LDAP Schema for DHCP

Status of this Memo

1. Abstract

This document defines a schema for representing DHCP configuration in an
LDAP directory. It can be used to represent the DHCP Service
configuration(s) for an entire enterprise network, a subset of the
network, or even a single server. Representing DHCP configuration in an
LDAP directory enables centralized management of DHCP services offered
by one or more DHCP Servers within the enterprise.

2. Conventions used in this document

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 RFC-2119 [ ].

In places where different sets of terminology are commonly used to
represent similar DHCP concepts, this schema uses the terminology of the
Internet Software Consortium's DHCP server reference implementation.
For more information see www.isc.org.

3. Design Considerations

The DHCP LDAP schema is designed to be a simple multi-server schema. The

intent of this schema is to provide a basic framework for representing
the most common elements used in the configuration of DHCP Server. This
should allow other network services to obtain and use basic DHCP
configuration information in a server-independent but knowledgeable way.

It is expected that some implementations may need to extend the schema
objects, in order to implement all of their features or needs. It is
recommended that you use the schema defined in this draft to represent
DHCP configuration information in an LDAP directory. Conforming to a
standard schema improves interoperability between DHCP implementations
from different vendors.

Some implementations may choose not to support all of the objects
defined here.

Two decisions are explicitly left up to each implementation:

First, implementations may choose not to store the lease information in
the directory, so those objects would not be used.

Second, implementations may choose not to implement the auditing
information.

It is up to the implementation to determine if the data in the directory
is considered "authoritative", or if it is simply a copy of data from an
authoritative source. Validity of the information if used as a copy is
to be ensured by the implementation.

Primarily two types of applications will use the information in this
schema: 1. DHCP servers (for loading their configuration) 2. Management
Interfaces (for defining/editing configurations).

The schema should be efficient for the needs of both types of
applications. The schema is designed to allow objects managed by DHCP
(such as computers, subnets, etc) to be present anywhere in a directory
hierarchy (to allow those objects to be placed in the directory for
managing administrative control and access to the objects).

The schema uses a few naming conventions - all object classes and
attributes are prefixed with "dhcp" to decrease the chance that object
classes and attributes will have the same name. The schema also uses
standard naming attributes ("cn", "ou", etc) for all objects.

[4]. Common DHCP Configuration Attributes

Although DHCP manages several different types of objects, the
configuration of those objects is often similar. Consequently, most of
these objects have a common set of attributes, which are defined below.

4.1. **Attributes Definitions**

The schema definitions listed below are for readability. The LDIF
layout for this schema will follow in section 8.

Name: dhcpPrimaryDN Description: The Distinguished Name of the
dhcpServer object, which is the primary server for the configuration.
Syntax: DN Flags: SINGLE-VALUE

Named: dhcpSecondaryDN Description: The Distinguished Name(s) of the
dhcpServer object(s), which are secondary servers for the configuration.
Syntax: DN

Name: dhcpStatements Description: Flexible storage for representing any
specific data depending on the object to which it is attached. Examples
include conditional statements, Server parameters, etc. This also
serves as a 'catch-all' attribute that allows the standard to evolve
without needing to update the schema. Syntax: IA5String

Name: dhcpRange Description: The starting and ending IP Addresses in the
range (inclusive), separated by a hyphen; if the range only contains one
address, then just the address can be specified with no hyphen. Each
range is defined as a separate value. Syntax: IA5String

Name: dhcpPermitList Description: This attribute contains the permit
lists associated with a pool. Each permit list is defined as a separate
value. Syntax: IA5String

Name: dhcpNetMask Description: The subnet mask length for the subnet.
The mask can be easily computed from this length. Syntax: Integer
Flags: SINGLE-VALUE

Name: dhcpOption Description: Encoded option values to be sent to
clients. Each value represents a single option and contains (OptionTag,
Length, OptionData) encoded in the format used by DHCP. For more
information see [DHCPOPT]. Syntax: OctetString

Name: dhcpClassData Description: Encoded text string or list of bytes
expressed in hexadecimal, separated by colons. Clients match subclasses
based on matching the class data with the results of a 'match' or 'spawn
with' statement in the class name declarations. Syntax: IA5String
Flags: SINGLE-VALUE

Name: dhcpSubclassesDN Description: List of subclasses, these are the
actual DN of each subclass object. Syntax: DN

