

Welcome!

PHP Inside

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Derick Rethans



- Dutchman living in London
- PHP development
- Author of the `mcrypt`, `input_filter`, `dbus`, `translit` and `date/time` extensions
- Author of `Xdebug`
- Contributor to the Apache Zeta Components Incubator project (formerly eZ Components)
- Freelancer doing PHP (internals) development



Am I mad?



My First Application

- is the new hello world
- Simple web API to get data
- Authentication with HTTP basic auth
- Simple interface: some buttons, an edit box and a list of tweets



- is a PHP binding for the GTK+ widget set
- It comes as an extension for PHP
- It wraps around many GTK+ widgets
- GUI can be created from PHP:

```
<?php
$tb = new GtkToolbar();
$tb->set_show_arrow( false );
$tb->set_property( 'toolbar-style', Gtk::TOOLBAR_BOTH );
$tb->set_property( 'icon-size', 6 );
$this->updatebutton = GtkToolButton::new_from_stock( Gtk::STOCK_REFRESH );
$lbl = new GtkLabel();
$lbl->set_markup( '<span underline="single">U</span>pdate' );
$this->updatebutton->set_label_widget( $lbl );
$this->updatebutton->connect_simple( 'clicked', array( $this, 'update' ) );
$this->updatebutton->add_accelerator( 'clicked', $accels, Gdk::KEY_U, Gdk::MOD1_MASK, 0 );
$this->updatebutton->set_use_underline( true );
$tb->insert( $this->updatebutton, -1 );
```

Getting PHP on the device

- It's an ARM processor
- Cross compiling vs compiling on the device

Cross-compiling:

- Requires cross-compilation set-up
- Tricky, and caused libtool problems for me

Compiling on the device

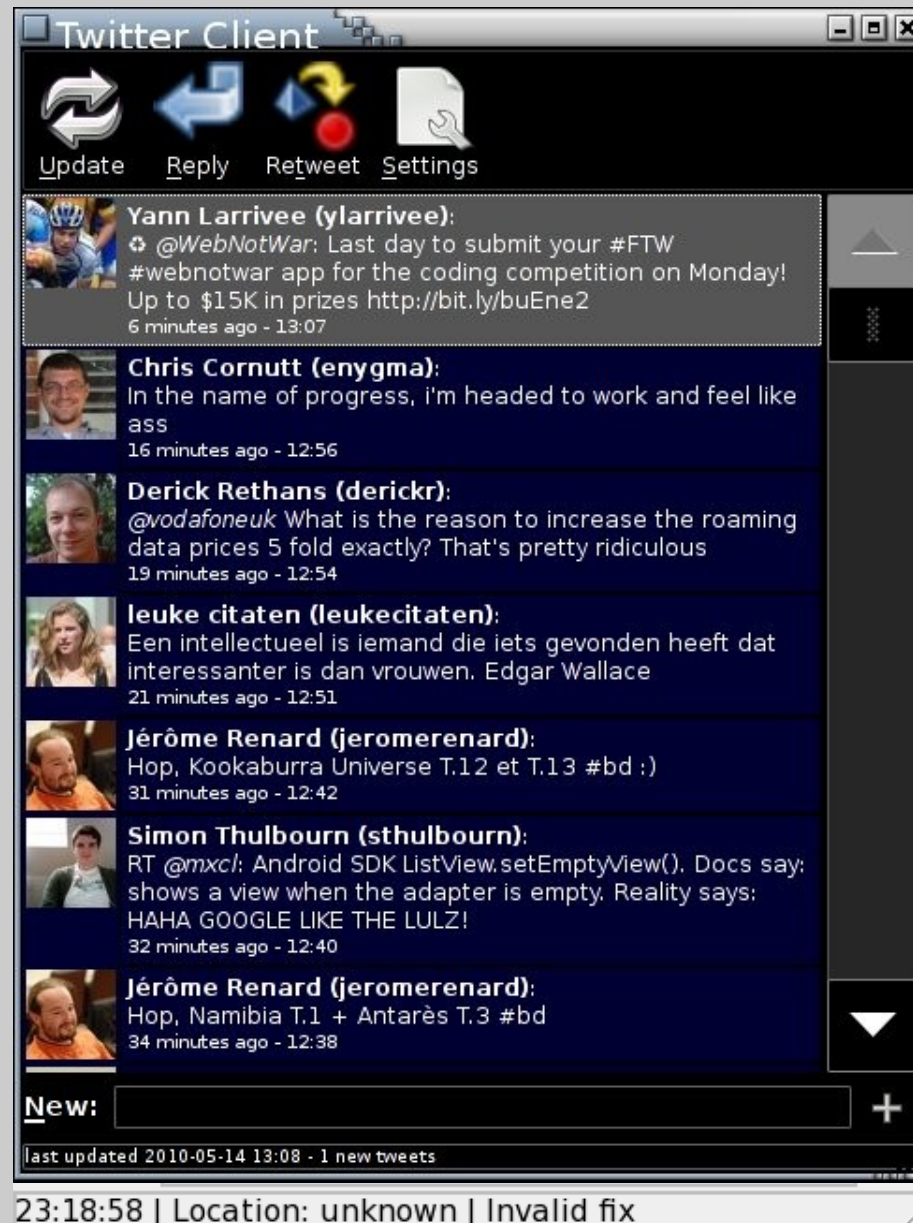
- All packages need to be found and installed
- Compiling PHP is really slow, you really don't want to use `make clean`

