- **Week #9 (March 1 - 5)**
- **Quiz**
- **Week #10   (March 8-12)**
- **Parlay/OSA and CPL (Other examples of signaling protocol neutral service engineering technologies)**
- **Week #11 (March 15 - 19)**
- **QoS**
- **Week #12 (March 22 – 26)**
- **Web 2.0**
- **Week #13 (March 29 – April 2)**
- **UMTS and beyond**
- **Week #14 (April 5 - 9)**
- **Quiz**
- **Week #15   (April 12 – 16)**
- **Project reports + demos**

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Chapter IX
Parlay/OSA and CPL as examples of signaling protocol neutral approaches

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Introduction

Signaling protocol neutral service engineering technology

- Service architecture applicable to NGNs using any signalling protocol
  - Next Generation signalling protocols
    - SIP
    - H.323
- Example already studied in this course: Web services
- Examples presented today:
  - Parlay/OSA
  - Call Processing Language (CPL)

- Example to study later in the course:
  - Web 2.0

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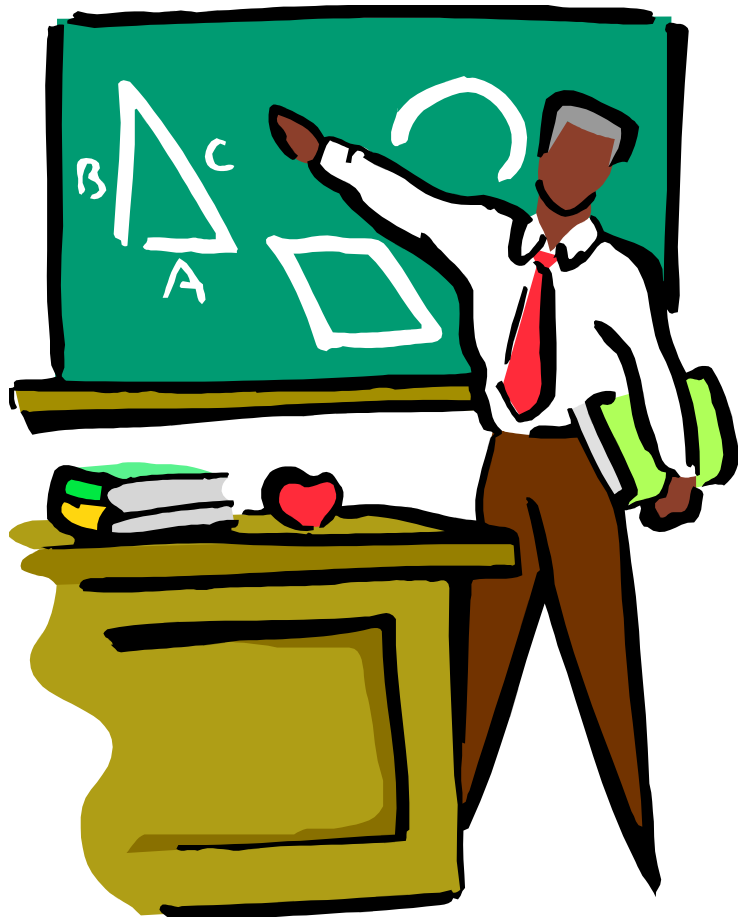
Signaling protocol neutral architectures …

1. Parlay

2. CPL

OSA/PARLAY

1. **Introduction**

2. **Business model**

3. **Interactions**

4. **APIs**

5. **Case Study**

6. **Pros and cons**

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Introduction

PARLAY forum

– Created in 1998 as close forum

– Open since 2000

– Include most major players from telecommunications and computer industries (e.g. Ericsson, Lucent, Siemens, IBM)

– Work initially done in collaboration with third generation partnership project (3GPP)

– API called Parlay / Open Service Access (OSA)

– Parlay forum now dismantled and work fully done in 3GPP

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Introduction

PARLAY main goal: Open up telecommunication networks

- Enable new business models

- Use open information technology middleware

- Make telecommunication network capabilities available for application development
    - Two types of APIs
    - Services APIs
        - Expose the network capabilities (e.g. call control, presence)
    - Framework APIs
        - Make the use of the service APIs secure, accountable and resilient (e.g. security, registration, authentication)
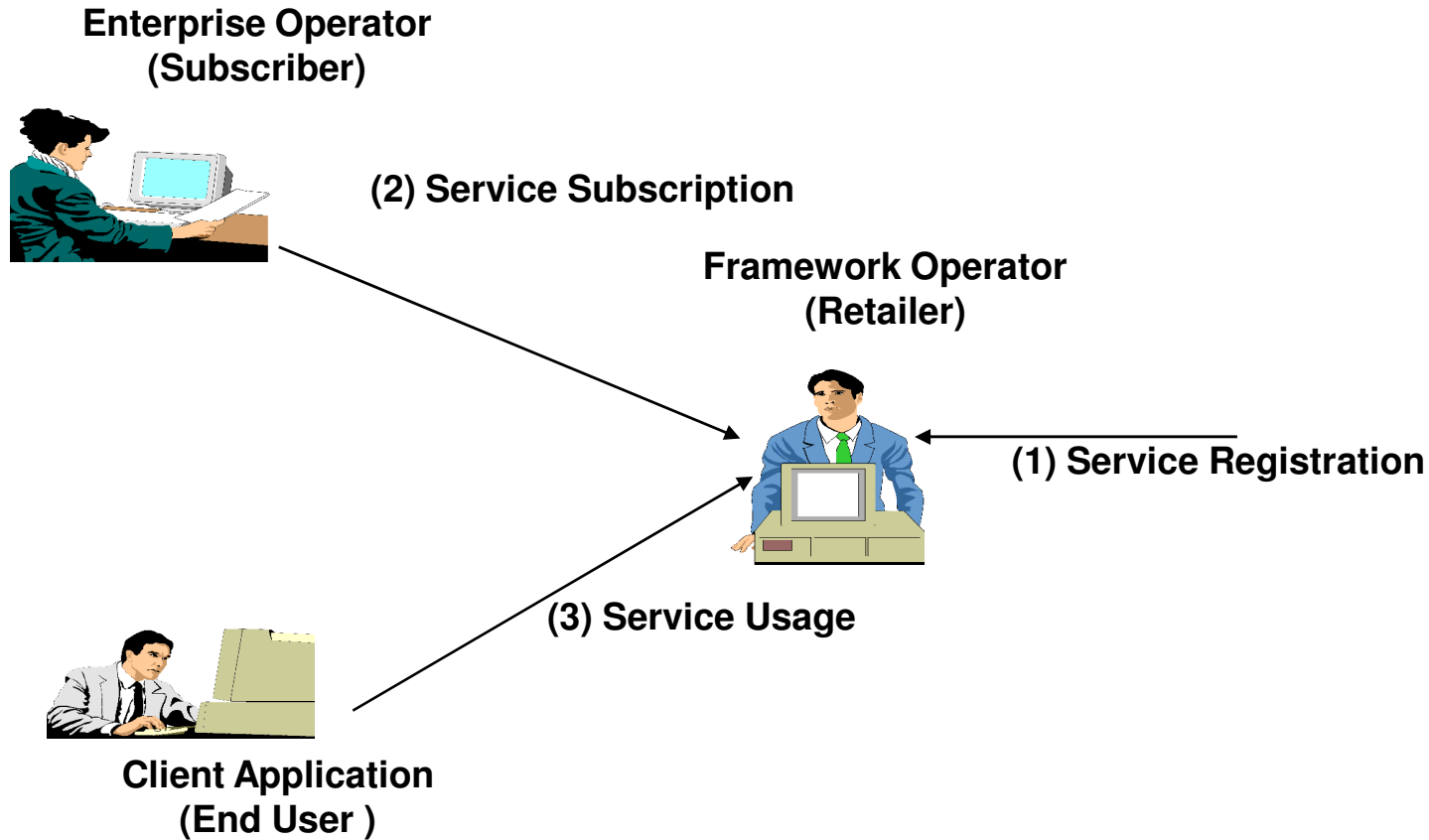
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The business model

