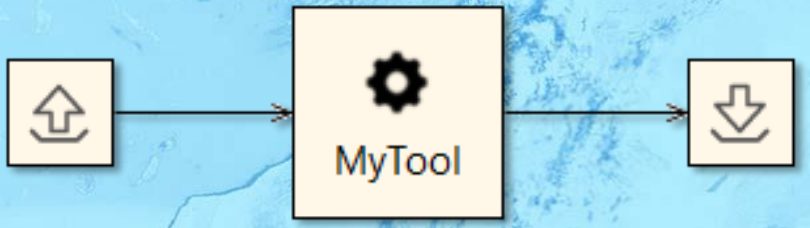
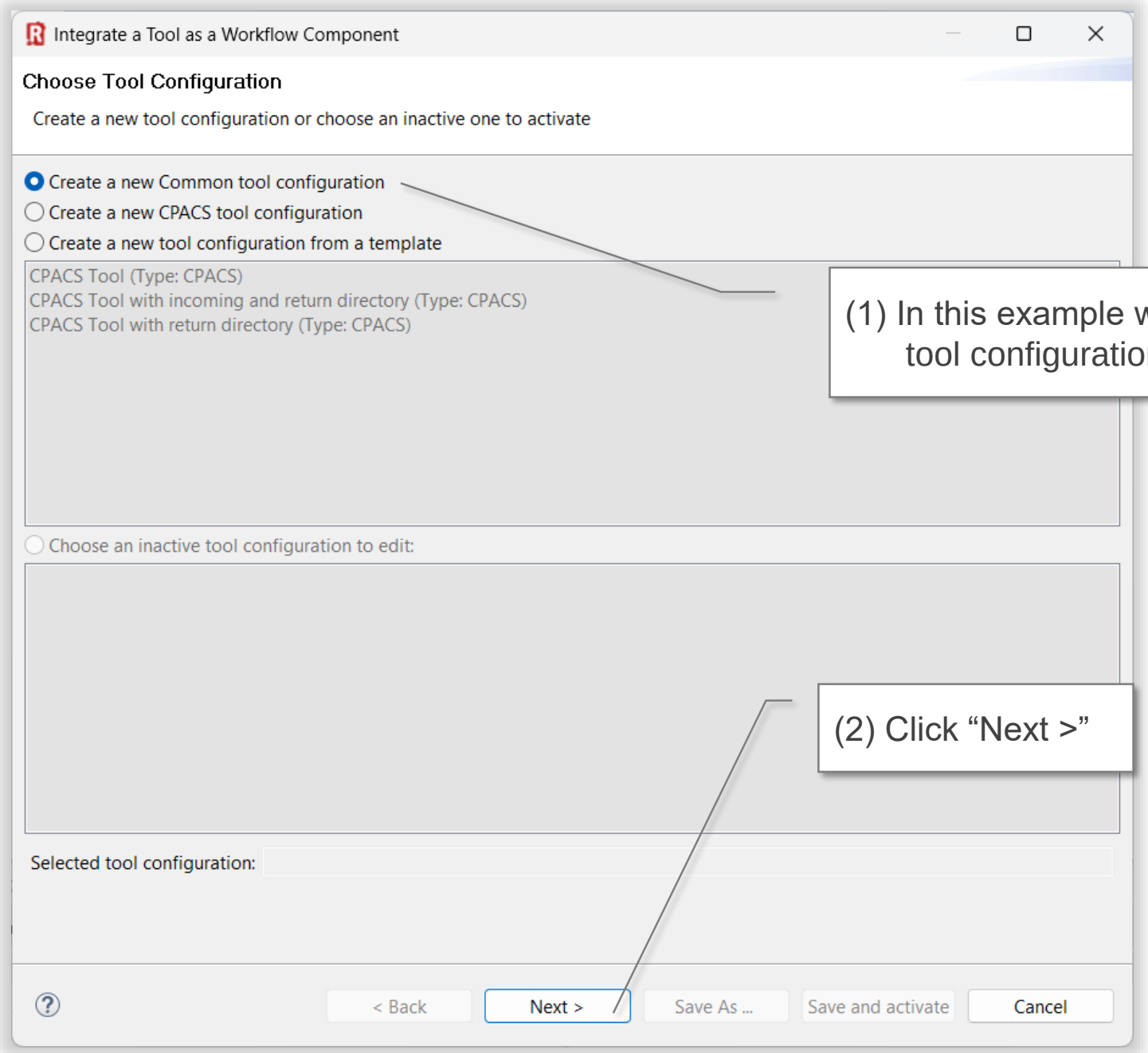
RCE TOOL INTEGRATION

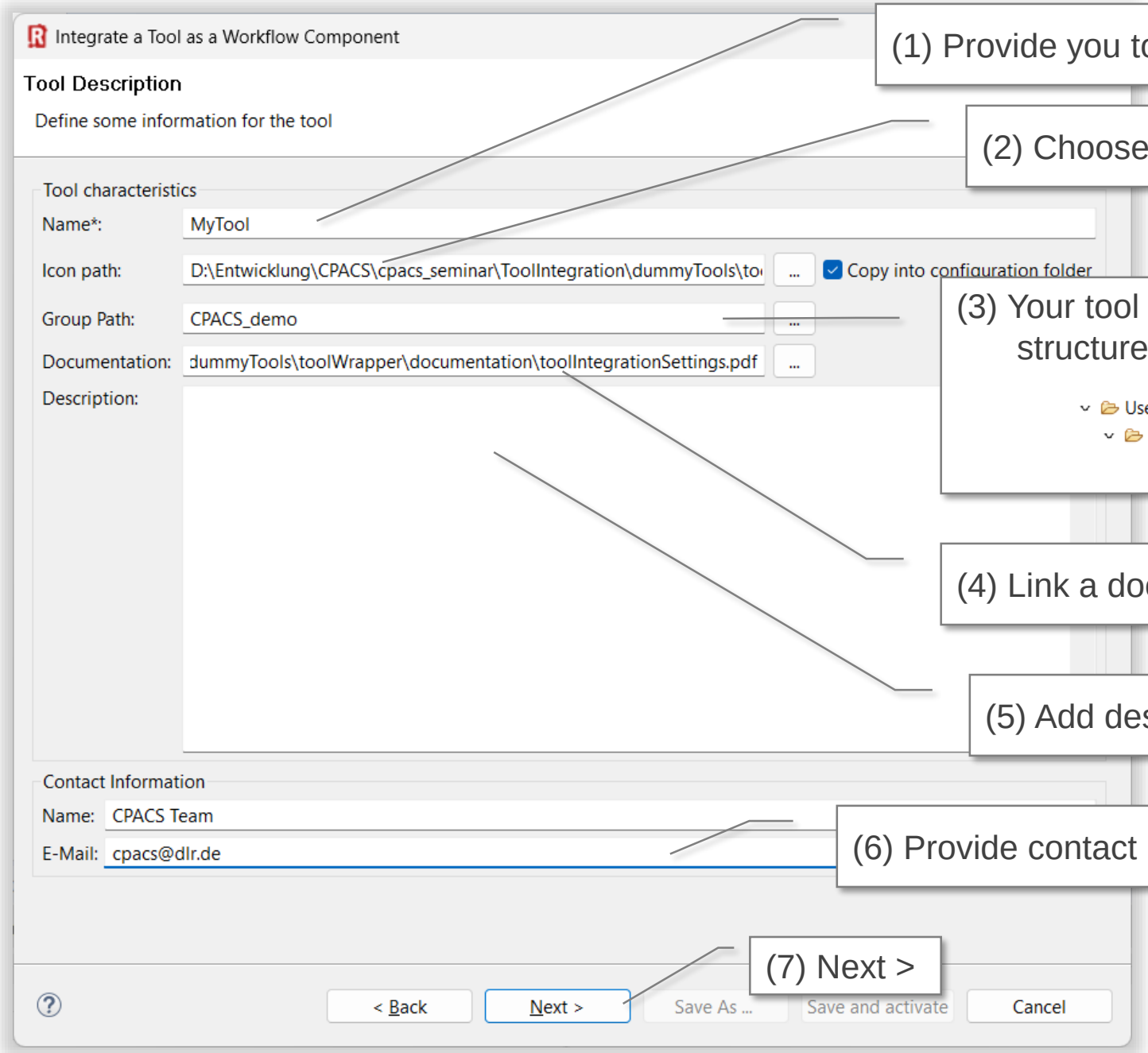
Dummy Tool Wrapper

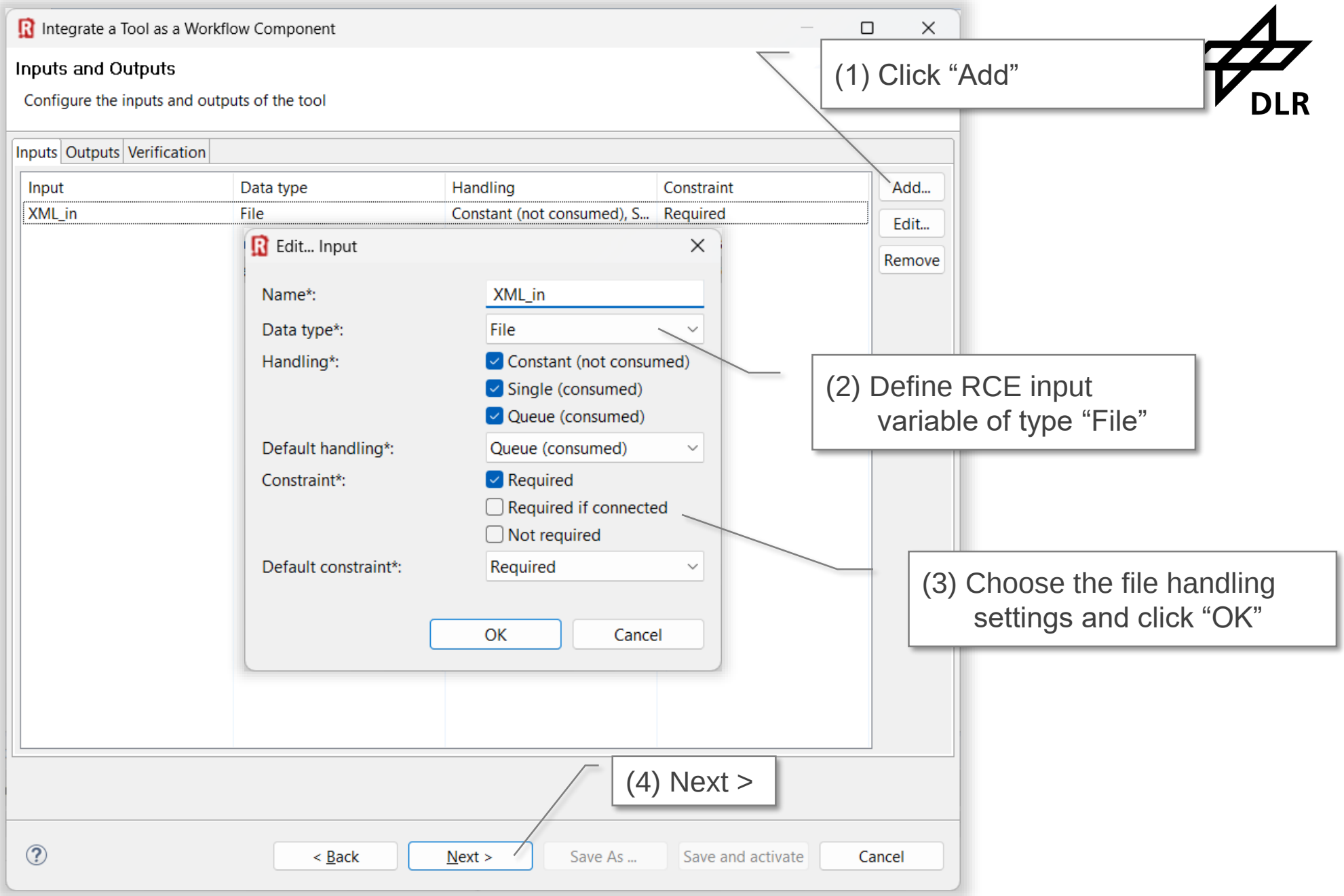
DLR Institute for System Architectures in Aeronautics

