Record Performance and Seamless Scalability in Core Banking with Infosys Finacle and Oracle SuperCluster

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Introduction

Today's financial services landscape calls for seamless, rich and individualized online and mobile experiences for consumers, new ways to meet increasing regulatory pressures and the ability to continually drive improved performance. Banks are grappling with a host of new challenges, ranging from increased competitive pressures and expanded government regulations to the impact of mobile technologies. At the same time many banks must streamline IT budgets while simultaneously paving the way for future expansions of products and services. Banks can no longer remain idle on legacy applications. Growth, and perhaps even survival, depends upon an agile, cost effective core banking solution that delivers a differentiated service experience.

Infosys Finacle core banking solution on Oracle SuperCluster provides a comprehensive, integrated, and agile approach to core banking that addresses banks' sophisticated needs in easy-to-configure modules that work together as a system. By providing all of the building blocks needed for business functionality, Finacle 10 enables users to configure products and processes flexibly in order to tailor the solution to their exact needs and adapt to a diverse and dynamic environment. With a 360-degree single-source view into customer accounts, banks can empower customers with relevant information and delight them with the right offerings—presented at the right time through the right channel.

Demonstrating extraordinary performance and scalability, an Infosys Finacle core banking solution version 10.2.13, running on an Oracle SuperCluster T5-8 system recently set a new global benchmark for the number of transactions processed across key banking functions. In a test that was audited and reviewed by a global business consulting and audit firm, the solution supported more than 1.9 billion (a number higher than the current population of China[1]) bank accounts with near linear scalability[2]. The test also saw Infosys Finacle processing 726 million effective transactions in four hours, or more than 50,000 average transactions per second, equating to six times the volume of transactions currently processed by the entire U.S. banking system[3].

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1 China's population figure as of 2012 from World Bank web site.

2 Infosys Ltd., conducted a performance benchmark exercise of Finacle core banking solution version 10.2.13 (herein referred to as 'Finacle') on Oracle Solaris 11.1 operating system and Oracle's SPARC T4/T5 servers at the web, Java EE, and application layers. Further, an Oracle Real Application Clusters (Oracle RAC) database was deployed on Oracle SuperCluster, Oracle WebLogic Server 10.3.6 was deployed on Java EE servers, and Oracle HTTP Server 11.1.1.6 was deployed on web servers for an online transaction processing mix of 12 business-critical transactions.

3 As per the recent CEB Towergroup report titled, "Planning Your Cross-Channel Future," published on Dec 2012, the total volume of transactions per year in the U.S. is 73.9 billion or 205 million transactions per day. Spread across 12 working hours, the daily workload translates into 17.11 million transactions per hour.

Deploying Finacle Core Banking Solution on Oracle Infrastructure

Just as other businesses have faced transformational moments, the financial services industry has undergone many changes in recent years. Driven by mergers, consolidation, expansion, shifting customer preferences, and continuously evolving regulatory constraints, banks must move quickly to embrace change and accelerate growth. As they approach this transition, most want to avoid the fragmented and piecemeal technology approaches that have proven to be limitations in the past. Infosys and Oracle's recent benchmark result highlights capabilities that can help banks manage extremely large transaction volumes and cater to a dynamically growing customer base at lower costs.

Deploying Finacle core banking solution on Oracle infrastructure provides a highly scalable solution. The availability of Finacle 10 on Oracle Solaris marks an important milestone, enabling banks to deploy Finacle core banking solution on Oracle SuperCluster engineered systems and Oracle's SPARC T-Series servers. This unique technology combination matches state-of-the-art core banking software from Finacle with hardware, software, database, and storage solutions from Oracle that are all optimized and engineered to work together. As described later in this paper, Oracle's testing has yielded dramatic results, including the following:

» The Finacle core banking solution processed interest accruals for more than 1 billion term deposit accounts in less than 87 minutes, or an average of 213,000 records per second.
» The solution demonstrated its ability to manage large delivery channel workloads by processing 204 million effective transactions in 35 minutes, or an average of 97,000 effective transactions per second.
» Interest payments to more than 79 million savings accounts were processed in 32 minutes, at around 41,000 transactions per second.
» The test was simulated on a Finacle database of more than 49 terabytes having more than 205,000 branches and more than a million branch users.
» Finacle's latest performance levels[4] have shown an improvement of three to five times over its own earlier established benchmarks.

