

# Lesson 12

## Internet Connected Agriculture (Irrigation) Monitoring Service

# Agriculture (Irrigation) Monitoring Service

- Uses of soil moisture sensors
- Actuators for water channels,
- WSNs, LPWAN, access points,

## Two applications

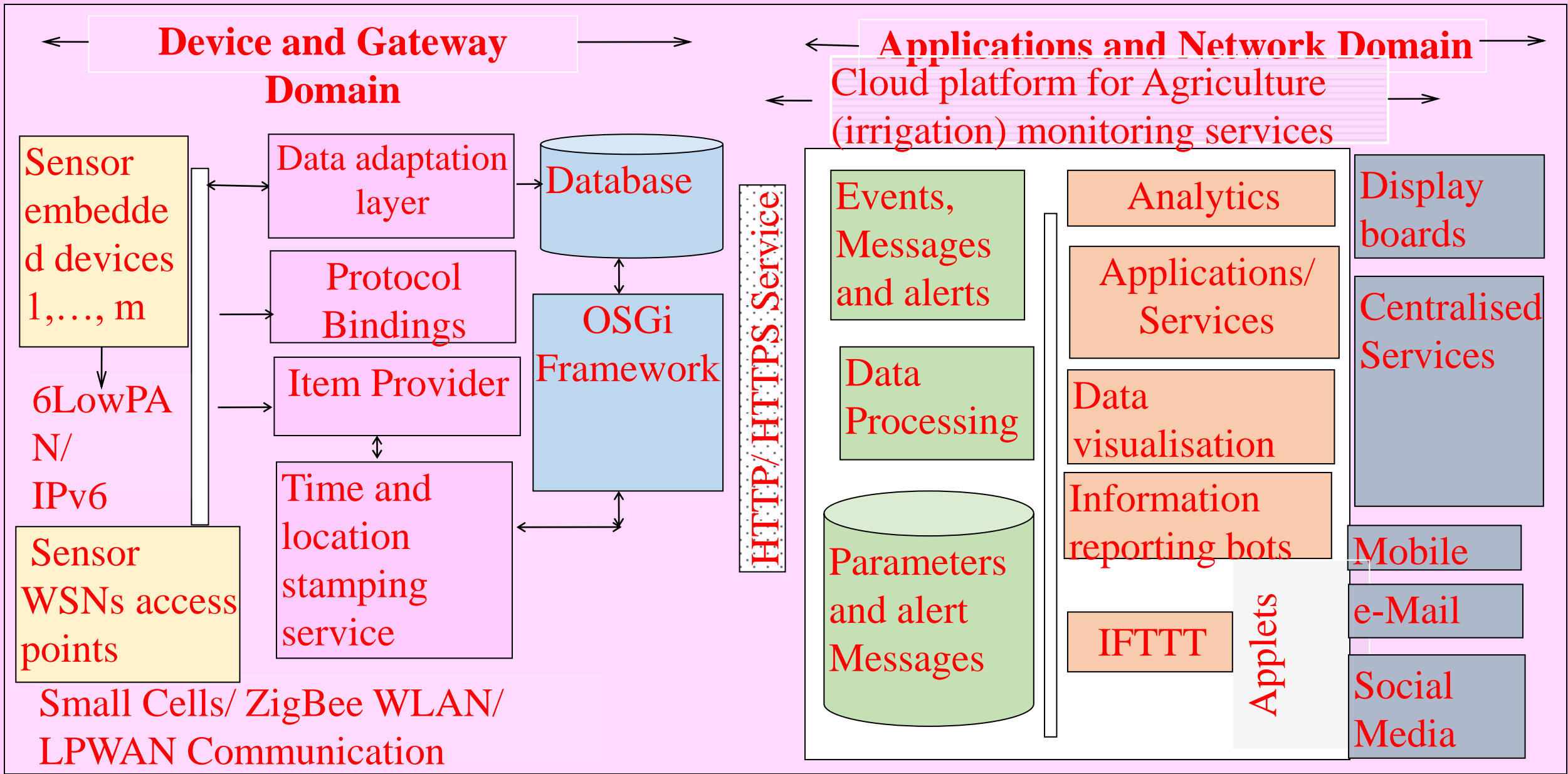
- Gateway and cloud platform for smart Irrigation irrigation in crop fields
- Wine quality enhancing

# Agriculture (Irrigation) Monitoring Service

- Uses sensors placed at three depths for monitoring of moisture in fruit plants such as vineyard or mango, and monitors evapo-transpiration (evaporation and transpiration)
- Measures and monitors actual absorption and irrigation water needs

# Agriculture (Irrigation) Monitoring Service

- Each sensor board is in a waterproof cover
- Each communicates to an access point using ZigBee protocol. An array of sensor circuits forms a WSN.



2017 **Fig. 12.12 Data flow diagram for the WSNs based monitoring services**

# Agriculture (Irrigation) Monitoring Service Steps

- Access point receives the data and transfers it to an associated gateway
- Data adapts at the gateway and then communicate to a cloud platform using LPWAN

# Agriculture (Irrigation) Monitoring Service Steps

- The cloud platform may such as Nimbits, my.openHAB, AWS or Bluemix.
- Analytics at the platform analyses the moisture data and communicate to the actuators of water irrigation channels as per the water needs and past historical data

# Agriculture (Irrigation) Monitoring Service

- Measurements at the sensors at preset intervals and actuators activate at analysed required values of the intervals
- The platform uploads the programs to sensors and actuators circuitry and sets preset measurement intervals of  $T_1$  (say, 24 hour) each and the preset actuation interval of  $t_2$  (say, on 120 hour)



# Agriculture (Irrigation) Monitoring Service

- Sensed moisture values when exceed preset thresholds then triggers the alarm
- An algorithm uploads and updates the programs for the gateways and nodes.
- Runs at the data-adaptation layer and finds the faulty or inaccessible moisture
- sensors at periodic intervals
- Open source SDK and IDE used for prototyping the monitoring system.

# Smart Wine Quality Enhancing

- The sensors monitor the soil moisture and trunk diameter in vineyards
- The monitoring controls the sugar content in grapes and health of grapevines



# Summary

## We learnt

- Smart irrigation deploys sensors for moisture at a depth in the crop fields and actuators for watering channels

# Summary

## We learnt

- Smart quality monitoring deploys sensors placed at three depths for monitoring of moisture in fruit plants such as vineyard or mango, and monitors evaporation and transpiration.
- Smart irrigation controls deficiencies in moisture levels above thresholds during a given crop-period

# End of Lesson 12 on Internet Connected Agriculture (Irrigation) Monitoring Service