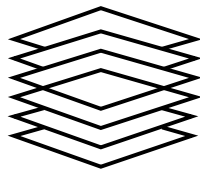


# *Dell Linux Strategies and Solutions 2003*

*July 2003*



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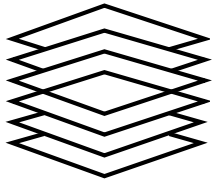
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# TABLE OF CONTENTS

- EXECUTIVE SUMMARY ..... 1
  - Figure 1: Linux Vision ..... 3
- INDUSTRY RELATIONSHIPS ..... 4
  - DELL AND THE LINUX COMMUNITY..... 5
- LINUX OFFERINGS ..... 6
  - HARDWARE PRODUCTS..... 6
    - Custom Factory Integration (CFI)* ..... 6
  - SERVICES AND SUPPORT ..... 7
- VALUE ADDED ..... 9
- APPLICATIONS FOCUS..... 9
- FUTURE ACTIVITY ..... 10



# *Dell Linux Strategies and Solutions 2003*

## EXECUTIVE SUMMARY

When Dell embraced Linux, it signaled the market that customer demand was evident. While Dell employs its fair share of engineers and technologists, its focus remains customer requirements rather than technologies. Dell delivers significant cost advantages, competing very effectively on both up front cost and TCO. Offering Windows and Linux across its Intel-based product line gave Dell an effective way to compete with both its direct Wintel competitors as well as the UNIX community. Stated simply, Linux is Dell's UNIX.

In effect, Dell operates as an Intel systems hardware supplier with an emphasis on speed in response to focused customer requirements. A customer-satisfaction machine that exploits standards to deliver pragmatic customer solutions, Dell's highly-focused approach to Linux extends that pragmatic and opportunistic strategy. Pragmatic in that Dell is responding to real customer demand, opportunistic in that Dell has put itself in position to actively respond to Linux demand without having to actually create that demand. Responding both to SMB and enterprise customer interest, this approach addresses the substantial Linux value proposition of IA-32 cost advantages over more expensive RISC UNIX systems. Dell positions Linux as the low cost alternative to "proprietary" UNIX. Linux enables Dell to take its business model to the UNIX environment. The close affinity between Linux and Solaris (and UNIX in general), allows Dell to target Sun and to compete with HP and IBM. In addition, Dell wants to change the enterprise focus from *scale up*, traditionally led by "big iron" providers, to *scale out*, where it has an opportunity to compete by means of industry-standard clusters.

Dell's customer focus and business model are ripe for the picking for businesses based on Unix solutions. By taking advantage of Dell's industry standard products, customers who used to purchase RISC/UNIX systems now have a new opportunity - the flexibility advantage to

- Change and reprioritize your business as market demand dictates
- Expand for growth and new technology
- Provide increased responsiveness & service to your customers
- Focus internal resources on higher value tasks

Smaller, clustered servers, (scale-out), offer proprietary/scale-up customers greater flexibility to react to changing demands.

The initial focus was the high-volume Linux client and server markets. In 2002, Dell started focusing on the enterprise. In 2003, Dell is moving up the value

chain, targeting enterprise applications using Linux as an alternative platform to UNIX for database rack servers. Dell's overarching focus remains UNIX-to-Linux migration. While Dell retains edge-of-network servers in its overall product portfolio, it is adding UNIX (mostly Sun Solaris) migration to Linux using Dell's ISV relationships (Oracle and SAP), and Linux clusters for the HPCC opportunity. Further, Dell targets migration enterprise custom solutions that began on RISC/UNIX. Dell has built specialized services in server consolidation, distributed applications, and HPCC to support this Linux thrust. Dell is creating TCO and ROI analysis tools to justify and promote this UNIX-to-Linux migration effort and to support the other key parts of its strategy.

Red Hat remains the primary Linux distribution for certifying its hardware. There is a strong partnership between the two companies that stretches beyond hardware into professional services. Dell recommends Red Hat "professional" for appliances and edge-of-network servers and Red Hat Linux Enterprise Edition for enterprise applications. At this time, Dell Europe does not certify its clients or servers on UnitedLinux or SuSE, but is actively working on certification. Dell has also built ISV relationships with BEA, BMC, Oracle (9i, 11i), SAP (Linux certified), and VERITAS. With a special concentration on Oracle 9i rack servers, its goal is to drive its participation in enterprise Linux engagements. Positioning itself as the primary point of contact for service for Linux, all the software is installed on its servers. Dell provides level 1, level 2, and advanced software support. Dell also manages level 3 escalations and owns the resolutions when the customer signs a support agreement through Dell. Dell manages the interaction with Red Hat and the other software providers on the customer's behalf. Dell offers Linux services from per-incident support to fully customized support packages providing 24x7 support and Linux Consulting Services from Dell Professional Services. Dell Professional Services also resells Red Hat Professional Service as part of its Linux offerings.

