ADVANTAGES OF UDP OVER TCP IN A WIRELESS ENVIRONMENT

A LONG TIME AGO AT A CUSTOMER SITE FAR FAR AWAY...

We had been working straight for two weeks. Exhausted and yet successful we would be heading home.

Sitting there eating breakfast and sipping a cup of java we were surprised to overhear a conversation at a table next to us. Apparently it was a breakfast meeting with folks from a major telephony carrier with some customers.

"*TCP has inherent problems…*"

Yes, we knew that we had been compensating for them all week.

"If you turn keep alive on, your connection may have problems shutting down…"

Yes we had seen this one. Keep alive is a TCP option to keep an idle connection open longer. The default for most systems is two hours.

"You can implement pinging, but this may not help you as the data sent out prior may clog your ping and then you will never know if the other side is still running or not. Plus pinging uses up bandwidth further exacerbating the problem…"

Our jaws dropped. it's a small world and the person next to us was describing issues which we had encountered. In a fixed LAN environment TCP is a nice protocol. But in a wireless environment it poses all sorts of problems.

For example TCP may buffer data sent by an application until enough data is gathered to send. (Nagle's Algorithm) This can make things tough for smaller transmissions of data. UDP transmits immediately

TCP may also reassemble data sent into larger packets. With UDP, what you send from one side is the same size on the other.

RADIUS servers use UDP as their primary protocol and not TCP. The major reason is the ability to have direct control of retransmissions and not wait for a timeout from a TCP send. In some cases this could be up to two minutes. This is a ridiculous time to redirect a connection to a server, much less submit to an end user on a PDA. RADIUS stands for Remote Authentication Dial-in User Service. RADIUS is a protocol that provides authentication, authorization and accounting services.

Differences in UDP and TCP

UDP stands for User Datagram Protocol while TCP is Transmission Control Protocol. Both are two types of internet protocols. UDP is a simpler

than TCP. TCP guarantees delivery of data and does so most of the time. UDP is more of a send and pray protocol. Because of this, implementations utilizing UDP need to handle packet assembly, sequencing issues and dropped packets carefully.

UDP is byte orientated and TCP is stream orientated.

UDP is stateless. TCP is stateful.

UDP is connectionless. TCP must maintain a connection.

Those reasons are why UDP presents itself as a good protocol for wireless environments where roaming and power management create issues which bring out the worst in TCP .

Moving in and out of range presents problems when using TCP. The connection will be dropped and it will take some time for this to happen creating lags in interactive use.

All 802.11 devices must support power saving polling mode (PSP). If PSP is enabled on a device it allows the processor a little time to "sleep". This continuous habit of catnaps is enough to reduce power consumption and provide longer times between battery recharges. The problem is a constant connection and PSP mode and are like fire and water.

Mobility across subnets is another issue. The typical methods to handle this are utilization of DHCP (Dynamic Host Configuration Protocol) or Mobile IP. DHCP is simply a server handing out reserved IP addresses for a certain leased amount of time. Mobile IP is where a server maintains a constant connection with and for a device as it roams across subnets.

The problem with Mobile IP is lack of availability and widespread use. It is extremely complex to deploy.

DHCP poses connectivity issues because it forces the end user typically to reboot the device in order to "reassign" an IP address.

A client having a connectionless protocol and only "conversing" with a server when necessary resolves some of the roaming and power consumption issues. (Note: the newer Strongarm chips and OS versions are offering better power savings).