

TReK Frequently Asked Question

Question

How are the Packet Statistics and Port Statistics calculated and what do they mean?

Answer

The Packet Statistics dialog in the Telemetry Processing application contains information on how much data TReK is processing and if there are any errors identified when the packets arrive. This information is updated once every second. For each packet the number of packets received and dropped by TReK is calculated. The dropped packets are actually pulled from the network, but removed from the queues because TReK could not process them fast enough. Each packet is also checked for sequence errors. The CCSDS sequence count in the primary header is checked for each packet. If the packet is not the next in the sequence, the number of sequence errors will increment. The maximum packet sequence error for each packet is the maximum difference in sequence counts between successive packets.

On the Port tab, information about each port's data rate, packets received and packets queued are displayed. The packets received on a port are the total number pulled from the network. This number could include packets that were not identified as a packet that should be processed. The packets queued are the total number of packets waiting to be processed. The data rate information is provided to give a one second snapshot of the amount of data ingested by TReK. The maximum rates indicate the highest one-second rate. Since data is sent asynchronously, the data rate will naturally fluctuate. However, you should see a data rate that is close to your expected data rate.

For more detailed information about packet and port statistics, read the following or press the help button on the Telemetry Processing Statistics dialog.

Details

The following sections are from the Telemetry Processing Users Guide (also available online). They describe the different columns that can be added to the Telemetry Processing Statistics dialog for both the packet and port tabs. Following this information is a detailed discussion of how each statistic is generated and what it means.

Select Packet Statistics Columns Dialog

The Select Packet Statistics Columns dialog is shown in Figure 1. This dialog is used to configure the columns in the Packet tab of the Show Telemetry Processing Statistics dialog.

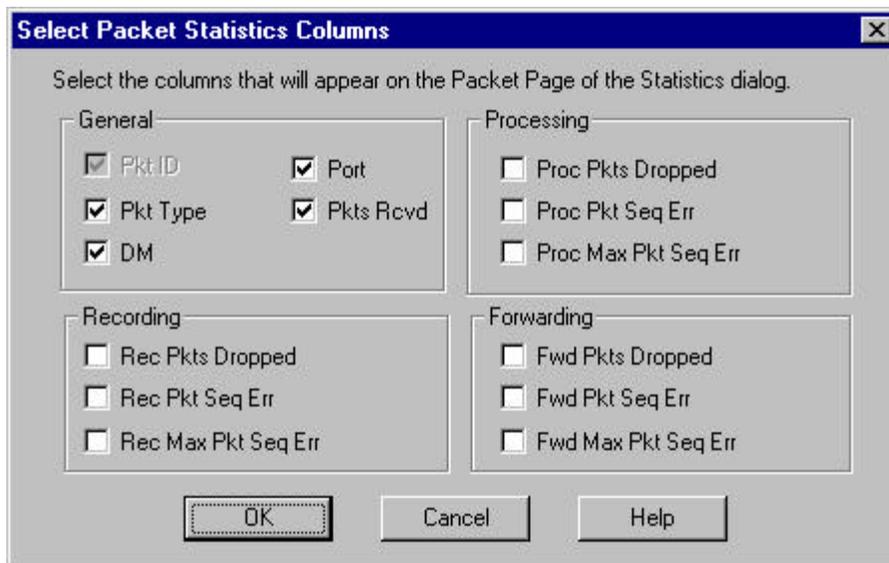


Figure 1 Select Packet Statistics Columns Dialog Box

Each field in the Select Packet Statistics Columns dialog is described below.

Pkt ID

Pkt ID is short for Packet ID. It represents the Packet ID (or APID). The Pkt ID column cannot be hidden.

Pkt Type

Pkt Type is short for Packet Type. If you check the Pkt Type button, the Pkt Type column will be displayed.

DM

DM is short for data mode. If you check the DM button, the DM column will be displayed.

Port

The port. If you check the Pkt Type button, the Pkt Type column will be displayed.

Pkts Rcvd

Pkts Rcvd is short for Packets Received. It represents the number of packets received. If you check the Pkts Rcvd button, the Pkts Rcvd column will be displayed.

