ELIXIR ALL HANDS 2021

Sustainability and Reuse: LifeMonitor

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Workflow Lifecycle Workshop

elixir

Sustainability of computational workflows

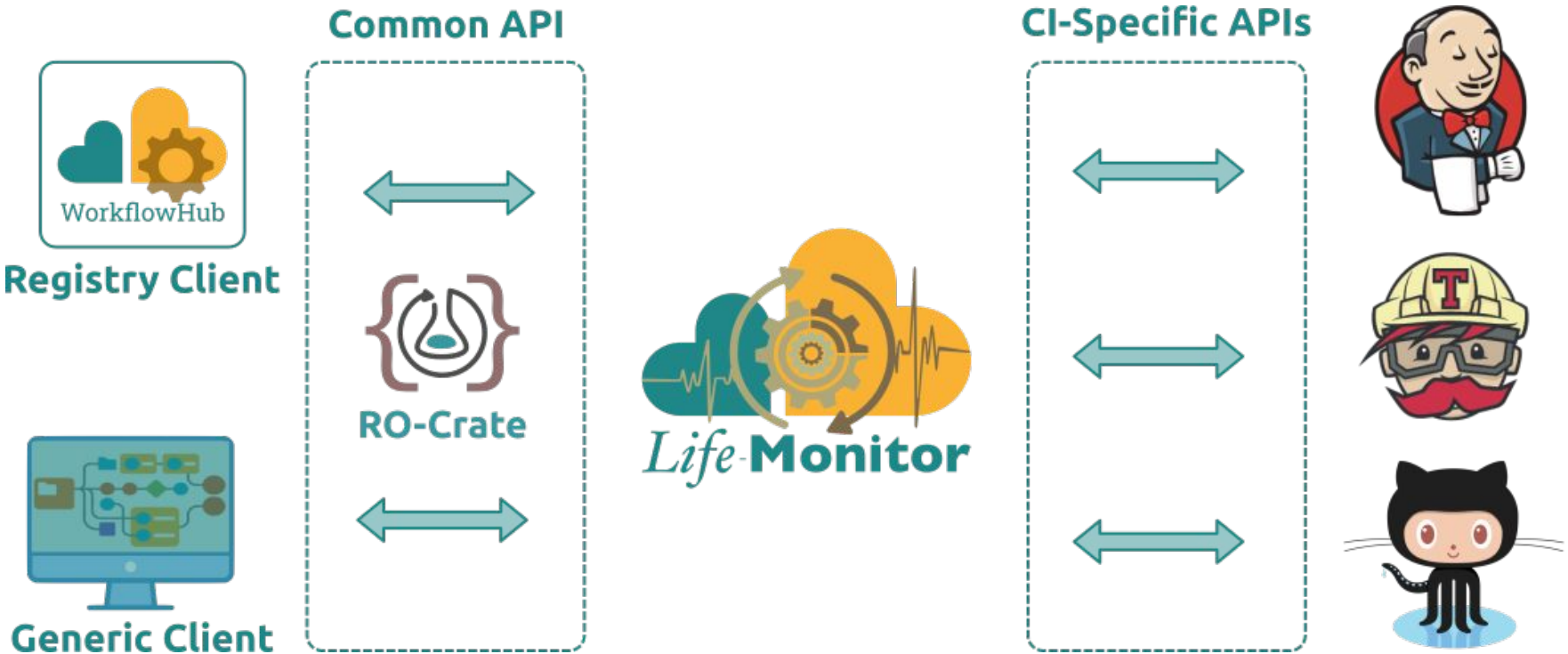
- Published workflows need to keep working properly to be useful
  - Unmaintained software tends to "collapse"[1] - unpinned dependencies, changes to services, new vulnerabilities, etc.
- Functionality also needs to be occasionally updated to stay relevant
- Workflow testing is a key instrument
  - Periodic execution of tests can expose problems when they arise
  - Tests provide a machine-actionable way to verify changes to workflows -> opportunities for semi-automated maintenance