While these results may be well beyond the needs of most banks in terms of both numbers of customers and raw transaction volumes, the testing demonstrated the unique scalability available with the combination of Infosys Finacle, Oracle hardware, and the Oracle Solaris operating system. In addition to removing arbitrary scalability barriers for banks, Infosys Finacle has earned Oracle SuperCluster Optimized status through the Oracle PartnerNetwork (OPN), demonstrating that Infosys has tested and tuned Finacle with Oracle SuperCluster to deliver speed, scalability, and reliability to customers. Infosys is a Diamond-level member of Oracle PartnerNetwork.

Finacle Core Banking Solution

Banks must consistently maintain and grow their businesses, handling high-transaction volumes and simultaneously managing ever-increasing customer expectations. Business innovation is key, and banks must concentrate on attracting and retaining customers while reducing their total cost of operations. To address these needs, Finacle core banking solution succeeds by implementing a layered service oriented architecture (SOA), straight-through processing (STP) capabilities, web-enabled technology, and support for true 24/7 operations. As a result, the Gartner Magic Quadrant consistently recognizes Infosys, for its Finacle core banking solution, as a Leader that demonstrates vision and execution excellence.[5] See http://www.infosys.com/finacle/solutions/Pages/leader-global-core-banking-market-2013.aspx.

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4 http://www.infosys.com/newsroom/press-releases/Pages/benchmarks-processing-bankingtransactions.aspx
5 Gartner: "Magic Quadrant for International Retail Core Banking," 2013.

Finacle core banking solution gives banks considerable agility by enabling them to:

- » **Create a differentiated and unique customer experience.** Finacle core banking solution enables banks to provide a hassle-free and unified banking experience that is personalized to customer needs.
- » **Expand product offerings.** With a robust and comprehensive core solution, banks can expand product offerings on demand, and stay ahead in a competitive marketplace.
- » **Configure bundled product suites.** The modular nature of the solution allows banks to easily configure bundled product suites to cater to the growing demands of today's customers.
- » **Generate right-sell opportunities.** Finacle core banking solution enables a phased, strategic approach in generating right-sell opportunities.
- » **Eliminate data redundancy.** By deploying the solution, banks can build a master data system that consolidates all customer and product data and eliminates redundancy.
- » **Increase productivity of front-line staff.** Automation and ease-of-operation lends itself to increases in productivity.
- » **Comply with emerging global regulations.** Regulatory compliance is a significant concern for any bank, and Finacle core banking solution lets banks rest assured of being compliant with growing regulations with a unified and real-time view of business data.
- » **Manage growth with proven scalability.** The solution is designed to be scalable and support the specific pace of growth needed by banks.
- » **Maximize business agility.** Business users can launch new products using the product factory infrastructure, without altering base code, ensuring faster adaptation to changing business conditions.
- » **Minimize risk.** The global delivery model (GDM) accelerates schedules with time and cost predictability. Infosys' rapid implementation methodology ensures rapid, smooth, and successful deployment, minimizing risks.
- » **Improve customer service.** Finacle's integrated framework enables banks to offer products and services through multiple channels including branches, telephone, ATMs, internet, and mobile devices, while ensuring a single view of customers across these channels.
- » **Provide support for multicountry growth.** The solution offers a proven multicountry deployment framework with support for multicurrency accounting, multiple legal entities and businesses across multiple time zones, and multilingual transactions.

Besides, leveraging the componentized structure of the solution, banks can choose to deploy or upgrade Finacle solutions all at once or one at a time, depending on business priorities. This flexibility empowers banks to simplify their transformation journey while enabling them to reap modernization benefits faster.

Oracle SuperCluster—An Oracle Engineered System

Traditional build-your-own solutions for banking infrastructure can rapidly prove to be complex and costly. Oracle engineered systems represent a different and compelling alternative.

