

X/Open Guide

Locale Registry Procedures, Version 2

X/Open Company Ltd.



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X/Open Guide

Locale Registry Procedures, Version 2

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Preface

X/Open

X/Open is an independent, worldwide, open systems organisation supported by most of the world's largest information systems suppliers, user organisations and software companies. Its mission is to bring to users greater value from computing, through the practical implementation of open systems.

X/Open's strategy for achieving this goal is to combine existing and emerging standards into a comprehensive, integrated, high-value and usable open system environment, called the Common Applications Environment (CAE). This environment covers the standards, above the hardware level, that are needed to support open systems. It provides for portability and interoperability of applications, and so protects investment in existing software while enabling additions and enhancements. It also allows users to move between systems with a minimum of retraining.

X/Open defines this CAE in a set of specifications which include an evolving portfolio of application programming interfaces (APIs) which significantly enhance portability of application programs at the source code level, along with definitions of and references to protocols and protocol profiles which significantly enhance the interoperability of applications and systems.

The X/Open CAE is implemented in real products and recognised by a distinctive trade mark — the X/Open brand — that is licensed by X/Open and may be used on products which have demonstrated their conformance.

X/Open Technical Publications

X/Open publishes a wide range of technical literature, the main part of which is focussed on specification development, but which also includes Guides, Snapshots, Technical Studies, Branding/Testing documents, industry surveys, and business titles.

There are two types of X/Open specification:

- *CAE Specifications*

CAE (Common Applications Environment) specifications are the stable specifications that form the basis for X/Open-branded products. These specifications are intended to be used widely within the industry for product development and procurement purposes.

Anyone developing products that implement an X/Open CAE specification can enjoy the benefits of a single, widely supported standard. In addition, they can demonstrate compliance with the majority of X/Open CAE specifications once these specifications are referenced in an X/Open component or profile definition and included in the X/Open branding programme.

CAE specifications are published as soon as they are developed, not published to coincide with the launch of a particular X/Open brand. By making its specifications available in this way, X/Open makes it possible for conformant products to be developed as soon as is practicable, so enhancing the value of the X/Open brand as a procurement aid to users.

- *Preliminary Specifications*

These specifications, which often address an emerging area of technology and consequently are not yet supported by multiple sources of stable conformant implementations, are released in a controlled manner for the purpose of validation through implementation of products. A Preliminary specification is not a draft specification. In fact, it is as stable as X/Open can make it, and on publication has gone through the same rigorous X/Open development and review procedures as a CAE specification.

Preliminary specifications are analogous to the *trial-use* standards issued by formal standards organisations, and product development teams are encouraged to develop products on the basis of them. However, because of the nature of the technology that a Preliminary specification is addressing, it may be untried in multiple independent implementations, and may therefore change before being published as a CAE specification. There is always the intent to progress to a corresponding CAE specification, but the ability to do so depends on consensus among X/Open members. In all cases, any resulting CAE specification is made as upwards-compatible as possible. However, complete upwards-compatibility from the Preliminary to the CAE specification cannot be guaranteed.

In addition, X/Open publishes:

- *Guides*

These provide information that X/Open believes is useful in the evaluation, procurement, development or management of open systems, particularly those that are X/Open-compliant. X/Open Guides are advisory, not normative, and should not be referenced for purposes of specifying or claiming X/Open conformance.

- *Technical Studies*

X/Open Technical Studies present results of analyses performed by X/Open on subjects of interest in areas relevant to X/Open's Technical Programme. They are intended to communicate the findings to the outside world and, where appropriate, stimulate discussion and actions by other bodies and the industry in general.

- *Snapshots*

These provide a mechanism for X/Open to disseminate information on its current direction and thinking, in advance of possible development of a Specification, Guide or Technical Study. The intention is to stimulate industry debate and prototyping, and solicit feedback. A Snapshot represents the interim results of an X/Open technical activity. Although at the time of its publication, there may be an intention to progress the activity towards publication of a Specification, Guide or Technical Study, X/Open is a consensus organisation, and makes no commitment regarding future development and further publication. Similarly, a Snapshot does not represent any commitment by X/Open members to develop any specific products.

