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DEVICE IDENTIFICATION SPECIFICATION

Abstract:

The document describes the information to be exported by a Bluetooth® device that enables it to be identified by a standard method of inquiry. This information is published as Bluetooth SDP records.

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Revision History

Public versions are listed below. For a complete revision history see 8, Appendix A — Detailed Revision History (Informative).

Revision	Date	Comments
1.0	January 16, 2003	Initial whitepaper release
1.1	October 01, 2003	Clarified that VendorID attribute uses Bluetooth CompIDs or USB VendorIDs
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Device Identification (DI)

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Contents

1   Overview

1.1   Scope

The scope of this document is identification of devices with Bluetooth wireless technology. This document specifies a profile to provide additional information above and beyond the Bluetooth *Class of Device*.

1.2   Purpose

The purpose of this document is to provide a profile specification for the identification of devices based on brand and device information (such as manufacturer and product identifier). This is important in order to make best use of the features on the device identified. A few examples illustrating possible uses of this information are listed below:

- In PC-to-PC usage models (such as conference table and file transfer), a PC may use this information to supplement information from other Bluetooth specifications to identify the right device to communicate with.

- A cellular phone may use this information to identify associated accessories or download Java apps from another device that advertises its availability.

- In PC to peripheral usage models (such as dial up networking using a cellular phone), the PC may need to download device drivers for that peripheral from a web site. To do this the driver must know the proper identity if the peripheral.

The information contained in this specification enables any device to properly identify other devices that come into range with Bluetooth wireless technology. To facilitate this, this document defines standardized ways in which such *device identification* (DI) information is exported by devices using the Bluetooth SDP [1] framework. It is assumed that the reader is familiar with the Bluetooth SDP [1] framework specification.

Similar efforts have been undertaken in the past for various bus technologies including Infrared communications [2], USB, 1394, PCI, PnP ISA, and EISA, among others.

2   Normative References

The following standards contain provisions which, through references in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below.

[1]   Specification of the Bluetooth system – Core, version 1.2 or later

[2]   Infrared Data Association Plug and Play Extensions to Link
         Management Protocol, version 1.1, *IrDA Specification*

3   Acronyms and Abbreviations

Acronym or Abbreviation	Definition
DI	Device Identification
IrDA	Infra-red Data Association
M	Mandatory
O	Optional
OS	Operating System
SDP	Service Discovery
UUID	Universally Unique IDentifier
SIG	Special Interest Group

4   DI Information

DI information for the device is exported in terms of an explicit SDP record on that device. This will be called the *DI Service Record*, and is identified by a unique UUID – this UUID is called the *PNPInformation* and is part of the *Bluetooth Assigned Numbers* document – see Assigned Numbers web pages at http://www.bluetooth.org.

A manufacturer may choose to have more than one DI service record in a device if the device consists of multiple logical devices in a single physical device i.e., if it is a composite device. Only the one DI service record for which the *PrimaryRecord* attribute[1] is set to TRUE will be used to uniquely identify the device – see 9.

It should be noted that the DI service record is in addition to any other service records already exported by the device for different profiles supported on the device. It is important to distinguish between the device specific information that is available in the DI service record and the service specific information that is available in other Bluetooth SIG profile recommended service records.

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[1] Refer section 5.5

5   DI Service Record

The DI Service Record attributes are listed below.

Attribute	Attribute ID	Attribute Value Type[2]	Status	Section
SpecificationID	0x0200	Uint16	M	5.1
VendorID	0x0201	Uint16	M	5.2
ProductID	0x0202	Uint16	M	5.3
Version	0x0203	Uint16	M	5.4
PrimaryRecord	0x0204	Boolean	M	5.5
VendorIDSource	0x0205	Uint16	M	5.6
ClientExecutableURL	0x000B	URL	O	Note 3
ServiceDescription	0x0001 Note 1	String	O	Note 3
DocumentationURL	0x000A	URL	O	Note 3

Table 5.1: DI Service Record Attributes

Notes

1. For national language support for all "displayable" text string attributes, an offset has to be added to the LanguageBaseAttributeIDList value for the selected language (see the SDP Specification [1] for details)

2. Notation: Uint16 = 2 byte Unsigned Integer

3. These attributes are recommended - See 10.

The following sections describe the mandatory attributes present in the DI record. See 10 for a description of the recommended optional attributes.

