



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

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

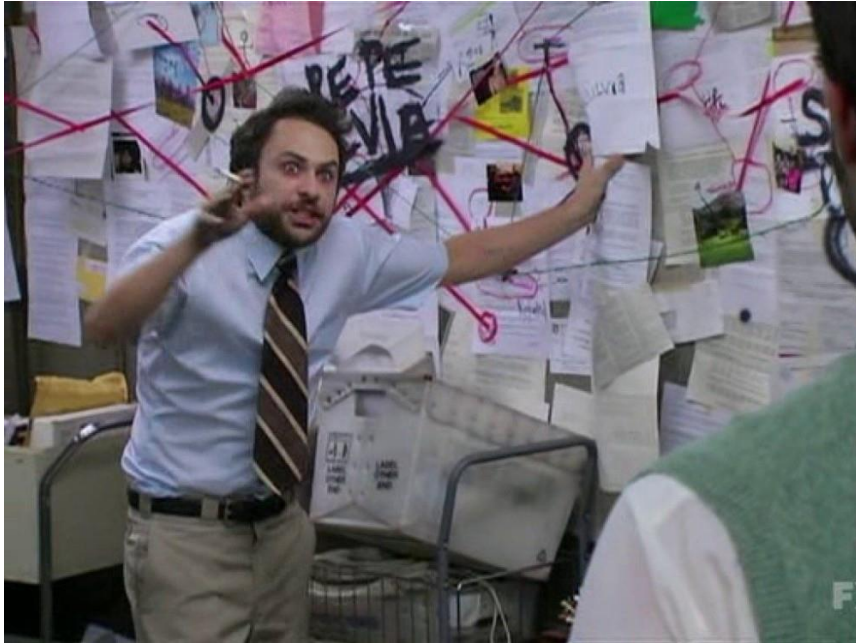
- fire-and-forget to applications running for 10+ years
- system configuration to software applications
- 1 to 50.000+ users
- Web applications (HTML5, TypeScript), Backends (C#, Java, Python, PHP, ...), Apps (Android, iOS, Windows, Linux)

External supervision to enhance development process since ~2019

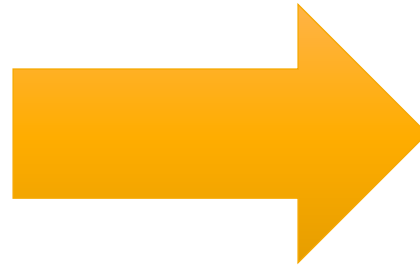
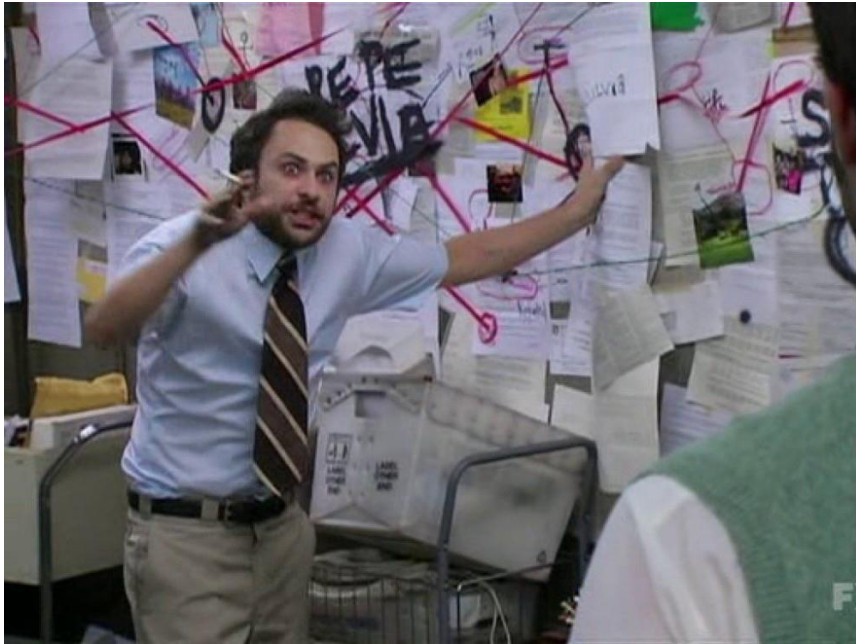
Challenges

- Constant change in personnel due to limited contracts
- Multitude of stakeholders
 - Students
 - Teachers
 - Researchers
 - Univ. Administration
 - Ministry of Education
 - ...
- Variety of different funding schemes

