



Facilitating Mobile Users with Contextualized Content

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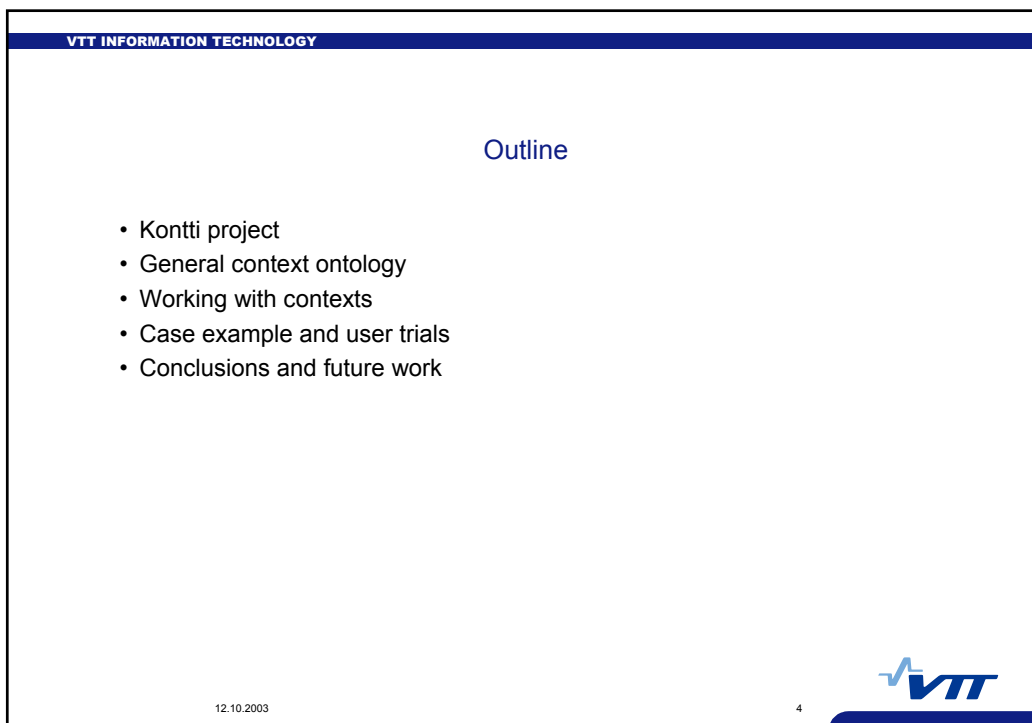
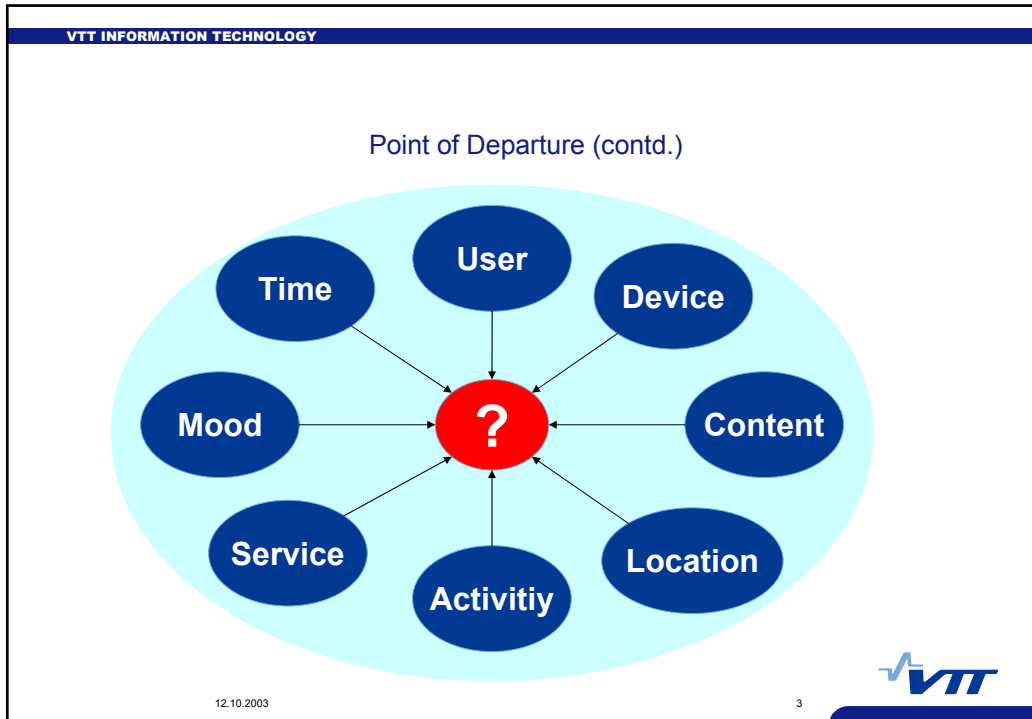
Point of Departure



