

IETF
Internet-Draft
Obsoletes: 3188 (if approved)
Updates: 2288 (if approved)
Intended status: Standards Track
Expires: November 20, 2010

J. Hakala
The National Library of Finland
A. Hoenes, Ed.
TR-Sys
May 19, 2010

Using National Bibliography Numbers as Uniform Resource Names
draft-hakala-rfc3188bis-nbn-urn-00

Abstract

National Bibliography Numbers, NBNs, are widely used by the national libraries and other organizations in order to identify various resources such as monographs pre-dating the emergence of the ISBN system or still images. As a rule, NBNs are applied to all kinds of resources that do not have an established identifier system of their own.

Since 2001, there has been a URN (Uniform Resource Names) namespace for NBNs, and during 2001-2009 millions of URN-based unique and persistent NBNs have been assigned. The namespace registration was performed in RFC 3188 and applied to the NBNs known at that point. No URN:NBN resolution services existed at the time when the RFC was written. Since then several countries have started using URN:NBNs to identify electronic resources and to provide persistent links to them. To this end, many countries have established URN:NBN resolution services that supply URN - URL linking.

This document replaces RFC 3188 and defines how NBNs can be supported within the URN framework. An updated namespace registration (version 4) is included.

Discussion

This document is an outcome of work performed in 2009-2010 as a part of the project PersID (<http://www.persid.org>) revising the basic URN RFCs, in order to bring them in alignment with the current URI Standard (STD 63, RFC 3986), ABNF, and IANA guidelines, and to establish a modern URN resolution system for bibliographic identifiers. This work is being brought to the IETF, and the intent is to establish a "URNbis" (or similar) working group in the Applications Area as soon as possible, which will then target this and related work.

Comments are welcome on the urn@ietf.org or the urn-nid@ietf.org mailing list (or sent to the authors). Interested parties are also invited to contribute to the WG formation process being discussed on the former list.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at <http://datatracker.ietf.org/drafts/current/>.

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."

This Internet-Draft will expire on November 20, 2010.

Copyright Notice

Copyright (c) 2010 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust's Legal Provisions Relating to IETF Documents (<http://trustee.ietf.org/license-info>) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

This document may contain material from IETF Documents or IETF Contributions published or made publicly available before November 10, 2008. The person(s) controlling the copyright in some of this material may not have granted the IETF Trust the right to allow modifications of such material outside the IETF Standards Process. Without obtaining an adequate license from the person(s) controlling the copyright in such materials, this document may not be modified outside the IETF Standards Process, and derivative works of it may not be created outside the IETF Standards Process, except to format it for publication as an RFC or to translate it into languages other than English.

Table of Contents

1. Introduction	4
2. Conventions used in this document	5
3. Identification and Resolution	5
4. Namespace considerations: National Bibliography Numbers (NBNs)	6
4.1. Overview	6
4.2. Encoding Considerations and Lexical Equivalence	7
4.3. Resolution of NBN-based URNs	9
4.4. Additional Considerations	10
4.5. Security Considerations	11
4.6. URN Namespace ID Registration for the National Bibliography Number (NBN)	11
5. Security Considerations	16
6. IANA Considerations	17
7. Community Considerations	17
8. Acknowledgements	17
9. References	17
9.1. Normative References	17
9.2. Informative References	18

1. Introduction

One of the basic permanent URI schemes (cf. RFC 3986 [RFC3986], [IANA-URI]) is 'URN' (Uniform Resource Name) as defined in RFC 2141 [RFC2141]. Currently, there is work in progress to revise that document [I-D.ah-rfc2141bis-urn]. Any identifier, when used within the URN system, needs its own namespace. As of this writing, there are 40 registered URN namespaces (see [IANA-URN]), one of which belongs to NBN, National Bibliography Number, as specified 2001 in RFC 3188 [RFC3188].

Currently URN:NBNs are in production use in several European countries including Finland, Germany, Italy, the Netherlands, Norway, and Sweden. Several other countries in Europe and elsewhere are considering usage of them. URN:NBNs have been applied in, e.g., Web archives, large collections of digitized materials, and collections of scientific articles.

As part of the validation process for the development of URNs back in late 90s, the IETF URN working group agreed that it was important to demonstrate that a URN syntax proposal can accommodate existing identifiers from well-established namespaces.

