

# **Introduzione a XAMPP**

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***Articolazione: INFORMATICA***

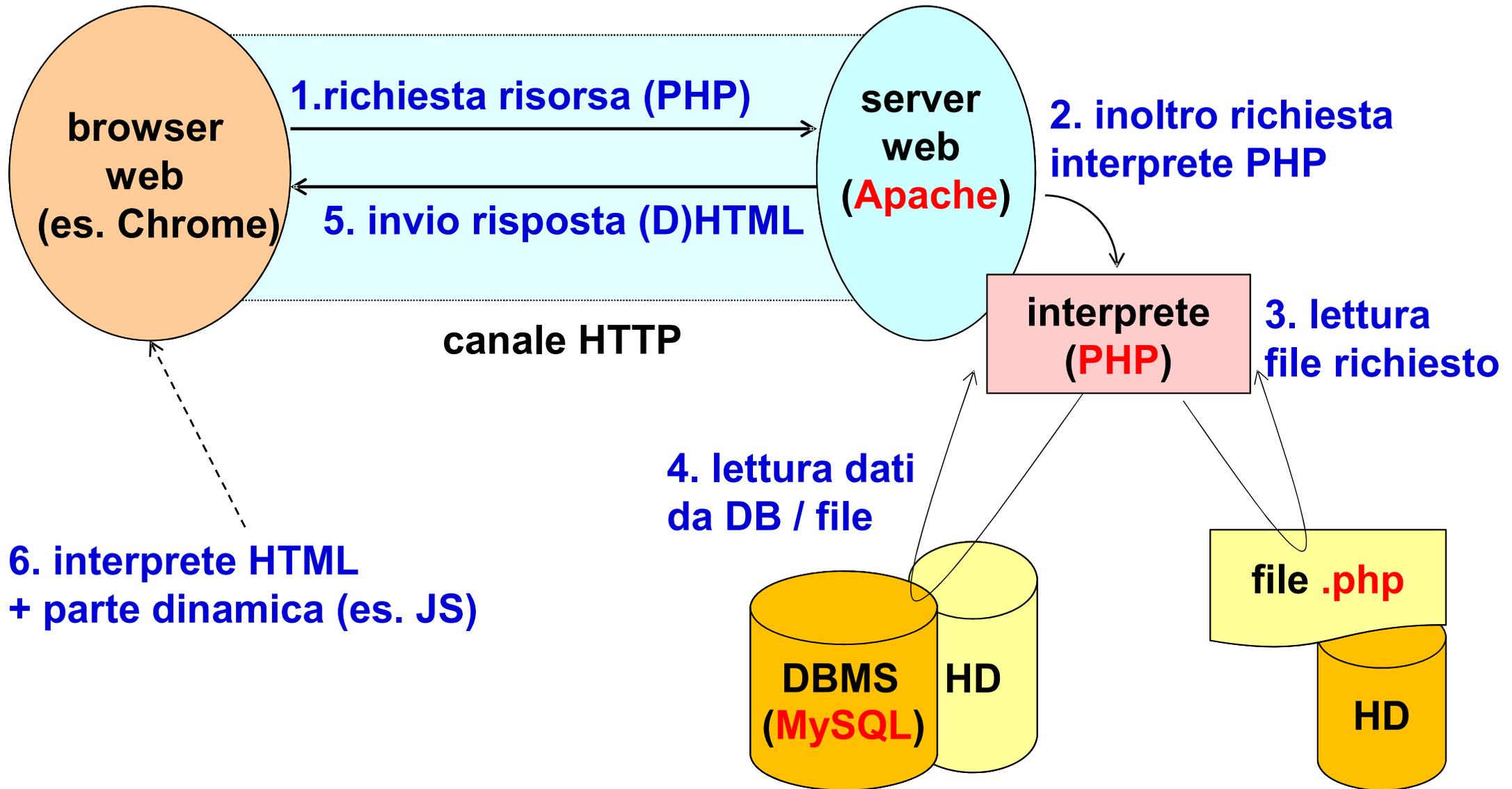
# Introduzione

- **applicazione web richiede**
  - diversi componenti
    - HTTP server per rendere disponibili le pagine web
      - es. Apache
    - database per gestire i dati
      - es. MySQL
    - application engine per l'esecuzione di programmi
      - es. interprete PHP, Tomcat per JSP
  - configurazioni specifiche per ogni componente
    - trade-off: semplicità vs. sicurezza vs. efficienza
      - ambito di utilizzo

# Introduzione

- **XAMPP: insieme integrato di pacchetti software (distribuzione)**
  - include: Apache, PHP, MySQL, phpMyAdmin, ...
  - orientato allo sviluppo/test di applicazioni web
  - facile da installare, configurazione predefinita
  - interfaccia per operazioni semplici
    - es. avvio/stop servizi, configurazione porte web server
  - operazioni avanzate: necessario agire sulle configurazioni specifiche dei servizi
    - es. host virtuali
  - in generale non adatto per sistemi di produzione
    - hardening

# Il web dinamico e XAMPP



# XAMPP per Windows 7 oppure 10

## ■ pagina di download

- <https://www.apachefriends.org/it/download.html>

- ultima versione 5.6.23 (per Windows 7)

  - XP e 2003 non piu supportati (ultima versione 1.8.3)

