

A decorative graphic on the left side of the slide, consisting of a network of light blue lines and small circles, resembling a circuit board or a stylized tree structure, set against a dark blue background.

SMART INVENTORY LEVEL SYSTEM

MIGUEL LOPEZ

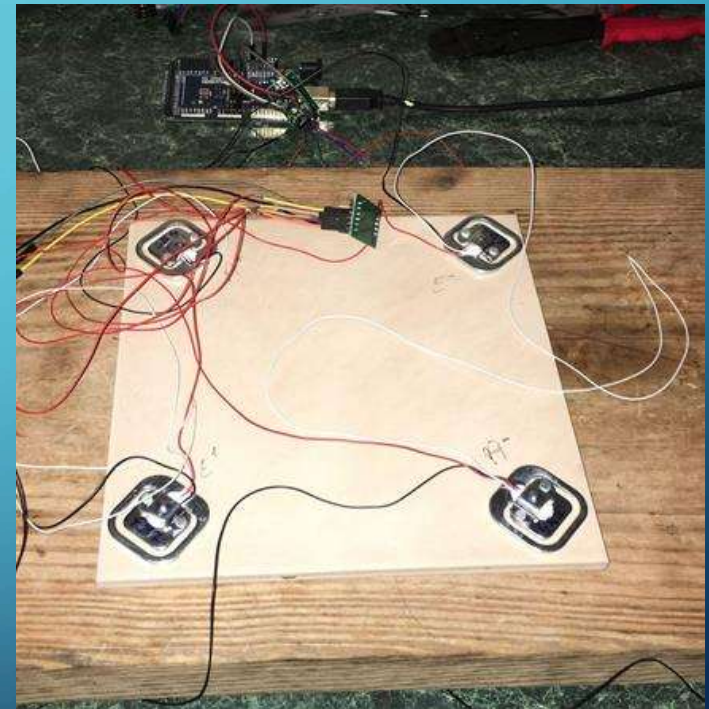
PROBLEM?

- Retail Store environment
 - Stockroom inventory levels fluctuate daily
 - Inbound shipment units must be monitored manually
 - Help coordinate stockroom management efforts

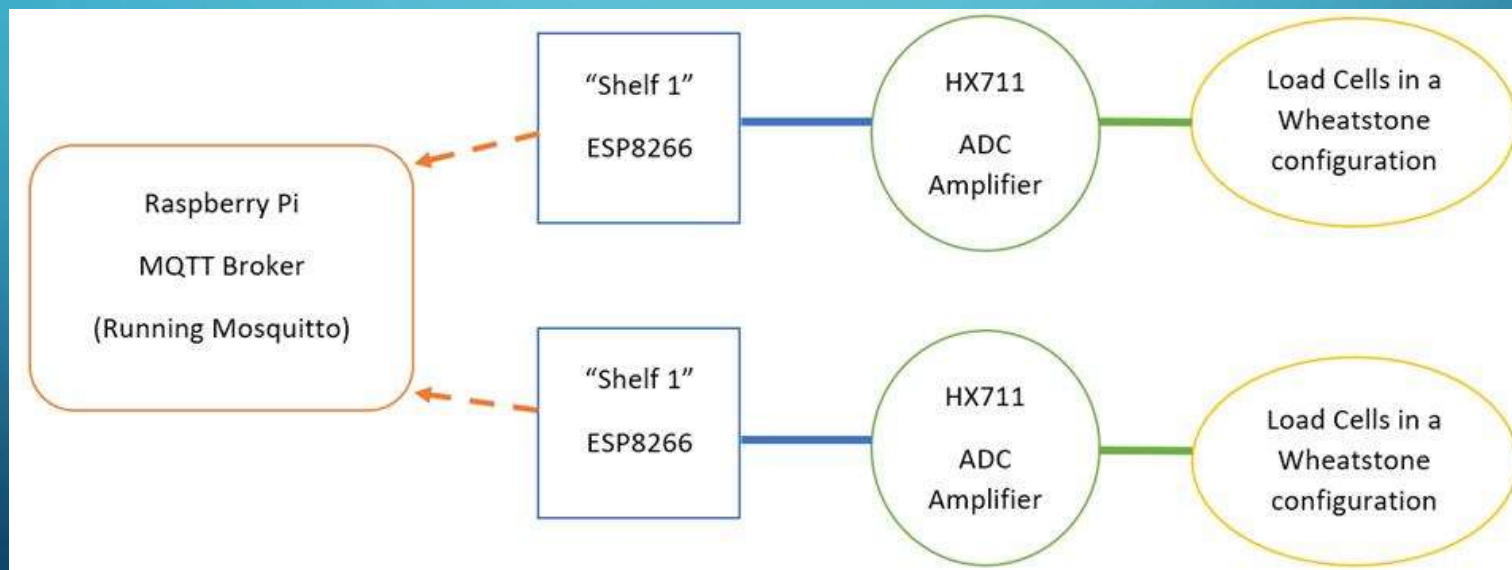


SYSTEM DESIGN

- Track each shelf with weight sensors
- Report to main system at beginning of day
- Visualize and log data

