**The State Machine**

The following are descriptions of each state and what tasks are carried out in each state:

* Initial - The initial state of the system. In this state, the system is initialised.
* SysIddle - In this state, the system is waiting for a message to be received from either MQTT or Bluetooth.
* BluetoothMsgRx - This state is entered when a message is received from Bluetooth. The system checks the connectivity status of the Bluetooth connection and then adds the message to the Bluetooth buffer.
* MQTTMsgRx - This state is entered when a message is received from MQTT. The system checks the connectivity status of the MQTT connection and then adds the message to the MQTT buffer.
* BluetoothMsgTx - This state is entered when a message is sent over Bluetooth. The system removes the message from the Bluetooth buffer.
* MQTTMsgTx - This state is entered when a message is sent over MQTT. The system removes the message from the MQTT buffer.
* ConnectivityErr - This state is entered when there is an error with the connectivity of either the MQTT or Bluetooth connection. The system retries sending the message in this state.

Here are some assumptions that I made during the design of the state machine:

* The system has two buffers, one for MQTT messages and one for Bluetooth messages.
* The system can only send one message at a time.
* The system will retry sending a message if there is an error with the connectivity.

State Diagram

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Description automatically generated