

Enterprise Storage Update

Hitachi Storage Results - TagmaStore Ramp Beginning to Materialize?

April 28, 2005

Analyst: Aaron C. Rakers, CFA (314) 955-4404

Disclosure Information: Please refer to pages 8-9 of this report for important disclosure information.

SUMMARY

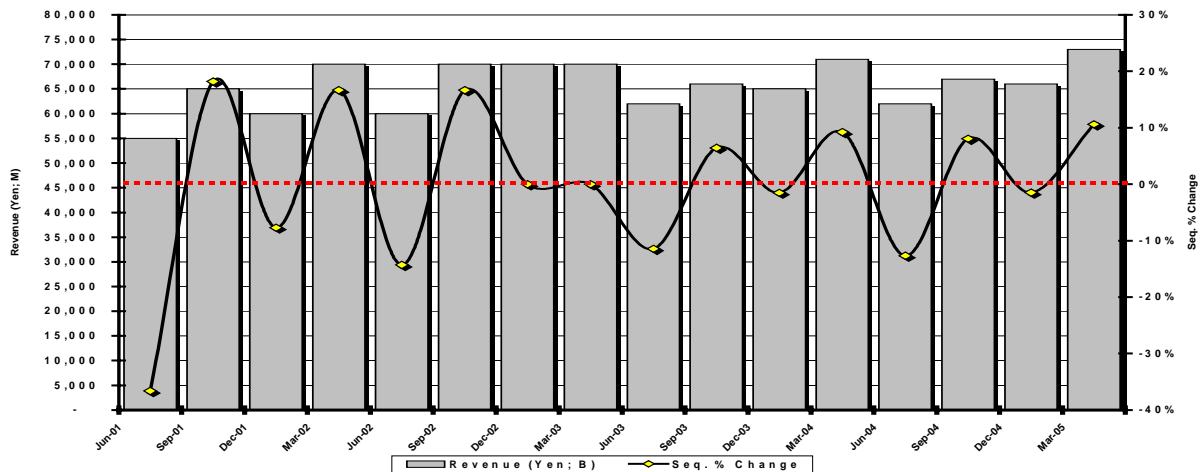
- Hitachi Ltd., parent company of Hitachi Data Systems (HDS; ~3% of total Hitachi Ltd. Rev.) reported its Mar 05 (FQ4'04) results. Hitachi reported HGGR (HDS + Hitachi Storage Japan; SAN/NAS) revenue of 268B Yen for the full year (+2% y/y), implying 73B Yen for the Mar 05 quarter (+3% y/y; +10.6% seq.).
 - Using the \$/Yen conversion rate of 107, this results in ~\$2.5B for the full year (+5% y/y); \$682.2M in the Mar 05 quarter (+7.5% seq.; currency = -3pp). This compares to EMC's reported +20% y/y growth; hardware up 13% y/y. We believe EMC did gain share on a y/y basis, but lost some modest share sequentially.
 - We believe Hitachi saw relatively flattish y/y growth in Japan, leaving HDS (HGGR ex-Japan) growing more than 3% y/y (we estimate ~5% y/y; +14-15% seq.). We view this as in-line with traditional seasonal trends, and reflects momentum in the company's new TagmaStore solutions (as expected).
 - We estimate that TB shipment growth trended in the 50-60% y/y range, while pricing remains relatively in-check (y/y ASP [\$/MB]) declines in the mid-30% range. This contradicts EMC's recent commentary regarding a trend towards the 40% y/y range; possibly reflective of the company's forthcoming product cycle.
 - Hitachi's ramping TagmaStore likely supported favorable software growth; however, we believe software contributions remained essentially unchanged (15-16% of total HGGR revenue; our estimate). This compares to EMC's software contribution at ~27%. We estimate that services continue to represent ~15% of total HGGR revenue (vs. 27% at EMC).
 - We estimate that HDS' SAN revenue (i.e. SAN switching, HBAs, etc.) grew more than the corporate average (>15% sequentially) as ports grew >30% y/y (vs. high-30% y/y as reported by EMC). We believe SAN switch pricing trends have remained relatively stable throughout the Mar 05 quarter => positive for Brocade (we estimate largest vendor at HDS; ~8% of Brocade revenue).
 - **Reduced Expectations.** Hitachi now expects total SAN/NAS revenue to be 280B Yen in during its FY2006 (ending Mar 06). This reflects 4.5% y/y growth and compares to the company's prior forecast of 320B Yen (+10% y/y). This reflects 133B in 1H (essentially flat y/y) and 147B Yen in the 2H (up ~6% y/y). HGGR operating margin is estimated to grow to 8.0% in F2005 (vs. 7.5% in F2004). Our checks suggest that these estimates could prove conservative.
 - **Net-Net:** We view Hitachi's results as net neutral for the space and EMC in general. Although the company's TagmaStore traction remains a positive, and we would expect to see a steady stream of product announcements throughout the remainder of this year (e.g. increasing NAS focus in midrange market), we believe EMC's competitive position remains solid. Continue to expect EMC to benefit from its own high-end refresh in 2H'05 (expecting "Symm-7" announcement in the May-July timeframe).
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Hitachi Storage - F2004 and FQ4/CQ1'05 Results

