Drupal 8 Kickstart

An Overview for Developers

Intro

Peter Sawczynec

Senior Customer Success Engineer

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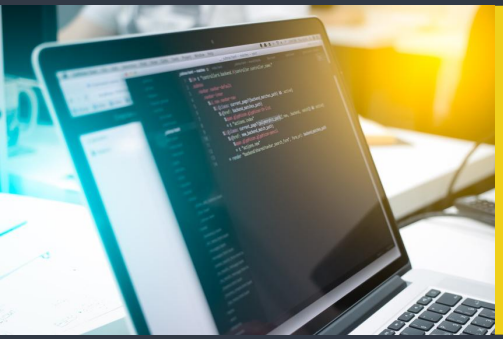
pantheon.io

peter@pantheon.io

drupal.org/u/**xpsusa**

@sawczynec

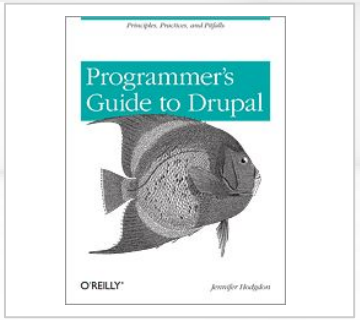


D8 Reading

D8 Reading

Drupal 8 API Reference

(https://api.drupal.org/api/drupal/8.2.x)

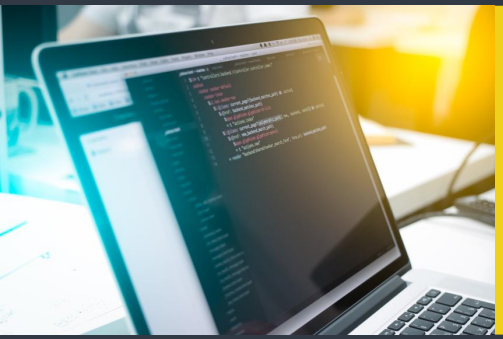


Programmer's Guide to Drupal

(2nd Edition)

Online Documentation

Check the publication date to judge the timeliness and accuracy of online D8 documentation. Most D8 online documentation older than December 2015 is very unlikely to be fully accurate



D8 Ecosystem

D8 Ecosystem

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Symfony PHP OOP PHP 7 Drush Git GitHub

Markdown Composer Homebrew **Linux shell** zshell SSH

PHPUnit Behat Gherkin jMeter Graphite New Relic

MySQL MySQL Workbench **Drupal 8** JSON jQuery AJAX Regex

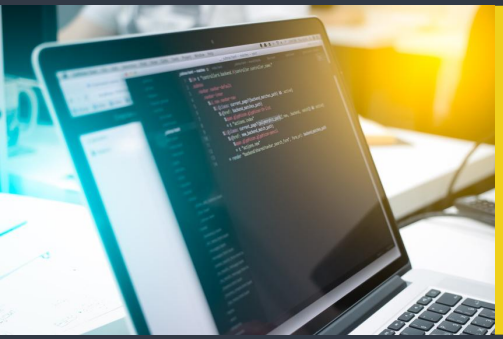
AngularJS Node.js Guzzle Gulp Twig Compass SASS SMACSS