One such infrastructure for assigning and managing names comes from the bibliographic community. Bibliographic identifiers function as names for objects that exist both in print and, increasingly, in electronic formats. RFC 2288 [RFC2288] investigated the feasibility of using three identifiers (ISBN, ISSN and SICI) as URNs, with positive results, however it did not formally register corresponding URN namespaces. This was in part due to the still evolving process to formalize criteria for namespace definition documents and registration, consolidated later in the IETF into RFC 3406 [RFC3406].

URN Namespaces have subsequently been registered for NBN, ISBN and ISSN in RFCs 3188 [RFC3188], 3187 [RFC3187], and 3044 [RFC3044]. The ISBN namespace registration is being revised so that it covers both ISBN-10 and ISBN-13; [I-D.hakala-rfc3187bis-isbn-urn]. the current ISSN registration still does not cover ISSN-L, defined in the new version of ISSN. However, there is no registered namespace for SICI, and no plans to make such registration, due to the low popularity of the standard.

Please note that NBN differs from the other identifiers listed here because there is no standard describing NBNs. The term "National Bibliography Number" encompasses all identifier systems the national libraries use in addition to the more formally established identifiers. Historically, they were only applied in the national bibliography to identify the resources catalogued into it. During

the last 10 years NBN scope has been extended to a wide variety of digital resources available via the Internet. Only a minority of these resources are catalogued in the national bibliography. Some national libraries have also allowed other organizations to apply NBNs to their publications and other materials.

Guidelines for using NBNs as URNs and the original namespace registration have been published in RFC 3188 [RFC3188]. The RFC at hand replaces RFC 3188 [RFC3188]; sections discussing the methods in which URN:NBNs can be resolved have been updated and the text is also compliant with the stipulations of RFC 3406 [RFC3406], which has replaced RFC 2611 [RFC2611] that was applied in the initial registration.

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 [RFC2119].

NBN refers to any National Bibliography Number identifier system used by the national libraries and other institutions using the system with the national library's permission.

3. Identification and Resolution

As a rule, NBNs identify finite, manageably-sized objects, but these objects may still be large enough that resolution into a hierarchical system is appropriate. The materials identified by an NBN will often be digital, but they may also exist only in printed or other physical form. In such a case, the URN:NBN resolver should nevertheless be able to supply e.g. bibliographic data about the resource, possibly including the address where the resource is available.

National libraries are the key organizations providing persistent URN resolution services for resources identified with NBNs, independent of their form. National libraries may however allow other organizations such as university libraries or governmental organizations to assign NBNs to their resources. In such case the national library will co-ordinate the use of NBNs and support the NBN users in guaranteeing the persistence of these resources and resolution. These other organizations may establish their own resolution services or they may use the infrastructure provided by the national library.

4. Namespace considerations: National Bibliography Numbers (NBNs)

4.1. Overview

National Bibliography Number (NBN) is a generic name referring to a group of identifier systems utilised by the national libraries and institutions authorized by them, such as universities. The common denominator is that all these organizations are committed to preserve their collections for a long time; at least decades and possibly centuries.

Each national library uses its own NBNs independently of other national libraries; there is no global authority that controls NBN usage. For this reason, NBNs as such are unique only on a national level. When used as URNs, NBN strings must be augmented with a controlled prefix such as the ISO 3166 country code. These prefixes guarantee uniqueness of the NBN-based URNs on the global scale.

NBNs have traditionally been given to documents that do not have a formal (standard) identifier, but are catalogued to the national bibliography. Examples of this include books that predate the introduction of the ISBN in the 1970s, or modern books that for some reason have not received an ISBN. NBNs can be seen as a fall-back mechanism: if no other, standards-based identifier such as an ISBN can be given, an NBN is assigned.

URNs may also be used in universities' open repositories when a resource already has another identifier -- often a DOI (Digital Object Identifier) -- that can only be resolved in a publisher's (or third party's) resolution service, which cannot be used to provide linking to the open repository. URN:NBN-based resolution can deliver that, and may also be extended to include access to other repositories holding the same resource.

