MEGACO/H.248
H323, SIP & MGCP, MEGACO

GW : Gateway
GK : Gatekeeper
TN : Terminal
MCU : Multipoint Control Unit

CA : Call Agent
TGW : Trunking Gateway
RGW : Residential Gateway
SG : Singling Gateway

2003/4/16
H323, SIP & MGCP, MEGACO

- H.323, SIP
  - peer-to-peer
  - internet oriented
  - intelligent endpoint
    - optional GK
  - decentralized

- Problems
  - maintenance
    - cost & scalability of large systems
  - signaling & media control are coupled
  - interoperability with SS7

- MGCP, MEGACO
  - client-server
  - traditional telephony
  - intelligent server
    - “dumb” terminal
    - “stateless” terminal
  - centralized

- Concept
  - gateway decomposed
    - separate call control from media ports
    - CA, MG, SG
  - interoperability with PSTN
# MEGACO Connection Model

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MEGACO Termination

- A logical entity on a MG
  - that sources/sinks media/control streams

- Termination ID
  - an arbitrary string assigned by the MG
  - at the time of their creation

- Two kinds of Termination
  - Physical Interface
  - RTP stream

- Root Termination
  - The entire MG itself
MEGACO Context

- An association between a collection of Terminations (within an media gateway)

- Context ID
  - A 32 bit integer chosen by the MG
  - $*: ALL ; -*: NULL; $*: Choosing one

- Null Context
  - Containing all Terminations that are not associated to any other Termination
MEGACO Connection Model

Media Flow

- Topology of a Context
  - describe the media flow between Terminations within a Context
  - refer to Topology Descriptor

- Mode of a Termination
  - describe the media flow at the ingress/egress of the media gateway
  - refer to Media Descriptor

Stream Descriptor

Local Control Descriptor
(receive-only, send/receive, ...)

Contexts in GW
Concept of Context

Connection established after CRCX

Add 2 Terminations into 1 context
# MEGACO Command Naming

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Transaction & Message

**Transaction**
- Multiple commands can be grouped.
- Commands are executed in sequence
  - If a command fails, the subsequent commands are not processed
  - Not the case for optional commands
    - O-"command-name"

**Messages**
- Concatenate multiple transactions
- The transactions are treated independently

2003/4/16
MEGACO Transactions

Transaction

Action 1 for One Context

Command 1

Command 2

Command 3

Action 2 for the Other Context

Command 1

Action 3 for Another Context

Command 1

Command 2

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MGC to MG1:

MEGACO/1 [123.123.123.41]:5555

Transaction = 10003 {

Context = $

Add = A4444,

Add = $

Media {

Stream = 1 {

LocalControl {

...

}

Local {

v=0

c=IN IP4 $

m= audio $ RTP/AVP 4

...

}

}]]

}]]


Descriptors

- To form the parameters of the commands/responses
- To provide additional information to qualify a given command/response
- Termination Descriptors
- Context Descriptors
Termination Descriptors

Transaction

- **Action 1 for One Context**
  - Topology Descriptor
  - Command 1
  - Command 2
  - Command 3

- **Action 2 for Another Context**
  - Command 1
  - Command 2

---

Media Descriptors
- Modem Descriptors
- MUX Descriptors
- Events Descriptors
- Signals Descriptors
- Digit Map Descriptors
- Audit Descriptors (no reply)
- Service Change Descriptors

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Observed Events Descriptors
- Event Buffer Descriptors
- Statistics Descriptors
- Error Descriptors
Media Descriptor

- Describe the various media streams
- A hierarchical descriptor

Media descriptor
  Termination state descriptor
  Stream descriptor
    Local control descriptor
    Local descriptor
    Remote descriptor
Termination State Descriptor

- **ServiceStates**
  - To indicate whether the termination is available for use
    - “test”, “out of service”, “in service”

- **EventBufferControl**
  - To specify whether events detected by the termination are to be buffered following detection or processed immediately

- **Other properties of a termination that are not specific to any media stream**
Stream Descriptor

- **Stream ID**

- **LocalControlDescriptor**
  - **Mode**: sendonly, receiveonly, sendreceive, inactive, and loopback
  - With respect to the exterior of the context
  - MGC specifies a set of choices for the session
  - **ReserveGroup** and **ReserveValue** indicate the resources should be reserved

- **LocalDescriptor** and **Remote Descriptor**
  - **Usage of SDP**
Event & Signal Descriptors

- **Event Descriptor**
  - RequestIdentifier
  - A list of events that the MG should detect and report

- **Signal Descriptor**
  - On/off
  - Timeout
  - Brief
ServiceChange Descriptor

- Used only in association with the ServiceChange command

- ServiceChangeMethod (The type of service change)
  - Graceful, the removal of existing terminations w/o interrupting existing connections
  - Forced, an abrupt removal
  - Restart, after a specified delay
  - Disconnected, applied to the entire MG
  - Handoff, from the old MGC; a new MGC is taking over
  - Failover, from MG to MGC

- ServiceChangeDelay, a number of seconds
- ServiceChangeReason
DigitMap Descriptor

- A dialing plan
- A start timer, to start
- A short timer, when more digits are needed
- A long timer, to differentiate different routing
ObservedEvents Descriptor

- Mandatory in the Notify command
  - RequestIdentifier
  - Optional time-stamp for each observed event

- Except for the response of a ServiceChange command

- In a response to the AuditValue command
  - Events stored in the event buffer
Context Descriptors

Transaction

Action 1 for One Context

Topology Descriptor

Command 1

Command 2

Action 3 for Another Context

Command 1

Context 1

Context 2

Context 3

1. No topology descriptor

Context 4

2. T1, T2 isolate

Context 5

3. T3, T2 one way

Context 6

4. T2, T3 oneway

5. T2, T3 bothway

6. T1, T2 bothway
Call Flow: RGW to RGW

1.(3) ServiceChange(ROOT): MG register with MGC

2.(4) Modify(A4444): MGC set Mode(SendReceive) & Events(al/of)
5. Notify(A4444): MG report an off hook event (time)

6. Modify(A4444): MGC set Events (al/on, dd/ce, {DigitMap = Dialplan0})
   Signals(cg/dt)

   Call Progress Tone Generator/Dial Tone

   DTMF detection/
   Digit Map Complete Event
Call Flow: RGW to RGW

7. Notify(A4444): MG report a Digit Map Complete event(ds=91613551212,Meth=FM)

8. Add(A4444,:Mode(ReceiveOnly), Local(RTP))
Call Flow: RGW to RGW

9. Add(A5555: Mode(SendReceive), Events(al/of), Signals(al/ri), $: Mode(SendReceive), Local(RTP), Remote(...))
10. Modify(A4444: Signals(cg/rt), A4445: Remote(...)))
Call Flow: RGW to RGW

11. Notify(A5555: Observed(al/of))

12. Modify(A5555: Events(al/on), Signals()); to turn off ringing

13. Modify(A4445: Mode(SendReceive), A4444: Signals())