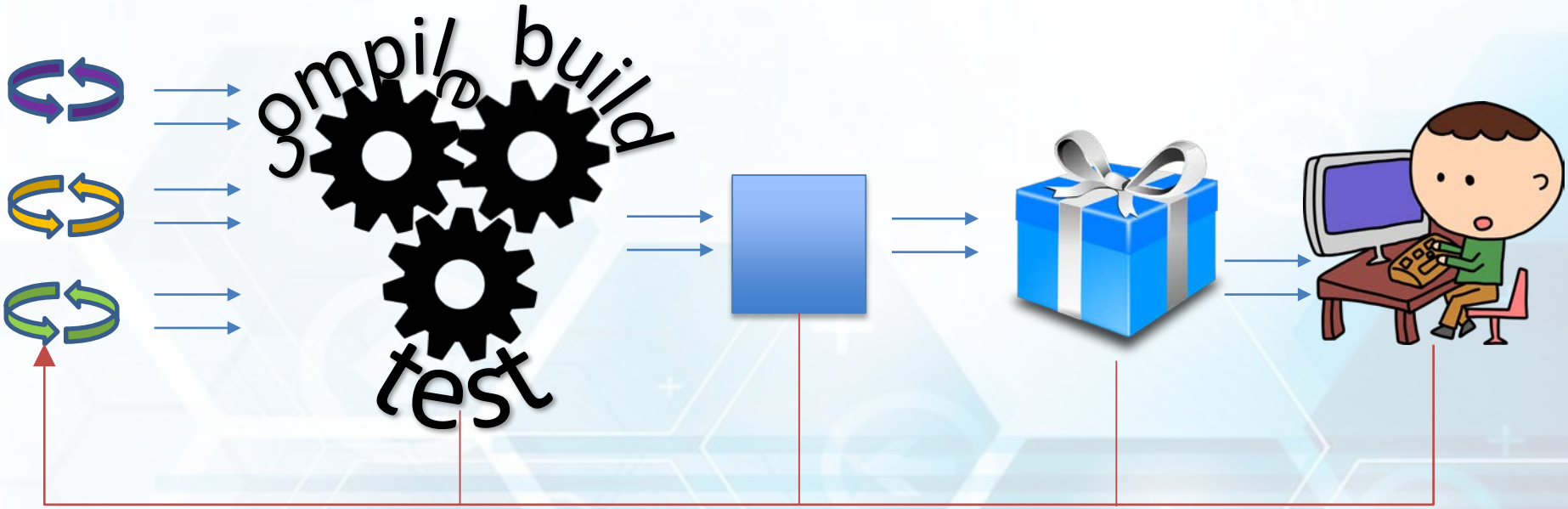
Theme #1
Continuous Delivery

Kristian Sandahl

Reporting workshop 2018-06-07

The machinery



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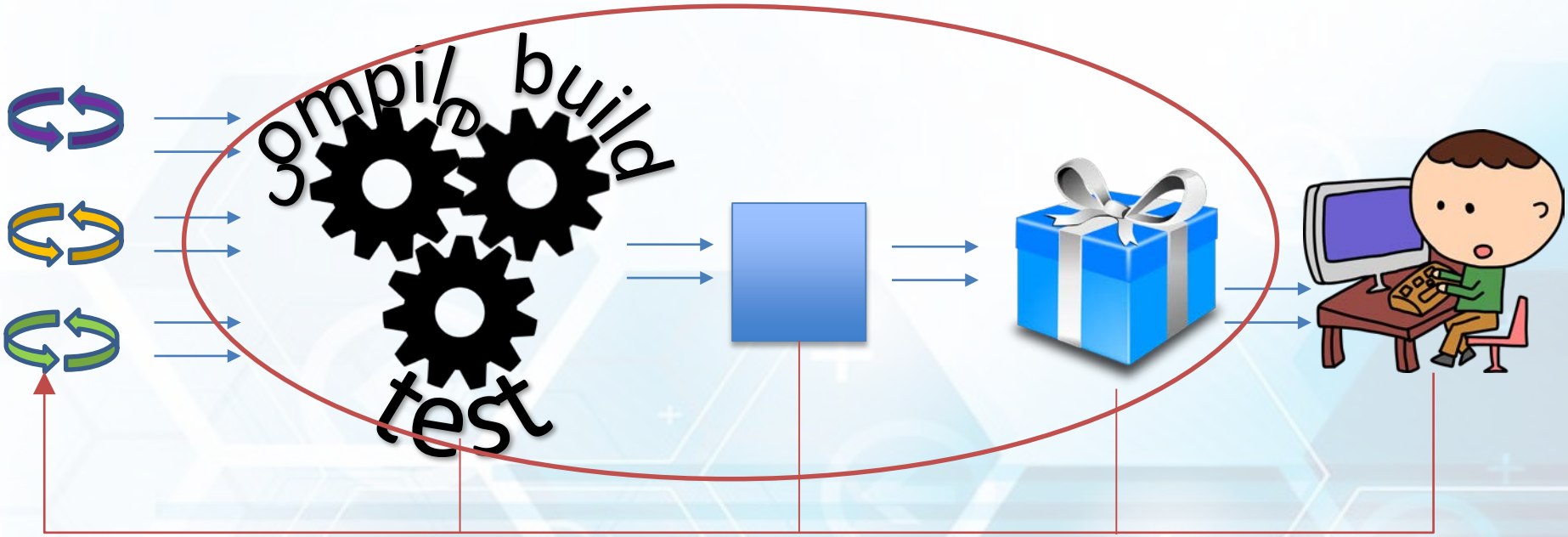
Challenges

