

Using Grails Asset-Pipeline

by @tednaleid

What is an
“asset”?

assets are “static” files

CSS, JavaScript, HTML & Images

Why do assets
need a “pipeline”?

**the asset you should serve
is not the asset you develop**

**JavaScript should be served
concatenated, minified & gzipped with
long-lived cache headers**

**JavaScript should be developed
as many small files**

Just like your Groovy and Java code

Your source code might not even be JavaScript

(i.e. CoffeeScript, ClojureScript, ES6, Dart, GrooScript, ...)

**The best place to do all
of this is compile-time**

then you're just serving static files

Behavior With & Without Asset-Pipeline

Without Asset-Pipeline

Your layout is littered with tags

```
<link rel="stylesheet" href="/test-app/assets/main.css" />
<link rel="stylesheet" href="/test-app/assets/mobile.css" />
<link rel="stylesheet" href="/test-app/assets/app.css" />

<script src="/test-app/assets/vendor/angular/angular-route.js" type="text/javascript" ></script>
<script src="/test-app/assets/vendor/jquery/jquery.js" type="text/javascript" ></script>
<script src="/test-app/assets/vendor/mongolab/mongolab-resource.js" type="text/javascript" ></script>
<script src="/test-app/assets/app/admin/admin.js" type="text/javascript" ></script>
<script src="/test-app/assets/app/admin/projects/admin-projects.js" type="text/javascript" ></script>
<script src="/test-app/assets/app/admin/users/admin-users-edit.js" type="text/javascript" ></script>
<script src="/test-app/assets/app/admin/users/admin-users-list.js" type="text/javascript" ></script>
<script src="/test-app/assets/app/admin/users/admin-users.js" type="text/javascript" ></script>
<script src="/test-app/assets/app/admin/users/uniqueEmail.js" type="text/javascript" ></script>
<script src="/test-app/assets/app/admin/users/validateEquals.js" type="text/javascript" ></script>
<script src="/test-app/assets/app/app.js" type="text/javascript" ></script>
<script src="/test-app/assets/app/dashboard/dashboard.js" type="text/javascript" ></script>
<script src="/test-app/assets/app/projects/productbacklog/productbacklog.js" type="text/javascript" ></script>
<script src="/test-app/assets/app/projects/projects.js" type="text/javascript" ></script>
<script src="/test-app/assets/app/projects/sprints/sprints.js" type="text/javascript" ></script>
<script src="/test-app/assets/app/projects/sprints/tasks/tasks.js" type="text/javascript" ></script>
<script src="/test-app/assets/app/projectsinfo/projectsinfo.js" type="text/javascript" ></script>
<script src="/test-app/assets/app.js" type="text/javascript" ></script>
```

Without Asset-Pipeline

Each tag is a request to the server

Filter	All	Documents	Stylesheets	Images	Media	Scripts	XHR	Fonts	TextTracks	WebSockets	Other	<input type="checkbox"/> Hide data URL
Name	M...	Status	Type	Initiator	Size	Time	Timeline	400 ms	600 ms	800 ms	1.00 s	
test-app/	GET	200	text/html	Other	6.0 KB	476 ms						
main.css	GET	200	text/css	localhost...	11....	91 ms						
application.css	GET	200	text/css	localhost...	13....	98 ms						
angular-route.js	GET	200	application/javas...	localhost...	29....	90 ms						
mobile.css	GET	200	text/css	localhost...	1.7 KB	55 ms						
jquery.js	GET	200	application/javas...	localhost...	281 ...	154 ms						
admin-projects.js	GET	200	application/javas...	localhost...	3.6 KB	84 ms						
admin.js	GET	200	application/javas...	localhost...	345 B	75 ms						
admin-users-edit.js	GET	200	application/javas...	localhost...	1.1 KB	96 ms						
admin-users-list.js	GET	200	application/javas...	localhost...	1.2 KB	111 ms						
mongolab-resour...	GET	200	application/javas...	localhost...	3.8 KB	75 ms						
admin-users.js	GET	200	application/javas...	localhost...	1.1 KB	122 ms						
uniqueEmail.js	GET	200	application/javas...	localhost...	1.2 KB	131 ms						
validateEquals.js	GET	200	application/javas...	localhost...	1.3 KB	138 ms						
app.js	GET	200	application/javas...	localhost...	3.4 KB	145 ms						
dashboard.js	GET	200	application/javas...	localhost...	1.2 KB	153 ms						
productbacklog.js	GET	200	application/javas...	localhost...	2.5 KB	162 ms						
projects.js	GET	200	application/javas...	localhost...	1.5 KB	171 ms						
sprints.js	GET	200	application/javas...	localhost...	3.2 KB	177 ms						
tasks.js	GET	200	application/javas...	localhost...	2.6 KB	185 ms						
projectsinfo.js	GET	200	application/javas...	localhost...	764 B	192 ms						
application.js	GET	200	application/javas...	localhost...	100...	389 ms						

