Exercise 6
Apache and MySQL

Announced Date: 2004/12/6

Due Date: 2004/12/24

Bonus Due Date: 2004/12/19

Outline

- Apache introduction
- SQL Introduction
- Install Apache + MySQL + PHP
- Administration of Apache
- Administration of MySQL

- Exercise

DSO (1)

- Dynamic Shared Object
  - A way to build a piece of program code in a special format for **loading it at run-time** into the address space of an **executable program**
- Two ways to use DSO
  - Shared Library
    - Reside in /usr/lib
    - Link to the executable program is established at build time
  - Shared Object files
    - Reside in program-specific directory
    - No link to the executable program
    - Executable program loads the DSO at run time via dlopen()

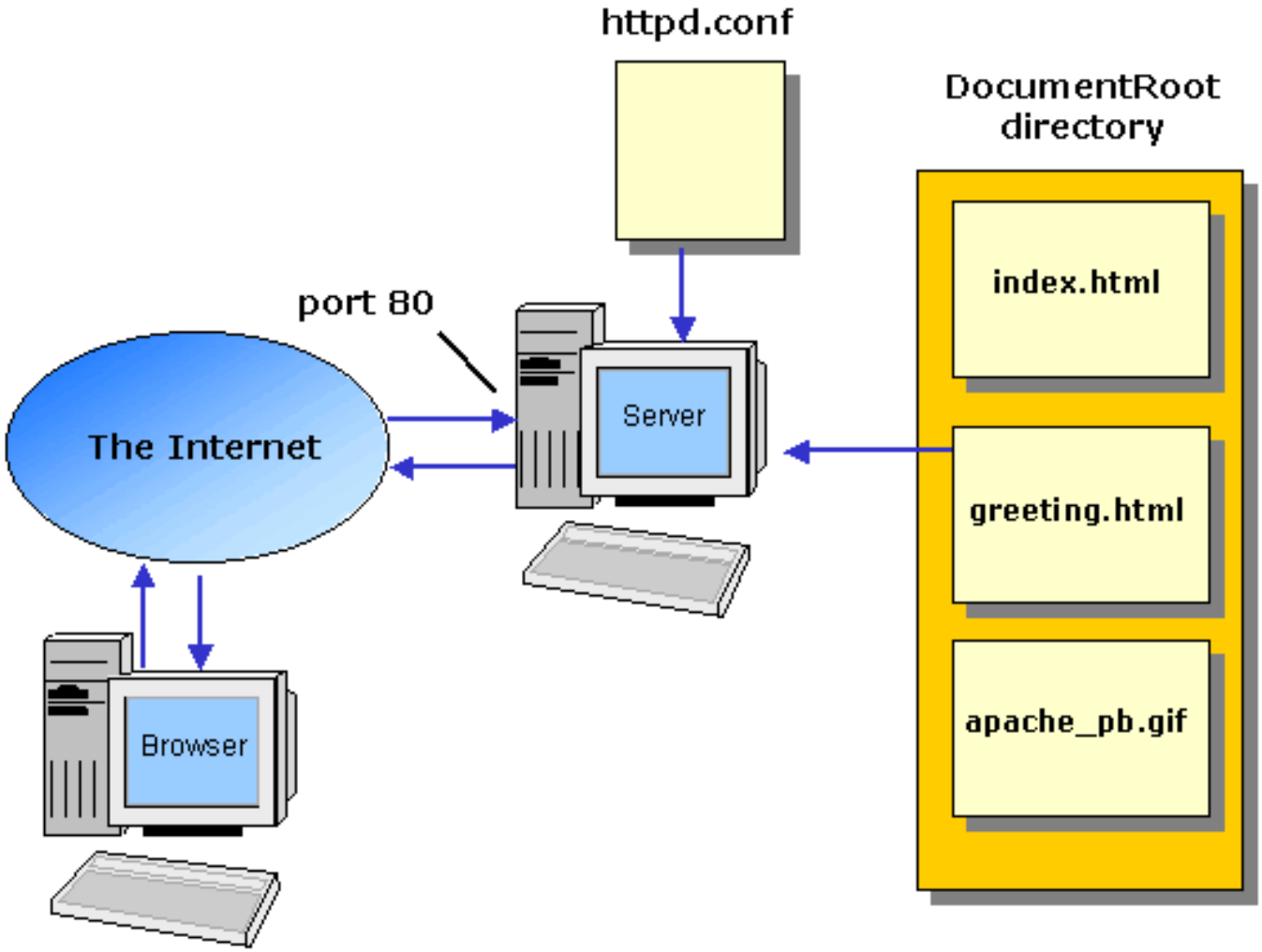
DSO (2)

- Apache support DSO
  - Apache DSO module
    - **mod_so**
  - Build module with apache source tree
    1. Put module source into apache source tree
    2. Build apache and module
    3. Put module to libexec directory for future loading
  - Build module outside the apache source tree

