Interop 2011

Here Come the Privates

Summary: Last week, we attended Interop in Las Vegas, the enterprise networking industry’s largest trade show, celebrating its 25th year. Instead of the usual public company recap, we thought it made sense to profile some of the most interesting private companies in the sector, each of which we believe has the potential to make a significant impact on the market over the next few years and cause headaches for the incumbent players. At the end of the report, we also provide a detailed view of key technology themes at this year’s Interop.

The private company profiles are based on discussions with company management, value-added resellers and distributors, and industry contacts, as well as our own “tire-kicking” of each vendor’s technology on the Interop show floor. While we were impressed by many private companies, we chose to highlight here later-stage companies that already have seen a healthy uptake in revenues and, in some cases, have already reached profitability. The companies profiled (in alphabetical order) are Arista Networks, A10 Networks, Infoblox, Silver Peak Systems, and Vidyo.
Arista Networks, Inc.

- **Brief Description:** Founded in 2005, Arista makes 10 Gigabit Ethernet switches for data center and high-performance computing (HPC) environments. Its claim to fame has been the low-latency (sub-700 nanoseconds) and superior price/performance of its switches, which has helped the company gain significant traction in areas like financial trading and Web 2.0/cloud services. Management notes that 50% of revenue in 2010 derived from cloud services deployments, including KT’s (KT $20.08) cloud service in Korea.

The company employs around 200 people and boasts 800 customers. Arista crossed the $100 million revenue run-rate mark last year and is on track for continued strong growth this year. Management expects a roughly 75%/25% domestic/international sales split this year as the company invests abroad.

- **What Impressed Us Most:** Last year at Interop, Arista introduced its high-density, fully nonblocking 10GbE modular 7500 series switch, adding a core switch to its top-of-rack lineup. In March of this year, the company introduced the Arista 7050 series, a 10 and 40 Gigabit Ethernet top-of-rack switch that delivers 1.28 terabits of switching performance at under 2 watts per 10GbE interface.

Dynamically allocated deep packet buffers and support for Data Center Bridging (DCB) position the Arista 7050 series for storage environments and "big data" applications such as Hadoop. As these applications scale, the Arista 7050 can connect up to 18,000 10GbE attached servers through a single leaf/spine network architecture. The scale so far exceeds that of Juniper (JNPR $39.12; Outperform) QFabric and Brocade’s (BRCD $6.13; Market Perform) VCS/VDX flat network offering, which claim to scale up to 3,000 physical servers (though this will not be available until the fourth quarter, at the earliest) and 1,000 physical servers, respectively, in their initial rollouts.

The company is determined to ride the merchant silicon wave, focusing its efforts on a robust and extensible operating system design. The latest Arista 7050 uses the Broadcom Trident+ switching silicon (as does Juniper’s new QFX3500 top-of-rack switch and Cisco’s [CSCO $16.60; Market Perform] Nexus 3000 introduced at the end of March). The entire Arista portfolio runs the same Extensible Operating System (EOS), a modular, Linux core based on a unique multiprocess state-sharing architecture that separates networking state from the processing itself. This enables fault recovery and incremental software updates on a fine-grain process basis without affecting the state of the system.

Following Juniper’s successful strategy to open JUNOS OS to third-party development last year, Arista announced at Interop that it will also open its EOS stack to third-party development. As part of the new Arista EOS 4.7 version, the developer support site houses projects like CloudVision, Chef, Puppet, and Wireshark, which can be integrated into Arista EOS either natively, or through a local virtual machine.

- **Acquisition Prospects:** The scarcity of pure-play Ethernet switching vendors in the market raises the likelihood that Arista could be acquired, though we believe management is intent on building the business. Among possible acquirers of Arista are Dell (DELL $16.07), Oracle (ORCL $34.18; Outperform), and IBM (IBM $167.04)—each of which lacks a native networking offering. While Cisco may be struggling in its switching business, we see a very low probability that Cisco would make a run at Arista (too much overlap), and we doubt that Arista would want to be acquired by Cisco (given the previous company ties).

- **Management Team:**
  - **Jayshree Ullal, President and Chief Executive Officer**
  Ms. Ullal is a networking veteran with 25 years of experience. Formerly, she was senior vice president at Cisco and responsible for $10 billion in annual revenue from data center, switching, and services, including Cisco’s flagship Nexus 7000 and Catalyst 4500 and 6500
product lines. Prior to joining Cisco, Ms. Ullal was the vice president of marketing at Crescendo Communications, which was acquired by Cisco in 1993.

– Andy Bechtolsheim, Founder, Chief Development Officer, and Chairman
Prior to Arista, Mr. Bechtolsheim was a founder and chief system architect at Sun Microsystems, where he was responsible for industry standard server architecture. He was also a founder and president of Granite Systems, a Gigabit Ethernet startup acquired by Cisco Systems in 1996. From 1996 until 2003, Mr. Bechtolsheim served as vice president/general manager of the Gigabit Systems Business Unit at Cisco (developing the Catalyst 4500 family of switches). Before that, he was also a founder and president of Kealia, a next-generation server company acquired by Sun in 2000.

