

Advanced Web Techniques

Incorporating Dynamic Content into
Web Presentations

Paco Hope

Goal of this Series

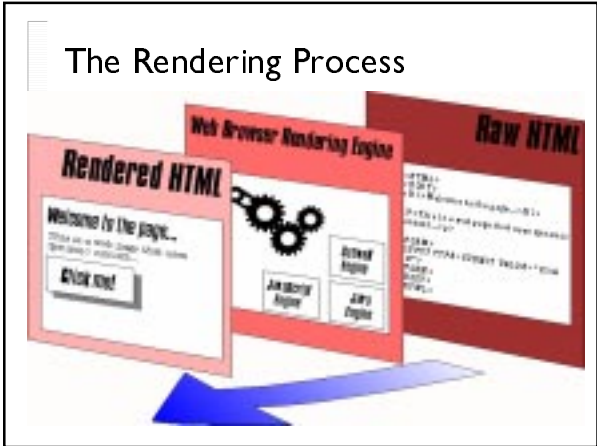
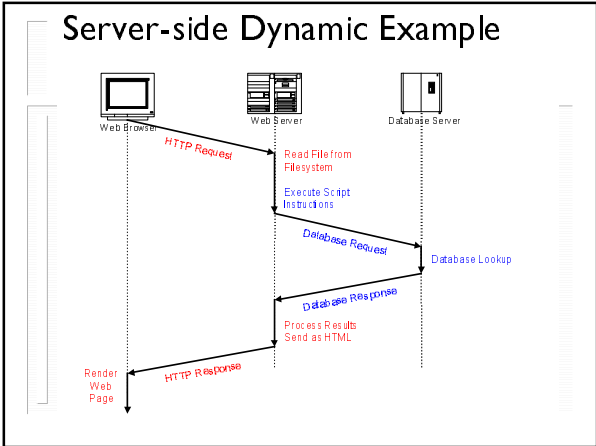
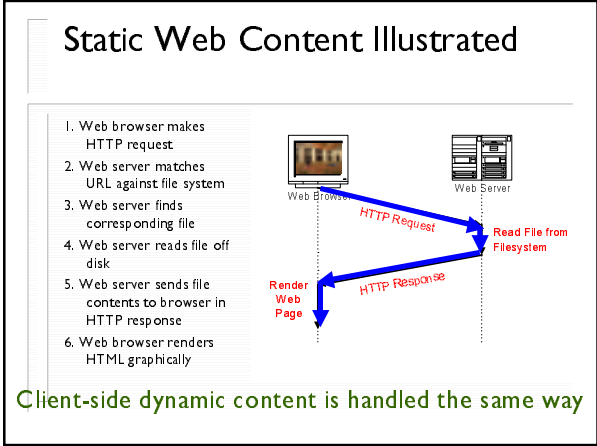
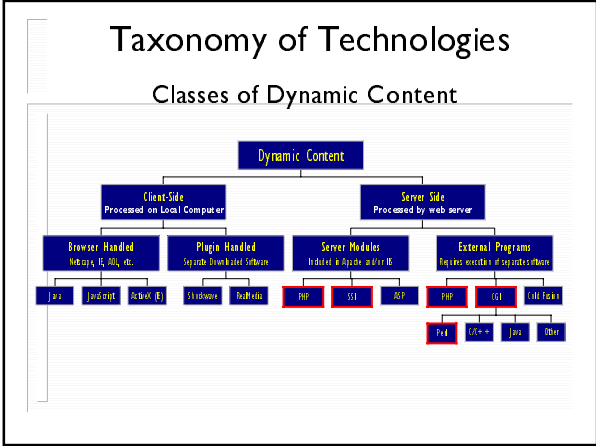
- Provide a clear **framework** to categorize existing technologies
- Provide clear **differentiation** between technologies
- Introduce the **basic structure** and syntax of three key technologies
- Provide **foundation** which can be supplemented by existing documentation

Dynamic versus Static

Static	Dynamic
➤ File contents served as is	➤ Reacts to stimuli (date, time, database, weather, user input)
➤ No processing done	➤ Sometimes slower
➤ Fastest delivery (13 system calls in apache under Solaris)	➤ Requires computation (sometimes an issue)
➤ Benefits from caching	➤ Reduces effectiveness of caching

Two Classes of Dynamism

Client-side (handled by web browser or software on local machine)	Server-side (handled by web server)
➤ Java	➤ CGI
➤ JavaScript	➤ SSI
➤ ActiveX	➤ PHP
➤ Shockwave	➤ ASP
➤ RealAudio (video, etc)	➤ Cold Fusion
	➤ Domino



Tour of Technology

- > JavaScript
- > Java
- > Active X
- > ASP
- > SSI
- > CGI
- > PHP

We will answer:

1. What is it good for?
2. What are its drawbacks?
3. How hard is it to develop?

JavaScript: What is it?