Apache

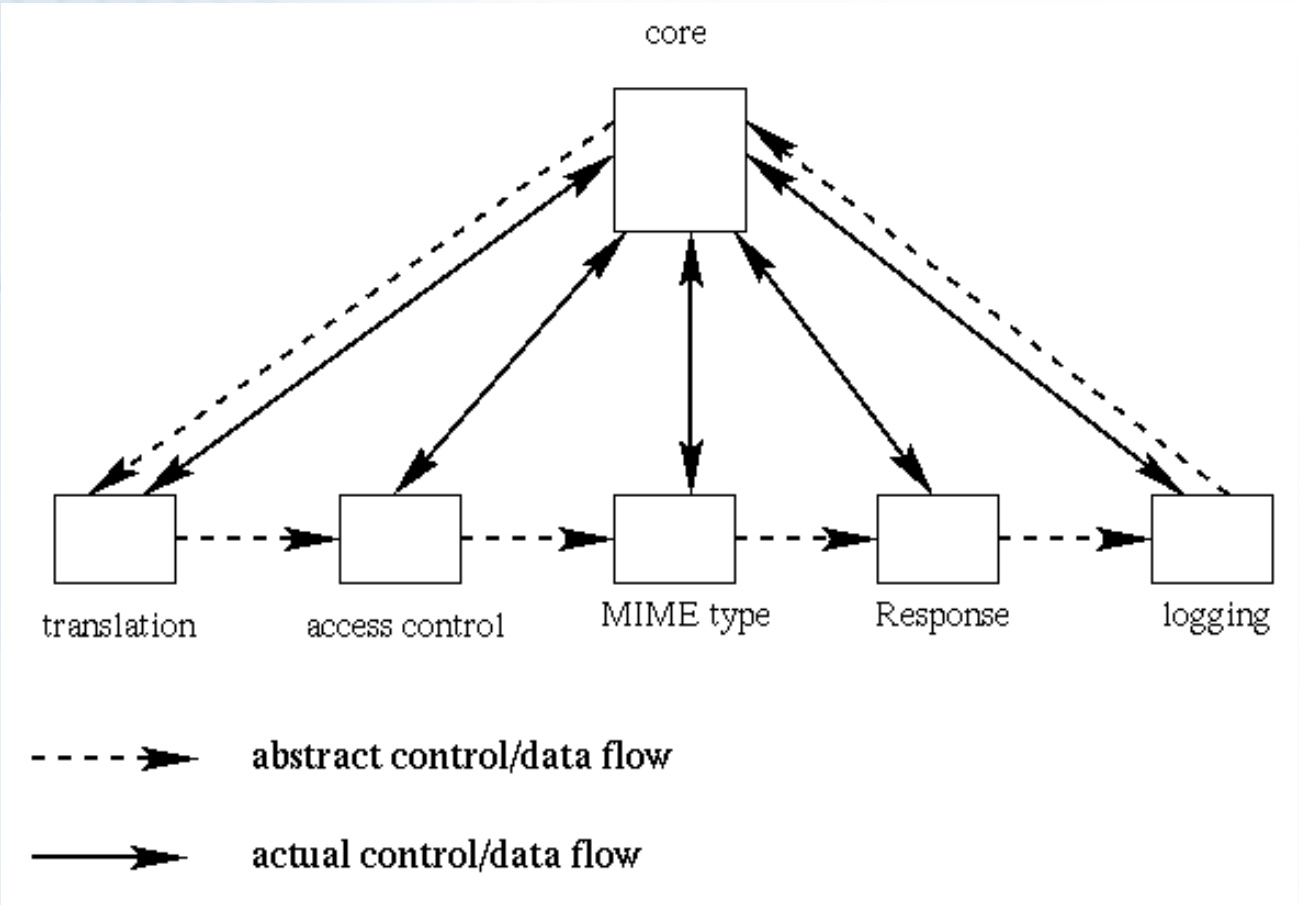
- Web httpd server that
  - HTTP/1.1 compliant web server
  - Modular design
  - Can be customised by writing modules using Apache module API
  - Freely available cross many platforms
- Two main parts
  - core
    - **Implement basic functions**
  - Modules
    - **Extend or override the functionality of the server**
    - **Example:**
      - Access control, logging, CGI, proxy, cache control, PHP…