Name: dhcpClassesDN Description: List of classes, these are the actual
DN of each class object. Syntax: DN

Name: dhcpSubnetDN Description: List of subnets, these are the actual DN of each subnet object. Syntax: DN

Name: dhcpPoolDN Description: List of pools, these are the actual DN of each Pool object. Syntax: DN

Name: dhcpOptionsDN Description: List of options, these are the actual DN of each Options object. Syntax: DN

Name: dhcpHostDN Description: List of hosts, these are the actual DN of each host object. Syntax: DN

Name: dhcpSharedNetworkDN Description: List of shared networks, these are the actual DN of each shared network object. Syntax: DN

Name: dhcpGroupDN Description: List of groups, these are the actual DN of each Group object. Syntax: DN

Name: dhcpLeaseDN Description: Single Lease DN. A dhcpHost configuration uses this attribute to identify a static IP address assignment. Syntax: DN Flags: SINGLE-VALUE

Name: dhcpLeasesDN Description: List of leases, these are the actual DN of each lease object. Syntax: DN

Name: dhcpServiceDN Description: The DN of dhcpService object(s)which contain the configuration information. Each dhcpServer object has this attribute identifying the DHCP configuration(s) that the server is associated with. Syntax: DN

Name: dhcpHWAddress Description: The hardware address of the client associated with a lease Syntax: OctetString Flags: SINGLE-VALUE

Name: dhcpVersion Description: This is the version identified for the object that this attribute is part of. In case of the dhcpServer object, this represents the DHCP software version. Syntax: IA5String Flags: SINGLE-VALUE

Name: dhcpImplementation Description: DHCP Server implementation description e.g. DHCP Vendor information. Syntax: IA5String Flags: SINGLE-VALUE

Name: dhcpHashBucketAssignment Description: HashBucketAssignment bit map for the DHCP Server, as defined in DHC Load Balancing Algorithm [RFC 3074]. Syntax: Octet String Flags: SINGLE-VALUE

Name: dhcpDelayedServiceParameter Description: Delay in seconds corresponding to Delayed Service Parameter configuration, as defined in

DHC Load Balancing Algorithm [RFC 3074]. Syntax: Integer Flags: SINGLE-VALUE

Name: dhcpMaxClientLeadTime Description: Maximum Client Lead Time configuration in seconds, as defined in DHCP Failover Protocol [FAILOVR] Syntax: Integer Flags: SINGLE-VALUE

Name: dhcpFailOverEndpointState Description: Server (Failover Endpoint) state, as defined in DHCP Failover Protocol [FAILOVR] Syntax: IA5String Flags: SINGLE-VALUE

5. Configurations and Services

The schema definitions below are for readability the LDIF layout for this schema will follow in section 8.

The DHC working group is currently considering several proposals for fail-over and redundancy of DHCP servers. These may require sharing of configuration information between servers. This schema provides a generalized mechanism for supporting any of these proposals, by separating the definition of a server from the definition of configuration service provided by the server.

Separating the DHCP Server (dhcpServer) and the DHCP Configuration (dhcpService) representations allows a configuration service to be provided by one or more servers. Similarly, a server may provide one or more configurations. The schema allows a server to be configured as either a primary or secondary provider of a DHCP configuration.

Configurations are also defined so that one configuration can include some of the objects that are defined in another configuration. This allows for sharing and/or a hierarchy of related configuration items.

Name: dhcpService Description: Service object that represents the actual DHCP Service configuration. This will be a container with the following attributes. Must: cn, dhcpPrimaryDN May: dhcpSecondaryDN, dhcpSharedNetworkDN, dhcpSubnetDN, dhcpGroupDN, dhcpHostDN, dhcpClassesDN, dhcpOptionsDN, dhcpStatements

The following objects could exist inside the dhcpService container: dhcpSharedNetwork, dhcpSubnet, dhcpGroup, dhcpHost, dhcpClass, dhcpServer, dhcpOptions, dhcpLog

Name: dhcpServer Description: Server object that the DHCP server will login as. The configuration information is in the dhcpService container that the dhcpServiceDN points to. Must: cn, dhcpServiceDN May: dhcpVersion, dhcpImplementation, dhcpHashBucketAssignment, dhcpDelayedServiceParameter, dhcpMaxClientLeadTime,

dhcpFailOverEndpointState

[5.1](). DHCP Declaration related classes:

Name: dhcpSharedNetwork Description: Shared Network class will list what
pools and subnets are in this network.

