Internet Engineering Task Force   C. Perkins
INTERNET DRAFT   E. Guttman
                                                            Sun Microsystems
                                                            09 October 1998

DHCP Options for Service Location Protocol
draft-ietf-dhc-slp-04.txt

Status of This Memo

   This document is a submission by the Dynamic Host Configuration
   Working Group of the Internet Engineering Task Force (IETF).
   Comments should be submitted to the dhcp-v4@bucknell.edu mailing
   list.

   Distribution of this memo is unlimited.

   This document is an Internet-Draft. 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 obsoleted 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.''

   To view the entire list of current Internet-Drafts, please check
   the ``1id-abstracts.txt'' listing contained in the Internet-Drafts
   Shadow Directories on ftp.is.co.za (Africa), ftp.nordu.net (Northern
   Europe), ftp.nis.garr.it (Southern Europe), munnari.oz.au (Pacific
   Rim), ftp.ietf.org (US East Coast), or ftp.isi.edu (US West Coast).

Abstract

   The Dynamic Host Configuration Protocol provides a framework for
   passing configuration information to hosts on a TCP/IP network.
   Entities using the Service Location Protocol need to find out the
   address of Directory Agents in order to transact messages. Another
   option provides an assignment of scope for configuration of SLP User
   and Service Agents.

[1]. Introduction

The Dynamic Host Configuration Protocol [3] provides a framework
for passing configuration information to hosts on a TCP/IP network.
Entities using the Service Location Protocol, Version 2 [4] need to
obtain the address of Directory Agents and Scope configuration. The
Service Location Protocol (SLP) provides a default configuration
for Scopes and Directory Agents may be discovered using multicast
or broadcast. It is useful in a larger deployment to be able
to configure SLP Agents using DHCP, so as to centralize the
administration and to deploy SLP in networks where multicast routing
is not available.

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 [1].

[2]. Introduction

The DHCP options described below are used to configure Agents using
the Service Location Protocol, Version 2.

The SLP Directory Agent option is used to configure User Agents and
Service Agents with the location of Directory Agents in the network.
These Directory Agents are assumed to support all of the scopes
supplied by the SLP Scope Option.

If the SLP Scope Option is absent, the scope string "default" is
used instead. If there is a scope string configured using local
configuration on the host that is used if no SLP Scope Option has
been sent. DHCP configuration takes precedence over the local
configuration of SLP scope lists. SLP Agents (be they Directory
Agents, User Agents or Service Agents) which use the SLP Directory
Agent Option MUST be configured with a scope.

[3]. SLP Directory Agent Option

This option specifies the location of one or more SLP Directory
Agents.

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|   Code = 78   |    Length     |      a1       |      a2       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      a3       |      a4       |      a1       |      ...
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

The SLP Directory Agent Option specifies a list of IP addresses
for Directory Agents. Directory Agents MUST be listed in order of
preference, if there is an order of preference.

The address of the Directory Agent is given in network byte order.
The length of the option MUST always be divisible by 4 and has a
minimum length of 4.

The Directory Agents listed in this option MUST be configured with
the a non-empty subset of the scope list that the Agent receiving the
Directory Agent Option is configured with. See the notes below.

SLPv2 Service Agents which are configured using the SLP Directory
Agent Option MUST send a SrvRqst to the DAs in the DHCPOFFER. This
SLPv2 SrvRqst sets the Scope List to the value configured by the SLP
Scope Option if one was sent or "DEFAULT" otherwise. The service
type for the request is "service:directory-agent" and the predicate
is omitted. The reply will include the DA's attributes, scope list.

The SA MUST register all service with the DA which it advertises
which are advertised in one or more of the scopes in the DA's scope
list. The SA MUST register no faster than the "min-lifetime" and not
slower than the "max-lifetime" attributes of the DA. These attributes
are obtained in the DAAdvert solicited by the SA after it receives
the SLP Directory Agent Option DHCPOFFER.

SLPv2 User Agents which are configured using the SLP Directory Agent
Option MUST send their requests to the DAs listed, using the entire
list of scopes they are configured with.

[4]. **SLP Service Scope Option**

The scope list is a comma delimited list which indicates the scopes
that a SLP Agent is configured to use.

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|   Code = 79   |    Length     | <Typed Scope List> String ...
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

The Length indicates the number of bytes which follow. Since the
Scope-List String is encoded using UTF8 characters, it may be the
cast that the Length is not the same as the number of characters in
the Scope-List String.

