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DNS Service Management Profile

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Foreword

The *DNS Service Management* Profile (DSP1069) was prepared by the Network Services Management Working Group of the DMTF.

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Introduction

The information in this specification should be sufficient for a provider or consumer of this data to identify unambiguously the classes, properties, methods, and values that shall be instantiated and manipulated to represent and manage Network Services and the associated configuration information. The target audience for this specification is implementers who are writing CIM-based providers or consumers of management interfaces that represent the component described in this document.

Document conventions

Typographical conventions

Typographical conventions

The following typographical conventions are used in this document:

- Document titles are marked in *italics*.
- ABNF rules are in `monospaced font`.

DNS Service Management Profile

1 Scope

The *DNS Service Management Profile* is a profile that specifies the common information model (CIM) schema and use cases associated with the general and common aspects of managing the DNS server. This profile includes a specification of the configuration, protocol service, and protocol endpoint for the DNS server.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated or versioned references, only the edition cited (including any corrigenda or DMTF update versions) applies. For references without a date or version, the latest published edition of the referenced document (including any corrigenda or DMTF update versions) applies.

DMTF DSP0004, *CIM Infrastructure Specification 2.7*,
http://www.dmtf.org/standards/published_documents/DSP0004_2.7.pdf

DMTF DSP0200, *CIM Operations over HTTP 1.3,*
http://www.dmtf.org/standards/published_documents/DSP0200_1.3.pdf

DMTF DSP0223, *Generic Operations 1.0*,
http://www.dmtf.org/standards/published_documents/DSP0223_1.0.pdf

DMTF DSP1001, *Management Profile Specification Usage Guide 1.1*,
http://www.dmtf.org/standards/published_documents/DSP1001_1.1.pdf

DMTF DSP1033, *Profile Registration Profile 1.0*,
http://www.dmtf.org/standards/published_documents/DSP1033_1.0.pdf

DMTF DSP1053, *Base Metrics Profile 1.1*,
http://www.dmtf.org/standards/published_documents/DSP1053_1.1.pdf

DMTF DSP1036 *IP Interface Profile 1.1.1,*
http://www.dmtf.org/sites/default/files/standards/documents/DSP1036_1.1.1.pdf

DMTF DSP1038 *DNS Client Profile 1.0.3,*
http://www.dmtf.org/sites/default/files/standards/documents/DSP1038_1.0.3.pdf

DMTF DSP1097, *Virtual Ethernet Switch Profile 1.1*,
http://www.dmtf.org/sites/default/files/standards/documents/DSP1097_1.1.0.pdf

DMTF DSP8020, *Message Registry XML Schema Specification 1.0*,
http://www.dmtf.org/standards/published_documents/DSP8020_1.0.xsd

IETF RFC 952, *DOD Internet Host Table Specification*, October 1985,
http://tools.ietf.org/html/rfc952

IETF RFC 1034, *Domain Names – Concept and Facilities*, November 1987,
http://tools.ietf.org/html/rfc1034

IETF RFC 1035, *Domain Names – Implementation and Specification*, November 1987, http://tools.ietf.org/html/rfc1035

IETF RFC 1208, *A Glossary of Networking Terms*, March 1991, http://tools.ietf.org/html/rfc1208

IETF RFC 1611, *DNS Server MIB Extensions*, May 1994, http://tools.ietf.org/html/rfc1611

IETF RFC 1996, *A Mechanism for Prompt Notification of Zone Changes (DNS NOTIFY)*, August 1996, http://tools.ietf.org/html/rfc1996

IETF RFC 2671, *Extension Mechanisms for DNS (EDNS0)*, August 1999, http://www.ietf.org/rfc/rfc2671.txt

IETF RFC 2845, *Secret Key Transaction Authentication for DNS (TSIG)*, May 2000, https://tools.ietf.org/html/rfc2845

IETF RFC 3007, *Dynamic Updates in the Domain Name System (DNS UPDATE)*, November 2000, http://tools.ietf.org/html/rfc3007

IETF RFC 3596, *DNS Extensions to Support IP* Version 6, October 2003, https://tools.ietf.org/html/rfc3596

IETF RFC4033, *DNS Security Introduction and Requirements*, March 2005, https://tools.ietf.org/html/rfc4033

IETF RFC4034, *Resource Records for the DNS Security Extensions*, March 2005, https://tools.ietf.org/html/rfc4034

IETF RFC4035, *Protocol Modifications for the DNS Security Extensions*, March 2005, https://tools.ietf.org/html/rfc4035

IETF RFC 4291, *IP Version 6 Addressing Architecture*, February 2006, http://www.ietf.org/rfc/rfc4291.txt

ISO/IEC Directives, Part 2, *Rules for the structure and drafting of International Standards*, http://isotc.iso.org/livelink/livelink.exe?func=ll&objId=4230456&objAction=browse&sort=subtype

3 Terms and definitions

In this document, some terms have a specific meaning beyond the normal English meaning. Those terms are defined in this clause.

The terms "shall" ("required"), "shall not", "should" ("recommended"), "should not" ("not recommended"), "may", "need not" ("not required"), "can" and "cannot" in this document are to be interpreted as described in ISO/IEC Directives, Part 2, Annex H. The terms in parentheses are alternatives for the preceding term, for use in exceptional cases when the preceding term cannot be used for linguistic reasons. Note that ISO/IEC Directives, Part 2, Annex H specifies additional alternatives. Occurrences of such additional alternatives shall be interpreted in their normal English meaning.

The terms "clause", "subclause", "paragraph", and "annex" in this document are to be interpreted as described in ISO/IEC Directives, Part 2, Clause 5.

The terms "normative" and "informative" in this document are to be interpreted as described in ISO/IEC Directives, Part 2, Clause 3. In this document, clauses, subclauses, or annexes labeled "(informative)" do not contain normative content. Notes and examples are always informative elements.

The terms defined in DSP0004, DSP0223, and DSP1001 apply to this document. The following additional terms are used in this document.

3.1

conditional

indicates requirements to be followed strictly to conform to the document when the specified conditions are met

3.2

mandatory

indicates requirements to be followed strictly to conform to the document and from which no deviation is permitted

3.3

optional

indicates a course of action permissible within the limits of the document

3.4

pending configuration

indicates the configuration that will be applied to an IP network connection the next time the IP network connection accepts a configuration

3.5

referencing profile

indicates a profile that owns the definition of this class and can include a reference to this profile in its “Referenced Profiles” table

3.6

unspecified

indicates that this profile does not define any constraints for the referenced CIM element or operation

4 Symbols and abbreviated terms

The abbreviations defined in DSP0004, DSP0223, and DSP1001 apply to this document. The following additional abbreviations are used in this document.

4.1

IP
Internet Protocol

4.2

DNS
Domain Name System

4.3

EDNS0
Extension mechanisms for DNS

4.4
DNSSEC

The Domain Name System Security Extensions (DNSSEC) is a suite of Internet Engineering Task Force (IETF) specifications for securing certain kinds of information provided by the DNS as used on IP networks

4.5
TCP

Transmission Control Protocol

4.6
TSIG

Transaction SIGnature - is a computer networking protocol defined in RFC 2845

4.7
UDP

User Datagram Protocol

5 Synopsis

Profile name: DNS Service Management Profile

Version: 1.0.0

Organization: DMTF

CIM Schema version: 2.46

Central class: CIM_ProtocolService

Scoping class: CIM_System

The *DNS Service Management Profile* is a profile that specifies the CIM schema and use cases associated with managing of the DNS server. This profile includes a specification for configuration and life cycle management of the DNS service.

Table 1 identifies profiles on which this profile has a dependency.

Table 1 – Referenced profiles

Profile Name	Organization	Version	Requirement	Description
Profile Registration	DMTF	1.0	Mandatory	None
IP Configuration Profile	DMTF	1.0	Optional	None
IP Interface Profile	DMTF	1.1.1	Mandatory	None

The central class for the *DNS Service Management Profile* shall be the CIM_ProtocolService class. The central instance of the *DNS Service Management Profile* shall be an instance of CIM_ProtocolService. The scoping class for the *DNS Service Management Profile* shall be CIM_System. The scoping instance of the *DNS Service Management Profile* shall be the instance of CIM_System to which the central instance is associated through an instance of the CIM_HostedService association.

6 Description

The *DNS Service Management Profile* is a profile that specifies the CIM schema and use cases associated with the general and common aspects of managing DNS service. This profile includes a specification of the configuration, protocol service, and protocol endpoint for the DNS service.

6.1 Class diagram

Figure 1 represents the class schema for the *DNS Service Management Profile*. For simplicity, the CIM_ prefix has been removed from the names of the classes.