With Asset-Pipeline


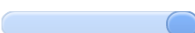




**Assets transpiled, concatenated,
minified, gzipped into one file per type**

```
<link rel="stylesheet" href="/test-app/assets/app-08f92c4662379e3e9a56541af70c871c.css"/>
```

```
<script src="/test-app/assets/app-e1ec7cb3d4c455fac6e62f1faa6232f9.js" type="text/javascript" ></script>
```

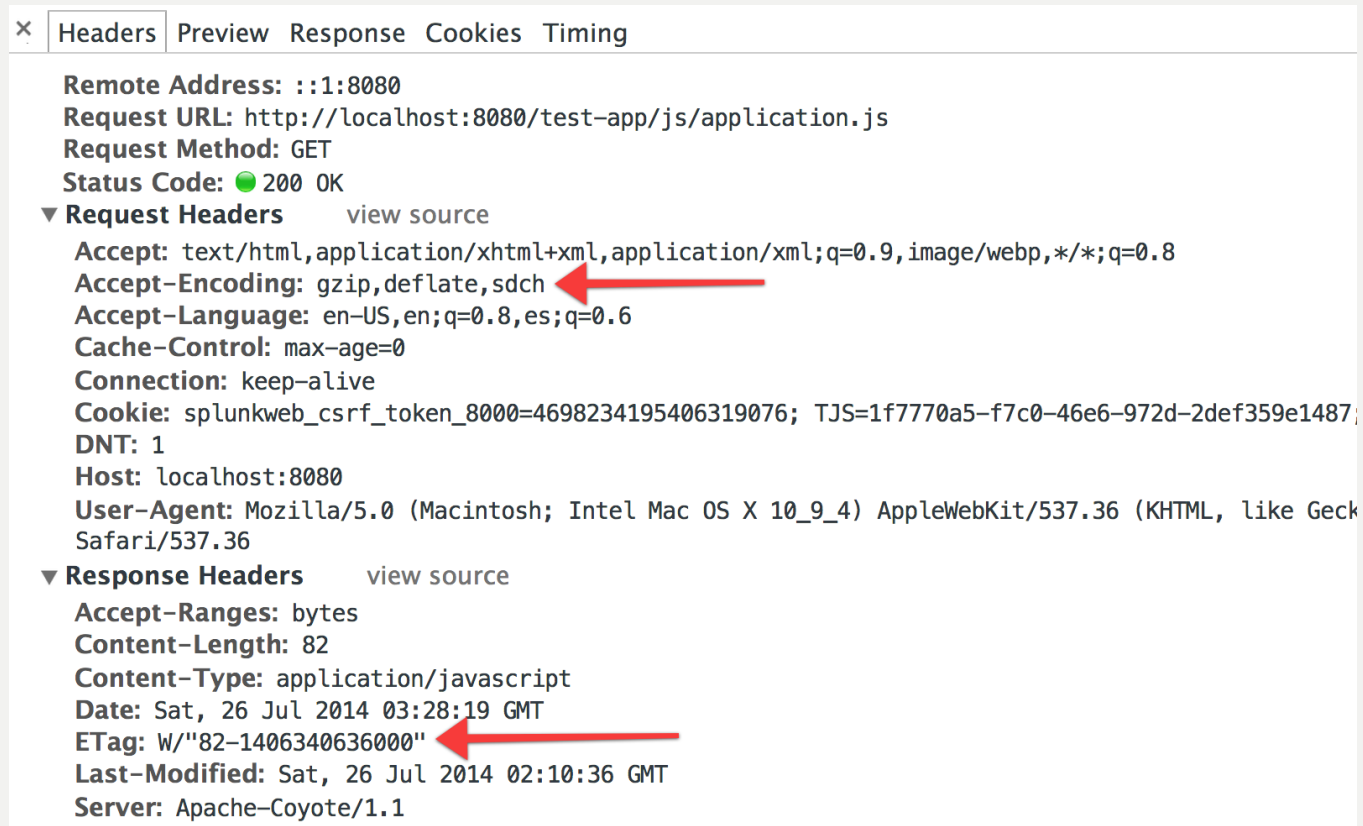
With Asset-Pipeline

One server hit per file type

Name	Method	Status	Type	Init...	Size	Time	Timeline
 test-app/	GET	200	text/html	Other	4.4 KB	663 ms	
 application-08f92c4662379e3e9a56541af70c871c.css	GET	200	text/css	loc...	2.8 KB	65 ms	
 application-e1ec7cb3d4c455fac6e62f1faa6232f9.js	GET	200	application/javascript	loc...	76.0 KB	67 ms	

Without Asset-Pipeline

Browser cache isn't properly used



× Headers Preview Response Cookies Timing

Remote Address: ::1:8080
Request URL: http://localhost:8080/test-app/js/application.js
Request Method: GET
Status Code: 200 OK

▼ Request Headers [view source](#)

- Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
- Accept-Encoding: gzip, deflate, sdch
- Accept-Language: en-US,en;q=0.8,es;q=0.6
- Cache-Control: max-age=0
- Connection: keep-alive
- Cookie: splunkweb_csrf_token_8000=4698234195406319076; TJS=1f7770a5-f7c0-46e6-972d-2def359e1487; DNT: 1
- Host: localhost:8080
- User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_9_4) AppleWebKit/537.36 (KHTML, like Gecko) Safari/537.36

▼ Response Headers [view source](#)

- Accept-Ranges: bytes
- Content-Length: 82
- Content-Type: application/javascript
- Date: Sat, 26 Jul 2014 03:28:19 GMT
- ETag: W/"82-1406340636000"
- Last-Modified: Sat, 26 Jul 2014 02:10:36 GMT
