



# Automating Drupal Development with Patterns: introducing 7.x-2.x

David Rozas and many others

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# A brief presentation ...

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- Almost 3 years working with Drupal.
- Recently joined CRESS (Centre for Research in Social Simulation) at University of Surrey (UK).
- Interest areas: free software, education and technology, distributed systems programming, CSCW, collaborative learning, socially intelligent information systems, ...
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# Outline

- The big picture: QLectives and QScience
- Patterns overview: components and Patterns files
- Patterns 7.x-1.x
- Introducing Patterns 7.x-2.x new features

# Outline

- The future: CM in Drupal 8
- A bit of code: making a module  
“Patterns Ready”
- Future Work
- Demo
- Q&A

# The big picture: QLectives

- What is quality?
- If half a million people give a YouTube video the thumbs up, does that mean it is good?
- Perhaps... but you would probably rather watch a recommendation from a friend
- Can we do it in a “P2P” way?

# The big picture: QLectives

- Take features of social networking to help groups of people share resources: from home videos to scientific papers
- Quality ratings in a distributed way

# The big picture: QLectives

Two application domains:

- QMedia: P2P media distribution fully decentralized - <http://www.tribler.org>
- QScience: distributed platform for scientists allowing them to locate or form new communities and quality reviewing mechanisms



# QScience: Science today

From...

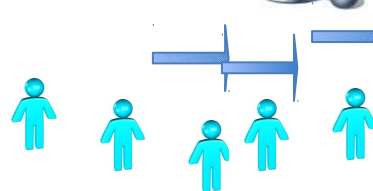


Rembrandt, "A Scholar" (1631)

To...



Community



Big Data



Networks

# Can we have it all?

- Many software packages are available that fit one (or more) of those needs, but not all.
- QScience is an attempt to pull them all together in a modular fashion: a **Drupal distribution**

