Continuous Modeling with MATLAB and Microsoft Azure DevOps

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Test and Validation Engineer

1. Introduction
2. Motivation
3. Solution
4. Microsoft Azure DevOps
5. Use Cases
6. Conclusion

Introduction about myself

I am 33 years old.

Degree in Electronics (B.Eng.) and Engineering Physics (M.Sc.).

Professional software development since 2013.

Current position: Test Automation in IoT (Architectural design, Test specification and implementation, continuous testing…).

Working at CLAAS since August 2018.

5+ years experience in modular software design using “git flow”.

CLAAS Company presentation









CLAAS E SYSTEMS Company presentation

Connectivity &
Data Management

Steering, Precision
Applications & Terminals

Process
Automation

Base Components & Architecture

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Who may be interested in this presentation

Are your models complex?


[1]

Are there 10+ people working on the same model?


[2]

Are those people working at different locations, even countries?


[3]

Do you feel that your teams develop several times similar stuff, e.g. libraries?

Have you experienced problems during integration of MATLAB Simulink models?

Do you want to adopt agile methodologies?


[4]

Best practices for modular mode design

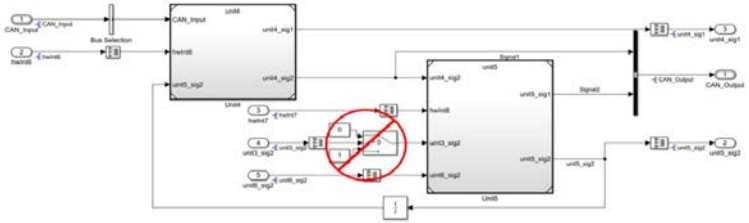
Use model reference for unit-level models.

Pick a strategy for grouping units into features.

[5]

Classify models according to safety requirements.

Avoid algorithmic content at the integration level.



Use model metrics to monitor unit complexity.

[6]

Define the role of model architects and integrators.

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Taking the approach of other industries

These problems are not new, there are a lot of engineers that have been struggling for years with them.

So… why don’t we use some of their approaches?

Do you know who I´m talking about?

SOFTWARE ENGINEERING

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Covering the entire application lifecycle with Microsoft Azure DevOps

It provides version control.

It provides reporting and requirements management.


[16]

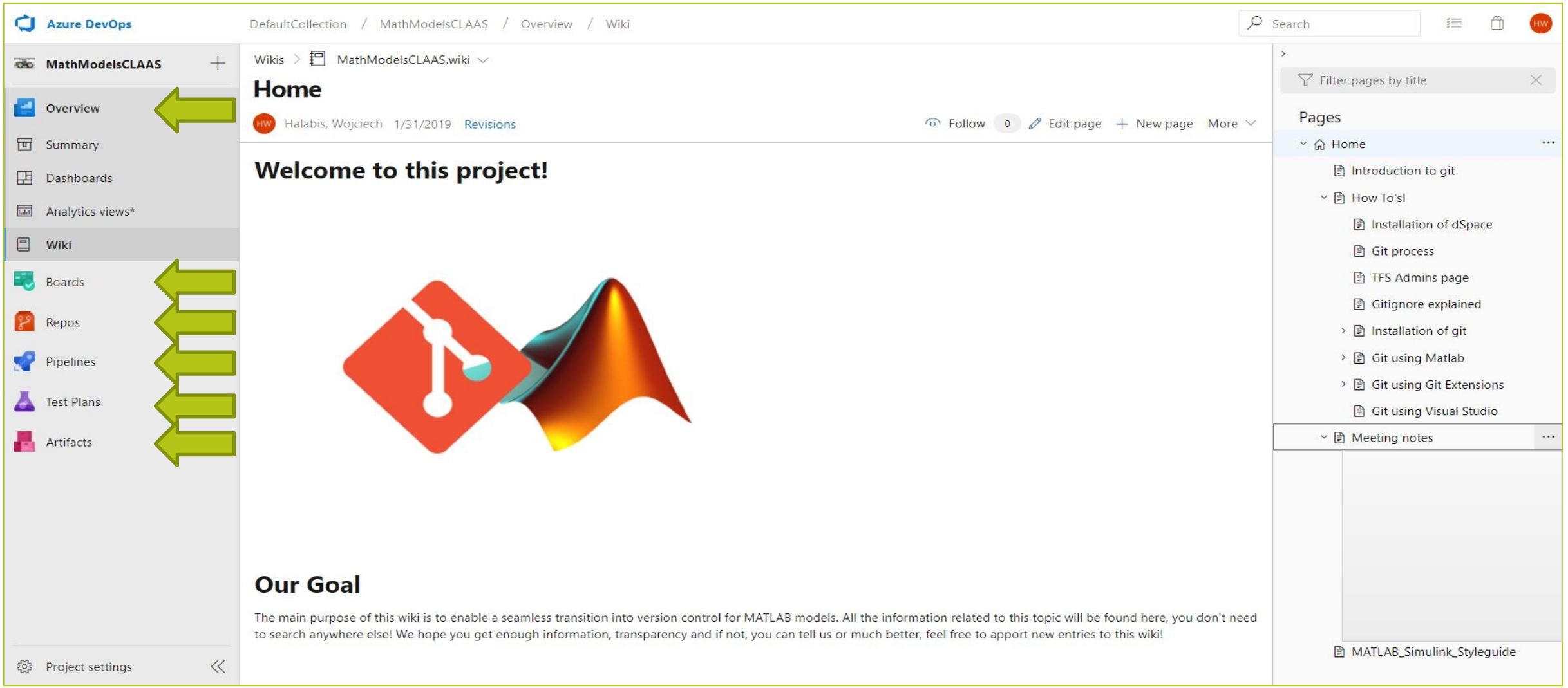
It provides project management, for both agile software development and waterfall teams.


