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Welcome!

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What is Wrong Here?

```
<?php
    $sql = "
        SELECT card_num, card_name, card_expiry
        FROM credit_cards
        WHERE uid = '{$_GET['uid']}'
    ";
?>
```

```
http://example.com/script.php?uid=42
```

```
SELECT card_num, card_name, card_expiry
FROM credit_cards
WHERE uid = '42'
```

!

```
http://example.com/script.php?uid=42'%20or%20''='
```

```
SELECT card_num, card_name, card_expiry
FROM credit_cards
WHERE uid = '42' or ''=''
```

What is Wrong Here?

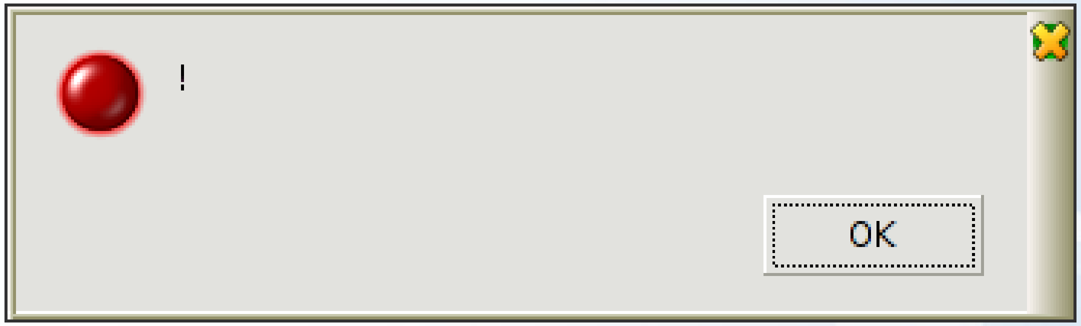
```
<html>
    <head>
        <title>Example</title>
    </head>
    <body>
        Name: <?php echo $_GET['name']; ?>
    </body>
</html>
```

```
http://example.com/script.php?name=derick
```

Name: derick

!

```
http://example.com/script.php?name=<script>alert('!');</script>
```



Casting

```
<?php
    $uid = (int) $_GET['uid'];
    $sql = "
        SELECT card_num, card_name, card_expiry
        FROM credit_cards
        WHERE uid = '{$uid}'
    ";
?>
```

```
http://example.com/script.php?uid=42
```

```
SELECT card_num, card_name, card_expiry
FROM credit_cards
WHERE uid = '42'
```

:-)

```
http://example.com/script.php?uid=42'%20or%20''='
```

```
SELECT card_num, card_name, card_expiry
FROM credit_cards
WHERE uid = '42'
```

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Filtering

```
<html>
    <head>
        <title>Example</title>
    </head>
    <body>
        Name: <?php echo htmlentities($_GET['name']); ?>
    </body>
</html>
```

```
http://example.com/script.php?name=derick
```

