

Progressive decoupling

A how-to with an example from
the World Health Organisation



2022
DRUPAL DEV DAYS
April 4-8th Ghent, Belgium

Hello 🖐️



Rodrigo Aguilera & Chloe the cat

FULL STACK DEVELOPER [@SystemSeed](#)

13+ years in Drupal

[@rodrigoaguilera](#)



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Hello 🙌



Kate Marshalkina & Ryzhik the cat

TECH LEAD @SystemSeed

10+ years in Drupal

@kalabro



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About SystemSeed

We're
hiring!

- **Social impact-focused**
- Clients include **WHO, UNICEF, Concern Worldwide**, Medecins Sans Frontières, and government agencies
- **Award winning** (Splash Awards - Concern Worldwide)
- Specialisms in **digital mental health** and **online fundraising**
- **International team**



@systemseed



systemseed.com



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The case for decoupling progressively

- ➡ Drupal comes with many solutions ready to use: authentication, routing, menus, SEO metatags, etc.
- ➡ Focus on the interactive parts
- ➡ Modern front-end tooling
- ➡ Rendering load shifted to client devices

[SystemSeed session about fully decoupling - 2019](#)



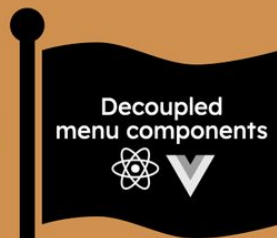
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Efforts for decoupling in Drupal core

Image: Driesnote
DrupalCon Europe 2020

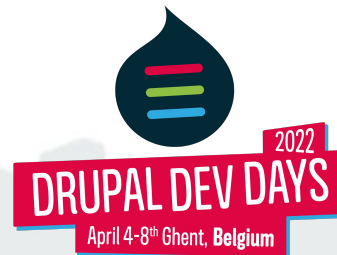
Mission

Provide the best way
for JavaScript front ends
to consume configurable
menus managed in Drupal



What does success look like?

- ✓ We have an official React component for menus
- ✓ We have an official Vue component for menus
- ✓ The developer experience is better than Contentful's
- ✓ We maintain the current Twig templates for traditional sites



