



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

David Rozas and many others

This work was partly supported by the Future and Emerging Technologies Programme (FP7-COSI-ICT) of the European Commission through the project QLectives (grant no.:231200).

# 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
- Differences between Patterns and other modules
- The future: CM in Drupal 8
- Patterns 7.x-1.x vs 7.x-2.x

# Outline

- Introducing Patterns 7.x-2.x new features:
  - Syntactic and semantic validation
  - Export functions
  - Patterns server
- 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 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)

# QScience: Science today

To...



Trends discovery



Communication

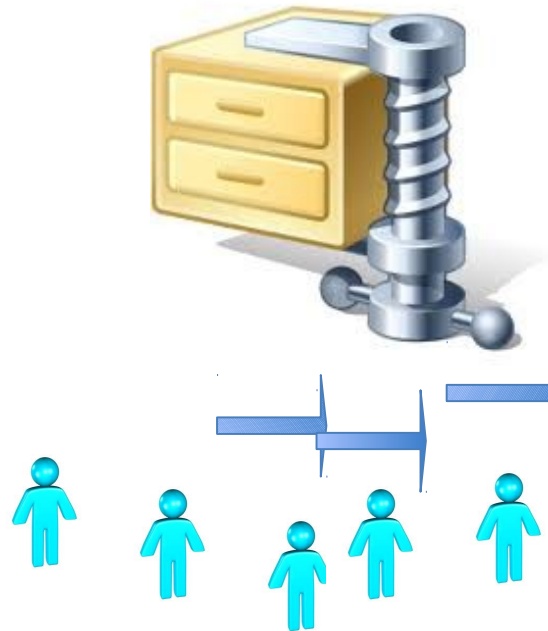
| rank | author   | $h_i$ Index | percentile |
|------|--|-------------|------------|
| 1    | S FREUD<br>psychology                            | 164.02      | 99.98      |
| 2    | P BOURDIEU<br>sociology                          | 138.58      | 99.96      |
| 3    | E WITTEN<br>physics, particles & fields          | 114.57      | 99.93      |
| 4    | N CHOMSKY<br>philosophy                          | 88.20       | 99.91      |
| 5    | P KRUGMAN<br>economics                           | 95.37       | 99.89      |
| 6    | LANZKES<br>computer science, information systems | 94.00       | 99.87      |
| 7    | A GIDDENS<br>sociology                           | 87.83       | 99.84      |
| 8    | K MARX<br>philosophy                             | 85.95       | 99.82      |

Indexes of scientific productivity

# QScience: Science today



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**
- EconoPhysics forum:
  - <http://www.unifr.ch/econophysics/> (old version)
  - <http://134.21.2.151/drupal-7.14/> (new Drupal version)

