



Build an Enterprise Web-Serving Environment on HP-UX



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Topics

- Overview of major web-serving components and products → **What is it? Why use it?**
 - HP-UX Web Server Suite
 - HP-UX Internet Express
 - Enterprise Add-on Products (HP and 3rd party)
- Putting it all together: An enterprise application
 - Architecture
 - Technologies used
- Resources
- Q&A

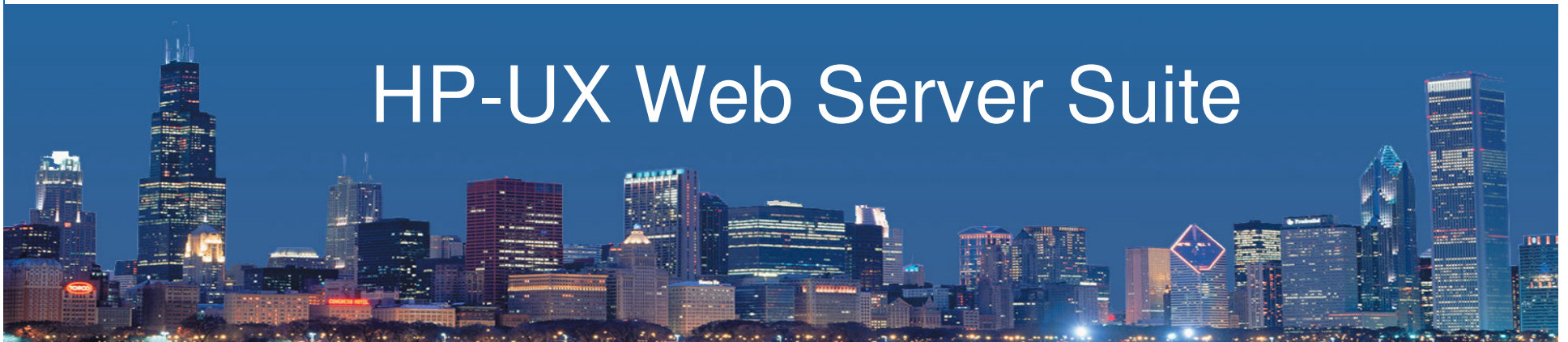
“ CBC prides itself on its forward-thinking and integrated use of the web for sports events such as the Olympics. Our partnership with HP was a critical determinant in the success of our online coverage.”



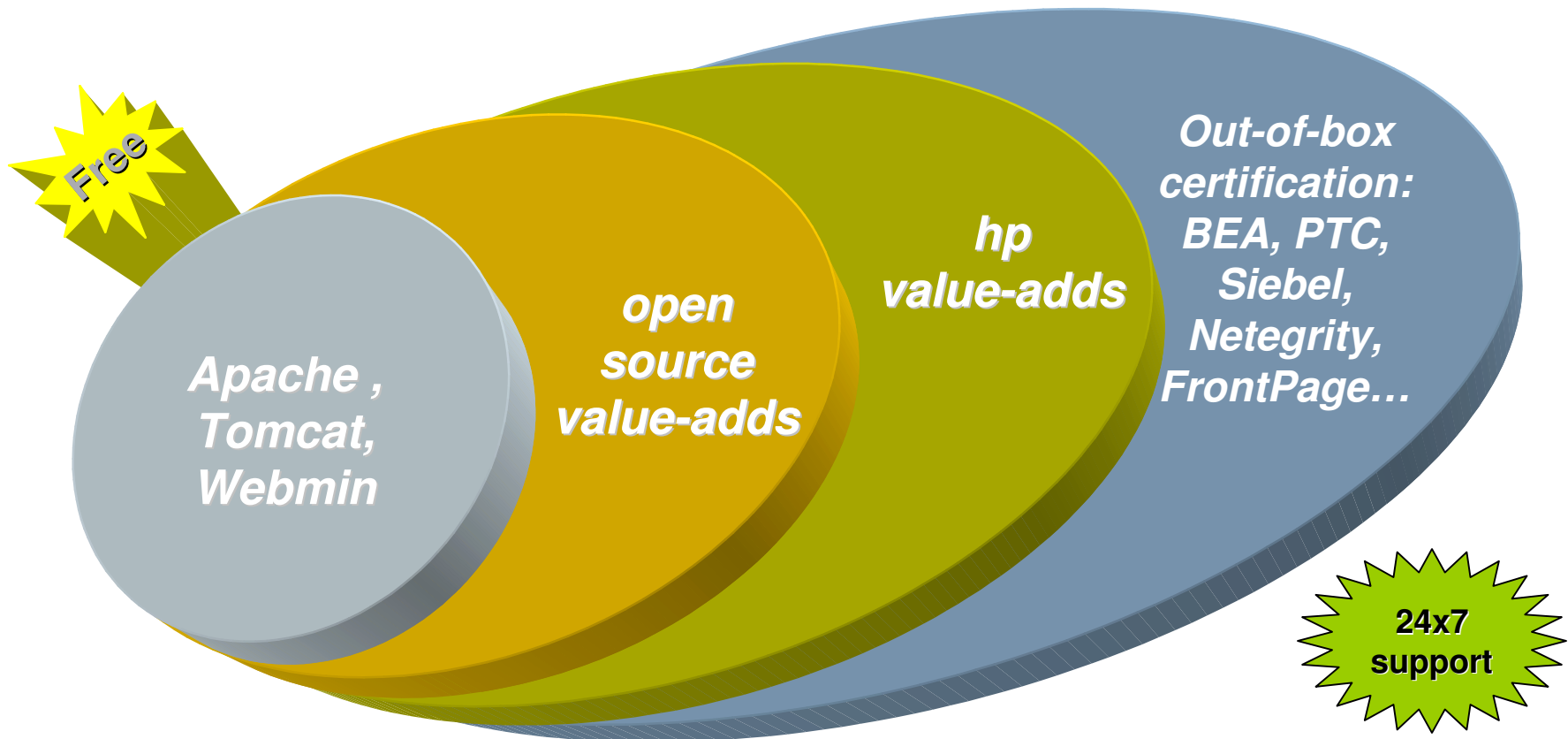
Liz Gyalokay

Director of Information Technology Operations And Client Support Services
Canadian Broadcasting Corporation
2002 Winter Olympics, Salt Lake City

HP-UX Web Server Suite



What is HP-UX Web Server Suite



hp value-adds:

- Increased performance w/ caching, secure SSL
- Increased security w/ Chroot, Virtual Vault Web Proxy
- Provides out-of-box experience on all 5 OEs
- Integrates with HP Open View, HP Workload Manager, HP-UX Bastille and HP-UX Internet Express

Open-source value adds:

- XML: Cocoon, Xerces, Xalan, Batik, FOF
- Scripting: PHP, Perl, mod_jk
- Security: OpenSSL, OpenLDAP



HP-UX Web Server Suite



HP-UX Web Server Suite

Publishing

Webserver

Security

Scripting

Java

Administration

mod_dav



XML Tools



Apache2.0



mod_ssl



mod_ldap

mod_php



mod_perl



mod_jk
mod_jk2

Tomcat



Webmin





HP-UX Web Server Suite

- What is it?
 - Collection of components to deploy, manage, and implement mission-critical web servers
- Why use it?
 - **Enterprise-level** web serving out-of-the-box
 - Tested with 9697 test cases(2.4 million lines test code)
 - Optimized for HP-UX
 - **Cost effective** => FREE
 - Runs on all HP-UX platforms
 - PA-RISC (32-bit) and IPF (32-bit and 64-bit)
 - 11.0, 11 v1, 11 v2
 - Run on IPv4 or IPv6



HP-UX Web Server Suite

- Why use it (cont'd) ?
 - Contains HP add-ons such as helper scripts, additional security, better performance
 - Integrated with other HP enterprise products
 - Certified with major 3rd party products
 - **Support by HP** Worldwide Response Center with HP-UX support contract
- Where to get it?
 - HP-UX OE
 - HP Software Depot download
<http://software.hp.com>

HP-UX Web Server Suite: Components



- **HP-UX Apache-based Web Server**
 - Scripting capabilities: PHP, mod_perl, CGI daemon
 - Content management: WebDAV
 - Security: LDAP server authentication , Chroot, SSL, Webproxy
- **HP-UX Tomcat-based Servlet Engine**
 - Runs Servlets and JSPs
- **HP-UX Webmin-based Admin**
 - Manages Apache, Tomcat, other open source
- **XML Tools**
 - Comprehensive XML publishing

HP-UX Apache-based Web Server



- What is it?
 - Web server based on open source Apache 2.x from ASF
- Why use HP-UX Apache?
 - Combines **numerous popular modules** from other Open Source projects
 - Provides **HP value-added features**
 - Optimized crypto libraries
 - Helper scripts (altroot.sh, mkcert.sh, chroot_os_cp.sh)
 - Integrated and tested with HP products such as Workload Manger (WLM), MC/ServiceGuard, Bastille
 - **Enterprise-ready**
 - Superior RAS (scalability, availability, reliability)
 - Leadership in security and performance



