

BOF4161:

REST in Peace with Java EE

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Session Description

This session describes an efficient and secure implementation of a REST API for a large Java EE 7 web application. Dataverse, Harvard's popular institutional scientific data repository, sports a comprehensive REST API which shares much functionality with the application's UI. Implementing such an API raises many engineering challenges, from code reuse and security to JSON roundtrips and proper HTTP response codes. To meet these challenges, the Dataverse development team defined new annotations, gave a modern twist to the classic Command pattern, used exceptions in a novel way, and other such niceties. After more than a year in production, the speakers feel confident enough to share this design with the “REST” of the Java community.

The Dataverse Project



- Began in 2006
- Software framework for publishing, citing and preserving research data
- Open source on GitHub for others to install
- Provides incentives for researchers to share:
 - Recognition & credit via data citations
 - Control over data & branding
 - Fulfill Data Management Plan requirements

Dataverse Team

Team:

Number of developers has varied over years. Currently:

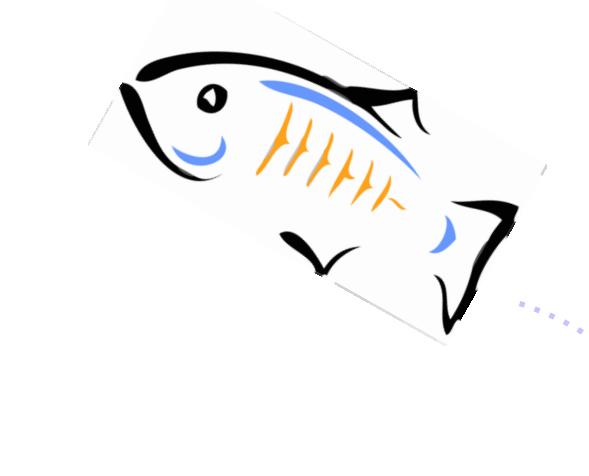
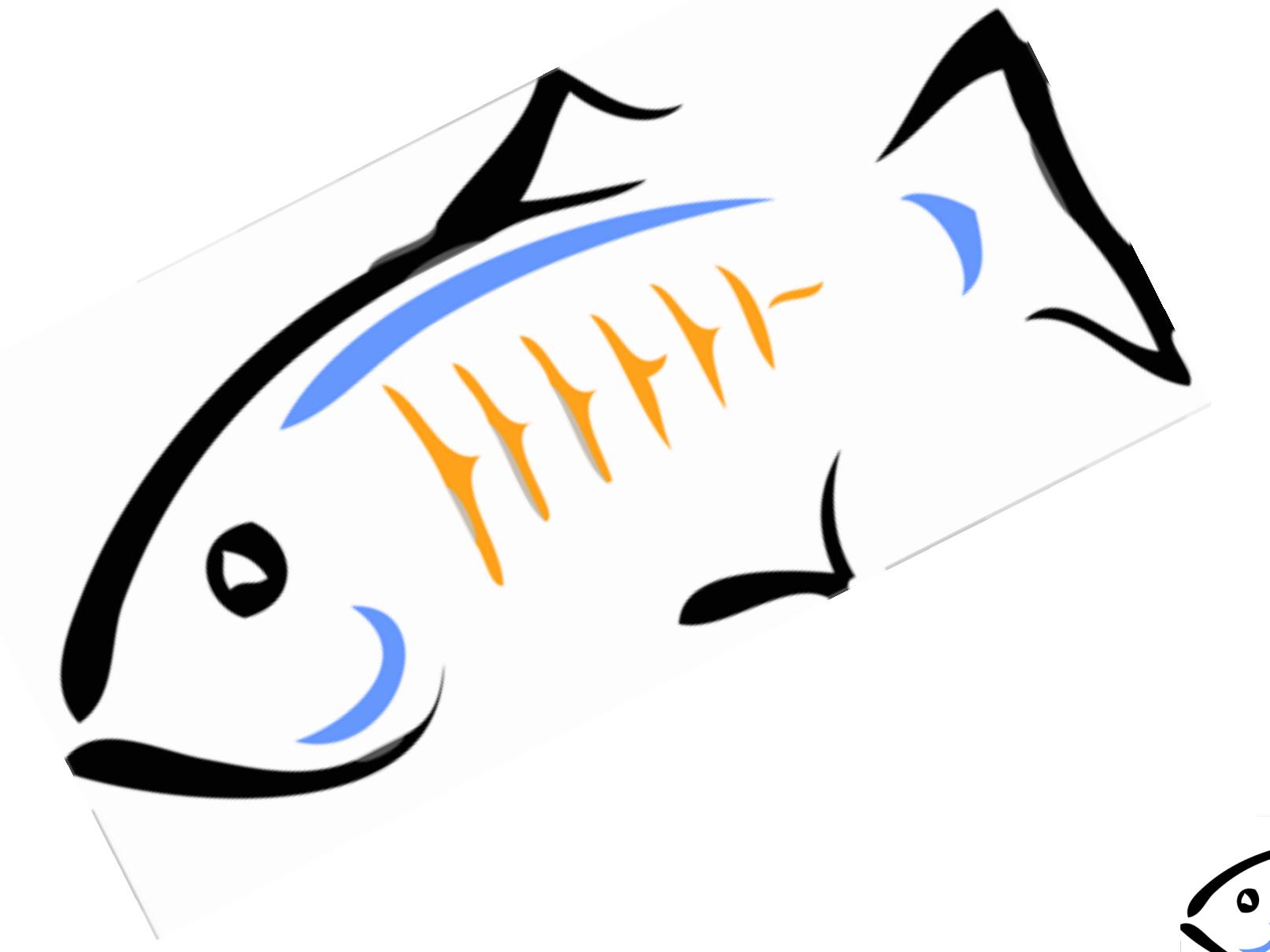
- 1 project manager
- 1 technical lead
- 4 dedicated developers
- Shared QA
- Shared UI designer

Community:

- Working with several partners to add features important to their installations
- Part-time developers

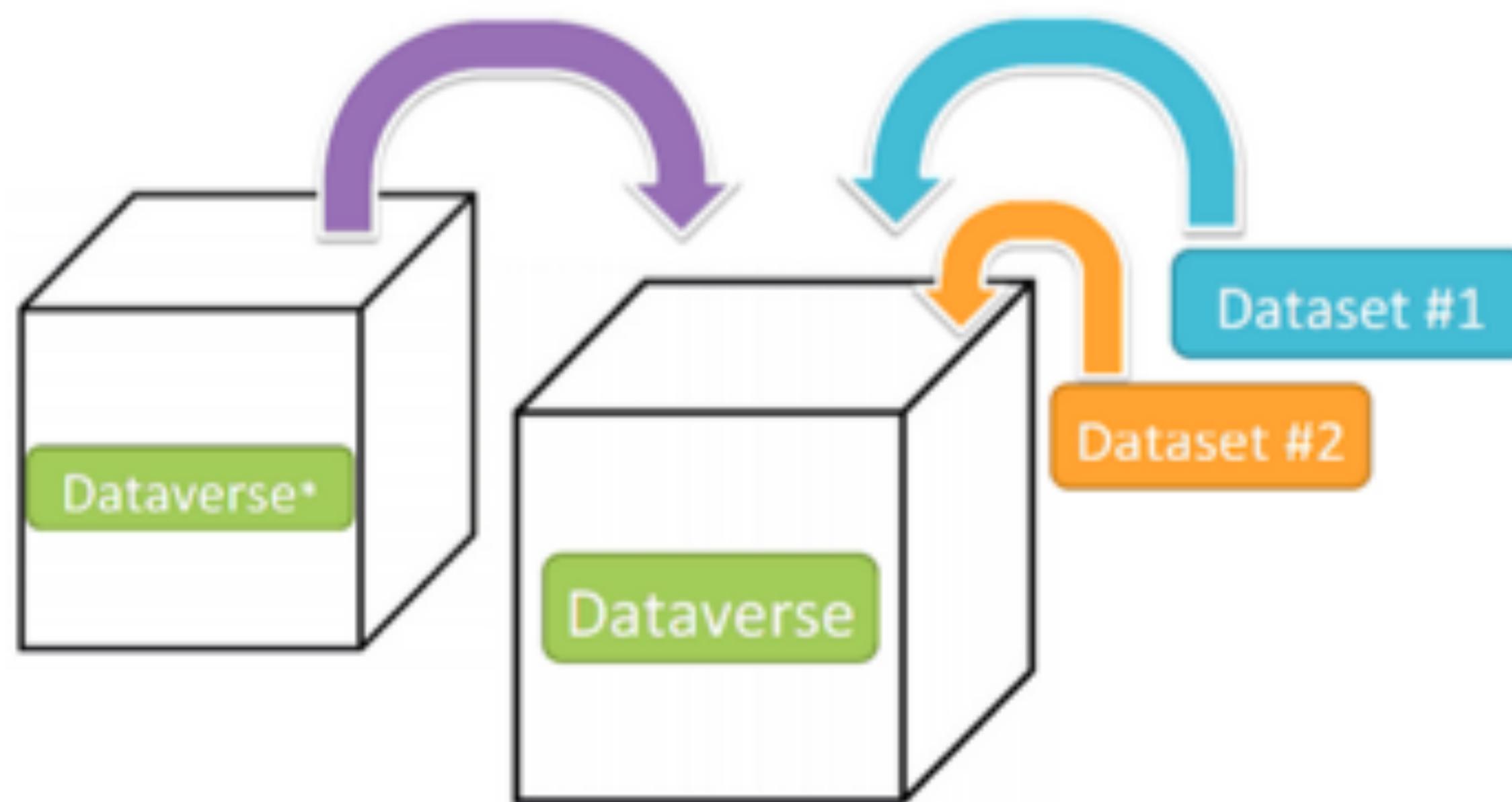
Dataverse Technology

- Glassfish Server 4.1
- Java SE8
- Java EE7
- Presentation: JSF (PrimeFaces), RESTful API
- Business: EJB, Transactions, Asynchronous, Timers
- Storage: JPA (Entities), Bean Validation
- Storage: Postgres, Solr, File System



What is a Dataverse or Dataset?

Schematic Diagram of a **Dataverse** in Dataverse 4.0



Container for your **Datasets and/or Dataverses***

Schematic Diagram of a **Dataset** in Dataverse 4.0



Container for your data, documentation, and code.

