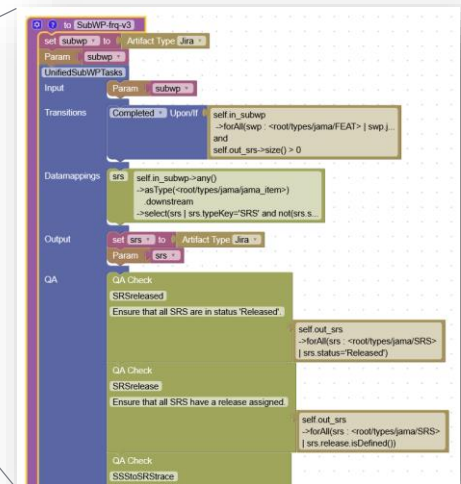
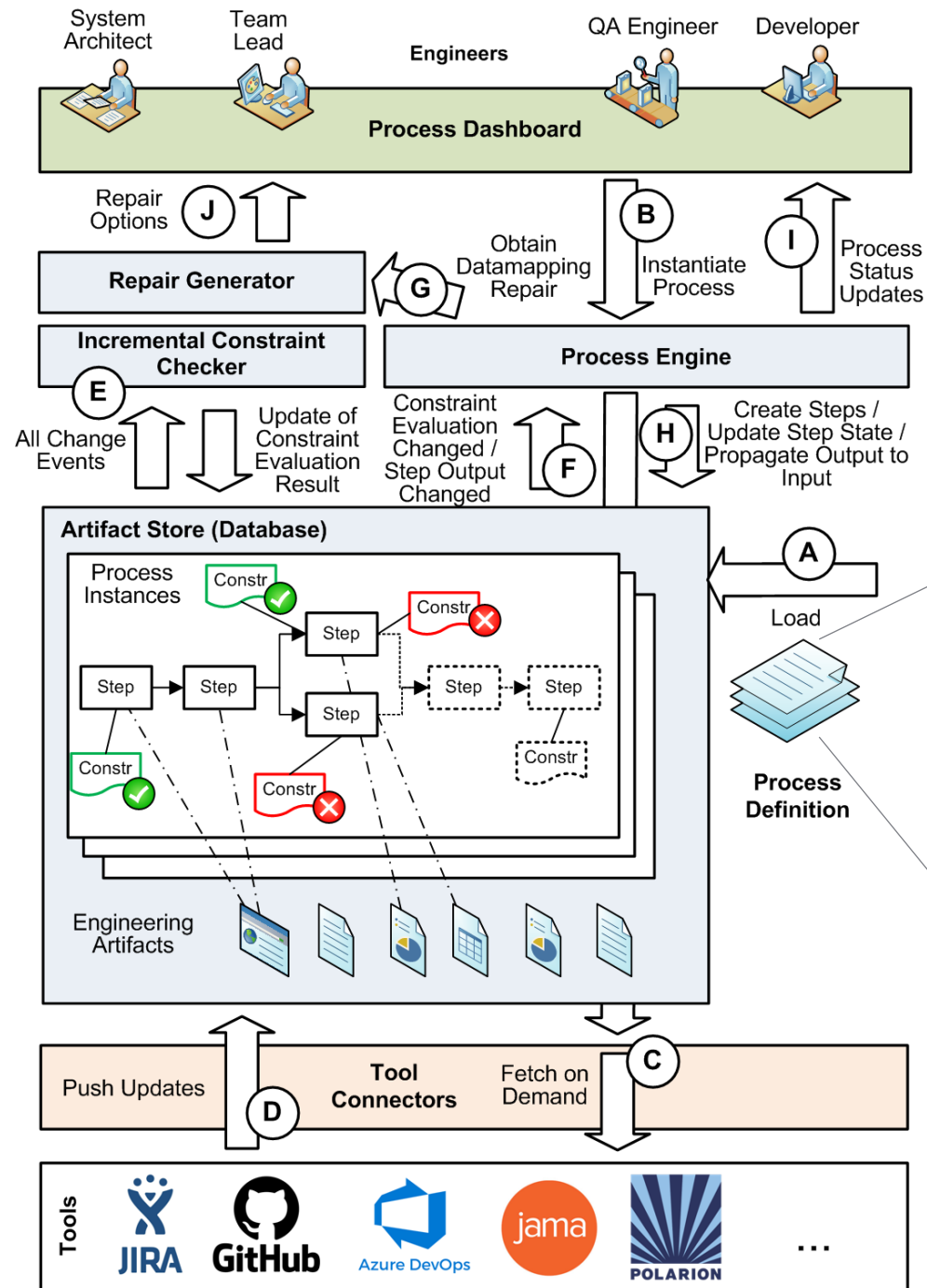


# QA SUPPORT TOOL PROTOTYPE OVERVIEW



Christoph Mayr-Dorn  
[christoph.mayr-dorn@jku.at](mailto:christoph.mayr-dorn@jku.at)

# PROTOTYPE ARCHITECTURE



# QA TOOL DASHBOARD

- Navigating to [URL] port 7171, logging in with dev:dev

Forces refreshing of overview – usually UI updates automatically (does not force fetch artifacts!)