HP-UX Apache-based Web Server: RAS



- **Reliability**
 - Quality Apache core actively developed by a community of developers
 - Adopted into corporations
- **Availability**
 - Automatic creation of new Apache child processes to maintain a constant available pool for connections
- **Scalability**
 - Built with "worker" Multi-Processing Module (MPM) that implements a hybrid, multi-process, multi-threaded server
 - Runs on the full range of PA-RISC and IPF platforms

HP-UX Apache-based Web Server: Security



- LDAP Authentication
 - Uses mod_auth_ldap over SSL to an LDAP directory
 - OpenLDAP Directory Server
 - Netscape Directory Server
 - MS Active Directory
- Chrooted environment
 - Named directory becomes root directory so malicious users cannot access the root file system
 - HP-added SSL enhancements
 - HP script to copy OS files (libraries, utilities, etc.) to the chroot directory

```
/opt/hpws/apache/util/chroot_os_cp.sh
```



HP-UX Apache-based Web Server: Security

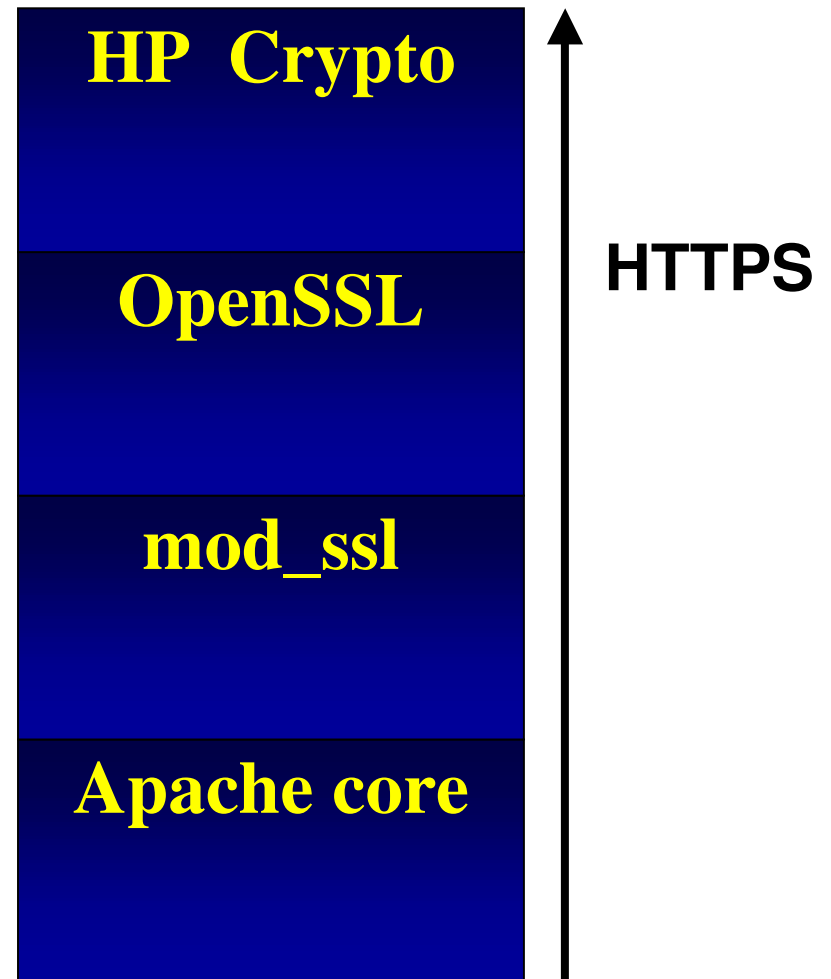


- Webproxy
 - Reverse proxy server
 - Back-end servers are transparent (hides hostnames, IP addresses)
 - Can filter incoming content
 - Can load balance between back-end servers
 - Back-end servers can be any web server/any OS
 - Single point of user authentication for all back-end servers
 - Runs in chrooted environment by default
 - Previously available as VirtualVault Web Proxy
 - For more information see Webproxy Admin Guide



HP-UX Apache-based Web Server: Security

- SSL Encryption
 - Optimized for HP-UX
 - Secure (128 bit)
- SSL Authentication
 - Client and Server Certificates
 - Update Certification Revocation List (CRL) without stopping web server



HP-UX Apache-based Web Server: Performance



- High performance core
 - Optimized at compilation for HP-UX
 - Based on Apache 2.x with thread-based worker MPM
 - Tuning tips for HP-UX kernel parameters in FAQ
 - HP crypto libraries gives 3-4x performance over open source for SSL transactions
- **SSL transaction caching** through shared memory
 - 50-100% by caching non-transient parts of the SSL message body in case of keepalive transaction.
 - Enabled by default in ssl.conf

```
SSLSessionCache    shmcb:logs/ssl_scache(512000)
```

HP-UX Apache-based Web Server: Performance



- **Faster static content**
 - mod_disk_cache
 - Caches request headers and file descriptors
 - Speeds up requests for frequently-requested files
 - mod_mem_cache
 - Files served from RAM rather than from file system
 - mod_deflate
 - Compresses content on the way to the client
 - Downloads faster because less data
- **Faster dynamic content**
 - mod_cgid
 - Light-weight, single-thread daemon to run CGI scripts

HP-UX Apache-based Web Server: Performance



- **LDAP authentication caching** with mod_Idap
 - LDAP connection pooling and shared memory cache
 - Faster throughput by 2-3x with caching
- **Network Server Accelerator (NSA)**
 - In-kernel cache of recently accessed web pages
 - Up to 40% faster web serving
 - Free download from HP Software Depot
 - For more information
 - <http://www.hp.com/products1/unix/operating/internet/index.html>
 - http://www.hp.com/products1/unix/operating/infolibra/whitepapers/nsa_whitepaper.pdf

HP-UX Tomcat-based Servlet Engine



- What is it?
 - A multi-threaded servlet container
 - Java program that manages and invokes servlets for dynamic content
- Why use it?
 - Servlets run in a sandbox eliminating web site damage
 - Speed
 - Once loaded servlets remain in memory
 - Can embed business logic into HTML
 - Java Server Pages (JSPs)
 - Tags for custom tasks common to multiple pages
 - Popular alternative to CGI
 - Has connection pooling for fast database access

Tomcat 4.x

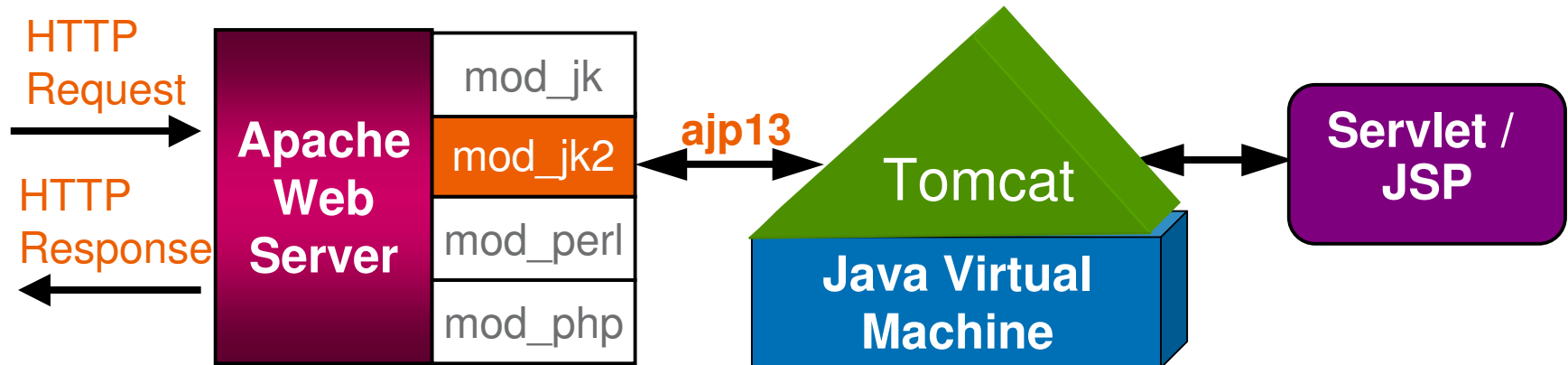
- Servlet Container **“Catalina”**
 - Java Servlet 2.3 specification
 - JSP 1.2 specification
 - Supports Servlet 2.2/JSP 1.1 from Tomcat 3.x
- JSP engine **“JASPER”**
- Apache passes on servlet requests to Tomcat through mod_jk or mod_jk2
- Uses Jakarta Commons-DBCP to implement database connection pooling

Apache to Tomcat Interaction

Apache JServ Protocol (ajp) between Apache and Tomcat



Client Browser





HP-UX Webmin-based Admin



- What is it?
 - GUI administrator
 - Apache, Tomcat, OpenLDAP, other Internet Express open source components
 - Written in Perl
 - Based on open source but highly customized by HP
- Why use it?
 - Remote management over SSL
 - Versioning of Apache conf files
 - Apache log rotation
 - Delegate management responsibilities
 - Easy SSL certificate creation and management



HP-UX Webmin-based Admin

- » HP-UX Web Server Suite
- » HP-UX Internet Express
- » Admin Settings
- » Others
- » Documentation

These components are in the HP-UX Web Server Suite.
More information on HP-UX Web Server Suite can be found in the » **Documentation** button above.

