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Institut für raumbezogene Informations- und Messtechnik
Fachhochschule Mainz

Social Media as Sensors

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FOSSGIS 2014

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Gliederung des Vortrags

1. Hintergrund
2. Sensornetzwerke (People as Sensors)
3. Social Media / Analyse
4. FlexSensor Ansatz
5. Ausblick

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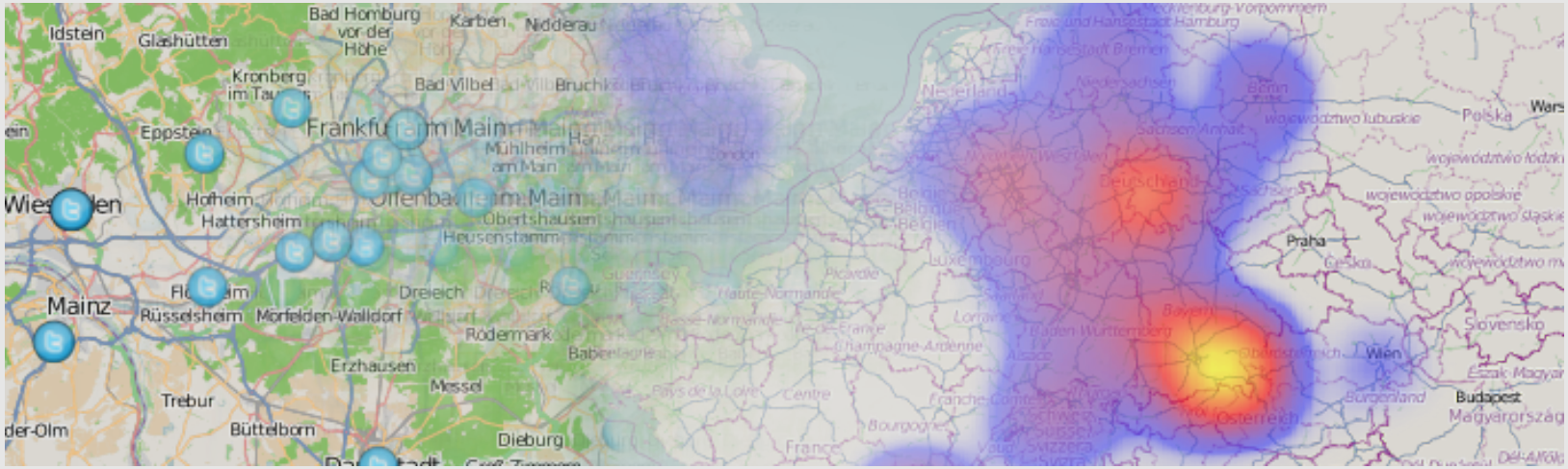
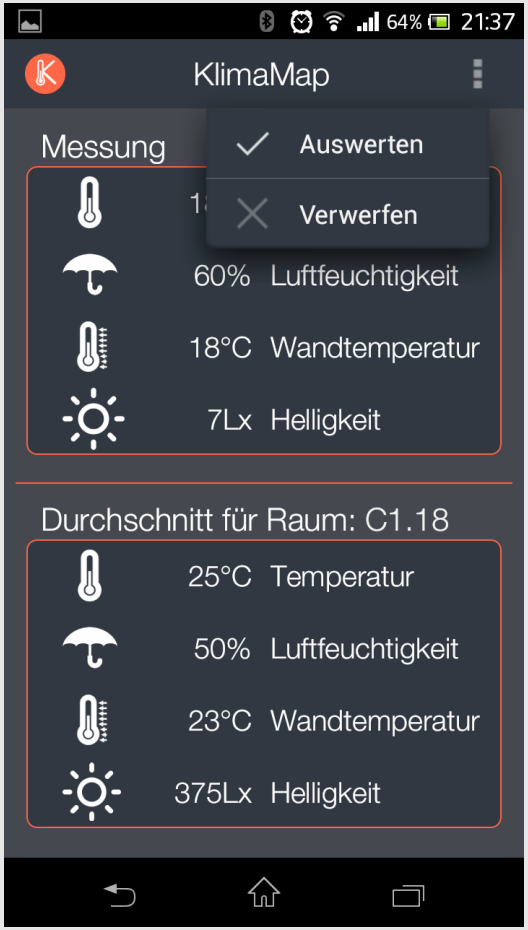
Tweetmap

- **Projektarbeit**
- **Mapped Tweets auf Karte**
- **Themen basierte Verwaltung**
- **Keine zeitliche Visualisierung / keine Analyse**



http://tweetmap.fh-mainz.de

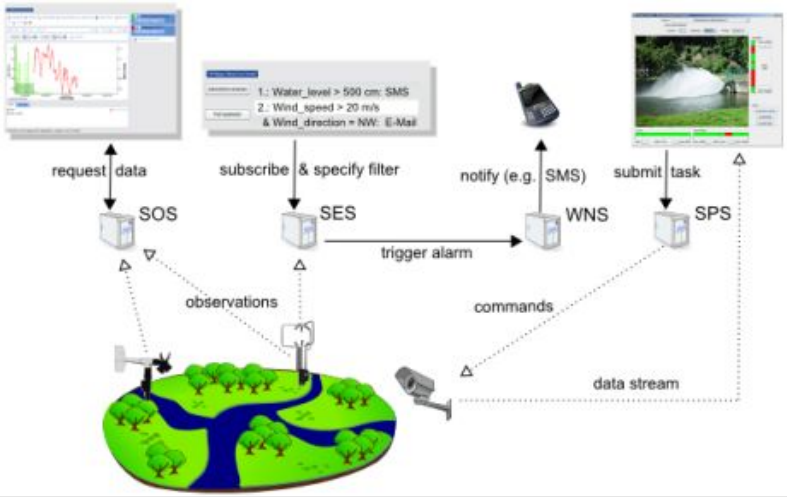
People as Sensors

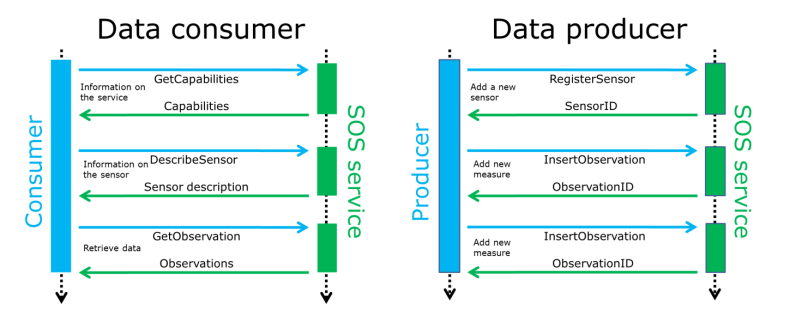


- **physikalische Messungen**
- **Sinneseindrücke**
- **Empfindungen**
- **persönliche Beobachtungen**

- **Häufige Verwendung von Smartphones (persönliche Informationen)**
  - **Sensoren**
  - **Apps**