- > Scripting language
 - > Interpreted by browsers
 - > Can do useful housekeeping and interactivity tasks
 - > Not standardized
 - > Good example: <http://www.cdw.com/>
 - > Bad example: <http://www.belk.com/>
- ```
<script language="JavaScript">
// ...
</script>
<!-- Fix Netscape CSS bug -->
```

## JavaScript

- | Good                                           | Bad                                                                                 |
|------------------------------------------------|-------------------------------------------------------------------------------------|
| > Adds <b>spice</b>                            | > Makes pages <b>larger</b>                                                         |
| > Readily <b>available</b>                     | > Not universal                                                                     |
| > <b>Improves usability</b> of web pages       | > <b>Can't be searched,</b> indexed, translated, printed                            |
| > <b>Many examples</b> and cookbooks available | > <b>Limited.</b> Can't do advanced things like database connections or file access |
- ```
<script language="JavaScript">
// ...
</script>
<!-- Fix Netscape CSS bug -->
```

Java: What is it?

- > Programming language not necessarily web-related
 - > Interpreted by browsers
 - > Powerful and extendable
 - > Standards are **shaky**
 - > Good example: <http://fun.devaluator.fidelity.com/>
- ```
public int read(byte b[]) { ... }
// ...
}
```

## Java


### Good

- **Powerful**
- Flexible, extensible
- **Offloads computation**
- Can perform **complex tasks**
- **Robust security**
- **Good development environments**

### Bad

- Users often download **large code**
- **Not universal**
- **Can't be searched, indexed, translated, printed**
- **Standards fluctuate**
- Usually **slow**

## ActiveX

- Client-side, **Windows, IE only** (not even Mac)
  - Provides complete program functionality
  - Full access to client system
- 
- Can be developed in several languages (Basic, C, C++)
  - Rotten security model

## ActiveX




### Good

- **Easy** to develop (if you already work in Windows languages, like VB and VC++)
- Easy to **integrate** with Windows products
- **Full access** can solve some otherwise difficult problems

### Bad

- **Windows IE only**
- **Large downloads** like Java
- **Security model** encourages costly applet signing or lax browsing practices

## Active Server Pages (ASP)

- **Windows only, server-side dynamic content**
  - Connects seamlessly to **Windows products**
  - Lots of modules available
- 
- Includes database connectivity
  - Rapid development environment

## ASP

| Good                                                                                                                                                                                                                                                | Bad                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>&gt; <b>Easy</b> to develop</li> <li>&gt; Easy to <b>integrate</b> with Windows products</li> <li>&gt; <b>Development environment</b> is nice</li> <li>&gt; Many simple apps are easily developed</li> </ul> | <ul style="list-style-type: none"> <li>&gt; <b>Windows only</b>, not portable</li> <li>&gt; <b>Costs \$\$\$</b> at many levels</li> <li>&gt; <b>Computationally intense</b> at server, requires beefier hardware than other similar solutions</li> </ul> |

## Server Side Includes

- > Processes simple "comments" to execute commands
- > Includes some control flow (if, else, variables)
- > Enables invocation of programs or decisions based on a few trivial criteria

- > Apache-only module
- > Limited utility

```
<!--#include virtual="footer.html" -->
```

## Server Side Includes


| Good                                                                                                                                                                                                                              | Bad                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>&gt; <b>Quick</b> and <b>simple</b></li> <li>&gt; Building block for more sophisticated content</li> <li>&gt; Enables modular site design</li> <li>&gt; Does not defeat caching</li> </ul> | <ul style="list-style-type: none"> <li>&gt; <b>Not sophisticated</b></li> <li>&gt; Crude flow control</li> <li>&gt; Security issues under unix and windows</li> <li>&gt; <b>No</b> development environment</li> <li>&gt; Poor documentation</li> </ul> |

## Common Gateway Interface

- > Allows execution of arbitrary programs
- > Any language can be used with CGI
- > Not platform-specific
- > Source code is protected


- > Program has a URL like any web page
- > Must return known content type (e.g. HTML, GIF, text, etc)

# CGI




| Good                                                                                                                                                                                                                                         | Bad                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>&gt; <b>Maximally flexible</b></li> <li>&gt; Allows developer to use their favorite environment</li> <li>&gt; Easily portable</li> <li>&gt; Can protect secrets or access proprietary data</li> </ul> | <ul style="list-style-type: none"> <li>&gt; <b>Debugging is hard</b></li> <li>&gt; Executes on web server (<b>compute load</b>)</li> <li>&gt; <b>Security issues</b> (readily solved)</li> </ul> |

# PHP



|                                                                                                                                                                                                                                                                                                                        |                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>&gt; Powerful scripting language</li> <li>&gt; Like C, Perl, shell scripts</li> <li>&gt; Lots of modules standard               <ul style="list-style-type: none"> <li>• Oracle</li> <li>• MySQL</li> <li>• MS SQL</li> <li>• Informix</li> <li>• Etc...</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>&gt; Integrates into web server</li> <li>&gt; Can be modular and efficient</li> </ul> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|

# PHP (personal home page)

| Good                                                                                                                                                                                                                                                                                 | Bad                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>&gt; <b>Powerful, fast, small</b></li> <li>&gt; Source is hidden</li> <li>&gt; Includes support for tons of <b>databases</b></li> <li>&gt; <b>Easy</b> to incorporate into HTML</li> <li>&gt; Similar to <b>familiar</b> languages</li> </ul> | <ul style="list-style-type: none"> <li>&gt; Security issues</li> <li>&gt; Different syntax</li> <li>&gt; No development environment</li> <li>&gt; Poor documentation</li> </ul>  |