Agenda

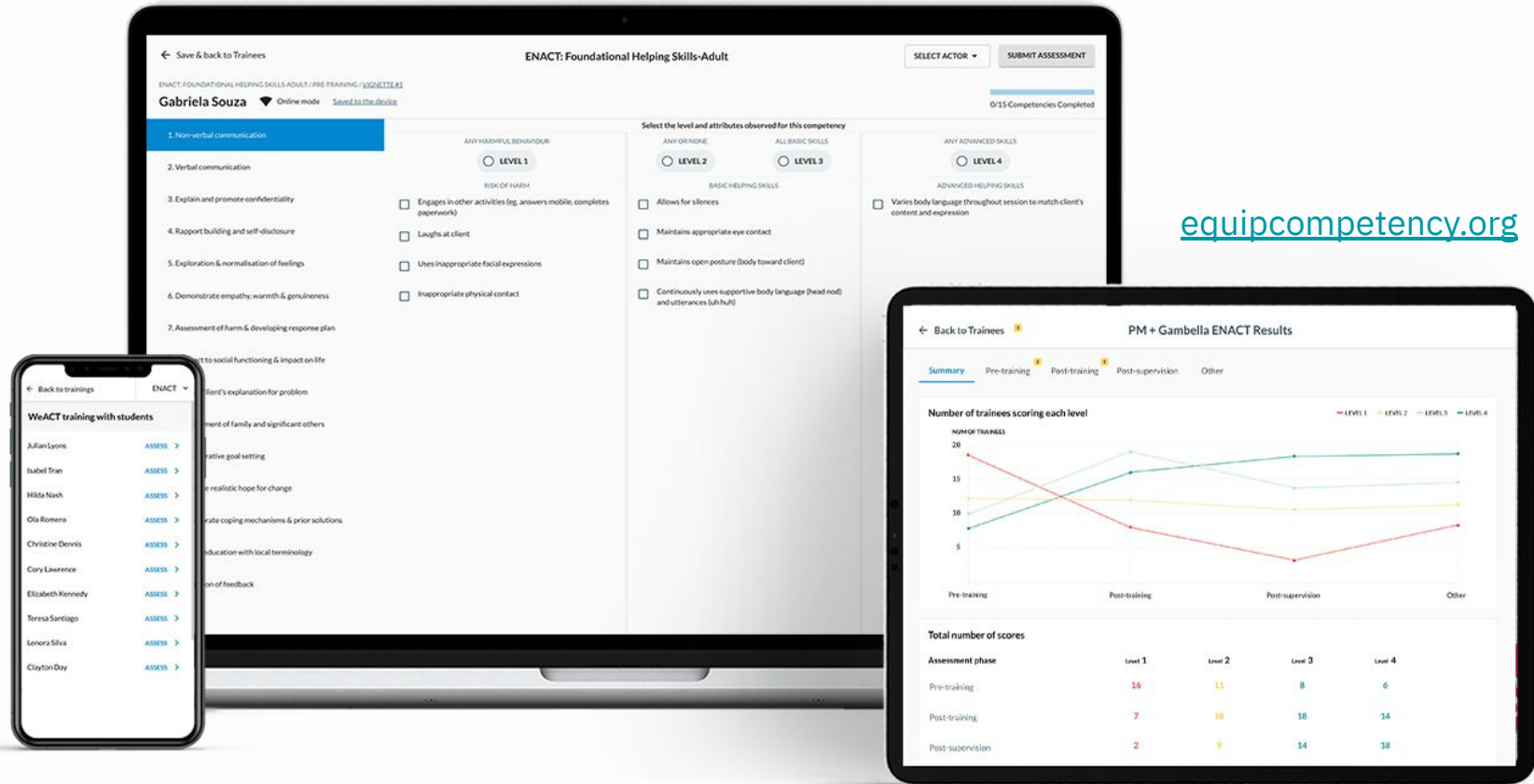
EQUIP - equipcompetency.org

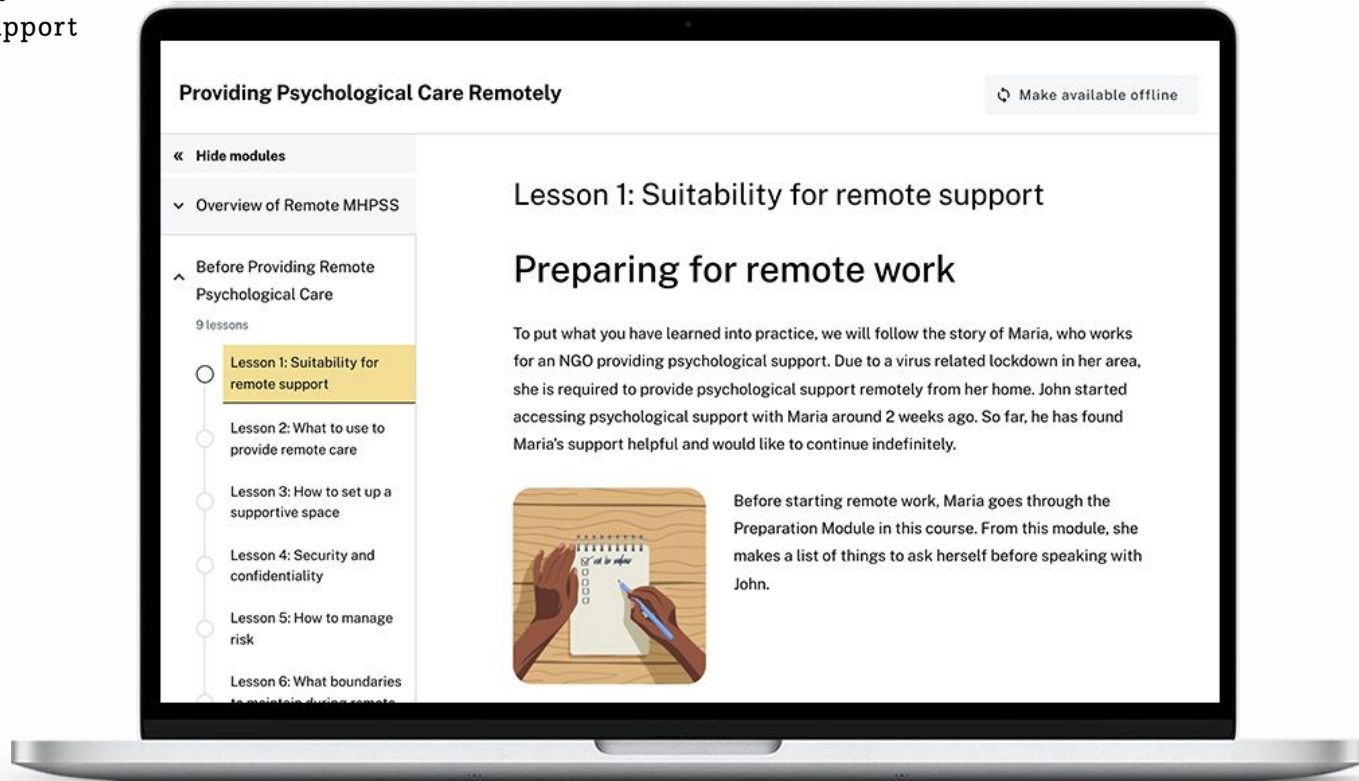
- Project overview
- Technical architecture
- Assessment tool as a progressively decoupled app

