



# 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

# 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

# Model-Driven Development

```
@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

```
@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;
}
```

# Model-Driven Development

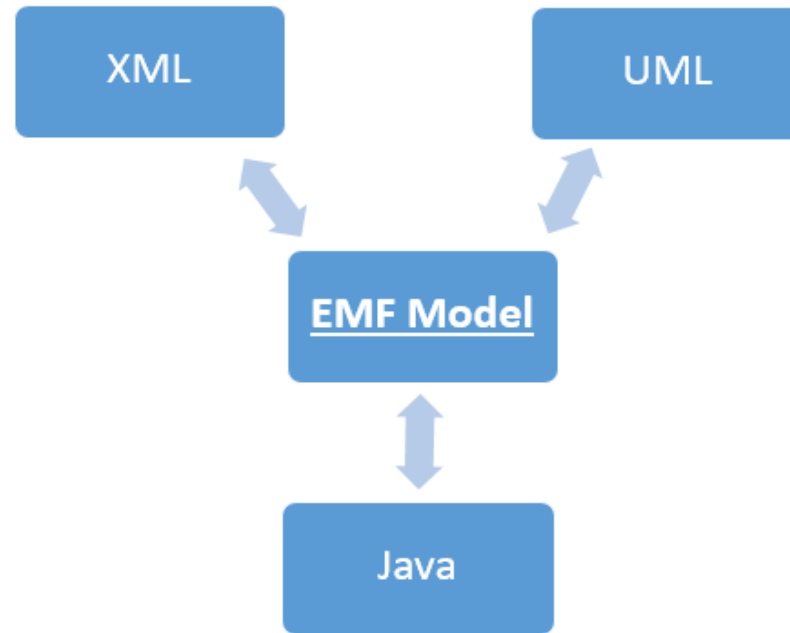
- Clear visibility
- Flexibility(models can be adjusted)
- Fast & cost-effective
- Leads to increased quality
- Enforces architecture
- Let's programmers focus on the hard stuff

# 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

# What is EMF?

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





# EMF - frameworks

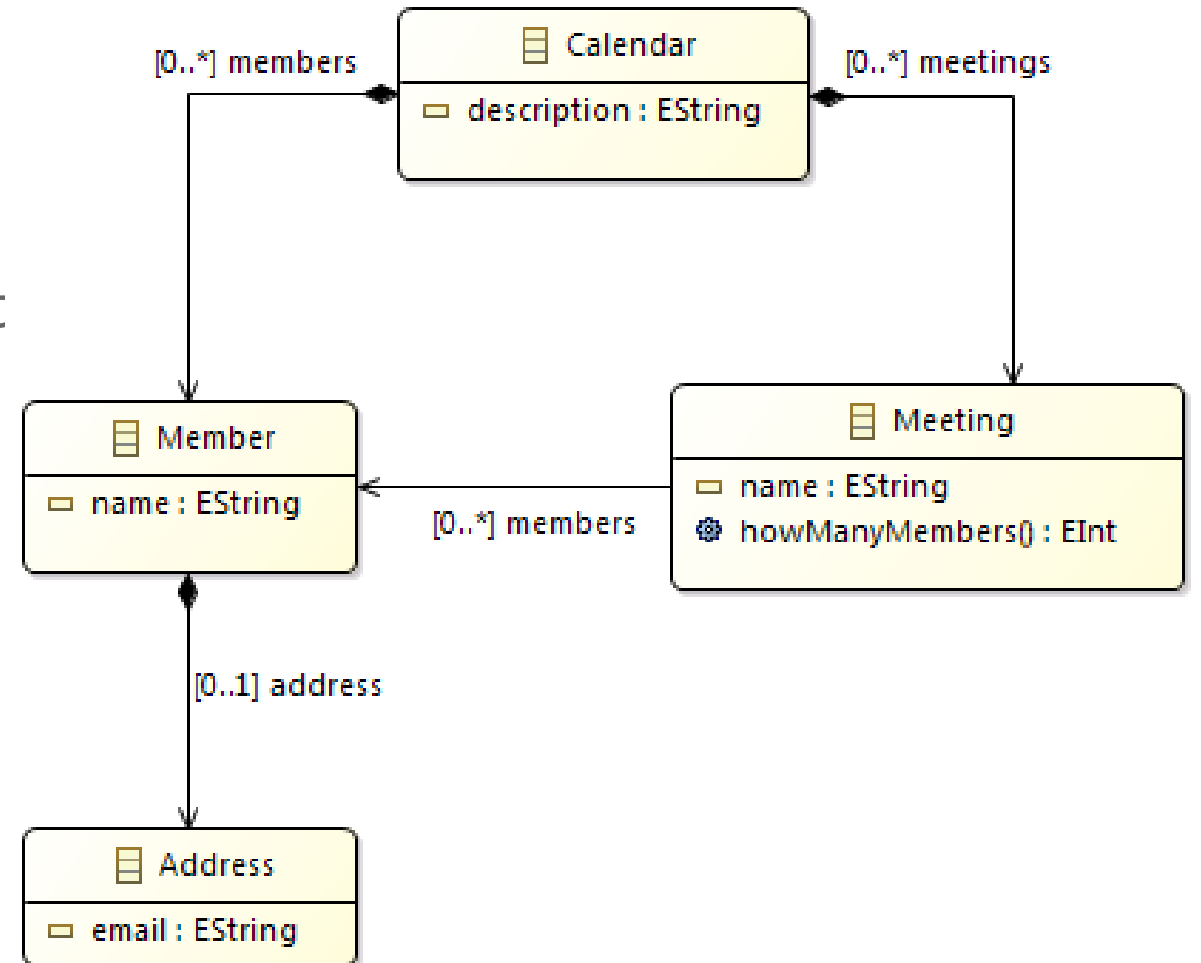
- Persistence
  - CDO, EMFStore, Teneo
- UI frameworks
  - EMF Forms
- Graphical Modeling
  - GMF, Sirius
- Textual Modeling
  - Xtext
- And much more...
  - <https://eclipse.org/modeling/>

# 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

# EMF demo - hello world

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



# EMF – ecore & genmodel

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

# <http://www.eclipse.org/emf/2002/GenModel>

- documentation
- copyright
- **body**
- suppressedGetVisibility
- suppressedSetVisibility
- ...

# 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>
```