How Apache Works – request and response

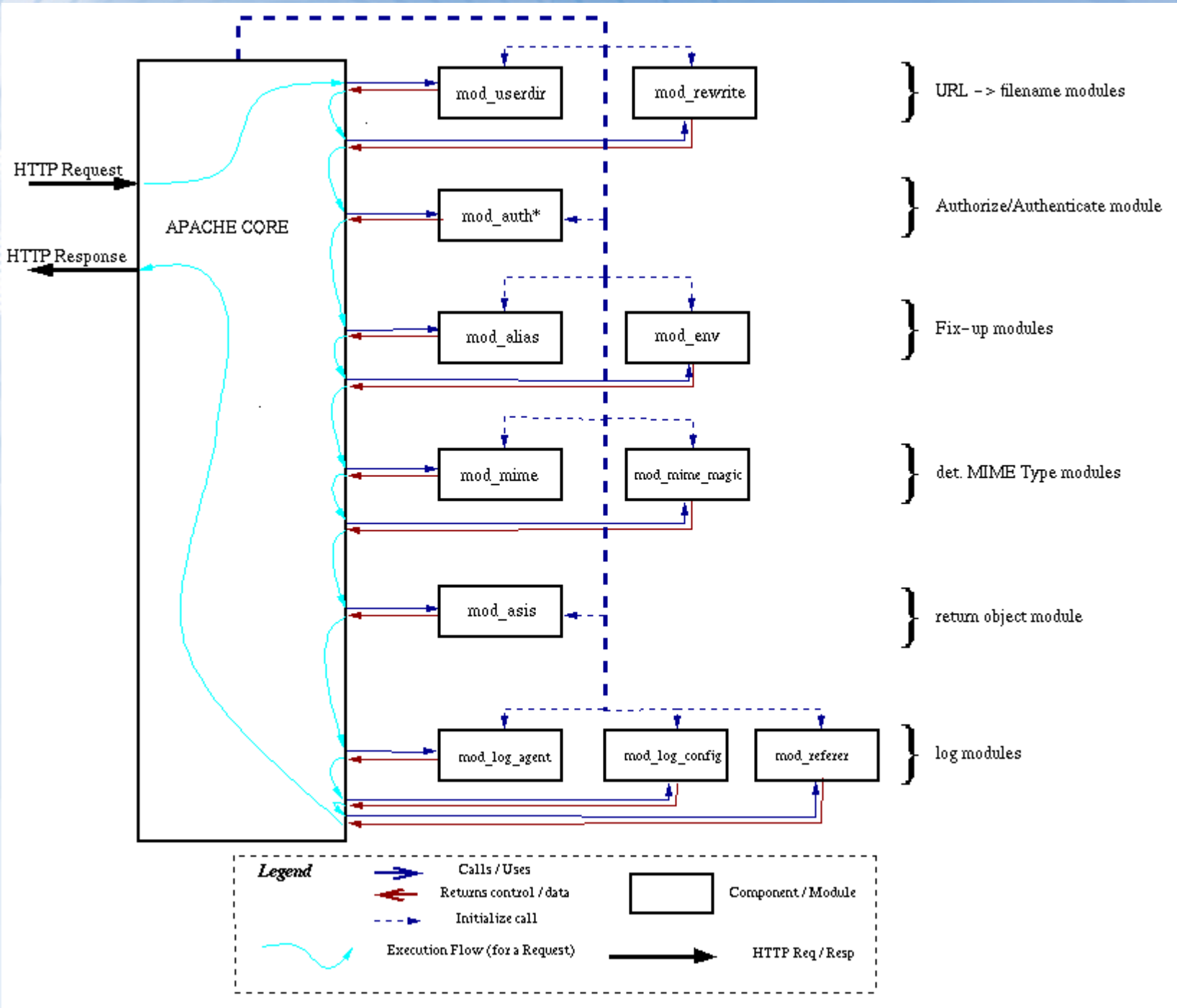


How Apache Works – Each request-response

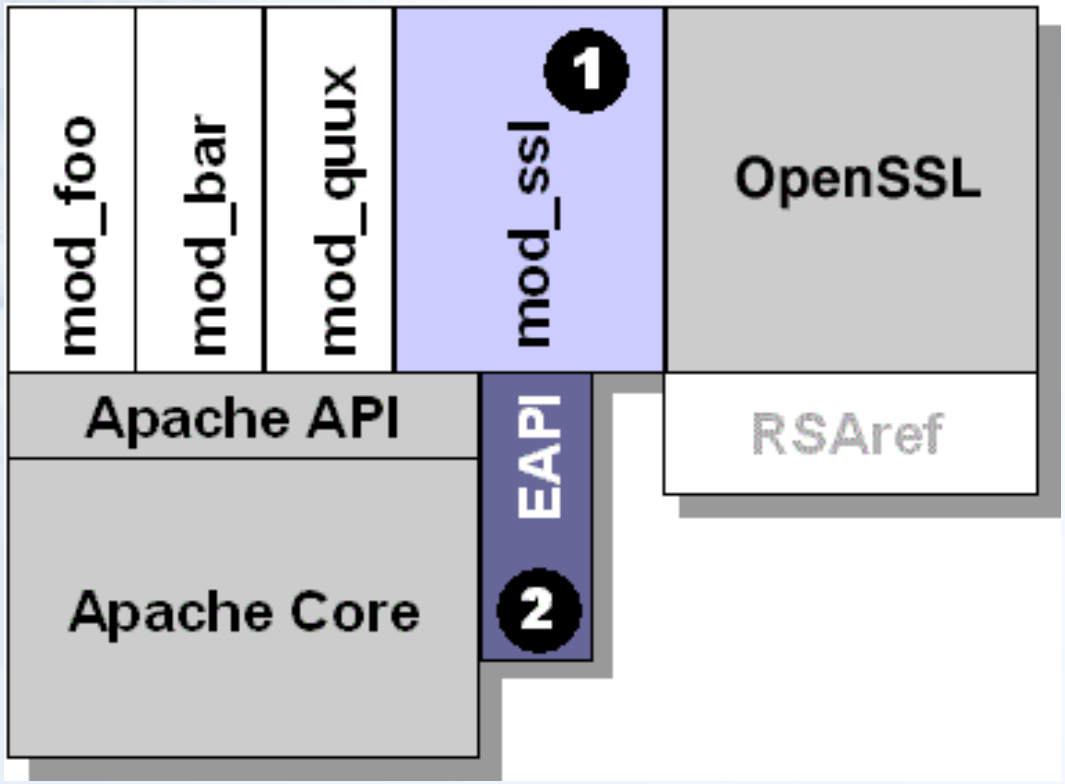
- Apache breaks client request into several steps which are implemented as modules



Apache Detail



Apache with mod_ssl



Installation

In this exercise …

- We want to install apache + PHP + MySQL + mod_ssl
- Files that we need …
  - apache_1.3.33.tar.gz
  - php-4.3.9.tar.gz
  - mysql-4.1.7.tar.gz
  - mod_ssl-2.8.22-1.3.33.tar.gz
  - openssl-0.9.7e.tar.gz
  - Move this file into /usr/local/src
- Install sequence
  - Untar all tarballs
  - Install MySQL
  - Install openssl
  - Configure mod_ssl and apache first
  - Install PHP
  - Install apache
  - Test PHP in apache

