

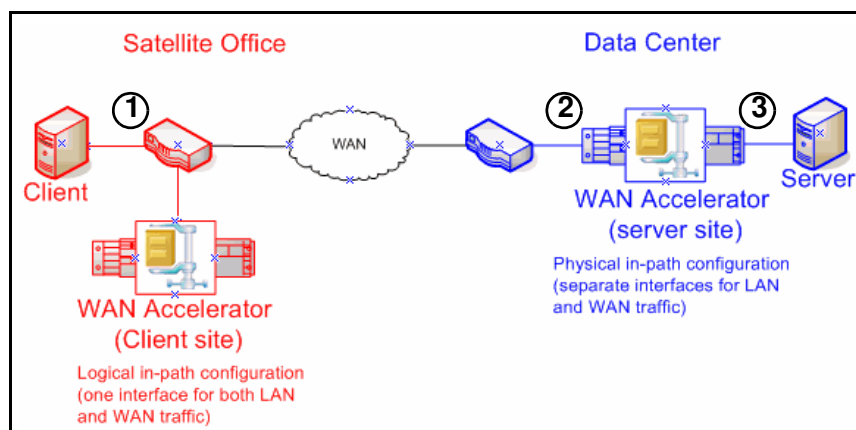
Troubleshooting a Network with WAN Accelerators

This tutorial demonstrates how to use AppTransaction Xpert to visualize and troubleshoot the effect of WAN accelerators on network and application performance.

In this network, a satellite office is connected to a data center over a 256 kbps leased line with a 50 ms latency. Management is unhappy with a client/server application that is deployed between these two sites. Tests show that a typical transaction takes 18 seconds. Because the leased line is slow, management authorizes the installation of a pair of WAN accelerators. These devices decrease the transaction time to about 16 seconds, but this is still too slow.

In this tutorial you will use AppTransaction Xpert to visualize the transaction from end-to-end and pinpoint the performance bottleneck.

Figure 5-1 Network Diagram and Capture Locations



Note the following accelerator characteristics:

- The client-site accelerator is in logical in-path configuration, which means that it uses one logical interface for both LAN and WAN traffic.
- The server-site accelerator is deployed in physical in-path configuration and uses two separate interfaces: one for LAN traffic, the other for WAN traffic.

The application developers captured the application on three different interfaces of the accelerators, which resulted in three packet traces:

- 1) Client-site traffic (LAN and WAN)
- 2) Server-site traffic (WAN only)
- 3) Server-site traffic (LAN only)

Network details:

- The local LAN speed at the satellite office and the branch office is 1Gbps
- The client, server, and accelerators have the following IP addresses:
 - Client: 192.168.70.100
 - Server: 192.168.71.200
 - Accelerator at satellite office: 192.168.73.2
 - Accelerator at data center: 192.168.71.4

Use the following workflow to determine the cause of the long delay in the WAN-accelerated application:

- Step 1: Opening the Packet Traces
- Step 2: Filtering Unrelated Traffic
- Step 3: Analyzing the WAN-Accelerated Application

Opening the Packet Traces

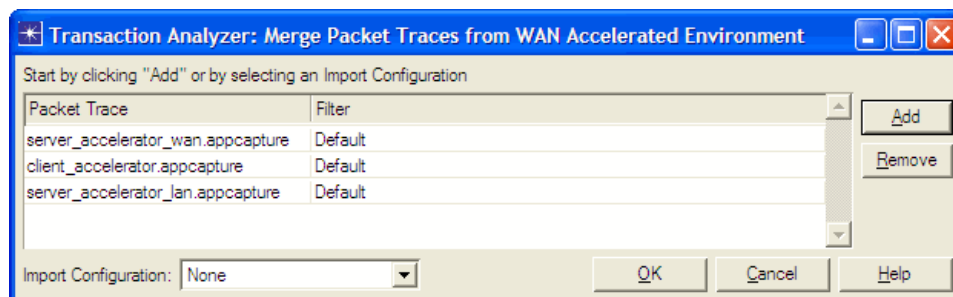
Start AppTransaction Xpert and open the packet traces containing the traffic, as described in the following procedure.