Hitachi recently reported its F2004 and FQ4'04 (Mar 05) quarterly results, which we believe were relatively in-line with typical seasonal FQ4 trends, but also representative of some TagmaStore traction. Below we highlight these results, as well as provide insight into the market share trends we currently see taking shape in the high-end enterprise disk storage marketplace.

Reported Results. For its FQ4'04 (Mar 05) quarter, Hitachi Storage (HGGR = HDS + Hitachi Storage sales in Japan) **grew 11% sequentially to 73B Yen** (~\$680M when using a \$/Yen exchange ratio of 107). On a y/y basis, revenue grew 3%, which compares to EMC's recently reported 20% y/y growth (+13% y/y in hardware alone). We believe Japan revenue remained relatively flat on a y/y basis, leaving pure HDS revenue up more than the corporate average (we estimate +5% y/y; ~15% seq.). Although we would have expected a more meaningful sequential growth rate out of HDS as the Mar 05 quarter represented the "production ramp" of its new TagmaStore solution, we consider these results as relatively in-line with typical seasonal trends (see Figure 1). For the full F2004, Hitachi reported storage revenue of 268B Yen, representing y/y growth of 1.5%. The company's F2004 operating margin was 7.5% (+150bps y/y), in-line with expectations. Hitachi currently expects its F2005 operating margin to be 8% (see Figure 2 below).

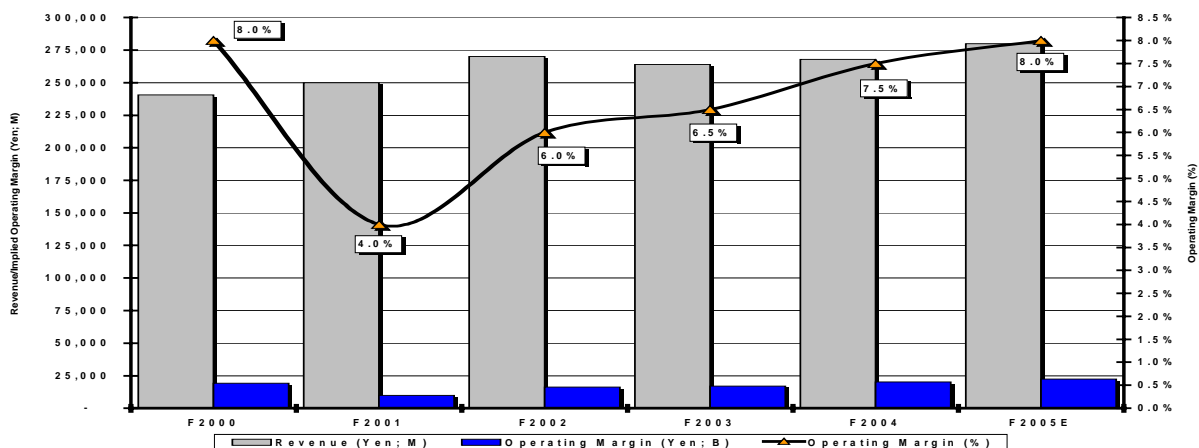
Figure 1: Reported Hitachi Quarterly Storage Revenue (Yen; M)



Source: Hitachi Ltd. Results; A.G. Edwards

Figure 2: Hitachi Storage - Fiscal Year Revenue versus Operating Margin Trends (Yen; M)

Source: Hitachi Ltd.



