3GPP SA#7 Meeting *SP-000139*
15-17 March, 2000 Madrid

Megaco-H.248 / SIP

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SIP: Session Initiation Protocol

- Developed by MMUSIC WG
- Work now carried on by SIP WG
- Lightweight signaling protocol for Internet conferencing
  - Text-based (similar to HTTP)
  - Uses e-mail like URLs (user@domain/host/numeric addr)

SIP: *SIP Actors*

- Client: the application that establishes the connection
- Server
  - User Agent Server: application that directly contacts the user
  - Proxy Server: application that forwards requests to other servers
  - Redirect Server: application that returns a new address to the client

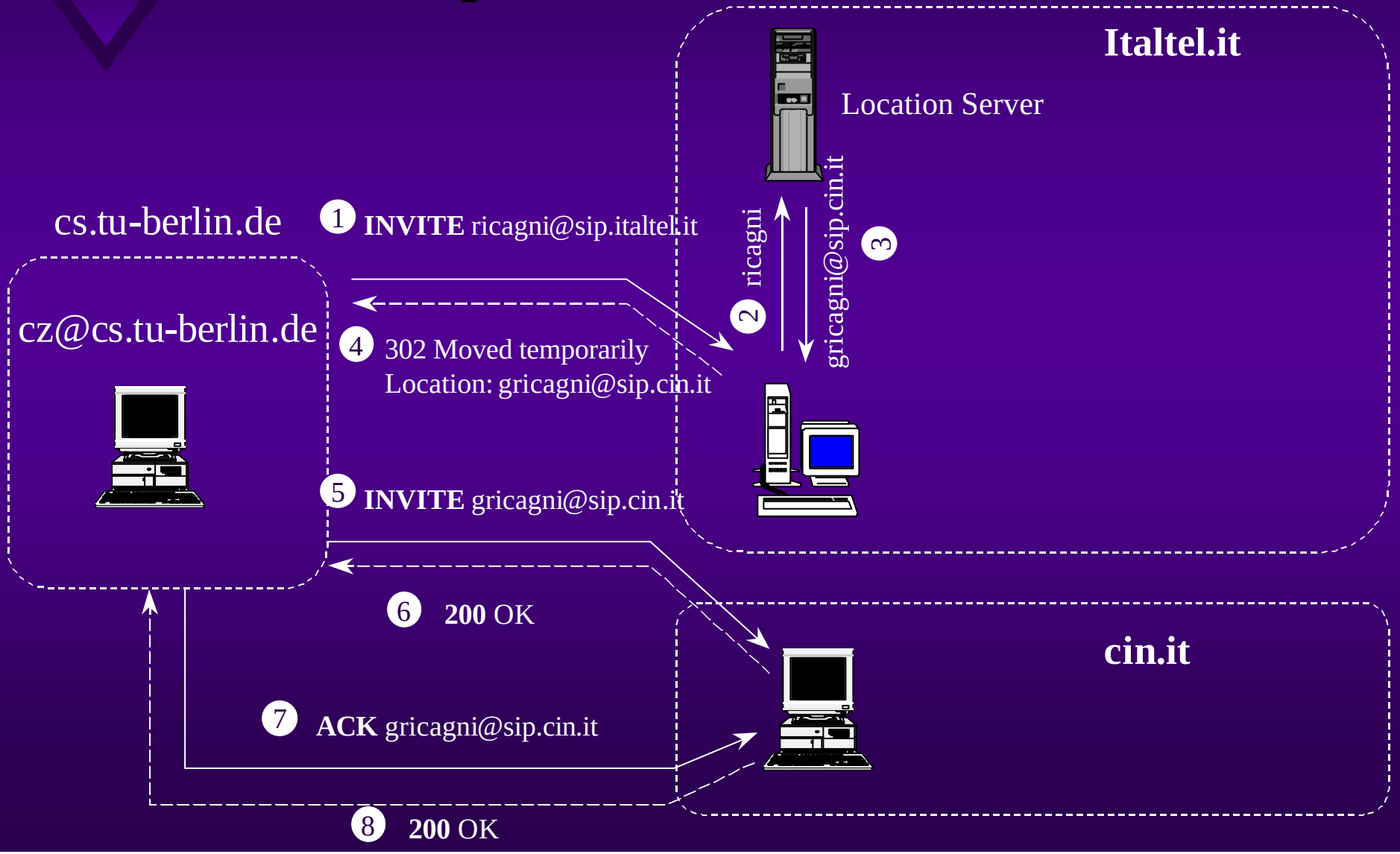
SIP: SIP methods

- Header
  - INVITE: invite in session
  - ACK: confirm connection
  - BYE: tear down call
  - REGISTER: sign up with a server
  - UNREGISTER: “leave” server
- Payload: carries protocols for Session (and media) description (SDP or others)