Name: derick

:-)

```
http://example.com/script.php?name=<script>alert('!');</script>
```

&lt;script>alert('!');&lt;/script>

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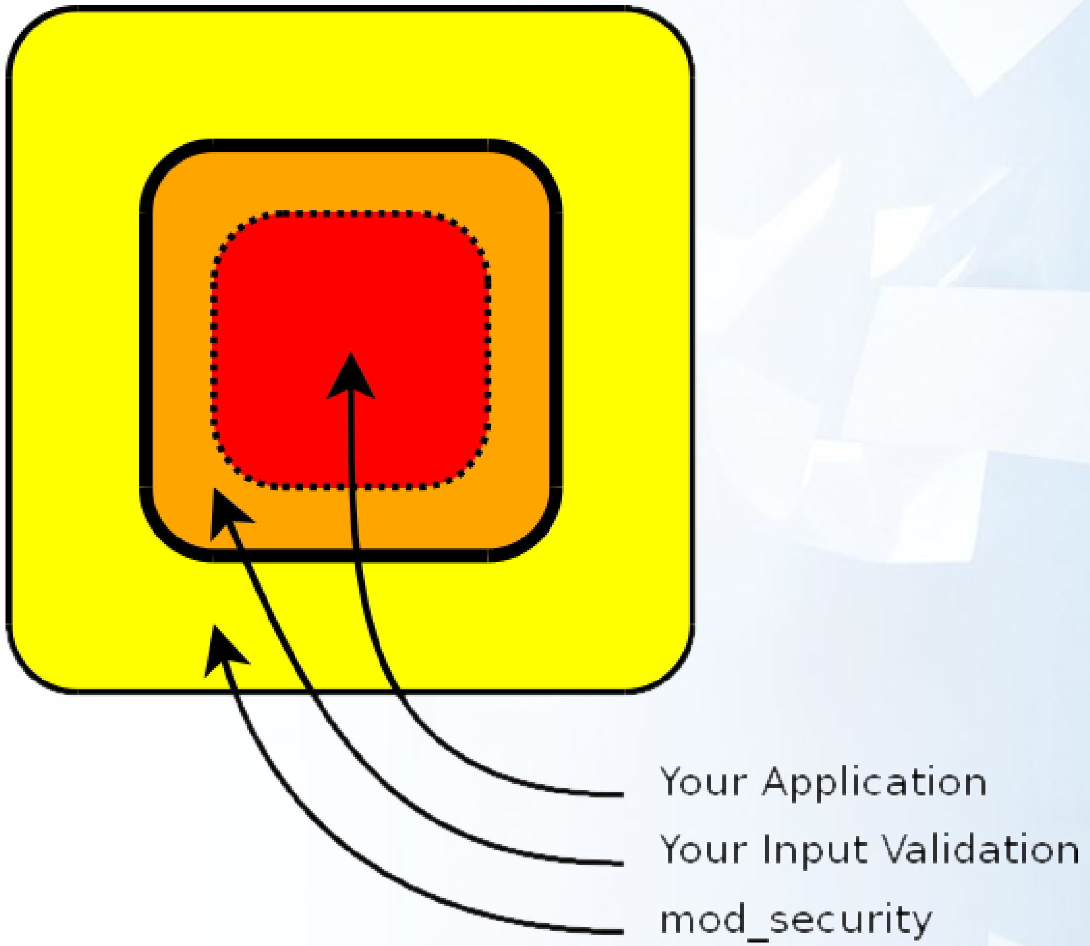
Multiple Levels of Defense



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mod_security

- Apache module
- Can be used to avoid certain attack
- Is not PHP specific

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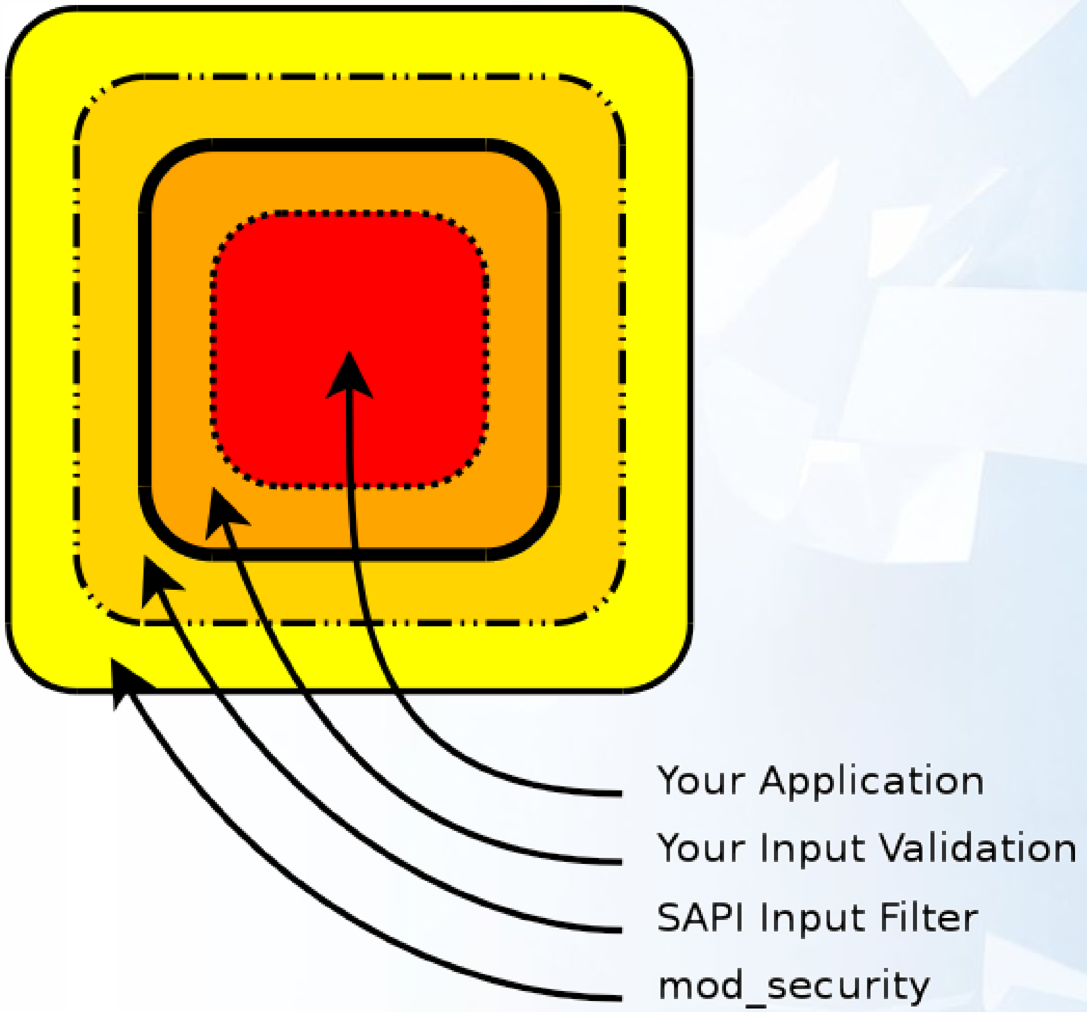
Multiple Levels of Defense++