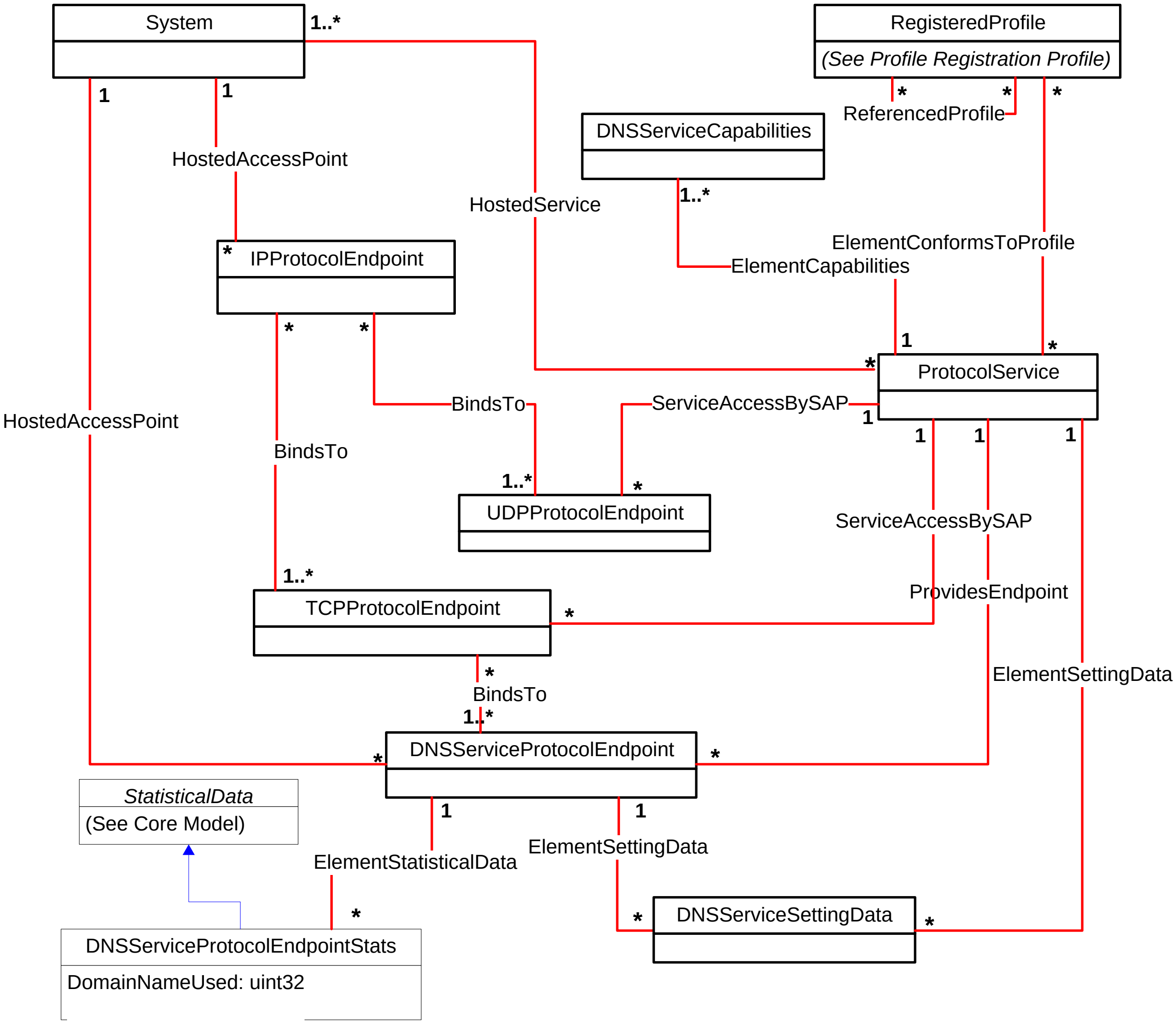

Figure 1 – DNS Service Management Profile: Class diagram

Functionality within the scope of this profile includes:

- representation of the DNS service
- configuration of the DNS service
- representation of protocol endpoints of the DNS service
- remote representation of DNS clients

Functionality explicitly excluded from the scope of this profile includes modeling of the DNS client. The DNS clients are modeled in DSP1038.

The DNS service is represented by an instance of CIM_ProtocolService. The capabilities of the DNS service are represented by an instance of CIM_DNSServiceCapabilities. The current configuration of the DNS service is modeled with the properties from the instance of CIM_DNSServiceSettingData. The management access to the DNS service is represented by CIM_DNSServiceProtocolEndpoint. DNS service uses UDP (CIM_UDPProtocolEndpoint) and optionally TCP (CIM_TCPProtocolEndpoint) for DNS query/response and requires TCP for certain DNS inter-service activities (e.g., zone transfer) [RFC1035].

6.1.1 Support for IP protocol versioning

The DNS service integrates mechanisms to support both IPv4 and IPv6 (simultaneously) as described in RFC3596. The IP protocol version used for querying resource records is independent of the protocol version of the resource records i.e., IPv4 transport can be used to query IPv6 records and vice versa.

6.1.2 Management of DNS security

TSIG (RFC2845) is used to securely authenticate transactions and is configurable.

The DNS Security Extensions (RFC4033, RFC4034, and RFC4035) are used to protect the integrity of data in the DNS by establishing a chain of trust. DNS data (e.g., zone) is digitally signed to attest its validity.

TSIG and DNSSEC can be used independently. DNS security management aspects are outside of the scope of this specification.

6.1.3 Representation of DNS service usage data

The CIM_DNSServiceProtocolEndpointStats represents statistics of operations of the DNS service.

7 Implementation

NOTE: Section 7 is normative and should be written from the class description viewpoint, not methods. Also some of the current content of this section (content below) should be moved to non-normative section 6. [Ghazanfar: I modified text by making normative statements. Class description is given in clause 10. Further review is needed to find relevant text to move (if any)]. [Ghazanfar: Done]

7.1 Representing a DNS service

An instance of CIM_ProtocolService shall represent the DNS service being modeled.

7.1.1 CIM_ProtocolService.Protocol

The Protocol property of the CIM_ProtocolService instance shall have a value of X (DNS).

NOTE: Do we have a value for X already defined? Is it in the schema (CR?)

[Ghazanfar: There is NSMWG Mantis to address this issue.]

7.1.2 DNS service capabilities

An instance of CIM_DNSServiceCapabilities shall be associated with the CIM_ProtocolService instance through an instance of CIM_ElementCapabilities. This instance of CIM_DNSServiceCapabilities shall represent the capabilities of the DNS service.

7.1.3 Managing the DNS service’s state

This clause describes the usage of the RequestedState and EnabledState properties to represent the state of an instance of CIM_ProtocolService.

7.1.3.1 State management supported

Exactly one instance of CIM_DNSServiceCapabilities shall be associated with an instance of CIM_ProtocolService, which indicates support for managing the state of the DNS service.

Support for managing the state of the DNS service is conditional behavior. This clause describes the CIM elements and behaviors that shall be implemented when this behavior is supported.

7.1.3.2 RequestedState

The CIM_ProtocolService.RequestedState property shall have one of the values specified in the CIM_DNSServiceCapabilities.RequestedStatesSupported property or a value of 5 (No Change).

When the RequestedStatesProperty of the associated instance of CIM_EnabledLogicalElementCapabilities does not contain any values, the RequestedState property shall have the value of 12 (Not Applicable).

7.1.3.3 EnabledState

The EnabledState property shall have the value 2 (Enabled), 3 (Disabled), or 6 (Enabled but Offline). Enabled (2) indicates that the element is or could be executing commands, will process any queued commands, and queues new requests. Disabled (3) indicates that the element will not execute commands and will drop any new requests. Enabled but Offline (6) indicates that the element might be completing commands, and will drop any new requests.

7.1.3.4 Indicating state management support with CIM_DNSServiceCapabilities

When state management is supported, the RequestedStatesSupported property of the CIM_DNSServiceCapabilities instance associated with the CIM_ProtocolService instance via an instance of CIM_ElementCapabilities shall contain at least one value. The RequestedStatesSupported property may have zero or more of the following values: 2 (Enabled), 3 (Disabled), or 11 (Reset).

7.2 DNS service port management

7.2.1 UDP port

An implementation may model one or more UDP ports of the DNS service. When the implementation models the UDP ports, the following requirements shall apply for each UDP port.

7.2.1.1 CIM_UDPProtocolEndpoint

There shall be an instance of CIM_UDPProtocolEndpoint in which the PortNumber property of the instance indicates the UDP port number on which the DNS service is accessible.

7.2.1.2 Relationship of UDP port to the DNS service

An instance of CIM_ServiceAccessBySAP shall associate the CIM_ProtocolService instance with the CIM_UDPProtocolEndpoint instance.

7.2.1.3 Managing UDP ports

The implementation may support managing the UDP ports on which the DNS service is accessible. The ListenOnUDPPort( ) method of the CIM_ProtocolService class shall be used to add UDP ports on which the DNS service will be accessible. Using the DeleteInstance intrinsic operation to remove an instance of CIM_UDPProtocolEndpoint shall remove the DNS service from being accessible on the represented port.

7.2.2 TCP listening port

An implementation may model one or more listening ports of the DNS service. When the implementation models the listening ports, the following requirements shall apply to each listening port.

7.2.2.1 CIM_TCPProtocolEndpoint

There shall be an instance of CIM_TCPProtocolEndpoint in which the PortNumber property of the instance shall indicate the TCP port number on which the DNS service is listening.

7.2.2.2 Relationship of TCP port to the DNS service

An instance of CIM_ServiceAccessBySAP shall associate the CIM_ProtocolService instance with the CIM_TCPProtocolEndpoint instance.

7.2.2.3 Managing TCP listening ports

The implementation may support managing the ports on which the DNS service listens. The ListenOnPort( ) method of the CIM_ProtocolService class shall be used to add ports on which the DNS service will listen. Using the DeleteInstance intrinsic operation to delete an instance of CIM_TCPProtocolEndpoint will stop the DNS service from listening on the represented port.

7.3 DNS server representation

The management access to the DNS service shall be modeled using an instance of CIM_DNSServiceProtocolEndpoint.

7.3.1 Relationship with DNS service

An instance of CIM_ProvidesEndpoint shall associate the CIM_ProtocolService with the CIM_DNSServiceProtocolEndpoint.

7.3.2 UDP port for DNS resolution session

An implementation may model the UDP port to which the DNS resolution session is bound. When the implementation models the UDP port, the following requirements shall apply.

7.3.2.1 CIM_UDPProtocolEndpoint

When the UDP port on which the DNS resolution session is bound is modeled, the UDP port shall be modeled using an instance of CIM_ UDPProtocolEndpoint.

7.3.3 TCP port for DNS resolution session

An implementation may model the TCP port on which the DNS maintenance is bound. When the implementation models the TCP port, the following requirements shall apply.

7.3.3.1 CIM_TCPProtocolEndpoint

When the TCP port to which the DNS resolution session is bound is modeled, the TCP port shall be modeled using an instance of CIM_TCPProtocolEndpoint.

7.4 DNS service configuration

The default configuration is the configuration of the DNS service when it was first installed on the managed system. When an implementation exposes the default configuration, the default configuration shall be represented by an instance of CIM_DNSServiceSettingData that is associated with the CIM_ProtocolService through an instance of CIM_ElementSettingData, where the IsDefault property of the CIM_ElementSettingData instance has a value of 1 (Is Default).

7.4.1 DNS service endpoint configuration

When a DNS resolution session is created, it will have an initial configuration. Implementations can indicate to DNS clients the configuration that will be assigned to a DNS resolution session. Implementations can also indicate to DNS clients the current configuration that an active DNS resolution session had when the DNS resolution session was first established.

7.4.1.1 Initial configuration that will be assigned

An implementation may assign the same initial configuration for all DNS resolution sessions that are spawned. When the implementation assigns the same initial configuration for all DNS resolution sessions, the configuration that a DNS resolution session will have when it is established shall be represented by an instance of CIM_DNSServiceSettingData that is associated with the instance of CIM_ProtocolService through an instance of CIM_ElementSettingData, where the IsNext property of the CIM_ElementSettingData instance has a value of 1 (Is Next).

7.4.1.2 Current configuration of a DNS resolution session

The initial configuration of a DNS resolution session may be modeled. When the configuration that a DNS resolution session had when it was established is modeled, it shall be represented by an instance of CIM_DNSServiceSettingData that is associated with the instance of CIM_DNSServiceProtocolEndpoint through an instance of CIM_ElementSettingData, where the IsCurrent property of the CIM_ElementSettingData instance has a value of 1 (Is Current).