Sensor Web Enablement





- **Standards des OGC**
- **Mehrere Services und Formate**

Sensor Observation Service:

- **Version 1.0.0 und 2.0.0**
- **Requests:**
  - **GetCapabilties**
  - **DescribeSensor**
  - **GetObservation**
  - **RegisterSensor**
  - **InsertObservation**

Social Media

„Social Media umschreibt grob Inhalte , bzw. Anwendungen zur Erstellung, Gestaltung und Austausch dieser Inhalte, welche „Benutzer-generiert“ sind. Social Media bedient sich hierbei der Techniken des Web 2.0.“

Atzmüller / Kaplan; Haenlein

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Twitter

Allgemein

- Mikro-Blogging Anwendung
- Tweets (140 Zeichen)
- Java / Scala / Bootstrap

API

- Version 1.1
- OAuth 2
- Search / Stream
- Unterschiedliche räumliche Informationen:
  - Coordinates
  - Places
  - User Location

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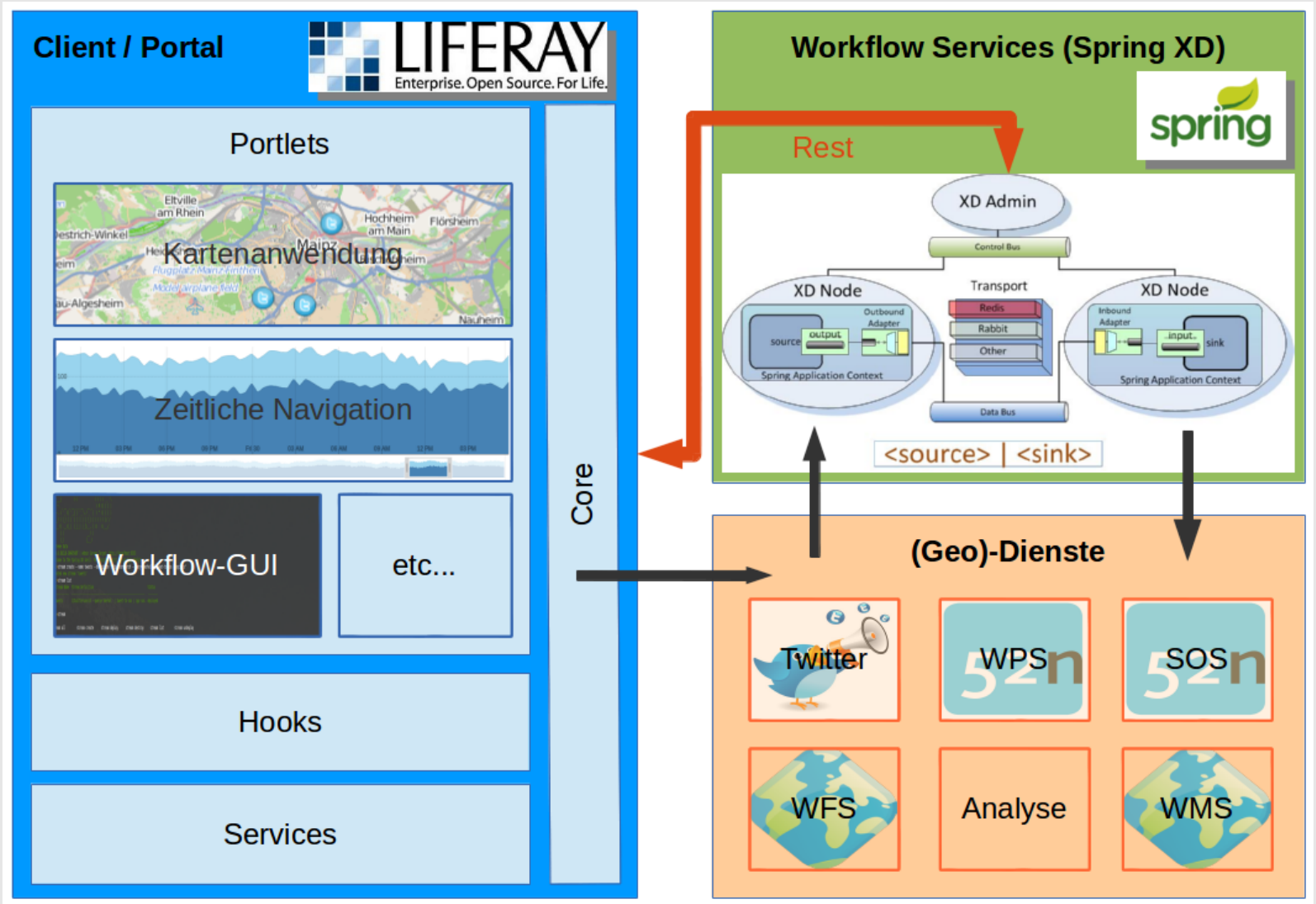
Analyse

- **Netzwerkanalyse (SNA)**
  - **Verbindungen**
  - **Relevanz / Expertenwissen**
- **Metainformationen analysieren**
  - **Beispiele Flickr**
- **Inhalt analysieren**
  - **Starker Fokus auf Text basierte Informationen**

FlexSensor Ansatz



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Twitter2SOS

- Flexibler Datenstrom
- Verwendung von Spring XD, Spring Integration, Spring Social Twitter, OX-Framework, 52north SOS
- Derzeitige Prozessschritte:
  - Twitter-API abfragen
  - Geocoding
  - Sentiment Analyse
  - Observation in SOS schreiben

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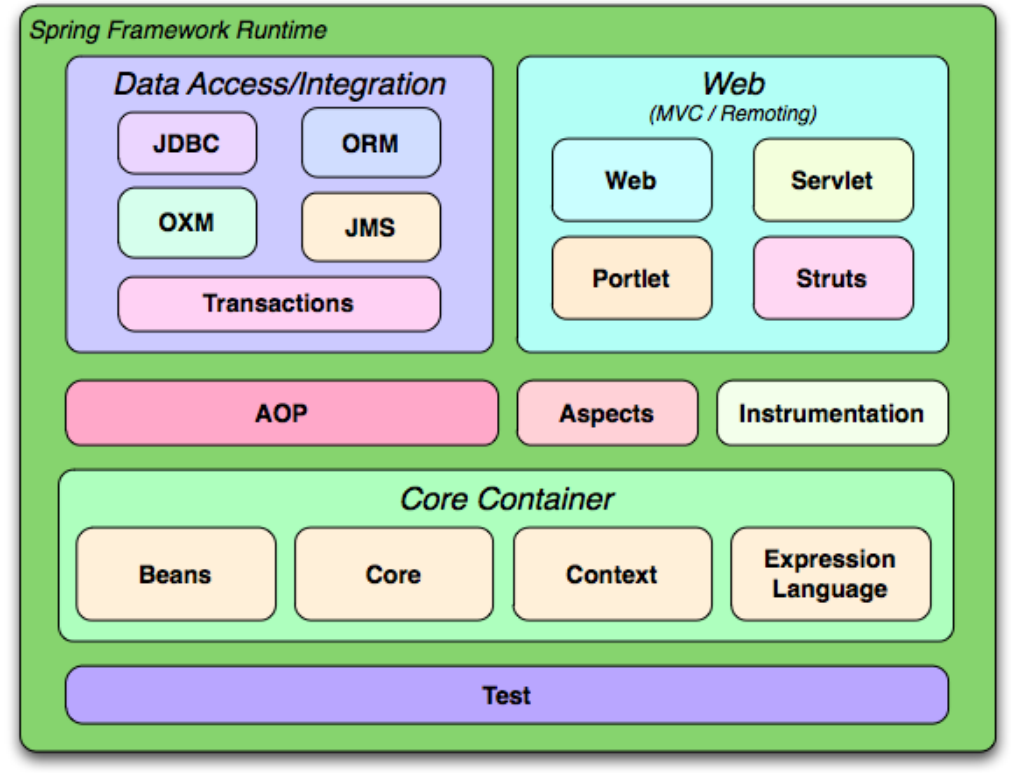
Spring Framework