The Oracle Engineered Systems Approach

Build-your-own solutions tend to represent one-off designs that require considerable IT staff time to design, integrate, test, and optimize. Even many vendor-supplied solutions lack the technology depth and ownership to provide meaningful integration. As a result, IT staff must focus on integration issues, when it should be focused on the strategic goals of the organization. An Oracle engineered system, Oracle SuperCluster offers a different approach that provides a single point of accountability, components designed to work together, and a tested and proven architecture (Figure 1).
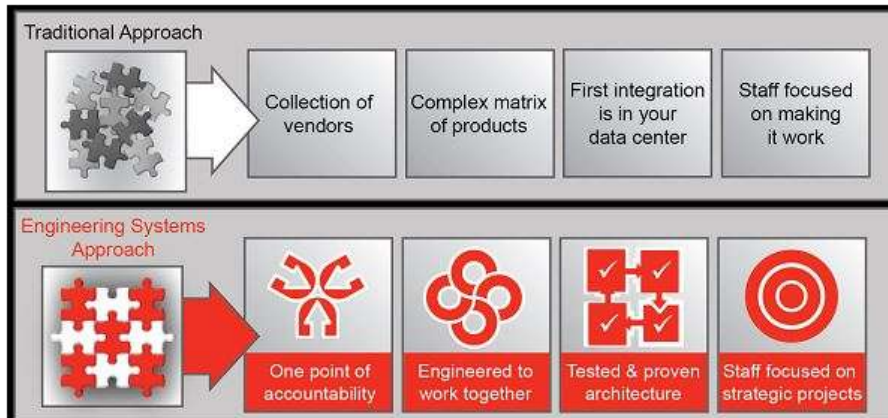
Figure 1. Oracle engineered systems such as Oracle SuperCluster accelerate the entire Oracle technology stack, providing simplicity and cost savings over multivendor build-your-own approaches.

Oracle SuperCluster

Like all Oracle engineered systems, Oracle SuperCluster is a complete solution optimized to provide the best performance, availability, and security for running business-critical Java and enterprise applications. In fact, Oracle Database and Java perform up to 10 times faster on Oracle SuperCluster than on other platforms, improving user response times and helping to meet service level agreements. Organizations deploying Oracle SuperCluster can achieve 99.999 percent application availability, minimizing both planned and unplanned downtime and providing the highest service levels for core business applications across all tiers of the data center. These benefits derive from a careful Oracle engineered systems approach that includes:

» Hardware and software engineered to work together

» Integration driven by organizational alignment within Oracle

» Optimization across the full solution stack

» Synchronized hardware and software release schedules

Oracle SuperCluster is particularly well suited for multitier enterprise applications, such as the Finacle core banking solution, that comprise web, database, and application components. This versatility, along with powerful bundled no-cost virtualization capabilities, offers an ideal platform on which to consolidate large numbers of applications, databases, and middleware workloads. Deploying complex multiuser development, test, and production environments is also considerably simpler and faster.

» **High performance.** Everything about the Oracle SuperCluster architecture is designed around delivering improved application performance and a responsive end-user experience. Oracle's SPARC T5-8 compute nodes offer the best Oracle Database performance. Multiple instances of Oracle Exadata Storage Server, coupled with Oracle's Exadata Storage Server Software, contribute the same technology that powers Oracle Exadata Database Machine. Integral InfiniBand networking provides fast communication and low latency between system components. Oracle ZFS Storage Appliance provides flash-accelerated storage for applications and data.

» **Full high availability**. Organizations must increasingly reduce risk by ensuring continued application and database operation in the face of both internal and external events. Oracle SuperCluster helps ensure continuous operation in the event of component failure. Beyond redundant hardware, the system is architected with high-availability functionality in database and application layers as well. When required, Oracle Real Application Clusters (Oracle RAC) can be used to provide continuous database access to help ensure that applications and users can continue to operate after an unplanned event. Unified patching of the entire stack can further reduce downtime.

» **Safe and effective consolidation**. Many organizations want to reduce costs and complexity through consolidation, but consolidation platforms must provide essential availability and isolation along with the
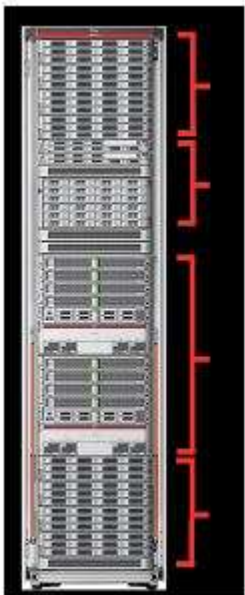
necessary scalability to meet application demands. Oracle SuperCluster is ideal for the replacement and consolidation of legacy database and application infrastructure. The platform provides a large computational platform and Oracle Exadata storage technology for database consolidation. Integrated no-cost virtualization offers workload isolation, predictable performance, and information security. High availability provides for safety of operations while the coordinated and integrated platform offers simplified management and updating.

» **A complete Oracle engineered system**. An Oracle engineered system, Oracle SuperCluster provides a complete platform that is integrated, tested, and prearchitected to help facilitate complete solutions. This approach removes the need for IT organizations to focus on basic hardware integration, accelerating time to operation and allowing more time to focus on strategic application projects. Organizations can deploy Oracle SuperCluster rapidly, and grow the solution in multiple dimensions as needed. This approach can save considerable time and money over multivendor build-your-own approaches that require integration, interoperability testing, and complex support structures to achieve desired functionality or levels of performance.

