

NETWORK PHYSICS IS THE ONLY PROVIDER OF BUSINESS-NETWORK INTEGRATION SOLUTIONS THAT DYNAMICALLY ALIGN NETWORK OPERATIONS WITH BUSINESS PRIORITIES, ENABLING GLOBAL 2000 COMPANIES TO MANAGE THE MOST COMPLEX AND DYNAMIC ENTERPRISE NETWORKS WITH EASILY DEPLOYED APPLIANCES THAT OVERCOME NETWORK COMPLEXITY, AUTOMATICALLY ADAPT TO CHANGE, AND REDUCE COSTS.

CORPORATE BACKGROUND

Both IT executives and network professionals face the same problem: the business-network gap, and must overcome the same obstacles: complexity, change, and cost. IT executives want to align IT with business goals, but they can't map their infrastructure investments back up to the business, because existing tools, network complexity and change obscure the business-network linkage. Network professionals want to know what's going on across their network in terms of business impact so they can efficiently prioritize their response to issues, but find it hard to drill down to the infrastructure to find out what to fix and where to fix it or understand how a device problem impacts business users, services, and applications.

Existing solutions are little help. Application response time tools can profile the performance of critical applications, whose importance to the business is known, but they can't map down to the physical infrastructure, most importantly the network itself, and the underlying cause of problems. Device-based service management tools can reveal hard failures in

the underlying infrastructure, but can't dynamically map device faults back up to their impact on the business. Managers must not only create the device mappings that encode business meaning, but re-create them every time the network changes, a practical impossibility.

Network Physics overcomes the business-network gap with the Business-Network Integration Engine, the heart of the company's network management software and the NP-2000 appliance that hosts it. The Business-Network Integration Engine dynamically links the business and the network, enabling network management at a business level while maintaining drilldowns to the physical infrastructure through both dynamically built and user-created links that automatically adapt to failures or changes in the underlying physical devices. The Network Physics solution delivers business-level visibility across any network regardless of complexity, cost-effectively managing network performance and utilization, faults, flow security, and network accounting, while adapting dynamically as the network changes.

Overcomes Complexity: Simple and Scaleable. The NP technology scales to support the largest and most complex networks. A single appliance delivers a detailed, real-time view of performance, utilization, route quality, end-to-end application performance, and end-user experience, across all network connections—LAN, WAN, VPN, MPLS, Internet, and third-party—without the need for agents, synthetic transactions, RMON probes, or access to network element data such as SNMP.

Overcomes Change: Adapts Automatically. The Business-Network Integration Engine at the heart of the NP-2000 enables managers to easily encode business relationships, entities, and applications as sets of IP addresses and ports (Business Groups, Group-to-Group Links, Applications, and Conversations), creating adaptive links between the business and the network that persist through changes in the devices supporting the flow. This yields more effective planning and management of network transitions by maintaining business service visibility from start to finish.

Reduces Costs: Integrates and Consolidates. By correlating data that formerly was available only from disparate management systems and automating its analysis, the NP-2000 reduces costs by accelerating problem resolution, eliminating IT fingerpointing by integrating management silos, and consolidating or eliminating management systems.

As the company name implies, Network Physics was founded on a vision of the network, not as a huge collection of devices, links, packets, and queues, but as a physical system governed by a small number of fundamental principles. Guided by an experienced executive team and backed by boards of advisors that include two Nobel laureates and industry luminaries, the company has assembled a stellar team of network engineers, software developers, and physicists expert in the analysis and control of complex systems. Network Physics was founded in March 1999 and its products are currently being deployed at Global 2000 firms, including two of the top 10 international banks.

CIO Challenges—Complexity, Change, and Cost

Enterprise CIOs today face three fundamental challenges as they attempt to align the business and the network: complexity, change, and cost—but their present network management tools fail on all three counts.

