

openArchitectureWare 4.1 Check – Validation Language

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Introduction

An important concept in model-driven software development is the concept of models. Another important concept is the idea of having domain-specific languages (DSLs) that are used to describe domain-specific stuff in a short and concise manner. *Check* is a domain-specific language that is specialized on model validation. Model validation, like any other validation, should happen as early as possible in a development process. It's best to directly integrate it in the model editor. If you have a long chain of components, for instance, containing model transformation steps, you may want to validate the state of your models several times. *Check* can be used to specify all of those constraints. It is based on the *oAW expressions framework* (see expressions reference), so it can be used with all kinds of model representations as long as a suitable meta model implementation is available (or you implement it yourself).

Check files

A check file must be located in the Java class path of the used execution context. Its file extension must be *.chk*. Let's have a look at a check file.

```
import my::metamodel;
extension other::ExtensionFile;

/**
 * Entities without a name are useless
 */
context my::Entity ERROR 'an entity must have a name!':
    this.name != null;

/**
 * We don't want entities with names shorter than 3 characters
 */
context my::Entity if name!=null WARNING 'name '+name+' too short!':
    name.length()>3;
```

This example shows all of the available statements. The structure of a check file is:

- import statements
- extension import statements
- checks

We will talk about each kind of statement one by one.

Import Statements

By using an import statement one can import name spaces of different types. (see expression reference documentation for a description of type names)

The syntax is:

```
import my::imported::namespace;
```

There are no static imports or any similar concept in *Check*. Therefore, you cannot write:

```
import my::imported::namespace::*; // WRONG!  
import my::Type; // WRONG!
```

Extension Import Statement

You can import extension files (see *Extend Reference*) using an extension statement. The syntax is:

```
extension fully::qualified::ExtensionFileName;
```

Comments

A check file can have single- and multiline comments.

The syntax for single line comments is:

```
// my comment
```

Multiline comments are written like this:

```
/* My  
multi line  
comment */
```

Checks

A *check* is a constraint for elements of a specific type. The syntax is:

```
context TypeName [if guard-predicate] (ERROR|WARNING) msg-expression:  
predicate;
```

If a given model element is of the specified Type, the constraint expression will be evaluated. If the constraint does not hold (the result of the evaluation is 'false'), the msg-expression is evaluated and the resulted String is stored in a so called `Issue`, together with the severity and the element on which the constraint was evaluated. The severity is specified using the keywords `ERROR` or `WARNING`.

The list of issues is collected and returned.

Guards

Since Version 4.1 Check has support for guards. A guard is written just after the type name started with the keyword 'if':

```
context my::Entity if name!=null WARNING 'name '+name+' too short!':  
    name.length()>3;
```

With this guard the constraint will only be evaluated for entities with a name!=null.

Workflow component

If you want to invoke such a validation from out of a workflow, you should add a declaration of the *Check* component to your workflow description (see *Workflow Engine Reference*).

A typical configuration of the check component might look like this:

```
<component  
    class="org.openarchitectureware.check.CheckComponent">  
    <metaModel class="org.open...emf.EmfMetaModel">  
        <metaModelPackage value="org.component.ComponentPackage"/>  
    </metaModel>  
    <checkFile value="example::Checks"/>  
    <expression value="myModel.get(0).eAllContents"/>  
</component>
```

The qualified name of the component is `org.openarchitectureware.check.Component`.

The check *Component* needs to know what kind of meta models your checks are based on. Therefore at least one dependency `metaModel` must be configured. In the example we configured an *EMF* meta model called `component`. If you have multiple interconnected models made up of different meta models (and meta meta models) you can specify more than one meta model.

The `checkFile` property expects a fully qualified name pointing to the check file containing all the checks.

The content of the `expression` property is evaluated (using the expressions engine, that is configured with all the meta models specified before). The result is converted to a list. The check engine checks each element contained in the list against the constraints found in the check file.

There are three additional configurable properties:

- `abortOnError`: If set to true the *Component* will throw an exception (to stop the workflow) if the issues list contains any errors. Default is `true`.

- `logIssues`: If set to `true` the component will log all issues contained in the resulted list (using `org.apache.commons.logging`). Default is `true`.
- `useWorkflowIssues`: If this is set to `true` the *Component* will store all found issues in the `Issues` object, handed in by the *workflow engine*. Default is `false`

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