Currently active process and QA check instances

Loaded/Deployed processes and QA checks

Status on fetching artifacts from backend servers

Trial running new rules/constraints

Blockly-based process editor (if enabled)

Blockly-based process deployment results (if enabled)

The screenshot shows the QA Tool Dashboard in a web browser. The browser tab is titled "Process Dashboard" and the address bar shows "localhost:7171". The dashboard has a left sidebar with a menu and a main content area. The menu items are: Process Instances, Process Definitions, Connector Progress, Rule Playground, Artifact/Instance Inspector, Local Process Editor, Process Deployment Result, and Stages Transformation Result. The main content area has a header with "Process Dashboard" and a "Log out" button. Below the header is a "Refresh State" button. The main content area also has a table with columns: Process Instance, Last Changed, State, and QA. The table is currently empty.

Process Dashboard

Log out

Refresh State

Process Instance	Last Changed	State	QA
------------------	--------------	-------	----

Results upon process deployment from Stages (if enabled)

# LOADED/DEPLOYED PROCESSES (INCL THEIR QA CHECKS)

Lists all available (correct) process definitions\*

Hierarchical/Tree structure of process steps and any (optional) decision nodes (AND, OR, XOR)

Displays selected process or process step details:

- Including description, pre/post condition (in OCL/ARL language)
- Any QA checks
- Input parameter name and type
- Output parameter name and type

Slider enables for size adjustment of details pane

The screenshot shows the 'Process Definitions' web application. The left sidebar contains a navigation menu with items: Process Instances, Process Definitions (selected), Connector Progress, Rule Playground, Artifact/Instance Inspector, Local Process Editor, Process Deployment Result, and Stages Transformation Result. The main content area displays a list of process definitions under the heading 'Process Definitions'. A dropdown menu is open, showing 'SIELA-jira-V3 (DSid: 1215)' selected. Below the dropdown, a list of process steps is shown: PrepareProcess, WriteOrReviseMMF, RefineToSuc, and CreateOrRefineCSC. The 'PrepareProcess' step is selected, and its details are shown on the right. The details pane includes a 'Constraint type' section with 'PRECONDITION' and 'POSTCONDITION' rules. Below this is a 'QA ID' table with columns 'QA ID', 'Explanation', and 'Constraint'. The table contains one row for 'ProcessTrace' with the explanation 'Each Process (story) must trace to at' and a constraint rule. At the bottom, there are sections for 'Input Parameters' and 'Output Parameters' with their respective types.

QA ID	Explanation	Constraint
ProcessTrace	Each Process (story) must trace to at	self.in_story ->forAll(story : <root/types/jira_core_s ->select( ref : <root/types/jira_core_s ->size() > 0)

Input Parameters	Type
story	jira_core_artifact

Output Parameters	Type
cscSubtask	jira_core_artifact
mmfSubtask	jira_core_artifact
sucSubtask	jira_core_artifact

# CREATING A PROCESS INSTANCE

The screenshot shows the 'Process Dashboard' interface. On the left is a sidebar menu with options: Process Instances, Process Definitions, Connector Progress, Rule Playground, Artifact/Instance Inspector, Local Process Editor, Process Deployment Result, and Stages Transformation Result. The main area is titled 'Instantiate Process' and contains a 'Select a Process Definition' dropdown menu with 'SIELA-jira-V3' selected. Below this, there are two input fields: 'story' with 'SIELA-20' and 'jira\_core\_artifact'. To the right of these fields is an 'Identifier Type' dropdown menu with 'JiraIssueKey' selected. A 'Reload Available Definitions' button is located to the right of the first dropdown. At the bottom of the main area is an 'Instantiate Process' button. Below this is a table with columns: Process Instance, Last Changed, State, and QA. The table is currently empty.

**Select Process**

For every input required (as defined by the process) provide the input artifact identifier\*

Initiates fetching of input artifact(s) which may take time – fetch progress is shown in connector overview  
UI is automatically refreshed upon completion

select type of provided ID (e.g., Jira and Jama allow different identifier types)

# PROCESS INSTANCE OVERVIEW

Root process allows replacement of input artifact by adding new and then removing old artifact

Hierarchical process structure, indicating completion and QA status

Step with collapsed QA status

Step with expanded QA status

Provides access to how the process and artifact properties are internally stored (e.g., for checking if an artifact update in the tool (e.g., Jama, Jira, etc) has already been received.

A history of the states each step and QA constraint has already reached earlier.

