Management Objects for ZigBee Devices

Approved Version 1.0 – 25 Jul 2017

Open Mobile Alliance

OMA-TS-DM-GwMO_ZigBeeMO-V1_0-20170725-A

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1. Scope

This document defines an OMA DM management object (data model) to represent ZigBee devices. This ZigBee MO models specific parameters used to represent a specific ZigBee device and should be used together with GwMO TS v1.1 [GwMO TS]. This ZigBee MO is optional for any OMA DM Gateway implementation.

This standardised ZigBee device data model encourages the wide adoption of the management object while allowing vendor innovations and extensions.

2. References

2.1 Normative References

[GwMO v1.1] "GwMO v1.1 Specifications", Version 1.1, Open Mobile Alliance™, URL:http://www.openmobilealliance.org/

[IEEE 802.15.4] IEEE 802.15.4, Wireles Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low-Rate Wireless Personal Area Networks (WPANs), IEEE, 2006.

[ISO 8601] ISO 8601 Data elements and interchange formats – Information interchange – Representation of dates and times

[ISO639-1] ISO 639-1, Codes for the representation of names of Languages - Part 1: Alpha-2 code, ISO, 2002

[ISO646-1991] ISO/IEC 646-1991, Information Technology - ISO 7-bit coded character set for information interchange, ISO, 1991.

[RFC2119] "Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997, URL:http://www.ietf.org/rfc/rfc2119.txt

[RFC2863] RFC 2863, The Interfaces Group MIB, IETF, 2000

URL:http://www.ietf.org/rfc/rfc2863.txt

[RFC4234] "Augmented BNF for Syntax Specifications: ABNF". D. Crocker, Ed., P. Overell. October 2005, URL:http://www.ietf.org/rfc/rfc4234.txt

[SCRRULES] "SCR Rules and Procedures", Open Mobile Alliance™, OMA-ORG-SCR_Rules_and_Procedures, URL:http://www.openmobilealliance.org/

[ZigBee2007] "ZigBee Specification 2007", ZigBee Alliance, Version 053474r17, URL: http://www.zigbee.org/Specifications/ZigBee/download.aspx

2.2 Informative References

[OMADICT] "Dictionary for OMA Specifications", Version 2.9, Open Mobile Alliance™, OMA-ORG-Dictionary-V2_9, URL:http://www.openmobilealliance.org/

3. Terminology and Conventions

3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

3.3 Abbreviations

OMA	Open Mobile Alliance
ZDO	ZigBee Device Object

4. Introduction

ZigBee is a protocol for wireless communication standardized by the ZigBee Alliance. The ZigBee protocol defines the network layer and the layers above it. Lower layers are based on IEEE 802.15.4 [IEEE 802.15.4] which defines the MAC sublayer and the physical layer. This specification defines OMA DM management objects to represent ZigBee devices so that these devices can be managed through an OMA DM Server and DM Gateway pair. The ZigBee Device MO is dependent on and SHOULD be used together with GwMO TS v1.1 [GwMO TS].

4.1 Version 1.0

This version defines ZigBee device MO to represent ZigBee devices.

5. ZigBee Management Object

The management object for ZigBee device capabilities is based on the [ZigBee2007] specification.

5.1 MO diagram

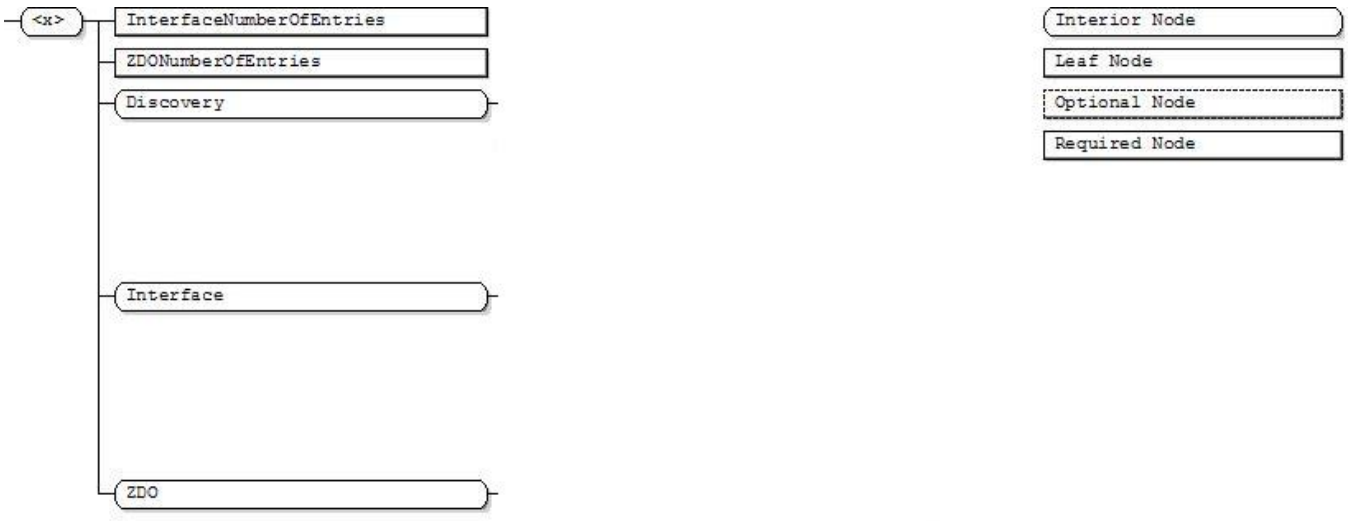

Figure 1 ZigBee MO (Overview)

This MO diagram is composed of following three sub-trees.

Nodes under **Discovery** are shown in Figure 2.

Figure 2 ZigBeeMO sub-tree under Discovery

Nodes under **Interface** are shown in Figure 3.

Figure 3 ZigBee MO sub-tree under Interface

Nodes under **ZDO** are shown in Figure 4.