Anu LMS

- Introducing a modern Learning Management System for Drupal
- Differentiating features
- Challenges for an open source Decoupled application







ENACT: FOUNDATIONAL HELPING SKILLS-ADULT (POST-CERTIFICACIÓN) (WISNETTE.ES)

Eleanor Tucker[TEST]



Modo Online

[Guardado en el dispositivo](#)

15/15 Competencias completadas

Seleccione el nivel y los atributos observados para esta competencia.

- ✓ 9. Explorar la explicación del problema que afecta al usuario

- ✓ 10. Participación de la familia y personas significativas

- ✓ 11. Establecer los objetivos de la intervención

- ✓ 12. Promover una esperanza de cambio realista

- ✓ 13. Inspeccionar recursos de afrontamiento y habilidades previas

- ✓ 14. Filioeducación con terminología NCJ

COMPLETAR COMPETENCIA Y/O ATRIBUTO

☐ NIVEL 1

COMPETENCIAS PROCESUALES

POTENCIALMENTE (AVANZO)

- ☐ Participa en otras actividades (p. ej., respondiendo al móvil, realizando los trámites)
- ☐ Sale del usuario
- ☐ Utiliza expresiones faciales interpretadas
- ☐ Contacto físico inapropiado

NO EN PARALELO

GRUPO CLASE

ACCIONES PERSONALES

NOTA:

☒ NIVEL 2

POTENCIALMENTE (AVANZO)

ACCIONES PERSONALES

☐ NIVEL 3

HABILIDADES BÁSICAS DE ESCRITO

- ☒ Permite silencio

- ☒ Mantiene contacto visual apropiado

- ☒ Mantiene una postura adecuada en todo momento

- ☒ Construye un lenguaje corporal apropiado acorde con la cultura y expresiones culturales

COMPLETAR COMPETENCIA Y/O ATRIBUTO

☐ NIVEL 4

HABILIDADES AVANZADAS DE ESCRITO

- ☐ Verbaliza lenguaje corporal durante las sesiones en relación con el contenido y las expresiones del cliente

Technical architecture - 1/3



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Technical architecture - 2/3



Contrib modules

Group

PWA

Paragraphs

ECK

...

Custom modules

equip_admin_ui

equip_assessment

equip_dashboard

equip_exports

...



Technical architecture - 3/3



Contrib modules

Group

PWA

Paragraphs

ECK

...

Custom modules

equip_admin_ui

equip_assessment 

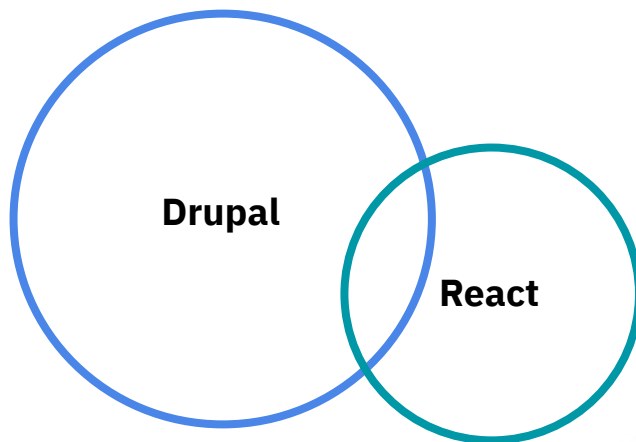
equip_dashboard

equip_exports

...



