

H16S35 - Managing a Web Server

- 6
- Logging and HTTP status codes

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Logging

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Log Etymology

- A record of observations, originally a record of a ship's progress, sailor's shortening of log-book (1670s)
- The daily record of a ship's speed, progress, etc., which is from log (piece of wood)
- The book was so called as it recorded the speed made by means of a weighted tree log on the end of a reeled log line (typically 150 to 200 fathoms)
- When the log lay dead in the water, sailors counted the time it took the line to play out
- The line was marked by different numbers of knots, or coloured rags, tied at regular intervals; hence the nautical measurement sense of knot



Apache Logging

- An Apache log is a record of the events that have occurred on the Apache web server
- Apache stores two kinds of logs:

ErrorLog /var/log/error.log

AccessLog /var/log/access.log

Error and Access

- **Access Log** - Contains information about requests coming in to the web server. This information can include what pages people are viewing, the success status of requests, and how long the request took to respond
- **Error Log** - Contains information about errors that the web server encountered when processing requests, such as when files are missing

Example Log

- By default, Apache logs each incoming request to its access log, typically located within its `/var/log/` directory
- Opening the log in a text editor, will look something like this

```
194.116.215.20 - - [14/Nov/2021:22:28:57 +0000] "GET / HTTP/1.0"  
200 16440
```

```
87.113.68.91 - - [15/Nov/2021:22:45:56 +0000] "GET / HTTP/1.1"  
200 36821
```

```
87.113.68.91 - - [15/Nov/2021:22:45:56 +0000] "GET /index.php?  
=PHPE9568F35-D428-11d2-A769-00AA001ACF42 HTTP/1.1" 200 2146
```

Common Log Format (CLF)

- Each line in an apache log file represents an incoming HTTP request, and Apache records information about it using a format known as the Common Log Format (CLF)
- Reading from left to right, this format contains the following information about the request host identifier authuser date request status bytes
- Each line in a file stored in the Common Log Format looks something like this, each field has a meaning

```
127.0.0.1 frank [10/Oct/2021:13:55:36 -0700] "GET /apache_pb.gif HTTP/1.0" 200 2326
```


Combined and Custom

- The logging format can be altered to store more or less information about each request by altering the LogFormat directive in the Apache configuration file
- This directive accepts format modifiers, each one representing a particular piece of data about the incoming request there are many possible options to add such as date, time, ip, method, access time, status, UserAgent, and [many more](#)
- Thus, for example, a LogFormat directive would look like this:

```
LogFormat "%h %l %u %t \"%r\" %>s %b" common
```

Defining Custom Logs

- Define format and provide a nickname for the log in: `/etc/apache2/apache2.conf`
- Use `/` in `vi` to search for `LogFormat` then add a new format to the end of the list with a new nickname

```
LogFormat "%h %l %u %t \"%r\" %>s %O  
\"{Referer}i\" \"%{User-Agent}i\"" combined
```

```
LogFormat "%h% %t" mylogformat
```

Add the log to a VirtualHost

- Next add your new format to the websites VirtualHost directive in sites-available

```
<VirtualHost *:80>
    ServerName example.com
    DocumentRoot /var/www/html/example.com
    CustomLog /var/log/apache/example_access.log
mylogformat
    ErrorLog /var/log/apache/example-error.log
</VirtualHost>
```

HTTP status codes

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HTTP Status Codes 1xx - 3xx

- Details here: <https://httpstatuses.com/>
- 1xx Informational: 100 Continue, 101 Switching Protocols, 102 Processing
- 2xx Success: 200 OK, 201 Created, 202 Accepted, 203 Non Authoritative Information, 204 No Content, 205 Reset Content, 206 Partial Content, 207 Multi Status, 208 Already Reported, 226 IM Used
- 3xx Redirection: 300 Multiple Choices, 301 Moved Permanently, 302 Found, 303 See Other, 304 Not Modified
- 305 Use Proxy, 307 Temporary Redirect, 308 Permanent Redirect

HTTP Status Codes 4xx

- 400 Bad Request, 401 Unauthorized, 402 Payment Required, 403 Forbidden, 404 Not Found, 405 Method Not Allowed, 406 Not Acceptable, 407 Proxy Authentication Required, 408 Request Timeout, 409 Conflict, 410 Gone, 411 Length Required, 412 Precondition Failed, 413 Payload Too Large, 414 Request-URI Too Long, 415 Unsupported Media Type, 416 Requested Range Not Satisfiable, 417 Expectation Failed, 418 I'm a teapot, 421 Misdirected Request, 422 Unprocessable Entity, 423 Locked, 424 Failed Dependency, 426 Upgrade Required, 428 Precondition Required, 429 Too Many Requests, 431 Request Header Fields Too Large, 444 Connection Closed Without Response, 451 Unavailable For Legal Reasons, 499 Client Closed Request