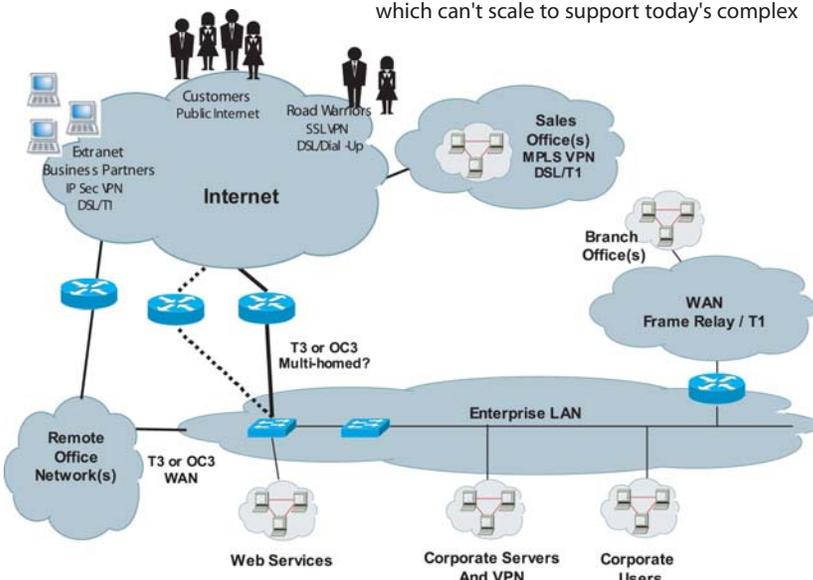
Challenge: Complexity. Thanks to the transition to IP, the network their business depends on—the New Business Ecosystem—has become too complex for a traditional, "bottom-up" management approach, which can't scale to support today's complex

networks. Trying to synthesize an overview of a large network from the data supplied by thousands of devices—RMON probes, SNMP, agents, and the like—is an intractable problem. Worse, many parts of the network can't supply element data because they belong to third parties—a service provider, business partner, or customer—making management difficult or impossible.

Challenge: Change. Reliance on specific device data makes it difficult to manage the changes needed to provide new services and keep up with dynamic business priorities. Physical changes in the network require extensive reprogramming to restore business relevance, making it difficult or impossible to maintain visibility of business services through network changes, migrations, moves, and new initiatives.

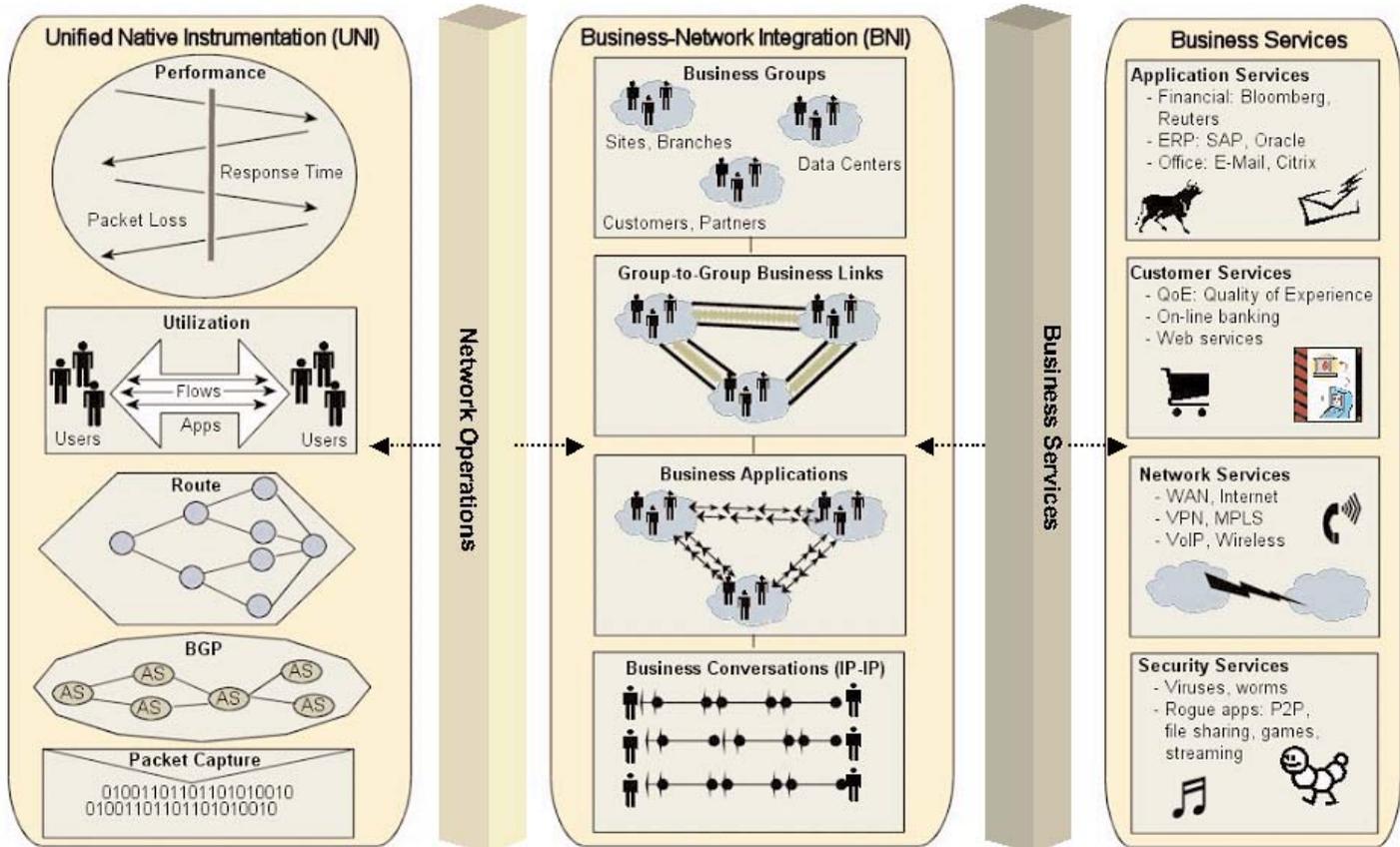
Challenge: Cost. With a device-based approach, new technologies and services generally require new management systems. Point tools proliferate, effective troubleshooting becomes more difficult as network staff must correlate data across many management silos, and IT fingerpointing becomes rampant.

