

Equity Research
North America

Industry Report

Internet, Technology, Telecommunications

Internet: New Media/eCommerce & PC Software

mary.meeker@msdw.com	(212) 761-8042
mark.mahaney@msdw.com	4864
david.joseph@msdw.com	3365
michael.l.brown@msdw.com	6030
mark.trowbridge@msdw.com	3384
fabrizio.cascianelli@msdw.com	8949
brian.fitzgerald@msdw.com	4276

European Internet

michael.steib@msdw.com	(London) 425-5263
------------------------	-------------------

Japan Internet

yoshiko.motoyama@msdw.com	(Tokyo) 5424-5912
hiromi.abe@msdw.com	5911

Asia-Pacific Internet

sunil.gupta@msdw.com	(Singapore) 834-6732
----------------------	----------------------

Latin America Internet

julio.zamora@msdw.com	(212) 761-8349
-----------------------	----------------

Internet Infrastructure Services

jeff.camp@msdw.com	(212) 761-3112
--------------------	----------------

Internet Infrastructure & Data Networking

chris.stix@msdw.com	(617) 856-8741
george.kelly@msdw.com	(212) 761-6242

Internet/B2B Software & Enterprise Software

charles.phillips@msdw.com	(212) 761-4450
---------------------------	----------------

Wireline Telecom Services

simon.flannery@msdw.com	(212) 761-6432
-------------------------	----------------

Telecom Equipment-Wireline/Wireless

alkesh.shah@msdw.com	(212) 761-6554
----------------------	----------------

Internet Advertising & Direct Marketing Services

michael.russell@msdw.com	(212) 761-6352
--------------------------	----------------

Broadband/Cable Television

richard.bilotti@msdw.com	(212) 761-7162
--------------------------	----------------

PC Hardware/Data Storage & Internet Devices

gillian.munson@msdw.com	(212) 761-6070
-------------------------	----------------

Wireless Data Services

greg.lundberg@msdw.com	(212) 761-4682
------------------------	----------------

RECENT REPORTS

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Industry Overview

March 27, 2001

Drilling Down on the Internet User/Usage Ecosystem Framework

We detail our Internet User/Usage Ecosystem Framework

This report provides details on the 24 (annual and quarterly) metrics for the 32 companies represented in our Internet User/Usage Ecosystem Framework. We also highlight other basic growth statistics related to Internet trends. This report is a companion piece to Part 2 of our five-part series looking at Internet-related trends.

Our framework, launched 1/24/01, is a one-stop shop...

Our intent was to determine the basics of the health, growth, and direction of the Internet. We believe we have created the best one-stop shop for determining Internet user/usage growth rates. This report will be updated quarterly as new data become available.

Internet usage continued to outpace user growth in CQ4:00

CQ4 Internet user/usage growth remained robust, though slowing. The median Y/Y Internet core *usage-to-user* growth multiplier was 1.11, vs. 2.28 in CQ3. But the decline was skewed mainly by a continued rise in Cisco's LAN port sales (+110% Y/Y in CQ4, vs. +75% in CQ3), which understates the multiplier, in our opinion. We expect Internet usage growth to continue outpacing user growth by almost two times.

CQ4:00 figures...

Y/Y user growth reflected a median rise of 110%, vs. 75% in CQ3. CQ4 Y/Y usage growth reflected median rise of 122%, vs. 148% in CQ3. Of the 23 quarterly metrics, 36% saw a rise in Q/Q growth, 55% saw a decrease, and 9% were unchanged.

Looking Ahead...

We continue to believe that Internet user and usage growth (especially outside the US) will remain strong, but will support slower rates of growth. While the slowing economy has clearly hit Internet-related purchases (from advertising space to routers), to date we haven't seen any signs indicating that Internet user and usage growth is being affected.

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Exhibit 1

The Internet User/Usage Ecosystem Framework

MORGAN STANLEY INTERNET/COMMUNICATIONS RESEARCH

The Internet User/Usage Ecosystem Framework - Key Internet Momentum Metrics

Company	Metric Share	Quarterly								Annual			
		Q1:99	Q2:99	Q3:99	Q4:99	Q1:00	Q2:00	Q3:00	Q4:00	1997	1998	1999	2000
Internet Users													
Yahoo! (Meeker/Mahaney) - Global													
Global Monthly Unique Visitors (000's)	63%	60,000	80,000	105,000	120,000	145,000	156,000	166,000	180,000	--	50,000	120,000	180,000
Y/Y Growth	--	88%	100%	163%	140%	142%	95%	58%	50%	--	--	140%	50%
Q/Q Growth	--	20%	33%	31%	14%	21%	8%	6%	8%	--	--	--	--
VeriSign (Network Solutions) (Meeker/Joseph) - Global													
Top Level Domain (TLD) Names Registered (b) (000's)	100%	4,224	5,354	6,746	8,957	13,957	19,000	24,200	28,200	--	--	8,957	29,000
Y/Y Growth	--	--	--	--	--	230%	255%	259%	215%	--	--	--	224%
Q/Q Growth	--	--	27%	26%	33%	56%	36%	27%	17%	--	--	--	--
Telcordia Technologies (Netsizer) (Meeker/Joseph) - Global													
Internet Hosts (000's)	100%	50,500	57,300	63,300	68,800	75,100	82,800	91,500	99,200	30,000	43,000	68,800	99,200
Y/Y Growth	--	--	--	--	--	49%	45%	45%	44%	--	43%	60%	44%
Q/Q Growth	--	--	13%	10%	9%	9%	10%	11%	8%	--	--	--	--
Cisco (Stix) - Global													
LAN Ports (000's)	47%	5,739	6,593	7,554	7,737	9,350	10,496	13,211	16,254	5,921	15,823	27,623	49,311
Y/Y Growth	--	110%	90%	63%	55%	63%	59%	75%	110%	153%	167%	75%	79%
Q/Q Growth	--	15%	15%	15%	2%	21%	12%	26%	23%	--	--	--	--
Cisco (Stix) - Global													
WAN Ports (Core & Edge) (a) (000's)	74%	8	11	15	17	28	35	42	46	0	9	17	46
Y/Y Growth	--	450%	693%	674%	263%	264%	215%	184%	165%	--	2250%	85%	165%
Q/Q Growth	--	60%	44%	32%	18%	61%	25%	19%	10%	--	--	--	--
Core Internet Usage													
<i>General</i>													
Yahoo! (Meeker/Mahaney) - Global													
Avg. Daily Page Views (000's)	<5%	235,000	310,000	385,000	465,000	625,000	680,000	780,000	900,000	65,000	167,000	465,000	900,000
Y/Y Growth	--	147%	170%	167%	178%	166%	119%	103%	94%	--	157%	178%	94%
Q/Q Growth	--	41%	32%	24%	21%	34%	9%	15%	15%	--	--	--	--
Media Metrix (Meeker/Mahaney/Joseph) - U.S.													
Estimated Total Digital Media Usage Mins. Per Quarter (MM)	100%	131,510	144,405	150,061	144,356	195,993	229,107	271,159	269,414	--	--	570,332	965,673
Y/Y Growth	--	--	--	--	--	49%	59%	81%	87%	--	--	--	69%
Q/Q Growth	--	--	10%	4%	(4%)	36%	17%	18%	(1%)	--	--	--	--
DoubleClick (Russell) - Global													
Ads Served (MM)	--	20,856	29,625	43,800	77,200	125,100	149,000	162,000	185,000	--	33,943	171,481	612,234
Y/Y Growth	--	--	--	--	--	500%	403%	270%	140%	--	--	405%	257%
Q/Q Growth	--	--	42%	48%	76%	62%	19%	9%	14%	--	--	--	--
eBay (Meeker/Mahaney) - U.S.													
Gross Merchandise Sales (SMM)	--	541	622	741	901	1,150	1,293	1,355	1,616	95	746	2,805	5,414
Y/Y Growth	--	420%	344%	280%	193%	113%	108%	83%	79%	--	685%	276%	93%
Q/Q Growth	--	76%	15%	19%	22%	28%	12%	5%	19%	--	--	--	--
RHK Inc. (Shah) - Global													
Average Petabytes Per Month	100%	--	--	--	--	--	--	--	--	--	--	14	41
Y/Y Growth	--	--	--	--	--	--	--	--	--	--	--	--	200%
Q/Q Growth	--	--	--	--	--	--	--	--	--	--	--	--	--
Exodus (Camp) - Global													
Peak Network Traffic (gigabits/second)	--	4	4	6	7	9	10	13	15	--	--	7	15
Y/Y Growth	--	--	--	--	--	129%	145%	125%	101%	--	--	--	101%
Q/Q Growth	--	--	11%	33%	29%	21%	18%	22%	15%	--	--	--	--
Exodus (Camp) - Global													
Servers Hosted in Internet Data Centers (c) (000's)	--	9	12	16	27	39	52	63	73	--	7	27	73
Y/Y Growth	--	--	--	--	303%	333%	348%	291%	170%	--	--	303%	170%
Q/Q Growth	--	34%	29%	38%	69%	44%	33%	20%	17%	--	--	--	--
Exodus (Camp) - Global													
Data Centers - Gross Sq. Footage (d) (000's)	24%	240	700	970	1,570	1,700	2,090	2,650	4,100	--	--	3,740	10,746
Y/Y Growth	--	--	--	--	--	608%	199%	173%	161%	--	--	--	187%
Q/Q Growth	--	--	192%	39%	62%	8%	23%	27%	55%	--	--	--	--

E = Morgan Stanley Internet Research Estimates

(a) CQ4:00 number is an estimate; (b) VeriSign is the exclusive global registry for .com, .org., and .net domain names; (c) EXDS did not report number for CQ4:00, so 73 is MS estimate; (d) GSF for CQ4:00 is not pro forma for the acquisition of Global Center — If GSF from Global Center were included, the number would be 5.3MM.

Exhibit 1 (continued)

The Internet User/Usage Ecosystem Framework (continued)

MORGAN STANLEY INTERNET/COMMUNICATIONS RESEARCH

The Internet User/Usage Ecosystem Framework - Key Internet Momentum Metrics

Company	Metric Share	Quarterly								Annual			
		Q1:99	Q2:99	Q3:99	Q4:99	Q1:00	Q2:00	Q3:00	Q4:00	1997	1998	1999	2000
Core Internet Usage (continued)													
Ariba+Commerce One (Phillips) - Global													
eProcurement Applications Deployed (e)	--	60	83	115	213	376	682	954	1,193	--	38	213	1,193
Y/Y Growth	--	--	--	--	461%	527%	722%	730%	460%	--	--	461%	460%
Q/Q Growth	--	58%	38%	39%	85%	77%	81%	40%	25%	--	--	--	--
Broadvision+Vignette+E.piphany+Kana/Silknet+Broadbase (Phillips) - Global													
eCRM Applications Deployed (e)	69%	741	946	1,323	1,767	2,354	2,879	3,585	3,921	--	620	1,767	3,921
Y/Y Growth	--	--	--	--	185%	218%	204%	171%	122%	--	--	185%	122%
Q/Q Growth	--	20%	28%	40%	34%	33%	22%	25%	9%	--	--	--	--
Narrowband													
WorldCom/UUNET (Flannery) - U.S.													
Customer Online Hours (f) (MM)	19%	904	988	1,094	1,200	1,500	1,600	1,630	1,680	--	--	4,185	6,410
Y/Y Growth	--	--	--	--	--	66%	62%	49%	40%	--	--	--	53%
Q/Q Growth	--	--	9%	11%	10%	25%	7%	2%	3%	--	--	--	--
AOL (Meeker/Mahaney/Bilotti) - U.S.													
Total Member Hours Per Month (MM)	33%	380	399	474	485	576	550	591	660	--	--	1,738	2,377
Y/Y Growth	--	--	--	--	--	52%	38%	25%	36%	--	--	--	37%
Q/Q Growth	--	--	5%	19%	2%	19%	(5%)	7%	12%	--	--	--	--
Broadband													
SBC+Verizon+BellSouth (g) (Flannery) - U.S.													
Digital Signal, Level 0 (DS-0) - Top 3 (000's)	83%	60,557	65,197	70,343	74,176	84,690	96,018	101,830	116,458	--	--	74,176	116,458
Y/Y Growth	--	--	--	--	--	40%	47%	45%	57%	--	--	--	57%
Q/Q Growth	--	--	8%	8%	5%	14%	13%	6%	14%	--	--	--	--
WorldCom/UUNET (Flannery) - Global													
Digital Signal, Level 3 (DS-3) Miles (h) (000's)	--	3	4	6	9	12	13	14	--	--	3	9	--
Y/Y Growth	--	230%	133%	174%	204%	252%	280%	122%	--	--	--	204%	--
Q/Q Growth	--	18%	6%	80%	35%	36%	15%	5%	--	--	--	--	--
SBC+Verizon (Flannery) - U.S.													
DSL Subscribers - Top 2 (000's)	53%	--	--	--	202	351	620	867	1,271	--	--	202	1,320
Y/Y Growth	--	--	--	--	--	--	--	--	529%	--	--	--	553%
Q/Q Growth	--	--	--	--	--	--	77%	40%	47%	--	--	--	--
@Home (i) +RoadRunner (Bilotti) - U.S.													
Cable Modem Subscribers - Top 2 (000's)	90%	507	675	908	1,239	1,631	2,023	2,594	3,323	--	331	1,239	3,322
Y/Y Growth	--	--	--	--	--	222%	200%	186%	168%	--	--	274%	168%
Q/Q Growth	--	--	33%	35%	36%	32%	24%	28%	28%	--	--	--	--
Wireless													
US													
Sprint PCS+Verizon+AT&T Wireless+Nextel - U.S.													
Wireless Data Subscribers - Via Cell Phones - Top 4 (000's)	74%	--	--	--	200	350	610	1,570	2,897	--	--	200	2,897
Y/Y Growth	--	--	--	--	--	--	--	--	1349%	--	--	--	1349%
Q/Q Growth	--	--	--	--	--	75%	74%	157%	85%	--	--	--	--
Palm.net+Aether+GoAmerica+OmniSky+RIM (j,k,l) (Lundberg) - U.S.													
Wireless Data Subscribers -Via Devices - Top 5 (000's)	86%	3	4	29	54	118	196	275	369	--	--	31	376
Y/Y Growth	--	--	--	--	--	4029%	4999%	854%	586%	--	--	--	1099%
Q/Q Growth	--	--	35%	649%	87%	119%	66%	40%	34%	--	--	--	--
Japan													
NTT DoCoMo (iMode) (Tanaka) - Japan													
Wireless Data Subscribers (000's)	77%	48	524	1,733	3,130	5,603	8,289	12,648	17,161	--	48	3,130	17,161
Y/Y Growth	--	--	--	--	--	11573%	1482%	630%	448%	--	--	6421%	448%
Q/Q Growth	--	--	992%	231%	81%	79%	48%	53%	36%	--	--	--	--

(e) Numbers not in thousands. Kana did not disclose customer number so CQ4:00 is MS est; (f) WCOM did not report so CQ4:00 is MS est.; (g) Share is in terms of access line. CQ4:99 and CQ4:00 numbers restated for asset acq./sales. Other Q's not restated; (h) Figures for DS-3 Miles are not absolute numbers rather they are ratios over CQ1:98 levels. So the 14 figure in CQ3:00 signifies that DS-3 Miles for the period are 14x higher than in CQ1:98; (i) @Home 2000E is pro forma for MediaOne acquisition. CQ4:00 numbers are MS estimates; (j) Note that Palm has roughly 100,000 users who registered for MyPalm access via cell phones in CQ1:01; (k) There may be some overlap between RIM and Aether/GoAmerica; (l) Actuals, except for GOAM.

General Thoughts

The Purpose of This Report

“New” news became old news very quickly — the Internet is a major mass medium and has ramped faster than anything before it. Evidence of the steep Internet adoption curves we are seeing today is most obvious when looking at the historical growth rates of different mass media (Exhibit 2), where the Internet has surpassed all other forms of media.

We think a key challenge that investors and Internet/communications executives face today is determining the growth rates of Internet users/usage and the level of supply and demand for products and services that exist today, and will exist in the future. This is particularly crucial given: the slowing global economy; slowing rates of user/usage growth (especially in the US market when compared with non-US markets); and the simple fact that the days of “easy money” (and all things good or bad associated with that) are behind us.

In our effort to determine the basics of the health/growth/direction of the Internet, we have created what is in effect an Internet user/usage ecosystem framework. It has been frustrating that there’s no single, truly dependable global source for Internet user/usage data. However, with this report, which we intend to update and publish frequently, we believe we have created the best one-stop shop for determining Internet user/usage growth rates. We have done this by compiling what we believe are the 24 most relevant publicly available metrics (23 quarterly, one annual) from 32 companies (primarily US-based) that have leading market positions in various parts of the Internet ecosystem, from the front end (users) to the back end (network infrastructure). While these data might be US-centric at this point, we believe they are a relevant sample that provide directional significance.

As one can see in Exhibit 1 (pages 3 and 4), we use Yahoo!’s visitor metric as one of five proxies for determining growth rates in the number of Internet users, and we use data from companies ranging from Yahoo! to Exodus to WorldCom/UUNET to SBC as four of 19 proxies for determining growth rates in Internet usage.

In the end, what we’ve gleaned from the metrics is that Internet user and usage growth remains strong, though it has shown signs of slowing, and that usage growth continues to outpace user growth.

This report (and the data set in it) is part of a series and complements our report published on January 3, titled, “A Look at Global TMT Market Status and Internet User/Usage Propensity”.

Highlights of this Report

- For CQ4:00, the Internet growth metrics continued to support very strong, though slowing, rates of growth. Though the median Y/Y Internet core usage to user growth multiplier came down in CQ4, to 1.11 from 2.28 in CQ3, this was skewed mainly by a continued acceleration in Cisco’s LAN port sales (up 110% Y/Y in CQ4). On average, CQ4 Y/Y Internet core usage growth outpaced user growth by a multiplier of 1.35. We believe that the multiplier may be understated here and that current usage growth may be closer to 2 times user growth.
- CQ4:00 Y/Y user growth ranged from 44-215% with a median increase of 110% and an average increase of 117%, versus CQ3:00 Y/Y user growth of 45-259% with a median increase of 75% and an average increase of 124%. CQ4:00 Y/Y core usage growth ranged from 79-460% with a median increase of 122% and an average increase of 157%, versus CQ3:00 Y/Y usage growth of 81-854%, with a median increase of 148% and an average increase of 225%.
- Of the 23 quarterly metrics presented in this report, 36% of the metrics experienced an increase in the rate of growth Q/Q in C4Q:00, 55% saw a decrease in the rate of growth Q/Q, and 9% (or two metrics’ growth rate) were unchanged.

Details of the Internet Ecosystem Framework

Simply stated, an ecosystem is any group of living or non-living things that interact with each other. We think the Internet is a great example of an ecosystem since it presents an environment in which Internet users, technologies, and companies continually interact with each other and drive the Internet’s evolution and growth.

As noted above, keeping tabs on this growth has never been easy, but in Exhibit 1 we present what we believe are the “key” indicators of Internet user and usage growth. We also portray these graphically below as they apply to the Internet Ecosystem. What makes these indicators “key” are that 1) they are direct indicators coming from companies with the widest footprints on the Web today, or at least the largest share in their respective markets; and 2) all of the companies in the table represent a wide

variety of industries and technologies powering the Internet from the back end to the front end.

When examining the data, we would keep a couple of points in mind. First, given the sample we use, while the absolute magnitude of the rates of change are suspect, the data should have directional significance on a consistent basis. Second, a lot of our data points have a US bias and, therefore, reflect a more mature Internet market than actually exists on a global level. Third, we believe that non-US rates of growth will continue to be higher than those in the US for the foreseeable future. And fourth, nearly 70% of Internet user live outside the US.

All in, we believe that the data tell us Internet growth remains robust, although rates are slowing, and that the Internet continues to permeate global economies, cultures, and lifestyles.

Internet User Growth — Worldwide, we estimate there are about 300MM Internet users today, up about 40% from 205 million in 1999 and up about 273% from 77 million in 1997, when we first began tracking Internet users.

Looking at other estimates out there, it seems that our numbers fall in the more conservative end of the spectrum, with estimates ranging from the World Bank's 243 million in 2000, to IDC's estimate of 338 million, to the Computer Industry Almanac's more aggressive number of 766 million.

Regionally, we estimate that the US still has the lead (based on year-end 2000), with about 91 million Internet users (up 20% Y/Y), followed by Western Europe (85 million, up 31%), non-Japan Asia (68 million, up 79%), Japan (28 million, up 65%), and Latin America (15 million, up 67%).

