

Media Gateway Control and the Softswitch Architecture

MEGACO Features

- **Media Gateway Control Protocol**
- **Change of Connection Model**
- **Concept of Context**
- **Change of Command Naming**
- **Comparison of Commands**
- **MEGACO Transaction & Descriptor**
- **Call Flow: RGW to RGW**

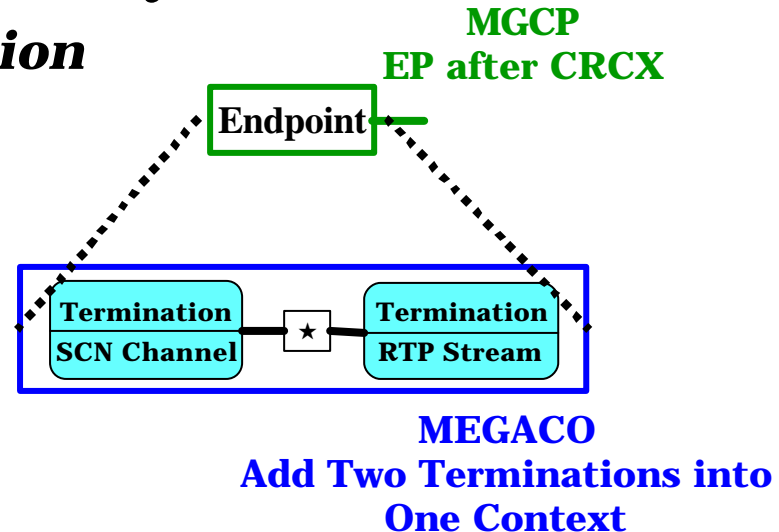
MEGACO Connection Model (1/6)

	MGCP	MEGACO
1	Endpoint Connection	Termination Context
2	Call Agent (CA)	Media Gateway Controller (MGC)
3	None	Media Flow within Gateway

MEGACO Connection Model (2/6)

■ 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 Connection Model (3/6)

■ Context

- An association between a collection of Terminations (within an media gateway)
 - ↳ *describe the topology (who hears whom)*
 - ↳ *refer to Topology Descriptor*
- 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 Terminations*

MEGACO Connection Model (4/6)

■ Media Flow

- Topology of a Context

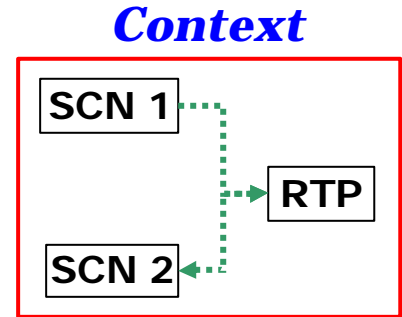
↪ *describe the media flow between Terminations within a Context*

↪ *refer to **Topology Descriptor***

- Mode of a Termination

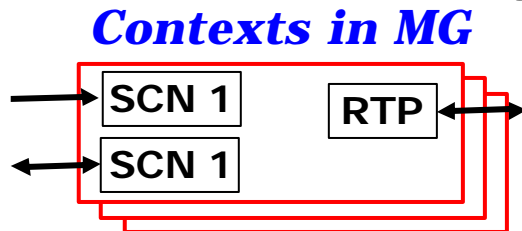
↪ *describe the media flow at the ingress/egress of the media gateway*

