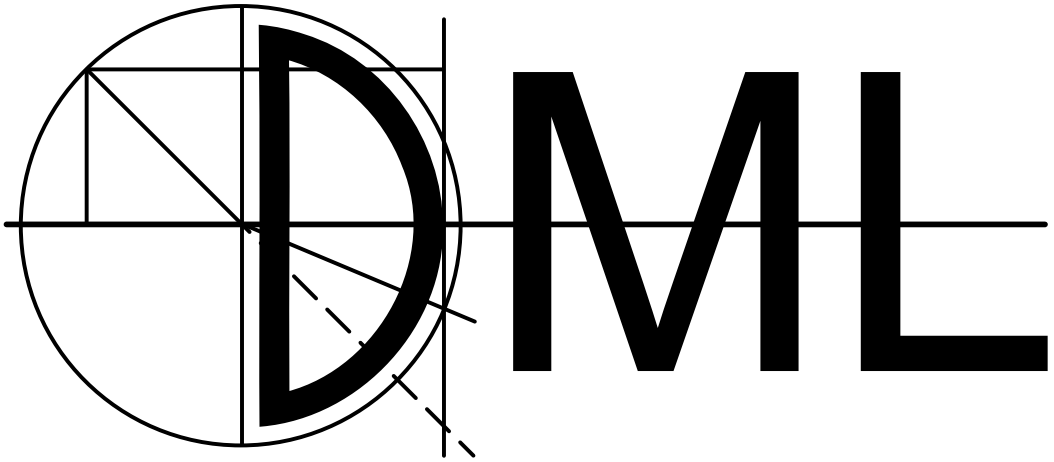

Descartes Modeling Language – Quick Start Guide

Johannes Grohmann
Simon Eismann
Jürgen Walter
Samuel Kounev

www.descartes.tools/dml

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1 Introduction

The Descartes Modeling Language (DML) is an architecture-level modeling language for quality-of-service and resource management of modern dynamic IT systems and infrastructures. DML is designed to serve as a basis for self-aware systems management during operation, ensuring that system quality-of-service requirements are continuously satisfied while infrastructure resources are utilized as efficiently as possible. The term quality-of-service (QoS) is used to refer to performance (response time, throughput, scalability and efficiency) and dependability (availability, reliability and security).

The current version of DML is focused on performance and availability, however, the modeling language itself is designed in a generic fashion and it is intended to eventually support further QoS properties. More information can be found on the tool website: `www.descartes.tools/dml`.

This document is a quick start guide, leading through installation and execution of the first query, written in Descartes Query Language (DQL). No deeper technical knowledge or understanding of DML concepts is required, nor are the underlying concepts described or explained. Instead, this document is intended to lead as a tutorial through the first steps with DML and to guide the reader in a hands-on fashion. However, further information and guides as well as a list of scientific publications can be found on the tool website `www.descartes.tools/dml`, explaining the fundamental concepts of the Descartes Modeling Language.

2 Installation

The following steps guide you through the installation of the DML Bench.

2.1 System Requirements

In order to install DML, your system needs to meet the following prerequisites:

