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HEALTH THERMOMETER PROFILE

Abstract:

This profile enables a Collector device to connect and interact with a Thermometer sensor for use in healthcare applications.

Revision History

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Document Terminology

The Bluetooth SIG has adopted Section 13.1 of the IEEE Standards Style Manual, which dictates use of the words “shall”, “should”, “may”, and “can” in the development of documentation, as follows:

The word *shall* is used to indicate mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (*shall* equals *is required to*).

The use of the word *must* is deprecated and shall not be used when stating mandatory requirements; *must* is used only to describe unavoidable situations.

The use of the word *will* is deprecated and shall not be used when stating mandatory requirements; *will* is only used in statements of fact.

The word *should* is used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain course of action is deprecated but not prohibited (*should* equals *is recommended that*).

The word *may* is used to indicate a course of action permissible within the limits of the standard (*may* equals *is permitted*).

The word *can* is used for statements of possibility and capability, whether material, physical, or causal (*can* equals *is able to*).

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1 Introduction

The Health Thermometer Profile is used to enable a data collection device to obtain data from a thermometer sensor that exposes the Health Thermometer Service [\[2\]](#).

1.1 Profile Dependencies

This profile requires the Generic Attribute Profile (GATT).

1.2 Conformance

If conformance to this profile is claimed, all capabilities indicated as mandatory for this profile shall be supported in the specified manner (process-mandatory). This also applies for all optional and conditional capabilities for which support is indicated. All mandatory capabilities, and optional and conditional capabilities for which support is indicated, are subject to verification as part of the Bluetooth qualification program.

1.3 Bluetooth Specification Release Compatibility

This specification is compatible with any Bluetooth core specification host [\[3\]](#) that includes the Generic Attribute Profile (GATT) specification and the Bluetooth Low Energy Controller specification.

2 Configuration

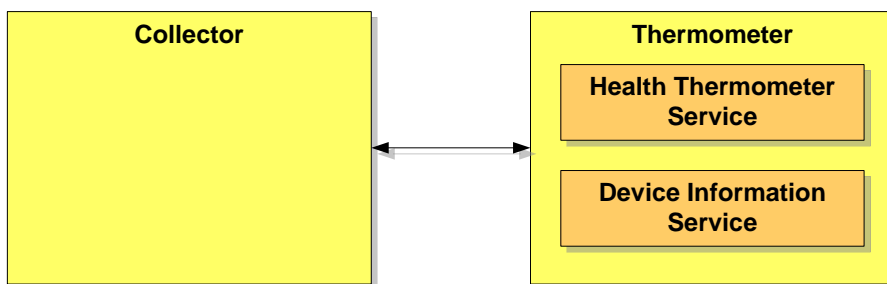
2.1 Roles

The profile defines two roles: Thermometer and Collector. The Thermometer is the device that measures the temperature and the Collector is the device that receives the temperature measurement and other data from a Thermometer.

- The Thermometer shall be a GATT Server.
- The Collector shall be a GATT Client.

2.2 Role/Service Relationships

The following diagram shows the relationships between services and the two profile roles.



Note: Profile roles are represented by yellow boxes and services are represented by orange boxes.

A Thermometer instantiates one and only one Health Thermometer Service [2] and instantiates one Device Information Service [4].

2.3 Concurrency Limitations and Restrictions

There are no concurrency limitations or restrictions for the Collector and Thermometer roles imposed by this profile.

For cases where bonding is supported, multiple bonds may be supported, but is outside the scope of this profile.

2.4 Topology Limitations and Restrictions

The Thermometer shall use the GAP Peripheral role.

The Collector shall use the GAP Central role.

2.5 Transport Dependencies

This profile shall operate over an LE transport only. For BR/EDR (and HS) the Health Device Profile [5] is to be used.

3 Thermometer Role Requirements

The Thermometer shall instantiate one and only one Health Thermometer Service [2].

The Thermometer shall instantiate the Device Information Service [4].

