



Model-Driven Engineering Tools

Epsilon-Eugenia/Emfatic

Moharram Challenger

Department of Computer Science, University of Antwerp, Belgium

17.12.2020

Eclipse Epsilon
Eugenia/Emfatic

1. Epsilon
2. Graphical Modelling
3. Eugenia/Emfatic
4. Demo



Content

1. Epsilon
2. Graphical Modelling
3. Eugenia/Emfatic
4. Demo

Eclipse Epsilon
Eugenia/Emfatic

1. Epsilon
2. Graphical Modelling
3. Eugenia/Emfatic
4. Demo



Eclipse Epsilon

Eclipse Epsilon
Eugenia/Emfatic

- Family of languages and tools in Java (Eclipse),
- Goal: Automating MDE
- Core:
 - EOL (Epsilon Object Language)
 - OCL for Model Querying
- On top of EOL, Epsilon provides languages for:
 - model validation
 - model-to-model transformation
 - code generation,
 - ...

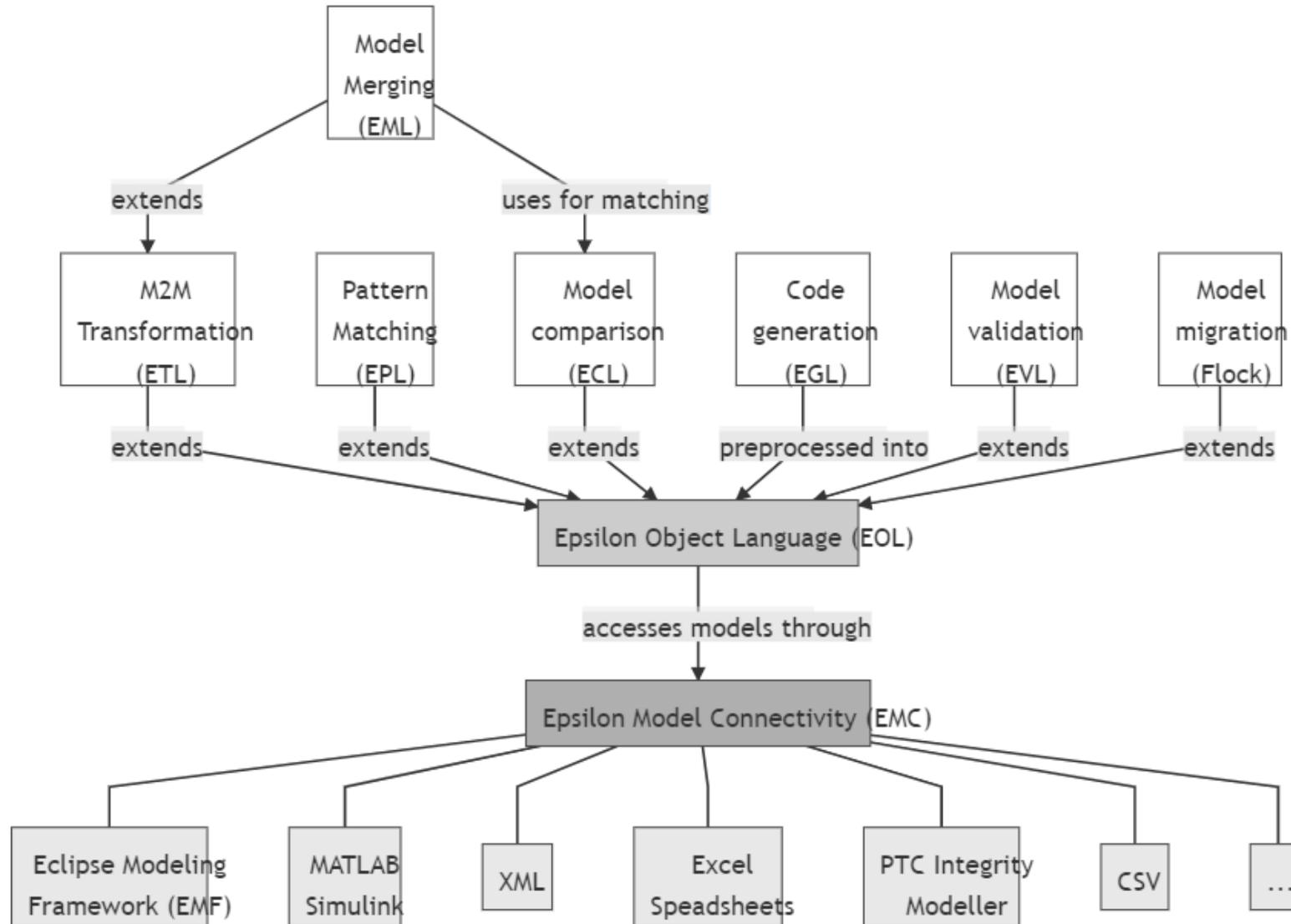
1. Epsilon
2. Graphical Modelling
3. Eugenia/Emfatic
4. Demo



