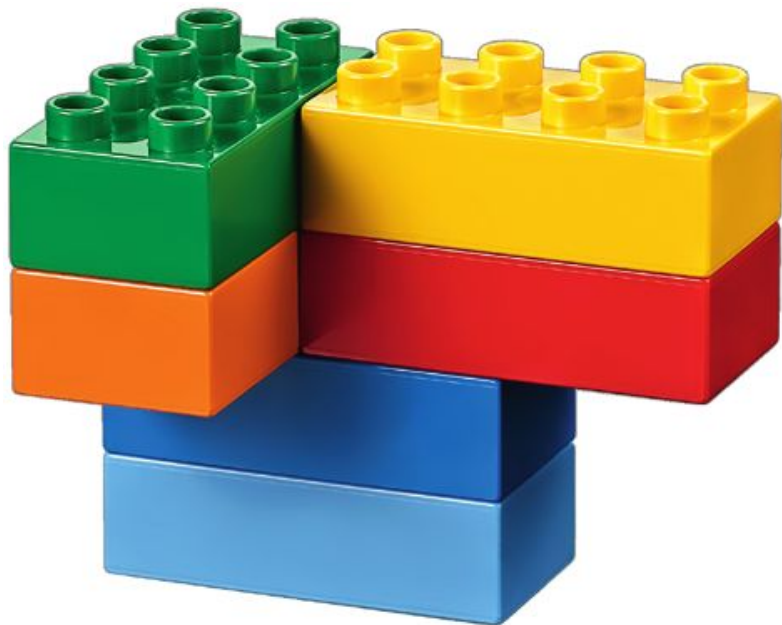
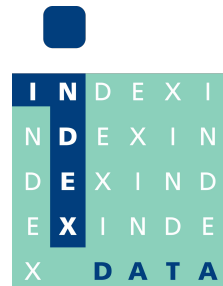


A case-study in FOLIO modularity: replacing mod-ldp with mod-reporting



Mike Taylor
Software Guy
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Where we're going

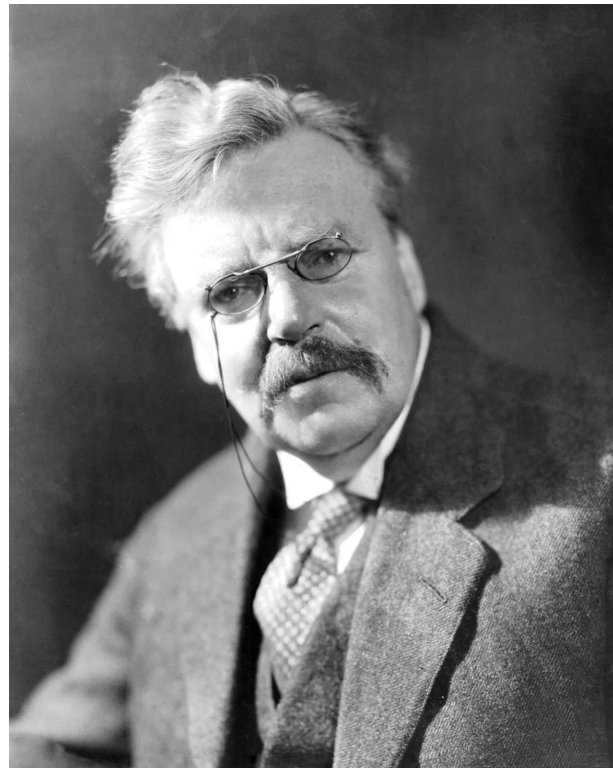
1. Philosophy
2. Modularity in FOLIO
3. Benefits of the modular architecture
4. An ecosystem of modules
5. Some light technical details
6. A case-study: mod-reporting
7. Implications

I. Philosophy

“I'm afraid I'm a practical man”, said the doctor with gruff humour, “and I don't bother much about [...] philosophy.”

“You'll never be a practical man till you do”, said Father Brown.

— G. K. Chesterton,
The Dagger with Wings.



