

# Executive Summary

<b>SUMMARY .....</b>	<b>2</b>
<b>MARKET OPPORTUNITY .....</b>	<b>4</b>
Market Trends and Challenges.....	4
<i>Corporate Data Access Bottlenecks.....</i>	<i>4</i>
<i>Sustained productivity despite increased number of users.....</i>	<i>4</i>
<b>TECHNOLOGY TRENDS .....</b>	<b>6</b>
<i>Data content and size undergoing tremendous changes .....</i>	<i>6</i>
<i>Databases capacity growing ten-fold.....</i>	<i>6</i>
<b>MARKET SEGMENTATION .....</b>	<b>7</b>
Market Segmentation by Applications.....	7
NAS - past, present and future.....	9
<b>NAS VS. SAN.....</b>	<b>10</b>
<b>MARKET FORECAST .....</b>	<b>11</b>
WW Market for Servers and Storage Subsystems .....	11
Storage Networking .....	11
<i>Potential Storage Networking Revenue Projections.....</i>	<i>11</i>
<i>Storage Subsystems Revenues Depicted by Architecture (\$millions) .....</i>	<i>13</i>
<i>Total Worldwide Storage Software Market Revenue (\$ in millions) .....</i>	<i>15</i>
<b>VENDOR STRATEGIES .....</b>	<b>16</b>
High Potential Targeted Markets .....	16
<b>COMPETITIVE POSITIONING.....</b>	<b>17</b>
Basis of Competition .....	17
<i>Price/Performance.....</i>	<i>17</i>
<i>Support for Heterogeneous Environments/Applications.....</i>	<i>17</i>
<i>Investment Protection / Futures.....</i>	<i>18</i>
<i>Reliability, availability, Serviceability / Fault Tolerance .....</i>	<i>18</i>
<i>Ease of configuration and Management.....</i>	<i>18</i>
<i>Network Management .....</i>	<i>18</i>
Superior Price/Performance Positioning.....	18
<b>CHANNELS OF DISTRIBUTION .....</b>	<b>20</b>
VAR Channels .....	20
<b>FUTURES.....</b>	<b>22</b>
Major Trends.....	22
Five year outlook .....	23

# Market Drivers & Dynamics

<b>MARKET DRIVERS .....</b>	<b>3</b>
Rapid Growth of Computer Storage .....	3
SAN and NAS Architectures Are Proliferating the Market.....	5
Demand Drivers - More Data.....	7
<i>High-End/Enterprise Applications .....</i>	8
<i>Internet .....</i>	9
<i>Traditional Desktop .....</i>	9
<b>SAN MARKET DRIVERS &amp; DETRACTORS.....</b>	<b>10</b>
Interoperability .....	10
Applications.....	11
High Implementation Costs .....	12
Multibillion dollar budgets to take SAN businesses prime time.....	13
Wall Street Valuations of major SAN Players .....	14
Computer Storage Incorporates Many Disciplines .....	15
<b>KILLER APPLICATIONS.....</b>	<b>15</b>
The Growth of Data.....	15
The Focus of Storage .....	16
<i>Customer Needs .....</i>	16
The changing environment.....	16
The challenges .....	17
The promise of SANs.....	17
Summary.....	18
<b>FIBRE CHANNEL VS. ETHERNET .....</b>	<b>18</b>
<i>Multiple Technologies Are Peering into Each Other's Markets for Future Growth .....</i>	19
<i>VoIP .....</i>	19
<i>SoIP .....</i>	19
The Reality of a Homogenous Network .....	19
<i>Storage Networking Technologies and Availability.....</i>	19
<i>Learning From History .....</i>	20
The Future.....	21
<i>SCSI.....</i>	21
<i>Ethernet .....</i>	21
<i>VI for Clustering .....</i>	21
<i>Fibre Channel .....</i>	21
<i>SAN vs. NAS.....</i>	21
<b>FIBRE CHANNEL TECHNOLOGY .....</b>	<b>22</b>
<b>STORAGE OVER FC VS. STORAGE OVER IP .....</b>	<b>22</b>
<i>Fibre Channel Helps Resolve I/O Constraints .....</i>	22
<i>Fibre Channel Moves Data More Quickly .....</i>	24
<i>SCSI And Fibre Channel Comparisons .....</i>	24
<i>Fibre Channel Traverses Greater Distances .....</i>	24
<b>FIBRE CHANNEL VERSUS ETHERNET .....</b>	<b>25</b>
<i>Fibre Channel Components .....</i>	25
<i>Ethernet's TCP\IP Started Out Servicing Government .....</i>	25
<i>Ethernet Is Cumbbersome .....</i>	25
The Potential Swing Vote .....	27
<i>EMC Moves .....</i>	28
<i>EMC's Fibre Channel History.....</i>	28
IP based storage .....	31
<i>Cisco/Brocade Partnership .....</i>	31
<i>Cisco's Acquisition of NuSpeed .....</i>	32
<i>iSCSI versus SoIP .....</i>	32
Defining SAN .....	33
Customer Focus.....	34
<i>Low Cost of Management .....</i>	34
<i>High Availability.....</i>	35