Proc Pkts Dropped

Proc Pkts Dropped is short for Processed Packets Dropped. It represents the number of packets which you indicated should be processed that were dropped (not processed). If you check the Proc Pkts Dropped button, the Proc Pkts Dropped column will be displayed.

Proc Pkt Seq Err

Proc Pkt Seq Err is short for Processed Packet Sequence Error. It represents the number of packet sequence errors that occurred for a packet that is being processed. A packet sequence error occurs when a packet arrives out of order (i.e. TReK expects a packet with a sequence count of six but instead receives a packet with a sequence count of seven). If you check the Proc Pkt Seq Err button, the Proc Pkt Seq Err column will be displayed.

Proc Max Pkt Seq Err

Proc Max Pkt Seq Err is short for Processed Maximum Packet Sequence Error. It represents the maximum packet sequence error that occurred for a packet that is being processed. TReK determines the maximum packet sequence error by calculating the delta or difference between the expected packet sequence count and the actual packet sequence count. If you check the Proc Max Pkt Seq Err button, the Proc Max Pkt Seq Err column will be displayed.

Rec Pkts Dropped

Rec Pkts Dropped is short for Record Packets Dropped. This number represents the number of packets that should have been recorded but were dropped when TReK attempted to retrieve the packets from the network. This number is not related to packets that could not be recorded due to some type of recording problem (disk full, error creating recording file, etc.). There is no statistic available that will tell you how many packets TReK could not record in a file. If you check the Rec Pkts Dropped button, the Rec Pkts Dropped column will be displayed.

Rec Pkt Seq Err

Rec Pkts Seq Err is short for Record Packet Sequence Error. It represents the number of packet sequence errors that occurred for a packet that is being recorded. If you check the Rec Pkt Seq Err button, the Rec Pkt Seq Err column will be displayed.

Rec Max Pkt Seq Err

Rec Max Pkts Seq Err is short for Record Maximum Packet Sequence Error. It represents the maximum packet sequence error that occurred for a packet that is being recorded. If you check the Rec Max Pkt Seq Err button, the Rec Max Pkt Seq Err column will be displayed.

Fwd Pkts Dropped

Fwd Pkts Dropped is short for Forward Packets Dropped. It represents the number of packets that you indicated should be forwarded that were dropped (not forwarded). If you check the Fwd Pkts Dropped button, the Fwd Pkts Dropped column will be displayed.

Fwd Pkt Seq Err

Fwd Pkt Seq Err is short for Forward Packet Sequence Error. It represents the number of packet sequence errors that occurred for a packet that is being forwarded. If you check the Fwd Pkt Seq Err button, the Fwd Pkt Seq Err column will be displayed.

Fwd Max Pkt Seq Err

Fwd Max Pkt Seq Err is short for Forward Maximum Packet Sequence Error. It represents the maximum packet sequence error that occurred for a packet that is being forwarded. If you check the Fwd Max Pkt Seq Err button, the Fwd Max Pkt Seq Err column will be displayed.

Select Port Statistics Columns Dialog

The Select Port Statistics Columns dialog is shown in Figure 2. This dialog is used to configure the columns in the Packet tab of the Show Telemetry Processing Statistics dialog.

