

INTEL-IRRIS

Intelligent Irrigation System for Low-cost Autonomous Water Control
in Small-scale Agriculture



Intel-Irris



Intelligent Irrigation System for Low-cost Autonomous Water Control in Small-scale Agriculture



Building the INTEL-IRRIS LoRa IoT platform Part 4: the INTEL-IRRIS Irrigation WaziApp

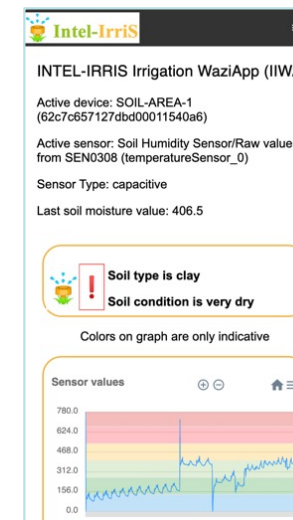


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INTEL-IRRIS Irrigation WaziApp

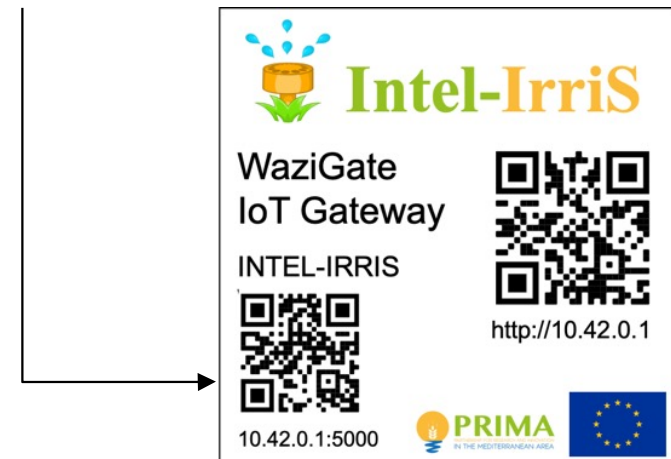
- ⦿ The INTEL-IRRIS Irrigation WaziApp (IIWA) is an embedded application running on the INTEL-IRRIS WaziGate itself
- ⦿ It is included in the starter-kit to implement the "intelligent Irrigation in-the-box" & "plug-&-sense" approach
- ⦿ Its objective is to enhance the irrigation indication by applying sensor calibration models with soil/plant/weather parameters



Connect to IIWA

- ④ First, connect to INTEL-IRRIS WaziGate WiFi which should look like WAZIGATE_XXXXXXXXXXXX
 - ④ Password is loragateway
- ④ Otherwise, with the OLED screen, a QR code for automatically joining the WiFi network is periodically displayed for 10s
 - ④ scan the displayed QR code with a smartphone to connect to WaziGate's WiFi
- ④ Then, scan the static QR code on the WaziGate sticker to connect to the INTEL-IRRIS Irrigation WaziApp on : <http://10.42.0.1:5000>

WAZIGATE_DCA6325C2A7A




IIWA main screens

Dashboard, Device Manager and Sensor Configuration

Dashboard →

Device Manager →

Sensor Configuration →



Menu


INTEL-IRRIS Irrigation WaziApp (IIWA)

Active device: SOIL-AREA-1
(6314f8f4127dbd00018b0f01)

Active sensor: Soil Humidity Sensor/Raw value
from SEN0308 (temperatureSensor_0)


Sensor Type: undefined

Last soil moisture value: 398.5



Soil type is undefined
Soil condition is undefined

Colors on graph are only indicative



IIWA Device Manager

List of devices added to IIWA.

Devices added to IIWA


DEVICE ID	DEVICE NAME	SENSORS

Active device determines sensors values
visualization and data source for humidity index
value computation.

Select an active device and sensor

Active device: **none**. Select from list

Active sensor: **none**. Select from list for
Dashboard & humidity index value
computation



IIWA Sensor Configuration

No sensor configuration has been made!

