PE INTERNATIONAL
SUSTAINABILITY PERFORMANCE

Gurkensalat statt Spaghetticode

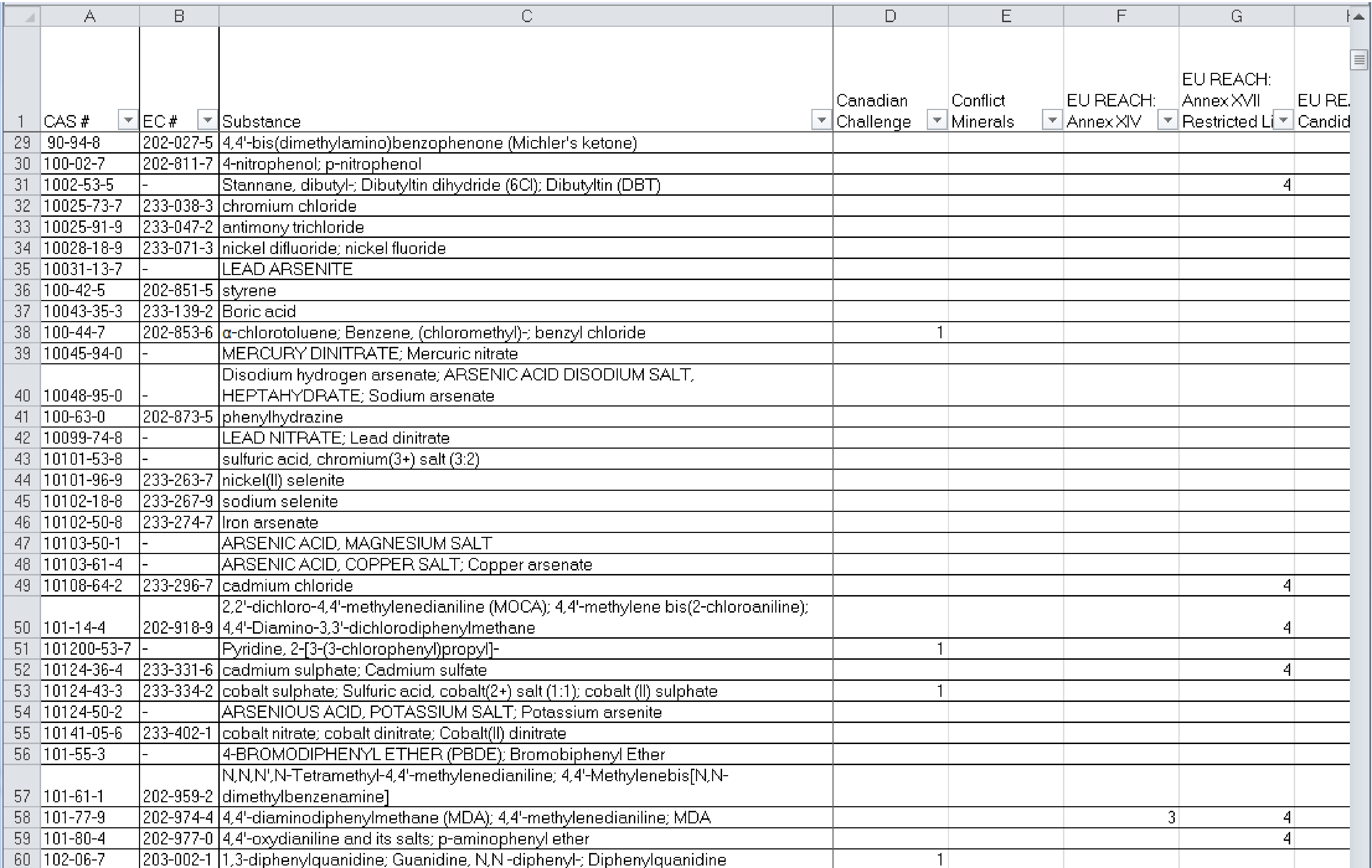
Stuttgarter Testtage 2013

1. Motivation für BDD
2. Einführung in BDD
3. Cucumber für Java
4. Lessons Learned

Motivation für BDD

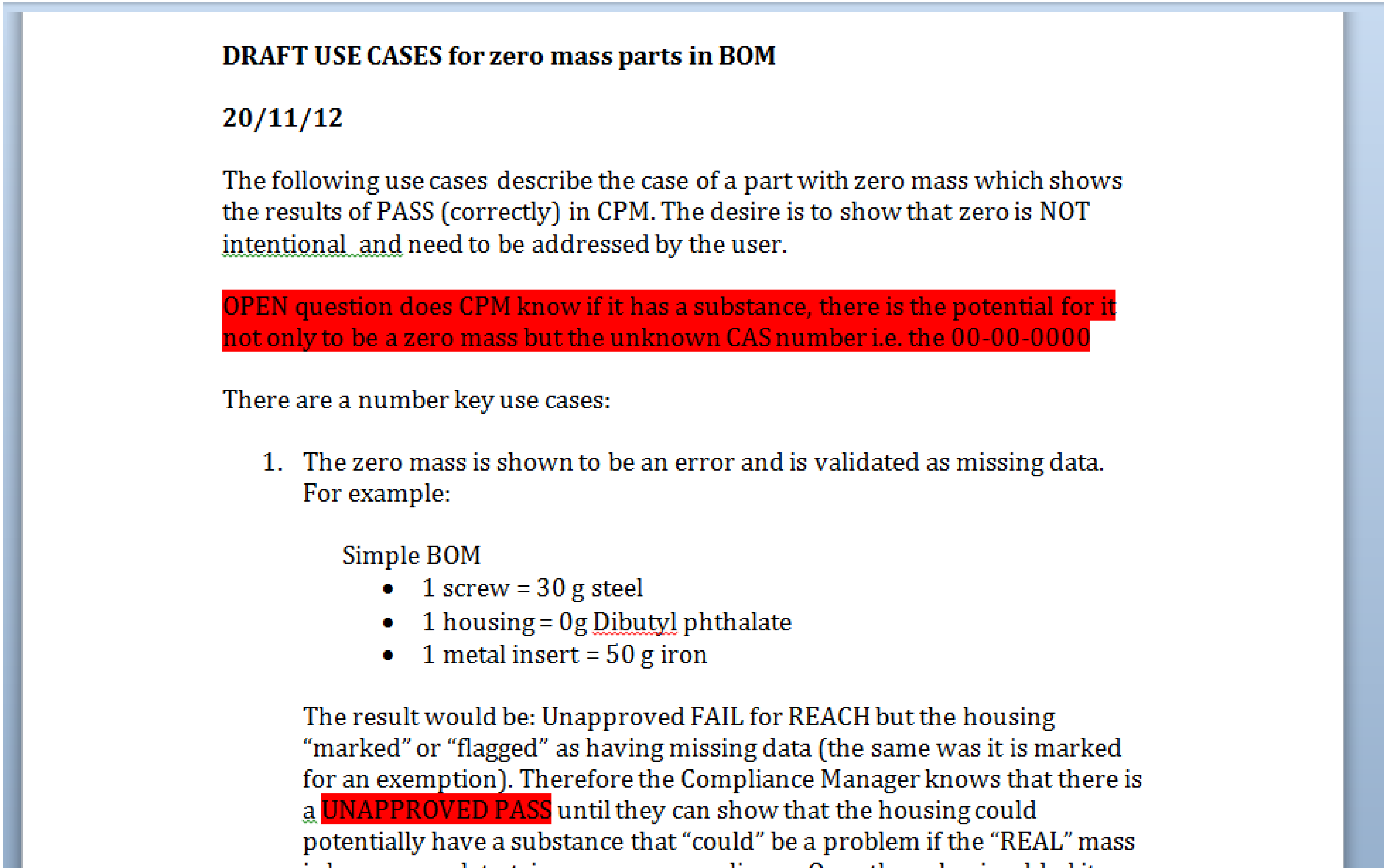
Requirements

... ein wenig Excel



	A	B	C	D	E	F	G	H
1	CAS #	EC #	Substance	Canadian Challenge	Conflict Minerals	EU REACH: Annex XIV	EU REACH: Annex XVII Restricted Li	EU RE. Candid
29	90-94-8	202-027-5	4,4'-bis(dimethylamino)benzophenone (Michler's ketone)					
30	100-02-7	202-811-7	4-nitrophenol; p-nitrophenol					
31	1002-53-5	-	Stannane, dibutyl-; Dibutyltin dihydride (6CI); Dibutyltin (DBT)				4	
32	10025-73-7	233-038-3	chromium chloride					
33	10025-91-9	233-047-2	antimony trichloride					
34	10028-18-9	233-071-3	nickel difluoride; nickel fluoride					
35	10031-13-7	-	LEAD ARSENITE					
36	100-42-5	202-851-5	styrene					
37	10043-35-3	233-139-2	Boric acid					
38	100-44-7	202-853-6	α-chlorotoluene; Benzene, (chloromethyl)-; benzyl chloride	1				
39	10045-94-0	-	MERCURY DINITRATE; Mercuric nitrate					
40	10048-95-0	-	Disodium hydrogen arsenate; ARSENIC ACID DISODIUM SALT, HEPTAHYDRATE; Sodium arsenate					
41	100-63-0	202-873-5	phenylhydrazine					
42	10099-74-8	-	LEAD NITRATE; Lead dinitrate					
43	10101-53-8	-	sulfuric acid, chromium(3+) salt (3:2)					
44	10101-96-9	233-263-7	nickel(II) selenite					
45	10102-18-8	233-267-9	sodium selenite					