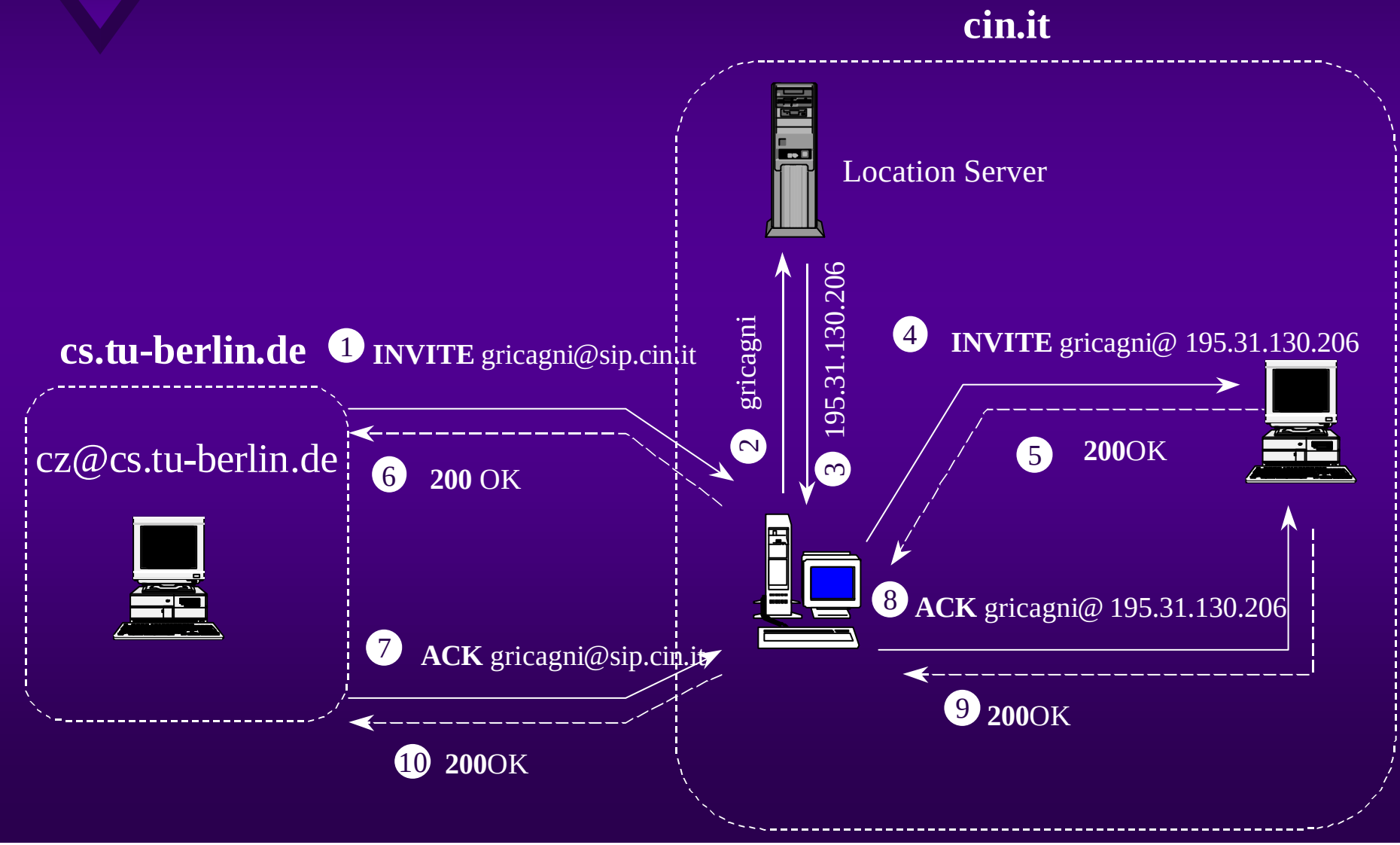
SIP: SIP responses

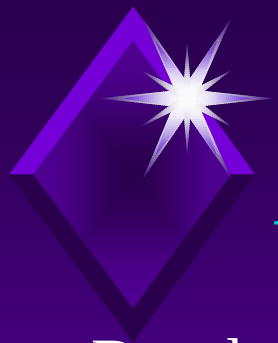
- 1xx: Informational (e.g. wait, alerting user)
- 2xx: Success
- 3xx: Redirection
- 4xx: Client error (request has bad syntax)
- 5xx: Server error (request failed)
- 6xx: Global failure (request invalid at any server)