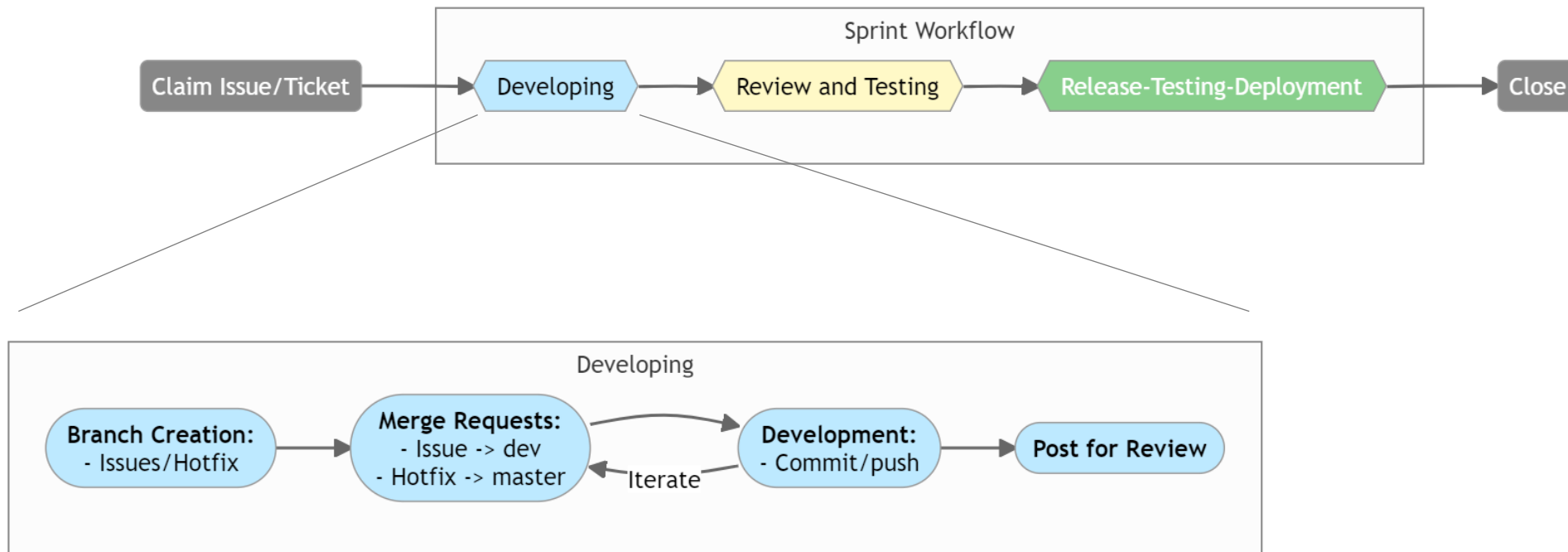
Insight 1: Plan your planning!



