

## Application Integration Market Assessment



*Photograph by Jason Sole*

# IP Circuit Switch Market Strategies and Forecasts, 2001-2006

**On the Mountain of Opportunity that is the IP Enterprise a  
Path has Emerged Leading to the Future of Communication  
Technology**

**WinterGreen Research, Inc.  
Lexington, Massachusetts**

[www.wintergreenresearch.com](http://www.wintergreenresearch.com)

**IP CIRCUIT SWITCH MARKETS,  
Positioning TO PARTICIPATE IN HIGH  
GROWTH Internet Business to Business  
Exchange SEGMENTS  
MARKET STRATEGIES FORECASTS TO  
2006**

**CHECK OUT THESE KEY TOPICS**

*INTEGRATION DRIVES COMMUNICATIONS INDUSTRY RESTRUCTURING*

**IP Market Strategies**

**IP Market Positioning**

**IP Circuit Switch Market Growth Opportunities**

**Flexible Operating Systems**

**Multiple Layers and Applications**

**End to End Solutions**

*IP MARKET FORECASTS*

*WORLDWIDE MARKET SHARES*

*CENTREX SOLUTION*

*INTERCONNECTING CIRCUIT SWITCHES TO IP NETWORK*

*IP LEVERAGES CURRENT LOCAL AREA NETWORKS*

*SERVICE PROVIDER PRODUCTS WITH THE ABILITY TO*

*WORK WITH THE ENTERPRISING CUSTOMER*

*Integration Broker Markets Shares*

*IP Circuit Switch Cross Platform Market Shares*

**REPORT METHODOLOGY**

THIS IS THE FORTY SIXTH REPORT IN A SERIES OF MARKET RESEARCH REPORTS THAT PROVIDE FORECASTS IN COMMUNICATIONS, TELECOMMUNICATIONS, THE INTERNET, COMPUTER, SOFTWARE, AND TELEPHONE EQUIPMENT. THE PROJECT LEADERS TAKE DIRECT RESPONSIBILITY FOR WRITING AND PREPARING EACH REPORT. THEY HAVE SIGNIFICANT EXPERIENCE PREPARING INDUSTRY STUDIES. FORECASTS ARE BASED ON PRIMARY RESEARCH AND PROPRIETARY DATA BASES. FORECASTS REFLECT ANALYSIS OF THE MARKET TRENDS IN THE SEGMENT AND RELATED SEGMENTS. UNIT AND DOLLAR SHIPMENTS ARE ANALYZED THROUGH CONSIDERATION OF DOLLAR VOLUME OF EACH MARKET PARTICIPATION IN THE SEGMENT. MARKET SHARE ANALYSIS INCLUDES CONVERSATIONS WITH MARKETING DIRECTORS, DISTRIBUTORS, LEADING MARKET PARTICIPANTS, AND COMPANIES SEEKING TO DEVELOP MEASURABLE MARKET SHARE. OVER 200 IN DEPTH INTERVIEWS ARE CONDUCTED FOR EACH REPORT WITH A BROAD RANGE OF KEY PARTICIPANTS AND OPINION LEADERS IN THE MARKET SEGMENT.

**APPLICATION INTEGRATION IS CENTRAL TO  
IMPLEMENTATION OF BUSINESS EXCHANGES**

**YOU MUST HAVE THIS STUDY**

## Companies Profiled

**Global Telecommunications  
Networking Industry  
Alcatel  
Avici  
Cisco Systems  
Fujitsu Network  
Communications**

**Lucent  
Ortel Corporation  
Spring Tide Networks  
Marconi PLC  
NEC Corporation  
Nortel  
Siemens**

### APPLICATION INTEGRATION EXECUTIVE SUMMARY

Summary Application Integration Industry	Robust Integration Systems	
Segment Market Shares	Market Driving Forces	1
(AI) Integration Broker Industry Summary Market	Application Integration Market Shares	
Forecasts	Types of Application Integration Brokers	5
Summary Application Integration Industry		
Market Segments		5

