Retrospective: migrating Yoda from the PHP iRODS client to the Python iRODS client
Organisation & people

1636
> 650 Incl. faculties Medicine
7+2 teaching institutes
> 7,400
> 30,000
Yoda: 'FAIR' Research Data Management

Collaborate safely as a group
- membership self-managed by researchers

Maintain integrity, deposit a folder in the vault
- metadata can vary per community,
- datamanager approves deposit

Allow FAIR reuse, publish a data package
- datamanager approves publication, DOI citable data
Data deposit workflow

- **Submit**: Researcher requests to deposit.
- **Approve**: Data manager checks metadata complies with policies.
- **Secured**: System deposits a copy in the vault.

Data deposit workflow includes:

- Data folder + metadata
- Vault data package
Title  Subjective and objective evaluations of horses for fit-to-compete or unfit-to-compete judgement.
Description  At Fédération Equestre Internationale (FEI) competitions horses pass a veterinary inspection for judgement of ‘fit-to-compete’. However, FEI Veterinary Delegates (VDs) often differ in opinion. The aim of the present study was to evaluate intra- and inter-delegational agreements of ‘fit-to-compete’ judgement and compare these with objective gait analysis.
Discipline  Agricultural Sciences - Veterinary science (4.3)
Version  1
Language of the data  English

Collection process  Start date  02 / 20 / 2017  End date  02 / 20 / 2017

Location(s) covered

Period covered  Start date  mm / dd / yyyy  End date  mm / dd / yyyy

Tag  Fit-to-compete
Tag  Objective gait analysis
Tag  Observer agreement
Tag  Motion symmetry
Tag  Optical motion capture
Tag  Motion capture videos
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FAIR data publication workflow

**Data package**

**Submit**
- **Researcher** requests to publish
- **Data manager** checks if metadata complies with publication policies

**Approve**
- **System** publishes the metadata and provides internet access to data if classified as “Open”

**Published**

**DOI landingpage**
- DataCite
- OAI-PMH
<table>
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<td>793 B</td>
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Serra Bragança, Filipe. & Brommer, Harold & Sloet van Oldruitenborgh-Oosterbaan, Marianne.

Subjective and objective evaluations of horses for fit-to-compete or unfit-to-compete judgement.

Publication Date: 2020-11-25T14:27:02Z  Accessibility: Open – freely retrievable

At Fédération Equestre Internationale (FEI) competitions horses pass a veterinary inspection for judgement of 'fit-to-compete'. However, FEI Veterinary Delegates (VDs) often differ in opinion. The aim of the present study was to evaluate intra- and inter-observer agreements of 'fit-to-compete' judgement and compare these with objective gait analysis measurements. Twelve horses were evaluated by three experienced VDs and one veterinary specialist and video-recorded for re-evaluation later. Simultaneously, quantitative gait analysis measurements (Qhorse®) were acquired. Inter-observer agreement during live evaluations was fair (κ=0.395, 58% agreement). Intra-observer agreement between live observations and videos at one month and one year was 71% and 73% respectively. Sensitivity and specificity of motion symmetry measured with quantitative gait analysis system were 83.3% and 66.7% respectively, against the consensus of all observers as a reference. Our findings might suggest that more VDs should be used to adequately judge fit-to-compete'. Quantitative-gait-analysis may be useful to support decision making during fit-to-compete judgement.

Tags
- Fit-to-compete
- Objective gait analysis
- Observer agreement
- Motion symmetry
- Optical motion capture
- Motion capture videos

VIEW CONTENTS
## Yoda milestones

<table>
<thead>
<tr>
<th>Year</th>
<th>Features</th>
<th>Version</th>
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</thead>
</table>
| 2015 | • Yoda Portal and Intake module for Youth project, iRODS 3.3 based  
      • Groupmanager module | v0.4 – v0.9 |
| 2016 | • Yoda Disk (davrods module)  
      • Yoda Portal supports dynamic Plug-in modules, iRODS 4.0 | v0.9.7 |
| 2017 | • Research Workspace, revisions, metadata form  
      • Vault archive, deposit workflow, statistics, data publication workflow (DOI) | v1.0 – v1.3 |
| 2018 | • Vault metadata operations, EPIC PID, External user provisioning  
      • (de/re)publication workflows, OAI-PMH harvestable, iRODS 4.1 | v1.4 |
| 2019 | • Metadata-schema management, dynamic metadata forms rendering  
      • Metadata form based on JSON schema, file up/download in Portal, iRODS 4.2.6 | v1.5 |
| 2020 | • Metadata format changed from XML to JSON, with JSON-AVU  
      • Python rules engine iRODS 4.2.7 | v1.6 |
| 2021 | • Yoda API, OIDC authentication, iRODS 4.2.9?  
      • Change from irods-php to python-irodsclient | v1.7 |
Yoda managed research data

