Cisco Expo 2007

Service Provider Voice Architecture

Ruediger Hartmann

ruhartma@cisco.com

Enable Your Network
Empower Your Business

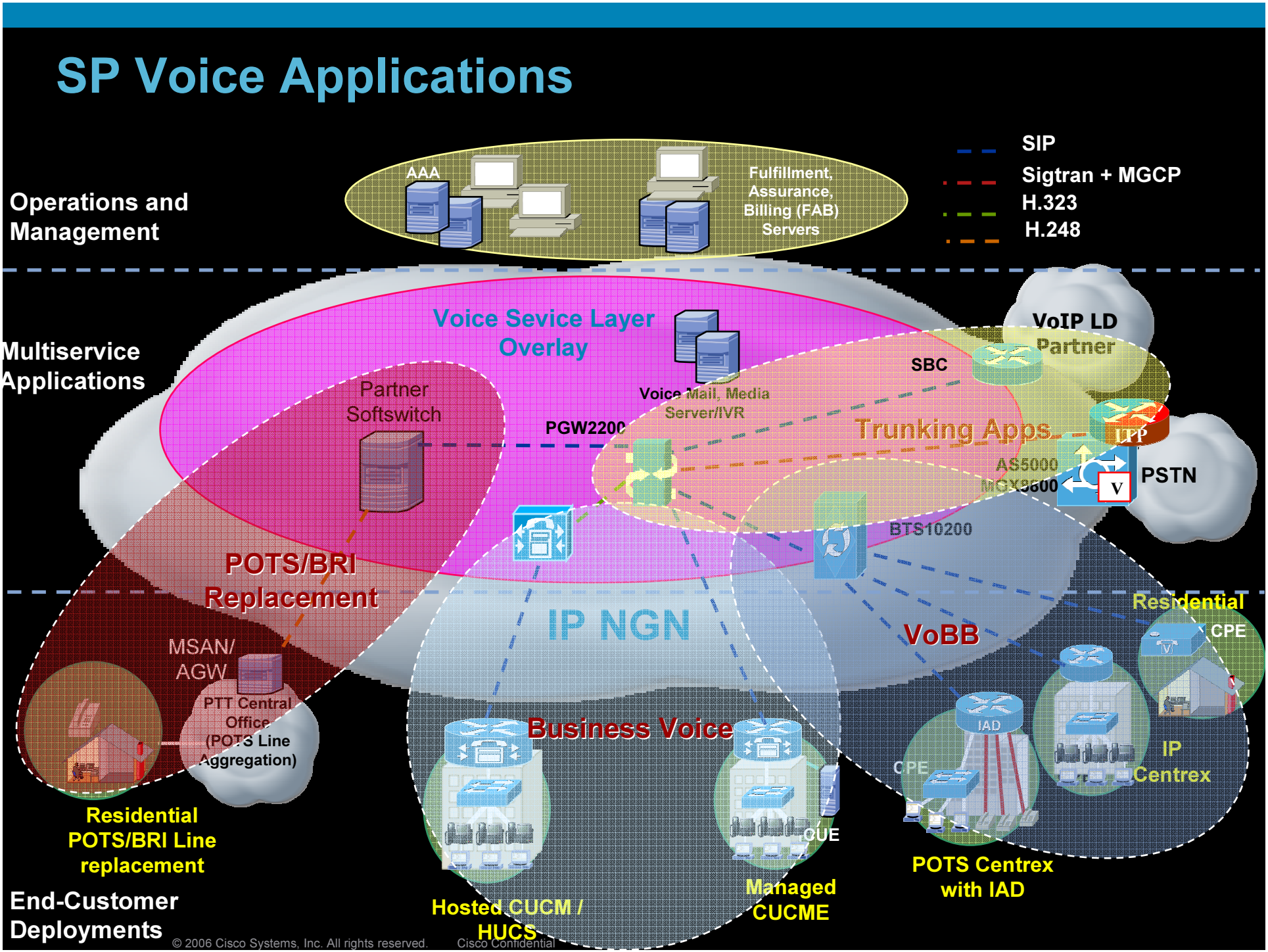
Dissecting the End User Segments/Needs

	Residential	Very Small Business	Small Business	Medium Business	Large Business
Phones per business	1-2	1-8 1 site	8-24 1-2 sites	24-250 1+ sites	250+ 1+ sites
Typical non-Voice Services	HSD, IPTV	HSD	HSD, IP-VPN, Security, Surveillance	HSD, IP-VPN, Security	HSD, IP-VPN, Security
Typical Vertical	Consumer	Proprietorship, SoHo, Professional Offices (e.g.:doctor, lawyer)	Retail, Franchises, Professional Offices (travel, insurance)	School, Wholesale, Resort	Finance/Banks, Hotel Chain, Hospitals, Universities, Manufacturing, Department Store Chain
Common Needs	Voice, Internet, TV, Zero Touch	Voice, Internet, Zero Touch	Voice, Internet, Intranet, Surveillance, Telecommuting, Backend Integration, Zero Touch	Voice, Internet, Intranet, Telecommuting, Guest Services, Backend Integration	Voice, Internet, Intranet, Telecommuting, Guest Services, Conferencing, Backend Integration
Voice Feature Richness	Basic, Regulatory	Basic	Enhanced	Demanding	Very Demanding

