

EcoPRT Database Schema

*All Object IDs are created by MongoDB and are hexadecimal which are made of:

- a 4-byte value representing the seconds since the Unix epoch,
- a 3-byte machine identifier,
- a 2-byte process id, and
- a 3-byte counter, starting with a random value.

(see [MongoDB documentation](#)) *

* Tables are called Collections in MongoDB *

** If there is a row with a strikethrough, then it is not in the current database, but may be used in the future **

Users Collection (if one device per user)

Collection Name: Users

Field Name	Format	Description
<u>_id</u>	ObjectID	<ul style="list-style-type: none">• Unique identifier for the user. Auto generated.• For this Collection it's shown as _id, but in other Collections it called userID
username	String	<ul style="list-style-type: none">• Screen name chosen by the user. Unique (or not?).
hash	String	<ul style="list-style-type: none">• SHA512 hash of password + salt
salt	String	<ul style="list-style-type: none">• Randomly generated string that gets concatenated to the password before the password is hashed.
email	String	<ul style="list-style-type: none">• Email the user gives types in the field when creating an account
lowercaseEmail	String	<ul style="list-style-type: none">• When an email is entered, it will be changed to all lowercase just in case a user enters a capital somewhere• This is what is checked when a user is logging in.• Does it so that all emails are the same format.
firstName	String	<ul style="list-style-type: none">• First Name of the user that has created an account
lastName	String	<ul style="list-style-type: none">• Last Name of the user that has created an account

birthday	Date	<ul style="list-style-type: none"> • Birthday of the user • Represented as milliseconds in the database • Front end will take mm/dd/yyyy • This will be used to keep track of how old users are that way underage users aren't making accounts
userType	Number	<ul style="list-style-type: none"> • 0 for admin • 1 for normal user

Password/Authentication Token Collection (if one user can log into multiple devices)

Collection Name: AuthTokens

Field Name	Format	Description
userID	ObjectID	<ul style="list-style-type: none"> • Unique identifier for the user.
authToken	String	<ul style="list-style-type: none"> • Random string of letters and numbers

Vehicles Collection

Collection Name: Vehicles

Field Name	Format	Description
_id	ObjectID	<ul style="list-style-type: none"> • Unique identifier for the vehicle. Auto generated.
name	String	<ul style="list-style-type: none"> • Name of the vehicle
enabled	Boolean	<ul style="list-style-type: none"> • False - vehicle should cease operation and not be assigned to rides • True - vehicle can do normal behavior (drive on edges, pick up passengers, go on rides)
batteryLife	Number	<ul style="list-style-type: none"> • Current Battery life of the vehicle. • Represented as a percentage
coordinates	Array of Numbers	<ul style="list-style-type: none"> • Location of the vehicle. • Represented as Latitude and Longitude. <ul style="list-style-type: none"> ◦ Decimal Numbers ◦ Length of 2

steeringAngle	Number	<ul style="list-style-type: none"> Angle the wheels are facing Represented as radians
headingAngle	Number	<ul style="list-style-type: none"> Angle the vehicle is facing Represented as radians
speed	Number	<ul style="list-style-type: none"> Current speed of the vehicle Represented as mph (for now)
rideID	ObjectID	<ul style="list-style-type: none"> What ride the vehicle is currently doing
edgeID	ObjectID	<ul style="list-style-type: none"> What edge the vehicle is currently on
rideQueue	Array of rideIDs	<ul style="list-style-type: none"> List of rides that are queued up for this vehicle

Vehicle History Collection

Collection Name: vehiclesHistory

Field Name	Format	Description
_id	ObjectID	<ul style="list-style-type: none"> Unique identifier for the vehicle history entry.
vehicleID	ObjectID	<ul style="list-style-type: none"> ID of the vehicle whose history this is for
batteryLife	Number	<ul style="list-style-type: none"> Current Battery life of the vehicle. Represented as a percentage
coordinates	Array of Numbers	<ul style="list-style-type: none"> Location of the vehicle. Represented as Latitude and Longitude. <ul style="list-style-type: none"> Decimal Numbers Length of 2
steeringAngle	Number	<ul style="list-style-type: none"> Angle the wheels are facing Represented as radians
headingAngle	Number	<ul style="list-style-type: none"> Angle the vehicle is facing Represented as radians
speed	Number	<ul style="list-style-type: none"> Current speed of the vehicle Represented as mph (for now)
rideID	ObjectID	<ul style="list-style-type: none"> What ride the vehicle is currently doing
edgeID	ObjectID	<ul style="list-style-type: none"> What edge the vehicle is currently on

rideQueue	Array of edgeIDs	<ul style="list-style-type: none"> List of rides that are queued up for this vehicle
goal	Number	<ul style="list-style-type: none"> Different tasks or statuses for the vehicle <ul style="list-style-type: none"> On Off Stopped Idle Ride in Progress Has Passengers vehicle is moving
isOn	Boolean	<ul style="list-style-type: none"> Whether the vehicle is on or off. <ul style="list-style-type: none"> True if On False is Off

