



Product Spotlight
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QALoad 5.7 and Vantage Analyzer

Combining Load Testing and Application Server Analytics for
Powerful Root Cause Analysis

Please direct questions about
or comments on this document to:
Compuware Corporation
One Campus Martius
Detroit, MI 48226-5099
1-800-538-7822

Outside the USA and Canada, please contact
your local Compuware office or agent.

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Introduction

Spotlight Overview

COMPUWARE's goal is to provide a "best of breed" performance testing solution:

Application Performance Assurance or APA.

- **QALoad:** Highly scalable load testing and comprehensive application analytics.
- **Vantage Analyzer:** Non-intrusive Java and .NET application server analytics to component and method level.

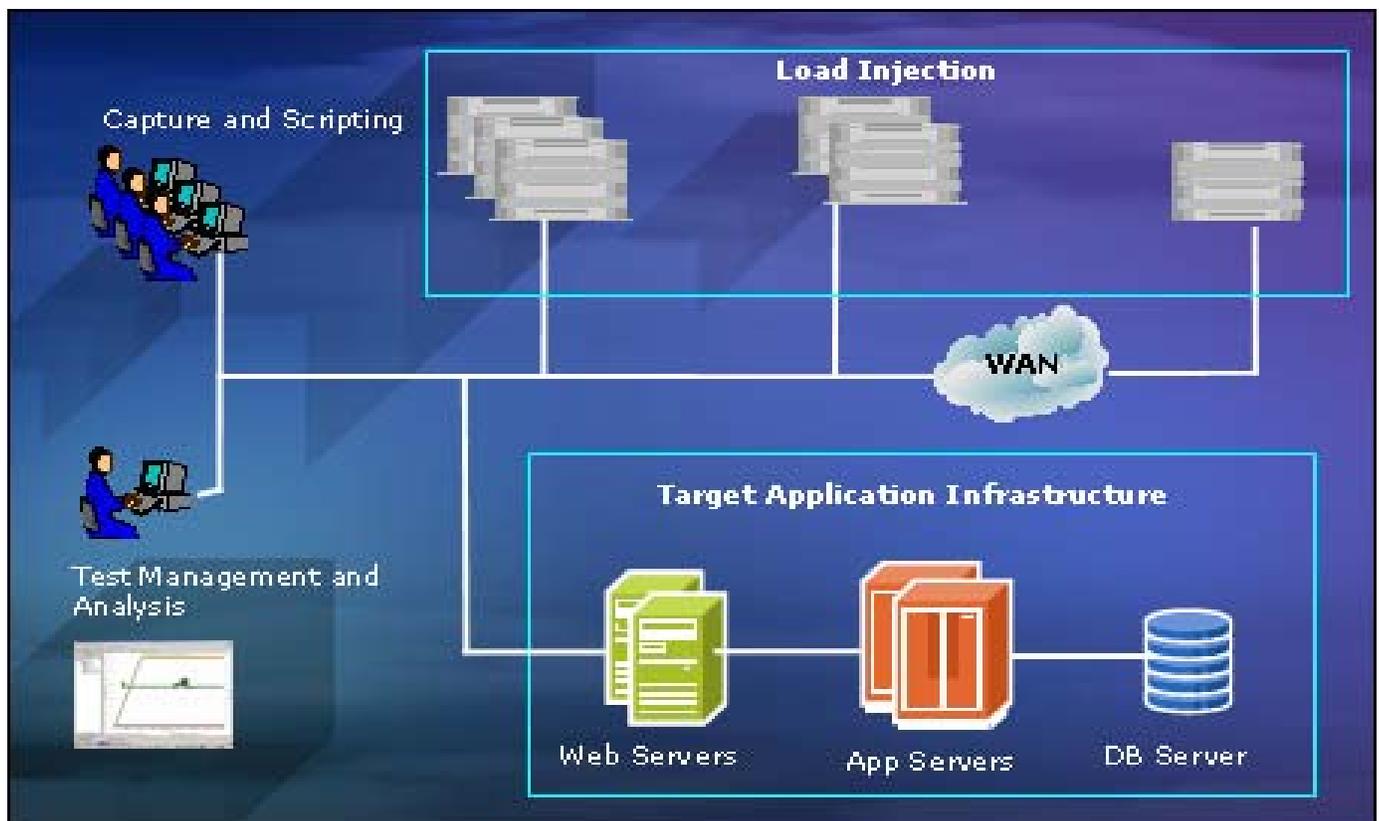
Integration of load testing and application analytics is a key part of **APA** and the latest release of **QALoad (5.7)** extends this integration to include the powerful application server analysis capabilities of **Vantage Analyzer**.

QALoad: Overview

QALoad consists of the following modules:

- **Script development workbench**
 - Records and renders end-user activity as transaction scripts for use by the **Conductor** to build load tests.
- **Conductor**
 - Creates and executes load tests using transaction scripts created by the **Script Development Workbench**. Also uses multiple **Players** to inject load.
- **Player**
 - Used by the **Conductor** and functions as the load injector to simulate highly-scalable end-user load from multiple points of presence.
- **Analyze**
 - Provides graphical and tabular analysis of the results of a load test
- **Remote Monitoring**
 - Provides the ability to monitor and capture server, network and database performance data during load test execution.