- High demand for automation
- Complex machinery
- Involves many stakeholders
- Changing organization, processes, mindset

Project #6 Enterprise Scale continuous Integration and Delivery



- Researchers: Daniel Ståhl Torvald Mårtensson Jan Bosch

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Project #6

Enterprise Scale Continuous Integration and Delivery (ESCID)

- The focus of the project is to develop and document methods and techniques facilitating systematic approaches to implementing continuous integration and delivery systems, particularly at enterprise scale.

Industry partners:

AXIS COMMUNICATIONS
VOLVO VOLVO TRUCKS
SAAB TECHNOLOGIES SAAB
ERICSSON
VOLVO
GRUNDFOS

Researchers:

Daniel Ståhl
Ericsson

Torvald Mårtensson
Saab

Jan Bosch
Chalmers

Project #6 Q1-Q2 2018

Published research papers:

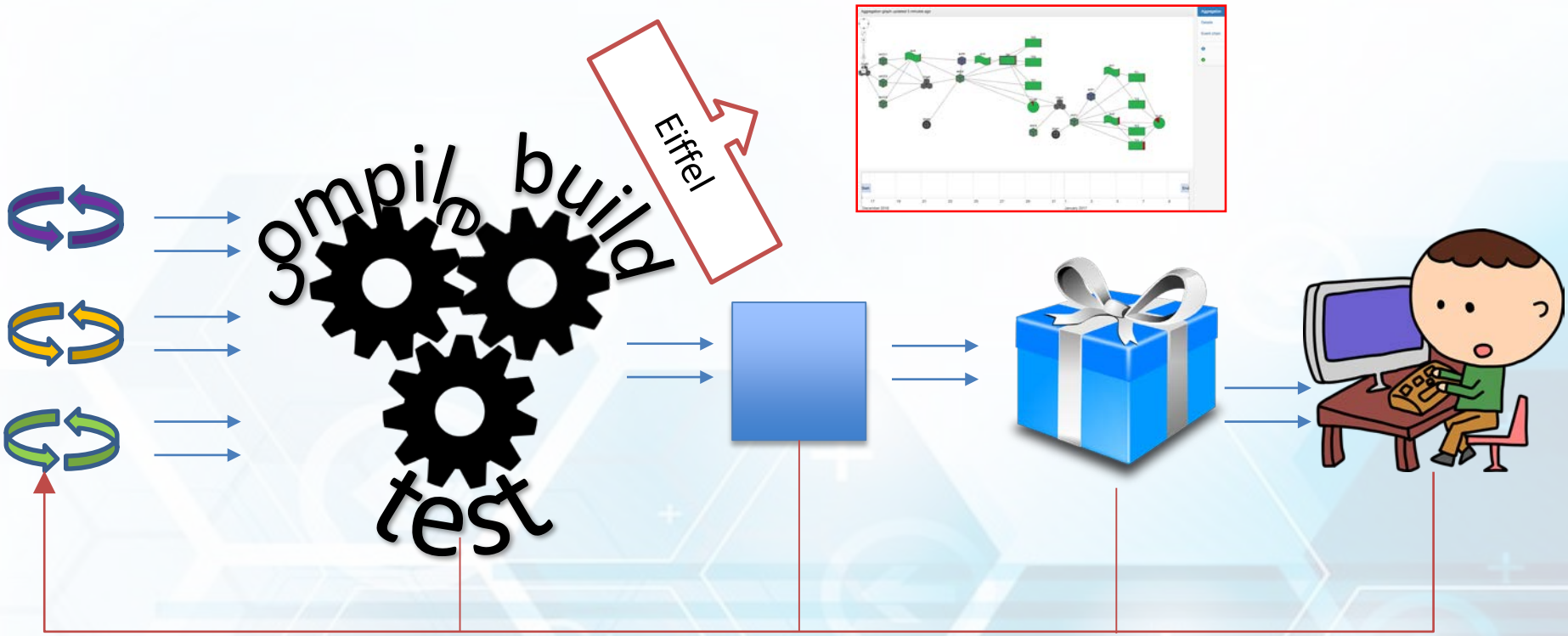
- “Enable More Frequent Integration of Software in Industry Projects”
  Mårtensson, Ståhl, Bosch – Journal of Software and Systems