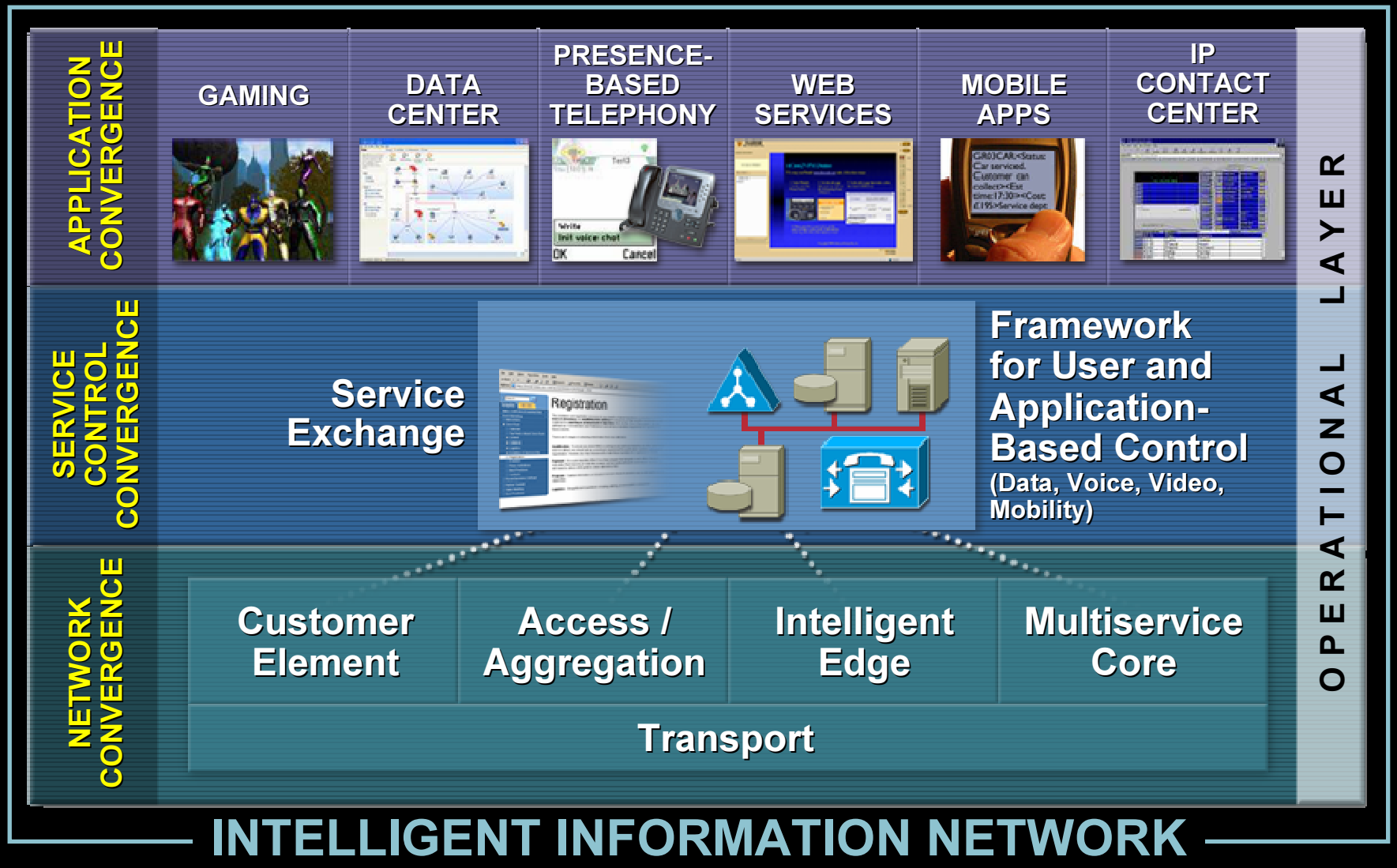
POTS Replacement or VoBB/IP Centrex

Managed & Hosted Services

SP Voice Applications



Cisco IP NGN Architecture

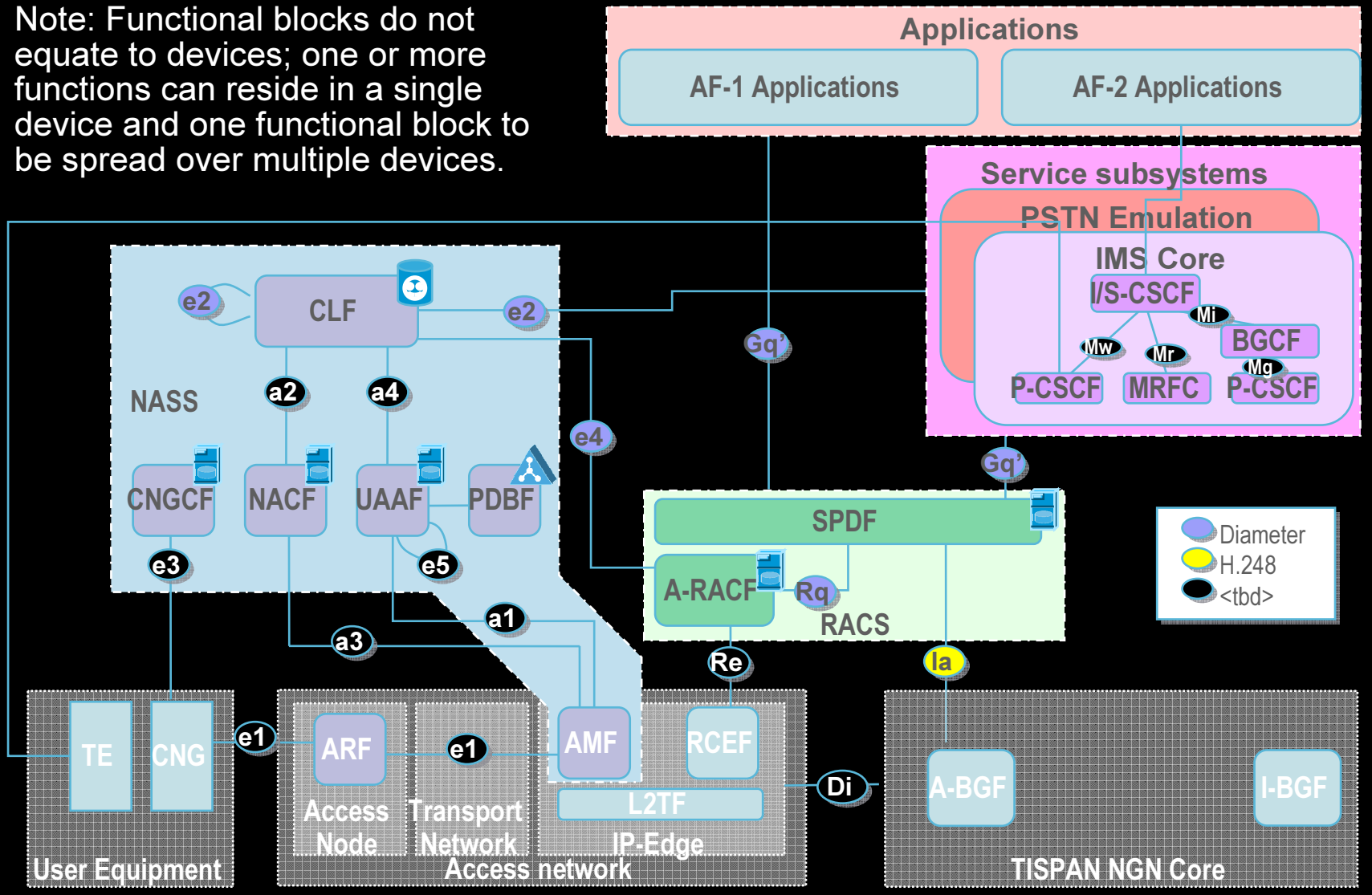


Cisco SEF and TISPAN

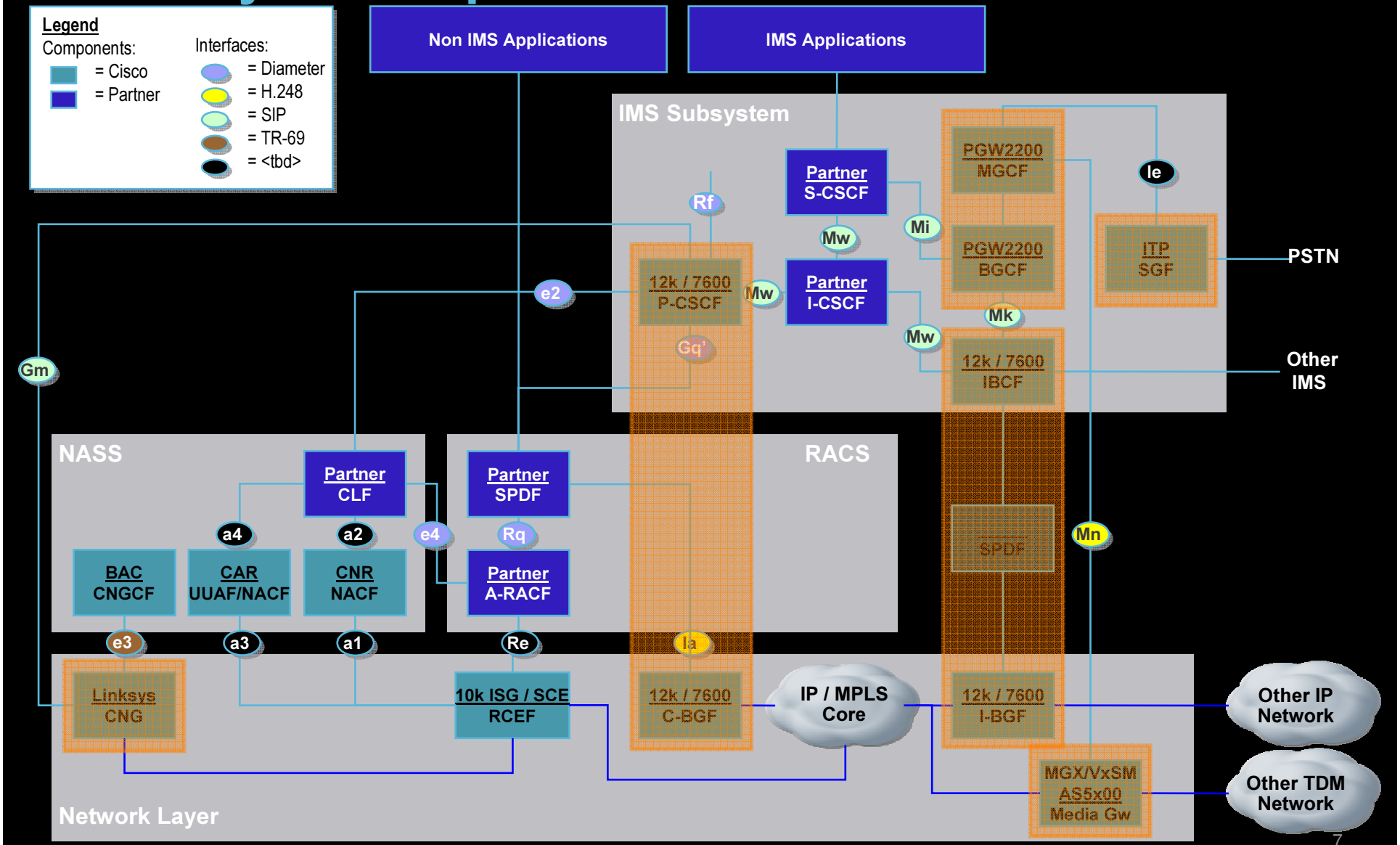
- Cisco strategy is to support a complete IMS / TISPAN system
  - Embracing the IMS / TISPAN bearer layer
  - Open architecture
    - Standards based external interfaces
    - Interoperable with leading call control and application vendors to provide a best in breed overall solution
  - Working with partners for components not provided by Cisco
- TISPAN system is part of Cisco's Service Exchange Framework (SEF), which addresses more that just TISPAN / IMS
  - SEF provides service and application convergence layer for next generation networks

