Tizen® 6.0 Compliance Specification for IoT Profile

Version 0.98 beta

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## Revision History

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Author</th>
<th>Reason for Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3 version 1.0</td>
<td>11 Dec 2014</td>
<td>Tizen TSG</td>
<td>Official release</td>
</tr>
<tr>
<td>2.4 version 1.0</td>
<td>18 Jan 2016</td>
<td>Tizen TSG</td>
<td>Official release</td>
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<td>3.0 version 1.0</td>
<td>31 Jan 2017</td>
<td>Tizen TSG</td>
<td>Official release</td>
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<td>4.0 version 0.9</td>
<td>30 Dec 2017</td>
<td>Tizen TSG</td>
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<td>5.0 version 0.9</td>
<td>31 Dec 2018</td>
<td>Tizen TSG</td>
<td>Initial edits</td>
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<td>5.5 version 0.9</td>
<td>31 Dec 2019</td>
<td>Tizen TSG</td>
<td>Initial edits</td>
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<tr>
<td>6.0 version 0.98</td>
<td>26 Feb 2021</td>
<td>Tizen IoT</td>
<td>Release candidate</td>
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### Glossary

<table>
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<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>ABI</td>
<td>Application Binary Interface, the runtime interface between a binary software program and the underlying operating system.</td>
</tr>
<tr>
<td>API</td>
<td>Application Programming Interface, the interface between software components, including methods, data structures, and processes.</td>
</tr>
<tr>
<td>Compliance</td>
<td>Certified for full conformance, which was verified by testing.</td>
</tr>
<tr>
<td>Conformance</td>
<td>How well the implementation follows a specification.</td>
</tr>
<tr>
<td>IOMMU</td>
<td>Input/Output Memory Management Unit.</td>
</tr>
<tr>
<td>IVI</td>
<td>In-Vehicle-Infotainment, a target of the IVI Profile. System used for entertainment, such as music, video, and games, along with information, such as navigation and web. A platform target for Tizen.</td>
</tr>
<tr>
<td>Mobile</td>
<td>Portable, connected devices, such as phones and tablets. A platform target for Tizen.</td>
</tr>
<tr>
<td>SDB</td>
<td>Smart Development Bridge, a device management tool in the Tizen SDK.</td>
</tr>
<tr>
<td>Side loading</td>
<td>Installing applications or components other than from a certified application installer package.</td>
</tr>
<tr>
<td>TV</td>
<td>Connected smart televisions and set-top boxes. A platform target for Tizen.</td>
</tr>
<tr>
<td>Profile</td>
<td>The variant of the Tizen system dedicated to specific type of device, i.e. TV, Mobile, Wearable.</td>
</tr>
<tr>
<td>Tizen Profile</td>
<td>The variant of the Tizen system dedicated to specific type of device, i.e. TV, Mobile, Wearable.</td>
</tr>
<tr>
<td>Smack</td>
<td>Simplified Mandatory Access Control Kernel, an access control technology used by Tizen to protect data and prevent malicious programs from causing harm.</td>
</tr>
<tr>
<td>UI</td>
<td>User Interface, the widgets, theme, and layout of software components displayed on the device screen (if present) through which the user may interact with the device. Usually refers to the visual software elements but may also include hardware buttons or controls.</td>
</tr>
<tr>
<td>UX</td>
<td>User experience, the effect that the design of a system (both software and hardware) has on the user of the system.</td>
</tr>
<tr>
<td>Wearable</td>
<td>Miniature computing devices worn by the user on the body or clothing. A platform target for Tizen.</td>
</tr>
<tr>
<td>WPS</td>
<td>Wi-Fi based Positioning System.</td>
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1. Overview

This specification defines the operating environment of the Tizen platform. It is intended to be used by both application developers and IoT device implementers to enable the development of portable application software.

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" used in this document are to be interpreted as described in [ref. 1].

Tizen is a registered trademark of the Linux Foundation, which controls the usage of the brand and trademark. A requirement for permission to use this trademark in conjunction with products is compliance with the requirements of this specification.

1.1. Why Compliance?

Tizen Compliance is designed to ensure IoT device implementations and applications work together.

1.2. Target Audience

This specification is intended to be used by:

- Application developers: know how to create compatible applications that work across multiple IoT devices, and know how Tizen devices will behave.
- IoT device implementers: know how to implement device hardware, security configurations, services, APIs, etc.