↪ *refer to **Media Descriptor***



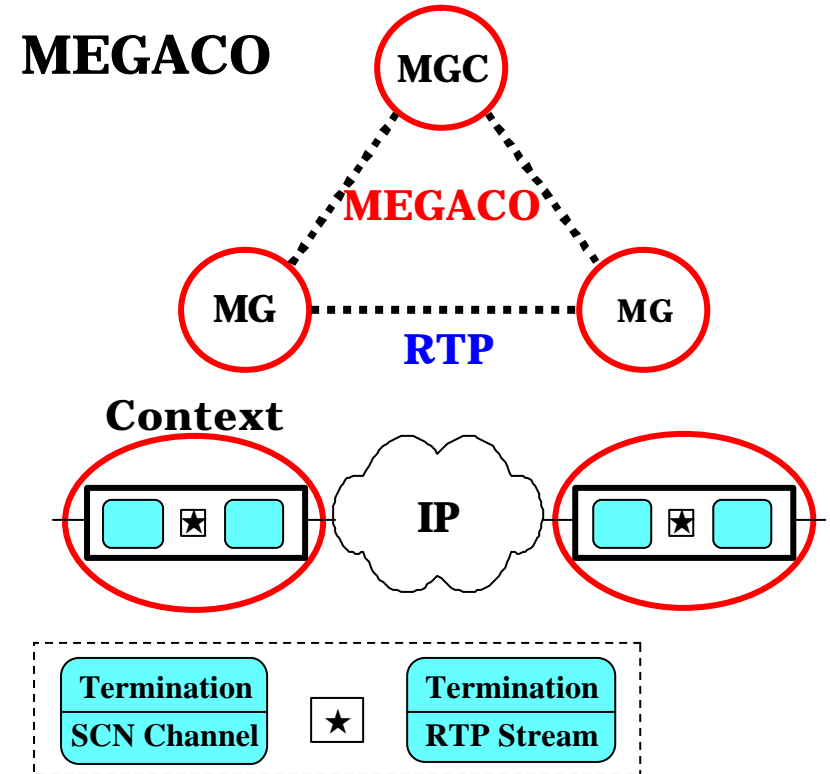
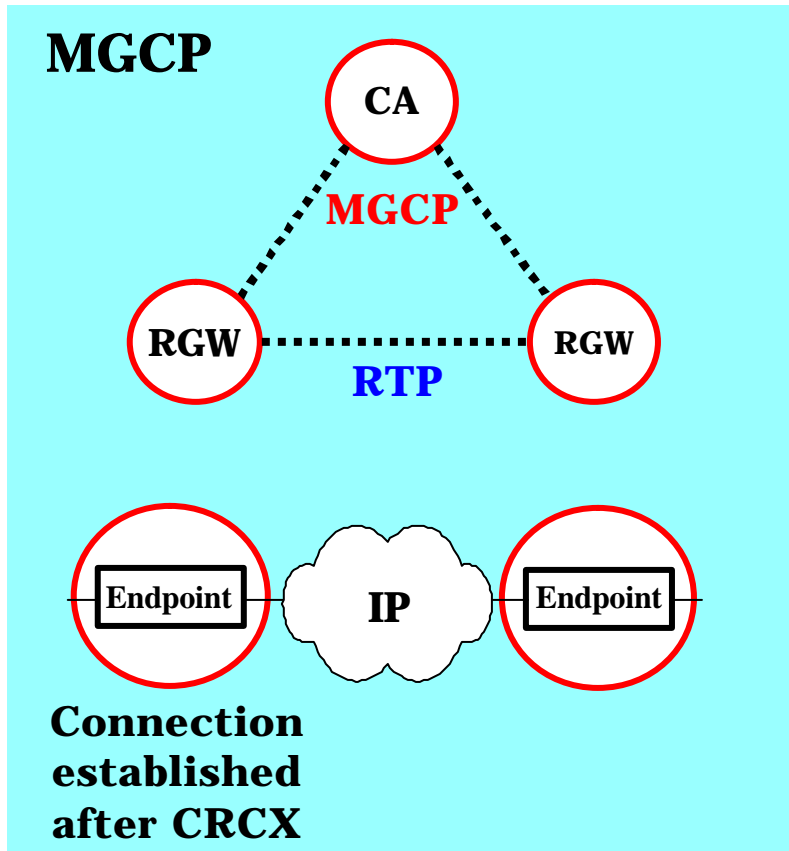
Stream Descriptor

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



MEGACO Connection Model (5/6)