SIP: SIP operation in redirect mode



SIP: SIP operation in proxy mode





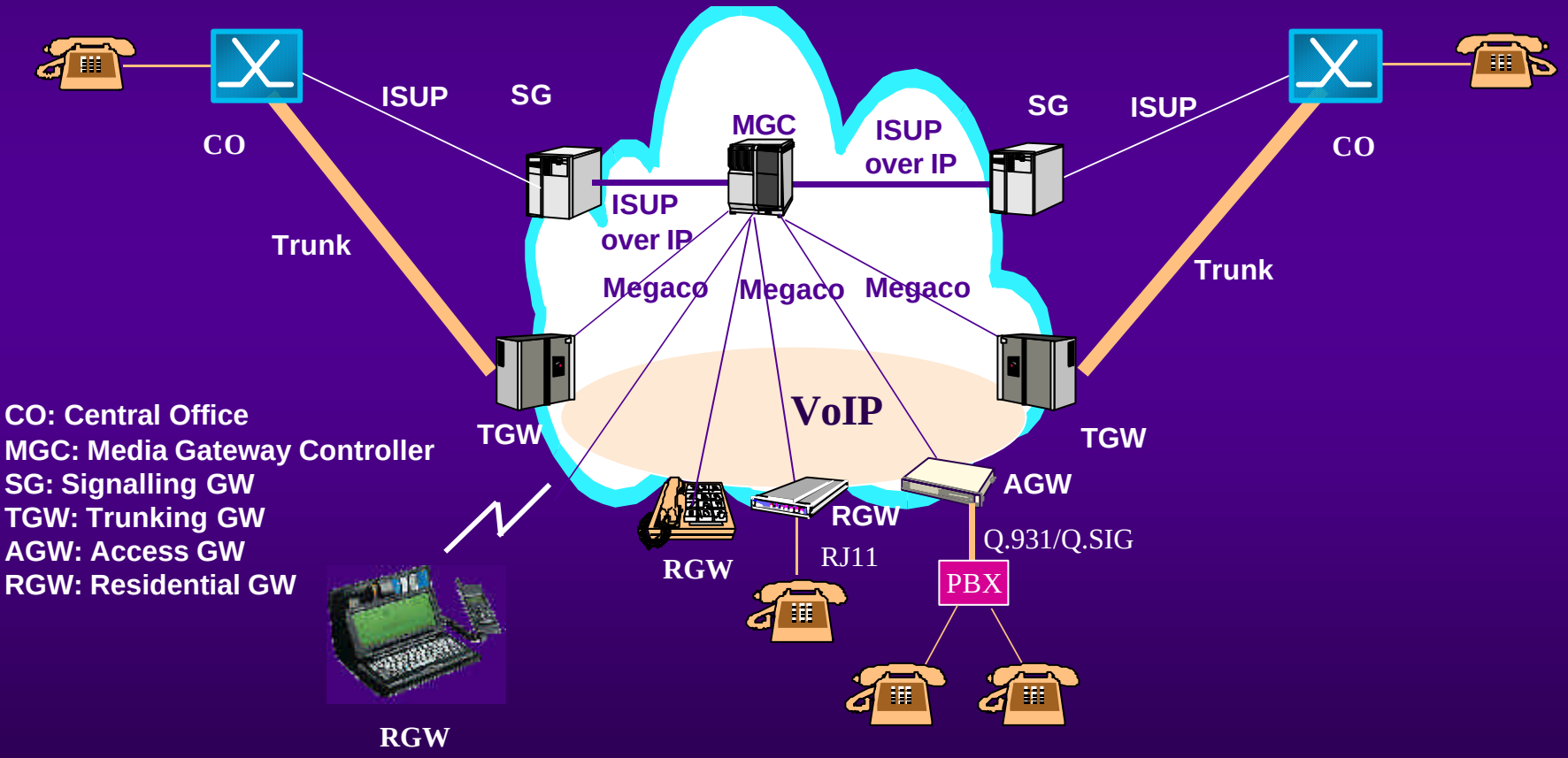
MEdia GAteway COntrol WG

- Develop a protocol to control Media GWs from centralized elements (Media GW controllers)
- Signaling GWs interface MGCs with the SS7 network to allow for interoperability between PSTN and the Internet
- Media Gateways:
  - **Trunking GW**: GW between telephone ntwk trunks and VoIP ntwk **(or VoATM, VoFR)**
  - **Access GW**: GW between ISDN BRI/PRI and VoIP(/ATM/FR)
  - **Residential GW**: GW between a few telephones directly attached (RJ11) to the GW and VoIP NTWK. **May collapse in an IP phone**
  - **NAS**: GW that provides access to the Internet
  - **IVR**: the Megaco protocol can also be used to control an IVR to collect digits, play announcements, send FAX etc.

MEdia GAteway COntrol WG

- "Intelligence" outside of MGs and handled by MGC:
  - MG focuses on audio signal translation
  - MGC handles call control, routing, signalling, interworking between signalling systems

Megaco: The Overall Architecture



CO: Central Office
MGC: Media Gateway Controller
SG: Signalling GW
TGW: Trunking GW
AGW: Access GW
RGW: Residential GW

Megaco: *Protocol Concepts*

- Terminations: sources and/or sinks one or more streams (MM)
  - Permanent (phisical)
    - may also exist outside of a context
  - Ephemeral (e.g. RTP port)
- Context:
  - contains terminations
  - created when the 1st Termination is added
  - destroyed when the last termination is subtracted
  - all terminations in a CTX can be connected
  - “null CTX”: contains all term. not assoc. with other terms

Megaco: *Protocol Concepts*

- Transactions
  - all or nothing
- Events
  - e.g. Off-hook On-hook
- Signals
  - e.g play dialtone, ring

Megaco: Packages

- MEGACO suits a wide range of very different Terminations
  - Variations are accommodated by allowing Terminations to have optional Properties, Events, Signals and Statistics
  - In order to achieve MG/MGC interoperability, such options are grouped into Packages
    - Most of the extension to the protocol are normally accommodated through ad-hoc packages
  - Each Termination must implement a set of such Packages
  - MGCs can audit a Termination to determine which Packages it realizes

Megaco: Command Format

- Command Name(Parameters)
  - TerminationId
  - LocalTerminationState
    - e.g. rcvonly, sndrcv
  - LocalTerminationDescriptor,RemoteTerminatonDescriptor
    - descripton f the media flow in each direction: e.g. IP address of the endpoint, port, codec etc.
  - EventsDescriptor
    - list of events to be reported (triggers)
  - SignalDescriptor
    - list of signals to be applied at the termination (signals are tones and announcements to be generated by the MG)

Megaco: Commands

- Add: adds a termination to a CTX (might also create the CTX)
- Modify: modifies the properties, events and signals of a termination
- Subtract: deletes a Termination from its CTX (might also delete the CTX)
- Move: moves a Termination to another CTX
- AuditValue: returns current state of properties, events, signals and statistics of Terminations

