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665 Guy Suite 6, Montreal, QC, Canada H3J 2V5

Tel: (514) 938-2314 Mobile: (514) 823-4096

Fax: (514) 938-2304

Email: [info@maravedis-bwa.com](mailto:info@maravedis-bwa.com)

# **Global Equipment Markets of VoIP Low Density Premises-based Gateways and Access Devices for Enterprise and SOHO Applications 2003-2008**

## **September 2003**

**Author: Mr.Adlane Fellah**

**Research Assistant: Ms.Cornelia Brandt**

**Technical Collaborator: Dr. Henning Schulzrinne, Columbia University**

**With Special Contributions from Jeff Pulver**

**And**

**Henry Sinreich, MCI**

*I would like to dedicate this market study*

*To Salah, my passed father, who gave me his work ethic and passion;*

*To my friend and former colleague Frederic Lebouar who introduced me to the world of telecoms with his genuine trust and professionalism.*

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**About the Author:**

Adlane Fellah, MBA, is the CEO and founder of Maravedis Inc. He has worked over 8 years in the telecom industry including 3 years as Marketing Manager for the BWA product line at Harris Corporation in charge of all point to multi-point radio market intelligence. He has extensive experience in the tactical dimension of sales support as well as the strategic vision and analysis to feed product development. He also has an extensive knowledge of regulatory affairs as well as financial modelling through his tenure as senior consultant with the telecom-consulting firm Lemay-Yates Associates Inc. Mr. Fellah holds a Master of Business Administration from the University of British Columbia.

### **Technical Collaborator:**

Henning Schulzrinne received his undergraduate degree in economics and electrical engineering from the Darmstadt University of Technology, Germany, his MSEE degree as a Fulbright scholar from the University of Cincinnati, Ohio and his Ph.D. degree from the University of Massachusetts in Amherst, Massachusetts. He was a member of technical staff at AT&T Bell Laboratories, Murray Hill and an associate department head at GMD-Fokus (Berlin), before joining the Computer Science and Electrical Engineering departments at Columbia University, New York. His research interests encompass real-time, multimedia network services in the Internet and modeling and performance evaluation.

He is a division editor of the "Journal of Communications and Networks", and an editor of the "IEEE/ACM Transactions on Networking" and former editor of the "IEEE Internet Computing Magazine" and "IEEE Transactions on Image Processing". He is member of the Board of Governors of the IEEE Communications Society and the ACM SIGCOMM Executive Committee, former chair of the IEEE Communications Society Technical Committees on Computer Communications and the Internet and has been technical program chair of Global Internet, Infocom, NOSSDAV and IPTel. He also was a member of the IAB (Internet Architecture Board).

Protocols co-developed by him are now Internet standards, used by almost all Internet telephony and multimedia applications. His research interests include Internet multimedia systems, quality of service, and performance evaluation.

### **Research Assistant**

**Cornelia Brandt**, Marketing Analyst, received her B.Sc. degree in International Economics from Georgetown University in Washington,DC. She is currently studying for a Master of Business Administration at Les Hautes Etudes Commerciales in Montreal. Ms. Brandt's previous work experience includes Marketing Analyst for a Canadian distribution company.

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## Executive Summary

### Applications & Drivers

In most of the world, toll bypass to reduce long distance costs remains a valid argument to migrate legacy equipment towards VOIP while in North America, it may not necessarily be the most compelling argument for VoIP adoption. Added functionality and savings from network convergence provide more arguments to support new investment in today's tightened corporate IT budgets.

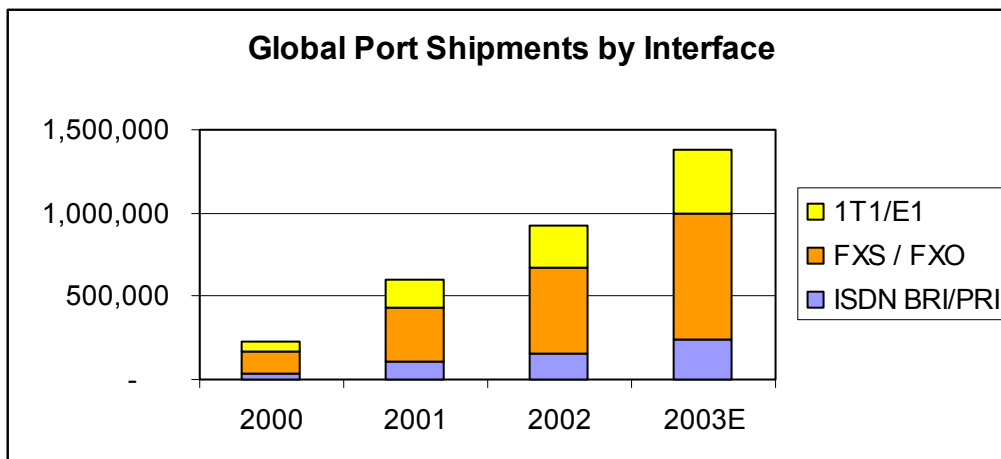
Numerous studies suggest that small and medium enterprises are slowly adopting VoIP but that they are not well prepared while large organizations are slowly moving from long trials to commercial deployments.