This will be a container with the following attributes. Must: cn May:
dhcpSubnetDN, dhcpPoolDN, dhcpOptionsDN, dhcpStatements

The following objects can exist within a dhcpSharedNetwork container:
dhcpSubnet, dhcpPool, dhcpOptions, dhcpLog

Name: dhcpSubnet Description: Subnet object will include configuration
information associated with a subnet, including a range and a net mask.

This will be a container with the following attributes. Must: cn
(Subnet address), dhcpNetMask May: dhcpRange, dhcpPoolDN, dhcpGroupDN,
dhcpHostDN, dhcpClassesDN, dhcpLeasesDN, dhcpOptionsDN, dhcpStatements

The following objects can exist within a dhcpSubnet container: dhcpPool,
dhcpGroup, dhcpHost, dhcpClass, dhcpOptions, dhcpLease, dhcpLog

Name: dhcpGroup Description: Group object will have configuration
information associated with a group.

This will be a container with the following attributes. Must: cn May:
dhcpHostDN, dhcpOptionsDN, dhcpStatements

The following objects can exist within a dhcpGroup container: dhcpHost,
dhcpOptions

Name: dhcpHost Description: The host object includes DHCP host
declarations to assign a static IP address or declare the client as
known or specify statements for a specific client. Must: cn May:
dhcpLeaseDN, dhcpHWAddress, dhcpOptionsDN, dhcpStatements

Name: dhcpOptions Description: The options class is for option space
declarations, it contains a list of options. Must: cn May: dhcpOption

Name: dhcpClass Description: This is a class to group clients together
based on matching rules.

This will be a container with the following attributes. Must: cn May:
dhcpSubClassesDN, dhcpOptionsDN, dhcpStatements

The following object can exist within a dhcpClass container:
dhcpSubclass, dhcpOptions

Name: dhcpSubClass Description: This includes configuration information
for a subclass associated with a class. The dhcpSubClass object will
always be contained within the corresponding class container object.
Must: cn May: dhcpClassData, dhcpOptionsDN, dhcpStatements

Name: dhcpPool Description: This contains configuration for a pool that
will have the range of addresses, permit lists and point to classes and
leases that are members of this pool.

This will be a container that could be contained by dhcpSubnet or a
dhcpSharedNetwork. Must: cn, dhcpRange May: dhcpClassesDN,
dhcpPermitList, dhcpLeasesDN, dhcpOptionsDN, dhcpStatements

The following objects can exist within a dhcpPool container: dhcpClass,
dhcpOptions, dhcpLease, dhcpLog

6. Tracking Address Assignments

The behavior of a DHCP server is influenced by two factors - it's
configuration and the current state of the addresses that have been
assigned to clients. This schema defines a set of objects for
representing the DHCP configuration associated with a server. The
following object classes provide the ability to record how addresses are
used including maintaining history (audit log) on individual leases.
Recording lease information in a directory could result in a significant
performance impact and is therefore optional. Implementations supporting
logging of leases need to consider the performance impact.

6.1. dhcpLeases Attribute Definitions

The schema definitions below are for readability the LDIF layout for
this schema will follow in section 8.

Name: dhcpAddressState Description: This stores information about the
current binding-status of an address. For dynamic addresses managed by
DHCP, the values should be restricted to the states defined in the DHCP
Failover Protocol draft [FAILOVR]: 'FREE', 'ACTIVE', 'EXPIRED',
'RELEASED', 'RESET', 'ABANDONED', 'BACKUP'. For more information on
these states see [FAILOVR]. For other addresses, it SHOULD be one of
the following: 'UNKNOWN', 'RESERVED' (an address that is managed by DHCP
that is reserved for a specific client), 'RESERVED-ACTIVE' (same as
reserved, but address is currently in use), 'ASSIGNED' (assigned
manually or by some other mechanism), 'UNASSIGNED', 'NOTASSIGNABLE'.
Syntax: IA5String Flags: SINGLE-VALUE

Name: dhcpExpirationTime Description: This is the time the current lease
for an address expires. Syntax: DateTime Flags: SINGLE-VALUE

Name: dhcpStartTimeOfState Description: This is the time of the last
state change for a leased address. Syntax: DateTime Flags: SINGLE-VALUE