Active Device: SOIL-AREA-1
(6314f8f4127dbd00018b0f01)

Active Sensor: Soil Humidity Sensor/Raw value
from SEN0308 (temperatureSensor_0)

Settings for sensor configuration

Select a sensor to view its current configuration
and update its parameters

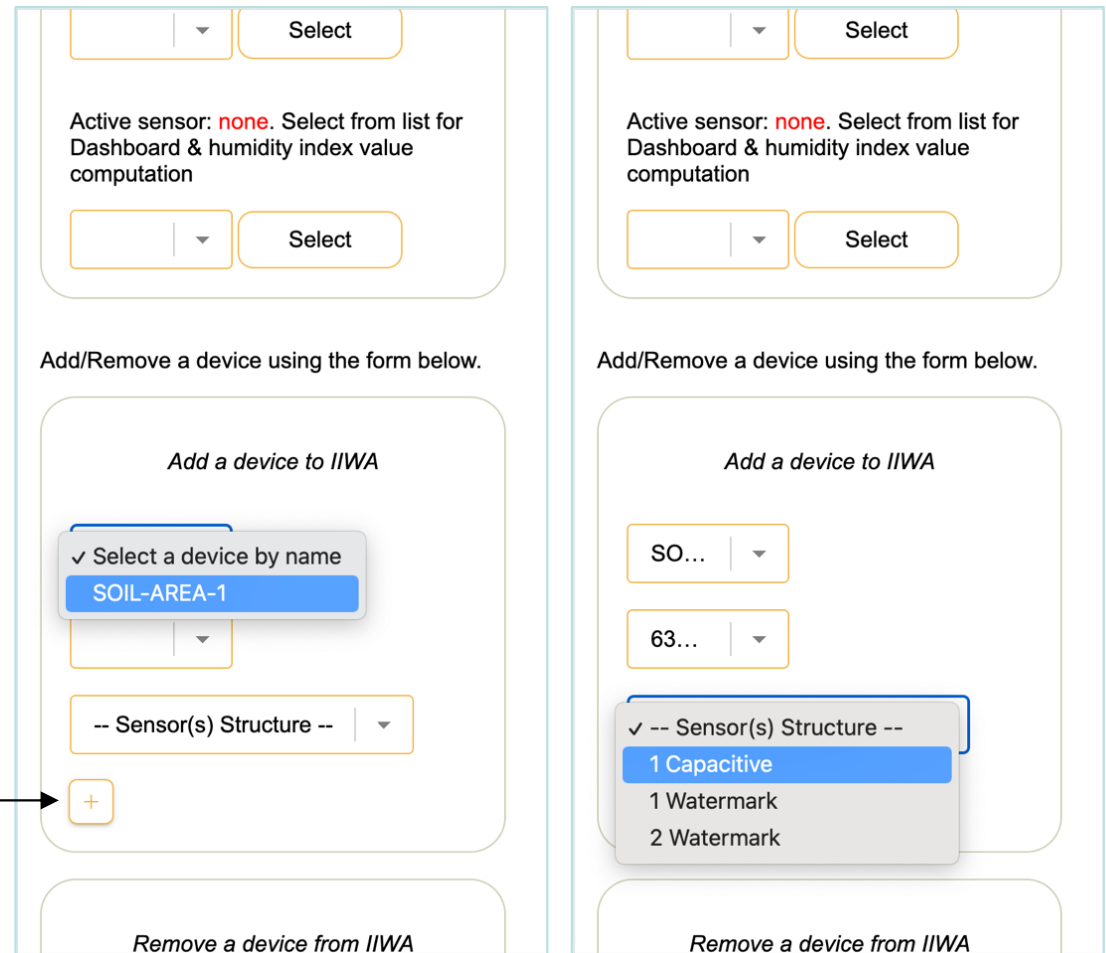
☒ Soil Humidity Sensor/Raw value from SEN0308
(temperatureSensor_0)

Update configurations

Sensor Type is the only
mandatory parameter to
be filled, other
parameters can be left
undefined

Add a device to IIWA

- IIWA only monitors devices that are added to the IIWA application
- By default, there is no device associated to IIWA
- Go to Device Manager to add the default capacitive sensor device
- The device name is SOIL-AREA-1
- Select "1 Capacitive" as sensor structure
- Click on "+" icon



Active sensor: **none**. Select from list for Dashboard & humidity index value computation

Select

Select

Add/Remove a device using the form below.