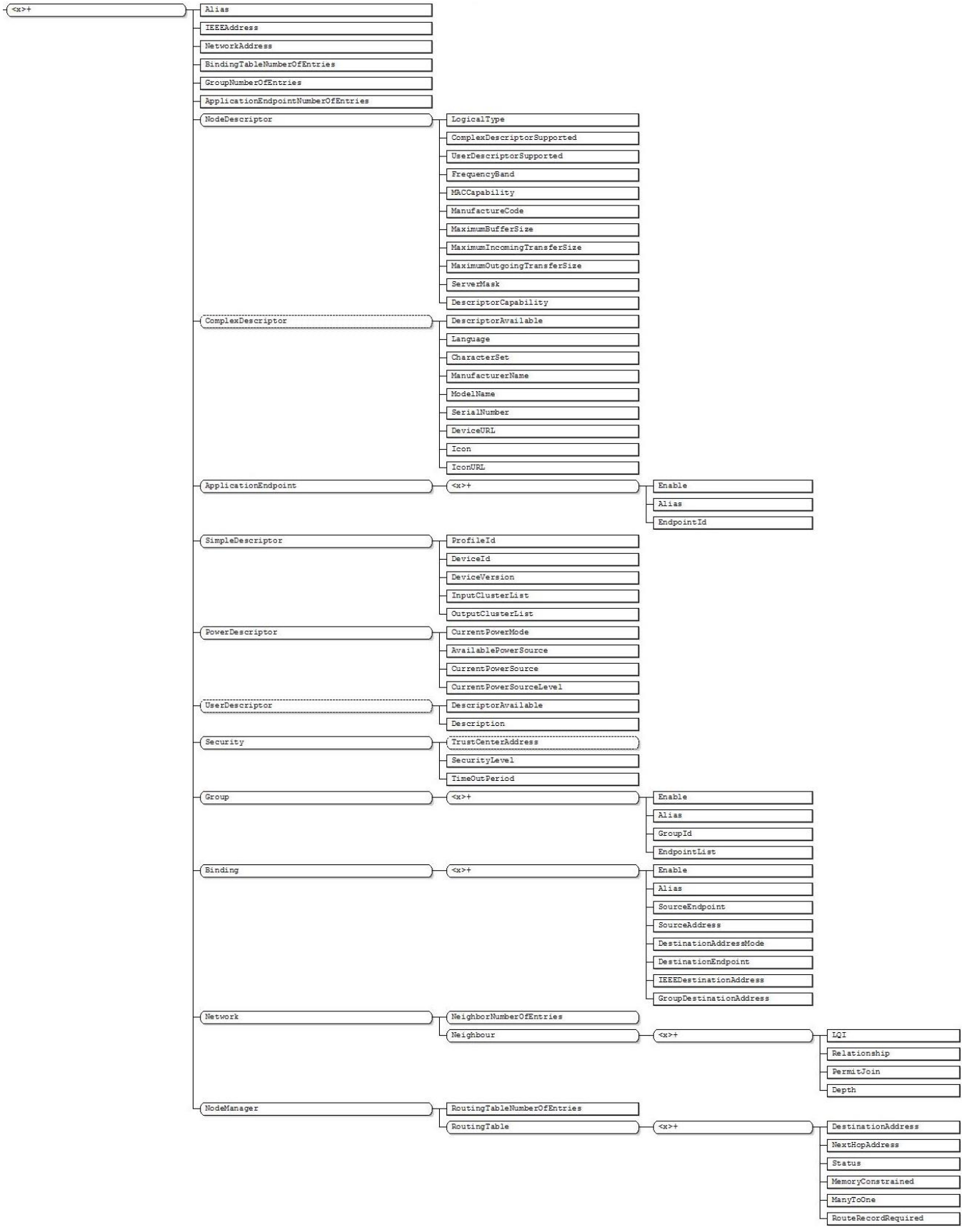

Figure 4 ZigBee MO sub-tree under ZDO

5.2 MO Descriptions

<x>

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This placeholder node is for storing information regarding the ZigBee End Device deployed. This node specifies a reference to the Management Tee of the ZigBee End Device.

The identifier for the ZigBee devices MUST be: “urn:oma:mo: oma-dm-zigbee:1.0”.

<x>/InterfaceNumberOfEntries

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The number of entries in the *Interface* table. Value of this node MUST be a positive integer.

<x>/ZDONumberOfEntries

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The number of entries in the *ZDO* table. Value of this node MUST be a positive integer.

<x>/Discovery

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This object is used for managing the discovery of ZigBee devices within a ZigBee Area Network. ZigBee Devices are discovered via the *ZDO* instance associated with the ZigBee Coordinator of an Area Network.

<x>/Discovery/AreaNetworkNumberOfEntries

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The number of entries in the *AreaNetwork* table. Value of this node MUST be a positive integer.

<x>/Discovery/AreaNetwork

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This object specifies the ZigBee devices that are discovered by the *Coordinator*.

As the ZigBee specification does not provide a discovery protocol between the DM Gatewayand the ZigBee coordinator, the *AreaNetwork* object is provisioned and not discovered.

At most one entry in this table (regardless of whether or not it is enabled) can exist with a given value for *Alias*. On creation of a new table entry, the device MUST choose an initial value for *Alias* such that the new entry does not conflict with any existing entries.

At most one enabled entry in this table can exist with a given value for *Coordinator*.

<x>/Discovery/AreaNetwork/<x>

Status	Tree Occurrence	Format	Min. Access Types
Required	OneOrMore	node	Get, Replace

This placeholder node is for OneOrMore *AreaNetwork* entries.

<x>/Discovery/AreaNetwork/<x>/Enable

Status	Tree Occurrence	Format	Min. Access Types
Required	One	bool	Get, Replace

Enables or disables discovery of the ZigBee devices in this *AreaNetwork*

<x>/Discovery/AreaNetwork/<x>/LastUpdate

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The date and time when this *AreaNetwork* or its member devices (i.e., the devices with ZDOs listed in *ZDOList*) were updated due to a discovery operation. The representation of this node MUST follow the [YYYY]-[MM]-[DD] T[hh]:[mm]Z format, as defined by [ISO 8601].

<x>/Discovery/AreaNetwork/<x>/Status

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The status of the current discovery operation.

- *Indeterminate* (The discovery operation has not been executed and there are no valid discovery results available))
- *InProgress*
- *Success*

- *Error*
- *Error_Timeout* (OPTIONAL)

<x>/Discovery/AreaNetwork/<x>/Alias

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get, Replace

A non-volatile handle used to reference this instance. Alias provides a mechanism for a DM Server to label this instance for future reference.

