Context-addressed communication dispatch

Licentiate proposal
presentation

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Agenda

- Problem statement
- Proposed solution
- Contribution
- Plan of action
- Current status
- Thesis outline

Problem statement

- How to *address* & *communicate* with people based on their **context**
  - **Acquire** context information from sensors
  - **Process** context knowledge
  - **Exploit** this knowledge to enable *context-addressed communication*, addressing:
    - How?
    - When?
    - Where?

Proposed solution
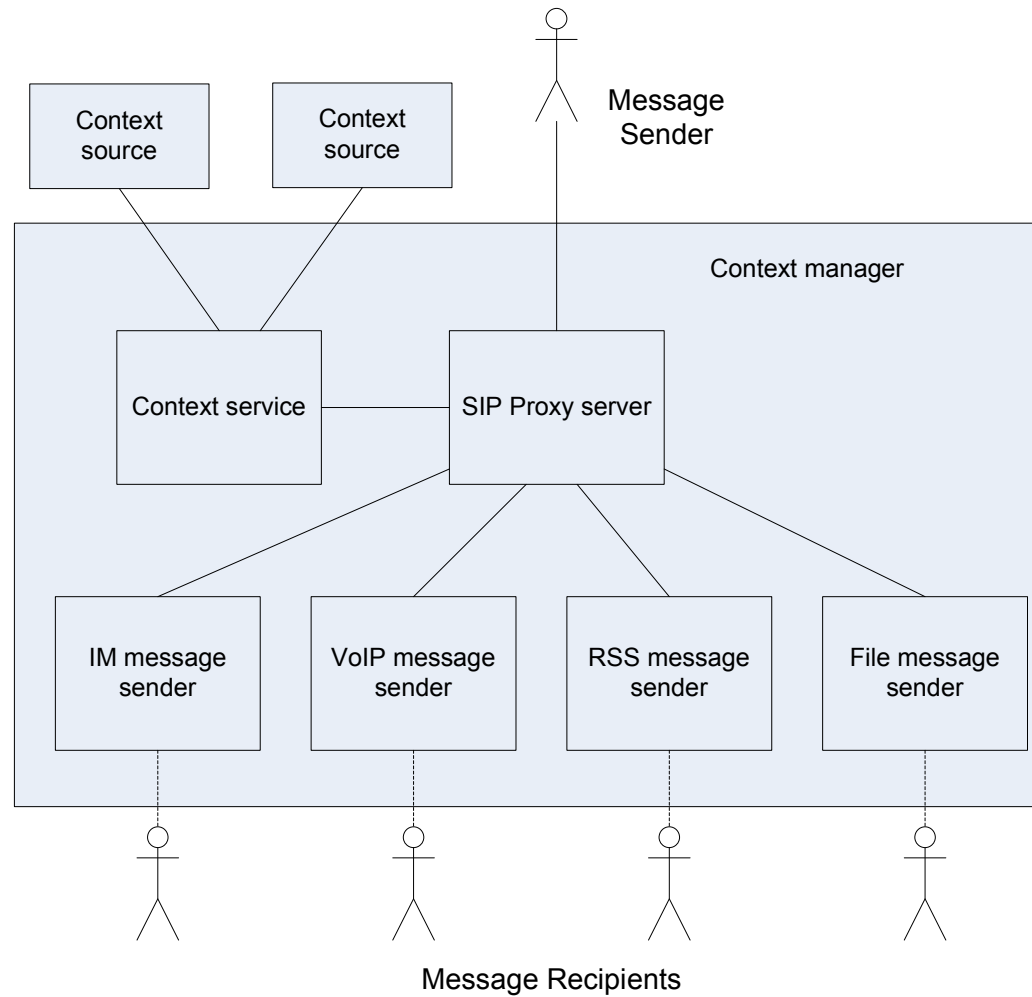
Contribution

- **New, innovative use of context**
  - **Creating, modifying, adapting, and maintaining *context-aware sessions*** according to context parameters
  - Take into account preferences regarding communication means and device
    - Voice over IP (VoIP) call, Instant Message (IM), RSS feeds, file sharing
  - Creating **Communication dispatchers**

- **Callee-centric context processing**
  - **Callee's context**, **preferences**, and **relationship with a caller** should determine how the callee receives a call (accept, reject, redirect, or proxy)
- **Modeling caller-callee relationship**
  - "friend", "family", "colleague", ... – while avoiding the need to **explicitly** specify the membership in each group

- By building upon a distributed context model
  - Context sources
    - acquire data from sensor(s), model context information, and publish context to context service
  - Avoid distributing user's context to others to preserve user's privacy
    - opposite to existing Instant Messangers and buddy lists

Plan of action (1)

- Context-aware VoIP system

  ☑ Extending CPL with context ontology

  ☐ Extending context ontology with caller-callee relationship

  ☐ Designing and implementing context-aware SIP proxy

  ☐ Message format conversion (text to speech)

  ☐ Porting context-aware SIP proxy server to mobile device

- Building context sources

  ☐ Identifying sensor information

  ☐ Retrieving information from sofware sensors

  ☑ Modeling context

  ☐ Synthesizing context

  ☐ Creating API for providing context information

Plan of action (2)

