Mobile Application Development
Project

MTAT.03.266

Fall 2014

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Course Purpose

- Practice the mobile application development
- Apply well-known techniques to develop applications for the mobile devices
- Glance of research at Mobile & Cloud Lab

- [https://courses.cs.ut.ee/2014/MADP/fall/](https://courses.cs.ut.ee/2014/MADP/fall/)
Questions

• Have you ever programmed for mobile devices?
  – This course assumes you have experience with at least one mobile technology
  – Or you are taking or have taken MTAT.03.262 Mobile Application Development course

• Which mobile platforms have you used already?

• How comfortable you are with programming?
  – Java?
    • External APIs?
  – Web programming?

• Have you heard of cloud computing?
Related Courses

• **MTAT.03.262** Mobile Application Development (3 ECTS)
  – Mon. 14.15 – 18.00, J Liivi 2 - 122

• **MTAT.03.280** Mobile and Cloud Computing Seminar (3 ECTS)
  – Friday 14.15 - 16.00, J. Liivi 2- 511

• **MTAT.08.036** Large-scale Data Processing on the Cloud (3 ECTS)
  – Wed. 10.15 – 12.00, J. Liivi 2 - 512

• **MTAT.08.027** Basics of Cloud Computing (3 ECTS)
  – Spring 2015
Grading

• No written exam
• Just deliver a project
  – Max 4 persons per group
• Activities
  – Design the application
  – Develop using the platform of your choice; Android is preferred
  – Deliver the project with detailed reports
To pass

• One must attend all the sessions
• Submission of project report
• Final presentation and demonstration
• Max 5 min Video which will be uploaded to youtube
• Source code properly managed
Outline

• Mobile Application Development
• Introduction to the projects
• General discussion and forming groups
Lecture 1

MOBILE APPLICATION DEVELOPMENT
**The Seven Mass Media**

First Mass Media Channel - **Print** from the 1500s
Second Mass Media Channel - **Recordings** from 1900s
Third Mass Media Channel - **Cinema** from 1910s
Fourth Mass Media Channel - **Radio** from 1920s
Fifth Mass Media Channel - **TV** from 1950s
Sixth Mass Media Channel - **Internet** from 1990s
Seventh Mass Media Channel - **Mobile** from 2000s

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**Report: Mobile cloud to grow beyond $11 billion in 2018**

Written by CopperEgg // July 12, 2012 // No Comment // Cloud Performance

The proliferation of smartphones, tablets and other mobile devices is contributing to change in the private sector, as businesses continue to leverage these gadgets in an attempt to enhance efficiency and potentially gain a competitive advantage. According to a new report by Global Industry Analysts, the evolution of mobility is also changing the cloud computing landscape, pushing the mobile cloud market to generate more than $11 billion in revenue by 2018.

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**Verizon's Stratton: The Future Of IT Is Mobile And Cloud**

Satish Srirama
Popular consumer mobile applications

• Location-based services (LBSs)
  – Deliver services to users based on his location
• Mobile social networking
  – Most popular social networking platforms have apps for mobiles
• Mobile commerce
  – An extension of e-commerce
• Mobile payment
  – Near field communication (NFC) payment
Popular consumer mobile applications - continued

• Context-aware services
  – Context means person's interests, history, environment, connections, preferences etc.
  – Proactively serve up the most appropriate content, product or service