I. Philosophy

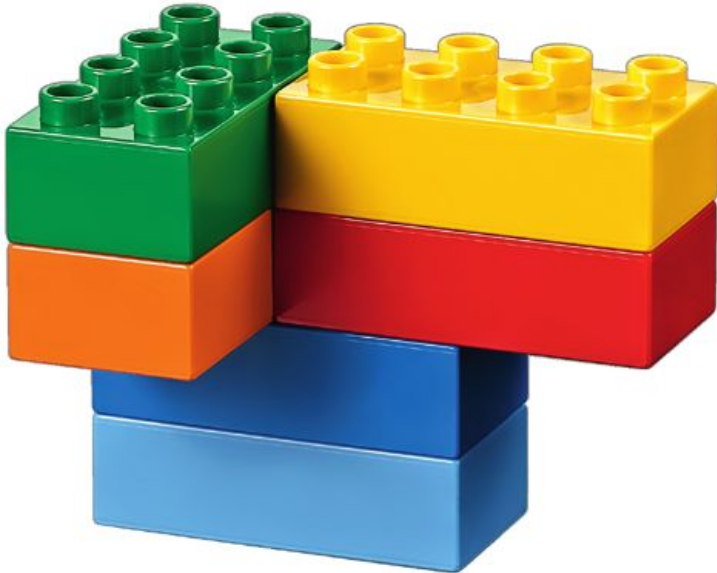
The design of FOLIO arose from a philosophy

- Communities **do things better** than top-down organizations.
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- FOLIO belongs to the library community, not to a vendor.
- Any member of the community should be able to contribute.

There is no magic access for insiders: we eat our own dogfood.

2. Modularity in FOLIO

FOLIO's community philosophy is reflected in its technical design: from the start, it was constructed to be modular.



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- Well-defined specifications for what a module is (discussed below)
- A handful of core modules to handle authentication and related concerns

This provides a context in which any module from any source can be deployed.

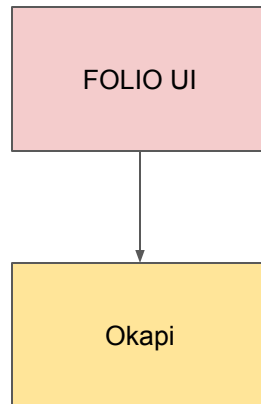
2. Modularity in FOLIO



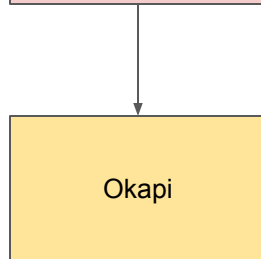
FOLIO UI

A diagram illustrating modularity in FOLIO. It consists of a single light red rectangular box with a thin black border, centered on the page. Inside the box, the text 'FOLIO UI' is written in a black, sans-serif font.