# Object vs EObject

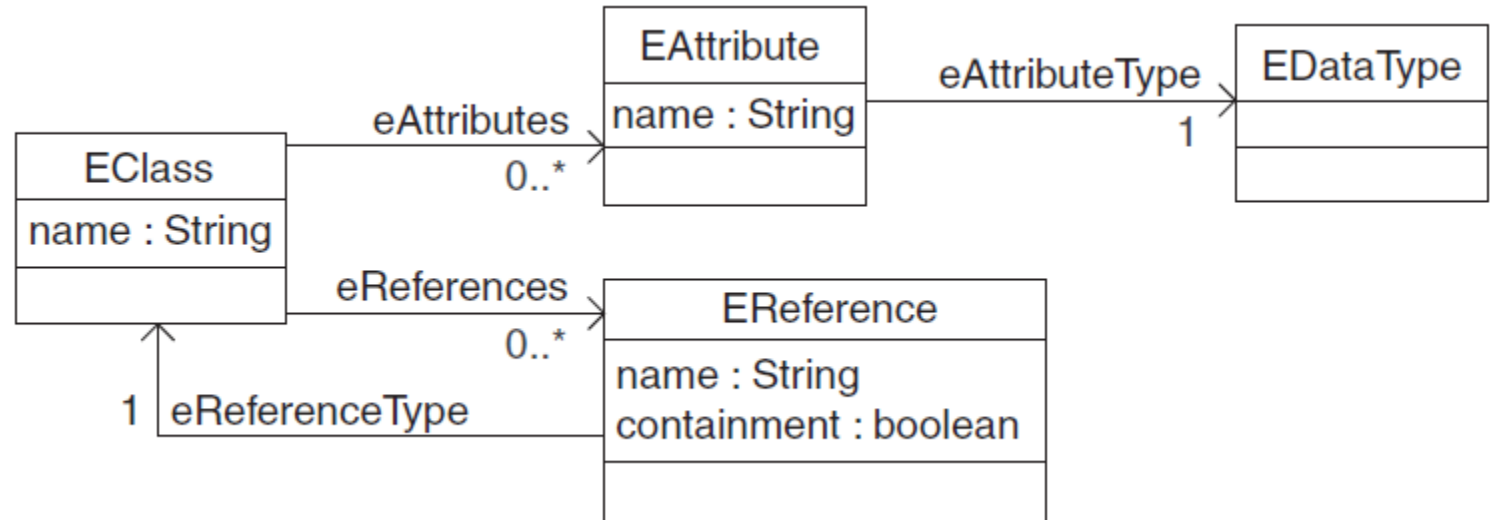
- EObject is the root of all modeled objects
- It provides support for the behaviors and features common to all modeled objects:

Reflection	Content
<ul style="list-style-type: none"><li>· eClass</li><li>· eGet</li><li>· eSet</li><li>· ...</li></ul>	<ul style="list-style-type: none"><li>· eResource</li><li>· eContainer</li><li>· eContents</li><li>· ...</li></ul>

# EMF – Ecore Model

■ (meta) model of models ☺:

- EClass
  - EStructuralFeature
    - EAttribute
    - EReference
  - EOperation
  - EDataType





# 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

# EMF demo - command stack & adapters

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

# 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

# EMF demo - data binding & validation

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

# 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

# EMF demo - generating a UI editor

- A simple form-based editor created using EMF Forms framework
- UI:
  - JavaFX
  - SWT
  - Eclipse RAP

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

# 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>

# 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>