Languages



Cordelia Herrera[TEST]

Online mode

[Saved to the device](#)

2/15 Competencies Complete

✓ 1. Non-verbal communication

✓ 2. Verbal communication

3. Explain and promote confidentiality

4. Rapport building and self-disclosure

Select the level and attributes observed for this competency

<p>ANY HARMFUL BEHAVIOUR</p> <p><input type="radio"/> LEVEL 1</p>	<p>ANY OR NONE</p> <p><input checked="" type="radio"/> LEVEL 2</p>	<p>ALL BASIC SKILLS</p> <p><input type="radio"/> LEVEL 3</p>	<p>ANY ADVANCED SKILLS</p> <p><input type="radio"/> LEVEL 4</p>
<p>RISK OF HARM</p> <p><input type="checkbox"/> Interrupts client</p>	<p>BASIC HELPING SKILLS</p> <p><input checked="" type="checkbox"/> Uses open-ended questions</p>	<p>ADVANCED HELPING SKILLS</p> <p><input type="checkbox"/> Encourages client to continue explaining (tell me more about...)</p>	



[Home](#)

Hello, I'm Drupal!



How-to: mounting React in Drupal - 1/4

Rendering HTML elements in Drupal

```
public function build() {  
  $build['app'] = [  
    '#type' => 'html_tag',  
    '#tag' => 'div',  
    '#attributes' => [  
      'id' => 'react-app',  
    ],  
  ];  
}
```



How-to: mounting React in Drupal - 2/4

Attaching Javascript

```
hello_react:  
  js:  
    # Built with webpack, esbuild or similar.  
    js/hello-react.min.js: { minified: true }
```

```
$build['app'] = [...];  
  
$build['#attached'] = [  
  'library' => ['hello_react/hello_react'],  
];
```



How-to: mounting React in Drupal - 3/4

Attaching data from Drupal

```
$data = ['title' => $this->t(string: 'Hello, I'm React!')];

$build['app'] = [
  '#type' => 'html_tag',
  '#tag' => 'div',
  '#attributes' => [
    'id' => 'react-app',
    'data-application' => Json::encode($data),
  ],
];
```



How-to: mounting React in Drupal - 4/4

Mounting React

```
import React from 'react';
import ReactDOM from 'react-dom';

const App = ({data}) => (
  <h1>{data.title}</h1>
);

const root = document.getElementById( elementId: "react-app" );
const data = JSON.parse(root.dataset.application);

ReactDOM.render(<App data={data} />, root);
```



[Home](#)

Hello, I'm Drupal!





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6. Demonstrate empathy, warmth & genuineness

7. Assessment of harm & developing response plan

8. Connect to social functioning & impact on life

9. Explore client's explanation for problem

10. Involvement of family and significant others

11. Collaborative goal setting

Select the level and attributes observed for this competency

ANY HARMFUL BEHAVIOUR

☐ LEVEL 1

RISK OF HARM

☐ Engages in other activities (eg, answers mobile, completes paperwork)

☐ Laughs at client

☐ Uses inappropriate facial expressions

☐ Inappropriate physical contact

ANY OR NONE

☒ LEVEL 2

BASIC HELPING SKILLS

☒ Allows for silences

☐ Maintains appropriate eye contact

☐ Maintains open posture (body toward client)

☐ Continuously uses supportive body language (head nod) and utterances (uh huh)

ALL BASIC SKILLS

☐ LEVEL 3

ANY ADVANCED SKILLS

☐ LEVEL 4

ADVANCED HELPING SKILLS

☐ Varies body language throughout session to match client's content and expression