A discrete instance of CIM_DNSServiceSettingData is not required for each active DNS resolution session. The instance of CIM_DNSServiceSettingData that is associated with the instance of CIM_DNSServiceProtocolEndpoint needs only to accurately reflect the initial configuration of the DNS resolution session.

7.5 DNS service relationship with IP interfaces

This clause details requirements for specifying the relationship between the DNS service or DNS resolution session and one or more IP interfaces of the system.

7.5.1 Modeling the IP interface over which a DNS resolution session is established

When the specific port for a DNS resolution is modeled, the specific IP interface over which the DNS resolution is active shall be modeled.

When the implementation models the specific interface over which a DNS resolution is active on TCP port, there shall be an instance of the CIM_BindsTo association where the value of the Antecedent property shall be a reference to the CIM_IPProtocolEndpoint instance and the value of the Dependent property shall be a reference to the CIM_TCPProtocolEndpoint instance.

When the implementation models the specific interface over which a DNS resolution is active on UDP port, there shall be an instance of the CIM_BindsTo association where the value of the Antecedent property shall be a reference to the CIM_IPProtocolEndpoint instance and the value of the Dependent property shall be a reference to the CIM_UDPProtocolEndpoint instance.

7.5.2 Modeling the IP interfaces for the DNS service

When the specific port for a DNS service is modeled, the specific IP interface over which the service is accessible may be modeled. This behavior is optional.

When the implementation models the specific interface over which a DNS service is active on TCP port, there shall be an instance of the CIM_BindsTo association where the value of the Antecedent property shall be a reference to the CIM_IPProtocolEndpoint instance and the value of the Dependent property shall be a reference to the CIM_TCPProtocolEndpoint instance.

When the implementation models the specific interface over which a DNS service is accessible on UDP port, there shall be an instance of the CIM_BindsTo association where the value of the Antecedent property shall be a reference to the CIM_IPProtocolEndpoint instance and the value of the Dependent property shall be a reference to the CIM_UDPProtocolEndpoint instance.

When the CIM_TCPProtocolEndpoint or CIM_UDPProtocolEndpoint is not associated with one or more instances of CIM_IPProtocolEndpoint through an instance of CIM_BindsTo, the DNS service accepts connections over all the IP interfaces of the system.

8 Methods

This clause details the requirements for supporting intrinsic operations and extrinsic methods for the CIM elements defined by this profile.

8.1 Extrinsic Methods

If synchronous execution of a method succeeds, the implementation shall set a return value of 0 (Completed with No Error).

If synchronous execution of a method fails, the implementation shall set a return value of 2 (Failed) or a more specific return code as specified with the respective method.

If a method is executed as an asynchronous task, the implementation shall perform all of the following actions:

- Set a return value of 4096 (Job Started).
- Set the value of the Job output parameter to refer to an instance of the CIM_ConcreteJob class that represents the asynchronous task.
- Set the values of the JobState and TimeOfLastStateChange properties in that instance to represent the state and last state change time of the asynchronous task.

In addition, the implementation may present state change indications as task state changes occur.

If the method execution as an asynchronous task succeeds, the implementation shall perform all of the following actions:

- Set the value of the JobState property to 7 (Completed).
- Provide an instance of the CIM_AffectedJobEntity association with property values set as follows: NOTE – we need to use example in the highlighted section relevant to THIS spec. [Ghazanfar: Please see below text for consideration]

– The value of the AffectedElement property shall refer to the object that represents the top-level entity that was created or modified by the asynchronous task. For example, for the CIM_ProtocolService. AddDNSServiceProtocolEndpoint() method, this is an instance of the CIM_DNSProtocolServiceEndpoint class

– The value of the AffectingElement property shall refer to the instance of the CIM_ConcreteJob class that represents the completed asynchronous task.

– The value of the first element in the ElementEffects[ ] array property (ElementEffects[0]) shall be set to 5 (Create) for the CIM_ProtocolService. AddDNSServiceProtocolEndpoint() method. Otherwise, this value shall be 0 (Unknown).

If the method execution as an asynchronous task fails, the implementation shall set the value of the JobState property to 9 (Killed) or 10 (Exception).

8.1.1 Job parameter

The implementation shall set the value of the Job parameter as a result of an asynchronous execution of a method of the CIM_ProtocolService as follows:

- If the method execution is performed synchronously, the implementation shall set the value to NULL.
- If the method execution is performed asynchronously, the implementation shall set the value to refer to the instance of the CIM_ConcreteJob class that represents the asynchronous task.

8.2 CIM_ProtocolService.ListenOnPort( )

The CIM_ProtocolService.ListenOnPort( ) method shall be supported when the ListeningPortManagement property of the associated instance of CIM_DNSServiceCapabilities has a value of TRUE. When the value of the ListeningPortManagement property is FALSE, the CIM_ProtocolService.ListenOnPort( ) method shall not be supported.

The CIM_ProtocolService.ListenOnPort( ) method is used to configure TCP ports on which the CIM_ProtocolService instance will listen. Detailed requirements of the ListenOnPort() method are specified in Table 2 and Table 3.

No standard messages are defined.

Table 2 – CIM_ProtocolService.ListenOnPort( ) method: Return code values

Value	Description
0	Request was successfully executed.
1	Method is unsupported in the implementation.
2	Error occurred.
0x1000	Job started: REF returned to started CIM_ConcreteJob

Table 3 – CIM_ProtocolService.ListenOnPort( ) method: Parameters

Qualifiers	Name	Type	Description/Values
IN	IPEndpoint	CIM_IPProtocolEndpoint REF	Optional reference to the specific CIM_IPProtocolEndpoint instance to which the created

Qualifiers	Name	Type	Description/Values
			CIM_TCPProtocolEndpoint instance will be bound
OUT	TCPEndpoint	CIM_TCPProtocolEndpoint REF	Reference to the CIM_TCPProtocolEndpoint instance that is created if the method is successful
IN, REQ	PortNumber	uint16	Desired port number for the service to listen

When the method is completed successfully, the implementation shall create an instance of CIM_TCPProtocolEndpoint. The value of the PortNumber property of the instance of CIM_TCPProtocolEndpoint shall be the value of the PortNumber parameter of the method invocation. The implementation shall create an instance of CIM_ServiceAccessBySAP that references the instance of CIM_TCPProtocolEndpoint and references the instance of CIM_ProtocolService on which the method was invoked.

The implementation shall perform the following actions when the IPEndpoint parameter is not specified:

- The implementation shall create an instance of CIM_HostedAccessPoint that references the newly created CIM_TCPProtocolEndpoint instance and the instance of CIM_System with which the CIM_ProtocolService instance is associated through an instance of CIM_HostedService (the scoping system).
- For each instance of CIM_IPProtocolEndpoint that is associated through an instance of CIM_HostedAccessPoint with the CIM_System instance with which the instance of CIM_ProtocolService on which this method was invoked is associated through an instance of CIM_HostedService, the implementation shall create an instance of the CIM_BindsTo association where the value of the Antecedent property shall be a reference to the CIM_IPProtocolEndpoint instance and the value of the Dependent property shall be a reference to the CIM_TCPProtocolEndpoint instance.

The implementation shall perform the following actions when the IPEndpoint parameter is specified:

- The implementation shall create an instance of CIM_HostedAccessPoint that references the newly created CIM_TCPProtocolEndpoint instance and the instance of CIM_System with which the CIM_IPProtocolEndpoint instance is associated through an instance of CIM_HostedAccessPoint.
- The implementation shall create an instance of the CIM_BindsTo association where the value of the Antecedent property shall be a reference to the CIM_IPProtocolEndpoint instance and the value of the Dependent property shall be a reference to the CIM_TCPProtocolEndpoint instance.

8.3 CIM_ProtocolService.ListenOnUDPPort( )

The CIM_ProtocolService. ListenOnUDPPort( ) method shall be supported when the ListeningPortManagement property of the associated instance of CIM_DNSServiceCapabilities has a value of TRUE. When the value of the ListeningPortManagement property is FALSE, the CIM_ProtocolService. ListenOnUDPPort ( ) method shall not be supported.

The CIM_ProtocolService. ListenOnUDPPort ( ) method is used to configure UDP port on which the CIM_ProtocolService instance will access DNS service. Detailed requirements of the ListenOnUDPPort ( ) method are specified in Table 4 and Table 5.

No standard messages are defined.

Table 4 – CIM_ProtocolService. ListenOnUDPPort ( ) method: Return code values

Value	Description
0	Request was successfully executed.
1	Method is unsupported in the implementation.
2	Error occurred.
0x1000	Job started: REF returned to started CIM_ConcreteJob

Table 5 – CIM_ProtocolService. ListenOnUDPPort ( ) method: Parameters

Qualifiers	Name	Type	Description/Values
IN	IPEndpoint	CIM_IPProtocolEndpoint REF	Optional reference to the specific CIM_IPProtocolEndpoint instance to which the created CIM_UDPProtocolEndpoint instance will be bound
OUT	UDPEndpoint	CIM_UDPProtocolEndpoint REF	Reference to the CIM_UDPProtocolEndpoint instance that is created if the method is successful
IN, REQ	PortNumber	uint16	Desired port number for the service to access

When the method is completed successfully, the implementation shall create an instance of CIM_UDPProtocolEndpoint. The value of the PortNumber property of the instance of CIM_UDPProtocolEndpoint shall be the value of the PortNumber parameter of the method invocation. The implementation shall create an instance of CIM_ServiceAccessBySAP that references the instance of CIM_UDPProtocolEndpoint and references the instance of CIM_ProtocolService on which the method was invoked.

The implementation shall perform the following actions when the IPEndpoint parameter is not specified:

- The implementation shall create an instance of CIM_HostedAccessPoint that references the newly created CIM_UDPProtocolEndpoint instance and the instance of CIM_System with which the CIM_ProtocolService instance is associated through an instance of CIM_HostedService (the scoping system).
- For each instance of CIM_IPProtocolEndpoint that is associated through an instance of CIM_HostedAccessPoint with the CIM_System instance with which the instance of CIM_ProtocolService on which this method was invoked is associated through an instance of CIM_HostedService, the implementation shall create an instance of the CIM_BindsTo association where the value of the Antecedent property shall be a reference to the CIM_IPProtocolEndpoint instance and the value of the Dependent property shall be a reference to the CIM_UDPProtocolEndpoint instance.