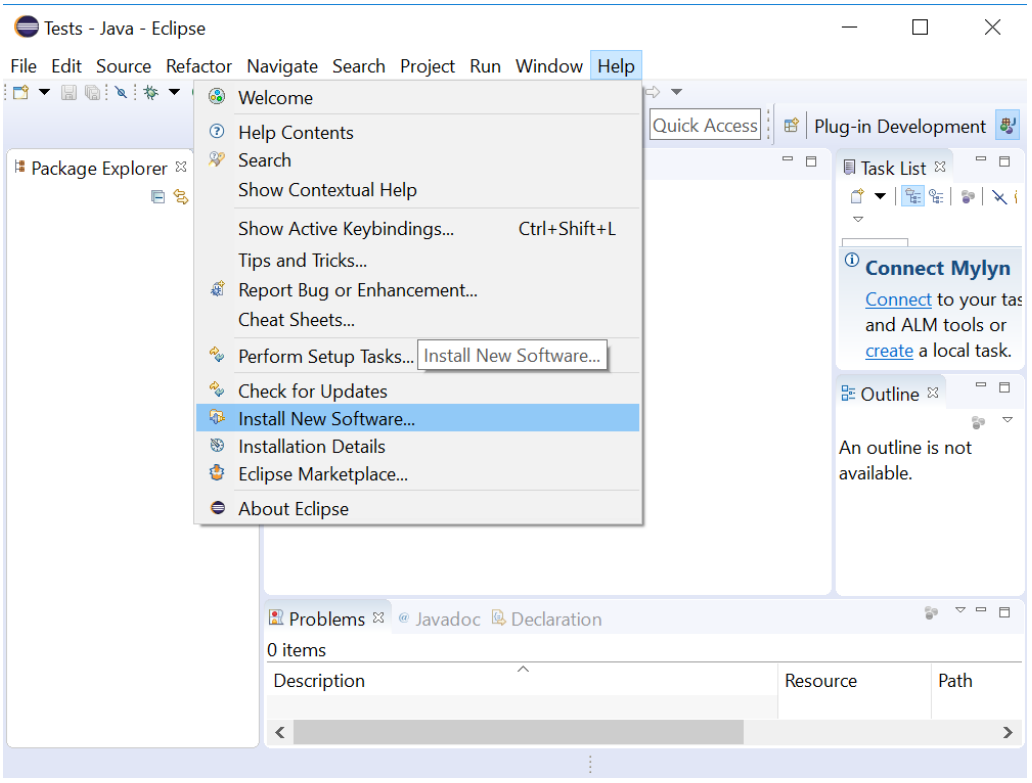
- **Operating System:** Windows 7/8/10, MacOS X or Linux, all 32-bit or 64-bit
- **Java Runtime Environment:** at least 1.8
- **Eclipse:** Eclipse Standard 4.4 or higher[1], with the Eclipse Modeling Tools[2] installed.

2.2 New Installation

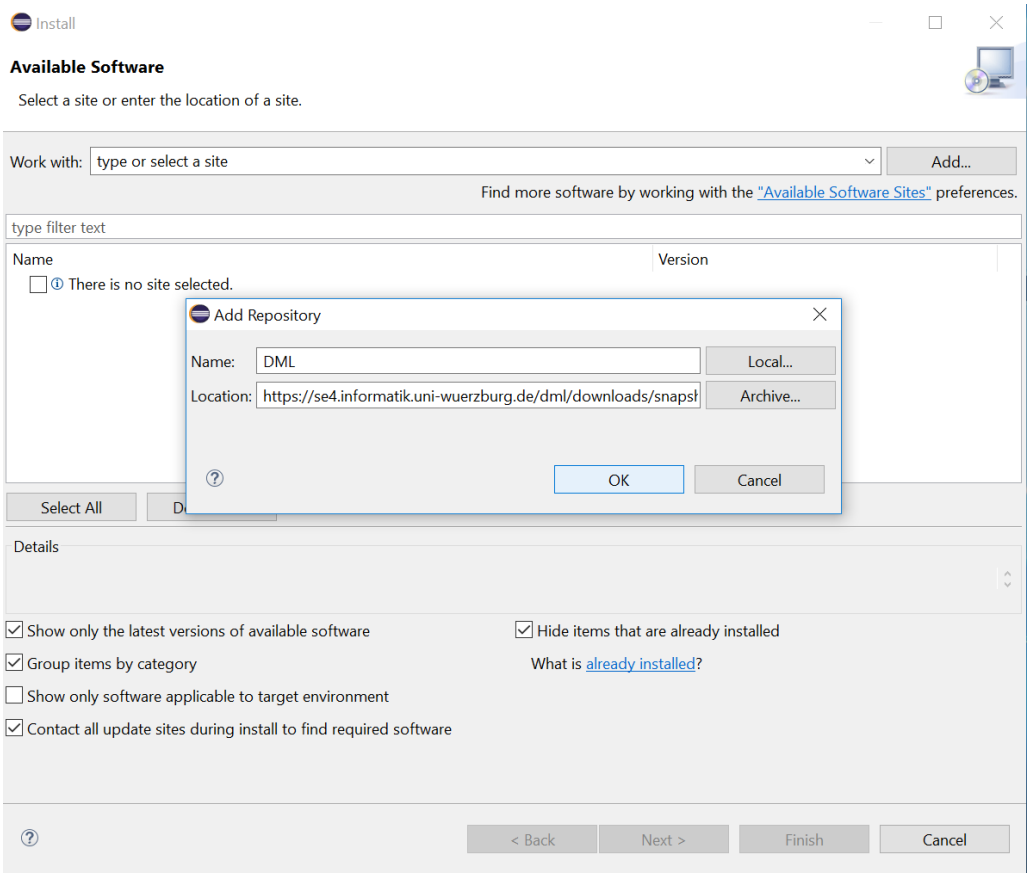
You can install the DML bench as an Eclipse plugin from the update site[3]. Follow these steps:

1. In Eclipse go to *Help* → *Install new Software*

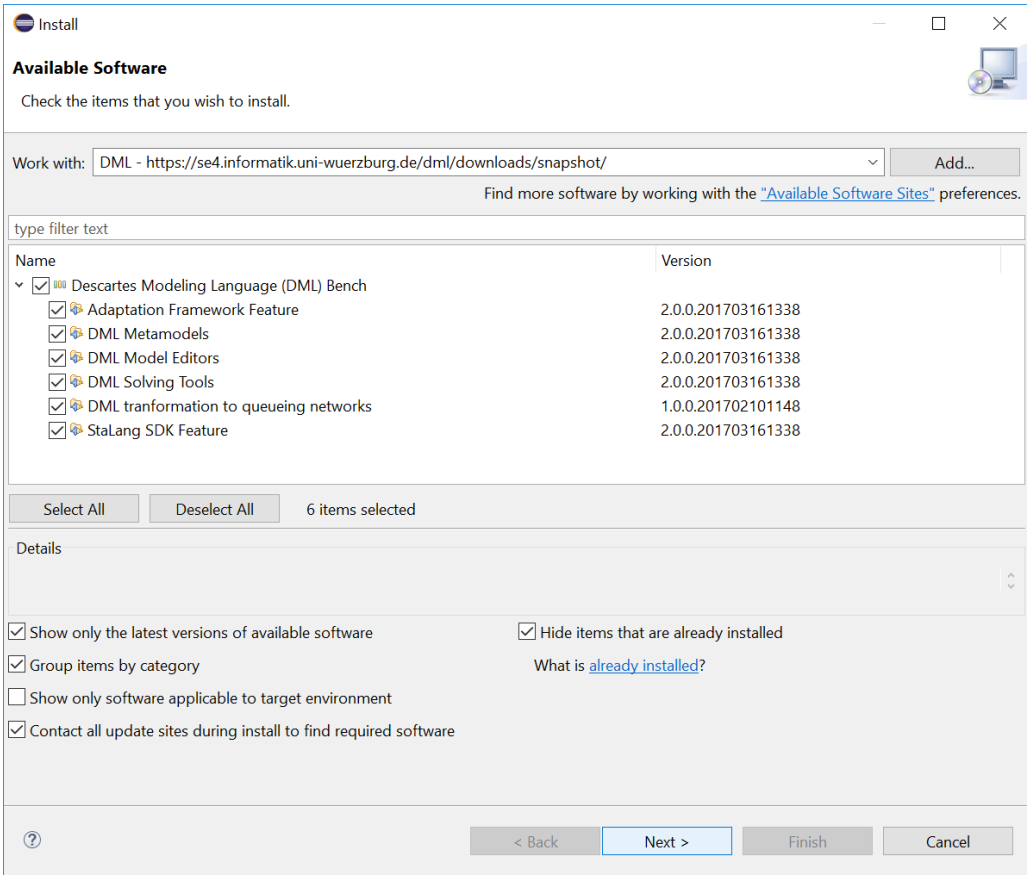
[1] `http://www.eclipse.org/downloads/`
[2] `https://eclipse.org/downloads/packages/eclipse-modeling-tools/lunasr1`
[3] `https://se4.informatik.uni-wuerzburg.de/dml/downloads/snapshot/`



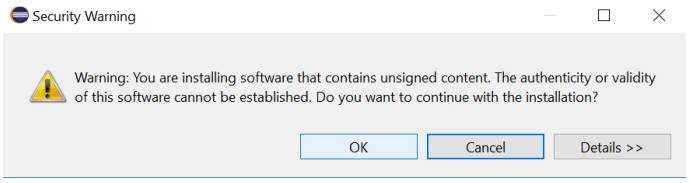
2. Add a new repository with `https://se4.informatik.uni-wuerzburg.de/dml/downloads/snapshot/` as location.



