31.8.–3.9.2015
in Nürnberg

Herbstcampus

Wissenstransfer
par excellence

JSF meets JS (2. ed.)

JSF-Komponenten mit JavaScript

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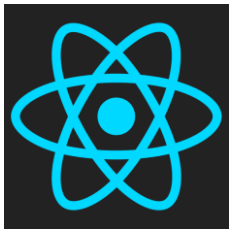
JSF in Webanwendungen?

JavaScript & SPA

- Single page application (SPA)
  - Nur eine HTML-Seite
  - DOM-Manipulation hintergründig
  - Business-Logik im Client
  - Status im Browser
- Rolle des Servers
  - Stateless



JavaScript & SPA

- Hypegefahr
  - „Is angularJs dead?“
  - „ReactJs is the next big thing!“
- Architekturelle Probleme
  - Geschwindigkeit
  - Browserkompatibilität
- Pitfalls
  - Pionierarbeit (v.a. Enterpriseumfeld)

Serverseitige Webanwendungen

- Berüchtigt im Enterprise Umfeld
  - Bekanntes Programiermodell
  - Weniger Medienbrüche
- Rich Internet Applications
  - Ajax
  - Presentations-Logik
- Rolle von JavaScript
  - DOM-Manipulation

Serverseitige Webanwendungen

- Berüchtigt im Enterprise Umfeld
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- Rich Internet Applications
  - Ajax
  - Presentations-Logik
- Rolle von JavaScript
  - DOM-Manipulation

→ BEST OF BREED

JSF meets JavaScript

JSF meets JS: Why not Primefaces?

JSF meets JS: Why not Primefaces?

- Kundenanforderungen an die GUI
  - Individuelle Probleme
- Frameworks sind Blackboxes
- Third-Party-Libraries
  - Boilerplate
  - Bugs
  - Abhängigkeiten

Ziele des Vortrags

- Best-Practices vermitteln
  - JavaScript-Pattern
  - JSF-JS-Komponenten
  - JSF-JavaScript-Kommunikation

→ Den Einsatz von 3rd Party Libraries überdenken

Was im Standard geschah...

JSF Composite Components

- JSF-Code in Komponenten auslagern
  - Parametrisierbar
  - Wiederverwendbar
- Ziel: deklarative Kapselung von GUI-Logik

```
<html xmlns="http://www.w3.org/1999/xhtml"
      xmlns:ok="http://xmlns.jscp.org/jsf/composite/ok">

<ok:labelTextBox
        value="#{someBean.firstName}"
        name="Firstname">
</ok:labelTextBox>
```

JSF Composite Components

- „Keep simple things simple“
  - XHTML Interface
  - XHTML Implementierung

- „Convention over code & configuration“
  - Namenskonventionen
  - Ressourcenzugriff

Keep simple things simple

- Interface & Implementierung

```
<html xmlns="http://www.w3.org/1999/xhtml"
      xmlns:composite="http://java.sun.com/jsf/composite"
      xmlns:jsf="http://xmlns.jcp.org/jsf">

<composite:interface>
    <composite:attribute name="name" />
    <composite:attribute name="value"/>
</composite:interface>

<composite:implementation>
    <label jsf:id="lbl" jsf:for="inputComponent"
                        jsf:value="#{cc.attrs.name}"/>
    <input  type="text" jsf:id="inputComponent"
                        jsf:value="#{cc.attrs.value}"/>
</composite:implementation>
```

Convention over configuration

- webapp/resources/ok/labelTextBox.xhtml
  → xmlns:ok="http://xmlns.jcp.org/jsf/composite/ok"

```
<html xmlns="http://www.w3.org/1999/xhtml"
      xmlns:composite="http://java.sun.com/jsf/composite"
      xmlns:jsf="http://xmlns.jcp.org/jsf">

<composite:interface>
    <composite:attribute name="name" />
    <composite:attribute name="value"/>
</composite:interface>

<composite:implementation>
    <label jsf:id="lbl" jsf:for="inputComponent"
                        jsf:value="#{cc.attrs.name}"/>
    <input  type="text" jsf:id="inputComponent"
                        jsf:value="#{cc.attrs.value}"/>
</composite:implementation>
```

Und JavaScript?

JSF und JS: Der Standard

- Alles ist deklarativ in JSF (XML-Kapselung)
  - Komponenten

```
<h:dataTable value="#{someBean.list}" var="row">
    <h:column>#{row.valA}</h:column>
    <h:column>#{row.valB}</h:column>
</h:dataTable>
```

  - JavaScript

```
<h:commandButton value="Submit">
    <f:ajax execute="@this" render="panelB"/>
</h:commandButton>
```