– David Cheriton, Founder and Chief Scientist
Mr. Cheriton is a professor of computer science and electrical engineering at Stanford University and a world-renowned researcher in the areas of networking and distributed systems. Prof. Cheriton was a founder of Granite Systems, acquired by Cisco Systems in 1996, and served as a technical advisor at Cisco for seven years and acted as chief ASIC architect for the Catalyst 4x00 line. Along with Mr. Bechtolsheim, he founded Kealia, where he served as CTO before it was acquired by Sun in 2004.

– Among other members of the Arista’s management team hailing from Cisco are the vice president of sales, vice president of marketing, vice president of hardware engineering and manufacturing, and vice president of customer engineering.

• Venture Backers: Arista received financial backing from company founders Andy Bechtolsheim and David Cheriton.

A10 Networks, Inc.

• Brief Description: Founded in 2004, A10 Networks makes application delivery controllers (ADCs) that help organizations accelerate, optimize, and secure their applications. A10 launched its first product (the AX-series) in 2007, has roughly 255 employees today, and has been profitable since first quarter 2010. In 2010, the company had about $50 million in revenue (growing 156% in 2010) and expects to grow 80%-100% in 2011.

The company says it currently holds the No. 5 spot in market share in application delivery controllers, at 6%. In 2010, 40% of company revenue came from Japan, with the remainder mostly from the United States. In first quarter 2011, the company saw a significant revenue ramp-up in the telco market (both in North America and Japan), accounting for about 80% of first-quarter revenue, as telcos accelerated their network migration from IPv4 to IPv6.

• What Impressed Us Most: A10’s stated value proposition versus its closest competitor, F5 (FFIV $105.03; Market Perform), is twice the performance at half the cost. This is accomplished via a performance-tuned architecture and no licensing of features (F5 charges extra for features like SSL, global server load balancing, application firewall, etc.). The company says its superior price/performance stems from three major technical bets it made when designing the AX-series: 1) a reliance on multicore, standards-based x86 processors; 2) a 64-bit OS, which allows more addressable memory per core (ultimately translating to more connections per second); and 3) a shared memory architecture, which results in faster performance because of the lack of inter-processor communication.

A10 claims that its 2U AX-5200 appliance can outperform a 6U fully loaded F5 Viprion chassis by a factor of three on layer 4 connections per second, which A10 believes is the ultimate measure of ADC performance. Further, A10 claims a 6-times reduction in capital expenditures and 9-times reduction in footprint and power versus F5’s chassis-based VIPRION.

To our knowledge, A10 is also the first vendor to go live with IPv4 to IPv6 migration capability for service providers—a key demand driver, which resulted in acceleration of its revenue in first
quarter 2011. The company saw a major telco in Japan, we believe NTT (NTT $23.37), moving forward with the IPv6 enablement in its network, after more than a year of trials.

F5, by contrast, saw a weaker performance in Japan during the March quarter, posting roughly flat revenue year-over-year. F5 blamed this on macro factors surrounding the earthquake and tsunami, but we suspect A10 may be taking share from F5 in Japan. We note that F5 lacks a large-scale NAT capability on its platform, which is a key element of IPv6 migration for service providers, which could explain why A10 has gained traction with Japanese telcos.

IPv6 gateways not only solve the IPv4 address exhaustion problem, but also allow support of new operating systems (such as Microsoft Windows 7) natively, and new applications that are being developed with IPv6 (such as Microsoft DirectAccess). The company believes the size of the IPv6 gateway market—given the complexity and scale of migrating large number of carriers and enterprise networks, users, devices, and applications to the new IPv6 protocol—could be as big as the whole ADC market as it exists today (a $1.3 billion market in 2010, according to Infonetics).

Another demand driver A10 sees is SSL acceleration, with the move from 1024-bit SSL key lengths to 2048-bit (standard in the United States), which raises the ADC/SSL offload engine’s performance requirements by a factor of 6 times, likely driving refresh activity of legacy ADC/SSL acceleration gear.

On the go-to-market front, A10 is seeing strong demand from the explosion of mobile devices and server/desktop virtualization, causing more application, traffic, and network load. The company has two strategic OEMs—Hitachi (HIT $56.12), which includes the A10 OS in its own blades, and an undisclosed partner, which OEMs A10’s hardware. Beyond these, the company sells its products exclusively through single-tier VARs in the United States and primarily through two-tier distributors outside the United States.

The company is also working to expand its enterprise focus obtaining certification for Microsoft (MSFT $24.57; Outperform) applications as well as VMware (VMW $89.45; Market Perform). MS Sharepoint 2010, Exchange 2010, and Lync require a 64-bit server, which plays well into A10’s 64-bit OS technology. In support of its enterprise effort, A10 has recently been ramping up its sales coverage, including several key hires from competitors.

- **Acquisition Prospects:** With cloud computing taking hold, the ADC market is rising in strategic importance, in our view, which sets A10 up well for a possible takeout or IPO. Potential acquirers include networking vendors that lack a strong ADC product (e.g., Cisco, Juniper, HP [HPQ $36.73]) or more diversified players (e.g., Oracle, IBM, Dell) that desire a key piece of strategic real estate in the data center.