Procedure 5-1 Opening the Packet Traces

- 1 Start AppTransaction Xpert.
- 2 Choose **File > Open Packet Trace(s) > In Transaction Analyzer (WAN-accelerated Environment)...**
 - ➔ The **Merge Packet Traces from WAN Accelerated Environment** dialog box appears.
- 3 Click the **Add** button.
- 4 In the **Select Packet Traces for Merging** dialog box, navigate to the following directory, where *<reldir>* is the AppTransaction Xpert release directory:

<reldir>\sys\examples\AppTransaction Xpert\examples

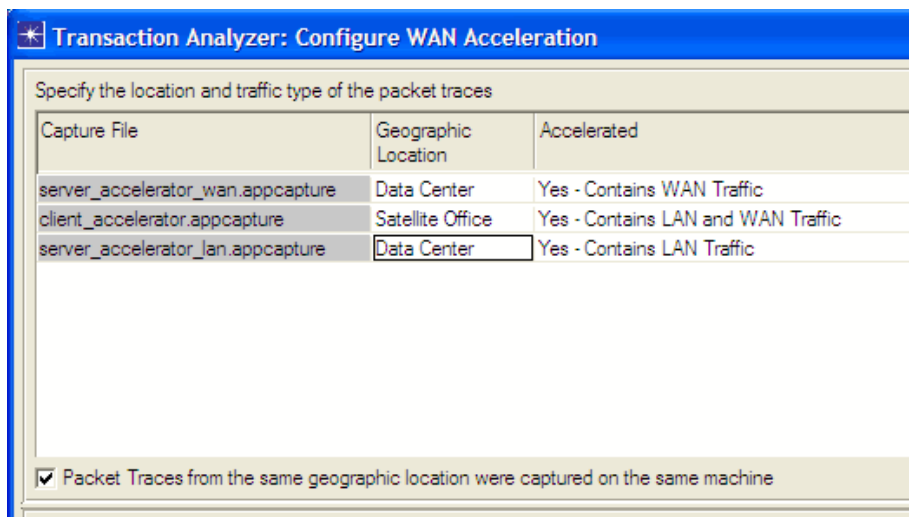
- 5 Hold down the Ctrl key and select the following packet traces:
 - client_accelerator
 - server_accelerator_lan
 - server_accelerator_wan
- 6 Click **OK**.
 - ➔ The selected files are added to the dialog box, as shown in the following figure.



- 7 Click **OK**.
 - ➔ The **Configure WAN Acceleration** dialog box appears.
- 8 The dialog box shows three sites (Site 1, Site 2, Site 3). Use the Network Diagram and Capture Locations figure as a guide and define the capture sites as follows:
 - server_accelerator_wan—Change “Geographic Location” to **Data Center**
 - client_accelerator—Change “Geographic Location” to **Satellite Office**

- server_accelerator_lan—Change “Geographic Location” to **Data Center**

➡ The dialog box fields should look as follows.



➡ Note that the topology pane now shows two sites (Satellite Office and Data Center) instead of the three sites that originally appeared (Site 1, Site 2, and Site 3.)

- 9 Notice that the “Packet Traces from the same geographic location were captured on the same machine” checkbox is selected. This is the default setting, and it is appropriate here because the two captures from the data center were captured on the same device.

- 10 Click **OK**.

➡ The **Rename Tiers** dialog box appears.

- 11 The Rename Tiers dialog box lets you rename the hostnames found in the capture data according to their corresponding tiers in the Transaction Analyzer model. AppTransaction Xpert usually detects WAN accelerators automatically. However, it is good practice to rename the hosts.