حدد المستوى والخصائص الملحوظة لهذه الكفاءة

<div>أي مهارات متقدمة</div> <div>المستوى 4</div>	<div>جميع المهارات الأساسية</div> <div>المستوى 3</div>	<div>أي منها أو لا شيء</div> <div>المستوى 2</div>	<div>أي سلوك ضار</div> <div>المستوى 1</div>
<div>مهارات المساعدة المتقدمة</div> <div><div>يُغيّر لغة الجسد خلال الجلسة لتناسب مع المضمون الذي يعبر عنه العميل</div><div></div></div>	<div>مهارات المساعدة الأساسية</div> <div><div>يسمح بالسكوت</div><div></div><div>يحافظ على تواصل بصري مناسب</div><div></div><div>يحافظ على وضعية منفتحة (الجسد باتجاه العميل)</div><div></div><div>يستخدم لغة الجسد بشكل مستمر لإظهار الاهتمام (إيماء الرأس، والمؤشرات "أهاا")</div><div></div></div>	<div>خطر الأذى</div> <div><div>يهتمّ بأمور أخرى خلال الجلسة (مثلاً، يردّ على مكالمات هاتفية؛ يكمل الأعمال الورقية)</div><div></div><div>يضحك على العميل</div><div></div><div>يستخدم تعابير غير ملائمة بوجهه</div><div></div><div>اتصال جسدي غير ملائم</div><div></div></div>	<div>1. التواصل غير اللفظي</div> <div>2. التواصل اللفظي</div> <div>3. شرح وتعزيز السرية</div> <div>4. بناء الصلة والإفصاح عن الذات</div> <div>5. استكشاف المشاعر ووضعها في إطار طبيعي</div> <div>6. إظهار التعاطف والدفع والصدق</div> <div>7. تقدير الأذى وتطوير خطة الاستجابة</div> <div>8. الربط بالأداء الاجتماعي والتأثير على الحياة</div> <div>9. استكشاف تفسير العميل للمشكلة</div> <div>10. إشراك أفراد الأسرة والأشخاص المقربين</div> <div>11. التعاون في وضع الأهداف</div>

How-to: translating React app - 1/3

Leveraging Drupal translation capabilities on the backend:

- Core
- Translation Management Tool (tmgmt)
- Translation Views (translation_views)
- Exposing translated content based on current language



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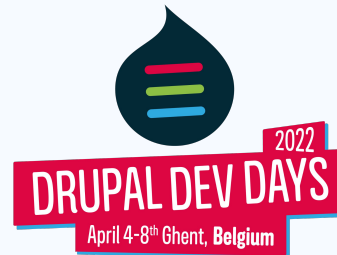
10. Involvement of family and significant others

11. Collaborative goal setting

```
foreach ($terms as $term) {
```

```
// Get translated version of the entity.
```

```
$term = $this->entityRepository->getTranslationFromContext($term);|
```



How-to: translating React app - 2/3

Using **Drupal.t()** to translate interface strings

- **Drupal.t('Welcome')** returns the translation for the current language
- Drupal parses Javascript code and makes strings available for translation in admin
- Can be used with any JS framework
- See also `Drupal.formatPlural()` & `Drupal.url()`

P.S. Clear cache!



How-to: translating React app - 3/3

```
const HomeLink = () => (  
  <a href={Drupal.url( path: '/' )}>  
    {Drupal.t( str: 'Go to homepage' )}  
  </a>  
)
```



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Select the level and attributes observed for this competency

ANY HARMFUL BEHAVIOUR	ANY OR NONE	ALL BASIC SKILLS	ANY ADVANCED SKILLS
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Syncing ...

How-to: auto-saving and auto-updating - 1/3

Creating Drupal REST API endpoints with cookie authentication

- ▼  src
 - >  Controller
 - ▼  Plugin
 - ▼  rest
 - ▼  resource
 -  AssessmentDataResource.php
 -  AssessmentSubmit.php
 -  CompetencyToolResource.php
 -  DashboardResource.php
 -  ResultsRiskOfHarm.php
 -  TrainingResource.php



How-to: auto-saving and auto-updating - 2/3

React makes API calls to check for updates:

- Every 10 seconds (background updates)
- On navigation to a different screen or other explicit user action
- On “online” event (will be covered later)



2

1

ACTIONS

SETTINGS

Assessme...

filter...

@@INIT

8:25:19.56

Diff

Action

State

Diff

Trace

Test

Tree

Raw

(states are equal)



Demo assessment

Try out an assessment **DEMO**

Try a demo assessment before real use >

My team:

SystemSeed, Test ▾

SystemSeed, Test Trainings:

GROUPACT | TEST SUITE [DO NOT CHANGE] | 2020-02-20 >

You don't need
react-redux anymore

JS

YOU ACTUALLY
DON'T NEED REDUX



**You Might
Not Need
Redux!**

Maybe you don't need redux-saga



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(if your application
is simple enough)

How-to: auto-saving and auto-updating - 3/3

Using [React Redux](#) family of tools:

- Redux - to manage app state
- Redux Saga - to regularly call API and check for updates
- Redux Persist - to persist data in local storage
- Redux State Sync - to sync data between tabs





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11. Collaborative goal setting

12. Promote realistic hope for change

Select the level and attributes observed for this competency

ANY HARMFUL BEHAVIOUR

☐ LEVEL 1

ANY OR NONE

☒ LEVEL 2

ALL BASIC SKILLS

☐ LEVEL 3

ANY ADVANCED SKILLS

☐ LEVEL 4

RISK OF HARM



Engage

con



La



Use



Ina

BASIC HELPING SKILLS

ADVANCED HELPING SKILLS



Varies body language throughout session to match client's content and expression

You must be connected to the Internet in order to submit your assessment.