- **Management Team:**

  - **Lee Chen, Founder and Chief Executive Officer**
  
  Mr. Chen served most recently as co-founder and vice president of engineering at Foundry Networks. He was also a founding member of Centillion Networks (acquired by Nortel). He has held management and senior technical positions at Apple Computer, Convergent Technologies, and InSync Group.

  - **Raj Jalan, Founder and Chief Technical Officer**
  
  Jalan has over 25 years of experience in the networking Industry. Prior to A10, he was the lead architect for Foundry Networks' ServerIron and L2/L3 switching product families. Before Foundry, he worked on a wide range of networking technologies from Ethernet, Token-Ring, ATM, and Digital Switching Systems.

- **Venture Backers:** Mitsui & Co. Ltd (the largest investor) led a $23 million Series C funding in 2008, bringing A10's total funding to $39 million. Other investors include Triton Ventures, H&Q/Asian Pacific, Harbinger Venture, Enspire Capital, and CIDC.
Infoblox Inc.

- **Brief Description:** Founded in 1999, Infoblox provides network automation and control through a series of appliances that integrate multiple behind-the-scenes functions, including DNS, DHCP, IP address management (IPAM), and most recently network change and configuration management (NCCM—via Netcordia acquisition in May 2010). Through its patented Grid architecture, Infoblox provides role-based visibility, control, and network availability. The reliability and availability of the DNS/DHCP/IPAM (DDI) infrastructure is critical to the stability of the overall IT environment.

With revenue of about $100 million today, which took the company 12 years to reach, Infoblox counts 300 of the Fortune 500 as customers and has an installed base of about 40,000 appliances. Throughout the company’s history, it has consistently grown in the double digits annually.

**Overview of DDI market:**

*Domain Name System (DNS)* is a hierarchical naming system built on a distributed database for computers, services, or any devices connected to the Internet or a private (MPLS/LAN) network. Acting as the “phone book for the Internet,” it translates domain names (e.g., www.williamblair.com) into the numerical identifiers (e.g., IPv4 address: 72.32.55.147) associated with networking equipment for the purpose of locating and addressing these devices.

DNS makes it possible to assign domain names to groups of Internet resources and users in a meaningful way, independent of each entity's physical location. Essentially all IP applications—Web browsing, e-mail, VoIP, wireless, etc.—rely on the availability of a robust Domain Name Service (DNS).

The *Dynamic Host Configuration Protocol (DHCP)* is a configuration protocol used to automatically provision IP addresses for PCs and servers connecting to an IP network, eliminating the need for manual intervention by a network administrator. It also provides a central database for keeping track of computers that have been connected to the network (preventing two computers from accidentally being configured with the same IP address). In addition to IP addresses, DHCP also provides other configuration information, particularly the IP addresses of local caching DNS resolvers.

There are two versions of DHCP, one for IPv4 and one for IPv6. DHCP is becoming essential as new classes of networking devices—such as IP phones, RFID readers, cameras, etc.—proliferate. Applications such as IP telephony depend on a resilient DHCP client service for ensuring connectivity.

Traditional network administration involves manual, time-consuming, error-prone processes that may cause outages and increase operating expenses, and cannot be securely delegated to other personnel. Further, disconnects between the DNS data, DHCP lease data, and IP address management spreadsheets can easily cause configuration problems. A single source database for all three (DNS, DHCP, and IP address management) is what DDI appliances bring to the table to prevent conflicts and automate DHCP client administration.

**IP address management:** The primary driver for adopting a DDI solution (80% of time) is for management of IP addresses. IPAM appliances control, automate, and manage the domain name and address space versus home-grown legacy spreadsheet-based management solutions, helping avoid duplicate IP addresses or configuration errors.

**Details of DDI/IPv6 Market Opportunity:**

Roughly 70% of IP addresses managed today are internal, managed inside the enterprise firewall, while the remaining 30% are external, coming from the service provider network. In 2010, the internal DDI appliance market generated about $216 million in revenue (according to Gartner), growing 23% from 2009. In 2011, Gartner estimates the market will grow 28%, to approximately $276 million. The internal DDI market is a separate market from external DNS services, offered mainly by ISPs (e.g., Comcast [CMCSA $24.56], Verizon [VZ $36.97; Market Perform]), Web
hosting providers or DNS managed service vendors like Akamai (AKAM $32.00), Neustar (NSR $25.75; Market Perform), and VeriSign (VRSN $35.53).

The majority of customers implementing a DDI solution are large enterprises and carrier networks managing more than 100,000 active IP addresses. The overall momentum of the virtualization trend—growth in IP addresses associated with VMs and the requirement to manage them—has driven greater demand for appliance-based DDI solutions. Infoblox has the largest installed base of DDI appliances (about 40% revenue share, according to Gartner). Infoblox believes that the DNS management opportunity remains robust, with market penetration only at roughly 30%.

Additionally, growth of DNS Security Extensions (DNSSEC) and IPv6 may accelerate the overall DDI growth trends. Gartner predicts 30% penetration of all DNS look-ups signed by DNSSEC by 2014. While IPv6 adoption will mainly come from mobile users, some growth is expected in the enterprise market as well.

