Cisco Broadband Local Integrated Services Solutions for T1/E1

Executive Summary

Service providers face growing market demand for enhanced services beyond the existing telephony services they offer. Their customers need local voice, long-distance voice, and high-speed data access in a bundled service. Although customers prefer single, integrated offerings, the existing approach requires service providers to operate multiple networks, increasing their resource requirements and operational expenses.

The Cisco Broadband Local Integrated Services Solutions (BLISS) framework addresses this issue for service providers. By integrating and testing proven technologies available today from Cisco, service providers can deploy Cisco BLISS for:

- One network, one protocol, and multiple services: voice, video, and data
- Proven availability and reliability
- Service flexibility suitable for high-density business and residential customers
- Standards-based interface to integrate current and future third-party applications
- Complete operations support systems (OSSs)

Market Dynamics

Today, more than ever, the cost of delivering integrated voice and data services over legacy networks is becoming increasingly expensive. Current service provider telephony and data networks are geared to deliver a single type of service, not multiple services per connection to a subscriber. Therefore, delivering multiple services over a single connection becomes a cost-prohibitive offering for today's service providers.

At the same time, service provider business customers of all sizes and high-end residential subscribers are looking for additional integrated services. A typical small business has five or more employees. It needs dedicated Internet access as well as local and long-distance calling. It wants advanced voice service offerings such as account code, authentication code, hunt groups, direct inward dial (DID), and direct outward dial (DOD) (refer to Table 1) and advanced data services, including secure remote access and virtual private networks (VPNs). Business subscribers who choose these services also want to receive a single bill the end of each month.

Table 1 Advanced Voice Services

Call Forwarding	
	Call Forwarding Unconditional (CFU)
	Call Forwarding On Busy (CFB)
	Call Forwarding on No Answer (CFNA)
Call Waiting	
	Call Waiting (CW)
	Cancel Call Waiting (CCW)
3-Way Calling	
	3Way Calling (TWC)
	Usage Sensitive 3Way Calling (USTWC)
Calling Identity Features	
	Calling Number Delivery (CND)
	Calling Number Delivery Blocking (CNDB)
	Calling Name Delivery Blocking (CNAB)
	Calling Name Delivery (CNAM)
	Calling Identity Delivery and Suppression (CIDS)
	Calling Identity Delivery on Call Waiting (CIDCW)
	Calling Identity Delivery Blocking (CIDB)
Call Trace	
	Customer Originated Call Trace (CT)
Multiple Directory Numbers	
	Multiple Directory Numbers (Teen Service) (MDN)
Class of Service Restrictions	
	Casual Call Restrictions (101XXXX)
	NANP Call & Toll Restrictions
	NANP Black and White Lists (Number Blocking)
	Blocking of 900, 976 Calls
	Blocking DA Calls
	Blocking of NANP Operator Assistance Calls
	Blocking of International Operator Assistance Calls
	Number Blocking

Table 1 Advanced Voice Services

Enhanced Services	
	Anonymous Call Rejection (ACR)
	Automatic Callback (Repeat Dialing) (AC)
	Automatic Recall (Call Return) (AR)
	Hotline and Warmline Services
	Selective Call Forwarding (SCF)
	Selective Call Rejection (SCR)
	Selective Call Acceptance (SCA)
	Remote Activation of Call Forwarding (RACF)
Business Customers Package	
	Account Code
	Authorization Code
	Direct Inward Dialing (DID) - PBX
	Direct Outward Dialing (DOD) - PBX
	Direct Inward Dialing (DID) - Business Group
	Direct Outward Dialing (DOD) - Business Group
	Multi-Line Hunt Group (MLHG)
	Call Hold (CHD)
	Call Park (CPRK)
	Call Retrieve (CPRK-RET)
	Do Not Disturb (DND)
	Directed Call Pickup With Barge-In (DPU)
	Directed Call Pickup Without Barge-In (DPN)
	Distinctive Ringing for Direct Inward Dial (DID)
	Distinctive Ringing/Call Waiting (DRCW)
	Directory Number Hunting (DNH)
	Speed Call (8 and 30)
Platform Features	
Numbering Plan and Dial Procedures	
	Casual Dialing (Dial Around)(101XXXX+Digits)
	Directory Services (411,555-1212, 0+Listing Services)
	Easily Recognizable Codes (500, 700)

Table 1 Advanced Voice Services

	Information Service Calls (900 and 976)
	N11 support (311, 411, 611, 711, 811)
	Operator Services Access (0,00,0+,01+,CAC+0+,CAC+01+)
	Busy Line Verification and Operator Interrupt
	Vertical Service Codes
	Dialing Parity (IntraLATA Toll Presubscription)
	Toll-Free Service
Regulatory & Operational Features	
	Emergency Services (911)
	Local Number Portability (LNP)
	NPA Split Support
	Test Calls (958,959)
Tandem and Routing Features	
Policy-Based Routing	
	Least-Cost Routing
	Prefix-Based Routing
	Line-Based Routing
	Calling Area Policy based Routing
	Time of Day (TOD) Routing
	Percentage-Based Routing
ANI Delivery and Blocking	
DNIS Outpulsing and Overflow Treatment	
Incoming 800 Service	