### IP CIRCUIT SWITCH MARKET DESCRIPTION

1.1 Business Services Product	1.16.2 Convergence Of Voice And Data-1	
1.1.1 Expanding Carrier IP Services To Business Customers	Signals 1-20	
1.2 Communication Servers	1.16.3 Existing Public Network 1-2	
1.2.1 Data-Focused Softswitch	Transmission Infrastructure 1-3	
1.3 Softswitch Functions	1.16.4 Network Primary Components 1-4	
1.4 Metropolitan Access Networks	1.16.5 Network Imbedded Intelligence 1-5	
1.5 Core Networks	1.16.6 IP Sonet and DWDM Systems 1-5	
1.5.1 Long-Haul Network	1.16.7 SONET Obsolescence 1-6	
1.5.2 Long-Haul Bandwidth	1.17 Fiber To The Last Mile 1-7	
1.5.3 New Network Dynamics	1.18 Seamless All-IP Network Issues 1-8	
1.5.4 Bandwidth Provisioned To Users	1.18.1 Quality Of Service (QoS) 1-9	
1.5.5 Service Network (OSN) Solutions	Functions 1-28 1-10	
1.6 Consolidated Solutions	1.18.2 QoS Different Levels Of Global-10	
1.7 Product Development	Service 1-29 1-10	
1.8 Growing Demand For Broadband Telecommunications	1.18.3 Access Networks 1-11	
1.9 Total System Solutions	1.19 IP Internet	
1.10 Global Manufacturing	1.19.1 Packet-Based Multi-Service 1-12	
1.11 Product Innovation	Networks 1-31 1-13	
1.12 T1/E1 Access	1.19.2 Second Wave Of Fiber Build-Out 1-13	
1.13 Geographic Networks	1.20 Growth of IP Networking 1-14	
1.14 Improved Networks	1.20.1 Almost Limitless Bandwidth 1-15	
1.15 Bringing Products To Market	1.21 Motive To Develop IP Switching 1-16	
1.16 Industry Background	1.22 Application Service Provider 1-18	
1.16.1 Increase In Data Traffic On The Public Network 1-20	Provisioning 1-35 1-19	
	1.22.1 Application Availability 1-19	

**INTERNET PROTOCOL CIRCUIT SWITCHING**

2.1	Telecommunications Market Driving Forces	2-1	2.8	Vendor Strategy	
2.2	Rapid Change		2.9	Carrier Equipment Market Shares	
2.3	Growth Opportunities		2.10	Circuit Switch Market Shares	2-2
2.4	Market Dynamics		2.11	Circuit Switch Market Forecasts	2-3
2.5	Carrier Competitive Forces		2.12	Market Assessment - Carrier Needs	2-4
2.6	Carrier Customer Demands		2.13	Network Efficiency	2-5
2.7	Multiservice Switch-Based Gateways		2.14	Integrate IP Routing Equipment And Optical Transport Gear	2-8 2-10

**IP CIRCUIT SWITCH PRODUCTS**

3.1	Core Circuit Switches		3.4.5	Simplified Open Systems Management	3-1 3-36
3.1.1	IP Network Circuit Switching Systems	3-2	3.4.6	Siemens Softswitch for Converged Voice and Data Networks	
3.2	IP Business Services Solution Product Positioning	3-3	3.4.7	Softswitch Service and Control Platform	3-38
3.2.1	Benefits Of Flexible, All-Switched Infrastructure	3-4	3.4.8	Supports Migration To Converged Networks Without Continued Investment in Legacy Systems	3-7
3.2.2	All-Switched Infrastructure		3.4.9	Products in the Siemens softswitch portfolio	3-40
3.2.3	Constraints of Metro Legacy Architectures	3-8	3.5	Nortel	3-41
3.3	Lucent Systems		3.5.1	Succession Solutions	3-10
3.3.1	Lucent Internet Protocol Business Calling Services Equipment		3.5.2	Scalable System	
3.3.2	Lucent 7R/E IP Business Services Product	3-10	3.5.3	Nortel Networks' End-To-End IP architecture	3-44
3.3.3	IP Business Services Solution Expands Carrier Services To Business Customers	3-11	3.5.4	Nortel Class of Broadband Remote Access Servers (B-RAS)	
3.3.4	Revitalization of Centrex		3.5.5	Nortel Networks Multiservice Switch-Based Gateways	3-13 3-14
3.3.5	Lucent Core Switching Solutions		3.5.6	Nortel Passport Multiservice WAN Switches	3-46
3.3.6	Lucent Wavestar™ LambdaRouter		3.6	Alcatel	3-47
3.3.7	Motive To Develop Optical Switching	3-20	3.6.1	Alcatel 1000 Softswitch	3-20
3.3.8	Photonic Switching		3.6.2	Network and Service Management Intelligence	3-49
3.3.9	All-Optical Switching Technologies	3-20	3.6.3	Toll Bypass VoIP/VoATM	
3.3.10	Lucent Remote Switching Solutions	3-21	3.7	Cisco and Ciena	
3.3.11	Remoting Capabilities Of 5ESS @ - 2000 Switch	3-21	3.8	Cisco Intelligent Switching	
3.3.12	7R/E Packet Network Solution		3.8.1	Cisco Open Programmable Switch	
3.3.13	Access Components		3.8.2	Cisco Mixed Environment Gateway	3-23 3-24
3.3.14	Fabric Components		3.8.3	Framework For Cisco OPT	3-24
3.3.15	Feature Servers		3.8.4	Cisco Connection Layer	3-24
3.3.16	Onelink Manager EMS For The 7R/E Switch	3-25	3.8.5	Cisco End-To-End QoS For Voice Traffic	3-61
3.4	Siemens	3-30	3.8.6	Cisco Call-Control Layer	
3.4.1	Siemens SMX		3.8.7	Cisco Service-Control Layer	3-30
3.4.2	Siemens SURPASS and EWSD		3.8.8	Cisco Service Application Layer	3-32
3.4.3	SMX-2100 Tandem Switch		3.8.9	Benefits of Cisco OPT	3-33
3.4.4	SMX-2100 Tandem Switch		3.8.10	Cisco Open Service Interoperability	3-35 3-69