HTTP Status Codes 5xx

- 500 Internal Server Error
- 501 Not Implemented
- 502 Bad Gateway
- 503 Service Unavailable
- 504 Gateway Timeout
- 505 HTTP Version Not Supported
- 506 Variant Also Negotiates
- 507 Insufficient Storage
- 508 Loop Detected
- 510 Not Extended
- 511 Network Authentication Required
- 599 Network Connect Timeout Error

500 Server Error

Oops, something went wrong.

Try to refresh this page or feel free to contact us if the problem persists.

Logs aren't just for Administrators

- Helping you improve accessibility errors such
- as 404 and 500 errors
- Identify HOT pages on the site, Identify click through trends, security logging
- Calculate Geolocation metrics through IP's
- User browser agent to determine mobile/browser types
- Optimise SEO / Create Reports

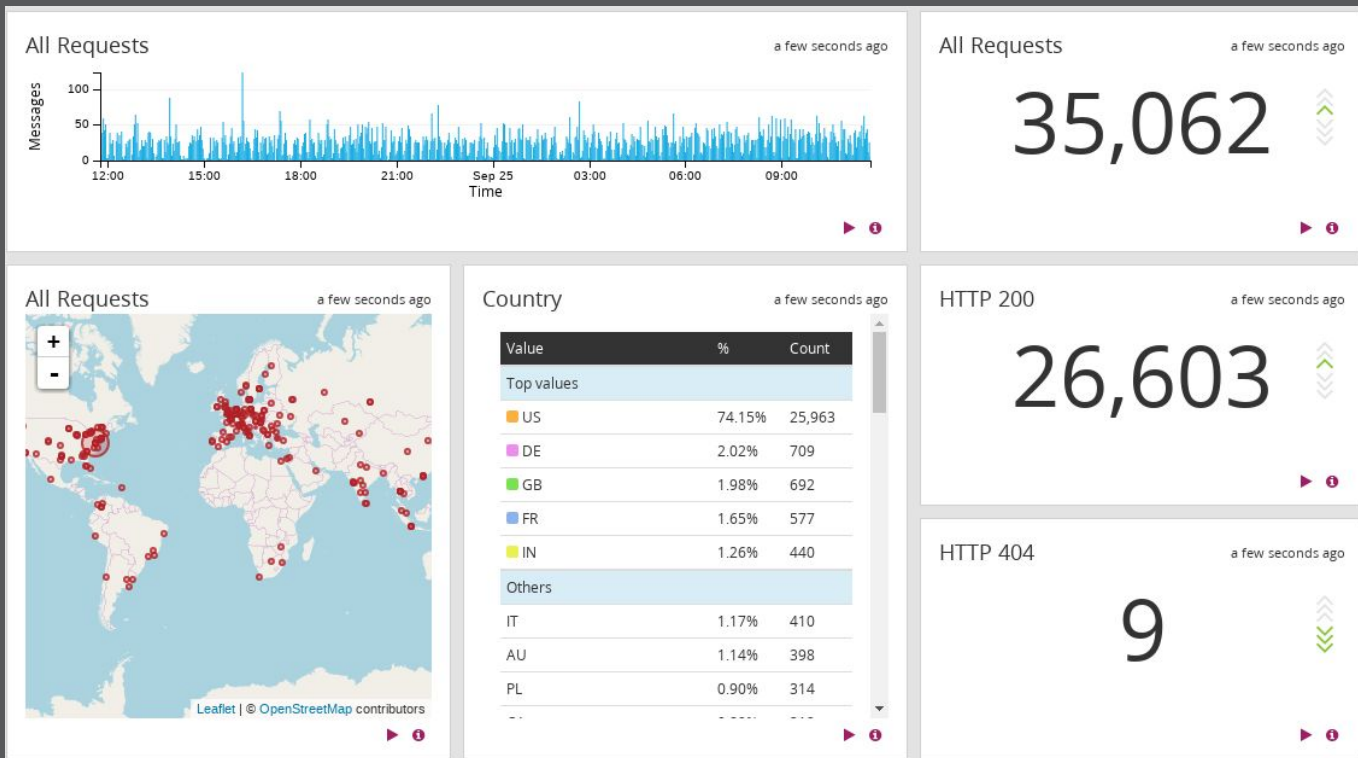
Logging visualisation

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Visualisation dashboard example



Visualisation dashboard example



Thanks for listening.
any questions?

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