  - Standardisierte JavaScript-Integration: Clientbehaviors

Client Behaviors

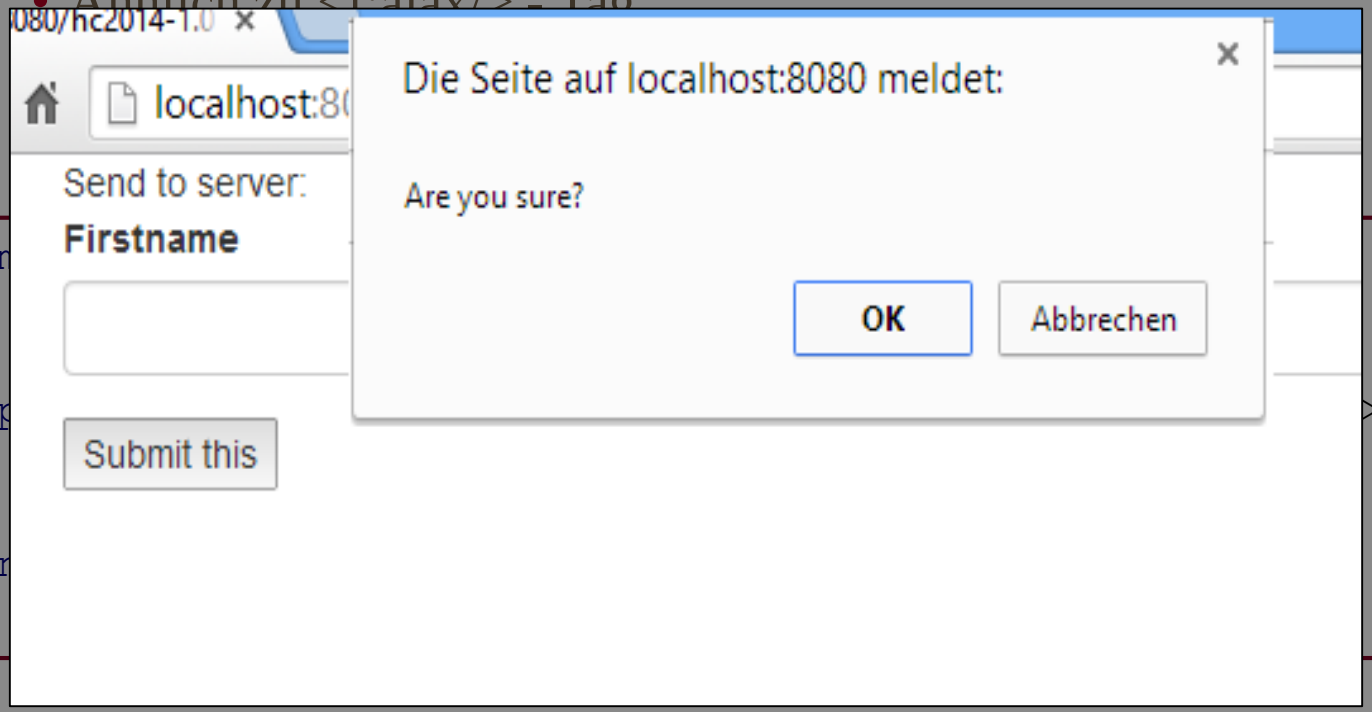
- JavaScript deklarativ kapseln
  - Ähnlich zu <f:ajax/> - Tag
  - Komponenten um clientseitige Funktionalität erweitern

```
<html xmlns="http://www.w3.org/1999/xhtml"
      xmlns:okb="http://openknowledge.de/behavior" ...>

<input type="submit" jsf:id="submit" value="Submit this">
    <okb:confirm message="Are you sure?"/>
    <f:ajax render="parentForm"/>
</input>
```

Client Behaviors

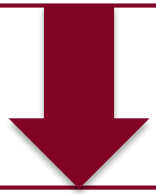
- JavaScript deklarativ kapseln
  - Ähnlich zu <f:ajax/> - Tag



Client Behaviors

- Was passiert da?

```
<input type="submit" jsf:id="submit" value="Submit this">
    <okb:confirm message="Are you sure?"/>
    <f:ajax render="parentForm"/>
</input>
```



```
<input id="parentForm:submit"
       onclick="jsf.util.chain(this,event,
           'return confirm(\'Are you sure?\')',
           'mojarra.ab(this,event,\'action\',0,\'parentForm\')');"/>
```

Client Behaviors

- Was braucht man?
  - Behavior-Klasse
    - extends ClientBehaviorBase
    - @FacesBehavior(“de.my.behavior“)
  - taglib.xml
    - Konfiguration ☹
  - JavaScript-Code
    - Das eigentliche Herzstück

Client Behaviors

```
@FacesBehavior("de.openknowledge.SimpleBehavior")
public class SimpleBehavior extends ClientBehaviorBase {
  private String message;

  @Override
  public String getScript(ClientBehaviorContext behaviorContext) {
    return "return confirm('"+getMessage()+"')";
  }

  public String getMessage() {
    return message;
  }

  public void setMessage(String msg) {
    this.message = msg;
  }
...
```

Client Behaviors

- JavaScript in Java?

```
@FacesBehavior("de.openknowledge.SimpleBehavior")
@ResourceDependencies(value = {
    @ResourceDependency(name = "ok/confirm.js")
})
public class SimpleBehavior extends ClientBehaviorBase {
  private String message;

  @Override
  public String getScript(ClientBehaviorContext behaviorContext) {
    return "ok.confirmDialog.show();";
  }
 ...
}
```

