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***Consultative
Committee for
Space Data Systems***

**REPORT CONCERNING INFORMATION
INTERCHANGE PROCESSES**

**UNIQUE IDENTIFICATION
OF CCSDS OBJECTS
AND SERVICES**

CCSDS A31.0-G-1

GREEN BOOK

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FOREWORD

This Report defines the highest-level CCSDS identifiers available to distinguish among types of CCSDS-defined objects and services at the CCSDS level, and it describes how to construct unique identifiers in the larger context of International Organization for Standardization (ISO) and International Telegraph and Telephone Consultative Committee (CCITT) identifiers.

This document serves as a resource for CCSDS Panel members as they develop Recommendations which specify or use unique identifiers.

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- Canadian Space Agency (CSA)/Canada.
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1 INTRODUCTION

1.1 PURPOSE AND SCOPE

This Report describes the identifiers available to distinguish among types of CCSDS-defined objects and services at the Consultative Committee for Space Data Systems CCSDS level, as well as in the larger context of International Organization for Standardization (ISO) and International Telegraph and Telephone Consultative Committee (CCITT) identifiers. It does not provide identifiers for specific objects and services, as these will be found in other CCSDS Recommendations or are assigned by other CCSDS services.

This document serves as a resource for CCSDS Panel members as they develop Recommendations which specify or use unique identifiers. It enables identifiers for specific CCSDS objects or services to be recognized as unique in a broader context, up to and including the general context of ISO and CCITT identifiers.

1.2 DOCUMENT STRUCTURE

Section 2 defines the identifiers that may be used to construct unambiguous identification within various contexts. Section 3 provides a recommended syntax for identifier exchange when no other syntax is preferred.

1.3 TERMINOLOGY

1.3.1 ACRONYMS

ADID - Authority and Description Identifier

CCITT - International Telegraph and Telephone Consultative Committee

CCSDS - Consultative Committee for Space Data Systems

ICD - International Code Designator

ID - Identifier

IEC - International Electrotechnical Commission

ISO - International Organization for Standardization

JTC1 - Joint Technical Committee One

OI - Organization Identifier

SC - Subcommittee

1.3.2 DEFINITIONS

Identifier: A character or group of characters constituting a value which is used to distinguish one entity from another. (Adapted from ISO 6523.)

Name Space: A set of unique values which serve as identifiers for a corresponding set of entities.

1.4 REFERENCES

The following documents are referenced in this Report. At the time of publication, the editions indicated were valid. All documents are subject to revision, and users of this Report are encouraged to investigate the possibility of applying the most recent editions of the documents indicated below. The CCSDS Secretariat maintains a register of currently valid CCSDS Reports and Recommendations.

- [1] *Procedures Manual for the Consultative Committee for Space Data Systems*, CCSDS A00.0-Y-6. Yellow Book. Issue 6. Washington, D.C.: CCSDS, May 1994.
- [2] *Standard Formatted Data Units—Control Authority Procedures. Recommendation for Space Data System Standards*, CCSDS 630.0-B-1. Blue Book. Issue 1. Washington, DC.: CCSDS, June 1993.
- [3] *Standard Formatted Data Units—Structure and Construction Rules*, CCSDS 620.0-B-2, Blue Book. Issue 2, November 1996.
- [4] *Space Link Extension—Service Management Specification*. CCSDS 910.5-R-1, Red Book. Issue 1. December 1999.
- [5] *ISO/IEC 6523-1:1998 Information technology—Structure for the identification of organizations and organization parts—Part 1: Identification of organization identification schemes*, 1998.
- [6] *ISO/IEC 8824-1:1998 Information technology—Abstract Syntax Notation One (ASN.1): Specification of basic notation*, 1998.

2 UNIQUE IDENTIFIERS

In the development of CCSDS Recommendations, it is sometimes necessary to define specific identifiers for CCSDS objects or services, or to define mechanisms by which such identifiers are assigned. These identifiers are unique within the specified Name Space. For example, the CCSDS Control Authority Procedures Recommendation (reference [1]) establishes a mechanism by which a set of distributed Control Authority Offices assign identifiers, called Authority and Description Identifiers (ADIDs), to descriptions of data. Each description is uniquely identified by its ADID within the Name Space of CCSDS Control Authority ADIDs.

When information containing identifiers is exchanged between two entities, it is necessary that they share the same understanding of the Name Space so that the identifiers remain unambiguous. For example, the CCSDS Standard Formatted Data Units Recommendation (reference [3]) defines a 20-byte label which contains a CCSDS ADID. Any entity which receives a 20-byte label, and knows how to parse it, will by definition have an understanding of the ADID Name Space. It will not expect to find ambiguous identifiers in the ADID field unless a mistake has been made by the sending entity.