If the device supports the Alias-based Addressing feature the following mandatory constraints MUST be enforced:

- Its value MUST NOT be empty.
- Its value MUST start with a letter.
- If its instance object is created by the Device, the initial value MUST start with a "device-" prefix.
- The Device MUST NOT change the parameter value.

The string length of this node MUST NOT exceed 64.

<x>/Discovery/AreaNetwork/<x>/Coordinator

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get, Replace

The Fully Qualified Domain Name (FQDN) or IP address of the ZigBee Coordinator. The Coordinator MAY be located within the Device. In this scenario the Server or Device MAY use the value of "localhost".

The string length of this node MUST NOT exceed 256.

<x>/Discovery/AreaNetwork/<x>/ZDOReference

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The ZDO object for this device that is used to discover the ZigBee capabilities of attached devices.

The value MUST be the path name of a row in the *ZigBee ZDO* table. If the referenced object is deleted, the parameter value MUST be set to an empty string.

The string length of this node MUST NOT exceed 256.

<x>/Discovery/AreaNetwork/<x>/ZDOList

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Comma-separated list of strings (maximum length 256). The list of ZDO objects discovered in this Area Network by the ZigBee Coordinator.

Each list item MUST be the path name of a row in the *ZigBee ZDO* table. If the referenced object is deleted, the corresponding item MUST be removed from the list.

<x>/Interface

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

ZigBee interface table is a stackable interface object. This table models the ZigBee interface of a ZigBee end device, ZigBee router or ZigBee coordinator.

At most one entry in this table can exist with a given value for *Alias*, or with a given value for *Name*, or with a given value for ZDOReference.

<x>/Interface/<x>

Status	Tree Occurrence	Format	Min. Access Types
Required	OneOrMore	node	Get, Replace

This placeholder node is for OneOrMore *Interface* entries.

<x>/Interface/<x>/Enable

Status	Tree Occurrence	Format	Min. Access Types
Required	One	bool	Get, Replace

Enables or disables the interface. This parameter is based on ifAdminStatus from [RFC2863].

<x>/Interface/<x>/Status

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The current operational state of the interface Enumeration of:

- *Up*
- *Down*

- *Unknown*
- *Dormant*
- *NotPresent*
- *LowerLayerDown*
- *Error* (OPTIONAL)

When *Enable* is *false* then *Status* SHOULD normally be *Down* (or *NotPresent* or *Error* if there is a fault condition on the interface).

When *Enable* is changed to *true* then *Status* SHOULD change to *Up* if and only if the interface is able to transmit and receive network traffic; it SHOULD change to *Dormant* if and only if the interface is operable but is waiting for external actions before it can transmit and receive network traffic (and subsequently change to *Up* if still operable when the expected actions have completed); it SHOULD change to *LowerLayerDown* if and only if the interface is prevented from entering the *Up* state because one or more of the interfaces beneath it is down; it SHOULD remain in the *Error* state if there is an error or other fault condition detected on the interface; it SHOULD remain in the *NotPresent* state if the interface has missing (typically hardware) components; it SHOULD change to *Unknown* if the state of the interface can not be determined for some reason.

This parameter is based on *ifOperStatus* from [RFC2863].

<x>/Interface/<x>/Alias

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get, Replace

A non-volatile handle used to reference this instance. Alias provides a mechanism for a Server to label this instance for future reference.

If the Device supports the Alias-based Addressing feature the following mandatory constraints MUST be enforced:

- Its value MUST NOT be empty.
- Its value MUST start with a letter.
- If its instance object is created by the Device, the initial value MUST start with a "device-" prefix.
- The DeviceMUST NOT change the parameter value.

The string length of this node MUST NOT exceed 64.

<x>/Interface/<x>/Name

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The textual name of the interface as assigned by the Device.

The string length of this node MUST NOT exceed 64.

<x>/Interface/<x>/LastChange

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The accumulated time in *seconds* since the interface entered its current operational state.

The node value MUST be positive.

<x>/Interface/<x>/LowerLayers

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get, Replace

Comma-separated list (maximum length 1024) of strings. Each list item MUST be the path name of an interface object that is stacked immediately below this interface object. If the referenced object is deleted, the corresponding item MUST be removed from the list.

The string length of this node MUST NOT exceed 1024.

<x>/Interface/<x>/IEEEAddress

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The IEEE address assigned to this interface. A value of "FF:FF:FF:FF:FF:FF:FF:FF" indicates that this address is unknown. This parameter has the same value as the *ZigBee ZDO/IEEEAddress* parameter of the ZDO instance *ZDOReference* is pointing to.

The string length of this node MUST NOT exceed 23.

<x>/Interface/<x>/NetworkAddress

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The ZigBee network address assigned to this interface. This parameter has the same value as the *ZigBee ZDO/NetworkAddress* parameter of the ZDO instance *ZDOReference* is pointing to.

The string length of this node MUST NOT exceed 4.

<x>/Interface/<x>/ZDOReference

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The value MUST be the path name of a row in the *ZigBee ZDO* table. If the referenced object is deleted, the parameter value MUST be set to an empty string. The ZigBee Device Object assigned to this interface.

The string length of this node MUST NOT exceed 256.

<x>/Interface/<x>/AssociatedDeviceNumberOfEntries

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The number of entries in the *AssociatedDevice* table. The node value MUST be positive.

<x>/Interface/<x>/AssociatedDevice

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

This table provides information about other ZigBee devices that are directly accessible via this interface.

At most one entry in this table can exist with the same values for *IEEEAddress* and *NetworkAddress*.

It is possible that instances of this object have the same key value when the value of *IEEEAddress* parameter is "FF:FF:FF:FF:FF:FF:FF:FF" and the ZigBee Coordinators on two or more separate area networks assign the same value for the *NetworkAddress*. This is because the ZigBee specification describes only intra-area network topologies in Section 1.1.4 Network Topology in [ZigBee2007]. As such if two or more *AssociatedDevice* instances have the same key value the implemenation is undefined.

