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DNS Resource Records for ILNP
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STATUS OF THIS MEMO

Distribution of this memo is unlimited.

This document is not on the IETF standards-track and does not specify any level of standard. This document merely provides information for the Internet community.

This document is part of the ILNP document set, which has had extensive review within the IRTF Routing Research Group. ILNP is one of the recommendations made by the RG Chairs. Separately, various refereed research papers on ILNP have also been published during this decade. So the ideas contained herein have had much broader review than the IRTF Routing RG. The views in this document were considered controversial by the Routing RG, but the RG reached a consensus that the document still should be published. The Routing RG has had remarkably little consensus on anything, so virtually all Routing RG outputs are considered controversial.

ABSTRACT

This note describes additional optional Resource Records for use with the Domain Name System (DNS). These optional resource records are for use with the Identifier-Locator Network Protocol (ILNP). This document is a product of the IRTF Routing RG.

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1. INTRODUCTION

The Identifier-Locator Network Protocol (ILNP) was developed to explore a possible evolutionary direction for the Internet Architecture. An description of the ILNP architecture is available in a separate document [ILNP-ARCH]. Implementation and engineering details are largely isolated into a second document [ILNP-ENG].

The Domain Name System (DNS) is the standard way that Internet nodes locate information about addresses, mail exchangers, and other data relating to remote Internet nodes [RFC1034] [RFC1035].

More recently, the IETF have defined standards-track security extensions to the DNS [RFC4033]. These security extensions can be used to authenticate signed DNS data records and can also be used to store signed public keys in the DNS. Further, the IETF have defined a standards-track approach to enable secure dynamic update of DNS records over the network [RFC3007].

This document defines several new optional data Resource Records. This note specifies the syntax and other items required for independent implementations of these DNS resource records. The reader is assumed to be familiar with the basics of DNS, including familiarity with [RFC1034] [RFC1035].

The concept of using DNS for rendezvous with mobile nodes or mobile networks has been proposed earlier, more than once, independently, by several other researchers; for example, please see [SB00] [SBK01] and [PHG02].

1.1 Terminology

In this document, the term "ILNP-aware" applied to a DNS component (either authoritative server or cache) is used to indicate that the component attempts to include other ILNP RRTypes to the Additional section of a DNS response to increase performance and reduce the number of follow-up queries for other ILNP RRTypes. These other RRsets MAY be added to the Additional section if space permits and only when the QTYPE equals NID, L64, L32, or LP. There is no method for a server to signal that it is ILNP-aware.

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 [RFC2119].

2. NEW RESOURCE RECORDS

This document specifies several new and closely related DNS data Resource Records (RRs). These new RR types have the mnemonics "NID", "L32", "L64", and "LP". These resource record types are associated with a Fully-Qualified Domain Name (FQDN), that is hereafter called the "owner name". These are part of work on the Identifier-Locator Network Protocol (ILNP) [ILNP-ARCH].

For clarity, throughout this section of this document, the "RDATA" subsections specify the on-the-wire format for these records, while the "Presentation Format" subsections specify the human-readable format used in a DNS configuration file (i.e. "master file" as defined by RFC-1035, Section 5.1).

2.1 The NID Resource Record

The NID DNS Resource Record (RR) is used hold values for Node Identifiers that will be used for ILNP-capable nodes.

NID records are present only for ILNP-capable nodes. This restriction is important; ILNP-capable nodes use the presence of NID records in the DNS to learn that a correspondent node is also ILNP-capable. While erroneous NID records in the DNS for an node that is not ILNP-capable would not prevent communication, such erroneous DNS records could increase the delay at the start of an IP communications session.

A given owner name may have zero or more NID records at a given time. In normal operation, nodes that support the Identifier-Locator Network Protocol (ILNP) will have at least one valid NID record.

The type value for the NID RR type is X-NID-X <to be assigned>.

The NID RR is class independent.

The NID RR has no special TTL requirements.