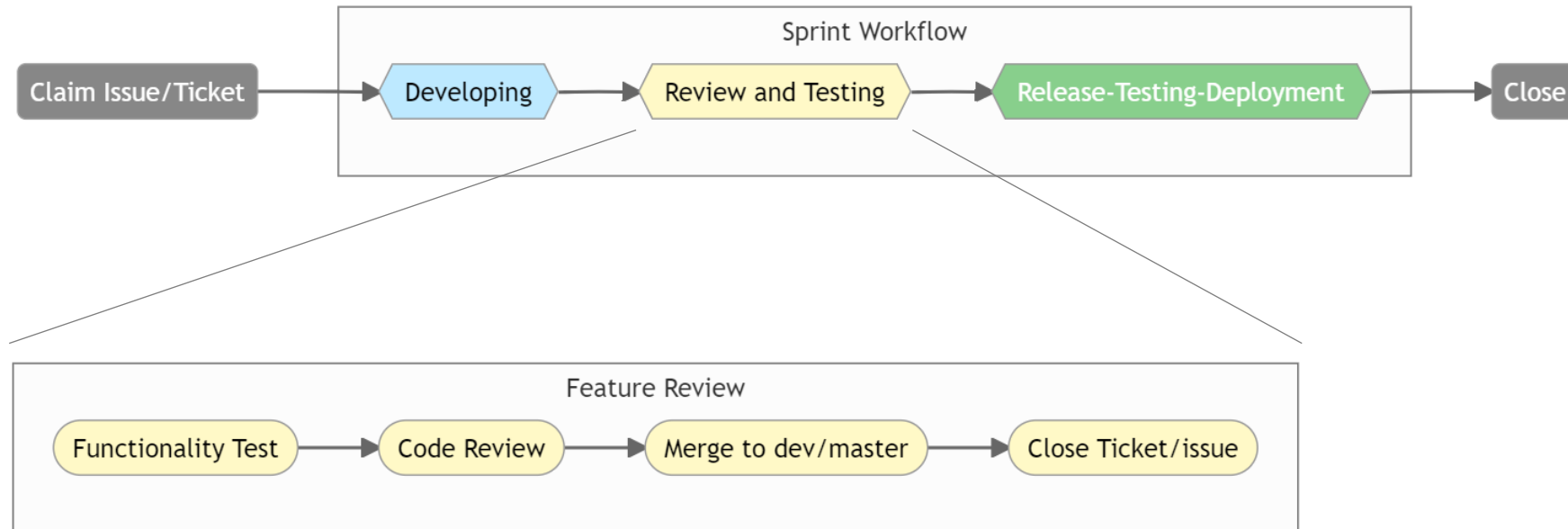
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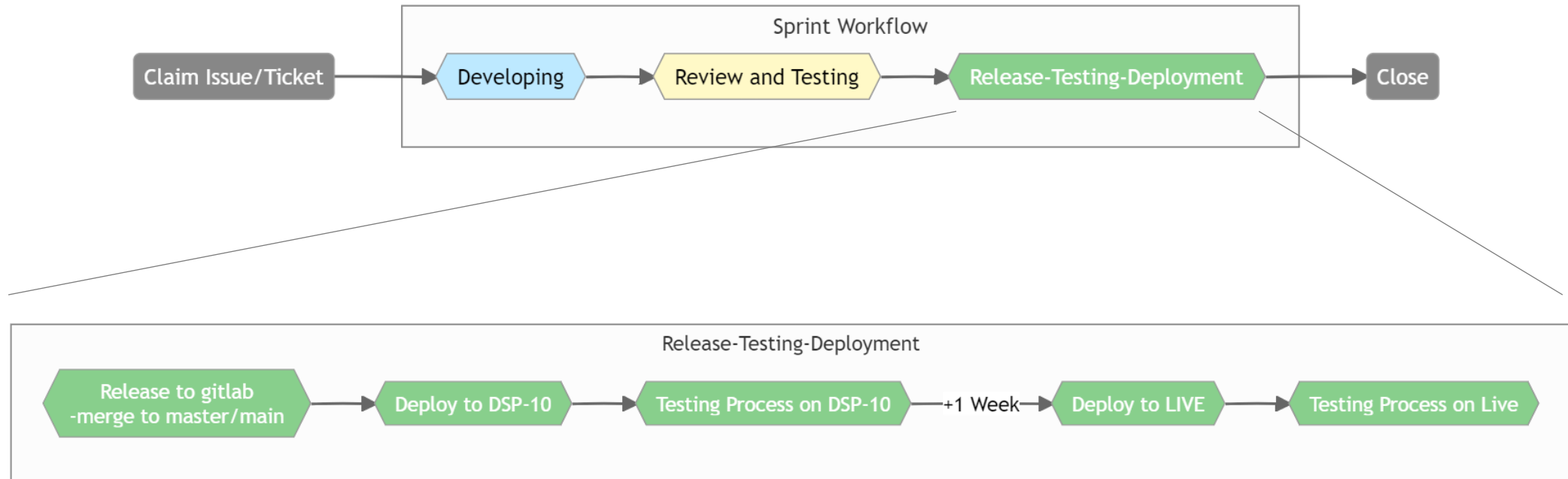
Development Process Documentation



Development Process Documentation



Development Process Documentation



Planning and Development

The screenshot displays a Jira board with four columns representing different stages of issue resolution:

