[**RED**] consulting
EMBEDDED

Software Portfolio

At Red Embedded software accounts for the majority of our work. Typically there are around 10 projects in flight at any one time for a number of clients. Project scope can range from single man investigations to large developments and integrations staffed by teams of over 20 engineers. We work at all levels in the software stack and use a variety of different languages, techniques and tools. This document provides a short summary of some of the projects we have delivered to give the reader an appreciation of our work.

Networking

Red Embedded has extensive experience of networking in a home environment, from consumer devices such as set top boxes or second screens, to edge of network routers and cable modems, our team has developed, deployed and supported devices for a range of global customers.
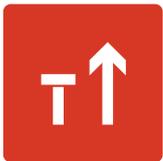
WiFi & Traffic Management

Working with an operator who was developing a gateway with multiple network interfaces, we worked to specify and develop advanced network functionality such as bridging between networks, traffic management, monitoring & diagnostics that together formed a comprehensive solution for delivering video through a consumers home network. We applied our networking expertise to contribute in proof of concept performance analysis, integration of WiFi and MoCA drivers, middleware and user interface development to deliver a reliable solution in a complex in home environment and then went on to support the project through deployment and field support phases.
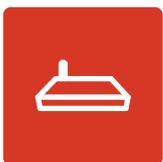
Cable Modem IPV6

A Silicon Vendor with a DOCSIS 2.0 Cable Modem reference design needed to add support for IPV6 and DOCSIS 3.0 to resource constrained legacy devices. Red Embedded put together a team with experience of cable modem development and Cable Labs certification to upgrade the legacy stack. After adding IPV6 functionality and updating SNMP, Multicast and Provisioning the Red Embedded team completed Cable Labs testing on the product.

where experience delivers

Video

Red Embedded has extensive experience of video streaming, codec implementation, and optimization in both broadcast and over the top (OTT) environments.
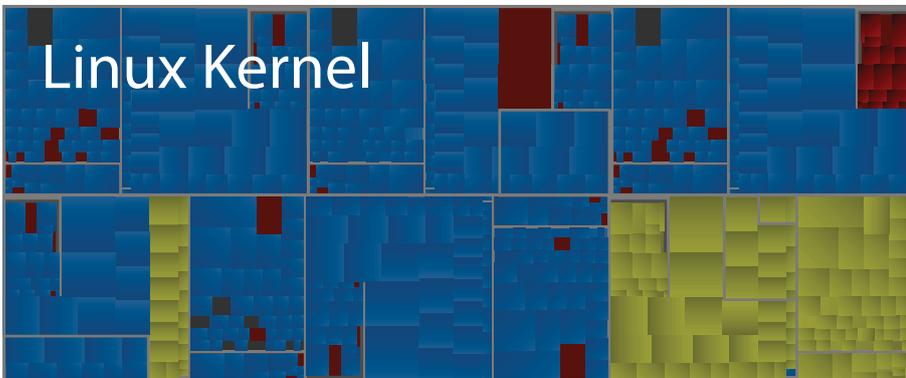
Security

In this project we used our understanding of the fundamentals of CODEC design and standards to develop software to manipulate the broadcast video stream in real time. Working with both MPEG2 and H.264 the software we developed dealt with all aspects of the source coding chain and needed a wide range of skills. The techniques were complex and we also wrote a number of tools to generate complex data sets to validate the techniques we developed and to test the behaviours of a wide range of deployed decoders.

Ad Insertion

Using our experience of video coding, streaming, and set top box silicon, we worked with a set top box manufacturer, CA provider and silicon vendor to implement Dynamic Ad insertion into a deployed set top box. Specifying and developing driver and application APIs, right down to the firmware, to allow seamless transition between broadcast video and inserted commercials on live broadcast, time shifted and recorded content.

Linux Kernel

The software on many modern consumer devices is based on the Linux kernel. Whether your kernel needs security hardening, optimising real time behaviour or drivers porting from legacy kernels, our team have the experience of delivering.

Kernel Hardening

Our client had concerns regarding the robustness of their products. A penetration test and review of their kernel confirmed this was a valid concern but addressing it wasn't straightforward. There was a number of product variants each running different Kernel version and patch set. Our project went on to converge to a single kernel version across their products that was hardened by porting security patches and locking down the kernel configuration to provide a secure maintainable base for their deployed products.

where experience delivers

Source and License Audit

Our client produces secure digital radio products and asked us to help with their Linux Kernel configuration. We conducted an audit of their kernel identifying the provenance of contributions and highlighting any potential licencing issues. Through review we were able to rationalise the patch-set and make improvements that enhanced their products security and performance.