Oracle SuperCluster T5-8

The Finacle core banking solution performance testing described later in this paper was conducted on the full-rack version of Oracle SuperCluster T5-8 (Figure 2), which is composed of:

» Two Oracle SPARC T5-8 servers for application and database processing
» Eight Oracle Exadata Storage Server X4-2 servers for enhanced database performance and storage
» One Oracle ZFS Storage ZS3-ES appliance for application file storage
» Three InfiniBand switches for a high-throughput, low-latency interconnect

Figure 2. Full-rack Oracle SuperCluster T5-8 systems integrate compute, storage, I/O, and networking into a preconfigured and pretested Oracle engineered system.

Oracle SuperCluster T5-8 delivers up to 2.5 times better performance than its predecessor with up to 33 percent greater storage capacity. The platform includes a number of key advancements and innovations that help drive better performance, higher consolidation ratios, and lower power and cooling costs. These advances stem from the integration of extremely capable components in the Oracle SuperCluster T5-8 configurations, including:

» **Increased processing power**. SPARC T5-8 servers provide substantial processing power and large memory support, enabling Oracle SuperCluster T5-8 to remain space and power-efficient. Oracle's SPARC T5 processors provide twice the number of cores (16 cores per processor) as previous-generation SPARC T4 processors from Oracle (8 cores per processor).

» **Large system memory**. SPARC T5-8 servers also support up to twice the contiguous memory of their predecessors, enabling consolidation of even extremely memory-intensive applications. Large contiguous system memory size also benefits Oracle Database performance with ample memory for the Oracle Database system global area (SGA).

» **Faster I/O technology**. SPARC T5-8 servers provide support for PCI Express (PCIe) 3.0. More bandwidth and lower latency help move data in and out of databases faster, and can ultimately improve response times for applications.

» **Enhanced storage cell technology and capacity**. Oracle SuperCluster T5-8 offers new storage cell technology in the form of Oracle Exadata Storage Server X4-2 servers, as well as support for larger numbers of storage servers. With up to eight Oracle Exadata Storage Server X4-2 servers in a single Oracle SuperCluster T5-8, these systems support considerable database capacity.

» **Extensible and expandable single-rack or multirack configurations**. Oracle SuperCluster T5-8 is available in single-rack or multirack configurations. Application and data storage can be easily expanded using Oracle ZFS Storage Appliance while additional Exadata Storage Expansion Racks from Oracle can be added for additional database storage.

Oracle's SPARC T-Series Servers

Oracle offers a broad range of servers based on SPARC T-Series technology. Given the size of the Infosys Finacle benchmark documented in this paper, a variety of SPARC servers from Oracle were employed to perform different aspects of benchmark testing. Systems based on Oracle's SPARC T4 and T5 processors were used extensively for web tier, Java EE, and C-application tier processing. Oracle's SPARC T4-4, T5-2, and T5-4 servers were all used in these roles as a part of benchmark testing. For more information on these servers, please visit http://www.oracle.com/us/products/serversstorage/servers/sparc/oracle-sparc/overview/index.html.

Oracle's SPARC T5-8 Server

The SPARC T5-8 server is the world's fastest single server for Oracle Database. Optimized to accelerate enterprise applications, this high-end server delivers extreme performance and outstanding virtualization capabilities in a compact design. Multiplying available performance, these servers offer improved price/performance leadership, provide support for more cores and more sockets, and add significant advancements in power management.

Each SPARC T5-8 server features:

» Support for up to eight SPARC T5 processors (up to 128 compute cores), with low one-hop latency
» Support for up to 4 TB of memory
» Double the throughput and 1.2 times the single-threaded throughput of previous-generation designs
» Enterprise-class reliability, availability, and serviceability
» Support for up to 16 hot-pluggable low-profile PCIe 3.0 slots

Finacle Core Banking Performance Testing

Banks need to run a mixture of workloads, including both online transaction processing (OLTP) and batch jobs. OLTP performance must keep pace with rapid and unpredictable growth, supporting fast response times to provide interactive performance with a large number of concurrent users and ad-hoc transactions. Batch performance must be sufficient to process significant numbers of records during available batch processing windows.

Testing Phases and Hardware Overview

Because banks have differing requirements, the benchmark sought to evaluate both OLTP and batch workloads, as well as demonstrate scalability in terms of simultaneous users. Benchmarks were run in two distinct phases with Finacle node configurations adjusted between the two phases to evaluate the ability to scale performance and tailor the system to different tasks. Infosys engaged a leading global business consulting and audit firm to observe and report the benchmarking exercise.

