Nasdanika HTML

Fluent Java API for building Web UI

Overview

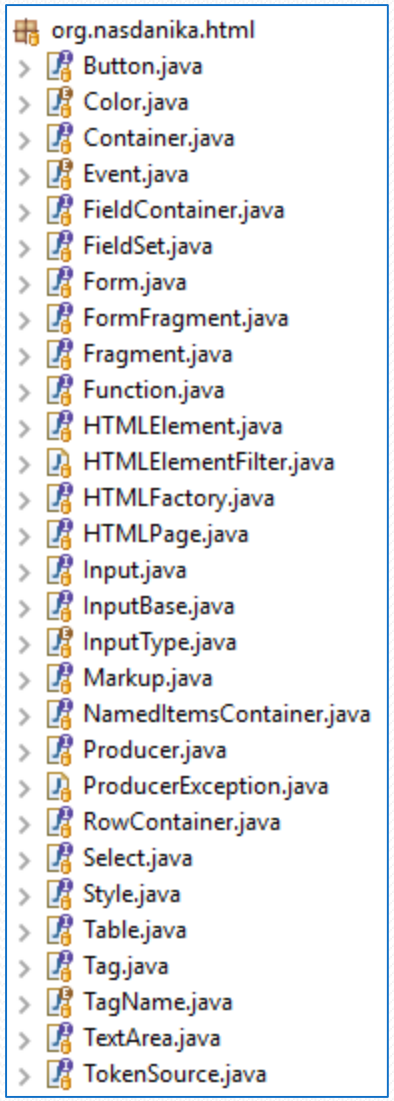
- Fluent Java API for building:
  - Low level – HTML elements
  - Mid level:
    - Bootstrap 4.x UI elements and 21 Bootswatch themes
    - ECharts 4.2.1 factory and option builders
    - Font Awesome 5.x icons
    - jsTree 3.3.8 nodes and context menus
    - KnockoutJS 3.4.x
  - High level – HTML Applications
    - Using abstractions of actions and property sources
    - From EMF models data and meta-data
    - Generation of documentation for Ecore models
- Dual delivery:
  - OSGi bundles – p2 repository
  - Jars - Maven repository (excluding EMF)

HTML

- API for building HTML elements
- Foundation for the other modules
- How to use:
  - Obtain HTMLFactory
  - Create HTML elements
  - Configure the elements:
    - Attributes
    - CSS Classes
    - Styles
- Output with `toString()` or `produce()`

```
HTMLFactory htmlFactory = HTMLFactory.INSTANCE;
Tag div = htmlFactory.div("Hello")
        .style().border("solid 1px")
        .on(Event.click, getClass().getResource("ClickHandler.js"));
System.out.println(div);
```

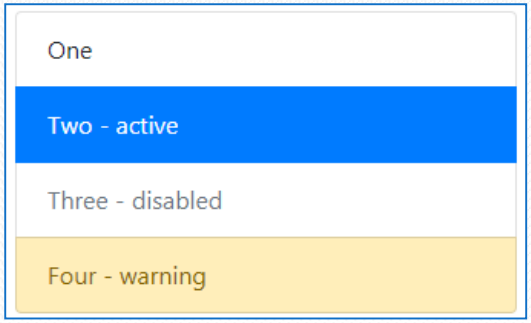
```
<div onclick="alert('Hi!')" style="border:solid 1px">Hello</div>
```

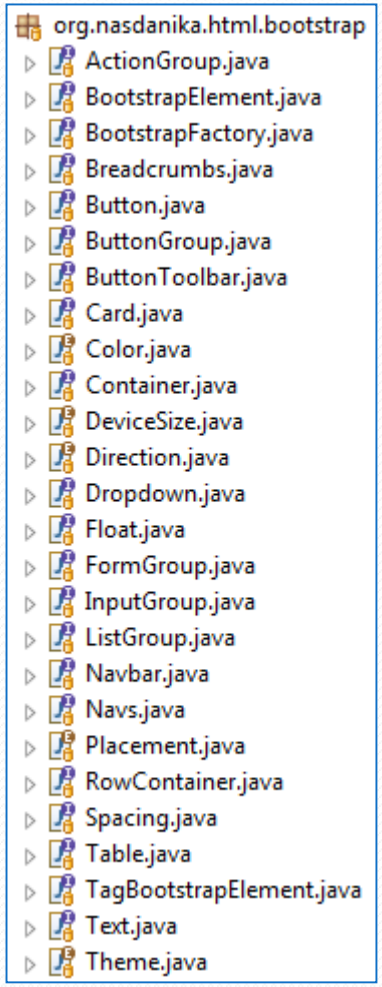


Bootstrap

- API for building Bootstrap 4 elements
- Built on HTML
- How to use:
  - Obtain BootstrapFactory
  - Create elements
  - Configure the elements
- Output with `toString()` or `produce()`
- Fallback to HTML API's when needed