(1) Hinsen, K. Dealing with software collapse. Computing in science and engineering 21 (3), 104-108. 2019

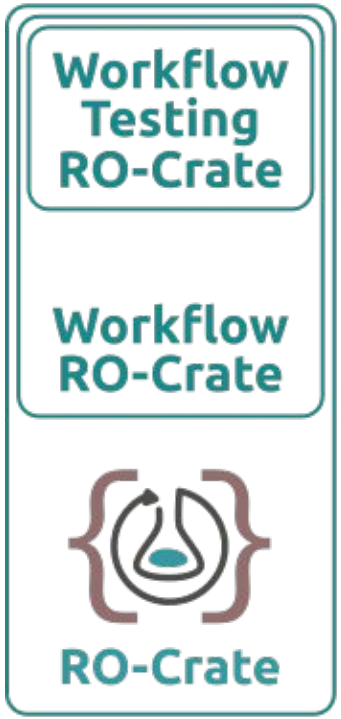
LifeMonitor

- A service to support the maintenance of computational workflows
  - Support the **reusability** of workflows, over time
- Currently focused on workflow testing and test monitoring
  - Facilitate test creation, monitoring and execution
- Access via REST API
  - Expose results from multiple CIs via a common interface
  - Web application currently limited to auth* configuration
- Integration with WorkflowHub
  - RO-Crate as an exchange format for testing metadata
- Under development at https://github.com/crs4/life_monitor

Monitoring test runs



Workflow Testing RO-Crate profile

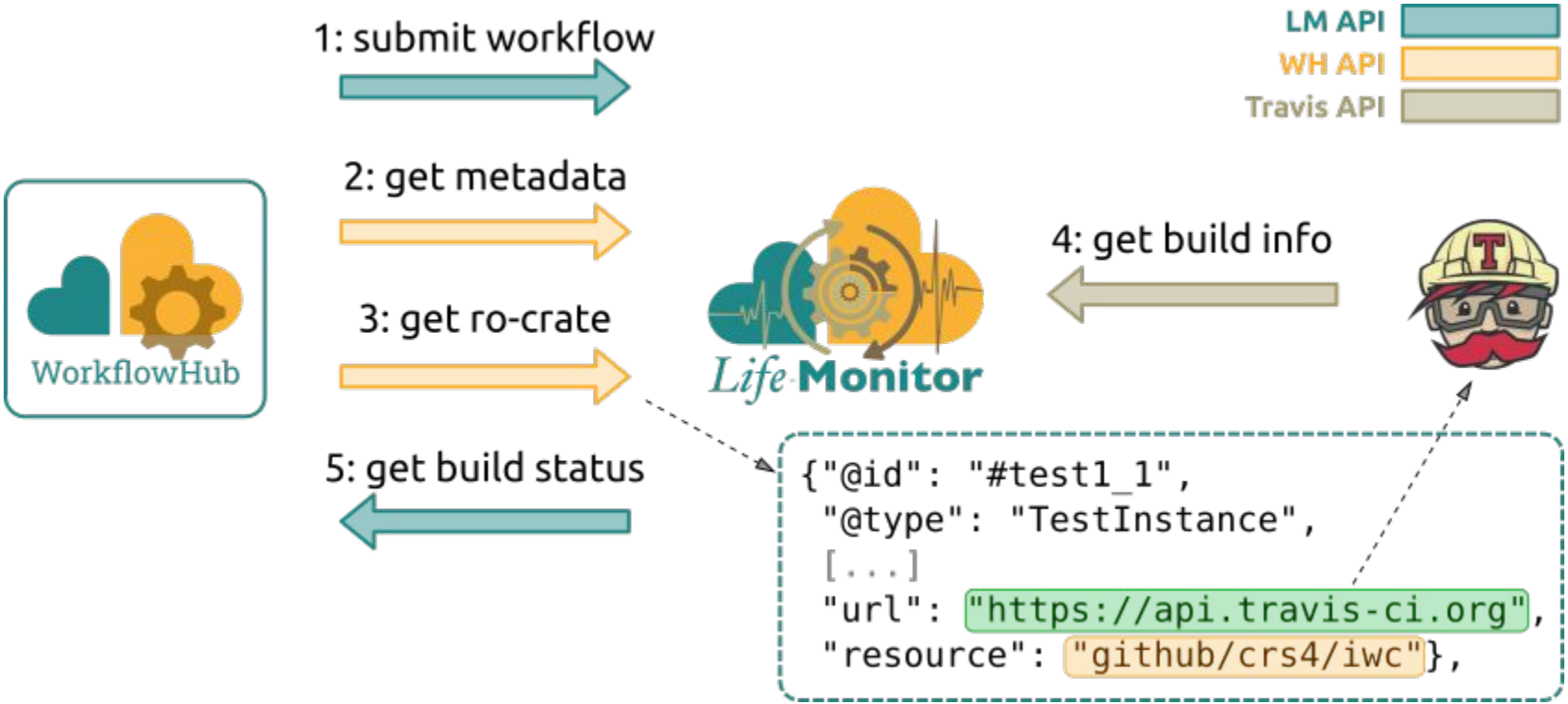



```
{"@id": "#test1",
 "@type": "TestSuite",
 "mainEntity": {"@id": "cure-for-cancer.ga"},
 "instance": [{"@id": "#test1_1"}],
 "definition": {"@id": "cure-for-cancer-test.yml"}},

{"@id": "cure-for-cancer.ga",
 "@type": ["File", "SoftwareSourceCode",
           "ComputationalWorkflow"],
 "programmingLanguage": {"@id": "#galaxy"}},

{"@id": "./",
 "@type": "Dataset",
 "mainEntity": {"@id": "cure-for-cancer.ga"},
 "mentions": [{"@id": "#test1"}]},
```