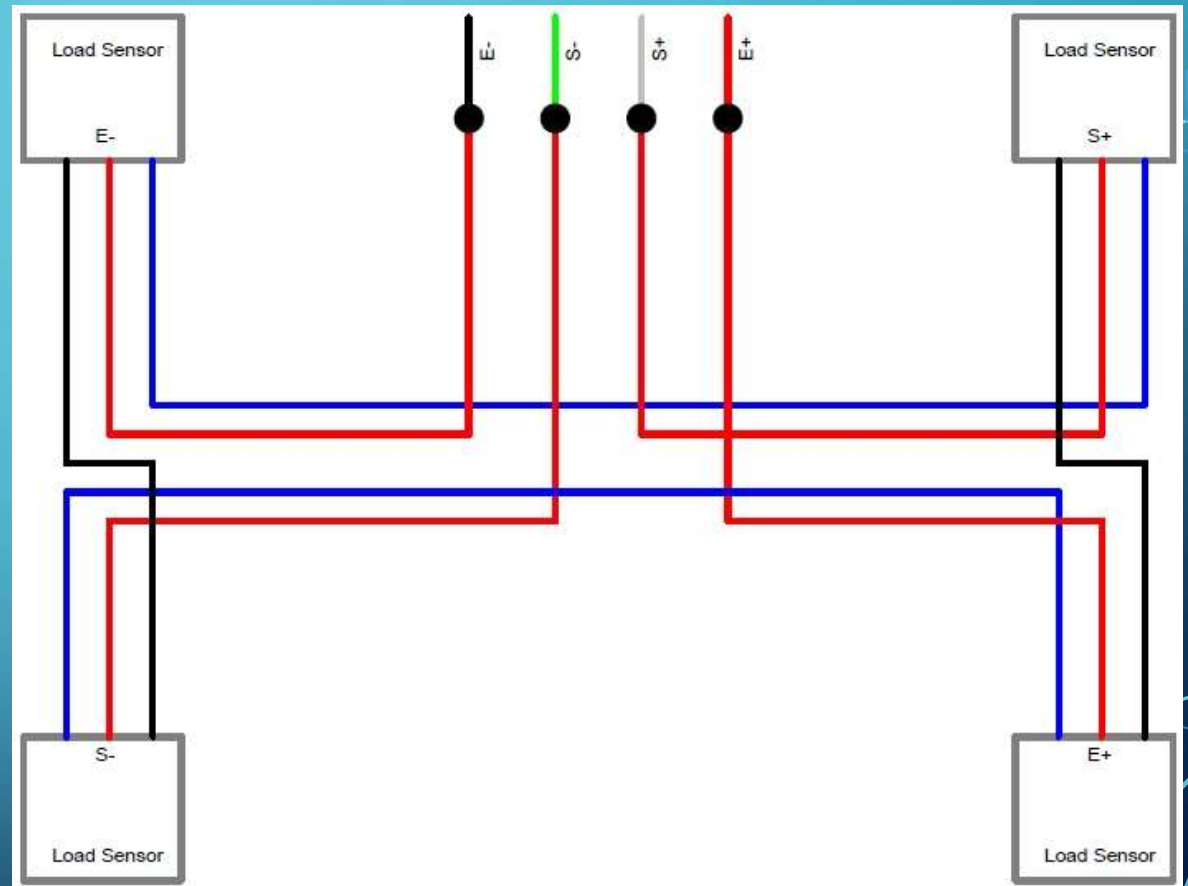


SYSTEM DIAGRAM



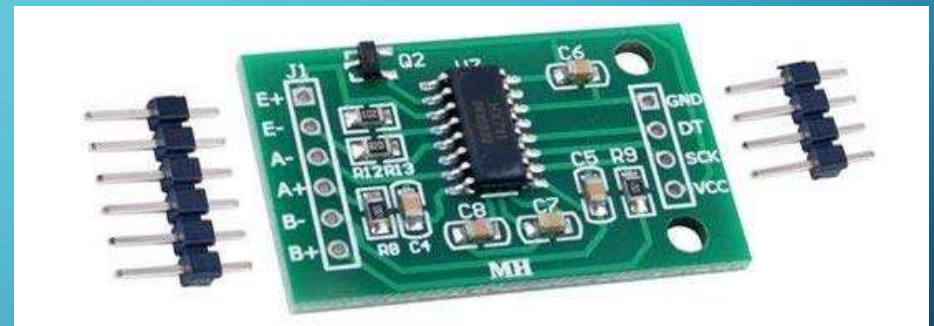
LOAD CELLS

- 3 Wire load cells
- 50kg each
- 200kg = about 440 lbs.



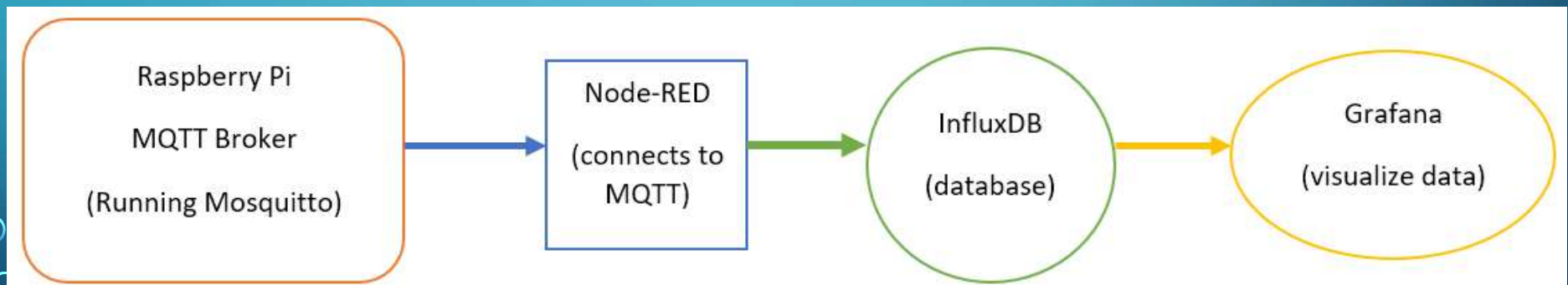
MODULE - MCU - MICROCOMPUTER

- HX711
 - Amplify the analog signals
 - Connected through data pin and clock
- ESP8266
 - Wifi microcontroller
- Raspberry Pi
 - Mosquitto -> Node-Red -> InfluxDB -> Grafana



FLOW CHART OF DATA

- All software running on the Raspberry Pi



TROUBLES

- HX711 system was not reliable
 - Tried multiple example codes, became confusing fast
- Fault in module? Fault in 1 sensor? 2 sensors?
 - # of sensors used determine wiring layout

```
COM3
HX711 Demo
Initializing the scale