> Instantiate Process

Process Instance	Last Changed	State	QA
▼ SIELA-jira-V3_[SIELA-20_Integrate Team Centric QA Tracking]		🔒	⚠️
▼ PrepareProcess		✓	✓
☑ Each Process (story) must trace to at least one Stakeholder Request (SR)	29/11/2023, 11:31		✓
> WriteOrReviseMMF		🔒	⚠️
▼ RefineToSuc		🔒	✖
☑ Each SUC must trace to at least one (parent) System Use Case (SUC) or a Business Use Case (BUC)	29/11/2023, 11:31		✖
☑ No engineering artifacts other than SUCs may be traced to.	29/11/2023, 11:31		✖
> CreateOrRefineCSC		🔒	✖

Process Instance ID: 1535

SIELA-jira-V3\_[SIELA-20\_Integrate Team Centric QA Tracking]

Process State: In Progress

Inputs

• story (jira\_core\_artifact) SIELA-20\_Integrate Team Centric QA Tracking

story •

Identifier Type

jira\_core\_artifact

JiraIssueKey

Add

Outputs

• suc (jira\_core\_artifact) none

• buc (jira\_core\_artifact) none

• csc (jira\_core\_artifact) none

• mmf (jira\_core\_artifact) none

🗑

[Internal Details \(opens in new tab\)](#)

[JSON Event Log \(opens in new tab\)](#)

Refresh State

# STEP DETAILS

> Instantiate Process

Refresh State

Step Instance ID: 1546  
RefineToSuc\_d0fb930c-72f0-44f1-9950-647bc56148d8

Step State: Ready

Precondition:

Postcondition:

Execute any one of the following actions to fulfill constraint:

Do all of:

Do one of:

Add to realizes of [SIELA-22\\_RefineToSUC](#) a jira\_core\_schema\_Artifact that has at least one element in its issueType = 'SUC'

Change issueType of [SIELA-12\\_Role Management Persistence](#) to = SUC

Change status of [SIELA-22\\_RefineToSUC](#) to = Done

Upstream incomplete work Caution! continuing on this step could lead to rework or unnecessary work.

Preceding Steps with unfulfilled QA constraints   
[WriteOrReviseMMF](#)

Inputs

- sucSubtask (jira\_core\_artifact) [SIELA-22\\_RefineToSUC](#)

Outputs

- suc (jira\_core\_artifact) none

Process Instance	Last Changed	State	QA
SIELA-jira-V3_[SIELA-20_Integrate Team Centric QA Tracking]			
>  PrepareProcess			
>  WriteOrReviseMMF			
>  RefineToSuc			
Each SUC must trace to at least one (parent) System Use Case (SUC) or a Business Use Case (BUC)	29/11/2023, 11:31		
No engineering artifacts other than SUCs may be traced to.	29/11/2023, 11:31		
>  CreateOrRefineCSC			

Precondition fulfilled: i.e., step is ready to be worked on

However, prior steps are incomplete

Post conditions here are not fulfilled, these are the actions (and alternatives) to signal that the step is done

This is the input if the step that is used to find the output: i.e., any output of a step needs to be reachable from its input artifacts (as defined in the process)

JYU

# QA CONSTRAINT FEEDBACK

When enabled in the configuration, the clicking this symbol forces an immediate refreshing of this artifact (and only this artifact) from the tools with subsequent constraint reevaluation

Instantiate Process

Refresh State

Process Instance	Last Changed	State	QA
SIELA-jira-V3_[SIELA-20_Integrate Team Centric QA Tracking]		🔒	⚠️
> PrepareProcess		✓	✓
> WriteOrReviseMMF		🔒	⚠️
> RefineToSuc		🔒	✖️
Each SUC must trace to at least one (parent) System Use Case (SUC) or a Business Use Case (BUC)	29/11/2023, 11:31		✖️
No engineering artifacts other than SUCs may be traced to.	29/11/2023, 11:31		✖️
> CreateOrRefineCSC		🔒	✖️

Quality Assurance Constraint:  
SUCtraceToSUCorBUC

Each SUC must trace to at least one (parent) System Use Case (SUC) or a Business Use Case (BUC)

Execute any one of the following actions to fulfill constraint:

Change issueType of [SIELA-12\\_Role Management Persistence](#) to = SUC

Add to realizes of [SIELA-22\\_RefineToSUC](#) a jira\_core\_schema\_Artifact that has at least one element in its issueType = 'SUC'

The alternative ways to fix the QA constraint.

Action: add/remove/change








Property/field that needs changing (could be a link or reference to another artifact)

Artifact (i.e., workitem, issue, etc) that needs changing (clicking on link opens that item in a new tab in its original tool like Jira, Jama, AzureDevOpsServices, ...)

Repair details such as value to use, or restrictions on the artifact to create/link/reference ...