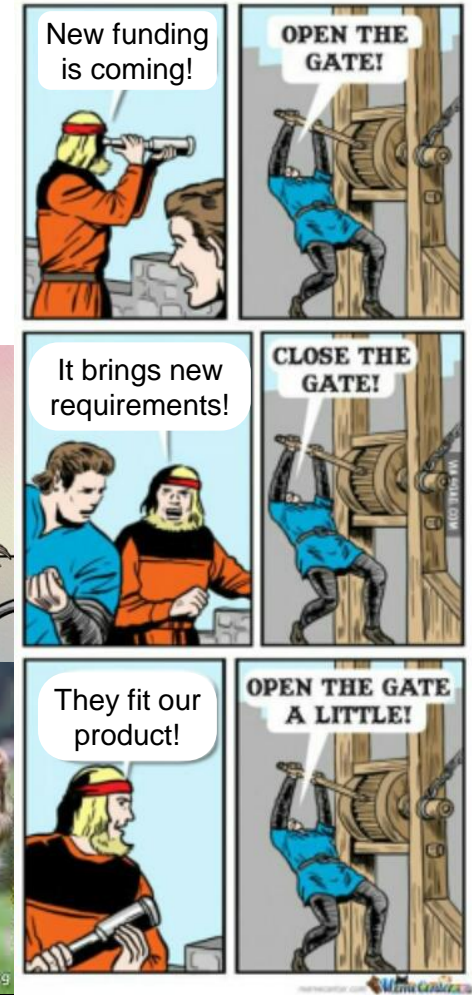
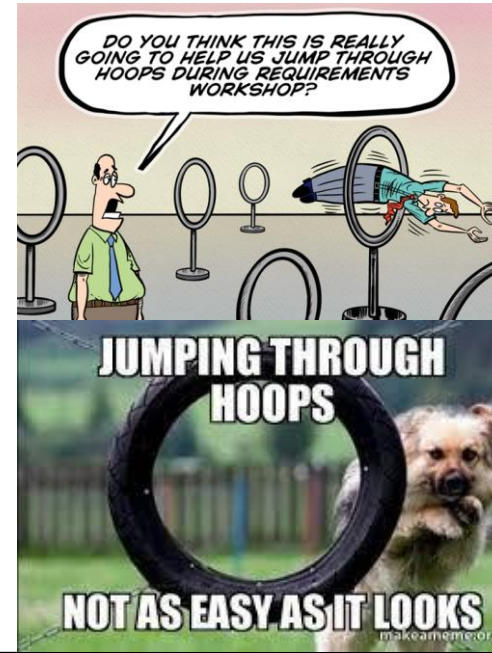
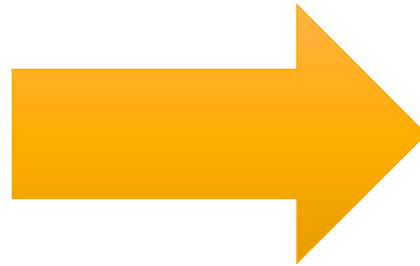
- Open (3 issues):**
 - [HIGH] Reevaluate Resource Type to Organization scoping (Bug, Coscine_Environment, Resource_Types, 2414)
 - [LIVE][MEDIUM] Strange GitLab Reporting - Quota is allocated to GitLab Resources (Bug, Reporting, Resource_Types, 2412)
 - [HIGH][LIVE] Suspicious Quota numbers in project (Bug, Quota_Management, 2418, Tomorrow)
- Status:_Doing (6 issues):**
 - Allow users to sort search results (Review_Technical, Search_& Discoverability, 2264)
 - [LIVE][MEDIUM] Search Categories/counts are broken (Bug, Search_& Discoverability, 2373)
 - [LOW][LIVE] Elastic Search: User can not get a search result for specific names (Bug, Search_& Discoverability, 2317)
 - Hint the user on how organization affiliation influences the visible resource types (Organizational_Structure, UI_& UX, 2393)
 - Resources and Project API errors due to UDE being hacked (Bug, Search_& Discoverability)
- Status:_Peer-Review_Testing (1 issue):**
 - Include the new metadata structure in all interaction points (Metadata_Management, 1792)
- Closed (3 issues):**
 - [HIGH][LIVE] Admin page quota problem (Bug, Status:_Deployed_to_D-SP10, Status:_Deployed_to_Live, Status:_Released, UI_& UX, 2427)
 - [LIVE][HIGH] Upload/Update button always enabled with empty required fields for resource types as LinkedData, gitlab and RDS-S3 (Bug, RCV, Resource_Types, Status:_Deployed_to_D-SP10, Status:_Deployed_to_Live, Status:_Released, Status:_Works on LIVE, Status:_Works on D-SP10, 2417)
 - [HIGH][LIVE] RWTH-RDS-S3 gone (Bug, Resource_Types, Status:_Deployed_to_D-SP10, Status:_Deployed_to_Live, Status:_Released, 2428)



Insight 2: Define hoops (and levers)!



