

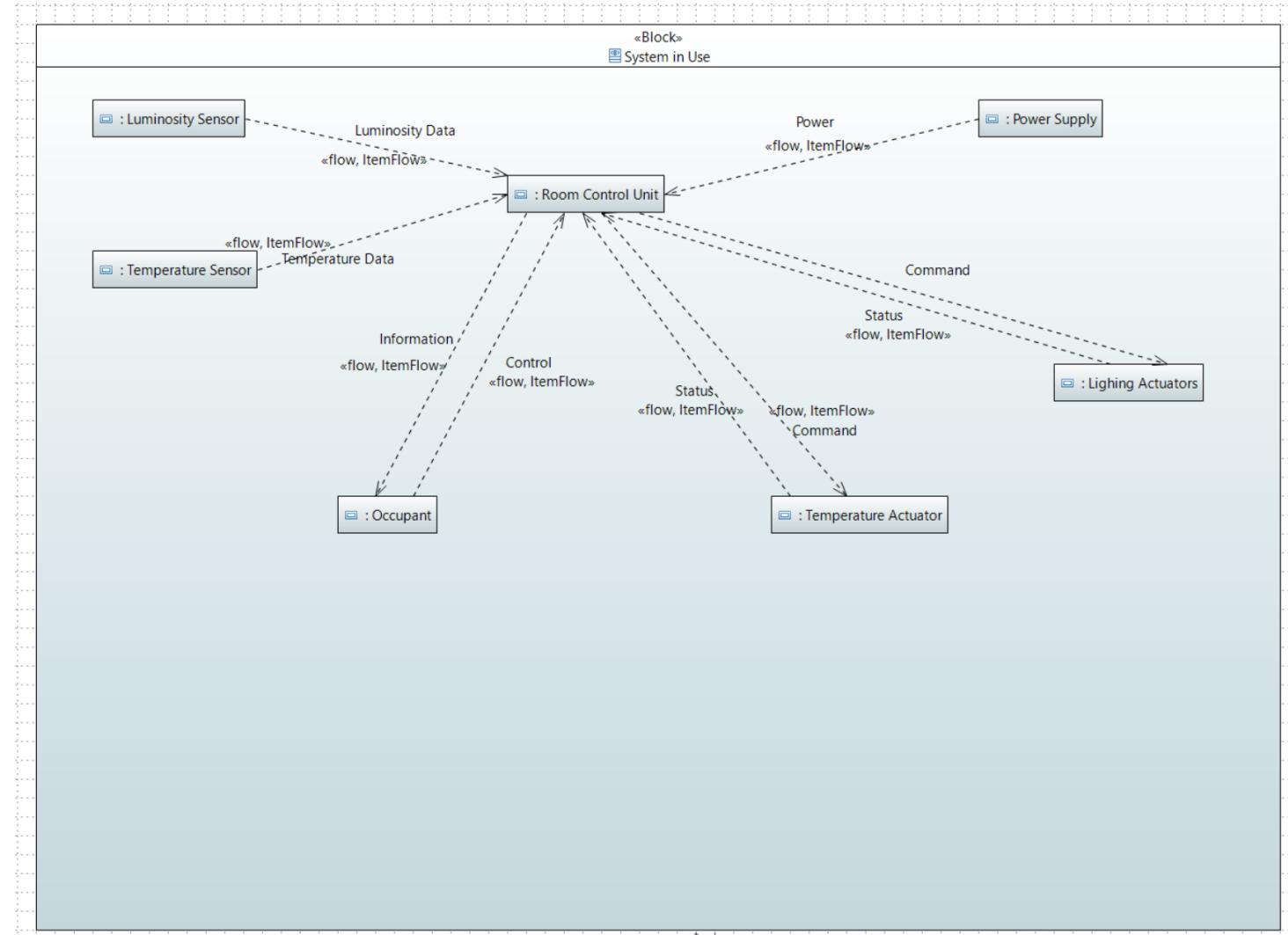
# CSLAB – Second Delivery

1210804 – André Gonçalves

1201458 – Jorge Moreira

# Problem Domain

## System Context



# Solution Domain

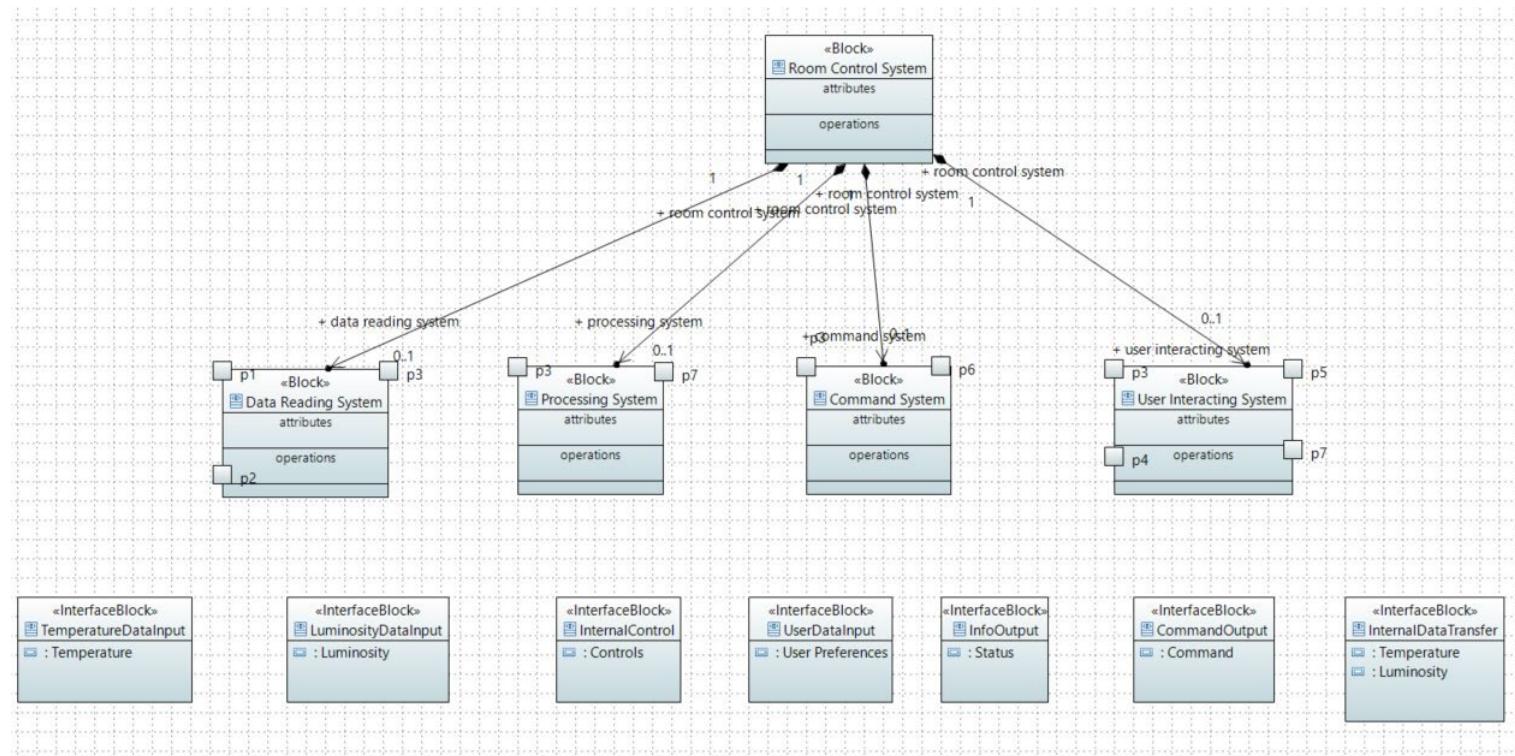
---

## System Requirements

	id	text
System Requirements		
Natural Light Adjustment	SR-1.1	When natural sunlight is available, the system shall adjust blinds to allow the required amount of light.
Artificial Light Compensation	SR-1.2	While natural sunlight is insufficient, the system shall activate artificial lighting to compensate.
Heating Control	SR-1.3	The system shall control the heating in the office using smart heaters.
Preference Configuration	SR-1.4	The system shall provide a user interface that allows office occupants to configure their preferences for lighting and temperature.
Preference Notification	SR-1.6	If the occupant's preferences are not being met, the system shall notify the occupant and indicate a potential problem with the system.
Failure Prevention	SR-1.7	The system shall include measures to prevent failures by identifying malfunctioning components.
Temporary Fix	SR-1.8	The system shall provide temporary fixes to mitigate the impact of failures.
Wireless Sensor Integration	SR-1.9	If possible, the system shall utilize Wireless Sensor Networks (WSNs) for communication and control.

