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Subsystem Hardware Gets Soft Around the Edges

Purchasers of subsystem hardware in the telecommunication industry are putting increased demands on board suppliers, asking them to get a little soft around the edges – essentially adding software components to traditional hardware solutions. While the majority of OEMs continue to develop their own software, increasingly, many no longer want to invest the time and resources it takes to develop in-house if they can purchase effective solutions from outside vendors. This article explores why hardware suppliers have added software capabilities to their previously hardware-only solutions and how these commercial off-the-shelf solutions are providing telecom developers with significant cost, flexibility and time-to-market benefits.

The numerous benefits that system developers have gained in recent years from off-the shelf hardware are leading many to seek similar advantages from commercial software. Today approximately eight percent of worldwide embedded markets use commercial real-time operating systems and over the next three to four years, industry trends indicate the number will rise to 25 percent. The telecommunications segment has become one of the fastest moving markets toward acceptance of commercial RTOSs, with long-term cost, flexibility and time-to-market pressures continuing to be factors.

DRIVING THE TREND

More complex products and applications are resulting in more complex software, including operating systems, communication protocols and development tools used to run the boards. As a result, software has quickly displaced hardware as the highest-cost item in an embedded-development project because of the increasing complexity of the solutions. Not surprisingly, a number of specialized software development vendors have emerged as developers realize that purchasing software rather than creating it can eliminate the time and energy spent coding, debugging and documenting the most vexing, yet critical portion of their board software.

In addition to time and cost savings, commercial software offers numerous other benefits, including scalability and the ability to leverage operating system development tools. Commercial software and development tools enable developers to accommodate changes in processors, hardware or architectures of board-level subsystems without re-designing the entire software component. Even if the basic underlying hardware of the system changes, users will not have to change the application software because the application programming interface (API) to the low-level software and hardware will remain consistent. With off-the-shelf software, developers can select any vendor-supported processor, providing more options for new designs or upgrades. OEMs today are developing product lines which use a single software platform that can be scaled across a wide range of systems. This ability to develop for one open platform enables developers to target customers from very small environments to large multi-component systems.

Another added benefit to purchasing software from a vendor is the integration factor. With software tightly integrated with hardware, most developers who purchase commercial hardware still have to wait for final boards from vendors before they can begin developing the board software. And because shipping the entire product is dependent on the final hardware/software product, this process doesn't hasten time-to-market. Today, some software vendors are integrating hardware and software to save time on porting, and provide an easy-to-use API which insulates the programmer from the minute details of the protocol. Ultimately, this type of integration shortens development time and time-to-market.

VENDORS AS PARTNERS

In recent years, board, subsystem and software vendors have all become more value-add oriented. They have enhanced product features and services and are offering more bundled products, packaging, open systems and other elements designed to give OEMs the time to market advantage that they need to be successful, and giving them an edge over the competition. With this competitive advantage at stake, system developers are evaluating their vendors closely to determine if the vendors can provide solutions with multiple components – hardware, software, volume expectations, timing and price requirements all play in as factors. Willingness to customize to meet application requirements, and offering services that save time and money are critical requirements for today's developers. The more the vendor can supply in all areas, the more satisfied the developer will be with the relationship.

Some vendors have developed combined hardware/software subsystems that can simplify development of protocol links. These combined systems can dramatically shorten development cycles and increase the flexibility of hardware components because they can be purchased as integrated systems or as standalone components.

For example, Artesyn Communication Products has developed the Portable Protocol Engine (PPE), a