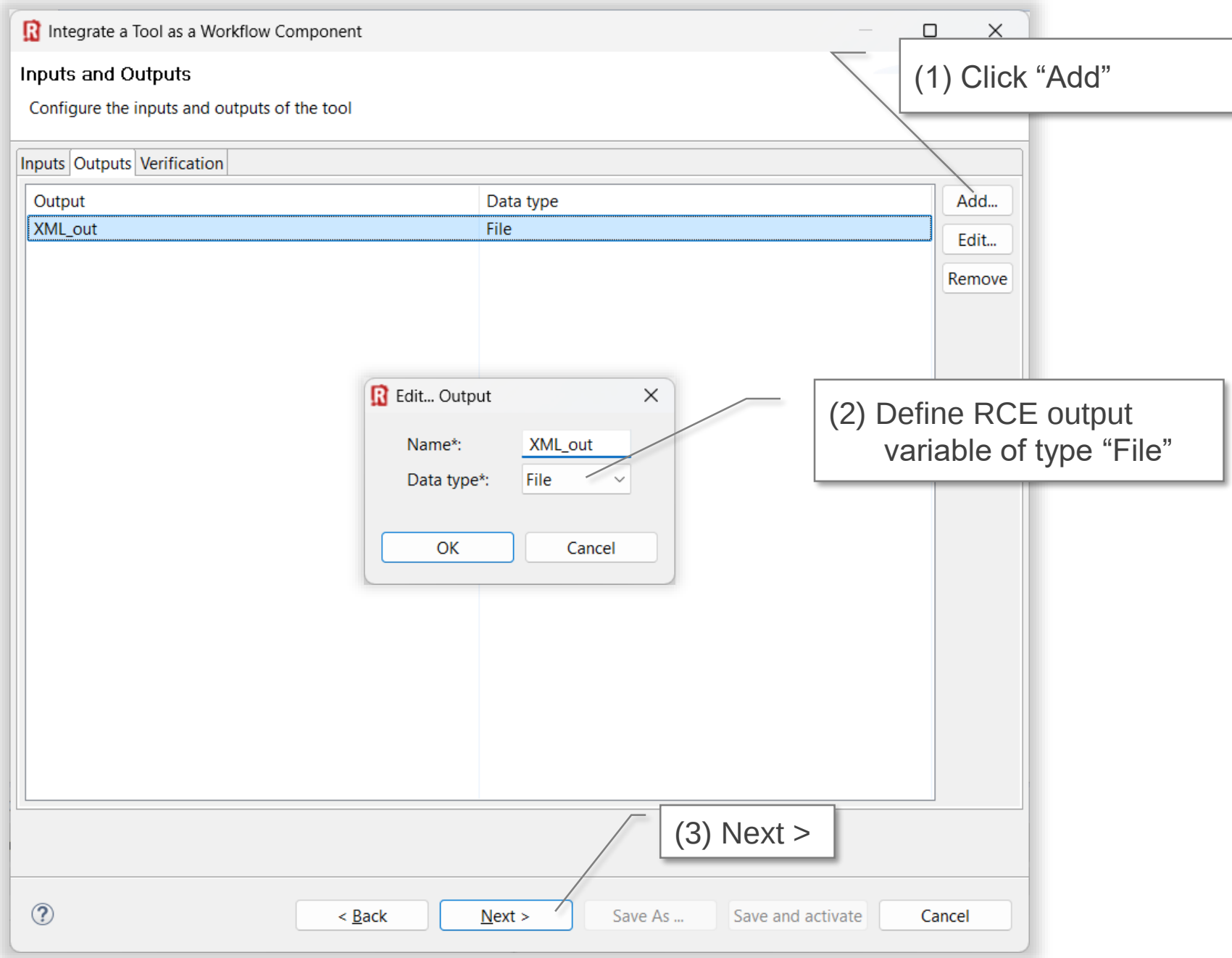


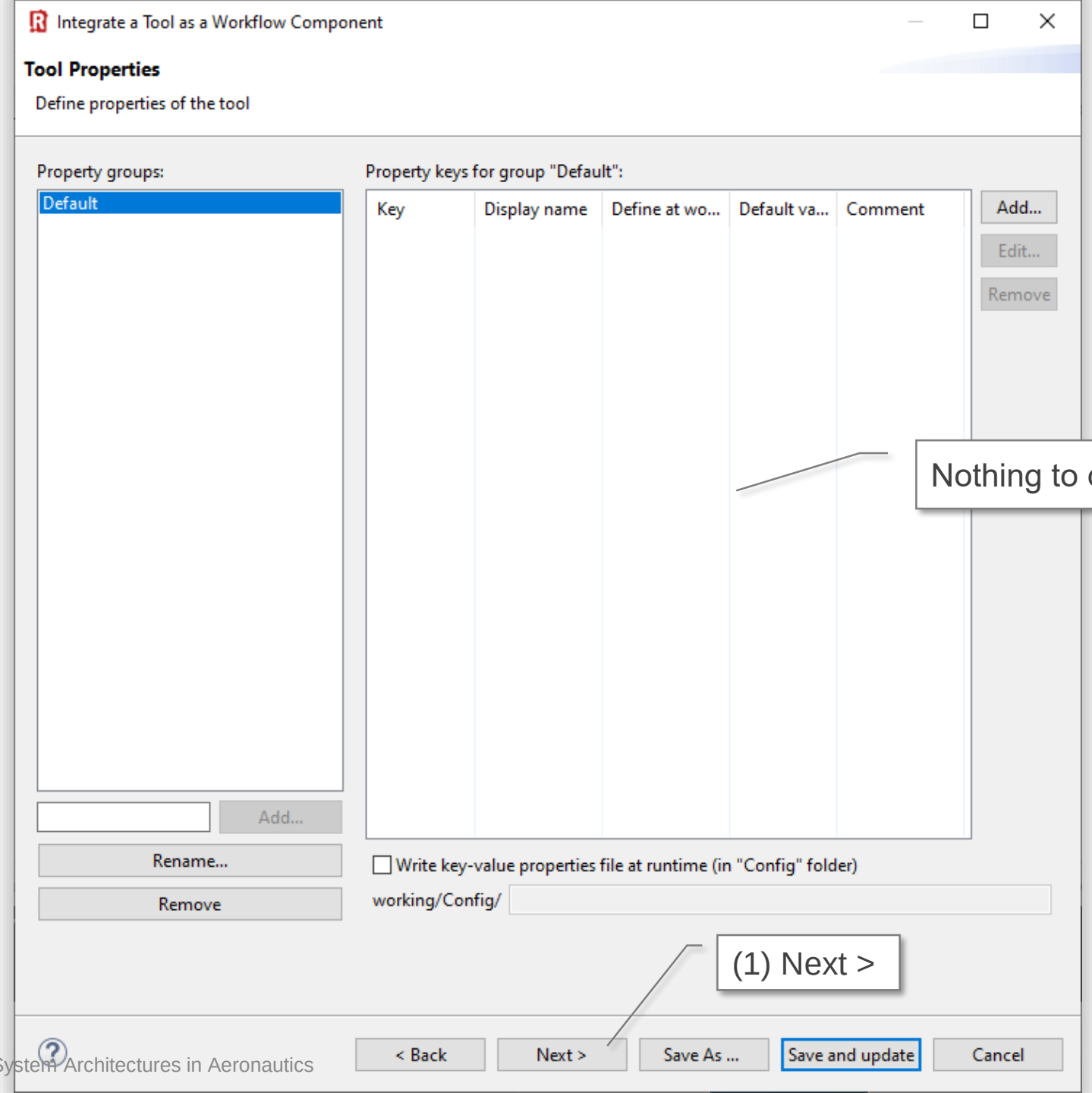
DLR

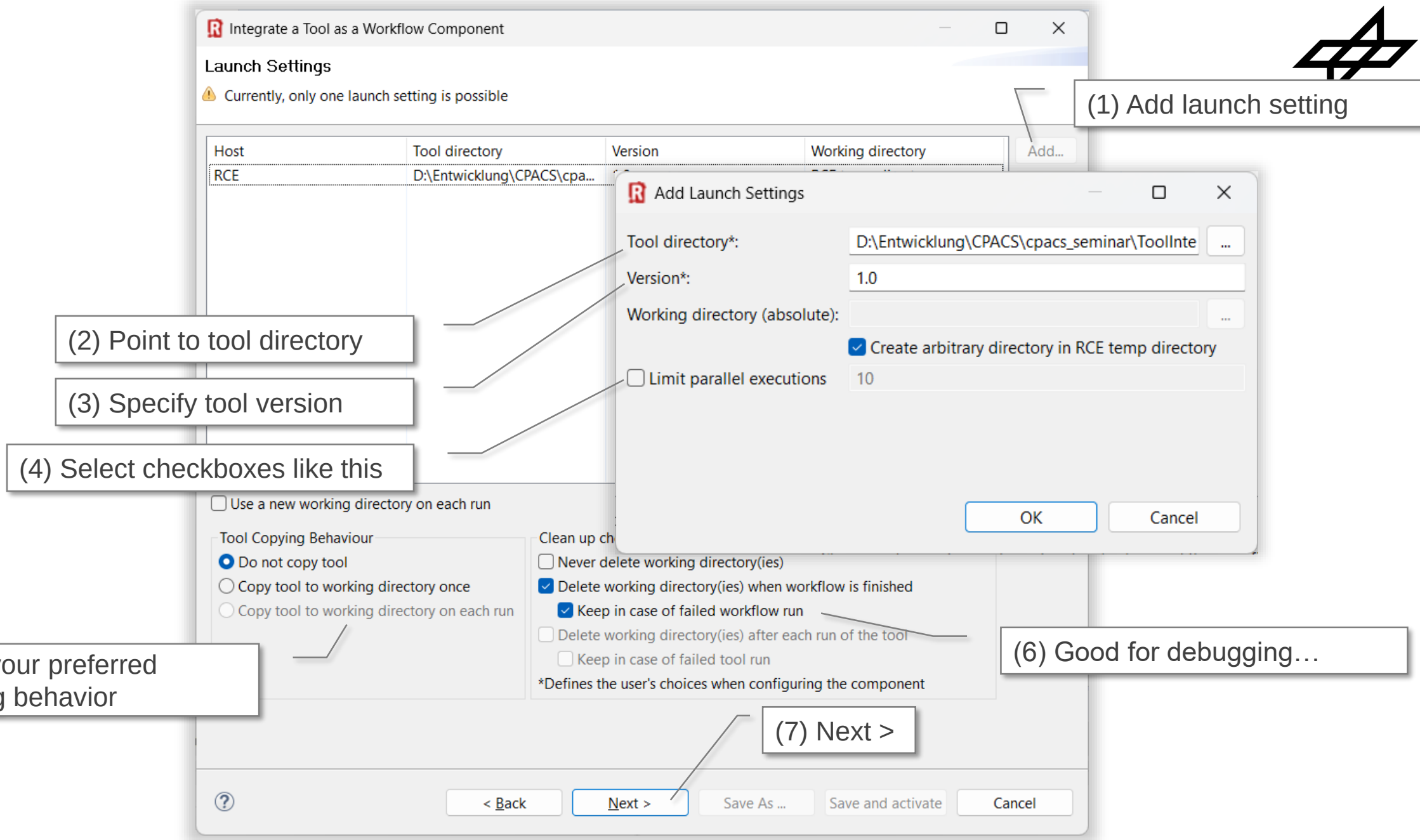

Integrate a Tool as a Workflow Component
Choose Tool Configuration
Create a new tool configuration or choose an inactive one to activate
Create a new Common tool configuration
Create a new CPACS tool configuration
Create a new tool configuration from a template
CPACS Tool (Type: CPACS)
CPACS Tool with incoming and return directory (Type: CPACS)
CPACS Tool with return directory (Type: CPACS)
Choose an inactive tool configuration to edit:
Selected tool configuration:
< Back
Next >
Save As ...
Save and activate
Cancel
(1) In this example we use the “Common tool configuration".
(2) Click “Next >”


Integrate a Tool as a Workflow Component
Tool Description
Define some information for the tool
Tool characteristics
Name*:
MyTool
Icon path:
D:\Entwicklung\CPACS\cpacs_seminar\ToolIntegration\dummyTools\to
Copy into configuration folder
Group Path:
CPACS_demo
Documentation:
dummyTools\toolWrapper\documentation\toolIntegrationSettings.pdf
Description:
Contact Information
Name:
CPACS Team
E-Mail:
cpacs@dlr.de
< Back
Next >
Save As ...
Save and activate
Cancel
(1) Provide you tool name
(2) Choose a pretty icon
(3) Your tool palette might be structured by groups:
User Integrated Tools
CPACS_demo
MyTool
(4) Link a documentation
(5) Add description
(6) Provide contact information
(7) Next >