[Configure Theme](#)



HP-UX [Apache-based Web Server](#)



HP-UX [Tomcat-based Servlet Engine](#)

[Switch user..](#)



HP-UX Webmin-based Admin

»HP-UX Web Server Suite »HP-UX Internet Express »Admin Settings »Others »Documentation

HP-UX Apache-based Web Server

[Start Apache](#) [Restart Apache](#) [Stop Apache](#)

[Search Docs..](#) [»Settings](#)

Home

Global Configuration



[Processes and Limits](#)



[Ports and Addresses](#)



[Apache Modules](#)



[MIME Types](#)



[User and Group](#)



[Miscellaneous](#)



[CGI Programs](#)



[Filters](#)



[LDAP Authentication](#)



[Status](#)



[Log Files](#)



[Per-Directory Options Files](#)



[Edit Defined Parameters](#)



[Certificate Manager](#)



[Back-up Config Files](#)



[Edit Config Files](#)

Virtual Servers

TOMCAT WEB SERVER ADMINISTRATION TOOL

Commit Changes

Log Out

- Tomcat Server
 - Service (Tomcat-Standalone)
- Resources
 - Data Sources
 - Mail Sessions
 - Environment Entries
 - User Databases
- User Definition
 - Users
 - Groups
 - Roles

Tomcat Server

Server Actions Available Actions

Save

Reset

Server Properties

Property	Value
Port Number:	<input type="text" value="8005"/>
Debug Level:	<input type="text" value="0"/>
Shutdown:	<input type="text" value="SHUTDOWN"/>

Save

Reset



HP-UX Webmin-based Admin

» HP-UX Web Server Suite

» HP-UX Internet Express

» Admin Settings

» Others

» Documentation

These components are in the HP-UX Internet Express.

[Configure Theme](#)



[MySQL Database Server](#)



[OpenLDAP server 2](#)



[PostgreSQL Database Server](#)

[Switch user..](#)

[»HP-UX Web Server Suite](#) [»HP-UX Internet Express](#) [»Admin Settings](#) [»Others](#) [»Documentation](#)

MySQL Database Server

[Help..](#) [Search Docs..](#) [»Settings](#)

MySQL Databases

[Create a new database](#)



[jmdb](#)



[mysql](#)



[test](#)

[Create a new database](#)

Global Options



[User Permissions](#)



[Database Permissions](#)



[Host Permissions](#)



[Table Permissions](#)



[Field Permissions](#)

Stop MySQL Server

Click this button to stop the MySQL database server on your system. This will prevent any users or programs from accessing the database, including this Webmin module.



HP-UX XML Web Server Tools



- What is it?
 - Collection of Java-based XML tools for XML parsing, stylesheet and XSL processing, web publishing and image translating
- Why use them?
 - Provides **output to diverse clients**
 - HTML for browsers
 - WML for PDAs
 - PDF for printers
 - XML is recognized as a standard for data exchange
 - Easy to integrate with J2EE applications



HP-UX XML Web Server Tools



Tool	Purpose	Information
Batik	SVG toolkit -- view SVG, generate SVG, SVG to PEG/PNG	http://xml.apache.org/batik
Cocoon	XML publishing framework	http://cocoon.apache.org
FOP	Render XML to printable output PDF, PCL, PS	http://xml.apache.org/fop
Xalan-J	XML stylesheet processor (convert to HTML, WML)	http://xml.apache.org/xalan-j
Xerces-J	XML parser	http://xml.apache.org/xerces-j



HP-UX Internet Express





HP-UX Internet Express

- What is it?
 - Free collection of over 30 popular Open Source Web, Internet, and Security components
 - Pre-built for HP-UX platforms
 - Available in two sets or individually (HP-UX 11i v1)
 - Available in three sets or individually (HP-UX 11iv2)
- Where do I get it?
 - Free standalone Internet Express Application CD shipped with HP-UX AR
 - HP-UX Operating Environment (OE)
 - HP Software Depot download

http://www.software.hp.com/ISS_products_list.html



HP-UX Internet Express

- Where do I get more information?
 - <http://docs.hp.com>
 - README.hp
 - Part of some products
 - Describes how product was built for HP-UX platforms
 - Compile options
 - Configuration options



HP-UX Internet Express Products

Download/AR Media

- Ant, Axis, Eclipse, JBoss, Perl-LDAP, PostgreSQL, Stunnel, Perl LDAP, Xerces C++, Xalan C++, etc.
- Tested and qualified on HP-UX
- Report defects to hpux.iexpress@hp.com

HP-UX OE

- OpenSSL, MySQL, Bastille, Secure Shell, Secure Patch Checker, /dev/random, Perl, IPFilter, etc.
- Fully tested and supported under HP-UX support contract

Download/AR Media

TCOpenSource 11iv2

- Bash, Emacs, Gmake, Vim etc.
- Not tested or supported by HP





Adding Enterprise Products



Enterprise Add-on Products

- **HP** Products
 - HP OpenView
 - HP Workload Manager
 - HP MC ServiceGuard
- Certified **third-party** plug-ins
 - BEA WebLogic Application Server
 - Microsoft FrontPage Server Extensions
 - Siebel Customer Relationship Management (CRM)
 - Netegrity SiteMinder



HP OpenView

- HP OpenView Transaction Analyzer (OVTA)
 - Comprehensive application performance measured against service level requirements
 - Detailed data for performance problem analysis
 - <http://www.openview.hp.com/products/tran/>
- HP OpenView Smart Plug-in (SPI)
 - Works with OpenView Operations management server (OVO)
 - Monitors processes and log files
 - Free product included on OVO/UNIX CD-ROM
- Evaluation software
 - <http://www.openview.hp.com/downloads/evaluation>



HP-UX Workload Manager

- What is HP-UX Workload Manager (WLM)?
 - Supplements HP Process Resource Manager (HP PRM)
 - Automatic resource allocation and application performance management
- What is WLM Apache Toolkit (ApacheTK)
 - Software utilities and example configuration files to manage Apache processes, Tomcat and CGI scripts
 - Whitepaper “Using HP-UX Workload Manager with Apache”
- Where can I get ApacheTK?
 - Free from software.hp.com
 - Bundled with other WLM toolkits on the quarterly Application Release media, /opt/wlm/toolkits/apache/
- Where can I get more information on ApacheTK?
 - <http://www.hp.com/go/wlm>

HP MC/ServiceGuard

- What is Enterprise Cluster Master Toolkit (**ECMT**)?
 - For mission-critical Internet applications through fast, automated failure detection and application restoration.
 - Templates and scripts to configure ServiceGuard for Internet servers and third-party database management systems
 - Apache, Tomcat, Oracle 9i
 - Requires installation of MC/ServiceGuard
- Where can I get ECMT?
 - Included with Mission Critical OE or from software.hp.com
- Where can I get more information on ECMT?
 - <http://docs.hp.com>

BEA WebLogic Plug-in

- What is it?
 - An Apache module that forwards requests to BEA WebLogic J2EE Application Server.
 - Certified on HP-UX
- Where can I get the BEA WebLogic plug-in?
 - Directly from BEA
- How do I enable the BEA WebLogic plug-in?
 - See BEA WebLogic documentation at <http://www.bea.com>

Microsoft FrontPage Plug-in

- What is it?
 - Microsoft FrontPage 2002 Server Extensions (FPSE)
 - Create/Update FrontPage docs directly on server
 - Enables special extension-only features
 - FPSE CGI programs get a POST request from FrontPage client over HTTP
- Where can I get the FPSE plug-in?
 - From Ready-to-Run Software (RTR) www.rtr.com
- How do I install and enable the FPSE plug-in?
 - See FrontPage Admin Guide shipped with HP-UX Apache (system requirements, install procedure, etc.)