Enterprises are the ones driving the market and SOHO applications remain a small portion of the market proper to industrialized countries or multinational employees. Broadband penetration and virtual private networks remain key drivers to guarantee security and quality of service of VoIP services in particular for SOHOs.

### Global Port Shipments

While 2001 and 2002 were difficult years for the telecommunications industry as a whole, there are clear signs that VoIP migration among enterprises is moving from the trial phase to critical commercial deployments.

Global port shipments for low density VoIP gateways and access devices were estimated at 929,670 in 2002 and should reach 1.4 million in 2003, a 50% CAGR increase. The report provides breakdowns between analog and digital ports, interfaces, port densities and regions as well as forecasts up to 2008. Maravedis foresees that global shipments will reach 6.4 million ports by 2008,



## **Average Selling Price**

This market is characterized by a fierce level of competition. The average list price per port as of end of August 2003 for digital gateways was around \$260.00 while the average selling price (“street price”) was estimated at \$140.00 after individual vendor discounts were applied. Discounts for each vendor were averaged out as they are dependant on regions, volumes, customer relationships which gives the reader a more precise measure of weighted average selling price.

The report provides price decline estimates for 2000-2003 period as well as price decline forecasts for both analog and digital ports.

## **Market Sizes in \$**

Using the weighted ASP, the estimated market size for 2003 is just shy of \$150 million. Even if the global port shipments will be multiplied by 5 by 2005, the market size progression is limited by the continued price erosion and therefore we estimate 2008 market size to be in the range of \$330 million in the moderate scenario using the weighted ASP. Using the ASP, the more aggressive scenario suggests market size closer to \$400 million by 2008.

## **Regions:**

North America represents the #1 market in terms of ports followed very closely by Europe. Asia represents the third largest market with a dense activity but a strong price pressure towards low end products. CALA and the rest of the world represent only marginal portions of the market and most of the activity lies in few multi-national companies looking at reducing long distance call charges.

## **Vendors Space**

Emerging vendors are seeking to develop strong brand name recognition. In a market gearing towards commodization and dominated by Cisco, differentiation is key for survival. However, differentiation, either through product offering or strategic partnerships, is not enough. It has to go along a severe cost reduction program to preserve margins. There are two kinds of vendors: pure low density vendors and low to high density vendors. In the first category, with almost 30 vendors selling more or less the same gear, the industry needs consolidation. Vendors try to find their niche either by focusing on a particular region or by providing added features for particular applications.

The industry still needs to consolidate to reduce customer confusion with so many products but overall it needs consolidation to benefit from economies of scale which will reduce the cost per port in the less than \$30 range which in turn will allow for wider market penetration. Consolidation has already started with Cisco’s acquisition of Linksys. Most vendors have less than 100 employees and are less than 10 years old. Some of them will go out of business while others will be acquired or

merge. Maravedis foresees that within the next five years, there will be half as many vendors still in the market as they are today.

In the second category, vendors tend to be good at their high density solutions at the expense of their low density products. Those vendors would benefit from “outsourcing” their low density solutions to pure low density players.....

Most vendors have demonstrated a commitment to new standard protocols as they emerge. Not every vendor is committed to SIP however as H323 remains the dominant signalling protocol and is seen the best to fit for IP PBX applications.

Interoperability between vendor products still requires these products to be tested for the two products to coexist in the same network. All vendors have established some form of cooperation or agreement with larger infrastructure suppliers and softswitch vendors to ensure their solution fits within carriers’ core network requirements.

Despite all this, enterprises prefer single vendor solutions over best-of-breed. As the industry consolidates, there will be fewer players and less to worry about interoperability but this is a dynamic process where interoperability drives the market. With limited resources, some vendors are taking an opportunistic approach driven by commercial opportunities and end-users requirements rather than a strategic plan.

### **Special Focus: Broadband Wireless Access**

The report provides a unique insight of VoIP gateway integration into Broadband Wireless Access solutions with a detailed review of BWA vendors VoIP gateway technological choice.

### **Trends...**

Enterprises migrating to VoIP still face implementations problems due to a lack of resources and skills required to guarantee a smooth migration. This is an opportunity for service providers, as highlighted in the MCI case study, to play a catalyst and educational role for the bulk of small and medium enterprises. Larger organizations are still trialing solutions and are more cautious about VoIP migration but will put their act together in the 2 following years as evidenced by the announcements of large investment banks deploying VoIP. Wireless applications are still marginally driving VoIP but with the advent of BWA, VoIP will become a must-to-have application. In turn, WiFi offers an opportunity to transcend communications and help bring mobility to what would otherwise be known as fixed broadband services.