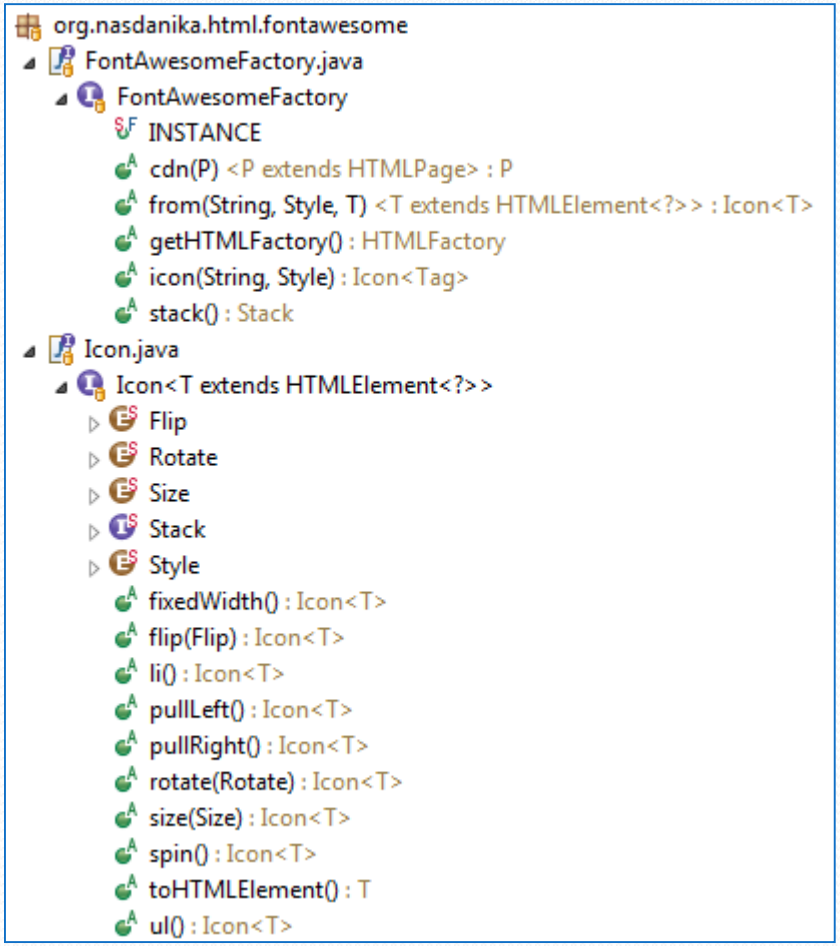
```
ListGroup listGroup = BootstrapFactory.INSTANCE.listGroup(false);

listGroup.item(false, false, Color.DEFAULT, "One");
listGroup.item(true, false, Color.DEFAULT, "Two - active");
listGroup.item(false, true, Color.DEFAULT, "Three - disabled");
listGroup.item(false, false, Color.WARNING, "Four - warning");
```





Font Awesome

- API for building Font Awesome 5 icons
- Built on HTML
- How to use:
  - Obtain FontAwesomeFactory
  - Create icons
  - Configure the icons
- Output with `toString()` or `produce()`
- Fallback to HTML API's when needed

