2011 Executive Forum

Optical Technology – Transforming Business Models and Networks

7 March 2011
Los Angeles, California, USA
Held in conjunction with OFC/NFOEC

EVENT PROGRAM

- Hear from leading industry executives.
- Ask challenging questions on the tough issues.
- Network one-on-one with top business leaders.

Keynote Speakers

Basil Alwan
Alcatel-Lucent

Simon Zelingher
AT&T Labs

Post-event materials will be available online at
www.osa.org/executiveforum

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Executive Forum 2011

Optical Technology – Transforming Business Models and Networks

JW Marriott Los Angeles
Los Angeles, California, USA
7 March 2011

The 2011 Executive Forum, held in conjunction with OFC/NFOEC, provides industry executives with networking opportunities, and insights and analysis from the field's leading business and financial experts on tomorrow's trends and opportunities.

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ACKNOWLEDGMENTS

The Optical Society gratefully acknowledges the support given by our Sponsors.

Corporate Sponsors

Huawei

Huawei is a leading telecoms solutions provider serving 45 of the world's top 50 telecom operators. Huawei's products and solutions have been deployed in over 100 countries and support the communications needs of one third of the world's population. The company is committed to providing innovative and customized products, services and solutions to create long-term value and growth potential for its customers. In 2009, Huawei recorded revenues of USD 21.8 billion, net profit of USD 2.7 billion and a net profit margin of 12.2 percent. For more information, please visit www.huawei.com.

OSA Foundation

The OSA Foundation (OSAF) was established by the Optical Society of America in 2002 as a charitable organization dedicated to carrying out philanthropic programs that further the study of science. The OSAF's mission is to support programs that advance youth science education; provide optics education and resources to underserved populations; offer career and professional development resources; and award, honor and recognize technical and business excellence. Since inception, the OSAF has funded nearly 300 programs and awarded 730+ grants and prizes that have benefited thousands of individuals in more than 55 countries. Learn more at www.osa-foundation.org.

Picometrix

Picometrix, LLC (NYSE Amex: API) has been a leading supplier of high-speed optical receivers and detectors since 1992, serving the telecommunications, data communications, and T&M markets. Our products are found inside a broad range of optical equipment from transmission systems to test equipment for the laboratory and the manufacturing floor and service provider systems. We are vertically integrated from material growth through hybrid assembly and high-speed test.

Picometrix is dedicated to serving our customers by providing high performance products in standard and custom configurations Our PIN, APD and waveguide based products offer industry leading performance and address the entire range of 10Gbps, 40Gbps and 100Gbps optical communication applications for a variety of modulation formats including NRZ, RZ, ODB, DPSK, DQPSK and DP-QPSK.

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Founded in 2000, Light Reading (www.lightreading.com) is the leading online media, research, and focused event company serving the $3 trillion worldwide communications market. Lightreading.com is the ultimate source for technological and financial analysis of the communications industry, leading the media sector in terms of traffic, content, and reputation. Light Reading produces nearly 20 targeted communications events including TelcoTV, and TelcoTV Asia, Ethernet Expo New York and Ethernet Europe, and The Tower Summit @ CTIA, as well as focused one-day events tailored for cable, mobile, and wireline executives in the US, Europe, India, and China.

2011 Executive Forum Planning Committee

- Dana Cooperson, Vice President and Practice Leader, Networks, Ovum
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- Richard Tompane, Telecom Consultant

Thank you to the dedicated committee for your time and efforts in developing an outstanding program.

The 2011 Executive Forum is produced by OSA.

The Optical Society

Uniting more than 106,000 professionals from 134 countries, the Optical Society (OSA) brings together the global optics community through its programs and initiatives. Since 1916 OSA has worked to advance the common interests of the field, providing educational resources to the scientists, engineers and business leaders who work in the field by promoting the science of light and the advanced technologies made possible by optics and photonics. OSA publications, events, technical groups and programs foster optics knowledge and scientific collaboration among all those with an interest in optics and photonics. For more information, visit www.osa.org.

AGENDA AT-A-GLANCE

7 March 2011

07:00 – 12:00	Registration
07:30 – 08:30	Breakfast – Sponsored by: OSA Foundation
08:30 – 08:45	Welcome
08:45 – 09:30	Keynote Presentation: Basil Alwan, Alcatel-Lucent
09:30 – 11:00	Panel 1: IP & Optics Integration: Challenges and Next Steps
11:00 – 11:15	Coffee Break – Sponsored by: Huawei
11:15 – 12:30	Panel 2: Business Model Innovation
12:30 – 13:45	Networking Lunch – Sponsored by: Huawei
13:45 – 14:30	Keynote Presentation: Simon Zelingher, AT&T Laboratories
14:30 – 15:45	Panel 3: Developing the Technology Edge: Requirements to Support New Business Models
15:45 – 16:00	Coffee Break – Sponsored by: Huawei
16:00 – 17:30	Panel 4: Where is the Optical Components Market Going?
17:30	Closing Comments
17:30 – 19:30	Networking Reception – Sponsored by: Picometrix