Configure the hostnames as follows:

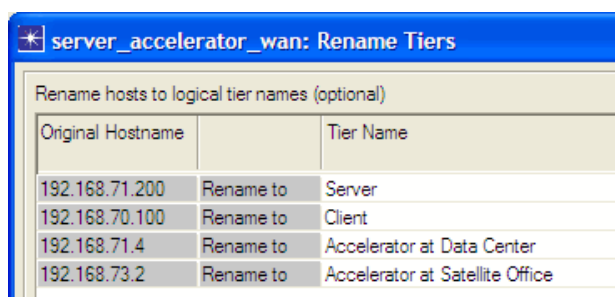
- Rename 192.168.70.100 to Client
- Rename 192.168.71.200 to Server

The mappings for the accelerators are correct already, so you need only verify that they are renamed as follows:

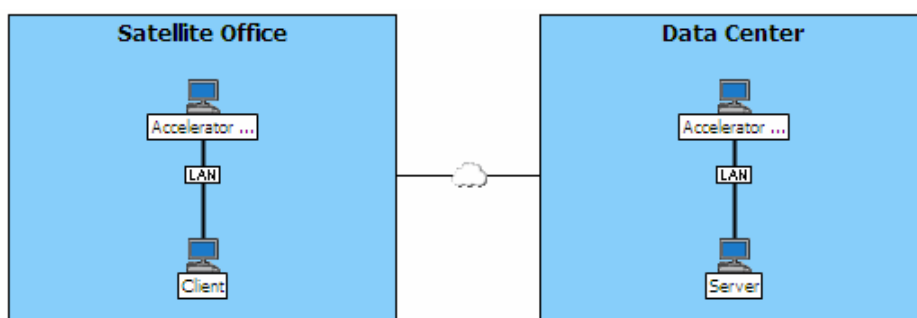
- 192.168.71.4 is Accelerator at Data Center

- 192.168.73.2 is Accelerator at Satellite Office

➡ The dialog box fields should look as follows.



- 12 Examine the network topology pane (at the bottom of the window) and verify that the network topology corresponds to the network where the application was captured.



The network topology pane is a good way to verify that the settings are correct. If your topology does not look like the one shown above, review the previous steps to see which ones you might have missed. If the topology does not look right when you are working with your own files (not tutorial files), see the product documentation for troubleshooting tips.

- 13 Click **OK**.

➡ The **Getting Started Analyzing an Application Transaction** window appears. If it does not, click the **Go** toolbar button in the Transaction Analyzer window.

End of Procedure 5-1

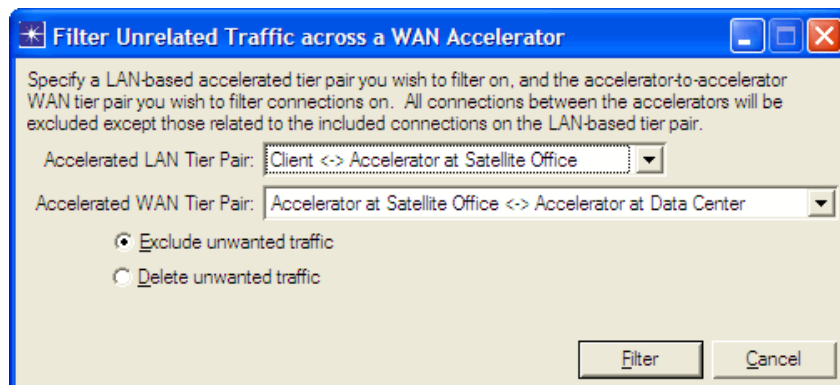
Filtering Unrelated Traffic

Some of the traffic in the packet traces may not be related to the application. You can filter this traffic from the model so that the model only includes conversations related to the WAN-accelerated application.

Procedure 5-2 Filtering Unrelated Traffic

- 1 Do one of the following:
 - In the **Getting Started** window, click the **Filter Unrelated Conversations** button.
 - Choose **Edit > Filter Unrelated Traffic (WAN Acceleration)**...

