CS 4261/8803 MAS, Mobile Applications and Services for Converged Networks

Main
Course Topics
Projects

Start meeting people and forming your project teams. You will need to have a team of 4 students formed and your first project proposal ready by the second week of class.

Fall 2012

Monday, Wednesday and Friday 11:05-11:55 - Klaus 1456

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Description

This course covers the area of application development and deployment in today's commercial, mobile networks. This space is undergoing rapid change as new devices and technologies become available and the network and service providers move to a more converged architecture. A goal of this course is to survey the current state of application work in this environment and provide a contrast with the traditional telco and Internet environments. We will cover both the technical details of the field and the business environment that is often equally important to understanding why things are designed the way they are.

In the old days, this course was known as "The IMS Course". The IP Multimedia Subsystem (IMS) is a next-generation standard for telecommunications network architectures. With all that is going on in the convergence world today, we no longer focus on IMS in this course. We will cover IMS briefly in the context of many other important standards. You should now refer to this course as "The Way Cool Mobile Apps Course".

An important goal for this class is to get you thinking about innovation and entrepreneurship. This is a natural fit for this material because the mobile and convergence space is replete with opportunities to build something that other people will use and maybe even launch a business. I expect that at least one of your class projects should be on one of the mobile app stores (e.g. iPhone, Android) by the end of the semester. There are many opportunities at Georgia Tech to support you in such an endeavor. One such opportunity is the Convergence Innovation Competition. You should plan to enter this year. We are currently planning the competition details for the 2012-2013 year.

While many of the students in this class are from the College of Computing, we encourage students from diverse areas on campus to participate. This includes people from Management, Communications, Music, and many others. In the course projects we have the flexibility to leverage the contributions of people with a wide range of experiences.

Instructor

- Russell J. Clark, PhD
- Office: RNOC Lab, TSRB 123 - phone: 404.385.4706

- Office hours: T-Th 11-12
- Email: Russ.Clark@gatech.edu **Email is always the most reliable way to reach me.**

TAs - TA office hours are held in the RNOC lab, TSRB 123.

Several people will be closely involved in this course.

- Matt Sanders - GT/OIT - msanders@gatech.edu
- Brian Davidson - GT-RNOC Lab Manager - bdavidson@gatech.edu
- GT/RNOC CIP lab staff
- Guest speakers from industry partners.

Grading

Your grade will be calculated from your work on the two projects as well as the final exam.

- Project 1 - 40%
- Project 2 - 40%
- Final Exam - 20% - Our final exam is scheduled for Wednesday, Dec 12, 8:00 AM - 10:50 AM

For most of this semester, we will meet in class on Monday and Wednesday. For most weeks, starting with week 2, the Friday session will be used for team meetings with the RNOC teaching team. Your attendance and participation in these team meetings is mandatory and will be part of your project grade.

Academic Honesty

Students are expected to abide by the Georgia Tech Honor Code. Honest and ethical behavior is expected at all times. All incidents of suspected dishonesty will be reported to and handled by the office of student affairs.

Textbook

We do not have an official textbook for the class. We will make extensive use of online resources and class notes. You should follow the tech news and stay current on what is going on in this space. Follow sites like TechCrunch, Slashdot, and ArsTechnica to see who is buying who and why!

Class Resources

Most of the class resources will be available on the Convergence Innovation Platform (CIP) website at http://www.cip.gatech.edu/Resources. Note: You will have to be logged in with your GT account to view most of the resources on the CIP site.

- Development Resources

- Development Resources - This page on the CIP site includes basic information about a variety of external platforms.
- GTmob Documentation - The web-based campus mobile portal
- CHIMP Interactive Video Platform Documentation
- Argon Augmented Reality Browser Documentation
- The Programmable Web - One stop shopping for web API's.
- Open API Service - Alcatel-Lucent supported API's.