### Users

#### Internal users

- 2015: 100
- 2016: 200
- 2017: 500
- 2018: 1000
- 2019: 1500
- 2020: 2000
- 2021Q2: 2500

#### External users

- 2015: 200
- 2016: 400
- 2017: 800
- 2018: 1200
- 2019: 1600
- 2020: 2000
- 2021Q2: 2400

### Storage (TB)

- 2015: 1000
- 2016: 2000
- 2017: 3000
- 2018: 4000
- 2019: 5000
- 2020: 6000
- 2021Q2: 7000
Yoda is build on iRODS

user interaction

web portal
https

network disk
davrods

power-user
iCommands

configuration

Utrecht University
Data Policies and -services

data integration

iRODS
Yoda web portal & API

- Yoda web portal communicates with backend using Yoda API

- API defined in Python ruleset
  - REST API
  - exposes all Yoda functionality as API
  - all business logic in ruleset
  - very lean web portal
Converting a rule to Yoda API

# iRODS rule language.
concat(*x, *y, *foo) {
    *foo = *x ++ *y;
}

def concat(rule_args, callback, rei):
x, y = rule_args[0:2]
rule_args[2] = x + y

# Yoda API Python rule
@api MAKE()
def api_concat(ctx, foo, bar):
    return foo + bar
Converting a rule to Yoda API

- Equivalent Python rule
- Boilerplate
- Non-pythonic
- Difficult to interface from Python functions

```python
def concat(rule_args, callback, rei):
    x, y = rule_args[0:2]
    rule_args[2] = x + y
```

```python
@api
def api_concat(ctx, foo, bar):
    return foo + bar
```
Converting a rule to Yoda API

- Equivalent Python rule
  - Boilerplate
  - Non-pythonic
  - Difficult to interface from Python functions

- Can we make this easier?
  - @api decorator
  - JSON input → Python arguments
  - Python return value → JSON output
  - Checks required/optional arguments
  - Supports dicts, lists...
  - Standardizes error handling

# iRODS rule language.
concat(*x, *y, *foo) {
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# Equivalent Python rule.
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Yoda web portal

CodeIgniter + irods-php

Yoda API

iRODS
Yoda web portal

Flask + python-irodsclient

Yoda API
Why are we migrating from the PHP client to Python client?

- Client actively developed
- Maintainability
- Performance improvement
- One programming language less
- Libraries and frameworks
- Available tooling
Flask iRODS

- Two modules for communication with iRODS

  - Connection manager module
    - manage python-irodsclient sessions
    - session per authenticated user

  - API module
    - handles API calls from web portal
    - JSON encoding / decoding

```python
x = rule.Rule(
g.irods,
body='a {{ api_{}>(*x); }}'.format(fn),
params='*x': '{'}.format(sanitized_params),
output='ruleExecOut')
x = x.execute()
```
Interfacing with Yoda API

- Yoda API rule
- JSON input → JSON output

```python
# Yoda API Python rule.
@api.make()
def api_concat(ctx, foo, bar):
    return foo + bar
```
Interfacing with Yoda API

- Yoda API rule
  - JSON input → JSON output

- Calling API from Flask
  - dictionary input → dictionary output

```python
# Yoda API Python rule.
@api.make()
def api_concat(ctx, foo, bar):
    return foo + bar

# Callable from Flask frontend.
response = api.call('concat',
    {'foo': 'test',
     'bar': '123'})
```
Interfacing with Yoda API

- Yoda API rule
  - JSON input → JSON output

- Calling API from Flask
  - dictionary input → dictionary output

- Calling API from JavaScript
  - dictionary input → dictionary output

# Yoda API Python rule.
@api.make()
def api_concat(ctx, foo, bar):
    return foo + bar

# Callable from Flask frontend.
response = api.call('concat',
    {'foo': 'test',
     'bar': '123'})

# Callable from JavaScript frontend.
let str = await Yoda.call('concat',
    {'foo': 'test',
     'bar': '123'});
Data archive geosciences

- Simplify deposit workflow to three steps
  - Upload data
  - Add metadata
  - Submit data package

- Reuses existing Yoda API functionality
Modern web file upload support

- Existing client library (https://github.com/flowjs/flow.js)
  - HTML5 File API
  - Support for folders
  - Chunked uploads
  - Resumable uploads

- python-irodsclient made it easy to implement upload backend
Python client challenges

- Session cleanup after rule execution
  - re-open a connection to iRODS after each rule execution
  - significant performance overhead
  - https://github.com/irods/python-irodsclient/issues/190

- Character limits?
  - strlen 1030 of msg > dim size 1024
Yoda is free and open source

Everything is available on GitHub: https://github.com/UtrechtUniversity

Deployment: https://github.com/UtrechtUniversity/yoda/tree/pyportal
Yoda portal: https://github.com/UtrechtUniversity/yoda-portal/tree/pyportal
iRODS ruleset: https://github.com/UtrechtUniversity/irods-ruleset-uu/tree/pyportal

More information? → UGM Slack / l.r.westerhof@uu.nl
$ iexit
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