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Session 6: New Architectures for Service Delivery

Hybrid Composition of Telecom and Internet Services: the Telecom Operator Perspective

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Outline

- Introduction
- Service Composition in the TelCo SDP
- Service Composition in the Internet
- Classification of Service Composition models
- Hybrid Service Composition in the SDP
- Conclusions

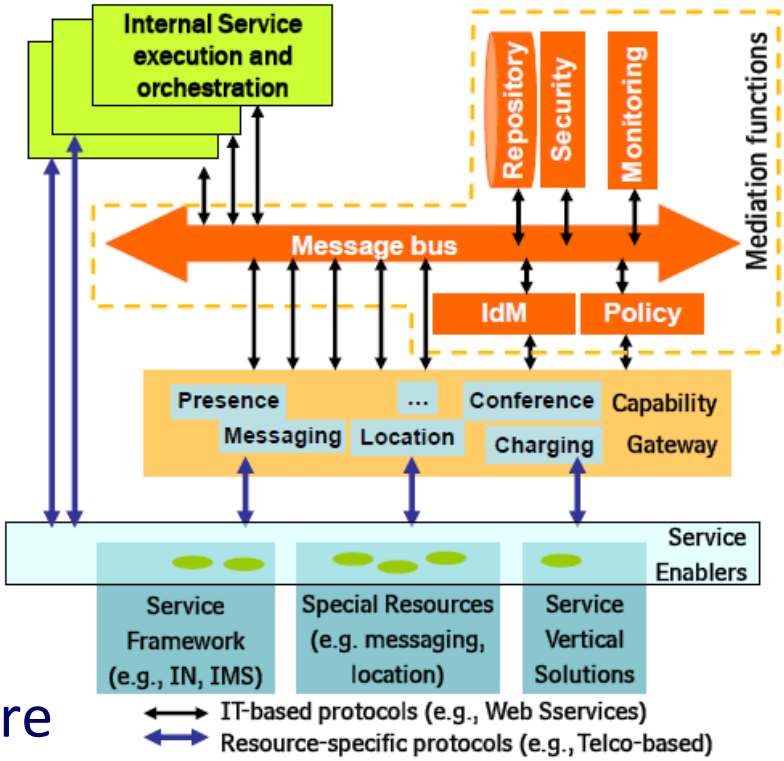
Introduction

- We analyzed the Service Composition paradigm from the Telecom Operator point of view
  - Where are basic services running?
  - Where are service compositions running?

- We propose a classification and a comparison of the different approaches
- We identified the "hybrid" service composition model as the most promising for TelCos
- We described a "hybrid service composition platform" integrated in the TelCo SDP

Service Composition in the TelCo SDP

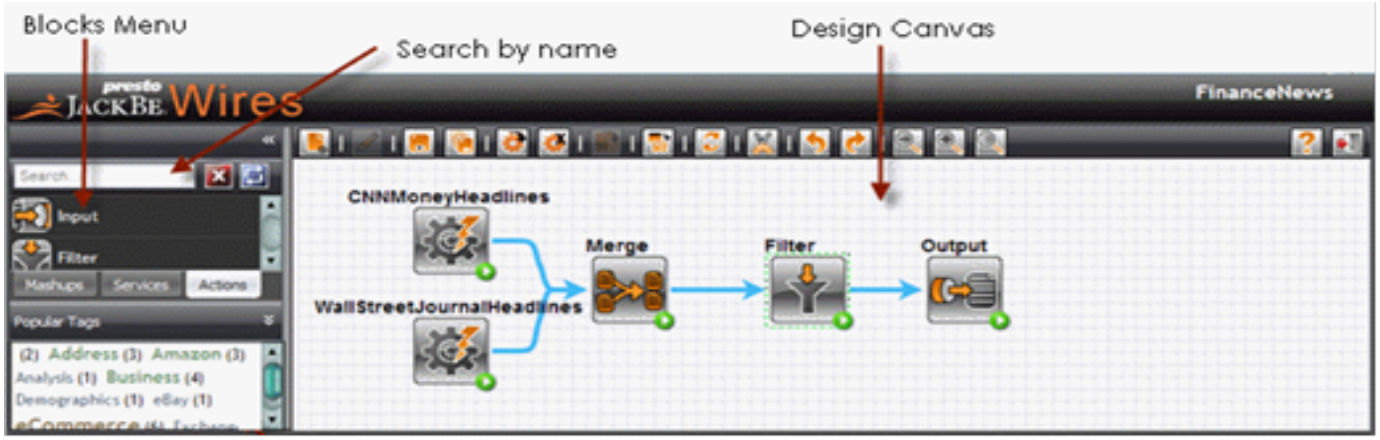
- To improve the development of internal services Telcos started adopting SDP to restructure their service layer
- Unfortunately, at the moment, SDP deployments are mainly based on proprietary solutions:
  - a reference architecture is still missing



