

# Aqu-Scape

## 1. Introduction

Aqu-Scape is an online tool that helps aquarists to design their aquarium layouts. It allows user to select dimensions of the aquarium and then place variable sized plants, stones and tree branches and roots into the aquarium. The software will have a database where plant information is stored (scientific name, light requirement, height and perimeter of the plant). The tool will allow placing objects on top of another but will note that if a plant with high light requirement would be shaded by another taller plant.

There is an existing tool that allows user to pick plants and tell if their water requirements are compatible (temperature, pH and dH). Once user is done selecting the plants, he or she can design the layout of the tank using this new tool (all the selected plants will be passed as a url parameter to the new service).

## 2. Design and Implementation

### 2.1 The REST API Specification

TITLE	Fetch plants
URL	/plants
Method	GET
URL Parameters	None
Success Response	Code: 200  Content:  [{"_id":"57de6c47ba9681f980b23644","identificationNumber":1,"tempMax":26,"tempMin":23,"dhMax":12,"phMax":7.5,"phMin":5.8,"height":10,"diameter":15,"finnishName":"Kiharakriinumi","scientificName":"Crinum calamistratum","__v":0,"dhMin":2}]
Notes	This is actually used by Aqu-Choice service to fetch full plant data

TITLE	Fetch plants lite
URL	/plants/lite
Method	GET
URL Parameters	None

Success Response	Code: 200  Content:  [{"scientificName":"Crinum calamistratum","diameter":15,"height":10,"identificationNumber":1}]
Notes	This is used by Aqu-Scape to fetch required information about the plants for drawing.

## 2.2 Front-end Architecture Design

Both mobile and browser applications will be using npm for dependency management and git for version control.

### 2.2.3 Browser

Browser side will actually be implement using newly released Angular2 with TypeScript. Gulp will be used as a build tool and canvas related functionality will be handled using PaperJS. Styles will be handled without Bootstrap using simple css.

### 2.2.4 Mobile

Mobile will be using Ionic framework with AngularJS to implement the hybrid application. PaperJS will be used to implement the canvas tools and drawing.

## 2.3 Database Schemas, Design and Structure

There will be a single collection for plants. Its schema is as follows:

- identificationNumber: { type: Number, unique: true, required: true }
- scientificName: { type: String, required: true, unique: true },
- finnishName: { type: String, unique: true },
- diameter: { type: Number, required: true },
- height: { type: Number, required: true },
- tempMin: { type: Number, required: true },
- tempMax: { type: Number, required: true },
- phMin: { type: Number, required: true },
- phMax: { type: Number, required: true },
- dhMin: { type: Number, required: true, default: 0},
- dhMax: { type: Number, required: true }

Note that the aqu-scape tool does not require all of these values

## 2.4 Communication

On browser side, the plants to use for aquascaping will be transferred to Aqu-Scape by Aqu-choice as URL parameters (using identificationNumber). The serverside will be queried for all plants anyway by Aqu-Scape, but the plants will be filtered browser side by their identification numbers.

On mobile side, the server side will be queried for plant data and no other communications will be done.

Both mobile and browser side will be using CORS for communication with the server side, so appropriate headers will be provided by the server. Since we are only querying server for the data and there are no user profiles, no authentication and authorization strategies are required.

### 3. Conclusions

While the structure and communication of the project will be reasonably straightforward to implement, the real challenge is to provide a good enough drawing tools that it will actually be useful for aquascapers.

It is still worth considering if this kind of canvas-using tool will be useful on the mobile side and the hybrid nature of ionic can provide robust enough experience. Barring that , alternate strategy is to just implement Aqu-Choice as a bit stripped mobile application.

### 4. References

[Aqu-Choice](#) is a online tool for selecting aquarium plants that will be used with Aqu-Scape (currently written for finnish users only) . It will be modified to transfer the chosen plants to the new tool. Mobile application, however, will be a standalone.