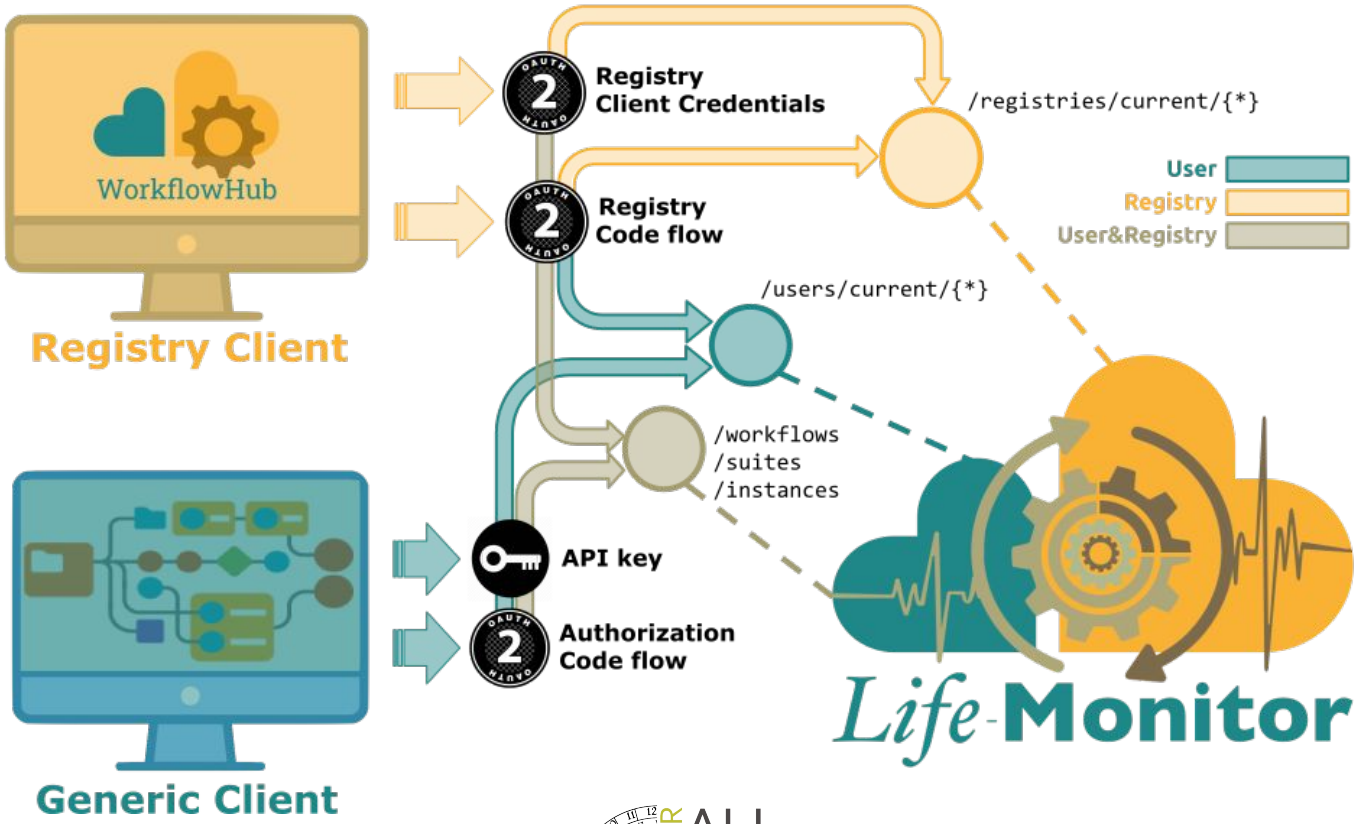
Testing metadata

```
{"@id": "#test1",
 "@type": "TestSuite",
 "mainEntity": {"@id": "cure-for-cancer.ga"},
 "instance": [{"@id": "#test1_1"}],
 "definition": {"@id": "cure-for-cancer-test.yml"}},

{"@id": "#test1_1",
 "@type": "TestInstance",
 "runsOn": {"@id": "https://w3id.org/ro/terms/test#TravisService"},
 "url": "https://api.travis-ci.org",
 "resource": "github/crs4/cure-for-cancer"},

{"@id": "cure-for-cancer-test.yml",
 "@type": ["File", "TestDefinition"],
 "conformsTo": {"@id": "https://w3id.org/ro/terms/test#PlanemoEngine"},
 "engineVersion": ">=0.70"},
```

