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edinburgh data-intensive research

The Demand for Consistent Web-based Workflow Editors

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WORKS 2013

November 17, 2013, Denver, CO

Workflow Systems

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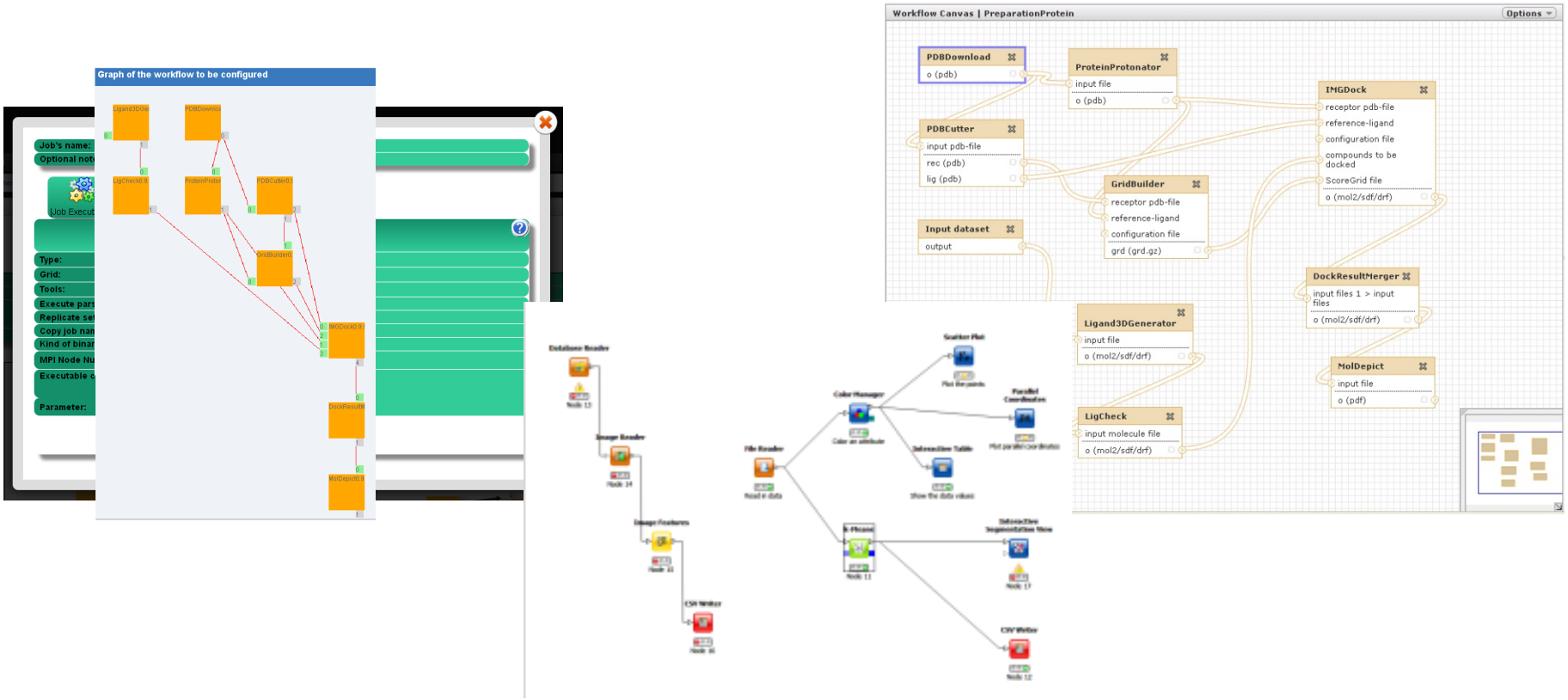
- Different workflow concepts
- Different workflow languages
- Different workflow constructs

Workflow Editors

- Different technologies (workbenches, web-based)
- Different look-and-feel



Heterogeneous Communities

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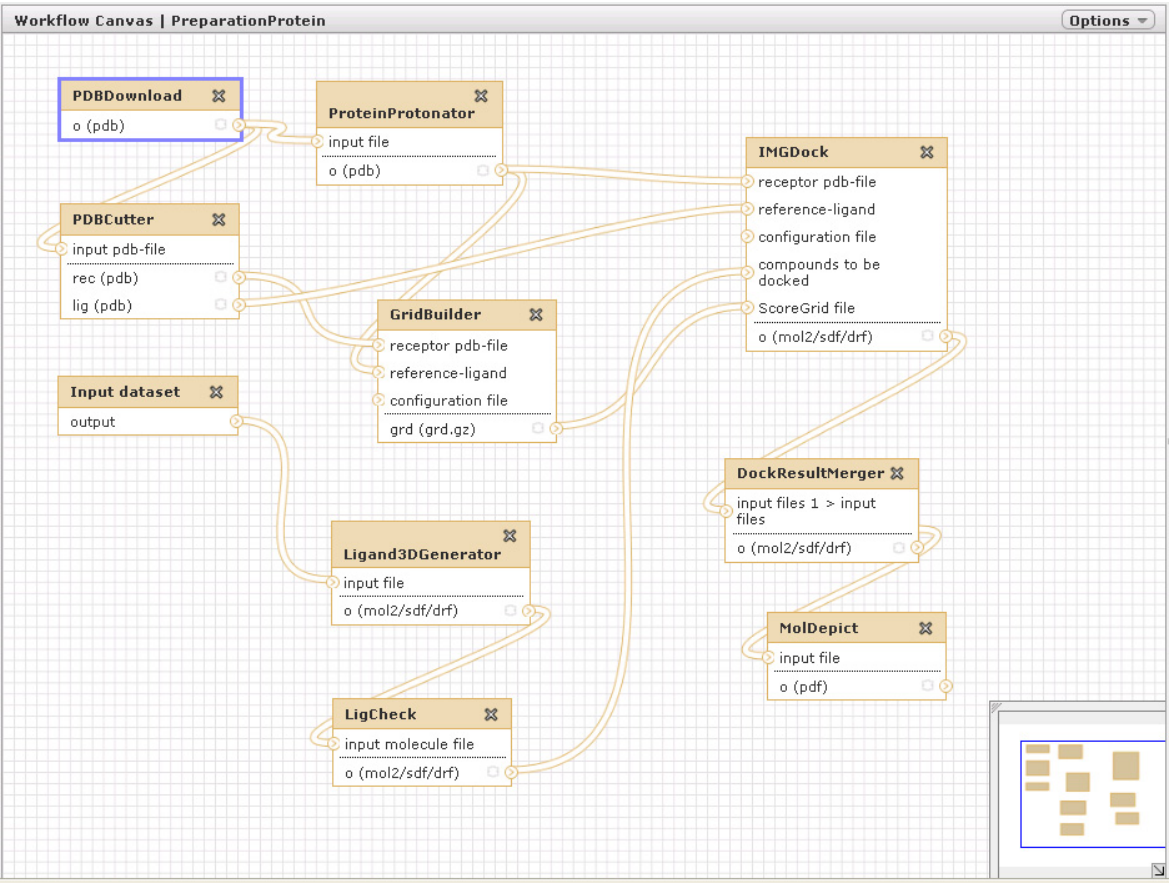
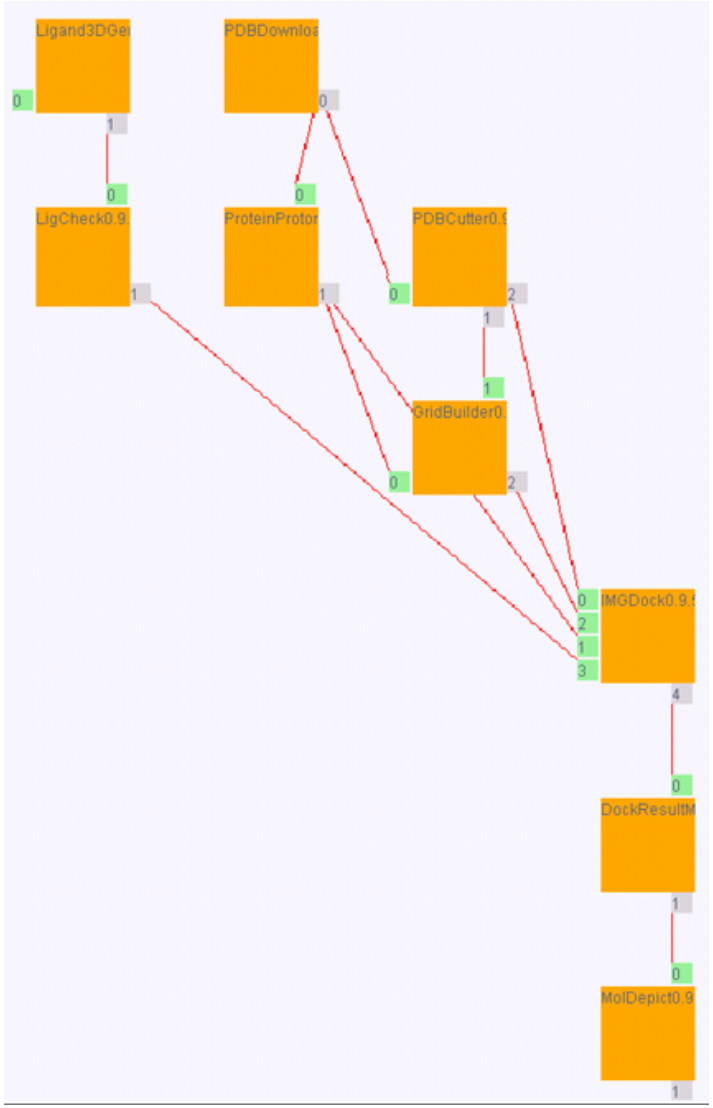
- Diverse research areas
- Diverse workflow engines and editors established