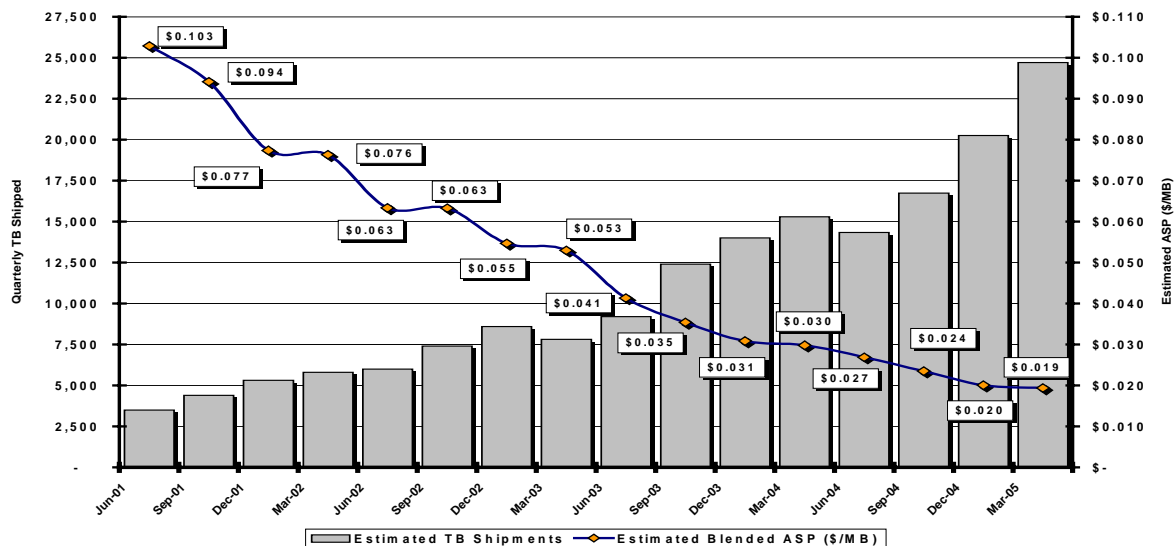
More importantly, we believe Hitachi has seen a production ramp in its TagmaStore USP solutions during the Mar 05 quarter (announced in Sept 04; meaningful ramp in Mar 05 quarter). We estimate that HGGR high-end (Lightning + TagmaStore) revenue grew as much as 15-18% sequentially during the Mar 05 quarter, which compares to EMC's reported Symmetrix decline of 14% seq. (albeit seasonality is a factor). This follows the company's elongated sales cycle issues in the prior quarter. Therefore, we believe HGGR has gained market share in the high-end market against EMC, as we had been expecting. On a y/y basis, we believe EMC's market share has remained stable (detailed below). With software and services contributions remaining similar to the prior quarter (we estimate ~15% of total HGGR revenue), we believe Hitachi's midrange Thunder revenue was relatively weak. This compares to EMC's software and services contributions both trending at ~27% of total revenue (>50% of total revenue combined). We believe an expanding software presence at Hitachi remains key; we view the company's recent announcement of Tiered Storage Manager (TSM; policy-based storage management) as a positive.

Other key highlights include:

- We believe pricing has remained relatively stable - mid-30% y/y ASP (\$/MB) declines. We view this favorably given: (1.) EMC's recent commentary regarding a ~40% y/y price decline (most notably in the high-end market; possibly reflecting the company's forthcoming refresh), and (2.) IBM's commentary regarding aggressive pricing on its legacy Shark solutions.
- With pricing in check, we estimate that TB shipments grew more than 60% y/y in the Mar 05 quarter (>20% sequentially). This reflects an increased high-end contribution given the ramping TagmaStore product (we estimate >50% y/y). Figure 3 below details Hitachi's quarterly TB shipment and blended ASP (\$/MB) trends over the past several quarters (per our estimates).
- We estimate that Hitachi's channel contributions have remained relatively unchanged - ~1/3 of revenue from OEMs (Sun and HP; HP largest), distribution channel, and HGGR direct.
- Linearity - Like EMC, we believe HDS did experience relative strength exiting Mar 05. However, seasonality was again a factor. The company's annual kick-off may have taken away from some of this momentum during April, a period in which trends are typically down.
- The company's ramping TagmaStore solutions did support strong SAN switching port growth in the quarter, in our view. Like EMC, HDS' SAN switching port growth was >30% y/y (EMC reported +30% y/y Connectrix [SAN switching] port growth as well). We believe SAN switching pricing has remained stable (mid single-digit sequential declines).

Figure 3: Hitachi Quarterly TB Shipments vs. Blended ASPs (\$/MB)

Source: A.G. Edwards' Estimates



Lowered Expectations - FY2005 (Mar 06)

