



The SAS Enterprise Excellence Center provides high-end performance metrics based on real-world customer scenarios. This enables customers to preview the performance of award-winning SAS technologies.

SAS Enterprise BI reference architecture provides a real-world scenario using retail data:

- During peak execution, 300 users performed standard tasks associated with business intelligence reporting.
- Uncompressed data of 63 gigabytes.
- Multitiered environment leveraging 16 CPUs.
- The average user experienced less than five second response time in this scenario.

## SAS® Enterprise BI Server

*Reference architecture for a 300 user enterprise work load*

The SAS Enterprise BI reference architecture test suite is based on scenarios driven by how SAS customers address their data reporting needs. While the data used in this scenario is retail based, the work load is representative of other environments.

### Scenarios

Real-world user volumes, reports and data were used in this simulated environment. SAS Enterprise BI Server reporting components included: SAS Enterprise Guide, SAS Add-In for Microsoft Office, SAS Information Delivery Portal and SAS Web Report Studio.

### User base

- Four SAS Enterprise Guide software client users.
- 30 users accessing SAS Stored Processes simulating SAS Add-In for Microsoft Office use.
- 36 users building dynamic reports based on relational data via SAS Web Report Studio.
- 30 users viewing OLAP cubes via SAS Web Report Studio.
- 200 users viewing static reports through SAS Information Delivery Portal, HTTP and SAS Web Report Studio.

### Reports

There were 23 dynamic reports and 40 static reports leveraged in this scenario. These reports provided users with the following information:

- Detection of low product inventory levels.
- Detailed sales performance of product vs. location.
- Comparison of item sales with and without marketing affects and effort.
- Identification of high-value customers.
- Cube views of sales performance by marketing effort, markdown and other causes and effects.

Report format and content varied. Simple tabular formats on small data were presented. Additionally, cross-tab reports with graphs were filtered and then that data joined against our 36 million record fact tables.

### Test execution

During testing, we emulated morning business activity. The number of users increased over a 40-minute period, reaching a constant level of use for several hours. They then exited the system. Users logged on and consistently followed a cycle of report navigating, launching and viewing reports for 45 to 90 seconds. When these tasks were completed, users logged off the system. Delays occurred at appropriate intervals. Once a user cycle was completed, a new user cycle was started. The system maintained 300 concurrent users.

## Reference architecture

### Server configuration

- 16 CPUs.
- 48 gigabytes (GBs) of memory.
- Storage in SAN array.
- Two hardware-based RAID controllers:
  - Data, operating system and SAS software on RAID 5 volume.
  - SASWork on RAID 0.
- Network connections were all one Gbps Ethernet.

### Application environments

- SAS 9.1.3 with Service Pack 2.
- SAS Web Report Studio 2.1.
- BEA WebLogic as the main Web application server.
- Xythos as the WebDAV server.
- SAS Workspace Server with six CPUs.
- SAS OLAP Server with two CPUs.
- SAS middle-tier server with six CPUs.
- SAS Metadata Server with two CPUs.

### Data

Data storage totals are approximately 63 GBs of uncompressed data including:

- Transaction or fact tables totaling 4.9 GBs, with an average of 36 million rows.
- Dimension tables of 252 and 42,273 rows that are directly joined to the fact tables.
- Fact and support data.
- Four cubes sized 1.5, 5.3, 5.3 and 8.8 GB.
- Cardinality was as high as the 42,273 row table but more typically was 252 rows or less.

### Performance results

Figure 1 shows the average response time for multiple reporting groups. Each line depicts a different class grouping. The average user experienced less than a five second response time in this scenario. Additional results include half-second response time to log in and out of SAS Web Report Studio and three seconds to navigate within the reports.

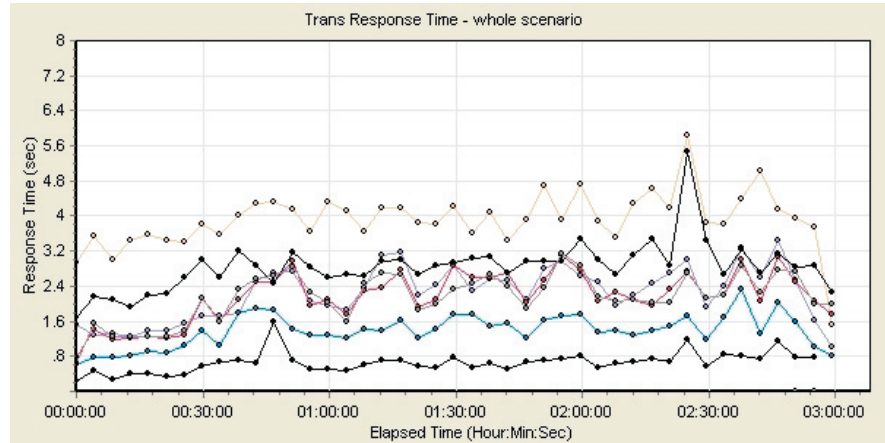


Figure 1: User response time. Server utilization remained constant once all 300 users were logged in.

Table 1 shows that on average the CPU utilization provides some room for growth. In addition, by following standards for data preparation to ensure that data is report ready, work load could be further minimized.

	Average CPU Number	CPU Utilization
Middle Tier	Six CPU machine	60%
SAS Metadata Server	Two CPU machine	25%
SAS Server	Eight CPU machine: Six CPUs for workspace server Two CPUs for SAS Olap Server	50%

Table 1: CPU utilization



World Headquarters  
and SAS Americas  
SAS Campus Drive  
Cary, NC 27513 USA  
Tel: (1) 919 677 8000  
Fax: (1) 919 677 4444  
U.S. & Canada sales:  
(1) 800 727 0025

SAS International  
PO Box 10 53 40  
Neuenheimer Landsr. 28-30  
D-69043 Heidelberg, Germany  
Tel: (49) 6221 4160  
Fax: (49) 6221 474850

[www.sas.com](http://www.sas.com)