AberdeenGroup

# NCR System 3000: The Champion of Intel/Unix Multiuser Systems

*The surprising and well kept secret of enterprise computing in 1992 was NCR shipping over $1 billion in System 3000 multiuser servers, while proving skeptics of the AT&T merger wrong. Over the past three years, NCR has articulated a visionary architecture based on Intel's microprocessors and the Unix operating system for open, cooperative computing. But the System 3000 family that fulfills the vision was tardy, delaying many initial product shipments until 1992.*

*In this Product Viewpoint, Aberdeen Group examines NCR's unpublicized emergence as a major commercial systems supplier well tuned to the demands of computing in the mid-1990s, and updates our clients on NCR's System 3000 line of multiuser commercial servers.*

## *Executive Summary*

After embarrassing delays aimed at getting the product right, NCR burst onto the high-end commercial multiuser server market in 1992 with the System 3000 family. NCR System 3000 Unix-based multiuser server hardware and software revenues were over $1 billion in 1992.

This new-found revenue stream came during a year when industry revenues of proprietary midrange and mainframe systems were flat or declining. As a result, NCR is the first-place champion in commercial multiuser Intel/Unix market share -- and second only to Hewlett-Packard in commercial multiuser Unix market share. However, the company had better 1992 success in Europe, which explains why the System 3000 is still a well-kept U.S. secret.

The heart of the System 3000 servers is Intel's ubiquitous 386 and 486 microprocessors, and the brains are a commercially ruggedized version of Unix Systems Laboratory's (USL's) Unix V.4 MP (multiprocessor) with V.4.2 extensions. NCR has done more with Intel's silicon and USL's software than any other commercial-multiuser supplier.

The System 3000 servers are more than the sum of their commodity parts. NCR's goal is to provide leading-edge price/performance advantages, rock-solid commercial system robustness, exceptional networking and distributed/replicated systems capabilities, and added-value in targeted vertical-market expertise.

The company has an excellent server scalability story -- from deskside uniprocessors ideal for branch and agency distributed/replicated systems, through a strong, Risc-challenging midrange built with symmetric multiprocessing, to a unique high-end supermainframe-class machine for next-generation attack applications. NCR's System 3000 servers are well-designed and professionally delivered to meet the needs of open-systems IS buyers who demand service, value, and a partnership relationship.

Aberdeen believes there are four keys to NCR's success with its System 3000 servers: base technology; superior production-class functionality; wide selection of world-class applications; and comprehensive integration services.

NCR has largely met the difficult product goals it set for the System 3000. We are impressed by the company's new-found ability to solve large-enterprise multinational business problems with the right 3000 server for the right job -- while providing the systems integration expertise needed to tie NCR and

other suppliers' products into a working system. And the accelerating trends towards downsizing and distributing computing mean 1993 is the year for NCR to prove it can be a first-tier partner with IS buyers.

NCR's challenge is to successfully market its System 3000 servers to IS executives who have not thought seriously about NCR for enterprise computing in years.

## *Breaking Down the Glass House*

What IS executives knew several years ago is now on the covers of business trade magazines: enterprises are implementing radically new philosophies regarding information systems. Lowering sales, general, and administrative costs across the enterprise -- not just the IS budget -- is going to come from new information architectures, resizing (down and up) and reengineering.

**NCR's challenge is to successfully market its System 3000 servers to IS executives who have not thought seriously about NCR for enterprise computing in years.**

Many are pushing information processing *out* into their enterprises by replicating distributed systems at branches, stores, and agencies. And seeking to put today's lower-cost computing platforms closer to line workers and decision-makers. To do this, IS innovators are breaking down the glass house that long surrounded the enterprise datacenter, limiting new development and work on the enterprise's legacy S/370 mainframes, and implementing rethought business processes on open (e.g., interoperable) systems.

NCR's System 3000 family of commercial multiuser servers are well suited to this changing IS environment.

## *New Times, New Terms, Unix Emerges*

Aberdeen defines commercial multiuser Intel/Unix systems as platforms running decision support, online transaction processing (OLTP), and database-intensive batch operations on an Intel 80X86 CPU (or CPUs) with a derivative of the Unix operating system.