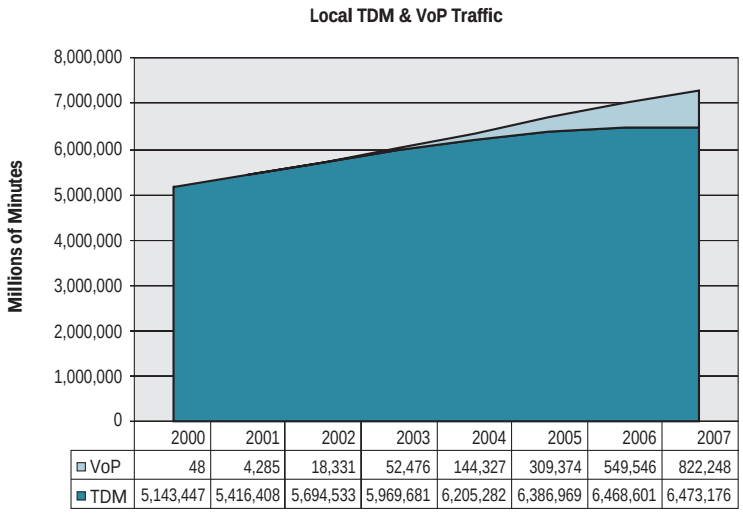
The traditional public switched telephone network (PSTN) deployed by service providers can meet some of the market's needs for integrated services, but only at a price premium—it is difficult or very expensive to deliver all these services over a single connection. Addressing the needs of small businesses that want five, ten, or more telephone lines, plus comprehensive phone service and Internet access, forces service providers to support at least two circuits: one for data and one for voice. Furthermore, there are two networks to provide these services.

Service providers that can create and manage a single network capable of delivering multiple services have significant advantages. By migrating to a single, multiservice-capable network, service providers can acquire new customers, maintain their existing customers, and offer both more services. This creates profitable new revenue streams and increases customer loyalty.

The Opportunity for Service Providers

The iLocus Global IP Telephony Market 2002 study describes the emerging new market associated with voice over IP (VoIP) as a profitable group of voice services for service providers, including local calling, domestic long distance, and international calling. Figure 1 shows the projected emergence of VoIP calling.

Figure 1
VoIP Minutes of Use Forecast Worldwide

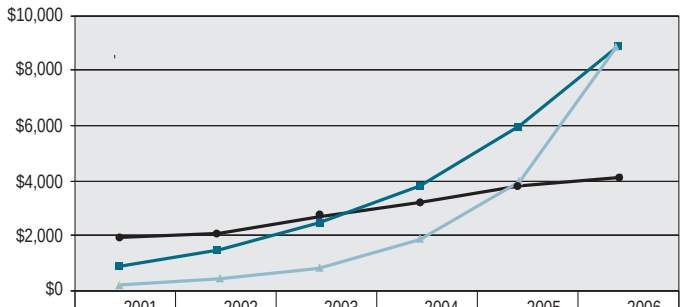


	2000	2001	2002	2003	2004	2005	2006	2007
VoP	48	4,285	18,331	52,476	144,327	309,374	549,546	822,248
TDM	5,143,447	5,416,408	5,694,533	5,969,681	6,205,282	6,386,969	6,468,601	6,473,176

* Forecast and Market Data based on Probe Research Voice Over Packet Markets Report, Volume 3, Number 6, Published August 2002

By 2007, VoIP will account for more than 10 percent of all voice minutes over any network. Figure 2 shows the breakdown of the three services, and forecasts aggressive growth for all three over the next four years—creating an aggregated market of nearly $22 billion by 2006.

Figure 2
Revenue and Projections



	2001	2002	2003	2004	2005	2006
International	$1,764	$1,943	$2,526	$3,031	$3,637	$4,001
Domestic LD	$750	$1,339	$2,276	$3,642	$5,827	$8,741
Local	$79	$273	$634	$1,712	$3,852	$8,859

* Forecast and Market Data based on iLocus Global IP Telephony Market 2002, 3rd Annual Update, developed by Jahangir Raina—February 2002

Offering integrated voice and data services to small and medium businesses is already emerging as an important and profitable business model.

Cisco Broadband Local Integrated Services Solution

The Cisco Broadband Local Integrated Services Solution (BLISS) framework provides the network foundation and call-control and application intelligence to deliver integrated voice, data, and video services over a single connection for small and medium businesses. The Cisco BLISS framework can support Metro Ethernet, DSL, cable, and T1/E1 access. It also provides an open environment that accommodates both Cisco and third-party solution elements for enhanced applications and features.