The New Business Ecosystem



Meeting the Challenges—A New Approach

As its name implies, Network Physics was founded by physicists, whose approach to complexity often involves finding some common principle that explains the behavior of apparently disparate disciplines or domains. Seen through a physicist's eyes, the network flow is the common principle that unifies the business and the network, and enables that unity to persist through changes in the physical infrastructure. This understanding is the foundation of the Network Physics software and appliance.



Go with the Flow

A flow is an end-to-end TCP or UDP conversation, across any IP network type, between two business entities, a resource provider and a resource user, whose conversation or transaction supports a business relationship. The flow thus maps naturally to both the network and the business, offering a simple way to integrate the two in even the most complex and dynamic networks.

Aligning the Network and the Business

The nature of TCP/IP is that these flows, the applications they represent, and the business entities communicating can be uniquely identified by a combination of IP address and port number. The Network Physics Business-Network Integration Engine enables managers to easily encode business relationships, entities, and applications as sets of IP addresses and ports (Business Groups, Group-to-Group Links, Applications, and Conversations), creating adaptive links between the business and the network that persist through changes in the devices supporting the flow.

Overcoming Complexity and Change

Because the flow is an end-to-end phenomenon, simply and naturally correlating the activity of all the devices that support it, the flow-based Network Physics appliance easily scales to any size network. Because it is independent of the underlying devices or network type, it maintains full visibility of network operations even during major network transformations and offers visibility into networks from which device data is not available. And, since flows can be monitored non-invasively via spanning port or tap, the appliance installs quickly with no network impact.

Discovering the Network

The Unified Native Instrumentation underlying the Business Network Integration Engine actually gathers five fundamental types of network metrics that require disparate collectors in competing network management systems: performance, utilization, route, BGP, and packet-level data. This enables the Network Physics system to not only display these metrics in terms of their business impact using Groups and Applications, but to correlate them to identify

fundamental network behaviors and alert users to deviations from them without programming, based on sophisticated analytic, statistical, and correlative algorithms. This is particularly useful for security-related issues, since anomaly detection depends, not on pre-programmed signatures, but fundamental network behaviors that are universal to various types of security violations.

Keeping It Manageable

But flow-based management is only half the solution, for a large enterprise network can easily produce over a terabit/hour of flow data, a quantity which cannot practically be either stored or analyzed. This, too, is a problem familiar to physicists, especially in the field of high-energy physics research, where experiments like the BABAR project at the Stanford Linear Accelerator Center (SLAC) can generate hundreds of terabytes a day of data. The Network Physics software uses techniques adapted from this research to intelligently aggregate the flood of data from a large enterprise network based on the business significance of each flow, reducing it to manageable proportions while maintaining its usefulness and business relevance.

Product & Technology—The NP-2000

The NP-2000 is a flow-based appliance for the management of business services across the largest and most complex networks. It can be installed in less than an hour via spanning port or fiber or copper tap on a network switch, imposing no burden on the network; and adapts automatically to network changes, maintaining business service visibility through network transitions from start to finish. The NP-2000's unified view of data formerly available only from disparate management systems—performance, utilization, route quality, end-to-end application performance, and end-user experience—reduces costs by accelerating problem resolution, eliminating IT fingerpointing, and consolidating or eliminating management systems.