- **Dependency Injection / Beans**
- **Templates**
- **Data / Web / ...**



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Spring Social Twitter

- Data Template
- API 1.1
- Version 1.0.5
- Nur teilweise Unterstützung des Raumbezugs

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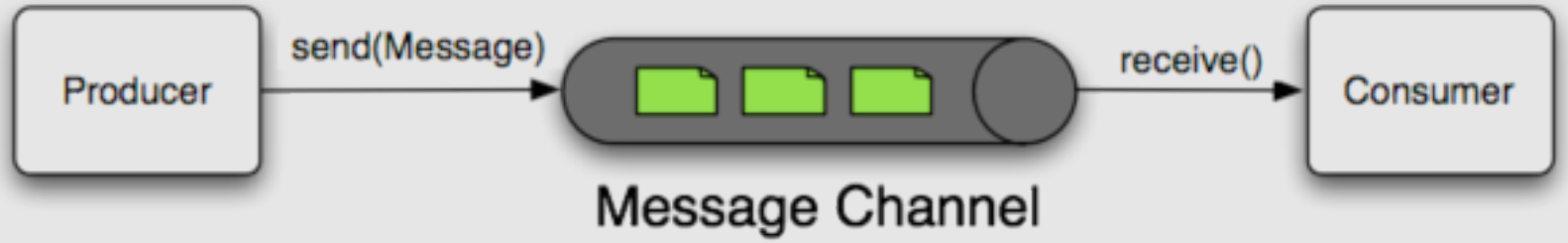
Spring Integration

- Enterprise Integration Pattern
- Messages (Header + Payload)
- Adapter (Channel, Endpoints, Routing, Transformation)
- Starke Entkopplung



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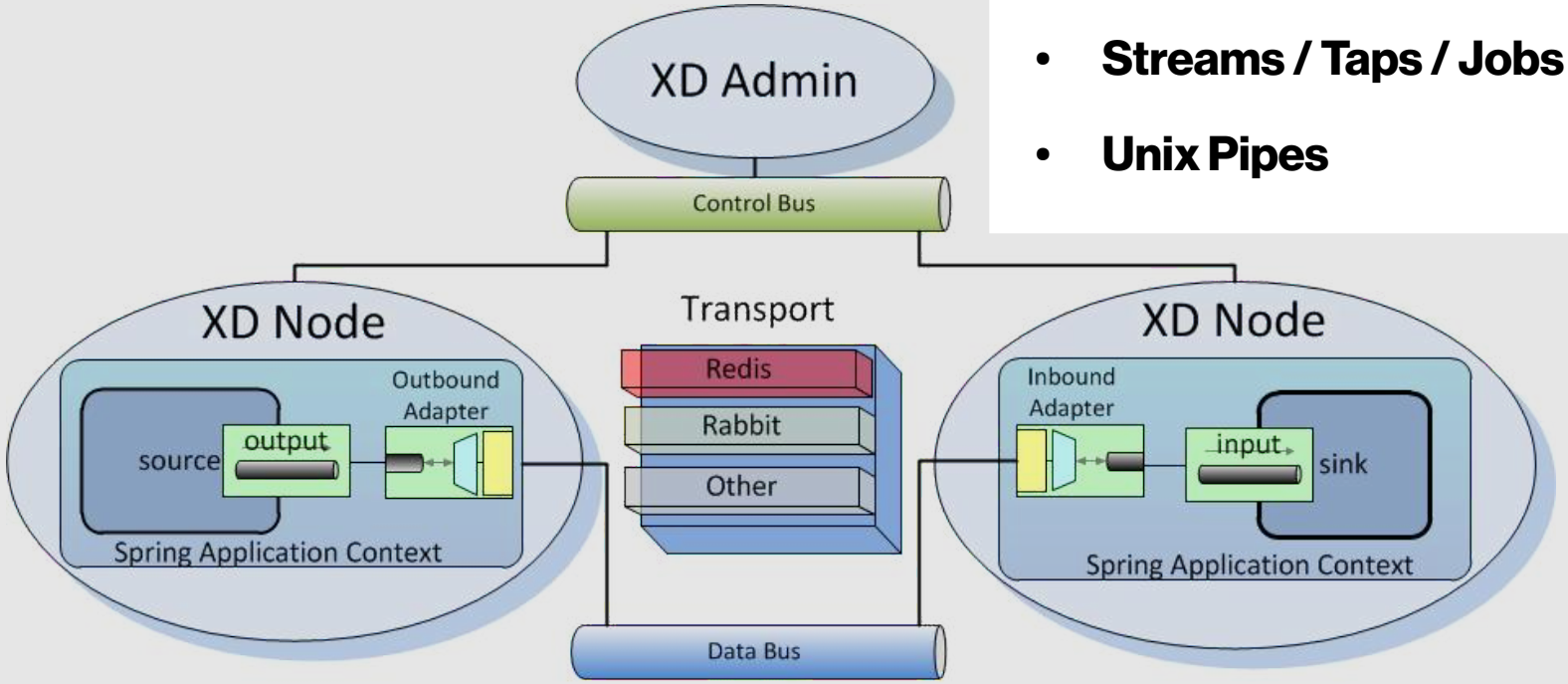
Spring XD