Ongoing research projects:

- **AAT-1: Test Activities in the Continuous Integration & Delivery Pipeline**
  - Validation of the TAS model is now finalized
  - Preparing to submit journal paper
- **CONTD-1: System design/architecture combined with CI and CD**
  - Two series of interviews held with participants from three companies
  - Results presented at a cross-company workshop
  - Analysis of data and comparison with published literature ongoing
- **CONTD-2: Code Complexity and Developer Integration Behavior**
  - One series of interviews
  - Data collected from one large-scale industry case
  - Analysis ongoing

AAT-1, CONTD-1 and CONTD-2 will be presented at the SC workshop in December 2018

Project #18 Visualization of Continuous Integration



Researchers: Kristian Sandahl Ola Leifler Azeem Ahmad

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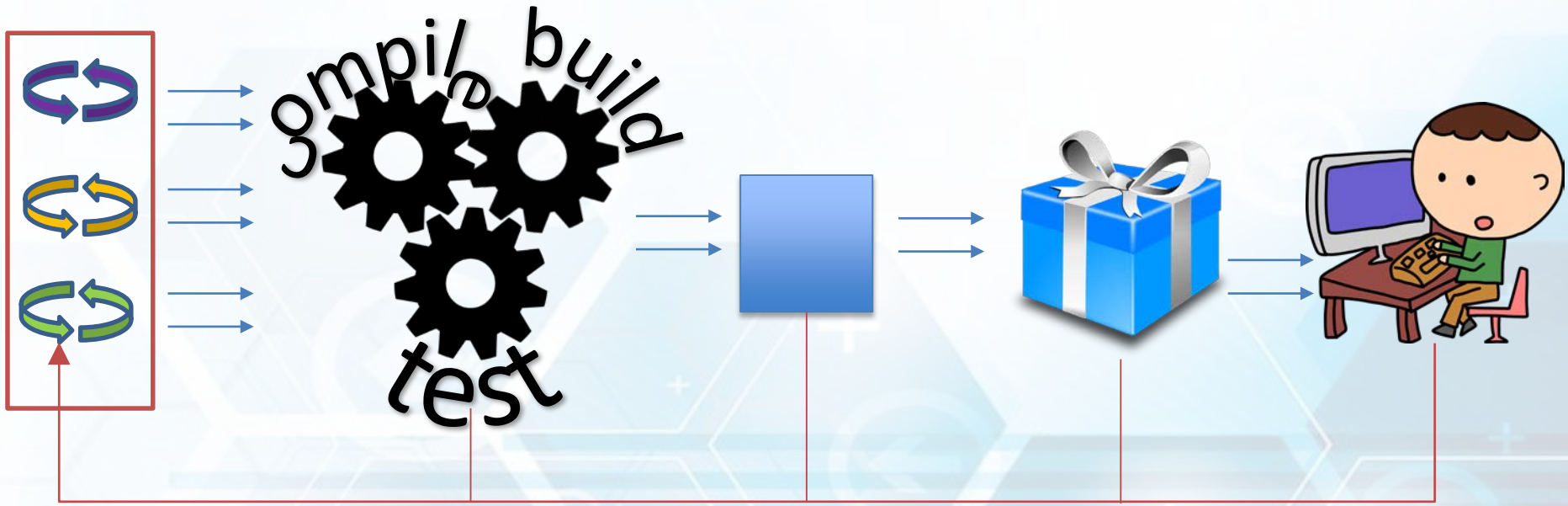
Project #18: Visualization of Continuous Integration