* Dataverses can now contain other Dataverses (this replaces Collections & Subnetworks)

Permissions, Roles, RoleAssignees

- **Permissions**

- Based on DVObject

- **Roles**

- Grouping of Permissions

- **Role Assignees**

- Users
 - Groups: Explicit groups, Dynamically defined groups

- **Role Assignments**

- Subject: RoleAssignnee
 - Verb: Role
 - Object: DefinitionPoint (DVObject)

Tools

- **curl**

- A command line tool for transferring data with URLs

- **HTTPie**

- A command line HTTP client that allows for sending arbitrary HTTP requests using a simple and natural syntax, and displays colorized output

- **jq**

- A lightweight and flexible command-line JSON processor

The image shows a terminal window with three separate command-line sessions. The first session at the top uses curl to send a PUT request to httpbin.org/put, setting Content-Type to application/json and the payload to {"hello": "world"}. The response is a 200 OK status with headers indicating nginx as the server and a Date header. The second session in the middle uses http to perform the same PUT request, resulting in a similar response. The third session at the bottom uses jq to parse the JSON response from the curl command, extracting fields like args, data, files, form, headers, json, origin, and url.

```
$ curl -i -X PUT httpbin.org/put -H Content-Type:application/json -d '{"hello": "world"}'
HTTP/1.1 200 OK
Server: nginx
Date: Sat, 14 Feb 2015 17:36:55 GMT
Content-Type: application/json
Content-Length: 3
Connection: keep-alive
Access-Control-Allow-Origin: *
Access-Control-Expose-Headers: Content-Type, Date, Content-Length, Access-Control-Allow-Origin, Access-Control-Expose-Headers
Access-Control-Allow-Methods: POST,PUT,OPTIONS,DELETE,GET,PATCH
Access-Control-Allow-Credentials: true
Content-Length: 423
Content-Type: application/json
Date: Sat, 14 Feb 2015 17:36:55 GMT
Server: nginx

$ http PUT httpbin.org/put hello=world
HTTP/1.1 200 OK
Access-Control-Allow-Credentials: true
Access-Control-Allow-Origin: *
Connection: keep-alive
Content-Length: 423
Content-Type: application/json
Date: Sat, 14 Feb 2015 17:36:55 GMT
Server: nginx

{
  "args": {},
  "data": "{\"hello\": \"world\"}",
  "files": {},
  "form": {},
  "headers": {
    "Accept": "*/*",
    "Content-Length": "18",
    "Content-Type": "application/json",
    "Host": "httpbin.org",
    "User-Agent": "HTTPie/1.0.0-dev"
  },
  "json": {
    "hello": "world"
  },
  "origin": "109.81.210.187",
  "url": "http://httpbin.org/put"
}

$ jq
{
  "args": {},
  "data": "{\"hello\": \"world\"}",
  "files": {},
  "form": {},
  "headers": {
    "Accept": "application/json",
    "Accept-Encoding": "gzip, deflate",
    "Content-Length": "18",
    "Content-Type": "application/json",
    "Host": "httpbin.org",
    "User-Agent": "curl/7.30.0"
  },
  "json": {
    "hello": "world"
  },
  "origin": "109.81.210.187",
  "url": "http://httpbin.org/put"
}
```

Why APIs?

- Design App as a *platform*
- Setup application state
 - Pre-populating a fresh dev install
e.g. after dropping the db
 - Pre-populating test cases
- Inspect application state without the UI
which might not be there
- Foster a developer community
- Allow for integration tests

DataVERSE uses of APIs

Setup

Admin

File Access

Deposit

Export

Design Considerations

- Request / Response formats
 - XML vs JSON
- URL Design
 - Consistency
- API Versioning
 - Allows backward compatibility
 - Calls to no version default to latest version

Design Considerations

**It is important to make these decisions
before you *publish* the API!**

- Request / Response formats
 - XML vs JSON
- URL Design
 - Consistency
- API Versioning
 - Allows backward compatibility
 - Calls to no version default to latest version

What Java EE 7 provides (JAX-RS)

ANNOTATIONS!

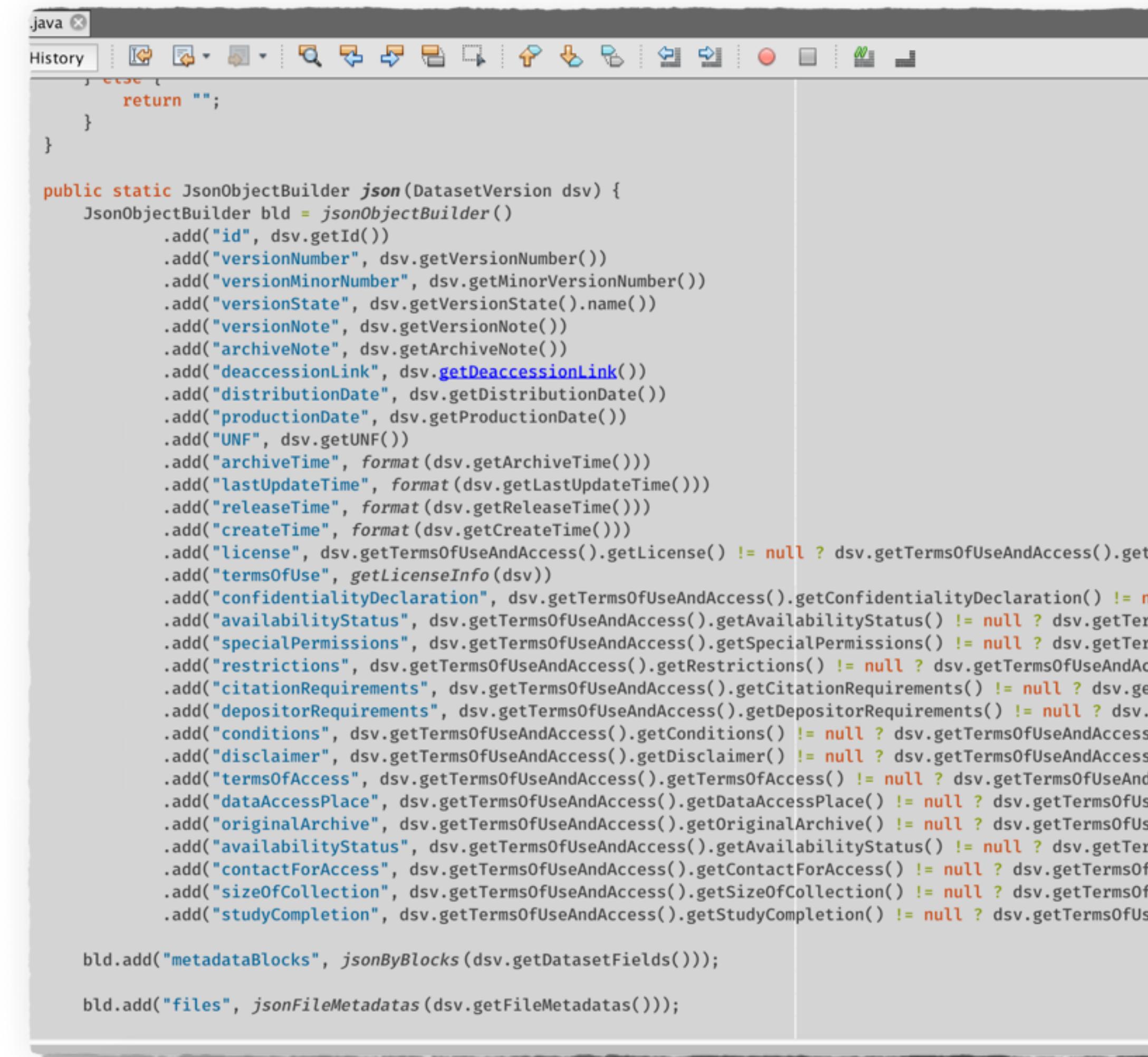
- `@Path` specifies the relative path for a resource class or method.
- `@GET`, `@PUT`, `@POST`, `@DELETE` and `@HEAD` specify the HTTP request type of a resource.
- `@Produces` specifies the response Internet media types (used for content negotiation).
- `@Consumes` specifies the accepted request Internet media types.
- `@PathParam` binds the method parameter to a path segment.
- `@QueryParam` binds the method parameter to the value of an HTTP query parameter.

A Simple Example

```
@Path("datasets")
public class Datasets extends AbstractApiBean {
    ...
    @GET
    @Path("/export")
    @Produces({"application/xml", "application/json"})
    public Response exportDataset(@QueryParam("persistentId") String persistentId,
                                  @QueryParam("exporter") String exporter) {
        ...
    }
}
```

JSON: There and Back Again

- Automatic vs. Manual: We went with **manual**
 - Representation has to be stable, or you break your user's code
 - Objects can have different representation in different contexts
 - Recursive structures are tricky
- Implementation *uses static methods* to better integrate with client code
- Two “printer” classes: full and brief
- One parser class
- **Tedious to write, OK to maintain.**
- Alleviated by null-safe object builders and JSON stream collectors (yay Java 8 streams!)