Versions and Issues of Specifications

As with all *live* documents, CAE Specifications require revision, in this case as the subject technology develops and to align with emerging associated international standards. X/Open makes a distinction between revised specifications which are fully backward compatible and those which are not:

- a new *Version* indicates that this publication includes all the same (unchanged) definitive information from the previous publication of that title, but also includes extensions or additional information. As such, it *replaces* the previous publication.

- a new *Issue* does include changes to the definitive information contained in the previous publication of that title (and may also include extensions or additional information). As such, X/Open maintains *both* the previous and new issue as current publications.

Corrigenda

Most X/Open publications deal with technology at the leading edge of open systems development. Feedback from implementation experience gained from using these publications occasionally uncovers errors or inconsistencies. Significant errors or recommended solutions to reported problems are communicated by means of Corrigenda.

The reader of this document is advised to check periodically if any Corrigenda apply to this publication. This may be done either by email to the X/Open info-server or by checking the Corrigenda list in the latest X/Open Publications Price List.

To request Corrigenda information by email, send a message to `info-server@xopen.co.uk` with the following in the Subject line:

```
request corrigenda; topic index
```

This will return the index of publications for which Corrigenda exist.

This Document

This document is a Guide (see above). It describes the rules under which the X/Open Locale Registry is operated and submissions to that registry are accepted.

This guide is intended for systems programmers. It is structured as follows:

- Chapter 1 is an introduction.
- Chapter 2 explains the procedure for establishing X/Open's locale registry.
- Chapter 3 defines the criteria for acceptable locale definitions.
- Chapter 4 gives the rules for character naming.
- Chapter 5 explains how the registry can evolve.
- Appendix A states the X/Open standards policy.
- Appendix B contains a copyright declaration and licence form.
- A glossary and index are also provided.

Typographical Conventions

The following typographical conventions are used throughout this document:

- *Italic* strings are used for emphasis or to identify the first instance of a word requiring definition.
- Syntax and code examples are shown in `fixed width font`.

Trade Marks

X/Open[®] is a registered trade mark, and the “X” device is a trade mark, of X/Open Company Limited.

Referenced Documents

The following documents are referenced in this guide:

Distributed Internationalisation Services

X/Open Snapshot, December 1994, Distributed Internationalisation Services, Version 2 (ISBN: 1-85912-033-4, S308).

ISO 639

ISO 639: 1988, Codes for the Representation of Names of Languages, Bilingual edition.

ISO 3166

ISO 3166: 1988, Codes for the Representation of Names of Countries, Bilingual edition.

ISO/IEC 646

ISO/IEC 646: 1991, Information Processing — ISO 7-bit Coded Character Set for Information Interchange.

ISO/IEC 10646

ISO/IEC 10646-1:1993, Information Technology — Universal Multiple-Octet Coded Character Set (UCS) — Part 1: Architecture and Basic Multilingual Plane.

ISO POSIX-2

ISO/IEC 9945-2:1993, Information Technology — Portable Operating System Interface (POSIX) — Part 2: Shell and Utilities (identical to IEEE Std 1003.2-1992).

XBD, Issue 4, Version 2

X/Open CAE Specification, August 1994, System Interface Definitions, Issue 4, Version 2 (ISBN: 1-85912-036-9, C434).

Introduction

A *locale* is where a variety of culturally-dependent data is defined, including language-dependent specifications for date and time, character classification, collating sequences, and numeric and monetary conventions.

This chapter summarises the current position regarding a locale registry, provides a rationale and specifies the goals of such a registry.

1.1 Overview

In the field of internationalisation of Information Technology (IT) there is a widespread and increasing acceptance of the need for a universally recognised locale registry, perhaps controlled by a formal standards body. However, there is also valid concern that, in the interim period before such a formal registry exists, diversification of the locale information used by hardware and software suppliers will occur, to the detriment of both users and the IT industry. Such diversification would also make the establishment of the formal registry at a later date even more difficult.

