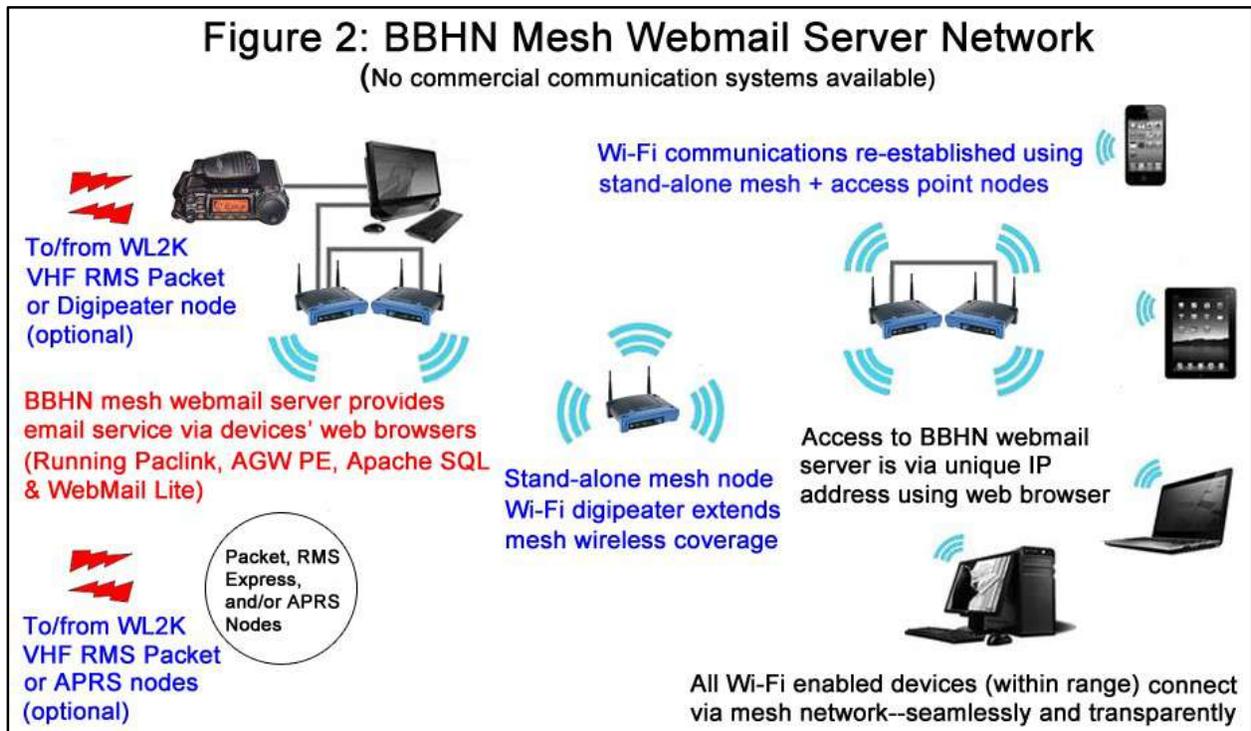
“MOVING THE MAIL”

One important function of EmComm (emergency communications) is messaging or “moving the mail”. Local disaster area voice/analog/digital communications are normally conducted using short-range (VHF/UHF) frequencies and are generally curt and concise because first and second responders don’t need (or want) to send/receive lengthy lists of information/instructions so the Keep It Short and Simple (KISS) principle is applied. But back at the EOC (emergency operations centre) others do want and need details, lists, and facts and figures: news media, municipal, provincial and federal authorities, various support NGO’s (non-governmental organizations), etc., and this type of messaging is normally conducted face-to-face, via video conferencing, texting, etc., often using smartphones requiring cellular networks which can and do fail when least expected.

EMO (Emergency Management) Ontario says we must be self-sufficient for at least three days (or more) when cut off from the outside world, but how do small and isolated communities or groups re-establish critical wireless communications without the resources of a Toronto or Montreal? Mesh networks to the rescue!

MESH WEBMAIL SERVER & WINLINK 2000 SYSTEM

This system (see Figure 2) allows everyone to communicate directly without having to scribble down messages, pass them over to and tie up radio operators, then wait for a reply back in the reverse sequence. Most iDevices can connect to alternate networks (2.4 GHz, in this case) which allows us to keep wireless messages flowing, eliminating the “middle-person”, saving time, reducing errors, freeing up limited resources (people) for other purposes. *Note: We could use the term ‘Mesh Mail’ to differentiate this service from other electronic messaging systems.*