KEYNOTE PRESENTATIONS

Keynote Presentation I: 7 March 2011; 08:45 – 09:30

Basil Alwan, President, IP Division and Head of Portfolio Strategy, Networks Group, Alcatel-Lucent

Presentation: Which is it: IP over Optical, IP vs. Optical or IP+Optical?
With a myriad of multimedia applications feeding users' accelerating thirst for bandwidth, service providers face the continual challenge of scaling their networks ahead of demand. To drive incremental value for their residential, business and wireless customers, they seek a high leverage network infrastructure that monetizes their network assets by unleashing creative new services and optimal user experience. To ensure profitability, transport architectures that significantly reduce the total cost per transported bit prove more compelling than ever.

Without a doubt IP-based services and applications dominate the future traffic mix across wireline and wireless networks. In looking beyond traditional assumptions and striving for the most efficient and profitable transport infrastructure for the coming wave of applications, collaboration and cross-layer visibility between IP and optical transport networks will play a key role. For service providers, the approach to optimizing transport efficiency across a converged IP and optical backbone must consider operational realities, given that service provider offerings are diverse and no two networks are exactly the same. With 100G as the new currency, a flexible range of traffic grooming options, and closer integration at the management and control plane level, the proper coordination of IP and optical technologies stands to deliver an infrastructure that is up to the service providers' challenge of profitable network scaling.

Speaker Biography
Basil Alwan is president of the Alcatel-Lucent IP Division (IPD) and has overall responsibility for the company's portfolio of IP/MPLS and Multiservice switches and routers, and Network and Service management. In addition, he is responsible for the portfolio strategy for the Networks Group, which is critical as Alcatel-Lucent continues to win massive, multi-billion dollar, multi-year IP network transformation projects. Formerly, Mr. Alwan was the founder, president and CEO of Timetra, a start-up focused on service routers for IP/MPLS networks, which was acquired by Alcatel in Q2 2003 to form the IP Division. Since that point, Alcatel-Lucent has seen significant global success for its IP service routing portfolio. The company secured the #2 position in the IP/MPLS service provider edge market, garnered more than 200 customers in 90+ countries and in 2007 had its first $1 billion revenue year for its IP service routing business.

Mr. Alwan is a recognized industry leader who serves as a member of the boards of directors of multiple Silicon Valley based companies including Kindsight, 2Wire, Omneon Video Networks and WiChorus – award-winning and innovative organizations focused on next-generation broadband solutions. He is frequently invited to keynote at industry events, and has twice been selected by influential telecom/cable magazine, *Light Reading*, as one of the Industry's "Top 10 Movers and Shakers" for his role in building the IP business at Alcatel.

Prior to TiMetra, Mr. Alwan held executive positions in Silicon Valley start-ups as well as large companies. Formerly, he was vice president and general manager of Nortel Networks' Enterprise Products Division (EPD), a team of 300 developers and staff primarily focused on scalable Layer 3 switched networks. Mr. Alwan came to Nortel through the Bay Networks acquisition of Rapid City Communications, where he was vice president of product management and marketing. Rapid City's market-leading Layer 3 switch sold under the name Accelar at Bay/Nortel and ramped to more than $1 billion in sales.

Mr. Alwan received his Bachelor's degree in Electrical Engineering from the University of Illinois at Champaign-Urbana.

About Alcatel-Lucent

Alcatel-Lucent (Euronext Paris and NYSE: ALU) is the trusted transformation partner of service providers, enterprises, strategic industries such as defense, energy, healthcare, transportation, and governments worldwide, providing solutions to deliver voice, data and video communication services to end-users. A leader in fixed, mobile and converged broadband networking, IP and optics technologies, applications and services, Alcatel-Lucent leverages the unrivalled technical and scientific expertise of Bell Labs, one of the largest innovation powerhouses in the communications industry. With operations in more than 130 countries and the most experienced global services organization in the industry, Alcatel-Lucent is a local partner with a global reach. Alcatel-Lucent achieved revenues of Euro 15.2 billion in 2009 and is incorporated in France, with executive offices located in Paris. For more information, visit Alcatel-Lucent on the Internet: http://www.alcatel-lucent.com, read the latest posts on the Alcatel-Lucent blog http://www.alcatel-lucent.com/blog and follow us on Twitter: http://twitter.com/Alcatel_Lucent

Keynote Presentation II: 7 March 2011; 13:45 – 14:30

Simon Zelingher, Vice President, Global Optical, IP & Data Planning, Design & Development, AT&T Laboratories

Presentation: AT&T Network (R)evolution

AT&T's optical network is going through a transformation, taking advantage of new and emerging capabilities to change the way we think about bandwidth. This new bandwidth virtualization concept allows capacity to be pooled rather than dedicated, and then applied in the amount needed to any application and reconfigured on demand. It extends from the core IP/Optical backbone all the way out to the network edges, and is enabled via a control plane that allows different technologies and supplier equipment to work together. I will talk about how the new technologies and software will enable AT&T's network to be flexible and responsive to the needs of the underlying applications such as cloud computing and video distribution and will lower cost by being both adaptive and responsive to changing capacity needs.

