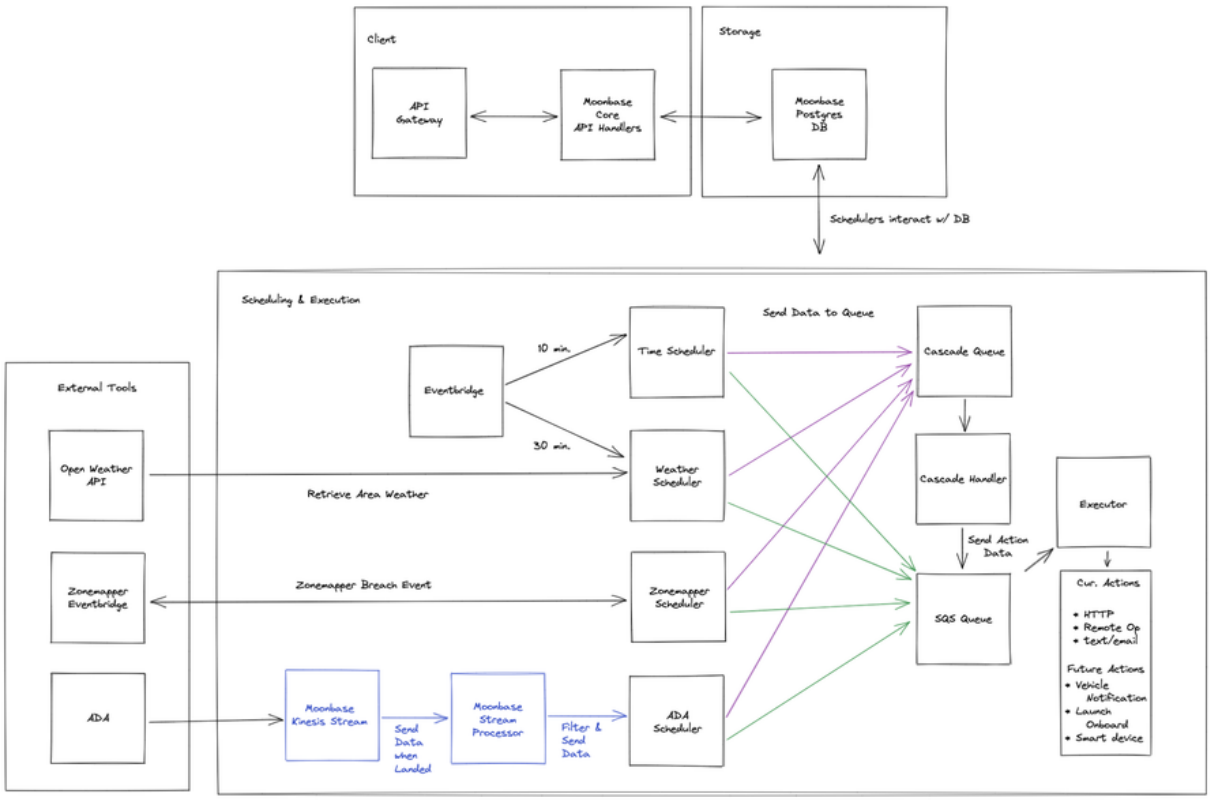
Moonbase Mission Specs - How it Works

Moonbase Terminology

To understand how Moonbase works, it's best to start with learning the terminology that we've created. Below is a list of the most used terms as well as examples of how they're represented.

- Triggers - The triggers of Moonbase are preconditions that users may use to "trigger" some type of action to occur. So far we support the following triggers: time, weather, Zonemapper (another Connected Services technology), and sensor values using ADA.
- Actions - Actions are tasks that a user wants to occur when a trigger's precondition is met. So far we support the following actions: SMS message, email, HTTP request, and remote vehicle operations.
- Sequences - A sequence is a user created trigger and action combination. It runs as a sequence of events as for an action to occur, the trigger preconditions must be met. A sequence can hold multiple triggers and multiple actions. In other words, multiple preconditions could need to be met in order for multiple actions to run.
- Schedulers - The schedulers of Moonbase check to see if trigger preconditions are met. Right now there are four of them to compliment the four triggers we currently support. In AWS, the Schedulers are made up of multiple Lambda functions, one for each trigger.
- Executor - The executor is responsible for running the actions of sequences that are ready to run. There is only a need for one executor. In AWS, the Executor is a Lambda function.
- Cascade - Cascading in Moonbase is the notion of using multiple triggers as a precondition in a sequence.

Moonbase Architecture



The Moonbase architecture diagram is continuously changing as new features are added. The above diagram is accurate as of December 21, 2022. Let’s break it down.

Moonbase Core API

To interface with Moonbase, one must use its API. The API is responsible for handling user requests to created, update, and delete sequences. The sequences are then stored behind the scenes in a AWS hosted PostgreSQL database.

Schedulers

There are four different schedulers, one for each trigger type. As such, they all behave in a slightly different way.

Time Scheduler

The time scheduler runs every ten minutes using an Eventbridge rule to run it. It then retrieves all sequences with a time trigger as the first trigger in a sequence and checks to see if it’s ready to be scheduled to run. This works by sending a delayed message to the executors through one of the queues.

Weather Scheduler

The weather scheduler runs every thirty minutes using an Eventbridge rule much like the time scheduler. It too searches for the weather events. However, it also makes an api request for the latitude and longitude of the vins needed for the following weather report in any vin’s given area. It will then send a message to one of the executors through one of the queues.

Zonemapper Scheduler

The Zonemapper Scheduler integrates with the other Connected Service’s effort of the same name. It works utilizing the events that Zonemapper creates to know when to send a message to the executors.

ADA Scheduler

The ADA scheduler utilizes the Kinesis stream generated by creating a policy through the ADA web app. Any vin that has the Moonbase feature attached has the potential to use this feature. It works by checking the sensor values retrieved from the vehicle against the values provided through the sequence.

Executors

Once a message is sent through a queue from the schedulers, it will arrive in one of two places. If a scheduler’s precondition is met, it will check if there are remaining triggers that need to be checked. In the case that there are, a message will be sent to the Cascade Handler which handles checking further trigger conditions through API requests. Lastly, if there are no remaining triggers in any of the schedulers, or the Cascade Handler has finished, a message will be sent through to the Executor. This Executor is responsible for performing the actions described in a sequence.