CloudFlare Memcache Varnish Redis Akamai Fastly **SendGrid**

Agile Jira Travis CI CircleCI Jenkins Chef Splunk **HHVM** Apache Nginx

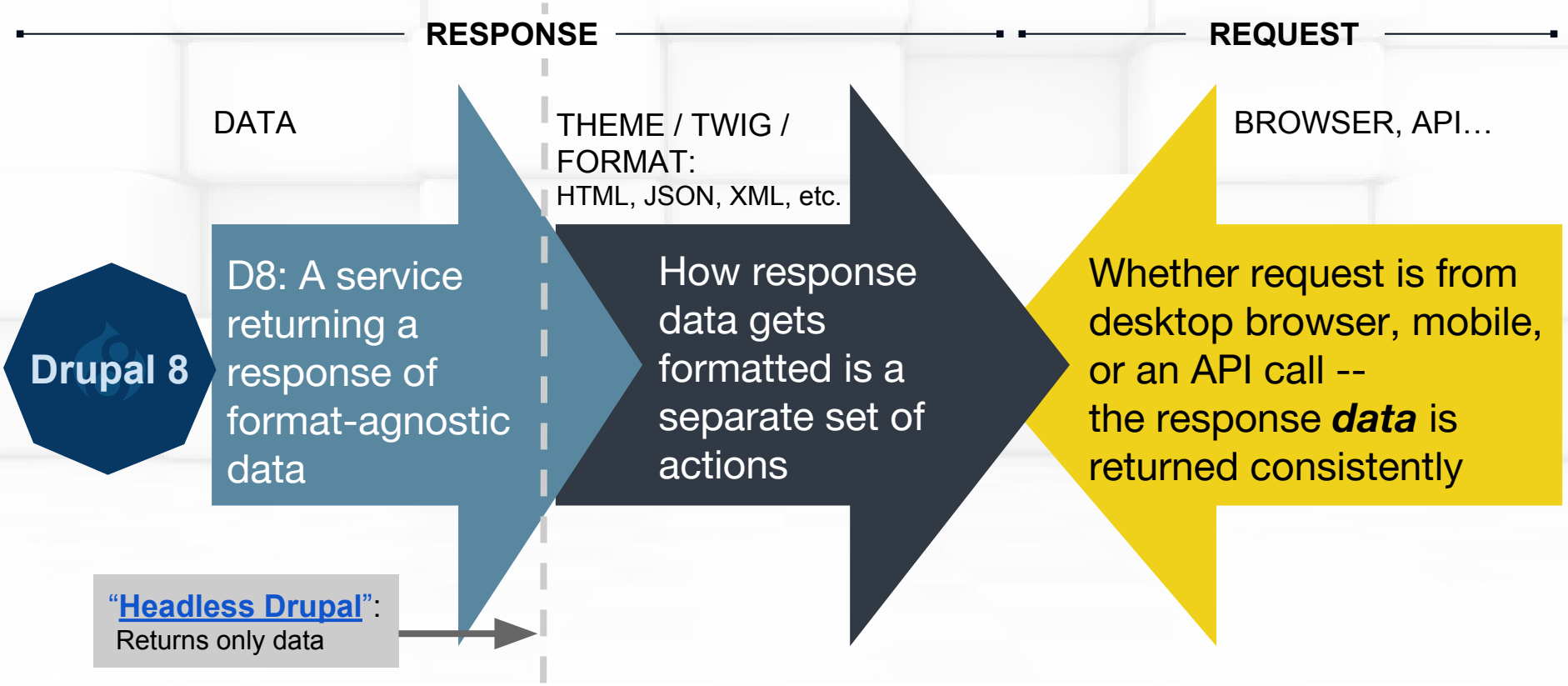
Pantheon Acquia

phpStorm Sublime NetBeans



D8 Overview

D8 Overview


RESPONSE
REQUEST
DATA
THEME / TWIG / FORMAT:
HTML, JSON, XML, etc.
BROWSER, API…
Drupal 8
D8: A service returning a response of format-agnostic data
How response data gets formatted is a separate set of actions
Whether request is from desktop browser, mobile, or an API call -- the response ***data*** is returned consistently
"Headless Drupal": Returns only data

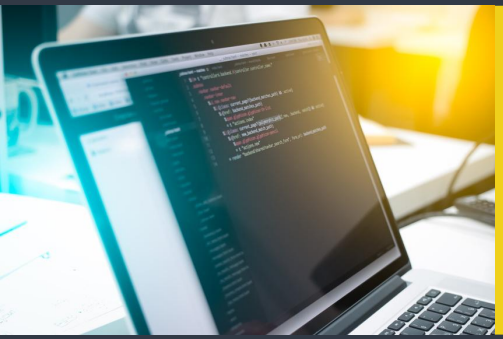
D8 Overview

Leverage existing industry-standard technologies so that D8 can interface with and be programmed like other globally-recognized PHP frameworks using PHP OOP concepts

To achieve this end D8 is built on top of the Symfony framework components

D8 / Symfony: Special Note

D8 will upgrade to Symfony 3.0 in a minor release and drop Symfony 2.x backwards compatibility



D8 Essentials

D8 Essentials

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Composer

Drush

Drupal Console

Git/GitHub

YAML

PHP OOP

Comments / Annotations

Testing

D8 and Composer

Composer is a dependency manager. Helps you declare, manage and install dependencies of PHP projects, ensuring you have the right stack everywhere

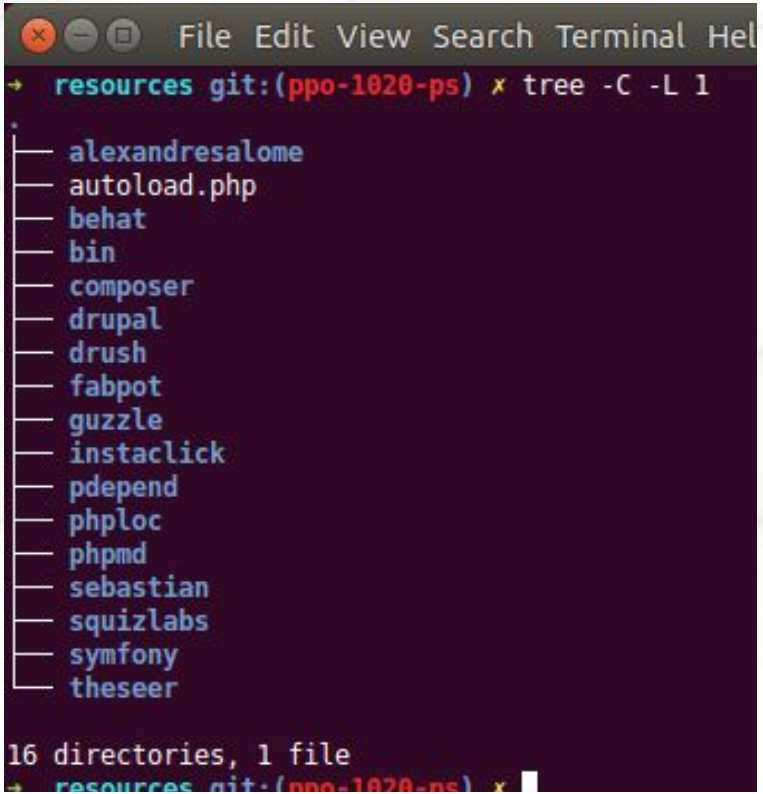
Composer uses .json files to keep track of the versions of php libraries and other software that you might employ in your website.

You can use Composer to install and manage D8

D8 and Composer

Any D8 website can have a large resources directory. You can use Composer to download and keep current all that software with basically two commands:

composer -install
composer -update



D8 and Composer Manager

Composer Manager Module allows contributed modules and your own custom modules to manage the inclusion of PHP and other supporting libraries via Composer.

Info Documentation

Drush

Drush is a command line tool for managing Drupal that provides numerous shortcut commands

- Drush executes Drupal admin tasks 3 - 10x faster than using the admin pages
- You can install Drush with Composer, Git or using curl

Drupal Console

Drupal Console is an app that you can use to quickly make the scaffold of a new D8 module or a D8 service or a block plugin (and more) within that module. **Drupal Console also helps w/ D8 debugging and admin tasks.**

Links: Drupal Console on Github
Install Drupal Console
Drupal Console Docs
Available Commands

Version control resources:

Git

GitHub

Bitbucket

Attend: “Next Level Git” session at DCNOLA 2016

D8 and YAML Files

YAML (*.yml files): A simple, clean format (similar to JSON) for storing structured data that is easier to read/write than XML

YAML is a recursive acronym for:
"YAML Ain't Markup Language"

All Drupal 8 configuration is created using YAML and during installation pulled from *.yml files