<x>/Interface/<x>/AssociatedDevice/<x>

Status	Tree Occurrence	Format	Min. Access Types
Required	OneOrMore	node	Get

This is placeholder node for OneOrMore *AssociatedDevice*.

<x>/Interface/<x>/AssociatedDevice/<x>/IEEEAddress

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The IEEE address assigned to this device. A value of "FF:FF:FF:FF:FF:FF:FF:FF" indicates that this address is unknown.

The string length of this node MUST NOT exceed 23.

<x>/Interface/<x>/AssociatedDevice/<x>/NetworkAddress

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The ZigBee network address assigned to this device.

The string length of this node MUST NOT exceed 4.

<x>/Interface/<x>/AssociatedDevice/<x>/Active

Status	Tree Occurrence	Format	Min. Access Types
Required	One	bool	Get

Whether or not this device is currently present in the ZigBee network as defined in Section 2.4.4.1 [ZigBee2007].

The ability to list inactive devices is OPTIONAL. If the Device includes inactive devices in this table, *Active* MUST be set to *false* for each inactive device. The length of time an inactive device remains listed in this table is a local matter to the Device.

<x>/Interface/<x>/AssociatedDevice/<x>/ZDOReference

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The value MUST be the path name of a row in the *ZigBee ZDO* table. If the referenced object is deleted, the parameter value MUST be set to an empty string. The ZigBee Device Object assigned to this interface.

The string length of this node MUST NOT exceed 256.

<x>/Interface/<x>/Stats/

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

Throughput statistics for this interface.

The Device MUST reset the interface's Stats parameters (unless otherwise stated in individual object or parameter descriptions) either when the interface becomes operationally down due to a previous administrative down (i.e. the interface's *Status* parameter transitions to a down state after the interface is disabled) or when the interface becomes administratively up (i.e. the interface's *Enable* parameter transitions from *false* to *true*).

<x>/Interface/<x>/Stats/BytesSent

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The total number of *bytes* transmitted out of the interface, including framing characters. The value of this node MUST be 64 bits positive.

<x>/Interface/<x>/Stats/BytesReceived

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The total number of *bytes* received on the interface, including framing characters. The value of this node MUST be 64 bits positive.

<x>/Interface/<x>/Stats/PacketsSent

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The total number of *ZigBee packets* sent transmitted out of the interface. The value of this node MUST be 64 bits positive.

<x>/Interface/<x>/Stats/PacketsReceived

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The total number of *ZigBee packets* received by the interface. The value of this node MUST be 64 bits positive.

<x>/Interface/<x>/Stats/ErrorsSent

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The total number of *ZigBee packets* discarded by interface due to any error. The value of this node MUST be 32 bits positive.

<x>/Interface/<x>/Stats/ErrorsReceived

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The total number of *ZigBee packets* received that contained errors preventing them from being delivered to a higher-layer protocol. The value of this node MUST be 32 bits positive.

<x>/Interface/<x>/Stats/UnicastPacketsSent

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The total number of *ZigBee packets* requested for transmission which were not addressed to a multicast or broadcast address at this layer, including those that were discarded or not sent. The value of this node MUST be 32 bits positive.

<x>/Interface/<x>/Stats/UnicastPacketsReceived

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get, Add, Delete, Replace

The total number of *ZigBee packets* received which were not addressed to a multicast or broadcast address at this layer. The value of this node MUST be 32 bits positive.

<x>/Interface/<x>/Stats/DiscardPacketsSent

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The total number of *ZigBee packets* requested for transmission which were chosen to be discarded even though no errors had been detected to prevent the *ZigBee packets* being transmitted. The value of this node MUST be 32 bits positive.

<x>/Interface/<x>/Stats/DiscardPacketsReceived

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The total number of *ZigBee packets* received which were chosen to be discarded even though no errors had been detected to prevent their being delivered. The value of this node MUST be 32 bits positive.

<x>/Interface/<x>/Stats/MulticastPacketsSent

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The total number of *ZigBee packets* requested for transmission which were addressed to a multicast address at this layer, including those that were discarded or not sent. The value of this node MUST be 32 bits positive.

<x>/Interface/<x>/Stats/MulticastPacketsReceived

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The total number of *ZigBee packets* received which were addressed to a multicast address at this layer and delivered by this layer to a higher layer. The value of this node MUST be 32 bits positive.

<x>/Interface/<x>/Stats/BroadcastPacketsSent

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The total number of *ZigBee packets* received which were addressed to a broadcast address at this layer and delivered by this layer to a higher layer. The value of this node MUST be 32 bits positive.

<x>/Interface/<x>/Stats/BroadcastPacketsReceived

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The total number of *ZigBee packets* received which were addressed to a broadcast address at this layer and delivered by this layer to a higher layer. The value of this node MUST be positive with 32 bits.

<x>/Interface/<x>/Stats/UnknownPacketsReceived

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The total number of *ZigBee packets* received which were discarded because of an unknown or unsupported protocol. The value of this node MUST be 32 bits positive.

<x>/ZDO

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

ZigBee Device Object (ZDO) provides management capabilities of the ZigBee Application Support (APS) and Network (NWK) layers of a ZigBee Device as defined in Section 2.5 [ZigBee2007].

At most one entry in this table can exist with the same values for *IEEEAddress* and *NetworkAddress*.

It is possible that instances of this object have the same key value when the value of *IEEEAddress* parameter is "FF:FF:FF:FF:FF:FF:FF:FF" and the ZigBee Coordinators on two or more separate area networks assign the same value for the *NetworkAddress*. This is because the ZigBee specification describes only intra-area network topologies in Section 1.1.4 Network Topology [ZigBee2007]. As such if two or more *ZDO* instances have the same key value the implemenation is undefined

<x>/ZDO/<x>

Status	Tree Occurrence	Format	Min. Access Types
Required	OneOrMore	node	Get

This is a placeholder node for *ZDO* entries.

<x>/ZDO/<x>Alias

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get, Replace

A non-volatile handle used to reference this instance. Alias provides a mechanism for an Server to label this instance for future reference.

If the Device supports the Alias-based Addressing feature, the following mandatory constraints MUST be enforced:

- Its value MUST NOT be empty.
- Its value MUST start with a letter.
- If its instance object is created by the Device, the initial value MUST start with a "Device-" prefix.
- The Device MUST NOT change the parameter value.