Install Sequence – untar all tarballs

- Using tar command
  - % cd /usr/local/src
  - % sudo tar xzvf apache_1.3.33.tar.gz
  - % sudo tar xzvf mod_ssl-2.8.22-1.3.33.tar.gz
  - % sudo tar xzvf openssl-0.9.7e.tar.gz
  - % sudo tar xzvf mysql-4.1.7.tar.gzs
  - % sudo tar xzvf php-4.3.9.tar.gz

  - After you untar all these three tarballs, you will get following dirs
    - **apache_1.3.33/**
    - **mod_ssl-2.8.22-1.3.33/**
    - **openssl-0.9.7e/**
    - **mysql-4.1.7/**
    - **php-4.3.9/**

Install Sequence – MySQL (1)

- Resource
  - http://mysql.nctu.edu.tw
- Install Steps
  1. Configure to generate Makefile
  2. Make and make install
  3. Create “mysql” user and group to own mysql
  4. Copy config file and initial basic DBs
  5. Start mysqld and test
  6. Securing initial MySQL accounts

Install Sequence – MySQL (2)

1. Configure to generate Makefile
   - With the following options
     - --with-charset=big5
     - --prefix=/home/mysql
     - --with-mysqld-user=mysql
   - **% cd /usr/local/src/mysql-4.1.7**
   - **% sudo ./configure --with-charset=big5 --with-mysqld-user=mysql \ --prefix=/home/mysql**
2. Make and make install
   - % sudo make
   - % sudo make install

Install Sequence – MySQL (3)

3. Create mysql user and group
   - Edit /etc/group
   - Using vipw to add “mysql” user

   - % sudo chown –R root:mysql /home/mysql
   - % sudo chown –R mysql /home/mysql/var
4. Copy config file and initial basic DBs
   - % cd /usr/local/src/mysql-4.1.7
   - % sudo cp support-files/my-huge.cnf /etc/my.cnf

   - % cd /home/mysql
   - % sudo bin/mysql_install_db --user=mysql

Install Sequence – MySQL (4)

5. Start mysqld
   - Command line
     - % /home/mysql/bin/mysqld_safe --user=mysql &
   - Copy management script to /usr/local/etc/rc.d/init.d
     - % cd /usr/local/src/mysql-4.1.7/support-files
     - % sudo cp mysql.server /usr/local/etc/rc.d/**mysql.server.sh**
     - % sudo chmod u+x /usr/local/etc/rc.d/mysql.server.sh
   - Edit /etc/my.cnf

```
[client]
#password   = your_password
port        = 3306
socket      = /tmp/mysql.sock

# Here follows entries for some specific programs
[mysql.server]
basedir=/home/mysql

# The MySQL server
[mysqld]
port        = 3306
user        = mysql
```

Install Sequence – MySQL (5)

- Test
  - **% mysql –u root –p**
    > The initial password for root is empty

```
tytsai@tybsd:/var/log> mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 2 to server version: 4.1.7-log

Type 'help;' or '\h' for help. Type '\c' to clear the buffer.

mysql> show databases;
+----------+
| Database|
+----------+
| mysql    |
| test     |
+----------+
2 rows in set (0.27 sec)

mysql> exit
Bye
```

Install Sequence – MySQL (6)

6. Securing initial accounts
   - Two initial accounts
     - **root**
     - **anonymous**

```
mysql> SELECT Host, User From mysql.user;
+-------------------------+------+
| Host                    | User |
+-------------------------+------+
| localhost               |      |
| localhost               | root |
| tybsd.csie.nctu.edu.tw  |      |
| tybsd.csie.nctu.edu.tw  | root |
+-------------------------+------+
```

```
tytsai@tybsd:~> mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 4 to server version: 4.1.7-log

Type 'help;' or '\h' for help. Type '\c' to clear the buffer.

mysql> UPDATE mysql.user SET Password = PASSWORD(`user123') WHERE User = '';
Query OK, 2 rows affected (0.26 sec)
Rows matched: 2  Changed: 2  Warnings: 0

mysql> UPDATE mysql.user SET Password = PASSWORD(`root123') WHERE User = 'root';
Query OK, 2 rows affected (0.00 sec)
Rows matched: 2  Changed: 2  Warnings: 0

mysql> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.00 sec)
```

Install Sequence – openssl

- Resource
  - http://www.openssl.org
- Install sequence
  - % cd /usr/local/src/openssl-0.9.7e
  - % ./config
  - % make
  - % make test
  - % make install

Install Sequence – configure mod_ssl and apache

- mod_ssl
  - % cd /usr/local/src/mod_ssl-2.8.22-1.3.33
  - % ./configure --with-apache=/usr/local/src/apache_1.3.33
- apache
  - % cd /usr/local/src/apache_1.3.33
  - % ./configure --prefix=/usr/local/apache

Install Sequence – PHP (1)

- Resource
  - http://www.php.net
- Install Steps
  1. configure PHP to use mysql with apache
  2. Make and make install
  3. Setup php.ini file

Install Sequence – PHP (2)

1. Configure PHP to use MySQL with apache
   - With the following options
     - --with-mysql=/home/mysql
     - --with-apache=/usr/local/src/apache_1.3.33
     - --enable-track-vars
   - % cd /usr/local/src/php-4.3.9
   - % ./configure --with-mysql=/home/mysql \
     --with-apache=/usr/local/src/apache_1.3.33 –enable-track-vars
2. Make and make install
   - % make
   - % make install

Install Sequence – PHP (3)