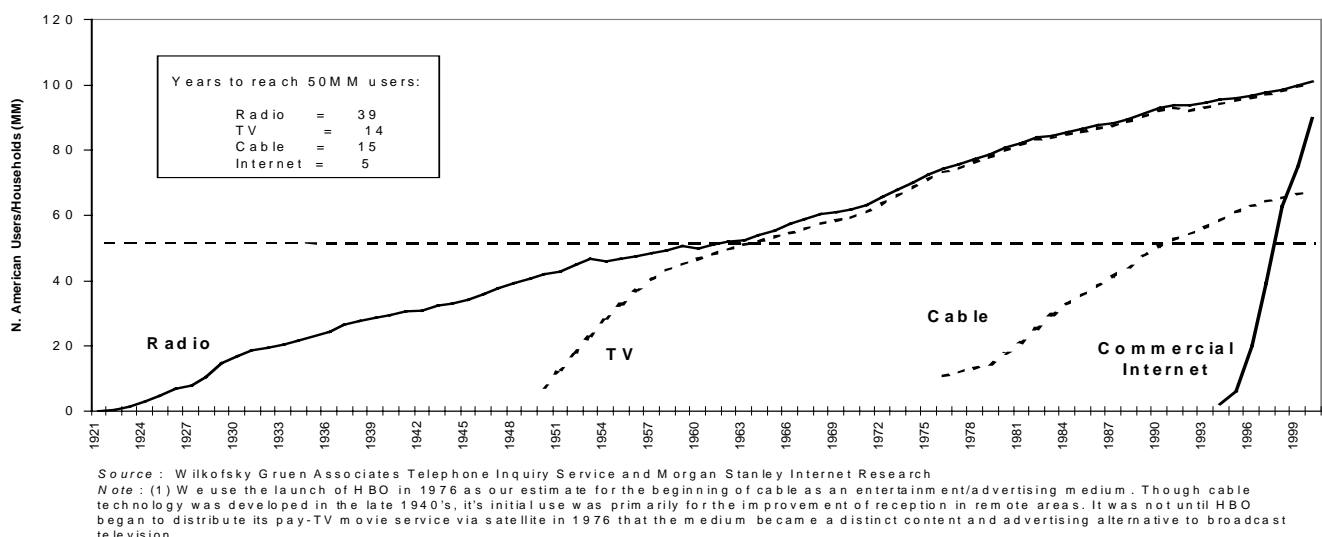
Among these regions, we expect the strongest growth in Internet users over the next three years will be in Latin American (up roughly 150% from calendar 2000 to 37MM users in 2003) and non-Japan Asia markets (up 107% from C2000, to 141MM in C2003), followed by Japan (up 129% from C2000, to 64MM in C2003), Western Europe (up 76% from C2000, to 150MM in C2003), and US markets (up 58% from C2000, to 144MM in C2003). Note that if user growth continues at its current pace worldwide, Europe will equal the US in 2001 in total users, and non-Japan Asia will almost catch up to the US in 2003.

Internet Usage Growth — Worldwide, we estimate that the average user is on the Internet approximately 30-35 minutes per day, and we think several factors will likely cause that number to double over the next two to four years. Simple math tells us that if global Internet users and average minutes per user per month nearly double by year-end 2003, then total usage should almost quadruple. We believe drivers of usage growth should include: 1) new Web applications, 2) the rollout of broadband services, and 3) the development of wireless services.

Exhibit 2

Adoption Curves for Various Media

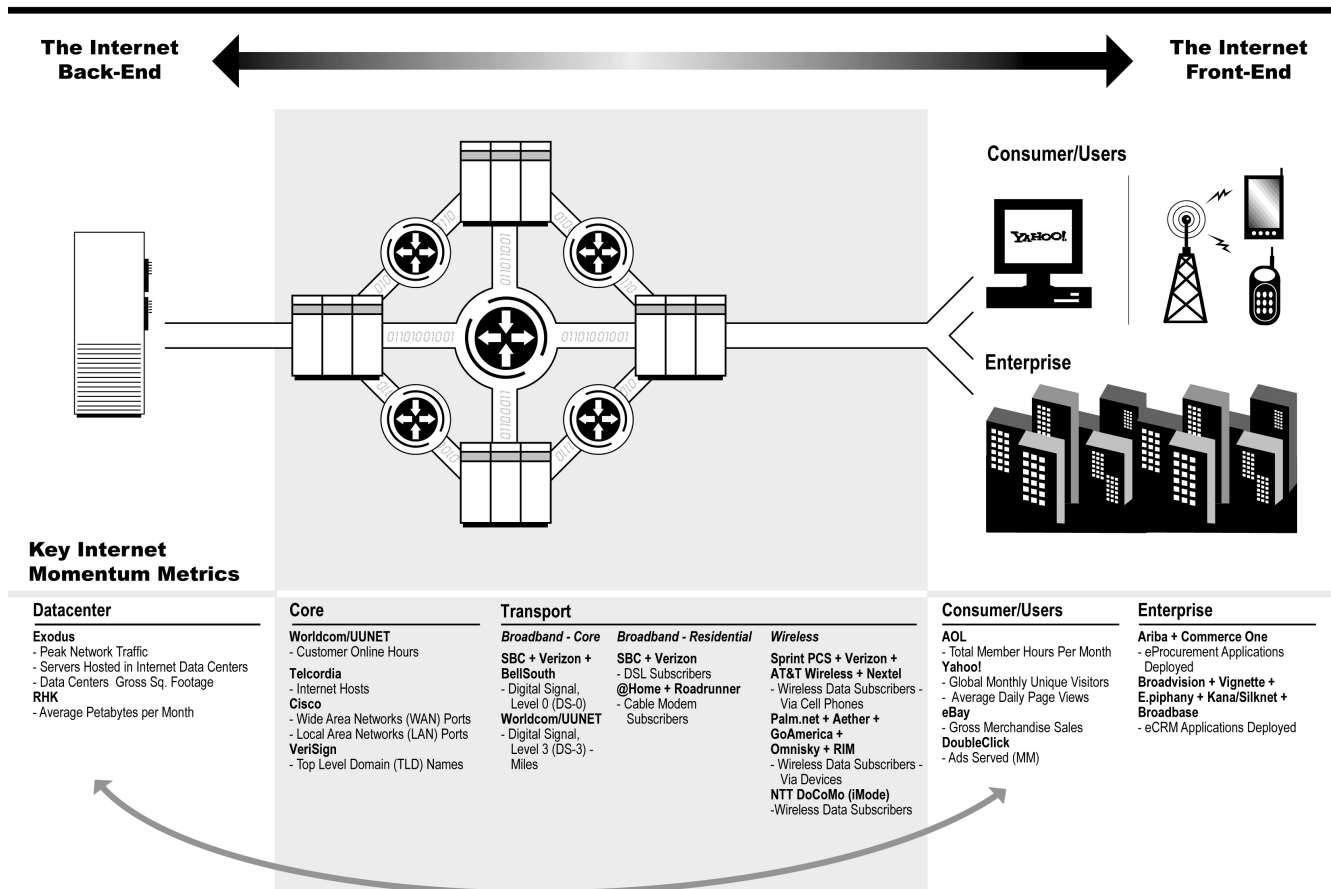
Historical North American User Penetration - All Media



Source: Morgan Stanley Internet Research

Exhibit 3

The Morgan Stanley Internet Ecosystem with Key Internet Momentum Metrics



Source: Morgan Stanley Internet Research

Internet User Growth

We monitor Internet user growth using five metrics:

- 1) **Monthly Unique Visitors** — Yahoo!
- 2) **Registered Top Level Domain (TLD) Names** — VeriSign
- 3) **Internet Hosts** — Telcordia Technologies
- 4) **Local-Area Network (LAN) Ports** — Cisco Systems
- 5) **Wide-Area Network (WAN) Ports, Core & Edge** — Cisco Systems

Global Monthly Unique Visitors — Yahoo!

We believe **Yahoo!**'s underlying user trends offer a very useful read on global Internet user growth. Yahoo! has an estimated 63% reach of global unique visitors — specifically, we believe that Yahoo! has an estimated 68% reach in the US., a 76% reach in Japan, a 47% reach in Europe, and a 49% reach in Latin America.

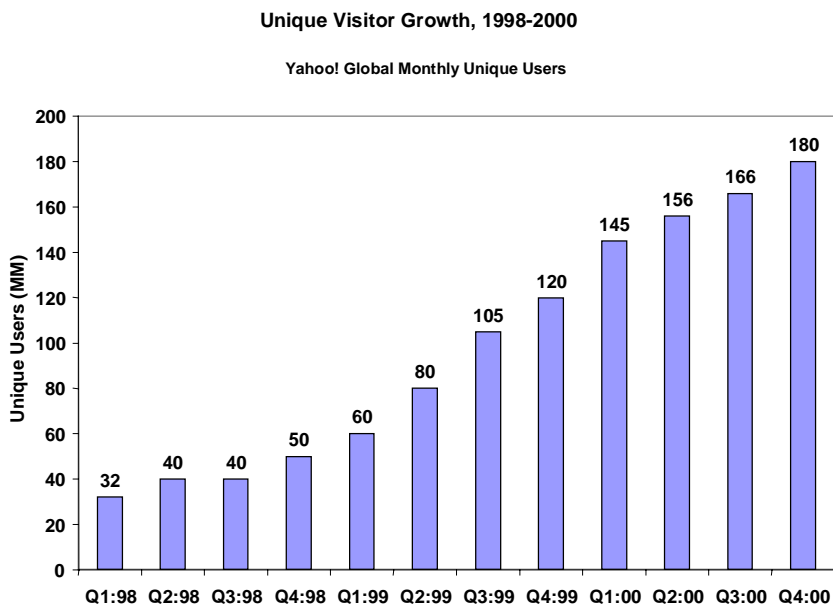
The growth metric we use for users is Yahoo!'s **Global Monthly Unique Visitors**, which represents all users worldwide who visited the Yahoo! sites during the last month of the quarter. As of CQ4:00, Global Monthly Unique Visitors reached about 180 million (up 50% Y/Y and 8% Q/Q), versus CQ3's 166 million (up 58% Y/Y, up 6% Q/Q), reflecting a decline in the Y/Y growth rate

(which began in CQ1:00), although Q/Q growth saw a slight uptick.

We think the takeaway from this metric is that growth in unique visitors remains impressive, given the tough comparison in CQ4:99 (120 million) and a law of large numbers at work. **Also, the US-centric nature of the data may make them a conservative indicator of future trends**, as we believe **Yahoo! should be one of the best-positioned companies to take advantage of the Internet's global expansion over the next several years.**

Exhibit 4

Yahoo! Global Monthly Unique Visitors



Source: Morgan Stanley Internet Research

Exhibit 5

Yahoo! Global Growth Metrics: 1998-2000

	1Q98	2Q98	3Q98	4Q98	1Q99	2Q99	3Q99	4Q99	1Q00	2Q00	3Q00	4Q00
Unique Visitors (MM)	32	40	40	50	60	80	105	120	145	156	166	180
Q/Q Growth	--	25%	0%	25%	20%	33%	31%	14%	21%	8%	6%	8%
Y/Y Growth	--	--	--	--	88%	100%	163%	140%	142%	95%	58%	50%

Source: Morgan Stanley Internet Research

Morgan Stanley Analysts: Mary Meeker / Mark Mahaney

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Top Level Domain (TLD) Names — VeriSign

VeriSign’s Global Registry Services (GRS) exclusively manages “.com” (commercial businesses), “.net” (network organizations), and “.org” (mostly non-profit organizations) domain names. In other words, the registry captures 100% of the market of **Top Level Domain (TLD) names** ending with the three most popular extensions of the Web today.

The absolute numbers remain impressive and growth rates remain high; however, Y/Y growth began to decelerate in CQ4:00 and Q/Q growth began to slow in CQ1. Again, we believe this trend has been due to a law of large numbers, as domain names grew to 28 million in CQ4:00 (up 259% Y/Y, 27% Q/Q), versus 24 million in CQ3 (up 259% Y/Y, 27% Q/Q) (see Exhibits 6 and 7).

One should keep three points in mind with this metric. First, VeriSign’s GRS does not capture other domain

name extensions that exist on the Web today, other than those mentioned above, and therefore may be a conservative gauge of growth. In addition, though we believe GRS is a good indicator of Internet users today, it might not be much longer because seven new extensions (.biz, .info, .name, .pro, .museum, .aero, and .coop) are scheduled to be introduced during 2001, most of which will most likely not be managed by VeriSign’s GRS.

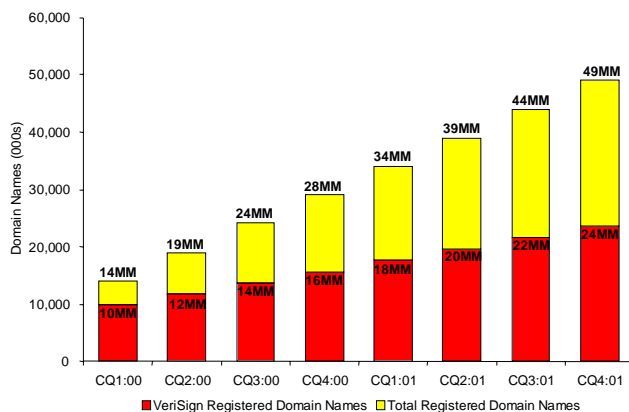
Second, we believe that about 20% of its registry customers own more than one domain name today, which would make the metric more of a directional gauge of Internet user growth than a direct reflection. Note that we do believe GRS trends provide a strong directional gauge of Internet growth.

Exhibit 6

VeriSign Global Metrics

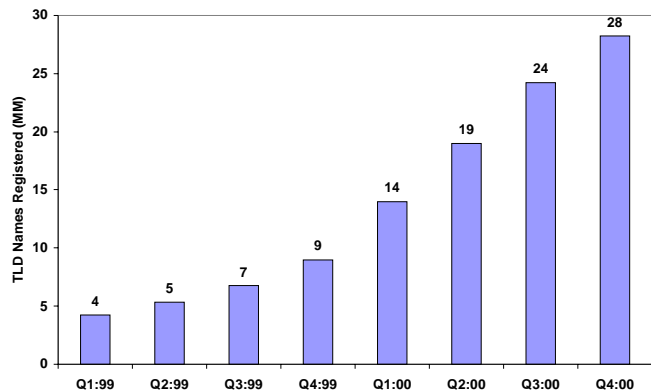
Global Registry Services (GRS) Q/Q Growth, 2000-2001E

VeriSign Registered Domain Names Vs. Total Registered Domain Names



Top Level Domain Names Registered, 1999-2000

Verisign (Network Solutions) Top Level Domain Names Registered



Source: Morgan Stanley Internet Research. E = Estimate

Exhibit 7

VeriSign Global Growth Metrics: 1998-2000

	1Q99	2Q99	3Q99	4Q99	1Q00	2Q0	3Q00	4Q00
Top Level Domain Names Registered (000's)	4,224	5,354	6,746	8,957	13,957	19,000	24,200	28,200
Q/Q Growth	--	27%	26%	33%	56%	36%	27%	17%
Y/Y Growth	--	--	--	--	230%	255%	259%	215%

Source: Morgan Stanley Internet Research

Morgan Stanley Analysts: Mary Meeker / David Joseph

Total Global Internet Hosts — Telcordia Technologies

An **Internet Host**, simply defined, is a computer with a permanent IP address (i.e., servers or workstations at universities, ports in ISPs' modem banks).

According to Telcordia Technologies, Internet hosts continue to grow significantly, reaching 99 million in CQ4:00 (up 44% Y/Y, up 8% Q/Q) versus 92 million in CQ3 (up 45% Y/Y, up 11% Q/Q).

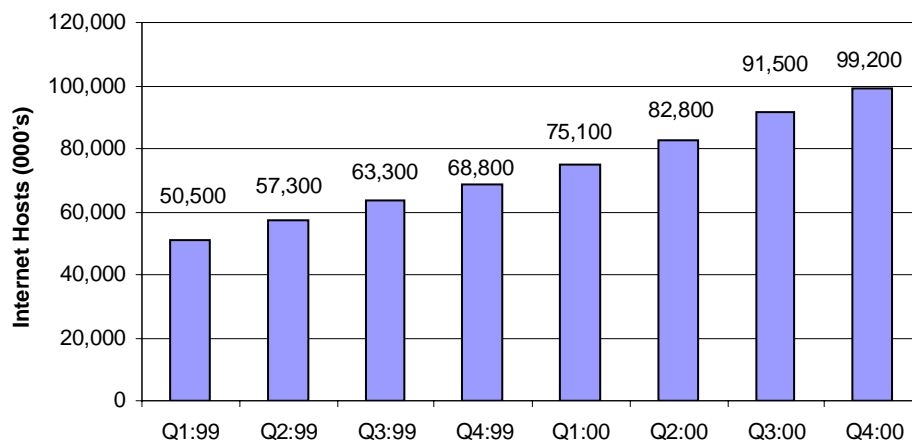
Our disclaimer for this data source is that these numbers do not include home computers (since they get IP addresses only when they have connected with the

service providers' modem banks), **nor workstations located behind firewalls. However, we believe these estimates remain a reliable, if conservative, directional indication of Internet user growth, since they are based on actual and frequent samplings of IP addresses declared in the Internet's directory name service (DNS).** More specifically, nearly 100,000 randomly generated IP addresses (from a universe of 2 to the 32nd power) are sampled on a daily basis, and the DNS system is used to find out whether or not a host with each sampled address exists in the name service.

Exhibit 8

Global Internet Hosts: Q1:99-Q4:00

Telcordia Technologies Internet Hosts



Source: Morgan Stanley Internet Research, Telcordia Technologies

Exhibit 9

Telcordia Global Growth Metrics: 1998-2000

	1Q99	2Q99	3Q99	4Q99	1Q00	2Q00	3Q00	4Q00
Internet Hosts (000's)	50,500	57,300	63,300	68,800	75,100	82,800	91,500	99,200
Q/Q Growth	--	13%	10%	9%	9%	10%	9%	8%
Y/Y Growth	--	--	--	--	49%	45%	45%	44%

Source: Morgan Stanley Internet Research, Telcordia Technologies

Morgan Stanley Analysts: Mary Meeker / David Joseph

Local-Area Network (LAN) Ports — Cisco Systems
Wide-Area Network (WAN) Ports — Cisco Systems

Looking a little further into the core of the Internet, we believe that Cisco provides two strong metrics: **Local-Area Network (LAN) Ports** and **Wide-Area Network (WAN) Ports**.

A LAN is a short-distance network (created by companies, universities, etc.) that links computers and devices under one controlled standard. LANs enable multiple end-users to access data, programs, servers, and the Internet, and to communicate from computers and other peripheral devices connected to the network. LAN ports represent the numbers of ports in the enterprise network.

Cisco holds a 47% market share in LAN ports, and the company continues to see accelerating Y/Y growth, with LAN port unit sales hitting 16.3 million in CQ4:00 (up 110% Y/Y, up 23% Q/Q), an increase from 13.2 million units in CQ3 (up 75% Y/Y, up 26% Q/Q).

We believe that “LAN ports sold” is a good indicator of Internet user growth, since one port represents one PC, device, and/or workstation connected to a short-distance network or campus. The stipulation is that, although most corporate or university networks are connected to the Internet, not all of them are, which makes this metric potentially higher in reality. Also, we believe this metric should be taken as a proxy for user growth, not as an indicator of usage growth, since, as capacity improves over time, the number of ports will remain the same.

The number of **WAN router ports** represents the number of ports on the backbone of the Internet core — the collection of equipment, infrastructure, and services — that carry WAN traffic over long distances. These IP routers move packets through the network reliably and efficiently. IP routers can perform ultra-fast operations, enabling packets to be moved from one network to another at rates up to OC-192, or 10 Gigabits per second (Gbps). Core IP routers serve as the on-ramp to the optical network, as each IP router has a number of ports that manage a particular connection to and from a network.

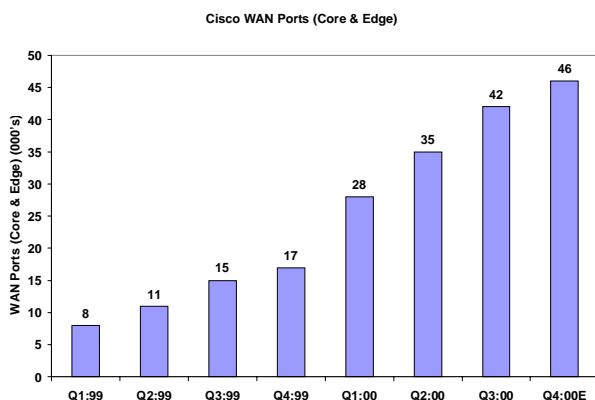
We estimate that Cisco holds about a 74% share in WAN ports (core and edge), and has also seen global unit sales remain at impressive levels, having reached an estimated 46,000 units in CQ4:00 (up 165% Y/Y, up 10% Q/Q). However, Y/Y growth began to decelerate during CQ1:00 and continued to do so through CQ2 to CQ3, as CQ3 WAN router port sales came in at 35,000 units (up 184% Y/Y, up 19% Q/Q).