In February 2011, the central registrar of the Internet—Internet Assigned Numbers Authority [IANA]—exhausted its IPv4 address pool. While enterprises currently have enough public IPv4 addresses and are able to recycle IPv4 addresses internally (via network address translation, NAT), new Internet connections (as well as native IPv6 applications) will need to make use of IPv6. Gartner predicts that by 2015, 17% of global Internet users will use IPv6, with 28% of new Internet connections running the protocol.

What Impressed Us Most: The company’s “secret sauce” is its distributed database technology, which ties together all Infoblox boxes in the data center and allows them to communicate with each other. Through a distributed information fabric (grid-based architecture), the company’s products are highly available, self-healing, and self-distributed. Infoblox grid-based architecture scales to 255 appliances per grid. In 2011, the company expects to enhance its management interface to manage multiple grids through a single management interface.

The company touts that by virtue of its control of the network, it serves as a database for the network and as the management system that owns all network and server resources. In the case of server virtualization and cloud computing, Infoblox sells software-based solutions as virtual machines for VMware environments that effectively control the ownership of VMs and how they connect to the network and/or overall cloud infrastructure.

The company integrates the IPAM capability, which is offered free of charge, into its DNS/DHCP appliances. With embedded DNS/DHCP services now bundled into a Windows Server (in 2010), Infoblox appliances are being deployed as an overlay solution to provide a more robust, multiplatform, and more feature-rich management solution. Additionally, Microsoft Server does not offer IP address management (IPAM) tools and its embedded DNS/DHCP services are perceived to be weak.

Among its competitors, Infoblox counts Alcatel-Lucent (ALU $5.75), BlueCat Networks, BT Diamond IP (a British Telecom company), and EfficientIP. The company has strategic technology partnerships with Cisco, F5 Networks, Juniper Networks, Neustar, Riverbed (RVBD $36.86; Outperform), Microsoft, and VMware, and sells its products mostly through the VAR channel.

The company acquired Netcordia last year, a network and systems management software company, which opened a new market and offered revenue diversification for the company. Netcordia’s NetMRI solution offers network change and configuration management (NCCM), which, for example, automates actions such as raising an alarm when unmanaged IP hosts are discovered on the network. Infoblox hopes to tame the complexity brought on by looming changes in data center and LAN networking by combining the features of IPAM with NCCM.

From a demand perspective, the company sees IPv4 address exhaustion as a major driver, especially given the proliferation of IP addresses from virtual servers and smart mobile devices, each of which carries its own IP address. At the Interop show, Infoblox announced the availability of its IPv6 gateway solution—also incorporating DHCP, DNS, and IPAM—which is designed to automate and manage the IPv4 to IPv6 transition life cycle.
• **Acquisition Prospects:** We believe Infoblox’s technology could fit within the technology portfolio of server and network/cloud infrastructure management vendors, as well as mobile infrastructure providers managing the explosion of smart mobile devices on the network.

• **Management Team:**
  
  – **Robert Thomas, President and Chief Executive Officer**
    Leveraging more than 30 years of technical, sales, marketing, and management experience in the technology industry, Mr. Thomas became CEO of Infoblox in 2004. Previously, he was CEO of NetScreen Technologies (acquired by Juniper Networks) and held senior positions at Sun Microsystems, Fujitsu, and ICL.

  – **Stuart Bailey, Founder and Chief Technology Officer**
    Before founding Infoblox in 1999, Mr. Bailey held a five-year stint as technical lead for the Laboratory for Advanced Computing/National Center for Data Mining at the University of Illinois at Chicago, where he led teams in developing advanced distributed data architectures.

  – **Remo Canessa, Chief Financial Officer**
    Mr. Canessa, who was most recently the CFO at NetScreen Technologies Inc., brings more than 25 years of experience in finance and administration to the company. He also held related positions at Bell Microproducts, Inc., InfoSeek Corp., and Raster Graphics Inc.

• **Venture Backers:** Infoblox investors include Tenaya Capital, Sequoia Capital, Big Basin Partners, and Duchossois Technology Partners, among others.

### Silver Peak Systems, Inc.

• **Brief Description:** Founded in 2004, Silver Peak makes WAN optimization controllers that improve application performance between data centers and between the data center and branch offices. The company’s appliances target data replication, backup, file transfers, e-mail, Web, and real-time applications such as Citrix (CTXS $81.14; Outperform) and VoIP. The company’s primary distribution channel is EMC (EMC $27.42; Outperform), which we estimate accounts for roughly 20% of current sales.

  The company has about 150 employees, is cash flow positive, and we estimate is nearing a $50 million revenue run-rate (70% top-line growth in 2010 with 50% growth expected in 2011). On the go-to-market side, the company doubled its salesforce over the last year, with key hires from competitors. The vast majority of Silver Peak’s sales are in the United States, though the company has been expanding internationally (now in 12 countries) and expects that 10% of sales this year will be outside the United States. Given Silver Peak’s focus on data center appliances (80% of its revenue still derives from the high-end boxes), the company’s gross margins have historically been slightly higher than Riverbed’s.

• **What Impressed Us Most:** Silver Peak has effectively targeted the core of application networks—i.e., data center to data center—with a robust and high performance product line, and recently began to extend its solution to the branch office with smaller form-factor appliances, including a sub-$5,000 appliance. Key customers include Google (GOOG $518.42; Outperform), Apple (AAPL $333.30; Outperform), AT&T (T $31.06; Market Perform), and VMware.

