PHP Weather Version 2.2.0

Reference and Users Guide released on 2004-01-01

Martin Geisler ⟨gimpster@phpweather.net⟩

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Introduction

PHP Weather is script written in PHP that can decode a METAR. A *METAR*[1] is a weather report used for avionic purposes — it has information about the temperature, the wind speed and direction, the clouds, the current weather phenomena, and so on. The information is presented in a special coded format, a format which PHP Weather can decode.

The METAR reports are made at about 4,500 airports from around the world, so there is a good chance that you live near one of them. And the airports make an report once or twice an hour, so you will be able to provide fresh reports on your website.

The reports from all over the world are stored at the National Weather Service (the *NWS*, see `http://www.nws.noaa.gov/`) which is a department under the National Oceanic and Atmospheric Administration (*NOAA*, see `http://www.noaa.gov/`) of the United States. The reports are available using both HTTP and FTP — PHP Weather uses HTTP because it is the fastest of the two protocols.

Once you have got hold of a METAR, you will want to display the weather report contained within it. A textual display, known as a *pretty print* looks like this:

> This is a report for **Aalborg, Denmark**. The report was made **33** minutes ago, at **21:50** UTC. The wind was blowing at a speed of **2.1** meters per second (**4.6** miles per hour) from **east** (100°). The temperature was **16** °C (**61** °F), with a dew-point at **15** °C (**59** °F). The atmospheric pressure was **1017** hPa (**30.03** inHg). The relative humidity was **93.8%**. There were no clouds below **1524** meter (**5000** feet) and no cumulonimbus clouds. The overall visibility was greater than **10** kilometers (**6.2** miles).

Each station is uniquely identified by it is *ICAO* code. ICAO is an abbreviation for the International Civil Aviation Organization.

You can control the output in various ways:

- You can change the HTML markup that is inserted before and after each value in the report. Using '`<b>`' and '`</b>`' gives you **bold letters** whereas '`<font color="navy">`' and '`</font>`' gives you navy-blue colored text. The choice is yours, see Section 3.1.1 [Changing the Output], page 6.
- You can change the language of the report. The report is built by combining many tiny strings which can be translated into other languages. There is also support for more diverse translations, see Section 4.1 [Diverse Translations], page 9.

Instead of text, you can also have PHP Weather select icons for you that match the current weather conditions.

[1] The abbreviation METAR is a French abbreviation for "message d'observation météorologique régulière pour l'aviation" which roughly translates to English as "Aviation Routine Weather Report".

1 Installation

PHP Weather has been designed so that it is easy to install it. After you have obtained PHP Weather, just unpack it somewhere on your webserver and load the file '`index.php`' in your favorite browser.

The next section will give you more details.

1.1 Installation Details

The first thing to do, is to get hold of PHP Weather. The official PHP Weather homepage can be reached at `http://phpweather.net/` and you will be able to download the latest version of PHP Weather from the "Downloads" section.

After you have downloaded PHP Weather in your favorite format (we provide files in three formats: '`tar.gz`', '`tar.bz2`', and '`zip`') you should unpack it in a temporary place. If the file you downloaded is called '`phpweather-x.y.tar.gz`', then it will be unpacked in a directory called '`phpweather-x.y`'. Upload this directory with all its files to your webserver.

PHP Weather has now been installed! Use your browser to load the file '`index.php`' found in the root-directory of the PHP Weather installation and see how it works. You will be presented with a demonstration of PHP Weather.

2 Configuration

Although PHP Weahter works right out of the package, you should configure it before you start to use it on your frontpage.

