IoT Showcase WeatherCubeOne2

The **WeatherCubeOne** is a showcase for using MQTT with

- TinkerForge Bricklets,
- Domoticz Home Automation and
- Google Charts.

Version 20160628

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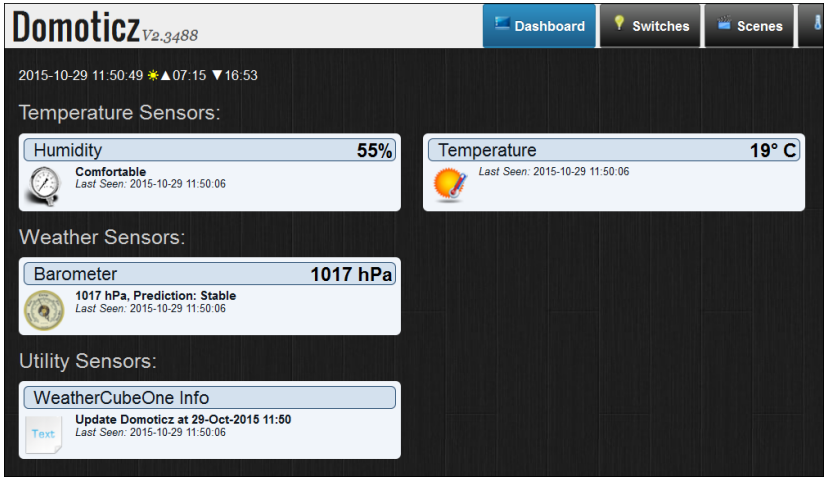
WeatherCubeOne2 - Overview