<i>Fast Data Transmission</i> .....	35
<i>Heterogeneous Connectivity and File Sharing</i> .....	36
<i>Any-to-Any Connectivity</i> .....	36
<i>SAN's Killer Application: Serverless and LANless Backup</i> .....	36
<i>Scalability</i> .....	37
<b>The SAN Brain</b> .....	<b>37</b>
<i>Application Servers</i> .....	37
<i>Storage Subsystems</i> .....	37
<i>Dedicated Servers</i> .....	37
<i>Networking Equipment</i> .....	38
<b>SAN Adoption</b> .....	<b>38</b>
<b>SAN AND NAS CONVERGENCE</b> .....	<b>39</b>
<b>Data-Centric Architectures</b> .....	<b>39</b>
<b>Defining NAS</b> .....	<b>39</b>
<i>When NAS Is Scaled, It Becomes a SAN</i> .....	41
<i>SANS Also Enable Disk Mirroring for NAS</i> .....	42
<i>EMC's Celerra NAS Server Is a SAN</i> .....	43
<i>SAN and NAS Architectures Are Proliferating the Market</i> .....	44
<b>BECOME A BELIEVER IN SANS.....</b>	<b>44</b>
<b>Backup Hurts</b> .....	<b>44</b>
<i>Leading LANless Companies</i> .....	45
<b>Data Recovery</b> .....	<b>45</b>
<i>Backup</i> .....	46
<i>Recovery</i> .....	46
<i>Another SAN Killer Application Is SRM</i> .....	47
<i>Device Administration</i> .....	47
<i>Load Balancing</i> .....	47
<b>Failover</b> .....	<b>47</b>
<b>Storage Resource Management (SRM)</b> .....	<b>48</b>
<i>Device Administration</i> .....	48
<i>Load Balancing</i> .....	48
<i>Failover</i> .....	48
<b>SOFTWARE. TAKES STORAGE TO THE NEXT LEVEL</b> .....	<b>48</b>
<b>The Importance of Software</b> .....	<b>49</b>
<b>The Attraction to Software</b> .....	<b>50</b>
<b>A Competitive and Consolidating Market.</b> .....	<b>50</b>
<b>STORAGE SOFTWARE TRENDS</b> .....	<b>51</b>
<b>Replication Software Is Becoming an Important Focus</b> .....	<b>51</b>
<i>Take a Look at EMC's Secret Sauce - SRDF</i> .....	51
<i>SRDF Characteristics</i> .....	51
<b>Descriptions by Category</b> .....	<b>52</b>
<b>Enterprise Storage Resource Management</b> .....	<b>52</b>
<b>Data Management Products</b> .....	<b>53</b>
<b>Storage Infrastructure Products</b> .....	<b>53</b>
<b>STORAGE NETWORKING</b> .....	<b>54</b>
<b>Inside the SAN Cloud</b> .....	<b>54</b>
<b>Market Breakdown</b> .....	<b>54</b>
<b>SAN Bridges</b> .....	<b>55</b>
<b>Traditional SAN Routers</b> .....	<b>55</b>
<i>Players</i> .....	55
<i>coming SAN Routing</i> .....	56
<i>Players</i> .....	56
<b>SAN Hubs</b> .....	<b>57</b>
<i>Entry Level SAN Hubs</i> .....	57
<i>SAN Managed Hubs</i> .....	57
<i>So What the Heck Is the Difference?</i> .....	58
<i>Looptel?</i> .....	58
<i>What's the Difference?</i> .....	59
<i>Pricing</i> .....	59
<i>Hub and Switch Side-By-Side Comparison</i> .....	59
<i>4-port Hub &amp; Switch architectures</i> .....	60
<b>FC-AL Switches versus Fabric Switches</b> .....	<b>60</b>
<i>Switch Addressing - Public Versus Private Loops</i> .....	60

# Market/Product Requirements

MAJOR TRENDS .....	3
MARKET SEGMENTS BY APPLICATION & ENVIRONMENT .....	5
Application Types .....	5
Storage System Metrics .....	5
Technology Requirements by Application .....	6
<i>Transaction Processing</i> .....	6
<i>Streaming Data (Multimedia/Video)</i> .....	6
MARKET REQUIREMENTS: TRANSACTION PROCESSING .....	7
Low-End: Workgroup Servers .....	7
Mid-range: Departmental Servers .....	7
High End: Enterprise Servers .....	7
MARKET REQUIREMENTS: INTERNET/INTRANETS .....	8
Intranets .....	8
High-Speed Access.....	8
Internet Commerce .....	8
"Streaming" Technologies .....	8
The Internet Is the Computer .....	9
Internet Appliance/WebTV.....	9
Voice Over the Internet.....	9
Workflow .....	9
MARKET REQUIREMENTS: DATA WAREHOUSING .....	10
Requirements of Data warehousing Applications.....	11
<i>Scalability</i> .....	11
<i>Performance</i> .....	12
<i>Storage Management</i> .....	12
<i>Tight Integration of Storage with File System</i> .....	12
Data Warehouse Market Size & Growth.....	12
Data Warehouse Storage - Market Size & Growth .....	13
MARKET REQUIREMENTS: VISUAL DATABASES .....	14
Beyond Rows and Records: The Management of Complex Data .....	14
Key conclusions.....	14
MARKET REQUIREMENTS: IMAGING/MULTIMEDIA .....	16
Imaging Applications.....	16
Building The Virtual Enterprise .....	16
<i>Supportive Multimedia</i> .....	17
MARKET REQUIREMENTS: MEDICAL .....	18
Patient Records Management.....	18
<i>Lifecycle in HealthCare</i> .....	18
<i>Hospitals and HMOs</i> .....	18
Generic Lifecycle for Scientific Method.....	18
MARKET REQUIREMENTS: VIDEO.....	19
Applications.....	19
Requirements .....	19
<i>Scalable I/O &amp; Communications</i> .....	19
<i>Very High BW</i> .....	19