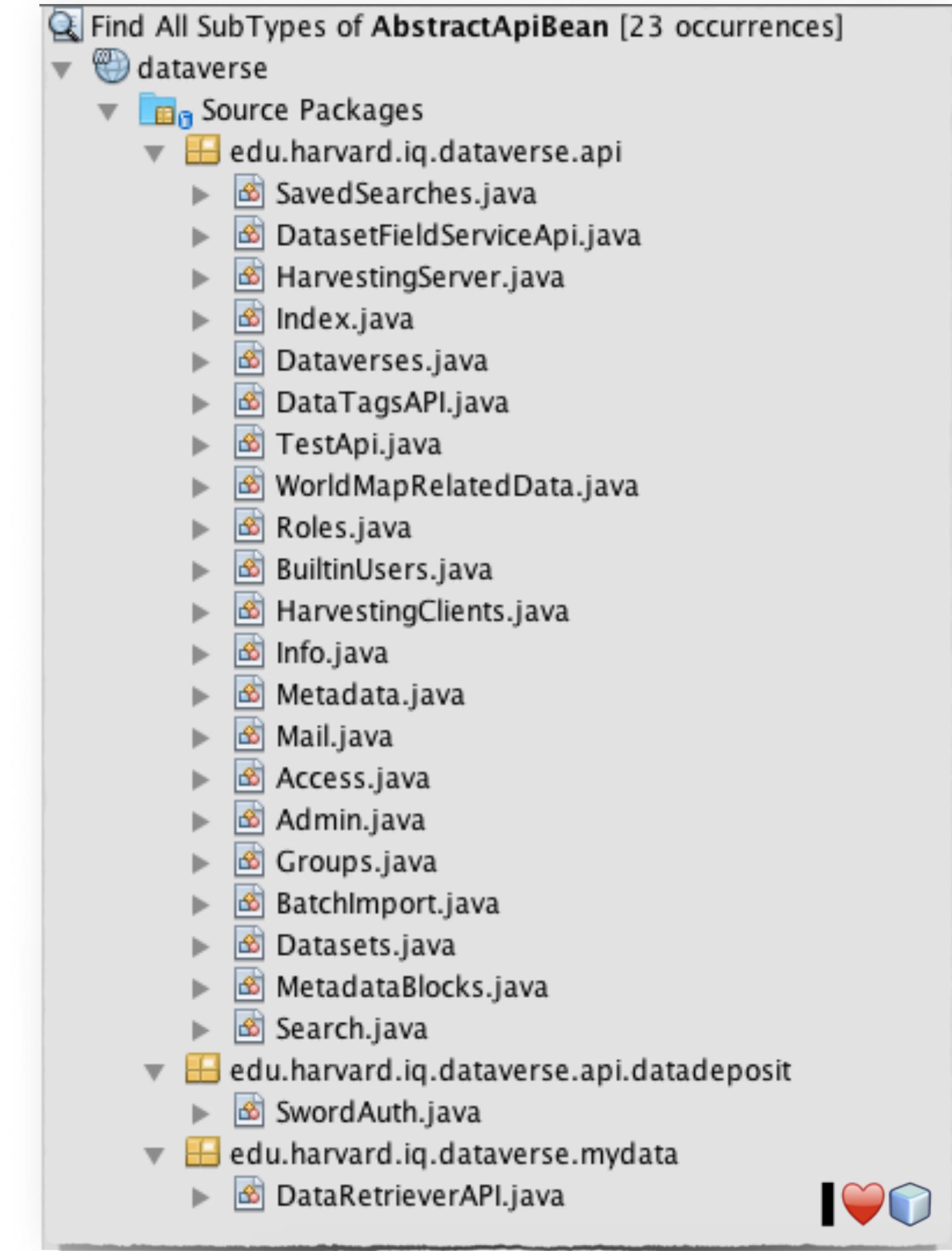


The screenshot shows a Java code editor within an IDE. The code is a static method named `json` that takes a `DatasetVersion` object as a parameter. It uses a `JsonObjectBuilder` to add various fields from the dataset version object to a JSON object. The fields include `id`, `versionNumber`, `versionMinorNumber`, `versionState`, `versionNote`, `archiveNote`, `deaccessionLink`, `distributionDate`, `productionDate`, `UNF`, `archiveTime`, `lastUpdateTime`, `releaseTime`, `createTime`, `license`, `termsOfUse`, `confidentialityDeclaration`, `availabilityStatus`, `specialPermissions`, `restrictions`, `citationRequirements`, `depositorRequirements`, `conditions`, `disclaimer`, `termsOfAccess`, `dataAccessPlace`, `originalArchive`, `availabilityStatus`, `contactForAccess`, `sizeOfCollection`, and `studyCompletion`. The code also handles null values by using the `!= null` operator. The `JsonObjectBuilder` is initialized with `bld = jsonObjectBuilder()`.

```
public static JsonObjectBuilder json(DatasetVersion dsv) {
    JsonObjectBuilder bld = jsonObjectBuilder()
        .add("id", dsv.getId())
        .add("versionNumber", dsv.getVersionNumber())
        .add("versionMinorNumber", dsv.getMinorVersionNumber())
        .add("versionState", dsv.getVersionState().name())
        .add("versionNote", dsv.getVersionNote())
        .add("archiveNote", dsv.getArchiveNote())
        .add("deaccessionLink", dsv.getDeaccessionLink())
        .add("distributionDate", dsv.getDistributionDate())
        .add("productionDate", dsv.getProductionDate())
        .add("UNF", dsv.getUNF())
        .add("archiveTime", format(dsv.getArchiveTime()))
        .add("lastUpdateTime", format(dsv.getLastUpdateTime()))
        .add("releaseTime", format(dsv.getReleaseTime()))
        .add("createTime", format(dsv.getCreateTime()))
        .add("license", dsv.getTermsOfUseAndAccess().getLicense() != null ? dsv.getTermsOfUseAndAccess().getLicenseInfo(dsv))
        .add("termsOfUse", getLicenseInfo(dsv))
        .add("confidentialityDeclaration", dsv.getTermsOfUseAndAccess().getConfidentialityDeclaration() != null ? dsv.getTermsOfUseAndAccess().getConfidentialityDeclarationInfo(dsv))
        .add("availabilityStatus", dsv.getTermsOfUseAndAccess().getAvailabilityStatus() != null ? dsv.getTermsOfUseAndAccess().getAvailabilityStatusInfo(dsv))
        .add("specialPermissions", dsv.getTermsOfUseAndAccess().getSpecialPermissions() != null ? dsv.getTermsOfUseAndAccess().getSpecialPermissionsInfo(dsv))
        .add("restrictions", dsv.getTermsOfUseAndAccess().getRestrictions() != null ? dsv.getTermsOfUseAndAccess().getRestrictionsInfo(dsv))
        .add("citationRequirements", dsv.getTermsOfUseAndAccess().getCitationRequirements() != null ? dsv.getTermsOfUseAndAccess().getCitationRequirementsInfo(dsv))
        .add("depositorRequirements", dsv.getTermsOfUseAndAccess().getDepositorRequirements() != null ? dsv.getTermsOfUseAndAccess().getDepositorRequirementsInfo(dsv))
        .add("conditions", dsv.getTermsOfUseAndAccess().getConditions() != null ? dsv.getTermsOfUseAndAccess().getConditionsInfo(dsv))
        .add("disclaimer", dsv.getTermsOfUseAndAccess().getDisclaimer() != null ? dsv.getTermsOfUseAndAccess().getDisclaimerInfo(dsv))
        .add("termsOfAccess", dsv.getTermsOfUseAndAccess().getTermsOfAccess() != null ? dsv.getTermsOfUseAndAccess().getTermsOfAccessInfo(dsv))
        .add("dataAccessPlace", dsv.getTermsOfUseAndAccess().getDataAccessPlace() != null ? dsv.getTermsOfUseAndAccess().getDataAccessPlaceInfo(dsv))
        .add("originalArchive", dsv.getTermsOfUseAndAccess().getOriginalArchive() != null ? dsv.getTermsOfUseAndAccess().getOriginalArchiveInfo(dsv))
        .add("availabilityStatus", dsv.getTermsOfUseAndAccess().getAvailabilityStatus() != null ? dsv.getTermsOfUseAndAccess().getAvailabilityStatusInfo(dsv))
        .add("contactForAccess", dsv.getTermsOfUseAndAccess().getContactForAccess() != null ? dsv.getTermsOfUseAndAccess().getContactForAccessInfo(dsv))
        .add("sizeOfCollection", dsv.getTermsOfUseAndAccess().getSizeOfCollection() != null ? dsv.getTermsOfUseAndAccess().getSizeOfCollectionInfo(dsv))
        .add("studyCompletion", dsv.getTermsOfUseAndAccess().getStudyCompletion() != null ? dsv.getTermsOfUseAndAccess().getStudyCompletionInfo(dsv))
    bld.add("metadataBlocks", jsonByBlocks(dsv.getDatasetFields()));
    bld.add("files", jsonFileMetadatas(dsv.getFileMetadatas()));
}
```

AbstractApiBean

- Base class for all API resource classes.
- Code reuse
 - Useful injections (e.g. `HttpServletRequest`)
 - Common Beans
 - Finding user by API token
- **Support of a DSL-ish environment for writing API endpoints.**
 - HTTP response codes methods
 - `okResponse(...)`, `notFound(...)`
 - Inspired by *Play!2.0*
 - `findUser()`,
 - `findDataaverse()`, `findDvo()`



RoleApiBean extends AbstractApiBean

```
@GET  
@Path("{id}")  
public Response viewRole( @PathParam("id") Long id) {  
    try {  
        DataverseRole role = rolesSvc.find(id);  
        if ( role == null ) {  
            return notFound("role with id " + id + " not found");  
        } else {  
            return ( permissionSvc.userOn(findUserOrDie(),role.getOwner())  
                    .has(Permission.ManageDataversePermissions) ) ?  
                okResponse( json(role) )  
                : permissionError("Permission required to view roles.");  
        }  
    } catch (WrappedResponse ex) {  
        return ex.getResponse();  
    }  
}
```

RoleApiBean extends AbstractApiBean

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}
```

Static Imports

RoleApiBean extends AbstractApiBean

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            return ( permissionSvc.userOn(findUserOrDie(),role.getOwner())  
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                okResponse( json(role) )  
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        }  
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}
```

HTTP Responses

Static Imports

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        }  
    } catch (WrappedResponse ex) {  
        return ex.getResponse();  
    }  
}
```

HTTP Responses

Static Imports

Wrapped Responses

Problem:

Unlike UI, API has no session; it has to build context for each request.

UI

1. Login (gets user)
2. Navigate to object (gets object)
3. Check permissions and select operation (action)
4. Actually have the user operate on the object

API

1. Get user, get object, check permission and operate on object.
Repeat. Each. call.

The Code is Loooong

```
@GET  
@Path("{identifier}/groups/{aliasInOwner}")  
public Response getGroupByOwnerAndAliasInOwner(  
    @PathParam("identifier") String dvIdtf,  
    @PathParam("aliasInOwner") String grpAliasInOwner){  
    Dataverse dv = findDataverse(dvIdtf);  
    if ( dv == null ) {  
        return notFound( ... );  
    }  
    User user = findUser();  
    if ( user == null ) {  
        return notAuthorized( ... );  
    }  
    if ( ! Permissions.check(user, dv, SEE_GROUPS) ) {  
        return notAuthorized( ... );  
    }  
    Group group = findExplicitGroup(dv, grpAliasInOwner );  
    if ( group == null ) {  
        return notFound( ... );  
    } else {  
        return okResponse( json(group) );  
    }  
}
```

/!\ Not a production code

The Code is Loooong

```
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public Response getGroupByOwnerAndAliasInOwner(  
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    if ( dv == null ) {  
        return notFound( ... );  
    }  
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    if ( user == null ) {  
        return notAuthorized( ... );  
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    if ( group == null ) {  
        return notFound( ... );  
    } else {  
        return okResponse( json(group) );  
    }  
}
```

Get, test,
return if fail

/!\ Not a production code

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    if ( dv == null ) {  
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    if ( user == null ) {  
        return notAuthorized( ... );  
    }  
    if ( ! Permissions.check(user, dv, SEE_GROUPS) ) {  
        return notAuthorized( ... );  
    }  
    Group group = findExplicitGroup(dv, grpAliasInOwner );  
    if ( group == null ) {  
        return notFound( ... );  
    } else {  
        return okResponse( json(group) );  
    }  
}
```

Get, test, return if fail

Validate permissions

/!\ Not a production code

Exceptions: the untold story

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Well, less told.

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Requirement:

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Well, less told.

Requirement:

Given a dataverse ID, return its data, or an HTTP error.

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Well, less told.

Requirement:

Given a dataverse ID, return its data, or an HTTP error.

```
public Dataverse || HttpError findDataverse(String id);
```

Exceptions: the untold story

Well, less told.

Requirement:

Given a dataverse ID, return its data, or an HTTP error.

```
public Dataverse || HttpError findDataverse(String id);  
final ?? result = findDataverse( id );
```

Exceptions: the untold story

Well, less told.