Name: dhcpLastTransactionTime Description: This is the last time a valid
DHCP packet was received from the client. Syntax: DateTime Flags:
SINGLE-VALUE

Name: dhcpBootpFlag Description: This indicates whether the address was
assigned via BOOTP Syntax: Boolean Flags: SINGLE-VALUE

Name: dhcpDomainName Description: This is the name of the domain sent to
the client by the server. It is essentially the same as the value for
DHCP option 15 sent to the client, and represents only the domain - not
the full FQDN. To obtain the full FQDN assigned to the client you must
prepend the "dhcpAssignedHostName" to this value with a ".". Syntax:
IA5String Flags: SINGLE-VALUE

Name: dhcpDnsStatus Description: This indicates the status of updating
DNS resource records on behalf of the client by the DHCP server for this
address. The value is a 16-bit bitmask that has the same values as
specified by the Failover-DDNS option (see [FAILOVR]). Syntax: Integer
Flags: SINGLE-VALUE

Name: dhcpRequestedHostName Description: This is the hostname that was
requested by the client. Syntax: IA5String Flags: SINGLE-VALUE

Name: dhcpAssignedHostName Description: This is the actual hostname that
was assigned to a client. It may not be the name that was requested by
the client. The fully qualified domain name can be determined by
appending the value of "dhcpDomainName" (with a dot separator) to this
name. Syntax: IA5String Flags: SINGLE-VALUE

Name: dhcpReservedForClient Description: This is the distinguished name
of the "dhcpHost" that an address is reserved for. This may not be the
same as the "dhcpAssignedToClient" attribute if the address is being
reassigned but the current lease has not yet expired. Syntax: DN Flags:
SINGLE-VALUE

Name: dhcpAssignedToClient Description: This is the distinguished name
of a "dhcpHost" that an address is currently assigned to. This
attribute is only present in the class when the address is leased.
Syntax: DN Flags: SINGLE-VALUE

Name: dhcpRelayAgentInfo Description: If the client request was received
via a relay agent, this contains information about the relay agent that
was available from the DHCP request. This is a hex-encoded option
value. Syntax: OctetString Flags: SINGLE-VALUE

6.2. **dhcpLeases Object Class**

This class represents an IP address. It may or may not be leaseable, and the object may exist even though a lease is not currently active for the associated IP address.

It is recommended that all Lease objects for a single DHCP Service be centrally located within a single container. This ensures that the lease objects and the corresponding logs do not have to be relocated, when address ranges allocated to individual DHCP subnets and/or pools change.

The schema definitions below are for readability the LDIF layout for this schema will follow in section 8.

Name: dhcpLeases Description: This is the object that holds state information about an IP address. The cn (which is the IP address), and the current address-state are mandatory attributes. If the address is assigned then, some of the optional attributes will have valid data. Must: cn, dhcpAddressState May: dhcpExpirationTime, dhcpStartTimeOfState, dhcpLastTransactionTime, dhcpBootpFlag, dhcpDomainName, dhcpDnsStatus, dhcpRequestedHostName, dhcpAssignedHostName, dhcpReservedForClient, dhcpAssignedToClient, dhcpRelayAgentInfo, dhcpHWAddress

6.3 **Audit Log Information**

A dhcpLog object is created whenever a lease is assigned or released. This object is intended to be created under the corresponding dhcpLeases container, or dhcpPool, dhcpSubnet, dhcpSharedNetwork or dhcpService containers.

The log information under the dhcpLeases container would be for addresses matching that lease information. The log information in the other containers could be used for errors, i.e. when a pool or subnet is out our addresses or if a server is not able to assign any more addresses for a particular dhcpService.

Name: dhcpLog Description: This is the object that holds past information about an IP address. The cn is the time/date stamp when the address was assigned or released, the address state at the time, if the address was assigned or released. Must: cn May: dhcpAddressState, dhcpExpirationTime, dhcpStartTimeOfState, dhcpLastTransactionTime, dhcpBootpFlag, dhcpDomainName, dhcpDnsStatus, dhcpRequestedHostName, dhcpAssignedHostName, dhcpReservedForClient, dhcpAssignedToClient, dhcpRelayAgentInfo, dhcpHWAddress

[7](). **Determining settings**

The dhcpStatements attribute is the key to DHC enhancements that may come along, and the different key words that a particular server implementation may use. This attribute can be used to hold conditional DHCP Statements and DHCP server parameters. Having a generic settings attribute that is just a string, allows this schema to be extensible and easy to configure.