- Introduction
  - TINA-C inspired business model
  - Terminology: Services mean network capabilities
- Roles
  - Client application
    - Consume/use the services (e.g. network capabilities)
    - Equivalent to end users in TINA-C.
  - Enterprise operator
    - The entity that subscribes to the services
    - Subscriber in TINA-C
  - Framework operator
    - Entity that handles the subscriptions
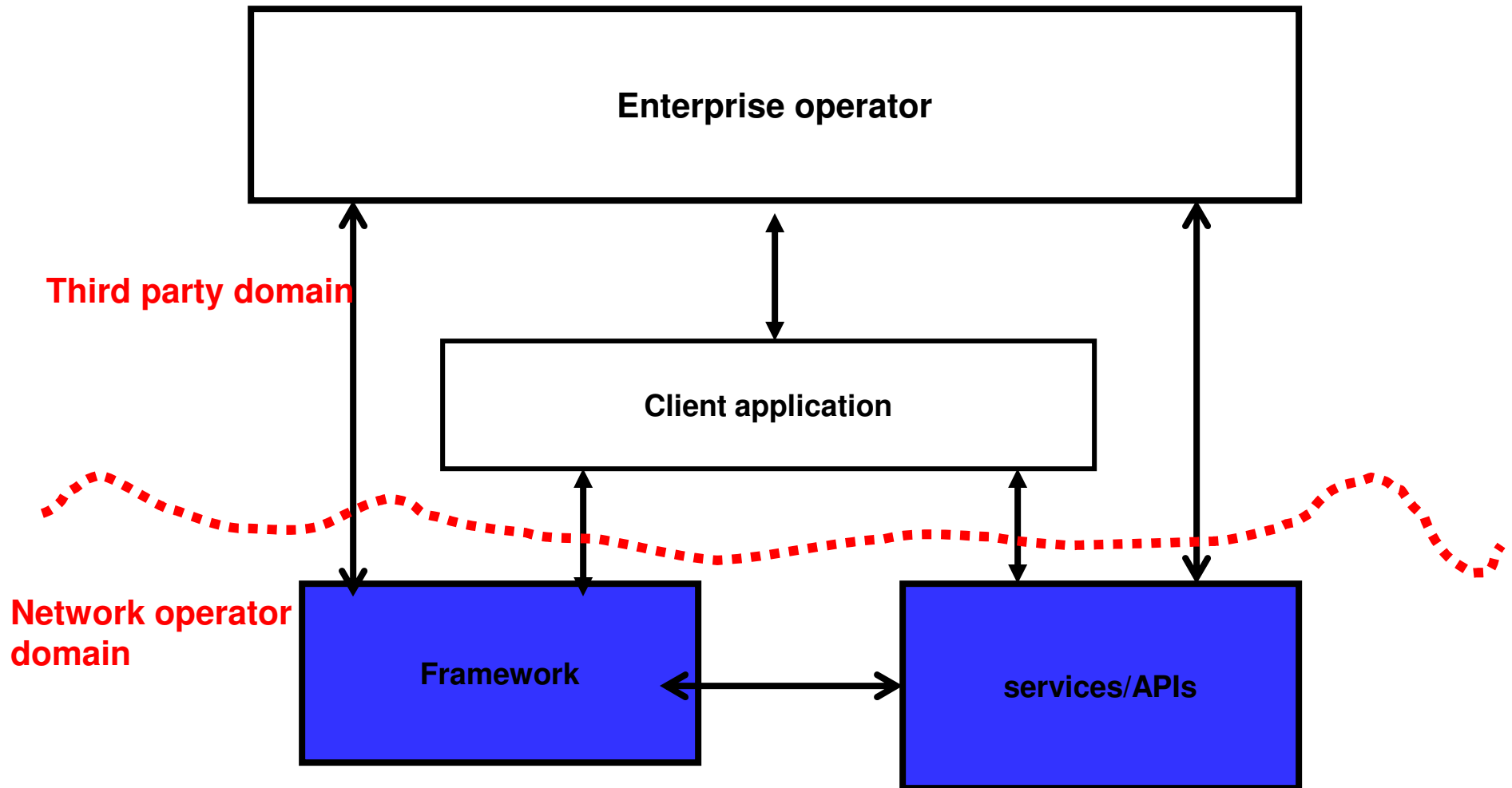   - Equivalent to the retailer in TINA-C

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General model

**Enterprise Operator
(Subscriber)**

(2) Service Subscription

**Framework Operator
(Retailer)**

(1) Service Registration

(3) Service Usage

**Client Application
(End User)**

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Commonly deployed model ...

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Interactions

Application and framework

Authentication

- Peer to peer model

- Allow framework to check that application is "who" it claims to be and application to check that framework is "who" it claims to be

- Usually used in only one direction (I.e. framework checking).