Requirement:

Given a dataverse ID, return its data, or an HTTP error.

```
public Dataverse || HttpError findDataverse(String id);  
final ?? result = findDataverse( id );  
public Dataverse findDataverse(String id) throws HttpError;
```

Exceptions: the untold story

Well, less told.

Requirement:

Given a dataverse ID, return its data, or an HTTP error.

```
public Dataverse || HttpError findDataverse(String id);  
final ?? result = findDataverse( id );  
public Dataverse findDataverse(String id) throws HttpError;
```

```
try {  
    Dataverse aDataverse = findDataverse(id);  
    // operate on aDataverse ...  
} catch (HttpError err) {  
    // Send proper HTTP error code ...  
}
```

Exceptions allow methods to return multiple types*

* Terms and conditions:

- All types except for one have to extend `java.lang.Exception`
- Implemented as control flow
- This view is less useful for cases where the exception propagates through the call stack until caught

WrappedResponse: an Exceptional Return

- Methods which may fail return the appropriate HTTP response, wrapped in a specialized exception
- Top method catches that exception and returns the wrapped response

```
private AuthenticatedUser findAuthenticatedUserOrDie( String key ) throws  
WrappedResponse {  
    AuthenticatedUser u = authSvc.lookupUser(key);  
    if ( u != null ) {  
        return u;  
    }  
    throw new WrappedResponse( badApiKey(key) );  
}
```

```
protected <T> T failIfNull( T t, String errorMessage ) throws WrappedResponse {  
    if ( t != null ) return t;  
    throw new WrappedResponse(  
        ErrorResponse(Response.Status.BAD_REQUEST, errorMessage));  
}
```

No Exceptions

```
@GET  
@Path("{identifier}/groups/{aliasInOwner}")  
public Response getGroupByOwnerAndAliasInOwner(@PathParam("identifier") String dvIdtf,  
                                              @PathParam("aliasInOwner") String grpAliasInOwner ) {  
    Dataverse dv = findDataverse(dvIdtf);  
    if ( dv == null ) {  
        return notFound( ... );  
    }  
    User user = findUser();  
    if ( user == null ) {  
        return notAuthorized( ... );  
    }  
    if ( ! Permissions.check(user, dv, SEE_GROUPS) ) {  
        return notAuthorized( ... );  
    }  
    Group group = findExplicitGroup(dv, grpAliasInOwner );  
    if ( group == null ) {  
        return notFound( ... );  
    } else {  
        return okResponse( json(group) );  
    }  
}
```

Wrapped Responses FTW!

```
@GET  
@Path("{identifier}/groups/{aliasInOwner}")  
public Response getGroupByOwnerAndAliasInOwner(@PathParam("identifier") String dvIdtf,  
                                              @PathParam("aliasInOwner") String grpAliasInOwner ){  
    try {  
        return okResponse(json(  
            findExplicitGroupOrDie(findDataverseOrDie(dvIdtf),  
            createDataverseRequest(findUserOrDie()), grpAliasInOwner)));  
    } catch (WrappedResponse wr) {  
        return wr.getResponse();  
    }  
}
```

Wrapped Responses FTW!

```
@GET  
@Path("{identifier}/groups/{aliasInOwner}")  
public Response getGroupByOwnerAndAliasInOwner(@PathParam("identifier") String identifier, @PathParam("aliasInOwner") String aliasInOwner){  
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            findExplicitGroupOrDie(findDataverseOrDie(dvIdtf),  
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    } catch (WrappedResponse wr) {  
        return wr.getResponse();  
    }  
}
```

200 OK

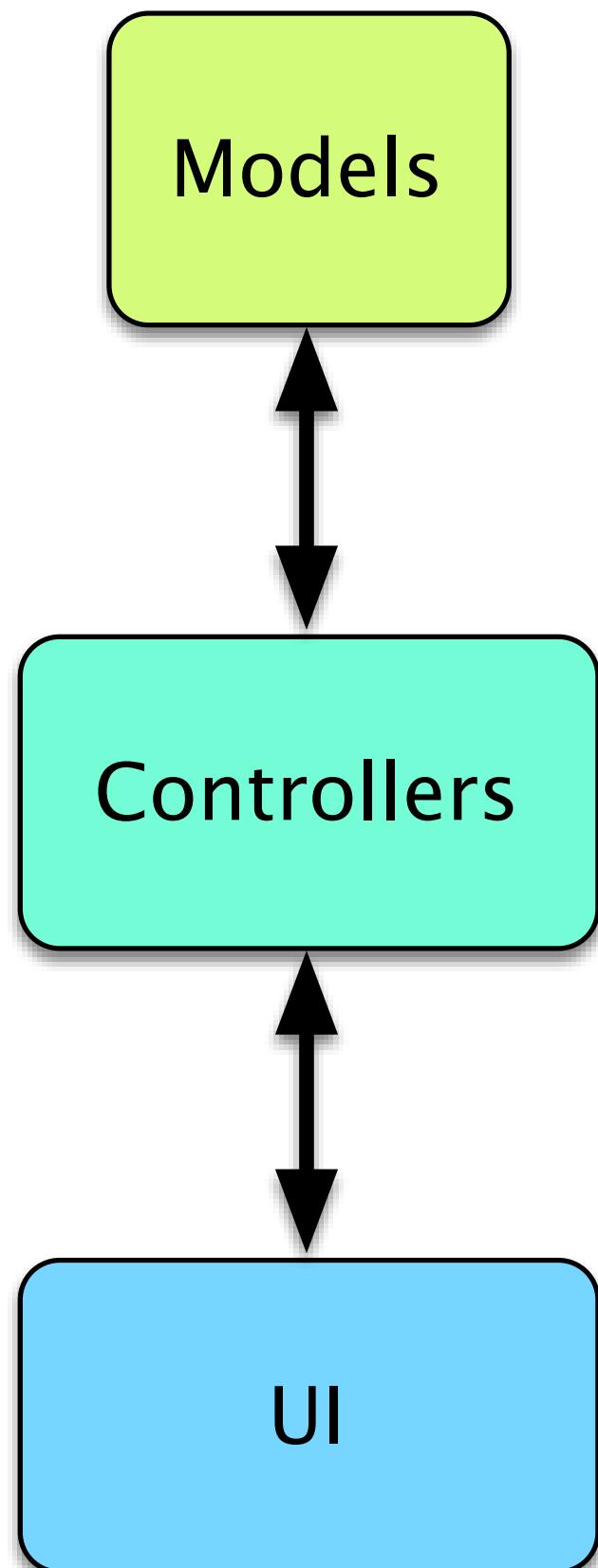
404 NOT FOUND
(dataverse)

401 NOT
AUTHORIZED
(user not found)

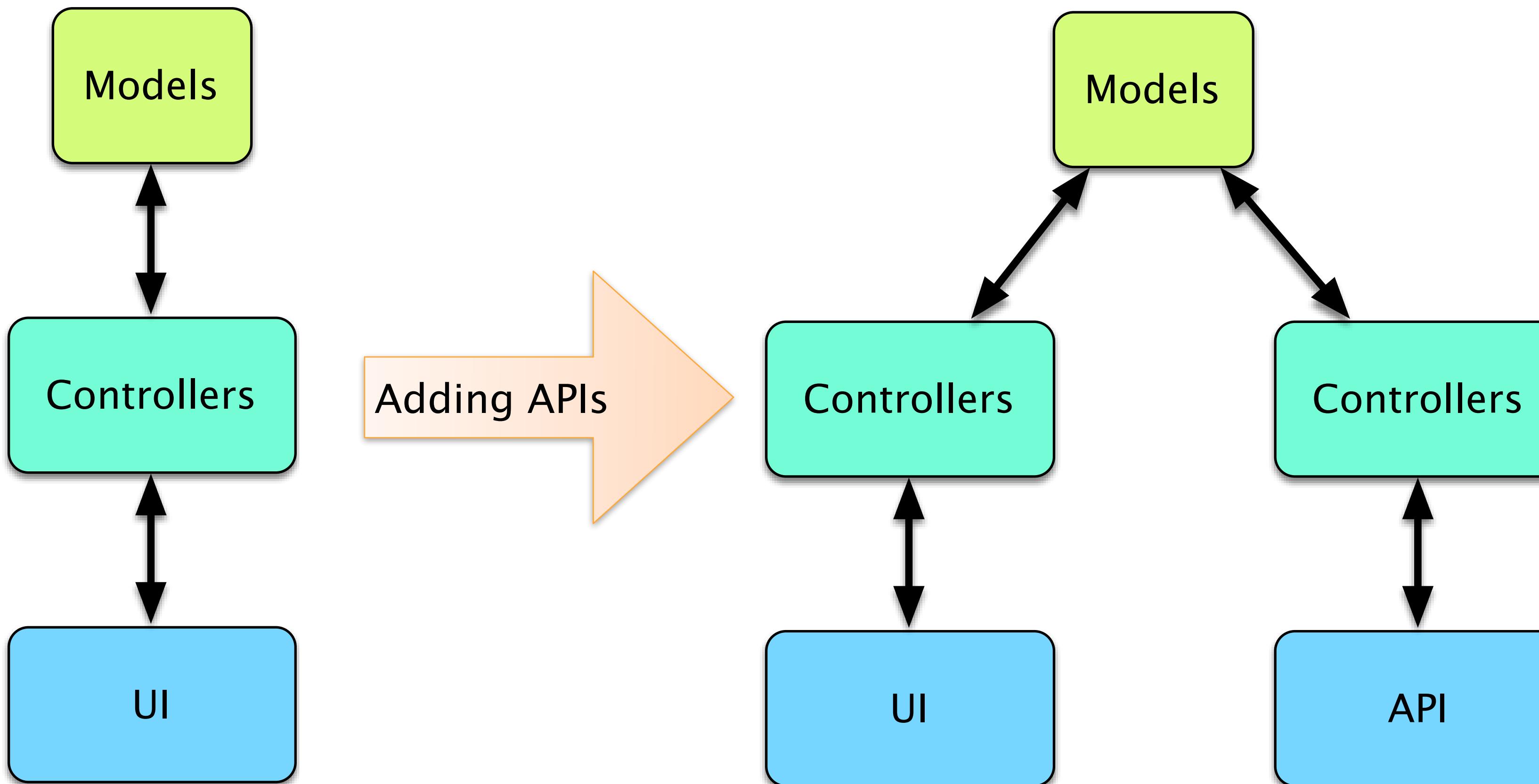
404 NOT FOUND
(group)