Phase 1 Testing

Phase I of benchmark testing sought to evaluate various different OLTP and batch workloads, with tests that included:

» Highest throughput for online workloads (with 12 online transactions)
» Highest throughput for online delivery channel transactions
» Interest accrual batch on term deposit (TD) accounts (standalone)
» Interest payment batch on savings accounts (standalone)

The database was hosted on a full-rack Oracle SuperCluster T5-8 with a half-rack of Exadata Storage Expansion Racks. This configuration provided roughly 60 TB of space for the database. Sixteen Finacle nodes were employed in phase I testing with each Finacle node consisting of:

» One web tier
» One Java EE tier
» One C-application tier

Phase II Testing

Phase II testing was designed to stress the system with a large number of users. In this case, the same Oracle SuperCluster configuration was used for the database (without the external expansion rack) while the Finacle nodes were configured differently. For phase II testing, 12 Finacle nodes were used to process transactions with each Finacle node consisting of:

» Two web tiers
» One Java EE tier
» One C-application tier

Data Volumes in the Finacle Database

The data volumes for the benchmark were considerable, designed to stress not only the storage capacity of the system, but also its I/O capability—the ability to get information in and out of the database. Table 1 lists the data volumes loaded into the system for both phases of benchmark testing.

TABLE 1. DATA VOLUMES IN FINACLE DATABASE FOR BOTH PHASES OF TESTING

Entity	Count
Number of branches (SOLs)	205,028
Number of customers	947 million
Term deposit accounts	1.1 billion

Savings bank accounts	848 million
Loan accounts	8 million
Other office accounts	1.3 million
Total number of accounts (sum of four rows above)	1.9 billion
Number of branch users (tellers) 1 million	1 million
Total number of history transactions	17 billion
Database size	49.8 TB

Software Details

Table 2 lists the software versions employed in benchmark testing.

TABLE 2. SOFTWARE VERSIONS USED IN AUDITED BENCHMARK TESTING

Software	Version
Finacle Core Banking Solution	10.2.13
Oracle Solaris	11.1 patch 6
Oracle WebLogic Server	10.3.6
Oracle Database 11g Release 2	11.2.0.3

Phase I Testing and Results

Figure 3 illustrates the hardware configuration utilized in phase I testing. The configuration included:

» Sixteen web servers
» Sixteen Java EE servers
» Sixteen C-application servers
» Four Oracle RAC database nodes deployed on a full-rack Oracle SuperCluster T5-8
» A half-rack of Oracle's Exadata Storage Expansion Racks
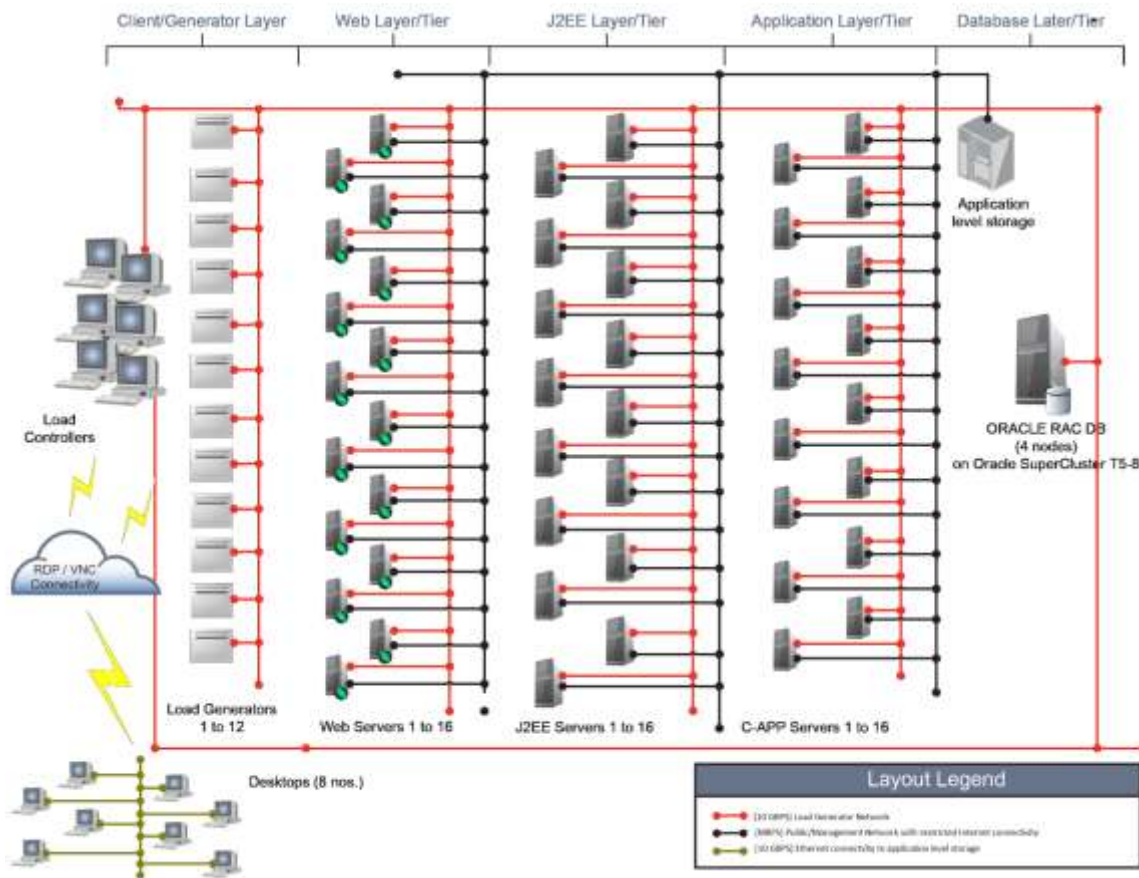» Two load controllers and 12 load generators