The logical flow of workflows are often the same inside a community

Heterogeneous Communities





Heterogeneous Communities

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⇒ Re-usability of workflows needed for communities

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⇒ Re-usability of workflows needed for communities

⇒ Workflow Interoperability

Workflow Engine-based Approach

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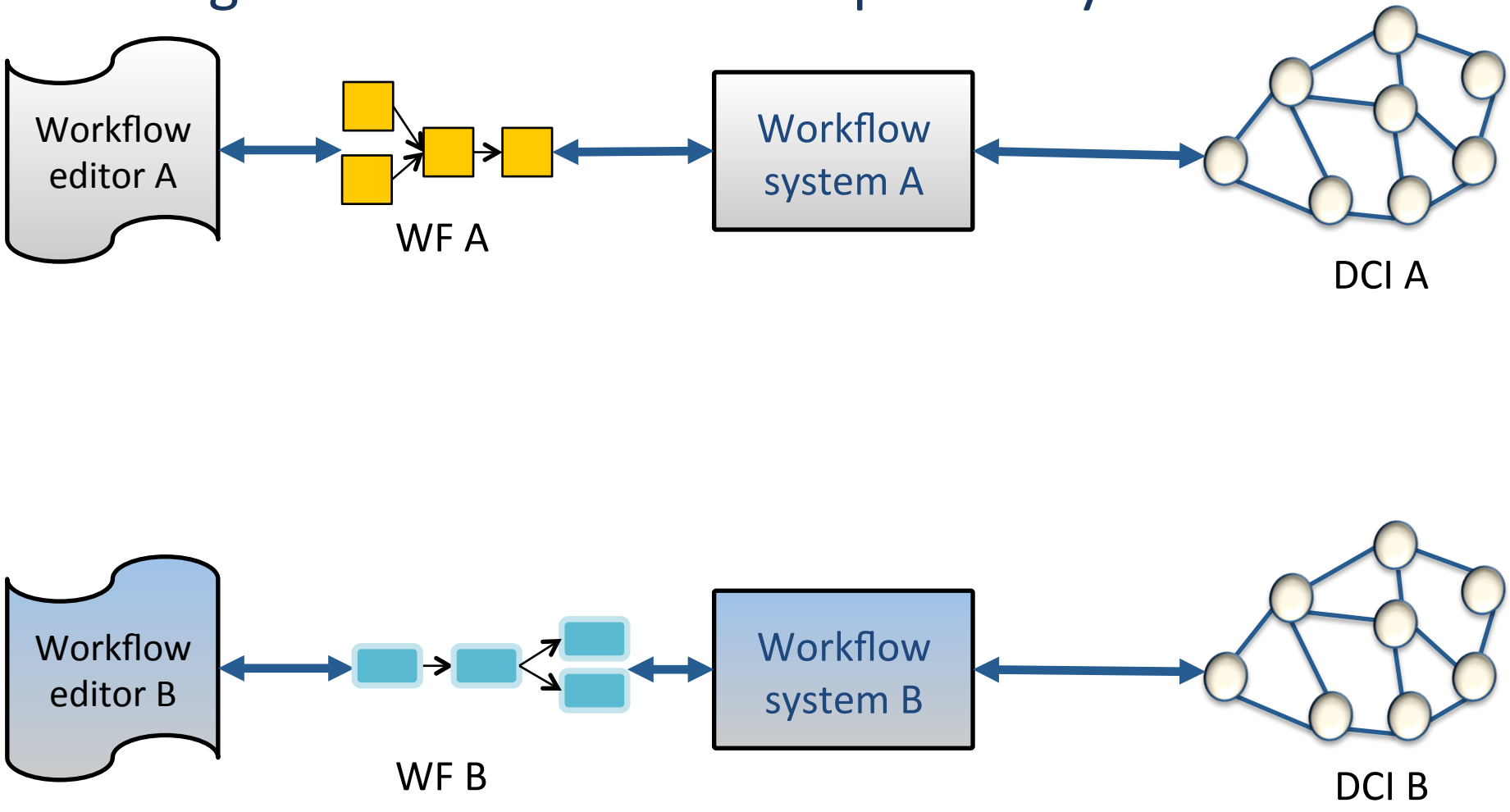
Coarse-grained workflow interoperability