■ Concept of Context

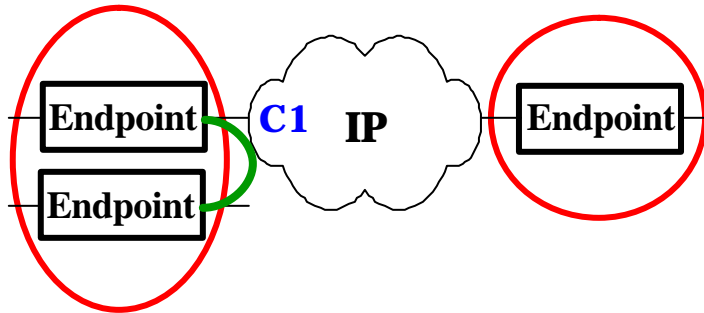


Add 2 Terminations into 1 context

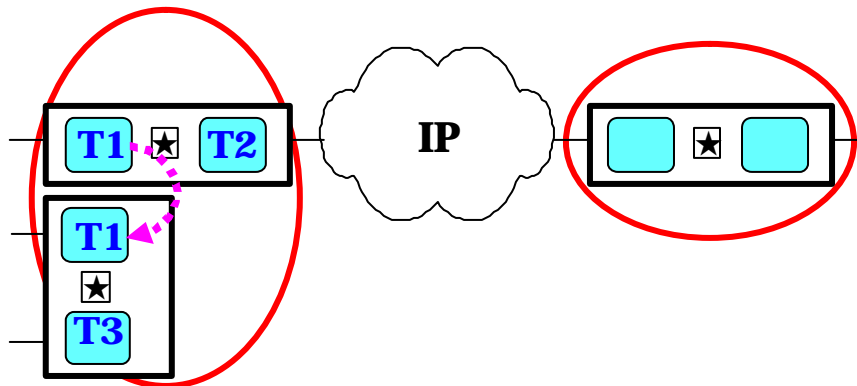
MEGACO Connection Model (6/6)

■ Difference Between MGCP & MEGACO

- Example: Call Waiting - Hairpin Connection



MGCP
MDCX for inactive C1
CRCX for
Hairpin Connection



MEGACO
Move SCN T1 into
the Context
containing SCN T3

MEGACO Command Naming

MEGACO	Similar Commands in MGCP
(1) Add (Termination to Context)	(1) CreateConnection (Endpoint)
(2) Modify (Term-descriptor)	(2) ModifyConnection (Endpoint)
(3) Subtract (Term from Context)	(3) DeleteConnection (Endpoint)
(4) Move (Termination)	» CreateConnection + DeleteConnection
(5) AuditValue (Termination-cur)	(4) AuditEndpoint & (5) AuditConnection
(6) AuditCapability (Term)	(NONE)
(7) Notify (Termination)	(6) Notify (Endpoint)
(8) ServiceChange (Termination)	(7) RestartInProgress (Endpoint)
' Add, Modify, Move	(8) NotificationRequest (Endpoint)
' Add, Modify, Move	(9) EndpointConfiguration (Endpoint-encode)

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

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**

Media Descriptor

- Describe 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 the 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
 - 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 without interrupting existing connections
 - Forced, an abrupt removal
 - Restart, after a specified delay
 - Disconnected, applied to the entire MG
 - ↳ Indicate that connection with the MGC has been restored after a period of lost contact.
 - ↳ The MGC can issue an Audit command to verify that termination characteristics have not changed during the period of lost contact.
 - 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

