Riverbed OPNET AppInternals Xpert
See application performance through your users’ eyes

It’s not uncommon for today’s web-based applications to require dozens of hops to complete a single transaction and along the way make use of third-party and/or cloud services, such as ad services and multiple database lookups. As a result, finding and troubleshooting back-end performance problems is very difficult and coordinating troubleshooting efforts between application support and development teams often makes it more challenging.

Given the complex nature of these applications, monitoring end-user experience is critical to understanding the quality of application delivery, and hence understanding the health of the business. However, it falls short of providing the complete picture; for the fastest problem diagnosis, end-user experience should be integrated with code-level transaction tracing and deep application component monitoring.

Unified APM

Riverbed® OPNET AppInternals Xpert® provides deep visibility into the performance of complex, multi-tier applications to deliver application support teams and developers with the information they need to quickly and collaboratively identify, troubleshoot, and debug application performance issues. It supports application performance management (APM) from the browser to back-end databases by combining code-level transaction tracing and end-user experience monitoring with fine-grained monitoring of application component performance.

OPNET AppInternals Xpert is compatible with hundreds of third party and custom applications, including popular commercial offerings such as SharePoint, Banner, OpenText or Oracle E-Business. It also excels at monitoring custom Java and .NET applications.

It enables application teams to understand and manage real user experience from the browser click through the web- and application-tiers, to the database, and back for all users, all transactions, 24x7. It does this by utilizing lightweight JavaScript agents that monitor real user experience from the browser, and through advanced, low-overhead, continuous tracing techniques to provide deep visibility into application code as it executes. The techniques assemble a complete picture of a transaction’s path and its performance across each tier for near real-time and historical analysis.

Figure 1. OPNET AppInternals Xpert integrates real end-user experience monitoring, code-level transaction tracing, and deep application component monitoring and uses “big data” analytics to automate and correlate analysis to accelerate problem identification and resolution.

OPNET AppInternals Xpert includes the following capabilities:
- Measures “stopwatch” times for applications and web pages and provides immediate notification of performance changes
- Identifies where problem delays occur – browser, network, server, or application
- Traces every transaction through the back end and stores it for real-time and historical analysis
- Enables seamless drill down into specific transactions (server, line of code)
- Correlates multiple metrics to identify causal relationships

Applying a big data approach to APM

OPNET AppInternals Xpert applies big data techniques to APM to provide application support and developer teams with the ability to follow multi-tiered user transactions across all application components as well as performance metrics to understand the impact of systems on transaction performance. It records and indexes all transaction traces—not just samples—through its Transaction


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Trace Warehouse (TTW). With every transaction captured, application teams always have the critical data they need at hand. It's simple, powerful open-ended search speeds troubleshooting by making it fast and easy to find a single transaction among billions. In addition, OPNET AppInternals Xpert includes a correlation engine that automates troubleshooting by identifying cause-and-effect relationships across hundreds of thousands of performance metrics from across multiple application tiers. Moreover, patented analytics capabilities automatically identify unusual patterns for thousands of performance indicators to provide early warning into potential future issues.

Figure 2. OPNET AppInternals Xpert collects thousands of metrics every second from all tiers of the application. These measurements are fed into a powerful analytics engine, where they are analyzed and correlated to produce dashboards and in-depth data views based on events and behavior patterns.

Supports entire application lifecycle

OPNET AppInternals Xpert delivers comprehensive performance management throughout the application lifecycle. It now integrates with popular integrated development environments (IDE), including Microsoft Visual Studio and Eclipse. This enables bidirectional drill down to streamline application debugging and troubleshooting and opens up visibility and enhances collaboration across application operations and developer teams.

Application support teams can use OPNET AppInternals Xpert in production environments to identify issues early and rapidly remediate performance problems. Seamless drill down from the transaction trace to the effected code enables operations to highlight the effected calls or methods for developers. Conversely, developers and QA teams can analyze applications in the test environment to proactively identify bottlenecks and prevent potential issues by quickly understanding how and where specific code is being used and who is using it in the production environment.

