

TReK Frequently Asked Question

Question

How are the Telemetry Processing Queues used and when should the values be changed?

Answer

This paper explains in more detail the queues referenced in the “SET TELEMETRY PROCESSING OPTIONS/ADVANCED” dialog. The first queue referenced is the Network Packet Queue. This queue’s primary purpose is to provide short-term storage while TReK identifies the packet and determines whether the packet should be processed (pull parameters out of the packet), recorded and or forwarded. It should be sized to handle two different worst-case scenarios. The first scenario concerns receiving burst of packets from the network. Since UDP is an asynchronous, connectionless protocol, packets can arrive in bursts or rates much higher than the POIC’s data distribution system originally transmitted. To avoid overflowing the network cards buffer in this burst scenario, packets are immediately stored in this queue prior to identifying the packets. This queue should therefore be large enough to handle the worst-case burst scenario when packets arrive at a rate that is faster than TReK’s identification software.

The second scenario that helps determine the size of the Network Packet Queue involves the amount of work that TReK is trying to perform (e.g., processing packets, recording packets, forwarding packets...) while receiving the packets from the network. For example, if TReK is trying to process more packets than it can handle or the PC’s resources (CPU) are being hogged by another application, the Network Packet Queue will start to fill up. When the Network Packet Queue reaches its Warning Threshold size, TReK will issue a warning message identifying the problem. When the Network Packet Queue reaches its max size it flushes and all the packets in the queue are dropped and a message is generated identifying the problem. However, these messages are only generated once every 5 minutes because they can be rather annoying to see every time the warning threshold is crossed or the queue is flushed. So, the Network Packet Queue should be sized to handle the burst scenario and the peak usage scenario. Note, if the only activity being performed on the PC is TReK and the Network Packet Queue starts to fill up because TReK is unable to process the packets fast enough, increasing the size of this queue will not help (a faster CPU or additional CPUs is one solution, defragging memory or adding more memory may also help).

You can monitor the Network Packet Queue on the Port Statistics dialog. Each port has its own Network Service Queue. The Pkts Queued value is a snapshot of the number of packets in the Network Packet Queue. The Pkts Dropped value is the sum of the number of packets that were flushed from the Network Packet Queue. If you start seeing the Pkts Dropped value growing, you might try increasing the size of the Network Packet Queue. This may help the problem but if the machine’s resources are the limiting factor (CPU speed) than increasing the queue size will not help.

The remaining three queues referenced by the “SET TELEMETRY PROCESSING OPTIONS/ADVANCED” dialog are the Process, Forward and Record queues. These queues are intermediate storage areas created to facilitate transferring packets.

You can monitor the Process, Forward and Record queues on the Packet Statistics dialog. The Process Pkts Dropped value is the sum of the number of packets that were dropped because the queue was full. The Forward and Record queue statistics operate the same way. If you start seeing the Pkts Dropped value growing for any one of these queues you might try increasing its size. This may help the problem but if the machine’s resources are the limiting factor (CPU speed) then increasing the queue size will not help.

A very good rule to follow when receiving high packet rates (rates greater than or equal to 100 packets per second) is to set the size of TReK’s queues equal to the number of expected packets per second. For example, if you are receiving, processing and recording a packet that is being sent at a rate of 200 packets per second, you should increase the sizes of the Network Packet Queue, Process Packet Queue, and Record Packet Queue to 200.

Another important point to keep in mind when sizing these queues is that the size determines how much memory the queues must pre-allocate. You should avoid making them unnecessarily large since this could also impact TReK’s performance.