All of the attributes that end with DN are references to the class that precedes the DN e.g. the dhcpPrimaryDN and dhcpSecondaryDN attributes hold the Distinguished Names of the dhcpServer objects that are associated with the dhcpService object.

[8](). **LDIF format for attributes and classes**.

Attributes

(2.16.840.1.113719.1.203.4.1 NAME 'dhcpPrimaryDN' DESC 'The DN of the dhcpServer which is the primary server for the configuration.' SYNTAX 1.3.6.1.4.1.1466.115.121.1.12 SINGLE-VALUE)

(2.16.840.1.113719.1.203.4.2 NAME 'dhcpSecondaryDN' DESC 'The DN of dhcpServer(s) which provide backup service for the configuration.' SYNTAX 1.3.6.1.4.1.1466.115.121.1.12)

(2.16.840.1.113719.1.203.4.3 NAME 'dhcpStatements' DESC 'Flexible storage for specific data depending on what object this exists in. Like conditional statements, server parameters, etc. This allows the standard to evolve without needing to adjust the schema.' SYNTAX **[1.3.6.1.4.1.1466.115.121.1.26]()**)

(2.16.840.1.113719.1.203.4.4 NAME 'dhcpRange' DESC 'The starting & ending IP Addresses in the range (inclusive), separated by a hyphen; if the range only contains one address, then just the address can be specified with no hyphen. Each range is defined as a separate value.' SYNTAX 1.3.6.1.4.1.1466.115.121.1.26)

(2.16.840.1.113719.1.203.4.5 NAME 'dhcpPermitList' DESC 'This attribute contains the permit lists associated with a pool. Each permit list is defined as a separate value.' SYNTAX 1.3.6.1.4.1.1466.115.121.1.26)

(2.16.840.1.113719.1.203.4.6 NAME 'dhcpNetMask' DESC 'The subnet mask length for the subnet. The mask can be easily computed from this length.' SYNTAX 1.3.6.1.4.1.1466.115.121.1.27 SINGLE-VALUE)

(2.16.840.1.113719.1.203.4.7 NAME 'dhcpOption' DESC 'Encoded option values to be sent to clients. Each value represents a single option and contains (OptionTag, Length, OptionValue) encoded in the format used by

DHCP.' SYNTAX 1.3.6.1.4.1.1466.115.121.1.40)

(2.16.840.1.113719.1.203.4.8 NAME 'dhcpClassData' DESC 'Encoded text
string or list of bytes expressed in hexadecimal, separated by colons.
Clients match subclasses based on matching the class data with the
results of match or spawn with statements in the class name
declarations.' SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 SINGLE-VALUE)

(2.16.840.1.113719.1.203.4.9 NAME 'dhcpOptionsDN' DESC 'The
distinguished name(s) of the dhcpOption objects containing the
configuration options provided by the server.' SYNTAX
1.3.6.1.4.1.1466.115.121.1.12)

(2.16.840.1.113719.1.203.4.10 NAME 'dhcpHostDN' DESC 'the distinguished
name(s) of the dhcpHost objects.' SYNTAX 1.3.6.1.4.1.1466.115.121.1.12)

(2.16.840.1.113719.1.203.4.11 NAME 'dhcpPoolDN' DESC 'The distinguished
name(s) of pools.' SYNTAX 1.3.6.1.4.1.1466.115.121.1.12)

(2.16.840.1.113719.1.203.4.12 NAME 'dhcpGroupDN' DESC 'The
distinguished name(s)   of the groups.' SYNTAX
1.3.6.1.4.1.1466.115.121.1.12)

(2.16.840.1.113719.1.203.4.13 NAME 'dhcpSubnetDN' DESC 'The
distinguished name(s) of the subnets.' SYNTAX
1.3.6.1.4.1.1466.115.121.1.12)

(2.16.840.1.113719.1.203.4.14 NAME 'dhcpLeaseDN' DESC 'The
distinguished name of a client address.' SYNTAX
1.3.6.1.4.1.1466.115.121.1.12 **SINGLE-VALUE)**

(2.16.840.1.113719.1.203.4.15 NAME 'dhcpLeasesDN' DESC 'The
distinguished name(s) client addresses.' SYNTAX
1.3.6.1.4.1.1466.115.121.1.12)