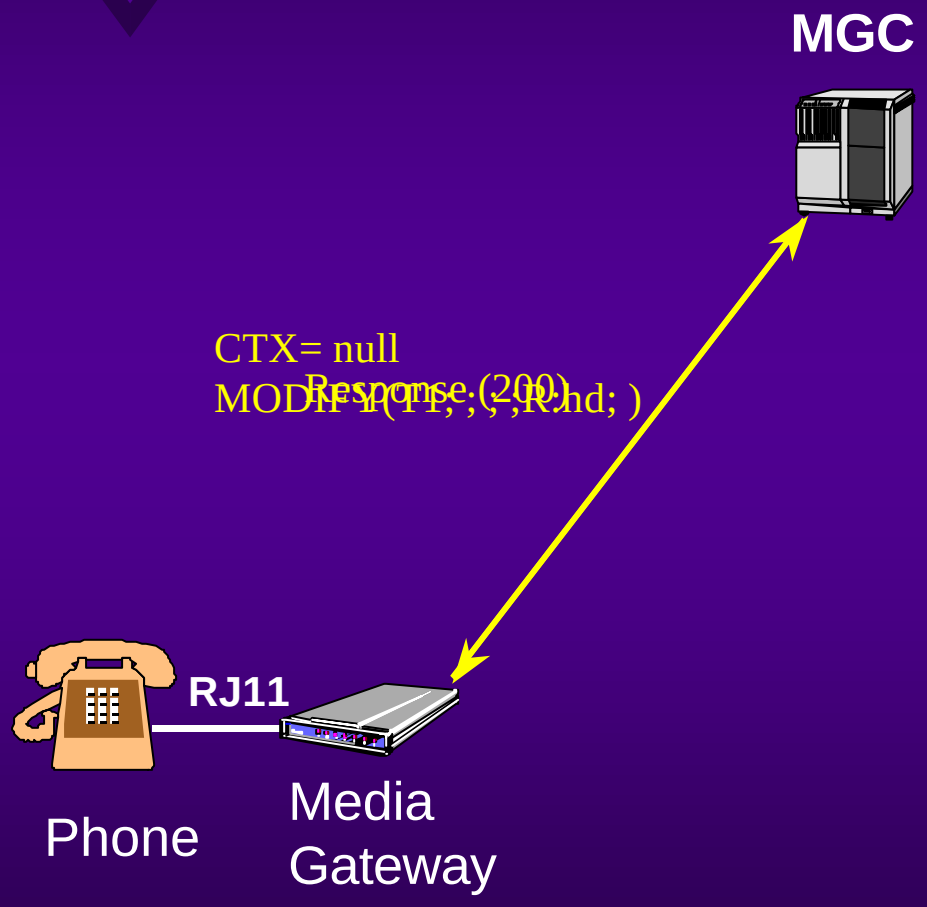
Megaco: Commands

- AuditCapabilities: returns all possible values for Termination properties, events and signals
- Notify: used by MGs to notify events to the MGC
- ServiceChange: used by
  - MGs to notify to the MGC that a group of Terminations is about to be taken out of service or has just been returned to service
  - MGs to register with an MGC upon restart
  - MGCs to announce a handover to the MG
  - MGCs to instruct the MG to take a Termination or group of Terminations in or out of service

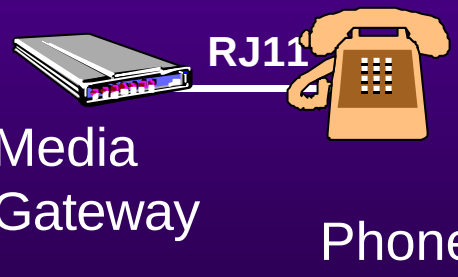
Megaco: *Transactions*

- Commands are grouped into Transactions, identified by a TransactionID
  - Ordered Command execution is guaranteed within a Transaction
  - Ordering *of Transactions* is NOT guaranteed
- TransactionRequest
- TransactionReply: groups all responses to a TransactionRequest
- TransactionPending: notifes that the Transaction is still actively being processed
  - Should restart the Transaction timeout