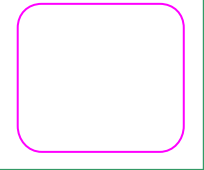
Context Descriptors

Transaction

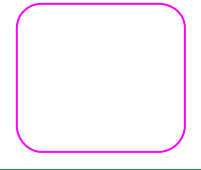
Action 1 for One Context

Topology Descriptor

Command
1

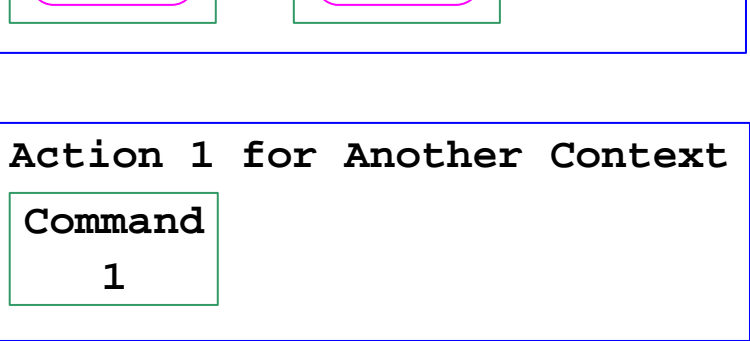


Command
2

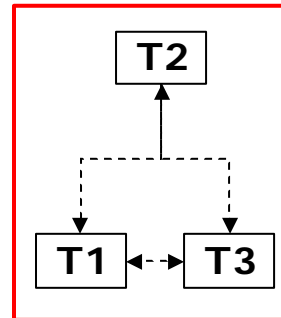


Action 1 for Another Context

Command
1

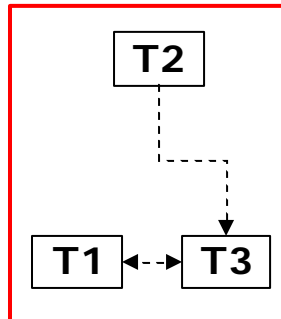


Context 1



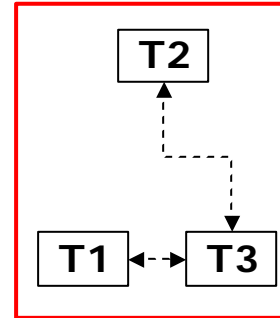
1. No topology descriptor

Context 4



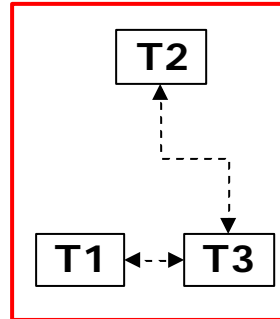
4. T2, T3 oneway

Context 2



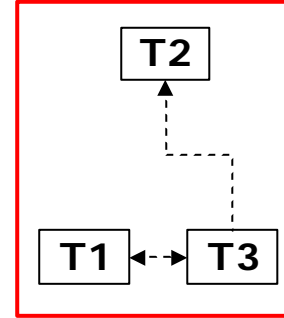
2. T1, T2 isolate

Context 5



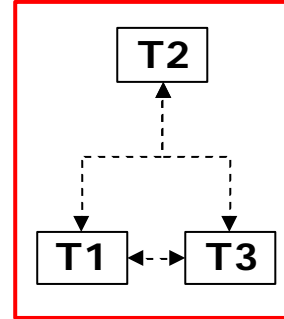
5. T2, T3 bothway

Context 3

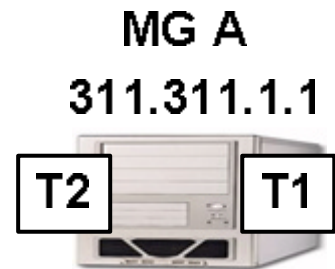
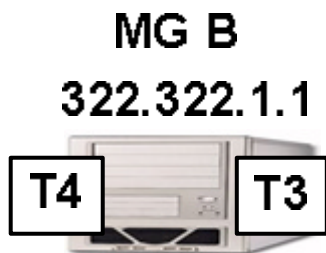


