Cramer6 OSS Suite Scalability Study

The IBM and Amdocs solution delivers outstanding vertical scalability to meet the needs of service providers across all Tiers — offering true carrier-grade performance and resilience, with exceptional and predictable Total Cost of Ownership.

This is a summary of the Cramer6 OSS Suite benchmark executed in the 3rd quarter 2007 at the IBM Telecommunications Infrastructure Support Center in Montpellier, France. It supported 1000 users on the Cramer6 OSS Suite with a representative set of Cramer client components. The hardware infrastructure included an IBM System p5™ 595 server with two logical partitions (application and database tiers) and an IBM System Storage™ DS8300.

"This benchmark — the first Cramer6 OSS Suite benchmark — is one more proof point that IBM technology can do more than just 'get the work done,'" says Stephen Leonard, Vice President of Worldwide Sales for IBM Power Systems. "IBM System p™ servers and Amdocs Cramer6 OSS Suite can help telecommunications companies manage growth and complexity, minimize risk, foster innovation and deliver business results to increase return on IT investments. Our joint customers are applying this powerful IBM-Amdocs combination to help drive down energy and administrative costs while driving up system utilization. The result — far greater overall infrastructure efficiency."

Cramer6 OSS (Operational Support Systems) Suite on IBM solution stack

Amdocs OSS Division is an industry-leading provider of end-to-end service automation for telecommunications service providers. OSS is key to telecommunications service providers, and the Amdocs and IBM long term alliance is focused on delivering innovative solutions to the transformational challenges facing service providers today. IBM's leading IBM System p servers, IBM System Storage, and IBM e-business infrastructure software, combined with Amdocs OSS technology, provide one of the most powerful platforms to support the needs of telecommunications organizations both now and in the future.

Superior performance and value of Cramer6 OSS Suite on IBM solution stack

IBM System p servers are designed to be easy to install, manage and virtualize – running IBM AIX® and Linux® operating systems on the legendary performance of IBM POWER™ technology. These powerful industry-leading servers provide unprecedented value and are ideal for mission-critical OSS/BSS, transaction processing, and Web-serving applications, in addition to demanding scientific and technical computing and business intelligence tasks. Because IBM System p servers are designed for delivering enterprise solutions, they provide the capacity and reliability that

companies need to drive successful function with Cramer6 OSS Suite—at a lower cost.

The IBM System Storage DS8000 series are high-performance, high-capacity storage systems designed to break through to an entirely new dimension in scalability, resiliency and overall total value. Incorporating dual-clustered IBM POWER5™ servers, new four-port 4 Gbps Fibre Channel/FICON host adapters, up to 256 GB cache, fibre channel and Fibre Channel ATA (FATA) disk drives, the DS8000 series is designed for outstanding performance.

IBM WebSphere® Application Server V6 was used to deliver strong performance in this benchmark, and it also delivers a flexible, secure infrastructure to providing a reliable foundation for your service oriented architecture. Designed for full Java™ 2 Platform Enterprise Edition (J2EE) V1.4 compatibility and support for Java 2 Platform Standard Edition (J2SE) 5.0, WebSphere Application Server V6 delivers a range of new features that can help you:

- *Improve time to value and make the most of existing technology skills with more simple, rapid development and deployment.*
- *Be confident applications and data are secure, and that you can eliminate lost business opportunities with a more scalable, secure, highly available SOA runtime environment.*
- *Improve the flexibility of your business and increase return on investment with extensive communication services.*
- *Minimize the cost of managing your environment with effective application management tools.*

Cramer6 OSS Suite Benchmark Overview

The objective of the Cramer6 OSS Suite benchmark was to:

- *Demonstrate that Cramer6 OSS Suite performance meets or exceeds the requirements of all Communication Service providers including Tier 0.*
- *Confirm that the continued R&D investment in product functionality, architecture, and integration TCO has been implemented while maintaining and improving Cramer6 OSS Suite scalability.*
- *Validate this scalability on the IBM System p hardware and WebSphere Application Server platforms.*

