Interfacing between ROSE and TCP/IP

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INTRODUCTION

The goal of the RATS Open System Environment (ROSE) X.25 Packet Switch from the beginning was to develop a radio network based upon standard protocols. It was also required that it provide reliable and completely transparent communications to all users of the AX.25 protocol.

For over a year now ROSE has properly supported passing AX.25 frames of any protocol type (PID). This was just the first step taken by ROSE in providing fully transparent services to TCP/IP users.

LEVEL OF SUPPORT

For our purposes we define support to mean that communications through each other is completely transparent. We should strive to provide services for the normal modes of communication. There also may be points where some additional information could be displayed to help give third parties insight into the type of connection and/or source and destination. It should be noted that features used to provide support, in many cases, are general features, not special features added to make a specific configuration work.

ROSE SUPPORT OF TCP/IP

In order for ROSE to support TCP/IP it must pass IP frames transparently. This can only be evaluated at the end points of a ROSE connection, as ROSE is only required to reassemble the original frame that was sent into the network.

VC Mode Connections

ROSE currently only supports IP connections in VC mode and provides two classes of service, unreliable and reliable mode. The only difference in these two modes is the action that is taken when data *might* have been lost. In reliable mode the connection is simply cleared. In unreliable mode all the data queued within the network is discarded and a ***** Call Reset ***** message is sent and then normal data transfer is resumed. The message is sent with PID=FO which would cause NOS to divert the connection to the BBS interface, ROSE will only sent this message if the normal data also has PID=F0.

When using unreliable mode the ROSE Switch generates two informational messages **Call being Setup** followed by a **Call Completed** or ***** Call Clearing ***** which are sent with PID=F0, this also causes the connection to be diverted to the BBS interface, even though: NOS is in the process of establishing this connection. These messages are sent before any user data has been sent, so the ROSE switch doesn't know what the PID of the data will be.

The net result is that NOS users are restricted to using ROSE reliable mode and NOS VC mode. One problem exists in this configuration, if the ROSE network detects a situation where data *might* have been lost it will tear down the connection, which will need to be restarted manually, since in NOS the VC mode handler does not attempt to reestablish a VC connection that fails.

Datagram Mode Connections

In the future ROSE will support datagram service, where UI frames will be forwarded through the network based upon the network address in the digipeater field. This will also allow for ARP broadcasts to specific ROSE user ports if the digipeater path can be changed on the fly. This is not a severe limitation, as there will be specific RF channels that have concentrations of TCP/IP users.

This will be a general feature independent of the actual PID in the UI frame. ROSE will manage an internal virtual circuit and maintain an idle timer that will keep a circuit open only while it is being used. This will reduce the number of X.25 Call establishments that will be required to pass the data.

TCP/IP SUPPORT OF ROSE

A ROSE switch must be able to establish an inter-switch AX.25 connection through a collection of NOS nodes. What is needed is an AXIP type of feature that is initiated by specifying a single digipeater field. Presently the AXIP feature is activated by digipeating through the NOS callsign followed by an alias that indicates the network address that the frames will be forwarded to. This is similar to the method ROSE uses to establish connections.

An additional extension to the AXIP feature would be to have the AX.25 Level 2 locally significant. This would not effect the actions of ROSE, but it would reduce the IP traffic, since the idle RR's would not be sent through the IP network. Then the only thing that would generate IP traffic would be an X.25 packet.

ADDITIONAL FEATURES

It would also be desirable for each environment to become aware of the existence of the other. The ROSE Switch USERS application will display the message "TCP/IP User" instead of "AX25L2 User" for the entry and exit points of a connection through the network. It would also be useful if NOS would capture and display the ROSE network address for connections terminating at a NOS node. NOS should keep track of any of the PID=FO messages, which indicate Reset or Clearing cause code. These could be used to trouble shoot network problems.

TNOS - Tampa NOS

There is work being done by Brian Lantz, KO4KS on a more ROSE aware version of NOS. Tampa NOS (TNOS) eliminates most of the problems discussed. This version has changes in the following areas:

- Ignores PID=FO in VC mode connects
- Clean up for Dynamic Routing
- Specific IP Only Callsign
- Specific AX.25 Only Callsign
- Conference users list included each station's ROSE Address

With these changes the operation of TCP/IP is very predictable and will allow NOS users to use either reliable or unreliable mode ROSE connections.

CONCLUSION

If we all take a little time to make some simple changes in our software it can make the operation much simpler for all the users of our systems. It is not simply a matter of implementing the features needed to support every other system out there, but one of examining the general features needed to address the needs of many systems. I would like to thank Brian Lantz, KO4KS for his efforts in making TNOS. RATS will have the latest version available to those who want it.