Unix is now clearly the multiuser, open-system operating system of choice. It has been adopted by virtually all platform suppliers. Aberdeen's research indicates buyers are increasingly aware of three important factors:

- Unix has reached a level of standardization such that cross-supplier interoperability is possible, if not downright simple;
- Unix has been enhanced by individual suppliers with the robustness required to use it in enterprise mission-critical applications and in datacenter operations;
- Unix is inherently a multi*user* as well as multi*processing* operating system. Low-end operating systems including Windows NT and OS/2 do not directly support multiple users, just multiple processes.

Aberdeen ranks NCR as the leading supplier in the commercial multiuser Intel/Unix market.

## *NCR's Secret: A Billion Dollar System 3000 Server Business*

Even though some of the System 3000 server models were not shipping during early 1992, Aberdeen believes NCR posted a highly respectable $1 billion in System 3000 multiuser Intel/Unix server hardware and software revenues. The bulk of these revenues came from the midrange 3450 and 3550 models, as shown in Figure 1.

NCR has replaced the Tower line and enhanced AT&T's 3B2 and StarServer product line with the more powerful 3400-and-above. Aberdeen believes that this is a key reason for NCR's surprising success. The company has



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developed new technology while accepting the challenge of obsoleting and replacing its installed base.

Aberdeen estimates that NCR's strong performance in 1992 -- in spite of world macroeconomic problems and early lack of product -- placed the company solidly in second place in worldwide commercial multiuser Unix systems revenues. Thus, NCR is behind Hewlett-Packard's Series 800 at $2.4 billion but well ahead of IBM's RS/6000 at $825 million. Nonetheless, we believe many of NCR's competitors -- and customers -- will be surprised at NCR's emergence as a major worldwide supplier of open enterprise servers. It has been a well kept secret.

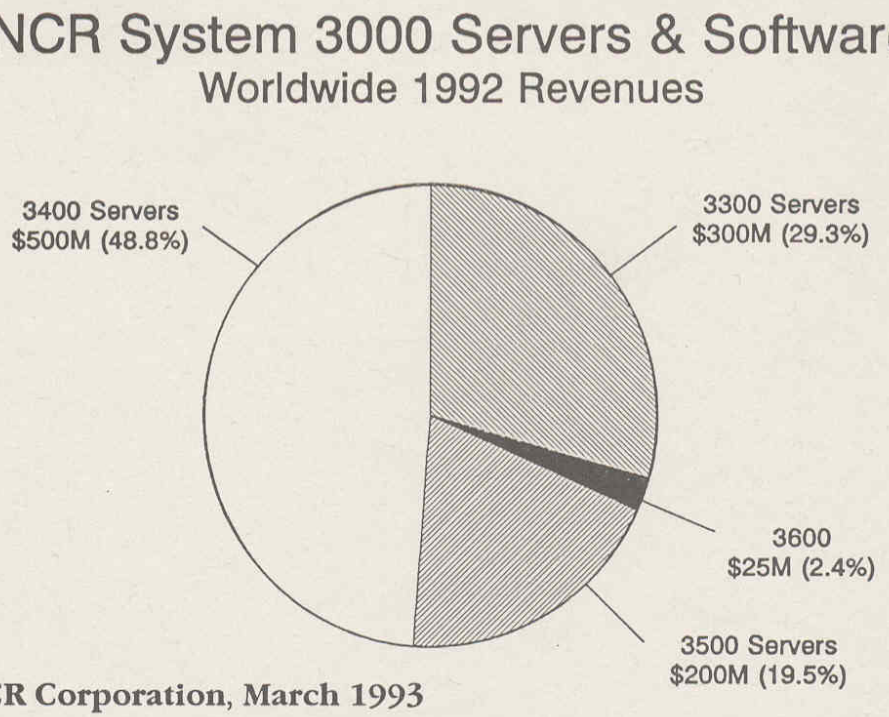
## *System 3000 Midrange Servers*

The NCR System 3000 family consists of seven levels of platforms based on Intel's 80X86 microprocessors (see Figure 2). The heart of NCR's System 3000 family are the 3450 and 3550 midrange servers. These servers support up to 4-way (3450) or 8-way (3550) symmetric multiprocessing.

NCR backs up its performance claims for the midrange 3450 and 3550 by placing both in the top ten of *all* Transaction Processing Council (TPC) benchmarks, including mainframe and Risc/Unix servers. And price-performance with the Oracle7 RDBMS is second only to Compaq's workgroup-oriented SystemPro. The model 3600 should push NCR even higher on the TPC performance charts when results are announced.

