

SAS I/T Service Vision™, Delta Technology's Performance Database

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ABSTRACT

Managing Enterprise-wide capacity and performance in an n-tier environment is the challenge facing capacity planners and performance analysts today. This challenge is being met by Delta technology, Inc., Delta Air line's wholly owned I/T subsidiary, by creating Performance Data Bases (PDBs) with SAS I/T Service Vision™ software. The project to identify the best Enterprise-Wide PDB product assembled a cross-functional team from OS/390, UNIX, Network and NT Server departments. Choosing I/T Service Vision™ has allowed Delta Technology to not only begin defining the capacity of the Enterprise, but also to save operating costs by replacing the more expensive and less functional CA-MICS™ product suite.

INTRODUCTION

Delta Technology, Inc., a wholly owned subsidiary of Delta airlines, provides hardware, software, systems and applications support for Delta airline's business processing. The airline has over 65,000 employees supporting over 2,600 flights per day to destinations in over 32 countries, boarding between 275,000 and 325,000 passengers. Critical applications include crew scheduling, aircraft maintenance, revenue tracking, electronic ticketing, Skymiles and passenger information. These applications run on OS/390, HP-UX, SUN SOLARIS and NCR machines, all located in our data center. Managing the performance of the servers on which the above applications reside can become a critical issue at times.

BACKGROUND

Delta is currently undergoing an I/T transformation designed to refresh technology throughout the corporation. One of the areas of concentration for Delta Technology is to employ "enterprise-wide" solutions whenever possible. Since the new applications being written to support the transformation are often two and three-tier client-server architectures, enterprise-wide systems management must include all the tiers. The project that ultimately resulted in the acquisition of I/T Service Vision™ was formed

to find an enterprise-wide capacity planning, performance management visibility system. Prior to I/T Service Vision™, we used CA-MICS for OS/390, a number of internally-written scripts for Unix and nothing for NT.

I/T TRANSFORMATION

The Delta I/T transformation is moving the I/T infrastructure from a mainframe-centric, "store and report" database structure to a more distributed "decision support" database structure. This is designed to put more information at the Delta employee's fingertips, with less "heads-down" customer interface and increased information currency. A typical architecture might look like figure 1 on the following page. The drawing shows an infrastructure architecture that contains workstations and servers at the airports and both mid-tier and enterprise servers at the General Office (G.O.) complex at Delta's world headquarters in Atlanta, GA.