Note that one can’t take these numbers literally when thinking of Internet users, since each WAN router port can represent a multitude of users, especially as capacity has expanded significantly over the years. On the other hand, since the speed, or capacity of each port, has grown over time, WAN router ports may actually understate Internet growth. Thus, we believe WAN router ports remain a strong directional indicator.

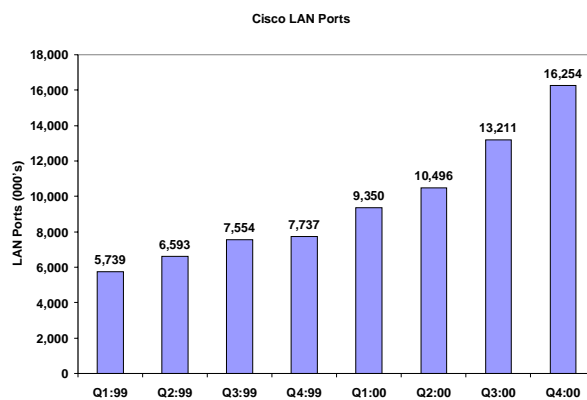
Exhibit 10

Cisco Global Metrics

Cisco WAN Ports (Core & Edge): Q1:99-Q4:00E



Cisco LAN Ports: Q1:99-Q4:00



Source: Morgan Stanley Internet Research

Exhibit 11

Cisco Global Growth Metrics: 1998-2000

	1Q99	2Q99	3Q99	4Q99	1Q00	2Q00	3Q00	4Q00
Wide Area Network WAN Ports (000's)	8	11	15	17	28	35	42	46
Q/Q Growth	60%	44%	32%	18%	61%	25%	19%	10%
Y/Y Growth	450%	693%	674%	263%	264%	215%	184%	165%
Local Area Network LAN Ports (000's)	5,739	6,593	7,554	7,737	9,350	10,496	13,211	16,254
Q/Q Growth	110%	90%	63%	55%	63%	59%	75%	110%
Y/Y Growth	15%	15%	15%	2%	21%	12%	26%	23%

Source: Morgan Stanley Internet Research

Morgan Stanley Analysts: Christopher Stix / George Kelly

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Please refer to important disclosures at the end of this report.

Internet Usage Growth

We monitor Internet usage growth using 19 metrics divided into four general categories:

General

- 1) **Average Daily Page Views** — Yahoo!
- 2) **Estimated Total Quarterly Digital Media Usage Minutes** — Media Metrix
- 3) **Ads Served** — DoubleClick
- 4) **Gross Merchandise Sales** — eBay
- 5) **Average Petabytes per Month** — RHK, Inc.
- 6) **Peak Network Traffic (gigabits/second)** — Exodus Communications
- 7) **Servers Hosted in Internet Data Centers** — Exodus Communications
- 8) **Data Centers – Gross Sq. Footage** — Exodus Communications
- 9) **eProcurement Applications Deployed, Top 2 Market Leaders** — Ariba and Commerce One
- 10) **eCRM Applications Deployed, Top 5 Market Leaders** — Broadvision, Vignette, E.piphany, Kana, and Broadbase

Narrowband

- 11) **Customer Online Hours** — WorldCom/UUNET
- 12) **Total Member Hours per Month** — AOL Time Warner

Broadband

- 13) **Digital Signal, Level 0 (DS-0), Top 3 Service Providers** — SBC, Verizon, and Bell South
- 14) **Digital Signal, Level 3 (DS-3) Miles** — WorldCom/UUNET
- 15) **DSL Subscribers, Top 2 Service Providers** — SBC and Verizon
- 16) **Cable Modem Subscribers, Top 2 Suppliers** — @Home and RoadRunner

Wireless

- 17) **Wireless Data Subscribers Via Cell Phones, Top 4 Providers** — Sprint PCS, Verizon, AT&T Wireless, and Nextel
- 18) **Wireless Data Subscribers Via Devices, Top 5 Providers** — Palm.net, Aether, GoAmerica, OmniSky, and RIM
- 19) **Wireless Data Subscribers** — NTT DoCoMo (iMode)

Average Daily Page Views (Global) — Yahoo!

Here we focus on the specifics of Internet usage growth, and we begin with **Yahoo!**. Though one would think that with less than a 5% share of **global Average Daily Page Views (ADPVs)**, Yahoo! would perhaps not be the most scientific indicator of usage growth. However, we believe the company's leading global market position makes it a directional indicator that's hard to ignore.

In CQ4, Yahoo!'s ADPVs continued to grow aggressively, reaching 850 million (up 83% Y/Y, up 9 Q/Q) versus CQ3's 780 million (up 103% Y/Y, up 15% Q/Q) (see Exhibits 27 and 28), although growth has been trending downward since CQ4:99 on an annual basis. Quarterly

growth has been pretty sporadic since CQ4:99, but generally trending downward as well.

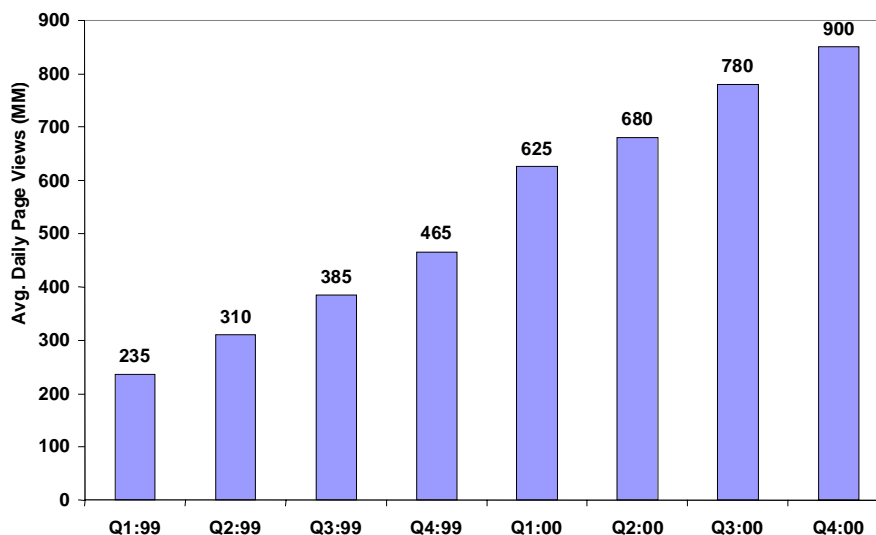
A couple of points to make here: **A larger percentage increase in page views than in unique visitors (as occurred last quarter) would likely indicate that users are spending more time on the sites. We expect Yahoo!'s growth here to remain strong, and to become smoother over time as broadband and wireless access are deployed globally.**

Exhibit 12

Yahoo! Global Metrics

Average Daily Page Views, 1999-2000

Yahoo! Global Average Daily Page Views (MM)



Source: Morgan Stanley Internet Research

Exhibit 13

Yahoo! Global Growth Metrics: 1998-2000

	1Q98	2Q98	3Q98	4Q98	1Q99	2Q99	3Q99	4Q99	1Q00	2Q00	3Q00	4Q00
Avg. Daily Pg. Views (MM)	95	115	144	167	235	310	385	465	625	680	780	900
Q/Q Growth		46%	21%	25%	16%	41%	32%	24%	21%	34%	9%	15%
Y/Y Growth	--	--	--	--	147%	170%	167%	178%	166%	119%	103%	94%

Source: Morgan Stanley Internet Research

Morgan Stanley Analysts: Mary Meeker / Mark Mahaney

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Estimated Total Digital Media Usage (Minutes per Quarter) — Media Metrix

Media Metrix’s Total Digital Media Usage Minutes Per Quarter serves as a proxy for the total number of minutes that US Internet users spend visiting digital media properties during a quarter. Media Metrix operates three samples of 50,000 digital media users that have installed a tracking meter on their computers that they use to access the Internet from home and at work. As a result, the company believes its estimates reflect 100% of the Total US Media Usage Minutes Per Quarter.

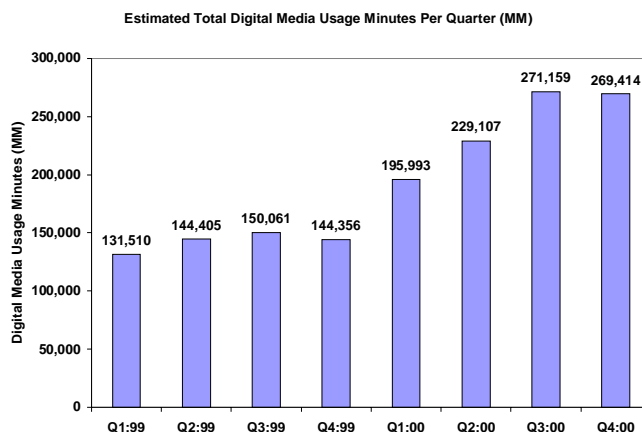
Media Metrix believes total digital minutes declined slightly Q/Q in CQ4, as total minutes per quarter came in at 269 million (up 87% Y/Y, down 1% Q/Q) versus CQ3’s 271 million (up 81% Y/Y, up 18% Q/Q). On a Y/Y basis, the data support Yahoo!’s indication of strong usage growth from Average Daily Page Views (ADPV);

however, in this case Y/Y growth has been accelerating since CQ1:00 (when we started keeping track).

We think one quarter of a Q/Q decline in total digital media usage is not enough to call a trend, especially when seasonality is the norm. However, we believe a **key takeaway here is that, while total usage is up significantly on a year-over-year basis, average usage per day remains well below one hour (at 35 minutes) and presents potentially significant room for upside. Also, Media Metrix’s numbers reflect US trends only, and we believe international usage growth rates should significantly outpace those in the US.**

Exhibit 14

Media Metrix Total Digital Media Usage Minutes: 1999-2000



Source: Media Metrix; Morgan Stanley Internet Research

Exhibit 15

Media Metrix US Growth Metrics: 1999-2000

	1Q99	2Q99	3Q99	4Q99	1Q00	2Q00	3Q00	4Q00
Total Digital Media Usage Minutes (B)	132	144	150	144	196	229	271	269
Q/Q Growth	--	10%	4%	(4%)	36%	17%	18%	(1)%
Y/Y Growth	--	--	--	--	49%	59%	81%	87%

Source: Media Metrix; Morgan Stanley Internet Research

Morgan Stanley Analysts: Mary Meeker / Mark Mahaney / David Joseph

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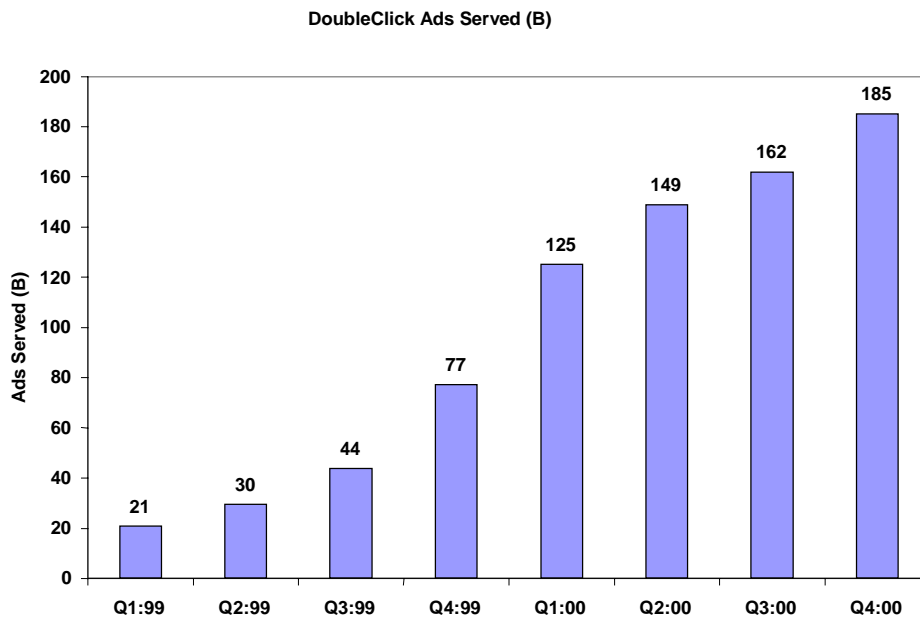
Ads Served — DoubleClick

DoubleClick’s Ads Served measures the number of global advertisements that DoubleClick places for its client sites. For example, each time a banner advertisement is generated, an ad is served. As the largest server of online advertisements, we believe this measure offers insight into the state of global Internet advertising growth and, therefore, usage growth.

In CQ4:00, DoubleClick’s global Ads Served increased to 185,000 million (up 140% Y/Y, up 14% Q/Q), which reflected a continued downward trend in Y/Y growth, though an uptick in Q/Q growth, versus CQ2 Ads Served of 162,000 (up 270% Y/Y, up 9% Q/Q).

Exhibit 16

DoubleClick Ads Served: 1999-2000



Source: Morgan Stanley Internet Research

Exhibit 17

DoubleClick Ads Served: 1999-2000

	1Q99	2Q99	3Q99	4Q99	1Q00	2Q00	3Q00	4Q00
Adds Served (B)	21	30	44	77	125	149	162	185
Q/Q Growth	--	42%	48%	76%	62%	19%	9%	14%
Y/Y Growth	--	--	--	--	500%	403%	270%	140%

Source: Morgan Stanley Internet Research

Morgan Stanley Analyst: Michael Russell

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Gross Merchandise Sales — eBay

On the e-commerce end, we believe **eBay** saw a similar trend to DoubleClick's Ads Served in its **Gross Merchandise Sales (GMS)**. We believe that eBay offers one of the purist, uniquely Internet forms of consumer and business commerce on the Internet; subsequently, we believe the company's growth represents a good proxy for growth of commerce on the Internet.

GMS is defined as the total sales value of all items transacted on the eBay site. Keep in mind that GMS does

not equate to eBay's revenue, since the company receives only a fraction of the total sale price in the form of listing fees and sales commissions

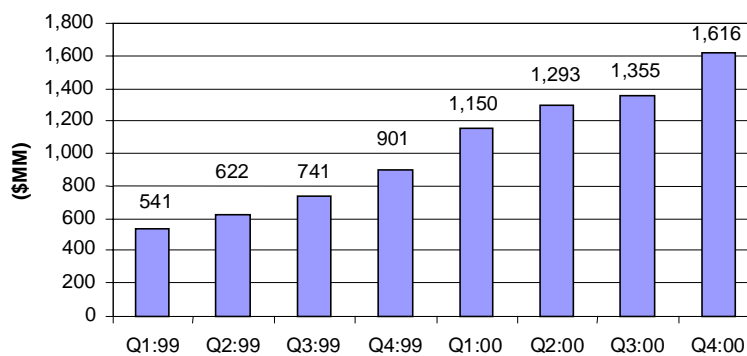
In CQ4:00, GMS reached \$1.6 billion (up 79% Y/Y, up 19% Q/Q), versus \$1.4B in CQ3 (up 83% Y/Y, up 5% Q/Q).

Here again, we believe that we're seeing both a law of large numbers take effect and, more important, a US bias in the data.

Exhibit 18

Gross Merchandise Sales (GMS): 1999-2000

eBay - Gross Merchandise Sales (\$MM)



Source: Morgan Stanley Internet Research

Exhibit 19

Gross Merchandise Sales (GMS): 1999-2000

	1Q99	2Q99	3Q99	4Q99	1Q00	2Q00	3Q00	4Q00
Gross Merchandise Sales (\$MM)	541	622	741	901	1,150	1,293	1,355	1,616
Q/Q Growth	76%	15%	19%	22%	28%	12%	5%	19%
Y/Y Growth	420%	344%	280%	193%	113%	108%	83%	79%

Source: Morgan Stanley Internet Research

Morgan Stanley Analysts: Mary Meeker / Mark Mahaney

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Please refer to important disclosures at the end of this report.

Average Monthly Petabytes — RHK, Inc.

Though **RHK, Inc.** presented only two annual pieces of data (for 1999 and 2000) for **Average Monthly Petabytes**, we include the numbers here because we believe they support traffic trends throughout the industry, and corroborate traffic data from Exodus, which we present in the next section of this report.

A petabyte is a unit of measurement used in gauging the amount of physical data stored on different forms of storage devices (e.g., hard disks, optical disks, RAM memory, etc.) or passing over a network. Here we use petabytes to measure Internet data traffic moving across the global Internet backbone. Whereas one megabyte equals 1 byte (equal to 8 bits of information) times 10 to the 6th power (i.e., 1 million bytes), a petabyte equals 1 byte times 10 to the 15th power (i.e., 1 billion-million bytes). For a little perspective, 2 megabytes can hold the

equivalent of a high-resolution photograph, whereas 2 petabytes can hold the equivalent of all the academic research libraries in the US today. RHK believes this metric reflects 100% of global Internet traffic growth.

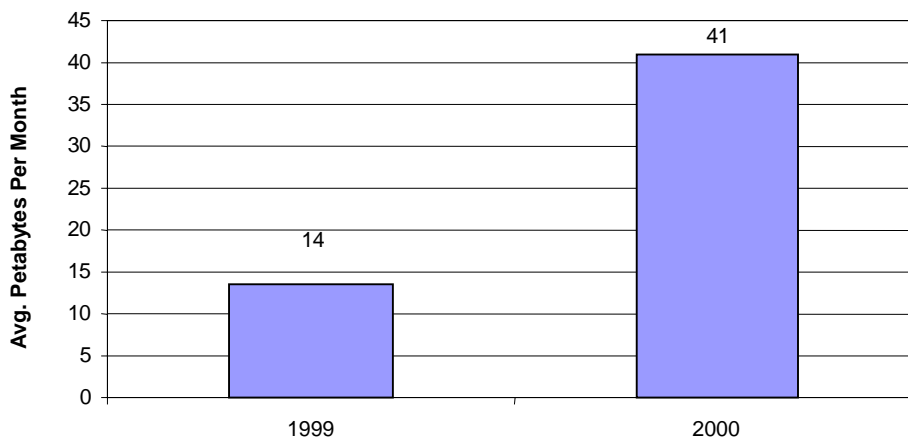
In 2000, RHK believes, Average Monthly Petabytes increased to 41,000, up 200% from 1999's level of 14,000.

With this metric, we believe double-counting is a possibility because one packet of information traveling from, let's say, WorldCom/UUNET's backbone to AT&T's may be counted twice. However, we believe the datapoint is a strong directional guide, as RHK collects traffic data from what we view as three direct sources: 1) Web hosting companies; 2) large backbone carriers; and 3) high-speed consumer (DSL, cable modem) and business (T1, T3, SONET, etc.) providers.

Exhibit 20

RHK, Inc. — Average Petabytes Per Month

RHK, Inc. - Average Petabytes



Source: Morgan Stanley Internet Research

Exhibit 21

Average Petabytes Per Month: 1999-2000

	C1999	C2000
Average Petabytes Per Month	14	41
Y/Y Growth	--	200%

Source: Morgan Stanley Internet Research

Morgan Stanley Analysts: Alkesh Shah / Michael Lynch

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Please refer to important disclosures at the end of this report.

Peak Network Traffic (gigabits/second) — Exodus Communications
Servers Hosted in Internet Data Centers — Exodus Communications
Data Centers – Gross Sq. Footage — Exodus Communications

From **Exodus**, the leading provider of hosting services, we believe we have three good indicators of Internet usage growth: 1) **Peak Network Traffic**, 2) **Servers Hosted**, and 3) **Gross Square Footage of Total Data Centers**.

Peak Network Traffic is the maximum load of incoming and outgoing traffic traveling over the Exodus network at one time. Specifically, this metric **represents** the highest of the five-minute averages taken over a month and, as such, is a proxy for usage/network volume.

In CQ4:00, Peak network Traffic reached 15 gigabits per second (up 101% Y/Y, up 15% Q/Q), versus 13 gigabits per second in CQ3 (up 125% Y/Y, up 22% Q/Q).

For **Servers Hosted**, we have included actual numbers through CQ3:00 (the latest quarter reported by Exodus). Servers Hosted grew to 63,000 in CQ3 (up 291% Y/Y, 20% Q/Q) up from 52,000 in CQ2 (up 348% Y/Y, 33% Q/Q). We estimate somewhat slowing growth in CQ4, to 73,000 (up 170% Y/Y, 17% Q/Q).

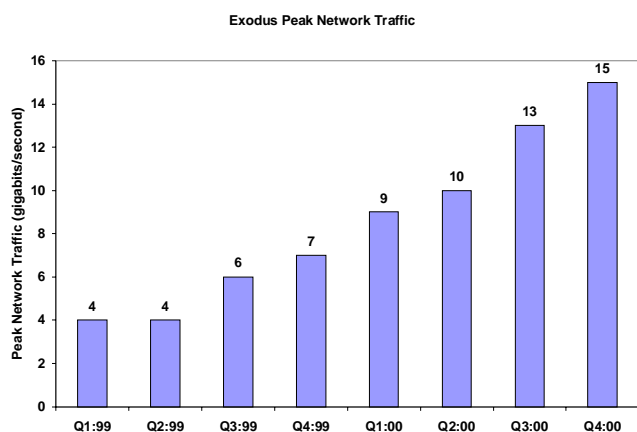
When looking at the total **Gross Square Footage of Exodus Data Centers** (the total square footage of all Exodus data centers that have been leased by companies for co-location and/or managed hosting services), we have seen quarterly growth rate trends picking up since CQ1:00, as Y/Y trends have been downward from the spike in growth that occurred in CQ4:99.

