PSM1000 Solutions
Delivering Interactive Multimedia Services from the Network to the Home
**Introduction**

From the introduction of digital television to the delivery of high-speed data and digital telephony, consumers have enjoyed a steady increase in the value and range of services delivered by their broadband providers. As the breadth and complexity of technology increases, the user experience becomes richer. In the digital video household, the capabilities of the set-top—which typically enables the video experience in the home—are being expanded to improve the user experience through more creative and interactive applications. These applications add value to existing service offerings by allowing network operators to leverage aspects of the entire bundle of services by combining elements of voice, video, and data services in creative new ways. To date, Motorola has delivered more than 65 million digital set-tops. These set-tops have progressively increased in functionality from Standard Definition (SD) to High Definition (HD), and they have enriched the user experience through features like Digital Video Recording (DVR) capabilities. Motorola also supports powerful capabilities such as multi-room DVR capabilities, and we are now introducing advanced applications to augment the subscriber experience by enabling the convergence of voice, data, and video services.

The ability to efficiently deliver network-centric applications is key to developing scalable interactive services. These new multimedia services help broadband providers engage subscribers, build brand value, and leverage existing infrastructure investments. Motorola offers solutions that leverage diverse network infrastructure and enable the flexible delivery of interactive services to multiple devices, including set-tops, cell phones, and PCs. Motorola offers the access and infrastructure products that enable converged services and allows service providers to more efficiently manage interactive services by taking a network-centric approach to deployment.

As consumers continue to demand increased access to content from various media sources, the applications that drive the user experience need to converge across multiple devices and access networks. Motorola is in a unique position to deliver content and applications seamlessly via a set-top, mobile device, PC, or phone. Motorola’s Platform for Seamless Mobility PSM1000 binds these services together. This platform allows carriers and operators to deliver a wide range of broadband, voice, video, and wireless integrated solutions that enable their customers to utilize IP and DOCSIS® services seamlessly and simply across multiple devices and locations.

**Addressing Market Challenges**

Today’s service providers face market threats from alternative providers and Internet-based services. Increasing competition and increasing risks of commoditization are becoming the norm. Pricing pressures continue to mount as consumers shop for the right mix of services for their individual needs. Delivering television services is not enough to meet revenue and growth targets, and service providers that can deliver groundbreaking multimedia services that creatively blend voice, video, and data services will succeed in an increasingly competitive marketplace.

In addition, consumers are increasingly mobile and increasingly desire access to many services from any location. The old lines differentiating voice from video services are becoming blurred, as are the lines separating broadband providers from wireless service operators. The ability to develop flexible and scalable interactive applications that can be centrally managed will allow network operators to repel competitive threats and nurture longer-lasting relationships with subscribers.

Service providers can gain competitive advantages by deploying the Motorola PSM1000 platform for seamless mobility application server and leveraging the following:

- Existing access network infrastructure
- Business Support Systems (BSS)
- Operational Support Systems (OSS)
- Open systems interfaces to other wireline and wireless operators

The PSM1000 enables service providers to quickly and cost-effectively deliver creative interactive services that bind subscribers to the network, reduce churn, and create new revenue opportunities.
Creating Differentiated Interactive Multimedia Services

The shift to mobility and the migration to interactive applications are just the latest steps in the natural evolution of the video services industry. Just as analog infrastructure gave way to digital networks, and as HD content has become more desired than SD content, interactive services that allow subscribers to more actively participate in the entertainment experience will foster stronger subscriber relationships.

The creative blending of familiar services creates immediate opportunities for network operators to increase revenues by delivering differentiated, interactive multimedia services. Consumers are well aware of existing video and telephony services, but the opportunity to creatively blend diverse features of existing services allows network operators to develop new services that not only reduce churn but also attract new subscribers.

Existing services are largely based on legacy technologies and infrastructure evolution, with telephony services and video services relying on dedicated infrastructure and dedicated operational and support organizations within the network operator’s organizational structure. While leveraging shared core and access transport infrastructure, voice, data, and video services largely rely on their own back-end infrastructure.

While this focus on dedicated service infrastructure has allowed network operators to aggressively launch new services, the ability to blend features allows service providers to develop next-generation applications that leverage existing network and infrastructure assets to deliver exciting new applications.

