



Request for Comment: Proposal to add a Standard to the New Zealand e-GIF

Standard: URN - A Unique/Uniform Resource Identifier naming convention and scheme for XML namespaces

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1 Executive summary

e-GIF needs a standard for XML namespace declaration

The E-government Unit of the State Service Commission (SSC EGU) has identified a business need for naming conventions for eXtensible Mark-up Language (XML) namespaces.

Declaring namespaces is an essential aspect of XML schema and file encoding. Currently, government agencies are developing schema using a variety of conventions. This lack of consistency means agencies cannot fully share (store, retrieve and re-use) schema. To promote successful data exchange across government agencies, the SSC EGU proposes standardising XML namespace declaration, as part of the New Zealand E-government Interoperability Framework (e-GIF).

SSC EGU proposes URN

So that XML namespaces are uniquely identified, the SSC EGU proposes including the Unique Resource Name (URN) type of Unique Resource Identifier (URI) method in the e-GIF.

While not as prevalent as the older Uniform Resource Locator (URL) method for declaring namespaces, URN is:

- a World Wide Web Consortium (W3C) standard
- both computer and machine readable
- adopted by several high-profile international bodies, with significant interest from other jurisdictions beyond New Zealand.¹

A good example of URNs can be found in the Metalogue application in govt.nz, where they are used for uniquely identifying agencies, services and documents.

URN namespaces for New Zealand

This proposal also recommends specific URN conventions for New Zealand, as outlined in [Appendix A](#). In particular, SSC EGU proposes:

- “nzl” for the top level
- “govt” for the second level
- NZGLS terms for government agencies.

At the top level, URNs resemble internet domains, such as “.nz”, but with at least three letters. For New Zealand’s top-level URN, the SSC EGU proposes to apply to the applicable international governing body for “nzl”, New Zealand’s Alpha-3 country code from ISO 3166.² Once the top-level URN has been granted, the

¹ Examples are the Organisation for the Advancement of Structured Information Standards (OASIS), Liberty and Swift. See <http://www.iana.org/assignments/urn-namespaces> for the complete list.

² For more information, contact e-GIF@ssc.govt.nz.

SSC EGU will establish and manage the second-level name “govt” and assign NZGLS terms for government-agency namespaces. For other qualifying New Zealand organisations, SSC EGU will delegate assignment of second-level names. InternetNZ has indicated its interest in operating the registry service for names in future.

Steps toward implementation

The SSC EGU proposal includes the following steps:

- 1 Add URN to the e-GIF in 2005 with a status of Under Development.
- 2 Undertake a pilot implementation, facilitated by the SSC EGU.
- 3 Analyse the pilot and make recommendations to the e-GIF Management Committee on proposed changes of status for the URN standard.
- 4 Outline a proposed syntax structure for URNs.
- 5 Outline a suggested process for moderating and maintaining URNs.

Feedback and participation needed

The SSC EGU is seeking:

- feedback on the proposal for a URN standard
- participation in the pilot implementation.

For the pilot, a group of agencies will form a Working Group, which will refine the processes and documentation to support the URN convention as an e-GIF standard.

Consultation is sought from government agencies, Crown entities, local bodies and individuals on this proposal. Submissions close on **31 March 2005**.

2 Definitions and acronyms

Because of the technical nature of this document, it includes a significant number of technical terms and acronyms. The most frequently used are explained below; those rarely used are defined within the text.

Acronym	Definition
CIQ	Customer Information Quality, the OASIS group of standards incorporating xCIL and its name and address subsets, xNL, xAL and xNAL.
CVL	Controlled Value/vocabulary/code List.
DNS	Domain Name Server, DNS, refers to a database of Internet names and addresses which translates the names to the official Internet Protocol numbers and vice versa.
e-GIF	E-government Interoperability Framework.
FONZ	Functions of New Zealand, incorporated into the New Zealand Government Locator Service (NZGLS), is a controlled vocabulary list of terms used in the NZGLS.
IANA	Internet Assigned Numbers Authority are responsible for the registration of globally unique internet domain names and namespaces. They are a function of ICANN. See http://www.iana.org/ .
ICANN	Internet Corporation for Assigned Names and Numbers. See http://www.icann.com/ .
IETF	Internet Engineering Task Force is a large open community of network designers, operators, vendors and researchers concerned with the evolution of the internet architecture and the smooth operation of the internet. The IETF is charged with developing and promoting Internet standards. It is an open, all-volunteer organization, with no formal membership nor membership requirements. See http://www.ietf.org/ . A more detailed description of the various bodies comprising the IETF can be found here: http://www.ietf.org/rfc/rfc2028.txt
NID	Namespace ID. The first part of a URN namespace. In this paper, the URN specifies "nzi".
NSS	Namespace Specific String. The part of an XML URN namespace that can be hierarchically split after the NID; for example, " govt:licence:car " where "govt" is the New Zealand Specifier and "licence:car" is the New Zealand Specifier Defined String.
NZGLS	New Zealand Government Locator Service, including Functions of New Zealand (FONZ) and Subjects of New Zealand (SONZ).
NZS	New Zealand Specifier. This is the first of the two-part NSS; e.g., "govt".
NZSDS	New Zealand Specifier Defined String. A string that is appropriate for the NZ Specifier it relates to. This is the part of the name that follows the NZ Specifier; i.e., "govt".