[4]

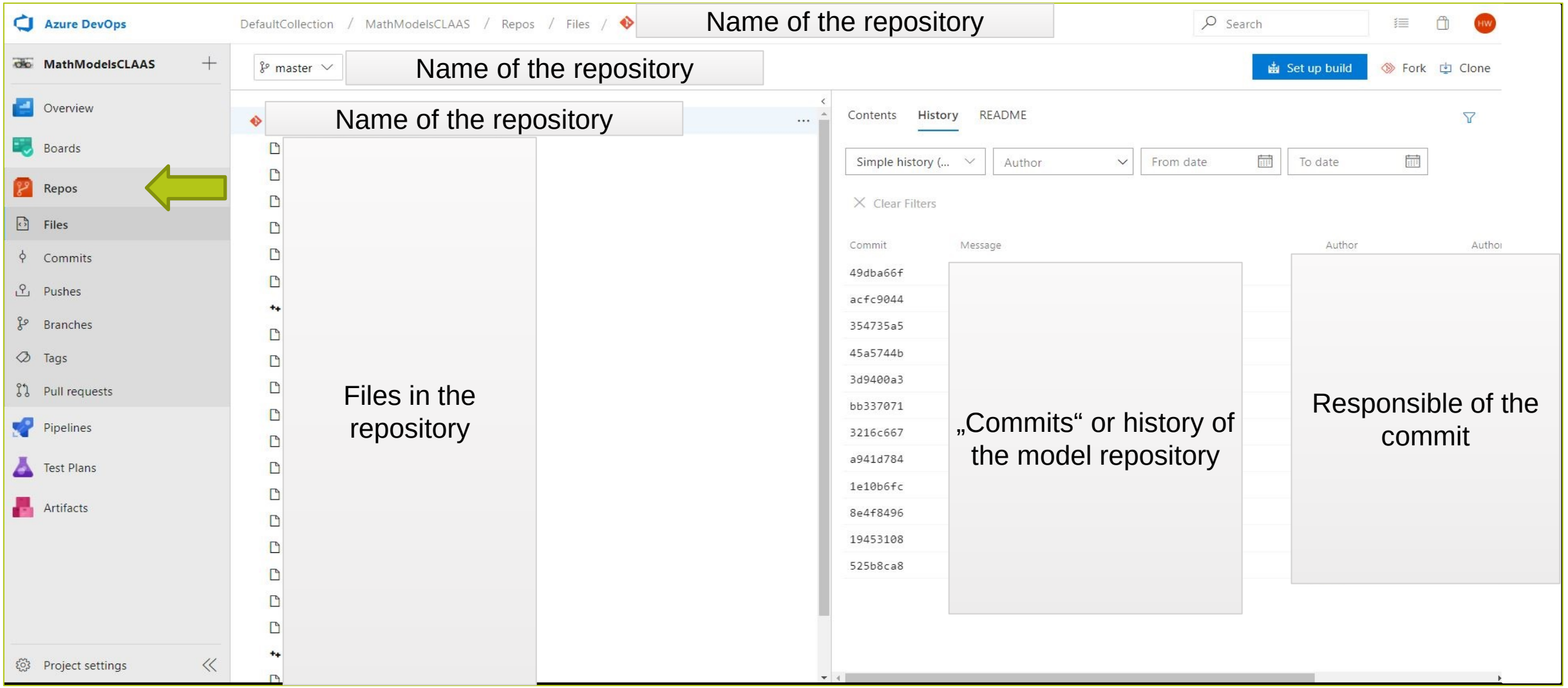
It provides automated build, testing and release management.


