

# FAMP / LAMP

FreeBSD/Linux/Apache/MySQL/PHP

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? (?-2018)

交大資工系資訊中心

Computer Center of Department of Computer Science, NCTU

# Introduction

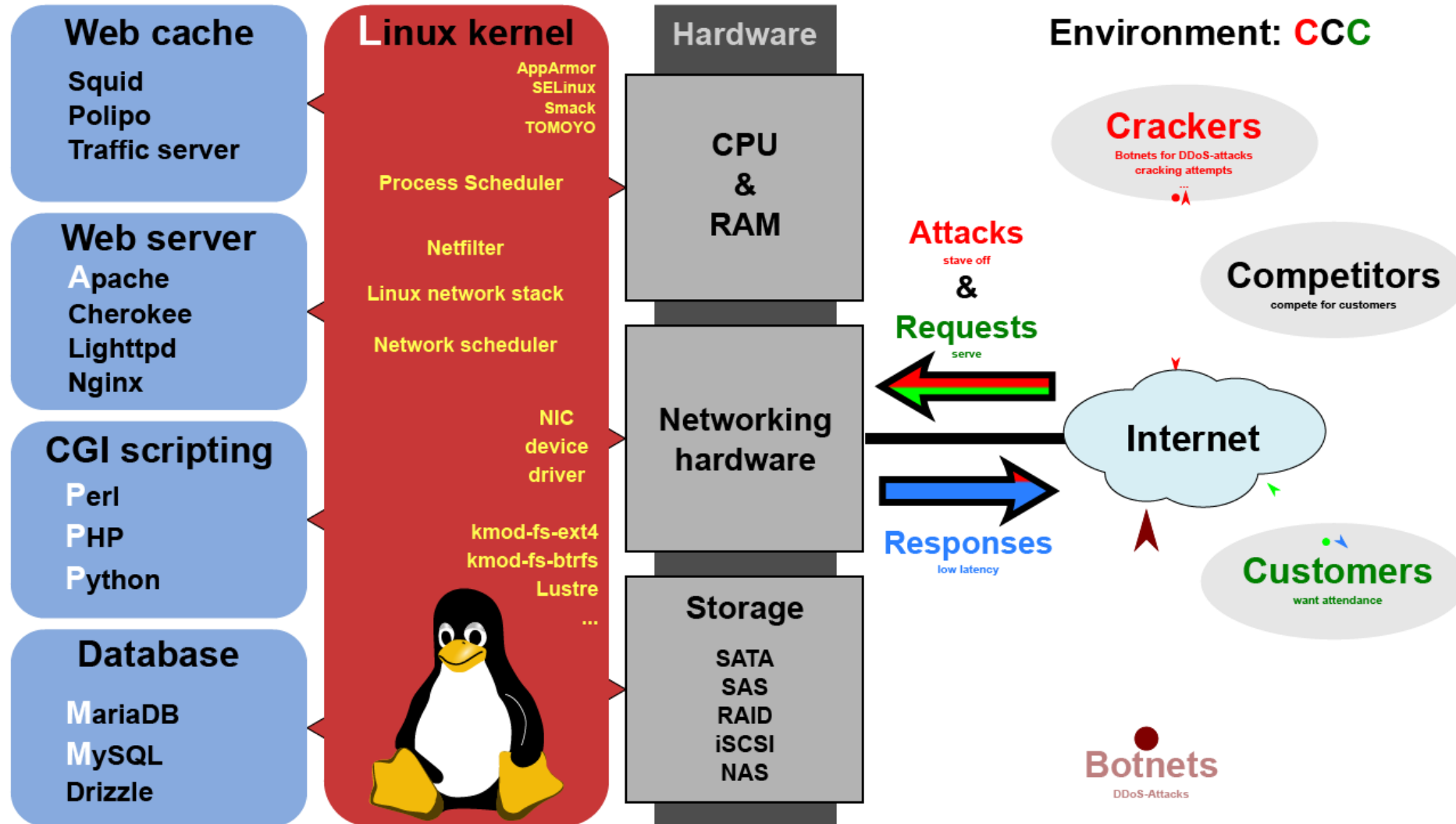
- Web service
  - Apache
  - GWS, Nginx, IIS
- SQL service
  - MySQL, MariaDB
  - MS SQL, Oracle DB, PostgreSQL
- NoSQL service
  - MongoDB
- Web backend language
  - Golang, Python, Node.js, PHP

# Outline

- Introduction
  - Apache
  - MySQL
  - PHP
- Installation and Administration
  - MySQL
  - Apache
  - PHP
- Appendix
  - phpMyAdmin
  - lighttpd
  - FastCGI

# Overview

by Shmuel Csaba Otto Traian; CC BY-SA 4.0; created 2013-09-10, last updated 2014-03-28