1.3. Tizen Compliance Model

To become Tizen compliant, a device MUST obtain Tizen Compliance certification from the Tizen certification authority for at least one Tizen Profile by satisfying the requirements of the Tizen Compliance Specification and passing all of the Tizen Compliance Tests for that profile.

A Tizen Profile describes the requirements for a category of Tizen devices that have a common application execution environment. Applications are created for a specific target profile and can run on devices compliant to that profile.

- Device implementations: if implemented to a profile, a device will provide applications with consistent behavior defined by that profile, as well as a consistent user experience.
- Applications: built to a profile, applications will run on devices that are compliant with that profile.

The Tizen Compliance Tests for a profile will measure conformance to the Tizen Compliance Specification for that profile.

Note: This specification describes only the compliance requirements for the Tizen IoT Profile. Other supported profiles have their own related specifications.

1.4. Revision Policy

There will be a distinct release of the specification, as well as matching compliance tests, for each distinct release (version) of the Tizen platform. If deemed necessary, updates may be issued between releases. All compliance requirements for the Tizen IoT Profile specification must be approved by the Tizen Technical Steering Group (TSG) and may change from time to time, only by approval of the Tizen Technical Steering Group.
1.5. Tizen Source Code Modification Policy

All Tizen implementations MUST provide the full behavior of the Tizen API and application execution environment as defined by the Tizen Profile for its device category. The best way to accomplish this is by using the source code for the Tizen reference implementation, which is available at https://source.tizen.org. If modifications or replacements to the source code must be made, the implementer is responsible for making sure that there is no impact on compliant applications. The Tizen Compliance Tests may be used to measure the correctness of the implementation, but in case of ambiguities, errors, or incompleteness of this specification or of the Tizen Compliance Tests, the final arbiter of compatibility is the behavior of the Tizen reference implementation.

1.6. References

The following external specifications and other documents are referenced by this specification.

[N]: Normative Reference
[I]: Informative Reference

1. [N] IETF RFC 2119 "Key words for use in RFCs to Indicate Requirement Levels": http://www.ietf.org/rfc/rfc2119.txt
2. [I] Log View Reference: https://docs.tizen.org/application/tizen-studio/common-tools/log-view/
3. [I] Smart Development Bridge: https://docs.tizen.org/application/tizen-studio/common-tools/smart-development-bridge/
4. [I] Tizen Application Filtering: https://docs.tizen.org/application/dotnet/tutorials/app-filtering/
5. [I] Application Controls for Tizen applications: https://docs.tizen.org/application/web/guides/app-management/app-controls/
7. [I] Tizen Application Package Model: https://docs.tizen.org/application/native/guides/applications/overview/
8. [N] Tizen API Privileges: https://www.tizen.org/privilege
12. [N] Tizen Native API Reference for Headed IoT Profile: https://docs.tizen.org/application/native/api/iot-headed/latest/
13. [N] Tizen Native API Reference for Headless IoT Profile: https://docs.tizen.org/application/native/api/iot-headless/latest/
2. IoT Profile Software Compliance

This chapter describes the software requirements that implementers MUST meet to create a compliant Tizen IoT device.

2.1. General Principles

IoT device implementations MAY include support for the Tizen .NET API.

- The IoT device implementation MUST report the availability of optional hardware and software features (see section 2.5) as platform attributes.
- If an IoT device implementation reports that it supports a particular optional hardware or software feature, it MUST implement the entire corresponding API.
- Whether an IoT device implementation supports or does not support a particular optional hardware or software feature, the compliance tests MUST be passed. If the feature is not supported, the corresponding API MUST report the lack of support by throwing an exception as described in the section 2.2.3 for .NET API.

2.2. Tizen .NET API

2.2.1. Namespace

IoT device implementations MUST provide all of the API namespaces and APIs listed in the TizenFX API Reference [ref. 10], including Tizen.*.

2.2.2. Tizen .NET API Categories

- **.NET Standard API 2.0**: implements the .NET Base Class library, allows you to use the well-known C# language base class libraries and features (e.g., collections, threading, file I/O, and LINQ) as well as features like XML and JSON processing. [ref. 11]
- **TizenFX API**: allows you to access platform-specific features not covered by the generic .NET and Xamarin.Forms features, such as system information and status, battery status, sensor data, account, connectivity services. Some APIs may be indicated as “preview”. These APIs may change in their final official versions. They may be omitted from the scope of Tizen Compliance Tests.
- **Xamarin.Forms**: allows you to efficiently build a user interface from standard components in C# or XAML. Xamarin.Forms APIs may exist in application packages as commonly used for all Xamarin.Forms supported platforms. In this case, the providers of Xamarin.Forms NuGet packages for the Tizen devices MUST guarantee correct behavior of Xamarin.Forms APIs on compatible Tizen platform version and may be omitted from the scope of Tizen Compliance Tests.