Service	Thermometer
Health Thermometer Service	M
Device Information Service	M

Table 3.1: Thermometer Service Requirements

See Sections 5.1 and 6.1 for additional requirements for the Thermometer role.

3.1 Incremental Health Thermometer Service Requirements

This section describes additional Thermometer requirements beyond those defined in the Health Thermometer Service.

3.1.1 Service UUIDs AD Type

While in a GAP Discoverable Mode for initial connection to a Collector, the Thermometer should include the Health Thermometer Service UUID defined in [6] in the Service UUIDs AD type field of the advertising data. This enhances the user experience as a Thermometer may be identified by the Collector before initiating a connection.

3.1.2 Local Name AD Type

For enhanced user experience a Thermometer should include the Local Name in its Advertising Data or Scan Response data.

3.1.3 GAP Device Name characteristic

The Thermometer may support the write property for the Device Name characteristic in order to allow a Collector to write a device name to the Thermometer.

3.2 Incremental Device Information Service Requirements

Table 3.1 shows additional requirements beyond those defined in the Device Information Service.

Device Information Service Characteristic	Requirement
Manufacturer Name String	M
Model Number String	M
System ID	M

Table 3.2: Device Information Service Requirements

Characteristics in this service may be transcoded for use in an ISO/IEEE 11073 ecosystem. Refer to the Personal Health Devices Transcoding White Paper [8] for more information. Since strings in this service are encoded as UTF-8, and IEEE 11073-20601 [7] specifies that strings are encoded as ASCII printable characters (a subset of UTF-8),

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string characteristics that are to be transcoded for use in an ISO/IEEE 11073 ecosystem must restrict their values to the printable ASCII character set.

4 Collector Role Requirements

The Collector shall support the Health Thermometer Service [2].

The Collector may support the Device Information Service [4].

Service	Thermometer
Health Thermometer Service	M
Device Information Service	O

Table 4.1: Collector Service Requirements

This section describes the profile procedure requirements for a Collector.

Profile Requirement	Section	Support in Collector
Service Discovery	4.2	M
- Health Thermometer Service Discovery	4.2.1	M
- Device Information Service Discovery	4.2.2	O
Characteristic Discovery	4.3	M
- Health Thermometer Service Characteristic Discovery	4.3.1	M
- Device Information Service Characteristic Discovery	4.3.2	O
Temperature Measurement	4.4	M
Intermediate Temperature	4.5	O
Measurement Interval	4.6	O
- Valid Range Descriptor	4.6.1	O
Temperature Type	4.7	O

Table 4.2: Collector Requirements

4.1 GATT Sub-Procedure Requirements

Requirements in this section represent a minimum set of requirements for a Collector (Client). Other GATT sub-procedures may be used if supported by both Client and Server.

Table 4.3 summarizes *additional* GATT sub-procedure requirements beyond those required by all GATT Clients.

GATT Sub-Procedure	Collector (Client) Requirements
Discover All Primary Services	C1
Discover Primary Services by Service UUID	C1
Discover All Characteristics of a Service	C2
Discover Characteristics by UUID	C2
Discover All Characteristic Descriptors	M
Write Characteristic Value	C3
Notifications	C4
Read Characteristic Descriptors	M
Write Characteristic Descriptors	M

Table 4.3: Additional GATT Sub-Procedure Requirements

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C1: Mandatory to support at least one of these sub-procedures.

C2: Mandatory to support at least one of these sub-procedures.

C3: Mandatory if Write is supported for the Measurement Interval characteristic.

C4: Mandatory if the Intermediate Temperature characteristic is supported.

4.2 Service Discovery

The Collector shall perform primary service discovery using either the GATT *Discover All Primary Services* sub-procedure or the GATT *Discover Primary Services by Service UUID* sub-procedure. Recommended fast connection parameters and procedures for connection establishment are defined in Section 5.2.6.

4.2.1 Health Thermometer Service Discovery

The Collector shall perform primary service discovery to discover the Health Thermometer Service.

4.2.2 Device Information Service Discovery

The Collector may perform primary service discovery to discover the Device Information Service.