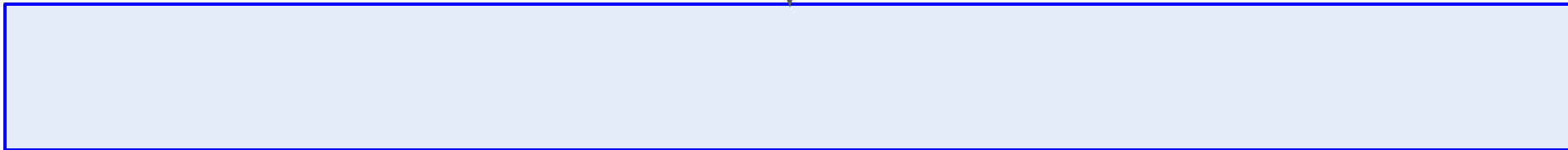
2. Modularity in FOLIO



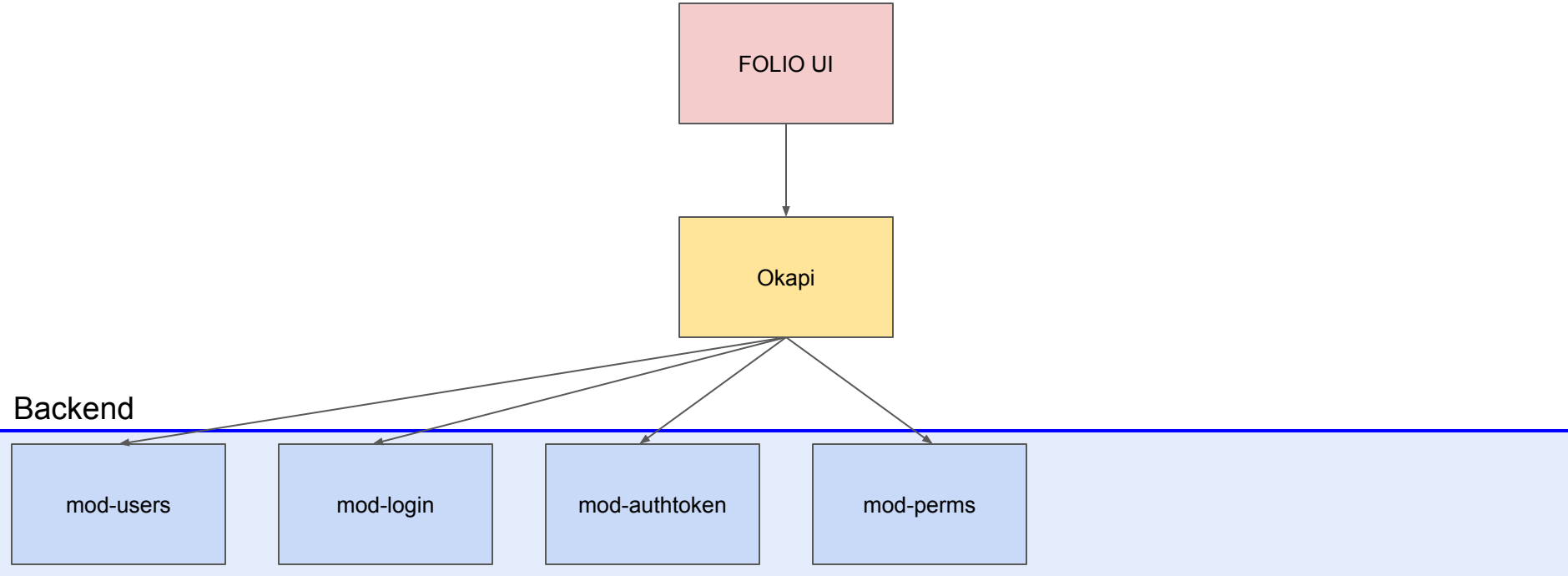
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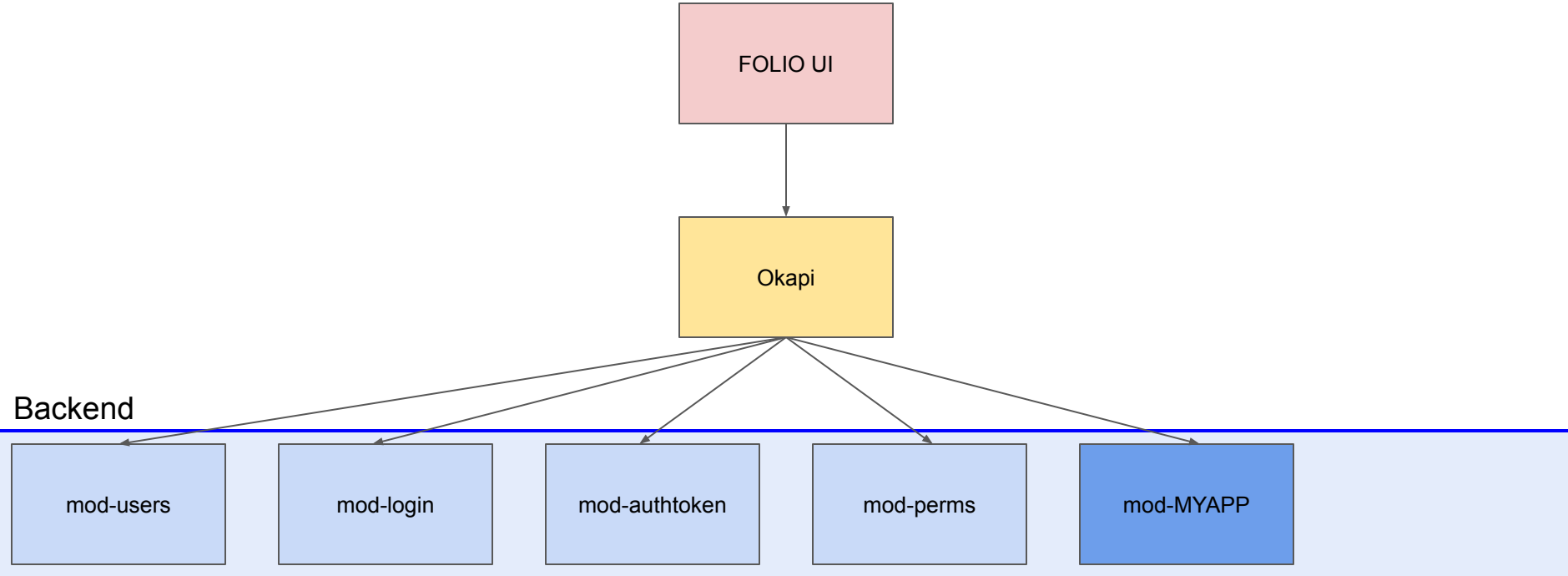
Backend



