Interworking between SIP and H.323, MGCP, Megaco/H.248

ipDialog, Inc.
1762 Technology Drive Suite 124
San Jose CA 95110-1307 USA

Phone (408) 451-1430
Fax (408) 451-1440
URL www.ipdialog.com

Joon Maeng
Jörg Ott

jmaeng@ipdialog.com
jo@ipdialog.com
The Starting Point…

VoIP

SIP

H.323

Proprietary

“Net Heads”

MEGACO

MGCP

“Bell Heads”

Proprietary

H.323

SIP

VoIP

MGCP

MEGACO

“Bell Heads”

“Net Heads”
Assumption…

SIP, H.323, MEGACO, MGCP, …

1. Protocols will co-exist for a while

2. Some need for interworking…
Reminder: Protocol Architectures

- H.323 and SIP compete
- Both complement MEGACO

<table>
<thead>
<tr>
<th>H.323 / SIP</th>
<th>H.248 / MEGACO</th>
</tr>
</thead>
<tbody>
<tr>
<td>✷ Smart endpoint, dumb network</td>
<td></td>
</tr>
<tr>
<td>✷ Distributed service creation</td>
<td></td>
</tr>
<tr>
<td>✷ Many points of control</td>
<td></td>
</tr>
<tr>
<td>✷ Dumb endpoint, smart network</td>
<td></td>
</tr>
<tr>
<td>✷ More centralized service creation</td>
<td></td>
</tr>
<tr>
<td>✷ (Few) central control point(s)</td>
<td></td>
</tr>
</tbody>
</table>

- Any of these protocols suffices to build a network!
SIP Call Signaling

1 and 2: INVITE sip:jo@ipdialog.com
3 and 4: 200 OK
5 and 6: ACK
7: Media streams

A simple SIP phone
H.323 Call Signaling

GK routed Fast Connect

1: Setup (fastStart, earlyH245Cntr)
2: Setup (fastStart, earlyH245Cntr)
3: Proceeding (fastStart earlyH245Cntr)
4: Proceeding (fastStart earlyH245Cntr)
5: Media streams
6 and 7: FACILITY (H245Cntr)

A simple H.323 phone
SIP (and H.323) Telephones

SIP Phone

Proxy

SIP

Proxy

SIP

RTP

Proxy

SIP

SIP Phone

ipDialog, Inc.
MGCP: Media Gateway Control Protocol

- Endpoint configuration (agent \(\rightarrow\) gateway)
- Notification request (agent \(\rightarrow\) gateway)
- Create connection (agent \(\rightarrow\) gateway)
- Modify connection (agent \(\rightarrow\) gateway)
- Delete connection (agent \(\rightarrow\) gateway or gateway \(\rightarrow\) agent)
- Audit endpoint (agent \(\rightarrow\) gateway)
- Audit connection (agent \(\rightarrow\) gateway)
- Notify (gateway \(\rightarrow\) agent)
- Restart in progress (gateway \(\rightarrow\) agent)
Megaco – Media Gateway Control

- Add (MGC \(\rightarrow\) MG)
- Modify (MGC \(\rightarrow\) MG)
- Subtract (MGC \(\rightarrow\) MG)
- Move (MGC \(\rightarrow\) MG)
- AuditValue (MGC \(\rightarrow\) MG)
- AuditCapabilities (MGC \(\rightarrow\) MG)
- Notify (MG \(\rightarrow\) MGC)
- ServiceChange (both directions)
MG Telephones

MGCP/Megaco

RTP

MG Phone

MGCP/Megaco

MG Phone

MG

MG

MG Phone

MG Phone

MG

MG

Analog Phone

Analog Phone

ipDialog, Inc.
SIP (H.323) Phone vs MG Phone

SIP phones can make calls to other SIP phones without Proxy

MG phones cannot make calls to other MG phones without MGC
Alternatives in your Network

“Endpoints”   “Access” LANs   Backbone Network(s)   “Access” LANs   “Endpoints”

PSTN    IN    H.323    SIP    H.248    MEGACO    MGCP    Proprietary    ...

Divergence in points for service creation

ipDialog, Inc.
Interworking...
Basic Interoperability

Similar Applications...!
Two Examples

- SIP – H.323 Interworking
  - “culturally compatible protocols”

- SIP – MEGACO Interworking
  - “similar to talking to the PSTN”
SIP-H.323 Interworking

Same admin domain

Different admin domains
SIP-H.323 Interworking – Mapping Signaling Only

H.323

Phone App

Audio Codec

H.225 RAS

H.225 Sig.