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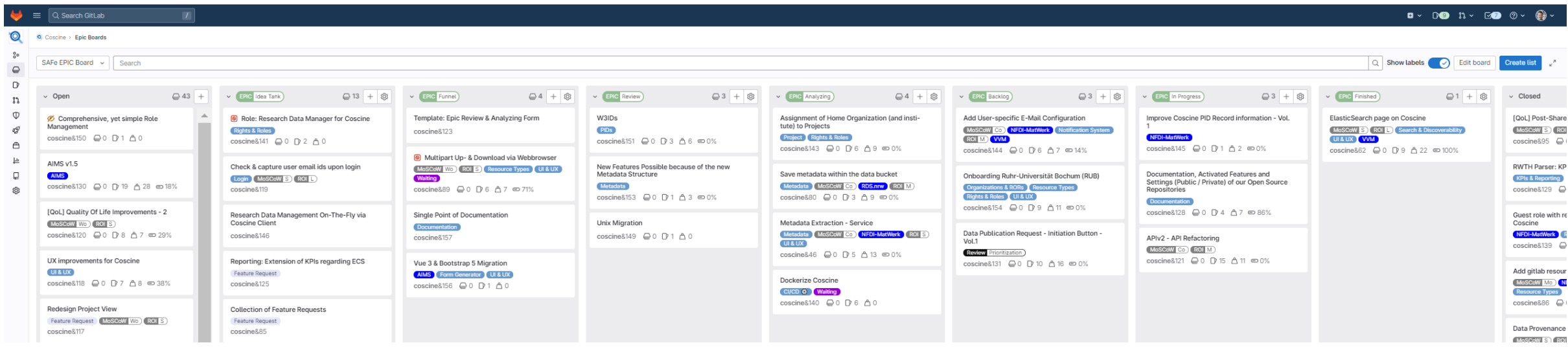
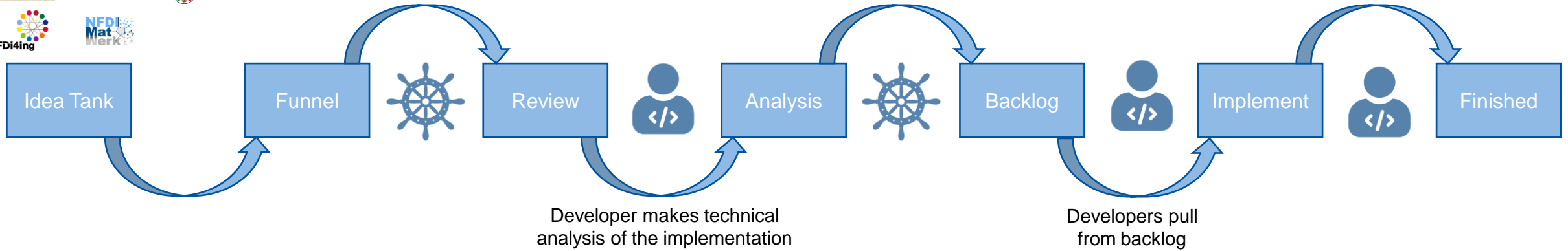
Planning at Scale – SAFe Framework for Prioritization



Steering Board votes based on fitness and fit to projects



Steering Board prioritizes based on estimated size and impact

Developers pull from backlog



Issue Templates

Coscine > Epics > #126

 Closed Created 6 months ago by  Petar Hristov

Reopen epic

Update KPI Generator: New KPIs for Reporting

► Status

Description:

For the service manager and the IT management (SEPro 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** (SEPro Process), service manager, other participating universities

► Review

► Analyzing

► Prioritization

Coscine > issues > Issues > #1792

 Open Issue created 1 year ago by  Benedikt Heinrichs (Owner) 0 of 13 checklist items completed

Close issue

Include the new metadata structure in all interaction points

Description:

To incorporate the new metadata structure proposed by [#41](#), include the new structure in every interaction point (cs/metadata, api/tree, etc.).

For this, check where the currently graphs for files are being retrieved. Adapt these methods to first target the `&type=metadata` graph in storing and receiving.

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


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

Acceptance Criteria:

- All interaction points use the new metadata structure, use methods from [MetadataTracker](#)

Challenge Ratio: 😊 😐 😞 😡 😤

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.md` or `Swagger API Docs`)
- `Integrator Script's integrations.json` is updated with relevant branch names and versions
- Relevant merge requests are created and are targeting the **relevant Sprint branch** (`Sprint/...`)
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Collaboration with Stakeholders and Transparency

Merge request for new application profile CT Imaging Parameters

Edit Code ▾

Open CoscineBot requested to merge [Request/dd052455-abcc-475f...](#) into [master](#) 3 days ago

Overview 0 Commits 1 Pipelines 1 Changes 1

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

👍 0 🗑️ 0 😊

✓ Pipeline #919923 passed for 0eb7c426 on Request/dd052455-ab... 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.