In order to minimise this danger and to support users in the short term, X/Open has established a locale registry with the intention that it will contribute the locale definitions to the formal registry when the latter comes into existence, and will then defer to the formal registry as the authoritative definition of locales.

X/Open experts are active members of the U.K. panel for JTC1/SC22/WG20, and through this involvement ensure that its work contributes to the effective use of locales in enabling internationalisation of IT functions.

1.2 Rationale

Many standard utilities in POSIX use locale specifications to provide localisable versions of the utility. There is currently no general way to specify portably which locale a user wants to use with these standard utilities.

In distributed applications or applications that otherwise make locale-sensitive demands on the resources of another system, behaviour on different systems with respect to locale-sensitive operations should be the same. This can be ensured if users can obtain standard locales from a registry that defines unique names and the contents of locales.

Furthermore, in distributed software (such as that using RPC) it is imperative that the semantics of a given locale on one system are identical to the same locale on a different system.

Since 1991, X/Open and UniForum have collaborated on a project to attempt to define internationalisation services that support distributed applications. This has so far resulted in a joint publication of the publicly-available **Distributed Internationalisation Services, Version 2** snapshot. The facilities defined in this specification are greatly enhanced by the existence of a set of standard locales that can be referenced.

1.3 Goals

The goals of the X/Open Locale Registry are:

1. To guarantee the same behaviour (of APIs and utilities) across different systems, with respect to locale-sensitive operations.
2. To resolve the name space collisions that can currently occur with respect to the naming of locales by different suppliers.
3. To support locale-sensitive operations in a heterogeneous network of computers.
4. To provide an initial set of locale definitions that support the above three goals.
5. To encourage the careful growth of the registry through consensus.
6. To promote the migration of this registry into the appropriate JTC1 authority.

X/Open members are not required to supply any published locale specifications.

X/Open does not intend to register all locales from all suppliers, user organisations and so on. In addition, X/Open recommends that registered locale names not be used by suppliers to identify private or proprietary locales. Failure to observe this recommendation results in rejection of the locale.

Locale Registry Maintenance

X/Open accepts one locale for each language and territory combination, from each national standards body, for inclusion in the registry. Application-specific locales may also be accepted. At the time of publication of this guide, various suppliers and other organisations have their own versions of locales for particular language and territory combinations. This situation poses a problem of selection through consensus for X/Open.

This chapter explains the procedures for maintaining the Locale Registry.

2.1 Status of Locales

The first issue of the X/Open Locale Registry contains locales at Snapshot status. It is expected that each locale will then proceed through Preliminary Specification status to eventual CAE Specification, which can be used to support verification and branding of implementations. Refer to the Preface for the definitions of these terms.

Note: At one time the X/Open Locale Registry can contain locales at all levels.

The status of a locale is determined as follows:

- The locale is a Snapshot if it is not approved by a national standards body.
- The locale is a Preliminary Specification if it is approved by a national standards body.
- The locale is a CAE Specification if the locale is approved and in use; at this time a verification suite may be required.

2.2 Acceptance Procedure

The procedure for accepting locales is as follows:

1. Submissions are reviewed by the X/Open and UniForum Joint Internationalisation Group.
2. Submissions are accepted or rejected by the X/Open Internationalisation Working Group. X/Open applies the following rules in making decisions on the adoption of individual locales:
 - Where a locale definition is known to be acceptable to the corresponding national standards body, it becomes the automatic choice without further debate.
 - In the absence of clear indications from a standards body, X/Open voting members ballot on the candidate submissions. This may result in the outright selection of one of the submitted locales, or the adoption of a single locale definition resulting from change requests having been applied by the submitter, at the request of X/Open, to one or more of the candidates.
3. Snapshot locales are circulated to national standards bodies to provide further opportunities to distribute the document for review. This allows the standards bodies to suggest changes and to consider adopting new locales for language and territory combinations not yet covered.

