Automatic Irrigation System (AIS)

**Irrigation Service (IS):** A microservice, that serve UI to create a plot of land and a time slot for its irrigation. It will store all plots/slots information in database. Also, it will configure the plots and save the status after irrigation. It’s a backend software component of AIS.

**Out of scope:**

1. Interface to direct sensor device to start irrigation
2. Sensor device installation
3. Alerting service

**APIs in IS:**

Resource: crops

Create a crop: POST /irr/api/v1/crops

Edit/Configure a crop: PUT /irr/api/v1/crops

Get a crop: GET /irr/api/v1/crops/{cropId}

Get all crops: GET /irr/api/v1/crops

Delete a crop: DELETE /irr/api/v1/crops/{cropId}

Resource: plots

Create a plot: POST /irr/api/v1/plots

Edit/Configure a plot: PUT /irr/api/v1/plots

Get a plot: GET /irr/api/v1/plots/{plotId}

Get all plots: GET /irr/api/v1/plots

Delete a plot: DELETE /irr/api/v1/plots/{plotId}

Calculate amount of water for the plot: GET /irri/api/v1/plots/water-amount-ltr/2001

Resource: slots

Create a time slot: POST /irr/api/v1/ slots

Edit/Configure a slot: PUT /irr/api/v1/slots

Get a slot: GET /irr/api/v1/slots /{slotId}

Get all slots: Get /irr/api/v1/slots

Delete a slot: DELETE /irr/api/v1/slots /{slotId}

**Configuration for Crops:**

Crop: Paddy, cultivation period: 180 days, irrigation gap: 30 days.

Crop: Wheat, cultivation period: 180 days, irrigation gap: 60 days.

Formula: water\_amount\_ltr = area\_sqmtr\*10

**Database tables:** Chose SQL DB because all data is transactional. For this assignment using in-memory H2 database.

ER Diagram:

Diagram

Description automatically generated with low confidence

Name: crop

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Type** | **Mandatory** | **Description** |
| crop\_id | PK (generated) | Y |  |
| name | text | Y |  |
| cultivation\_period\_days | number | N |  |
| irrigation\_gap\_days | number | Y |  |

Name: plot

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Type** | **Mandatory** | **Description** |
| plot\_id | PK (generated) | Y |  |
| name | text | Y |  |
| area\_sqrmtr | number | Y |  |
| crop\_id | text | N |  |
| cultivation\_start\_date | datetime | N |  |

Name: slot

|  |  |  |  |
| --- | --- | --- | --- |
| **Field** | **Type** | **Mandatory** | **Description** |
| slot\_id | PK (generated) | Y |  |
| name | text | N |  |
| start\_time | datetime | Y |  |
| end\_time | datetime | N |  |
| water\_amount\_ltr | number | Y |  |
| irrigation\_status | text | Y | Created/Started/Running/Completed |
| plot\_id | FK | N |  |

**Important design patterns used in this spring boot application:**

1. Singleton pattern
2. Factory Method pattern
3. Proxy pattern
4. Template pattern

**Repository link:**

<https://github.com/Alam-Nagarro/irrigation-service>