This string length of this node MUST be 64.

<x>/ZDO/<x>/IEEEAddress

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The IEEE address assigned to this device. A value of "FF:FF:FF:FF:FF:FF:FF:FF" indicates that this address is unknown.

This string length of this node MUST be 23.

<x>/ZDO/<x>/NetworkAddress

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The ZigBee network address assigned to this device.

This string length of this node MUST be 4.

<x>/ZDO/<x>/BindingTableNumberOfEntries

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The number of entries in the *Binding* table. This node value must be positive.

<x>/ZDO/<x>/GroupNumberOfEntries

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The number of entries in the *Group* table. This node value must be positive.

<x>/ZDO/<x>/ ApplicationEndpointNumberOfEntries

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The number of entries in the *ApplicationEndpoint* table. This node value must be positive.

<x>/ZDO/<x>/NodeDescriptor

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

The *NodeDescriptor* object describes the node capabilities of the ZigBee device as defined in Section 2.3.2.3 Node Descriptor [ZigBee2007].

<x>/ZDO/<x>/NodeDescriptor/LogicalType

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The type of ZigBee device that is extracted from the Logical Type Field as defined in Table 2.29 [ZigBee2007].

- *ZC* (ZigBee Coordinator)
- *ZR* (ZigBee Router)

- *ZED* (ZigBee End Device)

<x>/ZDO/<x>/ NodeDescriptor/ComplexDescriptorSupported

Status	Tree Occurrence	Format	Min. Access Types
Required	One	bool	Get

When *true*, specifies that the *ComplexDescriptor* object is supported for this ZigBee device.

<x>/ZDO/<x>/ NodeDescriptor/UserDescriptorSupported

Status	Tree Occurrence	Format	Min. Access Types
Required	One	bool	Get

When *true*, specifies that the *UserDescriptor* object is supported for this ZigBee device.

<x>/ZDO/<x>/ NodeDescriptor/FrequencyBand

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies the frequency bands that are supported by the underlying IEEE 802.15.4 radio utilized by the ZigBee device.

Comma-separated list of strings. Each list item is an enumeration of:

- *868-868.6* (The 868-868.6 MHz Band)
- *902-928* (The 902-928 MHz Band)
- *2400-2483.5* (The 2400-2483.5 MHz Band)

<x>/ZDO/<x>/ NodeDescriptor/MACCapability

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies the IEEE 802.15.4-2003 MAC sub-layer capabilities for this ZigBee device.

Comma-separated list of strings. Each list item is an enumeration of:

- *AlternatePANCoordinator* (Alternate PAN Coordinator)
- *FFD* (Full Function Device)
- *MainsPowerSource* (The current power source is mains power)
- *OnWhenIdle* (The receiver is on when idle)
- *SecureCommunication* (Secure communication is enabled)

<x>/ZDO/<x>/ NodeDescriptor/ManufactureCode

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

Specifies a manufacturer code that is allocated by the ZigBee Alliance, relating the manufacturer to the device. This node MUST be positive and MUST NOT exceed the value 65535.

<x>/ZDO/<x>/ NodeDescriptor/MaximumBufferSize

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

Specifies the maximum buffer size, in *octets*, of the network sub-layer data unit (NSDU) for this ZigBee device. This node MUST be positive and MUST NOT exceed the value 128.

<x>/ZDO/<x>/ NodeDescriptor/MaximumIncomingTransferSize

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

Specifies the maximum size, in *octets*, of the application sub-layer data unit (ASDU) that can be transferred to this ZigBee device in one single message transfer. This node MUST be positive and MUST NOT exceed the value 32768.

<x>/ZDO/<x>/ NodeDescriptor/MaximumOutgoingTransferSize

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

Specifies the maximum size, in *octets*, of the application sub-layer data unit (ASDU) that can be transferred from this ZigBee device in one single message transfer. This node MUST be positive and MUST NOT exceed the value 32768.

<x>/ZDO/<x>/ NodeDescriptor/ServerMask

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies the system server capabilities of this ZigBee device.

Comma-separated list of strings. Each list item is an enumeration of:

- *PrimaryTrustCenter*
- *PrimaryBindingTableCache*
- *BackupBindingTableCache*
- *PrimaryDiscoveryCache*
- *BackupDiscoveryCache*

- *NetworkManager*

<x>/ZDO/<x>/ NodeDescriptor/DescriptorCapability

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies the descriptor capabilities of this ZigBee device.

Comma-separated list of strings. Each list item is an enumeration of:

- *ExtendedActiveEndpointListAvailable*
- *ExtendedSimpleDescriptorListAvailable*

<x>/ZDO/<x>/ ComplexDescriptor

Status	Tree Occurrence	Format	Min. Access Types
Optional	One	Node	Get

The *ComplexDescriptor* object is an optional descriptor that describes extended capabilities of the ZigBee device as defined in Section 2.3.2.6 Complex Descriptor [ZigBee2007]. This MUST be present if *<x>/ZDO/<x>/ NodeDescriptor/ComplexDescriptorSupported* node is true.

<x>/ZDO/<x>/ ComplexDescriptor/DescriptorAvailable

Status	Tree Occurrence	Format	Min. Access Types
Required	One	bool	Get

When *true*, the Complex Descriptor recorded has been received from the target device.

<x>/ZDO/<x>/ ComplexDescriptor/Language

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies the ISO 639-1 language code as defined in [ISO639-1].

<x>/ZDO/<x>/ ComplexDescriptor/CharacterSet

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies the ISO 646 character set as defined in [ISO646-1991].

<x>/ZDO/<x>/ ComplexDescriptor/ManufacturerName

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies the name of the manufacturer of the ZigBee device.

<x>/ZDO/<x>/ ComplexDescriptor/ModelName

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies the name of the manufacturer's model of the ZigBee device.

<x>/ZDO/<x>/ ComplexDescriptor/SerialNumber

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies the manufacturer's serial number of the ZigBee device.

<x>/ZDO/<x>/ ComplexDescriptor/DeviceURL

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies the URL through which more information relating to the ZigBee device can be obtained.