401 NOT AUTHORIZED
(user not authorized to
new groups)

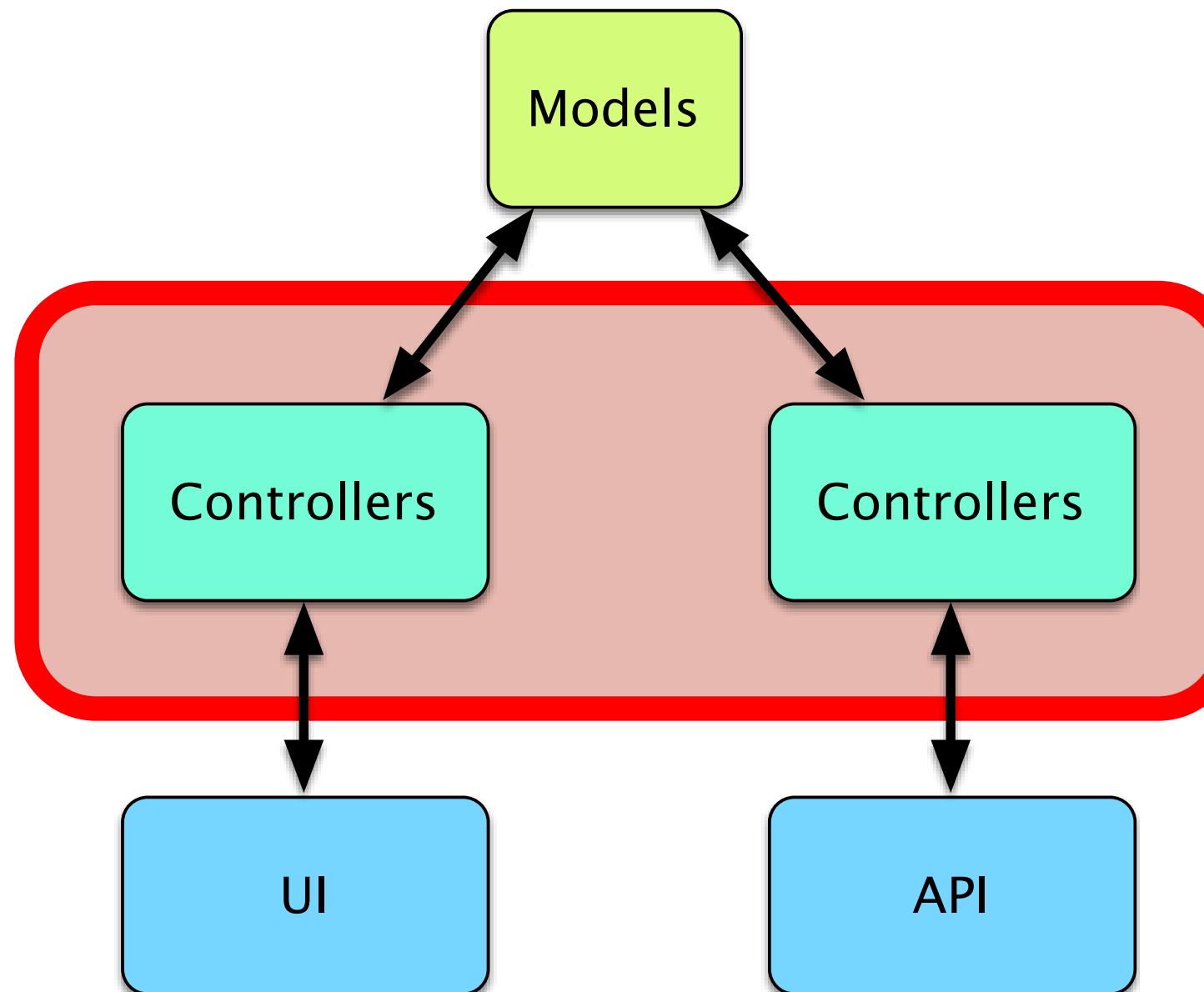
Problem: Functionality Duplication



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Problem: Functionality Duplication



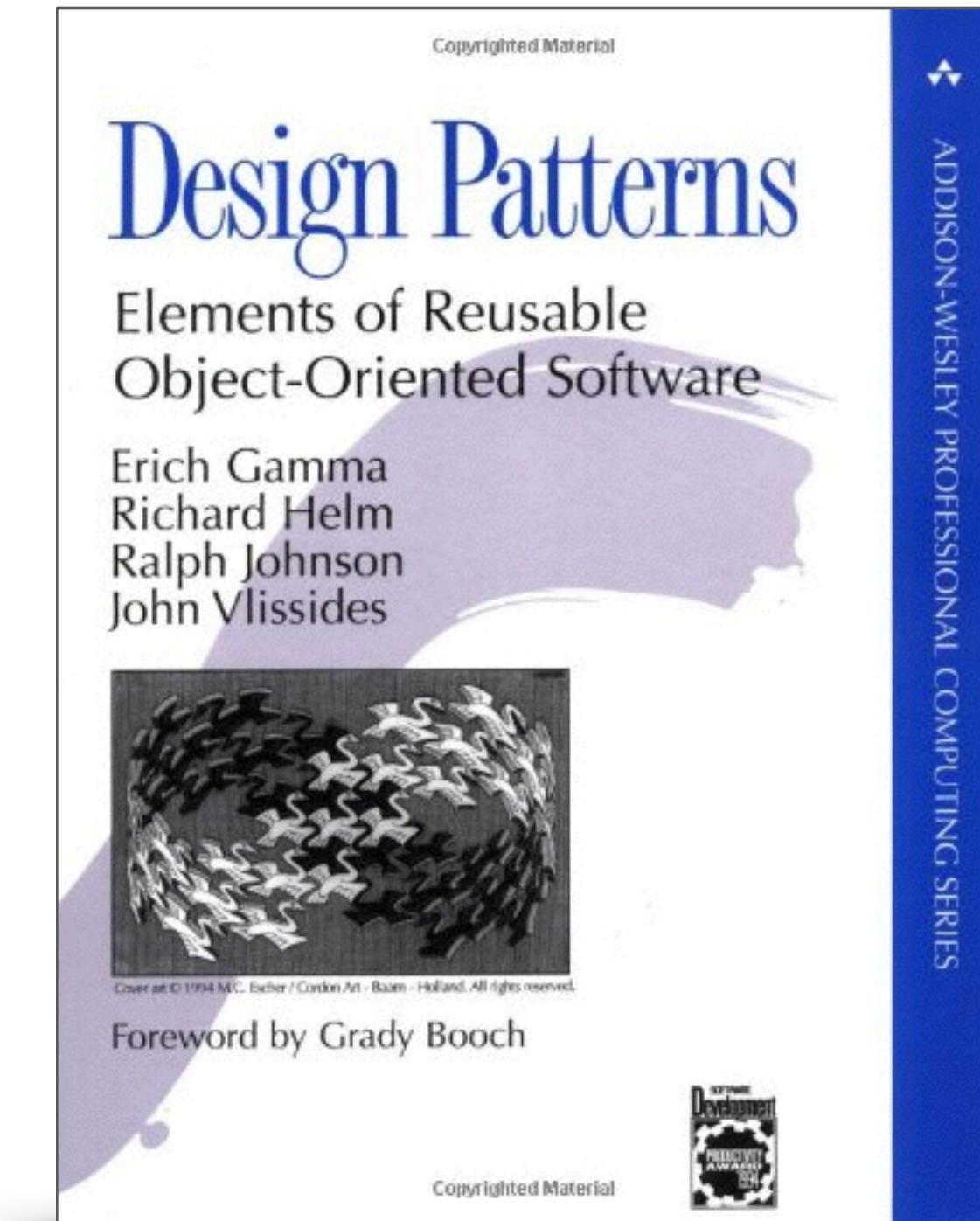
- Functionality duplication
 - ~ Code duplication
- More permission validations
 - More chances of missing one

**MVC alone is inefficient
for supporting a large API along a UI.**

The Command Design Pattern

*“Encapsulate a request as an object,
thereby letting you parameterize
other objects with different requests,
queue or log requests, and support
undoable operations.”*