Network operators can add value to existing bundles of voice, data, and telephony services by building value-added interactive services that can be flexibly tailored to address diverse segments of the subscriber base. By blending bundles of services — and creating new interactive services that bundle features currently associated with either telephony, video, or data services — operators can increase Average Revenue Per User (ARPU) levels and entice subscribers to select new bundles of interactive services. Service providers can increase subscriber retention and increase the “stickiness” of existing subscribers by offering new service bundles that creatively blend features from existing services, and they can drive revenue growth and increase market share by attracting new subscribers.

Leveraging the Platform for Seamless Mobility

In an on-demand world, ubiquitous, immediate access to information and entertainment is an essential component of any consumer service offering. Motorola’s strong heritage in innovation and industry-leading expertise in home entertainment and mobile communications allows us to bring innovative media mobility solutions to broadband operators.

The Motorola PSM1000 allows service providers to seamlessly deliver applications and services — regardless of network access technology or end-user platforms — through a modular, scalable architecture.

The PSM1000 can be deployed at the edge or core of the network to enable the seamless delivery of applications and services across virtually any access network or device. For hosted service implementations, the PSM1000 can be deployed in the hosting operator’s network while delivering services to subscribers. It is a server-based platform for delivering interactive applications to multiple devices, including:

- Set-tops
- Televisions
- Fixed telephones
- Mobile telephones
- PCs
- Generic network devices and peripherals

The PSM1000 is a shared server, and it includes open systems interfaces to enable easy integration with a multitude of OSS/BSS systems and applications, as well as other network elements and systems. It can be centrally managed via existing network management tools, and it serves as a common platform that can be integrated with back-end voice, video, and data infrastructure.
Architecturally, the PSM1000 can be configured with both a central server and a regional server. The central server performs multiple functions, and it is an aggregation point for provisioning and network management. It also abstracts the details of the underlying PSM1000 network (regional servers) to other back-end systems, such as billing and subscriber management systems, so that the growth of the underlying network requires minimal changes on these systems.

Regional, deployed PSM1000 clusters include open systems interfaces to support a wide spectrum of end-user devices, access networks, and voice/video/data network equipment. This “access agnostic” service delivery capability allows applications to be deployed across wired and wireless devices simultaneously, regardless of access network type. For example, application delivery can be delivered over DSL, cable, fiber, WiFi, or any other access network. The PSM1000 also supports heterogeneous infrastructure where some subscribers are served by one access type while others are served by another access network. It supports an open system philosophy, and it can therefore be integrated into back-end systems that support voice, video, and broadband infrastructure.

The PSM1000 can be centrally managed via existing network management tools, and its architecture is comprised of three fundamental elements:

- Application server(s)
- Database server(s)
- Web server(s) with load balancer and support for SSL encryption for high-volume, secure web-based transaction processing.

Each of these elements is individually scalable to meet the needs of the specific applications that are running on the platform. This allows an operator to scale the system as additional subscribers and applications are added.

**THE PSM1000 APPLICATION SERVER**

The application server resides in the network and supports client applications for remote media devices. Since much of the processing is performed at the server side, the clients can be slimmed down terminal devices still capable of offering user-rich experiences. The application server is based on industry standards, and interfaces with common client platforms. It supports a varied range of applications that enhance the subscriber multi-media experience. The application server is scalable to support yet-to-be-determined, next generation, “killer-applications” that will allow operators to secure customers and generate incremental revenue.

**THE PSM1000 WEB SERVER**

The web server integrates the PSM1000 with the Internet or dedicated, “walled-garden” networks, gaining a portal to a vast quantity of secured, web-based, shared media. The PSM1000 web server delivers this web experience to any web-enabled user device, whether it is a PC, mobile device, or set-top. The PSM1000 web server also enables a user to tailor applications behavior on specific devices. For example, on devices that have
simplified user input devices such as a TV remote control, the web portal enables the subscriber to customize that user interface to maximize ease of use. The PSM1000 server or the network operator’s web server can host the web portal for applications. The subscriber’s application data is then exchanged via the web services interface.

THE PSM1000 DATABASE SERVER

The database server incorporates varied data fields and lists, which are then utilized by the applications. Such data can include repositories of household information, including phone numbers, set-top addresses, and personalization data for applications. By maintaining personalization data in the server — rather than at the client — network operators can protect subscriber information and enable data recovery if the consumer device fails, and it allows subscribers to easily add additional devices.