Workflow Engine-based Approach

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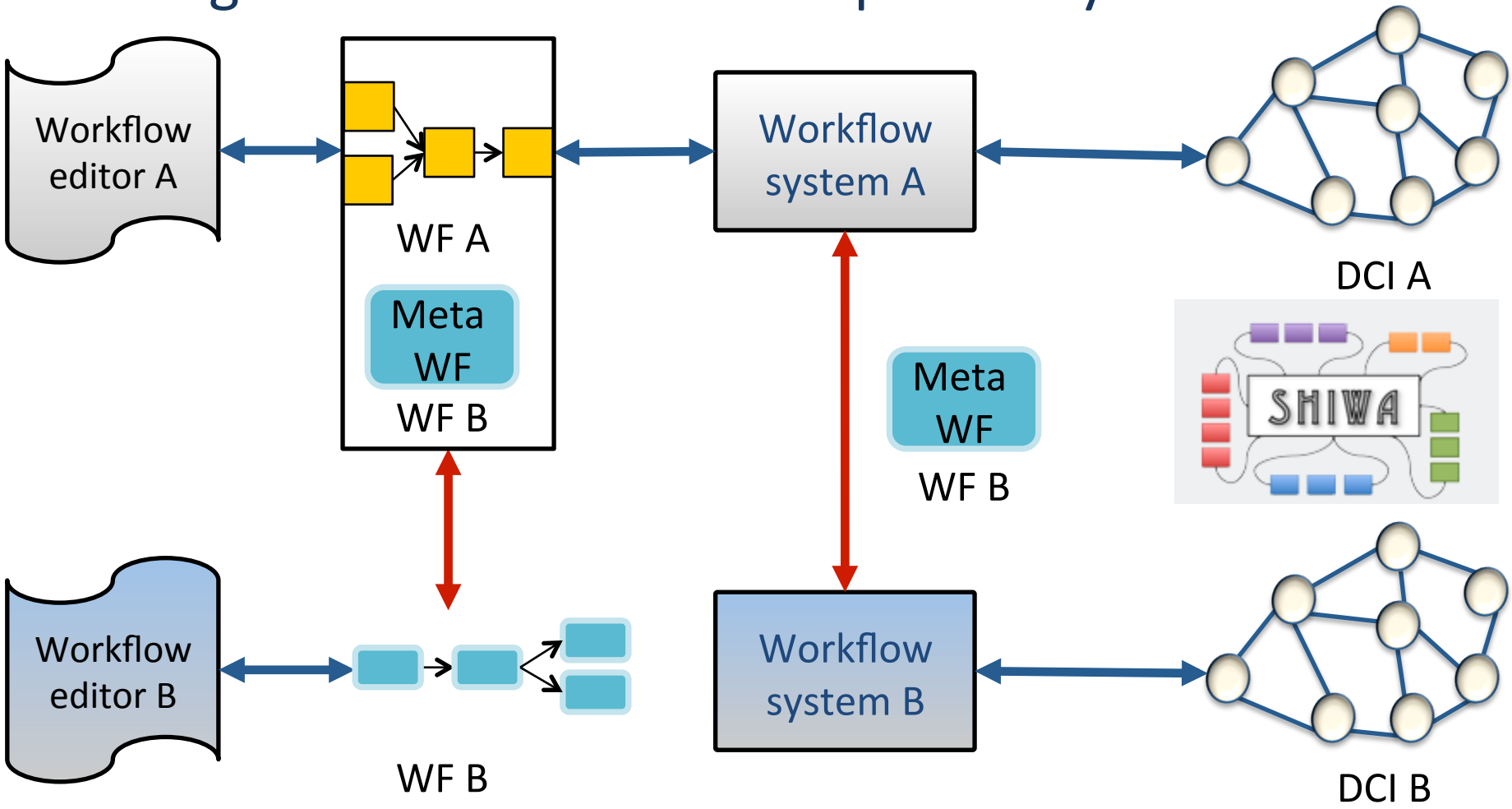
Coarse-grained workflow interoperability



Workflow Engine-based Approach

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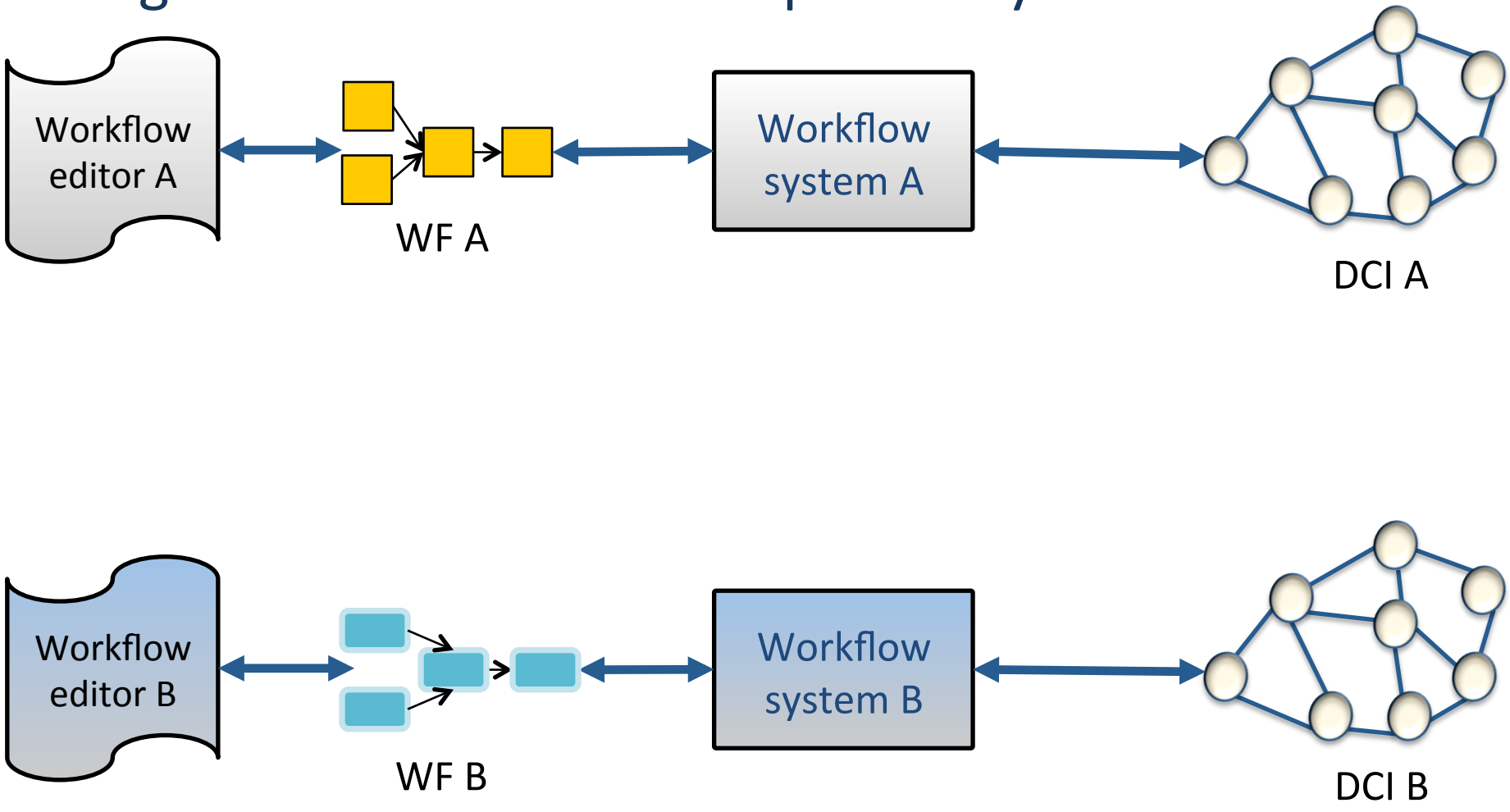
Fine-grained workflow interoperability