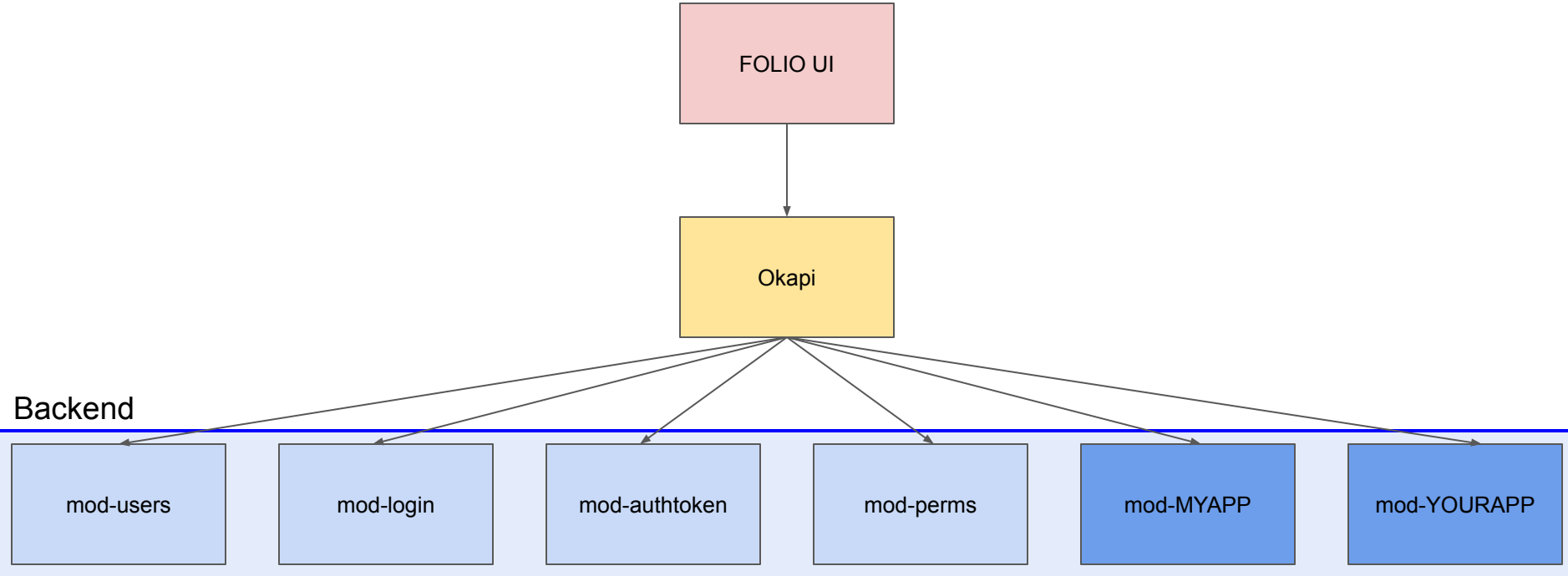
2. Modularity in FOLIO



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(The UI is also modular, but this talk is not concerned with that.)

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- New functionality can be added as a module
- Individual libraries may create modules that meet their needs
 - Or hire developers to do so
 - Or crowdfund development of widely needed modules
- Different libraries can deploy different sets of modules, lowering operating costs.

3. Benefits of the modular architecture

None of this needs “permission” from a central authority.

4. An ecosystem of modules

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And make it available for other FOLIO libraries to use.

This is exactly what happened with Course Reserves:

- Needed by FLO, the Fenway Library Organization in Boston.
- Developed by Index Data with their funding
- Now used by almost all US Academic libraries

4. An ecosystem of modules

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The first modules (mod-users and mod-inventory) came in 2016.

