

Embedded Qt Applications



ICS Has Comprehensive UI Development Experience for Embedded Processors

As the world continues to grow more mobile, it has become necessary to make a wide range of applications available at the touch of a finger. However, it can be a challenge to deliver these applications on small, sophisticated embedded devices. The most innovative approach to embedded application development comes from the Qt cross-platform application and UI framework.

The ICS Professional Services Team has unrivaled experience in both Qt and user interface design. We stand ready to develop a superior interface for your application and port it to your device. This allows your team to concentrate on value-added innovation for your core business, with the net result being a superior product delivered more quickly than your competition. ICS has successfully ported Qt to a variety of embedded platforms:

Embedded ARM® Processors

Gumstix Overo Earth (OMAP 3503)

ICS used Overo Earth (OMAP 3503) from Gumstix to develop a proof of concept multi-media device. This effort included a port of Qt 4.5 to the embedded platform with video and sound processed via the Qt Phonon subsystem.



Texas Instruments DaVinci™ 6446/6467 (ARM-9)

ICS developed an embedded video player for a personal health product family. The video player had a two chip architecture. DaVinci chip was used to decode video while an OMAP35xx was used for an embedded Qt-generated, highly kinetic user interface. These two sources were blended to provide a unified user experience.

Nokia 5800 XpressMusic (ARM-11) & Nokia N97 (ARM-11)

ICS helped our client port an application from the iPhone to the Qt "Tower" pre-release on the S60. This effort required recoding large segments of Objective C as well as rewriting other segments to leverage the benefits of Qt and S60. The resulting application was a hybrid, using Qt for the user interface portions and application infrastructure and S60 APIs for the networking and communication aspects.



Gumstix Verdex Pro (XScale™)

ICS used Verdex Pro as a performance test bed for a client that was developing a custom board with the Marvell® PXA270 processor. This project called for ICS to port Qt 4.5 to the embedded platform, validate the port, and assess its CPU performance and memory footprint. This project allowed our client to determine weeks in advance whether the custom board was going to provide sufficient performance. As a follow-on to this effort, ICS developed a set of custom user interface graphics to be used in the final product. Developing these UI graphics with the existing Verdex Pro board allowed our client to create their software in parallel with the hardware, resulting in faster time to market.

Beagleboard (OMAP 3530)

The Beagleboard (OMAP 3530) provides a highly functional development platform for devices that use the OMAP processor from Texas Instruments. ICS developed an embedded Qt application that delivered video at 30 fps. ICS ported a pre-release of Qt 4.6 to this board and successfully connected the Qt paint engine to the hardware graphics acceleration device.



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ARM-based Research and Development Activities

By using the most recent desktop and embedded technology in internal R&D projects, ICS is prepared to work with any client system. Examples include:

- **iPhone (ARM-11):** The iPhone was used by ICS engineering as part of an internal effort to assess the feasibility of developing a port of Qt to the iPhone.
- **Trolltech Greenphone (Intel XScale):** The Greenphone is a smart phone platform developed by Nokia, Qt Development Frameworks (then Trolltech) to support the first releases of the embedded version of Qt, Qtopia, and the Qtopia Phone Edition.
- **Openmoko Neo family of smart phones (Openmoko Neo 1973 ARM-9 and Openmoko Neo Freerunner ARM-9):** ICS used these devices as general test beds for evaluating new releases of embedded Qt, testing frameworks for cross-development tools, and as a reference for performance measurements on embedded systems.

Atom

Intel D945GCLF2 (Intel® Atom™ processor 330)

One of ICS's clients chose the mini-ITX board D945GCLF2 as the embedded processor for their line of office equipment. They selected QNX as the operating system and requested that ICS port Qt 4.5 to this embedded platform. This effort included the port of the latest version of x.org's x11 to QNX and the addition of supporting libraries to replace standard Linux libraries that were not provided. This successful port of Qt benefited our client by allowing them to develop their applications once and deploy them on a range of systems with differing price/performance.



Hitachi SuperH/SH

ST 7109

ICS's client had selected STMicroelectronics STi7109 as the foundation for their HDTV set-top box decoder. ICS jumpstarted the project by setting up the cross-platform development environment, porting Qt to their target hardware, and tuning their system environment.

MIPS

Ingenic Semiconductor Jz4740

The Jz4740 is a MIPS XBurst CPU chip made by the Chinese company Ingenic Semiconductor and is a popular choice for MP4 players. Our client has used this chipset in a point of sale, touch screen device. ICS became involved with this effort when our client asked us to debug failures generated by the quick selection of multiple options via the touch screen. We successfully isolated and eliminated the problem by rewriting the handling of serial I/O communication using the open source QextSerialPort class. Subsequently, we have expanded the functionality of this device to include field updates.

Sigma Designs SMP8634

In this project, our client engaged us to validate and tune Qt 4.5 for a video set-top device. The ICS team provided guidance on specific Qt APIs necessary to achieve desired functionality within the UI. The most challenging aspect of this project was the debugging of the Qt DirectFB screen driver. Our engineers worked closely with those of Nokia's Qt Development Frameworks to isolate and identify errors related to DirectFB on the Sigma Designs platform. We also identified and suggested workarounds to areas where Qt on embedded platforms functions differently on the Sigma Design platform compared to desktop Windows and Linux systems.



About ICS

Integrated Computer Solutions, Inc. (ICS), of Bedford, MA, is the largest independent supplier of professional services, training, and add-on products for the Qt cross-platform framework. ICS is a Preferred Qt Training and Consulting Partner in North America and has provided training and consulting services to over half of the Fortune 500, including many whose technology defines their core business. More information can be found at www.ics.com.



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