2.2.3. Behavior of Unsupported APIs

IoT device implementations MUST NOT omit any .NET API listed in the TizenFX API. Specially, .NET APIs are designed to be common to all Tizen profiles. If some APIs are not supported on the Tizen devices by software or hardware limitations, they MUST throw appropriate System.NotSupportedException exception, as specified in the TizenFX specification.

2.3. Application Control

The application control interface in the Tizen .NET API enables launching an application directly using an application ID or invoking specific application functionality remotely through inter-process communication (IPC).

A Tizen application may register itself as an application control provider. The available application control values can be queried and invoked by a Tizen application. There are no mandatory
platform provided application controls in this profile, however IoT device implementations MUST allow Tizen applications to register application controls for use by other Tizen applications.

Further details on Application Controls are provided in the developer documentation [ref. 5].

2.4. Platform Attributes

IoT device implementations MUST provide accurate platform attributes via the appropriate interfaces in the .NET API for System Information.

Platform attributes include but are not limited to the following:

- Device capabilities (see section 2.5)
- Information about data storage devices
- Display information
- Information about the device orientation
- Locale information
- Network information

2.5. Optional APIs

The Tizen API may depend on available hardware capabilities and, in some cases, on software capabilities. Optional software features may be capabilities not part of the publicly available stack, or may require hardware capability that is beyond the minimum IoT device requirement such as higher processing power or memory requirements (See section 3.1 for minimum hardware requirements).

IoT device implementations MUST implement all APIs listed in the referenced API specifications, except those specified as optional in this section. Optional APIs are dependent on the availability of particular underlying hardware or software features.

2.5.1. Tizen .NET API

See section 2.2.3. If an IoT device implementation does not include the corresponding hardware or software feature, the APIs MUST throw System.NotSupportedException exception and the IoT device implementation MUST accurately report the availability of these underlying features through the Tizen .NET API System Information API.

2.6. Privilege

Certain APIs have access to privacy-sensitive information (for example the Location API can be used to track user location) or have security or stability implications. If an application uses such APIs, then corresponding privileges MUST be declared in the application's config.xml file or tizen-manifest.xml file.

Privilege is affected by the privilege levels described below. In addition to declaring the privilege, the application MUST have access to the required privilege level:

- Public: for all Tizen developers
- Partner: for trusted application developers
- Platform: for OEMs/operators

If an application declares a privilege that requires a level higher than public, and the application is not signed with a certificate granting it access to that level, then the implementation MUST block installation and execution of the application.

2.6.1. Tizen .NET API
If a .NET application does not declare a required privilege in the `tizen-manifest.xml` file, access to the corresponding API MUST return errors according to TizenFX specification (usually `System.UnauthorizedAccessException`).

2.7. Application Packaging Compatibility

Tizen defines a mandatory application packaging format. IoT device implementations MUST correctly process packages in this format. They MUST NOT extend the packaging format in a way that would prevent packages generated on the implementation from running on other conforming IoT device implementations.

Nothing in this section precludes IoT device implementations from supporting additional packaging formats outside the requirements of this specification.

2.7.1. .NET App Package Support

IoT device implementations MUST be able to install, remove, list, and update .NET application packages in the `.tpk` format.

2.8. Chromium

The WebView implementation on Headed IoT device implementations SHOULD be based on Chromium version 47 or higher. This is strongly recommended for maintaining application compatibility across Tizen IoT devices. Any customizations made by device implementations SHOULD NOT alter the original web exposed behavior from the Chromium version used.

If Chromium is used, the user agent string reported by the Chromium MUST follow this format:

`Mozilla/5.0 (DEVICE TYPE; Linux; Tizen PLATFORM VER; MODEL) AppleWebKit/ 537.36 (KHTML, like Gecko) APP_NAME / APP_VER Chrome/ 47.0.2526.69 IoT Safari/ 537.36`

- The value of the `DEVICE_TYPE` string SHOULD be the same as the type of the device.
- The value of the `PLATFORM_VER` string MUST be "6.0".
- The value of the `MODEL` string SHOULD be the same as the name of the device. There is no specific format for this field.
- The value of the `APP_NAME` string SHOULD be the same as the name of the application.
- The value of the `APP_VER` string SHOULD be the same as the version of the application.
- IoT device implementations MAY omit the word “IoT” from the user agent string.