## ■ disponibile anche per

- GNU/Linux

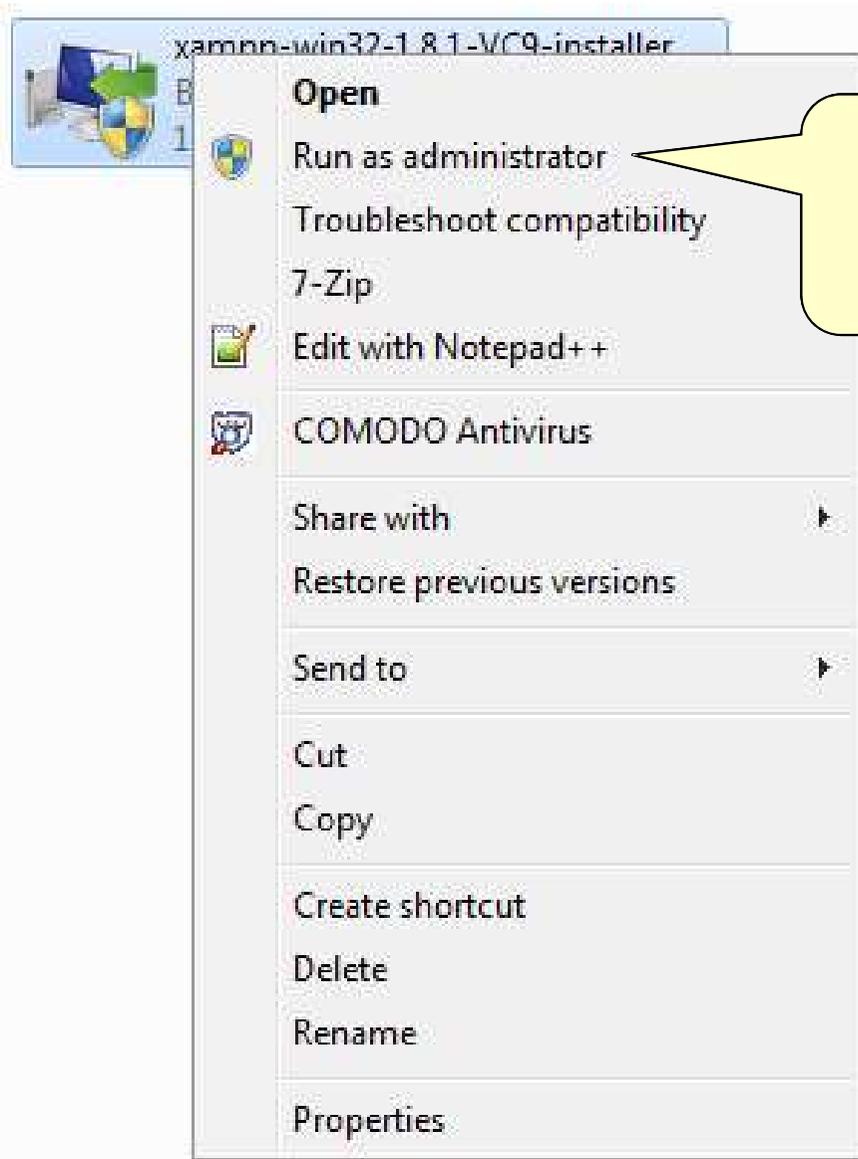
- Apple Mac OS X

- Solaris

# XAMPP portabile

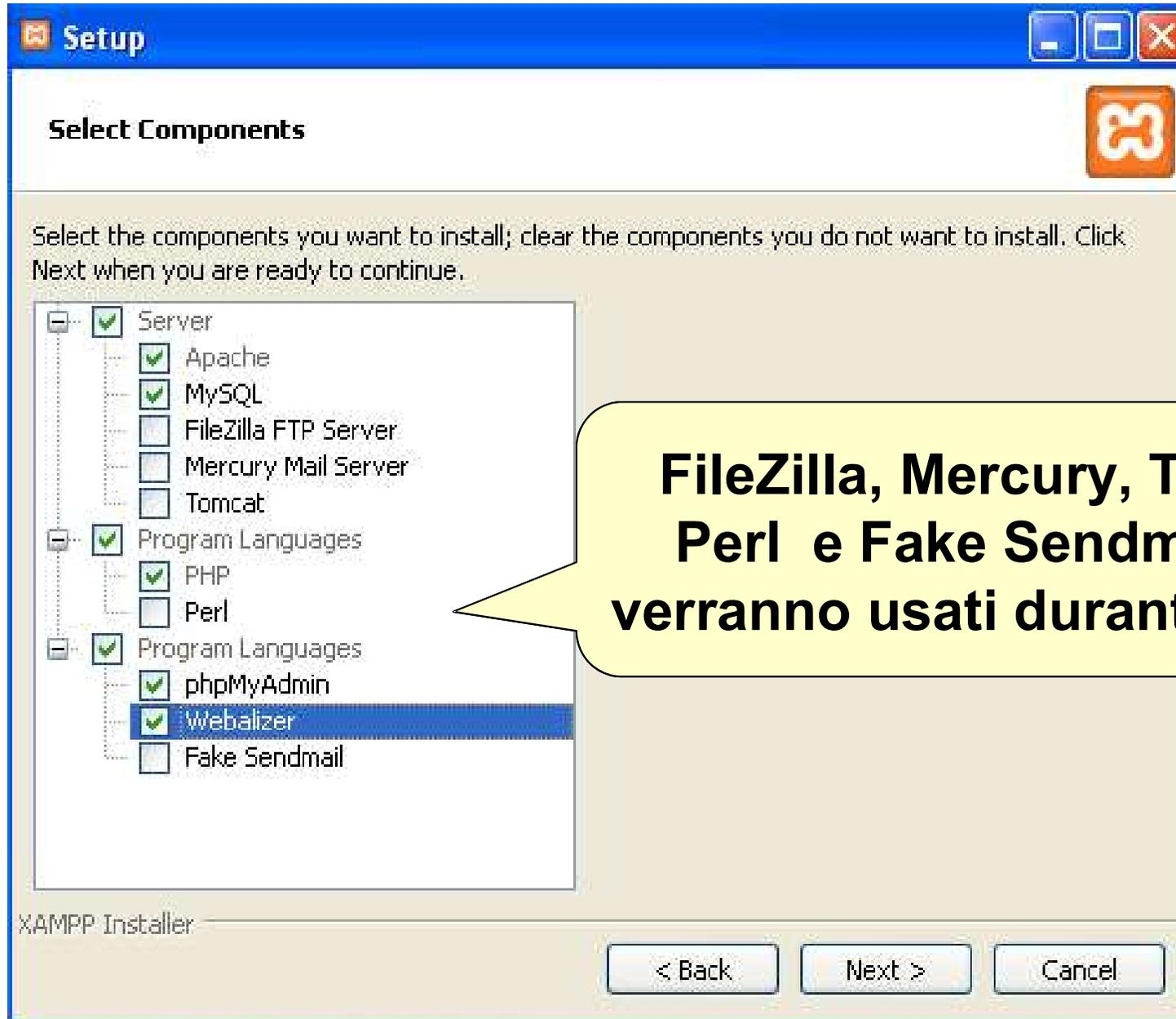
- possibile selezionare solo i servizi necessari (usa meno spazio su disco)
  - *Apache, PHP, MySQL* base essenziale
  - *phpMyAdmin* molto utile
- installabile su memoria esterna (es. memoria USB)
- una volta installata, per essere avviata:
  - aprire la cartella di installazione
    - default “C:\xampp” (per istallazione su hard disk)
    - non usare spazi vuoti, caratteri speciali o di spaziatura nel path
  - doppio click su “xampp\_start.exe”
  - per accedere al pannello di controllo, doppio click su “xampp\_control.exe”

# Installazione di XAMPP in Windows 7



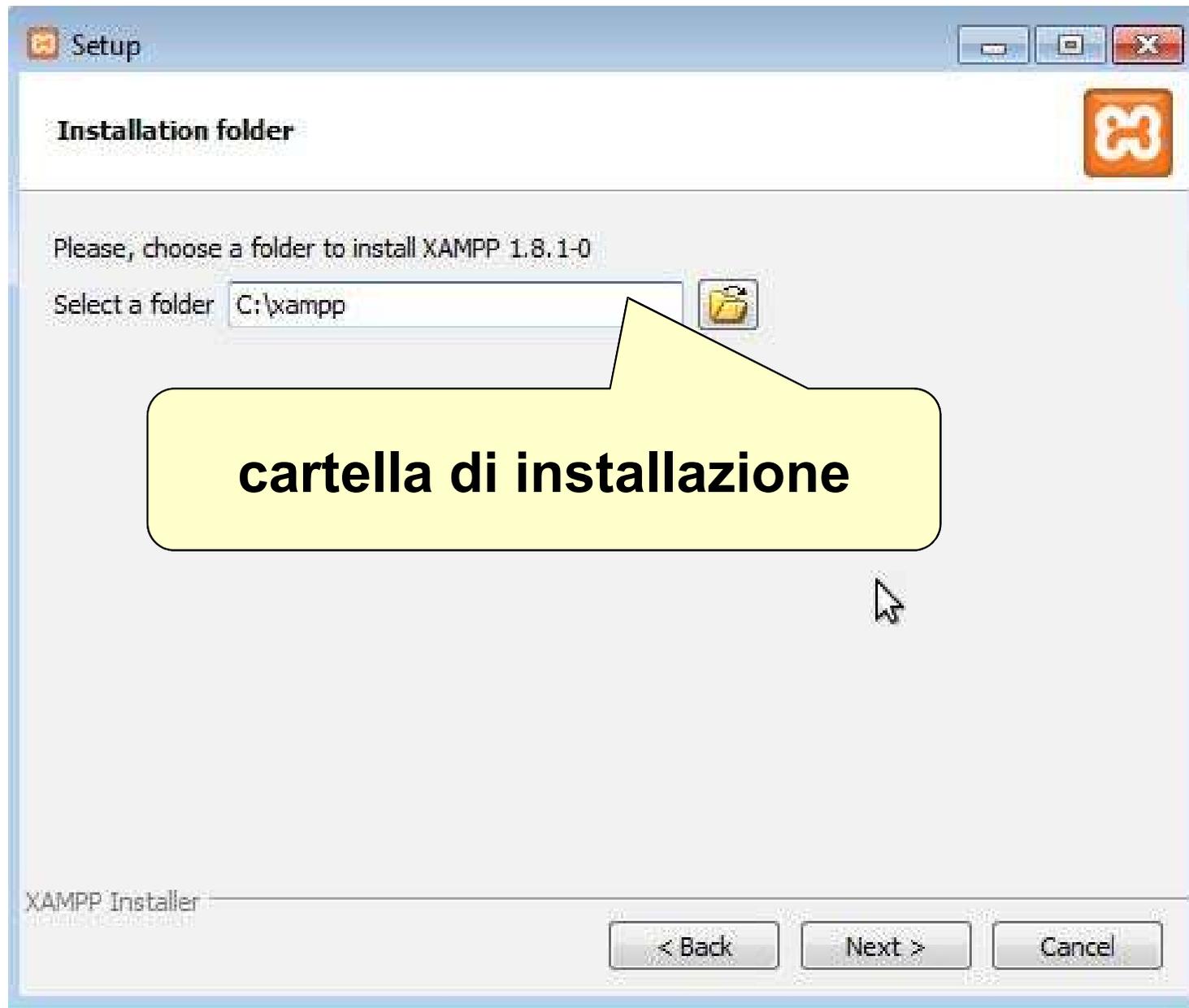
**avviare l'installazione con  
l'utente "Amministratore"**