- **Current Progress / Deliverables**
  - Plugins to generate Eiffel events from the JIRA Issue Management System that can be visualized in the Vici visualization tool [1].
  - Proposed an extension to the Eiffel protocol to explicitly handle the creation and modification of issues as manifested in an issue management system such as JIRA [2].
  - Produced a persistence solution that acts as an extension of our Vici visualization tool and is capable of consuming Eiffel events produced by JIRA and other Eiffel-producing components [3].
  - Expecting Eiffel plugins for Jenkins and BitBucket from Axis and Grundfos (through Praqma).

[1] https://github.com/eiffel-community/eiffel-jira-plugin
[2] https://github.com/Ericsson/eiffel
[3] https://github.com/eiffel-community/eiffel-store

#28 An Analysis of Team-based Development within an Activity Based Working Environment



Researchers: Robert Feldt Per Lenberg Lars-Göran Wallgren

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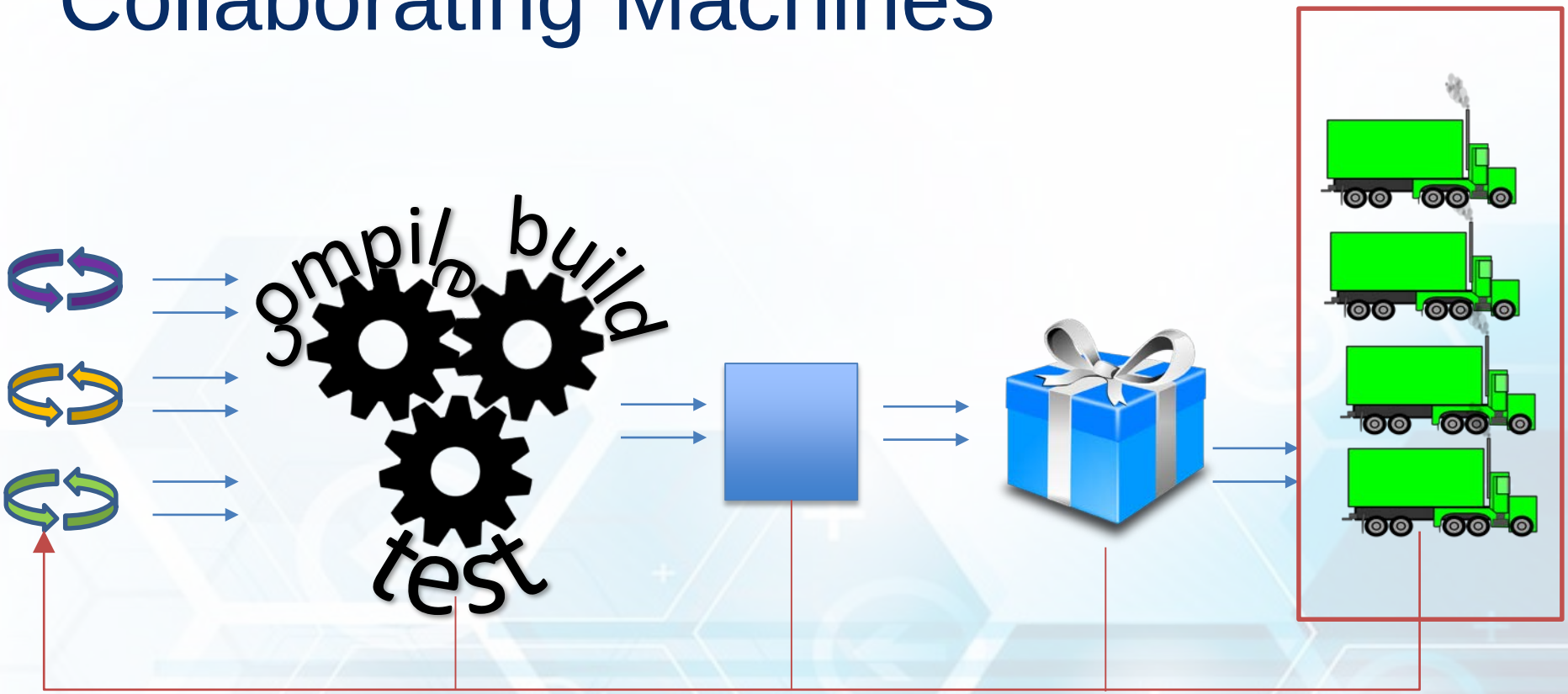
#29: Modeling and Analyzing Collaborating Machines



