

PROTECTING SMART DEVICES: MY IOT SECURITY PROJECT

2025 CAL STATE LA - STEM CORE SUMMER MAKING, ACADEMIC PREP, AND RESEARCH FOR TRANSFER STUDENTS (SMART) INTERNSHIP PROGRAM



01

WHAT IS IOT?

- IoT (Internet of Things) refers to smart devices that send and receive data – like thermostats, sensors, or wearables.
- These devices often send sensitive data, making security a major concern.

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THE PROBLEM

- IoT messages can be intercepted if not properly protected.
- Unauthorized devices can try to connect to the network.

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MY PROJECT

- I’m building a Python-based app to simulate how IoT devices send encrypted messages to a server.
- Each device message is encrypted
- The server then decrypts the message to read it securely.

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SECURITY FEATURES

- End-to-End Encryption: protects messages in transit
- Device Whitelist Check : only known devices are allowed
- Intrusion Detection: alerts on unknown devices

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NEXT STEPS

- Build a Front-End Interface to visualize messages, alerts, and device activity
- Add User Authentication so users can:
- Register an account
- Add or manage their IoT devices
- Goal: Make the app more interactive and secure for real-world use

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CONCLUSION

- This project lays the foundation for secure communication in IoT systems. By combining encryption, device verification, and user access control, I’m working toward a fully functional app that protects both the network and its users.

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HERE ARE THE RESULTS OF MY CODE

- Approved devices send encrypted messages that are successfully decrypted on the server.
- Unauthorized devices trigger real-time alerts (e.g., “ ALERT: Unknown device ‘device_999’ tried to connect!”).
- Simulated fake data is used to test and verify the encryption and detection systems.
- Everything is running in Visual Studio Code using Python.

```
✓ Device: device_001
🔒 Encrypted: b'gAAAAABofqmVrEAdrY2RQzj0geKfEUGHKGtFtWN--E6WB2MTVzFXs4-hVJSa3KIF2ckSrJmj9l0V1b3kitdGZHt50CEoG3KWhA=='
🔓 Decrypted: Temp: 78.2°F

✓ Device: device_002
🔒 Encrypted: b'gAAAAABofqmVbX2j4PxRp40sm0S91HejpaNYNZxEU-IqRRZ1bzthWi_L-9zA2UiUK0dMIPKW9dr9inPMsb-jEn1ZiDP9n94Y7w=='
🔓 Decrypted: Humidity: 50%

⚠️ ALERT: Unknown device 'device_989' tried to connect!
```