# Installazione di XAMPP in Windows 7



**FileZilla, Mercury, Tomcat, Perl e Fake Sendmail non verranno usati durante il corso**

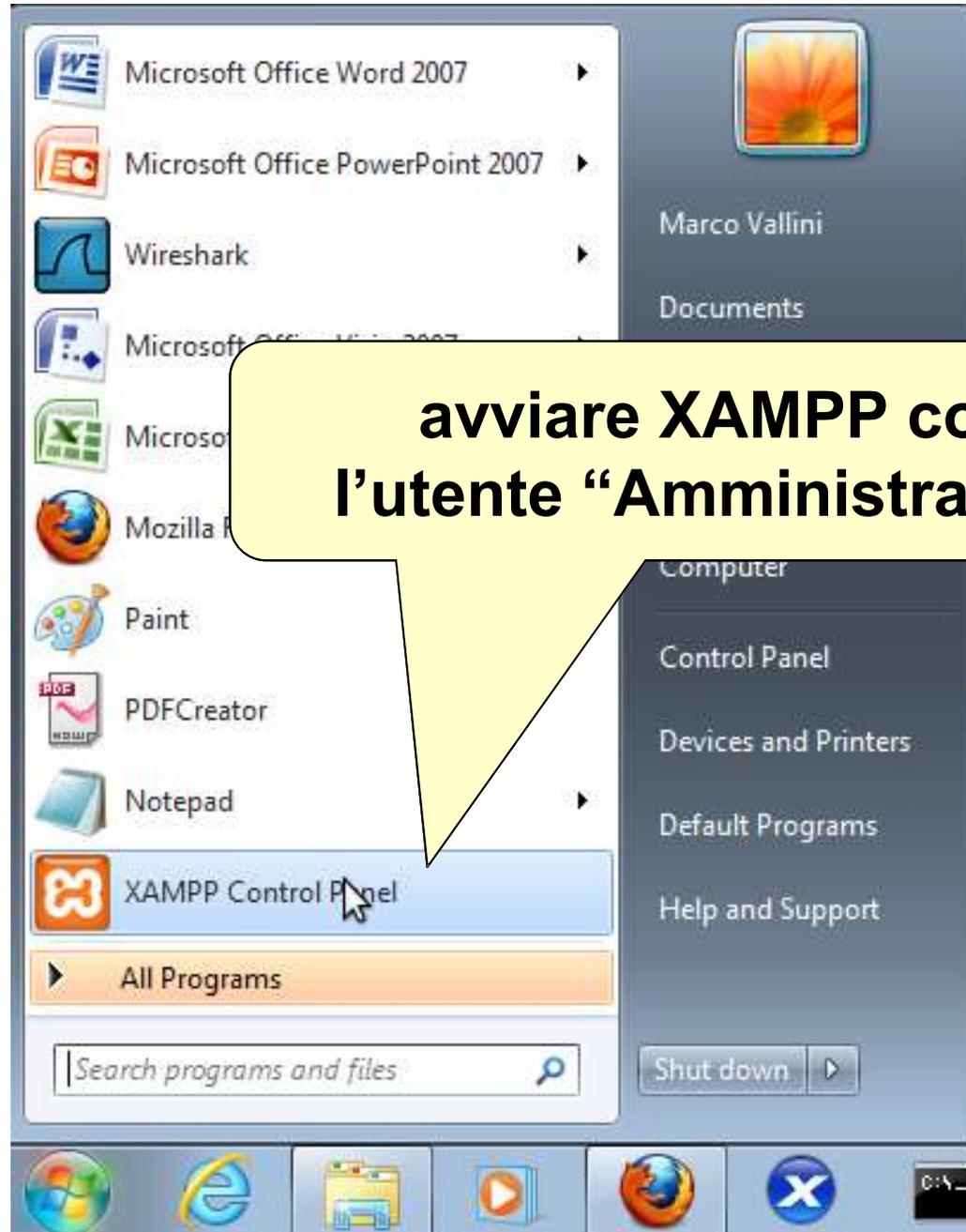
# Installazione di XAMPP in Windows 7



# Installazione di XAMPP in Windows 7



# Avvio di XAMPP



avviare XAMPP con  
l'utente "Amministratore"

# XAMPP – Pannello di controllo

XAMPP Control Panel v3.2.2 [ Compiled: Nov 12th 2015 ]

XAMPP Control Panel v3.2.2

Modules

Service	Module	PID(s)	Port(s)	Actions
<input type="checkbox"/>	Apache	8572 3860	80, 443	Stop Admin Config Logs
<input type="checkbox"/>	MySQL	9012	3306	Stop Admin Config Logs
<input type="checkbox"/>	FileZilla			Start Admin Config Logs
<input type="checkbox"/>	Mercury			Start Admin Config Logs
<input type="checkbox"/>	Tomcat			Start Admin Config Logs

