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Chapter 8

Routing Vulnerabilities

The graphic visualization of the Internet is usually presented as a mesh of connections among millions of nodes engaged in the transmission of billions of messages. These connections can be local (administered by the owner of the systems connected to the node) or general (the owner is responsible for a node or several nodes). The primary difference is the extent of control over the connected systems to the node(s).

The major nodes' job is to transmit messages, but, depending on the node type, they could be labeled a *bridge*, *repeater*, *hub,* or *router*. The most important of these are the routers. Routers are not only intermediaries for transmitting messages, but they may be used as separators between various networks. This means that some messages circulating in one network may be prevented from penetrating another. In handling the messages, routers know which destination addresses lie on which networks it is connected to, and it does not let traffic spread into irrelevant parts of the system. A visual representation of such a network is presented in Figure 8.1.

To a large extent, this structure resembles traditional mail activities. Similar to traditional postal services, Internet messages are accepted without much verification as to the authenticity of a sender or detailed verification of the message content prior to accepting a message delivery. The underlying nature of the Internet infrastructure can be summarized by stating that the nodes are to be considered trustworthy and cooperative. There are, however, the following significant differences.

- In the traditional mail system, within one country there is usually only one agency transporting the mail (excluding courier and similar agencies), while on the Internet, there are many.
- The traditional mail system usually transports the mail via the same routes. In the Internet, the messages may travel various routes that are chosen according to traffic conditions and other operational parameters. In addition, the total package (file) can be fragmented and each fragment dispatched through different routes.

Anyone interested in telecommunication protocols may notice that the major concern of the designers is to deliver messages from the source to a destination in the quickest way without changes in content. These *honest* assumptions were discovered by people who intended to use the telecommunication facilities for

Figure 8.1: Visual representation of a network (retrieved from http://starlight.pnl.gov)