46	10102-50-8	233-274-7	Iron arsenate					
47	10103-50-1	-	ARSENIC ACID, MAGNESIUM SALT					
48	10103-61-4	-	ARSENIC ACID, COPPER SALT; Copper arsenate					
49	10108-64-2	233-296-7	cadmium chloride				4	
50	101-14-4	202-918-9	2,2'-dichloro-4,4'-methylenedianiline (MOCA); 4,4'-methylene bis(2-chloroaniline); 4,4'-Diamino-3,3'-dichlorodiphenylmethane				4	
51	101200-53-7	-	Pyridine, 2-[3-(3-chlorophenyl)propyl]-	1				
52	10124-36-4	233-331-6	cadmium sulphate; Cadmium sulfate				4	
53	10124-43-3	233-334-2	cobalt sulphate; Sulfuric acid, cobalt(2+) salt (1:1); cobalt (II) sulphate	1				
54	10124-50-2	-	ARSENIOUS ACID, POTASSIUM SALT; Potassium arsenite					
55	10141-05-6	233-402-1	cobalt nitrate; cobalt dinitrate; Cobalt(II) dinitrate					
56	101-55-3	-	4-BROMODIPHENYL ETHER (PBDE); Bromobiphenyl Ether					
57	101-61-1	202-959-2	N,N,N',N-Tetramethyl-4,4'-methylenedianiline; 4,4'-Methylenebis[N,N-dimethylbenzenamine]					
58	101-77-9	202-974-4	4,4'-diaminodiphenylmethane (MDA); 4,4'-methylenedianiline; MDA			3	4	
59	101-80-4	202-977-0	4,4'-oxydianiline and its salts; p-aminophenyl ether				4	
60	102-06-7	203-002-1	1,3-diphenylguanidine; Guanidine, N,N -diphenyl-; Diphenylguanidine	1				

… dazu noch Word



DRAFT USE CASES for zero mass parts in BOM

20/11/12

The following use cases describe the case of a part with zero mass which shows the results of PASS (correctly) in CPM. The desire is to show that zero is NOT intentional and need to be addressed by the user.