In principle, NBNs enable identification of any kind of resource, such as still images published in periodical articles, or short stories and poems published in book form or in the Web. Local policies may limit the NBN usage to for instance documents stored permanently in the national library's collections. Following the initial registration of a URN namespace for NBN, several countries broadened the scope of NBN assignment significantly to cover broader scope of their digital materials.

Some national libraries (e.g., Finland, Norway, Sweden) have established Web-based URN generators, which enable authors and publishers to fetch NBN-based URNs for their network resources. There are also applications, used for instance in digitization processes, that assign NBNs automatically to resources or even their

component parts such as still images published in monographs or serials.

Within the limitations set by RFC 2141, this document, and other relevant RFCs, both syntax and scope of local NBNs can be decided by each national library independently. Historically, NBNs have consisted of one or more letters and/or digits. For instance, (Finnish) NBN for the Romanian translation of the Finnish classic "Seven Brothers" published in 1957 is f568471. URN strings can contain encoded UNICODE characters, as specified in the declaration of syntactic structure, and there are no length limitations. Therefore, literally billions of NBNs can be allocated, which makes them suitable for, e.g., naming of Web documents.

In Italy a novel hierarchical distributed architecture for NBN assignment has been designed, in order to eliminate the single-point-of-error risks of a centralised system and to reduce the costs of managing a resolution service based on persistent identifiers.

The Central National Library in Florence manages the national domain NBN:IT and the national URN resolution service that contains every URN:NBN assigned in Italy. The library has supplied URN:NBN:IT sub-domains to trusted institutions and bodies such as universities that are responsible for digital collections and routinely manage digital resources, for instance via creating and updating metadata on these resources, including location (URL) information. All these institutions have their own resolution services, but the URN - URL mappings in them are periodically harvested to the national resolution service using the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH; see (<http://www.openarchives.org/OAI/openarchivesprotocol.html>)).

Harvesting the data to the central node enables distributed service. The central node can serve the users when the local node is not functional. This architecture increases the robustness of the network via duplication of resolution services and enables peer-to-peer resolution between the second-level institutions. Moreover, it is possible to add yet another layer to the network by creating an international node, which shall contain all the data from the national nodes. Such international service may also be created by building a virtual union resolver that uses all the national nodes. The PersID project is investigating the feasibility of these technical solutions at the European level.

4.2. Encoding Considerations and Lexical Equivalence

Embedding NBNs within the URN framework initially did not present any particular encoding problems, since the ASCII characters utilized in

traditional NBN systems belonged to the URN character set. Machine generated NBNs may be more demanding; if necessary, NBNs must be translated into canonical form as specified in [I-D.ah-rfc2141bis-urn].

When an NBN is used as a URN, the namespace specific string must consist of three parts:

- o a prefix, consisting of either a two-letter ISO 3166 country code or other registered string,
- o a delimiting character that is either hyphen (-) or colon (:), and
- o the NBN string.

Delimiting characters are not lexically equivalent.

A Hyphen MUST be used for separating the prefix and the NBN string.

A Colon MAY be used as the delimiting character if and only if a country code-based NBN namespace is split further in smaller sub-namespaces. If there are several national libraries in one country, these libraries can divide the national namespace between themselves using this method.

A national library may also assign to trusted organisation(s) such as a university or a government institution its own NBN sub-namespace. For instance, the national library of Finland has given Statistics Finland (http://www.stat.fi/index_en.html) a sub-namespace "st" (i.e., urn:nbn:fi:st). These trusted organisations must follow the general rules of the NBN usage provided by the national library, and take care of the long-term preservation of the identified resources in order to guarantee persistence.

Non-ISO 3166 prefixes, if used, MUST be registered on the global level. The U.S. Library of Congress SHALL maintain the central register of reserved codes.

Sub-namespace codes beneath a country-code-based namespace MUST be registered on the national level by the national library that assigned the code. The national register SHOULD be made available on the Web.

Two-letter codes MUST NOT be used as non-ISO prefixes, since all such codes are reserved for existing and possible future ISO country codes. If there are several national libraries in one country that use the same prefix - for instance, a country code -, they need to agree on how to divide the namespace. They may either share one

namespace but agree on how to avoid assigning duplicate identifiers, or they may split the namespace into two sub-namespaces.

