Signaling Architecture

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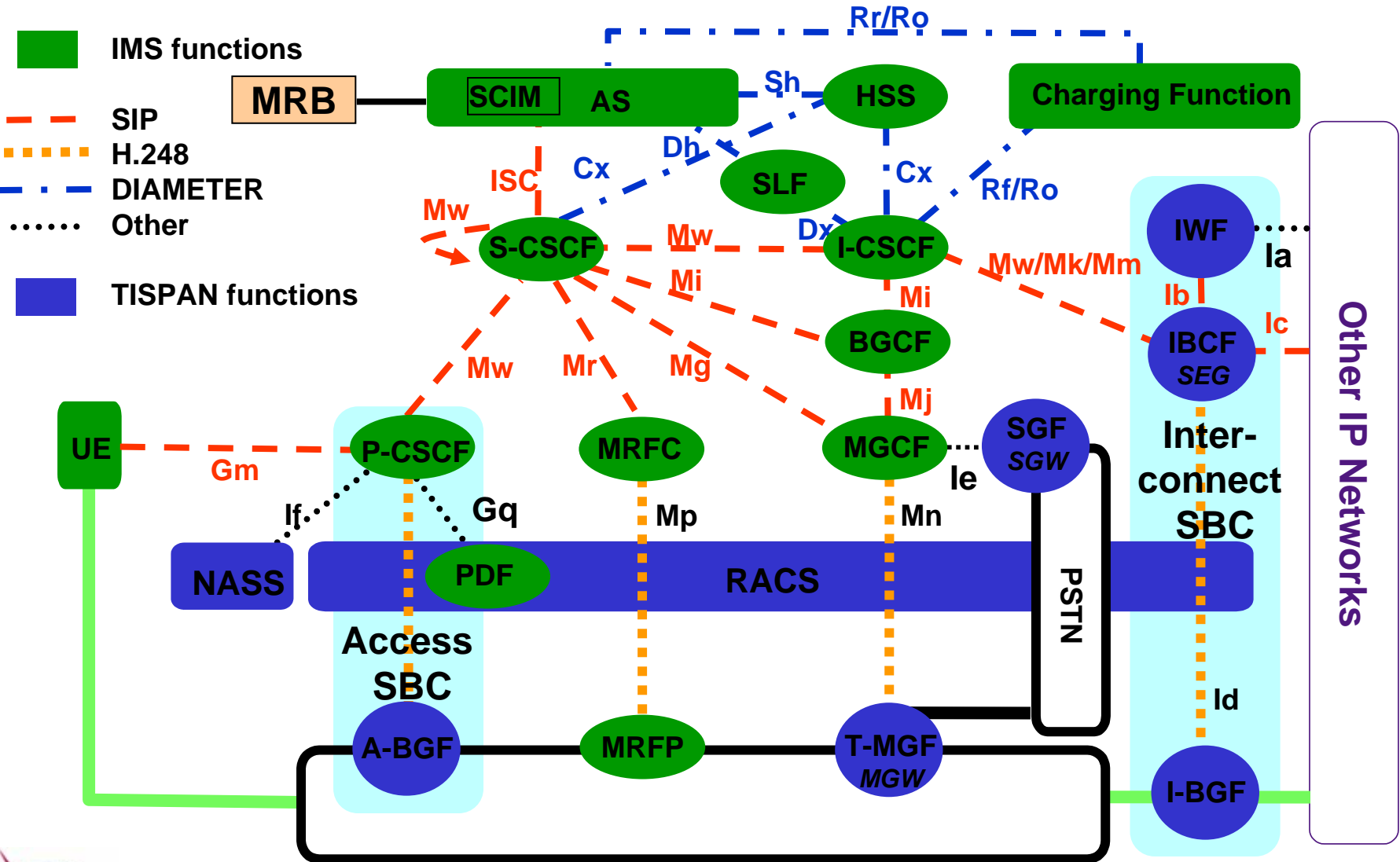
Scope