➔ The **Filter Unrelated Traffic across a WAN Accelerator** dialog box appears.
- 2 From the **Accelerated LAN Tier Pair** pull-down menu, select **Client <-> Accelerator at Satellite Office**, as shown in the following figure.



- 3 Use the default setting **Exclude unwanted traffic** to *exclude* rather than *delete* the unwanted traffic. Later, if you want to delete this traffic, you can do so from the Edit menu or from the Tree View.
- 4 Click the **Filter** button.

End of Procedure 5-2

Analyzing the WAN-Accelerated Application

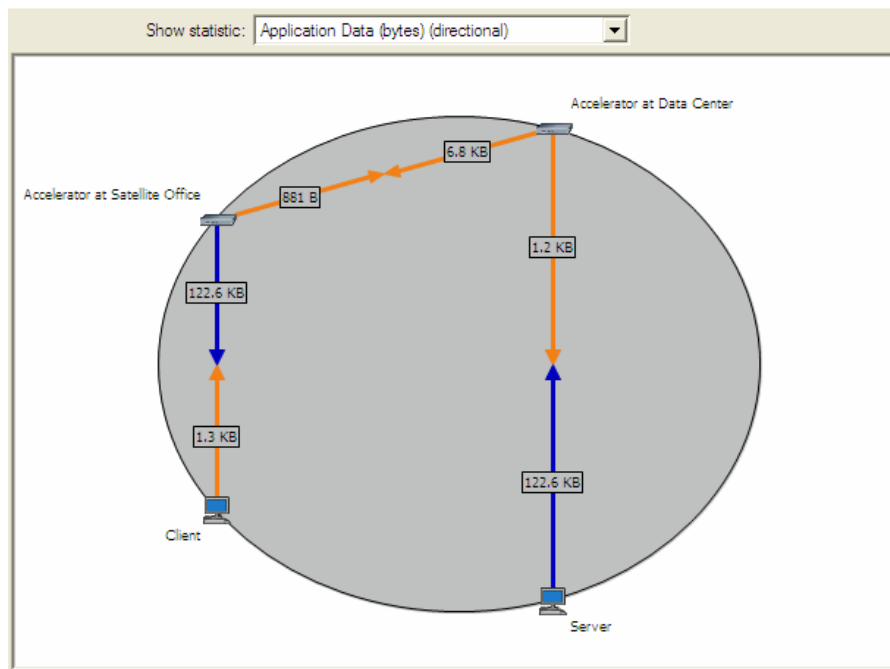
Now that we have merged the packet traces and filtered out unrelated traffic, we want to answer the following questions:

- Are the WAN accelerators reducing the data sent over the WAN?
- Why are the transactions still taking a long time to complete?

Typically, the Tier Pair Circle is a good place to start when analyzing a WAN-accelerated application. We want to see if the accelerators are reducing the amount of traffic between the satellite office and the data center.

Procedure 5-3 Analyzing the WAN-Accelerated Application: Tier Pair Circle

- 1 On the **Tier Pair Circle** tab, Set the **Show statistic** menu to **Application Data (bytes) (directional)**.



End of Procedure 5-3

In the Tier Pair Circle view, we see that the application is modeled as a 4-tier application that includes tiers for each accelerator.