Client Behaviors

- META-INF/ok.taglib.xml

```
<facelet-taglib version="2.2"  … >
    <namespace>http://openknowledge.de/behavior</namespace>
     <tag>
         <tag-name>confirm</tag-name>
      <behavior>
         <behavior-id>
            de.openknowledge.SimpleBehavior
         </behavior-id>
      </behavior>
      <attribute>
         <name>message</name>
      </attribute>
     </tag> ...
```

Client Behaviors

- Zeitgemäß?
  - Konfiguration ☹
  - Boilerplate ☹
  - Eventbasiert ☹
  - Keine zwingenden JS-Pattern

JSF & JavaScript – Ein Chaos vermeiden

JSF & JavaScript

- Umittelbare Integration von JavaScript in JSF
  - Nicht standardisiert

- Inline Scripting

```
<input type="text" jsf:id="dp"/>

<script type="text/javascript">
        var dpElm = document.getElementById("form:dp");
        dpElm.dataset.datepicker = true;
        dpElm.dataset.dateformat = #{someBean.dateformat};
        //...
</script>

<div jsf:id="someOtherPanel">
    <h1>Bad bad code...</h1>
</div>
```

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JSF & JavaScript

- Why Inline-Scripting sucks
  - Wartbarkeit?
  - DRY & Separation of concerns?
  - Fehlersuche?
  - Weiche Faktoren
    - Auslagerung = Modularisierung
    - Performanz + Traffic

Enterprise JavaScript

be unobtrusive

use consistent pattern

use build systems

minimize globals

write tests

Enterprise JavaScript

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write tests

Enterprise JS: Globals

- Globals are evil!

```
var myglobal = "hello"; // antipattern
console.log(myglobal); // "hello"
console.log(window.myglobal); // "hello"
console.log(window["myglobal"]); // "hello"
console.log(this.myglobal); // "hello"
```

- Kollisionen
  - Libraries
  - Andere JS-Dateien

Enterprise JS: Globals

- Namespace pattern

```
var Application = {};
Application.SubModul = {};
Application.SubModul = {
    SomeClass : function(){...}
};
```

- Module
  - Mit Tools (z.B. Browserify)
  - ES2015-Modules

```
//------ myFunc.js ------
export default function () { ... };
//------ main1.js ------
import myFunc from 'myFunc';
myFunc();
```

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Enterprise JS: Pattern

- JavaScript === dynamisch
  - 1000 Wege führen nach Rom
- Das richtige Pattern finden
  - !== Inline-Scripting, !== Globals
  - Wohlbefinden des Teams
  - „Framework Faktoren“
- Pattern konsistent einsetzen
  - Explizit
  - Implizit

Enterprise JS: Module-Pattern

- Von vielen JS-Bibliotheken verwendet
  - Minimiert globale Variablen
  - Strukuriert Code
- Information Hiding & Vererbung
- Herzstück
  - Self-Invoking Functions
  - Function-Scope von JavaScript

```
SomeNameSpace.Module = (function () {
    //...
    return PublicApi;
})();
```

Module-Pattern: Klassensimulation

```
SomeNameSpace.DatePicker = (function () {
    //constructor
    var DatePicker = function(param){
        this.param = param;
    };
    //public method
    DatePicker.prototype.init = function(){
        //use call to keep this reference
        privateMethod.call(this);
    };
    //private method
    var privateMethod = function(){
        console.log(this.param);
    };
    return DatePicker;
})();
//usage
new SomeNameSpace.DatePicker("hello").init(); //prints hello
```

ES 2015: Class-Syntax

```
class DatePicker extends BaseConent{
    constructor(param){
        super();
        this.param = param;
    }
    get otherParam(){
        return this.otherParam;
    }
    set otherParam(param){
        this.otherParam = param;
    }
    init(){
        this._init();
    }
    _init(){
        console.log(this.param);
    }
}
new DatePicker("hello").init();
```

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Separation of structure and behavior

Inline-Scripting

Separation of structure and behavior

- Problem: JavaScript wo und wie initialisieren?
  - Jede Komponente hat eigenes Script-Modul
  - Parameter aus JSF (Java) an JS übergeben

Separation of structure and behavior

- Problem: JavaScript wo und wie initialisieren?
  - Jede Komponente hat eigenes Script-Modul
  - Parameter aus JSF (Java) an JS übergeben