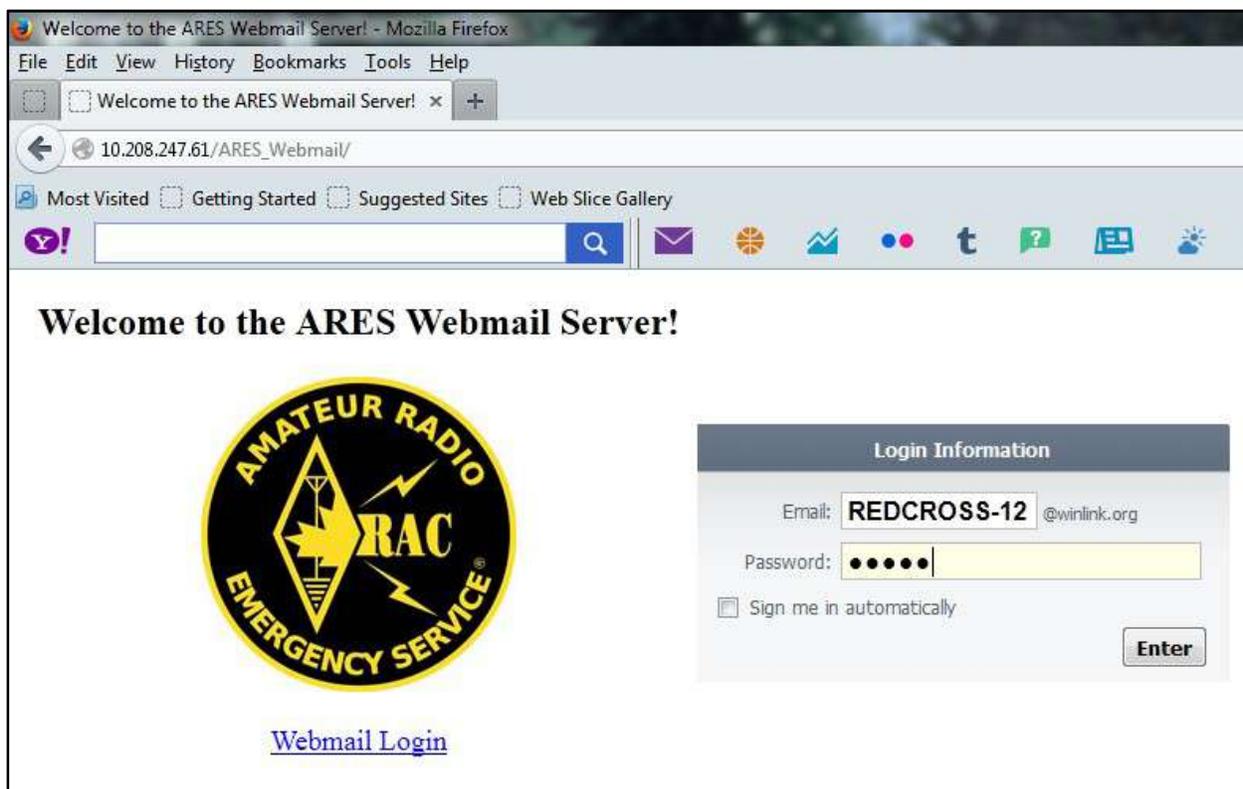
QUICK OPERATING POINTS

1. The webmail server is a Windows based computer (XP and up) connected to mesh and AP (access point) nodes (for 3rd party access), running the Paclink, Apache SQL Server, and WebMail Lite software installed as per Chris' instructions. For WL2K connectivity (optional) we also need a soundcard radio interface connected to a VHF (or HF) transceiver.
2. Paclink creates/controls all [tactical] user email accounts, acts as a liaison between Apache/WebMail, and optionally provides WL2K access (VHF and/or HF) to RMS Packet stations to extend the range of the mesh network.
3. Messaging is via web browsers providing a Hotmail type interface, accessible to Windows, Linux, Apple or Google based wireless iDevices through the AP's (and mesh node connected computers, of course). You only need the webmail server's IP (Internet protocol) address, your tactical email name/password, and a list of other addresses: e.g. EOC, REDCROSS-12, SHELTER-4, POLICECEN, FIRECEN, HOSPITAL, etc. The domain name is '@winlink.org': e.g. REDCROSS-12@winlink.org.
4. VHF/HF WL2K (and packet radio/APRS) stations inside or outside the mesh can send/receive messages through interchange RMS Packet or APRS station(s) and the webmail server (and vice versa). Depending on the situation you may want to run the two systems separately, and ideally you already have VHF/HF RMS Packet and APRS stations in your area. *Note: Short text/cellphone messages can be "piggybacked" onto APRS using the APRSLink WL2K service and RMS Packet stations can share the national APRS frequency (144.390 MHz, in North America) so everyone can be on a common VHF simplex data frequency. Note: APRS is a mesh network and invaluable for EmComm especially when combined with the WL2K system.*

REAL WORLD USE

Someone in your BBHN group (probably you) has to setup the working webmail server before you can add the WL2K component (if desired). The only drawback with the combined systems is the downshifting in transmission speed required with the WL2K system and its maximum message size (120,000 characters), but if you keep messages short and any attachments small, the WL2K system can keep up, and there are better alternatives to move large chunks of data through a mesh network (TeamViewer, for one). See Figures 3, 4 and 5.

