8 Creating a Transaction Analyzer Model

You can open one or more packet traces in AppTransaction Xpert to create a Transaction Analyzer file that models an application. When multiple packet traces are opened, AppTransaction Xpert merges the packet traces into one accurate, realistic model of the application. Thus, using AppTransaction Xpert, you can model highly complex application transactions that span multiple tiers.

The following table lists the different ways of opening packet traces, depending on your workflow.

Table 8-1 Opening Packet Traces in AppTransaction Xpert

To Open…	Operation	For more Information
Trace Explorer		
A single packet trace	**Menu Option:** • File > Open Packet Trace(s) > In Trace Explorer… **Right-Click Option:**[1] 1. Hold down the Ctrl/Shift key to select files. 2. Right-click and select “Open in Trace Explorer”.	Trace Explorer
Multiple packet traces (separate windows)	**Right-Click Option:**[1.] 1. Hold down the Ctrl/Shift key to select files. 2. Right-click and select “Open in Trace Explorer”.	

Table 8-1 Opening Packet Traces in AppTransaction Xpert (Continued)

To Open…	Operation	For more Information
Transaction Analyzer		
A single packet trace	**Menu Option:** • File > Open Packet Trace(s) > In Transaction Analyzer (Single Capture)… **Right-Click Options:**[1] • Open in Transaction Analyzer AppDoctor • Open in Transaction Analyzer Data Exchange Chart • Open in Transaction Analyze Tree View	Diagnosing Applications with AppDoctor Data Exchange Chart Tree View Tier Pair Circle
Multiple packet traces (separate windows)	**Right-Click Option:**[1] 1. Hold down the Ctrl/Shift key to select files. 2. Right-click and select one of the following: - Open in Transaction Analyzer AppDoctor - Open in Transaction Analyzer Data Exchange Chart - Open in Transaction Analyzer Tree View	
Multiple packet traces (Merge)	**Menu Option:** • File > Open Packet Trace(s) > In Transaction Analyzer (Simultaneous Captures)… • File > Open Packet Trace(s) > In Transaction Analyzer (WAN-accelerated Environment)…	Manual Merge (Synchronizing Packet Traces Manually) When You Can Import Multiple Packet Traces When You SHOULD NOT Import Multiple Packet Traces
Multiple packet traces (Batch)	**Menu Option:** • File > Open Packet Trace(s) > In Transaction Analyzer (Batch Analyzer)…	Batch Analyzer
Transaction trace(s) (.apptrace)	**Menu Option:** • File > Open Packet Traces > In Transaction Anayzer (Single Capture)… - and either of the following methods - **Manual Method**— File > Import Server Data > AppInternals Xpert Transaction Trace **Automatic Method—** Click the Download button on the toolbar **Right-Click Option:**[1] • Open With > OPNET 17.0	Transaction Trace Analysis **Note—**This feature requires that you have AppInternals Xpert to generate transaction trace (.apptrace) files. Additionally, the automatic method requires that you have implemented Transaction Trace Warehouse, which is included with AppInternals Xpert 8.0 and later.

1. Right-click options are available on Windows platforms only.

When packet trace(s) are opened, AppTransaction Xpert estimates and assumes default values for the network effects, including bandwidths, latencies, tier locations, and capture locations. You can re-define the default values to perform accurate analyses. For more information, see Defining the Network Effects.

Related Topics

- *Previewing and Extracting Traffic from Packet Traces*
- *Filtering Traffic*

Defining the Network Effects

When packet traces are opened, AppTransaction Xpert estimates and assumes default values for the network effects (bandwidth, protocol, and congestion). You can easily specify the network effects to perform accurate analyses.

Procedure 8-1 Defining the Network Effects

1 Do one of the following

- From the Transaction Analyzer window, choose AppDoctor > Refine Network Effects…
- From the AppDoctor window, choose the “Refine Network Effects…” button.

➥ The “Refine Network Effects” dialog box appears.

In addition to defining the bandwidth, you can edit capture locations, tier locations, and latencies.

End of Procedure 8-1

After defining the network effects, you can save the settings for future use.

- To save the network effect settings, choose AppDoctor > Save Settings…
- To re-use network effect settings, choose AppDoctor > Load Settings…

Lastly, you can rename tiers. While renaming does not impact analysis, it can make the capture data easier to interpret.

For more information, see:

- Refine Network Effects
- Edit Capture Locations
- Edit Tier Locations
- Edit Latencies
- Rename Tiers

Related Topics

- *Creating a Transaction Analyzer Model*

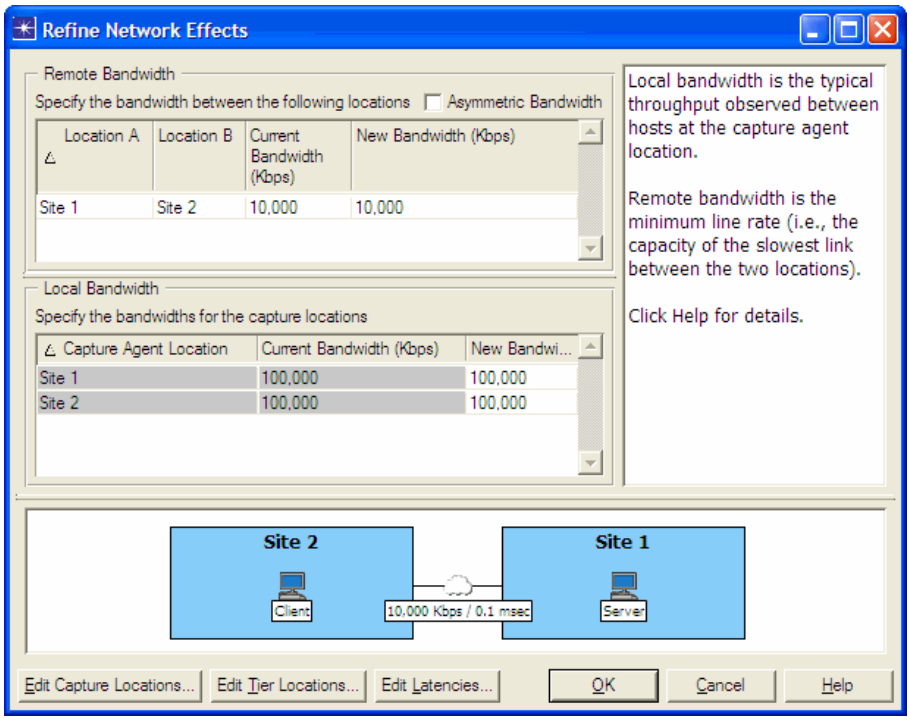
Refine Network Effects

Use the Refine Network Effects dialog box to define the following:

- Remote Bandwidth—Specifies the capacity of the slowest link (in Kbps) between two locations in the network. Choose “Unspecified” to indicate that the bandwidth is not known. (When the bandwidth is not known, the bandwidth, protocol, and congestion delays are combined and reported as network transfer delay. Optionally, select the “Asymmetric Bandwidth” checkbox to specify a different bandwidth for each direction.
- Local Bandwidth—Specifies the typical throughput (in Kbps) observed between hosts at the capture agent location. In other words, the local bandwidth defines the bandwidth between tier pairs within a local segment.

If the bandwidth between segments is not known, use PathProbe to measure the bandwidth between the host running AppTransaction Xpert and a specified capture agent.

Note—When specifying remote and local bandwidth for the first time, the default values for each is 1 Gbps. These default values are defined by the “Default Remote Bandwidth” and “Default Local Bandwidth” preferences.



Related Topics

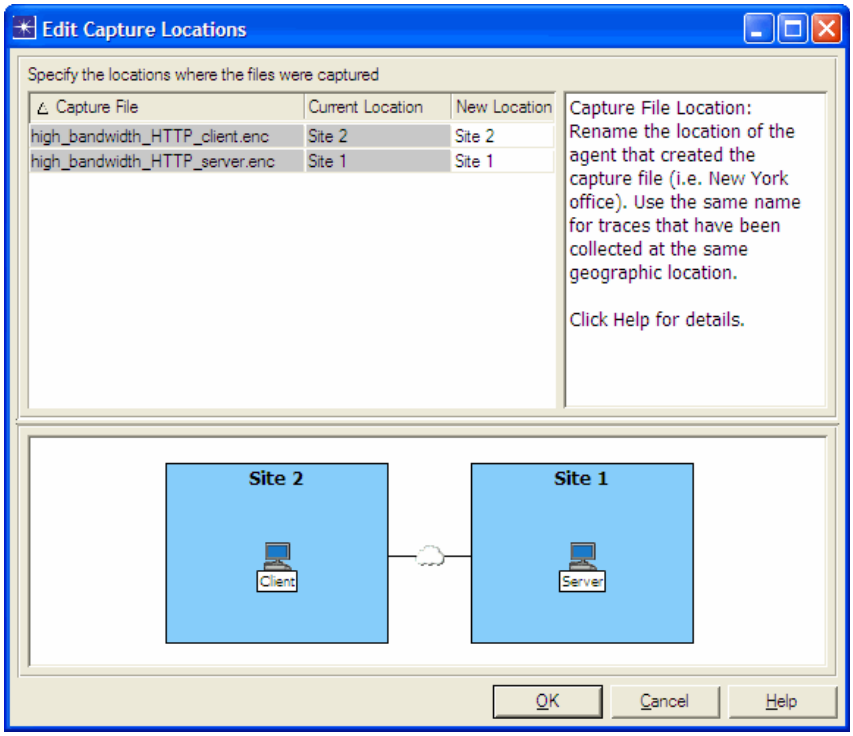
- *Defining the Network Effects*
- *Measuring Network Connections with PathProbe*

Edit Capture Locations

Use the Edit Capture Locations dialog box to rename the locations of the capture agent(s).

Note—Check the topology pane (bottom) to verify that the defined sites accurately reflect the tier locations in the network.

Figure 8-1 Edit Capture Locations Dialog Box



Related Topics

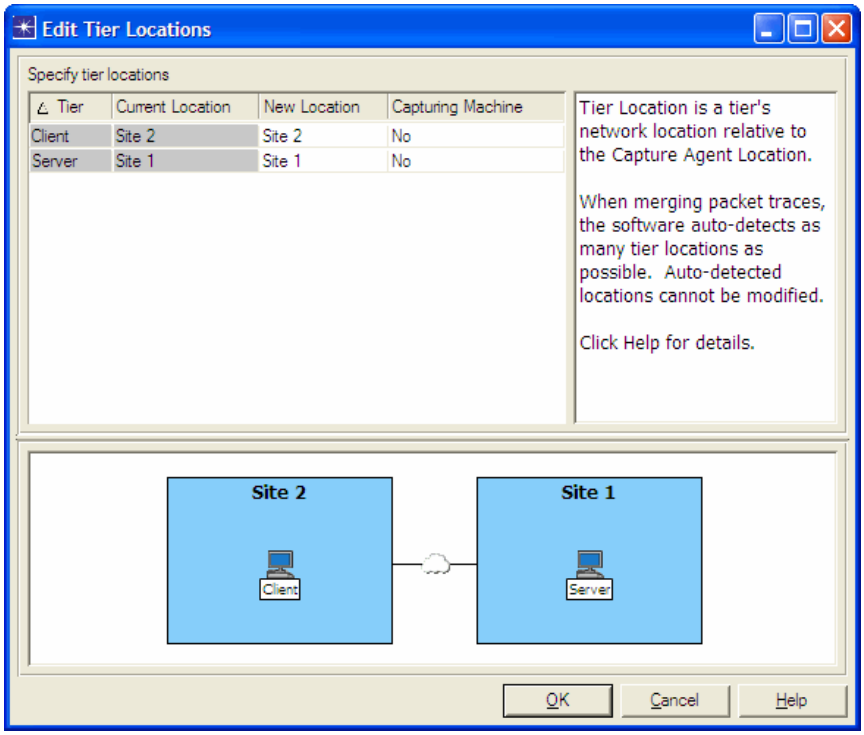
- *Defining the Network Effects*

Edit Tier Locations

Use the Edit Tier Locations dialog box to define the following:

- New Location—Specifies the name of the tier's network location relative to the capture agent location. When merging packet traces, tier locations are auto-detected and cannot be edited.
- Capturing Machine—Specifies whether the location was used for capturing network data.