Siebel Web Server Plug-in

- What is it?
 - Manages communication between a client and Siebel application server
- Where can I get the Siebel Web Server plug-in?
 - Comes with Siebel applications as a complete package
 - Package implemented as a 3-tier architecture (web server, application server, database server)
- Where can I get more information?
 - Siebel provides large-scale enterprise business solutions such as Customer Relationship Management (CRM)
 - Check out Siebel product information
<http://www.siebel.com/products>



Netegrity SiteMinder Plug-in

- What is it?
 - Manages communication between client and SiteMinder
 - SiteMinder provides single sign-on across multiple applications, servers, platforms, and Internet domains
- Where can I get the SiteMinder plug-in?
 - Included with SiteMinder product
- Where can I get more information?

<http://www.netegrity.com>



PTC Windchill Plug-in

- What is it?
 - Apache module that passes requests to a PTC server
 - Windchill is a comprehensive solution for distributed product development and life cycle management
- Where can I get the Windchill plug-in?
 - Included with the Windchill product
- Where can I get more information?

<http://www.ptc.com>



Putting it All Together: An Enterprise Application

~ featuring ~

HP-UX Web
Server Suite



modperl

APACHE





Background

- Enterprise-level web application demo
 - All products/components from HP-UX Web Server Suite and Internet Express
 - Developed and run on IPF machine
 - No IDE used (vi only)
 - Mix of technologies (PHP, Perl, Java, LDAP)
 - Quick development time
 - 4 part-time engineers x 3 weeks
 - Approx. 2000 lines of code, 50% HTML
 - Easy installation and setup
 - HPWS components are pre-configured
 - SD depots for IE products





DVD Rental Storefront Overview

- **Rent** movies
- **Browse** the database of movie titles
- **Search** for specific movies
 - Keyword
 - Advanced search by actor, title, year, genre, characters
 - Sort of search results (alphabetic, popularity, year)
- **Read** movie summaries
 - Plot, cast, characters, rating, year
- **List** current rentals

DVD Rental Storefront Overview (cont'd)



- **Sign-up** as a new user
 - Name, address, username, password, credit card info
- **Login** as existing user
 - Specify username and password
- **Logout**
 - Clean up existing session



Products Used

- **HP-UX Web Server Suite**
 - Apache: http server
 - Tomcat: servlets, JSPs
 - PHP: scripts
 - Perl: CGI scripts
 - Webmin: administer MySQL, Apache, Tomcat
- **HP-UX Internet Express**
 - MySQL: movie database (approx. 350,000 movie titles)
 - OpenSSL: authentication, encryption
 - OpenLDAP: login name and password storage
- **Other**
 - Cascading Style Sheets (CSS) for colors, fonts, layout
 - Javascript to simplify html pages
 - Free movie data from www.imdb.com



New User: [Sign Up Now](#) [Sign In](#)

Search

[Advanced search](#)

By Genre

- [Action](#)
- [Adventure](#)
- [Animation](#)
- [Comedy](#)
- [Crime](#)
- [Drama](#)
- [Family](#)
- [Fantasy](#)
- [Horror](#)
- [Music](#)
- [Mystery](#)
- [Romance](#)
- [Sci-Fi](#)
- [Thriller](#)
- [War](#)
- [Western](#)

By Year

- [2004](#)
- [2003](#)
- [2002](#)
- [2001](#)
- [2000](#)

Welcome Guest

New to Demo Flics?

Get a free membership - Movie rental has never been easier

- **5 DVD's at any time**
Keep them as long as you want
- **Over 50,000 titles**
- classics to new releases
- **No driving. No lines. No hassles**
All you need is a web connection .

Need more?

Demo Flics Platinum account offers 5 DVD rentals and 2 free DVDs of your choice every month for only \$29.00/month.

Feeling lucky?

Enter the [sweepstakes](#) to win a free HP-UX Apache Web server

Most Popular

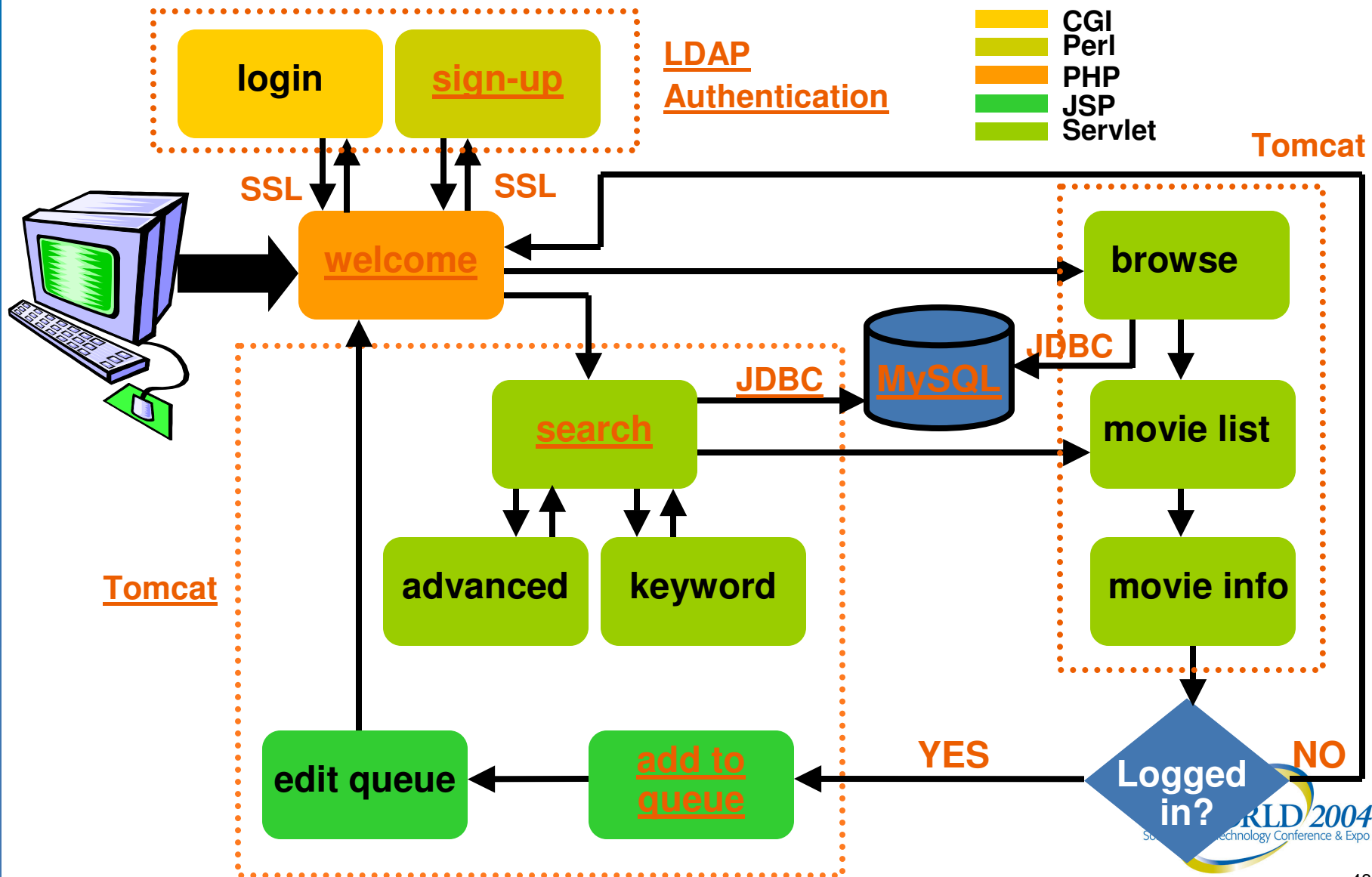
- [Eternal Sunshine of the Spotless Mind \(2004\)](#)
- [Troy \(2004\)](#)
- [Butterfly Effect, The \(2004\)](#)
- [Dawn of the Dead \(2004\)](#)
- [Starsky & Hutch \(2004\)](#)
- [Secret Window \(2004\)](#)
- [Shrek 2 \(2004\)](#)
- [Along Came Polly \(2004\)](#)
- [Miracle \(2004\)](#)
- [Hidalgo \(2004\)](#)

New Releases

- [12 \(2004\)](#)
- [13 Going On 30 \(2004\)](#)
- [17th Man, The \(2004\)](#)
- [24th Day, The \(2004\)](#)
- [28PerfectlyHonest \(2004\)](#)
- [Adam & Evil \(2004\)](#)
- [Adventures in Homeschooling \(2004\)](#)
- [After-School Special \(2004\)](#)



DVD Rental Architecture



HPWS Movie Store - Microsoft Internet Explorer provided by Hewlett-Packard

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites History Print Mail Stop

Address <http://myserver.com/movie/signup.html> Go Links

Demoflic powered by hp *- featuring -* HP-UX Web Server Suite Powered by modperl APACHE php Webmin OpenLDAP MySQL

New User: [Sign Up Now](#) [Sign In](#)