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SAPI Input filter

- Sits between PHP and the webserver
- Is used while fetching data from users sources
- Can be used to filter data
- Prohibit data from entering PHP
- Written as a C extension to PHP
- Server wide filter

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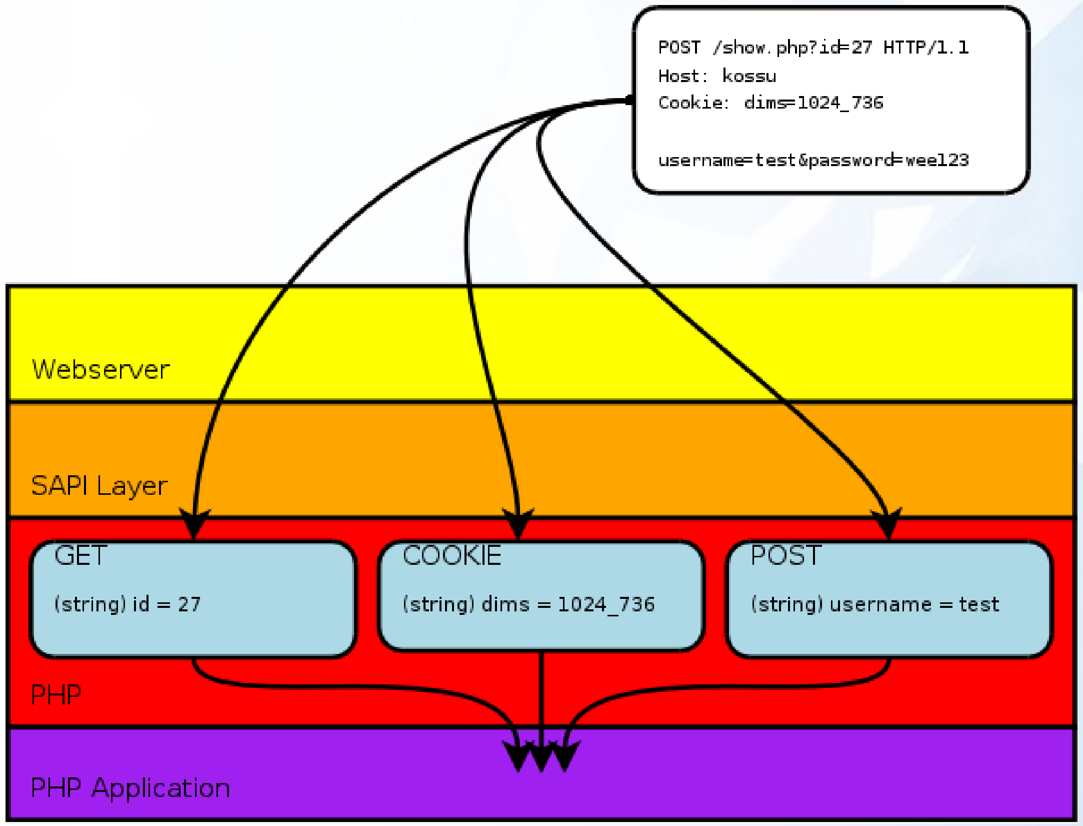
Current Situation