Typical deployment

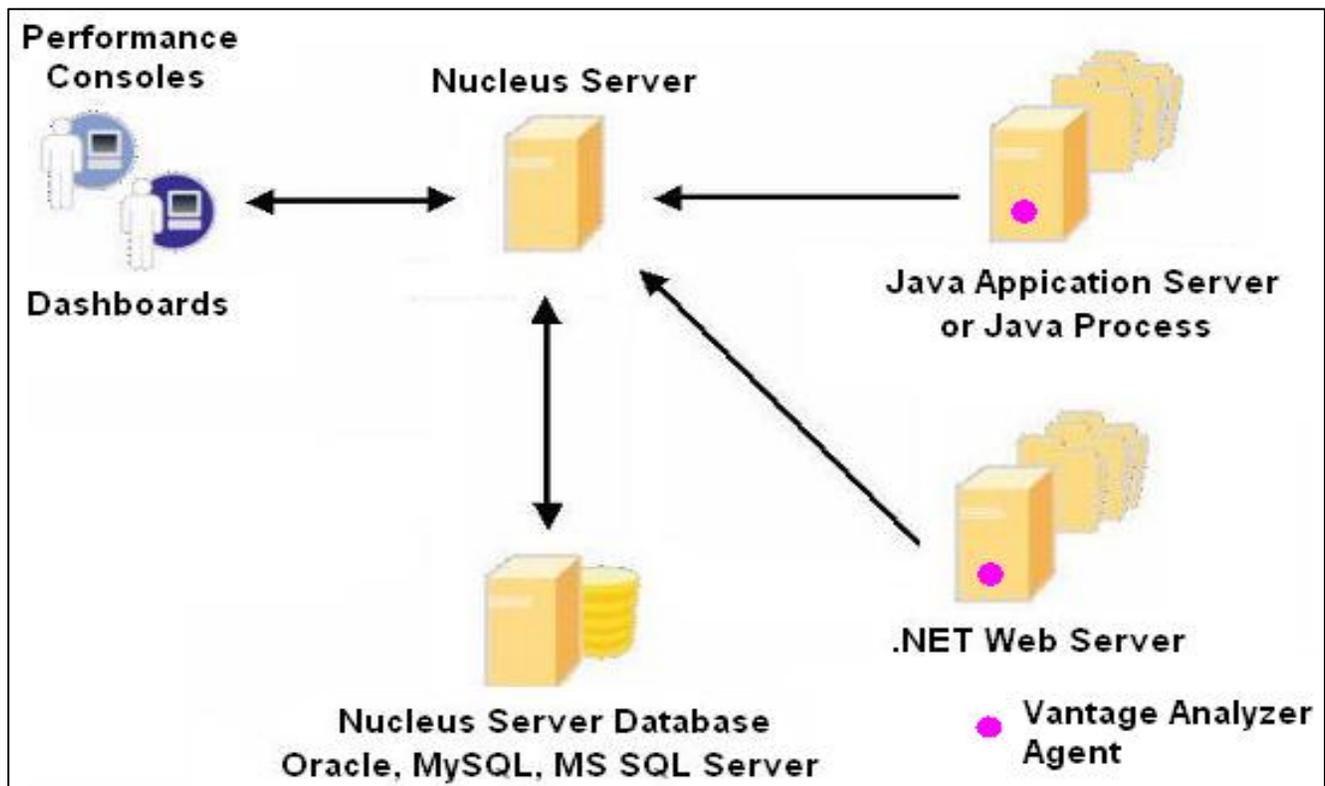


Vantage Analyzer Overview

Vantage Analyzer consists of the following modules:

- **Nucleus Server**
 - Acts as the database repository for all data collected by the **Java and .NET agents**.
- **Performance Console**
 - Real-time analysis of application server performance to method and component level.
- **Performance Dashboard**
 - Real-time highly customizable dashboard to display application server performance and monitor SLA compliance.
- **Java Agents**
 - Provides low-impact monitoring of Java application servers such as WebLogic, Websphere, JBoss and many others.
- **.NET Agents**
 - Provides low-impact monitoring of .NET CLR across multiple versions of the .NET framework.

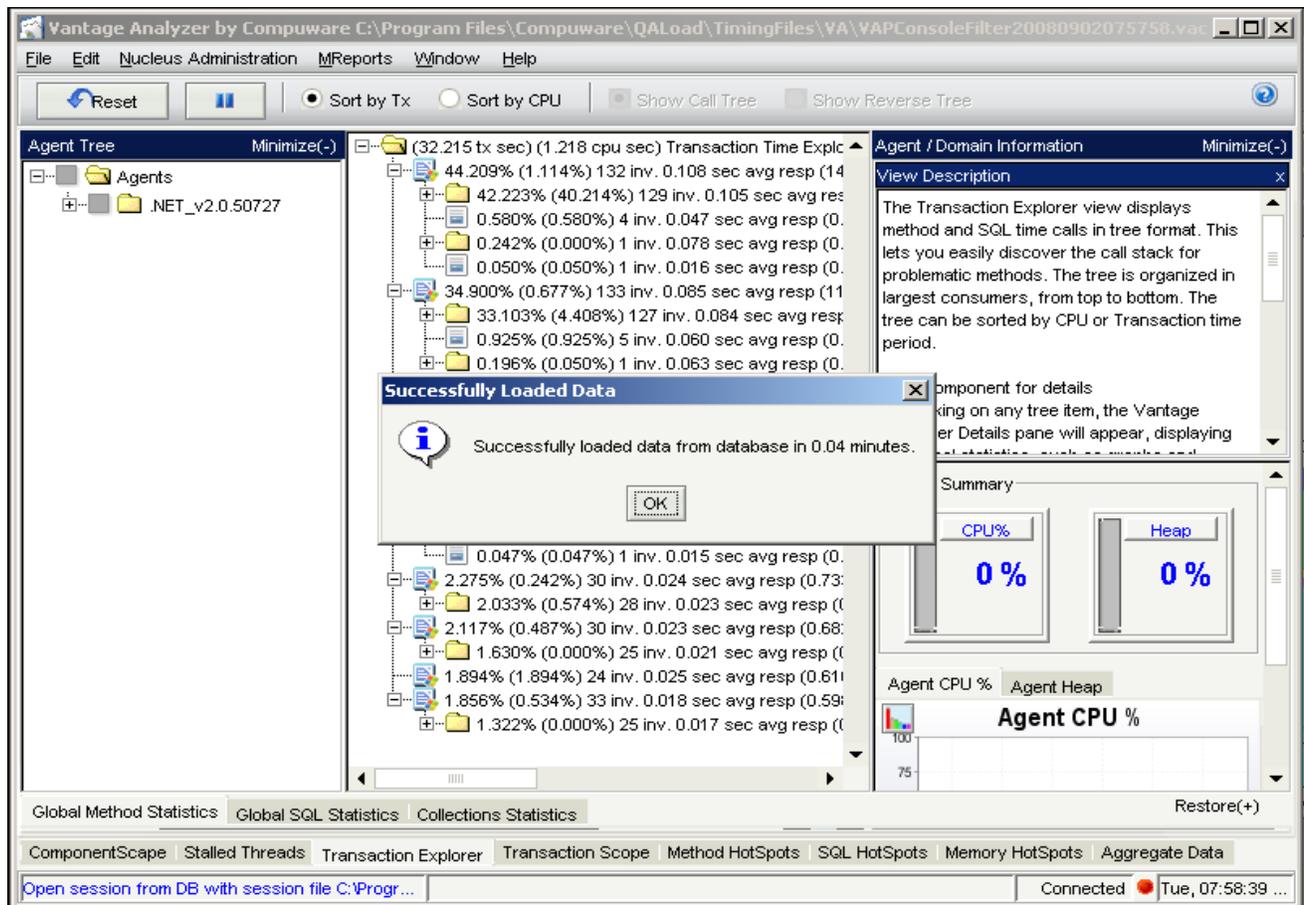
Typical deployment



Features:

Automatic extraction of Vantage Analyzer trace file

Upon completion of a load test application server data collected during test execution or alternatively a user-defined time period, is automatically extracted and presented in the Vantage Analyzer performance console.