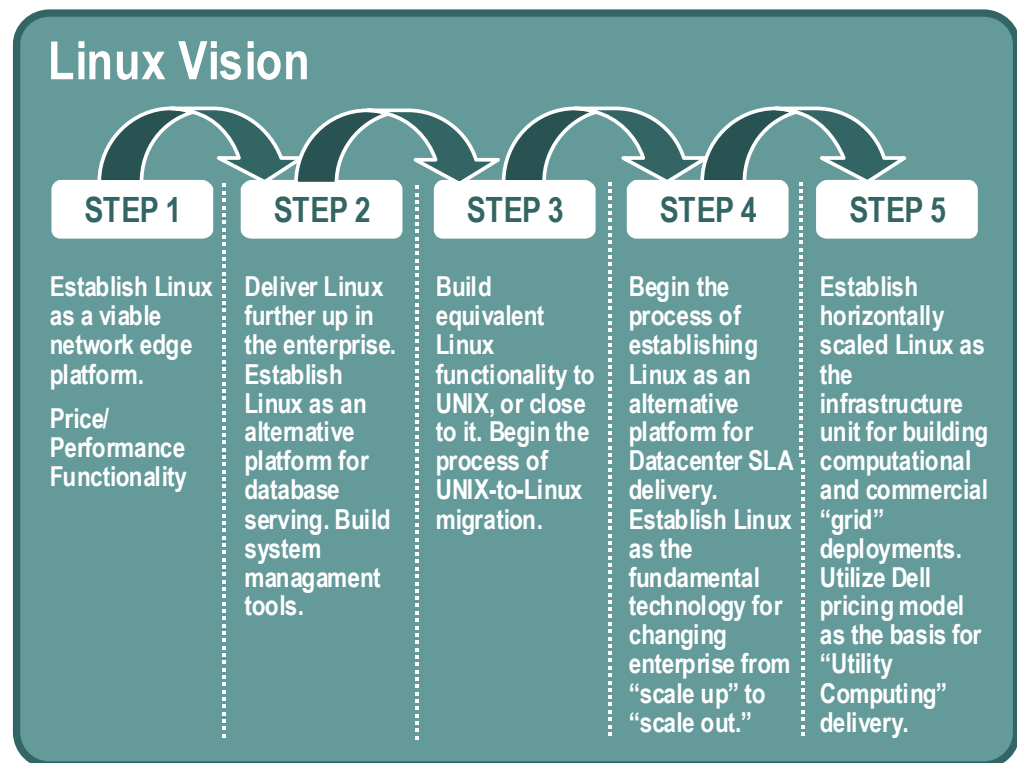
Dell will preload Linux to meet customer requirements. Dell uses this approach as part of its customer responsiveness and to communicate the "Dell model." The enabled systems comprise the Precision workstations and PowerEdge servers, with custom availability on its notebook and desktop systems. Dell also offers Linux server appliances for file/print, directory, networking services, and web servers. The strategy centers on the IA-32 architecture for its Linux-based systems. Dell also recently introduced an Itanium 2-based server.

Dell's strategy positions it well to be the high volume, commodity Linux server leader. A price leader for one-way and two-way commodity servers in a market where cost is critical, the company recognizes that the customer is prepared to use existing well-defined open source solutions, such as SAMBA, to build Linux solutions. By beginning to target the enterprise Linux opportunity, Dell takes a visible position with its Oracle relationship. Oracle stands out as the primary mechanism for Dell to enter the higher value enterprise market. Enterprise customers may require additional capability and support to entrust their mainline production systems to a commodity provider. These customers often look beyond the hardware provided to a full development and production solution

environment. The challenge for Dell is to communicate both its relationships with the ISV community and its services capability. Dell does not have to create a software infrastructure itself to be a viable provider and partner for enterprises, but it must communicate its understanding of the issues and that it has offerings available from leaders in the industry to support enterprise Linux exploitation. Dell uses Linux internally in its manufacturing operations and to manage the installation of customers' system images. Dell claims that the combination of deploying Linux and Dell PowerVault storage worldwide saves several million dollars per factory per year. That experience proves the need to share with its enterprise customers.