[17]

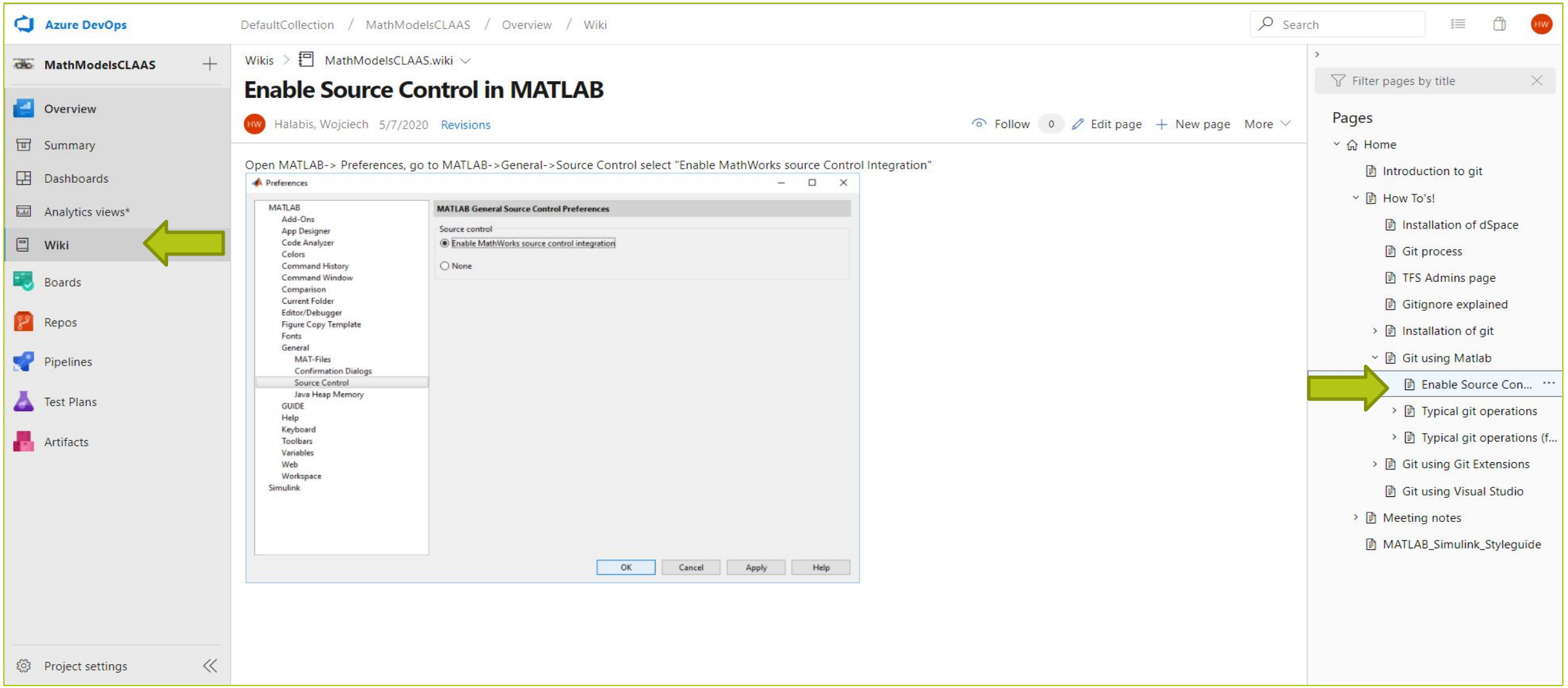
Snapshots – Home page



Snapshots – Git repositories



Snapshots – Knowledge base

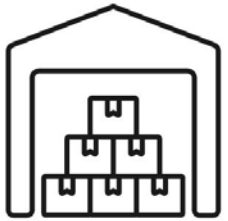


Putting your models in version control system

Encourage collaboration.