D8 and YAML Files

YAML is case sensitive

YAML structure is created by using indenting with spaces. YAML does not allow the use of tabs

Use 2 spaces for YAML indenting in Drupal

Schema Files (*.schema.yml files)

Schema files define the expected structure and allowed elements of YAML files (like DTD for XML)

D8 and YAML Files

```yaml
parameters:
  session.storage.options: {}
  twig.config: {}
  renderer.config:
    required_cache_contexts: ['languages:language_interface', 'theme']
  factory.keyvalue:
    default: keyvalue.database
  factory.keyvalue.expirable:
    default: keyvalue.expirable.database
services:
  # Simple cache contexts, directly derived from the request context.
  cache_context.ip:
    class: Drupal\Core\Cache\Context\IpCacheContext
    arguments: ['@request_stack']
    tags:
      - { name: cache.context }
  cache_context.headers:
    class: Drupal\Core\Cache\Context\HeadersCacheContext
    arguments: ['@request_stack']
    tags:
      - { name: cache.context }
  cache_context.cookies:
    class: Drupal\Core\Cache\Context\CookiesCacheContext
    arguments: ['@request_stack']
    tags:
      - { name: cache.context }
  cache_context.request_format:
    class: Drupal\Core\Cache\Context\RequestFormatCacheContext
    arguments: ['@request_stack']
    tags:
      - { name: cache.context }
  cache_context.url:
    class: Drupal\Core\Cache\Context\UrlCacheContext
```

Sample YAML file

core-services.yml

Class

A set of methods and properties ***organized in a file*** that offer a service

Controllers, **Routers**, **Forms,** and **Plugins** are all major types of classes in **D8.**

In general all functionality created for **D8**, including in your custom modules, is expected to be created in class files

Interface

A class with empty default methods that all other classes based on it must offer

Every single method declared in an Interface will have to be implemented in the subclass. A class can implement multiple Interfaces

```
class MyClass implements ParentInterface
```

```
class MyClass implements SomeInterface, OtherInterface
```

Abstract Class

A class with default abstract methods that classes based on it must offer. Only Abstract methods have to be implemented by the subclass. A class can only implement one abstract class at a time.

```
class MyClass extends ParentClass
class MyClass extends ParentClass implements SomeInterface, OtherInterface
```

Trait

A set of php functions in one file that supply a useful set of related functions

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PHP OOP Reading

phpfreaks

java2s

Attend: “OOP…” session at DCNOLA 2016

Dependency Injection

Instantiating a class, but telling the class what you want it to use to work.

See: What is Dependency Injection?
fabpot *(Fabien Potencier, creator of Symfony)*

Services

Something a class offers, e.g. “map this node’s location by address, returns latitude and longitude”

Plugins

In **D8** plugins are used, for example, to make Blocks, in that your Block and what describes it, builds it, and controls access to the Block is found in a special kind of class called a plugin

D8 and Code Comments

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Comments and special comments called Annotations are very important in **D8**

Properly formatted comments are used by D8 to create documentation, identify tests, and in some cases for D8 to make discovery of services and other plugin functionality

Links: Drupal Comments Annotations in Drupal

Method Chaining

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Method Chaining (used in jQuery, PHP, Drupal)

Allows us to run a series of methods, one after the other (or in a chain), because each method in the chain after it executes returns a full object with the the changes applied to it

jQuery Method Chaining example:

```
$("#edit-button").css("color","red").slideUp(2000).slideDown(2000);
```

Method Chaining (multiline)

jQuery method chaining (multiline):

```
$("#p1").css("color","red")
  .slideUp(2000)
  .slideDown(2000);
```

D8 Example (multiline):

```
db_update('example')
      ->condition('id', $id)
      ->fields(array('field2' => 10))
      ->execute();
```

Above using the Database Abstraction Layer where db_update returns an UpdateQuery object

Short Array Syntax

As of PHP 5.4 and in use throughout D8. The short array syntax replaces **array( )** with **[ ]**.

```
// Example: Array Language Construct, Constructor function
$build = array();
$build = array(0 => 'value0');

// Same Example: Short Array Syntax (requires PHP 5.4)
$build = [];
$build = [0 => 'value0'];
$build = ['value0', 'value1', 'key2' => ['value2', 'value3']];
```

Type Hinting

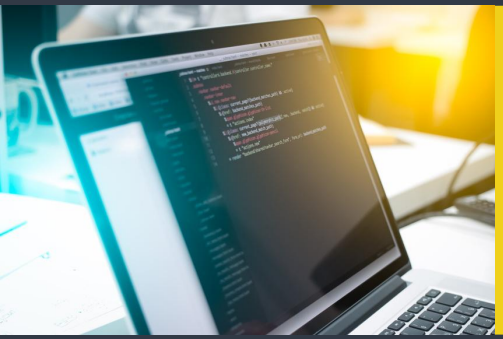
Use **type hinting** to specify the expected data type of an argument in a function declaration.

When the function is called, PHP checks that the arguments are of the specified type hint. If not, the run-time will raise an error and execution will be halted.

```
function tracking_inject_page_attachments(array &$page) {
        $tracking = new TrackingInject();
        $tracking_header_items = $tracking->getTrackingInjectCollections();
        $tracking_header = $tracking_header_items['html_head'];
        // Add each header tracking element into page HEAD area.
        if (!empty($tracking_header)) {
          foreach ($tracking_header as $tracking_header_item) {
            ....
          }
}
```

```
public function onResponse(FilterResponseEvent $event) {
        $response = $event->getResponse();
        if ($response instanceOf RedirectResponse && !devel_silent()) {
          ....
        }
}
```

Type hints



D8

Install Drupal 8

[*Create your database*]

mkdir <new site name>

cd <new site name>

git clone http://git.drupal.org/project/drupal.git

git tag

git checkout -b tags/<tagname> <tagname>

[*Perform Apache config updates, e.g. virtual directory*]