Acronym	Definition
NZ GMS	New Zealand Geospatial Metadata Standard is a consistent way of describing geospatial data holdings. This standard is listed as “Under Review” in Section 2.7 in the latest version of the e-GIF.
OASIS	Organisation for the Advancement of Structured Information Standards.
OASIS xNAL	eXtensible Name and Address Language developed by OASIS CIQ TC.
RSS	Resource description framework Site Summary, a standard for news publication and syndication. See http://web.resource.org/rss/1.0/spec .
SONZ	Subjects of New Zealand, incorporated into the New Zealand Government Locator Service (NZGLS), is a controlled vocabulary list of terms used in the NZGLS.
SSC EGU	E-government Unit of the State Services Commission
TC	OASIS Technical Committee.
URI	Unique (or interchangeably called Uniform) Resource Identifier. The mechanism or scheme used to uniquely identify XML namespaces.
URL and PURL	Unique Resource Locator and Persistent Unique Resource Locator. These are types of URIs. The term “Persistent” indicates that a method of providing persistent identifiers using standard Web protocols is being deployed.
TLD	Top Level Domain. In the Domain Name System (DNS), the highest level of the hierarchy after the root. In a domain name, that portion of the domain name that appears furthest to the right.
URN	Unique Resource Name. A type of URI.
W3C	World Wide Web Consortium. See http://www.w3c.org/ .
xCIL	eXtensible Customer Information Language.
XML	eXtensible Mark-up Language. A technology for exchanging structured information over intranets, extranets and the internet. See http://www.w3.org/TR/REC-xml .
XML Namespace	When an XML document refers to several schemas, namespaces are used to link each XML element with a schema. Namespace schema declarations begin with “xmlns”.
XML schema	Defines a data structure. A schema guarantees that the XML elements linked to it follow the defined structure.
xNAL	eXtensible Name and Address Language is an OASIS standard that operates as a container for xNL (eXtensible Name Language) and xAL (eXtensible Address Language) standards to store customer name and address data.
XSLT	eXtensible StyleSheet Language Transformation is a language - to transform the format of XML data into data of other formats, on the basis of a set of well-defined rules.

3 Introduction

3.1 Purpose

The purpose of this document is to propose a common naming convention for New Zealand Government XML namespaces. This proposal will:

- explain the problems associated with not having a common strategy
- recommend URN as the preferred option, with a supporting rationale
- suggest adding URN to the e-GIF in 2005, with a status of Under Development
- outline a pilot implementation, facilitated by the SSC EGU
- outline a process for moderating and maintaining chosen URN namespaces
- outline the syntax for the proposed URN standard.

This proposal aims to give sufficient background for public consultation. The SSC EGU seeks feedback from government agencies, Crown entities, local bodies and individuals. Submissions close on **31 March 2005**.

The e-GIF Custodian and the e-GIF Management Committee will evaluate feedback and decide on this proposal's future direction, using the standards-ratification process.

3.2 Scope

The document does not cover:

- guidelines for programmers to use URN Namespaces. (Guidelines will be produced for the pilot implementation.)
- the requirements of Controlled Values Lists (CVLs). These relate to the limited/defined lists of values inside the schema tags. A discussion document on CVLs can be found at <http://www.e-government.govt.nz/interoperability/cvl.asp>
- other content-management metadata identifiers that are *not* used in schema development, such as, but not limited to: ISBN (International Standard Book Number), EAN (European Article Number), DOI (Digital Object Identifier), GUID (Globally Unique Identifier) and RFID (Radio Frequency Identification)
- a deep analysis of the alternatives (they are referenced and compared briefly in [Section 7](#)).

3.3 Target audience

This proposal is primarily directed to Chief Information Officers, IT Managers, IT Strategists, Enterprise and Solution Architects and developers complying with the e-GIF.

This document discusses a technical subject and some understanding of XML is required.

4 Background

4.1 What is the e-GIF?

The e-GIF is a document containing a set of policies, technical standards, guidelines and a governance approach to integrated electronic services for Government in New Zealand. It defines the elements of a platform linking public sector data and information resources between Government agencies. Topics include network, architecture, business services, access, presentation and security. The e-GIF includes mandatory and recommended standards, such as XML conventions for data exchange and storage.

As the prime vehicle for delivering the Government's strategy for web-enabled, interconnected government, the e-GIF's objective is that by June 2007 "networks and Internet technologies will be integral to the delivery of government information, services and processes".

SSC EGU is the e-GIF Custodian. Version 2.1 (May 2004) of the e-GIF is available at <http://www.e.govt.nz/interoperability/>.

4.2 What is a standard?

According to Standards New Zealand, "a standard is a published document that sets out the minimum requirements necessary to ensure that a material, structure, product, method or system will do the job it is intended to do."

Standards can demonstrably be met or not met through observable and testable evidence. They set limits and are more detailed and explicit than policies. They differ from procedures in that a procedure is a way of proceeding, a mode of conducting business or a description of how to do something.

The development of a namespace assignment-and-management system is not strictly speaking a standard. But the need for agencies to adopt an agreed approach is critical to successful data exchange. The choice of which URI scheme to use for XML namespaces in government transactions in New Zealand does fall under the definition of a standard. The e-GIF is the most appropriate vehicle to publish the agreed standard URI scheme and related guidelines.

4.3 NZ Government experience to date

In 2003 the first significant data-standard development under the auspices of the e-GIF was the development of xNAL(nz), a New Zealand profile of the OASIS xNAL Name and Address standard. This standard highlighted two essential requirements for the take up and re-use of schema fragments: Namespace and Controlled Vocabulary/Value/code Lists (CVLs). With respect to Namespace, the schema fragments in the developed examples had to make assumptions about namespaces by using a notional URI scheme. While the assumption is sufficient in a test environment, because namespaces can be contrived, the schema would not be expected to work error free when used (and re-used) indefinitely in real-life data exchange.

Lack of a clear all-of-government direction on a URI scheme and naming convention for XML namespaces is one of the hindrances to successfully implementing schema fragments for data standards in the e-GIF. Schemas used in government today include assumptions about which URI mechanism to use. For example, xNAL(nz) uses a notional URI scheme, while the New Zealand Geospatial Metadata Standard (NZ GMS) uses URNs taken from its core standard, ISO19115, and the NZGLS. Different again is the current implementation of Resource description framework Site Summary (RSS) for syndicated news feed for government agencies, where Persistent URLs (PURLs) have been used to locate NZGLS terms for its namespace. Some government agencies, for example Accident Compensation Commission (ACC), already have internal agreement on a convention for namespace declarations.

4.4 Categorising the proposed standard URI scheme for XML Namespaces

Proposals for e-GIF standards fall into the following categories:

- **Category 1:** Recognised international standards from applicable standards bodies such as W3C or OASIS, with supporting documentation and implementation. These standards may or may not already be in use in New Zealand.
- **Category 2:** Standards in use overseas by an industry sector or group that may or may not be ratified by an international standards body. These standards may or may not be already in use in New Zealand, but they are expected to have supporting documentation and, where appropriate, schema from which the New Zealand Government can draw.
- **Category 3:** Standards used internally by an agency in New Zealand with no international recognition, but which the agency would like to propose as a standard for New Zealand Government to follow. These standards are expected to have supporting documentation and, where applicable, schema from which the New Zealand Government can draw.
- **Category 4:** No standard exists in New Zealand nor overseas—a standard needs to be developed.

