CMPE 295 Project Topics Fall 2012

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General Guidelines

For potential MS project students, please send me a list of three choices, in the order of your preferences, along with your background, such as unofficial transcript, course projects, and industrial experiences.

Usually I expect my MS project students to perform both research and development in their projects. To communicate on project progresses, we meet once every two weeks in my office hours. Meeting after 6pm is very difficult, so if you work full time, and can't make it to my office hours, I would suggest you consider alternative project choices. You need to maintain a project wiki page and continuously update on your progress there. The quality of the wiki page is an important factor in deciding your project grade.

Project Topics

Project Topic #1: Federated Cloud Storage Framework

In this project, you will design and develop a federated cloud storage solution (Fig. 1) that interacts with multiple cloud service providers, e.g. Amazon cloud drive, Dropbox, Box.net, Apple iCloud, and other similar services.

You will learn cloud storage APIs to communicate with cloud providers. To improve resilience against cloud service outages, you will implement a network coding based approach in cloud management and optimization.

Your solution runs on either Linux or Windows desktops.

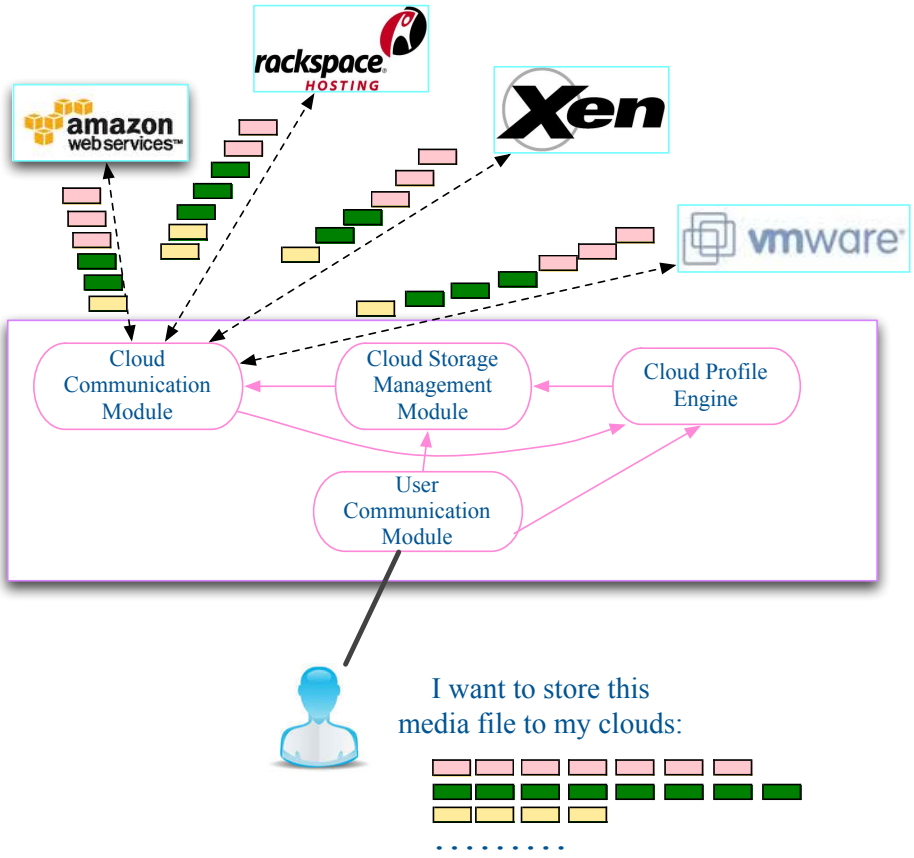

Fig. 1. A federated cloud client communicating with multiple cloud providers

Project Topic #2: Secure and efficient mobile cloud storage agent

In this project, you will design and develop a mobile version of the cloud storage solution as in Project Topic #1. Your project should be an Android application.

Project Topic #3: Optimal scheduling of network transmissions in OpenFlow networks

OpenFlow networking protocols (aks Software Defined Networking) were developed by Stanford University, to enable network research and innovations. Many industrial companies, including Cisco, Juniper, HP, Vmware, have deployed OpenFlow protocols on their router/switch solutions. In this project, you shall implement an OpenFlow network in a single computer, and shall implement a prioritized scheduling framework to provide different quality of service to different types of network applications.

To get more information on open networking protocols, visit the web page:
https://www.opennetworking.org/research

Here is a tutorial to OpenFlow:
http://www.openflow.org/wk/index.php/OpenFlow_Tutorial

Project Topic #4: Secure and scalable OpenFlow networks

A typical OpenFlow network comprises a centralized controller application that communicates to a group of OpenFlow compatible switches to guide packet forwarding/routing process. To scale OpenFlow networks, your project will build an overlay of OpenFlow networks, enable secure communications among controllers, so that packet forwarding can be done across different OpenFlow domains.

Reference on OpenFlow networks can be found under Project Topic #3.

Project Topic #5: Panoramic monitoring of electric grid

In this project, you will create both a desktop and a mobile application to generate panoramic view of monitoring objects in electric grid. The pictures are taken by infra-red cameras, and you don't need to consider artifacts from different lighting and whether conditions.

You shall develop your project using C++ and your project should run in both Linux and Windows environments. You should also provide a set of APIs for other applications to implement panoramic view from pictures.

Project Topic #6: Automatic hazard detection of electric grid

In this project, you will implement an automatic analysis system to detect potential hazard of electric grid networks, based on a sequence of pictures taken from the same angle/orientation at different times. The potential hazard could be large moving arms of engineering vehicles or moving trains that are getting close to electric grid.

The pictures are taken consequently of the same view under different lighting and whether conditions. Your analysis and detection system should not falsely sound an alarm due to changes in lighting and whether conditions.

You shall develop your project using C++ and your project should run in both Linux and Windows environments.

Other interesting project topics?

Talk to me and we can discuss whether it is a good choice.