[*Start the Drupal 8 install. Pauses for settings updates*]

cd sites/default

mkdir files

chmod 777 files

mv default.services.yml services.yml

cp default.settings.php settings.php

chmod 777 services.yml

chmod 777 settings.php

[*Continue and complete Drupal 8 install*]

chmod 655 services.yml

chmod 655 settings.php

cd ../../

composer install

Setup Drupal 8 for Debugging

[After D8 install, make these additional updates to setup for local verbose debugging]

cd docroot/sites

chmod 777 default

cp example.settings.local.php default/settings.local.php

chmod 777 default/settings.php

edit settings.php, uncomment the line:
include settings.local.php

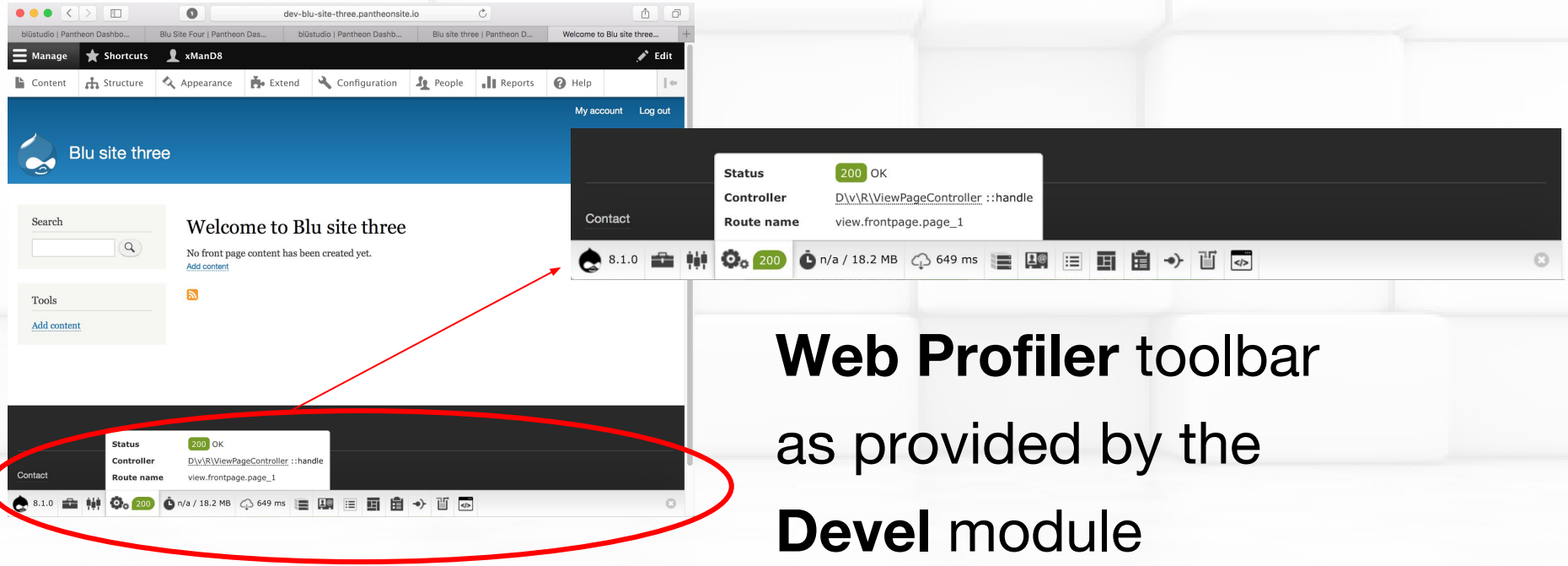
[Supplied settings.local file contains preset verbose settings]

chmod 644 default/settings.php

[Download/enable Devel module]

drush en devel -y

Setup Drupal 8 for Debugging



Web Profiler toolbar as provided by the **Devel** module

D8 Top-level Directory Structure

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- **/core** Core modules and files provided by **D8**
- **/libraries** Create this dir yourself when needed for common 3rd party libraries, e.g. a wysiwyg editor
- **/modules** Contrib and custom modules using sub-dirs **contrib** and **custom** (used to be sites/all/modules)
- **/profiles** Contrib and custom profiles
- **/sites** Site specific modules, themes and files. Including files uploaded by users, such as images.
  The site's YAML configuration files, **active** and **staged**
- **/themes** Contrib themes, custom themes and subthemes
- **/vendor** External 3rd party libraries and projects, e.g. phpUnit, Behat

D8 Core Directory Structure

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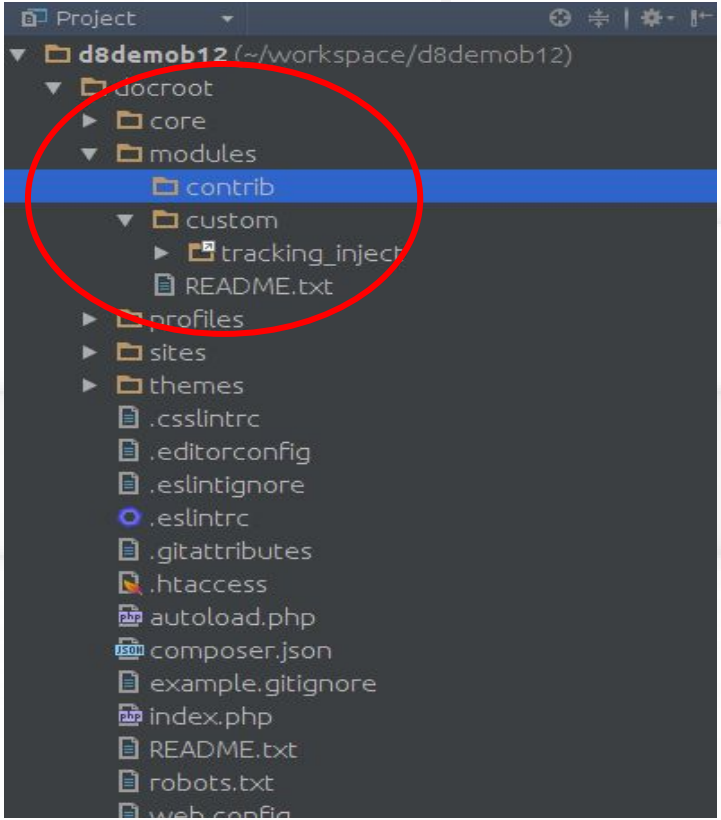
Inside D8's /core directory:

/core/assets	Various external libraries used by Core. jQuery, underscore, modernizer etc
/core/config	Configuration YAML files
/core/includes	Functionality that is to low level to be modular. Such as the module system itself
/core/lib	Drupal Core classes
/core/misc	Frontend libraries that Drupal Core depends on. (jQuery, modernizer, etc)
/core/modules	Drupal Core modules
/core/profiles	Drupal Core profiles. Empty at the time of writing
/core/scripts	Various CLI scripts, mostly used by developers
/core/tests	Drupal Core tests
/core/themes	Drupal Core themes
/core/vendor	Backend libraries that Drupal Core depends on. (Symfony, Twig, etc)

http://drupal.stackexchange.com/questions/84811/what-are-all-the-directories-for-in-the-new-drupal-8-structure

D8 Custom Module Directory Location

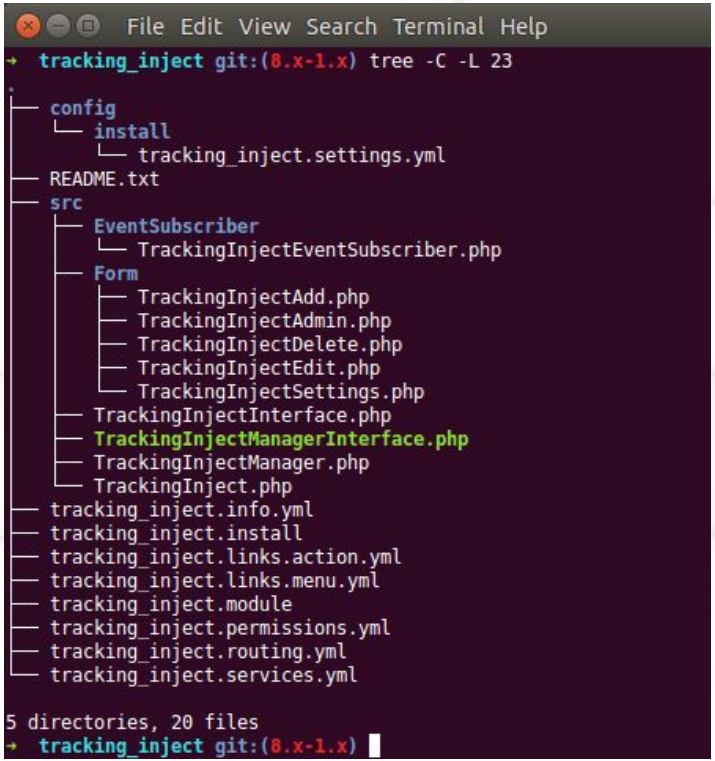


Inside D8's /modules dir:

Your global contrib modules reside in: **/modules/contrib**

Your global custom modules reside in: **/modules/custom**

D8 Module Structure



Typical D8 module structure

D8 YAML (*.yml) Files

Replaces .info files and used for Configuration, Routes, Menu Links, and Services

Pronounced: “YA-MUL”. Short for: “YAML Ain’t Markup Language”

D8	D7
<module_name>.info.yml <-->	<module_name>.info file
<module_name>.routing.yml <-->	hook_menu for page paths
<module_name>.links.menu.yml <-->	hook_menu for entries on admin menu
<module_name>.permissions.yml <-->	hook_permissions
<module_name>.services.yml <-->	Describes a class: machine name, class path, mandatory arguments

Sample Module Services .yml File

```
services:
  tracking_inject.manager:
    class: Drupal\tracking_inject\TrackingInjectManager
    arguments: ['@database']
    tags:
      - { name: backend_overridable }
  tracking_inject.response_event:
    class: Drupal\tracking_inject\EventSubscriber\TrackingInjectEventSubscriber
    tags:
      - { name: event_subscriber }
  tracking_inject.injections:
    class: Drupal\tracking_inject\TrackingInject
    arguments: ['@config.factory']
```

Top-level “services” key

Service machine name

Class that creates this functionality

Dependency injection: A service or object that should get passed into the __construct method of this service

1. Bootstrap configuration
   - Read the settings.php file, generate other settings dynamically, and store all in global variables and the Drupal\Component\Utility\Settings singleton object
   - Start the **class loader**, takes care of loading classes
   - Set the Drupal error handle
   - Detect if Drupal is actually installed. If it is not, redirect to the installer script

D8 Bootstrap

2. Create the Drupal kernel
3. Initialize the service container
   (either from cache or from rebuild)
4. Add the container to the Drupal static class
5. Attempt to serve page from static page cache
6. Load all variables
7. Load other necessary include files

8. Register stream wrappers
   (public://, private://, temp:// and custom wrappers)
9. Create the HTTP Request object
   (using the Symfony HttpFoundation component)
10. Let DrupalKernel handle it and return response
11. Send response
12. Terminate request
    (modules can act upon this event)

D8 Hooks to Events

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D8 Hooks

Request Event Example

D8 Events

D8 uses Symfony kernel and events. Kernel events available in **D8** are as follows:

KernelEvents::CONTROLLER

CONTROLLER event occurs once a controller was found for handling a request

KernelEvents::EXCEPTION

EXCEPTION event occurs when an uncaught exception appears

KernelEvents::FINISH_REQUEST

FINISH_REQUEST event occurs when a response was generated for a request

D8 Events

KernelEvents::REQUEST

REQUEST event occurs at the very beginning of request dispatching

KernelEvents::RESPONSE

RESPONSE event occurs once a response was created for replying to a request

KernelEvents::TERMINATE

TERMINATE event occurs once a response was sent

KernelEvents::VIEW

VIEW event occurs when the return value of a controller is not a Response instance