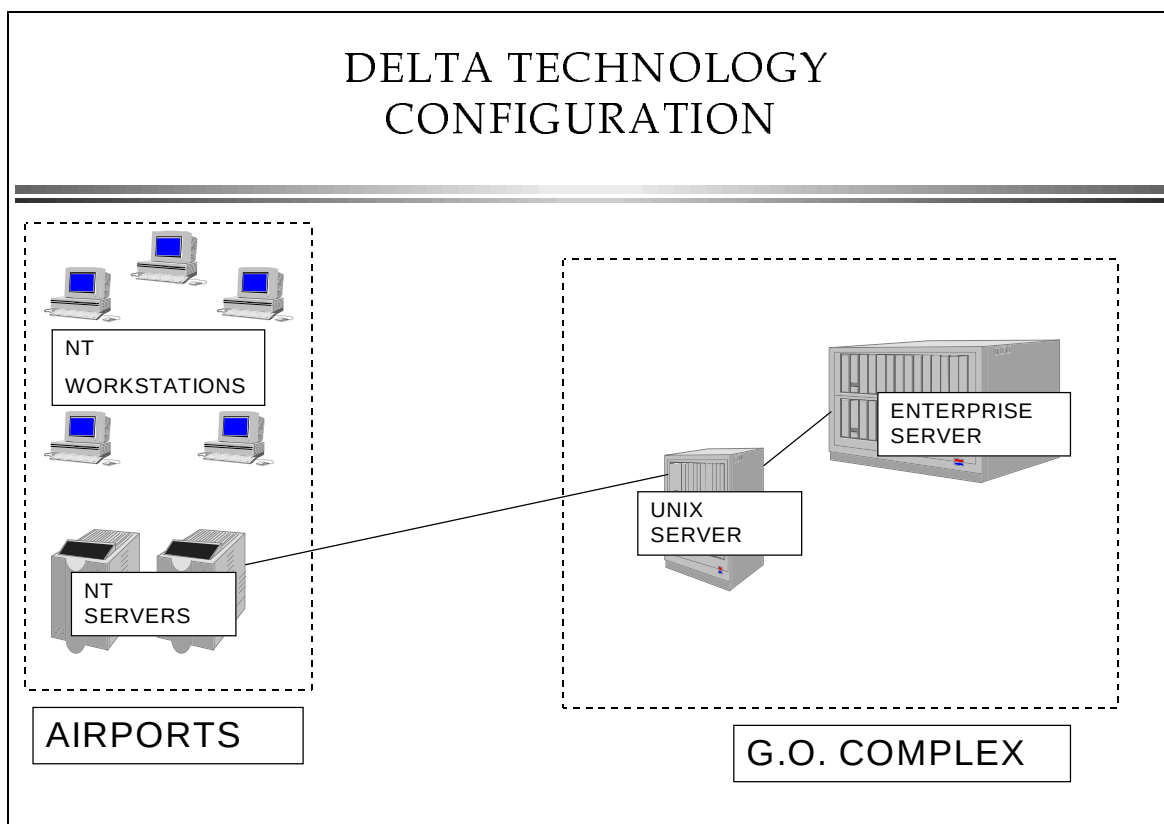


Figure 1.

CAPACITY/PERFORMANCE REQUIREMENT

Estimating the capacity requirements and managing the performance of applications that span the above architecture often requires multiple software products supported by numerous departments throughout the organization. Coordinating the information provided by the products and getting that information to a single source to do for example, a performance analysis, is a timely effort. When the performance problem is reported by the users of an application that spans the architecture, a single analysis of the entire infrastructure is required. One way to facilitate that analysis is to use a single software product that gathers capacity and performance data across the

enterprise and stores it consistently in a Performance DataBase (PDB). A PDB houses capacity and performance data that is sent to it from various operating system logs, and is usually organized by time period. A typical PDB might keep a detail file containing 5 days of detail data stored by 10-minute increments, summarize that into a daily file by day and hour and further summarize into weekly or monthly files for long-term trending. Once all the enterprise data is stored in the PDB, an "application view" of capacity and performance data can be obtained. SAS I/T Service Vision™ is the software product Delta Technology chose to create that enterprise PDB.

SAS I/T Service Vision™

The SAS I/T Service Vision™ implementation at Delta Technology covered the entire enterprise and involved several departments that

prior to the SAS I/T Service Vision™ project had very little contact. One of the byproducts of the project was the realization that in this new computing paradigm, all the groups supporting

the applications were facing similar problems that often required similar solutions. We acquired SAS I/T Service Vision™ for OS/390,

Unix and NT servers. The PDB architecture appears in Figure 2.