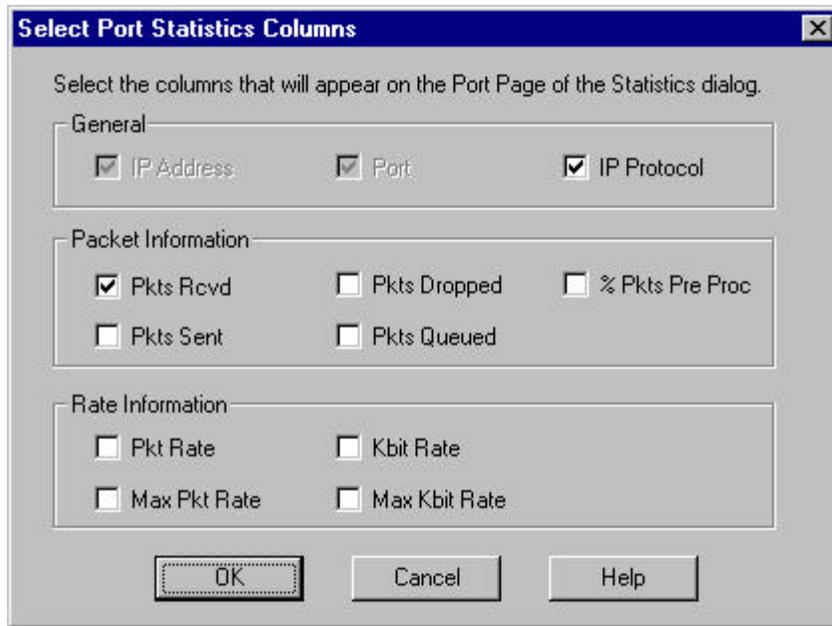


Figure 2 Select Port Statistics Columns Dialog Box

Each field in the Select Port Statistics Columns dialog is described below.

IP Address

IP Address. The IP Address column cannot be hidden.

Port

Port. The Port column cannot be hidden.

IP Protocol

The IP Protocol – either UDP or TCP. If you check the IP Protocol button, the IP Protocol column will be displayed.

Pkts Rcvd

Pkts Rcvd is short for Packets Received. It represents the number of packets received on the port identified in the port column. If you check the Pkts Rcvd button, the Pkts Rcvd column will be displayed.

Pkts Dropped

Pkts Dropped is short for Packets Dropped. It represents the number of packets dropped from the port identified in the port column. If you check the Pkts Dropped button, the Pkts Dropped column will be displayed.

% Pkts Pre Proc

% Pkts Pre Proc is short for Percent of Packets Pre-Processed. It represents the percent of packets that were preprocessed on the port identified in the port column. If you check the % Pkts Pre Proc button, the % Pkts Pre Proc column will be displayed.

Pkts Sent

Pkts Sent is short for Packets Sent. It represents the number of packets that were forwarded from the port identified in the port column. If you check the Pkts Sent button, the Pkts Sent column will be displayed.

Pkts Queued

Pkts Queued is short for Packets Queued. It represents the number of packets that are currently queued on the port identified in the port column. The packets are queued and ready to be processed, recorded, or forwarded. If you check the Pkts Queued button, the Pkts Queued column will be displayed.

Pkt Rate

Pkt Rate is short for Packet Rate. It represents the number of packets received in the last second on the port identified in the port column. If you check the Pkt Rate button, the Pkt Rate column will be displayed.

KBit Rate

Kbit Rate is short for Kilobit Rate. It represents the number of kilobits per second that have been received on the port identified in the port column. If you check the KBit Rate button, the KBit Rate column will be displayed.

Max Pkt Rate

Max Pkt Rate is short for Maximum Packet Rate. It represents the maximum packet rate seen thus far on the port identified in the port column. If you check the Max Pkt Rate button, the Max Pkt Rate column will be displayed.

Max KBit Rate

Max KBit Rate is short for Maximum Kilobit Rate. It represents the maximum kilobit rate seen thus far on the port identified in the port column. If you check the Max KBit Rate button, the Max KBit Rate column will be displayed.

Statistic Generation

The statistics that can change are described below with examples where needed.

Packet Tab

Packets Received

The packets received are the total number of packets that are identified for this packet (APID, Packet Type, and Data Mode).

The following statistics are available for processing, recording, and forwarding. If you only have TReK process and record your data, you will have zeros in all of the forwarding columns on this dialog. In most cases the numbers for processing, recording, and forwarding will be the same. If they are different, it is important information that could be used in tracking the problem.

Packets Dropped

This indicates the number of packets dropped by processing, recording, or forwarding. This number indicates that the network retrieved the packets and successfully made them available for processing, recording, or forwarding, but the packet was deleted because TReK was unable to process the data fast enough. If this error occurs, it may indicate that the queue size needs to be increased. See the FAQ about TReK Queues on the TReK web site for more information.