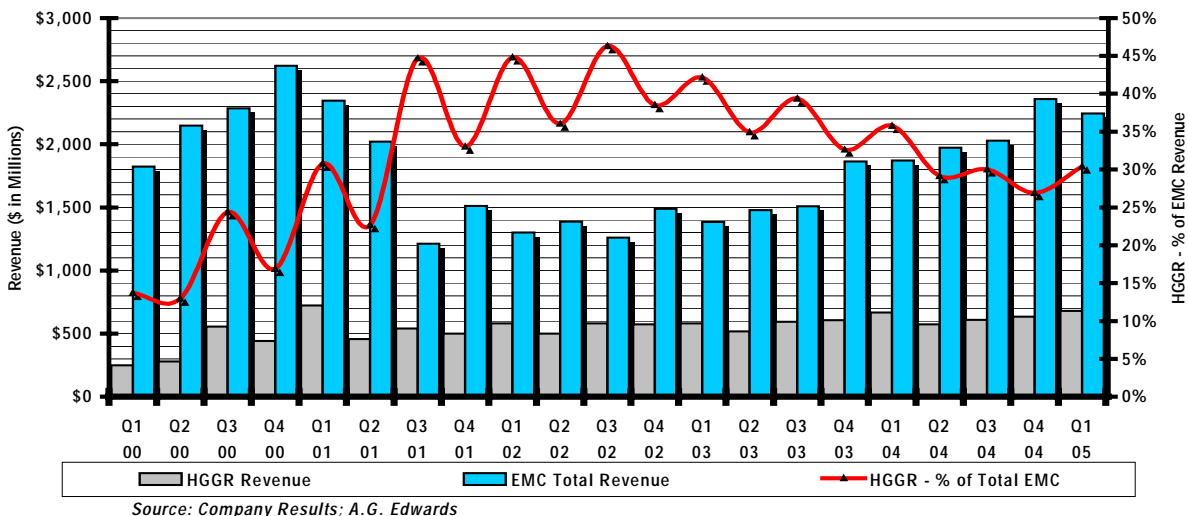
Hitachi now expects its F2005 (ending Mar 06) storage revenue to total 280B Yen (+4.5% y/y). This compares to the company's prior forecast of 320B Yen (+10% y/y; using prior F2004 estimate of 290B Yen). This reflects an estimated 133B Yen in 1H'05 (flat y/y) and 147B Yen in 2H'05 (+5.8% y/y). However, we believe these expectations could prove conservative as: 1.) we believe storage demand overall remains relatively healthy (EMC estimates overall storage market growing 7-8% y/y), 2.) we expect HDS to continue to benefit from a TagmaStore ramp, and 3.) we expect HDS to refresh its midrange Thunder line-up later this year. We believe this could reflect Hitachi's cautious stance on the economic dynamics currently playing out in Japan.

CQ1'05 Revenue/Shipment Share Trends

On a comparative basis, Hitachi's 3% y/y revenue growth in the Mar 05 quarter compared to EMC's 20% y/y growth and IBM's enterprise disk storage growth of ~20% y/y. Given that this represents Hitachi's seasonally stronger FQ4, the company's 11% sequential growth compared to a 5% revenue decline at EMC, and our estimate of -13-14% seq. in terms of IBM's enterprise disk business. IBM did note that its SAN revenue declined y/y in the Mar 05 quarter, while total storage (including disk, tape, and SAN) grew roughly 5% y/y. Figure 4 compares HGGR revenue to that of EMC on a quarterly basis. As we can see, HGGR did gain some share on a sequential basis, while our estimates indicate a modest y/y decline.

