

Internet, Technology,
Telecommunications

INTERNET ECOSYSTEM CONTRIBUTORS

Quarterly

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Morgan Stanley Internet Ecosystem Framework – 4Q01

- **CQ4:01 update to our User/Usage Framework**

We update 22 metrics from 37 companies in our Internet *User/Usage* Ecosystem Framework. We also highlight other basic Internet growth statistics.

- **Quarterly framework is a one-stop shop**

We believe we have created the best data set for determining global Internet *user/usage* trends. In our view, Internet user and usage growth rates in the Ecosystem have directional significance.

- **CQ4 Y/Y mean *user* growth was 23% vs. 29% in CQ3**

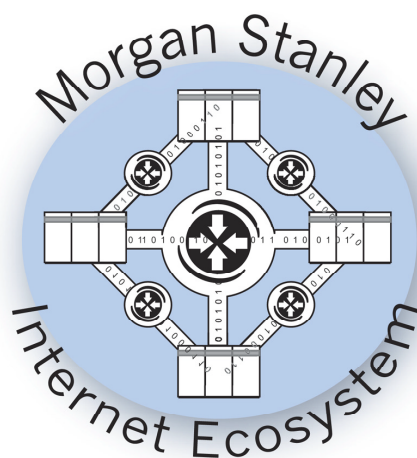
CQ4 Y/Y mean *usage* growth was 41% vs. 48% in CQ3. Of 21 quarterly metrics, 48% had accelerating Q/Q growth rates and 52% decelerating vs. 57% accelerating 43% decelerating in CQ3.

- **Internet *usage* continued to outpace *user* growth in 4Q**

The mean Y/Y core usage-to-user growth multiplier was 1.8 vs. 1.6 in CQ3.

- **Looking ahead: growth likely stays strong, but slower**

All in, the CQ4 results indicate to us that Internet user and usage growth remains strong. We continue to expect Y/Y Internet user and usage growth (especially outside the US) to remain strong (20%+), though expanding at slower rates.



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The Internet User/Usage Ecosystem Framework – 4Q01

Summary/Highlights

Normalized trends of the past few quarters continue to point to strong Internet user and usage growth, but at slowing rates. Although the weaker economy and the law of large numbers have clearly hit Internet-related purchases and usage this year, CQ4 data continue to support solid Internet user and usage growth rates.

What follows are key highlights from our update of the Morgan Stanley Internet User/Usage Ecosystem Framework (see Exhibit 1 for details on the 24 metrics — 23 quarterly and 1 annual — in our Framework):

- **CQ4:01 Y/Y user growth** metrics ranged from 8% to 40%, with a mean increase of 23% and a median increase of 22% — this compares with the CQ3:01 Y/Y user growth range of 27% to 37%, with a mean increase of 29% and a median increase of 27%.
- **CQ4:01 Y/Y usage growth** ranged from (7)% to 117%, with a mean increase of 41% and a median increase of 39% — this compares with CQ3:01 Y/Y usage growth of a range of (1)% to 128%, with a mean increase of 48% and a median increase of 46%.
- **For CQ4:01, the Internet growth metrics continued to support strong, though slowing, rates of growth.** Mean year-over-year usage growth outpaced mean user growth in CQ4:01 by a multiplier of 1.8.
- **The CQ4:01 quarter-to-quarter metric cut was as follows:** of the 21 quarterly metrics presented in this report, 48% saw an increase in the rate of growth Q/Q in CQ4:01, while 52% saw a decrease, versus 57% up and 43% down in CQ3:01.

Exhibit 1

The Morgan Stanley Internet Ecosystem — with Key Internet Momentum Metrics, February 2002