The results demonstrate that all of the above benchmark objectives were not only met, but exceeded—extending the scale of the test beyond those of previous benchmarks. The volume of network data was significantly increased to 1 billion objects (approximately 5.7 billion managed objects), which is enough data to manage a network of 76 million devices. Exceeding all requirements to date for user operations the benchmark went on to simulate 1000 concurrent users. It should be noted that these were 1000 busy, fully active (no "coffee-breaks" or chatting built in to the simulation)

concurrent users performing the entire range of service provisioning, reporting and service assurance activities through the Cramer6 OSS Suite Web-enabled GUI. Furthermore, the combination of Amdocs Cramer6 OSS Suite software and IBM System p servers showed no reason to doubt that both could continue to scale to meet even grander performance requirements if necessary.

Solution Overview

Cramer6 OSS Suite Products at a Glance

Amdocs offers a unique value proposition to today's carriers. As networks and services continue to change at an ever increasing rate, an OSS platform is required that embraces that continual change. Through its acquisition of the Cramer portfolio of Resource Management products, and through its innovative portfolio of Service Management products, Amdocs provides unrivaled coverage of OSS.

Uniquely, what Amdocs can provide is a single source of knowledge of all services, resources, and customers who use them—with built-in support for key operational processes of planning, fulfillment and assurance—all referring to and using this single source of knowledge. Because this software can support multiple technologies for both physical and logical inventory, and both network and IT resources via a meta-data approach, it forms the ideal basis to support the foundation for a complete operational support systems infrastructure.

The requirement to deploy and deliver new services quickly is also paramount. It is imperative that the OSS platform includes standard, out-of-the-box configurations so that both time to market and total cost of ownership can be reduced and new services and new technologies can be added quickly and cost-effectively. To support this goal, Amdocs has developed a library of common inventory models and processes, which are available as off-the-shelf products known as "Packs."

Business Benefits of the Amdocs/IBM Joint Solution

You need to quickly respond to customer and market demands, reduce service provisioning cycle time and use technology to drive productivity and revenue. The IBM and Amdocs solution for telecom bridges the gap between IT and business resources, helping you meet service-level objectives, enhance customer satisfaction and boost enterprise-wide productivity.

IBM e-business customers receive the following benefits from a Cramer6 OSS Suite solution running on the IBM solution stack:

- *Global and dynamic high-performance acquisition, management and delivery of content*
- *Virtually unlimited performance, reliability from IBM WebSphere, and Amdocs OSS solution leadership*
- *Maximum performance and value on IBM System p servers, extending leadership over the competition*
- *High-performance, high-capacity*

IBM System Storage – offering scalability, resiliency and overall total value

- *Low total cost of ownership*

Performance that meets your business needs

This benchmark was a milestone for Amdocs and IBM, showcasing the industry leading performance of the Cramer6 OSS Suite and IBM System p servers for powering even the most demanding OSS operations. The results demonstrate that the needs of even the largest communication service providers for service and resource management of both traditional and next-generation networks can be comfortably accommodated by Amdocs and IBM technology. Refer to Figure 1 and Figure 2 below, which show the ability of the solution to scale and support 1000 concurrent users, with near linear scalability of response time and CPU

utilization, respectively. The benchmark was based on a typical Tier-0 operators' inventory with 5.7 billion managed objects, 76 million devices, 747 million ports, and an inventory greater than 1 TB of data.

Amdocs and IBM Benchmark Test Methodology

The aim of the User Benchmark test suite (UBM) is to establish the maximum number of users that can successfully be supported by a single deployment of the Cramer6 OSS Suite, while still maintaining an acceptable user experience. The methodology on which the User Benchmark program is based is well established and has been in use since Cramer 4. It takes into account the way in which real-world users make use of the Cramer suite, and also considers the typical user population mix for a Tier 0 operator. The test suite therefore