- Server: Apache-Coyote/1.1

With Asset-Pipeline

Initial Request - Good Cache Headers

✕ Headers Preview Response Cookies Timing

Remote Address: ::1:8080

Request URL: http://localhost:8080/test-app/assets/application-e1ec7cb3d4c455fac6e62f1faa6232f9.js

Request Method: GET

Status Code: ● 200 OK

► **Request Headers (10)**

▼ **Response Headers** [view source](#)

Cache-Control: public, max-age=31536000

Content-Encoding: gzip

Content-Type: application/javascript; charset=utf-8

Date: Sat, 26 Jul 2014 03:01:37 GMT

ETag: application-e1ec7cb3d4c455fac6e62f1faa6232f9.js

Server: Apache-Coyote/1.1


Transfer-Encoding: chunked

Vary: Accept-Encoding


With Asset-Pipeline

Next Request - Cache Hit

✕ Headers Preview Response Cookies Timing

Remote Address: ::1:8080
Request URL: http://localhost:8080/test-app/assets/application-e1ec7cb3d4c455fac6e62f1faa6232f9.js
Request Method: GET
Status Code: ● 304 Not Modified 

▼ **Request Headers** [view source](#)

Accept: */*
Accept-Encoding: gzip, deflate, sdch
Accept-Language: en-US, en; q=0.8, es; q=0.6
Cache-Control: max-age=0
Connection: keep-alive
Cookie: splunkweb_csrf_token_8000=4698234195406319076; TJS=1f7770a5-f7c0-46e6-972d-2def359e1487; _ga
DNT: 1
Host: localhost:8080
If-None-Match: application-e1ec7cb3d4c455fac6e62f1faa6232f9.js 
Referer: http://localhost:8080/test-app/
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_9_4) AppleWebKit/537.36 (KHTML, like Gecko) (C

► **Response Headers (2)**

Without Asset-Pipeline

**Limited to browser-supported
languages**

i.e. CSS and JavaScript

With Asset-Pipeline

**Can use anything that transpiles to
browser-supported languages**

ex: SASS, LESS, CoffeeScript, ClojureScript ...