# QScience: contributing back

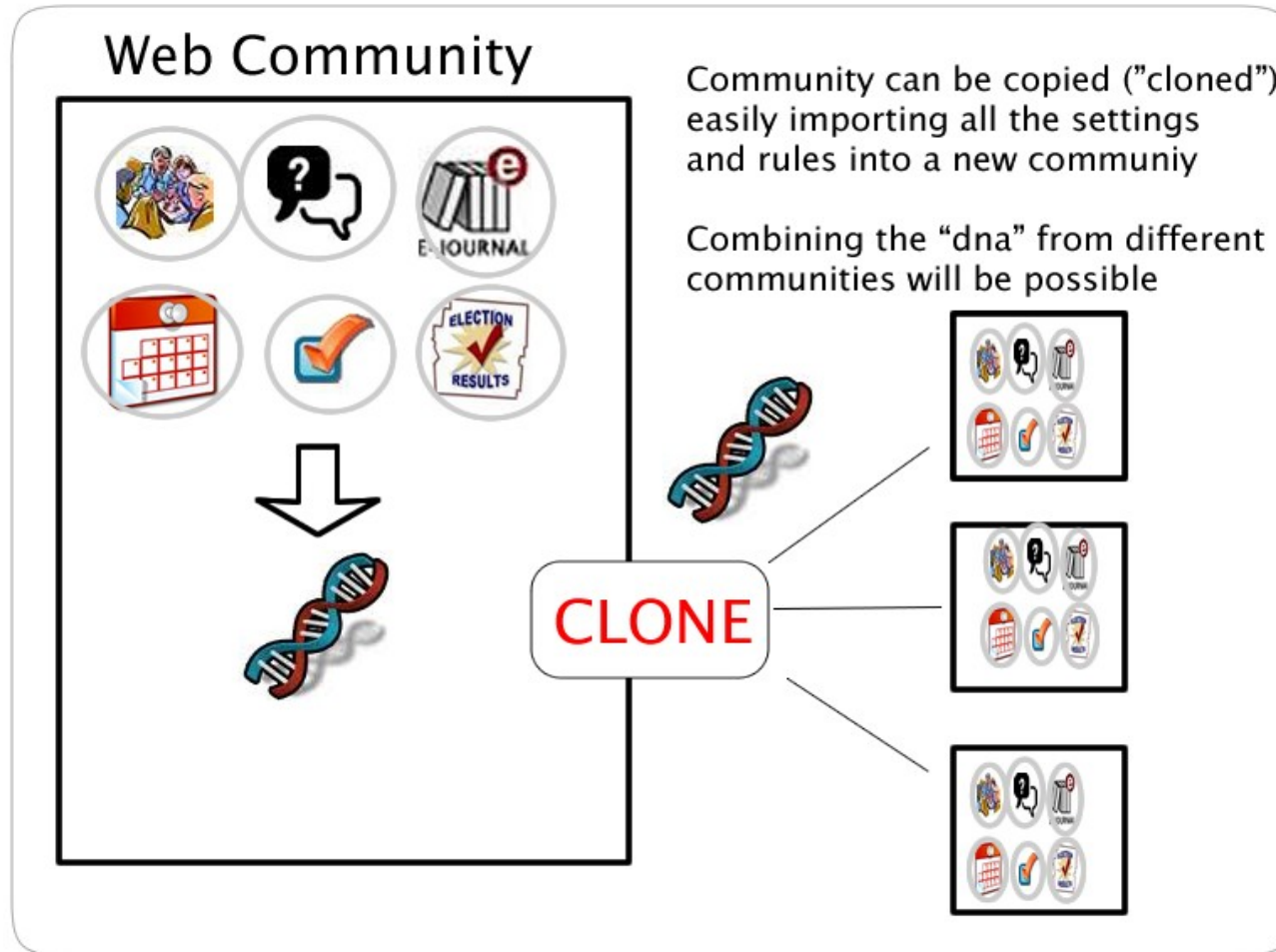
- **Patterns:** configuration management
- **D2D** (DrupalToDrupal): secure exchange of information between different Drupal instances in a P2P network.
- **QTR:** Implements a Quality Trust and Reputation algorithm to rate contents (e.g.: academic publications) in Drupal.
- **Living Science:** Drupal based search and visualization tool.

# Patterns



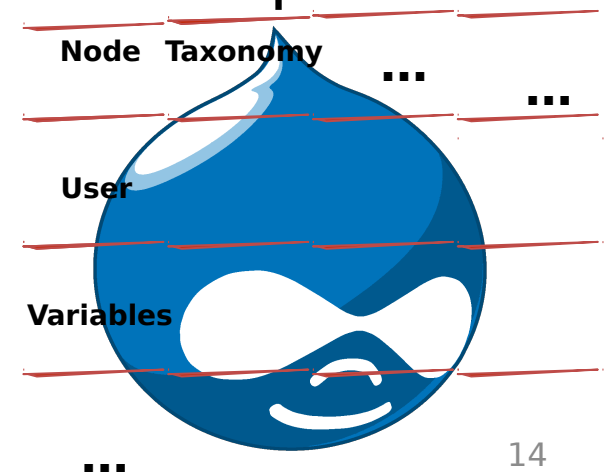
- What we want: reuse and share configuration.
- The main issue: configuration and data are mixed up in the DB.
- Patterns allows developers to take control of it.

# Patterns



# Patterns

- Patterns is built to bypass this bottleneck by managing and automating site configuration
- Patterns' approach to solve it:
  - Components (“Software driver concept”)
  - Store the configuration in files – decoupled architecture