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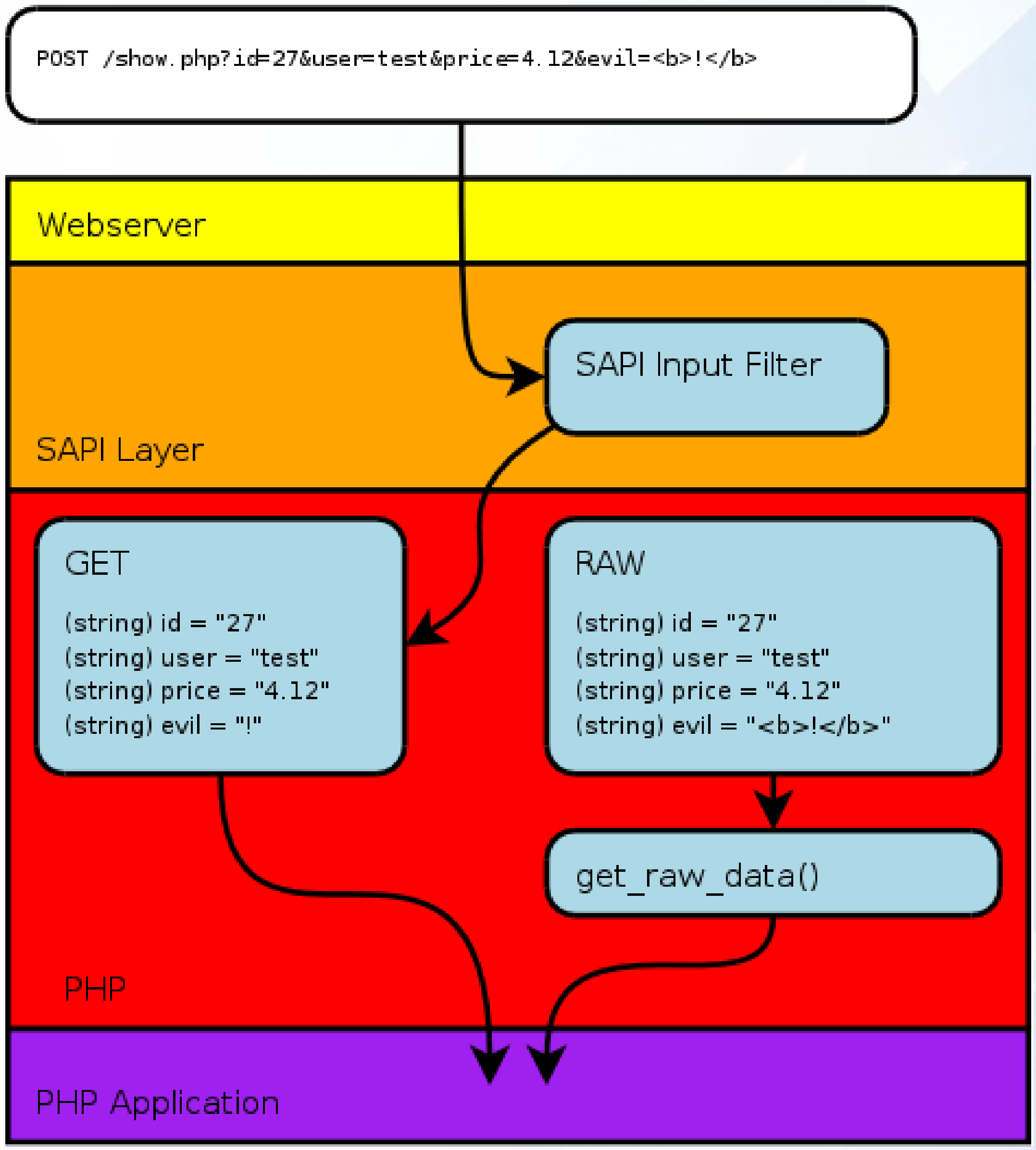
First Idea of an Input Filter



