The Network News Transfer Protocol and its use in packet radio

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ABSTRACT

The exchange of news bulletins is very popular among amateur packet radio users today. But there are currently no standardized protocols in use, and there is no widespread use of news forwarding protocols at all among amateur TCP/IP stations. This paper discusses how the Network News Transfer Protocol can be used to distribute news between stations on packet radio networks. NNTP is a standardized protocol that is widely used on the Internet. Different implementations of NNTP for the KA9Q Internet Package are presented and compared.

Introduction

The traffic on amateur packet radio is currently dominated by the transfer of bulletins and personal mail messages. This transfering is almost exclusively handled on AX.25 links by BBS'es using a forwarding protocol developed by WØRLI and WA7MBL. The protocol is ad hoc and most implementations differ in one way or another. I propose the use of NNTP, the Network News Transfer Protocol, for the forwarding of bulletins between amateur radio stations. NNTP is in widespread use in the Internet community and is standardized in RFC-977. [Kantor 86] There are several ways in which NNTP can exchange news articles ("bulletins.") On a slow speed network, NNTP can be used to save bandwidth. On a high speed network, NNTP can be used to save disk space.

NNTP Basics

NNTP uses a client and server model. The station that initiates the connection is always the client. And the station that answers is the NNTP server. Commands and responses are in ASCII and they are sent over a stream-based connection, such as a TCP or AX.25 link.

NNTP supports the concept of "news-

groups". Each article may belong to one or several newsgroups. As new newsgroups are created, the client can decide whether or not it wants the new groups. A typical NNTP transaction usually begins with the client sending the NEWGROUPS command to inquire about new newsgroups.

NNTP on slow networks

The exact definition of a "slow speed" network might be somewhat unclear, but most people seem to agree that 1200 Baud is slow speed. Most amateur packet radio networks today operate at that speed.
A typical scenario where NNTP would be used in this environment is as a forwarding mechanism between BBS's.

If a BBS wants to flood its messages on the network, it can use the IHAVE command. IHAVE followed by the message-ID of a news article will offer that particular article to the server. The server may then reject or accept the article. This is similar to how the WØRLI/WA7MBL forwarding system works.

Another method of forwarding news is for the client to ask the server about its new articles. The client would then issue the NEWNEWS command followed by a date and a list of newsgroups. The date indicates that the client is only interested in articles received after this particular date. And all suitable articles must belong to at least one of the listed newsgroups. The server will respond with the message-ID's of any articles that match this criterion. The client will compare these message-ID's with the ones from the articles it already has. It can then specifically request those articles that it wants. If the client is a BBS, the most natural thing would probably be to request the article in full. This is done with the ARTICLE command.

Example - A typical NNTP transaction

The client connects to TCP port 119 on the server machine. (Client commands are in boldface.)

```
  200 sun1.sk0we.ampr.org NNTP server
ready (posting ok).
```

The client asks for the names of any new newsgroups that have been created since 12 am on July 18.

```
  NEWGROUPS 900718 120000 GMT
  231 New newsgroups since 900718120000
follow.
  rec.fitness
  .
```

The client asks for the message-ID's of articles to any newsgroups whose name starts with "rec.ham-radio" that were received after the specified date.

```
  NEWNEWS rec.ham-radio* 900718 120000
GMT
  230 New news by message id follows
  <1990Jul18.175904.10700@bellcore-
2.bellcore.com>
  <3686@wb3ffv.ampr.org>
  <321@ka2qhd.UUCP>
```

More items follow.

```
  .
```

The client asks for a particular article.

```
  ARTICLE <3686@wb3ffv.ampr.org>
  220 0 <3686@wb3ffv.ampr.org> Article
retrieved, head and body follow.
```

The complete article follows.