RO-Crate metadata exchange



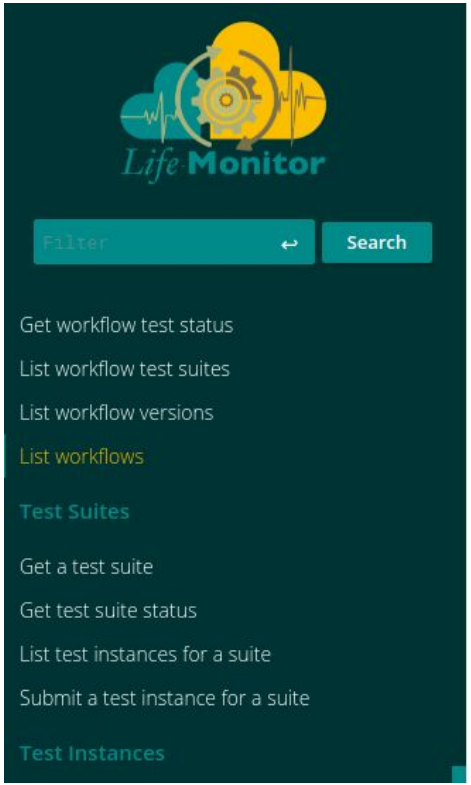
API access


WorkflowHub
Registry Client
Generic Client
Registry
Client Credentials
Registry
Code flow
API key
Authorization
Code flow
/registries/current/{*}
/users/current/{*}
/workflows
/suites
/instances
User
Registry
User&Registry
Life-Monitor

OAuth2 Support

- Use your current GitHub or WorkflowHub identity
  - Support for ELIXIR-AAI and/or LS-AAI is planned
- Authorize LifeMonitor to do things on your behalf
  - E.g., access WorkflowHub on your behalf to gather workflow metadata

API explorer



TEST SUITES

Operations related to test suites

Get a test suite

`GET /suites/{suite_uuid}`

Get information about the specified test suite.