<i>Instant access to very large databases</i> .....	19
<i>High Availability System Design</i> .....	19
<i>Price Sensitivity</i> .....	19
<b>Application Requirements</b> .....	<b>19</b>
<i>EMC Celerra Video Storage Subsystem</i> .....	20
<b>NETWORK/ENTERPRISE MANAGEMENT SYSTEMS</b> .....	<b>22</b>
<b>Network Management Protocols</b> .....	<b>22</b>
<b>WBEM</b> .....	<b>22</b>
<b>Interface to standard Network Management Packages</b> .....	<b>22</b>
<b>Implementation Requirements</b> .....	<b>22</b>
<b>MARKET REQUIREMENTS - FIBRE CHANNEL SAN</b> .....	<b>24</b>
<i>Performance</i> .....	25
<i>Availability</i> .....	25
<i>Cost</i> .....	25
<i>Scalability</i> .....	25
<i>Interoperability</i> .....	25
<i>Manageability</i> .....	25
<b>Future of SAN</b> .....	<b>25</b>
<b>MARKET REQUIREMENTS - THIN CLIENTS/SERVERS</b> .....	<b>27</b>

# Market Forecast

<b>STORAGE &amp; SERVERS MARKET.....</b>	<b>3</b>
<b>SAN Market Sizing .....</b>	<b>3</b>
<i>Storage Subsystems Revenues Depicted by Architecture (\$millions) .....</i>	<i>5</i>
<b>Storage Networking .....</b>	<b>6</b>
<i>Potential Storage Networking Revenue Projections .....</i>	<i>6</i>
<b>Market Trends.....</b>	<b>6</b>
<b>FC MARKET SHARES 1999 .....</b>	<b>8</b>
<b>NAS Market Size.....</b>	<b>8</b>
<b>STORAGE SOFTWARE TRENDS .....</b>	<b>8</b>
<i>Total Worldwide Storage Software Market Revenue (\$ in millions).....</i>	<i>9</i>
<b>Storage Resource Management (SRM).....</b>	<b>9</b>
<i>SRM Projections More than Doubled.....</i>	<i>10</i>
<b>SAN Market Sizing .....</b>	<b>10</b>
<b>NT and UNIX Focus.....</b>	<b>11</b>
<i>SRM .....</i>	<i>11</i>
<b>Failover .....</b>	<b>12</b>
<i>Device Administration .....</i>	<i>12</i>
<i>Load Balancing .....</i>	<i>12</i>
<i>Networking Backup and Recovery Projections More than Double.....</i>	<i>12</i>
<b>Data Management Products.....</b>	<b>13</b>
<b>Storage Infrastructure Products.....</b>	<b>13</b>
<b>Replication .....</b>	<b>14</b>
<b>Replication To Offer Tremendous Future Growth .....</b>	<b>14</b>
<b>Replication Software Is Becoming an Important Focus .....</b>	<b>14</b>
<i>Take a Look at EMC's Secret Sauce - SRDF .....</i>	<i>14</i>
<i>Data Replication Market - Dominant Market Leadership .....</i>	<i>14</i>
<i>Veritas Poised To KOCK Replication.....</i>	<i>14</i>
<i>Legato's Recent Challenges Create Opportunity .....</i>	<i>14</i>
<i>Storage Software Projections Doubled! .....</i>	<i>14</i>
<b>Segment Analysis .....</b>	<b>15</b>
<i>Dominant Market Leadership .....</i>	<i>16</i>
<b>Replication To Offer Tremendous Future Growth .....</b>	<b>16</b>
<i>Legato's Recent Challenges Create Opportunity .....</i>	<i>17</i>
<i>Dataquest Doubled Its Storage Software Projections! .....</i>	<i>17</i>
<i>Veritas Poised To KOCK Replication.....</i>	<i>18</i>
<b>Software Risks .....</b>	<b>18</b>
<b>NT and UNIX Focus.....</b>	<b>19</b>
<i>Total WW Storage Management Software Market Share Revenue by Platform (\$millions).....</i>	<i>19</i>
<i>WW Storage Software Market Revenue by Selected Vendor (\$ in millions).....</i>	<i>20</i>
<b>Segment Analysis .....</b>	<b>21</b>
<b>Market Trends.....</b>	<b>21</b>
<b>Market Forecast.....</b>	<b>22</b>
<i>Dataquest Numbers Are a Bit Low .....</i>	<i>22</i>
<i>Dataquest Methodology .....</i>	<i>22</i>
<i>Figure 62. Storage networking Revenue As % Of External RAID (\$millions) .....</i>	<i>23</i>
<i>Figure 63 Potential Storage Networking Revenue Projections .....</i>	<i>23</i>
<i>Figure 62. Storage networking Revenue As A Percentage Of External RAID Projections .....</i>	<i>23</i>
<i>Figure 63. Potential Storage Networking Revenue Projections .....</i>	<i>24</i>
<b>MARKET SHARES .....</b>	<b>25</b>
<i>Networking Backup and Recovery Projections More than Double.....</i>	<i>25</i>
<b>SERVER CLUSTERING MARKET OUTLOOK.....</b>	<b>26</b>