This assessment has been saved to your device.

[BACK TO ASSESSMENT](#)

[TRY AGAIN](#)

How-to: offline support - 1/2

- Progressive Web App module ([pwa](#)) - HTML, CSS & JS files
- All app data is exposed by Drupal (via data attribute) and persisted in localStorage



Application

Manifest

Service Workers

Storage

Storage

Local Storage

Session Storage

IndexedDB

Web SQL

Cookies

Trust Tokens

Interest Groups

Cache

Cache Storage

Back/forward cache

Usage

8.4 MB used out of 596798 MB storage quota

[Learn more](#)

8.4 MB

8.4 MB

16.3 kB

8.4 MB

Cache storage

Service Workers

Total

☐ Simulate custom storage quota

Clear site data

☐ including third-party cookies

Application

How-to: offline support - 2/2

- react-detect-offline - change UI based on network status
- On the “offline” event pause API calls
- On the “online” event immediately trigger synchronization



ANU



ANU LMS

Deceptively simple learning management system based on Drupal:

- E-learning for EQUIP
- Centered on the learner experience
- Features based on client needs
- Extra features: offline use, progress tracking and quizzes.
- Works on any device
- Open source

https://github.com/systemseed/anu_lms



ANU LMS: tech overview

- Built as a Drupal module: add an LMS to an existing site
- Courses and lessons as content types
- Relies on paragraphs for the lesson content (text, images, audio, video, etc)



Normalization of Drupal data

Convert Drupal data into consumable formats

ANU LMS uses REST Entity Recursive so front-end developers don't need to worry about data relationships

https://www.drupal.org/project/rest_entity_recursive



Front-end as a progressively decoupled React app

The Drupal module takes over node rendering (replacing NodeViewController) and outputs a `<div>` with a **data-application** attribute.

```
▼<div id="block-material-equip-content" class="block block-system block-system-main-block block-default"> flex
  ▼<div class="block_content"> flex
    ▼<div id="anu-application" data-application="{\"data\":{\"module_lesson\":{\"entity_type\":{\"value\":\"node\"},\"entity_bundle\":{\"value\":\"module_lesson\"},\"nid\":{\"value\":\"6201\"},\"uuid\":{\"value\":\"8c3a087f-875b-441f-9d3c-32d6b01c0452\"},\"status\":{\"value\":true}},\"title\":{\"value\":\"Devices and Browsers supported\"},\"created\":{\"value\":\"2021-03-10T13:01:54+00:00\",\"format\":\"Y-m-d\\TH:i:sP\"},\"changed\":{\"value\":\"2022-01-19T08:59:20+00:00\",\"format\":\"Y-m-d\\TH:i:sP\"},\"moderation_state\":{\"value\":\"moderated\"}}}" data-bbox="23 412 998 600"/>
```



Data sources for progressively decoupled applications


Main strategies:

- HTML data-* attributes
- HTTP endpoints
- Delivered as a JS object



Mapping drupal data to JS components

- Leverage the power of Drupal as a content modeling solution
- Paragraphs module is ideal for having the same fields as the properties in a JS component
- Easier for content editors to create pages that will render as a JS componentd


 [Make course available offline](#)

« Hide modules

^ Introduction
4 lessons

- ✓ Welcome
- ✓ How does it work?
- ✓ What can you learn?
- Tips to make Step-by-Step work best for you

What can you learn?