Customers deploy the 3450 as a distributed, replicated server at branches, stores, or agencies. The 3450 shows excellent price/performance. With Oracle7, TPC-A performance is 229 transactions per second (TPS), while lifecycle costs are exceptional at $6,300 per TPS. Customers use the 3450 for PC workgroup management (often with NCR's own StarGROUP), decision support, OLTP, replacing competitor's old minicomputers, downsizing S/370 mainframe applications, and upgrading older NCR systems.

The 3550 can support large offices, regions and divisional organizations, or be the mainframe at smaller enterprises. The 3550 also has excellent price/performance, with 413 TPC-A TPS at a cost of roughly $6,800 per




**Source: NCR Corporation, March 1993**

**Figure 1: System 3000 Revenues -- 1992**



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TPS using Oracle7. Customers most often choose the 3550 for OLTP, PC workgroup management, replacing traditional minicomputers, decision support, departmental computer consolidation, and mainframe downsizing.

Aberdeen expects NCR will revamp the 3450 with a lower cost/less expandable model soon. The company also believes its existing server architecture is fully prepared for Intel's upcoming Pentium (e.g., 586) microprocessor in the second half of 1993.

## *Microprocessor Mainframes*

The 3600 can be either a massive server or a dedicated RDBMS back-end. The 3600 loosely couples up to 32 application processors (APs). Each AP can be up to an 8-way symmetric multiprocessor (e.g., the power of a 3550) with each AP having its own memory, I/O channels, operating system, and user applications. But to an end user or computer operator, the 3600 looks like a single system.

Configured as a massive server, the 3600 can act as the enterprise hub and data repository. Or it can be a massively parallel OLTP and/or decision support query engine with an RDBMS. Both Oracle and Sybase have joint development projects underway with NCR which should result in very high-end RDBMS capabilities when their software is released later in 1993.

The 3600 can also be configured as a dedicated RDBMS backend to traditional mainframes or new-age open-systems mainframes. Using technology acquired from now-subsid-

| Level | Model | Processors | Purpose | Comments |
|---|---|---|---|---|
| 1 | 3100 | 1 | Mobile | Pen, palm, note. |
| 2 | 3200 | 1 | Desktop PC | Entry-level PC. |
| 3 | 3300 | 1 | Desktop PC | Power user & Low-end Server. |
| 4 | 3445 | 1 | Deskside server | SMP entry-level. |
| | 3447 | 1 | Deskside server | More powerful CPU. |
| | 3450 | 1 - 4 | Deskside server | More internal I/O & communications expandability. |
| 5 | 3550 | 2 - 8 | Midrange to small mainframe | Excellent internal expandability. |
| 6 | 3600 | 2 - 256 application processors | Mainframe to massive supermainframe | Loosely-coupled parallel processing. |
| 7 | 3700 | To 1,024 application processors | Supermainframe plus | Early 1994 delivery. Loosely-coupled, massively parallel. |

**Source: Aberdeen*Group*, March 1993**

**Figure 2: System 3000 Product Line**



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iary Teradata, the 3600 has dedicated-RDBMS-I/O engines and an intelligent backplane connection to efficiently merge and summarize queries.

The 3700 will next year extend the architecture of the 3600 by supporting more APs, probably based on Intel's upcoming Pentium microprocessor. The 3700 will also serve as the follow-on to Teradata's current DBC line of database machines.

## *Why NCR Is Winning at Major Enterprises*

Aberdeen believes there are four keys to NCR's success with its System 3000 servers:

- Base technology
- Superior production-class functionality
- Wide selection of world-class applications
- Comprehensive integration services.

These four critical factors are placing NCR on the short lists for many major enterprises who are seeking new, long-term supplier relationships. Partnerships include host-application rearchitecture (e.g., downsizing), distributed networked computing to replicated sites, enterprise-wide workgroup computing, and business process-automation reengineering.

NCR is also reinvigorating its long-important reseller channel with the goal of upgrading customers to System 3000 servers while protecting customer's investments in AT&T StarServer and NCR Tower products.

*System 3000 Base Technology:* The System 3000 rests on a sound technology base. The breadth of server capacity -- from a uniprocessor departmental server with roughly 5 mainframe MIPS (millions of instructions per second) to a super-mainframe at over 1,000 mainframe MIPS -- is made possible by cleverly harnessing one-to-many commodity Intel microprocessors. NCR benefits from Intel's multibillion dollar microprocessor research and development, allowing NCR to add value in other areas.