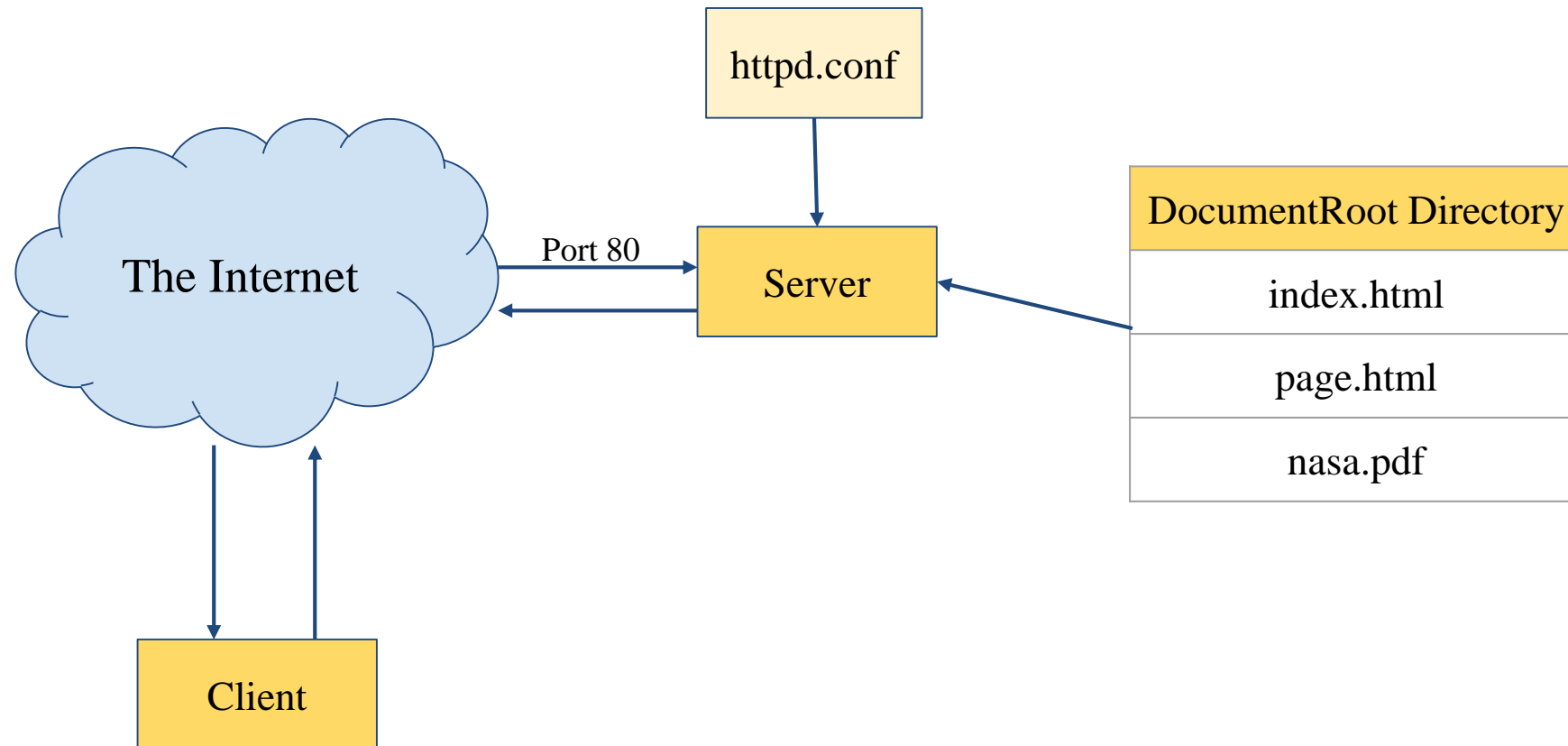


<https://commons.wikimedia.org/w/index.php?curid=28224098>

# Apache

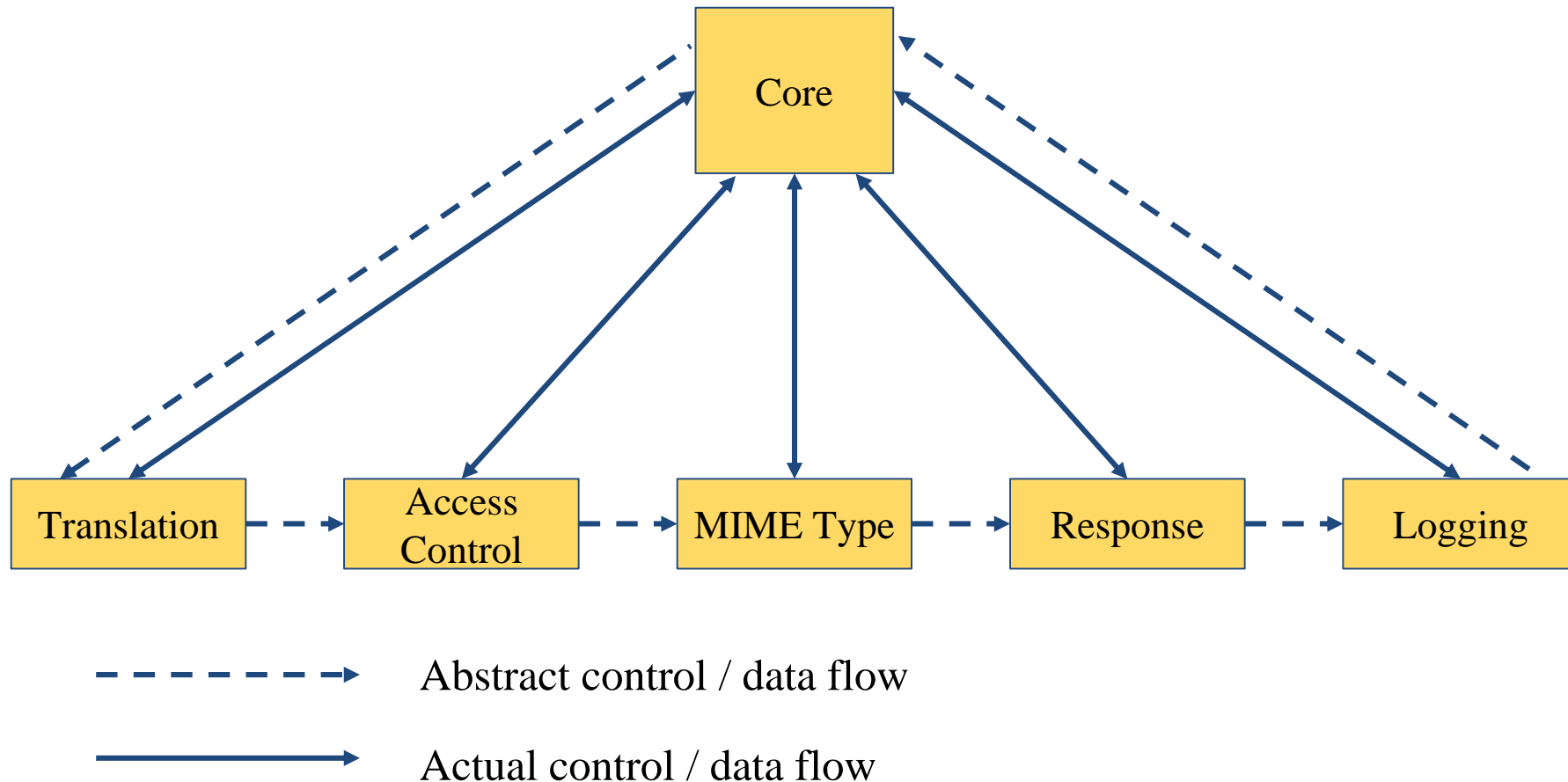
- Apache Software Foundation: <http://www.apache.org/>
- Apache HTTP Server Project: <http://httpd.apache.org/>
- Web httpd server that supports
  - HTTP/2
  - Modular design
  - Can be customized by writing modules using Apache module API
  - Freely available across many platforms
- Two main parts
  - Core: implements basic functions and provide the interface for Apache modules
  - Modules: extends or overrides the function of Core
    - Example: Access control, logging, CGI, proxy, cache control, PHP...

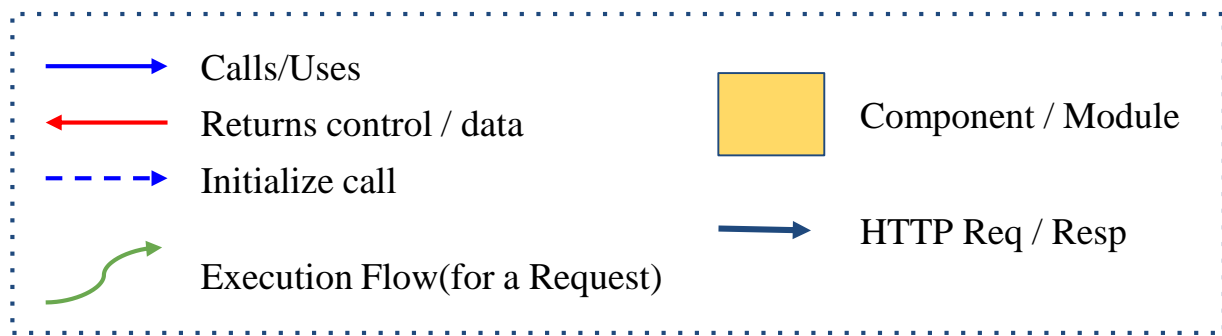
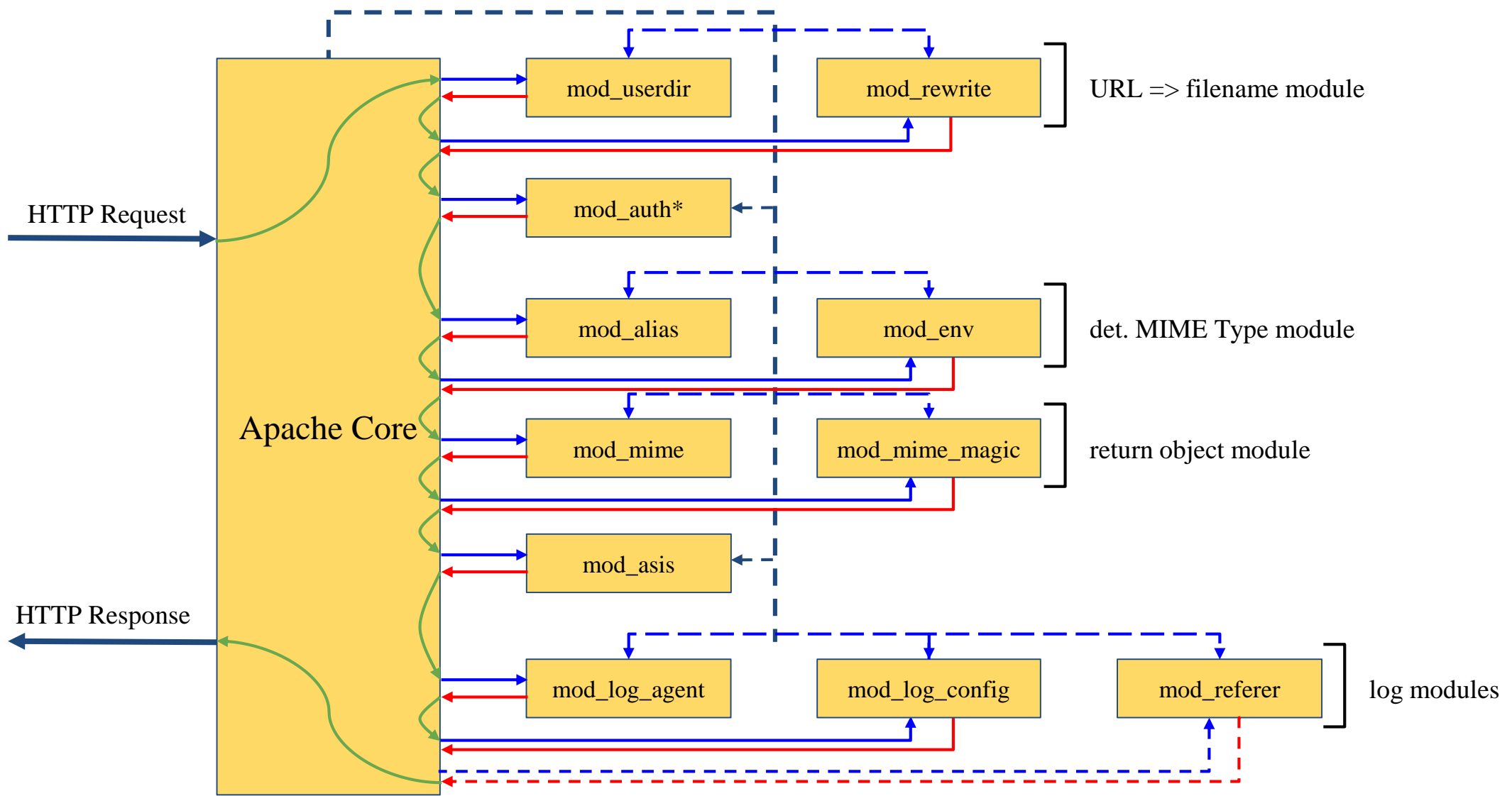
# How Apache Works – request and response