Authorisation

- Determination of what the application can do once authenticated

Discovery

- Once authenticated applications can get info on available APIs

Establishment of service level agreement

. Usually done off-line

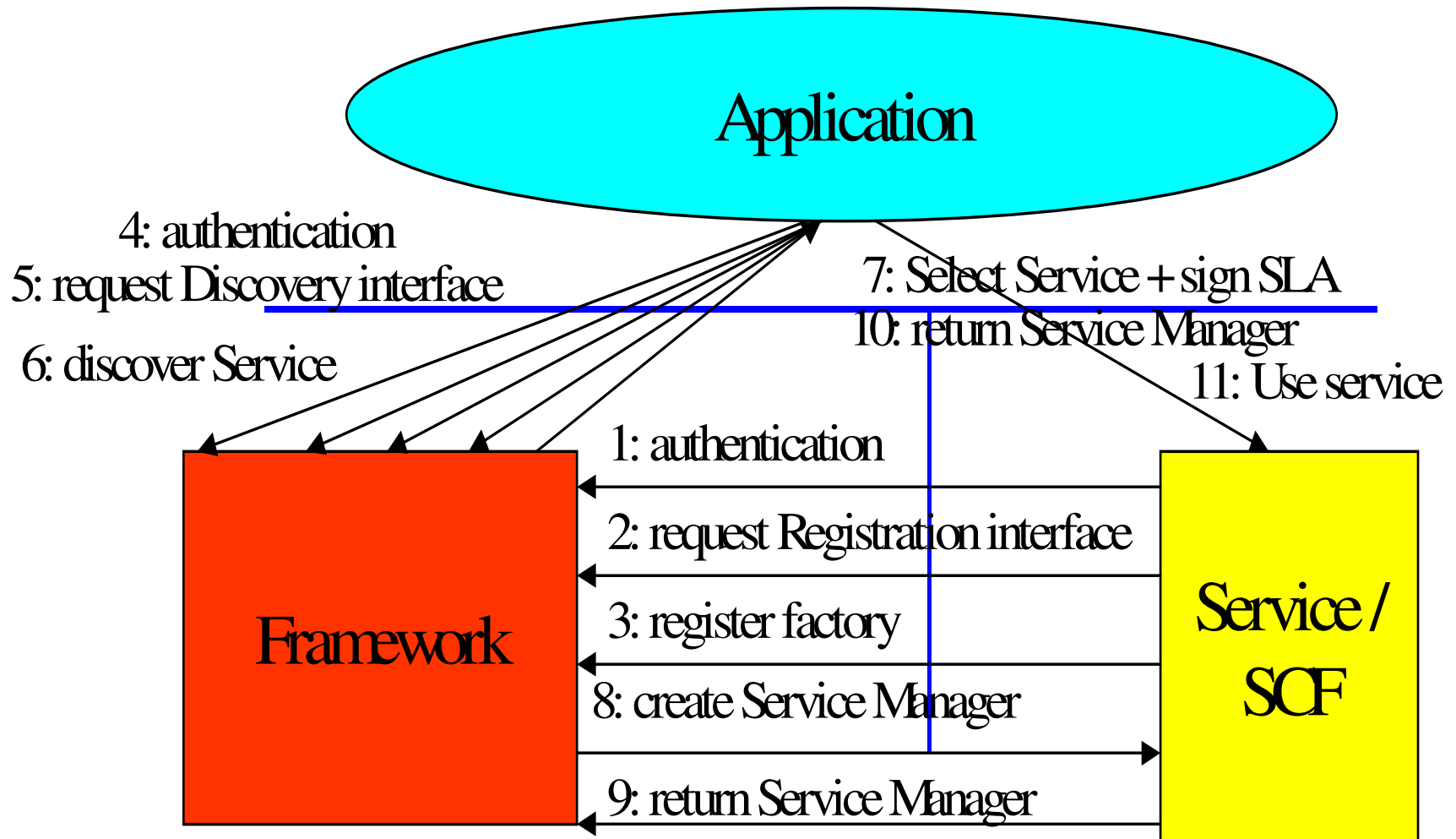**Roch H. Glitho**

Interactions

Services/APIs and framework

Registration / **De-registration**

- Allow services to register/de-register to/from the framework

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Interactions (Taken from reference [2])

1 – 3 registration/discovery, 4-11 run time communications establishment ….