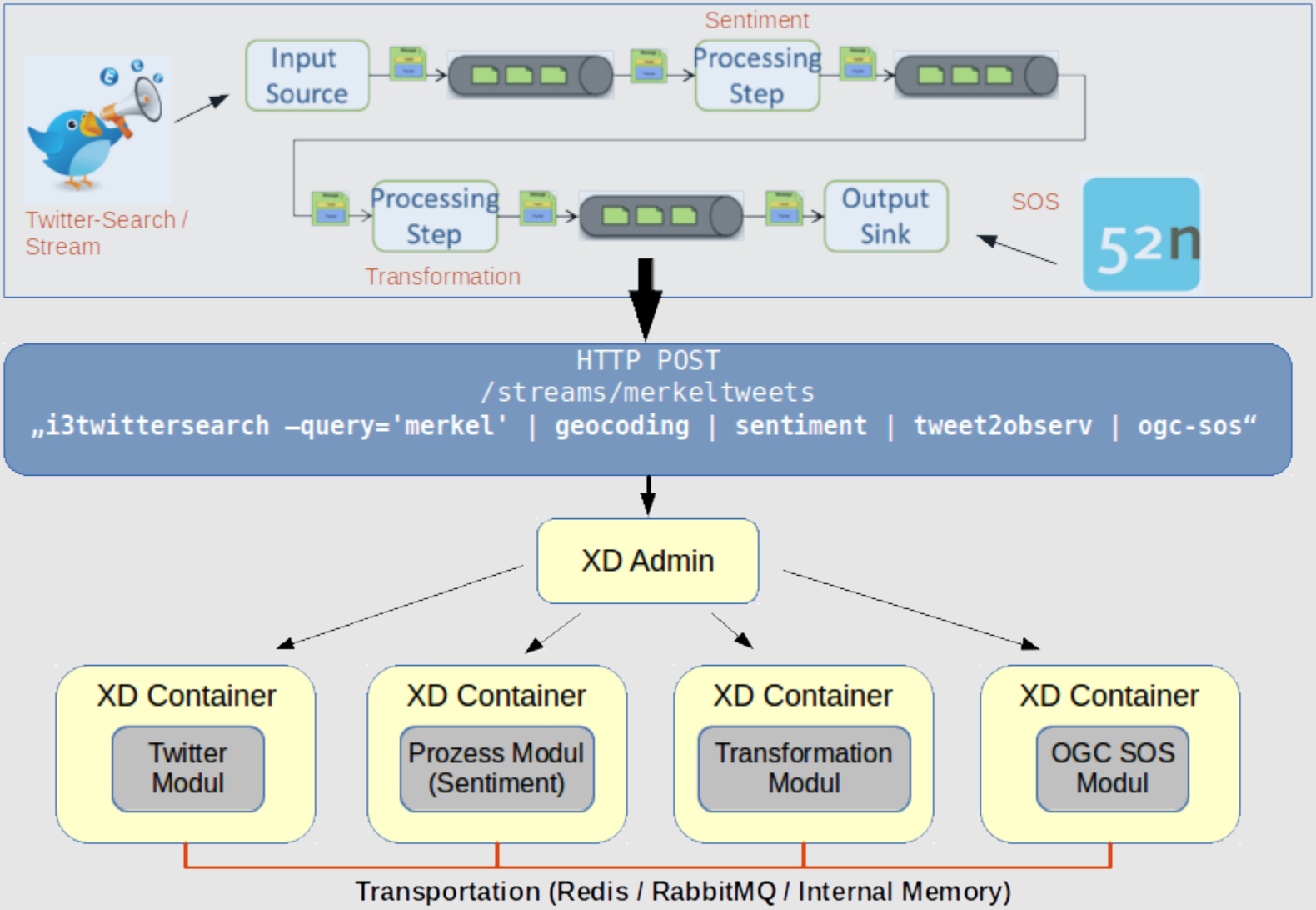
- Steht für eXtreme Data (Big Data)
- Erste 1.0.0 Milestones

- Modularisierung von Spring Integration und Spring Batch
- Verteilte Systeme (Container, Transportation, Admin)
- Streams / Taps / Jobs
- Unix Pipes



<source> | <sink>

Spring XD Workflow

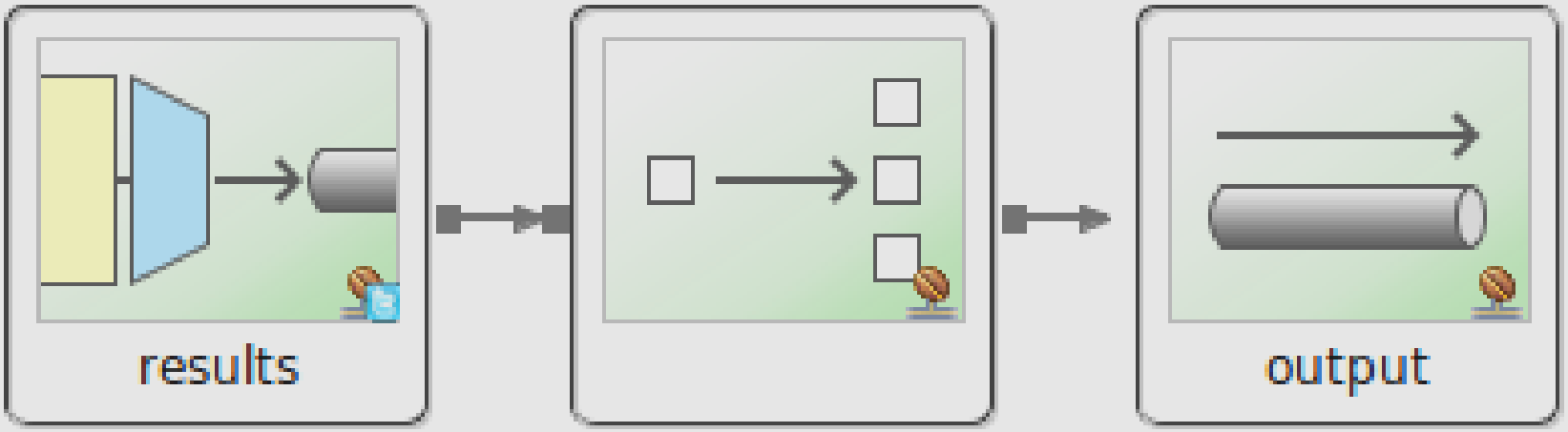


Module / Adapter

- Integration-Adapter für Sensor Observation Service
- Processor-Modul für Geocoding
- Processor-Modul für Sentiment Analyse
- Twitter Abfrage

Twitter Abfrage

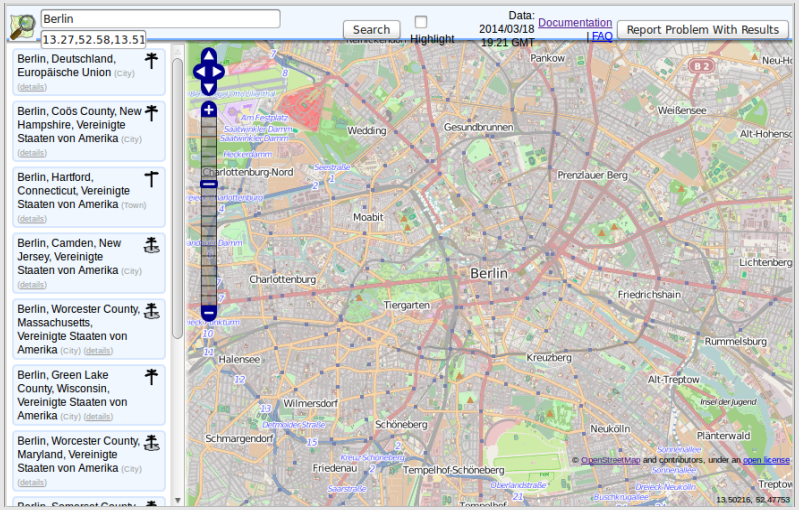
- Verwendung von Spring Social Twitter
- Erweiterung um räumliche Rückgabewerte