Workflow Engine-based Approach

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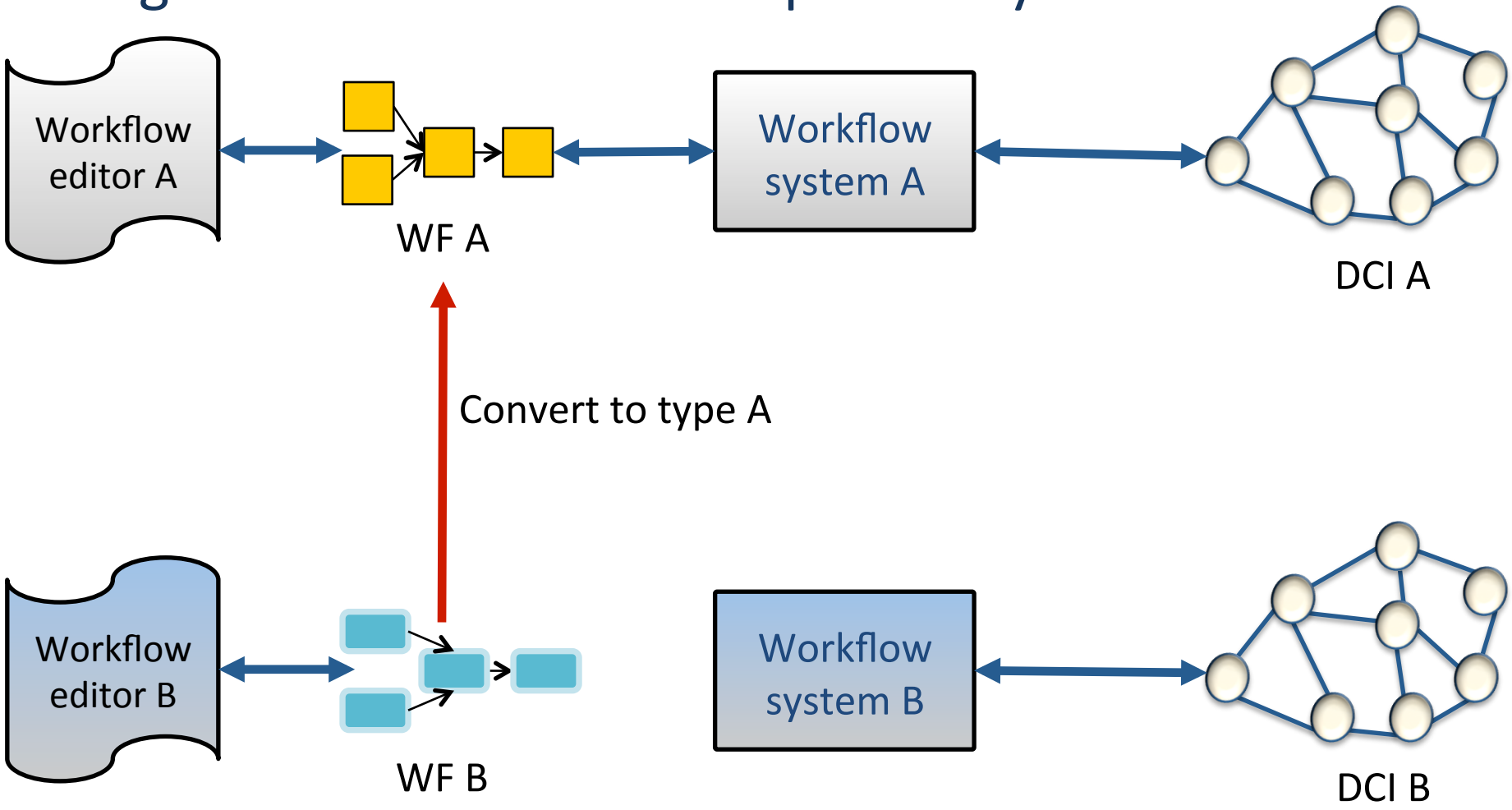
Fine-grained workflow interoperability



Workflow Engine-based Approach

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- SHIWA based on gUSE
  supporting ,e.g., Triana, Taverna, Kepler, MOTEUR
- Tavaxy based on Galaxy
  supporting Galaxy and Taverna
- MoSGrid based on gUSE
  supporting Galaxy to gUSE, UNICORE in gUSE

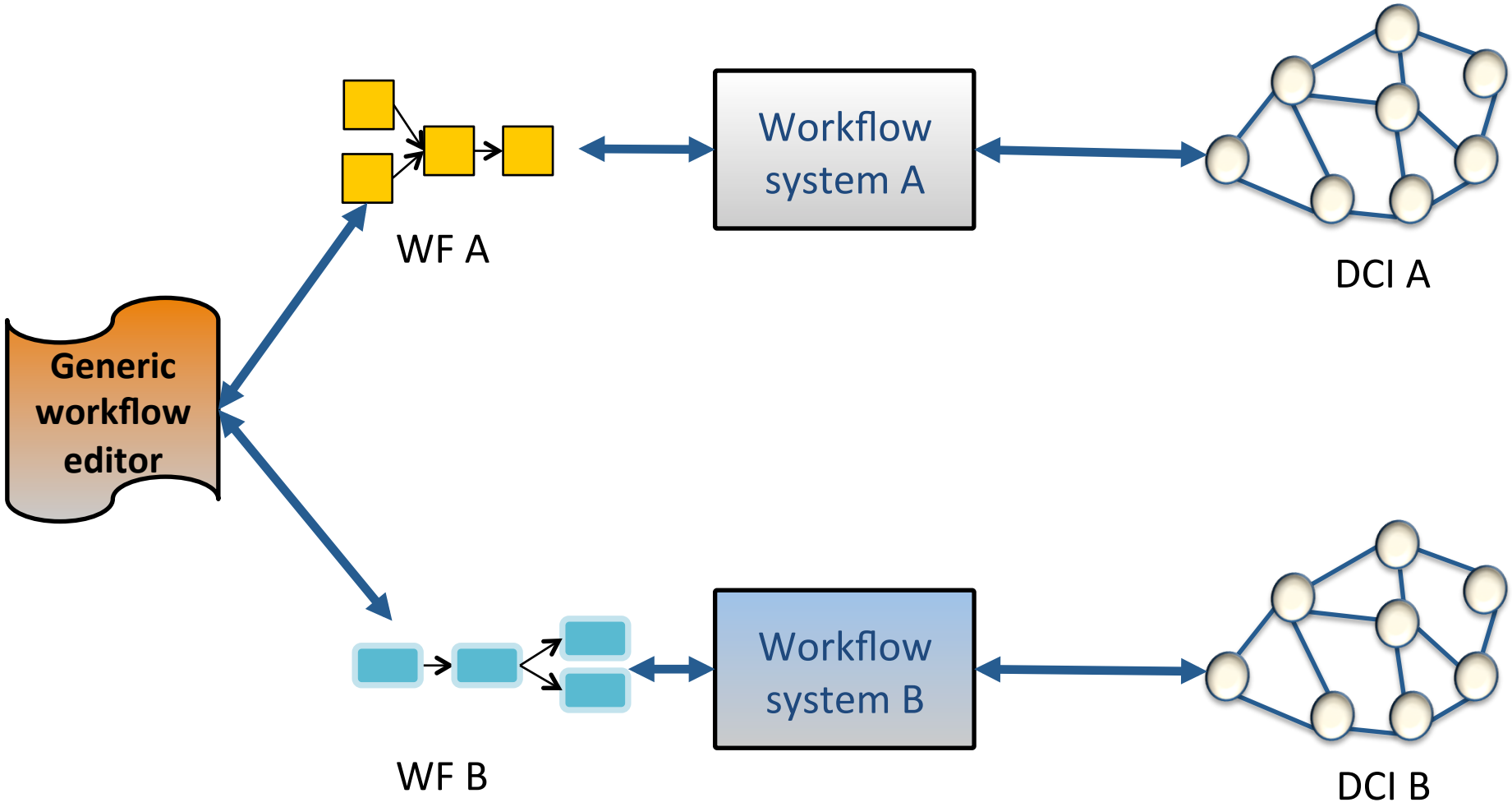
Excellent solutions but can be extended…