Benefits

- ☑ Previously this was only possible manually.
- ☑ Provides immediate access to application server analytics at the end of a load test.
- ☑ You can extract all data collected during a load test execution or from a user-selectable time slice.

Usage: Identify SQL hotspots

- Identify slow and/or CPU-intensive SQL calls

The screenshot shows the Vantage Analyzer interface with the SQL Hotspots View active. The main table displays the following data:

SQL String	Using Prepared Statements	Total Tx Time %	TX % Not In Child Calls	Total CPU Time %	CPU % Not In Child Calls	Last 90 Sec Tx / sec	Last 90 Sec Avg Resp Time (sec)	Overall Avg Resp Time (sec)	Longest Resp Time (sec)	Total Invocation Count
select supplier.supplierid, supplier.name, unitprice from itemssupplier,...	N	73.743	73.743	5.723	5.723	0.000	0.261	0.261	126.560	727
select * from orders where customerid=? order by orderno	N	0.995	0.995	7.904	7.904	0.000	0.028	0.028	1.106	93
select * from item where categoryname=? and subcategoryname=?...	N	0.527	0.527	0.520	0.520	0.000	0.023	0.023	0.347	60
select password from customer where customerid=?	N	0.311	0.311	0.000	0.000	0.000	0.020	0.020	0.205	40
select * from customer where customerid=?	N	0.299	0.299	3.746	3.746	0.000	0.019	0.019	0.190	40
select ordertotal from orders where customerid=?	N	0.297	0.297	0.000	0.000	0.000	0.019	0.019	0.236	40

Below the table, the 'SQL Statistics' section shows the executed SQL: `select supplier.supplierid, supplier.name, unitprice from itemssupplier, supplier where supplier.supplierid=itemssupplier.supplierid and itemno=?`. The 'Response Time' chart shows a peak response time of approximately 0.261 seconds. The 'Total CPU Time Statistics' section indicates a CPU time not in child calls of 0.165 s and a CPU not in child calls percentage of 5.723%.

Usage: Identify Method hotspots

- Identify slow and/or CPU-intensive Methods

Vantage Analyzer by Compuware C:\Program Files\Compuware\QALoad\TimingFiles\VA\VAPConsoleFilter20081027161324.vac

File Edit Nucleus Administration MReports Window Help

Reset

Method HotSpots View

Session Filter

Filter Name	Value
Database URL	jdbc:tds:sqlserver://192.168.58.133:1433;databaseName=va
Agent Name(s)	COMPUWAR-XHAYV4-DefaultAppPool
Time Span	From 2008-10-27 15:40:47.0 To 2008-10-27 16:10:14.0

Interactive Filter

Filter Name	Value
Types	All Types

Set Filter... Apply

Class Name	Method Name	Type	Total Tx Time %	TX % Not In Child Calls	Total CPU Time %	CPU % Not In Child Calls	Last 90 Sec Tx / sec	Last 90 Sec Avg Resp Time (sec)	Overall Avg Resp Time (sec)	Longest Resp Time (sec)	Total Invocation Cou	Stalled Count
BNTNET	itemlist_aspx()	ASP	75.224	0.146	24.315	4.266	0.000	0.578	0.578	126.776	335	3
BNTNETWebApp.itemlist	Page_Load(object,EventArgs)	NET	74.987	0.716	17.933	11.689	0.000	0.596	0.596	126.776	324	0
System.Data.OleDb.OleDbCommand	ExecuteReader(CommandBehavior)	SQL Query	74.878	0.000	6.243	0.000	0.000	0.222	0.222	126.699	867	0
BNTNET	account_aspx()	ASP	19.064	0.213	20.569	7.423	0.000	0.148	0.148	10.327	332	0
BNTNETWebApp.account	Page_Load(object,EventArgs)	NET	18.705	18.109	7.388	3.642	0.000	0.148	0.148	10.280	326	0
BNTNET	default_aspx()	ASP	2.094	0.637	16.060	9.192	0.000	0.025	0.025	1.673	215	0
BNTNET	myorders_aspx()	ASP	1.389	0.079	32.293	4.683	0.000	0.024	0.024	1.231	152	0
BNTNETWebApp.myorders	Page_Load(object,EventArgs)	NET	1.267	0.266	27.090	19.285	0.000	0.024	0.024	1.200	136	0
System.Data.Common.DbDataAdapter	Fill(DataSet,string)	SQL Query	1.294	0.000	11.550	0.000	0.000	0.025	0.025	1.106	133	0
ASP.default_aspx	ProcessRequest(HttpContext)	NET	1.025	0.000	2.151	0.000	0.000	0.020	0.020	0.515	130	0

Global Method Statistics Global SQL Statistics Collections Statistics

Method Statistics

Class Name: *BNTNET

Method Name: itemlist_aspx(*)

Type: ASP

Throughput Response Time

1.268% Other 98.732% SQL 0% External/Socket

Total CPU Time Statistics		Total Transaction Time Statistics		Total Invocation Statistics	
CPU Time Not In Child Calls:	0.123 s	Transaction Time Not In Child Calls:	0.377 s	Total Invocations:	335 times
CPU Not In Child Calls %:	4.266 %	Transaction Time Not In Child Calls %:	0.146 %	Throughput(0 Sec):	0.000 tx/sec
				Avg Response Time:	0.578 s
				Total Method Time:	193.671 s

Method Throughput

COMPUPWAR-XHAYV4-DefaultAppPool Through

ComponentScope Stalled Threads Transaction Explorer Transaction Scope Method HotSpots SQL HotSpots Memory HotSpots Aggregate Data

Usage: Identify Critical Path High Resource Utilization

- Identify resource hungry 'child calls' from individual application server components.