ETSI TISPAN
NGN Network Model Release 1 - Overview

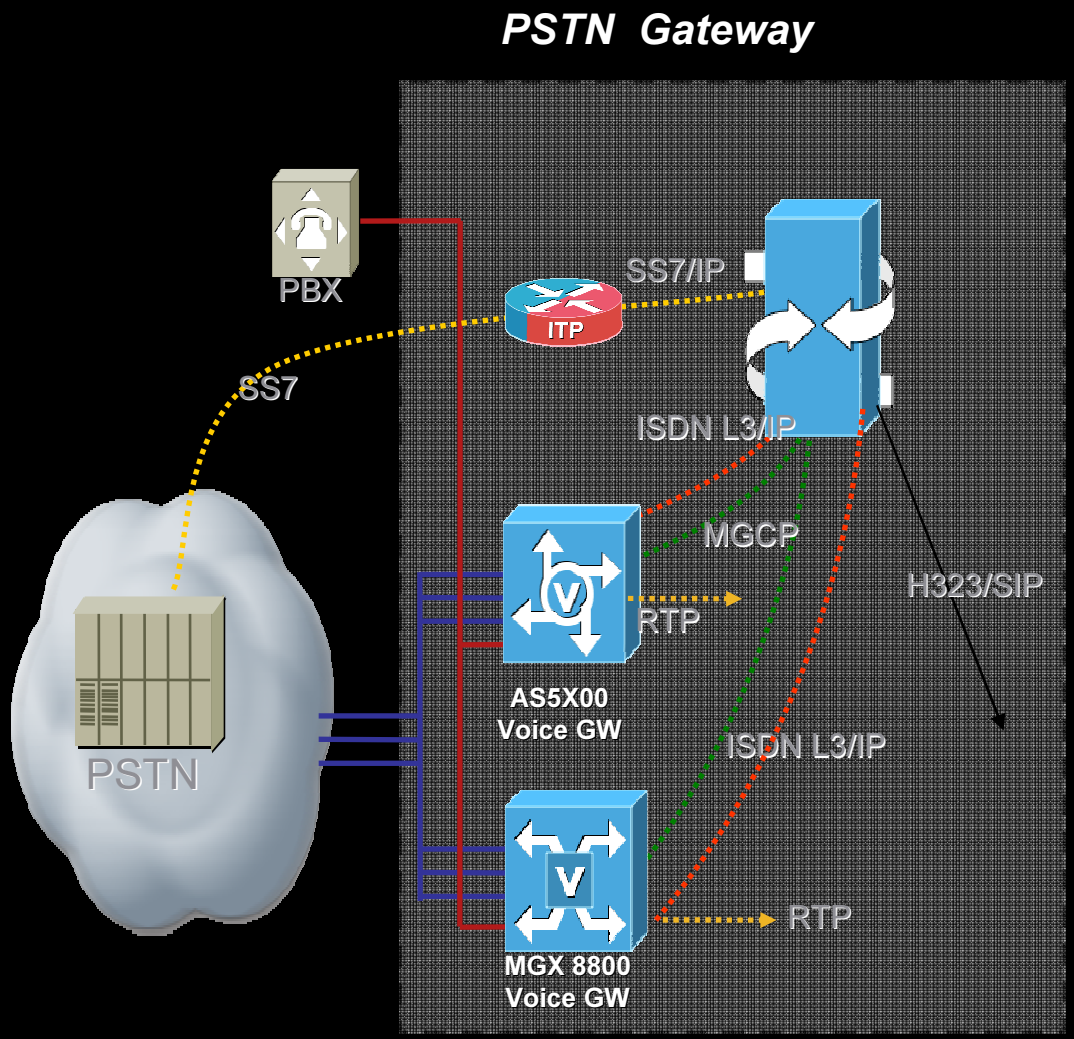
- Note: Functional blocks do not equate to devices; one or more functions can reside in a single device and one functional block to be spread over multiple devices.



Cisco IMS/TISPAN Solution: "Fully Decomposed model"



Cisco PGW2200
PSTN Gateway and IMS MGCF, BGCF

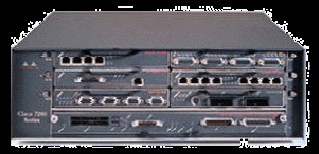


- Redundant Architecture
- Variety support of
  - SS7 country specific implementation
  - protocols
  - platforms for performance scaling
  - applications/services (pre/post-paid CC, carrier pre-select, MSC trunking, ...)
  - regulatory features (LNP, LI, ...)
  - billing interfaces

PGW 2200 Call Control Platforms

Netra 240	Netra 440	Mid - X4100	High - V40Z
2 x 1.5 GHz Proc 4 G RAM 2 RU Height	4 x 1.6 GHz Proc 8 G RAM 5 RU Height	2 x Dual Core 2.4 GHz Proc 8 G RAM 1 RU Height	4 x Dual Core 2.6 GHz Proc 16 G RAM 4 RU Height
Performance ~75 cps	Performance ~105 cps	Performance ~150 cps	Performance ~300 cps

Signaling Gateway
Cisco ITP Platforms Positioning



	2811	7204/6	7301	7600
Core STP				✓
Signaling Gateway (+MLR)	✓	✓	✓	✓
Applications (WLAN and/or MO-Proxy)		✓	✓	

Cisco Media Gateways
Unmatched Density, Scale & Performance

- Highest VoIP density, scalability and performance
  - Up to 120,000 Redundant DS0s in a 7' Rack with ECAN Backplane Capacity of 45 Gbps
  - Over 2000 Calls/Sec per 7'Rack
- Broad range of Network Interfaces
  - FE, GE, POS OC-12, T1, E1, T3, E3, OC-3c/STM1-OC48c/STM16
- Optimized for Service Provider Voice Applications
  - Broad Application Support for Wireless, Wireline, and PacketCable compliant applications
  - No single point of failure. Active calls preservation
- Investment Protection
  - Evolutionary, Pay-as-you-grow Design