What happens if a workflow changes?

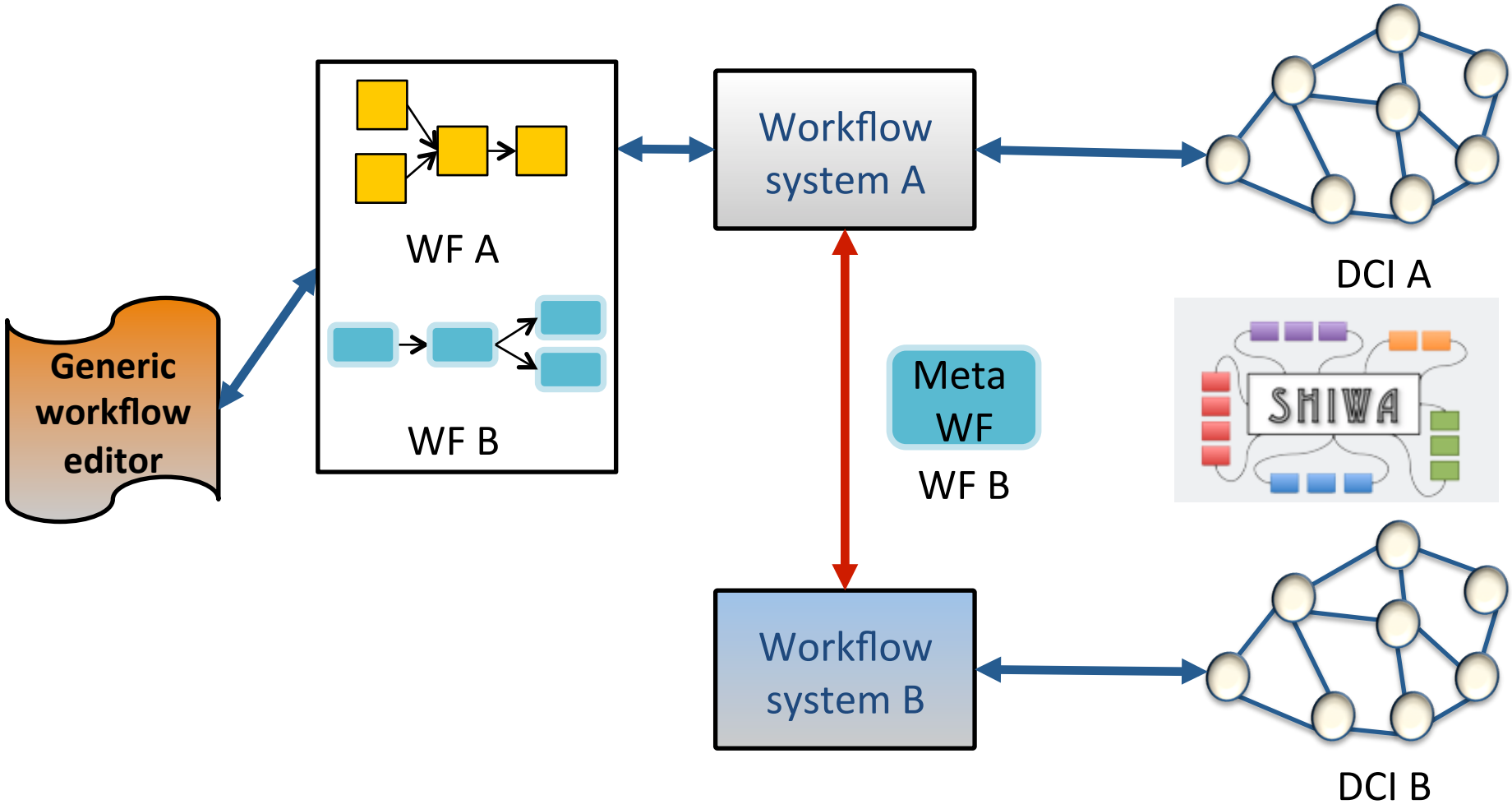
⇒ **Coarse-grained: users need access to the original workflow editor**

⇒ **Fine-grained: users needs to change the workflow in the original and in the targeted workflow editor**