Figure 8-2 Edit Tier Locations Dialog Box



Related Topics

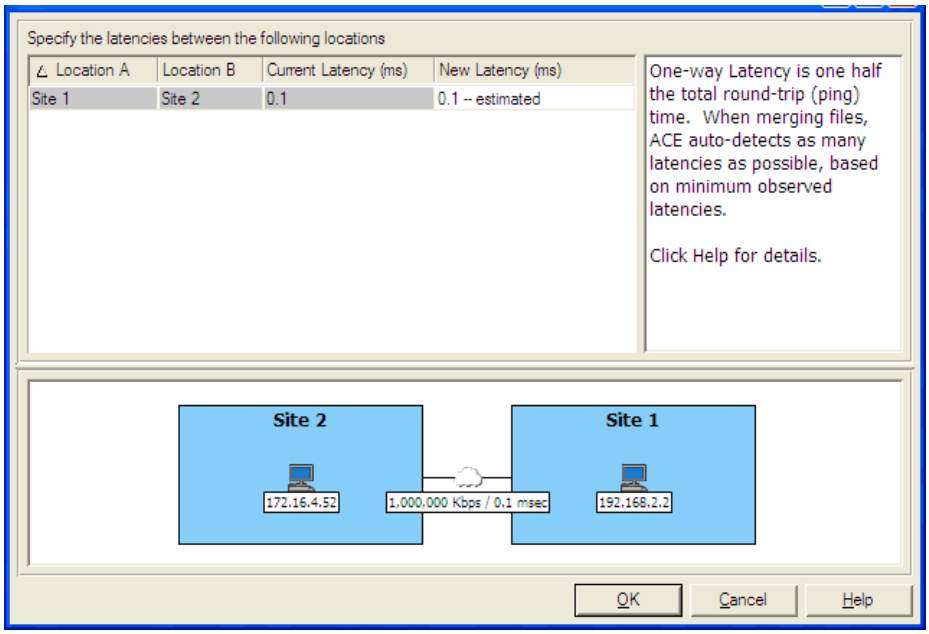
- *Defining the Network Effects*

Edit Latencies

Use the Edit Remote Latencies dialog box to edit the one-way latency—that is, half of the round-trip (ping) time. AppTransaction Xpert can auto-detect the one-way latency based on the underlying trace data.

If you do not know the latency between segments, use PathProbe to measure the latency between the computer running AppTransaction Xpert and a specified agent.

Figure 8-3 Edit Remote Latencies Dialog Box

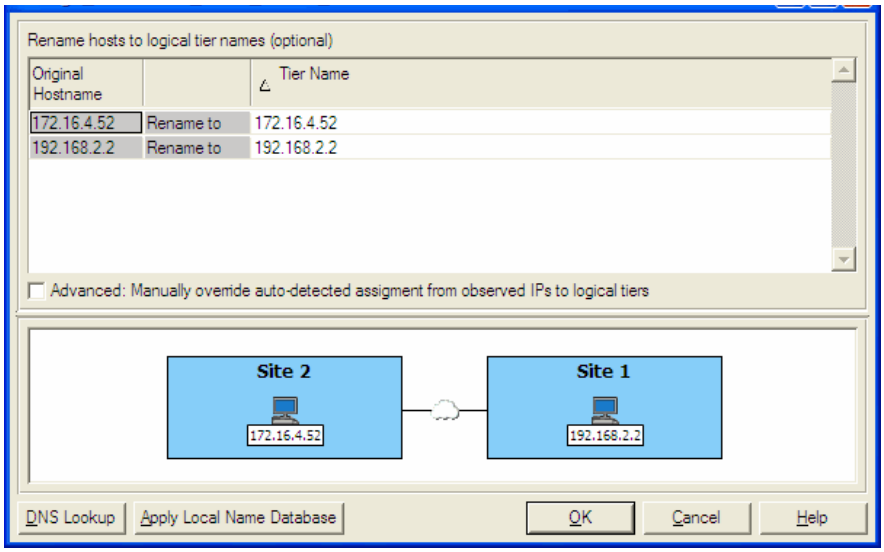


Related Topics

- *Defining the Network Effects*
- *Measuring Network Connections with PathProbe*

Rename Tiers

The Rename Tiers dialog box appears when merging packet traces. Additionally, tier names can be renamed after import. Simply go to the Data Exchange Chart, right-click on the tier name, and choose Rename.



Use the Rename Tiers dialog box to do the following:

- Assign friendly tier names (for example: client, app server, and web server) to make the resulting Transaction Analyzer model easier to interpret.
- Combine hosts if multiple hosts act as the same logical tier in the application.
- Assign a tier name manually when importing WAN-accelerated packet traces. (In some cases, there is not enough information to assign accelerator and non-accelerator tier names correctly.)

Note the following options/buttons:

- “Advanced: Manually override auto-detected assignment from observed IPs to logical tiers” checkbox—Overrides the auto-assignment with the specified tier names. For more information, see Tier Renaming for WAN-Accelerated Packet Traces: Standard Workflow.
- “DNS Lookup” button—Performs a DNS (Domain Name Server) lookup.

  For the operation to be successful:

  — The computer running AppTransaction Xpert must be in the same network where the traffic was captured.

  — The DNS host must be accessible to the computer running AppTransaction Xpert.
- “Apply Local Name Database” button—Applies a name previously specified in AppTransaction Xpert for the given IP address.

About the DNS Lookup

Note that when performing DNS lookup, the host/name mappings are stored in the following file:

<*opnet_user_home*>\op_admin\ace_import_configs\tier_name_db.txt

Note—Typically, <*opnet_user_home*> is "C:\Documents and Settings\<*user_name*>"

When opening packet traces, AppTransaction Xpert uses the host/name mapping in the tier_name_db.txt file to automatically rename tiers when the Rename Tiers dialog box opens. If the capture data includes hostnames that are not in the mapping file, the Tree View and Data Exchange Chart include a Tier Names menu option (Edit > Tier Names) that includes the following operations:

- Edit Name Database—Open the hostname file in a spreadsheet program (specified by the spreadsheet_prog preference in the Edit Preferences dialog box). This operation is useful when you want AppTransaction Xpert to assign "user-friendly" names to specific hosts automatically. For example, to change the tier name of your network's web server from the DNS name to "web server".
- Clear AppTransaction Xpert DNS Cache—AppTransaction Xpert caches the results of DNS lookups. To clear the internal cache, select this option. Enable this option if your DNS configuration changes while AppTransaction Xpert is running. This operation will not affect the entries in the name database.

Tier Renaming for WAN-Accelerated Packet Traces: Standard Workflow

The recommended workflow for assigning tier names is as follows:

1) Assign friendly names to hostnames— For example: "client", "app server", etc.

   If an accelerator is seen from multiple capture locations, the AppTransaction Xpert often auto-assigns a tier name ("Accelerator at <*geo_location*>").

2) If the Tier Name fields show the original hostname/IP address for a WAN accelerator, re-assign this to an accelerator tier.

   Note—The same accelerator might appear in multiple entries in the table. For example, you might see the auto-assigned tier name "Accelerator at client_site" on one line, and the IP address of the client-side accelerator on another line. This can happen when AppTransaction Xpert sees the same hostname from multiple locations. In the first case, it could auto-assign the hostname to the correct accelerator; in the second case, it could not.

   When this happens, you must assign both of these names to the same tier name ("client accelerator", "Accelerator at client site", etc.).

3) Verify that the network topology (bottom pane) corresponds with the network where the application was captured. Check for the following possible issues:
   - — A tier appears in the wrong geographic location. For example, the client appears in the server site.
   - — The network connectivity is incorrect. For example, the client and server are connected directly instead of across the WAN.
   - — The same host appears as multiple tiers in the network diagram. For example, the accelerator appears under its IP address and as "Accelerator at site of <*geo_location*>". In this case, you need to assign the same tier name to both entries in the table so that they are merged into the same tier.

4) Click OK to proceed to the Local Bandwidth window.

Note—If all the tier names and topology appear correct in this dialog box, but the resulting Transaction Analyzer model is incorrect, you might need to assign tier names using the Advanced workflow. This workflow is described in Tier Renaming: Advanced Workflow for WAN-Accelerated Environments.

Related Topics

- *Defining the Network Effects*

"Merge Capture Files" Options: Packet Traces and Packet Filters

This window defines the packet trace and packet filters that define the raw traffic data for the Transaction Analyzer model.

Note the following:

- If you select multiple packet traces and packets between the files cannot be matched, then you must perform a Manual Merge operation.

  For more information, see Manual Merge (Synchronizing Packet Traces Manually).

- If one or more packet traces with SSL-encrypted HTTPS connections are selected, you will need to specify the local directory of the private key required to decrypt the transaction.

  For more information, see Capturing HTTPS Transactions for Automatic SSL Decryption.

- If you are importing IP-layer-encrypted traffic, do not use the Default filter because it will filter out that traffic. The "IP" filter is usually a safe choice for packet traces that contain IP-layer-encrypted traffic.

Figure 8-4 Merge Capture Files Dialog Box

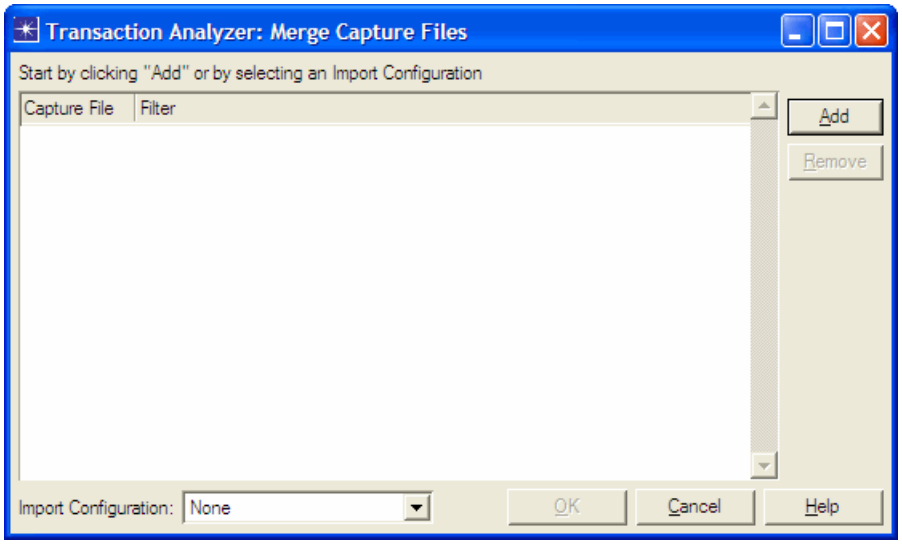


Table 8-2 Choose Capture Files Dialog Box

Item	Description
Capture File	Creates a file list using the Add and Remove buttons on the right. To change or replace a file in the list, click on the file name in the Capture File column.
Filter	Specifies a capture file filter to exclude extraneous frames. • To configure a filter, click in the Filter column to the right of the trace file name. Choose a predefined filter from the pull-down menu, or choose Edit… to define a filter. • To edit a filter, select the filter and choose Edit… from the pull-down menu. For more information, see Packet Filtering. **Note—**If you are importing IP-layer-encrypted traffic, do not use the Default filter because it will filter out that traffic. The “IP” filter is usually a safe choice for capture files that contain IP-layer-encrypted traffic.
Import Configuration	Saves the settings for reuse in the future.