  Silver Peak’s claim to fame has been on the data replication side, partnering with EMC. EMC resells Silver Peak’s products in conjunction with its SRDF replication application, which helps speed up the data replication process between Symmetrix storage arrays in different data centers for disaster recovery purposes. Hitachi Data System is another key partner, reselling Silver Peak’s technology for data replication.

  At Interop, Silver Peak announced that EMC selected its WAN optimization technology for integration in the VPLEX Geo data mover cache-coherent technology. This extends Silver Peak’s
leadership position in data center to data center disaster recovery and replication applications over the WAN.

From a technology perspective, Silver Peak differentiates its products through performance characteristics (it claims they can scale better than any other product at 2 Gbps on the LAN side and 1 Gbps on the WAN side) and network integrity feature set, which includes forward error correction (FEC), packet order correction, congestion management, traffic prioritization, and traffic tagging. Silver Peak believes that FEC is a major advantage of its platform, as the quality of the public network will be an increasing issue as organizations of all sizes rely more on the cloud (i.e., the WAN).

Unlike Riverbed’s TCP proxy-based architecture, Silver Peak uses a tunneling architecture, which the company says allows for deduplication of all IP-based traffic, including UDP, EMC VPLEX (UDT), and Microsoft’s IPsec encryption, not just traffic that sits on top of the TCP proxy engine. Tunneling is what enables Silver Peak to perform FEC.

Silver Peak does not support granular application-specific optimizations like those supported by Riverbed—this is not surprising, given Silver Peak’s initial focus on the data center to data center market, where application-specific optimizations are not important.

From a data center to branch perspective, while Silver Peak offers a CIFS proxy, the company believes that many of the applications themselves (e.g., Exchange, Windows) are becoming thinner and more efficient, diminishing the efficacy of application-level optimizations. Going forward, the company sees latency optimization being increasingly built into the applications, which should support its view that application latency tricks need not be built into the WAN optimization device itself.

• **Acquisition Prospects:** With cloud computing taking hold, the WAN optimization market is rising in strategic importance, in our view, which sets Silver Peak up well for a possible takeout or IPO. Potential acquirers include networking vendors (e.g., Cisco, Juniper, HP) or storage players (e.g., EMC, NetApp [NTAP $53.10; Outperform], HDS, Oracle, IBM, Dell) looking to supplement their data center product portfolios.

• **Management Team:**

  – **Rick Tinsley, President and Chief Executive Officer**
  Mr. Tinsley joined Silver Peak Systems in 2004 as president and CEO. In 1998, he co-founded Turnstone Systems, served as president and CEO for six years, and led the company through a successful IPO. In 1997, Mr. Tinsley was an “Entrepreneur in Residence” with the venture capital firms Institutional Venture Partners and Benchmark Capital. From 1993 to 1997, he held various positions at Newbridge Networks (acquired by Alcatel-Lucent in 2000), most recently as vice president and general manager with global operating responsibility for LAN Products. Prior to Newbridge, Mr. Tinsley worked at TranSwitch Corporation and Texas Instruments.

  – **David Hughes, Founder and Chief Technology Officer**
  Dr. Hughes founded Silver Peak in 2004 and is responsible for the company’s technical direction and product vision. He previously held senior architect positions with Cisco Systems, Stratacom, Blueleaf, and Nortel. Dr. Hughes has a Ph.D. in packet network optimization and he has been awarded more than 25 patents for networking-related inventions.

  – **Eric Yeaman, Chief Financial Officer**
  Mr. Yeaman has served as chief financial officer since joining Silver Peak in 2005. Previously, he served as chief financial officer of Turnstone Systems, and also held various senior financial positions at Atheros Communications, Atmosphere Networks (acquired by Ditech Communications), Whitetree Networks (acquired by Ascend Communications), and KPMG.

• **Venture backers:** Silver Peak’s investors include Artis Capital Management, Benchmark Capital, Duff Ackerman and Goodrich, Greylock Partners, and JW Seligman.
Vidyo, Inc.

- **Brief Description:** Founded in 2005, Vidyo sells “Personal Telepresence” solutions enabling multiparty, HD-quality video conferences using a PC, mobile device, or low-cost room system over the public Internet as well as 3G, 4G, or WiFi networks. Leveraging its patented technologies built on the new H.264 Scalable Video Coding (SVC) standard, Vidyo’s products deliver low latency and error resilience previously not possible over the Internet. Its software-centric approach eliminates the need for costly hardware endpoints and bridges, which the company claims can reduce the cost of HD video conferencing by a factor of 10.

While Vidyo does not disclose details on its financials, we speculate 2010 revenue exceeded $20 million, with rapid growth expected in 2011. The company maintains OEM partnerships with HP, Google, and Teliris and sells branded products mainly through a network of specialty VARs and its own salesforce.