The implementation shall perform the following actions when the IPEndpoint parameter is specified:

- The implementation shall create an instance of CIM_HostedAccessPoint that references the newly created CIM_UDPProtocolEndpoint instance and the instance of CIM_System with which the CIM_IPProtocolEndpoint instance is associated through an instance of CIM_HostedAccessPoint.
- The implementation shall create an instance of the CIM_BindsTo association where the value of the Antecedent property shall be a reference to the CIM_IPProtocolEndpoint instance and the

value of the Dependent property shall be a reference to the CIM_UDPProtocolEndpoint instance.

8.4 CIM_ProtocolService.RequestStateChange( )

Invocation of the CIM_ProtocolService.RequestStateChange( ) method will change the element's state to the value specified in the RequestedState parameter. The Enabled and Disabled values of the RequestedState parameter correspond to enabling or disabling the functionality represented by the instance of CIM_ProtocolService. A value of 2 (Enabled) shall correspond to a request to enable the functionality. A value of 3 (Disabled) shall correspond to a request to disable the functionality. A value of 11 (Reset) shall initiate a reset of the DNS service.

See 7.1.3.2 for information about the effect of this method on the RequestedState property.

The method shall be considered successful if the availability of the functionality upon completion of the method corresponds to the desired availability indicated by the RequestedState parameter. An actual change in state does not need to occur for the method to be considered successful. It is sufficient that the resultant state be equal to the requested state. Upon successful completion of the method, the Return Value shall be zero.

See 7.1.3.3 for information about the effect of this method on the EnabledState property.

Detailed requirements of the RequestStateChange( ) method are specified in Table 6 and Table 7.

No standard messages are defined.

Invoking the CIM_ProtocolService.RequestStateChange( ) method multiple times could result in earlier requests being overwritten or lost.

Table 6 – CIM_ProtocolService.RequestStateChange( ) method: Return code values

Value	Description
0	Request was successfully executed.
1	Method is unsupported in the implementation.
2	Error occurred.
0x1000	Job started: REF returned to started CIM_ConcreteJob

Table 7 – CIM_ProtocolService.RequestStateChange( ) method: Parameters

Qualifiers	Name	Type	Description/Values
IN, REQ	RequestedState	uint16	Valid state values: 2 (Enabled) 3 (Disabled) 11 (Reset)
OUT	Job	CIM_ConcreteJob REF	Returned if job started
IN, REQ	TimeoutPeriod	datetime	Client specified maximum amount of time that the transition to a new state is supposed to take: 0 or NULL – No time requirements <interval> – Maximum time allowed

8.4.1 CIM_ProtocolService.RequestStateChange( ) conditional support

Support for the RequestStateChange( ) method is conditional on the indication of support for at least one value for the RequestedState parameter as advertised through the RequestedStatesSupported property of an associated instance of CIM_EnabledLogicalElementCapabilities. When the CIM_EnabledLogicalElementCapabilities.RequestedStatesSupported property contains at least one value, the CIM_ProtocolService.RequestStateChange( ) method shall be implemented and supported. The CIM_ProtocolService.RequestStateChange( ) method shall not return a value of 1 (Unsupported).

8.5 Profile conventions for operations

For each profile class (including associations), the implementation requirements for operations, including those in the following default list, are specified in class-specific subclauses of this clause.

The default list of operations is as follows:

- GetInstance
- EnumerateInstances
- EnumerateInstanceNames
- Associators
- AssociatorNames
- References
- ReferenceNames

8.6 CIM_BindsTo

Table 8 lists operations that either have special requirements beyond those from DSP0200 or shall not be supported.

Table 8 – Operations: CIM_BindsTo

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

8.7 CIM_ElementCapabilities

Table 9 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 9, all operations in the default list in 8.3 shall be implemented as defined in DSP0200.

Table 9 – Operations: CIM_ElementCapabilities

Operation	Requirement	Messages
Associators	Unspecified	None

Operation	Requirement	Messages
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

8.8 CIM_ElementSettingData

Table 10 lists operations that either have special requirements beyond those from DSP0200 or shall not be supported.

Table 10 – Operations: CIM_ElementSettingData

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

8.8.1 CIM_ElementSettingData — ModifyInstance

When an instance of CIM_ElementSettingData associates an instance of CIM_DNSServiceSettingData with an instance of CIM_DNSServiceProtocolEndpoint, the following rules shall govern the behavior of the ModifyInstance operation:

- The ModifyInstance operation shall not allow the IsDefault property to be modified.
- The ModifyInstance operation shall not allow the IsCurrent property to be modified.
- When the ModifyInstance operation is used to modify the IsNext property to a value of 1 (Is Next), the ModifyInstance operation shall implement the following behavior:
  - The ModifyInstance operation shall find all other instances of CIM_ElementSettingData that associate a CIM_DNSServiceSettingData instance with the CIM_DNSServiceProtocolEndpoint instance referenced by the target instance of CIM_ElementSettingData.
  - For each instance of CIM_ElementSettingData found, the ModifyInstance operation shall modify the value of its IsNext property to a value of 2 (Is Not Next).

8.9 CIM_HostedAccessPoint

Table 11 lists operations that either have special requirements beyond those from DSP0200 or shall not be supported.

Table 11 – Operations: CIM_HostedAccessPoint

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None

Operation	Requirement	Messages
References	Unspecified	None
ReferenceNames	Unspecified	None

8.10 CIM_HostedService

Table 12 lists operations that either have special requirements beyond those from DSP0200 or shall not be supported.

Table 12 – Operations: CIM_HostedService

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

8.11 CIM_ProtocolService

Table 13 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 13, all operations in the default list in 8.4 shall be implemented as defined in DSP0200.

NOTE Related profiles may define additional requirements on operations for the profile class.

Table 13 – Operations: CIM_ProtocolService

Operation	Requirement	Messages
ModifyInstance	Optional. See 8.11.1.	None

8.11.1 CIM_ProtocolService — ModifyInstance

When the ElementNameEditSupported property of the CIM_DNSServiceCapabilities instance has a value of TRUE, the ModifyInstance operation shall allow the value of the ElementName property of the CIM_ProtocolService instance to be modified. The ModifyInstance operation shall enforce the length restriction specified in the MaxElementNameLen property of the CIM_DNSServiceCapabilities instance. When the ElementNameEditSupported property of the CIM_DNSServiceCapabilities has a value of FALSE, the ModifyInstance operation shall not change the value of the ElementName property of the CIM_ProtocolService instance.

8.12 CIM_ProvidesEndpoint

Table 14 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 14, all operations in the default list in 8.4 shall be implemented as defined in DSP0200.

Table 14 – Operations: CIM_ProvidesEndpoint

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

8.13 CIM_ServiceAccessBySAP

Table 15 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 15, all operations in the default list in 8.4 shall be implemented as defined in DSP0200.

Table 15 – Operations: CIM_ServiceAccessBySAP

Operation	Requirement	Messages
Associators	Unspecified	None
AssociatorNames	Unspecified	None
References	Unspecified	None
ReferenceNames	Unspecified	None

8.14 CIM_IPProtocolEndpoint

All operations in the default list in 8.5 shall be implemented as defined in DSP0200.

8.15 CIM_TCPProtocolEndpoint

Table 16 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 16, all operations in the default list in 8.4 shall be implemented as defined in DSP0200.

Table 16 – Operations: CIM_TCPProtocolEndpoint

Operation	Requirement	Messages
ModifyInstance	Optional. See 8.16.1.	None
DeleteInstance	Optional. See 8.15.2.	None

8.15.1 ModifyInstance

The ModifyInstance operation may be supported for an instance of CIM_TCPProtocolEndpoint. When the ModifyInstance operation is supported for an instance of CIM_TCPProtocolEndpoint, the ModifyInstance operation shall not modify the following properties:

- NameFormat
- ProtocolIFType

- PortNumber

8.15.2 DeleteInstance

When the CIM_ProtocolService.ListenOnPort( ) method is supported for the instance of CIM_ProtocolService with which the CIM_TCPProtocolEndpoint is associated through an instance of CIM_ServiceAccessBySAP, the DeleteInstance operation shall be supported for the instance of CIM_TCPProtocolEndpoint. When the CIM_ProtocolService.ListenOnPort( ) method is not supported, the DeleteInstance operation shall not be supported.

When the DeleteInstance operation is successful for an instance of CIM_TCPProtocolEndpoint, the DNS service shall stop listening on the TCP/IP port indicated by the PortNumber property of the CIM_TCPProtocolEndpoint. The implementation shall also remove any association instances that reference the CIM_TCPProtocolEndpoint.

8.16 CIM_DNSServiceProtocolEndpoint

Table 17 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 17, all operations in the default list in 8.4 shall be implemented as defined in DSP0200.

NOTE Related profiles may define additional requirements on operations for the profile class.

Table 17 – Operations: CIM_DNSServiceProtocolEndpoint

Operation	Requirement	Messages
ModifyInstance	Optional. See 8.16.1.	None
DeleteInstance	Optional. See 8.16.2.	None

8.16.1 ModifyInstance

The ModifyInstance operation may be supported for an instance of CIM_DNSServiceProtocolEndpoint. When the ModifyInstance operation is supported for an instance of CIM_DNSServiceProtocolEndpoint, the ModifyInstance operation shall not modify the following properties:

- NameFormat
- ProtocolIFType
- OtherTypeDescription

8.16.2 DeleteInstance

The DeleteInstance operation may be supported for instances of CIM_DNSServiceProtocolEndpoint. When the DeleteInstance operation is invoked against an instance, the corresponding DNS resolution session shall be terminated prior to deleting the CIM_DNSServiceProtocolEndpoint instance. The implementation shall also remove any association instances that reference the CIM_DNSServiceProtocolEndpoint.

8.17 CIM_UDPProtocolEndpoint

Table 18 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 18, all operations in the default list in 8.4 shall be implemented as defined in DSP0200.

Table 18 – Operations: CIM_UDPProtocolEndpoint

Operation	Requirement	Messages
ModifyInstance	Optional. See 8.17.1.	None
DeleteInstance	Optional. See 8.17.2.	

8.17.1 ModifyInstance

The ModifyInstance operation may be supported for an instance of CIM_UDPProtocolEndpoint. When the ModifyInstance operation is supported for an instance of CIM_UDPProtocolEndpoint, the ModifyInstance operation shall not modify the following properties:

- NameFormat
- ProtocolIFType
- PortNumber

8.17.2 DeleteInstance

When the CIM_ProtocolService.ListenOnUDPPort( ) method is supported for the instance of CIM_ProtocolService with which the CIM_UDPProtocolEndpoint is associated through an instance of CIM_ServiceAccessBySAP, the DeleteInstance operation shall be supported for the instance of CIM_UDPProtocolEndpoint. When the CIM_ProtocolService.ListenOnUDPPort( ) method is not supported, the DeleteInstance operation should not be supported.