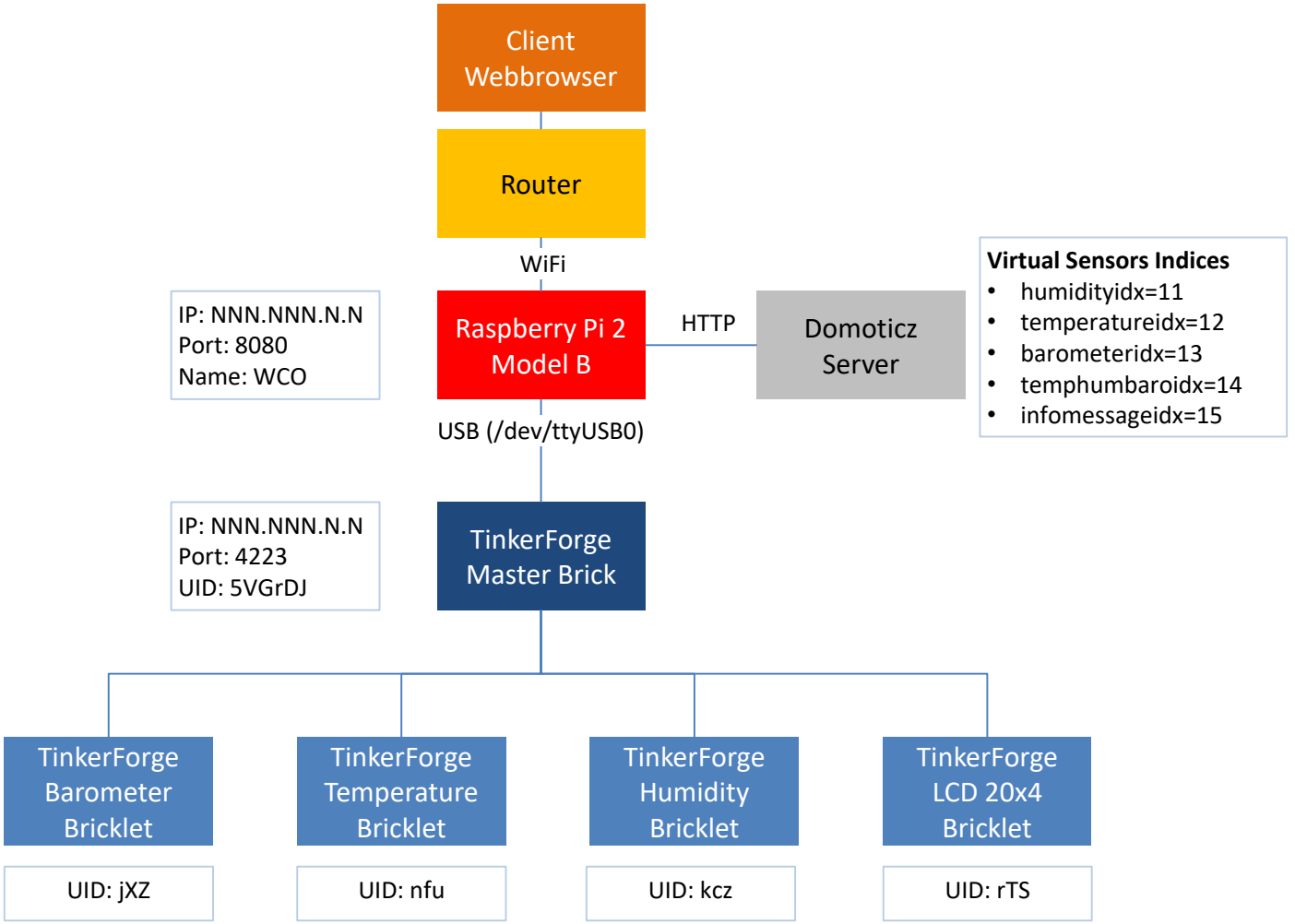
Objectives

Show Date & Time, Air Pressure, Temperature and Humidity on a LCD 20x4 and on Webbrowser Domoticz Client.