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D8 EventSubscriber class file sample

```php
<?php

/**
 * @file
 * Contains \Drupal\tracking_inject\EventSubscriber\TrackingInjectEventSubscriber.
 */

namespace Drupal\tracking_inject\EventSubscriber;

use Symfony\Component\HttpFoundation\RedirectResponse;
use Symfony\Component\HttpKernel\KernelEvents;
use Symfony\Component\HttpKernel\Event\GetResponseEvent;
use Symfony\Component\EventDispatcher\EventSubscriberInterface;

class TrackingInjectEventSubscriber implements EventSubscriberInterface {

  /**
   * {@inheritdoc}
   */
  static public function getSubscribedEvents() {
    $events[KernelEvents::REQUEST][] = array('initiateTracking');
    return $events;
  }

  /**
   * Stub function.
   */
  public function initiateTracking(GetResponseEvent $event) {
    // Redirect example:
    // print "<br /> init event subscriber tracking REQUEST event<br />";
    // if ($event->getRequest()->query->get('redirect-me')) {
    // $event->setResponse(new RedirectResponse('http://example.com/'));
    // }
  }

}
```

Services in D8

Core functionality in **D8** such as current user info, current path, node info, is logged in, module exists… these are all called services

Core services in **D8** are declared in:

/core/core.services.yml

Services can be accessed throughout **D8** via the global Drupal namespace \Drupal

Services in D8

Examples of using **D8** core services:

```
\Drupal::moduleHandler()->moduleExists('content_translation');

$account = \Drupal::currentUser();

$config = \Drupal::config('some_module.settings');
```

Services in D8

Examples of using **D8** core services:

```
$id = $config->get('domain_id');

$request = \Drupal::request();

$exception = $request->attributes->get('exception');

$status = $exception->getStatusCode();
```

D8: variable_get, variable_set

Replaced by using a **D8** core service…

(also understand states, settings and overrides)

Config is the global **D8** configuration object and holds the changeable site or module configurations, e.g.:

```
\Drupal::config('system.site') ->get('page.front');
```

D8: variable_get, variable_set

Getting a variable:

```
\Drupal::config(‘module_name.settings’)->get(‘var_name’);
\Drupal::config('system.site') ->get('page.front');
```

Setting a variable:

```
\Drupal:: configFactory()->getEditable('module_name.settings')
      ->set(‘var_name’, ‘some_value’)->save;
```

Unsetting a variable value:

```
$config = \Drupal::config('system.performance');
$config->clear('cache.page.max_age')->save();
```

D8: Config vs Settings

Settings is the global D8 settings object and holds site settings like the database settings that are in settings.php.

A get settings example:

```
use\Drupal\Core\Site\Settings
$theme = Settings::get()->('maintenance_theme', ‘bartik’);
```

A set settings in settings.php example:

```
$settings['maintenance_theme'] = ‘my_custom_theme’;
```

D8 Caching has two main concepts:

Caching and **Cache Invalidation**

"***Caching*** is easy: it's merely storing the result of an expensive computation, to save time the next time you need it. ***Cache invalidation*** is hard: if you fail to invalidate all the things that should be invalidated, you end up with incorrect results. If you invalidate *too many* things, your cache hit ratio is going to suffer, and you'd be inefficiently using your caches. Invalidating *only the affected things* is very hard."
wim leers

D8: Caching

Key concepts:

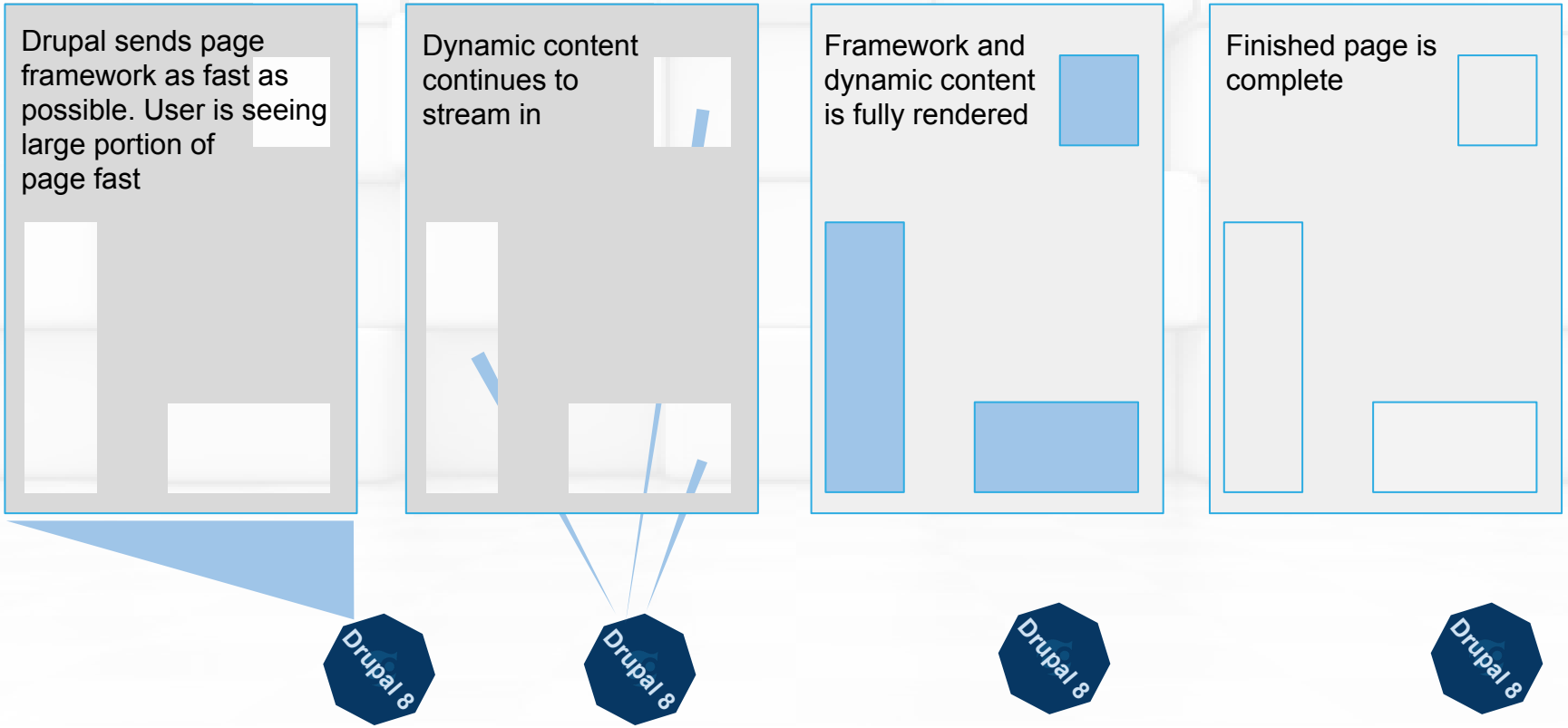
BigPipe
SmartCache
Dynamic Page Caching
Cache Keys
Cache Contexts
Cache Tags
Max-Age

