New York University
Computer Science Department
Courant Institute of Mathematical Sciences

Course Title: Cloud Computing   **Course Number:** csci-ga.3033-026
Instructor: Jean-Claude Franchitti   **Session:** 4

Course Project

I. **Due**

Progress reports to be submitted on a weekly basis starting on 02/24/25

II. **Objectives**

1. Learn how to migrate complex applications to Cloud
2. Learn how to develop next-gen IAN applications on Big Clouds

III. **References**

1. Slides and handouts posted on the course Web site
2. ADF Essentials Application (Cloud Migration)
3. Sample Cloud Projects and Related Information (Next-Gen Application)
4. Project Ideas and Teaming (Next-Gen Application)

IV. **Software Required**

1. Microsoft Word.
2. Win Zip as necessary.
3. Additional software as applicable based on Cloud application product stack (Figure 1)
4. ADF Essential application software and tools
5. Services provided by mainstream Cloud platforms (i.e., AWS, GCP, Microsoft Azure, IBM Cloud, etc.) as applicable

V. **Assignment**

1. Cloud Migration:

This part of the project studies the migration of complex applications to the Cloud. The project focuses on migrating an existing Oracle ADF Essential application and explores how to migrate this application to the Cloud. The project solution needs to provide justifications for the migration approach choices made, step by step migration instructions, and a demonstration of the migrated application instance.

Sub-project focus:

1. Install the Oracle ADF Essential application provided and document all installation steps (use software and material provided as part of [ADF Essentials Application](#)).

2. Analyze the architecture of the application provided and identify/report on the the areas of complexity from a Cloud migration standpoint.

3. Create a high-level architecture design diagram for the existing application as well as design diagrams for a few possible corresponding candidate architectures that the existing application could be migrated to on the Cloud.

4. Select the best fit design architecture to migrate it to the Cloud and also provide a corresponding implementation architecture/stack.

5. Migrate the application, document all migration steps as part of your final project report, and submit all additional software created to operate the migrated application.

6. Demo the migrated application and steps at the end of the semester.

2. Cloud-Based Active (IAN) Application:

This part of the project focuses on the design and implementation of a Cloud application framework that operate on a P2P/Decentralized network (e.g., Hybrid Web2/Web 3 DApp network). The project also includes the design and implementation of a Cloud semi-independent IAN application. Specific projects will be discussed in class.

Sub-project focus:

1. Study product stack provided in Figure 1.

2. You will need to mix the use of PaaS services provided by at least three Cloud platforms.

3. Review applicable PaaS services provided by mainstream Cloud platforms (pick at least three big Clouds and explain your choice).

4. Develop a proposal that provides a high-level description of your IAN framework and application along with corresponding design/implementation considerations and a planned implementation timeline.

5. Implement your P2P/Decentralized network using products and services of your choice; ensure that P2P nodes are able to complement each other when

supporting service requests. You will need to configure and/or program services as needed to support your Cloud application.

6. Document all implementation steps as part of your final project report, and submit all software created to implement the P2P/Decentralized network, framework nodes, and application.