2.1 The 'defaults.php' file

The behaviour of PHP Weather is controlled by several things. All options have default values, but they can be changed in several places. The value of an option is found by this process:

1. The file '`defaults-dist.php`' in the root-directory of the PHP Weather installation is read using `include`. This defines the initial values of the options.
2. Next, the file '`defaults.php`' is read if it exists. This file is not part of the PHP Weather distribution, but should be created by you if you want to change some of the defaults from '`defaults-dist.php`'.
3. You can supply an array when you create an object from the PHP Weather codebase. The following code will create a `phpweather` object with the ICAO set to '`EKAH`':

   ```
   $weather = new phpweather(array('icao' => 'EKAH'));
   ```

   You can (of course) change several options at the same time, the general template for this is

   ```
   $weather = new phpweather(array('option-1' => 'value-1',
                                   'option-2' => 'value-2',
                                   ...,
                                   'option-n' => 'value-n'));
   ```

4. You can change some of the options after you have created the object. If you want to change the current ICAO of a `phpweather` object, then you will use the `set_icao` method like this:

   ```
   $weather->set_icao('EKYT');
   ```

The idea is, that you should create a '`defaults.php`' file with the options that you will always want to use — things like database and proxy settings. To create the file, you should use the supplied script '`make_config.php`' found in the '`config`' directory.

Load the script in the browser and follow the instructions. In short, then you build the configuration file by repeatedly choosing/changing options until the all say "Input accepted". You will notice that all options are at their default settings when you load the page initially — you will have to change something and press the "Update Options" button before anything changes.

When you press the button, the page will reload, and the configuration file found at the bottom is updated with your new selections. Also, your selection might give your more choices such as when you change the `use_proxy` option from "No" to "Yes". When you press the update button you will be presented with input fields for the `proxy_host` and the `proxy_port`. Because we cannot anticipate the name of your proxy, the `proxy_host` will be set to nothing (the empty string "") initially. Since this is not a valid hostname, you will see a text in red that says exactly this.

Continue to make changes to the options. When you are happy with the configuration you should press the "Download the Configuration" button. Your browser should ask you

where to same the downloaded file — save it as '`defaults.php`' in the root of your PHP Weather installation.

All new objects created will now start out with the options in this file. This means that you can store sensitive things like database passwords in just one location, instead of having it scattered through out all the scripts that use PHP Weather. Just remember to protect the '`defaults.php`' file itself if you put your password in it!

2.2 Choosing a Database Backend

PHP Weather works by retrieving weather reports called METARs. It takes some time to get the METARs, so you will be interested in using a local database as a cache. All database backends support the same features (see Section 2.3 [Required Functions in a Backend], page 5 for details) but differ in speed. Your version of PHP might also lack support for some of the backends. PHP Weather supports the following databases backends:

`null` This is the default "database" backend, but it is not really a database. It pretends to cache the METARs, but in reallity it just throws them away. This means that PHP Weather will have to fetch them from the NWS again each time.

This makes the `null` backend the slowest backend if you repeadaly need the same METAR, e.g. if you show the current weather for a fixed location on your homepage. But it is just as quick (or slow, depending on how you view things) as the other backends when it comes to showing the weather for a random station. So if that is your typical usage-pattern, then you might like this backend.

`pw_mysql` You can use the MySQL relational database with PHP Weather.

`pw_pgsql` You can also choose to use a PostgreSQL database.

`pw_dba` This database backend uses normal files on the webserver to do the caching. You will have to ensure that the PHP process on the webserver can write to the '`db/files`' directory so that the necessary files can be created and maintained.

After you have chosen a database backend, you will have to initialize the database. You should first generate the appropriate '`defaults.php`' file, see Section 2.1 [The defaults.php file], page 3.

After you have uploaded the file to the webserver, you can load the script '`make_db.php`' found in the '`config`' directory in your favorite browser. When you press the "Create or Recreate Tables" button the database will be initialized. If you have selected a SQL-based database, then the necessary tables will be created.

If you have selected a file-based database, then the script will attempt to create the necessary files. This might very well fail: the script is run by the webserver, and the webserver will most likely *not* have permission to create new files in the '`db/files`' directory under the PHP Weather root directory because the webserver runs as an unprivileged user.