H.245 Ctrl.

RTP

Network Interface

ASN.1 PER encoding

SIP

Phone App

Audio Codec

H.225 RAS

H.225 Sig.

H.245 Ctrl.

RTP

Network Interface

SIP (SDP)

Text based encoding
SIP-H.323 Call Setup Issues

- **Registration**: how to register users to foreign networks?
  - Registering H.323 users to SIP registrar and vice versa
- **Mapping three piece of info for call establishment**
  - Address, media type and port addresses
- **Mapping signaling steps**
- **Media description mismatch**
  - SIP/SDP (dynamically choose from listed modes)
  - H.323/H.245 (choose from give set of modes)
- **Security**: H.323 uses H.235 and SIP does Digest
  - SDP extensions to carry / negotiate keys under development
- **QoS Signaling?**
Current Status: SIP – H.323

- First cut at Interworking Function (IWF)
  - Requirement draft: draft-agrawal-sip-h323-interworking-reqs-02.txt
  - Interworking draft: draft-agrawal-sip-h323-interworking-01.txt

- Covers basic call setup only
  - Complex stuff: further study

- Needs to deal with many configurations
- Integration works only well within servers

ONLY A FEW SERVICES!
Interworking between SIP and Megaco (MGCP) MG Phones
Current Status: SIP - MEGACO

- No Interworking Function Spec (IWF)…?
- Hidden in MGCs and MGs
- Limited to what MEGACO can do at all
- MEGACO is too much into services…
What about more sophisticated scenarios...?
Islands of Protocols?

Service Provider A (H.323)
- Enterprise 1
  Proprietary IP PBX
- GW
- Enterprise 2
  IP PBX (Megaco)
- GW

Service Provider B (SIP)
- Enterprise 3
  IP PBX (SIP)
- GW
- Enterprise 4
  IP PBX (H.323)
- GW

GW
Interworking between IP Phones
Universal Signaling Server?

- SIP Phone
- H.323 Phone
- Megaco MG Phone

SIP
H.323
Megaco
MGCP
The “Vision” for a Converged Network...
Network Integration: IN

Complex!

Service Creation APIs

Control Plane

Softswitch

MGCP MEGACO ... H.323 SIP

ipDialog, Inc.
Service Creation & Interworking

- Protocol building blocks in the network
  - Services to be created on top of those
  - Potential for limiting access to service creation
- “APIs” for service providers
  - JAIN, Parlay, OSA, CAMEL, …
- Back end service protocols
- Numerous standardized services / functions

Network infrastructure may inhibit extensions
And what would be the next step...?

Silence...
Network Integration: IP

Simple!

Link Layer of the Week

IP

Application Protocols

Transport Layer

Internet Layer

Link Layer Mapping

Physical Links

SMTP LDAP HTTP SIP/SDP/SAP
POP3/IMAP4 FTP NFS ...
TELNET X11 RTP
TCP UDP
IPCP ARP

Fiber
Copper
155/622 Mb/s

ipDialog, Inc.
Service Creation

- Basis of success of the World Wide Web
  - Many people
  - Many ideas
  - A lot of information
  - Many business models
  - No (or only a few) restrictions
  - No expensive certification, etc.

- Broad basis for creativity, innovation, …

Network is not an hurdle – it’s a bridge!
But it doesn’t do your job either.
Endpoint-enabled Interworking

- Some thoughts (not the full solution yet…)
- Leave address translation up to servers
  - Numerous approaches conceivable
    - Multiple registrations, shared data bases, integrated servers
    - Redirect, don’t proxy
- Dual infrastructure for outbound calling
  - Keep core networks orthogonal
- Use the peer’s protocol in your endpoint
  - Place logic into intelligent phone application
  - Works more easily for numerous services
    - Caveat: conferencing servers must be multi-lingual
Multi-Protocol Endpoints

- Enable endpoint-based interworking
- Devices such as cell phones and residential IP telephones may have to support multiple protocols
- Allows to migrate your client with your infrastructure
- ipDialog demonstrated call set up among multiple protocols in a simple SIP+Megaco phone
- ipDialog’s VoIP Tone™ family of IP phones are cost-effective OEM phones with SIP, H.323, MGCP and Megaco/H.248 support
Conclusion

- Many protocols will stay around for a while
- Network-based gatewaying: a nightmare
- Lot’s of complexity for little functionality
- Do it *the Internet way*: end-to-end
- Hoping that this will remain an interim solution…