Config

Netstat

Shell

Explorer

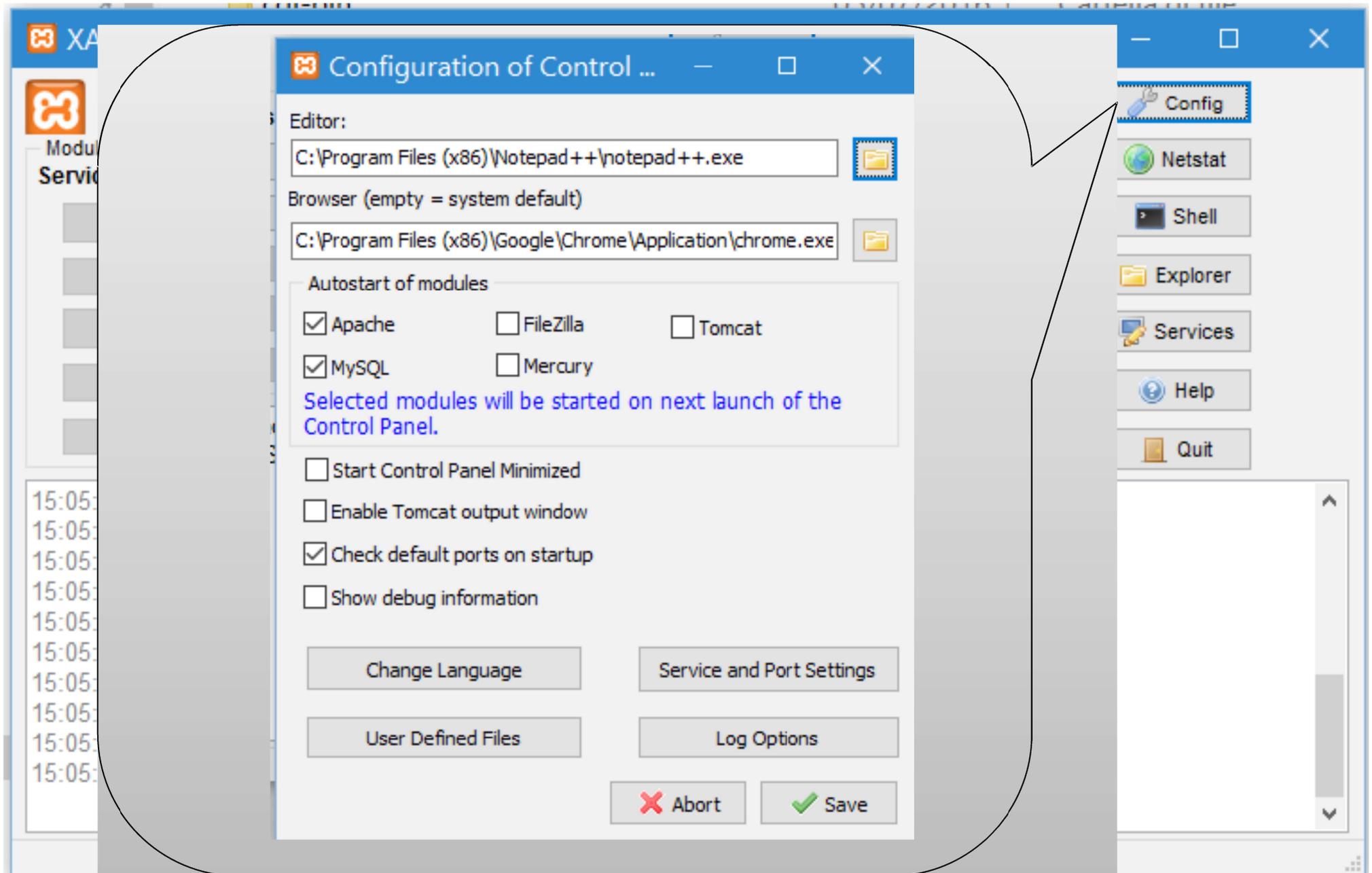
Services

Help

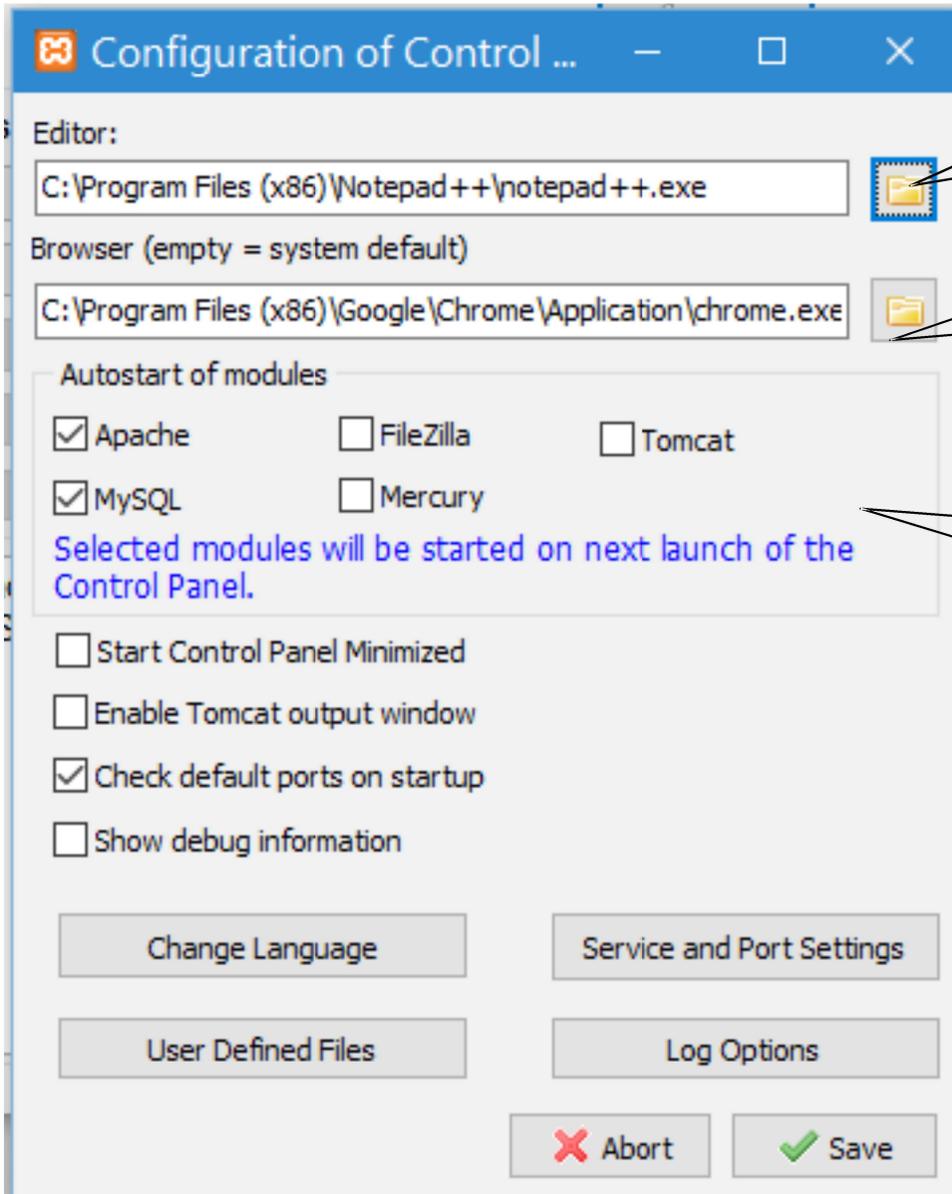
Quit

15:05:28 [main] Enabling autostart for module "Apache"  
15:05:28 [main] Enabling autostart for module "MySQL"  
15:05:28 [main] Starting Check-Timer  
15:05:28 [main] Control Panel Ready  
15:05:28 [Apache] Autostart active: starting...  
15:05:28 [Apache] Attempting to start Apache app...  
15:05:28 [mysql] Autostart active: starting...  
15:05:28 [mysql] Attempting to start MySQL app...  
15:05:29 [Apache] Status change detected: running  
15:05:29 [mysql] Status change detected: running

# XAMPP – Impostazioni generali



# XAMPP – Impostazioni generali

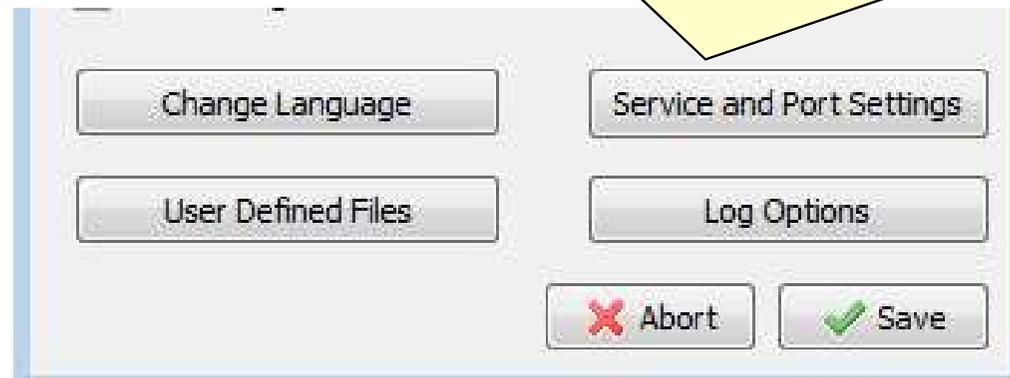
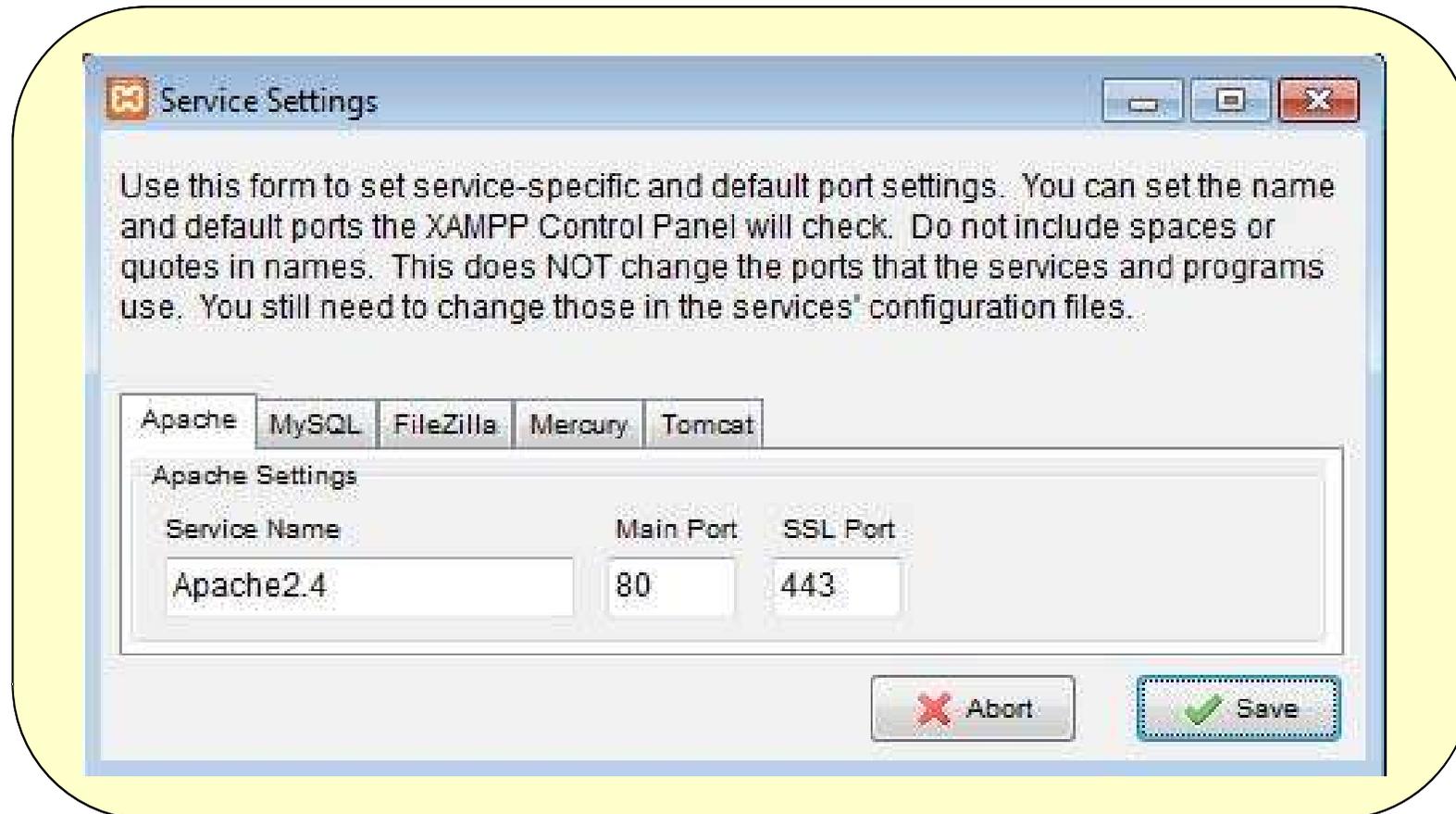