Researchers: Marjan Sirjani & C:o

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Project Team

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Ali Jafari
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MDH

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Project Goals

Combine efficiency/flexibility with dependability/predictability

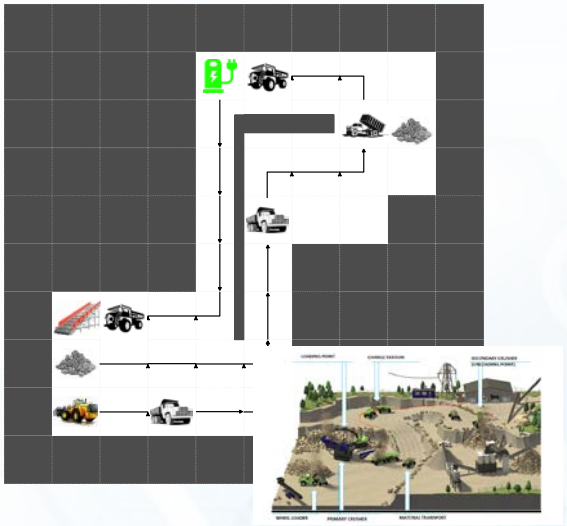
Modeling and Analyzing
Collaborating Event-based Autonomous Systems

- as Timed Critical Distributed Systems

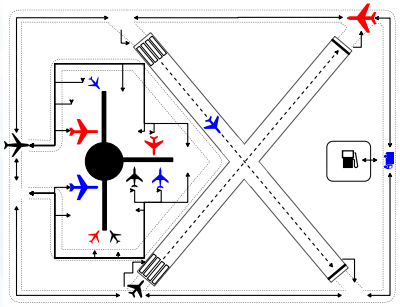
- System of systems:
  - Flow Management: **optimizing** the operation and keep it **safe**
- Autonomous system:
  - Architecture: **Safe** code in Robotic Operating System