Models:

URN:NBN:<ISO 3166 country code>-<assigned NBN string>

URN:NBN:<ISO 3166 country code>:<sub-namespace code>-<assigned NBN string>

URN:NBN:<non-ISO 3166 prefix>-<assigned NBN string>

Examples:

URN:NBN:fi-fe201003181510
(NBN assigned to Tero Frestadius's Master's Thesis "In and Out":
Segmentary Gang Politics in Los Angeles).

urn:nbn:ch:bel-9039

urn:nbn:se:uu:diva-3475

urn:nbn:hu-3006

From the libraries' point of view, one of the key benefits of using URNs and other persistent identifiers is that there is only one location - the resolution service - where the linking information has to be maintained. If bibliographic records in library on-line public access catalogues (OPACs) contain URLs, then each record must be modified whenever the URL changes. With URNs, it is only necessary to maintain the URN - URL linking in the mapping table of the resolution service.

4.3. Resolution of NBN-based URNs

URNs can be used to provide various services. RFC 2483 [RFC2483] gives a few examples, such as retrieving a single URL or all URLs applying to the resource. Services available may vary, depending on the technical implementation of the URN resolver and the target system contacted. Please note that services must not be hard coded into the URN itself.

Eventually, URNs will be resolved with the help of a resolver discovery service (RDS). However, no such system is widely available yet. Therefore, URNs are usually embedded in HTTP URIs in order to make them actionable in the present Internet. In these HTTP URIs, the authority part must point to the appropriate URN resolution service. In Finland, the address of the national URN resolver is

<http://urn.fi>. Thus the HTTP URI for the URN in the example is <http://urn.fi/URN:NBN:fi-fe201003181510>. This in turn resolves to the actual address of the thesis, which as of this writing (2010-03-27) was <https://oa.doria.fi/bitstream/handle/10024/59475/inandout.pdf?sequence=1>.

The country code-based prefix part of the URN namespace specific string will provide a guide to finding the correct national resolution service for URN:NBNs from the resolver discovery service when it is established. If there are multiple URN:NBN resolvers in the country, there are two possible approaches for making sure that RDS will work. All URN:NBNs mappings can be harvested to the national node (the Italian approach). The other approach is to make the RDS aware of all the URN:NBN resolution services, and specify which parts of the national URN:NBN namespace they are capable of serving.

URN:NBN - URL mappings maintained nationally can be harvested using e.g. OAI-PMH from abroad to other national and international URN resolvers. This makes it possible to improve the reliability of the system; if the Finnish national resolver node does not respond, its URN - URL mappings may be available at other resolvers.

Persistence of any resolution service is not only a technical issue, but also an organisational and legal one. National libraries are in ideal position to provide persistent resolution services, since most of them maintain (legal) deposit collections, in which domestic publications shall be preserved for future generations. Increasingly these collection contain also digital resources.

4.4. Additional Considerations

Guidelines adopted and promoted by each national library define when different manifestations of a work should be assigned the same or differing NBNs. These rules apply only if identifier assignment is done manually. If identifiers are allocated programmatically, each manifestation of a resource will get a new NBN. For instance, over time the national library may digitize the same photograph many times from different sources, but each copy will get its own NBN. However, if a checksum such as MD5 (see RFC 1321 [RFC1321]) is used as NBN, the resources that are identical at bit level will receive the same NBN. Dissimilar resources may get the same checksum; with a reliable message digest algorithm such probability is however very small.

The rules governing the usage of NBNs are local and usually less strict than those specifying the usage of ISBNs and other standard identifiers. As long as the NBNs were assigned only in the national libraries, the identifier use was however well co-ordinated in

practice. Now, following significant broadening in the scope of the NBN to cover Web resources, NBN assignment is less tightly controlled even within one national library. One resource -- for instance, a photo that has been published in many newspapers -- is likely to receive multiple NBNs. If two national libraries are digitizing the same resources and use NBNs for identification of these resources, the result will be duplicate NBN assignment since NBNs as a rule have national scope. If the metadata describing the resource is harvested into a common service, and the bibliographic records are similar enough to be merged, the user may see two NBNs and HTTP URIs pointing to two different resolution services and physical copies of the same resource. If the two copies had the same identifier such as an ISBN, there would still be two HTTP URIs providing access to different physical copies of the resource.

