PHP 运行机制初探

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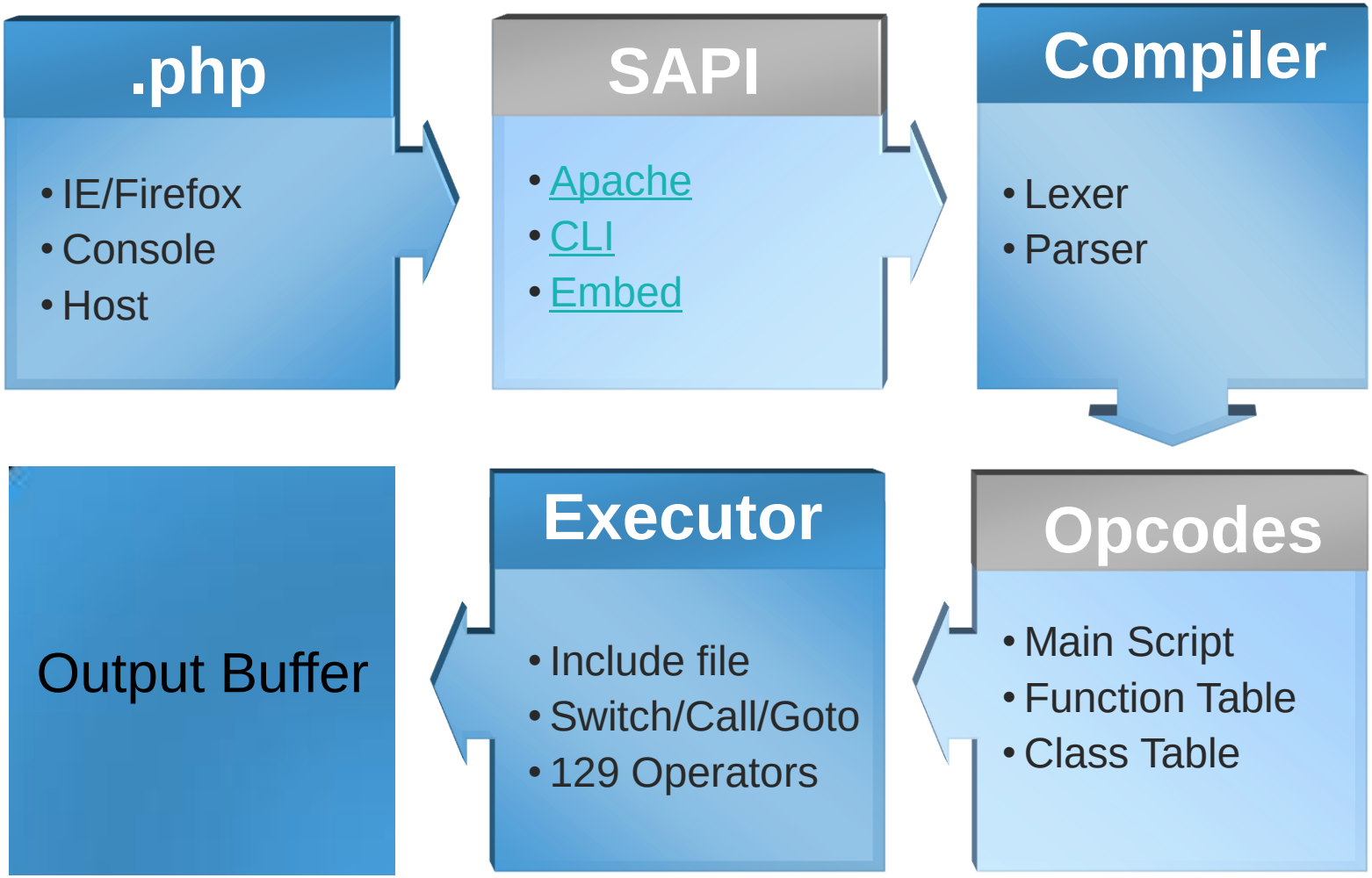
Introduction



Apache

- **Mime type handler**
  - AddType application/x-httpd-php .php
  - AddType application/x-httpd-php-source .phps
- **Server context**
  - Override php.ini (php_value, php_flag, etc)
  - Environment variables(PHP_SELF, etc)
- **Create Child Process/Thread**

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CLI (command line interface)

- **CLI ≈ CGI SAPI**
- **differences**
  - start up in quiet mode by default
  - plain text error message(no http header)
  - implicit_flush always on
  - max_execution_time is set to unlimited
  - others

Embed

- **Embed = Mini CLI**
- **php5embed .lib**
- example.c

```
#include <php_embed.h>
int main (int argc, char *argv[]){
    PHP_EMBED_START_BLOCK(argc, argv)
        zend_eval_string("echo 'Hello World';", NULL, "Embedded Code" TSRMLS_CC);
    PHP_EMBED_END_BLOCK()
        return 0;
}
```