By leveraging its brand, the company is well positioned in its worldwide Linux market share. Its focus on speed to customer requirements and the entire customer experience, from purchase through deployment, yields significant customer satisfaction. Dell's Customer Factory Integration process delivers significant value to customers with large and diverse deployments. Dell views itself as a hardware supplier and does not maintain its own software stack. However, the situation provides an advantage in that Dell can form deep relationships with leading ISVs. Dell offers them a high-volume industry-standard market with no fear of competition. Dell is well positioned to profit from Linux. With a broader enterprise thrust and a larger solutions portfolio, Dell can expand its Linux position substantially. The following figure describes Dell's vision to provide Linux solutions:

**FIGURE 1:**  
Linux Vision



## INDUSTRY RELATIONSHIPS

Dell's partnership activity is targeted at "close to the box" enterprise infrastructure. As a pragmatic Linux supplier, Dell is most interested in meeting immediate and near term customer requirements.

Given Red Hat's dominance in the U.S. market on IA-32 servers, Dell experiences no disadvantage in not developing strong relationships with other Linux distributions. Dell has established a relationship with SuSE in Germany for the European market and with Red Flag in Asia. These are opportunistic relationships driven by customer demand or geographic market entry requirements. Dell believes its close partnership with Red Hat in the One Source Alliance provides a time-to-market advantage in offering the latest versions of Red Hat Linux. Dell uses Red Hat Linux in its manufacturing operations. That real time usage likely yields value in helping Dell meet its commitment to deliver an integrated and assured operating system and hardware combination.

The One Source Alliance, along with Dell's Oracle relationship, provides the following benefits:

- Collaborative development of products between Dell and Red Hat, and between Dell and Oracle
- Co-development and delivery of Red Hat-certified enterprise-ready global-service offerings and solutions
- Co-development of tools and test suites for open source
- Promoting the adoption of Linux
- Offering services and solutions – Dell resells Red Hat services and exploits Red Hat technical support
- Driving future technology innovations to support Internet infrastructure needs
- Working jointly on Oracle deployments
- Supporting Dell partners and ISVs to work more effectively with the open source community

By building partnerships with the software community, Dell is mounting a strong Linux middleware and infrastructure portfolio. These events reveal the shift in Dell's focus from Linux in the infrastructure to Linux in the enterprise – both large enterprises and SMB. Dell is also partnering with Cray and others to deliver a more robust HPCC solution that can address grid and high performance opportunities in many industries. Dell highlights bioinformatics and energy systems and has installed large clusters in universities, energy companies, and biotech. Dell's partners in this space include Fluent, Platform, and TurboWorx.

Finally, as a very large volume system supplier, Dell oversees significant relationships with the IHV community to provide drivers and other software to support their unique hardware components. By working with them to ship their software in an open source model, Dell benefits. This makes it easier to support

their systems using Linux and it stands to the IHVs benefit because it makes it easier to support their components across the broad range of Linux-enabled equipment.

## **DELL AND THE LINUX COMMUNITY**

A participant or board member on most of the open source community's organizations, Dell stands as a frequent promoter of Linux in its target market. The purpose of Dell's efforts is to drive standards that meet customer requirements. Linux and open source have enabled Dell to attack the UNIX market with its low cost, high customer focus model. Dell's Linux community participation includes,

- Sponsor of the Open Source Development Lab (OSDL), whose mission is to provide open source developers with computing resources to build datacenter and Telco class enhancements into Linux and its open source software stack.
- Member of the Free Standards Group for the Linux Standards Base, a joint contributor to LSB 1.1 and a reviewer of Li18N.
- Member of the Open Cluster Group, an informal consortium of commercial and research organizations involved with cluster computing.
- Provides equipment to the Open Source Cluster Application Resources (OSCAR) and promotes OSCAR at trade shows. Does joint testing to ensure clustering remains competitive on Dell systems.
- Participates at an engineering level in the open source community on projects such as the Linux kernel port to the Intel IA-64 architecture and on open source device drivers.
- Offers open source SSL off-load card and all versions of Dell Remote Access Card support.
- Provided its Linux platform management code and interfaces to open source to facilitate system management software development in the community.
- Maintains public mailing lists to promote community involvement between Linux users of Dell servers. Customers are encouraged to sign up and participate in any lists they find interesting.
- Supports the Linux-Dell-Laptops group at Yahoo! – community-based support for running Linux on Dell Inspiron and Latitude notebook products.

A leading vendor driving Linux adoption and support by IHVs, Dell provides the volume and commands the relationships with these companies through its Windows-based business, now extended to Linux. Dell facilitates open technical discussions with multiple parties including orchestrating n-way NDAs. Dell also leads the active development of drivers with participation from Red Hat and the IHVs, which extends to getting Linux support “in the box.” All IHV suppliers are required to provide open source device drivers. All of Dell's factory installation is open source as well.