Geocoding

- Verwendung von HTTP-Gateway
- Anfrage derzeit an Nominatim
- Unterschiedliche räumliche Informationsquellen


```
{
    "place_id": "641338",
    "licence": "Data © OpenStreetMap contributors, ODbL 1.0. http://www.openstreetmap.org/copyright",
    "osm_type": "node",
    "osm_id": "240109189",
    "boundingbox": [
        "52.5170364379883",
        "52.5170402526855",
        "13.3888597488403",
        "13.3888607025146"
    ],
    "lat": "52.5170365",
    "lon": "13.3888599",
    "display_name": "Berlin, Deutschland, Europäische Union",
    "class": "place",
    "type": "city",
    "importance": 0.92214979763087,
    "icon": "http://nominatim.openstreetmap.org/images/mapicons/poi_place_city.p.20.png"
}
```

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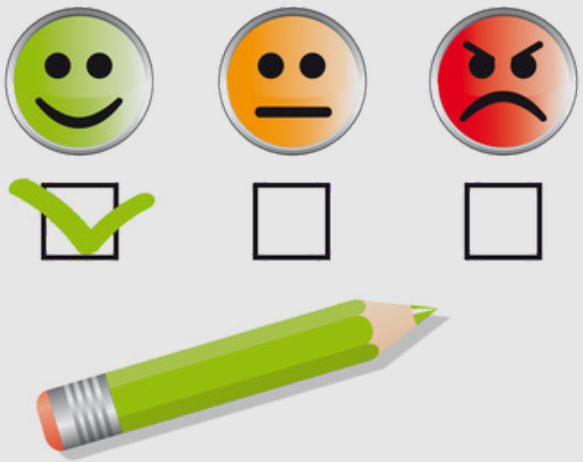
Sentiment Analyse

- **HTTP-Gateway**
- **Derzeitige Verwendung von AlchemyAPI**
  - **Beschränkung der Anfragen (1000/Tag)**
  - **Ergebnis als XML oder JSON**
  - **Sprachanalyse (Unterstützung von Englisch und Deutsch)**
  - **Type (Positiv / Negativ / Neutral)**
  - **Score (von -1 (negativ) bis +1 (positiv)**


```
{
 "status": "OK",
 "usage": "By accessing AlchemyAPI or using i
 "url": "",
 "language": "german",
 "docSentiment": [
  {
   "type": "positive",
   "score": "0.240424"
  }
 ]
}
```

Spring SOS Adapter + Modul

- **Eigenes OGC SOS Modul (u. a. Verwendung des OX Frameworks)**
- **Spring Integration Adapter (Outbound Adapter)**
- **Spring XD Modul**

```
<context:property-placeholder
    location="${xd.config.home}/${configProperties:ogc-sos}.properties"
    ignore-resource-not-found="true" />

<int:channel id="input" />
<int:channel id="sensorinput" />
<int:header-enricher input-channel="input" output-channel="sensorinput">
    <int:header
        name="#{T(de.i3mainz.springframework.integration.sos.SOSAdapterHeaders).SENSOR}"
        value="${sensorID}" />
</int:header-enricher>
<int-sosadapter:outbound-channel-adapter
    id="sosOut" sos-connection="sosConnection" channel="sensorinput" />

<bean id="sosConnection"
    class="de.i3mainz.springframework.swe.n52.sos.SOSConnectionParameter">
    <property value="${url:http://10.153.101.11:8180/52nSOSv3.5.0/sos}"
        name="url" />
    <property name="version" value="${serviceversion:1.0.0}" />
    <property name="binding" value="${binding:SOAP}" />
</bean>
```