2.1.1 NID RDATA wire format

The RDATA for an NID RR consists of:

- a 16 bit Preference field
- a 64 bit NodeID field

```
                     1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|          Preference           |                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+                               +
|                            NodeID                             |
+                               +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

2.1.1.1 The Preference field

The <Preference> field contains a 16-bit unsigned integer in network byte-order that indicates the owner name's relative preference for this NID record among other NID records associated with this owner name. Lower Preference values are preferred over higher Preference values.

2.1.1.2 The NodeID field

The NodeID field is an unsigned 64-bit value in network byte-order. It complies with the syntactic rules of IPv6 Interface Identifiers [RFC-4291, Section 2.5.1], but has slightly different semantics. Unlike IPv6 Interface Identifiers, which are bound to a specific *interface* of a specific node, NodeID values are bound to a specific *node*, and MAY be used with *any interface* of that node.

2.1.2 NID RR Presentation Format

The presentation of the format of the RDATA portion is as follows:

- The Preference field MUST be represented as a 16-bit unsigned decimal integer.

- The NodeID field MUST be represented using the same syntax (i.e. groups of 4 hexadecimal digits, with each group separated by a colon) that is already used for DNS AAAA records (and also used for IPv6 Interface IDs).

- The NodeID value MUST NOT be in the 'compressed' format (e.g. using "::") that is defined in RFC-4291, Section 2.2 (2). This restriction exists to avoid confusion with 128-bit IPv6 addresses, because the NID is a 64-bit field.

2.1.3 NID RR Examples

An NID record has the following logical components:
<owner-name> IN NID <Preference> <NodeID>

In the above, <owner-name> is the owner name string, <Preference> is an unsigned 16-bit value, and <NodeID> is an unsigned 64-bit value.

```
host1.example.com. IN NID 10 0014:4fff:ff20:ee64
host1.example.com. IN NID 20 0015:5fff:ff21:ee65
host2.example.com. IN NID 10 0016:6fff:ff22:ee66
```

As NodeID values use the same syntax as IPv6 interface identifiers, when displayed for human readership, the NodeID values are presented in the same hexadecimal format as IPv6 interface identifiers. This is shown in the example above.

2.1.4 Additional Section Processing

To improve performance, ILNP-aware DNS servers and DNS resolvers MAY attempt to return all L32, L64, and LP records for the same owner name of the NID RRset in the Additional section of the response, if space permits.

2.2 The L32 Resource Record

An L32 DNS Resource Record (RR) is used to hold 32-bit Locator values for ILNPv4-capable nodes.

L32 records are present only for ILNPv4-capable nodes. This restriction is important; ILNP-capable nodes use the presence of L32 records in the DNS to learn that a correspondent node is also ILNPv4-capable. While erroneous L32 records in the DNS for a node that is not ILNP-capable would not prevent communication, such erroneous DNS records could increase the delay at the start of an IP communications session.

A given owner name might have zero or more L32 values at a given time. An ILNPv4-capable host SHOULD have at least 1 Locator (i.e., L32 or LP) DNS resource record while it is connected to the Internet. An ILNPv4-capable multi-homed host normally will have multiple Locator values while multi-homed. An IP host that is NOT ILNPv4-capable MUST NOT have an L32 or LP record in its DNS entries. A node that is not currently connected to the Internet might not have any L32 values in the DNS associated

with its owner name.

A DNS owner name that is naming a subnetwork, rather than naming a host, MAY have an L32 record as a wild-card entry, thereby applying to entries under that DNS owner name. This deployment scenario probably is most common if the named subnetwork is, was, or might become, mobile.

The type value for the L32 RR type is X-L32-X <to be assigned>.

The L32 RR is class independent.

The L32 RR has no special TTL requirements.

2.2.1 L32 RDATA Wire Format

The RDATA for an L32 RR consists of:

- a 16 bit Preference field
- a 32 bit Locator32 field

```
                     1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|          Preference           |      Locator32 (16 MSBs)      |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|     Locator32 (16 LSBs)       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

2.2.1.1 The Preference field

The <Preference> field is an unsigned 16-bit field in network byte-order that indicates the owner name's relative preference for this L32 record among other L32 records associated with this owner name. Lower Preference values are preferred over higher Preference values.

2.2.1.2 The Locator32 field

The <Locator32> field is an unsigned 32-bit integer in network byte-order that is identical on-the-wire to the ADDRESS field of the existing DNS A record.

2.2.2 L32 RR Presentation Format

The presentation of the format of the RDATA portion is as follows:

- The Preference field MUST be represented as a 16-bit unsigned

decimal integer.