# STATUS SYMBOLS

Symbol	Status	Explanation
	Not Ready	Preconditions are not fulfilled
	Ready	Preconditions are fulfilled
	Completed	Postconditions and QA Constraints are fulfilled
	No QA defined	This step does not have any QA constraints
	Step's QA state	This step/process has all/none/some QA constraints fulfilled
	Fulfilled	QA constraint are fulfilled
	Violated	QA constraint not fulfilled

# CONNECTOR PROGRESS

Connector Progress Overview						Log out
Process Instances						
Process Definitions						
Connector Progress						
Rule Playground						
Artifact/Instance Inspector						
Local Process Editor						
Process Deployment Result						
Stages Transformation Result						
Fetch Artifact From Tool						
Search						
Timestamp	Source	Activity	Status	Comment		
29 Nov 2023, 13:44:46	JiraConnector	Initializing Connector	Completed			
29 Nov 2023, 13:44:47	JiraConnector	Created webhook for receiving up	Completed			
29 Nov 2023, 13:44:47	JamaConnector	Initializing Connector	Completed			
29 Nov 2023, 13:44:47	JamaConnector	Loaded Schema from file	Completed			
29 Nov 2023, 13:45:06	JiraConnector	Fetching Jira Item SIELA-20	Completed			
29 Nov 2023, 13:45:07	JiraConnector	Batch Loading 5 items	Completed	Batch Loaded 5 items		
29 Nov 2023, 13:45:07	JiraConnector	Fetching Jira Item 10052	Completed			
29 Nov 2023, 13:45:07	JiraConnector	Fetching Jira Item 10033	Completed			
29 Nov 2023, 13:45:08	JiraConnector	Fetching Jira Item 10032	Completed			
29 Nov 2023, 13:45:08	JiraConnector	Fetching Jira Item 10034	Completed			
29 Nov 2023, 13:45:09	JiraConnector	Fetching Jira Item 10014	Completed			
29 Nov 2023, 13:45:09	JiraConnector	Batch Loading 4 items	Completed	Batch Loaded 4 items		
29 Nov 2023, 13:45:09	JiraConnector	Fetching Jira Item 10019	Completed			
29 Nov 2023, 13:45:09	JiraConnector	Fetching Jira Item 10020	Completed			
29 Nov 2023, 13:45:10	JiraConnector	Fetching Jira Item 10024	Completed			
29 Nov 2023, 13:45:10	JiraConnector	Fetching Jira Item 10023	Completed			
29 Nov 2023, 13:45:11	JiraConnector	Batch Loading 1 items	Completed	Batch Loaded 1 items		
29 Nov 2023, 13:45:11	JiraConnector	Fetching Jira Item 10029	Completed			

Connectors initialization

Fetching of SIELA-20 and all further necessary items based on process constraint evaluation (e.g., when a constraint needs to inspect all downstream artifacts, it will trigger their fetching from the tool)

# FETCHING INDIVIDUAL ARTIFACTS

Fetching of artifact from tool (if not already locally available) by providing the type, identifier type, and id (in the same manner as for providing process input)  
Note that relations/links to other artifacts result in lazy loaded artifacts (that need separate fetching) unless these have already been fetched earlier.

### Connector Progress Overview

- Process Instances
- Process Definitions
- Connector Progress**
- Rule Playground
- Artifact/Instance Inspector
- Local Process Editor
- Process Deployment Result
- Stages Transformation Result