Twitter2SOS Stream

```
eXtreme Data
1.0.0.BUILD-SNAPSHOT | Admin Server Target: http://localhost:9393
Welcome to the Spring XD shell. For assistance hit TAB or type "help".
xd:>stream create --name tweets-merkel --definition "i3twittersearch --query='merkel' | geocoding | sentiment-alchemyapi | tweet-to-sos | ogc-sos --sensorID='Test2000'"
Created new stream 'tweets-merkel'
xd:>stream list
  Stream Name    Stream Definition                                                                                                                  Status
  -------------  -------------------------------------------------------------------------------------------------------------------------------  --------
  tweets-merkel  i3twittersearch --query='merkel' | geocoding | sentiment-alchemyapi | tweet-to-sos | ogc-sos --sensorID='Test2000'  deployed

xd:>
```

```
="Test2000"/><om:observedProperty xlink:href="urn:ogc:def:dataType:OGC:1.1:string"/><om:featureOfInterest><!-- a sampling feature is needed to insert CategoryObservations --><sa:SamplingPoint gml:id="foi_Cambridge,_522033051_0124862"><gml:name>Cambridge, Cambridgeshire, East of England, England, United Kingdom 52.2033051_0.124862</gml:name><sa:sampledFeature xlink:href=""/><sa:position><gml:Point><gml:pos srsName="urn:ogc:def:crs:EPSG::4326">52.2033051 0.124862</gml:pos></gml:Point></sa:position></sa:SamplingPoint></om:featureOfInterest><om:result codeSpace="">USER: DJSiri; TEXT: 'They are fascists!' German Left leader blasts Merkel's support of illegitimate Ukraine govt http://t.co/1cGOPT11US; Sentiment: {status: OK, language: english, scoretype: neutral, score: 0.0}</om:result></om:CategoryObservation></InsertObservation>
17:36:56,724  INFO task-scheduler-2 core.SOSTemplate:228 - <?xml version="1.0" encoding="UTF-8"?>              <InsertObservation              xmlns="http://www.opengis.net/sos/1.0"  xmlns:ows="http://www.opengis.net/ows/1.1"      xmlns:ogc="http://www.opengis.net/ogc"  xmlns:om="http://www.opengis.net/om/1.0"        xmlns:sos="http://www.opengis.net/sos/1.0"      xmlns:sa="http://www.opengis.net/sampling/1.0"xmlns:n52="http://www.52north.org/1.0"    xmlns:gml="http://www.opengis.net/gml"  xmlns:swe="http://www.opengis.net/swe/1.0.1"    xmlns:xlink="http://www.w3.org/1999/xlink"      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"  xsi:schemaLocation="http://www.opengis.net/sos/1.0      http://schemas.opengis.net/sos/1.0.0/sosInsert.xsd      http://www.opengis.net/sampling/1.0     http://schemas.opengis.net/sampling/1.0.0/sampling.xsd          http://www.opengis.net/om/1.0   http://schemas.opengis.net/om/1.0.0/extensions/observationSpecialization_override.xsd"  service="SOS" version="1.0.0">          <AssignedSensorId>Test2000</AssignedSensorId><om:CategoryObservation><om:samplingTime><gml:TimeInstant><gml:timePosition>2014-03-14T17:35:27+01</gml:timePosition></gml:TimeInstant></om:samplingTime><om:procedure xlink:href="Test2000"/><om:observedProperty xlink:href="urn:ogc:def:dataType:OGC:1.1:string"/><om:featureOfInterest><!-- a sampling feature is needed to insert CategoryObservations --><sa:SamplingPoint gml:id="foi_Berlin,_De_525170365_133888599"><gml:name>Berlin, Deutschland, European Union 52.5170365_13.3888599</gml:name><sa:sampledFeature xlink:href=""/><sa:position><gml:Point><gml:pos srsName="urn:ogc:def:crs:EPSG::4326">52.5170365 13.3888599</gml:pos></gml:Point></sa:position></sa:SamplingPoint></om:featureOfInterest><om:result codeSpace="">USER: GermanyDiplo; TEXT: Chancellor #Merkel addressed German Parliament on the situation in #Ukraine - find her full speech here: http://t.co/NEmhuz5h67 #Crimea; Sentiment: {status: OK, language: english, scoretype: negative, score: -0.108945}</om:result></om:CategoryObservation></InsertObservation>
17:37:09,018  INFO task-scheduler-6 core.SOSTemplate:228 - <?xml version="1.0" encoding="UTF-8"?>              <InsertObservation              xmlns="http://www.opengis.net/sos/1.0"  xmlns:ows="http://www.opengis.net/ows/1.1"      xmlns:ogc="http://www.opengis.net/ogc"  xmlns:om="http://www.opengis.net/om/1.0"        xmlns:sos="http://www.opengis.net/sos/1.0"      xmlns:sa="http://www.opengis.net/sampling/1.0"xmlns:n52="http://www.52north.org/1.0"    xmlns:gml="http://www.opengis.net/gml"  xmlns:swe="http://www.opengis.net/swe/1.0.1"    xmlns:xlink="http://www.w3.org/1999/xlink"      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"  xsi:schemaLocation="http://www.opengis.net/sos/1.0      http://schemas.opengis.net/sos/1.0.0/sosInsert.xsd      http://www.opengis.net/sampling/1.0     http://schemas.opengis.net/sampling/1.0.0/sampling.xsd          http://www.opengis.net/om/1.0   http://schemas.opengis.net/om/1.0.0/extensions/observationSpecialization_override.xsd"  service="SOS" version="1.0.0">          <AssignedSensorId>Test2000</AssignedSensorId><om:CategoryObservation><om:samplingTime><gml:TimeInstant><gml:timePosition>2014-03-14T17:36:02+01</gml:timePosition></gml:TimeInstant></om:samplingTime><om:procedure xlink:href="Test2000"/><om:observedProperty xlink:href="urn:ogc:def:dataType:OGC:1.1:string"/><om:featureOfInterest><!-- a sampling feature is needed to insert CategoryObservations --><sa:SamplingPoint gml:id="foi_Sauerland,_500631488_8210514 2"><gml:name>Sauerland, Wiesbaden, Regierungsbezirk Darmstadt, Hessen, Deutschland, European Union 50.0631488_8.2105142</gml:name><sa:sampledFeature xlink:href=""/><sa:position><gml:Point><gml:pos srsName="urn:ogc:def:crs:EPSG::4326">50.0631488 8.2105142</gml:pos></gml:Point></sa:position></sa:SamplingPoint></om:featureOfInterest><om:result codeSpace="">USER: c2h5oh1; TEXT: RT @RaykAnders: Ich heute beim Zeitungslesen.
#hoeneß #merkel #seehofer #cdu #csu http://t.co/dsD732tacr; Sentiment: {status: OK, language: german, scoretype: neutral, score: 0.0}</om:result></om:CategoryObservation></InsertObservation>
```