Developing With Asset-Pipeline

Files go in `grails-app/assets`

JavaScript Dependency Manifest

```
//= encoding UTF-8
//= require lib/angular.js
//= require_self
//= require_tree model

(function () {
  'use strict';
  console.log("loaded app.js");
  ...
})();
})();
```

assets/javascripts/app.js

CSS Dependency Manifest

```
/*  
*= encoding UTF-8  
*= require fonts  
*= require bootstrap  
*= require_self  
*/  
  
input.ng-invalid.ng-dirty:not(:focus) {  
  border-color: #d43232;  
  background-color: #f2dede;  
}  
...
```

assets/stylesheets/app.css

Use Taglibs in Layout GSP

```
<head>
  <title><g:layoutTitle default="Some Title" /></title>
  ...
  <asset:link rel="shortcut icon" href="favicon.ico" type="image/x-icon"/>
  <asset:stylesheet href="app.css"/>
  <g:layoutHead />
</head>
<body>
  <asset:image src="logo.png" width="200" height="200"/>
  ...
  <g:layoutBody />
  ...
  <asset:javascript src="app.js"/>
  <asset:deferredScripts/>
</body>
```

`grails-app/views/layouts/main.gsp`

Defer JavaScript Snippets in Views

```
<div>
  <h1>foobar</h1>

  <asset:script type="text/javascript">
    console.log("on foobar page");
  </asset:script>
</div>
```

`grails-app/views/user/index.gsp`

emitted at bottom of layout at `<asset:deferredScripts/>`

Dev Mode is Tuned for Quick Iteration

```
grails run-app
```

All Files Served With Real Names

```
// from: <asset:stylesheet href="app.css"/>
```

```
<link rel="stylesheet" href="/myapp/assets/fonts.css" />
```

```
<link rel="stylesheet" href="/myapp/assets/bootstrap.css" />
```

```
<link rel="stylesheet" href="/myapp/assets/app.css" />
```

```
// from: <asset:javascript src="app.js"/>
```

```
<script src="/myapp/assets/lib/angular.js" type="text/javascript" ></script>
```

```
<script src="/myapp/assets/app.js" type="text/javascript" ></script>
```

```
<script src="/myapp/assets/model/Foo.js" type="text/javascript" ></script>
```

```
<script src="/myapp/assets/model/Bar.js" type="text/javascript" ></script>
```

In Development Files Will Not Cache ²⁸

```
// HTTP 1.1  
Cache-Control:no-cache, no-store, must-revalidate  
  
// HTTP 1.0  
Pragma:no-cache  
  
// for proxies  
Expires:Thu, 01 Jan 1970 00:00:00 GMT
```

Response Cache Headers

War File Serves Processed Assets

```
grails war or grails run-war
```

War Compilation Puts All Assets Through the Full Pipeline

adds `assetClean` and `assetCompile` events

War File has **assets** Folder

```
...
assets/logo-7b9776076d5fceedf4993b55c9383dedd.jpg
assets/logo.jpg
...
assets/app-2b367068131a9dd4f31c18f635eb7e6c.css
assets/app-2b367068131a9dd4f31c18f635eb7e6c.css.gz
assets/app.css
assets/app.css.gz
...
assets/app-4bf9739e18a6d5f665c42ecb7edbd339.js
assets/app-4bf9739e18a6d5f665c42ecb7edbd339.js.gz
assets/app.js
assets/app.js.gz
...
assets/manifest.properties
...
```

Creates `manifest.properties` File³² With ETag Mapping For Each Asset

```
...  
logo.jpg=logo-7b9776076d5fceef4993b55c9383dedd.jpg  
...  
app.css=app-2b367068131a9dd4f31c18f635eb7e6c.css  
bootstrap.css=bootstrap-2b367068131a9dd4f31c18f635eb7e6c.css  
fonts.css=fonts-81f3e38a6e878acd57e3d51912c37b04.css  
...  
lib/angular.js=lib/angular-de39960f9b36bbbd76e76e7ed0086922.js  
app.js=app-4bf9739e18a6d5f665c42ecb7edbd339.js  
...
```


AssetPipelineFilter Processes
/assets/* Requests

looks for file in `/assets`
if found returns (gzipped?) file
with ETag from manifest

Optionally use CDN or Nginx

```
grails.assets.url = "https://cdn.example.com/"

// or

grails.assets.url = { request ->
    if(request.isSecure()) {
        return "https://cdn.example.com/"
    } else {
        return "http://cdn.example.com/"
    }
}
```