For recording this could also indicate that a disk is filling up or is in need of defragmentation. Check the disk on which you are recording and fix these problems if they exist.

For forwarding, this could also indicate that the network is busy and the packet could not be forwarded. Possible solutions include a faster network or a computer with multiple network interfaces. Please contact the TReK Help Desk to discuss this type of problem before buying anything.

Packet Sequence Errors

This indicates the total number of packet sequence errors identified for this packet. The primary header of the CCSDS packet contains a 14-bit number that is used as a sequence count. For each packet that arrives, TReK checks the sequence count and compares it to the sequence count of the previous packet. If it is not the next in sequence, the packet sequence error value is incremented. The following examples should help explain this better.

Example 1:

Packets arrive with the following sequences 0, 1, 2, 3, 4, 5, and 6. No errors are generated since the packets arrived in order.

Example 2:

Packets arrive with the following sequences 6, 7, 9, 10, and 15. Two sequence count errors are generated here: One for the jump from 7 to 9 and one for the jump from 10 to 15.

Example 3:

Packets arrive with the following sequences 15, 16, 18, 17, 19, and 20. Three sequence counter errors are generated: One for the jump from 16 to 18, one for the negative sequence of 18 to 17, and one for the jump for 17 to 19. In this example, all of the packets arrived, but three sequence errors are generated.

Example 4:

Packets arrive with the following sequences 16382, 16383, 0, and 1. No errors are generated since TReK recognizes that the sequence count must reset to 0 after 16383.

Maximum Packet Sequence Error

This indicates the absolute value of the maximum delta between sequences that caused an error. The following examples should help explain this better.

Example 1:

Packets arrive with the following sequences 6, 7, 9, 10, and 11. The maximum sequence count error is 2 (7-9).

Example 2:

Packets arrive with the following sequences 12, 13, 15, 16, 17, 14, and 18. The maximum sequence count error is 3 (17-14).

Port Tab

Packets Received

This indicates the total number of packets received on this port. This could include packets that arrived, but were not packets that TReK was configured to process.

Packets Sent

This is only applicable to ports that are configured to forward data. This number indicates the number of packets actually forwarded from the port.

Packets Dropped

This indicates the number of packets dropped. This can occur when TReK is trying to process too much data or you don't have the queues sized large enough. See the FAQ on the TReK web page for more information.

Packets Queued

This number indicates the number of packets currently in the network queue. This number will frequently be something other than zero. If it is fluctuating, but is not increasing toward the queue limit no problems should occur.

Percentage of Packets Processed

This number indicates the percentage of packets currently processed. If the packets dropped and packets queued numbers are zero and data has been sent, this value will be 100%. If no packets have been dropped, but some are in the queue this value will be slightly less than 100%.

Packet Rate

This indicates the number of packets arriving on the port in the last second. This value is updated every second and includes packets that may not be processed on TReK. If you know how many packets to expect each second, this number should be close. Since data is sent asynchronously the value will fluctuate around your expected number. If the packet rate is much less than you expect and you are seeing sequence errors on the packet tab, this could be caused by poor network performance.

Maximum Packet Rate

This indicates the maximum packet rate.

Kbit Rate

This number indicates the number of kilobits of data arriving in the last second. This value along with the packet rate can help determine how much data you are trying to process. If you know how much data to expect (e.g., 2 Mbits/sec), this number should be

close (don't forget 2Mbits/sec will be displayed as 2000 Kbits/sec). Since data is sent asynchronously the value will fluctuate around your expected number. If the Kbit rate is much less than you expect and you are seeing sequence errors on the packet tab, this could be caused by poor network performance.

Maximum Kbit Rate

This indicates the maximum kilobit rate of data.

Final Thoughts

If you need to record this information for your own use or to help track down a problem when working with the help desk, you can do this. This capability is available on the Add a Packet dialog. If you have already activated the packet, you can use the Packet Properties dialog to make this change. Both of these dialogs are explained in the Telemetry Processing Users Guide and the online help for Telemetry Processing.