#### Fetch Artifact From Tool


Instance Type

jira\_core\_artifact

Identifier Type

JiraIssueKey

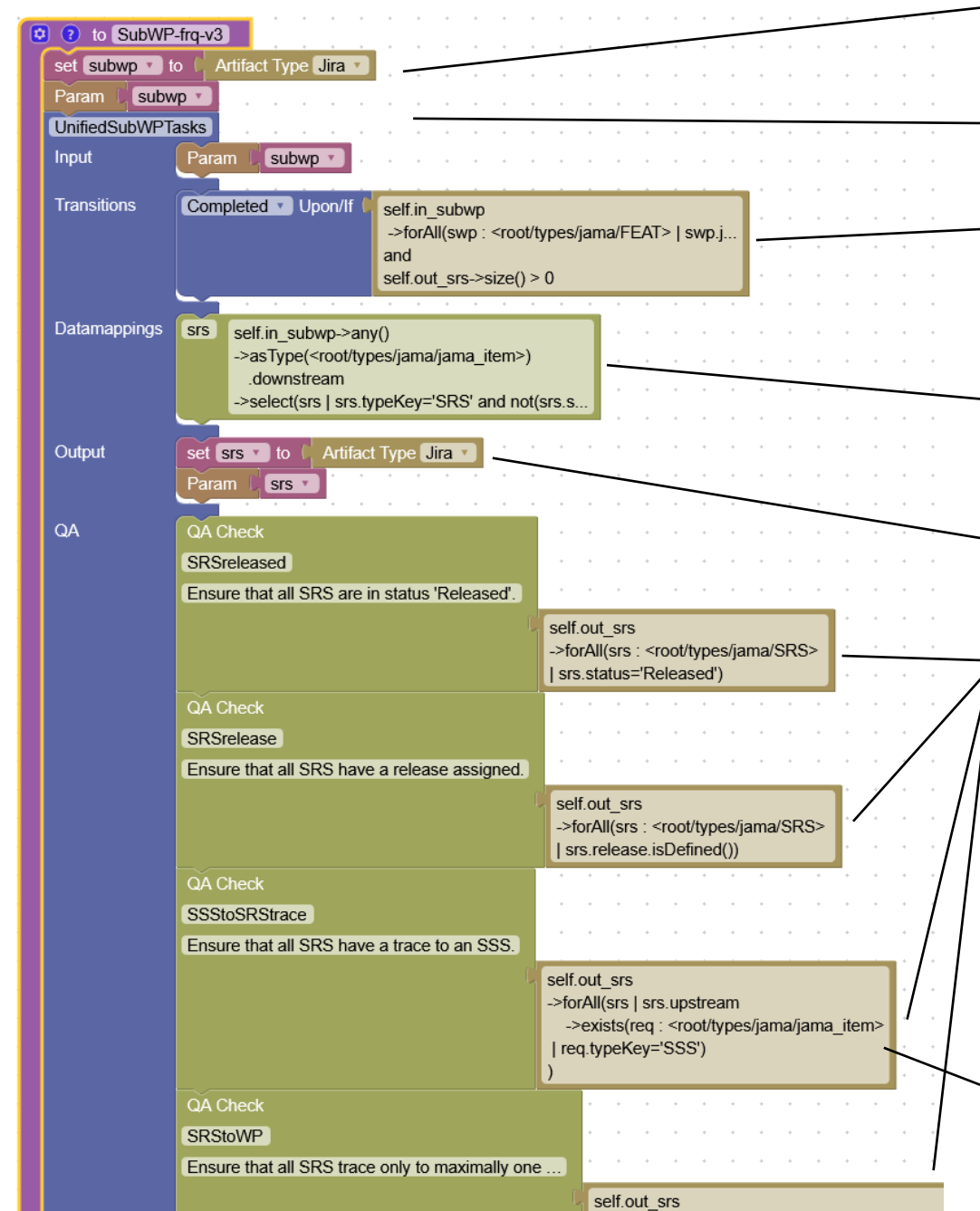
SIELA-345

 Fetch

# **DESIGNING CONSTRAINTS/PROCESSES**



# PROCESS EDITOR



Process entry point with input definition

Process Step definition with input mapped from process

Exit/End condition (also start/pre and cancel conditions available)

How one navigates from input to output, i.e., where does output come from

Step output, and type thereof

Any QA constraints, e.g., that input needs to be traced to something else, Context/scope is always the step, navigating via input or output of the step

Constraints are best written and tested separately first (see next slide)

# PROCESS DEPLOYMENT

Load a process definition from harddrive for editing in the blockly editor

Save current process to be able to later continue editing it in the blockly editor \*

Store the process definition in the framework native json format \*\*

Makes the process available in the framework by checking for rule errors etc. \*\*\*

**Process Editor**

- Process Instances
- Process Definitions
- Connector Progress
- Rule Playground
- Artifact/Instance Inspector
- Local Process Editor**
- Process Deployment Result
- Stages Transformation Result

**Process Definition Editor - PPE v3**

Process Elements  
Functions  
Variables  
Text

Load XML Save as XML Save as JSON Deploy to:

set epic to Artifact Type Jama  
Param epic  
epicStep  
Input Param epic  
Transitions Completed Upon/If self.out\_srs->size() > 0  
Datamappings  
SSS self.in\_epic->any()  
->asType(<root/types/jama/jama\_item>)  
.upstream  
->select(srs | srs.typeKey='SSS' and not(srs...  
SRS self.in\_epic->any()

**Deployment Feedback**

Severity	Type	Message	Scope
Error	DataMapping	Parsing error in 'self.in_epic->any()' -> asType(<root/types/jama/jama_item>).upstream -> select(srs   srs.typeKey='SSS' and not(srs.status.startsWith('Deleted')) -> asSet() -> symmetricDifference(self.out_srs) -> size() = 0: type 'SINGLE' < <InstanceType-jama_item[319]>>' does not have a property 'typeKey' (Line=3, Column=27)	epicStep
Error	DataMapping	Parsing error in 'self.in_epic->any()' -> asType(<root/types/jama/jama_item>).downstream -> select(srs   srs.typeKey='SRS' and not(srs.status.startsWith('Deleted')) -> asSet() -> symmetricDifference(self.out_srs) -> size() = 0: type 'SINGLE' < <InstanceType-jama_item[319]>>' does not have a property 'typeKey' (Line=3, Column=27)	epicStep