So, you will have to change the permission on the '`db/files`' directory. Assuming that the webserver is running some form of Unix and that you have shell access to the machine, then you can execute the following commands after you have logged into the webserver. If you do not have that kind of access to the machine, then you should still be able to change the permissions using your FTP program. The relevant commands are:

```
cd /root/directory/of/phpweather/installation
chmod 777 db/files
chmod 777 db/files/*
```

Everybody will now be allowed to create and change files under the '`db/files`' directory. **This is a security risk!** If you know of a better way to allow the webserver read/write access to the files, please use that instead and tell us so that we can update the manual.

2.3 Required Functions in a Backend

All database backends have to support a common set of methods — if PHP had support for *interfaces*, then we would require them to implement a database interface. Because of the lack of interfaces in the PHP language we are left with this description of what a database backend has to satisfy.

All database backends are defined in their own class which is a subclass of the `pw_db_common` class. If we pretend that we have a `pw_db_foo` database backend, then it must implement the following methods:

get_type Method on `pw_db_foo`
: This should return the type of the backend, '`foo`' in our case.

connect Method on `pw_db_foo`
: This is called by every other method that wants to ensure that the database is up and running. The method should cache the result of this operation as it will be called several times.

disconnect Method on `pw_db_foo`
: This disconnects from the database.

insert_metar *$station $metar $timestamp* Method on `pw_db_foo`
: Inserts a METAR into the database.

3 Using PHP Weather

Now that you have learned about how to install and configure PHP Weather, you might want to learn how you can use it on your own webpages.

3.1 Output Modules

The textual output you have seen on the '`index.php`' demonstration page is produces by an *output module* called `pw_text`. The images are selected by another module called `pw_images`.

These modules illustrate the idea behind PHP Weather: the code in '`phpweather.php`' handles the parsing of the METAR and then someone else has to present the data in a meaningful way.

3.1.1 Changing the Output

You can change the output of PHP Weather.

3.2 The Raw Data

It is easy for you to get hold of the raw data produced by the code in '`phpweather.php`':

```
$weather = new phpweather();
$data = $weather->decode_metar();
```

The variable `$data` is now an multidimensional associative array filled with all the information that the `decode_metar` function was able to extract from the METAR. The different parts in the METAR is stored under specific keys in the array — if the METAR lacks a given part, then the corresponding entry in the array will be left out. This means that you will have to check each entry with the built-in PHP function `empty` before you use it, otherwise you see warnings from PHP, if you have set the error reporting level high enough.

You can have PHP show you the structure of the array by using the builtin `print_r` function like this:

```
echo "<pre>\n";
print_r($data);
echo "</pre>\n";
```

The following entries is always part of a METAR report, and is therefore always part of the decoded METAR array:

`type` This can either be '`METAR`' or '`SPECI`' and denotes the type of the report. This is not used for anything.

`metar` The raw METAR report.

`icao` The ICAO of the station which made the report.

`location` The English name of the station.

`time` A UNIX timestamp corresponding to the time of the report.

The following entries are all optional so check with `empty` before accessing them:

`report_mod`
: A report modifier which gives information about how the report was made: '`AUTO`' for a fully automated report with no human intervention or '`COR`' for a corrected report. It is supposed to be part of all METARs, but experience shows that it is not.

`wind`
: This is an array with information about the wind. The `deg` entry tells you the direction of the wind as compass-direction. If the wind came from variable directions, then will be the string '`VRB`'.

  The `meters_per_second`, `miles_per_hour`, and `knots` entries tells you the wind speed in various units.

  If gust was observed, there will be three extra entries: `gust_meters_per_second`, `gust_miles_per_hour`, and `gust_knots`.

  If the wind was varying, then two extra entries are present: `var_beg` and `var_end`. Both of these entries contain a compass-direction

`visibility`
: This is an array with visibility information. Each entry in the array is a separate visibility group.

  Each visibility group contains a `prefix` which can be '`-1`', '`0`', or '`1`' which tells you if the visibility reported is "less than", "normal", or "greater than" respectively.

