CISCO SYSTEMS

Cisco Voice strategy for ISP/ASP market

Agenda

EMEA Voice Market Dynamics

Cisco Voice Strategy Overview

RVoBB Solutions Description and Services

BVS Solutions Description and Services
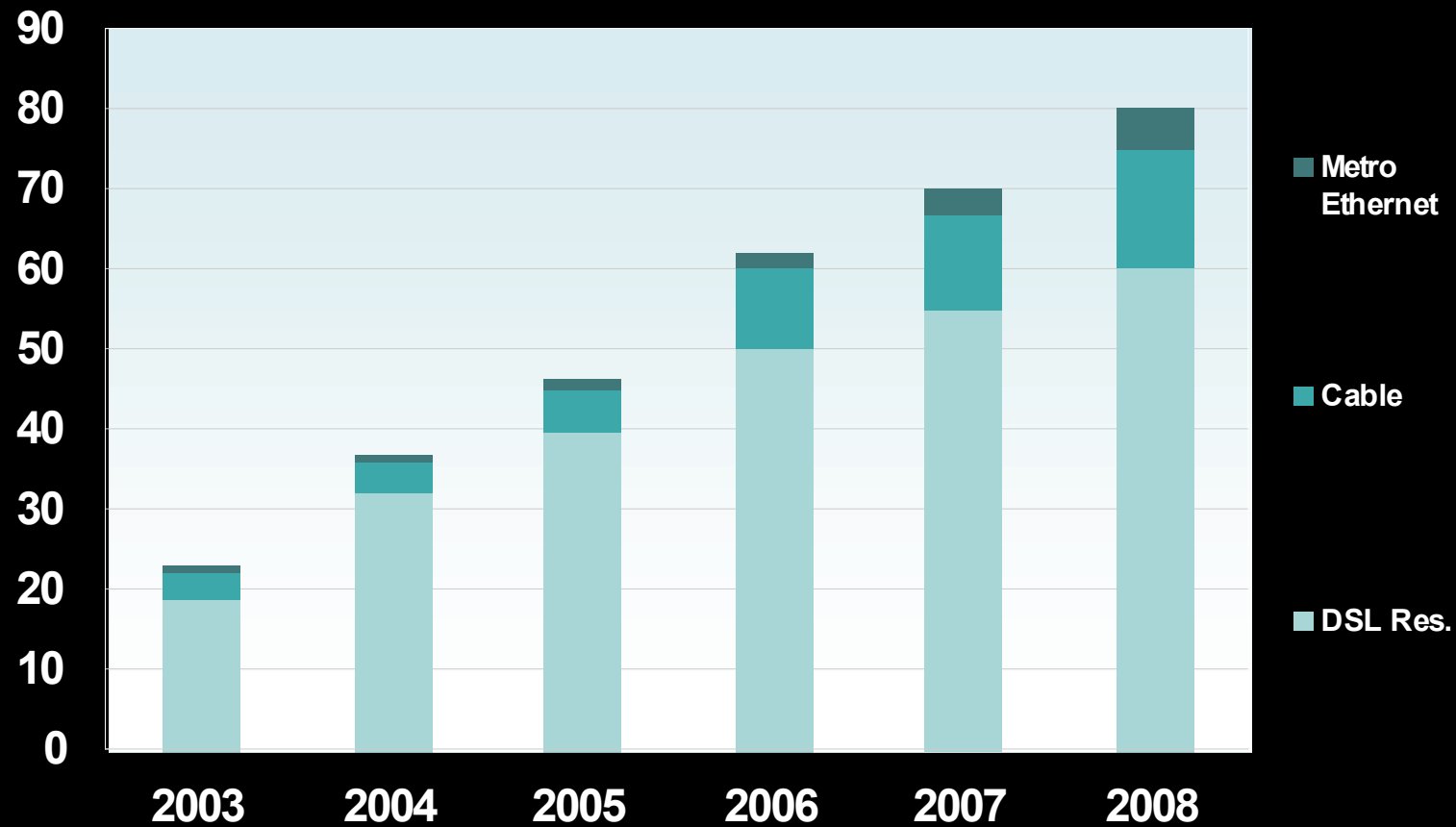
Case Studies

Cisco Broadband Product Positioning

EMEA Voice Market Dynamics
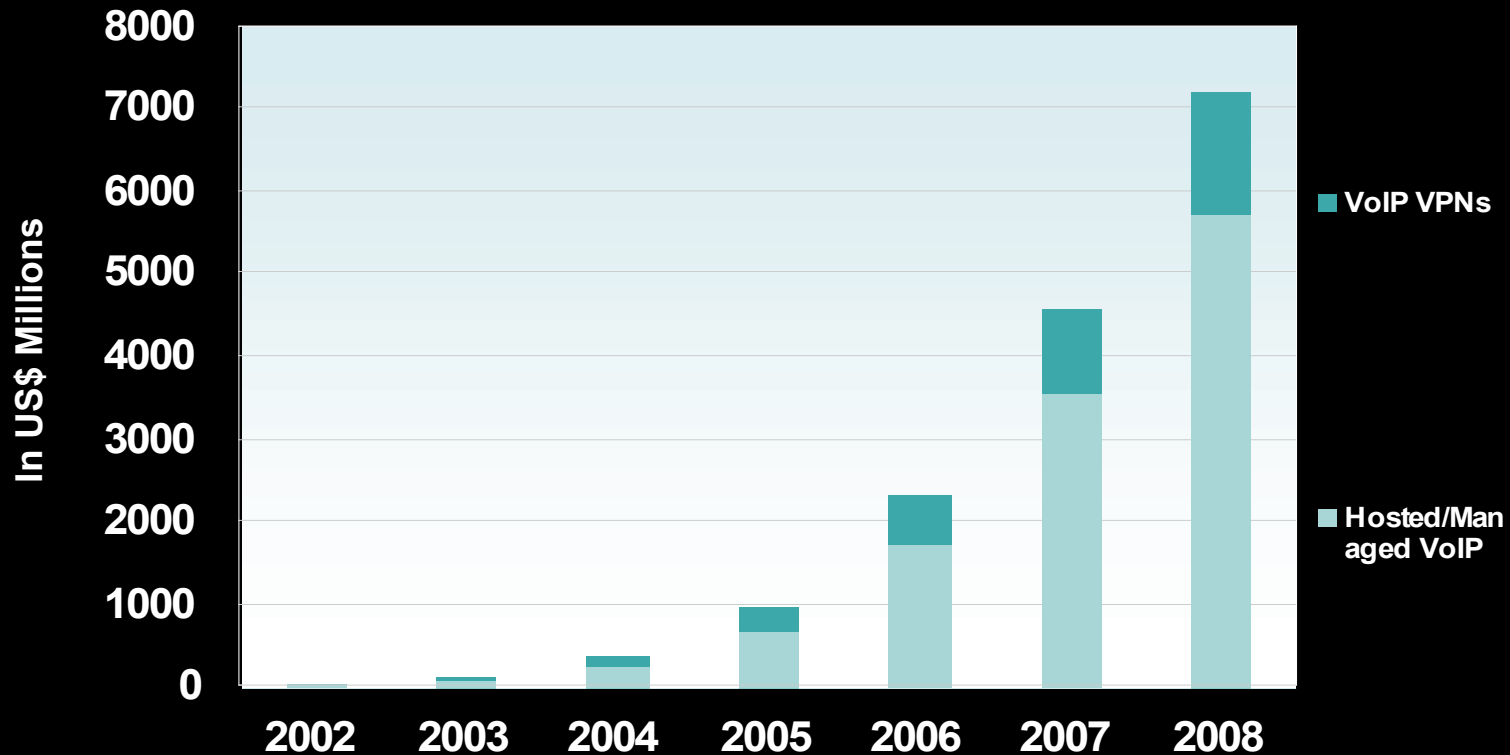
(Fixed) Broadband Subscribers – W. Europe

Source: IDC Oct 2004

VoIP is Spreading in the European Enterprise

Enterprise IP Voice Services in Europe, 2002-2008

In US$ Millions

8000
7000
6000
5000
4000
3000
2000
1000
0

2002 2003 2004 2005 2006 2007 2008

■ VoIP VPNs

■ Hosted/Man aged VoIP

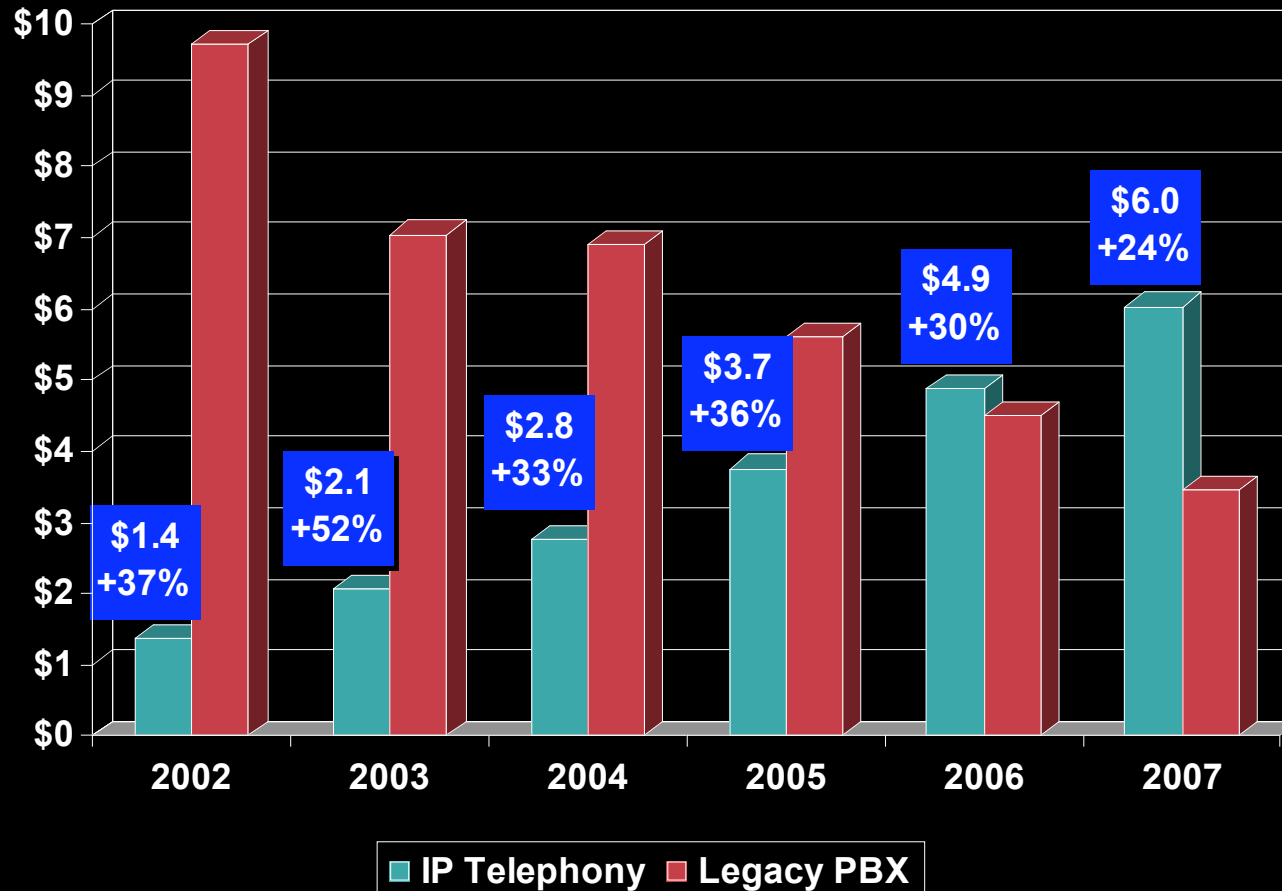**Source: Probe Group LLC, 2004**

5

IP Telephony Market Will Exceed the Legacy PBX Market by 2006

Worldwide PBX Market ($)

($ billions)

- IPT market will grow to $6B by 2007, a 31% CAGR (03 – 07)

- Legacy PBX market is expected to contract at a -16% CAGR (03 – 07)

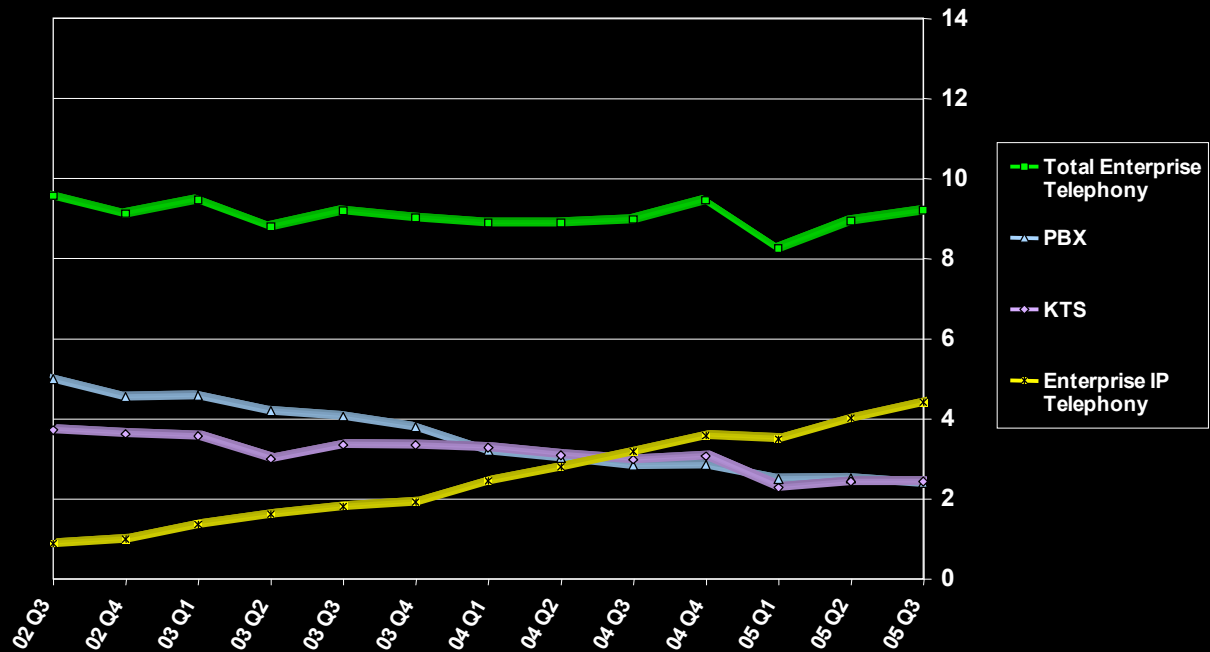- IPT includes both "Pure" & "Enabled" IP Telephony solutions

Chart values:
- 2002: $1.4 +37%
- 2003: $2.1 +52%
- 2004: $2.8 +33%
- 2005: $3.7 +36%
- 2006: $4.9 +30%
- 2007: $6.0 +24%

Legend: ■ IP Telephony ■ Legacy PBX

Source: Synergy Research, October 2003

IP Telephony È una Realtà

WW Enterprise Telephony: Lines/Ports
Source: Synergy Research

M lines/ports

Legend:
- Total Enterprise Telephony
- PBX
- KTS
- Enterprise IP Telephony

X-axis: 02 Q3, 02 Q4, 03 Q1, 03 Q2, 03 Q3, 03 Q4, 04 Q1, 04 Q2, 04 Q3, 04 Q4, 05 Q1, 05 Q2, 05 Q3

Y-axis: 0, 2, 4, 6, 8, 10, 12, 14

Fonte: Synergy Research, Novembre 2005

OLTRE 7 MILIONI DI TELEFONI IP CISCO

"**COMPANIES SHOULD FOCUS PLANNING EFFORT INTO CONVERGED NETWORK ARCHITECTURE THAT WILL BE** THE COMMON TRANSPORT LAYER FOR ALL BUSINESS AND COMMUNICATIONS APPLICATIONS. INVESTMENT **IN TRADITIONAL PBX ARCHITECTURE SHOULD BE LIMITED** TO INCREMENTS IN CAPACITY."

