Syllabus

COEN 241 Introduction to Cloud Computing
Department of Computer Engineering
Santa Clara University

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Course website: http://www.cse.scu.edu/~mwang2/cloud/
Office Hours: Tuesday & Thursday 9:00-9:30pm

Summer Quarter 2015

Course Description
Introduction to cloud computing, cloud architecture and service models, the economics of cloud computing, cluster/grid computing, virtualization, OpenStack, big data, distributed file system, MapReduce paradigm, NoSQL, Hadoop, horizontal/vertical scaling, thin client, disaster recovery, free cloud services and open source software, example commercial cloud services, and federation/presence/identity/privacy in cloud computing.

Prerequisites
Basic programming experience (COEN 12) and Computer Networks (COEN 146)

Required Textbooks

Recommended Textbooks

References

Course Objectives
1. To learn advanced and cutting edge state-of-the-art knowledge and implementation in cloud computing and big data.
2. To read and understand research publications in the technical area of cloud computing, beyond that of the traditional textbook level.
3. To conduct independent project and to equip for scholarly research in cloud computing.
4. To explore the next generation of cloud computing architectures, models, tools, etc. and other advanced topics if time permits.

Expected Learning Outcomes
1. Demonstrate the knowledge of cloud computing (including architecture, service models, economics, cluster/grid, virtualization, OpenStack, scaling, and recovering) and big data (distributed storage, MapReduce paradigm, and NoSQL), by answering exam questions correctly.
2. Demonstrate the ability to build example web applications of cloud services using open source cloud computing tools/systems, by implementing programming assignments correctly.
3. Demonstrate the ability to Install virtualization systems and then install Hadoop on the virtualization systems by running example MapReduce programs on the installed system and give correct results.
4. Demonstrate the ability to read current research papers and implement example research group project in computer networks by doing term project and showing reasonable contributions in this field.

**Grading Policy**

Course grade is determined based on the total score (maximum 1100 points + up to 200 optional bonus points for extra work) from:

1. Mid-term and final exams of 200 points each (close book with one A4 note, no sitting together, no wireless connection.) Makeup exams (must have a very good reason) are much difficult than normal exams.
2. Two programming assignments of 200 points each (late penalty: 40 points/day.) Makeups are more difficult too. You can call Design Center at 408/554-4909 for setup account or IT support, and ssh linux.scudc.scu.edu to work remotely.
3. A group (2-3 people in a team) programming term project of 300 points (late penalty: 60 points/day.) No makeup is allowed.
4. Bonus assignments will be assigned at each week with 20 points each. Due before next lecture begin by email to me with title “coen241bN” (where N can be 2, 3,…, 10) and cc to the grader. The solution for bonus assignments will be posted on my protected web page. Please read solutions of bonus assignments before asking questions. No late work accepted for bonus assignments. 75-80% of exam questions are similar to bonus assignments.

<table>
<thead>
<tr>
<th>Week</th>
<th>Readings</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6/23 6/25 introduction</td>
<td>submit due 6/25</td>
</tr>
<tr>
<td>2</td>
<td>6/30 7/2 cloud architecture, service models, economics,</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>7/7 7/9 cluster/grid computing</td>
<td>program #1 due 7/5</td>
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<tr>
<td>4</td>
<td>7/14 7/16 virtualization</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>7/21 7/23 big data</td>
<td>program #2 due 7/19</td>
</tr>
<tr>
<td>6</td>
<td>7/28 7/30 distributed file system</td>
<td>mid-term exam 7/23, problem due 7/28, group &amp; topic due 7/31</td>
</tr>
</tbody>
</table>

**Table 1: Grade-score table and triple 1/3 rule**

<table>
<thead>
<tr>
<th>Score</th>
<th>A</th>
<th>A-</th>
<th>B+</th>
<th>B</th>
<th>B-</th>
<th>C+</th>
<th>C</th>
<th>C-</th>
<th>F</th>
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<tbody>
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<td>700</td>
<td>650</td>
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<tr>
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<td>949</td>
<td>899</td>
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<td>799</td>
<td>749</td>
<td>699</td>
<td>649</td>
<td></td>
</tr>
</tbody>
</table>

**Course Schedule**  (Tuesday & Thursday 7:10pm-9:00pm)

Table 2: Course Schedule

<table>
<thead>
<tr>
<th>#</th>
<th>Week</th>
<th>Readings</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>8/4</td>
<td>MapReduce paradigm</td>
<td>paper presentation 8/4</td>
</tr>
<tr>
<td>8</td>
<td>8/11</td>
<td>NoSQL, Hadoop</td>
<td>last day to withdraw 8/7</td>
</tr>
<tr>
<td>9</td>
<td>8/18</td>
<td>federation/presence/identity, scaling &amp; disaster recovery</td>
<td>proposal due 8/11</td>
</tr>
<tr>
<td>10</td>
<td>8/25</td>
<td>cloud security</td>
<td>final 8/27</td>
</tr>
<tr>
<td>11</td>
<td>9/1</td>
<td>review</td>
<td>project defense 9/1</td>
</tr>
</tbody>
</table>

**Reminder**

- No cheating, and no register complaint without talking to me first.
- No incomplete. No sit-in or audit the class except formally registered.
- Read files under /home/mwang2/tips for help.
- Handouts, assignments, and solutions will be posted on the web. You should check the class web site at least once a week (and don't forget to refresh the webpage to get the latest versions). You are responsible for printing and bring the handout to the class if you prefer printed pages.
- Office hours: Tuesday & Thursday 9:00pm-9:30pm.

**Honor Code**

All students taking course in the school of engineering agree, individually and collectively, they will neither give nor receive unpermitted aid in examinations or other course work that is to be used by the instructor as a basis of grading.

**Disability Accommodation Policy:**

To request academic accommodations for a disability, students must contact Disability Resources located in The Drahmann Center in Benson, room 214, (408) 554-4111; TTY (408) 554-5445. Students must provide documentation of a disability to Disability Resources prior to receiving accommodations.