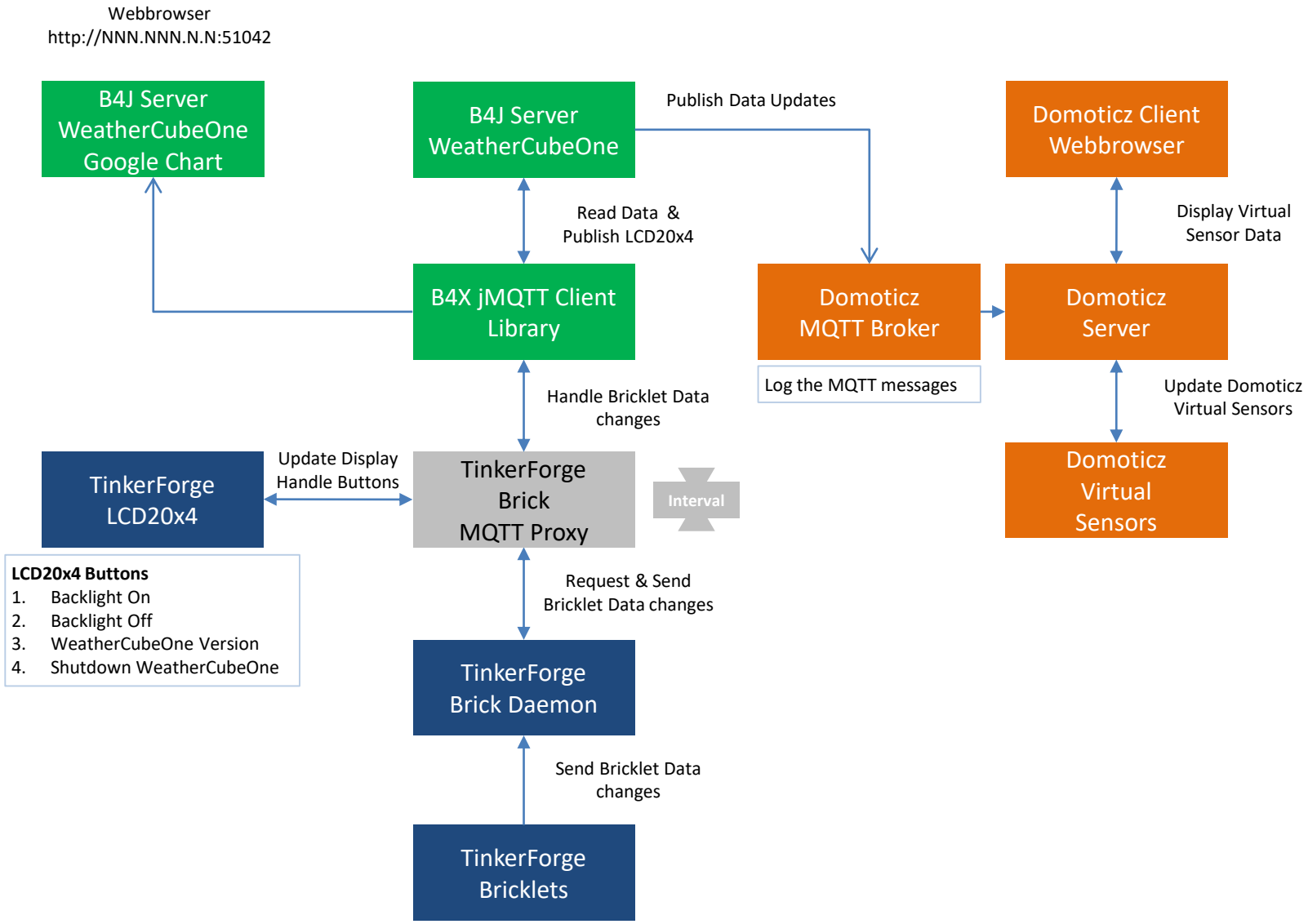


Hardware	Software	LCD20x4 Buttons
• Raspberry Pi 2 Model B v1.1 • TinkerForge Master Brick • TinkerForge Bricklets Temperature Barometer, Humidity and LCD20x4 • MakerBeam Aluminium Profiles	• TinkerForge Brick MQTT Proxy • B4X MQTT Client Library • Domoticz MQTT • Domoticz Home Automation Server • B4J Non-UI Application WeatherCubeOne (developed by www.rwblinn.de)	1. Backlight On 2. Backlight Off 3. WeatherCubeOne Version 4. Shutdown WeatherCubeOne