This proposal seeks ratification of a Category-1 standard.

4.5 The business need for this standard

The NZ GMS, RSS and xNAL examples indicate an urgent need to institute a common naming convention for namespaces within the New Zealand Government. Without a common naming strategy, XML code describing the elements to be exchanged amongst agencies will often fail when it is presented at the receiving agency. While it is possible to reduce failures by mapping names used by one agency against those used by another, extra systems development would be required. Also the objective of interoperability would be hindered since the business processes contained within the code are designed for many-to-many transmission, rather than one to one. This means that the task of mapping could potentially increase exponentially.

The use of a commonly referenced namespace standard enables maximum interoperability and allows the reuse of XML schemas.

5 What is namespace and why does it need a standardised format?

5.1 What is namespace?

Namespace is a way of defining each element type and attribute name in an XML document unambiguously, for example through associations with specific URIs, so that two or more XML-based languages may be used in that document without creating a conflict.

If schemas are to be re-usable throughout government agencies, the format and syntax of the namespace must be standardised.

5.2 What format should we use for namespace?

This proposal recommends using URI for namespaces. A URI is a formatted string that serves as an identifier for a resource. In an XML document, namespace declarations have the following syntax:

```
xmlns:<namespace>="<URI>"
```

XML namespaces are essential because they provide context to the XML elements to which they are linked. Without these contexts, XML documents may become ambiguous.

There are several types of URI that can be used, including URL, URN and notional or private URI schemes. [Section 7](#) presents the available options in more detail.

5.3 Why URI and not IRI?

Internationalised Resource Identifier (IRI), an alternative to URI for identifying namespaces, is now being developed by the W3 Consortium. The current draft, which expired on 7 November 2004, can be found at <http://www.w3.org/International/iri-edit/>.

IRI supports Māori macrons at the top (NID) level; for that reason, IRI could potentially provide value for government agency namespace considerations. However, because IRI is so new and remains subject to change, there are few instances of its extended use. URI can allow macrons, in the NSS, but not at the top (NID) level.

In addition, few if any tools support IRI today. Software developers are waiting for the mechanism to stabilise before investing time to support IRIs. While placing IRIs in documents or web pages presents no key issues, IRIs are not a practical replacement for URIs. Protocols that require URIs currently do not accept IRIs, because they cannot distinguish diacritic marks (such as Māori macrons) with characters from those without them.

For these reasons, this proposal does not offer IRI as a legitimate alternative to URI. Instead, it restricts itself to choosing which URI to agree on.³

³ In future, SSC EGU may extend its recommendation to include IRI. This could happen, for example, when IRI is more mature: with a definitive RFC, a clearly defined mechanism for mapping URI to IRI, and support from a majority of XML tools.

6 URI scheme recommendation: URN

This paper recommends that URN enter the e-GIF in 2005 with a status of Under Development, while undergoing a pilot implementation.

6.1 Simple example

Please note that this is a completely contrived example that was developed solely for the sake of clarity.

In XML the names of elements are not fixed. This means it is fairly easy to generate conflicting names. The following example demonstrates how the element called “length” has conflicting meanings:

```
<item>
  <type>Desk</type>
  <length>120</length>
</item>

<item>
  <name>Eat Dinner</name>
  <length>30</length>
</item>
```

In one case “length” refers to the length in physical terms (120 cm), in the other it refers to time (30 minutes).

XML resolves this ambiguity by providing context, using *identifiers* as prefixes. For example:

```
<furniture:item>
  <furniture:type>Desk</furniture:type>
  <furniture:length>120</furniture:length>
</furniture:item>

<time:item>
  <time:name>Eat Dinner</time:name>
  <time:length>30</time:length>
</time:item>
```

The example uses words as identifiers, but they could also be numbers or http addresses. Now the meaning of “length” in each case is now clear: one refers to furniture length and the other to lengths of time. It could be further tiered by defining the length measurement, for example identifying metres, centimetres, hours or minutes.

Each prefix can be linked to an XML schema with a *namespace declaration* (XMLNS) to distinguish, in our example, between different types of “furniture” and “time”. Then following OASIS’s schemas, the “furniture” and “time” data in the document become:

```
<furniture:item xmlns:furniture="urn:oasis:furnitures:furniture1.0/">
  <furniture:type>Desk</furniture:type>
  <furniture:length>120</furniture:length>
</furniture:item>

<time:item xmlns:time="urn:oasis:times:time1.0">
  <time:name>Eat Dinner</time:name>
  <time:length>30</time:length>
</time:item>
```

6.2 URN syntax

This section is based on RFC 2141, available at: <http://www.ietf.org/rfc/rfc2141.txt> and RFC 2396, available at: <http://www.faqs.org/rfcs/rfc2396.html>.

A URN namespace has the following syntax:

```
<urn>="urn:"<Namespace ID>":"<Namespace Specific String>
```

Namespace IDs are case-insensitive and can only be ASCII characters (Māori macrons do not work in the namespace ID).

Conversely, the Namespace Specific String (NSS) can include any Unicode characters, not just ASCII characters. However, these characters must be translated into their hexadecimal values (i.e. Māori becomes M%C4%81ori).

The explanation from RFC 2141 is:

“Depending on the rules governing a namespace, valid identifiers in a namespace might contain characters that are not members of the URN character set [...]. **Such strings MUST be translated into canonical NSS format before using them as protocol elements or otherwise passing them on to other applications.** Translation is done by encoding each character outside the URN character set as a sequence of one to six octets using UTF-8 encoding [5], and the encoding of each of those octets as “%” followed by two [hexadecimal] characters [...].”

This translation must be done, in particular, when documents are exchanged. This is further explained in another excerpt from RFC 2141:

“The URN syntax defines the canonical format for URNs [i.e. URN namespaces] and all URN transport and interchanges **MUST** take place in this format. Further, all URN-aware applications **MUST** offer the option of displaying URNs in this canonical form to allow for direct transcription (for example by cut and paste techniques). Such applications **MAY** support display of URNs in a more human-friendly form and may use a character set that includes characters that aren’t permitted in URN syntax as

defined in this RFC (that is, they may replace %-notation by characters in some extended character set in display to humans).”