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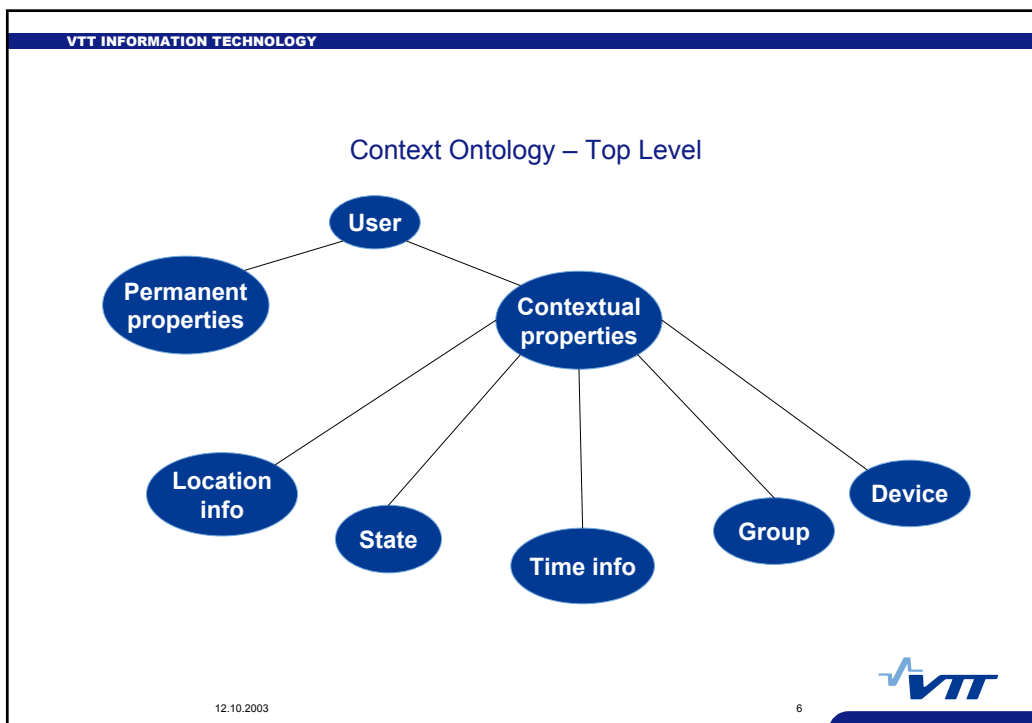



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Kontti Project

- Kontti – Context-aware services for mobile users
- Kontti project studies
 1. context-aware services for mobile users,
 2. contextual information needs of a mobile user, and
 3. the technology to provide answers to these needs
- Utilizes VTT's mobile testing environment and the adaptation proxy developed in terms of an earlier WAP-UAPROF project
- 1.1.2002 – 31.12.2003 (possibly continues in 2004)
- Strong influence on functionalities by user interviews and trials
 - Users are not mere consumers of content, but also active creators