## **LINUX OFFERINGS**

Linux is available on Dell servers, workstations, and selected client offerings. Selecting, configuring, and ordering Intel-Linux servers on Dell's website is quick and largely error resistant for rack-mounted, desk/floor models, and blades. Dell supports Linux-on-Intel systems in large clusters of up to 1,000 nodes. In addition, Dell has built its appliances on a Linux base. Its products are primarily hardware and operating systems. In addition, Dell has begun to offer certified enterprise solutions such as Oracle 9i. As Dell continues to target the enterprise with Linux, it will continue to build its "close to the box" solution portfolio. Dell also offers Linux design, migration, hosting, high-availability, and solution-development services. This is especially important for corporate accounts that do their own software development. Given Dell's aggressive price leadership and the attractiveness of the Linux value proposition, Dell's offerings remain very competitive.

## **HARDWARE PRODUCTS**

The currently developing standards-based modular servers appear ideal for Linux-based applications. Dell recently launched a blade server offering that includes a 3U modular system that packages the performance of six servers in the space of one. This format simplifies and helps lower the costs of enterprise computing. Comprised of high-performance server blades designed by Dell, the PowerEdge 1655MC accommodates up to six servers with two Intel Pentium III processors in a single enclosure. This design – the first in Dell's modular server line – offers increased density and simplified server management that targets server consolidation, thin client computing, and high-performance clustering.

The new line of Linux appliance servers is multi-functional, built on an open configuration, targeting specific application areas – web serving, mail serving, load balancing, caching, etc.

Dell's Precision workstations address the current Linux client market with factory installation of Linux on platforms targeted at power users. Dell's Custom Factory Integration offers factory installation of a customer's image on business desktops and notebooks. Further, Dell provides a one-stop shopping experience for retail versions of popular distributions and other Linux titles.

### **CUSTOM FACTORY INTEGRATION (CFI)**

Dell's Custom Factory Integration service provides a range of custom-built, factory-installed solutions. After determining user needs, Dell performs the custom configuration during the initial system build, a "one-touch," custom integration. This approach avoids the typical customer-built scenario in which systems are twice built and twice shipped via the channel. These services are provided as part of CFI:

- *Hardware Integration:* Custom hardware configurations are preserved for repeat orders and are maintained for integrity of hardware and software upgrades. Higher levels of standardization may simplify deployment and management.
- *Software Integration:* Enterprise Custom Factory Integration provides custom configuration and installation of software (standard, custom, or proprietary), in the factory environment. With Enterprise Custom Factory Integration, each customer can control its server deployments to ensure that every system operates with the same version of the software, without any variations due to old versions of the same application. CFI software integration services include,
  - *Scripted Operating System Integration.* Maintains users' custom software images across orders as desired.
  - *Custom Application Solutions* including DBMS (Database Management Service), ERP (SAP), disaster recovery and backup, and proprietary and third-party application installs.
- *Asset Data Services:* Asset tagging and labeling. Application of standard or custom asset tags for systems and monitors, and labels for packing boxes. Information gathered and reported on asset tags can include customer name, service tag, purchase order number, order number, order date, model number, shipping address, system component data, and/or customer-supplied information.
- *Parts Replacement Program:* If anything goes wrong with a CFI system, one call to one vendor to get the replacement parts required. A replacement of the original hard drive image can also be obtained.
- *Preconfigured "Rack 'n Stack" Option:* The ability to load operating environment (e.g., Linux), configuration, cable and rack servers into Dell racks and ship directly to customers (U.S. only). Targets HPCC in education and/or in large metropolitan areas with limited dock capabilities.

## SERVICES AND SUPPORT

The Dell/Red Hat partnership provides support for Linux-on-Dell platforms. Dell now provides full end-to-end Linux support without a "warm transfer" to Red Hat. While Red Hat provides substantial advanced level and back-end level 3 support in its technical support structure, Dell remains the customer interface. The level of service can be ordered through Dell as part of the server purchase and includes per-incident support as well as an annual fee-based contract. Dell delivers the same support levels for Linux as it does for Windows and Netware. Linux support is integrated into its Premier Enterprise Support Gold and Platinum Agreements, which include reactive and proactive support as well as entry-level planning services. Dell's Linux Premier Enterprise Support includes four levels positioned as:

- *Platinum* for mission-critical environments. This includes High Availability Option Services, the broadest customized support (training, call priority, account team, etc.), proactive support (includes change management), and

rapid resolution services (two-hour response/six-hour repair, Enterprise Expert Center Direct).