When the DeleteInstance operation is successful for an instance of CIM_UDPProtocolEndpoint, the DNS service shall stop listening on the UDP port indicated by the PortNumber property of the CIM_UDPProtocolEndpoint. The implementation shall also remove any association instances that reference the CIM_UDPProtocolEndpoint.

8.18 CIM_DNSServiceCapabilities

All operations in the default list in 8.4 shall be implemented as defined in DSP0200.

NOTE Related profiles may define additional requirements on operations for the profile class.

8.19 CIM_DNSServiceSettingData

Table 19 lists implementation requirements for operations. If implemented, these operations shall be implemented as defined in DSP0200. In addition, and unless otherwise stated in Table 19, all operations in the default list in 8.4 shall be implemented as defined in DSP0200.

NOTE Related profiles may define additional requirements on operations for the profile class.

Table 19 – Operations: CIM_DNSServiceSettingData

Operation	Requirement	Messages
ModifyInstance	Optional. See 8.19.1.	None

8.19.1 CIM_DNSServiceSettingData — ModifyInstance

When the CIM_DNServerSettingData instance is associated with the CIM_ProtocolService instance through an instance of CIM_ElementSettingData and the value of the IsDefault property of the

CIM_ElementSettingData instance has a value of 1 (Is Default), the ModifyInstance operation shall not be supported.

When the CIM_DNServerSettingData instance is not associated with an instance of CIM_ProtocolService through an instance of CIM_ElementSettingData where the IsDefault property has a value of 1 (Is Default), the ModifyInstance operation may be supported for the CIM_DNServerSettingData instance.

9 Use cases

This clause contains object diagrams and use cases for the *DNS Service Management Profile*.

9.1 Profile Registration

The object diagrams in Figure 2 and Figure 3 show two possible methods for advertising profile conformance.

The object diagram in Figure 2 describes method for advertising profile conformance using CIM_ComputerSystem. The instances of CIM_RegisteredProfile are used to identify the version of the *DNS Service Management Profile* with which an instance of CIM_ProtocolService is conformant. An instance of CIM_RegisteredProfile exists for each profile that is instrumented in the system. The CIM_ProtocolService instance is scoped to an instance of CIM_ComputerSystem. NOTE: Both the highlighted text above and the diagram below are incorrect. For example the Base Server profile on the diagram is not mentioned anywhere in the profile.

[Ghazanfar: There are two choices to reflect profile registration. One of the options will be selected based on WG consensus.]

Meeting: Keep both options.

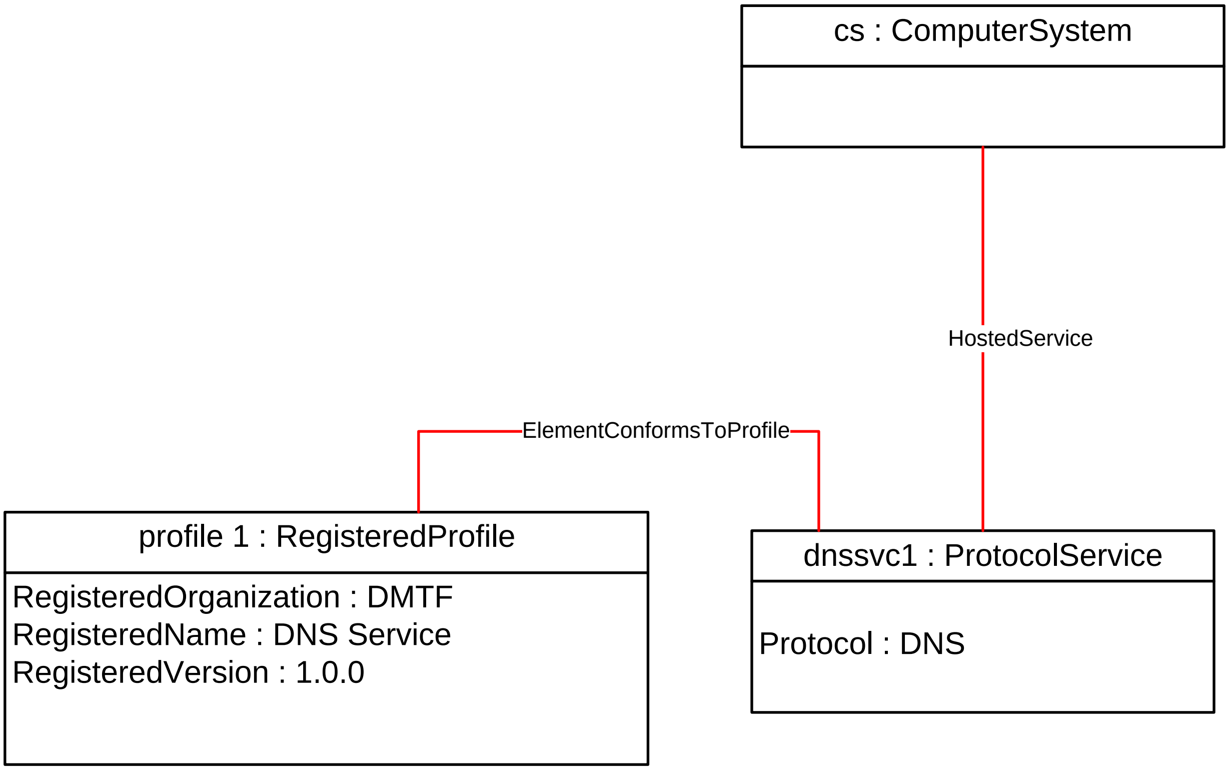
cs : ComputerSystem
HostedService
ElementConformsToProfile
profile 1 : RegisteredProfile
RegisteredOrganization : DMTF
RegisteredName : DNS Service
RegisteredVersion : 1.0.0
dnssvc1 : ProtocolService
Protocol : DNS

Figure 2 – Registered profile (ComputerSystem)

The object diagram in Figure 3 describes method for advertising profile conformance using CIM_System (i.e. network management). The instances of CIM_RegisteredProfile are used to identify the version of the *DNS Service Management Profile* with which an instance of CIM_ProtocolService is conformant. An instance of CIM_RegisteredProfile exists for each profile that is instrumented in the system. One instance of CIM_RegisteredProfile identifies the System conforming to the Network Management Profile. The other instance identifies an instance of CIM_ProtocolService. The CIM_ProtocolService instance is scoped to an instance of CIM_System. This instance of CIM_System is conformant with the DMTF Network Management Profile version 1.0.0 as indicated by the CIM_ElementConformsToProfile association to the CIM_RegisteredProfile instance.

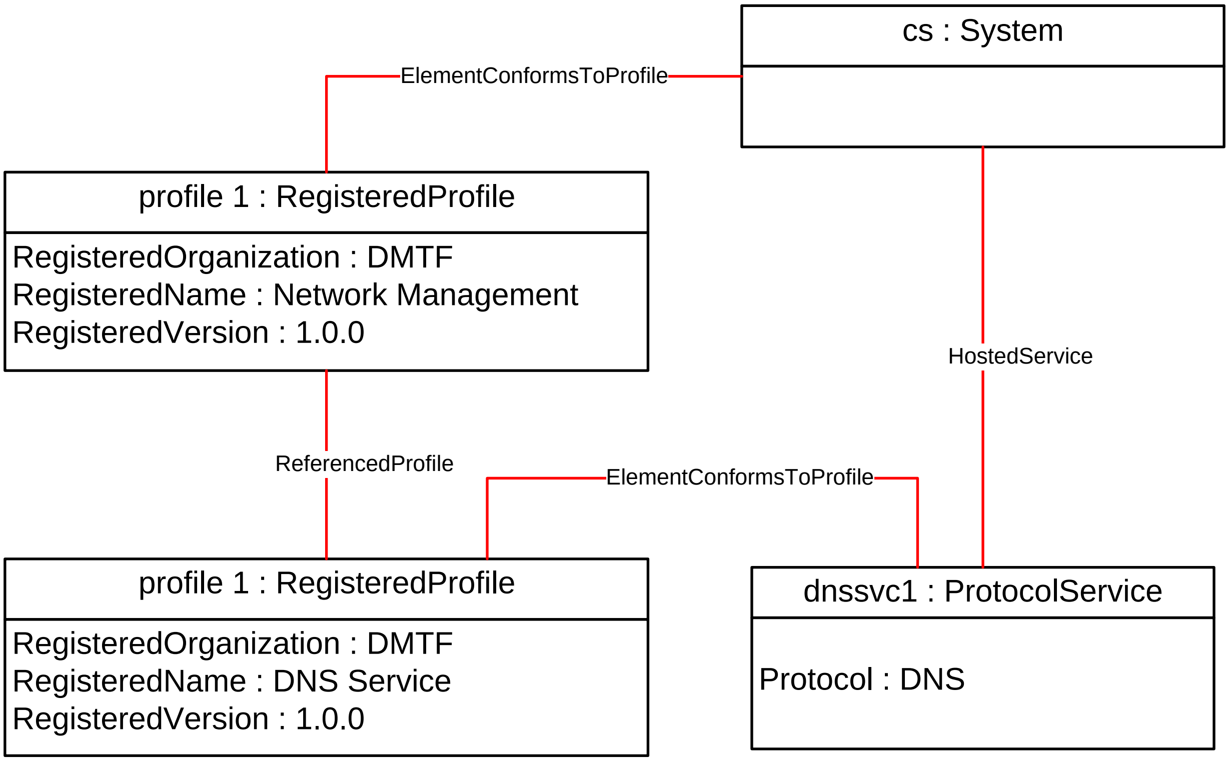
cs : System
ElementConformsToProfile
profile 1 : RegisteredProfile
RegisteredOrganization : DMTF
RegisteredName : Network Management
RegisteredVersion : 1.0.0
HostedService
ReferencedProfile
ElementConformsToProfile
profile 1 : RegisteredProfile
RegisteredOrganization : DMTF
RegisteredName : DNS Service
RegisteredVersion : 1.0.0
dnssvc1 : ProtocolService
Protocol : DNS

Figure 3 - Registered profile (Network Management)

9.2 Adding a UDP port for the DNS service

An implementation can support adding and removing bindings between the DNS service and UDP ports. When an implementation supports adding bindings, a client can configure the service to be accessible on all interfaces or a specific interface.

To have the DNS service accessible on a UDP port across all IP interfaces of the system, the client can invoke the ListenOnUDPPort() method of the CIM_ProtocolService instance, specifying the desired PortNumber.

To have the DNS service accessible on a UDP port for a specific interface, the client can invoke the ListenOnUDPPort( ) method of the CIM_ProtocolService instance, specifying a reference to the CIM_IPProtocolEndpoint instance that represents the specific IP interface.