Each PSM1000 regional server supports up to 250,000 set-tops or devices, and it offers an integrated web-portal or web services-based interface to enable integration with existing subscriber portals. The PSM1000 simplifies the user interface by supporting single sign-on, and it streamlines service delivery across multiple platforms and interfaces.

The PSM1000 also includes interfaces to mobile and IP Multimedia Subsystem (IMS) networks, supporting integration of video and wireless services that increase subscriber mobility. These interfaces will enable operators to migrate to an IMS-based architecture, should they choose to do so, as defined in PacketCable™ 2.0. The PSM1000 will enable a seamless transition from a PacketCable 1.x to 2.0 architecture, thereby ensuring uninterrupted service delivery to subscribers. Operators can develop and deploy applications that can be accessed from the living room or the car, and can potentially allow mobile users to program DVRs or to access entertainment services and content from the road.

As interactive applications for the connected home increase in popularity, Motorola is providing an environment and software for testing these experiences before they are deployed. The new Motorola DEVPlatform for OpenCable Application Platform (also referred in the industry as Tru2way™ for retail devices) allows service providers and application developers to participate in a collaborative environment to build customized applications and deliver a more personalized consumer experience. Applications can even be integrated into existing electronic programming guides, increasing the simplicity of user management of converged services and allowing interactive access via television remote controls.

Increasing ROI Via a “Common Platform” Approach

By deploying a common platform that leverages open systems interfaces to applications, networks, and devices, operators can efficiently leverage existing infrastructure, applications, and resources. They can increase Return On Investment (ROI) while swiftly deploying creative new services that drive revenue and market share growth. Service providers can avoid duplicative efforts within their organizations while blending features and services from diverse domains.

- Integration with back-end applications and third-party networks drives down development costs and supports the efficient re-use of existing infrastructure and features.
- Minimize training costs, since the PSM1000 transparently links to legacy resources and provides a common interface for delivering interactive services.
- Streamline operational and maintenance costs via a common platform that supports rich interactive services that can be delivered to multiple devices.
- Scalable PSM1000 solutions that efficiently utilize invested capital expenses.

The PSM1000 enables seamless delivery of applications and services through a modular, scalable architecture regardless of access type, network, or device. It allows operators to increase revenues while controlling costs. With the PSM1000 deployed in the network, operators can deploy interactive services that mask the complexity of the underlying infrastructure and enable the quick deployment of scalable interactive multimedia services.

This approach allows network operators to bundle multiple technologies into next-generation converged services, and it enables network-centric service delivery to a large and varied base of installed set-tops in the video network. By moving the processing and integration capabilities to a server on the network, the applications can potentially work on a larger population of deployed set-tops—including thin-client set-tops which might otherwise have lacked sufficient resources to run these types of sophisticated applications.

Motorola’s PSM1000 servers are open, standards-based systems that operate as a carrier-grade and flexible common platform for delivering a wide range of communications applications. By supplying integrated hardware, software, and professional services, Motorola can help operators drive down infrastructure costs, improve time-to-market, and focus on generating incremental revenue while increasing customer loyalty.
Demonstrated Application—Displaying Caller ID on TVs

The first PSM1000 application to be delivered by Motorola is Caller ID on TV, where telephone and video services seamlessly interface and incoming voice call information is graphically displayed on TVs throughout the home. This application blends resources from telephony and video services and offers the subscriber an integrated solution that combines video and telephony experiences. It offloads much of the processing from the set-top, instead allowing the information to be processed and generated from a PSM1000 server.

In this application, the PSM1000 provides the links to video and telephony services and interfaces with the set-tops, which automatically display information on TVs according to routing preferences set by the subscriber via an easy-to-use web portal interface. The televisions throughout the home in effect become a control point for telephony services, and users can determine when and where notifications are displayed.

The PSM1000 interfaces with Motorola set-tops, allowing them to display the name and number of incoming calls so consumers can decide whether to answer the calls without the need to check the phone. This application allows users to view incoming caller ID notifications as well as telephone call logs on their television screens, and it enables easy configuration of services via a graphical interface and a television remote control device.

The Caller ID application is a natural advancement of Motorola's strategy of offering operators a complete package of broadband, voice, video, and wireless integrated solutions that let their customers utilize their services seamlessly and simply across multiple devices and locations.
The application is an incremental service for video subscribers who have VoIP and video service from a single service provider. The functionality of the service is an on-screen menu that is accessed and operated via the existing remote control. Customers can access caller ID information from pop-ups on the television screen or from PCs via a Caller ID web portal.