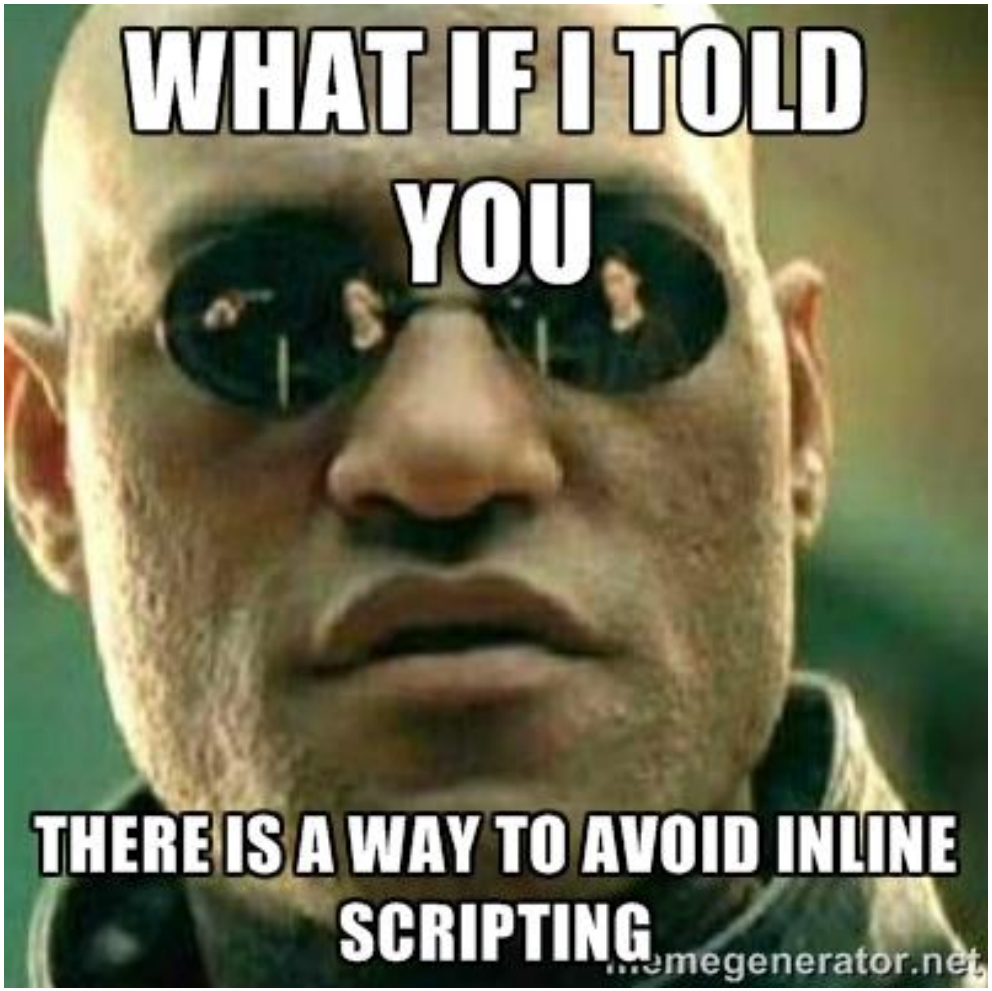
```
<composite:interface>
    <composite:attribute name="value" type="java.lang.Date"/>
    <composite:attribute name="format" type="java.lang.String"/>
</composite:interface>

<composite:implementation>
    <input type="text" jsf:id="dp" jsf:value="#{cc.attrs.value}"/>
    <script>
        new ok.DatePicker({
            clientId: "#{cc.clientId}",
            format: "#{cc.attrs.format}"
        });
    </script>
</composite:implementation>
```

Separation of structure and behavior

- Im Browser...

```
<input type="text" id="form:component:dp" value="1.1.2015"/>
<script>
    new ok.DatePicker({
        clientId: "form:component",
        format: "dd.mm.yyyy"
    });
</script>
```

JS-Initialisierung mit Nicole



JS-Initialisierung mit Nicole

- True separation of structure and behavior

```
<composite:interface>
    <composite:attribute name="value" type="java.lang.Date"/>
    <composite:attribute name="format" type="java.lang.String"/>
</composite:interface>

<composite:implementation>
    <input type="text" jsf:id="dp" jsf:value="#{cc.attrs.value}"/>

    <nicole:module modulename="DatePicker">
        <nicole:jsparameter name="format" value="#{cc.attrs.format}"/>
     </nicole:module>

</composite:implementation>
```

JS-Initialisierung mit Nicole

- Im Browser...

```
<input id="form:component:dp" value="1.1.2015" type="text"/>

<input id="form:component:nicoleCC:nicole"
       type="hidden"
       data-modulename="DatePicker"
       data-format="dd.mm.yyyy"
       data-clientid="form:component"/>
```

JS-Initialisierung mit Nicole

- Und JavaScript:

```
Nicole.module("DatePicker", function () {
    this.$elm("datePicker").datepicker({
        dateFormat: this.parameter("format")
    });
});
```

Nicole Zusammenfassung

- JSF bleibt JSF
- HTML bleibt HTML
- JavaScript: erzwungenes Pattern

→ github.com/dskgry/nicole

Enterprise JavaScript

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Enterprise JS: Build & Test

- Build-Systeme
  - Concatenation & Minification
  - Transpiling
  - Linting
  - Testing

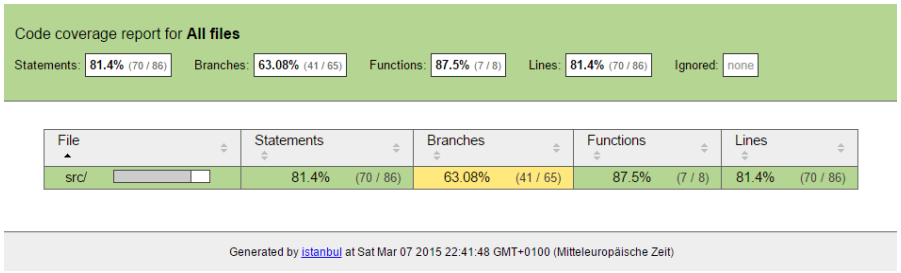
Enterprise JS: Build & Test

- Test: What do we test?

```
describe("the chartComponent", function () {
    it("does not support the type bar", function () {
        expect(function(){
            new ok.ChartComponent({
                clientId: "client:id",
                chartType: "bar"
            });
        }).toThrow();
    });
});
```