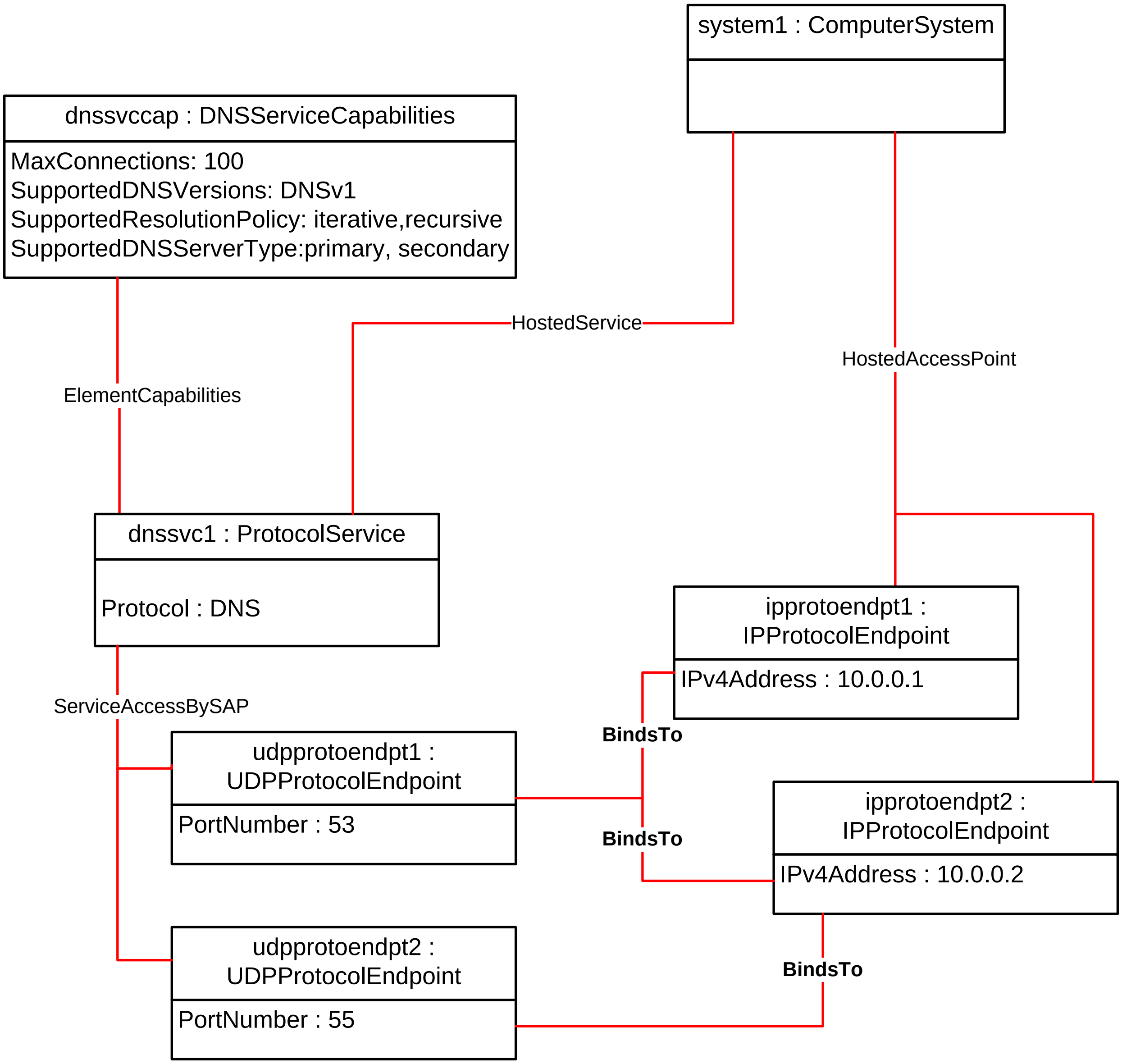
system1 : ComputerSystem
dnssvccap : DNSServiceCapabilities
MaxConnections: 100
SupportedDNSVersions: DNSv1
SupportedResolutionPolicy: iterative,recursive
SupportedDNSServerType:primary, secondary
HostedService
HostedAccessPoint
ElementCapabilities
dnssvc1 : ProtocolService
Protocol : DNS
ipprotoendpt1 : IPProtocolEndpoint
IPv4Address : 10.0.0.1
ServiceAccessBySAP
BindsTo
udpprotoendpt1 : UDPProtocolEndpoint
PortNumber : 53
BindsTo
ipprotoendpt2 : IPProtocolEndpoint
IPv4Address : 10.0.0.2
udpprotoendpt2 : UDPProtocolEndpoint
PortNumber : 55
BindsTo

Figure 4 – UDP port configuration to specific interface

Figure 4 reflects the configuration where the ListenOnUDPPort( ) method was invoked with the IPEndpoint parameter containing a reference to ipprotoendpt2 and a PortNumber parameter of 55. The instance udpprotoendpt2 is created and associated with ipprotoendpt2.

9.3 Determining the DNS service capabilities

A user can determine the capabilities of the DNS service as follows:

1) Find the instance of CIM_DNSServiceCapabilities associated with the CIM_ProtocolService through an instance of CIM_ElementCapabilities.

2) View the properties of the CIM_DNSServiceCapabilities instance to see the supported functions.

9.3.1 Determine which IP address versions are supported

View the DNSDomainType property of the CIM_DNSServiceCapabilities instance to determine the support for IPv4 (IN-ADDR.ARPA) and IPv6(IP6.ARPA) addresses.

IN-ADDR.ARPA property represents a domain that is defined to look up a record given an IPv4 address. In addition, IP6.ARPA property represents a special domain that is defined to look up a record given an IPv6 address.

9.4 Configuring DNS service default settings

When a DNS resolution session is established, DNS resolution session settings have default values. A client can change the default values for subsequent sessions' settings as follows:

1) Find the instance of CIM_ElementSettingData that associates an instance of CIM_DNSServiceSettingData with the CIM_ProtocolService, where the value of the IsDefault property is 1 (Is Default).

2) Modify the properties of the referenced CIM_DNSServiceSettingData instance.

9.5 Modifying DNS service active settings

Clients can find the active DNS resolution sessions for a DNS service and modify their configuration as follows:

1) From the instance of CIM_DNSServiceProtocolEndpoint, find the associated instance of the CIM_DNSServiceSettingData through the CIM_ElementSettingData association, where the value of the IsCurrent property is 1.

2) Modify the properties of the referenced CIM_DNSServiceSettingData instance.

9.5.1 Enabling DNS service security policy

Transaction Signature (TSIG) provides mechanisms for protecting a message from a primary to secondary DNS server and vice versa (RFC2845).

DNS SEC (RFC 4033, RFC4034, and RFC4035) provides mechanisms to establish authenticity and integrity of DNS data.

A client can activate TSIG and/or DNS SEC policies as follows:

1) From the instance of CIM_DNSServiceProtocolEndpoint, find the associated instance of the CIM_DNSServiceSettingData through the CIM_ElementSettingData association, where the value of the IsCurrent property is 1.

2) Set the values of TSIGEnable and/or DNSSecEnable properties of CIM_DNSServiceSettingData instance equal to 1.

9.6 Viewing DNS service active settings

A client can view the active configuration for DNS server as follows:

1) From the instance of CIM_DNSServiceProtocolEndpoint, find the associated instance of the CIM_DNSServiceSettingData through the CIM_ElementSettingData association, where the value of the IsCurrent property is 1.

2) Instance of the CIM_DNSServiceSettingData represents the active settings..

9.6.1 View the DNS service IP address

A user can find the DNS service IP address as follows:

1) Find the instance of CIM_DNSServiceProtocolEndpoint associated with either the CIM_UDPProtocolEndpoint or CIM_TCPProtocolEndpoint through an instance of CIM_BindsTo.

2) Find the instance of CIM_IPProtocolEndpoint associated with either the CIM_UDPProtocolEndpoint or CIM_TCPProtocolEndpoint through an instance of CIM_BindsTo.

3) View the IPv4Address and IPv6Address properties of the CIM_IPProtocolEndpoint instance to find the IP address of the DNS service.

9.6.2 View the DNS resolution session policy

A user can determine the DNS resolution session policy of the DNS service as follows:

1) From the instance of CIM_DNSServiceProtocolEndpoint, find the associated instance of the CIM_DNSServiceSettingData through the CIM_ElementSettingData association, where the value of the IsCurrent property is 1.

2) View the value of DNSResolutionPolicy property of the CIM_DNSServiceSettingData instance to find the DNS resolution session policy of the DNS service.

9.7 Stopping the DNS service on a specific UDP port

A management client can stop the DNS service from being accessible on a specific UDP port by invoking the intrinsic DeleteInstance operation against the instance of CIM_UDPProtocolEndpoint that represents the UDP port.

Using the configuration shown in Figure 4 as an example, invoking the DeleteInstance operation against the instance udpprotoendpt2 would cause the DNS service to be no longer accessible on port 55.

9.8 Disabling the DNS service

If an implementation supports disabling the DNS service, a user can disable the DNS service by invoking the RequestStateChange( ) method on CIM_ProtocolService instance with a value of Disabled for the RequestedState parameter.

10 CIM Elements

Table 20 shows the instances of CIM Elements for this profile. Instances of the CIM Elements shall be implemented as described in Table 20. Clauses 7 (“Implementation”) and 8 (“Methods”) may impose additional requirements on these elements.

Table 20 – CIM Elements: DNS service management profile

Element Name	Requirement	Description
Classes		

Element Name	Requirement	Description
CIM_BindsTo	Conditional	See clauses 10.1, 10.2, and 10.3
CIM_DNSServiceCapabilities	Mandatory	See clause 10.4
CIM_DNSServiceProtocolEndpoint	Mandatory	See clause 10.6
CIM_DNSServiceProtocolEndpointStats	Mandatory	See clause 10.8
CIM_DNSServiceSettingData	Mandatory	See clause 10.5
CIM_ElementCapabilities	Optional	See clause 10.16
CIM_ElementConformsToProfile	Optional	See clause 10.20
CIM_ElementSettingData	Optional	See clauses 10.9 and 10.10
CIM_HostedAccessPoint	Conditional	See clauses 10.11and 10.12
CIM_HostedService	Conditional	See clause 10.13
CIM_IPProtocolEndpoint	Optional	See clause 10.14
CIM_ProvidesEndpoint	Mandatory	See clause 10.17
CIM_ProtocolService	Conditional	See clause 10.7
CIM_RegisteredProfile	Optional	See clause 10.15
CIM_ServiceAccessBySAP	Conditional	See clauses 10.18 and 10.19
CIM_TCPProtocolEndpoint	Optional	See clause 10.21
CIM_UDPProtocolEndpoint	Mandatory	See clause 10.22

10.1 CIM_BindsTo — CIM_IPProtocolEndpoint and CIM_TCPProtocolEndpoint

CIM_BindsTo relates the CIM_IPProtocolEndpoint instance with the CIM_TCPProtocolEndpoint instance on which it depends. Table 21 provides information about the properties of CIM_BindsTo.