<i>WW Server Clustering Market Forecast (Rev \$M).....</i>	26
<i>WW Server Clustering Market Forecast (Units in 000s) .....</i>	26
<i>WW Server Clustering Penetration of Total Servers by OS (units basis) .....</i>	27
<b>Server Clustering Market Shares .....</b>	<b>27</b>
<b>Future consolidation in Server Clustering Software Market .....</b>	<b>27</b>

# Technology Trends

<b>SAN/NAS TECHNOLOGY .....</b>	<b>4</b>
What is a SAN.....	4
Increased Flexibility.....	5
Improved Scalability .....	5
Improved Performance .....	5
Improved Availability .....	6
Improved Manageability .....	6
Improved Reliability .....	6
The inevitable conclusion .....	7
RAID Systems.....	10
Background .....	11
Data Striping .....	11
Summary.....	12
<b>SAN COMPONENTS .....</b>	<b>12</b>
<b>SAN Servers .....</b>	<b>13</b>
<b>SAN Storage .....</b>	<b>13</b>
<b>SAN Interconnects .....</b>	<b>13</b>
Cables and Connectors.....	14
Gigabit Link Model (GLM) .....	14
Gigabit Interface Converters (GBIC) .....	14
Media Interface Adapters (MIA) .....	14
Adapters.....	14
Extenders .....	14
Multiplexors .....	15
Hubs.....	15
Routers.....	15
Bridges .....	15
Gateways .....	15
Switches.....	15
Directors.....	16
ESCON .....	16
FICON .....	16
<b>SAN Applications .....</b>	<b>16</b>
Shared Repository and Data Sharing .....	17
Storage Sharing .....	17
Data-Copy Sharing.....	18
"True" Data Sharing .....	18
Network Architecture .....	18
Data Vaulting and Data Backup .....	18
Data Interchange .....	18
Clustering .....	18
Data Protection and Disaster Recovery .....	18
Managing the SAN .....	19
Asset Management .....	20
Capacity Management .....	20
Configuration Management .....	20
Performance Management .....	20
Availability Management .....	20
<b>Hubs, Switches &amp; Bridges .....</b>	<b>20</b>
Fibre Channel Hubs .....	21
Fibre Channel Switches .....	22
Fibre Channel to SCSI Bridges .....	22
<b>Backup Solutions .....</b>	<b>22</b>
Background .....	22

<b>Backup Hardware</b>	23
<b>SAN Software</b>	24
<i>San Management Utilities</i>	25
<i>SAN Management SW</i>	25
<b>Data Replication</b>	27
<b>Replication Methods</b>	27
<i>Storage replication</i>	27
<i>Application level replication</i>	27
<b>Replication Types</b>	28
<i>Synchronous replication</i>	28
<i>Asynchronous replication</i>	28
<b>Uses of Replication</b>	28
<i>Disaster recovery</i>	28
<i>Off-host processing</i>	28
<i>Content Distribution</i>	28
<i>Data sharing</i>	28
<i>Data consolidation</i>	28
<i>Follow-the-sun processing</i>	29
<b>Volume &amp; File Management</b>	29
<b>SAN Market Sizing</b>	30
<b>NAS MARKET</b>	30
<b>NAS Market Sizing</b>	33
<b>THE NEXT GENERATION OF SANS: STORAGE DOMAIN MANAGEMENT</b>	33
<i>The Emergence Of Storage Area Networking</i>	33
<i>Achieving The Promise Of SANs</i>	34
<i>What Is Storage Domain Management?</i>	35
<i>The Fundamentals Of Storage Domain Management</i>	35
<i>Heterogeneous Interoperability</i>	35
<i>Secure, Centralized Management</i>	36
<i>Enterprise-Class Reliability, Availability And Serviceability (RAS)</i>	37
<i>An Intelligent Purpose-Built Platform</i>	37
<i>Conclusion</i>	38
<b>FIBRE CHANNEL TECHNOLOGY</b>	38
<i>Executive Summary</i>	38
<i>Fibre Channel Standards</i>	38
<i>Interoperability</i>	39
<i>Storage</i>	40
<i>Storage Devices and Systems</i>	40
<i>Storage Area Network</i>	40
<i>Networks</i>	41
<i>Technology Comparison</i>	42
<i>Why Fibre Channel?</i>	43
<i>Fibre Channel Systems</i>	45
<b>SAN MANAGEMENT</b>	46
<b>SAN STANDARDS</b>	47
<i>Overview</i>	47
<i>SAN Standards are evolving</i>	47
<i>A Phased Approach</i>	47
<i>Getting to the third phase</i>	48
<i>Other Players</i>	49
<i>Future of SAN Standards</i>	49
<b>VIRTUALIZING SAN</b>	50
<b>WW MARKET - SAN VIRTUALIZATION</b>	51
<i>SAN Virtualization Revenues</i>	51
<i>FC Switch Ports Installed Base</i>	51