Lexer(flex)

source: Zend/zend_language_scanner.l

```
<?php
    $sum = 1 + 2;
    echo ‘1+2=’.$sum;
?>
```



```
T_OPEN_TAG: '<?php '
=
T_LNUMBER: '1'
+
T_LNUMBER: '2'
T_ECHO: 'echo''
T_CONSTANT_ENCAPSED_STRING:
  "1+2=".
T_CLOSE_TAG: '?>'
```

Parser(bison)

source: Zend/zend_language_parser.y

T_OPEN_TAG: '<?php '

=

T_LNUMBER: '1'

+

T_LNUMBER: '2'

T_ECHO: 'echo''

T_CONSTANT_ENCAPSED_STRING:
  "1+2=".

T_CLOSE_TAG: '?>'

Opcode	Op1	Op2	Result
ADD	1	2	$tmp0
ASSIGN	$cv0(sum)	$tmp0	$var1
CONCAT	'1+2='	$cv0(sum)	$tmp2
ECHO	$tmp2		
RETURN	1		

Compiler

zend_op_array *(*zend_compile_file)(zend_file_handle *file_handle, int type TSRMLS_DC);

```
<?php
    $sum = 1 + 2;
    echo ‘1+2=’.$sum;
?>
```

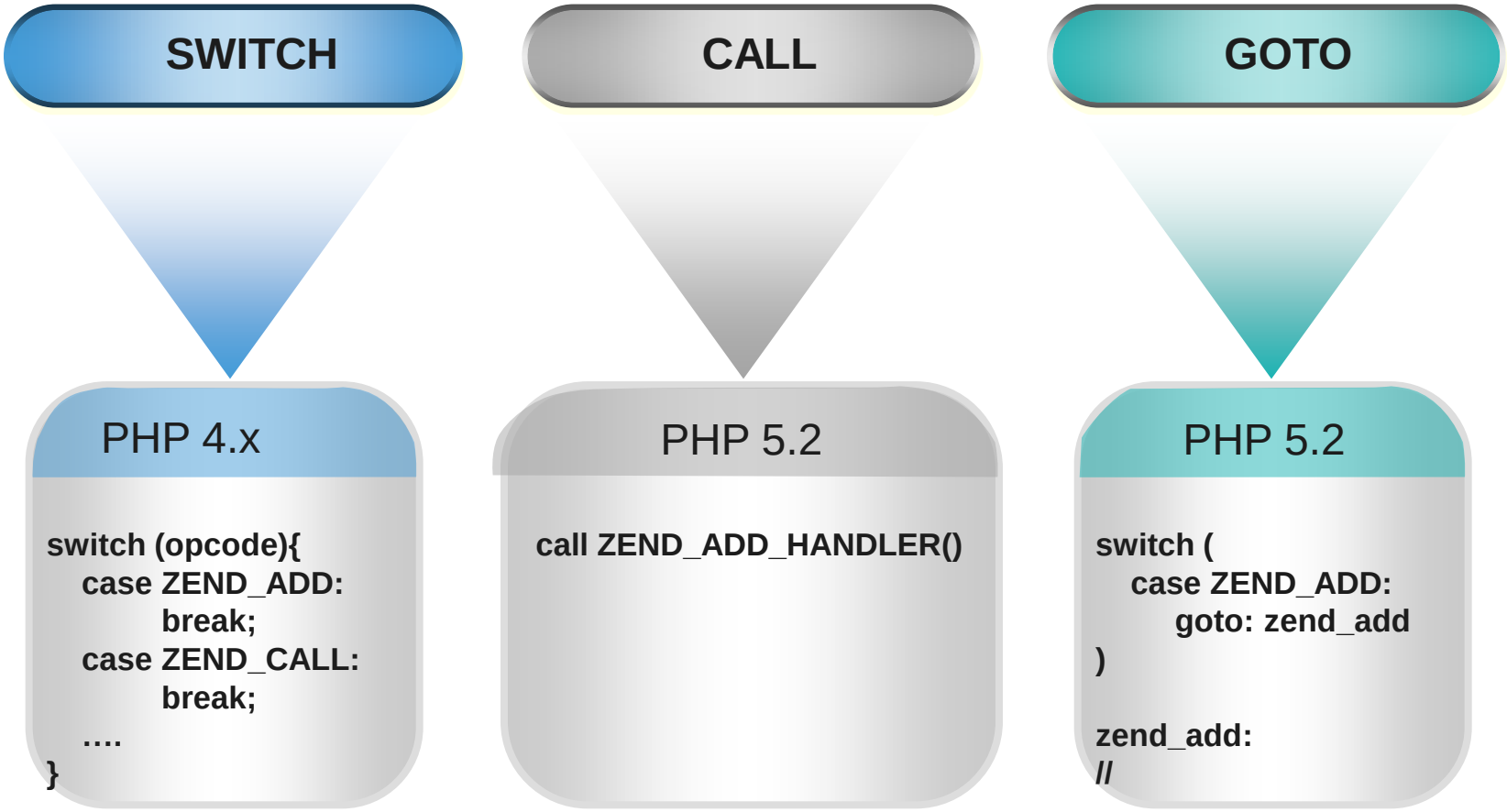
Opcode	Op1	Op2	Result
ADD	1	2	$tmp0
ASSIGN	$cv0(sum)	$tmp0	$var1
CONCAT	'1+2='	$cv0(sum)	tmp2
ECHO	$tmp2		
RETURN	1		