References:

D8 Block Cache
Exploring the Cache API in D8
Caching in D8
Cacheability of Render Arrays
Cache Contexts

Attend: “BigPipe” session at DCNOLA 2016

D8: BigPipe


Drupal sends page framework as fast as possible. User is seeing large portion of page fast
Dynamic content continues to stream in
Framework and dynamic content is fully rendered
Finished page is complete
Drupal 8
Drupal 8
Drupal 8
Drupal 8

D8: Caching Thought Process

1. Render Array Caching. I'm rendering something. That means think of cacheability.
   My Render Array Caching
2. Is this something that's expensive to render, and therefore is worth caching? If the answer is "yes", then what identifies this particular representation of the thing I'm rendering? Those are the **cache keys**.
   My Render Array Caching Invalidation (Cacheablility Metadata)
3. Does the representation of the thing I'm rendering vary per combination of permissions, per URL, per interface language, per … something? Those are the **cache contexts**. *Note: cache contexts are completely analogous to HTTP's Vary header.*
4. What causes the representation of the thing I'm rendering to become outdated? I.e. which things does it depend upon, so that when those things change, so should my representation? Those are the **cache tags**.
5. When does the representation of the thing I'm rendering become outdated? I.e. is the data valid for a limited period of time only? That is the **max-age** (maximum age). It defaults to "permanently (forever) cacheable" (Cache::PERMANENT). When the representation is only valid for a limited time, set a max-age, expressed in seconds. Zero means that it's not cacheable at all.

Cache contexts, tags and max-age **must always be set**, because they affect the cacheability of the entire response.
Therefore they "bubble": parents automatically receive them.
Cache keys must only be set if the render array should be cached.

Excerpted from Drupal.org: Cacheability of Render Arrays

Cache Contexts

cookies
  :name
headers
  :name
ip
languages
  :type
request_format
route
  .book_navigation
  .menu_active_trails
        :menu_name
  .name
session
theme
timezone
url
  .host
  .query_args
        :key
        .pagers
        :pager_id
  .site
user
  .is_super_user
  .node_grants
        :operation
  .permissions
  .roles
        :role

Cache max-age

What max-age allows you to do:

When **$build['#cache']['max-age']** is not set:

permanent cacheability (Cache::PERMANENT) is assumed.

To indicate that a render array is not cacheable at all, set: **$build['#cache']['max-age'] = 0** (i.e. zero seconds).

And to indicate that a render array is cacheable only for a limited amount of time, e.g. 5 minutes, set:

$build['#cache']['max-age'] = 300; // set in seconds, i.e. 300 / 60 = 5 min.

D8: Render Array w/ Caching

```
function my_module_build_array( ) {
$build = [
            '#prefix' => '<aside>',
            '#markup' => t('Hi, %name, welcome back to @site!', [
               ' % name' => $current_user->getUsername( ),
               '@site' => $config->get('name'),
            ]),
            '#suffix' => '</aside>',
            '#theme' => 'my_module_build_arry_theme',
            '#cache' => [
                'contexts' => ['user', 'url.query_args:quantity'],
                'keys' => ['my_module_build_render', 'cache', 'demo'],
                'tags' => ['node:42:en, config.system.performance],
                'max-age' => 300,
            ],
            '#pre-render' => 'my_module_build_pre_render',
            '#attached' => [
               'library' => 'core / jquery',
               'drupalSettings' => ['foo' => 'bar'],
            ],
          ];
}
```

Render Array Reference

Cache will differ based on these variations in context

Terms that identify what this cache is about

Cache expires if any of these other things tagged here change

Cache expires after a specified time

D8: Basic Twig

Basic Variables

```
{{ title }}
```

Conditional Logic

```
{% if title %}
  <h3>{{ title }}</h3>
{% endif %}
```

Filters

```
{{ ponies|safe_join(", ")|lower }}
```

Attributes

Attributes is an object available to every twig template. Its job is to store all the relevant attributes of the parent container and give the themer helpful methods to interact with that data.

There should not be any space between the tag name and the twig syntax. See red text in below:

```
<div{{ attributes }}></div>

{%
  set classes = [
          'red',
          'green',
  ]
%}
<div{{ attributes.addClass(classes) }}>
  {% if options.alignment == 'horizontal' %}
    {% for row in items %}
      <div{{ row.attributes.addClass(row_classes, options.
row_class_default ? 'row-' ~ loop.index) }}>
    {% endfor %}
     </div>
  {% endif %}
```

Routing System in D8

A route is a path which is defined for Drupal to return some sort of content on.

For example, the default front page, '/node' is a route. When Drupal receives a request, it tries to match the requested path to a route it knows about. If the route is found, then the route's definition is used to return content. Otherwise, Drupal returns a 404.

Drupal's routing system works with the Symfony HTTP Kernel.

The routing system is responsible for matching paths to controllers, and you define those relations in routes. You can pass on additional information to your controllers in the route. Access checking is integrated as well.