Stage: validate

- ✓ validate: [Ontologies] ↻
- ✓ validate: [Profiles] ↻
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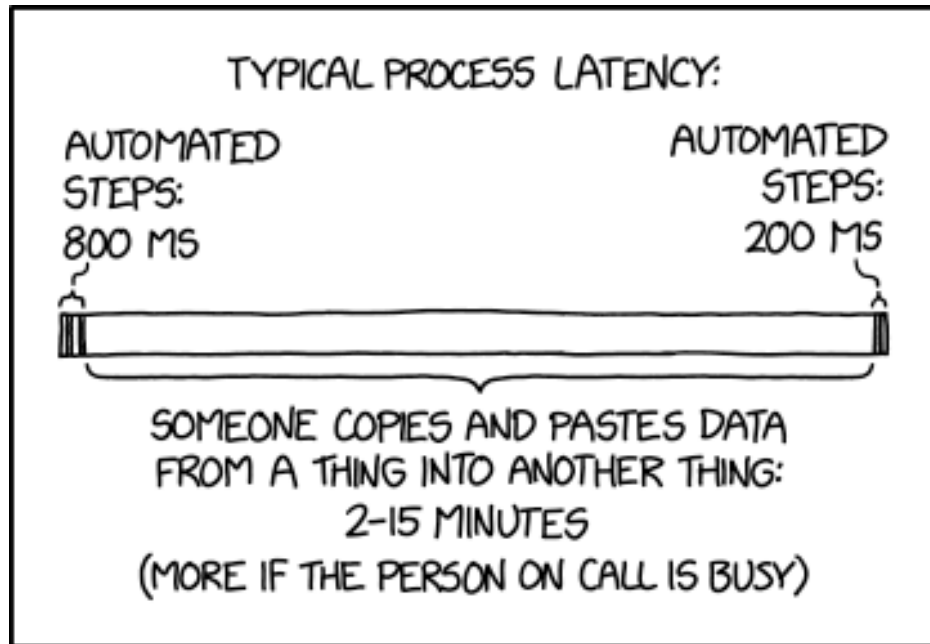
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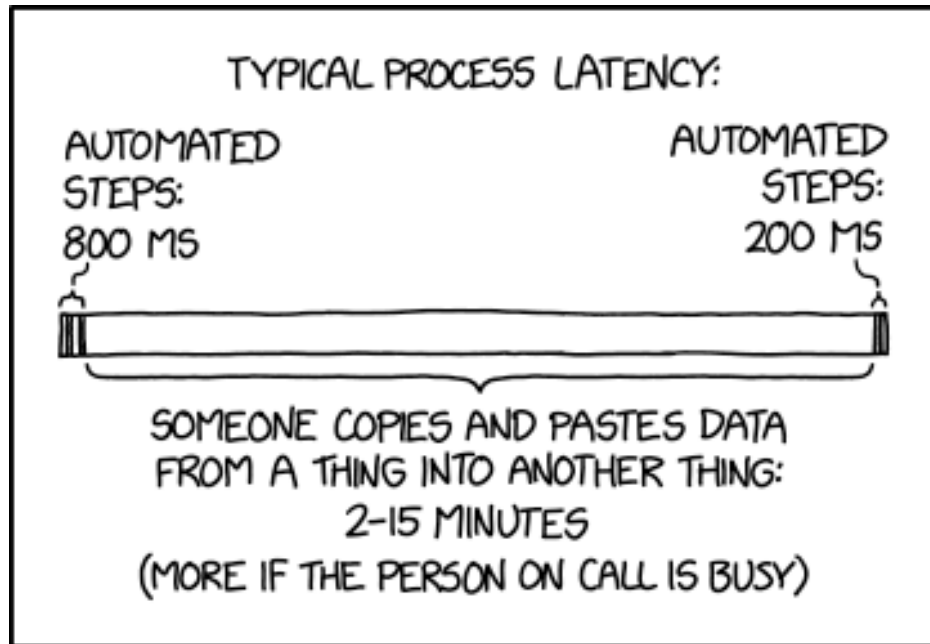
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Rule 3: Automate (all the things!?)

