

# SerializationDelay

## Serialization Delay (or *Transmission Delay*)

Serialization delay is the time it takes for a unit of data, such as a packet, to be serialized for transmission on a narrow (e.g. serial) channel such as a cable. Serialization delay is dependent on size, which means that longer packets experience longer delays over a given network path. Serialization delay is also dependent on channel capacity ("bandwidth"), which means that for equal-size packets, the faster the link, the lower the serialization delay.

Serialization delays are incurred at processing nodes, when packets are stored-and-copied between links and (router/switch) buffers. This includes the copying over internal links in processing nodes, such as router backplanes/switching fabrics.

In the core of the Internet, serialization delay has largely become a non-issue, because link speeds have increased much faster over the past years than packets sizes. Therefore, the "hopcount" as shown by e.g. traceroute is a bad predictor for delay today.

## Example Serialization Delays

To illustrate the effects of link rates and packet sizes on serialization delay, here is a table of some representative values. Note that the maximum packet size for most computers is 1500 bytes today, but 9000-byte "jumbo frames" are already supported by many research networks.

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Link Rate	64 kb/s	1 Mb/s	10 Mb/s	100 Mb/s	1 Gb/s	10 Gb/s
Packet Size						
64 bytes	8 ms	0.512 ms	51.2 $\mu$ s	5.12 $\mu$ s	0.512 $\mu$ s	51.2 ns
512 bytes	64 ms	4.096 ms	409.6 $\mu$ s	40.96 $\mu$ s	4.096 $\mu$ s	409.6 ns
1500 bytes	187.5 ms	12 ms	1.2 ms	120 $\mu$ s	12 $\mu$ s	1.2 $\mu$ s
9000 bytes	1125 ms	72 ms	7.2 ms	720 $\mu$ s	72 $\mu$ s	7.2 $\mu$ s

– Main.SimonLeinen - 28 Oct 2004 - 17 Jun 2010