1 Overview of AppTransaction Xpert

AppTransaction Xpert is a powerful tool for detailed analysis of individual transactions. In today's complex application architectures, a single transaction can involve many tiers and require thousands of messages to traverse the network. This solution makes use of extensive use of visualization and analytics to accelerate troubleshooting in production, as well as pre-deployment performance validation and prediction. In production, the combination of AppResponse Xpert and AppTransaction Xpert is unmatched in the industry, providing a seamless workflow that spans monitoring, alerting, triage, root cause diagnosis, and remediation guidance. In pre-deployment, AppTransaction Xpert is the industry-leading solution for application network readiness testing.

Use AppTransaction Xpert to:

- Analyze a single transaction to quickly and conclusively determine the root cause of a performance problem
- Visualize transactional behavior and performance and easily communicate information to application stakeholders
- Predict application performance prior to deployment
- Accurately size access links
- Test the effect of proposed application and infrastructure changes on application performance (e.g., data center consolidation)
- Validate the effectiveness of proposed approaches to fix performance problems
- Quantify the effects of WAN optimization on your applications prior to making an investment

This section includes the following overview topics:

- Workflow Description for AppTransaction Xpert
- Understanding the AppTransaction Xpert Offerings and Licensing

Workflow Description for AppTransaction Xpert

Creating a model of your application in AppTransaction Xpert involves two general steps:

1) Workflow: Capturing Application Traffic—AppTransaction Xpert uses raw traffic data, captured from your network, as the basis for modeling an application. You can use the Capture Manager utility or a third-party tool, such as Sniffer, to create packet traces.

2) Workflow: Importing Packet Traces—When a packet trace is imported, AppTransaction Xpert parses the data and creates a single representation of the exchange. This representation is called an *application task characterization* or simply *application task.*

After creating the application task, you can do any or all of the following operations. The operations you perform, and the features you use, depend on the nature of your application and the questions you want to answer.

- Workflow: Visualizing an Application—The Transaction Analyzer window includes three different tabbed pages for viewing an application; often you can troubleshoot an application just by viewing it in one of these pages. Additionally, you can use these pages to remove or delete sections from an application task, and thereby focus on transactions of interest.
- Workflow: Analyzing your Application and Network—The AppDoctor feature includes three different tools for performing high-level analysis:
  - identify and diagnose bottlenecks
  - determine the relative amounts of application vs. network delay
  - view detailed statistics for the network and application

  Additionally, you can decode and analyze the protocol and application data found in individual packets.
- Workflow: Predicting Application Performance—You can use three different features to predict future performance in “what-if” scenarios and to test proposed fixes.
- Workflow: Running a Discrete Event Simulation—You can import a Transaction Analyzer model into the discrete event simulation environment and play back the model to create the same traffic pattern that was captured in the live environment.

Workflow: Capturing Application Traffic

Application packet traces (also known as “capture files”) form the raw data for an application task (Transaction Analyzer model). The Application Capture utility (Capture Manager) enables you to simultaneously capture traffic at multiple network locations. You can install an unlimited number of capture agents throughout your network; then you can manage these capture agents and capture traffic directly using a centralized Capture Manager on your computer.

AppTransaction Xpert supports SSL encryption of communications between Capture Managers and capture agents. A Capture Manager and a capture agent can transfer data using “anonymous” encryption (without authentication) or “certificate” encryption (with authentication). The native capture agents also support a special “headers-only” capture mode, in which they capture only IP, TCP, and UDP header information but no other protocol or application data.

The following product modules extend the core capture functionality:

- AppTransaction Xpert Advanced Capabilities—This module includes the following features:
  - — Continuous captures—If the transaction or problem of interest occurs intermittently but you cannot predict when it will occur, you can do a *continuous capture* in which you start the capture and keep it running until the transaction occurs. Then you can stop the capture, extract the transaction of interest, and import it into AppTransaction Xpert.
  - — Scheduled captures—If a problem occurs intermittently, but you know that it occurs within a specific time window, you can perform a *scheduled capture* in which the capture agent runs according to a pre-specified schedule (for example, daily from 2:00 to 2:05 am). You can also use this type of utility to schedule and run automatic downloads.
  - — Capturing performance data—You can capture performance data and application traffic simultaneously using the native capture agents, then view the data together in AppTransaction Xpert.