# How Apache Works – each request-response

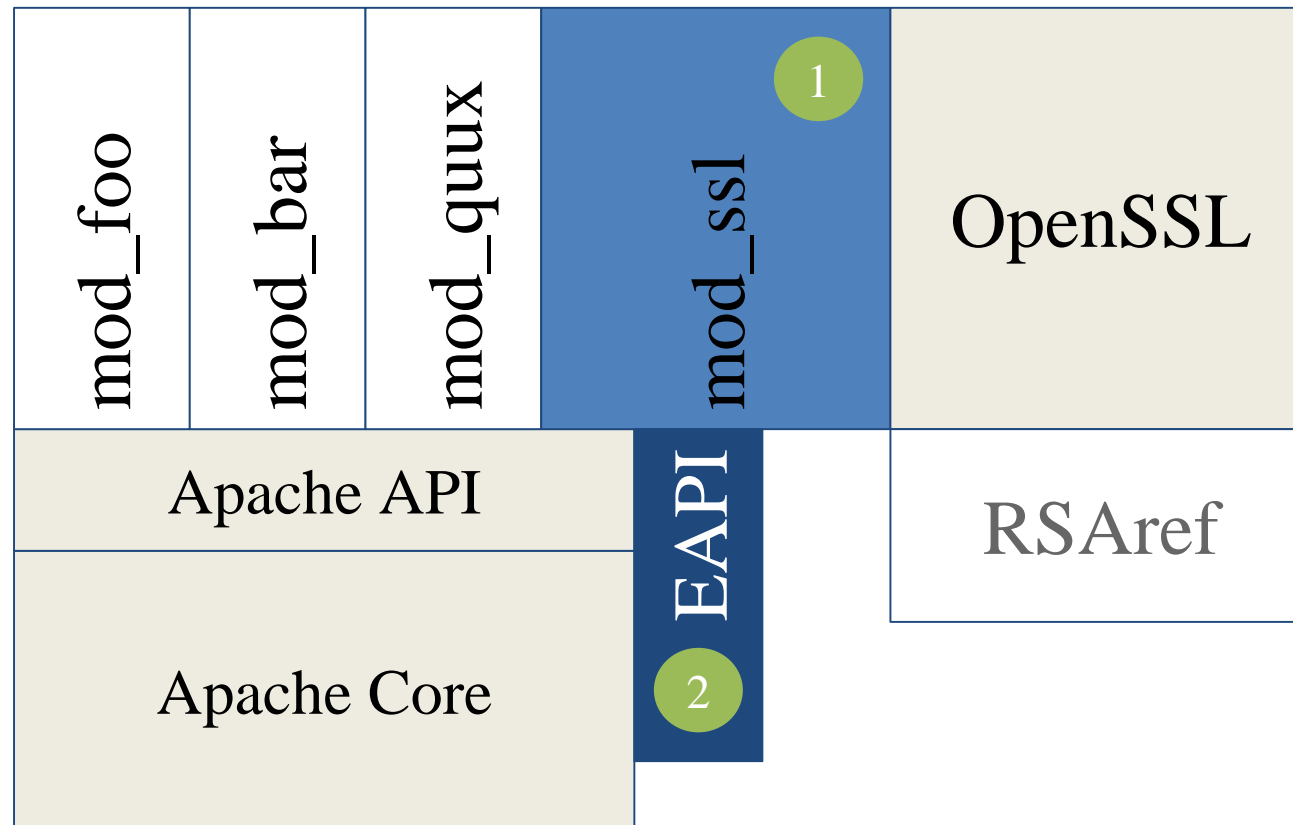
- Apache breaks client request into several steps which are implemented as modules







# Apache with mod\_ssl



# MySQL (1)

- SQL (Structured Query Language)
  - The most popular computer language used to create, modify, retrieve and manipulate data from **relational database** management systems.
  - Introduction to SQL: <http://www.1keydata.com/tw/sql/sql.html>
- A **multithreaded, multi-user, SQL** Database Management System.
- Owned and sponsored by a Swedish company MySQL AB, acquired by Sun Microsystems 2008. Oracle acquired Sun in 2009.
  - Forked version: [MariaDB](#), [Percona Server](#)
- Official Site: <http://www.mysql.com>
- Documentation: <http://dev.mysql.com/doc>

# MySQL (2)

- Features:
  - Writing in C/C++, tested by many compilers, **portable to many platforms**.
    - AIX, FreeBSD, HP-UX, Linux, Mac OS, Solaris, Windows, ...etc.
  - Providing APIs for C/C++, Java, Perl, PHP, Python, Ruby, Tcl, ...etc.
  - **Multi-threaded** kernel, supporting systems with multiple CPUs.
  - Optimized algorithm for **SQL** Query.
  - Multi-Language (coding) Supports.
  - Lots of connecting method: TCP/IP, ODBC, JDBC, Unix domain socket.
  - **Free Software** (GNU General Public License version 2)
  - Popular for web applications

# PHP

- PHP: Hypertext Preprocessor
  - A widely-used Open Source general-purpose scripting language.
  - Originally designed to create dynamic web pages, PHP's principal focus is server-side scripting.
  - PHP scripts can be embedded into HTML.
  - The LAMP architecture has become popular in the Web industry as a way of deploying inexpensive, reliable, scalable, secure web applications.
- Official Site: <http://php.net/>

# Installation and Administration

MySQL, Apache, PHP, phpMyAdmin

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# Installing MySQL (1)

- Steps

- \$ cd /usr/ports/databases/mysql57-server/
- \$ make OPTIONS install clean

You may use the following build options:

```
WITH_CHARSET=charset Define the primary built-in charset (latin1).
WITH_XCHARSET=list Define other built-in charsets (may be 'all').
WITH_COLLATION=collate Define default collation (latin1_swedish_ci).
WITH_OPENSSL=yes Enable secure connections
                    (define WITHOUT_YASSL for backward compatibility).
WITH_LINUXTHREADS=yes Use the linuxthreads pthread library.
WITH_PROC_SCOPE_PTH=yes Use process scope threads
                    (try it if you use libpthread).
WITH_FAST_MUTEXES=yes Replace mutexes with spinlocks.
BUILD_OPTIMIZED=yes Enable compiler optimizations
                    (use it if you need speed).
BUILD_STATIC=yes Build a static version of mysqld.
                    (use it if you need even more speed).
WITH_NDB=yes Enable support for NDB Cluster.
```

# Installing MySQL (2)

- OPTIONS:
  - WITH\_CHARSET=utf8
  - WITH\_XCHARSET=ascii,big5,... (all)
- Installed...

```
==> SECURITY REPORT:
```

```
    This port has installed the following files which may act as network  
    servers and may therefore pose a remote security risk to the system.
```

```
/usr/local/libexec/mysqld
```

```
    This port has installed the following startup scripts which may cause  
    these network services to be started at boot time.
```

```
/usr/local/etc/rc.d/mysql-server
```

# Installing MySQL (3)

- Startup script...

```
#  
# Add the following line to /etc/rc.conf to enable mysql:  
# mysql_enable (bool): Set to "NO" by default.  
# Set it to "YES" to enable MySQL.  
# mysql_limits (bool): Set to "NO" by default.  
# Set it to yes to run `limits -e -U mysql`  
# just before mysql starts.  
# mysql_dbdir (str): Default to "/var/db/mysql"  
# Base database directory.  
# mysql_args (str): Custom additional arguments to be passed  
# to mysqld_safe (default empty).  
#
```



# Managing MySQL (1)

- Configuration file
  - Copy config file
    - `$ cd /usr/local/share/mysql`
    - `$ cp my-huge.cnf /usr/local/etc/my.cnf`
  - Edit `/usr/local/etc/my.cnf`
- Start mysql daemon
  - Using startup script
    - `$ /usr/local/etc/rc.d/mysql-server start`

# Managing MySQL (2)

- Test
  - `$ mysql -u root -p`
    - The initial password for root is empty

```
$ mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 1
Server version: 5.1.41-log FreeBSD port: mysql-server-5.1.41

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases;
+-----+
| Database          |
+-----+
| information_schema |
| mysql             |
| test              |
+-----+
3 rows in set (0.06 sec)
```

# Managing MySQL (3)

- Securing initial accounts
  - Two initial accounts
    - root
    - anonymous

```
mysql> SELECT Host, User From mysql.user;
+-----+-----+
| Host          | User  |
+-----+-----+
| 127.0.0.1     | root  |
| nasa.cs.nctu.edu.tw |      |
| nasa.cs.nctu.edu.tw | root  |
| localhost     |      |
| localhost     | root  |
+-----+-----+
```

```
mysql> UPDATE mysql.user SET Password = PASSWORD('test123') WHERE User = 'root';
Query OK, 3 rows affected (0.08 sec)
Rows matched: 3  Changed: 3  Warnings: 0

mysql> FLUSH PRIVILEGES;                # Reload the grant tables
Query OK, 0 rows affected (0.00 sec)

mysql> SET PASSWORD FOR 'root'@'localhost' = PASSWORD('ttt123');
Query OK, 0 rows affected (0.02 sec)
```

