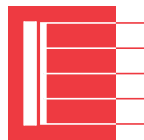


**Scalable, Standards-Based
IP Media Servers:
Driving the Shift from
Proprietary Architectures**

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abstract

The market for IP media servers is shifting away from proprietary hardware toward standards-based server platforms running media processing software. Carriers can now deploy open system-based servers running powerful and robust media processing software and achieve levels of scalability not even dreamed of just a few years ago. With the advent of more powerful server hardware that can handle the performance and scale required for carrier-class media processing, service providers can now capitalize on the many advantages of carrier-class, software-based IP media servers that run on open systems server platforms so they can efficiently manage capital and operating costs while deploying flexible, scalable and highly available multimedia services. The author will provide a historical perspective on IP media server evolution to open systems platforms, and offer insights learned from the market evolution for storage systems, database servers, supercomputers and Web servers. The author will explain that while proprietary servers were necessary for the initial introduction of IP media servers, open systems hardware, operating systems, applications and tools now provide everything needed to cost-effectively provide highly scalable and reliable IP media services. Software is the differentiator, and the author will highlight the limitations of proprietary media servers, discuss the impact of Moore's Law, and explain the advantages of open systems servers in terms of CAPEX, OPEX, feature velocity, scalability and reliability.

scaling open systems solutions

The history of server technology in other industries has taught the same lesson time and time again; while proprietary servers are often needed for the infant stages of a new technology, the market inevitably shifts to open systems servers due to the economic and technological benefits to both server vendors and server customers. Storage systems, database servers and Web servers are just a few examples of markets that once strictly relied on dedicated, proprietary platforms.

IP media servers are just the latest example of this trend, as vendors are shifting away from proprietary hardware platforms running embedded operating systems toward software-based media processing on scalable, flexible and modular open systems servers.

Proprietary media servers cannot possibly keep up with advances in open systems server technology. No single vendor can hope to compete with the hundreds of millions of dollars invested in research and development annually in standards-based processors, operating systems and hardware platforms.

One of the major drivers of the shift toward open systems servers is the need for scalability. This shift has already been boldly demonstrated in the market for supercomputers, which have evolved from proprietary platforms into rack-mounted, standards-based platforms.

The ability to efficiently distribute processing resources is the only way computing power can be effectively harnessed to support ever-increasing demands. Telcos can implement pay-as-you-grow scalability without the constraints of proprietary, chassis-based servers, and they can deploy modular servers in redundant configurations to meet carrier-class availability demands.

carrier-class availability via standards-based servers

Open systems servers offer maximum deployment flexibility for supporting availability requirements. Processing can be distributed throughout any number of platforms with full redundancy. One perspective on this trend can be gained by looking at the evolution of storage devices. Throughout most of the eighties, companies selected large, cumbersome, proprietary fault-tolerant disks for centralized storage. These systems were expensive to purchase and operate, leading to the concept of the appropriately named Redundant Array of Inexpensive Disks (RAID) platform.

Organizations could deploy many standards-based, loosely coupled disks to provide lower-cost storage with better overall reliability and more cost-effective scalability. When a disk crashed, there would be a redundant disk ready to take over. This market shift changed the economics of storage and continues to provide IT with long-term advantages, since organizations can take advantage of lower-cost/higher-performance storage platforms every year.

While proprietary carrier-class platforms have long been a hallmark of the telco world, another lesson about carrier-class architectures can be learned from the evolution of Web server farms. Early Web farms often relied on proprietary servers, but scalability and application demands drove organizations to adopt open systems Web servers. Individual standards-based servers—each with its own internal memory—are now grouped in clusters to provide virtually unlimited scalability.

Standards-based server technology now powers the most demanding, high-performance Web sites in the world. For example, it is estimated that Google has over 10,000 servers on its Web farm. Distributed computing of Web services leverages the performance improvements and price reductions of open systems servers while delivering modular, pay-as-you-grow economic advantages. Open systems servers can now meet the reliability levels of custom servers while providing limitless scalability potential.

simplifying management and operations

Carrier-class, open systems media servers can be maintained largely with the same toolsets already familiar to operations staff. Unlike proprietary platforms that often require custom training and the use of highly specialized maintenance and management tools, standards-based platforms can be configured, managed and maintained using off-the-shelf tools and methods already familiar to IT staff. Service providers therefore reduce training costs and can more efficiently maintain server infrastructure.

You can further simplify operations by consolidating media processing servers into your existing server farm. Media servers can even be deployed in the same chassis as application servers and database servers so you can better leverage chassis investments across diverse server requirements.

not just a market shift; it's the "law"

Way back in 1965, semiconductor pioneer Gordon Moore made the observation that the density and performance of integrated circuits would double every year while costs would hold constant. Dubbed "Moore's Law," it was later amended to predict a doubling of microprocessor performance every 18 months.