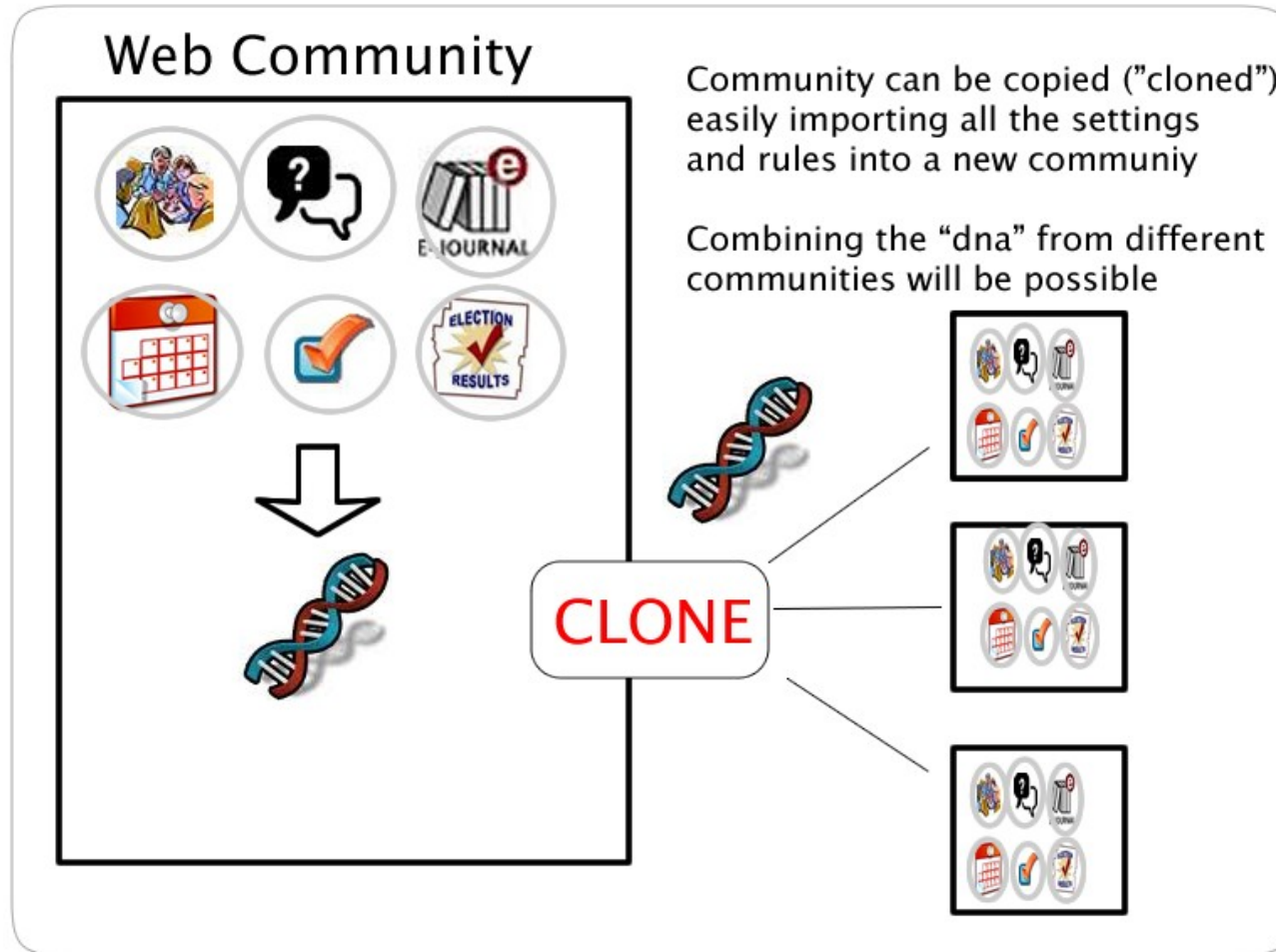
# QScience: contributing back

- **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 (i.e.: academical publications) in Drupal.
- **Living Science:** Drupal based search and visualization tool.

# QScience Patterns

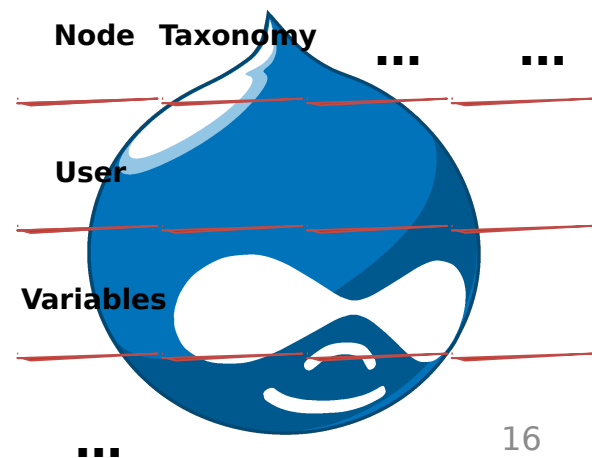
- What we want: reuse and share modules configuration
- The main issue: configuration and data are mixed up in the DB

