

5th SocioCortex Workshop

F. Matthes, F. Michel, K. Shumaiev, P. Holl, D. Braun, A. Faber, A. Hernandez Mendez, M. Kleehaus, B. Waltl and R. Stuffer. 9.03.2017 München

Lehrstuhl Software Engineering betrieblicher Informationssysteme (sebis)
Fakultät für Informatik
Technische Universität München
wwwmatthes.in.tum.de

Überblick Tagesablauf

Uhrzeit	Inhalt
13:30	Kaffee und Ankunft
13:40	SocioCortex Workshop
15:45	Kaffee und Ankunft
16:05	Sebis Workshop
18:00	Stammtisch und Diskussion (Brotzeit, Bier, nicht-alkoholische Getränke)

13:30	Kaffee und Ankunft	Alle Teilnehmer
13:40	Introduction	Prof. Dr. Florian Matthes
13:50	SocioCortex Backend <ol style="list-style-type: none">1. Core Architecture2. Importer - SyncPipes	Felix Michel, Klym Shumaiev
14:00	SocioCortex Frontend <ol style="list-style-type: none">1. Content Manager2. Modeler3. Visualizer	Patrick Holl, Daniel Braun, Felix Michel
14:20	Using SocioCortex in the context of mobility service platforms and ecosystems <ol style="list-style-type: none">1. Visual Ecosystem Modelling2. On- and Off-boarding Process Support3. Platform Monitoring	Anne Faber, Adrian Hernandez-Mendez, Felix Michel Martin Kleehaus
14:55	Extending SocioCortex for semantic analysis of legal document collections	Bernhard Waltl
15:20	Collaborative Project-Management with Cplace	Dr. Rupert Stuffer (CEO Collaboration Factory)

Introduction

Sebis Team



FLORIAN MATTHES



D. BRAUN

Natural Language Eng.



K. SHUMAEV

SA Knowledge Management



M. MAHABALESHWAR



P. HOLL

--



A. HERNANDEZ M.

View Modeling



F. MICHEL

Adaptive Case Mgmt.



A. FABER

Ecosystem Explorer



J. LANDTHALER

Log Data Analytics



M. KLEEHAUS

Log Data Visualization



M. ZEC

Social Software Eng.



D. HUTH

Digitization / EAM



Ö. ULUDAG

EAM



B. WALTl

Lexalyze



P. ALEATRATI K.

EAM



E. SCEPANKOVA

Lexalyze

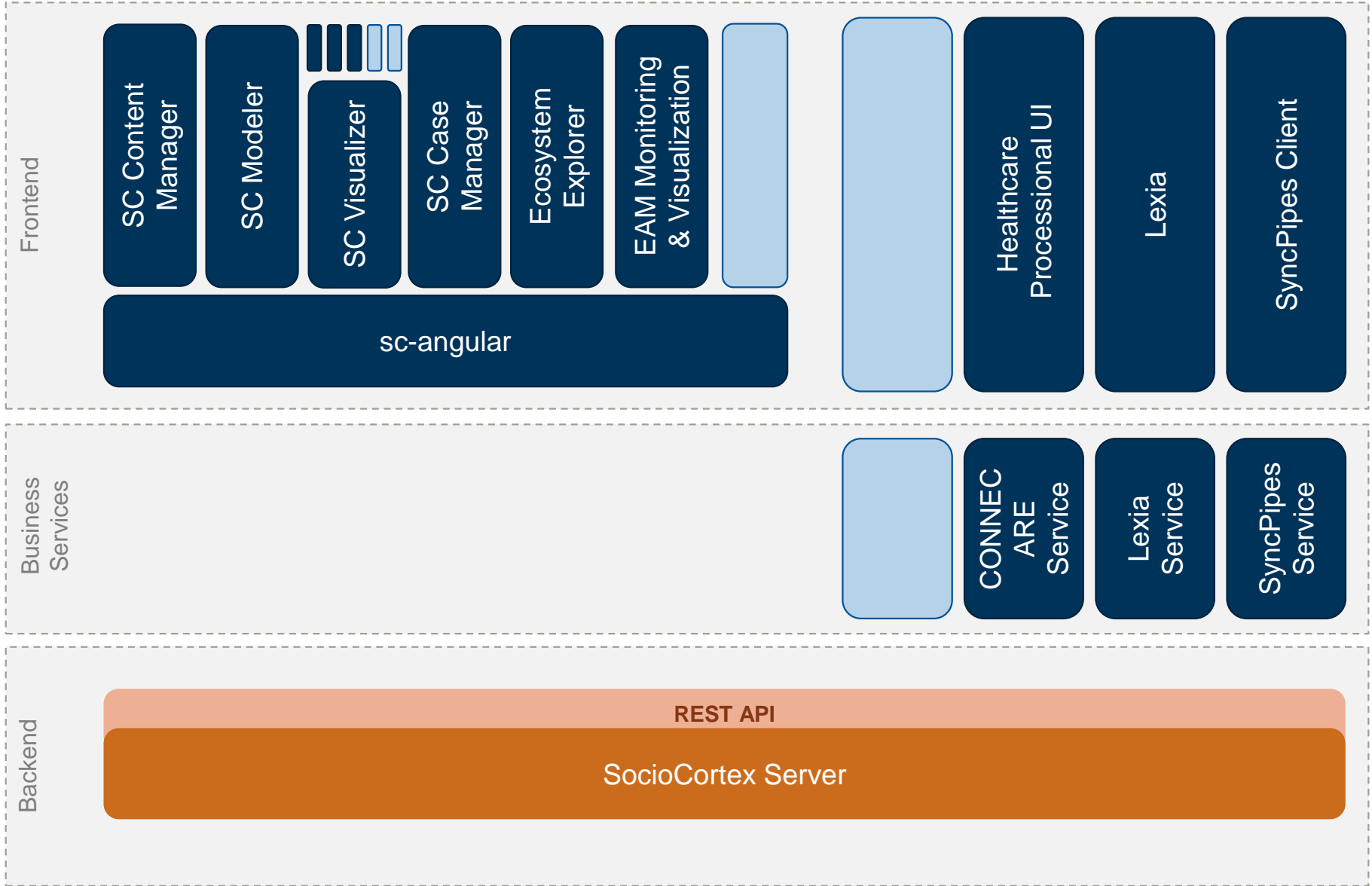
Who are you?