Integrate a Tool as a Workflow Component
Inputs and Outputs
Configure the inputs and outputs of the tool
Inputs
Outputs
Verification
Input
Data type
Handling
Constraint
XML_in
File
Constant (not consumed), S...
Required
Add...
Edit...
Remove
Edit... Input
Name*:
XML_in
Data type*:
File
Handling*:
Constant (not consumed)
Single (consumed)
Queue (consumed)
Default handling*:
Queue (consumed)
Constraint*:
Required
Required if connected
Not required
Default constraint*:
Required
OK
Cancel
(1) Click “Add”
(2) Define RCE input variable of type “File”
(3) Choose the file handling settings and click “OK”
(4) Next >
< Back
Next >
Save As ...
Save and activate
Cancel


Integrate a Tool as a Workflow Component
Inputs and Outputs
Configure the inputs and outputs of the tool
Inputs
Outputs
Verification
Output
Data type
XML_out
File
Add...
Edit...
Remove
Edit... Output
Name*:
XML_out
Data type*:
File
OK
Cancel
(1) Click “Add”
(2) Define RCE output variable of type “File”
(3) Next >
< Back
Next >
Save As ...
Save and activate
Cancel


Integrate a Tool as a Workflow Component
Tool Properties
Define properties of the tool
Property groups:
Default
Add...
Rename...
Remove
Property keys for group "Default":
Key
Display name
Define at wo...
Default va...
Comment
Add...
Edit...
Remove
Write key-value properties file at runtime (in "Config" folder)
working/Config/
Nothing to do …
(1) Next >
< Back
Next >
Save As ...
Save and update
Cancel


Integrate a Tool as a Workflow Component
Launch Settings
Currently, only one launch setting is possible
Host
Tool directory
Version
Working directory
RCE
D:\Entwicklung\CPACS\cpa...
Add...
Add Launch Settings
Tool directory*:
D:\Entwicklung\CPACS\cpacs_seminar\ToolInte
Version*:
1.0
Working directory (absolute):
Create arbitrary directory in RCE temp directory
Limit parallel executions
10
OK
Cancel
Use a new working directory on each run
Tool Copying Behaviour
Do not copy tool
Copy tool to working directory once
Copy tool to working directory on each run
Never delete working directory(ies)
Delete working directory(ies) when workflow is finished
Keep in case of failed workflow run
Delete working directory(ies) after each run of the tool
Keep in case of failed tool run
*Defines the user's choices when configuring the component
< Back
Next >
Save As ...
Save and activate
Cancel
(1) Add launch setting
(2) Point to tool directory
(3) Specify tool version
(4) Select checkboxes like this
(5) Select your preferred copying behavior
(6) Good for debugging…
(7) Next >

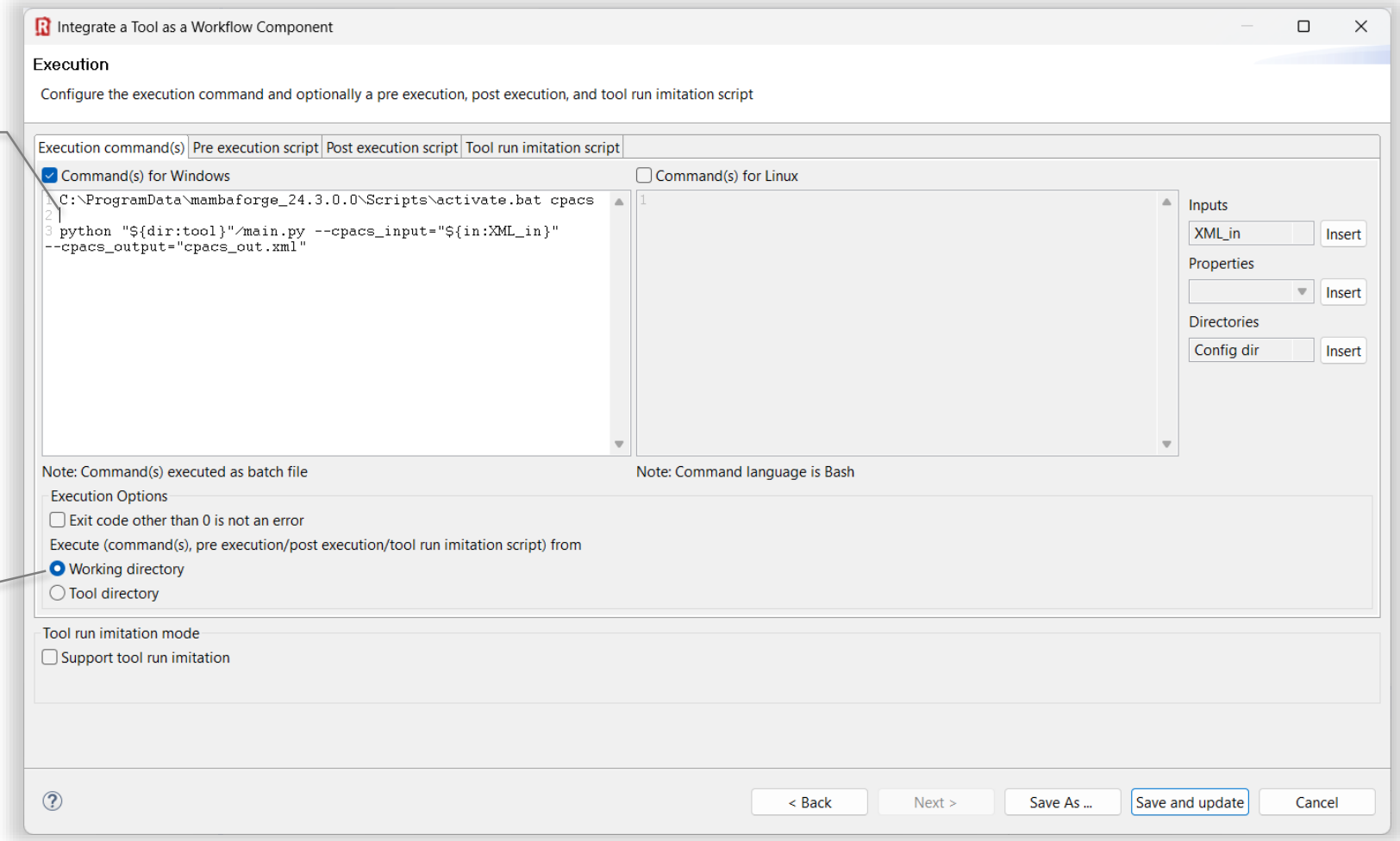
```
C:\ProgramData\mambaforge_24.3.0.0\Scripts\activate.bat cpacs

python "${dir:tool}"/main.py --cpacs_input="${in:XML_in}" --cpacs_output="cpacs_out.xml"
```

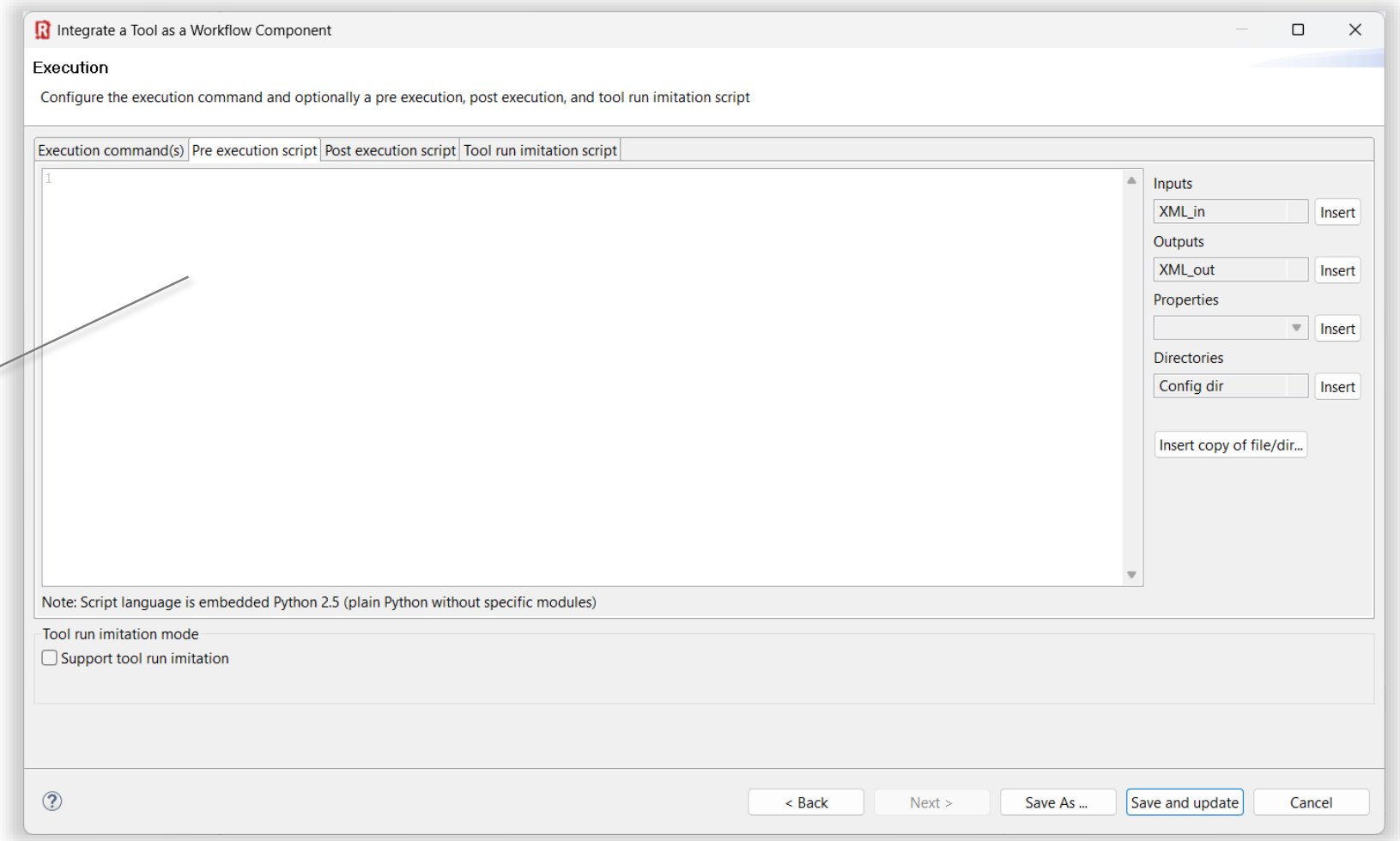
(1) Specify execution commands for Windows and/or Linux

This example is written in Python, so we need to activate the correct interpreter first.

(2) Select “Working directory”



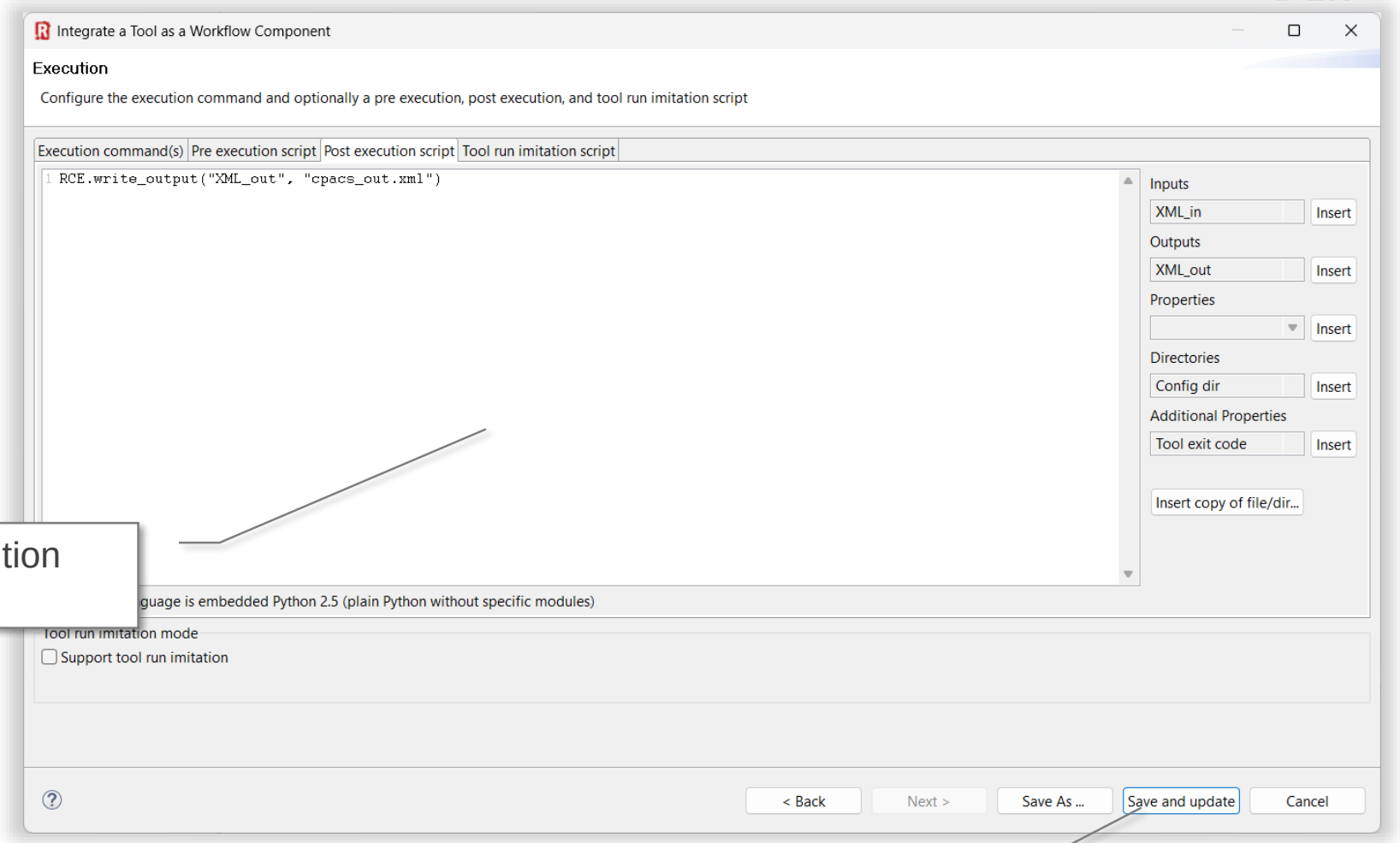
(1) Insert pre-execution script in Python



Pre-execution: What happens before the actual tool is activated. This is useful if you need to prepare a specific folder structure or copy resources before execution.

