NTT DATA

Efficient Automated Testing of a Contract Management System using Gherkin

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Frank Bergemann

Managing Consultant, NTT DATA DACH

Ioana Șular

Project Manager, Customer

Speed matters: Pedal to the metal!

Continuous Delivery

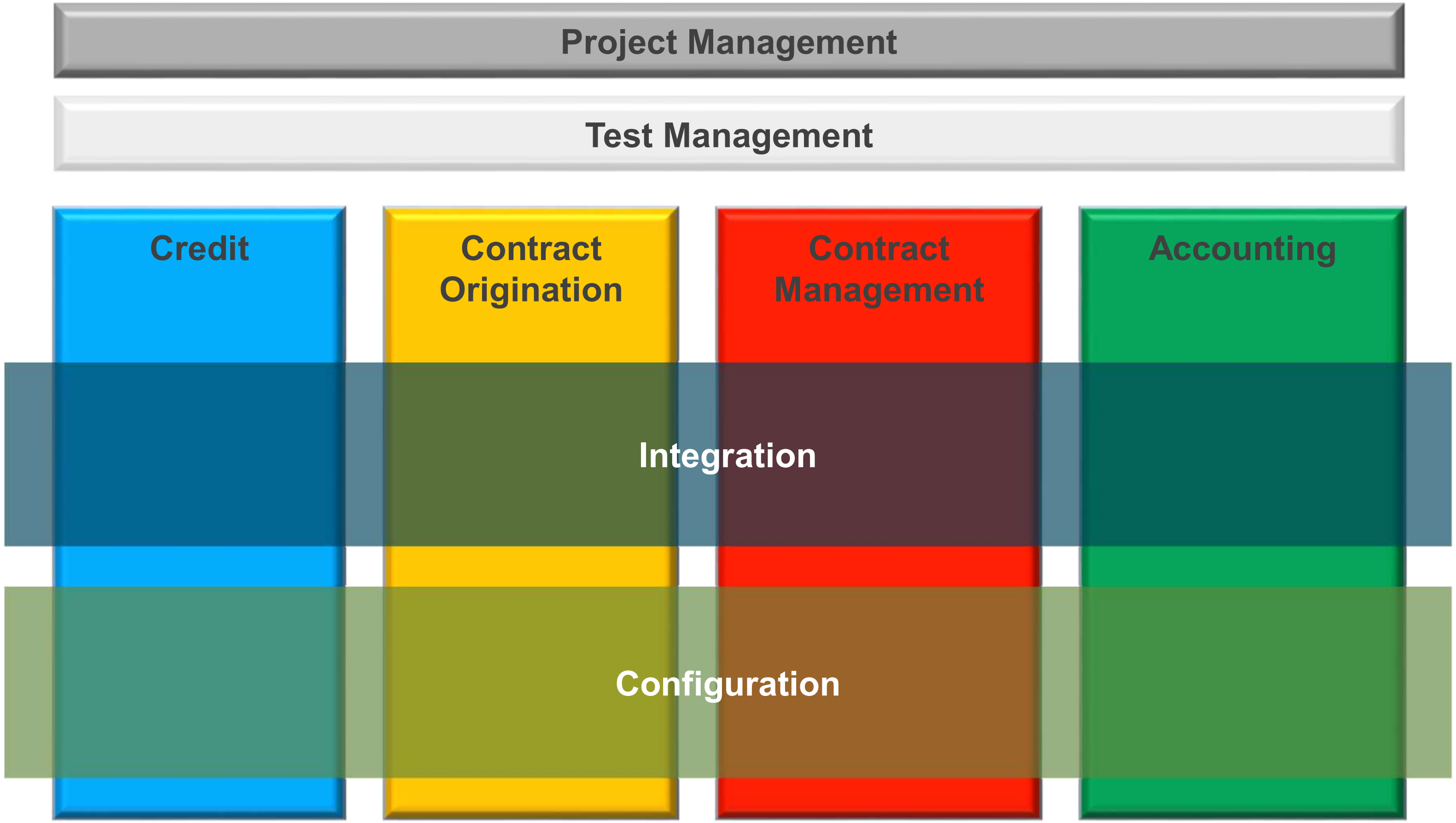
Automated Acceptance Tests

Executable Specification: Gherkin

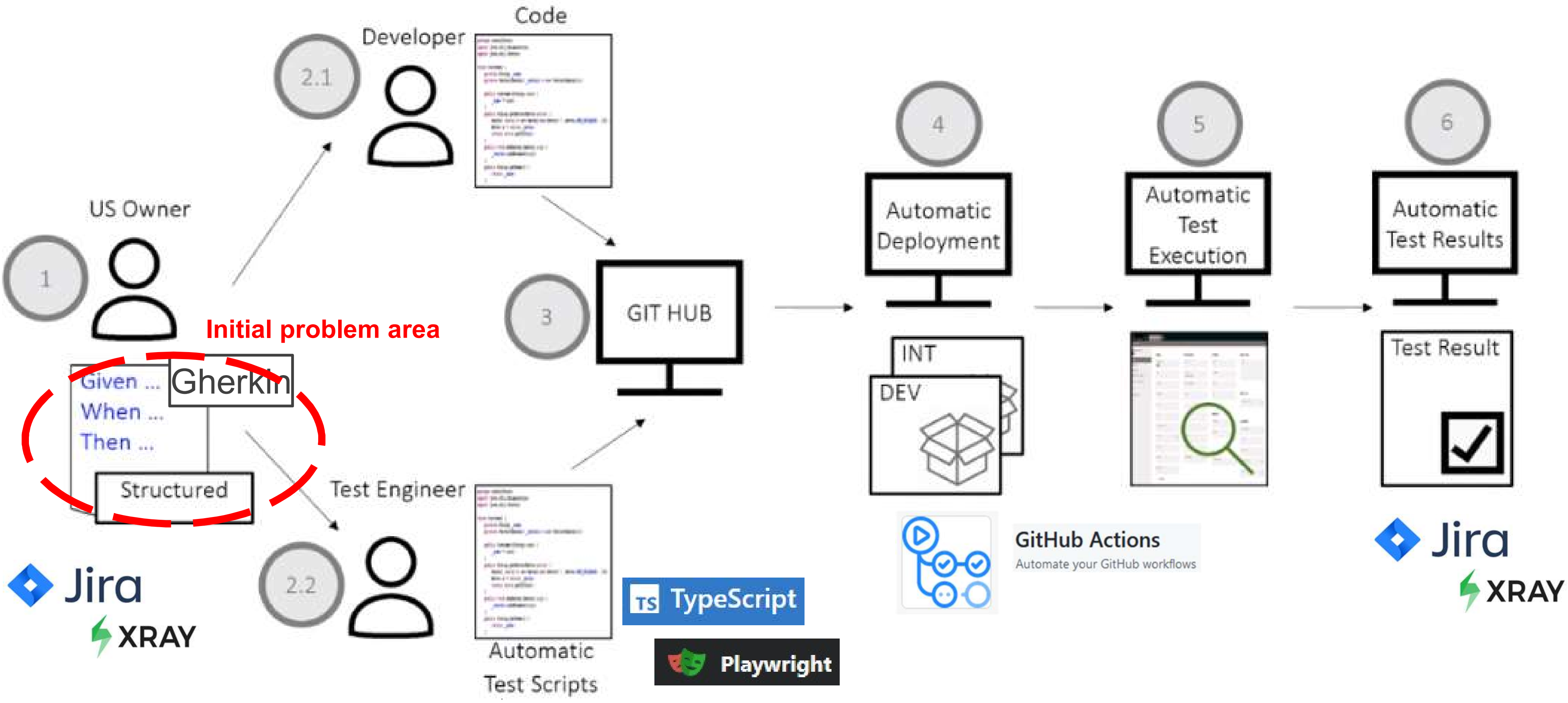
Project Setup

Roles in Scrum Teams

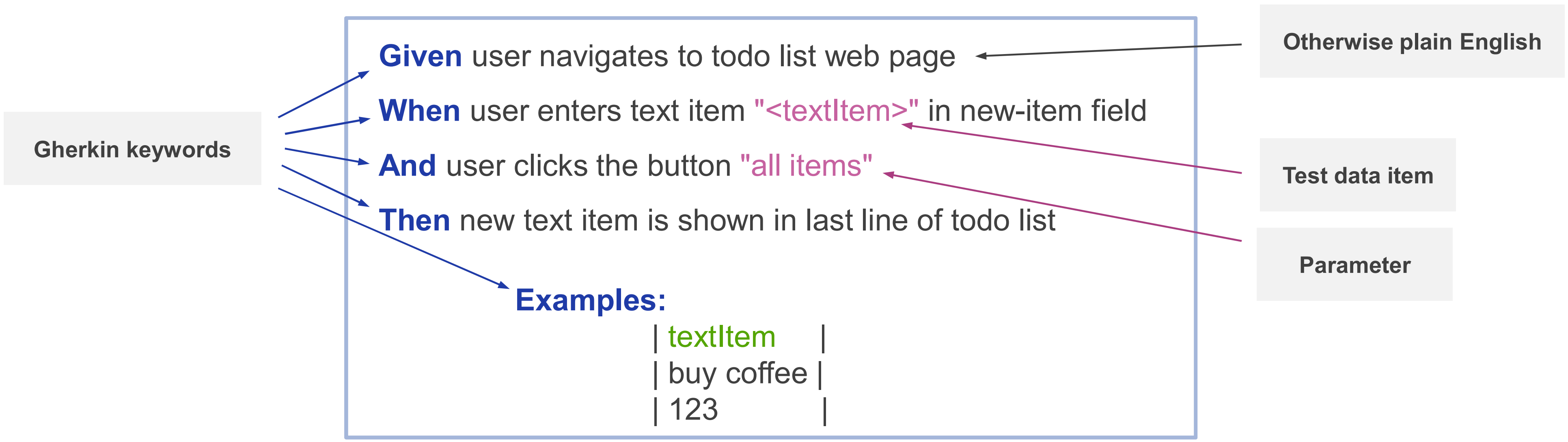
- PO
- Story Owners (Implementers)
- Test Automation Engineers
- Test Consultants (joined later)
- Scrum Master
- Tech Experts
- Integration Experts
- Developers



Software Development and Test Flow (CI/CD) of SMYLE Project



Gherkin in a Nutshell



Gherkin keywords

Given user navigates to todo list web page

When user enters text item "<textItem>" in new-item field

And user clicks the button "all items"

Then new text item is shown in last line of todo list

Examples:

textItem
buy coffee
123

Otherwise plain English

Test data item

Parameter

- **Given** describes the condition at test start, **When** an action, e.g. on the UI, **Then** a verification, and **And** continuation of the previous Step
- Gherkin is easily understood even without technical background
- Re-use of Gherkin Steps is mandatory for efficient test automation coding
- Therefore one should always utilize (exactly) the same Gherkin formulation of a Step for the same intent
- Proper use of Gherkin Parameters and Test data items is paramount for efficient test automation coding also

Initial Approach: Free-Style Gherkin Tests

Example:

Given I am a system user
When I am on the contact methods screen
Then I can add a contact method (Post, e-mail, mobile, telefon, Fax) for any third party

Given I am a system user
When I am on the contact methods screen
Then I can choose between different contact methods and choose one of them

Given I am a system user
When I am on the contact methods screen
Then I can choose whether the contact method is the preferred contact method

