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# ADSL FORUM Annual Report 1999



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## From ADSL to DSL — broadening the Forum's scope to address market needs and opportunities for the new millennium

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### INTRODUCTION

The ADSL Forum has completed its fifth full year of operation and 1999 was again a landmark year in the advancement of the Forum's goals. The Board of Directors would like to thank the delegates of our member companies for their contributions to the successful work of the Forum and for their efforts in advancing DSL. As 1999 comes to a close, the initiation of mass-market deployment of DSL has now really begun. In parallel and to reflect the broader scope of our work across the whole of DSL technologies, the Forum's membership agreed to change its name to DSL Forum. The achievements this year within the Forum and evidence of significant mass-market deployment owes much to the efforts of the DSL Forum's membership.

The DSL Forum has achieved significant milestones in the development of DSL as a mainstream technology for high-speed broadband delivery of multimedia, data, entertainment, Internet services and more. As we gather in Paris, France for the Annual Meeting of the DSL Forum on 8 February 2000, we can take pride in our accomplishments, which collectively constitute another series of significant steps toward fulfilling the primary goal of the DSL Forum:

  
"To Drive the Global Mass Market for DSL."  


DSL deployment is accelerating fast in North America, Europe and Asia. Extensive global trials have given impetus to the evolution of end-to-end architectures as defined by the DSL Forum and allowed commercial deployment of DSL services in towns and cities all around the world.

Throughout the past year, the DSL Forum has made significant progress in its technical work to support end-to-end architectures and interoperability. In parallel, the Forum's marketing and public relations programs have increased awareness of DSL among stakeholders in the technology and begun to focus on the important end user audiences. DSL remains the most viable option for promoting virtually ubiquitous delivery of broadband services to the consumer mass market. Media commentators have been reflecting their understanding of our key message in their growing coverage of communications technologies in technical and mainstream print and broadcast media.

This Annual Report provides a summary of our substantive accomplishments in 1999 and highlights some of our plans for 2000.

# ACCOMPLISHMENTS

## DSL FORUM ACCOMPLISHMENTS IN 1999

The DSL Forum is a non-profit industry association working cooperatively to promote DSL. We have forged a powerful alliance of service providers and companies from virtually every sector of communications, networking and computer industries around the world to focus on developing and promoting end-to-end solutions.

Drawing on the enormous collective expertise of our members and joining forces to develop a focused strategy, we have directed significant resources toward the development of end-to-end solutions to deliver DSL technologies to global mass markets. A similar approach to promoting DSL in the media, analyst community, communications industry and full range of user audiences, has been ensuring that DSL gets the recognition it deserves as an affordable, secure and continuous high-speed remote access solution and enabler of e-business and interactive multimedia applications.

Forum meetings, Summits in Washington, DC, Vienna and Hawaii in 1999, trade show exhibits, interoperability testing events and other activities not only keep participants abreast of industry news and technical developments, they provide an essential platform for influencing DSL marketing and technical developments.

Membership is now at 276, partly as a result of numerous industry mergers and acquisitions. We have also added new members among service providers as the market continues to mature and deployment momentum grows with providers deploying commercial services and the application and user markets realize its tremendous potential. Service Providers have joined the Forum in greater numbers than ever before, demonstrating market maturation. Deployment momentum has grown as market potential begins to be realized. More than 15 Auditing members upgraded their membership to Principal or Small Company Principal status in 1999. This was key to getting broad industry consensus for the end-to-end architectures created in the Forum this past year. Voting members increased from 170 to 186 from 1998 to 1999.

Membership at the end of 1999 was as follows:

<b>Principal Members</b>	<b>117</b>
<b>Small Company Principal Members</b>	<b>69</b>
<b>Auditing Members</b>	<b>90</b>

The DSL Forum has a balanced demography of membership represented by Service Providers, Equipment Suppliers and Technology Providers, both domestic and international. This balance leads to confidence that the Forum's work represents a broad and international industry consensus.

