



Unique Object Identifiers

Technical Guide



Document Content

Jonathan Simmons is responsible for the content of this document.

Change record of this document

Version	Date	Summary of change
1.0	June 2006	First Release
1.1	November 2007	Minor changes to terminology and layout

Content

This document consists of 12 pages

Location of this document

This document can be located at:

<http://www.dnf.org/Pages/technical%20guidance/technicalguides.asp>

Approval for issue

Version 1.0 approved by the DNF Expert Group.

Minor changes to Version 1.1 approved by Chair of DNF Expert Group

This publication

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Foreword

The Digital National Framework (DNF) is an industry standard for integrating and sharing business and geographic information from multiple sources. It is being developed for use within the United Kingdom although concepts and principles could be applied elsewhere. It aims to be: (i) definitive by using a detailed and maintained topographic reference base, (ii) inclusive by being open and adopting industry best practice, (iii) structured and formalised to the extent that data once created can be shared and used many times, (iv) reliable through the delivery of data integrity, (v) cost-effective through reduction in the costs of data from multiple sources and (vi) flexible by enabling information exchange.

The basic principles at the core of DNF are as follows:

- ~ The concept and methods shall be driven by the strategic needs of the wider geographic information (GI) community and the needs of the information industry;
- ~ Data should be collected only once and then re-used;
- ~ Base reference data should be captured at the highest resolution whenever economically possible;
- ~ Information following capture may, where appropriate, be used to meet analysis and multi-resolution publishing requirements;
- ~ DNF will incorporate and adopt existing *de facto* and *de jure* standards, wherever they are proven and robust.

DNF is being developed and promoted by an industry body with membership drawn from data providers, system vendors and integrators and users. Both the commercial and government sectors within Great Britain are represented. All members have a common interest in the integration, sharing and utilisation of geographic information. Direction and strategy comes from an Expert Group. This in turn oversees and approves the work of a Technical Group responsible for the development of all technical documentation including this document.

This document is one of a series of technical documents being developed in support of DNF. Included in the series are data models, technical guides, guidelines, best practice, examples and case studies. Web-based services such as identifier registration are also being developed in support of this documentation.



Of increasing significance to DNF is INSPIRE the European Union (EU) initiative for the creation of a European spatial information infrastructure. This will lead to the provision of integrated spatial information services and will allow users to identify and access spatial or geographical information from a wide range of sources from local to European-wide. There is much commonality between the objectives of DNF and those needed by UK to support INSPIRE. DNF has registered as a Spatial Data Interest Community (SDIC) and is participating fully in the review of INSPIRE documents. Conversely, DNF is ensuring that there is harmonisation between its documents and those of INSPIRE.

For more information on the Digital National Framework visit <http://www.dnf.org> .

If you have any comments or suggestions on this document, please e-mail contact@dnf.org , your response will be acknowledged.



1 Introduction

1.1 Purpose of the document

This document is intended to outline the fundamentals of dealing with nationally unique identifiers within the Digital National Framework (DNF) and to provide both rules and recommendations for their use, storage and allocation.

2 Scope

This Technical Guide is applicable to those organisations creating, maintaining or owning geographic data which they may wish to use or have used in the context of DNF. In general this data should relate to, or reference, specific objects or features in the real world which can be uniquely identified e.g. properties, delivery points, land parcels, streets or stream sections.

This guidance is for use by any organisation wishing to conform to the principles of DNF and requiring that their data can be shared and used by other DNF adopters. This document provides guidance on the structure and assignment of the unique identifier to DNF Reference Objects and DNF Application Reference Objects. The structure of a unique object identifier based on an organisation prefix and local identifier are described. Use and registration of an organisation prefix and the rules relating to organisational change are defined.

3 Definition of terms

3.1 Terms

The following terms, arranged in alphabetical order, are used in this document. Where definitions include terms defined elsewhere then these terms are shown in *italics*.

See <http://www.dnf.org/Pages/technical%20guidance/terminology.asp> for a full and up-to-date list of terms used in the Digital National Framework.

3.1.1 Application Reference Object

Geographic Object which is referenced by a *Business Object* in an application. The Application Reference Object can refer to one to many *DNF Reference Objects*

NOTE Class or instance depends on the context, assume class unless otherwise stated



EXAMPLE An area of designated access land, the extent of a National Trust property, Basic Land and Property Unit (BLPU) in a land & property gazetteer; a street in a highways maintenance application; an Output Area used in census analysis; a land title extent in a Land Registry database.

3.1.2 Business Object

Object which is processed by an application and needs to be located relative to a *Geographic Object*

NOTE Business is used a wide sense here to relate to any data and objects which are non-geographic. It is not specific to commercial data and can relate to any data such as environmental data that needs to be located

EXAMPLE Planning application referenced to a land parcel, census record referenced to a house, ecological record referenced to a Site of Special Scientific Interest

3.1.3 DNF Reference Base

Base framework of reference made up of *DNF Reference Objects* to which *Application Reference Objects* are associated

NOTE Over land the DNF Reference Objects would normally provide complete coverage

3.1.4 DNF Reference Object

Geographic Object that forms part of the *DNF Reference Base* which may be referenced by other objects

NOTE Currently, DNF Reference Objects are derived from a subset of OS MasterMap feature types but as DNF usage expands they will also be derived from other authoritative sources

3.1.5 Geographic Object

Abstraction or application view of a real world object which has a fixed and identifiable location on the Earth's surface

EXAMPLE Building, street, land parcel

NOTE 1 Typically represented in data by points, lines or areas

NOTE 2 Geographic Object is used in preference to *Feature* in DNF except in reference to data classification and feature cataloguing where the term "feature" is widely adopted

NOTE 3 Geographic Object is equivalent to "Spatial Object" in INSPIRE. However, "Spatial Object" in the ISO standards refers to an "object used for representing a spatial characteristic of a feature" e.g. a geometric or topological object.