3. Setup php.ini file
   - % cd /usr/local/src/php-4.3.9
   - % cp php.ini-dist /usr/local/lib/php.ini

Install Sequence – Apache (1)

- Resource
  - http://httpd.apache.org/
- Install Sequence
  1. Configure to support ssl and php
  2. Make
  3. Make certificate
  4. Make install

Install Sequence – Apache (2)

1. Configure
   - With the following options
     - --prefix=/usr/local/apache
     - --enable-shared=max
     - --enable-module=ssl
     - --activate-module=src/modules/php4/libphp4.a
   - **% cd /usr/local/src/apache_1.3.33**
   - **% setenv SSL_BASE "../openssl-0.9.7e"**
   - **% ./configure --prefix=/usr/local/apache --enable-shared=max **
     --enable-module=ssl --activate-module=src/modules/php4/libphp4.a
2. Make
   - % make

Install Sequence – Apache (3)

- Make certificate
  - % make certificate TYPE=dummy
- Make install
  - % make install

Install Sequence – test PHP in apache (1)

- Edit httpd.conf to support php
  - % cd /usr/loca/apache/conf
  - % mkdir /www ; mkdir /www/data
  - % Edit httpd.conf

```
...
AddType application/x-httpd-php .php .phtml .php3
AddType application/x-httpd-php-source .phps
...
```

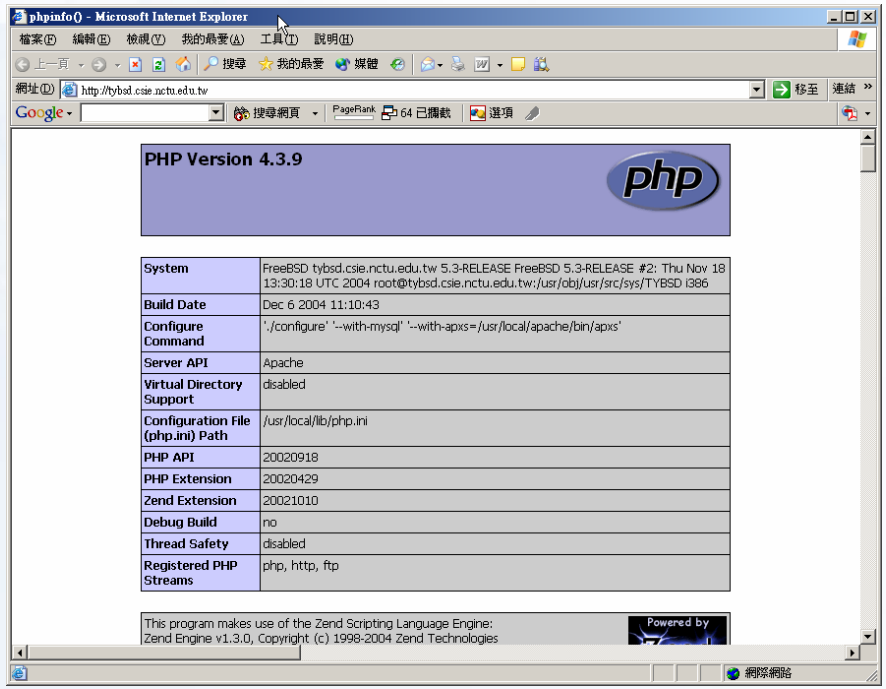
```
ServerName tybsd.csie.nctu.edu.tw
# DocumentRoot "/usr/local/apache/htdocs"
DocumentRoot "/www/data"
...
# <Directory "/usr/local/apache/htdocs">
<Directory "/www/data">
```

```
<IfModule mod_dir.c>
    DirectoryIndex index.php index.html index.htm
</IfModule>
```

Install Sequence – test PHP in apache (2)

5. Restart httpd
   - % /usr/local/apache/bin/apachectl startssl
6. Test PHP
   - % Edit /www/data/index.php

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



Administration of Apache

Apache Directory Architecture

- Under /usr/local/apache
  - bin/
    - **Core executable files**
  - cgi-bin/
    - **CGI storage**
  - conf/
    - **Configuration file storage**
  - htdocs/
    - **Default document root**
  - libexec/
    - **DSO modules**
  - logs/
    - **Apache log storage**

Apache configuration

- Two types
  - Global configurations
    - **Server specific setting**
    - **Global setting**
    - **Virtual host setting**
  - Directory Configuration
    - **Local setting for certain directory**

Apache configuration – Global Configuration (1)

- Global setting
  - ServerType standalone
  - Timeout 300
  - KeepAlive On
  - KeepAliveRequests 100
  - StartServers 5
- Server configuration
  - Port 80
  - ServerAdmin tytsai@tybsd.csie.nctu.edu.tw
  - ServerName tybsd.csie.nctu.edu.tw
  - DocumentRoot "/www/data"

Apache configuration – Directory Configuration (2)

- Configuration parameters
  - Options
    - **All** **(turn on all options except multiview)**
    - **ExecCGI** **(To allow executions of AddHandler)**
    - **FollowSymLinks** **(access files outside this directory)**
    - **Indexs** **(generate file-list for browsing)**
      (when there is no DirectoryIndex files)
    - **MultiViews** **(multi-language support)**
  - AllowOverride
    - **All** **(Read .htaccess)**
    - **None** **(ignoring .htaccess)**
  - Deny/Allow
    - **IP/DN** **(control access to this directory)**
  - Order
    - **Solve collision of deny and allow rules**

