# SE 430
Winter 2016
Group Assignment
Internet of Things

Due Date Feb. 18

Background

ACME automobile company has installed IoT interface in all their cars, where all sensor data listed below, is transferred to the Business application. The details are shown in the diagram, where the IoT interface will be transmitted using MQTT protocol to the IoT Cloud services. The Cloud services in turn, serve Business Applications using standard application interfaces such as REST, JMS, etc.
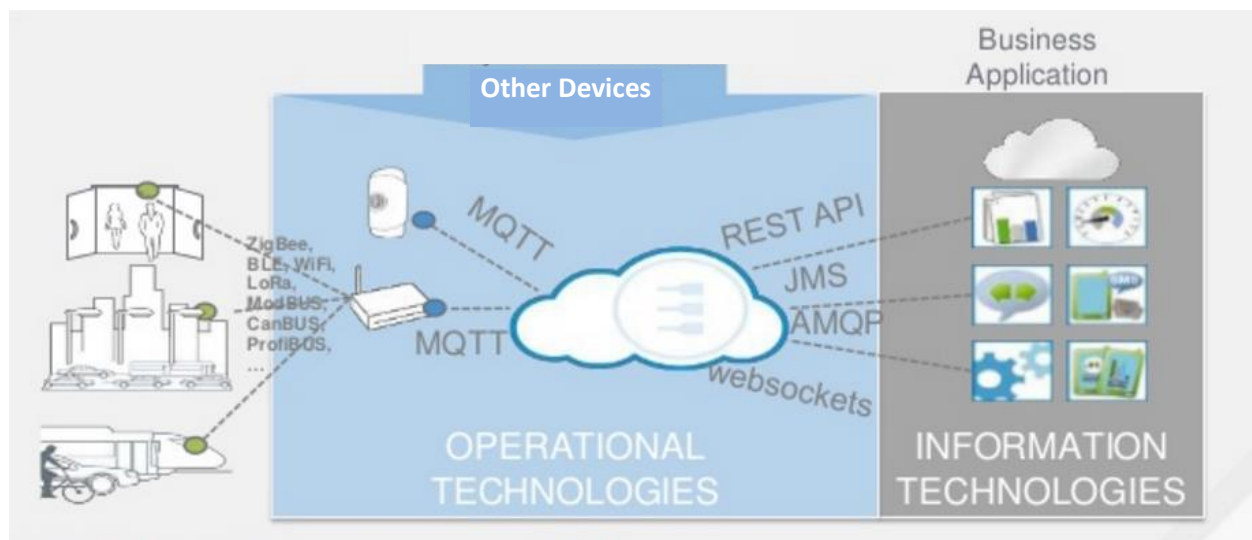
The Challenge

As apparent from the diagram, multiple automotive sensors feed into different busses, such as, CanBUS, Zygbee, Mod Bus, WiFi, etc. This architecture produces multi-gigabytes of sensor data, tabulated below, which is eventually routed to the IoT cloud (called, Operational Technologies). As you can imagine, consumption of data by Business Applications is a fraction of data produced by the IoT devices. Data volume is not just a result of high data frequency, but also data diversity, where great many sensors send data to the IoT cloud.

Your job is to create a UML Structure and Interaction based Architecture, two of the representative diagrams are, Class Diagram and Sequence Charts, respectively, but there are more. This Architecture organizes sensor data in the form of interface classes, which abstract disparate sensor data, into a coherent, integrated set of complex data. An example is, instead of presenting temperature, wind and

humidity values, two integrated measures: Heat Index and Wind Chill can be created, reflecting a simplified and holistic view of the weather. This data can then be displayed in a range of Business Applications, shown on the right side of the above diagram. Architecting which, is outside the scope of this project.

Create a similar abstraction using the disparate sensor data, where your solution creates abstract measures, such as: Driving Experience, Safety enforcement, Intelligent Cruise Control, Comfort Management, etc. Try to use as much sensor data as possible; it will be difficult to use all the data, so don't stress out if you can't either.

List of Available Sensor Data

Outside Temperature
Engine temperature
Engine oil level
Transmission oil level
Radiator Water temperature
Speed sensor
Road curve sensor
Obstacle-ahead sensor (senses potential collision while the car is in motion)
List of Radio Stations listened to most
Volume level of audio system used most frequently
Real-time ambient noise level
Inside temperature of the car
Passenger seat temperature
Engine RPM
Frequency of rain impacting the windshield
Speed of operational Windshield wipers
Bluetooth devices connected to the car's audio system

Please refer to D2L for your group membership