Base Utilities Reference

Core Foundation

2007-01-15

Apple Inc.
© 2003, 2007 Apple Inc.
All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, mechanical, electronic, photocopying, recording, or otherwise, without prior written permission of Apple Inc., with the following exceptions: Any person is hereby authorized to store documentation on a single computer for personal use only and to print copies of documentation for personal use provided that the documentation contains Apple's copyright notice.

The Apple logo is a trademark of Apple Inc.

Use of the "keyboard" Apple logo (Option-Shift-K) for commercial purposes without the prior written consent of Apple may constitute trademark infringement and unfair competition in violation of federal and state laws.

No licenses, express or implied, are granted with respect to any of the technology described in this document. Apple retains all intellectual property rights associated with the technology described in this document. This document is intended to assist application developers to develop applications only for Apple-labeled computers.

Every effort has been made to ensure that the information in this document is accurate. Apple is not responsible for typographical errors.

Apple Inc.
1 Infinite Loop
Cupertino, CA 95014
408-996-1010

Apple, the Apple logo, Mac, Mac OS, and Macintosh are trademarks of Apple Inc., registered in the United States and other countries.

iPhone and Numbers are trademarks of Apple Inc.

Intel and Intel Core are registered trademarks of Intel Corportation or its subsidiaries in the United States and other countries.

PowerPC and and the PowerPC logo are trademarks of International Business Machines Corporation, used under license therefrom.

Simultaneously published in the United States and Canada.

Even though Apple has reviewed this document, APPLE MAKES NO WARRANTY OR REPRESENTATION, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THIS DOCUMENT, ITS QUALITY, ACCURACY, MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE. AS A RESULT, THIS DOCUMENT IS PROVIDED "AS IS," AND YOU, THE READER, ARE ASSUMING THE ENTIRE RISK AS TO ITS QUALITY AND ACCURACY.

IN NO EVENT WILL APPLE BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY DEFECT OR INACCURACY IN THIS DOCUMENT, even if advised of the possibility of such damages.

THE WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHERS, ORAL OR WRITTEN, EXPRESS OR IMPLIED. No Apple dealer, agent, or employee is authorized to make any modification, extension, or addition to this warranty.

Some states do not allow the exclusion or limitation of implied warranties or liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Contents

Base Utilities Reference 5

Overview 5
Functions 5
CFRangeMake 5
Callbacks 6
CFComparatorFunction 6
Data Types 7
CFIndex 7
CFOptionFlags 7
CFRange 8
Constants 8
Comparison Results 8
Value Not Found 9
Current Framework Version Number 9
Framework Version Numbers 9

Document Revision History 15

Index 17

2007-01-15 | © 2003, 2007 Apple Inc. All Rights Reserved.

2007-01-15 | © 2003, 2007 Apple Inc. All Rights Reserved.

Base Utilities Reference

Framework:	CoreFoundation/CoreFoundation.h
Companion guide	Core Foundation Design Concepts
Declared in	CFBase.h

Overview

Core Foundation defines a number of miscellaneous symbols that are either used by many different opaque types, such as `CFIndex` (page 7), or apply to Core Foundation as a whole, such as `kCFCoreFoundationVersionNumber` (page 9). These symbols are collected together and documented here.

Functions

CFRangeMake

Declares and initializes a `CFRange` structure.

```
CFRange CFRangeMake (
   CFIndex loc,
   CFIndex len
);
```

Parameters

loc

The starting location of the range.

len

The length of the range.

Return Value

An initialized structure of type `CFRange` (page 8).

Discussion

This is an in-line convenience function for creating initialized `CFRange` (page 8) structures.

Availability

Available in Mac OS X v10.0 and later.

Related Sample Code

BSDLLCTest

2007-01-15 | © 2003, 2007 Apple Inc. All Rights Reserved.

HID Calibrator
HID Config Save
HID Explorer
QTCarbonShell

Declared In
`CFBase.h`

Callbacks

CFComparatorFunction

Callback function that compares two values. You provide a pointer to this callback in certain Core Foundation sorting functions.

```
typedef CFComparisonResult (*CFComparatorFunction) (
    const void *val1,
    const void *val2,
    void *context
);
```

If you name your function `MyCallBack`, you would declare it like this:

```
CFComparisonResult MyCallBack (
    const void *val1,
    const void *val2,
    void *context
);
```

Parameters

val1

The first value to compare.

val2

The second value to compare.

context

An untyped pointer to the context of the evaluation.

The meaning of this value and its use are defined by each comparator function. This value is usually passed to a sort function, such as `CFArraySortValues`, which then passes it, unchanged, to the comparator function.

Return Value
A `CFComparisonResult` value that indicates whether the *val1* is equal to, less than, or greater than *val2*. See "Comparison Results" (page 8) for a list of possible values.

Discussion
If you need to sort the elements in a collection using special criteria, you can implement a comparator function with the signature defined by this prototype. You pass a pointer to this function in one of the "sort" functions, such as CFArray's `CFArraySortValues`.

2007-01-15 | © 2003, 2007 Apple Inc. All Rights Reserved.

You can also pass pointers to standard Core Foundation comparator functions such as `CFStringCompare` and `CFDateCompare`.

Availability
Available in Mac OS X v10.0 and later.

Declared In
`CFBase.h`

Data Types

CFIndex

An integer type used throughout Core Foundation in several programmatic roles: as an array index and for count, size, and length parameters and return values.

```
typedef SInt32 CFIndex;
```

Discussion
Core Foundation types as `CFIndex` all parameters and return values that might grow over time as the processor's address size changes. On architectures where pointer sizes are a different size (say, 64 bits) `CFIndex` might be declared to be also 64 bits, independent of the size of `int`.

If you type your own variables that interact with Core Foundation as `CFIndex`, your code will have a higher degree of source compatibility in the future.

Availability
Available in Mac OS X v10.0 and later.

Declared In
`CFBase.h`

CFOptionFlags

A bitfield used for passing special allocation and other requests into Core Foundation functions.

```
typedef UInt32 CFOptionFlags;
```

Discussion
The flag bits are specific to particular opaque types and functions in Core Foundation.

Availability
Available in Mac OS X v10.0 and later.

Declared In
`CFBase.h`

2007-01-15 | © 2003, 2007 Apple Inc. All Rights Reserved.

CFRange

A structure representing a range of sequential items in a container, such as characters in a buffer or elements in a collection.

```
struct CFRange {
    CFIndex location;
    CFIndex length;
};
typedef struct CFRange CFRange;
```

Fields

`location`

An integer representing the starting location of the range.

`length`

An integer representing the number of items in the range.

Availability

Available in Mac OS X v10.0 and later.

Declared In

`CFBase.h`

Constants

Comparison Results

Constants returned by comparison functions, indicating whether a value is equal to, less than, or greater than another value.

```
enum CFComparisonResult {
    kCFCompareLessThan = -1,
    kCFCompareEqualTo = 0,
    kCFCompareGreaterThan = 1
};
typedef enum CFComparisonResult CFComparisonResult;
```

Constants

`kCFCompareLessThan`

Returned by a comparison function if the first value is less than the second value.

Available in Mac OS X v10.0 and later.

Declared in `CFBase.h`.

`kCFCompareEqualTo`

Returned by a comparison function if the first value is equal to the second value.

Available in Mac OS X v10.0 and later.

Declared in `CFBase.h`.

`kCFCompareGreaterThan`

Returned by a comparison function if the first value is greater than the second value.

Available in Mac OS X v10.0 and later.

Declared in `CFBase.h`.

2007-01-15 | © 2003, 2007 Apple Inc. All Rights Reserved.

Declared In
CFBase.h

Value Not Found

Special value returned when a Core Foundation function cannot locate a requested value.

```
enum {
    kCFNotFound = -1
};
```

Constants
kCFNotFound
A constant that indicates that a search operation did not succeed in locating the target value.
Available in Mac OS X v10.0 and later.
Declared in CFBase.h.

Declared In
CFBase.h

Current Framework Version Number

Current version number of the Core Foundation framework.

```
double kCFCoreFoundationVersionNumber;
```

Constants
kCFCoreFoundationVersionNumber
The current version of the Core Foundation framework. Compare this value to the values in "Framework Version Numbers" (page 9). Although this variable was added to the CFBase.h header file in Mac OS X v10.1, it was available and can be used in Mac OS X v10.0.
Available in Mac OS X v10.1 and later.
Declared in CFBase.h.

Declared In
CFBase.h

Framework Version Numbers

Version numbers of the Core Foundation framework.

2007-01-15 | © 2003, 2007 Apple Inc. All Rights Reserved.

```
#define kCFCoreFoundationVersionNumber10_0 196.4
#define kCFCoreFoundationVersionNumber10_0_3 196.5
#define kCFCoreFoundationVersionNumber10_1 226.0
#define kCFCoreFoundationVersionNumber10_1_2 227.2
#define kCFCoreFoundationVersionNumber10_1_4 227.3
#define kCFCoreFoundationVersionNumber10_2 263.0
#define kCFCoreFoundationVersionNumber10_2_1    263.10
#define kCFCoreFoundationVersionNumber10_2_2    263.10
#define kCFCoreFoundationVersionNumber10_2_3    263.30
#define kCFCoreFoundationVersionNumber10_2_4    263.30
#define kCFCoreFoundationVersionNumber10_2_5    263.50
#define kCFCoreFoundationVersionNumber10_2_6    263.50
#define kCFCoreFoundationVersionNumber10_2_7    263.50
#define kCFCoreFoundationVersionNumber10_2_8    263.50
#define kCFCoreFoundationVersionNumber10_3    299.00
#define kCFCoreFoundationVersionNumber10_3_1    299.00
#define kCFCoreFoundationVersionNumber10_3_2    299.00
#define kCFCoreFoundationVersionNumber10_3_3    299.30
#define kCFCoreFoundationVersionNumber10_3_4    299.31
#define kCFCoreFoundationVersionNumber10_3_5    299.31
#define kCFCoreFoundationVersionNumber10_3_6    299.32
#define kCFCoreFoundationVersionNumber10_3_7    299.33
#define kCFCoreFoundationVersionNumber10_3_8    299.33
#define kCFCoreFoundationVersionNumber10_3_9    299.35
#define kCFCoreFoundationVersionNumber10_4    368.00
#define kCFCoreFoundationVersionNumber10_4_1    368.10
#define kCFCoreFoundationVersionNumber10_4_2    368.11
#define kCFCoreFoundationVersionNumber10_4_3    368.18
#define kCFCoreFoundationVersionNumber10_4_4_Intel    368.26
#define kCFCoreFoundationVersionNumber10_4_4_PowerPC    368.25
#define kCFCoreFoundationVersionNumber10_4_5_Intel    368.26
#define kCFCoreFoundationVersionNumber10_4_5_PowerPC    368.25
#define kCFCoreFoundationVersionNumber10_4_6_Intel    368.26
#define kCFCoreFoundationVersionNumber10_4_6_PowerPC    368.25
#define kCFCoreFoundationVersionNumber10_4_7    368.27
```

Constants

`kCFCoreFoundationVersionNumber10_0`

The Core Foundation framework version in Mac OS X version 10.0.

Available in Mac OS X v10.1 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_0_3`

The Core Foundation framework version in Mac OS X version 10.0.3.

Available in Mac OS X v10.1 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_1`

The Core Foundation framework version in Mac OS X version 10.1.

Available in Mac OS X v10.2 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_1_2`

The Core Foundation framework version in Mac OS X version 10.1.2.

Available in Mac OS X v10.3 and later.

Declared in `CFBase.h`.

2007-01-15 | © 2003, 2007 Apple Inc. All Rights Reserved.

`kCFCoreFoundationVersionNumber10_1_4`
The Core Foundation framework version in Mac OS X version 10.1.4.

Available in Mac OS X v10.3 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_2`
The Core Foundation framework version in Mac OS X version 10.2.

Available in Mac OS X v10.3 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_2_1`
The Core Foundation framework version in Mac OS X version 10.2.1.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_2_2`
The Core Foundation framework version in Mac OS X version 10.2.2.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_2_3`
The Core Foundation framework version in Mac OS X version 10.2.3.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_2_4`
The Core Foundation framework version in Mac OS X version 10.2.4.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_2_5`
The Core Foundation framework version in Mac OS X version 10.2.5.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_2_6`
The Core Foundation framework version in Mac OS X version 10.2.6.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_2_7`
The Core Foundation framework version in Mac OS X version 10.2.7.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_2_8`
The Core Foundation framework version in Mac OS X version 10.2.8.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

2007-01-15 | © 2003, 2007 Apple Inc. All Rights Reserved.

`kCFCoreFoundationVersionNumber10_3`
The Core Foundation framework version in Mac OS X version 10.3.

Available in Mac OS X v10.4 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_3_1`
The Core Foundation framework version in Mac OS X version 10.3.1.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_3_2`
The Core Foundation framework version in Mac OS X version 10.3.2.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_3_3`
The Core Foundation framework version in Mac OS X version 10.3.3.

Available in Mac OS X v10.4 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_3_4`
The Core Foundation framework version in Mac OS X version 10.3.4.

Available in Mac OS X v10.4 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_3_5`
The Core Foundation framework version in Mac OS X version 10.3.5.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_3_6`
The Core Foundation framework version in Mac OS X version 10.3.6.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_3_7`
The Core Foundation framework version in Mac OS X version 10.3.7.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_3_8`
The Core Foundation framework version in Mac OS X version 10.3.8.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_3_9`
The Core Foundation framework version in Mac OS X version 10.3.9.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

2007-01-15 | © 2003, 2007 Apple Inc. All Rights Reserved.

`kCFCoreFoundationVersionNumber10_4`
The Core Foundation framework version in Mac OS X version 10.4.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_4_1`
The Core Foundation framework version in Mac OS X version 10.4.1.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_4_2`
The Core Foundation framework version in Mac OS X version 10.4.2.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_4_3`
The Core Foundation framework version in Mac OS X version 10.4.3.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_4_4_Intel`
The Core Foundation framework version in Mac OS X version 10.4.4 on Intel-based Macintosh computers.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_4_4_PowerPC`
The Core Foundation framework version in Mac OS X version 10.4.4 on PowerPC-based Macintosh computers.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_4_5_Intel`
The Core Foundation framework version in Mac OS X version 10.4.5 on Intel-based Macintosh computers.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_4_5_PowerPC`
The Core Foundation framework version in Mac OS X version 10.4.5 on PowerPC-based Macintosh computers.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_4_6_Intel`
The Core Foundation framework version in Mac OS X version 10.4.6 on Intel-based Macintosh computers.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

2007-01-15 | © 2003, 2007 Apple Inc. All Rights Reserved.

`kCFCoreFoundationVersionNumber10_4_6_PowerPC`

The Core Foundation framework version in Mac OS X version 10.4.6 on PowerPC-based Macintosh computers.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

`kCFCoreFoundationVersionNumber10_4_7`

The Core Foundation framework version in Mac OS X version 10.4.7.

Available in Mac OS X v10.5 and later.

Declared in `CFBase.h`.

Discussion

Compare these values to the value of the `kCFCoreFoundationVersionNumber` (page 9) variable to identify on which version of the Core Foundation framework your code is executing.

Declared In

`CFBase.h`

2007-01-15 | © 2003, 2007 Apple Inc. All Rights Reserved.

Document Revision History

This table describes the changes to *Base Utilities Reference*.

Date	Notes
2007-01-15	Minor text reformatting.
2005-08-11	Cosmetic changes to conform to documentation guidelines.
2003-08-01	Added description of Mac OS X version constants.
2003-01-01	First version of this document.

2007-01-15 | © 2003, 2007 Apple Inc. All Rights Reserved.

Document Revision History

2007-01-15 | © 2003, 2007 Apple Inc. All Rights Reserved.

Index

C

CFComparatorFunction callback 6
CFIndex data type 7
CFOptionFlags data type 7
CFRange structure 8
CFRangeMake function 5
Comparison Results 8
Current Framework Version Number 9

F

Framework Version Numbers 9

K

kCFCompareEqualTo constant 8
kCFCompareGreaterThan constant 8
kCFCompareLessThan constant 8
kCFCoreFoundationVersionNumber constant 9
kCFCoreFoundationVersionNumber10_0 constant 10
kCFCoreFoundationVersionNumber10_0_3 constant 10
kCFCoreFoundationVersionNumber10_1 constant 10
kCFCoreFoundationVersionNumber10_1_2 constant 10
kCFCoreFoundationVersionNumber10_1_4 constant 11
kCFCoreFoundationVersionNumber10_2 constant 11
kCFCoreFoundationVersionNumber10_2_1 constant 11
kCFCoreFoundationVersionNumber10_2_2 constant 11
kCFCoreFoundationVersionNumber10_2_3 constant 11
kCFCoreFoundationVersionNumber10_2_4 constant 11
kCFCoreFoundationVersionNumber10_2_5 constant 11
kCFCoreFoundationVersionNumber10_2_6 constant 11
kCFCoreFoundationVersionNumber10_2_7 constant 11
kCFCoreFoundationVersionNumber10_2_8 constant 11
kCFCoreFoundationVersionNumber10_3 constant 12
kCFCoreFoundationVersionNumber10_3_1 constant 12
kCFCoreFoundationVersionNumber10_3_2 constant 12
kCFCoreFoundationVersionNumber10_3_3 constant 12
kCFCoreFoundationVersionNumber10_3_4 constant 12
kCFCoreFoundationVersionNumber10_3_5 constant 12
kCFCoreFoundationVersionNumber10_3_6 constant 12
kCFCoreFoundationVersionNumber10_3_7 constant 12
kCFCoreFoundationVersionNumber10_3_8 constant 12
kCFCoreFoundationVersionNumber10_3_9 constant 12
kCFCoreFoundationVersionNumber10_4 constant 13
kCFCoreFoundationVersionNumber10_4_1 constant 13
kCFCoreFoundationVersionNumber10_4_2 constant 13
kCFCoreFoundationVersionNumber10_4_3 constant 13
kCFCoreFoundationVersionNumber10_4_4_Intel constant 13
kCFCoreFoundationVersionNumber10_4_4_PowerPC constant 13
kCFCoreFoundationVersionNumber10_4_5_Intel constant 13
kCFCoreFoundationVersionNumber10_4_5_PowerPC constant 13

2007-01-15 | © 2003, 2007 Apple Inc. All Rights Reserved.

kCFCoreFoundationVersionNumber10_4_6_Intel constant 13
kCFCoreFoundationVersionNumber10_4_6_PowerPC constant 14
kCFCoreFoundationVersionNumber10_4_7 constant 14
kCFNotFound constant 9

V

Value Not Found 9

2007-01-15 | © 2003, 2007 Apple Inc. All Rights Reserved.