

What is DVB-GEM?

DVB-GEM is the open middleware specification of the DVB, which enables the deployment of interactive applications over broadcast and broadband networks as well as for Blu-ray discs. It is based on Java and offers a platform-independent application execution environment, which is used to create interactive content for different devices and markets. The platform is built on the widely used Java Micro Edition (JavaME) with additional APIs, which offer TV-specific functionality.

GEM is not restricted to specific broadcast signalling but defines an abstraction of concepts common to various TV systems and is even used for disc based content (Blu-ray). This common core is a set of APIs and functional requirements, which is available in all GEM terminals. It is extended with APIs for target-specific markets, which are called profiles. GEM has now been adopted by a number of other organizations including CableLabs, the ATSC, ARIB and the Blu-ray Disc Association. GEM is the ITU-T recommended middleware standard for interactive television.

Background

The migration from analogue to digital TV offers the opportunity to deliver interactive applications to viewers. The use of an open middleware standard allows receiver/terminal manufacturers to target multiple markets and enables a horizontal market in the development of interactive applications. GEM grew out of the collaboration between the DVB Project and CableLabs, which develops specifications for the cable market in North America. GEM was developed as a common interoperable core middleware platform across different device categories ranging from Blu-ray players to IPTV and OTT set-top boxes to broadcast receivers for terrestrial, satellite and cable. GEM was first published in January 2003.

How does it work?

GEM is a common core of APIs and functional requirements, which define the behavior of these APIs. Content authors can use GEM to create globally usable interactive content that works on all different deployments. GEM currently defines four different "targets" designed for the different deployment scenarios: a "broadcast target" for broadcast TV using cable, terrestrial or satellite; an "IPTV target" for IPTV based set-top boxes; an "OTT target" for networks without guaranteed QoS such as the Internet; and a "packaged media target" for use in disc-based services. All of these targets share a common application model and a common set of core classes. Some specifications are more closely related to each other than others. For example ACAP and OCAP were designed to be quite similar.

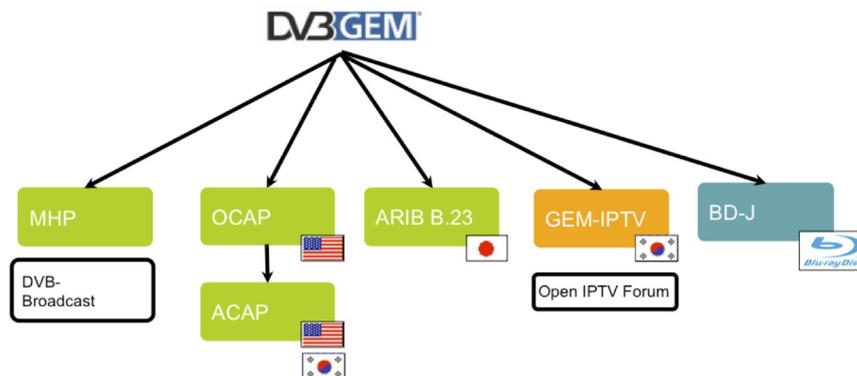


Figure 1:
Relationship between
GEM and GEM-based
specifications.

For each target and profile a GEM terminal specification defines the following, separated into mandatory and optional parts:

- Content formats (audio, video, images)
- Transport protocols (broadcast, Internet Protocol)
- An application model
- A mechanism for application signalling
- A Java based application platform

It is permitted to define functional equivalents for certain parts of the above.

GEM Targets & Profiles

GEM allows combining individual targets into a hybrid target, to support devices with more than one network interface. This is especially useful with the recent OTT target, which can be combined with the broadcast target into a hybrid broadcast/OTT target, enabling interactive applications across different networks. A hybrid target goes beyond a simple combination of APIs of the individual target since there's a new synchronization API to handle the synchronization of media streams over different networks. A first hybrid broadcast/OTT deployment is rolled out in Italy.

In 2012 DVB created a GEM profile to complement the DVB 3D specifications with APIs for stereoscopic 3D applications (GEM Stereoscopic 3D: GEM3D). This new 3D profile enables stereoscopic 3D applications being displayed together 3D content.

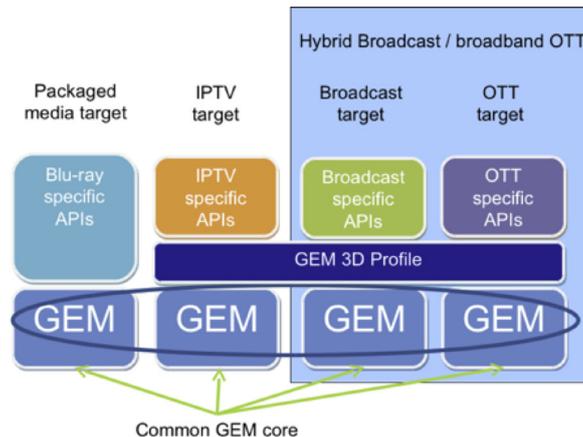


Figure 2: GEM Targets & Profiles

GEM Applications

The differences between different GEM targets essentially come down to the support necessary for the differences in network signaling between the different environments, DVB, US cable/terrestrial, ISDB-T, IPTV and Blu-ray Disc. GEM offers an abstraction for services from any signaling or network dependency of the underlying transmission system. This enables developers to write iTV or Web-2.0 style applications, like widgets, that don't need to know anything specific about the network it is carried on, which is particularly useful in an IPTV or OTT environment.

In addition, a wealth of GEM applications are available for more traditional iTV applications, such as EPGs/IPGs, ESGs, email, chat, SMS, enhanced TV, news ticker, weather, games, etc. These GEM applications can be run directly from standard web servers and can easily support Web 2.0 features like RSS feeds, P2P, user-contributed content etc. With GEM at the core of Blu-Ray's BD-J specification, interactive features and extras for a movie title originally written for an optical disc can be easily moved to a VOD network via Cable or Broadband.

Market Deployment

There are more than 123 million GEM-compatible devices already deployed. This includes 94 million Blu-ray Disc players and 17 million MHP receivers. GEM deployments include OCAP/tru2way on cable networks in the USA and South Korea, ACAP on terrestrial networks in the USA and South Korea and ARIB B.23 in Japan. South Korea is also the location for the first rollout of GEM-IPTV with more than 4.6M subscribers.

Next Steps for GEM

GEM continues to evolve for new target markets and to address new scenarios. This includes the integration of companion devices such as tables and smartphones, GEM-devices without a screen and enhanced support for browsers.

Links

www.mhp.org

www.dvb.org

www.blu-raydisc.com

www.cablelabs.org

www.tru2way.com

www.arib.or.jp/english