**editor di testo per  
le configurazioni**

**browser predefinito**

**avvio automatico dei servizi**

# XAMPP – Impostazioni servizio



# Apache

- **HTTP server**

- ospita pagine HTML statiche

- **application server**

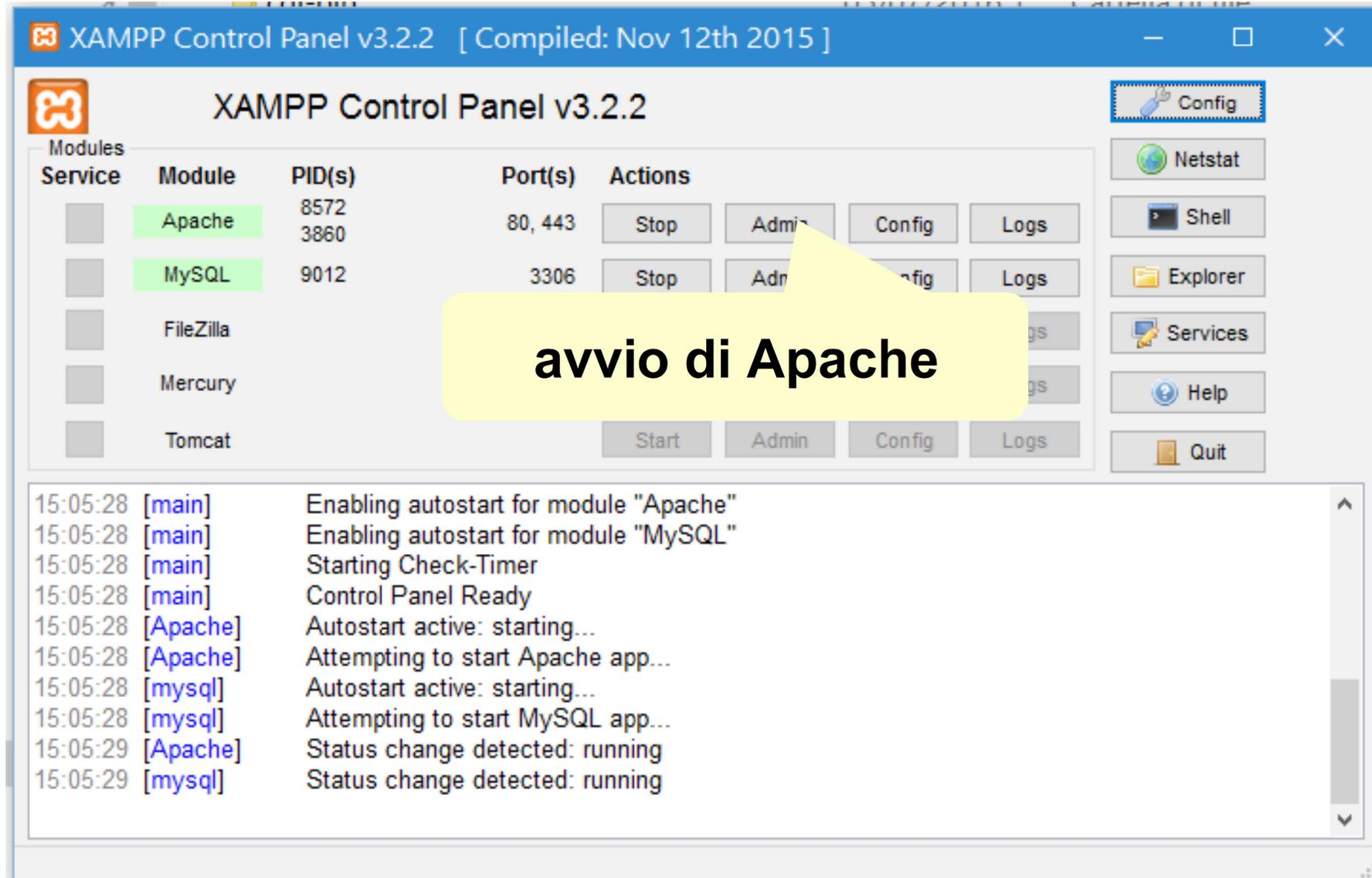
- ospita pagine/applicazioni dinamiche (es. PHP)
  - attraverso caricamento di un modulo (es. PHP)
  - file con estensione “.php” (o altro: configurabile!)

- **pagine/applicazioni posizionate nella “Document Root”**

- **configurazione di default**

- HTTP porta 80/TCP
- HTTPS porta 443/TCP

# Avvio di Apache



The screenshot shows the XAMPP Control Panel v3.2.2 interface. The title bar indicates it was compiled on Nov 12th 2015. The main area displays a table of services with columns for Service, Module, PID(s), Port(s), and Actions. The Apache service is highlighted in green, and its status is shown as 'running' in the log window below. A yellow callout box with the text 'avvio di Apache' points to the Apache service row.

Service	Module	PID(s)	Port(s)	Actions
<input checked="" type="checkbox"/>	Apache	8572 3860	80, 443	Stop Admin Config Logs
<input checked="" type="checkbox"/>	MySQL	9012	3306	Stop Admin Config Logs
<input type="checkbox"/>	FileZilla			Start Admin Config Logs
<input type="checkbox"/>	Mercury			Start Admin Config Logs
<input type="checkbox"/>	Tomcat			Start Admin Config Logs

**avvio di Apache**

```
15:05:28 [main] Enabling autostart for module "Apache"
15:05:28 [main] Enabling autostart for module "MySQL"
15:05:28 [main] Starting Check-Timer
15:05:28 [main] Control Panel Ready
15:05:28 [Apache] Autostart active: starting...
15:05:28 [Apache] Attempting to start Apache app...
15:05:28 [mysql] Autostart active: starting...
15:05:28 [mysql] Attempting to start MySQL app...
15:05:29 [Apache] Status change detected: running
15:05:29 [mysql] Status change detected: running
```

# Avvio di Apache

The screenshot shows the XAMPP Control Panel v3.2.2 interface. The main window displays a table of services with their respective modules, PID(s), and port(s). The Apache service is highlighted in green, indicating it is running. A yellow callout box points to the PID(s) column for Apache, containing the text "identificativo/i del processo/i".

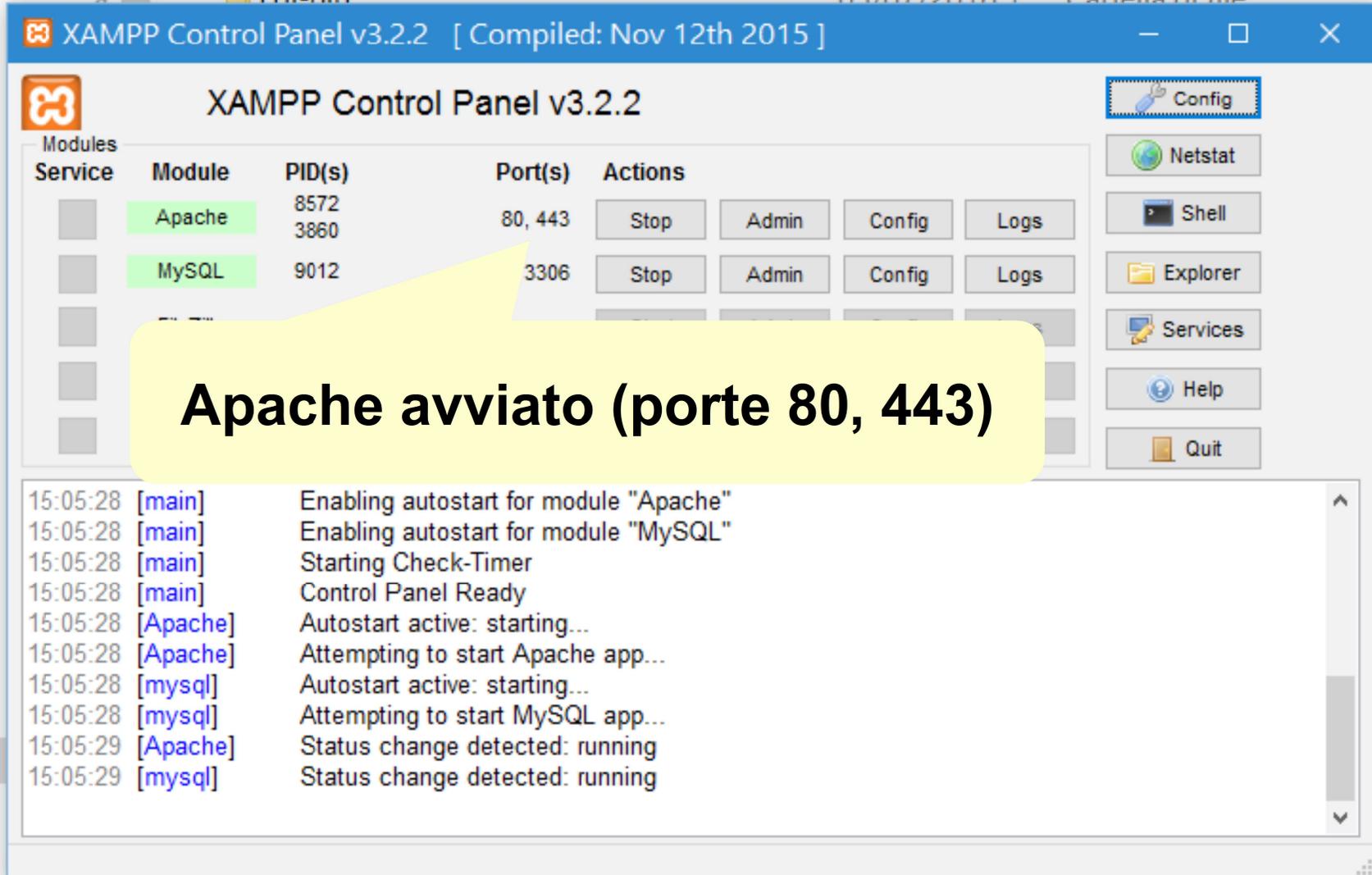
Service	Module	PID(s)	Port(s)	Actions
<input checked="" type="checkbox"/>	Apache	8572 3860	80, 443	Stop Admin Config Logs
<input checked="" type="checkbox"/>	MySQL	9012	3306	Stop Admin Config Logs
<input type="checkbox"/>	FileZilla			Stop Admin Config Logs
<input type="checkbox"/>	Mercu			Stop Admin Config Logs
<input type="checkbox"/>	Tomcat			Stop Admin Config Logs

**identificativo/i del processo/i**

Log window output:

```
15:05:28 [main] Enabling autostart for module "Apache"
15:05:28 [main] Enabling autostart for module "MySQL"
15:05:28 [main] Starting Check-Timer
15:05:28 [main] Control Panel Ready
15:05:28 [Apache] Autostart active: starting...
15:05:28 [Apache] Attempting to start Apache app...
15:05:28 [mysql] Autostart active: starting...
15:05:28 [mysql] Attempting to start MySQL app...
15:05:29 [Apache] Status change detected: running
15:05:29 [mysql] Status change detected: running
```

# Avvio di Apache



The screenshot shows the XAMPP Control Panel v3.2.2 interface. The title bar indicates it was compiled on Nov 12th 2015. The main area displays a table of services with columns for Service, Module, PID(s), Port(s), and Actions. The Apache service is highlighted in green, indicating it is running. The MySQL service is also highlighted in green, indicating it is running. A yellow callout box points to the Apache service with the text "Apache avviato (porte 80, 443)". The bottom of the window shows a log of system events, including the successful start of both Apache and MySQL.

