

TechTeamz Consultancy

At Tech Teamz, we are committed to providing engineering solutions tailored to our clients' needs. To demonstrate our expertise, we offer a complimentary consultancy service led by **Lucas**, one of our skilled **Embedded Linux Engineers**. Lucas is an **expert in Yocto, Bash, and Linux Kernel**, bringing extensive experience and knowledge to address various challenges. If you wish to know more about his technical background, we have his CV available upon request.

FREE SERVICES

1.CODE REVIEW AND OPTIMIZATION FOR EMBEDDED SYSTEMS

What Lucas Can Do:

Conduct a comprehensive audit of existing C/C++ code in embedded systems. Identify inefficiencies, improve performance and ensure the codebase adheres to best practices (like Misra coding guidelines). Suggest tools to improve development and debugging and improve the sprint process to ensure quality deployment on time.

Your Benefits:

Enhanced code quality and performance, leading to more reliable and efficient systems, and reducing future maintenance costs.

The amount of time required to audit the codebase of a certain project will be directly related to the project's size and complexity

2. IMPLEMENTATION OF UNIT TESTING AND CI/CD PIPELINES

What Lucas Can Do:

Set up and integrate unit testing frameworks (like gTest) in the continuous integration/continuous deployment (CI/CD) pipelines. This will ensure ongoing code quality and streamlined development processes.

Your Benefits:

Improved software quality and faster, more reliable releases, reducing bugs and deployment issues.

3.PROTOTYPING AND DEVELOPMENT OF EMBEDDED APPLICATIONS

What Lucas Can Do:

Develop rapid prototypes for new features or applications using prototyping boards like raspberry pi, beaglebone, stm32 nucleo, esp32, arduino (SPI, I2C, UART, I2S, CAN). This is particularly useful for validating new ideas or improvements.

Your Benefits:

Quick validation of concepts and features, allowing clients to make informed decisions before full-scale development.

FREE SERVICES

4.SYSTEM PERFORMANCE TUNING AND REAL-TIME PROTOCOL OPTIMIZATION

What Lucas Can Do:

Optimize real-time communication protocols and system performance, particularly in environments requiring high efficiency and low latency, such as autonomous vehicles or IoT devices (mqtt, gRpc, protobuf, json, websockets, dbus)

Your Benefits:

Enhanced system performance and reliability, crucial for applications requiring real-time data processing and communication.

5.SIMULATION AND TESTING ENVIRONMENT SETUP

What Lucas Can Do:

Develop and implement simulation infrastructures to test embedded systems thoroughly before deployment. This includes setting up tools like QEMU or developing custom testing tools to test communication protocols, hardware components, or use cases. Performance measures and optimization approaches.

Your Benefits:

Reduced risk of deployment issues and ability to test systems comprehensively under various scenarios without physical hardware constraints. Add robustness and reliability.

6.TOOLS AND FRAMEWORK SELECTION

What Lucas Can Do:

Help selecting the best toolset for the respective projects. From picking the correct IDE and addons to select the best simulation tool for the specific case. Debugging, tracing, profiling and logging tool selection. Telemetry design.

Your Benefits:

Take the most value out of the tools used by the embedded software team to develop and maintain the codebase of the project.

PREVIOUS CONSULTANCIES

1. IP Security Cameras as IoT Hubs

Role: Junior Embedded Developer

Challenge:

The project focused on providing video streaming and recording services for IP security cameras. However, an international insurance client required more innovative solutions.

Solution:

Proposed transforming the existing IP cameras in clients' homes into IoT hubs. This involved enabling the cameras to receive signals from various sensors and devices within the home network and then retransmitting these signals to the cloud. This enabled applications such as energy consumption monitoring, alarms, and smoke detection.

Technical Implementation:

Utilized the manufacturer-provided toolchain for cross-compiling code for the IP cameras. In scenarios where the provided toolchain was insufficient, he employed Crosstool-NG to generate the appropriate toolchain for embedding the code.

2. Biomedical Device Anesthesia Pumps

Role: Embedded Developer

Challenge:

The anesthesia pump systems struggled to test against messages from other devices, specifically gRPC messages, which was a requirement for FDA validation.

Solution:

Designed and implemented a simulator to send simulated gRPC messages during unit testing. This ensured comprehensive coverage of the communication spectrum and met FDA validation requirements.

3. Urgent Delivery for Biomedical Devices

Role: Embedded Developer

Challenge:

Two senior engineers resigned just two months before an important delivery deadline. The team was left with two semi-senior engineers and three junior engineers.

Solution:

Proposed a temporary pair programming routine during the development phase before testing. This approach significantly accelerated team ramp-up and enabled the team to successfully deliver the project on time.

PREVIOUS CONSULTANCIES

4. High-Frequency Data Display for Topcon Agricultural

Role: Embedded Developer

Challenge:

The PyQtGraph library they were using for the dashboard consumed excessive memory and was inefficient for real-time, high-frequency data display.

Solution:

After researching alternatives, identified the Vispy library, primarily used in the biomedical industry for neural data representation. Despite limited documentation, collaborated with the library's creators to resolve bugs and enhance documentation. Successfully implemented Vispy for the dashboard, achieving optimal performance even with data volumes exceeding real-world use cases

5. GNSS Receiver Unit Logging

Role: Embedded Developer

Challenge:

Issues logging various parameters from the GNSS receiver unit due to inefficient communication protocols.

Solution:

Optimized message fields by analyzing and refining the communication protocols. Implemented functionality to recognize simple and complex nested data types via an initial reconnaissance message, reducing bandwidth consumption by eliminating the need to send data type information in every message. Introduced a Logging Ring Buffer inspired by the TLV (Type-Length-Value) approach to further optimize resources.

Feel free to share your project details with us to arrange a free consultancy session. This offer is available for two weeks, and there is no commitment required before or after the consultation.