## Benefits of this Market Report:

- **Comprehensive:** Increases chances that report talks about industry aspects you care about! Saves you hundreds of hours of research.
- **Accurate:** We collect data mainly through primary research you can rely on. We strive to provide you with realistic demand forecast scenarios.
- **Timely:** Insures you are up to date on current product & market developments that affect your comprehension of the market and decision process.
- **Consistent:** We are very careful to compare apples with apples and use only the right metrics such as manufacturer shipments, in units well defined.
- **Transparent:** We clearly state all our sources and assumptions.
- **Withstands the Test of Time:** Saves you money from having to repurchase new reports within the first year of publication.
- **Unbiased:** Our editorial approach insures an objective and independent analysis of market players and trends
- **Value-added:** Our analysis is based on access to confidential information that only renowned third parties have access to.

## FEATURES:

- **Equipment Vendor Profiles:** Provides unbiased view of every vendor products, strategy and SWOT (Strength, Weakness, Opportunities, Threats).
- **Historical Market Sizes:** Accurate shipment figures collected from every vendor under NDA and aggregated to give you the real picture for your management decisions. Allows you to clearly assess your own position vis a vis your competitors.
- **Demand Forecast:** We review the main market drivers and inhibitors from interviews with service providers and end-users to provide you with market visibility and reduces uncertainty for funding or decision making.
- **Regional & Market Segment Analysis & Breakdown:** We provide you with detailed forecasts so that you can focus your company resources into most profitable avenues.

## Scope of the Study

This study provides both quantitative data on VoIP gateways and access devices as well as a qualitative discussion on vendors' strategies, applications driving the market and product analysis.

The following table provides an illustration of what product families/segments are covered in this study:

	Analog	Digital
Low density (<=1T1/1E1)	SOHO, SMEs	Enterprises
High density (>1T1/1E1)	Not Applicable	Enterprises, Carriers

The study will provide guidance on the following main topics of **VoIP access only**:

- SOHO & Enterprise Applications
- VoIP drivers and inhibitors
- VoIP Gateways and Access Devices Vendor profiles
- VoIP Gateways and Access Devices Product Features
- Historical market sizes 1999-2002 in ports and \$
- Historical average selling price per port
- Forecasts for 2003-2008 in units and \$
- Average selling price per port forecasts
- Port density, Interface and Regional breakdowns
- 26 Vendor Profiles

Maravedis defines an enterprise VoIP Gateway as either a modular or fixed device that is equipped with voice DSPs in its architecture. A modular enterprise VoIP gateway is typically a router chassis bundled with DSP voice cards. The application for this segmentation is typically to provide a means for toll bypass. That is sending voice to a physically different location without traversing the Public Switched Telephone Network (PSTN). **This report only covers the CPE devices that reside in an enterprise or SOHO environment at the access level of the network.**

The report also provides an insight on LAN telephony as a possible “disruptive” or in some instances “complementary” technology. - LAN Telephony is defined as a distributed, packet architecture, which operates independent of a resident PBX. The end stations can be either “hard” IP Phones or Softphones (PCs). IP Centrex is briefly discussed as well.

**Areas excluded:**

The study does not encompass the other segments of VoIP technologies and dimensions:

- High density VoIP Gateways and softswitches
- VoIP enabled-routers
- VoIP enabled remote access servers (RAS) used by ISPs to provide gateway services
- Cable Modem as a VoIP device unless it has both a voice DSP and a physical line -side telephony interface. Likewise we do not cover xDSL modem/router or cable modem unless they have both a DSP and a telephony interface.

## **Methodology & Assumptions**

This section provides guidance as to how Maravedis defines and segments the VoIP Marketplace:

Maravedis defines VoIP as the transport of voice traffic over IP packets. Traditional means of transporting voice required the use of circuit-switched (also known as time-division multiplexing or TDM) equipment. Applications for VoIP include LAN Telephony, IP Enabled/Converged PBX, Local & Long Distance Toll Bypass, Calling Card Services, and Subscriber (referred to as Class 5) and Tandem (referred to as Class 4) Central Office (CO) Switch augmentation and replacement. Typical end-users of low-density VoIP gateways are small and medium size businesses (<500 employees) with multiple locations having an existing WAN (VPN, public internet or intranet) and with repetitive phone/fax traffic between those locations that represent 25% or more of their total traffic. Some products are scalable and can be used in larger organizations.

In order to provide our customers with accurate, thorough and timely market analyses that withstand the test of time we have collected primary data through interviews of most vendors in the industry. Although it is a lengthy process, we believe gathering primary data directly from those players that craft the industry is the most valuable process for market research.