<b>WW Market - FC Hub &amp; Switches .....</b>	<b>51</b>
<b>STORAGE SHARING .....</b>	<b>57</b>
<b>DATA SHARING .....</b>	<b>58</b>
<b>PERFORMANCE OPTIMIZATION.....</b>	<b>59</b>
<b>STORAGE ON DEMAND.....</b>	<b>60</b>
<b>SAN SERVICES.....</b>	<b>61</b>
<b>SAN CONTROLLER .....</b>	<b>64</b>
<b>SAN SERVER .....</b>	<b>65</b>
<b>SAN CLUSTER .....</b>	<b>67</b>
<b>SERVER CLUSTERING .....</b>	<b>68</b>
<i>Server clustering to be key area of growth for storage and networking companies.....</i>	<i>68</i>
<i>Fig. - Server Clustering to achieve higher Availability and scalability .....</i>	<i>68</i>
<i>Server Clustering Using Switches.....</i>	<i>69</i>
<b>Storage Companies Have Embraced VI and Infiniband for Clustering .....</b>	<b>70</b>
<i>Virtual Interface (VI) .....</i>	<i>70</i>
<i>Infiniband (IB).....</i>	<i>71</i>
<b>Breaking Apart the Server Seems Logical .....</b>	<b>72</b>
<b>VI on Ethernet vs. Fibre Channel vs. Infiniband .....</b>	<b>73</b>
<b>SERVER CLUSTERING MARKET OUTLOOK.....</b>	<b>74</b>
<i>WW Server Clustering Market Forecast (Rev \$M).....</i>	<i>74</i>
<i>WW Server Clustering Market Forecast (Units in 000s) .....</i>	<i>74</i>
<i>WW Server Clustering Penetration of Total Servers by OS (units basis) .....</i>	<i>75</i>
<b>Server Clustering Market Shares .....</b>	<b>75</b>
<b>Future consolidation in Server Clustering Software Market .....</b>	<b>75</b>

# Competitive Products & Positioning

Section

6

SAN STORAGE SOLUTIONS - VENDOR POSITIONING.....	2
SAN Major Storage Solution Suppliers.....	2
SAN Definition .....	3
Key Issues .....	3
Scoring Method .....	3
Suppliers .....	4
EMC .....	4
Compaq Computer.....	4
Storage Technology.....	4
Dell Computer .....	5
Hewlett-Packard.....	5
IBM.....	5
Hitachi Data Systems.....	5
MTI's.....	5
Sun Microsystems.....	5
Summary.....	5
VENDORS & PRODUCTS .....	6
STORAGE SOLUTIONS, SUBSYSTEMS & COMPONENT VENDORS.....	12
FIBREALLIANCE.....	18
Equipment Vendors .....	18
Interconnect Vendors .....	18
HBA Vendors .....	19
Server Vendors.....	19
Service Providers.....	19
Software Management Vendors .....	20
Storage Vendors .....	20

