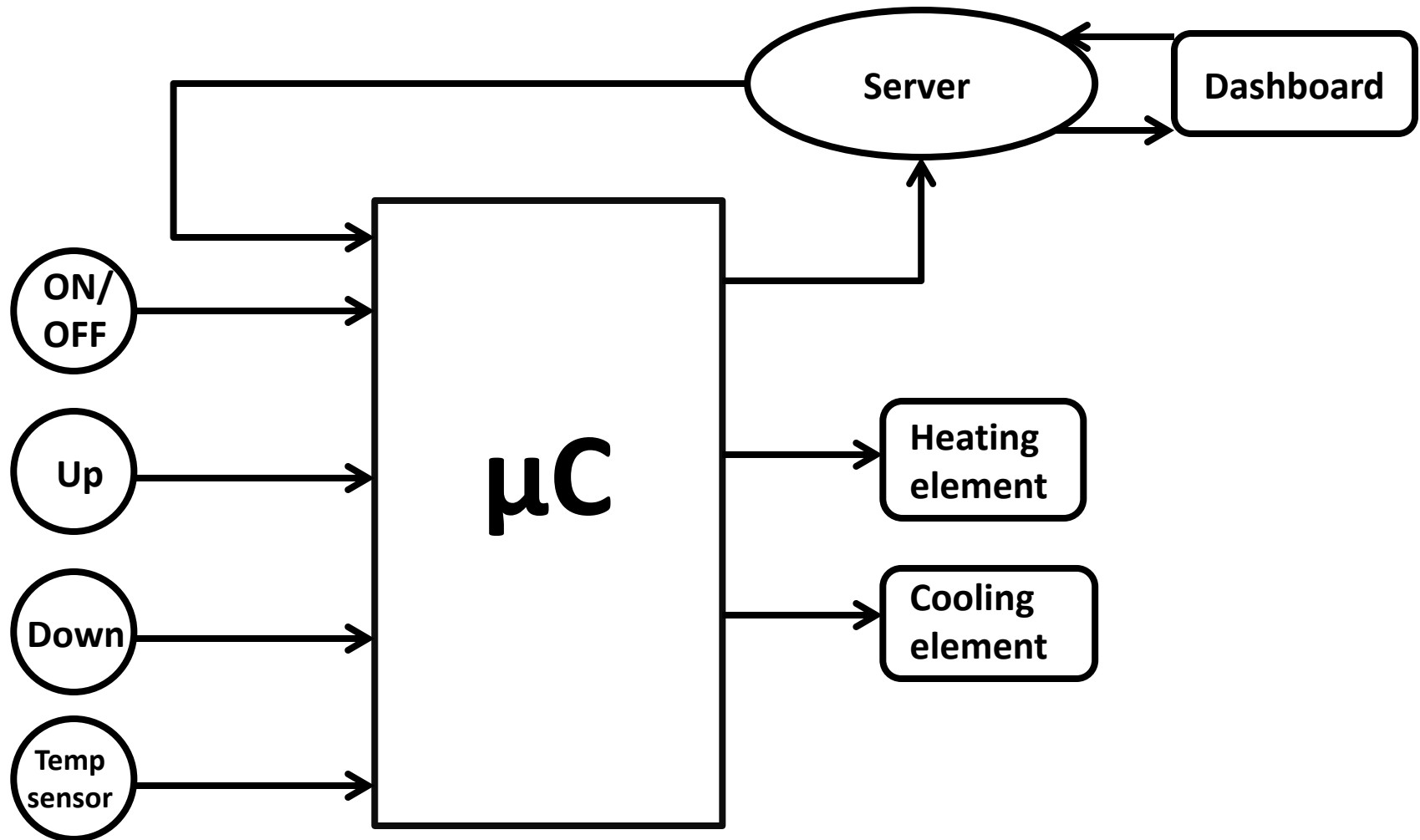


# **Electric Water Heater**

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# Overview



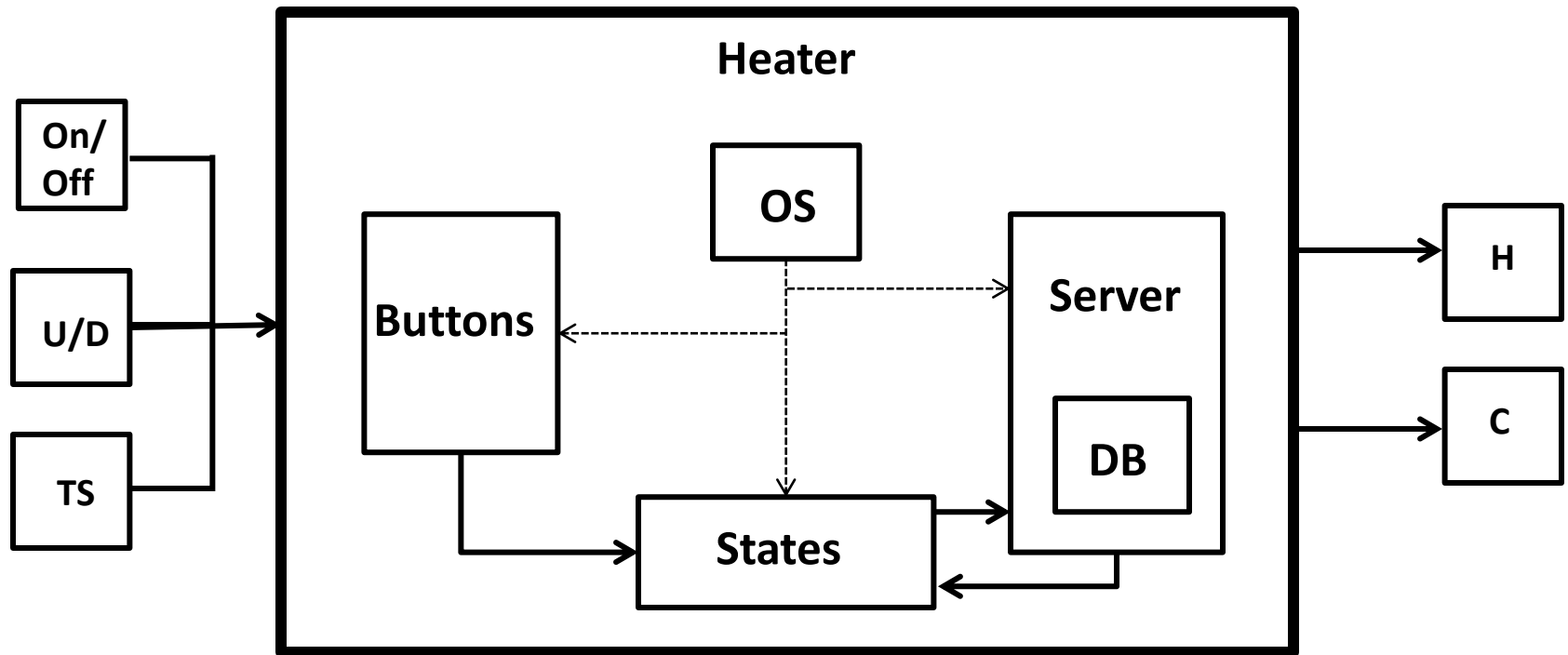
# Buttons Behavior

1. “ON/OFF ” button switches between off state and on state
2. In the OFF state, the heating element and the cooling element and all display should be turned OFF
3. The “Up” and “Down” buttons are used to set temperature
4. The first “Up” or “Down” button press, enters the temperature setting mode
5. After entering temperature setting mode, a single “Up” button press increase the set temperature by 5 degrees. A single “Down” button press decrease the set temperature by 5 degrees
6. If the “UP” or “Down” buttons are not pressed for 5 seconds the heater should exit the temperature setting mode