- Defined an SDP Reference Architecture aiming at supporting a Service Composition model:
  - Composite Services are defined by orchestrating Service Components;
  - specialized to process asynchronous events and handle large and dynamic sets of concurrent activities executing long-running transactions (see "Analysis of Design Patterns for Composite Telco Services", ICIN2010)

Service Composition in the Internet

- High availability of contents and services (Web APIs) through technologies typical of the Web 2.0 philosophy such as RSS Feed, Atom, REST-WS, SOAP-WS, etc.
- Availability of tools for the rapid development of Mashups (a.k.a. Composite Services) that combine different resources such as Yahoo Pipes!, JackBe Presto, etc.



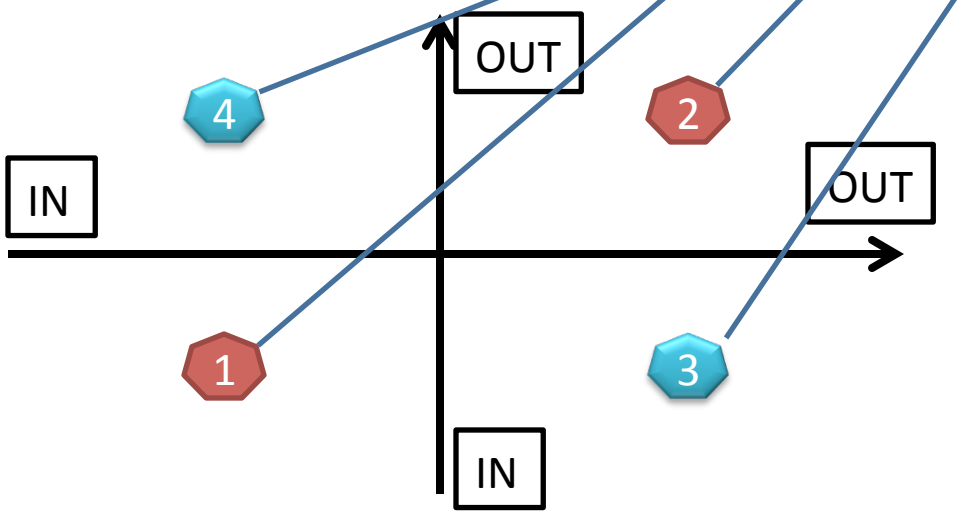
Classification

- We analyze the Service Composition paradigm from the point of view of the Telcos. We use 2 dimensions:
  - *Composite Service Location (X axis)*
  - *Service Component Location (Y axis)*

and 2 possible values:

  - *IN: the service is running INside the TelCo SDP*
  - *OUT: the service is running OUTside the TelCo SDP*