<x>/ZDO/<x>/ ComplexDescriptor/Icon

Status	Tree Occurrence	Format	Min. Access Types
Required	One	bin	Get

The icon field contains an octet string which carries the data for an icon that can represent the ZigBee device. The format of the icon MUST be a 32-by-32-pixel PNG image.

<x>/ZDO/<x>/ ComplexDescriptor/IconURL

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies the URL through which the icon for the ZigBee device can be obtained.

<x>/ZDO/<x>/ApplicationEndpoint

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

The *ApplicationEndpoint* object describes the application endpoint as defined in Section 2.1.2 Application Framework [ZigBee2007].

At most one entry in this table (regardless of whether or not it is enabled) can exist with a given value for *Alias*. On creation of a new table entry, the Device MUST choose an initial value for *Alias* such that the new entry does not conflict with any existing entries.

At most one enabled entry in this table can exist with a given value for *EndpointId*.

<x>/ZDO/<x>/ApplicationEndpoint/<x>

Status	Tree Occurrence	Format	Min. Access Types
Required	OneOrMore	node	Get, Replace

This node is a placeholder for OneOrMore *ApplicationEndpoint* entries.

<x>/ZDO/<x>/ApplicationEndpoint/<x>/Enable

Status	Tree Occurrence	Format	Min. Access Types
Required	One	bool	Get, Replace

Enables or disables the use of this application endpoint on the device.

<x>/ZDO/<x>/ApplicationEndpoint/<x>/Alias

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get, Replace

A non-volatile handle used to reference this instance. Alias provides a mechanism for a Server to label this instance for future reference.

If the Device supports the Alias-based Addressing feature, the following mandatory constraints MUST be enforced:

- Its value MUST NOT be empty.
- Its value MUST start with a letter.
- If its instance object is created by the Device, the initial value MUST start with a "device-" prefix.
- The Device MUST NOT change the parameter value.

The string length of this node MUST NOT exceed 64.

<x>/ZDO/<x>/ApplicationEndpoint/<x>/EndpointId

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get, Replace

The Endpoint Identifier for this object as defined in Section 2.1.2 Application Framework [ZigBee2007].

An *ApplicationEndpoint* with an *EndpointId* value of 0 is designated as the device application: This is a special application that is responsible for device operation and contains logic to manage the device's networking and general maintenance features. The value of this node MUST be positive and MUST NOT exceed 240.

<x>/ZDO/<x>/ ApplicationEndpoint/<x>/SimpleDescriptor

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

The *SimpleDescriptor* object contains the attributes of the Simple Descriptor of an application endpoint, as defined in Section 2.3.2.5 Simple Descriptor [ZigBee2007].

<x>/ZDO/<x>/ApplicationEndpoint/<x>/SimpleDescriptor/ProfileId

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get, Replace

Specifies the application profile that is supported on this endpoint. Application profiles are agreements for messages, message formats, and processing actions that enable developers to create an interoperable, distributed application employing application entities that reside on separate ZigBee devices. These application profiles enable applications to send commands, request data, and process commands and requests as defined in Section 2.1.2.1 Application Profiles [ZigBee2007]. The value of this node MUST be positive and MUST NOT exceed 65535.

<x>/ZDO/<x>/ApplicationEndpoint/<x>/SimpleDescriptor/DeviceId

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

Application device identifier, as defined in Section 2.3.2.5.3 Application Device Identifier Field [ZigBee2007]. The value of this node MUST be positive and MUST NOT exceed 65535.

<x>/ZDO/<x>/ApplicationEndpoint/<x>/SimpleDescriptor/DeviceVersion

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

Application device version, as defined in Section 2.3.2.5.4 Application Device Version Field [ZigBee2007]. The value of this node MUST be positive and MUST NOT exceed 15.

<x>/ZDO/<x>/ApplicationEndpoint/<x>/SimpleDescriptor/InputClusterList

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get, Replace

Comma-separated list of unsigned integers (value 0 to 65535). Specifies the input cluster identifiers to be matched by the ZigBee coordinator by remote Zigbee device's output cluster list for this *SimpleDescriptor* object.

<x>/ZDO/<x>/ApplicationEndpoint/<x>/SimpleDescriptor/OutputClusterList

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get, Replace

Comma-separated list of unsigned integers (value 0 to 65535). Specifies the output cluster identifiers to be matched by the ZigBee coordinator by remote Zigbee device's input cluster list for this *SimpleDescriptor* object.

<x>/ZDO/<x>/PowerDescriptor

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

The *PowerDescriptor* object describes the power capabilities of the ZigBee device as defined in Section 2.3.2.4 Node Power Descriptor [ZigBee2007].

<x>/ZDO/<x>/PowerDescriptor/CurrentPowerMode

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies the current sleep/power-saving mode of the ZigBee device.

- *Synchronized*
- *Periodic*
- *Manual*

<x>/ZDO/<x>/PowerDescriptor/AvailablePowerSource

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies the power sources available on this ZigBee device.

Comma-separated list of strings. Each list item is an enumeration of:

- *Constant* (Constant (mains) power)
- *Rechargeable* (Rechargable battery)
- *Disposable* (Disposable battery)

<x>/ZDO/<x>/PowerDescriptor/CurrentPowerSource

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The current power source field specifies the current power source being utilized by the node.

- *Constant* (Constant (mains) power)
- *Rechargeable* (Rechargable battery)
- *Disposable* (Disposable battery)

<x>/ZDO/<x>/PowerDescriptor/CurrentPowerSourceLevel

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies the level of charge of the current power source.

- *Critical* (Critical battery state)
- *33* (Battery state is 33 percent)
- *66* (Battery state is 66 percent)
- *100* (Battery state is 100 percent)

<x>/ZDO/<x>/>/UserDescriptor

Status	Tree Occurrence	Format	Min. Access Types
Optional	One	node	Get

The *UserDescriptor* object is an optional descriptor that describes user defined capabilities of the ZigBee device as defined in Section 2.3.2.7 User Descriptor [ZigBee2007]. The *UserDescriptor* object contains information that allows the user to identify the device using a user-friendly character string, such as "Bedroom TV" or "Stairs Light". This MUST be present if *<x>/ZDO/<x>/ NodeDescriptor/UserDescriptorSupported* node is true.