WeatherCubeOne2 - Hardware Setup

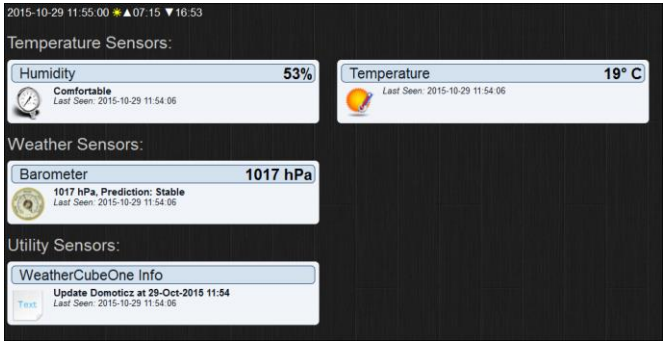


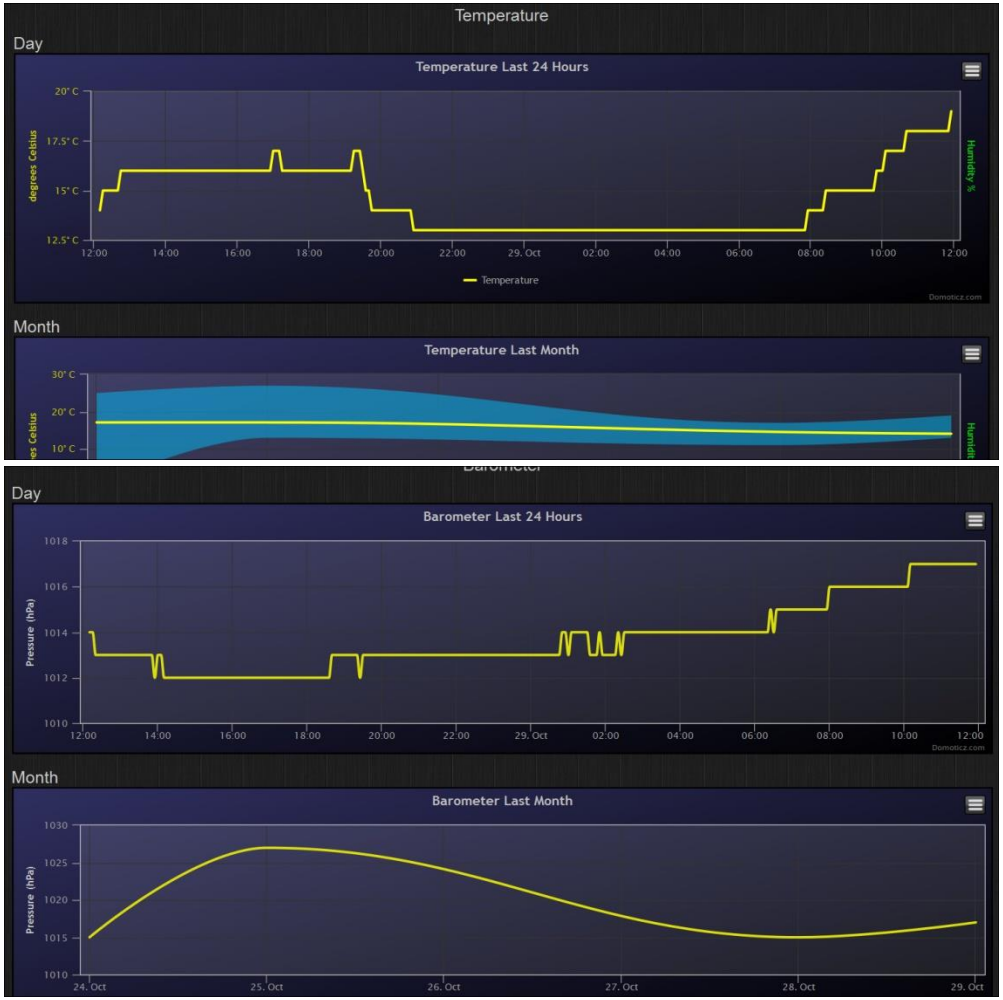
WeatherCubeOne2 - Processes

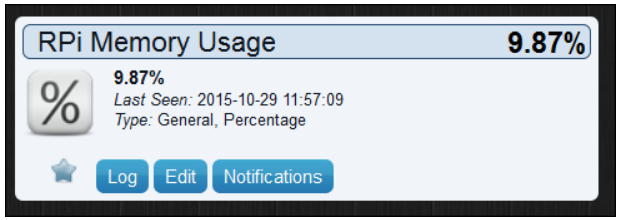


The B4J servers are Non-UI Applications

WeatherCubeOne2 - Domoticz Dashboard







Note: Just some graphs as an example.

WeatherCubeOne2 - Domoticz Devices

Idx	Hardware	ID	Unit	Name	Type	SubType	Data
1	Motherboard	0000044C	1	RPi Memory Usage	General	Percentage	19.31%
4	Motherboard	0001	1	RasPi CPU	Temp	TFA 30.3133	39.5 C
6	GPIO Port		18	GPIO18	Lighting 1	Impuls	Off
7	Virtual Devices	82006	1	TextDevice	General	Text	A very warm day
8	Virtual Devices	0014057	1	VirtualSwitch	Lighting 2	AC	Off, Level: 100 %
11	Virtual Devices	1405A	1	Humidity	Humidity	LaCrosse TX3	Humidity 66 %
12	Virtual Devices	1405B	1	Temperature	Temp	THR128/138, THC138	24.0 C
13	Virtual Devices	00082012	1	Barometer	General	Barometer	0.0 hPa
14	Virtual Devices	1405D	1	Weather	Temp + Humidity + Baro	THB1 - BTHR918, BTHGN129	24.0 C, 66 %, 1009 hPa
15	Virtual Devices	00082014	1	WeatherCubeOne Info	General	Text	Sensors updated (Interval=60000 ms).