Eight years on, it has grown to 114 back-end modules (as of the current snapshot build).

SIDEBAR

How are modules made available to the community?

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How can libraries know to trust them?

This is more of an organizational problem than technical one.

We can talk more about it in the Q&A if there is interest.

5. Some light technical details

A FOLIO module is a computer program that fulfils certain requirements.

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It can be written in any language (though most are in Java).

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- It must respond to WSAPI requests.
- WSAPIs are typically RESTful and use JSON payloads.
- It must provide a machine-readable description of the requests it accepts and the responses it can give.
- Its description can define permissions and specify which endpoints they govern.

5. Some light technical details

A module's description must specify:

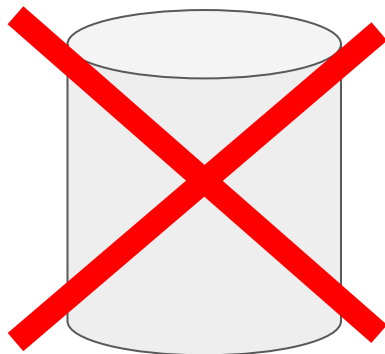
- What interfaces the module requires
- What interfaces it provides.

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- What interfaces it provides.

All communication between modules is via these interfaces:
there is no shared database.



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A module's description must specify:

- What interfaces the module requires
- What interfaces it provides.

All dependencies are on *interfaces*.

Not on modules
(which are implementations).



5. Some light technical details

An example interface description:

```
{
  "id" : "ldp-query",
  "version" : "1.2",
  "handlers": [
    {
      "methods": [ "GET" ],
      "pathPattern" : "/ldp/db/log",
      "permissionsRequired": [ "ldp.read" ]
    },
    ... etc, ...
  ]
}
```

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FOLIO enforces a partitioning of concerns: integration between modules is by contract-defined API-based communication.

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Consumers of an interface neither know nor care what module implements it. (And vice versa.)

Multiple modules can provide alternative implementations of the same interface.

