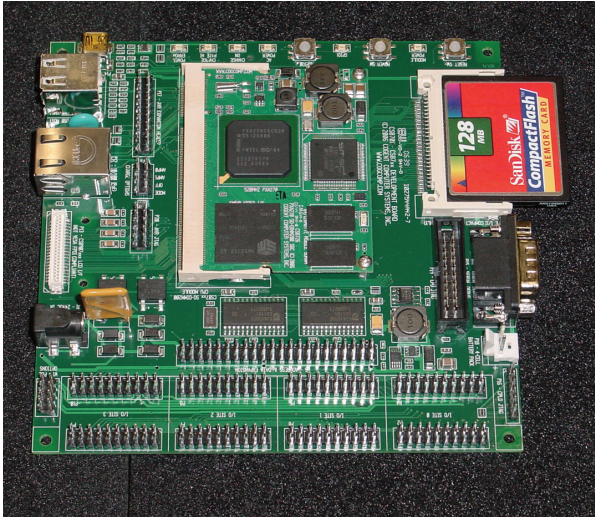


BSQUARE's SchemaBSP Tool Helps Cogent Rapidly Launch Windows CE-Based Board Support Packages



Cogent used BSQUARE's SchemaBSP development tool to create a Windows CE 5.0 board support package for its CSB726 PXA270 System on a Module (shown here with its CSB701 development board).

“When you buy Schema, you'll have your money back in three months tops—maybe sooner. In a month and a half, you'll be able to accomplish what otherwise would take four to six months—and that's just on your first project. Once you're fully up to speed, you'll save even more time.

Plus you have access to the source code.”

—Michael J. Kelly, Vice President of Engineering,
Cogent Computer Systems, Inc.

Customer Profile

Cogent Computer Systems, Inc., based in Smithfield, RI, has been designing and manufacturing embedded OEM and development boards since 1992. Cogent's single-board computers are based on leading-edge integrated CPUs, such as ARM, PowerPC, MIPS, and ColdFire. The boards provide a cost-effective platform for integration into custom OEM systems as well as for rapid software development. Cogent also offers custom design and manufacturing services.

Business Challenge: Upgrading BSP from Windows CE 4.2 to 5.0

Getting a new operating system running on a board support package (BSP) is often a challenge, as Cogent Computer Systems found when they first created a

Windows CE 4.2-based BSP for the Intel PXA255 chip. Drivers for the latest version of an operating system are often not available at the outset—and drivers for older versions may require a significant amount of debugging to get them to work with the new version. Porting all the drivers the board needed from Windows CE 3.0 to Windows CE 4.2 required the company to hire an outside engineering firm, costing them nearly \$30,000—and the process took about a year.

“That was bad enough,” says Michael Kelly, Cogent's Vice President of Engineering. “But then, in early 2006, when we wanted to move up to Windows CE 5.0 and started trying to port the drivers, we found that we were basically starting from scratch and would have to go through the whole process all over again.”

Initially, Cogent tried to save money by doing the porting with its own team—but after spending four months trying to get the USB host driver working, they realized this approach was not cost-effective. “We're hardware experts, not software experts,” Kelly says.

On the other hand, the company didn't want to hire an outside engineering firm and pay \$30,000 every time they wanted to move up to a new version of the operating system.

Solution: SchemaBSP from BSQUARE

Kelly found his solution in May 2006, when he attended a Microsoft seminar and saw a demonstration of BSQUARE's SchemaBSP, a software development tool for creating Windows CE-based BSPs. SchemaBSP is a highly custom-

izable BSP generator that integrates smoothly into Platform Builder, Microsoft's development tool for Windows CE. SchemaBSP contains a vast collection of configurable Windows CE source code, including bootloaders and OAL (OEM adaptation layer) code, as well as approximately 200 device drivers. By freeing developers from much of the code generation work, SchemaBSP enables them to focus on other parts of the development process and greatly shortens the development cycle—plus it provides them with reusable code that further reduces development time when building other products.

After seeing the demo, Kelly knew that SchemaBSP was the solution he was looking for. Cogent purchased the product in June, attended a BSQUARE training course in July, and by September had a working Windows CE 5.0-based BSP—USB host and all. “And this was our first time working with SchemaBSP,” Kelly notes.

Kelly does recommend that first-time users take the BSQUARE training course before attempting to use SchemaBSP on their own. “Like any software tool, SchemaBSP takes some time to learn, and it's helpful to have experts providing you with guidance,” he says.

In October, Cogent started creating a BSP for a new PXA270 hardware platform. That time, since the developers were already familiar with SchemaBSP, the task took only a month and a half. And when they later decided to add support for a 2D graphics accelerator

chip, they were able to integrate the necessary code in just two days.