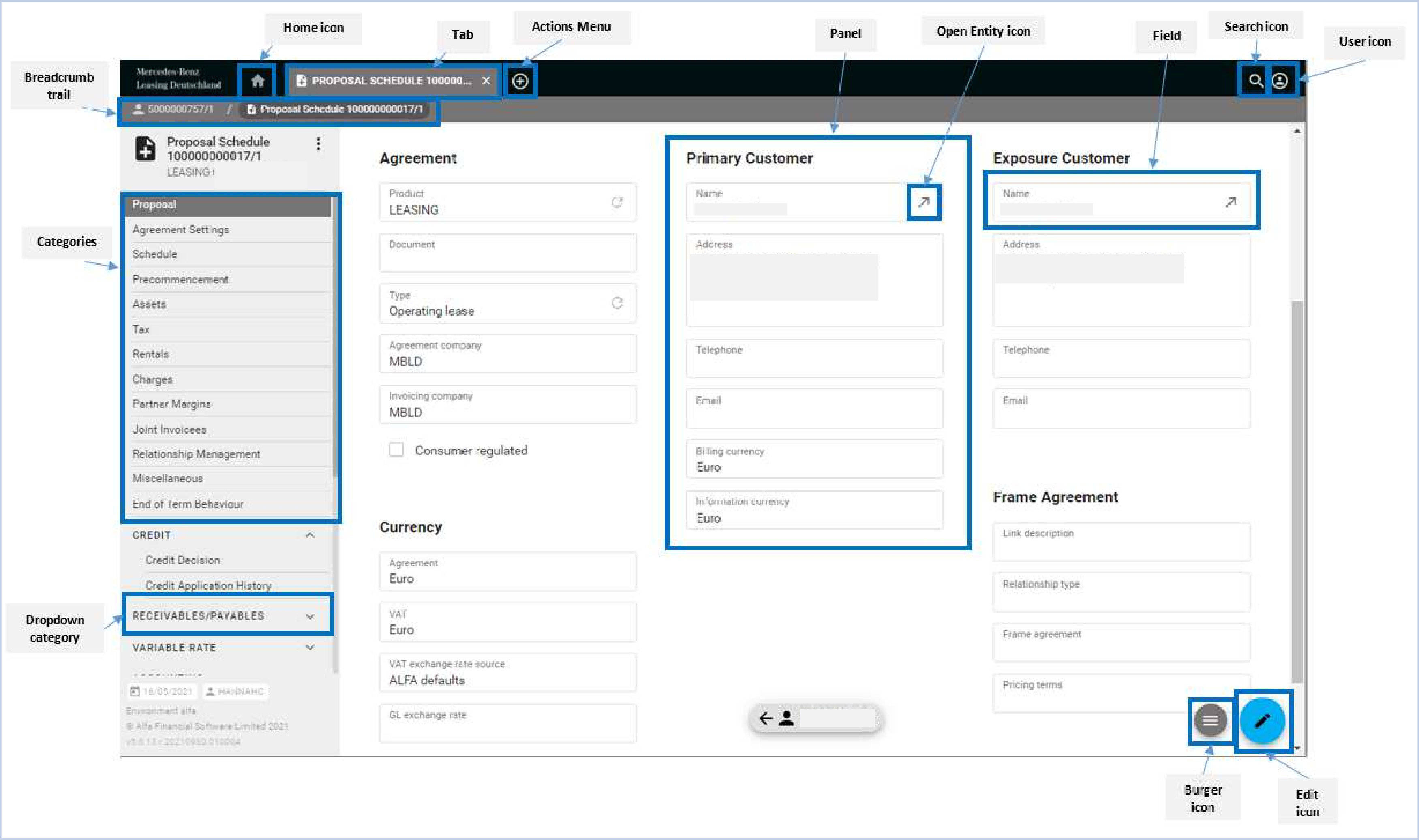
Shortcomings of free-style Gherkin Tests created at the beginning of the project:

- Test steps were formulated on a high-level; many details necessary for executing it on the Alfa UI were omitted
- Test steps were formulated very much freely and did not employ standardized language patterns or naming conventions
- Tests did not utilize Gherkin parameters ("…") or Gherkin Test data items ("<…>")
- Tests assumed appropriate test data being available in the test environment

Impact:

- It required excessive effort to code free-style Gherkin tests: much communication needed to align on the details, difficulties to leverage code re-use
- Thus, creation of automated tests of Stories was lagging behind and Scrum teams couldn‘t deliver Stories in full as per the set project milestones

Naming Conventions for UI Elements of Alfa



Mercedes-Benz Leasing Deutschland

PROPOSAL SCHEDULE 100000... ✕

5000000757/1 / Proposal Schedule 100000000017/1

Proposal Schedule 100000000017/1
LEASING

- Proposal
- Agreement Settings
- Schedule
- Precommencement
- Assets
- Tax
- Rentals
- Charges
- Partner Margins
- Joint Invoicees
- Relationship Management
- Miscellaneous
- End of Term Behaviour