- You can't really run a database server on the phone
- SQLite is part of PHP, and self-contained
- Indexes are vital on this platform
- Clever use of SQL/Data manipulation is required for performance

Twitter App Experiences

- Starting the app is not fast
- Styling with GTK is tricky, especially if you want to run the app on the desktop too
- Twitter API is very unstable, and inaccessible at times; it's also badly designed
- You pull in way too much data than you need
- My fingers are really fat
- Can't really have the app running for a long time

Twitter Client: The Result



Tube service update at 10:22pm

Bakerloo	Good service
Central	Good service
Circle	Severe delays
District	Severe delays
H'smith & City	Good service
Jubilee	Good service
Metropolitan	Good service
Northern	Good service
Piccadilly	Good service
Victoria	Good service
Waterloo & City	Planned closure

- Provides status updates through
- If you're traveling, it's really handy to have this information with you
- There is no API, so you need to scrape
- Widget provided for embedding:
- Strict rules about colours etc.:

▼ **Can I modify the colour schemes in any of the feeds to suit my own site design?**

No. All TfL syndicated feeds must use the official colour schemes as supplied within the feed.

Testing has shown that any deviation from the normal TfL colour scheme makes the information feel less trustworthy to customers. Keeping to these rules means people who use your feeds can be confident that the information is from an official source