4.3 Characteristic Discovery

As required by GATT, the Collector must be tolerant of additional optional characteristics in the service records of services used with this profile.

4.3.1 Health Thermometer Service Characteristic Discovery

The Collector shall use either the GATT *Discover All Characteristics of a Service* sub-procedure or the GATT *Discover Characteristics by UUID* sub-procedure to discover the characteristics of the service.

The Collector shall use the GATT *Discover All Characteristic Descriptors* sub-procedure to discover the characteristic descriptors described in the following sections.

4.3.1.1 Temperature Measurement Characteristic

The Collector shall discover the Temperature Measurement characteristic.

The Collector shall discover the *Client Characteristic Configuration* descriptor of the Temperature Measurement characteristic.

4.3.1.2 Temperature Type Characteristic

The Collector may discover the Temperature Type characteristic.

4.3.1.3 Intermediate Temperature Characteristic

The Collector may discover the Intermediate Temperature characteristic.

The Collector may discover the *Client Characteristic Configuration* descriptor of the Intermediate Temperature characteristic.

4.3.1.4 Measurement Interval Characteristic

The Collector may discover the Measurement Interval characteristic.

The Collector may discover the *Client Characteristic Configuration* descriptor of the Measurement Interval characteristic.

The Collector may discover the Valid Range descriptor of the Measurement Interval characteristic.

4.3.2 Device Information Service Characteristic Discovery

The Collector may discover the characteristics of the Device Information Service.

In order for the Collector to discover the characteristics of the Device Information Service, it shall use either the GATT *Discover All Characteristics of a Service* sub-procedure or the GATT *Discover Characteristics by UUID* sub-procedure to discover all characteristics of the service.

4.4 Temperature Measurement

The Collector shall control the configuration of indications (i.e. via the Client Characteristic Configuration descriptor) of the Temperature Measurement characteristic.

The Collector shall be able to receive multiple indications of the Temperature Measurement characteristic from the Thermometer for the case where the Thermometer has stored measurements to send.

When a Collector requires a connection to a Thermometer to receive temperature measurements it shall follow the connection procedures described in Section 5.1.4.

The Collector shall support receiving the Temperature Measurement characteristic both with and without the following fields: Time Stamp, Temperature Type.

The Collector shall determine the contents of the Temperature Measurement characteristic structure based on the contents of the Flags field. This allows the Collector to determine the unit of the measurement and whether or not a time stamp or temperature type is included.

If the Collector receives a Temperature Measurement characteristic with bits of the Flags field value that are designated as Reserved for Future Use (RFU), it shall ignore those bits and continue to process the Temperature Measurement characteristic normally.

If the Collector receives a Temperature Measurement characteristic with additional octets that are not recognized by the implementation, it shall ignore these extra octets.

If the Collector receives a Temperature Measurement characteristic with a Temperature Type field value that is designated as RFU, it shall discard the value and continue to process the Temperature Measurement characteristic normally.

The Collector shall support receiving the Temperature Measurement characteristic for temperature values in units of Celsius and Fahrenheit.

4.5 Intermediate Temperature

This section applies when the Intermediate Temperature characteristic is supported.

The intermediate temperature characteristic enables a Collector to receive notifications of the Intermediate Temperature characteristic from a Thermometer supporting this feature to show the progress of a measurement for display purposes.

The Collector shall control the configuration of notifications of the Intermediate Temperature characteristic.

The Collector shall be able to receive multiple notifications of the Intermediate Temperature characteristic from the Thermometer.

When a Collector requires a connection to a Thermometer to enable intermediate temperature notifications, it shall follow the connection procedures described in Section [5.1.4](#).

The Collector shall support receiving the Intermediate Temperature characteristic both with and without the following fields: Time Stamp, Temperature Type.

The Collector shall determine the contents of the Intermediate Temperature characteristic structure based on the contents of the Flags field. This allows the Collector to determine the unit of the measurement and whether or not additional information such as time stamp or temperature type is included.