Related Topics

- *When You Can Import Multiple Packet Traces*
- *When You SHOULD NOT Import Multiple Packet Traces*
- *Packet Filtering*
- *TCP Segmentation Offloading (TSO) in Packet Traces: What to Do*
- *Trace Summary*

Manual Merge (Synchronizing Packet Traces Manually)

When opening simultaneous captures, AppTransaction Xpert attempts to automatically merge packet traces by identifying matching traffic in each pair of files. (The merged packet traces, with matching traffic, are called *capture file sets*.) If AppTransaction Xpert *cannot* find matching traffic between packet traces, you can manually synchronize the data during the file opening process. If necessary, after opening the files, you can resynchronize the data.

Typically, you need to manually synchronize packet traces when:

- You want to capture a multi-tier application, but you cannot capture on an intermediate computer
- You captured on two sides of a multi-homed computer, and the packet traces came from different Network Interface Cards (NICs)

In both of these situations, you have two or more packet traces that record different phases of the same application. However, AppTransaction Xpert might be unable to match traffic in one packet trace with traffic in another packet trace and, therefore be unable to automatically synchronize the traffic.

This topic includes the following sections:

- Understanding Why Packet Traces are Manually Merged and Synchronized
- Manual Merge: Workflow Description
- Manual Merge Dialog Box (During Import)
- Resynchronize Manually Merged Sets of Capture Files Dialog Box (After Import)

Understanding Why Packet Traces are Manually Merged and Synchronized

Consider the example where we import two packet traces that record a web-based Oracle exchange, which involves three tiers (Client, Web Server, and Database Server).

This task consists of the following phases:

1) Client sends a request to Web Server

2) Web Server forwards request to Database Server

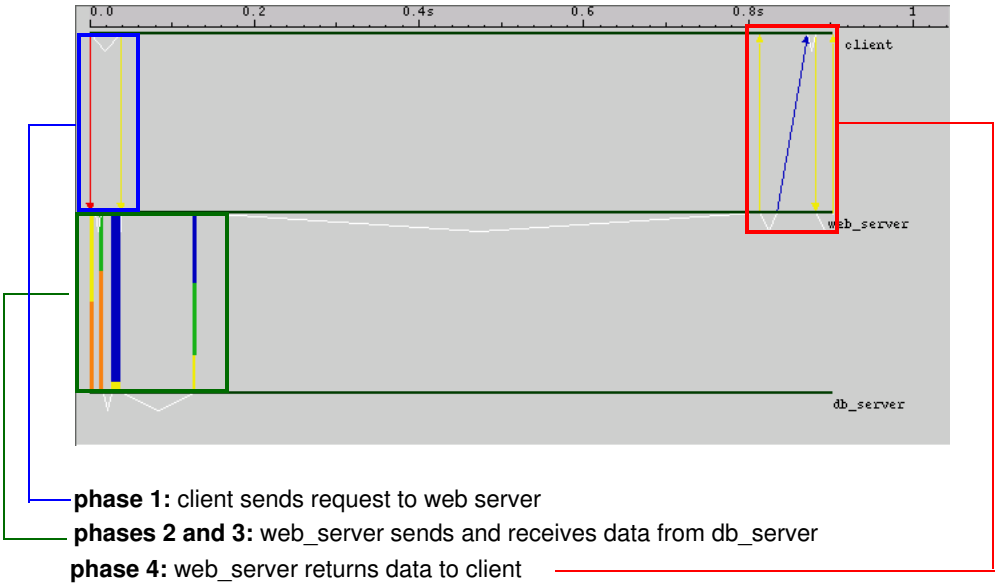
3) Database Server returns data to Web Server

4) Web Server formats data and returns an HTML page to Client

The application developer captured traffic on the Database Server and on the Client. During import, the import engine could not match the Client<-->Web Server and the Web Server<-->Database Server traffic. In addition, the clocks on the two computers are not synchronized.

First, we import the two files and do not synchronize the files, which specifies a time offset of 0 seconds. The following figure shows the result.

Figure 8-5 Manual Merge Example (Time Offset = 0 seconds)



From our knowledge of the application, we conclude that this result is inaccurate: the Database Server starts to return the requested data even before the Client sends the full request to the Web Server.

Clearly, Phase 2 must occur after Phase 1 ends and before Phase 4 begins. We examine the send/receive times of the relevant messages and find that

- Phase 1 ends at 0.0368 seconds (web_server receives last request message)
- Phase 4 begins at 0.811953 seconds (web_server sends first response message to client)
- Total duration of Phases 2 and 3 is 0.130537 seconds (web_server receives last message from db_server

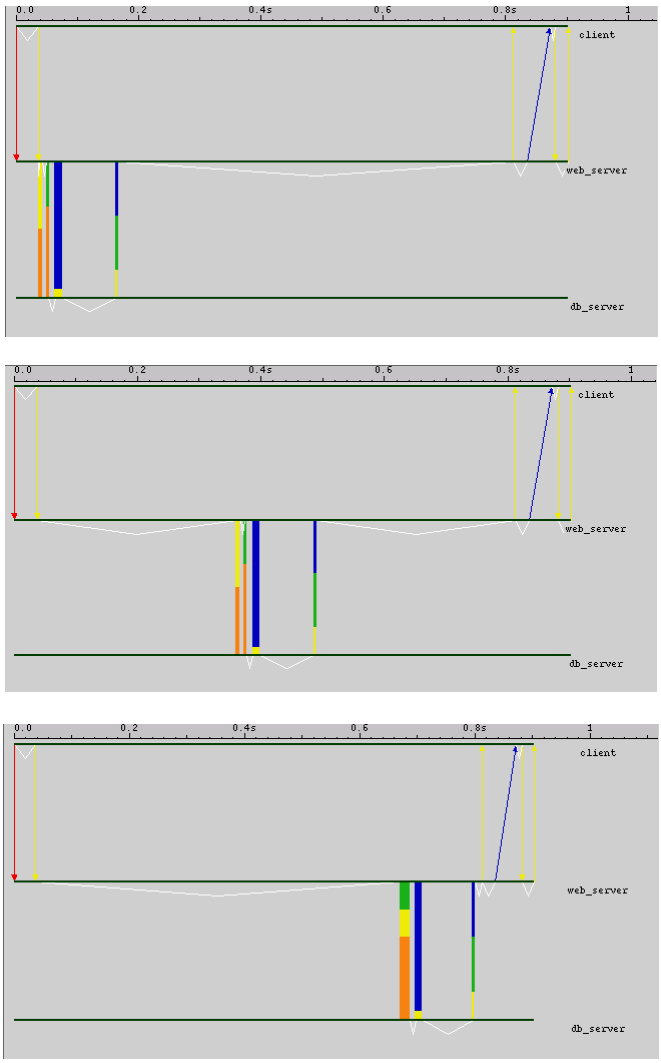
Thus, we know that the start time of Phase 2 is higher than 0.0368 (end of Phase 1) and lower than 0.6814 (start of Phase 4 minus the duration of Phases 2 and 3) to ensure that the phases occur sequentially.

Therefore, we could specify a time offset that defines the start time of the transaction captured on the db_server (Phases 2 and 3) as *x,* a number between 0.0368 and 0.6814 seconds after the start time of the transaction captured on the client.

To choose an accurate value for *x*, we need additional information about the application and the network. Specifically, we need to know how much of the delay occurred at the web server and the database server. Even if you use approximate offsets, you can still create reasonably accurate Transaction Analyzer models.

The following figure shows the results when we import the two example tasks with three different time offsets.

Figure 8-6 Manual Merge Example (Different Time Offsets)

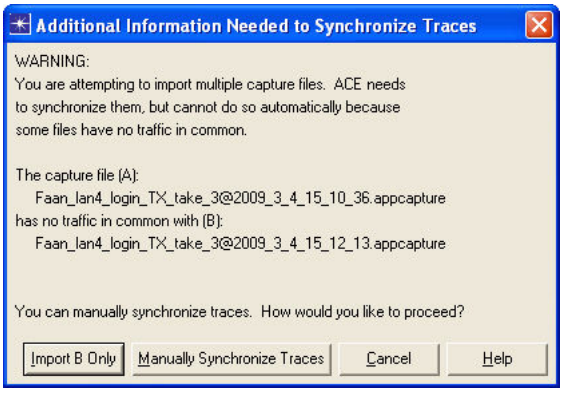


Manual Merge: Workflow Description

After selecting the set of packet traces to import and clicking Next in the Merge Capture Files Dialog Box, the import engine searches for matching traffic in each packet trace. The packet traces with matching traffic are automatically merged by the import engine. These merged files are called *capture file sets*.

If the import engine cannot find matching traffic in one or more packet traces, the “Additional Information Needed to Synchronize Traces” dialog box appears, as shown in the following figure.

Figure 8-7 Additional Information Needed to Synchronize Traces Dialog Box



From the “Additional Information Needed to Synchronize Traces” dialog box, you can select one of three actions:

- Cancel the import operation
- Disregard Unrelated Traffic File—Import one file only (the capture file set) that includes all imported files with matching traffic. (The import engine automatically merges the files with matching traffic.) The files that do not contain matching traffic (and therefore cannot be automatically merged) are ignored.
- Synchronize the capture files manually—that is, specify the difference (in seconds) between (1) the clocks on the capture machines or (2) the first packets for each packet trace file containing unrelated traffic. For more information see Manual Merge Dialog Box (During Import).

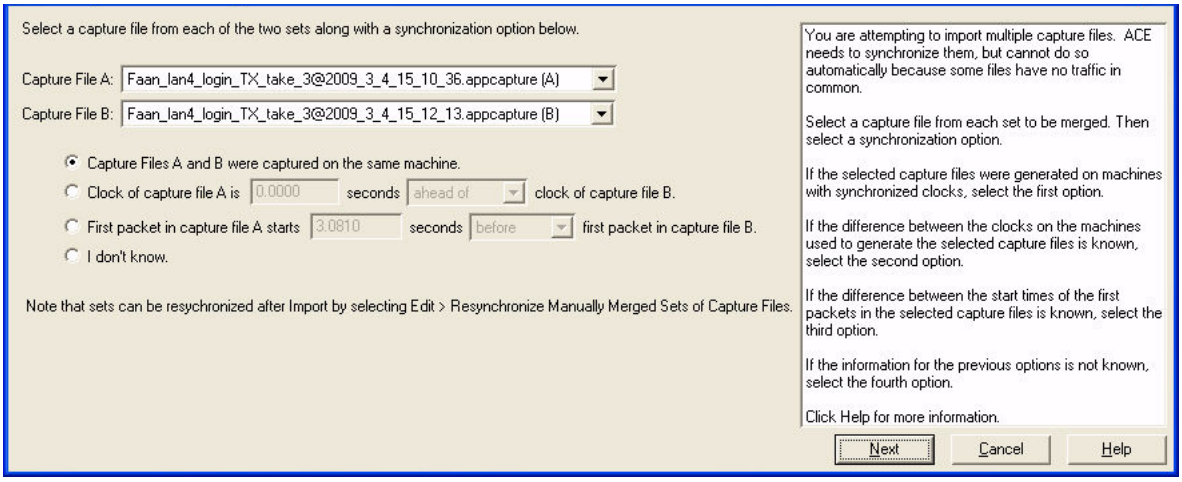
  After import, if you are not satisfied with the manual synchronization of the packet traces, you can resynchronize the packet trace file sets by selecting Edit > Resynchronize Manually Merged Sets of Capture Files. For more information, see Resynchronize Manually Merged Sets of Capture Files Dialog Box (After Import).