3.2 Abbreviations

DNF Digital National Framework

4 Background

Unique identifiers are the basis of all object referencing in the Digital National Framework. Every geographic object that is created must be assigned a unique identifier that will persist throughout its lifecycle. In order to achieve this uniqueness and consistency at a national level, this paper outlines required aspects and recommended approaches to structuring and allocating these IDs.

For further information on the Digital National Framework, please visit the website at <http://www.dnf.org>

5 The structure of a DNF unique identifier

Unique identifiers used in the context of the Digital National Framework should be formed in the following way:

<organisation prefix><local identifier>

The resulting identifier is a character string, formed by concatenating the two constituent parts. The table below summarises the meaning of these two components.

<organisation prefix>	A four-character, lower-case code identifying the organisation that created the identifier.
<local identifier>	An alpha-numeric identifier, allocated by and guaranteed to be, unique within the organisation identified by the prefix.

5.1 Organisation prefix

The organisation prefix part of the unique identifier is a mechanism for ensuring that different organisations do not generate identical codes. Each data-creating organisation should register a four-character code in the DNF registry (which can be found at <http://www.dnf.org/Pages/registry/>). This is an online registration service which maps organisation names against 4-character prefixes.



An organisation prefix must be:

- Exactly four characters in length
- Purely composed of lower-case alpha characters (a-z)
- Unique to a particular organisation.

The four characters used may or may not be chosen to be recognisable as representing a particular organisation. For example, “osgb” is used by Ordnance Survey (Great Britain). However, this is very much analogous to the use of personalised car registration plates: a prefix of “aaaa” would be equally valid provided that it is correctly registered to an organisation, even though it does not visually convey any meaning.

In cases where organisations change, either in name or in structure, the following rules apply:

- In the case of a name change, the organisation may choose to register a new prefix. However, any identifiers previously created must retain the original prefix. Alternatively, the organisation may simply continue to use the original prefix.
- If the organisation splits into two or more child organisations, these new bodies should each register new prefixes. However, any unique identifiers created by the parent organisation must retain the original prefix.
- If an organisation merges with another which has registered a different prefix, the existing unique identifiers must retain their existing prefixes. The new, larger organisation may then decide either to continue using one of the existing prefixes, or should register a new prefix and use this for the creation of new IDs.

5.2 Local identifiers

The identifier portion of the unique ID can be allocated in any way that is convenient to the organisation in question, provided that it is unique within that organisation. Existing identifiers can be converted to DNF identifiers simply through adding a registered organisation prefix.

For new datasets, it is recommended for the sake of consistency that identifiers should be a numeric value formatted as a fixed-length character string (with leading zeros inserted where required).

6 Recommendations for identifier allocation

While this paper does not seek to propose any allocation mechanism in particular, the following rules can be implemented where a simple solution to unique identifier allocation is required.



1. Use a numeric value for the <local identifier> part of the DNF Identifier.
2. Permanently maintain a record of the last allocated numeric value.
3. When a new identifier is required, read the stored value, increment it by one and use the result as the next <local identifier> value. Update the stored value.
4. Construct the DNF identifier by concatenating the relevant <organisation prefix>, and a string representation of the numeric <local identifier> value.

The fundamental rule for allocating unique identifiers is that **the same value must never be allocated more than once**.

6.1 Identifier lifecycle and versioning

In order for a unique identifier to remain meaningful, it must persist throughout the lifecycle of the object it refers to. There are two main events in the lifecycle of an object:

- Creation – when the object comes into being: a new unique identifier is allocated.
- Deletion – when the object ceases to exist. The identifier is never reused.

In addition to creation and deletion, objects can go through a number of changes in their lifetime while still retaining the same identity. An example of this could be a house which is built, extended at a later date, and then modified once again before finally being demolished. In this case, the house is allocated a unique identifier when it is built, retains it throughout the modifications before finally being deleted (demolished). Different stages in the lifecycle of an object can be identified through the use of a version number which starts at 1 when the object is first created and is incremented each time a change is applied.

Different organisations may use different rules for determining whether a real-world change is reflected in data by the deletion or versioning of an object, and these lifecycle rules should be made available to facilitate data sharing.

6.2 Sub-dividing local identifiers

Sometimes for internal purposes within an organisation, it may be beneficial to add further structure to the <local identifier> component. This may be necessary, for example, if the maintenance of multiple datasets in multiple departments requires the use of different, disconnected systems.

While out of scope for this paper, the use of numeric ranges or additional department/dataset/layer prefixes within an organisation's <local identifier> are all acceptable, and indeed desirable approaches to data management that are consistent with the Digital National Framework.



7 More Information

Further information is available on the DNF website (www.dnf.org). For more specific queries, please send an email to contact@dnf.org.