- **What Impressed Us Most:** Vidyo’s Personal Telepresence solutions depart from the traditional hardware-centric video endpoint and network infrastructure model, and use software running on quad-core x86 processors over a standard Internet connection to deliver very low-cost 1080p HD multipoint video conferencing to a range of devices. Vidyo’s technology is based on the H.264 SVC (Scalable Video Coding) standard, which the company developed, and which we expect will be widely adopted by the industry over the next few years based on its efficiency.

At the heart of Vidyo’s video conferencing system is the VidyoRouter appliance ($14,000 list price), which enables multiparty conferencing sessions to take place over general purpose IP networks with both high quality and low cost. The approach here is to eliminate the need for the Multipoint Control Unit (MCU), or video bridge, required in traditional video conferencing systems. Unlike an MCU, which uses a centralized, purpose-built network element to encode/decode (transcode) the video streams coming from each of the participants and bridge/mix them together to enable a multipoint video conferencing session, the Vidyo solution only encodes and decodes streams at the endpoints. Within the network itself, the VidyoRouter only needs to handle transrating and packet routing, which reduces the latency-inducing transcoding function and should result in a better overall end-user experience for multiparty calls.

By leveraging the public Internet and wireless networks, the VidyoRouter’s job is to ensure that packet-switching is handled with optimal efficiency—preserving video quality and low latency, by leveraging the H.264 SVC standard and introducing imperceptible delay of below 20 ms—delivering rate-matched and resolution-matched streams to each endpoint with maximum network error resiliency. By taking advantage of advances in the raw processing power of CPUs and memory configuration (available in industry-standard PCs, laptops, and servers) and increases in Internet bandwidth, the VidyoRouter constantly tests and recalibrates what it should be sending to each endpoint, ensuring that each endpoint is provided with the highest quality video it is capable of receiving—even as local conditions change.

Vidyo’s solution can scale to 100 concurrent HD 1440p multipoint sessions (VidyoLines) per VidyoRouter (or higher in case of an interconnected mesh of VidyoRouters in the Cloud Edition) and offers built-in NAT and firewall traversal (eliminating extra hardware) and error correction.

The new H.264 Scalable Video Coding (SVC) standard makes it possible to separate video bit streams into high-reliability and low-reliability channels. These different bit-stream components allow the system to dynamically adapt to varying network conditions such as packet loss, jitter, network bandwidth, network delay, etc. Similarly, the use of multiple bit-stream components permits the flexibility to adapt to changing processing power at the video source as well as at the receiving endpoints.

Unlike MCU-based implementations that require expensive proprietary hardware and specialized networks, VidyoRouter leverages commodity Intel (INTC $23.35) hardware rather than lower volume, high cost DSPs. The VidyoRouter’s connections are enabled through floating port
software licenses (called VidyoLines), as opposed to hardware port capacity that is geographically fixed to wherever the MCU is installed, dramatically reducing network infrastructure costs.

The floating licensing model, which offers perpetual VidyoLine licenses on a concurrent user basis, is a shared resource that enables any VidyoDesktop or VidyoRoom (room-based system) user to participate in a point-to-point or multipoint Vidyo conference, leading to an economical and redundant way of reusing VC lines. VidyoLine licenses cost $1,000 per line with the typical ratio of 10:1 for users to concurrent user licenses.

Non-Vidyo endpoints (standard-based VC solutions from the likes of Polycom [PLCM $54.66; Outperform] or Cisco/Tandberg) are connected to Vidyo’s H.264/SVC calls through the VidyoGateway, which supports a wide range of legacy video/audio standards (including H.323 and SIP, along with H.264 and H.263 video and wideband audio protocols).

In terms of endpoint pricing, a VidyoDesktop costs only $5 per seat while a typical VidyoRoom (with camera but no displays) will run from $2,000 to $7,000—prices well below those of competing systems. The low endpoint pricing is consistent with Vidyo’s strategy to proliferate video endpoints and make its money through the VidyoLine licenses.

The company won the Interop Best of Show award in the collaboration category (for the third consecutive year) for its VidyoMobile solution, enabling enterprise mobile users on iOS or Android-based smartphones or tablets to join multipoint video conferences with desktops and HD room system participants. VidyoMobile turns smartphones and tablets into video communication endpoints—a feature available only on desktop/laptop computers to date. VidyoMobile integrates seamlessly with all Vidyo endpoints including VidyoDesktop and VidyoRoom systems as well as legacy (H.323) and SIP endpoints using the VidyoGateway, and can decode up to 720p and encode up to VGA quality.

Vidyo’s video conferencing and collaboration platform also integrates into market-leading UC applications, such as Microsoft Lync, Adobe Connect, and IBM Lotus Sametime, via an API plug-in.

- **Acquisition Prospects:** While we categorize Vidyo’s technology mainly under desktop video conferencing today, we believe that over time Vidyo’s solution could encroach on the room systems market, given its high quality, low cost, and network/device flexibility. Possible acquirers include HP (which already is a Vidyo OEM partner), and incumbent vendors Cisco and Polycom (for consolidation purposes). In addition, Google (following its unsuccessful bid for Skype), Citrix, Adobe (ADBE $34.68), and IBM could be interested as a means of broadening their communications technology portfolios with a software-centric asset.

