



Aberdeen Group

Strategy Profile

Dell Computer Corporation

**One Dell Way
Round Rock, TX 78682
(800) 999-3355
www.dell.com**

Dell Focuses Its Linux Efforts Where Customers See the Most Value

Preface

In early 2000, most Information Technology (IT) managers were just becoming knowledgeable about Linux. By the second half of 2000, many enterprises began using Linux platforms as Web servers, firewall servers, file and print servers, and mail servers for less-critical edge applications. During 2001, Linux grew tremendously in popularity and functionality, and IT managers chose Linux as a lower-cost alternative to Windows and Unix for an increasing number of applications, including some commercial transaction processing applications. Aberdeen predicts that 2002 - 2003 will be crossover years for Linux — it will become established in the enterprise as a serious operating system for running mission-critical applications such as database applications and move into other mission critical ones such as SAP.

The downturn in the U.S. and worldwide economies in 2001 caused IT managers to reconsider investment choices in applications and server platforms. It is Aberdeen's perspective that IT organizations will choose Linux even more frequently in 2002 because of its cost effectiveness, ability to run on a variety of hardware platforms, and capability to support critical enterprise applications. For the past two years, Linux has grown at an industry-leading rate of about 25% per year. In 2002, Aberdeen expects Linux to grow about 35%. It will become increasingly important for IT managers to partner with the right systems vendor to maximize their investments. Dell is well positioned as a Linux vendor of choice for these customers based on a variety of factors.

Executive Overview

In this *Strategy Profile*, Aberdeen looks at Dell's Linux strategy, which is to be the "practical advocate of real Linux solutions" for its customers. Since 1998, well ahead of many in the industry, Dell has been supporting Linux deployment and now has a focused approach with packaged offerings to simplify and speed implementation. In 2001 Dell's efforts made it number one in the U.S. and number two worldwide in sales of Linux-based client

and server systems. This success is a result of a company that has developed a Linux strategy based on how customers are implementing Linux in the enterprise. Simply put, Linux is Dell's Unix strategy. Linux allows Dell to compete with HP, IBM, and Sun in the Unix market space.

One thing that Dell does as well, if not better than any other systems supplier, is to target market areas where there is customer need and then focus on filling that need. Dell is approaching Linux in the same manner. With its Linux strategy, Dell is fulfilling customer demand for Linux in four key areas:

1. Unix-to-Linux enterprise market — Unix/RISC migration to Red Hat Linux/Dell, Oracle 9i Real Application Clusters (RAC) with plans to expand to Oracle's next-generation database technologies.
2. Volume market — Web servers, firewall servers, file and print servers, etc.
3. High performance compute (HPC) clusters.
4. Systems management solutions for Linux.

Dell's partnerships with Red Hat and Oracle are keys to its current success in the enterprise — Oracle 9i for Linux was built on Dell PowerEdge servers, and Dell will be one of the first, if not the first, suppliers to offer customer deployment of Oracle 9i RAC on Red Hat Linux Advanced Server. The company has built strong three-way technical and sales/marketing relationships with Oracle and Red Hat. A Dell focus is to go after the Oracle on Unix market with Oracle on Red Hat Linux running on Dell PowerEdge servers — an area where Dell has received strong positive customer feedback. This collaboration has led to significant price/performance advantages for Dell.

The HPC cluster (HPC) market segment has become a bonanza for companies that sell Linux-based compute clusters. Aberdeen has predicted that within two to three years Linux will dominate about 80% of the HPC market. Dell is developing and delivering large cluster configurations (more than 256 nodes/two processors per node) to the enterprise and to users involved in oil/gas exploration, biotechnology, etc. In addition, the company is targeting divisional and departmental users with clusters of 64 – 256 nodes and solutions consisting of fewer than 64 nodes, by providing packaged offerings. Dell also has a technology partnership with Cray to meet customer demand in the high-end clustering market.

Dell is not just selling Linux-based server hardware. The company is developing software to reduce system administration costs of its Linux systems. To this end, it is involved in developing systems management tools, e.g., Dell OpenManage for Linux, and working with prominent industry partners. Dell provides open mailing lists for customer questions and gives direct access to its development team. Dell has assumed a leadership position in lowering customer total cost of ownership (TCO) by making Linux integration and migration seamless through its OpenManage software. Oracle is also building system management hooks into its Oracle Enterprise Manager for its databases based on OpenManage.