STEVE BLOOD – GARTNER, SETTEMBRE 2004

Mercato IP PBX, Fatturato e Crescita, 2003-2008, Italia (M€, %)

CAGR 2003-2008: 36,8%

M€

Mercato Ip PBX (Em) — Crescita

2003: 41,56
2004: 54,55 — 31,3%
2005: 83,26 — 52,6%
2006: 119,02 — 43,0%
2007: 157,72 — 32,5%
2008: 199,33 — 26,4%

Fonte: IDC, Febbraio 2005

"By 2010, 40 percent of companies will have completed the convergence of their entire voice and data networks onto a single network, and more than 95 percent or large and midsize companies will have started the process (0.6 probability)."
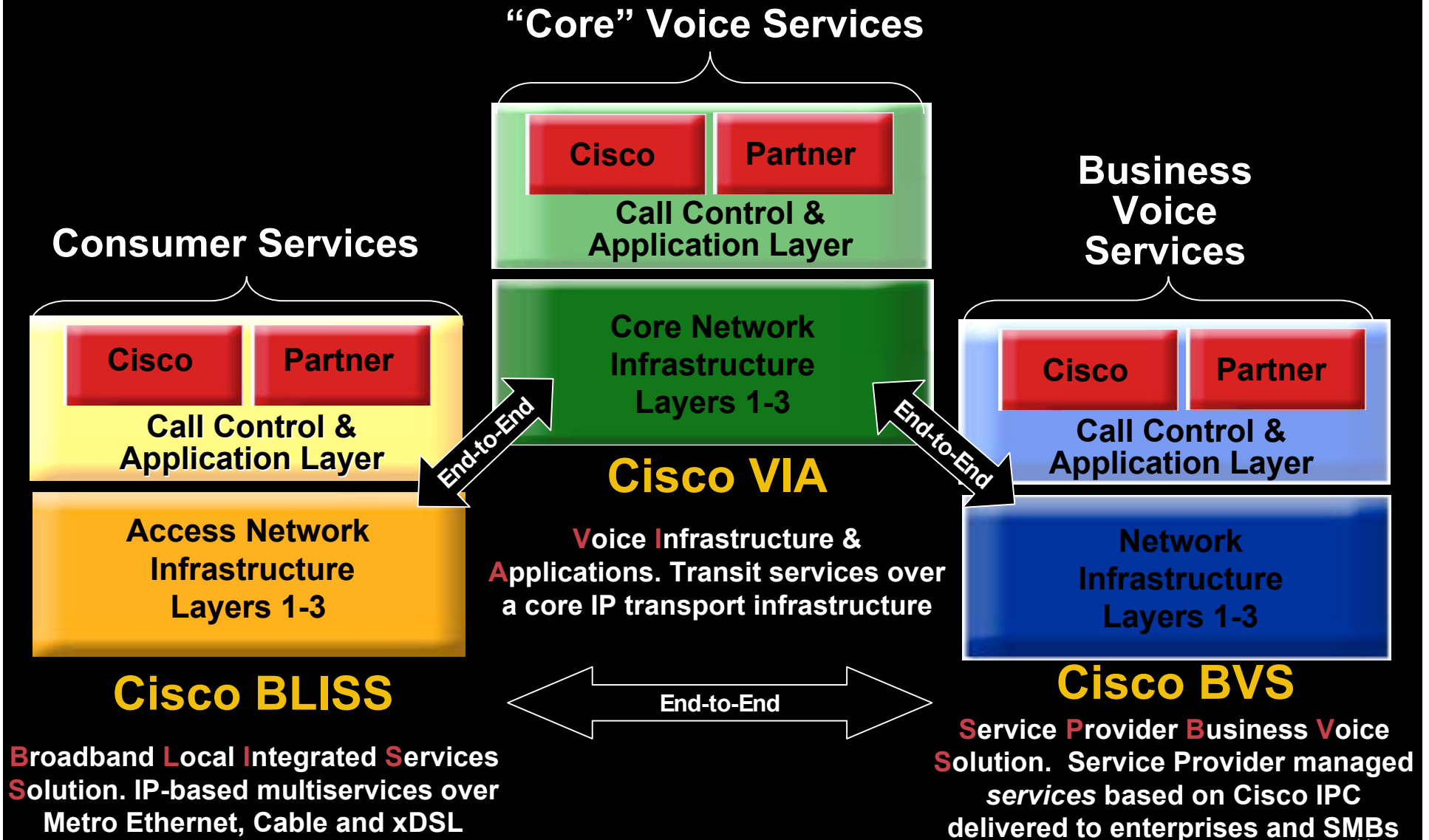
Source: Gartner, 2005
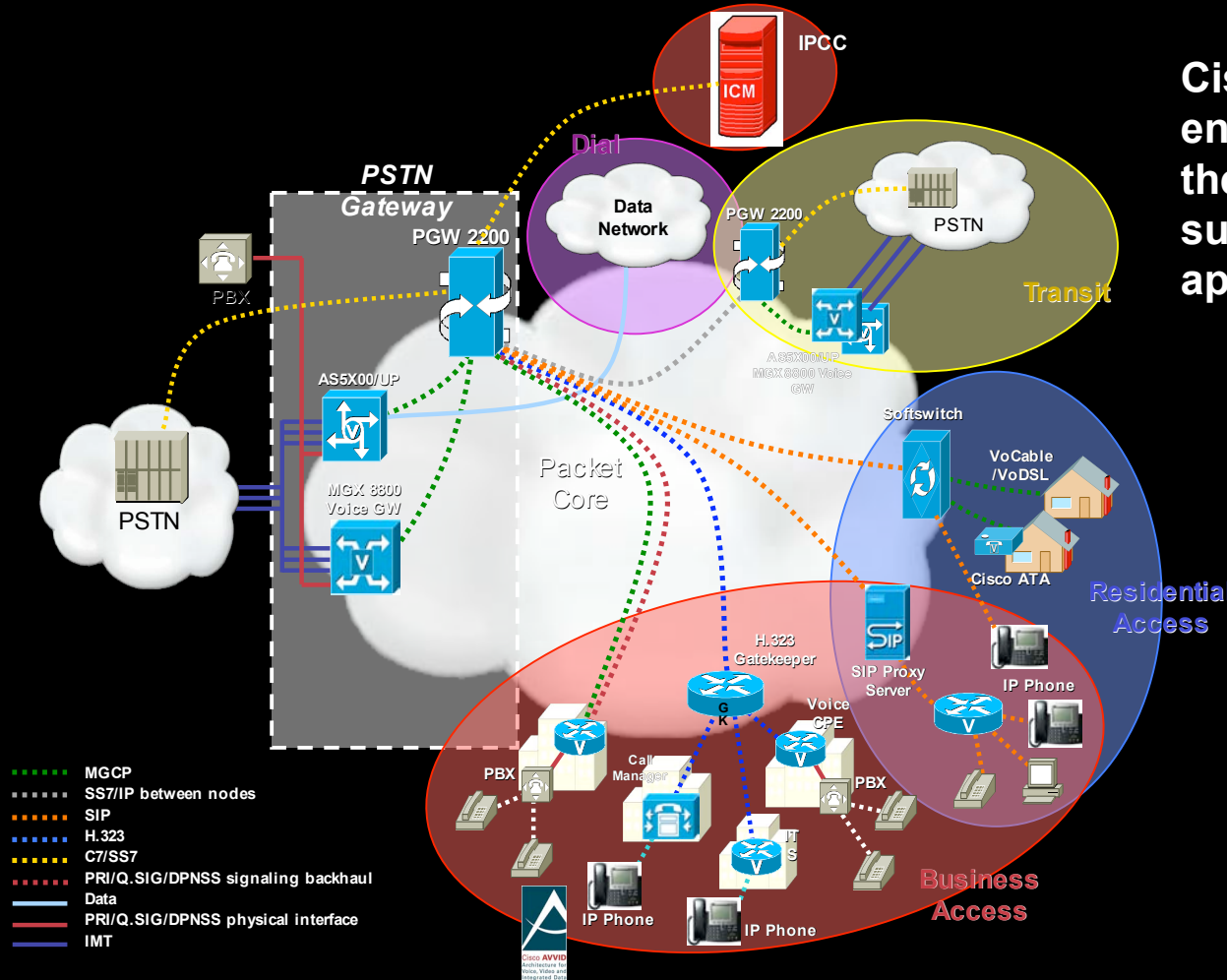
Cisco Voice Strategy Overview

Cisco's SP Voice Framework

"Core" Voice Services

Cisco	Partner

Call Control & Application Layer

Consumer Services

Business Voice Services

Cisco	Partner

Call Control & Application Layer

Core Network Infrastructure Layers 1-3

Cisco	Partner

Call Control & Application Layer

Access Network Infrastructure Layers 1-3

End-to-End

Cisco VIA

End-to-End

Network Infrastructure Layers 1-3

Voice **I**nfrastructure & **A**pplications. Transit services over a core IP transport infrastructure

Cisco BLISS

End-to-End

Cisco BVS

Broadband **L**ocal **I**ntegrated **S**ervices **S**olution. IP-based multiservices over Metro Ethernet, Cable and xDSL

Service **P**rovider **B**usiness **V**oice **S**olution. Service Provider managed *services* based on Cisco IPC delivered to enterprises and SMBs

11

PSTN Gateway Architecture/Applications

Cisco's PGW 2200 Softswitch enables interconnect between the PSTN and IP networks supporting the following applications:

✓**Voice Infrastructure and Applications (VIA)**
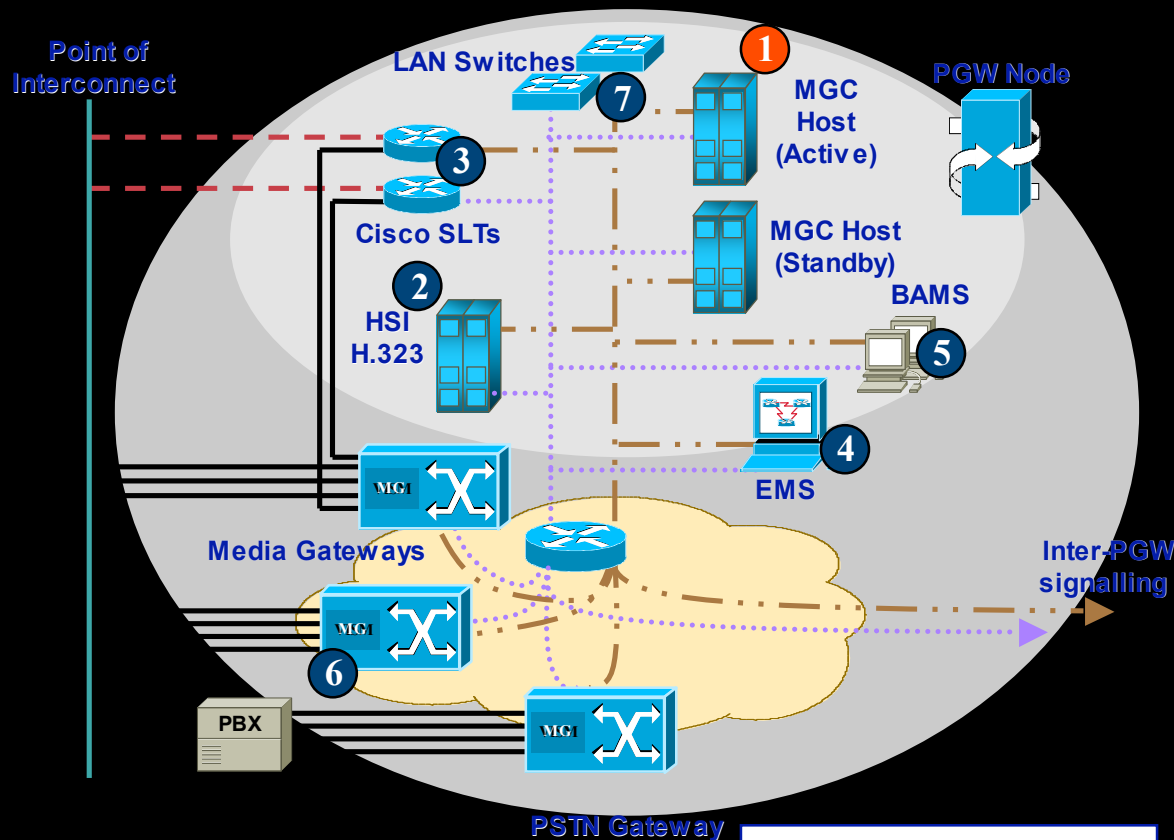- •Dial Services
- •Voice Transit Services

✓**Business Voice Services (BVS)**
- •Interconnect to IPCC
- •Voice VPNs
- •PSTN Interconnect for IP-based Business networks
- •QSIG and DPNSS PBX interconnect and interop with Cisco Call Manager

✓**Broadband for Local Integrated Services (BLISS)**
- •PSTN Interconnect for Broadband voice services

Legend:
- MGCP
- SS7/IP between nodes
- SIP
- H.323
- C7/SS7
- PRI/Q.SIG/DPNSS signaling backhaul
- Data
- PRI/Q.SIG/DPNSS physical interface
- IMT

PSTN Gateway
- Components

Point of Interconnect

LAN Switches

MGC Host (Active)

PGW Node

Cisco SLTs

MGC Host (Standby)

HSI H.323

BAMS

EMS

Media Gateways

Inter-PGW signalling

PSTN Gateway

PBX

Legend:
- – – – SS7 & Bearer Link
- ········· PRI
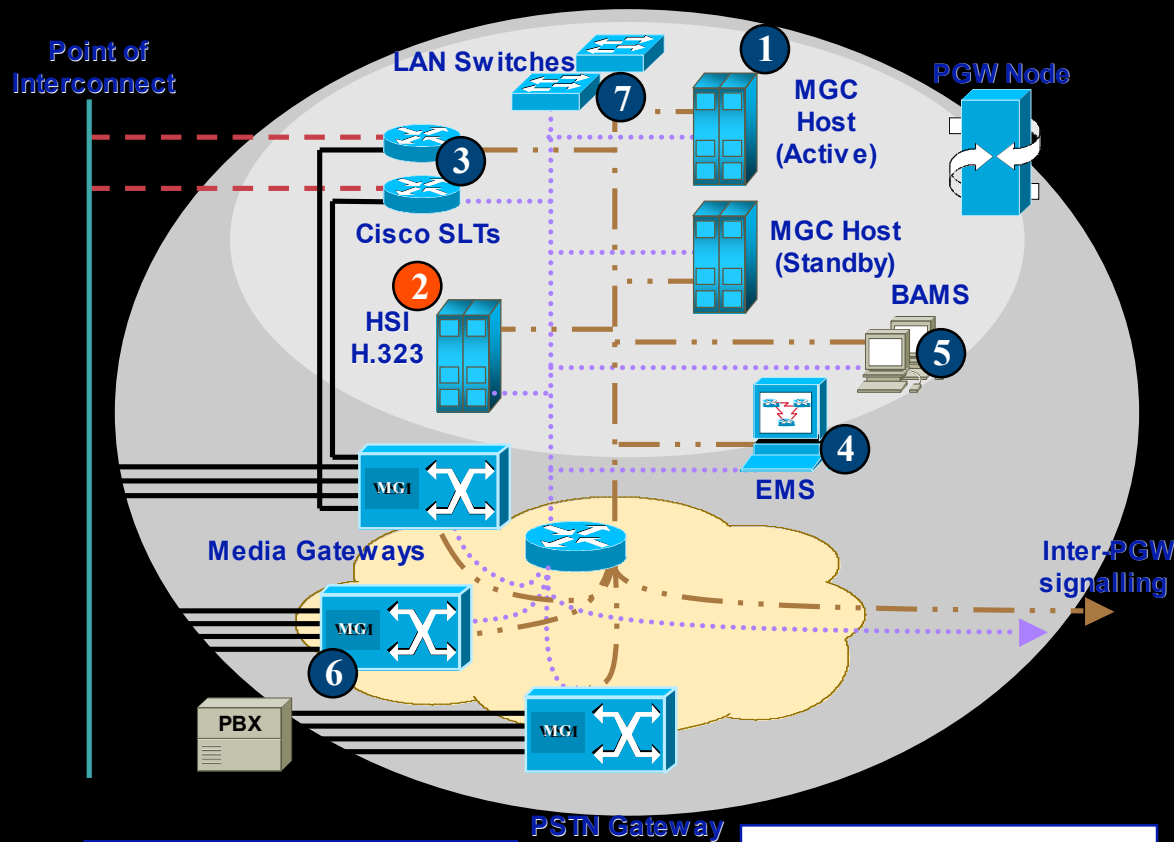- ——— Inter Machine Trunk
- ········· VLAN-1 Connection
- –·–·– VLAN-2 Connection

Components ❶

Cisco's PGW 2200 is the Media Gateway Controller (MGC). The MGC terminates SS7 and PRI Layer 3 signalling; Performs call processing, routing, feature invocations and generates CDB records; Provides OAM&P functions and controls the Gateways with MGCP. The MGC is implemented in active and standby halves, with continuous update.

