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.

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.

Design Considerations

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

LDAP Schema for DHCP

Status of this Memo

This document is an Internet-Draft and is in full conformance with all provisions of Section 10 of RFC2026 [ ].

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts. Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsolete by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress." The list of current Internet-Drafts can be accessed at http://www.ietf.org/ietf/1id-abstracts.txt The list of Internet-Draft Shadow Directories can be accessed at http://www.ietf.org/shadow.html.
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,
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 DHCP 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 )
SINGLE-VALUE )

( 2.16.840.1.113719.1.203.4.38 NAME 'dhcpFailOverEndpointState' DESC 'Server (Failover Endpoint) state, as defined in DHCP Failover Protocol [FAILOVER]' 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' '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' '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.

10. Intellectual Property Rights Notices

The IETF takes no position regarding the validity or scope of any intellectual property or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; neither does it represent that it has made any effort to identify any such rights. Information on the IETF’s procedures with respect to rights in standards-track and standards-
related documentation can be found in BCP-11. Copies of claims of rights made available for publication and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementors or users of this specification can be obtained from the IETF Secretariat.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights which may cover technology that may be required to practice this standard. Please address the information to the IETF Executive Director.

11. Full Copyright Statement

Copyright (C) The Internet Society (2001). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the Internet Society or other Internet organizations, except as needed for the purpose of developing Internet standards in which case the procedures for copyrights defined in the Internet Standards process must be followed, or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by the Internet Society or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

12. References


Acknowledgments

This work is partially based on a previous draft draft-ietf-dhc-schema-02.doc.
14. Author’s Addresses

Comments regarding this draft may be sent to the authors at the following address:

Mark Meredith
Mark Hinckley
Novell Inc.
1800 S. Novell Place
Provo, Utah 84606

Vijay K. Nanjundaswamy
Novell Software Development (I) Ltd
49/1 & 49/3, Garvebhavi Palya,
7th Mile, Hosur Road
Bangalore 560068

e-mail: mark_meredith@novell.com
e-mail: knvijay@novell.com
e-mail: mhinckley@novell.com

This Internet Draft expires December 16, 2001.