House Mate Model Service Requirements
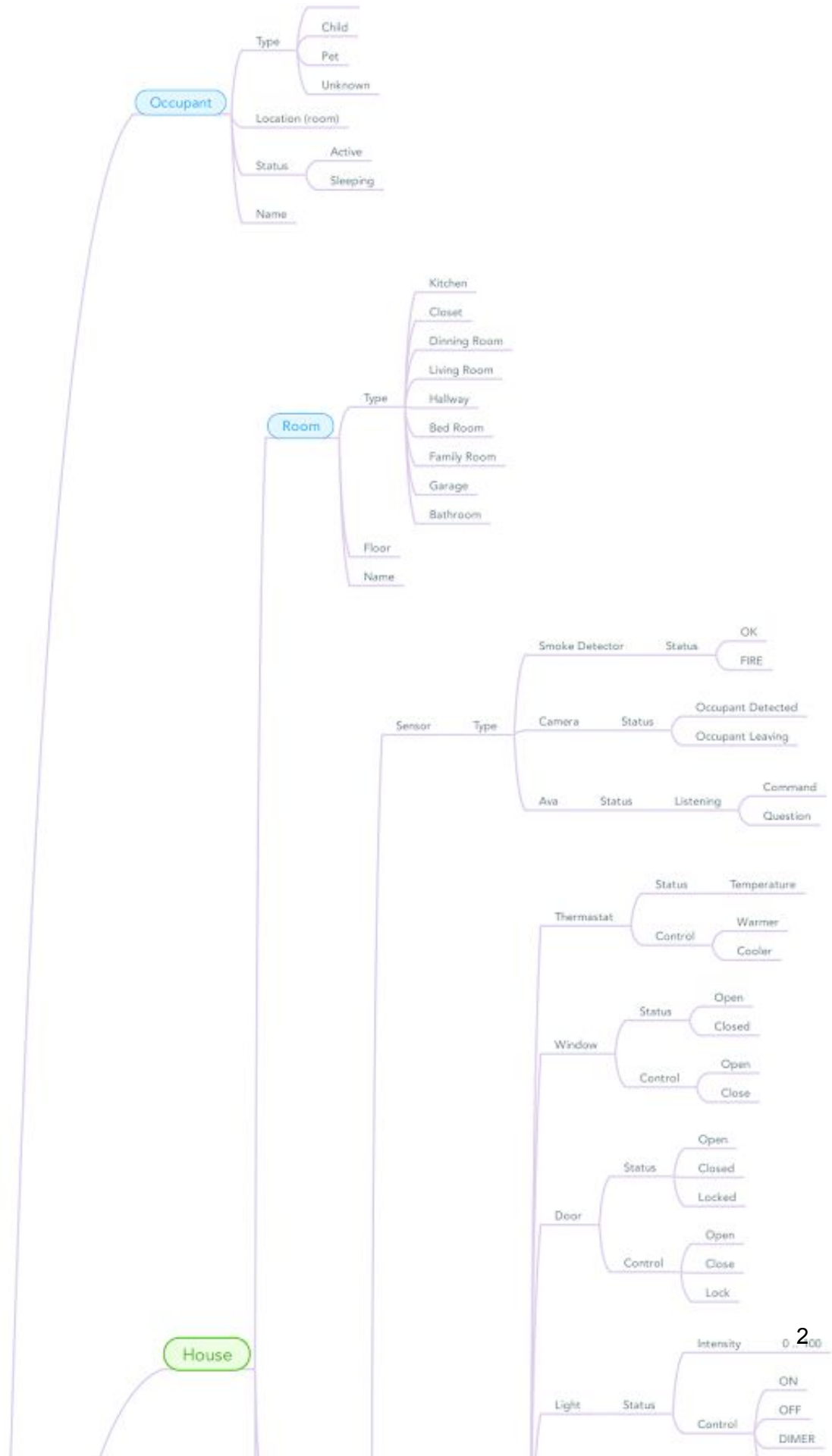
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Introduction

This document provides the requirements for the House Mate Model Service.

Overview

The House Mate Model Service is responsible for maintaining the state of the sensors and appliances within the home. Sensors are able to collect and share data. Like Sensors, Appliances can collect and share data. However, appliances can also be controlled.

The following diagram provides a mind map that captures the various aspects of the House Mate Model Service.

Occupant
- Type
  - Child
  - Pet
  - Unknown
- Location (room)
- Status
  - Active
  - Sleeping
- Name

Room
- Type
  - Kitchen
  - Closet
  - Dinning Room
  - Living Room
  - Hallway
  - Bed Room
  - Family Room
  - Garage
  - Bathroom
- Floor
- Name

Sensor — Type
- Smoke Detector — Status
  - OK
  - FIRE
- Camera — Status
  - Occupant Detected
  - Occupant Leaving
- Ava — Status — Listening
  - Command
  - Question

Thermastat
- Status — Temperature
- Control
  - Warmer
  - Cooler

Window
- Status
  - Open
  - Closed
- Control
  - Open
  - Close

Door
- Status
  - Open
  - Closed
  - Locked
- Control
  - Open
  - Close
  - Lock

Light
- Intensity 0 - 100
- Status
  - ON
  - OFF
- Control
  - DIMER

House

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Product API Requirements

This section defines the requirements for the House Mate Model Service.