Moore's Law continues to hold true, and this is the fundamental driver of the shift from proprietary to standards-based IP media servers. The massive investments made by the computer industry now result in open systems platforms that can handle the demands of media processing and can cost-effectively scale to meet the long-term demands of service providers and enterprise networks worldwide.

Over any given 18-month cycle the performance of proprietary technologies will likely remain flat, although the price/performance ratio should improve slightly because pricing will probably decline about ten percent. But during that same time period, open systems platforms will continue to double performance. They are now powerful enough for the most demanding media applications, and the cost/performance differential between proprietary and open systems servers will only continue to increase as these trends continue.

servers compliance: a close up on RoHS and WEEE

The EU enacted two laws that affect virtually all electrical and electronic equipment sold throughout Europe. The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive prohibits the use of six substances—including lead, chromium, and mercury—in electrical and electronic equipment.

The Waste Electrical and Electronic Equipment (WEEE) Directive requires that any manufacturers—regardless of nationality—establish a complex and costly recycling program for waste electrical and electronic equipment. The RoHS Directive and the WEEE Directive both go into effect in July, 2006 and are intended to encourage long-term improvements in the environment. These directives impact all server vendors, but proprietary server manufacturers—and their customers—will by far feel the greatest impact.

While standards-based server vendors just adapt the manufacturing processes as necessary during planned updates to their hardware platforms, proprietary vendors—that may have planned on much longer useful lives for their boards—may need to retool their manufacturing processes and create new boards to ensure compliance. Standards-based server vendors spread this cost-of-doing-business across very large volumes of server sales, so there is virtually no discernible impact in terms of cost or time for ensuring that software-based IP media servers support changing regulatory requirements.

understanding the limitations of proprietary architectures

Proprietary server architectures are often necessary in emerging markets because of limitations of existing open systems technologies. This was indeed the case in early stage of the market for media servers. Vendors wanting to participate in this market at that time had no choice but to develop proprietary platforms.

While the proprietary approach initially provided some initial advantages—particularly in the level of direct control of the overall solution and in the ability to create Digital Signal Processor (DSP)-based solutions optimized for media processing—these advantages are now outweighed by the advantages of software-based media servers running on a variety of open systems server platforms.

Although the server vendor's cost of goods- sold for proprietary servers can be compelling upon product introduction, the long-term costs of enhancing the platform and keeping it current with market demands and emerging application requirements is daunting. Vendors of proprietary servers need to create their own software development tools, leading to extended development cycles and long learning curves for engineers. Spinning a new server card is an expensive proposition, easily costing between a half-million and three million dollars.

Introducing new feature sets on closed platforms is time consuming and expensive, and the pace of performance improvements is slow—compared to the dramatic performance improvements of open systems servers. While vendors saddled with investments in proprietary servers seek to amortize research and development costs by extending the useful life of these platforms, network operators are paying the price in terms of higher capital costs, increased maintenance costs and longer time-to-revenue for new services.

Vendors of proprietary IP media processing servers or board-based platforms must also deal with changing regulatory requirements. Precious development resources may need to be reallocated to ensure compliance with governmental demands. For example, the European Union (EU) adopted two environmental laws (RoHS and WEEE) that have significant financial and technological impact on electronic equipment sold throughout Europe. While proprietary server vendors likely need to revise existing boards to ensure compliance, software-based solutions can rely on standards-based hardware platforms to ensure compliance (see sidebar).

overcoming the limitations of proprietary architectures

The many limitations inherent in a proprietary, closed-box approach can be overcome by instead selecting standards-based server architectures. The added value in media processing is in the software, since modular, standards-based server platforms provide all the processing power, flexibility, reliability and scalability necessary to process media flows—and they will continue to evolve in line with Moore's Law.

Service providers can rely on proven, standards-based platforms offered by established server vendors. IBM, a thought leader and market leader in blade computing, offers an ideal server platform for media processing. As part of a focus on offering reliable, low-cost network solutions for service providers, IBM has developed the Carrier-Grade Open Framework (CGOF) Reference Implementation. This new platform combines server, storage, carrier-grade Linux, middleware and third-party applications geared toward the IP telecom environment. The IBM eServer® BladeCenter is a standard IT platform that is available in carrier-class NEBS/ETSI compliant configurations supporting dual redundant power supplies and redundant Gigabit Ethernet switching fabrics. IBM offers a broad range of networking options integrated into the blade to simplify infrastructure complexity and manageability while lowering the total cost of ownership.