3.8.11	GlobalOpen Packet Telephony	3.9	Ericsson 3-71	3-70
3.8.12	Cisco Advantages	3.10	Marconi Integrated Solutions	3-70
3.8.13	Cisco Setting Internet And ATM Standards	3.10.1	Marconi SDH Photonic Portfolio	3-72

**IP CIRCUIT SWITCH TECHNOLOGY**

4.1	Convergence Of Voice And Data	4.9.3	Multi-Protocol Wavelengths	4-1
4.2	DWDM 4-1	4.10	Logical And Physical Topology Separation	4-16
4.2.1	DWDM Advantages	4.11	Bringing Access Networking To The Optical Domain	4-3
4.3	Fixed Lasers	4.12	Last Mile Bottleneck	4-5
4.4	Service Network (OSN) solutions	4.13	Space Laser For Network Access	4-5
4.5	SONET/SDH Functionality	4.14	Managed IP Optical Internetworking	
4.6	DWDM Technology	4.15	Connecting Internet Backbones	
4.7	IP Advances Over Frame Relay And ATM	4.16	Research Directions	4-6
4.7.1	Frame Relay	4.17	Indium Phosphide	
4.8	ATM 4-7	4.18	Osmine Process	4-9
4.8.1	IP Networks	4.19	Polarization Of Optical Signals	4-10
4.8.2	Multi-Service IP Capabilities	4.20	Tunable Lasers Increase Transmission Capacity	4-22
4.9	Optical Service Network Solutions	4.21	Tunable Lasers Switch Wavelengths	
4.9.1	Bridging The Metro Gap			
4.9.2	Protocol-Independent Native Mode			

**INTERNET CIRCUIT SWITCH COMPANY PROFILES**

5.1	Global Telecommunications Networking Industry 5-1	5.8.1	Marconi Digital Switch	
5.2	Alcatel 5-2	5.8.2	Marconi Strategic Positioning	
5.2.1	Alcatel Revenue	5.8.3	Marconi Optical Product Offerings	5-24
5.2.2	Alcatel Market Outlook	5.8.4	Marconi Revenue	5-3
5.2.3	Carrier Networking	5.8.5	Marconi Customers	5-4
5.2.4	Optics	5.8.6	Marconi Acquisitions	5-5
5.2.5	Space & Components	5.8.7	Marconi Divestiture	5-5
5.2.6	Alcatel Optronics	5.9	NEC Corporation	5-6
5.2.7	Alcatel Optronics Revenue	5.9.1	NEC ADSL	5-6
5.2.8	Optical Subsystem Production	5.9.2	NEC / Wind River	5-7
5.3	Avici 5-8	5.9.3	Pricing And Availability	
5.3.1	Avici Products	5.10	Nortel Networks	5-8
5.3.2	Avici Revenue	5.10.1	Nortel Revenue	5-9
5.3.3	Avici Customers	5.10.2	Nortel Reorganization	5-9
5.4	Cisco Systems	5.10.3	Optical Internet With Nortel Network Optical Network Solutions	5-11
5.5	Fujitsu Network Communications	5.10.4	Nortel Networks Customers	5-12
5.6	Fujitsu Network Communications	5.10.5	Nortel Networks Open Optical Dense-Wavelength Division Multiplexing (Dwdm) System	5-35
5.7	Lucent 5-13	5.10.6	IP-Ready Open Optical Interfaces	
5.7.1	Lucent Revenue	5.10.7	Nortel Networks Optical Packet Network Solution	5-37
5.7.2	Revenues By Segment 2001	5.10.8	IP Data Services	5-19
5.7.3	Lucent Technologies Revenue 1997-2000	5.10.9	SONET/SDH	5-19
5.7.4	Ortel Corporation	5.10.10	Optical IP Network Backbones	5-20
5.7.5	Spring Tide Networks	5.10.11	Acquisitions	5-20
5.7.6	Sale Of PBX / Avaya Spinoff	5.10.12	Focus On Solutions	5-22
5.7.7	Sale Of Power Systems			
5.7.8	Bell Labs			
5.8	Marconi PLC			