  Note—Only packet traces that were manually synchronized can be resynchronized. In other words, packet traces that were automatically synchronized by the import engine cannot be resynchronized.

Manual Merge Dialog Box (During Import)

When you click the “Manually Synchronize Traces” button on the Additional Information Needed to Synchronize Traces Dialog Box, the Manual Merge dialog box appears, as shown in the following figure.

Figure 8-8 Manual Merge Dialog Box



Note that a simpler version of the above dialog box appears when there are only two packet trace file sets and each set contains just one packet trace. (A capture file set consists of packet trace(s) which contain common traffic and therefore were automatically merged.) If two or more sets exist, you are repeatedly prompted to manually merge sets until only one set remains. Capture file sets are merged by synchronizing one packet trace from a set with another packet trace from a different set.

The Manual Merge dialog box allows you to:

1) Select packet traces from two different sets

2) Specify a synchronization method

The following procedure describes how to synchronize capture file sets during import.

Procedure 8-2 Manual Merge: Synchronizing Two Capture File Sets During Import

1 In the Manual Merge Dialog Box, select the packet traces (from different sets) to synchronize using the “Capture File A” and “Capture File B” pull-down menus.

If you can synchronize two files that were captured on the same machine, select those files first.

2 Synchronize the selected packet traces using one of the following options:

- **Capture Files A and B were captured on the same machine—**
  Indicates that start times of the packet traces are correct. No adjustment is made to the timestamps of the network packets.
- **Clock of capture file A is *n* seconds *ahead of|behind* clock of capture file B—**
  Indicates that the machine's clock on which packet trace A was captured is ahead or behind the machine's clock on which packet trace B was captured, by the specified number of seconds. When imported, the traffic in file A is shifted by the number of seconds in the specified direction.
- **First packet in capture file A starts *n* seconds *before|after* first packet in capture file B—**
  Indicates that the first packet in file A is before/after the first packet in file B, by the specified number of seconds. When imported, the timestamps are adjusted by the specified amount. For example, if file A and file B are offset by 1 second and you enter 2 seconds, then the timestamps are adjusted by 1 second.
- **I don't know—**
  Indicates that you are unsure whether the files are out-of-sync. No synchronization is performed. After import, you can review the files and perform a post-import resynchronization, if necessary.

3 If necessary, repeat step 1 and step 2 with packet traces from different sets until all packet traces are merged and there is only one set.

4 Click Next to continue with the import.

End of Procedure 8-2

If you are not satisfied with the manual synchronization of the packet traces after the opening process, you can resynchronize the files by selecting Edit > Resynchronize Manually Merged Sets of Capture Files. For more information, see Resynchronize Manually Merged Sets of Capture Files Dialog Box (After Import).

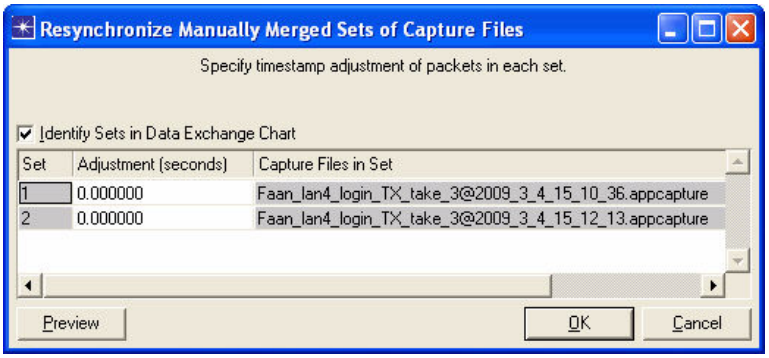
Note—Only packet traces that were manually synchronized can be resynchronized. In other words, packet traces that were automatically synchronized cannot be resynchronized.

Resynchronize Manually Merged Sets of Capture Files Dialog Box (After Import)

Capture file sets that were manually merged during import (described in Manual Merge Dialog Box (During Import)) can be resynchronized after import by using the resynchronization option (Edit > Resynchronize Manually Merged Sets of Capture Files).

The “Resynchronize Manually Merged Sets of Capture Files” dialog box, shown below, lists the sets of packet traces that exist after the import engine attempts to automatically merge the files.

Figure 8-9 Resynchronize Manually Merged Sets of Capture Files



Tip—Hold the mouse pointer over a “Capture Files in Set” field to display a tooltip that lists the packet traces in the set.

Procedure 8-3 Manual Merge: Resynchronizing Capture File Sets (After Import)

Note—Before performing the first step, display the Data Exchange Chart so that you can preview the adjustment before saving.

1. Choose Edit > Resynchronize Manually Merged Sets of Capture Files.

   The “Resynchronize Manually Merged Sets of Capture Files” dialog box appears, as shown in Figure 8-9.

2. As needed, specify the adjustment, in seconds, for the capture file set(s).

   Enter a positive number to increase the timestamps of the packets by the specified amount.

   Enter a negative number to decrease the timestamps of the packets by the specified amount.

   Note that the adjustments are cumulative.

3. Optionally, click the Preview button to preview the specified adjustment in the Data Exchange Chart. If it is not already displayed, select the Data Exchange Chart tab.

Use the “Identify Sets in Data Exchange Chart” checkbox to toggle between the visualization that was selected before launching the “Resychronize” dialog box and the visualization to preview resynchronized sets in the Data Exchange Chart. When the “Resynchronize” dialog box is launched, the set’s visualization is automatically displayed. When the checkbox is unchecked, the visualization reverts to the previous visualization.

4 Click OK to save the specified adjustment(s).

Note that if you click Cancel, the specified adjustments are not saved.

End of Procedure 8-3

Related Topics

- *Creating a Transaction Analyzer Model*

Batch Analyzer

Batch Analyzer is used to import multiple transactions in one operation. Batch Analyzer streamlines the import process (when you capture multiple transactions), and eliminates the need to import each new transaction manually.

Note—This feature is not available in all solutions.

You can specify the following information for each batch import:

- The set of transactions to import. Each transaction includes the following information:
  - — The set of packet traces that record the transaction
  - — The import settings for that transaction—You can specify the import options you want using an editable configuration file. This file specifies hostnames, segment bandwidth, etc.
- The Transaction Analyzer model files to create (*optional*)—In some cases, you might want to generate reports for a set of transactions, and do not need to view the transactions in AppTransaction Xpert. In this case, you can choose not to create Transaction Analyzer model files for the imported transactions.
- The type of reports to generate for the transactions (*optional*)—For the set of imported transactions, choose Word reports, Multi-Transaction reports, or Comparison reports.

This topic includes the following sections:

- Procedure Description: Running a Batch Import
- Batch Analyzer Dialog Box
- Adding Transactions for a Batch Import
- Editing Transactions
- Specifying Import Configurations

Procedure Description: Running a Batch Import

Procedure 8-4 Running a Batch Import

1. Choose File > Open Packet Trace(s) > In Transaction Analyzer (Batch Analyzer)…

   ➥ The Batch Analyzer Dialog Box appears.

2. Use the Add Transaction… and Add Multiple Transactions… buttons to specify the packet traces and transactions to import, as described in Adding Transactions for a Batch Import.

3. For each transaction, verify that the import configuration is correct. To edit an import configuration, click in the Import Configuration field.

   For more information, see Specifying Import Configurations.

4. For each transaction, verify that the capture agent locations are correct. To edit a location, click in the Location field.

   For more information, see “Merge Capture Files” Options: Packet Traces and Packet Filters.

5. Specify the file (Save Transaction Analyzer (*.atc.m) files) and the reporting (Save Transaction Analyzer (*.atc.m) files) options.

6. When all options are specified, click Import.

   ➥ If you choose to save Transaction Analyzer model files of the transactions, the files are saved in the specified output directory. The files themselves do not open automatically.

   ➥ If you choose to generate reports, a report appears for each transaction.

End of Procedure 8-4

Batch Analyzer Dialog Box

To open this dialog box, click File > Open Packet Trace(s) > In Transaction Analyzer (Batch Analyzer)…

This dialog box shows the options for a batch import: the transactions to import, the options for each transaction, the output directory (if any), and the reports to generate (if any). These options are listed in Table 8-3.

Figure 8-10 Batch Analyzer Dialog Box

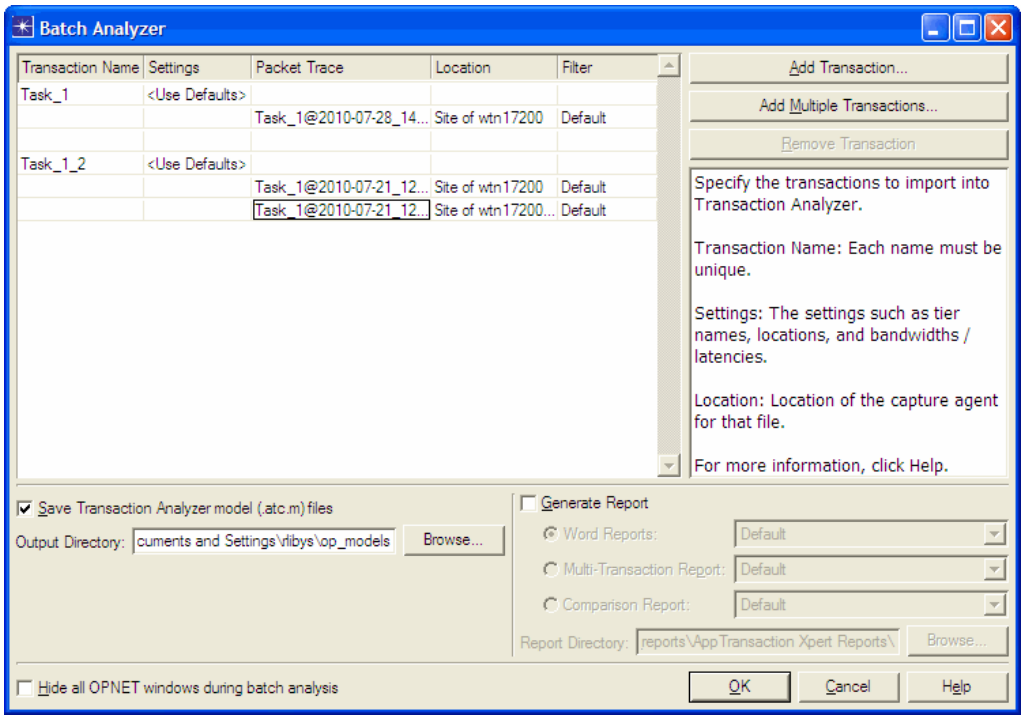


Table 8-3 Batch Import Dialog Box

Control	Description
Add Transaction…	Adds a single transaction to the Transactions table: click "Add Transaction…" and select the packet traces for that transaction. For more information, see Adding One Transaction.
Add Multiple Transactions…	Adds multiple transactions to the Transactions table in one operation. You can specify how to select the packet traces and how to arrange them into transactions. For more information, see Adding Multiple Transactions.
Remove Transaction	Removes a transaction: select the Transactions field in the table and click "Remove Transaction".
Transactions table	Lists the packet traces to import, organized by transaction. Use the Add and Remove buttons on the right to modify this table. • Transaction—The name of the application transaction. All names must be unique. • Settings—Specifies a settings file, which defines all settings needed to open/merge capture data, such as tier names, tier locations, and bandwidth/latency settings. (To create a settings file, open or merge traces in Transaction Analyzer; specifying any tier location, bandwidth, or latency settings using Refine Network Effect; then choose the Save Settings option.) • Packet Trace—The name of the packet trace file. • Location—The capture agent location. This specifies the network location of the agent that generated the packet trace. • Filter—Specifies a filter file. For more information, see: • Specifying Import Configurations • "Merge Capture Files" Options: Packet Traces and Packet Filters
Save Transaction Analyzer (*.atc.m) files	When selected, generates Transaction Analyzer model files in the specified output directory. To generate reports without viewing the files from which they were generated, do not select this option.
Generate Report(s)	When selected, generates reports for the imported transactions automatically. To specify a report template, set the menu next to the report type. For more information, see: • Microsoft Word Reports (RTF Format) • Multiple-Transaction Reports (RTF Format) • Comparison Reports (RTF Format)

Adding Transactions for a Batch Import

The Transactions table (at the top of the Batch Analyzer Dialog Box) lists the transactions to create and the import options and packet traces to use for each transaction. To edit this table, use the Add Transaction…, Add Multiple Transactions…, and Remove Transaction buttons.