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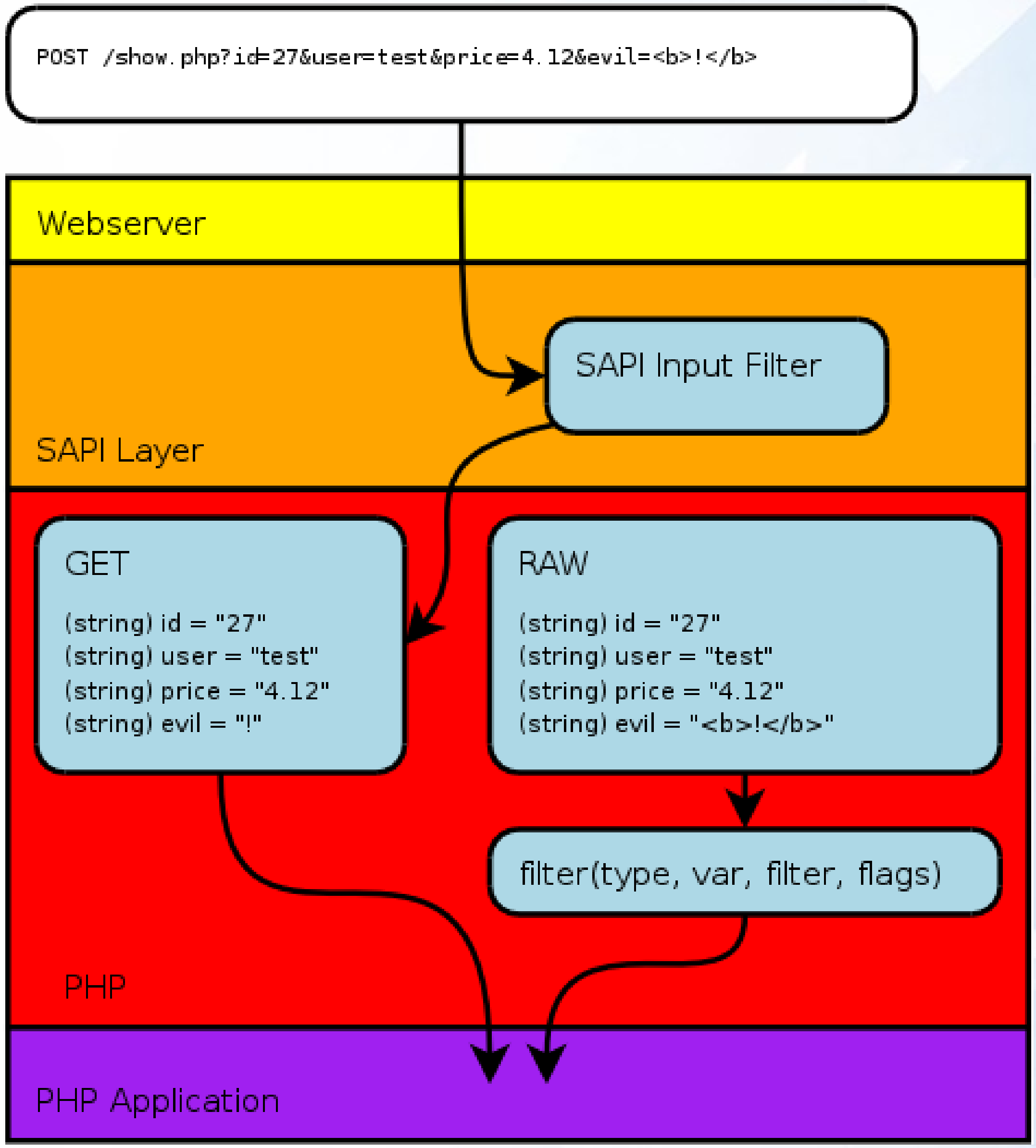
Second Idea of an Input Filter