Cogent's next step will be to upgrade the operating system on their PXA270-based BSP to the latest version of Windows CE, version 6.0. “With SchemaBSP, we expect that task to take only a week or two,” Kelly says, “because BSQUARE has done all the work to make the Windows CE 5.0 drivers work with version 6.0.”

Choice of Deliverables

The end product that Cogent offers its customers is an image created in Platform Builder that runs on a specific piece of hardware. In some cases, Cogent delivers the fixed image to its customers; in other cases, it supplies the image plus a binary BSP. Customers can plug the binary BSP into Platform Builder to create their own images that have different behaviors from the Cogent-supplied image. For example, a Cogent image that boots up to the Windows CE desktop can be changed to start up the customer's application instead. In other instances, a customer may want to remove Windows Media Player and Internet Explorer from the image in order to reduce memory size and cost, or limit the functions available to users. With the binary BSP, customers can add any Windows CE function from Platform Builder that Cogent didn't supply and remove any Windows CE function that isn't needed for their application. However, they can't change the way a BSP-related function works. For example, they can't change the particular pin to which a power switch is tied.

If customers want to be able to make these types of hardware-oriented changes, they can do so by buying SchemaBSP, which gives them access to the source code. With SchemaBSP they have the tools they need to make whatever changes they want—for example, moving to a different hardware platform, removing the display to create a “headless” system, or adding audio capabilities to a design that previously had no audio.

Benefits: Reusability, Portability, Consistency, Ease of Use

“Platform Builder is fine as far as it goes,” says Kelly, “but the production-ready BSPs that come with it aren't really practical as products. They were designed to show off all the chip features, so they're overloaded from a product standpoint. And since Platform Builder provides no consistent model from one BSP to the next—or one driver to the next—if you try to make any changes, you can easily end up breaking the underlying operating system.”

SchemaBSP, in contrast, lets users create BSPs that meet their precise need. “Schema is easy to work with and provides a consistent model across a wide range of BSPs and drivers, so you can tailor a BSP to meet your requirements without breaking the underlying operating system,” says Kelly. “It's a unique product—it really has no competitors.”

Some of the key benefits of SchemaBSP, in Kelly's opinion, are:

- **Code reusability.** Once an initial BSP is created with SchemaBSP, the code can be reused across product lines—plus boards can be easily upgraded to accommodate new hardware features and can easily be migrated to new versions of Windows CE.
- **Hardware portability.** SchemaBSP also makes it easy to port a design to a different hardware platform. “We took a PXA 255 design and easily ported it to a PXA 270 because we were able to reuse so much of the code,” says Kelly.
- **Operating system portability.** “With SchemaBSP, you can easily take a board from Windows CE 5.0 to 6.0,” says Kelly. “That’s huge! But even if you stay with the same version of the operating system, you can easily incorporate patches that help you get the most out of whatever version you’re using.”
- **Consistency.** SchemaBSP offers a consistent approach to working with Windows CE, regardless of the hardware platform or specific drivers the user selects. “That’s one of its key benefits,” says Kelly. “Once you’ve done one BSP with Schema, you understand the model and can apply it to whatever else you work with, saving even more time on future BSPs. And all the drivers are fully tested, so you can be confident that they’ll work.”
- **Ease of use.** Compared to creating a BSP from Platform Builder alone, SchemaBSP is extremely easy to use. “Because Schema does all the ‘heavy lifting,’ you don’t have to be a Windows CE expert to create great CE-based devices,” says Kelly

Summing Up

In Kelly's view, the decision to buy SchemaBSP is a no-brainer—even for companies that have in-house software expertise. “When you buy Schema, you’ll have your money back in three months tops—maybe sooner,” he says. “In a month and a half, you’ll be able to accomplish what otherwise would take four to six months—and that’s just on your first project. Once you’re fully up to speed, you’ll save even more time. Plus you have access to the source code—whereas, if you hire a Windows CE consultant, the consultant usually owns the source code.”

Looking toward the future, Kelly notes that “SchemaBSP gives us the flexibility and freedom we need to meet our customers’ requirements. We’re planning to create a new board based on the next-generation XScale processor—and we know that with SchemaBSP’s help, we’ll be able to get it to market quickly and cost-effectively.”



For more information, please visit www.bsquare.com or e-mail us at sales@bsquare.com.

About BSQUARE:

BSQUARE is a solution provider to the global embedded device community. Our teams collaborate with OEMs at any stage in their device development to bring quality products to market faster. Since 1994, BSQUARE has been a trusted partner to smart device makers worldwide.

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