# QScience Patterns



# QScience Patterns

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





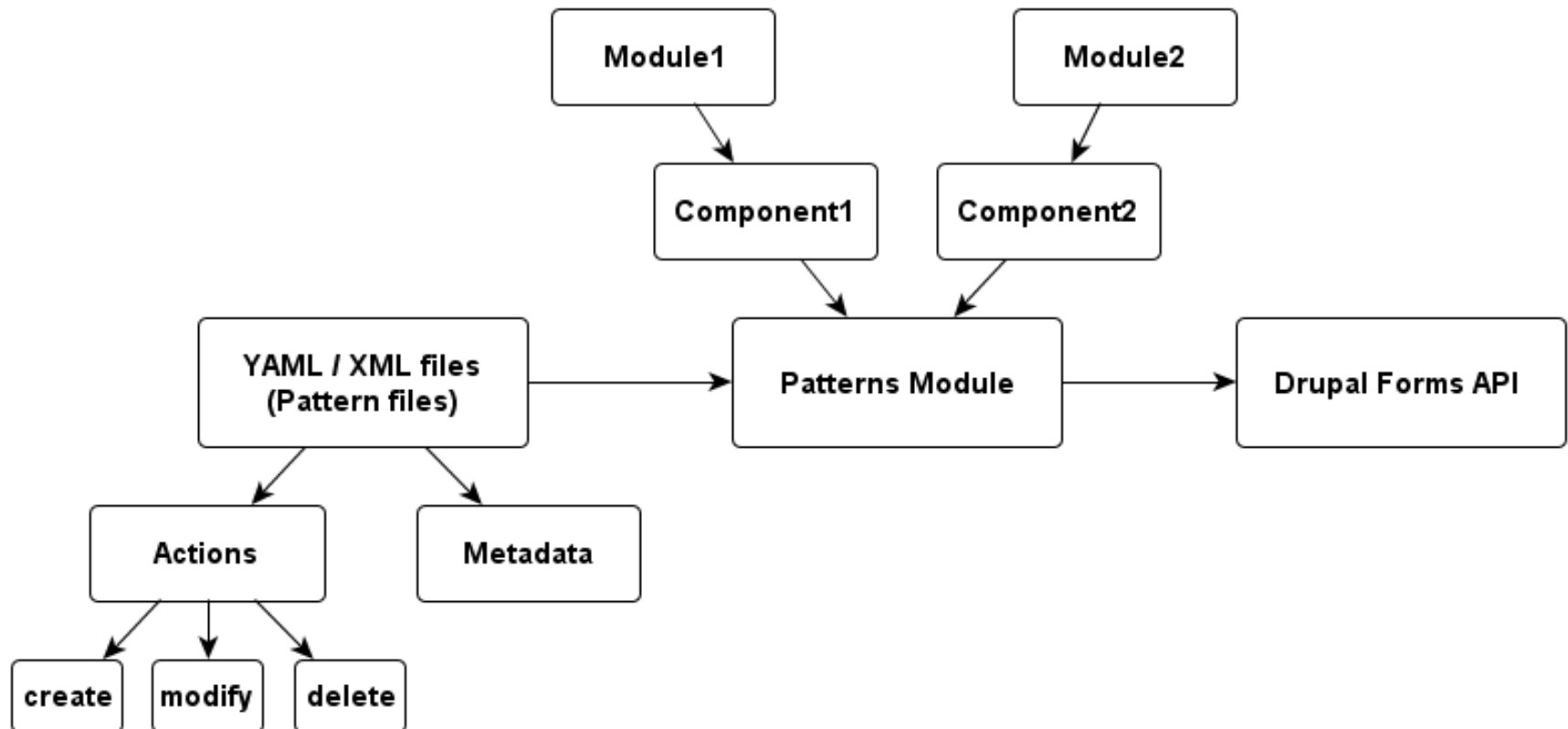
# Patterns Components

- 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
```

# 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:**

*“Don’t get me wrong, I love the features module, but I have to admit that I’ve run into my share of issues using features module for configuration management and deployment. Fortunately others in the community have ran into these issues too and have released modules such as features override, features plumber, and Features Tools. Not to mention entire workflows have been created around how to use Features to manage configuration for deployment that don’t even come close to creating KIT compliant features. **Features module is really being misused, it’s not being used to create features, it’s being used to manage configuration and deployment.**”*

*Tom Friedhof (“A new way to manage configuration on 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

# Patterns 7.x-1.x vs 7.x-2.x



- 7.x-1.x allows you:
  - 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 (27<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)

# 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_fortest
      link_title : link_admcont
      new_link_title : link_nodadddd
      new_link_path : node/add