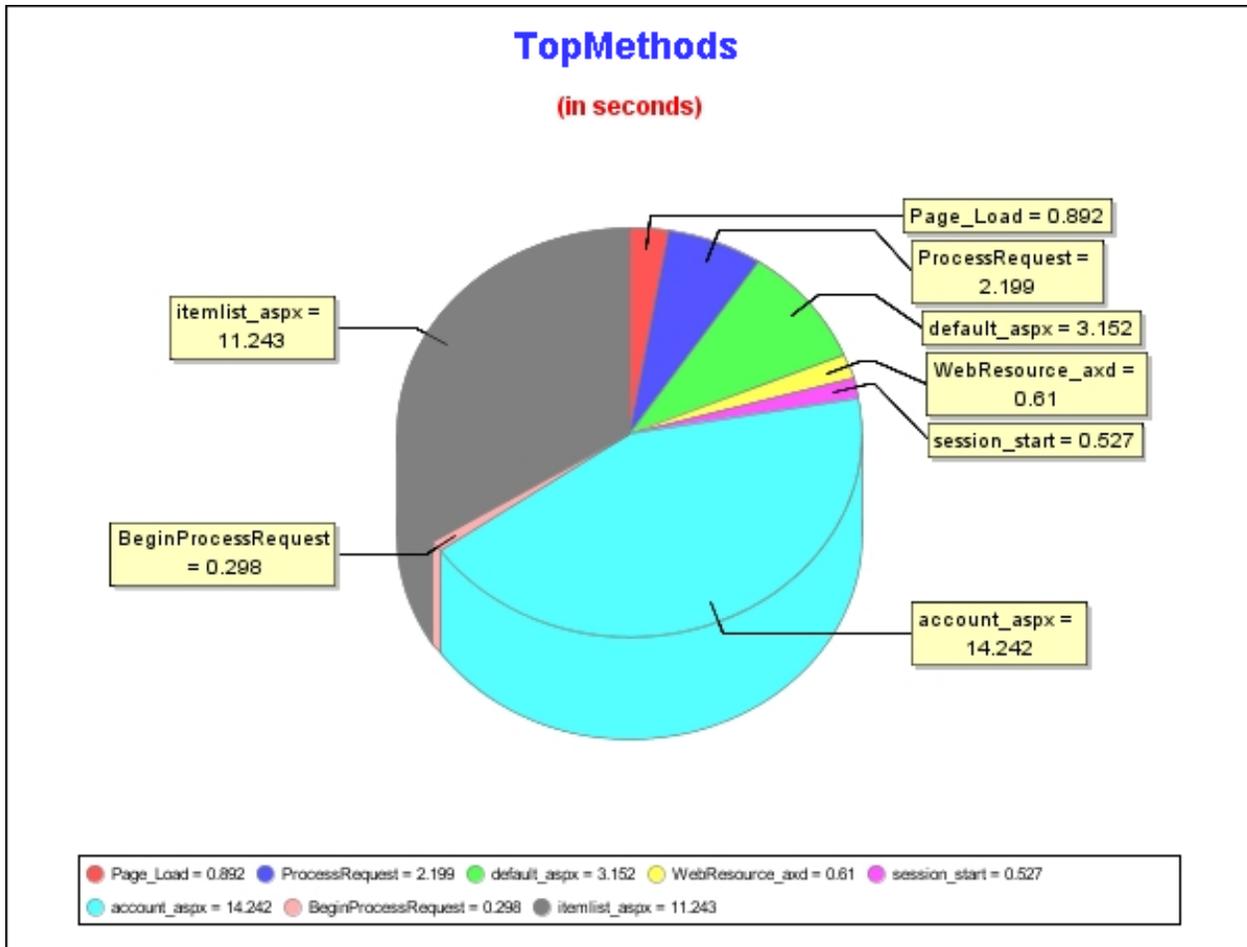
The screenshot displays the Vantage Analyzer interface. The top pane shows a Transaction Time Explorer Tree with a call tree for the `*BNTNET.account_aspx(*)` method. The tree highlights several child calls, with the most significant being `System.Data.Common.DbDataAdapter.Fill(DataSet,string)` at 0.299% CPU and `select * from customer where customerid=? (*)` at 0.297% CPU. The bottom pane shows Method Statistics for `*BNTNET.account_aspx(*)`, including a bar chart for Method Throughput and a table of statistics.

Category	Value
Total CPU Time Statistics	
CPU Time Not in Child Calls:	0.214 s
CPU Not in Child Calls %:	7.423 %
Total Transaction Time Statistics	
Transaction Time Not in Child Calls:	0.549 s
Transaction Time Not in Child Calls %:	0.213 %
Total Invocation Statistics	
Total Invocations:	332 times
Throughput(0 Sec):	0.000 tx/sec
Avg Response Time:	0.148 s
Total Method Time:	49.081 s

Method Throughput Legend: 96.877% Other, 3.123% SQL, 0% External/Socket

Automatic generation of Vantage Analyzer reports

Upon completion of a load test user-selected Vantage Analyzer reports are automatically generated and associated with the relevant QALoad timing file. These reports can be retained or discarded once the timing file is closed.