In summary, it is possible in a URN namespace to use Māori macrons, but only in the NSS portion.

7 URI schemes for XML namespaces compared

7.1 Overview of the options

URI is a generic mechanism to uniquely identify XML namespaces. There are several types of URI. The table below compares available options, revealing URN as the most appropriate for New Zealand Government.

	Description	Example	Suitability
Private URI scheme	Uses a notional mechanism that is made up for the particular usage of an application.	nz-egov://SSC EGU/xNAL/xNL-basic	Used today in NZ xNAL schema. Advantages: <ul style="list-style-type: none"> flexible. Drawbacks: <ul style="list-style-type: none"> not globally unique few tools available.
URL	Uniform Resource Locator (URL) is the most commonly used type of URI. It is similar to the mechanism used by browsers to retrieve HTML documents on the Internet. For XML namespaces, the URL is simply used to uniquely identify each namespace. It may or may not correspond to an HTML document on the Internet.	http://www.w3.org/TR/REC-html40	Advantages: <ul style="list-style-type: none"> widely used. globally unique. Drawbacks: <ul style="list-style-type: none"> not persistent; domain might change names or move locations on the Internet confuses users and programmers; most people think that URL namespaces must resolve to a document on the Internet includes, and is therefore dependent on, the HTTP protocol.
PURL	Persistent URL (PURL) is a particular form of URL, designed to work around URL drawbacks. Instead of pointing directly to the location of an Internet resource, a PURL namespace points to an intermediate resolution service on the Internet. See http://purl.org/ .	http://purl.org/rss/1.0	Currently being used by the RSS operation. Advantages: <ul style="list-style-type: none"> less confusion more persistent than URL. Drawbacks: <ul style="list-style-type: none"> still dependent on the HTTP protocol depends on the purl.org organisation.

	Description	Example	Suitability
URN	<p>Uniform Resource Name (URN) is a mechanism that assigns a persistent, globally unique name to an XML namespace. In contrast to a URL namespace, a URN namespace has no location dependency and therefore a longer lifetime. See http://www.w3.org/TR/2001/NOTE-uri-clarification-20010921/.</p>	<p>urn:oasis:names:tc:ciq:xsd:schema:xNL:3.0</p>	<p>Advantages:</p> <ul style="list-style-type: none"> • globally unique • persistent • allows Māori macrons. <p>Drawbacks:</p> <ul style="list-style-type: none"> • less used than URL. <p>A good example of URN namespaces can be found within the Government Metadata application, where they are used for uniquely identifying agencies, services and documents. See http://www.e.govt.nz/news/2003091905.asp.</p>

8 URN management

8.1 Registering “nzl” with IANA

In order to fully benefit from URN’s global uniqueness, the SSC EGU proposes to submit the NID “nzl” to the Internet Engineering Task Force (IETF) for acceptance. An international RFC (Request for Comment) is used for this process, using a template provided by the IETF and ultimately published for comment on <http://www.faqs.org/rfcs>. Upon successful completion of the IETF and RFC processes, IANA⁴ will register “nzl” for global use.

The reason for proposing “nzl” rather than “nz” is that the IETF technical requirement calls for a three letter NID. Two letter codes were originally reserved for country registrations but after the passage of a number of years the IETF confirm that there is still no process to submit two letter codes. The IETF have confirmed that to propose a two letter NID would be a lengthy process and not necessarily successful. The SSC EGU believes it is better to register the three letter code and address government agencies’ emerging namespaces issues now than to wait indefinitely for the two letter NID process. If two letter NIDs are subsequently authorised then a mapping and harmonisation exercise will be undertaken to manage the two NIDs.

It is proposed that the NID be “nzl”, New Zealand’s Alpha-3 country code from ISO 3166. Since it is the responsibility of the proposer (in this case the SSC EGU) to define the structure and the management process in the RFC, it is proposed to define NSS in two parts; first, a specific sub-type called an “nz-specifier” (NZS) e.g. “govt”, “mil”, “co”, “com” etc and the second part, a “nz-specifier defined string (NZSDS)”.

Once “nzl” has been accepted the nz specifier, “govt” would be implemented. Following this, other sector nz-specifiers (e.g. “mil”, “com”) could be assigned to other New Zealand organisations who can demonstrate that they have the capability to manage the requested <nz-specifier> and the <nz-specifier defined string>. The SSC EGU will follow the management process proposed to and accepted by the IETF.

8.2 Management of “govt:<nz-specifier defined string>”

Once the registration activities in 8.1 above are complete, the URN namespaces for the NZ Government would be:

urn:nzl:govt:<nz-specifier defined string>
--

The NSS must be centrally managed, in order to ensure that all URN namespaces are unique. It is proposed that the SSC EGU undertake this role for the pilot phase.

⁴ IANA – Internet Assigned Numbers Authority – a function of ICANN (Internet Corporation for Assigned Names and Numbers)

It is recommended that the NZSDS be broken into at least four levels, of which the first three levels are mandatory:

- **Level 1:** contains government “functions”. These functions will be based on the FONZ thesaurus. Examples include “building” and “registering”. Any functions containing a space will have underscores substituted for the spaces.
- **Level 2:** contains government “subjects”. These subjects will be based on the SONZ thesaurus. Examples for level 2 include “motor vehicles” and “passports”. Any subjects containing a space will have underscores substituted for the spaces.
- **Level 3:** contains one of the following: subject (as in level 2), jurisdiction or application name. Examples for jurisdiction include “Upper Hutt City” and “Taupo Fishing District”. Application name examples include “Metalogue” and “Aggregator”.
- **Level 4:** would be optional, but could include one of either: audience or application part name. Examples for audience include “business” and “parents”. Application part name examples include “export” and “news”.
- **Level 5:** contains a version number. As XML schemas evolve, a version number is required to track changes. The version number uses the hyphen character to separate major and minor version numbers. Examples for level 5 include “1-0”, “2-2”.

An example of motor vehicle registration might look like this:

urn:nzl:govt:registering:motor_vehicles:registration:1-0
--

Uniqueness is therefore maintained by adding levels to the hierarchy. These names will be moderated much like govt.nz is for the DNS (Domain Name Server) so that arbitrary entries cannot be made.