5.1   SpecificationID Attribute

Attribute Name	Attribute ID	Attribute Value Type
SpecificationID	0x0200	2 byte unsigned integer

Description:

This is intended to reflect the version number of the Bluetooth DI specification supported by the device. The two most significant hexadecimal digits will indicate the major number of the Bluetooth DI specification and the two least significant hexadecimal digits will reflect the minor number of the specification.

For example, version 1.2 will be 0x0102.

5.2   VendorID Attribute

Attribute Name	Attribute ID	Attribute Value Type
VendorID	0x0201	2 byte unsigned integer

Description:

This is intended to uniquely identify the vendor of the device. Used in conjunction with required attribute 0x0205, VendorIDSource, which determines which organization assigned the VendorID value.

Note: The Bluetooth Special Interest Group assigns Device ID Vendor ID and the USB Implementer's Forum assigns vendor IDs, either of which can be used for the VendorID value here. Device providers should procure the vendor ID from the USB Implementer's Forum or the Company Identifier from the Bluetooth SIG.

The VendorID '0xFFFF' is reserved as the default VendorID when no DI record is present in the device.

An example value for a device is 0x23A1.

5.3   ProductID Attribute

Attribute Name	Attribute ID	Attribute Value Type
ProductID	0x0202	2 byte unsigned integer

Description:

This is intended to distinguish between different products made by the vendor above. These IDs are managed by the vendors themselves.

An example value for a product is 0x1234.

5.4   Version Attribute

Attribute Name	Attribute ID	Attribute Value Type
Version	0x0203	2 byte unsigned integer

Description:

A numeric expression identifying the device release number in Binary-Coded Decimal. This is a vendor-assigned field, which defines the version of the product identified by the VendorID and ProductID attributes. This attribute is intended to differentiate between versions of products with identical VendorIDs and ProductIDs. The value of the field is 0xJJMN for version JJ.M.N (JJ – major version number, M – minor version number, N –

sub-minor version number); e.g., version 2.1.3 is represented with value 0x0213 and version 2.0.0 is represented with a value of 0x0200. When upward-compatible changes are made to the device, it is recommended that the minor version number be incremented. If incompatible changes are made to the device, it is recommended that the major version number be incremented.

5.5   PrimaryRecord Attribute

Attribute Name	Attribute ID	Attribute Value Type
PrimaryRecord	0x0204	Boolean

Description:

This is intended to designate one particular DI record (in case multiple DI records exist on a device) as the *primary DI record* for the device – the PrimaryRecord attribute is set to TRUE for that record and FALSE for all other records. The client device can use the primary DI record from the source device for UI purposes.

This field shall be set to TRUE in the case where a single DI record exists in the device.

5.6   VendorIDSource Attribute

Attribute Name	Attribute ID	Attribute Value Type
VendorIDSource	0x0205	2 byte unsigned integer

Description:

This attribute designates which organization assigned the VendorID attribute, 0x201.

Defined values:

0x0001 = Bluetooth SIG assigned Device ID Vendor ID value from the Assigned Numbers document

0x0002 = USB Implementer's Forum assigned Vendor ID value

0x0000, 0x0003 – 0xFFFF = Reserved for future use

5.7   Reserved Attribute IDs

Attribute IDs in the range 0x0206 through 0x02FF are reserved for future use.

5.8   Additional Details

The following should be noted:

- There is no *compatible ID[2]* entry in the record similar to some of the earlier technologies.

- The Product ID should be changed when a new feature is added to the device.

- Version information in the record is used to capture *revisions* in the device. Examples include bug fixes or enhancements in existing features. The version number should increase in a strictly monotonical manner.

- Hardware IDs based on the device information are not specified here since they are OS and implementation dependent.

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[2]   Other technologies have used the notion of *compatible ID*s in order to identify compatible devices. One use of this information (there could be other uses) is to load device drivers when an exact match is not found.

