Round Trip Time

Round-Trip Time (RTT)

Round-trip time (RTT) is the total time for a packet sent by a node A to reach is destination B, and for a response sent back by B to reach A.

Decomposition

The round-trip time is the sum of the one-way delays from A to B and from B to A, and of the time it takes B to send the response.

Impact on end-to-end performance

For window-based transport protocols such as TCP, the round-trip time influences the achievable throughput at a given window size, because there can only be a window's worth of unacknowledged data in the network, and the RTT is the lower bound for a packet to be acknowledged.

For interactive applications such as conversational audio/video, instrument control, or interactive games, the RTT represents a lower bound on response time, and thus impacts responsiveness directly.

Measurement

The round-trip time is often measured with tools such as ping (Packet InterNet Groper) or one of its cousins such as fping, which send ICMP Echo requests to a destination, and measure the time until the corresponding ICMP Echo Response messages arrive.

However, please note that while round-trip time reported by PING is relatively precise measurement, some network devices may prioritize ICMP handling routines, so the measured values do not correspond to the real values.

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Improving the round-trip time

The network components of RTT are the one-way delays in both directions (which can use different paths), so see the OneWayDelay topic on how those can be improved. The speed of response generation can be improved through upgrades of the responding host's processing power, or by optimizing the responding program.

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