Add a device to IIWA

✓ Select a device by name
SOIL-AREA-1

-- Sensor(s) Structure --

+

Remove a device from IIWA

Active sensor: **none**. Select from list for Dashboard & humidity index value computation

Select

Select

Add/Remove a device using the form below.

Add a device to IIWA

SO...

63...

✓ -- Sensor(s) Structure --
1 Capacitive
1 Watermark
2 Watermark

Remove a device from IIWA

Select the active device

- ⦿ The list of added device is updated
- ⦿ Then, an active device/sensor pair must be selected for sensor configuration
- ⦿ Normally the newly added device is selected as active
- ⦿ Select temperatureSensor_0 for the active sensor



Active sensor is "none", so we need to select a sensor

Select an active device and sensor

Active device: **SOIL-AREA-1** (6314f8f4127dbd00018b0f01). Select from list

63... | ▾ | Select

Active sensor: **none**. Select from list for Dashboard & humidity index value computation

☒ temperatureSensor_0
☐ analogInput_6

Select an active device and sensor

Active device: **SOIL-AREA-1** (6314f8f4127dbd00018b0f01). Select from list

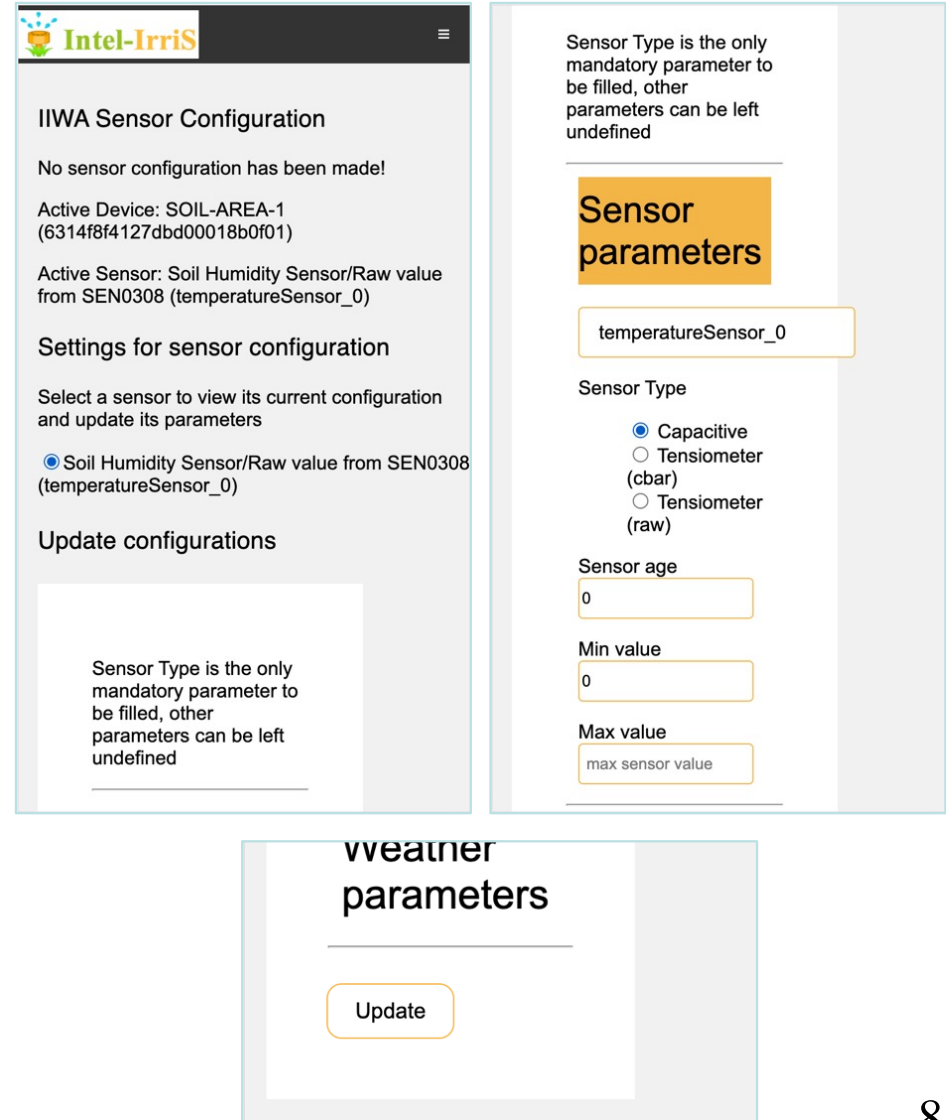
63... | ▾ | Select

Active sensor: **Soil Humidity Sensor/Raw value from SEN0308** (temperatureSensor_0). Select from list for Dashboard & humidity index value computation

te... | ▾ | Select

Sensor configuration

- ④ To enable IIWA to calibrate the sensor, the minimum information is to provide the sensor type
- ④ Go to Sensor Configuration and select the Soil Humidity Sensor
- ④ Then, open "Sensor Parameter" tab and select "Capacitive"
- ④ Scroll to the bottom and click on "Update"



The screenshot shows the 'IIWA Sensor Configuration' page. It displays the active device (SOIL-AREA-1) and the active sensor (Soil Humidity Sensor/Raw value from SEN0308). The 'Settings for sensor configuration' section shows the selected sensor type as 'Soil Humidity Sensor/Raw value from SEN0308 (temperatureSensor_0)'. The 'Update configurations' button is visible at the bottom.

Sensor parameters

temperatureSensor_0

Sensor Type

- ☒ Capacitive
- ☐ Tensiometer (cbar)
- ☐ Tensiometer (raw)