  The visibility itself is stored in the `meter`, `km`, `ft`, and `miles` entries. There is an optional entry `dir` for a direction — if there is no direction, then the visibility refers to the overall visibility.

`runway`
: This is an array of runway groups. Each entry is a separate group.

  The groups contain an `nr` entry and an optional `approach` entry which tells you the runway-number and the approach respectively. The approach is one of '`L`', '`C`', or '`R`' for "left", "center", or "right" respectively.

  The visibility information can either be a single value or a pair of values in case of varying conditions. If there is only a single value, then `meter` and `ft` holds the visibility, an optional `prefix` can be '`-1`' if range is less than the lowest reportable value or '`1`' if greater than the greatest reportable value. A `tendency` entry holds either '`D`', '`N`' or '`U`' for "downward tendency", "no distinct tendency", or "upward tendency" respectively.

`weather`
: This holds the current weather phenomena and is one of the most interesting groups. It is an array of weather groups which means that the the first group will be `$data['weather'][0]`, the second group (if there is such a group) will be `$data['weather'][1]`, and so on.

  Each group contains a `proximity` entry which can be either '`VC`' for phenomena in the vicinity or the empty string otherwise.

  Next comes the `intensity`. This can be '`-`' for light phenomena, the empty string for moderate phenomena, or '`+`' for heavy phenomena.

  This is followed by a `descriptor`, a `precipitation`, a `obscuration`, and finally a `other` entry. These entries contain the actual data found in the METAR. This

means that it's up to the application to decode these symbols further, so that '`RA`' becomes "rain" and so on.

`clouds` This is an array of cloud groups. Each group has a `condition` entry which can be either '`CAVOK`' for no clouds and no significant weather, '`VV`' for "vertical visibility", '`FEW`' for "few clouds", '`SCT`' for "scattered clouds", '`BKN`' for "broken clouds", '`OVC`' for "overcast", and '`SKC`' and '`CLR`' for "clear sky". The condition '`CAVOK`' is a bit special, because if it is present, then the `condition` entry will be the only entry in the cloud group.

The other conditions will be part of a larger array with an optional `cumulus` entry denoting the presence of cumulonimbus ('`CB`') or towering cumulus ('`TCU`') clouds. There will also be `meter` and `ft` entries with the height of the clouds. If the clouds are below the station, then the height will be stored as '`nil`'. Theres an optional `prefix` with the usual meaning.

`temperature`
This is the temperature group. It is an array with two or four entries: `temp_c` and `temp_f` is always present and is the temperature in degrees Celsius and Fahrenheit respectively. If information about the dew-point is present, then `dew_c` and `dew_f` will be added to the array.

`temp_min_max`
Some stations report the minimum and maximum temperature over various timescales. The temperatures are stored in `min6h_c`, `min6h_f`, `max6h_c` and `max6h_f` for the temperatures in the last 6 hours, and in `min24h_c`, `min24h_f`, `max24h_c` and `max24h_f` for the temperatures in the last 24 hours.

`altimeter`
This is the air pressure measured in various units. The array has these entries: `inhg`, `mmhg`, `hpa`, and `atm`.

`precipitation`
This is an array which stores the precipitation measured over various timescales. The entries `mm` and `in` contains the precipitation during the last hour, entries `mm_h6` and `in_6h` store the amount of precipitation in the last 3–6 hours and finally there is `mm_24h` and `in_24h` with the precipitation measured over the last 24 hours. If there has been snowfall, then that will be reported in the `snow_mm` and `snow_in` entries.

All the entries can contain the special value '`-1`' which means that there was only a trace of precipitation.

`remarks` Anything which is not recognized is added to this entry.

4 Translating PHP Weather

You can translate PHP Weather into other languages that the ones provided in the package you downloaded.

4.1 Diverse Translations

PHP Weather has facilities ready that makes it possible to totally redefine the generated text from within a translation.

5 Things To Do

PHP Weather is a work in progress — it will probably never be finished because people seams to have a never-ending thirst for new features.