In addition to IBM's CGOF, there is an alternative set of standards for carrier consideration. The Advanced Telecom Computing Architecture (AdvancedTCA) is a set of standards for telecom hardware, encompassing blade specifications and a number of switch-fabric options. AdvancedTCA was designed to provide higher I/O capacity and computing performance, and to deliver improved reliability and flexibility, reduced equipment footprint and power consumption, and greater choice and interoperability of components. Both CGOF and AdvancedTCA are viable frameworks for implanting telco-grade servers that overcome the limitations of proprietary IP media server architectures.

accelerating feature development velocity to drive services

The speed with which vendors can support demands for new features to support applications is a major limitation of proprietary systems. Open systems development using standards-based tools reduces the development cycle and allows standards-based platforms to more quickly respond to evolving market requirements.

One argument commonly given for proprietary platforms is that DSPs optimized for media processing will always be more powerful than a general-purpose processor. While this is true, this statement by itself can be misleading. Today's off-the-shelf processors provide enough computing power for processing media flows, and you can cluster multiple servers to reach virtually any desired level of scalability and redundancy at lower cost than through the use of proprietary platforms.

Open systems servers enable faster feature development time than possible with closed platforms. Developing proprietary hardware to support new functionality is more time consuming, with a three-month minimum for minor revisions of an existing board, and a nine-month minimum for a new board. To make matters worse, the hardware must be built before the software development cycle really begins.

The speed of feature development is accelerated through the use of open systems software. Software development can leverage prior efforts and readily available assets, and they can rely on the open systems Linux operating system. Developers have easy access to compilers, debuggers and other tools that proprietary server vendors must build themselves. Algorithms for important services such as media scheduling are readily available in the public domain, and libraries are readily available for content access, interface requirements, etc.

Carriers can leverage Internet standards such as the Session Initiation Protocol (SIP) to easily create new services with minimal programming, and they can also leverage SIP to integrate legacy and emerging services. Software development is further accelerated through reduced learning curves for programmers, who can rely on standard tools and libraries without having to learn proprietary operating systems and development tools. The bottom line is that the average length of time from concept to deployment averages 18 months using proprietary technologies—and six months using open systems technologies.

cantata shifts to carrier-grade open IP media servers

In response to the overwhelming logic of the advantages of open systems media servers, Cantata has evolved its SnowShore IP Media Server™ from a proprietary media server architecture to one based on open systems standards. We are leveraging industry investments in server platforms and have migrated our SIP-based media processing software onto standards-based server platforms. You can now deploy carrier-class IP media servers that take advantage of the economics of Moore's Law while leveraging the same proven, software-based media processing software that earned the SnowShore platform its early market leadership.

The Cantata SnowShore IP Media Server™ is the industry's premier open systems, carrier-class IP media server. It leverages the innovation and flexibility of SIP and VoiceXML to provide a cost-effective and scalable IP media server solution, powering a broad range of voice and video services for next-generation wireline, wireless and broadband networks. The SnowShore IP Media Server provides software-based media processing resources that can support a broad range of applications, from basic messaging and multi-party conferencing to prepaid services and video mail.

Because it utilizes industry-standard server platforms and standards-based IP protocols, the SnowShore IP Media Server can leverage the ongoing evolution of network architectures and processor technology to deliver a future-proof media processing solution for next-generation IP applications.

The SnowShore IP Media Server software is available on several standards-based hardware platforms to suit individual deployment requirements: a low-profile 1U rackmount server, a NEBS-compliant 2U rackmount server and an IBM eServer BladeCenter configuration that houses up to 14 server blades in a 7U rack. The SnowShore IP Media Server is also available in AdvancedTCA configurations. With our

software-based servers, you can begin service trials with a single server, then add capacity over time to support expansion or add redundancy—and do so in either a single centralized facility, or in regionally distributed points of presence throughout the network.

Highly optimized, software-based media and protocol processing make the SnowShore IP Media Server ideal for delivering media-rich services within The New Network™. Whether you are trialing a new service on a single low-cost, small footprint 1U server—or deploying a high-capacity solution using scalable blade server technology—the SnowShore IP Media Server is a cost-effective, scalable media server platform. It is supported by a growing list of industry-leading applications, speeding deployment of media-rich, high-value enhanced services for next-generation wireline, wireless and broadband networks.

Organizations can flexibly scale media processing capabilities to meet the highest levels of demand using a scalable server architecture already proven in the world's busiest Web server implementations. Cantata has brought the advantages of massive industry investments in server technology, open source development, and Moore's Law to the IP media server market so you can capitalize on the CAPEX, OPEX and scalability advantages of carrier-class open systems servers while continuing to leverage innovations in media server software. For more information, please visit www.cantata.com/products/media_server.



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