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

Apache configuration – Directory Configuration (3)

```
<IfModule mod_userdir.c>
    UserDir public_html
</IfModule>

#
# Control access to UserDir directories.  The following is an example
# for a site where these directories are restricted to read-only.
#
#<Directory /home/*/public_html>
#     AllowOverride FileInfo AuthConfig Limit
#     Options MultiViews Indexes SymLinksIfOwnerMatch IncludesNoExec
#     <Limit GET POST OPTIONS PROPFIND>
#         Order allow,deny
#         Allow from all
#     </Limit>
#     <LimitExcept GET POST OPTIONS PROPFIND>
#         Order deny,allow
#         Deny from all
#     </LimitExcept>
#</Directory>
```

```
<IfModule mod_dir.c>
    DirectoryIndex index.php index.html index.htm
</IfModule>
```

Apache configuration – Directory Configuration (4)

```
<IfModule mod_alias.c>
    Alias /icons/ "/usr/local/apache/icons/"

    <Directory "/usr/local/apache/icons">
        Options Indexes MultiViews
        AllowOverride None
        Order allow,deny
        Allow from all
    </Directory>

    Alias /manual/ "/usr/local/apache/htdocs/manual/"

    <Directory "/usr/local/apache/htdocs/manual">
        Options Indexes FollowSymlinks MultiViews
        AllowOverride None
        Order allow,deny
        Allow from all
    </Directory>
</IfModule>
```

Apache configuration – Virtual Host

> Name-Base

- Singe IP, several hostnames

```
NameVirtualHost 140.113.51.24

<VirtualHost 140.113.51.24>
ServerName www.snmg.com.tw
DocumentRoot "/www"
</VirtualHost>

<VirtualHost 140.113.51.24>
ServerName mail.snmg.com.tw
DocumentRoot "/home/sywang"
</VirtualHost>

<VirtualHost 140.113.51.24>
ServerName csie.snmg.com.tw
Redirect / http://www.csie.nctu.edu.tw/
</VirtualHost>
```

> IP-Base

- several IPs

```
<VirtualHost 140.113.50.33:80>
Port 80
ServerAdmin webmaster@sun3.csie.nctu.edu.tw
DocumentRoot /www/csie
ServerName sun3.csie.nctu.edu.tw
ErrorLog logs/csie-error_log
TransferLog logs/csie-access_log
</VirtualHost>

<VirtualHost 140.113.70.25:80>
Port 80
ServerAdmin webmaster@sun3.ee.nctu.edu.tw
DocumentRoot /www/ee
ServerName sun3.ee.nctu.edu.tw
ErrorLog logs/ee-error_log
TransferLog logs/ee-access_log
</VirtualHost>
```

Apache configuration – .htaccess (1)

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

Apache configuration – .htaccess (2)

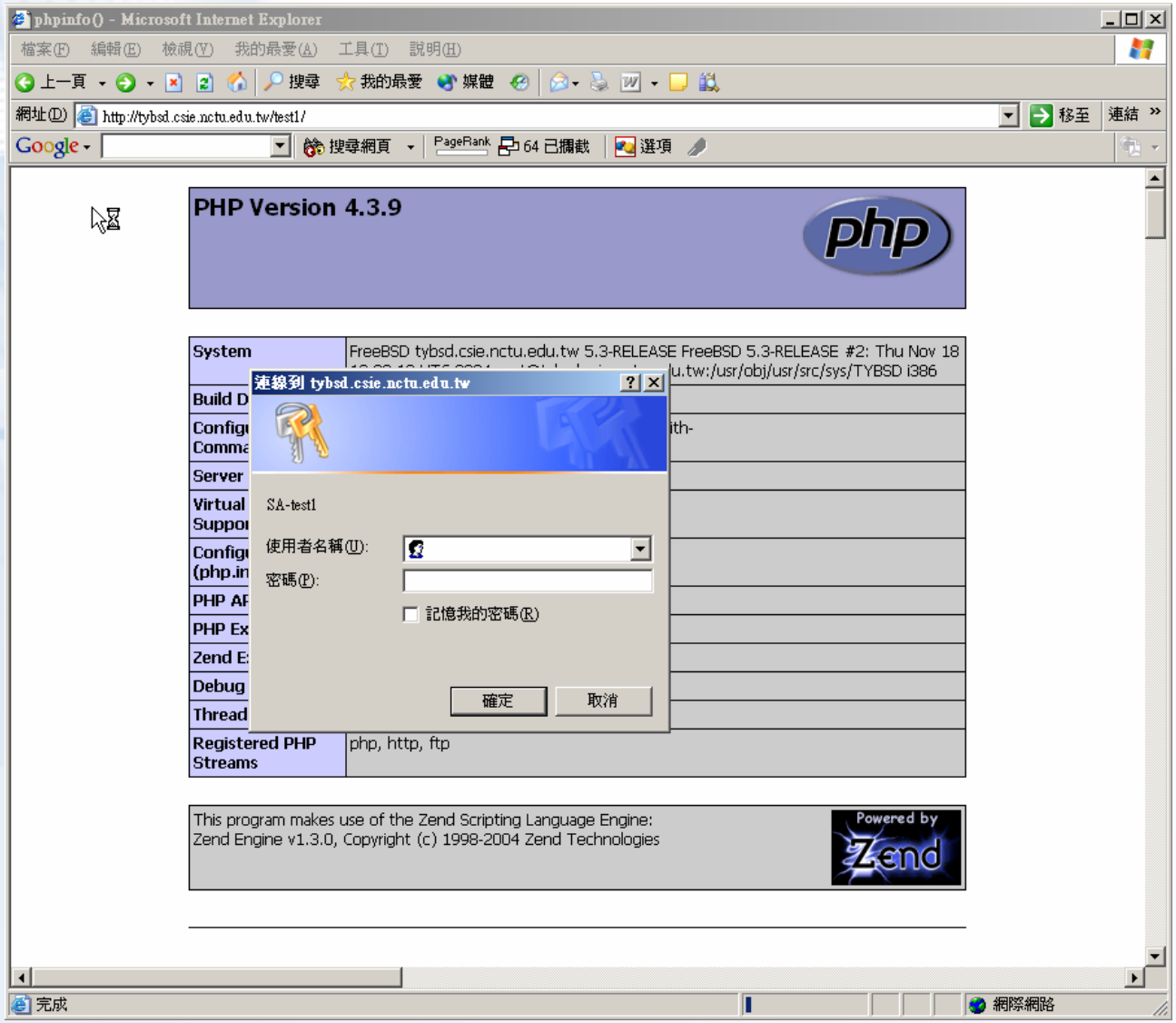
- Example
  - Modify httpd.conf
  - Create .htaccess file
  - Generate password file

```
<Directory "/www/data/test1">
    Options Indexes FollowSymLinks MultiViews ExecCGI
    AllowOverride All
    Order allow,deny
    Allow from all
</Directory>
```

```
tytsai@tybsd [3:02pm] /www/data/test1> cat .htaccess
AuthName "SA-test1"
AuthType "Basic"
AuthUserFile "/www/wwwpasswddb
require valid-user
```

```
tytsai@tybsd [2:58pm] /> /usr/local/apache/bin/htpasswd -c /www/wwwpasswddb SA-user1
New password:
Re-type new password:
Adding password for user SA-user1
```