## MARKETING

Our integrated marketing communications approach and strategy of the past few years, including a proactive PR program has established the DSL Forum as the primary source of information on matters relating to DSL and broadband access for stakeholders, consumers, media and analysts. In addition, our public relations representatives have generated considerable media coverage of DSL and the Forum. This has been achieved through news releases about our accomplishments, editorial opportunities pursued by working closely with key editors and analysts, arranging interviews and briefings, feature articles authored by Forum directors, trade show media relations and more. One key initiative has been P.R. Unlimited's, the Forum's PR firm, "Hook up America" program. This program has arranged for key American journalists to be 'hooked up' to DSL technology via the DSL Forum, giving them a 'first hand' experience of the benefits of DSL. Our communication strategy is to continuously grow awareness and understanding of DSL among stakeholders and potential users and to reinforce the value of the DSL Forum to industry stakeholders. We have established strong ties with influential analysts and editors while articulating a clear and consistent message to educate them about the relative benefits of DSL over other access technologies. We have also vigorously followed-up and rebutted, when appropriate, negative press reporting on DSL.

**ADSL FORUM MEMBERSHIP GROWTH**

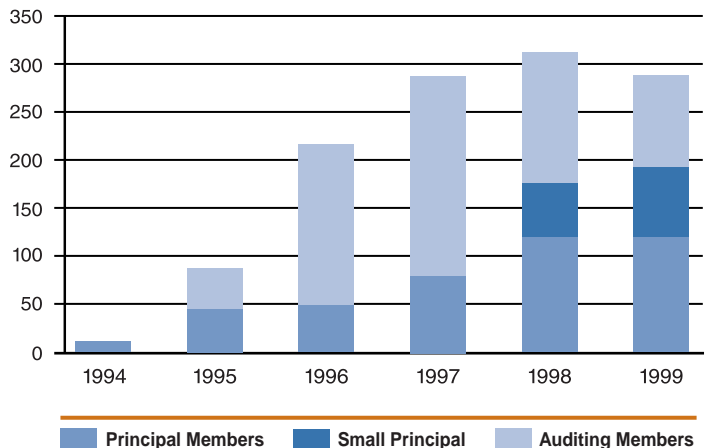


Figure 1 shows the development of the total number of members since the creation of the DSL Forum.

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In 1999, the Forum's public relations representatives expanded their focus to directly address the user community through a wide range of media outlets. Now that DSL services are available through multiple sources, it was appropriate to begin a Consumer Awareness Program to educate and inform potential users of the benefits of DSL. This began with a public relations approach to generate editorial coverage, helping to stimulate market interest and has addressed both residential and business audiences.

The DSL Forum's Ambassador program has been a huge success in 1999. Ambassadors have been speaking at an increasing number of conferences and DSL related events in the US, Europe and Asia/Pacific. The Forum's Ambassadors have been dispatched to speak at conferences and industry events around the globe, explaining the Forum's mission, educating the audience about DSL and building a positive reputation for DSL.

During 1999, three DSL Forum Summits were held. These events provided an excellent platform for updates about DSL developments and discussion of key issues. We held our first 1999 DSL Forum Summit in Washington, DC, providing an opportunity to focus on some of the U.S. regulatory aspects of our industry. The DSL Forum's Summit held in Vienna, Austria, last May gave us a look at the European regulatory environment and in Hawaii in September, we focussed on ISPs and research information.

Trade shows have been a continuing marketing and communication activity. In 1999 the DSL Forum exhibited at CeBit, SuperComm, World Telecom and ISPCon. At SuperComm in Atlanta in June, more than 30 leading Forum member companies demonstrated products and services based on a newly formed industry standard for a consumer flavor of high-speed Internet access called G.lite ADSL. The Universal ADSL Working Group (UAWG), a consortium of industry leading PC, networking and telecommunications companies, organized this event with the Forum. Its achieved objective was to demonstrate that products and services based on the G.lite ADSL specification inter-operate with one another – a key milestone for the broad deployment of ADSL services to the consumer market. The UAWG also announced at that time that it was transitioning future development of the G.lite specifications, and their contributions to the standards process, to the DSL Forum. Each trade show provided an opportunity to reach members and prospective members, ISPs, ASPs, media and market commentators, to educate them about DSL and generate significant editorial coverage and briefings. 2000 promises to be an even more exciting year for the marketing work of the Forum with trade show participation planned at the International Consumer Electronics Show, CeBit, DSLCon and SuperComm. The SuperComm event will again be a

multi-vendor program. The focus will be DSL interoperability and its importance in accelerating the deployment of DSL.

