Software Development With GitLab

EUNIS 2023 - Software & Service Management
M. Politze
14.06.2023
A long history and a bright future

Past
• Funded in 1870 as polytechnical school

Present
• One of the leading Technical Universities in Germany (TU9)
• One of eleven German Universities of Excellence
• Ranked among top 10 German universities in THE 2023
• Excellent Teaching, Learning and Assessment
• One of the central nodes in the German Initiative for Research Data Management (NFDI)
• Host of many recognized centers: National High Performance Computing Center for Engineering Sciences (NHR4CES), ....

Future
• Vision: “The Integrated Interdisciplinary University of Science and Technology”
• RWTH is becoming one of the largest technology-oriented campus in Europe
IT Center at RWTH Aachen University

Vision
The IT Center of RWTH Aachen University is a leading information technology institution in the international university landscape, actively cooperating with partners from research, teaching and industry. It is a guarantor of digital sovereignty and actively shapes the external and internal framework conditions. The IT Center is an integral and visible player of an excellent, technical university with a focus on teaching, research and infrastructure. It is a place where people like to work. Independent research and education are part of the IT Center's self-image.

Mission
IT-Service Provider for RWTH Aachen University
- From network infrastructure to HPC systems
- E-Learning and SLCM
- Responsible to support Research Data Management at RWTH

National Mission
- HPC for Computational Engineering Sciences (NHR4CES)
- Important node of the NFDI network
Software Development at IT Center

Several departments and development groups
- ~15 Teams, usually 3-10 software developers
- Internal and external stakeholders
- System Administration, Student Lifecycle, E-Learning, Research Data Management

Wide variety
- fire-and-forget to applications running for 10+ years
- system configuration to software applications
- 1 to 50,000+ users
- Web applications (HTML5, TypeScript), Backends (C#, Java, Python, PHP, …), Apps (Android, iOS, Windows, Linux)

External supervision to enhance development process since ~2019
Challenges

• Constant change in personnel due to limited contracts

• Multitude of stakeholders
  – Students
  – Teachers
  – Researchers
  – Univ. Administration
  – Ministry of Education
  – ...

• Variety of different funding schemes
Insight 1: Plan your planning!
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Development Process Documentation

Sprint Workflow

- Claim Issue/Ticket
- Developing
- Review and Testing
- Release-Testing-Deployment
- Close

Developing

- Branch Creation:
  - Issues/Hotfix
- Merge Requests:
  - Issue -> dev
  - Hotfix -> master
- Development:
  - Commit/push
- Iterate
- Post for Review

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Development Process Documentation

Sprint Workflow


Feature Review

Functionality Test → Code Review → Merge to dev/master → Close Ticket/issue
Planning and Development

- **[HIGH]** Reevaluate Resource Type to Organization scope
  - Bug: cosine/Environment, Resource_Types
  - cosine/issues#2414

- **[LIVE][MEDIUM]** Strange GitLab Reporting - Quota is allocated to GitLab Resources
  - Bug: Reporting, Resource_Types
  - cosine/issues#2412

- **[HIGH][LIVE]** Suspicious Quota numbers in project
  - Bug: Quota_Management
  - cosine/issues#2418

- **[LIVE][MEDIUM]** Search Categories/counts are broken
  - Bug: Search & Discoverability
  - cosine/issues#2373

- **[LOW][LIVE]** Elastic Search: User cannot get a search result for specific names
  - Bug: Search & Discoverability
  - cosine/issues#2317

- **Closed**
  - [HIGH][LIVE] Admin page quota problem
    - Cosmetic/Issues#2264

- **Closed**
  - [LIVE][HIGH] Upload/Update button always enabled with empty required fields for resource types as LinkedData, gitlab and RDS-S3
    - cosmetic/issues#2477

- **Closed**
  - [HIGH][LIVE] RWTH-RDS-S3 gone
    - cosmetic/issues#2428
Insight 2: Define hoops (and levers)!

I HAVE ALTERED THE PROJECT SCOPE

PRAY I DO NOT ALTER IT FURTHER
Insight 2: Define hoops (and levers)!

I HAVE ALTERED THE PROJECT SCOPE

PRAY I DO NOT ALTER IT FURTHER

DO YOU THINK THIS IS REALLY GOING TO HELP US JUMP THROUGH HOOPS DURING REQUIREMENTS WORKSHOP?

JUMPING THROUGH HOOPS

NOT AS EASY AS IT LOOKS

New funding is coming!