In CQ4:00, gross square footage increased to 4.1 million (up 161% Y/Y, 55% Q/Q), versus 2.7 million square feet in CQ3 (up 173% Y/Y, 27% Q/Q).

Note that **we have seen Y/Y growth rates trend downward since CQ2:00 for all three Exodus metrics**, though Q/Q growth in Gross Square Footage of Exodus Data Centers has been re-accelerating since CQ1:00. In addition, **Servers Hosted and Gross Square Footage of Exodus Data Centers tend to somewhat understate growth**, primarily because, as servers have become more powerful over the years, fewer machines are needed to run the same operations and less space is required.

Exhibit 22

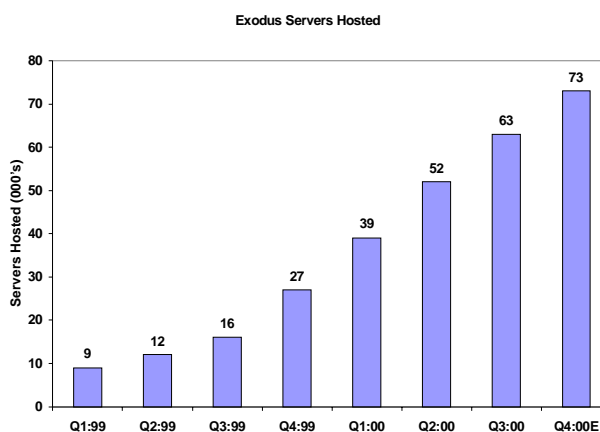
Exodus – Peak Network Traffic: 1999-2000



Source: Morgan Stanley Internet Research

Exhibit 23

Exodus – Data Center Servers: 1999-2000E



Source: Morgan Stanley Internet Research CQ4:00 estimated

Exhibit 24

Exodus Peak Network Traffic: 1999-2000

	1Q99	2Q99	3Q99	4Q99	1Q00	2Q00	3Q00	4Q00
Peak Traffic (gigabits/second)	4	4	6	7	9	10	13	15
Q/Q Growth	--	42%	48%	76%	62%	19%	9%	14%
Y/Y Growth	--	--	--	--	129%	145%	125%	101%

Source: Morgan Stanley Internet Research

Exhibit 25

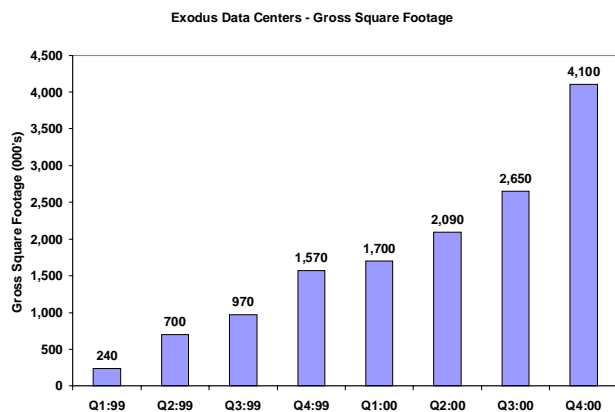
Exodus – Data Center Servers 1999-2000E

	1Q99	2Q99	3Q99	4Q99	1Q00	2Q00	3Q00	4Q00E
Data Center Servers (000's)	9	12	16	27	39	52	63	73
Q/Q Growth		34%	29%	38%	69%	44%	33%	20%
Y/Y Growth	--	--	--	--	500%	403%	270%	140%

Source: Morgan Stanley Internet Research *CQ4:00 estimated

Exhibit 26

Exodus Data Centers – Gross Sq. Footage: 1999-2000



Source: Morgan Stanley Internet Research

Exhibit 27

Exodus Data Centers – Gross Sq. Footage: 1999-2000

	1Q99	2Q99	3Q99	4Q99	1Q00	2Q00	3Q00	4Q00
Gross Sq. Footage (000's)	240	700	970	1,570	1,700	2,090	2,650	4,100
Q/Q Growth	--	192%	39%	62%	8%	23%	27%	55%
Y/Y Growth	--	--	--	--	608%	199%	173%	161%

Source: Morgan Stanley Internet Research

Morgan Stanley Analysts: Jeff Camp / April Henry

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Please refer to important disclosures at the end of this report.

eProcurement Applications Deployed — Ariba and Commerce One

eCRM Applications Deployed — Broadvision, Vignette, E.piphany, Kana, and Broadbase

In the B2B space, we present two metrics in eProcurement and eCRM Applications Deployed.

eProcurement applications enable efficient online trade, integration, and collaboration among B2B marketplaces, buyers, suppliers, and e-commerce service providers. Here, we look at the number of eProcurement applications, sold by **Ariba** and **Commerce One** (the two dominant pure plays in the space), deployed over a period of time.

In CQ4, applications deployed reached 1.2 million (up 460% Y/Y, up 25% Q/Q) versus CQ3's 954,000 (up 730% Y/Y, up 40% Q/Q).

eCRM (Customer Relationship Management) applications help companies manage online sales, product configuration, e-mail response, customer service, and online marketing campaigns, as well as customer behavior analysis. Here we use eCRM Applications Deployed as an indicator of the increasing level of sophistication of Web-based customer interaction, as Web sites evolve from marketing billboards to customer service and interactive portals.

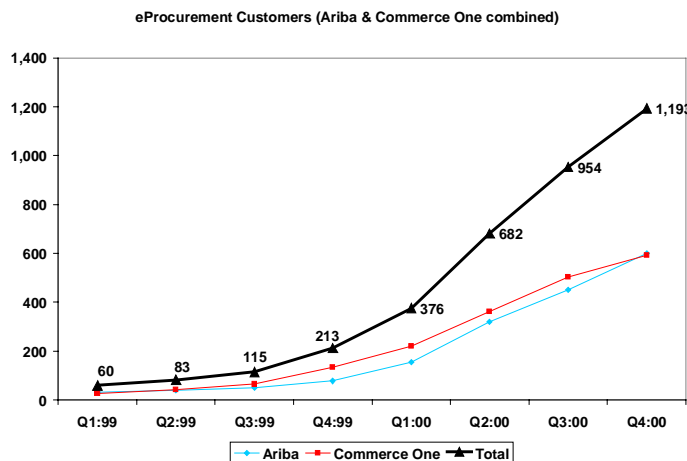
And for this metric we look at the five major players in the space: **Broadvision, Vignette, E.piphany, Kana, and Broadbase**, which collectively represent about 67% of the eCRM market.

In CQ4, the combined eCRM Applications Deployed reached 3.9 million (up 122% Y/Y, up 9% Q/Q) versus 3.6 million in CQ3 (up 171% Y/Y, up 25% Q/Q).

According to these metrics, **growth in eCRM and eProcurement applications deployed remains very strong Y/Y and Q/Q, off of smaller numbers.** eProcurement Y/Y rates came down for the first time in CQ4 and have trended downward Q/Q since CQ1:00. For eCRM, Y/Y growth rates began to trend downward in CQ1 as well, though Q/Q rates have been generally inconsistent. **These numbers appear to continue to support strong growth as businesses look more and more to the Web to realize operating efficiency. In the short term, however, this growth may be affected by a slowing global economy.**

Exhibit 28

eProcurement Customer Growth: 1999-2000



Source: Morgan Stanley Internet Research.

Exhibit 29

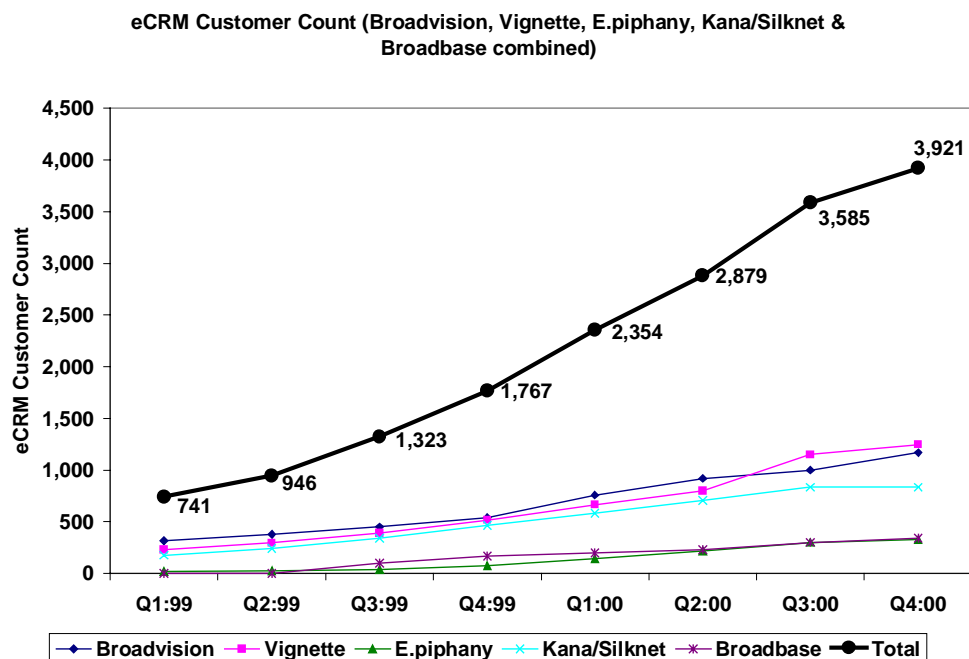
eProcurement Customer Growth: 1999-2000

	1Q99	2Q99	3Q99	4Q99	1Q00	2Q00	3Q00	4Q00
eProcurement Apps Deployed	60	83	115	213	376	682	954	1,193
Q/Q Growth	58%	38%	39%	85%	77%	81%	40%	25%
Y/Y Growth	--	--	--	461%	527%	722%	730%	460%

Source: Morgan Stanley Internet Research

Exhibit 30

eCRM Customer Growth: 1999-2000



Source: Morgan Stanley Internet Research

Exhibit 31

eCRM Customer Growth: 1999-2000

	1Q99	2Q99	3Q99	4Q99	1Q00	2Q00	3Q00	4Q00
eCRM Apps Deployed	741	946	1,323	1,767	2,354	2,879	3,585	1,193
Q/Q Growth	20%	28%	40%	34%	33%	22%	25%	9%
Y/Y Growth	--	--	--	185%	218%	204%	171%	122%

Source: Morgan Stanley Internet Research

Morgan Stanley Analysts: Chuck Phillips / Ryan Rathman

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Customer Online Hours — WorldCom/UUNET

In the narrowband area, one source we look to is **WorldCom's UUNET unit.**

We believe WorldCom's UUNET unit is an accurate gauge of global narrowband Internet traffic, as it provides Internet services to more than 100 countries and 70,000 businesses worldwide and carries around 37% of global Internet traffic (the highest of any backbone provider worldwide).

For CQ4:00, we believe **Customer Online Hours** increased to 1.68 million (up 40% Y/Y, up 3% Q/Q) versus CQ3 total hours of 1.63 million (up 49% Y/Y, up 2% Q/Q).

Though trending downward, UUNET's growth in customer online hours continues to be strong as prices are coming

down. This phenomenon was most apparent in CQ3, when UUNET's modems grew 76% Y/Y and online hours increased by 49% Y/Y, as dial-up revenue grew a mere 5% Y/Y (the weakness was due mostly to re-pricing of AOL's traffic in CQ1:00, about 50% of UUNET's dial-up revenue). Simon Flannery, MSDW's Wireline Telecom Services analyst, believes that behind this trend are lower prices charged to UUNET's ISP customers on a per-hour basis, which Simon estimates fell about 30% in CQ3:00, versus an estimated 20% decline in CQ1, and will lead to continued near-term pricing declines in the 20% range. **We believe the key point here is that modems and traffic over UUNET's backbone are experiencing, and should continue to experience, huge growth.**

Exhibit 32

WorldCom/UUNET Growth In Access and Minutes: 1999-2000E

	1999				2000			CQ4E ^(c)	C1999A	C2000E
	CQ1	CQ2	CQ3	CQ4	CQ1	CQ2	CQ3			
UUNET Dial-up Internet Access Revenues (\$MM)	320	364	385	428	417	405	403	411	1,497	1,636
Y/Y % Growth	--	--	--	--	30%	11%	5%	(4%)	--	9%
Q/Q % Growth	--	14%	6%	11%	(3)%	(3)%	0%	2%	--	--
As a % of Applicable Dial-up Market	--	--	--	--	--	--	--	--	53%	49%
Total U.S. Dial-up Internet Access Market (\$MM) ^(a)	--	--	--	--	--	--	--	--	8,009	9,534
Applicable Dial-up Market (\$MM) ^(b)	--	--	--	--	--	--	--	--	2,803	3,337
UUNET Customer online hours (MMs)	904	988	1,094	1,200	1,500	1,600	1,630	1,680	4,185	6,410
Y/Y % Growth	--	--	--	73%	66%	62%	49%	40%	--	53%
Q/Q % Growth	30%	9%	11%	10%	25%	7%	2%	3%	--	--

(a) Total U.S. Dial-up Internet Access Market includes consumer and business markets; Sources -- MSDW Research (The Broadband Report, May 2000)

(b) Applicable market for WorldCom (UUNET) is determined by a 35% margin after ISPs take an estimated 65% margin of total revenues.

(c) MSDW Estimates

Source: Morgan Stanley Internet Research

Morgan Stanley Analyst: Simon Flannery

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Total Member Hours Online Per Month — AOL Time Warner

Another strong source we look to on the narrowband front is **AOL Time Warner**, which we believe makes up almost 43% of total US ISP accounts and, as mentioned earlier, about 50% of UUNET’s global dial-up Internet business.

The metric we look at here is **Total Member Hours Per Month** (the cumulative number of hours spent online per month by AOL Brand US subscribers during the quarter). We believe AOL holds a 33% share of total US hours spent online via a narrowband connection.

In CQ4:00, AOL members spent a total of about 660 hours online (up 36% Y/Y, up 12% Q/Q), versus 591 hours in CQ3 (up 25% Y/Y, down 7% Q/Q).

From this metric it seems that AOL member usage began to re-accelerate on a Y/Y basis in CQ4, whereas growth began to re-accelerate on a Q/Q basis in CQ3. We believe these numbers are an accurate gauge of general Internet usage and should continue to reflect strong growth as broadband and wireless technologies are effectively deployed in C2001 and beyond. Since AOL makes up about 50% UUNET’s dial-up business, there might be some double-counting in the two metrics, and they should not be added together for a cumulative industry number.

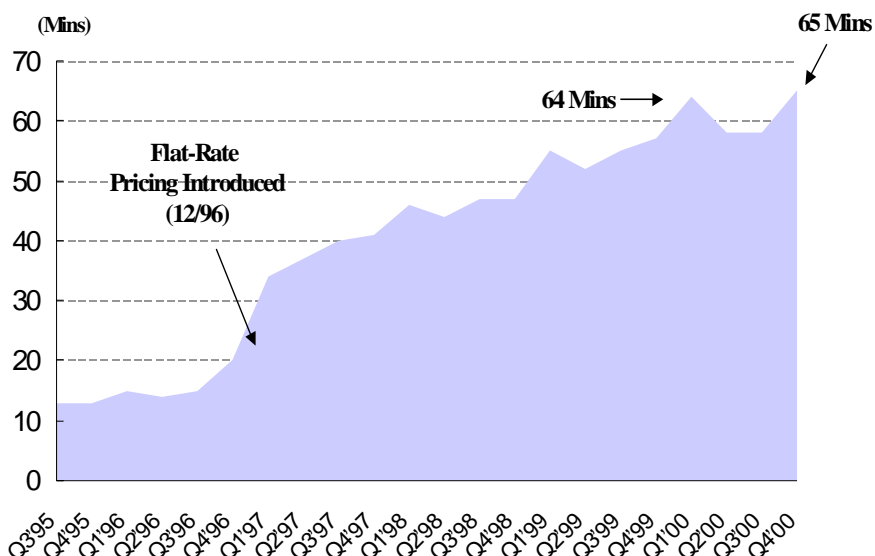
Exhibit 33

AOL Internet Traffic: 1999-2000

	1999				2000						
	CQ1	CQ2	CQ3	CQ4	CQ1	CQ2	CQ3	CQ4E ^(c)	C1999A	C2000E	
AOL Traffic Data											
AOL Avg. Hours per Month (MMs)	380	399	474	485	576	550	591	620	1,738	2,337	
Y/Y % Growth	62%	65%	73%	59%	52%	38%	25%	28%	--	34%	
Q/Q % Growth	25%	5%	19%	2%	19%	-5%	7%	5%	--	--	
AOL Net Modems (000s)	1,150	1,250	1,450	1,700	2,000	2,200	2,400	2,600	1,700	2,600	
Y/Y % Growth	--	--	64%	74%	74%	76%	66%	53%	--	53%	
Q/Q % Growth	18%	9%	16%	17%	18%	10%	9%	8%	--	--	
<i>(c) MSDW Estimates</i>											
<i>Source: Morgan Stanley Internet Research</i>											

Exhibit 34

AOL Average Minutes per Member per Day: 1995-2000



Source: Morgan Stanley Internet Research

Morgan Stanley Analysts: Mary Meeker / Mark Mahaney / Richard Bilotti

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Digital Signal Level 0 (DS-0) — SBC, Verizon, and BellSouth

For **DS-0** lines deployed, we believe that **SBC, Verizon,** and **BellSouth** combined present a strong gauge because together they capture 83% of the market.

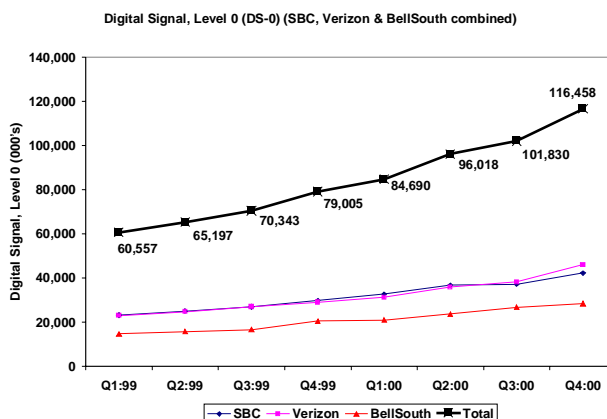
VGEs (voice grade equivalents) increasingly are used as an indicator of usage by the local phone companies. Capacity is measured in DS-0 (digital signal level 0) or VGE units, with each VGE carrying a 64Kb/s signal. A residential phone line is one VGE, a T1 line is 24 VGEs, and a DS-3 equals 672 VGEs. This measure captures the increasing use of high-capacity circuits by ILEC customers for their broadband needs.

In CQ4, growth in combined DS-0 lines accelerated, reaching 116 million (up 57% Y/Y, up 14% Q/Q), versus 102 million in CQ3 (up 45%, up 6%).

Y/Y DS-0 growth has been accelerating since CQ3:00 (though Y/Y growth has been otherwise erratic since CQ1:00). However, since all three companies have restated numbers (due to acquisitions/dispositions of assets) for CQ4:99 and CQ4:00 only, sequential comparisons are not meaningful.

Exhibit 35

Digital Signal, Level 0 (DS-0) Miles: 1999-2000



Source: Morgan Stanley Internet Research

Exhibit 36

Digital Signal, Level 0 (DS-0) Miles: 1999-2000

	1Q99	2Q99	3Q99	4Q99	1Q00	2Q00	3Q00	4Q00
Digital Signal, Level 0 (DS-0) Top 3 (000's)	61	65	70	74	85	96	102	116
Q/Q Growth	--	8%	8%	5%	14%	13%	6%	14%
Y/Y Growth	--	--	--	--	40%	47%	45%	57%

Source: Morgan Stanley Internet Research

Morgan Stanley Analyst: Simon Flannery

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Digital Signal Level 3 (DS-3) — WorldCom/UUNET

For **DS-3** growth, **WorldCom/UUNET** presents a strong source since the total miles of DS-3 circuitry the company has deployed is indicative of the size of WorldCom/UUNET’s entire backbone infrastructure, which carries about 37% of the global Internet traffic today.