Service	Module	PID(s)	Port(s)	Actions
<input checked="" type="checkbox"/>	Apache	8572 3860	80, 443	Stop Admin Config Logs
<input checked="" type="checkbox"/>	MySQL	9012	3306	Stop Admin Config Logs
<input type="checkbox"/>				

**Apache avviato (porte 80, 443)**

```
15:05:28 [main] Enabling autostart for module "Apache"
15:05:28 [main] Enabling autostart for module "MySQL"
15:05:28 [main] Starting Check-Timer
15:05:28 [main] Control Panel Ready
15:05:28 [Apache] Autostart active: starting...
15:05:28 [Apache] Attempting to start Apache app...
15:05:28 [mysql] Autostart active: starting...
15:05:28 [mysql] Attempting to start MySQL app...
15:05:29 [Apache] Status change detected: running
15:05:29 [mysql] Status change detected: running
```

# Stop di Apache

XAMPP Control Panel v3.2.2 [ Compiled: Nov 12th 2015 ]

**XAMPP Control Panel v3.2.2**

Modules

Service	Module	PID(s)	Port(s)	Actions
<input type="checkbox"/>	Apache	8572 3860	80, 443	Stop Admin Config Logs
<input type="checkbox"/>	MySQL	9012	3306	Stop Admin Config Logs
<input type="checkbox"/>	FileZilla			Start Admin Config Logs
<input type="checkbox"/>	Mercury			Start Admin Config Logs
<input type="checkbox"/>	Tomcat			Start Admin Config Logs

Config

Netstat

Shell

Explorer

Services

Help

Quit

**stop di Apache**

15:05:28 [main] Enabling autostart for module "Apache"  
15:05:28 [main] Enabling autostart for module "MySQL"  
15:05:28 [main] Starting Check-Timer  
15:05:28 [main] Control Panel Ready  
15:05:28 [Apache] Autostart active: starting...  
15:05:28 [Apache] Attempting to start Apache app...  
15:05:28 [mysql] Autostart active: starting...  
15:05:28 [mysql] Attempting to start MySQL app...  
15:05:29 [Apache] Status change detected: running  
15:05:29 [mysql] Status change detected: running

# Apache – file di configurazione e cartelle

## ■ cartella “DocumentRoot”

- dove posizionare le pagine/applicazioni web
- “C:\xampp\htdocs” (in MS Windows)

## ■ cartella “ServerRoot”

- dove Apache viene installato
- “C:\xampp\apache” (in MS Windows)

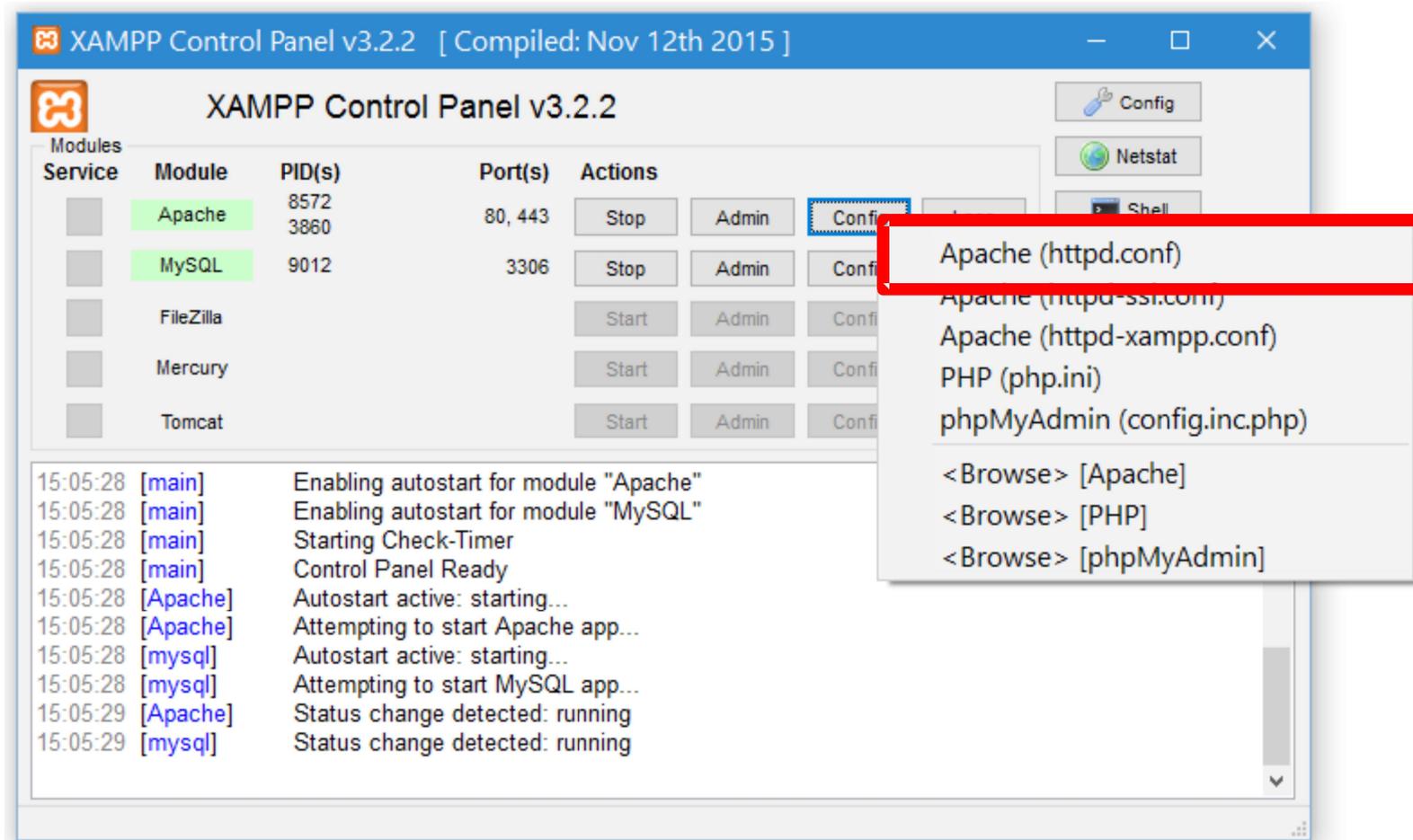
## ■ file configurazione principale

- porte in ascolto, moduli da caricare, ...
- “C:\xampp\apache\conf\httpd.conf” (in MS Windows)

## ■ file configurazione XAMPP

- usato per integrare i componenti (es. PHP, database, ...)
- “C:\xampp\apache\conf\extra\httpd-xampp.conf” (in MS Windows)

# Apache – accesso ai file di configurazione



The screenshot shows the XAMPP Control Panel v3.2.2 interface. The main window displays a table of services and their configuration options. A red box highlights the 'Config' button for the Apache service, which has opened a dropdown menu. The menu lists several configuration files and options for browsing them.