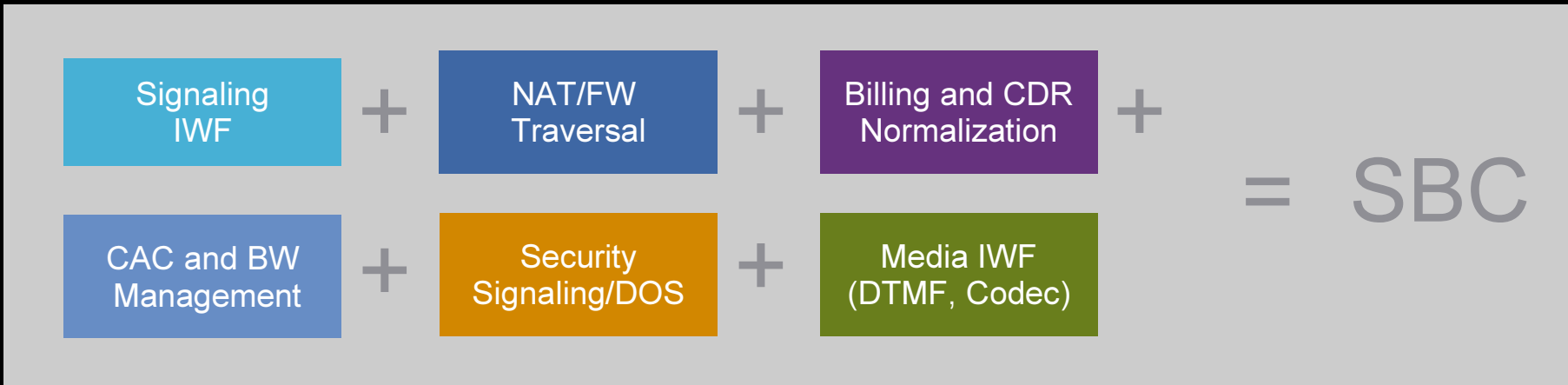
MGX 8880 Media Gateway

AS5350, 5400, 5850 Media Gateways

- Range from 2-8 T1/E1, to 8-32 T1/E1, to 24-86 T1/E1 or DS-3, STM-1 (240-4000 ports)
- Rich SIP Feature Set – compliant with most of RFC 3261, 3262, 3264
- All TDM interfaces (SS7/R2/T1CAS/PRI) are supported with SIP

What Does a Session Border Controller Provide?

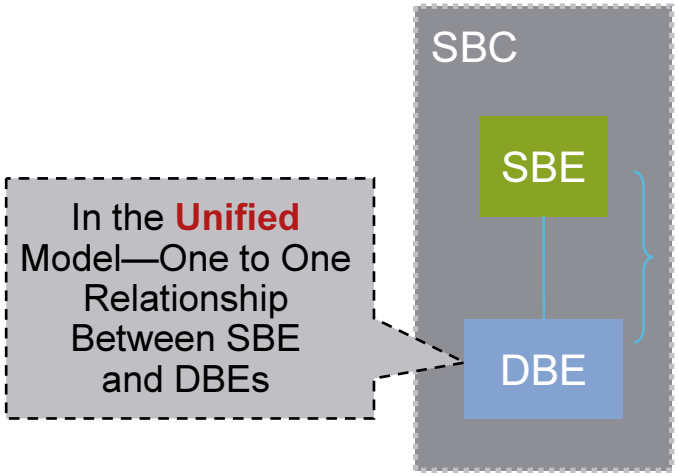
SBC Enables Direct IP to IP Interconnect Between Multiple Administrative Domains for Session-Based Services Providing: Protocol Interworking, Security, Admission Control and Management



- SBC is a tool kit of functions
- Depending on the application and deployment scenario, a different set of functions can be turned on/off

Deployment Models
Unified or Distributed

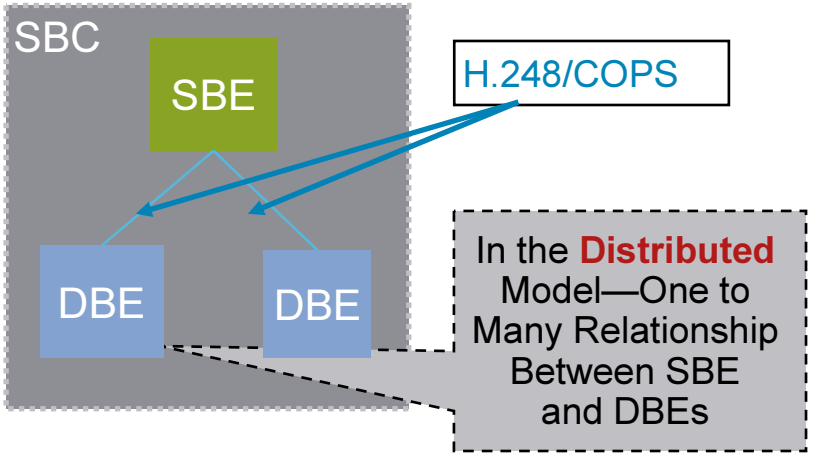
Unified Model



Service Access Control Is Local to the Box and Can Be Message Based

SBC Deployment Today

Distributed Model



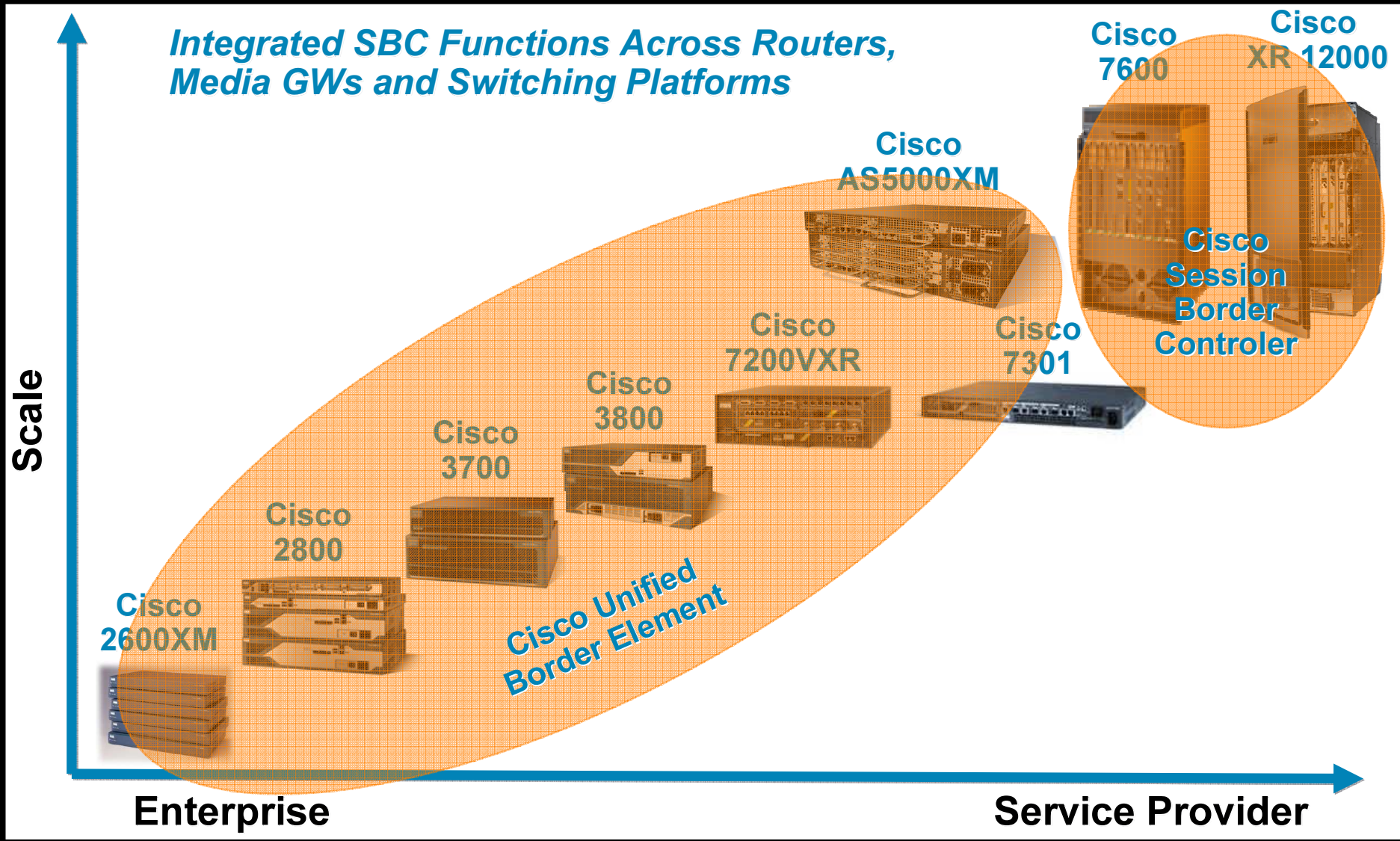
- The Interface Between the SBE and DBE Is Yet to Be Defined; Can Be Based on a Existing/Evolving Standards

