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INFUZE NGINX MODULE USER GUIDE

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WURFL InFuze Module for NGINX: User Guide

This document is aimed at developers and system administrators who intend to install and configure the WURFL InFuze module for NGINX on Unix, Linux, and other Unix-based systems.

If you are using NGINX Plus, please see the documentation for our NGINX Plus module here.

> ***Note:*** *Unlike NGINX Plus, you will still need to compile and link the NGINX module.*

Installing libwurfl

In order for the Module to work it is **ESSENTIAL** that the libwurfl library is installed on your system. libwurfl is provided in the **Downloads** section of your license in the Customer Vault.

If you have not already installed libwurfl, instructions can be found here. Release notes for each API can be found here.

> *WARNING*
>
> ***SINCE MODULE VERSION 1.8.4.1 YOU NEED TO ADD A wurfl_enable on; COMMAND TO THE http section OF YOUR CONFIGURATION FILE,***
> ***OTHERWISE THE WURFL MODULE WILL NOT BE LOADED. THIS CHANGE IS PART OF A FEATURE ALIGNMENT, NECESSARY FOR ENTERPRISE USERS OF NGINX.***

Build WURFL Module

We provide an installation script (wurfl_nginx_mod_setup.sh) which automatically installs the NGINX server and the WURFL NGINX module.
We strongly advise use of this script to quickly build NGINX with the WURFL module.

Execute wurfl_nginx_mod_setup.sh, specifying the NGINX version as the first script parameter (A.B.C), and WURFL version as the second parameter (W.X.Y.Z):

```
$ chmod +x ./wurfl_nginx_mod_setup.sh
$ ./wurfl_nginx_mod_setup.sh A.B.C W.X.Y.Z
```

> ***Tip****: Since NGINX 1.9.11, dynamic modules are supported. For WURFL NGINX module versions 1.8.1.0 and greater, you can choose to build it as a dynamic module or embedded in NGINX. If you want to build WURFL module as an NGINX Dynamic module, edit the* ***wurfl_nginx_mod_setup.sh*** *file, uncomment the line ##./configure --with-debug --with-threads --with-cc-opt=-Wno-error --add-dynamic-module=../src and comment the line ./configure --with-debug --with-threads --with-cc-opt=-Wno-error --add-module=../src*

> ***Tip****: By default, NGINX will be installed in* ***/usr/local/nginx****, which, although a good place, means that the main NGINX binary will be found in* ***/usr/local/nginx/sbin/nginx****. Have a look at the Install Options page of the NGINX wiki for full details.*

> ***Tip****: For significant performance enhancement, you might want to consider reinstalling PCRE with "just-in-time compilation", and then edit the* ***wurfl_nginx_mod_setup.sh*** *file adding --with-pcre-jit option to your ./configure call : ./configure --with-pcre-jit --with-debug --with-threads . . . . . .*
>
> ***Note:*** *The --with-pcre-jit option above tunes NGINX's* ***own*** *PCRE (used by NGINX's regex directives such as location ~, rewrite, map) and is unrelated to libwurfl's embedded PCRE2 JIT. The latter is controlled by the WURFL_PCRE_JIT environment variable â€" see Running on a Hardened (SELinux) Host below.*

***Tip**: If you choosed to build mod_wurfl as an NGINX Dynamic module, you should find the ngx_http_wurfl_module.so file in **/usr/local/nginx/sbin/nginx/modules**.*

WURFL Data Snapshot

To perform lookups, you will need a copy of your WURFL data snapshot (also referred to as thewurfl.xml). While there is one included in the release package, it is intended to be a sample and will not contain all of your licensed capabilities. Your licensed WURFL data snapshot can be accessed by following these directions.