# Patterns Components

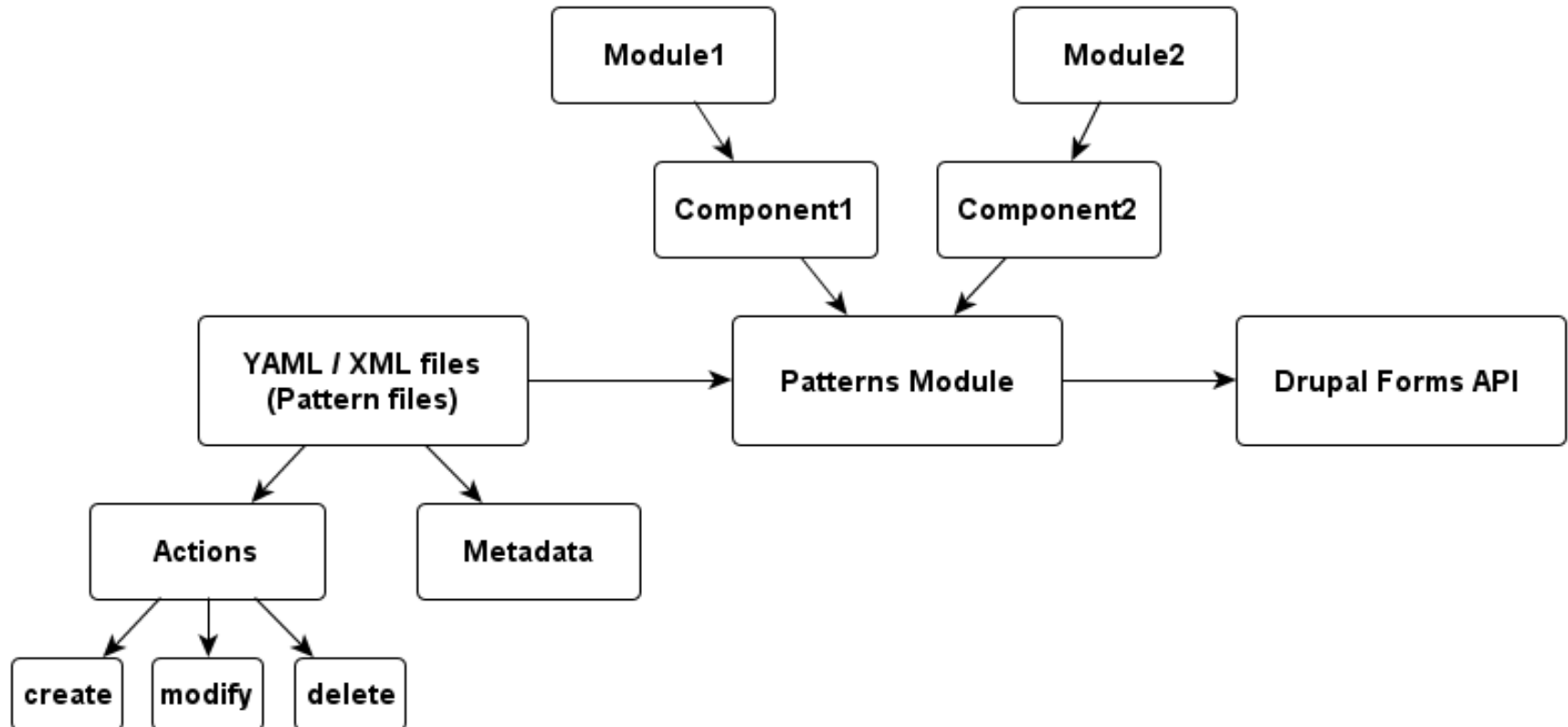
- Each Drupal **module** can have a corresponding component, e.g. Blocks, Nodes, Taxonomy, Users, System settings.
- The component handles tasks directed at the module, acts much like a **software driver**.

# Patterns Components

- Defines a set of hooks which are accessed by the Patterns core during the different phases: prepare, validate, callbacks, execution, cleanup...
- **Actions are preprocessed and reformatted** so that they can be the input of one or more Drupal forms.