<p>Search</p> <input type="text"/> <input type="button" value=">>"/>	<p>Welcome Guest</p> <p>Customer Information</p> <p>Login/Email: <input type="text"/></p> <p>Password: <input type="text"/> Confirm Password: <input type="text"/></p> <p>First: <input type="text"/> MI: <input type="text"/> Last: <input type="text"/></p> <p>Address: <input type="text"/></p> <p>City: <input type="text"/> State: <input type="text"/> ZIP: <input type="text"/></p> <p>Credit Card Information</p> <p>Card Type: <input type="radio"/> VISA <input type="radio"/> MC <input type="radio"/> AMEX <input type="radio"/> DIS</p> <p>Number: <input type="text"/> Exp: <input type="text"/></p> <p style="text-align: center;"><input type="button" value="Submit"/> <input type="button" value="Reset"/></p>
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Advanced search

By Genre

- [Action](#)
- [Adventure](#)
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By Year

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- [2000](#)

Local intranet



New User: [Sign Up Now](#) [Sign In](#)

Search

[Advanced search](#)

By Genre

- [Action](#)
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Welcome Guest

Shrek 2 (2004)

Genre: Fantasy
Rank : 7.8
Language: English
Duration: 93

Plot: The film picks up right where the first movie ended... Shrek and Fiona return from their honeymoon to find a letter from Fiona's parents inviting the newlyweds over for dinner. The only problem is that they have no idea that their daughter is now an ogre. Right after their honeymoon the newly wed couple goes to Princess Fiona's parents for dinner. When a Fairy God Mother discovers Fiona and Shrek are married she reminds the king about a deal they agreed on years ago that Fiona should of married Prince Charming (her son). The king then hires a cat named Puss-in-Boots (a sword fighting cat and ogre slayer) to kill Shrek. Organic_6@msn.com

Cast:

1. Myers, Mike as Shrek
2. Murphy, Eddie (I) as Donkey
3. Diaz, Cameron as Princess Fiona
4. Andrews, Julie (I) as Queen
5. Banderas, Antonio as Puss In Boots

- Most Popular**
1. [Eternal Sunshine of the Spotless Mind \(2004\)](#)
 2. [Troy \(2004\)](#)
 3. [Butterfly Effect, The \(2004\)](#)
 4. [Dawn of the Dead \(2004\)](#)
 5. [Starsky & Hutch \(2004\)](#)
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 8. [Along Came Polly \(2004\)](#)
 9. [Miracle \(2004\)](#)
 10. [You Got Served \(2004\)](#)





New User: [Sign Up Now](#) [Sign In](#)

Search

[Advanced search](#)
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[2004](#)
[2003](#)
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[2000](#)

Welcome Guest

Welcome Guest

Advanced Search

Title:

Actor Name:

Character Name:

Keyword:

Genre:

Year:

Sort By:

- Most Popular**
- [Eternal Sunshine of the Spotless Mind \(2004\)](#)
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 - [Shrek 2 \(2004\)](#)
 - [Along Came Polly \(2004\)](#)
 - [Miracle \(2004\)](#)
 - [You Got Served \(2004\)](#)





Technologies

Technologies Used

- Java
 - Servlets
 - JSPs
 - Tomcat deployment
- Perl
 - mod_perl
- PHP
 - mod_php
- LDAP authentication

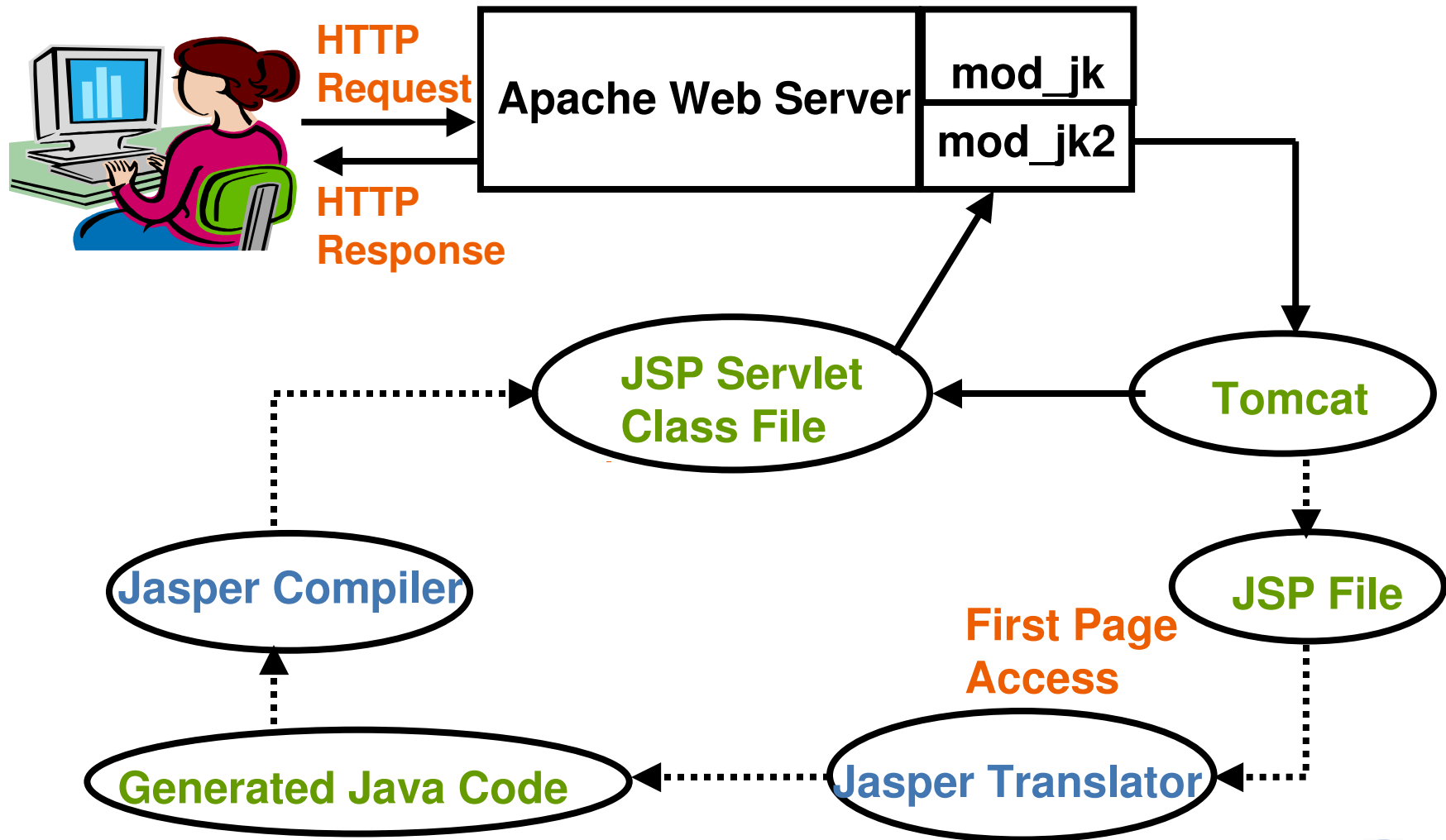
Java: Servlet

- Server-side Java class dynamically loaded and run by a “servlet container”
- Once instantiated and loaded it continues running
 - Until container is stopped
- Servlets can be autoloaded
- Servlet class files included with Tomcat
 - javax/servlet/*
 - /opt/hpws/tomcat/common/lib/servlet.jar
 - Add it to \$CLASSPATH

Java :JSP

- What is it?
 - HTML or XML page with additional elements that the JSP engine processes and replaces with text.
 - Compiled into a servlet on first access
- Why use it?
 - Can separate the look from the content
 - Web page designer builds the HTML leaving places for servlet programmers to insert dynamic content
 - Fast and simple web page development
 - Extensible through use of pre-defined and customized tags and tag libraries