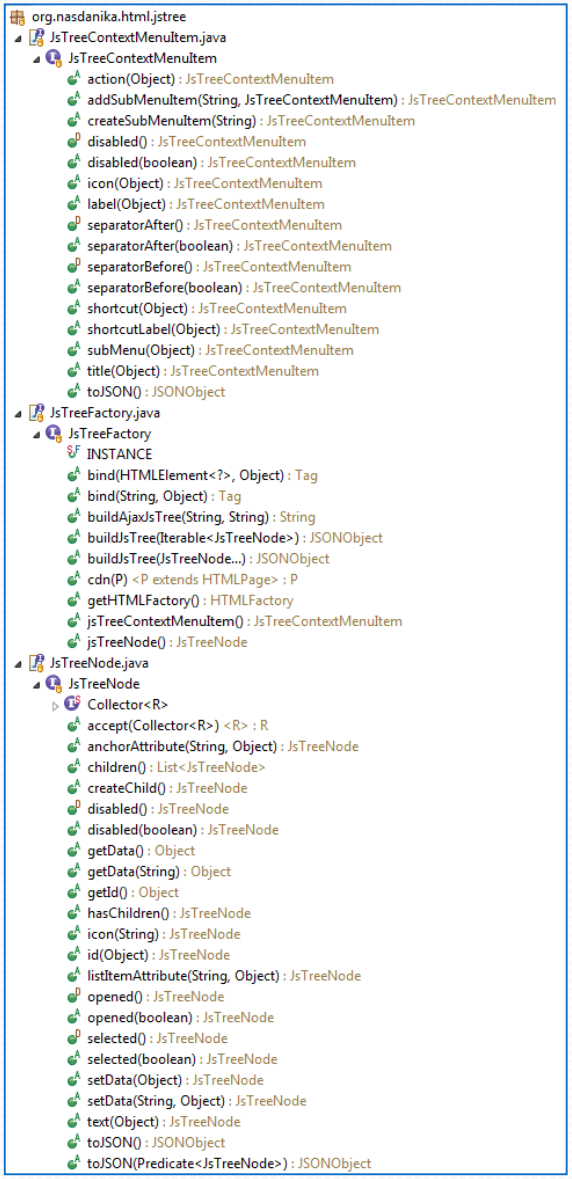



```
Icon<Tag> icon = FontAwesomeFactory.INSTANCE.icon("university", Style.SOLID)
        .size(Size.x5)
        .rotate(Rotate.R180);
```

jsTree

- API for building jsTree nodes and context menus
- Built on HTML
- How to use:
  - Obtain JsTreeFactory
  - Create nodes and menus
  - Configure the nodes and menus
- Output to JSON

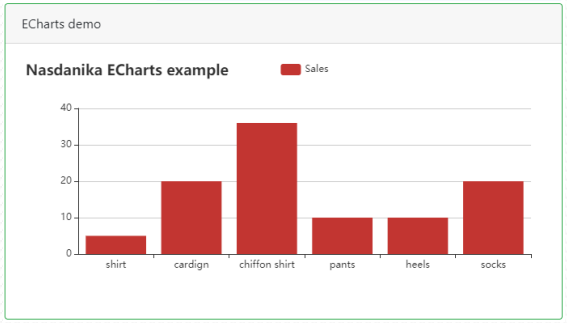
```
JsTreeFactory jsTreeFactory = JsTreeFactory.INSTANCE;
JsTreeNode rootNode = jsTreeFactory.jsTreeNode();
rootNode.icon("far fa-user");
rootNode.text("User");
rootNode.id(htmlFactory.nextId());
rootNode.hasChildren();
JSONArray jsTreeRootNodes = new JSONArray();
jsTreeRootNodes.put(rootNode.toJSON());
```



ECharts

- API for building ECharts charts
- Built on HTML
- How to use:
  - Obtain EChartsFactory
  - Create OptionBuilder
  - Configure option and then create a chart