NCR is a major industry supplier of Small Computer System Interface (SCSI) chip sets used in disk controllers. This technology has helped NCR to be a leader in high-availability (i.e., RAID) disk storage systems. All system 3000 servers include MCA slots, with technology licensed from IBM.

**Aberdeen ranks NCR as the leading supplier in the commercial multiuser Intel/Unix market.**

In the software arena, NCR was the first hardware supplier to develop an open system transaction monitor, Top End, that is required for high-end and distributed transaction processing. Top End has been ported to non-NCR platforms. And COOPERATION enhances client-server application development in distributed computing environments.

NCR's networking technology covers the gamut of today's LAN/WAN interconnectivity requirements. NCR's Comten group provides ES/9000 channel connections into the IBM SNA world. NCR's StarSentry is a robust distributed systems network manager. There are numerous bridge and router options for interconnecting clients to servers.

*Superior Functionality for Unix Commercial Applications:* As many IS buyers discovered several years ago, plain-vanilla Unix long lacked the commercial robustness required for enterprise commercial applications. NCR has added numerous features to Unix in order to make it safe for mission-critical applications on System 3000 servers.

NCR's full name for its Unix derivative is Unix V.4 MP-RAS. The base code is Unix System's Laboratory's Unix System V.4. NCR contributed symmetric multiprocessor support (the MP) to USL's V.4 and added numerous reliability (RAS) features.

The company's engineering R&D goal was to replicate all the RAS concepts of the industry's paragon of bullet-proof operating



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systems, IBM's MVS. Thus, data journaling, disk mirroring, high-speed backup and recovery, performance monitoring, and remote systems management are standard. NCR's LifeKeeper software adds fault resiliency and automatic application failover. The NCR Unix security is now at the U.S. government's tough B1-standard level.

**NCR is winning at major enterprises seeking new, long-term supplier relationships for downsizing, distributed networked computing, enterprise-wide workgroup computing, and business process-automation reengineering.**

Top End transaction management and COOPERATION's client-server application development environment add considerable value for IS implementers.

*Partnering With Software Suppliers:* There are about 1,500 applications for NCR's Unix V.4 MP-RAS servers. These applications cross numerous industries, but are concentrated in financial services, retail, manufacturing, airline transportation, and telecommunications.

NCR is picking up considerable attention from key vertical market players. In banking, for example, EDS is porting its strategic banking system from mainframes to System 3000 servers. And transaction switching specialist Shared Financial Systems is implementing its next-generation switch on the System 3000.

NCR has close relationships with independent relational database suppliers Oracle, Sybase and Informix. Oracle, for example, has a separate business unit dedicated to NCR. Oracle's biggest customer is AT&T, and Oracle demonstrates on NCR 3450 SMP servers in its sales offices. NCR, in turn, uses Oracle's financial and manufacturing applications to run its worldwide business. Both Oracle and Sybase are working on advanced parallel versions of their products with NCR.

Computer Associates is porting its Unicenter systems management solution to the System 3000, along with database managers CA-IDMS and CA-Datacom. Application packages for human resources (CA-Classic Open) and general accounting (Masterpiece series) are currently available for System 3000 servers.

Recently, database supplier Software AG announced it will be porting to NCR System 3000 servers.

*Integration Services:* NCR is a first-tier supplier of product and technology integration services. In fact, services and software is a $2.8 billion dollar piece of NCR's $7.1 billion revenues. While the company shies away from application programming contracts, NCR will integrate multivendor solutions and then maintain them.

Many of NCR's over-$1M System 3000 server wins in 1992 were due to the company's ability to deliver distributed platforms, communications infrastructure, development software, and training and implementation consulting services on a managed-project basis. This both reduces IS integration risks while allowing NCR the opportunity to add real value to competitively-priced products.

Aberdeen believes integration services aimed at distributed systems for Fortune-1000-sized multinational companies will play a pivotal role in the success -- or failure -- of the System 3000.