The client now tries to forward some articles it has. The first offer is rejected, while the second is accepted.

```
  IHAVE <321@ka2qhd.UUCP>
  435 Got it.
  IHAVE <4711@sun1.sk0we.ampr.org>
  335 Ok
```

The client sends its article.

```
  .
  QUIT
  205 sun1.sk0we.ampr.org closing
connection.  Goodbye.
```

If the client is a local user, that does not redistribute articles to anyone, it is more reasonable to request only the headers of the article. The header lines makes it possible for the user to decide if he wants to read the article. If so, the rest of the article can be requested immediately, or at a later date, when network load is lower.

NNTP provides the commands HEAD and BODY to transfer the headers and body of an article, respectively.

This last method of transfering only the headers of the articles can save a lot of network bandwidth. When the number of articles increases, most people will only read a few of them. And, obviously, it is wasteful to transfer articles that will neither be redistributed nor read by the recipient.

NNTP on fast networks

With the advent of new faster packet radio modems, NNTP can be used to interactively select and read news articles. The user can run a news reading program on his own PC. This program gives the impression that the articles are stored on the PC, when they are in fact accessed from a remote computer. This is the way NNTP is used on many Ethernet-based networks.

The USENET news system

NNTP does not dictate the format of the news articles, but the protocol was designed with the USENET news format in mind. This standard is described in RFC-1036.[Horton 87] The format is similar to the format used by mail messages on the Internet, but with some extra header lines. The similarity of the two formats makes it possible to use some mail reading programs as primitive news readers.

The USENET news network uses both dial-up telephone lines and Internet links. News articles are batched and compressed before they are sent over a telephone line. The receiving host will uncompress the batch and discard duplicate articles. News on the Internet is distributed mainly by NNTP or by distributed file systems.

News and the KA9Q package

Recent versions of the KA9Q Internet Package (NOS) incorporate a BBS-style "mailbox." Incoming mail is redirected to different message areas (or newsgroups), depending on how the message is addressed. However, the official version of the package does not provide a good way of distributing news articles. It is possible to set up mailing lists and have each article sent as a mail message using SMTP. But such lists make inefficient use of the channel and maintaining them is an awkward task.

A group of Japanese radio amateurs have modified NOS for the distribution of news and written a set of programs to read and post news. This is called the Terakoya system. However, the articles are transfered as mail messages using SMTP, instead of NNTP.

Given the above situation, several people started writing NNTP implementations. The author has implemented a NNTP client that inquires a set of servers. I.e., it first asks about new articles with the NEWNEWS command, and then fetches the articles it does not already have using the ARTICLE command. Finally, in later versions, the client will be able to offer any new articles it has to the server, by issueing the IHAVE command.

This implementation has the obvious drawback that it can waste a lot of bandwith by transfering articles that will never be read by the local user. But by transfering the article in full, it has been possible to use the mailbox already inherent in NOS to read the news articles, and post new ones. (As long as the format of the articles follow RFC-1036). The articles are simply treated like ordinary mail messages and placed in suitable message areas. This required minimal additions to the already long NOS program.
Bernie Roehl has been fixing bugs and

adding new features to this code.

Jeffrey Comstock, NRØD, is writing a full NNTP server and client. The local user can decide whether the client will offer articles for forwarding, or if it should request articles.
This client requests the article in full, as well. The articles are not converted into mail format, so they cannot be accessed from the NOS BBS. Instead it is possible to read and write articles using various more advanced news readers that are external to NOS, such as WAFFLE and the Japanese Terakoya system.

The server is not finished at the time of writing, but an early alpha release is available for testing.

Conclusion

There are at least two NNTP clients and one server implemented for the KA9Q Internet Package. Both clients request whole articles at once, instead of just the header lines. In an efficient implementation of NNTP it should be optional to transfer only the headers first, and then let the local user decide if the rest of the article is wanted. But this will require changes to the existing BBS in NOS, or porting of second source news software to the NOS environment.

References

Horton 87 M. Horton, "Standard for Interchange of USENET Messages", *ARPA RFC-1036*, December 1987.

Kantor 86 B. Kantor, P. Lapsley, "Network News Transfer Protocol, A Proposed Standard for the Streams-Based Transmission of News", *ARPA RFC-977*, February 1986.