PSTN Gateway
- Components

Cisco.com

Point of
Interconnect

LAN Switches   ①
⑦

③

Cisco SLTs

②

HSI
H.323

MGI

Media Gateways

⑥

PBX

MGI

MGI

MGC
Host
(Active)

MGC Host
(Standby)

BAMS

⑤

④

EMS

PGW Node

Inter-PGW
signalling

PSTN Gateway

- - - SS7 & Bearer Link
.... PRI
——— Inter Machine Trunk
.... VLAN-1 Connection
-·-·- VLAN-2 Connection

②

Components

**H.323 Signalling Interface
(HSI)**

**The H.323 Signalling
Interface provides the
connection from the PGW
2200 to the H.323
networks.**

**The HSI is deployed in a
load sharing configuration**

PSTN Gateway
- Components

Point of Interconnect

LAN Switches ①

⑦

PGW Node

MGC Host (Active)

③

Cisco SLTs

MGC Host (Standby)

②

BAMS

HSI H.323

⑤

④

EMS

Media Gateways

Inter-PGW signalling

⑥

PBX

PSTN Gateway

- - - - SS7 & Bearer Link
.... PRI
———— Inter Machine Trunk
.... VLAN-1 Connection
-·-·-·- VLAN-2 Connection

Components ③

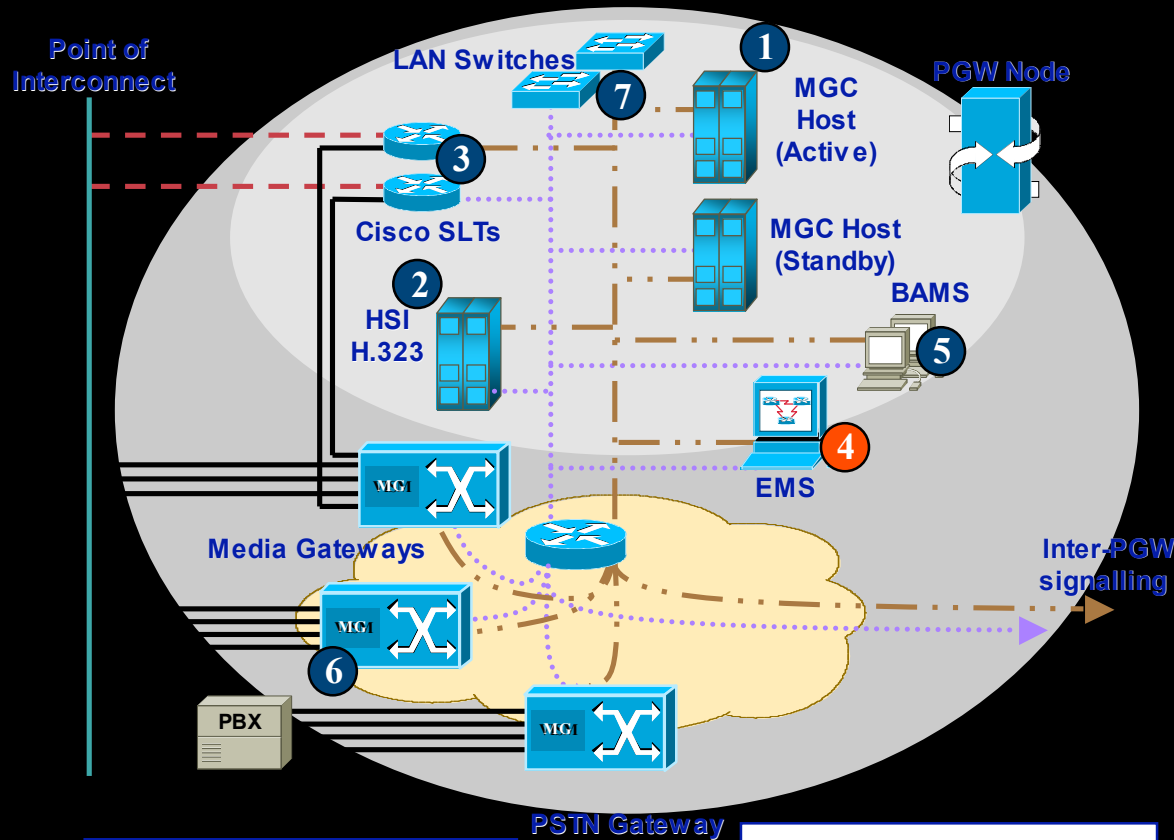**Signalling Link Terminals (SLTs) interface with the external network and have two functions.**

-Separating the signalling and bearer traffic in the T1/E1, where appropriate.

-Processing MTP1 and MTP2 locally, and sending MTP3 messages and above over RUDP to the MGC. Four links can terminate on each SLT

PSTN Gateway
- Components

Point of Interconnect

LAN Switches **1**

7

MGC Host (Active)

PGW Node

3

Cisco SLTs

MGC Host (Standby)

2

HSI H.323

BAMS

5

4

EMS

Media Gateways

Inter-PGW signalling

6

PBX

PSTN Gateway

- – – – SS7 & Bearer Link
- ·········· PRI
- ———— Inter Machine Trunk
- ·········· VLAN-1 Connection
- ·–·–·– VLAN-2 Connection

Components **4**

Element Management is provided through the following systems:

-VSPT, the GUI-based provisioning tool for the PGW 2200 and Voice Gateway elements

-CMNM, the EMS for the PGW 2200 node (including MGC, SLTs, LAN Switch and BAMS)

-UGM, the EMS for the AS5400 Voice Gateway

PSTN Gateway
- Components

Point of Interconnect

LAN Switches

1

7

MGC Host (Active)

PGW Node

3

Cisco SLTs

MGC Host (Standby)

2

BAMS

HSI H.323

5

4

EMS

MGi

Media Gateways

Inter-PGW signalling

MGi

6

PBX

MGi

PSTN Gateway
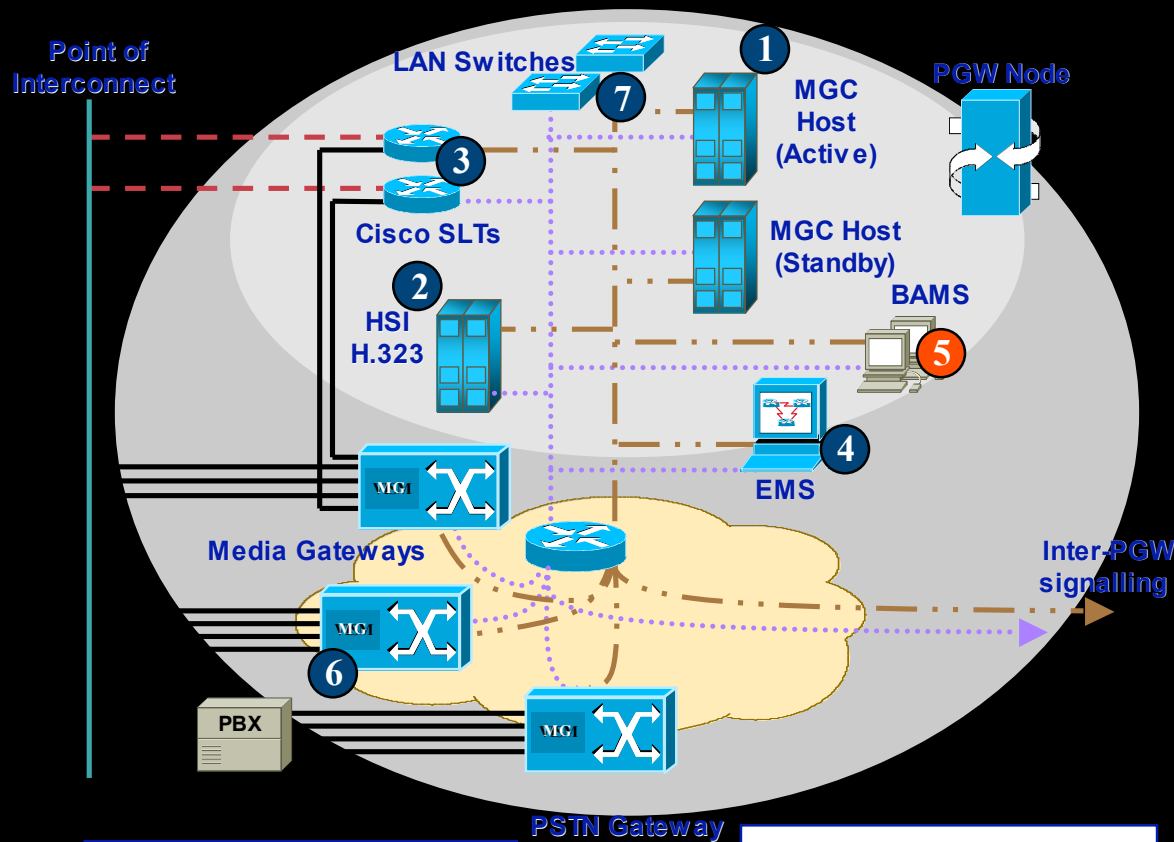
- – – – **SS7 & Bearer Link**
- .... **PRI**
- ——— **Inter Machine Trunk**
- .... **VLAN-1 Connection**
- –·–·– **VLAN-2 Connection**

Components   **5**

Billing And Measurement System (BAMS). This fault tolerant system provides translation of the binary Call Details Blocks (CDB) into CDRs in various formats (i.e. ASCII, BAF etc.)

Provides Peg counts and trunk occupancy information from the MGC (PGW 2200).

PSTN Gateway
- Components

Point of Interconnect

LAN Switches

1

7

MGC Host (Active)

PGW Node

3

Cisco SLTs

MGC Host (Standby)

BAMS

2

HSI H.323

5

4

EMS

MGI

Media Gateways

Inter-PGW signalling

6

MGW

PBX

MGW

PSTN Gateway

- — — SS7 & Bearer Link
- PRI
- —— Inter Machine Trunk
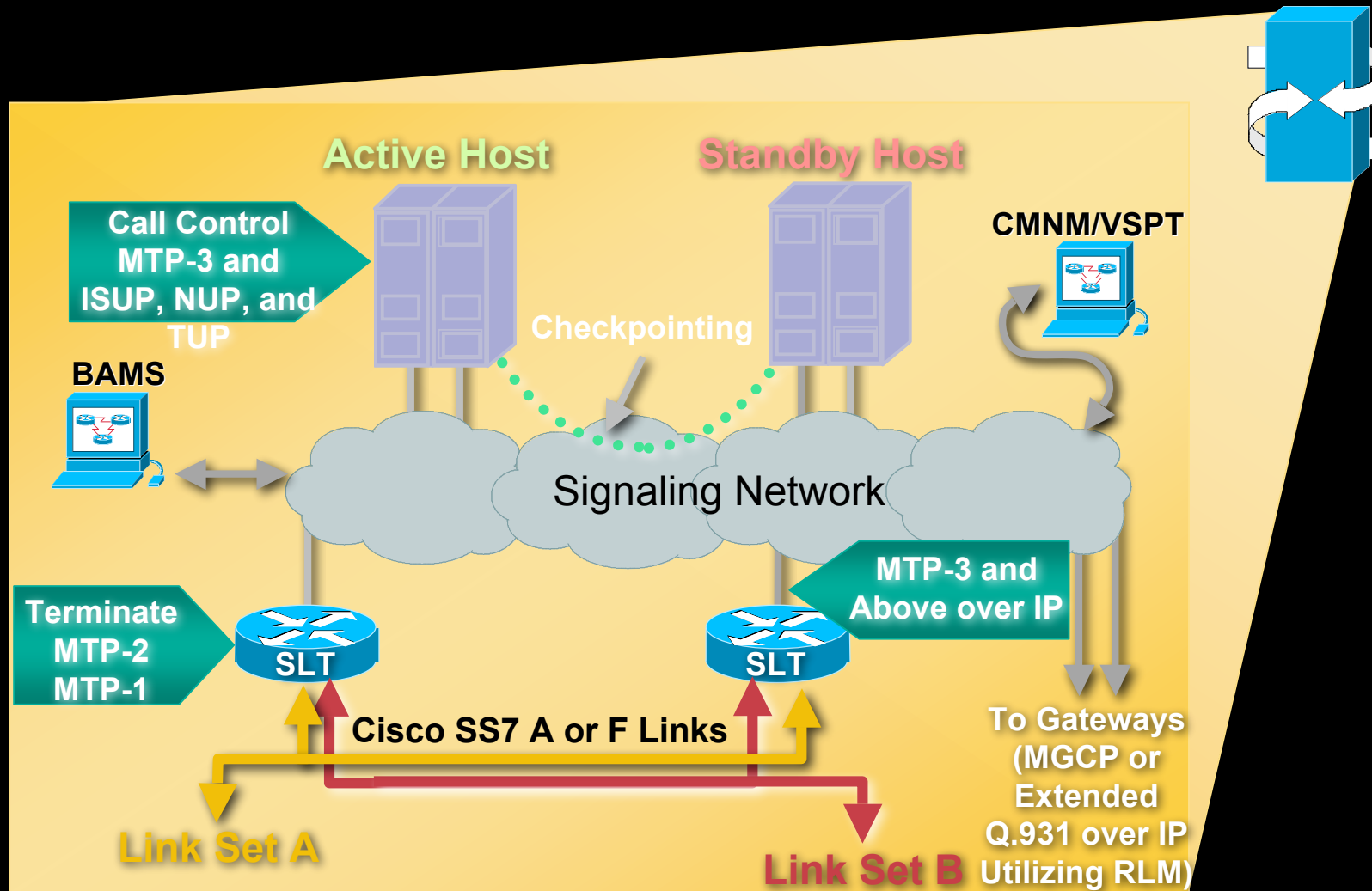- VLAN-1 Connection
- VLAN-2 Connection
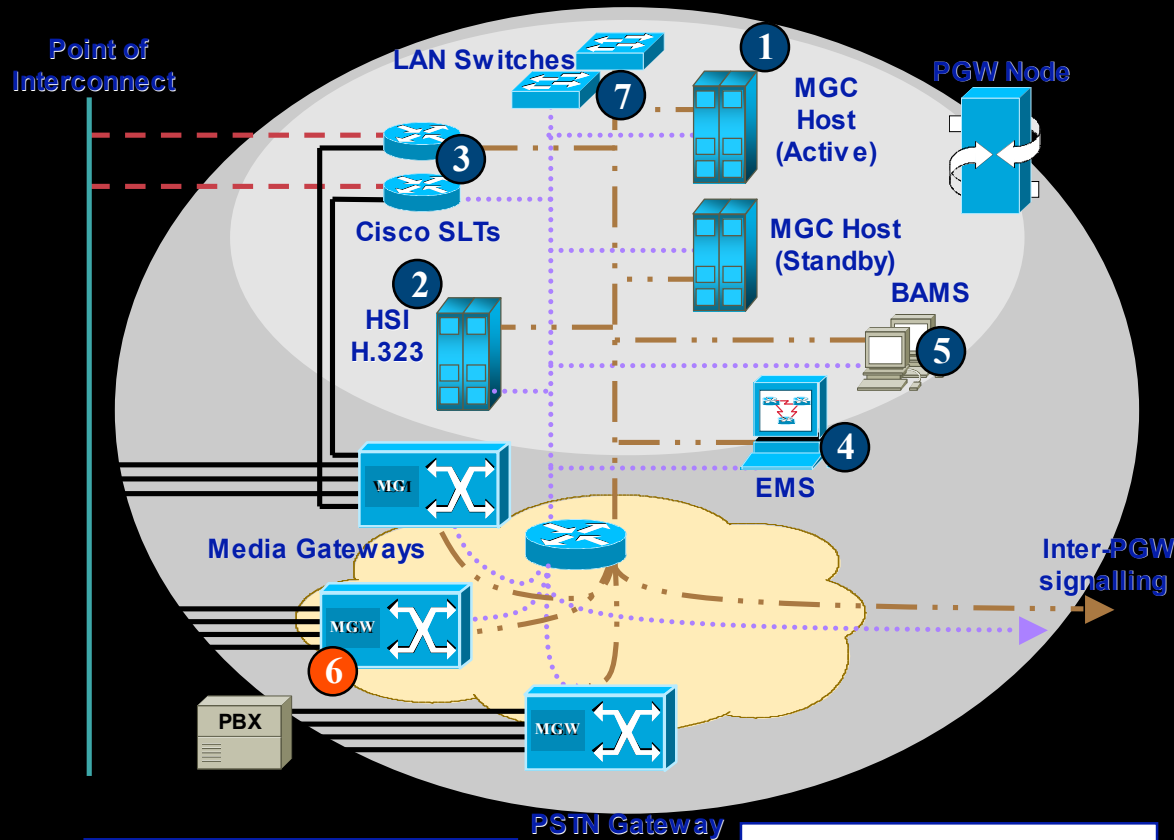
Components **6**

Media Gateway

The Media Gateway (MG). is the device that provides voice circuit to packet translation under MGC control.