Likely SBC Evolution

DBE: Data Path Session Border Element Function
Sample tasks: Media Relay, FW, Dynamic pinhole, Quality demarc

SBE: Signaling Path Session Border Element Function
Sample tasks: Signaling IW, NAT/FW Traversal, Topology hiding (SIP/SDP mgs), Voice MG Interop

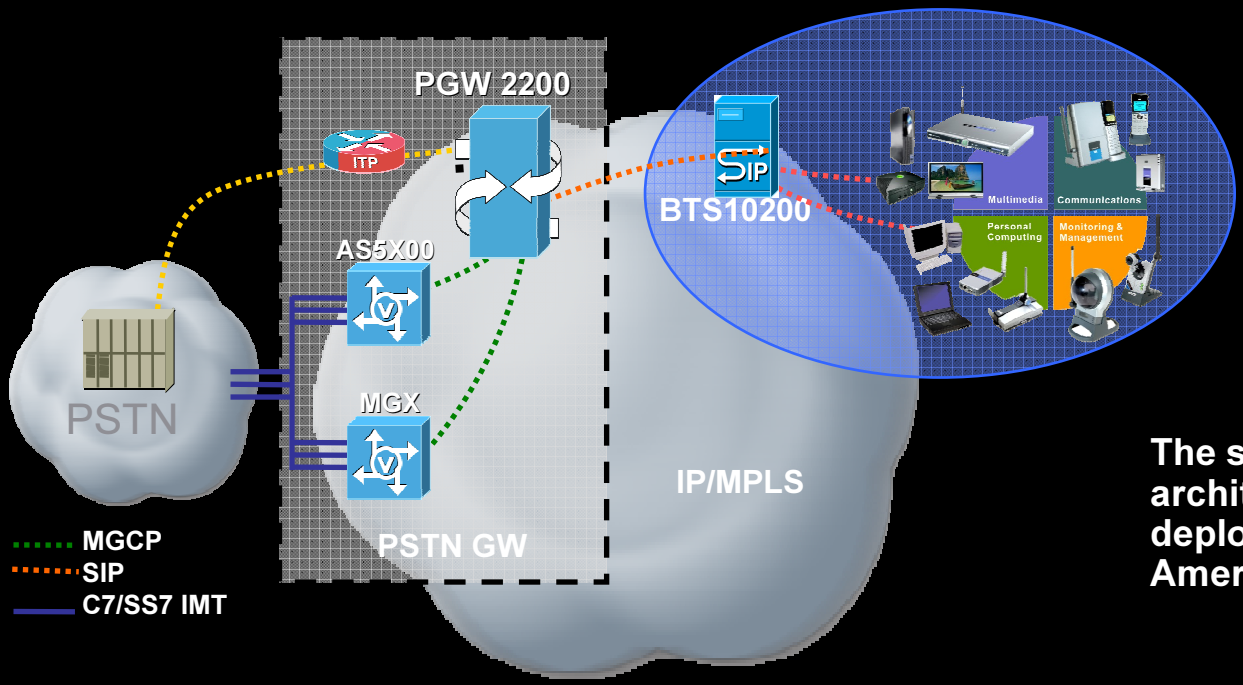
Cisco Session Border Control Portfolio



Cisco Residential VoBB Solution
SIP-based Architecture IMS aligned

SIP-based Residential Voice over Broadband solution, based on Cisco BTS 10200

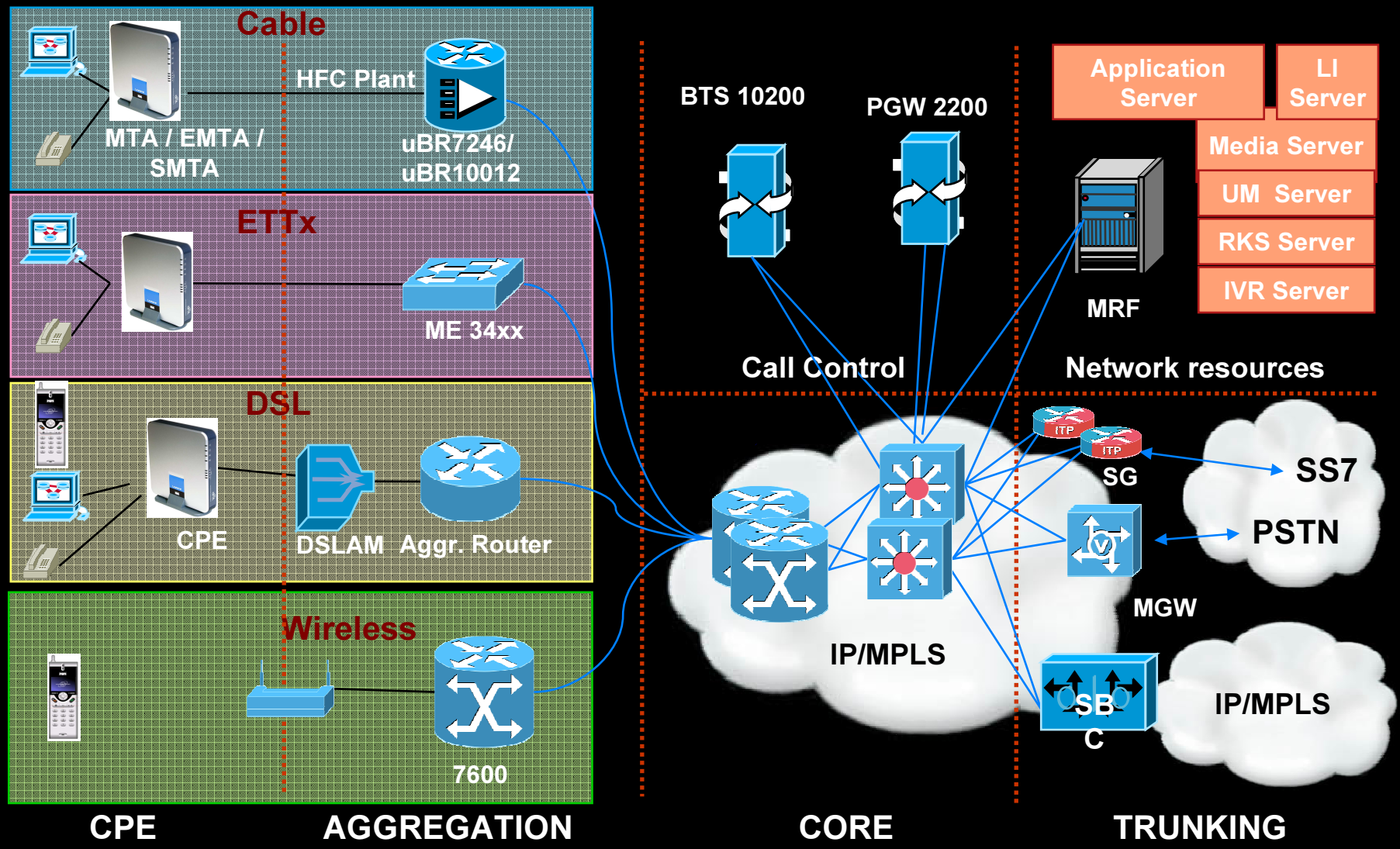
Components: BTS10200, Linksys CPEs, AS or MGX, PGW 2200