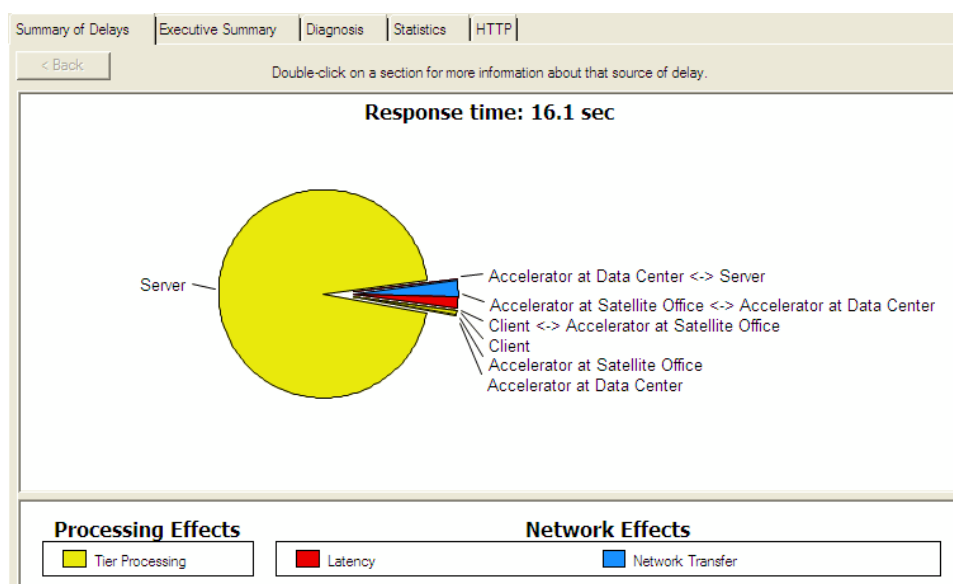
Note that 122.6 KB of traffic was sent from the server to the WAN accelerator at the data center, and the same amount of traffic was sent from the WAN accelerator at the satellite office to the client. This is what we expect, since the client should receive all of the data that the server sends. However, only 6.8 KB of traffic was sent on the leased line between the WAN accelerators. This indicates that the WAN accelerators are doing an excellent job of reducing the data sent between the satellite office and the data center.

Now, we will determine the primary causes of delay in this application.

Procedure 5-4 Analyzing the WAN-Accelerated Application: AppDoctor

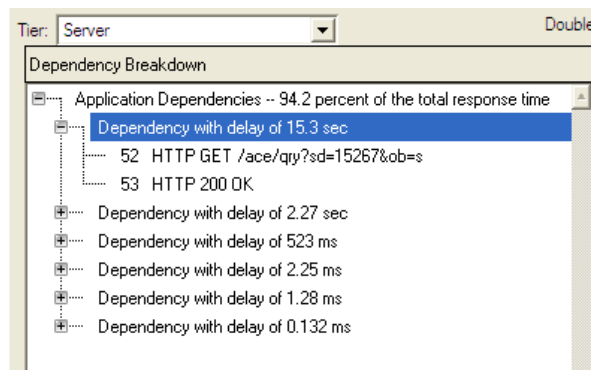
1 Choose **AppDoctor > Summary of Delays (AppDoctor Analysis)**.

➡ The AppDoctor Summary of Delays dialog box appears.



Notice that much of the response time is due to tier processing time on the server. The WAN accelerators greatly reduced the amount of traffic being sent between the two sites and this cut the response time down by 10.6% to 16.1 seconds per transaction. (Recall that it was originally 18 seconds per transaction.) It turns out that it is the large processing time on the server that keeps the application from performing at a satisfactory level.

2 Double-click on the Server section of the chart to see what is causing the delay.



The dependency breakdown shows that there is one HTTP request that is responsible for 15.3 seconds of the application's 16.1 second response time.

End of Procedure 5-4

Now that we know that the performance problem is caused by the high server response time—and not by an issue with the network—we can show our findings to the application developers.

When the developers look at the problematic query identified by AppTransaction Xpert, they realize that they need to tune a database index. Fixing this setting causes the response time for the transaction to drop to a satisfactory 2-second average.

Conclusion

In this tutorial, you found the root cause of high application delay for an application in a WAN-accelerated environment. In the process, you learned how to:

- Merge packet traces from a WAN-accelerated application into AppTransaction Xpert
- Filter traffic that was in the packet trace, but was not related to the transaction of interest
- Analyze the WAN-accelerated application in AppTransaction Xpert and identify the cause of performance issues