(in `Config.groovy`)

automate uploading with the `cdn-asset-pipeline` plugin

Writing Your Own³⁶

Asset-Pipeline Plugin

Implement/Override an AssetFile

37

```
package asset.pipeline

import asset.pipeline.AbstractAssetFile

class MyAssetFile extends AbstractAssetFile { // implements AssetFile

    static final String contentType = 'application/javascript'
    static extensions = ['js-myfile'] // MUST BE UNIQUE ACROSS ALL `AssetFile`s
    static final String compiledExtension = 'js'
    static processors = [MyFileProcessor]

    String directiveForLine(String line) {
        // identifies the directive in manifest lines at top of file
        // i.e. those starting with '//='
        line.find(/\/\//=(.*)/) { fullMatch, directive -> directive }
    }
}
```

Create 1..N Processors

```
package asset.pipeline

class MyFileProcessor implements Processor {

  MyFileProcessor(AssetCompiler compiler) {
    // compiler gives us access to the options/rules/paths
    // that asset-pipeline is running with
    super(compiler)
  }

  // inputText - a String holding the contents of the asset
  // assetFile - an AssetFile instance, has `file` and `baseFile` props
  // expected to return - a String holding the processed asset text
  def process(inputText, assetFile) {
    // ex processor to turn the asset into all UPPER CASE
    return inputText.toUpperCase()
  }
}
```

Configure Asset-Pipeline

```
// MyAssetPipelineGrailsPlugin.groovy
import asset.pipeline.AssetHelper
import asset.pipeline.MyAssetFile

class MyAssetPipelineGrailsPlugin {
    // ...

    def doWithDynamicMethods = { ctx ->
        AssetHelper.assetSpecs << MyAssetFile
    }
}
```

```
// scripts/_Events.groovy
eventAssetPrecompileStart = { assetConfig ->
    assetConfig.specs << 'asset.pipeline.MyAssetFile'
}
```

Asset-Pipeline

AngularJS Tips

AngularJS - Minification Breaks Magic⁴¹

```
// AngularJS magic injects $window using arg name
// MINIFICATION UNSAFE
myApp.controller('MyCtrl', function($window) {
    $window.alert("Hello World");
});

// SAFE for minification
myApp.controller('MyCtrl', ['$window', function($window) {
    $window.alert("Hello World");
}]);
```

Either turn variable mangling off in `Config.groovy` or
use Craig Burke's `angular-annotate-asset-pipeline` plugin

angular-template-asset-pipeline

```
// original: /grails-app/assets/templates/my-app/app-section/index.tpl.htm  
// <h1>Hello World!</h1>  
  
angular.module('myApp.appSection')  
  .run(['$templateCache', function($templateCache) {  
    $templateCache.put('index.htm', '<h1>Hello World!</h1>');  
  }]);
```

Compile HTML templates Into `$templateCache`

Advantages Over the Resources Plugin

**Allows the use
of a CDN**

**No Waiting to
Recompile in
Development**

Precompilation Allows Faster War Startup

Dependencies Are Inside Assets

Actively Developed

Migrating from Resources Plugin

Resources

layout: `<r:require modules="app"/>`

Asset-Pipeline

layout: `<asset:stylesheet href="app.css"/>`

bottom of layout `<body>`: `<asset:javascript src="app.js"/>`

Resources

```
<r:external uri="/img/favicon.ico"/>
```

Asset-Pipeline

```
<asset:link rel="shortcut icon" href="favicon.ico"  
type="image/x-icon"/>
```

Resources

```
<g:img dir="img" file="logo.jpg" alt="The Logo" />
```

Asset-Pipeline

```
<asset:image src="logo.png" alt="The Logo"/>
```

Resources

gsp: `<r:script disposition="defer">alert('foo');</r:script>`

layout: `<r:layoutResources/>`

Asset-Pipeline

gsp: `<asset:script>alert('foo');</asset:script>`

layout: `<asset:deferredScripts/>`

Resources

in gsp: `href="${resource(dir: 'css', file: 'errors.css')}}"`

Asset-Pipeline

in gsp: `href="${asset.assetPath(src: 'errors.css')}}"`

Asset-Pipeline

Alternatives

gradle

not part of grails build without more work,
doesn't solve caching/etags

grunt/gulp

requires buy-in/support of node.js
ecosystem, doesn't solve caching/etags

resources plugin

deprecated, more painful to work with

Questions?