**Review of "The Design Philosophy of the DARPA Internet Protocols", David Clark, ACM SIGCOMM 1988.**

This paper aims to clarify the design goals and considerations that went into building the TCP / IP protocol suite. The paper highlights the tradeoffs made and tries to assess the impact of these design decisions on the future evolution of TCP/IP as it is increasingly deployed in the internet. The author does not only stop in describing the existing Internet protocols, but also shows the imperfect parts of the Internet architecture and the goals that current protocols haven't reached yet. I was particularly interested in the explanations of how the relative priority of the different goals affected the protocols.

The internet protocol was very effective in meeting its original set of priorities, but was not designed to meet the priorities of today. If designed today the internet protocol would assign much different weights to the set of goals when defining. Some of the goals that were lower in importance when the internet was created were less effectively met and have now become serious shortcomings.

The paper barely addresses alternatives that were considered. I would like to know which design decisions were strongly contested. It does not explore the protocols that might have resulted from different goal prioritization. New types of networks and technologies are connected to the Internet without reengineering of the protocols, the Internet generally functions well in the face of failure, and new types of services are   
delivered without changes to the underlying protocols. However, the protocols do not lend themselves to lower priority goals such as resource accounting, and I would have liked more about alternatives that address these goals.

The author did make some suggestions of flow monitoring or soft state, but says very little to back this up. He says it may well permit us to reach our goals, but offers no reassurance, and leaves it open as a type of exploration, not a solution. The author also does not give a convincing explanation as to why packet switching was chosen. It merely compares with circuit switching and uses remote login as an application to justify the choice of packet switching. The reasoning could have been more sound.

One possible drawback with the design as presented, is the fact that these design goals might not hold in today's Internet which is far more inhomogeneous in terms of actual network components as well as types of service required for content and management. The goals of a protocol suite would probably place more emphasis for instance on accountability and ease of management. Also glaring, is the omission of the network security aspect and the behavior of the network in the presence of malicious entities either at the ends or the core of the network. This seems like a critical necessity in today's internet and it would seem that a protocol suite with security as a design goal would prove quite different from the current TCP/IP design.

System researchers and builders should recognize that in ever changing environment of the internet priorities often change. It is not the ability to immediately satisfy all priorities, but rather the ability to adapt to meet the priorities of tomorrow. It was a large step to move from networks which had been traditionally circuit switched to the packet switched internet. The use of datagrams allows much more flexibility in dealing with unlike systems than continuous streams would allow. It is also important to realize that sessions can still be used in the datagram model by creating a virtual circuit. The issue of survivability that was once so important to the military is pretty much non-existent due to the extreme redundancy built into the topology of the internet today. Much more important today is the issue of performance. Performance was not a large issue when the internet was created, but could now be considered the most important issue. TCP/IP has adapted to fit the current day needs, but it is evident by the ordering of priorities when created that the protocol was not designed for the present day internet.