# SAN Suppliers & Strategies

<b>BROCADE.....</b>	<b>3</b>
<b>Summary.....</b>	<b>3</b>
<b>Company Overview.....</b>	<b>3</b>
<b>Competitive Positioning.....</b>	<b>3</b>
<i>Feature rich storage networking products .....</i>	<i>3</i>
<i>The Debate Continues: Fibre Channel and Ethernet.....</i>	<i>4</i>
<i>Strategic Partnerships.....</i>	<i>4</i>
<i>Cisco.....</i>	<i>4</i>
<i>EMC.....</i>	<i>4</i>
<i>Highground.....</i>	<i>5</i>
<i>Optical Networks.....</i>	<i>6</i>
<i>StorageNetworks.....</i>	<i>6</i>
<i>Veritas.....</i>	<i>6</i>
<b>Brocade Is the Official Standard.....</b>	<b>6</b>
<i>Interconnecting Vendor's Switches Is Important.....</i>	<i>6</i>
<i>Inter-operability Promotes the Industry.....</i>	<i>6</i>
<i>Brocade Is Not Leaving Itself Vulnerable.....</i>	<i>7</i>
<b>Management.....</b>	<b>7</b>
<b>Product Road Map.....</b>	<b>7</b>
<b>Products.....</b>	<b>7</b>
<i>SilkWorm Switch Product Family.....</i>	<i>8</i>
<i>Brocade's Silkworm Switches.....</i>	<i>8</i>
<i>Brocade Software Upgrades Increase Functionality.....</i>	<i>8</i>
<i>Brocade's Scalability Advantage.....</i>	<i>9</i>
<i>Public-to-Private Loops - the "Translative Mode".....</i>	<i>9</i>
<i>Brocade's Zoning.....</i>	<i>10</i>
<i>Brocade Web Tools.....</i>	<i>10</i>
<b>GADZOOX.....</b>	<b>11</b>
<b>Summary.....</b>	<b>11</b>
<b>Company Overview.....</b>	<b>11</b>
<b>Competitive Positioning.....</b>	<b>11</b>
<i>Install Base Must Be Scaled.....</i>	<i>11</i>
<b>Gadzoox Products.....</b>	<b>12</b>
<i>Hardware.....</i>	<i>12</i>
<i>Axxess Networked Storage Pool.....</i>	<i>13</i>
<i>Geminix FC-to-SCSI Router.....</i>	<i>13</i>
<i>Software.....</i>	<i>13</i>
<b>LEGATO.....</b>	<b>15</b>
<b>Summary.....</b>	<b>15</b>
<b>Company Overview.....</b>	<b>15</b>
<b>Competitive Positioning.....</b>	<b>15</b>
<i>Benefit of APIs.....</i>	<i>15</i>
<i>Total Solution.....</i>	<i>15</i>
<b>Legato Products.....</b>	<b>15</b>
<i>Enterprise Resource Management.....</i>	<i>16</i>
<i>Data Management.....</i>	<i>16</i>
<i>NetWorker Modules.....</i>	<i>16</i>
<i>Celestra.....</i>	<i>17</i>
<i>Storage Infrastructure.....</i>	<i>17</i>
<i>HA/Cluster.....</i>	<i>17</i>
<b>OEMs and Partners.....</b>	<b>18</b>
<i>Data Protection (source code and/or binary).....</i>	<i>18</i>
<i>Data Availability Partners.....</i>	<i>18</i>
<i>Major ELAs.....</i>	<i>19</i>
<i>Linux Partners.....</i>	<i>19</i>
<i>Major NT Deployments.....</i>	<i>19</i>
<b>VERITAS.....</b>	<b>20</b>

<b>Summary.....</b>	<b>20</b>
<i>Growth Drivers.....</i>	<i>20</i>
<i>Demand Building for Back-end of 2000 and Full Year 2001.....</i>	<i>21</i>
<b>Company Overview.....</b>	<b>21</b>
<b>Competitive Positioning.....</b>	<b>22</b>
<b>Competition .....</b>	<b>22</b>
<i>Plowing Through Tough Times.....</i>	<i>22</i>
<i>Veritas Signs on Hewlett-Packard and IBM.....</i>	<i>22</i>
<i>UNIX Market Projections.....</i>	<i>23</i>
<i>Solaris + HP-UX + AIX = UNIX Domination.....</i>	<i>23</i>
<i>IBM's AIX Presents an Excellent Opportunity.....</i>	<i>23</i>
<i>Business Mix and a Look into 2004 .....</i>	<i>23</i>
<i>Goal to \$10 Billion.....</i>	<i>24</i>
<b>Sales Channels .....</b>	<b>24</b>
<b>Veritas, Oracle, and Sun (VOS) Joint Alliance .....</b>	<b>24</b>
<i>Veritas' Interoperability Lab Is a Key Competitive Advantage .....</i>	<i>24</i>
<b>Active Acquisition History .....</b>	<b>25</b>
<i>VERITAS Acquisition Activity.....</i>	<i>25</i>
<b>Acquisition War Chest.....</b>	<b>25</b>
<i>The Purchase of Seagate NSMG - Take 1 .....</i>	<i>25</i>
<i>The Purchase of Seagate NSMG - Take 2 .....</i>	<i>26</i>
<b>Veritas Products .....</b>	<b>26</b>
<i>Enterprise Resource Management .....</i>	<i>26</i>
<i>Data Management .....</i>	<i>26</i>
<i>Infrastructure.....</i>	<i>27</i>
<i>HA/Clustering.....</i>	<i>27</i>
<i>Other.....</i>	<i>27</i>
<i>Veritas' V3 - The SAN Manager.....</i>	<i>27</i>

