Context-aware architectures

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Context-aware architectures - © Guy Bernard / INT - October 2003
• framework for Symbian OS
• "blackboard-based" communication (center = context manager)
• stress on
  - fuzzy thresholds (Bayesian reasoning)
  - low-level vs. high-level context values
    • description syntax: Resource Description Framework (www.w3c.org)
VTT (3)

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IEEE Computer, september 2003
open-source Instant Messaging (www.jabber.org)
Univ. Lancaster, ReMMoC project

● Tech. Report MPG-03-01
Univ. College London, CARISMA project (1)

Fig. 1. User and application profiles.

Fig. 3. Application profile.
Fig. 4. Roles and Responsibilities in the Reflective Process.
CARISMA (3)

- their own "simple message passing" - porting to JMS underway

Figure 6.1: CARISMA architecture.
Couche de communication

- La couche de communication est basée sur le graphe de protocoles de Jonathan dans le but de:
  - instancier dynamiquement un graphe adapté aux conditions de l'environnement à cet instant;
  - restructurer et modifier ce graphe si les conditions varient pendant l'exécution
- Connexion multiple: possibilité d'utiliser simultanément plusieurs connecteurs (TCP, UDP...)
Le projet GET CARISM (2/2)

- Plate-forme mobile

CARISM (2)
CARISM (3)

Gestion locale à l’unité mobile

- Lications
  - Evaluation des besoins
  - Gestion architecture locale
    - Prise en compte des besoins des applications
      - API JMS
      - Moniteur de ressources système
        - Choix de configuration
ITEA Vivian project, ICM
AMPROS proposed architecture (1)
**AMPROS proposed architecture (2)**

- **Resource Monitor**
  - 1 resource monitor for each resource ("driver") type
    - WiFi, TETRA, remaining battery, available memory, geolocation, # of processes, ...
  - includes some system- and device-dependent code
  - gets raw data and processes it in order to provide system-independent low-level context data, e.g.:
    - bandwidth => average value in the last minute
    - geolocation => x, y
  - pushes (periodically ??) low-level context data to Context Recognition Service, e.g.:
    - Device:Network:WiFi:bandwidth = 30
    - Location:Coordinates = {80.0, 140.3}
AMPROS proposed architecture (3)

- **Context Recognition Service**
  - gathers low-level context data from Resource Monitors
  - returns the appropriate high-level context data, as considered by Applications/Users Profiles, to the Context Manager, e.g.:
    - Device:Network:*:Bandwidth = {WiFi:Bandwidth=30, Tetra:Bandwidth=0}

- **Applications/Users Profiles**
  - describe the interest of individual applications, or users, or middleware itself to monitor low-level or high-level context data, e.g.:
    - Device:Network:*:Bandwidth
    - Location:Coordinates
AMPROS proposed architecture (4)

● 

Policies

✓ describe the interest of individual applications, or users, or middleware itself to be notified when significant context changes occur, and the associated behaviour, e.g.:

◆ if (Device:Network::*:Bandwidth < {10} && Device:Processor > 25) then "enable compression"

● Context Manager

✓ notifies the appropriate entity (application, user, middleware) when significant context changes occur, e.g.:

◆ notify "middleware", "enable compression"
◆ notify "user", "battery low"