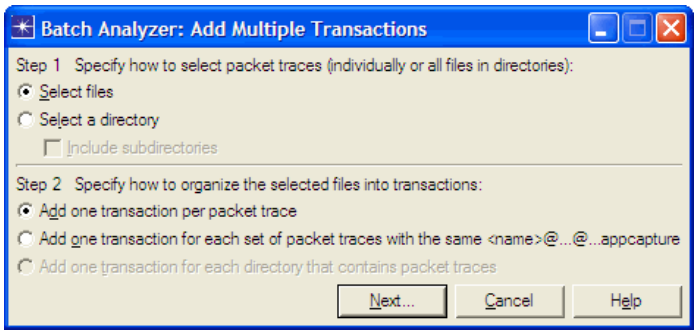
Adding One Transaction

To add one transaction to the table, click Add Transaction… and select the packet trace(s) in the “Select Packet Traces” dialog box. You can only select packet traces from one directory. To specify packet traces from different directories, you must add the external packet traces in the Transactions table (as described in Editing Transactions).

Adding Multiple Transactions

To add multiple transactions to the table, click Add Multiple Transactions…, which displays the Add Multiple Transactions dialog box.

Figure 8-11 Batch Analyzer: Add Multiple Transactions Dialog Box



The general workflow for this dialog box is:

1) Specify whether to select the capture files individually or by directory.

2) Specify how to organize the selected capture files into transactions: one transaction per capture file, one transaction for each set of capture files with the same name, or one transaction for each directory that contains capture files.

3) Click Next…

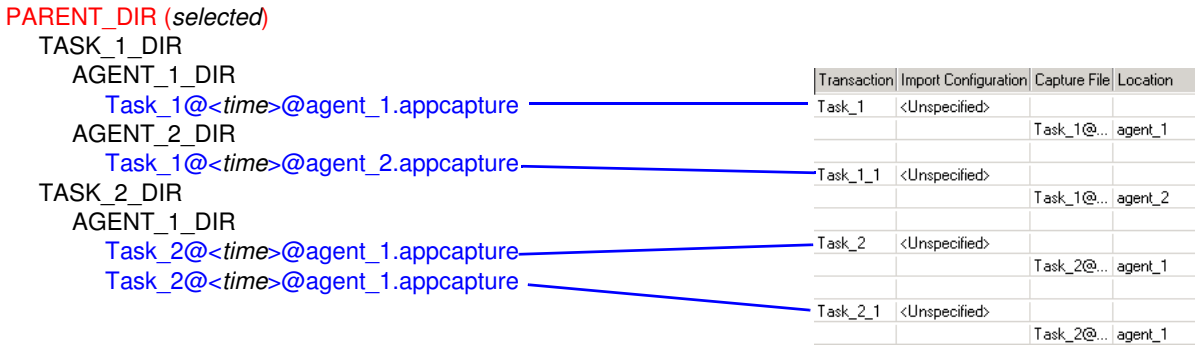
4) A file or directory chooser appears (depending on the option you selected in step 1). Select the file(s) or directory/subdirectories containing the packet trace.

5) Click OK in the file/directory chooser. The transactions appear in the Transactions table of the Batch Analyzer Dialog Box (the organization depends on the option you specified in step 2).

The following sections show how the different transaction settings operate on this set of capture files.

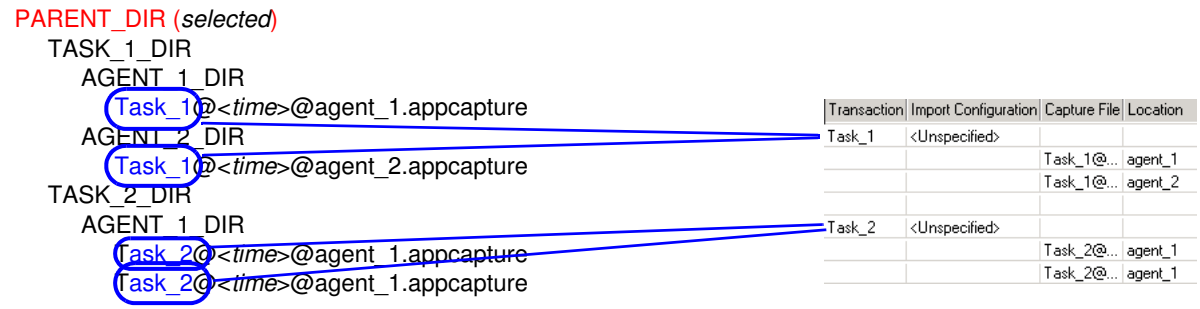
Add Transactions by Individual File When the “Add one transaction per capture file” option is selected, every selected capture file results in a separate transaction.

Figure 8-12 Adding Transactions (One Transaction per Capture File)



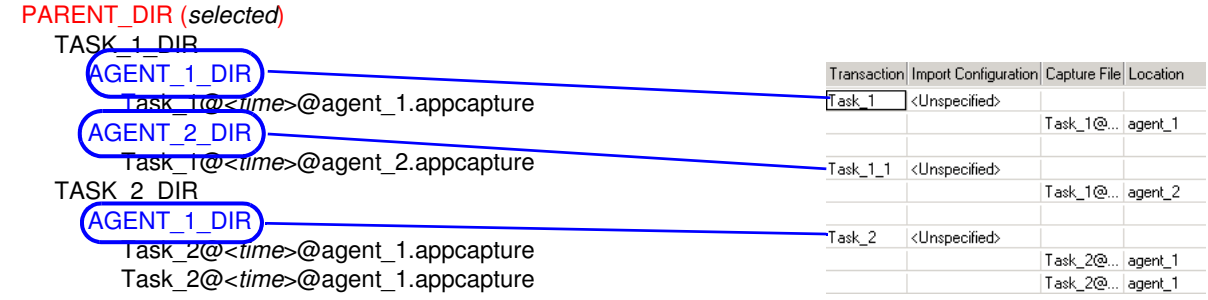
Add Transactions by File Name When the “Add one transaction for each set of capture files with the same name” option is selected, every capture task name in the set of selected files results in a separate transaction.

Figure 8-13 Adding Transactions (One Transaction per Capture Name)



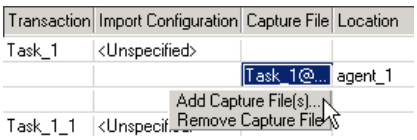
Add Transactions by File Name When the “Add one transaction for each directory that contains capture files” option is selected, every capture task name in the set of selected files results in a separate transaction.

Figure 8-14 Adding Transactions (One Transaction per Directory)



Editing Transactions

To add or remove packet traces from an existing transaction, click on a file name in the Capture File column.

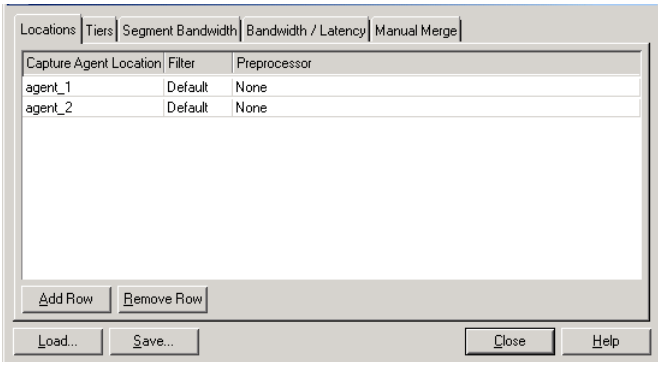


Specifying Import Configurations

Every transaction must have an import configuration selected. An import configuration specifies settings such as tier names and bandwidth/latency settings. When you click in the Import Configuration field of the Transactions table, you can specify one of the following options:

- Use defaults—Use the default settings.
- Browse—Choose this option if you have an existing Import Configuration (*.ace.ic.txt) file.
- Edit—Choose this option to edit an import configuration in the Import Configuration Editor, shown in the following figure.

Figure 8-15 Import Configuration Editor



The following table lists the tabbed pages available in the Import Configuration Editor.

Table 8-4 Import Configuration Editor

Page	Description
Location	Specify import filters and preprocessors for each possible capture location. For more information, see Filtering Traffic
Tiers	Map captured hostnames/IP addresses to tier names. Specify the location of tiers in relation to capture locations (for example, tier A is the “capturing machine at”, “local to,” or “remote from” capture location X).
Local Bandwidth	Specify the bandwidth of each network segment. For more information, see Refine Network Effects.
Remote Bandwidth	Specify the bandwidth and latency between network segments. For more information, see Refine Network Effects.
Manual Merge	If a transaction requires a manual merge, you can choose one of the following options: • Accept the default synchronization of the packet traces • Terminate the import of that transaction **Note—**Manual merge is an advanced feature. If these options are not appropriate for a transaction, you should import the transaction manually so that you can specify the synchronization that you want. For more information, see Manual Merge (Synchronizing Packet Traces Manually).

Related Topics

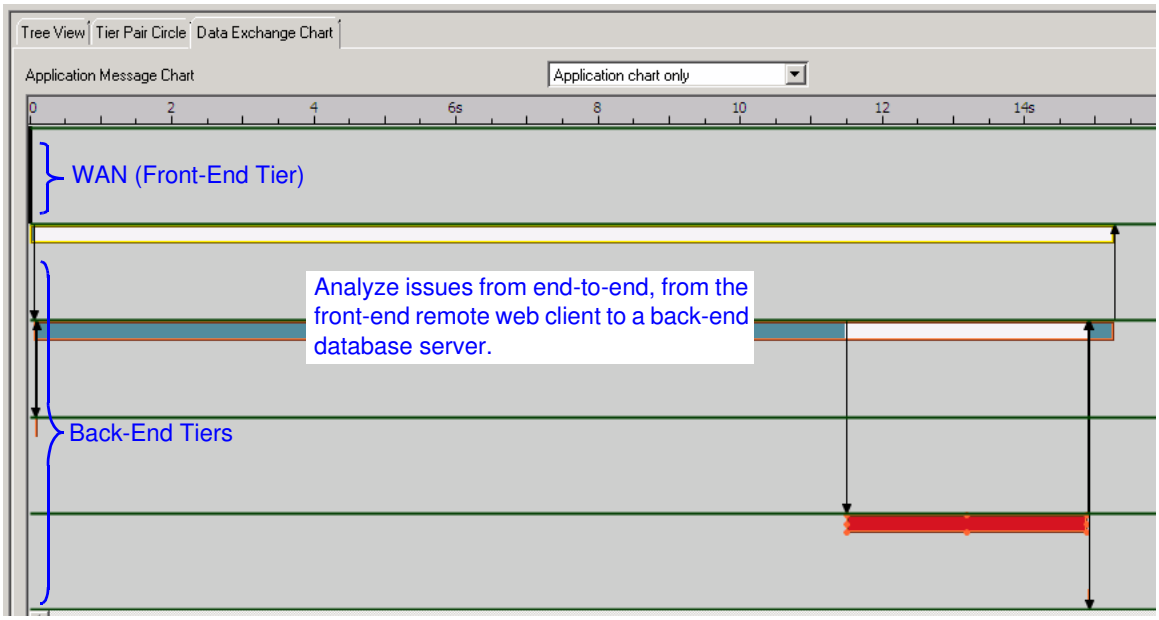
- *Creating a Transaction Analyzer Model*

Transaction Trace Analysis

Multi-tier code level transaction traces from AppInternals Xpert provide invaluable insight into transaction performance on the back-end tiers of a transaction. They allow you to follow a transaction through back-end tiers and pinpoint which classes and methods are responsible for the server processing delays within each tier.