- *Gold* for production servers. The Gold level includes customized support, proactive support (less change management), and rapid resolution services (four-hour response). This also includes Technical Account Management and Advanced Software Resolutions plus direct access to Enterprise Expert Center technicians.
- *Silver* for development servers. Includes rapid resolution services offered in resolution packs.
- *Bronze* for testing and file/print servers. Resolution services with response and software support options.
- *Directline Plus* – incident-based fee support for advanced software resolutions available in one to thirty incident packs. Full support for Red Hat Linux by Dell's top support technicians.

Linuxcare also provides support for older Dell Linux-based systems. All Linuxcare-supported configurations come with Linuxcare 90-day installation support.

Dell also offers its own Dell Professional Services and resells Red Hat Services. Among Dell's professional services for Linux are,

- Application development and integration
- Enterprise migration and consolidation
  - UNIX migration
  - Fast track to Linux
- Infrastructure consolidation
- High performance and high availability
  - Linux HPCC design and deployment
- Customer training and certification services
- Oracle 9i and 9i RAC migration, implementation, and optimization

Included in the above are a set of modular service packages to speed Linux installation. These are well-defined services that include specific deliverables, time frames, and expectations. They include,

- Fast Track to Linux for web applications
- Fast Track to Linux for Java
- Fast Track to Linux for Oracle
- Fast Track to Linux for C, C++

Dell supports open mailing lists for customer questions, which includes direct access to the Dell development team. There is voluntary participation from leading Linux developers as well as active participation and support from Dell customers. This open forum includes questions on all Linux distributions.

## VALUE ADDED

Dell's Custom Factory Integration includes worldwide hardware and software configuration and installation, asset data services, and support services. Follow-on ordering may be simplified using stored configurations and images. Further, these services offer standardization benefits that add value downstream in deployment and management cost reduction and simplification. Other value is created with the asset tracking services that simplify a necessary user-driven task.

OpenManage for Linux provides lifecycle management of Dell Enterprise systems and is designed to build on the benefits offered by CFI. OpenManage is not an enterprise-systems management framework like Tivoli. Its focus takes in basic system administration tasks such as:

- *Deployment* – factory, local and remote installation.
- *Operations* – administration, central monitoring and integration (connection management).
- *Serviceability* – remote access, diagnostics, and software updates.

Dell provides its own Linux services including Linux business consulting through its Dell Professional Services group. These include customized engagements, applications solution centers to validate and tune solutions, as well as design validation and Dell Custom Integration for custom-built needs. Dell is collaborating with Red Hat to facilitate the migration of Linux into higher-end systems based on Intel's IA-64 architecture.

## APPLICATIONS FOCUS

In light of Linux's move into the application and solutions space beyond "edge-of-network" infrastructure, Dell has chosen certain solution segments. Dell's Custom Solution Engineering includes Technology Showcase and Custom Solutions. The Technology Showcase offers "show-me, hands-on" opportunities for customers and includes technology briefings, live solution demos, and best-practices white papers targeted to IT professionals considering Linux. Pre-sales support occurs through Custom Solutions – a consulting team working with Dell's Advanced Systems Group.

These solutions are based on:

- UNIX-to-Linux migration
- Oracle (and SAP)
- HPCC
- Custom applications
- EMC

Dell underscores its commitment to SAP solutions on Linux in the enterprise, for example, with dedicated technical and engineering resources as part of the SAP Linux Lab development team at SAP headquarters in Waldorf, Germany. The Dell engagement ensures that the entire Linux solution stack is optimized for the Intel-based platform – including work with SAP and Red Hat Linux on Intel's Itanium processor-based platform. Several large global companies, small-to-medium-sized businesses, and public customers now deploy SAP and Linux on Dell.

## FUTURE ACTIVITY

Dell's strategy entails delivering Linux as an alternative to UNIX, continuing to drive the volume acceptance of Dell Linux offerings, and becoming a primary Linux provider into the enterprise. It also wishes to change the enterprise focus from *scale up* to *scale out* with industry standard clusters. To achieve this plan, Dell is going to continue to build up a "close to the box" software portfolio and additional clustering capability. The following are the areas that Dell will focus on to achieve these objectives:

- High-availability configurations for business continuity using industry standard technology
- Additional cluster management
- Continue its focus on storage management from such partners as EMC and VERITAS
- Additional enterprise software to drive Linux enterprise growth
- Continued focus on server consolidation programs for UNIX
- SMB customers