Figure 3. Phase I testing employed 16 web servers, 16 Java EE servers, 16 C-application servers, and four Oracle RAC database nodes running on Oracle SuperCluster T5-8.

Online Workload with 12 Transactions

The objective of the online workload testing was to determine the performance of Finacle for an online transaction processing mix of 12 business-critical transactions. The workload simulated a load of 3,931 concurrent users for a period of five hours (including ramp up and ramp down) executing the chosen workload mix of 12 (inquiry and non-inquiry) transactions. Table 3 lists performance data collected during the benchmark, with more than 426 million business transactions achieved in four hours of constant peak-load operation.

TABLE 3. RESULTS FOR ONLINE WORKLOAD WITH 12 TRANSACTIONS

Parameter Description	Measured Benchmark Data
Number of logged-in users at peak load	3, 931
Constant peak user load duration considered	4 hours
Total number of business transactions passed during four hours	426 million

Total number of effective transactions passed during four hours	726 million
Percent of failed transactions	0.0001%
Average business transactions processed per second (Business TPS) during four hours	29,625
Average effective transactions processed per second (Effective TPS) during four hours	50,449
Weighted average response time during peak load	130 ms

CPU and memory utilization were both carefully measured to determine the impact of the workload on the configured system. Despite the impressive results achieved, CPU and memory utilization remained well within acceptable bounds, demonstrating considerable headroom for most functions (Table 4).

TABLE 4. CPU AND MEMORY UTILIZATION DATA FOR ONLINE WORKLOAD TESTING

System Resource	Average CPU Utilization	Average Memory Utilization
Web servers	74%	45%
Java EE servers	43%	28%
C-application servers	42%	19%
Database servers	43%	50%

Online Delivery Channel Transactions

The objective of the online delivery channel transaction benchmark was to determine the performance of Finacle for a mix of four delivery channel transactions. Tested transactions included:

» Delivery channel debit transactions through customer touch points
» Payment transaction posting through customers and bank users
» Delivery channel balance inquiry through customer touch points
» Delivery channel account inquiry through customers and bank users

Table 5 lists performance data collected during the benchmark, with 128 million business transactions and 204 million effective transactions achieved in only 35 minutes of constant peak-load operation.

TABLE 5. RESULTS FOR ONLINE DELIVERY CHANNEL TRANSACTIONS

Parameter Description	Measured Benchmark Data
Number of logged-in users at peak load	4,049
Constant peak user load duration considered	35 minutes
Total number of business transactions passed during 35 minutes	128 million
Total number of effective transactions passed during 35 minutes	204 million
Percent of failed transactions	0.01%

Average business transactions processed per second (Business TPS) during 35 minutes	61,362
Average effective transactions processed per second (Effective TPS) during 35 minutes	97,235
Weighted average response time during peak load	64 ms

As before, the system demonstrated considerable CPU and memory headroom, as shown in Table 6.