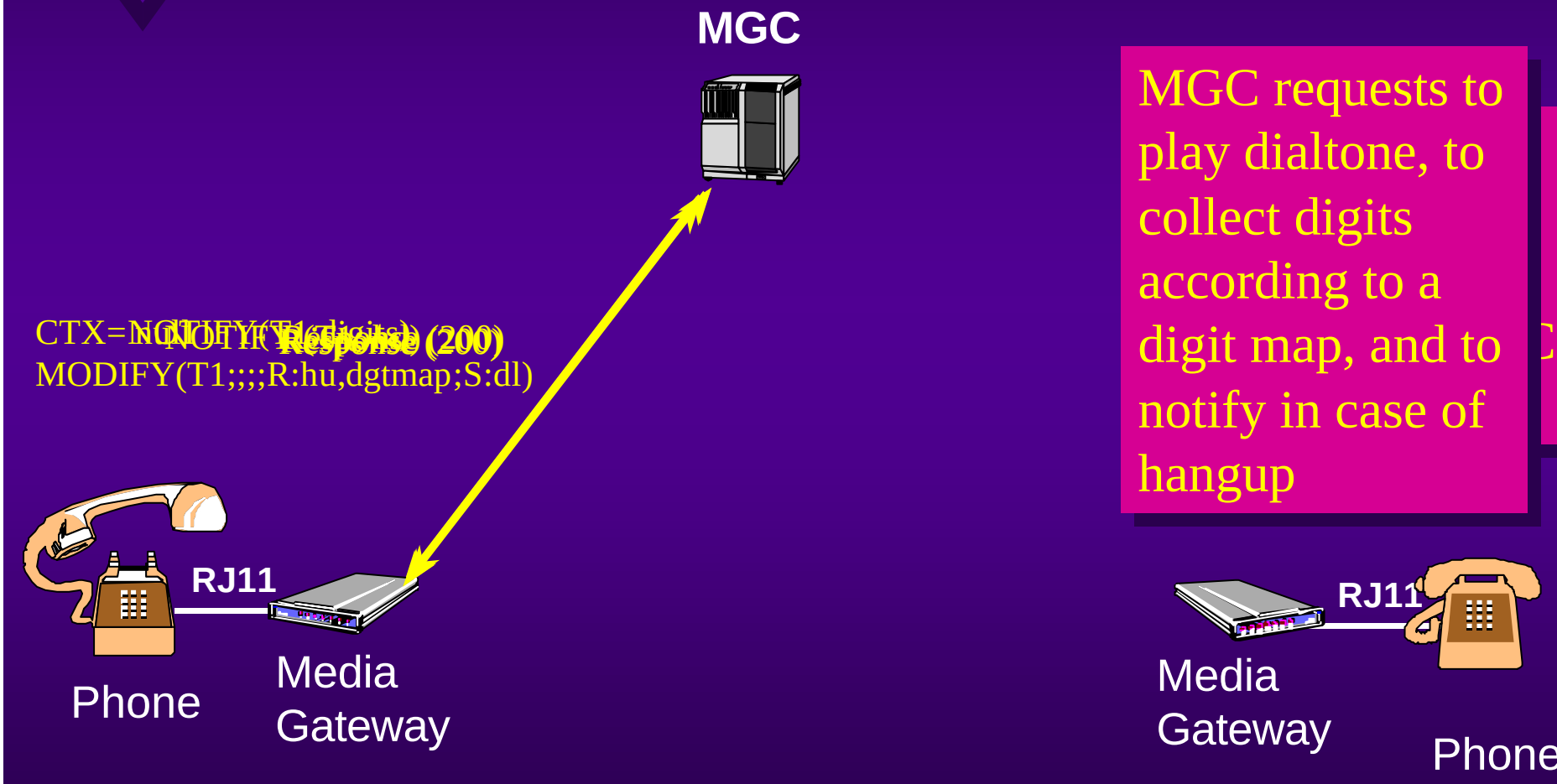
Megaco: *Residential GW Example*



Request notification of off-hook event

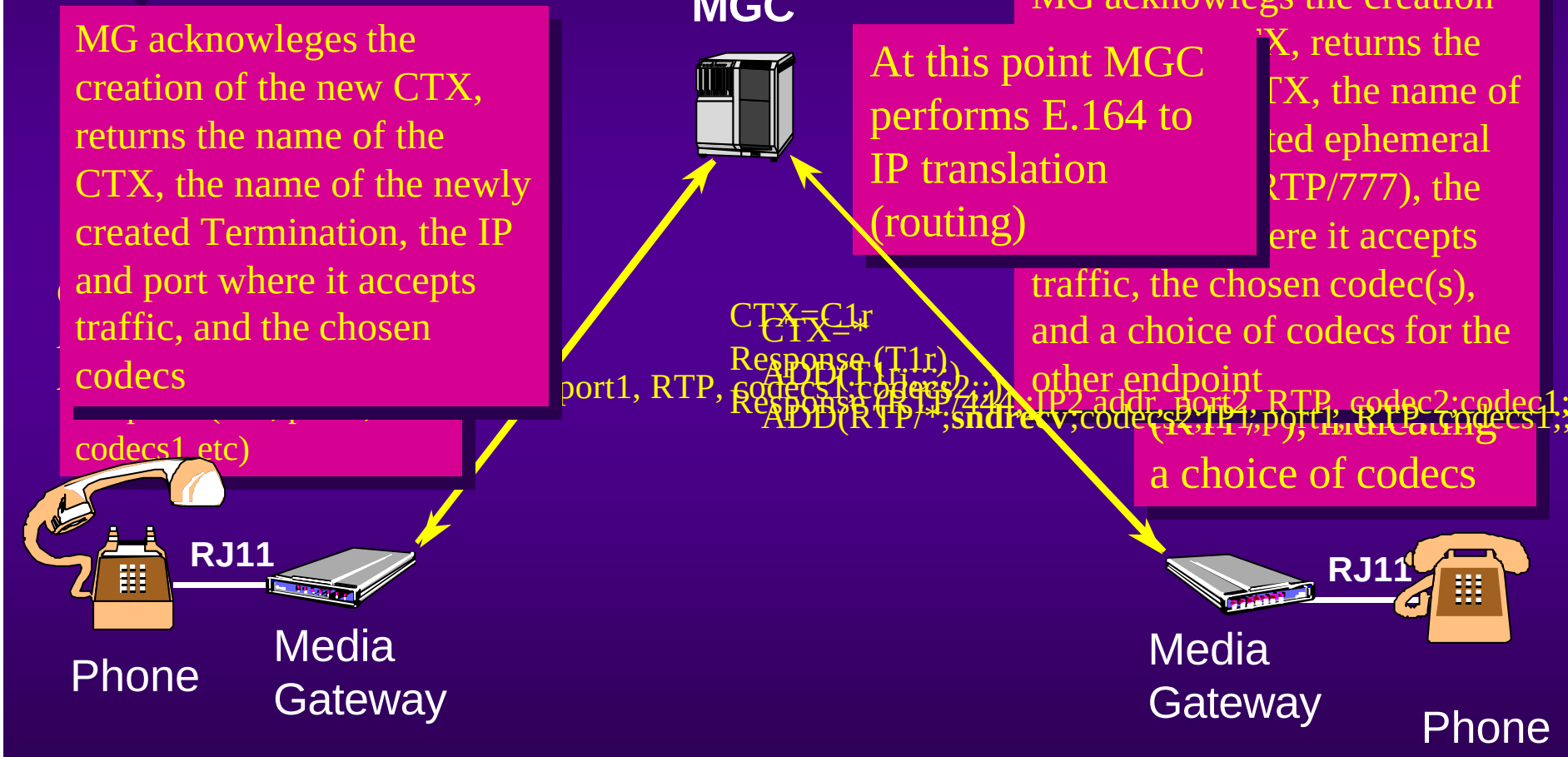