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The APIs

Client Applications

Parlay/OSA APIs

Framework
APIs

Service
APIs

Resources interfaces

Resource
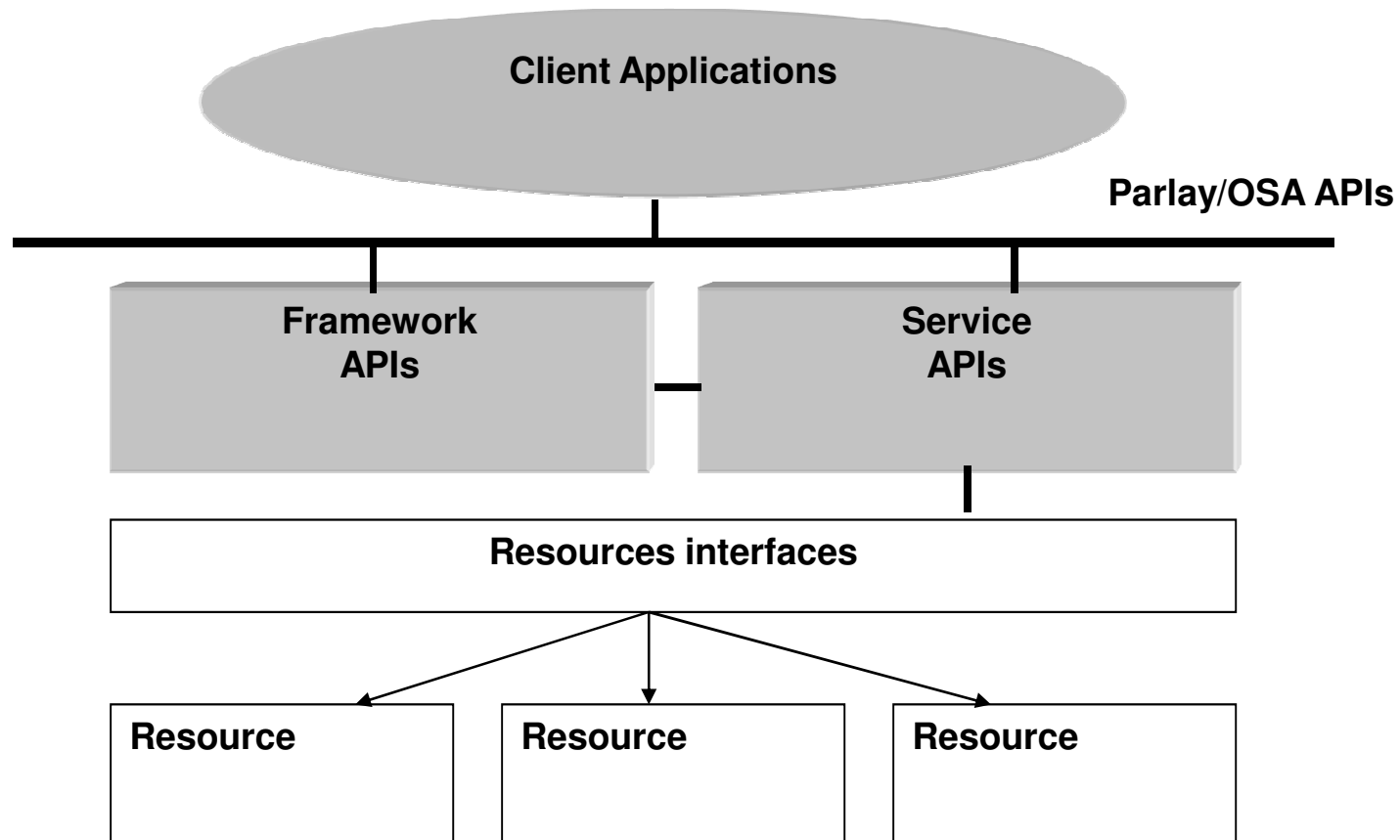
Resource

Resource

Figure 2 Parlay APIs interfaces

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The APIs

Some common characteristics

Specifications include

- High level specification in UML (Universal Modelling Language)
- API specifications for several IT technologies
    – CORBA IDL
    – WSDL
    – Java

Two modes of communications

- Synchronous
- Asynchronous

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Framework API: Make the use of the service APIs secure and resilient

Trust and security management

Event notification

Service discovery

Service registration

Integrity management (e.g. load management)

Service agreement

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Framework API: Make the use of the service APIs secure and resilient

Trust and security management – Examples of method

AbortAuthentication ()

AuthenticationSucceeded ()

Challenge ()

TerminateAccess ()

InitiateAuthenticationWithVersion ()

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Service API: Give access to network capabilities

Call control

User interactions

Generic messaging

Mobility

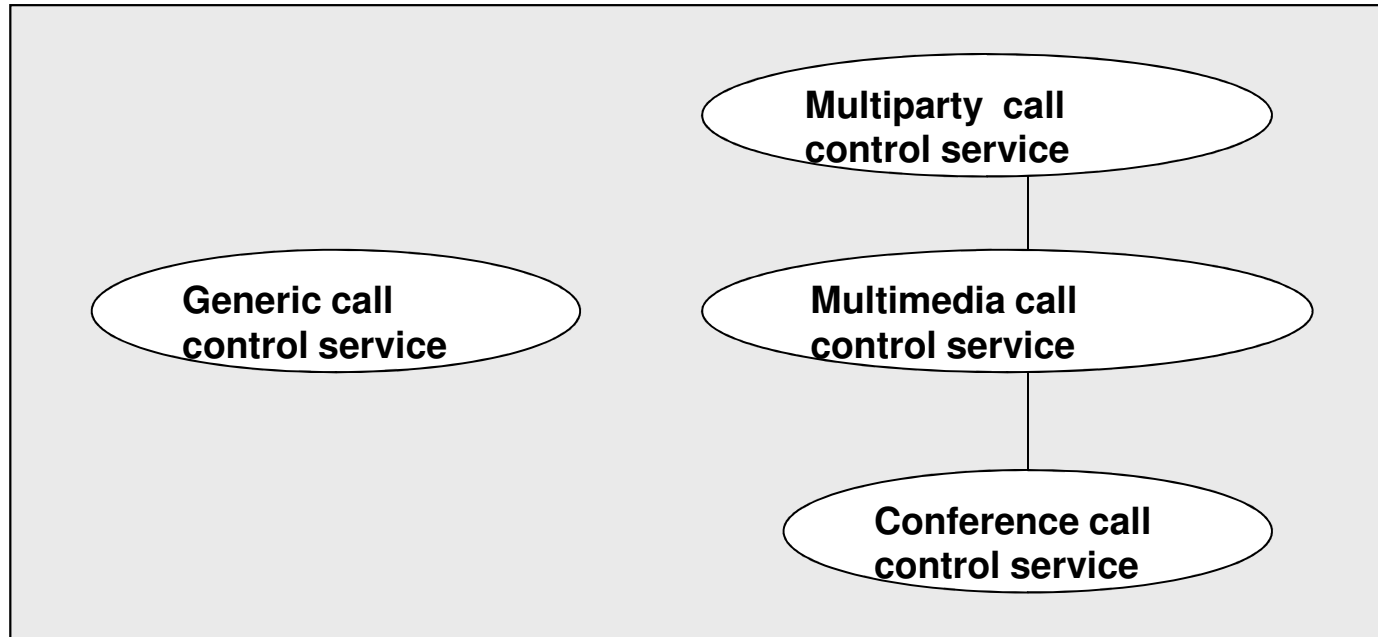**Terminal capabilities**

Connectivity management

Account management

Charging service

Data session control

Presence and availability management

An example of Service API: Call control

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The call control API

Call model

- Terminal

  - End point (Not covered in the current specifications)

- Address

  - Represents a party in a call (E.164 number, IP address)

- Call

  - Abstraction of the physical call that occurs in a network

- Call leg

  - Logical association between a call and a party involved in a call

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The call control API

Generic call control

- Two party voice call only
- Remain in Parlay for historical reasons

Multiparty call control

- Establishment of calls with any given number of users
- Root of the inheritance tree

Multimedia call control

- Add multimedia (e.g. media negotiation) capabilities

Conference call control

- Add conferencing capabilities

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Conferencing / multiparty sessions

Basis of a wide range of applications

- Voice/videoconferencing

- Multiparty gaming

- Distance learning

- And more …

Categorization schemes

- With / without sub-conferences

- Pre-arranged vs. ad hoc

- With / without floor control

  - Floor control: Who can be heard /seen

- Where the media is mixed (e.g Centralized vs. decentralized)

- Dial-in (Meet-me) vs. dial-out

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Conferencing with Parlay ….