- Distributed Agent Controller—The Distributed Agent Controller is a command-line program that enables you to capture traffic using scripts (instead of starting and stopping the capture manually from within AppTransaction Xpert). This enables you to integrate the native capture functionality with synthetic transaction generators and to generate scheduled captures.

Note—The Distributed Agent Controller and AppTransaction Xpert Advanced Capabilities modules may require additional licenses, depending on your specific solution.

Table 1-1 Creating Application Packet Traces: References

Topic	Reference
How to capture application traffic	General Advice for Capturing Application Traffic
Creating multiple packet traces	Capturing an Application from Multiple Locations
Capturing traffic using AppTransaction Xpert	Capturing Traffic with AppTransaction Xpert
Capturing traffic using Sniffer	Capturing Traffic with Network General's Sniffer
Capture encryption and security	Capture Encryption Excluding Sensitive Information from Captures Capture Security: Restricting Access to Capture Operations
Continuous captures	Continuous Captures
Scheduled captures	Running Scheduled Captures and Downloads
Capturing performance data	Creating, Importing, and Viewing Performance Statistics Importing Performance Statistics
Distributed Agent Controller module	Distributed Agent Controller

Workflow: Importing Packet Traces

You can import multiple packet traces of the same exchange and merge the results into an accurate, realistic model of an application. You can capture and analyze many different types of applications—even highly complex multi-tier applications.

You can also import packet traces from external programs, such as Sniffer and TCPdump. Additionally, AppTransaction Xpert interfaces with the conversion utility ProConvert to support a variety of other formats.

There are two primary methods for importing capture data:

- Creating a Transaction Analyzer Model—After creating packet traces, you can import the packet traces into AppTransaction Xpert to create a Transaction Analyzer model that models your application.
- Batch Analyzer—Batch Analyzer is useful when you want to import multiple transactions in one operation. Some users frequently capture multiple sets of packet traces. Batch Analyzer streamlines the import process when you capture multiple transactions, and eliminates the need to import each new transaction manually.

Workflow: Visualizing an Application

The Transaction Analyzer window has three tabbed pages for visualizing applications:

- Tree View—organizes a task into tier pairs, connections and frames. This window also shows summary information and a timeline of the individual transactions that make up an application.
- Data Exchange Chart—uses a timeline to show the overall flow of data between tiers. You can view applications from both the network and the application layer, quickly determine inefficient or “chatty” applications, and pinpoint delays in both the network and the application.
- Tier Pair Circle—is useful for viewing all tier-pair conversations in an application task (Transaction Analyzer model). You can easily determine which tiers are conversing and not conversing, view general information on each conversation, and zero in on conversations of interest.

Workflow: Analyzing your Application and Network

There are two primary tools for analyzing an existing application: AppDoctor, for performing high-level analysis; and decodes, which allow you to “drill down” into the protocol and application data contained in individual packets.

- The AppDoctor Summary of Delays window divides the total application response time into separate components of network and application delay.
- The AppDoctor Diagnosis window pinpoints and diagnoses bottlenecks and potential bottlenecks in your application and/or network.
- The AppDoctor Statistics window provides detailed statistics on various measures of network and application performance.

You can view detailed protocol and application decodes on selected packets or messages in any of the three views (Tree View, Data Exchange Chart, and Tier Pair Circle).

Table 1-2 Analyzing Applications: References

Tool	Reference
AppDoctor	AppDoctor Summary of Delays AppDoctor Statistics AppDoctor Diagnosis
Protocol and application decodes	Protocol Decodes AppTransaction Xpert Decode Module

Workflow: Predicting Application Performance

AppTransaction Xpert includes predictive features that enable you to determine how network and application changes will affect application performance:

- QuickPredict—This feature provides instant feedback on how network variations will affect an application's performance. This allows you to answer questions such as, "If I double the bandwidth between two tiers, will it speed up my application's response time?". AppTransaction Xpert has three different types of QuickPredict:
  - — Standard QuickPredict—This interface enables you to predict the effects of variations in bandwidth, latency, and other network parameters. This interface uses x-y graphs to show the results of these changes on application response times.
  - — QuickPredict Bar Charts—In addition to predicting application response times, QuickPredict Bar Charts break down the total application response time into separate components of application processing time and network delay (propagation, transmission, protocol, and congestion delay).
  - — Multi-User QuickPredict enables you to create QuickPredict deployments that involve multiple clients, multiple servers, and/or multiple applications. Multi-User QuickPredict is especially useful when you want to perform basic capacity-planning and application-response-time studies on access links. (This feature requires a license for AppTransaction Xpert Advanced Capabilities or AppTransaction Xpert Plus.)