The minimum length is 0, and the maximum length is 256. This imposes
a limit on the size of the Scope-List String which can be delivered

which does not exist in SLP. DHCP administrators will therefore have
to be careful to not configure very long scope names or very long
lists of scopes for any Agents in their network.

The Typed Scope List includes a list of scopes for the SLP Agent.
The list may be a list of scopes, such as "north,south,east,west".

The list may also include items which are 'typed scopes.' These
items indicate that SAs MUST advertise particular service types in
a scope other than that given in the scope list. UAs MUST issue
requests for services of these types in the scopes listed, or some
subset of the scopes. DAs ignore typed scopes in the SLP Service
Scope Option.

For example, "default,(service:printer:lpr=Math Department)"
indicates that SAs advertise all services in scope default except
for lpr printers, which are advertised in the Math Department scope.
UAs will request all services using the "default" scope, except lpr
printers, which are advertised in the "Math Department" scope. DAs
will simply be configured in the scope "default" since they ignore
the typed scope argument.

The grammar for the typed scope list is:

```
ts-list    = ts-item / ts-item `,' ts-list
ts-item    = scope-list / `(' srv-type `=' scope-list `)'
srv-type   = ALPHA *srv-safe [ `.' 1*srv-safe ]
srv-safe   = ALPHA / DIGIT / `+' / `-'
scope-list = scope-item / scope-item "," scope-list
scope-item = 1*safe-scope
safe-scope = ; Any character except rsvd-scope.
             ; Reserved characters must be escaped.
rsvd-scope = `(' / `)' / `,' / `\' / `!'  / `<' / `=' / `>' / `~'
             CTL / `;' / `*' / `+'
escaped    = `$\backslash$' HEXDIGIT HEXDIGIT
```

This grammar follows ABNF rules [2]. Reserved characters used in
scope names must be escaped. Reserved characters in <srv-type> names
are not allowed. Note that <srv-type> names may include a Naming
Authority extension.

4.1. Zero Length Scope-List String Configuration

A SLP Service Scope Option which indicates a Length of 0 configures
the SLP Agent to use "User Selectable Scopes".

If this is done, the SLP Agent MUST NOT be configured using the SLP
Directory Agent Option.

Instead, the SLP Agent will discover scopes using Directory Agent
discovery (or Service Agent Discovery) as defined in [4].

The SLP Agent will then use the aggregation of all scopes it
discovers on the network to configure its own scope list.

Note that this configuration is tantamount to removing all
centralized control of the configuration hosts on the network. This
makes it possible for every User Agent to see every service. This
may not be desirable as users may not be able to or desire to decide
which services are appropriate for them.

5. Security Considerations

If a malicious host is able to insert fraudulent information in
DHCPOFFER packets sent to a prospective SLP Agent then the SLP Agent
will be unable to obtain service, or may unwittingly be directed to
use the incorrect services.

Many opportunities for denial of service exist. A service agent
could find that it might rely on fraudulent or otherwise malicious
directory agents to advertise its services. DHCPOFFERs could prevent
the regular SLP framework from functioning by directing clients to
not use multicast, to use nonexistent directory agents and so on.

These difficulties are inherited from the much larger and more
serious problem, viz. securing or authenticating any information
whatsoever from a DHCP server (or client!) is not possible in common
DHCP deployments.

References

   [1] S. Bradner. Key Words for Use in RFCs to Indicate Requirement
       Levels. RFC 2119, March 1997.

   [2] D. Crocker and P. Overell. Augmented BNF for Syntax
       Specifications: ABNF. RFC 2234, November 1997.

   [3] R. Droms. Dynamic Host Configuration Protocol. RFC 2131, March
       1997.

   [4] E. Guttman, C. Perkins, J. Veizades, and M. Day. Service
       Location Protocol version 2. draft-ietf-svrloc-protocol-v2-04.txt,
       March 1998. (work in progress).

Author's Address

   Questions about this memo can be directed to:

  Charles E. Perkins   Erik Guttman
  Technology Development Group   Technology Development Group
  Mail Stop MPK15-214   Mail Stop UFRA02
  Sun Microsystems, Inc.   Sun Microsystems, Inc.
  15 Network Circle   Bahnstr. 2
  Menlo Park, CA 94025   74915 Waibstadt, Germany
  phone: +1 650-786-6464   phone: +49 7263 911 701
  fax: +1 650-786-6445   or: +1 650 786 5992
  email: Charles.Perkins@Sun.Com   Erik.Guttman@Sun.Com
  Web: http://www.svrloc.org/~charliep