4. Accepted locales are published and publicly available to anyone. The source files are distributed by means of electronic mail or DOS diskette. There is an index of published locales in the Locale Registry, which is reproduced in the X/Open Publications Price List.
5. X/Open progresses the locales from Snapshot status through Preliminary Specification status to CAE Specification status.

If a component definition refers to a CAE Specification locale, a verification suite is provided.

Acceptance Criteria

This chapter specifies the criteria for acceptable locale submissions. Submissions that do not meet these criteria are not accepted for the X/Open Locale Registry.

3.1 Format

The locales shall be submitted in source form.

The format of the locale sources shall conform to the ISO POSIX-2, with the following restrictions and extensions¹:

- Short symbolic names for characters represent an important element of the locale definition syntax. The current situation is that many locale definitions exist that make use of different symbolic naming schemes. The locale definition must be accompanied by a reference list that uniquely identifies all characters referred to in the locale. The rules and format of this reference list are contained in Chapter 4.

Where standard symbolic names have been defined in POSIX, these should be used in the locale definition.

- In the interests of providing an unambiguous locale definition that is also codeset-independent, the use of the ellipsis symbol is prohibited at this time. This restriction may be relaxed in the future if the definition of the ellipsis symbol in the ISO POSIX-2 is changed to allow codeset-independent specification of character lists.
- Codepoint values should not be used to represent characters, so characters must not be specified using decimal, octal or hexadecimal values.
- Extensions to the category definitions, as defined in the **XBD** specification, shall be allowed for the categories listed in Section 3.2 on page 6.

The sources shall be encoded in the International Reference Version coded character set of the ISO/IEC 646:1991 standard. Comments should be primarily in the English language, so that they can be widely understood. Comments intended for non-English audiences may be used, provided that they can be expressed using the International Reference Version coded character set of the ISO/IEC 646:1991 standard.

1. The restrictions are imposed to ensure that the locale definitions are codeset-independent; an extension is allowed to provide for enhanced capability.

3.2 Scope

The locale shall define all and only the following categories, for example, by copying categories of a standard locale:

```
LC_CTYPE
LC_COLLATE
LC_TIME
LC_NUMERIC
LC_MONETARY
LC_MESSAGES
```

Registration of other categories is prohibited.

3.3 Syntax

It is assumed that submitted locales compile with *localedef* and have been proven through testing and usage. Nevertheless, X/Open rejects submissions that contain obvious syntax errors.

3.4 Semantics

Although the language-specific content of locales is the preserve of the submitting authority, X/Open reserves the right to question semantics that may be in error.

Collation is the most complex part of the locale specification; it can be very difficult to ensure the completeness and correctness of this part of the specification by visual inspection. As the locales evolve from Snapshot status towards formal X/Open Specification, the issues of conformance testing and verification assume greater significance.

Therefore, to assist this procedure, it is strongly recommended that each locale submitted be accompanied by an example of the intended operation of the collation algorithm defined in the locale specification. This “benchmark” sequence of strings should be selected to exercise fully all levels of collation. Success in achieving the specified result provides a level of confidence to implementors of the locale specification.

3.5 Identification

The written application and the locale definition file must also contain the following information:

1. Organisation name
2. Organisation postal address
3. Name of responsible contact person
4. Email address of responsible contact person
5. Telephone and fax number of responsible contact person, in the following format:
+country_code - area_code - rest_of_number
(as in the example in point 8 above)
6. Natural language, as the two-letter form of ISO 639: 1988 standard
7. Territory, as the two-letter form of ISO 3166: 1988 standard.
8. Revision information.
9. Optional application modifier.
10. Optional user modifier.
11. Reference map specification.

3.6 Delivery

The locale definitions shall be sent to the following collection point:

X/Open Locale Registry
X/Open Company Limited
Apex Plaza
Forbury Road
Reading, RG1 1AX
Berkshire
England
Tel: +44 - 1734 - 508311
Fax: +44 - 1734 - 500110
Email: Xolocale@xopen.co.uk

The sources must be delivered electronically, either by electronic mail to the above mentioned email address, or to the above postal address on an IBM PC-compatible, PC-DOS or MS-DOS 1.44MB 3½ inch floppy diskette.