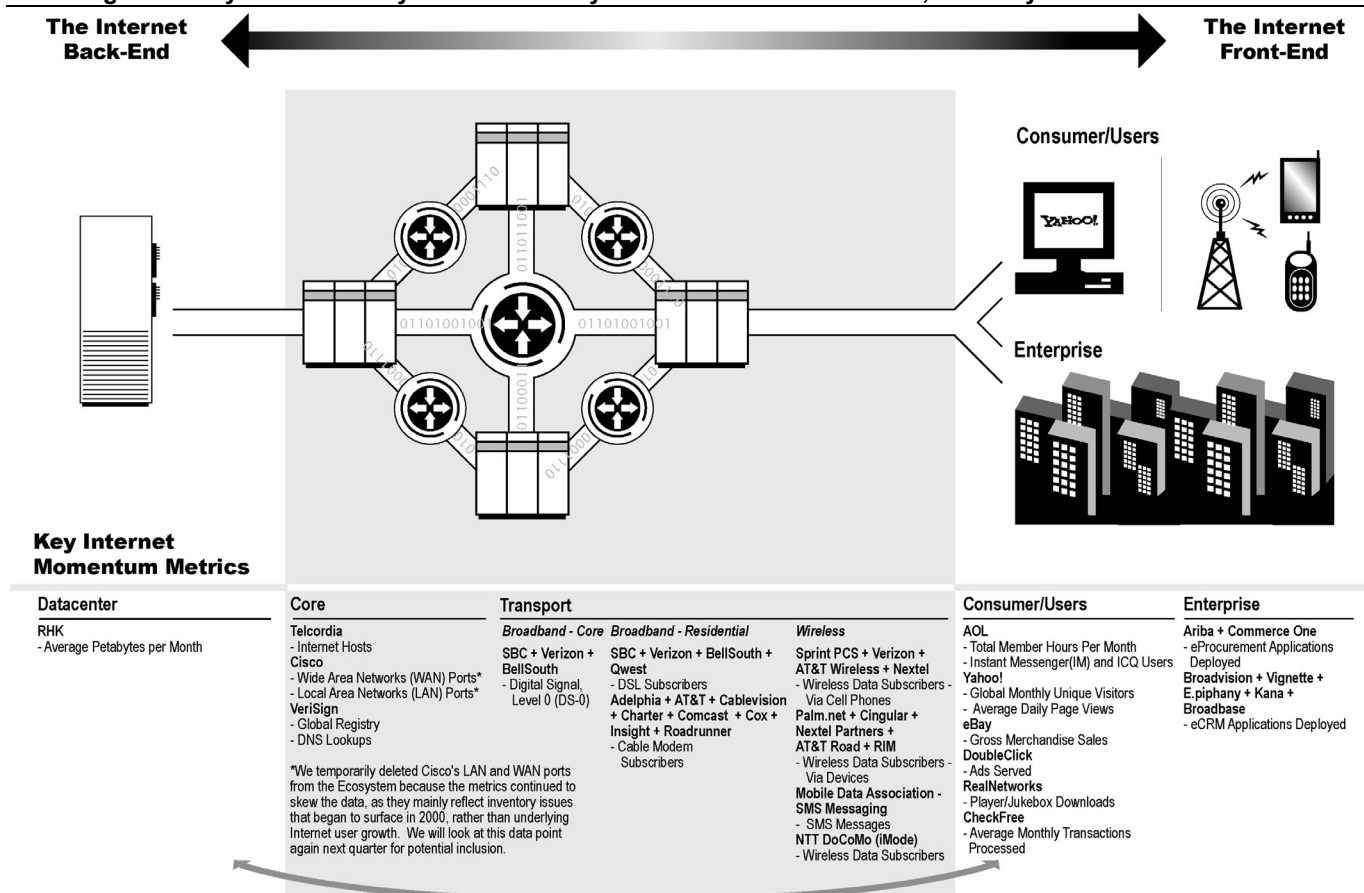


Exhibit 2

Mean Y/Y Internet User & Usage Growth Trends

Y/Y Growth	Dec-00	Mar-00	Jun-01	Sep-01	Dec-01
User	97%	60%	40%	29%	23%
Usage	118%	79%	57%	48%	41%
Usage / User Multiplier	1.2	1.3	1.4	1.6	1.8

Source: Morgan Stanley Internet Research

Exhibit 2A

Median Y/Y Internet User & Usage Growth Trends

Y/Y Growth	Dec-00	Mar-00	Jun-01	Sep-01	Dec-01
User	50%	44%	40%	27%	22%
Usage	81%	68%	52%	46%	39%
Usage / User Multiplier	1.6	1.5	1.3	1.7	1.8

Source: Morgan Stanley Internet Research

Year-to-Year Trends

- **On the user front**, Y/Y growth ranged from 8% for VeriSign's Top Level Domain Names Registered to 40% for Telcordia Technologies' estimated number of Internet hosts.
- **Y/Y usage growth** ranged from (7)% for DoubleClick's Ads Served to 117% for VeriSign's Average Daily DNS Queries.
- **In narrowband usage**, Y/Y growth was 24% for AOL Average Member Hours Per Month (down slightly from 29% in CQ3).
- Looking at our emerging metrics, **for broadband usage**, SBC, Verizon, BellSouth and Qwest's combined number of DSL subscribers (estimated at 90% of the U.S. market) grew 102% Y/Y, to 3.6MM, while the Cable Modem Subscriber base for Adelphia, AT&T, Cablevision, Charter, Comcast, Cox, Insight, and RoadRunner (estimated at 93% of the U.S. market) grew 122% Y/Y, to 6.8MM. Both metrics continue to see strong growth off of small bases, in contrast to the large base of Internet users we currently estimate to be over 450MM+ (See *Internet User Growth* on pg. 6 for further details).
- **On the wireless data usage front**, growth was also strong from small bases. In the US, Wireless Data Subscribers via Cell Phones — based on data from Sprint PCS, Verizon, AT&T Wireless, and Nextel

(estimated at 74% of the U.S. market) — increased 118% Y/Y, to 6.3MM, while those via devices — based on data from Palm.net, Cingular, Nextel Partners, AT&T Road, and Research In Motion (RIM) data (estimated at 86% of the U.S. market) — grew 62% Y/Y, to 1.5MM. In Japan, we look at NTT DoCoMo's iMode subscribers (up 76% Y/Y in CQ2 to 30MM) to gauge the power of the mobile Internet in Japan, give NTT DoCoMo's estimated market share of 62%. Finally, we include Short Messaging Service (SMS) data from the UK, where the number of SMS messages increased 73% Y/Y, from 756MM in CQ4:00 to 1,305MM in the December quarter.

Exhibit 3

Mean Q/Q Internet User & Usage Growth Trends

Q/Q Growth	Dec-00	Mar-00	Jun-01	Sep-01	Dec-01
User	9%	8%	5%	5%	4%
Usage	13%	14%	4%	8%	8%

Source: Morgan Stanley Internet Research

Exhibit 3A

Median Q/Q Internet User & Usage Growth Trends

Q/Q Growth	Dec-00	Mar-00	Jun-01	Sep-01	Dec-01
User	8%	8%	4%	5%	4%
Usage	13%	12%	6%	5%	7%

Source: Morgan Stanley Internet Research

Quarter-to-Quarter Trends

- **In terms of users**, Q/Q *user* growth ranged from (5)% for VeriSign's TLD Names Registered, to 11% for Telcordia Technologies' estimate of Internet Host growth.
- **For usage**, Q/Q *usage* growth ranged from 2% for the total number of eCRM Applications deployed by Broadvision, Vignette, E.piphany, and Kana, to 16% for eBay's Gross Merchandise Sales.
- **In terms of narrowband**, AOL's Average Member Hours Per Month grew 8% Q/Q — up from 4% growth in CQ3.
- **In broadband**, Q/Q growth was 19% for the number of DSL subscribers from SBC, Verizon, BellSouth and Qwest (up from 15% last quarter) and 16% (down from 15% in CQ3:01) for the combined Cable Modem Subscriber base of Adelphia, AT&T, Cablevision, Charter, Comcast, Cox, Insight, and RoadRunner.

- **For wireless**, Q/Q growth ranged from 3% for the combined wireless data subscribers (device) of Palm.net, Cingular, Nextel Partners, AT&T Road, and RIM, to 19% for SMS messaging in the UK.