Implementing Cisco BLISS for T1/E1 enables service providers to offer the services that small and medium businesses need:

- Voice services
  - Local and line services
  - Long distance
  - Trunk routing—least-cost routing, time-of-day routing, etc.
  - Business group services
  - Emergency services
  - Class-of-service restrictions
  - Voice mail and unified messaging
- Access to local- or network-based feature servers for additional services
- Extensive operations support
  - Billing
  - Provisioning
  - Fault reporting
  - Security
  - Configuration

The Cisco BLISS Value Proposition

The Cisco BLISS framework offers service providers the ability to use a single architecture to target a broader range of customers from large enterprises down to small and medium businesses—including telecommuter, small office and home office (SOHO), and residential subscribers. Cisco BLISS enables service providers to offer all their customers a single-circuit solution that meets all their business connectivity needs.

Service providers implementing Cisco BLISS will experience the following key benefits:

- Flexible and scalable integrated services over any access method through a single connection and network, using a single protocol
- Fully integrated voice and data applications over the same access link and packet core
- Ability to offer self-provisioning and self-configuring services
- Ease of adding new features such as unified messaging, conferencing, or business partner extranet
- Single bill, single vendor, and potentially lower prices than the competition

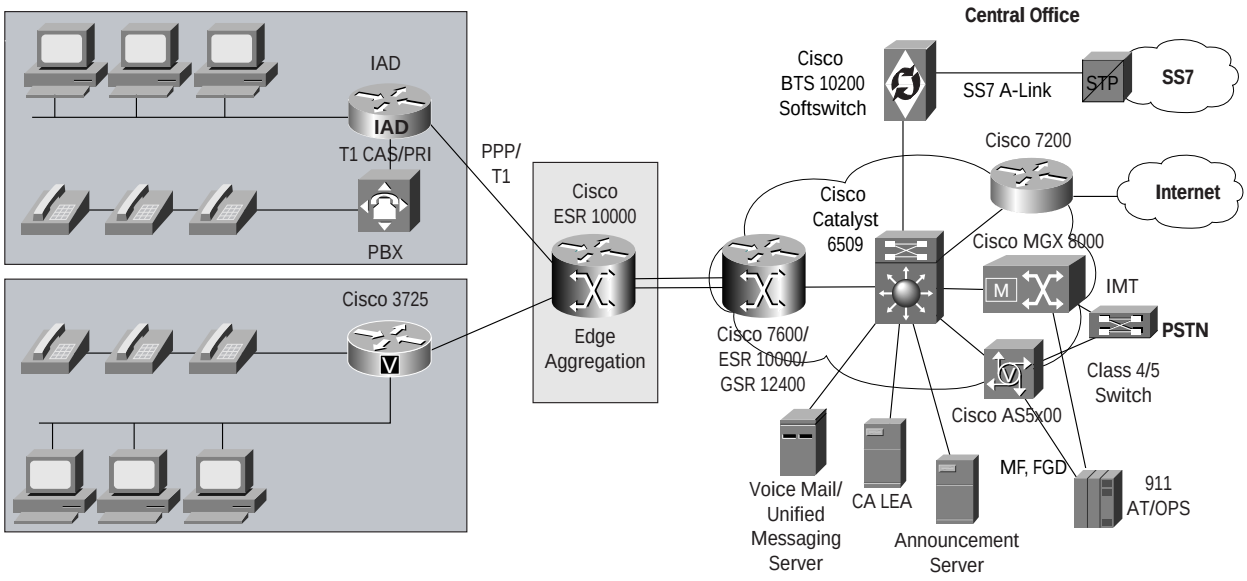
Key benefits for target market customers (businesses with five or more employees):

- Selectable Customized Local Area Signaling Service (CLASS) features
- Dedicated Internet access
- Advance voice service offering such as hunt groups, Centrex-like feature, etc.
- Advance data service offering such as secure remote access, data VPN, etc.
- A single bill

Architectural Overview

Figure 3 is a high-level functional overview, showing the principal Cisco BLISS components and their relationship and functions across customer premises, aggregation, core, and trunking layers.

Figure 3
Cisco BLISS Overview



Customer Premises Equipment Layer

The customer premises equipment (CPE) layer of this architecture contains integrated access services (IADs) such as the Cisco IAD 2400 Series or the Cisco 3725 Access Server. IADs on the customer premises deliver both network and telephony phone services, including integration of data and toll-quality analog or digital voice services, plus VoIP, quality-of-service (QoS) tools, multiple call-control protocols, diverse coders-decoders (codecs), IP routing, and security features.