Eclipse Epsilon

- Epsilon relies on a model connectivity layer
 - shields it from any specific modeling technology (such as EMF)
 - It query and modify models that conform to different technologies in a uniform way
 - e.g. EMF, Simulink, XML, CSV, ...

Epsilon Architecture



1. Epsilon
2. Graphical Modelling
3. Eugenia/Emfatic
4. Demo



Graphical Modelling Tools in Epsilon - Picto

- Picto: light weight visualization
 - It visualizes instance models via model-to-text transformation to SVG/HTML/JS
 - It does NOT provide graphical modelling editor (unlike GMF, Sirius, Eugenia, ...)
 - It produces read-only views from models
 - The model visualization can take place in any browser
 - So, it does not require running (multiple) Eclipse instances

1. Epsilon
2. Graphical Modelling
3. Eugenia/Emfatic
4. Demo



Graphical Modelling Tools in Epsilon - Eugenia

- Eugenia heavy weight modelling editor
 - Eugenia is a front-end for Eclipse GMF
 - Visual/graphical **syntax-directed** editors in the ECore
 - Its generates a fully-functional GMF editor (applying MDE on MDE tools 😊)
 - by specifying a few high-level annotations in the Ecore metamodel
 - In other words: the abstract and concrete syntaxes are specified in a single MM document
 - It can be useful for quickly generating PoC for a graphical modelling editor
 - For implementation:
 - You can use a regular EMF editor and add your annotations to the metamodel to specify concrete syntax (CS)
 - You can use Emfatic language to specify metamodel and CS annotations
 - A textual language and editor developed in Xtext

