DO YOU REALLY WANT TO OPERATE A NODE?

Every now and then packeteers get a strange urge. Why can't I have a node like everyone else does? This chapter attempts to help you answer that question when it arrives for you. We will use the term node to refer to a hilltop site rather than a node associated with a bulletin board.

16.A. DOES THE NETWORK NEED ANOTHER NODE?

There are many reasons why another node might be desirable and as many or more reasons why another node might be a bad idea. Here are some of the network-related issues.

16.A.1 Inadequate access: Perhaps an area (a valley, for example) has poor network access. Maybe retry rates are very high. Perhaps everyone needs to use a digipeater. This is an excellent reason to consider adding a node to a packet network.

16.A.2 Poor network link: Perhaps your local network has a poor quality link. A new node located between the two having the problem could be an excellent addition. But make certain, first, that the problem is not in the nodes, themselves. There could be radio problems, antenna problems, coax problems, or any one of several more problems. Also make certain that the difficulty is not due to an excessive number of other nodes on the same frequency. In this case, just adding another node will make things worse, not better.

16.A.3 Network restructuring: One of the most effective ways to improve a network is to change its structure. If the network is a single-frequency system (users and linking on the same frequency), then convert it to a backbone system (see section 8.D). If the network has a large area backbone, convert it into a clustered system. You can contribute by offering to add a port to an existing node to make either of these happen.

16.A.4 User access: In high population density areas, the number of nodes is especially important. There are some useful guidelines which can help show if there are too few or too many nodes. In the United States, roughly 1 in 2000 of the population has an amateur radio license. Based on TNC sales, it is thought that about 50% of hams own a TNC; this percentage may be optimistic but appears reasonable in some high population areas. Thus, there is about 1 TNC per 4000 population. During peak operating periods (5PM to 8PM local), perhaps 10% to 25% percent of the TNCs may be on simultaneously. Thus, 4 TNCs per 100,000 population (40 TNCs per 1 million population) are active simultaneously. Nodes begin to have problems with 10 simultaneous connections on the same frequency if the channel is perfect (that is, everyone can sense everyone else's transmission); in less perfect conditions, the capacity may be half that. To service the users who would like to operate during peak periods, something on the order of 8 nodes per million population is not unreasonable.

16.A.5 Improve network redundancy: Network redundancy? What's that? In many networks, there are locations where the failure of one node leads to a complete severance of the network without any practical way around the failure (single-point-of-failure). Network redundancy adds parallel paths so that the failure of one does not lead to failure of the network.

16.A.6 Can another node possibly hurt?: Yes! Simply adding one more node to an already overloaded system will make things worse, not better. If the node does not serve a clear purpose, then consider putting your efforts somewhere else.

16.B. WHAT'S THE DOWNSIDE?

Operating a node is much like operating a voice repeater. Here is some of what it involves.

16.B.1 Cost: Nodes do not come cheap. If you were to purchase everything needed, figure on the following for a single port of a TheNet node:

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TNC           $125
RADIO         $450
ANTENNA       $100
PWR SUPPLY      $50
MISC       $50
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TOTAL         $775
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At severe-weather sites, a durable antenna may actually cost $200 or (much) more.

Site rental is also a major issue. At U.S. government sites in the west (Forest Service, Bureau of Land Management, etc), yearly rents anywhere from $500 to $1000 may be demanded. It is often possible to reduce this figure through certification by your county and state emergency services office. If the site is private, there may be more leeway but expect, at the very least, to pay for a share of electrical costs.

16.B.2 Pressure: If the node fails, you may experience a lot of pressure to get it operating again. This is especially true if the node is a single-point-of-failure or if it is one on which bulletin boards depend. When winter weather makes access difficult, it may be impractical, if not impossible, to meet these demands.

16.C. AND THE PAYOFF?

Of course, along with cost, we expect some sort of payoff for operating a node.

16.C.1 Regional cooperation: A voice repeater often requires community cooperation. With the exception of frequency coordination issues so that repeaters do not interfere or possible linking, the effort remains local. A node, on the other hand, is a regional device. It is part of a network. For this network to operate, it takes cooperation of many individuals and groups. Being part of this cooperative system can be an excellent payoff for some hams.

16.C.2 Public service: A node can be a very significant public service tool. In many areas, county emergency services organizations depend on packet radio for some of their communication. Your node, if it is properly designed and located, can be part of this. Likewise, providing a

highway for bulletin board forwarding or for keyboard-keyboard communication by others represents a public service.

16.C.3 Technological growth: Operating a node is not simple. It requires learning a whole new set of skills. This learning can be a significant incentive for some.

16.C.4 Recognition: If your node provides a genuine service, your efforts will be recognized by users. You may never hear about it. But packeteers will recognize you as a supporter of packet radio who "puts money behind the words you speak". If your node is more of a hindrance than a help, folks will recognize that also. It may take some time, but this too will be recognized.

16.D. A PLEA!

Before you go very far thinking about putting up a node, please talk to node operators in the area you are considering. Courtesy, at the very least, demands it. Ask them a some questions; your efforts will more likely to be well received and effective. Here are some of the things to ask:

16.D.1 Does the idea make sense?: Often, those node operators can tell you if your proposal makes network sense. They can often tell you about areas with difficult access since they have likely heard complaints.

16.D.2 What are the near-term network plans?: Packet networks are undergoing rapid change. In some areas, there are well thought out, written, plans. But this are the exception rather than the rule. More often, a few node operators may have an understanding among themselves about how they want to improve things.

These plans may effect you in two ways. Your effort can help to make the improvements happen. But, also, if you add a node to your local network, you may find changes which will require you to change frequencies, change bands, or change baud rates. If the latter is the case, you should know about it before you start!

16.D.3 What frequencies are available?: The question affects both user frequencies and linking frequencies. If the question is one of a user frequency, the node ops may be able to suggest something themselves.

If there is a frequency coordinating group in your area, they should be able to tell you how to reach it.

With respect to linking frequencies, which one is appropriate? Often, that tantalizing link with only two nodes on it is designed that way as a point-point link (see section 8.D). In other cases, your proposal may appear as a hidden node to some of the other nodes on the backbone. In yet other cases, there may already be too many nodes on one frequency. The best backbone frequency for your node may not be obvious, so ask.

16.D.4 Is your proposal welcome?: In some areas of the U.S., groups have a very strong hold on network linking. They often attempt to control very tightly what nodes are a part of that network. If such is the case in your area, and your efforts are rebuffed, you might check to see whether or not there are other organizations which also organize networks or if there are networks which the group does not control. If you fail on all counts, you might try some other hobby!