3. Select all desired plug-ins from the DML Bench (usually all) for installation and click next.



4. Accept the license agreements.
5. Confirm the security warning.



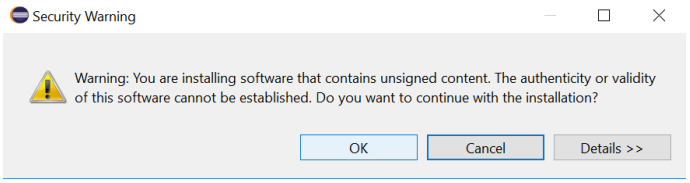
6. After completion, restart Eclipse.
7. Done. You should now be able to use DML with your Eclipse installation.

2.3 Update Existing Installation

To update an existing installation of any DML plugin follow these steps:

1. In Eclipse go to *Help* → *Check for Updates*
2. Wait for the Eclipse operations to complete.
3. If a DML update is available, select the plug-ins you want to update (usually all) and follow the next steps to install it. Otherwise, your installation is up-to-date.

4. Accept the license agreements.
5. Confirm the security warning.



6. After completion, restart Eclipse.
7. Done. Your DML bench should now be up-to-date.

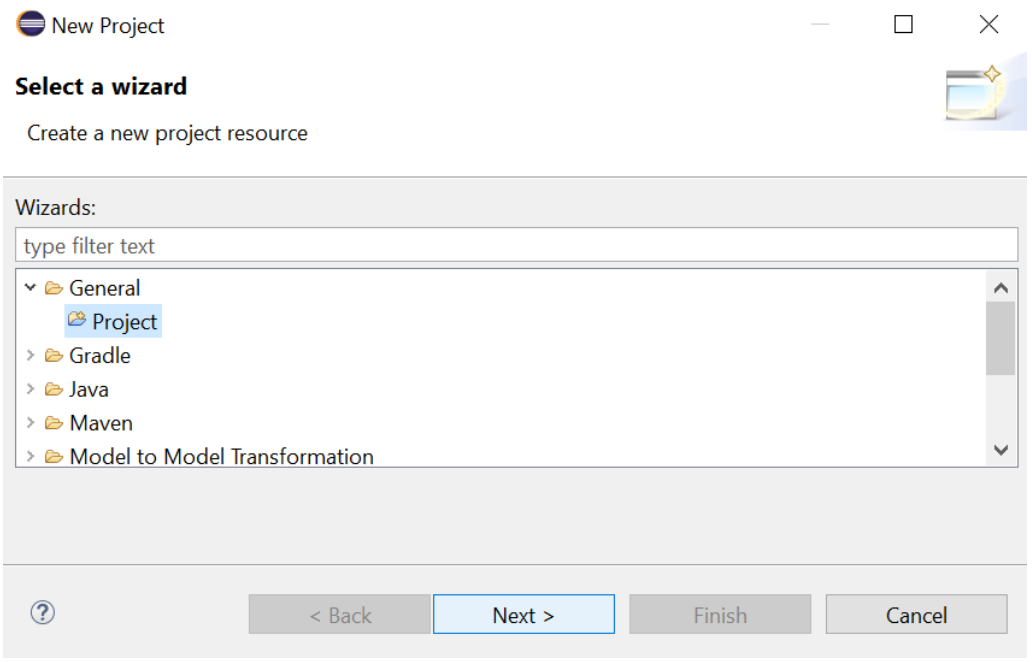
3 Getting started

This section explains the first steps with a simple example.