1. Epsilon
2. Graphical Modelling
3. Eugenia/Emfatic
4. Demo



Eugenia and Emfatic

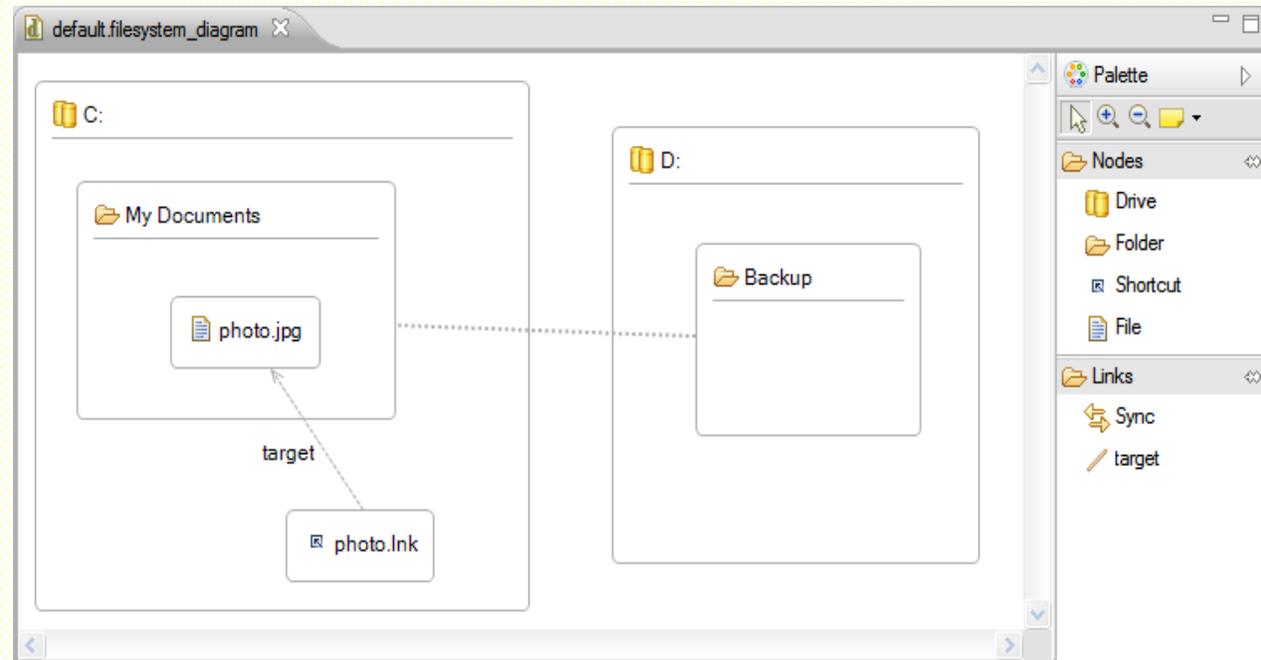
- It automatically generates all models required by GMF from a single annotated Ecore metamodel in Emfatic:
 - .gmfgraph,
 - .gmftool and
 - .gmfmap

1. Epsilon
2. Graphical Modelling
3. Eugenia/Emfatic
4. Demo



Eugenia

- Example: File System
 - From this annotated EMF metamodel (expressed in Emfatic)
 - it can generate a fully functional GMF editor (shown in the next slide)



```
@namespace(uri="filesystem", prefix="filesystem")
```

```
@gmf
```

```
package filesystem;
```

```
@gmf.diagram
```

```
class Filesystem {
    val Drive[*] drives;
    val Sync[*] syncs;
}
```

```
class Drive extends Folder {
}
```

```
class Folder extends File {
    @gmf.compartment
    val File[*] contents;
}
```

```
class Shortcut extends File {
    @gmf.link(target.decoration="arrow", style="dash")
    ref File target;
}
```

```
@gmf.link(source="source", target="target", style="dot", width="2")
```

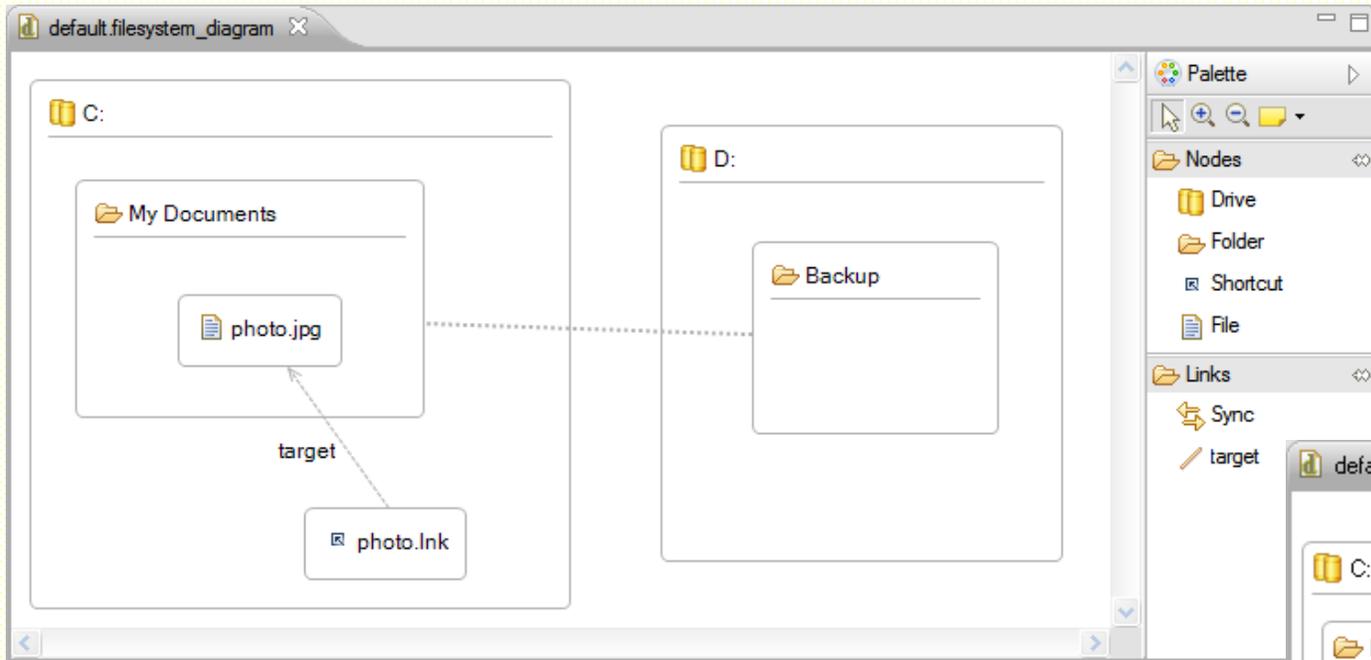
```
class Sync {
    ref File source;
    ref File target;
}
```

```
@gmf.node(label = "name")
```

