IS THE FUTURE OF MOBILE COMPUTING IN
THE CLOUDS?
(CLASS-MA)

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Motivation

- Cloud computing + mobile computing = ?
- Revolution or evolution?
Mobile computing

- Specific user interface
  - Touch
  - Voice and gestures
- Limited resources
  - No massive storage devices
  - Limited processing capabilities
  - No 3D graphic acceleration (for now)
- Specific I/O devices
  - GPS, Compass, Camera, ...
- Used mostly for communication and entertainment
Cloud computing

- Cloud computing = server hosting ++
- Main goal: reduced total cost of ownership
- Main characteristics
  - resources are provided as the utility (pay-per-use)
  - elasticity (adaptation to the current demands)
  - online access (access from everywhere)
  - fault-tolerance, 24/7 availability
- Adopted mainly for business and for desktop applications
Cloud computing

Different levels of cloud resource utilization
Opportunities and challenges - pros

• Extension of storage resources
  – accessible from everywhere, from any device
  – available to a group of users

• Portability – thin client solutions

• Extension of processing capabilities
  – image processing
  – audio processing
Opportunities and challenges - cons

• Broadband Internet connection
  – signal coverage
  – "pay-per-byte"
  – alternative: open Wi-Fi infrastructure

• Safety, security, availability
Main features of cloud services for mobile applications

• Adaptation to the profile of specific mobile device (resolution, colour depth, bandwidth, ...)
  – The client provides the profile with each request or during the login
  – Filters for downgrading hi-definition media sources
  – "Virtual mobile devices"
Development of cloud services for mobile applications

• Similar to development of services for desktop applications
  – Design, implementation and testing in the host environment
  – Deployment to the cloud – test configuration
  – Promotion to the production level

• There is no universal development platform for different cloud solutions
Development of mobile applications with cloud-assisted services

• Many programming tools for mobile devices already includes interfaces to common cloud services (e.g. storage services) – vendor dependent

• Alternative: universal interfaces that can be used with different cloud providers

• CLASS-MA services will be vendor independent
HTML5 as a universal platform for mobile applications in the cloud

• HTML5 and CSS3 support mobile devices
  – media queries
  – geo-location API
• No native application required
• Cloud services are accessible through Ajax
• All modern mobile devices includes powerful Web browsers
  – Compatibility issues
  – No off-line mode
Some prototypical cloud services for mobile applications (1/4)

• Services for structured and non-structured data storage, independent of the cloud provider
  – non-structured: multimedia files
  – structured: SQL queries, XML or JSON data formats
Some prototypical cloud services for mobile applications (2/4)

• Geo-location services
  – Convergence of services
  – Unified format
  – Parallel queries
  – Consideration of user preferences
Geo-location services
Some prototypical cloud services for mobile applications (3/4)

• Image and audio processing
  – Simple image manipulation and editing
  – Image recognition (biometrics)
  – Voice processing
Image and audio processing

Face detection
Some prototypical cloud services for mobile applications (4/4)

• Data compression and multimedia transformation
  – Data compression/decompression
  – Image and video resolution transformation
  – Progressive downloading
Data compression and multimedia transformation

Cloud

Video services

Video transformation

Image services

Image transformation

Compression/decompression

Client application

User interface

Client
Discussion

Is the future of mobile computing in the clouds?

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