# Installing Apache (1)

- Steps
  - `$ cd /usr/ports/www/apache24/`
  - `$ make install clean`
  
- Options
  - A lot of options for modules
  - `WITH_SSL` (default)
  - `WITH_MPM=worker`
  - `WITH_THREADS=yes`
  - `WITH_SUEXEC=yes`

# Installing Apache (2)

- Installed...

```
To run apache www server from startup, add apache22_enable="YES"
in your /etc/rc.conf. Extra options can be found in startup script.
```

```
Your hostname must be resolvable using at least 1 mechanism in
/etc/nsswitch typically DNS or /etc/hosts or apache might
have issues starting depending on the modules you are using.
```

```
==> SECURITY REPORT:
```

```
    This port has installed the following binaries which execute with
    increased privileges.
```

```
/usr/local/sbin/suexec
```

- Startup script

- `/usr/local/etc/rc.d/apache24`
- `apache24_http_accept_enable`

# Apache configuration – Configuration files

- Location
  - The default location of apache (in ports) is /usr/local/etc/apache24
  - Major configuration file: httpd.conf
    - Other configuration files could be included. (setting in httpd.conf)
    - extra/httpd-\*.conf, Includes/\*.conf
- Two types
  - Global settings
    - Server configurations
    - Options of modules
  - Directory Configuration
    - Local setting for certain directory

# Apache configuration – Global Settings (httpd.conf)

- Server configuration
  - Listen 80
  - ServerAdmin tsaimh@cs.nctu.edu.tw
  - ServerName nasa.cs.nctu.edu.tw
  - DocumentRoot "/home/wwwadm/data"
    - Remember create DocumentRoot directory if you modify it
- Options of modules
- Include supplemental configuration files
  - Include etc/apache22/extra/httpd-\*.conf
  - Include etc/apache22/Includes/\*.conf

# Apache configuration – Directory Configuration (1)

- Configuration parameters

- Options

- All
    - ExecCGI
    - FollowSymLinks
    - Indexs
    - MultiViews
    - SymLinksIfOwnerMatch

- <http://httpd.apache.org/docs/2.4/mod/core.html#options>

```
<Directory "/home/wwwadm/data">  
    Options Indexes FollowSymLinks MultiViews  
    AllowOverride None  
    Order allow,deny  
    Allow from all  
</Directory>
```



# Apache configuration – Directory Configuration (2)

- Configuration parameters
  - AllowOverride
    - All (Read .htaccess)
    - None (ignoring .htaccess)
  - Order
    - Solve collision of deny and allow rules
  - Deny/Allow
    - IP/DN (control access to this directory)

```
<Directory "/home/wwwadm/data">  
    Options Indexes FollowSymLinks MultiViews  
    AllowOverride None  
    Order allow,deny  
    Allow from all  
</Directory>
```

# Apache configuration – Options of Modules

- `dir_module`

```
<IfModule dir_module>
    DirectoryIndex index.html
</IfModule>
```

- `alias_module` ([http://httpd.apache.org/docs/2.2/mod/mod\\_alias.html](http://httpd.apache.org/docs/2.2/mod/mod_alias.html))

```
<IfModule alias_module>
    Redirect /foo http://www.example.com/bar
    Alias /webpath /full/filesystem/path
    ScriptAlias /cgi-bin/ "/usr/local/www/apache22/cgi-bin/"
</IfModule>
```

- `mime_module`

```
DefaultType text/plain
<IfModule mime_module>
    TypesConfig etc/apache22/mime.types
    AddType application/x-compress .Z
    AddHandler cgi-script .cgi
</IfModule>
```

# Supplemental configuration – httpd-mpm.conf (Multi-Processing Module)

- Server-pool management (MPM specific)
  - Include etc/apache22/extra/httpd-mpm.conf
- WITH\_MPM
  - prefork: non-threaded, pre-forking
  - worker: hybrid multi-process multi-threaded

```
<IfModule mpm_worker_module>
    StartServers          2
    MaxClients            150
    MinSpareThreads      25
    MaxSpareThreads      75
    ThreadsPerChild      25
    MaxRequestsPerChild  0
</IfModule>
```

# Supplemental configuration – httpd-userdir.conf

- User home directories
  - Include etc/apache22/extra/httpd-userdir.conf

```
UserDir public_html
UserDir disabled root toor daemon operator bin tty kmem games news man sshd bind proxy
_pflogd _dhcp uucp pop www nobody mailnull smmsp

<Directory "/home/*/public_html">
    AllowOverride FileInfo AuthConfig Limit Indexes
    Options MultiViews Indexes SymLinksIfOwnerMatch IncludesNoExec
    <Limit GET POST OPTIONS>
        Order allow,deny
        Allow from all
    </Limit>
    <LimitExcept GET POST OPTIONS>
        Order deny,allow
        Deny from all
    </LimitExcept>
</Directory>
```

- Methods: <http://www.w3.org/Protocols/rfc2616/rfc2616-sec9.html>

# Supplemental configuration – httpd-vhosts.conf

- Virtual hosts
  - Include  
etc/apache24/extra/httpd-vhosts.conf
  - Name-based
    - NameVirtualHost
    - <VirtualHost>
  - IP-based
    - <VirtualHost>
  - ServerName
  - DocumentRoot
  - <http://httpd.apache.org/docs/2.2/vhosts>

```
Listen 80
Listen 8080

NameVirtualHost 172.20.30.40:80
NameVirtualHost 172.20.30.40:8080
<VirtualHost 172.20.30.40:80>
    ServerName www.example.com
    DocumentRoot /www/domain-80
</VirtualHost>
<VirtualHost 172.20.30.40:8080>
    ServerName www.example.com
    DocumentRoot /www/domain-8080
</VirtualHost>
<VirtualHost 172.20.30.40:80>
    ServerName www.example.org
    DocumentRoot /www/otherdomain-80
</VirtualHost>
<VirtualHost 172.20.30.40:8080>
    ServerName www.example.org
    DocumentRoot /www/otherdomain-8080
</VirtualHost>
```

# Supplemental configuration – More...

- Multi-language error messages
  - `httpd-multilang-errordoc.conf`
- Fancy directory listings
  - `httpd-autoindex.conf`
- Language settings
  - `httpd-languages.conf`
- Real-time info on requests and configuration
  - `httpd-info.conf`
- Local access to the Apache HTTP Server Manual
  - `httpd-manual.conf`
- Various default settings
  - `httpd-default.conf`

# Other configuration for Apache – log

- Rotate your log using newsyslog
- In httpd config
  - ErrorLog "/var/log/httpd-error.log"
  - TransferLog "/var/log/httpd-access.log"

```
/var/log/httpd-access.log    640  5  *  @T00  z  /var/run/httpd.pid
/var/log/httpd-error.log    640  5  *  @T00  z  /var/run/httpd.pid
```

- In startup script
  - \_pidprefix="/var/run/httpd"
  - pidfile="\${\_pidprefix}.pid"

# .htaccess (1)

- .htaccess
  - Allow admin or users to control access to certain directory
- Usage
  - Modify httpd.conf
  - Create .htaccess file
  - Generate password database
  - Test



# .htaccess (2)

- Example
  - Modify httpd.conf
  - Create .htaccess file
  - Generate password file

```
<Directory "/home/wwwadm/data/test1">  
    Options None  
    AllowOverride All  
    Order allow,deny  
    Allow from all  
</Directory>
```

```
$ cat .htaccess  
AuthName "SA-test1"  
AuthType "Basic"  
AuthUserFile "/home/wwwadm/data/test1/.htpasswd"  
Require valid-user  
Options Indexes
```

```
$ htpasswd -c ./htpasswd SA-user1  
New password:  
Re-type new password:  
Adding password for user SA-user1
```

# .htaccess (3)

- You can use these tools to generate .htaccess
  - <http://www.linuxkungfu.org/tools/htaccesser/index.php>
  - <http://www.htaccesseditor.com/>



# Installing PHP7 (1)

- Steps

- `$ pkg install php74 php74-mysqli mod_php74 php74-zlib \ php74-mbstring php74-gd php74-json php74-curl`
- `$ vim /usr/local/etc/apache24/Includes/php.conf`


```
<IfModule dir_module>
  DirectoryIndex index.php index.html
  <FilesMatch "\.php$" >
    SetHandler application/x-httpd-php
  </FilesMatch>
  <FilesMatch "\.phps$" >
    SetHandler application/x-httpd-php-source
  </FilesMatch>
</IfModule>
```