If the Collector receives a Intermediate Temperature characteristic with bits of the Flags field value that are designated as Reserved for Future Use (RFU), it shall ignore those bits and continue to process the Intermediate Temperature characteristic normally.

If the Collector receives an Intermediate Temperature characteristic with additional octets that are not recognized by the implementation, it shall ignore these extra octets.

If the Collector receives an Intermediate Temperature characteristic with a Temperature Type field value that is designated as RFU, it shall discard the value and continue to process the Intermediate Temperature characteristic normally.

The Collector shall support receiving the Intermediate Temperature characteristic for temperature values in units of Celsius and Fahrenheit.

4.6 Measurement Interval

This section applies when the Measurement Interval characteristic is supported.

The Measurement Interval characteristic enables a Collector to receive indications of the Temperature Measurement characteristic at periodic intervals from a Thermometer supporting this feature. The Measurement Interval characteristic is only applicable to the Temperature Measurement characteristic.

To enable periodic indications, the Collector shall enable indications of the Temperature Measurement characteristic as described in Section [4.4](#) and also set the value of the Measurement Interval characteristic to a non-zero value.

Setting the value of the Measurement Interval characteristic to zero disables periodic indications.

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The Collector may read the Valid Range descriptor of the Measurement Interval characteristic to determine the range of supported interval values of the Thermometer.

The Collector may read the value of the Measurement Interval characteristic.

The Collector may write the value of the Measurement Interval characteristic.

If the Collector attempts to write an unsupported value to the Measurement Interval characteristic and receives an error response *Out of Range* from the Thermometer, the Collector should reattempt the write using a value within the valid range defined in the Valid Range descriptor.

The Collector may control the configuration of indications of the Measurement Interval characteristic.

The Collector may receive indications of the Measurement Interval characteristic sent from the Thermometer.

4.6.1 Valid Range Descriptor

This section applies when the Measurement Interval characteristic is writable.

The Collector may read the value of the Valid Range descriptor to determine the current supported measurement interval range for the Thermometer.

4.7 Temperature Type

This section applies when the Temperature Type characteristic is supported.

The Temperature Type characteristic enables a Collector to read the value of the Temperature Type characteristic from a Thermometer supporting this characteristic. This characteristic describes the type of temperature measurement in relation to the location on the human body at which the temperature was measured.

The Collector may read the value of the Temperature Type characteristic to determine the current temperature type value on the Thermometer.

If the Collector reads a Temperature Type characteristic with a value that is designated as RFU, it shall discard the value.

4.8 Device Information Service Characteristics

The Collector may read the value of Device Information Service characteristics.

5 Connection Establishment

This section describes the connection establishment and connection termination procedures used by a Thermometer and Collector in certain scenarios.

The following scenario description is informative:

Once configured by the Collector, a Thermometer will typically remain powered off between uses and will only advertise and allow a Collector to connect when the Thermometer has data to send. In this scenario, the Thermometer will enter a GAP Connectable Mode and start advertising when it has data to send to the Collector. The Collector will typically execute a GAP connection establishment procedure such that it is scanning for the Thermometer using a white list. When a connection is established, the Thermometer sends one or more indications or notifications to the Collector. When the data transfer is complete the Thermometer typically terminates the connection.

5.1 Thermometer Connection Establishment

5.1.1 Device Discovery

The Thermometer should use the GAP *Limited Discoverable Mode* when establishing an initial connection. The $T_{\text{GAP}}(\text{lim_adv_timeout})$ used during GAP *Limited Discoverable Mode* may be larger than the value specified in the Section 16, Appendix A in the GAP specification [3], but the value shall be less than or equal to 180 seconds.

5.1.2 Connection Procedure for Unbonded Devices

This procedure is used for connection establishment when the Thermometer connects to a Collector to which it is not bonded. This may be initiated either through user interaction or autonomously when the Thermometer has a notification or indication is pending.