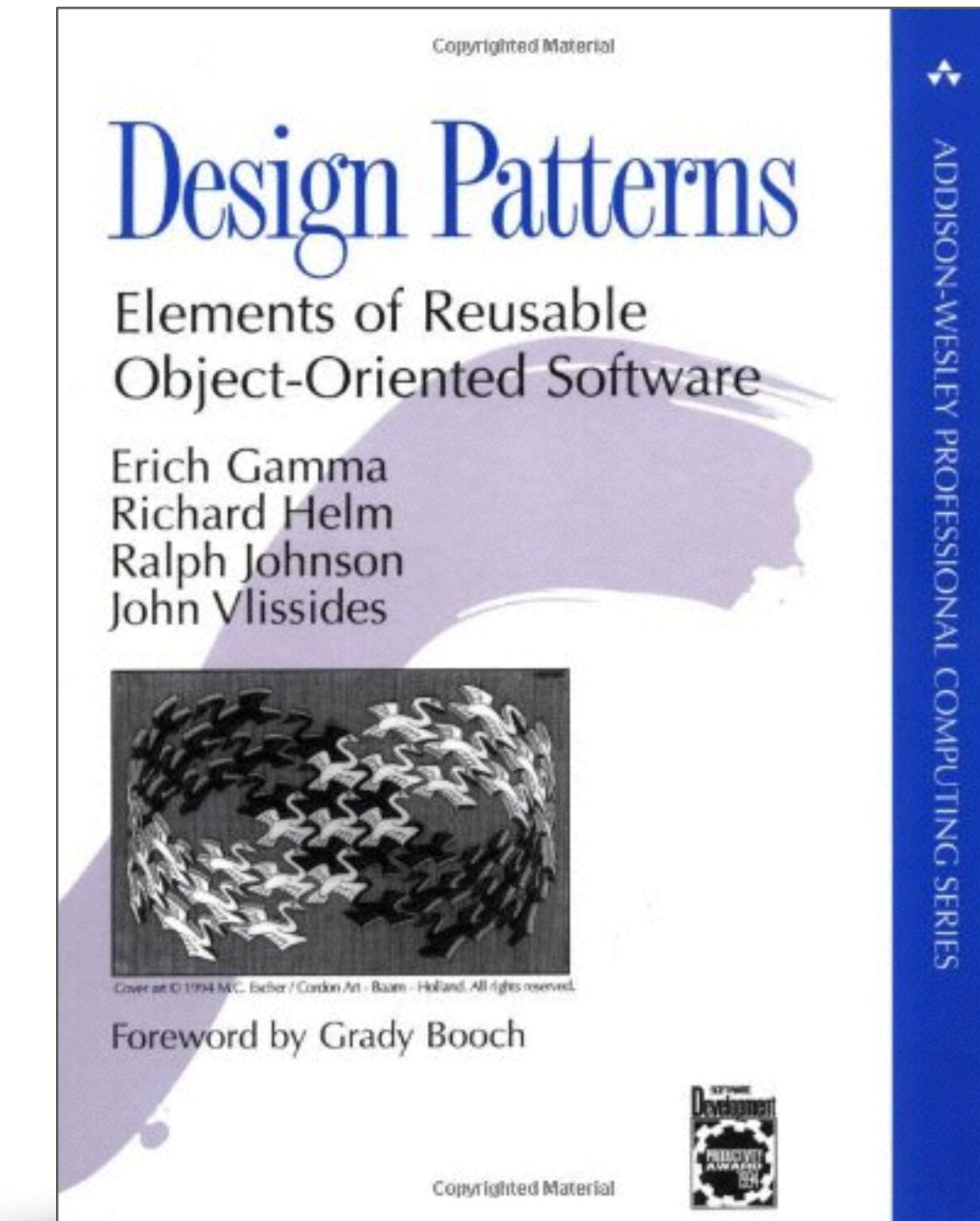
GoF, 1994



The Command Design Pattern

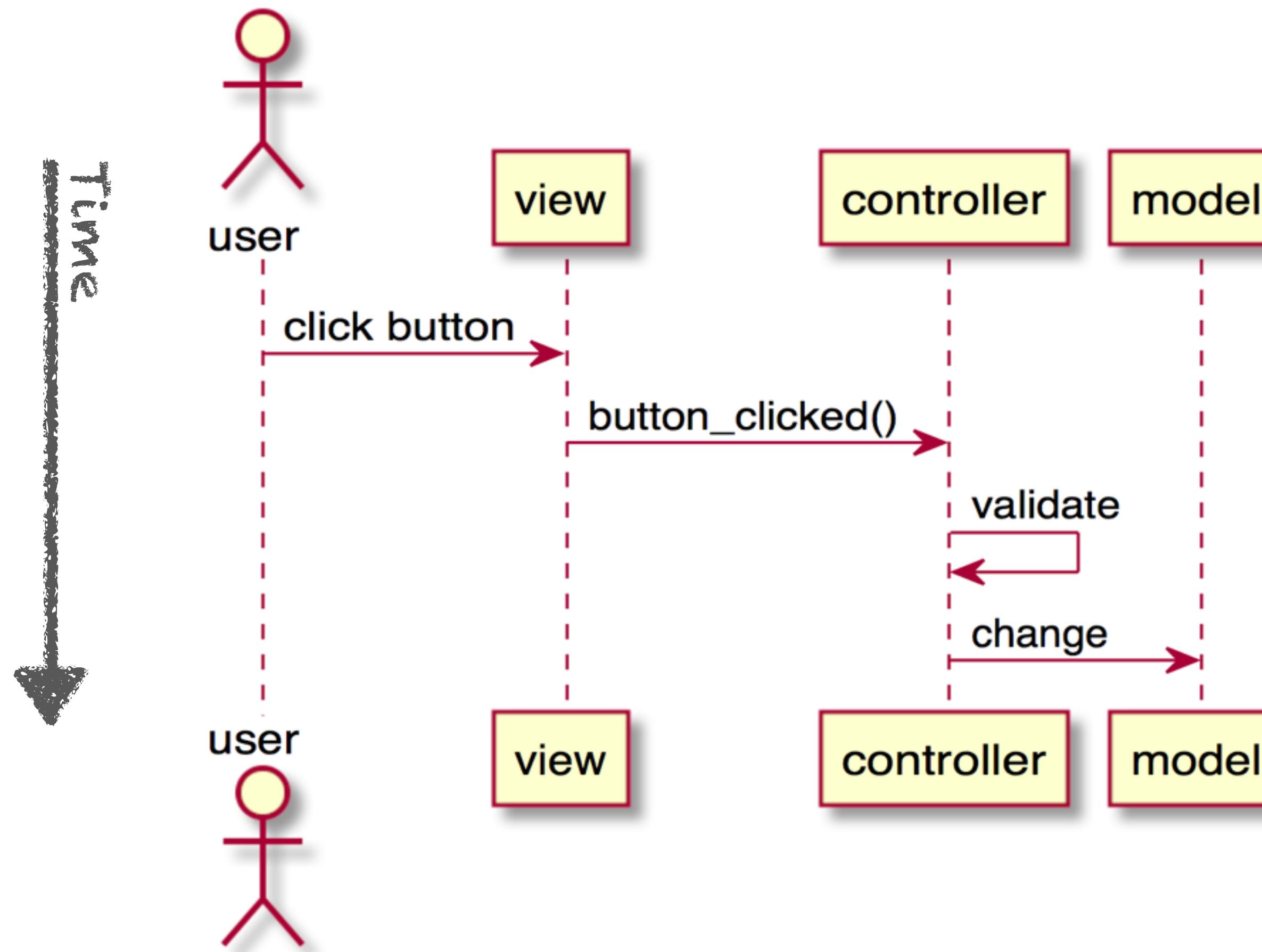
“Encapsulate a request as an object, thereby letting you parameterize other objects with different requests, queue or log requests, and support undoable operations.”