<x>/ZDO/<x> UserDescriptor/DescriptorAvailable

Status	Tree Occurrence	Format	Min. Access Types
Required	One	bool	Get

When *true*, the User Descriptor recorded has been received from the target device.

<x>/ZDO/<x>/UserDescriptor/Description

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies the information that allows the user to identify the ZigBee device using a user-friendly character string, such as "Bedroom TV" or "Stairs light". This node string length MUST NOT exceed 16.

<x>/ZDO/<x>/Security

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

The *Security* object provides the configuration capabilities needed to perform the Security Management functionality defined in Section 4 Security Management [ZigBee2007].

<x>/ZDO/<x>/Security/TrustCenterAddress

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies the IEEE address of a special device trusted by devices within a ZigBee network to distribute keys for the purpose of network and end-to-end application configuration management. This node string length MUST NOT exceed 23.

<x>/ZDO/<x>/Security/SecurityLevel

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies how an outgoing frame is to be secured, how an incoming frame purportedly has been secured; it also indicates whether or not the payload is encrypted and to what extent data authenticity over the frame is provided, as reflected by the length of the message integrity code (MIC).

- *None*
- *MIC-32*
- *MIC-64*
- *MIC-128*
- *ENC*
- *ENC-MIC-32*
- *ENC-MIC-64*
- *ENC-MIC-128*

<x>/ZDO/<x>/Security/TimeOutPeriod

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The period of time, in *milliseconds*, that this ZigBee device will wait for an expected security protocol frame. This MUST be positive integer and the value MUST NOT exceed 65535.

<x>/ZDO/<x>/Group

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

The *Group* object describes the configuration capabilities related to maintaining a ZigBee Device's Group Table as defined in Section 2.5.2.7 Group Manager [ZigBee2007].

At most one entry in this table (regardless of whether or not it is enabled) can exist with a given value for *Alias*. On creation of a new table entry, the Device MUST choose an initial value for *Alias* such that the new entry does not conflict with any existing entries.

At most one enabled entry in this table can exist with a given value for *GroupId*.

<x>/ZDO/<x>/Group/<x>

Status	Tree Occurrence	Format	Min. Access Types
Required	OneOrMore	node	Get, Replace

This is a placeholder node for OneOrMore *Group* entries.

<x>/ZDO/<x>/Group/<x>/Enable

Status	Tree Occurrence	Format	Min. Access Types
Required	One	bool	Get, Replace

Enables or disables the use of this group on the device.

<x>/ZDO/<x>/Group/<x>/Alias

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get, Replace

A non-volatile handle used to reference this instance. Alias provides a mechanism for an Server to label this instance for future reference.

If the Device supports the Alias-based Addressing feature as, the following mandatory constraints MUST be enforced:

- Its value MUST NOT be empty.
- Its value MUST start with a letter.

- If its instance object is created by the Device, the initial value MUST start with a "cpe-" prefix.
- The Device MUST NOT change the parameter value.

This node string length MUST NOT exceed 64.

<x>/ZDO/<x>/Group/<x>/GroupId

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get, Replace

The Group Identifier for this object as defined in Table 2.25 Group Table Entry Format [ZigBee2007]. This node string length MUST NOT exceed 4.

<x>/ZDO/<x>/Group/<x>/EndpointList

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get, Replace

Comma-separated list of strings (maximum length 256). Each list item MUST be the path name of a row in the *ZigBee ZDO/ApplicationEndpoint* table. If the referenced object is deleted, the corresponding item MUST be removed from the list. The list of application endpoints assigned as a member of this *Group* object.

<x>/ZDO/<x>/Binding

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

The *Binding* object describes the configuration capabilities related to maintaining a ZigBee Device's Binding Table as defined in Section 2.2.8.2 Binding [ZigBee2007].

At most one entry in this table (regardless of whether or not it is enabled) can exist with a given value for *Alias*. On creation of a new table entry, the Device MUST choose an initial value for *Alias* such that the new entry does not conflict with any existing entries.

<x>/ZDO/<x>/Binding/<x>

Status	Tree Occurrence	Format	Min. Access Types
Required	OneOrMore	node	Get, Replace

This is a placeholder node for *Binding* entries.

<x>/ZDO/<x>/Binding/<x>/Enable

Status	Tree Occurrence	Format	Min. Access Types
Required	One	bool	Get, Replace

Enables or disables the use of this binding on the device.

<x>/ZDO/<x>/Binding/<x>/Alias

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get, Replace

A non-volatile handle used to reference this instance. Alias provides a mechanism for a Server to label this instance for future reference.

If the Device supports the Alias-based Addressing feature, the following mandatory constraints MUST be enforced:

- Its value MUST NOT be empty.
- Its value MUST start with a letter.
- If its instance object is created by the Device, the initial value MUST start with a "device-" prefix.
- The Device MUST NOT change the parameter value.

This node string length MUST NOT exceed 64.

<x>/ZDO/<x>/Binding/<x>/SourceEndpoint

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get, Replace

Specifies the source endpoint used in this binding entry. This MUST be positive integer and the value MUST NOT exceed 240.

<x>/ZDO/<x>/Binding/<x>/SourceAddress

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get, Replace

Specifies the source address used in this binding entry. This node string length MUST NOT exceed 23.

<x>/ZDO/<x>/Binding/<x>/ClusterId

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get, , Replace

Specifies the cluster identifier used in this binding entry. This MUST be positive integer and the value MUST NOT exceed 65535.

<x>/ZDO/<x>/Binding/<x>/DestinationAddressMode

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get, Replace

Specifies the type of destination address used for this binding entry. Enumeration of:

- *Group*

- *Endpoint*

<x>/ZDO/<x>/Binding/<x>/DestinationEndpoint

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get, Replace

Specifies the destination endpoint for the binding entry. The value of this field is valid when the value of the *DestinationAddressMode* is *Endpoint*. This MUST be positive integer and the value MUST NOT exceed 240.