The DSL Forum's Website is another major method of disseminating key information about DSL. It is a valuable resource for anyone interested in DSL, drawing 40,000+ hits a month from editors, analysts, industry observers and increasingly, the end user audience from businesses to the general public. A major update of our Forum Website began during the last month of 1999 and will continue throughout the early part of 2000. The "Members Only" section has developed into a highly useful working tool for all members with automated facilities for registering contributions and archiving important documents. As part of our name change, the new address for the Forum Website will be <http://www.dslforum.org>.

In 1999 we established a new users' WebSite called DSLLife.com (<http://www.dsllife.com>). The content of much of this site is under continuous development. As we go to print, it already provides information about many important services to potential DSL users including basic education on DSL and its benefits, referral to services available in the user's area and multimedia content such as Webcasts of the DSL Forum's press conferences. One of the hottest new areas now up and running on the site is a click-down map that a consumer can use to determine where DSL service is available, worldwide. In 2000, this site will play a big role in educating the consumer and helping to drive mass market growth.

The Forum also formed an alliance with the International Engineering Consortium (IEC) in 1999, to jointly promote DSL technology to the stakeholder marketplace. The organizations together developed and approved a plan to work together on numerous professional marketing and academic educational programs in 2000.

In 1999, the Forum also laid the groundwork for two major consumer targeted marketing initiatives. In January 2000, the Forum will stage a cooperatively funded exhibit at the International Consumer Electronics Show. Also, beginning in early 2000, we have plans for a cooperatively funded advertising campaign targeting consumers and other end-users, initially in the North American market.

## TECHNICAL

During 1999, the DSL Forum's Technical Committee has continued to evolve its work focus and working practices to meet the changing needs of all players in the global DSL industry. The use of the Technical Roadmap to identify work plans, priorities and record progress to date has continued. In addition, 1999 saw the introduction of the use of focus

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groups and workshops to fast track progress on key issues. The Technical Committee has also re-organized its working group structure to adapt to new technological and market developments. The salient aspects of Technical Committee progress in 1999 are highlighted below.

1999 has seen the emergence of Voice over DSL (VoDSL) as a key technological development. The DSL Forum first embraced this technology via a one-day workshop that included tutorials on both the market opportunity and the technical aspects (both voice and DSL related). A task force was then formed to identify how the DSL Forum could best add value and accelerate the development and market adoption of VoDSL. This culminated in the formation of the VoDSL Working Group that has been extremely active in agreeing its scope, organizational structure and soliciting volunteers for key roles. Already the group has produced a techno-marketing white paper, made extremely good progress on a requirements document and is progressing two parallel solutions. One solution comes under the title of BLES – Broadband Loop Emulation Services - and the other is Multi-Service Data Networks (VoMSDN). These have synergies with the use of VoATM and VoIP respectively.

The ATM Architecture group has made good progress on both core network and customer premises architecture options. In 1999 the DSL Forum membership agreed that standards compliant DMT modulation and an ATM link layer are preferred for ADSL. Work is continuing in the architecture group to examine evolutionary addition of capabilities as we move towards the multi-service era of ADSL.

The UAWG and the DSL Forum jointly organized and promoted the demonstration of DSL-lite interoperability at SuperComm in June 1999. Following this event the UAWG invoked its sunset clause handing over further work on DSL-lite interoperability issues to the DSL Forum. The majority of the technical work fell to the Testing & Interoperability WG. It soon became apparent that the T&I WG was assigned two almost orthogonal types of work. The first was the careful and meticulous development of working texts, which requires attention to detail and due process. The second was to provide the technical direction to the interoperability events, which requires a keen focus on technical program delivery by a target date. It was therefore decided to introduce some parallel working via an Interop sub-group to address plugfest type activities. This ad-hoc group includes vendors planning to participate in the interoperability events and planning the technical focus of the plugfest/staging events. This group has successfully organized a number of plugfests in 1999 including one that was attended by 48 vendors. During 1999 the Testing and Interoperability WG also produced an RFI for a test house that will provide a single focus for DSL testing activity during 2000.