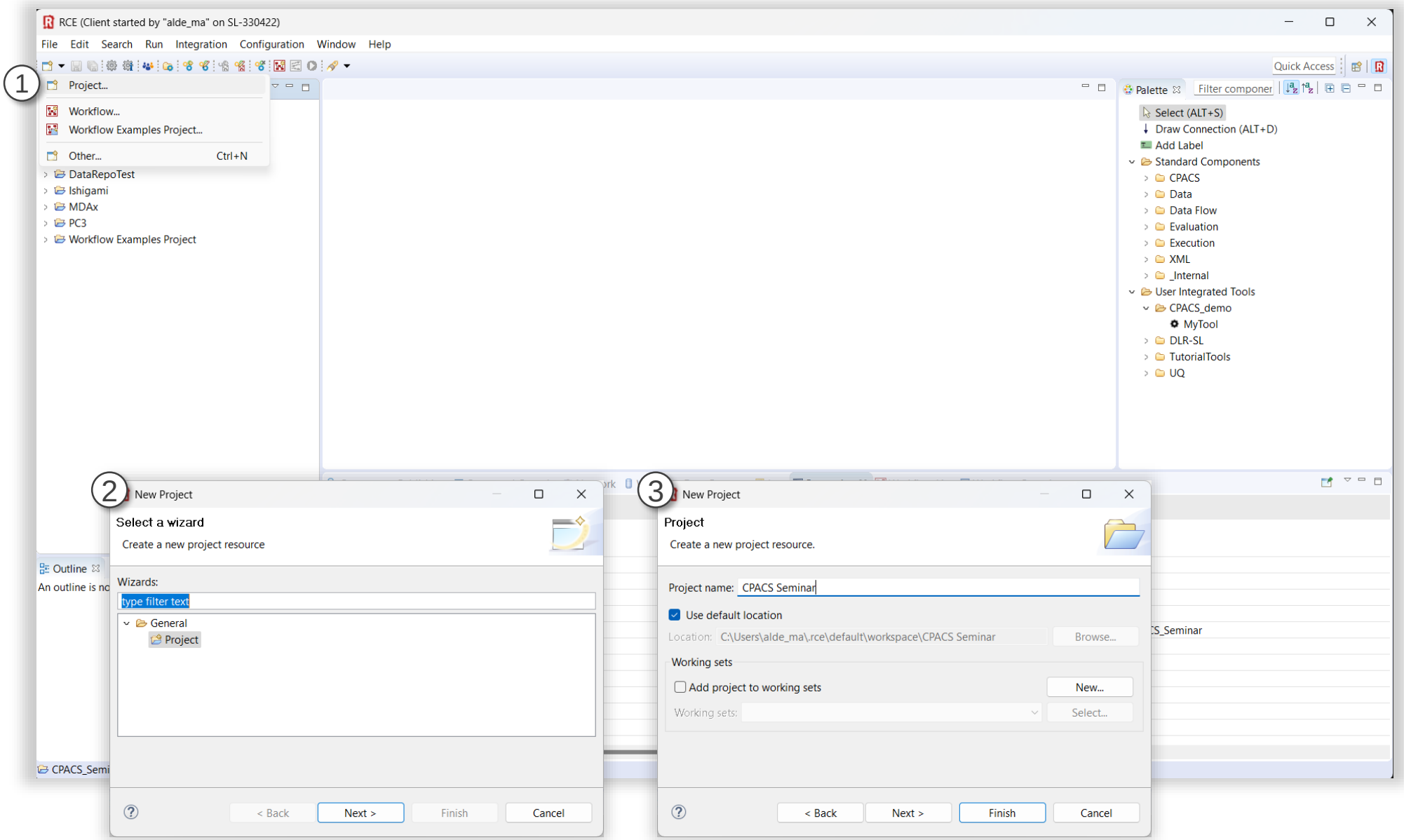
```
RCE.write_output("XML_out", "cpacs_out.xml")
```

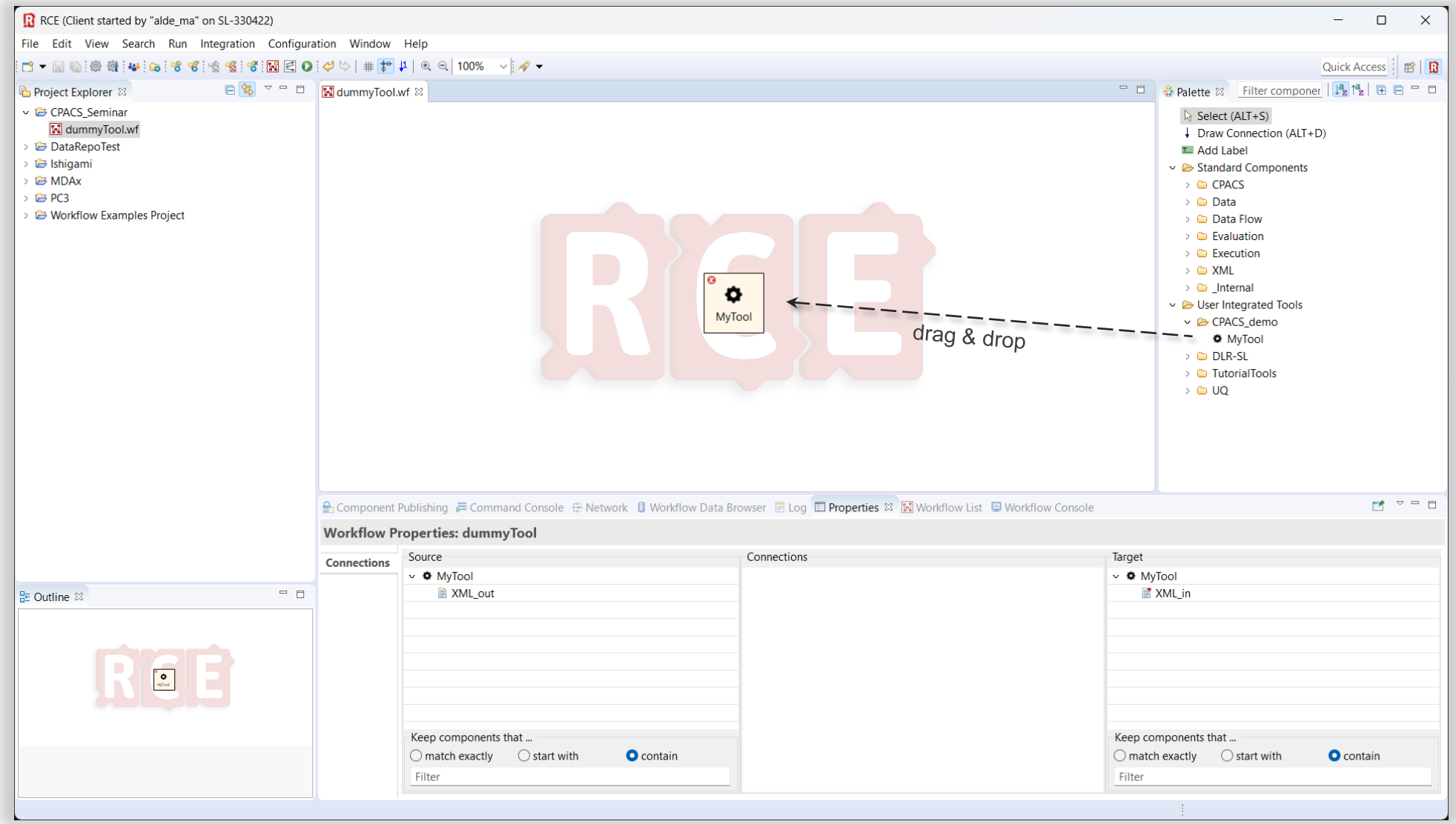
Post-execution: What happens after the actual tool has finished. Here we're telling RCE where to find the output file.



(1) Insert post-execution script in Python

(2) "Save and update/activate"


RCE (Client started by "alde_ma" on SL-330422)
File Edit Search Run Integration Configuration Window Help
Quick Access
1
Project...
Workflow...
Workflow Examples Project...
Other... Ctrl+N
DataRepoTest
Ishigami
MDAx
PC3
Workflow Examples Project
Palette
Filter componer
Select (ALT+S)
Draw Connection (ALT+D)
Add Label
Standard Components
CPACS
Data
Data Flow
Evaluation
Execution
XML
_Internal
User Integrated Tools
CPACS_demo
MyTool
DLR-SL
TutorialTools
UQ
Outline
An outline is no
2
New Project
Select a wizard
Create a new project resource
Wizards:
type filter text
General
Project
< Back
Next >
Finish
Cancel
3
New Project
Project
Create a new project resource.
Project name: CPACS Seminar
Use default location
Location: C:\Users\alde_ma\.rce\default\workspace\CPACS Seminar
Browse...
Working sets
Add project to working sets
New...
Working sets:
Select...
< Back
Next >
Finish
Cancel