3. T3, T2 oneway

Context 6



6. T1, T2 bothway



a
b
c
d
e
f

Context = \${
Add = T4, Add= \$ {Remot Descriptor}}

Reply {Context = 2002{
Add = T4, Add= T3{Local Descriptor}}

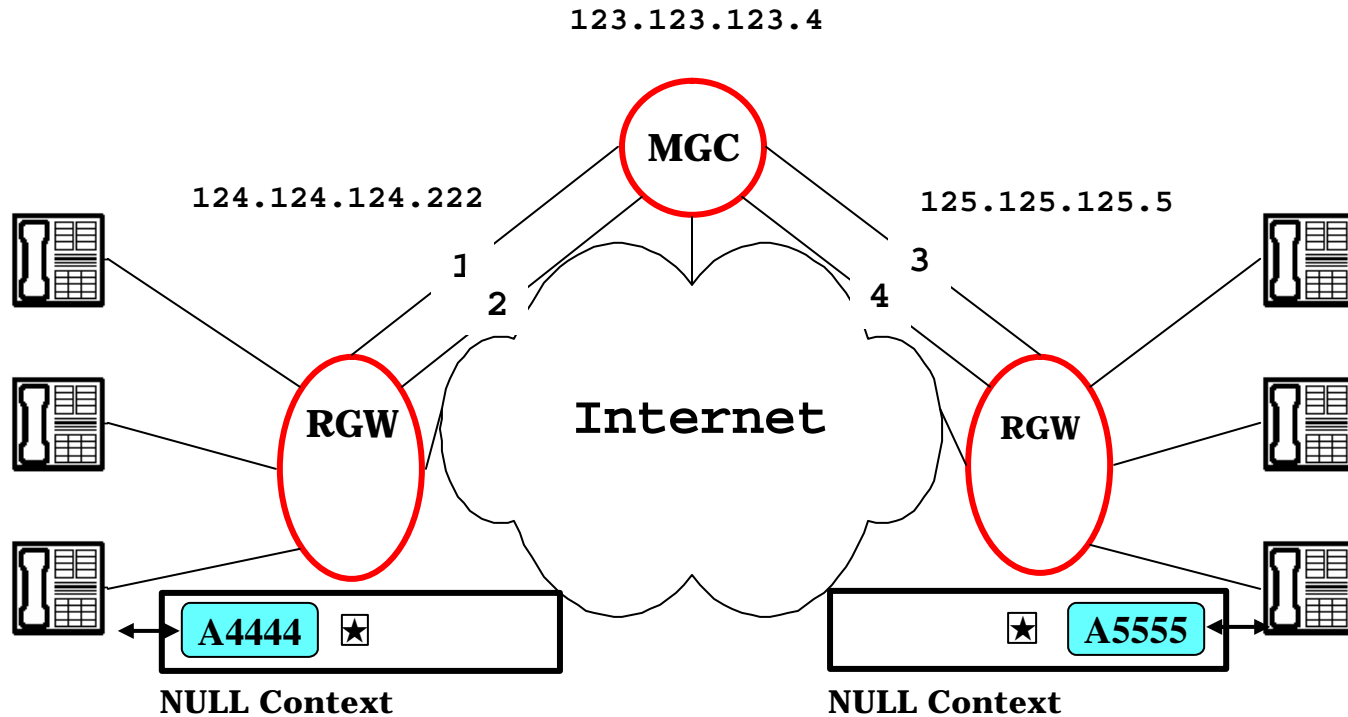
Context = \${
Add = T1, Add= \$ {mode = receiveonly}}

Reply {Context = 1001{
Add = T1, Add = T2{
Local Descriptor}}}

Modify = 1001 {
Modify = T2{
Mode = sendreceive,
Remote descriptor}}

Reply {Contex = 1001{
modify = T2}}

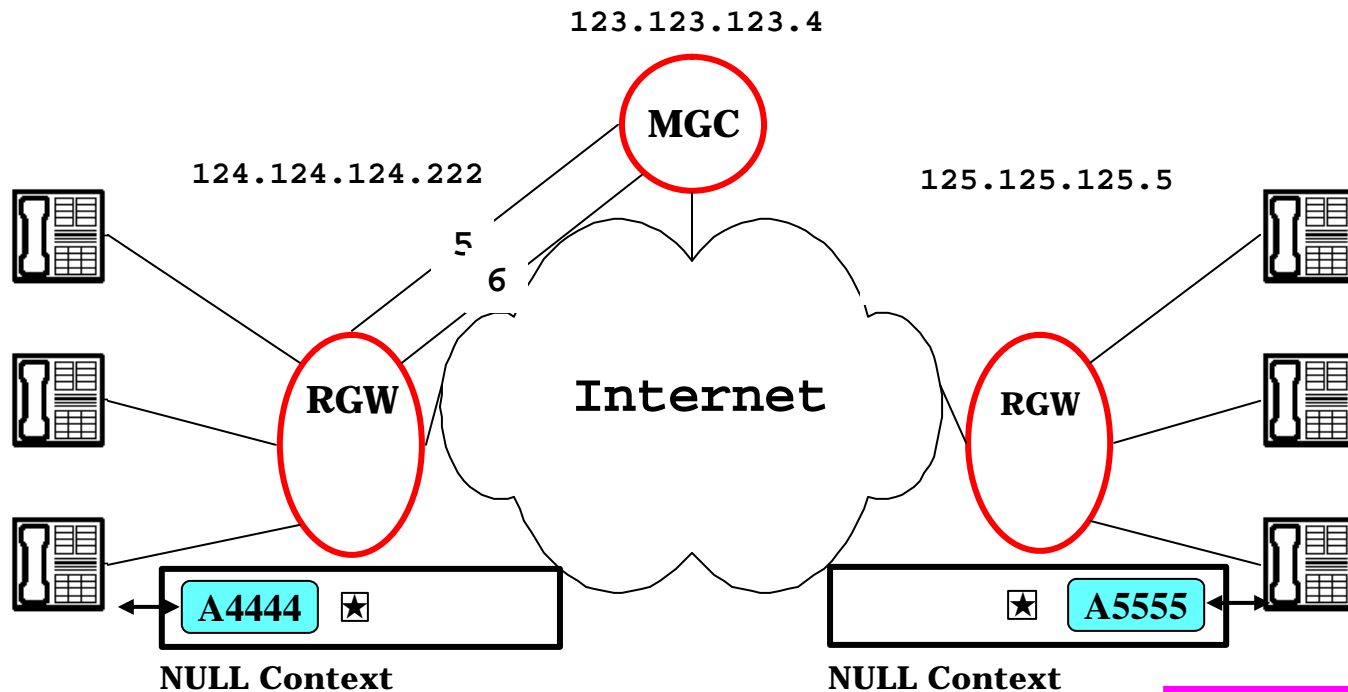
Call Flow: RGW to RGW (1/5)