- The Locator32 field MUST be represented using the same syntax used for existing DNS A records (i.e. 4 decimal numbers separated by periods without any embedded spaces).

2.2.3 L32 RR Examples

An L32 record has the following logical components:

```
<owner-name>  IN  L32  <Preference>   <Locator32>
```

In the above <owner-name> is the owner name string, <Preference> is an unsigned 16-bit value, and <Locator32> is an unsigned 32-bit value.

```
host1.example.com. IN L32 10 10.1.02.0
host1.example.com. IN L32 20 10.1.04.0
host2.example.com. IN L32 10 10.1.08.0
```

As L32 values have the same syntax and semantics as IPv4 routing prefixes, when displayed for human readership, the values are presented in the same dotted-decimal format as IPv4 addresses. An example of this syntax is shown above.

In the example above, the owner name is from a FQDN for an individual host. host1.example.com has two L32 values, so host1.example.com is multi-homed.

Another example is when the owner name is that learned from an LP record (see below for details of LP records).

```
l32-subnet1.example.com. IN L32 10 10.1.02.0
l32-subnet2.example.com. IN L32 20 10.1.04.0
l32-subnet3.example.com. IN L32 30 10.1.08.0
```

In this example above, the owner name is for a subnetwork rather than an individual node.

2.2.4 Additional Section Processing

To improve performance, ILNP-aware DNS servers and DNS resolvers MAY attempt to return all NID, L64, and LP records for the same owner name of the L32 RRset in the Additional section of the response, if space permits.

2.3 The L64 Resource Record

The L64 resource record (RR) is used to hold unsigned 64-bit Locator Values for ILNPv6-capable nodes.

L64 records are present only for ILNPv6-capable nodes. This restriction is important; ILNP-capable nodes use the presence of L64 records in the DNS to learn that a correspondent node is also ILNPv6-capable. While erroneous L64 records in the DNS for a node that is not ILNP-capable would not prevent communication, such erroneous DNS records could increase the delay at the start of an IP communications session.

A given owner name might have zero or more L64 values at a given time. An ILNPv6-capable host SHOULD have at least 1 Locator (i.e., L64 or LP) DNS resource record while it is connected to the Internet. An ILNPv6-capable multi-homed host normally will have multiple Locator values while multi-homed. An IP host that is NOT ILNPv6-capable MUST NOT have an L64 or LP record in its DNS entries. A node that is not currently connected to the Internet might not have any L64 values in the DNS associated with its owner name.

A DNS owner name that is naming a subnetwork, rather than naming a host, MAY have an L64 record as a wild-card entry, thereby applying to entries under that DNS owner name. This deployment scenario probably is most common if the named subnetwork is, was, or might become, mobile.

The type value for the L64 RR type is X-L64-X <to be assigned>.

The L64 RR is class independent.

The L64 RR has no special TTL requirements.

2.3.1 The L64 RDATA Wire Format

The RDATA for an L64 RR consists of:

- a 16 bit Preference field
- a 64 bit Locator64 field

```
                     1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|          Preference           |                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+                               +
|                          Locator64                            |
```

```
+                              +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

2.3.1.1 The Preference field

The <Preference> field is an unsigned 16-bit integer in network byte-order that indicates the owner name's relative preference for this L64 record among other L64 records associated with this owner name. Lower Preference values are preferred over higher Preference values.

2.3.1.2 The Locator64 field

The <Locator64> field is an unsigned 64-bit integer in network byte-order that has the same syntax and semantics as a 64-bit IPv6 routing prefix.

2.3.2 L64 RR Presentation Format

The presentation of the format of the RDATA portion is as follows:

- The Preference field MUST be represented as a 16-bit unsigned decimal integer.

- The Locator64 field MUST be represented using the same syntax used for AAAA records (i.e. groups of 4 hexadecimal digits separated by colons). However, the 'compressed' display format (e.g. using "::") that is specified in RFC-4291, Section 2.2 (2), MUST NOT be used. This is done to avoid confusion with a 128-bit IPv6 address, since the Locator64 is a 64-bit value, while the IPv6 address is a 128-bit value.

2.3.3 L64 RR Examples

An L64 record has the following logical components:

```
     <owner-name>  IN  L64  <Preference>   <Locator64>
```

In the above, <owner-name> is the owner name string, <Preference> is an unsigned 16-bit value, while <Locator64> is an unsigned 64-bit value.