CREDIT

- Credit Decision
- Credit Application History

RECEIVABLES/PAYABLES

VARIABLE RATE

16/05/2021 HANNAHC

Environment alfa
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v5.0.13 - 20210930.010004

Agreement

Product: LEASING

Document:

Type: Operating lease

Agreement company: MBLD

Invoicing company: MBLD

☐ Consumer regulated

Currency

Agreement: Euro

VAT: Euro

VAT exchange rate source: ALFA defaults

GL exchange rate:

Primary Customer

Name:

Address:

Telephone:

Email:

Billing currency: Euro

Information currency: Euro

Exposure Customer

Name:

Address:

Telephone:

Email:

Frame Agreement

Link description:

Relationship type:

Frame agreement:

Pricing terms:

New Approach: Structured Gherkin Tests

Example:

```
Given I as "Standard user" am logged in on Alfa
When I click on "search" icon on screen "home"
Then the "search" field is displayed on screen "home"
When I enter "<individual-customer-number>" in the "search" field on screen "home"
Then the "<individual-customer-number>" is displayed on screen "home"
When I click on "<individual-customer-number>" on screen "home"
Then the "Summary" screen is displayed
# Comment: Update of Address
When I click on "Edit" icon on screen "Summary"
And I enter "123 wall street" in field "Address" in panel "Billing Address" on screen "Summary"
And I enter "30412" in field "Post code" in panel "Billing Address" on screen "Summary"
And I enter "Silent Hill" in field "Town" in panel "Billing Address" on screen "Summary"
And I click on "Save" icon on screen "Summary"
Then message "Third party saved successfully" is displayed

Examples:
   |individual-customer-number|
   |individual-customer-number|
```

Pattern view of example:

```
Given I as “…" am logged in on Alfa
When I click on “…" icon on screen “…"
Then the “…" field is displayed on screen “…"
When I enter "<…>" in the “…" field on screen “…"
Then the "<…>" is displayed on screen “…"
When I click on "<…>" on screen “…"
Then the “…" screen is displayed

When I click on “…" icon on screen “…"
And I enter “…" in field “…" in panel “…" on screen “…"
And I enter “…" in field “…" in panel “…" on screen “…"
And I enter “…" in field “…" in panel “…" on screen “…"
And I click on “…" icon on screen “…"
Then message “…" is displayed

Examples:
   |individual-customer-number|
   |individual-customer-number|
```

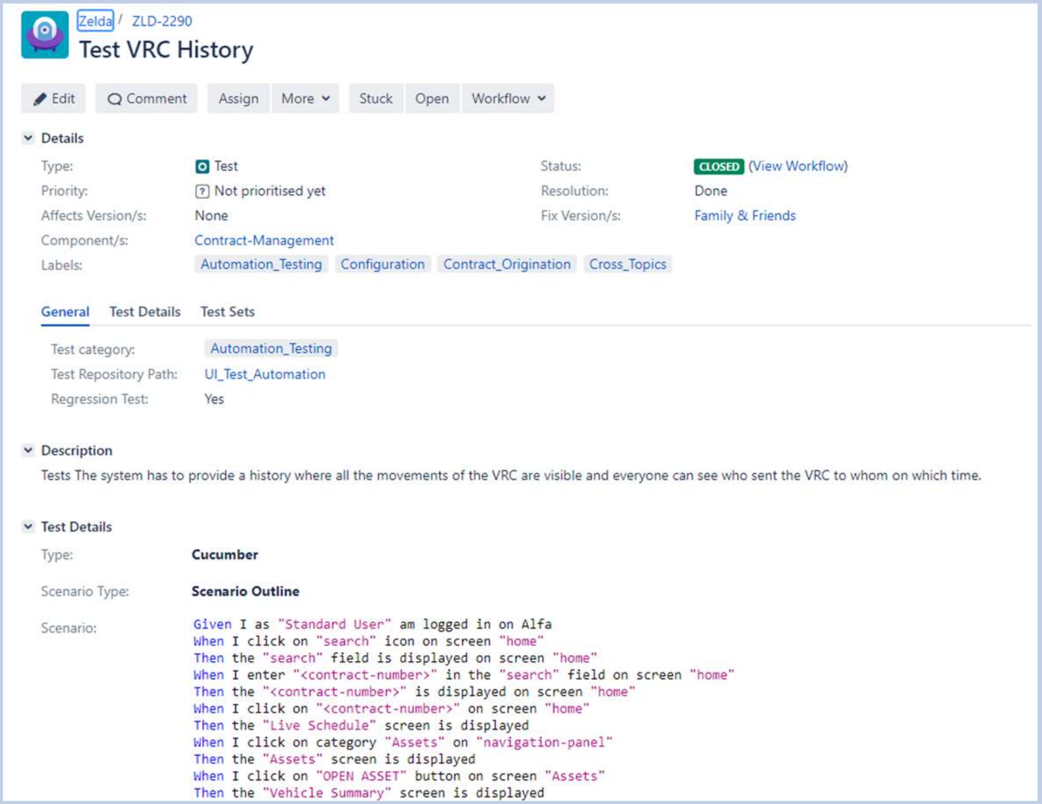
Features of structured Gherkin Tests:

- Every action or verifcation of a test is stated in detail by atomic Gherkin Steps
- Gherkin Steps strictly follow standardized language patterns and naming conventions, see pattern view above
- Gherkin parameters (“…“) and Gherkin test data items (“<…>“) are used thoroughly to facilitate test automation coding

Impact:

- Teams quickly understood and adopted the new approach for writing Gherkin tests
- Test automation coding became much more efficient
- Concept was a main factor to get back on track with SW delivery
- Concept triggered further improvements and helped to resolve other major challenges related to testing

Solutioning – Jira Screens of Gherkin Tests and further Improvements



Zelda / ZLD-2290

Test VRC History

Details

Type:	Test	Status:	CLOSED (View Workflow)
Priority:	Not prioritised yet	Resolution:	Done
Affects Version/s:	None	Fix Version/s:	Family & Friends
Component/s:	Contract-Management		
Labels:	Automation_Testing Configuration Contract_Origination Cross_Topics		

Test category: Automation_Testing
Test Repository Path: UI_Test_Automation
Regression Test: Yes

Description

Tests The system has to provide a history where all the movements of the VRC are visible and everyone can see who sent the VRC to whom on which time.

Test Details

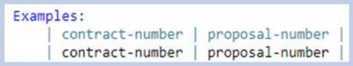
Type: **Cucumber**

Scenario Type: **Scenario Outline**

Scenario:

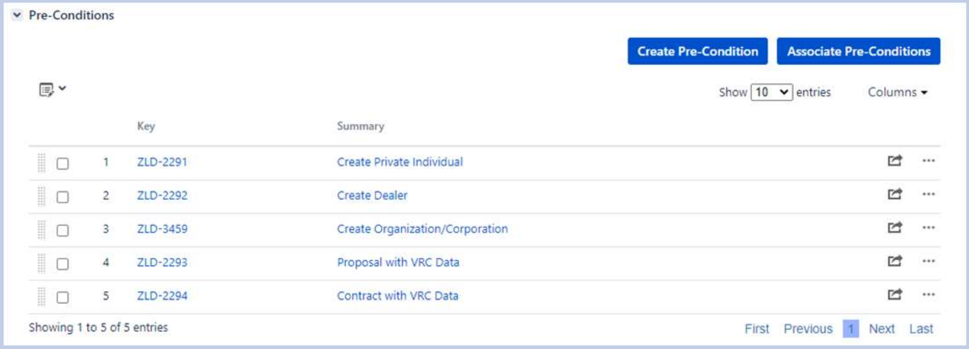
```
Given I as "Standard User" am logged in on Alfa
When I click on "search" icon on screen "home"
Then the "search" field is displayed on screen "home"
When I enter "<contract-number>" in the "search" field on screen "home"
Then the "<contract-number>" is displayed on screen "home"
When I click on "<contract-number>" on screen "home"
Then the "Live Schedule" screen is displayed
When I click on category "Assets" on "navigation-panel"
Then the "Assets" screen is displayed
When I click on "OPEN ASSET" button on screen "Assets"
Then the "Vehicle Summary" screen is displayed
```