Table 21 – Class: CIM_BindsTo — CIM_IPProtocolEndpoint and CIM_TCPProtocolEndpoint

Elements	Requirement	Description
Antecedent	Mandatory	**Key:** This shall be a reference to an instance of CIM_TCPProtocolEndpoint. Cardinality 1..*
Dependent	Mandatory	**Key:** This shall be a reference to an instance of CIM_IPProtocolEndpoint. Cardinality *

10.2 CIM_BindsTo — CIM_IPProtocolEndpoint and CIM_UDPProtocolEndpoint

CIM_BindsTo relates the CIM_IPProtocolEndpoint instance with the CIM_UDPProtocolEndpoint instance on which it depends. Table 22 provides information about the properties of CIM_BindsTo.

Table 22 – Class: CIM_BindsTo – CIM_IPProtocolEndpoint and CIM_UDPProtocolEndpoint

Elements	Requirement	Description
Antecedent	Mandatory	**Key:** This shall be a reference to an instance of CIM_UDPProtocolEndpoint. Cardinality 1..*
Dependent	Mandatory	**Key:** This shall be a reference to an instance of CIM_IPProtocolEndpoint. Cardinality *

10.3 CIM_BindsTo — CIM_TCPProtocolEndpoint and CIM_DNSServiceProtocolEndpoint

CIM_BindsTo relates the CIM_TCPProtocolEndpoint instance with the CIM_DNSServiceProtocolEndpoint instance on which it depends. Table 23 provides information about the properties of CIM_BindsTo.

Table 23 – Class: CIM_BindsTo – CIM_TCPProtocolEndpoint and CIM_DNSServiceProtocolEndpoint

Elements	Requirement	Description
Antecedent	Mandatory	**Key:** This shall be a reference to an instance of CIM_DNSServiceProtocolEndpoint. Cardinality 1..*
Dependent	Mandatory	**Key:** This shall be a reference to an instance of CIM_TCPProtocolEndpoint. Cardinality *

10.4 CIM_DNSServiceCapabilities

CIM_DNSServiceCapabilities represents the capabilities of a DNS service. Table 24 provides information about the properties of CIM_DNSServiceCapabilities.

Table 24 – Class: CIM_DNSServiceCapabilities

Elements	Requirement	Description
InstanceID	Mandatory	Key
SupportedDNSDomainTypes [ ]	Mandatory	This property shall have a value of 1 (IPv4/ IN-ADDR.ARPA) , 2 (IPv6/IP6.ARPA) or both.
ReverseResolutionSupport	Optional	This property shall have a boolean value i.e., true indicates support and false indicates feature not supported.

Elements	Requirement	Description
SupportedNameServerTypes [ ]	Mandatory	This property indicates role of DNS name server and shall have a value of 1 (Primary name server), (Secondary name server), 3 (Caching-only name server), or all.
RecursionSupport	Optional	This property shall have a boolean value. true means the server deals with DNS queries according to recursive mechanisms and false means all queries are processed nonrecursively.
DNSNotifySupport	Optional	The DNSNotify operation is described in RFC1996. DNS Notify can inform the secondary name servers about data changes in the zone. This property shall have a boolean value i.e., true indicates support and false indicates feature not supported.
SupportedDNSwks	Mandatory	A description of well-known server services (wks) in TCP and UDP. It consists of three parts: 32-bit address, protocol number, and service ports.
DNSUpdateSupport	Optional	The DNS Update mechanism is described in RFC3007. The DNS Update operation enables dynamic correction of entries in the DNS database. This property shall have a boolean value i.e., true indicates support and false indicates feature not supported.
TSIGSupport	Optional	This property indicates support for TSIG. This property shall have a boolean value i.e., true indicates support and false indicates feature not supported.
DNSsecSupport	Mandatory	This property indicates support for DNSSEC. This property shall have a boolean value i.e., true indicates support and false indicates feature not supported.
QuerySupport	Optional	This parameter indicates the support for query. This property shall have a boolean value i.e., true indicates support and false indicates feature not supported.
ZoneTransferSupport	Optional	This property indicates support of zone transfer capability. This property shall have a boolean value i.e., true indicates support and false indicates feature not supported.
EDNS0Support	Optional	This property indicates support of EDNS0 capability. This property shall have a boolean value i.e., true indicates support and false indicates feature not supported.

971 10.5 CIM_DNSServiceSettingData

972 CIM_DNSServiceSettingData represents the settings for the DNS server. Table 25 provides information
973 about the properties of CIM_DNSServiceSettingData.

974 **Table 25 – Class: CIM_DNSServiceSettingData**

Elements	Requirement	Description
InstanceID	Mandatory	Key
DNSDomainTypes []	Mandatory	This property shall have a value of 1 (IPv4/ IN-ADDR.ARPA), 2 (IPv6/IP6.ARPA) or both.

Elements	Requirement	Description
EnableReverseResolution	Optional	This property shall have a boolean value i.e., true enable reverse resolution and false disable reverse resolution .
NameServerType []	Mandatory	This property indicates role of DNS name server and shall have a value of 1 (Primary name server), (Secondary name server), or 3 (Caching-only name server).
EnableRecursion	Optional	This property shall have a boolean value, i.e., true means the server deals with DNS queries according to recursive mechanisms and false means all queries are processed nonrecursively.
EnableDNSNotify	Optional	The DNSNotify operation is described in RFC1996. DNS Notify can inform the secondary name servers about data changes in the zone. This property shall have a boolean value i.e., true enables DNSNotify and false disables DNSNotify.
DNSwks	Mandatory	A description of well-known server services (wks) in TCP and UDP. It consists of three parts: 32-bit address, protocol number, and service ports.
EnableDNSUpdate	Optional	The DNS Update mechanism is described in RFC3007. The DNS Update operation enables dynamic correction of entries in the DNS database. This property shall have a boolean value i.e., true enables DNSUpdate and false disables DNSUpdate.
EnableTSIG	Optional	This property is used to enable TSIG. This property shall have a boolean value i.e., true enables EnableTSIG and false disables EnableTSIG.
EnableDNSsec	Mandatory	This property is used to enable DNSSEC. This property shall have a boolean value i.e., true enables DNSSec and false disables DNSSec.
AllowQuery	Optional	This parameter defines which hosts are allowed to ask a query. This property shall have a boolean value i.e., true enables AllowQuery and false disables AllowQuery.
AllowTransfer	Optional	This property defines which hosts are permitted to do a zone transfer from the server. This property shall have a boolean value i.e., true enables AllowTransfer and false disables AllowTransfer.
TTL	Optional	This property specifies the time interval that the resource record may be cached before the source of the information should again be consulted.
EnableEDNS0	Optional	[RFC2671] extension to DNS to allow for the larger packets. This property shall have a boolean value i.e., true enables EDNS0 and false disables EDNS0.

10.6 CIM_DNSServiceProtocolEndpoint

CIM_DNSServiceProtocolEndpoint represents the DNS server on the system. Table 26 provides information about the properties of CIM_DNSServiceProtocolEndpoint.

978 **Table 26 – Class: CIM_DNSServiceProtocolEndpoint**

Elements	Requirement	Description
SystemCreationClassName	Mandatory	Key
CreationClassName	Mandatory	Key
SystemName	Mandatory	Key
Name	Mandatory	Key
ProtocolIFType	Mandatory	This property shall have a value of 1 (“Other”).
OtherTypeDescription	Mandatory	This property shall have a value of “DNS”.
DNSDomainTypes []	Mandatory	This property shall have a value of 1 (IPv4/ IN-ADDR.ARPA), 2 (IPv6/IP6.ARPA) or both.
EnableReverseResolution	Optional	This property shall have a boolean value i.e., true enable reverse resolution and false disable reverse resolution .
NameServerType []	Mandatory	This property indicates role of DNS name server and shall have a value of 1 (Primary name server), (Secondary name server), or 3 (Caching-only name server).
EnableRecursion	Optional	This property shall have a boolean value, i.e., true means the server deals with DNS queries according to recursive mechanisms and false means all queries are processed nonrecursively.
EnableDNSNotify	Optional	The DNSNotify operation is described in RFC1996. DNS Notify can inform the secondary name servers about data changes in the zone. This property shall have a boolean value i.e., true enables DNSNotify and false disables DNSNotify.
DNSwks	Mandatory	A description of well-known server services (wks) in TCP and UDP. It consists of three parts: 32-bit address, protocol number, and service ports.
EnableDNSUpdate	Optional	The DNS Update mechanism is described in RFC3007. The DNS Update operation enables dynamic correction of entries in the DNS database. This property shall have a boolean value i.e., true enables DNSUpdate and false disables DNSUpdate.
EnableTSIG	Optional	This property is used to enable TSIG. This property shall have a boolean value i.e., true enables EnableTSIG and false disables EnableTSIG.
EnableDNSsec	Mandatory	This property is used to enable DNSSEC. This property shall have a boolean value i.e., true enables DNSSec and false disables DNSSec.
AllowQuery	Optional	This parameter defines which hosts are allowed to ask a query. This property shall have a boolean value i.e., true enables AllowQuery and false disables AllowQuery.

Elements	Requirement	Description
AllowTransfer	Optional	This property defines which hosts are permitted to do a zone transfer from the server. This property shall have a boolean value i.e., true enables AllowTransfer and false disables AllowTransfer.
TTL	Optional	This property specifies the time interval that the resource record may be cached before the source of the information should again be consulted.
EnableEDNS0	Optional	[RFC2671] extension to DNS to allow for the larger packets. This property shall have a boolean value i.e., true enables EDNS0 and false disables EDNS0.

10.7 CIM_ProtocolService

CIM_ProtocolService represents the DNS service. Table 27 provides information about the properties of CIM_ProtocolService.