PHP 5.2

- Comes with a filter extension
- Enabled by default
- Provides a default filter
- Provides two groups of accessing filters: sanitizing and logical
- Filters can have options to configure their behavior

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Sanitizing filters try-out

```
<form action="" method="get">
<input type="text" name="data" maxlength="64" size="64"/>
<input type="submit"/>
</form>
<?php
if ( isset( $_GET['data'] ) ) {
    $filter = ini_get('filter.default');
    echo "The data filterered through '$filter' is:";
    var_dump( $_GET['data'] );
}
?>
```

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Getting Input

```
<form action="" method="get">
Data: <input type="text" name="data" maxlength="64" size="64"/><br/>
<input type="submit"/>
</form>
<?php
$options = FILTER_FLAG_STRIP_HIGH;

if (isset($_GET['data'])) {
    $data = filter_input(
        INPUT_GET,              // source
        'data',                 // parameter name
        FILTER_SANITIZE_STRING, // filter
        $options                // options
    );
    var_dump( $data );
}
?>
```

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Getting Input Arrays

```
<form action="" method="get">
Data 1: <input type="text" name="data[]" maxlength="64" size="64"/><br/>
Data 2: <input type="text" name="data[]" maxlength="64" size="64"/><br/>
<input type="submit"/>
</form>
<?php
$options = FILTER_FLAG_STRIP_HIGH | FILTER_REQUIRE_ARRAY;

if (isset($_GET['data'])) {
    $data = filter_input(
        INPUT_GET,              // source
        'data',                  // parameter name
        FILTER_SANITIZE_STRING, // filter
        $options                 // options
    );
    var_dump( $data );
}
?>
```

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More about dealing with arrays

- FILTER_REQUIRE_SCALAR (default): requires the input variable to be not an array
- FILTER_REQUIRE_ARRAY: requires the input variable to be an array
- FILTER_FORCE_ARRAY: converts the input variable to an array, even if a scalar was submitted

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Getting Input Arrays

```
<form action="" method="get">
Number: <input type="text" name="int" maxlength="64" size="64"/><br/>
String: <input type="text" name="string" maxlength="64" size="64"/><br/>
<input type="submit"/>
</form>
<?php
$definition = array(
    'int' => array(
        'filter' => FILTER_VALIDATE_INT,
        'options' => array( "min_range" => 1, "max_range" => 10 )
    ),
    'string' => FILTER_SANITIZE_SPECIAL_CHARS
);

if (isset($_GET['int'])) {
    $data = filter_input_array( INPUT_GET, $definition );
    var_dump( $data );
}
?>
```

Filtering Variables

```
<?php
$text = "This tekßt is göing\tto be changed\n";
$data = filter_var(
    $text,
    filter_id( 'special_chars' ),
    FILTER_FLAG_STRIP_HIGH
);
var_dump( $data );
?>
```

Sanitizing Filters

- Allows or disallows characters in a string
- Does not take care about data formats
- Does not transform types, but keeps strings

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Sanitizing filters

Is basically "strip_tags", but supports a couple of flags:

```
<?php
$flags = array(
    'FILTER_FLAG_NO_ENCODE_QUOTES', 'FILTER_FLAG_ENCODE_LOW',
    'FILTER_FLAG_ENCODE_HIGH', 'FILTER_FLAG_STRIP_LOW',
    'FILTER_FLAG_STRIP_HIGH'
);
$filter = FILTER_SANITIZE_STRING;
include 'presentations/slides/input-filter/render-form.php';
include 'presentations/slides/input-filter/check-data.php';
?>
```

Sanitizing filters

Is basically "url_encode", but supports a couple of flags:

```
<?php
$flags = array(
    'FILTER_FLAG_STRIP_LOW', 'FILTER_FLAG_STRIP_HIGH'
);
$filter = FILTER_SANITIZE_ENCODED;
include 'presentations/slides/input-filter/render-form.php';
include 'presentations/slides/input-filter/check-data.php';
?>
```