o Call Control Signaling Architecture

- Identify Network Elements involved in call control signaling

- Functions of these Network Elements

o ATIS Functional Architecture and Interfaces

o Illustrative Call Flows

- IP origination and termination

- IP origination and PSTN termination

Overall Functional Architecture and Interfaces

Description of Signaling Network Elements

o **Application Server (AS)**
  - Executes service logic associated with value-added services
  - Provides enhanced and intelligent services to subscribers

o **Call Session Control Function (CSCF)**
  - Proxy CSCF (P-CSCF) is the first point of contact and the control point for the User Equipment (UE) within the Service Provider network. It forwards session requests from the UE to the S-CSCF
  - Serving CSCF (S-CSCF) has access to the user subscription data and actually handles the session request
  - Interrogating CSCF (I-CSCF) is the first contact point within a Service Provider network for all incoming session requests from another Service Provider

o **Breakout Gateway Control Function (BGCF)**
  - Identifies the network that will be used for connecting IP sessions to the PSTN

Description of Signaling Network Elements (Contd.)

o **Home Subscriber Server (HSS)**
- Stores all the static and dynamic information for a subscriber
- Maintains a list of features and services associated with a user, and also the location and means of access to the user
- Provides user profile information

o **Subscription Locator Function (SLF)**
- Queried during Registration and Session Setup to get the name of the HSS containing the required subscriber specific data

o **Media Gateway Control Function (MGCF)**
- Controls the parts of the call state that pertain to connection control for media channels in a T-MGF MGW
- Selects the CSCF depending on the routing number for incoming calls from legacy networks
- Performs protocol conversion between ISUP and call control protocols (e.g., SIP) and maintains call states

o **Multimedia Resource Function Controller (MRFC)**
  - Controls the media stream resources in the MRFP under direction from an S-CSCF or Application Server
  - Interprets information coming from an AS or S-CSCF (e.g., session identifier) and controls MRFP accordingly

o **Multimedia Resource Function Processor (MRFP)**
  - Provides media resources under the direction of MRFC
  - May generate media streams (e.g., multimedia announcements), mix incoming media streams for multiple parties, or process media streams (e.g., audio trans-coding, media analysis)

o **Policy Decision Function (PDF)**
  - Provides management of network QoS resources, authorization of resource allocations, and makes policy decisions with regard to use of network QoS resources

Description of Signaling Network Elements (Contd.)

o **Trunk Media Gateway Function (T-MGF)**
  - Terminates bearer channels from a switched circuit network and media streams from a packet network (e.g., RTP streams in an IP network)
  - Establishes and releases connections between these channels under control of the MGCF in support of calls between PSTN and IP network

o **Signaling Gateway Function (SGF)**
  - Acts as a gateway between the IP call/session control signaling and the SS7-based PSTN signaling
  - May provide signaling translation, for example between SIP and SS7 or simply signaling transport conversion e.g., SS7 over IP to SS7 over TDM

o **Access Border Gateway Function (A-BGF)**

- Packet gateway between an access network and a core network used to mask a service provider's network from access networks, through which UE accessing packet-based services (e.g., IMS, Internet)
- Functions may include Opening and closing gate, Traffic classification and marking, Traffic policing and shaping, Network address and port translation, and Usage information
- Under control of the PDF

o **Interconnection Border Gateway Function (I-BGF)**

- Packet gateway used to interconnect a service provider's core network with another service provider's core network supporting the packet-based services
- Functions may be the same as that of the A-BGF

Description of Signaling Network Elements (Contd.)