JSP Translate-Compile Cycle



Java Servlets vs JSPs

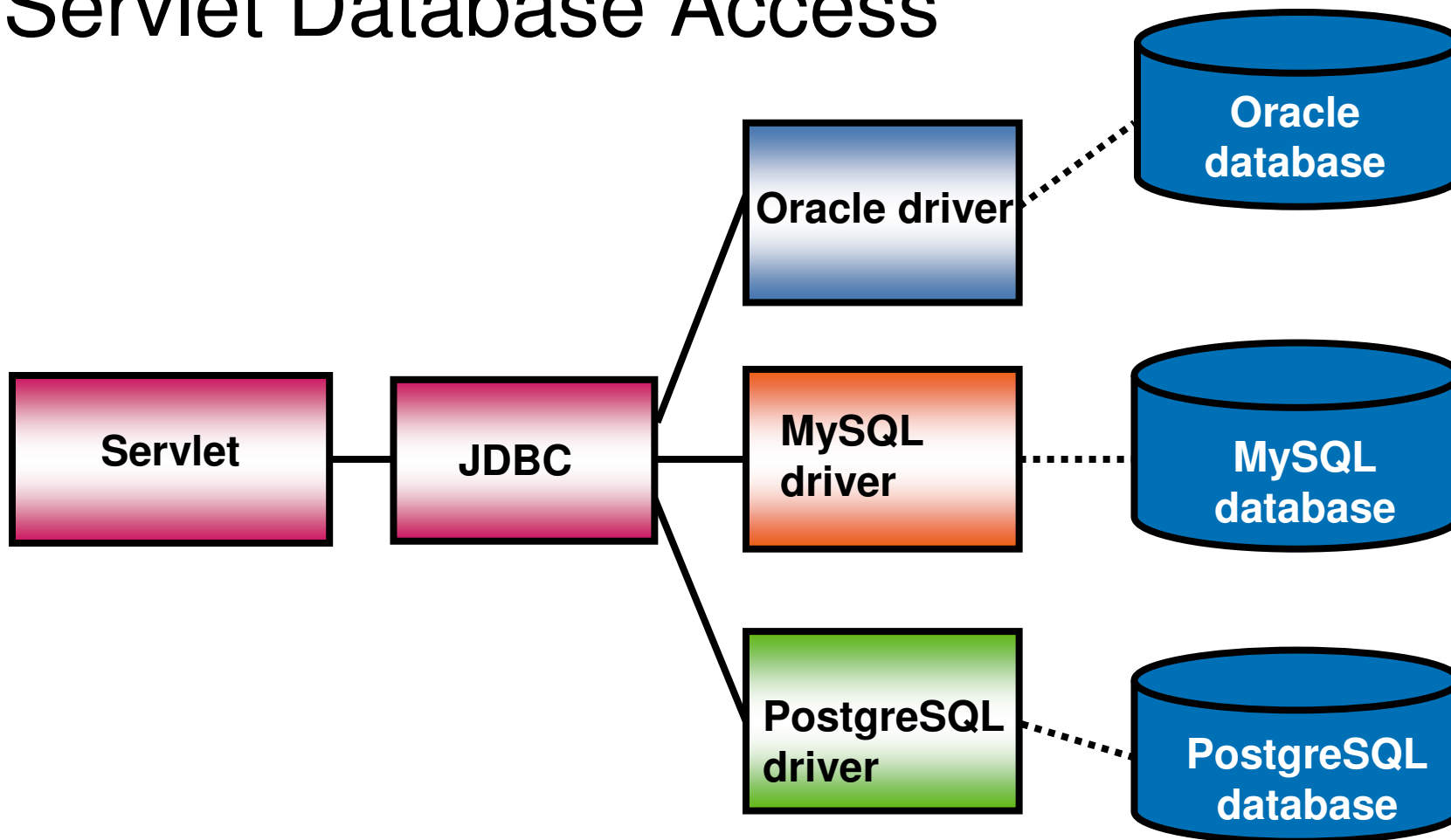
Servlet	JSP
Java pre-compiled class	Java code+HTML mixed in a script compiled at first access
Requires only JRE on system	Requires JDK on system
For apps with more logic and less display	For apps with more display and less logic
Slower development	Fast development
Defined by servlet spec	Defined by JSP spec



Java Database Access: JDBC

- Requires both API and driver
- JDBC API
 - Built into the Java SDK
 - Allows Java servlets to execute SQL statements
- JDBC Driver
 - Get from vendor
 - Bridge to ODBC driver comes with SDK
 - Specific to database (MySQL, PostgreSQL, Oracle)
 - Four types of drivers
 - Vary by platform independence, performance, and deployment administration

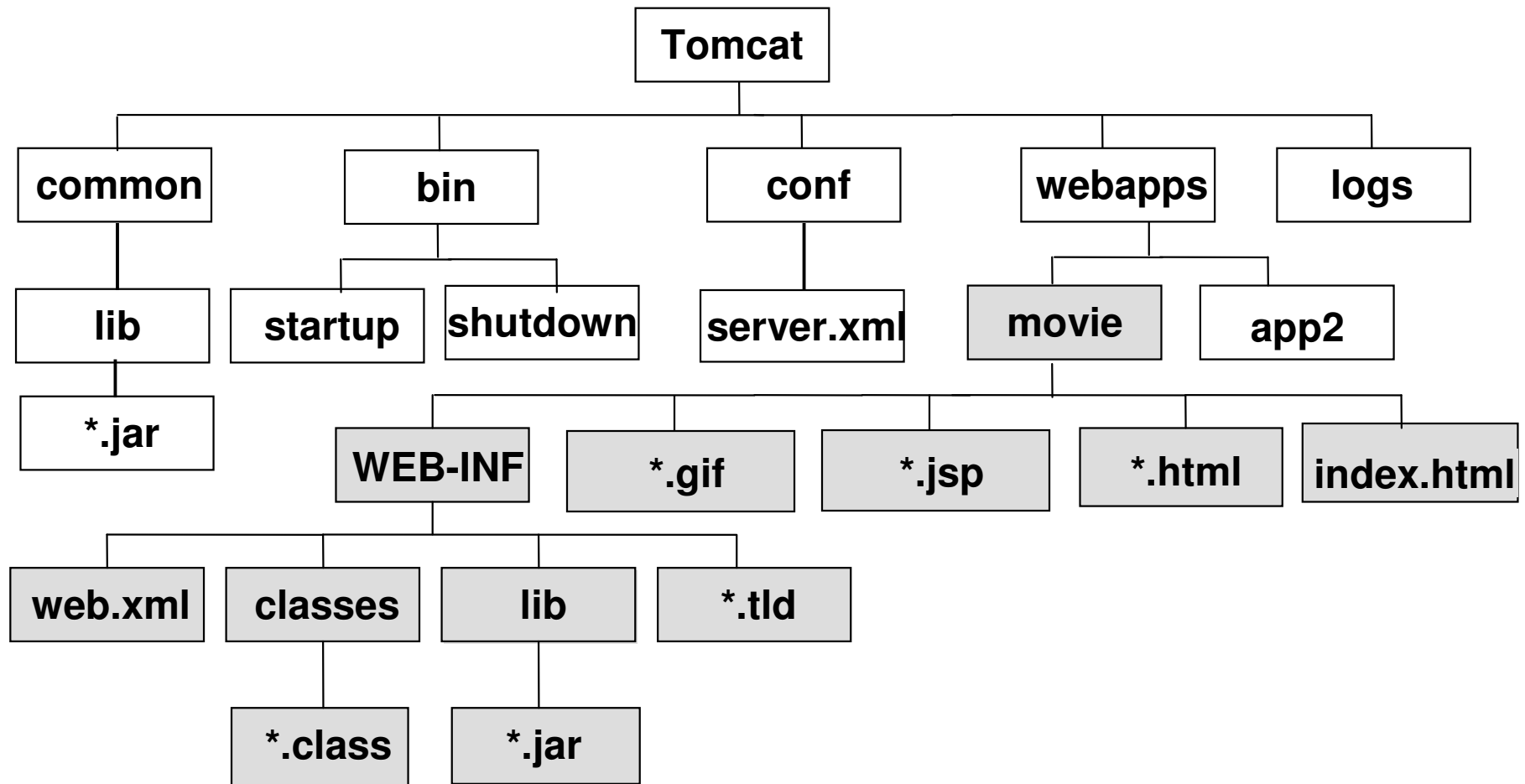
Servlet Database Access



Tomcat Application Deployment

- Add new *movie* application to Tomcat's config file
 - conf/server.xml
- Create directory structure for *movie*
 - webapps/movie/<static files>
 - webapps/movie/WEB-INF/<config file>
 - webapps/movie/WEB-INF/<class files>
- Create a Web Application Archive file (WAR)
 - Jar file with a standard structure
 - `$ cd webapps/movie`
 - `$ jar cvf movie.war .`
 - Copy and deploy on servlet containers that support the Java Servlet Specification (Tomcat, WebLogic, etc.)