```
host1.example.com. IN L64 10 2001:0DB8:1140:1000
host1.example.com. IN L64 20 2001:0DB8:2140:2000
host2.example.com. IN L64 10 2001:0DB8:4140:4000
```

As L64 values have the same syntax and semantics as IPv6 routing prefixes, when displayed for human readership, the values might conveniently be presented in hexadecimal format, as above.

In the example above, the owner name is from a FQDN for an individual host. host1.example.com has two L64 values, so it will be multi-homed.

Another example is when the owner name is that learned from an LP record (see below for details of LP records).

```
l64-subnet1.example.com. IN L64 10 2001:0DB8:1140:1000
l64-subnet2.example.com. IN L64 20 2001:0DB8:2140:2000
l64-subnet3.example.com. IN L64 30 2001:0DB8:4140:4000
```

Here, the owner name is for a subnetwork rather than an individual node.

2.3.4 Additional Section Processing

To improve performance, ILNP-aware DNS servers and DNS resolvers MAY attempt to return all NID, L32, and LP records for the same owner name of the L64 RRset in the Additional section of the response, if space permits.

2.4 The LP Resource Record

The LP DNS resource record (RR) is used to hold the name of a subnetwork for ILNP. The name is an FQDN which can then be used to look up L32 or L64 records. LP is, effectively, a Locator Pointer to L32 and/or L64 records.

As described in [ILNP-ARCH], the LP RR provides one level of indirection within the DNS in naming a Locator value. This is useful in several deployment scenarios, such as for a multi-homed site where the multi-homing is handled entirely by the site's border routers (e.g. via Locator rewriting) or in some mobile network deployment scenarios [ILNP-ADV].

LP records MUST NOT be present for owner name values that are not ILNP-capable nodes. This restriction is important; ILNP-capable nodes use the presence of LP records in the DNS to infer that a correspondent node is also ILNP-capable. While erroneous LP records in the DNS for an owner name would not prevent communication, presence of such erroneous DNS records could increase the delay at the start of a communications session.

The type value for the LP RR type is X-LP-X <to be assigned>.

The LP RR is class independent.

The LP RR has no special TTL requirements.

2.4.1 LP RDATA Wire Format

The RDATA for an LPP RR consists of:

- an unsigned 16 bit Preference field
- a variable-length FQDN field

```
                     1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|          Preference           |                               /
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+                               /
/                                                               /
/                              FQDN                             /
/                                                               /
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

2.4.1.1 The Preference field

The <Preference> field contains an unsigned 16-bit integer in network-byte order that indicates the owner name's relative preference for this LP record among other LP records associated with this owner name. Lower Preference values are preferred over higher Preference values.

2.4.1.2 The FQDN field

The variable-length FQDN field contains the DNS target name that is used to reference L32 and/or L64 records. This field MUST NOT have the same value as the owner name of the LP RR instance.

2.4.2 LP RR Presentation Format

The presentation of the format of the RDATA portion is as follows:

- The Preference field MUST be represented as a 16-bit unsigned decimal integer.

- The FQDN field MUST be represented as a wire-encoded domain name, as described in Section 3.3 of RFC 1035 [RFC1035]. The

wire-encoded format is self-describing, so the length is implicit. The domain names MUST NOT be compressed.

2.4.3 LP RR Examples

An LP record has the following logical components:

```
<owner-name>  IN  LP  <Preference>   <FQDN>
```

In the above, <owner-name> is the owner name string, <Preference> is an unsigned 16-bit value, while <FQDN> is the domain name which should be resolved further.

```
host1.example.com. IN LP 10 l64-subnet1.example.com.
host1.example.com. IN LP 10 l64-subnet2.example.com.
host1.example.com. IN LP 20 l32-subnet1.example.com.
```

In the example above, host1.example.com is multi-homed on three subnets. Resolving the FQDNs return in the LP records would allow the actual subnet prefixes to be resolved, e.g. as in the examples for the L32 and L64 RR descriptions, above. This level of indirection allows the same L32 and/or L64 records to be used by many hosts in the same subnetwork, easing management of the ILNP network and potentially reducing the number of DNS Update transactions, especially when that network is mobile [RAB09] or multi-homed [ABH09a].

