

# Games on the Java™ Platform for Mobile Information

## Mobile Information Device Profile



### Key feature highlights

There are many new features in the Mobile Information Device Profile (MIDP) 2.0 that make game development easier. Following are a few of these features:

#### Games API

- Offscreen buffer for flicker-free rendering
- Polling of game keys for responsiveness
- Layers as basic visual screen elements
  - Tiled layers
  - Sprites (layers including transformations and collision detection)
- Layer manager for multilayer screens

#### Image Handling

- RGB images
- Transparency

#### High-Level GUI API

- Custom items that applications control (like having a canvas on a form)
- Commands on individual form items
- Strings and images on forms can be buttons or hyperlinks
- Gauges and commands on alerts

#### Push Functionality

- MIDlets can be launched to handle incoming messages

#### Audio Generation and Playback

The Mobile Information Device Profile (MIDP) is the Java™ runtime environment for today's mobile information devices, such as phones and entry-level PDAs. It provides the core functionality required by mobile applications and defines a platform for dynamically and securely delivering these highly graphical, networked applications to users.

MIDP has been widely adopted as the platform of choice for mobile applications. It is deployed globally on millions of mobile phones and PDAs, and supported by leading Java technology integrated development environments (IDEs). Companies around the world use MIDP to write a broad range of consumer and enterprise mobile applications.

#### Write Once

MIDP enables developers to create networked applications (MIDlets) with great end-user experiences. Written once, MIDlets can be run on multiple devices. The graphical user interface (GUI) and input methods automatically adapt to the device.

#### User Interface Updates

The MIDP user interface is optimized for the small display size, input methods, and other native features of mobile devices. It provides intuitive navigation and data entry by fully leveraging phone keypads, touch screens, small QWERTY keyboards, and extra buttons such as arrow keys.

MIDP 2.0 has many user interface enhancements. This document focuses on the ones that improve game and multimedia application development. It points out many areas in which MIDP 2.0 provides standard APIs so that games do not have to rely on device-specific proprietary technology.

#### Game Canvas

A game canvas extends the canvas available since MIDP 1.0. The game canvas provides an offscreen buffer to help reduce screen flickering. Developers no longer have to implement their own double-buffering on devices without this functionality.

The game canvas also provides key suppressing and latching to help improve responsiveness. Suppression keeps the game's key presses from being handled as an ordinary MIDP event. This reduces the number of application callbacks executed. Latching enables the game to efficiently determine if the user has pressed a game key since the last time through the game loop.

#### Layers

Layers are basic visual elements on a screen. A games API provides tiled layers and sprites, as well as a layer manager for screens that use multiple layers.

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A tiled layer is a grid of rectangles and a set of images that fit them. The layer is built by placing the images into the rectangles. With a small set of images, a tiled layer saves space in an application by taking the place of a large graphic.

A sprite is a layer that is made from an image that contains several frames. The frames can be shown in sequence to animate the image. To assist with animation, sprites provide transformations such as rotating a frame around an application-definable reference pixel. Sprites also provide collision detection, including detection at the pixel level.

Having sprites and tiled layers available in MIDP 2.0 means that game developers do not have to use proprietary APIs to gain access to this important functionality.

### Image Handling

MIDP 2.0 supports full transparency, and where possible, partial transparency in images. If a device cannot support partial transparency, any pixel that is not completely opaque is rendered as fully transparent. MIDP 2.0 also supports RGB images

### General User Interface Changes

Some MIDP 2.0 features affect all user interface objects. Backlight and vibrate functionality are available no matter what screen is being displayed. Tickers and titles are now available to all displayables, including canvases and game canvases. Both the canvas and game canvas have a full-screen mode that provides more screen real estate by removing the title and ticker.

Using the MIDP 2.0 standard APIs to access backlight, vibrate, and full-screen features helps keep game code portable.

### High-Level User Interface

MIDP 2.0 adds features to high-level user interface components. It also adds new components, such as a custom item. A custom item is like having a canvas on a form.

Alerts can now contain commands. Instead of just informing a user that a destructive operation has taken place, alerts can now be used to have the user confirm that they want to carry out the operation.

Alerts can also contain gauges. Gauges enable the alert to show that a long-running operation, such as sending a high score to the server, is taking place.

Forms in MIDP 2.0 have a more sophisticated layout algorithm. There are more layout controls, and they are available to all form items. Form items have been enhanced, and new form items have been added. For example, items can now have their own commands. Image and string items can now appear as buttons and hyperlinks too.

### Multimedia Functionality

MIDP 2.0 supports tone sequences and WAV files. The support is an audio subset of the Mobile Media API (MMAPI), an optional package that MIDP 2.0 can support. MMAPI provides standard APIs for multimedia functionality. For example, the MMAPI Reference Implementation supports simple tone generation, tone sequencing, streaming,

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interactive MIDI, audio/video file playback, and audio/video capture.

### Extensive Connectivity

MIDP 2.0 improves networking and messaging capabilities by requiring HTTPS and adding optional support for protocols such as sockets. MIDP 2.0 also supports a server push model. When information arrives, the device can start the recipient MIDlet to handle it.

### Over-the-Air Provisioning

MIDP 2.0 defines how users discover, install, update, and remove MIDlet suites from their devices. Over-the-air provisioning was only a recommended practice in MIDP 1.0.

### End-to-End Security

MIDP provides a robust security model — built on open standards — that protects the network, applications, and devices. In addition to requiring HTTPS support, it uses security domains to protect against unauthorized network use, data access, and device resource use.