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Context Ontology – RDF Schema Excerpt

```

<rdf:Description rdf:about="ContextualProperties">
  <rdf:type rdf:resource="&rdf;Class"/>
  <rdfs:subClassOf rdf:resource="&rdfs;Resource"/>
</rdf:Description>

<rdf:Description rdf:about="location">
  <rdf:type rdf:resource="&rdf;Property"/>
  <rdfs:domain rdf:resource="&#ContextualProperties"/>
  <rdfs:range rdf:resource="&#LocationInfo"/>
</rdf:Description>

<rdf:Description rdf:about="LocationInfo">
  <rdf:type rdf:resource="&rdf;Class"/>
  <rdfs:subClassOf rdf:resource="&rdfs;Resource"/>
</rdf:Description>

<rdf:Description rdf:about="direction">
  <rdf:type rdf:resource="&rdf;Property"/>
  <rdfs:domain rdf:resource="&#LocationInfo"/>
  <rdfs:range rdf:resource="&xsd;string"/>
</rdf:Description>

<rdf:Description rdf:about="address">
  <rdf:type rdf:resource="&rdf;Property"/>
  <rdfs:domain rdf:resource="&#LocationInfo"/>
  <rdfs:range rdf:resource="&#Address"/>
</rdf:Description>

```

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Context Ontology (contd.)

- Intention to reuse existing ontologies whenever possible
- Both at conceptual and at technological (or implementation) level
- Currently only device-related information at the technological level
 - CC/PP (W3C) and UAProf (OMA)
- Conceptual level
 - Wireless Village presence attributes for mood
 - Location Interoperability Forum's specifications for location-information
 - Others exist...

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Combining Contexts

- Complex contexts can be combined from simpler ones
- Three operators: AND, OR, and NOT

"Attending interesting workshops"

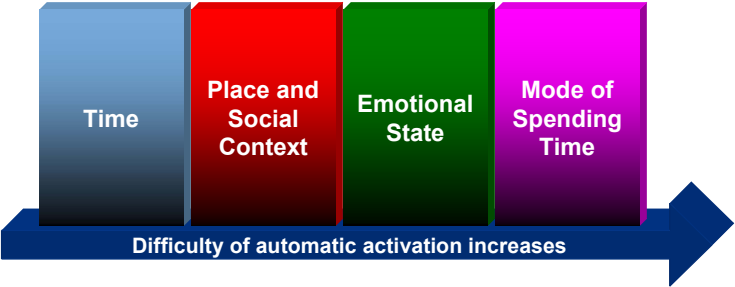
"Attending AIMS 2003"	OR	"Attending AIMS 2002"
Location: Seattle, WA AND Time: Oct 12th, 2003, 9AM – 6PM AND Mood: Very excited NOT Mode: Sunbathing		Location: Lyon, France AND Time: Jul 22nd, 2002, 9AM – 6PM NOT Mood: Bored AND Mode: Working



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Automatic Activation of Contexts



Time
Place and Social Context
Emotional State
Mode of Spending Time

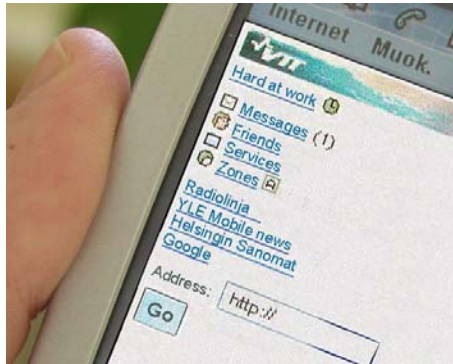
→

Difficulty of automatic activation increases



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Case Example and User Trials



- Context-aware mobile portal
- Based on a subset of the context ontology
- Does not use RDF Schema serialization
- Implemented both in WML and XHTML
- Based on earlier work, namely
 - adaptation proxy
 - media conversions
- Supports automatic activation of time- and location-based contexts, manual activation of social contexts (e.g. mood and activity)
- Four key concepts
 - Messages *A sends a message to B and C so that the message is delivered once both arrive at work on Monday morning*
 - Friends
 - Services
 - Zones