RCE (Client started by "alde_ma" on SL-330422)
File Edit View Search Run Integration Configuration Window Help
Project Explorer
CPACS_Seminar
dummyTool.wf
DataRepoTest
Ishigami
MDAx
PC3
Workflow Examples Project
dummyTool.wf
MyTool
drag & drop
Palette
Select (ALT+S)
Draw Connection (ALT+D)
Add Label
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Data
Data Flow
Evaluation
Execution
XML
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User Integrated Tools
CPACS_demo
MyTool
DLR-SL
TutorialTools
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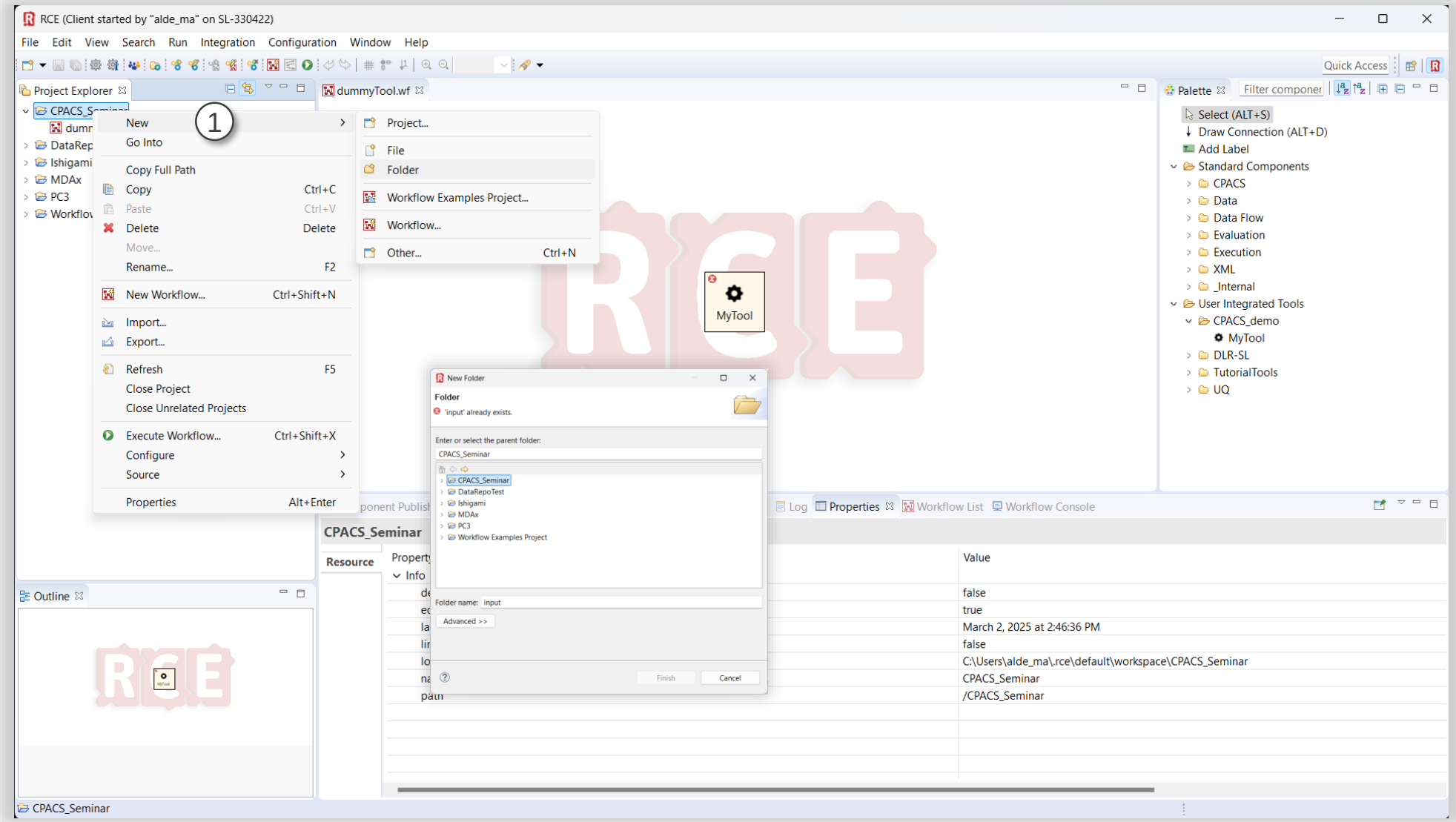
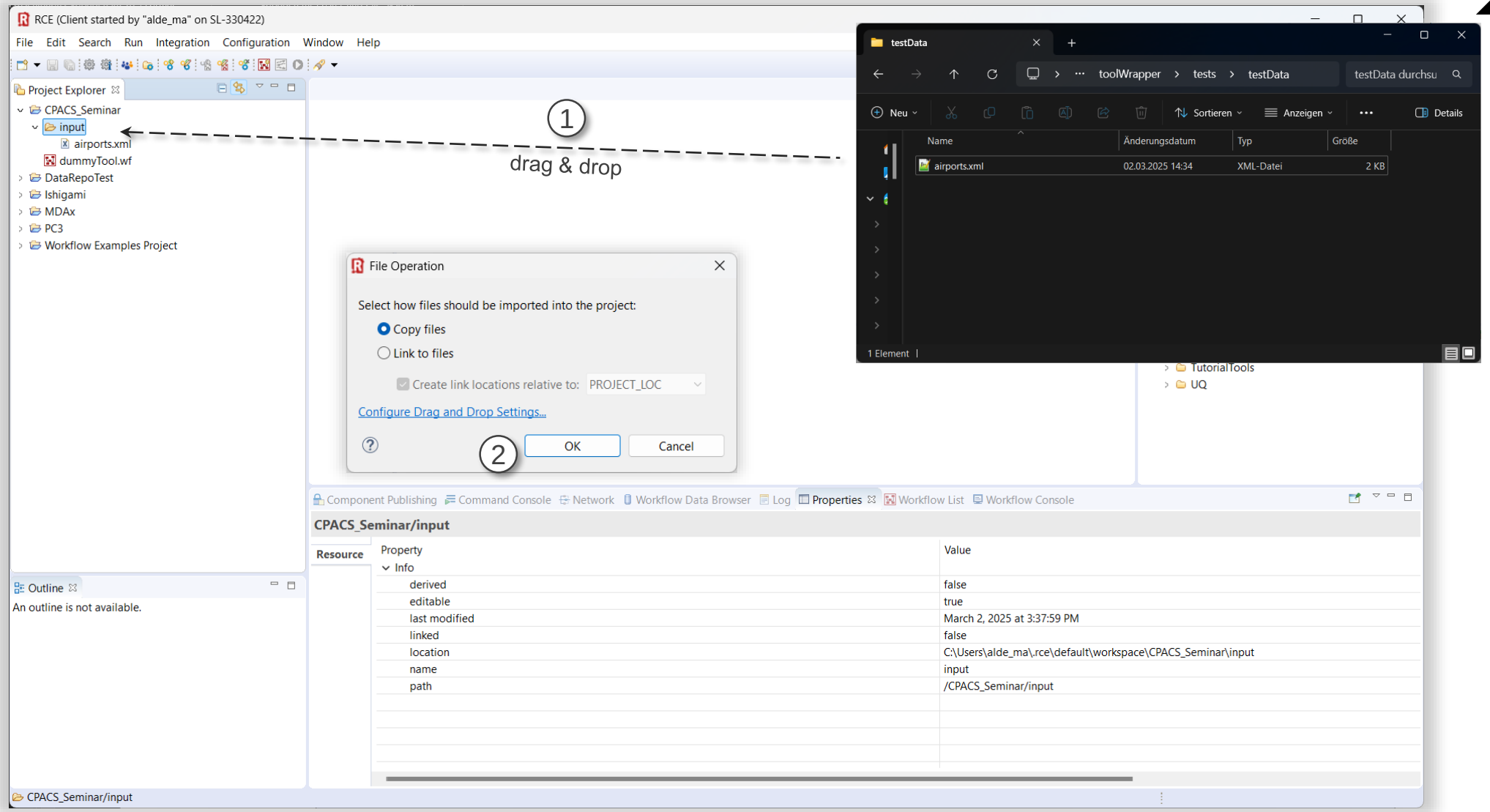
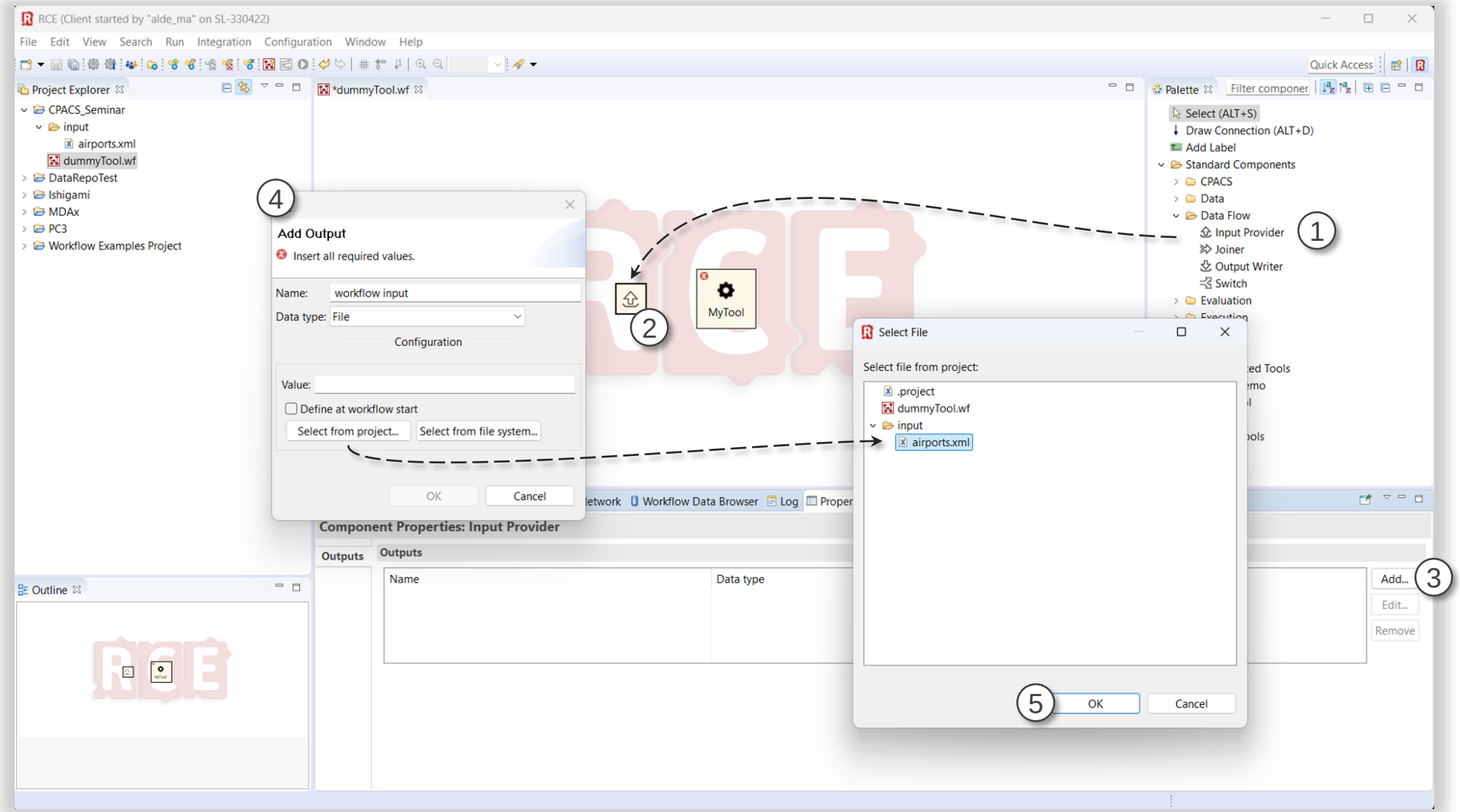
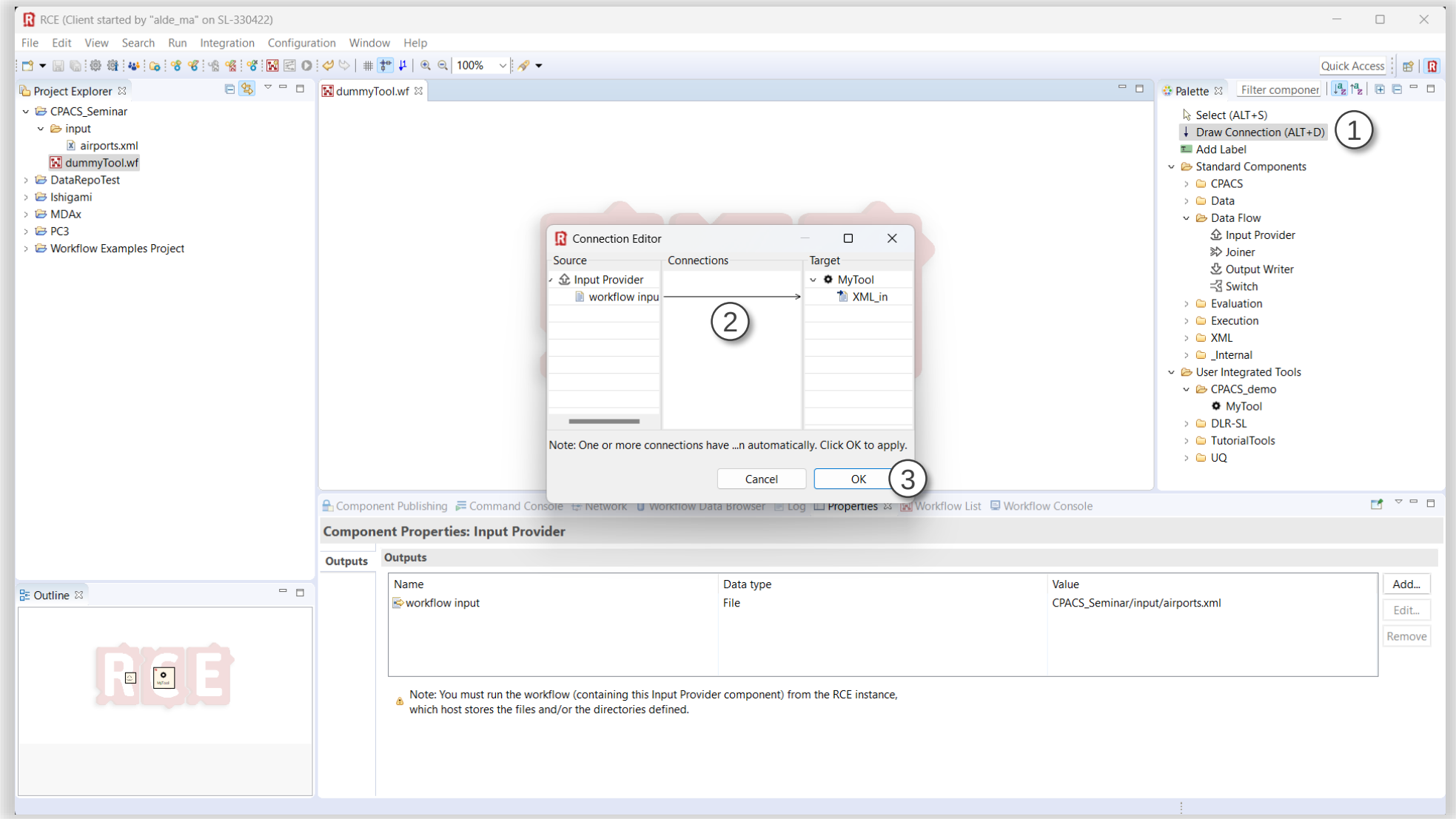
Component Publishing
Command Console
Network
Workflow Data Browser
Log
Properties
Workflow List
Workflow Console
Workflow Properties: dummyTool
Connections
Source
MyTool
XML_out
Connections
Target
MyTool
XML_in
Keep components that ...
match exactly
start with
contain
Filter