- Toolsets
  - Runner
  - Assertions%
  - Spy/Mock

- CI
  - Jenkins Integration
  - Statische Codeanalysen
    - Coverage



JSF & JavaScript: JSON-Kommunikation

JSF & JavaScript: JSON-Kommunikation

- JSF (Ajax) Kommunikation basiert auf XML
  - semantische Daten

```
<partial-response id="j_id1"><changes><update
id="parentForm"><![CDATA[
<form id="parentForm" method="post" class="container">
<input type="hidden" name="parentForm" value="parentForm" />
```

- JS-Komponenten nutzen JSON
  - Übertragung „reiner“ Daten nötig

JSF & JavaScript: JSON-Kommunikation

- Warum nicht mit JAX-RS
  - Stateless vs. Stateful
  - JSF-Lifecycle
  - CDI-Scopes
    - Viewscope?

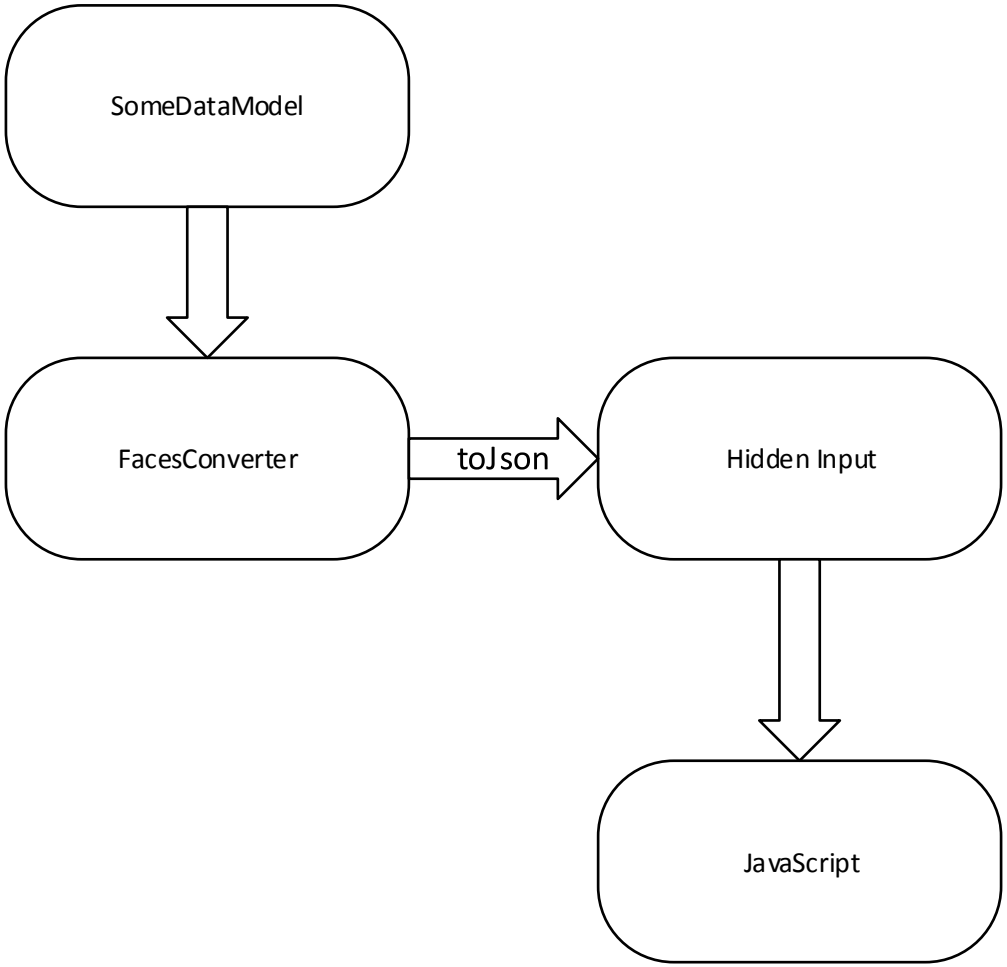
JSF & JavaScript: JSON-Kommunikation

- Übertragung des JSON in Hidden-Input-Fields
  - Nutzung von FacesConvertern (Java zu JSON konvertieren)