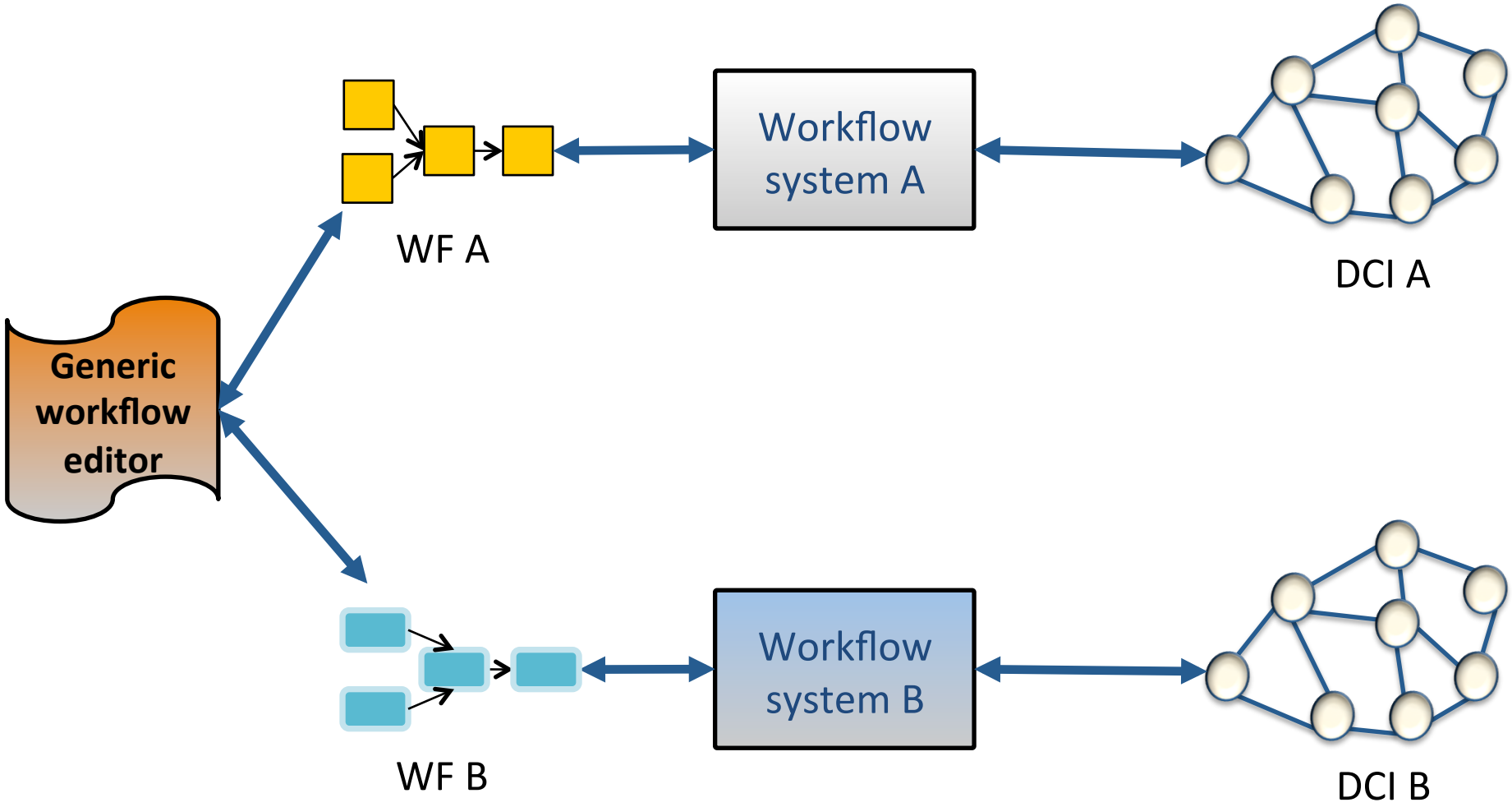
Workflow Editor-based Approach



Workflow Editor-based Approach



Workflow Editor-based Approach



Workflow Editor-based Approach

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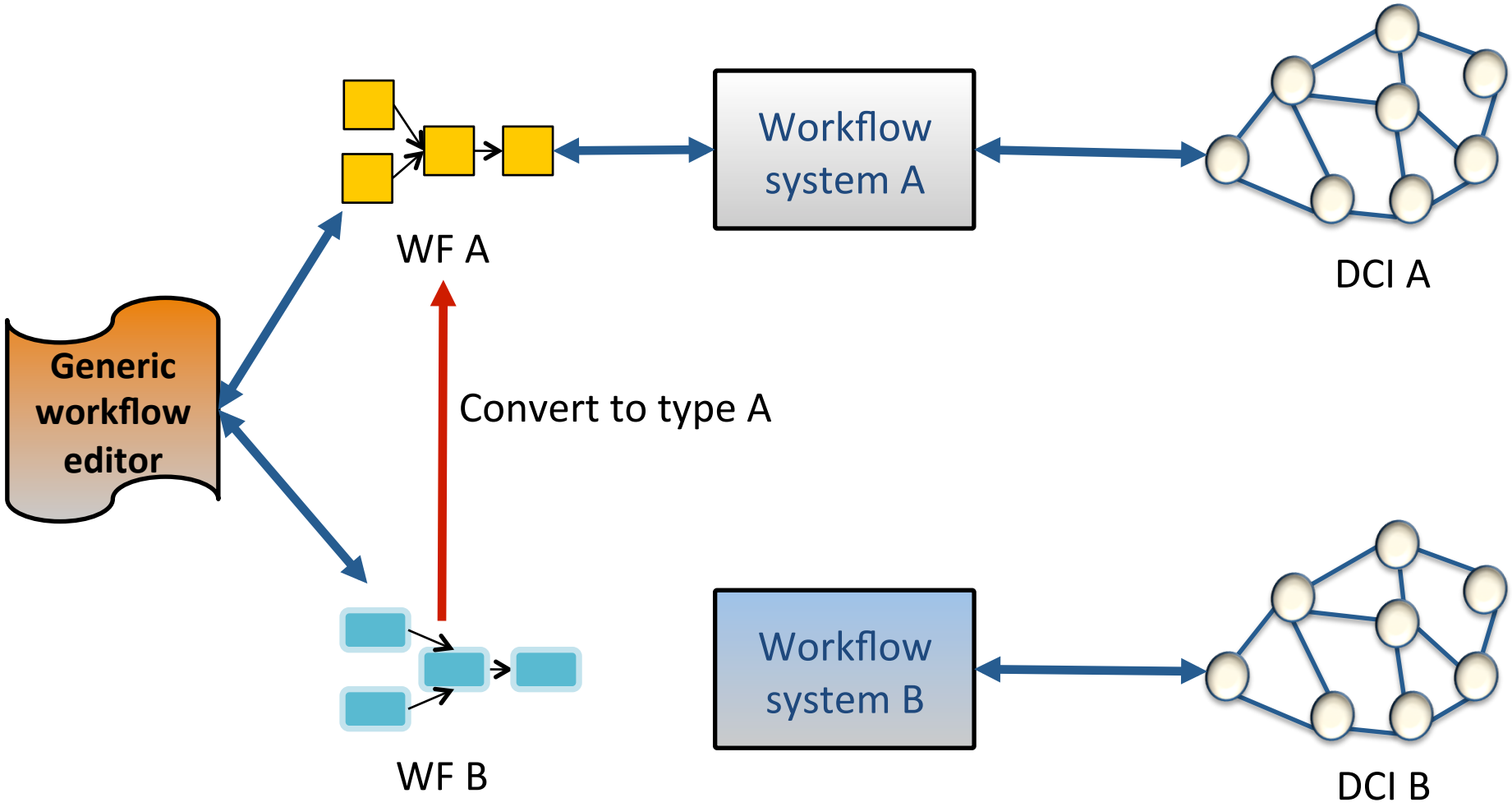

Workflow Editor-based Approach

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GeWWE (Generic Web-based Workflow Editor)
Goal

- One editor for diverse workflow languages
- Visual representation of workflows is the same as in the original workflow editor
- Easy integration of new workflow languages

⇒ **Same look-and-feel for editing diverse workflows**
⇒ **One editor for workflows that are composed of methods in different workflow languages**
⇒ **One platform for the whole life cycle of editing workflows**