# Patterns Overview



# Patterns Files

- Store **configuration in files**
- There is not any dependency with any specific format: `hook_patterns_parser()`:  
<http://drupal.org/node/1545346>
- Currently supported formats
  - YAML: easy to read and write (human-readable data serialization format)
  - XML: interoperability
  - PHP arrays: performance

# Patterns Files: structure

- Divided in sections:
  - Metadata: author, category, version, description, etc.
  - Sub-sections:
    - Actions: create, modify, delete, include

# Patterns Files

```
1 # This is a comment
2 # Example Pattern
3
4 info: # mandatory name
5   title: Create, modify and delete a Vocabulary
6   description: as title
7   author: QScience
8   category: Taxonomy
9   version: 1.0
10  core: 7.x
11  author_email: sbalietti@ethz.ch
12  author_website: qlectives.eu
13
14 actions: # any name is good for this category
15
16   - create:
17     tag: vocabulary
18     name: Another Vocabulary
19     machine_name: anothervoc
20     description: Another interesting vocabulary
21     hierarchy: 0
22
23   - modify:
24     tag: vocabulary
25     machine_name: anothervoc
26     description: It was not that interesting after all
27     # vid: 2
28
29   - delete:
30     tag: vocabulary
31     machine_name: anothervoc
32     # vid: 2
33
```

# Patterns 7.x-1.x

- Write or re-use patterns using the already developed components (content types, menus, blocks, users, permissions, roles, etc.)
- Make your module “Patterns Ready”
- Export configuration automatically (in a more “raw” way than the new version)

# Introducing Patterns 7.x-2.x

- Major new release: **7.x-2.0-rc1 (26<sup>th</sup> Feb 2013)**
- Syntactic and Semantic validation: assistance to solve conflicts.
- Automatic extraction of the configuration improved.
- Patterns server/client: new (sub)modules to allow pushing/pulling patterns.

# Patterns 7.x-2.x: syntactic and semantic validation

- Similar approach to name collision and dependencies resolution of compilers.
- Two separated layers and different type of warnings/errors:
  - Already Defined Element
  - Element Undefined
  - Unmet Dependency
  - Not Unique Alias
  - ...

# Patterns 7.x-2.x: syntactic and semantic validation

- Rule of thumb:
  - Syntactic errors/warnings: wrong grammar statements.
  - Semantic warnings: related to the meaning of that pattern itself in certain “context”.
- Inclusive relationship: *“a pattern semantically valid will always be syntactically valid, but not the other way around”*.



# Patterns 7.x-2.x: syntactic and semantic validation

- Example: Roles name collision (semantic warning)

## Validation Level

Semantic and Syntax ▾

Choose the level of validation. Patterns validated semantically will run without errors, but they only need to be syntactically valid in order to be run.

### PATTERN FILE

**This pattern is NOT valid.**

**Tag semantic warnings:**

**[create:role] [Already defined element]: The role name *researcher* already exists in the system.**

**[create:role] [Already defined element]: The role name *student* already exists in the system.**

### Pattern's code

```
1 ---
2 info:
3   title: Create roles
4   category: Users
5   description: Creates a role for researchers and students
6   version: 1.0
7   core: 7.x
8   author: QScience
9   author_website: http://qlectives.eu/
10 modules:
11   - user
12   role:
13     -
14       create:
15         tag: role
16         name: researcher
17     -
18       create:
19         tag: role
20         name: student
21
```

When cursor is in the editor: F11/ESC toggle full screen editing. Ctrl-F search in the pattern

Save

Validate

Run current pattern

Back

# Patterns 7.x-2.x: export functions

- All the main core components possess now automatic export capabilities.
- Options to choose the type of actions generated:
  - **CREATE** actions: intended for the creation of patterns for “fresh installation”.
  - **MODIFY** actions: intended for the creation of patterns to override the current settings (i.e.: to deploy changes from test to stage).
- Depends on the component: certain actions might not make sense in some cases: “create colour”?