Configuration Guide

Below is a sample nginx.conf configuration file for WURFL setup. Please refer to the Module Command Table below which explains each element in detail (Table 1), their parameters, constraints, and default recommended settings.

```
# ...

# -- Uncomment this if you are using NGINX Plus
# -- or you compiled WURFL module with --add-dynamic-module (WURFL API version 1.8.1.0 or above / NGINX OSS
 1.9.11 or above).
#load_module modules/ngx_http_wurfl_module.so;

# ...

http {
    # ...

    # -- Command to enable WURFL module. Since WURFL module version 1.8.4.1, WURFL module is DISABLED BY
DEFAULT.
    # -- Used to switch on/off WURFL module; if set 'off', NGINX will ignore all wurfl_* configuration.
    # -- If WURFL module is disabled, NGINX variables used to handle WURFL detection results (i.e: $wurfl_id , $wur
fl_cap_is_smarttv...) are still valid but their values will be "empty string".
    # -- Valid values are on/off. Default value is off.
    wurfl_enable     on;

    # -- WURFL root definition, one per config. User MUST specify this path in order to make WURFL engine correctl
y start.
    wurfl_root      /usr/share/wurfl/wurfl.zip;

    # -- WURFL Updater allows for seamless update of the WURFL Engine with new data downloaded from Scientia
Mobile.
    # -- Updater configuration must be done after wurfl_root.
    # -- WURFL file should be either .zip or .xml.gz and match the wurfl_root file type.
    # -- Apply the wurfl_updater by setting your personal updater URL from your Snapshot generator page in the C
ustomer Vault. If your license is expired, NGINX won't start with the Updater configured.
    # -- Valid values for Updater's checking frequency (how often the updater checks for any new WURFL data file
    # -- to be downloaded and used by the engine) are DAILY or WEEKLY.
    # -- Updater log file (wurfl-updater.log) will be located in the "wurfl_root" folder. The folder and wurfl.zip file sho
uld be writable, and a wurfl.zip file must already be present in order for the Updater to determine whether or not i
t has to pull an update.
    # -- by an NGINX process
    #wurfl_updater    https://data.scientiamobile.com/xxxxx/wurfl.zip DAILY;

    # -- WURFL patches definition (as much as needed, patches will be applied in the same order as specified in thi
s conf file)
    #wurfl_patch     /path/to/patch1.xml;
    #wurfl_patch     /path/to/patch2.xml;
    #wurfl_patch     /path/to/patch3.xml;

    # Increase the variable hash size
    variables_hash_max_size 1024;
    variables_hash_bucket_size 1024;
```

```
    # -- WURFL cache: one of the following
    wurfl_cache_lru 100000;
    #wurfl_cache_null;

    # -- WURFL properties (formerly "WURFL default variables")
    # -- The wurfl_request_property <property_name>; command generates a $<property_name> variable
    # -- that can be used for header injection
    # -- Since WURFL API version 1.8.0.0, WURFL default variables except "wurfl_id" are no longer injected by defau
lt
    # -- and have to be explicitly specified.
    #wurfl_request_property  wurfl_root_id;
    #wurfl_request_property  wurfl_isdevroot;
    #wurfl_request_property  wurfl_useragent;
    #wurfl_request_property  wurfl_info;
    #wurfl_request_property  wurfl_api_version;
    #wurfl_request_property  wurfl_last_load_time;
    #wurfl_request_property  wurfl_normalized_useragent;

    # -- WURFL user requested static capabilities (as an example, this is not a complete list)
    # -- The wurfl_request_capability <capability_name>; command generates a $wurfl_cap_<capability_name> va
riable
    # -- that can be used for header injection
    #wurfl_request_capability is_tablet;
    #wurfl_request_capability is_wireless_device;

    # -- WURFL user requested virtual capabilities (as an example, this is not a complete list).
    # -- Since WURFL API version 1.7.1.0, virtual capabilities are no longer injected by default
    # -- and have to be explicitly specified.
    #wurfl_request_capability advertised_device_os;
    #wurfl_request_capability is_android;

    # ...

    server {

        # ...

        # -- WURFL injection rules
        #
        # -- The following rule lists define which urls hasn't/has to be injected with wurfl data.
        #
        # -- The urls will be processed in this manner:
        #
        # -- Check if a wurfl_do_not_process_url regex matches the url. If yes, the url
        # -- itself will not be injected and no further checks will be made
        # -- If no wurfl_do_not_process_url match, check if a wurfl_process_url regex
        # -- matches the url. If yes, the url itself will be injected
        #
        # -- The fallback behaviour in case the url doesn't match any
        # -- wurfl_do_not_process_url/wurfl_process_url rule is:
        # -- INJECTION if the list of wurfl_process_url is empty
        # -- NO INJECTION if the list of wurfl_process_url is not empty
        #
        #
        # ---- Black list: defines which urls hasn't to be injected with wurfl data
        # ---- syntax: wurfl_do_not_process_url <url regex> <rule name>
        #
        # wurfl_do_not_process_url .*\.(gif|jpeg|png|css) "Static contents";
        # wurfl_do_not_process_url .*\/img\/.* "All in img folder;
        #
        #
        # ---- White list: defines which urls has to be injected with wurfl data
        # ---- syntax: wurfl_process_url <url regex> <rule name>
        #
        # wurfl_process_url .*\.(php|php4|php5) "Php scripts";
        # wurfl_process_url .*\.(jsp|asp) "Jsp/Asp scripts";

        # -- Trace wurfl injections (default value = off)
        # -- The log format is:
        # -- WURFL: Server <server name> - Whitelist hit - resource: <url> - regex: <url regex> (rule name:<rule n
ame>)
        # -- WURFL: Server <server name> - Blacklist hit - resource: <url> - regex: <url regex> (rule name:<rule na
me>)
        # -- <server name> is the value of server_name property, or, if empty, a number indicating
        # -- which server section the log is relative to
        #
```

```
        # wurfl_log_header_injection on;

        # ...

        # Example of uses with PHP FastCGI (Note: PHP is not a requirement!)
        location ~ \.php$ {
            root           html;
            fastcgi_pass   127.0.0.1:9000;
            fastcgi_index  index.php;
            fastcgi_param  SCRIPT_FILENAME  /var/www$fastcgi_script_name;
            include        fastcgi_params;

            ############ WURFL data passed to fastcgi PHP scripts
            #
            ######## WURFL properties (formerly "WURFL default variables"): add here to make them available to
fastcgi PHP scripts.
            ######## Property "wurfl_id" is injected by default (see http section) and could be specified here
            fastcgi_param  WURFL_ID                      $wurfl_id;
            #fastcgi_param  WURFL_ROOT_ID                $wurfl_root_id;
            #fastcgi_param  WURFL_ISDEVROOT              $wurfl_isdevroot;
            #fastcgi_param  WURFL_ORIGINAL_USERAGENT     $wurfl_useragent;
            #fastcgi_param  WURFL_INFO                   $wurfl_info;
            #fastcgi_param  WURFL_API_VERSION            $wurfl_api_version;
            #fastcgi_param  WURFL_LAST_LOAD_TIME         $wurfl_last_load_time;
            #fastcgi_param  WURFL_NORMALIZED_USERAGENT   $wurfl_normalized_useragent;
            #
            #
            ######## WURFL capabilities: headers injected by into Request by wurfl engine.
            ######## Add here to make them available to fastcgi PHP scripts.
            #
            #### specify the static capabilities needed in webapp (as an example, this is not a complete list)
            #fastcgi_param  WURFL_IS_TABLET              $wurfl_cap_is_tablet;
            #fastcgi_param  WURFL_IS_WIRELESS_DEVICE     $wurfl_cap_is_wireless_device;
            #
            #### specify the virtual capabilities needed in webapp (as an example, this is not a complete list)
            #fastcgi_param  WURFL_ADVERTISED_DEVICE_OS   $wurfl_cap_advertised_device_os;
            #fastcgi_param  WURFL_IS_ANDROID             $wurfl_cap_is_android;
        }
        # ...
    }
}
```

Important Note

If you are using NGINX with the builtin wurfl updater make sure that the folder that contains the wurfl.zip file is writable to all. Even if nginx starts as root, worker child processes might run as unpriviliged user ("nobody" by default) and this prevents workers engine updater to correctly update the wurfl.zip file during normal operations.

Running on a Hardened (SELinux) Host

On SELinux-enforcing hosts (RHEL, Rocky, AlmaLinux, Oracle Linux, â€¦) NGINX runs in the confined httpd_t domain, so the WURFL module is subject to SELinux policy. Check the current state with getenforce and getsebool -a | grep httpd.

JIT and the httpd_execmem boolean

libwurfl compiles its internal regular expressions with the PCRE2 **JIT**, which maps memory as writable-and-executable.

On a hardened host the httpd_execmem boolean is **off** by default, so that mapping is denied and the WURFL engine cannot initialize â€” NGINX logs WURFL: Engine creation failed and refuses to start.

Rather than relaxing the host by turning httpd_execmem on, disable libwurfl's JIT by setting WURFL_PCRE_JIT=off.

The variable must be present in NGINX's **launch** environment: the WURFL engine initializes in the master process while the configuration is parsed, so NGINX's own env directive â€” which only reaches worker processes â€” is too late.

Use a systemd drop-in:

```
$ sudo mkdir -p /etc/systemd/system/nginx.service.d
$ sudo tee /etc/systemd/system/nginx.service.d/wurfl.conf >/dev/null <<'EOF'
[Service]
Environment=WURFL_PCRE_JIT=off
EOF
$ sudo systemctl daemon-reload
$ sudo systemctl restart nginx
```

NGINX now starts and serves WURFL detection with `httpd_execmem` left **off**.

> ***Note:*** *The WURFL_PCRE_JIT switch requires libwurfl* ***1.14.1.2*** *or later.*
>
> *On earlier versions the only option is to enable the boolean:`sudo setsebool -P httpd_execmem on`.*

Data file labels

The wurfl_root data file must carry an SELinux type that `httpd_t` can read:

```
$ sudo chcon -t httpd_sys_content_t /usr/share/wurfl/wurfl.zip
```

If you enable the **Updater**, the module writes the refreshed data file (and `wurfl-updater.log`) inside the wurfl_root folder, so the whole directory must be read-write for `httpd_t` and writable by the worker user:

```
$ sudo semanage fcontext -a -t httpd_sys_rw_content_t '/usr/share/wurfl(/.*)?'
$ sudo restorecon -Rv /usr/share/wurfl
$ sudo chown -R nginx:nginx /usr/share/wurfl
```

Updater network access

The Updater downloads the data file with `curl`, so when it is enabled the `httpd_t` domain must be allowed outbound connections:

```
$ sudo setsebool -P httpd_can_network_connect on
```

WURFL NGINX Module command table

The following table shows directives which can be applied to configure and use the WURFL NGINX Module.

Section	Syntax	Description	Availability

Section	Syntax	Description	Availability
http	**wurfl_enable**	Enable/Disable the WURFL module. Since version 1.8.4.1, the WURFL module is disabled by default and will need to be enabled: wurfl_enable on; Otherwise all WURFL commands will be ignored and the WURFL module will not be loaded. Possible values: on/off. Default value: off.	1.9
http	**wurfl_root**	Defines the location (path) of the WURFL data file.	1.4

Section	Syntax	Description	Availability
	wurfl_updater	Allows seamless updates of the WURFL Engine with new data downloaded from Scientiamobile. This directive must follow wurfl_root. It takes two parameters: • the data url (taken from the **Snapshot generator** page of your ScientiaMobile Customer Vault, choosing between two data file types: .zip or .xml.gz) Take care that wurfl_root file type and wurfl_updater data url file types match so you may need to change the wurfl_root file type accordingly. Please note that in the case your license is expired, NGINX won't start with Updater configured. • the updater checking frequency (how often the updater checks for any new WURFL data file to be downloaded and used by the engine) which you can choose between DAILY and WEEKLY. In order to let the Updater perform its activities both the wurfl_root folder and file must be writable by NGINX. The wurfl-updater.log file in wurfl_root folder will contains details on Updater activity.	1.8.3
	wurfl_patch	Adds one or more custom patch files to the WURFL repository.	1.4

Section	Syntax	Description	Availability
	wurfl_target_default or **wurfl_target_fast_desktop_browser_match** or **wurfl_target_performance** or **wurfl_target_accuracy**	**These configuration options are deprecated and will be removed in a future release.**	1.4
	wurfl_cache_lru or **wurfl_cache_null**	In order to increase performance while processing real HTTP traffic, we suggest setting up a LRU cache. The LRU caching strategy will speed up lookup operations on processed User Agents by keeping them in an LRU map. By default the cache will be set to 30000 entries which accounts for 7 to 10 MB of additional memory usage. Specific concerns regarding memory usage apart, users are advised to size their cache generously (100,000 or more) to increase performance. For more information, please see LRU Cache Mechanism.	1.4

Section	Syntax	Description	Availability
	wurfl_request_capability	Enables injection of WURFL Static Capabilities/Virtual Capabilities in the HTTP request headers with your specified parameter(s). Syntax: **wurfl_request_capability <static capability/virtual capability name>** You can find the complete list of WURFL Static Capabilities and WURFL Virtual Capabilities here. If a Static Capability/Virtual Capability is specified in a wurfl_request_capability command, WURFL NGINX module set a NGINX variable whose name is **wurfl_cap_**	1.4
	wurfl_useragent_priority_override_sideloaded_browser_useragent or **wurfl_useragent_priority_use_plain_useragent**	**These configuration options are deprecated and will be removed in a future release.**	1.5.2
	wurfl_request_property	Enables injection of WURFL Properties (see section WURFL Properties below) in the HTTP request headers. Syntax: **wurfl_request_property <variable name>** Not mandatory.	1.8

Section	Syntax	Description	Availability
server	**wurfl_do_not_process_url**	A regular expression defining which URLs hasn't to be injected with wurfl data. Syntax: **wurfl_do_not_process_url <url regex> <rule name>** Not mandatory. You can specify more than one wurfl_do_not_process_url The URLs will be processed in this manner: Check if a wurfl_do_not_process_url regex matches the URL. • If yes, the URL itself will not be injected and no further checks will be made. • If no, check if a wurfl_process_url regex matches the url. • • If yes, the url itself will be injected The fallback behaviour in case the url doesn't match any wurfl_do_not_process_url/wurfl_process_url rule is: • **INJECTION** if the list of wurfl_process_url is empty • **NO INJECTION** if the list of wurfl_process_url is not empty	1.8

Section	Syntax	Description	Availability
	wurfl_process_url	A regular expression defining which URLs has to be injected with wurfl data. Syntax: **wurfl_process_url <url regex> <rule name>** Not mandatory. You can specify more than one wurfl_process_url. The urls will be processed in this manner: Check if a wurfl_do_not_process_url regex matches the URL. • If yes, the URL itself will not be injected and no further checks will be made. • If no, check if a wurfl_process_url regex matches the URL. • • If yes, the URL itself will be injected The fallback behaviour in case the URL doesn't match any wurfl_do_not_process_url/wurfl_process_url rule is: • **INJECTION** if the list of wurfl_process_url is empty • **NO INJECTION** if the list of wurfl_process_url is not empty	1.8
	wurfl_log_header_injection	Enable/disable logging of occurred injections. You can choose between **on**/**off** Not mandatory. (default value is off)	1.8

WURFL Properties

The WURFL NGINX module sets some useful convenience NGINX variables to retrieve information regarding the currently active WURFL configuration.

These variables are automatically calculated and are injected in HTTP requests if specified in a

wurfl_request_property command.

Please note that the wurfl_id variable is injected by default so you don't have to sepcify it in a wurfl_request_property command.

WURFL Properties Table

Variable Name	Contents	Availability
wurfl_id	Contains the device ID of the matched device. It is injected by default so you don't have to specify it in a wurfl_request_property command	1.4
wurfl_root_id	Contains the device root ID of the matched device.	1.4
wurfl_isdevroot	Tells if the matched device is a root device. Possible values are "TRUE" or "FALSE"	1.4
wurfl_useragent	The original useragent coming with this particular web request	1.5.1
wurfl_api_version	Contains a string representing the currently used libwurfl API version	1.5.1
wurfl_engine_target	**This property is deprecated and will be removed in a future release.**	1.5.1
wurfl_info	A string containing information on the parsed WURFL data file and its full path	1.5.1
wurfl_last_load_time	Contains the UNIX timestamp of the last time WURFL has been loaded successfully.	1.5.1
wurfl_normalized_useragent	The normalized useragent.	1.5.1.3
wurfl_useragent_priority	**This property is deprecated and will be removed in a future release.**	1.5.2

Running NGINX Web Server

Once you have configured NGINX and are ready to test the installion by launching the webserver, use the following command:

```
sudo /usr/local/nginx/sbin/nginx
```

> ***Tip:*** *This guide only instructs you on how to start and stop NGINX manually. There are many different online guides that shows how to build init scripts for NGINX, here is an example site.*

To see if NGINX is running, go to your server's IP address. You should see a 'welcome to NGINX' message, indicating that NGINX is installed. Alternatively, check to see if the NGINX process is running by executing this command:

```
sudo ps aux | grep nginx
```

To stop the NGINX service manually, you can take advantage of thepid file to identify process ID.

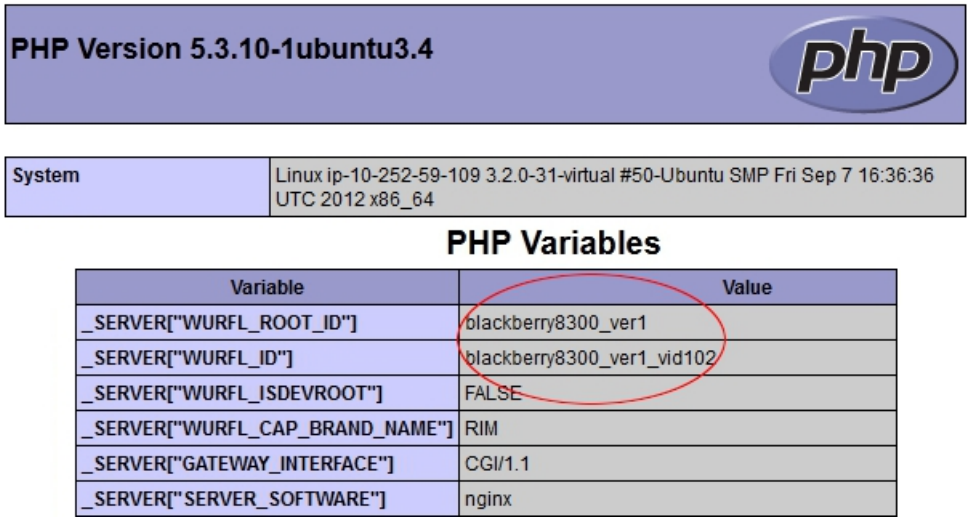
```
sudo kill `cat /usr/local/nginx/logs/nginx.pid`
```

Verify WURFL Installation

At the end of the installation procedure, your NGINX web server will be enhanced with the new WURFL API capabilities to support a variety of use-cases that rely on your NGINX instance becoming aware of device information. Among other things, NGINX will augment HTTP requests with new headers such as: X-Wurfl-Is-Tablet, X-Is-Full-Desktop and the relative values as defined in WURFL. This will enable services deployed downstream to take advantage of device detection in the simplest way possible (getHeader() and similar).

> ***Note:*** *Pre-selected capabilities and header names are shown for this example (the actual choice of header names is configurable).*

The WURFL module for NGINX enables organizations to leverage device and browser information within the very tools, frameworks and programming languages that they have previously elected to use. For example, assuming that a RIM BlackBerry 8830 device requests a PHP phpinfo() page (assuming that PHP is installed), the following information would be returned by the system thanks to the WURFL NGINX module:



PHP Version 5.3.10-1ubuntu3.4

System	Linux ip-10-252-59-109 3.2.0-31-virtual #50-Ubuntu SMP Fri Sep 7 16:36:36 UTC 2012 x86_64

PHP Variables

Variable	Value
_SERVER["WURFL_ROOT_ID"]	blackberry8300_ver1
_SERVER["WURFL_ID"]	blackberry8300_ver1_vid102
_SERVER["WURFL_ISDEVROOT"]	FALSE
_SERVER["WURFL_CAP_BRAND_NAME"]	RIM
_SERVER["GATEWAY_INTERFACE"]	CGI/1.1
_SERVER["SERVER_SOFTWARE"]	nginx

PHP variables now include HTTP headers that contain device information. This information can be leveraged by downstream applications to tailor the content to the capabilities of the requesting device. For example, assuming we choose the X-Wurfl-* notation for the environment variables or HTTP headers, the following PHP code can be used to determine if the requesting device is a tablet:

```
// PHP
if ($_SERVER['X-Wurfl-Is-Tablet'] == 'true') {
    //Do whatever makes sense for a tablet
```

```
}
```

Java, ASP.NET, Perl, Python and everything that can run in a CGI environment can take advantage of the functionality.

Running PHP Script on NGINX

In order to run the example script above, you will need to install PHP FastCGI. It is highly recommended that you use PHP-FPM (FastCGI Process Manager) for its features and ease of installation. Use the following command to install the latest PHP-FPM package:

```
sudo apt-get install php5-fpm
```

Then run PHP5-FPM in the background, using the following init.d script to start the process:

```
sudo /etc/init.d/php-fpm start
```

At this point, we are ready to create a simple test script. Test the capabilities filters with the following PHP script test.php to put in /usr/local/nginx/html:

```
//PHP - test.php
phpinfo(INFO_ENVIRONMENT);
```

The test.php script will return an extended result of what can be seen in Figure 1. You can use any kind of mobile device to load the site and see their unique device capabilities.

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