GoF, 1994

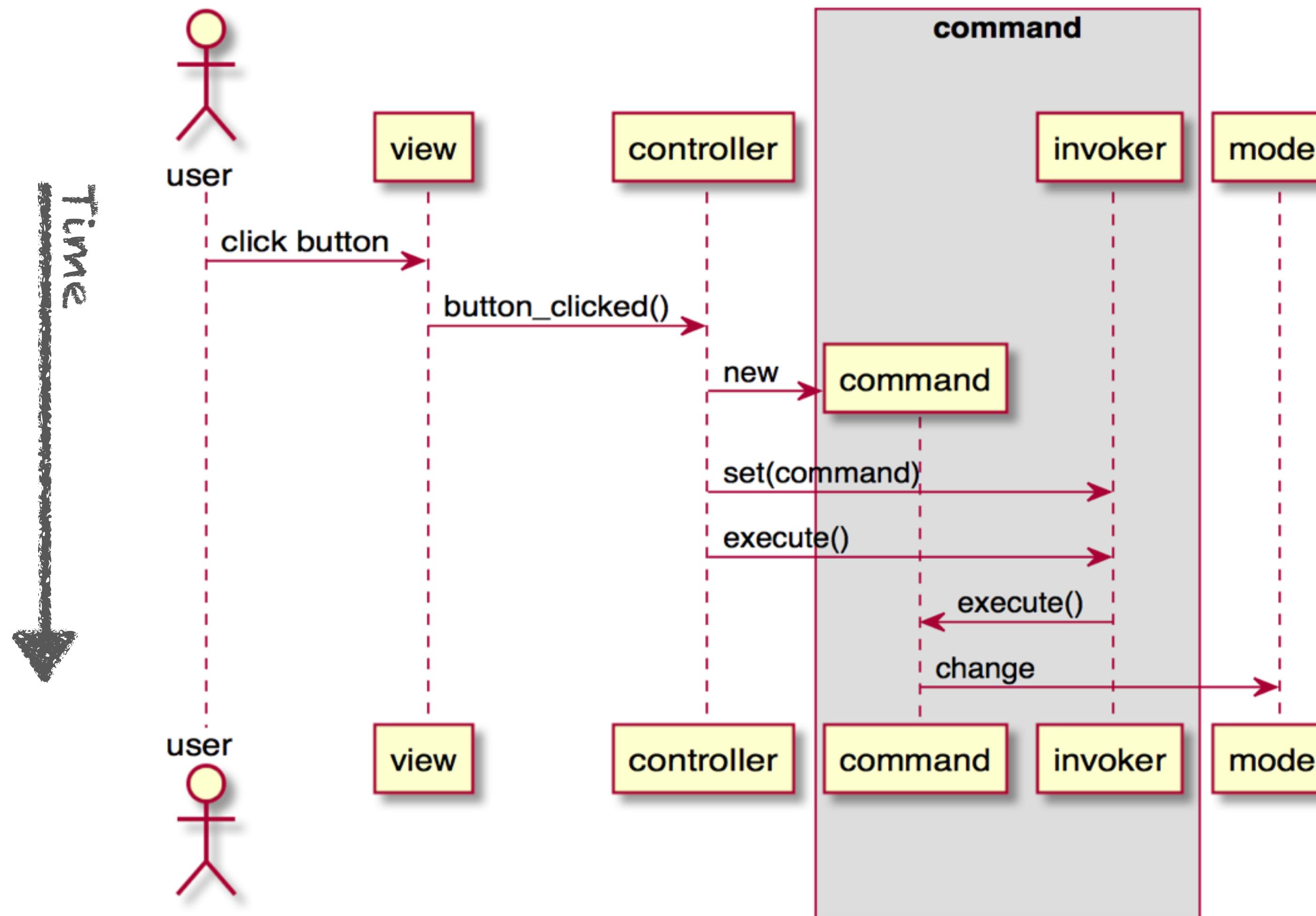


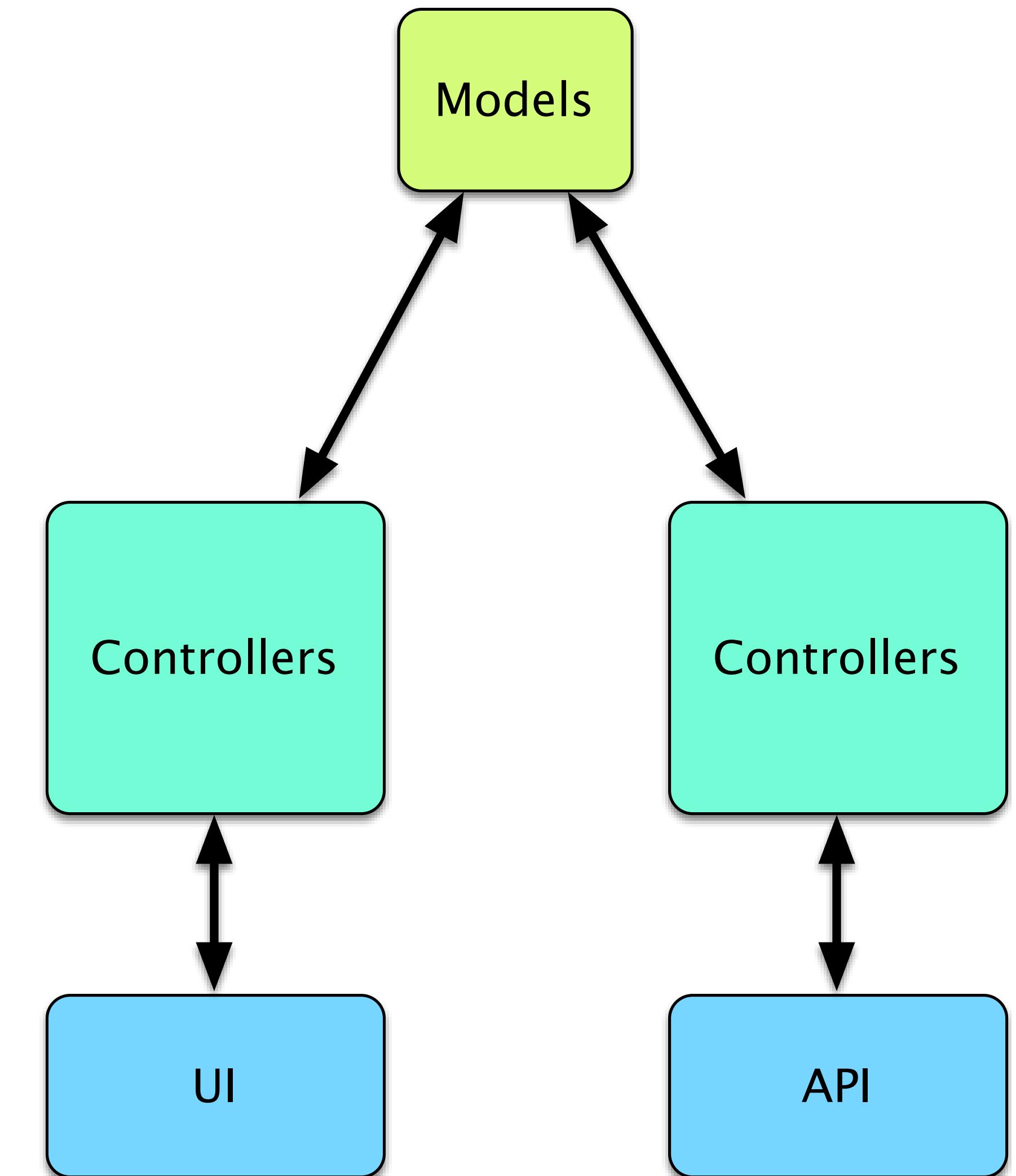
Using **code** as **data**

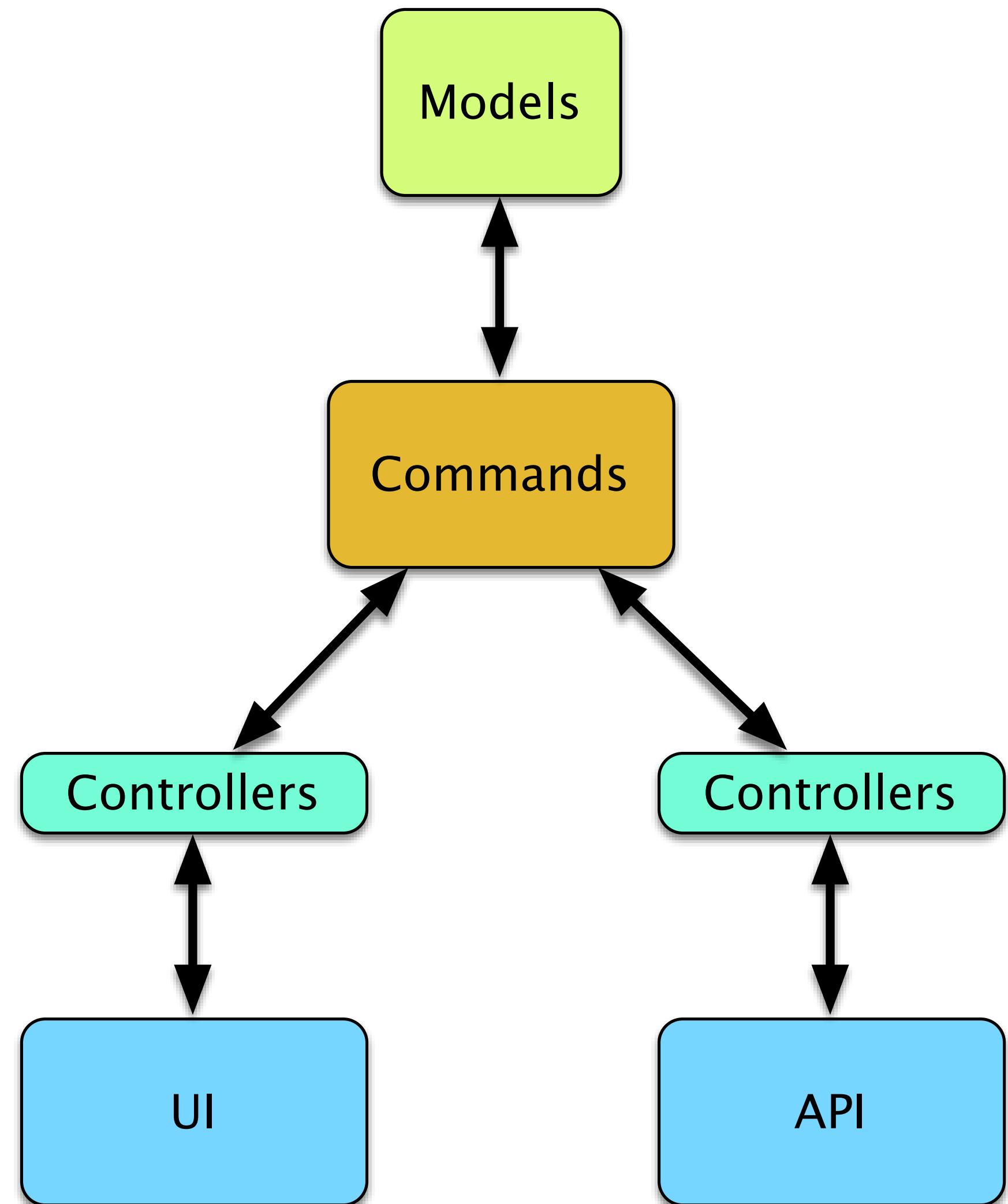
Classic Model-View-Controller



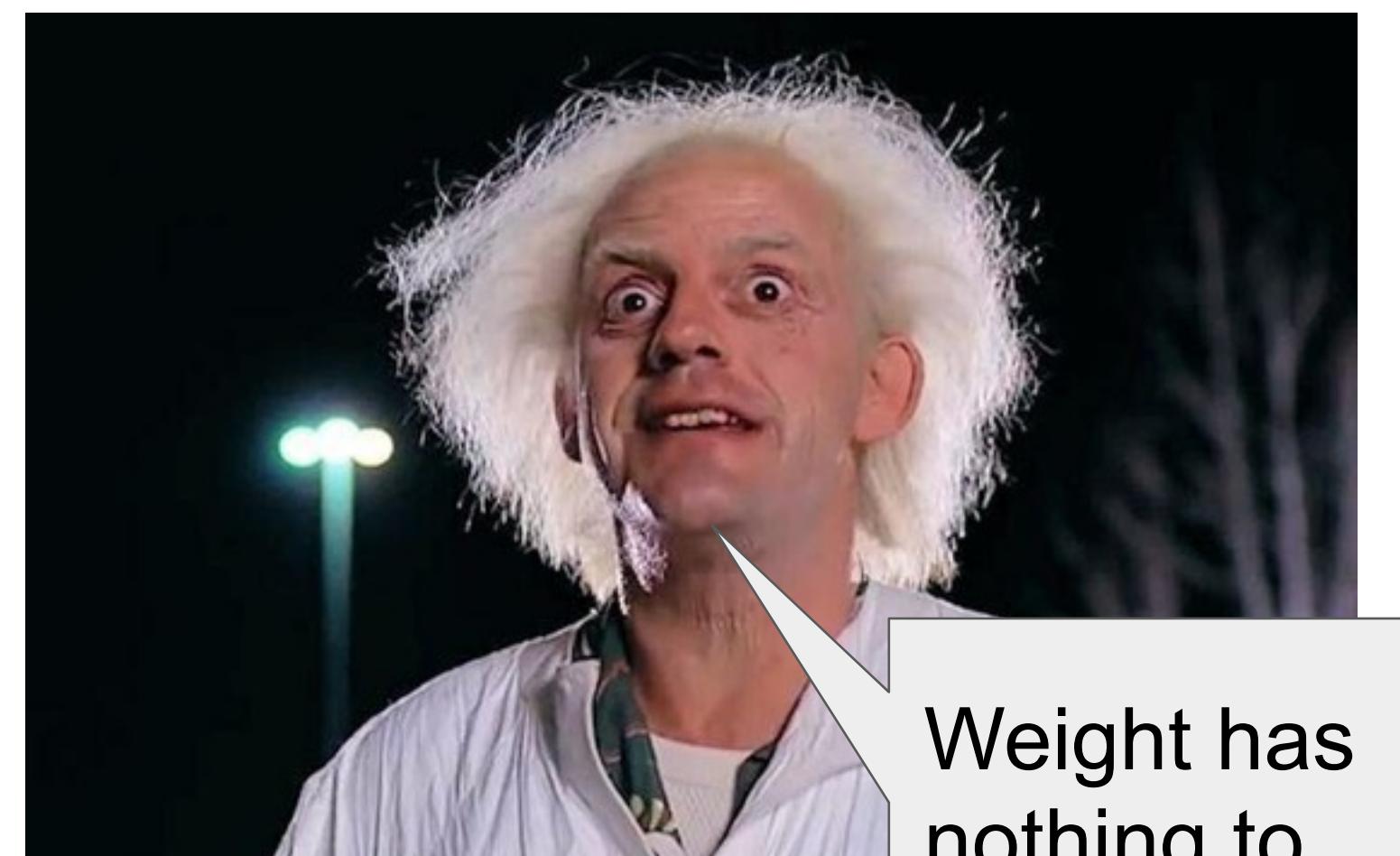
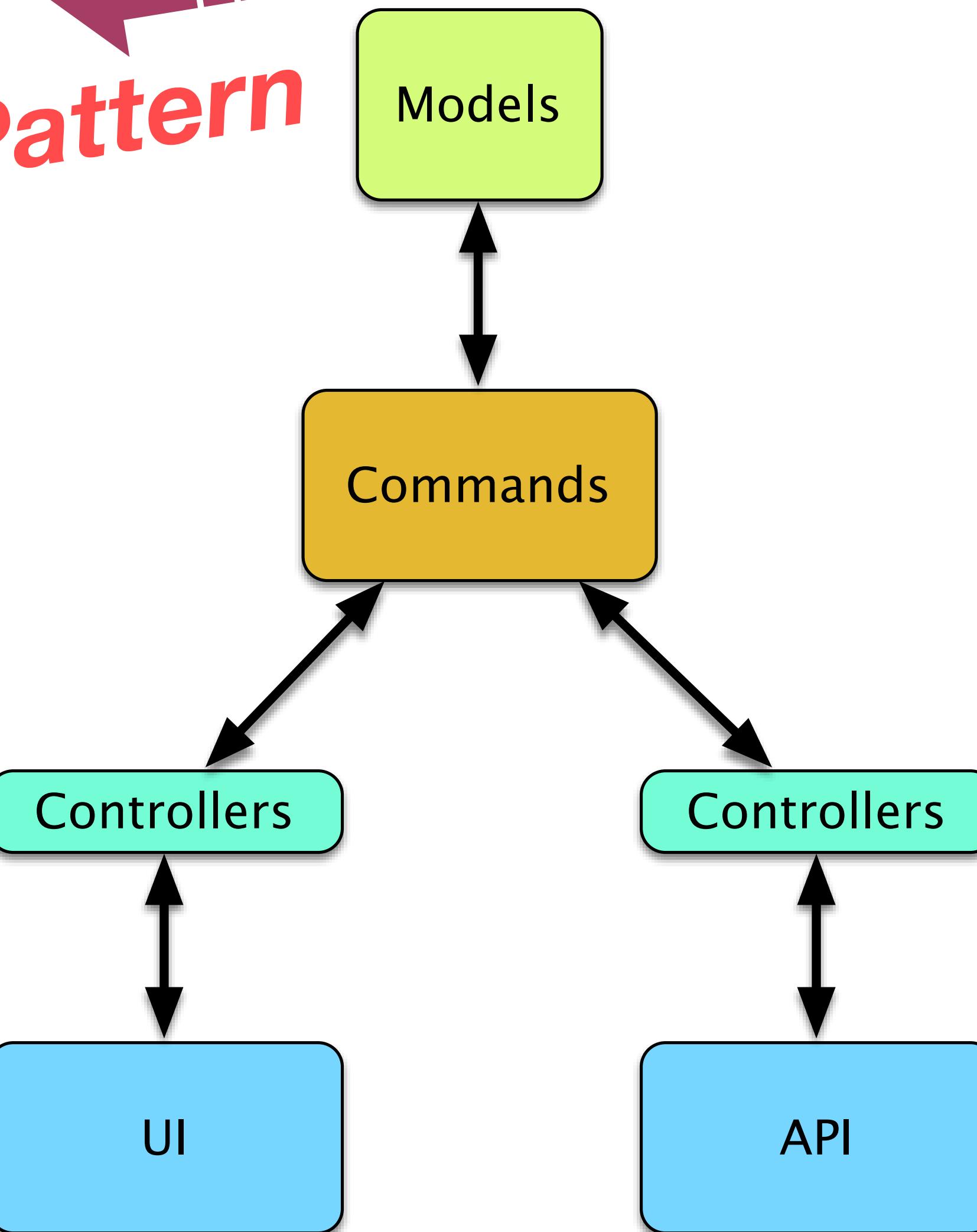
Classic Command Pattern







