

Wipro Ports UPnP Stack to S60 Platform Using Open C



Wipro's multimedia slide show application uses UPnP technology.

The challenge: Port UPnP stack to S60 platform

Wipro Ltd., one of the largest independent research & development (R&D) services providers in the mobile market, saw the benefits of enhancing its multimedia slideshow application on the S60 platform with Universal PlugnPlay (UPnP) capabilities. These UPnP capabilities would connect the huge S60 consumer base with the peripheral capabilities of digital televisions, set-top boxes, digital cameras, portable media players, and many other devices. Wipro's challenge was to write the UPnP stacks using open source C, and then to port those stacks over to S60 3rd Edition. The question Wipro faced was how to accomplish this porting process as efficiently as possible.

The solution: Open C plug-in for S60 SDK

The answer to the question was in open source code, and in the usage of the new Open C plug-in to the S60 3rd Edition SDK. "Usage of the Open C plug-in basically helped us to get the POSIX [Portable Operating System Interface] UPnP stack and multimedia slide-show application up and running in the target environment in a much shorter time span," says Sharad Sharma, project manager for the porting project at Wipro. "I think this was a huge benefit in realizing our UPnP-based multimedia slide-show service, as it was completed with significantly less than the planned amount of effort."

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— Irfan Abdul, software engineer, Wipro*

Irfan Abdul, a core member of the project at Wipro, gives the specifics: "By using the Open C plug-in, we were able to get the POSIX C UPnP stack compiled on S60 3rd Edition successfully within a few hours," he says. "This enabled us to spend the rest of the saved effort in further developing the application, fine-tuning the code logic, enhancing the UI effects, and developing some extra nice-to-have differentiating features for the application."

The benefits: faster porting path to the S60 platform

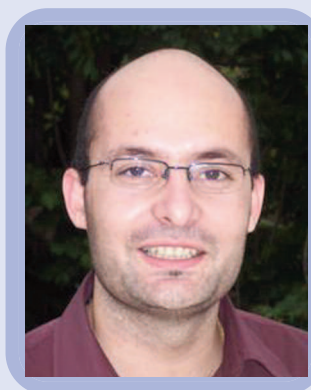
According to Sharma, the Wipro team had three choices. "We could have developed the whole UPnP stack on the S60 platform from scratch, which would have been costly in both time and effort; we could have written our own open-source Open C plug-in; or we could use the POSIX C UPnP stack and the Open C plug-in in the SDK. Clearly, the third choice was the most efficient method."

UPnP

UPnP is a set of computer network protocols distributed by the UPnP Forum (<http://www.upnp.org>). The goals of UPnP are to allow devices to connect seamlessly and to simplify the implementation of networks in the home and corporate environments. This includes data sharing, communications, and entertainment sharing among devices. UPnP achieves this by defining and publishing UPnP device-control protocols built on open, Internet-based communication standards.



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Looking ahead:

In the near future, says Sharma, Wipro will be porting other software using the Open C plug-in. "We would like to port other POSIX-compliant services and applications to [the] S60 platform, and to use it for application development in various other consumer electronics devices platforms. We have just recognized the immense potential of Open C and will be doing a lot more with it. We will also conduct training sessions on open source Open C, and thereby leverage the opportunity to migrate applications and services from other platforms onto S60 3rd Edition devices. This will further contribute to expanding the unique environment of the S60 community."

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“Porting the UPnP stack onto the S60 devices basically extends the power and scope of the device, turning it into a DLNA [Digital Living Network Alliance] media server and media control point,” says Sharma. “DLNA is an innovative technology that enables new digital entertainment devices to collaborate on a home network. This in turn allows seamless sharing of digital content like music, video, and photos.”

Wipro's multimedia slide show application

“The multimedia slide-show application developed by Wipro can be extended to become a generic control point,” says Sharma. “It discovers other UPnP services and servers on the network and can control them. In the home networking environment, the S60 device can then act as a remote control for the HDTV, the audio system, the printer, and other devices. In the particular case of the multimedia slide-show application, for example, it can separately control the audio system and the external display device.”

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Wipro's multimedia slideshow application enhances the user's experience as he or she watches the images on the handheld device. The application supports different themes, which the user can activate to set different visual and audio effects on the slide show.

What makes this application stand apart is the fact that, because it makes use of UPnP technology, the user can render the images and music onto separate UPnP devices. During this whole exercise, the user can still control the running show on the wireless rendering devices from his or her mobile device.

Wipro

Wipro's services for the smartphone ecosystem span the entire design spectrum, from hardware design to application development and product verification. Wipro operates the only S60 Competence Center in India, and has years of experience in working with leading players of the smartphone eco system. Wipro engineering teams have years of system integration experience with S60 devices, as well as consumer devices such as set-top boxes, portable media players, digital TVs, and digital cameras.

The Open C plug-in for S60 SDK

The Open C plug-in for the S60 3rd Edition SDK forms a bridge between the vast C programming community and the more than 100 million S60 devices being used worldwide. It implements nine libraries built on open source projects -- five implemented by Nokia and four that had previously been implemented by Symbian Limited. The five libraries implemented by Nokia in the Open C plug-in are the OpenSSL (libssl) for secure sockets; libz for compression; libcrypto and libcrypto for cryptography functions; and libglib, a general-purpose library of functions.

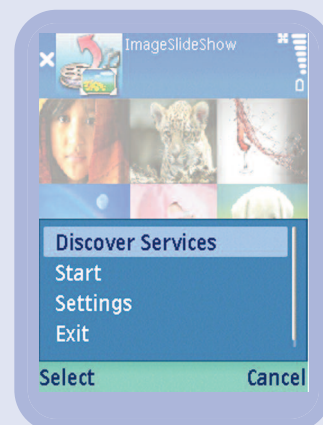
In January 2007, Symbian introduced four of the basic POSIX libraries on Symbian OS in P.I.P.S. (P.I.P.S. is POSIX on Symbian): the libc, libm, libpthread, and libdl libraries. The C standard library, libc has system APIs mapped to Symbian OS APIs for better performance; libm is a mathematical library; libpthread implements POSIX-style threading support using the terms of the underlying Symbian OS thread support; and libdl implements POSIX-style dynamic linking.

While the Wipro team is very experienced with the S60 platform, Open C also makes it easier for developers with no S60 experience to contribute to mobile projects. The large pool of developers experienced in C language work can now contribute immediate value to projects serving S60 users. Among other things, Open C makes it easy for developers who have little experience with mobile systems to create project modules on client/server management, 3D graphics using OpenGL ES, message queue management, and event-driven systems.

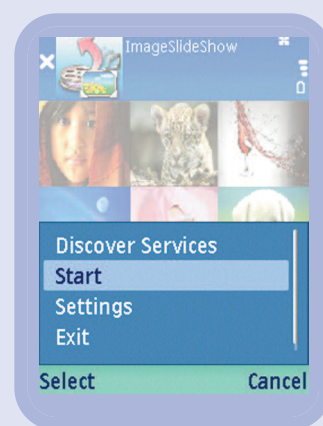
To download the Open C plug-in for the S60 3rd Edition SDK, visit http://www.forum.nokia.com/info/sw.nokia.com/id/91d89929-fb8c-4d66-bea0-227e42df9053/Open_C_SDK_Plug-In.html. To learn more about the open source project, visit <http://opensource.nokia.com/index.html>.

For more information, go to:

www.nokia.com/developer



Wipro's multimedia slideshow application has a UPnP stack that can discover display and playback services on other devices.



After connecting to the UPnP-enabled display and audio services, the user is ready to start the slideshow.



The detail zoom-in effect shown here is one of the application's many features.