Note: The Hardware devices with Idx 6,7,8 are not used and for test purposes only.

WeatherCubeOne2 - MQTT Topics

Subscribe	Publish
weathercubeone/airpressure	weathercubeone/backlighton
weathercubeone/timestamp	weathercubeone/backlightoff
weathercubeone/temperature	weathercubeone/clear
weathercubeone/humidity	weathercubeone/copyright
	weathercubeone/close
	weathercubeone/shutdown

Notes

There are additional topics available to direct subscribe or publish to the TinkerForge Master Brick or Bricklets.
The same applies for Domoticz.
To be able to use JSON is required.
Learn more from these references:

- TinkerForge Brick MQTT Proxy (http://www.tinkerforge.com/en/doc/Software/Brick_MQTT_Proxy.html)
- B4X MQTT Client Library(http://www.b4x.com/android/forum/threads/jmqtt-official-mqtt-client.59472)
- Domoticz MQTT (http://www.domoticz.com/wiki/MQTT)

WeatherCubeOne2 - MQTT Communication Example

B4J weathercubeone application – MQTT Topics received from the TinkerForge Broker

The Sub mqtt_MessageArrived (Topic As String, Payload() As Byte) handled the incoming messages holding the topic and the payloadstr.

```
'PayLoadStr = BytesToString(Payload, 0, Payload.Length, "utf8")
'Parse the payload string, holding timestamp  and value --- if not a command set by pressing one of the LCD buttons
TimeStampStr = Utils.ConvertUnixTimeStamp(Root.Get("_timestamp"))
mqtt.Publish(TopicWeatherCubeOneTimeStamp, TimeStampStr.GetBytes("UTF8"))
Temperature = Root.Get("temperature"); Temperature = Temperature / 100; TemperatureStr = Temperature & " °C"
mqtt.Publish(TopicWeatherCubeOneTemperature, TemperatureStr.GetBytes("UTF8"))
```

B4J weathercubeone application – MQTT Topics Send to Domoticz

```
'Build the payload which is Domoticz JSON API conform
PayLoadStr = "{""idx"":" & DomoticzTemperatureIdx & ", ""nvalue"":0, ""svalue"":""" & Temperature & """}"
'Publish the payload accordingly -  The topic domoticz in is defined as "domoticz/in" (see Domoticz JSON/API documentation)
mqtt.Publish(TopicDomoticzIn, PayLoadStr.GetBytes("UTF8"))
```

Domoticz Log – MQTT Topics received

```
2016-04-16 16:53:45.996 MQTT: Topic: domoticz/in, Message: {"idx":11, "nvalue":54, "svalue":"1"}
2016-04-16 16:53:46.105 MQTT: Topic: domoticz/in, Message: {"idx":15, "nvalue":0, "svalue":"Update Domoticz at 16-Apr-2016 16:53"}
2016-04-16 16:53:47.951 MQTT: Topic: domoticz/in, Message: {"idx":13, "nvalue":0, "svalue":";;;998;0"}
2016-04-16 16:53:48.058 MQTT: Topic: domoticz/in, Message: {"idx":15, "nvalue":0, "svalue":"Update Domoticz at 16-Apr-2016 16:53"}
```

WeatherCubeOne2 - Weather Data on Google Line Charts

Goal

Display Weather Data on Google Line Charts accessible via Webbrowser.

How

The process “weathercubeonegooglechart” is running on the Raspberry Pi to gather data by subscribing to MQTT messages. The data is converrted and displayed on line charts.

MQTT Subscribe

Tinkerforge Topic structure: tinkerforge/<prefix>/<uid>/<suffix>

tinkerforge/bricklet/barometer/jXZ/air_pressure

tinkerforge/bricklet/humidity/kcz/humidity

tinkerforge/bricklet/temperature/nfu/temperature

Access

Via Webbrowser http://NNN.NNN.N.N:51042

Settings

Various setting in file waethercubeonegooglechart.set.