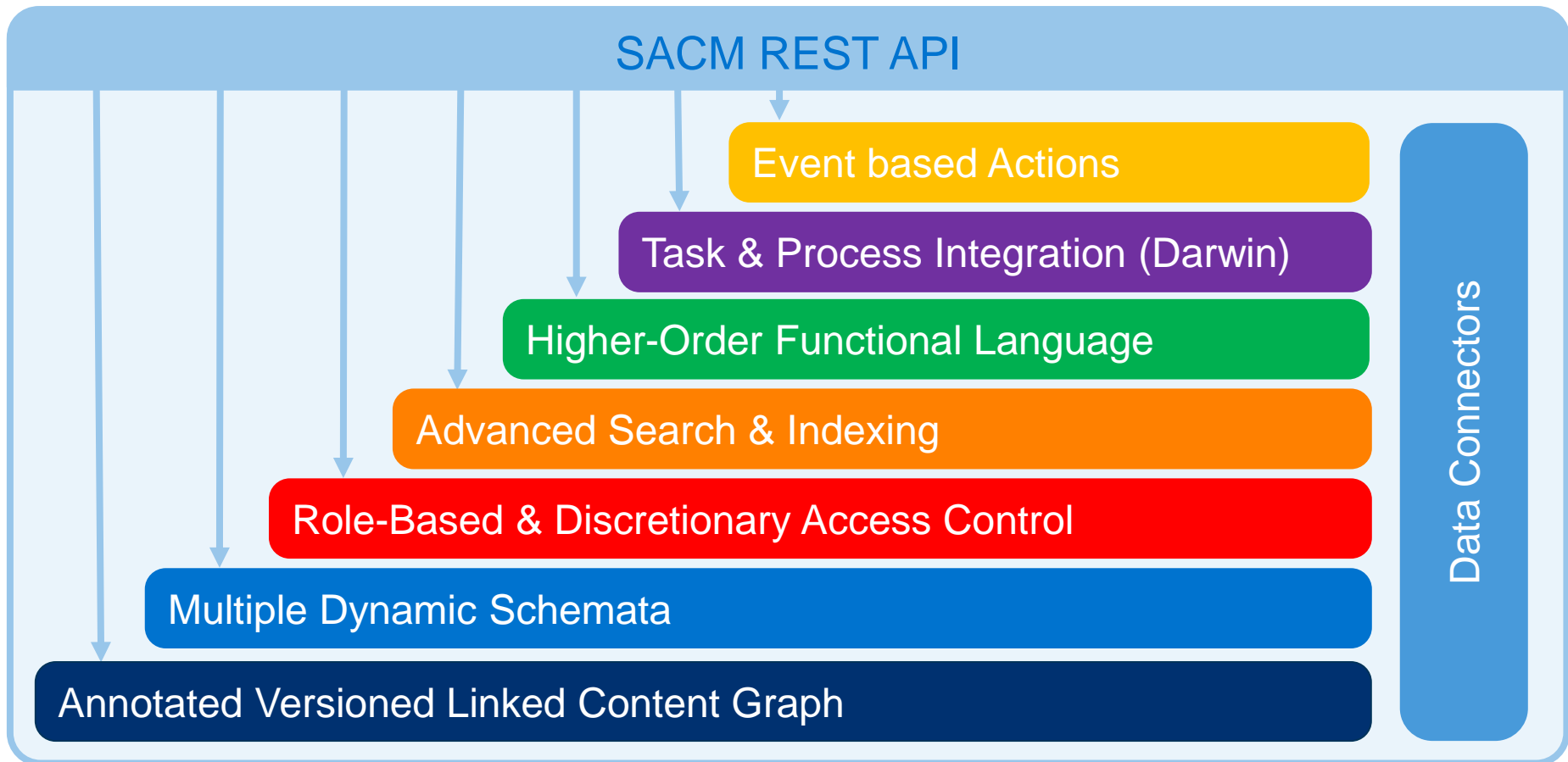
What are your concrete goals regarding the SocioCortex Community and the workshop series?