TABLE 6. CPU AND MEMORY UTILIZATION DATA FOR ONLINE DELIVERY CHANNEL TESTING

System Resource	Average CPU Utilization	Average Memory Utilization
Web servers	10%	41%
Java EE servers	14%	25%
C-application servers	68%	17%
Database servers	40%	49%

Batch Interest Accrual on Term Deposit Accounts

In addition to online processing, it was important to evaluate the performance of batch processing for the Infosys Finacle configuration on Oracle SuperCluster T5-8. The objective of this benchmark was to determine the performance of Finacle for interest accrual on term deposit (TD) accounts in a batch process. The following performance parameters were observed and analyzed during the benchmark test:

» Total time taken by the batch process
» Average records processed per second
» Average resource utilization in terms of the CPU and memory resources of the servers

Table 7 lists performance data collected during the benchmark, with 1.1 billion records processed in only 86 minutes and with an average of 213,000 records processed per second.

TABLE 7. BATCH PROCESSING OF INTEREST ACCRUAL ON TERM DEPOSITS

Parameter Description	Measured Benchmark Data
Total duration of the test	86 minutes, 21 seconds
Total number of records processed	1.1 billion
Average records processed per second (RPS)	213,000

As before, the system demonstrated considerable CPU and memory headroom, as shown in Table 8.

TABLE 8. CPU AND MEMORY UTILIZATION DATA FOR BATCH INTEREST ACCRUAL ON TERM DEPOSITS

System Resource	Average CPU Utilization	Average Memory Utilization
C-application servers	60%	18%
Database servers	74%	47%

Batch Interest Payments on Savings Accounts

The objective of this benchmark was to determine the performance of Finacle for interest payment on savings accounts in a batch process. The following performance parameters were observed and analyzed during the benchmark test:

» Total time taken by the batch process
» Average records processed per second
» Average resource utilization in terms of the CPU and memory resources of the servers

Table 9 lists performance data collected during the benchmark, with 79 million accounts processed in only 32 minutes and with an average of 40,000 records processed per second.

TABLE 9. BATCH PROCESSING OF INTEREST PAYMENTS ON SAVINGS ACCOUNTS

Parameter Description	Measured Benchmark Data
Total duration of the test	32 minutes, 30 seconds
Total number of records processed	79 million
Average records processed per second (RPS)	40,697

In accordance with the other online and batch tests, the system demonstrated considerable CPU and memory headroom, as shown in Table 10.

TABLE 10. CPU AND MEMORY UTILIZATION DATA FOR BATCH PAYMENTS ON SAVINGS ACCOUNTS

System Resource	Average CPU Utilization	Average Memory Utilization
C-application servers	52%	25%
Database servers	44%	47%

Phase II Testing and Results

After baseline values were determined in phase I testing, phase II testing aimed to evaluate a high user load scenario on the Oracle RAC database running on Oracle SuperCluster T5-8. The configuration was adjusted slightly, with additional processor cores dedicated to serving the web tier and fewer processor cores dedicated to the C-application tier. Figure 4 illustrates the hardware configuration utilized in phase II testing.

The configuration included:

» Twenty-four web servers
» Twelve Java EE servers
» Twelve C-application servers
» Four Oracle RAC database nodes deployed on a full-rack Oracle SuperCluster T5-8
» Eight Oracle Exadata Storage Server X4-2 servers within the Oracle SuperCluster rack
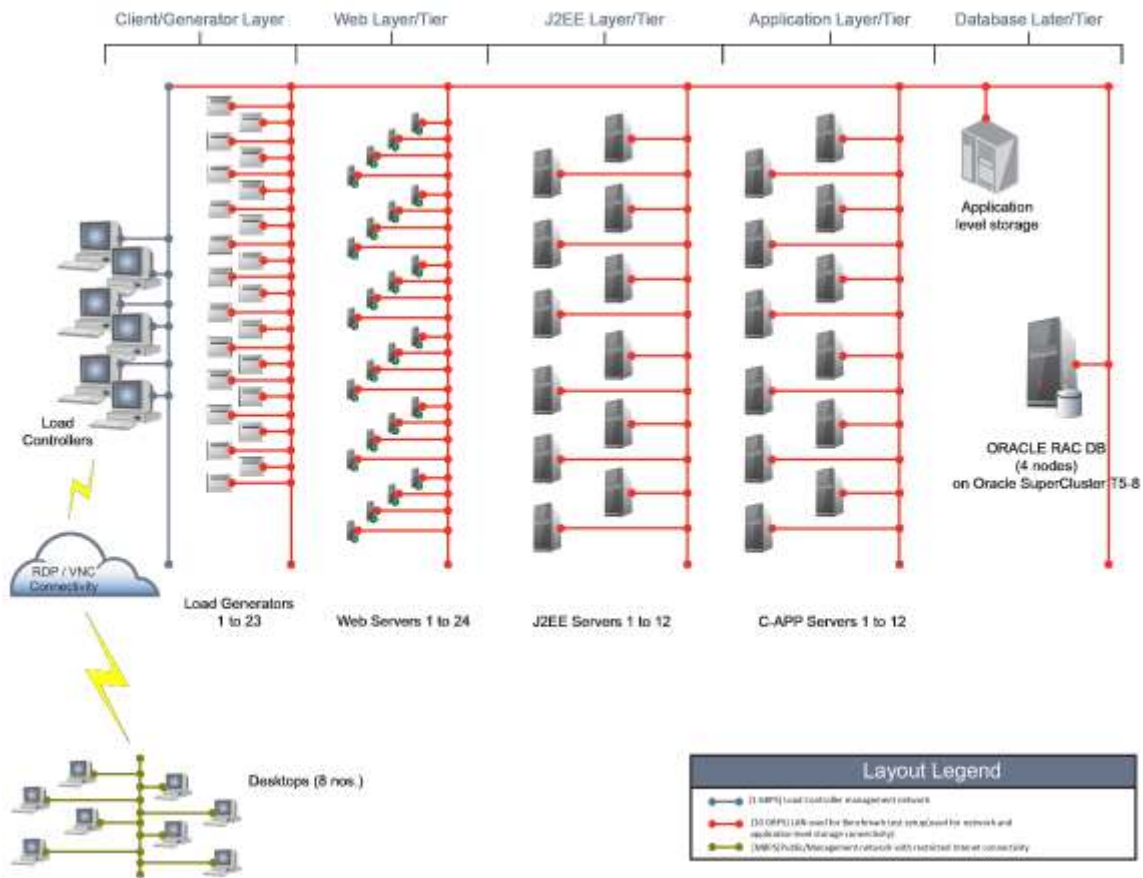» Two load controllers and 24 load generators

Figure 4. Phase II testing employed 24 web servers, 12 Java EE servers, 12 C-application servers, and four Oracle RAC database nodes running on Oracle SuperCluster T5-8

High Concurrent User Load Testing

Table 11 lists performance data collected during the benchmark, with 323,000 users measured in the audited benchmark.

TABLE 11. HIGH USER LOAD TESTING BENCHMARK FOR ORACLE SUPERCLUSTER DATABASE

Parameter Description	Measured Benchmark Data
Number of logged-in users during constant duration period	323,064
Achieved average business transactions per second	13,868
Achieved average effective transactions per second	22,718
Total login time for all branch users	49 minutes, 13 seconds
Weighted average response time	0.17 seconds

In accordance with other online and batch benchmark tests, the system demonstrated considerable CPU and memory headroom, as shown in Table 12.

TABLE 12. CPU AND MEMORY UTILIZATION DATA FOR HIGH USER LOAD TESTING

System Resource	Average CPU Utilization	Average Memory Utilization
Web servers	27%	29%
Java EE servers	40%	34.44%
C-application servers	40%	42%
Database servers	16%	66.35%

Conclusion

Faced with incredible challenges and promising new opportunities, banks need flexible and agile solutions that solve their unique problems while providing a high-performance infrastructure that scales with their needs. As demonstrated by the workload testing described in this paper, Infosys Finacle core banking solution running on Oracle SuperCluster T5-8 and Oracle's SPARC T-Series servers sets a new standard of scalability for core banking infrastructure. The audited benchmark demonstrated unprecedented scalability as well as the opportunity to consolidate infrastructure for considerable CapEx and OpEx savings. Engineered to reduce cost and risk in the enterprise, Oracle SuperCluster T5-8 supplies strong Finacle 10 performance while providing top-to-bottom integration of the solution stack, ease of deployment, and ongoing maintenance—letting banks focus on their customers and their most important strategic business priorities.

References

For more information, visit the web resources listed in Table 13.

TABLE 13. WEB RESOURCES FOR FURTHER INFORMATION

Description	Web Resource URL
Oracle SuperCluster	oracle.com/supercluster
Oracle's SPARC servers	oracle.com/us/products/servers-storage/servers/sparc/overview/index.html
Oracle Solaris	oracle.com/solaris
Infosys Finacle	infosys.com/finacle

Hardware and Software, Engineered to Work Together

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