# Solution Domain

## High Level Architecture



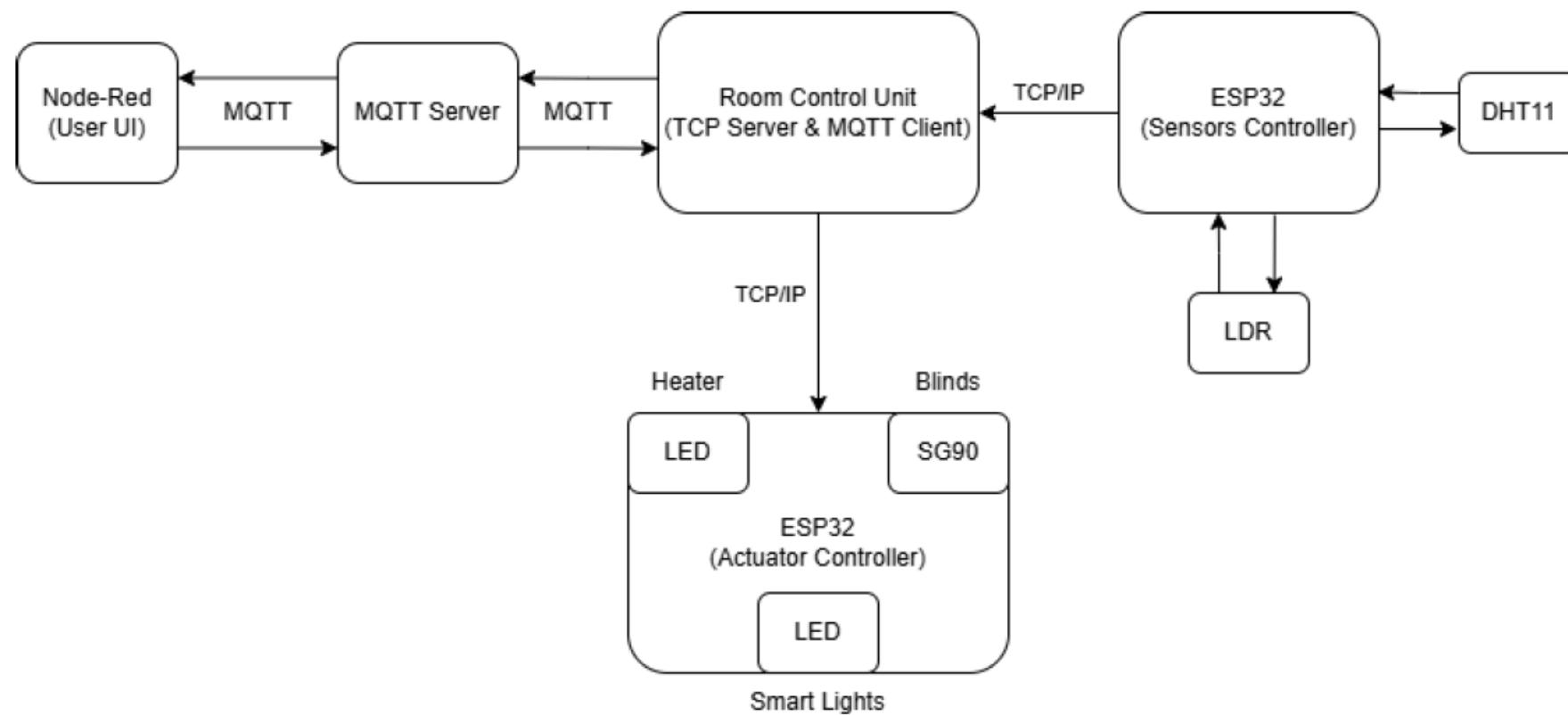
# Solution Domain

---

## Sub System Requirements

	Id	text
Subsystem Requ...	SSR.1	
Data Processing	SSR-1.1	The subsystem shall process data from sensors, user inputs, and external systems to control the office environment.
Decision-making	SSR-1.2	The subsystem shall make decisions based on predefined rules and occupant preferences to optimize office conditions.
Data Integrity	SSR-1.3	The subsystem shall validate incoming data to ensure it is free from corruption or malicious interference.
Fault Isolation	SSR-1.4	If a fault occurs in the processing subsystem, it shall isolate the fault to prevent impact on other subsystems.
Safe State	SSR-1.5	If the subsystem fails, it shall transition the system into a safe state to avoid harm to occupants or equipment.
Error Handling	SSR-1.6	The subsystem shall detect errors during operation and log them for diagnosis while attempting to recover automatically.

# Real Time Scheduling



# Real Time Scheduling

---

Task Sets:

	C(ms)	D(ms)	T(ms)	Priority
Verify Data Sensors	10	35	35	4
MQTT Data	10	70	70	2
Sensor Verification	15	100	100	1

The server will have priority 3 to be able to send the command as soon as possible. In order for the task set to be schedulable, and at the same time the server be able to execute when needed with the right priority, we gave the server a bandwidth of 15%. So, for this sporadic server we gave it a period of 40, and a capacity of 6.

	C(ms)	D(ms)	T(ms)	Priority
Read Data Sensors	10	20	20	2
Send Data Sensors	7	30	30	1



# Demo

---