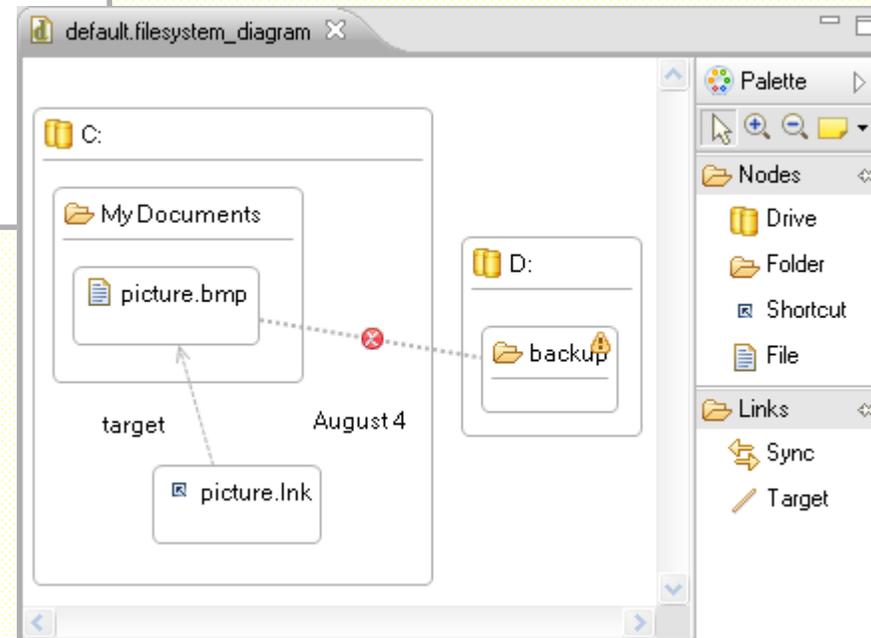
```
class File {
    attr String name;
}
```

Eugenia

Eclipse Epsilon
Eugenia/Emfatic



The rules for warnings, errors, auto-corrections are added using EVL



Eugenia polishing:

To further customize the editor you need to customize the generated .gmfgraph, .gmfmap and .gmftool models

1. Epsilon
2. Graphical Modelling
3. Eugenia/Emfatic
4. Demo



Live Demo

- PACo Project: Product-Assembly Co-Design
- Product Assembly Sequence Modelling

Eclipse Epsilon
Eugenia/Emfatic

1. Epsilon
2. Graphical Modelling
3. Eugenia/Emfatic
4. Demo



1. Epsilon
2. Graphical Modelling
3. Eugenia/Emfatic
4. Demo

Questions?