Megaco: *Residential GW Example*

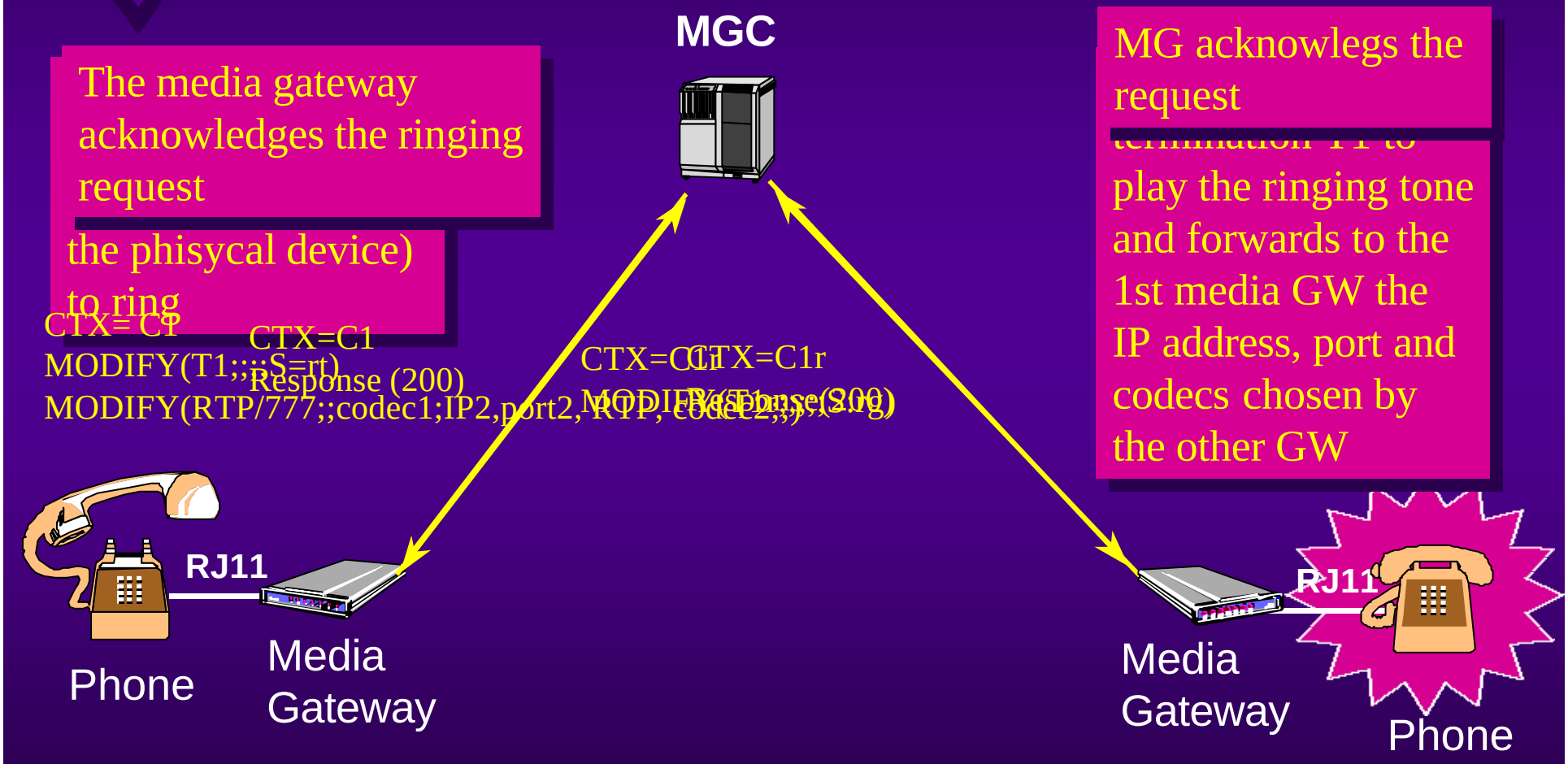


MGC requests to play dialtone, to collect digits according to a digit map, and to notify in case of hangup