**Process Definitions**

- Process Instances
- Process Definitions**
- Connector Progress
- Rule Playground
- Artifact/Instance Inspector
- Local Process Editor
- Process Deployment Result
- Stages Transformation Result

Process Definitions  
A (DSid: 1756)

Process Definition Structure  
A  
epicStep

For unsuccessful deployment, opens the Deployment Result page in a new tab to provide error details

For deployment to a different server (e.g., production) \*\*\*

For upon successful deployment, opens the Process Definition page in a new tab

# ACL/ARL CONSTRAINT PLAYGROUND

Instance Type (rule starting point/context)

jira\_core\_artifact (DSid: 216 FQN: root/types/jira\_core\_artifact)

Which type of artifact should this constraint be checked against

Constraint Definition

self.status='Open'

Artifacts are loaded as needed. Hence, no loading lazy loaded artifacts might lead to incorrect constraint results but might require a lot of time if constraint checker realizes more artifacts are within the scope of the constraint and are also fetched.

☒ Show results for fully fetched artifacts only

☐ Fetch incompletely loaded artifacts? (may significantly increase evaluation duration!)

Evaluate

All instance currently available to the constraint checker (link leads to internal representation (see next slide))

Instance ▾	Result ▾	RepairTree ▾
SIELA-3_Enable Per Team Process View	false	<a href="#">Show Eval</a> <a href="#">Show Repairs</a>
SIELA-22_RefineToSUC	false	
SIELA-18_UserToRole Management	false	<a href="#">Show Eval</a> <a href="#">Show Repairs</a>
SIELA-13 Team Management Persistence	false	<a href="#">Show Eval</a> <a href="#">Show Repairs</a>

Constraint evaluation result

Shows what possible repairs the repair generator would produce for this violated constraint. (same repair view as on the dashboard)

# CONSTRAINT WRITING FEEDBACK IN CASE OF SYNTAX ERROR

Example of constraint cannot be evaluated due to non-existing property “state”.

To inspect the available artifact properties, load an example one and inspect (see next slide)

Instance Type (rule starting point/context)

jira\_core\_schema\_Artifact (DSid: 260 FQN: root/types/jira\_core\_schema\_Artifact )

Constraint Definition

```
self.state='Open'
```

☒ Show results for fully fetched artifacts only ☐ Fetch incompletely loaded artifacts? (may significantly increase evaluation duration!)

Evaluate

Constraint Evaluation Feedback

Errors while evaluating: self.state='Open' :  
[Parsing error in "self.state='Open'": type 'SINGLE<<InstanceType-jira\_core\_schema\_Artifact{260}>>' does not have a property 'state' (Line=0, Column=10)]

Instance	Result	EvalTree	RepairTree
----------	--------	----------	------------



# INTERNAL ARTIFACT REPRESENTATION

The screenshot shows the 'Artifact/Instance Inspector' interface. On the left is a sidebar with navigation options: Process Instances, Process Definitions, Connector Progress, Rule Playground, **Artifact/Instance Inspector** (highlighted), Local Process Editor, Process Deployment Result, and Stages Transformation Result. The main panel has a search bar 'Find Instance by Id', a refresh button, and the text 'Artifact/Instance (DSid=1527): SIELA-20\_Integrate Team Centric QA Tracking'. Below this is another search bar 'Search in Properties'. A table lists properties and their values. Callout boxes on the left point to specific features: 'Navigate to a different internal object by internal id' points to the sidebar; 'Search across all properties and values' points to the 'Search in Properties' bar; 'Navigate to artifact type definition' points to the '@containedFolder' property; 'Properties starting with '@' are internally created' points to the '@propertyMetadata' property; 'Navigate to linked artifacts' points to the '@rl\_ruleContexts' property; and 'Navigate to rule evaluation results and on to rule definitions' points to the 'realizes' property.