Purpose of This Quarterly Report

A key challenge facing investors and Internet/communications executives is determining both the growth rates of Internet users and usage as well as the levels of supply and demand for products and services. This is particularly crucial given the slowing global economy, depressed IT spending and consumer confidence levels, excesses in the telecom space, declining rates of Internet *user/usage* growth off of large numbers (especially in the more mature US market), and the war on terrorism.

In our effort to determine the basics of the health/growth/direction of the Internet, we created our **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 framework, which we update and publish quarterly, we believe that we have created the best data set for determining Internet *user/usage* growth rates. We have done this by compiling what we believe are the 22 most relevant publicly available metrics (21 quarterly, one annual) from 37 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).

We have updated our framework with current data for CQ4:01. We use Yahoo!'s visitor metric as one of three proxies for determining the growth rate of Internet *users*, and we use data from companies ranging from Yahoo! to RealNetworks to CheckFree as three of 18 proxies for determining the growth rate of Internet *usage*.

Since CQ3:01, we have made a couple of changes to the Ecosystem metrics. We have deleted three 'Wireless Data Subscribers (by Device)' metrics due to declining market share and replaced them with more relevant companies: 1) SkyTel was replaced by Cingular; 2) GoAmerica was replaced by Nextel Partners; and 3) Aether was replaced by AT&T Road. In addition, we have temporarily deleted two metrics: 1) Cisco LAN ports (we will look at this data point again next quarter for potential inclusion — see the *Conclusions* section below for more detail); and 2) Cisco WAN ports (we will also look at this

data point again next quarter for potential inclusion — see the *Conclusions* sections below for more detail).

Conclusions

Our Internet user/usage ecosystem data show us that Internet user/usage growth rates continue to be strong, although they continue to rise at slower rates of growth, and that usage growth continues to outpace user growth.

Interestingly, the strongest Q/Q growth rates were among the more direct gauges of Internet traffic growth: Yahoo!'s Average Daily Page Views, VeriSign's Average Daily DNS Queries, AOL's Average Member Hours Per Month, and Media Metrix's Total Digital Media Usage Minutes Per Quarter. eBay's Gross Merchandise Sales showed a nice uptick — growing 16% Q/Q (up from 5% in CQ3). **Potentially driving the growth in these metrics this quarter could be a mix of seasonality and reverberations from the events of 9/11, when more people turned to the Internet as a source of information and mode of communication in the days after the crisis; we would not necessarily point to a secular trend just yet, though we will monitor this closely going forward.**

Looking at the Y/Y usage-to-user growth multiplier. For CQ4, our mean Y/Y usage-to-user growth multiplier is 1.8. As mentioned above, we temporarily deleted Cisco's LAN and WAN ports from the Ecosystem because the metrics continued to skew the distribution of the data, as they had been for the past four to five quarters, mainly reflecting, we believe, inventory issues that began to surface in 2000, rather than underlying Internet user growth. Going forward, we believe many service providers are done spending on their backbone networks for the next several quarters (with the next backbone upgrade occurring no earlier than the mid-2002 time frame). We plan on revisiting these two metrics next quarter to potentially reincorporate them into the Ecosystem.

We reiterate that while these global data might still be somewhat US-centric, we believe they are a relevant sample. Specifically, we note the following: 1) given the sample used for our data, we believe that, while the absolute magnitude of rates of change is somewhat suspect, the data will have directional significance on a consistent basis; 2) a lot of our data points have a US bias; 3) we continue to believe that non-US rates of growth are,

and will continue to be, higher than US rates of growth; and 4) 65-70% of Internet users are outside of the US.

Internet User Growth

Worldwide, we estimate there are more than 450MM+ Internet users today, up about 35% from 335 million in 2000; up about 120% from 205 million in 1999; up about 485% from 77 million in 1997; and up over 8,900% from less than 5 million in 1995, 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.

Regionally, we estimate that the US still has the lead (based on year-end 2001), with about 149 million Internet users (up 19% Y/Y), followed by Europe, Africa & the Middle East (132 million, up 47%), non-Japan Asia (64 million, up 55%), Japan (33 million, up 29%), and Latin America (17 million, up 47%).

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 198MM in C2003). Note that if *user* growth continues at its current pace worldwide, Europe will equal the US in 2002 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 30-40 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.

Ecosystem Defined

According to The Franklin Institute in Philadelphia, PA, an ecosystem is any “group of living and non-living things” interacting with each other. They can vary in size, being as small as a puddle or as large as the Earth itself.

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According to *Encyclopaedia Britannica*, an ecosystem is “the complex of living organisms, their physical environment, and all their interrelationships in a particular unit of space. The principles underlying the study of ecosystems are based on the view that all the elements of a life-supporting environment of any size, whether natural or man-made, are parts of an integral network in which each element interacts directly or indirectly with all others and affects the function of the whole. All ecosystems are contained within the largest of them, the ecosphere, which encompasses the entire physical Earth (geosphere) and all of its biological components (biosphere).”

Key Metric Definitions

Internet Users

Global Unique Visitors (Yahoo! – Meeker/Mahaney):

Up 22% Y/Y, up 4% Q/Q at 219MM— Includes all users worldwide who visited the Yahoo! sites within the last month of the quarter. We believe Yahoo! has about a 61% reach of Total Global Unique Visitors today.

Global Registry (VeriSign/Network Solutions – Meeker/Joseph):

Up 8% Y/Y, down 5% Q/Q at 29MM— Top-level domain (TLD) refers to the extension attached to Internet domain names (such as .com). Today, TLDs include .com, .org, .net, .gov, .edu, .mil, and all country extensions, such as .uk (United Kingdom), .ca (Canada), and so forth. Also, the newly approved domain name extensions .biz and .info were launched in September 2001 and October 2001 respectively, reaching 1.1 million domain name registrations by December. The .name TLD went live on January 15th, and we expect the .pro to be launched by the summer. ICANN, the Internet’s governing body, has also approved 3 other TLDs (.museum, .aero, and .coop) to be launched at a later date.

