UO-TECH

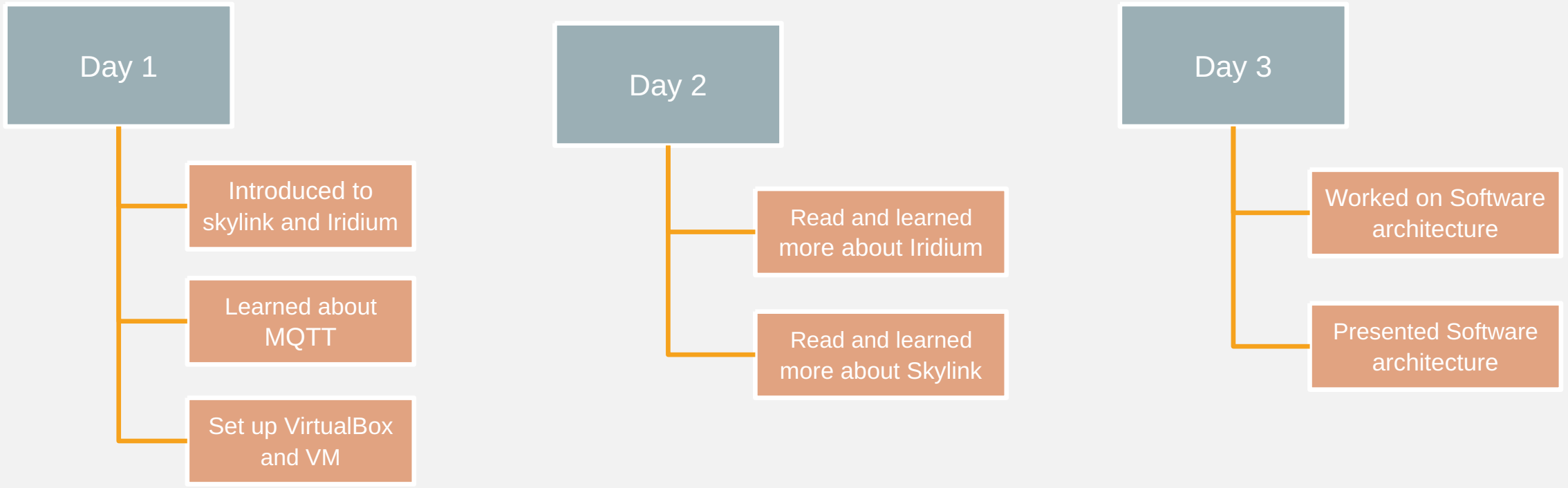
SKYTRAC Hack-a-thon

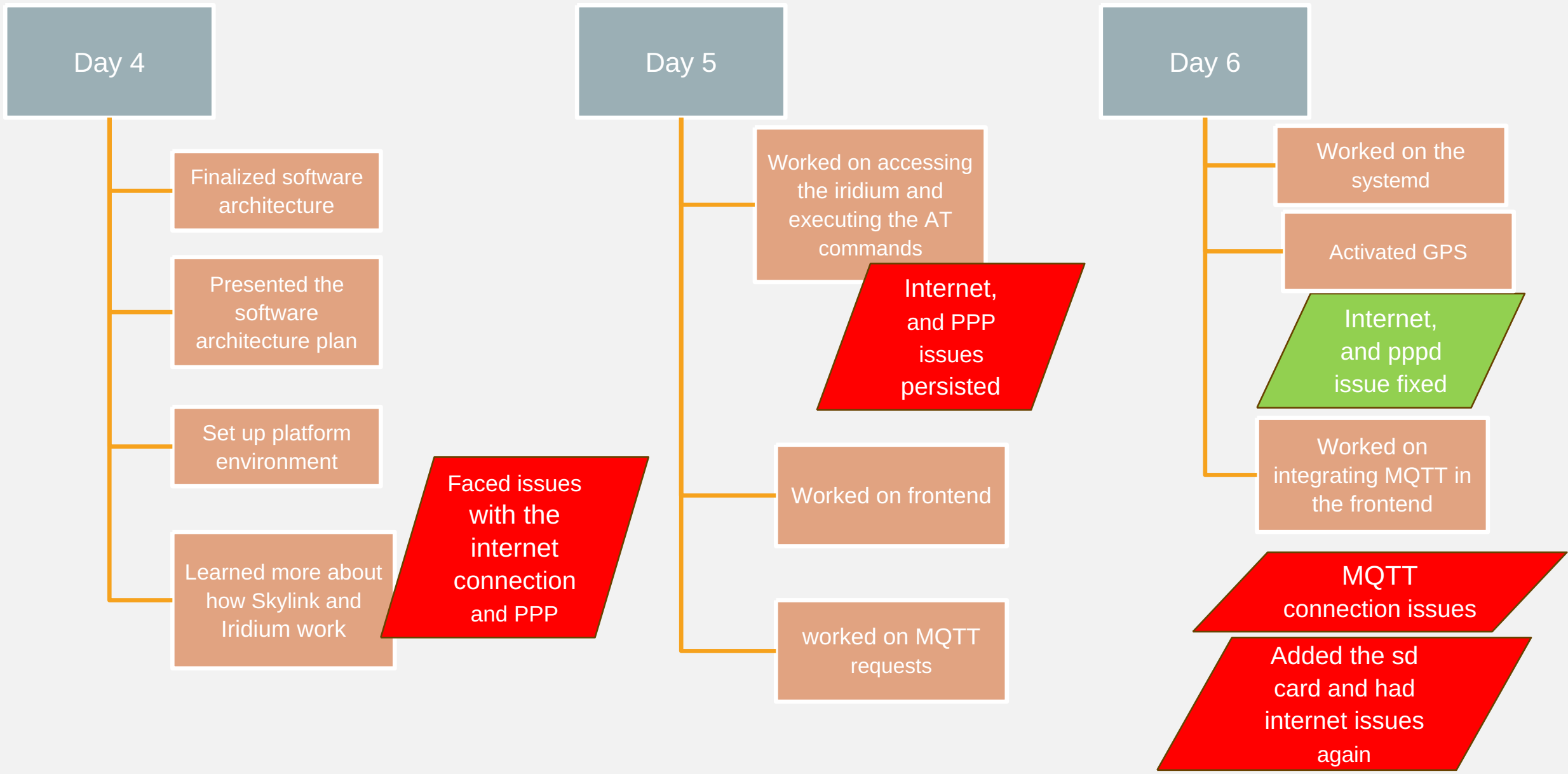
Presentation Date: April 5th , 2025

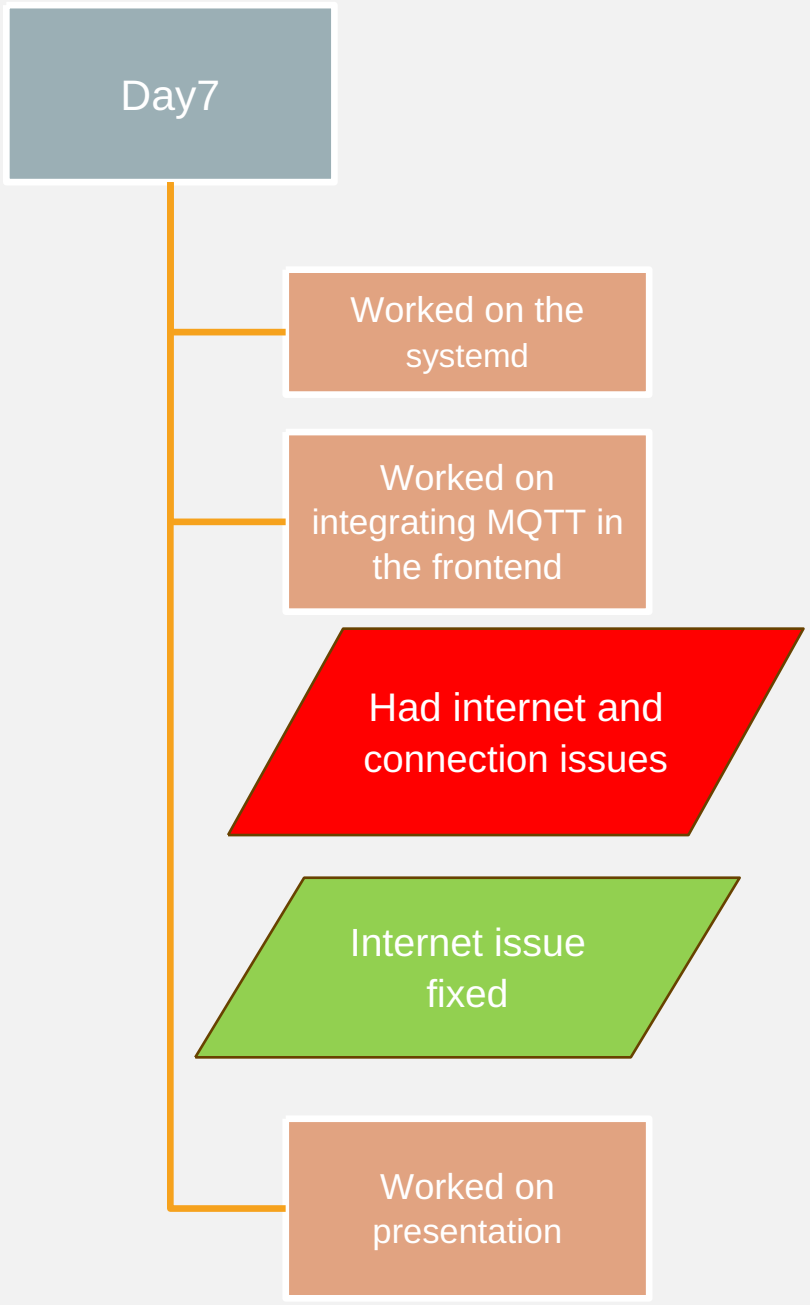
ABBREVIATIONS

LCP: Link Control Protocol
PPP: Point-to-Point Protocol
AP: Authentication Protocol
NCP: Network Control Protocol
Systemd: System Deamon
LTE: Long Term Evolution
REST: Representative State Transfer
JSPR: JSON-based Serial Protocol for REST
LCR: Least Cost Rounting

OUR JOURNEY


Day 1
Introduced to skylink and Iridium
Learned about MQTT
Set up VirtualBox and VM
Day 2
Read and learned more about Iridium
Read and learned more about Skylink
Day 3
Worked on Software architecture
Presented Software architecture


Day 4
Finalized software architecture
Presented the software architecture plan
Set up platform environment
Learned more about how Skylink and Iridium work
Faced issues with the internet connection and PPP
Day 5
Worked on accessing the iridium and executing the AT commands
Internet, and PPP issues persisted
Worked on frontend
worked on MQTT requests
Day 6
Worked on the systemd
Activated GPS
Internet, and pppd issue fixed
Worked on integrating MQTT in the frontend
MQTT connection issues
Added the sd card and had internet issues again


Day7
Worked on the systemd
Worked on integrating MQTT in the frontend
Had internet and connection issues
Internet issue fixed
Worked on presentation