This an attempt to list some of the things that PHP Weather might do in the future:

- Parse Terminal Aearodome Forecasts (TAF) reports. These reports are similar to METAR reports, the difference is that they contain *forecasts* instead of just the current weather. This is of course much more interesting that the current weather conditions.

  There is more information about how to decode TAF reports at this website: http://www.awc-kc.noaa.gov/awc/help/taf-decode.html.
- Improve the system used to select units. It would be nice, if the user could choose a unit for each element displayed instead of just having to choose between metric and imperial units.
- Add support for other timezones than UTC so that people can say that they want the time reported in their local timezone.
- Have PHP Weather calculate the time of sunset and -rize automatically based on latitude and longitude data for the stations. This information would be used to select correct sun/moon images.
- It should be possible to calculate the local time for a given station based on the same geographical data combined with data about local daylight saving times.

6 History

I began writing PHP Weather in June 2000. I had been talking with Kristian Kristensen ⟨zianet@zianet.dk⟩ about making such a script for a project we were both working on. But it was only after the project was finished, that I began investigating the possibilities of making a script with PHP that could display the current weather.

I knew that it was possible to do such a thing, as I had seen a couple of applets (small programs that serves only one purpose, such as displaying the time or the amount of free space on the hard drive, etc.) that could display the weather. I discovered that they got their data from the NWS who makes the data available at no cost.

The data is available off the Internet via either FTP or HTTP, so it is easy to get hold of it with PHP. The only problem was that the data has to be decoded because it is written in a compact fashion. The data in question is a so-called METAR report that the airports issue once or twice an hour.

I then discovered a script written in Perl that could take a METAR and split it into its components. The script was written by Jeremy D. Zawodny ⟨Jeremy@Zawodny.com⟩ and is licensed under the GPL just like PHP Weather. So there was no problem with me peeping at his code for PHP Weather. I took the logic from the Perl script and wrote a function in PHP that would decode a METAR.

But that would not do it — to be useful the decoded data has to be displayed in a nice fashion, preferable so that it is easy to customize. The script should also be able to fetch a METAR from the NWS and once that is done, the METAR should be cached so that the script would run faster after the METAR had been fetched once. The problem is, that it takes about a second to contact the NWS.

I wanted to see the data I could extract from the METAR in a meaningfull way, so I started wrapping the data in English words to form sentences like in "The temperature is 20 degrees Celsius (68 degrees Fahrenheit)". That turned out very nice so I released the code to the public.

I did not think about internationalization then, but after a while, I received a Spanish translation made by Eduardo Guilenea. Because the script was not ready for internationalization, he had simply gone through the script and translated all the English words into Spanish.

That promped me to start thinking about how we could translate PHP Weater into other languages. I quickly found out, that it would work if we kept the strings used in external files instead of having them in the main '`phpweather.inc`' file. The users could then simply use `include(locale_da.inc)` to get Danish output.

As things started to grow, it became apparent that PHP Weather would have to be reorganized. I wanted a more flexible structure, a structure that would allow us to extend PHP Weather in the future without having to mess with the code that does the actually parsing of the METARs. We also had to be able to support databases in a cleaner way — the code in '`phpweather.inc`' had turned into a mess.

So I started to split the file up into several files, and also started to use classes in PHP. This was the first time I had to do an object oriented design, so it was very exciting.

The result is the current PHP Weather, and it does have a quite flexible structure. All locale-specific code has been moved out from the main parsing algorithms, so that PHP

Weather can be truly localized. All access to the database is now done through a database abstraction layer: each database is defined in its own class, so it is free to implement the various methods any way it wants.

7 Contributors

Everybody listed below has helped in some way with the creation of PHP Weather. If, by some mistake, your name isn't listed below, then send a mail to Martin Geisler ⟨gimpster@gimpster.com⟩ so that proper credit can given. Please include your SourceForge login, if any, and an URL if you like.

Kristian Kristensen (kkrz)
: He made the interface to PostgreSQL.