Any organisation is eligible to submit locale definitions to X/Open for consideration for inclusion into the X/Open Locale Registry. However, X/Open is unable to proceed without a clear position regarding copyright and intellectual property rights in the locale submission. To allow X/Open to proceed with the processing of the submission, the form that is presented in Appendix B should be completed by the person responsible for the submission, and sent by post to the collection point identified above.

Rules for Character Naming

This chapter explains the use of a reference table to map the symbolic names used in the locale definition to those specified in the ISO/IEC 10646 standard.

4.1 Problem Statement

It is apparent that, apart from the names provided in the ISO/IEC 10646 standard, there are no commonly accepted symbolic names for most characters. This would not be a problem, but for the length of the symbolic names provided by the ISO/IEC 10646 standard in locale definitions. For example, if a collation sequence for a locale is defined using the ISO/IEC 10646 standard symbolic names, that collation sequence definition quickly becomes unwieldy and difficult to read. This makes it difficult to detect errors, as well as making it difficult to develop the locale definitions.

It is currently impossible to define short symbolic names for characters that satisfy everyone and preserve the investment in locales that are already defined. Therefore, to define codeset-independent locales, a mechanism must be provided that allows for the use of many different symbolic naming schemes for characters.

4.2 Reference Table

The method defined here makes use of a reference table that maps the symbolic names used in the locale definition to the well known and unique set of symbolic names contained in the ISO/IEC 10646 standard and other character set standards. This reference table must be attached to each submission to the X/Open Locale Registry.

The reference table maps the short symbolic character names used in the locale definition to hexadecimal identifiers for the corresponding characters in the ISO/IEC 10646 standard or other standards. An ISO/IEC 10646 standard hexadecimal identifier has the following form:

<Uxxxxxxxx>

where xxxxxxxx represents eight hexadecimal digits expressing the codepoint value of the ISO/IEC 10646 standard character in a canonical form.

The characters of most standard character sets are already defined in the ISO/IEC 10646 standard, so most short symbolic character names in a locale definition have a corresponding ISO/IEC 10646 standard hexadecimal identifier. In cases where a standard character set has not yet been included in the ISO/IEC 10646 standard, the ISO/IEC 10646 standard hexadecimal identifier is substituted by the name of the standard character set, followed by an underscore or underbar (_) character, followed by a string of hexadecimal digits that represents the codepoint value of the character in the standard character set, for example, <ISO6429_xx>.

This method does not require the use of the ISO/IEC 10646 standard encoding scheme; only the ISO/IEC 10646 standard hexadecimal identifiers are required.

If a character exists in the locale definition, and is defined in the ISO/IEC 10646 standard, its entry in the reference table is as follows:

<short symbolic name> <Uxxxxxxxx>

where the space character is used as the separator, and the entry is terminated by a newline

character. If a right angle bracket or an escape character is used within a symbolic name, it must be preceded by the escape character. The escape character can be redefined from the default backslash (\) as follows:

```
"escape_char %c\n", <escape character>
```

If the character is not defined in the ISO/IEC 10646 standard, its entry in the reference table is as follows:

```
<short symbolic name> <Name of Standard Character Set_xxxx>
```

For example:

```
<short symbolic name> <ISO6429_xx>
```

where as many hexadecimal digits are used as are necessary to span the range of codepoint values in the standard.

