



URL Mapping

ApacheCon

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ApacheCon : URL Mapping

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URL Mapping - ApacheCon

ApacheCon 2002 - URL Mapping

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URL Mapping

<http://httpd.apache.org/docs/sections.html>

- The process of translating a URL into an actual something that is sent out to the user.
- Can be a static file (html, gif, etc)
- Or a program (cgi, php)
- Or a handler (mod_perl, Java servlet)
- Or something else ... (??)

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Location

- Not tied to file space
- Usually maps to a handler or script

```
<Location /status  
    SetHandler server-status  
</Location>
```

- This example maps the URL `/status` to the `server-status` handler provided by `mod_status`

```
<Location /example>  
    SetHandler perl-script  
    PerlHandler Apache::Example  
</Location>
```

- This example maps the url `/example` to a `mod_perl` handler defined in the Perl module `Apache::Example`.

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Alias

- Maps a URL to a directory, often outside of the DocumentRoot directory
- In default config, used for /icons and /manual

```
Alias /icons/ /usr/local/apache/icons/
```

- Note that this example is very literal. It works for the URL /icons/ but not for the URL /icons
- Ommitting the slash on the second argument can result in strange 404 errors:

```
File does not exist: /usr/local/apache/iconsimage2.gif
```

- Note the missing slash

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ScriptAlias

- Maps a URL to a directory, and indicates that the directory contains CGI programs

```
ScriptAlias /cgi-bin/ /usr/local/apache/cgi-bin/
```

- Equivalent to ...

```
Alias /cgi-bin/ /usr/local/apache/cgi-bin/  
<Directory /usr/local/apache/cgi-bin/>  
    Options ExecCGI  
    SetHandler cgi-script  
</Directory>
```

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AliasMatch and ScriptAliasMatch

- Just like Alias and ScriptAlias, but with regular expressions
- More about regular expressions to come
AliasMatch /cgi(-bin)?/ /usr/local/apache/cgi-bin/
- ? indicates an optional match, so the above matches /cgi/ and /cgi-bin, mapping them both the same place

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Redirect

- Maps a URL to another URL

```
Redirect /HyperCal.html http://www.coopermcgregor.com/products/hypercal/
```

- Optionally specify additional argument to modify the status code sent

http://apache13/mod/mod_alias.html#redirect

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RedirectMatch

- Redirect, but with regexes

```
RedirectMatch [sS]upport(.*) http://www.coopermcgregor.com/support/  
Redirectmatch [dD]r[Bb]acc?h?us.* http://www.drbacchus.com/  
RedirectMatch (.*) https://otherserver.com$1
```

- This seems like a good time to talk about regular expressions

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Regular Expressions

- Match patterns of characters
- Able to express arbitrarily complex patterns
- Perl tends to be the king of regular expressions, but Apache implements a manageable subset of this
- In 2.0, uses PCRE

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Regular Expressions

`.` Matches anything

`+` "one or more"

`*` "zero or more"

`?` "optional"

`^` Beginning of string

`$` End of string

`()` Groups and/or captures

`[]` Character class - Match one of the characters in here

`^` in a character class means "not"

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Regular Expressions, examples

- [Zz]ebra matches "Zebra" or "zebra"
- Giraff?e matches "Giraffe" or "Girafe"
- Spell?ing matches "Spelling" or "Speling"
- Spel+ing matches "Speling", "Spelling", "Spelling", etc
- Spel*ing matches "Speing", "Speling", "Spelling", "Spelling", etc
- ab[cde]fg matches "abcfg", "abdfg" or "abefg"
- ab[^c]d matches anything that starts with ab, followed by anything that is NOT c, followed by d.
- etc ...

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Regular expressions

- So ... why did we care?
- *Match and mod_rewrite use these things

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Redirect examples

```
Redirect /kenya http://kenya.rcbowen.com/
```

```
RedirectMatch [Ss]arah http://sarah.rcbowen.com/
```

- Redirects sarah and Sarah

```
RedirectMatch drbacc?h?us http://www.drbacchus.com/
```

- Redirects common misspellings of drbacchus

```
RedirectMatch (.*) https://other.server.com$1
```

- Redirects any URL to that same URL, but on the https server.