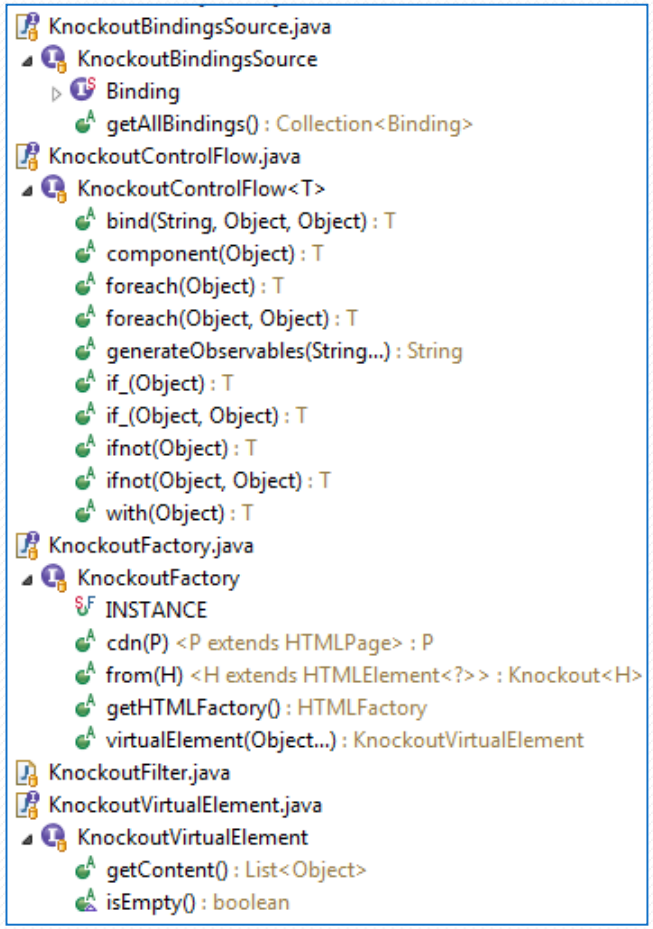
```
Card card = BootstrapFactory.INSTANCE.card().border(Color.SUCCESS);
card.getTitle().toHTMLElement().content("ECharts demo");
OptionBuilder optionBuilder = EChartsFactory.INSTANCE.createOptionBuilder();

optionBuilder.titleBuilder().text("Nasdanika ECharts example");

JSONArray legendData = new JSONArray();
legendData.put("Sales");
optionBuilder.legend().put("data", legendData);

JSONArray xAxisData = new JSONArray();
xAxisData.put("shirt");
xAxisData.put("cardign");
xAxisData.put("chiffon shirt");
xAxisData.put("pants");
xAxisData.put("heels");
xAxisData.put("socks");
optionBuilder.xAxis().put("data", xAxisData);

// yAxis object must be present,
// so we call this method to create an empty object.
optionBuilder.yAxis();

JSONObject salesSeries = new JSONObject();
salesSeries.put("name", "Sales");
salesSeries.put("type", "bar");

JSONArray salesData = new JSONArray();
salesData.put(5);
salesData.put(20);
salesData.put(36);
salesData.put(10);
salesData.put(10);
salesData.put(20);
salesSeries.put("data", salesData);

optionBuilder.series().put(salesSeries);

card.getBody().toHTMLElement().content(optionBuilder.create("700px", "300px"));
writeThemedPage("echarts/card.html", "Bootstrap card", card);
```