It can happen that two or more Name Spaces need to be combined. This can occur, for example, with the definition of a service that provides identifiers from multiple Name Spaces. In this case a more globally unique identifier may be desired. This is typically constructed by hierarchically combining the Name Spaces, and then hierarchically combining the associated identifiers to construct a more global identifier. One way to express this more global identifier is to separate the individual identifiers using the 'period' as shown in the example of figure 2-1.

x.y

where:
'x' is an identifier from Name Space 1
'y' is an identifier from Name Space 2.

Figure 2-1: Example of a Global Identifier Constructed from Two Name Spaces

It is not necessary to explicitly identify, for transfer and unambiguous usage, the fact that 'y' is an identifier in Name Space 2 when 'x' has been defined in Name Space 1 as an identifier of Name Space 2, and the global identifier is constructed hierarchically. In this case it is sufficient to give the fact that the first identifier is a member of Name Space 1. This is the case of hierarchically registered Name Spaces and hierarchically constructed identifiers, and this is the type of global identifier that this document addresses. Therefore 'x.y' is a unique identifier under Name Space 1 assuming hierarchically registered Name Spaces.

2.1 CCSDS NAME SPACES

The CCSDS desires to define multiple CCSDS Name Spaces and wishes to have a unique way to distinguish each Name Space. In this regard CCSDS acts as the highest level naming authority for the CCSDS domain. An initial set of CCSDS highest level Name Spaces and their identifiers are defined in table 2-1.

Table 2-1: CCSDS Highest Level Name Spaces

CCSDS Name Space Identifier	Name Space Title	Assigning Body	Source for Name Space Definition
1	Control Authority Procedures Registration Authority Identifiers	CCSDS in CCSDS A31.0-Y-1	CCSDS 630.0-B-1 (reference [2])
2	Control Authority Procedures Authority and Description Identifiers	CCSDS in CCSDS A31.0-Y-1	CCSDS 630.0-B-1 (reference [2])
3	Space Link Extension Management Identifiers	CCSDS in CCSDS A31.0-Y-1	CCSDS 910.5-R-1 (reference [4])

The use of the CCSDS Name Space Identifier provides one way in which to distinguish these Name Spaces. The definitions of allowed values for each Name Space are given in the corresponding CCSDS Recommendation. The issue of syntax for the exchange of identifiers is addressed in section 3. This table will be extended whenever additional CCSDS Name Spaces are defined.

As an example, consider the string '2.NSSD0123' with the information that it is constructed from hierarchically registered Name Spaces and that the first identifier is from the CCSDS Name Space. This means that in the context of CCSDS Name Spaces, the identifier '2.NSSD0123' will be globally unique. Of course within the context of Control Authority Procedures Authority and Description Identifiers, 'NSSD0123' is already globally unique.

2.2 ISO/IEC 6523 NAME SPACES

There may be circumstances when it is useful to use CCSDS Name Spaces in context with Name Spaces defined outside of CCSDS. The ISO/IEC 6523-1(1998) standard (reference [5]) provides a mechanism to accommodate this requirement. It provides a mechanism to distinguish organizations, such as CCSDS, which assign identifiers to objects or services. Under this standard, the British Standards Institute acts as the registrar for broadly based international organizations. This body has assigned a number of identifiers to various organizations, including the ISO itself. The ISO, as an organization that recognizes a variety of standards bodies, assigns identifiers to such bodies. CCSDS has been registered as a recognized, international, standards body that also assigns identifiers. The relevant ISO/IEC 6523 identifiers are provided in table 2-2.

Table 2-2: ISO 6523 Identifiers Relevant to Identification of CCSDS Name Spaces

Name Space Identifier	Name Space Title	Name Space Type	Assigning Body	Source for Name Space Definition
112	Standards Producing Organization Identifiers	International Code Designator (ICD)	British Standards Institute	ISO JTC1/SC 32
4	CCSDS Name Space Identifiers	Organization Identifier (OI)	ISO JTC1/SC32	CCSDS A31.0-Y-1

From this table, the CCSDS Name Space has been given an organizational identifier with a value equal to '4' by the ISO JTC1/SC 32 naming authority. The definition of the allowed values under this Name Space is given in this document, CCSDS A31.0-Y-1 and, more specifically, in table 2-1. Further, the Standards Producing Organization Identifiers Name Space has been given the value '112' within the ICD Name Space. The ICD Name Space is also known as the ISO 6523 Name Space of identified organizations that also assign their own identifiers.