Model-View-Controller Concept

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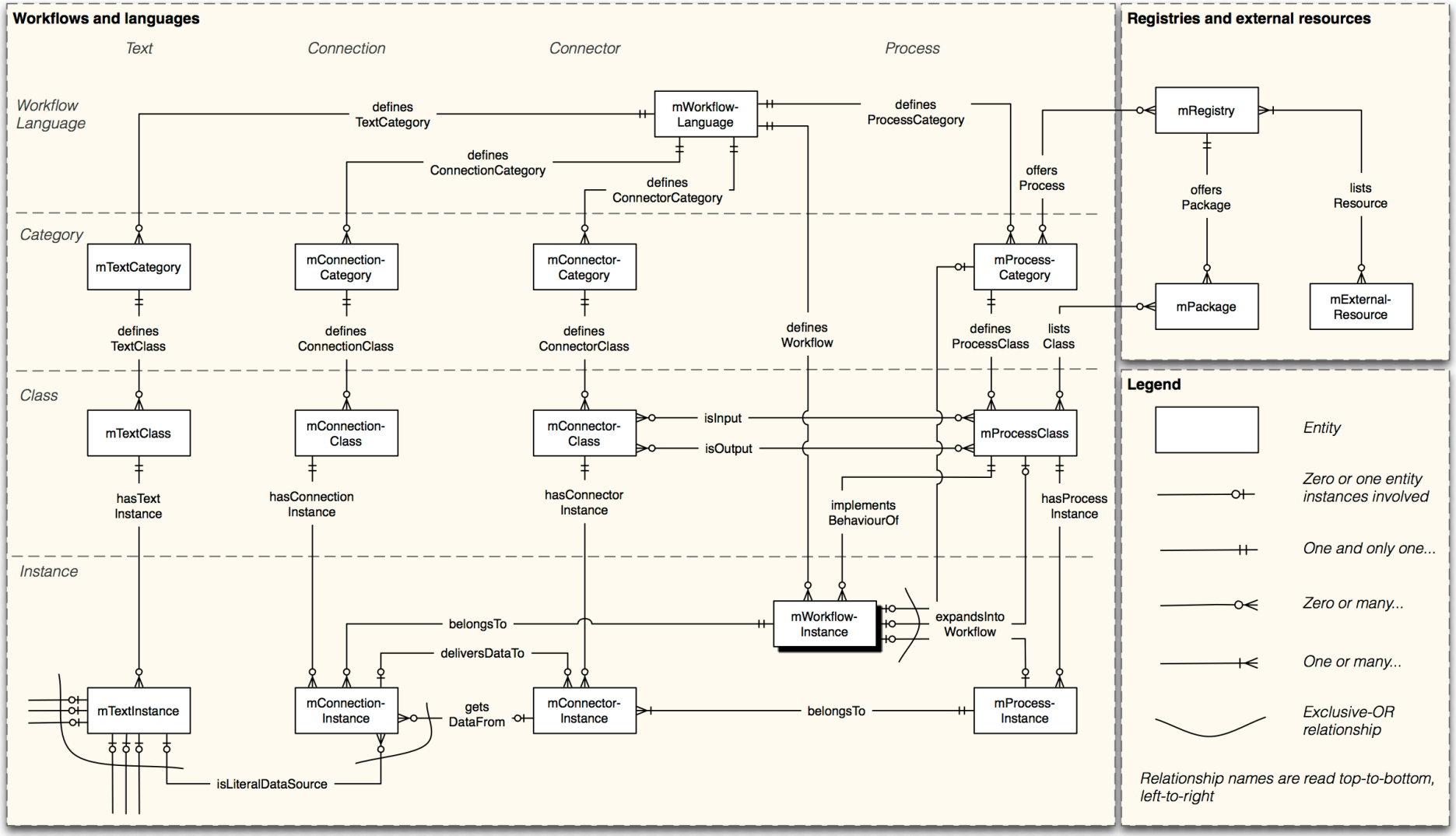
Model
Workflow language
Workflow
Process
Connection
Connector
Text
Registry

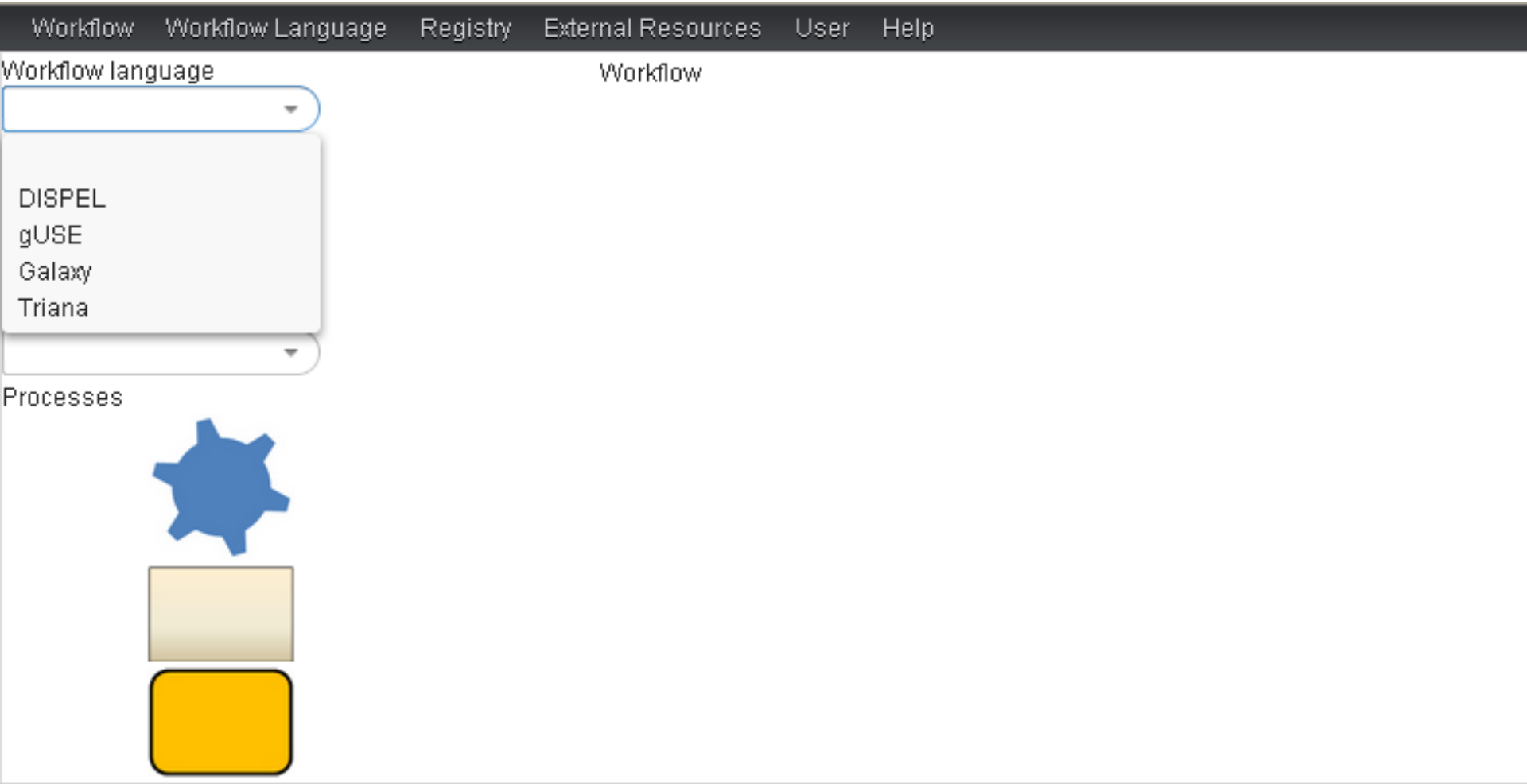
View
Workflow
Process
Connection
Connector
Text

