Data communication protocols can have a great number of characteristics by which to categorize them: for example, applications supported, geography, which technology is implemented, and who the users are. An important distinction among networks is whether the communication protocols are Connectionless or Connection-Oriented ("Connection-Oriented and Connectionless Protocols", 2010). In order to determine which network protocol is preferable, a point by point comparison of each protocol’s advantages and design issues is necessary. This essay will compare these two network protocols.

HANDLING PACKETS

Connection-Oriented data communication involves a call being set up from one computer to another. All data packets are then transmitted and, in turn, received by each computer on the same network path established by the call. When the stream of packets has been successfully transmitted, the call terminates. On the other hand, in Connectionless data communications no call is set up between sender and receiver. Instead, messages are broken down into individual packets of data, which are transmitted separately. In this way individual packets can take different network paths to get from the sender to the receiver (“Lesson 14: Connection-Oriented vs. Connectionless”, 2000).

ADDRESSING REQUIREMENTS

In Connectionless communications, each individual packet must have the full source and destination address information in order to ensure that each packet gets from the sender to the receiver. This is not necessarily so for Connection-Oriented data communications. When a call is set up, a virtual circuit can be established, at which point the packets would simply need a virtual circuit number rather than the full source and destination address (“Lesson 14: Connection-Oriented vs. Connectionless”, 2000).

RESOURCE ALLOCATION

Another comparison point between Connectionless and Connection-Oriented communication is resource management. In Connection-Oriented communications, both the sending computer and the receiving computer must establish and maintain an open call (“Lesson 14: Connection-Oriented vs. Connectionless”, 2000). Maintaining an open call between sender and receiver means that resources on both ends will need to be reserved until the call is closed. In Connectionless communications, however, there is no need to reserve resources in either the sending or receiving computers.

STATE INFORMATION and NODE/SWITCH CRASH

In Connection-Oriented communications, when a virtual circuit is set up between computers they will monitor the call. In this way, state information is stored at each of the network nodes to ensure that the call is still open. If there is a node or switch failure, all of the calls thru that node fail. Connectionless communications do not need to store state information. Moreover is a node or switch crashes, only packets at that node are lost (“Lesson 14: Connection-Oriented vs. Connectionless”, 2000).

LATENCY and ADAPTING TO CONGESTION

The latency of transmission of packets across a network is dependant on traffic. Both Connectionless and Connection-Oriented communication protocols are susceptible to latency. However, Connection-Oriented protocols have an advantage over Connectionless protocols in terms of their ability to adapt to network congestion. If a Connection-Oriented protocol makes use of a virtual circuit, then data can be buffered (“Lesson 14: Connection-Oriented vs. Connectionless”, 2000). Assuming there is sufficient buffers allocated by the sending and receiving computers, latency can be mitigated by Connection-Oriented protocols.

CONCLUSION

Choosing a communication protocol can be based on any of the aforementioned characteristics of the Connectionless and Connection-Oriented types. Connectionless protocols put less demands on resources and allow the transmission of a majority of packets when a node crashes. On the other hand, Connection-Oriented protocols provide the ability to mitigate latency through buffering. Although Connection-Oriented protocols require more resources, they are better able to control data flow and recover when latency occurs. Ultimately, deciding which protocol to use will depend on how reliable the data communication needs to be ("Connection-Oriented and Connectionless Protocols", 2010). My opinion is that a reliable network is more important than a potentially fast network that is intermittent at best. As such, I would choose Connection-Oriented protocols over Connectionless protocols.

REFERENCES

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