Eclipse Modeling Framework (EMF)

Paweł Żalejko

Agenda

- Model-Driven Development

- What is EMF?

- EMF demo - hello world

- EMF demo - command stack & adapters

- EMF demo - data binding & validation

- EMF demo - generating UI editors

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Agenda

- **Model-Driven Development**

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Model-Driven Development

```java
@Entity
@Table(name = "Members")
public class Member {

    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    private Long id;

    @Column(name = "member_name")
    private String name;
}
```

Model-Driven Development

```java
@Entity
@Table(name = "Members")
public class Member {

    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    private Long id;

    @NotNull(message="Name must be specified.")
    @Size(max = 25)
    @Column(name = "member_name")
    private String name;
}
```

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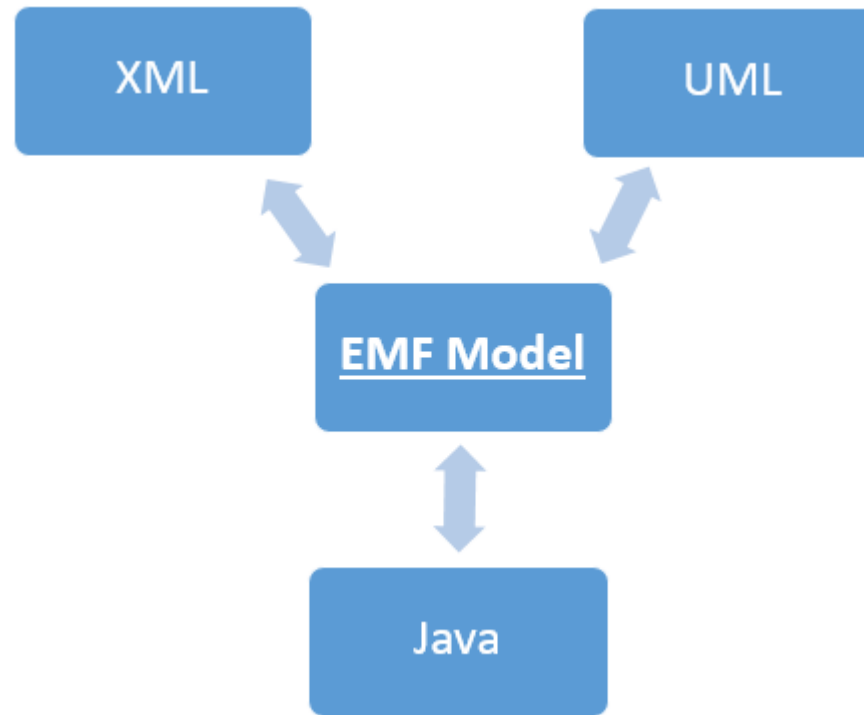
Model-Driven Development

- Clear visibility
- Flexibility(models can be adjusted)
- Fast & cost-effective
- Leads to increased quality
- Enforces architecture
- Let's programmers focus on the hard stuff

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What is EMF?

- Modeling framework
- Code generator
- **Framework for building tools and applications based on a structured data model**