**Artifact/Instance Inspector**

Process Instances  
Process Definitions  
Connector Progress  
Rule Playground  
**Artifact/Instance Inspector**  
Local Process Editor  
Process Deployment Result  
Stages Transformation Result

Find Instance by Id

Artifact/Instance (DSid=1527): SIELA-20\_Integrate Team Centric QA Tracking

Search in Properties

Property	Value		
@containedFolder	null		
@instanceOf	<a href="#">jira_core_schema_Artifact</a>		
@instances	[]		
@instantiationClass	null		
@propertyMetadata	<table><thead><tr><th>Key</th><th>Value</th></tr></thead><tbody></tbody></table>	Key	Value
Key	Value		
@propertyTypes	<table><thead><tr><th>Key</th><th>Value</th></tr></thead><tbody></tbody></table>	Key	Value
Key	Value		
@rl_ruleContexts	<a href="#">constraintplaygroundrule_0</a> <a href="#">constraintplaygroundrule_2</a>		
realizes	<a href="#">SIELA-3_Enable Per Team Process View</a> <a href="#">SIELA-38_SR_TestCR</a>		
realizes/@rl_ruleScopes	<a href="#">crd_gaspec_ProcessTraceToSR_SIELA-jira-V3</a>		

# FETCHING LAZY LOADED ARTIFACTS

Fetch Button is visible

Specific Type is unknown yet

FullyFetched Property is 'false'