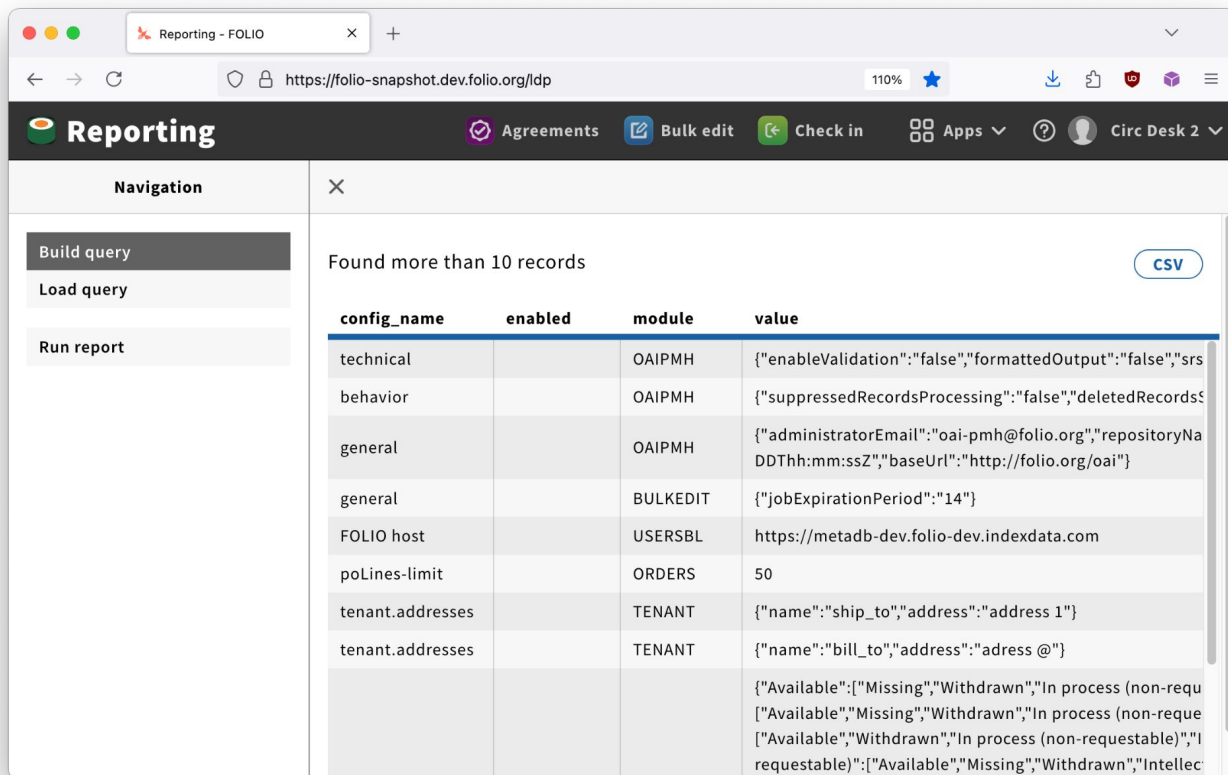
6.A case-study: mod-reporting

The screenshot displays the 'Reporting - FOLIO' web application interface. The browser's address bar shows the URL 'https://folio-snapshot.dev.folio.org/ldp'. The application header includes a 'Reporting' logo and navigation links for 'Agreements', 'Bulk edit', 'Check in', 'Apps', and 'Circ Desk 2'. A left-hand navigation menu contains 'Build query' (highlighted), 'Load query', and 'Run report'. The main content area is configured with the following settings:

- Schema:** folio_configuration
- Table:** config_data__t
- Filter by column:** enabled = true (with an 'Add filter' button)
- Show columns:** module, enabled, config_name, value
- Order by column:** (with an 'Add ordering criterion' button)
- Limit number of results:** 10

A 'Submit' button is located at the bottom of the configuration panel.

6.A case-study: mod-reporting



The screenshot shows a web browser window with the URL `https://folio-snapshot.dev.folio.org/ldp`. The page title is "Reporting - FOLIO". The interface includes a navigation sidebar on the left with options: "Build query", "Load query", and "Run report". The main content area displays a table of configuration records. A message at the top of the table states "Found more than 10 records" with a "CSV" button to the right. The table has four columns: "config_name", "enabled", "module", and "value". The "value" column contains JSON objects representing configuration settings.

config_name	enabled	module	value
technical		OAIPMH	{"enableValidation": "false", "formattedOutput": "false", "srs": "application/javascript"}
behavior		OAIPMH	{"suppressedRecordsProcessing": "false", "deletedRecords": 1000}
general		OAIPMH	{"administratorEmail": "oai-pmh@folio.org", "repositoryName": "FOLIO", "DDThh:mm:ssZ": "mm:ssZ", "baseUrl": "http://folio.org/oai"}
general		BULKEDIT	{"jobExpirationPeriod": "14"}
FOLIO host		USERSBL	https://metadb-dev.folio-dev.indexdata.com
poLines-limit		ORDERS	50
tenant.addresses		TENANT	{"name": "ship_to", "address": "address 1"}
tenant.addresses		TENANT	{"name": "bill_to", "address": "address @"}
			{"Available": ["Missing", "Withdrawn", "In process (non-requestable)", "Available", "Missing", "Withdrawn", "In process (non-requestable)", "Available", "Withdrawn", "In process (non-requestable)", "Available", "Missing", "Withdrawn", "Intellectual property"]}

6.A case-study: mod-reporting

FOLIO's Reporting app allows users to search in Metadb.