If there is more than one short symbolic name for a given character, there should be one entry for each short symbolic name, for example:

```
<short symbolic name 1> <Uxxxxxxxx>
<short symbolic name 2> <Uxxxxxxxx>
<short symbolic name 3> <Uxxxxxxxx>
```

At the time of publication of this guide, only the UCS-2 form of the ISO/IEC 10646 standard has been assigned, so all the ISO/IEC 10646 standard hexadecimal identifiers currently have four leading zeros. In order to promote brevity and clarity in the reference table, an alternative form for the ISO/IEC 10646 standard hexadecimal identifiers is allowed that has only four hexadecimal digits following the letter U (for example, <Uxxxx>). There is no danger of ambiguity since the identifiers with four hexadecimal digits are synonyms for the eight digit identifiers with four leading zeros.

Evolution of the Registry

This chapter explains how a locale is withdrawn when it is superseded by a locale from a standards body. This chapter also considers passing control to standards bodies and the requirements of verification.

5.1 Superseding Locales

The selection of locales to be included in the first issue of the Locale Registry is determined by the procedure in Chapter 2.

In line with X/Open's standards policy, however (see Appendix A), when standard locales are eventually created by the relevant national standards bodies, X/Open defers to those standards where there are differences.

Within 12 months of the acceptance of a standardised locale, the relevant X/Open-registered locale is marked TO BE WITHDRAWN, and a marker inserted that references the standardised locale. At this time the submitter of the locale is informed by X/Open that the locale is withdrawn.

Eventually, therefore, there should be no difference between the locale definitions used by X/Open and standardised locales where they are defined.

5.2 Passing Control to Standards Bodies

If an international standards body decides to set up a locale registry, X/Open will make its registered locales available to the authority delegated to manage such a registry.

In that event, X/Open would still be interested to act as a distributor of the registered locales.

5.3 Verification

The following approach is taken with respect to the verification and branding of products claiming to support a particular locale in an X/Open-conformant manner:

- The product is tested independently for each combination of locale and codeset that it claims to support.
- It is expected that a brand will be available that states explicitly each combination of locale and codeset supported by the product.

X/Open Standards Policy

X/Open shall cooperate with formal standards bodies to bring standards-based open systems to the market in a timely and effective manner. It shall make its work available to standards bodies with such release of copyright as is required to permit material to be incorporated into formal standards.

Where *de jure* standards exist, X/Open shall conform to them. Wherever possible, X/Open shall use International Standards approved by ISO/IEC or Recommendations approved by CCITT. In their absence, it may adopt Regional or National standards which are likely to become internationally adopted.

Where *de jure* standards are under development, X/Open shall ensure that its specifications are aligned with them.

Where the results of X/Open work extend beyond that covered by the development of *de jure* standards, X/Open shall, in situations where formal ratification is appropriate, and where resources permit, submit its work to the standardisation process.

Where there is no *de jure* standard, X/Open may use *de facto* standards if they are broadly acceptable in the market place.

X/Open, and its Technical Working Groups, shall observe the rules of the standards bodies with which they work and shall offer reciprocal liaison as required.

Approved by the X/Open Board on 17th July 1991.



Copyright Declaration and Licence

Copyright Declaration and Licence

Concerning the locale definition entitled:

.....
.....

(“The Definition”)

We,, in submitting the Definition for registration by X/Open Company Limited hereby:

1. Confirm that either we own the entire copyright and other intellectual property rights in the Definition or, insofar as we do not own it, have all necessary authority from the true copyright holders to submit this Definition and to grant the licence set out below.
2. Licence X/Open Company Limited to copy, modify, republish and distribute the Definition throughout the world for any purpose without fee or royalty, provided that any copyright notices contained in the definition are incorporated in any such copy or republication.
3. Indemnify X/Open Company Limited against any legal action by any other person claiming to have rights in the Definition.

Signed

Name (in BLOCK CAPITALS)
(for and on behalf of)

Submitting Body

Date

Glossary

coded character set (codeset)

A set of unambiguous rules that establishes a character set and the one-to-one relationship between each character of the set and its bit representation.

locale

The definition of the subset of a user's environment that depends on language and cultural conventions.

POSIX

A group of operating system interface and environment standards, developed under the aegis of the Institute of Electrical and Electronic Engineers (IEEE), and based on the UNIX operating system documentation, which are designed to support application portability at the source level.

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