o **Interconnection Border Control Function (I-BCF)**

- Controls I-BGF to interwork with other packet-based networks
- May support the following functions (not limited to):
  - Inter-domain protocol normalization and/or repair
  - Inter-domain protocol interworking
  - Interaction with PDF for resource reservation, resource allocation, and/or other resource related information

o **Media Resource Broker (MRB)**

- Assigns specific media server resources to incoming calls at the request of service applications (i.e., an AS)
- Acquires knowledge of media server resources utilization and reservation requests that it can use to help decide which media server resources to assign to resource requests from applications
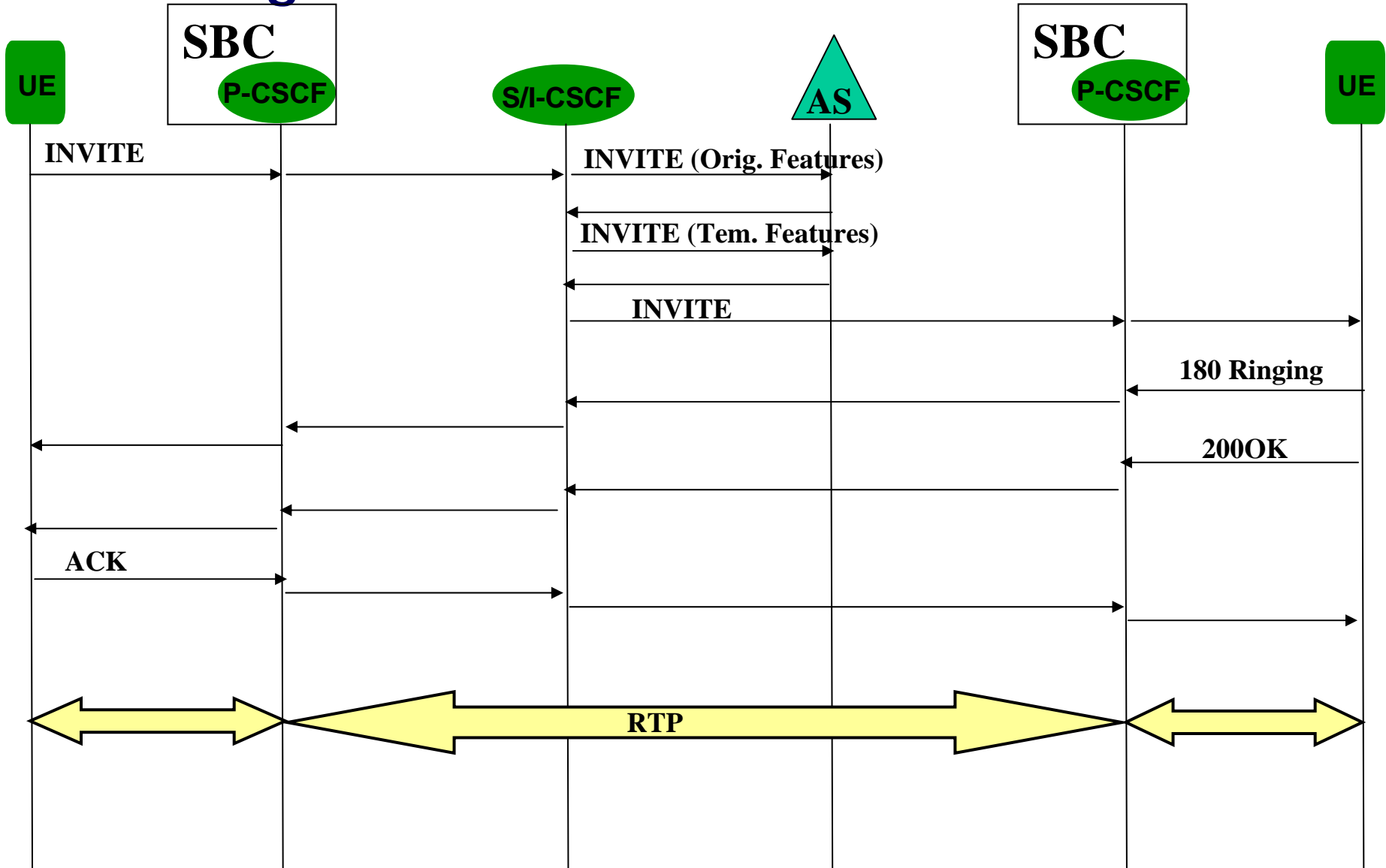- Employs methods/algorithms to determine media server resource assignment