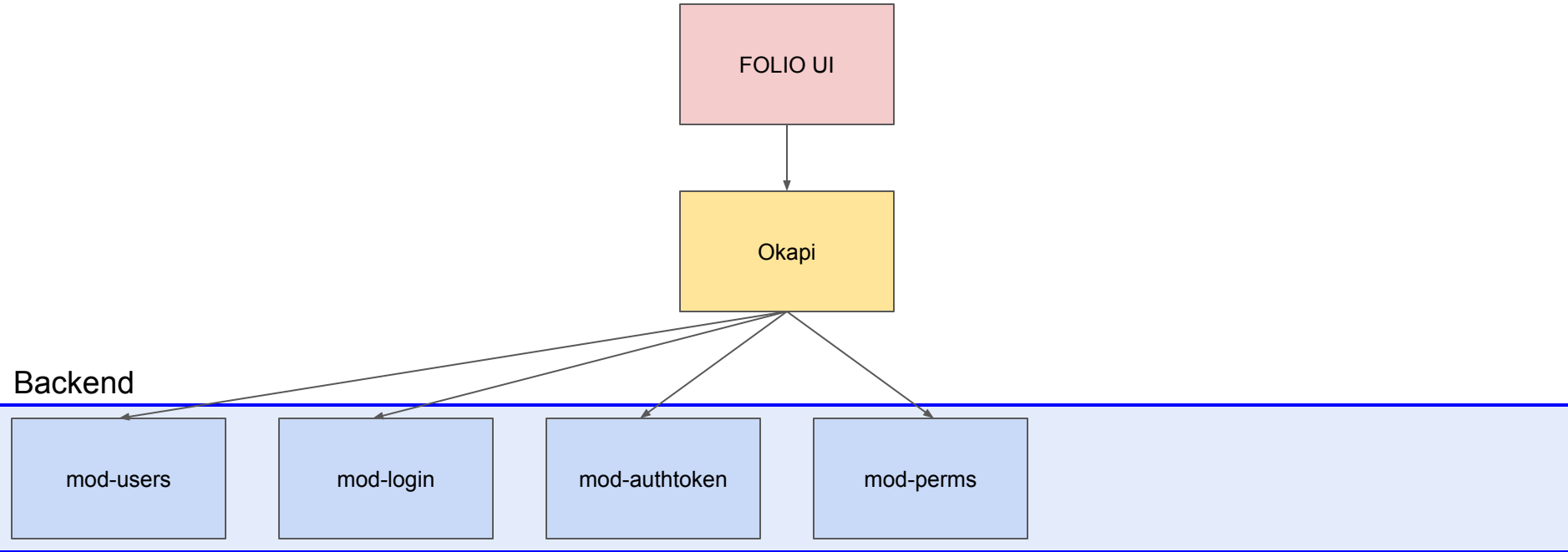
This is a relational database that contains normalized records harvested from FOLIO.

They are continually updated as they change, and history is maintained.