As we work to meet this vision, we need our suppliers (and their suppliers) to rise to meet the challenges of supporting a multi-vendor, flexible network. This requires a new level of control and software, in addition to hardware that scales cost-effectively from very small to large Core nodes. This presentation will focus on some of the key pieces of the vision, and what will be needed to start today and grow to the future.

Speaker Biography

Simon Zelingher is the global optical, IP & data planning, design, & development vice president at AT&T Laboratories. He has responsibility for the development of AT&T's global optical transport, frame relay, ATM, IP, and Ethernet Networks and Services.

Mr. Zelingher has more than 20 years of experience with AT&T. Much of this time he spent ensuring AT&T's world leadership for reliable, state-of-the-art networks. In recognition of Simon's outstanding contributions to AT&T and the industry, Mr. Zelingher received the AT&T Fellow in 2000. This is the most prestigious award given by AT&T and is a testament to his outstanding technical achievement, leadership, and dedication.

In his recent assignment Mr. Zelingher lead the development effort for converging of the AT&T IP backbone, establishing the seamless end-to-end MPLS/IP Network with vertical features to support advanced services like QoS, eVPN, and introducing the Multi-Services Edge (MSE) technology.

Prior to this, Mr. Zelingher led the development of an intelligent, optical network that provides distributed mesh restoration and automated point-and-click provisioning. This intelligent optical network has been fully implemented in the continental United States and in the rest of the World (AP, EMEA). In the mid-1990's, he led the

development of SONET ring technologies and high-capacity Dense Wave Division Multiplexing optical line systems.

Earlier, he was principal contributor responsible for the implementation of the FASTAR platform. This innovative technology, developed in the late 1980's, allowed the real-time re-routing of hundreds of T3 facilities in response to fiber cuts. FASTAR was an internally developed technology that allowed AT&T to enjoy years of competitive advantage for reliable, restorable, transport services.

Mr. Zelingher received 11 patents for inventions associated with SONET technologies and restoration methods. He has a MS in Electrical Engineering from the Polytechnic Institute in NY, and a BS in Electrical Engineering from the Polytechnic Institute of IASSY, Romania.

About AT&T
AT&T Inc. (NYSE:T) is a premier communications holding company. Its subsidiaries and affiliates – AT&T operating companies – are the providers of AT&T services in the United States and around the world. With a powerful array of network resources that includes the nation's fastest mobile broadband network, AT&T is a leading provider of wireless, Wi-Fi, high speed Internet and voice services. A leader in mobile broadband, AT&T also offers the best wireless coverage worldwide, offering the most wireless phones that work in the most countries. It also offers advanced TV services under the AT&T U-verse® and AT&T │DIRECTV brands. The company's suite of IP-based business communications services is one of the most advanced in the world. In domestic markets, AT&T Advertising Solutions and AT&T Interactive are known for their leadership in local search and advertising. In 2010, AT&T again ranked among the 50 Most Admired Companies by *FORTUNE*® magazine.

PANEL DISCUSSIONS

Panel 1: IP & Optics Integration: Challenges and Next Steps

7 March 2011; 09:30 – 11:00

Moderator: Eve Griliches, Managing Partner, *ACG Research*

Speakers

- Vijay Gill, Senior Manager, Engineering and Architecture, *Google*
- Scott Mountford, Principal-Network Planning Engineer, *AT&T Services, Inc.*
- Hans-Juergen Schmidtke, Chief Architect for Optical & Transport, *Juniper Networks*
- Glenn Wellbrock, Director of Optical Transport Network Architecture & Design, *Verizon*

Panel Description

Carriers and their suppliers discuss both the challenges of IP and optics integration and the opportunities for future capabilities. Speakers will discuss where they are today in implementation, where they would like to be today, and what they are looking for in the future.

Panel 2: Business Model Innovation

7 March 2011; 11:15 – 12:30

Moderator: Dana Cooperson, Vice President and Practice Leader, Networks, *Ovum*

Speakers

- Shamim Akhtar, Sr. Director Network Architecture and Technology, *Comcast Cable Communications Inc.*
- Donn Lee, Senior Network Engineer, *Facebook*
- Peder Ulander, Chief Marketing Officer, *Cloud.com*

Panel Description

Innovative technology solutions hold great promise, but will not in and of themselves fix market structural problems. New players who enter with novel business models and incumbent players willing to try bold new approaches will take the best advantage of new communications technologies. Speakers on this panel will showcase their respective approaches to applying technologies and business models to tap new opportunities in, for example, infrastructure as a service (aka cloud computing), mobile broadband and backhaul, and social networking.