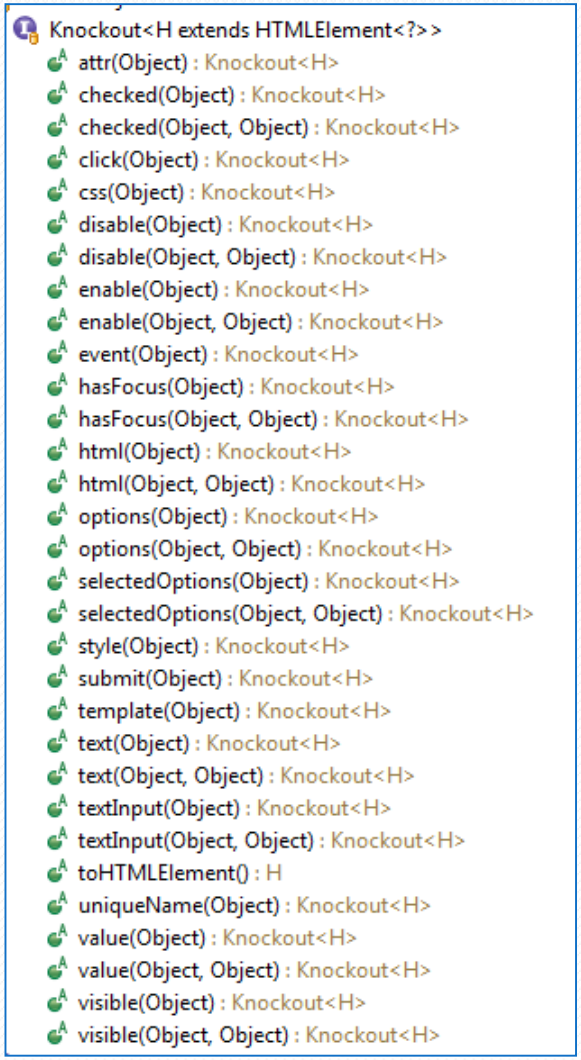


- org.nasdanika.html.echarts
  - EChartsFactory.java
    - EChartsFactory
      - INSTANCE
      - cdn(P) <P extends HTMLPage> : P
      - create(JSONObject, Object, Object) : Fragment
      - create(JSONObject, Object, Object, Consumer<Object>) : void
      - create(Supplier<JSONObject>, Object, Object) : Fragment
      - create(Supplier<JSONObject>, Object, Object, Consumer<Object>) : void
      - createOptionBuilder() : OptionBuilder
      - getHTMLFactory() : HTMLFactory
      - init(HTMLElement<?>, JSONObject) : String
      - init(HTMLElement<?>, Supplier<JSONObject>) : String
      - init(String, JSONObject) : String
      - init(String, Supplier<JSONObject>) : String
  - OptionBuilder.java
    - OptionBuilder
      - angleAxis() : JSONObject
      - animation() : JSONObject
      - animationDelay() : JSONObject
      - animationDelayUpdate() : JSONObject
      - animationDuration() : JSONObject
      - animationDurationUpdate() : JSONObject
      - animationEasing() : JSONObject
      - animationEasingUpdate() : JSONObject
      - animationThreshold() : JSONObject
      - aria() : JSONObject
      - axisPointer() : JSONObject
      - backgroundColor() : JSONObject
      - brush() : JSONObject
      - calendar() : JSONObject
      - color() : JSONObject
      - create(Object, Object) : Fragment
      - create(Object, Object, Consumer<Object>) : void
      - dataset() : JSONObject
      - dataZoom() : JSONArray
      - geo() : JSONObject
      - getFactory() : EChartsFactory
      - graphic() : JSONObject
      - grid() : JSONObject
      - init(HTMLElement<?>) : String
      - init(String) : String
      - legend() : JSONObject
      - parallel() : JSONObject
      - parallelAxis() : JSONObject
      - polar() : JSONObject
      - radar() : JSONObject
      - radiusAxis() : JSONObject
      - series() : JSONArray
      - singleAxis() : JSONObject
      - textStyle() : JSONObject
      - timeline() : JSONObject
      - title() : JSONObject
      - titleBuilder() : TitleBuilder
      - toolbox() : JSONObject
      - tooltip() : JSONObject
      - useUTC() : JSONObject
      - visualMap() : JSONArray
      - xAxis() : JSONObject
      - yAxis() : JSONObject

KnockoutJS

- API for building KnockoutJS bindings
- Built on HTML



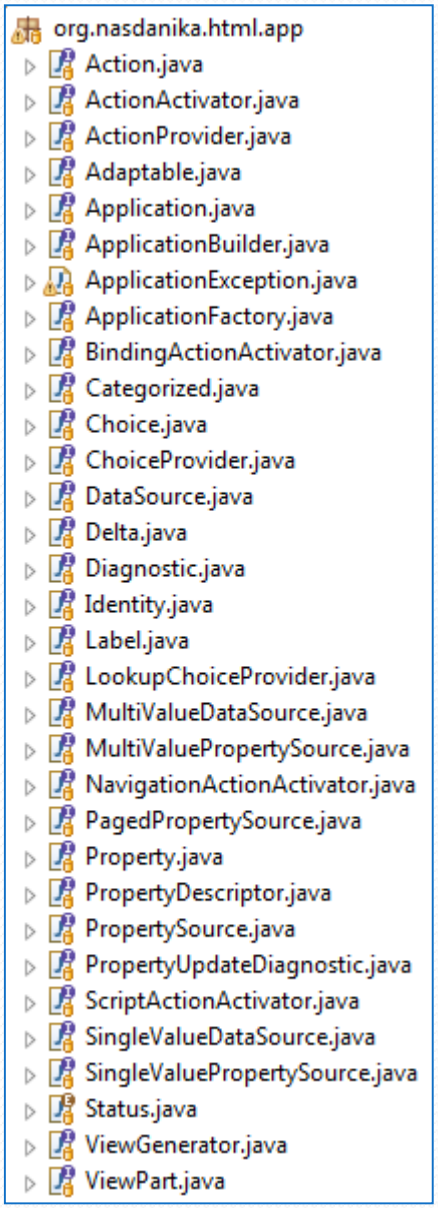


Application - philosophy

- Abstractions to thinks of user-system interaction as:
  - System invokes a user by passing them a callback (user) interface with actions to activate
  - Actions form a vocabulary of system-user interactions
  - The framework takes care of generating an HTML UI from actions and property sources
- Subject - Verb – Object => User - Action - Property source:
  - "Customer views account details":
    - Customer - user
    - Views account details – view action for "account" property source
- If it can be articulated, it can be automated