[7]

Maintain properly our versions.



[8]

Restore previous versions.

[9]

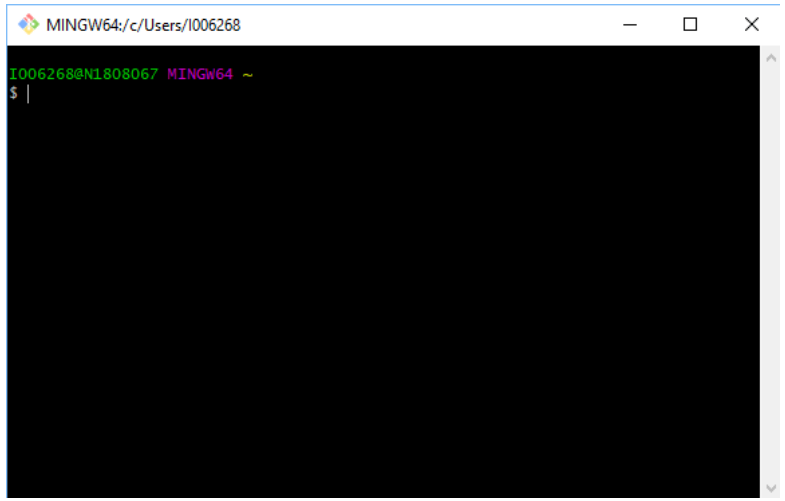
Understand all the time what is happening.

[10]

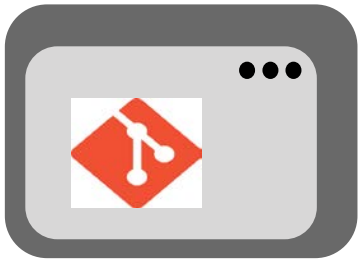
ALL OF THAT JUST BY INTEGRATING PROPERLY A VERSION CONTROL SYSTEM IN YOUR COMPANY