- Building context service
  - ☐ Store, retrieve, and modify context parameters
  - ☐ Map a user's context to the user's SIP URI
  - ☐ Assigns context to SIP proxy server & associates this context with its SIP URI

- PDA measurements
  - ☐ Build resource allocation model to describe effect of running different applications on different types of PDAs
  - ☐ Create resource allocation framework to predict resource consumption on PDAs by various applications

- Context-addressed communication dispatchers
  - ☐ Establish, maintain, and terminate context-aware sessions
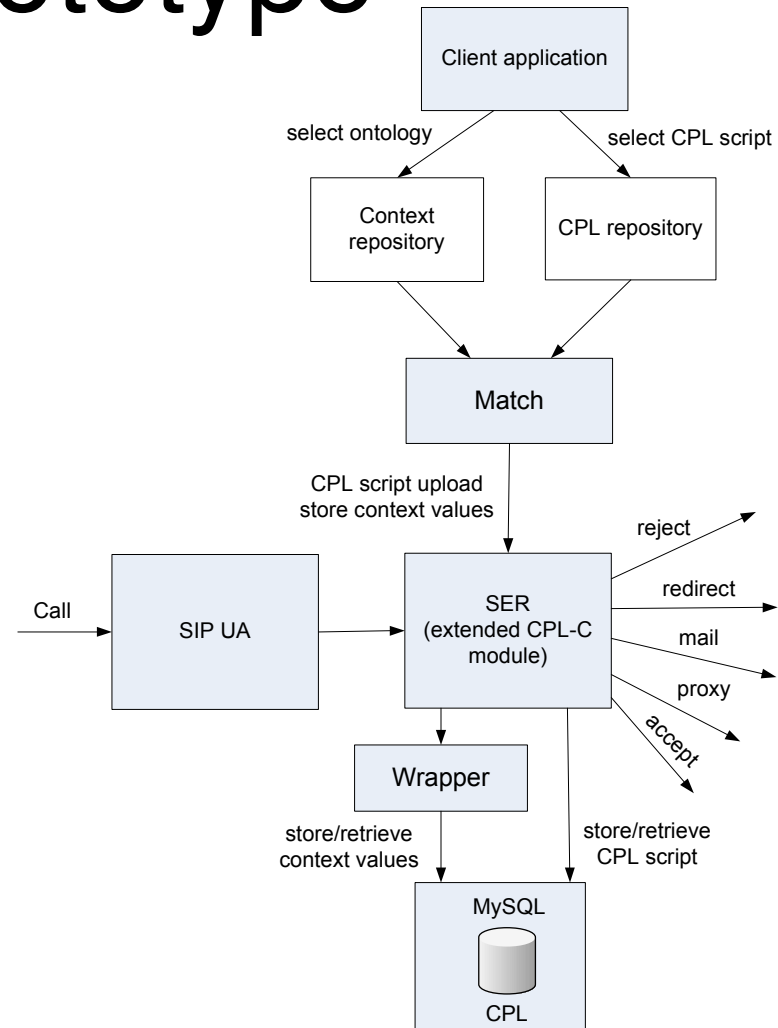 - ☐ Delivery of message in the callee's preferred format

Current status - Context-aware VoIP prototype

Components
1. Client application
2. Match component
3. Wrapper
4. SER's CPL-C module extensions

CPL extended with context parameters
- Context owner
  - the person to whom the context parameters relate to; i.e. Alice
- Location
  - office, home, car, hotel
- Task
  - in a meeting, at lunch, on vacation
- Activity
  - presenting, listening, driving

Client application

select ontology   select CPL script

Context repository   CPL repository

Match

CPL script upload
store context values

Call → SIP UA → SER (extended CPL-C module) → reject, redirect, mail, proxy, accept

Wrapper

store/retrieve context values   store/retrieve CPL script

MySQL CPL

Current status – Resource consumption measurements

- **Measuring resource consumption**
  - battery power consumption,
  - available memory,
  - processing power

  when transmitting information over Bluetooth, WLAN, playing audio and video.

- **Goal**
  - predict & optimize actual consumption of resources before initiating a service
  - Improve the session quality with a callee if there are enough resources

Context-addressed communication dispatchers

- Establish, maintain, and terminate context-aware sessions
- Delivery of message in the callee's preferred format

- Planned for spring/fall 2007.

Thesis outline

1. Introduction
2. Problem statement
3. State-of-the-art of context management
4. Context-aware VoIP system [1]
5. PDA measurements: predictions and optimizations for resource consumption of running services
6. Context-addressed communication dispatch
7. Conclusion
8. Future work

References

The related publications will be included as appendices

Papers

[1] A. Devlic, "Extending CPL with context ontology", In Mobile HCI 2006 Conference Workshop on Innovative Mobile Applications of Context (IMAC 2006), Espoo/Helsinki, Finland, September 2006.

[2] A. Devlic, "CPL extensions", Report for the VoIP course, http://web.it.kth.se/~devlic/CPL extensions.pdf, May 2006.

[3] A. Devlic, "iPAQ Measurements report", http://web.it.kth.se/~devlic/iPAQMeasurements.pdf, February 2006.

The end

Thank you!
Any questions?

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