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SocioCortex Backend

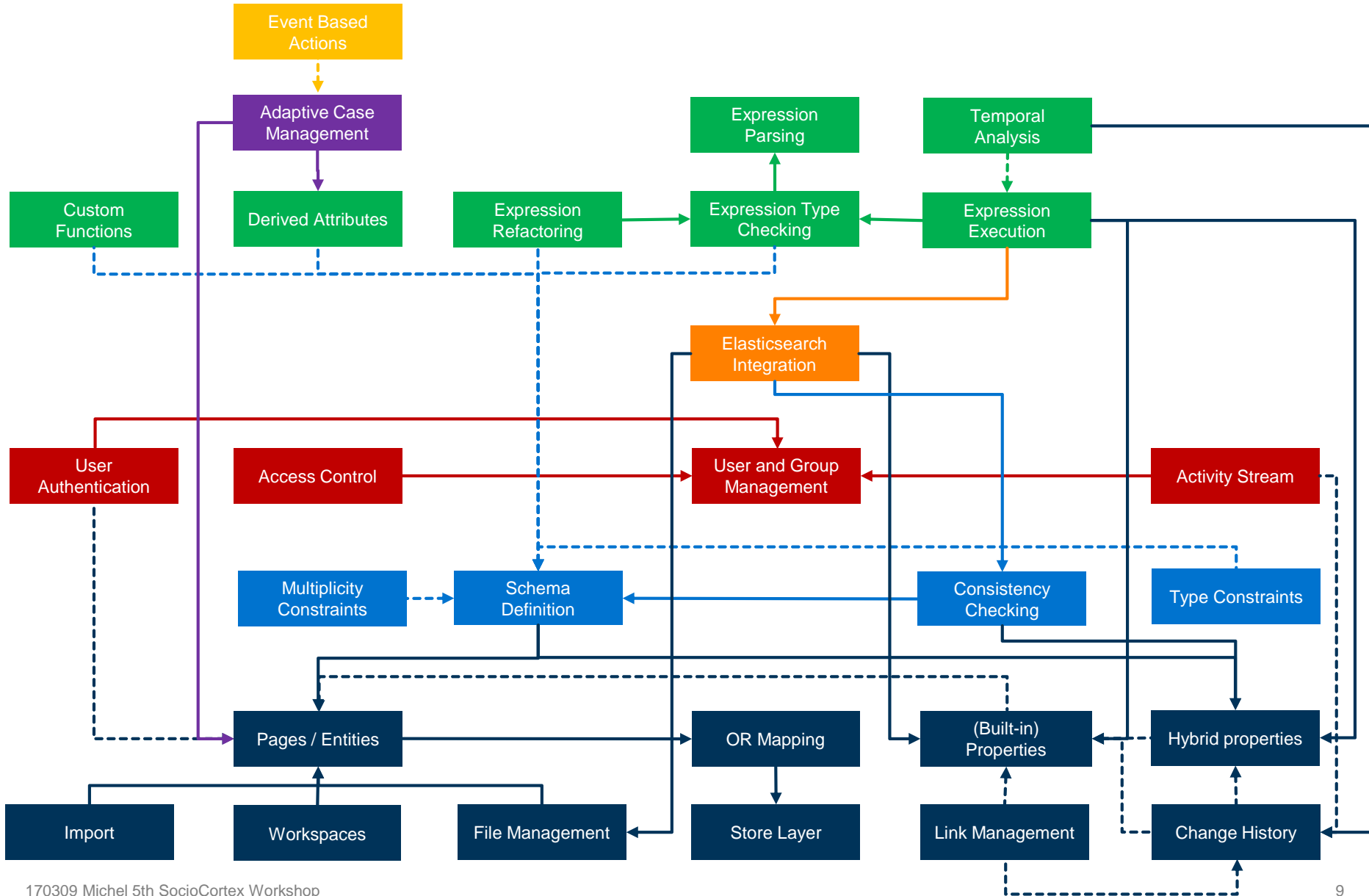
Overview





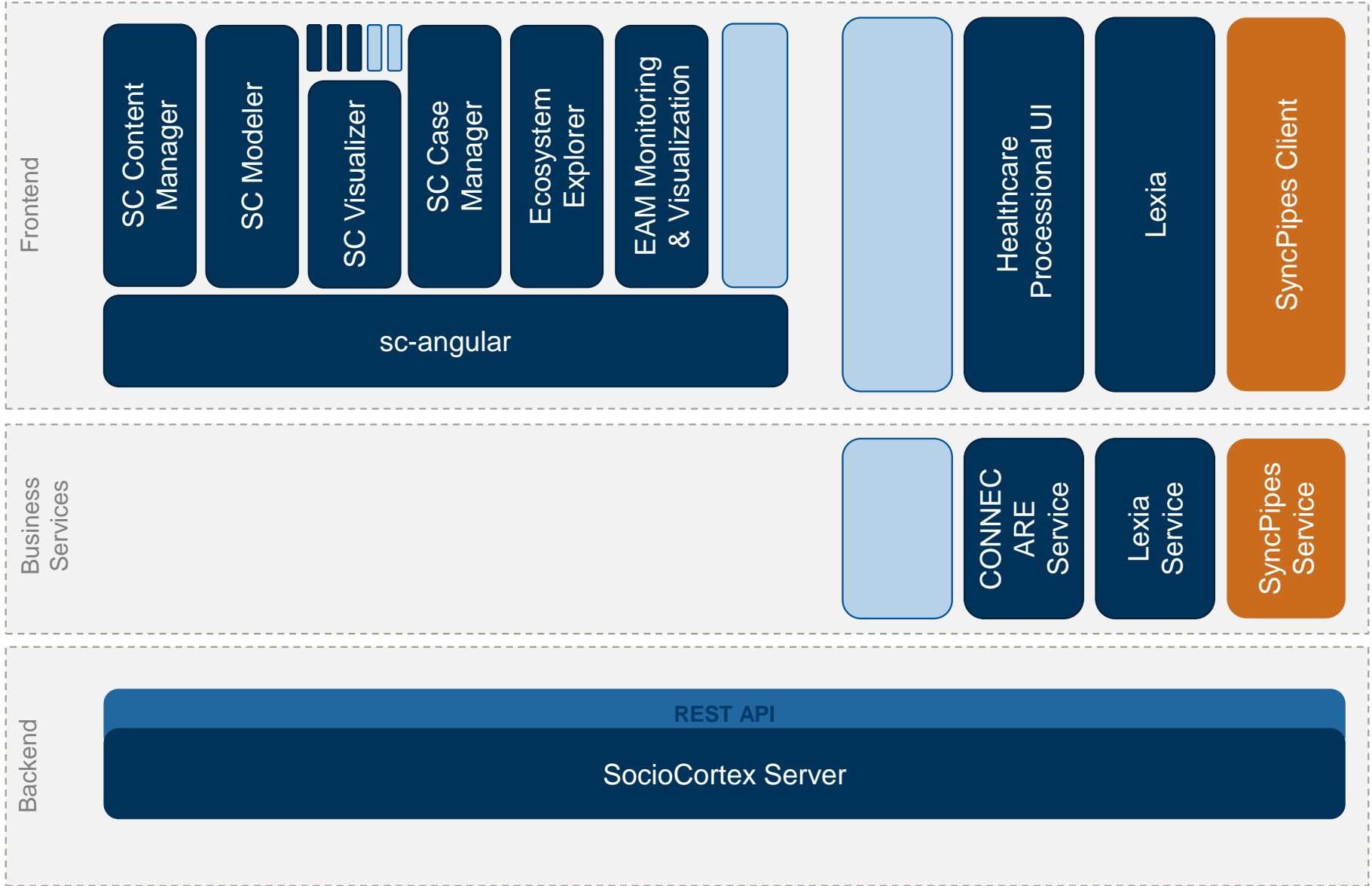
SocioCortex Backend

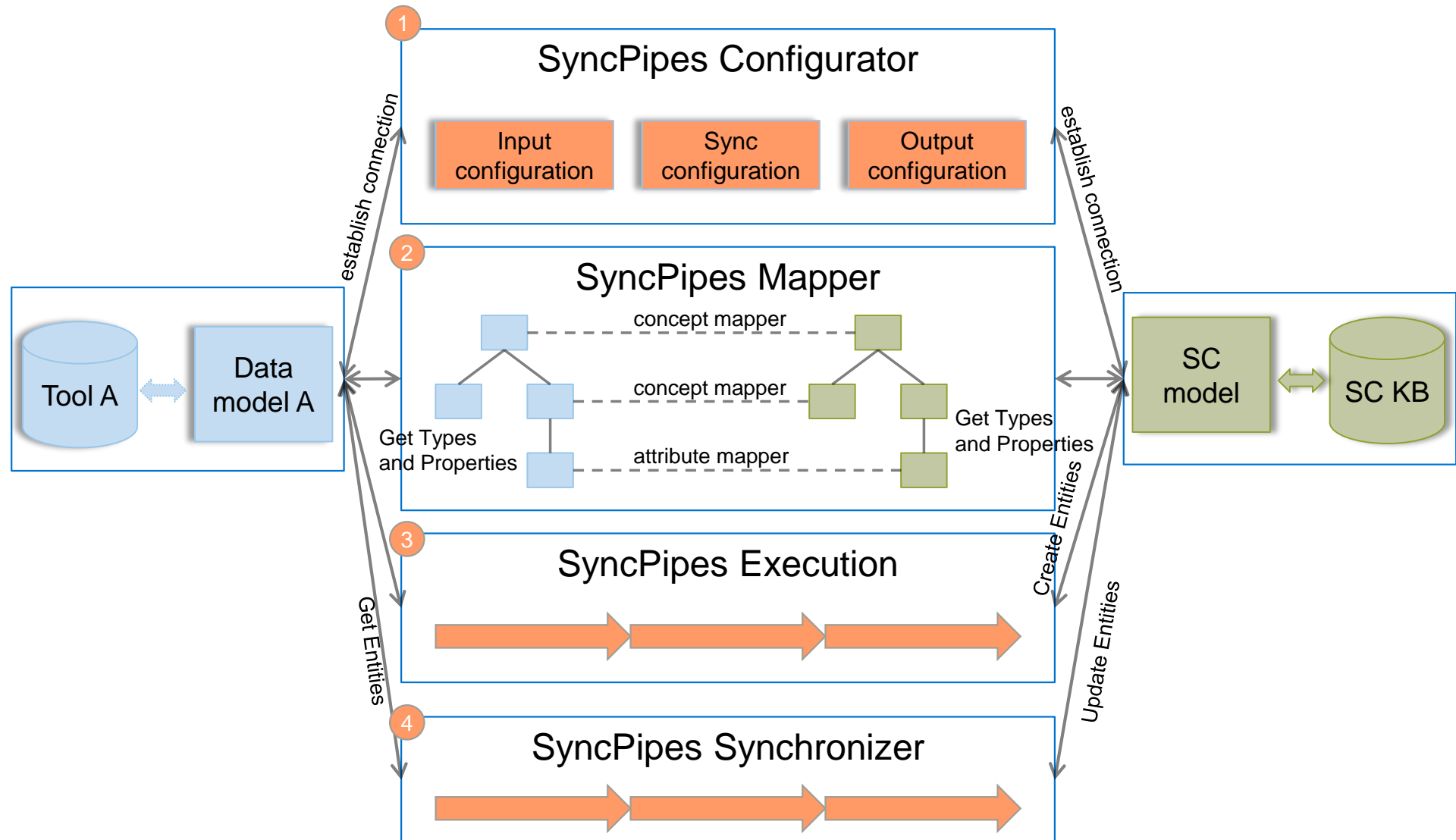
Capabilities



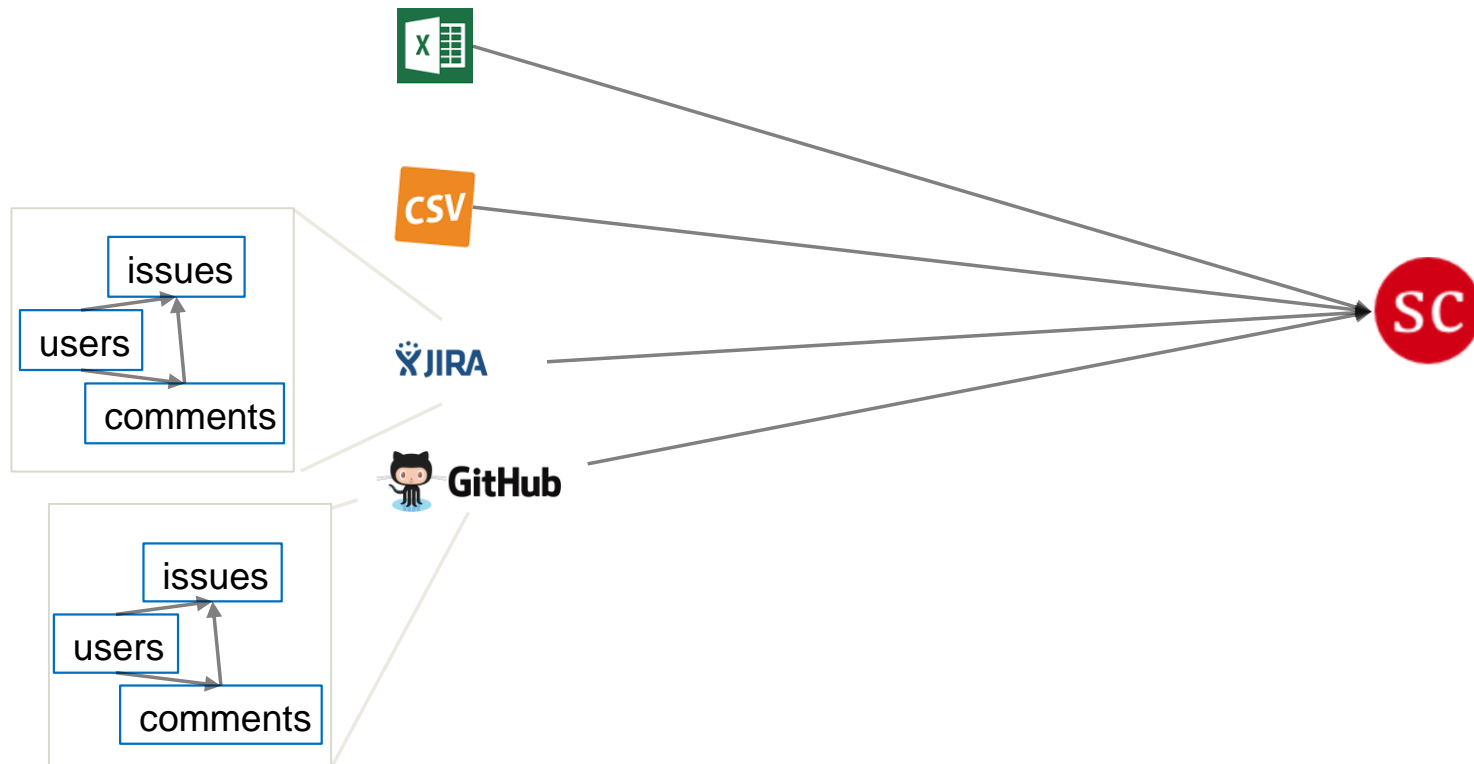
SocioCortex Backend

Overview





Existing pipelines



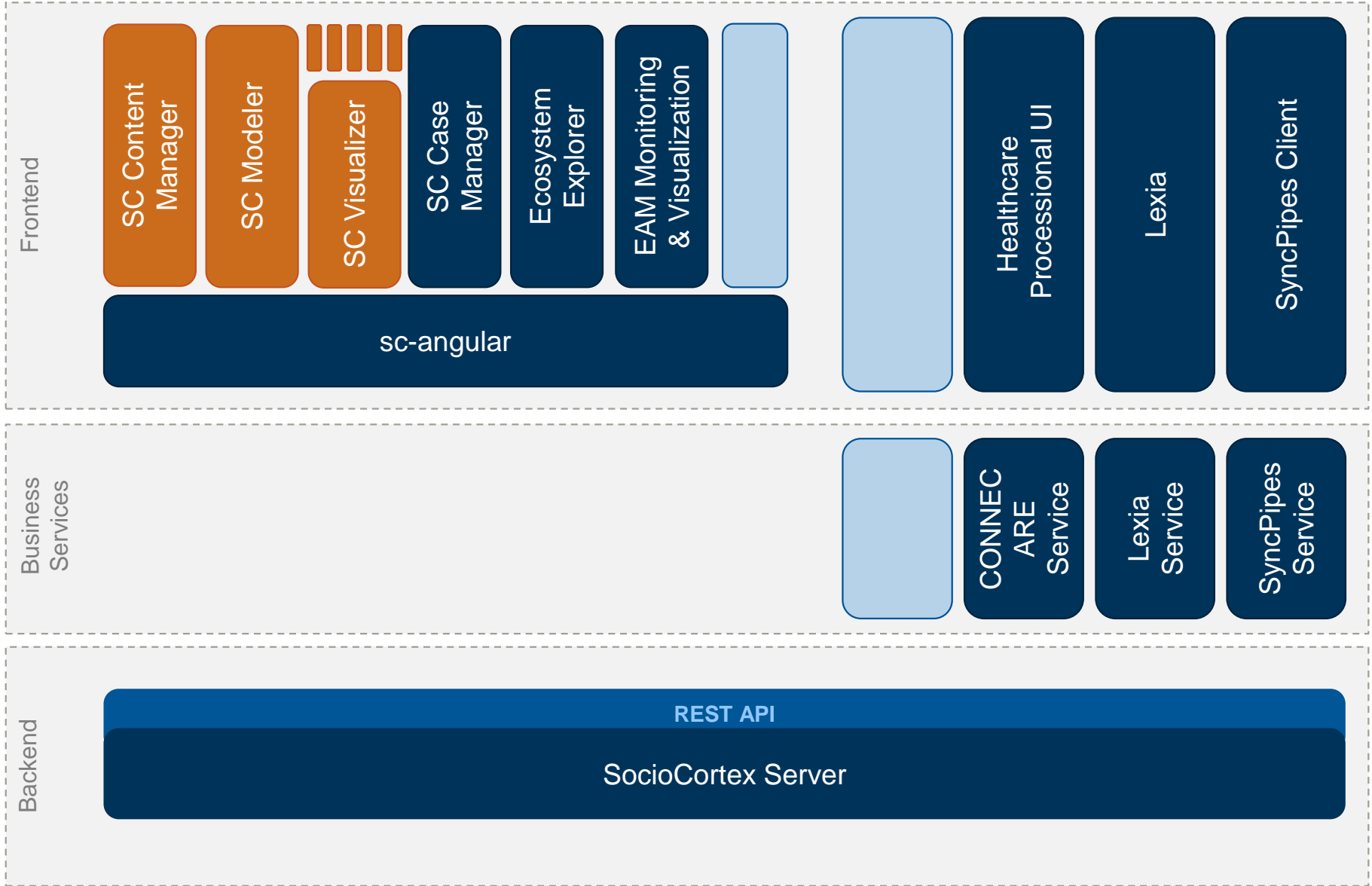
- SyncPipes server: <https://github.com/sebischair/syncpipes-server>
- SyncPipes client: <https://github.com/sebischair/syncpipes-client>
- Used at Siemens in [AMELIE](#)

Questions and Discussion

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SocioCortex Frontend

Overview



SocioCortex Frontend

Content Manager for end-users



sebis
Fakultät für Informatik
Technische Universität München

Search for ...

NORTHWIND SEBIS PUBLIC WEBSITE CLONE SOCIOCORTX DOCUMENTATION **PROJECT X** ALL WORKSPACES

Filter Pages

Project X - Home

Keras a Deep Learning library fo...

Keras a Deep Learning library for TensorFlow

build passing license MIT License

You have just found Keras.

Keras is a high-level neural networks library, written in Python and capable of running on top of either [TensorFlow](#) or [Theano](#). It was developed with a focus on enabling fast experimentation. *Being able to go from idea to result with the least possible delay is key to doing good research.*

Use Keras if you need a deep learning library that:

- Allows for easy and fast prototyping (through total modularity, minimalism, and extensibility).
- Supports both convolutional networks and recurrent networks, as well as combinations of the two.
- Supports arbitrary connectivity schemes (including multi-input and multi-output training).
- Runs seamlessly on CPU and GPU.

Read the documentation at [Keras.io](#).

Keras is compatible with: **Python 2.7-3.5**.