- ATT Developer Portal - ATT supported developer resources
- OpenPlug - multiplatform mobile app development

Entrepreneurship and Innovation Resources

- The Lean Startup - A startup philosophy promoted by Eric Ries that fits well with many student innovators.
- The Art of the Start by Guy Kawasaki is a widely read resource.
- DEMO - A place to pitch your ideas. You should go to the alumni page and watch the presentations from previous winners of this event.
- Legal Zoom, The Startup Lawyer
- Y Combinator - A popular early seed funding program.
- Article: How To Make Big Career Decisions: Don't Tack To Cover - Advice for taking the startup risk rather than a "safe" job.
- Article: 10 Marketing Lessons for Tech Startups

IMS Resources

- IMS Defined at Wikipedia
- 3rd Generaton Partnership Project (3GPP) main site, specifications
- IMS 101: What You Need To Know Now - article
- SIP/IMS Technical Portal Tech-invite site,
- IMS Development Wiki,

RFC's of Interest - There are many RFC's related to IMS and SIP. The ones listed here are a good place to start.

- Session Initiation Protocol (SIP) RFC 3261
- SIP Basic Call Flow Examples RFC 3665
- Session Description Protocol (SDP) RFC 2327
- Real-time Transport Protocol (RTP) RFC 3550
- Indicating user Agent Capabilities in SIP RFC 3840
- SIP Event Package for Presence RFC 3856

Books

- "The 3G IP Multimedia Subsystem (IMS): Merging the Internet and the Cellular Worlds" by Gonzalo Camarillo, Miguel-Angel Garcia-Martin
- "The IMS: IP Multimedia Concepts and Services" by Miikka Poikselka, Aki Niemi, Hisham Khartabil, Georg Mayer

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Topic Outline (updated as the semester develops)

This is a outline of possible topics that we will cover. We probably won't get to all of them.

I am trying to post all slides and presentation resources to the Resources page on T-Square. Go there to download the slides.

- Overview: The Class, The State of the MAS World - Aug 20
  slides
- Overview: Descriptions of Recent and Ongoing Projects - Aug 22
  See the demos and projects on the CIC site.
- Eco-system Case Study: Google+Motorola -
  Read these brief articles before class. 1, 2, 3, 4, 5, 6, 7, 8
- Traditional Telephony vs Traditional IP Networks
- The Cellular Network -
- Mobile Development Environments
  - iPhone - iOS and Objective-C
  - Android - Java and the Android SDKs
  - Mobile Web - HTML5/CSS/Javascript
- History of Television and IPTV
- Interactive TV Development Environments
- SIP and IMS
  - SIP and VoIP
  - IMS Architecture
    - components and signaling -
    - authentication and registration (REGISTER) -
    - simple call setup (INVITE) -
    - charging/billing -
  - Other Services
    - presence - RFC 2778, RFC 3856, RFC 3863,
      - Nokia Siemens Presence Implementation - Documentation
    - location - - 3G Location Services Service Description, RFC 4119, slides
      IMS Location Service Paper, NPR Story on Cell Phone Location Service
    - group
    - gateways and application servers
    - PoC - Push-and-Talk Over Cellular -
      PoC Architecture Description, PoC User Plane Protocol Interface Description, Siemens PoC Server Technical Description,
- Home Networking Challenges
  - DLNA, UPnP, OSGI, and others

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Course Projects

This is primarily a project class. There will be two separate projects this semester. You should form teams for the first project as soon as possible. You will need to propose and start work on the first project by the second week of class. You will have an opportunity to change teams for the second project.

Teams of three to four students each will work on these projects and present them to the class. The projects cover an extremely broad topic space. There is significant opportunity to bring your skills and interests to these projects. This is also a great opportunity to learn something completely new. The class topic outline is a good place to start looking or project ideas.

An important aspect of the projects in this class is that each project will become a unique and challenging "contribution to the platform". This means that you will document your project and make it available to your peers as a building block for future projects. For instance, you might decide to build an application using Android and the Facebook API. Through the project you will learn how to put these together and you will document it such that others can learn what you learned.

For each project you will create a video presentation. These will be used in class and the video will also become part of the project documentation. This requires some practice and should not be done in the final hours before the assignment is due. It is a lasting record of your work, and something you can use to promote yourself to potential employers and investors. You should take pride in it! We have lots of experience and help for you in making this work. We will give you guidelines and requirements for these videos as well as advice on tools and methods for producing the videos.

You will all participate in providing feedback to your peers for their work. While your final grades will be determined by the instructor and RA's, a part of your grade will be determined by the reviews provided by your peers. Also, part of your grade will be determined by the quality of the reviews you write of your peers' work.