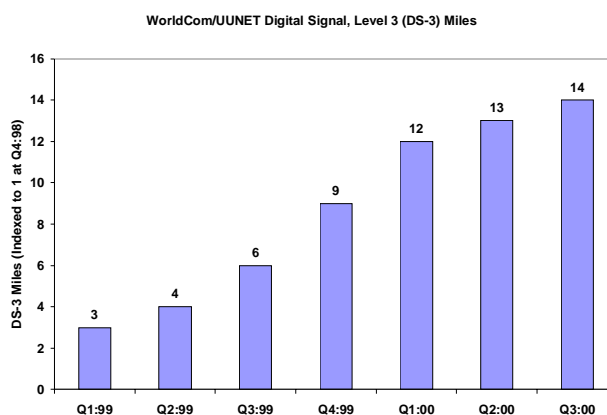
DS-3 is a digital communications circuit that has the capacity to carry 28 DS-1 channels, or a total of 672 DS-0 channels (i.e., 44.736 million bits per second). In the US, the term “T3” is usually used interchangeably with “DS-

3,” though T3 actually refers to the medium (copper transmission system) and DS-3 refers to the bit format.

The metric we use here is WorldCom/UUNET’s DS-3 miles deployed as a multiplier of miles deployed as of CQ1:98. Though we have numbers only through CQ3, we see very strong trends, with DS-3 miles increasing in CQ3 to 14 times the lines deployed in CQ1:98 (up 122% Y/Y, 5% Q/Q), from 13 times in CQ2 (up 280% Y/Y, up 15% Q/Q).

Exhibit 37

Digital Signal, Level 3 (DS-3) Miles: 1999-2000



Source: Morgan Stanley Internet Research. WCOM did not report number in CQ4:00.

Exhibit 38

Digital Signal, Level 3 (DS-3) Miles: 1999-2000

	1Q99	2Q99	3Q99	4Q99	1Q00	2Q00	3Q00
Digital Signal, Level 3 (DS-3) Miles (000's)	3	4	6	9	12	13	14
Q/Q Growth	18%	6%	80%	35%	36%	15%	5%
Y/Y Growth	230%	133%	174%	204%	252%	280%	122%

Source: Morgan Stanley Internet Research WCOM did not report number in CQ4:00.; Figures for DS-3 Miles are not absolute numbers rather they are ratios over CQ1:98 levels. So the 14 figure in CQ3:00 signifies that DS-3 Miles for the period are 14x higher than in CQ1:98.

Morgan Stanley Analyst: Simon Flannery

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Please refer to important disclosures at the end of this report.

DSL Subscribers — SBC Communications and Verizon

Broadband is still in its very early stages, but we have already begun to see a serious ramp in deployment in the US. Today, we estimate that there are over 6 million DSL and cable modem lines installed, with cable modems being the majority of the total (about 60%). Though these numbers remain small, we anticipate that DSL lines will eclipse cable modems by 2003, when we expect there will be 27 million total broadband connections in the US (see Exhibits 42 and 43).

DSL technology uses existing copper-pair wiring found in almost every home and office to deliver high-speed access. Special hardware attached to both the user and switch-ends of telephone lines allows data transmission over the wires at far greater speeds than is possible with standard phone wiring alone.

In terms of **DSL Subscribers**, we look at **SBC Communications** and **Verizon**, which have market shares (in terms of subscribers) of 31% and 22%, respectively.

Here again we see turbo growth off of relatively small numbers, as SBC subscribers grew to 760,000 in 2000, up 561% Y/Y, and Verizon subs grew to 560,000, up 544% Y/Y. Combined, the two companies saw DSL subscribers grow to 1.3MM in CQ4 (up 47% Q/Q) versus CQ3's 867,000 (up 40% Q/Q).

We would stress that, although growth has been strong and is accelerating, the early-stage ramp of DSL (well below 5% of Internet users) implies that its impact has not yet been felt on the Internet at large and on usage in particular.

Exhibit 39

US DSL Subscriber Forecasts by Company: 1999-2003E

	1999	2000E	2001E	2002E	2003E	'00 Market Share (%)
Total DSL Subscriptions (000's)	530	2,489	5,488	9,681	13,844	
SBC	115	760	1,839	3,099	4,359	31%
Verizon	87	560	1,325	2,943	4,130	22
Covad	57	270	460	788	1,206	11
Qwest-US West	110	251	500	687	908	10
BellSouth	30	200	600	1,025	1,643	8
Other	76	186	307	410	557	7
NorthPoint	24	130	130	130	130	5
Rhythms	13	67	170	325	495	3
Broadwing	18	41	67	105	156	2
Sprint	0	24	90	169	260	1

Source: Morgan Stanley Internet Research

Exhibit 40

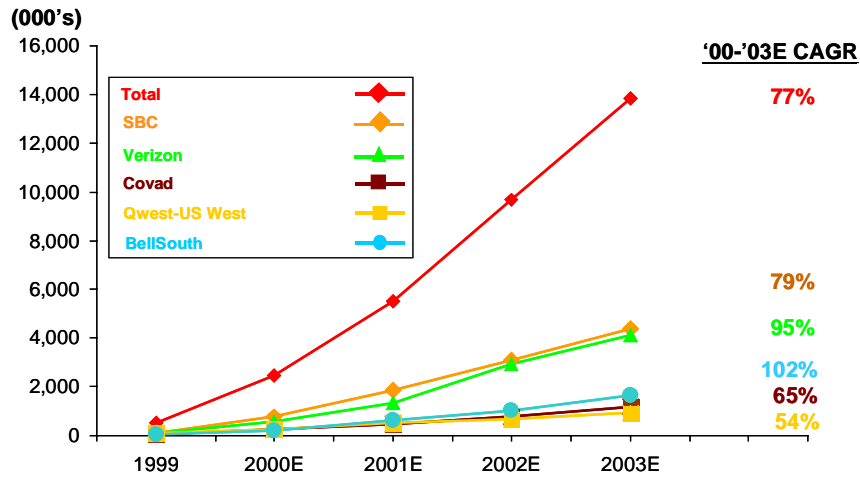
US DSL Subscriber Growth Forecasts by Company: 2000E-2003E

	2000E	2001E	2002E	2003E	'00-03E CAGR
Total DSL Subscriber Growth	370%	120%	76%	43%	77%
SBC	561	142	69	41	79
Verizon	544	137	122	40	95
Covad	374	70	71	53	65
Qwest-US West	128	99	37	32	54
BellSouth	567	200	71	60	102
Other	145	65	34	36	44
NorthPoint	442	0	0	0	0
Rhythms	415	154	91	52	95
Broadwing	128	63	57	49	56
Sprint	--	275	88	54	121

Source: Morgan Stanley Internet Research. E = Estimates

Exhibit 41

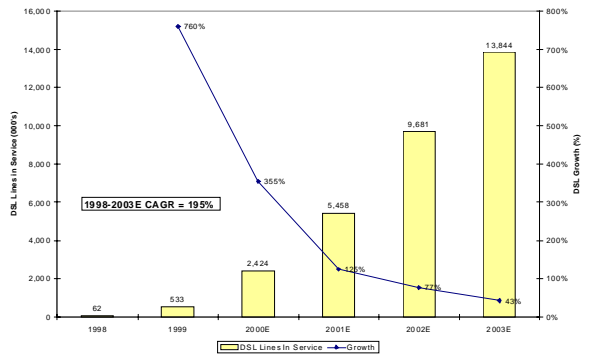
Top DSL Providers Ranked by Subscribers: 1999-2003E



Source: Morgan Stanley Internet Research Estimates

Exhibit 42

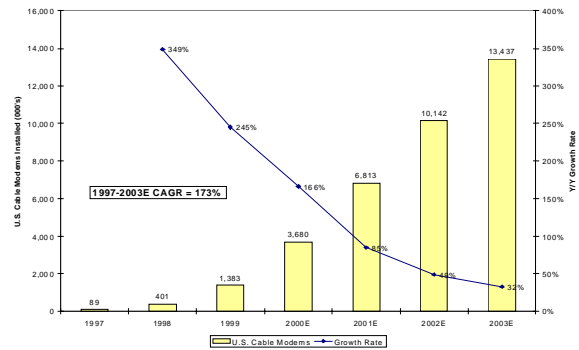
US DSL Units in Service, 1998-2003E



Source: Morgan Stanley Internet Research Estimates

Exhibit 43

US Cable Modems in Service, 1997-2003E



Source: Morgan Stanley Internet Research Estimates

Morgan Stanley Analyst: Simon Flannery

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Please refer to important disclosures at the end of this report.

Cable Modem Subscribers — @Home and RoadRunner

The metric we use here is simply the number of broadband Internet access subscribers that connect through cable lines.

We believe that **@Home**, AT&T's cable Internet unit, and **RoadRunner**, Time Warner's cable unit, collectively capture 90% of total cable modem subscribers in the US.

@Home remains the market leader today, with what we estimate to be about 1.1 million high-speed Internet cable subscribers as of end-2000 (about 31% of the total high-speed cable market), up about 181% Y/Y and 931% since 1998. RoadRunner is also seeing strong growth in

subscribers, having seen an estimated 165% Y/Y growth in 2000 and 716% growth since 1998.

Collectively, @Home and RoadRunner saw **Cable Modem Subscribers** increase to 3.3 million (up 168% Y/Y, up 28% Q/Q) in CQ4, versus CQ3's 2.6 million (up 186% Y/Y, up 28% Q/Q).

As with DSL, we believe that **given the early-stage ramp of cable modems (also well below 5% of Internet users), its potentially significant impact is not yet felt on Internet usage.**

Exhibit 44

US Cable Modem Subscriber Forecasts by Company: 1998-2003E

	1998	1999	2000E	2001E	2002E	2003E	'00 Market Share (%)
Total Cable Modem Subs. (000's)	401	1,383	3,680	6,813	10,142	13,437	
AT&T	111	407	1,144	2,114	2,931	3,700	31%
Time Warner	104	320	849	1,380	1,963	2,511	23
Cox Communications	69	204	481	877	1,297	1,714	13
Comcast	56	159	380	817	1,300	1,793	10
Other	25	138	272	357	481	594	7
Cablevision	11	52	207	360	545	756	6
Charter Communications	9	66	195	475	815	1,108	5
Adelphia	15	37	152	355	661	1,038	4

Source: Morgan Stanley Internet Research. E = Estimates

Exhibit 45

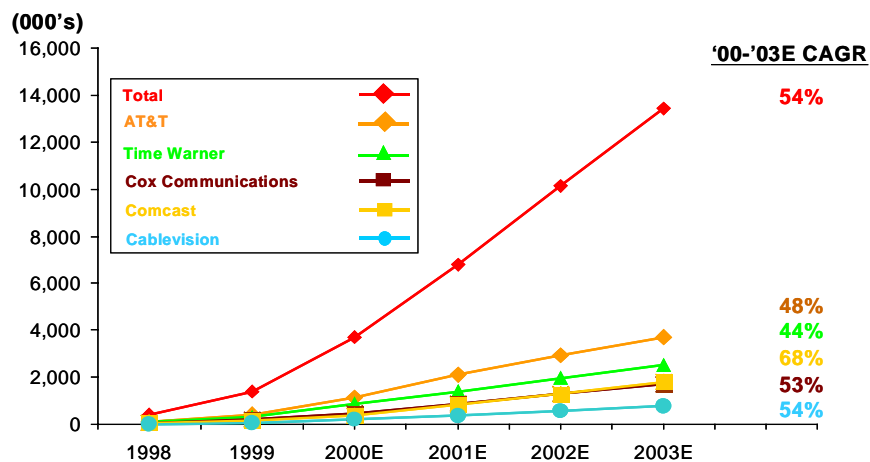
US Cable Modem Subscriber Growth Forecasts by Company: 1999-2003E

	1999	2000E	2001E	2002E	2003E	'00-03E CAGR
Total Cable Modem Subs. Growth	245%	166%	85%	39%	26%	54%
AT&T	267	181	85	39	26	48
Time Warner	208	165	63	42	28	44
Cox Communications	197	136	82	48	32	53
Comcast	184	139	115	59	38	68
Other	446	97	31	35	23	30
Cablevision	364	297	74	51	39	54
Charter Communications	605	198	143	72	36	78
Adelphia	143	305	134	86	57	90

Source: Morgan Stanley Internet Research. E = Estimates

Exhibit 46

Top 5 Cable Modem Providers Ranked by Subscribers: 1998-2003E



Source: Morgan Stanley Internet Research. E = Estimates

Morgan Stanley Analyst: Richard Bilotti

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Please refer to important disclosures at the end of this report.

Wireless Data Subscribers Via Cell Phone — Sprint PCS, Verizon, AT&T Wireless, and Nextel
Wireless Data Subscribers Via Devices — Palm.Net, Aether, GoAmerica, OmniSky, and RIM

Like broadband, we believe global wireless Internet subscriber growth is surging off of smaller numbers, though the market remains a little more fragmented, making it virtually impossible at this point to identify any one industry leader or accurate indicator of usage growth.

Doing the best we can, we look at what we believe are the best two metrics currently in the space: **1) Wireless Data Services via Cell Phones** and **2) Wireless Data Subscribers via Devices**. These two metrics give us the number of users who have access to mobile wireless data services through an interactive telephone, PDA, or pager. These devices are generally equipped with wireless access and an embedded Internet browser or wireless data access software (such as Palm’s web clipping). Two-way text messaging is also wireless data communication, but does not allow users to access Web sites (we include two-way e-mail subscribers in our wireless data numbers).

Looking first at the top four carriers delivering **Wireless Data Services via Cell Phones (Sprint PCS, Verizon, AT&T Wireless, and Nextel)** — which collectively capture about 74% of the market — Wireless Subscribers via Cell Phones grew to 2.2 million (up 42% Q/Q), versus 1.6 million in CQ3 (up 157% Q/Q), **pointing to a trend of strong growth off of small bases** (note that Sprint PCS figures may include customers who use the Web

infrequently; AT&T Wireless, Verizon, and Nextel figures represent heavier data users).

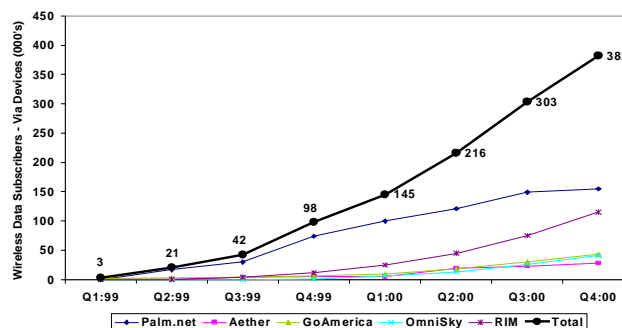
For **Wireless Data Subscribers via Devices**, we looked at the top five players in the space (**Palm.net, Aether, GoAmerica, OmniSky, and RIM**), collectively making up about 86% of the market (see Exhibits 47 and 48). More specifically, we looked at users who access data through a device or advanced e-mail paging device. We did not include users of myPalm.net, where users access wireless data with a traditional Palm device in conjunction with a cell phone (in CQ1:01 we believe roughly 100,000 users will register for this service).

And in CQ4:00, total combined subs grew to 369,000 (up 586% Y/Y, up 34% Q/Q) versus CQ3 subs of 275,000 (up 854% Y/Y, up 40% Q/Q).

Although growth in both of the metrics we look at here is inflated due to the small bases, at the same time **we believe that the absolute numbers should be considered a conservative gauge of global growth**, since the US remains generally behind Japan and Europe in wireless Internet penetration. Also, like broadband, **given the early-stage ramp of wireless Internet access, especially in the US (again well below 5% of Internet users), we believe its impact has not yet been felt on Web.**

Exhibit 47

Wireless Data Subscribers-Via Internet Devices: 1999-2000



Source: Morgan Stanley Internet Research

Exhibit 48

Wireless Data Subscribers-Via Internet Devices: 1999-2000

	1Q99	2Q99	3Q99	4Q99	1Q00	2Q00	3Q00	4Q00
Wireless Data Subscribers (000's)	3	4	29	54	118	196	275	369
Q/Q Growth	--	35%	649%	87%	119%	66%	40%	34%
Y/Y Growth	--	--	--	--	4029%	4999%	854%	586%

Source: Morgan Stanley Internet Research

Morgan Stanley Analyst: Greg Lundberg

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Wireless Data Subscribers — NTT DoCoMo (iMode)

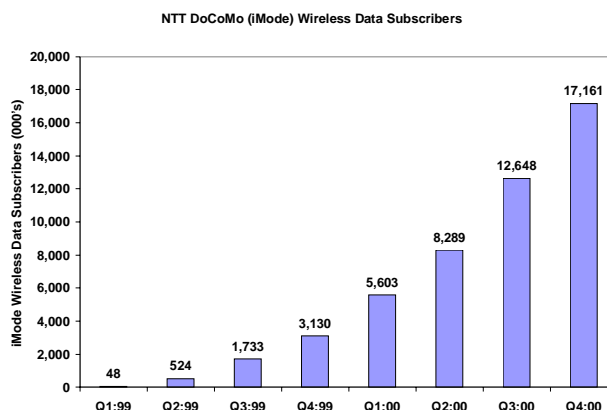
When talking about wireless growth, one can't ignore the phenomenon seen in Japan. NTT DoCoMo is the largest provider of wireless data services in the world through its iMode service, capturing 77% of the Wireless Data subscribers in Japan.

This is obviously a serious ramp and accelerating, but we wouldn't expect this kind of performance in the US once the wireless Internet market eventually catches on. Still, we believe it is an indication of the potential impact that wireless technology will have on global usage growth and user growth.

In just over 22 months, iMode had seen subscribers grow from scratch to over 17 million in CQ4 (up 455% Y/Y, up 35% Q/Q), versus 13 million in CQ3 (up 630% Y/Y, up 53% Q/Q).

Exhibit 49

NTT DoCoMo (iMode) Wireless Data Subscribers: 1999-2000



Source: Morgan Stanley Internet Research

Exhibit 50

NTT DoCoMo (iMode) Wireless Data Subscribers: 1999-2000

	1Q99	2Q99	3Q99	4Q99	1Q00	2Q00	3Q00	4Q00
Wireless Data Subscribers (000's)	48	524	1,733	3,130	5,603	8,289	12,648	17,161
Q/Q Growth	--	992%	231%	81%	79%	48%	53%	36%
Y/Y Growth	--	--	--	--	11573%	1482%	630%	448%

Source: Morgan Stanley Internet Research

Morgan Stanley Analyst: Hironori Tanaka

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More General Metrics Related to IU³ Growth

We now look at Internet User/Usage Growth focusing on six more metrics:

Internet User/Usage Growth Estimates

Metrics to Watch — Users

- 1) **International PC Penetration**
- 2) **Ramp of Less-Expensive, Easier-to-Use Access Devices**
- 3) **Ramp of Less-Expensive Access Services**

Metrics to Watch — Usage

- 1) **Innovation in Web Applications**
- 2) **Deployment of Broadband Services**
- 3) **Ramp of Wireless Internet Access**

Internet User/Usage Growth Estimates

While the Internet has already witnessed very impressive growth in users, we expect strong growth to continue. **We conservatively forecast worldwide Internet users to grow 87%, from 287 million in 2000 to 536 million in 2003** (see Exhibit 51, 52, and 53). As growth rates accelerate in Europe, and especially in Asia and Latin America, the US share of total users is expected to fall from 32% in 2000 to 27% in 2003.

Comparing our estimates to others out there, eMarketer predicts total Internet users of 513 million in 2003, with the US share of the total falling from 36% in 2000 to 28% in 2003. On the low end of the estimates, The World Bank

predicts 399 million Internet users in 2003. At the high end of the spectrum, IDC anticipates global Internet users of 602 million in 2003.

As the number of Internet users grows, we expect an even greater increase in Internet usage as average minutes spent online per user ramps up with higher penetration of broadband and wireless Internet access.

We currently estimate worldwide usage at 30 minutes per day, and expect this number to double by year-end 2003. **And simply multiplying our 2003 Internet user estimate of 536 million by 60 minutes would have overall Internet usage nearly doubling by year-end 2003.**

Exhibit 51

MSDW Conservative Internet Growth Forecasts: 1997-2003E

	1997	1998	1999	2000E	2001E	2002E	2003E	'97 Market Share (%)	'00E Market Share (%)	'03E Market Share (%)
Total Internet Users (MM)	77	133	205	287	365	449	536			
US	39	63	76	91	107	125	144	51%	32%	27%
Western Europe	22	41	65	85	107	128	150	29	30	28
Non- Japan Asia	8	13	38	68	90	115	141	10	24	26
Japan	6	11	17	28	39	53	64	8	10	12
Latin America	2	5	9	15	22	28	37	3	5	7

Source: Morgan Stanley Internet Research (US - M. Meeker, M. Mahaney, D. Joseph), (Europe - M. Steib, J. Amaro, J. Marin), (Asia Pacific - S. Gupta), (Japan - H. Abe, Y. Motoyama), (Latin America - J. Zamora). E = Estimates.

Note: There are some inconsistencies between these Internet user estimates and those in the Overview of Global TMT Markets tables. These inconsistencies are largely due to different regional groupings — e.g., Europe in the Global TMT tables vs. Western Europe in the above table; and Non-Japan Asia in the Global TMT tables not including countries like South Korea.