## *NCR System 3000 Family Benefits*

Aberdeen believes NCR with the System 3000 has seven significant corporate differentiating benefits to offer IS buyers:

- NCR is one of only a handful of computer suppliers with the ability to provide systems and technology integration services for complex, over-$10 million, and multinational integration services assignments;



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- The family breadth is unmatched in the industry. No other supplier's architecture and platforms scale from mobil notebooks and palmtops, through midrange multiuser servers, to mainframe-plus massive servers;
- Excellent price/performance across the product line, as typified by outstanding Transaction Processing Council benchmarks, is a hallmark;
- Commercial features, such as the RAS (reliability, availability, serviceability) features added to Unix V.4, make the System 3000 suitable for mission-critical and low-service environments. RAS goals, for example, are set at 99.99% availability;
- The System 3000 family expansion and growth capacity is excellent. Many server components are interchangeable and upgradable in place. Several expandability options allow buyers to finely tune their configurations, buying only the expandability they need. This represents investment protection;
- NCR's networking capabilities are excellent. Not only can NCR tap parent AT&T's world-class laboratories and expertise, the company has several unheralded communications strengths itself. The Comten products give NCR excellent connectivity with traditional mainframes. StarSentry is an innovative systems network management tool for controlling distributed computing across the enterprise. StarGROUP/3000 is a PC-LAN manager. And LifeKeeper provides fault resilience and disaster backup;
- NCR has leadership vertical market expertise and added-value products and services in the retail, banking, telecommunications, and financial services markets. The company has expert knowledge in numerous other industries due to its long presence in commercial computing.

## *What Held NCR Back?*

NCR's System 3000 assets include a well-engineered product line that is in production, and targeted to meet IS executive's buying criteria with excellent price-performance and broad service and support capabilities. Aberdeen research shows large and small customers alike genuinely like the System 3000. What held NCR back from even greater success in 1992?

**NCR has the broadest range of multiuser Intel/Unix servers in the industry.**

First, the System 3000 servers only became generally available in 1992. The company was long on sales literature and short on product the year before. However, the delayed availability allowed NCR to deliver a solid product which has rapidly entered application production at demanding large enterprises.

Second, we believe the NCR sales force was slow to aggressively push the System 3000 servers in 1992. This is reflected in low buyer recognition of the System 3000 in Aberdeen's ongoing surveys. Many of NCR's publicly announced successes with the System 3000 servers occurred in Europe, a market with sophisticated tastes and a voracious appetite for open systems. The System 3000 servers were not visibly successful in the U.S.

Third, as a result of modest sales attention and lack of focus on enterprise-level selling, NCR's large-enterprise successes are spotty. A new enterprise marketing organization is being goaled on successfully telling the company's story to IS decision makers.

Fourth, the high-end 3600 is late in achieving general customer availability. Delivery of the even larger 3700 is not expected until 1994. However, Aberdeen believes few customers in production will outgrow the 3600 and need a 3700 in 1993.

Aberdeen believes NCR has the System 3000 product, sales, marketing, and service issues in hand.



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## *1993 Could be a Very Good Year for NCR System 3000*

There will be enormous disappointment at Dayton, Ohio headquarters if 1993 is not a banner year for the System 3000 servers. The company is now internally building confidence based on its championship debut showing in 1992.

We believe NCR's strong showing in 1992 sales places the company in first place in the Intel/Unix commercial multiuser server market. And NCR has an excellent springboard position in second place of the *entire* commercial multiuser Unix market, behind leader HP's HP-UX systems.

There are no significant holes in the company's product and service offering. Rather, NCR has the broadest range of multiuser Intel/Unix servers in the industry, starting from the deskside (today's base design point) and building through datacenter-class servers.

The company claims that the System 3000 servers were designed for Intel's upcoming Pentium chip, so Aberdeen predicts board-swap upgrades to installed 3400- and 3500-class machines later in 1993. How well NCR manages the transition to Pentium from today's 486-class processors will say a lot about the partnership between semiconductor volume-giant Intel and added-value-supplier NCR.

NCR has won and delivered several over-$10M orders from world-class customers who demanded breadth of product line, rock-solid commercial robustness from Unix, excellent price-performance, strong internetworking and network management capabilities, and the willingness to integrate complex multi-vendor technology. Aberdeen believes NCR is one of a handful of computer suppliers who can provide worldwide integration and support services for sophisticated mission-critical distributed applications.

The challenge is that NCR itself must truly believe in the System 3000 servers, champion them at high levels in new customer accounts, and be more aggressive in telling its story. In particular, the U.S. market will not come to NCR, and today's savvy IS executives have no time for lukewarm sales pitches.

NCR's open cooperative "new way of computing" is more than just a slogan. The company is now delivering its midrange System 3000 multiuser servers in volume -- as well as the significant added-value in commercial processing robustness and data integrity, networking, and services which differentiate a mere platform supplier from a potential long-term IS and business partner. Thus, Aberdeen believes NCR has the opportunity to have a very good year in 1993.

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