OPEN question does CPM know if it has a substance, there is the potential for it not only to be a zero mass but the unknown CAS number i.e. the 00-00-0000

There are a number key use cases:

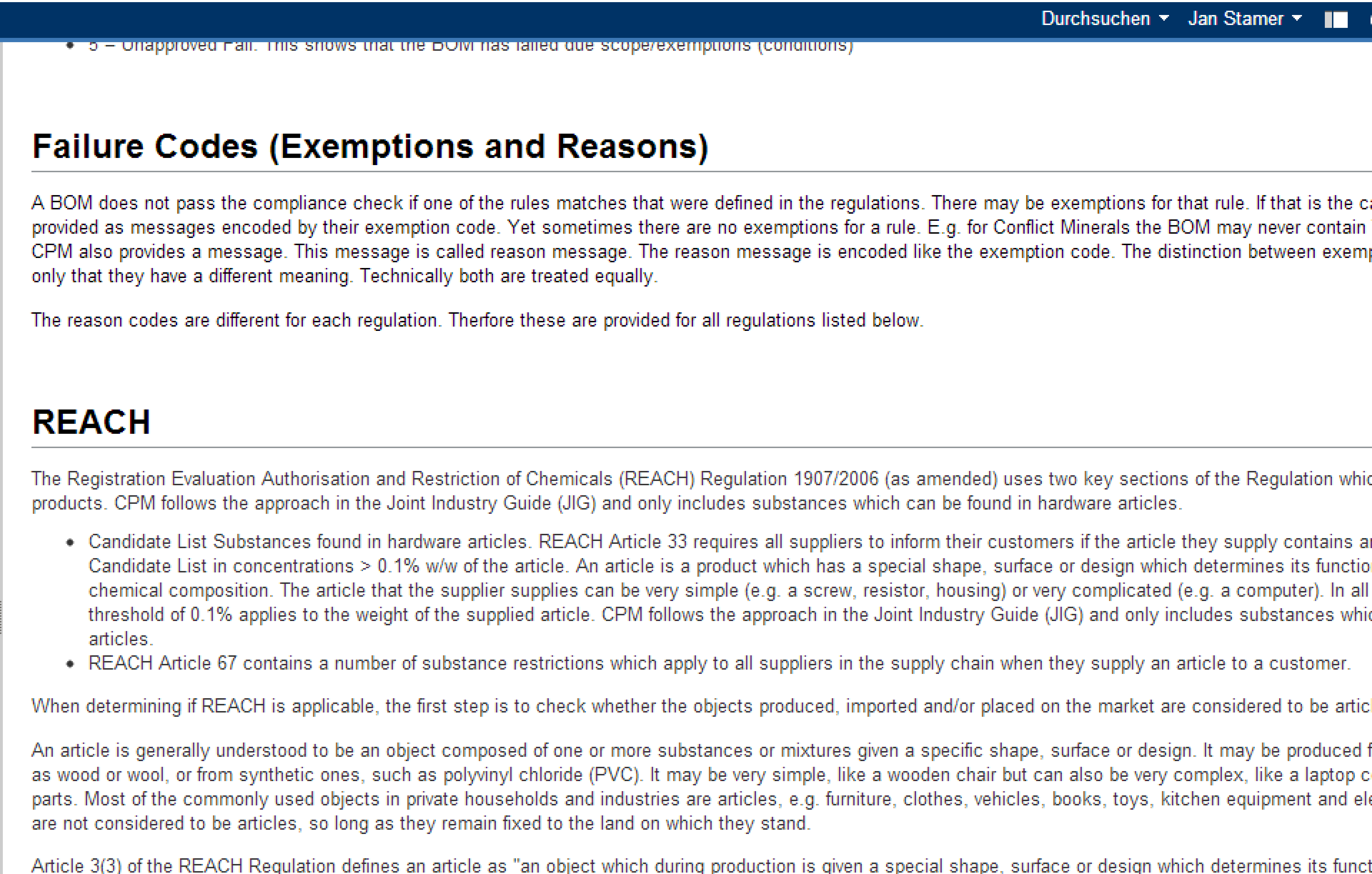
1. The zero mass is shown to be an error and is validated as missing data. For example:

   Simple BOM

   - 1 screw = 30 g steel
   - 1 housing = 0g Dibutyl phthalate
   - 1 metal insert = 50 g iron

   The result would be: Unapproved FAIL for REACH but the housing "marked" or "flagged" as having missing data (the same was it is marked for an exemption). Therefore the Compliance Manager knows that there is a UNAPPROVED PASS until they can show that the housing could potentially have a substance that "could" be a problem if the "REAL" mass

… auch im Wiki steht was …



- 5 – Unapproved Fail. This shows that the BOM has failed due scope/exemptions (conditions)

Failure Codes (Exemptions and Reasons)

A BOM does not pass the compliance check if one of the rules matches that were defined in the regulations. There may be exemptions for that rule. If that is the ca
provided as messages encoded by their exemption code. Yet sometimes there are no exemptions for a rule. E.g. for Conflict Minerals the BOM may never contain
CPM also provides a message. This message is called reason message. The reason message is encoded like the exemption code. The distinction between exemp
only that they have a different meaning. Technically both are treated equally.

The reason codes are different for each regulation. Therfore these are provided for all regulations listed below.

REACH

The Registration Evaluation Authorisation and Restriction of Chemicals (REACH) Regulation 1907/2006 (as amended) uses two key sections of the Regulation whic
products. CPM follows the approach in the Joint Industry Guide (JIG) and only includes substances which can be found in hardware articles.