Examples of methods …

- CreateConference ()

    - Parameters include the number of sub-conferences

- CheckResource ()

- ReserveResources ()

- FreeResources ()

- PartyJoined ()

- SplitSubconference ()

- MergeSubconference ()

- FloorRequest ()

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A case study on PARLAY/OSA and SIP: Run For Your Life game (Described in detail in reference [3])

- • **1 - Introduction**

- • **2 - Game**

- • **3 - Architecture**

- • **4 - Mapping**

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Introduction   ...

Run-For-Your-Life

- Built from scratch in Ericsson Research lab in Montreal Canada

- Demonstrated at several trade shows (e.g. ICIN 2001, Parlay Munich meeting, Parlay Hong Kong meeting)

- Objectives assigned to the game design

  - Extensive usage of call control capabilities

  - Have fun …

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Introduction ...

Objective of the case study …

Aim at helping in tackling two issues:

1. PARLAY Call Control APIs that cannot be mapped onto SIP

  – What are they?

  – What is the impact on service creation?

1. SIP semantics that are not visible in PARLAY APIs as per today's specification

  – What are they?

  – What is the impact on service creation?

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The game ...

A multiparty cooperative game

– Group of people trapped in a house with several rooms set to burn/explode in a given time

– Can escape only if password is found

– Letters making the password scattered in selected rooms of the house

– People ending up in the same room can exchange hints about the password via audio and chat

– Game can be assimilated to a conference with as sub-conference people ending up in a same room

Requiring a set of well defined conferencing functionality
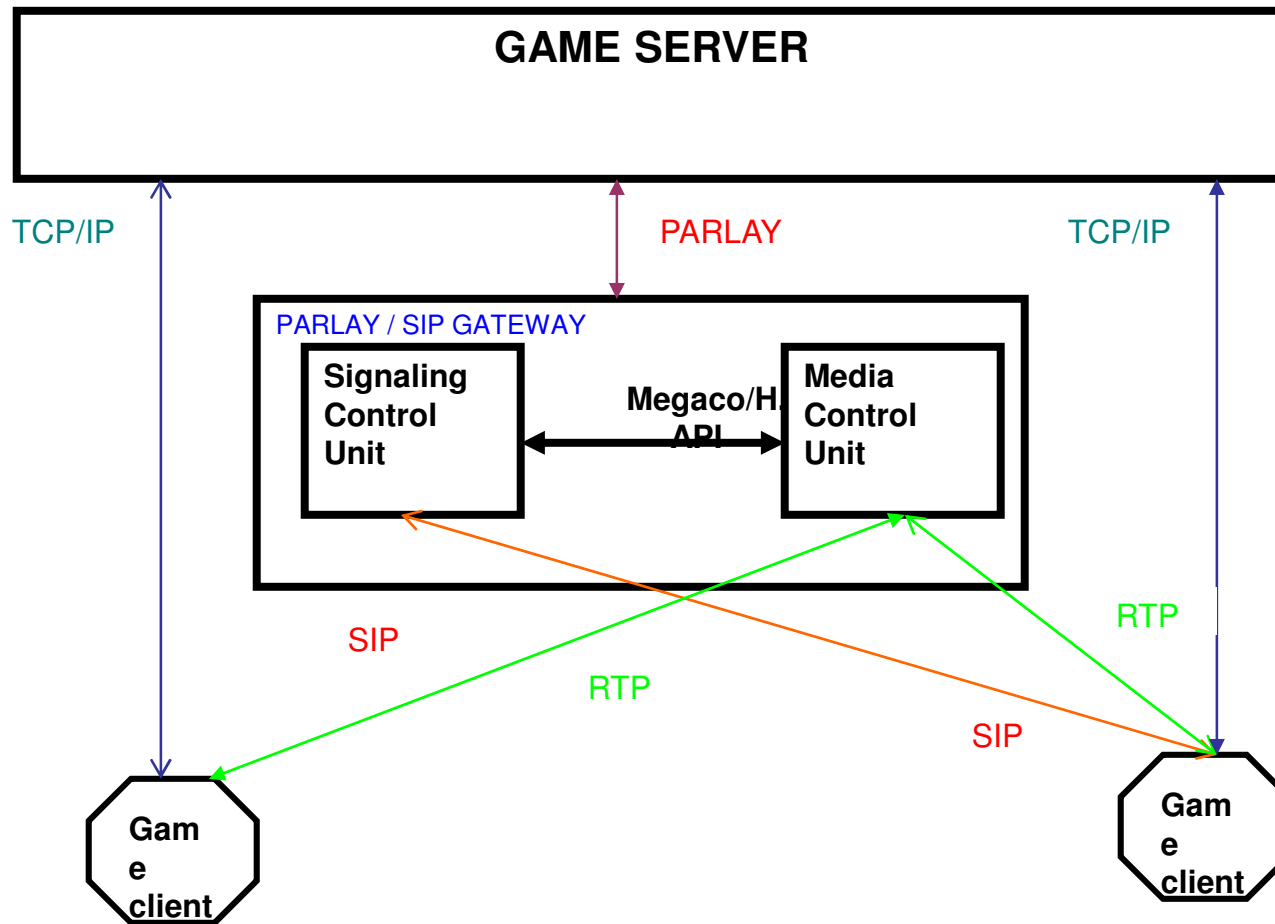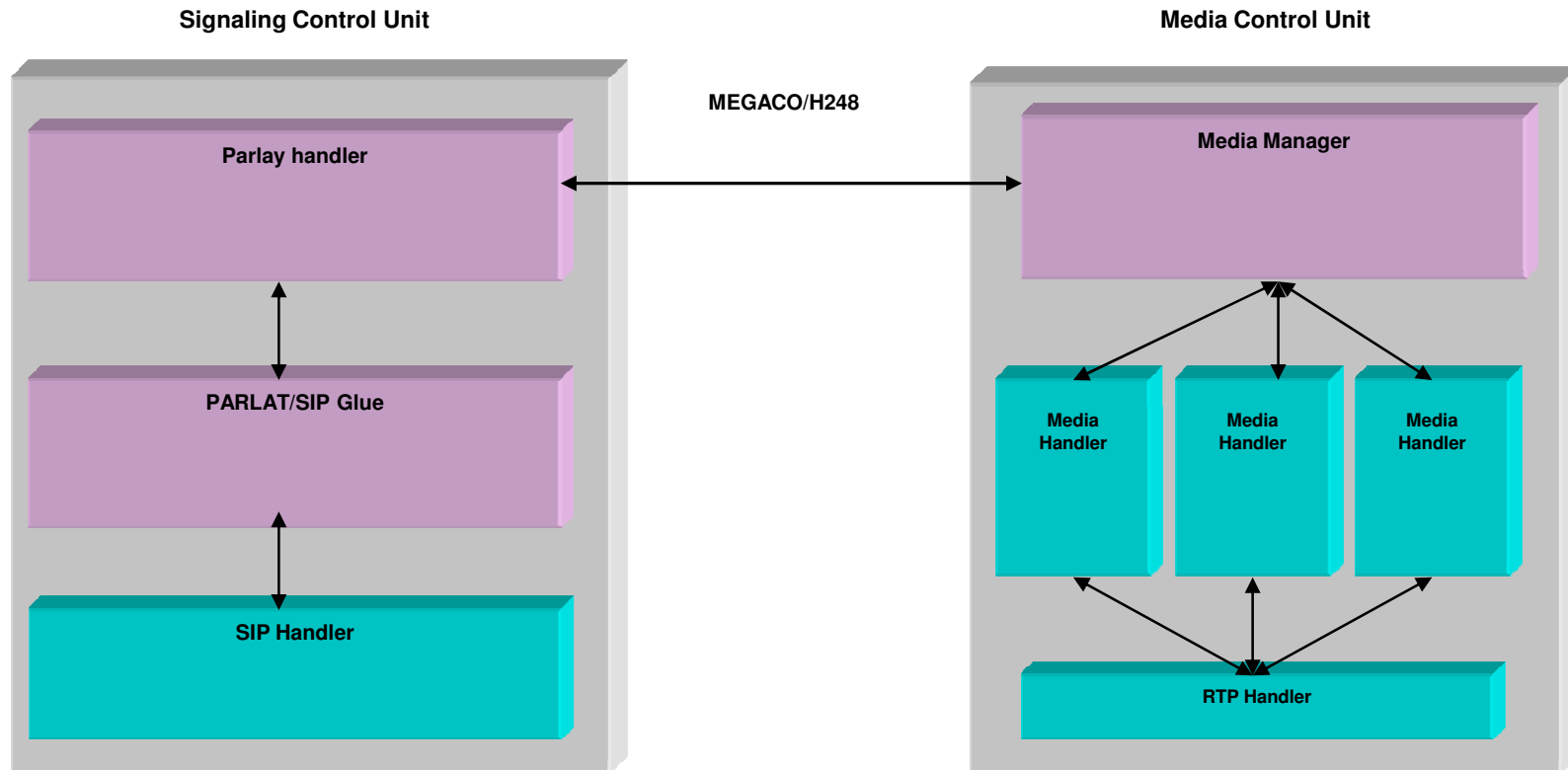
- Conferencing