7. Demo your P2P framework, and application and describe all implementation steps at the end of the semester.

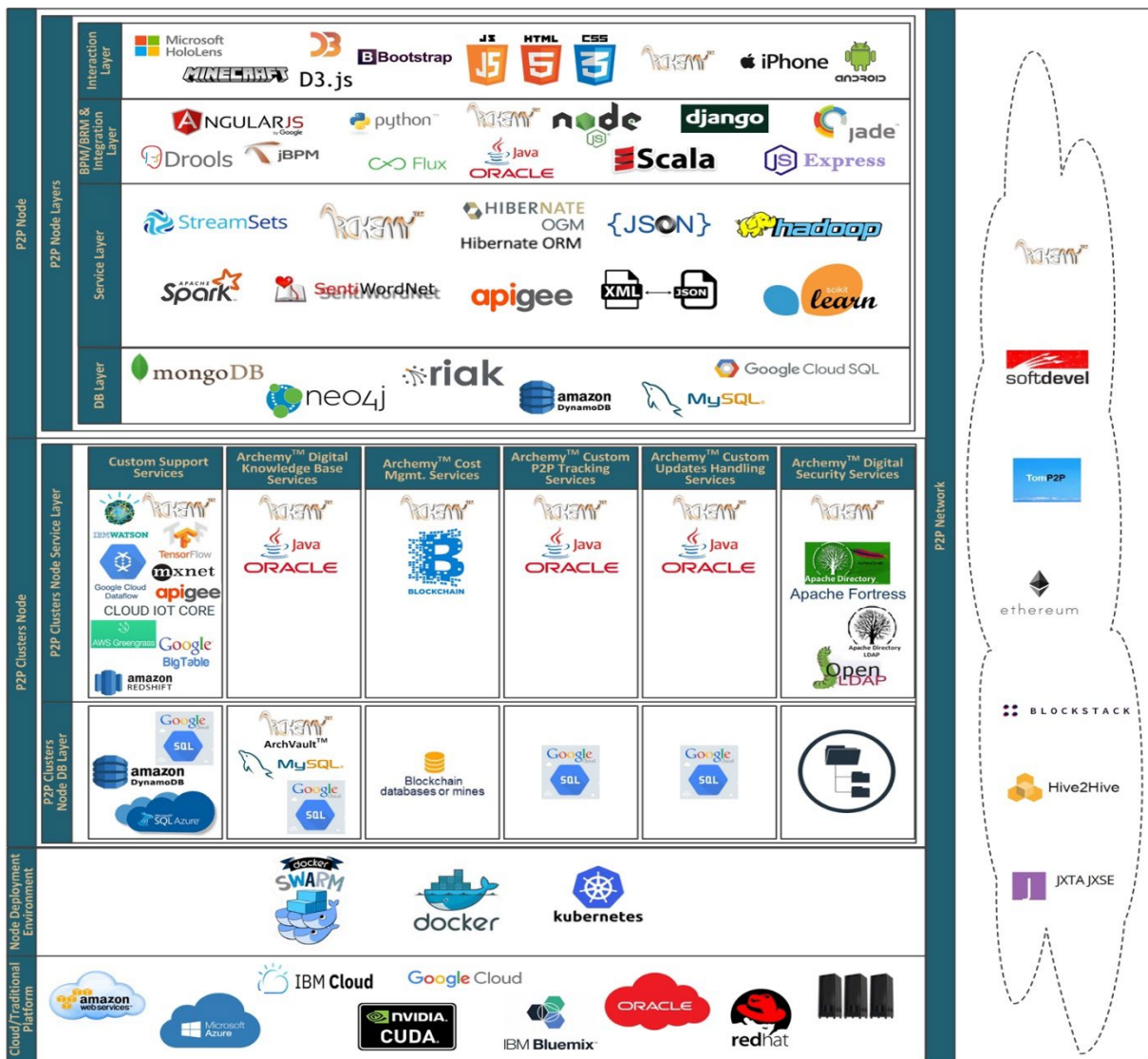8. Optional: Work with other group(s) in the class to operate multiple applications on your P2P network.

Figure 1 – Sample Cloud Product Stack

VI.   Deliverables

1. Electronic:

    A group progress report must be emailed to the course grader and/or instructor on a weekly basis. At the end of the semester, a project report and related software archive must be submitted via Brightspace. The files will need to be created and sent by the beginning of the class marked as the final due date. After that class period, the final project submission will be late. The Brightspace clock will be the official clock.

2. Cover page and other formatting requirements:

    The cover page supplied on the next page must be the first page of your project report.

    Fill in the blank area for each field.

    NOTE:

    The sequence of the electronic submission is:

    1. **Cover sheet**
    2. **Answers to course project questions (weekly updates may focus on subsets of questions to keep building a final report that answers all questions)**

3. Grading guidelines:

    1. **Project Report Layout (15%)**
        o Report is neatly assembled on 8 1/2 by 11 layout.
        o Cover page with names of project members, date, and course name with a signed statement of independent effort included and signed by all project members.
        o File name is correct.
    2. **Project Report Content (25%)**
        o Answers to all questions are correct.
    3. **Working software (60%)**

VII.   Sample Cover Sheet:

- Names _____
    (last name, first name of each project member)
- Date: _____
- Course Section: _____

Course Project

Weekly Update Date: _____

Team Members: _____

Answers to Individual Questions:

(100 points total, all questions weighted equally)

o Assumptions provided when required.

Total in points (100 points total): _____

Professor's Comments: