Maximizing Available Markets for Hardware Products

Increasing sales and gaining market penetration through technology partnering

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Overcoming Market Barriers

Hardware designers and marketers are under great pressure to rapidly introduce products and penetrate as many markets as possible in the shortest time possible.

The inability to provide complete solutions that include both hardware and software often hinder the profit potential of new products. Unfortunately, software development is an increasingly specialized and complex discipline and system level development skills even more so. As hardware manufacturers focus on their core competencies in hardware design, the resources necessary to develop software and deliver complete solutions are often simply not available.

Providing a complete solution often requires:

- *Client side protocol and standards support:* As support for upcoming standards and other new features are added to hardware, software support for the features must also be available Without the accompanying software, the features often have little benefit for users and are not considered a strategic differentiator from lesser competing offerings.
- *Applications providing access to new or extended hardware features:* A competitive hardware feature advantage often requires changes to applications before it can be fully utilized by customers. Simply providing support at the system level and leaving customers to obtain or develop the associated software is not enough. Examples include advanced management interfaces, device control software, or protocol use and configuration support.
- *Application Programming Interfaces for customers:* In order to adapt their own applications to take advantage of new and compelling hardware features, potential customers must be given a way to access these features from within their existing software environments. An Application Programming Interface (API) is often critical to penetrate particular markets.

As an example, an upcoming network product may support a new networking protocol that adds a significant new capability. This new capability is seen as a major feature providing a competitive advantage and a way to position the product for increased sales. While this new protocol can offer substantial benefit, without off-device software such as client side device drivers or APIs, the potential customer is unable to utilize the new capability in their applications or as part of their existing network infrastructure.

This client side software support is key to the customer fully realizing the value of the new device and hence the key market success.

Solving the Client Side Problem

One of the most significant problems in addressing the client side lies in the vast range of potential client platforms. This includes various hardware platforms such as embedded devices, handhelds, PC-like platforms, server systems and many more. In addition, the problems multiply even further when the full range of operating environments are taken into account such as Real Time Operating Systems (RTOSes), commercial operating systems such as Windows (with variants including WinCE and embedded versions), Linux, UNIX, PalmOS, Java embedded devices and others. In many cases, the development effort needed to address these potential platforms significantly impacts overall cost and time to market, as well as stretching product development staff beyond the breaking point.

One solution is to partner with firms specializing in software development. Partnering provides significant advantages:

- *Access to specialized expertise:* Software development is an increasingly complex discipline and systems level development even more so. Expert software engineering skills are very valuable and increasingly rare.
- *Single source for broad based experience:* By working with a partner experienced across a broad range of environments, hardware providers can work with fewer partners but build deeper product expertise and simplify product development.
- *Improved utilization of internal resources:* No internal resources need be committed to developing and supporting software. No specialized engineering skills to resolve complex software issues need be developed.
- *No distraction from core mission:* Hardware providers are free to focus on the things they do best while still providing first-class software solutions.

Technology partners offer a wide variety of ways to bring more cost effective, complete solutions to market. By partnering with specialists with a proven record of successful project execution, hardware developers can retain their focus on hardware while insuring success in delivering a complete solution. Establishing the right partner relationship can mean the difference between success or failure of a new product.

Software Technologies Group

Software Technologies Group (STG) works with a variety of networking equipment and other hardware manufacturers to develop client side software. By building on many years of experience in operating system internals, network protocols and related software services, we help our customers enter new markets faster and sell more hardware.

STG provides a wide range of services for leading edge hardware vendors to help support their products in a variety of environments on a broad range of platforms. With experience ranging from embedded environments to the full range of commercial operating systems, STG operates as a key partner in providing crucial support software in a variety of markets.

Successes and Examples

STG has had many successful technology development and partnering efforts. Listed below are just a few examples of successful partnering with equipment manufacturers.

Wireless Networking

Within the wireless area, STG has developed EAPOL (Extensible Authentication Protocol over LAN) support for operating systems not providing this support native including some Windows platforms and Linux. EAPOL offers an effective framework for authenticating user traffic and supports multiple authentication methods, such as token cards, Kerberos, one-time passwords, certificates, and public key authentication.

STG has developed drivers and other support software for wireless access device manufacturers,. Support included low level device drivers, configuration and connection software and network management capabilities.

STG is also actively developing technologies relating to ZigBee, a short range, low power wireless standard intended for control, sensing, and other low data rate wireless applications. STG is working with vendors of ZigBee components and is developing a reference ZigBee to IP router product for manufacturers and resellers of ZigBee products. STG is an active member of the ZigBee Alliance.

PPPoE

STG developed one of the first PPPoE (PPP over Ethernet) client side implementations for manufacturers of broadband Internet access equipment. By providing the end user client software in a form which could be easily branded for specific customers, effectively distributed and installed, our licensees and partners were able to offer a complete broadband solution to their carrier level customers including Comcast and Time-Warner Cable.

VPN Clients

STG developed both proprietary and standards-based VPN clients which provided our licensees VPN capabilities in advance of their competition using a variety of encryption and authentication mechanisms. By providing this client side software, our customers were able to gain a significant market advantage and greatly speed the sales of their hardware-based VPN gateways.

SNMPv2

Having participated in the definition of numerous SNMP MIB definitions (Simple Network Management Protocol Management Information Base), STG worked with several hardware partners to develop some of the very first SNMPv2 capable commercial products including supporting network hubs/switches and uninterruptible power supplies.

USB 2.0

STG developed one of the first commercially shipping USB 2.0 (Hi-speed Universal Serial Bus) protocol stacks which is currently shipping in two commercial operating systems and is planned to ship with a third by the end of 2004.

In addition to this protocol stack implementation, STG also provides support software licensing and value added services based around the USB hardware and software provided by Philips Semiconductors.

UDI (Uniform Driver Interface)

Working in conjunction with SCO, IBM, Hewlett-Packard, Sun Microsystems, Compaq, Adaptec, Intel and other major operating system and hardware vendors, STG helped develop the industry's most successful, portable, high performance, scalable driver interface standard and reference implementation. As the only non-operating system and non-hardware vendor participating in this industry-wide effort, STG developed the Linux-based reference release and made this effort available on an open source basis to all industry partners and other interested parties.

STG continues to support this effort with custom driver development, UDI enhancements, and porting services to adapt UDI to new platforms and operating systems. At the present time, UDI is shipping as part of at least two commercially available operating systems as well as being an integral part of several special purpose operating environments used in defense and other vertical markets.

Conclusion

As hardware and networking devices grow in complexity and markets continue to grow and diversify, the need to offer a more complete solution is becoming a requirement to maximize market potential.

Many of today's devices are of little or limited use without the appropriate software which has elevated the need to address this component on par with the effort dedicated to the hardware itself. Add to this the growing complexity and number of potential operating environments and platforms plus the associated support demands, it becomes clear that a "go it alone" strategy can be inefficient. By teaming with partners who specialize in complementary areas, the ability to provide more complete solutions grows, time to market for customers shrinks, all without adding additional staff and overhead.

Through STG's specialized capabilities in this area, hardware manufacturers can partner with an effective and reliable teammate to grow their business, respond to customer needs and requests and leverage sales opportunities more completely. We have helped a number of manufacturers save money, grow their markets and increase customer satisfaction. We welcome the chance to discuss how we could work with you to grow your market share and help ensure the successful rollout of your next device.

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