5.10.13	Customers	5.11.4	Siemens / Efficient Networks	5-40
5.11	Siemens	5.11.5	Efficient Networks' Sales And Worldwide Presence	
5.11.1	Siemens Information And Communication Networks Group (ICN)	5.11.6	Efficient Network Customers	5-41
5.11.2	Siemens Broadband Access XpressLink In Bruchsal	5.11.7	Efficient Networks Key Customers	5-48 5-42
5.11.3	Siemens' Solutions For Broadband Access	5.11.8	Efficient Networks	
		5.11.9	Efficient Networks Revenue	

**MANY OF THESE KEY TOPICS HAVE PHENOMENAL SUBCATEGORIES**

## LIST OF TABLES AND FIGURES

### Market Forecasts 2000-2005      Market Shares 1999

Table 1-1		1-4
Data-Focused Softswitch Positioning		
Table 1-2		1-8
Service Provider Economics In The Metro OSN Solutions Market		
Table 1-3		1-17
Switching Support for Varied Geographic Networks		
Table 1-4		1-22
Network Components		
Table 1-5		1-27
Seamless All-IP Network Issues		
Table 1-6		1-32
Factors Driving Growth Of IP Networking		
Table 1-7		1-33
Advantages Provided By IP Switching		
Table 2-1		2-1
Telecommunications Market Driving Forces		

Table 2-2	2-5
Principal Competitive Factors In Carrier Markets	
Table 2-3	2-6
Competitive Product Positioning For Carrier Markets	
Table 2-4	2-7
Carrier Market Success Factors	
Table 2-5	2-8
Carrier Customer Demands	
Table 2-6	2-9
Carrier Equipment Market Positioning	
Table 2-11	2-25
Service Provider Environment	
Table 2-12	2-26
Service Provider Repositioning Stance	
Table 2-13	2-26
Service Provider Response To Network Shifts	
Table 2-14	2-27
Elements That Comprise Communications Networks For Service Providers	
Table 2-15	2-28
Function Of Communications Networks	
Table 2-16	2-29
Service Provider Network Functions	

Table 3-1	3-2
Circuit Switch Network Limitations	
Table 3-2	3-4
IP Switch Challenges	
Table 3-3	3-5
Benefits Of Flexible, All-Switched Infrastructure	
Table 3-4	3-6
Switched Intelligent Optical Network Functions	
Table 3-5	3-8
Constraints of Legacy Architectures of the Metropolitan Network	
Table 3-6	3-12
Lucent iMerge Functions	
Table 3-7	3-12
Lucent VPN Firewall Brick Functions	
Table 3-8	3-14
Lucent Positioning To Realize Benefits of IP	
Table 3-9	3-15
Lucent Primary Switching Solutions	
Table 3-10	3-16
Lucent WaveStar LambdaRouter Features	
Table 3-11	3-17
Lucent WaveStar Lambda Router All-Optical Cross-Connect	
Table 3-12	3-18
Lucent WaveStar LambdaRouter Applications	
Table 3-13	3-26
Forces Influencing the Design of a Management System	

Table 3-14	3-27
7RE Management Functions	
Table 3-15	3-28
7 RE Management Features	
Table 3-16	3-30
7RE Fault Recovery Positioning	
Table 3-17	3-32
Surpass and EWSD Combined Voice and Data Communications in Data Networks	
Table 3-18	3-33
SMX-2100 Tandem Switch Features	
Table 3-19	3-34
SMX-2100 Tandem Switch Functions	
Table 3-20	3-40
Products in the Siemens Softswitch Portfolio	
Table 3-21	3-43
Nortel Softswitch System Functions	
Table 3-22	3-52
Cisco VCO/4K Features and Functions	
Table 3-23	3-57
Framework of Cisco OPT	
Table 3-24	3-58
Cisco OPT Paradigm of Telephony Infrastructure Layers	
Table 3-25	3-59
Cisco Connection Layer Definition	
Table 3-26	3-60
Cisco Connection Layer Functions	