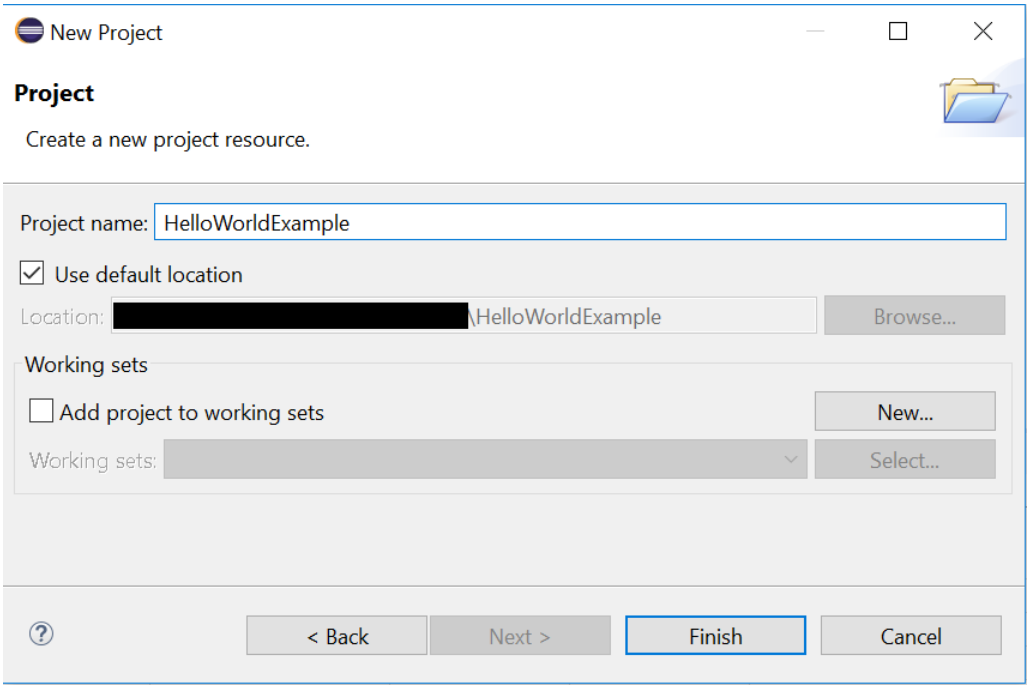
3.1 Model import

A set of example models can be found and downloaded at `https://se3.informatik.uni-wuerzburg.de/descartes/dml-examples`. The easiest way to import is described in the following:

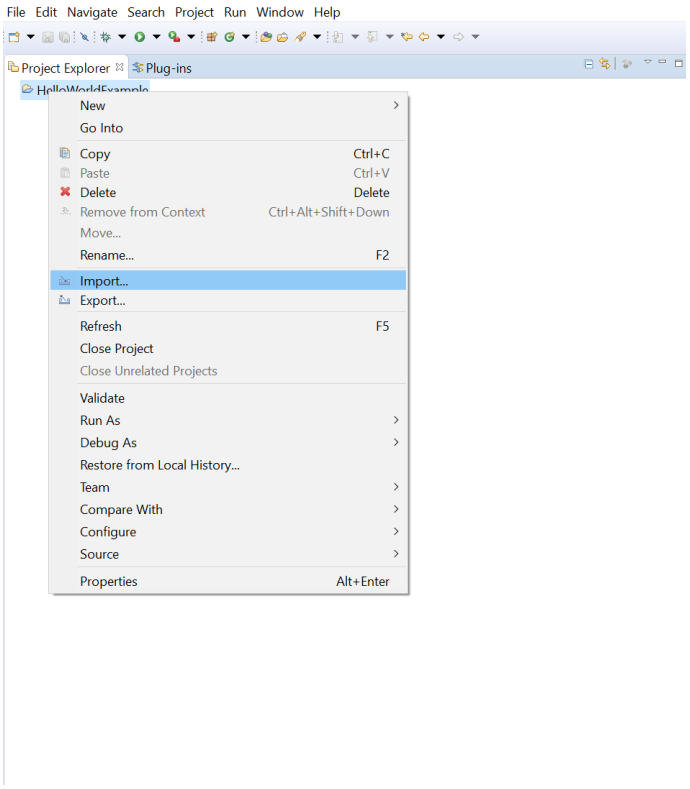
1. Download the zip archive containing the examples at `https://se3.informatik.uni-wuerzburg.de/descartes/dml-examples/repository/archive.zip?ref=master`.
2. Unpack the zip archive into a folder of your choosing, e.g. your workspace.
3. You can now either import all projects as an existing eclipse projects or just import a simple example. The following steps assume you want to import the "HelloWorld" model.
4. Right-click on the *Project explorer*.
5. Click on *New* → *Project...*.
6. From *General*, select *Project* and confirm by clicking on *Next*.