It is recommended that the Thermometer advertises using the parameters in [Table 5.1](#). The interval values in the first row are designed to attempt fast connection during the first 30 seconds; however, if a connection is not established within that time, the interval values in the second row are designed to reduce power consumption for devices that continue to advertise.

Advertising Duration	Parameter	Value
First 30 seconds (fast connection)	Advertising Interval	20 ms to 30 ms
After 30 seconds (reduced power)	Advertising Interval	1 s to 2.5 s

Table 5.1: Recommended Advertising Interval Values

The advertising interval and time to perform advertising should be configured with consideration for user expectations of connection establishment time.

The Thermometer shall accept any valid values for connection interval and connection latency set by the Collector until service discovery and encryption is complete. Only after that should the Thermometer change to the preferred connection parameters that best suits its use case.

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If a connection is not established within a time limit defined by the Thermometer, the Thermometer may exit the GAP connectable mode.

The Thermometer should be in a bondable mode during this procedure to optimize connecting to the Collector again using the procedure described in Section 5.1.3. If a bond is created, the Thermometer should write the address of the Collector in the Thermometer controller's white list and set the Thermometer controller's advertising filter policy to 'process scan and connection requests only from devices in the White List'.

Once connected, the Thermometer should wait for an idle connection timeout (see Section 5.1.5) to allow the Collector to complete configuration.

If the Client Characteristic Configuration descriptor has been configured to enable indications or notifications but the Thermometer has no data to transfer, the Thermometer should wait for an idle connection timeout (see Section 5.1.5) to allow the Collector to terminate the connection once its actions are complete.

If the Client Characteristic Configuration descriptor has been configured to enable indications or notifications and the Thermometer has data to transfer, after it has completed its transfer, it should perform the GAP *Terminate Connection* procedure after waiting for an idle connection timeout. This allows the Collector to perform any additional required actions (e.g. read Temperature Type characteristic).

5.1.3 Connection Procedure for Bonded Devices

This procedure is used after the Thermometer has bonded with the Collector using the connection procedure in Section 5.1.2 and either when the user initiates a connection or autonomously when a notification or indication is pending.

A Thermometer shall enter the GAP *Undirected Connectable Mode* either when commanded by the user to initiate a connection to a Collector or when a Thermometer has one or more indications or notifications to send to a previously connected Collector.

The Thermometer should use the advertising filter policy configured when bonded using the connection procedure in Section 5.1.2.

The Thermometer should use the recommended advertising interval values shown in Table 5.1.

The advertising interval and time to perform advertising should be configured with consideration for user expectations of connection establishment time.

The Thermometer shall accept any valid values for connection interval and connection latency set by the Collector until service discovery, bonding and/or encryption is complete. Only after that should the Thermometer change to the preferred connection parameters that best suits its use case.

If a connection is not established within a time limit defined by the Thermometer, the Thermometer may exit the GAP connectable mode.

When a connection is established with an indication or notification pending, the Thermometer shall send one or more indications or notifications to the Collector. If the Client Characteristic Configuration descriptor has been configured to enable indications

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or notifications but the Thermometer has no data to transfer, it should wait for an idle connection timeout (refer to Section 5.1.5) to allow the Collector to terminate the connection once its actions are complete.

If the Client Characteristic Configuration descriptor has been configured to enable indications or notifications and the Thermometer has data to transfer, after it has completed its transfer, it should perform the GAP *Terminate Connection* procedure after waiting for an idle connection timeout. This allows the Collector to perform any additional required actions (e.g. read Temperature Type characteristic).

5.1.4 Link Loss Reconnection Procedure

When a connection is terminated due to link loss, a Thermometer should attempt to reconnect to the Collector by entering a GAP connectable mode using the recommended advertising interval values shown in [Table 5.1](#).

5.1.5 Idle Connection

The Thermometer may perform the GAP *Terminate Connection* procedure if the connection is idle for more than 5 seconds.

5.2 Collector Connection Establishment

5.2.1 Device Discovery

The Collector should use the GAP *Limited Discovery Procedure* to discover a Thermometer.