(2.16.840.1.113719.1.203.4.16 NAME 'dhcpClassesDN' DESC 'The
distinguished name(s) of a class(es) in a subclass.' SYNTAX
1.3.6.1.4.1.1466.115.121.1.12)

(2.16.840.1.113719.1.203.4.17 NAME 'dhcpSubclassesDN' DESC 'The
distinguished name(s) of subclass(es).' SYNTAX
1.3.6.1.4.1.1466.115.121.1.12)

(2.16.840.1.113719.1.203.4.18 NAME 'dhcpSharedNetworkDN' DESC 'The
distinguished name(s) of sharedNetworks.' SYNTAX
1.3.6.1.4.1.1466.115.121.1.12)

(2.16.840.1.113719.1.203.4.19 NAME 'dhcpServiceDN' DESC 'The DN of
dhcpService object(s)which contain the configuration information. Each
dhcpServer object has this attribute identifying the DHCP

configuration(s) that the server is associated with.' SYNTAX
1.3.6.1.4.1.1466.115.121.1.12)

(2.16.840.1.113719.1.203.4.20 NAME 'dhcpVersion' DESC 'The version
attribute of this object.' SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 SINGLE-
VALUE)

(2.16.840.1.113719.1.203.4.21 NAME 'dhcpImplementation' DESC
'Description of the DHCP Server implementation e.g. DHCP Server's
vendor.' SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 SINGLE-VALUE)

(2.16.840.1.113719.1.203.4.22 NAME 'dhcpAddressState' DESC 'This stores
information about the current binding-status of an address. For dynamic
addresses managed by DHCP, the values should be restricted to the
following: "FREE", "ACTIVE", "EXPIRED", "RELEASED", "RESET",
"ABANDONED", "BACKUP". For other addresses, it SHOULD be one of the
following: "UNKNOWN", "RESERVED" (an address that is managed by DHCP
that is reserved for a specific client), "RESERVED-ACTIVE" (same as
reserved, but address is currently in use), "ASSIGNED" (assigned
manually or by some other mechanism), "UNASSIGNED", "NOTASSIGNABLE".'
SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 SINGLE-VALUE)

(2.16.840.1.113719.1.203.4.23 NAME 'dhcpExpirationTime' DESC 'This is
the time the current lease for an address expires.' SYNTAX
1.3.6.1.4.1.1466.115.121.1.24 **SINGLE-VALUE)**

(2.16.840.1.113719.1.203.4.24 NAME 'dhcpStartTimeOfState' DESC 'This is
the time of the last state change for a leased address.' SYNTAX
1.3.6.1.4.1.1466.115.121.1.24 **SINGLE-VALUE)**

(2.16.840.1.113719.1.203.4.25 NAME 'dhcpLastTransactionTime' DESC 'This
is the last time a valid DHCP packet was received from the client.'
SYNTAX 1.3.6.1.4.1.1466.115.121.1.24 SINGLE-VALUE)

(2.16.840.1.113719.1.203.4.26 NAME 'dhcpBootpFlag' DESC 'This indicates
whether the address was assigned via BOOTP.' SYNTAX
1.3.6.1.4.1.1466.115.121.1.7 **SINGLE-VALUE)**

(2.16.840.1.113719.1.203.4.27 NAME 'dhcpDomainName' DESC 'This is the
name of the domain sent to the client by the server. It is essentially
the same as the value for DHCP option 15 sent to the client, and
represents only the domain - not the full FQDN. To obtain the full FQDN
assigned to the client you must prepend the "dhcpAssignedHostName" to
this value with a ".".' SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 SINGLE-
VALUE)

(2.16.840.1.113719.1.203.4.28 NAME 'dhcpDnsStatus' DESC 'This indicates
the status of updating DNS resource records on behalf of the client by

the DHCP server for this address. The value is a 16-bit bitmask.'
SYNTAX 1.3.6.1.4.1.1466.115.121.1.27 SINGLE-VALUE)

(2.16.840.1.113719.1.203.4.29 NAME 'dhcpRequestedHostName' DESC 'This
is the hostname that was requested by the client.' SYNTAX
1.3.6.1.4.1.1466.115.121.1.26 SINGLE-VALUE)