Apache configuration – .htaccess (3)



Apache configuration – log

- Rotate your log using newsyslog

Administration of MySQL

Using phpMyAdmin (1)

Using phpMyAdmin (2)

> Steps

- Put phpMyAdmin-2.6.0-pl3.tar.gz in your document root
  - % cp phpMyAdmin-2.6.0-pl3.tar.gz /www/data
- Untar it
  - % cd /www/data
  - % tar xzvf phpMyAdmin-2.6.0-pl3.tar.gz
- Create soft-link
  - % ln –s phpMyAdmin-2.6.0-pl3 phpMyAdmin
- Modify configuration file “config.ini.php” of phpMyAdmin

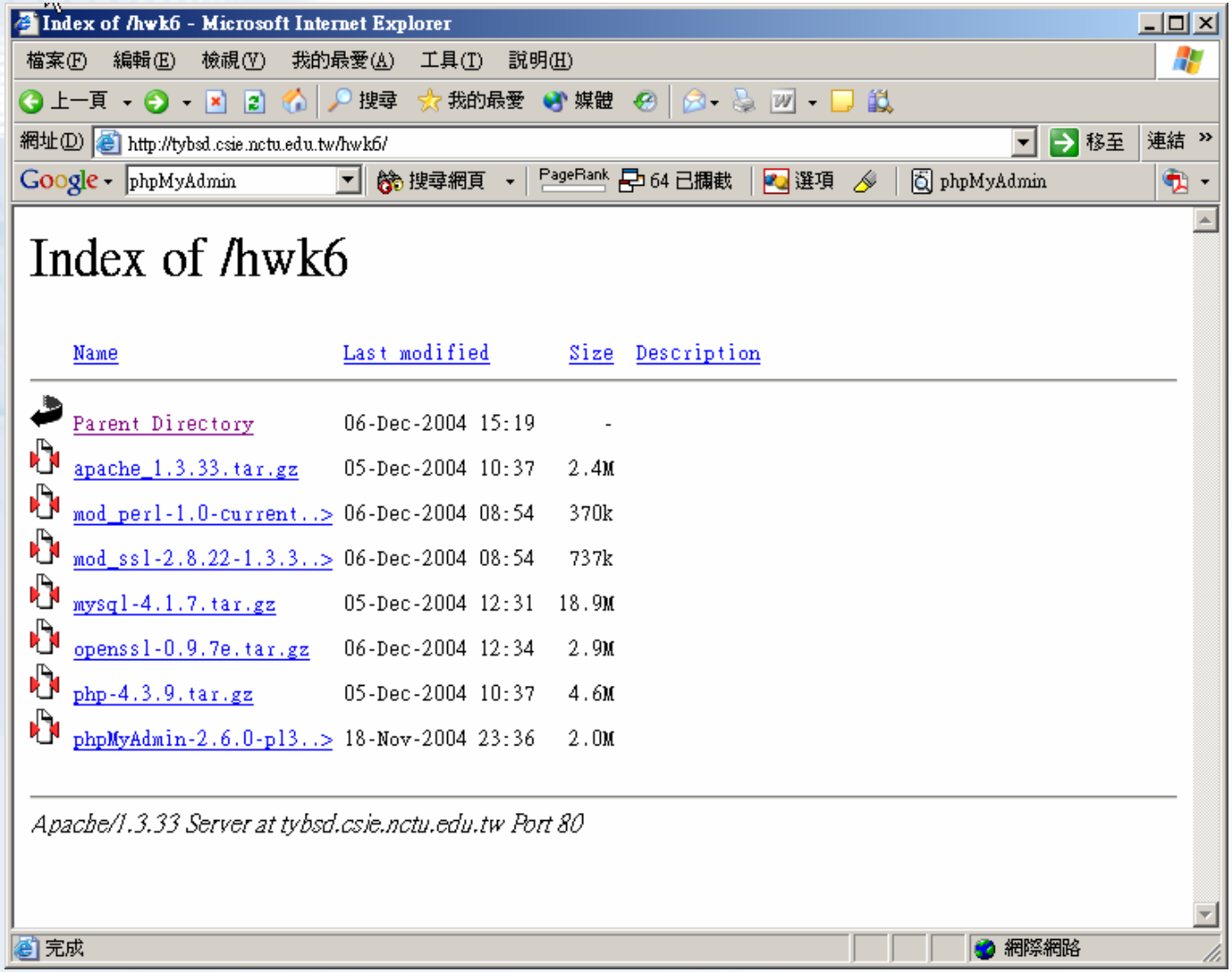
```
//$cfg['Servers'][$i]['auth_type']     = config';
$cfg['Servers'][$i]['auth_type']     = 'http';
```