2.4.4 Additional Section Processing

To improve performance, ILNP-aware DNS servers and DNS resolvers MAY attempt to return all L32 and L64 records for the same owner name of the LP RRset in the Additional section of the response, if space permits.

3. DEPLOYMENT EXAMPLE

Given a domain name, one can use the Domain Name System (DNS) to discover the set of NID records, the set of L32 records, the set of L64 records, and the set of LP records that are associated with that DNS owner name.

For example:

```
host1.example.com. IN NID 10 0014:4fff:ff20:ee64
host1.example.com. IN L64 10 2001:0DB8:1140:1000
```

would be the minimum requirement for an ILNPv6 node that has

owner name host1.example.com and is connected to the Internet at the subnetwork having routing prefix 2001:0DB8:1140:1000.

If that host were multi-homed on two different IPv6 subnets:

```
host1.example.com. IN NID 10 0014:4fff:ff20:ee64
host1.example.com. IN L64 10 2001:0DB8:1140:1000
host1.example.com. IN L64 20 2001:0DB8:2140:2000
```

would indicate the Identifier and two subnets that host1.example.com is attached to, along with the relative preference that a client would use in selecting the Locator value for use in initiating communication.

If host1.example.com were part of a mobile network, a DNS query might return:

```
host1.example.com. IN NID 10 0014:4fff:ff20:ee64
host1.example.com. IN LP  10 mobile-net1.example.com.
```

and then a DNS query to find the current Locator value(s) for the node named by the LP record:

```
mobile-net1.example.com. IN L64 2001:0DB8:8140:8000
```

3.1 Use of ILNP records

As these DNS records are only used with the Identifier-Locator Network Protocol (ILNP), these records MUST NOT be present for a node that does not support ILNP. This lookup process is considered to be in the "forward" direction.

The Preference fields associated with the NID, L32, L64, and LP records are used to indicate the owner name's preference for others to use one particular NID, L32, L64, or LP record, rather than use another NID, L32, L64, or LP record also associated with that owner name. Lower Preference field values are preferred over higher Preference field values.

It is possible that a DNS stub resolver querying for one of these record types will not receive all NID, L32, L64, and LP RR's in a single response. Credible anecdotal reports indicate at least one DNS recursive cache implementation actively drops all Additional Data records that were not expected by that DNS recursive cache. So even if the authoritative DNS server includes all the relevant records in the Additional Data section of the DNS response, the querying DNS stub resolver might not receive all of those Additional Data records. DNS resolvers also might

purge some ILNP RRsets before others, for example if NID RRsets have a longer DNS TTL value than Locator-related (e.g. LP, L32, L64) RRsets. So a DNS stub resolver sending queries to a DNS resolver cannot be certain if they have obtained all available RRtypes for a given owner name. Therefore, the DNS stub resolver SHOULD send follow-up DNS queries for RRTYPE values that were missing and are desired, to ensure that the DNS stub resolver receives all the necessary information.

Note nodes likely either to be mobile or to be multi-homed normally will have very low DNS TTL values for L32 and L64 records, as those values might change frequently. However, the DNS TTL values for NID and LP records normally will be higher, as those values are not normally impacted by node location changes. Previous trace-driven DNS simulations from MIT [JSBM02] and more recent experimental validation of operational DNS from U. of St Andrews [BA11] both indicate deployment and use of very short DNS TTL values within 'stub' or 'leaf' DNS domains is not problematic.

An ILNP node MAY use any NID value associated with its DNS owner name with any or all Locator (L32 or L64) values also associated with its DNS owner name.

3.2 Additional Section Processing

For all the records above, Additional Section Processing MAY be used. This is intended to improve performance for both the DNS client and the DNS server. For example, a node sending DNS query for an NID owner name, such as host1.example.com, would benefit from receiving all ILNP DNS records related to that owner name being returned, as it is quite likely that the client will need that information to initiate an ILNP communication session.

However, this is not always the case: a DNS query for L64 for a particular owner name might be made because the DNS TTL for a previously resolved L64 RR has expired, while the NID RR for that same owner name has a DNS TTL that has not expired.