Tomcat Directory Structure





Tomcat Web Application

Directory/File	Contents
webapps	Document root: contains static files such as JSP, HTML, image files, stylesheets
webapps/movie/WEB-INF	Contains all resources not in the document root of the application. Not directly accessible to a client.
webapps/movie/WEB-INF/classes	Classes accessed by JSPs and servlets
webapps/movie/WEB-INF/lib	JAR files containing the binary and source of tag library handler
webapps/movie/WEB-INF/web.xml	Deployment descriptor: register servlets with Tomcat



Tomcat: Access a Web Application

- Enable Apache-Tomcat connection in httpd.conf
 - #Include conf/mod_jk.conf
 - #Include conf/mod_jk2.conf
- Configure connection module
 - mod_jk.conf or mod_jk2 for ajp protocol
 - workers.properties or workers2.properties for application mount point
- Restart Apache to read conf file changes
- Configure Tomcat
 - Enable application logging, servlet auto-loading, connection pooling
- Start Tomcat
 - bin/startup.sh

Perl and mod_perl



 modperl

Perl and mod_perl

- What is it?
 - Server-side scripting language popular for writing CGI
 - mod_perl is Perl interpreter plug-in for Apache
- Why use Perl?
 - Flexible, non-constricting
 - Hundreds of Perl modules to extend functionality
 - Popular CGI scripting language
 - Simple database access
 - You know it!

mod_perl

- Why use mod_perl?
 - **Faster CGI**
 - Perl interpreter always running so interpreter startup overhead is eliminated
 - No recompilation of the script at each access
 - Up to 100x faster depending on the script
 - **Faster database connections**
 - Connections are persistent
 - **No changes needed** in existing Perl CGI
 - Apache modules (plug-ins) can be written in Perl
 - Access to Apache APIs written in C
 - Many existing modules available from CPAN
 - Add Perl modules to Apache's httpd.conf

mod_perl is more than CGI scripting on steroids. It is a whole new way to create dynamic content by utilizing the full power of the Apache web server to create stateful sessions, customized user authentication systems, smart proxies and much more. Yet, magically, your old CGI scripts will continue to work and work very fast indeed. With mod_perl you give up nothing and gain so much!

Lincoln D. Stein

Researcher, author, and prolific Perl programmer

<http://perl.apache.org/>



Enabling mod_perl

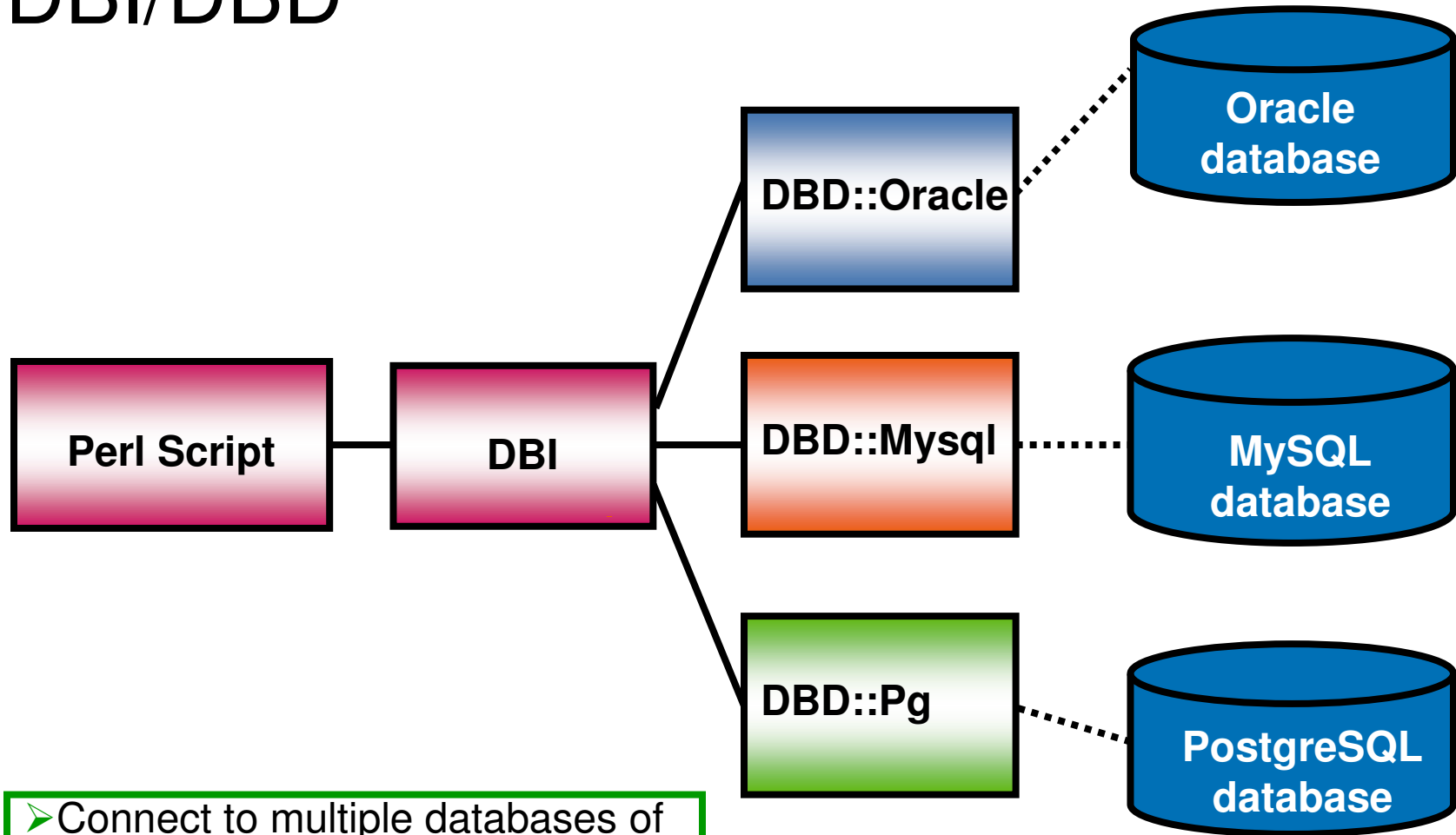
- mod_perl built and pre-configured but not enabled
- Remove # in httpd.conf to enable mod_perl
`LoadModule perl_module modules/mod_perl.so`
- Executes any Perl CGI with .pl extension
 - Doesn't have to reside in cgi-bin directory
 - Just needs to be accessible to web server
- Add additional modules with **PerlModule** directive



mod_perl Default Configuration

```
#LoadModule perl_module          modules/mod_perl.so
<IfModule mod_perl.c>
    PerlModule ModPerl::Registry
    PerlModule Apache::compat
    PerlModule Apache::Server
    <Files *.pl>
        SetHandler perl-script
        PerlHandler ModPerl::Registry::handler
        Options +ExecCGI
        PerlOptions +ParseHeaders
    </Files>
</IfModule>
```

Perl Database Access: DBI/DBD



- Connect to multiple databases of different types at the same time
- Easily move data between them



PHP and mod_php



PHP and mod_php

- What is it?
 - A server-side scripting language
 - mod_php is PHP interpreter plug-in to Apache
- Why use it?
 - Easy database access
 - Built-in MySQL and ODBC interface
 - Extensions for PostgreSQL, Oracle 8i or 9i, and LDAP
 - Powerful
 - 700 available functions, numerous functions for mysql (~50 in PHP4)
 - Easy development of complex web application
 - Short learning curve
 - You know it!

mod_php Configuration

- Extensions are shared libraries

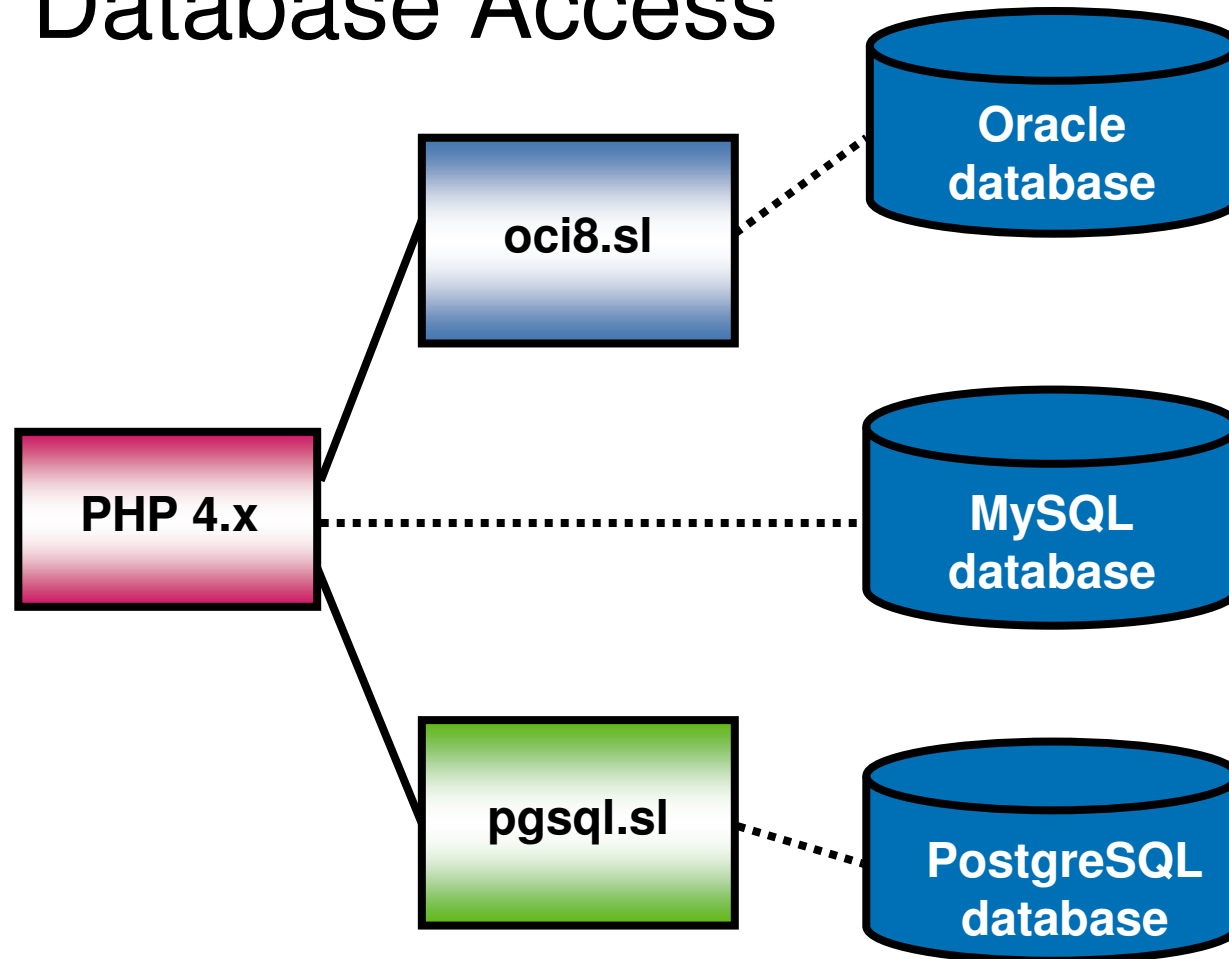
```
% ls /opt/hpws/apache/php/lib/php/extensions  
pgsql.sl  
oci8.sl  
ldap.sl
```