7. Enter “HelloWorldExample” or any other name you like as project name and confirm by clicking on *Finish*.



8. Now, right-click on the new project in the *Project explorer* and select *Import...*.

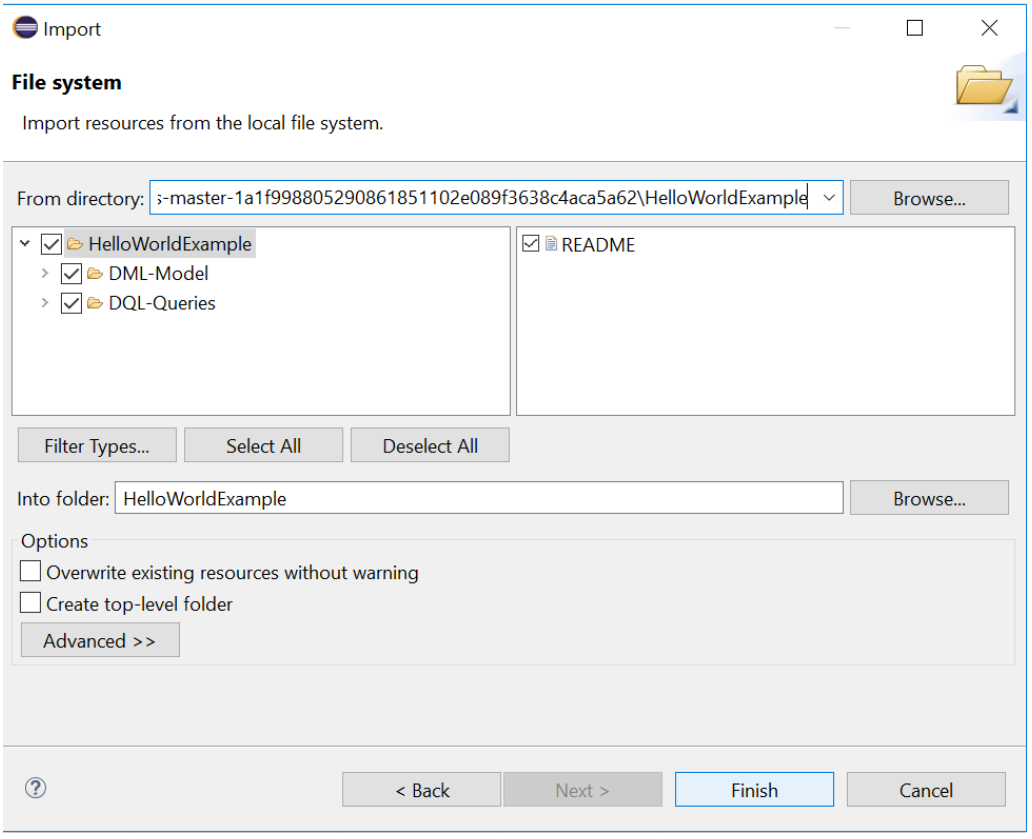


9. From *General*, select *File System*.

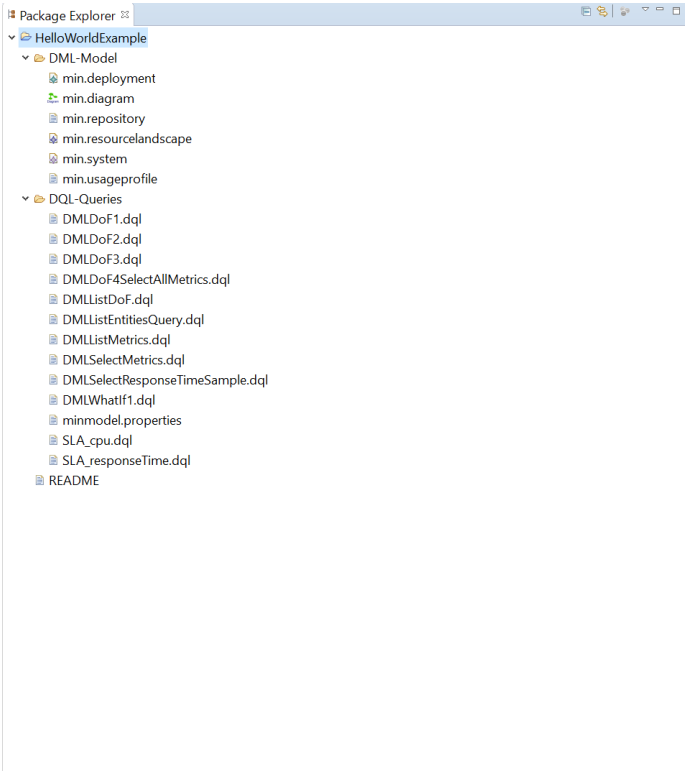
10. After clicking on *Next*, select *Browse* in the following window.

11. Then browse to the location containing the unpacked DML examples and select the folder *HelloWorldExample*.

12. Select all items and then click on *Finish* to import the files into your existing project.



13. Your project should now look like this:



3.2 Performance query execution

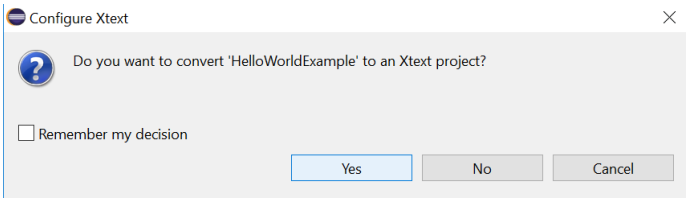