Aggregation Layer

IADs in this solution are connected via T1 to an edge aggregation device, the Cisco ESR 10000 Edge Services Router. This router can connect to additional aggregation devices or to a switching device, depending upon the size of, or demands for, the aggregation layer.

Core Switching Layer

The core switching layer contains either the Cisco Catalyst® 6509 or a Cisco 12000 Series Internet Router, which directs traffic among the solution components.

High-Density Media Gateways

To ensure that this solution scales, a high-density, carrier-grade media gateway (or PSTN gateway) is required. Following are the recommended platforms for this application:

- The Cisco MGX® 8000 Series Voice Gateway (that is, Cisco MGX 8230, MGX 8250, and MGX 8850) product line of platforms offers carrier-grade traffic support.
- The Cisco AS5850 Series gateway access servers can handle incoming traffic from one or more T3 lines.

Call-Control Layer

The centerpiece of this solution is the Cisco BTS 10200 Softswitch, controlling intelligence throughout the solution. The Cisco BTS 10200 Softswitch provides call-control intelligence for establishing, maintaining, routing, and terminating voice calls. The Cisco BTS 10200 Softswitch also serves as an interface to enhanced service and application platforms. Taking advantage of the power of packet networks while seamlessly operating with traditional circuit-switched infrastructures, the Cisco BTS 10200 Softswitch empowers service providers and carriers to gracefully transition to packet-based technology. Implementing the Cisco BTS 10200 Softswitch ensures rapid service deployment, carrier-grade reliability, service flexibility, scalability to millions of subscribers, and cost savings through investment optimization and operational efficiencies.

The product incorporates a comprehensive feature set, including support for local and long-distance voice services that previously required implementation of large, complex telephone switches. Compared with traditional switching systems, the Cisco BTS 10200 Softswitch saves service providers equipment and transmission costs, space, and deployment time.

Services Layer

The Cisco BLISS for T1/E1 solution enables advanced applications to be integrated today or in the future. Applications such as unified messaging allow subscribers to have more than traditional voice-mail service. Unified messaging application servers from Cisco partners can be integrated into a solution that provides a single place for users to receive voice mail, fax, e-mail, plus notification to multiple resources. Other applications such as single number reach and virtual voice network for multisite corporations can be integrated into this architecture using existing signaling protocols.

Network Resource Layer

This solution can support a broad variety of resources, enabling standard, premium, and emergency services for voice, as well as data and video support. The Cisco BLISS framework also provides other key network services such as local number portability, toll-free services, and extensive routing.

Announcement Server

VoIP requires the same set of services and facilities that PSTN voice provides today. The announcement server broadcasts automated announcements to callers using VoIP, including *disconnect*, *new number*, and *no longer in service* announcements. Cisco BLISS for T1/E1 provides announcement server function through tested Cisco partner platforms.

Wiretapping

Many regulatory requirements demand the ability to tap phone lines and record calls if law enforcement needs this service. Cisco BLISS for T1/E1 provides the wiretap capability function through tested Cisco partner platforms.

IVR Server

The interactive-voice-response (IVR) server supplies automated phone attendants to interact with callers who have standard interaction needs. IVR servers can: supply auto attendants who provide callers with information, supply customized greetings, and enable dialing or dial for the caller, among other transactional options. Cisco BLISS for T1/E1 provides IVR function through tested Cisco partner platforms.

Unified Messaging Server

The unified messaging server enables service providers to give end users one-stop access to voice, fax, e-mail, short message service (SMS) and video—from any phone (fixed or wireless), PC, or Web browser. Cisco BLISS for T1/E1 provides announcement server function through tested Cisco partner platforms.

Web Server

The Web server in this solution enables end users to self-provision their own accounts and pay bills online. Cisco BLISS for T1/E1 provides this feature through tested Cisco partner platforms.

Media Server

The media server acts as a translator that sits in front of an application if needed. Cisco BLISS for T1/E1 provides media server function through tested Cisco partner platforms.

Network Gateway

The Cisco 7200 or 7500 router sends the data traffic coming over the Cisco BLISS network out to the public Internet.

Network Management Solution

The network management system (NMS) that controls a Cisco BLISS network includes the following functions:

- Network element management
- End-to-end (CPE and IAD-to-call agent-to-aggregator) subscriber and service provisioning
- Integrated fault management with a centralized console
- Northbound application programming interface (API) for end-to-end subscriber provisioning
- Web access for subscriber-modifiable feature management

The NMS frees service providers from low-level equipment management and network operations, allowing them to concentrate on attracting customers and providing high-value services.

Summary

Converged network services, delivering voice, data, and video to small and medium businesses from a single provider, are a revenue opportunity opening up to service providers now. The Cisco BLISS framework enables service providers to rapidly implement and deliver high-value integrated service offering solution to their customer base.

To learn more about Cisco BLISS, or to run a trial in your network environment, visit http://www.cisco.com/go/telephony

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