Service	Module	PID(s)	Port(s)	Actions
<input type="checkbox"/>	Apache	8572 3860	80, 443	Stop Admin <b>Config</b>
<input type="checkbox"/>	MySQL	9012	3306	Stop Admin Config
<input type="checkbox"/>	FileZilla			Start Admin Config
<input type="checkbox"/>	Mercury			Start Admin Config
<input type="checkbox"/>	Tomcat			Start Admin Config

Log messages:

```
15:05:28 [main] Enabling autostart for module "Apache"  
15:05:28 [main] Enabling autostart for module "MySQL"  
15:05:28 [main] Starting Check-Timer  
15:05:28 [main] Control Panel Ready  
15:05:28 [Apache] Autostart active: starting...  
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15:05:28 [mysql] Autostart active: starting...  
15:05:28 [mysql] Attempting to start MySQL app...  
15:05:29 [Apache] Status change detected: running  
15:05:29 [mysql] Status change detected: running
```

Configuration menu items:

- Apache (httpd.conf)
- Apache (httpd-ssi.conf)
- Apache (httpd-xampp.conf)
- PHP (php.ini)
- phpMyAdmin (config.inc.php)
- <Browse> [Apache]
- <Browse> [PHP]
- <Browse> [phpMyAdmin]

# Apache – estratto httpd.conf

```
...  
ServerName localhost:80  
  
...  
ServerRoot "C:/xampp/apache"    (path relativo se su  
                                una pen-drive)  
  
...  
DocumentRoot "C:/xampp/htdocs" (path relativo se su  
                                una pen-drive)  
...  
Listen 80  
  
...  
LoadModule auth_basic_module modules/mod_auth_basic.so  
LoadModule mime_module modules/mod_mime.so  
LoadModule cgi_module modules/mod_cgi.so
```

# Apache – estratto httpd.conf (cont.)

(n.b. path relativo se su pen drive)

...

```
<Directory "C:/xampp/cgi-bin">
```

```
    AllowOverride All
```

```
    Options None
```

```
    Require all granted
```

```
</Directory>
```

...

```
<IfModule mime_module>
```

```
    AddType text/html .shtml
```

```
    AddOutputFilter INCLUDES .shtml
```

```
</IfModule>
```

...

```
# XAMPP settings
```

```
Include "conf/extra/httpd-xampp.conf"
```

# PHP

- **modulo installato sul server**
  - caricato/utilizzato da application server
    - configurazione interna all'application server
  - configurazione del modulo PHP
    - impostazioni specifiche (es. upload di file, sessioni, ...)
- **integrato e preconfigurato in XAMPP**
  - installato in C:\xampp\php\ (in MS Windows)
  - file configurazione Apache
    - C:\xampp\apache\conf\extra\httpd-xampp.conf (in MS Windows)
  - file configurazione modulo PHP
    - C:\xampp\php\php.ini (in MS Windows)

# PHP – file di configurazione per Apache

The screenshot shows the XAMPP Control Panel v3.2.2 interface. The Apache service is highlighted in green in the Modules table. A context menu is open over the 'Config' button for Apache, listing several configuration files. The file 'Apache (httpd-xampp.conf)' is highlighted with a red rectangle. Below the table is a log window showing the status of the services.

Service	Module	PID(s)	Port(s)	Actions
<input type="checkbox"/>	Apache	8572 3860	80, 443	Stop Admin <b>Config</b> Logs
<input type="checkbox"/>	MySQL	9012	3306	Stop Admin Config
<input type="checkbox"/>	FileZilla			Start Admin Config
<input type="checkbox"/>	Mercury			Start Admin Config
<input type="checkbox"/>	Tomcat			Start Admin Config

Log window content:

```
15:05:28 [main] Enabling autostart for module "Apache"  
15:05:28 [main] Enabling autostart for module "MySQL"  
15:05:28 [main] Starting Check-Timer  
15:05:28 [main] Control Panel Ready  
15:05:28 [Apache] Autostart active: starting...  
15:05:28 [Apache] Attempting to start Apache app...  
15:05:28 [mysql] Autostart active: starting...  
15:05:28 [mysql] Attempting to start MySQL app...  
15:05:29 [Apache] Status change detected: running  
15:05:29 [mysql] Status change detected: running
```

- Apache (httpd.conf)
- Apache (httpd\_ssl.conf)
- Apache (httpd-xampp.conf)**
- PHP (php.ini)
- phpMyAdmin (config.inc.php)
- <Browse> [Apache]
- <Browse> [PHP]
- <Browse> [phpMyAdmin]

# PHP – estratto httpd-xampp.conf

n.b. path relativo se su pen drive

```
LoadFile "C:/xampp/php/php5ts.dll"
```

```
LoadModule php5_module "C:/xampp/php/php5apache2_4.dll"
```

```
<FilesMatch "\.php$"  
    SetHandler application/x-httpd-php
```

```
</FilesMatch>
```

```
<FilesMatch "\.phps$">
```

```
    SetHandler application/x-httpd-php-source
```

```
</FilesMatch>
```

**software che implementa PHP**

# PHP – estratto httpd-xampp.conf

**estensione “.php” (notare regexp!):  
file eseguito dall'interprete PHP**

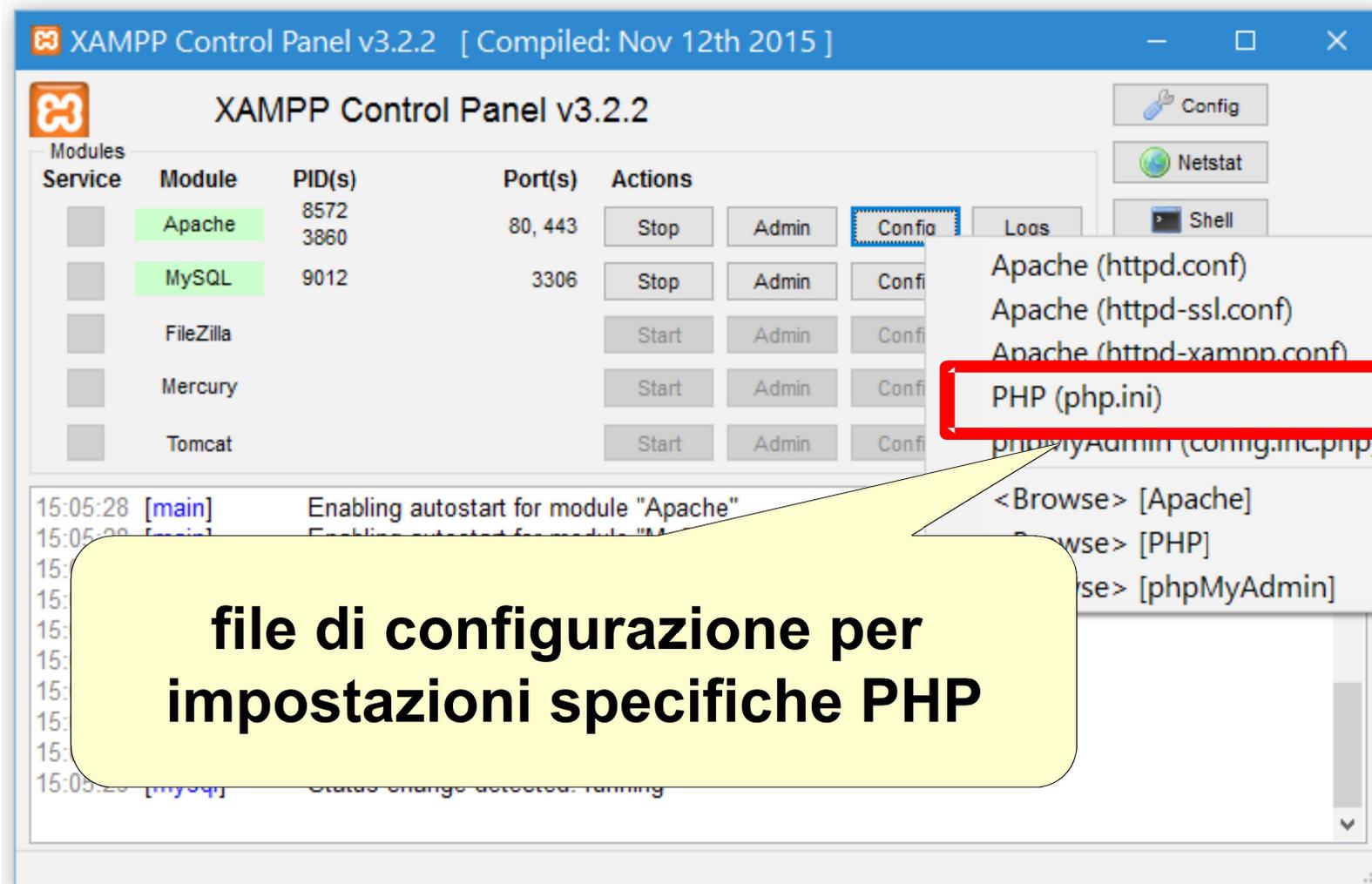
```
LoadFile "C:/xampp/...  
LoadModule php5_module .../php/php5apache2_4.dll"  
  
<FilesMatch "\.php$">  
    SetHandler application/x-httpd-php  
</FilesMatch>  
<FilesMatch "\.phps$">  
    SetHandler application/x-httpd-php-source  
</FilesMatch>
```

# PHP – estratto httpd-xampp.conf

```
LoadFile "C:/xampp/php/php5ts.dll"  
LoadModule php5_module "C:/xampp/php/php5apache2_4.dll"  
  
<FilesMatch "\.php$">  
    SetHandler application/x-httpd-php  
</FilesMatch>  
  
<FilesMatch "\.phps$">  
    SetHandler application/x-httpd-php-source  
</FilesMatch>
```

**estensione ".phps" (PHP Source):  
file NON eseguito dall'interprete PHP !**

# PHP – file di configurazione per PHP



The screenshot shows the XAMPP Control Panel v3.2.2 interface. A table lists the services and their configuration options. The 'Config' button for the PHP service is highlighted with a red box, and a dropdown menu is open, showing the following options:

- Apache (httpd.conf)
- Apache (httpd-ssl.conf)
- Apache (httpd-xampp.conf)
- PHP (php.ini)**
- phpMyAdmin (config.inc.php)

A yellow callout box points to the 'PHP (php.ini)' option with the text:

**file di configurazione per impostazioni specifiche PHP**

Service	Module	PID(s)	Port(s)	Actions
<input type="checkbox"/>	Apache	8572 3860	80, 443	Stop Admin <b>Config</b> Logs
<input type="checkbox"/>	MySQL	9012	3306	Stop Admin Config
<input type="checkbox"/>	FileZilla			Start Admin Config
<input type="checkbox"/>	Mercury			Start Admin Config
<input type="checkbox"/>	Tomcat			Start Admin Config

Log messages at the bottom of the panel:

```
15:05:28 [main] Enabling autostart for module "Apache"  
15:05:28 [mysql] Enabling autostart for module "MySQL"  
15:05:28 [mysql] Status change detected: running
```

# Apache - verifica installazione

- **caricare il file "ciao.html" nella DocumentRoot di Apache**
  - C:\xampp\htdocs (in MS Windows)
- **aprire il browser alla URL:**
  - <http://localhost/ciao.html>

```
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01//EN"
  "http://www.w3.org/TR/html4/strict.dtd">
<html>
<head>
  <title>Saluti HTML</title>
</head>
<body>
  <p>Ciao!</p>
</body>
</html>
```

# PHP - verifica installazione

- caricare il file "ciao.php" nella DocumentRoot di Apache
  - C:\xampp\htdocs" (in MS Windows)
- aprire il browser alla URL:
  - <http://localhost/ciao.php>

```
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01//EN"
    "http://www.w3.org/TR/html4/strict.dtd">
<html>
<head>
    <title>Saluti PHP</title>
</head>
<body>
    <p><?php echo "Ciao da PHP!" ?></p>
</body>
</html>
```

# XAMPP portabile - problema

- **installare su memoria esterna, semplice ma ...**
- **su host diversi, possibili unita logiche diverse (E:\xampp, G:\xampp)**
  - **il pannello di controllo parte comunque ...**
  - **ma i file di configurazione possono contenere percorsi errati**

# XAMPP portabile - problema

The screenshot shows the XAMPP Control Panel v3.2.1 interface. The title bar indicates it was compiled on May 7th, 2013. The main window displays a table of modules and their status. The Apache and MySQL services are marked with a red 'X' in the 'Service' column, indicating they are not running. The log window at the bottom shows the following messages:

```
9:30:12 AM [main] Initializing Control Panel
9:30:12 AM [main] Windows Version: Windows 7 Professional 32-bit
9:30:12 AM [main] XAMPP Version: 5.6.8
9:30:12 AM [main] Control Panel Version: 3.2.1 [ Compiled: May 7th 2013 ]
9:30:12 AM [main] Running with Administrator rights - good!
9:30:12 AM [main] XAMPP Installation Directory: "e:\xampp\"
9:30:12 AM [main] Checking for prerequisites
9:30:12 AM [main] All prerequisites found
9:30:12 AM [main] Initializing Modules
9:30:12 AM [main] The FileZilla module is disabled
9:30:12 AM [main] The Mercury module is disabled
9:30:12 AM [main] The Tomcat module is disabled
9:30:12 AM [main] Starting Check-Timer
9:30:12 AM [main] Control Panel Ready
9:30:22 AM [Apache] Attempting to start Apache app...
9:30:22 AM [Apache] Status change detected: running
9:30:23 AM [Apache] Status change detected: stopped
9:30:23 AM [Apache] Error: Apache shutdown unexpectedly.
9:30:23 AM [Apache] This may be due to a blocked port, missing dependencies,
9:30:23 AM [Apache] improper privileges, a crash, or a shutdown by another method.
9:30:23 AM [Apache] Press the Logs button to view error logs and check
9:30:23 AM [Apache] the Windows Event Viewer for more clues.
9:30:23 AM [Apache] If you need more help, copy and post this
9:30:23 AM [Apache] entire log window on the forums
```

The error message is highlighted with a red dashed box. The interface also includes buttons for 'Config', 'Netstat', 'Shell', 'Explorer', 'Services', 'Help', and 'Quit' on the right side.

# XAMPP portabile - problema

KAMPP Control Panel v3.2.1 [ Compiled: May 7th 2013 ]

### XAMPP Control Panel v3.2.1

Service	Module	PID(s)	Port(s)	Actions
<input checked="" type="checkbox"/>	Apache			Start Admin Config <b>Logs</b>
<input checked="" type="checkbox"/>	MySQL			Start Admin Config Logs
<input type="checkbox"/>	FileZilla			Start Admin Config Logs
<input type="checkbox"/>	Mercury			Start Admin Config Logs
<input type="checkbox"/>	Tomcat			Start Admin Config Logs

9:30:12 AM [main] Initializing Control Panel  
9:30:12 AM [main] Windows Version: Windows 7 Professional 32-bit  
9:30:12 AM [main] XAMPP Version: 5.6.8  
9:30:12 AM [main] Control Panel Version: 3.2.1 [ Compiled: May 7th 2013 ]  
9:30:12 AM [main] Running with Administrator rights - good!  
9:30:12 AM [main] XAMPP Installation Directory: "e:\xampp\  
9:30:12 AM [main] Checking for prerequisites  
9:30:12 AM [main] All prerequisites found  
9:30:12 AM [main] Initializing Modules  
9:30:12 AM [main] The FileZilla module is disabled  
9:30:12 AM [main] The Mercury module is disabled  
9:30:12 AM [main] The Tomcat module is disabled  
9:30:12 AM [main] Starting Check-Timer  
9:30:12 AM [main] Control Panel Ready  
9:30:22 AM [Apache] Attempting to start Apache app...  
9:30:22 AM [Apache] Status change detected: running  
9:30:23 AM [Apache] Status change detected: stopped  
9:30:23 AM [Apache] **Error: Apache shutdown unexpectedly.**  
9:30:23 AM [Apache] **This may be due to a blocked port, missing dependencies,**  
9:30:23 AM [Apache] **improper privileges, a crash, or a shutdown by another method.**  
9:30:23 AM [Apache] **Press the Logs button to view error logs and check**  
9:30:23 AM [Apache] **the Windows Event Viewer for more clues.**  
9:30:23 AM [Apache] **If you need more help, copy and post this**  
9:30:23 AM [Apache] **entire log window on the forums**

**vedere i log  
per investigare  
l'errore**

# XAMPP portabile - problema

*Logs → Apache (error.log)*

**[Mon May 04 07:08:03.729200 2015]** [ssl:warn] [pid 18020:tid 244] AH01909: www.example.com:443:0 server certificate does NOT include an ID which matches the server name

**[Mon May 04 07:08:04.246200 2015]** [mpm\_winnt:notice] [pid 18020:tid 244] AH00455: Apache/2.4.12 (Win32) OpenSSL/1.0.1f PHP/5.6.8 configured -- resuming normal operations

**[Mon May 04 07:08:04.246200 2015]** [mpm\_winnt:notice] [pid 18020:tid 244] AH00456: Apache Lounge VC11 Server built: Jan 28 2015 16:48:40

**[Mon May 04 07:08:04.246200 2015]** [core:notice] [pid 18020:tid 244] AH00094: Command line: '*g:\\xampp\\apache\\bin\\httpd.exe -d G:/xampp/apache*'

**[Mon May 04 07:08:04.280200 2015]** [mpm\_winnt:notice] [pid 18020:tid 244] AH00418: Parent: Created child process 19664

# XAMPP portabile – soluzioni

- **cambiare tutti i percorsi nei file di configurazione**
  - molti, soprattutto per Apache -> possibili errori!!!
  - possibile usare percorsi relativi (tranne che per serverRoot e documentRoot)
- **cambiare lettera associata all'unità esterna:**

1. Open **Computer Management** by clicking the **Start** button clicking **Control Panel**, clicking **System and Security**, clicking **Administrative Tools**, and then double-clicking **Computer Management**
  - if you're prompted for an administrator password or confirmation, type the password or provide confirmation.
2. In the left pane, click **Disk Management**
3. Right-click the drive that you want to change, and then click **Change Drive Letter and Paths**.

<http://windows.microsoft.com/en-us/windows/change-add-remove-drive-letter#1TC=windows-7>

# Possibili conflitti

- a volte l'avvio di Apache (o di un altro servizio, es. MySQL) fallisce
- oltre ad errori nei file di configurazione, il fallimento può essere dovuto a porte già occupate
  - (WIN) le porte occupate in ascolto si possono vedere con NetStat
- caso tipico è Skype
  - Skype cerca sempre di occupare la porta 80/tcp se disponibile (creando così un conflitto con Apache che vorrebbe usare la stessa porta)
  - in questo caso terminare Skype e riprovare l'avvio di Apache
  - dopo che Apache è partito regolarmente, si può riavviare Skype (che sceglierà una porta diversa dalla 80/tcp per comunicare con i peer)