Dell is working closely with the open source community and, as a sponsor of the Open Source Development Lab (OSDL), routinely makes equipment available to this organization. Dell also supports the Free Standards Group's specification and implementation of Linux Standard Base (LSB) 1.1 and the Linux Internationalization Standard (Li18nux). Red Hat Linux on Dell servers will be LSB-compliant.

Dell offers an extensive set of Linux services tailored for a customer's specific requirements, from per-incident support to fully customized 7x24 support and consulting. Dell provides information on its Linux activities at www.dell.com/linux.

Linux Market Trends

Linux is following the path that Unix took when it moved from a little known operating system in the 1980s to become today's largest revenue generator among server platforms. But the big historical difference between Linux and Unix is that Linux is maturing at a much faster rate than Unix did, and it is being developed to run primarily on industry-standard Intel hardware.

This gives Linux the industry-wide development focus that Unix never had. Aberdeen expects Linux to scale to 8-way and 16-way in 2002 and 2003 respectively, with benchmarking available. As a result of this rapid development and cost effectiveness, Linux is moving into and replacing proprietary Unix in areas that Unix currently dominates such as scientific and technical computing, carrier grade platforms, database management, and financial applications. For example, in an Oracle database environment customers are seeing significant performance advantages (at a much lower cost) from multiple four-processor Dell servers over RISC-based single node solutions with equivalent numbers of processors.

Today, Linux volume is in infrastructure and edge devices. HP and Dell own more than 50% of the worldwide volume Linux server market. IBM trails in third place even though it is spending large sums of money to boost its Linux position. One reason that HP and Dell have been more successful selling Linux servers than IBM is because they have more highly developed Intel platform efforts. Dell in particular can focus all of its development efforts into the standards-based market and reap the corresponding benefits.

Dell's Linux Strategy

Dell's overarching enterprise strategy is to accelerate the adoption of relevant industry standards, reduce costs and solution complexities for customers, and get solutions into the hands of the customer as quickly as possible. Enterprises are increasingly moving from proprietary technology to standards-based technology, such as servers, because it is generally less expensive and offers them greater flexibility in their IT infrastructures. Linux fits especially well within this strategy as a key enabling technology.

Dell's overall Linux strategy focuses on:

- The database and financial markets – Oracle and SAP;

- Promoting the Unix-to-Linux enterprise market (Unix replacement);
- Continuing growth in the infrastructure volume market — appliance servers;
- Developing Linux systems management tools;
- Partnering with leading Linux suppliers and important ISVs;
- Continuing its work in the open source community;
- Reducing costs for customers;
- Reducing complexity and risk for customers; and
- Developing a Linux distribution strategy.

The sections below describe Dell's Linux strategy in more detail.

The Unix-to-Linux Enterprise Market

One of the main thrusts of Dell's Unix-to-Linux enterprise strategy involves Unix/RISC to Red Hat Linux/Dell migration. This strategy is a good one since Linux is following in the footsteps of Unix as it makes its way into the enterprise. Many IT managers want to move from proprietary Unix software and hardware solutions to industry-standard hardware running Linux. This Unix replacement trend continues to gain momentum, and Dell has devised an effective strategy to satisfy this demand.

Two examples of Dell's migration strategy at work include migrating Unix-based Internet service providers (ISPs) to Dell Web servers running Red Hat Linux, and migrating Unix/RISC-based application servers to Dell PowerEdge servers running Red Hat Linux. Why would enterprises want to do this? Dell's low-cost Intel-based servers offer potential price/performance advantages over proprietary Unix/RISC servers. In addition, many Unix-based applications can be easily ported to Linux.

Oracle Relational Databases and Applications

Another important part of Dell's Unix-to-Linux enterprise thrust is its Oracle-based market strategy. In several ways Dell is a great partner for Oracle:

- Oracle has made a strategic commitment to developing for the Intel platform and Dell is the Intel server market leader;
- Oracle views Linux as an easier evolution away from Unix than Windows and Dell is focusing on Linux and not Unix;
- Dell has no channel conflicts with Oracle since it sells direct; and
- Oracle and Dell are both expanding their professional service capabilities, and they are not currently competing for this business.