All XML schemas that require a unique URN namespace are therefore expected to request an appropriate NSS entry under the “govt” specifier. Requests for NSS entries will be sent to moderator@ssc.govt.nz. [Section 12](#) provides more details on the proposed process to create and maintain URN namespaces.

8.3 New Zealand government URNs – a practical example

To present a further practical usage of URN namespaces, let us assume that all the XML schemas related to registrations would reside in the URN namespace

urn:nzl:govt:registering

If an XML schema for motor vehicle registrations were developed, it would reside in the URN namespace:

urn:nzl:govt:registering:motor_vehicles:registration:1-0

Other examples in this same theme could include:

urn:nzl:govt:registering:dogs:registration:1-0

urn:nzl:govt:registering:firearms:registration:1-0

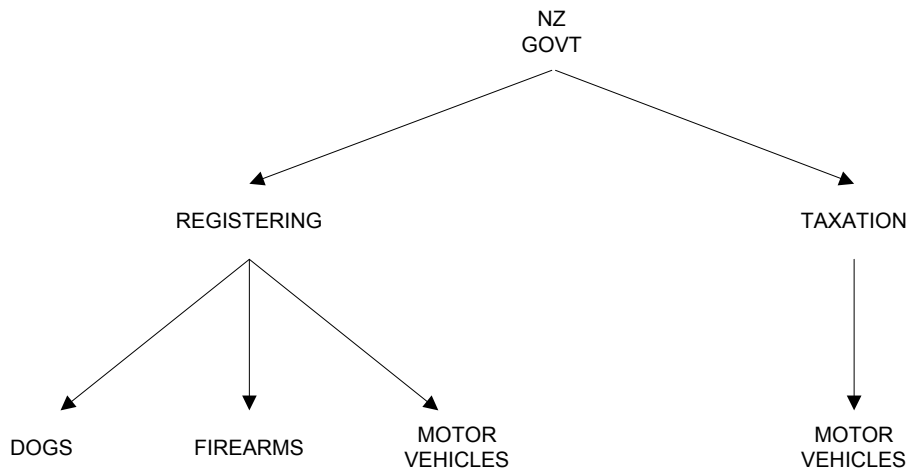
urn:nzl:govt:registering:recreational_fishing:registration:1-0

urn:nzl:govt:registering:recreational_fishing:taupo_fishing_district:1-0

If an XML schema for motor vehicle taxation were subsequently developed, it would reside at the location

urn:nzl:govt:taxation:motor_vehicles:taxation:1-0

Graphically, this complete example could be rendered as:



8.4 Similarity of name values with second level Internet domains

During the pilot implementation, the SSC EGU will establish nz specifiers as they see fit. Any similarity between a nz specifier and a New Zealand second level Internet domain would not necessarily indicate any relationship between them.

9 Rationale for choosing URN

The prime considerations for the common naming strategy are outlined below.

9.1 Globally unique

The NID “nzl” is New Zealand’s Alpha-3 country code from ISO 3166. IETF-approved processes for assigning other second and subsequent names ensure uniqueness.

9.2 Persistent naming

URN is very persistent, because it does not depend on Internet domain names or other Internet protocols such as HTTP.

9.3 Widely used

URN is a widely used standard, adopted by large organisations such as OASIS and xml.org. This support ensures that tools are available to work with XML documents that define namespaces using URN.

9.4 Work with Māori macrons

URN can work with Māori macrons (in its NSS portion).

9.5 Easy to understand, easy to use

URL is quite confusing to users and programmers alike, because most people think that a URL namespace must be a valid URL on the Internet. In contrast, URN clearly distances itself from the Internet format and is therefore easier to understand and use.

9.6 Based on existing NZ Government thesauri

This proposal bases URN namespaces on the FONZ and SONZ thesauri. This means that many useful and already defined terms will be put to good use.

9.7 Dependence on other standards

To be useful, URN depends completely on XML itself. It is also partly dependent on consistent use of CVLs for tagging schema-fragment elements.

9.8 Fit with other standards

The choice of URN for XML namespaces takes into account the development of other naming standards in New Zealand. See [Section 10](#) for details of compatibility with other e-GIF standards.

Public consultation is encouraged to expose further issues and other potential interfaces of which the authors may not be aware.

10 Assessment of URN against e-GIF criteria

The following table assesses URN against e-GIF criteria for adoption of standards into the e-GIF.

Compatibility	
Compatible with existing e-GIF standards.	<p>URN is not a data standard in the strict sense of the word; however, an approach consistent with adoption of a standard is critical in data exchange.</p> <p>URN is compatible with:</p> <ul style="list-style-type: none"> • the mandated Unicode UTF-8, as the primary character set to handle 2-bit character sets such as Māori macrons • the mandated XML 1.0 standard for structured data • the mandated XSLT standard for data transformation. <p>URN namespaces should be taken from the NZGLS thesauri in Metalogue to keep descriptions consistent with that standard, its SONZ and FONZ terms and future CVLs.</p> <p>URN namespaces can be used by xNAL and other XML schemas.</p> <p>URN appears to be adopted by the NZ GMS, though a detailed study has not been undertaken. The Emergency Services Addressing (ESA) standard is currently modelled in UML. Once in schema, ESA should ideally adopt URN for its unique identifier.</p>
Consistent with private sector and international directions in interoperability.	Yes; it is supported by OASIS, W3C, IETF and XML.org amongst others.
Open – i.e. non-proprietary, available without restriction.	Yes.
In a technology area that is stable enough to permit standardisation.	Yes; XML data Exchange
Business need	
The agency and collective needs that this addresses need to be clearly stated.	The need is for a consistent way of describing the context of the schema elements and attributes in data exchange.

Functionality – the proposed standard must be:	
Shown to meet the business needs.	URN meets the business need. There will need to be best-practice guidelines and a URN namespace-management system in place before it can be fully used.
Preferably pre-existing – a need for a new standard will need to be justified.	Uses international XML 1.0.
Demonstrable, preferably with implementations from multiple sources. (Where the standard was created by an e-GIF Working Group, the group must show why it believes the standard can be implemented. This may involve building a proof of concept.)	Used overseas. Successful take-up in NZ will require development of best-practice guidelines and a network-accessible URN namespace management-and-resolution system. This proposal includes the intention to form a Working Group to oversee the development and implementation of a management-and-resolution system.
Shown to be properly engineered for security.	N/A; URN is a data standard with no known security threats. RFC 2396 Section 7 provides guidance on potential issues surrounding URLs, which also in part could be attributed to URNs.