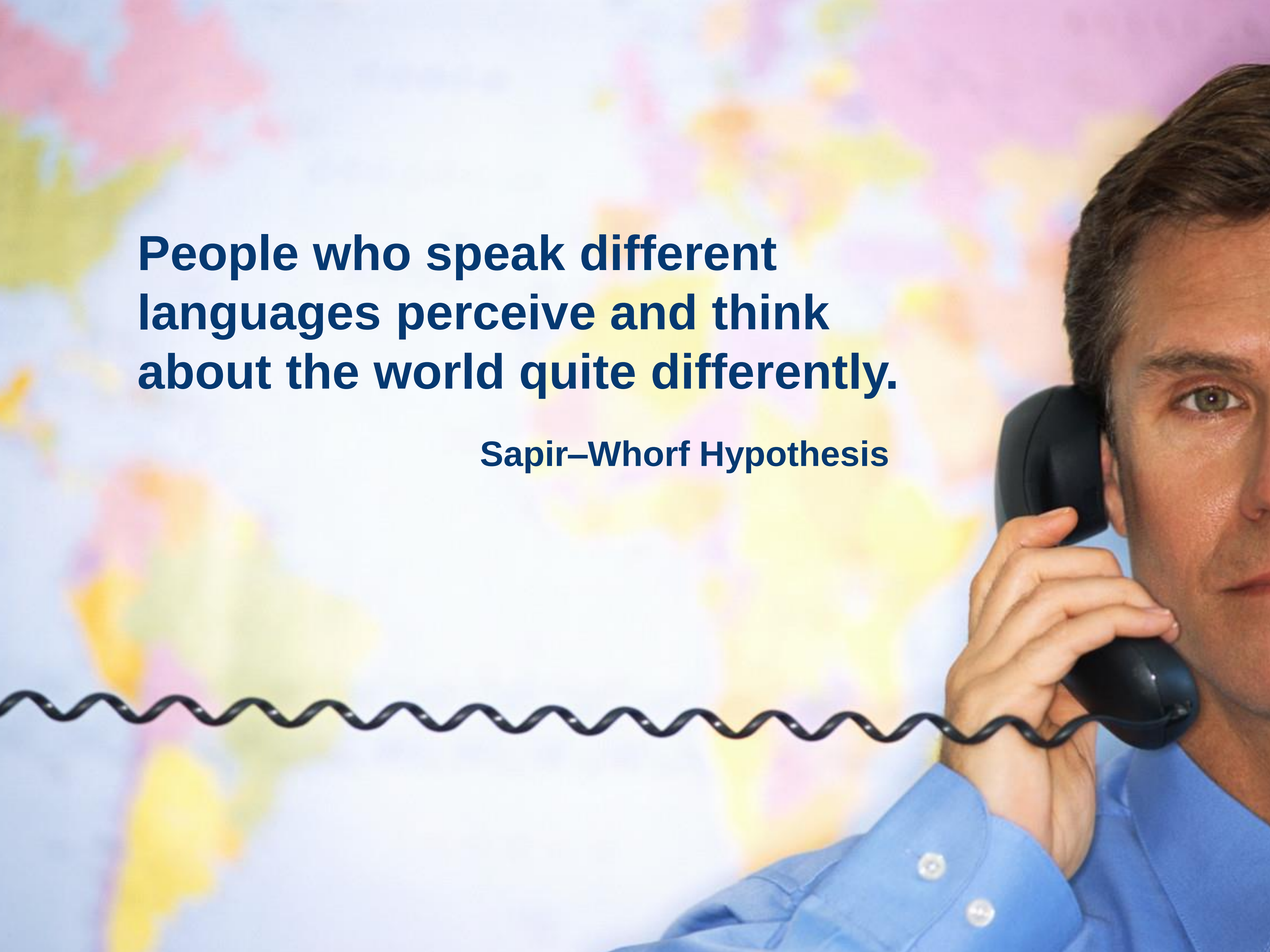
- Candidate List Substances found in hardware articles. REACH Article 33 requires all suppliers to inform their customers if the article they supply contains a
Candidate List in concentrations > 0.1% w/w of the article. An article is a product which has a special shape, surface or design which determines its functio
chemical composition. The article that the supplier supplies can be very simple (e.g. a screw, resistor, housing) or very complicated (e.g. a computer). In all
threshold of 0.1% applies to the weight of the supplied article. CPM follows the approach in the Joint Industry Guide (JIG) and only includes substances whic
articles.
- REACH Article 67 contains a number of substance restrictions which apply to all suppliers in the supply chain when they supply an article to a customer.

When determining if REACH is applicable, the first step is to check whether the objects produced, imported and/or placed on the market are considered to be artic

An article is generally understood to be an object composed of one or more substances or mixtures given a specific shape, surface or design. It may be produced f
as wood or wool, or from synthetic ones, such as polyvinyl chloride (PVC). It may be very simple, like a wooden chair but can also be very complex, like a laptop c
parts. Most of the commonly used objects in private households and industries are articles, e.g. furniture, clothes, vehicles, books, toys, kitchen equipment and ele
are not considered to be articles, so long as they remain fixed to the land on which they stand.

Article 3(3) of the REACH Regulation defines an article as "an object which during production is given a special shape, surface or design which determines its funct

Noch Fragen?



People who speak different languages perceive and think about the world quite differently.

Sapir–Whorf Hypothesis

Behaviour Driven Development

A way to describe the requirement such that **everyone**

the business folks,

the developer,

the tester

and others

has a common understanding of the scope of work.

A description of a requirement and its business benefit, and a set of criteria by which we all agree that it is “done”.

Einführung in BDD

Workflow

- Developer and stakeholder collaborate to write automated tests.
- Software is accepted if automated tests pass.

Automated acceptance tests as …

- ubiquitious language for everybody
- a means of collaboration and discussion
- living documentation

Gherkin Language

Feature

- Requirements werden als Features beschrieben
- Ein Feature enthält mehrere Scenarios

Scenario

- Beschreibung des gewünschten Verhaltens als Scenario.
- All scenarios follow the same pattern:
  1. Get the system into a particular state.
  2. Poke it (or tickle it, or ...).
  3. Examine the new state.

Grundgerüst Feature

Feature: [Title]
As a [Role]
I want to [Some action] (feature)

Grundgerüst Scenario

Scenario: [Title]

Given [Context]

When I do [Action]

Then I should see [Outcome]

