Converged IP Telecom Services and Mashups
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The Vision
Application Convergence and Service Mashups
Device Convergence

Combining different device capabilities in a single device

- Phone +
- GPS +
- Mobile PC +
- Camera +
- Accelerometer +
- Proximity Sensor +
- Light Sensor
Application Convergence

A converged application unifies different **device capabilities** and **service offerings** forming a seamless user experience

- User experiences a unified UI
- Services on-device or network-resident
- Application may unify physically distinct devices
Converged Telecom Applications (1)

This talk is concerned with converged applications that integrate **telecom** device capabilities and services.
Converged Telecom Applications (2)

Apps that unify devices can leverage unique device capabilities

- IPTV + Cell/Landline provide (one-way) large format video/image feed to IPTV and (two-way) audio over phone
- PC + Desk Phone provides rich status/control UI on PC and audio over phone
The Vision
Telecom 2.0 / Telecom Mashups

Converged telecom applications by composition of reusable service components

– Reuse enables **rapid development** and **maintainability**
– Modular composition enables **customized applications** (long tail)

(telecom component = “feature” in remainder of presentation)
Telecom Mashup Example 1

Deepak Sharma’s $25K winning entry in 2007 Connected Services Sandbox contest sponsored by BT and Microsoft

“Using Sharma’s managed network mashup, member organizations log on to a Web site using **BT Authentication**. From this site they’re shown a list of available trucks on a **MapPoint Servicesmap**. The location of a truck is supplied through **BT Location services** and availability is displayed because of **BT Presence services**. The user can then send an **SMSInbound** message to a truck. From there, the truck company can collaborate on the shipment details directly with the user. In addition, truck owners can broadcast their unused space to subscribers through the mashup service.”
Telecom Mashup Example 2

A more interesting and challenging hypothetical example: “An incoming call to a cell phone displays the Google map location of the caller and a synopsis of their Facebook profile.”

Raises questions:

• How does one insert a telecom feature into a call?
• How does that feature interact with phone’s other features?
The Challenges
Converged Telecom Applications

Minor Challenges

Cell phones
- Modal devices: “call” mode or “app” mode
- Inconsistent support for launching call from web browser or SMS message e.g. on iPhone <a href="tel:1-555-555-5555"> </a>
- Very little support for running an application/browser while on a call e.g. iPhone 3G
- No support (?) for launching a call from an app and staying in the app

IPTV Set-Top Box
- Only act as audio/video streaming clients i.e. unidirectional media

PC
- Anything possible but...
- Currently not a preferred communications device due to portability, hardware configuration and echo cancellation issues
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Major Challenges

- Little or no support for inserting custom endpoint features or network based features
- Small feature programming community
- Various APIs e.g. SIP Servlet, Parlay X, CPL, MS Unified Communications, Ribbit, BT Web21C, JAIN SLEE, Avaya/Ubiquity SOOF, Adobe Pacifica
- Until recently, only expensive, proprietary development tools and execution platforms
- Complexity of SIP
- Also, challenges that come with modularity...
Converged Telecom Applications
Challenges of Modularity

Composition of modular features brings with it two major challenges

- Undesirable **feature interaction** is a significant issue with multi-feature services
- No standard way to **orchestrate** interaction between telecom and non-telecom components

These challenges exist regardless of whether the modular features exist in the network or the endpoint.
Feature Interaction
Background: Feature Composition

Feature interaction occurs when telecom features are “composed” (combined together in a call path)
- SIP Servlet 1.1 standard provides a rigorous specification for feature composition (called “Application Routing”) based on the principles of Distributed Feature Composition (DFC)
- Composed peer features “interact” via exchange of signals along their shared call path
Desirable Feature Interaction Example

Do Not Disturb sends failure to Record Voicemail which, in turn, invokes a Voicemail Server.
Undesirable Feature Interaction Example

Call Blocking generates failure to Record Voicemail which causes unwanted voicemail to be recorded.
Feature Interaction
The Challenge

Feature interaction analysis
- Currently a manual process
- Greatly aided by a suitable composition architecture e.g. SIP Servlet 1.1 (DFC)
- Hindered by complexity of SIP
Orchestration
Background

“Orchestration” is the (most recent) term for coordinating interactions amongst non-telecom components and services

- Example supporting technologies: WS-BPEL (Business Process Execution Language), ESB (Entity Service Bus) message routing
Orchestration and Feature Composition Comparison

- Both interpose themselves between components.
- Both are triggered by receipt of messages and respond by propagating/sending messages.

But...

- Messages
  - Many messages in a SIP session.
  - Non-SIP invocation normally a single message.

- Response time
  - Important for feature composition.
  - Not as important for web service invocation.

- Feature interaction
  - Limiting the role of the composer benefits analysis e.g. SIP Servlet 1.1 App Router.
Unified Orchestration
Some Approaches

WSIP (Web Services SIP)
- SIP over HTTP (Avaya)

WIP (Web Services Initiation Protocol)
- web services protocol that replaces basic SIP (Avaya)

Composition Engine
- SIP Servlet 1.1 Application Router augmented with in-call “agents” for propagating SIP signaling to/from the CE (Ericsson)
**Unified Orchestration**

**Our Approach**

- Not necessary to propagate **all** SIP messages between feature and orchestrator, only those events for notification/control
- Let feature decide which events are important and expose non-SIP notification/control interfaces
- Permits feature composition co-to exist with orchestration
Unified Orchestration
Possible Models

Individual feature wrapped up as a web service

“Pre-composed” telecom features works around potential feature interaction problems
Summary

Two major challenges for converged telecom applications
  - feature interaction management
  - unified orchestration

Modularity brings same challenges for network-resident or endpoint-resident applications.

See echarts.org for papers/presentations/software