



## INFUZE C API USER GUIDE

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# WURFL InFuze C API: User Guide

## Introduction

The WURFL C Application Programming Interface (API) is a high-performance and low-memory footprint mobile device detection software component written in C++ that can quickly and accurately detect over 500 capabilities of visiting devices. It can differentiate between portable mobile devices, desktop devices, SmartTVs and any other types of devices on which a web browser can be installed. The API library allows applications to perform real-time detection for a variety of uses, such as content adaptation, redirections, and data traffic analysis.

ScientiaMobile's WURFL C Module is also the core component for the Apache, Nginx, and Varnish-Cache Modules, offered by ScientiaMobile as separate products. Those modules allow you to add support for device detection in a variety of contexts, such as retrieving WURFL device data through the Apache Environment, FastCGI Environment, or data objects defined by Nginx and Varnish scripts. Other strategies may include injecting WURFL capabilities into HTTP Headers from your HTTP Proxy. This eliminates the need for application developers to maintain a WURFL library dependency in their code base.

*Note: Apache, Nginx and Varnish-Cache are the trademarks of the respective trademark holders.*

## API Features

- Standard WURFL API (implements same logic as other standard WURFL APIs by ScientiaMobile)
- Accurately detect over 500 capabilities
- High performance & low memory footprint (as compared to other WURFL APIs)
- Automatic caching previous detections for faster response times
- Ability to adjust and configure different in-memory caching strategies
- Support for WURFL 'patch files' (custom device description profiles that enrich WURFL)

## Technical Overview

The libwurfl C API is written in C++ language, with a C-language interface on top of it. The installed libwurfl library on the system consists of a header file wurfl.h and a dynamic link library which an application can link to.

When running the WURFL C API library, libwurfl will read and parse the WURFL's Device Definition Repository (DDR) database file from run-time memory. If needed, you can also load wurfl patch files that extend or correct the WURFL repository with your own customizations of the device data.

The libwurfl C library has an in-memory cache technique to preserve the result of previous detections. This achieves a great balance between accuracy of detection and fast response time in virtually all use cases. Finally, the strategies for caching are configurable (more later).

*Note: Full documentation for API methods can be found below.*

## Supported Platforms

The libwurfl API is supported by multiple linux distros such as Ubuntu, CentOS, RedHat, Fedora, and FreeBSD (other distros have similar building procedures). Other supported operating systems include Windows and Mac OS X. The libwurfl API was tested on SmartOS as well (actually 13.2.0 zone, released on September 25, 2013), but due to the very particular environment, you should contact ScientiaMobile for support. Please contact ScientiaMobile to inquire about specific platforms not listed here.

## Installing libwurfl on Ubuntu/Debian

Once you have obtained the libwurfl deb package from ScientiaMobile, you can install it with:

```
sudo apt-get update
sudo dpkg -i libwurfl-1.9.0.0-x86_64.deb
```

## Installing libwurfl on RedHat/Fedora/CentOS/Opensuse

Once you have obtained the libwurfl rpm package from ScientiaMobile, you can install it with:

```
sudo yum update
sudo rpm -i libwurfl-1.9.0.0-x86_64.rpm
```

Include file are installed under /usr/include and library in standard /usr/lib path so to compile code that uses libwurfl you will only have to add -lwurfl to your link step

## Installing libwurfl on FreeBSD 10

The installation procedure for FreeBSD differs slightly from other Linux-based systems. In particular, you will need to use the pre-compiled files provided by ScientiaMobile. Just extract the tar file under / and everything should be set:

```
cd /
tar xzvf libwurfl-1.9.0.0-x86_64.tgz
```

## Installing libwurfl on Mac OS X

Download the libwurfl-1.9.0.0-x86\_64.pkg file from ScientiaMobile and install it by double clicking on it. Beware that from mac os x 10.11 (El Capitan), rootless mode is enabled by default so you should download the alternative installation package named libwurfl-1.8.3.0-x86\_64-rootless.pkg. Since rootless mode we cannot install anymore the header file under /usr/include/wurfl and so both header file and library are installed under /usr/local/opt/libwurfl. When compiling use -I /usr/local/opt/libwurfl/include and -L /usr/local/opt/libwurfl/lib when linking your executables. When executing don't forget to set :

```
export DYLD_LIBRARY_PATH=/usr/local/opt/libwurfl/lib
```

from the shell that is running the application.

## Installing libwurfl on Windows

Download the libwurfl-1.9.0.0-x64.msi file from ScientiaMobile and install it by double clicking on it.

## Obtain the WURFL Repository file

In order for the WURFL C API library to work, you need a WURFL file installed on your system. The libwurfl C API library

package comes with a recent evaluation copy of the WURFL file called wurfl.zip. The file is automatically installed to /usr/share/wurfl/ path, or is included with the Windows installer.

## Updating the WURFL Repository

Commercial licensees of WURFL are granted access to "The Customer Vault", a personal virtual space containing purchased software licenses and weekly updated versions of the WURFL repository.

All licensed customers are given access to a direct download URL for obtaining the latest WURFL snapshot. This is either the weekly snapshot (released on Sunday night), or an Out-Of-Band snapshot that ScientiaMobile releases to customers between weekly snapshots in case of a significant improvement to the data (for example, if a high-profile device is released mid-week). The snapshots are licensed to your organization specifically as part of the agreement with ScientiaMobile.

To create a direct download URL, login to ScientiaMobile and click the "My Account" at the top-right corner of the screen. Then, click "Direct Download" to create a URL for your access. This URL is unique to you and must be kept private.

**WURFL Snapshots**  
As a ScientiaMobile customer, you are entitled to weekly snapshots of the WURFL data. Unlike the public WURFL snapshot, these downloads are customized with a commercial license for your product(s).

WURFL Date	
May 18, 2014	<a href="#">Download 2014-05-18_wurfl.zip</a>
May 11, 2014	<a href="#">Download 2014-05-11_wurfl.zip</a>

**Remote WURFL Snapshot Access**  
Here are your custom direct download links to the latest WURFL snapshot. Please **do not** share these links with anyone! Links are provided for both **zip** and **gzip** formatted data for your convenience.

**Zip:** [http://www.scientiamobile.com/wurfl/\[redacted\]/wurfl.zip](http://www.scientiamobile.com/wurfl/[redacted]/wurfl.zip)

**Gzip:** [http://www.scientiamobile.com/wurfl/\[redacted\]/wurfl.xml.gz](http://www.scientiamobile.com/wurfl/[redacted]/wurfl.xml.gz)

[Instructions for implementing automatic downloading of WURFL data.](#)

In addition to the weekly snapshots, the Vault contains a personal URL to the latest update, that can be used to update one's WURFL installation programmatically. Please refer to the following [Forum post](#) for details.

## Getting Started

Using the InFuze C API is simple : all operations are performed on a wurfl\_handle which is obtained, typically during init phase by :

```
wurfl_handle hWurfl = wurfl_create();
```

this operation return a wurfl\_handle and creates an engine for further operations. WURFL engine is thread safe and the intended design is that multiple threads share the same wurfl\_handle.

The caching strategies are also configurable. You can choose between NONE, LRU, or Double LRU (Least Recently Used) cache mechanisms. The default is Double LRU, which is a two-cache strategy (one going from User-Agent to Device-Id, the other from Device-Id to Internal Device). The default parameters are 30,000, 10,000 (maximum 30,000 elements for the User-Agent to device-id cache and maximum 10,000 elements for the device-id to device cache) and the values are in elements. The LRU cache comes with User-Agent to Device mapping only, and the NULL parameter will disable the cache mode. For more information, please see [LRU Cache Mechanism](#).

You can use the following code to define a different cache provider :

```
wurfl_set_cache_provider(hwurfl, WURFL_CACHE_PROVIDER_DOUBLE_LRU, "100000, 30000");
```

*Note: `wurfl_set_cache_provider` and `wurfl_set_engine_target` must be set prior to calling `wurfl_load()`.*

Before any device lookup you will need to load the DDR file, named `wurfl.zip` :

```
// Define wurfl db
error = wurfl_set_root(hwurfl, "/usr/share/wurfl/wurfl.zip");
if (error != WURFL_OK) {
    printf("%s\n", wurfl_get_error_message(hwurfl));
    return -1;
}

// Loads wurfl db into memory
error = wurfl_load(hwurfl);
if (error != WURFL_OK) {
    printf("%s\n", wurfl_get_error_message(hwurfl));
    return -1;
}
```

After properly loading the WURFL instance, device detection can start. For this example, we will manually inject the User-Agent string of a popular Android device and proceed to detect the device (with some error-handling):

```
// Example of an User-Agent
const char *userAgent = "Mozilla/5.0 (Linux; U; Android 3.2; en-gb; K3108 Build/HTJ85B) AppleWebKit/534.13 (KHTML, like Gecko) Version/4.0 Safari/534.13";

wurfl_device_handle hdevice = wurfl_lookup_useragent(hwurfl, userAgent);

if (hdevice) {
    // DEVICE FOUND
    // ...
}
```

Once a device is detected, device capabilities can be retrieved as follows:

```
if (hdevice) {
    // DEVICE FOUND

    // Print out a capability
    printf("brand_name = %s\n", wurfl_device_get_capability(hdevice, "brand_name"));
}
```

## Virtual Capabilities

Virtual capabilities are an important feature of the WURFL API that obtain values related to the requesting agent out of the HTTP request as a whole (as opposed to limiting itself to capabilities that are found in WURFL).

In order to compute its final returned value, a virtual capability may look at regular (non-virtual) capabilities as well as parameters derived from the HTTP request at run-time. Virtual capabilities are useful to model aspects of the HTTP Client that are not easily captured through the finite number of profiles in WURFL.

```
// Print out a virtual capability
printf("is_smartphone = %s\n", wurfl_device_get_virtual_capability(hdevice, "is_smartphone"));
```

If your application needs to retrieve all the capabilities, and/or virtual capabilities, you can use an enumerator to iterate

through all capabilities that were loaded into the runtime memory and another enumerator to iterate through all the virtual capabilities. Thus, there is no need to provide a list of individual capability names.

```
if (hdevice) {
    // DEVICE FOUND
    // Iterate through all capabilities
    wurfl_device_capability_enumerator_handle hdevicecaps = wurfl_device_get_capability_enumerator(hdevice);

    while (wurfl_device_capability_enumerator_is_valid(hdevicecaps)) {
        printf("%s = %s\n", wurfl_device_capability_enumerator_get_name(hdevicecaps), wurfl_device_capability_enumerator_get_value(hdevicecaps));

        wurfl_device_capability_enumerator_move_next(hdevicecaps);
    }

    wurfl_device_capability_enumerator_destroy(hdevicecaps);

    // Iterate through all virtual capabilities
    hdevicecaps = wurfl_device_get_virtual_capability_enumerator(hdevice);

    while (wurfl_device_capability_enumerator_is_valid(hdevicecaps)) {
        printf("%s = %s\n", wurfl_device_capability_enumerator_get_name(hdevicecaps), wurfl_device_capability_enumerator_get_value(hdevicecaps));

        wurfl_device_capability_enumerator_move_next(hdevicecaps);
    }

    wurfl_device_capability_enumerator_destroy(hdevicecaps);
}
```

To avoid memory leaks, destroying pointer references to the **Device Handler** is recommended every time the processing of the device detection is over.

```
// Destroys the Device Handler
wurfl_device_destroy(hdevice);
```

## Code Example

This code allows you to create a **WURFL Handler** instance, define the path to the WURFL repository, and load the database into the memory. For this example, we assume that the wurfl.zip file is located on the same path of the executable program file. However, the path name can be different depending on your requirements.

```
#include <stdio.h>
#include <wurfl/wurfl.h>

int main(int argc, char **argv)
{
    wurfl_handle hwurfl;
    wurfl_error error;

    // Create wurfl handler
    hwurfl = wurfl_create();

    // Define wurfl db
    error = wurfl_set_root(hwurfl, "wurfl.zip");
    if (error != WURFL_OK) {
        printf("%s\n", wurfl_get_error_message(hwurfl));
        return -1;
    }

    // Loads wurfl db into memory
    printf("Loading wurfl, api version %s\n", wurfl_get_api_version());
```

```

error = wurfl_load(hwurfl);
if (error != WURFL_OK) {
    printf("%s\n", wurfl_get_error_message(hwurfl));
    return -1;
}

char *userAgent = "Mozilla/5.0 (Linux; Android 5.0; SAMSUNG SM-G925 Build/LRX21V) AppleWebKit/537.36 (KHTML, like Gecko) SamsungBrowser/4.0 Chrome/44.0.2403.133 Mobile Safari/537.36";

printf("Lookup >%s<\n", userAgent);

wurfl_device_handle hdevice = wurfl_lookup_useragent(hwurfl, userAgent);

// Print out a static capability
printf("model_name = %s\n", wurfl_device_get_capability(hdevice, "model_name"));
printf("brand_name = %s\n", wurfl_device_get_capability(hdevice, "brand_name"));
printf("device_os = %s\n", wurfl_device_get_capability(hdevice, "device_os"));

// Print out a virtual capability
printf("complete_device_name = %s\n", wurfl_device_get_virtual_capability(hdevice, "complete_device_name"));
printf("form_factor = %s\n", wurfl_device_get_virtual_capability(hdevice, "form_factor"));
}

```

Compile and run this code (on a linux box) with :

```

$ gcc example.c -o example -lwurfl
$ ./example
Loading wurfl, api version 1.9.0.0
Lookup >Mozilla/5.0 (Linux; Android 5.0; SAMSUNG SM-G925 Build/LRX21V) AppleWebKit/537.36 (KHTML, like Gecko) SamsungBrowser/4.0 Chrome/44.0.2403.133 Mobile Safari/537.36<
model_name = SM-G925
brand_name = Samsung
device_os = Android
complete_device_name = Samsung SM-G925 (Galaxy S6 Edge)
form_factor = Smartphone
$

```

On macosx 10.11 (El Capitan) up with rootless mode enabled you will have to run :

```

$ cc -I /usr/local/opt/libwurfl/include example.c -o example -L /usr/local/opt/libwurfl/lib -lwurfl
$ export DYLD_LIBRARY_PATH=/usr/local/opt/libwurfl/lib
$ ./example

```

## Filtering Capabilities

By default WURFL will fetch the complete set of capabilities for all device detection. By selecting only the capabilities you need before engine load, you will achieve better load times and a smaller memory footprint.

Use

```
wurfl_add_requested_capability(wurfl_handle hwurfl, const char *requested_capability);
```

to add the capabilities you need.

## wurfl\_lookup function and http headers

For better accuracy in device detection and virtual capability computation you may use `wurfl_lookup()` which receives a

header retrieve callback function pointer to be used to retrieve all http headers needed by subsequent computations. An example in C++ :

```
#include <map>
#include <string>
#include <wurfl/wurfl.h>

const char* get_header_value(const char* name, const void* headers) {
    const std::map<std::string, std::string> &headersMap = *((const std::map<std::string, std::string> *)headers);
    std::map<std::string, std::string>::iterator it = headersMap.find(header_name);

    if (it != headersMap.end()) {
        return it->second.c_str();
    }

    return 0;
}

int main() {
    std::map<std::string, std::string> headers;
    headers["User-Agent"] = "SomeUserAgent";
    headers["Device-Stock-UA"] = "SomeDeviceStockUserAgent";

    wurfl_handle hwurfl = wurfl_create();
    wurfl_error error = wurfl_set_root(hwurfl, "/usr/share/wurfl/wurfl.zip");
    if (error) {
        std::cout << wurfl_get_error_message(hwurfl) << std::endl;
        return 1;
    }

    error = wurfl_load();

    if (error) {
        std::cout << wurfl_get_error_message(hwurfl) << std::endl;
        return 1;
    }

    wurfl_device_handle hdevice = wurfl_lookup(hwurfl, get_header_value, (void*)&headers);

    if (!hdevice) {
        std::cout << "Lookup failed with error: " << wurfl_get_error_message(hwurfl) << std::endl;
    } else {
        std::cout << "The matched device's ID: " << wurfl_get_wurfl_id(hdevice) << std::endl;
        /*
         * do something else with the wurfl device handle here..
         */
        wurfl_device_destroy(hdevice);
    }

    wurfl_destroy(hwurfl);
    return 0;
}
```

## WURFL Updater features

Since 1.8.3.0 InFuze C API provides a set of new functions to allow for seamless update of the DDR file (wurfl.zip or wurfl.xml.gz). Assuming your init code is as follows :

```
wurfl_handle hwurfl = wurfl_create();

// Define wurfl db
error = wurfl_set_root(hwurfl, "/usr/share/wurfl/wurfl.zip");
if (error != WURFL_OK) {
```



```
printf("%s\n", wurfl_get_error_message(hwurfl));
return -1;
}
```

If you wish to have your `/usr/share/wurfl/wurfl.zip` file automatically updated when new DDR are released you will only need to :

```
// substitute https://data.scientiamobile.com/xxxxxxx/wurfl.zip with your data url from scientiamobile vault
error = wurfl_updater_set_data_url(hwurfl, "https://data.scientiamobile.com/xxxxxxx/wurfl.zip");
if (error != WURFL_OK) {
    printf("Updater cannot run : %s\n", wurfl_get_error_message(hwurfl));
    return -1;
}

// specify how frequent shall we check for updates
error = wurfl_updater_set_data_frequency(hwurfl, WURFL_UPDATER_FREQ_DAILY);
```

Now everything is set up and after loading your DDR

```
// Loads wurfl db into memory
error = wurfl_load(c);
if (error != WURFL_OK) {
    printf("%s\n", wurfl_get_error_message(hwurfl));
    return -1;
}
```

You will want to start the updater thread :

```
wurfl_updater_start(hwurfl);
```

For better operations logging and to troubleshoot any problem you might have we suggest to enable logging (before the first `set_data_url` call ) :

```
wurfl_updater_set_log_path(hwurfl, "updater.log");
```

File "updater.log" will contain detailed information of all background operations.

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## WURFL InFuze C++ Wrapper

A single-header object oriented C++ InFuze wrapper is available.

If interested, please check documentation [here](#).

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## API Documentation

The `wurfl.h` interface gives you access to the main WURFL functionalities. Listed below is a quick overview of the functions, along with a few example on how to correctly use them.

*Note: As of WURFL 1.5 the functions `get_capability` and `get_virtual_capability` returns a zero terminated string.*

## Typedef Documentation:

```
typedef struct wurfl_device_capability_enumerator_tag*  
wurfl_device_capability_enumerator_handle
```

**Description:**

WURFL Device capability enumerator handle, used to enumerate capabilities in a specific WURFL device.

```
typedef struct wurfl_device_tag* wurfl_device_handle
```

WURFL Device handle, used to represent an instance of WURFL device.

```
typedef struct wurfl_tag* wurfl_handle
```

**Description:**

WURFL handle, used to represent an instance of WURFL database.

## Enumeration Type Documentation:

```
enum wurfl_cache_provider
```

**Enumerator:**

WURFL\_CACHE\_PROVIDER\_NONE : do not use caching mechanisms

WURFL\_CACHE\_PROVIDER\_LRU : use a single least-recently-used cache for useragents only

WURFL\_CACHE\_PROVIDER\_DOUBLE\_LRU : use a double least-recently-used cache mechanism: useragent -> device\_id, device\_id->device handle

```
enum wurfl_engine_target
```

**Enumerator:**

WURFL\_ENGINE\_TARGET\_HIGH\_ACCURACY : DEPRECATED - please read note about "decommissioning of engine target"

WURFL\_ENGINE\_TARGET\_HIGH\_PERFORMANCE : DEPRECATED - please read note about "decommissioning of engine target"

WURFL\_ENGINE\_TARGET\_DEFAULT : engine default, high performance, generic traffic target mode

WURFL\_ENGINE\_TARGET\_FAST\_DESKTOP\_BROWSER\_MATCH : Use this option when you have significant amounts of desktop browser traffic compared to mobile device. Will return "generic\_web\_browser" wurfl\_id for the majority of web browsers.

**enum wurfl\_error****Enumerator:**

WURFL\_OK : no error.

WURFL\_ERROR\_INVALID\_HANDLE : handle passed to the function is invalid.

WURFL\_ERROR\_ALREADY\_LOAD : wurfl\_load has already been invoked on the specific wurfl\_handle.

WURFL\_ERROR\_FILE\_NOT\_FOUND : file not found during wurfl\_load or remote data file update.

WURFL\_ERROR\_UNEXPECTED\_END\_OF\_FILE : unexpected end of file or parsing error during wurfl\_load.

WURFL\_ERROR\_INPUT\_OUTPUT\_FAILURE : error reading stream during wurfl\_load or updater accessing local updated data file.

WURFL\_ERROR\_DEVICE\_NOT\_FOUND : specified device is missing.

WURFL\_ERROR\_CAPABILITY\_NOT\_FOUND : specified capability is missing.

WURFL\_ERROR\_INVALID\_CAPABILITY\_VALUE : invalid capability value.

WURFL\_ERROR\_VIRTUAL\_CAPABILITY\_NOT\_FOUND : specified virtual capability is missing.

WURFL\_ERROR\_CANT\_LOAD\_CAPABILITY\_NOT\_FOUND : specified capability is missing.

WURFL\_ERROR\_CANT\_LOAD\_VIRTUAL\_CAPABILITY\_NOT\_FOUND : specified virtual capability is missing.

WURFL\_ERROR\_EMPTY\_ID : missing id in searching device.

WURFL\_ERROR\_CAPABILITY\_GROUP\_NOT\_FOUND : specified capability is missing in its group.

WURFL\_ERROR\_CAPABILITY\_GROUP\_MISMATCH : specified capability mismatch in its group.

WURFL\_ERROR\_DEVICE\_ALREADY\_DEFINED : specified device is already defined.

WURFL\_ERROR\_USERAGENT\_ALREADY\_DEFINED : specified user agent is already defined.

WURFL\_ERROR\_DEVICE\_HIERARCHY\_CIRCULAR\_REFERENCE : circular reference in device hierarchy.

WURFL\_ERROR\_UNKNOWN : unknown error.

WURFL\_ERROR\_INVALID\_USERAGENT\_PRIORITY : specified override sideloaded browser user agent configuration not valid.

WURFL\_ERROR\_INVALID\_PARAMETER : invalid parameter.

WURFL\_ERROR\_INVALID\_CACHE\_SIZE : specified an invalid cache size, 0 or a negative value.

WURFL\_ERROR\_XML\_CONSISTENCY : WURFL data file is out of date or wrong - some needed device\_id/capability is missing.

WURFL\_ERROR\_INTERNAL : internal error. If this is an updater issue, please enable and check updater log using wurfl\_updater\_set\_log\_path().

WURFL\_ERROR\_VIRTUAL\_CAPABILITY\_NOT\_AVAILABLE : the requested virtual capability has not been licensed.

WURFL\_ERROR\_MISSING\_USERAGENT : an XML device definition without mandatory UA has been detected.

WURFL\_ERROR\_XML\_PARSE : the XML data file is malformed.

WURFL\_ERROR\_UPDATER\_INVALID\_DATA\_URL : updater data URL is missing or invalid (note: only .zip and .gz formats allowed)

WURFL\_ERROR\_UPDATER\_INVALID\_LICENSE : client license is invalid, expired etc.

WURFL\_ERROR\_UPDATER\_NETWORK\_ERROR : updater request returned an HTTP response != 200, or SSL error, etc. Please enable and check updater log using wurfl\_updater\_set\_log\_path().

WURFL\_ERROR\_ENGINE\_NOT\_INITIALIZED : prerequisite for executing an update is that the engine has been initialized (i.e., wurfl\_load() has been called)

WURFL\_ERROR\_UPDATER\_ALREADY\_RUNNING : wurfl\_updater\_start() can be called just once, when the updater is not running.

WURFL\_ERROR\_UPDATER\_NOT\_RUNNING : wurfl\_updater\_stop() can be called just once, when the updater is running.

WURFL\_ERROR\_UPDATER\_TOO\_MANY\_REQUESTS : Updater encountered HTTP 429 error.

WURFL\_ERROR\_UPDATER\_CMDLINE\_DOWNLOADER\_UNAVAILABLE : Curl executable not found. Please check path, etc

WURFL\_ERROR\_UPDATER\_TIMEDOUT : Curl operation timed out.

WURFL\_ERROR\_ROOT\_NOT\_SET : set\_root() must be called before any load() / reload() and update attempt.

WURFL\_ERROR\_WRONG\_ENGINE\_TARGET : set\_engine\_target() was called with a wrong/unrecognized parameter

## enum wurfl\_updater\_frequency

### Enumerator:

WURFL\_UPDATER\_FREQ\_DAILY : check for any updated wurfl.zip every day.

WURFL\_UPDATER\_FREQ\_WEEKLY : check for any updated wurfl.zip once a week.

## Configuration Methods:

### wurfl\_error wurfl\_add\_patch(wurfl\_handle hwurfl, const char\* patch)

#### Availability:

1.4

#### Description:

Adds a WURFL patch to the patch collection.

#### Parameters:

wurfl\_handle: The WURFL instance to add the patch to.

patch: The patch filename as a zero terminated ASCII string.

#### Returns:

WURFL\_OK: If the function terminated correctly.

wurfl\_error: If the function failed.

### wurfl\_error wurfl\_add\_requested\_capability(wurfl\_handle hwurfl, const char\* requested\_capability)

**Availability:**

1.4

**Description:**

Adds a capability to the requested capabilities collection. If this function is never called on a `wurfl_handle`, the `wurfl_load()` function will automatically load all the features in the WURFL repository. If one or more of the capabilities are added to the requested capabilities collection, only the specified ones (if available) will be loaded from the repository, resulting in a reduced memory footprint.

**Parameters:**

`wurfl_handle`: The WURFL instance.

`requested_capability`: The capability name as a zero terminated ASCII string.

**Returns:**

`WURFL_OK`: If the function terminated correctly, or a different.

`wurfl_error`: If the function failed.

**`wurfl_error wurfl_set_cache_provider(wurfl_handle hwurfl, wurfl_cache_provider cache_provider, const char* config)`**

**Availability:**

1.4

**Description:**

Sets the cache provider. Default is `WURFL_CACHE_PROVIDER_DOUBLE_LRU`.

**Parameters:**

`wurfl_handle`: The WURFL instance.

`wurfl_engine_target`: The cache provider.

`config`: The cache configuration as a zero terminated ASCII string, or a null pointer if the specified cache doesn't need any specific configuration.

**Returns:**

`WURFL_OK`: If the function terminated correctly, or another.

wurfl\_error: If the function failed.

## wurfl\_error wurfl\_set\_engine\_target(wurfl\_handle hwurfl, wurfl\_engine\_target target)

### Availability:

1.4

### Description:

Sets the engine target. Default is WURFL\_ENGINE\_TARGET\_DEFAULT.

### Parameters:

wurfl\_handle: The WURFL instance

wurfl\_engine\_target: The new engine target (WURFL\_ENGINE\_TARGET\_DEFAULT or WURFL\_ENGINE\_TARGET\_FAST\_DESKTOP\_BROWSER\_MATCH)

Use WURFL\_ENGINE\_TARGET\_FAST\_DESKTOP\_BROWSER\_MATCH option when you have significant amounts of desktop browser traffic compared to mobile device. Will return "generic\_web\_browser" wurfl\_id for the majority of web browsers.

### Returns:

WURFL\_OK: If the function terminated correctly.

wurfl\_error: If the function failed

## wurfl\_error wurfl\_set\_root(wurfl\_handle hwurfl, const char\* root)

### Availability:

1.4

### Description:

Sets the WURFL root.

### Parameters:

wurfl\_handle: The WURFL instance to set the root to.

root: The root filename as a zero terminated ASCII string

## Returns

WURFL\_OK: If the function terminated correctly.

wurfl\_error: If the function failed.

## wurfl\_error wurfl\_set\_useragent\_priority(wurfl\_handle hwurfl, wurfl\_useragent\_priority priority)

### Availability:

1.5.2

### Description:

Tells WURFL if it should prioritize use of the plain user agent (WURFL\_USERAGENT\_PRIORITY\_USE\_PLAIN\_USERAGENT) over the default sideloaded browser user agent (WURFL\_USERAGENT\_PRIORITY\_OVERRIDE\_SIDELOADED\_BROWSER\_USERAGENT).

### Parameters:

wurfl\_handle: The WURFL instance to set the root to.

wurfl\_useragent\_priority: WURFL\_USERAGENT\_PRIORITY\_USE\_PLAIN\_USERAGENT or WURFL\_USERAGENT\_PRIORITY\_OVERRIDE\_SIDELOADED\_BROWSER\_USERAGENT.

### Returns:

WURFL\_OK: If the function terminated correctly.

wurfl\_error: If the function failed.

### Example:

```
wurfl_set_useragent_priority(hwurfl, WURFL_USERAGENT_PRIORITY_USE_PLAIN_USERAGENT);
```

## wurfl\_error wurfl\_load(wurfl\_handle hwurfl)

### Availability:

1.4

### Description:



Performs WURFL root file and patch loading. Must be called after specifying root filename by calling `wurfl_set_root` to set the root file name, and optionally `wurfl_add_patch` and/or `wurfl_add_requested_capability` to respectively specify patches and requested capabilities (if no capability is requested, all capabilities from WURFL root file and patches are loaded).

**Parameters:**

`wurfl_handle`: The WURFL instance.

**Returns:**

`WURFL_OK`: If the function terminated correctly.

`wurfl_error`: If the function failed.

### **`const char* wurfl_get_last_load_time_as_string(wurfl_handle hwurfl)`**

**Availability:**

1.5.1

**Description:**

Returns a zero terminated ASCII string of the most recently successful WURFL load phase. 0 will be returned if WURFL has not been successfully initialized. The returned string has the following format: `Www Mmm dd hh:mm:ss yyyy` where `Www` is the weekday, `Mmm` the month (in letters), `dd` the day of the month, `hh:mm:ss` the time, and `yyyy` the year.

**Parameters:**

`wurfl_handle`: The WURFL instance to use.

**Returns:**

### **`wurfl_handle wurfl_create()`**

**Availability:**

1.4

**Description:**

Creates a new WURFL instance. All configuration settings must be set prior to calling this method.

**Returns:**

wurfl\_handle or a null pointer if the function failed.

**const char\* wurfl\_get\_api\_version()****Availability:**

1.5.1

**Description:**

Returns a string representing the currently used Libwurfl API version.

**const char\* wurfl\_get\_wurfl\_info(wurfl\_handle hwurfl)****Availability:**

1.5.1

**Description:**

Returns a zero terminated ASCII string containing infos on WURFL root and the loaded patches, or 0 if WURFL has not been initialized yet.

**Parameters:**

wurfl\_handle: The WURFL instance to use.

**const char\* wurfl\_get\_engine\_target\_as\_string(wurfl\_handle hwurfl)****Availability:**

1.5.1

**Description:**

Returns a string representing the currently set WURFL Engine Target. Possible values are "DEFAULT", "FAST\_DESKTOP\_BROWSER\_MATCH" or "INVALID".

**Parameters:**

wurfl\_handle: The WURFL instance to use.

**Returns:**

DEFAULT: WURFL is running in high accuracy, generic traffic default mode.

FAST\_DESKTOP\_BROWSER\_MATCH: WURFL is running in desktop browser high traffic specialized mode.

Please see "Decommissioning of engine target" note.

INVALID: An invalid mode has been set.

## WURFL Query Methods:

```
wurfl_device_handle wurfl_lookup(wurfl_handle hwurfl, wurfl_header_retrieve_callback  
header_retrieve_callback, const void *header_retrieve_callback_data)
```

**Availability:**

1.5.0

**Description:**

WURFL Device lookup function. You must provide a header retrieve function which returns a header value given a header name. If there are no headers with that name the header retrieve callback function should return 0. Otherwise, it should return the header value associated to that name.

You must also provide the header container in which all the headers are stored using the header\_retrieve\_callback\_data parameter, so the header retrieve callback function will look into it when searching for a header. The header\_retrieve\_callback function will be called at least one time during the lookup phase, but it can be called multiple times to check for additional headers.

**Parameters:**

wurfl\_handle: The WURFL instance.

wurfl\_header\_retrieve\_callback: A callback for function each time a header is looked up.

header\_retrieve\_callback\_data: A header container in which all headers are stored.

**Returns:**

A new WURFL device instance (wurfl\_device\_handle).

## wurfl\_device\_handle wurfl\_lookup\_useragent(wurfl\_handle hwurfl, const char\* useragent)

### Availability:

1.5.0

### Description:

User Agent lookup function.

### Parameters:

wurfl\_handle: The WURFL instance.

useragent: The User Agent to lookup as a zero terminated ASCII string.

### Returns:

A new WURFL device instance, or a null pointer if the function failed.

### Example:

```
wurfl_device_handle hdevice = wurfl_lookup_useragent(hwurfl, "USERAGENT");  
  
if (hdevice) {  
    cout << wurfl_device_get_id(hdevice) << endl;  
}
```

## const char\* wurfl\_device\_get\_id(wurfl\_device\_handle hwurfldevice)

### Availability:

1.4

### Description:

Returns the device id of this device

### Parameters:

hwurfldevice: The WURFL device instance.

### Returns:

The WURFL device id as a zero terminated ASCII string, or a null pointer if the function failed.

**const char\* wurfl\_device\_get\_root\_id(wurfl\_device\_handle hwurfldevice)**

**Description:**

Retrieve the root device id of this device.

**Parameters:**

hwurfldevice: The WURFL device instance.

**Returns:**

The WURFL device root id as a zero terminated ASCII string, or a null pointer if the function failed.

**const char\* wurfl\_device\_get\_useragent(wurfl\_device\_handle hwurfldevice)**

**Availability:**

1.4

**Description:**

Retrieve the User Agent for a device (as found in the WURFL repository).

**Parameters:**

hwurfldevice: The WURFL device instance

**Returns:**

The matched User Agent (as contained in the WURFL repository) as a zero terminated ASCII string, or a null pointer if the function failed.

**const char\* wurfl\_device\_get\_original\_useragent(wurfl\_device\_handle hwurfldevice)**

**Availability:**

1.5.1

**Description:**

Returns the original useragent of this device.

**Parameters:**

wurfl\_device\_handle: The WURFL device instance

**Returns:**

The original User Agent as a zero terminated ASCIIZ string, or a null pointer if the function failed.

**const char\* wurfl\_device\_get\_normalized\_useragent(wurfl\_device\_handle hwurfldevice)****Availability:**

1.5.0

**Description:**

Returns the normalized useragent of this device as a zero terminated ASCIIZ string, or a null pointer if the function failed.

**Parameters:**

hwurfldevice: The WURFL device instance.

**Returns:**

Returns the normalized useragent of this device as a zero terminated ASCIIZ string, or a null pointer if the function failed

**wurfl\_device\_handle wurfl\_get\_device(wurfl\_handle hwurfl, const char\* deviceid)****Availability:**

1.4

**Description:**

Retrieve a device by device id.

**Parameters:**

wurfl\_handle: The WURFL instance.

deviceid: The wurfl device id to lookup as a zero terminated ASCIIZ string.

**Returns:**

A new WURFL device instance, or a null pointer if the function failed.

**void wurfl\_device\_destroy(wurfl\_device\_handle hwurfldevice)****Availability:**

1.4

**Description:**

Releases a wurfl\_device\_handle. All wurfl\_device\_capability\_enumerator\_handle's relative to this device handle must be released by calling wurfl\_device\_capability\_enumerator\_destroy on them before calling this function.

**Parameters:**

hwurfldevice: The WURFL device instance to destroy.

**void wurfl\_destroy(wurfl\_handle hwurfl)****Availability:**

1.4

**Description:**

Releases a wurfl\_handle. All wurfl\_device\_handles relative to this handle must be released by calling wurfl\_device\_destroy on them before calling this function.

**Parameters:**

wurfl\_handle: The WURFL instance to destroy.

**const char\* wurfl\_device\_get\_capability(wurfl\_device\_handle hwurfldevice, const char\* capability)****Description:**

Retrieves a capability value from a device.

**Parameters:**

hwurfldevice: The WURFL device instance.

capability: The capability name as a zero terminated ASCII string.

**Returns:**

The capability value as a zero terminated ASCII string, or a null pointer if the function failed.

```
const char* wurfl_device_get_virtual_capability(wurfl_device_handle hwurfldevice, const char* capability)
```

**Description:**

Retrieves a virtual capability value from a device.

**Parameters:**

hwurfldevice: The WURFL device instance.

capability: The virtual capability name as a zero terminated ASCII string.

**Returns:**

The virtual capability value as a zero terminated ASCII string, or a null pointer if the function failed.

```
int wurfl_device_get_capability_as_int(wurfl_device_handle hwurfldevice, const char *capability)
```

**Availability:**

1.5.0

**Description:**

Retrieves a capability value as an integer value from a device.

**Parameters:**

wurfl\_device\_handle: The WURFL device instance.



capability: The capability name as a zero terminated ASCII string.

**Returns:**

Returns the capability value as an integer.

**Example:**

```
wurfl_device_handle hdevice = wurfl_lookup_useragent(hwurfl, "USERAGENT");

if (hdevice) {

    int resolutionWidth = wurfl_device_get_capability_as_int(hdevice, "resolution_width");

    if (resolutionWidth == 800) {
        cout << "Do something useful for device with a 800 width resolution" << endl;
    }
    else if (resolutionWidth == 1200) {
        cout << "Do something useful for device with a 1200 width resolution" << endl;
    }
}
```

**int wurfl\_device\_get\_virtual\_capability\_as\_int(wurfl\_device\_handle hwurfldevice, const char \*virtual\_capability)**

**Availability:**

1.5.0

**Description:**

Retrieves a virtual capability value as an integer value from a device.

**Parameters:**

wurfl\_device\_handle: The WURFL device instance.

virtual\_capability: The virtual capability name as a zero terminated ASCII string.

**Returns:**

Returns the virtual capability value as an integer.

**Example:**

```
wurfl_device_handle hdevice = wurfl_lookup_useragent(hwurfl, "USERAGENT");

if (hdevice) {

    int browserVersion = wurfl_device_get_virtual_capability_as_int(hdevice, "advertised_browser_version");

    if (browserVersion == 26) {
        cout << "Use special layout" << endl;
    }
}
```

```
else {
    cout << "Use common layout" << endl;
}
}
```

**int wurfl\_device\_get\_capability\_as\_bool(wurfl\_device\_handle hwurfldevice, const char \*capability)**

**Availability:**

1.5.0

**Description:**

Retrieves a capability value as a boolean value from a device.

**Parameters:**

wurfl\_device\_handle: The WURFL device instance.

capability: The capability name as a zero terminated ASCII string.

**Returns:**

Returns the capability value as a boolean.

**Example:**

```
wurfl_device_handle hdevice = wurfl_lookup_useragent(hwurfl, "USERAGENT");

if (hdevice) {

    bool isWireless = wurfl_device_get_capability_as_bool(hdevice, "is_wireless_device");

    if (isWireless) {
        cout << "Do something useful for a wireless device" << endl;
    }
    else {
        cout << "Do something useful for a non wireless device" << endl;
    }
}
```

**int wurfl\_device\_get\_virtual\_capability\_as\_bool(wurfl\_device\_handle hwurfldevice, const char \*virtual\_capability)**

**Availability:**

1.5.0

**Description:**

Retrieves a virtual capability value as a boolean value from a device.

**Parameters:**

wurfl\_device\_handle: The WURFL device instance.

virtual\_capability: The virtual capability name as a zero terminated ASCII string.

**Returns:**

Returns the virtual capability value as a boolean.

**Example:**

```
wurfl_device_handle hdevice = wurfl_lookup_useragent(hwurfl, "USERAGENT");  
  
if (hdevice) {  
  
    bool isAndroid = wurfl_device_get_virtual_capability_as_bool(hdevice, "is_android");  
  
    if (isAndroid) {  
        cout << "Do something useful for Android devices" << endl;  
    }  
    else {  
        cout << "Do something useful for non Android devices" << endl;  
    }  
}
```

**int wurfl\_device\_is\_actual\_device\_root(wurfl\_device\_handle hwurfldevice)**

**Description:**

Verifies if the device is an actual device root.

**Parameters**

hwurfldevice: The WURFL device instance.

**Returns:**

1 if the specified device is an actual device root, 0 otherwise.

**wurfl\_useragent\_priority wurfl\_get\_useragent\_priority(wurfl\_handle hwurfl)**

**Availability:**

1.5.2

**Description:**

Tells if WURFL is using the plain user agent or the sideloaded browser user agent for device detection. Returns either WURFL\_USERAGENT\_PRIORITY\_USE\_PLAIN\_USERAGENT or WURFL\_USERAGENT\_PRIORITY\_OVERRIDE\_SIDELOADED\_BROWSER\_USERAGENT.

**Parameters:**

wurfl\_handle: The WURFL instance to set the root to.

**Returns:**

wurfl\_useragent\_priority:

WURFL\_USERAGENT\_PRIORITY\_OVERRIDE\_SIDELOADED\_BROWSER\_USERAGENT or WURFL\_USERAGENT\_PRIORITY\_USE\_PLAIN\_USERAGENT.

```
const char* wurfl_get_useragent_priority_as_string(wurfl_handle hwurfl)
```

**Availability:**

1.5.2

**Description:**

Tells if WURFL is using the plain user agent or the sideloaded browser user agent for device detection, returning a zero terminated ASCII string.

**Parameters:**

wurfl\_handle: The WURFL instance to set the root to.

**Returns:**

WURFL\_USERAGENT\_PRIORITY\_OVERRIDE\_SIDELOADED\_BROWSER\_USERAGENT or WURFL\_USERAGENT\_PRIORITY\_USE\_PLAIN\_USERAGENT as a string.

```
int wurfl_device_has_capability(wurfl_device_handle hwurfldevice, const char* capability)
```

**Availability:**

1.5.0

**Description:**

Verifies if the device has a specific capability.

**Parameters:**

hwurfldevice: The WURFL device instance. capability: The capability name as a zero terminated ASCII string.

**Returns:**

1 if the specified device has the requested capability, 0 otherwise.

**Example:**

```
wurfl_device_handle hdevice = wurfl_lookup_useragent(hwurfl, "USERAGENT");  
  
if (hdevice && wurfl_device_has_capability(hdevice, "requested_capability")) {  
    cout << "Requested capability has been found" << endl;  
}
```

**int wurfl\_device\_has\_virtual\_capability(wurfl\_device\_handle hwurfldevice, const char\* capability)**

**Availability:**

1.5.0

**Description:**

Verifies if the device has a specific virtual capability.

**Parameters:**

hwurfldevice: The WURFL device instance.

capability: The virtual capability name as a zero terminated ASCII string.

**Returns:**

1 if the specified device has the requested virtual capability, 0 otherwise.

**Example:**

```
wurfl_device_handle hdevice = wurfl_lookup_useragent(hwurfl, "USERAGENT");  
  
if (hdevice && wurfl_device_has_virtual_capability(hdevice, "requested_virtual_capability")) {  
    cout << "Requested virtual capability has been found" << endl;  
}
```

```
int wurfl_has_capability(wurfl_handle hwurfl, const char *capability)
```

**Availability:**

1.5.3

**Description:**

Verify if a capability is a valid wurfl capability.

**Parameters:**

wurfl\_handle: The WURFL instance to use. capability: The capility to verify.

**Returns:**

1 if the capility exists, otherwise 0.

```
int wurfl_has_virtual_capability(wurfl_handle hwurfl, const char *virtual_capability)
```

**Availability:**

1.5.3

**Description:**

Verify if a virtual capability is a valid wurfl virtual capability.

**Parameters:**

wurfl\_handle: The WURFL instance to use. virtual\_capability: The capility to verify.

**Returns:**

1 if the capility exists, otherwise 0.

## WURFL Device Methods:

```
wurfl_capability_enumerator_handle wurfl_get_capability_enumerator(wurfl_handle hwurfl)
```

**Availability:**

1.5.1

**Description:**

Returns a new WURFL capability enumerator instance.

**Parameters:**

wurfl\_handle: The WURFL handle instance to use.

**Example:**

```
wurfl_handle hwurfl = [...];

wurfl_capability_enumerator_handle hcapabilityenumerator = wurfl_get_capability_enumerator(hwurfl);

while (wurfl_capability_enumerator_is_valid(hcapabilityenumerator)) {
    const char *name = wurfl_capability_enumerator_get_name(hcapabilityenumerator);

    // do something with name

    wurfl_capability_enumerator_move_next(hcapabilityenumerator);
}

wurfl_capability_enumerator_destroy(hcapabilityenumerator);
```

**wurfl\_capability\_enumerator\_handle wurfl\_get\_virtual\_capability\_enumerator(wurfl\_handle hwurfl)**

**Availability:**

1.5.1

**Description:**

Returns a new WURFL virtual capability enumerator instance

**Parameters:**

wurfl\_handle: The WURFL handle instance to use.

**Returns:**

wurfl\_capability\_enumerator\_handle: A new capability enumerator handle.

**Example:**

```
wurfl_handle hwurfl = [...];
wurfl_capability_enumerator_handle hvirtualcapabilityenumerator = wurfl_get_virtual_capability_enumerator(hwurfl);

while (wurfl_capability_enumerator_is_valid(hvirtualcapabilityenumerator)) {
```

```
const char *name = wurfl_capability_enumerator_get_name(hvirtualcapabilityenumerator);

// do something with name

wurfl_capability_enumerator_move_next(hvirtualcapabilityenumerator);
}

wurfl_capability_enumerator_destroy(hvirtualcapabilityenumerator);
```

**void wurfl\_capability\_enumerator\_destroy(wurfl\_capability\_enumerator\_handle  
hwurflcapabilityenumeratorhandle)**

**Availability:**

1.5.1

**Description:**

Releases a wurfl\_capability\_enumerator\_handle instance.

**Parameters:**

wurfl\_capability\_enumerator\_handle: The capability enumerator instance to destroy.

**int wurfl\_capability\_enumerator\_is\_valid(wurfl\_capability\_enumerator\_handle  
hwurflcapabilityenumeratorhandle)**

**Availability:**

1.5.1

**Description:**

Verifies if the WURFL enumerator instance is still valid.

**Parameters:**

wurfl\_capability\_enumerator\_handle: The WURFL enumerator handler instance to check.

**Returns:**

1 if the specified device is valid, 0 otherwise.



```
void wurfl_capability_enumerator_move_next(wurfl_capability_enumerator_handle
hwurflcapabilityenumeratorhandle)
```

**Availability:**

1.5.1

**Description:**

Moves the WURFL enumerator instance to the next capability

**Parameters:**

wurfl\_capability\_enumerator\_handle: The WURFL enumerator handler instance to check.

```
const char* wurfl_capability_enumerator_get_name(wurfl_capability_enumerator_handle
hwurflcapabilityenumeratorhandle)
```

**Availability:**

1.5.1

**Description:**

Returns the name of the current capability as a string.

**Parameters:**

wurfl\_capability\_enumerator\_handle: The WURFL enumerator handler instance to check.

**Returns:**

Returns the name of the current capability as an ASCIIZ string, or a null pointer if the function failed.

```
wurfl_device_id_enumerator_handle wurfl_get_device_id_enumerator(wurfl_handle hwurfl)
```

**Availability:**

1.5.2

**Description:**

Returns a new WURFL device id enumerator instance.

**Parameters:**

wurfl\_handle: The WURFL instance.

**Example:**

```
wurfl_handle hwurfl = [...];
wurfl_device_id_enumerator_handle hdeviceenumerator = wurfl_get_device_id_enumerator(hwurfl);

while (wurfl_device_id_enumerator_is_valid(hdeviceenumerator)) {
    const char *name = wurfl_device_id_enumerator_get_device_id(hdeviceenumerator);

    // do something with name

    wurfl_device_id_enumerator_move_next(hdeviceenumerator);
}

wurfl_device_id_enumerator_destroy(hdeviceenumerator);
```

**int wurfl\_device\_id\_enumerator\_is\_valid(wurfl\_device\_id\_enumerator\_handle  
hdeviceenumerator)**

**Availability:**

1.5.2

**Description:**

Verifies if the WURFL enumerator instance is still valid

**Parameters:**

wurfl\_device\_id\_enumerator\_handle: The WURFL device id enumerator to verify.

**Returns:**

1 if the enumerator is valid, otherwise 0.

**void wurfl\_device\_id\_enumerator\_move\_next(wurfl\_device\_id\_enumerator\_handle  
hdeviceenumerator)**

**Availability:**

1.5.2

**Description:**

Moves the WURFL enumerator instance to the next capability.

**Parameters:**

wurfl\_device\_id\_enumerator\_handle: The WURFL device id enumerator to use.

```
void wurfl_device_id_enumerator_destroy(wurfl_device_id_enumerator_handle  
hdeviceidenumerator)
```

**Availability:**

1.5.2

**Description:**

Releases a wurfl\_device\_id\_enumerator\_handle instance.

**Parameters:**

wurfl\_device\_id\_enumerator\_handle: The WURFL device id enumerator to use.

```
const char* wurfl_device_id_enumerator_get_device_id(wurfl_device_id_enumerator_handle  
hdeviceidenumerator)
```

**Availability:**

1.5.2

**Description:**

Returns the name of the current capability as an ASCIIZ string, or a null pointer if the function failed.

**Parameters:**

wurfl\_device\_id\_enumerator\_handle: The WURFL device id enumerator to use.

**Returns:**

The current capability as an ASCIIZ string, or a null pointer if the function failed.

**void**

**wurfl\_device\_capability\_enumerator\_destroy(wurfl\_device\_capability\_enumerator\_handle enumerator\_handle)**

**Availability:**

1.5.0

**Description:**

Releases a wurfl\_device\_capability\_enumerator\_handle (see wurfl\_device\_get\_capability\_enumerator).

**Parameters:**

hwurfl\_device\_capability\_enumerator\_handle: The enumerator instance to be released.

**Example:**

```
if (hdevice) {
    const char *capabilityValue = wurfl_device_get_capability(hdevice, "brand_name");

    if (capabilityValue == "Nokia") {
        cout << "Do something useful for Nokia device" << endl;
    }
    else if (capabilityValue == "HTC") {
        cout << "Do something useful for HTC device" << endl;
    }
}
```

**const char\***

**wurfl\_device\_capability\_enumerator\_get\_name(wurfl\_device\_capability\_enumerator\_handle)**

**Availability:**

1.5.0

**Description:**

The current capability name (see wurfl\_device\_get\_capability\_enumerator).

**Parameters:**

hwurfl\_device\_capability\_enumerator\_handle: The enumerator instance.

**Returns:**

The name of the current capability as an ASCII string, or a null pointer if the function failed.

**const char\***

**wurfl\_device\_capability\_enumerator\_get\_value(wurfl\_device\_capability\_enumerator\_handle)**

**Availability:**

1.5.0

**Description:**

The current capability value (see `wurfl_device_get_capability_enumerator`).

**Parameters:**

`hwurfl_device_capability_enumerator_handle`: The enumerator instance.

**Returns:**

The value of the current capability as an ASCIIZ string, or a null pointer if the function failed.

**int**

**wurfl\_device\_capability\_enumerator\_get\_value\_as\_int(wurfl\_device\_capability\_enumerator\_handle)**

**Availability:**

1.5.0

**Description:**

The current capability value as an integer (see `wurfl_device_get_capability_enumerator`).

**Parameters:**

`hwurfl_device_capability_enumerator_handle`: The enumerator instance.

**Returns:**

The value of the current capability value as an integer, or a null pointer if the function failed.

**int**

**wurfl\_device\_capability\_enumerator\_get\_value\_as\_bool(wurfl\_device\_capability\_enumerator\_handle)**

## enumerator\_handle)

### Availability:

1.5.0

### Description:

The current capability value as an boolean value (see wurfl\_device\_get\_capability\_enumerator).

### Parameters:

hwurfl\_device\_capability\_enumerator\_handle: The enumerator instance.

### Returns:

The value of the current capability value as an boolean value, or a null pointer if the function failed.

## int wurfl\_device\_capability\_enumerator\_is\_valid(wurfl\_device\_capability\_enumerator\_handle)

### Availability:

1.5.0

### Description:

Verifies if the enumerator is still valid (see wurfl\_device\_get\_capability\_enumerator).

### Parameters:

hwurfl\_device\_capability\_enumerator\_handle: The enumerator instance.

### Returns:

1 if the enumerator is valid, 0 otherwise.

## void

## wurfl\_device\_capability\_enumerator\_move\_next(wurfl\_device\_capability\_enumerator\_handle)

### Availability:

1.5.0

**Description:**

Moves the enumerator to the next capability (see wurfl\_device\_get\_capability\_enumerator).

**Parameters:**

hwurfl\_device\_capability\_enumerator\_handle: The enumerator instance.

**wurfl\_device\_capability\_enumerator\_handle****wurfl\_device\_get\_capability\_enumerator(wurfl\_device\_handle hwurfldevice)****Availability:**

1.5.0

**Description:**

Creates a new capability enumerator for a device

**Parameters:**

hwurfldevice: The WURFL device instance.

**Returns:**

A new WURFL capability enumerator instance.

**Example:**

```
wurfl_device_handle hdevice = wurfl_lookup_useragent(hwurfl, "USERAGENT");

if (hdevice) {
    wurfl_device_capability_enumerator_handle hdevicecaps = wurfl_device_get_capability_enumerator(hdevice);

    while (wurfl_device_capability_enumerator_is_valid(hdevicecaps)) {
        cout << " " << wurfl_device_capability_enumerator_get_name(hdevicecaps) << "=" << wurfl_device_capability_enumerator_get_value(hdevicecaps) << endl;
        wurfl_device_capability_enumerator_move_next(hdevicecaps);
    }
    wurfl_device_capability_enumerator_destroy(hdevicecaps);
}
```

**wurfl\_device\_capability\_enumerator\_handle****wurfl\_device\_get\_virtual\_capability\_enumerator(wurfl\_device\_handle hwurfldevice)****Availability:**

1.5.0

**Description:**

Creates a new virtual capability enumerator for a device.

**Parameters:**

hwurfldevice: The WURFL device instance.

**Returns:**

A new WURFL virtual capability enumerator instance.

**Example:**

```
wurfl_device_handle hdevice = wurfl_lookup_useragent(hwurfl, "USERAGENT");

if (hdevice) {
    wurfl_device_capability_enumerator_handle hdevicecaps = wurfl_device_get_virtual_capability_enumerator(hdevice);

    while (wurfl_device_capability_enumerator_is_valid(hdevicecaps)) {
        cout << " " << wurfl_device_capability_enumerator_get_name(hdevicecaps) << "=" << wurfl_device_capability_enum
erator_get_value(hdevicecaps) << endl;
        wurfl_device_capability_enumerator_move_next(hdevicecaps);
    }

    wurfl_device_capability_enumerator_destroy(hdevicecaps);
}
```

## WURFL Updater Methods:

**wurfl\_error wurfl\_updater\_set\_log\_path(wurfl\_handle hwurfl, const char\* log\_path)**

**Availability:**

1.8.3.0

**Description:**

Instructs the internal WURFL InFuze updater to log to file any operation/error. This is an optional call: if not used, the updater will not log anything.

**Parameters:**

wurfl\_handle: The WURFL instance.

log\_path: the path where the updater log file is created.

**Returns:**

WURFL\_OK: If the function terminated correctly.



wurfl\_error: If the function failed.

## wurfl\_error wurfl\_updater\_set\_data\_url(wurfl\_handle hwurfl, const char\* data\_url)

### Availability:

1.8.3.0

### Description:

Set remote data URL to be downloaded via internal WURFL InFuze updater. This is a MANDATORY call if you want to use the InFuze Updater.

### Parameters:

wurfl\_handle: The WURFL instance.

data\_url: the ScientiaMobile updater URL where to seek for updated WURFL data file, in the form "https://data.scientiamobile.com/xxxxx/wurfl.zip". "xxxxx" must be replaced with your personal access token, which is located in your license account page.

### Notes

- The WURFL data file and the path where it resides, specified in the setRoot() call, MUST have write/rename access: the old data file will be replaced (i.e, a rename operation will be performed) with his updated version upon successful update operation completion, and the directory will be used for remote file download, etc.
- ScientiaMobile does not distribute uncompressed XML data files via updater. This means that, if you plan to use the updater feature, you MUST use a compressed (i.e, a ZIP or a XML.GZ) file as data root in the setRoot() call.
- The WURFL InFuze Updater functionality relies on availability and features of the well-known and widely available curl command-line utility. Among others, also a check for curl availability is done in the wurfl\_updater\_set\_data\_url() call.

### Returns:

WURFL\_OK: If the function terminated correctly.

wurfl\_error: If the function failed.

## wurfl\_error wurfl\_updater\_set\_data\_frequency(wurfl\_handle hwurfl, wurfl\_updater\_frequency

## freq)

### Availability:

1.8.3.0

### Description:

Sets how often the updater checks for any new/updated WURFL data file to be downloaded and used by the engine.

### Parameters:

wurfl\_handle: The WURFL instance.

freq: the frequency of online checks, one of WURFL\_UPDATER\_FREQ\_DAILY (default) or WURFL\_UPDATER\_FREQ\_WEEKLY

### Notes

wurfl\_updater\_set\_data\_frequency() sets how often the updater checks for any updated data file, not how often the engine data file is actually updated.

### Returns:

WURFL\_OK: If the function terminated correctly.

wurfl\_error: If the function failed.

## wurfl\_error wurfl\_updater\_set\_data\_url\_timeouts(wurfl\_handle hwurfl, int connection\_timeout, int data\_transfer\_timeout)

### Availability:

1.8.3.0

### Description:

Set internal WURFL InFuze Updater timeouts, in milliseconds.

### Parameters:

wurfl\_handle: The WURFL instance.

connection\_timeout: timeout for the connection phase of updater data file download operation

data\_transfer\_timeout: timeout for the data transfer phase of updater data file download operation

## Notes

The values are mapped to curl `--connect-timeout` and `--max-time` parameters (after millisecs-to-secs conversion). Connection timeout has a WURFL InFuze default value of 10 seconds (10000 ms) and refers only to connection phase. Passing 0 will use curl value "no timeout used". Data transfer timeout has a InFuze default value of 600 seconds (600000 ms). Passing 0 will use curl default value "no timeout used". So, pass 0 to either parameter to invoke curl "no timeout used" behaviour. Pass -1 to either parameter to use WURFL InFuze default values (10 secs, 600 secs). The specified timeouts (if any) are only used in the synchronous (i.e., `runonce_updater()`) API call. The asynchronous background updater invoked by `start_updater()/stop_updater()` always runs with curl behaviour and timeouts (i.e., it will wait "as long as needed" for a new data file to be downloaded)

## Returns:

`WURFL_OK`: If the function terminated correctly.

`wurfl_error`: If the function failed.

## `wurfl_error wurfl_updater_reload_root(wurfl_handle hwurfl, const char* newroot)`

### Availability:

1.8.3.0

### Description:

Reload a given WURFL data file, rebooting engine and overwriting the old one.

### Parameters:

`wurfl_handle`: The WURFL instance.

`newroot` : the WURFL data file to reload.

### Returns:

`WURFL_OK`: If the function terminated correctly.

`wurfl_error`: If the function failed.

## `wurfl_error wurfl_updater_runonce(wurfl_handle hwurfl)`

### Availability:

1.8.3.0

**Description:**

Call a WURFL InFuze synchronous update.

**Parameters:**

wurfl\_handle: The WURFL instance.

**Returns:**

WURFL\_OK: If the function terminated correctly.

wurfl\_error: If the function failed.

**wurfl\_error wurfl\_updater\_start(wurfl\_handle hwurfl)**

**Availability:**

1.8.3.0

**Description:**

Starts the asynchronous WURFL InFuze background update thread.

**Parameters:**

wurfl\_handle: The WURFL instance.

**Returns:**

WURFL\_OK: If the function terminated correctly.

wurfl\_error: If the function failed.

**wurfl\_error wurfl\_updater\_stop(wurfl\_handle hwurfl)**

**Availability:**

1.8.3.0

**Description:**

Stops the asynchronous WURFL InFuze background update thread.

**Parameters:**

wurfl\_handle: The WURFL instance.

**Returns:**

WURFL\_OK: If the function terminated correctly.

wurfl\_error: If the function failed.

## Error Handling:

**void wurfl\_has\_error\_message(wurfl\_handle hwurfl)****Availability:**

1.5.0

**Description:**

Indicates if the last call to the WURFL library on a specific wurfl\_handle instance was successful.

**Parameters:**

wurfl\_handle: The WURFL instance.

**Example:**

```
wurfl_add_requested_capability(hwurfl, "unavailable_capability");  
  
if (wurfl_has_error_message(hwurfl)) {  
    cout << wurfl_get_error_message(hwurfl) << endl;  
}
```

**const char\* wurfl\_get\_error\_message(wurfl\_handle hwurfl)****Availability:**

1.5.0

**Description:**

Returns the last error message (if any) produced by a call to the WURFL library on a specific wurfl\_handle instance.

**Parameters:**

wurfl\_handle: The WURFL instance.

**Returns:**

The last error message as a zero terminated ASCII string, or a null pointer if the function failed.

**Example:**

```
if (error != WURFL_OK) {  
    cout << wurfl_get_error_message(hwurfl) << endl;  
}
```

## void wurfl\_clear\_error\_message(wurfl\_handle hwurfl)

**Availability:**

1.5.0

**Description:**

Clears the last error message (if any) produced by the last call to the WURFL library on a specific wurfl\_handle instance.

**Parameters:**

wurfl\_handle: The WURFL instance.

**Example:**

```
wurfl_add_requested_capability(hwurfl, "unavailable_capability");  
  
if (wurfl_has_error_message(hwurfl)) {  
    cout << wurfl_get_error_message(hwurfl) << endl;  
    wurfl_clear_error_message(hwurfl);  
}
```

**IMPORTANT - Decommissioning of MatchMode options** Prior to version 1.9 of the API, users could choose between MatchMode.Performance and MatchMode.Accuracy engine optimization options. These options had been introduced years ago to manage the behavior of certain web browsers and their tendency to present "always different" User-Agent strings that would baffle strategies to cache similar WURFL queries in memory.

As the problem has been solved by browser vendors, the need to adopt this strategy has diminished and ultimately disappeared (i.e. there was no longer much to be gained with the performance mode in most circumstances) and ScientiaMobile elected to "remove" this option to simplify configuration and go in the direction of uniform API behavior in different contexts.

When we wrote "remove" in the previous sentence, we were not being totally accurate. Customers who may find themselves in the unlikely situation of having to analyze significant amounts of legacy web

*traffic, may still enable the old high-performance internal behavior by calling `wurfl_set_engine_target(..., WURFL_ENGINE_TARGET_FAST_DESKTOP_BROWSER_MATCH)` in their engine configuration. Please note that users with the old `HIGH_PERFORMANCE` target engine will not receive an error. The old behavior will not be triggered, though. The default target (corresponding to the old High Accuracy) will be used instead.*

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