 What can you learn
0:00 1:45

NEXT >



Offline capabilities



Offline capabilities

- Different strategy to the EQUIP assessments
- URLs are cached by the browser when a user wants to visit them later offline
- The feature was initially based on the PWA Drupal module service worker
- Upcoming ANU 2.5.0 will start using the Google Workbox service worker
- PWA module is also moving to Workbox

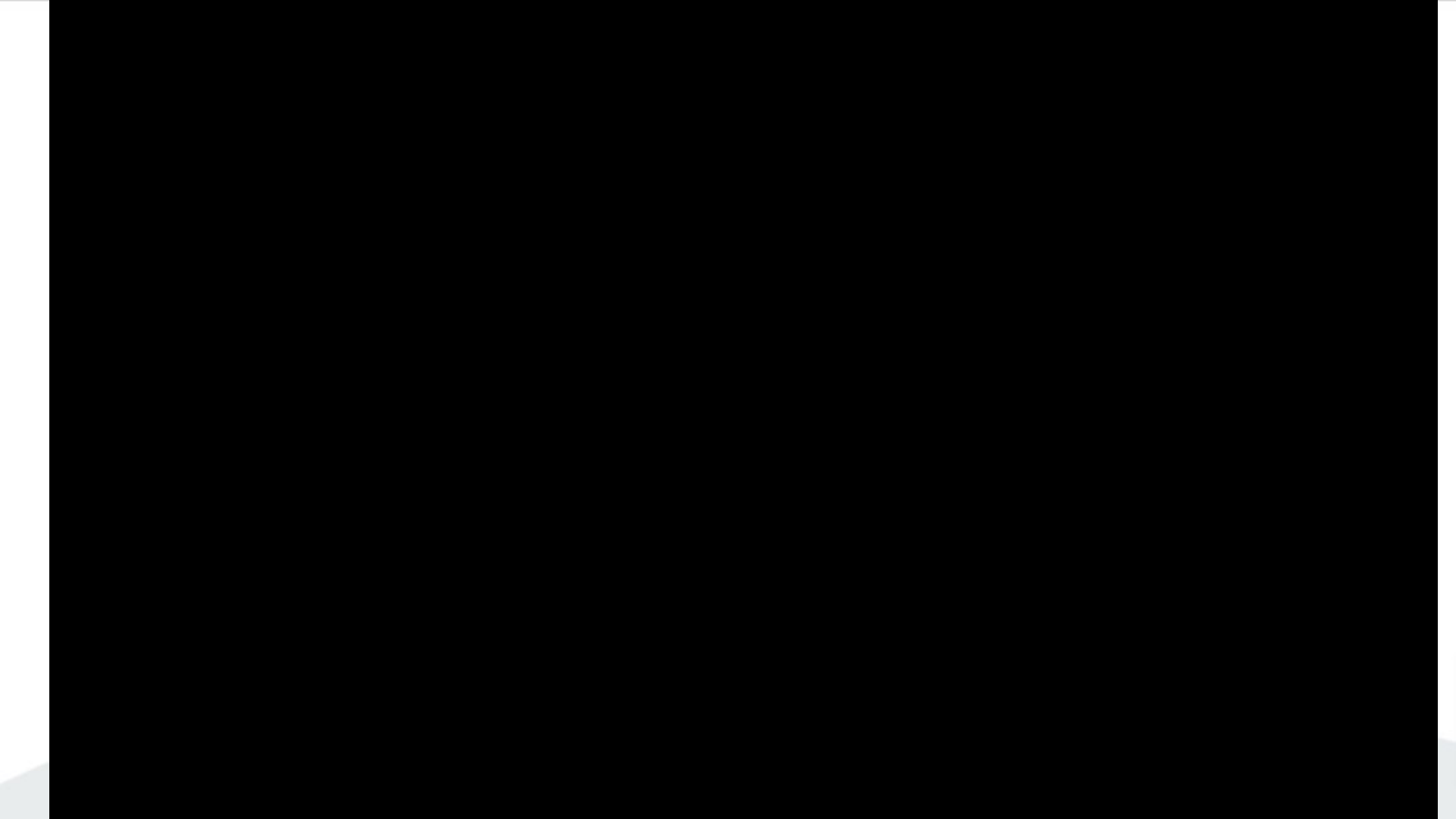
<https://developers.google.com/web/tools/workbox>