Edge Collection

Collection Name: Edges

Field Name	Format	Description
_id	Object ID	<ul style="list-style-type: none"> Unique identifier for an edge. Auto generated
startingNode	ObjectID	<ul style="list-style-type: none"> First node of the edge (should refer to item in Node Collection)
endingNode	ObjectID	<ul style="list-style-type: none"> Last node of the edge (should refer to item in Node Collection)
distance	Number	<ul style="list-style-type: none"> How long the edge is between two nodes. Represented in miles
waypoints	Array of Waypoints	<ul style="list-style-type: none"> All the points that represent an edge. A waypoint Includes: <ul style="list-style-type: none"> Coordinates Speed Steering angle Heading angle Timestamp Tick Actuator Motor Control Flag Motor Throttle Format and description of waypoint in another

		Collection
--	--	------------

Waypoint (not an actual collection in the database)

<i>coordinates</i>	<i>Array of Numbers</i>	<ul style="list-style-type: none"> • <i>Location of the waypoint</i> • <i>Represented as Latitude and Longitude</i> <ul style="list-style-type: none"> ◦ <i>Decimal number</i> ◦ <i>Length of 2</i>
<i>speed</i>	<i>Number</i>	<ul style="list-style-type: none"> • <i>Speed of the vehicle when it reaches this point</i> • <i>Represented as mph (as of now)</i>
<i>steeringAngle</i>	<i>Number</i>	<ul style="list-style-type: none"> • <i>Angle of the vehicle's wheels when it reaches this waypoint</i> • <i>Represented as radians</i>
<i>headingAngle</i>	<i>Number</i>	<ul style="list-style-type: none"> • <i>Angle the vehicle is facing when it reaches this waypoint</i> • <i>Represented as radians</i>
<i>timeStamp</i>	<i>Date</i>	<ul style="list-style-type: none"> • <i>Date and time the vehicle reached the waypoint</i>
<i>tick</i>	<i>Number</i>	<ul style="list-style-type: none"> • <i>Index of the waypoint on the edge that the vehicle has arrived at.</i> • <i>Will get higher as you go to a new waypoint</i>
<i>actuator</i>	<i>Bytes</i>	<ul style="list-style-type: none"> • <i>Array of 3 numbers</i> • <i>3 bytes stored as numbers in database</i>
<i>motorControlFlags</i>	<i>Int8</i>	<ul style="list-style-type: none"> • <i>8 boolean values representing a bit</i>
<i>motorThrottle</i>	<i>Byte</i>	

Node Collection

Collection Name: Nodes

Field Name	Format	Description
<i>_id</i>	<i>ObjectID</i>	<ul style="list-style-type: none"> • <i>Unique identifier for a node. Auto generated</i>
<i>coordinates</i>	<i>Array of Numbers</i>	<ul style="list-style-type: none"> • <i>Location of the node</i> • <i>Represented as Latitude and Longitude</i> <ul style="list-style-type: none"> ◦ <i>Decimal numbers</i> ◦ <i>Length of 2</i>

name	String	<ul style="list-style-type: none"> Name of the node (optional)
type	Number	<ul style="list-style-type: none"> What type of node this is <ul style="list-style-type: none"> 0: pickup station 1: charging station 2: docking station 3: not a station/just a node
stationInfo		Has certain things depending on what type of station it is.

Rides Collection

Collection Name: Rides

Field Name	Format	Description
_id	ObjectID	<ul style="list-style-type: none"> Unique identifier for a ride. Auto generated
vehicleID	ObjectID	<ul style="list-style-type: none"> Vehicle that picks up the passengers and is doing the ride
userID	ObjectID	<ul style="list-style-type: none"> ID of the user(s) that is/are in the ride
startingNode	ObjectID	<ul style="list-style-type: none"> Node that the vehicle is starting the ride from
endingNode	ObjectID	<ul style="list-style-type: none"> Node that the vehicle will stop at
pickupNode	ObjectID	<ul style="list-style-type: none"> Node that the user will be picked up from by the vehicle
dropoffNode	ObjectID	<ul style="list-style-type: none"> Node that the user will be dropped off at by the vehicle
passengerCoordinates	Array of Numbers	<ul style="list-style-type: none"> Location of the user who requested a ride Represented as longitude and latitude Decimal number Length of 2
numberOfPassengers	Number	<ul style="list-style-type: none"> How many people the vehicle has for the ride
requestTime	Date	<ul style="list-style-type: none"> Time when the user requests a ride after hitting the request button. Represented a milliseconds
vehicleArrivalTime	Date	<ul style="list-style-type: none"> Time when the vehicle arrives at the

		passenger's location to get picked up at. <ul style="list-style-type: none"> • Represented as milliseconds
pickupTime	Date	<ul style="list-style-type: none"> • Time when the passenger gets in the vehicle and starts their ride. • Represented as milliseconds
dropoffTime	Date	<ul style="list-style-type: none"> • Time when the vehicle arrives at the destination and drops the passenger(s) off. • Represented as milliseconds
distance	Number	<ul style="list-style-type: none"> • Distance of the total trip • Represented as miles
currentTask	Number	<ul style="list-style-type: none"> • Number that corresponds to the status of the ride: <ul style="list-style-type: none"> ○ 0: created and needs a path ○ 1: found path, heading to starting node ○ 2: passenger is picked up ○ 3: ride is completed ○ 4: ride was cancelled
pathChosen	Array of edgeIDs	<ul style="list-style-type: none"> • What path the vehicle is taking
sentTask	Boolean	<ul style="list-style-type: none"> • True - The vehicle is ready to do the ride • False -The vehicle is not ready for a ride yet