

School of Computer Science - Carnegie Mellon University

Norman Sadeh, Fabien Gandon, Enoch Chan, Linh Van, Joseph Kwon, Kaz Takizawa

Mobility Challenges

- Can no longer assume the user's undivided attention: talking to colleagues, driving, combat, etc.
- Time critical nature of many tasks: finding the nearest gas station or the next flight back home
- Limited input/output functionality
- Solution: higher levels of automation, context awareness

Sources of Contextual Information

- Context information is distributed across a number of disparate resources: calendar, location tracking, address book, buddy lists, organizational DB, weather, etc.
- Available resources vary from one user to another and over time

No Interoperability

- Ad hoc/proprietary standards & Minimal re-use
- Applications hardwired to different sources of contextual information
- High development and maintenance costs: No economies of scale & Lack of an open architecture

Vision

- A growing collection of context-aware agents that users can pull into their own personal environment (**Semantic e-Wallet**).
- An agent accesses the user's semantic e-Wallet to discover and access relevant contextual resources

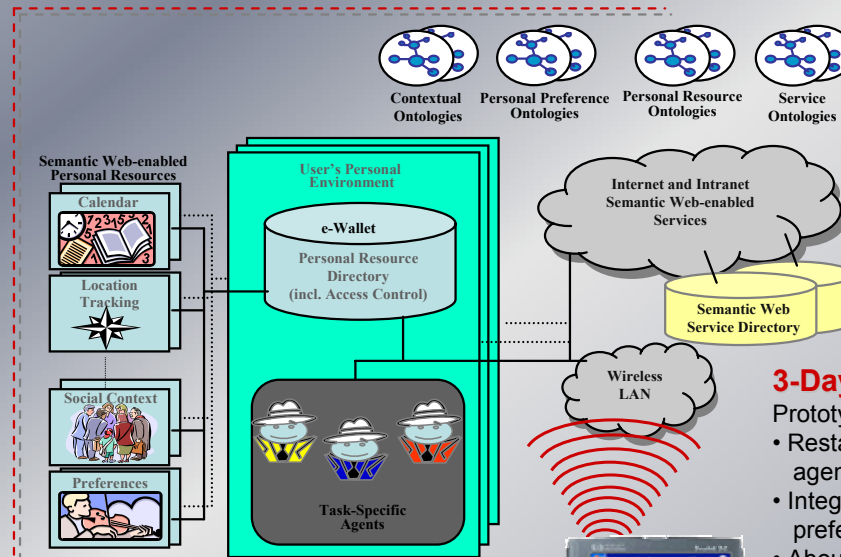
Semantic Web Approach

Ontologies to explicitly represent and reason about:

- Personal/Contextual Resources: Location tracking, calendar, organizational resources, messaging resources, preferences, access devices, etc.
- Contextual attributes e.g.: location, calendar activities, social or organizational context, device characteristics, etc.
- Preferences, including: access control/privacy preferences, e.g.: "My colleagues can only see my calendar on weekdays"
- Web services: automated service discovery, access, composition and execution

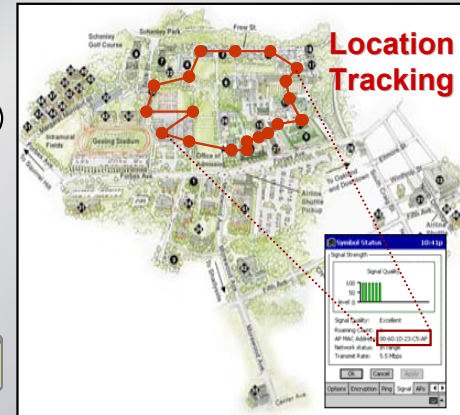
MyCampus Prototype

- Motivation: campus as "everyday life microcosm"
- Objective: enhance campus life through context-aware services accessible over the WLAN
- Methodology: evaluate and extrapolate to other environments: *Context Aware Battlefield, Context Aware Enterprise, Mobile Commerce, etc.*



Example: Restaurant Concierge

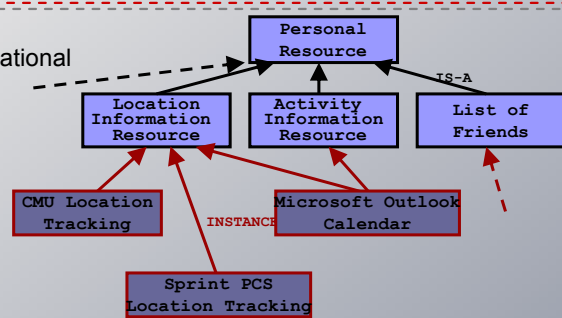
- Contextual Attributes: location, weather, calendar (where's my next meeting and how much time do I have?)
- Static & context-sensitive preferences: budget, food preferences, etc.



3-Day Live Experiment with 11 Users

- Prototype working on Carnegie Mellon's campus
- Restaurant concierge agent, message filtering agent, etc.
- Integration with calendar, location tracking, user preference profiles, etc.
- About 70% of user-relevant messages benefit from context aware filtering and delivery
- Quality of context-aware restaurant recommendations led to 15% increase in user satisfaction
- Additional customization for context-aware enterprise and DoD applications

DoD Application: SONAT Context Aware Notification Agent



Status

FY02 (DONE)

- First set of ontologies and editing tools
- First Prototype on CMU campus
- First demonstration of SONAT Notification Agent

FY03

- Semantic eWallet to support automated discovery & access of personal/contextual resources
- Contribution to DAML Experiment

FY04

- Semantic Access Control (eWallet)
- AI Planning & Web services
- Contribution to DAML Experiment