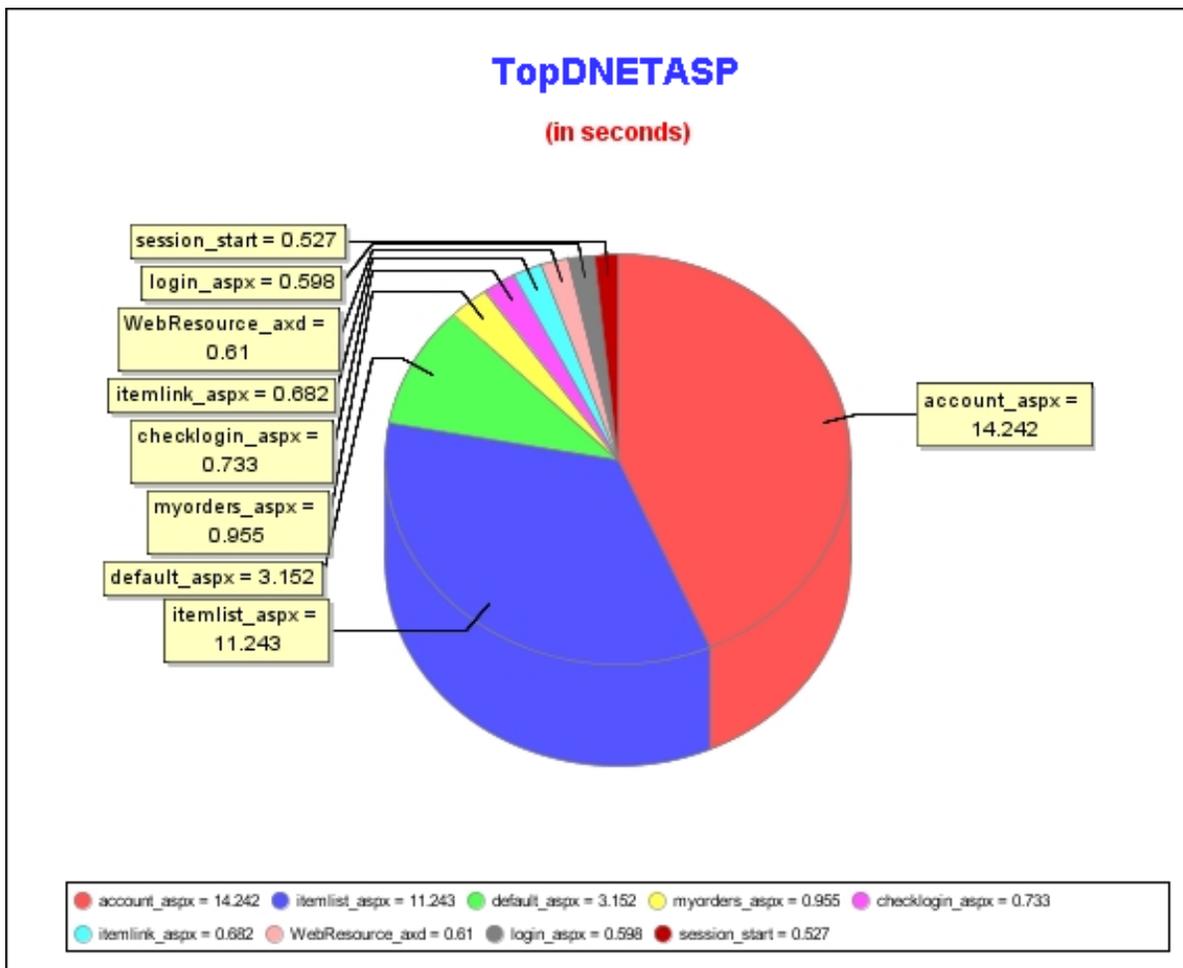


Benefits

- Previously report generation was a manual exercise.
- Reports are automatically linked to timing files.
- Provides immediate access to slowest methods, SQL and other application server components at the end of a load test.
- You can extract all data collected during a load test execution or from a user-selectable time slice.

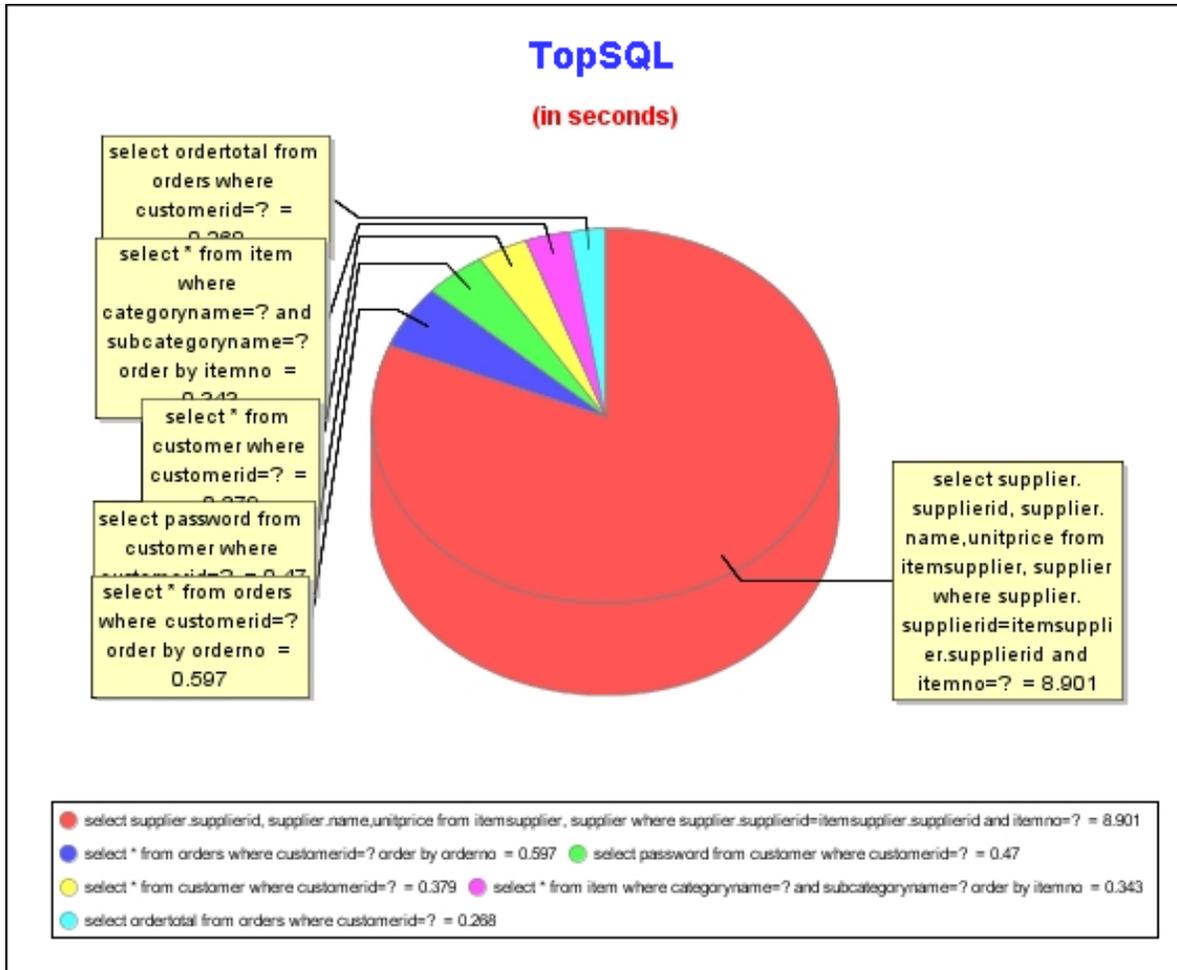
Usage: Top DNETASP Report

- Displays slowest .NET ASP components for date/time period selected



Usage: Top SQL Report

- Displays slowest database SQL calls for date/time period selected



Usage: Vantage Analyzer report options

- Displays available Vantage Analyzer report options for integration with QALoad

<input checked="" type="checkbox"/>	Top N Methods
<input checked="" type="checkbox"/>	Top N SQL
<input type="checkbox"/>	Top N Servlets
<input checked="" type="checkbox"/>	Top N JSPs
<input type="checkbox"/>	Top N Entity EJBs
<input type="checkbox"/>	Top N Session EJBs
<input type="checkbox"/>	Top N Message Driven EJBs
<input checked="" type="checkbox"/>	Top N .NET ASPs
<input checked="" type="checkbox"/>	Top N .NET Web Services
<input checked="" type="checkbox"/>	Top N .NET Methods
<input checked="" type="checkbox"/>	Top N Stalled Thread

Configuration Process

For quick reference, below is the process involved in configuration.