The Operations and Network Management groups completed the tasks originally assigned to them and then began to re-focus jointly on new challenges. Hence these two distinct Working Groups (WG) were merged. The CPE & CO Configurations and Interfaces WG also completed its tasks during 1999 and were subsequently halted. The ATM Transport sub-group completed its tasks and was put on temporary hold until the number of new transport issues (e.g. arising from VoDSL work etc.) reach critical mass to justify further work. This group will be re-launched in 2000.

The final organizational change to the Technical Committee in 1999 was the formation of the SymDSL WG. This was spawned from the Emerging DSLs Study Group, with a view of providing a focus for work on SymDSL. The intent is to re-use as much of the Forum's work on ADSL architectures and protocols as possible in order to maximize synergies between ADSL, SymDSL and the systems level (where the market dictates this is appropriate).

The DSL Forum's Technical Committee finished 1999 with the following Working Group structure:

1. ATM over ADSL (including end-to-end architecture and transport aspects)
2. Voice over DSL (VoDSL)
3. Operations & Network Management
4. Testing and Interoperability
5. Symmetrical DSLs
6. Support to the Emerging DSLs Study Group (inc. VDSL) – joint with marketing

The Working Groups continued to complete their work on technical recommendations at an impressive rate. During 1999 the following TRs were completed and published on the Forum Website:

#### **[By Washington DC Meeting \(March 2, 1999\)](#)**

TR-013: Interface & Configurations for ADSL - WT-018v5

TR-014: DMT Line Code Specific MIB - WT-022v4

TR-015: CAP Line Code Specific MIB - WT-023v4

TR-016: CMIP-based Network Management Framework - WT-025v4

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### By Vienna (May 25, 1999)

- TR-017: ATM over ADSL Recommendation - (TR-002 Issue 2)
- TR-018: References and Requirements for CPE Architectures for Data Access WT-031v3
- TR-019: ADSL Forum Recommendation for Physical Layer of ADSLs with a Splitter - PR-001
- TR-020: ADSL Forum Recommendation for Physical Layer of ADSLs without a Splitter - PR-002
- TR-021: ADSL Forum Recommendation for ATM layer of ADSLs - PR-003

### By Hawaii (August 31, 1999)

- TR-022: The Operation of ADSL-based Networks - WT-026v6
- TR-023: Overview of ADSL Testing - WT-027v5
- TR-024: DMT Line Code Specific MIB - WT-036v2

### By Montreux (Nov. 16, 1999)

- TR-025: Core Network Architecture for Access to Legacy Data Network over ADSL - WT-033v5
- TR-026: T1.413 Issue2, ATM-based ADSL ICS - WT-034v5
- TR-027: SNMP-based ADSL LINE MIB - WT-037v3

### By end of year (Dec. 1999)

- TR-028: Updated CMIP Specification for ADSL Element Management -WT-038v1

1999 saw the DSL Forum make its first use of workshops to address key issues. The first of these was held in Washington in March. This one-day workshop covered ADSL operations and network management. 210 people attended it, over 100 of who were from service providers (RBOCs, CLECs and ISPs). The focus was provisioning, fault management and element management aspects of ADSL. This gave a significant insight into real-world experiences and challenges being faced by telcos as they have moved from trials into ADSL "business as usual" operation. The Forum's meeting in Vienna was also preceded by a one-day workshop, this time the topic was Voice over DSL. 170 people attended this workshop.