5.2.2 Connection Procedure for Unbonded Devices

This procedure is used for connection establishment when the Collector connects to a Thermometer to which it is not bonded. This may be initiated either through user interaction or autonomously when a Collector requires measurements from a Thermometer.

A Collector may use one of the following GAP connection procedures based on its connectivity requirements:

- *General Connection Establishment Procedure*. The Collector may use this procedure when it requires measurements from one or more Thermometers. This procedure allows a Collector to connect to a Thermometer discovered during a scan without using the white list.
- *Direct Connection Establishment Procedure*. The Collector may use this procedure when it requires measurements from a single Thermometer.
- *Auto Connection Establishment Procedure*. The Collector may use this procedure when it requires measurements from one or more Thermometers or other sensors. This procedure will automatically connect to a Thermometer in the white list.
- *Selective Connection Establishment Procedure*. The Collector may use this procedure when it requires measurements from one or more Thermometers. This

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procedure allows a Collector to connect to a Thermometer discovered during a scan while using the white list.

The Collector should use the recommended scan interval and scan window values shown in [Table 5.2](#). For the first 30 seconds (or optionally continuously for mains powered devices), the Collector should use the first scan window / scan interval pair to attempt fast connection. However, if a connection is not established within that time, the Collector should switch to one of the other scan window / scan interval options as defined below to reduce power consumption.

Scan Duration	Parameter	Value
First 30 seconds (fast connection)	Scan Interval	30ms to 60ms*
	Scan Window	30ms
After 30 seconds (reduced power) - Option 1	Scan Interval	1.28s
	Scan Window	11.25ms
After 30 seconds (reduced power) - Option 2	Scan Interval	2.56s
	Scan Window	11.25ms

Table 5.2: Recommended Scan Interval and Scan Window Values

* A scan interval of 60ms is recommended when the Collector is supporting other operations to provide a 50% scan duty cycle versus 100% scan duty cycle.

Option 1 in the table above uses the same background scanning interval used in BR/EDR so the power consumption for LE will be similar to the power consumption used for background scanning on BR/EDR. Option 2 uses a larger background scanning interval (e.g. twice as long) than used in BR/EDR so the power consumption for LE will be less than the power consumption used for background scanning on BR/EDR. Connection times during background scanning will be longer with Option 2.

The Collector should bond with the Thermometer during this procedure to optimize connecting to the Thermometer again using the procedure in [Section 5.2.3](#). If a bond is created, the Collector should write the address of the Thermometer in the Collector controller's white list and set the Collector controller's initiator filter policy to 'process connectable advertisement packets'.

If the Client Characteristic Configuration descriptor has been configured to enable indications or notifications, the Collector should wait for an idle connection timeout (see [Section 5.2.5](#)) before terminating the connection in case the Thermometer has any notifications or indications pending. The Thermometer typically terminates the connection after it has no additional data to transfer.

5.2.3 Connection Procedure for Bonded Devices

This procedure is used after the Collector has bonded with the Thermometer using the connection procedure in [Section 5.2.2](#) and either when the user initiates a connection or autonomously when a Collector requires measurements from a Thermometer.

A Collector may use one of the following GAP connection procedures based on its connectivity requirements:

- *General Connection Establishment Procedure.* The Collector may use this procedure when it requires measurements from one or more Thermometers. This

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procedure allows a Collector to connect to a Thermometer discovered during a scan without using the white list.

- *Direct Connection Establishment Procedure.* The Collector may use this procedure when it requires measurements from a single Thermometer.
- *Auto Connection Establishment Procedure.* The Collector may use this procedure when it requires measurements from one or more Thermometers or other sensors. This procedure will automatically connect to a Thermometer in the white list.
- *Selective Connection Establishment Procedure.* The Collector may use this procedure when it requires measurements from one or more Thermometers. This procedure allows a Collector to connect to a Thermometer discovered during a scan while using the white list.