Dell's strategy addresses the largest and most logical opportunities for moving users from Unix to Red Hat Linux on Dell such as:

- Providing products and services to migrate the large installed base of customers from Solaris on UltraSPARC systems to Oracle/Linux on Intel systems;
- Seeking opportunities where the switch to Oracle/Red Hat Linux/Dell is the least disruptive to the customer's business; and
- Focusing on enterprises that have attempted to implement database solutions on Unix via ISVs and have failed.

The Dell/Oracle roadmap schedules Oracle 9i RAC to be available on Red Hat Linux Advanced Server/Dell in the third quarter of 2002.

An example of Dell's success with Oracle 9i is the Federal Aviation Air (FAA) Traffic Control System Command Center in Herndon, Virginia — the FAA center that manages air traffic control throughout the country. The FAA decided to handle its vital operational data using a system that features Dell back-end servers and workstations and an Oracle 9i RAC certified configuration for Dell, all running on Red Hat Linux.

FAA selects Oracle 9i RAC on Dell to manage its countrywide critical air traffic control data.

Dell's work with SAP also underscores its commitment to Linux in the enterprise. For example, SAP uses dedicated Dell technical and engineering resources as part of the SAP Linux Lab development team at its headquarters in Waldorf, Germany. This Dell engagement ensures that the entire Linux solution stack is optimized and expanded for Intel-based platforms— including pioneer work with SAP and Red Hat Linux on Intel's Itanium micro-processor architecture. Several large global companies, small-to-medium businesses, and public customers are now productive on SAP and Red Hat Linux on Dell. Giving the customer optimal application choice means that Dell will continue to work to help make all SAP functionality currently available on proprietary Unix operating systems and/or Windows platforms available on Linux in a timely manner.

Enterprise High-Performance Computing

Another thrust of Dell's enterprise Linux strategy is in the HPC cluster (or compute cluster) market segment. Aberdeen has predicted that Linux will dominate about 80% of this market within two – three years¹. Compute clusters are built from commodity hardware and a combination of open source and proprietary software. This market segment is becoming a bonanza for Linux. Aberdeen's research indicates Linux-based compute clusters can provide price/performance advantages of 5x to 20x over Unix/RISC and other large proprietary platforms such as the IBM SP2.

There are three specific performance-related HPC market segments in which Dell offers solutions (each compute node contains two processors):

- Large capacity and enterprise market — more than 256 nodes per system;

¹ <http://www.aberdeen.com/ab%5Fabstracts/2001/11/11010007.htm>

- Divisional and departmental clusters — between 64 and 256 nodes per system; and
- Small capacity and trial clusters market segment — 32 nodes or less.

Based on Aberdeen research, the size of the HPC market is in the \$7B - \$7.5B range, with the divisional and departmental clusters market segment accounting for about 70% of the total HPC market size. In the large capacity and enterprise market segment, Dell works with customers to provide specialized configurations, project management, application benchmarks, and porting assistance. This customer set includes firms involved in oil/gas exploration, biotechnology and large research organizations such as universities.

The Dell HPC cluster program provides at least eight pre-packaged configurations for the 8 – 128 node offerings along with OpenManage system management tools and integration testing with Red Hat Linux pre-installed. To simplify the customer’s use of a newly arrived cluster configuration, Dell assists with performance tuning, provides best practices guidelines, and offers third-party software tools that include message passing interface (MPI) libraries, and mathematics libraries.

Dell is very focused on the HPC market, not only by providing various services to assist customers in moving to Red Hat Linux/Dell, but also in developing partnerships with companies like Cray who have pioneered the HPC segment. Dell and Cray have two original equipment manufacturer (OEM) deals in place — the first is for Dell to sell hardware to Cray (Cray is marketing its SuperCluster product on Linux and commodity hardware), and the second is for Cray to OEM its software and services to Dell. The software relationship is significant for Dell because Cray has been a leader in developing workload management, checkpoint/restart, performance analysis tools, and other software necessary for running HPC applications.

In the higher education market, Swinburne University in Victoria Australia is using high-performance clusters based on Dell PowerEdge servers and Linux to map new territories in space. The University’s clusters are being used to process data from the Parkes Radio Telescope in search of ultra-fast pulsars (a pulsar is a small spinning star). Swinburne is investigating the equation of state of nuclear matter and testing the General Theory of Relativity in new ways. It is also transforming data from the Mars Orbital Laser Altimeter into animations of Mars’ surface for use in educational films.

