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SKYTRAC HACK-A-THON 2025 ✈️

🚀 Mission: Global Connectivity 🚀

🌎 The Challenge:

Imagine you're on a remote expedition, deep in the mountains, sailing across the ocean, or working in a disaster zone where standard connectivity is unreliable. The only way to stay online? An intelligent, self-monitoring communication system that dynamically adapts to available connectivity options.

🔍 Your Mission:

Design and implement a high-performance Linux-based networking service for an ARM-powered device that seamlessly manages connections across multiple networks.

This is your chance to develop real-world embedded systems software for an actual hardware platform—where efficiency, reliability, and intelligence matter.

What You'll Build 💡

You will develop a Yocto-based Linux solution that turns an ARM device into a next-generation intelligent network router. Your software will need to include:

✅ System-Level Services:

- Iridium modem control:
  - A C++-based Linux daemon that runs as a systemd service
  - MQTT-based control interface and status monitoring of the Iridium 9770 satellite modem
  - (Iridium 9770 Modem specification and interface documents will be provided)

- Health/Status monitoring:
  - A C++-based Linux daemon that runs as a systemd service
  - MQTT-based communication of all state and status data

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- High-performance web-based user interface:
    - Real-time monitoring of statistics
        - Snapshot Bandwidth Usage, Voltages, Current, Temperature
        - Total Data Usage during billing period per WAN access device
- Performant - FAST and low CPU/MEM usage
- Expose configuration settings for the device
- Securely protected from unwanted access to avoid malicious changes

✅ **Smart Network Management:**

- "Modem manager" integration to control the LTE cellular modem
- Wi-Fi Hotspot functionality for local connectivity, with SSID and Passkey configuration in user interface
- Asterix Integration for VoIP connectivity to enable people to use VoIP applications (SIP)
- Advanced Firewall with all settings available in user interface

✅ **Cost-Optimized Connectivity:**

- Implement a Least Cost Routing (LCR) solution or algorithm that dynamically switches between cellular, satellite, and Wi-Fi based on cost, signal strength, available bandwidth/speed, and assigned network priority

✅ **Embedded Linux Support:**

- Yocto-based Linux system to ensure lightweight, optimized performance for ARM hardware

✅ **Full Documentation:**

- Deliver clear, professional-grade System Requirements, High-Level Software Requirements, Design Documents, and API/system documentation for maintainability and future integration/scalability

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Why Compete? 🏆

- Work on real embedded systems with satellite & cellular communication technology
- Build a powerful portfolio project that showcases advanced networking and C++ and web skills!
- Compete against top talent, win real prize$, and get noticed by industry leaders!
- Network with professionals and explore potential career opportunities in embedded systems, networking, and IoT!
- We are offering a maximum prize of $15,000. This would go to the team that delivers the best workable solution to the challenge

Are you ready to revolutionize global connectivity? Join the hackathon and build the future of smart networking! 💥