# Patterns 7.x-2.x: export functions

▶ TAXONOMY

▶ TOOLBAR

▼ USER

Export options

☒ role
 ☐ permission
 ☐ user
 ☐ role\_users

role

☒ all

▼ EXPORT OPTIONS

Type of export

☒ Export as a set of MODIFY actions
 ☐ Export as a set of CREATE actions

Action

☒ Import into the database
 ☐ Download as a pattern file
 ☐ Download as a zip-archive

# Patterns 7.x-2.x: server/client

- Act as a HUB to share Patterns between Drupal users using a secure channel.
- Pushed via UI / Drush
- Implemented as a module: anyone can set up his/her own server
- Provides functionalities to search patterns, generate statistics, etc.
- “Default Patterns Server”: [drupal-patterns.org](http://drupal-patterns.org) (coming soon)

# Patterns 7.x-2.x: server/client

## Latest Patterns

Category	Title	Author	upload time	Download	Download Times
Shortcut	<a href="#">edit a shortcut link (modify)</a>	drupal7	5 days ago	<a href="#">Download</a>	18
Block	<a href="#">Blocks and Roles (delete)</a>	drupal7	7 days ago	<a href="#">Download</a>	148
Block	<a href="#">Blocks and Node types (create)</a>	drupal7	7 days ago	<a href="#">Download</a>	15
Block	<a href="#">Blocks and Roles (create)</a>	drupal7	7 days ago	<a href="#">Download</a>	16
Block	<a href="#">Blocks and Node types (delete)</a>	drupal7	7 days ago	<a href="#">Download</a>	8
Block	<a href="#">Blocks (create)</a>	drupal7	7 days ago	<a href="#">Download</a>	12
Block	<a href="#">Blocks (modify)</a>	drupal7	7 days ago	<a href="#">Download</a>	6
Block	<a href="#">Blocks (custom) delete</a>	drupal7	7 days ago	<a href="#">Download</a>	2
Content	<a href="#">Content Type (create)</a>	drupal7	13 days ago	<a href="#">Download</a>	3
pathauto	<a href="#">Pathauto settings</a>	drupal7	13 days ago	<a href="#">Download</a>	2

## edit a shortcut link (modify)

### Pattern Description:

- pid : 48
- name : shortcut\_edit\_link.yaml
- format : yaml
- title : edit a shortcut link (modify)
- description : change the shortcut link
- uuid : 5e7df67f-20ff-3ea4-99c1-b4b22c789ab5
- author : drupal7

### Pattern file content:

```

info :
  title : edit a shortcut link (modify)
  description : change the shortcut link
  author : QScience
  category : Shortcut
  version : 1.0
  core : 7.x
  author_email : xrfind@gmail.com
  author_website : http://qlectives.eu/

actions :
  - modify :
      tag : shortcut_link
      set_name : new_set_forrest
      link_title : link_admcont
      new_link_title : link_nodadddd
      new_link_path : node/add

```

# So, what is the difference between Patterns and...?

- **Distribution/Installation Profile:**
  - *Granularity*: the configuration can be split into smaller definitions
  - *Simplicity*: easier to write YAML files than an installation profile
  - Can be used in existing sites

# So, what is the difference between Patterns and...?

- **Features+Strongarm:**
  - *Paradigm:* Features is more 'use case oriented', Patterns is more 'CM oriented' (*Interesting blog post from Tom Friedhof about this at <http://activelamp.com/blog/new-way-manage-configuration-your-site>*)

# So, what is the difference between Patterns and...?

- **Features+Strongarm:**
  - *Storage:* Features stores the configuration in Drupal modules, patterns stores it in files as D8 will (see D8 Config Management Initiative)



# So, what is the difference between Patterns and...?

- **Features+Strongarm:**

- *Implementation:* Features uses module specific APIs (e.g: Views API), Patterns uses mostly FAPI (although can use specific ones as well).
- The “trick” is **drupal\_form\_submit()**
- Advantage: Validation for free!
- Disadvantage: Performance