Szenario

Beispiel

Scenario: Successful withdrawal from an account in credit

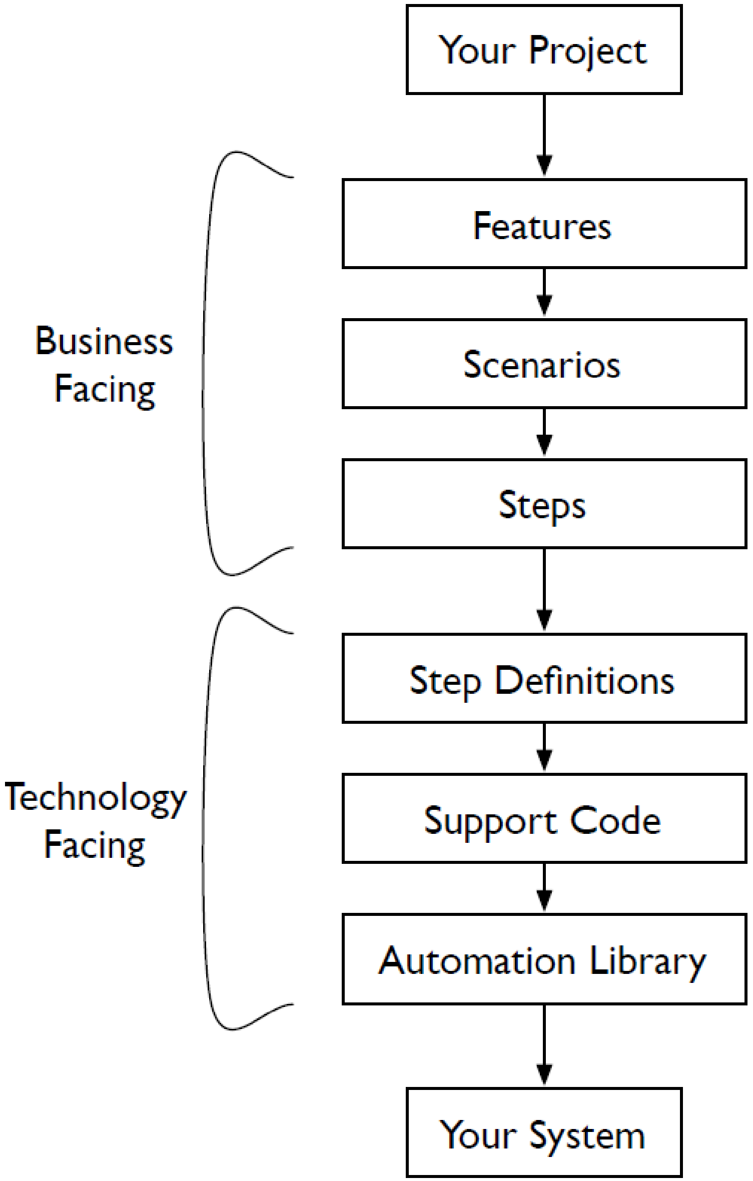
Given I have $100 in my account *// the context*

When I request $20 *// the event(s)*

Then $20 should be dispensed *// the outcome(s)*

Cucumber

Testing Stack



Your Project

Features

Scenarios

Steps

Step Definitions

Support Code

Automation Library

Your System

Business Facing

Technology Facing

Step

And the regulations install directory contains 'corrupt_1.0.0.regulation'.

Step Definition

```
@And("^the regulations archive directory contains '([^']*)'.$")
public void checkRegulationsArchiveDirectory(String fileName) {
  File archivedRegulation = new File(getArchiveDir(), fileName);
  assertTrue(archivedRegulation.exists());
}
```

Cucumber für Java

Cucumber JVM

Projektstruktur

```
-- src
    |-- main
    |   `-- java
    |       `-- cucumber
    |              `-- helloworld
    |                       `-- Hello.java
    `-- test
        |-- java
        |   `-- cucumber
        |          `-- helloworld
        |                   |-- HelloStepdefs.java
        |                   `-- RunCukesTest.java
        `-- resources
            `-- cucumber
                   `-- helloworld
                            `-- helloworld.feature
```

Cucumber JVM

Hello World

```
Feature: Hello World

  Scenario: Say hello
    Given I have a hello app with "Howdy"
    When I ask it to say hi
    Then it should answer with "Howdy World"
```

Cucumber JVM

Glue Code

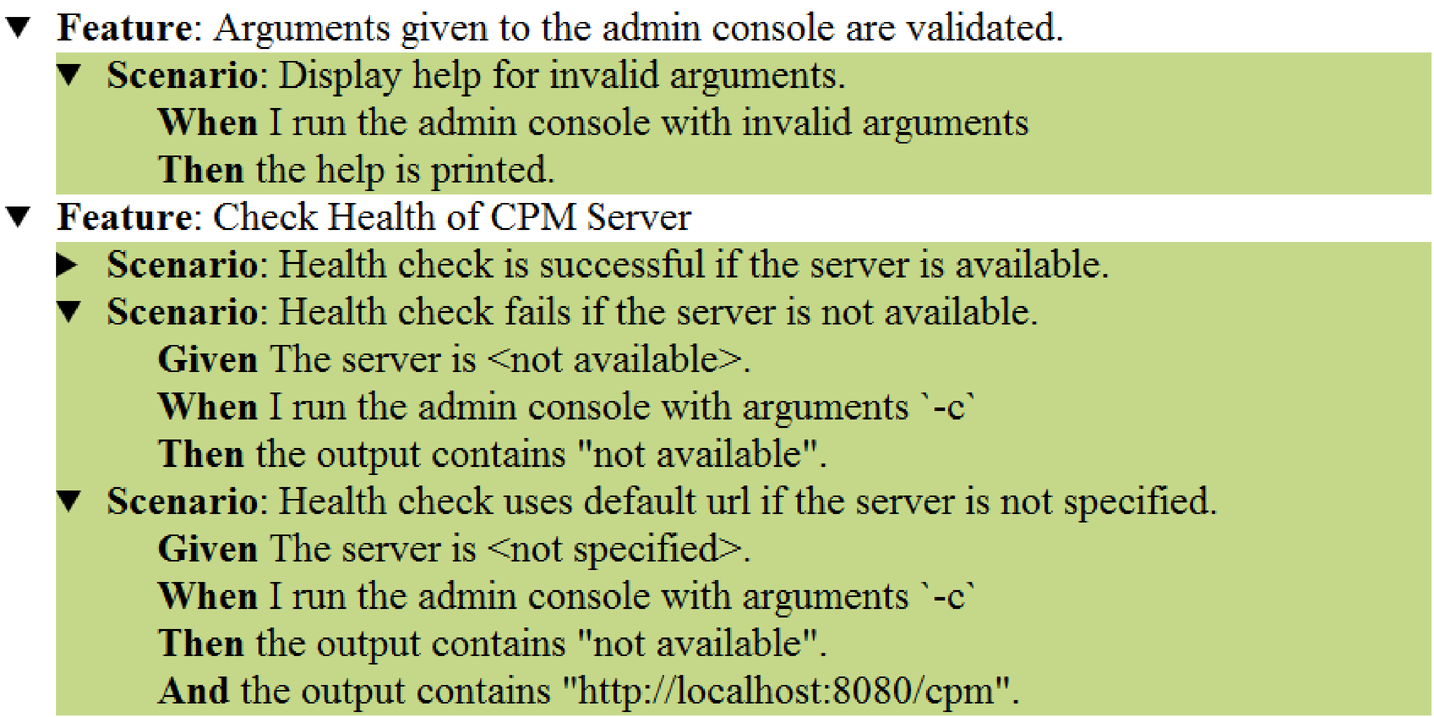
```java
package cucumber.examples.java.helloworld;

import cucumber.junit.Cucumber;
import org.junit.runner.RunWith;

@RunWith(Cucumber.class)
@Cucumber.Options(format = {"pretty", "html:target/cucumber"})
public class RunCukesTest {
}
```

Step Definitions

```
public class HelloStepdefs {
    private Hello hello;
    private String hi;

    @Given("^I have a hello app with \"([^\"]*)\"$")
    public void I_have_a_hello_app_with(String greeting) {
        hello = new Hello(greeting);
    }

    @When("^I ask it to say hi$")
    public void I_ask_it_to_say_hi() {
        hi = hello.sayHi();
    }

    @Then("^it should answer with \"([^\"]*)\"$")
    public void it_should_answer_with(String expectedHi) {
        assertEquals(expectedHi, hi);
    }
}
```

BDD in the Wild

BDD in CPM



▼ **Feature**: Arguments given to the admin console are validated.