2.9. .NET Runtime

If the IoT device implementation provides support for Tizen .NET API, then it MUST support all mandatory requirements of .NET Core Runtime version 2.0 or newer.

2.10. Keys

Hardware keys are not mandatory for an IoT device. The Headed IoT implementations MUST embed Hardware keys or Softkey container that supports following events:

- **Home** – switches to the start screen.
- **Back** – used to navigate to previous view in the applications. Sends a ‘tizenhwkey’ event with `keyName == “back”`. The implementation MUST deliver Back event to a listening application.

The Headed IoT implementations MAY additionally embed Hardware keys or Softkey container that supports following events:

- **Task Manager** – opens task manager allowing to switch to or close opened applications.
2.11. Security

The following are security requirements for Tizen platforms.

- The device MUST follow the Linux standard security model, including:
  - Applications MUST run under a non-root user ID.
  - An application MUST be allowed to read and write files in its home directory.

- Smack-based access control and process isolation:
  - The device MUST have all Smack features from Linux kernel version 3.12 or later, and the Smack features MUST be enabled.
  - All applications MUST run with Smack labels different from the predefined Smack labels.
  - The device MUST use file systems which supports extended attributes (XATTR) and traditional discretionary access control (DAC) attributes such as owner, group, and permissions except for the case of external storage such as USB mass storage.

- Secure execution environment:
  - There SHOULD NOT be any set-user-ID binaries in the device.

- Smack supported modules:
  - The device SHOULD contain coreutils or equivalent, d-bus, and udev with Smack capability enabled by Tizen.
  - The device SHOULD contain the Tizen rpm security plugin.

- Privileged information:
  - The device MUST only allow an application to carry out an operation if it has the privilege and permission to do so. Privileges will be declared in the application’s manifest file.

2.12. Multimedia

The following tables list media formats/codecs for IoT device implementations and whether they are REQUIRED or OPTIONAL. Please note that the Tizen Technical Steering Group makes no representation that these codecs are unencumbered by patents. Implementation of these codecs MAY require patent licenses from the relevant patent holders.

<table>
<thead>
<tr>
<th>Format</th>
<th>Codec</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio Codec (Decoder)</td>
<td>AAC LC</td>
<td>REQUIRED</td>
</tr>
<tr>
<td></td>
<td>HE-AAC</td>
<td>OPTIONAL</td>
</tr>
<tr>
<td></td>
<td>AC3</td>
<td>REQUIRED</td>
</tr>
<tr>
<td></td>
<td>EAC3</td>
<td>OPTIONAL</td>
</tr>
<tr>
<td></td>
<td>MPEG</td>
<td>REQUIRED</td>
</tr>
<tr>
<td></td>
<td>DTS (Core)</td>
<td>OPTIONAL</td>
</tr>
<tr>
<td></td>
<td>WMA v7/v8/v9 (Standard v1/v2/v3)</td>
<td>OPTIONAL</td>
</tr>
<tr>
<td></td>
<td>Vorbis</td>
<td>REQUIRED</td>
</tr>
<tr>
<td></td>
<td>PCM (raw PCM)</td>
<td>REQUIRED</td>
</tr>
<tr>
<td>Video Codec (Decoder)</td>
<td>MPEG1</td>
<td>OPTIONAL</td>
</tr>
<tr>
<td></td>
<td>MPEG2 (SP/MP)</td>
<td>REQUIRED</td>
</tr>
</tbody>
</table>
MPEG4 (SP/ASP) REQUIRED
H.264 REQUIRED
Divx 3.11/4/5/6 OPTIONAL
VP6/8 OPTIONAL
Theora OPTIONAL