Sanitizing filters

Is basically "html_special_chars", but supports a couple of flags:

```
<?php
$flags = array(
    'FILTER_FLAG_STRIP_LOW', 'FILTER_FLAG_STRIP_HIGH',
    'FILTER_FLAG_ENCODE_HIGH',
);
$filter = FILTER_SANITIZE_SPECIAL_CHARS;
include 'presentations/slides/input-filter/render-form.php';
include 'presentations/slides/input-filter/check-data.php';
?>
```

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Sanitizing filters

By default doesn't do anything, but supports a couple of flags:

```
<?php
$flags = array(
    'FILTER_FLAG_ENCODE_AMP', 'FILTER_FLAG_ENCODE_LOW',
    'FILTER_FLAG_ENCODE_HIGH', 'FILTER_FLAG_STRIP_LOW',
    'FILTER_FLAG_STRIP_HIGH'
);
$filter = FILTER_UNSAFE_RAW;
include 'presentations/slides/input-filter/render-form.php';
include 'presentations/slides/input-filter/check-data.php';
?>
```

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Sanitizing filters

This only strips out illegal characters, no validation is done!
The allowed characters are: a-z A-Z 0-9 " ! # $ % & ' * + - / = ? ^ _ ` { | } ~ @ . [ ]

```
<?php
$flags = array();
$filter = FILTER_SANITIZE_EMAIL;
include 'presentations/slides/input-filter/render-form.php';
include 'presentations/slides/input-filter/check-data.php';
?>
```

Sanitizing filters

This only strips out illegal characters, no validation is done!
The allowed characters are: a-z A-Z 0-9 $ - _ . + ! * ' () , { } | \ ^ ~ [ ] ` < > # % " ; / ? : @ & =

```
<?php
$flags = array();
$filter = FILTER_SANITIZE_URL;
include 'presentations/slides/input-filter/render-form.php';
include 'presentations/slides/input-filter/check-data.php';
?>
```

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Sanitizing filters

Strips all chars which are not 0-9, + and -.

```
<?php
$flags = array();
$filter = FILTER_SANITIZE_NUMBER_INT;
include 'presentations/slides/input-filter/render-form.php';
include 'presentations/slides/input-filter/check-data.php';
?>
```

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Sanitizing filters

Strips all chars which are not 0-9, + and -, but supports some flags as well.

```
<?php
$flags = array(
    'FILTER_FLAG_ALLOW_FRACTION', 'FILTER_FLAG_ALLOW_THOUSAND',
    'FILTER_FLAG_ALLOW_SCIENTIFIC'
);
$filter = FILTER_SANITIZE_NUMBER_FLOAT;
include 'presentations/slides/input-filter/render-form.php';
include 'presentations/slides/input-filter/check-data.php';
?>
```

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Sanitizing filters

Filter that applies magic quotes or actually "add_slashes"

```
<?php
$flags = array();
$filter = FILTER_SANITIZE_MAGIC_QUOTES;
include 'presentations/slides/input-filter/render-form.php';
include 'presentations/slides/input-filter/check-data.php';
?>
```

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Validating Filters

- Analyses the data in a logical way
- Understands data formats
- Can transform type

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Logical filters

```
<a name='form'/><?php
$flags = array( 'FILTER_FLAG_ALLOW_OCTAL', 'FILTER_FLAG_ALLOW_HEX' );
$filter = FILTER_VALIDATE_INT;
?>
<form action="" method="get">
data: <input type="text" name="data" maxlength="64" size="64"/>
<table>
<?php foreach( $flags as $flagName ) {
echo "<tr><td>$flagName</td><td><input type='checkbox'
name='$flagName'/></td></tr>";
} ?>
</table>
Min: <input type="text" name="min"/><br/>Max: <input type="text" name="max"/>
<input type="submit"/>
</form>
<?php
if (!empty($_GET['min']))
    $options['options']['min_range'] = (int) $_GET['min'];
if (!empty($_GET['max']))
    $options['options']['max_range'] = (int) $_GET['max'];
if (isset($_GET['data'])) {
    $o = 0;
    foreach( $flags as $flagName )
        if ( isset( $_GET[$flagName] ) )
            $o |= constant( $flagName );
    $options['flags'] = $o;
    $data = filter_input( INPUT_GET, 'data', $filter, $options );
    var_dump( $data );
}
?>
```