▼ **Scenario**: Display help for invalid arguments.

When I run the admin console with invalid arguments
Then the help is printed.

▼ **Feature**: Check Health of CPM Server

▶ **Scenario**: Health check is successful if the server is available.

▼ **Scenario**: Health check fails if the server is not available.

Given The server is <not available>.
When I run the admin console with arguments `-c`
Then the output contains "not available".

▼ **Scenario**: Health check uses default url if the server is not specified.

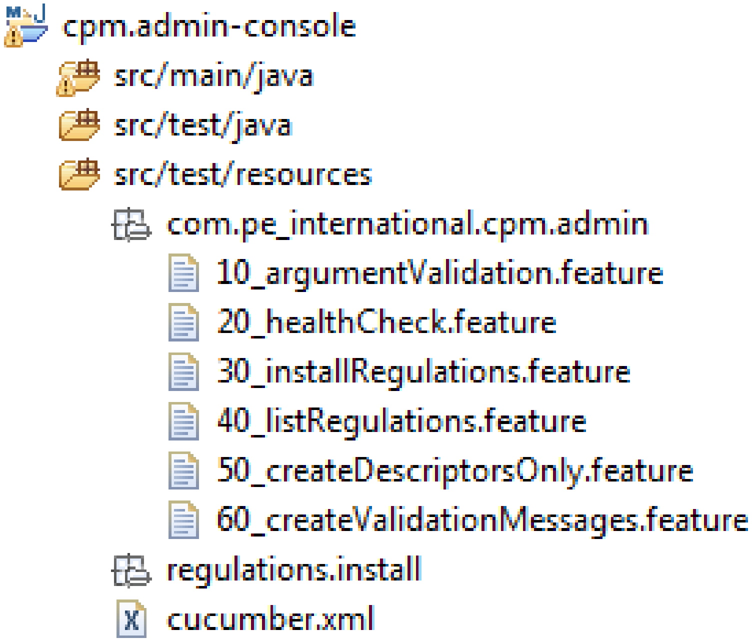
Given The server is <not specified>.
When I run the admin console with arguments `-c`
Then the output contains "not available".
And the output contains "http://localhost:8080/cpm".

```
Feature: Check Health of CPM Server

  Scenario: Health check is successful if the server is available.
    Given The server is <available>.
    When I run the admin console with arguments `-c`
    Then the output contains "up and running".

  Scenario: Health check fails if the server is not available.
    Given The server is <not available>.
    When I run the admin console with arguments `-c`
    Then the output contains "not available".

  Scenario: Health check uses default url if the server is not specified.
    Given The server is <not specified>.
    When I run the admin console with arguments `-c`
    Then the output contains "not available".
    And the output contains "http://localhost:8080/cpm".
```

Example CPM Admin Console

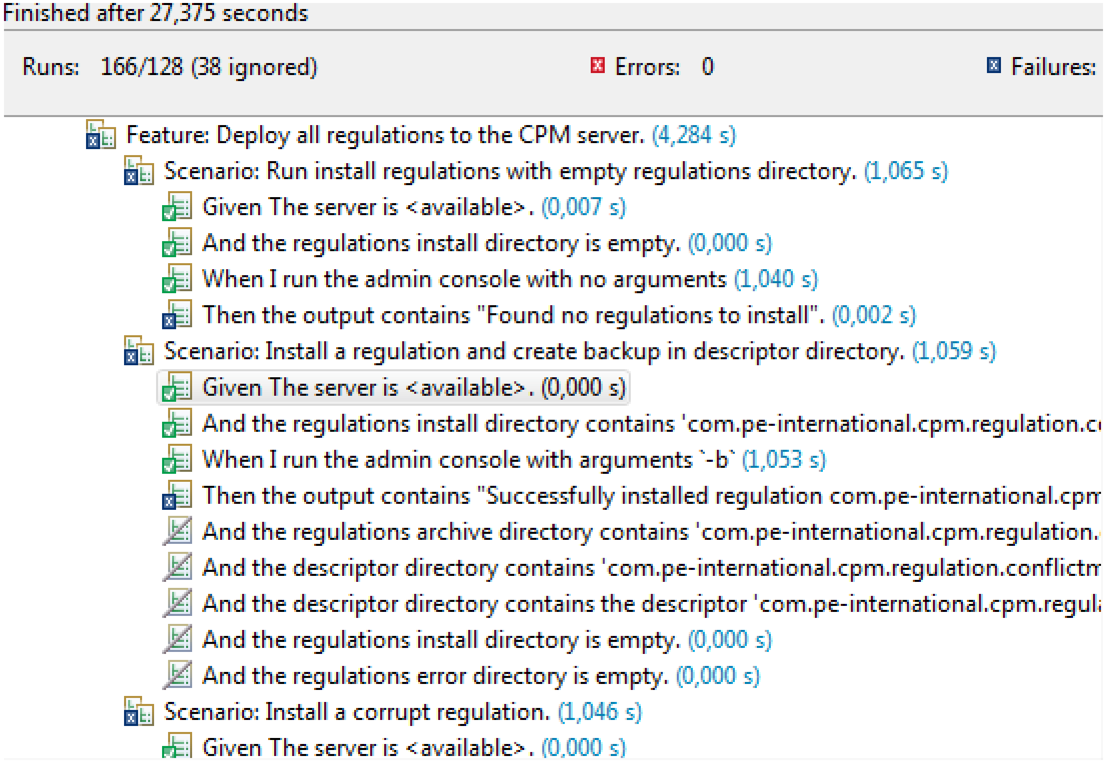
Features definieren

- Each Features is defined in its own file e.h. argumentValidation.feature
- Feature files are under source control (in Github).