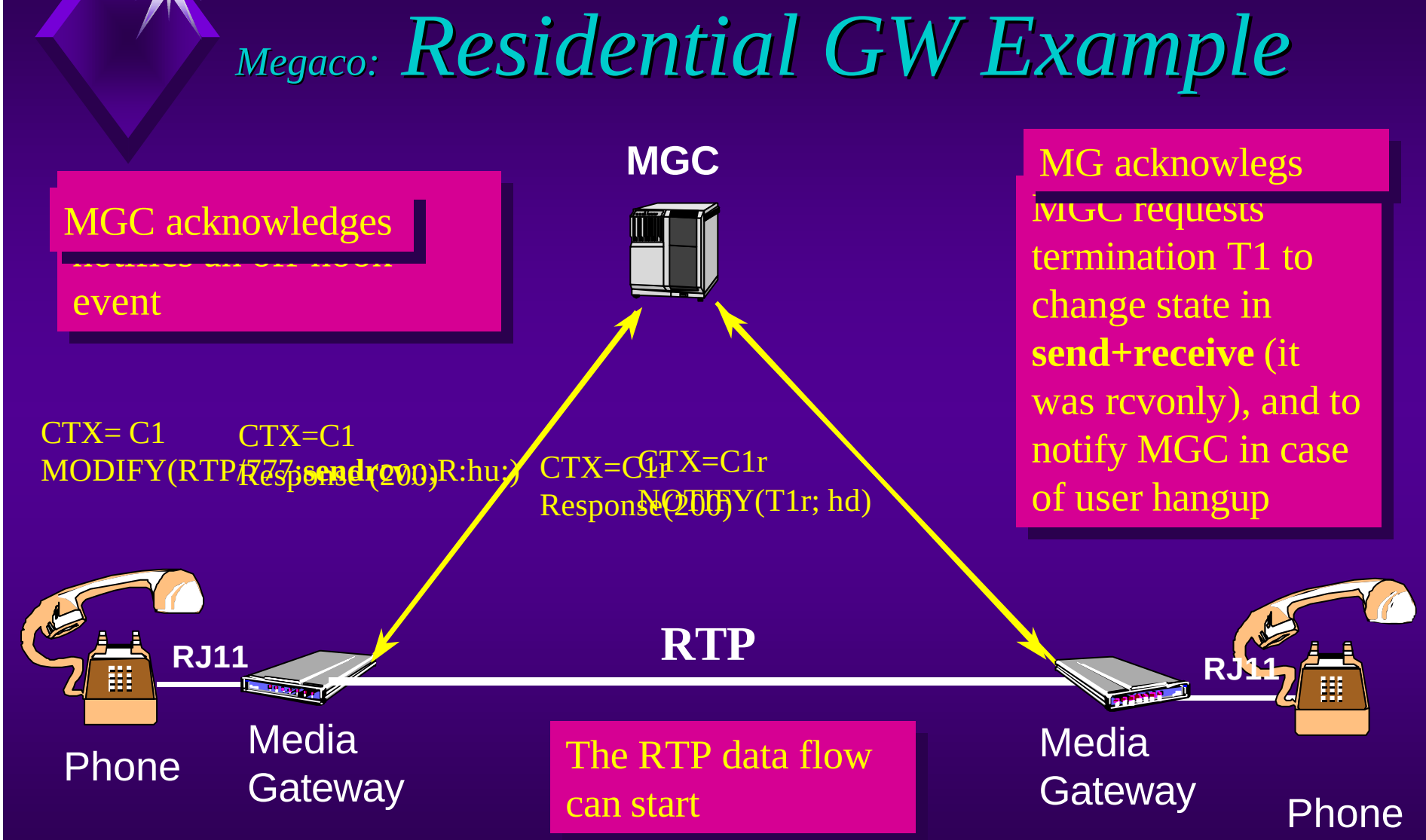
Megaco: Residential GW Example



Megaco: *Residential GW Example*



Megaco: Residential GW Example



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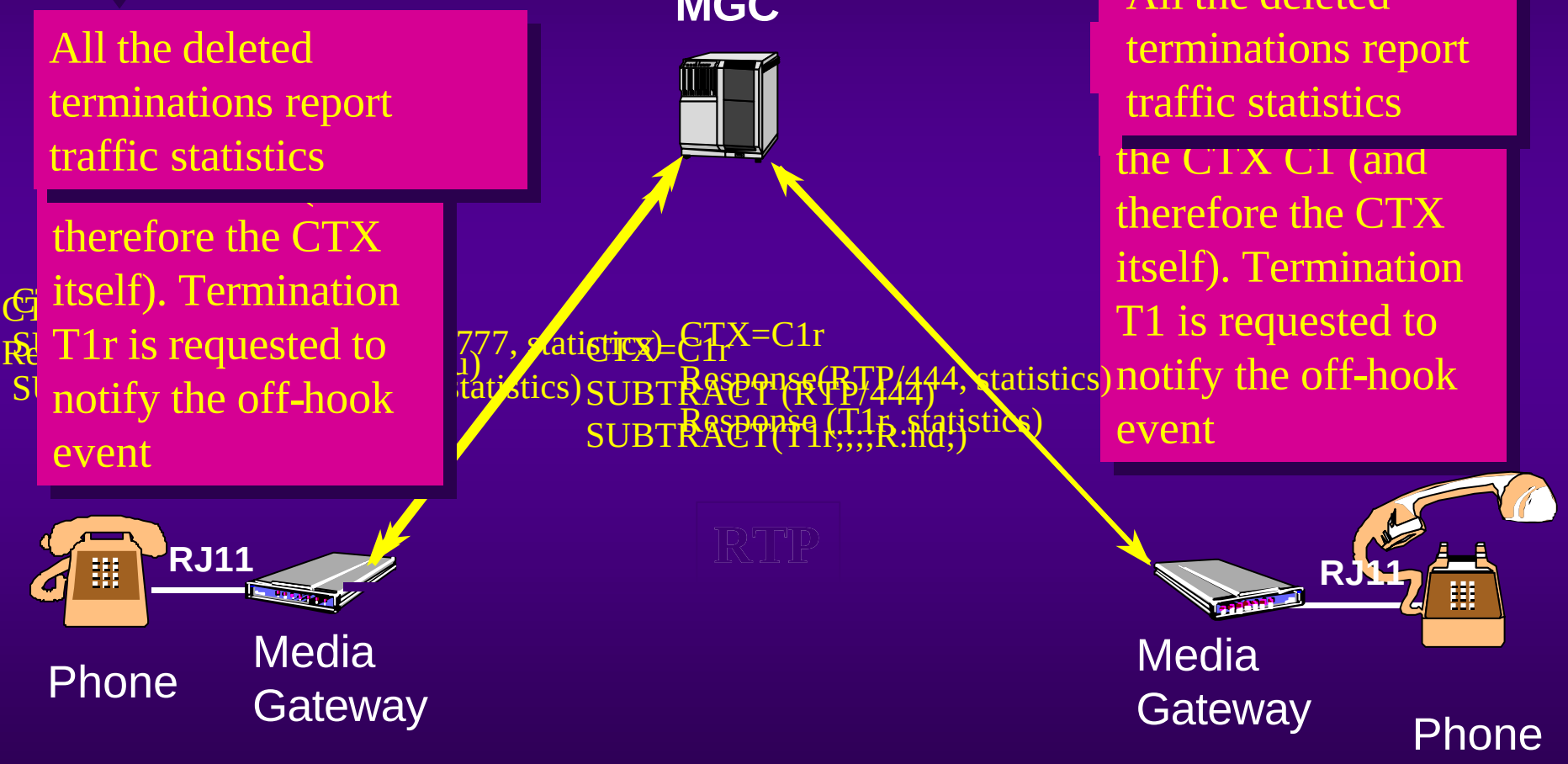


Megaco: *Transport*

- MGCs: must support TCP AND ALF
- MGs: must support TCP OR ALF or both
  - At startup, MG issues the ServiceChange method on a different port depending on the transport it whishes to use
- ITU-T wants to add Sigtran as an option on both

Megaco: RSVP and DIFFSERV support

- (will be) Part of the “IP Package”, in the form of SDP(Megaco)/Annex C(H.248) extensions
- MGC will be able to instruct the MG to
  - mark packets of a specific service with a given DSCP
  - send out RSVP PATH messages for the specified service

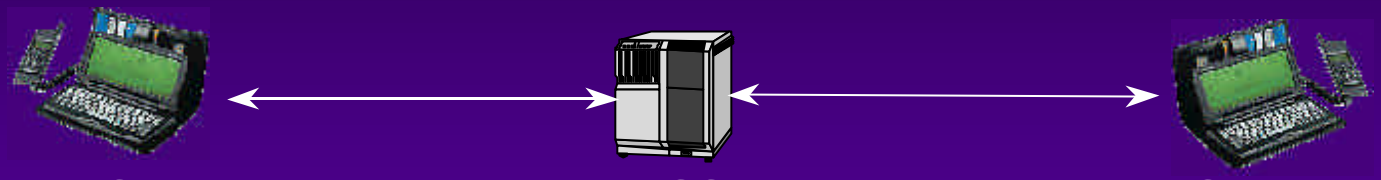
Megaco: *Security*

- IPSEC Authentication Header is mandatory
  - origin authentication
  - data integrity
- IPSEC Encapsulating Security Payload is optional
