NGN Voice and Carrier Interconnection for IMS and non-IMS based Architectures

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NGN Voice and Carrier Interconnection for IMS and non-IMS based Architectures


Market Transition... Consumers...“everything 2.0”
Content / Device Boundaries Blurring

Content / Applications

Experiences
At Home, At Work, On the Move

Devices

CONSUMER DRIVEN
### Transition of Expectations

**New Digital Culture... New SP Opportunities**

<table>
<thead>
<tr>
<th>What They Want</th>
<th>When They Want It</th>
<th>Where They Want It</th>
<th>How They Want It</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad Choice</td>
<td>On Demand</td>
<td>Everywhere</td>
<td>Flexible</td>
</tr>
<tr>
<td>Personalized</td>
<td>Available</td>
<td>“Follow Me”</td>
<td>No Platform,</td>
</tr>
<tr>
<td>Simple</td>
<td>Always</td>
<td></td>
<td>Access or Bundle</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Restrictions</td>
</tr>
</tbody>
</table>

- **Follow Me**: Flexible
- **No Platform, Access or Bundle Restrictions**
# IP NGN Journey

Requires Multiple Layers of Convergence

<table>
<thead>
<tr>
<th>Application Convergence</th>
<th>Integration of New Innovative IP D/V/V Services over Broadband for Increased Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Convergence</td>
<td>Service Continuity across Access for Customer Loyalty and Stickiness</td>
</tr>
<tr>
<td>Network Convergence</td>
<td>Eliminate Layers in the Network for Increased OpEx/ CapEx Efficiencies</td>
</tr>
</tbody>
</table>

- **Application Convergence**: Content, Mobile, WLAN, DSL, Cable, FTTH
  - Common Subscriber Management

- **Service Convergence**: Service Continuity across Access for Customer Loyalty and Stickiness
  - Content

- **Network Convergence**: Eliminate Layers in the Network for Increased OpEx/ CapEx Efficiencies
  - IP Next-Generation Network
  - Optical
  - Broadband Services
  - High-Speed Internet
  - Mobile
  - PSTN
  - FR / ATM
Cisco IP NGN Architecture
Achieving a Whole Greater Than the Sum of the Parts

- Application Layer:
  - Tele-Presence
  - Collaboration
  - Presence-Based Telephony
  - Web Services
  - Mobile Apps
  - IP Contact Center

- Service Layer:
  - Cisco Service Exchange Framework
  - Self Service
  - Identity
  - Policy
  - Billing
  - Open Framework for Enabling "Any Play" Delivery
    (Any service, to any device, to any location)

- Network Layer:
  - Customer Element
  - Access/Aggregation
  - Intelligent Edge
  - Multiservice Core

Intelligent Networking
New Service Provider Offer:
“Many Services to Many Screens”

<table>
<thead>
<tr>
<th>VoIP</th>
<th>Custom Ring Tones / MP3 Player</th>
<th>High-Speed Internet / VPN</th>
<th>Text / Instant Messaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Push-to-Talk / Intercom</td>
<td>Video Conferencing</td>
<td>Digital TV / VOD</td>
<td>PDA / Email</td>
</tr>
</tbody>
</table>

At Work, At Home, On The Move
Service Exchange Framework
Making “Any Play” Real

Identity and Mobility Management
- User / Device ID
- Subscriber Awareness
- Location / Presence
- Service Registration
- Audit / Logging
- Assured Authentication
- Device Roaming
- Service Mobility
- User Mobility

Service Policy and Resource Management
- Subscriber Policy
- Application / Chaining
- Per-Subscriber Service
- Service Invocation

Session and Media Management
- Call Control
- Session Border Control
- Rich-Media Control
- Diff Bandwidth & QoS per Session
- Accounting / Billing

Cisco Service Exchange Framework
Selective Network Integration of SEF Intelligence
Maximizing Scale and Efficiency

Cisco Service Exchange Framework
Supports Both IMS and non-IMS Applications

<table>
<thead>
<tr>
<th>Service Layer</th>
<th>MRPF</th>
<th>HSS/HLR</th>
<th>Policy Management</th>
<th>MGCF</th>
<th>S-CSCF</th>
<th>H.323/MGCP</th>
<th>Identity Management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PDF</td>
<td>SBC</td>
<td>Video CAC</td>
<td>GGSN</td>
<td></td>
<td>Service Control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Content Filtering</td>
<td>DDoS Protection</td>
<td>Multicast CAC</td>
<td>Channel Change</td>
<td>PDSN</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Network Layer:
- Access
  - Cable
  - DSL
  - Wireless
  - ETTx