Figure 4: HGGR versus EMC Revenue - HGGR Revenue as % of Total EMC Revenue

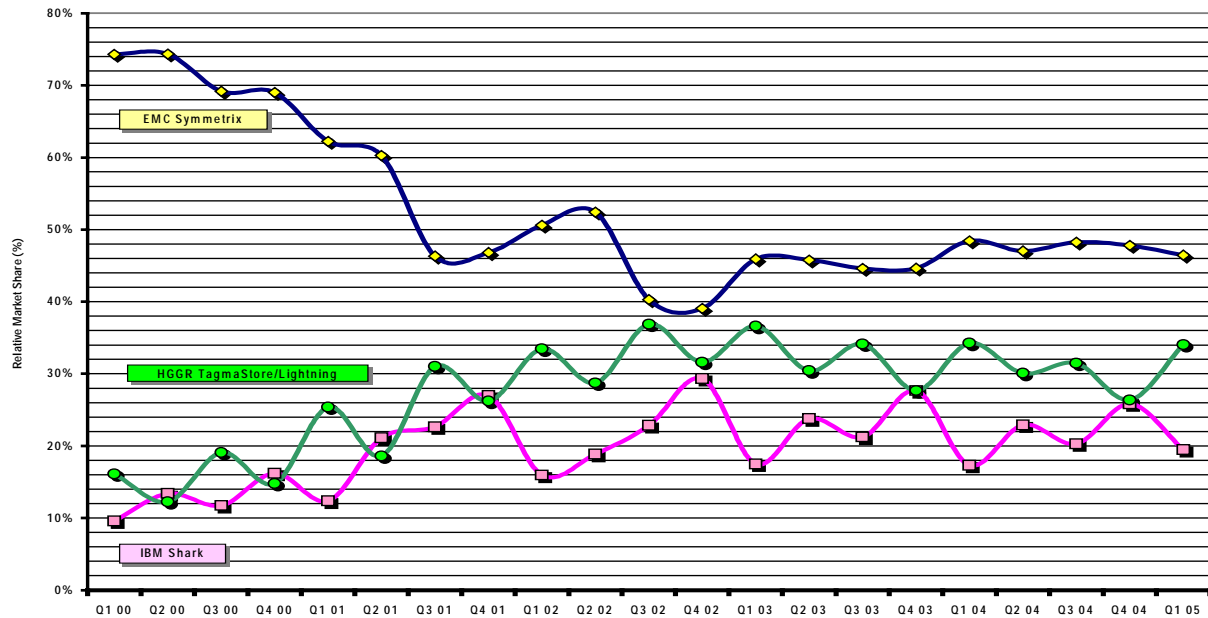
Source: A.G. Edwards



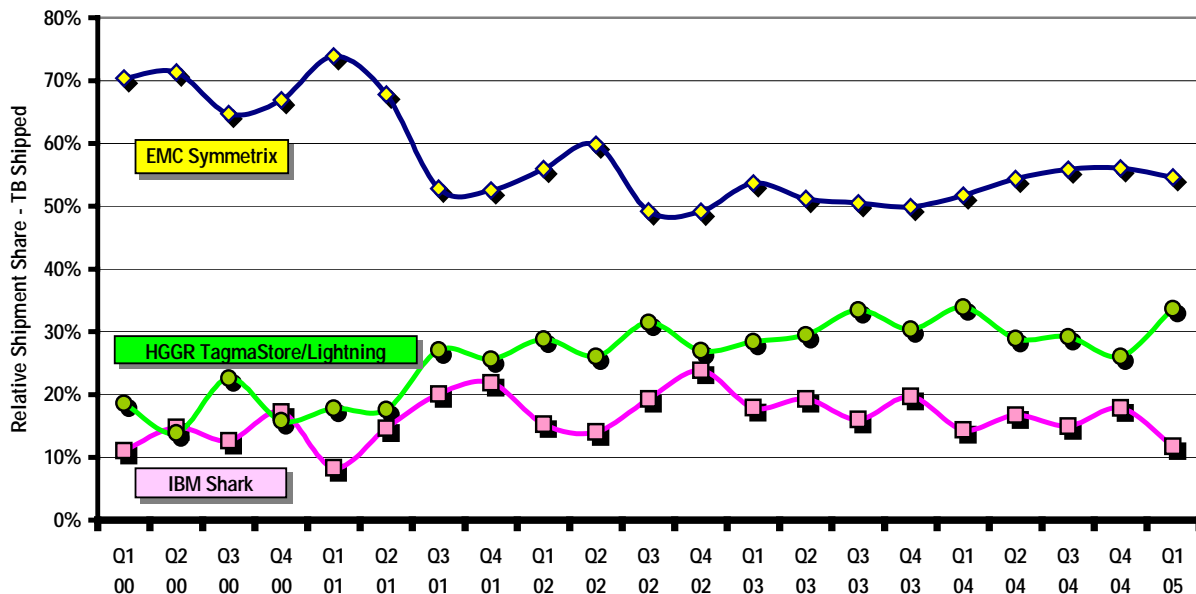
High-End RAID Share. According to our estimates, Hitachi's high-end revenue share remained essentially flat on a y/y basis, but grew nearly 8pp sequentially to ~34%. We believe this was primarily at the expense of IBM, which reflects: 1.) IBM's typical CQ1 seasonal trends, and 2.) the fact that a production volume ramp with IBM's new high-end DS8000 and DS6000 solutions did not take shape until late in the quarter. We estimate that IBM's relative high-end revenue share declined to 19% in CQ1, down from 26% in the prior quarter. We estimate that EMC's share declined approximately 2pp both on a y/y and seq. basis. We would expect the potential for further near-term declines as customers await EMC's own high-end refresh later this year (we estimate a ramp taking shape in 2H'05; most notably in the Dec 05 quarter). On a TB shipment basis, we estimate that Hitachi gained as much as 8pp of relative share sequentially in CQ1 (~34%; essentially flat y/y, according to our estimates). EMC's share declined to 55% (vs. 56% in the prior quarter), while IBM's shipment share declined to roughly 12% (vs. 18% and 14% in the prior and year ago quarters, respectively). Figure 5 and 6 detail our estimates in regards to high-end revenue and shipment market share trends over the past several quarters.

