**Analysis of alternatives**

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**Purpose:**

**To decide the best platform for future uses.**

**Criteria:**

* **The server needs to able to connect with Arduino board and read motion data from motion sensor and prints it with the timestamp on the console.**
* **Server needs to be able to send data to client**
* **The client needs to be able to receive the data and calculate the time taken for the data to be sent from server to client which labeled as response time. Once done, the motion status, timestamp of server and response time will be displayed on the client side.**

**Options:**

* **Socket.io and Johnny Five**
* **Firebase and Socket.io**
* **Serial Port and Socket.io**

**Socket.io and Johnny Five:**

**Socket.io is a Javascript library for us to utilize it and proceed the program with instructions whereas Johnny Five is a platform for Javascript robotics and Internet of things HTML. For this platform, Socket.io handles the bidirectional communication between the client and server while Johnny five allow us to interact with the client and the server. A device has been used while testing this spike which is an Arduino board. Arduino board consist of LED and motion sensor. The motion sensor will function whenever it senses small motions within its parameter. The platform will be connected to an Arduino board in order for us to implement the criteria and test which is the best.**

**Johnny Five and Firebase:**

**Johnny Five is a platform for Javascript robotics and Internet of things HTML whereas Firebase is a third party web application platform that provides tools for us to utilize and help us store data. For this platform, Johnny Five handles the communication between the server and the device we used which is the Arduino board while Firebase acts as a real-time communication database that allows use to store data and handle the interaction between the server and the client. A device has been used while testing this spike which is an Arduino board. Arduino board consist of LED and motion sensor. The motion sensor will function whenever it senses small motions within its parameter. The platform will be connected to an Arduino board in order for us to implement the criteria and test which is the best.**

**Socket.io and Serial Port:**

**Socket.io is a Javascript library for us to utilize it and proceed the program with instructions whereas Serial port is a connector between the device and the server. For this platform, Socket.io handles the bidirectional communication between the client and server while Serial port handles the interaction between the device and the server which gave us the control on the devices we have. An Arduino board was used in this test which consists of LED and motion sensor. The motion sensor will function whenever it senses small motions within its parameter. The platform will be connected to an Arduino board in order for us to implement the criteria and test which is the best.**

**Decisions:**

**For the platform Socket.io and Johnny Five, it met the criteria pretty well because it is able to directly give out the signal from the server to the client. This allows the time taken for the data to be sent from the server to the client to be shorter and instant. One of the evidence that can be shown is based on the average time. Based on the table below, this platform was tested 10 times and gave us the same result.**

|  |  |
| --- | --- |
| **Motion** | **Response time** |
| **1st motion** | **0.001** |
| **2nd motion** | **0.001** |
| **3rd motion** | **0.002** |
| **4th motion** | **0.002** |
| **5th motion** | **0.001** |
| **6th motion** | **0.002** |
| **7th motion** | **0.001** |
| **8th motion** | **0.001** |
| **9th motion** | **0.002** |
| **10th motion** | **0.001** |

**Average Time = the total response time/number of motions**

**Hence, it took an average time of 0.001 seconds for data to travel from the server to the client.**

**For the platform Johnny Five and Firebase, it met the criteria but it took a longer time for the data to be sent from server to client because the data needs to be sent to the Firebase platform before being able to be received from the client side. One of the evidence can be shown is the average time.**

|  |  |
| --- | --- |
| **Motion** | **Response time** |
| **1st motion** | **0.211** |
| **2nd motion** | **0.254** |
| **3rd motion** | **0.214** |
| **4th motion** | **0.210** |
| **5th motion** | **0.214** |
| **6th motion** | **0.223** |
| **7th motion** | **0.228** |
| **8th motion** | **0.222** |
| **9th motion** | **0.284** |
| **10th motion** | **0.220** |

**Hence it took an average time of 0.228 seconds. It can be concluded that it took a longer time than Socket.io and Johnny Five platform.**

**For the platform Socket.io and Serial port, it met the criteria same as the platform Socket.io and Johnny Five. It took a short amount of time for the data to travel from the server to the client. One of the evidence can be proven for this is the average time of the motion data.**

|  |  |
| --- | --- |
| **Motion** | **Response time** |
| **1st motion** | **0.001** |
| **2nd motion** | **0.002** |
| **3rd motion** | **0.002** |
| **4th motion** | **0.001** |
| **5th motion** | **0.001** |
| **6th motion** | **0.002** |
| **7th motion** | **0.002** |
| **8th motion** | **0.001** |
| **9th motion** | **0.001** |
| **10th motion** | **0.001** |

**Hence, there is an average time of 0.001 seconds for the client to receive data from the server.**

**In conclusion, the best option that we have decided is Socket.io and Johnny Five. Although it achieve the same results as the platform of Socket.io and Serial Port but due to the complexity of using the Serial port and more familiar with Johnny Five is the reason of us choosing Socket.io and Johnny Five as our best option out of the 3 option.**