- Ethernet Aggregation
  - Aggregation Node
  - Distribution Node

- IP / MPLS Edge
  - Multiservice Edge
  - Broadband Aggregation

- IP / MPLS Core
Application Architecture of the Future
Service Control is Critical to User Experience

Service Control Point

Service Exchange Framework
- Policy Management
- Security Management

IMS Services
Internet
Hosted Apps

Cellular
DSL
Fixed Wireless
Cable
Enterprise
Wireless Mesh City Networks
Common SP Voice Infrastructure

CPE Sites
- Consumer
- Enterprise
- SMB

Access
- BAC
- Provisioning

IP WAN Access Network
- VPN 1
- VPN 2
- VPN 3

SP Infrastructure
- CMNM
- PGW
- BTS 10200
- MGX/VXSM
- IP/MPLS
- XR12000 SBC
- VoIP (SIP, H.323)
- Interconnection

PSTN/PLMN
- E1/STM-1
- MGX/VXSM Transcoding
- INAP ISUP
- VoIP (IMS/TISPAN/Softswitch)
What Is an Session Border Controller?

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
VoIP Border Inter-Connect

- Protocol Translation, Topology Hiding, Security, Transcoding, CCM Interworking, RSVP Proxy
- LI Administration Function
- Call Control Server Farm: MGX, AS5000XM
- Enterprise #1: SBC, SP 1, SP 2
- SMB: SBC
- PSTN
- MGX, AS5000XM

Rich Media Inter-Enterprise
VolP PSTN Hop-Off
Residential with Lawful Intercept
A Look at Signalling & Media Plane Functions

- Traditional Composed SBCs tend to incorporate both media and signalling plane functions
  - Signalling Plane Functions
    - All protocol handling functions
    - Usually SIP/H.323 B2BU
    - Security “Firewall” Functions
    - Direct control of media plane (gating/policing)
  - Media Plane Functions
    - Security “Firewall” Functions
    - Media policing
- Some allow media-bypass/flow around to cater for path optimisation
- Some allow physical separation of media and signalling plane functions
# Cisco Softswitch Solutions

## Access-Agnostic Broadband VoIP Residential & Business Services

<table>
<thead>
<tr>
<th>CPE</th>
<th>Aggregation</th>
<th>Core</th>
<th>Trunking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable</td>
<td>HFC Plant</td>
<td>SS7</td>
<td>Application Server</td>
</tr>
<tr>
<td></td>
<td>MTA / eMTA / sMTA</td>
<td>BTS10200, PGW2200</td>
<td>Laful Intercept</td>
</tr>
<tr>
<td>Cable</td>
<td>uBR7246/ uBR10012</td>
<td>Call Control</td>
<td>Media Server</td>
</tr>
<tr>
<td>ETTx</td>
<td>Catalyst 3550</td>
<td>ITP</td>
<td>ENUM</td>
</tr>
<tr>
<td>DSL</td>
<td>DSLAM</td>
<td>CRS-1, C7600</td>
<td>RADIUS</td>
</tr>
<tr>
<td></td>
<td>Aggr. Router</td>
<td>IP Backbone</td>
<td>ENUM</td>
</tr>
<tr>
<td>T1 / E1</td>
<td></td>
<td></td>
<td>Billing</td>
</tr>
<tr>
<td></td>
<td>C10000</td>
<td></td>
<td>VoIP Carrier</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PSTN</td>
</tr>
</tbody>
</table>

Network Resources:
- Cisco SBC
- MGX 8000

VoIP Carrier:
- MGX 8000

PSTN: V

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Cisco Database for Telecommunications (CDT) Architecture
Cisco Database for Telecommunications (CDT)

Highlights

**Number Portability Signaling Protocol Support**
- INAP CS1 - ITU Q. 1218 (10/95)
- INAP CS2 - ITU 1228 (9/97)
- SRF (per 3GPP TS 23.066 V6.0.0)
- DNS
- SIP RFC 3261
- ENUM RFC 2916 and RFC 3761

**Flexible Numbering Protocol Support (ARD)**
- GSM/CDMA (route-on-gt)
- CDMA (route-on-ssn)

**Performance**
- Up to 30,000 tps per Edge server
- Up to 150 database updates per second
- <10 min reload for 100 Million numbers
- 100M record audit in 4 hours over a WAN

**Interface Support**
- SOAP/XML
- HTTP/HTTPS
- FTP
- SFTP
- SNMP v2

**Database Capacity**
- up to 200 Million subscribers with 0-15 services per sub
Cisco Database for Telecommunications (CDT) System TAB