**The survey took place from June to September 2003 and involved discussion with product managers, marketing managers, technologists and sales people at all organizational levels.**

Most vendors have been willing to provide us with their insight of market activity by regions and market segments, customer requirements, strategies, and vision openly. Most vendors have provided us with their shipment and average selling price figures under non-disclosure agreement. This quantitative data was used internally to produce both historical market size figures and were integrated into our forecast model. As a result, we are not in a position to reveal the individual market share by vendor but we did provide a comparison matrix based on price/port and functionality and interoperability.

For every vendor, the report provides a detailed discussion on the following business aspects that goes well beyond the public information available on the Internet:

- Overview of the company
- Detailed description of the product offering based on product features analysis which includes:

<b>Select Technical Specifications</b>	
Ports	
Interface Type	
Signalling Protocols	
Telephony Features Supported	
Voice CODECs	
Audio Features	
Quality of Service	
Network Management Protocol	
Special Features	

- Markets and customers: commercial activity
- Distribution Channels
- Strategies
- Partnerships/Alliances
- Financial data

As part of the primary research we want also to mention the valuable contribution of Jeff Pulver, one of the famous advocates of VoIP and Dr. Henry Sinnreich a Distinguished Member of Engineering at MCI whose book "Internet Communications Using SIP" co-authored with Alan B. Johnston published by John Wiley is considered the reference on IP communications.

In order to provide our readers with an accurate overview of the technical and regulatory aspects of the VoIP market, we asked our technical collaborator Dr. Henning Schulzrinne from Columbia University to address the following topics:

- History of VoIP Systems
- VoIP System architecture
- Protocols for the transport of voice over IP networks
- Signalling protocols
- Quality of service issues

## Secondary Sources

Maravedis as a small and specialized firm always commits to provide our clients with a new and unique perspective of the industry based on our own research. In order to ensure that we were not “duplicating” the information already available to stakeholders in the industry, we have reviewed most of the market research available in the market on low-density VoIP gateways and access devices. There are plenty of studies on softswitches, high-density gateways for carriers but we have not found any market study available that targets specifically low-density gateways and access devices. This can easily be explained by the fact that the low-density market is relatively new and fragmented.

## Forecasts Methodology

Market sizes in dollar figures are obtained by combining the two following essential metrics:

- Manufacturers' port shipments (this is defined as the VoIP logical equivalent of a Digital Signal, level zero, commonly referred to as a DS0. A traditional DS0 is equal to one voice conversation, digitized using pulse-code modulation (PCM) and utilizing a single 64 kbps circuit)-
- Average selling price

Most of equipment suppliers provided us with their exact numbers under NDA while others gave us rough estimations. For the rest, we estimated their shipments and ASP from investor conference calls, contracts announced, and trade shows and customers interviewed.

## The construction of the model consisted in the following steps:

### Average selling price per port:

In this very competitive industry, all vendors provide discounts whether they sell direct to end-users or to resellers, specifically distributors, integrators, VARs. Those discounts can range from 15% to an outstanding 60%! It was thus essential for the model to run using an average selling price as opposed to an average list price in order to provide an accurate view of both price erosion and total market size. We thus obtained various list prices and related discounts that we applied to obtain “street” prices. Although we are conscious that discount rates can vary greatly based not only on volumes but also on regions, reflecting the competitive environment, we had to draw a line to come up with a weighted average selling price which reflects discount practices across regions, volumes and product lines. We also provide a breakdown of average selling price for analog and digital products.

There are 2 ways to come up with an average selling price across the market

- 1) Simple Average: average out all individual ASPs with the same “weight” regardless of volume shipments
- 2) Weighted Average: uses a “weighted average” meaning each vendor’s own ASP is “weighted” in relation to the vendors’ own shipments in relation to the total market. This methodology provides amore accurate ASP number

The 2 methodologies result in strikingly different numbers.

For the forecast, we first looked at the historical price decline and made assumptions as to future price decline according to our view of future volume shipments and technology cost reduction.

Historical Average selling price 2000-2003

Historical Price decline 2000-2003

Future price decline 2004-2008

### Shipments Volumes

All market shares and statistics are reported in Manufacturer Sales. That is the sales realized by the manufacturer that ships the product. This does not measure the additional revenue realized by added margins when sold through the sales channel. For the purposes of accuracy and tying numbers back to public financial documents, we believe reporting in manufacturing sales is the cleanest metric. We obtained approximate primary data from 85% of the market and have thus added 15% of the market in an “Other” section to account for shipments of very small and scattered players, which were not profiled.

Historical shipment volumes in units or ports 2000-2003

Future shipment volumes 2004-2008

Forecasting is completed through statistical analysis based on historical data, general economic forecasts by CIBC world-markets, industry developments and recent surveys on enterprise networking spending plans and attitude towards VoIP.

***The model itself is confidential and will not be provided with the report***