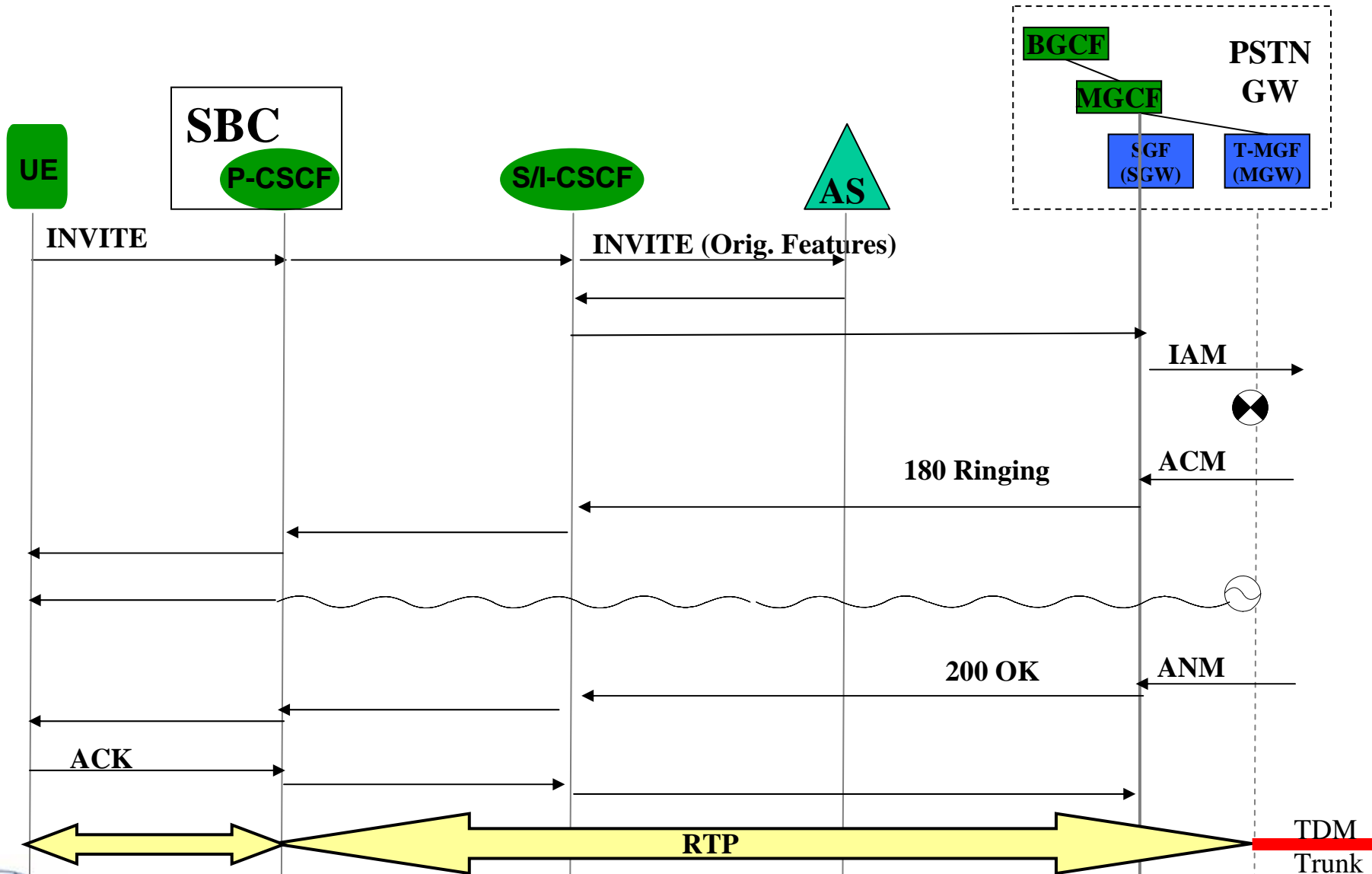# ATIS Functional Architecture and Interfaces
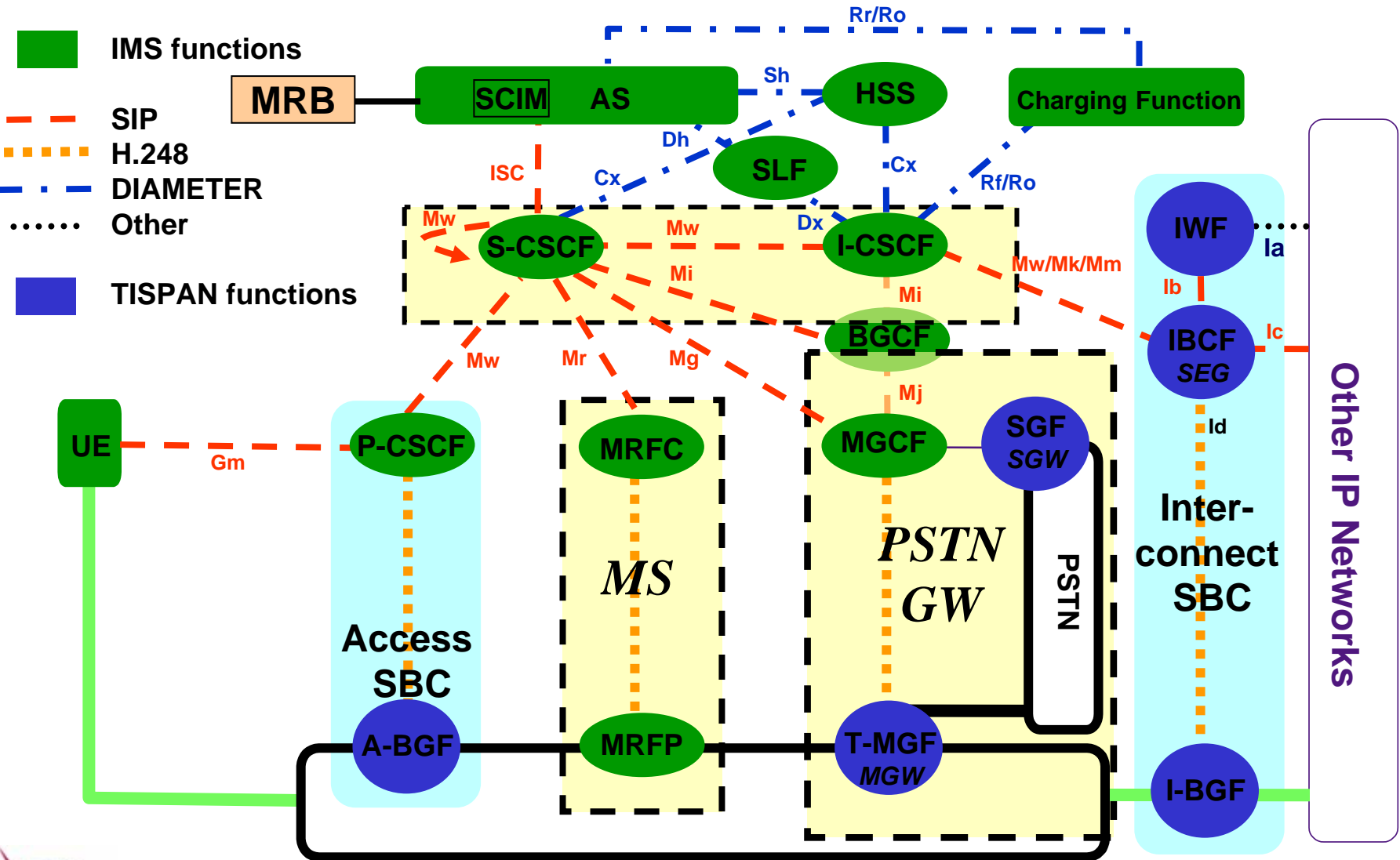