- Sub-conferencing

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The game   ...

Architecture ...

GAME SERVER

TCP/IP

PARLAY

TCP/IP

PARLAY / SIP GATEWAY

Signaling Control Unit

Megaco/H. API

Media Control Unit

SIP

RTP

RTP

SIP

RTP

Game client

Game client

Architecture ...

Signaling Control Unit   Media Control Unit

MEGACO/H248

Parlay handler

PARLAT/SIP Glue

SIP Handler

Media Manager

Media Handler

Media Handler

Media Handler
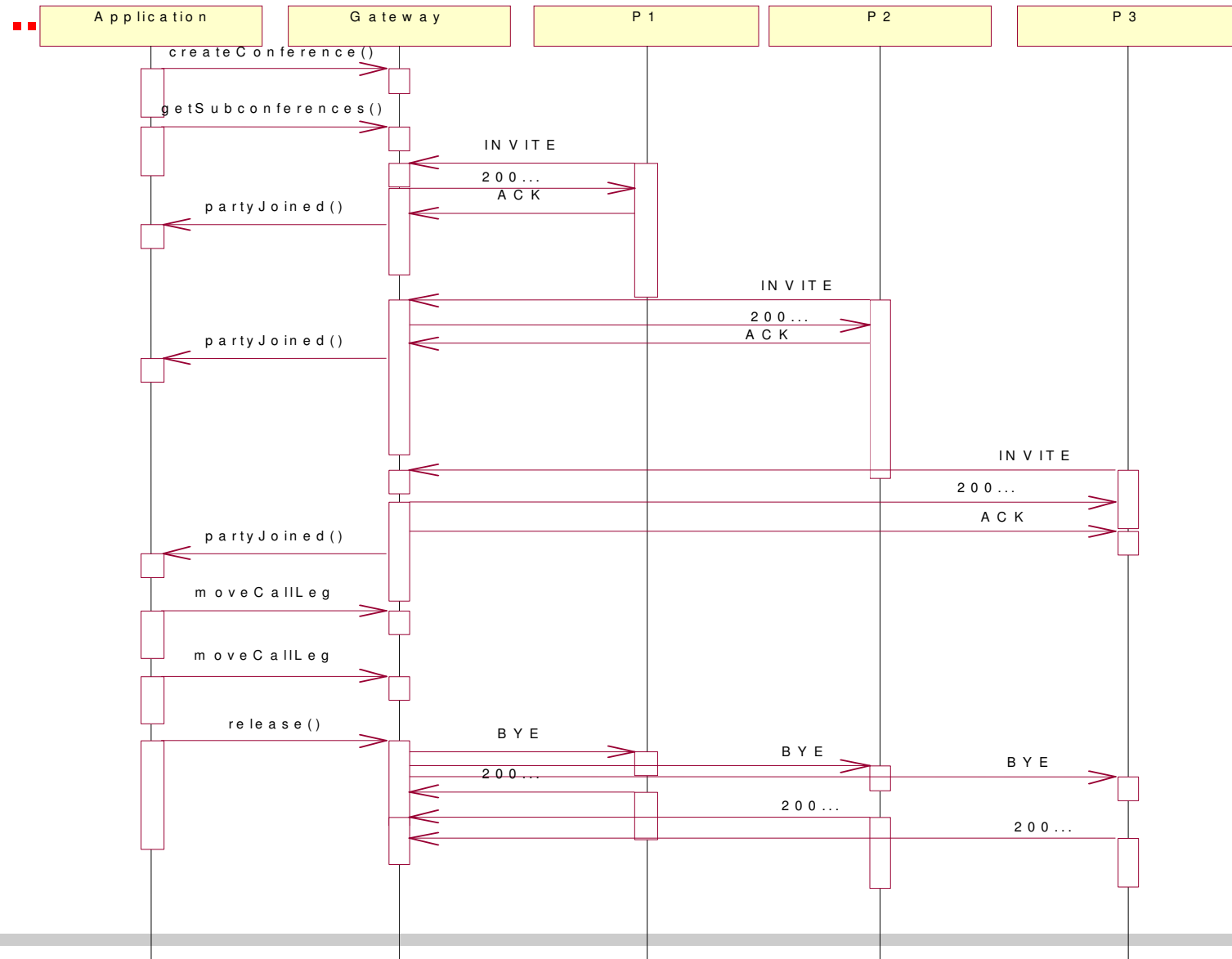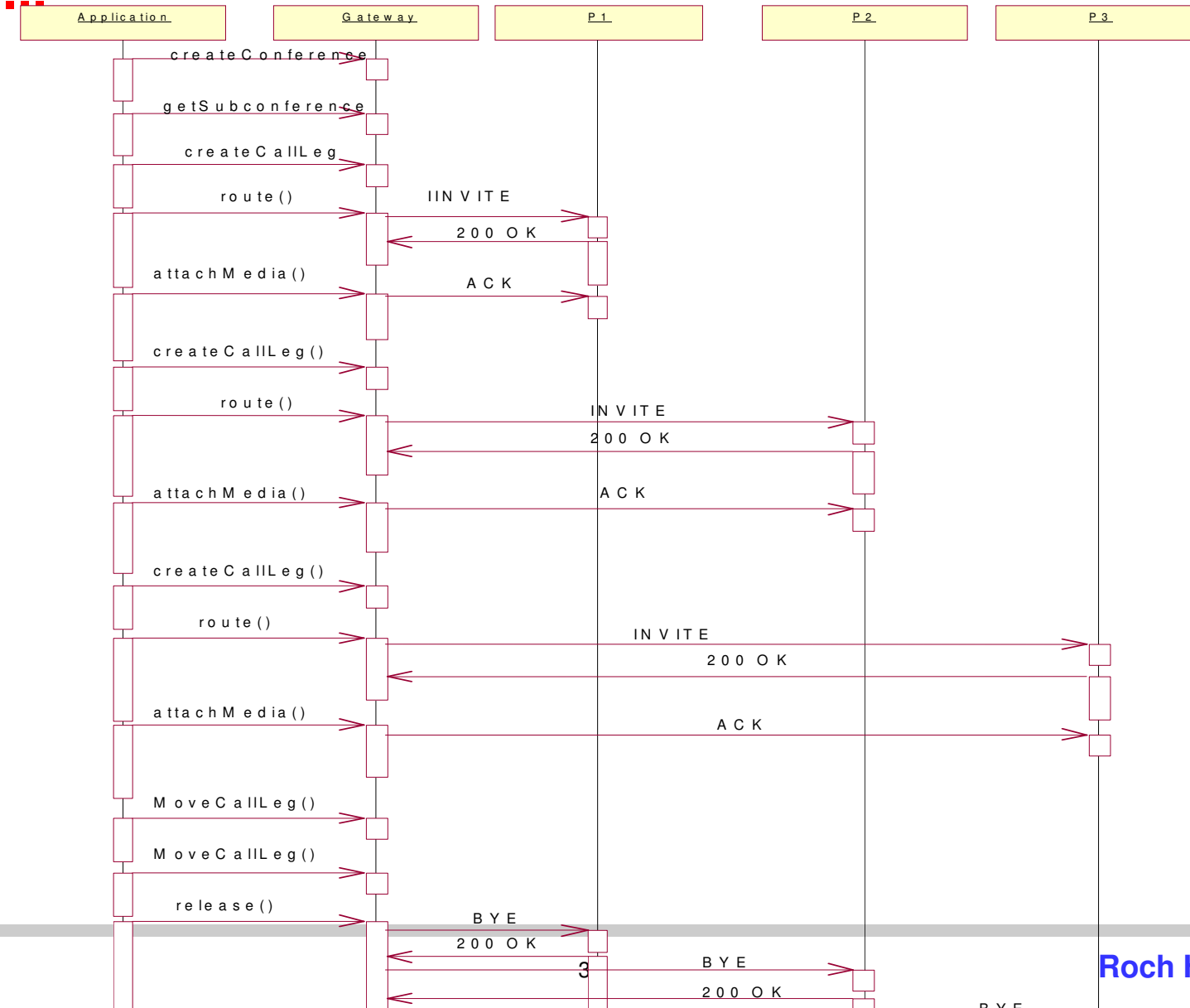
RTP Handler

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Dial in ..