Using phpMyAdmin (3)

> Create another user with limited privilege

Exercise

You can get all source here...

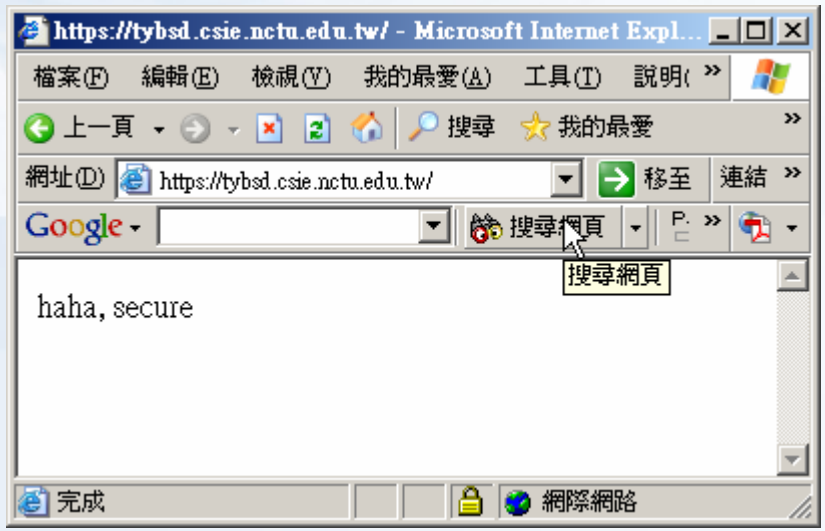


Lab1

- Install apache + MySQL + PHP + mod_ssl
  - Requirements of port80
    - Set your apache document root to "/www/data"
    - http://*yourhostname*/ will appear content of phpinfo
    - http://*yourhostname*/test1/ must appear a authentication window using .htaccess,
      - **Under test1, there is a file named test1**
      - **After login using "SA/SA123", there will be a directory listing automatically**
    - http://*yourhostname*/test2/
      - **Under test2, there is a file named test2, however, there can not have directory listing automatically**

Lab1

- Requirements of mod_ssl, port 443
  - Set SSL virtual host document root to "/www/data_ssl"
  - Under /www/data_ssl, put a file named index.htm, with the content of "haha, secure"
  - https://*yourhostname*/ will appear a page showing "haha, secure"



Lab2

- Requirements
  - Install phpMyAdmin
    - **It must provide "http" authentication**
  - Using phpMyAdmin to create a DB named "SA_hwk6"
    - **In "SA_hwk6" DB, create a table named "account"**
    - **account table have three fields**
      - > account_id (auto-increment)
      - > account_name
      - > account_passwd
    - **Add one record for account table**
      - > account_name = SA-test1, account_passwd = "SA-test1123"
      - > Password must be encrypted using "password" function
  - Create a user "SA" that has only "select, insert, update" privileges on SA_hwk6 DB

Lab2


tybsd.csie.nctu.edu.tw >> tybsd.csie.nctu.edu.tw >> SA_hwk6 >> account | phpMyAdmin 2.6.0-pl3 - Microsoft Internet Explorer
檔案(F) 編輯(E) 檢視(V) 我的最愛(A) 工具(T) 說明(H)
上一頁 搜尋 我的最愛 媒體
網址(D) http://tybsd.csie.nctu.edu.tw/phpMyAdmin/
移至 連結
Google 搜尋網頁 PageRank 64 已攔截 選項
phpMyAdmin
資料庫:
SA_hwk6 (1)
SA_hwk6
account
伺服器: tybsd.csie.nctu.edu.tw ▸ 資料庫: SA_hwk6 ▸ 資料表: account
結構 瀏覽 SQL 搜索 新增 輸出 管理 清空 刪除
顯示記錄 0 - 1 (2 總計, 查詢需時 0.0003 秒)
SQL 語法:
SELECT *
FROM `account`
LIMIT 0 , 30
[編輯] [說明 SQL] [建立 PHP 程式碼] [更新]
顯示: 30 筆記錄，開始列數: 0
顯示為 水平 方式 及 每隔 100 行顯示欄名
依鍵名排序: 不適用 執行
account_id account_name account_passwd
1 SA-test1 *969D4253B56DD17
2 SA-test2 *C33B687E02B482F
全選 / 全部取消 選擇的資料表:
顯示: 30 筆記錄，開始列數: 0
顯示為 水平 方式 及 每隔 100 行顯示欄名
新增一筆記錄 列印檢視 列印檢視 (顯示完整文字) 輸出
網際網路