RCE (Client started by "alde_ma" on SL-330422)
File Edit View Search Run Integration Configuration Window Help
Quick Access
Project Explorer
CPACS_Seminar
DataRep
Ishigami
MDAx
PC3
Workflo
1
New
Go Into
Copy Full Path
Copy Ctrl+C
Paste Ctrl+V
Delete Delete
Move...
Rename... F2
New Workflow... Ctrl+Shift+N
Import...
Export...
Refresh F5
Close Project
Close Unrelated Projects
Execute Workflow... Ctrl+Shift+X
Configure
Source
Properties Alt+Enter
Project...
File
Folder
Workflow Examples Project...
Workflow...
Other... Ctrl+N
dummyTool.wf
MyTool
New Folder
Folder
'input' already exists.
Enter or select the parent folder:
CPACS_Seminar
DataRepoTest
Ishigami
MDAx
PC3
Workflow Examples Project
Folder name: input
Advanced >>
Finish
Cancel
Palette
Filter componer
Select (ALT+S)
Draw Connection (ALT+D)
Add Label
Standard Components
CPACS
Data
Data Flow
Evaluation
Execution
XML
_Internal
User Integrated Tools
CPACS_demo
MyTool
DLR-SL
TutorialTools
UQ
Log
Properties
Workflow List
Workflow Console
CPACS_Seminar
Resource
Property
Value
Info
false
true
March 2, 2025 at 2:46:36 PM
false
C:\Users\alde_ma\.rce\default\workspace\CPACS_Seminar
CPACS_Seminar
/CPACS_Seminar
Outline
CPACS_Seminar


RCE (Client started by "alde_ma" on SL-330422)
File Edit Search Run Integration Configuration Window Help
Project Explorer
CPACS_Seminar
input
airports.xml
dummyTool.wf
DataRepoTest
Ishigami
MDAx
PC3
Workflow Examples Project
1
drag & drop
testData
toolWrapper › tests › testData
testData durchsu
Neu
Sortieren
Anzeigen
Details
Name
Änderungsdatum
Typ
Größe
airports.xml
02.03.2025 14:34
XML-Datei
2 KB
1 Element
File Operation
Select how files should be imported into the project:
Copy files
Link to files
Create link locations relative to:
PROJECT_LOC
Configure Drag and Drop Settings...
2
OK
Cancel
TutorialTools
UQ
Component Publishing
Command Console
Network
Workflow Data Browser
Log
Properties
Workflow List
Workflow Console
CPACS_Seminar/input
Resource
Property
Value
Info
derived
false
editable
true
last modified
March 2, 2025 at 3:37:59 PM
linked
false
location
C:\Users\alde_ma\.rce\default\workspace\CPACS_Seminar\input
name
input
path
/CPACS_Seminar/input
Outline
An outline is not available.
CPACS_Seminar/input


RCE (Client started by "alde_ma" on SL-330422)
File Edit View Search Run Integration Configuration Window Help
Quick Access
Project Explorer
CPACS_Seminar
input
airports.xml
dummyTool.wf
DataRepoTest
Ishigami
MDAx
PC3
Workflow Examples Project
*dummyTool.wf
Palette
Filter componer
Select (ALT+S)
Draw Connection (ALT+D)
Add Label
Standard Components
CPACS
Data
Data Flow
Input Provider
Joiner
Output Writer
Switch
Evaluation
1
2
MyTool
4
Add Output
Insert all required values.
Name: workflow input
Data type: File
Configuration
Value:
Define at workflow start
Select from project...
Select from file system...
OK
Cancel
Select File
Select file from project:
.project
dummyTool.wf
input
airports.xml
5
OK
Cancel
Workflow Data Browser
Log
Component Properties: Input Provider
Outputs
Outputs
Name
Data type
Add...
Edit...
Remove
3
Outline


RCE (Client started by "alde_ma" on SL-330422)
File Edit View Search Run Integration Configuration Window Help
Project Explorer
CPACS_Seminar
input
airports.xml
dummyTool.wf
DataRepoTest
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MDAx
PC3
Workflow Examples Project
dummyTool.wf
Connection Editor
Source
Connections
Target
Input Provider
workflow inpu
MyTool
XML_in
2
Note: One or more connections have ...n automatically. Click OK to apply.
Cancel
OK
3
Palette
Select (ALT+S)
Draw Connection (ALT+D)
1
Add Label
Standard Components
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Joiner
Output Writer
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UQ
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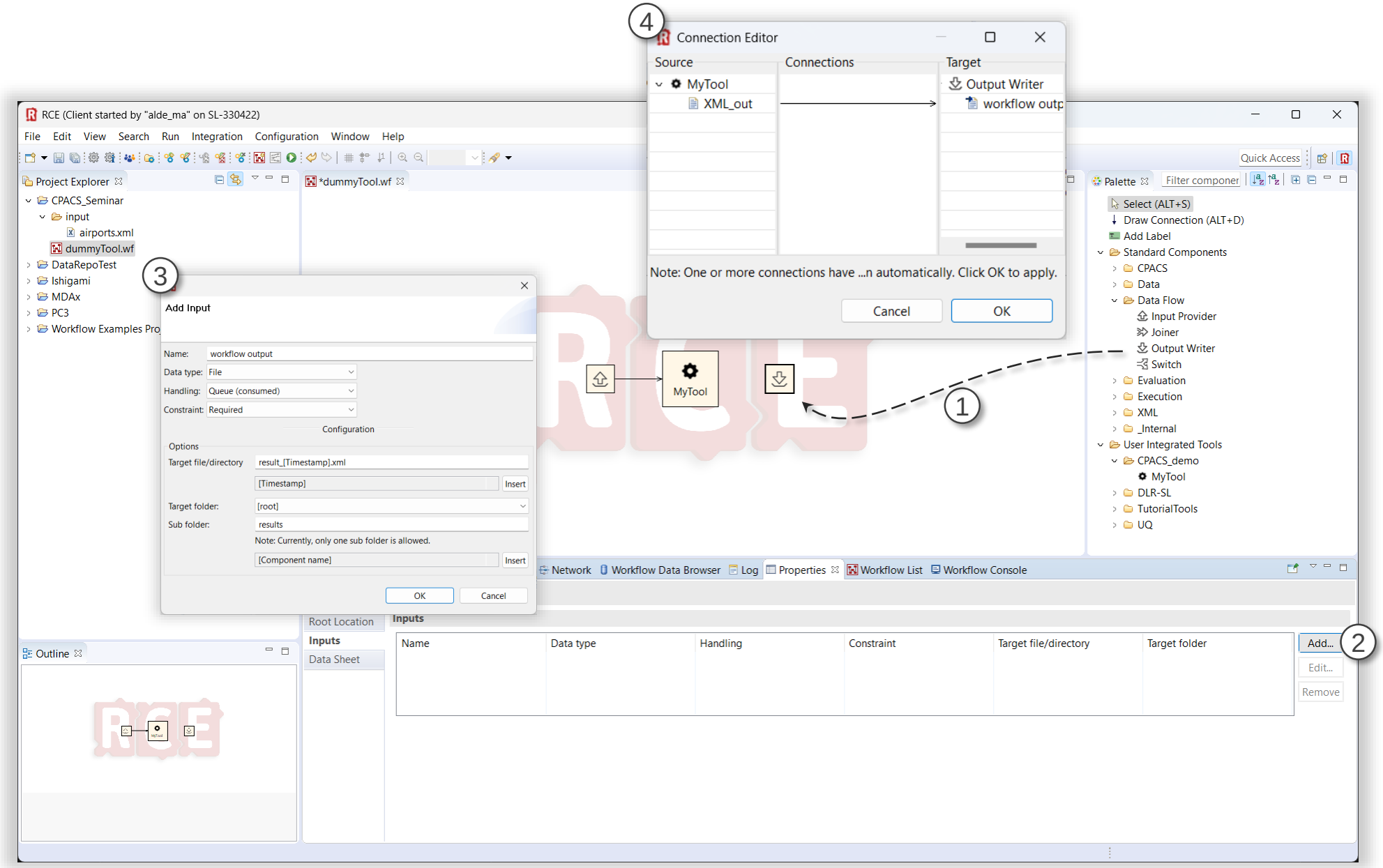
Workflow List
Workflow Console
Component Properties: Input Provider
Outputs
Outputs
Name
Data type
Value
workflow input
File
CPACS_Seminar/input/airports.xml
Add...
Edit...
Remove
Note: You must run the workflow (containing this Input Provider component) from the RCE instance,
which host stores the files and/or the directories defined.
Outline