CORE COMPONENTS OF THE IMPLEMENTED SOFTWARE

Daemon/Modem Manager

- Initiate the system
- Runs and monitor other components

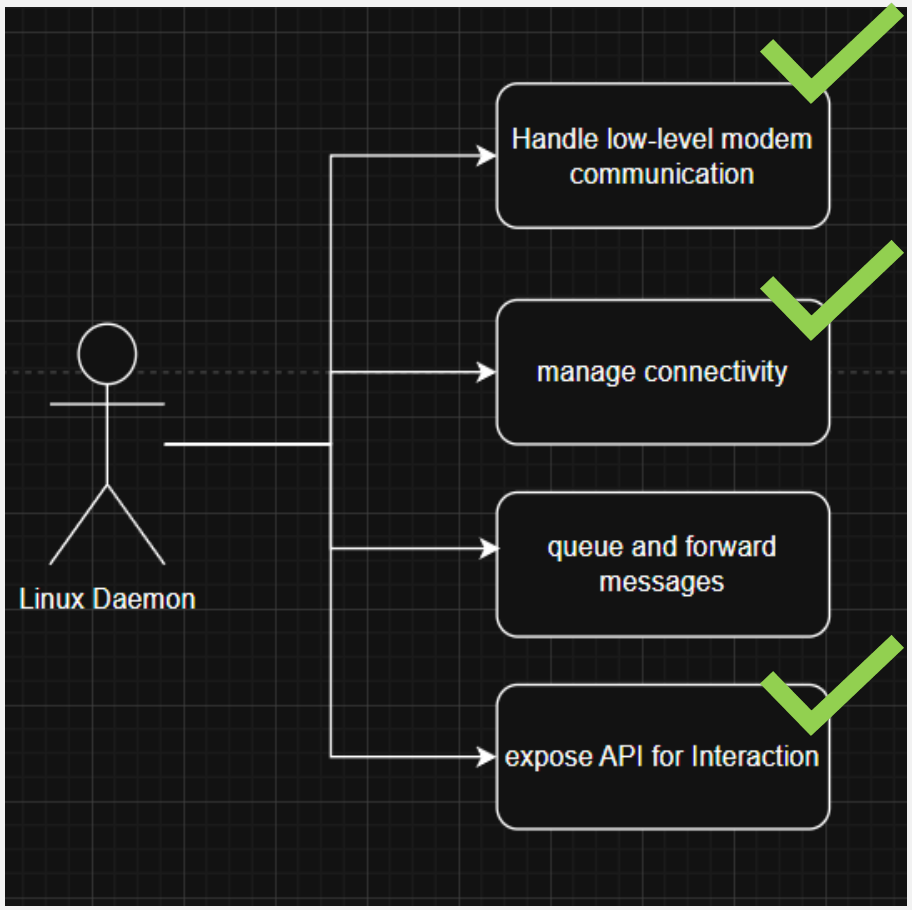
Network Request Handler

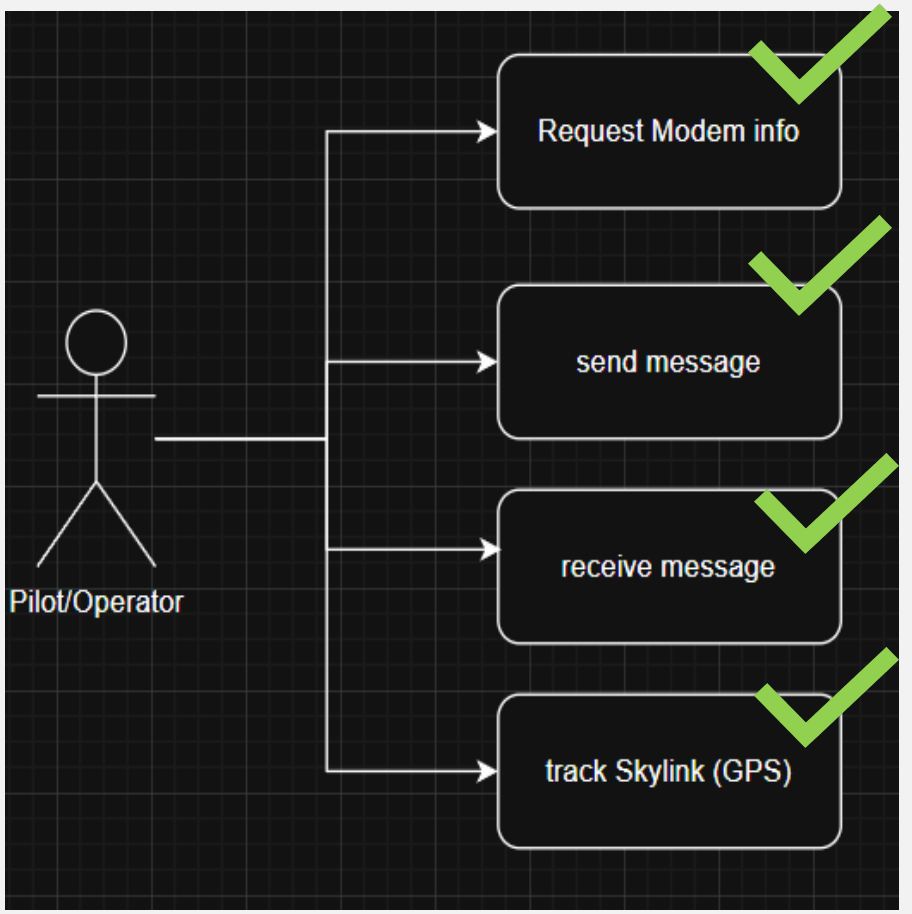
- Uses MQTT
- Handles data transmission
- Reads responses and processes them
- Uses sockets for network communication