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

2.(4) Modify(**A4444**): MGC set Mode(**SendReceive**) & Events(**al/of**)

Call Flow: RGW to RGW (2/5)



5. Notify(A4444): MG report an off hook event(time)

DTMF detection/
Digit Map Complete Event

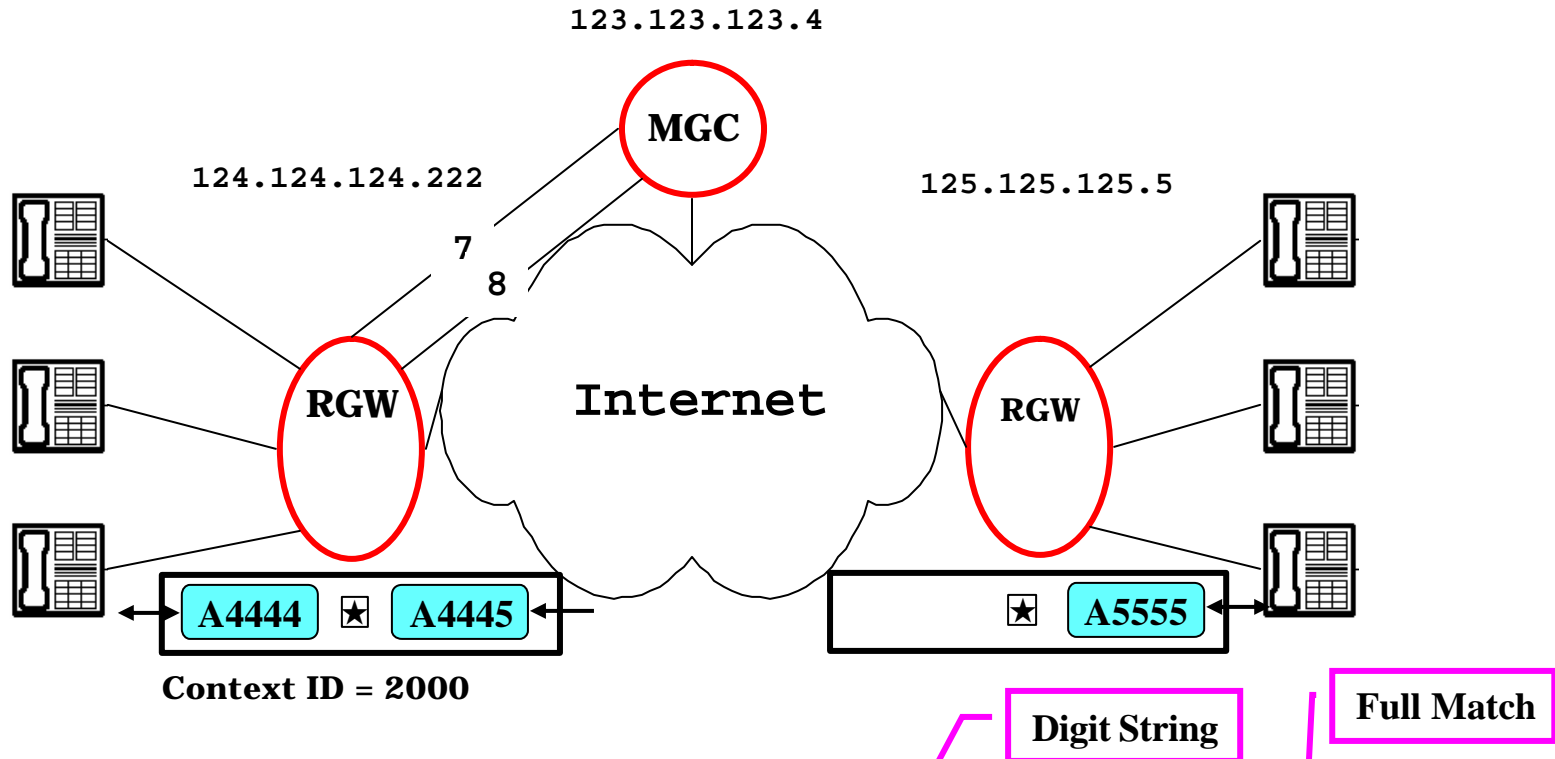
6. Modify(A4444): MGC set Events(al/on, dd/ce, {DigitMap = Dialplan0})