Figure 5 - Mapping for dial-in

Dial out ...

The mapping ...

PARLAY Call Control Services that cannot be mapped onto SIP

– There seems to be none

– However the mapping can be done in several ways in some cases

SIP semantics that are not visible in PARLAY APIs as per today's specification

– There exist a few (e.g. Possibility of a caller to state for instance that the call should not forwarded)

– PARLAY may be extended to cater to these features

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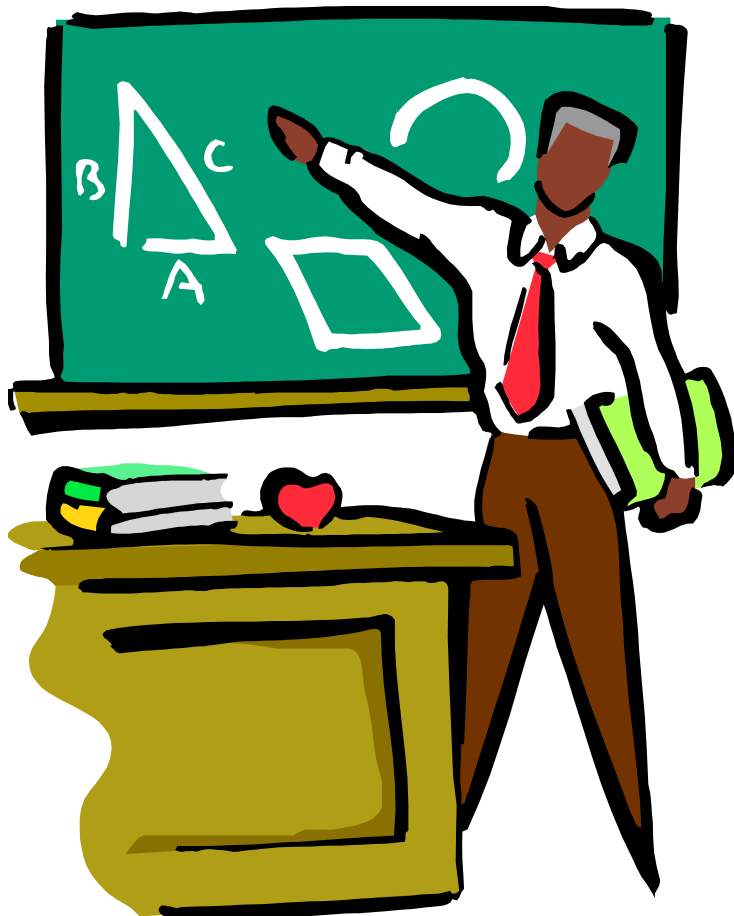
Pros and cons ...