The NP-2000 appliance is built on the NP Architecture, a robust, extensible platform capable of supporting multiple applications including performance and utilization management, flow security management, accounting, and more. Its Business Network Integration engine creates a dynamic linkage between the business and the network that helps CIOs manage at a business level and gives network professionals a business-relevant drill-down from network issues to physical infrastructure. The Engine allows managers to assign groups of flows, identified by their IP addresses and ports, to Business Groups, representing key business entities (e.g., business groups, offices, users, customers, data centers, server farms, etc.); Inter-Group Links, representing the networks between Groups; and Applications.



The Engine uses these business-level definitions to create the data collection policies for the underlying high-speed data acquisition engine, enabling it to synthesize a unified view of network operations. By biasing data collection towards the data most critical to the business, the NP Architecture overcomes complexity by reducing the flood of data to manageable proportions while preserving its business relevance at all scales of observation, from the highest business entities to the packet level.

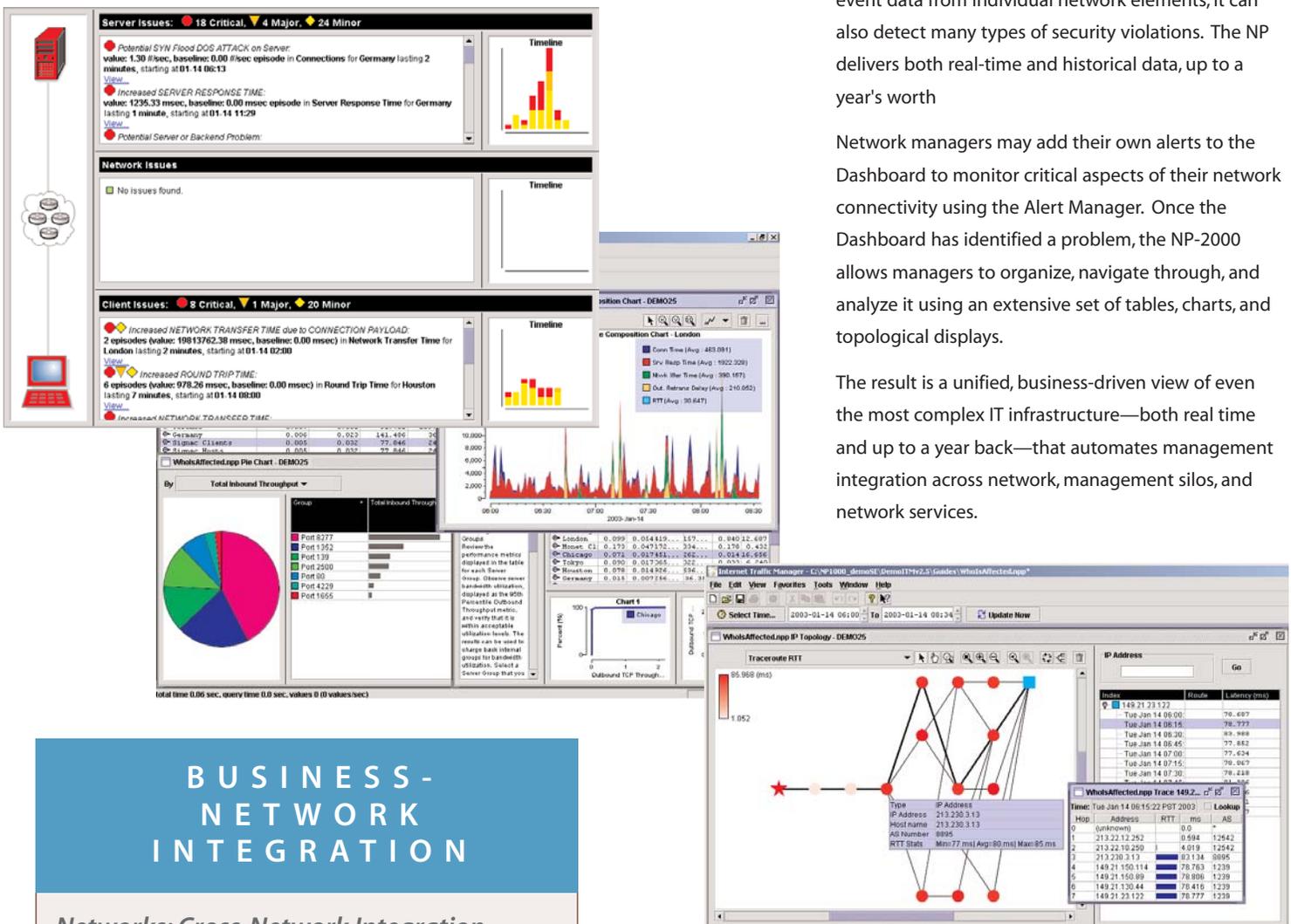
The result of this business-network integration is actionable visibility, from a business level—business services, application services, network services, overlay services—down to the infrastructure level: which user, server, application, hop, device, port, or client. The CIO can see clearly the impact of changes on key services,

while network professionals can easily prioritize their response to problems, and quickly drill-down to the source of critical issues.

