

HCL's Embedded Platform Lab

Innovation and New
Product
Development
made Easy



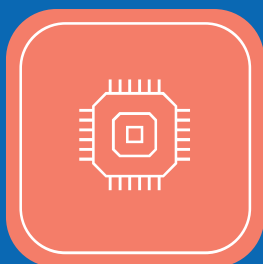
Embedded Software Design and Development for Growth

Industry 4.0, IoT, 5G, and automation have changed the landscape of embedded systems product development, which calls for deep technology and domain expertise. HCL has several decades of expertise in embedded software, especially in developing platforms for embedded systems used in consumer electronics, medical devices, automotive, aircraft, and telecommunications, where scalability, stability, security, reliability, and performance are integral.

Many leading global companies partner with HCL to help them develop and sustain their product lines. We use our expertise in embedded platforms, embedded systems, embedded devices, and embedded software architecture to help these companies quickly develop high-speed products such as storage and networking, rapid prototypes such as white goods, and mission-critical products such as medical devices and aerospace systems.

Our embedded system group comprises SEI Certified Architects, a large talent pool of SMEs and engineers, and is equipped with competencies in microcontrollers, processors, programming, and debugging tools, Linux, and Real-Time Operating Systems (RTOS).

HCL's Embedded Platform Engineering Consultancy Services and Offerings



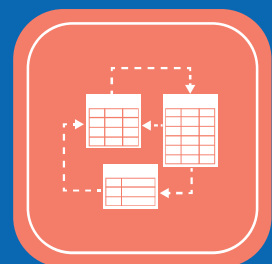
Embedded OS Customization

Ultra-compact devices with limited CPU, memory, and power resources require embedded OS customization to meet the resource and performance requirements. Our clients consult us for embedded OS customization, which includes kernel patch analysis and modification of subsystem modules in Linux/RTOS or the creation of a custom OS altogether.



Platform Migration and Porting

To add new capabilities and increase the performance of embedded devices, embedded systems, and embedded software architecture, platform migration and porting to a different environment will be required. Our clients choose us to critically evaluate the hardware such as chipset selection and board design and software change analysis like OS evaluation, application integrity, and help in seamless implementation of such porting and migration.



Architecture and Design Services

Next-generation embedded products have a huge demand in the market. These niche products involve complex architecture and design. We help our clients in creating efficient architecture by analyzing functional and non-functional requirements, quality attributes, system modeling and state machines and implementation of the architecture design.

HCL's Embedded Expertise You Can Count On

Amid Industry 4.0, HCL provides leading global organizations with services in embedded software architecture, design, and development. In doing so, we enable customers to build embedded devices and services that connect them with their end-customers and other stakeholders in the ecosystem. This can deliver a differentiated digital experience that is above market standards.

Our embedded services are built with deep expertise in Linux, RTOS, and Firmware and our associations with open-source communities and contributions in open-source software, helps us in delivering world class products in business verticals such as aerospace and defense (like wing control, and engine control unit), consumer electronics (like Washing Machines, cameras, tablets), telecom and networking (like gateways and routers), industrial manufacturing (like PowerStation monitoring, process control), medical devices (from implantable pacemakers to patient monitoring systems).

We help our customers in all stages of embedded platform software design, starting from custom boot loader, firmware, custom protocol communication, device driver, OOS porting, as well as application and test design, to verification and validation, and manufacturing support.

Experiences Engineered for our Customers



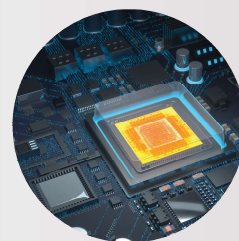
Fast Boot

A U.S.-based imaging technology company wanted to improve boot time to less than 10 seconds after power-on for its Linux-based night-vision camera. HCL helped customize the boot and helped the client to improve the boot time to 3.5 seconds after powering on.



Multi-RTOS

An U.K.-based power station equipment manufacturer company wanted a critical application to be handled via a real-time operating system (RTOS) for quicker processing, and other operations via Linux. HCL helped reengineer the embedded platform so that the real-time sensors, control system signals, and actuators ran on VxWorks (RTOS), while the other embedded applications ran on Linux, thereby helping the client achieve crucial product and domain specific requirements and compliances such as safety and security.



Quick Prototype

A Japan-based global electronics manufacturing company wanted multiple prototypes of an infotainment system to be designed and delivered with various OS options like Linux, uTron, and Android. In eight months, HCL helped deliver all the prototypes of the entertainment system in the required versions.

Why choose HCL Embedded Platform Lab?



EXPERIENCE

We help customers across all major industry verticals launch world-class products that redefine user experiences and create new revenue streams for their businesses. Our customers are leading global organizations in organizations in aerospace and defense, medical devices, industrial manufacturing, automotive, telecom, and consumer electronics. We offer services across all major geographies such as the U.S., Europe, and the APAC region.



EXPERTISE

Our expertise extends to different Linux flavors, RTOS, chipsets, and tools:

- Linux Flavors - Ubuntu, Fedora, Debian
- RTOS - Free RTOS, Zephyr, RIOT, Nucleus...
- Chipsets - ARM, RISC V, Power PC, x86
- Tools - Yocto, Eclipse, GNU Tools, JIRA, Jenkins, GIT

Along with the above areas of expertise, we also have complementary capabilities such as VLSI, SoC, FPGA design, Mixer IC signal, AI/ML, and device security.



ASSETS AND ACCELERATORS

The following accelerators expedite the new product development process:

Stable Linux image for ARM platforms: This solution helps our clients ensure that the tested Linux Image is used which helps in the stability of the product and reduces development time.

Tested Device Drivers suite: This suite helps clients ensure faster verification and validation of their embedded devices and improves production test quality.

Edge Computing Stack: This solution provides a customizable open-source blueprint of the client's unique IoT Solutions.



PARTNERSHIPS

Customers benefit from our strategic relationships with partners across the ecosystem which includes partnerships in the edge computing space, with Nvidia and Intel's new chipsets. Also, we have working relations with top global universities on areas of collaborative research in edge computing, RISC etc. We have membership with Linux Foundation in edge computing and actively contribute to the community.

HCL



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HCL Technologies (HCL) empowers global enterprises with technology for the next decade today. HCL's Mode 1-2-3 strategy, through its deep-domain industry expertise, customer-centricity and entrepreneurial culture of ideapreneurship™ enables businesses to transform into next-gen enterprises.

HCL offers its services and products through three lines of business - IT and Business Services (ITBS), Engineering and R&D Services (ERS), and Products & Platforms (P&P). ITBS enables global enterprises to transform their businesses through offerings in areas of Applications, Infrastructure, Digital Process Operations, and next generation digital transformation solutions. ERS offers engineering services and solution in all aspects of product development and platform engineering while under P&P HCL provides modernized software products to global clients for their technology and industry specific requirements. Through its cutting-edge co-innovation labs, global delivery capabilities, and broad global network, HCL delivers holistic services in various industry verticals, categorized under Financial Services, Manufacturing, Technology & Services, Telecom & Media, Retail & CPG, Life Sciences, and Healthcare and Public Services.

As a leading global technology company, HCL takes pride in its diversity, social responsibility, sustainability, and education initiatives. As of March 31, 2021, HCL Enterprise generates annual revenues of US\$ 10.1 billion and has 169,000 employees operating out of 50 countries.

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