Impact and Risks	
<p>The impact of implementing the standard must be analysed. The cost of this must not exceed the all-of-government benefits identified.</p>	<p>The costs of implementing this standard are:</p> <ul style="list-style-type: none"> • Moving existing XML schemas and documents to the new standard. e-GIF standards are not retrospective, but interoperability will be achieved more rapidly if key re-usable schema are aligned with the URN convention. Since alignment is not always possible, the SSC EGU, in conjunction with the agencies concerned, will develop mappings to URNs from existing agency namespaces. • Management of URN namespaces. The SSC EGU uses InternetNZ's registry application, a customised version of an open-source application, to manage the .govt domain. The SSC EGU expects to develop a similar application from the same source for the pilot. <p>The benefits are:</p> <ul style="list-style-type: none"> • Immediate exchange. Any body supporting the new standard, government agencies and private sector, will more seamlessly exchange XML documents. • Reduce redundancy. Because XML schemas will be registered centrally as a URN namespace, different agencies are less likely to develop the same schemas. • Encourage cooperation. Having unified URN namespaces will encourage agencies to use existing XML schemas. xNAL, for instance, would be exposed to all agencies through a unique URN namespace, increasing its potential reusability by all.

Impact and Risks (cont.)	
<p>Risks of implementing the standard must be analysed and presented with likelihood, impact and any mitigations.</p>	<p>Risks are:</p> <ul style="list-style-type: none"> • Conflicts with international standards. Existing schemas in use by agencies may already have namespaces defined using a format provided by an international standards body. If a new schema is defined using the proposed New Zealand standard, there will be a conflict. The impact would be wasted resources and redundant work. <p>This risk is mitigated during the process of giving an XML schema a new unique URN namespace. Possible solutions include:</p> <ul style="list-style-type: none"> • keeping the international namespace format • mapping the international namespace format to the New Zealand namespace format • encapsulating the international format into the New Zealand namespace format. <ul style="list-style-type: none"> • Existing XML schemas and documents do not get updated. There is a likely risk that agency programmers and users do not update their existing XML schemas and documents. To mitigate this risk, guidelines and a mapping programme will be developed that outline easy migration paths to the new standard for existing XML schemas residing in agency repositories.
<p>The impact and risks of not proceeding should also be shown.</p>	<p>Continuation of the existing situation will render any efforts to define an XML namespace standard almost futile, because the cost of moving to a newly defined standard will increase with every non-standard XML schema or document produced.</p>

11 Deliverables required

If the e-GIF Management Committee approves the URN standard, and it enters the e-GIF with status Under Development, the SSC EGU will need resources and funds to:

- establish and support the URN Working Group
- develop and publish the process for assigning and managing URN namespaces with open-source registry tools and SSC EGU-development resources
- refine the draft URN-namespace syntax proposed for government namespace declarations, based on experience from the pilot implementation
- develop and publish guidelines on best practice for using URN namespaces
- review agencies' existing XML schemas, including xNAL, RSS, NZ GMS, and ESA; and develop and publish guidelines for mapping them to the proposed NZGLS-based URN convention, noting especially those existing schemas that could be significantly re-used by various agencies.

12 Proposed process for namespace registry, resolution and maintenance

Agencies need guidelines, registry management and a resolution system to establish and operate an XML-namespace process.

For the pilot implementation phase, this paper proposes that the SSC EGU be responsible:

- for the “govt” name – establishing a registry service that uses open-source registry applications and existing quality-assurance and maintenance processes
- for “govt” and other second-level names – supervising namespace management via a network-accessible server and registry for resolving URN namespaces in New Zealand (while possible to resolve internationally, most access will be from New Zealand Government and other agencies).

Developers should request appropriate NZS and NSS entries for all XML schemas needing unique namespaces. The SSC EGU will manage the “govt” NZS and assign additional specifiers as requested by other New Zealand organisations. To ensure interoperability during the pilot phase, all requests for XML namespaces must be subject to SSC EGU moderation, regardless of the NZS involved. In later phases, it may be appropriate to adopt a more collegial approach to moderation, whereby experienced moderators establish and operate under mutually agreed moderation and governance rules.

SSC EGU expects initial demand for namespace-related services to come mainly from government agencies. Once the pilot phase is established and operational, the SSC EGU will review the appropriateness of its continued direct involvement. They may consider transferring or outsourcing namespace management to an organisation with the appropriate infrastructure and capability to manage international internet-related registers to a broad community. As part of the background research for this paper, SSC EGU approached InternetNZ, who indicated that its affiliate organisations may be interested in operating a registry for names in future.

13 References

13.1 Standards

XML 1.0

<http://www.w3.org/TR/REC-xml>

XML Namespaces

<http://www.w3.org/TR/REC-xml-names>

Uniform Resource Identifiers (URI): Generic Syntax

<http://www.ietf.org/rfc/rfc2396.txt>

URN Syntax (RFC 2141)

<http://www.ietf.org/rfc/rfc2141.txt>

NZGLS

<http://www.e-government.govt.nz/nzgls/>

13.2 References

URIs, URLs, and URNs: Clarifications and Recommendations

Report from the joint W3C/IETF URI Planning Interest Group (Latest version)

<http://www.w3.org/TR/uri-clarification>

URN Namespace for OASIS

<http://www.faqs.org/rfcs/rfc3121.html>

The official list of registered URN namespaces maintained by IANA

<http://www.iana.org/assignments/urn-namespaces>

IRI Namespace

<http://www.w3.org/International/O-URL-and-ident.html>

<http://www.w3.org/International/iri-edit/>

XML Namespace Identifier Guidelines for NZ e-Gov – initial Discussion Draft, Max Voskob, MSI Business Solutions Ltd (MSI), 27th March 2003. SSC Document no: 303282.

Office of the eEnvoy, Cabinet Office, UK, Technical Standards Catalogue Version 6.0, 30th April 2004

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Appendix A: Draft URN namespace semantics

A1 Introduction

Purpose

The main body of this document proposes a common convention for uniquely identifying XML namespaces. The proposal discusses why this is important and outlines a possible way of creating a hierarchical structure based on NZGLS, in particular FONZ and SONZ.