The Management Console of the NP appliance features a Problem Management Dashboard that applies sophisticated pattern analysis to enable network managers to deal efficiently with the amount of data generated by the extended, hybrid networks characteristic of Global 2000 enterprises. It uses automatic baselining, data correlation, anomaly detection, and various types of automated actions to automatically alert network managers to significant network behaviors and events and to prioritize their actions in line with the business impact of network problems. No programming is necessary, and, since the NP appliance looks at system behavior rather than event data from individual network elements, it can also detect many types of security violations. The NP delivers both real-time and historical data, up to a year's worth

Network managers may add their own alerts to the Dashboard to monitor critical aspects of their network connectivity using the Alert Manager. Once the Dashboard has identified a problem, the NP-2000 allows managers to organize, navigate through, and analyze it using an extensive set of tables, charts, and topological displays.

The result is a unified, business-driven view of even the most complex IT infrastructure—both real time and up to a year back—that automates management integration across network, management silos, and network services.



BUSINESS-NETWORK INTEGRATION

Networks: Cross-Network Integration

- > WAN, Internet, VPN, MPLS, extranets

Management Silos: Cross-Silo Integration

- > Network, Server, Application, Desktop

Network Services: Cross-Service Integration

- > Data, VoIP, Frame, Wireless, Video

BENEFITS

Manages Complexity

- > Manage the most complex networks from a business perspective: any combination of WAN, Internet, VPN, LAN, and third-party
- > Manage performance, utilization, route quality, end-to-end application performance, and end-user experience from a single appliance
- > Easily see the impact of current and future network operations on critical business initiatives

Adapts Automatically to Change

- > Maintain business service visibility throughout network changes, moves, and migrations, start to finish
- > Respond more quickly to business needs and initiatives
- > Avoid buying new management systems for new network initiatives (e.g. VoIP, wireless)

Reduces Costs

- > Accelerate problem resolution, resolve nagging but hidden network issues, uncover rogue traffic (e.g., P2P, virus, security, gaming)
- > Immediately identify who's affected—users, branch offices, customers, partners, business services—and business impact
- > Eliminate IT fingerpointing, enable collaboration across management silos/teams
- > Consolidate or eliminate management systems: no RMON probes, agents, SNMP feeds, or synthetic transactions needed

Management

David Jones, President & CEO. Mr. Jones has been instrumental in the development of a number of early-stage, venture-funded companies that culminated in successful acquisitions within their industry. Immediately prior to Network Physics, Mr. Jones was President & CEO of Ambrent, a venture-funded startup providing a network appliance to address the problems inherent in delivering video and audio content over the Internet. As General Manager of Cisco Systems Communications Software Division, Mr. Jones was responsible for defining and delivering the service and management infrastructure for the Service Provider line of business.

Tom Dunn, Vice President, Sales & Business Development. Mr. Dunn bring over 20 years of enterprise sales and sales management experience at leading software companies where he was responsible for direct sales, channel sales, strategic system integrator relationships, pre/post sales support and consulting including Tivoli Systems (a division of IBM), Sybase and Ingres.

Bob Quillin, Vice President, Marketing. Bob Quillin brings over 20 years of networking and network management experience to Network Physics. Most recently, he was Vice President of Marketing at Manage.com, and previously the founding Vice President of Marketing at Packeteer.

Tom Pavel, Chief Architect. Tom Pavel received B.S. degrees in physics and mathematics from Massachusetts Institute of Technology and a Ph.D. in physics from Stanford University. After receiving his degree, he worked on design, procurement, and operation of data acquisition, computing, and networking systems for the BaBar experiment at the Stanford Linear Accelerator Center (SLAC).

Dr. Minh Duong-van, company co-founder and Chief Scientist. Dr. Duong-van has been working in the field of chaos for 30 years at Cornell University, Stanford University, Los Alamos National Laboratory, and Lawrence Livermore National Laboratory. Dr. Duong-van is the world leader in chaos control, being the first scientist to develop a theoretical framework for controlling chaos and proving it in a number of domains.

