TCP/IP in details

TCP sliding window

sequence number

initial sequence number was exchanged, then it incremented by the size of data sent in bytes.

http://www.tcpipguide.com/free/t_TCPSlidingWindowDataTransferandAcknowledgementMech-5.htm

sliding window

1. The window closes as the left edge advances to the right. This happens when data is sent and acknowledged. and it will cause the 2.

2. The window opens when the right edge moves to the right, allowing more data to be sent. This happens when the receiving process on the other end reads acknowledged data, freeing up space in its TCP receive buffer.

3. The window shrinks when the right edge moves to the left. The Host Requirements RFC strongly discourages this, but TCP must be able to cope with a peer that does this.

http://www.uic.rsu.ru/doc/inet/tcp_stevens/tcp_bulk.htm#20_3

congestion window

Slow start adds another window to the sender's TCP: the congestion window, called cwnd. When a new connection is established with a host on another network, the congestion window is initialized to one segment (i.e., the segment size announced by the other end). [Client maintains a congestion window (cwnd).

Initially the window is set to lower of the maximum TCP segment size and receiver's allowed window size. In most cases the segment size is smaller than receiver window, thus cwnd is set to the maximum TCP segment size, for instance MSS: 512, receiver's allowed windows size: 65535].

Each time an ACK is received, the congestion window is increased by one segment, (cwnd is maintained in bytes, but slow start always increments it by the segment size.) The sender can transmit up to the minimum of the

congestion window and the advertised window. This behavior continues until the congestion window size (cwnd) reaches the size of the receiver's advertised window or until a loss occurs.

When a loss occurs half of the current cwnd is saved as a Slow Start Threshold (SSThresh) and slow start begins again from its initial cwnd. Once the cwnd reaches the SSThresh TCP goes into congestion avoidance mode where each ACK increases the cwnd by SS*SS/cwnd. This results in a linear increase of the cwnd.

The congestion window is flow control imposed by the sender, while the advertised window is flow control imposed by the receiver.

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layer 2

True original Ethernet vs 802.3

http://www.erg.abdn.ac.uk/users/gorry/eg3567/lan-pages/llc.html

The IEEE 802.3 standard for Ethernet defines an additional data link layer protocol called the Logical Link Control (LLC) protocol. This operates on top of the MAC protocol defined in the original Ethernet standard (the "Blue Book").

- 802.3 covers an entire set of CSMA/CD networks,

- 802.4 covers token bus networks,

- 802.5 covers token ring networks.

Common to all three of these is the 802.2 standard that defines the logical link control (LLC) common to many of the 802 networks.

IEEE 802.2/802.3 encapsulation (RFC 1042) vs Ethernet encapsulation (RFC 894).

original true Ethernet :

802.3 encapsulation:

Fortunately none of the valid 802 length values is the same as the Ethernet type values, making

the two frame formats distinguishable.

http://www.uic.rsu.ru/doc/inet/tcp_stevens/link_lay.htm

HDLC, SLIP,PPP

http://www.lincoln.edu/math/rmyrick/ComputerNetworks/InetReference/64.htm

Most serial links use HDLC or some varient of it. Dialup modem lines first used SLIP, but PPP is now preferred. Both are HDLC-based, but PPP is more elaborate. ISDN's D channel uses a slightly modified version of HDLC. Cisco routers' default serial link encapsulation is HDLC.

HDLC:

SLIP:

PPP:

in fact, Using the link control protocol, most implementations negotiate to omit the constant address and control fields and to reduce the size of the protocol field from 2 bytes to 1 byte. If we then compare the framing overhead in a PPP frame, versus the 2-byte framing overhead in a SLIP frame , we see that PPP adds three additional bytes: I byte for the protocol field, and 2 bytes for the CRC

Address Field—Contains the binary sequence 11111111. As PPP directly connects two nodes in a network, the

address field has no particular meaning.

PPP provides the following advantages over SLIP: (1) support for multiple protocols on a

single serial line, not just IP datagrams, (2) dynamic negotiation of the IP address for each end (using the IP network control protocol) ??? i don't understand this

type MTU bytes

PPP 296

Ethernet 1500

802.31496

SPT

SPT FLASH animation

http://www.cisco.com/image/gif/paws/10556/spanning_tree1.swf

4 states.

A switch port on a 2960 comes up with a default configuration on VLAN 1. What happens from the perspective of spanning-tree?

* First, the port comes up on blocking mode. This is to make sure that loops aren’t created without first listening to the network to see what’s going on.

* Next, if the port may be a root or designated port, the port is moved to the listening state. In this state, the port can only receives BPDUs only. so it can discover the other switches participating in STP.

* After the forwarding delay, the port goes into the learning state. In this state, the port can send and receive BPDUs.

* After the forwarding delay again, the port goes into the forwarding state. The port can now send and receive data.

http://www.cisco.com/univercd/cc/td/doc/product/rtrmgmt/sw_ntman/cwsimain/cwsi2/cwsiug2/vlan2/stpapp.htm

http://aconaway.com/2009/05/21/bcmsn-notes-stp-states/

misc

- Bridge ID is a field of 8 bytes, that includes a 2-byte priority and a 6-byte MAC address.

- The switch looks at three components of the BPDU to determinate the root port:

- Lowest path cost to root bridge
- Lowest sender Bridge ID
- Lowest port priority/port ID

1. traffic is classified

2. Once traffic has been classified the next step is to ensure that it receives special treatment in the routers. This brings into focus scheduling and queuing.(WFQ,)

3. Traffic shaping becomes necessary when Layer 3 traffic must be shaped to a desired set of rate parameters to enforce a maximum traffic rate. The result will be a smooth traffic stream1. Traffic shaping queues and forwards data streams (as opposed to dropping excess traffic) so as to conform to agreed upon Service Level Agreements (SLAs).

4. Congestion avoidance could be defined as the ability to recognize and act upon congestion on the output direction of an interface so as to reduce or minimize the effects of that congestion.

Source: http://manoftoday.wikidot.com/network#toc26