The structure of the DSL Forum's Technical Committee and the competence-based divisional structure of a commercial company contain an analogy. It is not productive to re-organize every time a new technology development or challenge occurs. Some issues are best dealt with by a cross-organizational task force; much like a temporary project team. This task force and cross Working Group approach to progressing key issues

has been successfully adopted in 1999. An example is the work on CPE management and auto-configuration that is a joint effort between the Operations & Network Management WG and the ATM WG. This joint WG will develop requirements and candidate designs. The topic was the subject of a BoF session followed by an extended one-day working session to accelerate progress. The outcome of such task forces can then be critiqued by the rest of the Technical Committee to expedite progress of ideas and discussions into an agreed draft working text. Another area in which the task force approach has been used is that of service provider management interoperability to address provisioning and fault management flow through between service and network providers. Both of the aforementioned task forces have had active E-mail debates about their own subject through specific exploders and have organized additional one-day face to face meetings between regularly scheduled quarterly Forum meetings.

In 1999, the Technical Committee chairs spent more time planning the meeting agenda and preparing the contribution allocation in advance. This has greatly improved the meeting for many members, helping them to be in the right room at the right time for the topics of interest to them. 1999 has also seen a huge increase in the number of other bodies that want to liaise with the DSL Forum, hence the number of liaisons that need to be addressed at each meeting. This has now reached a point where the current process has become too cumbersome and time consuming, so the Technical Committee is seeking to make improvements in this process area as we enter 2000.

The leadership of the Technical Committee held a one-day strategy workshop at the end of 1999 to review the technical and market developments that would impact the work of the Technical Committee as the DSL Forum enters the new millennium. The priorities, organizational structure and processes used by the Technical Committee were also reviewed.

## POSITION & OUTLOOK

With the name change approved by the DSL Forum members in November, we signal that our scope of work has widened significantly during 1999 as a result of both the incorporation of the work of the former UAWG into the DSL Forum and the intensification of the work on SDSL.

The DSL Forum is recognized by an ever-increasing number of standardization bodies and industry organizations and maintains formal relationships with many of them to expedite progress across the industry. Media, largely as a result of the work of the Marketing Committee, now recognize the DSL Forum as the authority on broadband access in general

and of course on DSL in particular, but also on many other matters related to broadband communication business.

Politicians and regulators on both sides of the Atlantic are interested in the DSL Forum's views of the developing regulatory environment and have repeatedly communicated with us – as well as presenting to us at our Summit meetings.

The important work on DSL interoperability, CPE auto-configuration and service provider flow through operations will continue. In addition issues such as DSL security and the impact of IP QoS and MPLS developments will need consideration. SymDSL and VDSL will also gain in prominence. The delivery of multiple services simultaneously over DSL together with service provider selection issues will also gain in significance. It is clear that there are numerous challenges ahead that provide opportunities for members to get involved in interesting "21<sup>st</sup> century" leading-edge technical and marketing work!

Following initial steps in 1999, marketing and public relations work will continue to shift its focus gradually towards the consumer. In parallel, the team will ensure that all stakeholders in this industry, as well as analysts and media, are kept well informed on what is going on in the DSL world in an unbiased and professional way. The planned Mindshare Campaign and the Consumer Electronics Show are but two examples of this. With DSL now having entered the mass-market paradigm, marketing and PR will face new challenges for which the Marketing Committee is well prepared.

It is the view of the Board of Directors of the DSL Forum that the first year of the new millennium will again be one of formidable challenges and significant opportunities. Managing expectations of DSL among stakeholders and end users around the world requires a combination of technical excellence and development with marketing and communication by the Forum and by the industry as a whole.

As the preferred solution for secure, continuous high-speed remote access in the local loop, DSL technologies are well positioned to win new converts in the years ahead. We look forward to your continuing participation and support as we usher in an exciting future.

## ORGANIZATION DSL FORUM ORGANIZATION

By drawing upon the tremendous collective expertise of our members and joining forces to develop a focused strategy, the DSL Forum can direct significant resources toward the development of end-to-end solutions.

### Membership Classes of the DSL Forum

#### **Principal Members**

(full rights and membership fee)

#### **Small Company Principal Members**

(full rights and reduced fee)

#### **Auditing Members**

(no voting rights, no right to nominate Officers, admission to Plenary Meeting only, full information, reduced fee)

Each year, members elect new officers to the DSL Forum Board of Directors to lead the effort to promote DSL. Board members themselves serve on several internal Board sub-committees to focus on specific areas of management.