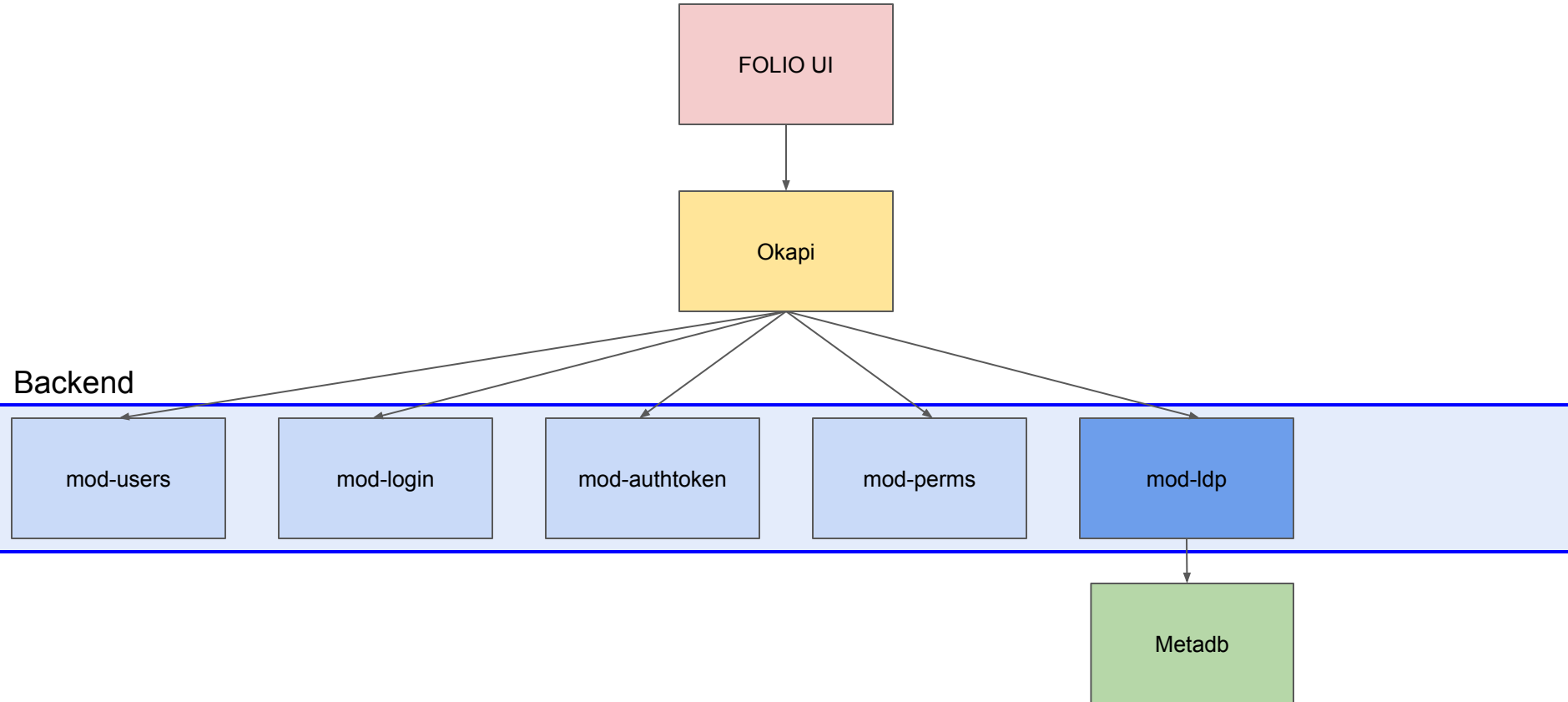
6.A case-study: mod-reporting

Apart from the UI component, the app is implemented by a back-end module (mod-ldp) which communicates on the UI's behalf with Metadb.

6. A case-study: mod-reporting



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mod-ldp is ... not great:

- old code
- written by a third party
- using tools alien to its maintainers
- insecure in places
- badly in need of updates.

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mod-ldp is ... not great:

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- using tools alien to its maintainers
- insecure in places
- badly in need of updates.

Rather than fix it, we decided to replace mod-ldp with a new module, mod-reporting, written in Go.

6.A case-study: mod-reporting

The new module provides the same interface as the old.

```
{
  "id" : "ldp-query",
  "version" : "1.2",
  "handlers": [
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That means the new module is plug-compatible with the old.

It has been deployed in place of its predecessor without problems.

The existing UI module has not been changed to accommodate it, and continues to work exactly as before.

... In fact, it's been running on Snapshot for a week!

7. Implications

Our experience provides an example of how such code upgrades can be performed.

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It provides a pathway for piecewise refreshment of parts of FOLIO as they age out.

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- A plug-compatible mod-users alternative that uses LDAP as the source of truth

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For example:

- A plug-compatible mod-users alternative that uses LDAP as the source of truth
- A plug-compatible mod-fqm-manager replacement that runs queries against MetaDB

7. Implications

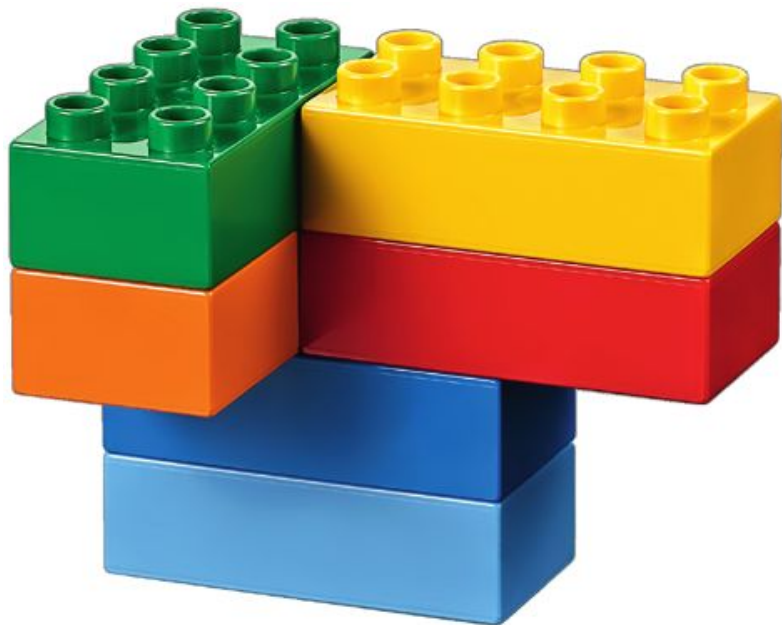
Crucially, *anyone can do this*.

7. Implications

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**Modularity
is
empowering!**

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