

Initiate precision packet captures to analyze zero window conditions

Published: 2024-09-05

In TCP metrics, window size specifies the amount of data that a device can receive and process during a flow. When the window size is zero, transmissions are halted until the device signals that it has the space to receive data again.

Zero window conditions that last 1 or 2 seconds are not too unusual, especially during periods of heavy traffic. However, longer-lasting zero window conditions can indicate a more serious problem and cause performance issues.

You can create a dashboard or configure alert notifications to track zero window occurrences, but the cause can be hard to determine. For example, CPU, memory, and NIC usage might be normal, and you don't know if the issue is with the network, the servers, or the application. But you can always find the truth in the packet!


In this walkthrough, you will create a trigger that captures packets with zero window conditions on HTTP transactions. Then, you will download the captures so that you can upload the data to a packet analyzer to help you determine the state of the client and server on a flow when zero window conditions occurred.

Prerequisites

- You must have either system and access administration privileges or full write privileges with packet access enabled.
- You must [enable packet capture through the Administration page](#).
- You must have a packet analyzer, such as Wireshark or Microsoft Network Monitor.
- Familiarize yourself with [Triggers](#) concepts and the procedures in [Build a trigger](#).

Write the precision capture trigger

In the following steps, you will write a trigger that initiates a precision packet capture each time a zero window condition occurs on an HTTP transaction.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. Click the System Settings icon  and then click **Triggers**.
3. Click **Create**.
4. Specify the following trigger configuration settings:
 - a) Type `Zero Window PCAP` into the **Name** field.
 - b) From the Events list, select **FLOW_TICK**.
 - c) In the Assignments field, type `HTTP Servers`, and then select **HTTP Servers**.
 - d) Select the **Enable debug log** checkbox.
 - e) Click **Show Advanced Options** and type `128` in the Bytes Per Packet to Capture field.



Tip: The default value is 0. Keep this value to capture all the bytes in each packet.

5. In the right pane, type the following code to initiate the packet capture when a zero window condition occurs:

```
// Check to make sure that this is an HTTP transaction
if ( Flow.l7proto != 'HTTP' ){
    return;
}
```


```
//The packet capture name, which includes the client and server
//IP addresses and port numbers
var pcapName = 'Zero Windows_'
  + Flow.client.ipaddr + ':' + Flow.client.port
  + '-'
  + Flow.server.ipaddr + ':' + Flow.server.port;

//Initiate packet capture each time a zero window occurs on
//the client or the server
if ( Flow.zeroWnd1 > 0 || Flow.zeroWnd2 > 0 ) {
  var opts = {
    maxPackets: 30,           // Capture up to 30 packets
    maxPacketsLookback: 15 // Capture up to 15 lookback packets
  };
  Flow.captureStart(pcapName, opts);
  //Show capture activity in debug log
  debug('Start Zero PCAP: ' + pcapName);
}
```

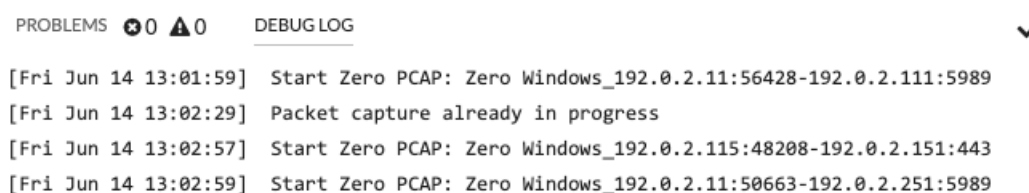
6. Click **Save**.

View debug output in the debug log

In the following steps, you will view the trigger debug output to confirm that the trigger is running and capturing packets. After you assign the trigger to your data sources, the system runs the trigger when HTTP traffic occurs, and if any transactions contain a zero window, the system sends debug results to the debug log.

1. Click the System Settings icon , and then click **Triggers**.
2. Click the **Zero Window PCAP** trigger you just created.
3. Click **Edit Trigger Script**.
4. Click the **Debug Log** tab.

The debug log displays results similar to the following figure:




The screenshot shows a 'DEBUG LOG' tab with a dropdown arrow. Below the tab, there are four log entries:

```
[Fri Jun 14 13:01:59] Start Zero PCAP: Zero Windows_192.0.2.11:56428-192.0.2.111:5989
[Fri Jun 14 13:02:29] Packet capture already in progress
[Fri Jun 14 13:02:57] Start Zero PCAP: Zero Windows_192.0.2.115:48208-192.0.2.151:443
[Fri Jun 14 13:02:59] Start Zero PCAP: Zero Windows_192.0.2.11:50663-192.0.2.251:5989
```

Download and view packet captures

In the following steps, you will download packet captures.

1. Log in to the ExtraHop system through `https://<extrahop-hostname-or-IP-address>`.
2. From the top menu, click **Records**.
3. Click **View Records**.
4. From the Record Type drop-down list, select **Packet Capture**.
5. After the records associated with your packet capture appear, click the Packets icon , and then click **Download PCAP**.