However for our purposes here, we look at only the VeriSign Global Registry, which is the exclusive global registry for .com (commercial businesses), .net (network organizations), and .org (mostly non-profit organizations) extensions and represents 100% of the domain name market for these three extensions. Therefore, we think this metric can be considered a conservative indicator of the size of the current global registered domain name market, being that it does not include the newer TLDs. Also, possibly making this metric even more conservative, is the fact that VeriSign has been cleaning out its Registry of promotional (i.e. buy one, get one free) and speculative

names that accumulated during the Internet bubble of 1999/2000. We believe the company cleaned out over one million names in CQ4 and we expect more to come, though at a lower levels, in CQ1:02 and potentially in CQ2:02.

Internet Hosts (Telcordia Technologies – Meeker/Joseph): *Up 40% Y/Y, up 11% Q/Q at 137MM*— Defined as the number of named (in the Domain Name System, or DNS) computers that have a permanent IP address, including servers and workstations in universities and businesses and ports in modem banks of Internet service providers (ISPs). The estimates are based on actual samplings of IP addresses declared in the Internet name service, or the DNS. Nearly 100,000 randomly generated IP addresses (from the universe of 2 to the 32nd power possible addresses) 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. Telcordia believes these estimates represent 100% of the Internet Host market. Note, our metric for Internet hosts is growing at a faster rate than our metric for Top Level Domains (TLDs), which we believe indicates greater IP address proliferation beneath the broader TLDs.

WAN Router Ports: Core & Edge (Cisco – Shah):

Note: We temporarily deleted Cisco's LAN and WAN ports from the Ecosystem because the metrics continued to skew the data, as they had been for the past four to five quarters, mainly reflecting inventory issues that began to surface in 2000, rather than underlying Internet user growth.

Wide-area network (WAN) router ports represent the number of ports on the backbone of the Internet core. The Internet core, which carries WAN traffic over long distances, is composed of IP routers that are responsible for moving packets through the network reliably and efficiently. Using dedicated purpose-built ASICs, IP routers can perform ultra-fast operations, enabling packets to be moved from one network to another at rates of 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 should note here that WAN router ports may actually understate Internet growth, since the speed, or capacity, of each port has grown over time. We believe that Cisco accounts for about 66% of all WAN ports (core and edge) sold globally today.

LAN Ports (Cisco – Shah):

Note: We temporarily deleted Cisco's LAN and WAN ports from the Ecosystem because the metrics continued to skew the data, as they had been for the past four to five quarters, mainly reflecting inventory issues that began to surface in 2000, rather than underlying Internet user growth.

A LAN (local-area network) 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. We believe this metric, as reported by the Dell'Oro Group, captures about 66% of all LAN ports sold globally.

Please Note: Cisco metrics included in this report (WAN and LAN ports) have not been adjusted for acquisitions and, therefore, the numbers may overstate growth. However, two factors increase our confidence in these two metrics: 1) usually Cisco acquires product lines and technology that have yet to ship in volume, and 2) most of the growth in these two metrics can be attributed to the company's 12000 Gigabit Router (WAN) and Catalyst 6000 (Layer 2 and 3 LAN) products, which predominantly are internally developed.

Core Internet Usage

General

Average Daily Page Views (Yahoo! – Meeker/Mahaney): *Up 47% Y/Y, up 6% Q/Q at 1.3B*— The average number of pages viewed by visitors to the Yahoo! sites during the last month of the quarter. A larger percentage increase in page views than in unique visitors would indicate that users are spending more time on the sites, and vice versa. We believe that Yahoo! Average Daily Page Views represent less than 5% of global daily page views.

Total Digital Media Usage Minutes Per Month (Media Metrix – Meeker/Mahaney/Joseph): *Up 48% Y/Y, up 12% Q/Q at 400B*— The total number of minutes that US Internet users spent visiting digital media properties during the last month of the quarter. Media Metrix operates three samples of 50,000 digital media users that have installed a tracking meter on the computers that they use to access the Internet from both their homes and at work. As a result,

the company believes its estimates reflect 100% of the Total US Media Usage Minutes Per Month.

Instant Messenger (IM) and ICQ Users (AOL Time Warner – Meeker/Mahaney/Bilotti): *Up 48% Y/Y, up 6% Q/Q at 157MM* — AOL's Instant messenger (IM) and ICQ applications enable users to communicate via the Internet in real time. Typically, the instant messaging system alerts you whenever somebody on a user's private list is online. One can then initiate a chat session with that particular individual. Instant Messaging applications are used as a conferencing tool by individuals on the Internet to chat, e-mail, perform file transfers, collaborate on work, play games, etc. We estimate that AOL has approximately 50% of the U.S. market.

This is not a user metric, since it assumes that anyone using one or both of these services is already an Internet user. That said, it is possible that one person may use both services and, therefore, some double-counting may occur.

Average Daily DNS Queries (VeriSign – Meeker/Joseph): *Up 117% Y/Y, up 10% Q/Q at 5.3B* — An Internet protocol (IP) address is a 32-bit integer used to route Internet traffic. However, an IP address like 199.89.99.81 would prove cumbersome and confusing to the public when trying to reach a person (e-mail) or a property (Web page) via the Internet. Therefore, machines or servers were assigned host names, such as *amazon.com* or *pepsi.com*, to make things easier. For this reason a distributed database called the Domain Name System (DNS) was developed to manage and translate host names into IP addresses for electronic routing purposes. In this sense, the DNS provides an "addressing" solution that enables machines to communicate with one another. Through its Global Registry Services, VeriSign maintains the definitive directory of Web addresses.

Here we consider a DNS query to be whenever VeriSign's DNS translates a host name into an IP address for the purpose of routing an e-mail or a browser from one place to another.

Advertisements Served (DoubleClick – Russell): *Down 7% Y/Y, up 7% Q/Q at 172B* — 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.

Gross Merchandise Sales (eBay – Meeker/Mahaney): *Up 69% Y/Y, up 16% Q/Q at 2.7B* — Defined as the total sales value of all items transacted on the eBay site. Note: this 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.