Image Decoder (Decoder)
JPEG REQUIRED
BMP OPTIONAL
PNG OPTIONAL

<table>
<thead>
<tr>
<th>Type</th>
<th>File Type / Container format</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio</td>
<td>MPEG (*.mp3)</td>
<td>REQUIRED</td>
</tr>
<tr>
<td></td>
<td>MPEG4 (*.m4a, *.mpa)</td>
<td>REQUIRED</td>
</tr>
<tr>
<td></td>
<td>OGG (*.ogg)</td>
<td>REQUIRED</td>
</tr>
<tr>
<td></td>
<td>WMA (*.wma)</td>
<td>OPTIONAL</td>
</tr>
<tr>
<td></td>
<td>WAV (*.wav)</td>
<td>OPTIONAL</td>
</tr>
<tr>
<td>Video</td>
<td>AVI (*.avi, *.divx)</td>
<td>REQUIRED</td>
</tr>
<tr>
<td></td>
<td>MKV (*.mkv)</td>
<td>REQUIRED</td>
</tr>
<tr>
<td></td>
<td>MP4 (*.mp4)</td>
<td>REQUIRED</td>
</tr>
<tr>
<td></td>
<td>PS (*.mpg, *.mpeg)</td>
<td>OPTIONAL</td>
</tr>
<tr>
<td></td>
<td>TS (*.ts, *.tp, *.trp, *.m2ts, *.mts)</td>
<td>REQUIRED</td>
</tr>
<tr>
<td>Image</td>
<td>JPEG (*.jpeg, *.jpg)</td>
<td>REQUIRED</td>
</tr>
<tr>
<td></td>
<td>PNG (*.png)</td>
<td>OPTIONAL</td>
</tr>
<tr>
<td></td>
<td>BMP (*.bmp)</td>
<td>OPTIONAL</td>
</tr>
</tbody>
</table>

2.13. Developer Tools

IoT device implementations MAY include services that enable communication with the Smart Development Bridge (SDB) in the Tizen SDK. If the implementation includes such support, the following development tasks MUST be available:

- MUST support all SDB functions [ref. 3] to interact with the Tizen SDK. The SDB daemon (sdbd) SHOULD support all commands documented in the SDB Commands section of the SDB reference. The implementation SHOULD allow sdbd to be activated by a device user.
- MUST support the Log View [ref. 2] function to retrieve the Tizen platform log (dlog).

In addition, if the implementation supports SDB it MUST support either USB 2.0 or later or another data networking technology listed in section 3.1.3.

While SDB support is OPTIONAL in production devices, device implementation MUST have a device driver available enabling connection to SDB in order to execute the Tizen Compliance Tests (TCT).
This driver need not be available in production devices.

2.14. Software Update

IoT device implementations MUST provide a mechanism for updating system software. If provided, user data, application private data, and application shared data SHOULD be preserved. Upgrade process is described in detail in [Ref. 9].

2.15. Tizen Compliance Tests

The Tizen Compliance Tests (TCT) for the Tizen IoT Profile verify conformance to the requirements of this specification. Platforms MUST pass the TCT to be considered Tizen compliant.

2.15.1. Satisfying TCT preconditions

IoT device implementations MUST satisfy preconditions to pass TCT. The list of TCT preconditions that MUST be satisfied is available in the Tizen 6.0 TCT for IoT Profile.

3. IoT Profile Hardware Compliance

This chapter describes mandatory and optional hardware components.

3.1. Mandatory Hardware Requirements

These minimum hardware features MUST be provided by a compliant IoT device implementation and any corresponding API must be fully implemented.

3.1.1. Memory Storage

A Tizen IoT device MUST have at least 512MB of RAM to run applications smoothly.

IoT device implementations MUST have at least 1 GB of internal storage.

IoT device implementations MAY allow an external device to access files in the shared media folder on the device. The precise method is unspecified.

3.1.2. USB

IoT device implementations MUST provide USB host functionality.

3.1.3. Connectivity / Networking

IoT device implementations MUST support at least one form of data networking capable of accessing the Internet. Examples of acceptable data networking technologies include Wi-Fi, Ethernet, etc. Implementations MAY omit any individual mechanism, as long as at least one method is supported.

3.1.4. Display

A IoT device implementation, whether it is an integrated device with display or a controller-type device without its own display, MUST support driving a display with a minimum screen resolution of 1280x720 (HD). It is strongly recommended to use a display resolution of 1280x720 (HD) for an IoT Headed device implementation.

IoT device implementations SHOULD support a 32-bit frame buffer.

3.1.5. Input Devices
IoT device implementations MUST provide applications a means of receiving keyboard input from users.

- Implementations MAY omit a full hardware keyboard.
- If no hardware keyboard is available, a soft keyboard MUST be provided.
- A soft keyboard or an input method setup MUST be able to augment keyboards not capable of a full QWERTY layout. For example, a 12 key number pad can allow a user to enter alphabetical letters through multiple presses of a numeric key.