AppTransaction Xpert integrates with AppInternals Xpert 8.0 to embed these transaction traces to provide end-to-end analysis. The recommended workflow is to use packet traces to analyze a transaction's performance from the client to the first server tier and to use cross-tier code level transaction traces to analyze a transaction's performance across the back-end tiers.

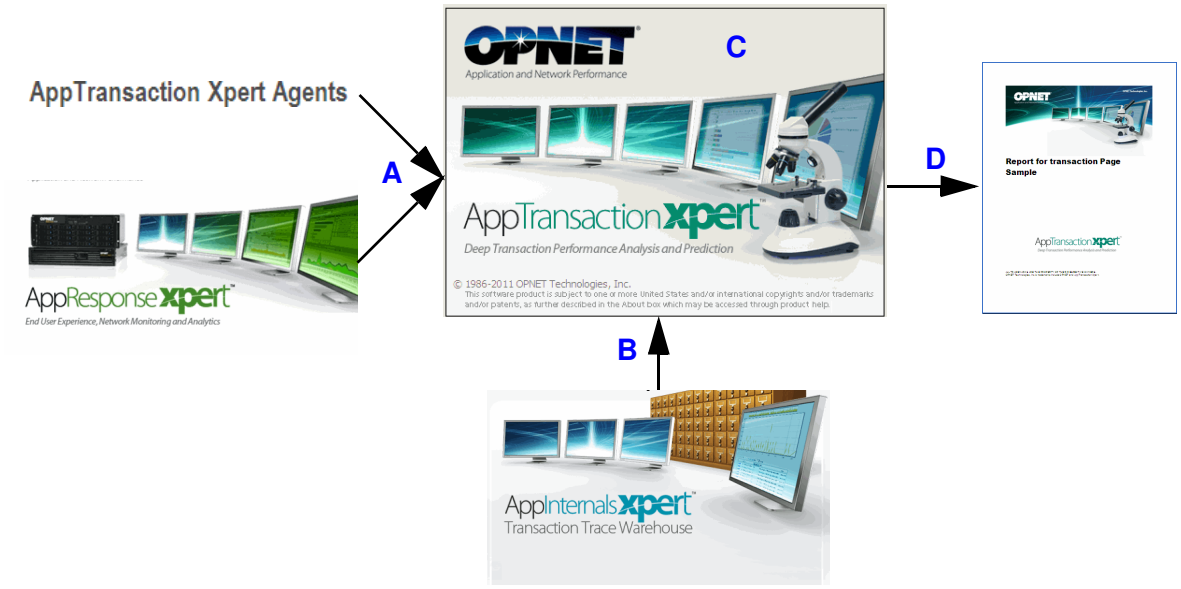
Figure 8-16 End-to-End View of Transactions



Note—This feature requires that you have AppIntenrals Xpert to generate transaction trace (.apptrace) files. Additionally, to automatically download back-end transaction traces you must have implemented Transaction Trace Warehouse, which is included with AppInternals Xpert 8.0 and later. Additionally, for the automatic download of back-end transaction traces to work, the back-end server must have AppIntenrals Xpert data adapters deployed on it.

The following figure shows the software needed to implement this feature and the typical workflow.

Figure 8-17 Software Configuration and Typical Workflow



Step 1: (**A**) Open the packet trace and (**B**) download the transaction traces.
Step 2: (**C**) Analyze the cause of delay.
Step 3: (**D**) Generate a report to support and disseminate your analysis.

Additionally, to automatically download back-end transaction traces from Transaction Trace Warehouse, you must set preferences in AppTransaction Xpert. For more information, see Optional Configuration.

The typical workflow includes the following steps:

- Step 1: Obtain and Open the Trace Files
  - — Opening Trace Files Manually
  - — Opening Trace Files Automatically
- Step 2: Troubleshoot the Issue
  - — Adjust Trace Synchronization
  - — TTA Menu Options
  - — Tree View Tabbed Page (Multi-Tier Analysis)
  - — Tier Pair Circle Tabbed Page (Multi-Tier Analysis)
  - — Data Exchange Chart Tabbed Page (Multi-Tier Analysis)
  - — AppDoctor Analysis and Pie Chart
- Step 3: Generate Reports

Step 1: Obtain and Open the Trace Files

There are many ways to obtain and open the trace files in AppTransaction Xpert. The two most common methods are as follows:

- Opening Trace Files Manually—This method is used when you perform an on-demand capture to generate the trace files.

  Typically, this method is performed by manually opening the packet traces and the corresponding transaction traces in AppTransaction Xpert to troubleshoot an issue.

- Opening Trace Files Automatically—This method is used when you have AppInternal Xpert's Transaction Trace Warehouse, which stores continuous transaction data harvested from AppIntenrals Xpert managed nodes. (Transaction traces record the execution and performance of individual method calls in an application.)

Note—The methods above are *not* mutually exclusive. For example, after manually opening a packet trace, you can attempt to download corresponding transaction traces from Transaction Trace Warehouse. Use the method that works for you.

Opening Trace Files Manually

Use this method when you generate the trace files using an on-demand capture.

When opened in AppTransaction Xpert, the packet and transaction traces are automatically synchronized. If AppTransaction Xpert cannot determine how the files are related, the “Specify Server Tier” dialog box appears and asks you to specify how the files are related. Additionally, if necessary, you can change the synchronization of the trace files.

Procedure 8-5 Manually Opening Packet and Transaction Traces in AppTransaction Xpert

1 Generate the trace files:
Generate the following files for the application that you want to analyze:

- packet traces
- transaction trace

Note—

- For best results, generate the trace files simultaneously on the machine(s) where the transaction of interest is running. This ensures that both sets of data are based on the same clock and have the same time stamps.
- An AppInternals Xpert license is required to generate .apptrace files. For information about generating transaction trace (.apptrace) files, see the AppInternals Xpert documentation.

2 Open the packet trace in AppTransaction Xpert:

2.1 Choose File > Open Packet Traces.

2.2 Choose the appropriate submenu (i.e., “In Transaction Analyzer (Single Capture)…”).

2.3 Select the packet trace file(s) and click OK.

3 Open the transaction trace in AppTransaction Xpert:

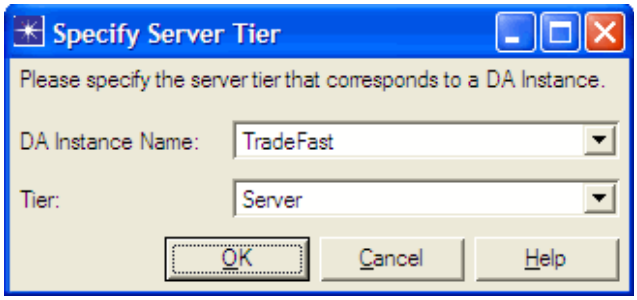
3.1 Choose File > Import Server Data > AppInternals Xpert Transaction Trace.

3.2 Select the transaction trace file and click OK.

➥ The “Specify Server Tier” dialog box appears if AppTransaction Xpert cannot determine how the imported transaction trace is related to the packet trace. See step 4.

➥ The “Resynchronize Trace” dialog box appears. See step 5.

4 If AppTransaction Xpert cannot determine how the imported transaction trace is related to the packet trace, the “Specify Server Tier” dialog box appears.

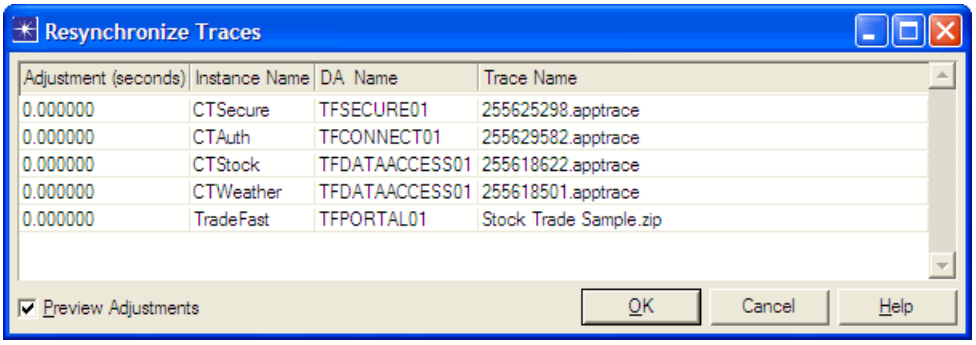


4.1 From the pull-down menus, select a DA instance name and the corresponding tier (Server, Client, DB Server, Application Server).

4.2 Click OK.

5 Synchronize the trace files using the “Resynchronize Trace dialog” box.

Typically, the trace files are automatically synchronized. However, you can change the synchronization using the options in this dialog box.



5.1 If necessary, specify the adjustment in seconds, in the “Adjustment (seconds)” column for the traces that you want to change.

- Enter a positive number to move the transaction forward in time.
- Enter a negative number to move the transaction backward in time.

If the “Preview Adjustments” checkbox is selected, then the timeline pane (in the Tree View tab and/or the sequence diagram pane (in the Data Exchange Chart tab) automatically display the adjustment.

Continue to adjust the synchronization until you are satisfied. Then click OK.

If you want to make additional changes after closing this dialog box, you can open the dialog box again by clicking the “Adjust Trace Synchronization…” button on the Tree View tab. However, be aware that the previously-adjusted traces are set to “0.0”.

5.2 Click OK.

End of Procedure 8-5

After opening the trace files, you can troubleshoot the issue. For more information, see Step 2: Troubleshoot the Issue.

Opening Trace Files Automatically

Use this method when you have AppInternal Xpert Transaction Trace Warehouse, which stores continuous transaction data harvested from AppIntenrals Xpert managed nodes. (Transaction traces record the execution and performance of individual method calls in an application.)

This method is especially useful when a user sees a slow response time in AppResponse Xpert and downloads the front-end packet trace to troubleshoot the issue in AppTransaction Xpert. After the packet trace is opened, AppTransaction Xpert downloads and opens the corresponding back-end transaction traces from Transaction Trace Warehouse.

Procedure 8-6 Automatically Opening Packet and Transaction Traces in AppTransaction Xpert

1 Open the application packet trace in AppTransaction Xpert:

Perform one of the following:

- In AppTransaction Xpert, choose File > Open Packet Trace, choose the appropriate submenu (i.e., “In Transaction Analyzer (Single Capture)...”), select the application packet trace(s), and click OK.
- In AppResponse Xpert, from an HTTP insight (i.e., Page Analysis > Individual Page Views), right-click on a page view and choose Analyze in AppTransaction Xpert Tree View.