Average Petabytes Per Month (RHK, Inc. – Shah/Lynch): *Up 117% Y/Y (12/31/01) at 100* — A petabyte is a unit of measurement for 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 a petabyte as a unit of measurement of the Internet data traffic moving across the global Internet backbone. Whereas 1 megabyte equals a 1-byte unit (1 byte contains 8 bits of information) times 10 to the 6th power (i.e., 1 million bytes), a petabyte equals a 1-byte unit 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 arrives at this estimate by collecting data from three sources: 1) traffic data from Web hosting companies, 2) backbone-to-backbone peering traffic between large backbone carriers, and 3) high-speed consumer (DSL, cable modem) and business (private lines such as Fractional T1, T1, T3, and SONET OC-X) access and usage levels. The company believes this metric reflects 100% of global Internet traffic growth.

Digital Signal Level 0 (DS-0) (SBC + Verizon + BellSouth – Flannery): *Up 31% Y/Y, up 6% Q/Q at 163MM* — VGEs, or voice-grade equivalents, are increasingly used as an indicator of usage by the local phone companies. Capacity is measured in DS-0 (digital signal level 0) or VGE units; each VGE carries 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. We believe SBC, Verizon, and BellSouth collectively hold an 83% share of total US DS-0 lines.

Unique Users: RealPlayer and GoldPass (RealNetworks – Meeker/Mahaney/Joseph): *Up 45% Y/Y, up 8% Q/Q at 250MM* — Measures the number of cumulative unique users of RealNetwork's two flagship products — RealPlayer and GoldPass. We estimate that RealPlayer

represents about 85% of the market for computer media players.

Estimated Average Transactions Processed per Month (CheckFree – McVey): *Up 33% Y/Y, up 9% Q/Q at 25MM* — Defined as the average of monthly transactions processed by CheckFree in a given three-month calendar quarter.

eProcurement Applications Deployed (Ariba + Commerce One – Phillips): *Up 29% Y/Y, 7% Q/Q at 1,192* — For this metric, 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. EProcurement applications enable efficient online trade, integration, and collaboration among B2B marketplaces, buyers, suppliers, and e-commerce service providers.

eCRM Applications Deployed (Broadvision + Vignette + E.piphany + Kana – Phillips): *Up 12% Y/Y, up 2% Q/Q at 4,051* — 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**, and **Kana**, which collectively represent about 67% of the eCRM market.

Narrowband

Total Member Hours Per Month (AOL – Meeker/Mahaney/Bilotti): *Up 24% Y/Y, up 8% Q/Q at 820MM* — 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.

Emerging Market Metrics

Broadband

DSL Subscribers (SBC + Verizon+BellSouth+Qwest – Flannery):

Up 102% Y/Y, up 19% Q/Q at 3.6MM — The number of subscribers of broadband Internet access that connect through a digital subscriber line. This technology uses existing copper-pair wiring found in almost every home and office. Special hardware attached to both the user and

the switch ends of a line allows data transmission over the wires at far greater speed than normally possible with standard phone wiring. Note that, given the early stage ramp of DSL (well below 5% of Internet users), its impact has not yet been felt on the Internet at large. We believe SBC and Verizon collectively capture 90% of total DSL subscribers in the US.

Cable Modem Subscribers Adelphia + AT&T + Cablevision + Charter + Comcast + Cox + Insight + Roadrunner – Bilotti): *Up 122% Y/Y, up 16% Q/Q at 6.8MM* — The number of subscribers of broadband Internet access that connect through cable lines. Note that, given the early stage ramp of cable modems (well below 5% of Internet users), its impact has not yet been felt on the Internet at large. We believe the subscriber bases from the companies above collectively capture more than 90% of the total cable modem subscribers in the US.

Wireless – US

Wireless Data Subscribers (via cell phones: Sprint PCS + Verizon +AT&T Wireless + Nextel – Carvalho/Lundberg; via devices: Palm..net + Cingular + Nextel Partners + AT&T Road + RIM – Lundberg) — 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 technology). Two-way text messaging is also wireless data communication, but does not allow users to access Web sites (we include two-way e-mail in our definition of wireless data communications). Note that given the early stage ramp of wireless Internet access, especially in the US (well below 5% of Internet users), its impact has not yet been felt on the Internet at large.

For **Wireless Data Subscribers Via Cell Phones** (*up 118% Y/Y, up 3% Q/Q at 6.3MM*), we include users who generally access wireless data with a phone. For Sprint PCS, Verizon, AT&T Wireless, and Nextel, we used reported data users. For Sprint PCS, these figures may include some customers who use Web capabilities infrequently. The AT&T Wireless, Verizon, and Nextel figures represent heavier data users.

For **Wireless Data Subscribers Via Devices** (*up 62% Y/Y, up 8% Q/Q at 1.5MM*), we looked at users who access data through a device or advanced e-mail paging device. We did not include users of myPalm.net, who access wireless

data with a traditional Palm device in conjunction with a cell phone. We believe Sprint PCS, Verizon, AT&T Wireless, and Nextel collectively capture 74% of total Wireless Data subscribers in the US.

Wireless – Japan

Wireless Data Subscribers (NTT DoCoMo – Tanaka): *Up 76% Y/Y, up 9% Q/Q at 30MM*— The number of wireless subscribers in Japan who access the wireless Internet through NTT DoCoMo's iMode platform (comparable to WAP in Europe). NTT DoCoMo is the largest provider of wireless data services in the world and captures a 62% share of wireless data subscribers in Japan.

Wireless – Europe

SMS Messages (Mobile Data Association – Farrell): *Up 73% Y/Y, up 19% Q/Q at 1.3B*— Short Messaging Service (SMS), otherwise known as text messaging, mobile messaging, or alphanumeric paging, is a digital cellular network feature. It allows users to send short text and numeric messages (under 160 characters) between digital cell phones, cell phones, and e-mail addresses, as well as cell phones and public SMS messaging gateways on the Internet. SMS has become popular in Europe and Asia, where more advanced digital networks made SMS available before its debut in North America. For this emerging European metric, we use data from the Mobile Data Association on the number of SMS messages sent via the wireless Internet.