  For more information, see QuickPredict.

- QuickRecode—Use this feature to predict how proposed fixes and changes to an application will affect its performance. You do this by manually editing your Transaction Analyzer model to create a "hypothetical application" and comparing its performance to the original. The comparison enables you to study questions such as, "How will the application be affected if the database could transmit a record in 30 messages, instead of the current 300?".

  For more information, see QuickRecode.

Workflow: Running a Discrete Event Simulation

AppTransaction Xpert can generate a *model* of an application by analyzing a live network packet trace from an application. Based on the packet traces, AppTransaction Xpert makes conjectures as to the actual message exchange pattern of the application, complete with message sizes, timing sequence, and dependencies. You can import the AppTransaction Xpert model into OPNET's discrete event simulation (DES) environment and play back the model to create the same traffic pattern as captured in the live environment.

Note—The ability to run a discrete event simulation with a Transaction Analyzer model (.atc.m) requires an AppTransaction Xpert Plus or an AppTransaction Xpert Module license.

If you have an AppTransaction Xpert Plus license and no discrete event simulation environment, you can download and run IT Guru 16.0 or later to run discrete event simulations. When started, IT Guru uses an AppTransaction Xpert Plus license and runs without any product module functionality, except for discrete event simulation. (Be aware that if you only have a single AppTransaction Xpert Plus license, you must close AppTransaction Xpert before starting IT Guru, so that a license is available. If you have multiple AppTransaction Xpert Plus licenses, it is not necessary to close AppTransaction Xpert, as long as another AppTransaction Xpert Plus licence is available.)

You can import Transaction Analyzer models (.atc.m) into a discrete event simulation environment using one of the following methods:

- Import into a new scenario—
  - — From the Project Editor, choose Topology > Import Topology > From AppTransaction Xpert…
  - — Using the Startup Wizard, choose "Import from AppTransaction Xpert" when prompted for the initial topology.
- Import into an existing scenario—
  - — From the Project Editor, choose Protocols > Application > Deploy AppTransaction Xpert Application on Existing Network > as Discrete Traffic…
  - — From the Project Editor, choose Protocols > Application > Deploy AppTransaction Xpert Application on Existing Network > as Traffic Flows…

To import a Transaction Analyzer model into the discrete event simulation environment, the AppTransaction Xpert directory must be added to the model directories (mod_dirs) preference for the DES environment application.

For more information about running discrete event simulations with Transaction Analyzer models, see the documentation for the discrete event simulation environment (e.g., OPNET Modeler, SP Guru Network Planner, or IT Guru).

Understanding the AppTransaction Xpert Offerings and Licensing

The availability of AppTransaction Xpert functionality is determined by licenses, which are obtained during application startup.

This section includes the following topics:

- Licenses Obtained During Startup—Describes how to specify the licences needed during startup so that you have access to the required functionality
- Packaging of Product Licenses and AppTransaction Xpert Licenses—Describes the availability of AppTransaction Xpert licenses with other product licenses
- Functionality Provided by ADM and AAC Licenses—Describes the functionality provided by theAppTransaction Xpert Decode Module (ADM) and AppTransaction Xpert Advanced Capabilities (AAC) licenses
- OPNET Modeler's AppTransaction Xpert Real Application Simulation Module—Describes the AppTransaction Xpert functionality available with OPNET Modeler

For information about the licensing system, (including the License Manager, the License Server, and license operations), see Licensing System Overview.

Licenses Obtained During Startup

By default, during startup AppTransaction Xpert attempts to obtain license(s) that provide the maximum capabilities. If the licenses that provide the maximum capabilities are in use or otherwise unavailable, AppTransaction Xpert obtains license(s) that provide the most capabilities from the available licenses.

Optionally, you can override the default by specifying the alternate maximum required capabilities. For example, if your work does not require the AppTransaction Xpert Decode Module, then by omitting the AppTransaction Xpert Decode Module as a required license, the AppTransaction Xpert Decode Module license remains available to other users.

If the required licenses are not obtained during startup, the Feature Availability dialog box appears indicating the licenses that were available and the impact on the capabilities/features. Options and capabilities that require licenses not obtained during startup are grayed out (i.e., unavailable).