The projects usually contain multiple folders. The folder *DML-Model* contains all DML model files required to specify the system.

For modeling the application architecture, there are a repository model and a system model. To model the resource landscape, there are resource landscape, container repository, and resource type model. Furthermore, there are deployment models connecting application architecture and resource landscape, as well as usage profile models. For more detailed information about modeling, please see the modeling guide on `www.descartes.tools/dml`.

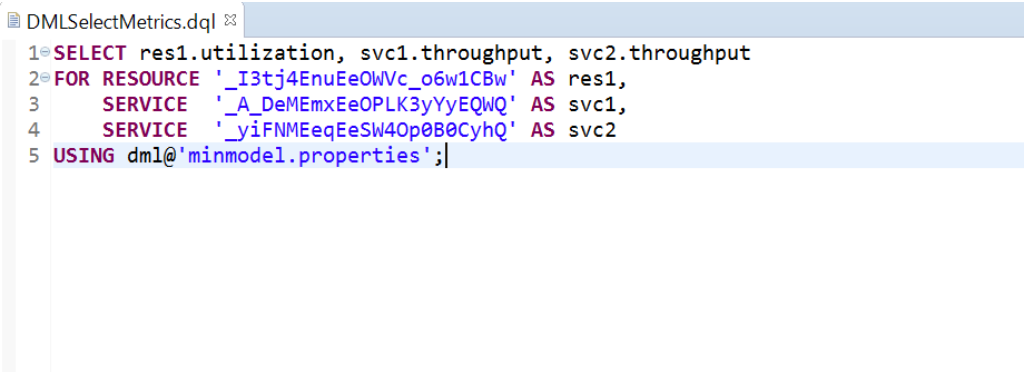
In order to solve the DML models, Descartes Query Language (DQL) queries are formulated. A set of example queries is contained in the folder *DQL-Queries*.