(2.16.840.1.113719.1.203.4.30 NAME 'dhcpAssignedHostName' DESC 'This is
the actual hostname that was assigned to a client. It may not be the
name that was requested by the client. The fully qualified domain name
can be determined by appending the value of "dhcpDomainName" (with a dot
separator) to this name.' SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 SINGLE-
VALUE)

(2.16.840.1.113719.1.203.4.31 NAME 'dhcpReservedForClient' DESC 'The
distinguished name of a "dhcpClient" that an address is reserved for.
This may not be the same as the "dhcpAssignedToClient" attribute if the
address is being reassigned but the current lease has not yet expired.'
SYNTAX 1.3.6.1.4.1.1466.115.121.1.12 SINGLE-VALUE)

(2.16.840.1.113719.1.203.4.32 NAME 'dhcpAssignedToClient' DESC 'This is
the distinguished name of a "dhcpClient" that an address is currently
assigned to. This attribute is only present in the class when the
address is leased.' SYNTAX 1.3.6.1.4.1.1466.115.121.1.12 SINGLE-VALUE)

(2.16.840.1.113719.1.203.4.33 NAME 'dhcpRelayAgentInfo' DESC 'If the
client request was received via a relay agent, this contains information
about the relay agent that was available from the DHCP request. This is
a hex-encoded option value.' SYNTAX 1.3.6.1.4.1.1466.115.121.1.40
SINGLE-VALUE)

(2.16.840.1.113719.1.203.4.34 NAME 'dhcpHWAddress' DESC 'The clients
hardware address that requested this IP address.' SYNTAX
1.3.6.1.4.1.1466.115.121.1.40 SINGLE-VALUE)

(2.16.840.1.113719.1.203.4.35 NAME 'dhcpHashBucketAssignment' DESC
'HashBucketAssignment bit map for the DHCP Server, as defined in DHC
Load Balancing Algorithm [RFC 3074].' SYNTAX
1.3.6.1.4.1.1466.115.121.1.40 SINGLE-VALUE)

(2.16.840.1.113719.1.203.4.36 NAME 'dhcpDelayedServiceParameter' DESC
'Delay in seconds corresponding to Delayed Service Parameter
configuration, as defined in DHC Load Balancing Algorithm [RFC 3074]. '
SYNTAX 1.3.6.1.4.1.1466.115.121.1.27 SINGLE-VALUE)

(2.16.840.1.113719.1.203.4.37 NAME 'dhcpMaxClientLeadTime' DESC
'Maximum Client Lead Time configuration in seconds, as defined in DHCP
Failover Protocol [FAILOVR]' SYNTAX 1.3.6.1.4.1.1466.115.121.1.27

SINGLE-VALUE)

(2.16.840.1.113719.1.203.4.38 NAME 'dhcpFailOverEndpointState' DESC
'Server (Failover Endpoint) state, as defined in DHCP Failover Protocol
[FAILOVR]' SYNTAX 1.3.6.1.4.1.1466.115.121.1.26 SINGLE-VALUE)

#Classes

(2.16.840.1.113719.1.203.6.1 NAME 'dhcpService' DESC ' Service object
that represents the actual DHCP Service configuration. This is a
container object.' SUP top MUST (cn $ dhcpPrimaryDN) MAY
(dhcpSecondaryDN $ dhcpSharedNetworkDN $ dhcpSubnetDN $ dhcpGroupDN $
dhcpHostDN $ dhcpClassesDN $ dhcpOptionsDN $ dhcpStatements))

(2.16.840.1.113719.1.203.6.2 NAME 'dhcpSharedNetwork' DESC 'This stores
configuration information for a shared network.' SUP top MUST cn MAY
(dhcpSubnetDN $ dhcpPoolDN $ dhcpOptionsDN $ dhcpStatements) X-
NDS_CONTAINMENT ('dhcpService'))

(2.16.840.1.113719.1.203.6.3 NAME 'dhcpSubnet' DESC 'This class defines
a subnet. This is a container object.' SUP top MUST (cn $ dhcpNetMask)
MAY (dhcpRange $ dhcpPoolDN $ dhcpGroupDN $ dhcpHostDN $ dhcpClassesDN $
dhcpLeasesDN $ dhcpOptionsDN $ dhcpStatements) X-NDS_CONTAINMENT
('dhcpService'))