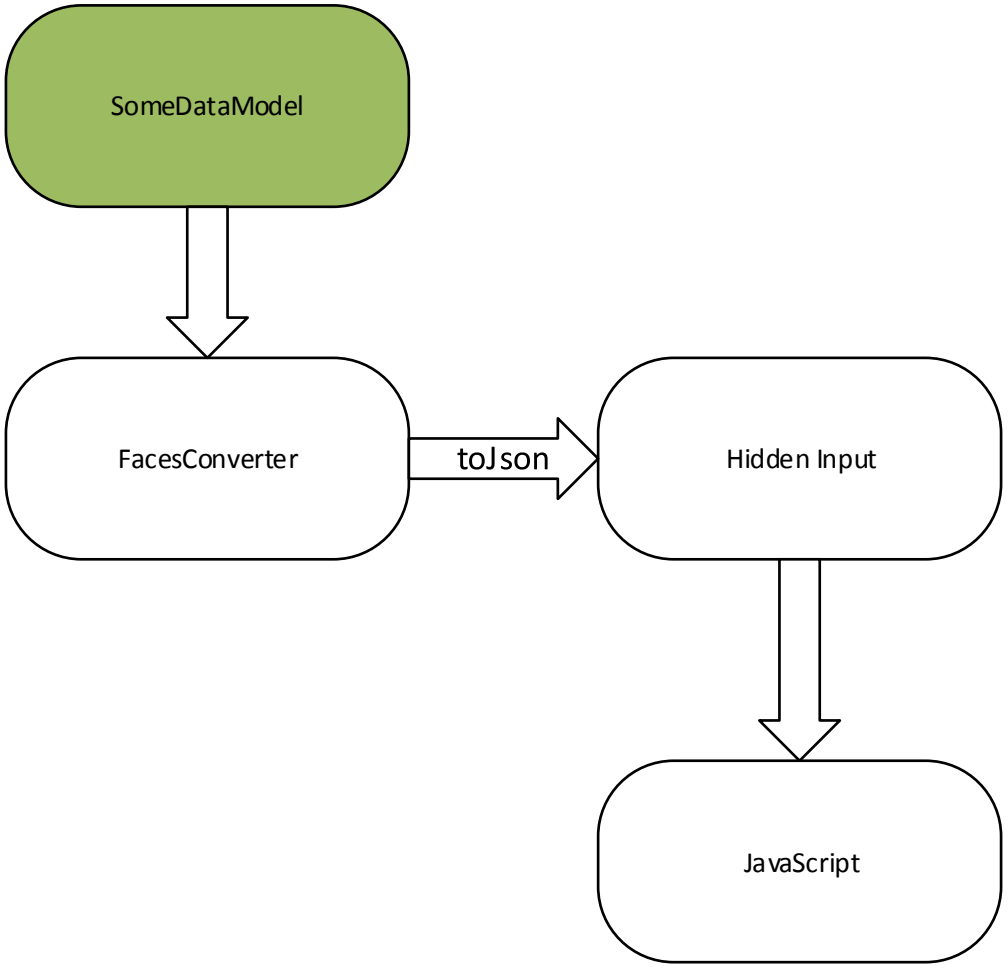
```
{"data":[{"a":"b"},{"a":"b"}]}
```

- Nutzung von JSF im Standard
- Minimaler Overhead

JSF & JavaScript: JSON-Kommunikation



JSF & JavaScript: JSON-Kommunikation



JSF & JavaScript: JSON-Kommunikation

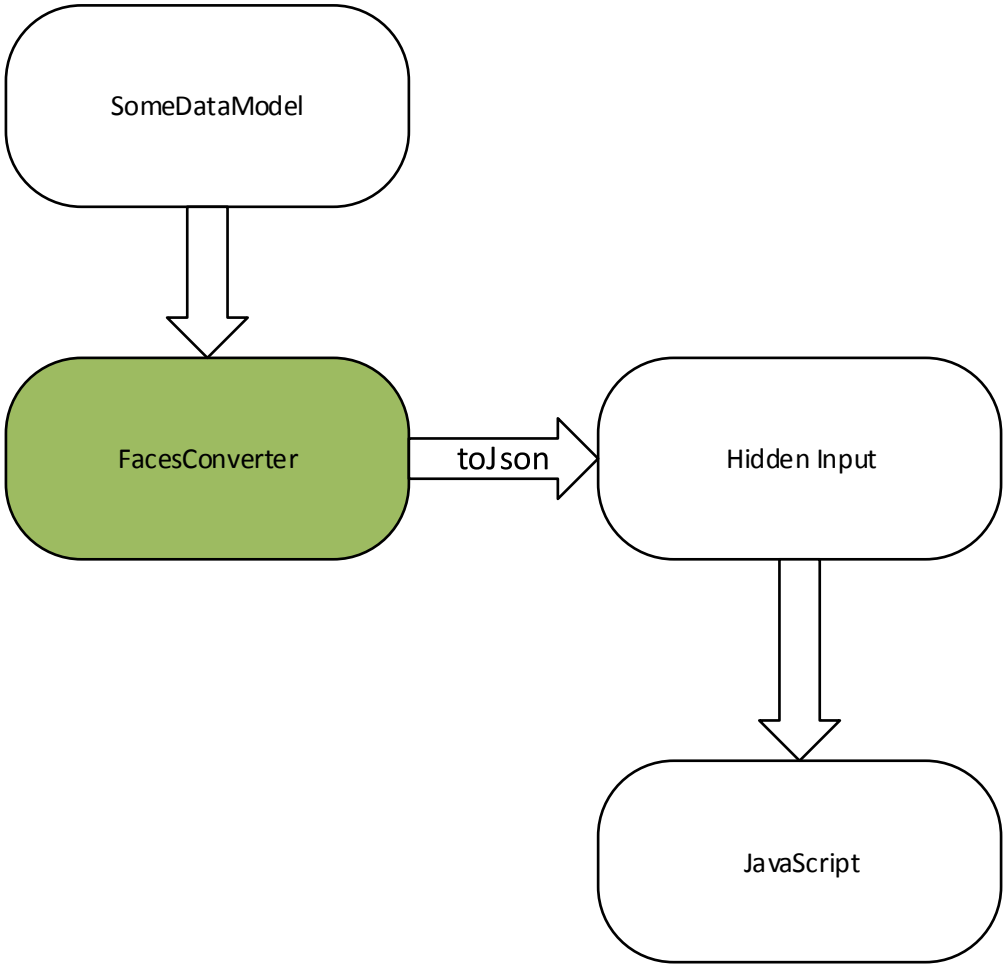
- Komponente hat ein geeignetes Datenmodell
  - z.B. Chart - Menge aus x und y Werten
  - z.B. Map - Menge aus Lat. und. Lon. Werten

```
public abstract class ChartDataModel<T, X, Y> {
  private Map<X, Y> dataSeries;

  public Map<X, Y> getDataSeries() {
    return dataSeries;
  }
  protected abstract X getXValue(T t);

  protected abstract Y getYValue(T t);
}
```