Technical Advisory Board

The Network Physics Technical Advisory Board includes experts in the management of scientific research and leaders from major networking companies, joined by two Nobel Laureates:

Dr. Murray Gell-Mann is the recipient of the Nobel Prize in 1969 for the discovery of the quark and founder of the Santa Fe Institute.

Dr. Martin L. Perl is the recipient in 1995 of the Nobel Prize in Physics for pioneering experimental contributions to lepton physics, which also gained him the Wolf Prize in 1982.

Dr. Rich Pelavin is Director of the Intelligent Network Business Unit at Cisco Systems.

Dr. John H. Nuckolls, currently the Director Emeritus of Lawrence Livermore National Labs, has received the E.O. Lawrence award and the James Clerk Maxwell award for his research on inertial confined fusion.

Dr. Richard Blankenbecler is a highly regarded physicist specializing in algorithmic science and is the former Head of Theoretical Physics at Stanford University.

Business Advisory Board

The Network Physics Business Advisory Board consists of five industry veterans who collectively share more than 100 years of experience in leading private, start-up companies to become industry leaders in the public market.

Betsy Atkins is a founder and former vice president of Ascend Communications. Ms. Atkins served as president and CEO of NCI, Inc. from 1990 to 1993. She was a founder and director of Ascend Communications Corporation, and from 1989 to 1990, she was vice president of Marketing and Sales. Ms. Atkins serves as a director of Polycom; Olympic Steel, Inc.; Selectica Corporation; and a number of private companies. Ms. Atkins is also a corporate governance expert. In 2001, U.S. President George W. Bush selected Ms. Atkins to serve on the federal Pension Benefit Guaranty Corporation (PBGC) Advisory Committee.

Anson Chen is the vice president and general manager of Cisco's Network Management and Services Group, which is responsible for driving Cisco's Internet OSS architecture, products, solutions and partnerships. In his 11-year tenure at Cisco, Mr. Chen has built and led world-class teams in IOS systems, protocol software, plug-n-play CPE deployment, identity-based subscriber management systems, and provisioning and management systems for VPNs and cable networks. Prior to Cisco, he was part of a team that built VISA's global financial networking infrastructure. Mr. Chen also played lead engineering roles in Unix networking software development at Convergent Technologies/Unisys.

Marco Landi is currently president of Atlantis Venture. Prior to that, Mr. Landi was CEO of NavLink Inc. At BMC, Landi served as president of BMC Europe, Middle

East and Africa, as well as a senior vice president of BMC from January 1998 until March 2000. Mr. Landi was also Chief Operating Officer of Apple Computer Inc, based in Cupertino, California. He first joined Apple as president of its European Operations, after a 25-year tenure with Texas Instruments. At TI, he held a variety of national and international marketing and management positions, as well as president and general manager of TI Europe.

Bo Hedfors brings 35 years of global telecom experience in both wireline and wireless. He is currently president of Hedfone Consulting. Previously, Mr. Hedfors was executive vice president of Motorola, and president of its global wireless infrastructure business based in Chicago. He came to Motorola in 1998 from Ericsson, where he spent 30 years in different management positions. Among them, Mr. Hedfors served as president of Honeywell Ericsson Development Co. in Anaheim, Calif. from 1984 to 1986; CTO of LM Ericsson in Stockholm, Sweden from 1990 to 1993; and president and CEO of Ericsson, Inc. in Dallas from 1994 to 1998.

James Yee is a seasoned IT executive with more than 25 years of experience in the financial services industry. He is currently leading GBR Partners, which provides consultation, analysis/assessment and the brokering/management of global IT resources for financial services organizations. Previously, Mr. Yee was senior vice president and CIO of the Pacific Exchange in San Francisco. At Bank of America Securities LLC, Mr. Yee served as managing director and CIO. He came to BofA from Stanford University Hospital and Medical Center, where he was CIO. He has also held executive positions at Citibank, PaineWebber Inc. and Chase Manhattan Bank.

Investors

In October 2003, Network Physics closed a venture round of \$8 million in funding, led by Palomar Ventures. All of Network Physics' major venture and corporate investors—Sofinnova Venture Partners,, Vantage Point Venture Partners, Intel Capital, Lucent

Venture Partners, AIG SunAmerica, and Infovista, leading vendor of performance management solutions, participated in this new round, bringing total investment in the company to \$40 million.



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