FIGURE 3: BBHN MESH ARES WEBMAIL SERVER LOGIN SCREEN



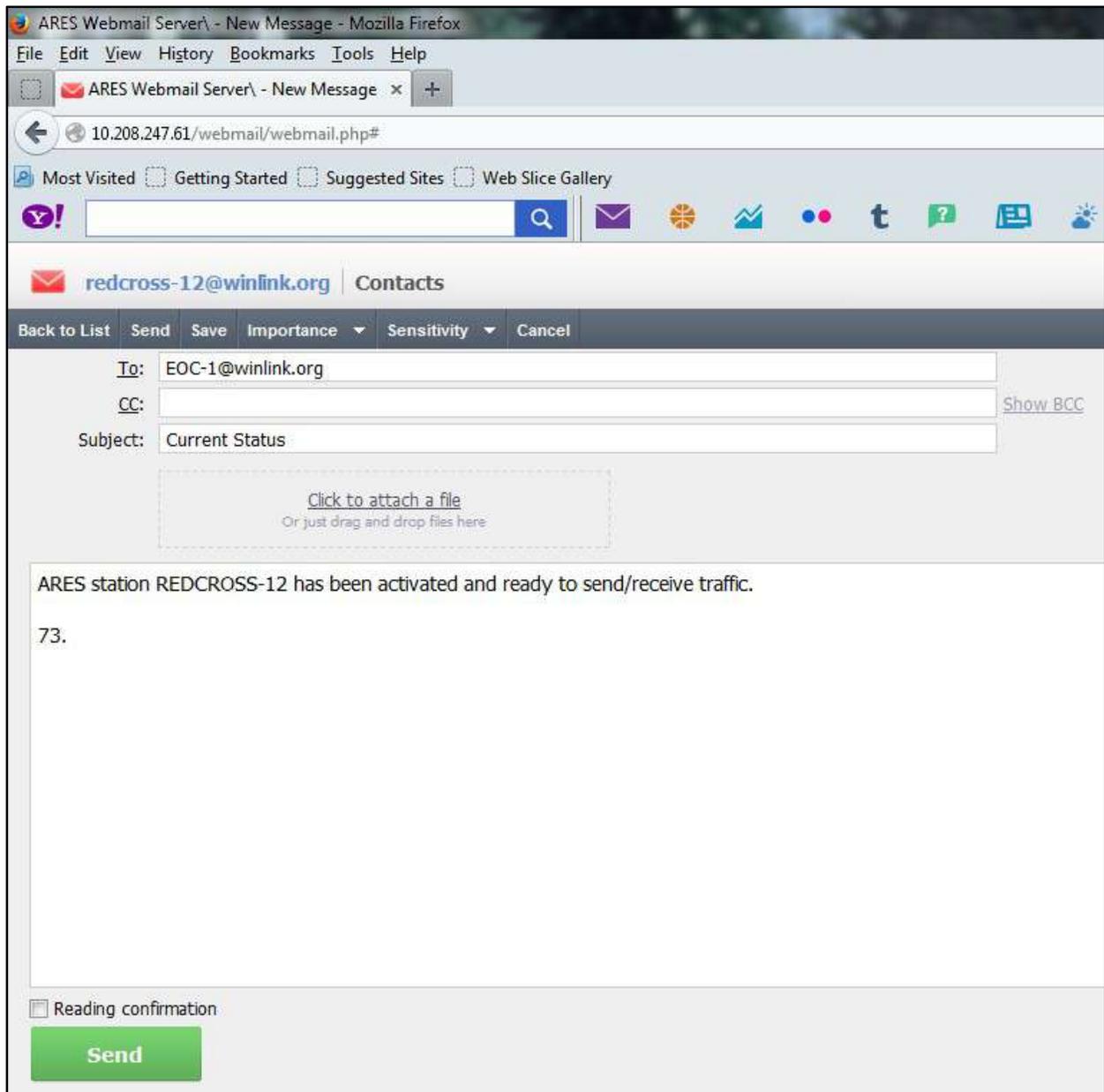
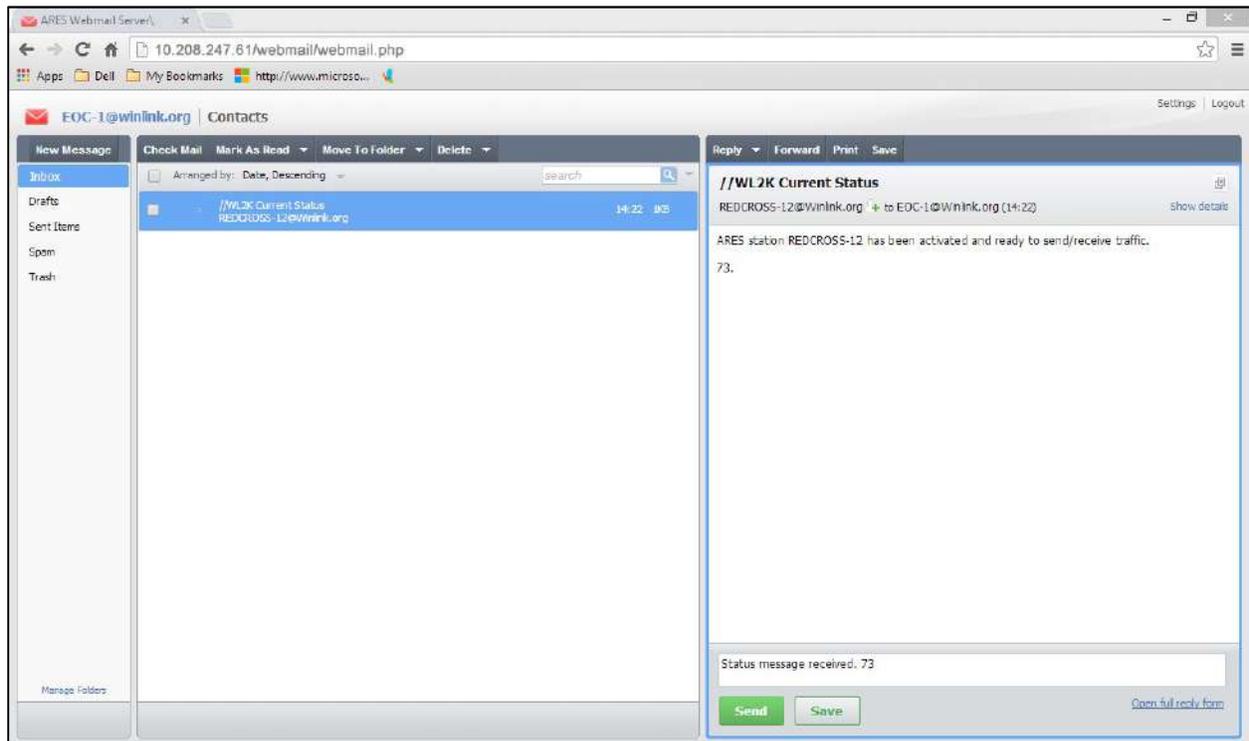