Portal

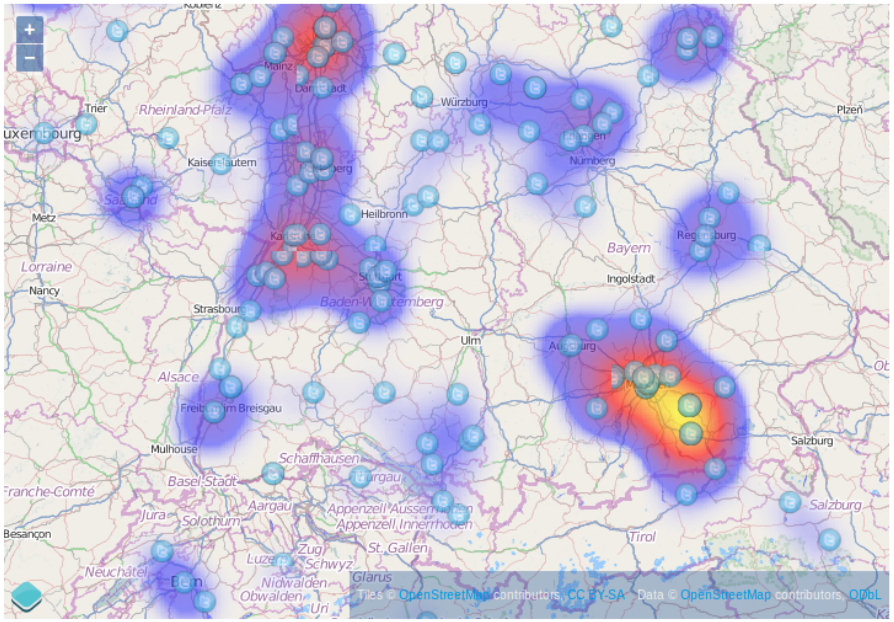
Layer-Management

Hinzufügen

HeatMap

Tweetmap-TweetBird

OL Maps



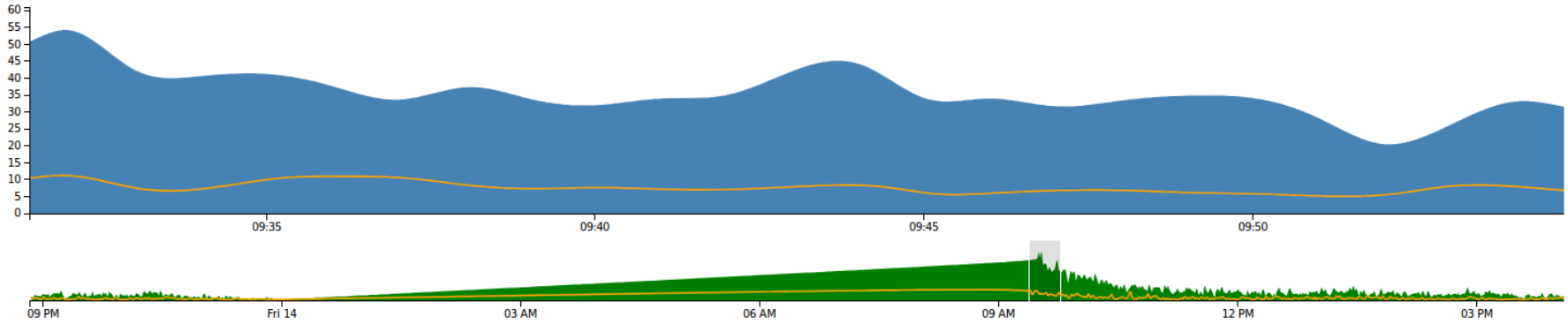
Layer-FeatureInfo

Feature-Info

2014-03-14T09:55:23Z

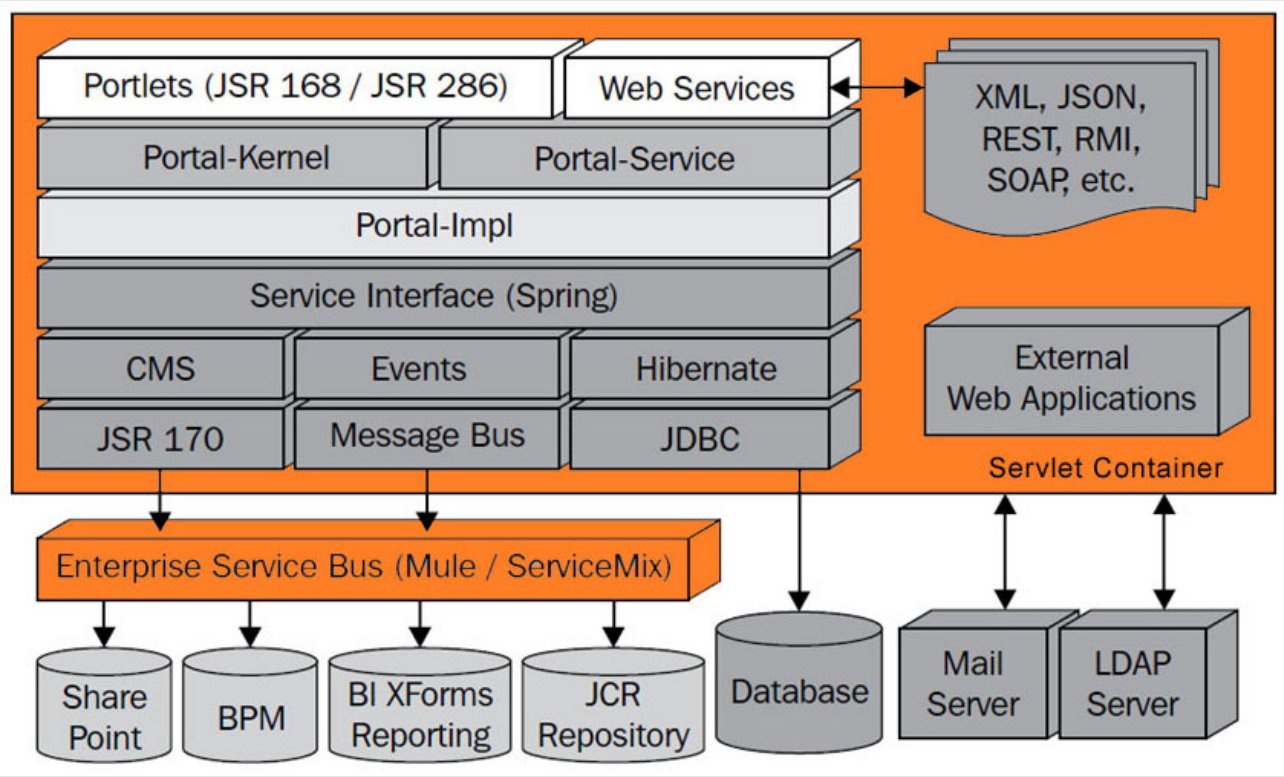
RT @tazgezwitscher: Er verzichtet auf eine Revision, tritt als Präsident des FC Bayern ab. Was bleibt von Uli #Hoeneß? http://t.co/rxARTmym…

Time Chart

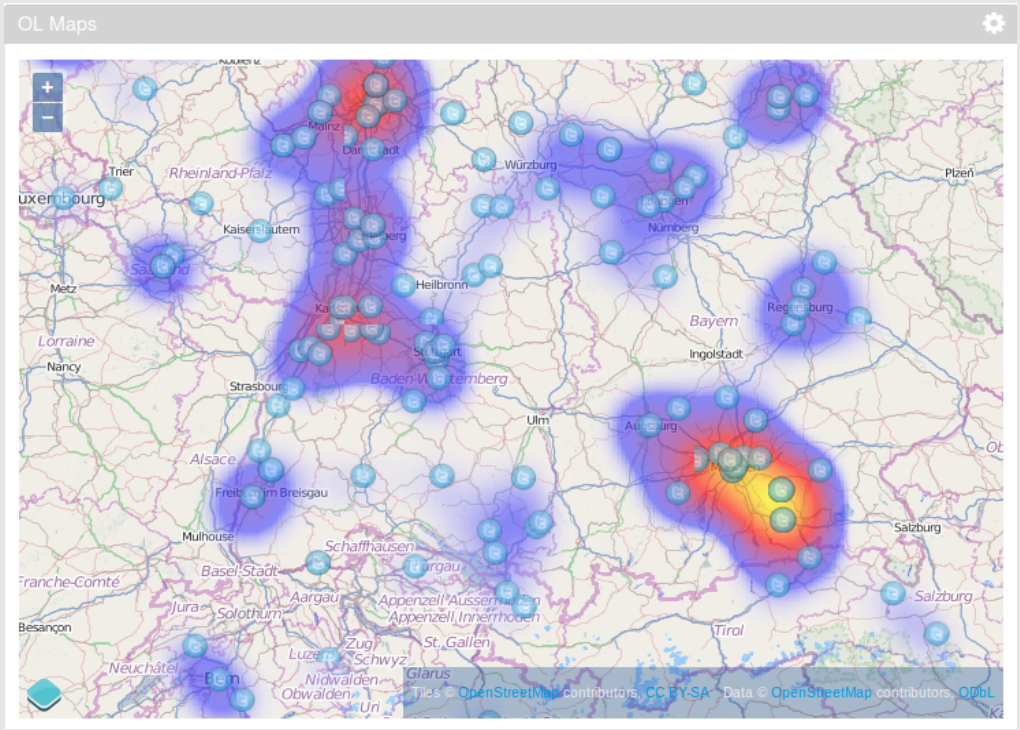


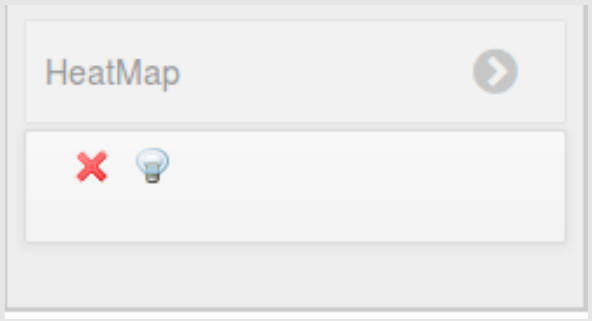
Liferay

- **Portalsoftware**
- **Java (Spring, Hibernate, Lucene, etc.)**
- **Portlets, Hooks, Themes, Extentions, Layouts, Services**



OpenLayers Map





- OpenLayers 3
- Derzeit noch WMS Layer aus Tweetmap
- Client-seitiges Eventhandling über Liferay