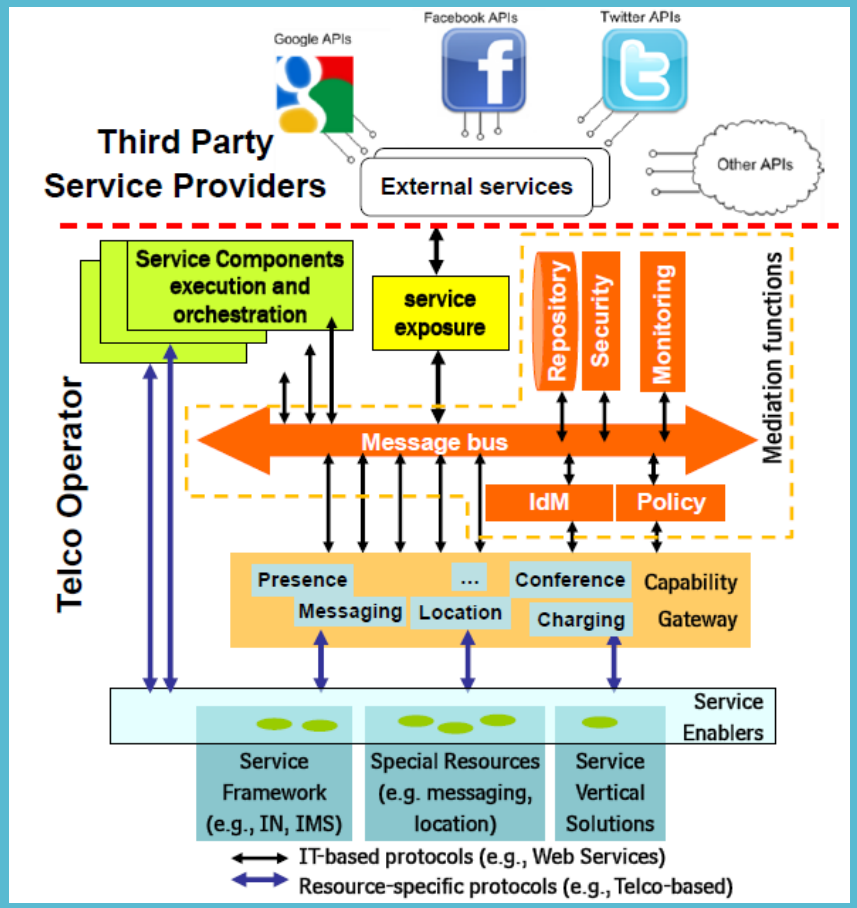
Telco services exploiting 'Web as a Platform' approach



1	In the SDP
2	In the Internet
3 4	HYBRID

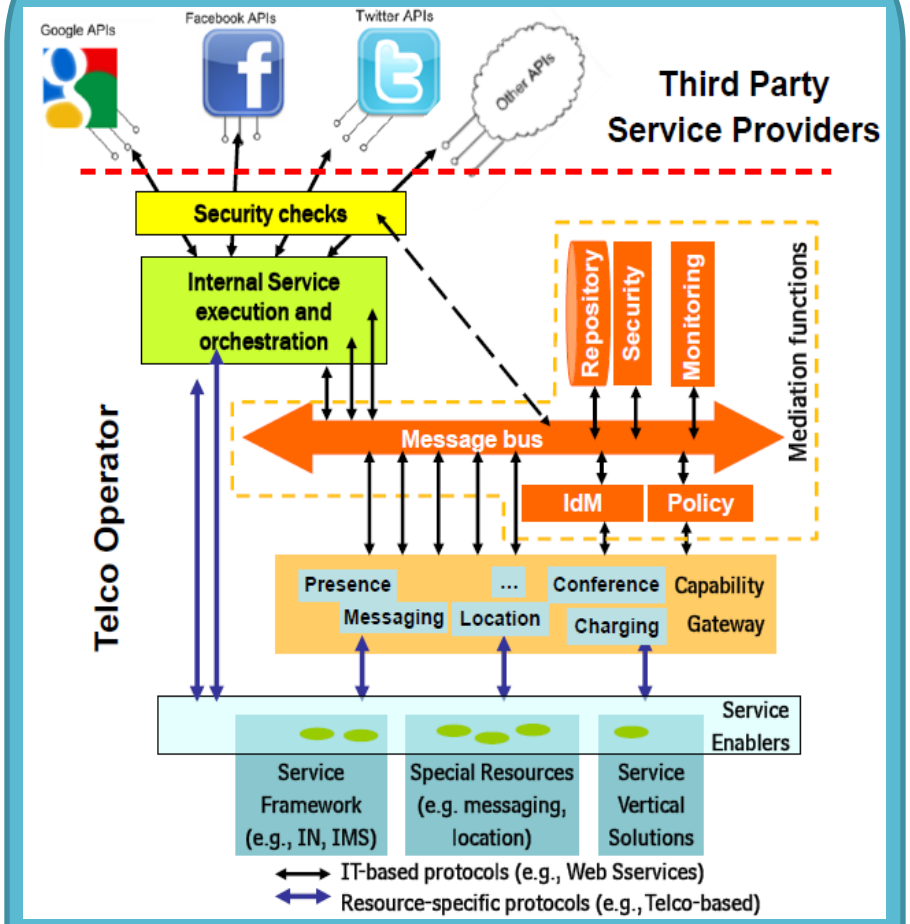
The Out/In & In/Out Hybrid models (1/4)