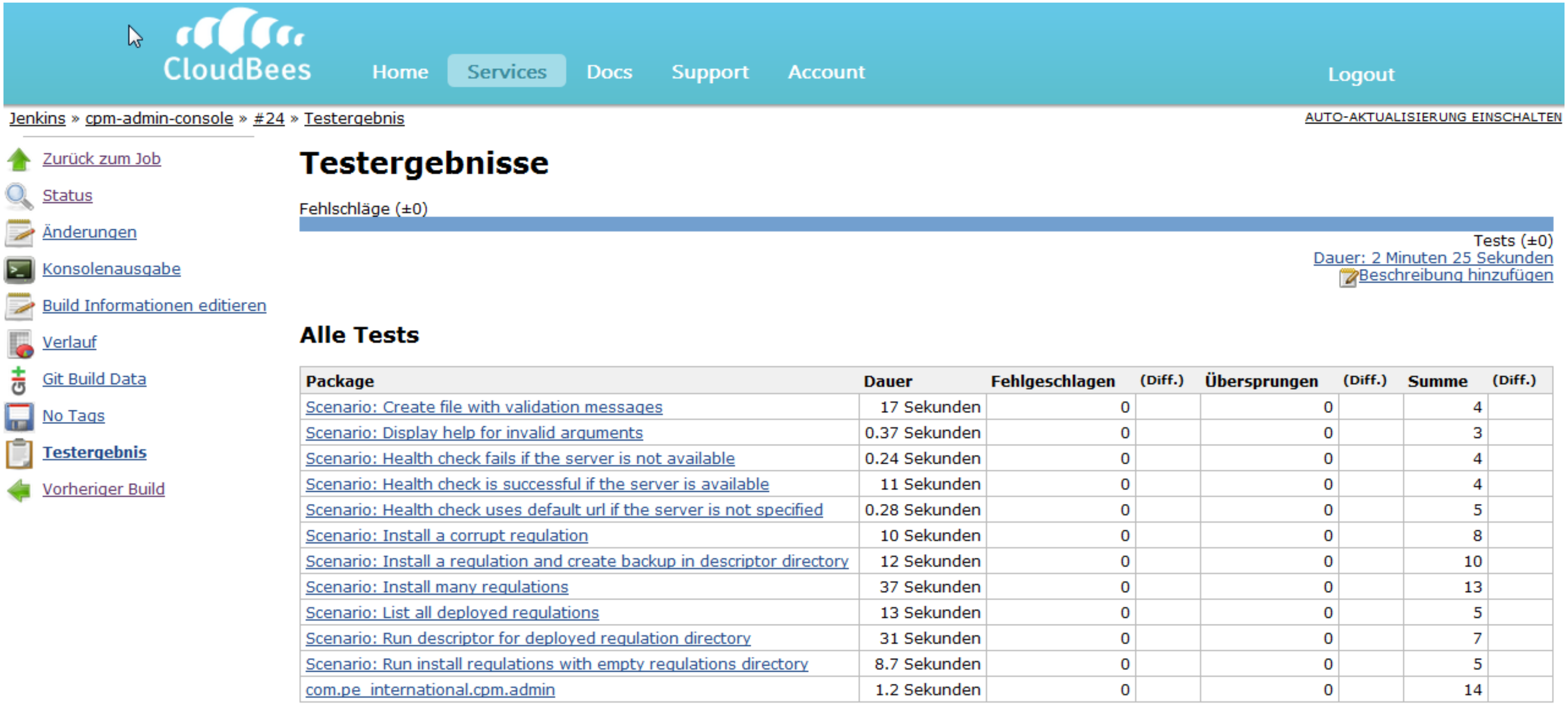
```
cpm.admin-console
    src/main/java
    src/test/java
    src/test/resources
        com.pe_international.cpm.admin
            10_argumentValidation.feature
            20_healthCheck.feature
            30_installRegulations.feature
            40_listRegulations.feature
            50_createDescriptorsOnly.feature
            60_createValidationMessages.feature
        regulations.install
        cucumber.xml
```

Features beim Entwicklen



```
Finished after 27,375 seconds

Runs:   166/128 (38 ignored)                    ☒ Errors:   0                     ☒ Failures:

    Feature: Deploy all regulations to the CPM server. (4,284 s)
        Scenario: Run install regulations with empty regulations directory. (1,065 s)
            Given The server is <available>. (0,007 s)
            And the regulations install directory is empty. (0,000 s)
            When I run the admin console with no arguments (1,040 s)
            Then the output contains "Found no regulations to install". (0,002 s)
        Scenario: Install a regulation and create backup in descriptor directory. (1,059 s)
            Given The server is <available>. (0,000 s)
            And the regulations install directory contains 'com.pe-international.cpm.regulation.c
            When I run the admin console with arguments `-b` (1,053 s)
            Then the output contains "Successfully installed regulation com.pe-international.cpm
            And the regulations archive directory contains 'com.pe-international.cpm.regulation.
            And the descriptor directory contains 'com.pe-international.cpm.regulation.conflictm
            And the descriptor directory contains the descriptor 'com.pe-international.cpm.regul
            And the regulations install directory is empty. (0,000 s)
            And the regulations error directory is empty. (0,000 s)
        Scenario: Install a corrupt regulation. (1,046 s)
            Given The server is <available>. (0,000 s)
```