Exhibit 4

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

	Metric Share	Quarterly												Annual			
		Q1:99	Q2:99	Q3:99	Q4:99	Q1:00	Q2:00	Q3:00	Q4:00	Q1:01	Q2:01	Q3:01	Q4:01	1998	1999	2000	2001
Internet Users																	
Yahoo! (Meeker/Mahaney) - Global																	
Global Monthly Unique Visitors (000's)	61%	80,000	80,000	105,000	120,000	145,000	156,000	166,000	180,000	192,000	200,000	210,000	219,000	50,000	120,000	180,000	219,000
Y/Y Growth	--	88%	100%	163%	140%	142%	9%	58%	50%	32%	28%	27%	22%	--	140%	50%	22%
Q/Q Growth	--	20%	33%	31%	14%	21%	8%	6%	8%	7%	4%	5%	4%	--	--	--	--
VeriSign (Network Solutions) (Meeker/Joseph) - Global																	
Global Registry (a) (000's)	100%	4,224	5,354	6,746	8,957	14,000	19,300	24,200	26,600	28,600	29,400	30,200	28,800	--	8,957	26,600	28,800
Y/Y Growth	--	--	--	--	--	231%	260%	258%	197%	104%	52%	25%	8%	--	197%	--	8%
Q/Q Growth	--	--	27%	26%	33%	56%	38%	25%	10%	8%	3%	3%	-5%	--	--	--	--
Telcordia Technologies (Netsizer) (Meeker/Joseph) - Global																	
Internet Hosts (000's)	100%	50,195	56,886	62,319	67,702	74,348	81,868	90,292	97,800	107,237	114,859	123,290	137,272	43,000	68,800	97,800	137,272
Y/Y Growth	--	--	13%	10%	9%	48%	44%	45%	44%	44%	40%	37%	40%	43%	60%	42%	40%
Q/Q Growth	--	--	13%	10%	9%	10%	10%	10%	8%	10%	7%	7%	11%	--	--	--	--
Cisco (Shah) - Global																	
LAN Ports (b) (000's)	66%	3,652	4,685	5,435	5,773	7,864	9,287	11,920	14,729	12,044	10,375	11,185	*	17,410	19,545	43,789	--
Y/Y Growth	--	110%	90%	63%	55%	115%	96%	119%	155%	53%	12%	(6%)	8%	351%	12%	124%	--
Q/Q Growth	--	15%	28%	16%	6%	36%	18%	28%	24%	(18%)	(14%)	8%	--	--	--	--	--
Cisco (Shah) - Global																	
WAN Ports (Core & Edge) (b) (000's)	66%	8	11	15	17	24	31	36	40	33	18	20	*	10	60	168	--
Y/Y Growth	--	450%	693%	674%	263%	217%	177%	145%	128%	34%	(41%)	(45%)	9%	2645%	522%	180%	--
Q/Q Growth	--	60%	44%	32%	19%	40%	26%	17%	10%	(18%)	(45%)	9%	--	--	--	--	--
User Y/Y Growth - Mean																	
		--	--	--	--	140%	133%	121%	97%	60%	40%	29%	23%	--	119%	23%	23%
User Y/Y Growth - Median																	
		--	--	--	--	142%	95%	58%	50%	44%	40%	27%	22%	--	124%	22%	22%
User Q/Q Growth - Mean																	
		--	--	--	--	29%	19%	14%	9%	8%	5%	5%	4%	--	--	--	--
User Q/Q Growth - Median																	
		--	--	--	--	21%	10%	10%	8%	8%	4%	5%	4%	--	--	--	--
Core Internet Usage																	
General																	
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	1,130,000	1,180,000	1,250,000	1,320,000	167,000	465,000	900,000	1,320,000
Y/Y Growth	--	147%	170%	187%	178%	186%	119%	103%	94%	81%	74%	60%	47%	157%	178%	94%	47%
Q/Q Growth	--	41%	32%	24%	21%	34%	9%	15%	15%	26%	4%	6%	6%	--	--	--	--
Media Matrix (Meeker/Mahaney/Joseph) - U.S.																	
Estimated Total Digital Media Usage Minutes (MM)	100%	131,510	144,405	150,061	144,356	195,993	229,107	271,159	269,414	302,787	311,879	357,070	400,051	--	570,332	965,673	1,371,787
Y/Y Growth	--	--	--	--	--	49%	59%	61%	87%	54%	36%	32%	48%	--	--	69%	42%
Q/Q Growth	--	--	10%	4%	(4%)	38%	17%	18%	(1%)	12%	3%	14%	12%	--	--	--	--
AOL (Meeker/Mahaney/Bilotti) - U.S.																	
Instant Messenger - IM and ICQ Users (MM)	53%	32	40	49	58	71	82	94	106	118	127	148	157	27	58	106	157
Y/Y Growth	--	--	--	--	--	122%	105%	92%	83%	68%	55%	57%	48%	--	115%	83%	48%
Q/Q Growth	--	--	25%	23%	18%	22%	15%	15%	13%	11%	8%	17%	6%	--	--	--	--
VeriSign (Meeker/Mahaney/Joseph) - Global																	
Average Daily DNS Queries (MM)	100%	1,204	1,336	1,440	1,545	1,650	1,729	2,103	2,443	3,329	3,600	4,800	5,300	3,536	5,525	7,925	17,029
Y/Y Growth	--	--	--	--	--	37%	29%	46%	58%	102%	108%	128%	117%	181%	56%	43%	115%
Q/Q Growth	--	--	11%	8%	7%	7%	5%	22%	18%	36%	8%	33%	10%	--	--	--	--
DoubleClick (Russell) - Global																	
Ads Served (MM)	50%	20,856	29,825	43,800	77,200	125,100	149,000	162,000	185,000	181,000	168,000	161,000	172,270	33,943	171,481	621,100	682,270
Y/Y Growth	--	--	--	--	--	500%	403%	270%	140%	45%	-1%	-7%	-7%	--	405%	262%	10%
Q/Q Growth	--	--	42%	48%	76%	62%	19%	9%	14%	(2%)	(7%)	(4%)	7%	--	--	--	--
eBay (Meeker/Mahaney) - U.S.																	
Gross Merchandise Sales (\$MM)	--	541	622	741	901	1,150	1,293	1,355	1,616	1,980	2,248	2,355	2,735	746	2,805	5,414	9,318
Y/Y Growth	--	420%	344%	280%	193%	113%	108%	83%	79%	72%	74%	74%	68%	685%	276%	93%	72%
Q/Q Growth	--	76%	15%	19%	22%	28%	12%	5%	19%	23%	14%	5%	16%	--	--	--	--
RHK Inc. (Shah) - Global																	
Average Petabytes Per Month	100%	--	--	--	--	--	--	--	--	--	--	--	--	--	14	46	100
Y/Y Growth	--	--	--	--	--	--	--	--	--	--	--	--	--	--	237%	--	117%
Q/Q Growth	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SBC+Verizon+BellSouth (Flannery) - U.S.																	
Digital Signal, Level 0 (DS-0) - Top 3 (c) (000's)	83%	59,956	64,853	70,708	78,144	85,718	97,268	106,661	124,508	136,158	145,656	153,464	163,019	--	78,144	124,508	163,019
Y/Y Growth	--	--	--	--	--	43%	50%	51%	59%	59%	50%	44%	31%	--	--	59%	31%
Q/Q Growth	--	--	8%	9%	11%	10%	13%	10%	17%	9%	7%	5%	6%	--	--	--	--
RealNetworks (Meeker/Mahaney/Joseph) - Global																	
Unique Users - RealPlayer and Gold Pass (MM)	85%	58	69	81	97	116	135	154	173	197	215	232	250	57	97	173	250
Y/Y Growth	--	180%	177%	180%	147%	100%	96%	90%	78%	70%	59%	51%	45%	--	70%	78%	45%
Q/Q Growth	--	22%	19%	18%	20%	19%	16%	14%	12%	14%	9%	8%	8%	--	--	--	--
CheckFree (McVey) - Global																	
Estimated Avg. Transactions Processed Per Month (E) (MM)	67%	--	11	12	14	15	16	17	19	21	22	23	25	--	12	17	23
Y/Y Growth	--	--	--	--	--	--	45%	42%	34%	40%	38%	35%	33%	--	--	35%	36%
Q/Q Growth	--	--	--	9%	17%	7%	7%	6%	11%	12%	5%	5%	9%	--	--	--	--
Ariba+Commerce One (Phillips) - Global																	
eProcurement Applications Deployed	50%	50	68	93	143	291	540	759	927	1,010	1,084	1,118	1,192	38	143	927	1,192
Y/Y Growth	--	--	--	--	481%	482%	684%	716%	548%	247%	101%	47%	29%	--	276%	548%	29%
Q/Q Growth	--	58%	36%	37%	54%	103%	86%	41%	22%	9%	7%	3%	7%	--	--	--	--