If the same resource -- for instance, a master's thesis published by two universities -- is held in two repositories located in different NBN-sub-namespaces within one national namespace, these copies may also receive different NBNs especially if there is no easy way of checking if the resource has already been identified somewhere. In this case, duplication may be revealed in the national level when the metadata records of the two copies are compared. In such case, like in the previous example, both URN:NBNs are equally valid.

4.5. Security Considerations

This document proposes means of encoding national bibliography numbers (NBNs) within the URN framework. It discusses resolution only at a very generic level; thus, questions of secure or authenticated resolution services and authentication of users of such services are out of scope. This document does not address means of validating the integrity or authenticating the source or provenance of URNs that contain NBNs. Issues regarding intellectual property rights associated with objects identified by national bibliography numbers are also beyond the scope of this document, as are questions about rights to the bibliographic databases that may be used to construct resolution services.

4.6. URN Namespace ID Registration for the National Bibliography Number (NBN)

This registration describes how National Bibliography Numbers (NBNs) can be supported within the URN framework.

[RFC Editor: please replace "XXXX" in all instances of "RFC XXXX" below by the RFC number assigned to this document.]

Namespace ID: NBN

This Namespace ID was formally assigned to the National Bibliography Number in October 2001 when the namespace was registered officially. Utilization of URN:NBNs started in demonstrator systems in 1998; production use has been going on for several years, and millions of URN:NBNs have been assigned.

Registration Information:

Version: 4
Date: 2010-05-18

Declared registrant of the namespace:

Name: Mr. Juha Hakala
Affiliation: Senior Adviser, The National Library of Finland
Email: juha.hakala@helsinki.fi
Postal: P.O.Box 15, 00014 Helsinki University, Finland
Web URL: <http://www.nationallibrary.fi/>

The National Library of Finland registered the namespace on behalf of the Conference of the European National Librarians (CENL) and Conference of Directors of National Libraries (CDNL), which have both made a commitment in 1998 to foster the use of URNs. The NBN namespace will be available for free for all national libraries in the world.

Declaration of syntactic structure:

The namespace specific string (NSS) will consist of three parts:

a prefix, consisting of either a two-letter ISO 3166 country code or other registered string and sub-namespace codes,

delimiting characters (colon (:)) and hyphen (-)), and

an NBN string assigned by the national library or sub-delegated authority.

Formal declaration of the NSS, using ABNF [RFC5234].

```
nbn_nss      = prefix "-" nbn_string
prefix       = cc_prefix / reg_prefix
cc_prefix    = iso_cc *( ":" subspc )
iso_cc       = 2ALPHA
              ; country code as assigned by ISO 3166, part 1 --
              ; identifies the national library
              ; to which the branch is delegated

subspc       = 1*ALPHANUM
              ; as assigned by the respective national library

reg_prefix   = 3*ALPHANUM
              ; as assigned by the Library of Congress --
              ; identifies a trusted third party
              ; to which the branch is delegated

nbn_string   = <specific per prefix>
              ; must follow RFC 3986 <path-rootless> syntax
```

Colon may be used as a delimiting character only within the prefix, between ISO 3166 country code and sub-namespace code, which splits the national namespace into smaller parts.

Dividing non-ISO 3166-based namespaces further with sub-namespace codes MUST NOT be done.

Hyphen MUST be used as the delimiting character between the prefix and the NBN string. Within the NBN string, hyphen MAY be used for separating different sections of the code from one another.

Non-ISO prefixes used instead of the ISO country code must be registered. A global registry, maintained by the Library of Congress, shall be created and made available via the Web. Contact information: nbn.register@loc.gov.us.

All two-letter codes are reserved for existing and possible future ISO country codes and MUST NOT be used as non-ISO prefixes.

Sub-namespace codes MUST be registered on the national level by the national library which assigned the code. The list of such codes SHOULD be available via the Web.