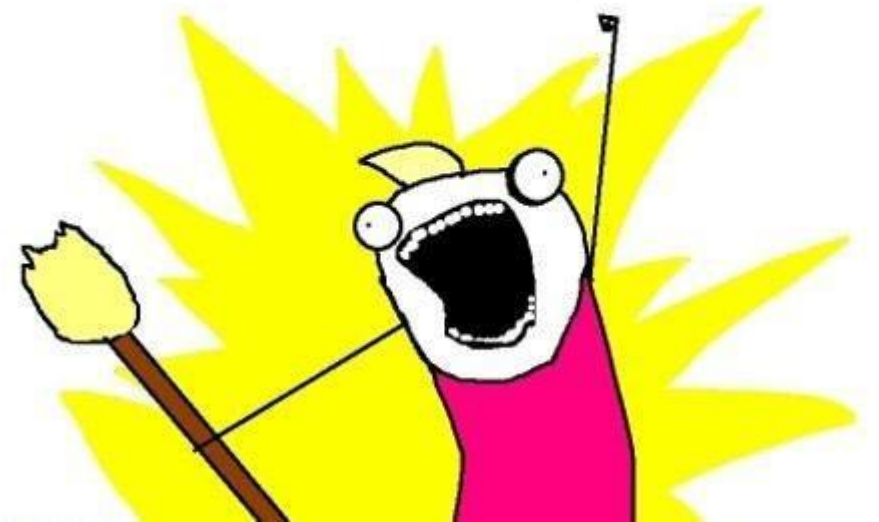
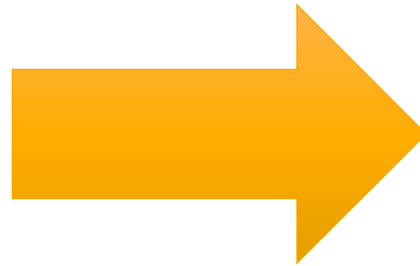


<https://xkcd.com/2565>

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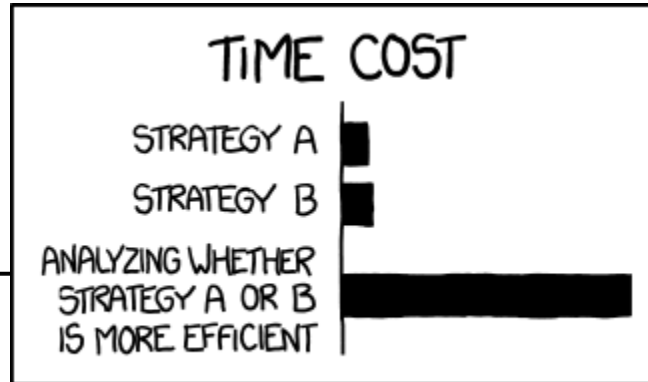
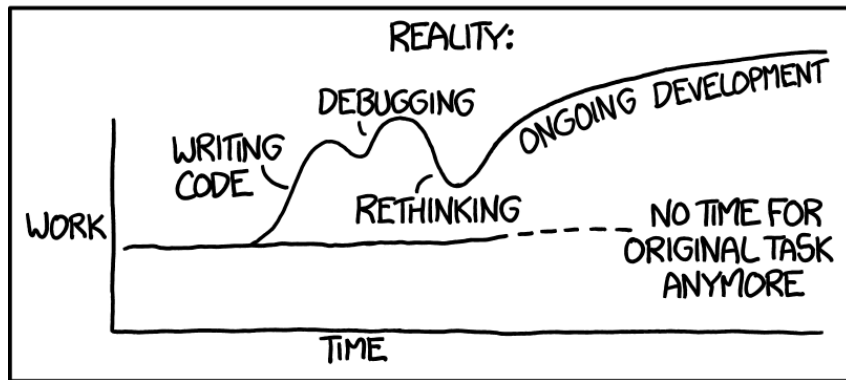
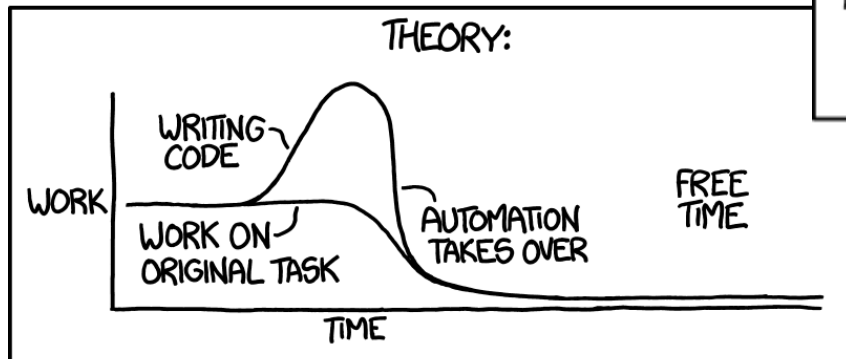


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* ... but only if it is worth it ...