Pros

- PARLAY/OSA allows the creation of a wide range of services including services that combine different types of network capabilities (e.g. call control, mobility, presence)
- Parlay allow the creation of services that span several network technologies (e.g. Sip, H.323)

Cons

- The level of abstraction is still low
    - 3N+1 calls were required to create a conference call in older versions of Parlay – The number is now N+1
- Parlay is not easy to grasp by people with no circuit switched telephony/IN background
    - Call leg concept

The Call Processing Language

1. **Introduction**

2. **Requirements**

3. **Constructs**

4. **Example**

5. **Pros and cons**

Introduction ...

Specificities:

- Only architecture that aims at service creation by end-users

Prime target: Un-trusted parties

– Direct use

– Use via a graphical user interface

• Higher level of abstraction

• Mapping done by middle ware

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Introduction ...

Targeting end-users has a few consequences:

– Stringent language requirements

– Need to upload scripts to servers

• REGISTER has been proposed for SIP

• No mechanism has been proposed for H.323

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Requirements on language (From the RFC).

Lightweight, efficient easy to implement

Easily verifiable for correctness

Executable in a safe manner

Easily writeable and parsable

Extensible

Signaling protocol independence

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Constructs for an XML Based CPL ...

Switches

– Choices the script can make
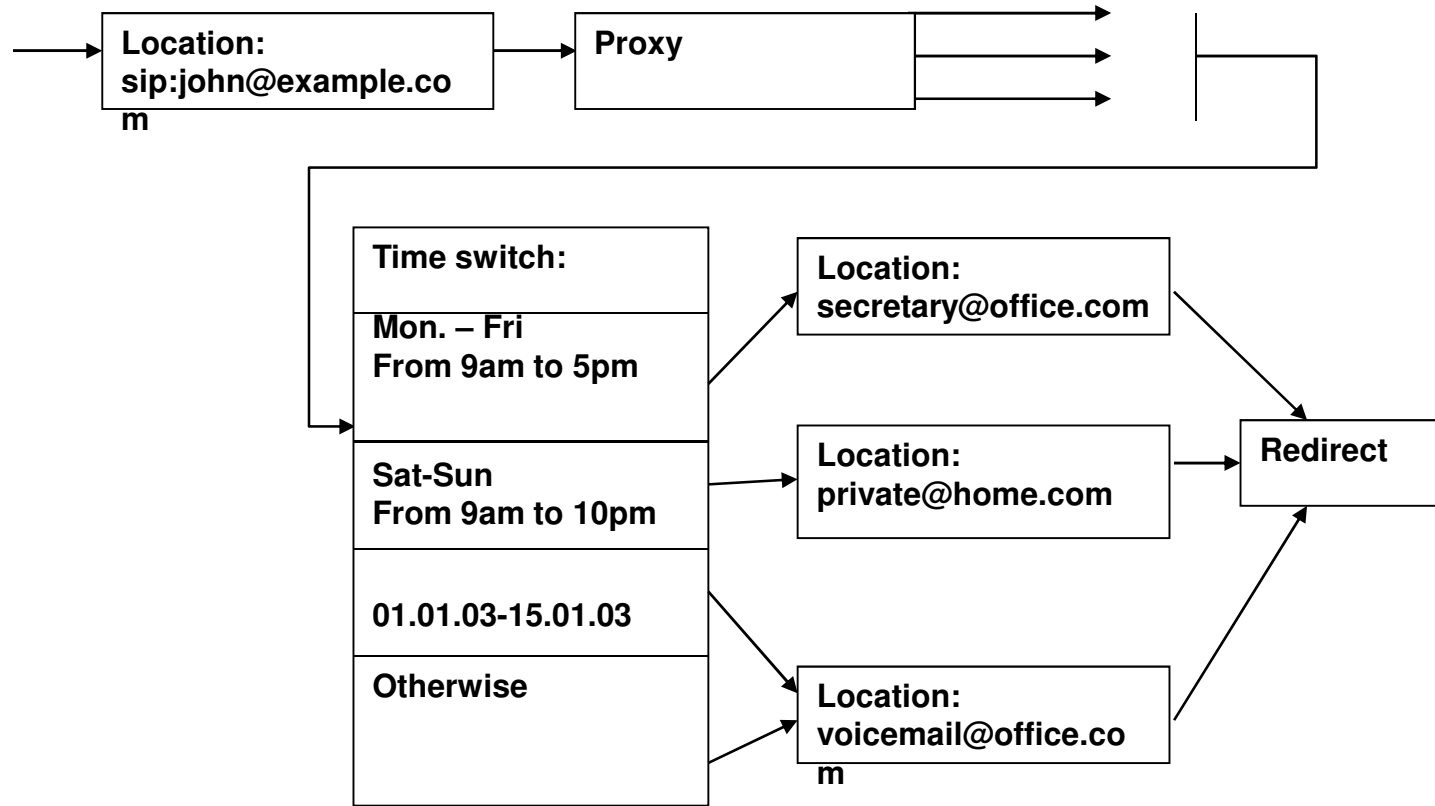
- Address, string, time, priority

Signaling operation

– Cause signalling events in underlying protocol

- Proxy, redirect, reject

Location modifier

– Add/remove location

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Simplified example from the RFC ...

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Pros and Cons ...

Highly suitable for service creation by end-users

– End-users familiar with scripts / XML

– End-users unfamiliar with scripts / XML (via GUI)

– Offer required security

However:

– Very few end-users are interested in creating service

– CPL is highly unsuitable for service creation by providers / third parties

- Range of services that can be created is limited

- More powerful tools exist

– Service logic and service data need to reside in the same script

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To probe further   ...

PARLAY:

2. A.J. Moerdijk and L. Klostermanns, Opening the networks with Parlay/OSA: Standards and Aspects behind the APIs, IEEE Network Magazine, May/June 2003

3. R. Glitho and K. Sylla, Developing Applications for Internet Telephony: A case Study on the use of Parlay Call Control APIs in SIP Networks, IEEE Network, May/June 2004, Vol. 18, No. 3, pp. 48 - 55

CPL

RFCs

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