JSF & JavaScript: JSON-Kommunikation



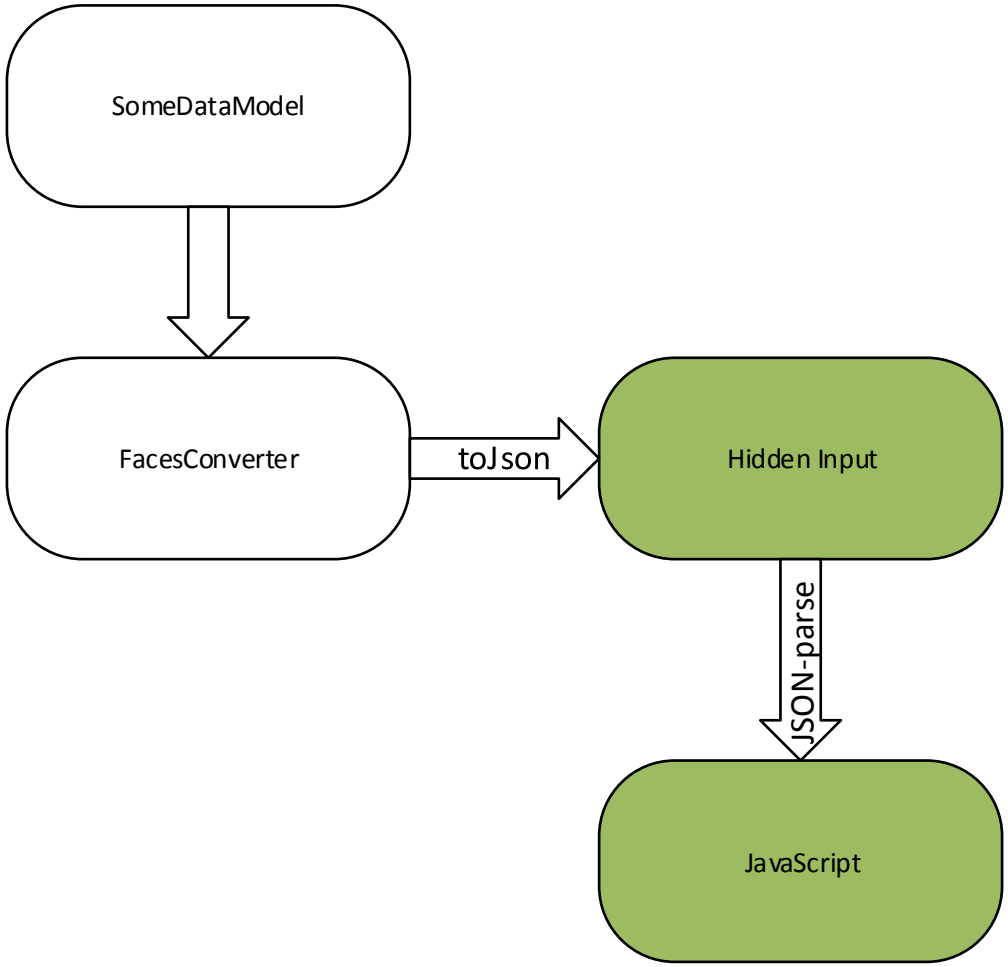
JSF & JavaScript: JSON-Kommunikation

- FacesConverter: Datenmodell → JSON
  - JavaEE 7 JSON-API

```
@FacesConverter(value = "de.openknowledge.ChartConverter")
public class ChartConverter implements Converter {
 ...
public String getAsString(FacesContext ctx, UIComponent comp,
                                                    Object value) {
    ChartDataModel dataModel = (ChartDataModel) value;

    JsonArrayBuilder dataArray = Json.createArrayBuilder();
     ...
    return dataArray.build().toString();
  }
  ...
```