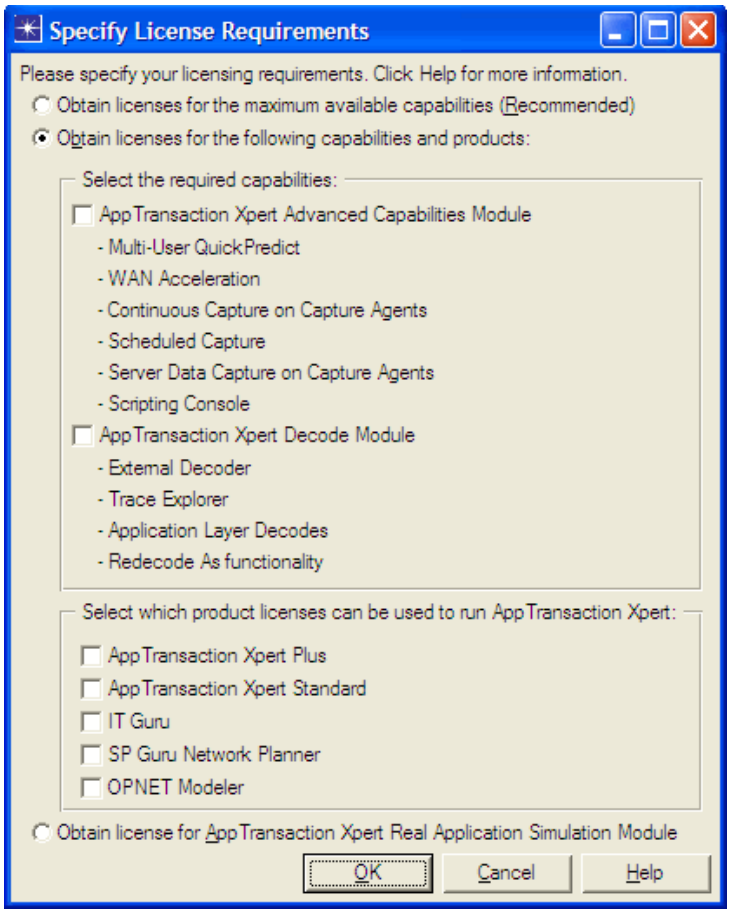
The following procedure describes how to specify the default/alternate license requirements.

Procedure 1-1 Specifying the Default/Alternate License Requirements

1 From the System window, choose License > Configure Product Licenses.

➥ The Specify License Requirements dialog box appears.

Figure 1-1 Specify License Requirements Dialog Box



Note that the dialog box may list a subset of the options listed above, depending on the licenses on the License Server.

2 Specify the license requirements, as listed in the following table.

Table 1-3 Specify License Requirement Options

Option	Description
Obtain licenses for maximum capabilities	Specifies to obtain licenses for the maximum capabilities.
Obtain licenses for the following capabilities	Specifies to obtain licenses for the selected capabilities/solutions. Choose one or more of the following: Solutions: [ ] AppTransaction Xpert Advanced Capabilities Module [ ] AppTransaction Xpert Decode Module Licenses: [ ] AppTransaction Xpert Plus [ ] AppTransaction Xpert Standard [ ] IT Guru (See Note.) [ ] SP Guru Network Planner (See Note.) [ ] OPNET Modeler (See Note.) For a list of the associated AppTransaction Xpert functionality, see Table 1-4 and Table 1-5.
Obtain license for AppTransaction Xpert Real Application Simulation Module	Specifies to obtain the AppTransaction Xpert Real Application Simulation Module license for use with OPNET Modeler. For a list of associated AppTransaction Xpert functionality, see OPNET Modeler's AppTransaction Xpert Real Application Simulation Module.
Note—These items ([ ] IT Guru, [ ] SP Guru Network Planner, [ ] OPNET Modeler) indicate to obtain the AppTransaction Xpert module licenses during startup in addition to the solution license. This differs from the last option, which indicates to obtain the AppTransaction Xpert Real Application Simulation Module, leaving the OPNET Modeler andAppTransaction Xpert modules free.	

3 Select OK.

➥ The "Confirmation: Product License Requirements" dialog box appears. The dialog box states the license requirements currently being used by AppTransaction Xpert and the license requirements that will be used the next time AppTransaction Xpert is started.

Click OK to close the confirmation dialog box.

4 Restart AppTransaction Xpert.

➥ The specified license requirements are used when AppTransaction Xpert is started.

End of Procedure 1-1

The following procedure describes how to verify the license(s) obtained during startup.