REQUEST

PATH PARAMETERS

*suite_uuid string	e3208b02-69b6-4e32-a3dc-b93967d30e2c Universal unique identifier of the test suite **Example:** e3208b02-69b6-4e32-a3dc-b93967d30e2c

API Server https://api.lifemonitor.eu/
Authentication No API key applied

https://api.lifemonitor.eu/static/apidocs.html

Python interaction

In [9]:
```
response = s.get(f"{lm_base_url}/workflows/{workflow_uuid}/status")
assert response.status_code == 200, f"Unexpected error {response.status_code}: {response.content}"
status = response.json()
for b in status['latest_builds']:
    del b['last_logs']
status
```

Out[9]:
```
{'aggregate_test_status': 'all_passing',
 'latest_builds': [{'build_id': '769307075',
   'instance': {'managed': False,
    'name': 'test1_1',
    'resource': 'github/crs4/iwc',
    'roc_instance': '#test1_1',
    'service': {'type': 'travis',
     'url': 'https://travis-ci.org',
     'uuid': '0694c600-ffa9-4e37-bcd5-43a5790f415b'},
    'uuid': '045d99ee-1337-49bc-9465-31918bb655c3'},
   'status': 'passed',
   'suite_uuid': 'fbe0c0ae-c204-4543-ad30-b5b7d2efa875',
   'timestamp': '1620037573.0'}],
```

CLI interaction

```
[simleo@neuron:~]$ restish lm workflows-get -q status=false
HTTP/1.1 200 OK
Access-Control-Allow-Origin: *
Cache-Control: private
Content-Length: 313
Content-Type: application/json
Date: Tue, 08 Jun 2021 15:40:32 GMT
Server: nginx
Set-Cookie: session=.eJwlzjkOwjAQAMC_uKbY7GGv8xnkvQRtQirE30FiXjDvdq8jz0fbX8eVt3Z_Rtvb2GC5C1MaTqewTlJM0sm8TMoXqfMIRgMTV7FAJYy
5ONl5BuWKgZKZrDDJEZaoeWAi9mFK3YC1ppkCcBpXClJybWIA2X6R68zjv6HePl9ABTBJ.YL-PcA.VYJXvz2mvooX373FdJT5EtL_g1Q; HttpOnly; Path=/
9544ac48d9c55647d010c525a5be4146=5bcd90e8adf26e883aa66a370ea3f3bf; path=/; HttpOnly; Secure
Vary: Cookie
X-Frame-Options: SAMEORIGIN

{
  items: [
    {
      latest_version: "1"
      name: "sort-and-change-case-travis"
      uuid: "bc435030-6e1e-0139-2dea-005056ab5db4"
    }
  ]
  meta: {
    api_version: "0.2.0-beta2"
    base_url: "https://api-lifemonitor-test.rahtiapp.fi"
    resource: "/workflows?status=false"
  }
}
```

LifeMonitor as a workflow sustainability platform

- Test monitoring is and will remain the main focus
  - Workflow's no good if it doesn't work
- Plan to expand core service to provide semi-automated maintenance features
  - Workflow test generation/test execution configuration
  - Workflow maintenance plugins
  - FAIRness checks: e.g. Does it have an open license?
- General idea
  - Bring sw maintenance best practices to workflows
  - Enhance reusability

Resources

- Docs: https://www.lifemonitor.eu/
  - https://www.lifemonitor.eu/workflow_testing_ro_crate
  - https://www.lifemonitor.eu/lm_api_specs
- Deployments (REST API)
  - Production: https://api.lifemonitor.eu (note it's still Alpha!)
  - Also available, for development / testing: https://api.dev.lifemonitor.eu
- Code: https://github.com/crs4/life_monitor
  - https://github.com/crs4/life_monitor/tree/master/examples
- WorkflowHub community: https://about.workflowhub.eu/community

Thank you!

Team

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Hosting

#ELIXIR21