- **Management Team:**
  - **Ofer Shapiro, Co-Founder, President, and Chief Executive Officer**
    Mr. Shapiro co-founded Vidyo in 2005. Prior to Vidyo, Shapiro spent eight years at RADVISION—also serving as senior vice president of business development—where he was responsible for the development of the first IP video conferencing bridge and gatekeeper technology. He also served as senior vice president of business development responsible for strategic sales and relationships. Mr Shapiro was a contributor and one of the editors of the H.323 standard.
  - **Dr. Alex Eleftheriadis, Co-Founder and Chief Scientist**
    Dr. Eleftheriadis drives the technical vision and direction for Vidyo and also represents the company on standardization committees and technical advisory boards. He brings over 19 years of research experience in video compression and communications to his role at Vidyo. Before joining Vidyo, he was an associate professor of electrical engineering at Columbia University. Dr. Eleftheriadis has more than 100 publications and holds 15 patents.
Mr. Sofer brings more than 20 years of experience in finance management and operations to Vidyo. Mr. Sofer formerly served as CFO for Finjan Inc. Previously, he was group vice president of finance at Amdocs and held a variety of positions at SunGard Data Systems, including senior vice president and CFO. Mr. Sofer also held financial positions at Converse Technology and PriceWaterhouseCoopers.

- **Venture Backers:** Vidyo is backed by Menlo Ventures, Rho Ventures, Sevin Rosen Funds, Star Ventures, and Four Rivers Group.

### Key Technology Themes at Interop

Beyond the usual vendor battles over speeds and feeds, the industry buzz this year was centered on three main themes: 1) cloud services and their affect on data center and campus network design, 2) mobility and collaboration, including the impact of the influx of smart mobile devices on enterprise edge and access architectures, and 3) 40/100 Gigabit Ethernet (GE). All three themes are a by-product of greater adoption of server virtualization, cloud computing, and IT-as-a-service models as enterprises are adapting to a growing number of applications, greater load on the network, and demand for more ubiquitous network access.

1. **Cloud services:** Virtual services (extending applications from the edge to the core/data center while preserving user identity, defined policies, and application integrity), social networking (internal, B2B, and B2C collaboration applications), and mobility (driven by influx of smart mobile devices and business apps) are defining the new enterprise network, which is evolving from a fixed, data-centric, client-server topology to an application-driven, multimedia, and mobile network.

Converged, flatter networks enable IT managers to collapse the number of switching tiers in their data centers, resulting in higher performance, lower latency, reduced power consumption, and fewer total devices versus traditional hierarchical switching architectures (that typically consist of three or more tiers, from access to aggregation to core). Ethernet, as the protocol of choice in converged data center network, grew to constitute 62% of data center network revenue in 2010, according to IDC.

This year, virtually all Ethernet switch vendors—Cisco, HP, Avaya, Brocade, Extreme (EXTR $3.14), Force10, Juniper, Arista, and Enterasys—have embraced convergence and flat network architectures. Among different core switching vendors, most of which are adopting open standards flat network architectures (TRILL, SPB, etc.), we believe only Juniper Networks has leapfrogged the others with its highly innovative QFabric architecture.

Lastly, the WAN remains the key enabler of cloud services and the hybrid cloud (both private and public), but is still very complex. As a result, application delivery over the WAN has quadrupled in terms of revenue over the last seven years, and is expected to accelerate by growing about 60% through 2015 (according to IDC). The companies well positioned to capitalize on this trend are Riverbed, Citrix, F5 Networks, and Silver Peak Networks (private). A number of vendors rolling out WAN optimization services for public clouds focusing on SaaS applications include Riverbed (in partnership with Akamai), IBM WebSphere (in partnership with Akamai) and Aryaka (private).

2. **Mobility and collaboration:** In 2011, the number of smart mobile devices shipped will outrank laptops by a factor of 2, quadrupling in size between 2009 and 2014 (according to IDC). Ubiquitous, mobile connectivity to enterprise network is becoming universal, with several verticals leading the way in terms of penetration of mobility applications (healthcare, retail, and education). The so-called “consumerization of IT” and BYOD (bring your own device) in the enterprise are causing the rethinking of the network edge and access architectures as means to deliver application mobility at lower cost, enhanced performance, and greater scale.

Wireless is moving from an overlay network to a primary network at the access layer with a unified wireless/wired control and management plane. Vendors moving to integrate wired with wireless stand to benefit from this transition. Among those leading the way are Aruba (ARUN $30.14;
Market Perform) and Cisco, with Meru (MERU $17.82; Outperform) and Juniper/Trapeze not far behind.

Proliferation of mobile devices in the enterprise, along with video desktop and room systems, are converging at the application layer to drive unified communications and video interoperability. With VoIP as the main accelerator for UC adoption, SIP trunking (that typically provides costs savings on telephony services of 30% or more) is moving forward in the United States in a major way, with projected five-year CAGR of 38% in terms of line growth. On the collaboration front, hosted or cloud-based UC and enterprise social networking are among the fast emerging growth trends. We view ShoreTel (SHOR $10.64), Acme Packet (APKT $72.69), and Broadsoft (BSFT $37.88) (none of which we cover) as well-positioned in the UC/collaboration market.