Panel 3: Developing the Technology Edge: Requirements to Support New Business Models

7 March 2011; 14:30 – 15:45

Moderator: Richard Tompane, *Telecom Consultant*

Speakers

- Stuart Barnes, Chief Technical Officer, *Xtera Communications*
- John Dunne, Chief Technology Officer, *Intune Networks*
- Bill Gartner, Vice President and General Manager Access & Transport Technology Group, *Cisco Systems, Inc.*
- John Roese, Senior VP North American R&D Center, *Huawei Technologies*

Panel Description

With new business models emerging, what technologies and ecosystems are required to support them now and in the future? What are the demanding requirements on technology performance and life cycle cost? And what will the new architectures look like? Executives from systems companies will address the market opportunities and questions related to the technology needs to support business models and networks.

Panel 4: Where is the Optical Components Market Going?

7 March 2011; 16:00 – 17:30

Moderator: Gurinder Parhar, Chief Business Officer, *Triple Ring Technologies*

Speakers

- Alain Couder, President and Chief Executive Officer, *Oclaro, Inc.*
- Bikash Koley, Senior Network Architect, *Google*
- Rajiv Ramaswami, Executive Vice President & General Manager, Infrastructure & Networking Group, *Broadcom Corporation*
- Jerry Rawls, Chairman of the Board, *Finisar*

Panel Description

Business, customer applications and market logic drive decisions related to business models, technology advancements, and more. Industry executives will address business structure opportunities and challenges and projections on how business models will change in five years to support customer and technology trends.

SPEAKER AND COMPANY PROFILES

Shamim Akhtar, Senior Director Network Architecture & Technology, Comcast Corporation

Shamim Akhtar, senior director network architecture & technology is responsible for driving the network technology platform and architecture roadmap for Comcast's truly converged national IP backbone, Metro, Edge and Access network. His technology and operations leadership, both inside and outside Comcast has brought tremendous momentum in the area of vendor agnostic network scaling to support Triple play residential, MEF based business services and Mobile backhaul services over one converged IP/Optical network. He has been a key contributor in recently founded "100G and beyond" user group in North America and has been a founding member of Docsis provisioning of EPON/10GEPON for business services scalability. Mr. Shamim has been involved in critical technology acquisition and investment decisions in IP/Optical industry with help of his experience and insight on the length and breadth of network technologies and their operational models. He is an IIT Kharagpur Graduate with working knowledge on MSO/Carrier network in North America, Europe and APAC through his prior experience in Philips, VPISystems and IPI/Ciena.

About Comcast Corporation

Comcast Corporation is one of the nation's leading providers of cable, entertainment and communication products and services, with 22.9 million video customers, 16.7 million high-speed Internet customers and 8.4 million Comcast Digital Voice customers. Comcast is principally involved in the development, management and operation of cable networks and in the delivery of programming content. Comcast also sees MEF based Metro Ethernet and Cell Backhaul services as high growth engine for next several years. With the help of one Converged IP/Optical nationwide backbone, Metro and Docsis3.0 based fiber rich infrastructure Comcast offers ultra fast service velocity and very high network availability both for residential triple play and business customers.

Stuart Barnes, Chief Technical Officer, Xtera Communications

Stuart Barnes is the CTO of Xtera Communications and has been with Xtera since 2007, serving in a number of roles. Prior to Xtera, Dr. Barnes was the founder and COO of Polariq, as well as founder and CTO of both Azea Networks and of ilotron in the UK. In addition, Dr. Barnes has held senior management positions at Atlas Venture, Alcatel Recherche, STC Submarine Systems and STC Cables Newport. Dr. Barnes received his post-doctoral degree from QMC, London University, England and is Visiting Professor to School of Electronics and Computer Science, Southampton University, England. He holds over 20 patents and has published over 40 papers.

About Xtera Communications

Xtera Communications specializes in network infrastructure that delivers maximum capacity, reach and value. Providing solutions for enterprise and telecom companies, Xtera offers an extensive portfolio of optical and IP networking solutions for submarine, long-haul, regional, metropolitan and enterprise applications. With deployments across five continents, Xtera's optical transport solutions help service providers expand and accelerate their market reach with new deployments and extend the life of existing network assets with cost-effective upgrades. Our IP networking solutions for WAN traffic management deliver efficient, flexible

network optimization. Xtera's innovative technologies offer exceptional quality and performance, driving customer success. For more information, visit www.xtera.com.

Alain Couder, President and Chief Executive Officer, Oclaro, Inc.