6   SDP Transactions to Obtain DI Information

The device and function information presented in this document may be present in devices with Bluetooth wireless technology as an SDP service record. This record is identified by a unique service class UUID. This UUID is assigned in the Bluetooth Assigned Numbers document – see Assigned Numbers web pages at http://www.bluetooth.org.

For details on the Transactions see the SDP Protocol Description section in [1] and Appendix C of this document.

7 Conformance

Support for the DI service record in devices with Bluetooth wireless technology is optional; however, when implemented, the attributes shall be implemented as characterized in the table below:

Attribute	Requirement
SpecificationID	Mandatory
VendorID	Mandatory
ProductID	Mandatory
Version	Mandatory
PrimaryRecord	Mandatory
VendorIDSource	Mandatory
ClientExecutableURL	Optional
ServiceDescription	Optional
DocumentationURL	Optional

8   Appendix A — Detailed Revision History (Informative)

Public versions are in bold in the table below.

Revision	Date	Comments
0.1	April 9, 1999	Initial Draft.
0.2	May 17, 1999	Added Profile PnP strings. See Section 10.
0.5	March 9, 2000	Document revised for SDP 1.0; revised DI record & IDs.
0.6	March 24, 2000	Incorporates review comments, several TBDs completed.
0.7	May 4, 2000	Added SDP types to the attributes, removed VER and FID from PnP ID, added sample DI record, incorporated review comments.
0.71	May 25, 2000	Incorporates comments from ESDP f2f meeting.
0.72	July 17, 2000	Added VER back to PnP ID, added VID_ and PID_ prefixes in the PnP ID, added Documentation URL, corrected the AttributeID value for ServiceDescription.
0.73	August 14, 2000	Incorporated changes that position the DI record for device identification rather than driver loading. Removed text that was meant for clarification purposes only. Changed the copyright statement.
0.74	August 17, 2000	Includes comments from Salt Lake f2f.
0.75	August 24, 2000	PrimaryRecord attribute added. Includes comments from Markus.
0.90	September 8, 2000	Review comments from team included.
0.91	September 27, 2000	Adds a note on use of multiple DI records and some clarifying text on ClientExecutableURL. An edit on Attribute ID in section 5.1.2.
0.95	October 12, 2000	Includes comments from North Carolina f2f.
0.95a	July 12, 2002	Modified by HID working group to add VendorIDSource attribute. Clarifies whether Vendor ID was assigned by USB or Bluetooth.
0.95b	July 29, 2002	Corrected typographical error in VendorIDSource attribute description.
1.0_draft	November 8, 2002	Modified the Version attribute in section 5.5 to BCD format to better align with software versioning conventions.
1.0	January 16, 2003	Initial whitepaper release.
1.1_draftA	August 26, 2003	Modified VendorID and VendorIDSource to specifically mention the CompID value listed in the Bluetooth Assigned Numbers document.
1.1	September 18, 2003	Updated version field to 1.1 for release.
1.1	October 01, 2003	Clarified that VendorID attribute uses Bluetooth CompIDs or USB VendorIDs

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Revision	Date	Comments
0.9r01	August 19, 2004	Created draft for specification approval. Note: the Specification Management process requires particular version numbers for first-time specification, even though Device ID previously was a whitepaper. This is why the version number was temporarily rolled back.
0.9r02	September 3, 2004	Made ServiceDescription attribute optional Moved recommended universal attributes to Appendix Removed Definitions clause Moved transactions description to Appendix
0.9r04	November 3, 2004	Add public revision history, moved detailed revision history to appendix A
0.9r5	November 08, 2004	Added 1.0 and 1.1 public release dates to Detailed Revision history table
0.9r6	November 24, 2004	Editorial comments
0.9r7	January 1, 2005	Incorporated editorial feedback from BARB reviews
0.9r8	February 15, 2005	Editorial comments
1.0r01	April 19, 2005	Editorial changes
D12r00	April 29, 2005	Release for committee approval
D12r01	June 28, 2005	Removed non-unique acronyms & abbreviations Section 5, Table 1: changed referenced section numbers Appendix C: Corrected referenced Section number to 5.1.11
D12r02	July 21, 2005	Editorial changes Added Peter Hauser (Microsoft) to contributors
D12r03	October 27, 2005	Accepted changes and made editorial changes.
D12r04	March 02, 2006	Editorial updates
V12r00	April 27, 2006	Adopted by Board of Directors

9   Appendix B — Example Use of Multiple DI Records (informative)

The way in which drivers are loaded into client operating systems can vary from operating system to operating system. Typical operating systems will understand particular categories of devices (such as printers or VGA projectors) and will know how to plumb device drivers into their standard operating system infrastructure and UI model. So for example, a Java operating environment might understand how to load a Printer Driver and then use it as part of its print services.