(2.16.840.1.113719.1.203.6.4 NAME 'dhcpPool' DESC 'This stores
configuration information about a pool.' SUP top MUST (cn $ dhcpRange)
MAY (dhcpClassesDN $ dhcpPermitList $ dhcpLeasesDN $ dhcpOptionsDN $
dhcpStatements) X-NDS_CONTAINMENT ('dhcpSubnet' 'dhcpSharedNetwork'))

(2.16.840.1.113719.1.203.6.5 NAME 'dhcpGroup' DESC 'Group object that
lists host DNs and parameters. This is a container object.' SUP top MUST
cn MAY (dhcpHostDN $ dhcpOptionsDN $ dhcpStatements) X-NDS_CONTAINMENT
('dhcpSubnet' 'dhcpService'))

(2.16.840.1.113719.1.203.6.6 NAME 'dhcpHost' DESC 'This represents
information about a particular client' SUP top MUST cn MAY (dhcpLeaseDN
$ dhcpHWAddress $ dhcpOptionsDN $ dhcpStatements) X-NDS_CONTAINMENT
('dhcpService' 'dhcpSubnet' 'dhcpGroup'))

(2.16.840.1.113719.1.203.6.7 NAME 'dhcpClass' DESC 'Represents
information about a collection of related clients.' SUP top MUST cn MAY
(dhcpSubClassesDN $ dhcpOptionsDN $ dhcpStatements) X-NDS_CONTAINMENT
('dhcpService' 'dhcpSubnet'))

(2.16.840.1.113719.1.203.6.8 NAME 'dhcpSubClass' DESC 'Represents
information about a collection of related classes.' SUP top MUST cn MAY
(dhcpClassData $ dhcpOptionsDN $ dhcpStatements) X-NDS_CONTAINMENT

'dhcpClass')

(2.16.840.1.113719.1.203.6.9 NAME 'dhcpOptions' DESC 'Represents
information about a collection of options defined.' SUP top MUST cn MAY
(dhcpOption) X-NDS_CONTAINMENT ('dhcpService' 'dhcpSharedNetwork'
'dhcpSubnet' 'dhcpPool' 'dhcpGroup' 'dhcpHost' 'dhcpClass')

(2.16.840.1.113719.1.203.6.10 NAME 'dhcpLeases' DESC 'This class
represents an IP Address, which may or may not have been leased.' SUP
top MUST (cn $ dhcpAddressState) MAY (dhcpExpirationTime $
dhcpStartTimeOfState $ dhcpLastTransactionTime $ dhcpBootpFlag $
dhcpDomainName $ dhcpDnsStatus $ dhcpRequestedHostName $
dhcpAssignedHostName $ dhcpReservedForClient $ dhcpAssignedToClient $
dhcpRelayAgentInfo $ dhcpHWAddress) X-NDS_CONTAINMENT ('dhcpService'
'dhcpSubnet' 'dhcpPool'))

(2.16.840.1.113719.1.203.6.11 NAME 'dhcpLog' DESC 'This is the object
that holds past information about the IP address. The cn is the
time/date stamp when the address was assigned or released, the address
state at the time, if the address was assigned or released.' SUP top
MUST (cn) MAY (dhcpAddressState $ dhcpExpirationTime $
dhcpStartTimeOfState $ dhcpLastTransactionTime $ dhcpBootpFlag $
dhcpDomainName $ dhcpDnsStatus $ dhcpRequestedHostName $
dhcpAssignedHostName $ dhcpReservedForClient $ dhcpAssignedToClient $
dhcpRelayAgentInfo $ dhcpHWAddress) X-NDS_CONTAINMENT ('dhcpLeases'
'dhcpPool' 'dhcpSubnet' 'dhcpSharedNetwork' 'dhcpService'))

(2.16.840.1.113719.1.203.6.12 NAME 'dhcpServer' DESC 'DHCP Server
Object' SUP top MUST (cn, dhcpServiceDN) MAY (dhcpVersion $
dhcpImplementation $ dhcpHashBucketAssignment $
dhcpDelayedServiceParameter $ dhcpMaxClientLeadTime $
dhcpFailOverEndpointState) X-NDS_CONTAINMENT 'dhcpService')

9. Security Considerations

Since the DHCP Configuration information is stored in a directory, the
security of the information is limited to the security offered by the
directory including the security of the objects within that directory.

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11. Full Copyright Statement

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13. Acknowledgments

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