1. Double click on any of the files .dql files to the DQL query in the editor.

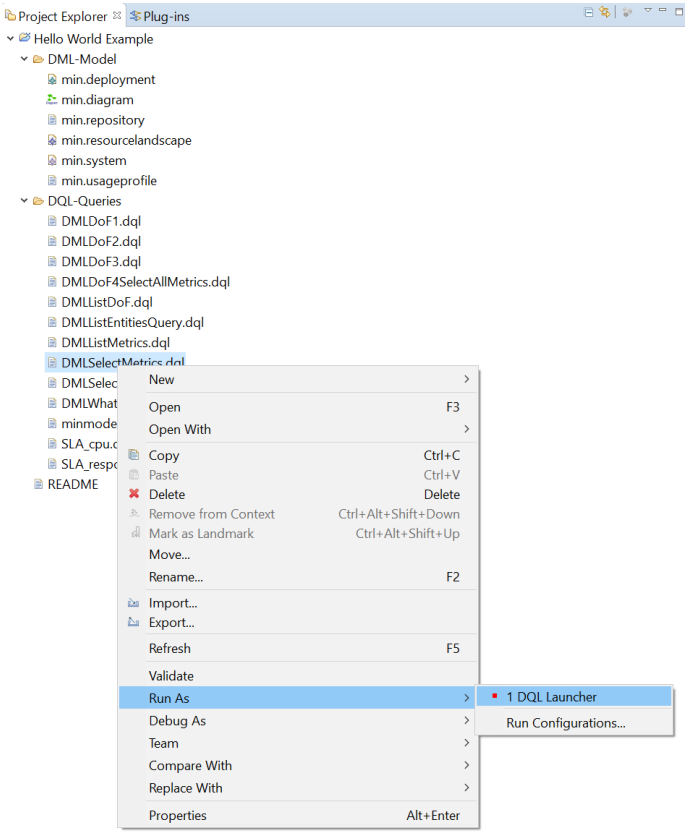
2. If a window pops up, asking if you want to convert the project into a *Xtext project*, you can confirm that by clicking on *Yes*.



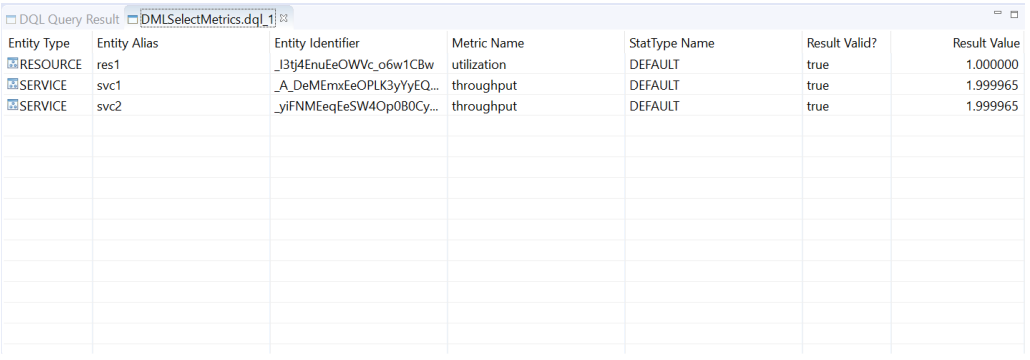
3. You should be able to see and edit the query you clicked.



4. You can run DQL queries using the DQL launcher by right-clicking on the .dql file and selecting *Run As* → *DQL Launcher*.



5. After a short waiting period, you should be able to see the result of the query.



Entity Type	Entity Alias	Entity Identifier	Metric Name	StatType Name	Result Valid?	Result Value
RESOURCE	res1	_l3tj4EnuEeOWVc_o6w1CBw	utilization	DEFAULT	true	1.000000
SERVICE	svc1	_A_DeMEmxEeOPLK3yYyEQ...	throughput	DEFAULT	true	1.999965
SERVICE	svc2	_yiFNMEeqEeSW4Op0B0Cy...	throughput	DEFAULT	true	1.999965

4 Further reading

More details about the Descartes Modeling Language (DML) can be found on the website `www.descartes.tools/dml`. There you can find a list of publications, a documentation of the meta-model and a modeling guide for starters.