3. **40/100 GE:** As the number of devices and end-users on the network grows, edge and data center server and network infrastructure needs to support resulting edge, application, and database workloads. Video conferencing is decisively moving into the mainstream (Microsoft-Skype deal is a testament), with new applications such as IP-video surveillance and video-based collaboration (for business training, marketing) stressing networks in a major way. Both carriers and enterprises are dealing with the mobile device and video explosion by throwing more bandwidth at the problem, rolling out 40/100 Gigabit Ethernet services, along with new compression technologies, and better network intelligence (network monitoring, intelligence, and peak-demand balancing). Among switch vendors leading the way on faster and bigger Ethernet pipes are Extreme Networks and Force10. On the network optimization and intelligence front, we believe F5 Networks, Riverbed, and NetScout (NTCT $22.68) are well positioned to capitalize on the growing network complexity.
Current Rating Distribution (as of 04/30/11)

<table>
<thead>
<tr>
<th>Coverage Universe</th>
<th>Percent</th>
<th>Inv. Banking Relationships*</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outperform (Buy)</td>
<td>58</td>
<td>Outperform (Buy)</td>
<td>8</td>
</tr>
<tr>
<td>Market Perform (Hold)</td>
<td>31</td>
<td>Market Perform (Hold)</td>
<td>2</td>
</tr>
<tr>
<td>Underperform (Sell)</td>
<td>1</td>
<td>Underperform (Sell)</td>
<td>0</td>
</tr>
</tbody>
</table>

*Percentage of companies in each rating category that are investment banking clients, defined as companies for which William Blair has received compensation for investment banking services within the past 12 months.

Stock Rating: William Blair & Company, L.L.C. uses a three-point system to rate stocks. Individual ratings reflect the expected performance of the stock relative to the broader market over the next 12 months. The assessment of expected performance is a function of near-term company fundamentals, industry outlook, confidence in earnings estimates, valuation, and other factors. Outperform (O) – stock expected to outperform the broader market over the next 12 months; Market Perform (M) – stock expected to perform approximately in line with the broader market over the next 12 months; Underperform (U) – stock expected to underperform the broader market over the next 12 months; Not Rated (NR) – the stock is currently not rated.

Company Profile: The William Blair research philosophy is focused on quality growth companies. Growth companies by their nature tend to be more volatile than the overall stock market. Company profile is a fundamental assessment, over a longer-term horizon, of the business risk of the company relative to the broader William Blair universe. Factors assessed include: 1) durability and strength of franchise (management strength and track record, market leadership, distinctive capabilities); 2) financial profile (earnings growth rate/consistency, cash flow generation, return on investment, balance sheet, accounting); 3) other factors such as sector or industry conditions, economic environment, confidence in long-term growth prospects, etc. Established Growth (E) – Fundamental risk is lower relative to the broader William Blair universe; Core Growth (C) – Fundamental risk is approximately in line with the broader William Blair universe; Aggressive Growth (A) – Fundamental risk is higher relative to the broader William Blair universe.

The ratings and company profile assessments reflect the opinion of the individual analyst and are subject to change at any time.

The compensation of the research analyst is based on a variety of factors, including performance of his or her stock recommendations; contributions to all of the firm’s departments, including asset management, corporate finance, institutional sales, and retail brokerage; firm profitability; and competitive factors.

Our salespeople, traders, and other professionals may provide oral or written market commentary or trading strategies—to our clients and our trading desks—that are contrary to opinions expressed in this research. Our asset management and trading desks may make investment decisions that are inconsistent with recommendations or views expressed in this report. We will from time to time have long or short positions in, act as principal in, and buy or sell the securities referred to in this report. Our research is disseminated primarily electronically, and in some instances in printed form. Electronic research is simultaneously available to all clients. This research is for our clients only. No part of this material may be copied or duplicated in any form by any means or redistributed without the prior written consent of William Blair & Company, L.L.C.

THIS IS NOT IN ANY SENSE A SOLICITATION OR OFFER OF THE PURCHASE OR SALE OF SECURITIES. THE FACTUAL STATEMENTS HEREIN HAVE BEEN TAKEN FROM SOURCES WE BELIEVE TO BE RELIABLE, BUT SUCH STATEMENTS ARE MADE WITHOUT ANY REPRESENTATION AS TO ACCURACY OR COMPLETENESS OR OTHERWISE. OPINIONS EXPRESSED ARE OUR OWN UNLESS OTHERWISE STATED. PRICES SHOWN ARE APPROXIMATE.

THIS MATERIAL HAS BEEN APPROVED FOR DISTRIBUTION IN THE UNITED KINGDOM BY WILLIAM BLAIR INTERNATIONAL, LIMITED, REGULATED BY THE FINANCIAL SERVICES AUTHORITY (FSA), AND IS DIRECTED ONLY AT, AND IS ONLY MADE AVAILABLE TO, PERSONS FALLING WITHIN COB 3.5 AND 3.6 OF THE FSA HANDBOOK (BEING “ELIGIBLE COUNTERPARTIES” AND “PROFESSIONAL CLIENTS”). THIS DOCUMENT IS NOT TO BE DISTRIBUTED OR PASSED ON TO ANY “RETAIL CLIENTS.” NO PERSONS OTHER THAN PERSONS