Faster development with appropriate git tool

As a command line tool

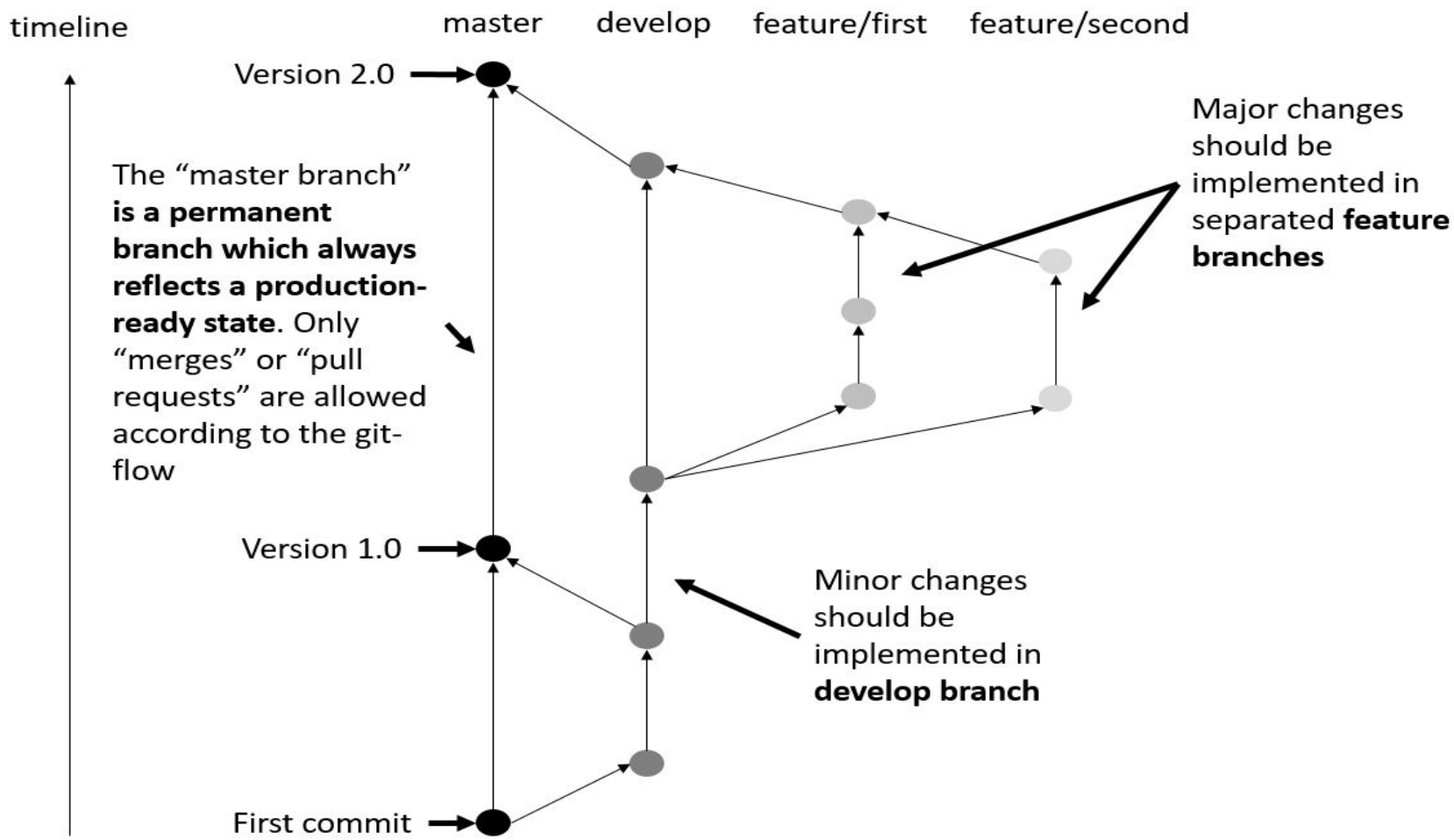


With a git GUI



Integrated

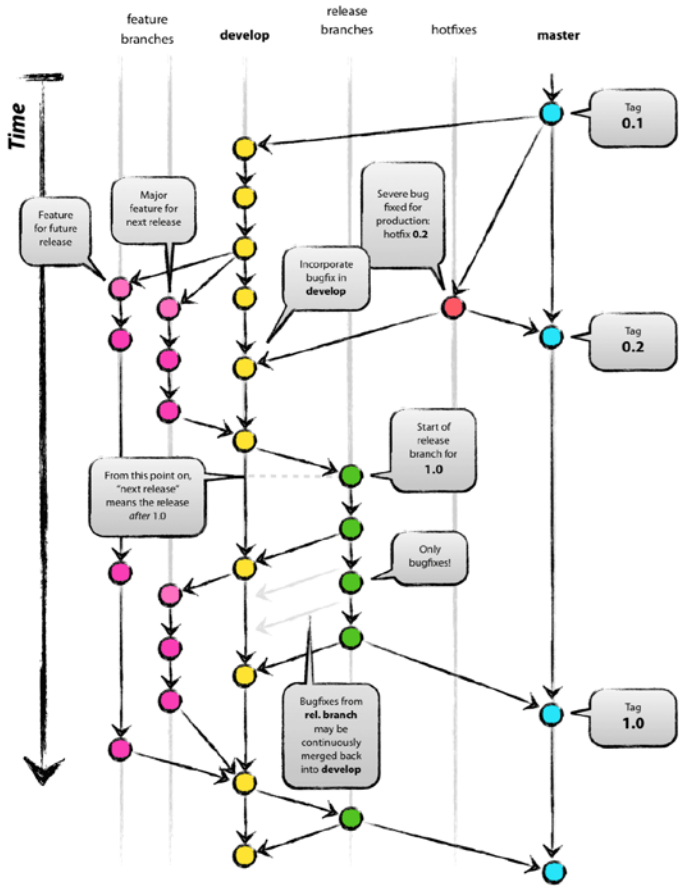
Developing models using the “git flow”



Traceability out of the box

REQ: a function that calculates max of two values

Automatic creation of feature-branches for the model, important for almost automated release notes creation



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Example of modular design with git submodules