4. SECURITY CONSIDERATIONS

These new DNS resource record types do not create any new vulnerabilities in the Domain Name System.

Existing mechanisms for DNS Security can be used unchanged with these record types [RFC4033] [RFC3007]. As of this writing, the DNS Security mechanisms are believed to be widely implemented

in currently available DNS servers and DNS clients. Deployment of DNS Security appears to be growing rapidly.

In situations where authentication of DNS data is a concern, the DNS Security extensions SHOULD be used [RFC4033].

If these DNS records are updated dynamically over the network, then the Secure Dynamic DNS Update [RFC3007] mechanism SHOULD be used to secure such transactions.

5. IANA CONSIDERATIONS

IANA is requested to allocate each of these DNS Resource Records

NID
L32
L64
LP

(described above in Section 2) a Data RRTYPE value according to the procedures of Section 3.1 and 3.1.1 on pages 7 through 9 of RFC 6195 [RFC6195].

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Roy Arends provided expert guidance on technical and procedural aspects of DNS issues, for which the authors are greatly obliged.

RFC EDITOR NOTE

This section is to be removed prior to publication.

This document is written in English, not American. So English spelling is used throughout, rather than American spelling. This is consistent with existing practice in several other RFCs, for example RFC-5887.

This document tries to be very careful with history, in the interest of correctly crediting ideas to their earliest identifiable author(s). So in several places the first published RFC about a topic is cited rather than the most recent published RFC about that topic.

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[NOTE: Appendix A is to be removed by the
RFC Editor prior to publication.]

Appendix A:

DNS RRTYPE PARAMETER ALLOCATION TEMPLATE

When ready for formal consideration, this template is to be submitted to IANA for processing by emailing the template to dns-rrtype-applications@ietf.org.

A. Submission Date: To be determined.

B. Submission Type:
[X] New RRTYPE

C. Contact Information for submitter:
Name: R. Atkinson
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D. Motivation for the new RRTYPE application?

Support for an experimental set of IP extensions that replace the concept of an "IP Address" with distinct "Locator" and "Identifier" values.

E. Description of the proposed RR type.

Please see:

http://tools.ietf.org/id/draft-irtf-rrg-ilnp-dns-03.txt

for a full description.

F. What existing RRTYPE or RRTYPEs come closest to filling that need and why are they unsatisfactory?

There is no RRTYPE that fulfils the need due to the new semantics of Locator and Identifier values.

The AAAA record combines both Locator and Identifier, so has significantly different semantics than having separate L64 and NID record values. The AAAA record also lacks scalability and flexibility in the context of the experimental protocol extensions that will use the NID

and L64 records, as any valid NID record value for a node can be used on the wire with any valid L64 record value for the same node.

The CNAME record is closest conceptually to an LP record, but a CNAME is a node name referral scheme, while the LP record is indicating that the given node has the same routing prefix as some other domain name, but does not necessarily have any other values that are the same.

Lastly, the AAAA and CNAME RR Types lack a Preference field to rank responses. Such Preference information is required for ILNP in order to support the use of multiple instances of NID, L32, L64 and LP records.

G. What mnemonic is requested for the new RRTYPE (optional)?

As described in this draft, "NID", "L32", "L64", and "LP".

H. Does the requested RRTYPE make use of any existing IANA Registry or require the creation of a new IANA sub-registry in DNS Parameters?

Existing registry of DNS Resource Record (RR) data TYPE values should be used.

I. Does the proposal require/expect any changes in DNS servers/resolvers that prevent the new type from being processed as an unknown RRTYPE (see [RFC3597]) ?

No.

J. Comments:
This document defines "ILNP-aware" DNS servers or DNS resolver as a DNS server (authoritative or recursive) that MAY include other ILNP RRTypes in the Additional section of a DNS response that match a QNAME (if size permits). This is to reduce the number of DNS stub resolver follow-up DNS queries. and only applies when the QTYPE is either NID, L32, L64, or LP. There is no signalling mechanism for this Additional section processing, and this is believed to be compatible with existing non-ILNP-aware DNS servers and DNS stub resolvers.

No changes are required for existing deployed DNS servers or DNS resolvers.

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