Exhibit 52

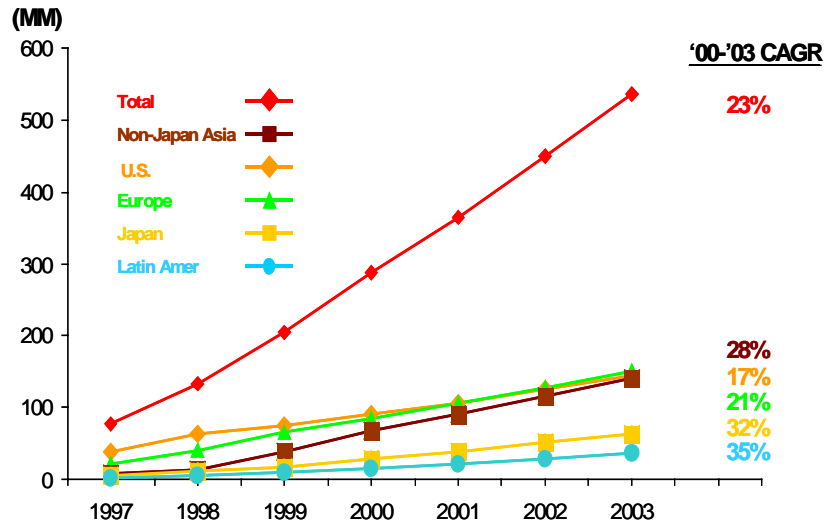
MSDW Internet Research Annual Growth Forecasts: 1997-2003E

	1998	1999	2000E	2001E	2002E	2003E	CAGR '00-'03E
Total Internet Users	73%	54%	40%	27%	23%	19%	23%
US	62	21	20	18	17	15	17
Western Europe	86	59	31	26	20	17	21
Non- Japan Asia	63	192	79	32	28	23	28
Japan	83	55	65	39	36	21	32
Latin America	150	80	67	47	27	32	35

Source: Morgan Stanley Internet Research Estimates

Exhibit 53

MSDW Conservative Internet Growth Forecasts: 1997-2003E



Source: Morgan Stanley Internet Research; E = Estimates.

Metrics to Watch — Internet Users

We believe the important general metrics to watch that relate to Internet user and usage growth include: 1) PC penetration (particularly in non-US markets); 2) roll-out of less expensive and easier-to-use access devices (wireless phones, PDAs, set-top boxes, etc.); and 3) emergence of less-expensive access services (in part due to telecom deregulation in non-US markets and in part due to declining bandwidth costs).

International PC Penetration

Gillian Munson, our PC Hardware, Data Storage & Internet Devices analyst, expects only about 128 million PCs to ship in 2001, up 2% versus 14% growth in 2000, with 305 million estimated PC users worldwide. However, considering the current sorry state of PC unit growth, the international markets remain highly under-penetrated today and PC growth in these areas should drive connectivity and Internet users going forward.

In the first report in our five-part series, *A Look at Global TMT Market Status and Internet User/Usage Propensity*, we identified those markets most under-penetrated by PCs. According to our analysis, the top three countries least penetrated by PCs in the world (all averaging less than 1% PC penetration and all in Asia) make up about 42% of the world's total population (or 2.5 billion of 5.9 billion people).

Moreover, record-high sales of modems and networking equipment imply that PC connectivity is on the rise. We estimate that, at the end of 1999, 56% of the global PC population had Web access (up from 29% in 1997); taking this number and forecasting out, we expect that, by year-end 2003, 85% of all PC users worldwide will have access to the Internet.

As discussed above, we believe that PC penetration opportunities are still huge in regions like Non-Japan Asia and Latin America, where home and business PC penetration rates remained in the single digits in 2000. Though penetration levels in these regions will likely be limited by economic factors such as high poverty rates and declining global GDP growth, we believe that PC penetration still has room for upside in both regions. We believe opportunities still exist in the US, Japan, and Europe as well, where we believe home PC penetration still hovers under 50%, though on a lower level.

We believe the Internet is becoming an increasingly important PC application, in some cases serving as the primary driver of PC purchases. Our view is that the low PC penetration rates found in regions like Latin America and Asia indicate that PC unit growth rates, though depressed globally, could still prove to be solid in certain regions, boding well for Internet user growth as Web access becomes a more common bundled capability with each PC sold.

Exhibit 54

Current Worldwide PC Penetration

	Home PC Penetration	Homes (MM)	Business PC Penetration	Employees (MM)	% of Internet WW Usage
U.S.	40%	99	70%	139	36%
Japan	30	59	50	68	8
Europe	24	184	48	203	36
Latin America	7	92	7	148	4
Asia	1	829	5	1,400	16
World	9%	1,263	16%	1,958	12%

Source: Morgan Stanley Internet Research; gillian.munson@msdw.com

Exhibit 55

Base Case Estimates for PC Units, Shipments and Users, 1988-2004E

Software Events	Windows 3.0											Windows 2000					
Hardware Events	486/CPQ LTE Portable											Merced					
	1988E	1989E	1990E	1991E	1992E	1993E	1994E	1995E	1996E	1997E	1998E	1999E	2000E	2001E	2002E	2003E	2004E
Worldwide																	
PC Unit Shipments (MM)	14	16	19	24	31	41	50	60	71	84	96	111	126	128	143	157	171
PC Lifetime Shipments (MM)	68	84	103	127	158	199	249	309	380	464	560	671	797	925	1,068	1,225	1,396
PCs in Use (MM) (a)	45	52	61	73	90	115	146	182	222	265	311	362	417	461	507	554	599
Actual # of PC Users (MM)	43	49	56	66	78	96	120	148	178	207	239	272	304	325	343	367	396
U.S.																	
PC Unit Shipments (MM)	7	7	8	9	12	16	19	23	26	30	38	45	51	49	54	59	64
PC Lifetime Shipments (MM)	42	49	57	66	78	94	113	136	162	192	230	275	326	375	429	488	551
PCs in Use (MM) (a)	26	27	28	31	36	45	56	70	84	99	117	140	164	183	199	213	225
Actual # of PC Users (MM)	23	23	24	25	29	36	44	54	63	72	82	94	109	121	132	140	149

Source: Morgan Stanley Internet Research; gillian.munson@msdw.com. E = Estimates.
 (a) Assumes that PCs have an average useful life of four years. (b) Estimated number of PC users that use second PCs: home, office, and portables.

Exhibit 56

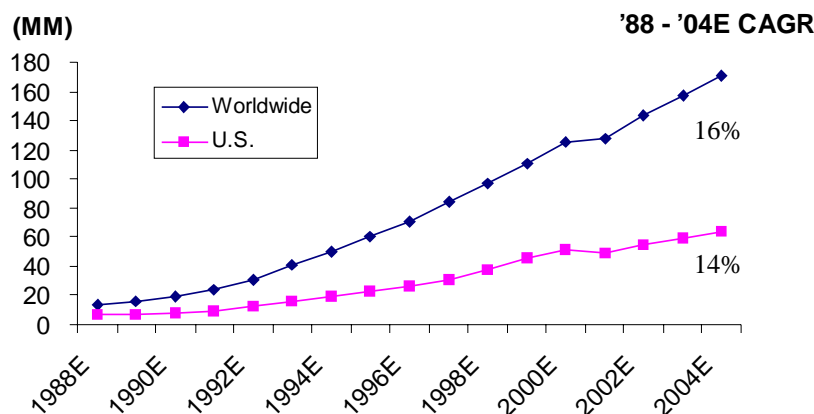
Base Case Growth Estimates for PC Units, Shipments and Users, 1988-2004E

Software Events	Windows 3.0											Windows 2000					
Hardware Events	486/CPQ LTE Portable											Merced					
	1988E	1989E	1990E	1991E	1992E	1993E	1994E	1995E	1996E	1997E	1998E	1999E	2000E	2001E	2002E	2003E	2004E
Worldwide																	
PC Unit Shipments	17%	14%	19%	26%	29%	32%	22%	20%	19%	18%	15%	15%	13%	2%	12%	10%	9%
PC Lifetime Shipments	26%	23%	23%	23%	24%	26%	25%	24%	23%	22%	21%	20%	19%	16%	15%	15%	14%
PCs in Use (a)	12%	15%	17%	20%	23%	28%	27%	25%	22%	19%	18%	16%	15%	11%	10%	9%	8%
Actual # of PC Users	11%	14%	16%	17%	18%	22%	25%	24%	20%	17%	16%	14%	12%	7%	6%	7%	8%
U.S.																	
PC Unit Shipments	6%	0%	12%	18%	31%	31%	23%	17%	15%	16%	24%	21%	12%	-4%	12%	8%	8%
PC Lifetime Shipments	20%	17%	16%	16%	18%	20%	21%	20%	19%	19%	20%	20%	18%	15%	15%	14%	13%
PCs in Use (a)	3%	4%	6%	9%	16%	24%	26%	24%	20%	17%	18%	19%	18%	11%	9%	7%	6%
Actual # of PC Users	1%	0%	2%	7%	15%	22%	23%	22%	18%	14%	14%	15%	15%	11%	9%	7%	6%
U.S. as % of Worldwide Users	55%	48%	42%	38%	37%	37%	37%	36%	36%	35%	34%	35%	36%	37%	38%	38%	37%

Source: Morgan Stanley Internet Research; gillian.munson@msdw.com. E = Estimates.
 (a) Assumes that PCs have an average useful life of four years. (b) Estimated number of PC users that use second PCs: home, office, and portables.

Exhibit 57

Base Case Estimates for PC Units, Shipments and Users, 1988-2004E



Source: Morgan Stanley Internet Research; gillian.munson@msdw.com. E = Estimate

Ramp of Less-Expensive, Easier-to-Use Access Devices

In our view, we are clearly in the early days of non-PC Internet access devices, such as PDAs with wireless connectivity options, set-top boxes, and Web appliances. All of these devices carry the potential to drive new users to the Internet for three main reasons: 1) lower price points relative to PCs; 2) user-friendly form factors (e.g., Web appliances such as Compaq's iPAQ Home Internet Appliance, which offers basic e-mail and Web surfing capabilities and nothing else); and 3) high convenience levels (wireless access means the ability to tap into the Internet anytime, anywhere).

As a result, we believe that non-PC Internet Access Devices will experience very strong growth over the next two to four years and will actually surpass the number of PCs accessing the Web within the same time frame.

Our PC Hardware, Data Storage & Internet Devices analyst, Gillian Munson, forecasts that shipments of non-PC Internet Devices will climb from 36 million in 1999 to 185 million in 2003, up 411% over the period, or a 50% compound annual growth rate (see Exhibits 58 and 59).

Exhibit 58

U.S. Internet Device Annual Shipments: 1999 - 2003E

	1999	2000E	2001E	2002E	2003E	'99 Market Share (%)	'03 Market Share (%)
Total Internet Device Shipments (000's)	147,076	189,396	235,896	291,168	356,736		
Non-PC Devices	36,121	63,573	94,974	134,660	184,577	25%	52%
PCs	110,955	125,823	140,922	156,508	172,159	75	48

	2000E	2001E	2002E	2003E	'99-'03E CAGR
Total Internet Device Shipments (000's)	29%	25%	23%	23%	25%
Non-PC Devices	76	49	42	37	50
PCs	13	12	11	10	12

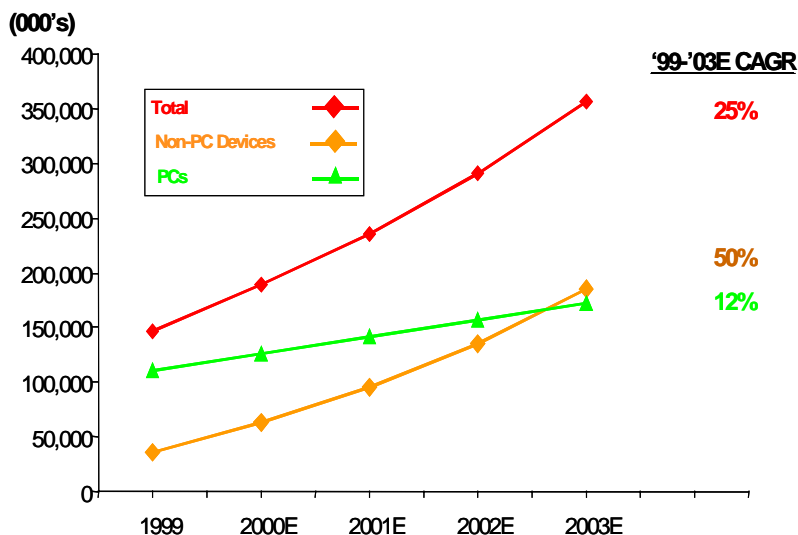
Source: Morgan Stanley Internet Research, gillian.munson@msdw.com

Note: Non-PC Internet Devices include handhelds, web-enabled phones, smart phones, and infotainment devices.

E = Morgan Stanley Internet Research Estimates.

Exhibit 59

Internet Devices Shipment Growth



Source: Morgan Stanley Internet Research, gillian.munson@msdw.com. E = Estimate

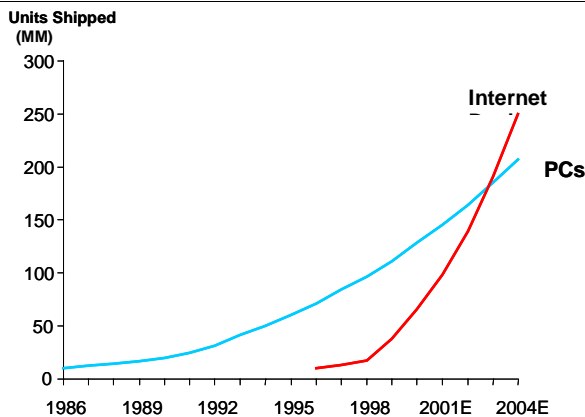
We believe that the markets most primed to benefit from the growth discussed above are those that are most “wired-less” today, and here we think there are no surprises. According to data recently released by the International Telecommunications Union (ITU), which consists of only 1999 data, mobile subscribers per 100 inhabitants are highest in Finland (66.7), Japan (45.0), the UK (40.8), and the US (31.2). However, global penetration remains relatively low, with Europe registering 21.8 mobile subscribers per 100 inhabitants, the Americas 16.4, and Asia bringing up the rear with 4.4.

We think the way to look at the data is through long- and short-term lenses. Obviously, those markets most penetrated today should be those that will benefit most from the ramp of the wired Web over the next three to five years. Those with the lowest penetration likely will have to look more to the 10-15 year time frame.

In the end, we believe, we are only in the embryonic moments of a rather long wireless ramp that should eventually reach all corners of the world and exponentially expand the Internet’s audience from its current level.

Exhibit 60

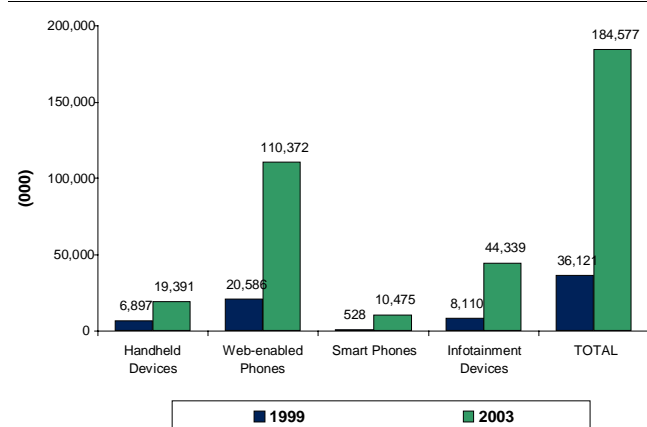
Wireless Devices vs. PCs, 1996-2005E



Source: MSDW Internet Research, IDC, The Yankee Group, gillian.munson@msdw.com. E = Estimate

Exhibit 61

Wireless Internet Devices, 1999 vs. 2003E



Source: MSDW Internet Research, IDC, The Yankee Group, gillian.munson@msdw.com, greg.lundberg@msdw.com. E = Estimate

Exhibit 62

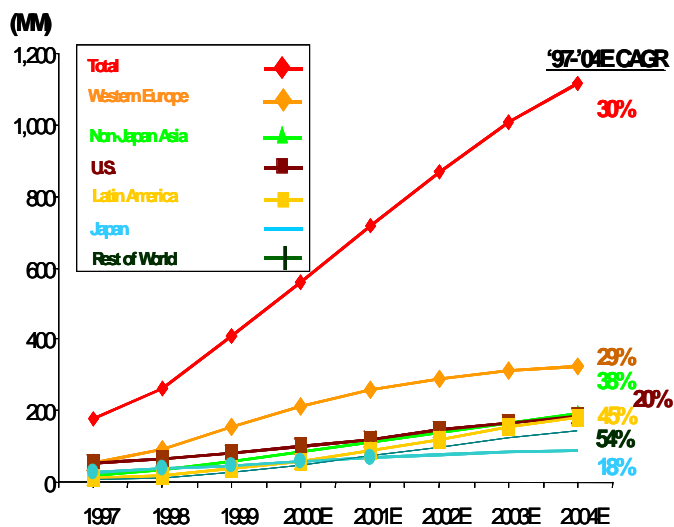
Global Cellular Subscribers & Growth: 1997-2004E

	1997	1998	1999	2000E	2001E	2002E	2003E	2004E	'00 Market Share (%)
Total Subscribers (MM)	178	262	409	561	716	870	1,007	1,115	
Western Europe	55	91	154	212	257	290	311	325	38%
Non-Japan Asia	20	34	58	85	110	139	166	191	15
U.S.	54	66	81	99	120	145	167	186	18
Latin America	13	21	40	59	88	121	154	180	11
Japan	28	37	48	59	69	78	84	90	11
Rest of World	7	12	27	47	72	98	123	142	8
		1998	1999	2000E	2001E	2002E	2003E	2004E	'97-04E CAGR
Total Subscriber Growth		47%	56%	37%	28%	22%	16%	11%	30%
Western Europe		65	69	38	21	13	7	5	29
Non-Japan Asia		70	71	47	29	26	19	15	38
U.S.		22	23	22	21	21	15	11	20
Latin America		62	90	48	49	38	27	17	45
Japan		32	30	23	17	13	8	5	18
Rest of World		71	125	74	53	36	26	15	54

Source: Morgan Stanley Internet Research, gillian.munson@msdw.com, greg.lundberg@msdw.com. E = Estimate

Exhibit 63

Global Cellular Subscribers: 1997-2004E



Source: Morgan Stanley Internet Research, greg.lundberg@msdw.com. E = Estimate

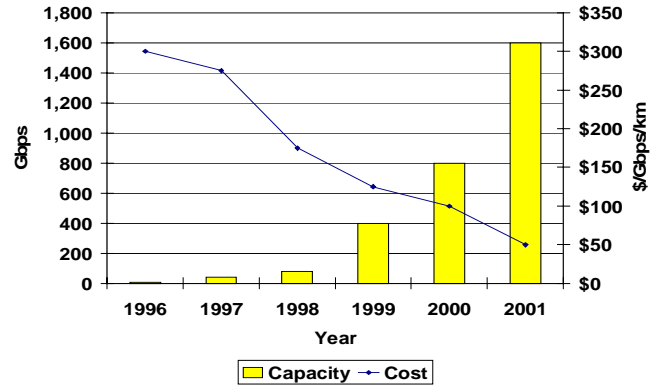
Ramp of Less-Expensive Access Services

Particularly in non-US markets, where metered access pricing plans are the norm, we think there is the potential for telecommunications deregulation to lower access costs to consumers and businesses and, in turn, reduce a main barrier to Internet user growth.

Access costs might also be reduced by network improvements, increased bandwidth efficiency, and bandwidth supply, which should collectively pave the way for higher-quality services at maintained prices. While fixed-price, “all-you-can-eat” access plans have not gained much traction in Europe to date, both Viatel and Carrier1 introduced flat-fee service recently, with initial signs of success. In the US, we believe bandwidth costs will continue to decline. According to AT&T (see Exhibit 64), the unit cost of fiber should decline from almost \$300 per gigabit per kilometer per year in 1996 to about \$50 in 2001.

Exhibit 64

Falling Unit Costs of Fiber, 1990-2001E



Source: AT&T, Morgan Stanley Internet Research; simon.flannery@msdw.com. E = Estimate

On the other hand, AOL has already seen network costs decline to approximately \$0.30 per hour in CH3:00, from well over \$0.60 only a few years ago. In the end, these declining costs should enable service providers to either reduce access prices or offer users better service within the same price range and, in turn, drive user growth.

Metrics to Watch — Internet Usage

Just as important as user growth, and maybe even more important at this point, is anticipated usage growth per user, which continues to register strong growth across the board. For AOL, which we think is a very good proxy for overall Internet usage, usage has tripled over the last three years from approximately 20 minutes per day to 65 minutes. And based on Media Metrix data, US Internet users have increased their daily usage from 30 minutes in February 2000 to 40 minutes in February 2001, up 27% Y/Y.