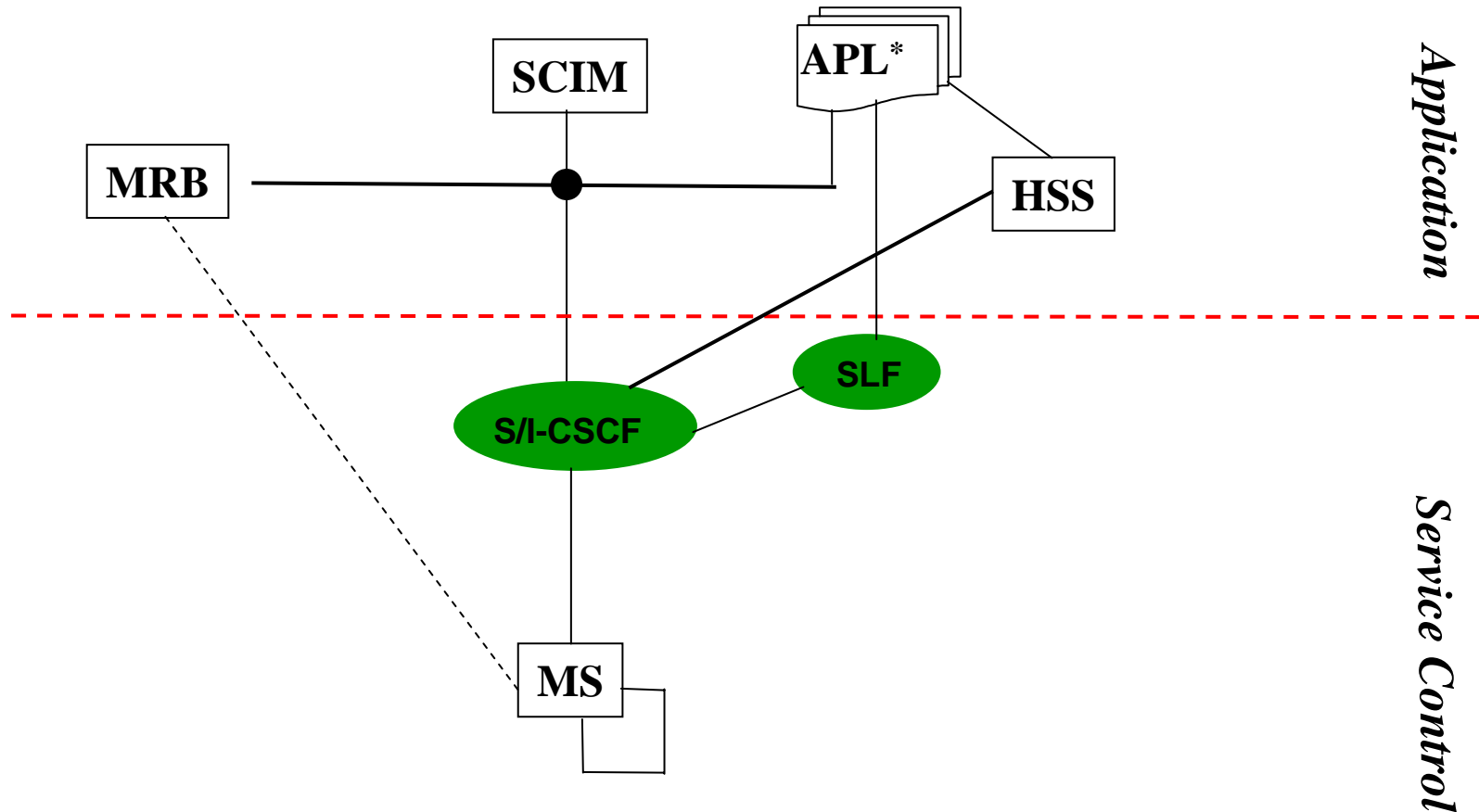
IP Origination and IP Termination Call Flow

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IP Origination and PSTN Termination Call Flow

Thank You