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RedirectTemp and RedirectPermanent

- RedirectTemp is really the same as Redirect
- RedirectPermanent sends a 301 header, indicating permanent redirection

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DocumentRoot

- If all else fails, it must be a request for an actual document, so we look in the DocumentRoot for the path requested.
- File is retrieved off of the file system, and returned to the user
- However, if the file is not there ...

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Error documents

- Maps an error condition to a more useful error message

```
ErrorDocument 404 /cgi-bin/404.cgi
```

```
ErrorDocument 404 http://www.errors.com/
```

```
ErrorDocument 500 /errors/500.html
```

```
# Apache 1.3
```

```
ErrorDocument 403 "You need to log in first
```

```
# Apache 2.0
```

```
ErrorDocument 403 "You need to log in first"
```

- In Apache 1.3, when you specify a string argument to ErrorDocument, you start with quotes, but do not close the quotes on the end of the string.
- In Apache 2.0, you need to close the quotes.

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Example of a 404 CGI handler.

- The example provided below will send you email every time someone goes to a bad link on your web site
- This can generate a lot of email
- You have been warned
- In your configuration file, put:

```
ErrorDocument 404 /cgi-bin/404.cgi
```

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CGI 404 handler

- Then `/cgi-bin/404.cgi` will look like:

```
#!/usr/bin/perl
use Mail::Sendmail;
use strict;
```

```
my $message = qq~
Document not found: $ENV{REQUEST_URI}
Link was from: $ENV{HTTP_REFERER}
~;
```

```
my %mail = (
    To => 'admin@server.com',
    From => 'website@server.com',
    Subject => 'Broken link',
    Message => $message,
);
sendmail(%mail);
```

```
print "Content-type: text/html\n\n";
print "Document not found. Admin has been notified";
```

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Error documents in Apache 2.0

- Apache 2.0 has a new way of handling ErrorDocument that will mean much more customizable error messages, rather than the same old boring "Document Not Found" errors.
- In you Apache 2.0 default configuration file, you will see the following:

```
<IfModule mod_negotiation.c>
<IfModule mod_include.c>
    Alias /error/ "@@ServerRoot@@/error/"
```

```
<Directory "@@ServerRoot@@/error">
    AllowOverride None
    Options IncludesNoExec
    AddOutputFilter Includes html
    AddHandler type-map var
    Order allow,deny
    Allow from all
    LanguagePriority en es de fr
    ForceLanguagePriority Prefer Fallback
</Directory>
```

```
ErrorDocument 400 /error/HTTP_BAD_REQUEST.html.var
ErrorDocument 401 /error/HTTP_UNAUTHORIZED.html.var
... etc ...
ErrorDocument 506 /error/HTTP_VARIANT_ALSO_VARIES.html.var
```

```
</IfModule>
</IfModule>
```

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And the error documents ...

- In the directory @@ServerRoot@@/error/ you will find all of those .html.var files, which contain SSI directives for building custom ErrorDocument pages.
- And, thanks to the efforts of several people, they are available in several languages. These error documents can be customized to your heart's content.
- The 404 page, for example, looks like the following, in English:

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404

```
Content-language: en
Content-type: text/html
Body:-----en--
<!--#set var="TITLE" value="Object not found!" -->
<!--#include virtual="include/top.html" -->
```

The requested URL was not found on this server.

```
<!--#if expr="$HTTP_REFERER" -->
```

The link on the
<a href="<!--#echo encoding="url" var="HTTP_REFERER"-->">referring
page seems to be wrong or outdated. Please inform the author of
<a href="<!--#echo encoding="url" var="HTTP_REFERER"-->">that page
about the error.

```
<!--#else -->
```

If you entered the URL manually please check your
spelling and try again.

```
<!--#endif -->
```

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

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And in French ...

```
Content-language: fr
Content-type: text/html
Body:-----fr--
<!--#set var="TITLE" value="Objet non trouv&eacute;!" -->
<!--#include virtual="include/top.html" -->
```