Figure 5: High-End RAID Market - Relative Quarterly Revenue Share

Source: A.G. Edwards' Estimates


Figure 6: High-End RAID Market - Relative Quarterly TB Shipment Share

Source: A.G. Edwards' Estimates



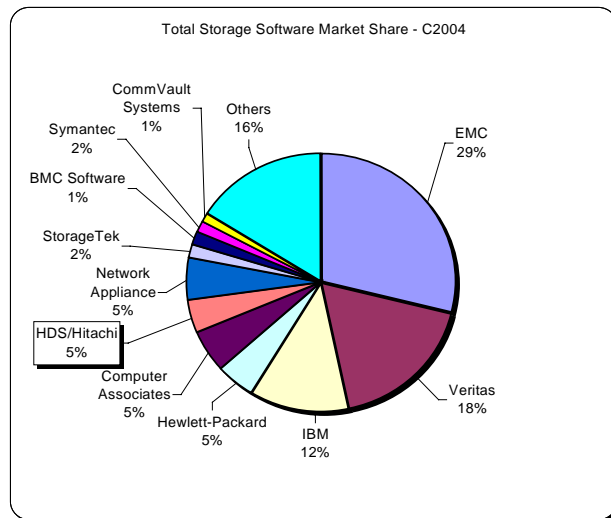
Product Announcements - Software Remains a Focus. We believe Hitachi is set to announce some meaningful product introductions throughout the remainder of this year. From NAS functionality in the midrange market ("channel-optimized midrange NAS blades for the Windows & Linux markets"; similar to the recently announced

NAS blades for the TagmaStore), to the possibility of seeing virtualization move into the company's midrange solutions (possibly mid/early 2H'05 story; coupled with new Thunder refresh), we believe Hitachi continues to broaden its product portfolio. Following the announcement of its Tiered Storage Manager (TSM; policy-based storage management software) in mid-April, we believe Hitachi will continue to build out its software portfolio. TSM represents a unified solution within the company's HiCommand product suite, which will become available in May. We would expect follow-on versions with enhanced functionality (possibly leveraging/integrating with the company's App IQ SRM software) to be introduced this year. That said, we believe Hitachi's ability to expand its software presence will be key as it looks to differentiate itself from EMC and IBM. As we can see in Figure 7 below, Hitachi's overall storage management software share stood at only 5% in C2004, according to Dataquest's estimates. This compares to nearly a 30% revenue share at EMC, and IBM's revenue share of approximately 12%.

Figure 7: Storage Management Software Share

Source: Dataquest; A.G. Edwards

Vendor	1998	1999	2000	2001	2002	2003	2004
EMC (Includes Legato)	\$592	\$975	\$1,483	\$1,678	\$1,283	\$1,371	\$1,661
Veritas	\$293	\$505	\$855	\$985	\$881	\$929	\$1,038
IBM	\$608	\$724	\$844	\$603	\$542	\$616	\$688
Hewlett-Packard	\$60	\$113	\$230	\$260	\$252	\$279	\$272
Computer Associates	\$596	\$799	\$613	\$224	\$352	\$328	\$295
HDS/Hitachi	\$5	\$9	\$22	\$119	\$210	\$235	\$256
Network Appliance	\$15	\$53	\$156	\$89	\$107	\$169	\$293
StorageTek	\$87	\$113	\$144	\$120	\$121	\$114	\$105
BMC Software	\$165	\$229	\$224	\$161	\$116	\$79	\$84
Symantec	\$24	\$36	\$40	\$102	\$108	\$94	\$89
CommVault Systems	\$24	\$29	\$24	\$20	\$24	\$37	\$59
Others	\$422	\$569	\$681	\$686	\$777	\$888	\$934
Total Storage Mgmt Software	\$2,890	\$4,088	\$5,252	\$4,925	\$4,641	\$5,008	\$5,625



REVENUE SHARE (%)

Vendor	1998	1999	2000	2001	2002	2003	2004
EMC	20.5%	23.9%	28.2%	34.1%	27.6%	27.4%	29.5%
Veritas	10.1%	12.3%	16.3%	20.0%	19.0%	18.6%	18.5%
IBM	21.0%	17.7%	16.1%	12.3%	11.7%	12.3%	12.2%
Hewlett-Packard	2.1%	2.8%	4.4%	5.3%	5.4%	5.6%	4.8%
Computer Associates	20.6%	19.5%	11.7%	4.5%	7.6%	6.5%	5.2%
HDS/Hitachi	0.2%	0.2%	0.4%	2.4%	4.5%	4.7%	4.6%
Network Appliance	0.5%	1.3%	3.0%	1.8%	2.3%	3.4%	5.2%
StorageTek	3.0%	2.8%	2.7%	2.4%	2.6%	2.3%	1.9%
BMC Software	5.7%	5.6%	4.3%	3.3%	2.5%	1.6%	1.5%
Symantec	0.8%	0.9%	0.8%	2.1%	2.3%	1.9%	1.6%
CommVault Systems	0.8%	0.7%	0.5%	0.4%	0.5%	0.7%	1.1%
Others	14.6%	13.9%	13.0%	13.9%	16.8%	17.7%	16.6%
Total Storage Mgmt Software	100%	100%	100%	100%	100%	100%	100%