The solution is based on the architecture of existing SIP-based deployments of operators North America and Europe.

Cisco Solutions Architecture

Access Transparent Broadband VoIP/RVoBB Services



Consumer SIP Telephony – Linksys

Wireless Router

WRT54GP2
2 FXS + 3 Eth.

WRTP54Gv2
2 FXS + 4 Eth.

WTR54GP
Traveling ATA
1 FXS + 1 Eth.

WAG54GP2
ADSL GW
2 FXS + 4 Eth.

Wired Multi-Port Router

RT31P2
2 FXS +
3 Ethernet

RTP300v22
FXS + 4 Ethernet

Wired Single Port Router

SPA2100
2 - FXS

SPA2102
2 - FXS

SPA3102
1 FXS + 1 FXO (Line)

ATA only

PAP2
2 FXS

PAP2T
2 FXS

SPA1001
1 FXS

SPA2002
2 FXS

SPA3000
1FXA + 1FXO (Line)

Sipura SIP Implementation VoIP Features:

- G.729, G.723, G.711, G.722, G.726 codecs
- DTMF Tone Detection & Generation
- Fax
- G.711 Pass-Through, G.711 Fax Mode
- T.38 Real Time Fax over IP
- Dynamic Jitter Buffer
- Line Echo Cancellation
- Secure Automated or Manual Configuration
- Security via S-RTP, HTTPS, Encryption
- Customized Configuration
- Automatic Remote Provisioning
- In-Service Upgrades
- Private IP Address (NAT/PAT) Interworking
- DHCP, DNS SRV, IPv4 & IPv6
- IVR and Web Browser Mgmt UI
- CLASS Features (Partial List)
- Three-Way Calling
- Call Transfer
- Call Waiting, Cancel Call Waiting
- Caller ID with Name and Number
- Call Forwarding: No Answer/Busy/Select
- Message Waiting Ind. (Stutter Tone)
- Call Return (*69)
- Distinctive-Ring Service
- Selective/Anonymous Call Rejection
- ToS, 802.1q VLAN and 802.1p Support
- Syslog Debug, RTCP, Stats in BYE
- FCC, CE, A-Tick Compliance
- Configurable Tones

Programmable Dial Plan
Terminating Impedance Agnostic

Consumer Telephony – Cable Modem with Embedded MTA (Scientific Atlanta)

Webstar DPX2203/DPX2203C

- Embedded MTA
- NCS or SIP signaling
- Battery Cartridge optional
- International Frequency plans for North America, UK, Europe, Japan
- EPX2203/EPX2203C are the European versions with Euro-DOCSIS

DPX2203 shown with optional battery pack

Webstar DPC2223

- Embedded MTA
- NCS or SIP signaling
- 2 RJ-11 FXS ports
- 1 Ethernet port
- USB 1.1 port for HSD connection
- DECT Base Station
- Battery Cartridge optional
- DECT stations for North America, Europe
- Up to 6 GAP-compliant cordless phones per DECT station
- G.711 Voice
- T.38 Fax support

Consumer WiFi SIP Telephony – VoWLAN/VoPWLAN

Solutions:

Residential Cordless Telephony Substitution
PWLAN Telephony with WiFi – WiFi Handover support
Mass Transit – Air, Train, Bus, Boat
Leisure – Hotel, Cruise Ship, Amusement Parks
Rentals – Hotspots, Rental Kiosks/Airports, Airplanes
WiFi-enabled citywide Telephony (e.g. San Francisco, Alexandria)

- 802.11 b/g
- Multiple SSID Registration Support
- Remote Administration
  - Configuration File Backup and Restore
  - Firmware Upgrades using TFTP over WiFi
  - Embedded Web UI (with password protection)
- Network Selection Profiles
  - Automatic
  - Manual - up to 10 Pre-Set User Profiles
- Network Profile Configuration
  - Static IP/DHCP
  - TCP/UDP/IP, IPv4, DNS, SDP, ARP, ICMP, DHCP client, Static IP, PPPoE
  - WEP, WPA, WPA2, TKIP Security
  - AES Encryption
  - SIP Session Keep Alive
- WiFi Site Survey Tool
- Connection Status Button
- High Resolution Screen
  - LCD Color
  - 128 x 160 (65 colors)
  - 1.8 “
- Phone Features
  - 50hrs (standby) +3 hrs (talk time)
  - Rechargeable batteries (limited life)
  - Backlit Keypad
  - RF & Battery Level Indication
  - Speaker Phone
  - Phone Book (100 records)
  - Call History (20 Records) – Missed, Dialed, Received
  - Language (English)
  - Vibrator (Silent Mode)
  - Speed Dial
  - Last Number Redial
  - Password Security
  - Mute & Volume Control
  - Selectable Wallpaper Background
  - POP3/SMTP Email Access (optional)
- VoIP Features
  - Call Forwarding
  - Call Transfer
  - CLIP/CLIR
  - Call Wait/Hold/Resume
  - DTMF Detection & Generation (in-band or out-of-band; RFC2833)
  - G.711 (A or m-kaw), G.729 A/B
  - Dial by Phone Number or SIP URI

WiFi Rich SIP Telephony (Voice + Data)

Solutions:

Residential Rich Telephony (Voice + Data)
PWLAN Rich Telephony (Voice + Data) with WiFi – WiFi Handover support
Mass Transit – Air, Train, Bus, Boat
Leisure – Hotel, Cruise Ship, Amusement Parks
Rentals – Hotspots, Rental Kiosks/Airports, Airplanes
WiFi-enabled citywide Telephony (e.g. San Francisco, Alexandria)

- WinCE 4.2 w/ IE Web Browser – WinCE 5.0 upgradeable
  32 MB SDRAM & 64 MB FLASH
- 802.11
  B & G at Launch; I, WPA and E as Firmware Update later
- 11 Channels (U.S., Canada), or 13 channels (Europe)
- Multiple SSID / Fast Hotspot Authentication
- Remote Administration
  Configuration changes using HTTP or HTTPS
  Firmware Upgrades using HTTP or HTTPS
  Embedded Web UI (with password protection)
- Network Selection Profiles
  Automatic
  Manual - up to 10 Pre-Set User Profiles
- Network Profile Configuration
  Static IP/DHCP
  WEP (64/128), WPA-PSK
  AES or SSL Encryption
  SIP Session Keep Alives
- High Resolution Screen
  TFT
  240 x 320
  2.2 “