#### **Finance & Audit**

#### **Membership & Nominations**

#### **Technical Management**

#### **Marketing Management**

As in previous years, the Board of Directors elected at the Annual Meeting in March held a full-day strategy meeting when they discussed the issues ahead of the Forum and to map out our activity plan to be ready to efficiently drive our work. Among matters related to the technical and marketing work a SWOT analysis was presented and discussed. Valuable conclusions were drawn for the future; the name change was discussed in a similar manner to the widening scope of the Forum's work to incorporate the UAWG work and SDSL; and some guidelines for the future positioning of the DSL Forum were also covered.

As a result, during 1999 the way of working and the organization of the DSL Forum meetings have been gradually changed in order to enable more productive work during and in between meetings.

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The work of the DSL Forum is performed under two main committees, which were headed by the following chairpersons:

**Technical Committee**

Chair: Gavin Young

Vice Chair: Frank van der Putten

**Marketing Committee**

Chair: Dawn Diflumeri-Kelly

Vice Chair: Franz Starnberger

In October 1998 PR Unlimited, Inc. became the Forum's new public relations consultant for the Americas. They and Pielle Consulting, responsible for public relations work on behalf of the Forum in the European and Asia/Pacific regions, continued their high impact activities throughout 1999 and into 2000. In May 1999 the Board retained the services of Mark Meudt as marketing consultant, to provide support in all areas of strategic planning, marketing communications and public relations.



The Technical Committee is subdivided into a series of sub-committees or working groups that focus on specific areas to facilitate and expedite the technical work of the Forum.

The Technical Committee structure changed during 1999:

**ATM over ADSL**

**Voice over DSL**

**Operations & Network Management**

**Testing & Interoperability**

**Symmetrical DSLs**



Additionally the Forum recently created an "Emerging DSLs Study Group" that bridges both the Technical and Marketing Committees.

The Marketing Committee also is subdivided into task-oriented groups which focus on increasing awareness of DSL, educating key audiences about the many key benefits of DSL and winning 'mindshare' in the marketplace for DSL. In 1999, these working groups were:

**Public Relations & Education (renamed Strategic Communication)**

**Ambassador Program**

**Website**

**DSL Forum Summits**

**CES 2000**

**MINDSHARE advertising**

**IEC**

# FINANCIAL REPORT

## DSL FORUM FINANCIAL REPORT

Our auditors, Cote & Company, Certified Public Accountants have reviewed the financial management of the DSL Forum. The following gives an overview over the key financial figures and indicators of the DSL Forum.

### Statement of Unrestricted Revenues, Expenses & Change in Membership Equity

December 31	1999	1998
<b>Unrestricted Revenues:</b>		
Membership Fees	\$1,132,500	\$942,000
Meeting Observer Fees	\$205,100	\$182,395
Sponsorship Revenues	\$56,431	\$147,000
Interest	\$16,655	\$32,322
CDA Donation	—	\$12,000
Dividend income	\$4,013	\$111
Realized gains on investment sales	\$23,294	\$3,997
Unrealized gains on investments	\$5,954	\$3,604
Other	\$10,881	\$13,616
	<b>\$1,454,828</b>	<b>\$1,337,045</b>
<b>Unrestricted Expenses:</b>		
Management Fees	\$379,225	\$287,557
Sales & Marketing	\$337,413	\$167,695
Consulting & Professional Fees	\$115,305	\$83,510
Meetings & Trade Shows	\$405,370	\$392,846
General & Administrative	\$258,308	\$44,593
	<b>\$1,495,621</b>	<b>\$976,201</b>
Increase in Unrestricted Membership Equity	\$40,793	\$360,844
Unrestricted Membership Equity, January 1st	\$849,878	\$489,034
Unrestricted Membership Equity, December 31st	<b>\$809,085</b>	<b>\$849,878</b>