# The future?

# The future?



# CM in Drupal 8

- Two issues to address:
  - #1: Save configuration data into files (in core!): CMI  
**[!]** @alexpott's presentation tomorrow: “Drupal 8 Configuration System for Coders”
  - #2: Bundle functionality into a “package” that can be re-used in another site: Features v3.x, Patterns v3.x?
- Patterns (as features) currently combines #1 & #2
- Features' maintainers contacted to collaborate since we are working on the same direction

# Getting a bit “teckie”...



**“How to create your own Drupalicon Munny”, by Andre Molnar**  
([http://becircle.com/how\\_create\\_your\\_own\\_custom\\_drupalicon\\_munny](http://becircle.com/how_create_your_own_custom_drupalicon_munny))

# How to make my module “Patterns Ready”?

- You need to implement `hook_patterns()` to declare which actions your module is able to handle:

```
function fb_likebox_patterns($data = NULL) {  
  $actions['fb_likebox'] = array(  
    PATTERNS_INFO    => t('Settings for Facebook Likebox module'),  
    PATTERNS_MODIFY  => array('block_admin_configure'),  
    PATTERNS_EXPORT  => array(PATTERNS_EXPORT_ALL => 'fb_likebox_patterns_export_all_settings'),  
  );  
  return $actions;  
}
```

# How to make my module “Patterns Ready”?

Hooks available to interact on each phase:

`hook_patterns_prepare($action, $tag, &$data)`

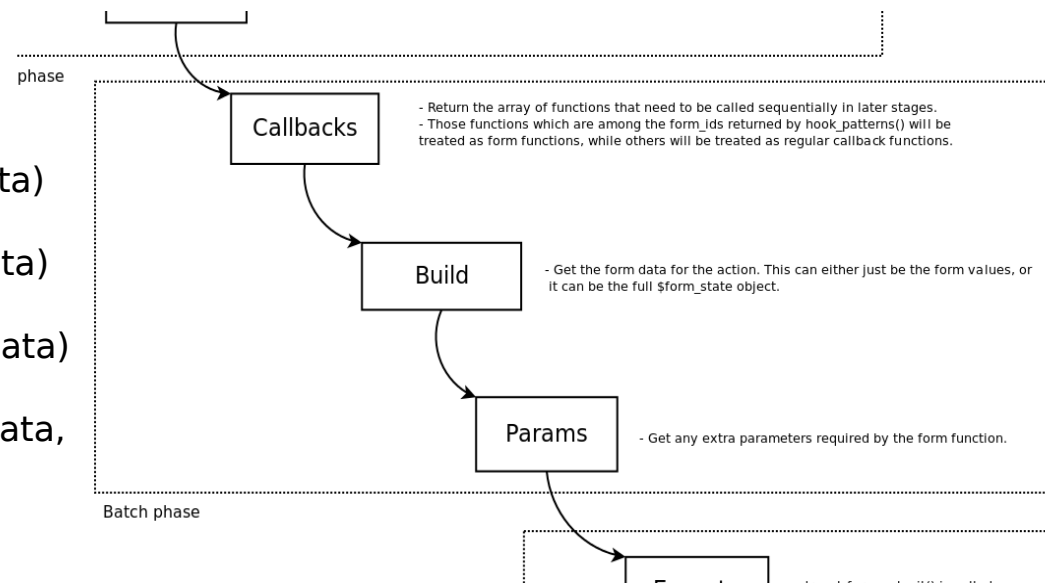
`hook_patterns_validate($action, $tag, &$data)`

`hook_patterns_callbacks($action, $tag, &$data)`

`hook_patterns_build($action, $form_id, &$data, &$action_state)`

`hook_patterns_params($action, $form_id, &$data &$action_state)`

`hook_patterns_cleanup($action, $tag, &$data)`



Source:

<https://github.com/QScience/patterns-flowcharts/blob/master/running-pattern-workflow.dia>

# How to make the settings of my module automatically exportable?

- You need to declare in `hook_patterns()` a function that will gather the data
- Write that function: can be more or less complex depending on the component