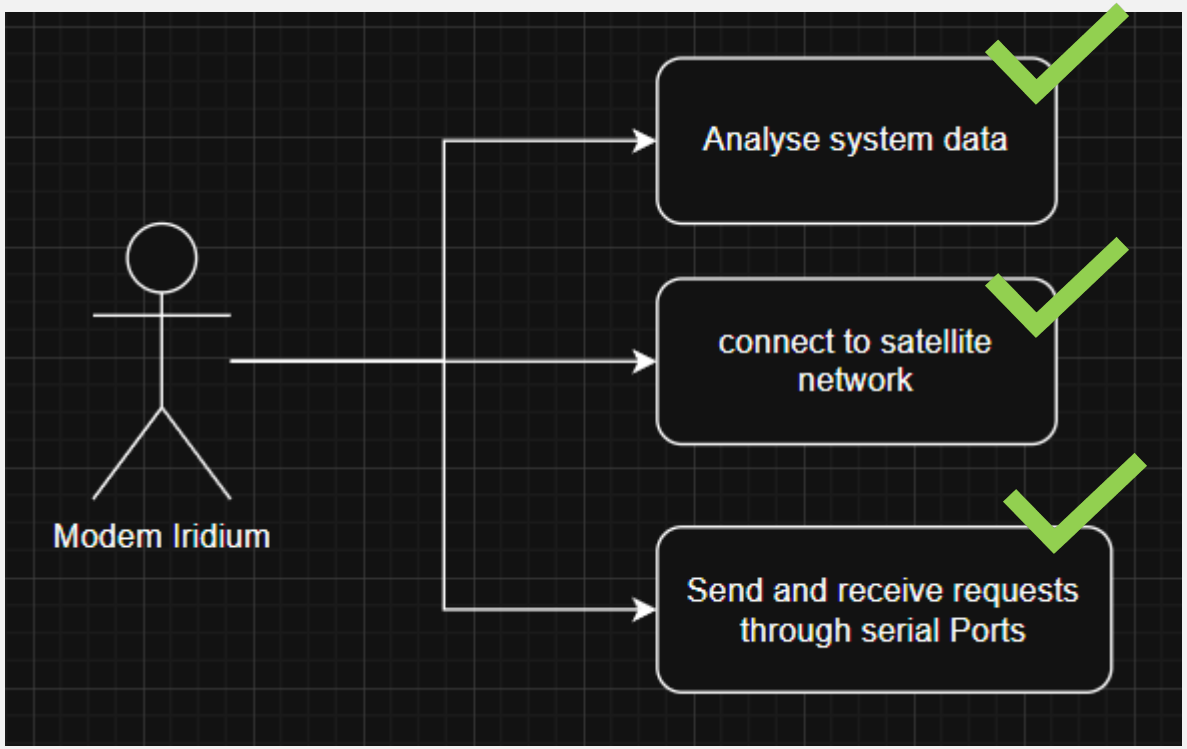
Serial Communication Handler

- Reads responses from the modem
- Manages timeouts and retries

USE CASES


Handle low-level modem communication
manage connectivity
queue and forward messages
expose API for Interaction
Linux Daemon


Request Modem info
send message
receive message
track Skylink (GPS)
Pilot/Operator


Analyse system data
connect to satellite network
Send and receive requests through serial Ports
Modem Iridium

IMPORTANT INFO

LCR (Least Cost Routing) solution

V1 CHECKLIST

- Full-stack website
- Linux daemon
- Communication set up between the website and the daemon
- Linux-based system embedded into Iridium through Ethernet
- System works independently

V2 CHECKLIST

VoIP (voice over IP)

GPS