At the time this document was created, contact information for the Assigning Bodies in table 2-2 was as follows:

British Standards Institute - DISC

389 Chiswick High Rd

London W4 4AL

Tel: +44 181 996 7466

Fax: +44 181 996 7048

ISO JTC1/SC 32:

Sophie Clivio

Technical Programme Manager

Standards Department

ISO Central Secretariat

Tel : +41 22 749 72 84

Fax : +41 22 749 73 49

email: clivio@iso.ch

Note that ISO 6523 does not specify an order for the exchange of the International Code Designator (ICD) and the Organization Identifiers (OI), nor any other syntactic requirements. Such specifications are outside the scope of this standard. However, using the 'period', the example '112.4.2.NSSD0123' together with the information that its Name Spaces start from an International Code Designator results in a globally unique identifier under all ICD hierarchically-registered Name Spaces.

2.3 ISO 8824 NAME SPACES

There may be circumstances when it is useful to use ISO 6523 Name Spaces in context with Name Spaces defined outside of the ISO identification of registered organizations. The ISO 8824 standard (reference [6]) provides a mechanism to accommodate this requirement. It provides a mechanism, at the ISO level, to distinguish organizations from other methods by which identifiers might be assigned. In particular it distinguishes identifier assignments by organizations under ISO 6523 requirements from those in ISO standards. It also distinguishes the ISO track from other international tracks under organizations such as CCITT. The relevant ISO 8824 identifiers are provided in table 2-3.

Table 2-3: ISO 8824 Identifiers Relevant to Identification of CCSDS under ISO 6523

Name Space Identifier	Name Space Title	Name Space Type	Assigning Body	Source for Name Space Definition
1	ISO Identifiers	ISO and CCITT Identifiers	ISO and CCITT in ISO 8824	ISO 8824 (reference [6])
3	ISO 6523 Organization Identifiers	ISO Identifiers	ISO in ISO 8824	ISO 6523 (reference [5])

From this table, the track in which organizations are assigned identifiers under ISO 6523 is defined as '3'. Further, the ISO track is distinguished from other tracks (e.g., CCITT or Joint ISO/CCITT) by the identifier '1'. Note that no syntax for the expression of these identifiers is required by ISO 8824.

However, using the 'period', the example '1.3.112.4.2.NSSD0123' together with the information that its Name Spaces start from ISO and CCITT Identifiers results in a globally unique identifier under all ISO and CCITT hierarchically registered Name Spaces.

2.4 NAME SPACE SUMMARY

The exchange of unique identifiers between 2 parties requires that they have a common understanding of the Name Space from which the identifier is taken. When global identifiers are assembled from a set of hierarchically registered Name Spaces, it is sufficient to identify only the highest level Name Space involved in order to ensure uniqueness of the global identifier. At the same time the highest level Name Space involved is often not the highest level Name Space that could have been involved, because the exchanging parties will have a common understanding of a lower level Name Space that is adequate to ensure uniqueness.

For example, the identifier '1.3.112.4.2.NSSD0123' has a highest level Name Space of 'ISO and CCITT'. This identifier will be unique among all 'ISO and CCITT' identifiers, and it identifies a description whose ID is '0123' registered with the NASA primary Control Authority Office (ID = 'NSSD'). However, in all current CCSDS standards it is sufficient to simply use 'NSSD0123' as the global identifier, because the context of usage already establishes that the Name Space in use is the Control Authority and Procedures—Authority and Description Identifiers Name Space.

For those cases when a higher level Name Space is needed, this document provides the information to be used to construct such an identifier from higher level registered Name Spaces. The available Name Space Tree is shown in figure 2-2.

For example, the string 112.4.1.xxx, together with the information that it starts with the Name Space of the ISO 6523 ICD and is organized hierarchically, is sufficient to make this identifier unique among all such identifiers starting with an ICD. In principal, it is possible to determine that '112' identifies Standards Producing Organization Identifiers, that '4' identifies CCSDS Name Space Identifiers (assigned as the organization identifier by ISO JTC1/SC32 to the CCSDS authority), that '1' identifies Control Authority Procedures Registration Identifiers (assigned by CCSDS), and that 'xxx' is therefore an identifier of a Control Authority Procedures—Registration Authority, or Control Authority Office as defined in CCSDS 630.0-B-1.