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EMF - frameworks

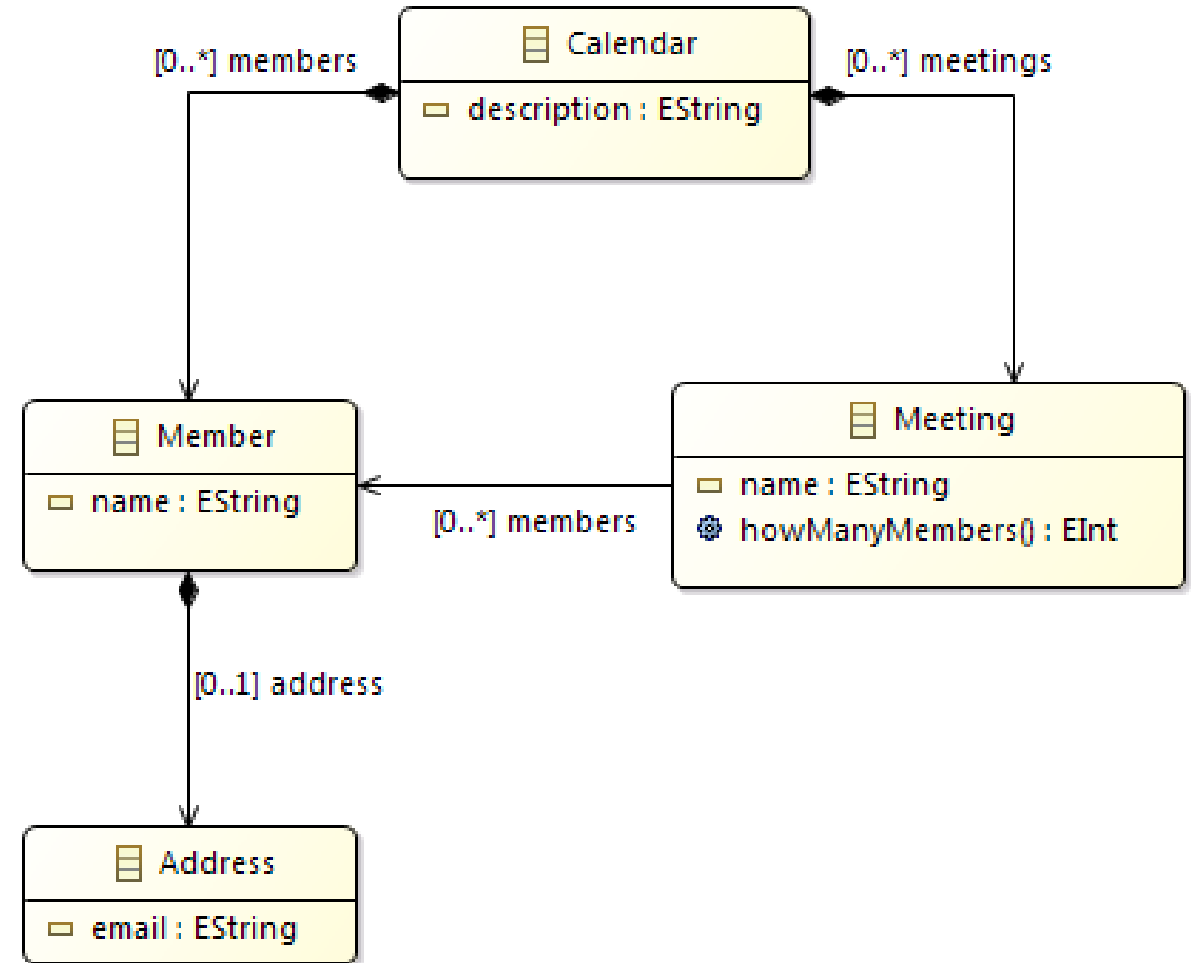- Persistence
  - CDO, EMFStore, Teneo
- UI frameworks
  - EMF Forms
- Graphical Modeling
  - GMF, Sirius
- Textual Modeling
  - Xtext
- And much more…
  - https://eclipse.org/modeling/

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EMF demo - hello world

- Create a model
  - Eclipse Modeling IDE
  - Create a new Ecore Modeling Project
- Generate the code

- About the model:
  - 4 classes
  - Integer and String attributes
  - 1 operation (method)
  - Containment and non containment refs.