- It's probably not totally legal

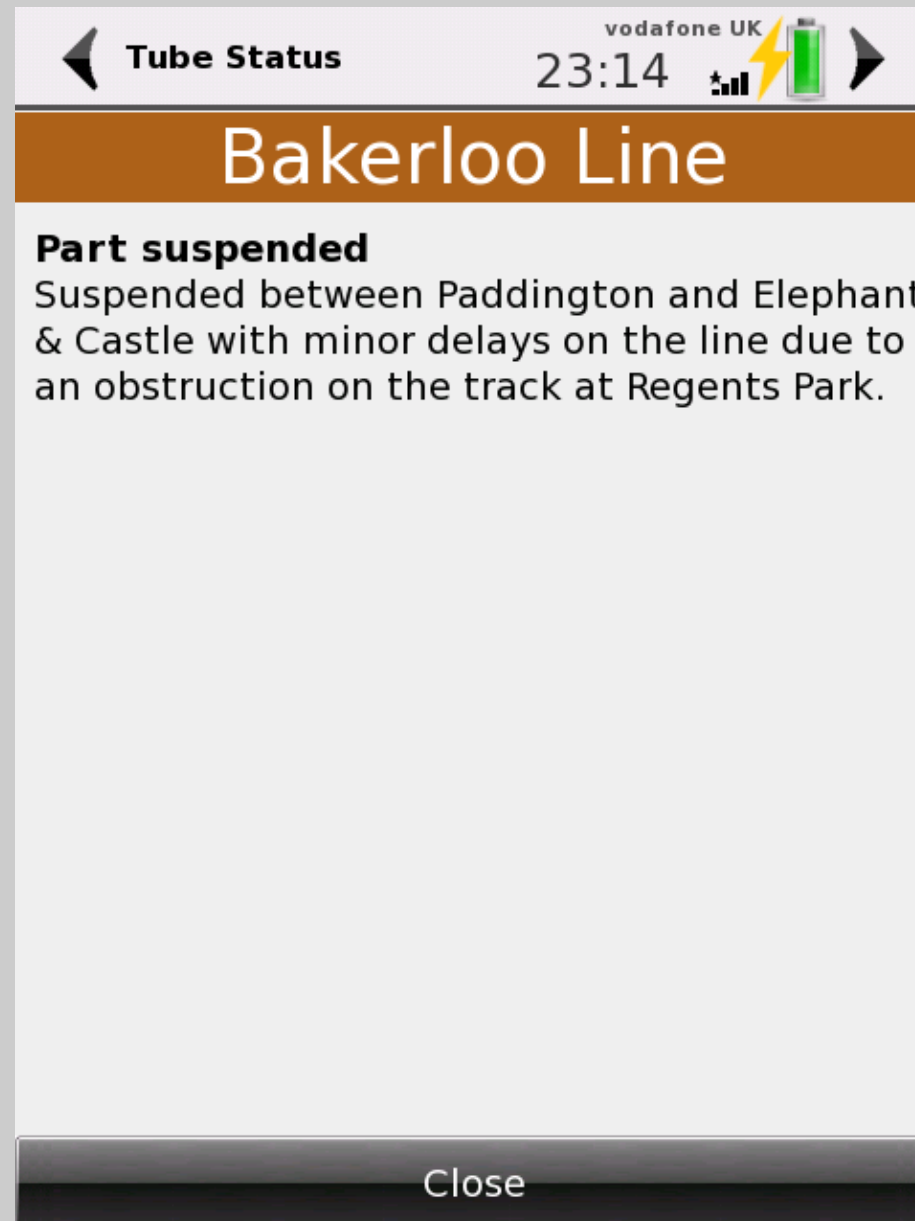
Scraping the Tube status

- It's a ~25kb download; with GPRS the download time is about 5 seconds
- It has lots of mark-up and JavaScript that we're not interested in
- Using PHP to get the data we want from it is relatively slow
- If the format changes, all the installed apps need to be updated

- The download with status is only 0.5kb
- The API caches the download
- It only provides the data in JSON that we require:

```
{
  "date":1273835118,
  "status":[
    ["Bakerloo",["Good service",""]],["Central",["Good service",""]],
    ["Circle",["Good service",""]],["District",["Good service",""]],
    ["H'smith & City",["Good service",""]],["Jubilee",["Good service",""]],
    ["Metropolitan",["Good service",""]],["Northern",["Good service",""]],
    ["Piccadilly",["Good service",""]],["Victoria",["Good service",""]],
    ["Waterloo & City",["Good service",""]]
  ]
}
```

- Parsing the JSON is fast, very little processing needed in the app, just display
- If the HTML changes, only the scraping algorithm needs to be changed



The screenshot shows a mobile application interface for Tube Status. At the top, there is a status bar with a back arrow, the text "Tube Status", the time "23:14", the carrier "vodafone UK", signal strength, a battery icon with a lightning bolt, and a right arrow. Below this is a brown header bar with the text "Bakerloo Line". The main content area has the heading "Part suspended" in bold, followed by the text "Suspended between Paddington and Elephant & Castle with minor delays on the line due to an obstruction on the track at Regents Park." At the bottom, there is a dark grey button labeled "Close".

Tube Status

vodafone UK 23:14

Bakerloo Line

Part suspended
Suspended between Paddington and Elephant & Castle with minor delays on the line due to an obstruction on the track at Regents Park.

Close

Talking to the hardware

- Many applications (phonebook, sending SMS) that came with the phone were suboptimal
- Writing a new GUI is possible, but talking to the hardware requires D-BUS
- D-BUS APIs are exposed by the freesmartphone project that the Linux distribution uses
- PHP didn't have a D-BUS extension

- DBUS bindings using the low-level C library (libdbus)
- Provides proxy objects
- Implements automatic-marshalling of data
- Provides specific classes for full control
- Support for method invocation, method calls, sending and receiving signals
- (Basic) support for introspection