- Phone Features
  50hrs (standby) +3 hrs (talk time)
  Rechargeable batteries (limited life)
  Speaker Phone
  Phone Book (250 records)
  Call History (20 Records) – Missed, Dialed, Received
  Language (English/Spanish)
  Vibrator (Silent Mode)
  Speed Dial
  Last Number Redial
  Password Security & Multi-level Password
  Date/Time (NTOP synchronization)
  Mute & Volume Control
  Multiple (true) Ring Tones
  Power Up Diagnostic
- VoIP Features
  Consultation Hold/Transfer
  Call Wait/Hold/Resume
  Call Forwarding
  CLIP/CLIR, CNAM\
  3-Way Call
  DTMF Detection & Generation (in-band or out-of-band; RFC2833)
  G.711 (A or m-kaw), G.729 A/B
  Dial by Phone Number or SIP URI

Business Voice – with Linksys SIP Phones

- **SPA922/941/942/962 Software Features:**

- Comprehensive Interoperability
- Complete VoIP Features & Management
- Excellent Voice Quality
- Secure Calling via sRTP
- Remote Provisioning via HTTPS, HTTP, TFTP
- 3rd Party Application Server Call Control Interop
- SIP B and Bridged Line Appearance Support
- Downloadable Ring Tones
- Network Based Ring Tone Support
- Call Transfer
- Call Back on Busy
- Call Forwarding
- Call Conferencing
- Do Not Disturb
- Hands Free Operation
- Personal Directory – 100 Entries
- Independently Configurable Dial Plan Per Line
- IP Dialing (URI or IP Address) Support
- Call Logs for Incoming, Outgoing, Missed Calls – 60 Entries

Centralized Control off a Business Voice Softswitch or Feature Server

Cisco IAD2430 Series

Service	Models	Base			VWIC Options	
		Voice	WAN	LAN	Voice	WAN / Data
Ethernet	IAD2430-24FXS	24 FXS	None	2 FE	None	None
T1/E1, ADSL, or G.SHDSL Integrated Access (VoIP, TDM) with rich data services	IAD2431-8FXS	8 FXS	1 T1/E1	1 FE	2/4 FXS/FXO/BRI, 2 T1/E1	T1, ADSL, G.SHDSL Serial
	IAD2431-16FXS	16 FXS	1 T1/E1	2 FE	2/4 FXS/FXO/BRI, 2 T1/E1	T1, ADSL, G.SHDSL Serial
	IAD2431-T1/E1	T1/E1	1 T1/E1	2 FE	2/4 FXS/FXO/BRI, 2 T1/E1	T1, ADSL, G.SHDSL Serial
	IAD2432-24FXS	24 FXS	2 T1/E1	2 FE	2/4 FXS/FXO/BRI, 2 T1/E1	T1, ADSL, G.SHDSL Serial

FMC for Business Customers
Single Number Reach and Voice VPN

http://www1.corp.mts.ru/special_services/fmc/

- Applications/Services

Fixed-Mobile Conversion: Enterprise PBXs to MSC with services like

Voice VPNs;

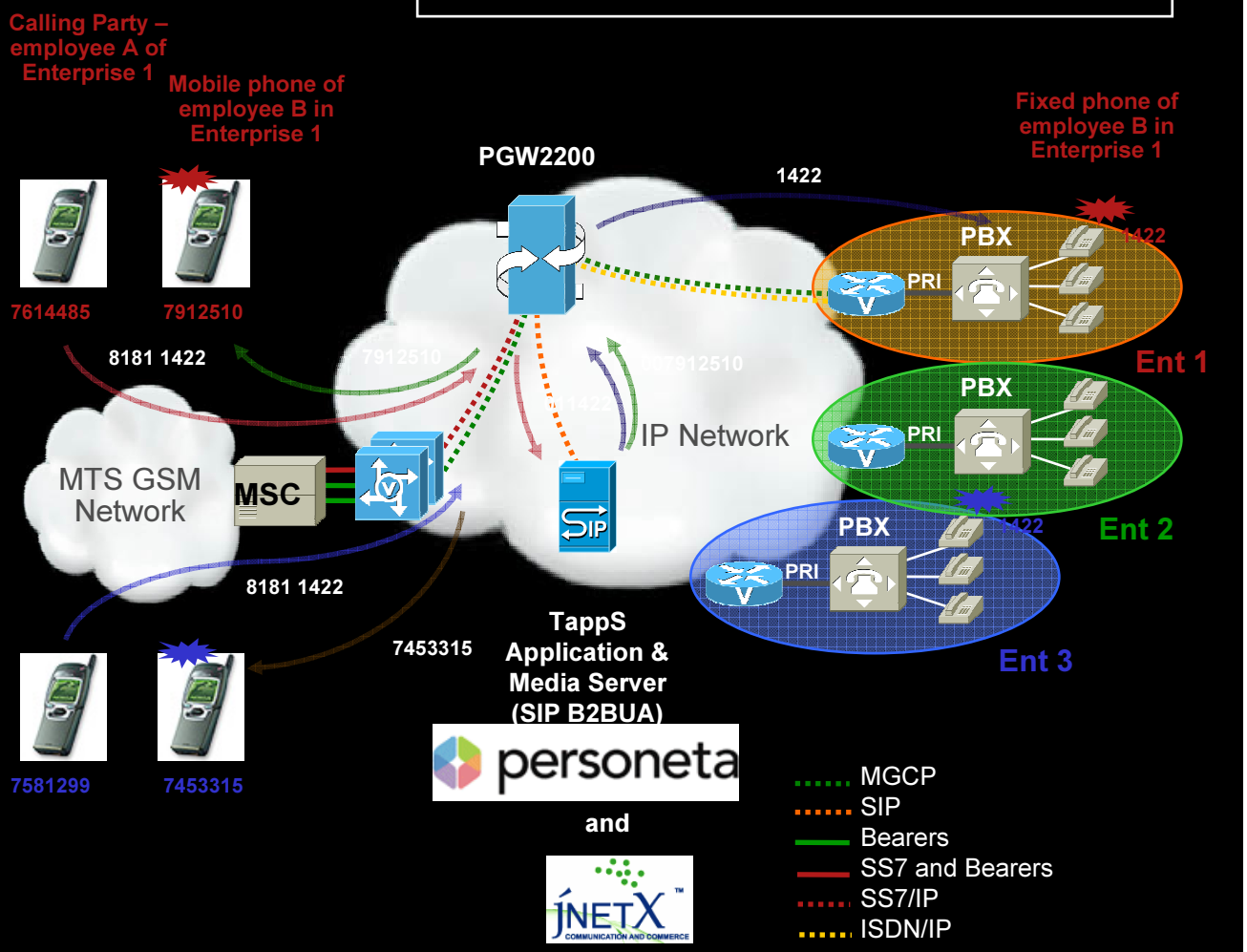
Single number for reaching multiple destinations including mobile and fixed phones