System of Systems: Flow Management

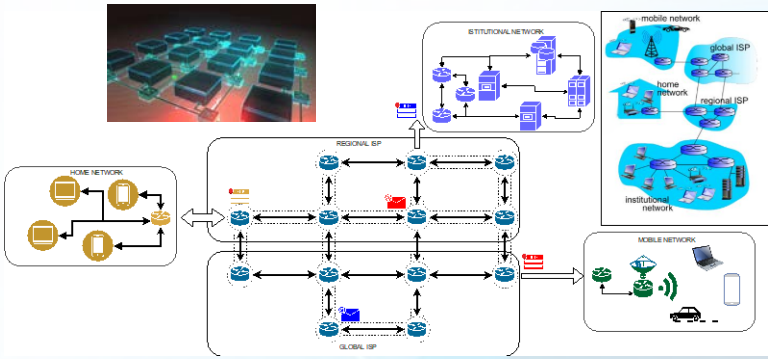
Quarry



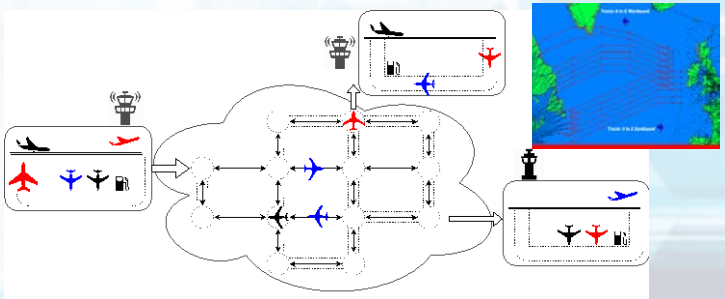
Airports



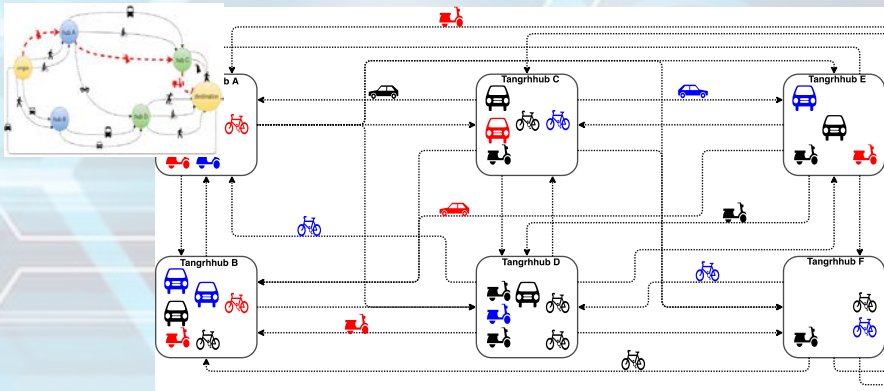
Networks



Air Space



City



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Autonomous system:
Safe code in Robotic Operating System (ROS)

Check functional safety properties using temporal logic and model checking tools

Examples:
Fleet control node receives all the three required mandatory inputs (in order to perform error free fleet coordination).

Non-availability of ‘sitepathfile’ for ‘machinecontrol’ node leads to a ‘machine paused’ state.

Application of Server emergency brake signal leads to stopping of the vehicle movement.

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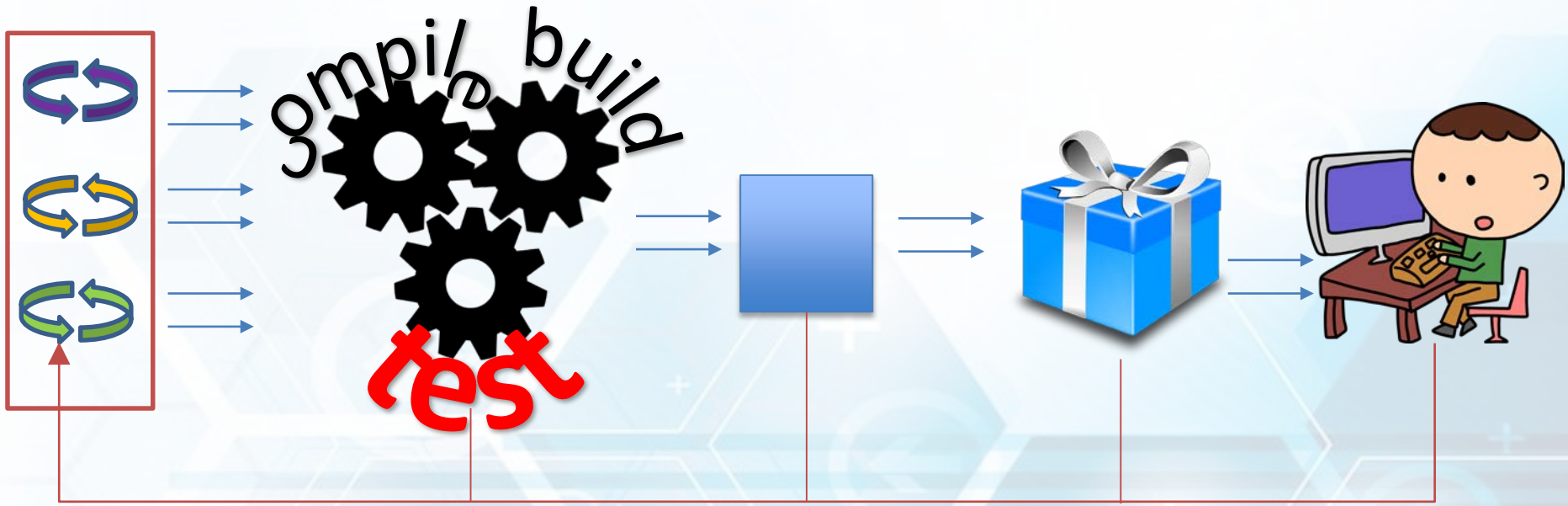
#30 Aspects of automated testing



Researchers: Torvald Mårtensson Daniel Ståhl Kristian Sandahl Ola Leifler Azeem Ahmad Francisco Gomes Eduard Paul Enoiu