Table 27 – Class: CIM_ProtocolService

Elements	Requirement	Description
SystemCreationClassName	Mandatory	None
CreationClassName	Mandatory	None
SystemName	Mandatory	None
Name	Mandatory	None
Protocol	Mandatory	See 7.1.1
MaxConnections	Mandatory	A value of 0 (zero) shall indicate unknown.
RequestedState	Mandatory	See 7.1.1
EnabledState	Mandatory	See 7.1.1
ElementName	Mandatory	None
OperationalStatus	Mandatory	None
HealthState	Mandatory	None
RequestStateChange( )	Mandatory	See 8.3.
ListenOnPort( )	Conditional	See 8.2.
ListenOnUDPPort( )	Conditional	See 8.3

10.8 CIM_DNSServiceProtocolEndpointStats

The CIM_DNSServiceProtocolEndpointStats represents the statistics of the DNS service that includes total number of resolution requests to DNS server, the total number of requests resolved locally/by server itself, the total number of requests resolved by support of other DNS server(s), usage frequency of Domain Names, and so on.

Table 28 provides information about the properties of CIM_DNSServiceProtocolEndpointStats.

Table 28 – Class: CIM_DNSServiceProtocolEndpointStats

Elements	Requirement	Description
ResolutionRequests	Mandatory	This property indicates total number of resolutions requests received.
RequestsResolvedLocally	Mandatory	This property indicates number of requests resolved locally.
RequestsResolvedRemotely	Conditional	This property indicates number of requests resolved via remote DNS servers.

10.9 CIM_ElementSettingData — CIM_ProtocolService and CIM_DNSServiceSettingData

CIM_ElementSettingData associates instances of CIM_DNSServiceSettingData with the CIM_ProtocolService instance. Table 29 provides information about the properties of CIM_ElementSettingData.

Table 29 – Class: CIM_ElementSettingData — CIM_ProtocolService and CIM_DNSServiceSettingData

Elements	Requirement	Description
ManagedElement	Mandatory	**Key:** This shall be a reference to the Central Instance. Cardinality 1
SettingData	Mandatory	**Key:** This shall be a reference to an instance of CIM_DNSServiceSettingData. Cardinality *

10.10 CIM_ElementSettingData — CIM_DNSServiceProtocolEndpoint and CIM_DNSServiceSettingData

CIM_ElementSettingData associates instances of CIM_DNSServiceSettingData with the CIM_DNSServiceProtocolEndpoint instance. Table 30 provides information about the properties of CIM_ElementSettingData.

Table 30 – Class: CIM_ElementSettingData — CIM_DNSServiceProtocolEndpoint and CIM_DNSServiceSettingData

Elements	Requirement	Description
ManagedElement	Mandatory	**Key:** This shall be a reference to the Central Instance. Cardinality *
SettingData	Mandatory	**Key:** This shall be a reference to an instance of CIM_DNSServiceSettingData. Cardinality 1..*

10.11 CIM_HostedAccessPoint — CIM_System and CIM_IPProtocolEndpoint

CIM_HostedAccessPoint associates an instance of CIM_IPProtocolEndpoint with scoping CIM_System. Table 31 provides information about the properties of CIM_HostedAccessPoint.

Table 31 – Class: CIM_HostedAccessPoint — CIM_System and CIM_IPProtocolEndpoint

Elements	Requirement	Description
Antecedent	Mandatory	**Key:** This shall be a reference to the Scoping Instance. Cardinality 1
Dependent	Mandatory	**Key:** This shall be a reference to an instance of CIM_IPProtocolEndpoint Cardinality *

10.12 CIM_HostedAccessPoint — CIM_System and CIM_DNSServiceProtocolEndpoint

CIM_HostedAccessPoint associates an instance of CIM_DNSServiceProtocolEndpoint with scoping CIM_System. Table 32 provides information about the properties of CIM_HostedAccessPoint.

Table 32 – Class: CIM_HostedAccessPoint — CIM_System and CIM_DNSServiceProtocolEndpoint

Elements	Requirement	Description
Antecedent	Mandatory	**Key:** This shall be a reference to the Scoping Instance. Cardinality 1
Dependent	Mandatory	**Key:** This shall be a reference to an instance of CIM_DNSServiceProtocolEndpoint. Cardinality *

10.13 CIM_HostedService

CIM_HostedService relates the CIM_ProtocolService instance to its scoping CIM_System instance. Table 33 provides information about the properties of CIM_HostedService.

Table 33 – Class: CIM_HostedService

Elements	Requirement	Description
Antecedent	Mandatory	**Key:** This shall be a reference to the Scoping Instance. Cardinality 1
Dependent	Mandatory	**Key:** This shall be a reference to an instance of CIM_ProtocolService. Cardinality *

10.14 CIM_IPProtocolEndpoint

CIM_IPProtocolEndpoint represents an IP interface that is associated with an Ethernet interface. Table 34 provides information about the properties of CIM_IPProtocolEndpoint.

Table 34 – Class: CIM_IPProtocolEndpoint

Elements	Requirement	Description
SystemCreationClassName	Mandatory	**Key**
CreationClassName	Mandatory	**Key**
SystemName	Mandatory	**Key**
Name	Mandatory	**Key**
NameFormat	Mandatory	Pattern ".*"
ProtocolIFType	Mandatory	See.
ElementName	Mandatory	Pattern ".*"
IPv4Address	Conditional	None.
SubnetMask	Conditional	None.
AddressOrigin	Mandatory	None.

Elements	Requirement	Description
IPv6Address	Conditional	None.
IPv6SubnetPrefixLength	Conditional	None.

10.15 CIM_RegisteredProfile

CIM_RegisteredProfile identifies the *DNS Service Management Profile* in order for a client to determine whether an instance of CIM_IPProtocolEndpoint is conformant with this profile. The CIM_RegisteredProfile class is defined by the *Profile Registration Profile* (DSP1033). With the exception of the mandatory values specified for the properties in Table 35, the behavior of the CIM_RegisteredProfile instance is in accordance with DSP1033.

Table 35 – Class: CIM_RegisteredProfile

Elements	Requirement	Description
RegisteredName	Mandatory	This property shall have a value of "DNS Service".
RegisteredVersion	Mandatory	This property shall have a value of "1.0.0".
RegisteredOrganization	Mandatory	This property shall have a value of "DMTF".

10.16 CIM_ElementCapabilities

CIM_ElementCapabilities is used to associate an instance of CIM_DNSServiceCapabilities with the CIM_ProtocolService. Table 36 provides information about the properties of CIM_ElementCapabilities.

Table 36 – Class: CIM_ElementCapabilties

Elements	Requirement	Description
ManagedElement	Mandatory	This property shall be a reference to the Central Instance. Cardinality 1..*
Capabilities	Mandatory	This property shall be a reference to the CIM_DNSServiceCapabilities instance. Cardinality 1

10.17 CIM_ProvidesEndpoint

CIM_ProvidesEndpoint is used to associate the instance of CIM_ProtocolService with an instance of CIM_DNSServiceProtocolEndpoint that represents a DNS server. Table 37 provides information about the properties of CIM_ProvidesEndpoint.

Table 37 – Class: CIM_ProvidesEndpoint

Elements	Requirement	Description
Antecedent	Mandatory	This property shall be a reference to the instance of CIM_ProtocolService. Cardinality 1
Dependent	Mandatory	This property shall be a reference to an instance of CIM_DNSServerProtocolEndpoint. Cardinality *

10.18 CIM_ServiceAccessBySAP - CIM_TCPProtocolEndpoint and CIM_ProtocolService

CIM_ServiceAccessBySAP is used to associate the instance of CIM_ProtocolService with an instance of CIM_TCPProtocolEndpoint over which a DNS resolution session with the service can be established. Table 38 provides information about the properties of CIM_ServiceAccessBySAP.

Table 38 – Class: CIM_ServiceAccessBySAP - CIM_TCPProtocolEndpoint and CIM_ProtocolService

Elements	Requirement	Description
Antecedent	Mandatory	This property shall be a reference to the instance of CIM_ProtocolService. Cardinality 1..*
Dependent	Mandatory	This property shall be a reference to an instance of CIM_DNSServiceProtocolEndpoint. Cardinality *

10.19 CIM_ServiceAccessBySAP - UDPProtocolEndpoint and CIM_ProtocolService

CIM_ServiceAccessBySAP is used to associate the instance of CIM_ProtocolService with an instance of CIM_UDPProtocolEndpoint over which a DNS resolution session with the service can be established. Table 39 provides information about the properties of CIM_ServiceAccessBySAP.

Table 39 – Class: CIM_ServiceAccessBySAP - UDPProtocolEndpoint and CIM_ProtocolService

Elements	Requirement	Description
Antecedent	Mandatory	This property shall be a reference to the instance of CIM_ProtocolService. Cardinality 1..*
Dependent	Mandatory	This property shall be a reference to an instance of CIM_DNSServiceProtocolEndpoint. Cardinality *

10.20 CIM_ElementConformsToProfile

CIM_ElementConformsToProfile associates an instance of CIM_ProtocolService with its corresponding CIM_RegisteredProfile that represents the version of profile implemented. Table 40 provides information about the properties of CIM_ElementConformsToProfile.

Table 40 – Class: CIM_ElementConformsToProfile

Elements	Requirement	Description
ManagedElement	Mandatory	**Key:** This shall be a reference to the instance of CIM_ProtocolService. Cardinality *
ConformantStandard	Mandatory	**Key:** This shall be a reference to a CIM_RegisteredProfile. Cardinality 1

10.21 CIM_TCPProtocolEndpoint

CIM_TCPProtocolEndpoint represents an IP port to which a DNS service can be bound. Table 41 provides information about the properties of CIM_TCPProtocolEndpoint.

Table 41 – Class: CIM_TCPProtocolEndpoint

Elements	Requirement	Description
SystemCreationClassName	Mandatory	None
CreationClassName	Mandatory	None
SystemName	Mandatory	None
Name	Mandatory	None
NameFormat	Mandatory	Pattern “.*”
ProtocolIFType	Mandatory	Matches 4111 ("TCP")
ElementName	Mandatory	Pattern “.*”
PortNumber	Mandatory	None

10.22 CIM_UDPProtocolEndpoint

CIM_UDPProtocolEndpoint represents an IP port to which a DNS service can be bound. Table 42 provides information about the properties of CIM_UDPProtocolEndpoint.

Table 42 – Class: CIM_UDPProtocolEndpoint

Elements	Requirement	Description
SystemCreationClassName	Mandatory	None
CreationClassName	Mandatory	None
SystemName	Mandatory	None

Elements	Requirement	Description
Name	Mandatory	None
NameFormat	Mandatory	Pattern “.*”
ProtocolIFType	Mandatory	Matches 4111 ("UDP")
ElementName	Mandatory	Pattern “.*”
PortNumber	Mandatory	None

ANNEX A
(informative)

Change log

Version	Date	Description
1.0.0	2016-02-23	DMTF Work in Progress