  - confidentiality (payload encryption)
- An interim solution is devised for those cases where the OS does not support IPSEC

Megaco: *Deadlines*

- Jan 99 **MET**
  - Requirement document approved as RFC
- Feb 2000 Last Call ended on March 7th
  - Draft standard

Megaco: Performances: RGWs, 1 MGC



Off-hook (Dialtone), Digits

Notify: *Tcr=15ms*

Reply: *Tcr= 15ms*

Tgc= 255ms

Add: *Tcr= 15ms*

Tra= 30ms

Reply: *Tcr= 15ms*

Tgc= 255ms

Add: *Tcr= 15ms*

Ringing

Tra= 30ms

Reply: *Tcr= 15ms*

Tx :included in Tgc

Modify: *Tcr= 15ms*

Trm= 30ms
Ringback

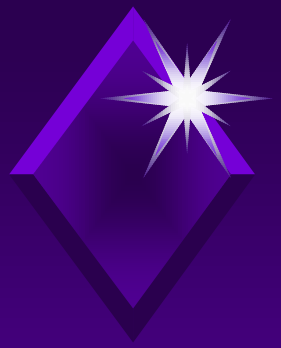
Reply: *Tcr= 15ms*

Megaco: Performances: RGWs, 1 MGC

PDD=2 Tgc+2 Tra+8 Tcr+Trm=720 ms

Megaco: References

- draft-ietf-megaco-reqs-10.txt (To-Be RFC)
- draft-ietf-megaco-protocol-07.txt (To-Be RFC)
- draft-ietf-sigtran-performance-req-01.txt



The Real OSI Model

9. Political
8. Financial
7. Application
6. Presentation
5. Session
4. Transport
3. Network
2. Link
1. Physical