This appendix proposes a method to create and assign new identifiers in the proposed hierarchy, using NZGLS terms.

Scope

This appendix focuses on the “govt” specifier of the NZL URN namespace. Other specifiers such as “com” or “mil” are not covered in this document. However, there is no reason that these specifiers could not adopt part or all of the syntax proposed here for their parts of the NZL namespace.

Audience

This proposal is primarily directed to Chief Information Officers, IT Managers, IT Strategists, Enterprise and Solution Architects and developers complying with e-GIF. This document discusses a technical subject and some understanding of XML is required.

It is assumed that the reader has read the main body of this proposal document (“URN – A Unique/UniformResource Identifier naming convention and scheme for XML namespaces”). Because this appendix makes frequent reference to NZGLS, SONZ and FONZ, it is recommended that the reader has a passing familiarity with NZGLS (see <http://www.e.govt.nz/nzxls/>).

A2 The syntax

Overview

A URN namespace has the following syntax:

```
<urn>="urn:"<Namespace ID>":"<Namespace Specific String>
```

Earlier versions of this proposal specified that the NSS (Namespace Specific String) would be broken into three levels: function, subject/noun and version. This led to URNs of the form:

urn:nzl:govt:registering:motor_vehicles:1-0

On initial inspection, this would seem sufficient for most needs. However, for example, this does not allow more than one motor vehicle registration XML namespace, nor similar functional namespaces from other agencies or organisations.

There are two possible solutions:

- allow arbitrarily long sequences of subjects (or nouns)
- allow more flexibility after the second level.

The first solution is not suitable because our list of subjects or nouns is finite, not built to accommodate increasing precision of terms (from broad to specific). We have therefore devised a syntax that allows more flexibility after the second level. The syntax emphasises the use of controlled lists, but will also allow “free text” as required, since NZGLS term lists do not include all potential values.

Guiding principles

The guiding principles involved in the design of the URN-namespace syntax are:

- All names should be human readable.
- Terms to build names should be from controlled lists when possible to avoid an uncontrolled hierarchy.
- Names must be unique.
- Construction of names needs to be flexible and extensible.

Syntax in detail

This section details the syntax developed. A later section outlines examples.

```
nzl:govt:<function>:<noun>:<noun/jurisdiction/text>:[<audience/text>:]<version>
```

Where:

<function> is a mandatory term.

<noun/text> is a mandatory term choice (choose one of the terms).

[<text>] is an optional term.

While all terms in the URN should be lowercase, no distinction will be made in URNs between lower and uppercase. The colon character is only used for separating terms. All spaces should be replaced with underscores.

Function

The function is always taken from the second level of FONZ. The first level is too generic and the third level too specific. FONZ terms are copied exactly as published. All spaces are replaced by underscores. For example:

- Building
- Providing_access_to_information
- Registering

For a complete list of FONZ terms, see [section A5](#) of this document.

Noun (also known as Subject)

Nouns are always taken directly from SONZ, using the preferred terms (those referenced as “USE”). For example:

- Cars
- Houses
- Passports
- Visas

For a complete list of SONZ terms, see <http://www.e.govt.nz/nzxls/thesauri/>.

Jurisdiction

The jurisdiction is always taken from NZGLS territorial and regional authority lists. All spaces are replaced by underscores. For example:

- Upper_Hutt_City
- Taupo_Fishing_District

For a complete jurisdiction list, see Appendix 6 of the NZGLS Usage Guide (<http://www.e.govt.nz/docs/usage-guide-2-1/>).

Audience

The audience is always taken from the NZGLS audience list. All spaces are replaced by underscores. For example:

- Business
- Migrants
- Parents

For the complete audience list, see Appendix 4 of the NZGLS Usage Guide (<http://www.e.govt.nz/docs/usage-guide-2-1/>).

Text

Text can consist of any string made up of the characters a-z (lowercase), 0-9 and underscore. Text is typically used for application and application-part names. For example:

- export
- student_loan_application
- metalogue

Version

The version is always a sequence of numbers, with hyphens separating major and minor versions. To avoid confusion, full stops are not used, since they frequently indicate other meanings. For example:

- 4
- 1-0
- 1-2-34
- 5-119

A3 Examples of New Zealand Government XML namespaces

Example 1

A vehicle registration form provided by the Land Transport Safety Association (LTSA) could have this XML-namespace declaration:

```
urn:nzl:govt:registering:motor_vehicles:registration:1-0
```

The “registering” and “motor_vehicles” terms are taken from FONZ and SONZ respectively. The “registration” term is free text representing the function of the namespace.

If the LTSA decided to have two different namespace declarations for vehicle registrations, they could differentiate them using the (optional) *audience* term, for example:

```
urn:nzl:govt:registering:motor_vehicles:registration:all:1-3
```

```
urn:nzl:govt:registering:motor_vehicles:registration:business:1-0
```

Example 2

If two agencies require the same namespace, they can be distinguished using the *function* of the namespace as free text, for example:

urn:nzl:govt:subsidising_individual_and_family_income:student_loans:application:1-0

urn:nzl:govt:subsidising_individual_and_family_income:student_loans:payment:1-0

Example 3

Registrations in different areas can be distinguished using terms from NZGLS territorial and regional authority lists, such as “taupo_fishing_district”, for example:

urn:nzl:govt:registering:recreational_fishing:taupo_fishing_district:1-0

Example 4

This example uses *two free text strings*, the first to specify an *application* name “metalogue”, and the second to specify an *application component*:

urn:nzl:govt:providing_access_to_information:databases:metalogue:export:2-0

urn:nzl:govt:providing_access_to_information:databases:metalogue:cvl:2-1

A4 References

The latest NZGLS specification can be found here:

<http://www.e.govt.nz/docs/element-set-21/>

The latest NZGLS usage guide can be found here:

<http://www.e.govt.nz/docs/usage-guide-2-1/>

The usage guide contains copies of all the controlled lists used in this document.

The FONZ and SONZ terms can be found here:

<http://www.e.govt.nz/nzgl/thesauri/>

A5 FONZ Terms

This section contains a list of all the appropriate FONZ second-level terms.