Alain Couder joined Bookham as director, president and CEO in 2007. In 2009, Mr. Couder led the successful merger of Bookham and Avanex to form Oclaro, and drove the transformation of Oclaro into a Tier One optical solutions provider. Prior to Bookham, Mr. Couder held CEO positions at IP Dynamics, Inc., Confluent Software, Inc., and Solid Information Technology Inc. Previously Mr. Couder was COO of Agilent Technologies, Inc., Chairman and CEO of Packard Bell NEC, and held positions at Groupe Bull, Hewlett Packard and IBM. Mr. Couder currently serves as a director at Sanmina-SCI, an electronic manufacturing services firm. He holds a master's degree in electrical engineering from the Ecole Superieure d'Electricite in Paris.

About Oclaro

Oclaro, Inc. is one of the largest providers of innovative optical communications solutions at the heart of today's core optical network, where applications such as video services, cloud computing, voice over IP, and more are driving the need for ever increasing performance and bandwidth. The company is also expanding beyond telecommunications to fuel the emergence of new laser applications in high-growth markets such as home and professional hair removal, cosmetic surgery, medical; and in the consumer and PC markets where electrical interconnects are being rapidly replaced with optical interconnects. Since its inception in 2009 when it was formed through the merger of Avanex and Bookham, Oclaro has been executing against an aggressive strategy to be the predominant force in the fiber optics industry. The company has driven industry consolidation through a series of successful mergers and acquisitions; and has further outdistanced the competition with a broad portfolio of solutions – from discrete chips and lasers to complete modules and subsystems. As a result of this success, Oclaro has significantly increased revenues, established a strong balance sheet with no debt; and is now a tier 1 provider of innovative optical and laser components and solutions for a broad range of diverse markets, including telecommunications, industrial, consumer electronics, medical and scientific applications. Headquartered in San Jose, CA, Oclaro combines in-house and outsourced manufacturing to maximize flexibility and drive improved gross margin through economies of scale, with cutting-edge chip fabrication facilities in the U.K., Switzerland and Italy, and in-house and contract manufacturing sites in the U.S., Thailand and China.

John Dunne, Chief Technology Officer, Intune Networks

John Dunne co-founded Intune in 1999 with Tom Farrell following EU-funded research work at University College Dublin. Dr. Dunne has a first class honors electronics degree and a Ph.D. in the field of tunable lasers from UCD and has spent his career working on the application of these devices into telecommunications systems. He is a co-inventor on some of Intune's core intellectual property on network systems and is published internationally in the field of optoelectronics. Since founding the company, Dr. Dunne has been responsible for the commercial vision of how Intune's core technology could be applied into the telecom market. His current role includes working with technology strategy leaders of network operators and network users to roll out Intune's tunable

network innovation. He is a regular invited speaker at conferences on innovation, network technology and the future trends in the communications industry. He leads all research programs at Intune.

About Intune Networks

Intune Networks is changing what networks can do. Based on a technology breakthrough, the company has designed a set of network equipment products that will make the network tunable for any service, anytime, anywhere. Intune Networks was founded in Dublin in 1999 by John Dunne and Tom Farrell, both UCD graduates who were researching laser technology in European funded programs. Over the next 10 years, Intune developed and refined its technology to solve a critical problem in the optical networking sector and this solution is now being brought to market as a family of telecom switch products. Along the way, Intune supplied expertise and technology to many European and U.S. research programs building a customer base of the world's leading academic and commercial research groups. Now, Intune is focused on the telecom equipment market where the next generation of digital service requirements such as quality of experience and high bandwidths are creating a new global opportunity. Intune currently employs over 120 people and has design center in Dublin and Belfast and sales offices in the U.K. and U.S. The problem Intune has solved is how to evolve network architectures to cope with the massive increase in unpredictable traffic demand while sustaining profitability and controlling costs. They have achieved this through their breakthrough technology named Optical Packet Switch and Transport (OPST).

Bill Gartner, Vice President and General Manager Access & Transport Technology Group, Cisco Systems, Inc.

Bill Gartner leads Cisco Systems' Optical Transport Business Unit (OTBU), which includes Cisco's portfolio of DWDM and TDM Optical Networking products. He has P&L responsibility for this business and is responsible for strategic direction, product development, product positioning and new product introduction. Prior to joining Cisco, Mr. Gartner was chief operating officer of Meriton Networks (acquired by Xtera Networks). Prior to Meriton, Mr. Gartner served as president and COO of Mahi Networks and COO of Photuris. Before joining Photuris, he was vice president and general manager of Lucent's Optical Networking Systems business, responsible for Metro, Access, and Long Haul DWDM Products. In this role, he was responsible for well over $1B of revenue, with 500 employees in 5 worldwide locations. His earlier tenure in the industry included roles at AT&T Bell Labs and Paradyne. Mr. Gartner has served on the boards of OptronX (acquired by JDSU) and CyOptics. Mr. Gartner has a bachelor's degree in Electrical Engineering from Georgia Tech, a Master's degree in Electrical Engineering from Cornell University, and an Executive Master's in Technology Management from University of Pennsylvania/Wharton. He is a University of Pennsylvania Moore Fellow, and holds 3 patents.