Guiding principles

- **Modularity.** A model is understood as a sequence or a graph of standalone, fully-configurable modules that can be plugged together with as little restrictions as possible. In particular, neural layers, cost functions, optimizers, initialization schemes, activation functions, regularization schemes are all standalone modules that you can combine to create new models.
- **Minimalism.** Each module should be kept short and simple. Every piece of code should be transparent upon first reading. No black magic: it hurts iteration speed and ability to innovate.
- **Easy extensibility.** New modules are dead simple to add (as new classes and functions), and existing modules provide ample examples. To be able to easily create new modules allows for total expressiveness, making Keras suitable for advanced research.
- **Work with Python.** No separate models configuration files in a declarative format. Models are described in Python code, which is compact, easier to debug, and allows for ease of extensibility.

Getting started: 30 seconds to Keras

The core data structure of Keras is a **model**, a way to organize layers. The main type of model is the [Sequential](#) model, a linear stack of layers. For more complex architectures, you should use the [Keras functional API](#).

Here's the [Sequential](#) model:

```
from keras.models import Sequential
model = Sequential()

Stacking layers is as easy as .add():

from keras.layers import Dense, Activation
model.add(Dense(output_dim=64, input_dim=100))
model.add(Activation('relu'))
model.add(Dense(output_dim=10))
model.add(Activation('softmax'))
```

Once your model looks good, configure its learning process with `.compile()`:

```
model.compile(loss='categorical_crossentropy', optimizer='sgd', metrics=['accuracy'])
```

If you need to, you can further configure your optimizer. A core principle of Keras is to make things reasonably simple, while allowing the user to be fully in control when they need to (the ultimate control being the easy extensibility of the source code).

Text Page

ATTRIBUTES

Current Version	1.0.8
Last Update	12/12/2016
Main Developer	fchollet
Project Website	https://keras.io/

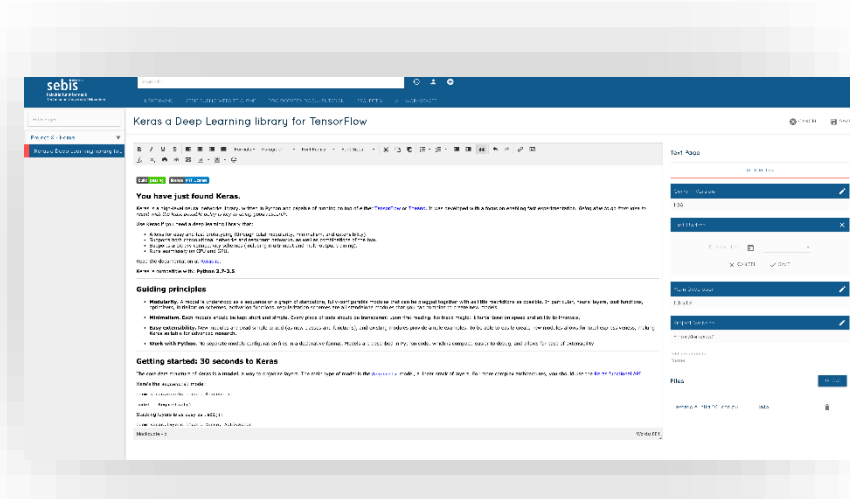
Add new attribute Name

Files

example_cifar10_cnn.py [Info](#)

UPLOAD

A powerful meta model based content manger



Create and edit any content you want

Add attributes on the fly – without changing the model

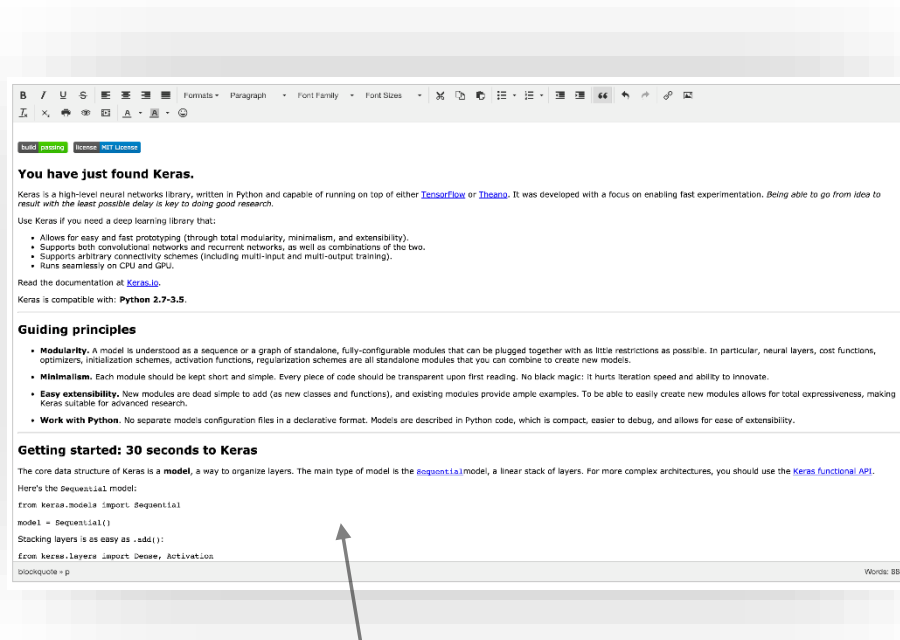
Automated type detection of attributes

Use custom types and entities

Simple but powerful WYSIWYG content editor

Attach and share files with your clients and colleagues

A powerful meta model based content manger



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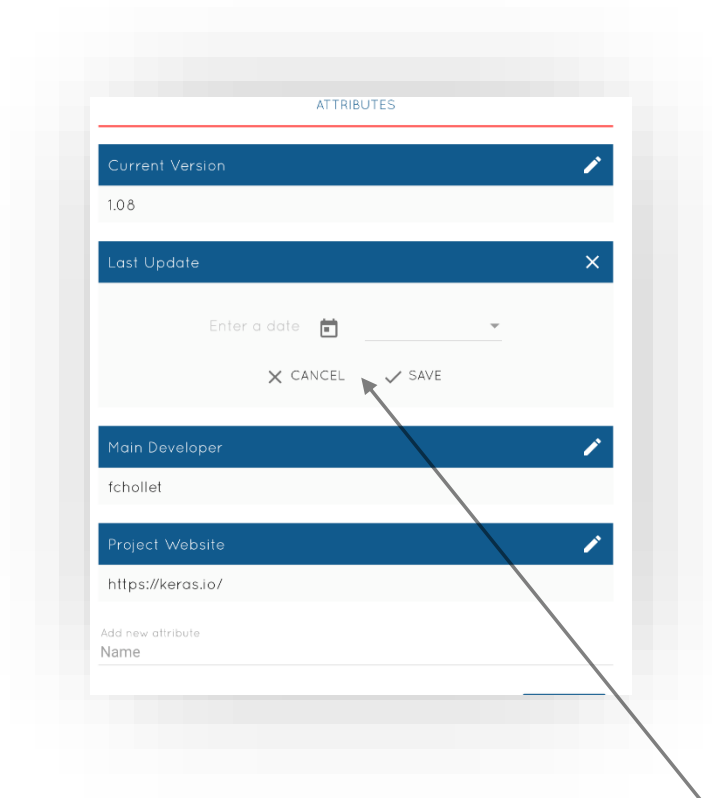
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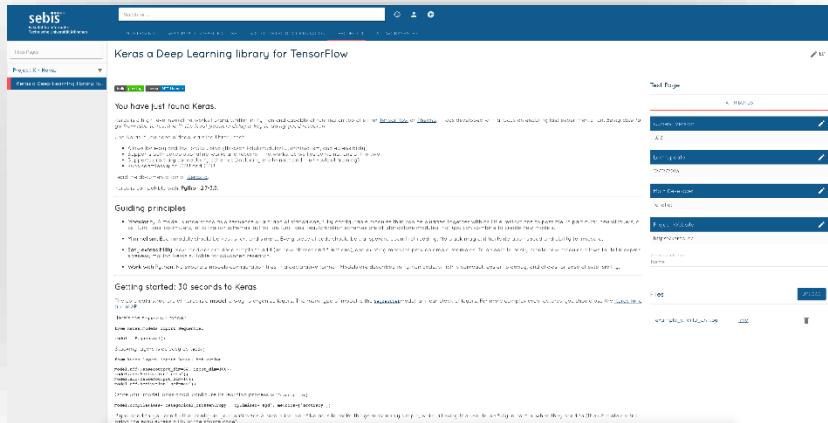
Use custom types and entities

