ANANTHULA MADHU

Principal Engineer

"If you have energy and/or time you must develop the engines yourselves to get a deeper understanding of underlying technologies and frameworks instead of using the APIs of 3rd party components"

My one word **"TRANSPARENCY"**

Innominds

Connected Devices

EMPLOYEE IMPACT

Madhu made life easy for IoT solution developers with a Peripheral Manager SDK and a Sensor Hub.

Google and Transparency

Madhu, a principal engineer in Connected Devices BU, is a big fan of Google and Android. He has been keenly following, for the last 5+ years, on how Google built the Android services. A seemingly different thread, Madhu sticks to his one word 'transparency' – to communicate and share anything 'as-is'. But the term 'transparency' in information technology is often used to refer to an abstraction layer that shields the developers in one layer from the implementation aspects of the lower or other neighbouring layers.

These two forces – Google and Transparency are the ones that drove Madhu to develop two components that helped developers to easily manage the sensors.

Peripheral Manager SDK to access devices connected to I/O interfaces like I2C, SPI, UART, PWM, GPIO

When an Android developer needs to access different sensors to control, say, the direction and speed of a drone, they resort to writing low-level code to access the hardware bus interfaces. **How about having high-level APIs to control these sensors?** Madhu built this plug-in, Peripheral Manager SDK:

- Implemented the necessary infrastructure (JNI, AIDL, Manager, Service, HAL Libraries) in the Android platform to access the hardware bus interfaces

- The SDK JAR file with Peripheral Services can be loaded in Android Studio and a developer can use the provided APIs

- These APIs are implemented in C/C++

Sensor-Hub in Android Framework (HAL) to operate dynamically connected external I2C sensors

What does a developer code when a sensor from a specific manufacturer, is connected to the board? They integrate the given drivers with Linux and use the APIs to access specific registers. What happens when another sensor from a different manufacturer needs to be connected? They repeat the process. **How about removing these steps when connecting any sensor?** Madhu did that with the Sensor-Hub solution:

- Sensor-Hub implemented in 'C' as a service, wakes up on system boot.

- It parses the XML configurations of connected sensors and creates sysfs nodes, which will be used by Android sensor framework to read sensor data.

- Sensor-Hub designed to handle 10 sensors connected at time on given I2C bus

Vijay, his reporting manager and guide, and leaders in Connected Devices acknowledge that Madhu's spirit is inspirational to developers besides the fact that these components are re-usable by other teams.

ABOUT **ANANTHULA MADHU**

Experience: 10 yrs. in the IT industry

Technologies: C, C++, C#, Android JAVA, Assembly (DSP), Gstreamer, OpenMax, FFMbc, OpenSSL, OpenDesign, OpenCascade, Android SDK, X-link, VTP, MQTT, Android HAL, Audio, Camera, Peripheral SDK, sensors

Domain: Embedded, DSP, Mobile, Smart Watch, Automotive

INSPIRATIONS / BLOGS

- Technology Solutions: Android Services Black Magic by Aleksandar Gargenta

- Personal Development: Impact Foundation Motivational Speeches

- Tech How-to Blog: Android Peripheral SDK: Control Peripherals Using Android App

A FEW **NUMBERS**

10
SENSORS
Connected at a time on a given I2C bus can be handled by the Sensor-Hub.

5
I/O INTERFACES
Devices connected to GPIO, UART, I2C, SPI, and PWM interfaces can be manged with the Peripheral SDK.

"Madhu is always keen to investigate from bottom to top across the layers of a framework or a device. This project of developing SDKs and engines is a perfect fit for him. And, yes, he delivered the goods as expected and I'm sure this project will help many of our embedded engineering teams"

VIJAY KRISHNA MANJULA

Practice Head –
Embedded Engineering
Connected Devices

About Innominds Connected Devices: We help SoC providers, OEMs, Product Companies and Enterprises to design, build and launch connected devices & solutions faster with our embedded engineering services, industry solutions and production-ready building blocks. We ensure our clients realize full digital solutions by bringing together devices, applications and analytics.