Quizzes

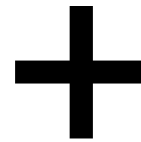
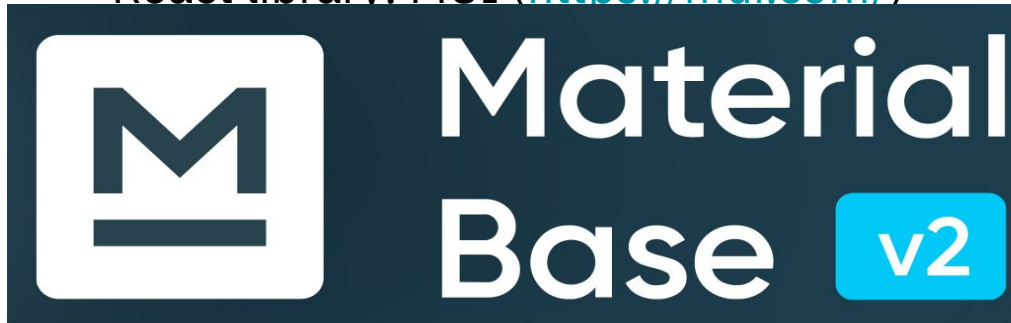
A series of REST endpoints to receive answers and return the correct choice





Theming

- Be aware of the mismatch between the Drupal theme and the JS app styles
- Use the same theme on Drupal and the app: Material design
- Drupal theme: Material base
(https://www.drupal.org/project/material_base)
- React library: MUI (<https://mui.com/>)



How-to: Override JS components 1/2

In the Drupal world, overriding parts of core or other modules is easy.

We needed a mechanism to customize parts of ANU LMS for each project.



```
1  const path = require('path');
2  const anuConfig = require('../../../../contrib/anu_lms/js/webpack.config');
3
4  const pathTo = (file) => path.resolve(__dirname, file);
5
6  module.exports = {
7    ...anuConfig,
8    entry: {
9      // Overridden ANU LMS Courses page bundle.
10      '../../sbs_sessions/js/dist/courses': {
11        import: path.resolve(__dirname, '../../../contrib/anu_lms/js/src/bundles/courses.js'),
12        dependOn: 'vendors',
13      },
14      ...
15      // Shared modules across bundles to avoid code loading duplication.
16      vendors: ['react', 'react-dom', 'react-router-dom', 'he', 'prop-types'],
17    },
18    resolve: {
19      modules: [path.resolve(__dirname, 'node_modules')],
20      alias: {
21        '@anu/pages/courses$': pathTo('../../../sbs_sessions/js/src/pages/courses/index'),
22        '@anu/Application': path.resolve(__dirname, './src/Application'),
23        // Default ANU LMS components.
24        '@anu': path.resolve(__dirname, '../../../../contrib/anu_lms/js/src'),
25      },
26    },
27  };
28
```



```
/**
 * Implements hook_library_info_alter().
 *
 * Replace the courses' library from anu.
 */
function sbs_sessions_library_info_alter(&$libraries, $extension) {
  if ($extension === 'anu_lms') {
    // Override ANU LMS courses page.
    if (!empty($libraries['courses'])) {
      $libraries['courses']['js'] = [
        '/' . drupal_get_path('module', 'sbs_sessions') . '/js/dist/courses.min.js' => [
          'minified' => TRUE,
          'weight' => -15,
        ],
      ];
    }
    // Override ANU LMS vendors.
    if (!empty($libraries['vendors'])) {
      $libraries['vendors']['js'] = [
        '/' . drupal_get_path('module', 'sbs_application') . '/js/dist/vendors.min.js' => [
          'minified' => TRUE,
          'weight' => -16,
        ],
      ];
    }
  }
}
```

PHP overrides

Use Symfony events to allow other modules to modify the normalised data.

On modern modules we avoid introducing new hooks.



Current challenges

- Ease Developer experience
- Decide on a framework for end-to-end testing
- More docs and examples



Contribute to ANU LMS

Join us this week!



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EQUIP 2 years later...

- The foundation of EQUIP was built in 2020
- Extended and expanded to multiple countries
- Covered by automated tests
- No major refactoring



EQUIP 2 years later...

- The foundation of EQUIP was built in 2020
- Extended and expanded to multiple countries
- Covered by automated tests
- No major refactoring
- Success! 🎉



Takeaways - 1/3

- Drupal can power very complex UI projects (with a little help from React 😊)
- Complex software doesn't have to be complicated
- Simple & pragmatic approach wins in the long run (localStorage, Drupal REST API, Redux, etc)



Takeaways - 2/3

- Progressive decoupling is a stable, battle-proven, approach
- You can use it now
- Progressive decoupling is well adopted in other webdev communities (Laravel, Ruby on Rails), and known there as the “monolith” approach
- Progressive decoupling doesn’t work for every situation



Give it a try

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