The Media Gateway provides the CODEC, VAD, echo cancellation and packetisation facilities for transition between TDM and packet networks.

PSTN Gateway
- Components

Point of Interconnect

LAN Switches ① ⑦

MGC Host (Active) ①

PGW Node

MGC Host (Standby)

Cisco SLTs ③

BAMS

HSI H.323 ②

⑤

④

EMS

Media Gateways MGI

Inter-PGW signalling

MGI ⑥

PBX

MGI

PSTN Gateway
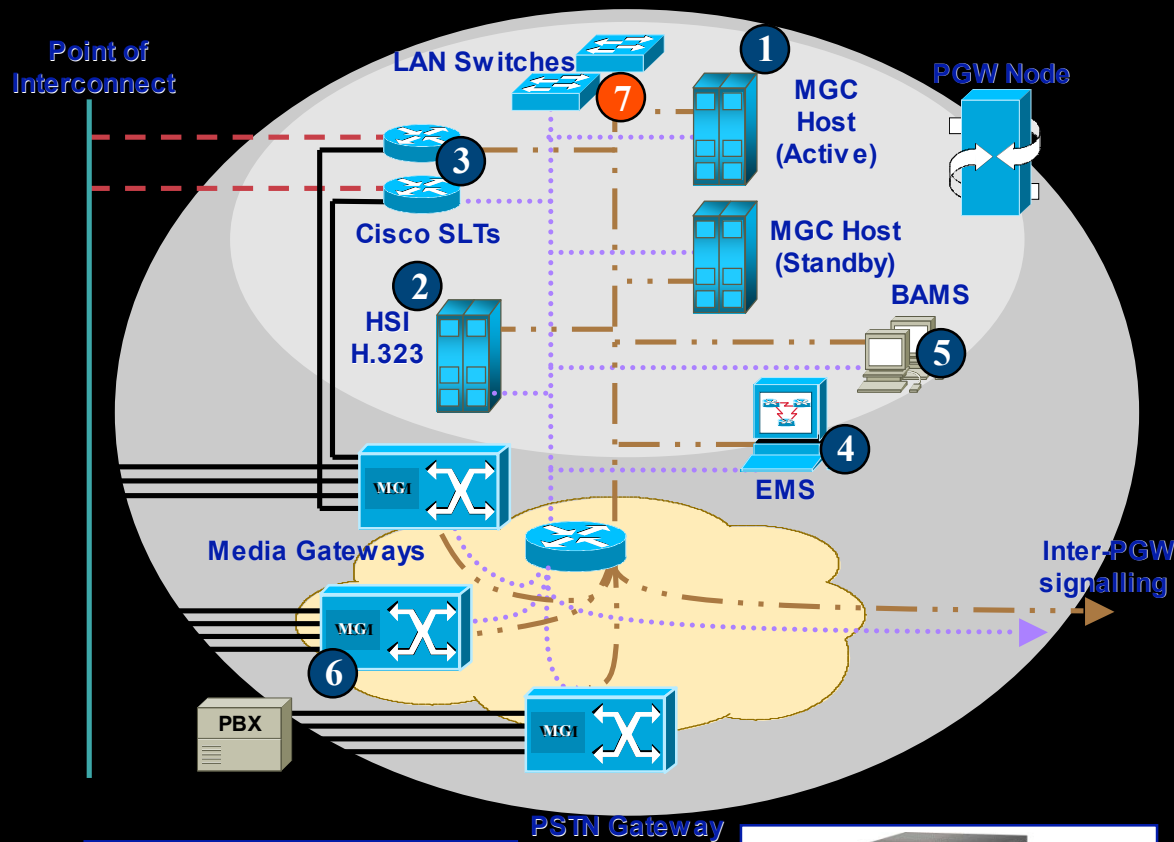
- – – – **SS7 & Bearer Link**
- .... **PRI**
- ———— **Inter Machine Trunk**
- .... **VLAN-1 Connection**
- –·–·–· **VLAN-2 Connection**

Components ⑦

LAN switches provide the two virtual LANs that give resilient internal communication inside the PGW 2200 node, and provide the IP connection points to the transit network.

PGW Redundancy

PGW 2200

Active Host

Standby Host

**Call Control
MTP-3 and
ISUP, NUP, and
TUP**

CMNM/VSPT

Checkpointing

BAMS

Signaling Network

**MTP-3 and
Above over IP**

**Terminate
MTP-2
MTP-1**

SLT

SLT

Cisco SS7 A or F Links

**To Gateways
(MGCP or
Extended
Q.931 over IP
Utilizing RLM)**

Link Set A

Link Set B

RVoBB Solutions Description and Services

What are Cisco Doing ?

- **Focussing on Broadband based approaches**

- **PacketCable VoIP with BTS10200**

  - **Full packet cable compliant architecture including call control**

- **VoIP over Broadband with CSPS and BTS10200**

  - **Key focus area with different architectural approaches depending on customer requirements**

  - **Operational services in Italy ,Sweden , Germany, Romania.**

Two Approaches to Consumer VoBB

- **Pure SIP Proxy based approach with CSPS**

  Simple "quick start" solution

  Small number of key features

  Basic deployment can support 20k subscribers and then grows in units of up to 20k

- **Call Agent/Softswitch and SIP B2BUA with BTS10200**

  Fully feature rich

  Integrated PSTN Gateway (in some EMEA geographies)

  Fully Integrated with cable infrastructure (Packet Cable certified)

  Mid range hardware platform can support up to 180k subscribers

CSPS Consumer Voice over Broadband

CSPS
- **Cisco develop Infrastructure SIP proxy server (incl Registrar)**
- **Transaction Stateful**
- **20k subscribers per far**
- **2 hardware platforms per farm**
- **Solaris or Linux**
- **Software only with hardware recommendation**
- **Integrated Provisioning & Management**

PGW 2200

SLT/ITP

CSPS Farm

SIP   SIP

AS5X00

SP IP Network

PSTN

AS5X00

Access Network

.... MGCP
— — · SIP
········ C7 ISUP
———— RTP

Voice Service Features
- **Call Waiting**
- **Three way conference call**
- **Call Forward Unconditional**
- **Call Forward no Answer**
- **Calling Number Identification Presentation**
- **Calling Number Identification Restriction**
- **LNP**
- **Redial on busy**
- **Emergency number management**

TV

External Interfaces

Subscriber Data
MySQL Server

Directory Services
Server

Routing Database
GKTMP Server

Directory Services
Server

Accounting
RADIUS Server

IP Phone
SIP Client

TDM-IP Gateway
SIP Client

SIP IP

Advanced Services
B2BUA

Advanced Services
Redirect

LRQ to H.323 Network

TRIP

Available Feature Summary

- RFC 2543 Compliance
- Proxy, Redirect, Registrar Srvr
- UDP Transport
- IPSec
- Access Control Lists
- Spiral Loop Detection
- Sip & Tel URLs
- Number Expansion
- Static & Dynamic Registrations
- ENUM Queries
- GKTMP Interface to Route Srvr
- Static Routes
- DNS SRV & A Record Queries
- LRQ Interface to H.323 Gk

- MySQL Subscriber Database
- Call Forwarding
- Digest, CHAP or Basic Auth
- Auth via MySQL or RADIUS
- Accounting via RADIUS
- Linux & Solaris Platforms

Cisco BTS Solutions Architecture
Access Agnostic Broadband VoIP Services

Cable

HFC Plant

MTA / EMTA / SMTA

uBR7246/ uBR10012

NCS
COPS

BTS10200

BTS10200
Cisco owned and developed softswitch platform
• Consumer VoBB Call Control
• Packet Cable Compliant
• MGCP/NCS end point control
• SIP end points (B2BUA)
• Direct PSTN gateway or via PGW200

LI Server
Media Server
Server
RKS Server
IVR Server

ETTx

ATA18X

Catalyst 3550

SIP/MGCP

Call Control

Network resources

DSL

SIP/MGCP

CPE

DSLAM   Aggr. Router

12000/10000/7xxx

CAT

PSTN

Wireless

SIP/MGCP

IP Backbone

ESR10000

MGX 8000
AS5xxx

CPE   **AGGREGATION**   **CORE**   **TRUNKING**

Cisco BTS 10200 Components

CA: Call Agent

The call agent (CA) component serves as a Call Management System (CMS) and Media Gateway Controller (MGC). It handles the establishment, processing and tear-down of telephony calls.

FS: Feature Servers

The Feature Server (FS) provides POTS, Centrex, Tandem and IN network services to the calls controlled by the CAs and also provides processing for service features such as call forwarding, call waiting, local number portability, etc.

EMS BDMS A

EMS BDMS B

CA FS A

CA FS B
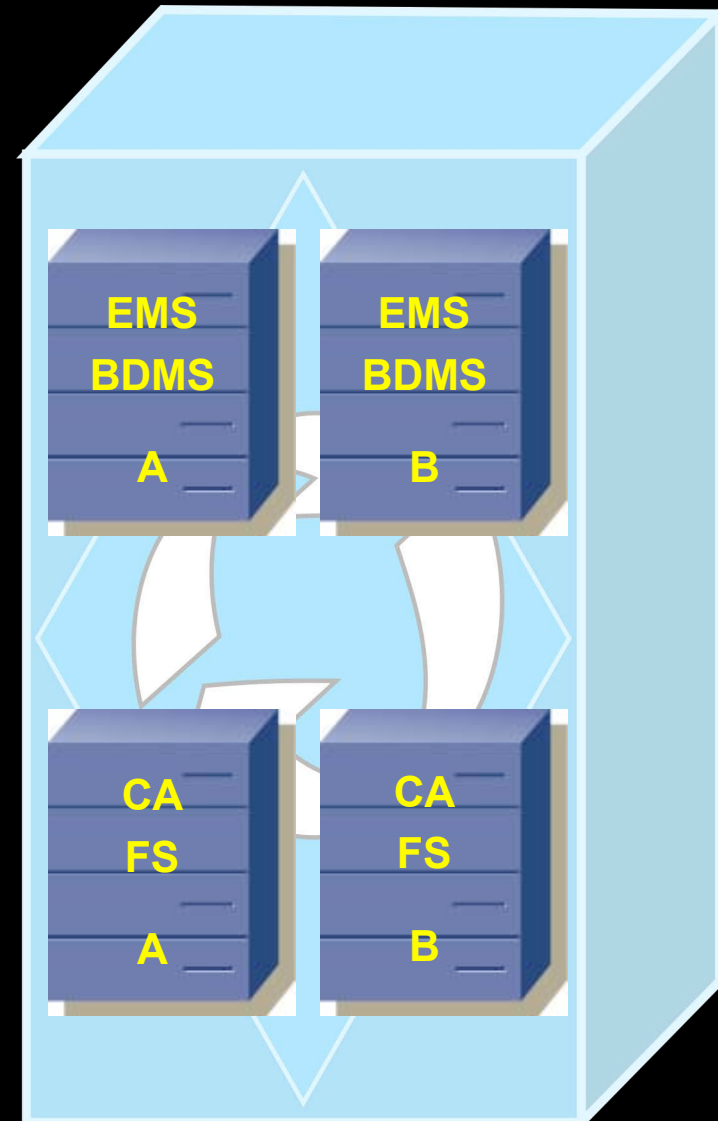
Protocol Support – Line Side

ATA18x

IAD24xx

Partner CPE

MTA

IP Phone 79xx
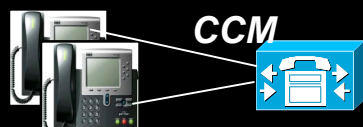
CCM

ITS
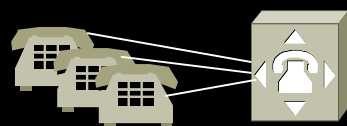
PBX
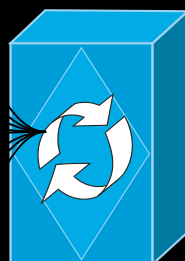
Protocol	Variants	Reference
MGCP	1.0	IETF RFC2705
NCS	1.0	Cable Labs Pkt-sp-ec-mgcp-i02-991201
SIP		IETF RFC3261
H.323	v1, v2	ITU H.323 v2
ISDN PRI	Cisco Call Manager Lucent/Avaya/AT&T - Definity G3 Nortel Meridian Toshiba - Strada DK424 Siemens - Hicom 300E Inter-Tel - Axxess 256	Telcordia TR-NWT-001268, SR-4994

Protocol Support – Trunk Side

MGCP

SIP/SIP-

AS5xx0

H.323
AS5xx0

SS7
ITP
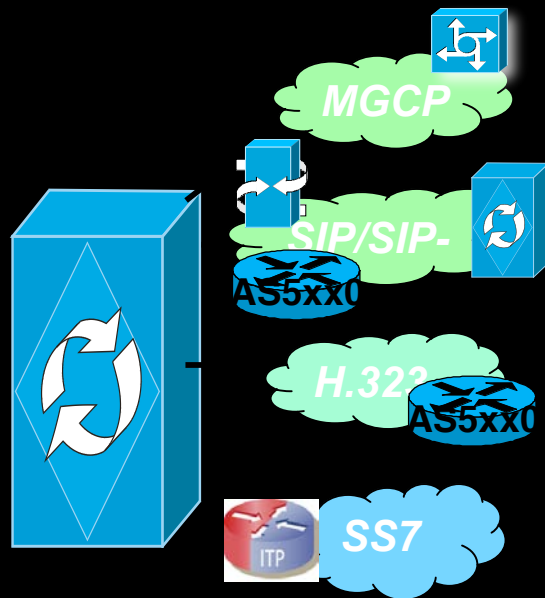
Protocol	Version	Reference
MGCP	1.0	IETF RFC2705
SIP SIP-T		IETF RFC3261 IETF *Draft-ietf-sip-isup-00.txt*
H.323	v1, v2	ITU H.323 v2
ISUP	ANSI ITU China Mexico	Telcordia GR246/317, ANSI T1.113 ITU Q.761-764, 767

BTS10200 - Subscriber Features on Analog Phones

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 Line ID Presentation (CLIP)
Calling Line ID Restriction (CLIR)
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)

Enhanced Services
Anonymous Call Rejection (ACR)
Hotline and Warmline Services
Selective Call Forwarding (SCF)
Selective Call Rejection (SCR)
Selective Call Acceptance (SCA)
Remote Activation of Call Forwarding (RACF)

Class of Service Restrictions
Casual Call Restrictions (101XXXX)
Toll Restrictions
Black and White Lists (Number Blocking)
Blocking of 900, 976 Calls
Blocking DA Calls
Blocking of National Operator Assistance Calls
Blocking of International Operator Assistance Calls
Number Blocking

BTS10200-Number Translation & Platform Features

Numbering Plan, Dial Procedures and Translations

Casual Dialing (Dial Around)(101XXXX+Digits)
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