.
.
.



```
Examples:
    | contract-number | proposal-number |
    | contract-number | proposal-number |
```

Jira/Xray Issuetype "Pre-Condition" is used to create test data on-the-fly

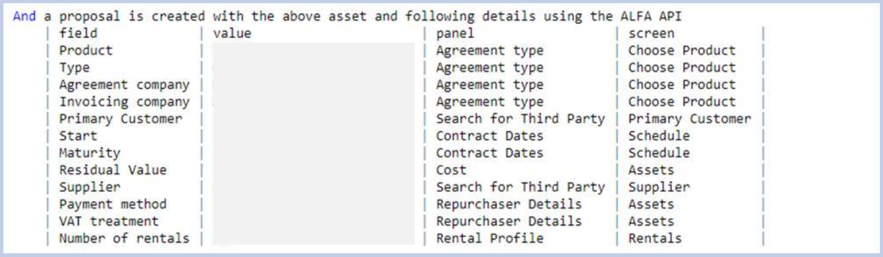


Pre-Conditions

	Key	Summary
1	ZLD-2291	Create Private Individual
2	ZLD-2292	Create Dealer
3	ZLD-3459	Create Organization/Corporation
4	ZLD-2293	Proposal with VRC Data
5	ZLD-2294	Contract with VRC Data

Showing 1 to 5 of 5 entries

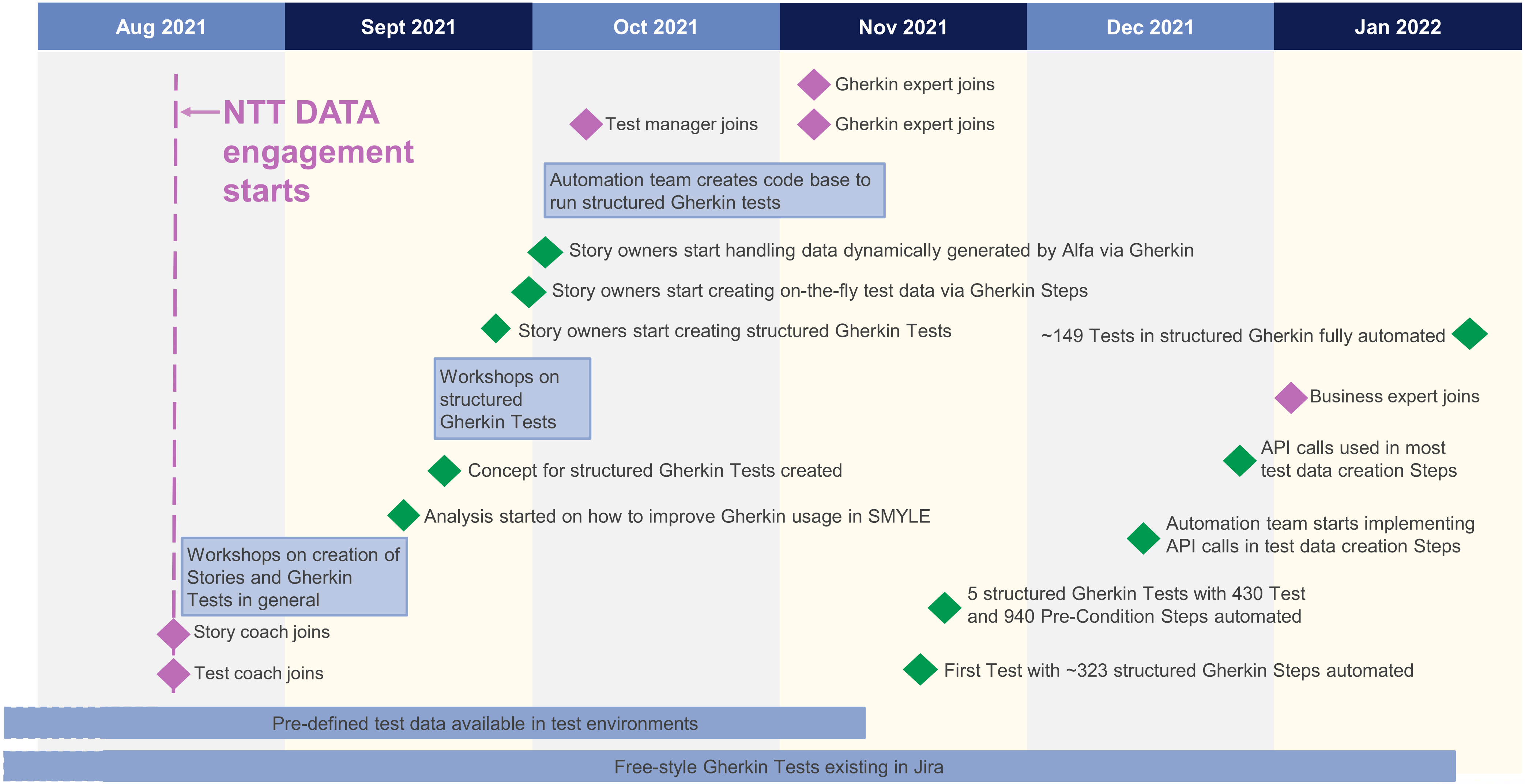
Runtime of test data creation is now optimized by using API calls



```
And a proposal is created with the above asset and following details using the ALFA API
    | field             | value                          | panel                 | screen           |
    | Product           |                                | Agreement type        | Choose Product   |
    | Type              |                                | Agreement type        | Choose Product   |
    | Agreement company |                                | Agreement type        | Choose Product   |
    | Invoicing company |                                | Agreement type        | Choose Product   |
    | Primary Customer  |                                | Search for Third Party | Primary Customer |
    | Start             |                                | Contract Dates        | Schedule         |
    | Maturity          |                                | Contract Dates        | Schedule         |
    | Residual Value    |                                | Cost                  | Assets           |
    | Supplier          |                                | Search for Third Party | Supplier         |
    | Payment method    |                                | Repurchaser Details   | Assets           |
    | VAT treatment     |                                | Repurchaser Details   | Assets           |
    | Number of rentals |                                | Rental Profile        | Rentals          |
```