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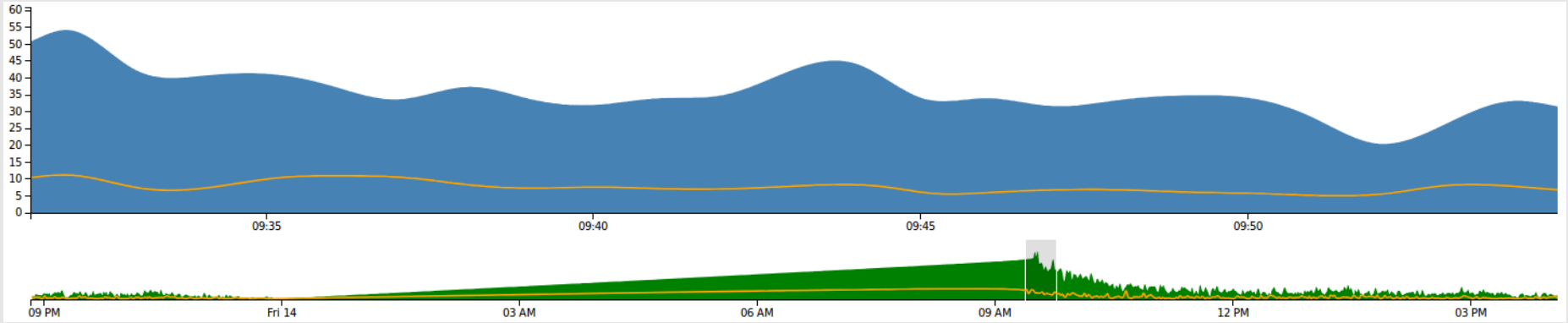
Time Line

- Verwendung von D3js
- Rendering als SVG
- Aggregation über Zeit
- Derzeit WFS Informationen aus Tweetmap
- Brush-Area für „Zooming“



Spring XD

- Erster rudimentärer Client (Nutzung durch Nutzer mit Spring XD Kenntnis
- Rest-Client Steuerung von Spring XD Admin Server

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Ausblick

- Clientunterstützung für SOS Daten
- Eigene Analyse Services
- Nutzerfreundliche Steuerung der Sensor Datenströme
- Verknüpfung mit weiteren Sensorinformationen

Layer-Management

Add

HeatMap

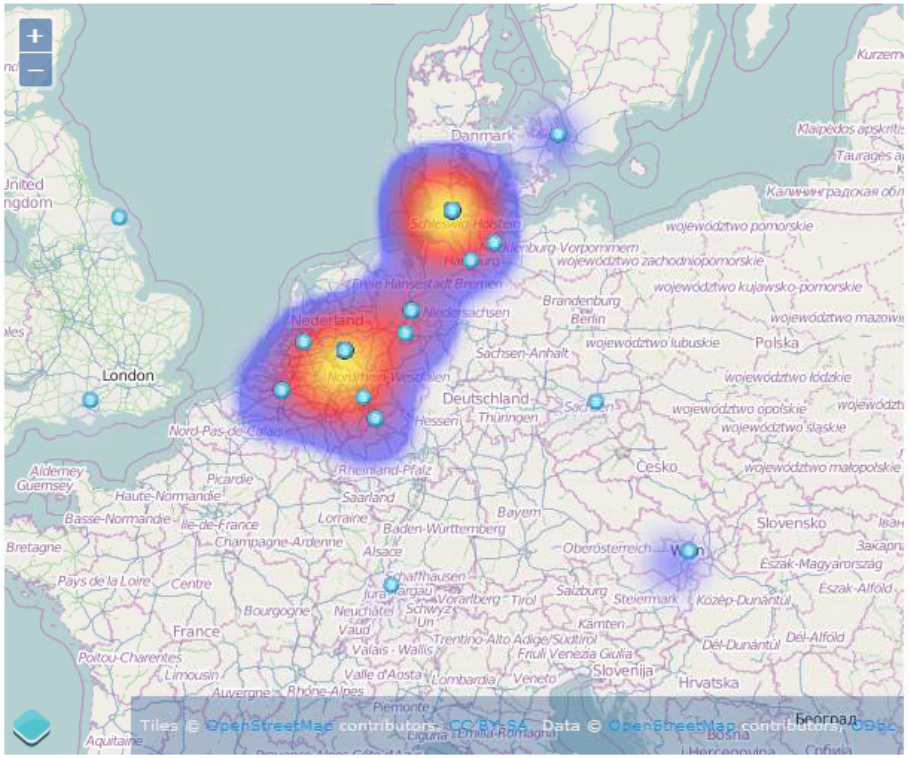
Tweetverteilung als HeatMap

Transparenz

Legende

Tweetmap-TweetBird

OL Maps



Layer-FeatureInfo

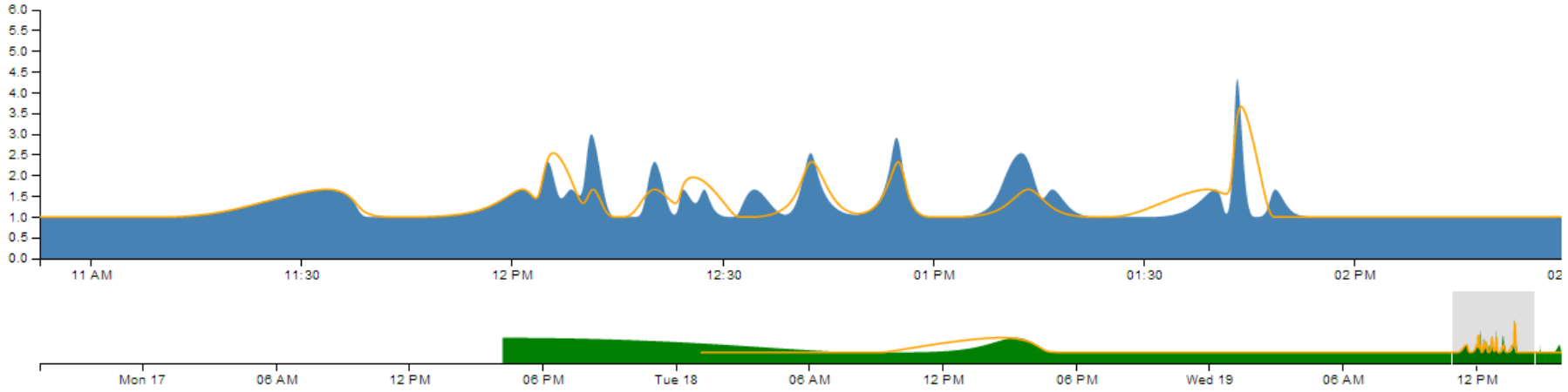
Feature-Info

splashmaps

2014-03-19T13:48:35Z

RT @sevenspatial: Publishing a shape file on the Web with #REST on the terminal at #FOSSGIS2014 in <3 min. Live. Nice. :-)

Time Chart



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Informations- und Messtechnik
Fachhochschule Mainz

Fragen???