- Remove # in httpd.conf to enable mod_php
#LoadModule php4_module modules/libphp4.so

- Remove ; in “php.ini” configuration file to load extensions


```
;extension=oci8.sl  
;extension=pgsql.sl  
;extension=ldap.sl
```

PHP Database Access



LDAP Authentication

Enter Network Password

 Please type your user name and password.

Site: mesa

Realm: Restricted Area

User Name:

Password:

Save this password in your password list

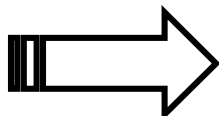
OK Cancel

LDAP Authentication

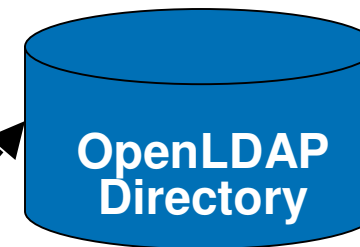
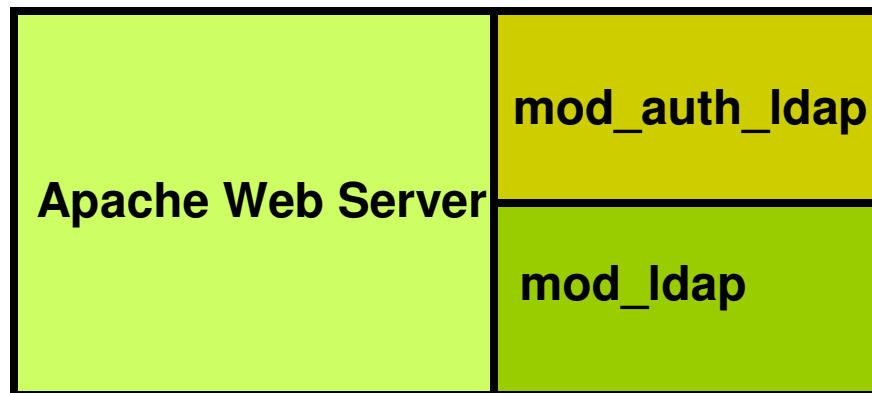
- What is it?
 - LDAP directory used as a central point for user authentication to access system resources
- Why use it?
 - Simplified administration
 - Addition or change of authorized users is in a single database either local or remote
 - Industry standard protocol
 - Directory can be shared among multiple platforms and applications out-of-the box
 - Directory can be managed by standard tools and configurations
 - Optimized for reading

LDAP Authentication

Request for a protected page



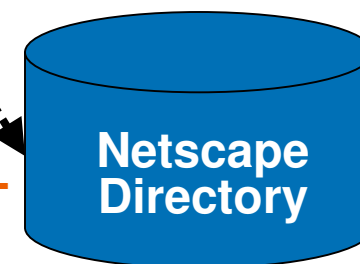
Top Secret



Port 389

Port 636

SSL



Database Access Summary

	MySQL	PostgreSQL	Oracle
Servlet	Java Database Connectivity JDBC		
Perl	Database Interface(DBI) / Database Driver(DBD) via mod_perl or CGI		
PHP	Built-in	PHP extension	

Resources

- MySQL Reference Manual
 - <http://dev.mysql.com/doc/mysql/en/index.html>
- PHP Home Page
 - <http://www.php.net>
- phpMyAdmin
 - Open source GUI written in PHP to set up and manage MySQL over the web
 - <http://www.phpmyadmin.net>

Resources (cont'd)

- Perl home page
 - www.perl.com
- Perl DBI documentation
 - dbi.perl.org
- Comprehensive Perl Active Network (CPAN)
 - For Perl modules including DBI and DBD for database access
 - <http://www.cpan.org/modules/>



Q & A



i n v e n t



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server.xml Content

- Configure **application**
 - Application name
 - Enable application logging
 - Enable reloadable
- Configure **database**
 - Database name
 - Database user and password
- Configure **connection pooling**
 - Number of connections
 - Connection wait time
- Configure **JDBC driver**
 - Driver name
 - JDBC connection URL

server.xml example



```
<Context path="/jmovie" docBase="jmovie" debug="1"
         reloadable="true" crossContext="true">
  <Logger className="org.apache.catalina.logger.FileLogger"
         prefix="localhost_jmovie_log." suffix=".txt"
         timestamp="true"/>

  <Resource name="jmdb" auth="Container"
         type="javax.sql.DataSource"/>

  <ResourceParams name="jmdb">
    <parameter>
      <name>factory</name>
      <value>org.apache.commons.dbcp.BasicDataSourceFactory</value>
    </parameter>

    <!-- Maximum number of dB connections in pool. -->
    <parameter>
      <name>maxActive</name>
      <value>100</value>
    </parameter>
  </ResourceParams>
</Context>
```



Server.xml example cont'd

```
<!-- MySQL dB username and password for dB connections -->
  <parameter>
    <name>username</name>
    <value>demo</value>
  </parameter>
  <parameter>
    <name>password</name>
    <value></value>
  </parameter>
<!-- Class name for mm.mysql JDBC driver -->
  <parameter>
    <name>driverClassName</name>
    <value>org.gjt.mm.mysql.Driver</value>
  </parameter>
  <!--The JDBC connection url for connecting to your MySQL dB.-->
  <parameter>
    <name>url</name>
    <value>jdbc:mysql://myserver.com/jmdb?autoReconnect=true</value>
  </parameter>
</ResourceParams>
</Context>
```

webapps/WEB-INF/web.xml



```
<web-app>
  <servlet>
    <servlet-name>getInfo</servlet-name>
    <servlet-class>hpws.getInfo</servlet-class>
  </servlet>
  <servlet-mapping>
    <servlet-name>getInfo</servlet-name>
    <url-pattern>/getInfo/*</url-pattern>
  </servlet-mapping>
  <resource-ref>
    <description>DB Connection</description>
    <res-ref-name>jmdb</res-ref-name>
    <res-type>javax.sql.DataSource</res-type>
    <res-auth>Container</res-auth>
  </resource-ref>
  <taglib>
    <taglib-uri>
      http://jakarta.apache.org/tomcat/mytaglib
    </taglib-uri>
    <taglib-location>
      /WEB-INF/jsp/jmovie-taglib.tld
    </taglib-location>
  </taglib>
</web-app>
```

Perl database example

```
use DBI;
```

```
my $dbh = DBI->connect('DBI:Oracle:payroll');  
my $sth = $dbh->prepare('SELECT * FROM people WHERE  
lastname = ?');  
lastname="Smith";  
$sth->execute($lastname);  
@data = $sth->fetchrow_array();  
my $firstname = $data[1];  
print "\t$firstname $lastname\n";  
$dbh->disconnect;
```


PHP database example

```
<html>
<body>
<?php
$db = mysql_connect ("localhost", "root", "pass");
mysql_select_db ("mydb", $db);
$result = mysql_query ("SELECT * FROM people", $db);
printf ("First Name: %s<br>\n",
    mysql_result ($result, 0, "first"));
printf ("Last Name: %s<br>\n",
    mysql_result ($result, 0, "last"));
mysql_close ($db);
?>
</body>
</html>
```