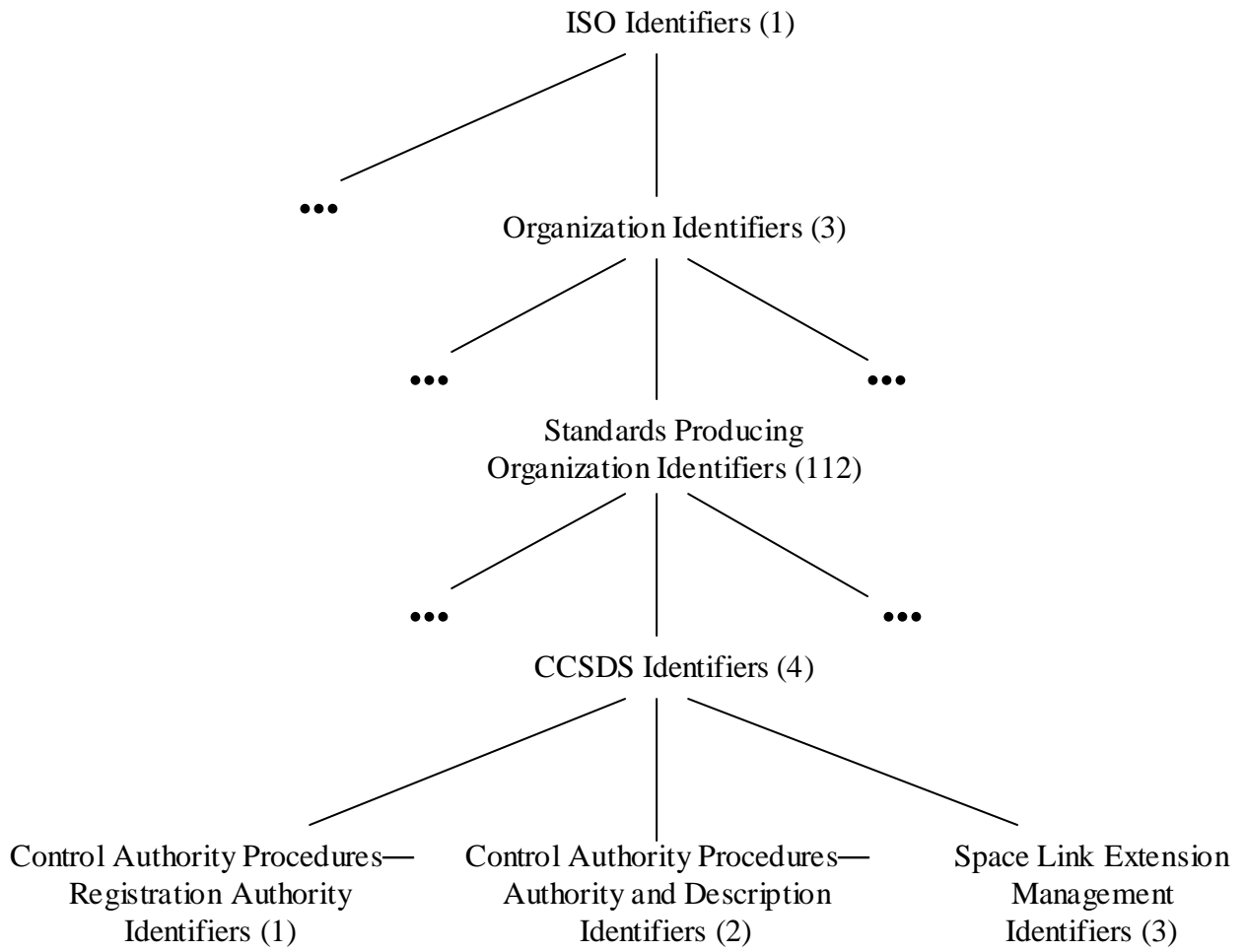


Figure 2-2: Name Space Tree

3 SYNTAX FOR IDENTIFIER EXCHANGES

None of the identifiers discussed so far have an associated syntax for exchange. There are many possible syntaxes depending on usage. However as a default, it is recommended that hierarchical order be maintained and the identifiers be separated by the 'period'. In addition, the starting Name Space also needs to be identified to the recipient entity. The examples, provided in subsection 2.4, conform to this recommendation. Another example is:

3.112.4.2.NSSD0123

Here the initial Name Space is ISO ('3' is assigned within the ISO Name Space) and it can be determined, in principal, that NSSD0123 is a Control Authority Procedures—Authority and Description Identifier. This string provides a unique identifier among all hierarchically organized strings within the ISO Name Space.