It brings new requirements!

They fit our product!

OPEN THE GATE!

CLOSE THE GATE!
Planning at Scale – SAFe Framework for Prioritization

Steering Board votes based on fitness and fit to projects

Steering Board prioritizes based on estimated size and impact

Developer makes technical analysis of the implementation

Developers pull from backlog

Developers pull from backlog

Idea Tank

Funnel

Review

Analysis

Backlog

Implement

Finished
Issue Templates

Update KPI Generator: New KPIs for Reporting

Description:
For the service manager and the IT management (SEPPro G2a), who need daily information about the status of Coscine, the new KPI Generator is a tool to collect the necessary KPIs that shows the current numbers related to users and the system status. Unlike the current reporting our solution will be usable and more comprehensive for all related universities.

Key Stakeholders:
- IT Center Management (SEPPro Process), service manager, other participating universities
- Review
- Analyzing
- Prioritization

Include the new metadata structure in all interaction points

Description:
To incorporate the new metadata structure proposed by K4I, include the new structure in every interaction point (csa/metadata, api/free, etc.). For this, check where the currently graphs for files are being retrieved. Adapt these methods to first target the structure's graph in storing and retrieving.

Then, include the new provenance information and store them when the following interaction points are called:

- Provenance Interaction Points
  - Data
    - Upload
    - Update
    - Remove (Invalidated)
  - Metadata
    - Upload
    - Update
    - Remove (Invalidated)

Acceptance Criteria:
- All interaction points use the new metadata structure, use methods from MetadataTracker

Definition of Done:
- Issue branches were updated with the default project branch (master/main)
- All pipeline stages are ✔️ (CI/CD)
- Fitting documentation is present (e.g. README, Ad or Swagger API Docs)
- Integrator Script's `integrations.json` is updated with relevant branch names and versions
- Relevant merge requests are created and targeting the relevant sprint branch (Sprint/...)
- Merge requests can be merged without conflicts and are linked only to this issue
Issue Templates

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For this, check where the currently graphs for files are being retrieved. Adapt these methods to first target the key-metadata graph in storing and retrieving.

Then, include the new provenance information and store them when the following interaction points are called:

- Provenance Interaction Points
  - Data
    - Upload
    - Update
    - Remove (invalidates)
  - Metadata
    - Upload
    - Update
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Challenge Rating: 😊😊😊😊😊

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Collaboration with Stakeholders and Transparency

Merge request for new application profile CT Imaging Parameters

Overview

Merge request created by Catherine Gonzalez, c.gonzalez@itc.rwth-aachen.de, created at 17.02.2023 10:51:52

Pipeline #919923 passed for 8e97c426 on Request/08652455-mlb... 3 days ago

Approve

Requires 1 approval from Merging into master/main.

View eligible approvers

Test summary: no changed test results, 268 total tests

Merge blocked: all required approvals must be given.

Merge details
- 1 commit and 1 merge commit will be added to master.
- Source branch will not be deleted.
Collaboration with Stakeholders and Transparency
Collaboration with Stakeholders and Transparency

Merge request for new application profile CT Imaging Parameters

Pipeline #919923 passed for 0e97e426 on Request/d0852455-wt8.. 3 days ago

Stage: validate
- validate: [Ontologies]
- validate: [Profiles]
- validate: [Rules]
- validate: [Terms]
- validate: [Vocabulary]

Approve
Requires 1 approval from Merging into master/main.

View eligible approvers

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Rule 3: Automate (all the things!?)

TYPICAL PROCESS LATENCY:

AUTOMATED STEPS: 800 ms

AUTOMATED STEPS: 200 ms

SOMEONE COPIES AND PASTES DATA FROM A THING INTO ANOTHER THING:
2-15 MINUTES
(MORE IF THE PERSON ON CALL IS BUSY)

https://xkcd.com/2565
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https://xkcd.com/2565
*... but only if it is worth it ...*
Automated Tests & Quality Checks

Pipeline: validate

Tests:
- profiles/compos/measurments/index.ttl
- profiles/cru344/index.ttl
- profiles/cws3/index.ttl

Status: ✔️
Duration: 0.00ms
View details

100% success rate
0.00ms
Final Remarks
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• Transparency creates understanding
Final Remarks

• It's for the team!
• Prepare for gradual adoption; address greatest pains first
• Transparency creates understanding
• Watch out! GitLab is becoming a critical infrastructure!
Contact

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