

Distributed Directory Services for the Amateur Packet Radio Network

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The Amateur Radio Packet Network has implemented an ad-hoc, hierarchical, area-based message addressing system. In the United States these areas resolve down to states or local domain. Packet Bulletin Board Systems (PBBSs) also support a limited user directory service, implemented as the “home BBS” function. This sets the stage for relatively easily implementing a distributed directory service for the packet network.

The Problem

It isn't easy to ensure that a packet message will reach its intended recipient. There is no universal, automated system to keep track of which Amateurs are receiving their packet “mail” at which PBBS. (Yes, there are White Pages servers, but their operation is neither universal nor automatic.) Originators must both know and explicitly specify the destination PBBS when sending a message if it is to have a reasonable chance of being received.

There are exceptions which at times make it easier to send packet messages. PBBSs can automatically address messages when they “know” the “home BBS” of the

addressee. Some systems can query White Pages servers to determine the correct destination PBBS. However, these are exceptions to the situation. facing most packet users.

A Proposed Solution

Consider the situation if all PBBSs “know” where to send messages addressed to all active packet operators in their area. Amateurs could then easily correspond with others in their area without having to know which system they frequent. If one wanted to send a message to an Amateur in a distant state or province the “address” need only consist of the destination state or province; upon reaching the first PBBS in the destination state or province it would be re-addressed to the correct PBBS.

This can be accomplished with a modification to the “home BBS” function of Packet Bulletin Board System software and establishment of state/province (or sub-area) area “flood” message distribution.

As currently implemented the “home BBS” function requires manual updates, and operates in what seems to be a “backwards” manner. Users must connect with as many PBBSs as possible and inform these systems of their preferred “home BBS.” If users change their preferred “home” they must again connect to each system to update the information.

It would be much more logical for users to connect to their system of choice and declare it to be their “home BBS.” PBBSs would share “home b’bs” data within their area. All systems within the state/province, or sub-area, would know the “home bbs” of all active packet operators in their area.

Consideration must be given to dealing with packet operators who move from one area to another. As part of the procedure to declare a PBBS as one’s “home,” the user must be asked for the callsign of their previous “home BBS.” The previous “home,” and all systems in its area, must also be advised of the new “home BBS” declaration.

Another special case is temporary operation. Many Amateurs travel. Some live in different areas throughout the year. This requires the ability to declare a system to be one's temporary "home BBS."

Update messages should be allowed to contain multiple updates, but each individual entry must be date/time-stamped. This will permit checking that update information is truly new, and not an old message which was delayed or re-sent for some reason. In addition there should be fields for optional inclusion of effective and expiration dates. This will provide for advanced scheduling of "home BBS" changes for "migratory" users.

Proposed PBBS Dialogues

The following is a proposed dialogue for PBBSs to use for the new implementation of "home BBS":

```
@KB7UV MailBox>
```

```
home
```

```
Your home BBS is the PBBS where you will receive yourpacketmail.  
If you choose this as your home BBS system*ALL* packetmessages  
for you will be routedhere. You can only have one home BBS.
```

```
Your current home BBS is WB2GTX.
```

```
{Youdonotcurrentlyhave a home BBS.}1
```

```
Change home BBS to KB7UV? [Y/N/?]
```

```
Y
```

```
This is now your home BBS. All yourpacketmailwillbe forwarded  
to this system.
```

```
@KB7UV MailBox>
```

¹If there was no "home bbs" information on file for the user.

For both temporary operation and permanent changes to other areas, Amateurs who know which system will become their new home (permanent or temporary) should be able to inform their current home system of the change. This dialogue could be similar to this:

```
@KB7UV MailBox>
```

```
nothome
```

```
{This system is not your "home" BBS -- cannotprocess "nothome" request. @KB7UV MailBox>}2
```

```
You are currently receiving yourmailhere. Do youwishto change to another BBS [Y/N] ?
```

```
Y
```

```
What is the callsign of the BBS you wish to change to?
```

```
W1AW
```

```
{W1AW does not appear in the "known BBS" list. In what state/province (Z-letters) is it located?}3
```

```
You have chosen W1AW.CT.USA as your new home BBS. Is this correct [Y/N]?
```

```
Y
```

```
Your home BBS change to W1AW.CT.USA has been accepted. W1AW and all BBSS in CT will be informed of yourmove.
```

```
@KB7UV MailBox>
```

Message Routing

²This would be the response if the user attempted to use this command on a PBBS other than their "home bbs."