• Mobile instant messaging (MIM)
  – Skype for mobiles

• Mobile e-mail

• Mobile video
Variety of languages and platforms to choose from

<table>
<thead>
<tr>
<th>Programming Language</th>
<th>Debuggers available</th>
<th>Emulators available</th>
<th>Integrated development environment available</th>
<th>Cross-platform deployment</th>
<th>Installer packaging options</th>
<th>Development tool cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adobe AIR</td>
<td>Yes</td>
<td>Yes</td>
<td>Flash Builder, Flash Professional</td>
<td>iOS, iPhone, iPad, iPod touch, Android, BlackBerry</td>
<td>The native distribution format of each platform</td>
<td>Flash Builder, Flash Professional (commercial licenses available) Adobe AIR SDK (command line tool)</td>
</tr>
<tr>
<td>Airplay SDK (Now Marmalade)</td>
<td>Yes</td>
<td>Yes</td>
<td>Visual Studio, XCode</td>
<td>All native: Android, BlackBerry, BREW, iOS (iPhone), Maemo, Palm/WebViewOS, Samsung bada, Symbian, Windows Mobile 6.x and desktop, OSX</td>
<td>The native distribution format of each platform</td>
<td>Commercial licenses available</td>
</tr>
<tr>
<td>alchemo</td>
<td>Yes</td>
<td>Yes</td>
<td>Visual Studio, Eclipse, XCode</td>
<td>Android, BREW, iOS (iPhone), Windows Mobile</td>
<td>The native distribution format of each platform</td>
<td>Commercial licenses available</td>
</tr>
<tr>
<td>Android</td>
<td>Yes, in Eclipse, standalone debugging monitor available</td>
<td>Yes</td>
<td>Eclipse, Project Kangaroo, Android plugin for NetBeans</td>
<td>Android only, because of Dalvik VM, March 2009</td>
<td>apk</td>
<td>Free</td>
</tr>
<tr>
<td>Appcelerator</td>
<td>Yes</td>
<td>Yes</td>
<td>Satish Sriramana, internal SDK</td>
<td>Apple, iPhone, BlackBerry, Blackberry, dropped</td>
<td>The native distribution format of each platform</td>
<td>Apache 2.0 license, commercial licenses</td>
</tr>
</tbody>
</table>
Popular platforms – Market share

http://en.wikipedia.org/wiki/Mobile_operating_system
The devices we use
GENERAL TOPICS OF INTEREST
Mobile Web Services

- Provisioning of services from the smart phones
- Invocation of web services from smart phones
- Mobile web service discovery
- Addressing mobiles in 3G/4G networks
- Push notification mechanisms
- Mobile positioning [aare.puussaar@gmail.com]
  - Indoor and Outdoor

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Mobile Cloud Computing

• One can do interesting things on mobiles directly
  – Today’s mobiles are far more capable
  – We can even provide services from smart phones

• However, some applications need to offload certain activities to servers
  – Processing sensor data

• Resource-intensive processing on the cloud
  – To enrich the functionality of mobile applications
Mobile Cloud Access Schemes

[Flores & Srirama, JSS 2014]

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Code offloading

• Decision making
  – When is it ideal to offload a task from mobile to cloud?
  – Fuzzy logic
  – Linear Programming

• We also think the decision making should be a continuous learning process
  – Machine learning

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Internet of Things (IoT)

“The Internet of Things allows people and things to be connected Anytime, Anyplace, with Anything and Anyone, ideally using Any path/network and Any service”—(Guillemin and Friess, 2009)

US National Intelligence Council has predicted that “by 2025 Internet nodes may reside in everyday things—food packages, furniture, paper documents, and more”

UK + Germany governments supported £73 million for IoT (2014). China government is planning to invest $800 million by 2015.
How to provide energy efficient services?

How to interact with ‘things’ directly?
Mobile Resource Composition Mediation Framework (MRCMF)
email: srirama@ut.ee

WE ALWAYS WELCOME NEW IDEAS!
Course Schedule

• Today we introduce you the projects
• Lecture 2 (16.09)
  – Second meeting to finalize the topics
• Lecture 3 (23.09)
  – Deadline for choosing a project
  – Deliver a preliminary report of the project
    • Meaningful report explaining (architecture, design, similar solutions etc.)
• Remaining schedule will be notified later
Project selection

• Projects are available at

https://courses.cs.ut.ee/2014/MADP/fall/Main/Projects

• Responsible persons
  – Satish Srirama (srirama AT ut DOT ee)
  – Chii Chang (chang AT ut DOT ee)
  – Huber Flores (huber AT ut DOT ee)
  – Mohan Liyanage (liyanage AT ut DOT ee)
THANK YOU