Before setting up the scale:
read:          2097151
read average:      4404018
get value:         3355442.00
get units:         5872024.0
After setting up the scale:
read:          4194303
read average:      5662309
get value:         0.00
get units:         -735.8
Readings:
one reading:      -1103.8 | average:      -919.8
one reading:       735.8 | average:      -367.9
one reading:       735.8 | average:     -1839.6
one reading:       735.8 | average:      -367.9
one reading:       735.8 | average:       367.9
one reading:       735.8 | average:      -367.9
```

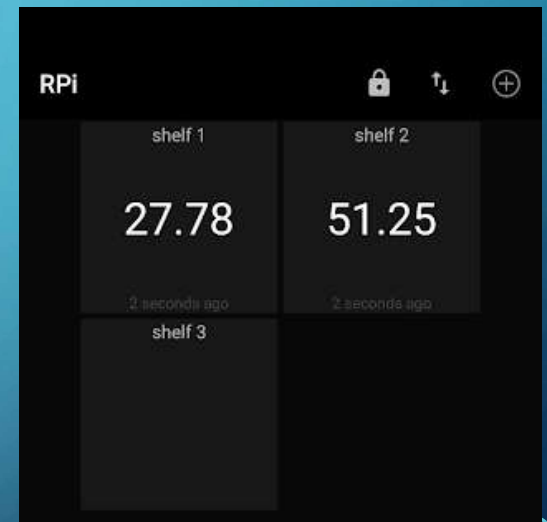

COMPROMISES

- Simulated results of HX711/weight sensors
- No touchscreen display for manual control
- No automatic visualization