### Statement of Financial Position

December 31	1999	1998
<b>Assets</b>		
<b>Cash &amp; Investment</b>	\$ 1,085,010	\$921,890
<b>Prepaid Expenses</b>	\$550,429	\$5785
<b>Total Assets</b>	<b>\$1,635,439</b>	<b>\$927,675</b>
<b>Liabilities &amp; Membership Equity</b>		
<b>Liabilities:</b>		
Accounts Payable	\$143,821	\$54,297
Deferred Membership Fee Revenue	\$744,000	\$23,500
<b>Total Liabilities</b>	<b>\$887,821</b>	<b>\$77,797</b>
<b>Membership Equity - Unrestricted</b>	<b>\$747,618</b>	<b>\$849,878</b>
<b>Total Liabilities &amp; Membership Equity</b>	<b>\$1,635,439</b>	<b>\$927,675</b>



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## PRINCIPAL MEMBERSHIP

2Wire  
3Com  
ADC Telecommunications  
ASC  
AT&T Laboratories  
Accelerated Networks  
Admit Design Systems  
Advanced Fibre Communications  
Advanced Micro Devices  
Agilent Technologies  
Alcatel Telecom  
Ameritech  
Analog & Digital Devices  
Analog Devices  
Anda Networks  
Arescom  
Assured Access Technology  
Atlas Communication Engines  
AudioCodes  
Avail Networks  
Aware  
Bandspeed  
Belgacom  
Bell Atlantic  
Bell Canada  
BellSouth Telecommunications  
Bosch Telecom  
British Telecom  
Broadband Technologies  
CS Telecom  
Cable & Wireless  
Cabletron Systems  
Cadence Design Systems  
Catena Technologies  
Cayman Systems  
Celotek  
Centillium Technology  
Chunghwa Telecom Labs  
Cisco Systems  
CommTech Corporation  
Compaq Computer  
Concentric Network  
Conexant  
Conklin Corporation  
Copper Development Association  
Copper Mountain Networks  
CopperCom  
Covad Communications  
DSET Corporation  
Design of Systems on Silicon (DS2)  
Deutsche Telekom AG  
Digicom Systems  
Digi International  
Duet Technologies  
ECI Telecom  
Earthlink  
East by North  
Efficient Networks  
Eicon Technology  
Element 14  
Ericsson  
Fantastic Corporation  
Flashcom  
Fluke Corporation  
France Telecom  
Fujitsu Limited  
GTE Corporation  
General Bandwidth  
Globespan  
Gorham & Partners  
Harris Corporation  
Hekimian  
Hellenic Telecommunications Organization  
Helsinki Telephone Corporation  
Hitachi  
Hyundai Electronics  
i-Beam Broadcasting  
iMagicTV  
INTERSPEED  
IPM Datacom  
ITRI  
Infinitec Communications  
Integral Access  
Integrated Device Technology  
Integrated Telecom Express  
Intel  
Intracom S.A.  
Inverness Systems  
Italtel  
Jato Communications  
Jetstream Communications  
KPN Telecom  
Kenetec  
LG Information & Communications Ltd.  
LSI Logic Corporation  
Lucent Technologies  
MCI Worldcom  
Marconi Communications  
Matsushita Electric Ind. Co.  
Metalink  
Microphase  
Microsoft  
Mitel Corporation  
Motorola Semiconductor  
NEC  
NTT  
National Semiconductor  
Netcom Systems  
Netopia  
Newbridge Networks Corporation  
Next Level Communications  
NightFire Software  
Nokia Networks Oy  
Nortel Networks  
Northpoint Communications  
OKI America  
OpenCon Systems  
Orckit Communications  
PCTEL  
PMC-Sierra Inc.  
PairGain Technologies  
Paradyne  
Philips Multimedia & Network Systems  
GmbH  
Promatory Communications  
Pulse  
Pulsecom  
Radio Shack  
Ramp Networks  
Raychem  
Redback Networks  
Redstone Communications  
Rhythms NetConnections  
Rosun Technologies  
SAGEM  
SBC Technology Resources  
STMicroelectronics  
Samsung Electronics Co.  
Santera Systems  
Secre Composants SA  
Siecor  
Siemens AG  
Silicon Automation Systems  
Silicon Spice  
Sonera Corporation  
Sphere Communications  
Sprint  
Starnet Technologies  
Sumitomo Electric Industries  
Sun Microsystems  
Surf Communication Solutions  
TTC  
Tektronix  
Telcordia (Bellcore)  
Tele Danmark  
TeleChoice  
Telecom Italia  
Telia AB  
Tellabs OY  
Telmax Communications  
Telrad  
Telstra  
Teradyne  
Texas Instruments  
TollBridge Technologies  
Tollgrade Communications  
Toshiba Corp.  
Toucan Systems  
Transcend Access Systems  
Transwitch Corporation  
Turk Telecom  
Turnstone Systems  
Tycho Networks  
UUNET Technologies  
Universal Microelectronics  
VTT Electronics  
ViaGate Technologies  
Virata  
Vitria Technology  
WCI Cable  
WaiLAN Communications  
Westell  
Wind River Systems  
xDSL Networks  
XTSREAMIS plc  
ZILOG  
Zyxel Communications