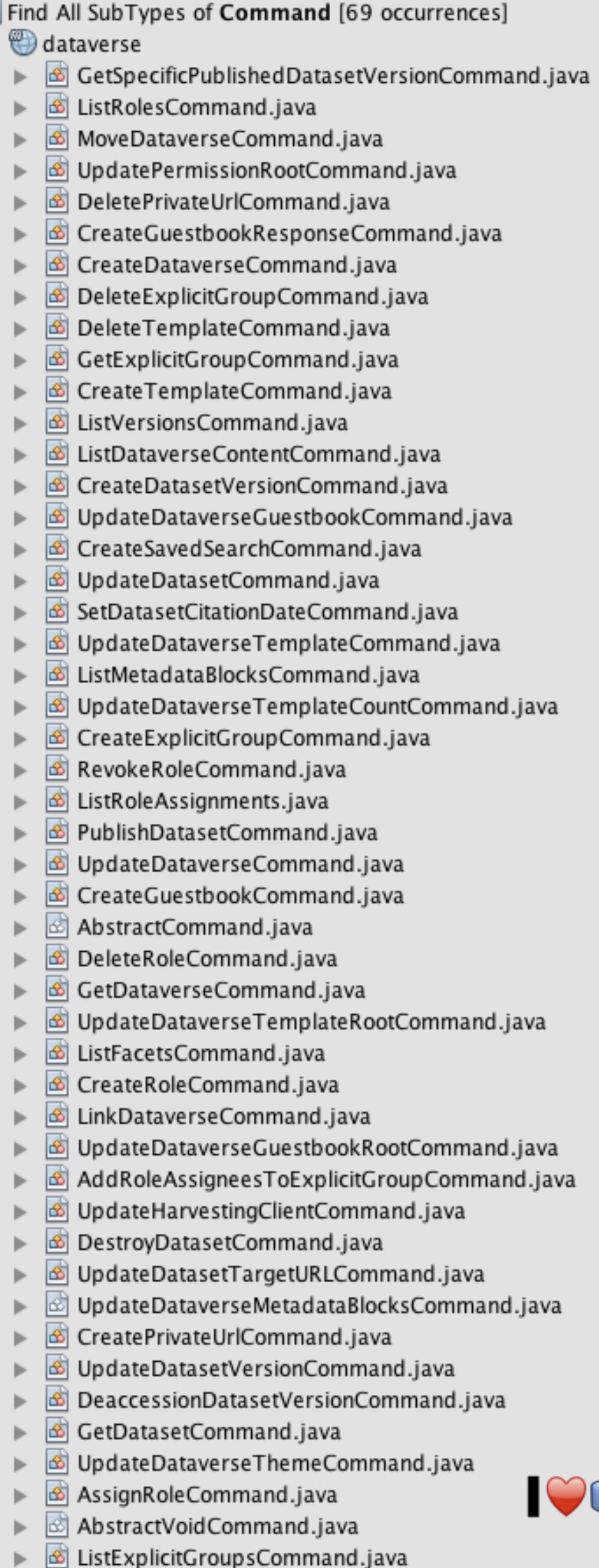
Back to the Command Pattern



Using the Command Design Pattern

Business logic implemented in Command Subclasses, Validation implemented in the “invoker” (engine)

- **Code Reuse**
 - Controllers become thinner, mostly preparing commands from view request and submitting them to the **CommandEngine** for execution
- **Security by Design**
 - Each command is annotated with required permissions
 - Permissions tested by the engine - single place, single implementation
 - Auditing: Engine logs all executed commands
- **Testable**
- **Standardized application operations**



Command, Adapted

```
public interface Command<R> {  
    R execute( CommandContext ctxt ) throws CommandException;  
    Map<String,DvObject> getAffectedDvObjects();  
    Map<String,Set<Permission>> getRequiredPermissions();  
    DataVERSERequest getRequest();  
}
```

- `execute()` is where the work is done.
 - Server resources and injected objects are made available via `CommandContext`
- `getAffectedDvObjects()` and `getRequiredPermissions()` detail which objects are affected and what permissions are needed to affect them
- `getRequest()` allows the permission system to detect which permissions the user has.

Sample Command: Delete a Role

```
@RequiredPermissions( Permission.ManageDataversePermissions )
public class DeleteRoleCommand extends AbstractVoidCommand {

    private final DataverseRole doomed;

    public DeleteRoleCommand(DataverseRequest aRequest, DataverseRole doomed) {
        super(aRequest, doomed.getOwner());
        this.doomed = doomed;
    }

    @Override
    protected void executeImpl(CommandContext ctxt) throws CommandException {
        for (RoleAssignment ra: ctxt.roles().roleAssignments(doomed.getId())) {
            ctxt.roles().revoke(ra);
        }
        ctxt.roles().delete(doomed.getId());
    }
}
```

Sample Command Usage: Delete a Role

```
@DELETE
@Path("{id}")
public Response deleteRole( @PathParam("id") Long id ) {
    DataverseRole role = rolesSvc.find(id);
    if ( role == null ) {
        return notFound( "role with id " + id + " not found");
    } else {
        try {
            execCommand( new DeleteRoleCommand(
                createDataverseRequest(findUserOrDie()), role));
        return okResponse("role " + id + " deleted.");
        } catch (WrappedResponse ex) {
            return ex.refineResponse( "Cannot delete role " + id + ".");
        }
    }
}
```

Sample Command Usage: Delete a Role

```
@DELETE  
@Path("{id}")  
public Response deleteRole( @PathParam("id") Long id ) {  
    DataverseRole role = rolesSvc.find(id);  
    if ( role == null ) {  
        return notFound( "role with id " + id + " not found");  
    } else {  
        try {  
            execCommand( new DeleteRoleCommand(  
                createDataverseRequest(findUserOrDie()), role));  
            return okResponse("role " + id + " deleted.");  
        } catch (WrappedResponse ex) {  
            return ex.refineResponse( "Cannot delete role " + id + ".");  
        }  
    }  
}
```

Results of execCommand

```
protected <T> T execCommand( Command<T> cmd ) throws WrappedResponse
```

Executing a command has 4 possible results:

- Issued command **makes no sense** (e.g. delete published data)
 - **IllegalCommandException**
 - Wrapped in WrappedResponse: 403 FORBIDDEN
- Issuing user is **not permitted** to perform the command
 - **PermissionException**
 - Wrapped in WrappedResponse: 401 UNAUTHORIZED
- General **Server Error**
 - **CommandException**
 - Wrapped in WrappedResponse: 500 INTERNAL_SERVER_ERROR
 - Plus, logging.
- **Works**
 - Return the result of the command (Java object)

Exec-ing a Command

```
@GET  
@Path("{identifier}/facets/")  
public Response listFacets( @PathParam("identifier") String dvIdtf ) {  
    try {  
        return okResponse(json(  
            execCommand(  
                new ListFacetsCommand(createDataverseRequest(findUserOrDie()),  
                                      findDataverseOrDie(dvIdtf))  
            )));  
    } catch (WrappedResponse wr) {  
        return wr.getResponse();  
    }  
}
```

Exec-ing a Command

```
@GET  
@Path("{identifier}/facets/")  
public Response listFacets( @PathParam("identifier") String dvIdtf ) {  
    try {  
        return okResponse(json(  
            execCommand(  
                new ListFacetsCommand(createDataverseRequest(findUserOrDie()),  
                    findDataverseOrDie(dvIdtf))  
            )));  
    } catch (WrappedResponse wr) {  
        return wr.getResponse();  
    }  
}
```

200 OK
(JSON content)

500 INTERNAL SERVER ERROR
(oops, our bad)

401 UNAUTHORIZED
(user not found)

403 FORBIDDEN
(for other cases)

401 UNAUTHORIZED
(user not permitted to list facets)

404 NOT FOUND
(dataverse)

Composable Commands

“If at first you don’t succeed, go get the public version”

```
@RequiredPermissions({})
public class GetLatestAccessibleDatasetVersionCommand extends AbstractCommand<DatasetVersion>{
    private final Dataset ds;
    ...
    @Override
    public DatasetVersion execute(CommandContext ctxt) throws CommandException {
        try {
            return ctxt.engine().submit(new GetDraftDatasetVersionCommand(getRequest(), ds));
        } catch(PermissionException ex) {
            return ctxt.engine().submit(new GetLatestPublishedDatasetVersionCommand(getRequest(),ds));
        }
    }
}
```

/!\ *Code cleaned for clarity*

Questions?



Thanks!

We thank the Frenkel Fund for taking part in funding this talk