FUTURE TINKERING

- Get HX711 working, apply to different projects?
- MQTT dashboard/control from android?
- Some functional level of the touchscreen display
- Alternative MQTT broker?
 - Hosted on android or traditional x86/x64 Linux | Windows



Mosquitto

- MQTT subscription messages being stored by NodeRed and stored into an InfluxDB database

```
SHELF2 123.75
SHELF3 2.50
SHELF2 121.25
SHELF3 26.25
SHELF2 130.00
EVENT SHELF1 is ONLINE
SHELF1 8.33
SHELF3 1.25
SHELF2 51.25
SHELF1 13.89
SHELF3 5.00
SHELF2 15.00
```

MQTT Published Data

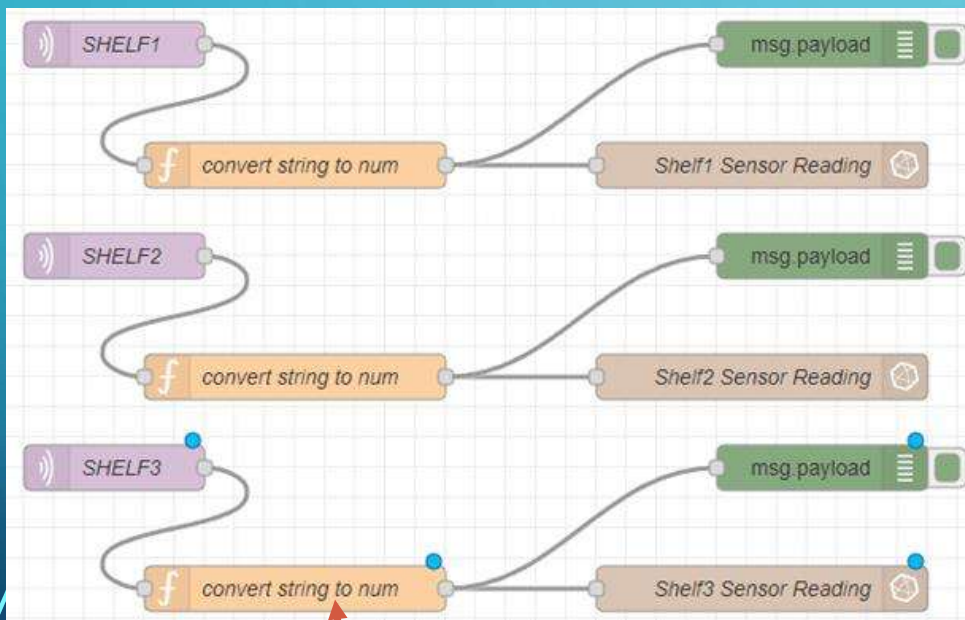
File Edit Tabs Help

```
SHELF1 213873
TestClient/lastwill I am going offline
EVENT SHELF1 is ONLINE
SHELF1 26363
SHELF1 63300
SHELF1 212064
SHELF1 1040
SHELF1 72124
SHELF1 208242
SHELF1 78614
SHELF1 200905
SHELF1 91196
SHELF1 85191
SHELF1 51983
SHELF1 208179
SHELF1 119076
SHELF1 127620
SHELF1 123258
SHELF1 74908
SHELF1 112734
SHELF1 179478
SHELF1 23106
SHELF1 16241
```

InfluxDB Database

```
1646531531694979237 74908
1646531536688505852 112734
1646531541689441544 179478
1646531546729906784 23106
1646531551748289541 16241
> use sensors
Using database sensors
> show measurements
name: measurements
name
----
SHELF1
> select * from "SHELF1"
name: SHELF1
time                value
----
1646531456673214086 26363
1646531461636180830 63300
1646531466640419317 212064
1646531471660115383 1040
1646531476679354387 72124
1646531481647579399 208242
1646531486654226296 78614
1646531491653913461 200905
1646531496663011689 91196
1646531501705766427 85191
1646531506667323452 51983
1646531511670304829 208179
1646531516722615671 119076
1646531521677278455 127620
1646531526687716147 123258
1646531531694979237 74908
1646531536688505852 112734
1646531541689441544 179478
1646531546729906784 23106
1646531551748289541 16241
>
```

Node-RED



- Converting string to num in NodeRed, to then store into InfluxDB, and read as nums and not string by Grafana

Edit function node

Delete Cancel

Properties

Name convert string to num

Setup On Start **On Message** On Stop

```
1 var payload = msg.payload;
2 msg.payload = Number(payload);
3
4 return msg;
```

Grafana

- Short Live Demo