<x>/ZDO/<x>/Binding/<x>/IEEEDestinationAddress

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get, Replace

Specifies the IEEE destination address for this binding entry. The value of this field is valid when the value of the *DestinationAddressMode* is *Endpoint*. This node string length MUST NOT exceed 23.

<x>/ZDO/<x>/Binding/<x>/GroupDestinationAddress

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get, Replace

Specifies the group destination address for this binding entry. The value of this field is valid when the value of the *DestinationAddressMode* is *Group*. This node string length MUST NOT exceed 4.

<x>/ZDO/<x>/Network

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

The *Network* object provides the configuration capabilities needed to by a ZigBee Device to operate within a ZigBee Area Network as defined in Section 2.5.2.4 Network Manager [ZigBee2007].

<x>/ZDO/<x>/Network/NeighborNumberOfEntries

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Gete

The number of entries in the *Neighbor* table. This MUST be a positive integer.

<x>/ZDO/<x>/Network/Neighbour

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

The *Neighbor* object provides the configuration capabilities needed to by a ZigBee Device to operate within a ZigBee Area Network as defined in Section 2.5.2.4 Network Manager [ZigBee2007].

At most one entry in this table can exist with a given value for *Neighbor*.

<x>/ZDO/<x>/Network/Neighbour/<x>

Status	Tree Occurrence	Format	Min. Access Types
Required	OneOrMore	node	Get

This is placeholder node for OneOrMore *<x>/ZDO/<x>/Network/Neighbour* entries**.**

<x>/ZDO/<x>/Network/Neighbour/<x>/Neighbor

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The value MUST be the path name of a row in the *ZigBee ZDO* table. If the referenced object is deleted, the parameter value MUST be set to an empty string. Neighbor of this ZigBee device. The value MUST be the path name of a row in the ZigBee.ZDO table. If the referenced row is deleted then this entry MUST be deleted.

<x>/ZDO/<x>/Network/Neighbour/<x>/LQI

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The LQI field specified link quality identification (LQI) for neighbor ZigBee device. This MUST be positive integer and the value MUST NOT exceed 255.

<x>/ZDO/<x>/Network/Neighbour/<x>/Relationship

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The relationship between the neighbor and this device.Enumeration of:

- *Parent*
- *Child*
- *PrevChild*
- *Sibling*
- *None*

<x>/ZDO/<x>/Network/Neighbour/<x>/PermitJoin

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

An indication of whether the neighbor device is accepting join requests.Enumeration of:

- *Accepting*
- *NotAccepting*
- *Unknown*

<x>/ZDO/<x>/Network/Neighbour/<x>/Depth

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The tree depth of the neighbor device. A value of 0x00 indicates that the device is the ZigBee coordinator for the network. This MUST be positive integer.

<x>/ZDO/<x>/NodeManager

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

The *NodeManager* object describes the configuration capabilities related for remote management of the ZigBee Area Network as defined in Section 2.5.2.6 Node Manager [ZigBee2007].

<x>/ZDO/<x>/NodeManager/RoutingTableNumberOfEntries

Status	Tree Occurrence	Format	Min. Access Types
Required	One	int	Get

The number of entries in the *RoutingTable* table. This MUST be positive integer.

<x>/ZDO/<x>/NodeManager/RoutingTable

Status	Tree Occurrence	Format	Min. Access Types
Required	One	node	Get

The *RoutingTable* object describes the route table as defined in Table 3.51 Routing Table Entry [ZigBee2007].

At most one entry in this table can exist with a given value for *DestinationAddress*.

<x>/ZDO/<x>/NodeManager/RoutingTable/<x>

Status	Tree Occurrence	Format	Min. Access Types
Required	OneOrMore	node	Get

This is placeholder node for OneOrMore *RoutingTable* entries.

<x>/ZDO/<x>/NodeManager/RoutingTable/<x>/DestinationAddress

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The ZigBee network address of this route. Possible patterns:

- *([0-9A-Fa-f]){4}*

This node string length MUST NOT exceed 4.

<x>/ZDO/<x>/NodeManager/RoutingTable/<x>/NextHopAddress

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

Specifies the network address of the next hop ZigBee device on the way to the destination ZigBee device. This node string length MUST NOT exceed 4.

<x>/ZDO/<x>/NodeManager/RoutingTable/<x>/Status

Status	Tree Occurrence	Format	Min. Access Types
Required	One	chr	Get

The status of the route entry. Enumeration of:

- *Active*
- *DiscoveryUnderway*
- *DiscoveryFailed*
- *Inactive*
- *ValidationUnderway*

<x>/ZDO/<x>/NodeManager/RoutingTable/<x>/MemoryConstrained

Status	Tree Occurrence	Format	Min. Access Types
Required	One	bool	Get

A flag indicating whether the device is a memory constrained concentrator.

<x>/ZDO/<x>/NodeManager/RoutingTable/<x>/ManyToOne

Status	Tree Occurrence	Format	Min. Access Types
Required	One	bool	Get

A flag indicating that the destination is a concentrator that issued a many to-one request.

<x>/ZDO/<x>/NodeManager/RoutingTable/<x>/RouteRecordRequired

Status	Tree Occurrence	Format	Min. Access Types
Required	One	bool	Get

A flag indicating that a route record command frame should be sent to the destination prior to the next data packet.

Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
OMA-TS-DM-GwMO_ZigBeeMO-V1_0-20170725-A	25 Jul 2017	Status changed to Approved by TP TP Ref # OMA-TP-2017-0031-INP_GwMO-V1_1_ERP_for_Final_Approval

Appendix B. Static Conformance Requirements (Normative)

The notation used in this appendix is specified in [SCRRULES].

B.1 SCR for GwMO Client

B.1.1 SCR for ZigBee MO

Item	Function	Reference	Requirement
GwMO-ZB-C-001-M	Support for updating ZigBee MO when the GW becomes aware of a new ZigBee Device	Section 5.2	GwMO-C-007-O
GwMO-ZB-C-002-M	Support for updating ZigBee MO when the GW becomes aware of a previously subtending Device that is no longer present in the network	Section 5.2	GwMO-C-007-O

B.2 SCR for GwMO Server

Item	Function	Reference	Requirement
GwMO-ZB-S-001-M	Support for the ZigBee Management Object	Section 5	GwMO-S-001-M