2 Open the transaction trace in AppTransaction Xpert:

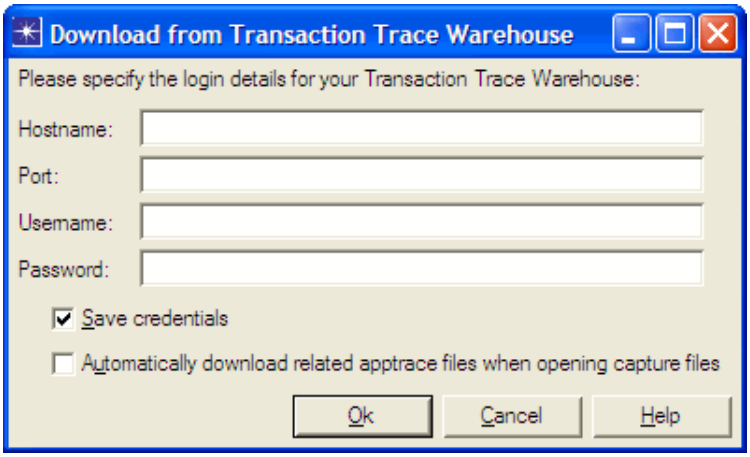
Depending on how the feature is configured (see Optional Configuration), one of the following actions will occur:

- The transaction trace data is downloaded automatically from Transaction Trace Warehouse and opened in the Transaction Analyzer window.

- Click the Download button on the toolbar (or choose File > Import Server Data > Download from AppInternals Xpert Transaction Trace Warehouse.)

Note—If you click the Download button after a transaction trace has already been opened in AppTransaction Xpert, then the download will replace the current transaction trace.

➥You are prompted for the Transaction Trace Warehouse login information (host, port, username, password).



Enter the requested information.

For future downloads, set the following checkbox options:

- Save credentials—Specifies to save the username and password (encrypted). By default, this option is checked. (The hostname and port are always saved.)
- Automatically download related apptrace files when opening capture files—Specifies to download .apptrace files automatically without displaying this dialog box. Note that even if this option is checked, the dialog box will appear if the hostname and password are not saved or if any other information is not specified.

For more information about these options, see Optional Configuration.

Then click OK.

End of Procedure 8-6

After opening the trace files, you can troubleshoot the issue. For more information, see Step 2: Troubleshoot the Issue.

Optional Configuration The following behavior characteristics are determined by preference settings:

- **Automatic Download of Transaction Traces**

  By default, AppTransaction Xpert automatically attempts to download related transaction traces from Transaction Trace Warehouse when a packet trace is opened in AppTransaction Xpert.

  You may want to change this behavior if you typically filter packet traces after opening them in AppTransaction Xpert. After filtering, you can click the Download button to obtain the corresponding transaction data for the filtered packet trace.

  To change this behavior, set the following preferences to TRUE:
  - Automatically Download (ace_auto_download_apptraces)
  - Save Credentials (auto_save_ttw_credentials)

- **Prompt for Transaction Trace Warehouse Login Details**

  If not specified, the first time you attempt to download transaction traces from Transaction Trace Warehouse, you are prompted for the login details (hostname, port, username, and password). If the login details are saved (the Save Credentials preference is set to TRUE, then the specified login information is used for subsequent downloads.

  To define the login details, set the following preferences:
  - Hostname (ace_ttw_hostname)
  - Username (ace_ttw_username)
  - Password (ace_ttw_password)
  - Port (ace_ttw_port)

Note—To set preference, choose Edit > Preferences. Then in the Preferences Editor treeview, select AppTransaction Xpert > Transaction Trace Warehouse.

Step 2: Troubleshoot the Issue

After the packet trace and transaction trace files are opened in AppTransaction Xpert (see Step 1: Obtain and Open the Trace Files), you can troubleshoot the issue.

This feature combines the troubleshooting process in AppTransaction Xpert and Transaction Trace Analyzer. You troubleshoot just as you normally would. The following sections highlight the added capabilities when troubleshooting with both packet and transaction traces:

- Adjust Trace Synchronization
- TTA Menu Options
- Tree View Tabbed Page (Multi-Tier Analysis)
- Tier Pair Circle Tabbed Page (Multi-Tier Analysis)
- Data Exchange Chart Tabbed Page (Multi-Tier Analysis)
- AppDoctor Analysis and Pie Chart

Note—If you are unfamiliar troubleshooting transaction traces in Transaction Trace Analyzer, the Help buttons in the transaction trace panes link to the Transaction Trace Analyzer documentation. You might find it helpful to read the “Quick Start” section, which walks you though the troubleshooting process.

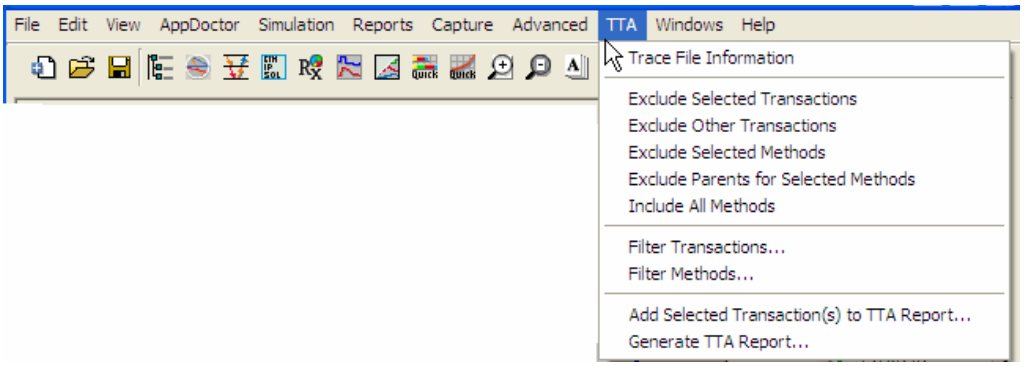
Adjust Trace Synchronization

If you are not satisfied with the synchronization of the trace files, you can resynchronize the files. For an indication of the synchronization, view the alignment of the messages and method calls in the Data Exchange Chart.

To resynchronize the trace file, click the “Adjust Trace Synchronization…” button on the Tree View tabbed page. Specify the synchronization of the files, as specified in step 5 of Procedure 8-5 Manually Opening Packet and Transaction Traces in AppTransaction Xpert.

TTA Menu Options

When a transaction trace file is opened in AppTransaction Xpert, the TTA menu option appears. The TTA menu provides the ability to exclude and filter transactions and methods. Additionally, the TTA menu includes options to view information about the opened transaction trace file and generating reports.



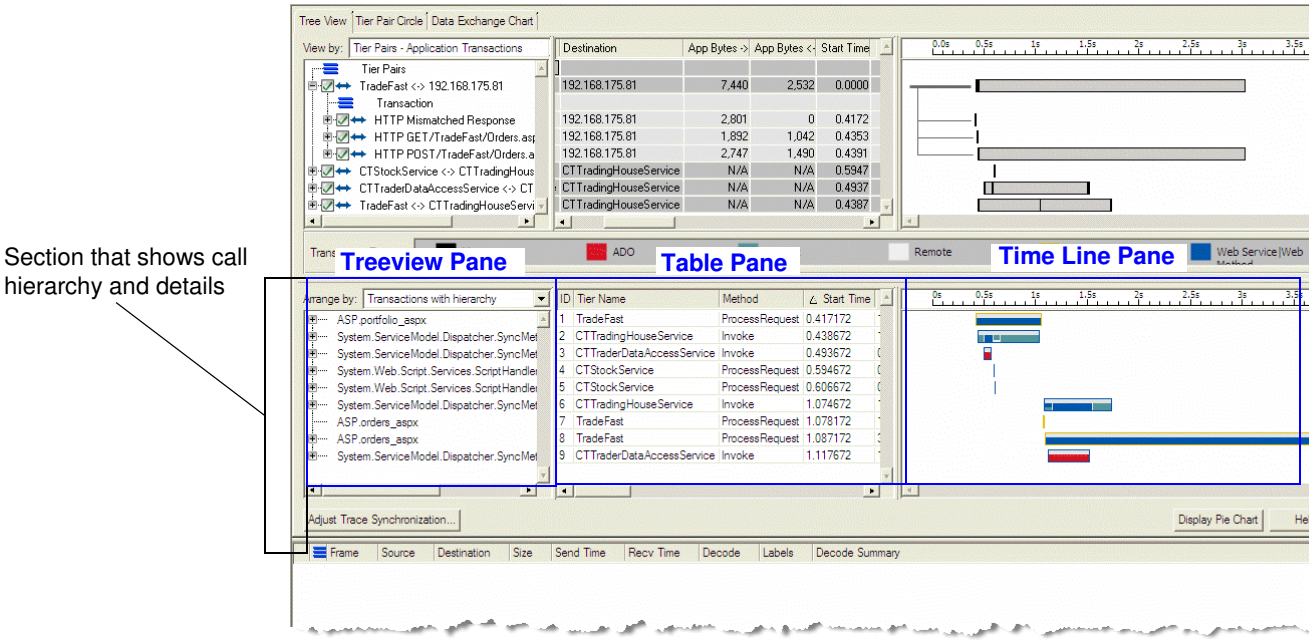
The TTA menu options correspond with the menu options in Transaction Trace Analyzer. For more information about the menu options, see the Transaction Trace Analyzer documentation. (On the Tree View tabbed page, click the Help button. Then on the “Treeview Screen” page, scroll down to the “Menu Options” section. The TTA menu option correspond to the Edit menu options.)

For information about adding items to reports and generating reports, see Step 3: Generate Reports.

Tree View Tabbed Page (Multi-Tier Analysis)

When a transaction trace file is opened in AppTransaction Xpert, the Tree View tabbed page includes an additional section showing the call hierarchy that lets you quickly find details (such as execution time and associated SQL statements) on calls of interest. The new section has three panes:

- Treeview Pane—shows an expandable hierarchy of method calls for each transaction.
- Table Pane—shows details and performance statistics for every call visible in the treeview pane.
- Time Line Pane—shows a graphic representation of the activity in a specific method and any methods it called.



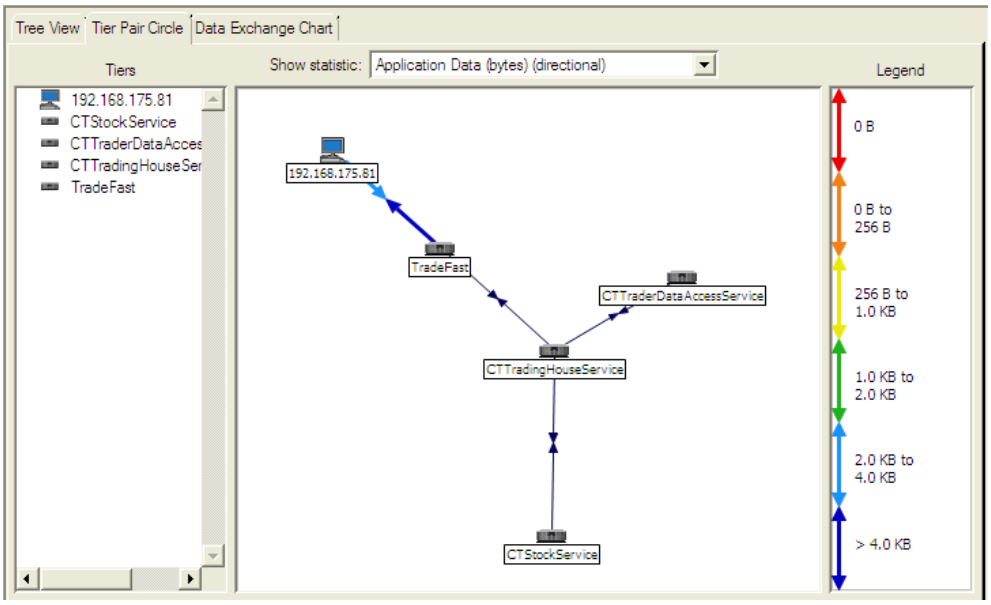
For information about the buttons on this page, see:

- Adjust Trace Synchronization
- AppDoctor Analysis and Pie Chart

For more information about the panes and using the panes to troubleshoot issues, click the Help button below the Time Line pane.