Directory Services (411,555-1212, 0+Listing Services)
Easily Recognizable Codes (500, 700)
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
Account code collection based on call type
Remote Call Forwarding
ANI Delivery and Blocking
DNIS Outpulsing and Overflow Treatment
Incoming 800 Service
Test Calls (958,959)

Platform Features

Voice Mail Support
IVR Support
Intercept and Call Failure Treatments
Dynamic Announcements Support
Call Detail Blocks to Provide traditional and Packet billing information
CODEC Negotiation
Call Admission Control via RSVP
IRDP Redundant links fail-over and switch-over

Operational Features

Work-Group for multi-level security
Command Line Interface (CLI)
- CLI Scheduler
- CLI Session Control
- DB Threshold Report
- Menu-driven CLI
- Menu Assisted Commands (MAC)
- Web-based HELP

XML over CORBA Provisioning
System Hardware/Usage Monitor
Alarm/Event message queuing by demand
Audit/Fresh Download Active/Standby CA/FS databases

BVS Solutions Description and Services

Cisco Business Voice Solution (BVS)

- **Enables Service Providers to deliver** revenue generating services **based on Cisco IP Communications to enterprises and SMBs**

- **Allows Enterprises and SMBs to** mix and match deployment models (own premise vs. SP's Data Center) and management options (self vs. SP-managed) **for IPC services across various locations**

- **Ensures** application inter-working, feature transparency, and PSTN connectivity **for business voice services across a range of IP and TDM deployment options**

Cisco BVS – Business Voice Services Description

- The SP iBVS Solution enables Service Providers to deploy a portfolio of managed voice services to offer any combination of services including:

- **Business Voice Access, ie TDM PBX and IP PBX Trunking**

    Access to PSTN

    Virtual BRI/PRI service with onnet calls routing, centralized PSTN breakout, International long-distance

    DPNSS/Q.SIG Backhauling for TDM PBX enable IP PBX migration

    CallManager and CallManager Express interconnection

    - **Voice VPNs**

    Access to remote sites with voice VPN

    TDM/IP PBX Interconnection with support of private numbering plans

- **Hosted CallManager Services**

    Hosted IP Telephony Services

    Carrier Scale Cisco CallManager Services

Cisco SP Business Voice Solution
A Distributed Architecture for Managed/Hosted IPT

Cisco.com

Operations and Management

AAA

Performance, Fault, Provisioning Servers
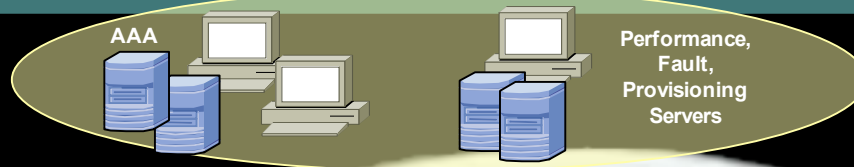
Cisco SP Business Voice Solution Reference Architecture

Multi-Service Applications

Unity VM/UM 1:1

Apps Servers

3rd Party VM/UM

VM

Cisco Softswitch
PGW2200

MCU / H.320 GW

ISDN / H.320

MCM MCM MCM

1:1 CCM

PSTN

PSTN/VoIP Interconnect

V

Video NW

GK GK GK

Voice Application Functional Area

SP QoS IP Network

SCCP SRST

CCM Cluster

IPCC

Unity VM/UM

CME

VoIP GW/IAD

TDM PBX

IAD

CP

SP Hosted Cisco CallManager

Managed Cisco CallManager

Managed CallManager Express

VoIP CPE GW with TDM PBX

IAD w/ analog phones
(w/ BTS only)

End Customer Deployment Options

36

Cisco SP Business Voice Solution
Enabling a Portfolio of Business Voice Services

Service Provider Services

Business Phone Services	Site-to-Site Voice	PSTN Access	Unified Communications	Enhanced IP Services XML, IPCC, Video Conferencing

Remote Network Management and Operations

Call Routing	Scalability	Security, QoS	Regulatory LNP, LI	PSTN Connectivity	Call Accounting

SP Business Voice Infrastructure

Customer Options
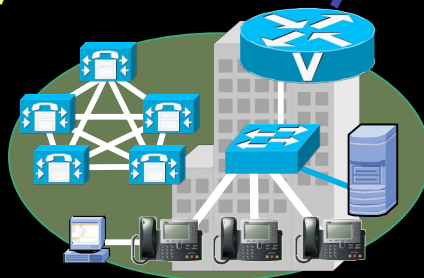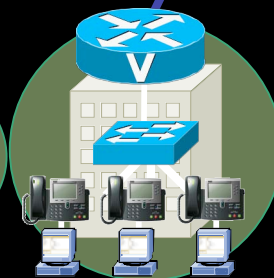
Managed Cisco CallManager (CCM)	Hosted Cisco CallManager (w/SRST failover)	Managed Cisco CallManager Express (CCME) <120 seats	Managed VoIP GW with TDM PBX/KTS	Managed IAD w/ Analog Phones
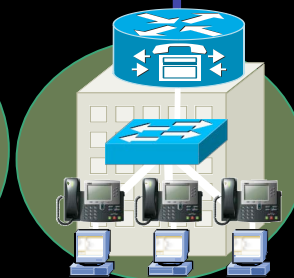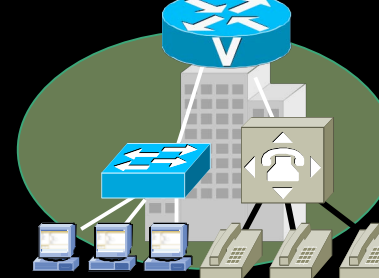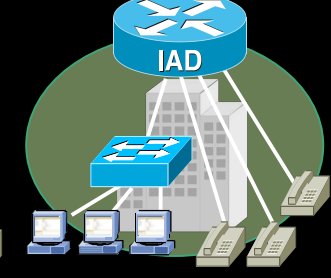
37

Portfolio of Service Provider Operated Services Enabled by the Business Voice Solution

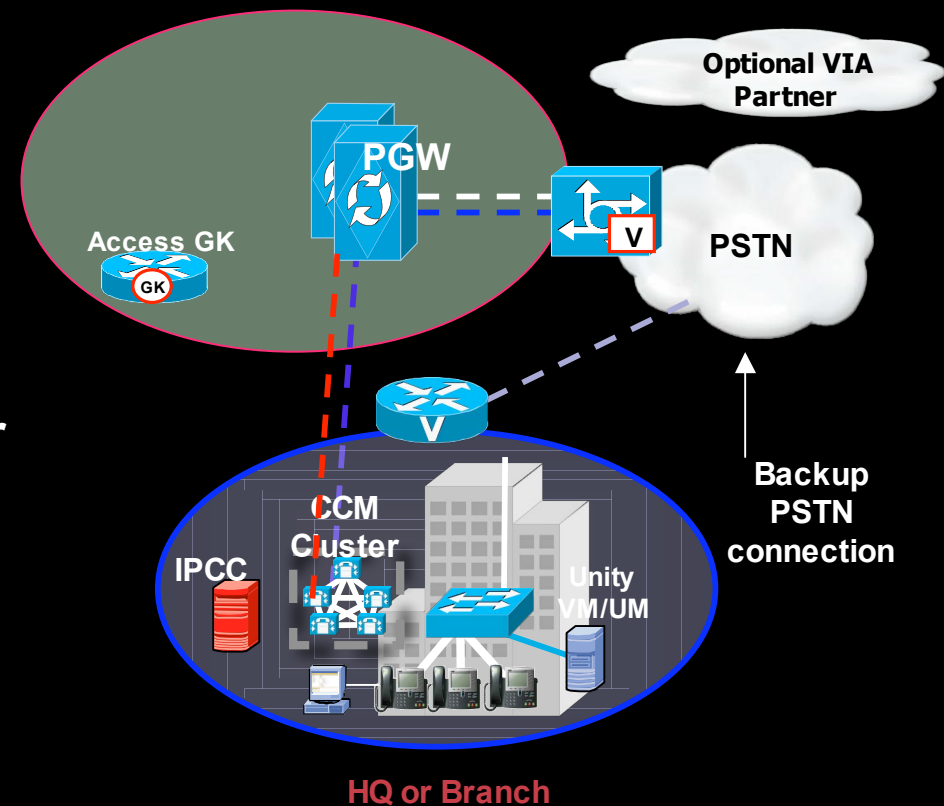| End User Service	Business Voice Services Descriptions
Business Phone	**Provides IP subscriber and group calling features, such as paging, intercom, 3-way conferencing, hunt groups, call forwarding, call transfer, etc. on a range of CPE options (CallManager, CallManager Express, Remote IP Phones, legacy PBX w/ GW)**
Site-to-Site Voice	**Enables a company to use the service provider's VoIP infrastructure for Toll Bypass among its distributed sites and branches. With this service, a enterprise can preserve its custom dial plans and gain new features such as abbreviated extension dialing.**
PSTN Access	**Connects all enterprise branches and sites to the PSTN, either using the service provider's VoIP infrastructure or a VoIP gateway on the customer premises. Supports call routing policies, e.g., least cost, time of day, etc.**
Unified Communications	**Managed and 1:1 hosted Unified Communications (voicemail, email, fax, find/follow me).**
Enhanced IP Services	**Hosted applications for IP Phones (e.g. vXML), IP Conferencing services, Managed/Hosted IP CC, Managed/Hosted Video Conferencing, etc.**
Remote Network Operations	**Manage customers' IPT CPE & networks, including remote fault monitoring, performance management, configuration, MACs, etc**

SP Premises Based CallManager

- **A single CallManager cluster is allocated for each customer**

- **Hosting in the Service Provider NOC eliminates CCM NMS access issues**

- **Requires backup mechanism in the event that WAN Transport link goes down: Skinny SRST**

- **VM through Cisco Unity**

Unity VM/UM

Apps Servers

Optional VIA Partner

1:1 CCM

PGW

PSTN

SCCP SRST

SCCP SRST in the Edge Router

Backup PSTN connection

HQ or Branch

SCCP phones

– – –	**SIP (CCM 4.0)**
– – –	**H.323**
– – –	MGCP
– – –	**SCCP**
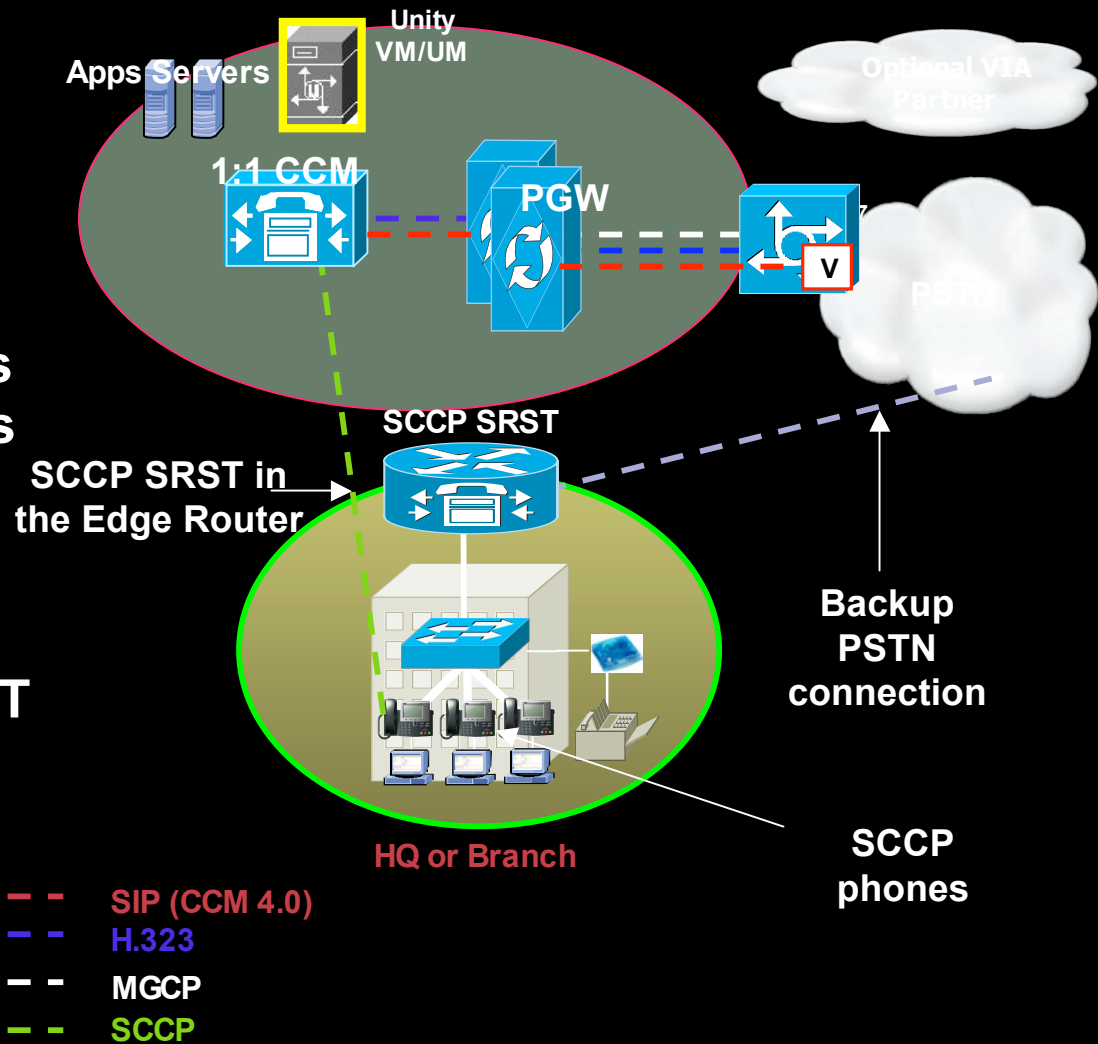
Managing/Interconnecting Cisco CallManager (CCM)

- Cisco CallManager offers medium to large enterprise customers an IP PBX solution for up to 30,000 users

- Provides feature rich IP enhanced productivity applications

- CallManager resides on customer premise

- CallManager may also provide centralized call control for smaller remote offices

- SP provider can provide day 2 managements for customer CCM

- SP provides VoIP PSTN interconnection

- PGW interconnect to CCM with either SIP or H.323

Optional VIA Partner

PGW

Access GK

GK

PSTN

V

Backup PSTN connection

CCM Cluster

IPCC

Unity VM/UM

HQ or Branch

- - - SIP (CCM 4.0)
- - - H.323
- - - MGCP
- - - SCCP

Managed/Interconnect CallManager Express

- Cisco IOS CPE performs local IP telephony call control

- Offers turnkey IP telephony for new SMB offices (up to 120 users)

- End customer uses VoIP for internal, site-to-site, and PSTN offnet calling

- PGW supports separate dial plans for each customer to allow for private and overlapped dialing

- Allows migration of traditional keyswitch customers to IP based solution

- VM through centralized third-party or unity or through customer premise unity or CUE

- SIP or H.323 interconnection to PGW

VM

PGW

Optional VIA Partner

Access GK

GK

PSTN

CME and CUE in the edge Router

CME

Backup PSTN connection

SCCP phones

Managed CME

- - - SIP
- - - H.323
- - - MGCP
- - - SCCP
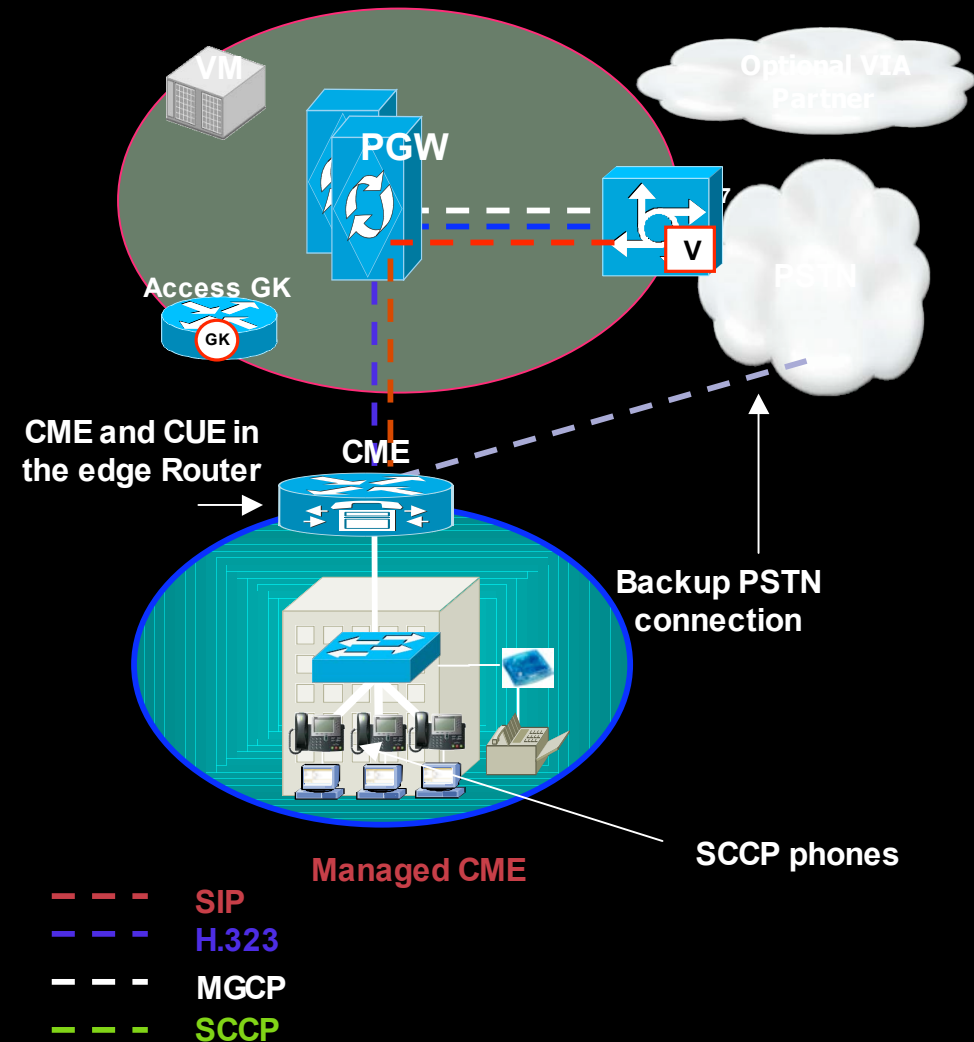
Managed GW: PBX Interconnection

- Cisco IOS GW CPE Front-ends a Traditional PBX

- Service Provider manages the GW and/or provide PSTN off-load

- Enables Migration of Existing TDM PBX Customer to IP Data/Voice Convergence with Minimal Investment

- Enables Customer benefit from IP Data/Voice Convergence with Minimal Investment in CPE

- Branch Offices Use VoIP for PBX Tie-Line and PSTN Offnet Calling

- Customers May Upgrade to IP Telephony (IP PBX) When Ready

- MGCP is preferred signaling protocol, SIP/H.323 also supported

- Support many PBX signaling interfaces: Q.Sig, DPNSS, ISDN variants and CAS

VM

PGW

Optional VIA Partner

PSTN

VoIP GW

Backup PSTN connection

PBX/ KeySystem

E1, BRI Or Analog

Managed GW

- - - SIP
- - - H.323
- - - MGCP
- - - SCCP
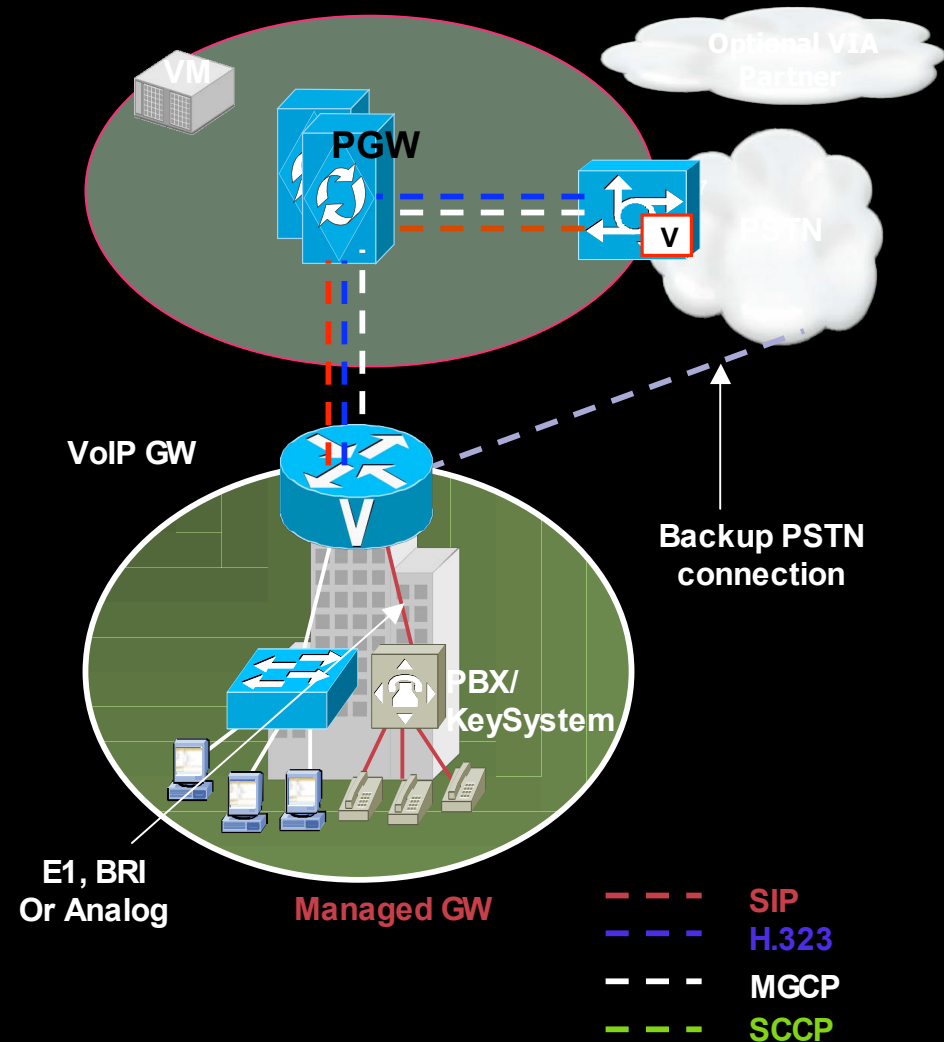
iBVS – Hosted or Managed CallManager

- **A partitioned CallManager service allowing a single CallManager to be virtualized across a number of Enterprise customers**

- **Cisco Call Processing and Routing with a comprehensive provisioning layer, enhanced applications, and multi layered administration**

- **Provides a short ROI with a web based, solution wide, bulk provisioning system and ability for subscribers to self provision revenue generating features**

- **Includes the worlds most widely deployed IP telephony system and VoIP softswitch for unprecedented PSTN and IP network connectivity**

Cisco Integrated Business Voice Services

iBVS Scope

SERVICE PROVIDER SERVICES

Business Phone Services	Voice Call Routing Intra and Inter	PSTN Access	Unified Commun- ications	Enhanced IP Services

Remote Service Management and Operations

Site-to-Site Call Routing	Scalability	Security, QoS	Regulatory LNP, LI	PSTN Connectivity	Call Accounting

SP Business Voice Infrastructure

CUSTOMER DEPLOYMENT OPTIONS
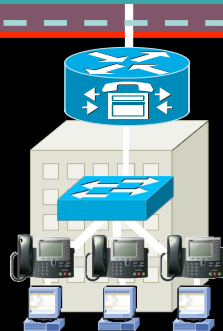
Enterprise VoIP Interconnect
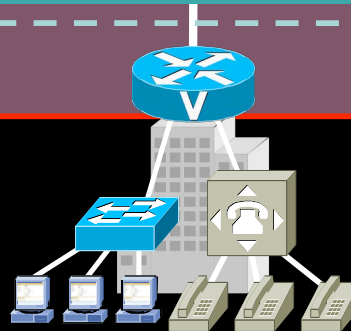
Managed VoIP GW Fronting TDM PBX
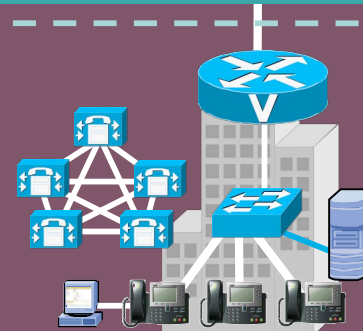
Managed IP PBX Customer Premise
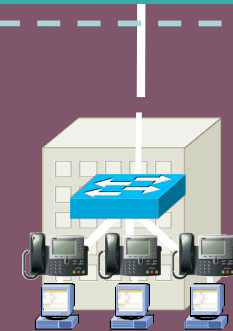
SP Hosted Call Control & applications

Integrated Business Voices Services

Vision OSS Provisioning

Netwise Attendant Console

App Servers

Distributed AS5x00 / VIXM

IP Unity Voicemail

Cisco Call Manager Cluster

Cisco Softswitch (PGW-2200)

Cisco H.323 Gatekeeper

GK

Q.SIG/ DPNSS

PSTN

PSTN

SS7

SIP/MGCP Core Network

PIX Firewall

Company A

SRST

Company B

SRST

Company C

SRST

Company D

SRST

Company E

SRST

Hosted Multi Tenant Cisco Call Manager

Call Manager Cluster

Legacy PBX Interconnection

Managed Cisco Call Manager

iBVS Program

- **A solution aimed at Outsourcers and Service Providers catering for a key aspects of BVS plus the addition of partion-able hosted call manager services**

- **Solution designed and verified by Cisco**

- **Solution incorporates**

  Cisco Call Processing (CCM, PGW and Gatekeepers)

  Cisco VoIP gateways and IP Phone technology

  A 3rd party "application enablement" layer from Vission OSS

  Enhanced applications from Netwise and IP Unity

- **The solution caters for a number of deployment models**

  Large (Hosted) Enterprise

  "Service Provider" managed Multi Site Multi Geography Enterprises

  "Service Provider" managed Business Park (a subset of the above)

iBVS Deployment Models

- **Service Provider Hosted IPT services (M clusters – N customers)**
  - **Multi-cluster**
  - **Multi-site**
  - **Multi-tenant**
  - **Multi-national**
- **Large, Complex Enterprises (M clusters – 1 customer) – e.g. Bank, Government**
  - **Multi-cluster**
  - **Multi-site**
  - **Single-tenant / Multi-business unit**
  - **Multi-national**
- **Business Park/Internet City (1 cluster – N customers)**
  - **Single-cluster**
  - **Single-site**
  - **Multi-tenant**

BVSM – Simple Web GUI Interfaces

What is a Session Border Controller ?

| Signaling IWF | + | Address & Port Translations | + | Security | + | Billing and CDR Normalization |

| + | QoS and BW Management | + | Rich Signaling (TCL, Rotary) | + | Media IWF (DTMF, Codec) |

- **SBC is a tool kit of functions**
- **Desired Functions**
  - **Protocol Interworking**
  - **Address Hiding, Security**
  - **Media Interworking**
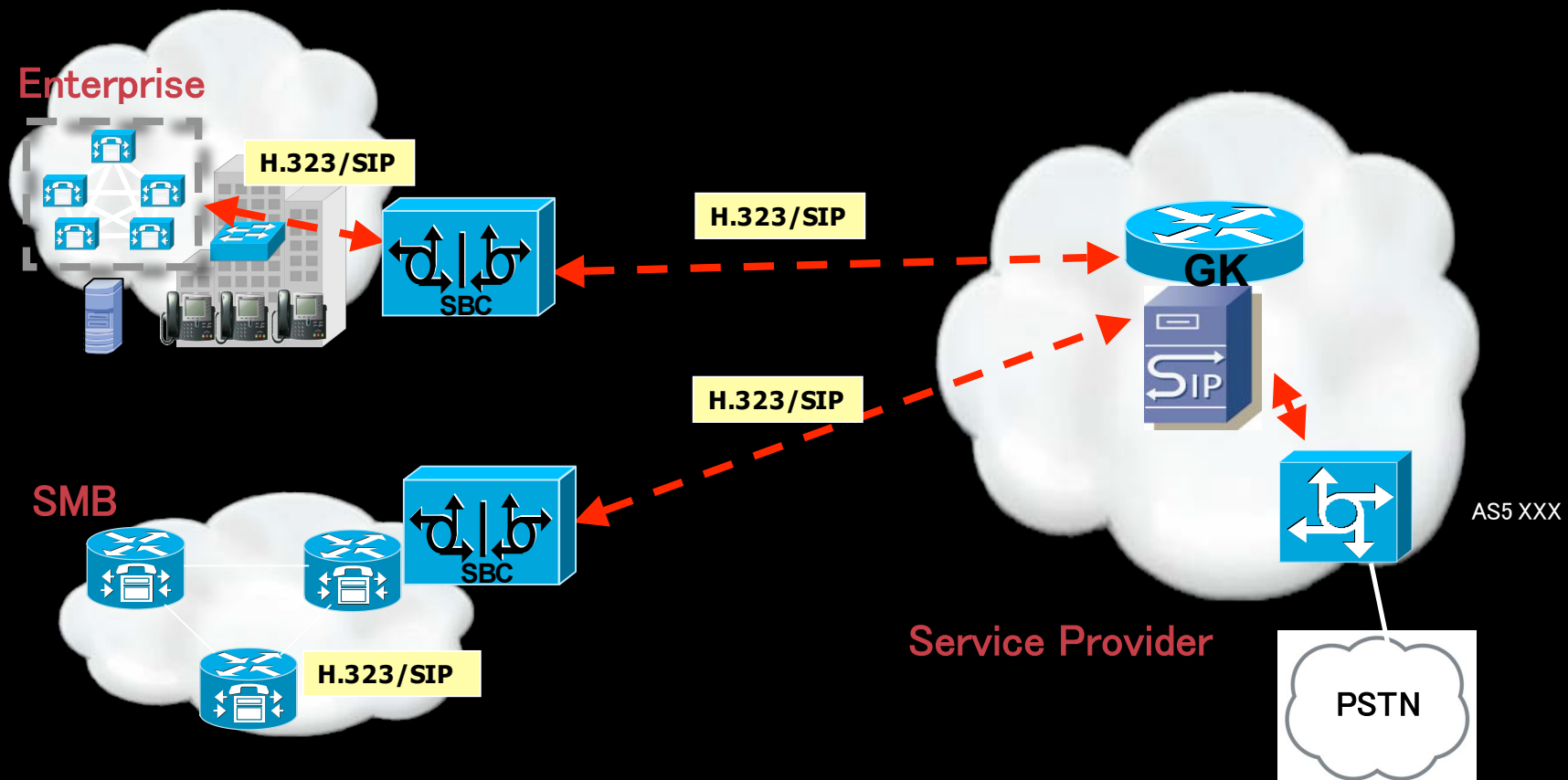 - **QoS**
  - **Call Admission Control**
  - **NAT Traversal**
  - **Billing**
  - **Lawful Intercept**