<b>SAN PRODUCTS BY SUPPLIER BY MODEL - SUBSYSTEMS &amp; COMPONENTS.....</b>	<b>5</b>
Bridges/Routers .....	5
Switches.....	5
Cables/Connectors .....	5
Components .....	6
Host Adapters.....	6
RAID Storage Systems .....	8
Servers .....	8
SAN Mgmt Software.....	9
Storage Devices .....	9
Storage Systems RAID .....	9
Switches.....	10
System Design and Integration .....	11
Test Equipment, Tools & Services .....	11
Training and Education .....	11
<b>ADAPTEC .....</b>	<b>12</b>
Host 1/O .....	12
RAID Controllers .....	12
Software .....	12
NICS.....	13
<b>ADVANCED DIGITAL INFORMATION CORP. (ADIC).....</b>	<b>13</b>
<b>ALACRITECH .....</b>	<b>14</b>
<b>AMERICAN MEGATRENDS.....</b>	<b>14</b>
<b>BAYDEL .....</b>	<b>15</b>
<b>BMC SOFTWARE .....</b>	<b>16</b>
<b>BULL .....</b>	<b>16</b>
<b>BUS-TECH .....</b>	<b>16</b>
<b>CAMBEX .....</b>	<b>17</b>
<b>CHAPARRAL NETWORK STORAGE .....</b>	<b>18</b>
<b>CIPRICO.....</b>	<b>18</b>
<i>Ciprico's FibreSTORE Family of Storage Systems.....</i>	<i>18</i>
<i>Fibrestore Products include: .....</i>	<i>18</i>
<i>SCSI Interface Products.....</i>	<i>19</i>
<i>Total Storage Solutions.....</i>	<i>19</i>
<b>CMD TECHNOLOGY .....</b>	<b>19</b>
<i>Storage Systems Products.....</i>	<i>19</i>
<i>Storage Interconnect Products.....</i>	<i>20</i>
<b>COMMVAULT SYSTEMS .....</b>	<b>20</b>
<b>COMPAQ.....</b>	<b>20</b>
<i>Compaq ENSA .....</i>	<i>21</i>
<i>StorageWorks Enterprise Volume Manager (EVM) .....</i>	<i>22</i>
<b>COMPUTER ASSOCIATES.....</b>	<b>24</b>
<b>COMPUTER NETWORK TECHNOLOGY .....</b>	<b>25</b>
<b>CROSSROADS.....</b>	<b>26</b>
<i>History .....</i>	<i>26</i>

<b>Product Offerings.....</b>	<b>26</b>
4X50.....	26
4200 .....	26
<b>CROSSTOR .....</b>	<b>27</b>
<b>DATACORE SOFTWARE.....</b>	<b>27</b>
<b>DATADIRECT NETWORKS .....</b>	<b>28</b>
<b>DATALINK .....</b>	<b>29</b>
<b>DELL .....</b>	<b>29</b>
<b>DOT HILL SYSTEMS.....</b>	<b>30</b>
<b>Products.....</b>	<b>31</b>
<b>Professional Services.....</b>	<b>31</b>
<b>EMC .....</b>	<b>31</b>
<b>Storage Subsystems.....</b>	<b>32</b>
Symmetrix .....	32
CLARiiON.....	33
Connectrix .....	33
Celerra .....	33
<b>Enterprise Storage Services .....</b>	<b>34</b>
<b>Internet Services .....</b>	<b>34</b>
<b>EMULEX.....</b>	<b>34</b>
<b>EXABYTE CORPORATION.....</b>	<b>35</b>
<b>FINISAR .....</b>	<b>36</b>
<b>GIGANET .....</b>	<b>36</b>
<b>HEWLETT-PACKARD .....</b>	<b>37</b>
<b>HIGHGROUND.....</b>	<b>38</b>
<b>HITACHI DATA SYSTEMS.....</b>	<b>39</b>
<b>IBM .....</b>	<b>39</b>
<b>Storage Subsystems.....</b>	<b>39</b>
<b>Software .....</b>	<b>40</b>
<b>IMATION.....</b>	<b>40</b>
<b>INRANGE TECHNOLOGIES .....</b>	<b>40</b>
<b>INTEL .....</b>	<b>41</b>
<b>I-TECH.....</b>	<b>41</b>
<b>JNI .....</b>	<b>41</b>
<b>LSI LOGIC .....</b>	<b>42</b>
<b>MCDATA CORPORATION .....</b>	<b>43</b>
<b>Products.....</b>	<b>43</b>
Storage Directors .....	43
FICON Bridge.....	43
ES-1000 .....	43
EFC Manager .....	43
ED-5000 and ED-1000 Product Managers .....	43
<b>MELLANOX TECHNOLOGIES.....</b>	<b>44</b>
<b>MTI TECHNOLOGY .....</b>	<b>44</b>

<b>NETWORK APPLIANCE .....</b>	<b>44</b>
<b>NISHAN SYSTEMS.....</b>	<b>45</b>
<b>NSTOR .....</b>	<b>46</b>
<b>OTG SOFTWARE .....</b>	<b>46</b>
<b>PATHLIGHT .....</b>	<b>47</b>
<b>POWERQUEST.....</b>	<b>47</b>
<b>QLOGIC.....</b>	<b>48</b>
<b>SAN VALLEY .....</b>	<b>48</b>
<b>SANCASTLE.....</b>	<b>49</b>
<b>SEAGATE .....</b>	<b>49</b>
<b>STORAGEAPPS.....</b>	<b>50</b>
<b>STORAGETEK.....</b>	<b>50</b>
<b>STOREAGE NETWORKING TECHNOLOGIES LTD. ....</b>	<b>50</b>
<b>SUN MICROSYSTEMS.....</b>	<b>51</b>
<b>TRICORD .....</b>	<b>51</b>
<b>TROIKA NETWORKS, INC.....</b>	<b>52</b>
<b>TRUESAN NETWORKS .....</b>	<b>52</b>
<b>VICOM.....</b>	<b>53</b>
<b>VIXEL .....</b>	<b>53</b>