4
Connection Editor
Source
Connections
Target
MyTool
XML_out
Output Writer
workflow outp
Note: One or more connections have ...n automatically. Click OK to apply.
Cancel
OK
RCE (Client started by "alde_ma" on SL-330422)
File Edit View Search Run Integration Configuration Window Help
Project Explorer
CPACS_Seminar
input
airports.xml
dummyTool.wf
DataRepoTest
Ishigami
MDAx
PC3
Workflow Examples Pro
*dummyTool.wf
3
Add Input
Name: workflow output
Data type: File
Handling: Queue (consumed)
Constraint: Required
Configuration
Options
Target file/directory result_[Timestamp].xml
[Timestamp] Insert
Target folder: [root]
Sub folder: results
Note: Currently, only one sub folder is allowed.
[Component name] Insert
OK Cancel
MyTool
1
Quick Access
Palette
Filter componer
Select (ALT+S)
Draw Connection (ALT+D)
Add Label
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Joiner
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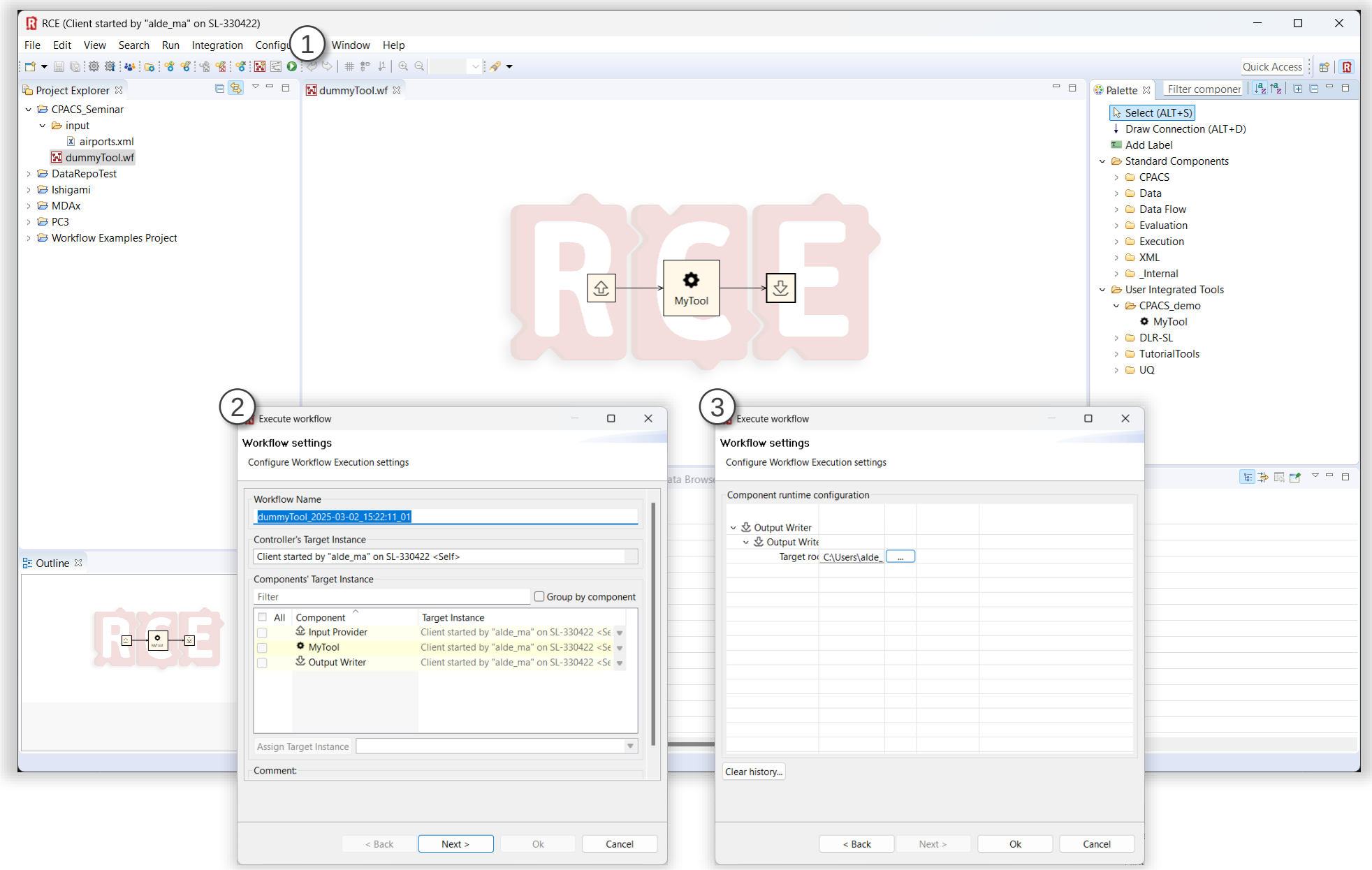
Workflow Console
Root Location
Inputs
Data Sheet
Inputs
Name
Data type
Handling
Constraint
Target file/directory
Target folder
Add...
Edit...
Remove
2


RCE (Client started by "alde_ma" on SL-330422)
File Edit View Search Run Integration Configu Window Help
1
Project Explorer
CPACS_Seminar
input
airports.xml
dummyTool.wf
DataRepoTest
Ishigami
MDAx
PC3
Workflow Examples Project
dummyTool.wf
MyTool
Palette
Filter componer
Select (ALT+S)
Draw Connection (ALT+D)
Add Label
Standard Components
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Execution
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_Internal
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CPACS_demo
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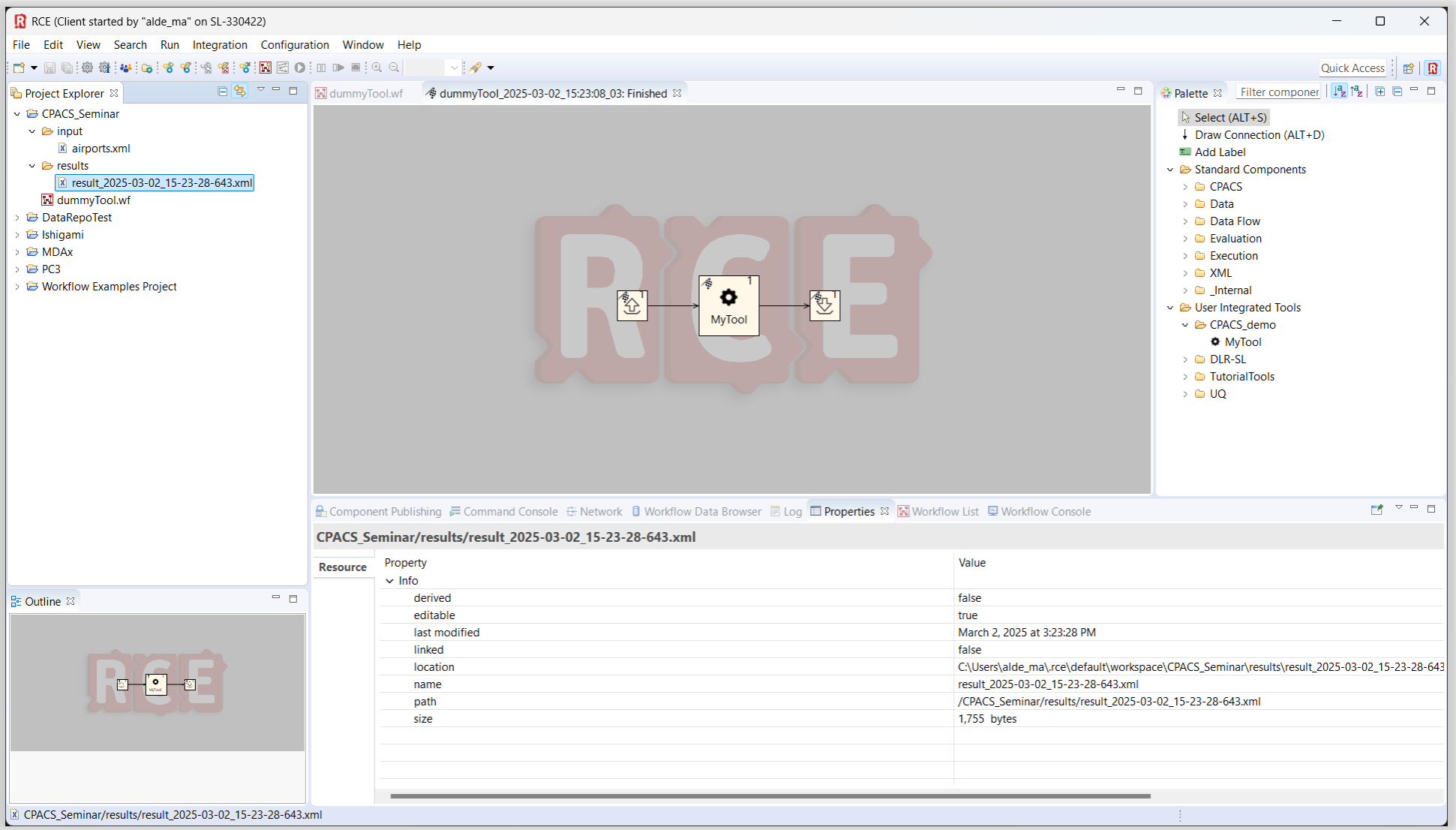
DLR-SL
TutorialTools
UQ
Outline
2
Execute workflow
Workflow settings
Configure Workflow Execution settings
Workflow Name
dummyTool_2025-03-02_15:22:11_01
Controller's Target Instance
Client started by "alde_ma" on SL-330422 <Self>
Components' Target Instance
Filter
Group by component
All
Component
Target Instance
Input Provider
MyTool
Output Writer
Client started by "alde_ma" on SL-330422 <Se
Assign Target Instance
Comment:
< Back
Next >
Ok
Cancel
3
Execute workflow
Workflow settings
Configure Workflow Execution settings
Component runtime configuration
Output Writer
Output Write
Target ro
C:\Users\alde_
...
Clear history...
< Back
Next >
Ok
Cancel