Simple but powerful WYSIWYG content editor

Attach and share files with your clients and colleagues

Automated type detection of attributes

Beautiful, minimalistic interface to increase productivity



Focus on formatted page content and relevant information

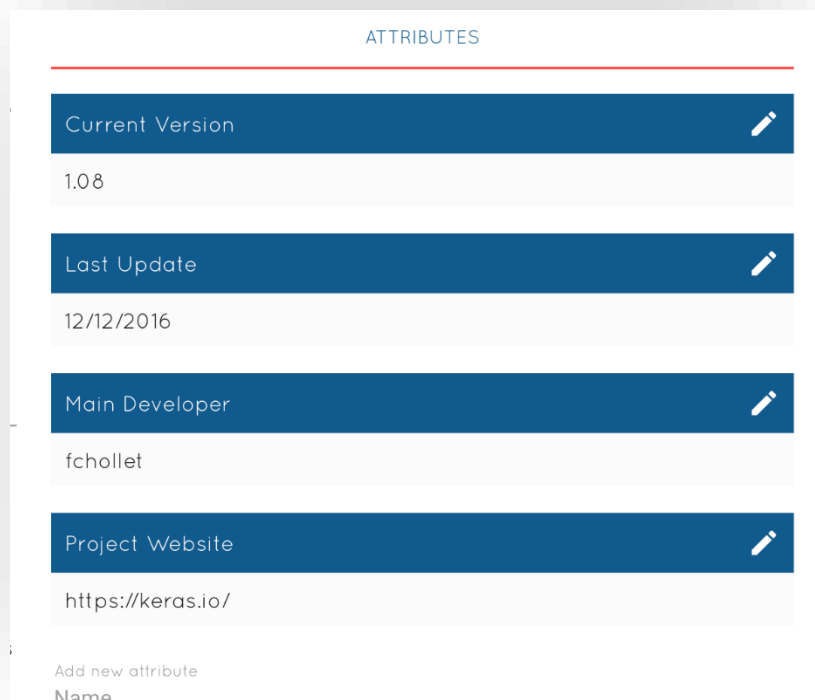
Attributes placed right next to the content to make them easily scannable for the human eye

Add any attribute you want in seconds

Complete freedom over attribute definition

Seamlessly link pages, files, users or any other content via attributes

Beautiful, minimalistic interface to increase productivity



Focus on formatted page content and relevant information

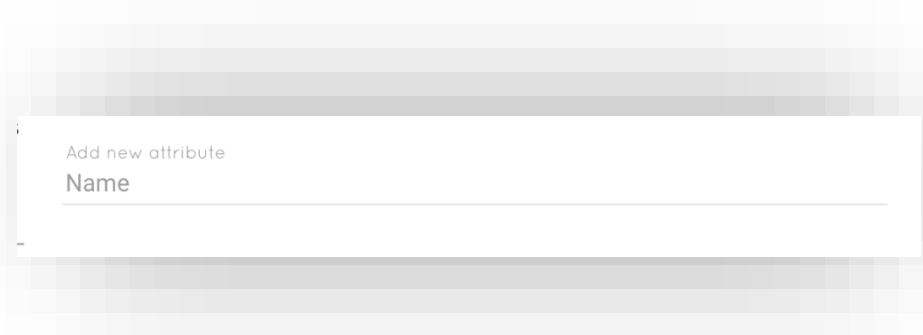
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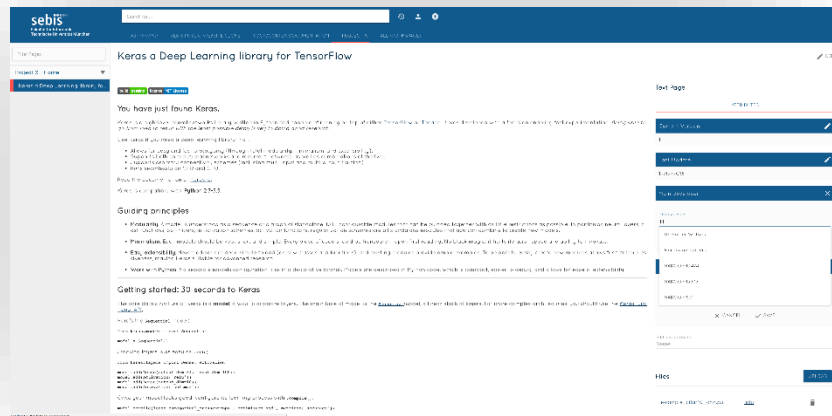
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Support the user with technology wherever possible

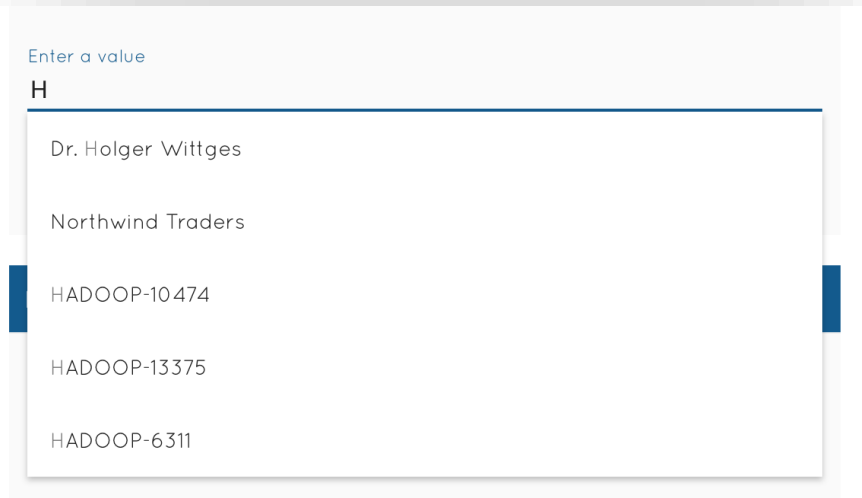


Real-time search with autocompletion across documents and workspaces

Intelligent autocompletion for attributes to reduce user typos and increase usability

Fast, reliable REST-based instant search API

Support the user with technology wherever possible



Enter a value

H

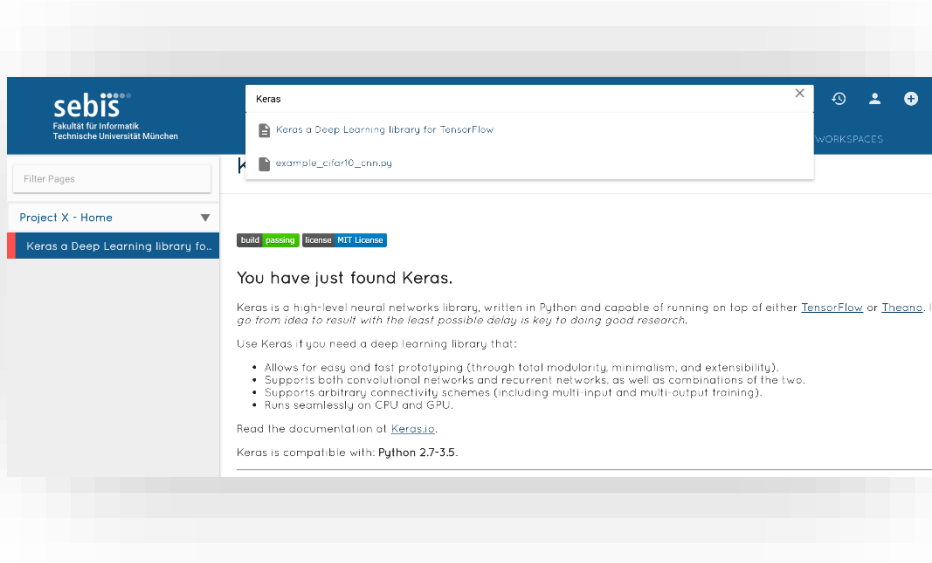
- Dr. Holger Wittges
- Northwind Traders
- HADOOP-10474
- HADOOP-13375
- HADOOP-6311

