New York University
Computer Science Department
Courant Institute of Mathematical Sciences

Course Title: Data Communication & Networks
Course Number: CSCI-GA.2662-001
Instructor: Jean-Claude Franchitti
Session: 5

Lab #5 – Wireless and Mobile Networks
(5G) Intelligent MEC with IoT

I. Due

Thursday October 28, 2021 at the beginning of class.

II. Objectives

1. Understand how networking and 5G enable the next generation of cloud-connected fog and edge solutions.
2. Understand how to leverage IoT Edge platform services on the Cloud in a Fog and Edge application development context.
3. You will learn how to Create an IoT Hub, register an IoT Edge device to your IoT hub, install and start the IoT Edge runtime on your device, and remotely deploy a module to an IoT Edge device and send telemetry to IoT Hub.
4. You will learn how to turn your smart phone into an IoT device.

III. References

1. Slides and handouts shared
2. Relevant course textbook sections (as applicable)
3. Microsoft Azure IoT (https://docs.microsoft.com/en-us/azure/iot-fundamentals/)
4. IoT Material on other Big Clouds websites
5. Other references provided in Section V below.

IV. Software Required

1. Microsoft Word.
2. Win Zip as necessary.

V. Assignment

Part I: Read articles 1 and 2 mentioned in slide #82 of the Session 5 main presentation (i.e., Assignments & Readings slide); also refer to the video mentioned in slide

#12 of the Session 2 presentation (i.e., Introduction to MEC slide) that explains how to enable compute VNFs and 5G with Azure:

https://www.youtube.com/watch?v=N9kD64f7-_o_

Write a short document based on the articles (and video) to explain how networking and 5G enable the next generation of cloud-connected fog and edge solutions; give examples of fog and edge solutions.

Part II: Deploy an IoT Edge Module using Microsoft Azure IoT capabilities

Implement and document the following tutorials (on either Linux or Windows):

https://docs.microsoft.com/en-us/azure/iot-edge/quickstart-linux

https://docs.microsoft.com/en-us/azure/iot-edge/quickstart

Note: The "Simulated Temperature Sensor" mentioned in Step 6 is no longer available in the IoT Module Marketplace; as an altenative, please use https://hub.docker.com/_/microsoft-azureiotedge-simulated-temperature-sensor and follow the deployment steps that are specific to that module.

Part III (extra credit): Complete the list of IoT Edge tutorials that follow the link labeled as https://docs.microsoft.com/en-us/azure/iot-edge/quickstart

Part IV: (extra credit) Turn your smart phone into an IoT device

Implement and document a solution based on the following tutorials:

https://docs.microsoft.com/en-us/samples/azure-samples/azure-iot-samples-ios/azure-iot-samples-for-ios-platform/

https://developer.ibm.com/tutorials/iot-mobile-phone-iot-device-bluemix-apps-trs/

VI. Deliverables

1. Electronic:

   Your lab assignment files must be submitted via NYU Brightspace. Name the file "**firstname_lastname_lab_#.docx**" (e.g., "john_doe_lab_5.docx"). The file must be created and sent by the beginning of class. After the class period, the homework is late. The email clock is 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 lab assignment file.

Fill in the blank area for each field.

NOTE:

The sequence of the electronic submission is:

1. **Cover sheet**
2. **Assignment Answer Sheet(s)**

3. Grading guidelines:

Assignment Layout (15%)

- o Assignment is neatly assembled on 8 1/2 by 11 layout.
- o Cover page with your name (last name first followed by a comma then first name), username and section number with a signed statement of independent effort is included.
- o File name is correct.

Answers to Individual Questions (85%):

- o Answers to all questions are complete and correct.
- o Assumptions provided as required.

(100 points total, all questions weighted equally)

VII. Sample Cover Sheet:

Name _____ Date: _____
(last name, first name)
Section: _____

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Total in points (100 points total): _____

Professor's Comments:

Affirmation of my Independent Effort: _____
(Sign here)