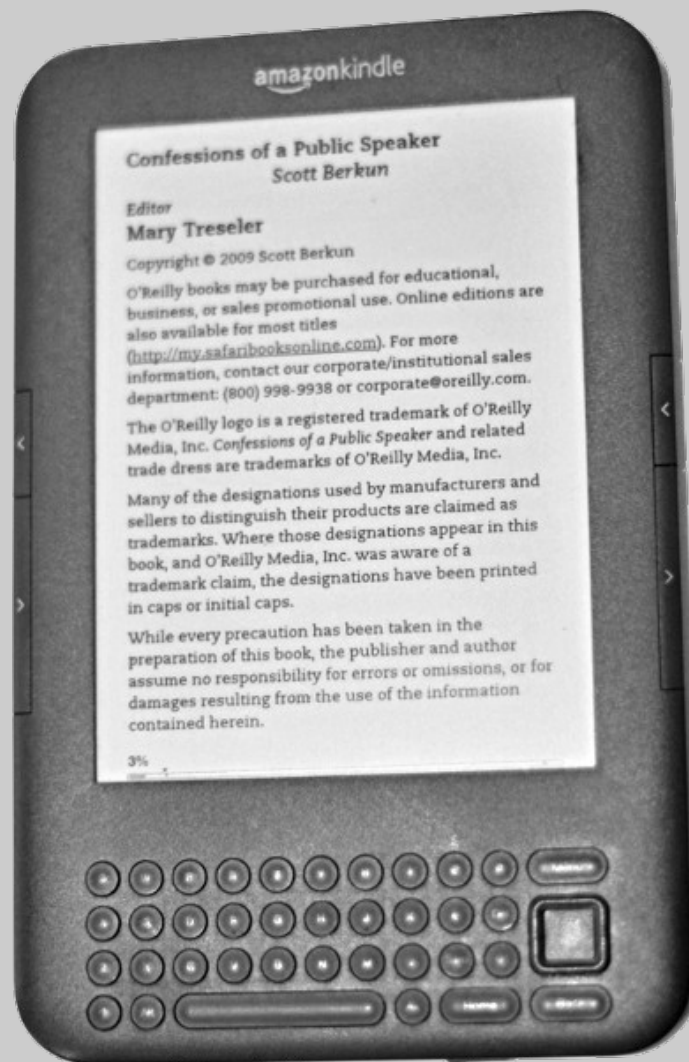
Talking to a DBUS object from PHP

Activating the screensaver

screensaver.php:

```
<?php
$d = new Dbus;
$n = $d->createProxy (
    "org.gnome.ScreenSaver",
    "/org/gnome/ScreenSaver",
    "org.gnome.ScreenSaver"
);

var_dump($n->GetActive());
$n->SetActive( true );
var_dump($n->GetActive());
sleep(5);
$n->SetActive( false );
?>
```





Playing around with your Kindle can make Amazon angry



In order to get shell, you have to do the following:

- Install a jailbreak
- Install USB networking
- Install Launchpad
- <http://www.mobilerread.com/forums/showthread.php?t=88004>

```
derick@whisky: ~ - Terminal
derick@whisky:~$ ssh kindle

Welcome to Kindle!

#####
# NOTICE * NOTICE * NOTICE #
#####
Rootfs is mounted read-only. Invoke mntroot rw to
switch back to a writable rootfs.
#####
[root@kindle root]#
```



- **Install the cross compilers from Emdebian:**

```
echo "deb http://www.emdebian.org/debian/ testing main"  
>> /etc/apt/sources.list  
apt-get update  
apt-get install gcc-4.3-arm-linux-gnueabi
```

- **Cross compile PHP**

- **Copy it over and run:**

```
scp sapi/cli/php root@kindle:/tmp  
ssh root@kindle /tmp/php  
[root@kindle root]# /tmp/php -v PHP 5.3.6-dev (cli) (built:  
Mar 7 2011 13:42:56) Copyright (c) 1997-2011 The PHP Group  
Zend Engine v2.3.0, Copyright (c) 1998-2011 Zend  
Technologies
```

- **Install the cross compilers from Emdebian:**

```
echo "deb http://www.emdebian.org/debian/ testing main" >>
/etc/apt/sources.list
apt-get update
apt-get install gcc-4.3-arm-linux-gnueabi
```

- **Configure "like normal":**

```
CC='arm-linux-gnueabi-gcc' \ '/home/derick/dev/php/php-
src/branches/PHP_5_3/configure' \ '--disable-all' \ '--
prefix=/home/derick/install/kindle/cross/target' \ '--enable-
sockets' \ '--enable-pcntl' \ '--with-pcre-regex'
```

- **make**
- **Edit the last line, remove everything until arm-
linux-gnueabi-gcc**
- **Add -static after -fvisibility=hidden**
- **Replace every .lo with .o**
- **Run**

```
arm-linux-gnueabi-gcc -export-dynamic -g -O2 -fvisibility=hidden
-static ext/date/php_date.o .... -lcrypt -o sapi/cli/php
```

The Kindle:

- Runs Linux
- Does not run X, but a framebuffer
- Has WiFi (and 3G), but requires a proxy to work

Getting GTK to run on framebuffer is a pain, and so far I have not managed to get PHP-GTK running on it.



Kindle Hacking

Accessing the screen

- Open framebuffer `/dev/fb0`
- `mmap` the open file
- Screen data is stored with every two pixels stored in one byte, in total 800 rows, with 300 bytes per row (600 pixels)

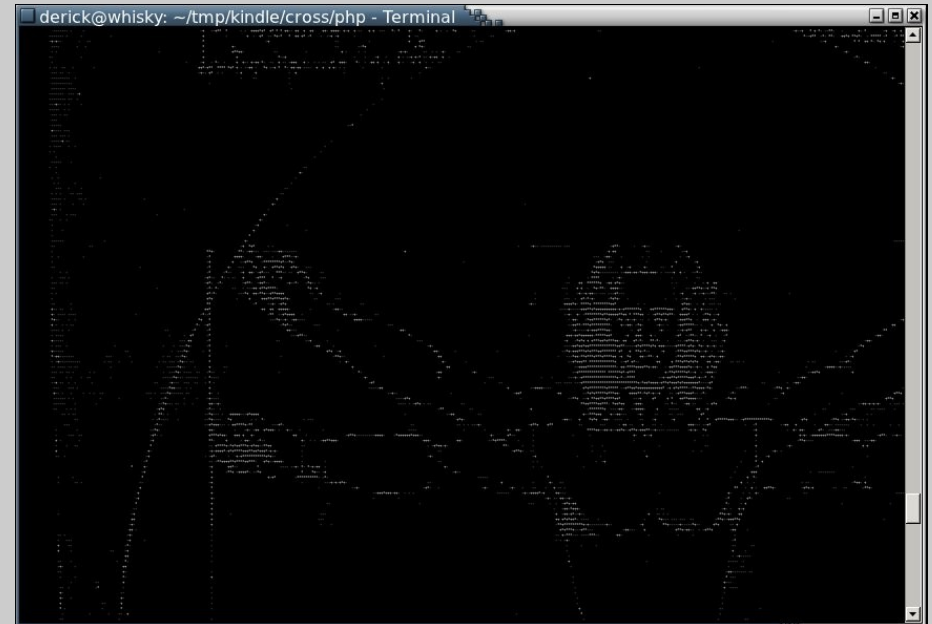
(40 more)

```
66 55 55 65 66 54 45 68 CF FF (290 more)
```

```
77 77 66 78 77 65 65 55 7B FF (290 more)
```

(858 more)

```
7B = 0111 1011
      \--' \--'
      |      \----- 2nd nibble: 11/15
      \-----1st nibble: 7/15
```



Kindle Hacking

Downloading files from PHP

You need to use Amazon's proxy

- Each request with the proxy needs to be authenticated, otherwise:

```
HTTP/1.1 403 Forbidden+for+Client3A+amz5F2020
Date: Thu, 03 Mar 2011 20:54:10 GMT
Content-Type: text/html
Transfer-Encoding: chunked
x-kn-retry: 300
```

There is a problem with your Kindle account. Please call Customer Service at 1-866-321-8851 or 1-206-266-0927. For UK customers, please call +44(0)800 496 2449.

```
<?php
$url = "tcp://87.238.83.84:80";

$fp = stream_socket_client($url, $errno, $errstr, 1);
if (!$fp) {
    echo "$errstr ($errno)<br />\n";
} else {
    fwrite($fp, <<<ENDREQ
GET http://derickrethans.nl/ws/tubestatus.ws.php HTTP/1.1\r
Host: derickrethans.nl\r
User-Agent: Mozilla/5.0 (Linux; U; en-US) AppleWebKit/528.5+ (KHTML, like Gecko, Safari/528.5+) Version/4.0 Kindle/3.0
(screen 600x800; rotate)\r
Referer: http://mobile.twitter.com/\r
Cache-Control: max-age=0\r
Accept-Encoding: gzip\r
Accept-Language: en-US\r
x-fsn: R0pdR...personal-key...qpxX1J\r
x-kn-appId: BBookletV3\r
\r
\r
ENDREQ
);
while (!feof($fp)) {
    echo fgets($fp, 1024);
}
fclose($fp);
}??>
```

What is left?

- A PHP extension to talk to the screen
- Figure out how to stop the Kindle's main application from running when our own app is going
- How to write an interface, and or interface with the keyboard just like the Kindle does

Conclusion

- Mobile devices have little memory and CPU power
- Bandwidth is a real issue
- Lack of APIs
- PHP can run on them, but whether it's smart is to be seen
- Issues with proprietary systems
- Next experiment: PHP on Android/WebOS/Meeego?

Thanks!

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