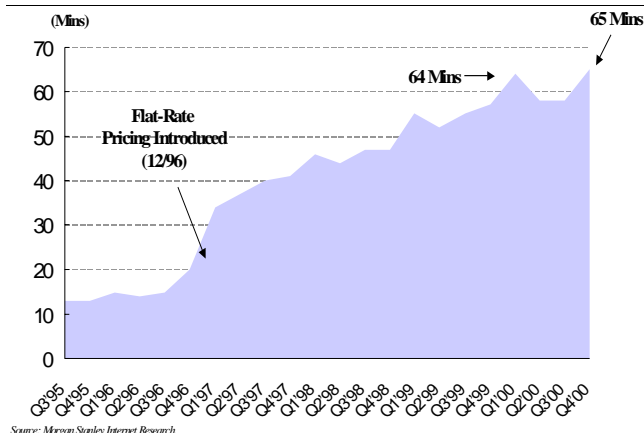
Comparing US users to users from other countries, we find that by a factor of 2 to 3, US users spend more time on

the Internet than their European counterparts, and by 50% to 85% over English-speaking non-Europeans. We expect this gap to narrow over the next few years as Internet penetration abroad catches up with adoption rates in the more mature US market.

Given these datapoints, our overall view is that average daily Internet usage worldwide is in the 30-minute range, and we believe this figure could double over the next three years and even quadruple over the next 5-10 years. We believe driving usage going forward growth will be: 1) continued innovation in the applications available over the Web (e.g., music and other entertainment offerings); 2) wider deployment of broadband services (cable, DSL, and satellite); and 3) the emergence of wireless Internet access.

Exhibit 65

AOL Average Minutes per Member per Day, 1995-2000

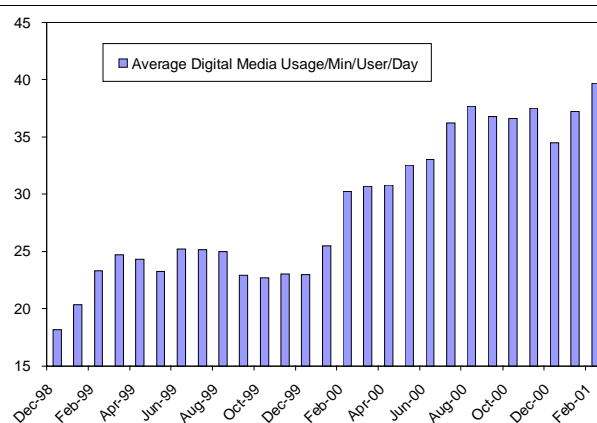


Source: Morgan Stanley Internet Research

Source: Morgan Stanley Internet Research

Exhibit 66

Average US Digital Media Usage per Day, 12/98-2/01



Source: Media Metrix, Morgan Stanley Internet Research

Exhibit 67

International Daily Home Usage Rates-October 2000

Country	Unique Home Users(MM)	Avg. Usage Days per Month	Avg. Minutes per Usage Day	Avg. Minutes per Calendar Day
United States	77,714	13	69	29
Japan	17,853	15	48	23
United Kingdom	12,525	9	40	12
Canada	12,351	13	57	24
Germany	11,322	11	45	17
Australia	6,707	11	58	21
France	6,030	9	37	11
Denmark	1,986	11	36	14
Brazil	1,601	11	69	25

Source: MediaMetrix, Morgan Stanley Internet Research

Internet, Technology, Telecommunications – March 27, 2001

Please refer to important disclosures at the end of this report.

Innovation in Web Applications

New and interesting applications drive new uses of the Internet, and new uses drive usage. So, what are the main or “killer” applications today? As the data below from Forrester Research indicate, the most popular applications today are communications (e-mail and chat; but, intuitively, we would add instant messaging as well), information access (search engines, research, local info/weather, etc.), and shopping. We expect the percentage of users who visit online stores to climb significantly as Internet users become more accustomed to shopping on the Web. There is no reason, in our view, why this percentage shouldn’t climb from 25%-ish today to double our triple that level over the long term.

Also driving new Internet uses and usage will be new applications, in our view. Three years ago, person-to-person trading of collectibles was not perceived to be a popular activity over the Web. Today, eBay consistently ranks as the “stickiest” Web property in terms of page

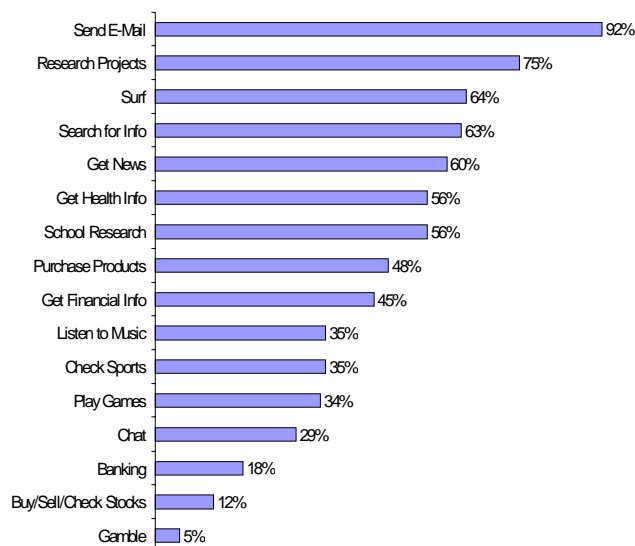
views per user, with the average eBay user viewing 120 pages per month on the site and spending almost 2 hours per month with eBay. Online music is proving to be another promising application.

Before it was shut down, Napster was able to register over 57 million users in less than 21 months, making it arguably the fastest-growing software application ever. This is a clear indication to us of the high level of interest in Internet-related music applications (downloading, streaming, etc.).

Voice-enabling technologies should make cell phones a lot easier to use for surfing the Web. And here the future may even be closer than we think, as TellMe, a voice portal/browser, has already completed 1.6 million calls in a three-month trial period, priming it for wide deployment in the near future. **After wading through all of this evidence (both primary and anecdotal), we think the point is that new applications should continue to emerge on the Internet, and the overall growth in these applications should continue to drive overall usage of the medium.**

Exhibit 68

Top Internet Activities



Source: Pew Internet and American Life Project, March 2000

Exhibit 69

Top Portal Content

Functionality	Offline Competitor	AOL	Yahoo!	MSN
Address Book	Address Book	O	O	O
Auctions	Auction Houses	L	O	O
Bill Payment	ADP, Checks	L	O	O
Broadcasts	TV, Radio, Blimp	O	O	O
Calendar	Calendar	O	O	O
Chat	Water Cooler, Bar, Telephone	O	O	O
Classifieds	Newspaper, Trade Magazine	O	O	L
Clubs/Special Interest Channels	Convention, Trade Magazine	O	O	O
Directions and Maps	AAA, Gas Station Attendant, Maps	O	O	O
Education	School, Books	O	O	O
E-Greeting Cards/Invitations	Hallmark Cards, Mail	O	O	O
E-Mail	Telephone, Mail, Conversation	O	O	O
Employment/Career	Newspaper Classified, Recruiter	O	O	O
Entertainment	TV, Movies, Radio, Sporting Events, CDs	O	O	O
Finance/Money	TV, Radio, Newspaper, Magazine, Financial Service Firms	O	O	O
Games	Chess in the park	O	O	O
Health	Doctor, Physicians Desk Reference	O	O	O
Instant Messaging	Telephone, Screaming	O	O	O
International Content	International Herald Tribune, Short-Wave Radio	O	O	O
Internet Phone Service	Telephone	O	O	O
Local Content	Local Newspaper, Guidebook	O	O	O
Message Boards	Square pieces of cork with pushpins	O	O	O
Mobile Access to Content	Radio, Portable TV, Stock Ticker on Outside of Building	O	O	O
Music	Radio, CD, 8-Track, Phonograph	O	O	O
News	Newspaper, TV, Radio	O	O	O
Personalized Content	Direct TV, Personal Assistant to Collate Desired Information	O	O	O
Personals	Newspaper, Magazine	O	O	O
Photos	Photo Album	O	O	O
Product Finder	Window Shopping	O	O	O
Reference	Encyclopedia	O	L	O
Search	411, Encyclopedia, Library, Specially Trained Dogs	O	O	O
Shopping	Shopping Mall, Catalogs	O	O	O
Sports	Newspaper, TV, Magazine, Radio	O	O	O
Travel	Guidebook, Travel Agent	O	O	O
Voice Portal	Local Newspaper, 411, Encyclopedia, Library, City Guides	O	O	O
Wallets	Banks, Wallets	O	O	O
Weather	Newspaper, TV, Radio, Stick Hand Out Window	O	O	O
Yellow Pages	Yellow Pages	O	O	O

Note: O=Contains Feature On Site; L=Contains Feature on Linked Site

Source: Morgan Stanley Internet Research

Deployment of Broadband Services

In advance of Wireless, Broadband Internet access should continue to grow among consumers. Initial data coming from @Home indicate that broadband users so far have been about 50% more active (in terms of time) on the Internet than narrowband users. And across the board, broadband users have shown a greater propensity to visit sites, click on advertisements, and research investments online (see Exhibit 71), hinting at what we believe is broadband’s ability to increase the uses of the Internet.

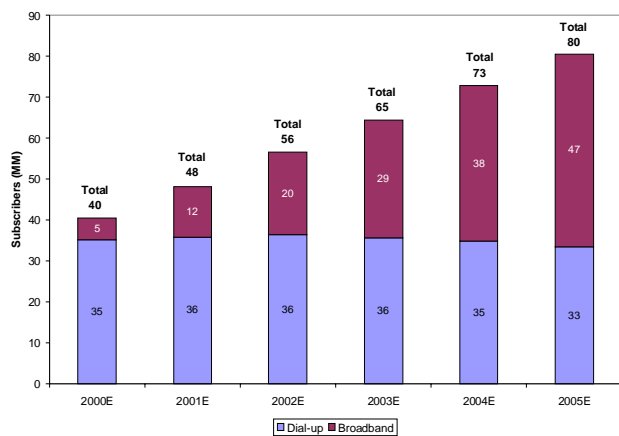
According to Nielsen NetRatings, about 40% of Internet users at work access the Web via broadband services,

whereas only about 11% of users at home access the Web via broadband — implying a huge opportunity for significant usage growth over time.

At the end of 2000, we believe, there were about 5 million residential broadband access subscribers in the US, a number that we believe could approach 47 million by 2005, surpassing the number of residential narrowband dial-up subscribers. **Two salient features of broadband are that it will automatically increase usage per user, as the “always-on” connectivity increases convenience, while richer, faster applications (e.g., music, video, games) increase the functionality (or uses) of the Internet.**

Exhibit 70

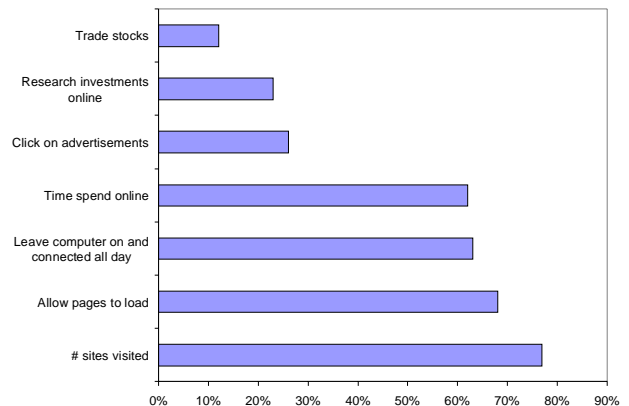
Broadband vs. Dial-up Connections 2000-2005E



Source: Morgan Stanley Internet Research; alkesh.shah@msdw.com; simon.flannery@msdw.com

Exhibit 71

Internet Use Increases with Broadband Connection



Source: @Home Customer Survey, 2000 (Broadband customers were asked: "How has your online use changed since switching to broadband?")

Ramp of Internet Wireless Access

As noted above, we believe that advanced wireless Internet access will significantly increase the “convenience” factor of the Internet — the ability to access news and applications anytime, anywhere, free of a PC connection. And with that increase in convenience should come an increase in usage. While still in the very early innings, long-term, wireless access might actually be the strongest driver of Internet usage growth.

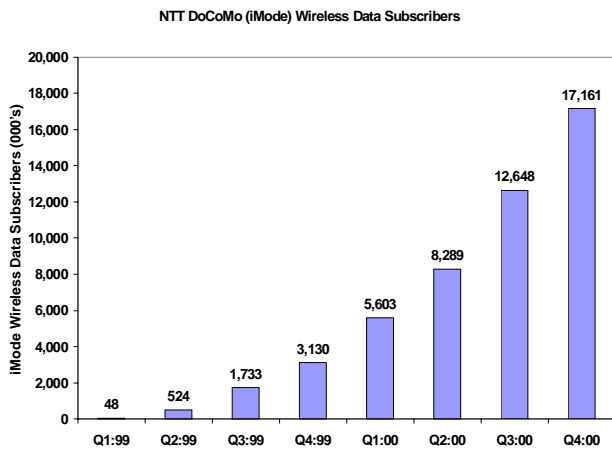
One of the best examples of the growth in wireless Internet access continues to come from Japan, where the growth in

NTT DoCoMo’s iMode service has been a phenomenon: from zero to 17MM subscribers in only 22 months. Equally compelling, we believe, are data from Japan’s Ministry of Posts and Telecommunications showing that penetration of the mobile Internet grew to 10% in just two years, versus 76 years for the wireline telephone, or even 15 years for mobile phones.

Our simple point here is that, to judge from the Japanese experience, wireless Internet access is likely to grow very quickly in several markets, serving as a boost to both the number of Internet users and the amount of usage per user.

Exhibit 72

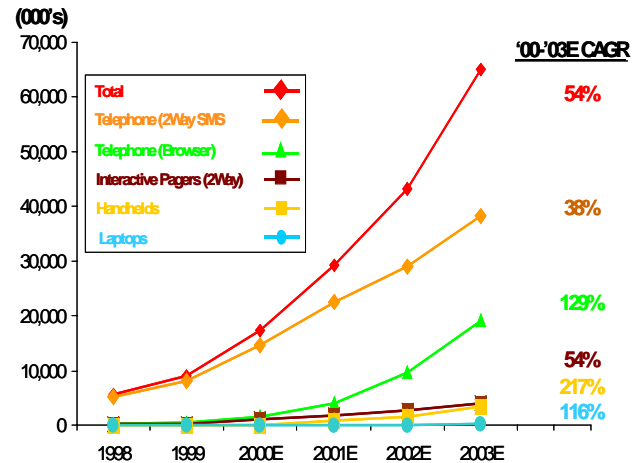
i-Mode Wireless Data Subscribers: 1999-2000



Source: Company data; Morgan Stanley Internet Research, yoshiko.motoyama@msdw.com

Exhibit 73

Morgan Stanley US Wireless Growth Forecast To 2003E



Source: Morgan Stanley Internet Research, gillian.munson@msdw.com, greg.lundberg@msdw.com. E = Estimate

Exhibit 74

Morgan Stanley US Wireless Internet Forecasts: 1998-2003E

	1998	1999	2000E	2001E	2002E	2003E	'00-'03E CAGR
Total Wireless Internet Subscribers (000's)	5,587	8,952	17,387	29,213	43,301	65,004	54%
Telephones (2Way SMS) (000's)	5,205	8,122	14,597	22,476	29,112	38,333	38
Telephones (Browser) (000's)	159	499	1,582	4,068	9,677	19,065	129
Interactive Pagers (2Way) (000's)	217	315	1,080	1,832	2,729	3,956	54
Handhelds (000's)	2	7	109	792	1,681	3,447	217
Laptops (000's)	5	10	20	45	101	203	116

Source: Morgan Stanley Internet Research; gillian.munson@msdw.com; greg.lundberg@msdw.com. E = Estimate

Exhibit 75

Morgan Stanley US Wireless Internet Growth Forecasts: 1999-2003E

	1999	2000E	2001E	2002E	2003E	'00-03E CAGR
Total Wireless Internet Subscribers	60%	94%	68%	48%	50%	54%
Telephones (2Way SMS)	56	80	54	30	32	38
Telephones (Browser)	214	217	157	138	97	129
Interactive Pagers (2Way)	45	243	70	49	45	54
Handhelds	302	1,516	629	112	105	217
Laptops	100	100	125	125	100	116

Source: Morgan Stanley Internet Research; gillian.munson@msdw.com; greg.lundberg@msdw.com. E = Estimate

Global Internet Expansion

We briefly look at general Internet Expansion, on the International and Domestic fronts. For additional detail, please see our January 3, 2001, report: *A Look at Global TMT Market Status and Internet User/Usage Propensity*, available on the Internet through Client Link on www.msdw.com. If you wish to receive this service, please contact your institutional sales representative. This report can also be downloaded from www.msdw.com/techresearch/.

Growth Opportunities Abroad

Growth Opportunities in the US

Growth Opportunities Abroad

North American Internet usage continues to grow at a robust rate — but while North Americans were the earliest adopters of the Internet, the rest of the world is clearly catching up. The North American share of total Internet users has eroded from 51% to 32% over the past three years and is expected to fall further to 27% by 2003.

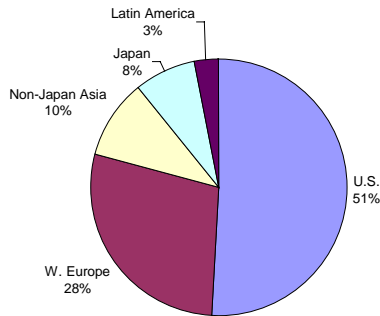
To determine which countries will likely see the strongest Internet growth, we dig back one layer to look at the Internet platforms — the PC, obviously, but also mobile phones, cable TV, and telephone lines. And we look at not

only the current penetration rates of each of these platforms (which should indicate relative growth rates) but also at the absolute size of the platforms in the various countries (which should indicate market opportunity).

Cut this way, **the usual suspects — the US, Japan, China, Germany, and the UK — make up the top 5.** However, on the basis of penetration, smaller countries like Singapore, Switzerland, and the Scandinavian nations are nearly on par with the US. We believe this is an important barometer for how quickly the Web is becoming a mainstream channel for marketing, communications, and business transactions.