Key use cases

Use OPNET AppInternals Xpert to:

- Troubleshoot application performance regardless of application type – web-based or common packaged applications – or how they are deployed – data center, private or public cloud
- Streamline testing and deployment of new application releases
- Monitor transaction performance and SLA compliance
- Detect and document SaaS or third-party application problems
- Communicate relevant application performance information across business, app support and development stakeholders

“We used to spend the majority of the analysis phase determining ownership and isolating the problem to a specific area. With OPNET AppInternals Xpert, we reduced the turnaround time by 50% while reducing head-count utilization by 25%.”

— Application Manager, Fortune 50 Manufacturing Company
Key features

End-user experience monitoring

OPNET AppInternals Xpert passively monitors and analyzes end-user experience for all types of enterprise applications to provide early identification of issues and quickly determine the scope and seriousness of the problem.

- Monitor end-user experience with minimal instrumentation and no footprint in the IT environment
- Supports all end users using a web browser, regardless of user location or device – laptop, tablet, or mobile device
- Report on key end-user experience metrics, including Apdex, end-to-end response time, detailed response time composition, and page view statistics
- Delineate response time by contributing sources, including server delay, network delay, browser render time, redirect time, DNS lookup delay, connection setup, in-browser layout, and resource loading times
- Gain detailed performance reporting by application, page, user, geographic location, browser and device/platform type
- Onboard analytics provide application recognition, user identification, root-cause analysis, and powerful business-level summarization
- Automatic JavaScript injection using the AppInternals Xpert agent or Riverbed Stingray Traffic Manager application delivery controller software

![Figure 3. OPNET AppInternals Xpert displays front-end user experience metrics in the same view as back-end transaction-level information to accelerate problem identification and resolution.](image)

Transaction Trace Warehouse and “big data” techniques

Unlike competitive solutions, OPNET AppInternals Xpert captures all transaction data; data is never sampled. Additionally, it provides a variety of ways to streamline problem identification and resolution by uncovering hidden patterns, unknown correlations and other useful information.

- Captures, stores, and indexes all transactions using a big data approach that scales to billions of transactions
- Always-on cross-tier transaction tracing follows user transactions across all application components with code-level detail
- Patented deviation tracking automatically learns normal behavior for thousands of performance indicators and alerts on deviations
- True correlation engine automatically identifies cause-and-effect relationships across hundreds of thousands of performance metrics from across multiple application tiers to find relationships and automate troubleshooting
  - Identifies metrics that deviate at the same instance in time
  - Identifies metrics that repeatedly deviate in tandem over time
- Simple and powerful open-ended search makes finding that one transaction in a billion quick and easy so that troubleshooting can begin sooner
- Heuristic-based recommendations are offered in “plain English” to simplify diagnosis
- Bidirectional integration with Microsoft Visual Studio and Eclipse integrated development environments (IDE) enhances workflow between application support and development teams
Deep application component monitoring

- Monitor thousands of performance metrics from across all application tiers, including Java, .NET, database, VMware, and SOA
- Automatic application discovery and intelligent tuning accelerates set up and ensures low overhead
- Low-overhead, always-on memory analysis and real-time memory leak detection identifies code-level source of leaks
- Automatically detect systemic anomalies
- Correlate relationships among performance metrics to support troubleshooting
- High resolution data collection (~1 second)

Figure 4. OPNET AppInternals Xpert provides fine-grained monitoring of resources consumed by the application components and events occurring within them.

Extensive metric collection

OPNET AppInternals Xpert provides deep visibility into J2EE and .NET applications, with broad visibility across all other components. It collects thousands of measurements every second, including:

- **Java/J2EE**: WebSphere, WebLogic, JBoss, etc.
- **.NET**: IIS, ASP.NET
- **Web services**: REST, SOAP, XML-RPC
- **VMware**: VMware ESX, vSphere (sample metrics include physical allocation, physical usage, CPU shares)
- **Web server**: Apache, IIS, iPlanet/Sun One
- **Databases**: Oracle, MS SQL Server, DB2, Sybase
- **Operating systems**: Windows, Solaris, AIX, HP-UX, Linux (Red Hat / SUSE)