Signals(cg/dt)

Call Progress Tone Generator/Dial Tone

DigitMap = Dialplan0{... }

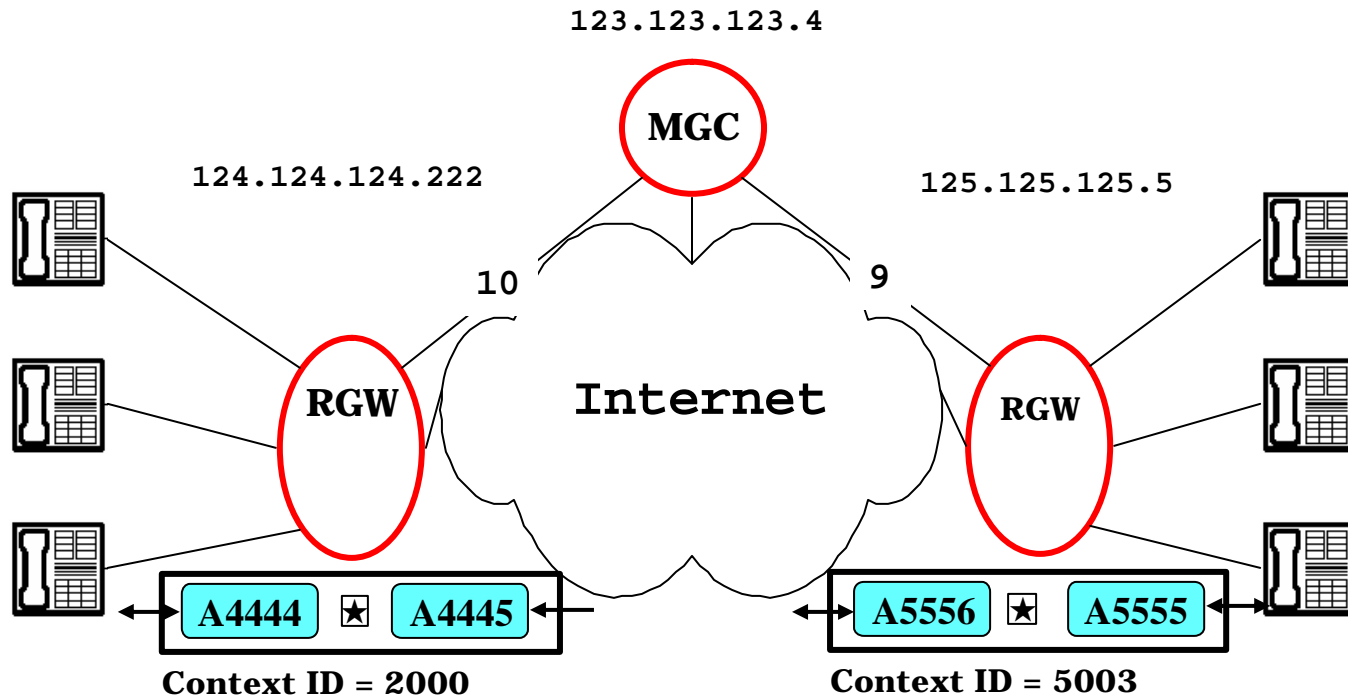
Call Flow: RGW to RGW (3/5)