About Cisco Systems, Inc.

Cisco Systems, Inc. is the worldwide leader in networking for the Internet. Today, networks are an essential part of business, education, government and home communications, and Cisco Internet Protocol-based (IP) networking solutions are the foundation of these networks. Cisco hardware, software, and service offerings are used to create Internet solutions that allow individuals, companies, and countries to increase productivity, improve customer satisfaction and strengthen competitive advantage. The Cisco name has become synonymous with the Internet, as well as with the productivity improvements that Internet

business solutions provide. At Cisco, our vision is to change the way people work, live, play and learn. Cisco (NASDAQ:CSCO) enables people to make powerful connections - whether in business, education, philanthropy, or creativity. Cisco hardware, software, and service offerings are used to create the Internet solutions that make networks possible - providing easy access to information anywhere, at any time. For more information visit www.cisco.com.

Vijay Gill, Senior Manager, Engineering and Architecture, Google

Vijay Gill is senior manager, engineering and architecture, at Google. He is responsible for all network design, expansion and datacenter infrastructure for Google's production network, as well as participating in various industry organizations and advancing the company's efforts in the standards arena. Mr. Gill has co-authored a variety of RFCs on traffic engineering, multihoming and routing. He has also given talks and presentations on network design, BGP scaling issues and traffic engineering in forums such as NANOG and IETF. Mr. Gill is also currently serving on the IETF Internet Architecture Board (IAB). Prior to joining Google, Mr. Gill worked as senior technical manager for AOL Global Network Operations and was responsible for setting the technical direction and strategy for AOL production. Before AOL, he worked as manager of architecture at MFN/Abovenet where he participated in revamping the global backbone, standardization of routing policy and product development. Earlier in his career, Mr. Gill worked as a senior engineer at UUNET, participating in the MPLS and multicast engineering projects.

About Google

Google's mission is to organize the world's information and make it universally accessible and useful. Google's innovative search technologies connect millions of people around the world with information every day. Founded in 1998 by Stanford Ph.D. students Larry Page and Sergey Brin, Google today is a top web property in all major global markets. Google's targeted advertising program – the largest and fastest growing in the industry – provides businesses of all sizes with measurable results, while enhancing the overall web experience for users. Google is headquartered in Silicon Valley with offices throughout North America, Europe, and Asia. For more information, visit www.google.com.

Bikash Koley, Senior Network Architect, Google

Bikash Koley is currently senior network architect at Google, where he is focused on network infrastructure scaling, optimization and reliability. Prior to Google, Dr. Koley was the CTO of Qstreams Networks, a company he co-founded. He also spent several years at Ciena Corporation in various technical roles developing DWDM and Ethernet technologies. Dr. Koley is a frequent speaker in conferences and industry forums and is an active participant in various networking standard bodies. He received a B.Tech. from IIT, India; and M.S. and Ph.D. from the University of Maryland at College Park, all in Electrical Engineering.

About Google

Google's mission is to organize the world's information and make it universally accessible and useful. Google's innovative search technologies connect millions of people around the world with information every day. Founded in 1998 by Stanford Ph.D. students Larry Page and Sergey Brin, Google today is a top web property in all major global markets. Google's targeted advertising program – the largest and fastest growing in the industry – provides

businesses of all sizes with measurable results, while enhancing the overall web experience for users. Google is headquartered in Silicon Valley with offices throughout North America, Europe, and Asia. For more information, visit www.google.com.

Donn Lee, Senior Network Engineer, Facebook

Donn Lee is a senior network engineer at Facebook. His duties include designing networks, evaluating products, optimizing performance, and performing escalation troubleshooting. Previous to Facebook, Mr. Lee worked in Google's Network Architecture group for four years and during tremendous growth of Google's backbone, optical, and datacenter networks. While working as a consulting systems engineer at Cisco Systems (CCIE #3262) he worked on large global networks and wrote his book, *Enhanced IP Services for Cisco Networks*, which is published by Cisco Press. He holds a bachelor's degree in Electrical Engineering from UCLA.

About Facebook

Founded in February 2004, Facebook is a social utility that helps people communicate more efficiently with their friends, family and coworkers. The company develops technologies that facilitate the sharing of information through the social graph, the digital mapping of people's real-world social connections. Anyone can sign up for Facebook and interact with the people they know in a trusted environment. Facebook is a part of millions of people's lives all around the world. Facebook is a privately-held company and is headquartered in Palo Alto, Calif.

Scott Mountford, Principal-Network Planning Engineer, AT&T Services, Inc.