³This prompt would be sent if the specified new "home" was not "known" to the PBBS. The state is needed in order to route the automatically generated update message to the specified new "home" system. Following the query for state the PBBS should ask for the country of the new "home BBS."

Whenever a message arrives at a PBBS the system will first look to see if it already fully addressed for another destination PBBS. If so the addressing will be left alone, and the message will be forwarded out based upon that address. This ensures that messages fully addressed upon origination will not be “tampered” with.

If an arriving, or originated, message is not fully addressed whatever routing information it does carry will be checked. If it is for another area it will be forwarded as specified. If it is for the same area as the PBBS, or if it has no routing information, the PBBS will check to see if the addressee is “known.” For “known” addressees the system will either readdress and forward the message, or hold it for pick-up, as appropriate. Messages for “unknown” addressees without routing information are more of a challenge.

The first check of these “unknown” messages should be of the callsign prefix of the addressee. Foreign callsigns are rather easy: route the message to the appropriate country.⁴ Domestic callsigns can be automatically looked-up through a nearby White Pages server for routing information, if available, or through a callbook server to obtain the addressee’s state or province. Messages for which routing was found at the White Pages server will be sent as specified. Out-of-state/province messages, looked-up through a callbook server, should then be forwarded to the correct states or province. Messages with instate/province addressees which are not known to the White Pages Server, and those whose addresses could not be found at all, require special handling.

If there are sub-areas within the state/province, an inquiry should be sent to those other sub-areas to see if the addressee is known. If a reply is received with routing information the message should be re-addressed and forwarded. If no routing information is received within a specified time period (seven days seems reasonable) the message should be returned to the sender as “undeliverable, addressee unknown.”

⁴Many amateurs operate under reciprocal agreements. The six-character “To:” field does not provide for portable designations... This common PBBS software limitation must be rectified.

Why Not Dedicated Servers?

Others have suggested utilizing dedicated Directory Servers for the Amateur Packet Radio Network. These schemes would require address queries and responses for **each** message to be forwarded. Without higher speeds this will further burden our already heavily trafficked networks. Distributing directory information among message servers will limit these queries and responses to those messages destined for other areas.

This is not to say that dedicated Directory Servers wouldn't be helpful along with this proposal for distributed directory services. Dedicated servers in all areas, sharing information, would provide a more efficient means for dealing with unknown addressees.

Implementation

As current BBS software already supports the "home BBS" function, albeit in what seems to be a backwards implementation, it should be relatively easy for this distributed directory service proposal, or something similar, to be implemented. This paper outlines needs and a proposed solution; the actual implementation will need to be a cooperative effort by the PBBS software authors.

There is an additional requirement for this to work. Each state/province, and any sub-areas, must establish area flooding forward routes. All PBBS systems will need to be able to forward messages addressed simply as "@ΣT" where "CT" is a Z-letter state/province designation. In this way update messages can be sent to "UPDATE@ΣT," "WPAGES@ΣT," or similar for automatic distribution to all PBBSs and White Pages servers in the region.

Remote Operation Message Formats

. Home Declaration

header: SP UPDATE@ΣT <BBSCALL \$123456.BBSCALL

title: not used — blank or informative, such as: “New Users This System”

text: one or more line of the following:

“callsign YYMMDDHHMM [START-DATE EXP DATE]”

Where “YYMMDDHHMM” is a date/time stamp indicating when the user made the “home bbs” declaration, and **START_DATE** and **EXP DATE** are optional fields of the format **YYMMDD** for effective and expiration dates.

Note: The “home bbs” for the callsigns in the message is the originating PBBS as shown in the header. Use of RFC-822 headers is suggested so as to place this information explicitly in the body of the message.

. Callsign Look-up Request To Address Server

header: SP LOOKUP@*ServerCall* <BBSCALL \$123456_BBSCALL

title: REQSTATE

text: one or more line of the following:
“call sign”

. Response From Address Server

header: SP DAEMON@BBSCALL <*ServerCall* \$34567_*ServerCall*

title: RE:REQ_STATE

text: one or more line of the following, as appropriate:
“Callsign Address”
“Callsign ***NOT FOUND***”

Where Address is in one of the forms:

“ΣT.cou”

“bbSCALL.ΣT.cou”

(“ΣT” — 2-letter state/province code)