Table 3-27	3-62
Cisco End-To-End QoS Tools	
Table 3-28	3-63
Cisco Network Core	
Table 3-27	3-67
Benefits of Cisco OPT	
Table 3-28	3-68
Cisco Universal Access	
Table 4-1	4-2
DWDM Broadband Bandwidth Solutions	
Table 4-2	4-4
Difficulties with Fixed Lasers	
Table 4-3	4-7
ATM Basic Mechanisms	
Table 4-4	4-12
Protocol-Independent Native Modes Supported	
Table 4-5	4-15
Multi-Protocol Wavelength Functions	
Table 4-6	4-15
Wavelength Switching Definition	
Alcatel First Quarter 2001 Revenue	5-2
First Quarter 2001	
Table 5-1	5-28
NEC Strengths And Challenges In DSL Market	

Table 5-2	5-33
Nortel Networks Acquisitions	
Table 5-3	5-33
Nortel Networks Customers	

**ABOUT THE COMPANY**

WinterGreen Research, founded in 1985, provides strategic market assessments in telecommunications, communications equipment, health care, and advanced computer technology. Industry reports focus on opportunities that will expand existing markets or develop major new markets. The reports assess new product and service positioning strategies, new and evolving technologies, and technological impact on products, services, and markets. Market shares are provided. Leading market participants are profiled, and their marketing strategies, acquisitions, and strategic alliances are discussed. The principals of WinterGreen Research have been involved in analysis and forecasting of international business opportunities in telecommunications and advanced computer technology markets for over 30 years.

**ABOUT THE PRINCIPAL AUTHORS**

**Ellen T. Curtiss**, Technical Director, co-founder of WinterGreen Research, conducts strategic and market assessments in technology-based industries. Previously she was a member of the staff of Arthur D. Little, Inc., for 23 years, most recently as Vice President of Arthur D. Little Decision Resources, specializing in strategic planning and market development services. She is a graduate of Boston University and the Program for Management Development at Harvard Graduate School of Business Administration. She is the author of recent studies on worldwide telecommunications markets and the Top Ten Telecommunications market analysis and forecasts.

**Susan Eustis**, President, co-founder of WinterGreen Research, has done research in communications and computer markets and applications. She holds several patents in microcomputing and parallel processing. She is the author of recent studies of the Regional Bell Operating Companies' marketing strategies, Internet equipment, a study of Internet Equipment, Worldwide Telecommunications Equipment, Top Ten Telecommunications, Digital Loop Carrier, Web Hosting, and Application Integration markets. Ms. Eustis is a graduate of Barnard College.

**Return To:** WinterGreen Research, Inc.  
6 Raymond Street  
Lexington, MA 02421 USA

Phone: (781) 863-5078 --- Fax: (781) 863-1235

PLEASE ENTER MY ORDER FOR:

**IP-Circuit Switch Market Strategies and  
Forecasts, 2001-2006**

***-ALL REPORTS ARE AVAILABLE IN EITHER PRINT OR PDF -***

\_\_\_ ENCLOSED IS MY CHECK FOR \$2800

\_\_\_ PLEASE BILL MY COMPANY USING P.O. NUMBER \_\_\_\_\_

\_\_\_ PLEASE CHARGE MY MASTERCARD/VISA/AMERICAN EXPRESS--CARD NUMBER \_\_\_\_\_ EXP. DATE \_\_\_\_\_

\_\_\_ ADDITIONAL COPIES, @ \$375 (EXTRA COPY PRICE IN EFFECT ONLY WITH INITIAL ORDER)

SIGNATURE **X** \_\_\_\_\_

DATE \_\_\_\_\_

NAME \_\_\_\_\_

TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

DIVISION \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

ZIP \_\_\_\_\_

TELEPHONE \_\_\_\_\_

FAX \_\_\_\_\_

*E-MAIL* \_\_\_\_\_

*PLEASE NOTE:* RESIDENTS OF MASSACHUSETTS AND CONNECTICUT MUST INCLUDE APPROPRIATE SALES TAX  
SUBSCRIBERS OUTSIDE THE UNITED STATES MUST PROVIDE PREPAYMENT IN U.S. FUNDS