Exhibit 76

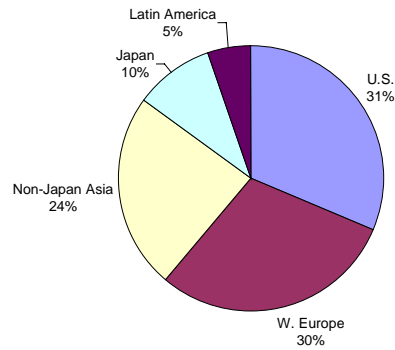
Worldwide Internet Users – 1997



Source: Morgan Stanley Internet Research

Exhibit 77

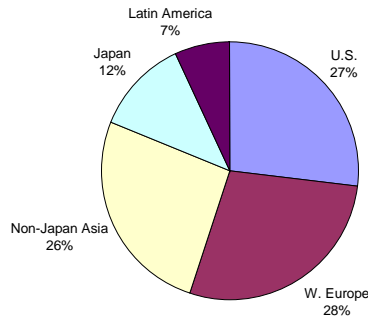
Worldwide Internet Users – 2000



Source: Morgan Stanley Internet Research

Exhibit 78

Worldwide Internet Users – 2003



Source: Morgan Stanley Internet Research

Exhibit 79

MORGAN STANLEY DEAN WITTER INTERNET RESEARCH
 Overview of the Global TMT Markets - Sorted Regionally by Population

Country	Population (mill)	Households (mill)	Land Lines (mill)	GDP per Capita (US\$)	Telephone Lines (mill)	Telephone Base (mill)	PC Penetration (%)	Mobile Subscribers (mill)	Mobile Phone Penetration (%)	Cable Subscriptions (mill)	Cable Penetration (%)	Internet Subscribers (mill)	Internet Penetration (%)	Credit Card Penetration (%)	
North America															
USA	276	101	91,559	25,240	132,145	60%	126,684	69,000	21%	9,080	69%	81,800	14%	17,000	
Canada	31	11	9,221	19,170	39,614	61%	9,980	5,415	10%	8,178	65%	5,700	5%	69,000	
Total	307	112	100,780	24,285	171,759	60%	136,664	74,415	14%	17,258	67%	87,500	9%	176,000	
Europe															
France	61	21	8,417	4,030	20,000	12%	4,180	7,000	4%	1,700	7%	6,100	4%	66,000	
Germany	80	28	11,048	24,970	39,600	10%	4,700	8,000	4%	1,500	4%	1,800	1%	13,200	
UK	51	18	6,800	24,970	39,600	10%	4,700	2,800	6%	1,200	2%	1,200	2%	17,200	
Italy	57	21	3,717	6,800	16,800	4%	1,600	2,800	6%	5,000	26%	1,200	2%	17,200	
Spain	44	15	1,238	2,440	1,700	7%	710	1,100	5%	500	1%	500	1%	5,200	
Sweden	9	3	802	1,830	2,700	12%	800	2,800	9%	600	17%	800	1%	6,200	
Netherlands	16	5	1,108	4,080	1,600	20%	875	875	7%	672	17%	800	4%	3,600	
Total	214	82	27,883	42,7%	114,749	11%	19,818	19,818	5%	12,287	11%	11,800	3%	119,200	
Asia/Pacific															
Japan	126	42	14,008	2,260	25,762	20%	9,880	710	3%	11,031	10%	1,800	1%	2,800	
China	1,261	408	26,970	47,804	41%	27%	15,139	15,139	21%	3,680	11%	10,800	2%	32,000	
India	1,014	294	21,400	35,619	57%	12,272	10,904	17%	162	7%	6,600	10%	18,000		
South Korea	44	15	4,090	8,715	42%	3,827	2,298	6%	460	4%	3,249	27%	500	1%	5,900
Singapore	4	1	304	3,090	8,892	21%	3,716	0	0%	3,671	62%	3,100	52%	21,000	
Hong Kong	6	2	2,080	9,408	20%	2,080	1,710	17%	1,710	27%	2,280	22%	2,800	18%	8,600
Taiwan	22	8	3,900	3,440	30%	3,900	840	9%	71	10%	500	5%	1,800	18%	1,800
Thailand	61	21	4,500	3,500	24%	580	2,200	12%	580	20%	800	4%	2,000	20%	5,000
Philippines	80	28	10,670	4,119	41%	810	4,000	17%	4,000	21%	1,800	20%	2,800	20%	5,000
Indonesia	196	64	2,900	7,800	20%	700	4,270	40%	1,000	40%	1,800	20%	5,000	14%	5,000
Australia	19	7	3,000	3,028	40%	3,000	2,215	20%	2,400	42%	2,400	20%	2,800	14%	5,000
New Zealand	4	1	80,000	5,000	60%	400	2,000	20%	1,645	21%	1,100	10%	1,100	10%	2,000
Israel	6	2	16,180	2,800	40%	1,812	1,810	10%	1,810	10%	1,810	10%	1,810	10%	2,000
Denmark	5	2	8,000	1,600	60%	1,600	2,800	10%	2,800	10%	2,800	10%	2,800	10%	2,000
Finland	5	2	11,200	1,600	60%	1,600	1,600	10%	1,600	10%	1,600	10%	1,600	10%	2,000
Sweden	9	3	11,200	1,600	60%	1,600	1,600	10%	1,600	10%	1,600	10%	1,600	10%	2,000
Total	616	213	21,869	68,246	14,749	14%	14,808	14,808	4%	12,287	11%	11,800	3%	119,200	
Latin America															
Brazil	157	42	3,130	63,869	90%	36,000	47,000	37%	14,000	20%	14,000	27%	20,000	17%	300,000
Argentina	35	10	812	70	17,000	7%	2,000	45,318	2%	61,080	21%	10,000	1%	77,000	
Colombia	40	10	1,812	440	5,508	8%	6,642	1,700	0%	18,080	21%	2,800	8%	4,000	
Peru	21	7	778	470	2,508	2%	528	300	0%	0	0%	1,700	1%	6,500	
Chile	14	4	1,208	1,890	2,775	4%	1,121	1,610	2%	612	7%	1,500	2%	5,400	
Venezuela	23	7	778	1,400	6,802	2%	1,400	3,010	8%	980	4%	1,900	2%	24,800	
Costa Rica	4	1	311	1,850	5,124	8%	1,812	1,812	8%	644	7%	2,100	2%	17,400	
Ecuador	4	1	308	8,680	19,818	47%	7,880	25,000	50%	14,800	10%	14,800	10%	64,400	
Uruguay	3	1	7,682	20,840	39,600	42%	8,515	3,100	10%	3,100	10%	7,400	10%	26,000	
Panama	4	1	308	1,818	40%	1,818	1,818	20%	0	0	0%	1,800	10%	4,000	
Paraguay	3	1	801,700	1,600	50%	1,600	1,600	10%	1,600	10%	1,600	10%	1,600	10%	2,000
Total	232	60	21,401	5,415	174,749	6%	63,429	63,429	2%	61,172	17%	41,800	1%	217,200	
Rest of World															
South Africa	43	13	96,983	136,519	8%	186,749	45,717	3%	79,101	27%	31,889	2%	21,812	1%	
Israel	6,943	1,491	155,444	1,1%	881,318	423,109	14%	348,305	326,423	9%	304,789	40%	2,347,912	40%	

Population figures are based on 2000 data from the UN, CIA World Factbook, and other sources. GDP figures are based on 2000 data from the World Bank. Telephone lines are based on 2000 data from the International Telecommunications Union (ITU). PC penetration is based on 2000 data from the International Telecommunications Union (ITU). Mobile phone penetration is based on 2000 data from the International Telecommunications Union (ITU). Cable subscriptions are based on 2000 data from the International Telecommunications Union (ITU). Internet subscribers are based on 2000 data from the International Telecommunications Union (ITU). Credit card penetration is based on 2000 data from the International Telecommunications Union (ITU). The data is for the year 2000. All figures are in US dollars unless otherwise specified. © Morgan Stanley Dean Witter, 2001. All rights reserved.

Exhibit 80

Top Countries by Total PC Units

Country	PCs (000's)	Phones (000's)	Subs (000's)
1 US	123,930	69,120	65,961
2 Japan	29,862	47,124	14,465
3 Germany	25,010	13,940	17,589
4 UK	15,517	14,868	0
5 France	12,272	11,092	1,623
6 China	11,151	23,541	0
7 Italy	10,034	20,590	162
8 Canada	9,900	5,280	7,914
9 Australia	7,828	5,434	828
10 Russia	6,027	735	11,540

Source: World Bank, World Development Indicators 2000 (1998 data)

Exhibit 81

Top Countries by PC Penetration Rate

Country	PC	Mobile Phone	Cable
1 US	46%	26%	24%
2 Singapore	46	35	5
3 Switzerland	42	24	35
4 Australia	41	29	4
5 Denmark	38	36	25
6 Norway	37	47	16
7 Sweden	36	46	22
8 Finland	35	57	18
9 Canada	33	18	26
10 Netherlands	32	21	38

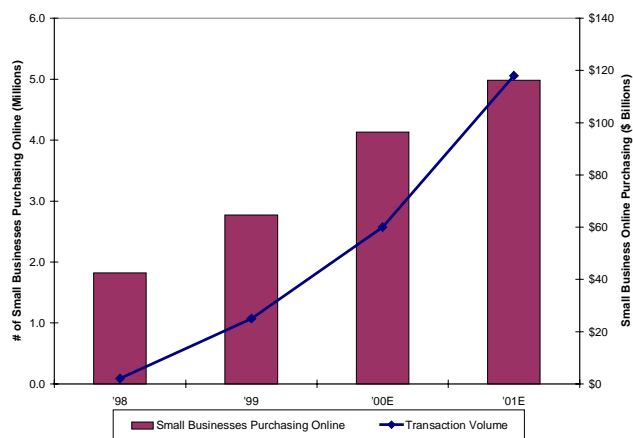
Source: World Bank, World Development Indicators 2000 (1998 data)

...And Businesses Are Moving Online Rapidly
 According to IDC estimates, **at the beginning of 1996, only 175 Fortune 500 companies had a Web presence, compared with all 500 today.** Now, it is virtually unthinkable for a major company not to at least have an informational Web site. But it is not just major corporations who are flocking to the Web. Small

businesses are also getting into the act. According to IDC, 36% of businesses with fewer than 100 employees have Web sites. eMarketer sees this growing to 57% by 2002. According to AMI Partners, small businesses have been even quicker to use the Internet to purchase goods and services to run their operations, with over 55% currently doing so.

Exhibit 82

US Small Businesses Online & Purchasing Online



Source: AMI-Partners, 2000.

Growth Opportunities in the US

While the US is the most mature Internet market, the country is still recording strong usage growth.

According to Media Metrix, Internet usage (users * minutes per user) in the US is up 57% Y/Y as of February 2001.

US Internet users reached 88MM in Feb 2000, up 18% Y/Y, while average minutes of usage per user per month dipped slightly from January to 1,112 minutes, up 27% Y/Y. As noted, though we believe Media Metrix numbers for total users are generally conservative, **we believe the data provide strong directional evidence that Internet usage is still growing significantly in the US.**

Exhibit 83

US Digital Media Usage Trends, 1998 to Present

	Total US Digital Media Users (000s)	US Digital Media Usage Minutes/ User/Month	Total US Digital Media Usage Minutes (MMs)
Nov-98	61,256	512	31,363
Dec-98	61,255	563	34,480
Jan-99	63,210	630	39,822
Feb-99	63,869	653	41,706
Mar-99	65,251	766	49,982
Apr-99	64,968	730	47,427
May-99	65,369	720	47,066
Jun-99	66,021	756	49,912
Jul-99	66,641	780	51,980
Aug-99	66,956	775	51,891
Sep-99	67,136	688	46,190
Oct-99	67,571	703	47,502
Nov-99	68,795	691	47,537
Dec-99	69,197	713	49,317
Jan-00	72,722	790	57,465
Feb-00	74,629	877	65,450
Mar-00	76,795	952	73,078
Apr-00	77,883	925	72,003
May-00	78,263	1,009	78,960
Jun-00	78,854	991	78,144
Jul-00	80,097	1,123	89,953
Aug-00	79,638	1,168	93,006
Sep-00	79,859	1,104	88,200
Oct-00	80,657	1,136	91,596
Nov-00	80,984	1,125	91,081
Dec-00	81,097	1,070	86,737
Jan-01	84,801	1,154	97,843
Feb-01	87,905	1,112	97,741

Source: Morgan Stanley Internet Research; Media Metrix

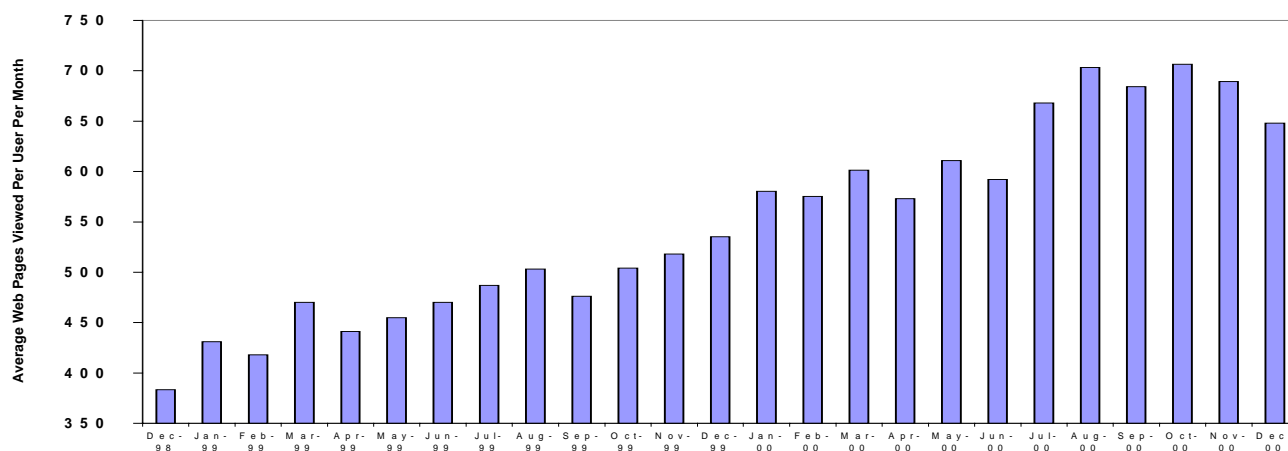
As one can see from the data in Exhibit 83, US Internet users seem to be spending an average of 40 minutes per day online, a number we expect to double over the next two to four years.

The increase in usage has resulted in an identical rise in the average number of monthly page views per user. This suggests that, despite the growth in the average time spent on the Web, users' attention spans appear to have remained

constant. This will likely change with the introduction of more rich media features enabled by broadband.

While there has been speculation about seasonal trends in Web usage, the lack of reliable historical data complicates the task of discerning a definitive trend.

Exhibit 84
Monthly Unique Web Pages Viewed Per US User: 1998-2000



Source: Media Metrix

In the US over the past few years, the average Internet user has inched his or her way closer to the average US citizen with respect to age, gender, income, and

education. Over time, we would expect this trend to continue as the Internet becomes more accessible to wider audiences within the US.

Exhibit 85
Internet Users — Trending Toward the Average

	Avg. Internet User, 1997	Avg. Internet User, 1999	Avg. American, 1999
Age (median)	32.0	33.0	34.6
Gender	65% Male	54% Male	49% Male
Education	70% College Grad	43% College Grad	22% College Grad
Income (median)	\$60K	\$58K	\$37K

Source: Morgan Stanley Internet Research; eMarketer - 1997, 1999

The following table gives a more detailed view of this convergence trend in the income category.

Exhibit 86
Internet Users — Average Income 6/99 vs. 6/00

	<\$25K	\$25-40K	\$40-60K	\$60-75K	\$75-100K	\$100K<
June 1999	4,989	10,170	17,732	8,121	9,304	11,977
June 2000	7,449	14,245	20,828	9,684	10,506	13,647
Y/Y Change (%)	49%	40%	17%	19%	13%	14%

Source: Morgan Stanley Internet Research, Media Metrix

Internet, Technology, Telecommunications – March 26, 2001

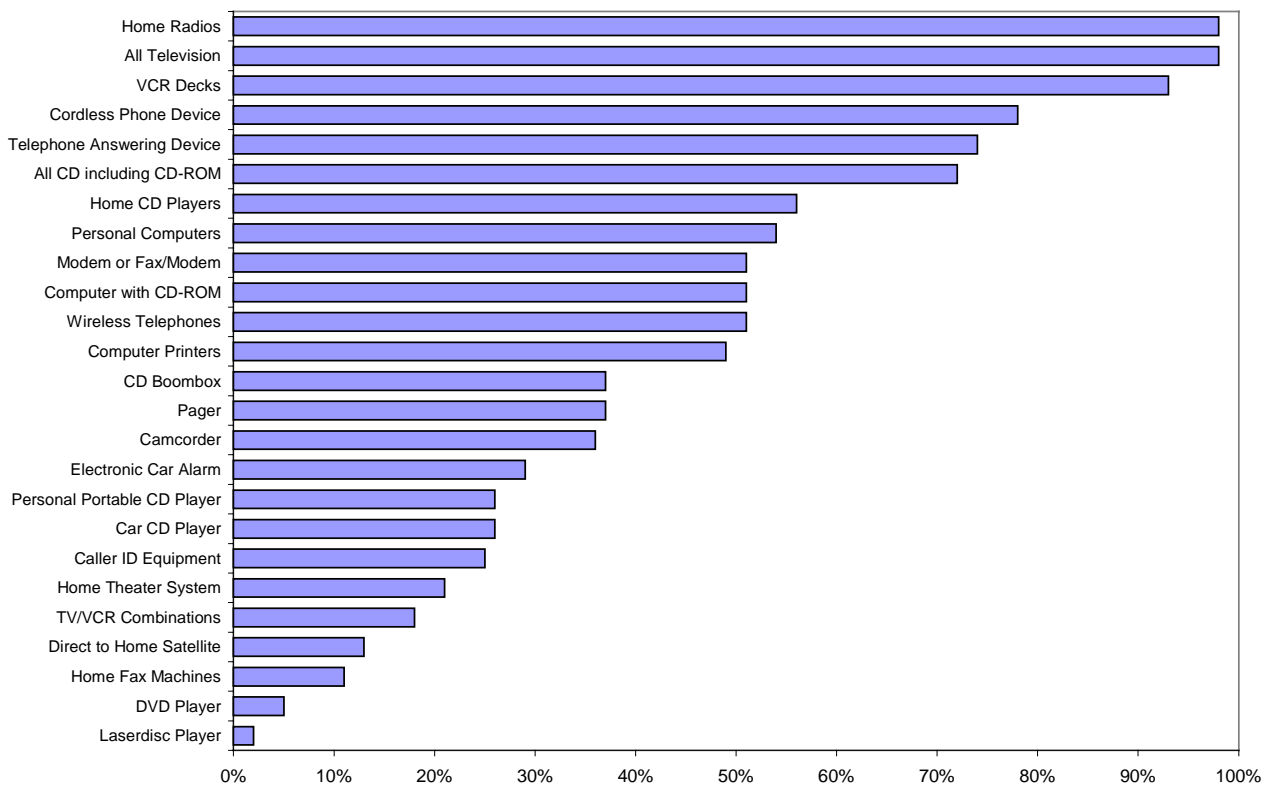
Please refer to important disclosures at the end of this report.

Exhibits 87 and Exhibit 88 show the US household penetration of various consumer electronics products. Given the growth in modem penetration, coupled with the expected rapid growth in Internet-enabled non-PC devices (such as TV set-top boxes that access the Internet through dial-up connections, like WebTV, or via cable modems), we believe that **the percentage of Internet-enabled**

households will continue to ramp over the next several years. We expect people and businesses to continue to spend more on personal computers and computer-related devices, as they have in the past, **and the Web to continue to reach penetration of the consumer sector faster than any other medium before it.**

Exhibit 87

US Household Penetration of Selected Consumer Electronics Products, January 2000



Source: Morgan Stanley Internet Research, Consumer Electronics Manufacturers Association.

Exhibit 88

US Household Penetration of Selected Consumer Electronics Products

U.S. Household Penetration of Consumer Electronics Products (Based on Telephone Surveys Conducted by CEA)

	Jan-97	Jun-97	Jan-98	Jun-98	Jan-99	Jun-99	Jan-00
Laserdisc Player	2%	2%	2%	2%	2%	2%	2%
DVD Player			0	0	1	3	5
All LCD TV	10	10	11	11	11	11	11
Home Fax Machines	9	10	10	10	10	11	11
Direct to Home Satellite	7	8	9	10	11	12	13
Projection TV	11	12	12	13	13	14	14
TV/VCR Combinations	10	11	12	13	15	17	18
Multi-line Phone	15	16	17	18	19	20	21
Home Theater System	14	15	16	17	18	20	21
Caller ID Equipment	14	16	18	19	21	23	25
Car CD Player	18	19	19	22	22	24	26
Personal Portable CD Player	20	21	22	23	23	24	26
Electronic Car Alarm	27	28	29	29	29	29	29
Camcorder	26	28	30	32	33	35	36
Pager	28	29	29	30	33	36	37
CD Boombox	27	28	30	32	34	35	37
Rack or Compact Audio System	36	37	38	39	40	41	42
Monochrome TV	46	46	45	45	45	44	43
Computer Printers	38	39	40	41	44	47	49
Wireless Telephones	34	36	39	41	44	48	51
Computer with CD-ROM	21	23	26	32	39	48	51
Modem or Fax/Modem	19	22	25	31	38	47	51
Personal Computers	40	41	42	44	48	52	54
Home CD Players	49	50	52	54	55	56	56
Separate Component Systems	54	55	55	55	56	57	57
Color TV with Stereo	55	57	59	61	63	64	65
All CD including CD-ROM	67	68	69	71	71	71	72
Telephone Answering Device	65	68	69	71	72	73	74
Cordless Phone Device	66	68	70	73	75	77	78
VCR Decks	89	90	90	91	91	92	93
Corded Phone	96	96	96	96	96	96	96
All Television	98	98	98	98	98	98	98
Color TV	98	98	98	98	98	98	98
Home Radios	98	98	98	98	98	98	98

Source: Consumer Electronics Manufacturers Association and eBrain Market Research

MORGAN STANLEY DEAN WITTER

The Americas	Europe	Japan	Asia/Pacific	
1585 Broadway New York, NY 10036-8293 Tel: (1) 212 761-4000	25 Cabot Square, Canary Wharf London E14 4QA, England Tel: (44 171) 425 8000	20-3, Ebisu 4-chome Shibuya-ku, Tokyo 150-6008, Japan Tel: (81) 3 5424 5000	Three Exchange Square Hong Kong Tel: (852) 2848 5200	4th Floor Forbes Building Charanjit Rai Marg Fort Mumbai 400 001, India Tel: (91 22) 209 6600
BCE Place, 181 Bay Street, Suite 3700 Toronto, Ontario M5J 2T3, Canada Tel: (1) 416 943-8400	AB Asesores Plaza de la Lealtad, 3 Madrid 28014, Spain Tel: (34 91) 580 11 00		23 Church Street #16-01 Capital Square Singapore 049481 Tel: (65) 834 6888	The Chifley Tower, Level 33 2 Chifley Square Sydney NSW 2000, Australia Tel: (61 2) 9770 1111

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