# Test PHP7 in apache (2)

- Start apache
  - \$ /usr/local/etc/rc.d/apache24 start
  - \$ service apache24 restart
- Test PHP
  - \$ vim /usr/local/www/apache24/data/index.php


```
<?  
    phpinfo();  
?>
```

# phpinfo()

**PHP Version 7.1.10**


<b>System</b>	FreeBSD tbsdweicc 11.1-RELEASE FreeBSD 11.1-RELEASE #0 r321309: Fri Jul 21 02:08:28 UTC 2017 root@releng2.nyi.freebsd.org:/usr/obj/usr/src/sys/GENERIC amd64
<b>Build Date</b>	Nov 17 2017 07:06:25
<b>Configure Command</b>	./configure '--with-layout=GNU' '--localstatedir=/var' '--with-config-file-scan-dir=/usr/local/etc/php' '--disable-all' '--enable-libxml' '--enable-mysqlnd' '--with-libxml-dir=/usr/local' '--with-pcre-regex=/usr/local' '--program-prefix=' '--disable-cli' '--disable-cgi' '--with-apxs2=/usr/local/sbin/apxs' '--enable-dtrace' '--prefix=/usr/local' '--mandir=/usr/local/man' '--infodir=/usr/local/info' '--build=amd64-portbld-freebsd11.0' 'build_alias=amd64-portbld-freebsd11.0' 'CFLAGS=-O2 -pipe -fstack-protector -fno-strict-aliasing' 'CPPFLAGS=' 'CPP=cpp'
<b>Server API</b>	Apache 2.0 Handler
<b>Virtual Directory Support</b>	disabled
<b>Configuration File (php.ini) Path</b>	/usr/local/etc
<b>Loaded Configuration File</b>	(none)
<b>Scan this dir for additional .ini files</b>	/usr/local/etc/php
<b>Additional .ini files parsed</b>	/usr/local/etc/php/ext-20-curl.ini, /usr/local/etc/php/ext-20-gd.ini, /usr/local/etc/php/ext-20-json.ini, /usr/local/etc/php/ext-20-mbstring.ini, /usr/local/etc/php/ext-20-mcrypt.ini, /usr/local/etc/php/ext-20-mysqli.ini, /usr/local/etc/php/ext-20-zlib.ini
<b>PHP API</b>	20160303
<b>PHP Extension</b>	20160303
<b>Zend Extension</b>	320160303
<b>Zend Extension Build</b>	API320160303,NTS
<b>PHP Extension Build</b>	API20160303,NTS
<b>Debug Build</b>	no
<b>Thread Safety</b>	disabled
<b>Zend Signal Handling</b>	enabled
<b>Zend Memory Manager</b>	enabled
<b>Zend Multibyte Support</b>	provided by mbstring
<b>IPv6 Support</b>	enabled
<b>DTrace Support</b>	available, disabled
<b>Registered PHP Streams</b>	php, file, glob, data, http, ftp, compress.zlib
<b>Registered Stream Socket Transports</b>	tcp, udp, unix, udg
<b>Registered Stream Filters</b>	string.rot13, string.toupper, string.tolower, string.strip_tags, convert.*, consumed, dechunk, mcrypt.*, mdecrypt.*, zlib.*

This program makes use of the Zend Scripting Language Engine:  
 Zend Engine v3.1.0, Copyright (c) 1998-2017 Zend Technologies



# Architecture

Cluster, Server Load Balancer

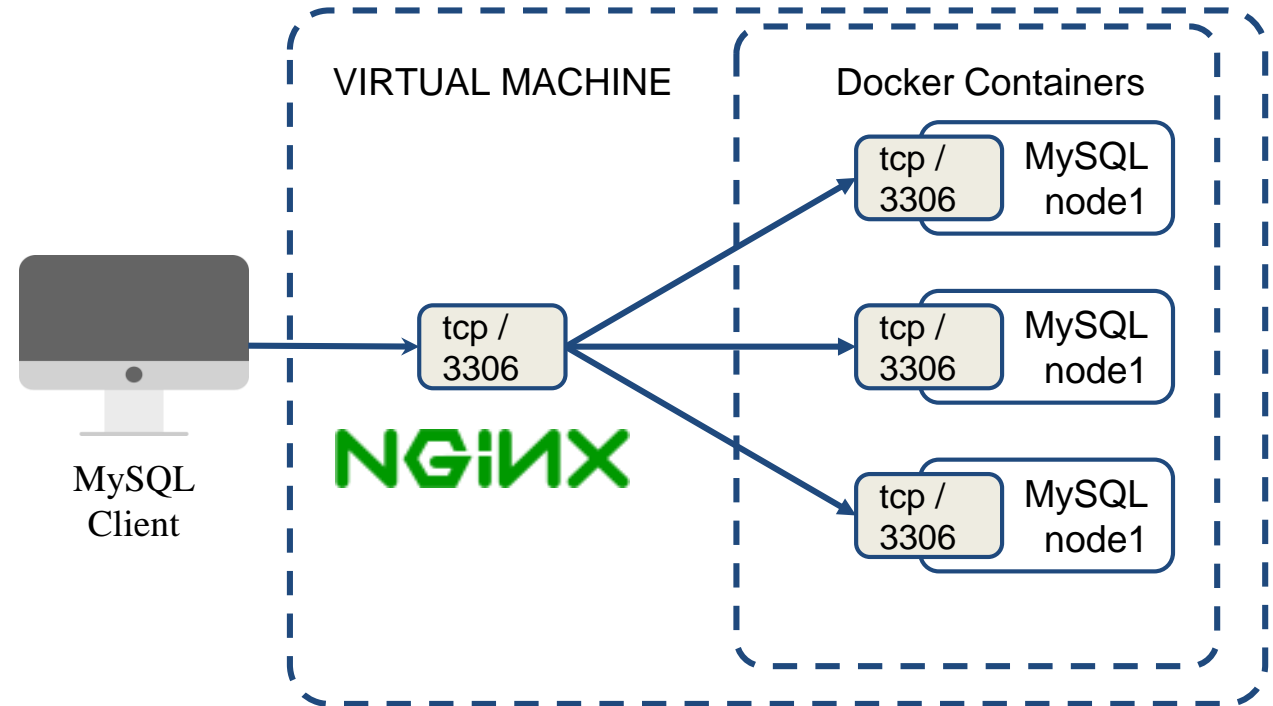
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# Load balance

- Nginx proxy

```
upstream backend {  
    server 172.16.1.1:3000;  
    server 172.16.1.2:3000;  
}  
server {  
    listen 80;  
    server_name www.example.com;  
    location / {  
        proxy_pass  
        http://backend;  
    }  
}
```