RCE (Client started by "alde_ma" on SL-330422)
File Edit View Search Run Integration Configuration Window Help
Quick Access
Project Explorer
CPACS_Seminar
input
airports.xml
results
result_2025-03-02_15-23-28-643.xml
dummyTool.wf
DataRepoTest
Ishigami
MDAx
PC3
Workflow Examples Project
dummyTool.wf
dummyTool_2025-03-02_15:23:08_03: Finished
MyTool
Palette
Filter componer
Select (ALT+S)
Draw Connection (ALT+D)
Add Label
Standard Components
CPACS
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CPACS_demo
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TutorialTools
UQ
Component Publishing
Command Console
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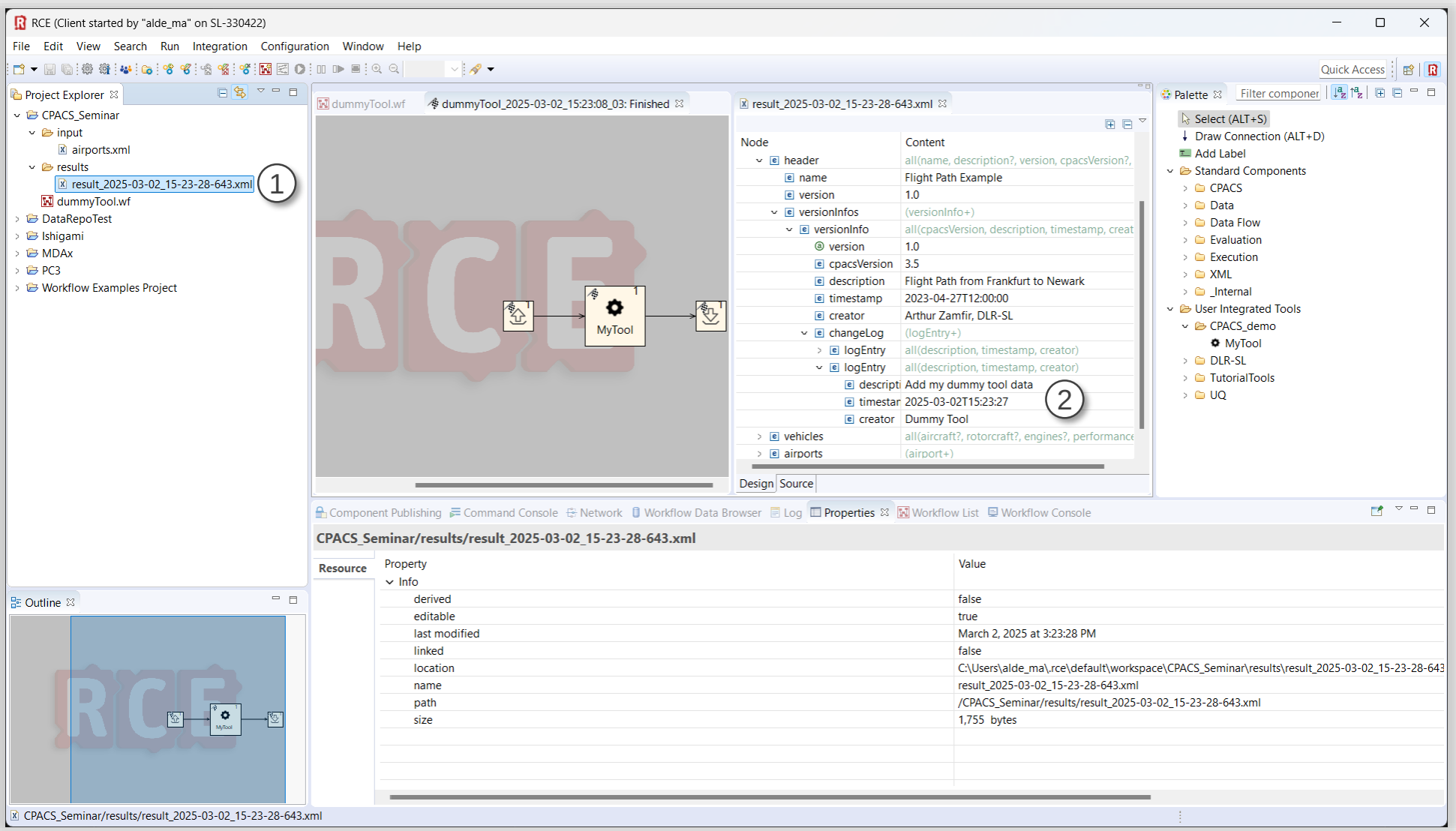
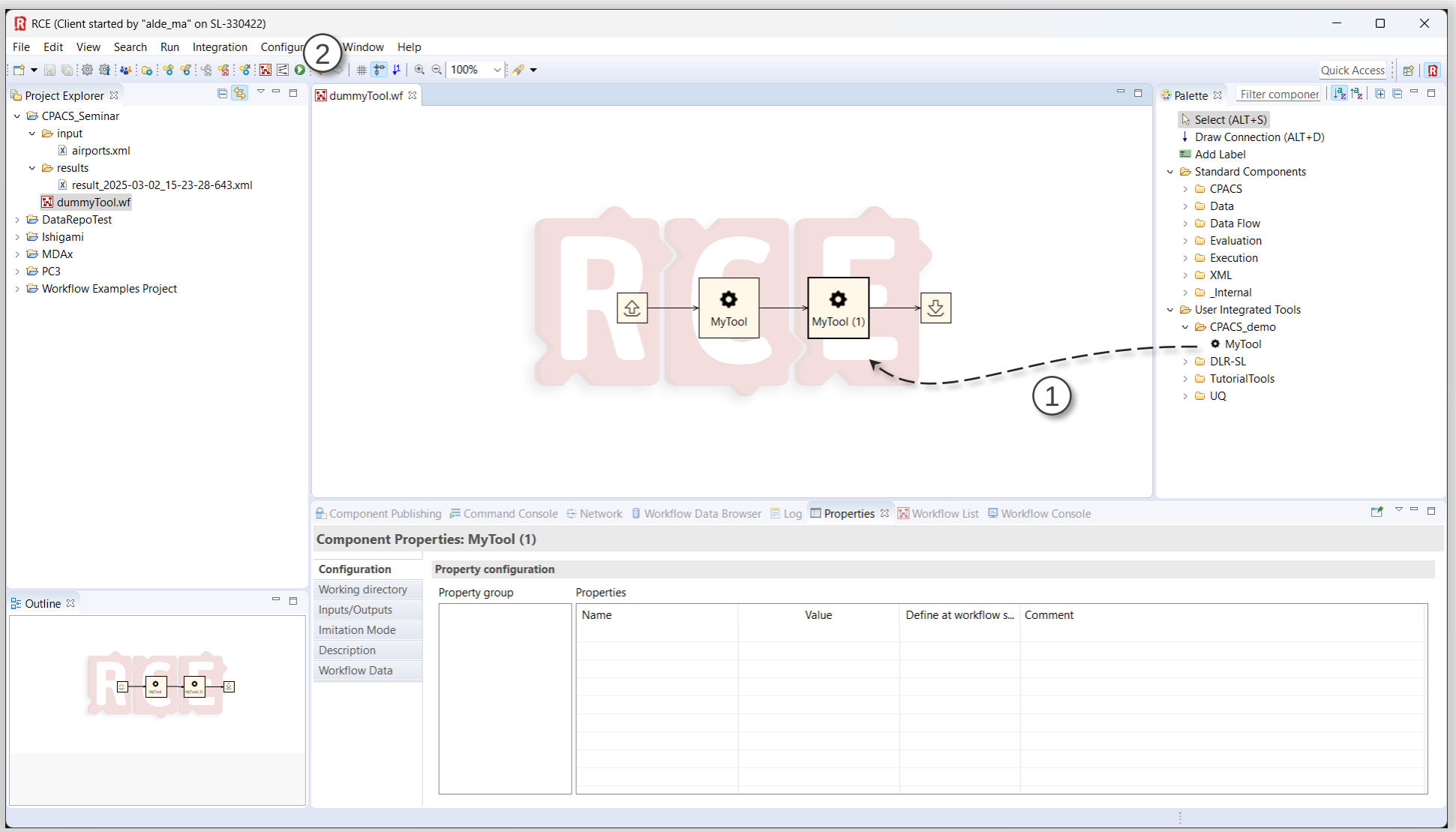
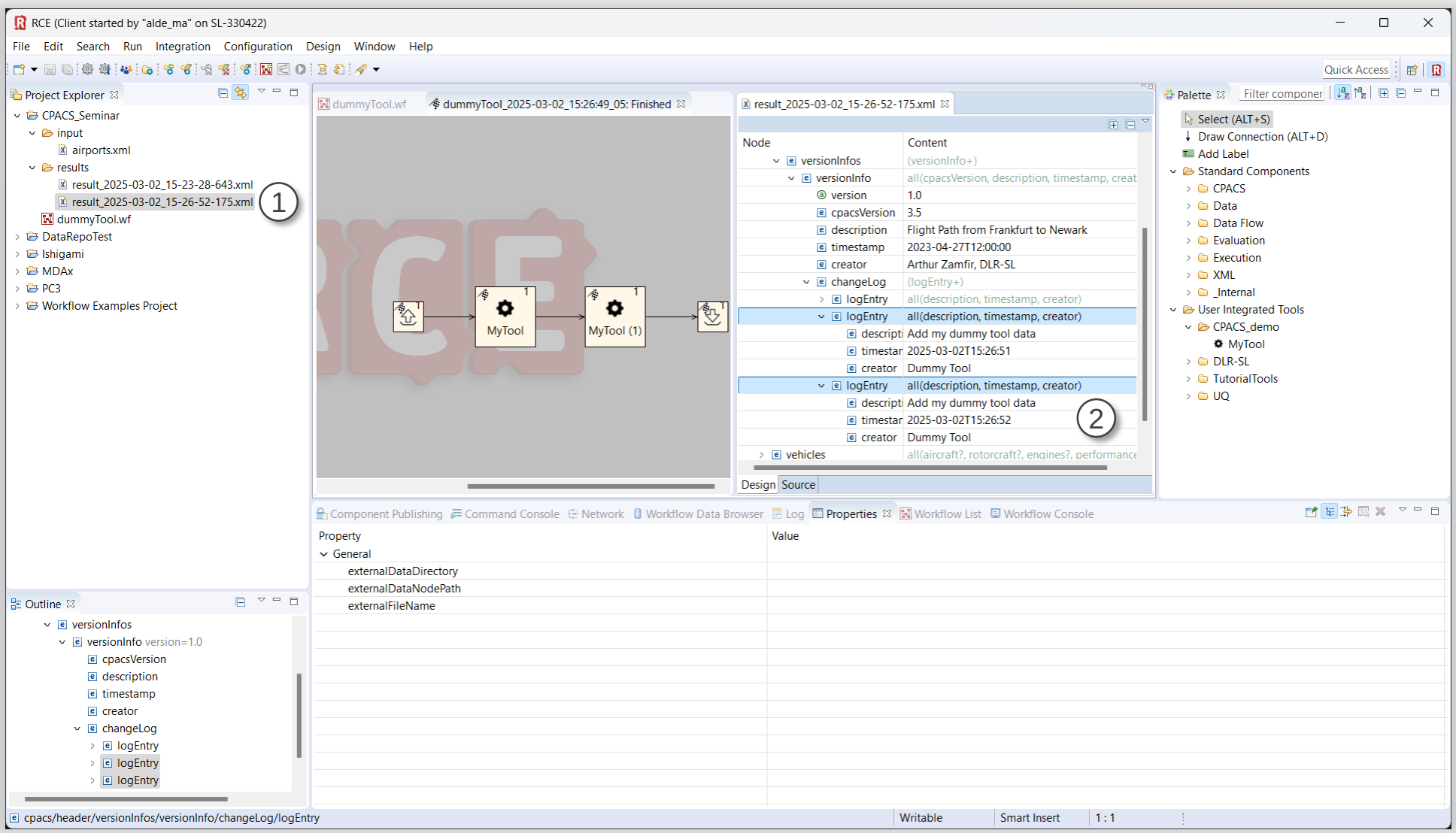
Workflow Data Browser
Log
Properties
Workflow List
Workflow Console
CPACS_Seminar/results/result_2025-03-02_15-23-28-643.xml
Resource
Property
Value
Info
derived
false
editable
true
last modified
March 2, 2025 at 3:23:28 PM
linked
false
location
C:\Users\alde_ma\.rce\default\workspace\CPACS_Seminar\results\result_2025-03-02_15-23-28-643
name
result_2025-03-02_15-23-28-643.xml
path
/CPACS_Seminar/results/result_2025-03-02_15-23-28-643.xml
size
1,755 bytes
Outline
CPACS_Seminar/results/result_2025-03-02_15-23-28-643.xml


RCE (Client started by "alde_ma" on SL-330422)
File Edit View Search Run Integration Configuration Window Help
Quick Access
Project Explorer
CPACS_Seminar
input
airports.xml
results
result_2025-03-02_15-23-28-643.xml
1
dummyTool.wf
DataRepoTest
Ishigami
MDAx
PC3
Workflow Examples Project
dummyTool.wf
dummyTool_2025-03-02_15:23:08_03: Finished
MyTool
result_2025-03-02_15-23-28-643.xml
Node
Content
header
all(name, description?, version, cpacsVersion?,
name
Flight Path Example
version
1.0
versionInfos
(versionInfo+)
versionInfo
all(cpacsVersion, description, timestamp, creat
version
1.0
cpacsVersion
3.5
description
Flight Path from Frankfurt to Newark
timestamp
2023-04-27T12:00:00
creator
Arthur Zamfir, DLR-SL
changeLog
(logEntry+)
logEntry
all(description, timestamp, creator)
logEntry
all(description, timestamp, creator)
descripti
Add my dummy tool data
timestar
2025-03-02T15:23:27
creator
Dummy Tool
vehicles
all(aircraft?, rotorcraft?, engines?, performance
airports
(airport+)
2
Design
Source
Palette
Filter componer
Select (ALT+S)
Draw Connection (ALT+D)
Add Label
Standard Components
CPACS
Data
Data Flow
Evaluation
Execution
XML
_Internal
User Integrated Tools
CPACS_demo
MyTool
DLR-SL
TutorialTools
UQ
Outline
Component Publishing
Command Console
Network
Workflow Data Browser
Log
Properties
Workflow List
Workflow Console
CPACS_Seminar/results/result_2025-03-02_15-23-28-643.xml
Resource
Property
Value
Info
derived
false
editable
true
last modified
March 2, 2025 at 3:23:28 PM
linked
false
location
C:\Users\alde_ma\.rce\default\workspace\CPACS_Seminar\results\result_2025-03-02_15-23-28-643
name
result_2025-03-02_15-23-28-643.xml
path
/CPACS_Seminar/results/result_2025-03-02_15-23-28-643.xml
size
1,755 bytes
CPACS_Seminar/results/result_2025-03-02_15-23-28-643.xml


RCE (Client started by "alde_ma" on SL-330422)
File Edit View Search Run Integration Configur Window Help
2
Project Explorer
CPACS_Seminar
input
airports.xml
results
result_2025-03-02_15-23-28-643.xml
dummyTool.wf
DataRepoTest
Ishigami
MDAx
PC3
Workflow Examples Project
dummyTool.wf
MyTool
MyTool (1)
1
Palette
Filter componer
Select (ALT+S)
Draw Connection (ALT+D)
Add Label
Standard Components
CPACS
Data
Data Flow
Evaluation
Execution
XML
_Internal
User Integrated Tools
CPACS_demo
MyTool
DLR-SL
TutorialTools
UQ
Outline
Component Publishing
Command Console
Network
Workflow Data Browser
Log
Properties
Workflow List
Workflow Console
Component Properties: MyTool (1)
Configuration
Working directory
Inputs/Outputs
Imitation Mode
Description
Workflow Data
Property configuration
Property group
Properties
Name
Value
Define at workflow s...
Comment


RCE (Client started by "alde_ma" on SL-330422)
File Edit Search Run Integration Configuration Design Window Help
Project Explorer
CPACS_Seminar
input
airports.xml
results
result_2025-03-02_15-23-28-643.xml
result_2025-03-02_15-26-52-175.xml
dummyTool.wf
DataRepoTest
Ishigami
MDAx
PC3
Workflow Examples Project
1
dummyTool.wf
dummyTool_2025-03-02_15:26:49_05: Finished
MyTool
MyTool (1)
result_2025-03-02_15-26-52-175.xml
Node
Content
versionInfos
versionInfo
version
cpacsVersion
description
timestamp
creator
changeLog
logEntry
Design
Source
2
Palette
Select (ALT+S)
Draw Connection (ALT+D)
Add Label
Standard Components
CPACS
Data
Data Flow
Evaluation
Execution
XML
_Internal
User Integrated Tools
CPACS_demo
MyTool
DLR-SL
TutorialTools
UQ
Component Publishing
Command Console
Network
Workflow Data Browser
Log
Properties
Workflow List
Workflow Console
Property
Value
General
externalDataDirectory
externalDataNodePath
externalFileName
Outline
versionInfos
versionInfo version=1.0
cpacsVersion
description
timestamp
creator
changeLog
logEntry
cpacs/header/versionInfos/versionInfo/changeLog/logEntry
Writable
Smart Insert
1 : 1

Imprint

Topic: **RCE Tool Integration**
Dummy Tool wrapper

Date: 2025-03-02

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