Pre-requisites

- QALoad 5.7 installed.
- Vantage Analyzer 10.1 SP1 Performance Console installed on same machine as the QALoad Conductor. (Note VA 10.2 is not yet supported.)
- Nucleus server database persistence configured as shown below:

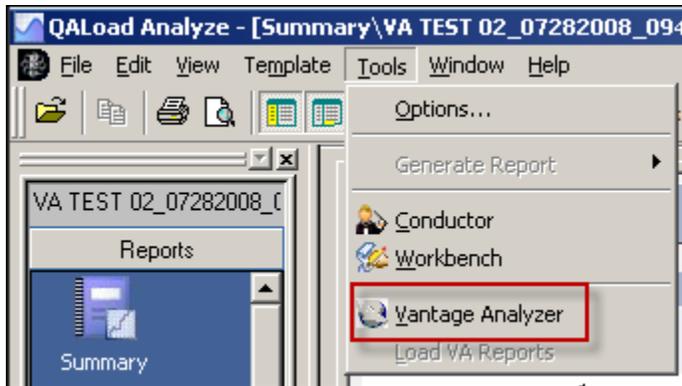
The screenshot shows the 'Server Configuration' window with the 'User Administration' tab selected. The 'Port Configuration' section has 'Nucleus Agent Port' set to 4445 and 'Nucleus Performance Console Port' set to 4446. The 'Agent Data Persistence Configuration' section has 'Database Persistence Enabled' checked. The 'Database driver' is set to 'net.sourceforge.jtds.jdbc.Driver'. The 'Database URL' is 'jdbc:jtds:sqlserver://127.0.0.1:1433;databaseName=va;selectMethod=<>'. The 'Database user' is 'vantage' and the 'Database password' is masked with asterisks. The 'Transaction Scope Database Purge Days' and 'Production Database Purge Days' are both set to 10. A red arrow points from the text 'Configure database persistence' to the 'Database Persistence Enabled' checkbox. A 'Test Connection' button is located at the bottom right.

- Compuware Open Server (COS) installed and configured in Nucleus Server as shown below:

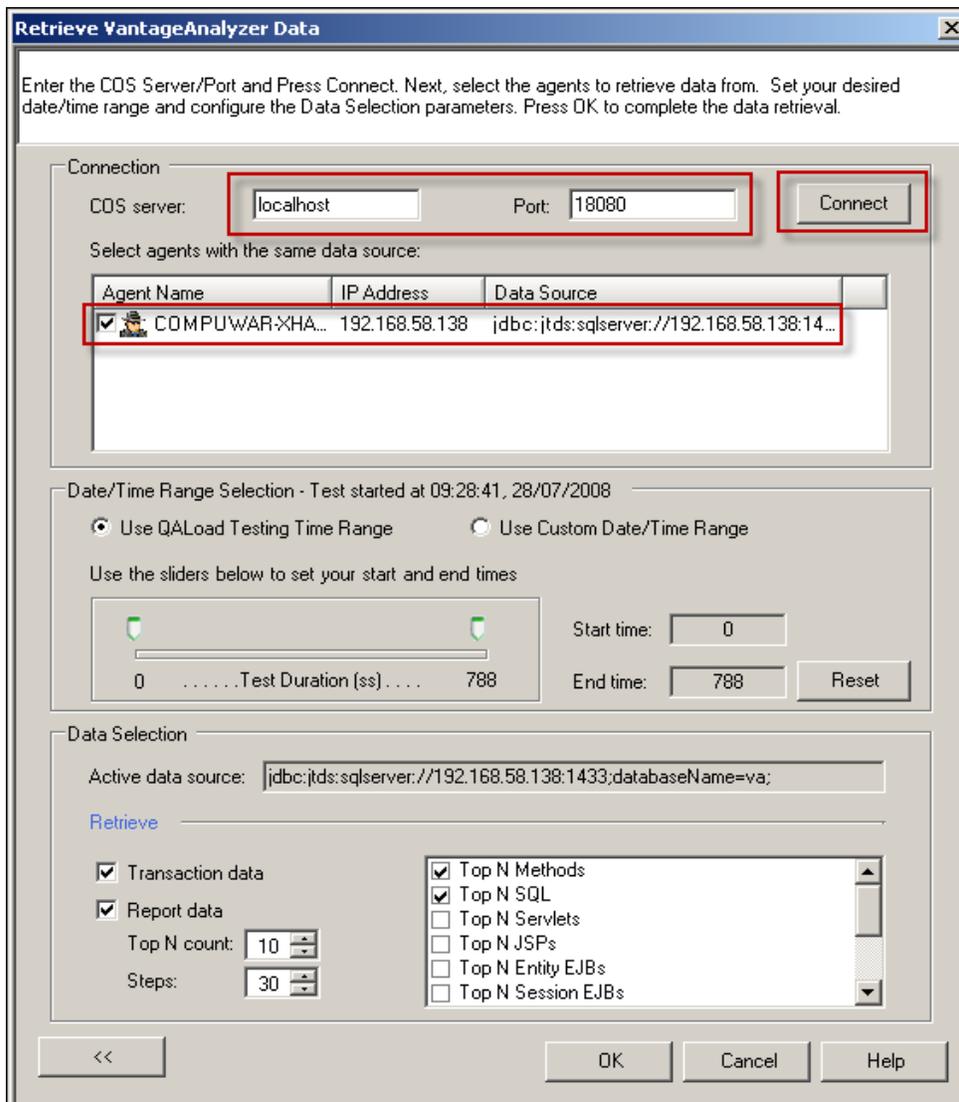
The screenshot shows the 'Compuware Open Server (COS) Configuration' window. The 'COS Integration Enabled' checkbox is checked. The 'COS Hostname(or IP):' field is empty, and the 'Port(4447):' field is also empty. There are 'Add >', '< Remove', and 'Test Connection' buttons. The 'Registered COS hosts (address:port)' list contains the entry '127.0.0.1:4447'. A red arrow points from the text 'Configure COS' to the 'COS Hostname(or IP):' field.

Agent selection

- New menu option in QALoad Analyze module



- Connect to COS and then select agents



Date/time range selection

- Choose default test time range or custom date - time range

Date/Time Range Selection - Test started at 09:28:41, 28/07/2008

Use QALoad Testing Time Range Use Custom Date/Time Range

Use the sliders below to set your start and end times

0 Test Duration (ss) 788

Start time:

End time:

Retrieve VantageAnalyzer Data

Enter the COS Server/Port and Press Connect. Next, select the agents to retrieve data from. Set your desired date/time range and configure the Data Selection parameters. Press OK to complete the data retrieval.