However, there can occasionally be physical devices that combine concepts that the operating system has kept logically separate. For example, someone might provide a conference room server that combines the functionality of a VGA projector and a printer.

This might be exposed through two DI records.

For those operating systems that allow arbitrary combinations of drivers, the driver associated with the primary DI record might provide all the functionality of both the printer and the VGA projector.

However, for operating systems that require separate drivers for the separate concepts, the first DI record might identify an arbitrarily selected "primary" device driver, such as the VGA projector. Then the second DI record can identify a secondary device driver, such as a printer driver.

How DI records are processed will depend on the client operating system. If the client operating system expects all device functionality to be exposed via a single driver it need only use the primary DI. If a client operating system expects to see separate drivers for logically distinct functions, then it will check all the available DI records and attempt to load the drivers associated with each DI record.

9.1   Recommended Universal Attributes (informative)

This section lists the SDP universal attributes that are recommended for the DI service record.

ClientExecutableURL Attribute

Attribute Name	Attribute ID	Attribute Value Type
ClientExecutableURL	0x000B	URL

Description:

See the SDP Specification in [1] for details, Section 5.1.11.

Note
Advertisement of the ClientExecutableURL is optional in a DI record. If advertised, it is meant to be yet another mechanism for distribution of device executables, and it can be referred to in an implementation dependent manner to obtain a desired executable. It is possible that a Bluetooth stack implementation on a particular OS may not find an appropriate executable when the URL is referenced. It is also possible that even if an appropriate executable is available, a Bluetooth stack implementation on a particular OS may not use that executable.

ServiceDescription Attribute

Attribute Name	Attribute ID Offset	Attribute Value Type
ServiceDescription	0x0001	String

Description:

See the SDP Specification in [1] for details, Section 5.1.15.

Note
For national language support for all "displayable" text string attributes, an offset has to be added to the LanguageBaseAttributeIDList value for the selected language (see the SDP Specification [1] for details)

DocumentationURL Attribute

Attribute Name	Attribute ID	Attribute Value Type
DocumentationURL	0x000A	URL

Description:

See the SDP Specification in [1] for details, Section 5.1.15.

Note
This can be instructions on how to install drivers, or an explanation of different drivers available from the ClientExecutableURL.

10   Appendix C — SDP Transactions (informative)

10.1   Requesting the DI Service Record

The DI service record is requested using the standard SDP_ServiceSearchRequest PDU.

PDU Parameters:

- The *ServiceSearchPattern* should be a *Data Element Sequence* containing only the DI service class UUID.

- The 16-bit *MaximumSeviceRecordCount* value is the maximum number of service record handles to be based on the search. Remembering that a different DI service record is expected for each function on the device, this value of this parameter should be appropriately large.

10.2   Response to the DI Service Record Request

The requesting device gets back an SDP_ServiceSearchResponse PDU containing handles to the DI service records on the device, if any.

- The *TotalServiceRecordCount* parameter returns the number of DI service records in the device

- A value of zero returned in *TotalServiceRecordCount* indicates that DI service records are not present in the device fielding the search request. This is possible since inclusion of DI service record information in devices is optional.

10.3   Access to Attributes in DI Service Record

For a given service handle, the individual attributes in the DI service record(s) can be requested using the SDP_ServiceAttributeRequest PDU.

The attributes themselves are returned in the SDP_ServiceAttributeResponse PDU.

SDP_ServiceSearchAttributeRequest PDU can alternatively be used to combine Service search and attribute request PDUs into a single request, as described in the SDP specification [1]. The attributes in this case are returned using the SDP_ServiceSearchAttributeResponse PDU.