Sensor age

0

Min value

0

Max value

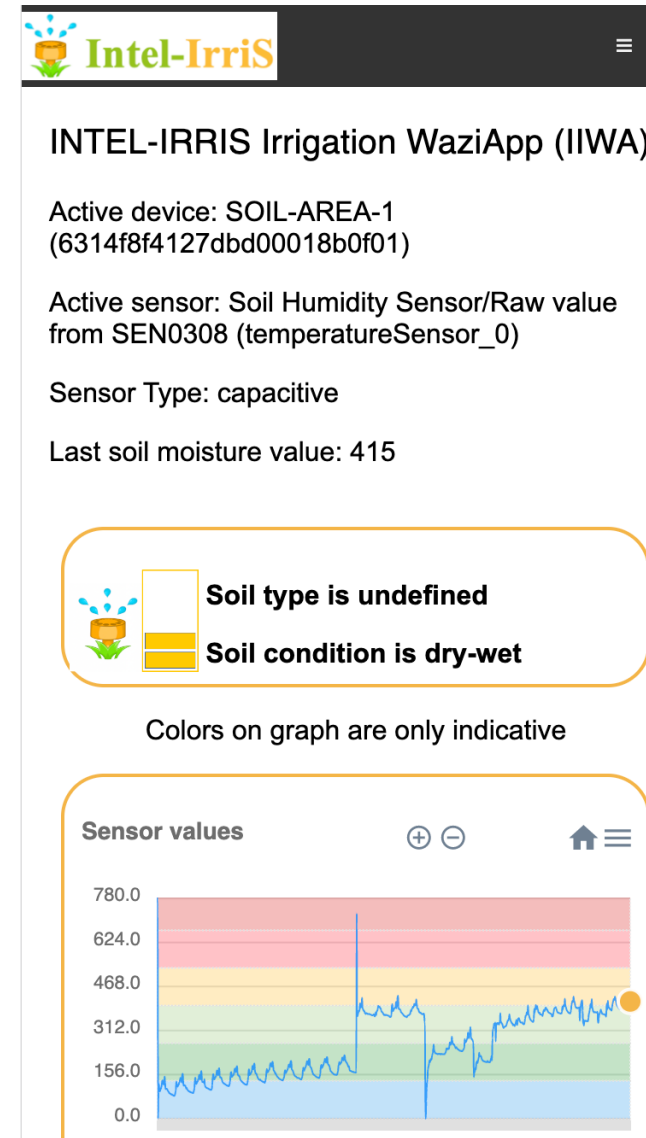
max sensor value

weather parameters

Update

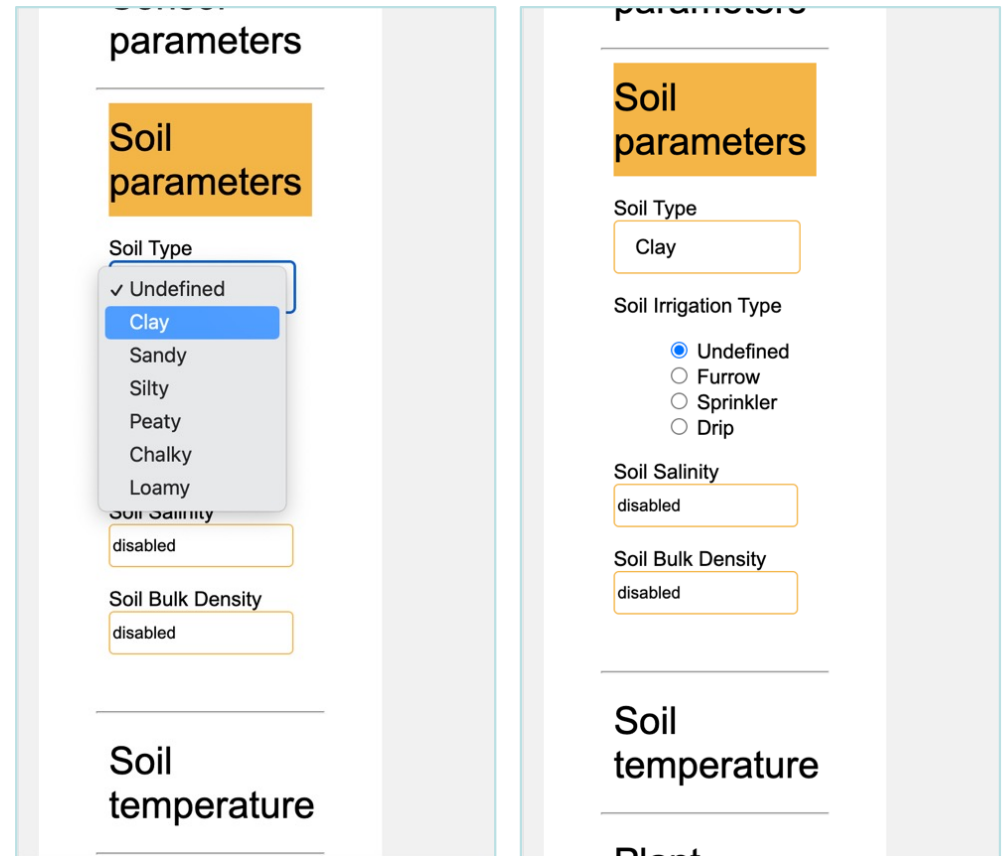
IIWA dashboard

- Now that a device/sensor pair has been defined, IIWA dashboard can display information for the active sensor
- The soil type, and other parameters, are still undefined therefore IIWA takes the default value to determine irrigation conditions
- The "dry-wet" indication in this example not correct



Advanced configuration

- ⦿ We will configure soil type to better reflect the reality
- ⦿ Go back to Sensor Configuration and select the Soil Humidity Sensor
- ⦿ Here, we go to "Soil Parameter" tab and select "Clay" as soil type
- ⦿ This is the soil type where the sensor is installed for this example
- ⦿ Don't forget to click on "Update"