Out/In model



E.g., Tweet2Call

In/Out model



E.g., Call Redirect on FB status

The Out/In & In/Out Hybrid models (2/4)

Comparison (from the TelCo perspective):

Out/In vs. In/Out

- Telco service granularity level
  - Out/In: the TelCo decides what to expose (and how)
  - In/Out: the usage of native interfaces is allowed
- Programming skills
  - Out/In: tools for non-skilled users exists (but limited functionalities)
  - In/Out: deep knowledge of TelCo protocols (but no limitations)

The Out/In & In/Out Hybrid models (3/4)

Comparison (from the TelCo perspective):

Out/In vs. In/Out

- Execution latency
  - Out/In: many levels are involved (e.g., the Service Exposure Layer) – higher latency
  - In/Out: direct access to TelCo services – lower latency
- Composite Service lifecycle management
  - Out/In: out of the control of the TelCo
  - In/Out: the TelCo manages all the phases

The Out/In & In/Out Hybrid models (4/4)

Comparison (from the TelCo perspective):

Out/In vs. In/Out

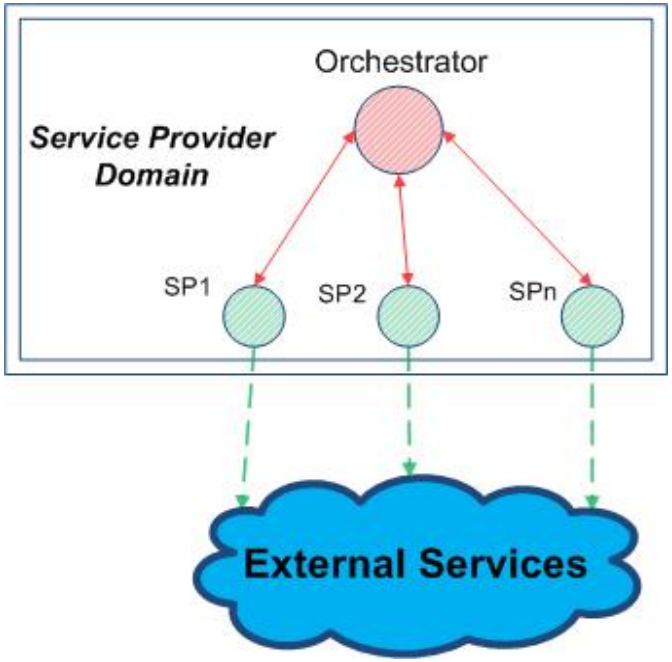
- Security/Identity mgmt

Functions	Out/In	In/Out
Control on message exchanges		
firewall and controls at networking level	on in-bound messages	on in-bound messages
controls at application protocol level	on in-bound messages	on in-bound messages
data integrity	yes (optional)	if required by external service
AAA functions		
authentication of the 3rd Party applications	yes	optional
application-component subscriptions	yes	no
generation of logs (monitoring, account.)	yes	yes

