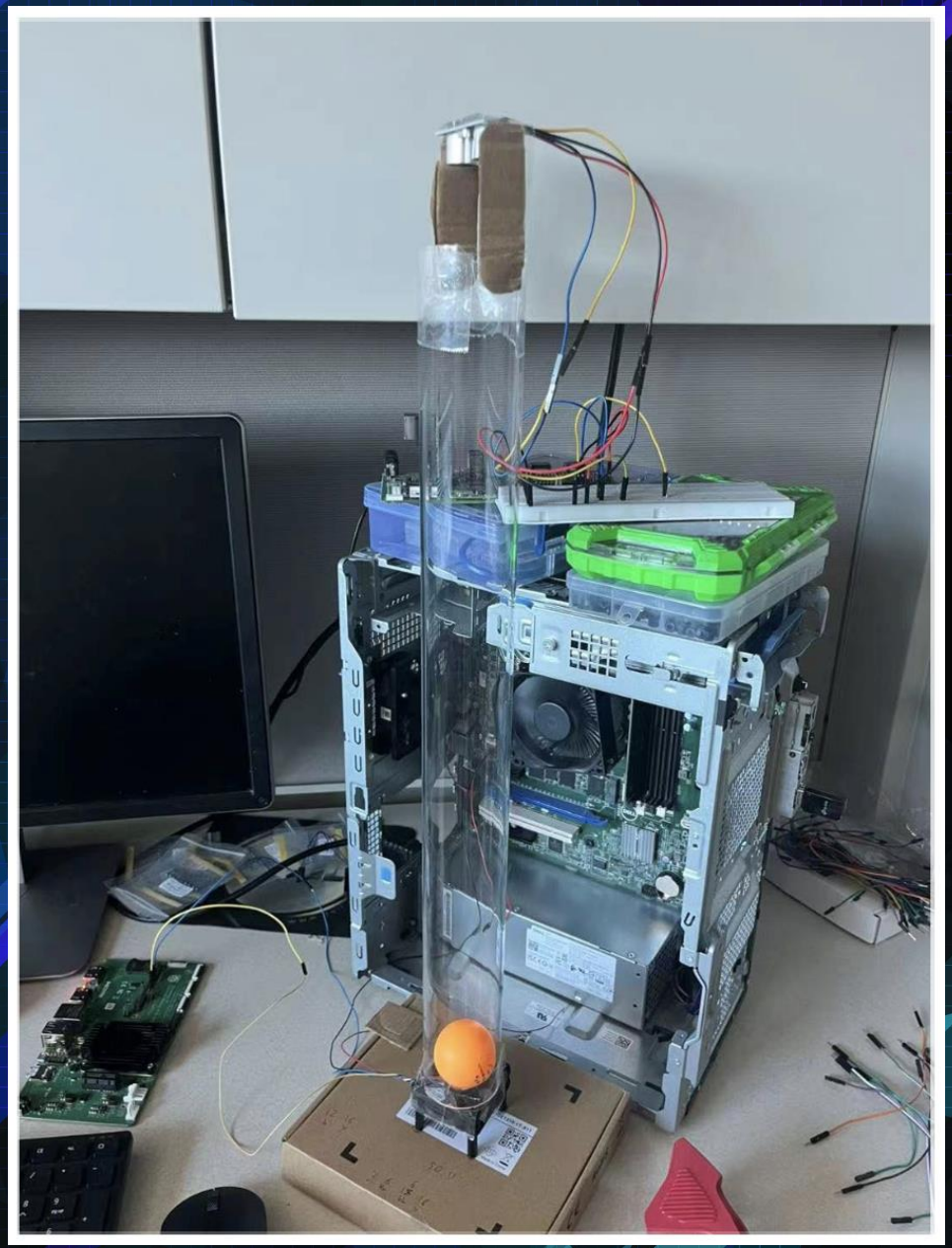
“Experimental Performance Evaluation of Real-Time Traffic Scheduler in Control Systems”

SE5402/CSE5312: ARCHITECTURE OF INTERNET OF THINGS

FALL 2025

ABBY HORNING & JAKE THURMAN



Motivation & Objective

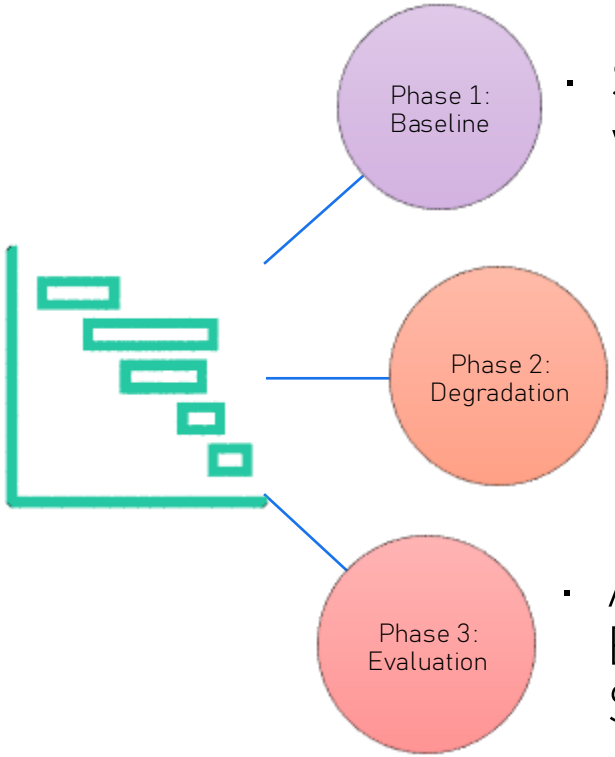
The Problem:

- Network Congestion → System Instability

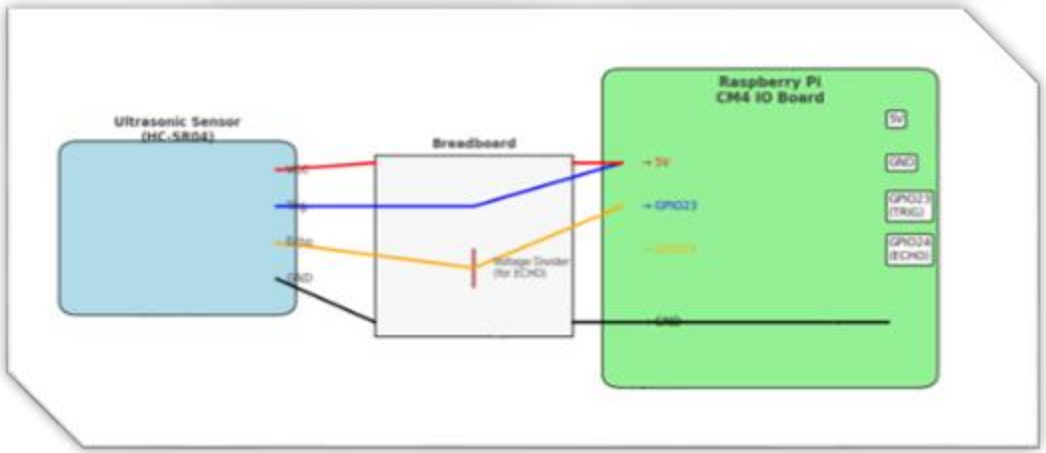
The Objective:

- Prove that a Linux Real-Time Scheduler Restores Stability.

Design, Hardware & Methodology



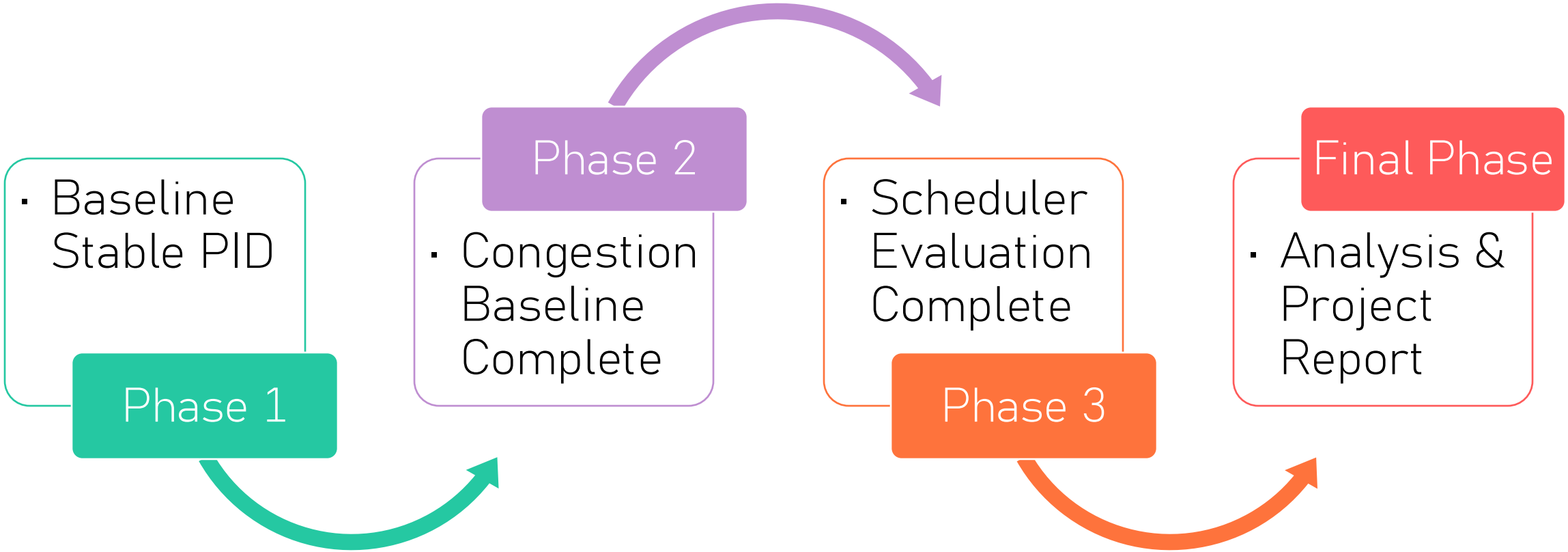
- Stabilize with PID
- Introduce code-based congestion
- Apply Linux ETF Scheduler



Team Assignments

Collaborative	Assembly & Configuration Integration Analysis, Documentation & Presentation
Abby	PID Implementation Data Logging Visualization
Jake	Network Congestion Real-Time Scheduler

Deliverables and Q&A



References

- Salzmann et al. (2025): Hovering a ping-pong ball: A demonstration setup for teaching PID control
  - (https://doi.org/10.26434/chemrxiv-2025-328tk)
- An example of how Linux traffic scheduler improves control under traffic congestion:
  - (https://github.com/NXP/dds-tsn)
- Depth/Distance Sensors:
  - (https://randomnerdtutorials.com/complete-guide-for-ultrasonic-sensor-hc-sr04/)
- PWM Fan Control:
  - PWM basics: https://www.arduino.cc/en/Tutorial/Foundations/PWM
  - PWM fan control: https://github.com/folkhack/raspberry-pi-pwm-fan-2