Real-time search with autocompletion across documents and workspaces

Intelligent autocompletion for attributes to reduce user typos and increase usability

Fast, reliable REST-based instant search API

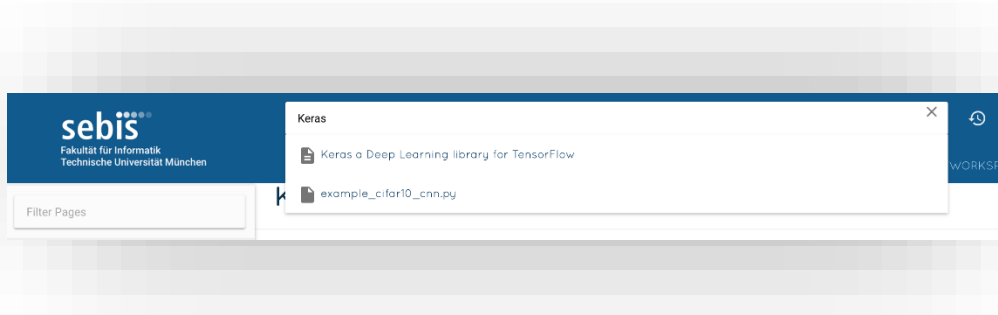
Search that goes beyond keywords



Search goes beyond a simple keyword-based approach as in most systems

Find items based on their contextual relevance, e.g. "is attachment of"

Search that goes beyond keywords



Search goes beyond a simple keyword-based approach as in most systems

Find items based on their contextual relevancy, e.g. "is attachment of"

SocioCortex Frontend

Modeler for Domain Experts



☰ SocioCortex Modeler > Northwind > Order

DANIEL BRAUN

Users and Groups

Workspaces

Northwind

MxL Documentation

SocioCortex Community

Project X

Search Entity Types

[+ Add Entity Type](#)

Category

Product

Supplier

Order

Customer

< **ATTRIBUTE DEFINITIONS** DERIVED ATTRIBUTE DEFINITIONS TASK DEFINITIONS >

Name	Type	Name
Customer	Link	exactlyOne
Discount	Number	exactlyOne
Product	Link	exactlyOne
Quantity	Number	exactlyOne
Shipping date	Date	exactlyOne



SocioCortex Frontend

Modeler for Domain Experts



SocioCortex Modeler > Northwind > Order

DANIEL BRAUN

- Users and Groups
- Workspaces
 - Northwind
 - MxL Documentation
 - SocioCortex Community
 - Project X

Quick access to favorite workspaces

Search Entity Types

+ Add Entity Type

Category

Product

Supplier

Order

Customer

Overview of all entity types of the workspace

ATTRIBUTE DEFINITIONS DERIVED ATTRIBUTE DEFINITIONS TASK DEFINITIONS

Name	Type	Name
Customer	Link	exactlyOne
Discount	Number	exactlyOne
Product	Link	exactlyOne
Quantity	Number	exactlyOne
Shipping date	Date	exactlyOne

Attribute types



SocioCortex Frontend

Modeler for Domain Experts

> Northwind > Order

DANIEL BRAUN

< **ATTRIBUTE DEFINITIONS** DERIVED ATTRIBUTE DEFINITIONS TASK DEFINITIONS

Search Entity Types

+ Add Entity Type

Category

Product

Supplier

Order

Customer

Name	Type	Name
Customer	Link	exactlyOne
Discount	Number	exactlyOne

Edit or create attribute types

PRODUCT

Read Only

Name *
Product

Multiplicity
Exactly one value

Description
0 / 1000

Default Value



SocioCortex Frontend

Modeler for Domain Experts

- Users and Groups
- Workspaces
 - Northwind
 - MxL Documentation
 - SocioCortex Community
 - Project X

