

Java™ Technology for Digital Media



Highlights

Java™ Platform, Micro Edition for digital media benefits:

- Rich platform features for digital media content from 2-way interactive cable and broadcast TV to next-generation HD Blu-ray Disc movie titles
- A flexible middleware architecture adapted to fit a broad range of devices including set top boxes, Blu-ray players and game consoles
- Digital media content creators can develop interactive content for a larger market with fewer device dependencies



Digital media has evolved on numerous fronts over the last few years. Cable and satellite multiple service operators (MSOs) are developing two-way interactive services. Device manufacturers are innovating with personal video players that can retrieve digital media from the internet. And digital media content creators are enriching the audience experience by including features ranging from extra informative content to full-fledged games.

To manage these services and product features requires platform capabilities for media management, GUI presentation, security infrastructure and network interaction. And the nature of digital media delivery combined with rapidly evolving devices requires a middleware architecture that allows digital media to exploit these platform features across a complex device matrix.

The Java ME platform provides features that support a wide range of consumer devices like set-top boxes, kiosks and cellphones. And the Java TV API (JSR-927) is a platform extension to support digital media for a variety of deployment scenarios from two-way interactive cable and broadcast television to next-generation high-definition Blu-ray Disc players.

Goals

Digital media technology for the Java ME platform has two principal goals:

- Provide access to rich platform features for digital media content.
- Provide a flexible middleware architecture for a broad range of digital media devices.

Benefits

- Digital media content creators — Develop interactive content for a larger market with fewer device dependencies.

- MSOs — Simplify their device matrix while managing interactive services for their subscribers.
- Device manufacturers — Address a larger market with more digital media sources.

Java ME Platform technology

Java ME platform technology for digital media is based on two components: the Java ME platform itself, which provides services required by a broad range of consumer devices and the Java TV API (JSR-927), which extends the Java ME platform to provide access to device-level services for digital media.

The Java ME platform component has been proven in many different device scenarios to provide a robust, scalable and portable Java runtime environment including resource-constrained devices like set-top boxes and video players, and more recently game players. Even though these consumer devices may be based on different CPUs or operating systems, the Java runtime environment can still execute the same application code. In addition, the Java ME platform includes a managed application model called an xlet that simplifies application deployment and resource sharing.

The Java TV API (JSR-927) performs a middleware function by defining a set of interfaces for accessing and controlling digital media services that are typically provided by native platform technology. Xlets embedded in a media title can then access these digital media services without needing to know about device-level issues.

Media applications

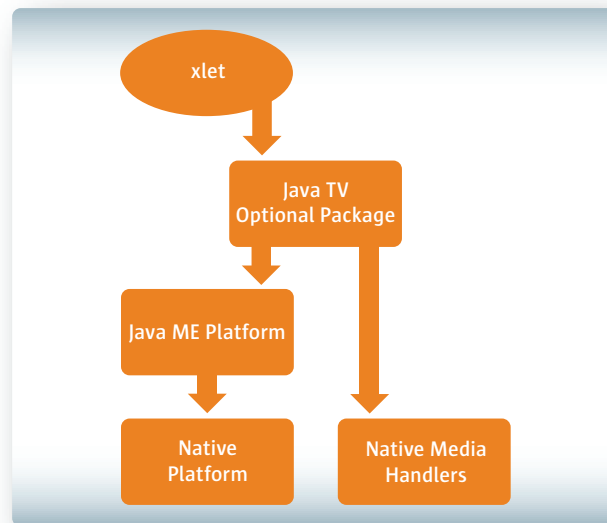
These fall into three categories:

- *Unbound* applications are not associated with a specific media title and are usually resident in a media player. For example, an electronic programming guide (EPG) is an unbound media application that controls the selection and presentation of digital media.
- *Loosely bound* applications are associated with a specific media title but not based on specific timing. For example, an MSO might develop a comments log for a reality show so that friends can share their reactions to specific episodes.
- *Tightly bound* applications are associated with specific moments within a media title. For example, a sports title might poll the popularity of a star player.

Digital television standards

The Java TV API (JSR-927) forms the basis for a number of digital television standards. First, DVB based their Media Home Platform (MHP) standard for European digital television on the Java TV API. This was later expanded into Globally Executable MHP (GEM) for use in a variety of country-based digital television standards, including the following:

- OpenCable Application Platform (OCAP — US)
- Advanced Common Application Platform (ACAP — US)
- ARIB B.23 (Japan)



Java TV Architecture

Java TV API has been more recently included in standards for Blu-ray Disc, the next-generation high-definition optical media format which is intended to replace DVD. The Blu-ray Disc based standard references the Java TV API as the foundation of its BD-J advanced interactivity platform. Together, this set of related Java technology-based standards can be expected to appear in televisions and audio/video equipment in hundreds of millions of homes around the world over the next few years.

System requirements

The Java technology system requirements for digital media players are based on both the size of the Java runtime environment and the native software platform. In particular, the Java TV API is heavily based on native platform technology. For example, common set-top box reference designs have 32 MB RAM memory and 32 MB of flash memory and the CDC/PBP/ Java TV stack fits well within this memory footprint.

Java Community Process

Java platform technology is developed through the Java Community ProcessSM (JCP) in a three-part standardization mechanism. Java specification requests (JSRs) define interfaces, while reference implementations (RIs) demonstrate the technology and technology compatibility kits (TCKs) validate implementations.

Sun Microsystems licenses RIs and TCKs for Java ME technologies that are critical to the digital media industry. In addition, Sun licenses optimized implementations (OIs) of Java ME technology for strategic devices and platforms. OIs provide greater configurability to adapt Java technology to a target platform as well as superior performance and resource management. For example, the CDC/PBP stack is available for Linux/MIPS-based set-top box reference designs.