FIGURE 4: SENDING ARES “MESH” EMAIL THROUGH BBHN-MESH

FIGURE 5: “MESH” EMAIL CLIENT PROGRAM



Note: Figure 3 is a combined image of two ARES Webmail logon screens the end user sees. Figure 4 depicts a status message from a Red Cross station to an EOC, and Figure 5 is the EOC acknowledging using a quick reply. All screen captures are from various iDevices connected through a portable BBHN mesh webmail server via a mobile/portable wireless AP (see Figure 6).



FIGURE 6: PORTABLE/MOBILE BBHN-MESH WIRELESS AP

MY FINAL

In Part 3, we'll look at streaming Skype-like mesh images and video/audio because those in charge often need to see and hear things in real-time to better make decisions during emergencies. After my first BBHN article, Kevin, VA3KGS, emailed me about his local mesh group's work with the 440 MHz BBHN mesh variation for extended range through difficult terrain with cross-over connectivity to a 2.4 GHz mesh network—way too cool!—73

REFERENCES AND RESOURCES

AGW Express Interface

<http://w2ygsoftware.com>

APRSLink

<http://www.winlink.org/aprslink>

BBHN Website

<http://www.broadband-hamnet.org>

Emergency Management Ontario

<http://www.emergencymanagementontario.ca/english/home.html>

VA3KGS: Amateur Radio

<http://www.va3kgs.ca/amateur-radio>

WL2K Global Radio Email System

<http://www.winlink.org>

Webmail Access to Paclink (PDF)

<http://tiny.cc/n7evhx>

YouTube Videos

Emergency Communications 101 (1-4): <http://tiny.cc/ij5ffx>

Post Disaster Communications: <http://tiny.cc/jy4ffx>

Tactical Call Signs: <http://tiny.cc/rg4ffx>

VA3ROM: All Things Digital

<http://tinyurl.com/og2acxq>