parameters

Soil parameters

Soil Type

- ✓ Undefined
- Clay
- Sandy
- Silty
- Peaty
- Chalky
- Loamy

Soil Salinity

disabled

Soil Bulk Density

disabled

Soil temperature

parameters

Soil parameters

Soil Type

Clay

Soil Irrigation Type

- ⦿ Undefined
- Furrow
- Sprinkler
- Drip

Soil Salinity

disabled

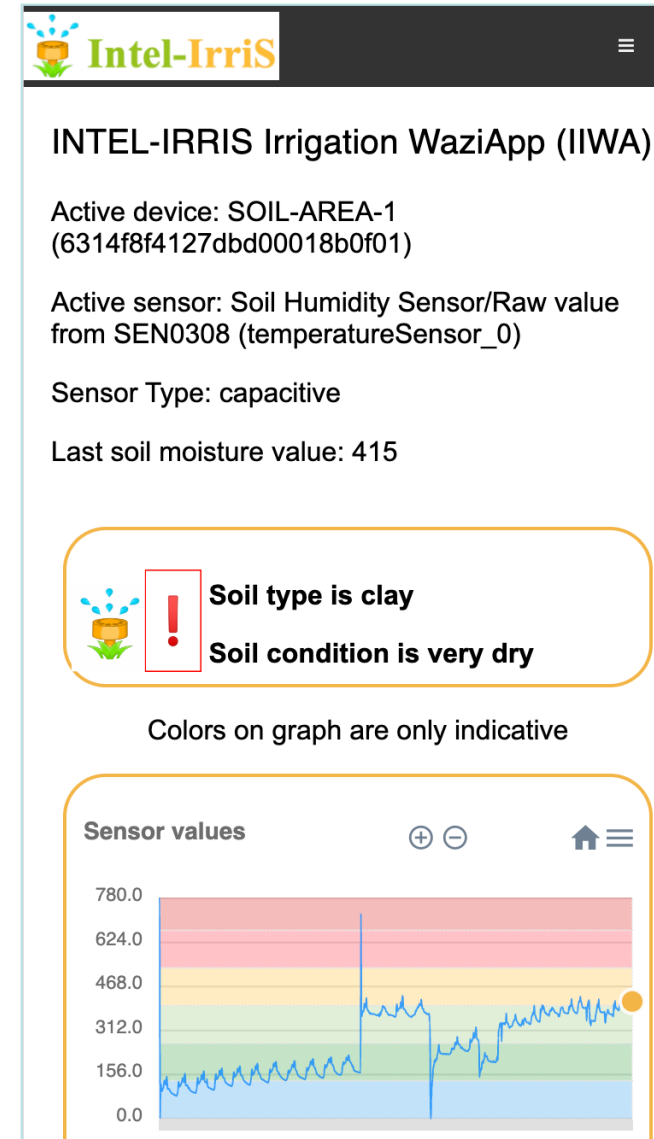
Soil Bulk Density

disabled

Soil temperature

Get back to the dashboard

- When getting back to the dashboard, the irrigation indication has been corrected by taking into account the soil type
- The soil condition is reported to be "very dry" which is the case in the deployment example used for this tutorial
- More parameters will be integrated in IIWA during the INTEL-IRRIS project



List of advanced parameters

Sensor parameters

temperatureSensor_0

Sensor Type

☒ Capacitive
☐ Tensiometer (cbar)
☐ Tensiometer (raw)

Sensor age

0

Min value

0

Max value

800

Soil parameters

Soil parameters

Soil Type

Clay

Soil Irrigation Type

☒ Undefined
☐ Furrow
☐ Sprinkler
☐ Drip

Soil Salinity

disabled

Soil Bulk Density

disabled

Soil temperature

Please select a source for soil temperature data

☐ user input
☐ real sensor

enter temperature

Enter device id

enter device id

Enter sensor id

enter sensor id

Plant parameters

Plant/Crop

Undefined

Plant Sub-Type

Undefined

Planting Date

jj/mm/aaaa

Weather parameters

Region

Undefined

Update

Indication on the OLED screen

- IIWA monitors devices that are added to the IIWA application and **only** process sensor data from sensors that have been **configured** – i.e. at least the sensor type must be selected

- When the device/sensor has been properly configured then "IIWA" text is shown on the summary screen associated to the device
- If the irrigation indication computed by IIWA is older than the received time of the last value from the device then "IIWA" text will not show anymore, indicating that the irrigation indication may not be accurate



IIWA is active.
Irrigation indication
"très sec" (very dry)
reflects the soil
condition



IIWA is NOT active.
Irrigation indication
"sec-hum" (dry-wet)
does not reflect
correctly the soil
condition as sensor
type and soil type are
not taken into account

- This can happen if IIWA application is not running for some reasons. In this case, try to reboot the INTEL-IRRIS WaziGate **if you are sure that device/sensor configuration has been performed properly**