Controller
Mapping between model and view

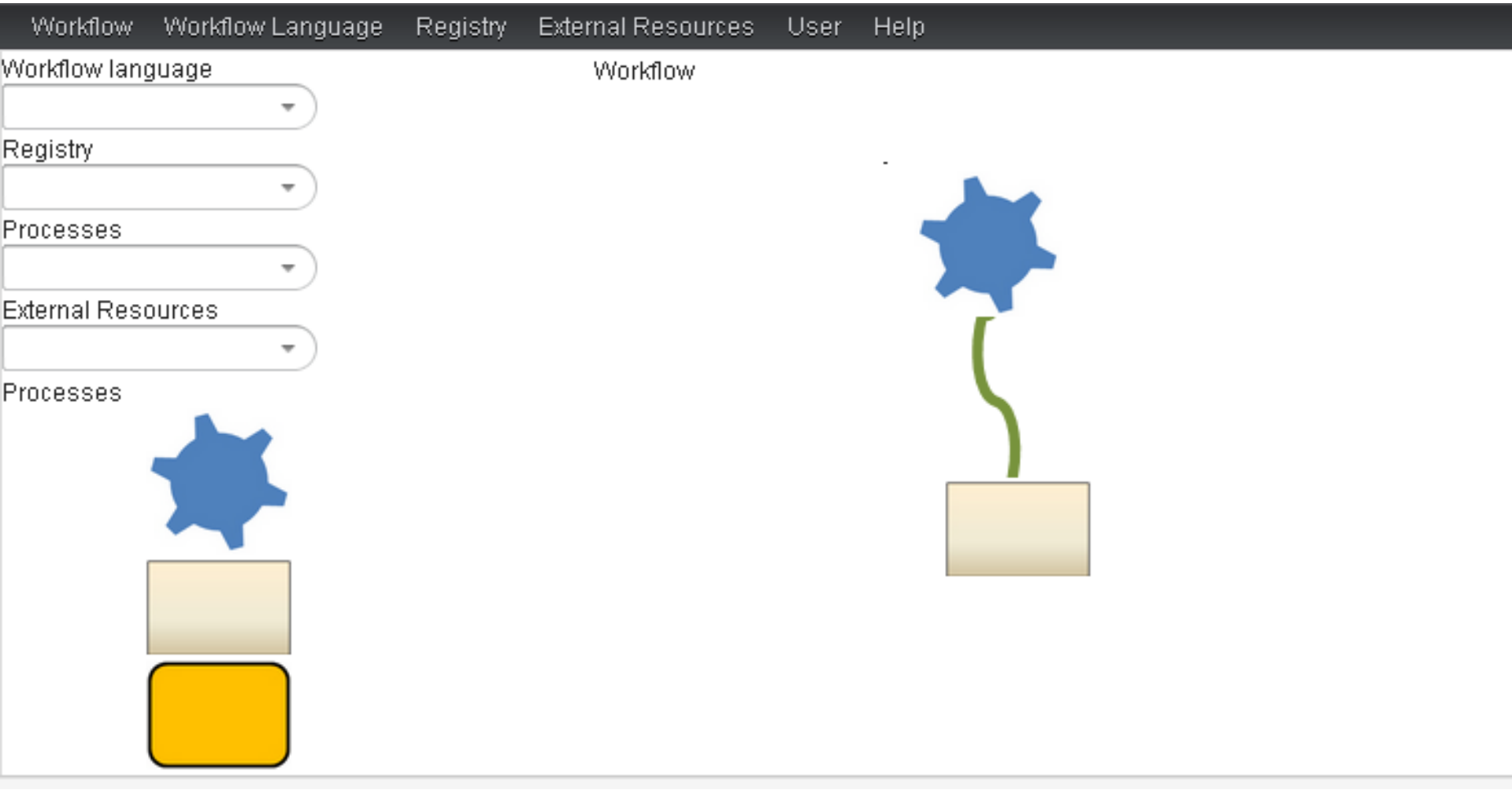
MVC - Model


Workflows and languages
Text
Connection
Connector
Process
Workflow Language
defines TextCategory
mWorkflow-Language
defines ProcessCategory
defines ConnectionCategory
defines ConnectorCategory
offers Process
Category
mTextCategory
mConnection-Category
mConnector-Category
mProcess-Category
defines TextClass
defines ConnectionClass
defines ConnectorClass
defines Workflow
defines ProcessClass
lists Class
Class
mTextClass
mConnection-Class
mConnector-Class
isInput
isOutput
mProcessClass
hasText Instance
hasConnection Instance
hasConnector Instance
implements BehaviourOf
hasProcess Instance
Instance
belongsTo
mWorkflow-Instance
expandsInto Workflow
deliversDataTo
mTextInstance
mConnection-Instance
gets DataFrom
mConnector-Instance
belongsTo
mProcess-Instance
isLiteralDataSource
Registries and external resources
mRegistry
offers Package
lists Resource
mPackage
mExternal-Resource
Legend
Entity
Zero or one entity instances involved
One and only one...
Zero or many...
One or many...
Exclusive-OR relationship
Relationship names are read top-to-bottom, left-to-right

GeWWE


Workflow
Workflow Language
Registry
External Resources
User
Help
Workflow language
DISPEL
gUSE
Galaxy
Triana
Processes
Workflow

GeWWE


Workflow
Workflow Language
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External Resources
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Workflow language
Registry
Processes
External Resources
Processes
Workflow

GeWWE

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Workflow | Workflow Language | Registry | External Resources | User | Help

Workflow language

Workflow

Registry

Processes

External R

Processes

```
use uk.org.ogsadai.SQLQuery;

use uk.org.ogsadai.ListRandomSplit;
use uk.org.ogsadai.TupleProjectByIds;
use eu.admire.BuildClassifier;
use eu.admire.BuildIterationalClassifier;
use eu.admire.Evaluate;
use eu.admire.ClassifierGraph;
use eu.admire.Results;
use uk.org.ogsadai.TupleSelect;

use eu.admire.MultiClassify;
use uk.org.ogsadai.TupleToWebRowSetCharArrays;
    SQLQuery query1 = new SQLQuery ;
    TupleProjectByIds projection1 = new TupleProjectByIds ;
    TupleProjectByIds projection3 = new TupleProjectByIds ;
    MultiClassify classify = new MultiClassify ;
    BuildClassifier bc1 = new BuildClassifier ;
    BuildClassifier bc2 = new BuildClassifier ;
    BuildIterationalClassifier bc3 = new BuildIterationalClassifier ;
```

Implementation

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- Vaadin framework
  - Server & clients components in Java
  - GWT (Google Web Toolkit)
- JavaScript libraries
  - JQuery
  - JQuery UI
  - jsPlumb
- Hibernate with MySQL

Acknowledgements

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Tamas Kiss
Peter Kacsuk

Dave Snelling

Liew Chee Sun

Neil Chue Hong

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