Scott Mountford has his B.S. and M.S. in analytical chemistry from the University of the Pacific. His research in artificial photosynthesis under Nobel Prize winner Melvin Calvin and Dr. Larry Spreer was in the area of optical emission spectroscopy of inorganic photosynthetic conversion pathways. Prior to joining SBC in the Fundamental Planning Organization in 2000, Mr. Mountford served as the director of environmental analytical measurements at Lawrence Berkeley National Lab. At SBC, he was the fundamental planning lead in DWDM and ROADM RFPs and optical network architecture. Currently at AT&T, Mr. Mountford is the lead fundamental planner for long range planning of optical systems within AT&T, (DWDM, ROADM, and OTN switching) and their corresponding planning tools. Mr. Mountford has developed Layer 1 nationwide builds of corporate initiatives to support Projects Pronto (DSL) & Lightspeed (U-verse). These initiatives have lead to development and wide deployment of Optical systems with first generation and second generation DWDM technologies. Currently, Mr. Mountford is working on the business drivers and deployment plans for a new end-end OTN infrastructure. The end goal of this initiative is to bridge the Long Distance, Metro and Wireless infrastructures with an OTN control plane driven switched network.

About AT&T

AT&T Inc. (NYSE:T) is a premier communications holding company. Its subsidiaries and affiliates - AT&T operating companies - are the providers of AT&T services in the United States and around the world. With a powerful array of network resources that includes the nation's fastest mobile broadband network, AT&T is a leading provider of wireless, Wi-Fi, high speed Internet and voice services. A leader in mobile broadband, AT&T also offers the best wireless coverage worldwide, offering the most wireless phones that work in the most

countries. It also offers advanced TV services under the AT&T U-verse® and AT&T |DIRECTV brands. The company's suite of IP-based business communications services is one of the most advanced in the world. In domestic markets, AT&T Advertising Solutions and AT&T Interactive are known for their leadership in local search and advertising. In 2010, AT&T again ranked among the 50 Most Admired Companies by FORTUNE® magazine. Additional information about AT&T Inc. and the products and services provided by AT&T subsidiaries and affiliates is available at http://www.att.com.

Rajiv Ramaswami, Executive Vice President & General Manager, Infrastructure & Networking Group, Broadcom Corporation

Rajiv Ramaswami is the executive vice president and general manager, Infrastructure & Networking Group at Broadcom. Previously he was at Cisco, where he served as vice president and general manager for a variety of business units in optical, switching, and storage networking. Prior to Cisco, Dr. Ramaswami held various technical and leadership positions at Xros, Tellabs and IBM's T.J. Watson Research Center. Dr. Ramaswami holds M.S. and Ph.D. degrees in Electrical Engineering from the University of California, Berkeley and a B. Tech. degree from the Indian Institute of Technology in Chennai. He is a Fellow of the IEEE and a Distinguished Alumnus of the Indian Institute of Technology, Chennai.

About Broadcom

Broadcom Corporation is a major technology innovator and global leader in semiconductors for wired and wireless communications. Broadcom products enable the delivery of voice, video, data and multimedia to and throughout the home, the office and the mobile environment. We provide the industry's broadest portfolio of state-of-the-art system-on-a-chip and software solutions to manufacturers of computing and networking equipment, digital entertainment and broadband access products, and mobile devices. These solutions support our core mission: Connecting everything®. Broadcom is one of the world's largest fabless semiconductor companies, with 2008 revenue of $4.66 billion, and holds over 3,650 U.S. and over 1,450 foreign patents, more than 7,750 additional pending patent applications, and one of the broadest intellectual property portfolios addressing both wired and wireless transmission of voice, video, data and multimedia.

Jerry S. Rawls, Chairman of the Board, Finisar

Jerry Rawls was elected chairman of the board in 2006. He has also served as president, chief executive officer, and a member of the Board of Directors for Finisar Corporation from 1989 to 2008. From 1968 to 1989, he was employed by Raychem Corporation, a materials science and engineering company. At Raychem he held various management positions including manager of product marketing, national sales manager, general manager of the Aerospace Products Division, and general manager of the Interconnection Systems Division. Mr. Rawls holds a B.S. in Mechanical Engineering from Texas Tech University and an M.S. in Industrial Administration from the Krannert Graduate School of Management at Purdue University. He is a member of Tau Beta Pi and Pi Tau Sigma engineering honorary societies.

About Finisar

With over 20 years of experience, Finisar is a global technology leader in optical communications subsystems and components that enable high-speed voice, video and data communications for

networking, storage, wireless, and cable TV applications. During this time, not only has Finisar provided critical breakthroughs in optics technologies, but it has supplied system manufacturers with the production volumes needed to meet the exploding demand for network bandwidth and storage. Finisar's industry-leading optical products include transceivers/transponders, ROADMs and passive and active components for enterprise networking and storage, telecom and CATV applications. In 2008, Finisar merged with Optium Corporation, creating the world's largest supplier of optical communication components and subsystems. By combining Finisar's vertically integrated business model ideally suited for delivering massive production volumes with that of Optium's quick-turn mass customization capabilities for lower volume solutions, the company now delivers the industry's broadest product portfolio backed by world-class quality and reliability. With approximately 7,000 employees, Finisar has sales, channel, and support offices worldwide. Corporate headquarters are located in Sunnyvale, California (USA), with product development and manufacturing facilities located in California, Pennsylvania and Texas (USA), Australia, China, Israel, Malaysia, and Singapore.