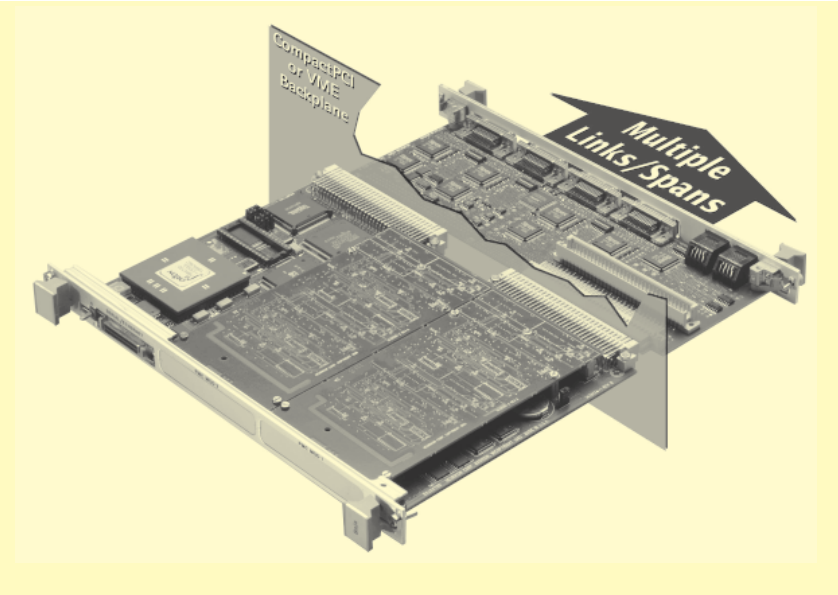

Figure 1.

hardware/software subsystem that combines a PCI mezzanine card (PMC) communications module with a driver and a choice of SS7 and/or HDLC LAPB/LAPD protocol options to deliver a network interface solution (see Figure 1). Because they offer different protocol options, developers have options in customizing their system with the PPE. The subsystem is portable between baseboards and operating systems, enabling customers to plug it into a baseboard from Artesyn or the customer's proprietary baseboard. This, unlike purchasing hardware and software from two different vendors, can provide developers with even shorter design cycles and offers OEMs a significant time-to-market advantage. Also, because the system is optimized to work together, it eliminates component incompatibilities and decreases troubleshooting when developing the system.

Another important aspect of the PPE is the API, which insulates developers from the details of the protocol – shortening the learning curve and time to market. For instance, a developer working on a system that has to talk to a third-party system using HDLC was once required to know the details of HDLC. However, with the PPE, the developer can open a connection and start writing data to the connection without regard to its format. The PPE takes care of "framing" up the data into HDLC format and sending it down the wire. This dramatically shortens development time and allows users to work with more protocols with less training time.

By using off-the-shelf software, companies have found that their resources can be better spent on developing their own core competencies. Spending the energy and resources to develop the application – which in turn provides a company's market differentiator – is usually money well spent. Partnering with a software vendor who specializes in system software also enables vendors to take advantage of expertise and technological advancements without expending direct costs to do so themselves.

FUTURE TRENDS IN DEVELOPMENT

Application plug-ins, or objects, may be the next big tool that system developers will look to outside vendors for. Objects are not complete stand-alone applications, but small application components that add value and functionality to the application. They have a simplified user interface and are easy to integrate into existing systems. By plugging in an object, developers can customize their application for specific needs. If these objects are built on an open platform, they can be plugged into any application that supports the platform. This can save time and expense, by allowing users to purchase any application and plug-in objects for added functionality.

In spite of the industry's push to commercial software and the shortened time to market for new products, the majority of system developers continue to write their own operating systems. For some, critical timing, legacy code, low project funding or simply a lack of need for a commercial operating system may be factors in choosing to keep their development in-house. Programmers generally understand their own code better and can be biased in its performance. Also, many application needs are simply better served with proprietary operating software.

Nevertheless, as hardware and software becomes more sophisticated and systems more complex, companies are realizing that the performance advantage formerly provided by proprietary software is quickly being overtaken by ever-increasing hardware processor performance.

Additionally, developers are finding that the cost barriers to build and maintain the software for such systems far outweigh the fears that keep them from working with commercial vendors – hardware that is just a bit soft is a better investment for many developing companies. ■

Todd Wynia joined Artesyn Communication Products in 1987. Throughout his tenure, he has held numerous titles within the marketing department, including Marketing Communications Manager, Product Manager and Strategic Marketing Manager. Wynia became Vice President of Marketing – his current position – in 1998. Aside from a bevy of titles, however, his 12 + years of industry experience has given Wynia an in-depth understanding of the technology, customer and market trends driving teledatacom applications.