```

# 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)`

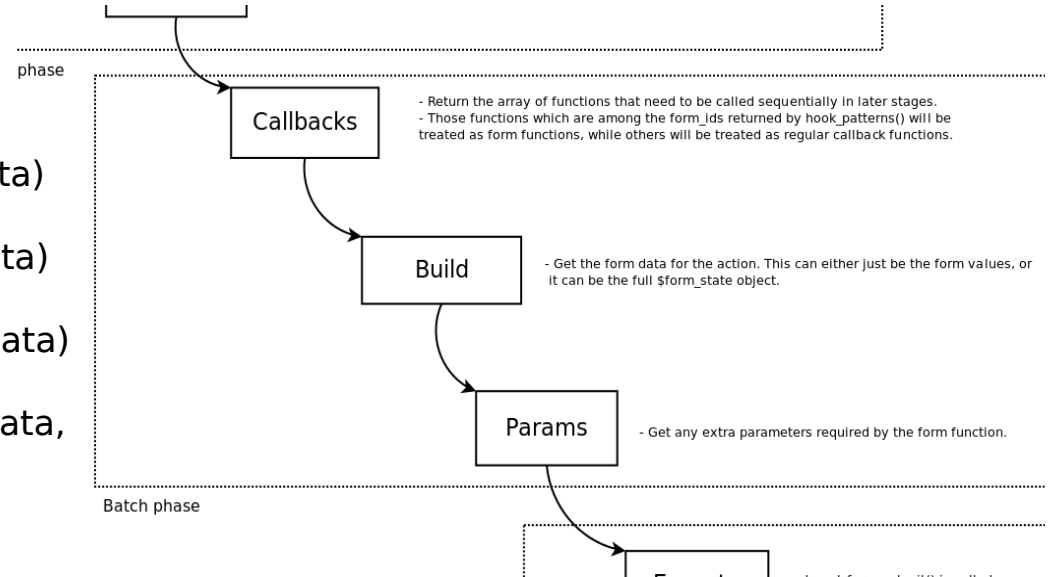
`hook_patterns_validate($action, $tag, &$data)`

`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

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

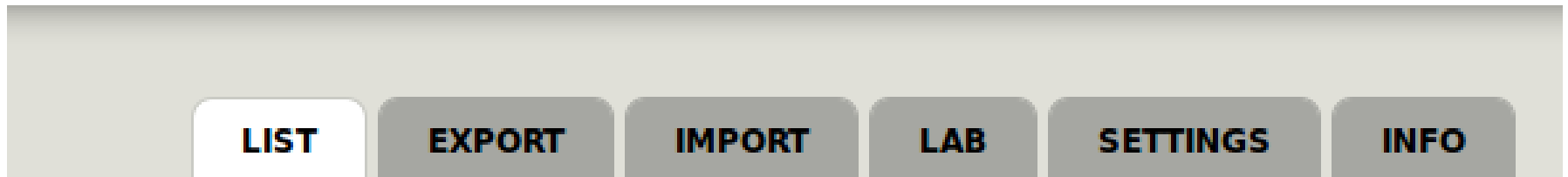
# Future Work

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

# Ideas

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

# 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> |

# Links

- Qlectives:
  - Main site: <http://www.qlectives.eu/>
  - 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:  
<http://www.unifr.ch/econophysics/>



# Links

- Patterns:
  - Main Page: <http://drupal.org/project/patterns>
  - Documentation: <http://drupal.org/node/346509>
  - Group: <http://groups.drupal.org/patterns>
- Configuration Management Initiative:
  - <http://groups.drupal.org/build-systems-change-management/cmi>
  - <http://drupal.org/community-initiatives/drupal-core#cmi>

# Thanks!

謝謝

¡Gracias!

Merci!

Danke!

Grazie!