# Channels of Distribution

<b>INDUSTRY STRUCTURE .....</b>	<b>3</b>
Manufacturers, Channels of Distribution, End Users by Vertical Markets) .....	3
<b>MAJOR CHANNELS OF DISTRIBUTION .....</b>	<b>4</b>
<b>Channels of Distribution by EU Business Size.....</b>	<b>4</b>
<i>Direct &amp; Indirect Channels (OEM, Distribution, VARS/SI, Retail)</i> .....	4
<b>Channels of Distribution by Application Markets.....</b>	<b>5</b>
<i>Vertical Markets Players - Transaction Processing.....</i>	5
<i>Vertical Markets Players - Video .....</i>	5
<b>CHANNELS OF DISTRIBUTION BY VERTICAL MARKETS.....</b>	<b>5</b>
<b>Top Federal System Integrators .....</b>	<b>5</b>
<b>DISTRIBUTOR PROGRAMS .....</b>	<b>6</b>
<b>OEM Programs .....</b>	<b>6</b>
<b>Reseller Programs .....</b>	<b>6</b>
<i>VAR Partner Programs .....</i>	6
<i>High Volume Reseller Programs.....</i>	6
<b>Business Partner Marketing Program.....</b>	<b>6</b>
<b>DISTRIBUTOR SERVICES .....</b>	<b>6</b>
<b>Broad Product line .....</b>	<b>6</b>
<b>Financial &amp; Credit Services.....</b>	<b>6</b>
<b>Add-on Services for Profit .....</b>	<b>6</b>
<i>Network Services .....</i>	6
<i>Software Licensing Programs .....</i>	7
<b>Interactive Electronic Tools Services .....</b>	<b>7</b>
<i>Electronic Commerce .....</i>	7
<i>End-User Printed &amp; Electronic Catalogs .....</i>	7
<b>Marketing Services .....</b>	<b>7</b>
<i>Tech Expos .....</i>	7
<i>Prepaid TechSupport Cards.....</i>	7
<i>Training .....</i>	7
<b>Technical Support Services .....</b>	<b>7</b>
<b>PRICING STRUCTURES .....</b>	<b>8</b>
<i>Pricing Structure - Direct Channels (Direct, Web/Mail) .....</i>	8
<i>Pricing Structure - Indirect Channels (OEM, Disty, VAR/SI, Retail).....</i>	8
<b>MAJOR CHANNEL PLAYERS .....</b>	<b>9</b>
<b>Top OEMs, Distributors, VARS, VADS.....</b>	<b>9</b>
<i>System OEMs .....</i>	9
<i>Distributors.....</i>	9
<i>Large System Integrators.....</i>	9
<i>Small System Integrators .....</i>	9
<i>VARS .....</i>	9
<i>VADS/Retail Chains .....</i>	9
<b>TOP-50 SYSTEM INTEGRATORS .....</b>	<b>10</b>
<b>Top 50 VARS.....</b>	<b>12</b>
<b>TOP-75 VADS.....</b>	<b>14</b>
<b>TOP-75 VADS.....</b>	<b>14</b>
<b>TOP OEMS .....</b>	<b>17</b>

# Research Methodology

<b>METHODOLOGY .....</b>	<b>2</b>
<b>Primary Data</b>	<b>2</b>
<b>Factors Fueling Growth</b>	<b>2</b>
<b>Key Findings</b>	<b>2</b>
<b>MARKETS .....</b>	<b>3</b>
<b>Market Segments</b>	<b>3</b>
<i>Server Platform by price/performance segments:.....</i>	<i>3</i>
<i>Server and storage subsystems shipments by major OS categories:.....</i>	<i>3</i>
<i>Server and storage subsystems shipments by price categories:.....</i>	<i>3</i>
<i>Server and storage subsystems shipments by Channels of Distribution:.....</i>	<i>3</i>
<i>Server and storage subsystems shipments by File Systems:.....</i>	<i>3</i>
<i>Server and storage subsystems shipments forecast by applications categories (in future) .....</i>	<i>3</i>
<i>Server and storage subsystems worldwide shipments by Geography (future) .....</i>	<i>3</i>
<b>Market Demand Forecast</b>	<b>4</b>
<i>Market Demand 1999-2003 .....</i>	<i>4</i>
<i>Near Term Forecast.....</i>	<i>4</i>
<i>Long-Term Forecast.....</i>	<i>4</i>
<b>Market Shares</b>	<b>4</b>
<b>Geographic Coverage</b>	<b>4</b>
<b>IMEX DEFINITIONS &amp; TERMINOLOGY .....</b>	<b>5</b>
<b>Definitions</b>	<b>5</b>
<b>Terms</b>	<b>5</b>
<i>Computer Systems &amp; Servers.....</i>	<i>5</i>
<i>Storage Subsystems .....</i>	<i>5</i>

# Appendices

<b>REFERENCES .....</b>	<b>1</b>
<b>Related IMEX Research</b>	<b>2</b>
<b>Glossary of Terms</b>	<b>4</b>