In addition to displaying incoming call pop-up notifications on the televisions, the application allows users to view a log of the past 100 incoming calls, associate nicknames with incoming caller ID numbers, and use call routing to enable call notification on different set-tops around the home.

**Emerging Next-Generation, Network-Centric Applications**

The PSM1000 enables network-centric applications that minimize the burden on consumer devices, and it serves as a centralized point of control for the delivery of robust interactive services. Caller ID is the first in a suite of value-added applications delivered via the PSM1000, which opens up possibilities for a wide range of interactive services developed by Motorola, service providers, or third-party developers. The following are just a few of the types of applications that can potentially be developed:

**Telephony** — It is easy to envision the television becoming the central control point for all telephony services, allowing consumers to order new services via an easy-to-use menu. For example, from a simple graphical interface on the TV, a user would program landline phone calls to be forwarded to voice mail or to a cell phone, or set up a conference call based on presence and location information. Those same capabilities are then extended to a user mobile device via the TV when that device is “in the house.” In this case, the PSM1000 dynamically serves up these services only when location data from the mobile devices indicates that the user is present in the house or within several feet of the set-top box.

**Remote Access for Services** — The PSM100 integrates a wide array of broadband services and related applications and makes them available via a TV interface. From your living room couch, imagine sitting in front of the television and potentially reading and responding to your e-mail, looking up phone numbers, and accessing highly customized weather reports that are tailored to your presence information. When you request weather information, the PSM1000 correlates your zip code with weather data, parses together information from multiple weather sources, and delivers customized weather reports to your TV. The PSM1000 server does most of the processing, allowing operators to centralize control and processing without the added expense of adding increased intelligence to access devices located in the customer premises.

**DVR Programming** — Since the applications are server driven, the PSM1000 enables consumers to schedule their DVRs from a web portal, or even a cell phone. If you’re on the road and hear about a new program you’d like to record, you may easily set up programming via your cellphone — using the same graphical interface you are already familiar with from your DVR services. Standards-based interfaces to wireless carriers create new opportunities for cable operators and carriers to collaborate with mobile operators to create high-value interactive services.

**Remote Streaming** — The PSM1000 is capable of providing the authentication resources that enable remote video streaming that complies with digital rights management regulations and protects the integrity of content. Here, network operators would establish parameters that enable the remote streaming of video content based on clear authentication and enforceable licensing of content. Subscribers would be able to feed shows recorded on their DVR to a remote location, or access recorded or live television programs via their cellphone.

**Social TV** — The combination of location-based and presence-based services pose exciting possibilities for social TV. Imagine the possibility of watching a football game on television, checking your buddy list to see which of your friends are also watching that game, and setting up a chat group or telephone conference. Social TV applications will integrate telephony, data, and video services in new combinations that allow network operators to sell higher-end bundles of services that command premium pricing.

**Location-Based Services** — The combination of wireless services and broadband services creates new opportunities for high-value, location-based services. What parent would not value the ability to instantly view a map on a television that highlights the location of their children by accessing cell phones presence data? Location-based services will also enable highly customized advertising, particularly via integration with wireless services. For example, network operators will be able to partner with wireless service providers to develop powerful advertising programs for advertisers that deliver focused ads based on whether you’re at home or traveling.
Summary
The PSM1000 is a common, shared server that allows operators to rapidly introduce high-value, interactive services. It provides interfaces to legacy and emerging technologies as well as networks of third-party providers. By deploying the PSM1000, network operators can deliver interactive services to multiple device types and control the delivery of converged services that leverage features already developed for video, telephony, and data services. It enables a natural evolution to higher-end services and fosters the integration of PCs, televisions, phones, and other consumer devices via a flexible broadband network that allows service providers to create increased value for converged broadband offerings.

While Caller ID on TV is the first application, the PSM1000 enables the swift development of network-centric applications and services that increase brand loyalty while attracting new subscribers. It lays the foundation for next-generation converged services and serves as the “glue” that enables the swift delivery of interactive converged services. The PSM1000 supports seamless mobility and seamless access to content by providing subscribers with flexible access to rich content from televisions, PCs, telephones, and cell phones. Motorola offers the access and infrastructure products that enable converged services, and provides the professional services expertise to help network operators aggressively create and deliver innovative service bundles that command premium pricing. For more information about the PSM1000, visit www.motorola.com or contact your Motorola account representative.