Features beim Bauen



Jenkins » cpm-admin-console » #24 » Testergebnis

AUTO-AKTUALISIERUNG EINSCHALTEN

Testergebnisse

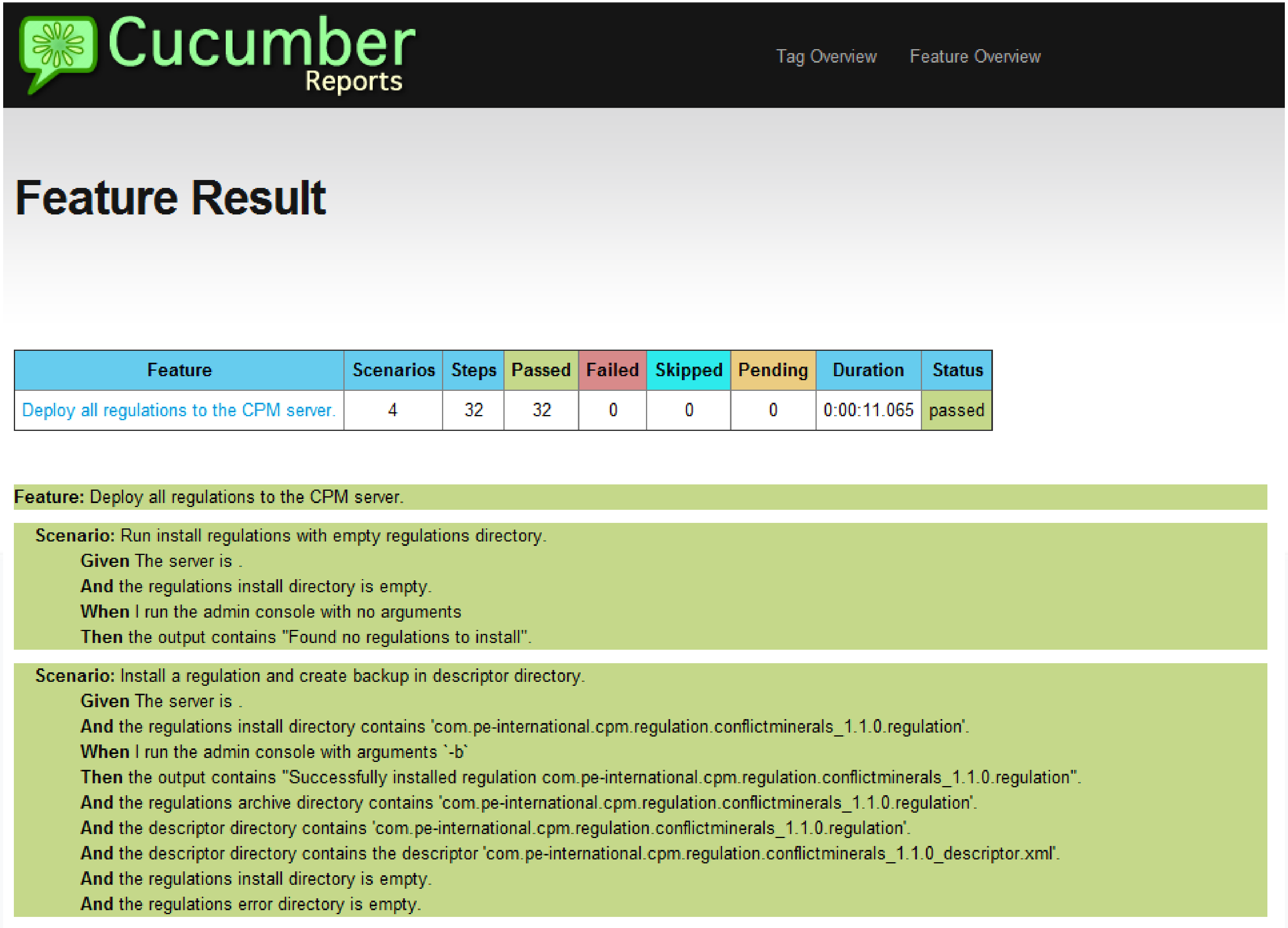
Fehlschläge (±0)

Tests (±0)
Dauer: 2 Minuten 25 Sekunden
Beschreibung hinzufügen

Alle Tests

Package	Dauer	Fehlgeschlagen	(Diff.)	Übersprungen	(Diff.)	Summe	(Diff.)
Scenario: Create file with validation messages	17 Sekunden	0		0		4	
Scenario: Display help for invalid arguments	0.37 Sekunden	0		0		3	
Scenario: Health check fails if the server is not available	0.24 Sekunden	0		0		4	
Scenario: Health check is successful if the server is available	11 Sekunden	0		0		4	
Scenario: Health check uses default url if the server is not specified	0.28 Sekunden	0		0		5	
Scenario: Install a corrupt regulation	10 Sekunden	0		0		8	
Scenario: Install a regulation and create backup in descriptor directory	12 Sekunden	0		0		10	
Scenario: Install many regulations	37 Sekunden	0		0		13	
Scenario: List all deployed regulations	13 Sekunden	0		0		5	
Scenario: Run descriptor for deployed regulation directory	31 Sekunden	0		0		7	
Scenario: Run install regulations with empty regulations directory	8.7 Sekunden	0		0		5	
com.pe_international.cpm.admin	1.2 Sekunden	0		0		14	

Dokumentation der Features



Feature Result

Feature	Scenarios	Steps	Passed	Failed	Skipped	Pending	Duration	Status
Deploy all regulations to the CPM server.	4	32	32	0	0	0	0:00:11.065	passed

Feature: Deploy all regulations to the CPM server.

Scenario: Run install regulations with empty regulations directory.
Given The server is .
And the regulations install directory is empty.
When I run the admin console with no arguments
Then the output contains "Found no regulations to install".

Scenario: Install a regulation and create backup in descriptor directory.
Given The server is .
And the regulations install directory contains 'com.pe-international.cpm.regulation.conflictminerals_1.1.0.regulation'.
When I run the admin console with arguments `-b`
Then the output contains "Successfully installed regulation com.pe-international.cpm.regulation.conflictminerals_1.1.0.regulation".
And the regulations archive directory contains 'com.pe-international.cpm.regulation.conflictminerals_1.1.0.regulation'.
And the descriptor directory contains 'com.pe-international.cpm.regulation.conflictminerals_1.1.0.regulation'.
And the descriptor directory contains the descriptor 'com.pe-international.cpm.regulation.conflictminerals_1.1.0_descriptor.xml'.
And the regulations install directory is empty.
And the regulations error directory is empty.

Lessons Learned

Lessons Learned

- Business Case für BDD gut kommunizierbar
- Motivation und Schulung aller Stakeholder notwendig
- Scenarien schreiben ist harte Arbeit
- Fachbereich muss näher an die Entwicklung heranwachsen
- wer Angst vor einem Texteditor hat tut sich schwer mit BDD
- Fachbereich freut sich Fortschritte zu tracken

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