Opcode

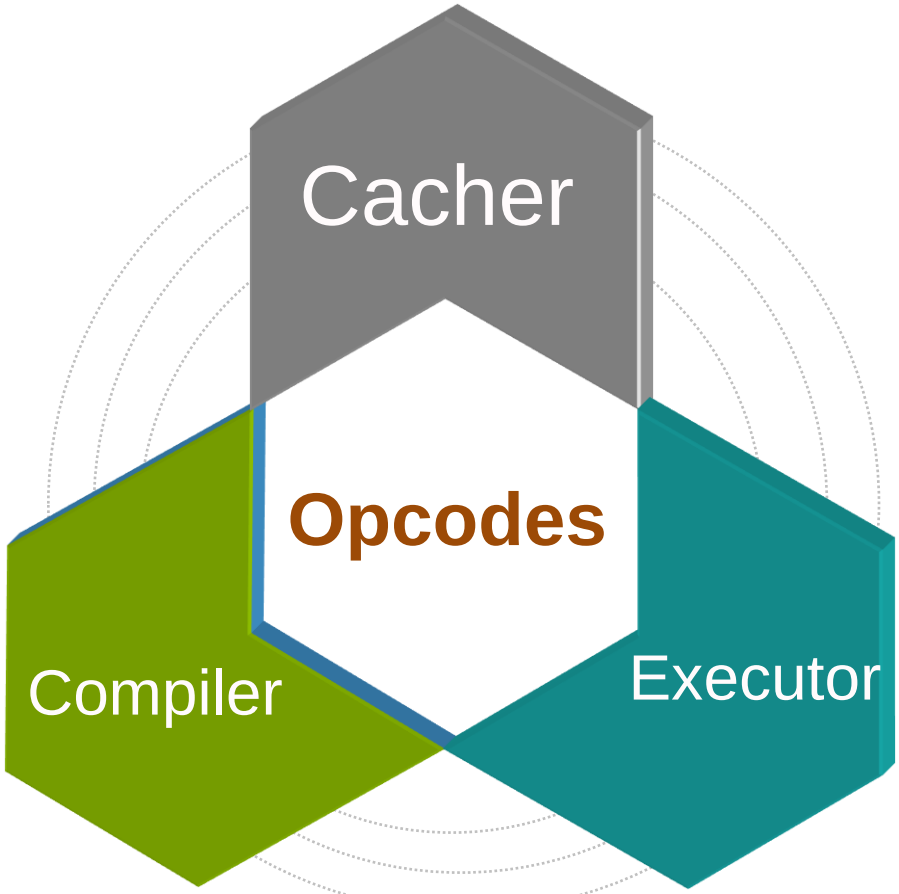
```
struct   zend_op {
         opcode_handler_t        handler;
         znode result;
         znode op1;
         znode op2;
         ulong extended_value;
         uint lineno;
         zend_uchar     opcode;
};
```

Executor

void (*zend_execute)(zend_op_array *op_array TSRMLS_DC);