"I SPEND A LOT OF TIME ON THIS TASK. I SHOULD WRITE A PROGRAM AUTOMATING IT!"



THE REASON I AM SO INEFFICIENT

HOW LONG CAN YOU WORK ON MAKING A ROUTINE TASK MORE EFFICIENT BEFORE YOU'RE SPENDING MORE TIME THAN YOU SAVE? (ACROSS FIVE YEARS)

HOW OFTEN YOU DO THE TASK

	50/DAY	5/DAY	DAILY	WEEKLY	MONTHLY	YEARLY
1 SECOND	1 DAY	2 HOURS	30 MINUTES	4 MINUTES	1 MINUTE	5 SECONDS
5 SECONDS	5 DAYS	12 HOURS	2 HOURS	21 MINUTES	5 MINUTES	25 SECONDS
30 SECONDS	4 WEEKS	3 DAYS	12 HOURS	2 HOURS	30 MINUTES	2 MINUTES
1 MINUTE	8 WEEKS	6 DAYS	1 DAY	4 HOURS	1 HOUR	5 MINUTES
5 MINUTES	9 MONTHS	4 WEEKS	6 DAYS	21 HOURS	5 HOURS	25 MINUTES
30 MINUTES		6 MONTHS	5 WEEKS	5 DAYS	1 DAY	2 HOURS
1 HOUR		10 MONTHS	2 MONTHS	10 DAYS	2 DAYS	5 HOURS
6 HOURS				2 MONTHS	2 WEEKS	1 DAY
1 DAY					8 WEEKS	5 DAYS

HOW MUCH TIME YOU SHAVE OFF

<https://xkcd.com/1319/>
<https://xkcd.com/1445/>
<https://xkcd.com/1205/>



Automated Tests & Quality Checks

Pipeline Needs Jobs 6 Tests 268

< validate: [Profiles]

73 tests 0 failures 0 errors 100% success rate 0.00ms

Tests

Suite	Name	Filename	Status	Duration	Details
	profiles/comsys/measurements/index.ttl		✓	0.00ms	View details
	profiles/cru344/index.ttl		✓	0.00ms	View details
	profiles/cwd/index.ttl		✓	0.00ms	View details

Pipeline Needs Jobs 6 Tests 268

validate

dev_deploy

✓ validate 5

- ✓ validate: [Ontologies]
- ✓ validate: [Profiles]
- ✓ validate: [Rules]
- ✓ validate: [Terms]
- ✓ validate: [Vocabularies]

Automated Environments & Infrastructure Management

All 191 Finished Branches Tags

Clear runner caches

CI lint

Run pipeline

Source = Schedule X

X Q

Show Pipeline ID v

Status	Pipeline	Triggerer	Stages
<p>passed</p> <p>00:02:28</p> <p>15 hours ago</p>	<p>Update image path for coscine_reporting</p> <p>#921340 main -> e1508e28 </p> <p>Scheduled latest</p>		<p>▶ ▼ ▶▶ ▶▶▶</p> <p>▶ ▼ ▶ ▼</p>
<p>passed</p> <p>00:02:15</p> <p>1 day ago</p>	<p>Update image path for coscine_reporting</p> <p>#920971 main -> e1508e28 </p> <p>Scheduled latest</p>	<p>Available 13 Stopped 0</p> <p>Enable review app New environment</p>	
<p>passed</p> <p>00:02:26</p> <p>2 days ago</p>	<p>Update image path for coscine_reporting</p> <p>#920546 main -> e1508e28 </p> <p>Scheduled latest</p>		

Q Search by environment name

> about-coscine-de production

Open ▶ Stop ⋮

> aims production

Open ▶ Stop ⋮

> coscine-reporting production

Open ▶ Stop ⋮

▼ docs-coscine-de production

Open ▶ Stop ⋮

Success Latest Deployed #2651 -> e1508e28 15 hours ago

Update image path for coscine_reporting

Triggerer	Job	Branch
@mpolitze	docs... jscine-de	main



Final Remarks



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- It's for the team!

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- Prepare for gradual adoption; address greatest pains first

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- 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



Dr. Marius Politze

IT Center RWTH Aachen University

Head of Department

Research Process & Data Management

politze@itc.rwth-aachen.de