Corporate management
Ensuring accountability
Implementing Treaty of Waitangi
Managing public finances
Providing secretariat
Running commercial enterprises
Structuring government
Subsidising businesses
Subsidising communities
Subsidising individual and family income
Accrediting
Authenticating documents
Granting consents
Registering
Conducting military operations
Developing international military relations
Intelligence gathering
Maintaining military readiness
Educating
Facilitating business development
Facilitating community development
Optimising employment
Promoting participation in society
Holding official ceremonies
Honouring individuals
Promoting participation in cultural and leisure activities
Providing amenities for cultural and leisure activities
Providing funding for cultural and leisure activities
Analysing information
Collecting information
Maintaining information
Providing access to information
Researching
Consulting on policy
Creating draft policy
Evaluating policy
Exploring policy options
Finalising policy
Planning for policy implementation
Border control
Conserving the environment
Controlling unwanted organisms
Ensuring personal health
Ensuring public safety
Granting citizenship
Managing consumption of resources
Protecting business
Protecting heritage
Providing protective care for the vulnerable
Providing public health services
Providing records of personal identity
Building
Decommissioning infrastructure
Establishing infrastructure systems
Establishing monetary control mechanisms
Identifying locations

Maintaining infrastructure systems
 Interest group advocacy
 Maintaining electoral process
 Representing constituents
 Representing New Zealand internationally
 Developing delegated legislation
 Developing service delivery procedures
 Legislating in Parliament
 Reviewing rules
 Enforcing legal sanctions and remedies
 Ensuring compliance
 Interpreting the law
 Monitoring compliance

A6 Example: URN with xNAL

```

<?xml version="1.0" encoding="UTF-8" ?>
<xNAL:xNAL xmlns:xAL="nz-egov://egu/xNAL/xAL?
version=3.0;release=20030512"
xmlns:xNLb="nz-egov://egu/xNAL/xNL-basic?version=3.0;release=20030512"
xmlns:xNL="nz-egov://egu/xNAL/xNL?version=3.0;release=20030512"
xmlns:xNAL="nz-egov://egu/xNAL/xNAL?version=3.0;release=20030512"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="nz-
egov://egu/xNAL/xNAL?version=3.0; release=20030512 nz-xNAL3.0.xsd">
  : <xNAL:Record>
    : <xNL:NameDetails>
      : <xNL:PersonName>
        <xNLb:FirstName>John</xNLb:FirstName>
        <xNLb:LastName>Doe</xNLb:LastName>
      </xNL:PersonName>
    </xNL:NameDetails>
    : <xAL:AddressDetails>
      : <xAL:Country>
        <xAL:Name>New Zealand</xAL:Name>
      </xAL:Country>
      : <xAL:Locality>
        <xAL:Name>Wellington</xAL:Name>
        : <xAL:DependentLocality Type="Suburb">
          <xAL:Name>Thorndon</xAL:Name>
        </xAL:DependentLocality>
      </xAL:Locality>
      : <xAL:Thoroughfare>
        <xAL:Name>Molesworth</xAL:Name>
        : <xAL:Number>
          <xAL:Number>100</xAL:Number>
        </xAL:Number>
        <xAL:TrailingType>Street</xAL:TrailingType>
      </xAL:Thoroughfare>
    </xAL:AddressDetails>
  </xNAL:Record>
</xNAL:xNAL>
  
```

A7 Example: URN with NZGLS

```
<?xml version="1.0" encoding="UTF-8"?>
<nzxls xmlns="urn:nzl:govt:ls:1.0">
  <record>
    <title>
    <creator>
    <function>
    <Subject>
    <type>
  </record>
</nzxls>
```

Appendix B: How other jurisdictions manage URIs.

B1 The United Kingdom

The UK has categorised all popular schemes (private URI scheme, URL, PURL, URN) as “Recommended” in the latest UK e-GIF Technical Standards Catalogue V6.1, published 11 November 2004. This is because their remit extends beyond Government and into private enterprise interfacing with government; and pragmatically, any community exchanging data can use any of the namespace options, provided that use remains consistent.

B2 Australia

Currently Australia does not specify namespace, as the following email explains:

“The current Australian Government Interoperability Technical Framework does not include any Namespace standards or guidelines. You are probably well aware of the W3C recommendations in this respect, so I am not going to refer you to those.

We are currently undertaking a review and update of the Framework and considering including a naming category covering such standards as URI, URN, URL, OID, GUID, RFID, ISBN and others. In addition, AGIMO is also coordinating activities of another interoperability group - the Information Interoperability Working Group - which may also look into this range of standards.

There's also been some sector-specific activity in this area which we will be researching in more detail while developing the Australian Government interoperability frameworks under the auspices of the two working groups.....

[name removed by author]
Senior Project Officer, Interoperability
Australian Government Information Management Office”

However, the National Archives of Australia <http://www.naa.gov.au> is prescribing URL. The results are shown in the following link:

<http://www.naa.gov.au/search/indexsearch.asp?SearchString=xml+namespace§ion=All&PageSize=10&MaxRecords=100&htm=yes&doc=yes&pdf=yes&SUBMIT=Search>

B3 Canada

The Government of Canada (GoC) is grappling with the issue as well. From the following email quote it appears they are at a similar point to the Australians in regard to XML namespaces.

“We recently commissioned a paper on XML Namespace Management in the GoC. Among the recommendations in the paper were, the GoC consider using URLs for Namespace identifiers and using a “Federated Namespace Model” for its XML artifacts. I would be very interested in your work with the OASIS xNAL and how you are considering using URNs. We also face a short-term challenge in that we have a requirement for Namespaces associated with GoC metadata application profiles and other XML artifacts.

Among the Namespace issues we are investigating are Naming Authorities, Naming Conventions (human and machine readable – URIs being the predominant standard) and persistence commitments for information objects in GoC Namespaces.”

[name removed by author]
Government of Canada
May 2004

B4 USA

In August 2003, at the request of the General Services Administration (GSA), the Logistics Management Institute (LMI) undertook a study of the alternative naming conventions and schemes for use by the US government. They concluded that URNs were “the preferred solution”.

The SSC EGU is not aware of any URN NID Request for Comment or application from the USA at the time of writing this paper. The study can be found at:
http://xml.gov/documents/completed/lmi/GS301L1_namespace.pdf