- Technology

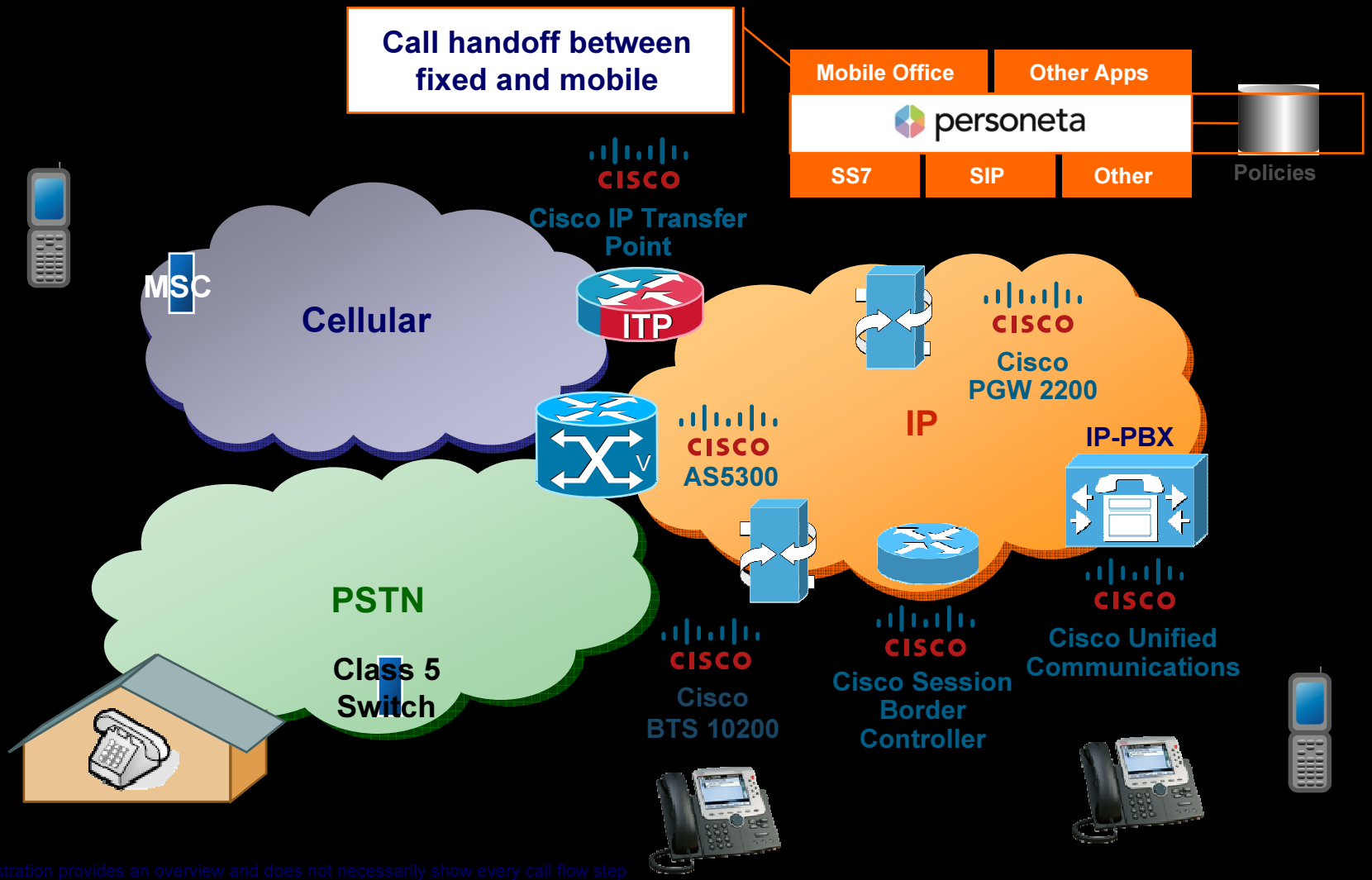
8x PGW 2200 nodes and 16x AS5400 Voice Gateways for PSTN Gateway and Voice VPN functions in all major MTS Macro-Regions

Personeta TappS (5x) and jNetX (3x) Application Servers for FMC call processing and self-provisioning (customer portal)

MGCP controlled Access Gateways for Q.SIG/ DPNSS transparency

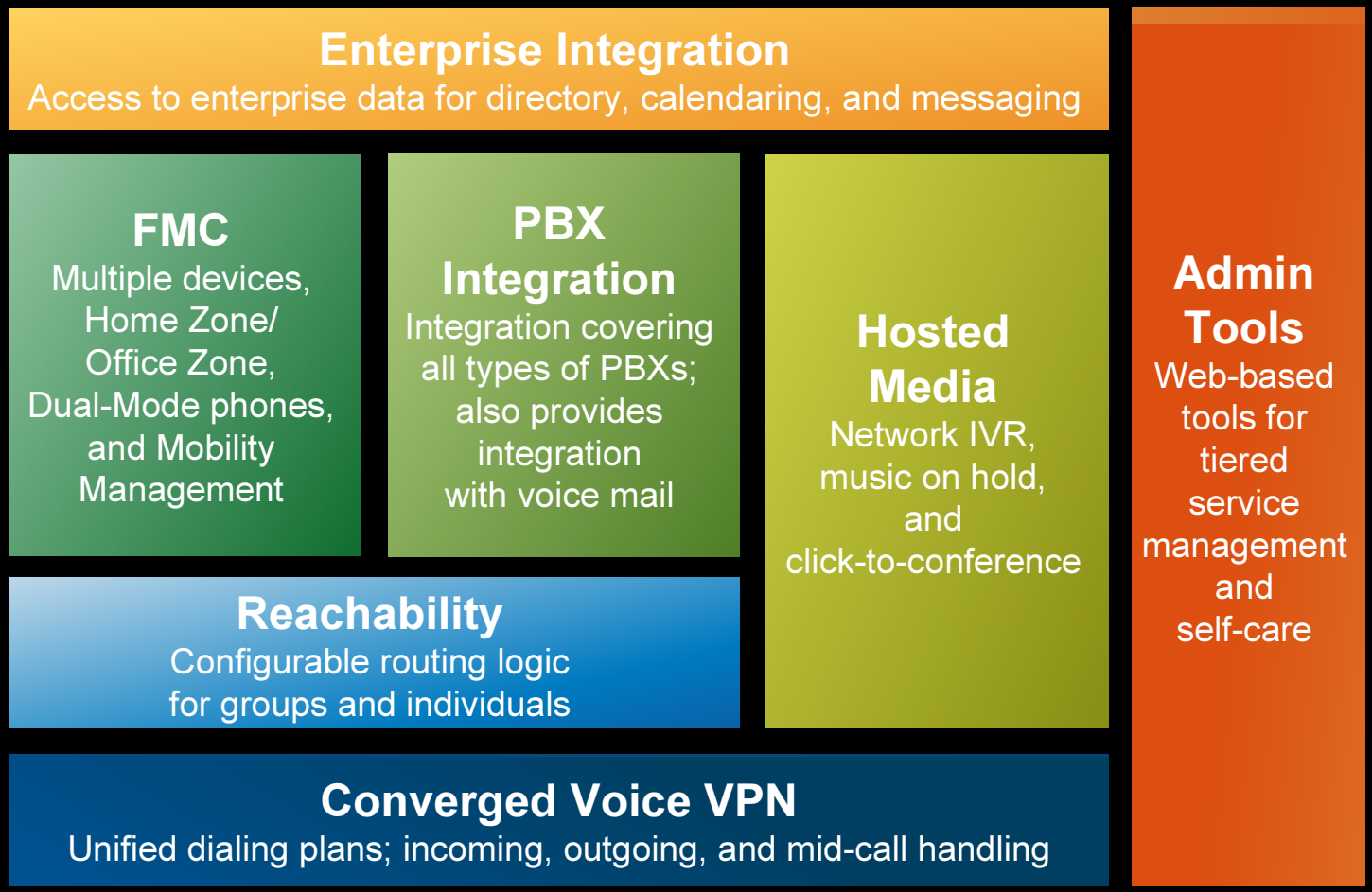


Multiple Devices FMC Example



This illustration provides an overview and does not necessarily show every call flow step

Mobile Office Solution -
Cisco SEF Solution for Enterprise Communications Mobility



Enables mobile operators to capture new enterprise revenues by integrating mobile and enterprise voice networks into a single communications environment

Ne zaboravite da se prijavite na Cisco Networkers 2008!

http://www.cisco.com/web/europe/cisco-networkers/2008/index.html