E=Morgan Stanley Research Estimates
 (a) VeriSign is the exclusive global registry for .com, .org., and .net domain names; The Registry does not include the 7 new TLDs (.biz, .pro, .name, .info, .museum, .aero, and .coop) approved by ICANN.
 (b) Sourced from The Dell'Oro Group
 (c) Share is in terms of access lines; Q4:99 and Q4:00 numbers restated for asset acq/sales. Other Q's not restated
 *We temporarily delete Cisco's WAN & LAN (though we list the historic values for perspective) because the metrics continue to skew the data, mainly reflecting Cisco-specific inventory issues that began to surface in 2000, rather than underlying Internet user growth. We will re-examine these metrics in Q2:02 for potential inclusion.

Exhibit 4 (continued)

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

Metric Share	Quarterly												Annual				
	Q1:99	Q2:99	Q3:99	Q4:99	Q1:00	Q2:00	Q3:00	Q4:00	Q1:01	Q2:01	Q3:01	Q4:01	1998	1999	2000	2001	
Core Internet Usage (continued)																	
Broadvision•Vignette•E.piphany•Kana (Phillips) - Global																	
eCRM Applications Deployed (d)	67%	655	846	1,207	1,644	2,112	2,612	3,353	3,813	3,871	3,844	3,958	4,051	620	1,644	3,613	4,051
Y/Y Growth	--	--	--	--	165%	222%	209%	178%	120%	83%	47%	18%	12%	--	165%	120%	12%
Q/Q Growth	--	6%	29%	43%	36%	26%	24%	28%	8%	7%	(1%)	3%	2%	--	--	--	--
Narrowband																	
AOL (Meeker/Mahoney/Bilotti) - U.S.																	
Average Member Hours Per Month (MM)	33%	380	399	474	485	576	550	591	660	760	730	760	820	1,056	1,738	2,377	3,070
Y/Y Growth	--	62%	65%	73%	59%	52%	38%	25%	36%	32%	33%	29%	24%	--	65%	37%	29%
Q/Q Growth	--	25%	5%	19%	2%	19%	-5%	7%	12%	15%	(4%)	4%	8%	--	--	--	--
Usage Y/Y Growth - Mean (e)	--	--	--	--	--	171%	163%	148%	118%	79%	57%	48%	41%	--	--	140%	35%
Usage Y/Y Growth - Median (e)	--	--	--	--	--	113%	100%	86%	81%	68%	52%	46%	39%	--	--	85%	34%
Usage Q/Q Growth - Mean	--	--	--	--	--	31%	18%	16%	13%	14%	4%	8%	8%	--	--	--	--
Usage Q/Q Growth - Median	--	--	--	--	--	25%	14%	14%	13%	12%	6%	5%	7%	--	--	--	--
Mean Y/Y usage/user multiplier (f) (g) (h) (i) (j)						1.22	1.22	1.23	1.21	1.31	1.42	1.64	1.77				
Median Y/Y usage/user multiplier (f) (g) (h) (i) (j)						0.79	1.06	1.48	1.62	1.54	1.30	1.72	1.80				

(d) For CQ4:00, Kana did not disclose customer number so CQ4 is a Morgan Stanley estimate.
 (e) CQ1:00 figure does not include Y/Y growth rate for CheckFree - Estimated Avg. Transactions Processed Per Month (MM).
 (f) The following metrics which were discontinued in CQ1:01 -- 1) Exodus - Servers Hosted in Internet Data Centers (000's); 2) WorldCom/UUNET - Digital Signal, Level 3 (DS-3) Miles (000's).
 (g) Metrics added in CQ1:01 -- 1) RealNetworks - Downloads - Player/Player Premium+Jukebox/Jukebox Premium (MM); 2) CheckFree - Estimated Avg. Transactions Processed Per Month (MM).
 (h) Metrics added in CQ2:01 -- 1) AOL Time Warner - Instant Messenger - IM and ICQ Users (MM); 2) VeriSign - Average Daily DNS Queries (MM).
 (i) C1Q:00 figure does not include Y/Y growth rate for CheckFree - Estimated Avg. Transactions Processed Per Month (MM).
 (j) Metrics deleted in CQ3:01 -- 1) Exodus - Peak Network Traffic (gigabytes/sec); 2) Exodus - Data Centers - Gross Sq. Footage (000's); 3) WorldCom/UUNET Customer Online Hours (MM).