- Configure system facility information including accounting, certificates, database, high availability, logging, notifications, services and user accounts.
Cisco PSTN Gateway Solutions—PGW 2200
Migration to Carrier-Class Packet Voice Solutions

**Programmable Element Enabling:**

- Supports ISUP, PRI, H.323 and SIP interfaces for interworking between networks
- Hides complexity of PSTN from IP telephony devices and applications
- Enables multiple Carrier Services (Voice Transit, Dial Access, ASP Termination) and Managed Business Voice (Hosted IP Telephony, Voice VPNs)

**Delivering:**

- Scalable, centralized call control and billing
- Advanced routing capabilities and circuit selection supporting regional regulatory requirements
- An SS7 Trunking Gateway to networks that have existing R2 and PRI based gateways

Providing a Bridge Between PSTN and IP Networks
Cisco PGW 2200 Enables a Variety of Applications

The PGW 2200, coupled with Cisco Media Gateways, forms a PSTN Gateway to support multiple applications:

- **Voice Transit**
  - National and international transit
  - Prepaid/postpaid card service
  - Dial access
  - ASP Termination

- ** Supports signaling or call control modes**
- **Managed voice services**
- **Voice over broadband**
  - Residential Hosted IP Telephony
  - Voice VPNs

Many customers use a combination of these capabilities in their network.
Cisco SP Interconnect Solutions

IP Interconnect Network
- PGW2200
- SIGTRAN
- H.248
- MGW
- SIP-I, SIP
- SIP, H.323
- ENUM
- CDT
  Cisco Database for Telecommunication
- SCE
- VPN

PSTN/PLMN

VoIP/IMS Carrier
- SBC
- SIP

Corporate Network
- CUBE
- SIP
- ENUM
- CDT Cisco Database for Telecommunication
Cisco Softswitch Solutions—BTS 10200
Migration to Carrier-Class Packet Voice Solutions

Programmable Element Enabling:
- Supports local access methods, including ISUP, PRI, IAD, cable modem, PBX, for cost-effective last mile access alternatives
- Complete set of local voice service features for business/residential users
- Use today’s VoIP infrastructure to create one network for voice/data services, and video in the future

Delivering:
- Self-service Phone Administrator (SPA) for ease of subscriber provisioning
- Supports both traditional PSTN and IP/ATM specific billing needs
- Improve network efficiency through true IP internetworking realization
- Standards-based open commercial platform allows low-cost insertion and quick ROI

Providing Packet Voice and Call Control Intelligence for Softswitch Networks

Cisco BTS 10200 Softswitch
BTS 10200
Protocols/Interfaces
Release 5.0 – June 2007
Key Benefits
No more internal migration of subscribers to keep NPA/NXX aligned
No longer have to launch LNP query from your network

Simple Domain based Routing Policy for efficient on-net routing
Advance Domain based Routing Policy
Ability PSTN as Fallback for Call routing
Domain re-writing using ENUM database
Rewriting Dialed AORs for name dialing
ENUM LNP instead of TCAP LNP in same ENUM query
### Cisco IP NGN: Universal NGN Architecture

**Enabling all Emerging Network Architecture Standards**

#### Application Layer
- Any IP Application
- Current and Future
- “Over-The-Top-Applications”
- IMS-enabled SIP
- Applications
- “Future Feature Attractions”
- Application Support Functions

#### Service Layer
- Generic Service Subsystems
- Identity and Mobility Management
- Service Policy and Resource Management
- Session and Media Management
- SEF Common Service Subsystem
- “Anything IP” Subsystem
- IMS Service Subsystem

**Core Functions**
- Optimal Interop with Intelligent NEs
- Network Element Service Control and Peering

**Optimal Interop with Intelligent NEs**
- Optimal Interop with Intelligent NEs
- Wireline Access
- Wireless Access
- Aggregation
- Intelligent Edge
- Multiservice Core
Does IMS Solve All of the SP Issues?

Includes Non-SP Controlled Services:
- Infinite apps, content, URL
- Unknown and known Subs
- Numerous devices and access
- Wide variety of protocols

SP Controlled Services:
- Known applications
- Known subscribers
- Known device-types
- Limited protocol set
Cisco Service Provider Vision

Connecting Customers with Services, Services with Networks, and Networks with Each Other

IP Next-Generation Network

- Consumer
- Small/Medium Business
- Enterprise
- SP Wholesale

- VPNs
- Content
- Transport
- Mobility
- Internet
- Voice and Video