← **Gherkin standard test data management has been changed to handle data dynamically created by Alfa**

Timeline of Achievements



Aug 2021 | Sept 2021 | Oct 2021 | Nov 2021 | Dec 2021 | Jan 2022

NTT DATA engagement starts

Workshops on creation of Stories and Gherkin Tests in general

Story coach joins

Test coach joins

Analysis started on how to improve Gherkin usage in SMYLE

Concept for structured Gherkin Tests created

Workshops on structured Gherkin Tests

Story owners start creating structured Gherkin Tests

Story owners start creating on-the-fly test data via Gherkin Steps

Story owners start handling data dynamically generated by Alfa via Gherkin

Automation team creates code base to run structured Gherkin tests

Test manager joins

Gherkin expert joins

Gherkin expert joins

First Test with ~323 structured Gherkin Steps automated

5 structured Gherkin Tests with 430 Test and 940 Pre-Condition Steps automated

Automation team starts implementing API calls in test data creation Steps

API calls used in most test data creation Steps

Business expert joins

~149 Tests in structured Gherkin fully automated

Pre-defined test data available in test environments

Free-style Gherkin Tests existing in Jira

Conclusion

- ➢ A successful scalable approach to Test Automation based on Gherkin could be realized
- ➢ Scrum teams do well understand what happens in test cases in detail; this is a substantial improvement in transparency
- ➢ The structured Gherkin aproach is well-suited to fulfill compliance regulations regarding testing of financial software
- ➢ The structured Gherkin approach can be extended to other areas beyond UI testing, e.g. automated API testing
- ➢ The realized automated testing is already saving a large amount of effort manual testing would require
- ➢ As it has been successful, the shown approach can serve as a template for future projects of customer

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THANK YOU

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