Jeremy D. Zawodny
: He wrote `Geo::METAR`, which is a Perl module which can do some of the things PHP Weather now does. `Geo::METAR` can be found here: http://www.wcnet.org/jzawodn/perl/Geo-METAR/index.html.

Enrico Lodolo
: For suggesting that I use http to get the METARs instead of the much slower ftp.

Stefan Wiesendanger
: For rewritting some large `case`- and `switch`-statements as a couple of arrays. This speeds-up the parsing of the METARs.

Mike
: He noticed that the pressures was all wrong. I though the unit used in the METAR was hPa, when it really was inHg.

Jeffrey Y. Sue
: Suggested that I told people how to turn off the warnings, if you don't establish a connection to MySQL.

  Later he made it possible to use PHP Weather with DBM databases. He also added support for precipitation. Lots of other stuff, see the '`ChangeLog`' for more details.

Rutger Lubbers
: Noticed that South/southeast was duplicated in the directions-array.

Eduardo Guilenea
: Translated PHP Weather into Spanish, and thereby forced me to add support for multiply languages. (Which was a Good Thing :-)

Sven-Erik (seasoft)
: Translated PHP Weather into Norwegian.

  He also sat down and did the boring work, when he manually compiled the complete list of all airports available from NWS.

Maciek Uhlig
: Noticed that I sometimes tried to access `$cloud_coverage_array` with just `$cloud_coverage` — which, of cause, didn't work.

Ing. Vladimir Kotala
: Suggested that I changed the long text '`... degrees Celsius`' into the more compact '`... C`', which is much better.

Gyulai Mihály (misibacsi) http://gyulai.freeyellow.com/
: Made the Hungarian translation for PHP Weather. He has also corrected tons of spelling errors.

Johnny Funder
: Lots of explanations and suggestions. He also gave a much simpler formula for calculating the relative humidity.

Ray van Beek
: Helped me spot a little error with the current weather. He has also written code that displays the current weather as an image.

David Kjellquist
: Added support for windchill.

Max Hammond (iridium)
: Lots of different things: bugfixes, clever suggestions, and general maintenance.

Jesús Peñas
: Made the Spanish translation.

Ondrej Jombik (nepto)
: Translated PHP Weather into Slovak and rewrote the navigation system used in index.php. He also looked at the MySQL and PostgreSQL database and found some security flaws.

Reini Urban
: Fixed some problems with using PHP Weather on a default installation of PHP 4.2.

Kari Salovaara and Tage Malmen
: Translated PHP Weater into Swedish and Finnish.

Paul Kairis
: Wrote the code that handles connections through a proxy server.

Bas Elshof
: Translated PHP Weather into Dutch.

Václav Ríkal
: Made a Czech translation.

Radoslava Fedáková
: Czech translation.

Guillaume Petit
: Translated PHP Weather into French.

Rudy Boedts
: Updated the Dutch translation.

Konrad Tadesse
: Finally, a working German translation.

Andrew Simpson (andrewsimpson)
: Reported problems with the use of short open tags in a couple of files.

Jim Whitehead
: Fixed the rounding of hours and minutes in the pretty-printed report.

Ferhat Bingol
: Made a Turkish translation.

Renato Gallmetzer
: Provided us with an Italian translation.

Pablo Alcaraz (pabloa)
: Updated the Spanish translation and other bugfixes.

Etienne Tourigny (etienne_t)
: Added a method that decodes TAF reports and made some of the database backends archive the data instead of always replacing the old data with new reports.

Justin Heideman
: Drew a full set of beautiful icons for PHP Weather to display the current weather conditions.

Warren Rohner
: Updated the South African stations in the '`stations.csv`' file.

Appendix A Licenses

Because we believe in Open Source, we have licensed the code in PHP Weather under the GNU General Public License and the manual under the GNU Free Documentation License. This license is similar to the GPL, it is just aimed for documentation.

This means that you are allowed to use PHP Weather on as many websites as you like, and you are even allowed to use it on commercial websites.

A.1 GNU General Public License

Version 2, June 1991

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