D8 Routes and Controllers

An example.routing.yml file:

```
example.content:
  path: '/example'
  defaults:
      _controller: '\Drupal\example\Controller\ExampleController::content'
      _title: 'Example Route Response '
  requirements:
      _permission: 'access content'
```

Route machine name (module_name.routename)

Path of this route

Class::method
The class and the method in that class that handles (or responds) to this route (path request)

Page title

Permissions

D8 Blocks Plugin

PANTHEON®

Block plugin creation overview.

D8 is looking for block content to be returned as render arrays.

D8 Configuration Management Initiative

Configuration Management Initiative (CMI): Saving D8 global and module settings into and reading settings from *.yml files and also uses special D8 CMI tables in the database. Links:

- Configuration Management Initiative
- Principles of Configuration Management - Pt 1
- Principles of Configuration Management - Pt 2
- D8 CMI critical analysis

Drupal Configuration Inspector

A module that exposes the configuration settings in use throughout your site using nice visual organization.
Links:

Configuration Inspector Module

D7 to D8 Using Module Upgrader

Module Upgrader is a D8 module that can analyze your Drupal 7 module for needed changes and/or attempt the actual upgrade to D8. Links:

- About Module Upgrader
- Download D8 ‘Module Upgrader’ Module

Testing

SimpleTest and PHPUnit are as of this time the de facto testing tools for D8

PHPUnit for testing discrete functionality like classes and backend functionality
See: Drupal's Implementation of PHPUnit

SimpleTest for testing the user interface and interactions on the front end
See: Testing (D7 and D8) / SimpleTest (D6)

Testing

Behat, Drupal Extension, Mink Extension, Mink, Goutte (pronounced like ‘boot’) headless browser, or Phantom.js

There is dialogue regarding the above paradigm possibly to officially replace SimpleTest in the long run for interface testing

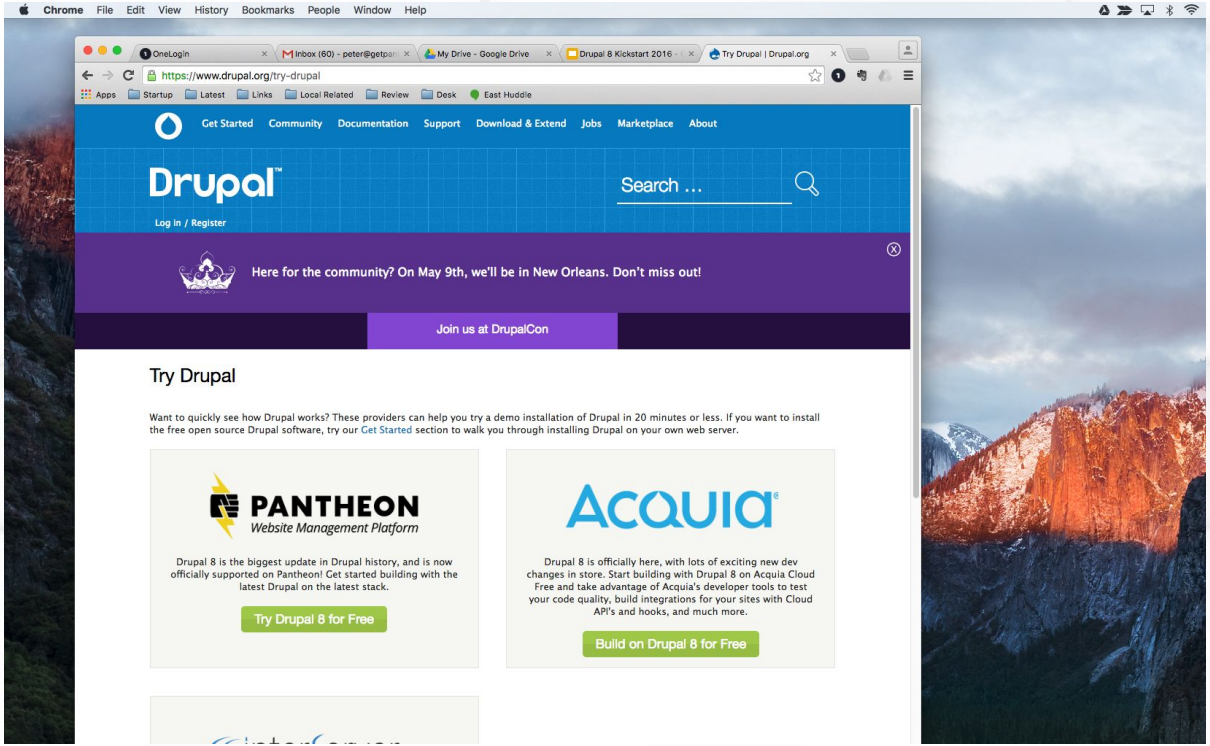
D8 Site Management

Managing a D8 site for maximum performance and flexibility goes beyond tweaking the Drupal admin interface

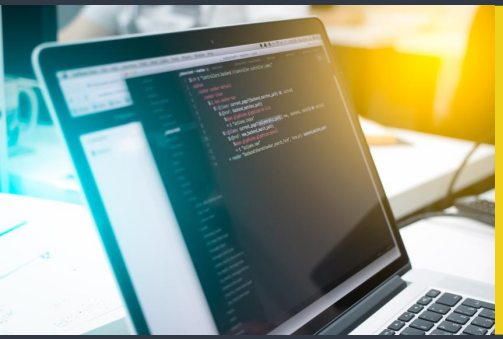
A cloud-based platform with server environment and add-on services pre-installed and optimized for Drupal can expedite your Drupal development

Using a Drupal 8 platform fits the “Proudly invented elsewhere” theme

D8 Site Management



Expedite website management. Spin up a D8 site and be online in a few minutes.
See: Try Drupal



D8 Training Resources

D8 Training/Resources

Drupalize.me

Buildamodule.com

Knp University

Safaribooksonline.com

Drupal Association - YouTube
(https://www.youtube.com/user/DrupalAssociation)