Emerging Market Metrics																	
Broadband																	
SBC•Verizon•BellSouth•Qwest (Flannery) - U.S.																	
DSL Subscribers - Top 4 (000's)	90%	--	--	--	342	536	869	1,214	1,777	2,283	2,618	3,018	3,584	--	202	1,307	2,533
Y/Y Growth	--	--	--	--	--	--	--	--	420%	326%	201%	148%	102%	--	--	547%	94%
Q/Q Growth	--	--	--	--	--	57%	62%	40%	46%	28%	15%	15%	19%	--	--	--	--
Adelphia•AT&T•Cablevision•Charter•Comcast•Cox•Insight•Roadrunner (Bilotti) - U.S.																	
Cable Modem Subscribers (000's)	83%	237	298	368	494	1,393	1,760	2,305	3,062	4,378	5,070	5,835	6,796	309	1,006	3,062	6,796
Y/Y Growth	--	--	--	--	--	488%	491%	526%	470%	270%	195%	151%	112%	--	225%	204%	122%
Q/Q Growth	--	--	26%	24%	34%	182%	28%	31%	33%	43%	16%	15%	16%	--	--	--	--
Usage Y/Y Growth - Mean (k)	--	--	--	--	--	488%	491%	526%	470%	270%	195%	151%	112%	--	--	376%	108%
Usage Y/Y Growth - Median (k)	--	--	--	--	--	488%	491%	526%	470%	270%	195%	151%	112%	--	--	376%	108%
Usage Q/Q Growth - Mean	--	--	--	--	--	119%	44%	35%	40%	36%	15%	15%	18%	--	--	--	--
Usage Q/Q Growth - Median	--	--	--	--	--	119%	44%	35%	40%	36%	15%	15%	18%	--	--	--	--
Wireless																	
US																	
Sprint PCS•Verizon•AT&T Wireless•Nextel (Carvalho/Lundberg) - U.S.																	
Wireless Data Subscribers - Via Cell Phones - Top 4 (000's)	74%	--	--	--	200	450	710	1,670	2,887	4,261	5,355	6,100	6,283	--	200	2,887	6,283
Y/Y Growth	--	--	--	--	--	--	--	1344%	847%	654%	285%	118%	3%	--	--	1344%	118%
Q/Q Growth	--	--	--	--	--	125%	58%	135%	73%	48%	26%	14%	8%	--	--	--	--
Palm.net•Cingular•Nextel Partners•ATT Road•RIM (Lundberg) - U.S.																	
Wireless Data Subscribers - Via Devices - Top 5 (000's) (l)	86%	--	--	21	42	407	527	691	917	1,124	1,279	1,385	1,489	--	42	917	1,489
Y/Y Growth	--	--	--	--	--	--	--	3269%	2084%	176%	143%	101%	82%	--	--	2084%	62%
Q/Q Growth	--	--	--	--	105%	869%	29%	31%	33%	23%	14%	8%	8%	--	--	--	--
Japan																	
NTT DoCoMo (iMode) (Tanaka) - Japan																	
Wireless Data Subscribers (000's)	62%	48	524	1,733	3,130	5,603	8,289	12,648	17,161	21,695	24,989	27,769	30,182	48	3,130	17,161	30,182
Y/Y Growth	--	--	--	--	--	11573%	1482%	630%	448%	287%	201%	120%	76%	--	6421%	448%	76%
Q/Q Growth	--	--	982%	231%	81%	79%	48%	53%	36%	26%	15%	11%	9%	--	--	--	--
Europe																	
Mobile Data Association - SMS Messaging (Farrell) - UK																	
SMS Messages (MM) (m)	--	45	60	110	271	372	505	580	756	864	950	1,093	1,305	--	486	2,213	4,212
Y/Y Growth	--	--	--	--	--	727%	742%	427%	179%	132%	88%	88%	73%	--	--	355%	90%
Q/Q Growth	--	--	33%	83%	146%	37%	36%	15%	30%	14%	10%	15%	19%	--	--	--	--
Usage Y/Y Growth - Mean (n)	--	--	--	--	--	6150%	1112%	1442%	1014%	361%	272%	143%	82%	--	--	1292%	85%
Usage Y/Y Growth - Median (n)	--	--	--	--	--	6150%	1112%	630%	896%	232%	172%	110%	74%	--	--	1344%	76%
Usage Q/Q Growth - Mean	--	--	--	--	--	278%	43%	58%	43%	28%	16%	12%	10%	--	--	--	--
Usage Q/Q Growth - Median	--	--	--	--	--	102%	42%	42%	34%	24%	14%	13%	8%	--	--	--	--

E= Morgan Stanley Research Estimates
 (k) Respectively, CQ1:00, CQ2:00, and CQ3:00 figures do not include Y/Y growth rates for SBC•Verizon - DSL Subscribers - Top 2 (000's).
 (l) Aether and GoAmerica replaced with Nextel Partners & ATT Road in CQ4:01
 (m) SMS Messages (MM) sourced from the Mobile Data Association (MDA)
 (n) Respectively, CQ1:00, CQ2:00, and CQ3:00 figures do not include Y/Y growth rates for Sprint PCS•Verizon•AT&T Wireless•Nextel - Wireless Data Subscribers - Via Cell Phones - Top 4 (000's).

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