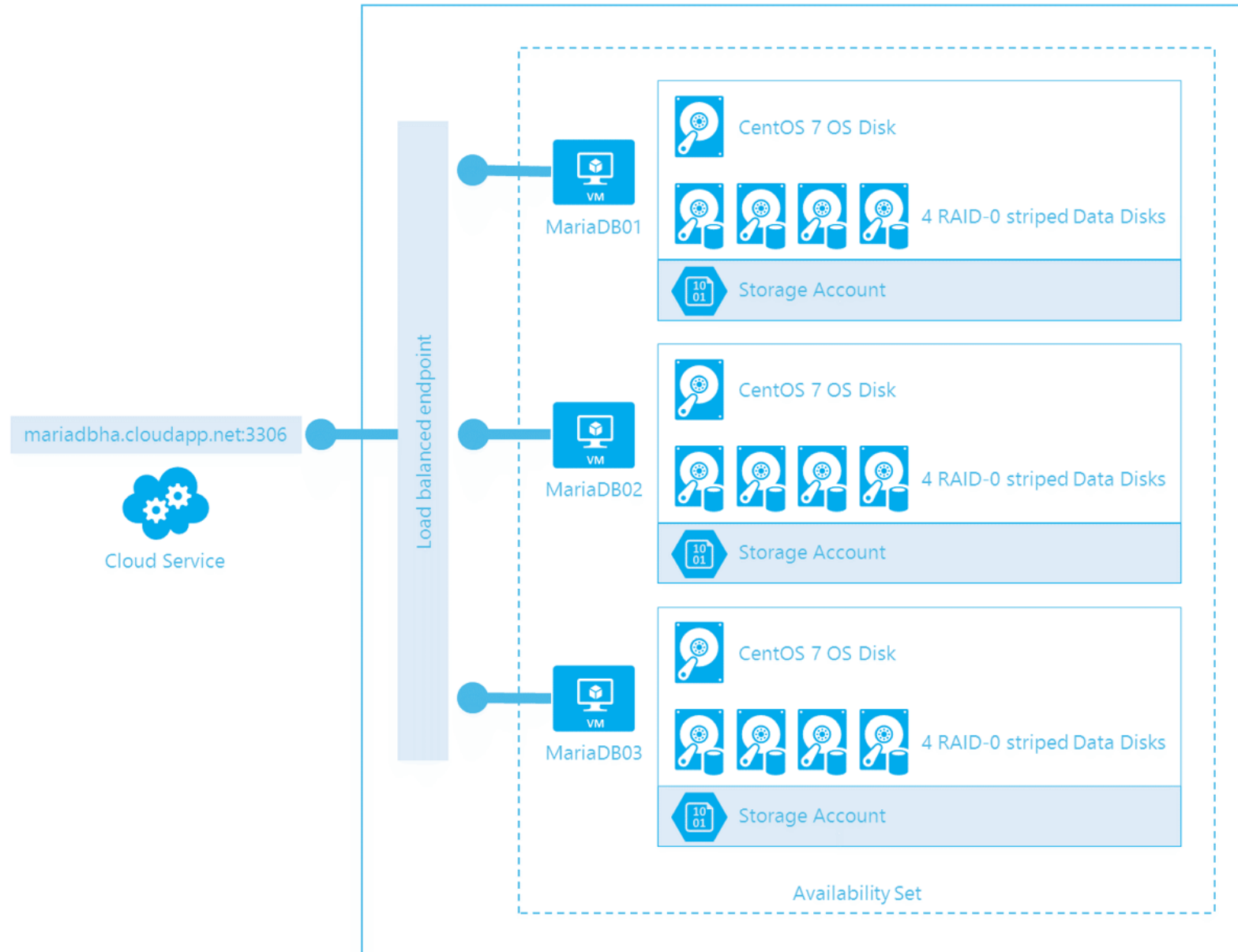


# Load balance

- Open Source
  - haproxy - <http://www.haproxy.org/>
  - envoy - <https://www.envoyproxy.io/>
- Commercial
  - F5
  - A10
  - AWS ELB
  - Google Cloud Load Balance

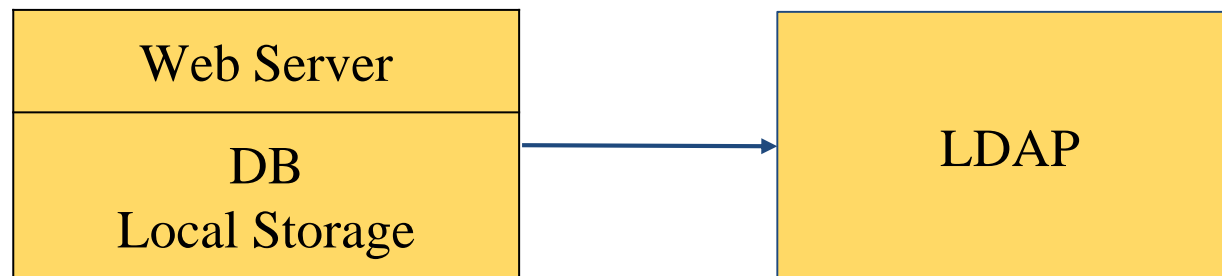


# MySQL cluster



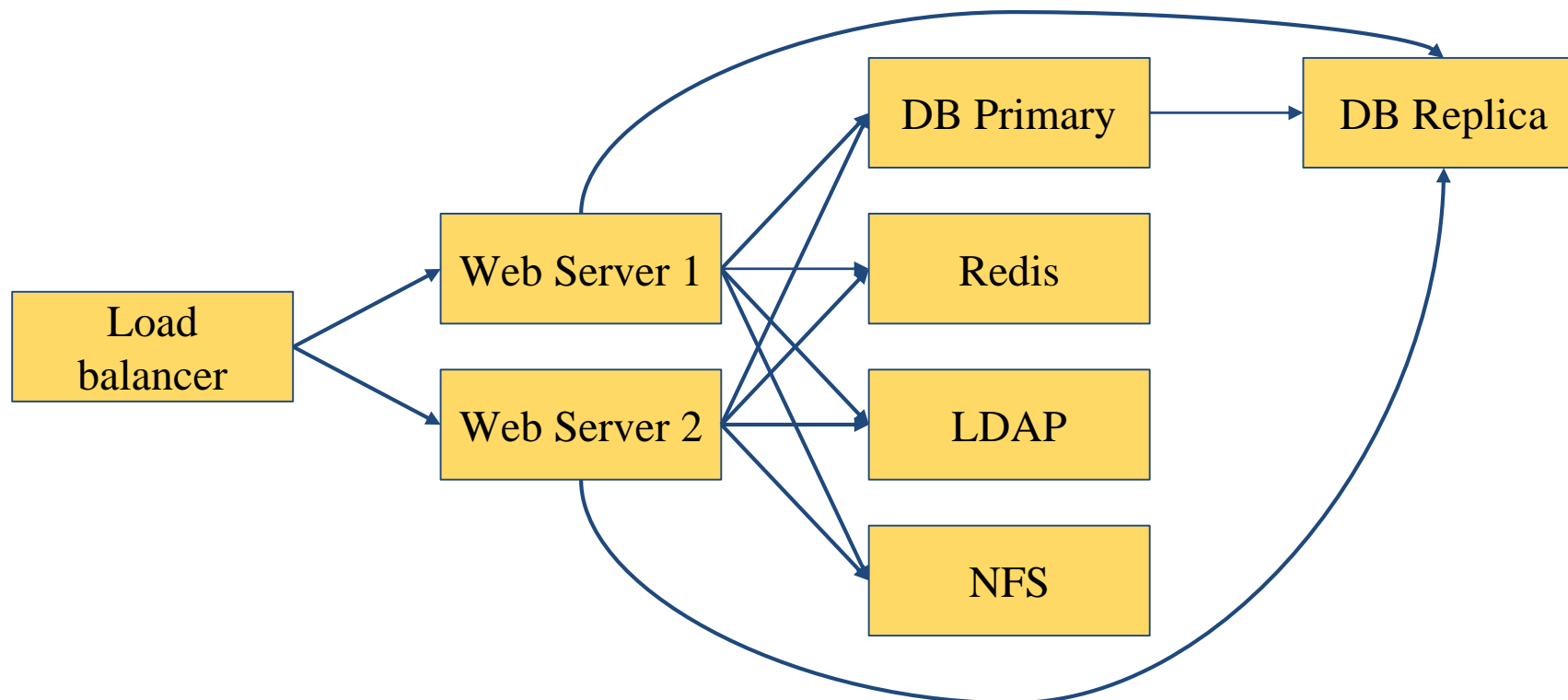
# Up to 150 users

- One machine running the application server.
  - Web server
  - database server
  - local storage
- Authentication via an existing LDAP or Active Directory server.



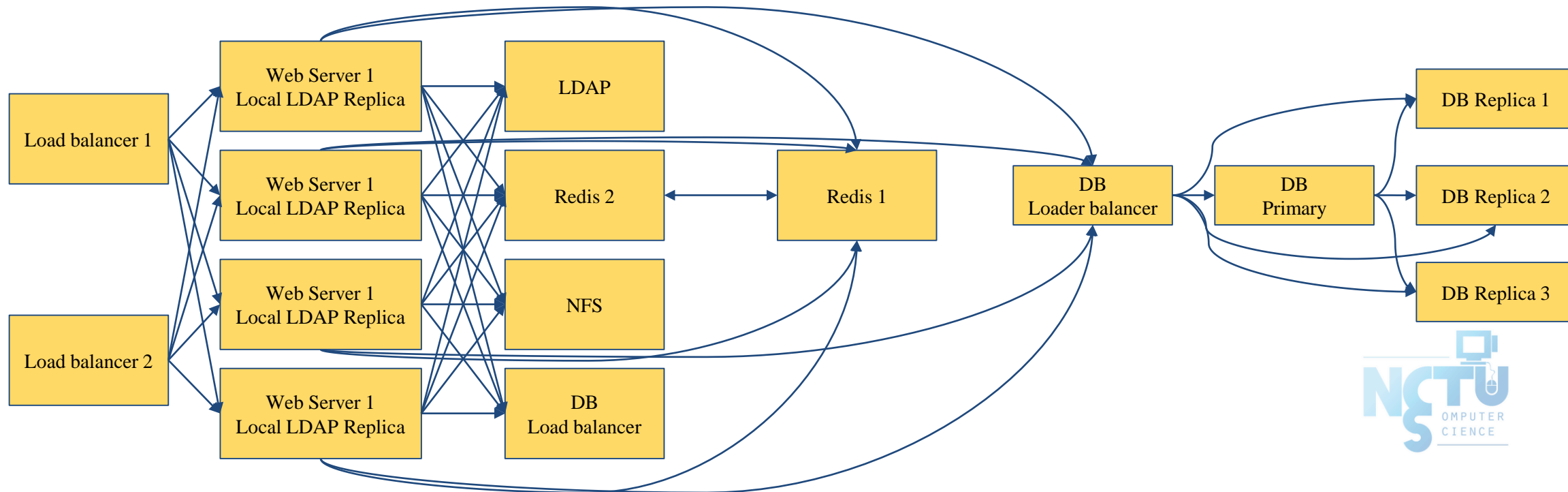
# 150 to 1,000 users

- High availability level
  - Every component is fully redundant and can fail without service interruption.
  - Backups without service interruption



# 5,000 to >100,000 users

- 4 to 20 application/Web servers.
- A cluster of two or more database servers
  - behind a load balancer to send all writes to the master and reads to the slaves.
- Storage is an NFS server, or an object store that is S3 compatible.