Swinburne University uses Dell high performance clusters to process telescope data.

Companie Generale de Geophysique (CGG) is in the process of further expanding its capacity for high-performance computing at its Foxboro Center, United Kingdom facilities. The expansion is being driven by oil and gas companies’ increasing demand for CGG’s unique proprietary applications for seismic data processing. As a leading supplier of services and products to the worldwide oil and gas industry, CGG is deploying 512

CGG is using Dell-based clusters running Red Hat Linux to reduce costs for processing seismic data for oil and gas exploration.

clustered PowerEdge servers running Red Hat Linux in the United Kingdom to process data in finding new oil fields around the world.

The Infrastructure Volume Market

Today, Dell's strong position in Linux server revenue is built around the volume market. This market consists of low-end (1-, 2-, and 4-way) servers used for Web hosting, Apache Web servers, firewall servers, file and print servers, appliances, etc. Red Hat is Dell's primary partner in the volume Linux market, although Dell will work with other distributions depending on customer requests and market demand. Dell and Red Hat work closely together on Linux certification, customer support, and training. Dell's recently announced blade server products, featuring up to six two-way servers in a 3U space, is squarely aimed at achieving leading price-performance in rack-dense Linux-based servers.

System Management Tools — OpenManage

To support its Linux platforms, Dell has developed life-cycle management tools. These tools are directed at improving the availability and productivity of Linux-based systems and shortening downtime, reducing the time required to diagnose problems, and lowering TCO.

Dell's OpenManage offering helps reduce the number of "people" involved in day-to-day systems management. A systems administrator typically has loaded "costs" of between \$125,000 and \$250,000 per year depending on geographical location. Even with an emphasis on server consolidation in the enterprise, the number of servers in data centers is on the increase. Dell's OpenManage software helps customers reduce management costs.

OpenManage is usable with any Dell PowerEdge server including the recently announced PowerEdge 1655MC blade server enclosure. OpenManage supports Red Hat Linux, Windows, and Novell Netware environments through a Web browser or via a command line interface. OpenManage, via its remote deployment capabilities, provides the following capabilities:

- Remote deployment and migration;
- Proactive warnings of potentially critical failures;
- Asset and inventory management; and
- Remote access and control of systems.

The remote deployment capabilities of OpenManage will be available on Dell PowerEdge servers in August 2002.

Solution Partnerships and Community Involvement

In addition to its development and marketing programs with Oracle and Red Hat, Dell regularly forms alliances to provide customer-specific solutions. Examples include SteelEye and Veritas, where Dell tests and certifies products on its hardware and custom integrates it for customers. As Red Hat delivers its Advanced Server offering on Dell hardware platforms later this year, Dell will expand its application support to other ISVs that enhance Dell's Linux-based solutions.

Dell is working with the open source community in a number of different ways:

- Dell requires all independent hardware vendor (IHV) suppliers to provide open source device drivers.
- Dell is a sponsor of the open source development lab (OSDL) and regularly donates equipment.
- Dell supports the Free Standards Group Workgroups such as the Linux Standard Base 1.1 (LSB 1.1) Workgroup — Dell and Red Hat will be LSB-compliant. Aberdeen's web site ² presents a concise description of the LSB 1.1 certification process.

Services

Dell offers an extensive set of support, deployment, and professional services for Linux. The support services can be tailored for a customer's specific requirements, from per incident support to fully customized packages providing 7 x 24 support and Linux consulting. The customized support packages provide a dedicated support queue of Linux technical experts to resolve Linux server issues to reduce downtime. Customers can also choose additional options that may include onsite engineers, onsite troubleshooting, onsite spare parts, remote monitoring, and change management services. Dell offers support for Linux servers as part of its Gold & Platinum support offerings which include features such as shared or dedicated Technical Account Managers and support via a specialized Gold queue staffed with level two support analysts who provide "engineer-to-engineer"-level support. Dell's Gold & Platinum support services can be further tailored to provide customized support for Dell Linux server solutions.