The Collector should use the recommended scan interval and scan window values shown in [Table 5.2](#). For the first 30 seconds (or optionally continuously for mains powered devices), the Collector should use the first scan window / scan interval pair to attempt fast connection. However, if a connection is not established within that time, the Collector should switch to one of the other scan window / scan interval options as defined below to reduce power consumption.

The Collector should use a scan window and scan interval suitable to its power and connection time requirements. Increasing the scan window increases the power consumption, but decreases the connection time.

The scan interval and scan window should be configured with consideration for user expectations of connection establishment time.

If the Client Characteristic Configuration descriptor has been configured to enable indications or notifications, the Collector should wait for an idle connection timeout (refer to Section 5.2.5) before terminating the connection in case the Thermometer has any notifications or indications pending. The Thermometer typically terminates the connection after it has no additional data to transfer.

The Collector shall start encryption after each connection creation to verify the status of the bond. If encryption fails upon connection establishment (i.e. the bond no longer exists), the Collector must, after user interaction, re-bond, perform service discovery (unless the Collector had previously determined that the Thermometer did not have the <<Service Changed>> characteristic), and set the Thermometer Client Characteristic Configuration descriptor again before using any of the services referenced by this profile in case the configuration was altered or lost.

5.2.4 Link Loss Reconnection Procedure

When a connection is terminated due to link loss, a Collector should attempt to reconnect to the Thermometer using any of the GAP connection procedures with the parameters in [Table 5.2](#).

5.2.5 Idle Connection

The Collector may perform the GAP *Terminate Connection* procedure if the connection is idle for more than 5 seconds.

5.2.6 Fast Connection Interval

To avoid very long service discovery and encryption times, the Collector should use the connection intervals defined in [Table 5.3](#) in the connection request.

Parameter	Value
Minimum Connection Interval	50 ms
Maximum Connection Interval	70 ms

Table 5.3: Recommended Fast Connection Interval Values

At any time a lower latency is required, for example to perform key refresh or encryption setup, this should be preceded with a connection parameter update to the minimum and maximum connection interval values defined in [Table 5.3](#) and a connection latency of zero. This fast connection interval should be maintained as long as low latency is required. After that, it should switch to the preferred connection parameters as decided by the Thermometer using the *GAP Connection Parameter Update* procedure.

6 Security Considerations

This section describes the security considerations for a Thermometer and Collector.

6.1 Thermometer Security Considerations

The Thermometer shall use LE Security Mode 1 and either Security Level 2 or 3.

All supported characteristics specified by the Health Thermometer Service shall be set to Security Mode 1 and either Security Level 2 or 3.

The Thermometer should bond with the Collector.

The Thermometer should use the SM *Slave Security Request* procedure to inform the Collector of its security requirements. If the Thermometer uses bonding, it shall use the SM *Slave Security Request* procedure.

All supported characteristics specified by the Device Information Service should be set to the same security mode and level as the characteristics in the Health Thermometer Service.

6.2 Collector Security Considerations

The Collector should bond with the Thermometer.

The Collector shall support LE Security Mode 1 and Security Levels 2 and 3.

The Collector shall accept the LE Security Mode and Security Level combination requested by the Thermometer.

7 Acronyms and Abbreviations

Acronyms and Abbreviations	Meaning
AD	Advertising Data
BR/EDR	Basic Rate / Enhanced Data Rate
GAP	Generic Access Profile
GATT	Generic Attribute Profile
HS	High Speed
LE	Low Energy
RFU	Reserved for Future Use
SM	Security Manager
UUID	Universally Unique Identifier

Table 7.1: Acronyms and Abbreviations

8 References

- [2] Health Thermometer Service
- [3] Bluetooth Core specification v4.0
- [4] Device Information Service
- [5] Health Device Profile v1.0
- [6] Characteristic and Descriptor descriptions are accessible via the [Bluetooth SIG Assigned Numbers](#).
- [7] IEEE Std 11073-20601™ - 2008 Health Informatics - Personal Health Device Communication - Application Profile - Optimized Exchange Protocol - version 1.0 or later
- [8] Personal Health Devices Transcoding Whitepaper