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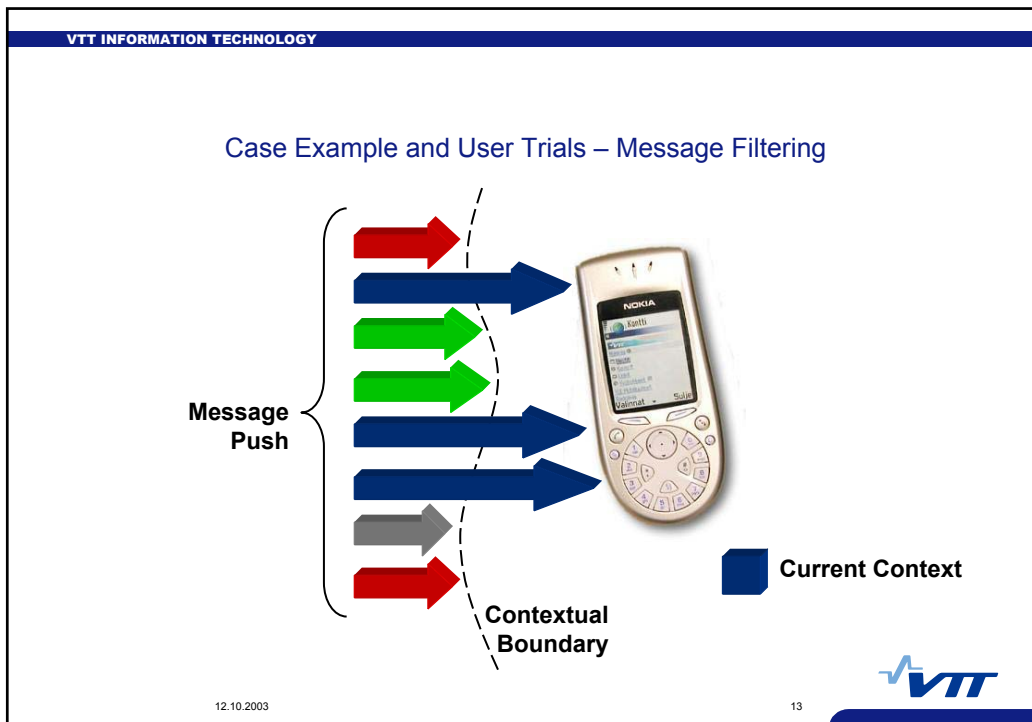
Case Example and User Trials (contd.)

- Messages are delivered to mobile devices using push-functionality of WAP
- Messaging is asynchronous → expiration date can be added to messages
 - *A sends a message to B and C so that the message is delivered once both arrive at work on Monday morning, but if the message is not delivered by Tuesday, it expires and is deleted*
- Both user interviews and actual trials indicated the need for group contexts
 - people like to both share their own contexts and keep track of their friends'
- Three kinds of group messaging:
 - "One by one"
 - "All after one"
 - "All after all"
- Three most promising usages of contextual information (based on the user trials):
 - finding out availabilities and activities of others
 - time-critical information needs
 - filtering incoming messages

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Conclusions and Future Work

- Conclusions
 - We have recognized the evident need for combining information about users, devices, situations, etc.
 - We have approached this problem by
 - defining a context ontology
 - using it as a base for a case example: a context-aware mobile portal
 - conducting user interviews and trials for testing the portal and learning more about the special needs for contextual information
- Future work
 - More user trials, for example a context-aware guide at Tampere Theatre Festival
 - Merging the context ontology serialization in RDF Schema with the rest of the system
 - Upgrading RDF Schema to OWL to enable more expressivity

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Thank you!

Further information:

- Kontti project timo.laakko@vtt.fi
- Context ontology santtu.toivonen@vtt.fi
- User trials juha.kolari@vtt.fi
- Project web site <http://www.vtt.fi/tte/projects/kontti/>