Models:

URN:NBN:<ISO 3166 country code>-<assigned NBN string>

URN:NBN:<ISO 3166 country code:sub-namespace code>-<assigned NBN string>

URN:NBN:<non-ISO 3166 prefix>-<assigned NBN string>

Example:

urn:nbn:de:gbv:089-3321752945

Relevant ancillary documentation:

National Bibliography Number (NBN) is a generic name referring to a group of identifier systems used by the national libraries and other organizations for identification of deposited publications and other resources that lack a 'canonical' identifier, or to descriptive metadata (cataloguing) that describes the resources. Each national library uses its own NBN system independently of other national libraries; there is neither a general standard defining NBN syntax nor a global authority to control the use of these identifier systems.

Each national library decides locally which resources shall receive NBNs. These identifiers have traditionally been assigned to documents that do not have a publisher-assigned identifier, but are nevertheless catalogued to the national bibliography. Typically identification of grey publications have largely been dependent on NBNs. With the introduction of the Internet and URN:NBN namespace in 1998, the scope of NBN assignment has been extended to a broad spectrum of Internet resources including, e.g., harvested Web pages.

Some national libraries (Finland, Norway, Sweden) have established Web-based URN generators that enable authors and publishers to fetch NBN-based URNs for the resources they publish in the Web. The most significant group of publications to which NBNs have been applied are doctoral theses.

The syntax of NBNs is decided by each national library independently. Historically, NBNs used in national bibliographies contained only characters that belong to the URN character set. Following the expansion of NBN scope and semi- and fully automated NBN assignment processes, some NBNs may contain characters that must be translated into canonical form according to the specifications in [I-D.ah-rfc2141bis-urn].

Identifier uniqueness and persistence considerations:

NBN strings assigned by two national libraries may be identical. In order to guarantee global uniqueness of NBN-based URNs, therefore a controlled prefix is present in the namespace specific string. These NBNs, once given to the resource, will be persistent. Persistence of the resources themselves will be guaranteed by the national libraries as a part of their legal deposit activities. This applies to publications and Web resources only; long-term preservation of other resources such as governmental documents will be dependent on other actors like national archives.

An NBN, once it has been assigned, must never be re-used for another resource.

At the national level, libraries may utilise different policies for guaranteeing uniqueness of NBNs. They may be assigned sequentially by programs (URN generators) in order to avoid human mistakes. It is also possible to use checksums such as SHA-1 or MD5 as NBN.

Process of identifier assignment:

Assignment of NBN-based URNs MUST be controlled on national level by the national library / national libraries. Although the basic principles are the same, there are differences in scope; for instance in the Netherlands URN:NBNs are used -- among other things -- to identify scientific articles stored in the national library's long term preservation system, whereas most other URN users are not applying them on scientific articles. Finland, on the other hand, is using URNs extensively to identify and provide access to the digitized content.

National libraries may choose different strategies in assigning NBN-based URNs, and different approaches have varying levels of control. Manual URN assignment by the library personnel only provides the best possible control, especially if this is done traditionally, that is, only when the document is catalogued into the national bibliography. Usually the scope of URN:NBN is much broader than this; NBNs may for instance be automatically generated for each archived resource by a long term preservation system. From control point of view, the most liberal approach is a URN generator which builds URNs for everyone, with no guarantee that the resource identified will be preserved or accessible. Every national library must decide the degree of freedom it allows to the URN:NBN users. Usage rules may of course vary from one sub-namespace to the next. As of yet there are no international guidelines for NBN use, but they may be developed in the future.

Process for identifier resolution:

See Section 4.3 of RFC XXXX.

Rules for lexical equivalence:

None in the global level, beyond those expressed in [I-D.ah-rfc2141bis-urn].

National libraries may develop their own rules for the NBNs they use.

Conformance with URN syntax:

Traditional NBNs (those applied in the national bibliographies) consisted of ASCII 7-bit letters and digits (a-z and 0-9). For instance, the NBN of the first Hungarian translation of the Finnish national epos Kalevala is f20043425. The book was published in 1853 and therefore does not have an ISBN. Machine-generated NBNs must follow the stipulations of [I-D.ah-rfc2141bis-urn].

Validation mechanism:

None specified on the global level (beyond a routine check of those characters that require special encoding when expressed as URIs). A national library may use NBNs, which contain a checksum and can therefore be validated, but as of this writing there are no NBNs which incorporate a checksum.

Scope:

NBN is a global identifier system used for identification of diverse publications and other resources. It is widely used and supported by the national libraries.

