

Lava Lamp System

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Sponsor: Amazon Web Services

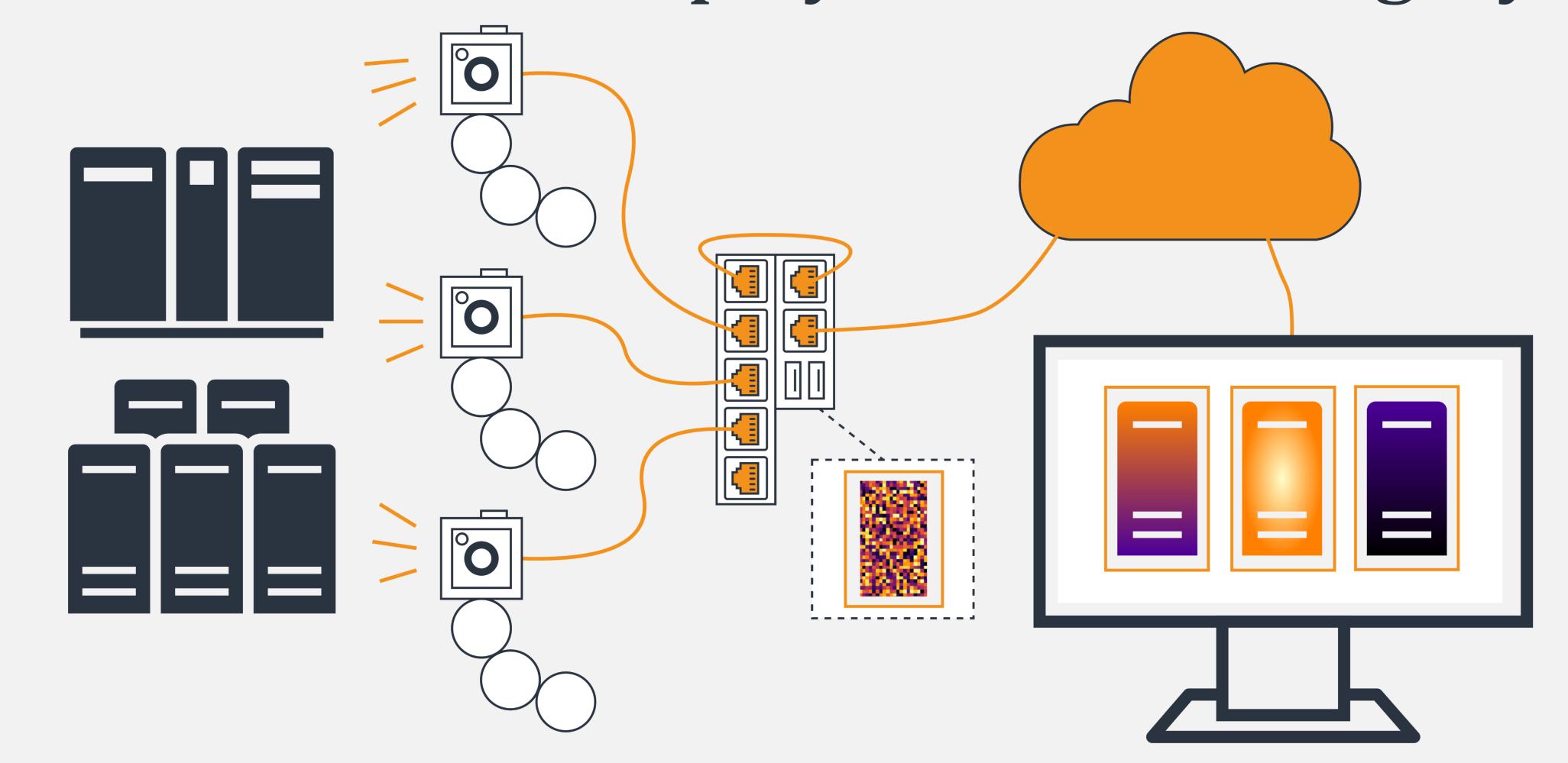
Gateway Hub:

- Forwards video feed to cloud
- Provides PoE to DCU network
- Approves new connections

Discrete Camera Unit:

- FLIR Lepton 3.5: 160x120 infrared video (≈4 fps)
- WIZnet W5500: Power over Ethernet & TCP/IP
- STM32F412: Data encryption & device management

Expandable infrared camera system that monitors and displays thermal imagery.



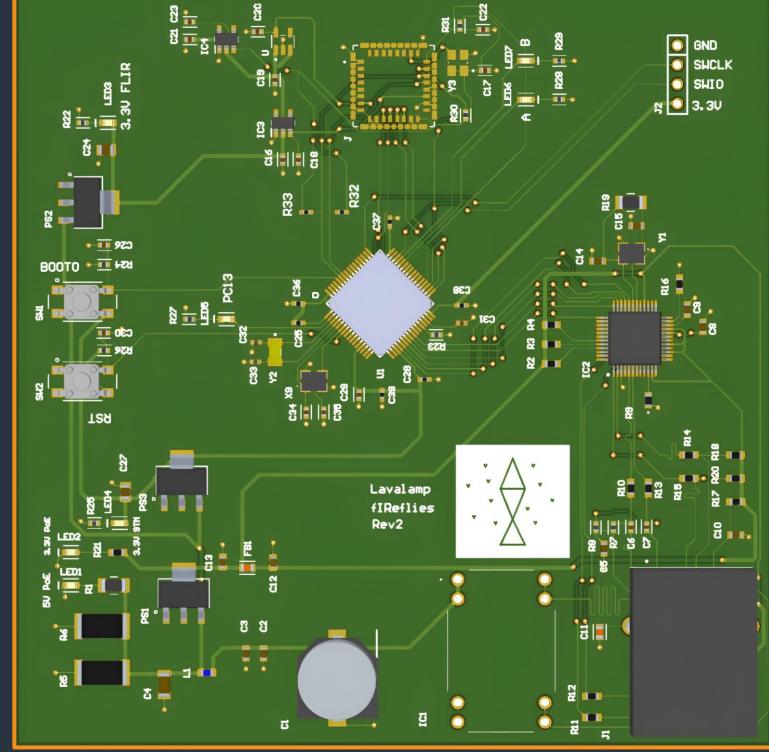
Dashboard:

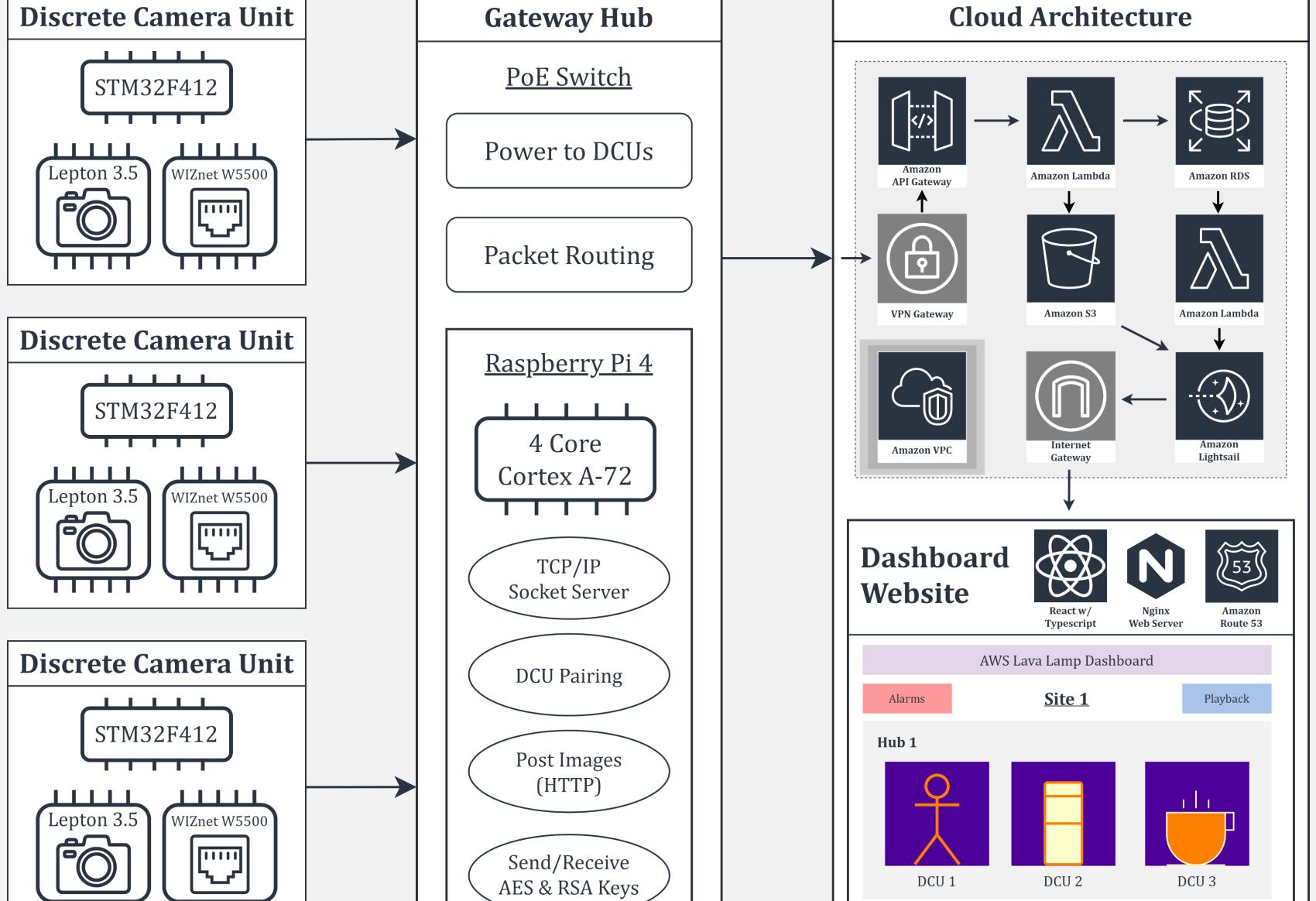
- Graph of average, minimum, and maximum temperatures
- Displays live, paused, or historic video feed
- Create and view alarms (triggered by hazardous temperature conditions)
- Hosted using Nginx web server

Cloud Backend Services:











API Gateway "Front door" for directing video and meta



Lambda Event-driven computing for managing



Relational Database Service PostgreSQL database for timestamps, temperatures, S3 paths, and alarms.



Scalable Storage Service S3 "bucket" filled with video frames (each accessible by unique URL path).



Lightsail Building and launching the web-based

Development Journey:

The speed of progress rose and fall, as expected, but setbacks were mitigated by contingency plans and frequent communication with the customer. Development pace benefitted from specialization and working in parallel.

Encryption:

- All video frames are immediately encrypted upon capture
- Video is decrypted when it enters the cloud database



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