HDS is a subsidiary of Hitachi, Ltd., (HIT) which is not closely followed by A.G. Edwards. HDS revenues represent approximately 3% of HIT's total revenues; this report should not be construed as providing information sufficient to allow an investor to make a decision on the merits of an investment in HIT.

Valuation/Risk Information:

We look at a variety of metrics to determine valuation, such as price/earnings, price/sales, and enterprise-value/sales. Sometimes stocks are attractive or not based on absolute or relative valuations or both. We consider the strength of the balance sheet and the quality of management in our assumptions, as well as the company's overall growth outlook when evaluating our rating on the company's equity. We look at the history of earnings over several cycles. Risks to achieving any of our price objectives include a loss of share, a slowdown in global GDP and IT spending patterns, increased pricing pressures, and the company's ability to execute in their respective addressable markets.

EMC - VALUATION/RISK FACTORS

Although shares of EMC (EMC-\$12.93-Buy/Aggressive) seem to be trading at a relatively steep/fair valuation when using our current 2005 EPS estimate of \$0.51 (i.e. currently trading at approximately 25x), we believe investors need to focus on what EMC can earn on a "normalized" basis over the next few years. Therefore, given that our

\$17/share price objective looks out twelve-to-eighteen months from today, we believe the valuation will begin to reflect a normalized EMC earnings potential exiting calendar 2006. Given that our EPS estimate exiting calendar 2006 is currently approximately \$0.18/share (approximately \$0.73/share annualized; versus its peak annualized quarterly earnings of \$1.00/share), our current price objective equates to roughly a 23x forward P/E multiple based on this “normalized” earnings potential. This also reflects a 27x multiple when looking at our current C2006 EPS estimate of \$0.62, which we believe has the potential for some upward revision. This is relatively in-line with the mean trading range of these shares during the “pre-bubble” period (i.e. 1994 through 1998). We view this as fair as we continue to believe that EMC can expand its operating margin leverage to the upper teens, and potentially in the 20% range over this timeframe (note that this compares to the company’s peak operating margin of 27%). This also reflects our assumption that EMC’s top-line revenue growth will normalize in the 8-10% year-over-year range over this timeframe, while EPS growth normalizes in the mid-teens year-over-year.

Risk Factors. Risk factors to our rating and price objective include: 1.) increasing competitive/pricing pressures, 2.) EMC’s ability to meaningful expand its operating margins going forward, 3.) Recent concerns regarding an IT spending slowdown; although we continue to belief growth will remain healthy throughout 2004 and into 2005, 4.) Execution – most notably given the company’s ongoing ability to effectively executive with its recent software acquisitions.

Analyst Certification:

The views expressed in this research report accurately reflect my personal views about the subject company/companies and its securities. I receive no compensation that is directly or indirectly related to the specific recommendations or views contained within this report.