# Appendix

phpMyAdmin / lighttpd / FastCGI

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# phpMyAdmin

- phpMyAdmin can manage a whole MySQL server as well as a single database over the World Wide Web.
- Official Site: <http://www.phpmyadmin.net/>
- Documentation: <http://www.phpmyadmin.net/documentation/>
- Features
  - Browser-based, Supporting PHP5.3+, MySQL 5.0+, Open Source
- There are four authentication modes offered:
  - http
  - cookie
  - signon
  - config (the less secure one, not recommended).

# Installing phpMyAdmin (1)

- databases/phpmyadmin
  - \$ make install clean
- Installed...

```
phpMyAdmin-4.7.4 has been installed into:
  /usr/local/www/phpMyAdmin

Please edit config.inc.php to suit your needs.

To make phpMyAdmin available through your web site, I suggest
that you add something like the following to httpd.conf:

Alias /phpmyadmin/ "/usr/local/www/phpMyAdmin/"

<Directory "/usr/local/www/phpMyAdmin/">
  Options none
  AllowOverride Limit

  Order Deny,Allow
  Deny from all
  Allow from 127.0.0.1 .example.com
</Directory>
```

# Installing phpMyAdmin (2)

- config.inc.php
  - Override libraries/config.default.php
- config.sample.inc.php
  - \$cfg['blowfish\_secret']



# Administering MySQL – Using phpMyAdmin (3)



歡迎使用 phpMyAdmin

語系 - *Language*

中文 - Chinese traditional

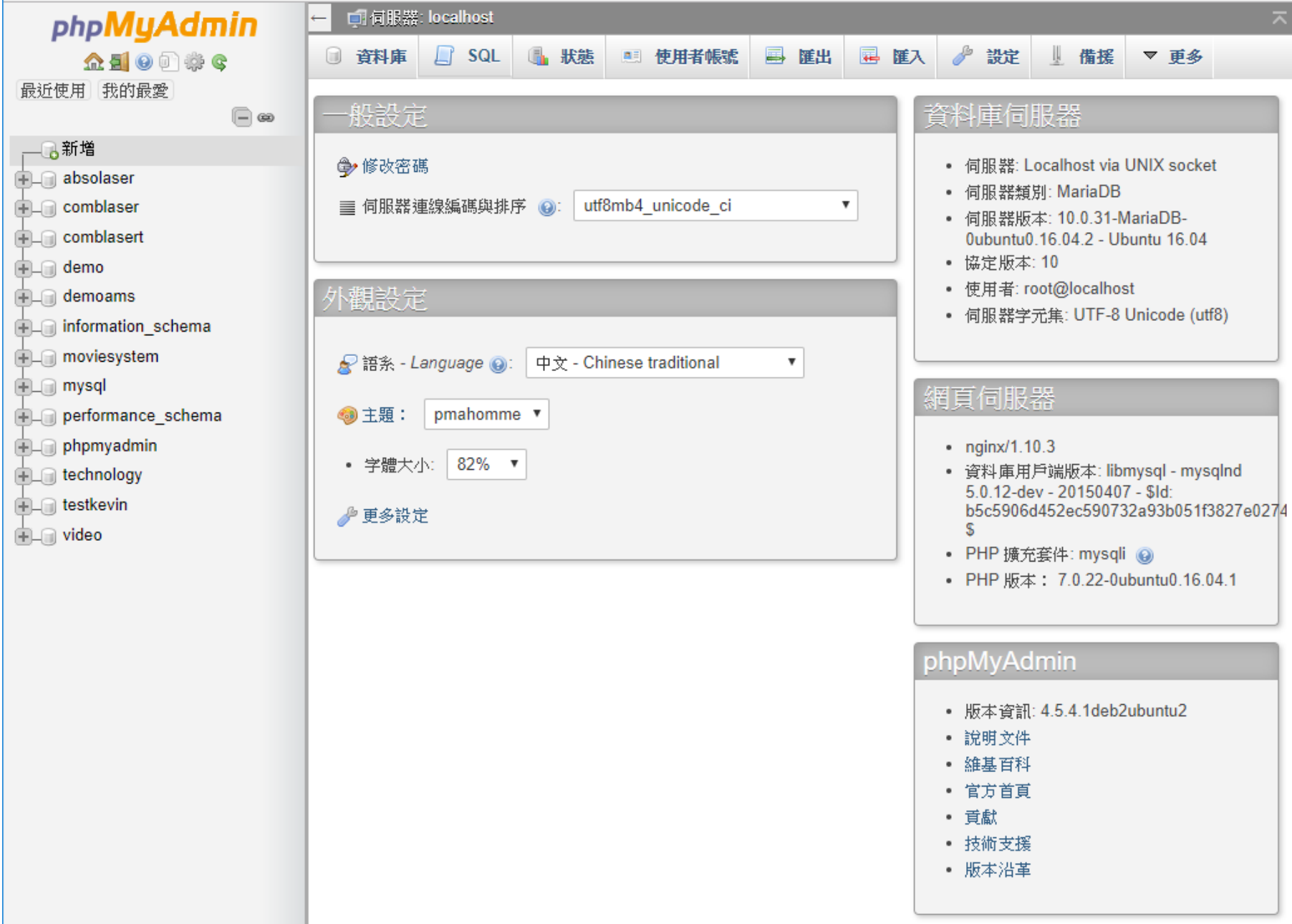
登入 

使用者名稱:

密碼:

執行

# Administering MySQL – Using phpMyAdmin (4)



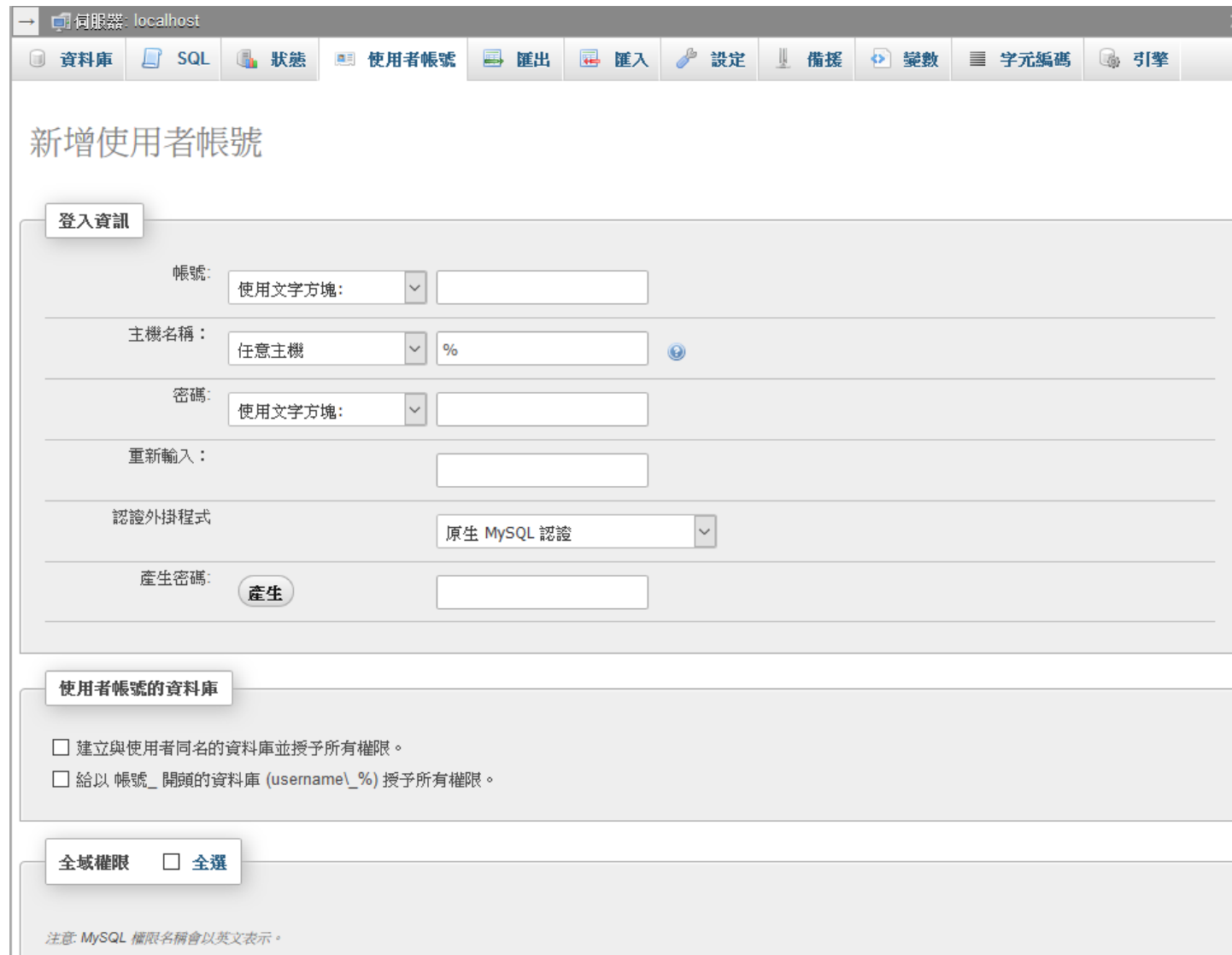
The screenshot displays the phpMyAdmin web interface for a MySQL server on localhost. The interface is in Chinese and shows various configuration panels:

- 一般設定 (General):** Includes a "修改密碼" (Change Password) button and a dropdown menu for "伺服器連線編碼與排序" (Server Connection Character Set and Collation) set to "utf8mb4\_unicode\_ci".
- 外觀設定 (Appearance):** Includes a dropdown for "語系 - Language" (Language) set to "中文 - Chinese traditional", a theme selector set to "pmahomme", and a font size selector set to "82%".
- 資料庫伺服器 (Database Server):** Lists server details: Localhost via UNIX socket, MariaDB, version 10.0.31-MariaDB-0ubuntu0.16.04.2 - Ubuntu 16.04, protocol 10, user root@localhost, and character set UTF-8 Unicode (utf8).
- 網頁伺服器 (Web Server):** Lists web server details: nginx/1.10.3, libmysql - mysqlnd 5.0.12-dev - 20150407 - \$Id: b5c5906d452ec590732a93b051f3827e0274\$, PHP extension mysqli, and PHP version 7.0.22-0ubuntu0.16.04.1.
- phpMyAdmin:** Lists version 4.5.4.1deb2ubuntu2 and provides links for documentation, Wikipedia, official homepage, contributions, technical support, and version history.

The left sidebar shows a tree view of databases and users, including "absolaser", "comblaser", "demo", "demoams", "information\_schema", "moviesystem", "mysql", "performance\_schema", "phpmyadmin", "technology", "testkevin", and "video".

# Administering MySQL – Using phpMyAdmin (5)

- Create another user with limited privilege



The screenshot shows the 'Add User' (新增使用者帳號) form in phpMyAdmin. The form is divided into several sections:

- 登入資訊 (Login Information):** This section contains fields for '帳號' (Username), '主機名稱' (Host Name), '密碼' (Password), '重新輸入' (Re-enter), '認證外掛程式' (Authentication Plugin), and '產生密碼' (Generate Password). The '帳號' and '密碼' fields have a dropdown menu for '使用文字方塊' (Use text area). The '主機名稱' field has a dropdown for '任意主機' (Any host) and a text input with a '%' wildcard. The '認證外掛程式' dropdown is set to '原生 MySQL 認證' (Native MySQL authentication).
- 使用者帳號的資料庫 (Database for the user):** This section contains two checkboxes:
  - 建立與使用者同名的資料庫並授予所有權限。
  - 給以 帳號\_ 開頭的資料庫 (username\\_%) 授予所有權限。
- 全域權限 (Global Privileges):** This section contains a checkbox for '全選' (All).

At the bottom of the form, there is a note: 注意: MySQL 權限名稱會以英文表示。

# PopSQL & SQLpro (1)

The screenshot shows the PopSQL web interface. At the top, there's a window title 'dellstore' and a 'Feedback' link. The main heading is 'Weekly orders'. On the right, there are 'Run' and 'Share' buttons. The SQL query is as follows:

```
1 select
2     date_trunc('week', orderdate) as week,
3     count(1)
4 from orders
5 where orderdate between '2004-01-01' and '2004-02-28'
6 group by 1
7 order by 1
8 limit 5
```

Below the query, there are two result panels. The top panel is a line chart titled 'Success' with a timestamp of '9:51 AM' and execution time of '0.146 seconds'. It shows the weekly order counts over time. The bottom panel is a table titled 'Success' with a timestamp of '9:50 AM' and execution time of '0.145 seconds', displaying the same data in a tabular format.

week	count
2003-12-29 00:00:00-08	125
2004-01-05 00:00:00-08	238
2004-01-12 00:00:00-08	225
2004-01-19 00:00:00-08	210
2004-01-26 00:00:00-08	241

# PopSQL & SQLpro (2)

The screenshot shows the SQLPro for Postgres application interface. The window title is "SQLPro for Postgres -- Untitled 5.sql". The interface includes a sidebar on the left with a search filter and a tree view of the database schema for "haproxy660.aws-us-east-1-portal.0.dblayer.com - dvdrental". The main area displays a SQL query:

```
1 SELECT * FROM nicer_but_slower_film_list LIMIT 100;  
2 select * from city
```

A dropdown menu is open over the second line of the query, listing various tables: actor, actor\_info, address, category, city (highlighted), country, customer, customer\_list, film, film\_actor, and film\_category.

Below the query editor, a table of results is displayed with the following columns: fid, title, description, category, price, length, rating, and a column for actor names. The table contains 20 rows of data:

fid	title	description	category	price	length	rating	actor
1	Academy Dinosaur	A Epic Drama of a Feminist And a Mad Scientist...	Documentary	0.99	86	PG	RockD
2	Ace Goldfinger	A Astounding Epistle of a Database Administrato...	Horror	4.99	48	G	Minnie
3	Adaptation Holes	A Astounding Reflection of a Lumberjack And a ...	Documentary	2.99	50	NC-17	Camer
4	Affair Prejudice	A Fanciful Documentary of a Frisbee And a Lumb...	Horror	2.99	117	G	JodieD
5	African Egg	A Fast-Paced Documentary of a Pastry Chef And...	Family	2.99	130	G	Dustin
6	Agent Truman	A Intrepid Panorama of a Robot And a Boy who...	Foreign	2.99	169	PG	Warren
7	Airplane Sierra	A Touching Saga of a Hunter And a Butler who m...	Comedy	4.99	62	PG-13	Menah
8	Airport Pollock	A Epic Tale of a Moose And a Girl who must Con...	Horror	4.99	54	R	Lucille
9	An Alabama Devil	A Thoughtful Panorama of a Database Administr...	Horror	2.99	114	PG-13	William
10	Aladdin Calendar	A Action-Packed Tale of a Man And a Lumberjac...	Sports	4.99	63	NC-17	GretaM
11	Alamo Videotape	A Boring Epistle of a Butler And a Cat who must...	Foreign	0.99	126	G	Michael
12	Alaska Phantom	A Fanciful Saga of a Hunter And a Pastry Chef w...	Music	0.99	136	PG	ValBol
13	Ali Forever	A Action-Packed Drama of a Dentist And a Croc...	Horror	4.99	150	PG	Christo
14	Alice Fantasia	A Emotional Drama of a A Shark And a Database...	Classics	0.99	94	NC-17	Woody
15	Alien Center	A Brilliant Drama of a Cat And a Mad Scientist w...	Foreign	2.99	46	NC-17	Sidney
16	Alley Evolution	A Fast-Paced Drama of a Robot And a Compose...	Foreign	2.99	180	NC-17	Gregor
17	Alone Trip	A Fast-Paced Character Study of a Composer A...	Music	0.99	82	R	Reneel
18	Alter Victory	A Thoughtful Drama of a Composer And a Femin...	Animation	0.99	57	PG-13	JadaRy
19	Amadeus Holy	A Emotional Display of a Pioneer And a Technical...	Action	0.99	113	PG	Penelo
20	Amelie Hellfighters	A Boring Drama of a Woman And a Squirrel who...	Music	4.99	79	R	LauraE

At the bottom of the window, a status bar indicates: "Finished with 100 records. 0.217 seconds."

# Installing lighttpd

- `www/lighttpd`
  - Official: <http://www.lighttpd.net/>
- Configuration files
  - `/usr/local/etc/lighttpd/{lighttpd,modules}.conf`
  - `/usr/local/etc/lighttpd/{vhosts,conf}.d/`
- Startup script
  - `/usr/local/etc/rc.d/lighttpd`
- Documentation:
  - `/usr/ports/www/lighttpd/work/lighttpd-1.4.28/doc/*.txt`
  - `alias, cgi, dirlisting, fastcgi, ssl, userdir`
  - Virtual hosts: `evhost, mysqlvhost, simple-vhost`

# FastCGI

- FastCGI is actually CGI with only a few extensions.
  - FastCGI is language-independent.
  - FastCGI run applications in processes isolated from the core Web server, which provides greater security than APIs.
  - FastCGI developers are committed to propagating FastCGI as an open standard. (C/C++, Java, Perl, Tcl)
  - FastCGI is not tied to the internal architecture of any Web server and is therefore stable even when server technology changes.
- Benefits:
  - Distributed computing
  - Multiple and extensible roles
- Official site: <http://www.fastcgi.com/drupal/>