The House Mate Model Service should support the following functions:

Model the following entities:
- House
- Room
- Occupant
- Sensor
- Appliance

House
The House is used to model a house. Note that House Mate is a cloud based service and should be able to manage multiple Houses. A House contains:

- globally unique identifier
- zero or more occupants
- one or more rooms
- zero or more IOT Devices

Room
The Room is used to model a room of the house. Room identifiers are used to track the location of occupants. A Room contains the following:

- Type of Room (Kitchen, Closet, Dining Room, etc)
- Floor of the house that the room is on
- Unique name of the room within the scope of the house.

Occupant
Occupant represents a person or animal. Occupants are recorngnized by the HouseMate system through facial and voice recognition. Cameras and Microphones located in each room of the house monitor the location of all occupants. Persons can be either Adults or Children. Animals are usually pets. Occupants can be known (family member or friend) or unknown (e.g. guest or burgular). All occupants have a name for reference. Occupants also have a status, either active or sleeping.

Note that the same occupant can be recognized by more than one house.

Sensor

Sensors are IoT devices and capture and share data about the conditions within the house. Examples of Senors include:

- Smoke Detector
- Camera: monitors location of occupants
- Ava: listening device for recieving voice commands from occupants

Each sensor records data specific to its type. The data recorded by the sensor is automatically sent to the House Mate System. Each sensor has a unique identifier. Sensors are also located within a room of the house. In summary Sensors have the following features.

- unique identifier
- state
- room, location within the house
- sensor type

Appliance

An Appliance is similar to a Sensor since it is able to record and share data about itself or its surrondings. An Appliance differs from a Sensor since it can be also be controlled. Examples of Appliances include:

- Thermastat (adjust room temperature)
- Window (open, close)
- Door (open, close, lock)
- Light (on, off, dimer, brighten)
- TV (chanel, power, volume)
- Pandora (channel, power, volume)
- Oven (power, temperature, time to cook)
- Refrigerator (temperature, beer count, clean)

API

The House Mate Model Service provides a service interface for managing the state of the house.

The API supports commands for

- modifying the house configuration
- contolling appliance state
- accessing sensor and appliance state

All APIs should include an auth_token paramter that will be used later to support access control.

Command API

The House Mate Model Service supports a Command Line Interface (CLI) for configuring houses. The commands can be listed in a file to provide a configuration script. The CLI should be use the service interface to implement the commands.

Command Syntax:

define house <house_name>
> *define a new house instance*

define room <room_name> floor <floor> type <room_type> house <house_name>
> *define a new room instance and attach to a house*

define occupant <occupant_name> type <occupant_type>
> *define a new occupant instance*

add occupant <occupant_name> to_house <house_name>
> *associate an occupant to a house, note that occupants can be associated with more than one house*

define sensor <name> type <sensor_type> room <house_name>:<room_name>
> *create a new sensor instance*

define appliance <name> type <sensor_type> room <house_name>:<room_name>
> *create a new appliance instance*

set sensor|appliance <house_name>:<room_name>:<name> status <status_name> value <value>
> *set the sensor value*

show sensor|appliace <house_name>:<room_name>:<name> status <status>
> *get the sensor value*

show sensor|appliace <house_name>:<room_name>:<name>
> *show the entire sensor status*

show configuration house <house_name>
> *show configuration for the given house*

show configuration room <house_name>:<room_name>
          show configuration for specified room

show configuration
          show all houses and their configuration

Sample Script

define a new house instance with identifier house1
define house house1

define a new room instance and attach to a house
define room kitchen1 floor 1 type kitchen house house1

define a new occupant
define occupant joe_smith type adult

add joe_smith as an occupant to house1
add occupant joe_smith to_house house1

create a new sensor in a room
define sensor smoke_detector1 type smoke_detector room house1:kitchen1

create a new appliance instance
define appliance oven1 type oven room house1:kitchen1

turn the oven on and set the temperature to 350 degrees
set appliance house1:kitchen1:oven1 status power value ON
set appliance house1:kitchen1:oven1 status temperature value 350

show the temperature of the oven
show appliace house1:kitchen1:oven1 status temperature

show all state for the oven
show appliace house1:kitchen1:oven1

show all state for the smoke detector
show appliace house1:kitchen1:smoke_detector1

show the configuration for the house1

show configuration house house1

show configuration of the kitchen1
show configuration room house1:kitchen1

show configurations for all houses
show configuration