Connection

COS server: Port:

Select agents with the same data source:

Agent Name	IP Address	Data Source
<input checked="" type="checkbox"/> COMPUWAR-XHA...	192.168.58.138	jdbc:jdbc:sqlserver://192.168.58.138:14...

Date/Time Range Selection - Test started at 09:28:41, 28/07/2008

Use QALoad Testing Time Range Use Custom Date/Time Range

Use the sliders below to set your start and end times

0 Test Duration (ss) 788

Start time:

End time:

Data Selection

Active data source:

Retrieve

Transaction data

Report data

Top N count: Steps:

Top N Methods

Top N SQL

Top N Servlets

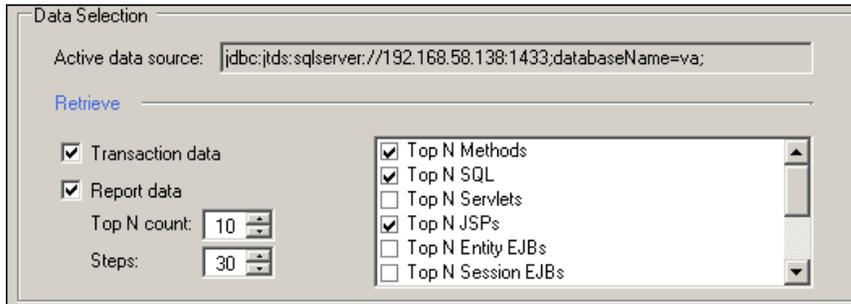
Top N JSPs

Top N Entity EJBs

Top N Session EJBs

Data selection

- Select **Transaction data**
- Select **Report data**
 - Select **Top N count**
 - Select number of **Steps** to include
- Click **OK** button or **Cancel**



Data Selection

Active data source: jdbc:jtds:sqlserver://192.168.58.138:1433;databaseName=va;

Retrieve

Transaction data

Report data

Top N count: 10

Steps: 30

Top N Methods

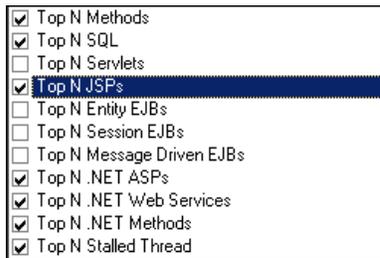
Top N SQL

Top N Servlets

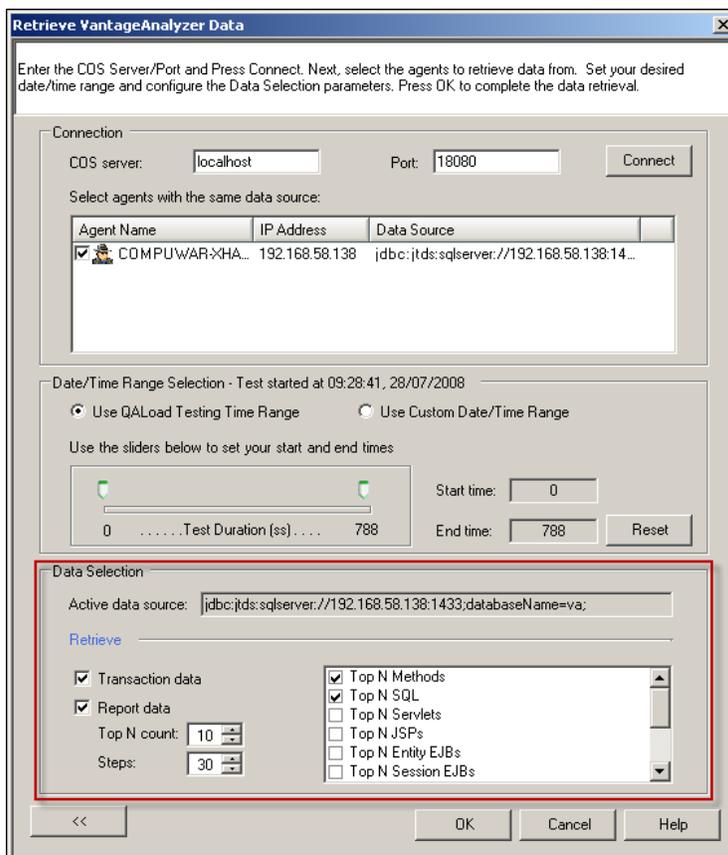
Top N JSPs

Top N Entity EJBs

Top N Session EJBs



- Top N Methods
- Top N SQL
- Top N Servlets
- Top N JSPs
- Top N Entity EJBs
- Top N Session EJBs
- Top N Message Driven EJBs
- Top N .NET ASPs
- Top N .NET Web Services
- Top N .NET Methods
- Top N Stalled Thread



Retrieve VantageAnalyzer Data

Enter the CDS Server/Port and Press Connect. Next, select the agents to retrieve data from. Set your desired date/time range and configure the Data Selection parameters. Press OK to complete the data retrieval.

Connection

CDS server: localhost Port: 18080 Connect

Select agents with the same data source:

Agent Name	IP Address	Data Source
<input checked="" type="checkbox"/> COMPUWAR-XHA...	192.168.58.138	jdbc:jtds:sqlserver://192.168.58.138:14...

Date/Time Range Selection - Test started at 09:28:41, 28/07/2008

Use QALoad Testing Time Range Use Custom Date/Time Range

Use the sliders below to set your start and end times

0 Test Duration (ss) 788 Start time: 0 End time: 788 Reset

Data Selection

Active data source: jdbc:jtds:sqlserver://192.168.58.138:1433;databaseName=va;