L'URL requise n'a pu être trouvée sur ce serveur.

```
<!--#if expr="$HTTP_REFERER" -->
```

```
La r&eacute;f&eacute;rence sur
<a href="<!--#echo encoding="url" var="HTTP_REFERER"-->">la page
cit&eacute;e</a>
semble &ecirc;tre erron&eacute;e ou perim&eacute;e. Nous vous prions
d'informer l'auteur de
<a href="<!--#echo encoding="url" var="HTTP_REFERER"-->">cette page</a>
de cette erreur.
```

```
<!--#else -->
```

Si vous avez tapé l'URL à la main, veuillez vérifier
l'orthographe et réessayer.

```
<!--#endif -->
```

```
<!--#include virtual="include/bottom.html" -->
-----fr--
```

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And so on

- The user will get the error message in their own language, based on their browser preferences
- This is called Content Negotiation
- A very cool feature that surprisingly few people are aware of

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Customizing error messages

- As you have the full array of SSI variables at your disposal, this lets you customize this page as much as you like
- Look in the `include` directory for a header and footer file you can tweak too

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Other modules that handler URL mapping

- There are a variety of other modules that can effect URL mapping
- Most of these are not standard modules, but there are a few of them
- `mod_speling`
- `mod_rewrite` (Go to Mads Toftum's talk!!)

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mod_speling

- Yes, it is spelled that way on purpose
- Corrects common typos

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mod_rewrite

- Alter URLs on the fly as they come in
- Regular Expressions!

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mod_rewrite examples (1)

- Problem: Ugly URLs.

```
http://www.server.com/cgi-bin/program.cgi?A=arg1&B=arg2
```

- Want to have prettier ones.

```
http://www.server.com/program/arg1/arg2
```

- Solution: mod_rewrite

```
RewriteEngineOn
RewriteRule ^/program/([^/]+)/([^/]+) \
http://www.server.com/cgi-bin/program.cgi?A=$1&B=$2
```

- `[^/]+` means "one or more character that is not a slash"
- `()` traps the results in a variable

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mod_rewrite examples (2)

- Problem: Want arbitrary user to have a website at "username.example.com"
- Don't want to have to set up vhosts for everyone
- Solution: "wild-card" cname in DNS:

```
*      86400      IN      CNAME    www.example.com.
```

- Then, a rewrite rule:

```
RewriteEngine on
RewriteCond %{HTTP_HOST} ^(.+)\.example\.com$
RewriteRule ^(.+)$ /home/%1/public_html$1
```

- %1 contains the match from the RewriteCond
- \$1 contains the match from the RewriteRule
- Note that you can also do this with mod_vhost_alias

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mod_userdir and public_html

- URLs that begin with ~ (tilde) map to that user's directory

```
http://www.uky.edu/~rbowen/
```

- UserDir specifies where that home directory is supposed to be

```
# Serve files out of /home/username/public_html
UserDir public_html
```

```
# Serve files out of somewhere else
UserDir /www/users/*/htdocs
```

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UserDir caveats

- No clear idea of home directory on Windows
- Be careful with permissions.
- Disable for certain users

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UserDir file permissions

- Directory must be a+rx in order for files to be accessible

```
chmod 755 /home/foo  
chmod 755 /home/foo/public_html
```

- Some users may object
- Put confidential files in other subdirectories with tighter file permissions on them

```
mkdir /home/foo/sekrit  
chmod 700 /home/foo/sekrit
```

- Or, just put all of your per-user web directories somewhere else

```
UserDir /www/users/*/htdocs
```

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Disable for some users

- Some users should not have a UserDir
- Root, for example, may have a home directory of / which would, possibly, be a security problem

```
UserDir enabled  
UserDir disabled root hackerdude rbowen
```

- Note: This syntax might give an error in the version of Apache that you are running. May instead lead to omit that first line.
- Can also just enable for some users

```
UserDir disabled  
UserDir enabled larry bob archibald
```

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Summary

- URL Mapping is the process of converting a URL into a resource to be returned to the user
- Phase can be influenced by a variety of directives
- URLs don't always refer to files on your filesystem

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Questions?

- #apache on
irc.openprojects.net
(I'm DrBacchus)



- comp.infosystems.www.servers.unix (or win32)
- users@httpd.apache.org

<http://httpd.apache.org/docs/>

<http://httpd.apache.org/docs-2.0/>

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