John Roese, Senior Vice President North American R&D Center, Huawei Technologies

John Roese is an experienced information and communications technology CTO and R&D leader. He is an industry recognized chief technology officer/R&D executive within the enterprise, carrier, wireless, wire line, security and IT sectors. Mr. Roese has a proven history of transforming and operating both focused and extremely large R&D organizations, providing industry thought leadership and vision and evangelizing that future to both customers and the wider industry of press, analyst, investor and partners.

About Huawei Technologies

Huawei is a leading telecoms solutions provider serving 45 of the world’s top 50 telecom operators. Huawei’s products and solutions have been deployed in over 100 countries and support the communications needs of one third of the world’s population. The company is committed to providing innovative and customized products, services and solutions to create long-term value and growth potential for its customers. In 2009, Huawei recorded revenues of USD 21.8 billion, net profit of USD 2.7 billion and a net profit margin of 12.2 percent. For more information, please visit www.huawei.com.

Hans-Juergen Schmidtke, Chief Architect for Optical & Transport, Juniper Networks

Hans-Juergen Schmidtke is chief architect for optical & transport at Juniper Networks located in Sunnyvale, Calif. In this role he is responsible for the optical and transport strategy and implementation of Juniper’s optical and transport related technologies and products. In his career he was head of the fixed network operator business in North America for Nokia Siemens Networks located in Mountain View, Calif. Over the years at Nokia Siemens Networks and Siemens Communications, Inc., he held positions in product management and general management in both Germany and the US. Dr. Schmidtke has more than 18 years experience in the optical industry. He worked on various aspects of optical physics from advanced research, to product development, to real-world large-scale deployments. He studied physics at the University of Dusseldorf and at the Max-Planck Institute of Quantum Optics, and received his Ph.D. from the University of Wurzburg. Dr. Schmidtke is member of IEEE, OSA and the German Physical Society.

About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide, generating revenues exceeding $3 billion over the last year. Additional information can be found at www.juniper.net.

Peder Ulander, Chief Marketing Officer, Cloud.com

Peder Ulander is the chief marketing officer where he sets the direction and strategy around corporate identity, product marketing and demand generation. Peder is passionate about new, disruptive markets and has a strong track record of bringing new, market defining open source technologies to market. Prior to joining cloud.com, Peder was the senior vice president of marketing at Sun Microsystems where he was responsible for open sourcing the Java platform, building a growth business with OpenSolaris and establishing Sun as a leader in the open source enterprise software market. Throughout his career, Peder has contributed to the success of a number of open source technology startups like Cobalt Networks (acquired by Sun) and MontaVista Software (acquired by Cavium Networks) as well as held product leadership positions at Cisco and Symantec.

About Cloud.com

Cloud.com delivers an innovative open source software platform for launching either public or private cloud environments – delivering all of the essential components used to build, deploy and manage multi-tier and multi-tenant cloud applications in a fully integrated software package. With the Cloud.com CloudStack, customers can quickly and easily build cloud services within their existing infrastructure and start realizing the benefits of this new IT service within minutes without the overhead of integration, professional services, and complex deployment schedules. Cloud.com was founded in 2008 by a group of infrastructure and virtualization veterans determined to take the complexity and high costs out of deploying cloud services. The Cloud.com team has extensive open source, service provider and enterprise experience from companies such as Sun, Cisco, Citrix, Zimbra, SEVEN Networks, Openwave and others. Cloud.com technologies can be deployed on-premise or as hosted cloud services.

Glenn Wellbrock, Director of Optical Transport Network Architecture & Design, Verizon

Glenn Wellbrock is the director of optical transport network architecture and design at Verizon, where he is responsible for the development of new technologies for both the metro and long haul transport infrastructure. Prior to this position, Mr. Wellbrock was responsible for the advanced technology lab, where he established evaluation criteria and set engineering guidelines for all backbone transport equipment. Previous experience includes various positions within network operations. In addition to his more than 20 years at Verizon (1984-2001 and 2004-present), Mr. Wellbrock was responsible for product architecture within the U.S. optical networks group at Marconi and product planning at Qplus Networks where he developed alternative modulation techniques.

About Verizon

Verizon Communications Inc. (NYSE, NASDAQ:VZ), headquartered in New York, is a global leader in delivering broadband and other wireless and wireline communications services to mass market, business, government and wholesale customers. Verizon Wireless operates America's most reliable wireless network, serving more than 92 million customers nationwide. Verizon also provides converged communications, information and entertainment services over America's most advanced fiber-optic network, and delivers innovative, seamless business solutions to customers around the world. A Dow 30 company, Verizon last year generated consolidated revenues of more than $107 billion. For more information, visit www.verizon.com.

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