Application – key abstractions

- Label – something with a text and an icon
- Action – a label which can be activated by a user
- Data sources and properties – low-level data access
- Property sources and property descriptors – higher-level data access abstractions with UI attributes and actions
- Application – header, navigation bar, navigation panel, content panel, footer
- Application Builder – builds an application
- Action Application Builder – builds an application from an action tree
- ViewPart – a contributor to UI construction
- ViewGenerator – provides common generation methods and access to factories – HTML, Bootstrap, …



EMF

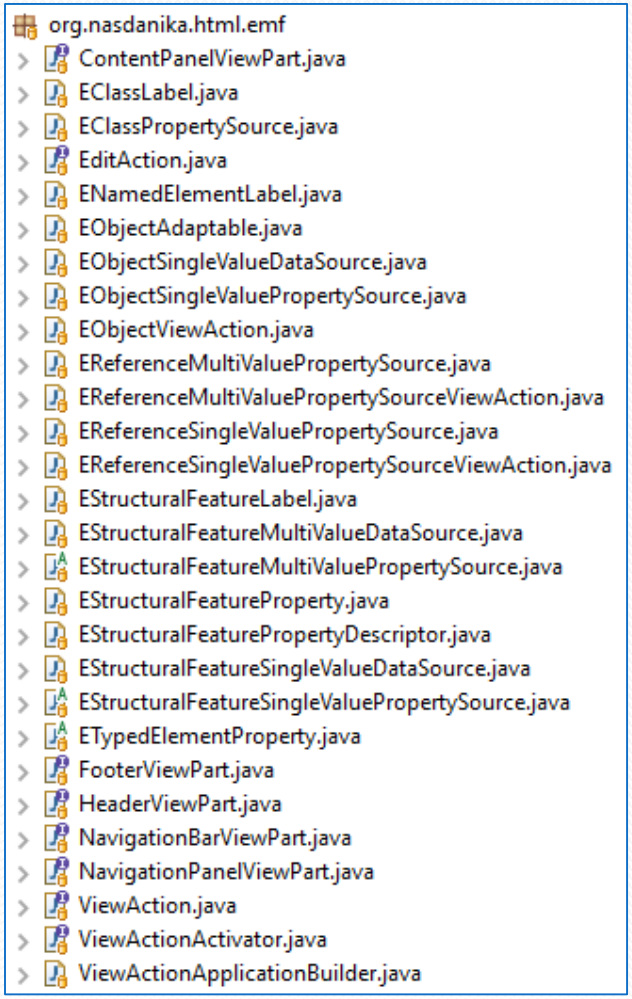
- EMF adapters to the application abstractions
- Use default implementations or customize
- Register with a resource set:

```
ComposedAdapterFactory composedAdapterFactory = new ComposedAdapterFactory();

composedAdapterFactory.registerAdapterFactory(
        new SupplierAdapterFactory<ApplicationFactory>(
                ApplicationFactory.class,
                this.getClass().getClassLoader(),
                BootstrapContainerApplicationFactory::new));

composedAdapterFactory.registerAdapterFactory(
        new FunctionAdapterFactory<ApplicationBuilder, EObject>(
                ApplicationBuilder.class,
                this.getClass().getClassLoader(),
                ViewActionApplicationBuilder::new));

composedAdapterFactory.registerAdapterFactory(
        new FunctionAdapterFactory<ViewAction, EObject>(
                ViewAction.class,
                this.getClass().getClassLoader(),
                EObjectViewAction::new));

resourceSet.getAdapterFactories().add(composedAdapterFactory);
```

- Adapt EObject to generate HTML UI:

```
Application application = EObjectAdaptable.adaptTo(eObj, ApplicationFactory.class).createApplication();
ApplicationBuilder applicationBuilder = EObjectAdaptable.adaptTo(eObj, ApplicationBuilder.class);
applicationBuilder.build(application);
```

- Can be used to generate static content and in dynamic Web applications



ECore

- ViewAction adapters for Ecore model elements
- Documentation generator and helper classes

```
EcoreDocumentationGenerator generator = new EcoreDocumentationGenerator("Nasdanika Bank Model", null);
generator.loadGenModel("urn:org.nasdanika.bank");
generator.generate(new File("target/test-dumps/ecore"));
```