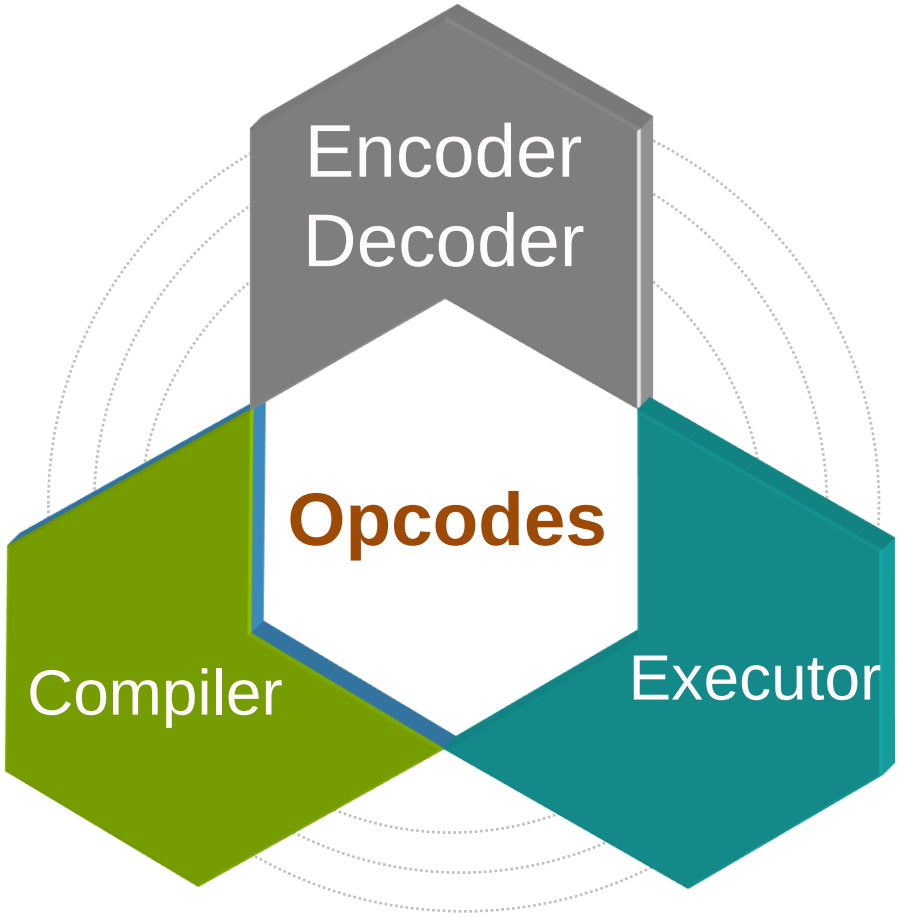
Cacher



- APC
- eAcclerator
- XCache
- Zend Platform

```
PHP_MINIT_FUNCTION(xxx){
        old_compile_file = zend_compile_file;
        zend_compile_file = xxx_compile_file;;
}
```

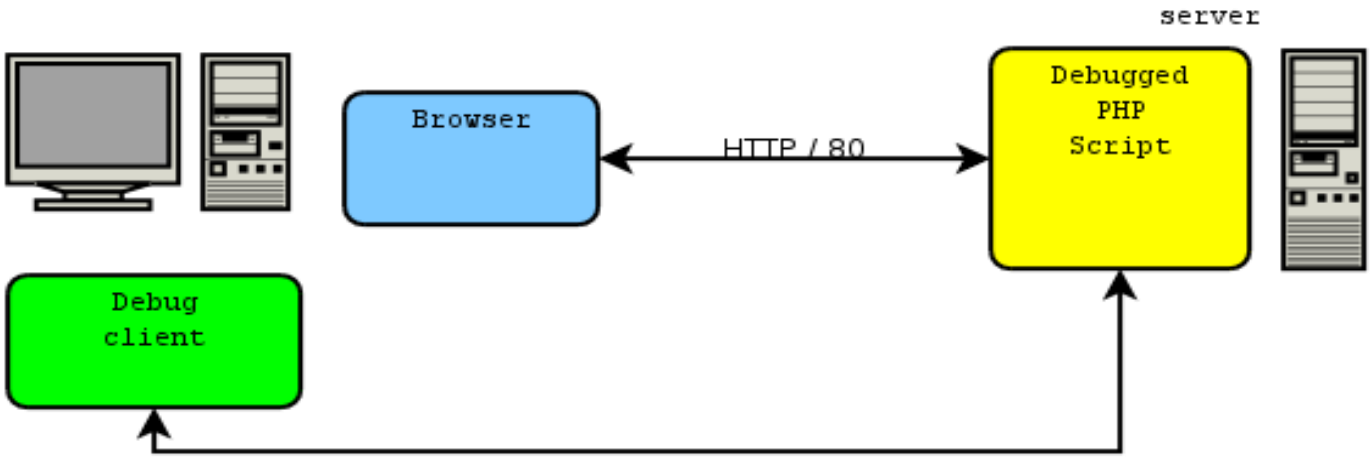
Encoder / Decoder



- ZendGuard
- ionCube
- eAcclerator Encoder

NOT Encoder, BUT Obfuscator!

Debugger




```
PHP_MINIT_FUNCTION(xxx){
        old_ execute = zend_ execute;
        zend_ execute = xxx_ execute;
}
```

```
struct zend_extension {
    message_handler_func_t message_handler;
    op_array_handler_func_t op_array_handler;
    statement_handler_func_t statement_handler;
    fcall_begin_handler_func_t fcall_begin_handler;
    fcall_end_handler_func_t fcall_end_handler;
    op_array_ctor_func_t op_array_ctor;
    op_array_dtor_func_t op_array_dtor;
}
```

Question

Thank You !

http://www.yAnbiN.org