# How to make the settings of my module automatically exportable?

```
/**
 *
 * Returns a set of PATTERNS_MODIFY actions ONLY with the whole
 * set of roles currently stored in the system.
 *
 * @param array $args Set of arguments received from the form.
 * @param string $result Current set of actions for the whole process.
 *
 * @return array $result Set of actions after performing the changes.
 */
function user_patterns_export_all_permissions($args = NULL, &$result = NULL) {

  $roles = user_roles();
  $permissions = user_role_permissions($roles);
  $result = array();

  foreach ($permissions as $rid => $perms) {
    $permissions = array_keys($perms);

    $action = array(
      PATTERNS_MODIFY => array(
        'tag' => 'permission',
        'role' => $roles[$rid],
        'value' => $permissions,
      )
    );
    array_push($result, $action);
  }

  return $result;
}
```

# Future Work

- Create new sites based on QScience: CRESS, Qlectives, ...
- Improve compatibility with Patterns Server, D2D modules.
- Write components for QScience custom modules and for the most important contrib modules: Views, Rules, OG, Context, ...
- Try to contribute in the future of CM for D8.

# Future Work

- Documentation (D7):
  - More than 30 pages already published at Drupal.org:  
<http://drupal.org/node/1464118>
  - Extend documentation for Patterns 7.x-2.x
  - Video tutorials

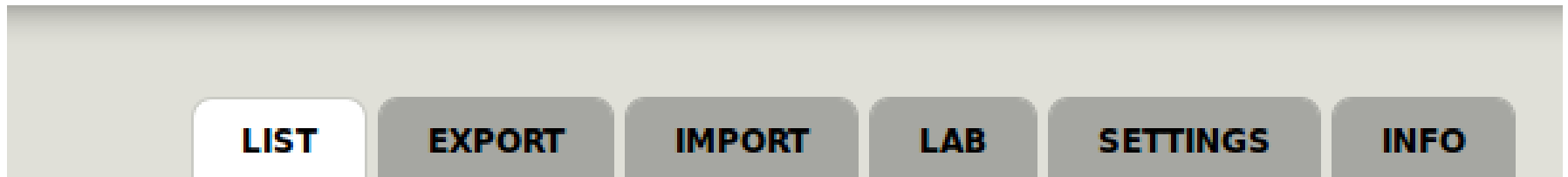
# Ideas

- **Thanks for your ideas/suggestions/patches!**
- Patterns group at:  
<http://groups.drupal.org/patterns>

# Links

- Patterns (<http://drupal.org/project/patterns>):
  - Documentation: <http://drupal.org/node/346509>
  - Group: <http://groups.drupal.org/patterns>
- Qlectives :
  - QScience Repository: <https://github.com/QScience>
  - Deliverable 4.2.4 (Patterns 7.x-2.x):  
<http://www.qlectives.eu/docs/D4.3.1.pdf> (to be officially published very soon)
  - Deliverable 4.2.3 (Patterns 7.x-1.x):  
<http://www.qlectives.eu/wiki/images/9/91/Qd4-2-3.pdf>
  - Econophysics Forum (use case):  
<http://physpc140.unifr.ch/drupal-7.14/>

# Time for the demo!



## SYSTEM

ENABLED	FORMAT	NAME	TITLE	VERSION	DESCRIPTION
Disabled	xml	<b>modules2.xml</b>	Enable/disable modules (XML)	1.0	Based on <a href="http://drupal.org/node/408960">http://drupal.org/node/408960</a>
Disabled	yaml	<b>variables.yaml</b>	Create and delete variables	1.0	Based on <a href="http://drupal.org/node/409180">http://drupal.org/node/409180</a>
Disabled	yaml	<b>fill_forms.yaml</b>	Fill in values for forms	1.0	Based on <a href="http://drupal.org/node/516332">http://drupal.org/node/516332</a>

Thanks!

¡Gracias!

謝謝

Merci!

Danke!

Grazie!

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