In addition to its worldwide support services, Dell has developed professional services to help customers deploy and integrate Linux solutions into their corporate environments. These include services for high performance computing where Dell has seen growing demands in the scientific computing marketplace for deployment of large Linux-based clusters. Due to the growing interest in reducing operations costs among industry professionals and the ever-increasing price/performance advantages of Linux over proprietary Unix, Dell is providing services for Unix-to-Linux migrations, including application porting and a variety of high-availability services.

Dell is also making available design, deployment, and consolidation services inline with its strategic thrust of Oracle on Linux, especially with the availability of Oracle 9i RAC and the increasing customer adoption of Linux for mainstream applications. Dell also provides deployment services to simplify and accelerate the installation of Linux on Dell servers with its custom factory installation options. The combination of deployment, support, and tech-

² <http://www.aberdeen.com/ab%5abstracts/2002/03/03020007.htm>

nology consulting services enables Dell to provide a suite of services to reduce even further the already low cost of adopting Linux.

Aberdeen Conclusions

IT managers are striving more than ever to keep hardware and software costs at an affordable level while at the same time addressing increased demands on their infrastructures. This cost consciousness while planning for increases in enterprise infrastructure use provides an opportunity for Dell. IT managers who choose Linux on Dell's industry standard servers have an opportunity to significantly enhance their overall Return on Investment (ROI).

It is Aberdeen's perspective that Dell has a very good Linux value proposition for customers. Dell, already the number one supplier of Linux systems in the United States and number two worldwide, is delivering real solutions on Linux today — Oracle/Red Hat Linux, HPC, and solutions for infrastructure computing. Dell has its Linux engineering and development organizations focused on simplifying the deployment of Linux systems — systems management solutions like OpenManage, integration and testing of compute cluster configurations for HPC customers, and certification of Oracle 9i on Dell. Dell is serious about enterprise computing with Linux and has made the investments and partnerships to support customers as they migrate from Unix or deploy new Linux applications.

Dell will face strong competition from other enterprise suppliers in carrying out its Unix-to-Linux migration strategy. However, Dell has identified markets where there are clear customer needs and nobody does a better job focusing on and implementing strategy than Dell.

To provide us with your feedback on this research, please go to www.aberdeen.com/feedback.

*Aberdeen Group, Inc.
One Boston Place
Boston, Massachusetts
02108
USA*

*Telephone: 617 723 7890
Fax: 617 723 7897
www.aberdeen.com*

*© 2002 Aberdeen Group, Inc.
All rights reserved
June 2002*

Aberdeen Group is a computer and communications research and consulting organization closely monitoring enterprise-user needs, technological changes and market developments.

Based on a comprehensive analytical framework, Aberdeen provides fresh insights into the future of computing and networking and the implications for users and the industry.

Aberdeen Group performs specific projects for a select group of domestic and international clients requiring strategic and tactical advice and hard answers on how to manage computer and communications technology.

Abstract

Profile Title: Dell Focused Its Linux Efforts Where Customers See the Most Value

Dell Computer Corporation

Title

June 2002

This Aberdeen Profile examines Dell's Linux strategy in detail. Dell is second to none in targeting customers needs and then focusing on that need. As a result, Dell's Linux strategy focuses on how customers are implementing Linux in the enterprise. Dell's Linux strategy focuses on the Unix-to-Linux enterprise market, in particular, the migration of Unix/RISC to Red Hat Linux/Dell and Oracle 9I RAC on Dell, the volume market, high performance computing market, and the systems management solutions market for Linux.

Bill Claybrook

Keywords: Linux, Red Hat, Oracle, Unix-to-Linux migration

Coverage Area: Linux, Open Source Software, and Unix

To provide us with your feedback on this research, please go to www.aberdeen.com/feedback.

*Aberdeen Group, Inc.
One Boston Place
Boston, Massachusetts
02108
USA*

*Telephone: 617 723 7890
Fax: 617 723 7897
www.aberdeen.com*

*© 2002 Aberdeen Group, Inc.
All rights reserved
June 2002*

Aberdeen Group is a computer and communications research and consulting organization closely monitoring enterprise-user needs, technological changes and market developments.

Based on a comprehensive analytical framework, Aberdeen provides fresh insights into the future of computing and networking and the implications for users and the industry.

Aberdeen Group performs specific projects for a select group of domestic and international clients requiring strategic and tactical advice and hard answers on how to manage computer and communications technology.