7. Notify(A4444): MG report a Digit Map Complete event(ds=916135551212, Meth=FM)

8. Add(A4444, \$:Mode(ReceiveOnly), Local(RTP))

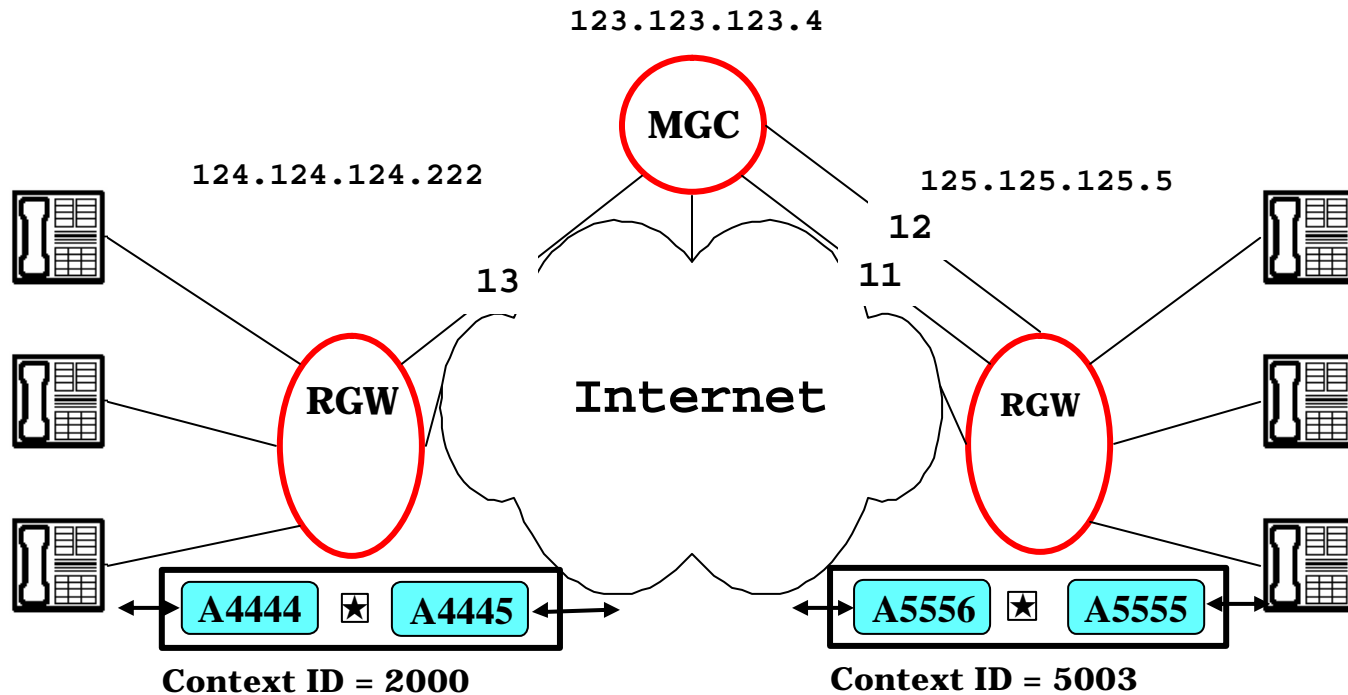
Call Flow: RGW to RGW (4/5)



9. Add(A5555: Mode(SendReceive), Events(al/of), Signals(cg/ri),
S: Mode(SendReceive), Local(RTP), Remote(...))

10. Modify(A4444: Signals(cg/rt)); Modify(A4445: Remote(...))

Call Flow: RGW to RGW (5/5)



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

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

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

Why MEGACO ?

■ MGCP & MEGACO

- Similarity & Differences

■ Why MEGACO ?

- New concepts for supplementary services

↳ Context, Termination

- IETF(datacom) & ITU-T(telecom) acceptable
- MGCP only an informational RFC
- MGCP vendors commit to moving MEGACO

■ IETF MEGACO/ITU-T H.248 Status

- Megaco 1.0 (RFC 3015, November 2000)
- Gateway Control Protocol Version 1 (RFC 3525, June 2003)