Acceptance Testing

UAT Execution & Submission

Date	19 September 2022
Team ID	PNT2022TMID43270
Project Name	Signs with Smart connectivity for Better road safety
Maximum Mark	4 Marks

Testing Internet of Things (IoT):

When a question such as “What are the basic necessities of life” is thrown at people, most of them would answer, “Food, Shelter, Clothing”.

But, that was the case before a century. Human beings have evolved to develop a handful of extra necessities for living. We have evolved to make our life, simpler, better, easier.
We have stopped using switches to control lights, have stopped paying at kiosks to submit toll charges, we have been monitoring our health status smartly, tracking vehicular movements more efficiently and a lot in the list.

Technology used in IoT

Following are the few of the most used technologies in IoT:

1. **RFID** [Radio Frequency Code] tags and EPC [Electronic Product Code]
2. **NFC** [Near Field Communication] is used to enable two-way interactions between the electronic devices. This is basically for the smartphones and is mostly used to do the contactless payment transactions.
3. **Bluetooth:** This is used where short range communications are enough to get away with the problem. This is mostly used in wearable technologies.
4. **Z-Wave:** This is a low power RF comm technology. This is primarily used for home automation, lamp controlling etc.
5. **WiFi:** This is the most commonly used choice for IoT. When on a LAN, this helps in transferring files, data and messages seamlessly.

Testing IoT

Let’s take an example of a Medical healthcare tracking system in which the instrument monitors the health, heart rate, fluid intake details and sends out a report to the physicians. That data is recorded in the system and the historical data can be viewed whenever required.
The physicians can initiate drug intakes, fluid supplements based on the data. This can be triggered remotely from any of the devices [computers or mobile devices] to which the medical device is connected to.

IoT Test Approaches

#1) Usability:

- We need to make sure the usability of each of the device used here.
- The medical healthcare tracking device used should be portable enough to be moved into different segments of the medical.
- The equipment should be smart enough to push not only the notifications but also the error messages, warnings etc.
- The system should have an option to log all the events to provide clarity to the end users. If it is not capable of doing that, the system should push those as well to a database to store it.
- The notifications should be shown and handling of the display should be done properly in the devices [computers/mobile devices].
- Usability in terms of displaying data, processing data, pushing job tasks from the devices should be tested thoroughly.

=> Read more about general Usability testing

#2) IoT Security:

- IoT Security challenges: IoT is data centric where all the devices/system connected operate based on the data that is available.
- When it comes to the data flow between devices, there is always a chance that the data can be accessed or read when getting transferred.
- From a testing standpoint, we need to check if the data is protected/encrypted when getting transferred from one device to the other.
- Wherever, there is an UI, we need to make sure there is a password protection on it.

=> Read more about general Security Testing

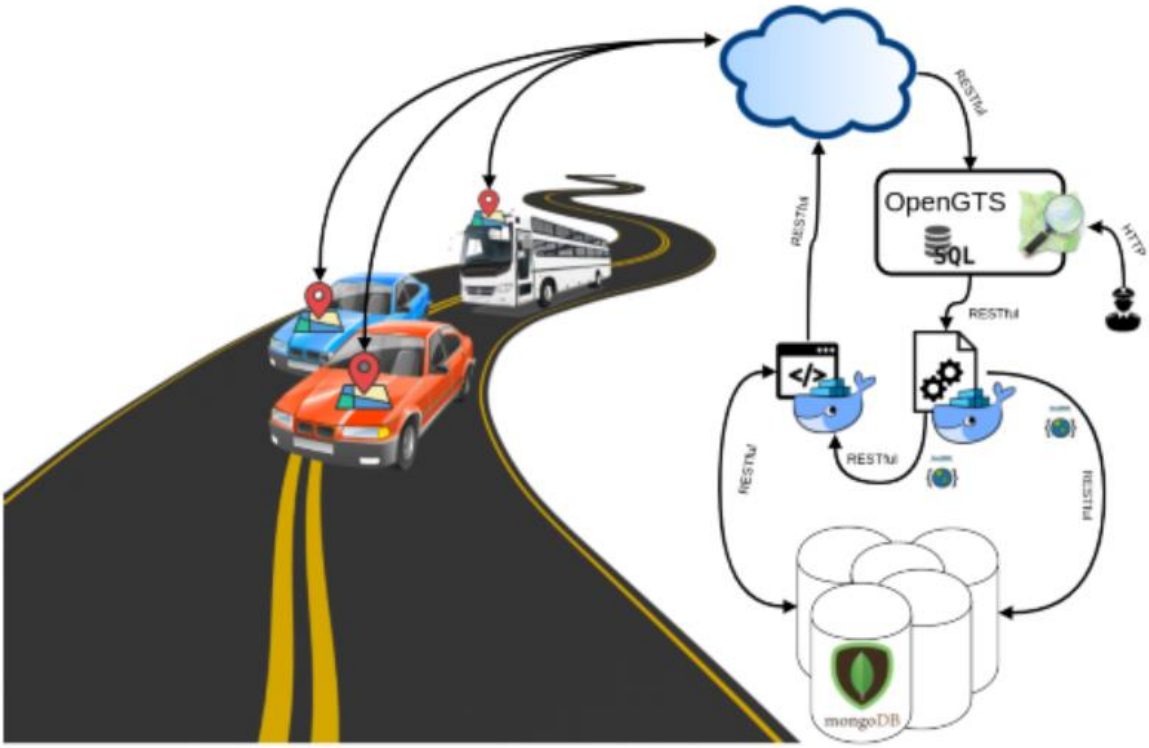
#3) Connectivity:

- As it is a healthcare solution, connectivity plays a vital role.
- The system has to be available all the time and should have seamless connectivity with the stakeholders.
- As per connectivity, two things are very important to test;
    - Connectivity, transfer of data, receiving job tasks from the devices should be seamless when the connection is UP and running.
    - The other condition is the connection down scenario. Doesn't matter how robust is the system and the network, there are chances that the system will go offline. Being a tester, we should test the offline conditions as well. Once the system is not available on the network, there has to be an alert which can prompt the physicians so that they can start to monitor the health conditions manually not depending on the system till it is up. On the other hand, there has to be a mechanism in the system which can store all the data in it during the offline period. Once the system comes online, all that data should get propagated. Data loss should not be there in any condition.

#4) Performance:

- When we are talking about a system for a healthcare domain, we need to make sure the system is scalable enough for the whole hospital.
- When the testing is carried out, it is done for 2-10 patients at a time and the data is propagated to 10-20 devices.
- When the whole hospital is connected and 180-200 patients are connected to the system, the data that is propagated is much bigger than the tested data.
- As testers, we need to make sure the system performs the same even though the added data is propagated.

- We should also test the monitoring utility to display the system usage, power usage, temperature etc.



UAT Activities

All core UAT activities are defined below:

- Identify UAT Team – Business Analyst lists SMEs that will take part in testing for the project. The Project Sponsor is often the source of information for the team list. A full description of team member attributes is detailed in section 4.1.
- UAT Plan – A strategy-based document defining test methodology and criteria is distributed to the team.
- UAT Plan Team Review – Session with business stakeholders to review plan and provide feedback and sign-off.
- UA Test Cases – A document that details each specific test case that will be performed during the UAT process.