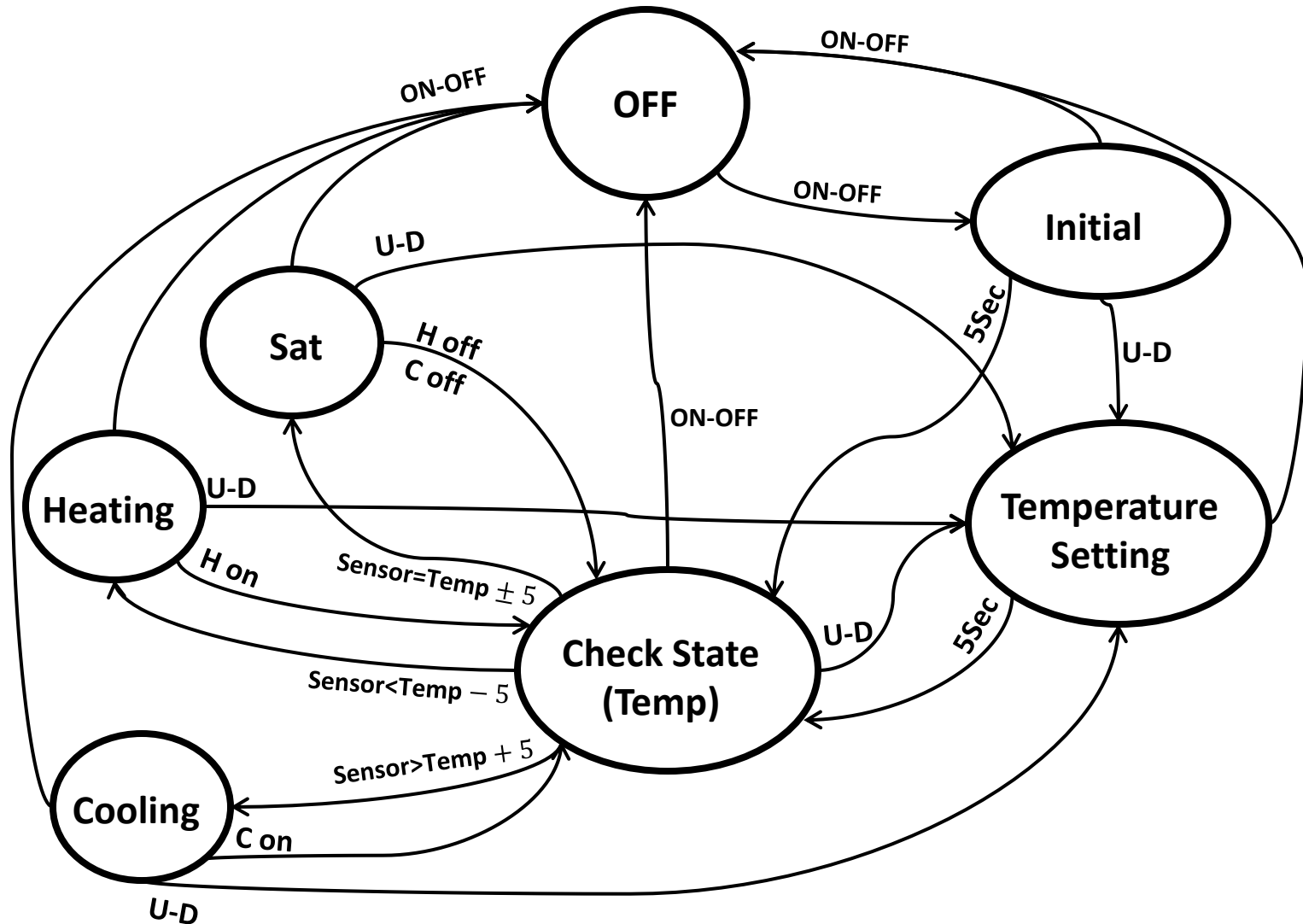
# Specifications –Temperature

1. If the current water temperature is less than the set temperature by 5 degrees, the heater enters the Heating state (Heating Element-ON)
2. If the current water temperature is greater than the set temperature by 5 degrees, the heater enters the cooling state (Cooling Element-ON)
3. Otherwise The “Cooling Element” and The “Heating Element” should be turned OFF and the heater enters the Sat state
4. The minimum possible set temperature is 15 degrees The maximum possible set temperature is 75 degrees
5. The initial set temperature is 60 degrees

# Static Architecture



# State Diagram



# States Details

## OFF State

If power is connected to the heater, the electric water heater is in OFF state

Heating element and cooling element are off, initial set temperature is 0 degrees

## Initial State

set Initial temperature to 60 degrees

## Temperature Setting State

Increase and decrease the set temperature by 5 degrees



# States Details

## Check State

Check the current temperature and transfer the heater to the next state based on the sensor temperature and the set temperature

## Heating State

Turning the heating element ON and turning the cooling element OFF

## Cooling State

Turning the cooling element ON and turning the heating element OFF

## Sat State

Turning the heating and the cooling elements OFF

# Timing Analysis

Task	Actions	Period of Action	Period of task
Heater Control Update	Update heater states	100	100
Button Update	Update push buttons states	25	25
Dashboard update	Update wifi connection Update dashboard	100	100
Sensor Update	Update Temperature	100	100
Ticks(ms)			25

# Schematic diagram