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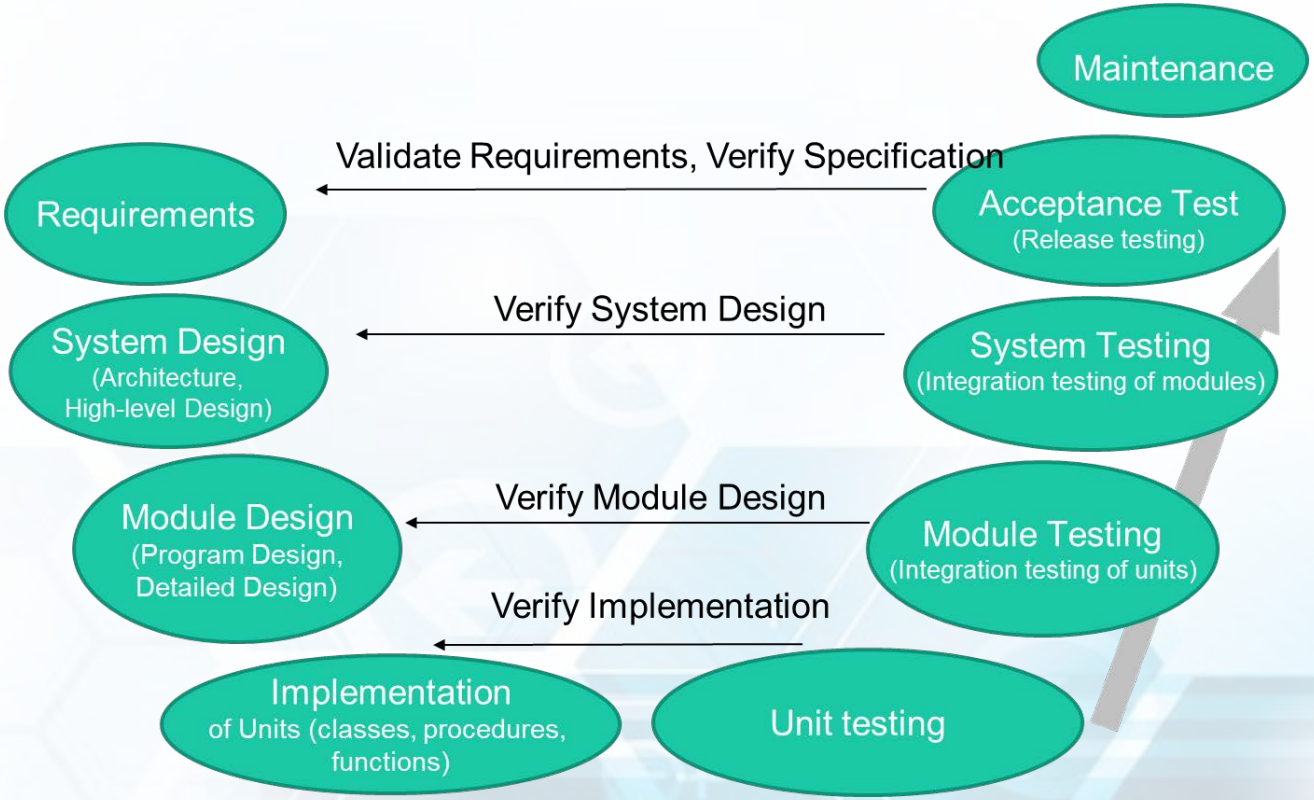
Subproject AAT-1: Which test activities have most value?



- 25+4 interviews
- 2 workshops
- Collected quantitative data
- Research paper submitted

SWC30 – AAT3

- Study on test minimization for **resource allocation**
  - Minimal set of hardware parts to maximise test coverage.

- RQ1: Can I use **fewer hardware products**? ~ 80-95% less products
- RQ2: How much **redundancy** do I have? ~ 98% fewer tests
- RQ3: How much testing **time can I save**? ~ 45 – 90% faster

Property	Total	400 features (current)	400 features (minimized)	10 features (minimized)
Products	249	247	50	5
Num. of Tests	44000+	3800+	700	19
Time	3 hours	2.5 hours	1.5 hours	3.5 minutes

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Experience exchange

- Dissemination workshop 2018-04-19
  - 5 researchers and 5 companies
- Contribution at AST in Göteborg 2018-05-28—29
- Regular contacts with Testomat ITEA project

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