### 3.2. Optional Hardware Requirements

If an IoT device implementation reports that it includes an optional hardware component that has a corresponding optional API, the implementation MUST fully implement that API, as described in this specification. IoT device implementers MAY report a hardware component as absent if they choose not to support the full API. Partial API implementations are not permitted.

#### 3.2.1. Camera

An IoT device implementation MAY omit camera devices. If an IoT device implementation reports that it includes a camera hardware feature, it MUST support at least one of the preview pixel formats for camera previews:

<table>
<thead>
<tr>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGB565</td>
<td>The RGB565 pixel format</td>
</tr>
<tr>
<td>ARGB8888</td>
<td>The ARGB8888 pixel format</td>
</tr>
<tr>
<td>R8G8B8A8</td>
<td>The R8G8B8A8 pixel format</td>
</tr>
<tr>
<td>YCbCr420_PLANAR</td>
<td>The 8-bit Y-plane followed by 8-bit 2x2 sub sampled U-plane and V-plane</td>
</tr>
<tr>
<td>JPEG</td>
<td>The encoded formats</td>
</tr>
<tr>
<td>NV12</td>
<td>The NV12 pixel format</td>
</tr>
<tr>
<td>UYVY</td>
<td>The UYVY pixel format</td>
</tr>
<tr>
<td>H.264</td>
<td>MPEG-4 AVC video compression format</td>
</tr>
</tbody>
</table>

#### 3.2.2. HDMI Input

An IoT device implementation MAY omit HDMI input hardware.

#### 3.2.3. Wi-Fi

An IoT device implementation MAY omit Wi-Fi capability. If an implementation reports that it includes Wi-Fi hardware features, it MUST support the Wi-Fi API.

#### 3.2.4. Sound

IoT device implementations MAY support audio output.

#### 3.2.5. Audio Input Devices

An IoT device implementation MAY omit a microphone. IoT device implementations MUST accurately report the presence or absence of a microphone.

#### 3.2.6. Graphics
An IoT device implementation SHOULD provide 3D Graphics hardware acceleration. While it MAY be omitted, doing so will provide a degraded user experience.

IoT device implementations MUST accurately report the presence or absence of acceleration hardware.

3.2.7. Bluetooth

An IoT device implementation MAY omit Bluetooth capability. If an implementation reports that it includes Bluetooth hardware features, it MUST support the Bluetooth API.

4. IoT Profile Application Compliance

This chapter provides information for application developers to aid them in creating applications that will run on Tizen compliant devices.

4.1. API Use

.NET applications MUST use only the APIs defined in the Tizen .NET API specifications when making calls external to the application. Additional libraries included in the application are considered internal to the application. The Tizen .NET API include API allowing access to various features such as application common, network, system, etc.

4.2. Application Packaging

Tizen .NET applications MUST be packaged into a .tpk file format. See section 2.6.1.

4.3. Namespace

Applications SHOULD include a namespace, such as: <company>.<application>. Applications MUST NOT overwrite the Tizen API namespaces.

4.4. Application Features and Privileges

A Tizen application MUST declare the features and privileges that it uses in the configuration document included in the application package [ref. 7]. Further details on how to implement this requirement are provided in the developer documentation [ref. 4 and ref. 8].

The application SHALL be granted privileges only for the listed APIs. In some circumstances, user consent MAY be required before a privilege is granted. User consent may be requested at install time or at access time.

The Tizen .NET application manifest file (tizen-manifest.xml) uses syntax as shown in the following example:

```
<feature name="http://tizen.org/feature/iot.ocf">true</feature>
<privileges>
  <privilege>http://tizen.org/privilege/filesystem.write</privilege>
</privileges>
```

4.5. Profile Declaration

A Tizen application MUST declare the Tizen profile it is capable of running on. If this declaration is omitted, application stores MAY not correctly select the application for installation. For the Tizen IoT profile, the following declaration style is used.
4.6. Tizen .NET UI Framework

A Tizen IoT application MUST use one of the following .NET UI frameworks:

- Xamarin.Forms
  To ensure Xamarin.Forms support, system MUST be compatible with Xamarin.Forms libraries version 4.3 or newer built for tizen40 .NET target framework. The libraries are usually included in an application package.
- Tizen.NUI
  The Tizen.NUI framework is a part of the TizenFX API, and as such is subject of the requirements described in the section 2.2 Tizen .NET API. This set of libraries are provided by the system and not included in an application package.