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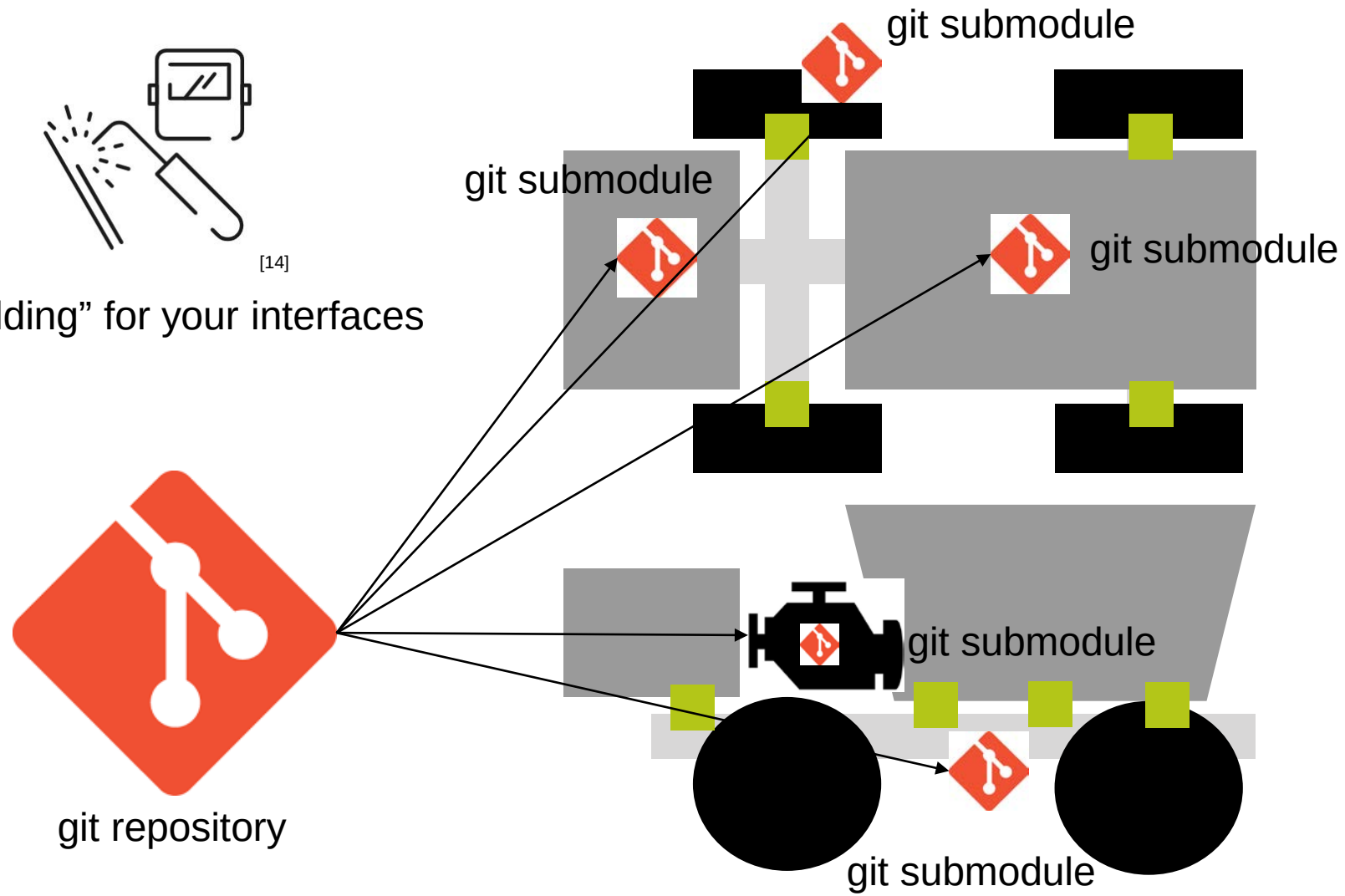
“Welding” for your interfaces