Procedure 1-2 Verifying the License(s) Obtained During Startup

1. From the System window, choose Help > About This Application.
2. Select the Environment tab.
3. Expand the Licenses in Use tree.

   ➥ The tree lists the license(s) in use.

End of Procedure 1-2

Packaging of Product Licenses and AppTransaction Xpert Licenses

The following table lists the availability of AppTransaction Xpert licenses with other product licenses.

- *Built-in*—Indicates that the module license is included with the product license.
- *Optional*—Indicates that the module license is available, but is not included with the product license.
- *Required*—Indicates that the module license is required to access AppTransaction Xpert functionality.
- *Unavailable*—Indicates that the module license is not available with the product license.

Table 1-4 Product Licenses and AppTransaction Xpert Module Licenses

	— Module Licenses —		
Product License	**AppTransaction Xpert Module**	**AppTransaction Xpert Decode Module (ADM)[1]**	**AppTransaction Xpert Advanced Capabilities (AAC)[1]**
AppTransaction Xpert Plus[2]	Built-in	Built-in	Built-in
AppTransaction Xpert Standard	Built-in	Built-in	Unavailable
IT Guru	Required	Optional	Optional
IT Guru Network Planner	Unavailable	Unavailable	Unavailable
OPNET Modeler	Required	Optional	Optional
OPNET Modeler and AppTransaction Xpert Real Application Simulation Module[3]	Unavailable	Unavailable	Unavailable
SP Guru Network Planner	Required	Optional	Optional

1. For a list of the functionality provided by ADM and AAC, see Table 1-5.
2. To run discrete event simulations, install IT Guru 16.0 or later. IT Guru 16.0 or later can be run using an AppTransaction Xpert Plus license, provided that no IT Guru license is available. However, IT Guru will run without any product module functionality, except for discrete event simulation.
3. The AppTransaction Xpert Real Application Simulation Module (ATXRASM) license includes a select set of AppTransaction Xpert functionality for OPNET Modeler users. To run ATXRASM, a Modeler license must be present; however, ATXRASM does not reserve the Modeler license. (In other words, both Modeler and ATXRASM can be run at the same time.) For a list of the AppTransaction Xpert functionality available in ATXRASM, see OPNET Modeler's AppTransaction Xpert Real Application Simulation Module.

Functionality Provided by ADM and AAC Licenses

The following table lists functionality provided by ADM and AAC licenses.

Table 1-5 Functionality Provided by ADM and AAC Licenses

Functionality	— Module Licenses —	
	AppTransaction Xpert Decode Module (ADM)	**AppTransaction Xpert Advanced Capabilities (AAC)**
Capture Application Traffic		
- Continuous Capture on AppTransaction Xpert Agents	—	✔
- Scheduled Capture	—	✔
- Server Data Capture on AppTransaction Xpert Agents	—	✔
Preview and Import Capture Data		
- Trace Explorer	✔	—
- External Decode	✔	—
WAN Acceleration (capture and import)	—	✔
Visualize Applications		
- Scripting Console	—	✔
Protocol Decodes		
- Application Layer Decodes	✔	—
- Recode As	✔	—
Predict Application Performance		
- Multi-User Quick Predict	—	✔

Note that the AppTransaction Xpert Module license is required with ADM and/or AAC licenses. For more information, see Table 1-4.

OPNET Modeler's AppTransaction Xpert Real Application Simulation Module

AppTransaction Xpert Real Application Simulation Module (ATXRASM) is specially designed for OPNET Modeler users. ATXRASM enables the simulation of real application traffic and provides access to industry-leading AppDoctor analysis for transactions captured in a simulation.

The following functionality is available with an ATXRASM license:

- Capture Application Traffic
  — On-Demand
  — AppResponse Xpert
- Import Packet Capture Data
  — Single trace
  — Trace merge
  — Manual Merge
  — External Decodes (provides access to hundreds of decodes)

  Note—ATXRASM can import packet captures in CSV format from any OPNET Modeler release. Additionally, ATXRASM can import .appcapture files from OPNET Modeler 16.0 PL6 and later.
- Analysis and Visualization Tools
  — AppDoctor
  — Parallel Effects
  — User Think Time
  — Graph Statistics
- Visualizations
- Scripting Console
- Protocol Decodes
  — Recode As
  — HTTP Decoder
  — External Decodes (provides access to hundreds of decodes)
- Transaction Whiteboard