JSF & JavaScript: JSON-Kommunikation



JSF & JavaScript: JSON-Kommunikation

- Converter am Hidden-Input-Feld registrieren
- Hidden-Input-Field mit JSON „befüllen“

```
<input
      type="hidden"
      jsf:id="jsonHelper"
      jsf:converter="de.openknowledge.ChartConverter"
      jsf:value="#{somebean.chartDataModel}"/>
```

JSF & JavaScript: JSON-Kommunikation

- HTML

```
<input value="{"xAxes":["04.09.14","06.09.14"],
        "yAxes":["8.74","85.77"]}"/>
```

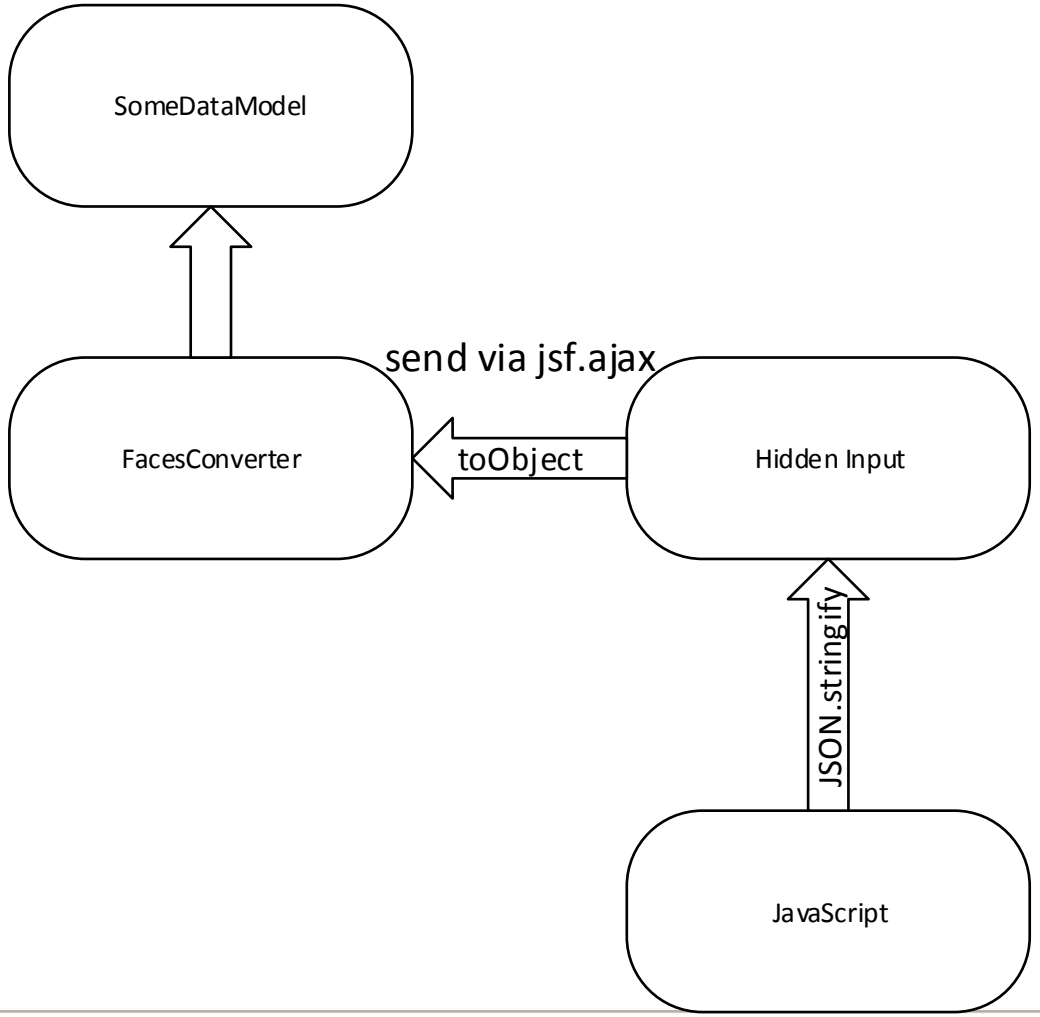
- JavaScript, jQuery

```
var chartDataJson =
   JSON.parse(this.$elm("jsonHelper").val());
```

JSF & JavaScript: JSON-Kommunikation

- Und andersrum?

JSF & JavaScript: JSON-Kommunikation




"That's all Folks!"

Ausblick

- JSF 2.3: Evolution statt Revolution
  - Ajax method invokation
- MVC 1.0
  - Auch hier: Chaos vermeiden
  - Weg von DOM-Manipulation?
- EcmaScript 2015 / 2016
  - class syntax / promises
  - privates

Fazit

- JSF & JavaScript
  → Pattern essentiell
- JSON-Kommunikation
  → JavaEE 7 Boardmittel
- Eigene Komponenten bringen enorme Flexibilität
  → initialer Aufwand höher
- Einsatz von 3rd-Party Libraries abwägen
  → 0 8 15 vs. fancy web

Vielen Dank!

Sven Kölpin
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