Tier Pair Circle Tabbed Page (Multi-Tier Analysis)

The Tier Pair Circle tabbed page shows all tier-pair conversions in the packet trace and the transaction trace.



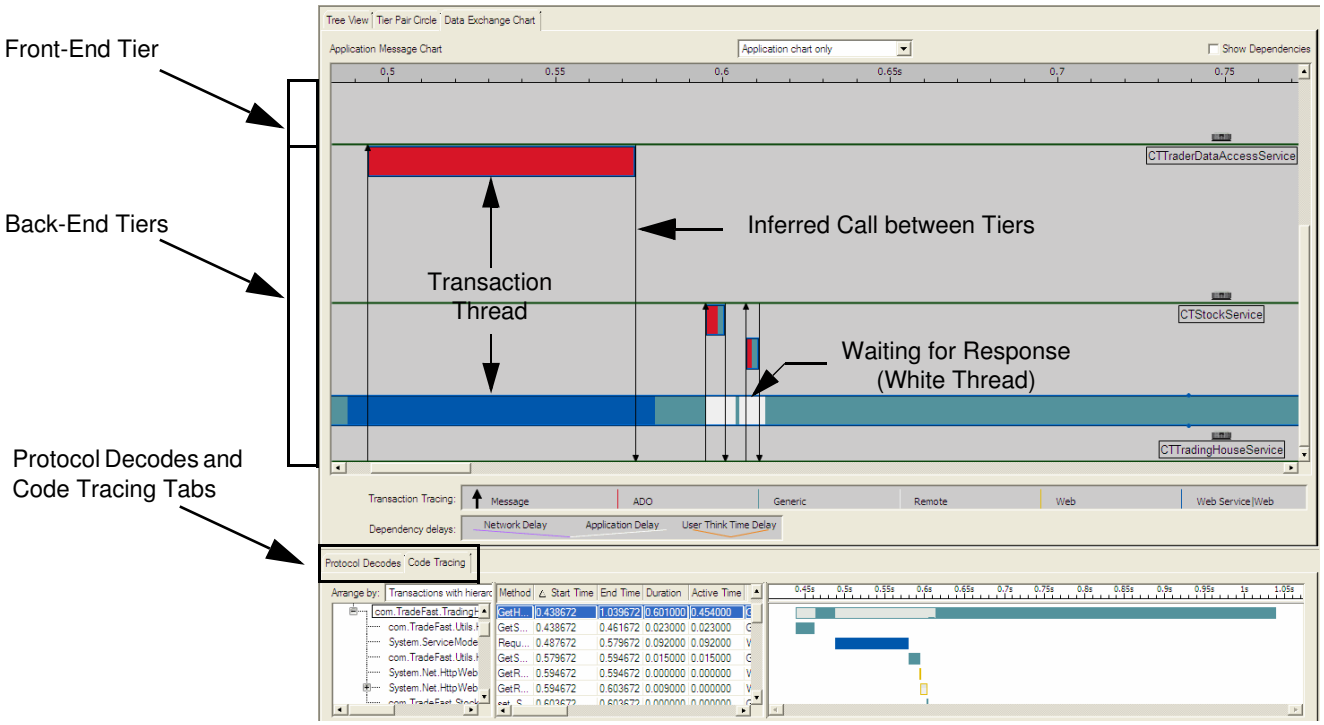
Important—Because the calls are inferred, the metric values reported for the back-end tiers always display as “N/A” or “0”.

Data Exchange Chart Tabbed Page (Multi-Tier Analysis)

The Data Exchange Chart tabbed page shows the flow of transactions across tiers from start to end, allowing you to immediately construct a detailed transaction model.

Select an application message to view decode information in the Protocol Decode tab at the bottom of the page. Select a transaction thread to view tracing information in the Code Trace tab at the bottom of the page. (The Code Trace tab displays the same call hierarchy information as the Tree View Tabbed Page (Multi-Tier Analysis).

Note that solid black lines indicate inferred calls between tiers. (AppTransaction Xpert assumes that when a transaction shifts from one tier to another tier, then the first tier called the second tier.)



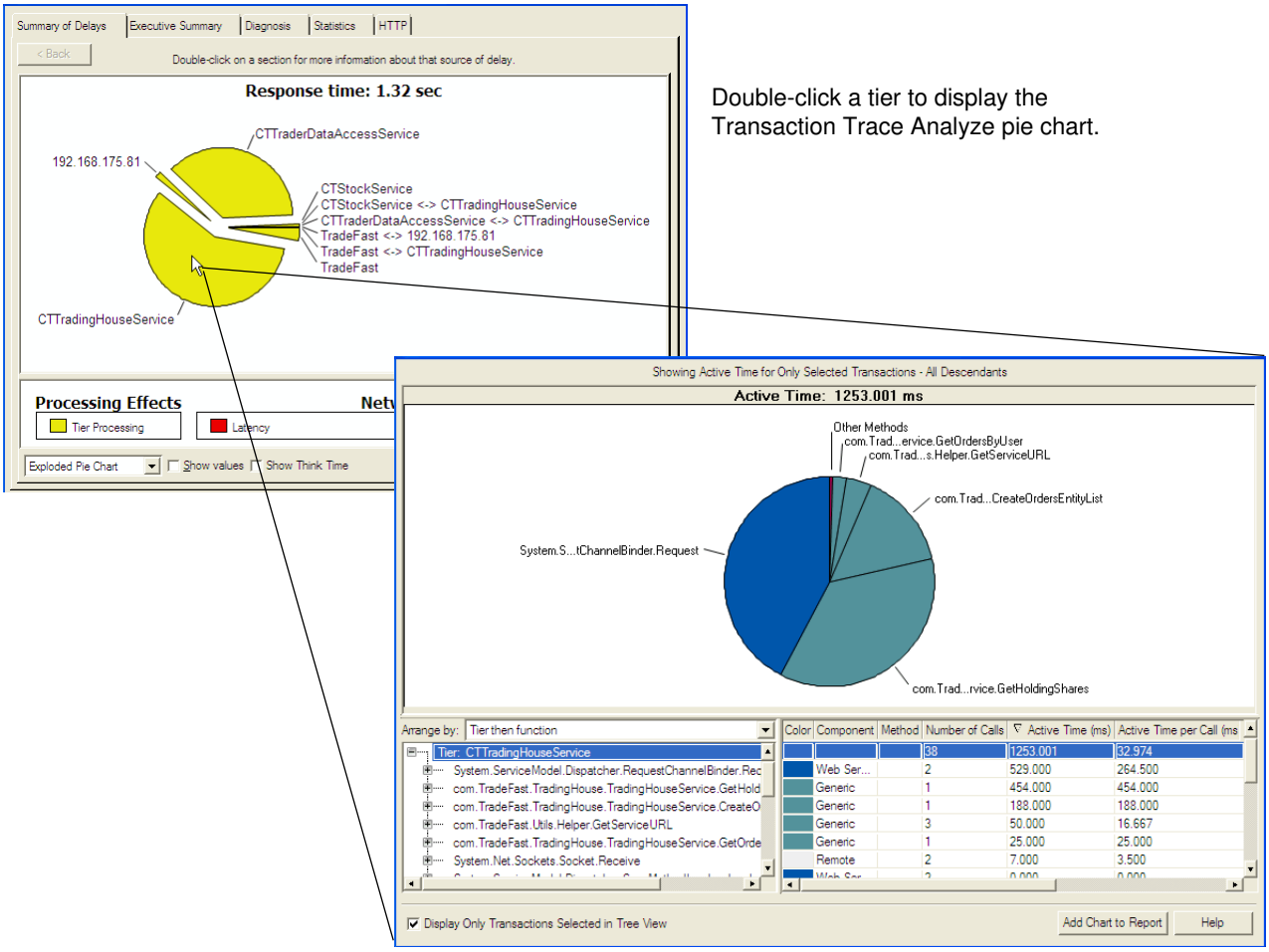
For more information about the using the information on this page to troubleshoot issues, click the Code Tracing tab and then click the Help button.

AppDoctor Analysis and Pie Chart

When a transaction trace file is opened in AppTransaction Xpert, AppDoctor displays transaction data.

Important—Because the calls are inferred, the metric values reported for the back-end tiers always display as “N/A” or “0”.

Double-click a wedge representing a tier to display selected transaction trace information in a pie chart.



Double-click a tier to display the Transaction Trace Analyze pie chart.

The pie chart displays the selected methods as the root of a virtual transaction. The pie chart shows:

- A pie chart with a single slice for the selected method calls and additional slices for each method called by the selected method calls.
- Aggregate performance details for the selected methods.
- An expandable hierarchy with the selected transactions as the root.
- Details on the individual method calls currently exposed in the call hierarchy.

For more information about the pie chart, click the Help button on the Pie Chart window.

Step 3: Generate Reports

After diagnosing the cause of the issue, you can generate a report to support and disseminate your analysis. On the Pie Chart window, choose the "Add Chart to Report" button. To generate a Transaction Trace Analyzer report, choose TTA > Generate TTA… Also note that relevant tiers from the Transaction Trace Analyzer pie chart will be substituted in AppTransaction Xpert reports (Reports > Generate Reports…), as needed, in the "Tier Processing" AppDoctor drilldown section when AppDoctor drilldowns are included.

Related Topics

- *Collecting Performance Data from AppInternals Xpert*

File Types

The following table lists the types of files used in AppTransaction Xpert.

Table 8-5 AppTransaction Xpert File Types

Suffix	Description	Format
.ace.cr.txt	Settings file for comparison reports. By default, this file is saved to the following directory: <*user_home*>\op_admin\ace_report_settings	ASCII text
ace.f	Packet filter file that can be used filter hosts and ports during capture or import. You can edit this file in the following windows: • Merge Capture Files Dialog Box • Remote Capture Agent Editor (On-Demand Captures) • Remote Capture Agent Editor (Continuous Captures)	ASCII text
.ace.ic.txt	Import configuration file. By default, this file is saved to the following directory: <*user_home*>\op_admin\ace_import_configs To change this default directory, set the preference ace_import_config_dir.	ASCII text
.ace.qpb	QuickPredict bar template file. This file contains settings that you can load into the QuickPredict Bar Chart (QuickPredict > Bar Charts). By default, this file is saved to the default model directory.	binary data
.ace.qps	QuickPredict simulation settings file. By default, this file is saved to the default model directory.	ASCII text
.ace.rt.txt	Report settings file for MS Word (.rtf) reports. By default, this file is saved to the following directory: <*user_home*>\op_admin\ace_report_settings.	ASCII text
.aed.m	Transaction Whiteboard model file.	binary data

Table 8-5 AppTransaction Xpert File Types (Continued)

Suffix	Description	Format
.appcapture	Application Capture traffic file. These files are created by capture agents and contain the raw binary traffic data. An appcapture file is imported to create the Transaction Analyzer model, and is also used to show the detailed protocol decodes within AppTransaction Xpert. These files are saved to the trace file directory, which is defined in Capture Manager. (Click the "Capture Download Settings…" button.)	binary data
.apptrace	Application Trace file. Trace files are generated by AppInternals Xpert data adapters (either the Java Instrumentation Data Adapter (JIDA) or dotNet data adapter). The trace files record execution sequence of calls within an application and the call hierarchy of Java or .NET classes that the data adapter is configured to trace.	binary data
.atc.m	Transaction Analyzer model file. This is the main file that contains all high-level information about an application task, except for the information in individual packets. (Packet information is stored in the packet trace(s) used to create the transaction analyzer model).	binary data
.pp	PathProbe results file. These files are saved to your trace file directory, which you can specify in Capture Manager. (Click the "Capture Download Settings…" button.)	binary data

Related Topics

- *Creating a Transaction Analyzer Model*