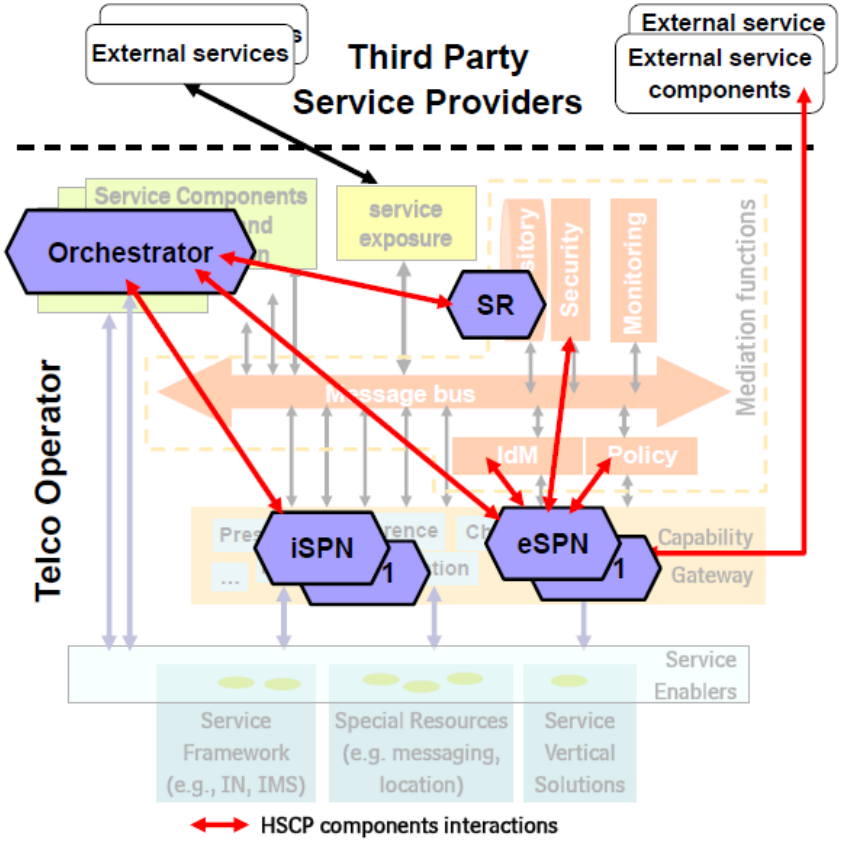
Functions	Out/In	In/Out
Enforcement of policies on service access/usage		
time and frequency of method invocation or event reception	yes	on events from external services and on invocations to check SLA conditions
permission to invoke a specific method or subscribe some event	yes	no
black/white lists of network addresses used as parameters	yes	optional for double check
allowed values for parameters	yes	optional for double check

Hybrid Service Composition in the SDP

We took an already existing Service Composition platform…



…and we integrate it into the SDP



Related works

- Ericsson Composition Engine
  - JEE-based platform for Service Composition
- FOKUS Service Broker
  - Based on the State Chart XML technology
- IMS SCIM
  - No valuable implementation for that

Conclusions

- We provided a classification of the different Service Composition approaches involving the TelCo
- We analyzed and compared in depth the two most promising approaches (i.e., the Out/In & In/Out models)
- The bricks classified as "Out" can also be:
  - Smart Things (see the *iCore* project and *"Smart Object Cooperation through Service Composition"* @ICIN2011)
  - Device capabilities like sensors, storage, user profile, etc.
- We proposed the architecture for a SDP supporting both the models
- Future work:
  - Integration of the platform in a real world scenario
  - Improve the business models involving the TelCo

The End

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