Wireless Protocol Stacks

Red Embedded has experience of integrating a wide range of wireless stacks into consumer devices, including WiFi, Wifi Direct, Bluetooth, Bluetooth LE and RF4CE.

WiFi

An operator planning to deploy WiFi for range extending in home video distribution engaged us to help their development. Using 802.11n with QoS and WMM extensions we worked with the operator and hardware vendors to specify the end to end system, and stood up a multi-skilled team that saw the project from development, QA and trials, right through to diagnosing in home issues during roll out.
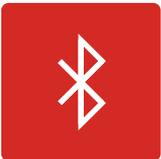
Bluetooth

Red Embedded have worked extensively with BlueZ, integrating the open source stack into a STB target, analysing and fixing stack and protocol issues with techniques like on air capture. We integrated A2DP audio with metadata and Bluetooth LE to support HID and mouse/touchpad for advanced user interface interaction.

RF4CE

Working with set top box manufacturers and RF4CE technology providers we integrated RF4CE remote protocols into an operator's middleware. We specified the driver API, designed and developed middleware and User Interface for programmable remotes. We delivered the feature, and worked with the third parties to make sure it worked in the real world.

where experience delivers

Modern Architectures

Increasingly modern architectures based on frameworks are chosen accelerate development and enable a wide range of web tools and resources. Red Embedded has experience creating and working with such frameworks.

Android

One Android based project delivered a TV centric solution providing hybrid IP and broadcast content across a network of Android devices that share distributed tuner and storage resources. The project leveraged the power of the Android platform that enabled a rich animated user interface and powerful content distribution to be achieved in a short timeframe with only a small team.

Web Services/REST

Red Embedded developed Web Services APIs for a major operator's set top box devices to enable enhanced functionality including improved guide search, diagnostics and UX analytics. Web Service interfaces have also been developed to be served from the set top box devices, this has been aimed for enhanced integration with mobile and tablet devices as well as whole-home. These Web Services use modern web technologies including JSON and RESTful interfaces to provide for agile development and rapid deployment.

Strategic

Not all of our software projects are about writing code, we've worked with customer early in their planning cycles to inform decisions on platform and framework selection, performance analysis to understand if a platform can deliver the planned service.

Middleware Landscape Review

An operator customer looking to launch a new service engaged us to provide analysis and a report on the Digital TV middleware landscape. We selected a set of appropriate middleware vendors, and carried out technical and business analysis of their offerings to inform our customers technology selection.

Project Support

As well as developing the software, Red Embedded typically establishes tools and processes to support a development. Source Code Repositories, Bug Trackers, Code Review tools and Continuous Integration infrastructure all contribute to our flexible and efficient delivery.

where experience delivers

Working With You

We bring our specialist experience and technical capability to work on your projects. We work in a flexible way, allocating the right skills mix of directors, consultants, project managers and hardware/software developers to your project. We provide a project-based service, ranging from complete turnkey projects to individual work packages tailored to your specific needs.

At key stages, we place our class-leading staff within your company. You'll find us practical and plain speaking, thorough and innovative, with the capacity and skills to help deliver your project, right first time.

About Us

Red Embedded Consulting is a professional services company providing a wide range of technology-led consultancy services.

Founded by 5 engineering leaders from Pace Micro in 2003. Red Embedded has grown a strong reputation by delivering innovative and practical solutions through services that cover competencies in software and hardware design, system integration and strategic research.

Red Embedded has built an impressive client portfolio that includes some of the largest global players in the world of consumer electronics and digital technology who access our extensive experience in high-volume, video centric technology such as set top boxes and media gateways,

Our service approach is based on a value of Customer Advocacy. We are dedicated to delivering for our clients and transfer the Intellectual Property we develop to our clients allowing our customers to exploit their service investment to the full.

Or team work from fully equipped laboratories in Yorkshire, UK and Los Angeles, USA. Where needed we embed into clients teams either virtually or physically.

The company is privately owned and currently has around 68 heads.

- **Strategic Research**

- **Design & Development**

- **Integration Services**

Contact Us

consulting@redembedded.com

www.redembedded.com

UK: +44 1274 287 787
US: +1 310 807 0818

[**RED**] consulting
EMBEDDED

where experience delivers