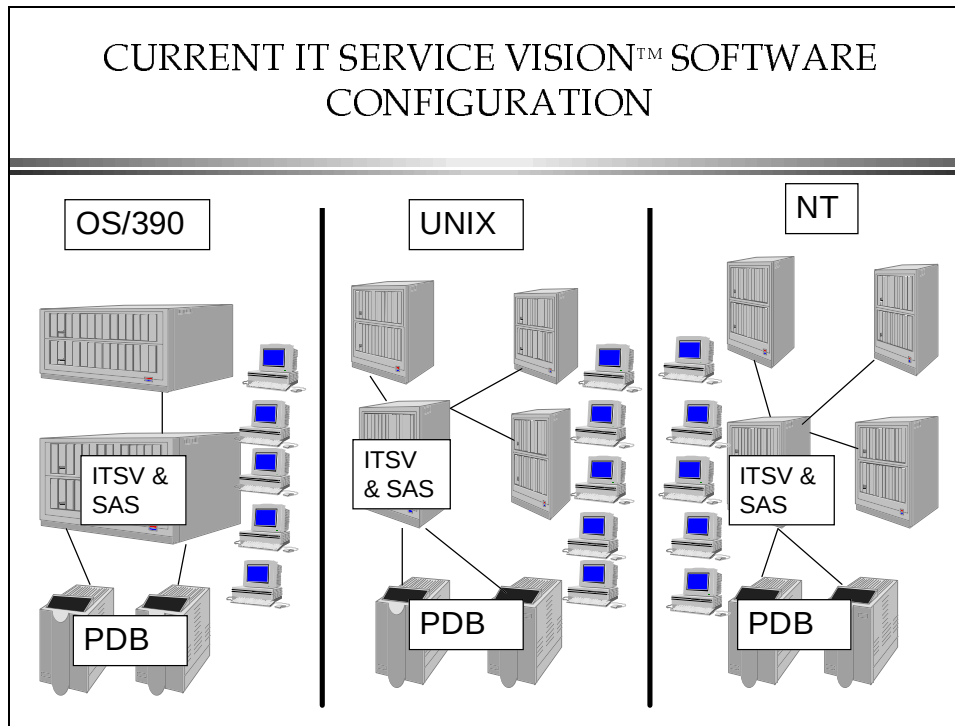


Figure 2.

Each PDB is maintained on a server in each infrastructure tier, giving us 3 PDBs. However, all the PDBs can be accessed from any of the client workstations (there are 5 client workstations per PDB). So a performance analyst can view OS/390, Unix and NT capacity/performance data from a single workstation. The SAS I/T Service Vision™ installation also installs SAS on the client workstation, so now the data can not only be accessed but also processed and reported by any of the standard SAS procedures. Another key feature is the ability to generate HTML output which facilitates storing and reporting the data in web format. The installation on all three platforms was accomplished over a 2-day period, at which time a useable PDB was up and running. This installation has resulted in a number of savings for Delta technology.

SAVINGS

Most operating systems, especially OS/390, generate volumes of usage and utilization data. The OS/390 PDB being maintained in CA-MICS™ was 15 gigabytes, and even at that size, detail data was kept for only 3 days and for many parts of the PDB (e.g. disk statistics) no detail data was kept. One feature of SAS I/T Service Vision™ is its ability to choose which metrics to keep in the PDB. By selecting only those metrics of high interest, a very difficult undertaking with CA-MICS™, with SAS I/T Service Vision™ more days of fewer metrics is stored in less disk space.

RESULTS

The SAS I/T Service Vision™ PDBs for OS/390 and Unix are currently running daily and capacity/performance reports are being used by Delta Technology. One example of SAS I/T

Service Vision™ enterprise-wide capability is shown in figure 3.

HP SERVER UTILIZATIONS - JUNE 1999				PEAK HOUR RESOURCE UTILIZATIONS/QUEUES		
SERVER NAME	SERVER MODEL-CPU	SERVER CATEGORY	AVG CPU UTILIZATION	PEAK HOUR CPU UTILIZATION	PEAK CPU QUEUE	PEAK PRIORITY QUEUE
ddi200	d02	nonha	30.3%	100%	3	2
ddo200	d02	nonha	1.5%	10.30%	1	0
ddo201	d02	nonha	21.7%	100%	90	177
ddo202	d02	nonha	12.2%	53.90%	3	0
ddo203	d02	hasys	1.4%	2.64%	1	0
ddo204	d02	nonha	11.5%	100%	2	1
ddo205	d02	nonha	1.7%	8.17%	0	0
ddo207	d02	nonha	3.6%	6.28%	1	0
ddo208	d02	hasys	2.8%	6.87%	1	0
ddo209	d02	nonha	14.9%	63.60%	2	0
ddo212	k06	hasys	2.2%	14.00%	0	0
ddo213	k06	hasys	1.6%	11.70%	0	0
ddo215	k06	nonha	1.1%	5.03%	0	0
ddt201	d02	nonha	5.9%	28.60%	0	0

Figure 3.

This report was generated using SAS to capture the average utilization from the monthly file and using SAS PROC SUMMARY, MAX= on the daily file to create the PEAK HOUR CPU UTILIZATION column. A similar report is created for OS/390 and the other Unix platforms, SUN and NCR. Having the data readily accessible in the PDBs and easily manipulated using SAS makes this report very easy to generate. Previously, this type of information would have required a coordinated effort between several software products and systems analysts. SAS I/T Service Vision™ and SAS® software makes it possible to create this report and others in a single pass of the PDB by a single analyst.

SUMMARY

SAS I/T Service Vision™ is an excellent enterprise-wide capacity/performance product with no apparent peer in the industry today. Delta Technology is reaping the benefits of centralized capacity/performance reporting and analysis on a daily basis, and is currently planning to include other I/T resources like NT, phone logs and web logs into the enterprise-wide PDB environment.