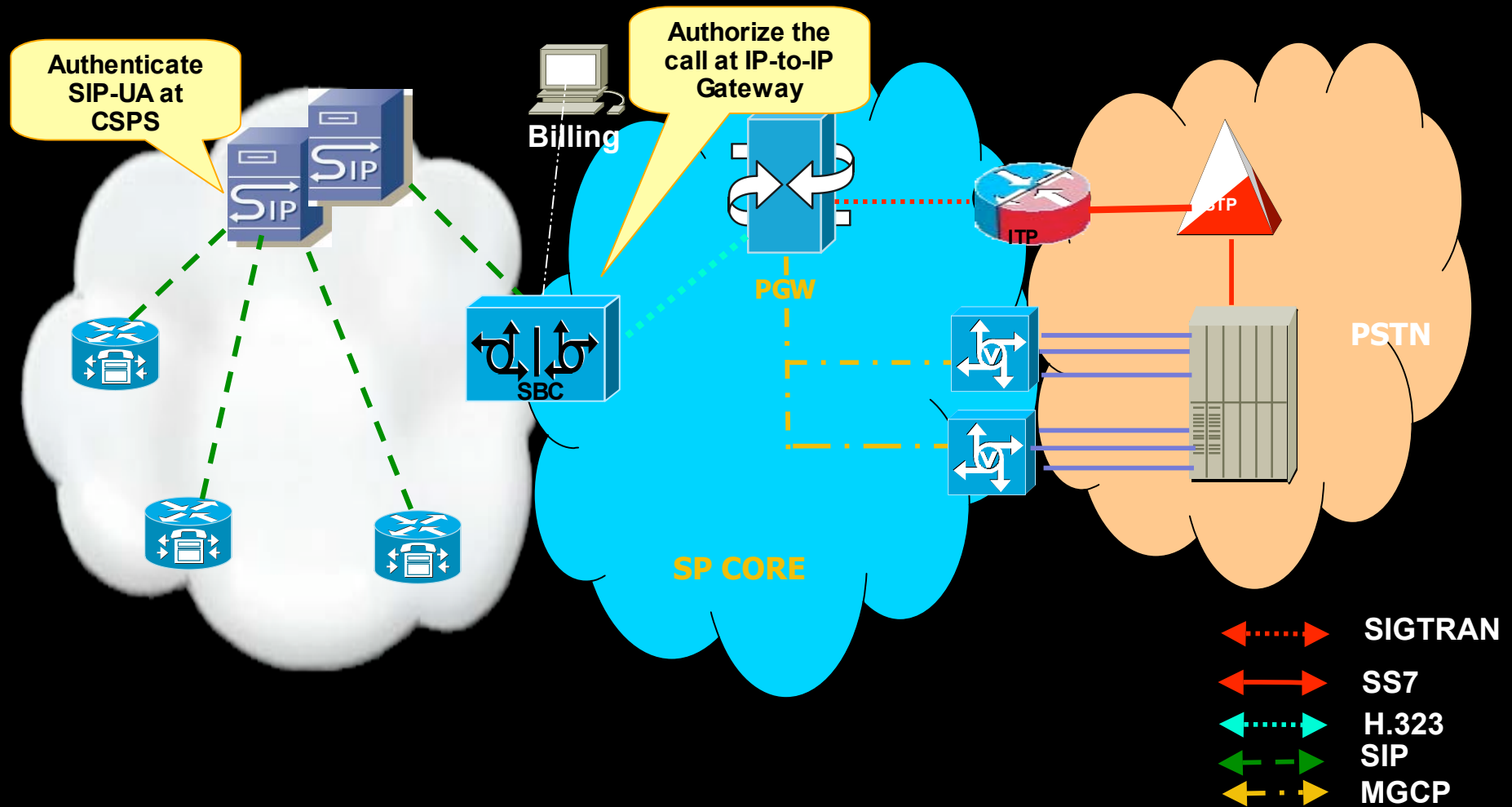# Deployment Scenarios

- **Intra Enterprise**

- **Enterprise to Service Provider**

  Customer Edge

  Service Provider Edge

- **Service Provider to Service Provider**

- **Residential to Service Provider**

Enterprise to Service Provider

Enterprise

H.323/SIP

SBC

H.323/SIP

GK

SIP

AS5 XXX

SMB

SBC

H.323/SIP

H.323/SIP

Service Provider

PSTN

51

Enterprise to Service Provider

Authenticate SIP-UA at CSPS

Authorize the call at IP-to-IP Gateway

Billing

PGW

SBC

ITP

STP

PSTN

SP CORE

SIGTRAN

SS7

H.323

SIP

MGCP

Features At a Glance

| Protocols H.323 and SIP

Interworking
•H.323 <> H.323
•H.323 <> SIP
•SIP   <> SIP | Media Modes
•Flow-Through
•Flow-Around

DTMF Conversion

Transcoding
•G711u- G729r8 | Quality of Service

•DSCP Marking

•IP Precedence

•LLQ | Call Admission Control
•Max Connections

•RSVP

•IP Circuits | •Billing

•TCL/VXML

•Cause Code |

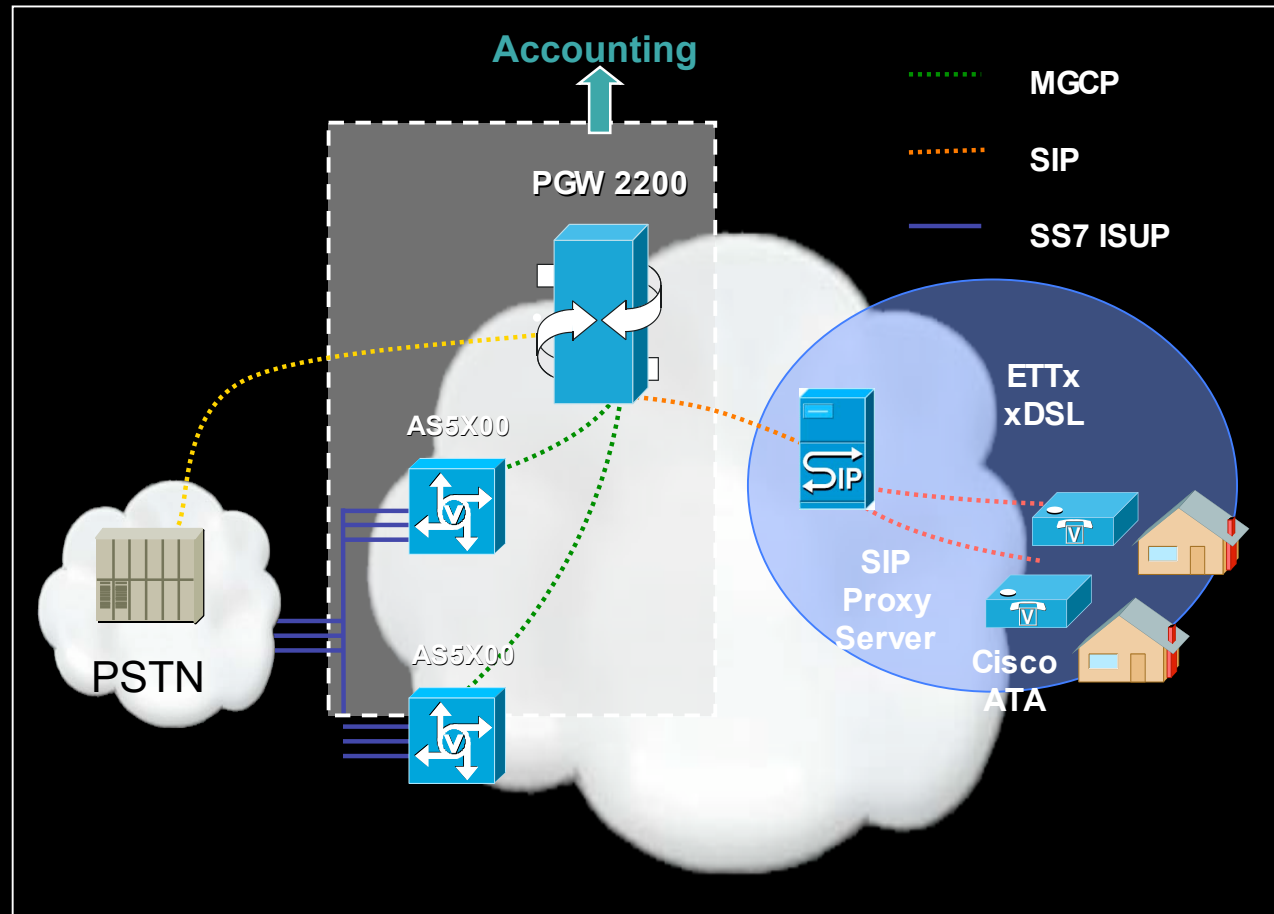## Topology and Address Hiding

Case Studies

Live Deployment : B2
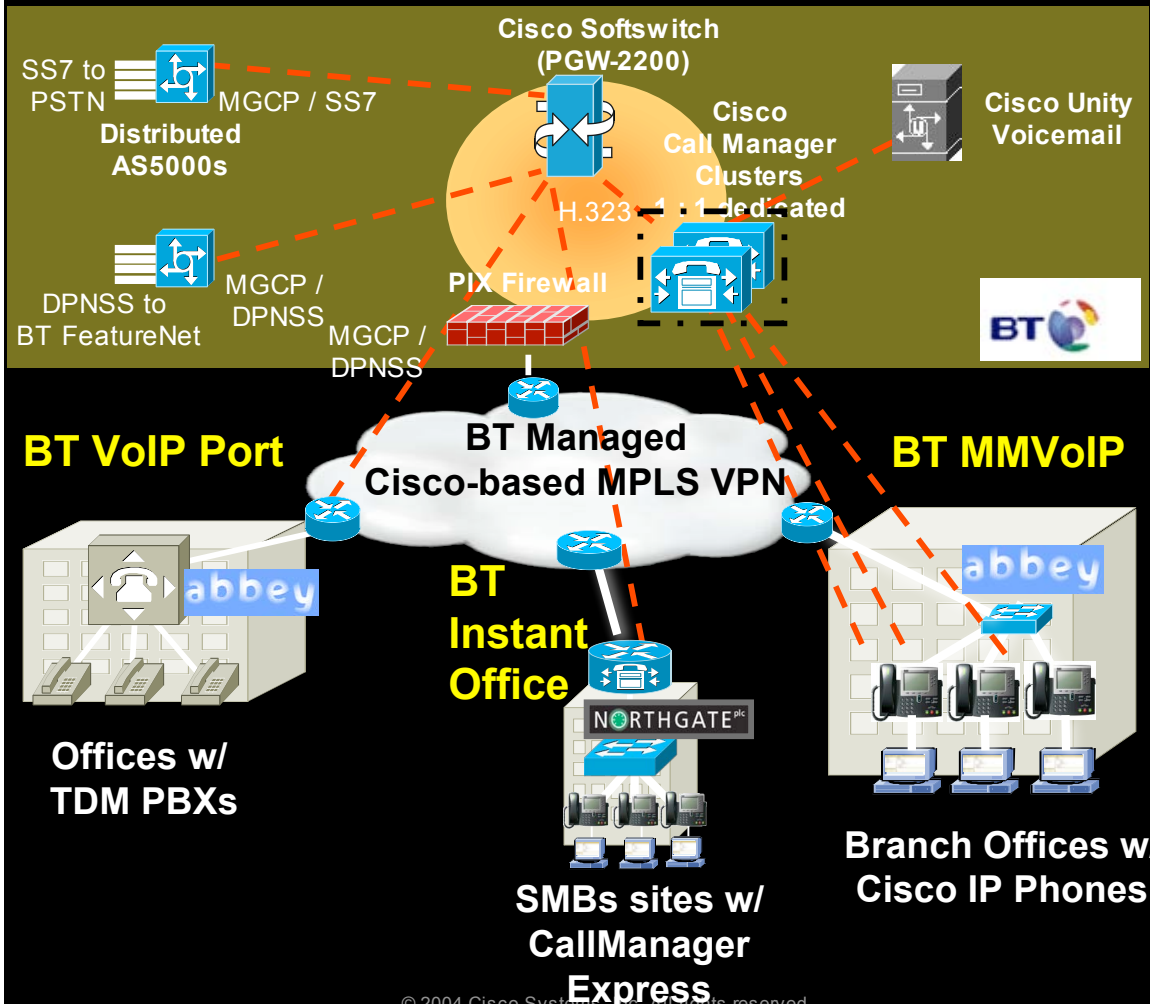
Cisco.com

Primary line Telephony over Ethernet

- Free on-net calls
- Billed off-net calls
- Call Waiting
- Three way conference call
- Call Forward Unconditional
- Call Forward no Answer
- Calling Number Identification Presentation
- Calling Number Identification Restriction
- LNP
- Redial on busy
- Emergency number management
- VXML Gateways used for Subscriber Auto-Provisioning

Accounting

PGW 2200

AS5X00

PSTN

AS5X00

········· MGCP

········· SIP

——— SS7 ISUP

ETTx
xDSL

SIP
Proxy
Server

Cisco
ATA

Business Voices Services Case Study:
British Telecom – Hosted CallManager

BT's Business Voice Services

Cisco Softswitch (PGW-2200)

SS7 to PSTN — MGCP / SS7

Distributed AS5000s

Cisco Unity Voicemail

Cisco Call Manager Clusters 1 : 1 dedicated

DPNSS to BT FeatureNet — MGCP / DPNSS

H.323

PIX Firewall

MGCP / DPNSS

BT

BT VoIP Port

BT Managed Cisco-based MPLS VPN

BT MMVoIP

BT Instant Office

NORTHGATE plc

Offices w/ TDM PBXs

SMBs sites w/ CallManager Express

Branch Offices w/ Cisco IP Phones

abbey

---

abbey

- **6th largest bank in U.K.**
- **Targeting IPC for comp. advantage**
- **32 HQ Offices - DPNSS TDM PBX interworking w/ IPT & IP VPN to replace leased lines (VoIP Port)**
- **750 Branch Offices**
  - **were on mix of FR, ISDN, DSL KTS**
  - **migrated to high speed networks w/ IP Phone connectivity to Voice VPNs & BT managed CCM (MMVoIP)**

Key Benefits:
- **Network consolidation**
- **Improved branch capabilities**
- **Improved flexibility & efficiency**
- **Millions of pounds in cost savings**

NORTHGATE plc

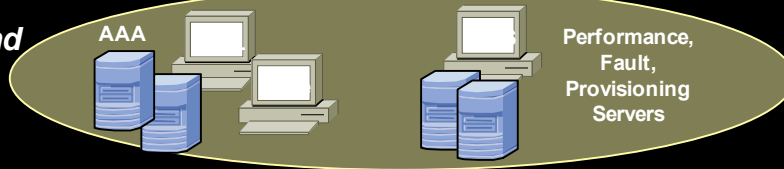- **Commercial Car/Truck rental**
- **30 Offices deployed (Instant Office)**

Key Benefits:
- **Rapid new site deployment**
- **Low TCO**

Business Voices Services Case Study:
China Unicom – Hosted CallManager

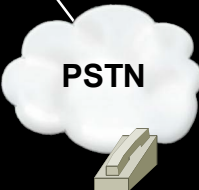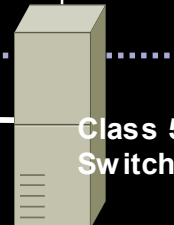China Unicom

Operations and Management

AAA

Performance, Fault, Provisioning Servers

GSM CDMA

Trunking GW

Media Servers
(CALEA, Conferencing, VMail)

China Unicom

Unicom's Chengdu Control Center

BTS 10200

EMS

Class 5 Switch

CCM

CA

H.323

MGCP

SCCP

GK

GK

PSTN

Unicom's Sichuan MPLS MAN

Business IP Phone

VoIP Access GW

Business Analog Phone

IAD

PBX

Deployment Scenarios

Key Features/Services

- *CallManager IP Phone services, PSTN connectivity (local & LD), voice mail, FAX over IP, etc.*

- **NGN packet network supports** *bundled data/voice/video* **and single bill convenience**

- **Supports multiple access technologies for** *high end customers with IP Phones*, **and** *low end legacy customers* **with TDM PBX, IAD, ATA, FXS**
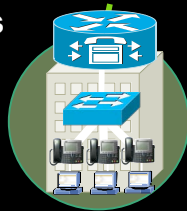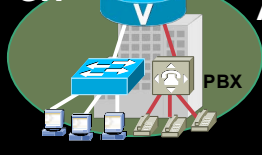
Market Insertion Approach

- **Bundled voice/data/video services to** *small and medium-sized businesses averaging 100 phones*, **as well as** *high-end multi-tenant communities* **pre-wired for broadband**

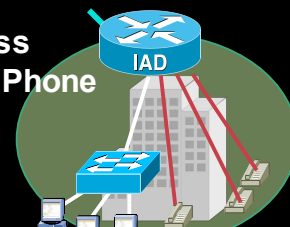- **Sichuan province IP network 10 cities and 97 exchanges**

Key Customer Wins

- **Currently over 50 customers with total of 7,000 subscribers**

- **Adding 1,000 subs/month**

"… Unicom's bundled IP telephony and data service is 20-30% cheaper than alternatives, and we like having a single bill from one service provider for all communications services."