Figure 1: Average response times for Complex Cramer6 OSS Suite GUI operations against User Load
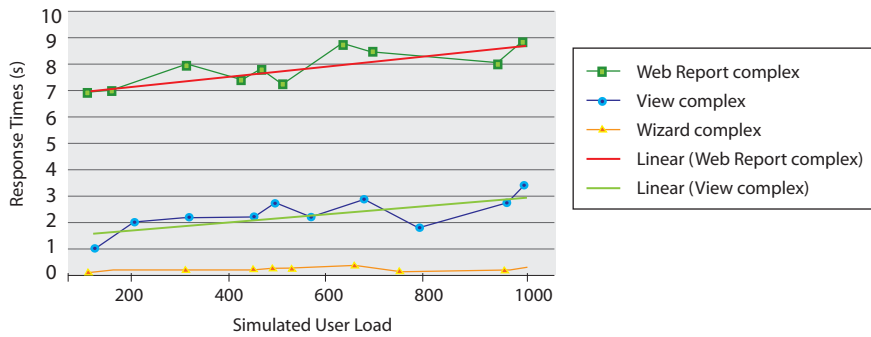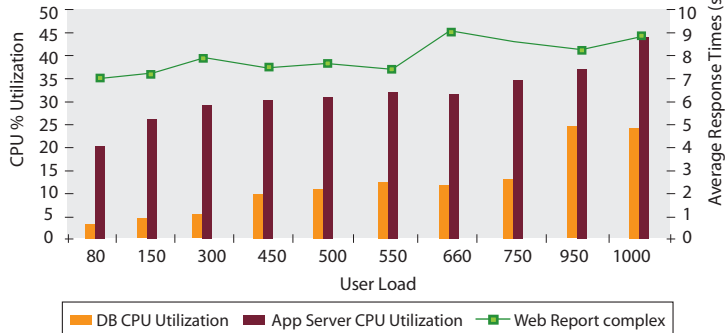

Figure 2: Average Performance of a Complex Web Report against CPU utilization for the Database Server and Application Server

simulates an appropriate distribution of user interactions covering different types of circuit designers, field engineers and trouble ticket processors. An actual test is performed by simulating a specified user load (e.g. 500 or 1000 concurrent users) and then launching a test probe that monitors the responsiveness of a representative set of Cramer6 OSS Suite GUI components (e.g. Technical Reports, Graphical Views, Wizards, etc.). The results obtained are then compared against predefined limits that are used to indicate an acceptable level of performance.

Test Architecture

The Enterprise Level Cramer6 OSS Suite UBM was performed on IBM System p and IBM System Storage hardware, using the IBM WebSphere 6.0.2.9 Application Server and the Oracle 10g database management system. The Enterprise Level IBM hardware used for the benchmarking test included:

Database server
  - IBM System p5 595 with AIX 5.3
  - 16 IBM POWER5+™ CPUs running at 2.3GHz
  - 128 GB RAM

Application server
  - IBM System p5 595 with AIX 5.3
  - 4 POWER5+ CPUs running at 2.3GHz
  - 32 GB RAM

Storage
  - IBM System Storage DS8300
  - RAID-10 array with 2 TB usable

Summary of Results

During the benchmark, the goal was to prove that 500+ concurrent users could be supported with acceptable response times. This aim was exceeded by scaling to 1000 users while maintaining acceptable user experience. During the performance test the number of CPUs allocated to the application tier was kept constant. From an examination of the CPU utilization of the two server systems, it is evident that additional capacity was available to have supported significantly higher user populations, demonstrating the powerful scalability of the Amdocs and IBM solution.

This benchmark demonstrated that the Cramer6 OSS Suite on IBM System p and IBM System Storage hardware is a solution offering superior system capacity with excellent response time. Results were acceptable up to twice the target user load and delivered significant performance improvement compared to previous benchmarks, with near linear scalability to 1000 concurrent users.

Dale Thomas, General Manager, Amdocs OSS Division concluded. "Service providers need to be comfortable that solutions they deploy can flex and support their ever changing business and market requirements. This benchmark proves the superior abilities of Amdocs Cramer6 OSS Suite and IBM System p hardware to scale and perform – cost-effectively – against the demands of service providers today, but also into the performance needs of the Global Tier 0 providers of tomorrow."

For complete results, please contact Didier Petitprez (didier.petitprez@fr.ibm. com) or Uri Sela (uri.sela@amdocs.com).