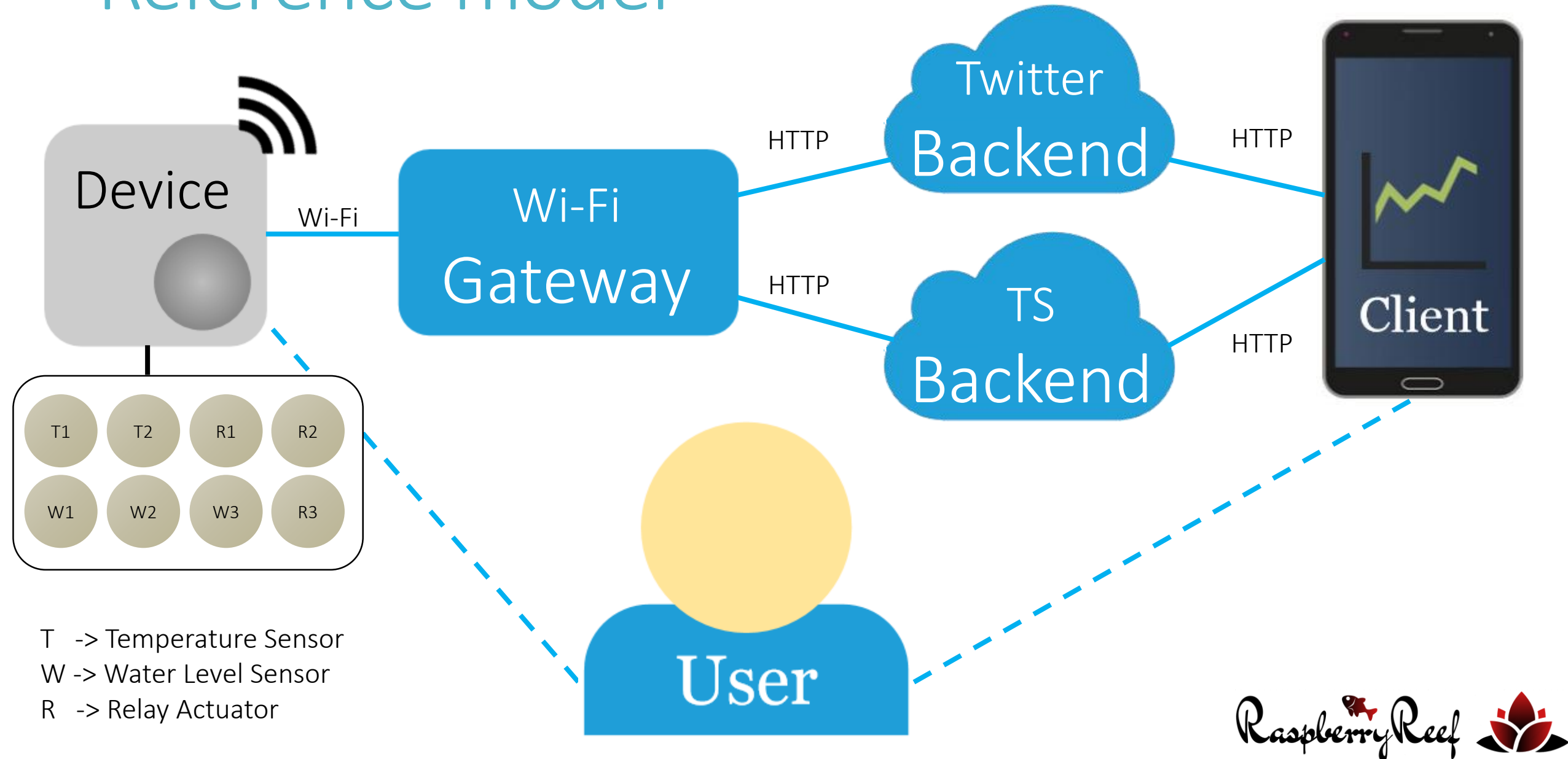




FHNW-IoT Project
by Jonathan Bättig

RaspberryReef

Reference model



Use cases

Measure water temperature

Switch on / off reef aquarium led

Refill evaporated water with RODI water

Send Twitter DM to reef owner

Display sensor and actuator data on ThingSpeak

Interface documentation

HTTP API to write ThingSpeak

```
$ curl -vX POST https://api.thingspeak.com/update.json --  
data 'api_key==WRITE_API_KEY&field1=TEMP_GROUND&field2=TEMP_SURFACE&fiel  
d3=WATER_REEF_MIN&field4=WATER_REEF_MAX&field5=WATER_REFILL_MIN&field6  
=LAMP_LEFT_STATE&field7=LAMP_RIGHT_STATE&field8=REFILL_PUMP_STATE'
```

Interface documentation

HTTP API to write Twitter DM

```
curl --request POST --url https://api.twitter.com/1.1/direct_messages/events/new.json  
- header  
'authorization: OAuth oauth_consumer_key="CONSUMER_KEY", oauth_nonce="AUTO  
_GENERATED_NONCE", oauth_signature="AUTO_GENERATED_SIGNATURE", oauth_sig  
nature_method="HMAC-  
SHA1", oauth_timestamp="AUTO_GENERATED_TIMESTAMP", oauth_token="USERS_A  
CCESS_TOKEN", oauth_version="1.0" --header 'content-type: application/json' --  
data '{"event": {"type": "message_create", "message_create": {"target": {"recipient_id"  
: "RECIPIENT_USER_ID"}, "message_data": {"text": MESSAGE_TEXT}}}}'
```

Issues

ThingSpeak write restriction

Pull-up and pull-down resistors and the correct resistor size

Soldering

Attaching the water level sensors to my reef aquarium

Random Twitter DM caused by a magnetic field

Twitter OAuth 1.0 authentication