- Mr. Li, General Manager, Sichuan West Information & Networks

Business Voices Services Case Study:
Equant – Managed CallManager

Global Container Shipping
180 locations, 32 countries

- 113 sites installed on Equant IP VPN
- 33 sites using Equant Voice VPN
- 5 sites with fully managed IP Telephony

Key Benefits:

- Productivity Applications:

    Supply-chain mgmt, E-Logistics, E-Learning, efficient communication
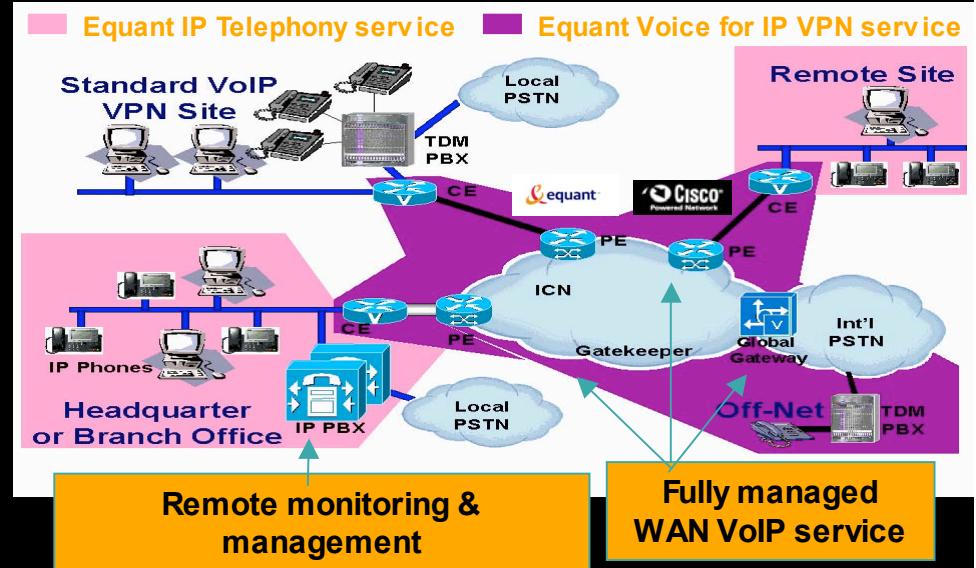
- Global Support, SLAs, Low TCO

Japan Tobacco International
230 locations, 40+ countries

- Outsourced IP VPN, Voice VPN, Managed LAN IPT, Contact Centers

Key Benefits:

- Low TCO, easy MACs, new apps e.g. SAP

Equant IP Telephony service — Equant Voice for IP VPN service

Remote monitoring & management

Fully managed WAN VoIP service

- End-to-end IP voice/data services over Cisco Powered MPLS network
- Equant Voice for IP VPN service offered in 93 countries
- Equant has 130 multinational customers using its Voice for IP VPN service, more than 10% of Equant IP VPN customers
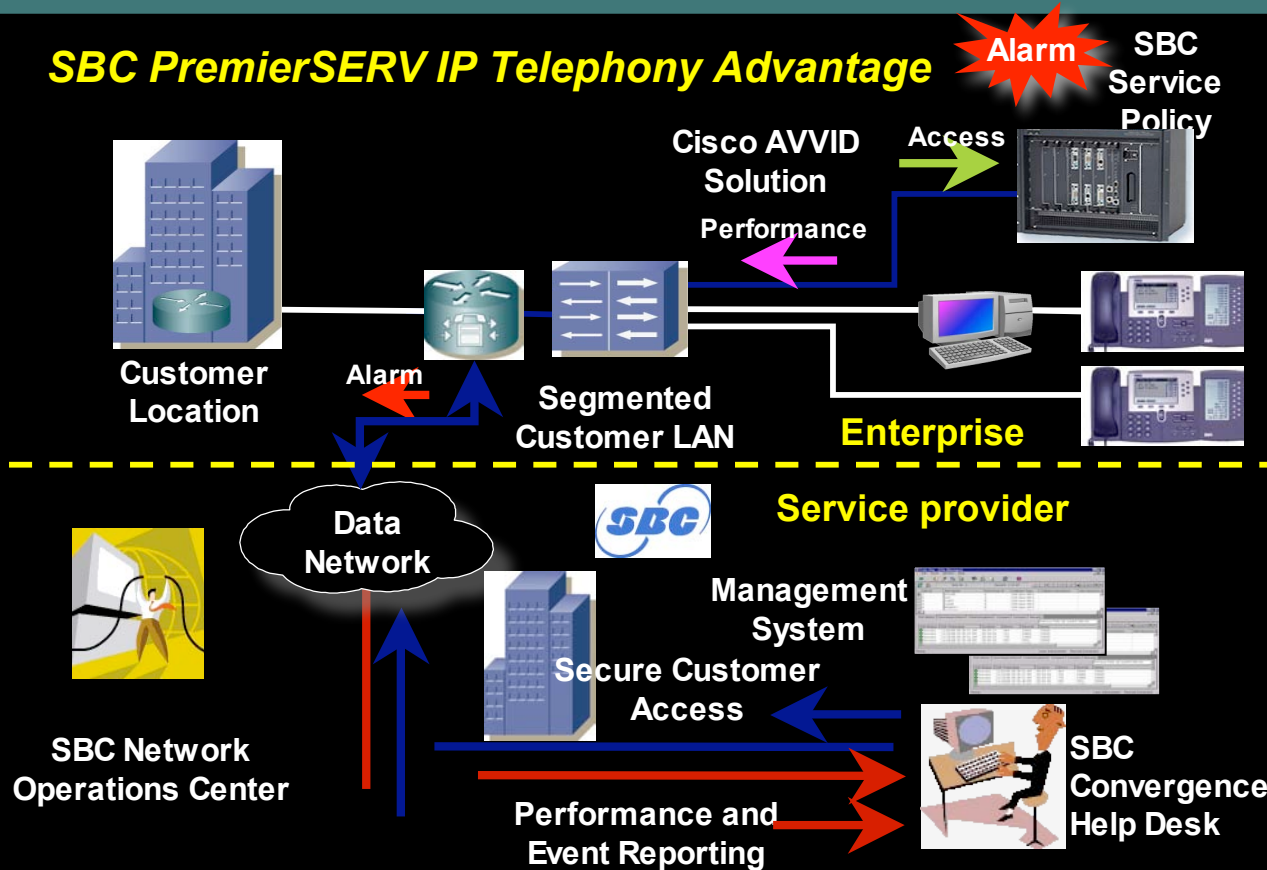- Fully managed service, SLAs, global support capability

Business Voices Services Case Study:
SBC – Managed CallManager

SBC PremierSERV IP Telephony Advantage

Alarm

SBC Service Policy

Cisco AVVID Solution

Access

Performance

Customer Location

Alarm

Segmented Customer LAN

Enterprise

Data Network

Service provider

Management System

Secure Customer Access

SBC Network Operations Center

Performance and Event Reporting

SBC Convergence Help Desk

- *Proactive remote IPT Monitoring & Management 24x7x365*
- *Performance Reports, SLAs, Administration Options*
- *Secure Remote Access for Diagnostics*
- *Target SMB market, drive up managed services "attach rate", cross-sell other managed services (WAN, IP VPN, firewall, etc.)*

Mt. San Jacinto College — come soar with us!
- **Needed to replace out-dated 12-year-old TDM PBX system**
- **SBC deployed Cisco IPT solution, prof. services and SBC managed IPT services**

Key Benefits:
- Network consolidation
- Will enable video and XML
- $80K/year maint. savings

The Latin School of Chicago
- **Not able to get user and mgt. features from prior Centrex svc**
- **SBC installed & managed IPT**

Key Benefits:
- IPC Personal Assistant productivity at no extra cost

BALL STATE Federal Credit Union Online
- **Inflexible Centrex with high opex**

Key Benefits:
- SBC managed IPT enables better customer contact svcs
- Mobile access to network

Business Voices Services Case Study:
FastWeb – Managed CallManager Express

SMB Bundle **Easy Inclusive Office (activation: 185 €)**
Always on Internet at 10 Mbps (or DSL 2Mbps)
5 Mailboxes w. Antivirus/Spamm
5 Internet Access
Unlimited on-net voice call
Local (20h) National (10h) calls **160 €**

Voice, Video and Data Bundles

Solution:

- **Cisco Access routers with managed CallManager Express (CCME)**
- **Lower TCO for SMBs** – Integrated telephony functionality Cisco 1751/2691 platform
- **Customized telephony – CCME** lets customers pick and choose features
- **Expanded managed service offering**

Results

- **Significant increase in new customers –** Over 900 CCME customers; 80+ new subscribers/mo

FastWeb One (Voice over IP for SMB)
IP Phone activation fee **55 €**
IP Phone monthly rental (depends on type) **33-83 €**
Switch monthly rental **48-128 €**
Voice traffic **add €**

Flat Voice Option
Free local and national long distance calls: **€ 20/seat**

Security
VPN activation **300 €**
VPN monthly rental **150 €**
Firewall activation (<10 users, 11-44) **100-200 €**
Firewall monthly rental (<10 users, 11-44) **50-100 €**
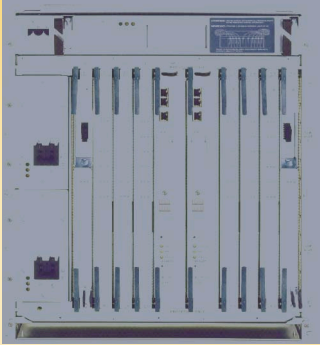
Cisco Broadband Product Positioning

High Level Broadband Product Positioning

B-RAS

Cisco 10000

Cisco 7301

Cisco 7200

LNS

Cisco 7301

Cisco 10000

Cisco 7200

Metro Aggregation (N-PE)

Cisco 7600

B-RAS – Product Positioning

Distributed

Cisco 7301

Cisco 7200

- Co-located with DLSAM clusters
- Typically < 4000 Subs
- Non Redundant configuration
- Highly price sensitive

IP Core

Direct B-RAS Connections (ATM/Ethernet)

CO's

DSLAMs

Access Network Connections (ATM/Ethernet)

Semi Distributed

Access Network

- Dark fiber or L2 Access connection to DSLAM
- Typically 16,000 Subs
- Comprehensive QoS
- Redundancy Highly Desirable

IP Core

Centralized

Access Network

- Up to 32,000 Subs
- Fully Redundant
- High port density
- Complex QoS
- Scalable Services

IP Core

Cisco 10000

63

LNS Positioning

Cisco 7200

Cisco 7301

7200/7301 is ideal when

Moderate scale and performance

Security functions are implemented at LNS (NBAR, CBAC, IPv6..)

Support per session QoS

Ideal when entry price is important (pay as grow modularity)

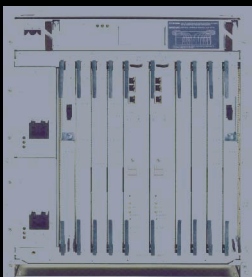## 10000 is ideal when

Cisco 10000

High and consistent Performance (3Mpps)

Security functions implemented with external device

Limited per-session QoS is a requirement

Single network management entity is preferred

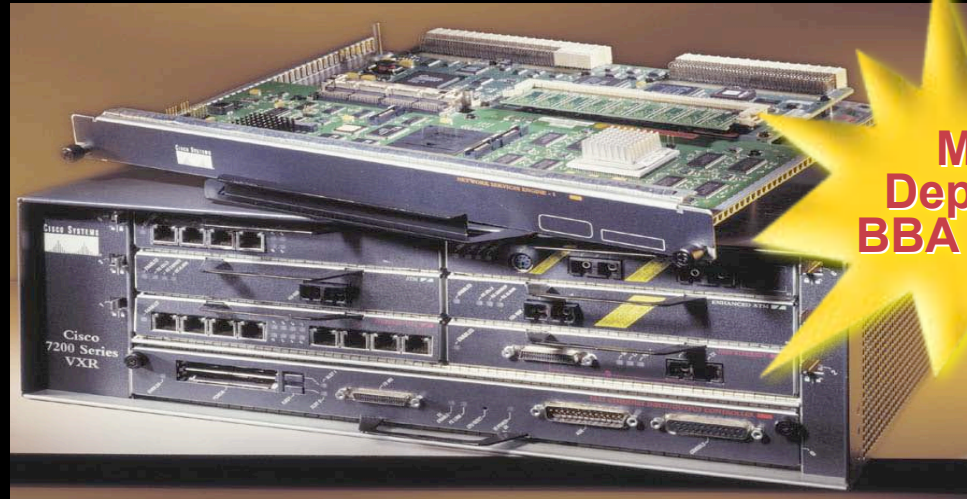Ideal when B-RAS+LNS required in the same platform

Cisco 7200 for Small PoP/ Distributed LAC/
Over 30,000 Broadband routers in production

BB Density

- 48 T/E1 ATM
- 4 OC3 ATM
- 6 DS3 ATM
- 6 GE / 9FE

Most
Deployed
BBA Router

PTA or LAC Features

- 16K subscribers (40Kbps per subscriber)
- 16K L2TP Tunnels
- 1 Mpps CEF (with NPE-G1)
- 3 10/100/1000 ports on board
- 8K VC per slot (Double Delux PA-A6)
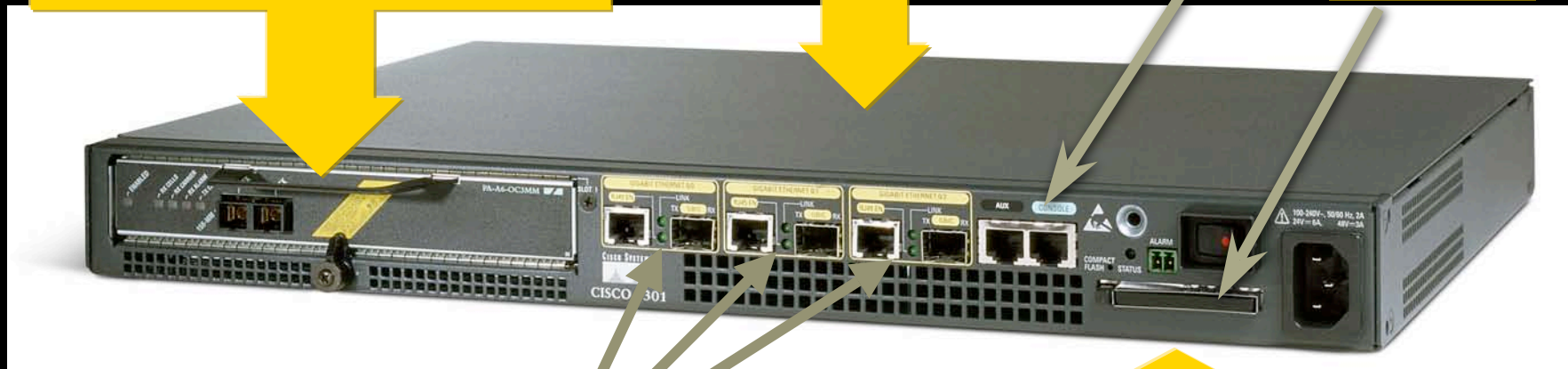- 16K VCs and 16K VLANs

7301-BB Features – LNS Lead Platform

40 Interface types
1 standard 7xxx PA slot
ATM - DS3 / OC3 / IMA
ISDN - 4 or 8 PRI
Ethernet- 2FE or 1GE
VAM2 - 3DES encrypt

NPE-G1 Processor
1Mpps

Aux & Console port

FLASH

Fixed on chassis
Copper & GBIC
3 x   10/100/1000

1 Rack Unit with front-back airflow
Dual AC/DC Power Supplies
75 Watts draw

Cisco 10000 with Broadband Aggregation
Non-Stop performance without compromise

- **Highest Density Broadband Box on the market**
  - **61,500 sessions / 10,000 L2TP tunnels**
- **Highest availability for lowest operational costs**
  - **Full hardware redundancy**
  - **Fully redundant processors (RPR+)**
  - **Single and Multi-Router APS for all SONET Line Cards**
- **Fully converged Broadband and MPLS PE Leased Line Solution**
- **Broadest portfolio of wholesale and retail IP services for greater revenue opportunities**
  - **PPPoX, 1483, RBE**
  - **LNS / Managed LNS / PTA / Multicast**
  - **IP QoS**
  - **RA-MPLS**
- **Hardware acceleration for line-rate performance with multiple simultaneous IP services**

Cisco 10000 Router:
Non-Stop Performance
Without Compromise

Q&A