5. Security Considerations

This document proposes means of encoding NBNs within the URN framework. An NBN-based URN resolution service is depicted, but only in a fairly generic level; thus questions of secure or authenticated resolution mechanisms are excluded. It does not deal with means of validating the integrity or authenticating the source or provenance of URNs that contain NBNs. Issues regarding intellectual property rights associated with objects identified by the NBNs are also beyond the scope of this document, as are questions about rights to the databases that might be used to construct resolvers.

6. IANA Considerations

IANA is asked to update the existing registration of the Formal URN Namespace 'NBN' using the template given above in Section 4.6.

7. Community Considerations

National bibliography numbers enable the national libraries and organisations which liaise with them to uniquely identify resources and provide persistent links to the resource accessible in the Internet. Since most digital documents held in national libraries' digital collections are not eligible for other, more formal identifiers such as ISBN, NBNs are a valuable asset for the community. A proof of this are the millions of URN:NBNs that have been allocated since the NBN namespace was reserved, and the operational services that have been built, using these identifiers and resolver applications.

For library users, URN-based identification and resolution services mean more efficient and reliable access to resources in general. No special tools are needed for this; Web browsers are sufficient. The users may also be able to acquire URN:NBNs to their own key resources such as university thesis.

8. Acknowledgements

The author wishes to thank his colleagues in the PersID project for their support.

9. References

9.1. Normative References

- [I-D.ah-rfc2141bis-urn] Hoenes, A., "Uniform Resource Name (URN) Syntax", draft-ah-rfc2141bis-urn-00 (work in progress), March 2010.
- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.
- [RFC3406] Daigle, L., van Gulik, D., Iannella, R., and P. Faltstrom, "Uniform Resource Names (URN) Namespace Definition Mechanisms", BCP 66, RFC 3406, October 2002.
- [RFC5234] Crocker, D. and P. Overell, "Augmented BNF for Syntax Specifications: ABNF", STD 68, RFC 5234, January 2008.

9.2. Informative References

- [I-D.hakala-rfc3187bis-isbn-urn]
Huttunen, M., Hakala, J., and A. Hoenes, "Using International Standard Book Numbers as Uniform Resource Names", draft-hakala-rfc3187bis-isbn-urn-00 (work in progress), March 2010.
- [IANA-URI]
IANA, "URI Schemes Registry",
<<http://www.iana.org/assignments/uri-schemes/>>.
- [IANA-URN]
IANA, "URN Namespace Registry",
<<http://www.iana.org/assignments/urn-namespaces/>>.
- [RFC1321] Rivest, R., "The MD5 Message-Digest Algorithm", RFC 1321, April 1992.
- [RFC2141] Moats, R., "URN Syntax", RFC 2141, May 1997.
- [RFC2288] Lynch, C., Preston, C., and R. Jr, "Using Existing Bibliographic Identifiers as Uniform Resource Names", RFC 2288, February 1998.
- [RFC2483] Mealling, M. and R. Daniel, "URI Resolution Services Necessary for URN Resolution", RFC 2483, January 1999.
- [RFC2611] Daigle, L., van Gulik, D., Iannella, R., and P. Faltstrom, "URN Namespace Definition Mechanisms", BCP 33, RFC 2611, June 1999.
- [RFC3044] Rozenfeld, S., "Using The ISSN (International Serial Standard Number) as URN (Uniform Resource Names) within an ISSN-URN Namespace", RFC 3044, January 2001.
- [RFC3187] Hakala, J. and H. Walravens, "Using International Standard Book Numbers as Uniform Resource Names", RFC 3187, October 2001.
- [RFC3188] Hakala, J., "Using National Bibliography Numbers as Uniform Resource Names", RFC 3188, October 2001.
- [RFC3986] Berners-Lee, T., Fielding, R., and L. Masinter, "Uniform Resource Identifier (URI): Generic Syntax", STD 66, RFC 3986, January 2005.

Authors' Addresses

Juha Hakala
The National Library of Finland
P.O. Box 15
Helsinki, Helsinki University FIN-00014
Finland

Email: juha.hakala@helsinki.fi

Alfred Hoenes (editor)
TR-Sys
Gerlinger Str. 12
Ditzingen D-71254
Germany

Email: ah@TR-Sys.de