EMF – ecore & genmodel

- Two files:
  - **ecore** - contains the information about the defined classes
  - **genmodel** - contains information for the code generation

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EMF – containment vs non containment

```
<demo:Calendar description="Hi all!">

  <meetings name="JUG meeting" members="//@members.0"/>

  <members name="JUG member">
    <address email="jug@zgora.pl"/>
  </members>

  <members name="JUG2 member">
    <address email="jug2@zgora.pl"/>
  </members>

</demo:Calendar>
```
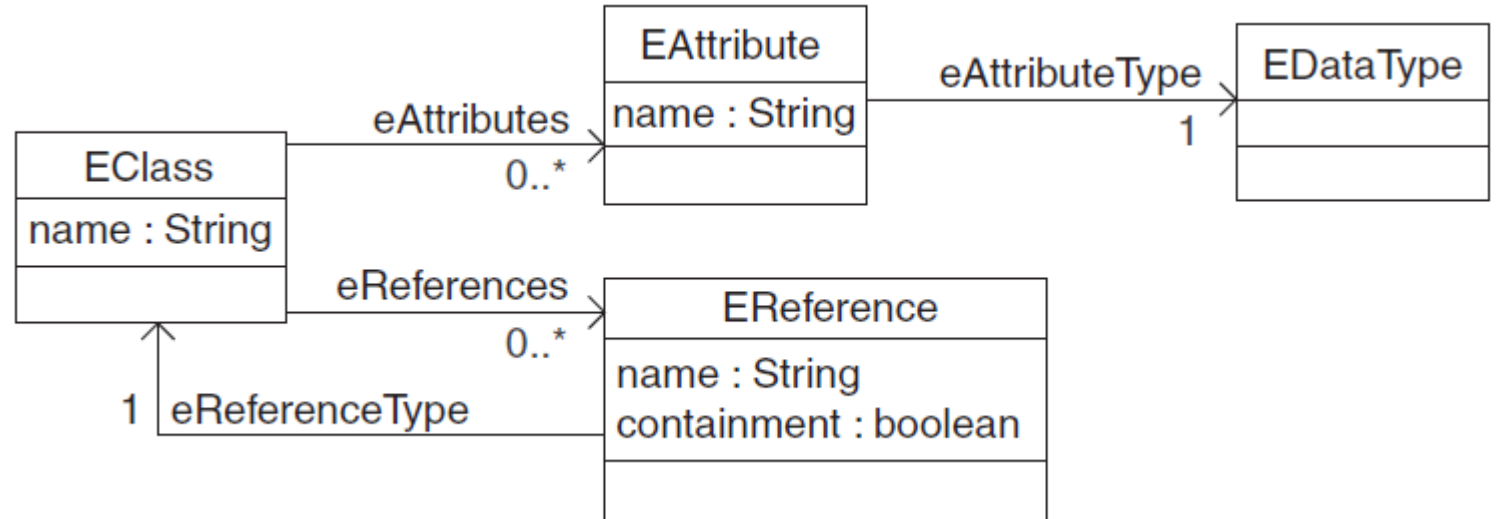
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Object vs EObject

- EObject is the root of all modeled objects
- It provides support for the behaviors and features common to all modeled objects:

Reflection	Content
- eClass - eGet - eSet …	- eResource - eContainer - eContents …

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EMF – Ecore (Meta) Model

- model of a model ☺:
  - EClass
  - EStructuralFeature
    - EAttribute
    - EReference
  - EOperation
  - EDataType

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EMF demo - command stack & adapters

- Editing objects using commands
- Undo/redo
- Adapters as change listeners

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EMF demo - data binding & validation

- Binding a model to UI controls
  - DataBindingContext
  - IObservableValue
  - UpdateValueStrategy
- Validating inputs
  - Java
  - Object Constraint Language (OCL)

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EMF demo - generating a UI editor

- A simple UI editor created using EMF Forms framework

- UI:
    - JavaFX
    - SWT
    - Eclipse RAP

http://www.eclipse.org/ecp/emfforms/

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EMF demo - generating a Sirius-based editor

- Sirius:

*„**Sirius** is an Eclipse project which **allows you to** easily **create** your own **graphical modeling workbench** by leveraging the Eclipse Modeling technologies, including EMF and GMF.”*

https://eclipse.org/sirius/overview.html

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Thanks!

- https://eclipse.org/modeling/
- https://eclipse.org/modeling/emf/
- http://www.eclipse.org/modeling/emf/docs/
- http://www.eclipse.org/ecp/emfforms/
- https://eclipse.org/sirius/overview.html