Retrieve

Transaction data

Report data

Top N count: 10

Steps: 30

Top N Methods

Top N SQL

Top N Servlets

Top N JSPs

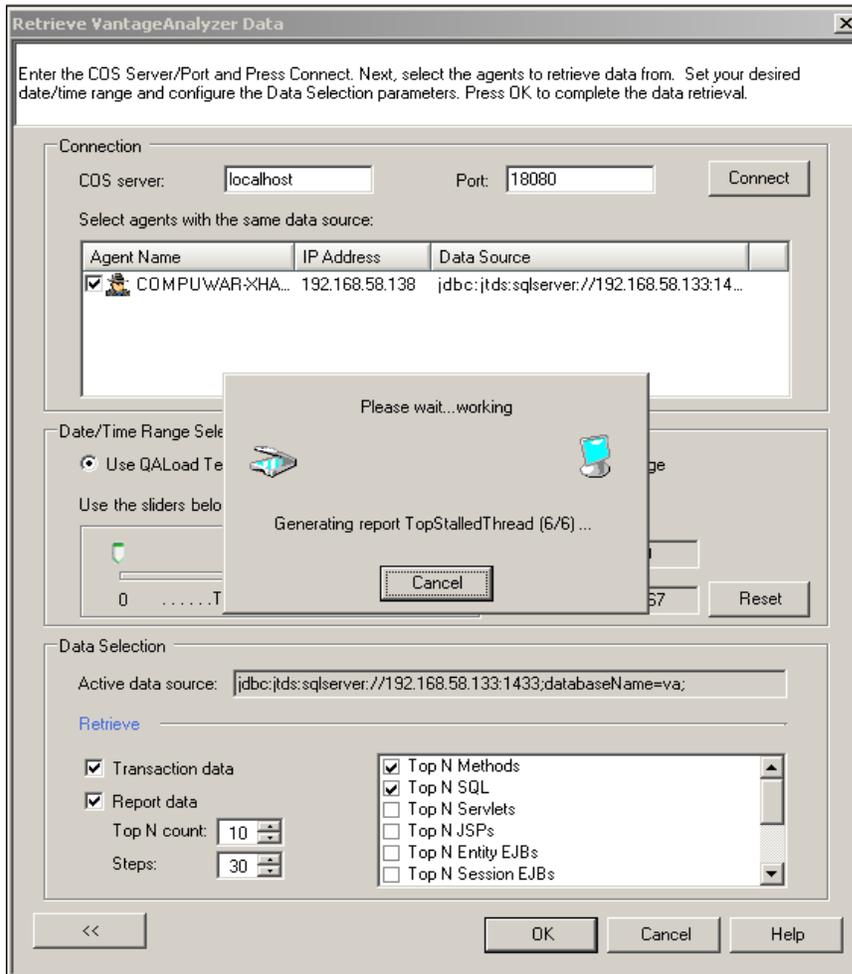
Top N Entity EJBs

Top N Session EJBs

<< OK Cancel Help

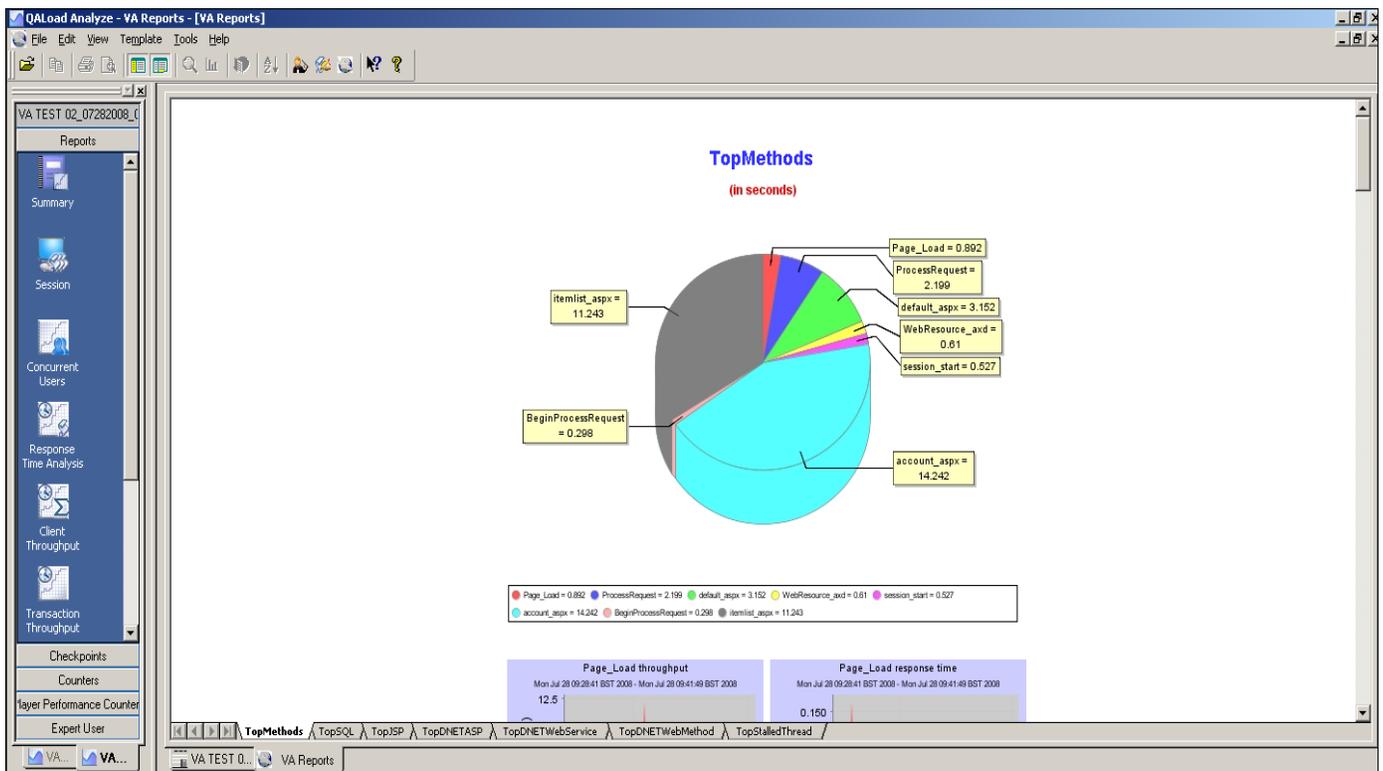
Execution

- The following dialog displays while data is extracted and reports are generated



Timing file output

- Finally the timing file will redisplay this time with a new tab, VA Reports.
- If you have selected **Transaction data** in the Data selection step then the Vantage Analyzer Performance Console will also appear.



Troubleshooting Tips

Question: When I try and connect to the COS from QALoad Analyze I get an error dialog saying that the COS is not available.

Answer: Check the following points:

- Make sure that the COS is running by checking that the appropriate windows service is active on the machine that you are trying to access.
- Make sure that the Vantage Analyzer Nucleus Server is running on the machine that you are trying to access.
- Make sure that the COS host name/IP and port that you have entered are correct.
- Make sure that the version of Vantage Analyzer you are trying to connect to is supported.

Question: Some of the Vantage Analyzer reports that are generated have blank content.

Answer: Check the following points:

- Make sure that you have only selected reports that are relevant to the application servers being monitored. i.e. Don't select Java reports for .NET and vice versa.
- Make sure that the date-time range you have selected matches the execution period for the load test you are looking to report on.

Further Reading

This has been a brief overview of using QALoad 5.7 and Vantage Analyzer. For more information, you can refer to the QALoad 5.7 documentation on <http://frontline.compuware.com>