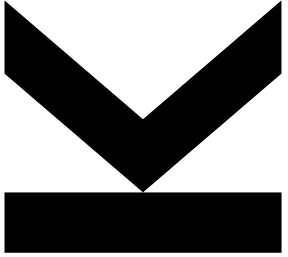
Most properties not known or still null

Fetch Properties

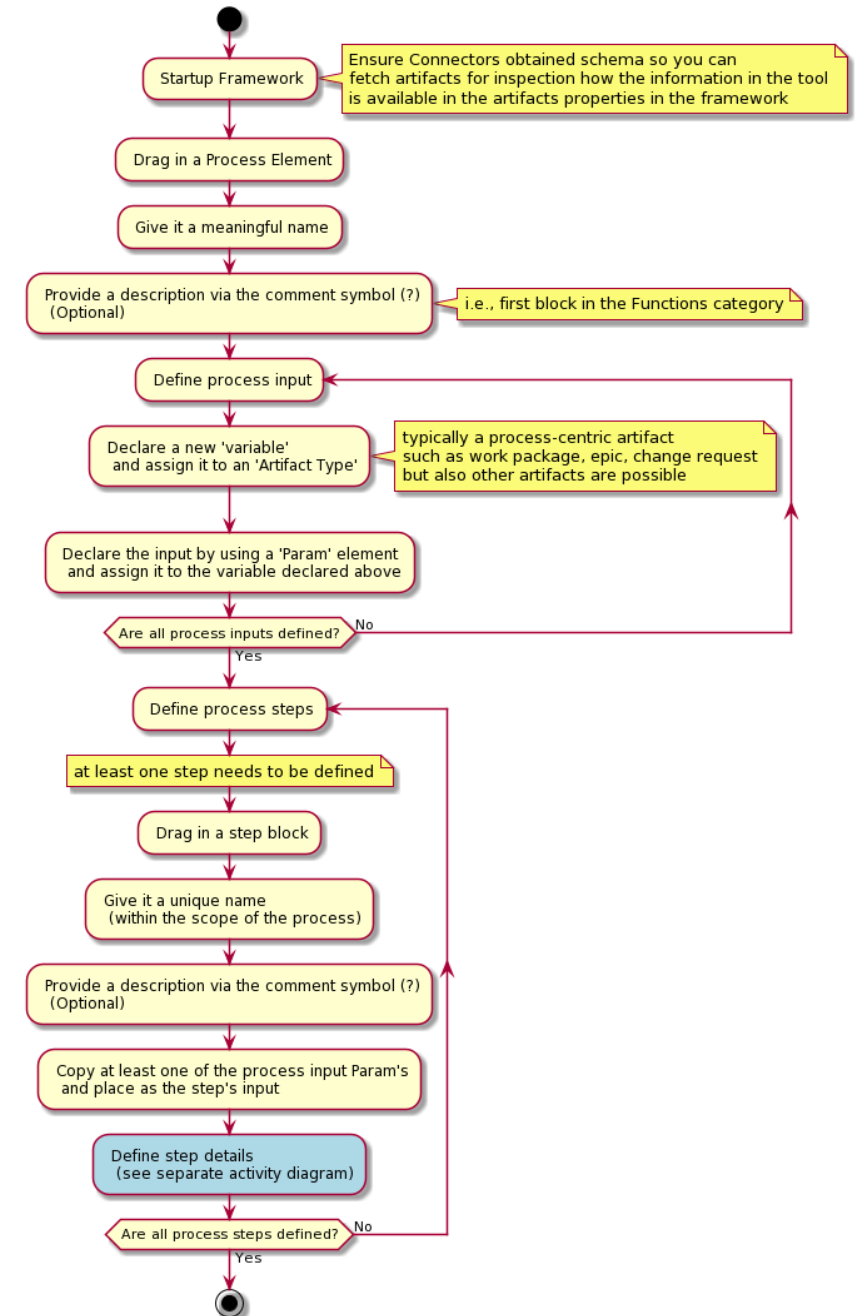
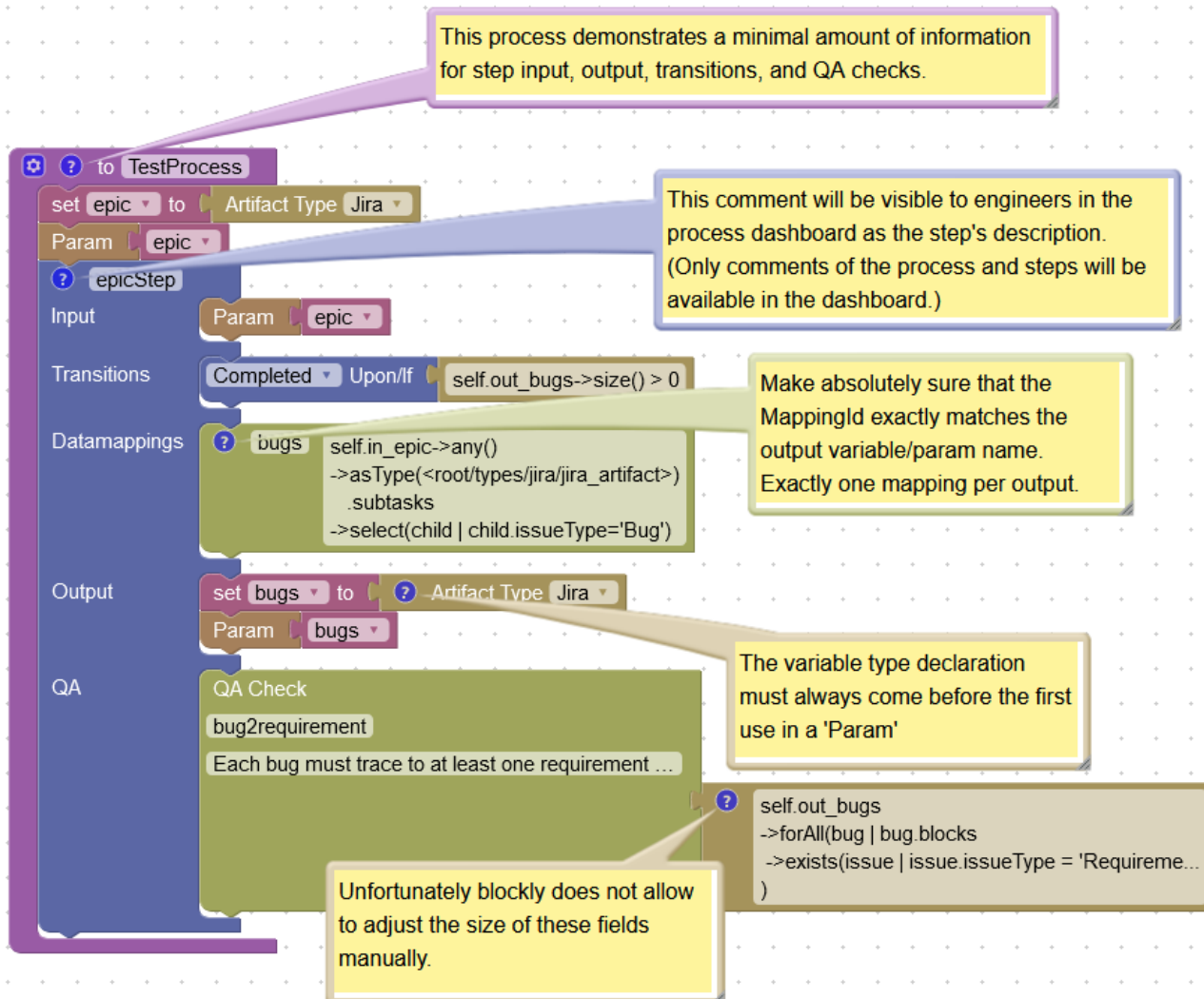
Q Search

Property	Value
@containedFolder	null
@instanceOf	jama_item
@instances	{}
@instantiationClass	null
@propertyMetadata	<div>Key</div>
@subTypes	{}
@superTypes	{}
createdByJamaUser	null
createdDate	null
description	null
downstream	{}
fullyFetched	false
globalId	null
html_url	null
id	7103934
itemType	null
jiraIssue	null
key	null
lastActivityDate	null

# **PROCESS DESIGN PROCEDURE**



# BASIC PROCESS EXAMPLE



# DEFINING STEP DETAILS

## ■ Constraints used in example:

- ☐ **Completion/PostConditions:** `self.out_bugs->size() > 0`
- ☐ **Datamapping:** `self.in_epic->any()->asType(<root/types/jira/jira_artifact>).subtasks`
  - `->select(child | child.issueType='Bug')`
- ☐ **QA:** `self.out_bugs->forAll(bug | bug.blocks->exists(issue | issue.issueType = 'Requirement'))`