## AUDITING MEMBERSHIP

3CX  
4i2i  
AKM  
Abocom System  
Aethra  
Ambient Technologies  
Ambit Microsystems  
Aztech Systems  
Basis Communications  
Bintec Communications  
Burr-Brown Corporation  
Cellware GmbH  
C-DOT (Centre for Development of Telematics)  
CIS Industries  
CSI/Suttle Apparatus  
Centre for Wireless Communications  
Coilcraft  
Comtrend  
Consultronics  
Critchley Components  
D-Link  
DTI  
Davicom Semiconductor  
Delphi Delco Electronics  
Delta Products Corporation  
Diamond Multimedia  
E-Tech  
ELSA GmbH  
ESS Technology  
ETRI  
Edgumbe Instruments  
Epigram  
GC International  
Halfdome Systems  
HarmonyCom  
HiQ Networks  
Huawei Technologies  
IIR Limited  
Iceland Telecom  
Interlink  
Jersey Telecoms  
KAPSCH  
Katron Technologies  
Korea Telecom  
LASAT NetworkS  
Matthews Communications  
Midcom  
Mitsubishi Electric  
NEC DO Brasil S.A.  
NeoWave  
Network Equipment Technologies  
Parks S/A Comunicacoes Digitais  
Predictive Systems  
Rad Data Communications  
Rit Technologies  
Ryan-Hankin-Kent  
Schott Corporation  
Scientific Generics  
Silicon Integrated Systems  
Sony Semiconductor Europe  
Superior Telecommunications  
TDK Semiconductor  
tdSoft Communications  
TELEknowledge Group  
TNC (The Networking Company)  
TRACE GmbH  
Tadiran  
Taicom Data Systems Co.  
Tainet Communication System Corporation  
Telamon Corporation  
Telefonica de Espa a  
Telekom Malaysia BHD  
Telenor  
Teles AG  
TeleSoft International  
Telocity  
Telus Advanced Communications  
TeraGen Corporation  
Toko America  
UTStarcom  
University of New Hampshire  
University of Pretoria  
Wandel & Goltermann A.T.E. Systems  
Wind  
Wisecom  
Wong's International  
Xecom  
Xedia Corporation  
Yokogawa Electric Corporation

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## CONCLUSION

The Board of Directors would like to take this opportunity to thank the delegates of our member companies for their continued contributions to the successful work of the Forum and for their efforts in advancing DSL. We also thank them for their confidence in our officers and chairpersons. 1999 was a year of which the Forum and its members can take significant pride.

The DSL Forum has performed its tasks and duties in a very professional and cooperative spirit during 1999. Its Officers have taken great care and made every effort to manage the Forum in the best interests of its members.

Therefore, the Board of Directors proposes to the members present at the Annual Meeting to accept this Annual Report and approve the financial report provided by the Treasurer.

Hans-Erhard Reiter  
Chairman and President

William Rodey  
Vice President and Treasurer

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As of 12/31/99

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