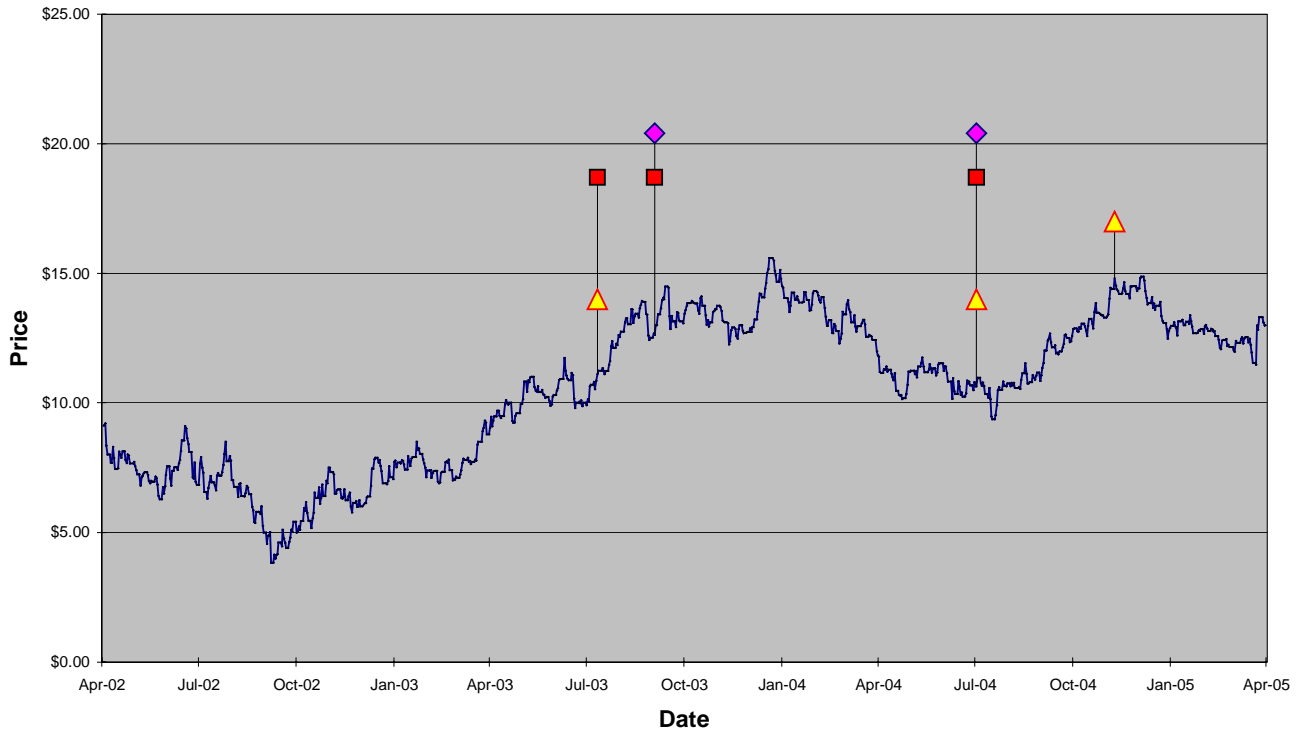
EMC CORPORATION

April 28, 2005

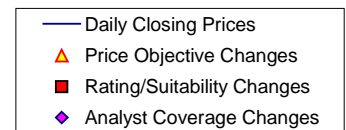
Buy/Aggressive

EMC/NYSE/\$13.00

Price Objective: \$17.00



Pricing sources: Factset and IDS1



PRICE OBJECTIVE (PO) CHANGES *

Date	Closing Price	PO	Date	Closing Price	PO	Date	Closing Price	PO
08/07/2003	11.10	14.00	09/30/2003	12.63	NA	12/06/2004	14.80	17.00
			07/29/2004	10.64	14.00			

* NA: Positive rating removed; no price objective supplied.

RATING/SUITABILITY CHANGES

Date	Closing Price	Rating/Suitability	Date	Closing Price	Rating/Suitability
08/07/2003	11.10	Hold/Aggressive	09/30/2003	12.63	Coverage dropped/
		Buy/Aggressive	07/29/2004	10.64	Buy/Aggressive

ANALYST COVERAGE CHANGES

Analyst	From	To	Analyst	From	To
Shebly Seyrafi	09/21/1999	09/30/2003	Aaron C. Rakers	07/29/2004	

EMC CORPORATION

April 28, 2005

Buy/Aggressive

EMC/NYSE/\$13.00

Price Objective: \$17.00

Rating	Master List Companies	Current Rating Distribution	Past 12 months	
			Investment Banking Clients	% of Investment Banking Clients *
Buy	238	35%	37	16%
Hold/Neutral	428	62%	44	10%
Sell	19	3%	1	5%

* Percentage of Investment Banking Clients on Master List by rating.

OUR 3-TIER RATING SYSTEM (12-18 month time horizon)

Buy: A total return is anticipated in excess of the market's long-term historic rate (approximately 10%). Total return expectations should be higher for stocks which possess greater risk.

Hold: Hold the shares, with neither a materially positive total return nor a materially negative total return is anticipated.

Sell: Stock should be sold, as a materially negative total return is anticipated.

RISK SUITABILITY (Relates to fundamental risk, including earnings predictability, balance sheet strength and price volatility)

Conservative: Fundamental risk approximates or is less than the market.

Aggressive: Fundamental risk is higher than the market.

Speculative: Fundamental risk is significantly higher than the market.

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AGE or an affiliate received compensation from the subject company for products or services other than investment banking services during the past 12 months, and analyst or person with ability to influence substance of this report is aware of same.

The subject company is or was a client of AGE during the past 12 months for non-investment banking securities-related services and analyst is aware of same.

AGE and/or officer(s) own a long position in the issuer's equity securities.

The views expressed in this research report accurately reflect my personal views about the subject company and its securities.

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