

EDITORIAL

EDITOR-IN-CHIEF | Eddie Ho

MANAGING EDITOR | Lea Anne Bantsari

CONTRIBUTING EDITORS | Stephanie Dobler, Liza Graffeo,
Cathy Luo, Vicki Van Ausdall

ART

ART DIRECTOR | Mark Mastroianni

DESIGNER | Cynthia Webb

COVER DESIGN | Phu Tran

ONLINE

WEB PRODUCTION MANAGER | Brad Klenzendorf

SUBSCRIPTION SERVICES

SUBSCRIPTION SERVICES | Lisa Ho

Subscriptions are free to qualified readers who complete the subscription card found in each issue. To subscribe or change your address, complete and return the business reply card in this issue to Dell Computer Corporation, c/o Lisa Ho, One Dell Way, RR #5, Box 8503, Round Rock, TX, 78682, USA, or visit us at www.dell.com/powersolutions.

About Dell

Dell Computer Corporation, headquartered in Round Rock, Texas, near Austin, is the world's leading direct computer systems company. Dell is one of the fastest growing among all major computer systems companies worldwide, with approximately 40,000 employees around the globe. Dell uses the direct business model to sell its high-performance computer systems, workstations, and storage products to all types of enterprises. For more information, please visit our Web site at www.dell.com.

ActiveArchive™, Dell™, OpenManage™, OptiPlex™, PowerConnect™, PowerEdge™, PowerVault™—Dell Computer Corporation; Adaptec™—Adaptec, Inc.; Apple™, AppleTalk™—Apple Computer, Inc.; Ateonix™, NASAS™—Ateonix Networks, Inc.; BMC™, PATROL™—BMC Software, Inc.; Broadcom™, NetXtreme™, Smart Load Balancing™—Broadcom Corporation; Brocade™—Brocade Communications Systems, Inc.; Cisco™, EtherChannel™—Cisco Systems, Inc.; EMC™, Navisphere™, PowerPath™, VisualSAN™—EMC Corporation; BIG-IP™—F5 Networks, Inc.; POPnetserver™—First Internet Alliance, Inc.; IBM™, TotalStorage™—International Business Machines Corporation; IEEE™, POSIX™—Institute of Electrical and Electronics Engineers, Inc.; Intel™, Pentium™, Xeon™—Intel Corporation; Iomega™—Iomega Corporation; LEGATO™, Networker™—LEGATO Systems, Inc.; Linux™—Linus Torvalds; LSI Logic™—LSI Logic Corporation; Lucent™—Lucent Technologies, Inc.; Active Directory™, Microsoft™, Visual Basic™, Windows™, Windows NT™—Microsoft Corporation; SmartBits™, SmartMetrics™—Netcom Systems, Inc.; Chariot™, NetIQ™—NetIQ Corporation; NetWare™, Novell™—Novell, Inc.; UNIX™—The Open Group; Oracle™, Oracle9i™—Oracle Corporation; QLogic™—QLogic Corporation; Guardian™—Quantum Corporation; Red Hat™, RPM™—Red Hat Software, Inc.; Sendmail™—Sendmail, Inc.; Sistine™—Sistina Software, Inc.; SmartFlow™, SmartMulticast™, TeraMetrics™—Spirent Communications, Inc.; Spirent Communications™—Spirent plc; Java™—Sun Microsystems, Inc.; BSD™—UNINET Technologies, Inc.; VERITAS™, VERITAS Backup Exec™—VERITAS Software Corporation; FreeBSD™—Walnut Creek CDROM, Inc.; NetBench™—Ziff-Davis Media Inc.; PC Magazine Editors' Choice Award logo, Ziff Davis™—Ziff Davis Publishing Holdings Inc. Other company, product, and service names may be trademarks or service marks of others.

Dell *Power Solutions* is published quarterly by the Dell Product Group, Dell Computer Corporation, One Dell Way, Round Rock, Texas 78682. This publication is also available online at www.dell.com/powersolutions. No part of this publication may be reprinted or otherwise reproduced without permission from the editor. Dell does not provide any warranty as to the accuracy of any information provided through Dell *Power Solutions*. Opinions expressed in this magazine may not be those of Dell. The information in this publication is subject to change without notice. Any reliance by the end user on the information contained herein is at the end user's risk. Dell will not be liable for information in any way, including but not limited to its accuracy or completeness. Dell does not accept responsibility for the advertising content of the magazine nor for any claims, actions, or losses arising therefrom. Goods, services, and/or advertisements within this publication other than those of Dell are not endorsed by or in any way connected with Dell Computer Corporation.

© Dell Computer Corporation. All rights reserved. Printed in the U.S.A.

February 2003



FEBRUARY 2003

EXECUTIVE NOTES

1 | Practical Value for Practical Times **By Pete Morowski**

EDITOR'S COMMENTS

4 | Looking Forward with Linux **By Eddie Ho**

EXECUTIVE INSIGHTS

6 | Linux: Moving Deeper into the Data Center

LINUX ENVIRONMENT

8 Keeping Pace with the Rapid Adoption of Linux

By Gary Gumanow

14 Using NIC Teaming to Achieve High Availability on Linux Platforms

By Amit Bhutani and Zafar Mahmood

20 Expanding Storage on Linux-based Servers

By Matt Domsch and Tesfamariam Michael

38 Facilitating Application Consolidation onto Linux-based Platforms

By JahJuan Rogers

42 Integrating OpenNMS with OpenManage Server Agent to Manage Dell PowerEdge Servers Running Linux

By Joshua Giles

47 Performance-Tuning Apache 2.0 on Dell PowerEdge Servers

By Simon Jandreski

51 Dell Serial and Telnet Interfaces Ease Migration from UNIX to Linux

By Wendy Stresau and Paul Vancil

54 Enabling Serial Port Console Redirection on Linux-based Dell Servers

By Christopher Stanton

59 Resolving Device Renaming Issues in Linux

By Gary Lerhaupt

62 Using Dell PowerVault NAS Software to Manage Storage in Linux Environments

By Jacob Cherian, Antonio Gallardo, and Jason Lau

MODULAR COMPUTING ENVIRONMENT**30 Examining Web Serving on the PowerEdge 1655MC**

By Dave Jaffe, Ph.D.

65 Exploring Networking Configurations for the PowerEdge 1655MC

By Yinglin Yang, Mike J. Roberts, and Brian Doty

71 Troubleshooting a Modular Computing Environment

By Haihong Zhuo and Weimin Pan

STORAGE ENVIRONMENT**77 Evaluating Dell PowerVault 770N and 775N Storage Server Performance**

By Julia Courtney

83 Managing Small- to Medium-Size SANs with EMC VisualSAN

By Keith R. Kammer

87 Tuning SANs for Peak Performance with the EMC VisualSAN Performance Manager

By Keith R. Kammer

90 Backing Up and Restoring an Oracle Database

By Sanjeet Singh, Robert Nadon, William Collins, and Zafar Mahmood

95 High-Availability Tape Backup in a Cluster Environment

By Richard Golasky and Nam Nguyen

100 Managing Distributed Backup Servers

By VERITAS Software Corporation

DATA CENTER ENVIRONMENT**26 The Effect of L3 Cache Size on MMB2 Workloads**

By Scott Stanford

102 Building the Virtual Data Center

By J. Craig Lowery, Ph.D.

PRODUCT REVIEWS**107 Dell PowerConnect 3248 Ethernet Switch Hits Hard on Price/Performance**

By John Bass

112 Storage Made Simple

By David P. Chernicoff