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Logical filters

Returns true for '1', 'on', 'yes' and 'true', false otherwise.

```
<?php
$flags = array();
$filter = FILTER_VALIDATE_BOOLEAN;
include 'presentations/slides/input-filter/render-form.php';
include 'presentations/slides/input-filter/check-data.php';
?>
```

Logical filters

```
<?php
$flags = array();
$filter = FILTER_VALIDATE_FLOAT;
include 'presentations/slides/input-filter/render-form.php';
include 'presentations/slides/input-filter/check-data.php';
?>
```

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Logical filters

```
<form action="" method="get">
Data: <input type="text" name="data" maxlength="64" size="64"/><br/>
Regexp: <input type="text" name="regexp" maxlength="64" size="64"/><br/>
<input type="submit"/>
</form>
<?php
$filter = FILTER_VALIDATE_REGEXP;
if (!empty($_GET['regexp']))
    $options = array( 'options' =>
        array( 'regexp' => $_GET['regexp'] ) );

if (isset($_GET['data'])) {
    $data = filter_input( INPUT_GET, 'data', $filter, $options );
    var_dump( $data );
}
?>
```

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Logical filters

```
<?php
$flags = array(
    'FILTER_FLAG_SCHEME_REQUIRED', 'FILTER_FLAG_HOST_REQUIRED',
    'FILTER_FLAG_PATH_REQUIRED', 'FILTER_FLAG_QUERY_REQUIRED'
);
$filter = FILTER_VALIDATE_URL;
include 'presentations/slides/input-filter/render-form.php';
include 'presentations/slides/input-filter/check-data.php';
?>
```

Logical filters

```
<?php
$flags = array();
$filter = FILTER_VALIDATE_EMAIL;
include 'presentations/slides/input-filter/render-form.php';
include 'presentations/slides/input-filter/check-data.php';
?>
```

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Logical filters

```
<?php
$flags = array(
    'FILTER_FLAG_IPV4', 'FILTER_FLAG_IPV6', 'FILTER_FLAG_NO_RES_RANGE',
    'FILTER_FLAG_NO_PRIV_RANGE'
);
$filter = FILTER_VALIDATE_IP;
include 'presentations/slides/input-filter/render-form.php';
include 'presentations/slides/input-filter/check-data.php';
?>
```

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Callback Filter

- Allows you to write your own callback filter
- Can not be used as default filter

Callback filter

```
<form action="" method="get">
Data: <input type="text" name="data" maxlength="64" size="64"/><br/>
<input type="submit"/>
</form>
<?php
$filter = FILTER_CALLBACK;
$callback = array( 'options' => array( 'Validate', 'My' ) );

if (isset($_GET['data'])) {
    $data = filter_input( INPUT_GET, 'data', $filter, $callback );
    var_dump( $data );
}

class Validate {
    function My( $text ) {
        if ( $text == 'PHP' ) {
            $text = 'PHP Rocks!';
            return $text;
        }
        return false;
    }
}
?>
```

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eZ components Goals

- Provide a solid platform for PHP application development
- Don't force a structure: no "framework"
- Clean and simple API
- Excellent documentation
- Keep backward compatibility for longer periods of time
- Stable and few regressions
- Clean IP, Open Source friendly

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UserInput

```
<?php
require 'ezc-setup.php';
if ( ezcInputForm::hasGetData() )
{
    $definition = array(
        'test' => new ezcInputFormDefinitionElement(
            ezcInputFormDefinitionElement::REQUIRED, 'int' ),
        'test2' => new ezcInputFormDefinitionElement(
            ezcInputFormDefinitionElement::REQUIRED, 'number_int' ),
    );

    try
    {
        $form = new ezcInputForm( INPUT_GET, $definition );
        echo $form->test, "\n";
        echo $form->test2, "\n";
    }
    catch ( ezcInputFormException $e )
    {
        die( $e->getMessage() );
    }
}
?>
```

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Resources

These slides: http://derickrethans.nl/talks.php
UserInput: http://components.ez.no/doc/UserInput
SQLite Input Filter: http://derickrethans.nl/sqlite_filter.php
Questions?: mailto:dr@ez.no