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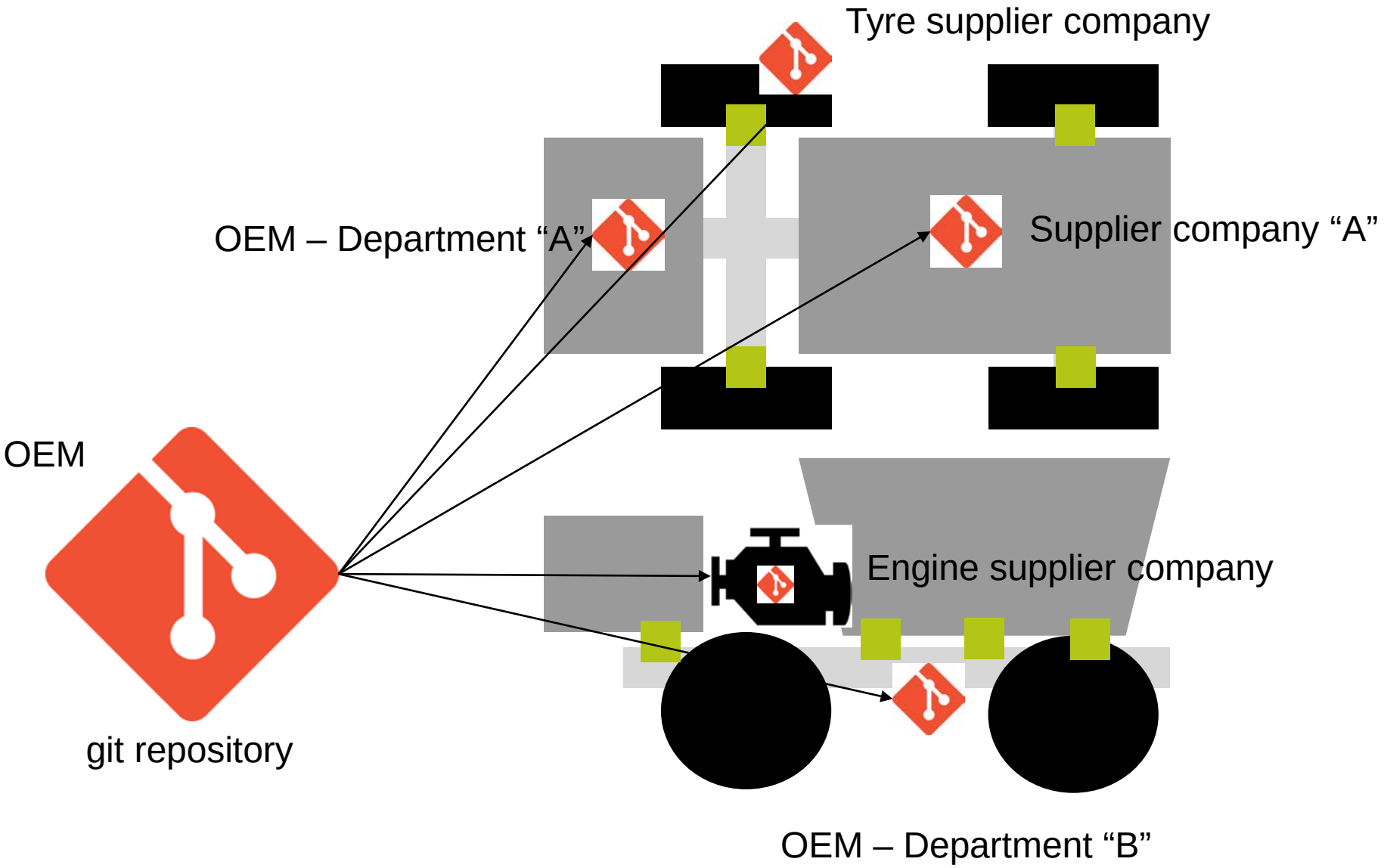
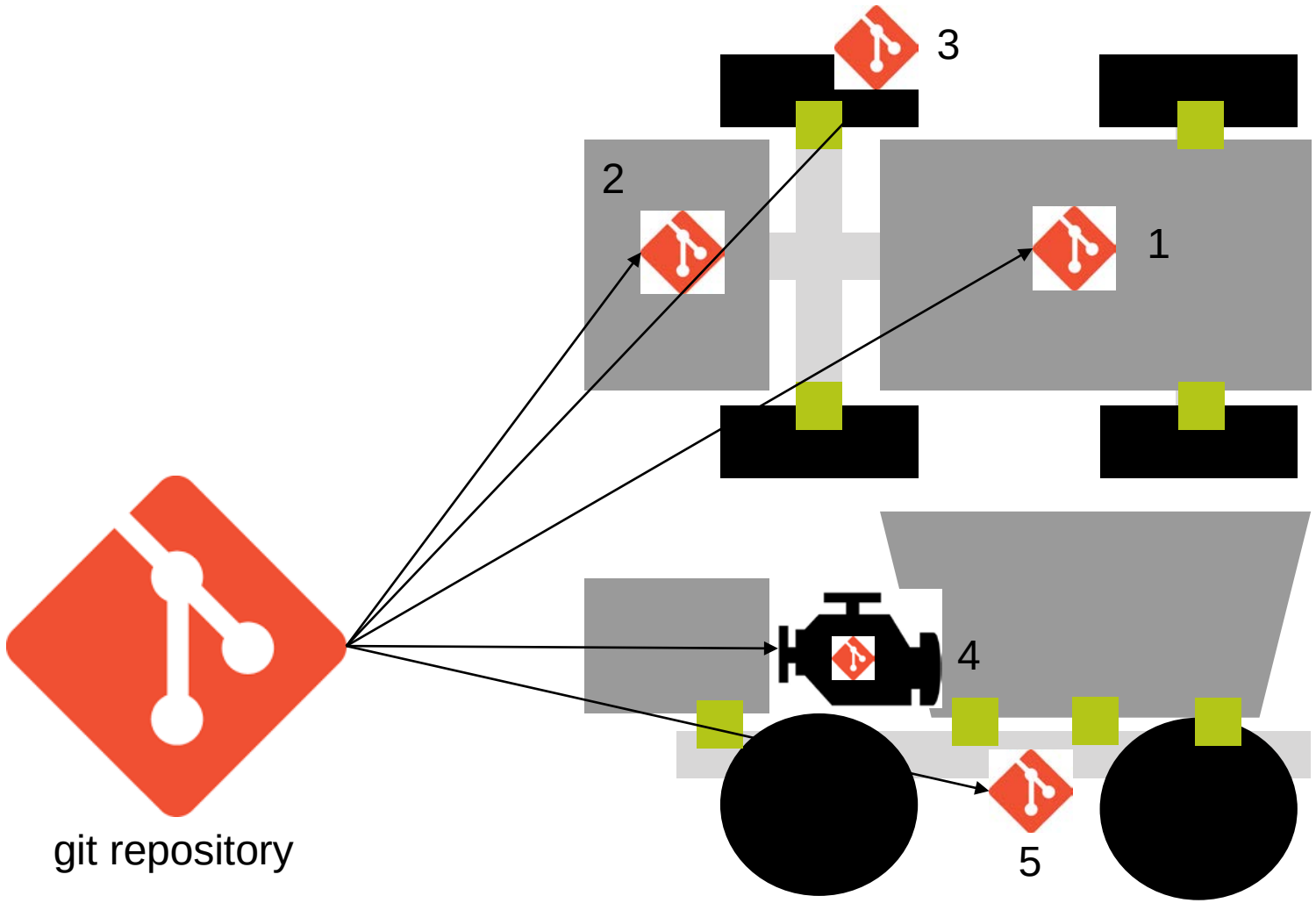
“Nuts and bolts” for your interfaces

Externalization and reuse of model units



Development efforts based on safety requirements of model units



Safety critical model unit

5

Non safety critical model unit

1

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Where are we now at CLAAS

Different departments are already working using this methodology.


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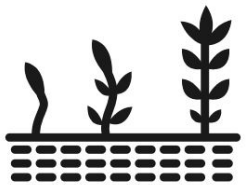
[11]

Growing number of machine Simulink models are being built on top of git submodules.


[12]

Departments that have developed a modelling process without git, are being trained and will adopt this methodologies in the near future.


[13]

References

[1] https://thenounproject.com/weltenraser/

[2] https://thenounproject.com/rshashank19/

[3] https://thenounproject.com/nhor/collection/global-business

[4] https://thenounproject.com/floicons/

[5] https://thenounproject.com/popcornartsgfx

[6] https://thenounproject.com/lastspark

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[8] https://thenounproject.com/victorulerz

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[10] https://thenounproject.com/mirhashemihamed

[11] https://thenounproject.com/hatti27789service

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[17] https://thenounproject.com/coquet_adrien

Thank you for your attention.

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