Name *

Administrators



Group & user management

Administrators

Name

Administrators

Members

Florian Matthes

Name

Adrian Hernandez-Mendez

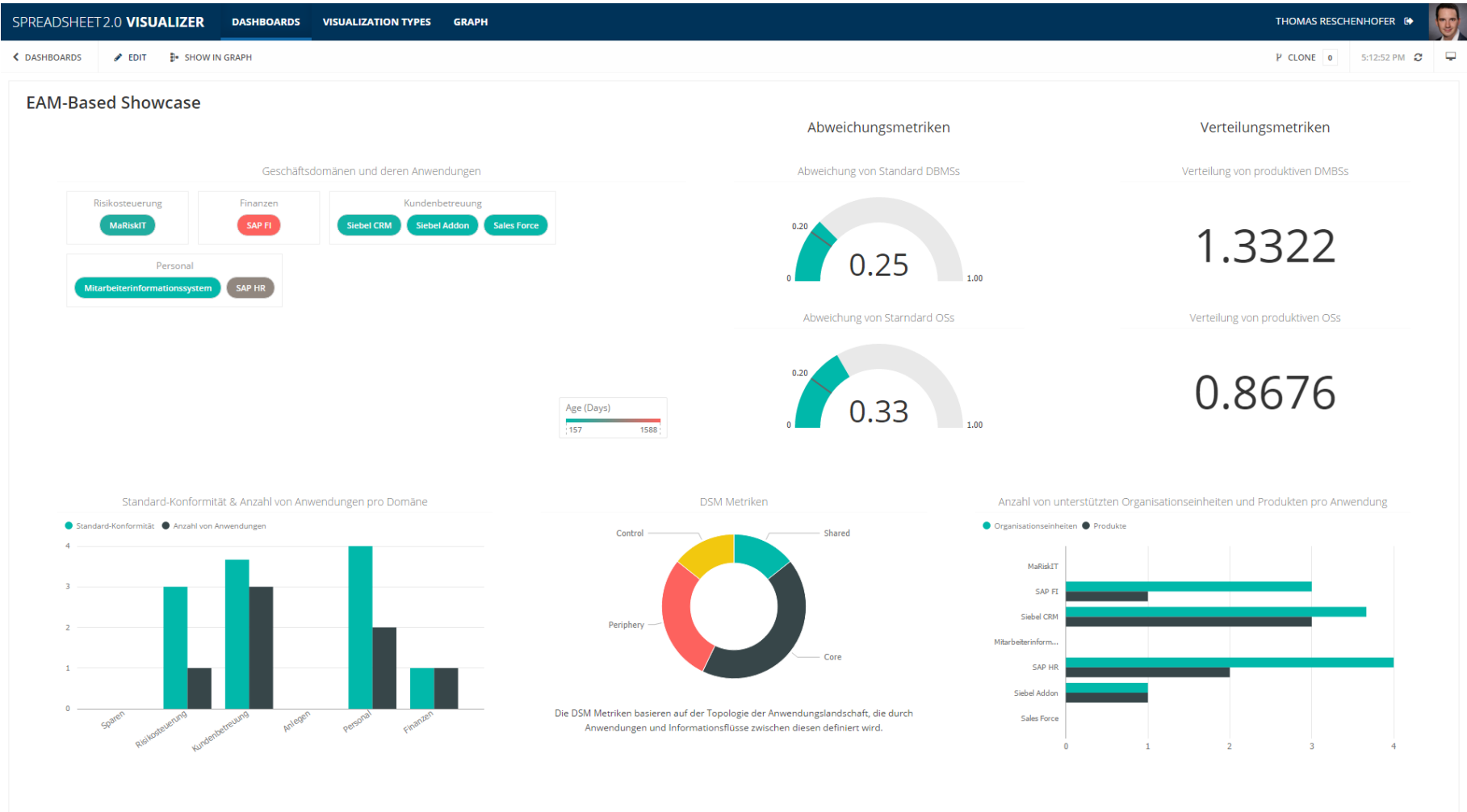
Anne Faber

Bernhard Walzl

Daniel Braun

Felix Michel

Auto completion



SPREADSHEET 2.0 VISUALIZER DASHBOARDS VISUALIZATION TYPES GRAPH THOMAS RESCHENHOFER VERSION 21

← BACK SAVE REVERT DELETE

GENERAL

TITLE
EA Management

WORKSPACE
EAMKON Workshop

OWNER
 Thomas Reschenhofer

ADD A VISUALIZATION

- Animated Number
- Bar Chart
- Cluster Map
- Gauge
- Highstock Line
- Line Chart
- List
- Pie Chart
- Text
- YouTube

EAM-Based Showcase

Geschäftsdomänen und deren Anwendungen

Risikosteuerung

MaRiskIT

Finanzen

SAP FI

Kundenbetreuung

Siebel CRM Siebel Addon Sales Force

Personal

Mitarbeiterinformationssystem SAP HR

Age (Days)

157 — 1588

Abweichungsmetriken

Abweichung von Standard DBMSs

0.25

Abweichung von Standard OSS

0.33

Verteilungsmetriken

Verteilung von produktiven DBMSs

1.3322

Verteilung von produktiven OSS

0.8676

Standard-Konformität & Anzahl von Anwendungen pro Domäne

Standard-Konformität Anzahl von Anwendungen

Domäne	Standard-Konformität	Anzahl von Anwendungen
Spezial	3	1
Risikosteuerung	3.5	3
Kundenbetreuung	4	2
Anlagen	1	1
Personal	1	1
Finanzen	1	1

DSM Metriken

Control Shared Core Periphery

Die DSM Metriken basieren auf der Topologie der Anwendungslandschaft, die durch Anwendungen und Informationsflüsse zwischen diesen definiert wird.

Anzahl von unterstützten Organisationseinheiten und Produkten pro Anwendung

Organisationseinheiten Produkte

Anwendung	Organisationseinheiten	Produkte
MaRiskIT	3	1
SAP FI	3	1
Siebel CRM	3.5	3
Mitarbeiterinfo...	4	2
SAP HR	4	2
Siebel Addon	1	1
Sales Force	1	1

170309 Michel 5th SocioCortex Workshop

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The screenshot shows the SocioCortex Frontend Visualizer interface. The top navigation bar includes 'SPREADSHEET 2.0 VISUALIZER', 'DASHBOARDS', 'VISUALIZATION TYPES', and 'GRAPH'. The user is identified as 'THOMAS RESCHENHOFER' and the version is 'VERSION 21'. The interface is divided into a left sidebar and a main workspace.

Left Sidebar:

- GENERAL:** TITLE (EA Management), WORKSPACE (EAMKON Workshop), OWNER (Thomas Reschenhofer).
- ADD A VISUALIZATION:** A list of visualization types: Animated Number, Bar Chart, Cluster Map, Gauge, Highstock Line, Line Chart, List, Pie Chart, Text, and YouTube.

Main Workspace:

- EAM-Based Showcase:** The main dashboard title.
- Geschäftsdomänen und deren Anwendungen:** A central visualization area with a 'Force' button.
- Abweichungsmetriken:** Two gauge charts showing deviations from standard DBMSs (0.25) and standard OSS (0).
- Verteilungsmetriken:** Two large numerical displays showing the distribution of productive DBMSs (1.3322) and productive OSS (0.8676).
- Standard-Konformität & Anzahl von Anwendungen pro Domäne:** A bar chart comparing standard conformity and the number of applications per domain.
- Control, Periphery, Core:** A donut chart showing the distribution of these categories.
- Die DSM Metriken basieren auf der Topologie der Anwendungslandschaft...** A text box explaining the basis of the DSM metrics.
- Mitarbeiterinfo...:** A horizontal bar chart showing employee information for SAP HR, Siebel Addon, and Sales Force.

Annotations:

- Annotation 1:** A "master data source" of the dashboard is defined here. However, the data of several workspaces (see databases) can also be integrated.
- Annotation 2:** Each visualization can be configured for position, size, data binding, and visual properties (e.g., color).
- Annotation 3:** From the list of available visualization types you can create a visualization on the dashboard using drag & drop.

SPREADSHEET 2.0 VISUALIZER DASHBOARDS VISUALIZATION TYPES GRAPH THOMAS RESCHENHOFER VERSION 21

← BACK SAVE REVERT DELETE

ABWEICHUNG VON STANDAR...

TITLE
Abweichung von Standard DBMSs

DATA BINDINGS

VALUE
find DBMS
.ratio(isStandard = "No")

EXPECTED

RETURNS

MINIMAL VALUE
0

EXPECTED

RETURNS

MAXIMAL VALUE
1

EXPECTED

RETURNS

TARGET VALUE
0.2

EAM-Based Showcase

Geschäftsdomänen und deren Anwendungen

Risikosteuerung
MaRiskIT

Finanzen
SAP FI

Kundenbetreuung
Siebel CRM Siebel Addon Sales Force

Personal
Mitarbeiterinformationssystem SAP HR

Age (Days)

Abweichungsmetriken

Abweichung von Standard DBMSs

Abweichung von Standard OSS

Verteilungsmetriken

Verteilung von produktiven DBMSs

1.3322

Verteilung von produktiven OSSs

0.8676

Standard-Konformität & Anzahl von Anwendungen pro Domäne

Domäne	Standard-Konformität	Anzahl von Anwendungen
Sparen	0	0
Risikosteuerung	3	1
Kundenbetreuung	4	3
Anliegen	0	0
Personal	4	2
Finanzen	1	1

DSM Metriken

Die DSM Metriken basieren auf der Topologie der Anwendungslandschaft, die durch Anwendungen und Informationsflüsse zwischen diesen definiert wird.

Anzahl von unterstützten Organisationseinheiten und Produkten pro Anwendung

Anwendung	Organisationseinheiten	Produkte
MaRiskIT	3	1
SAP FI	3	1
Siebel CRM	4	3
Mitarbeiterinfo...	4	2
SAP HR	4	2
Siebel Addon	1	1
Sales Force	1	1

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SPREADSHEET 2.0 VISUALIZER DASHBOARDS VISUALIZATION TYPES GRAPH THOMAS RESCHENHOFER VERSION 21

Each visualization defines typed DataBinding parameters as a data interface

The user has access to the EAM model in SocioCortex via the query language and has to transform the data to correspond to the interface of the visualization (in this case, a number must result)

In addition to data bindings, there are also visual properties (e.g., colors, formats, etc.) that can be configured

DATA BINDINGS

TITLE: Abweichung von Standard DBMSs

VALUE: `find DBMS .ratio(isStandard = "No")`

EXPECTED: Number

RETURNS: Number

MINIMAL VALUE: 0

MAXIMAL VALUE: 1

TARGET VALUE: 0.2

Abweichungsmetriken

Abweichung von Standard DBMSs: 0.25

Abweichung von Standard OSS: 0.33

Verteilungsmetriken

Verteilung von produktiven DBMSs: 1.3322

Verteilung von produktiven OSS: 0.8676

Anzahl von unterstützten Organisationseinheiten und Produkten pro Anwendung

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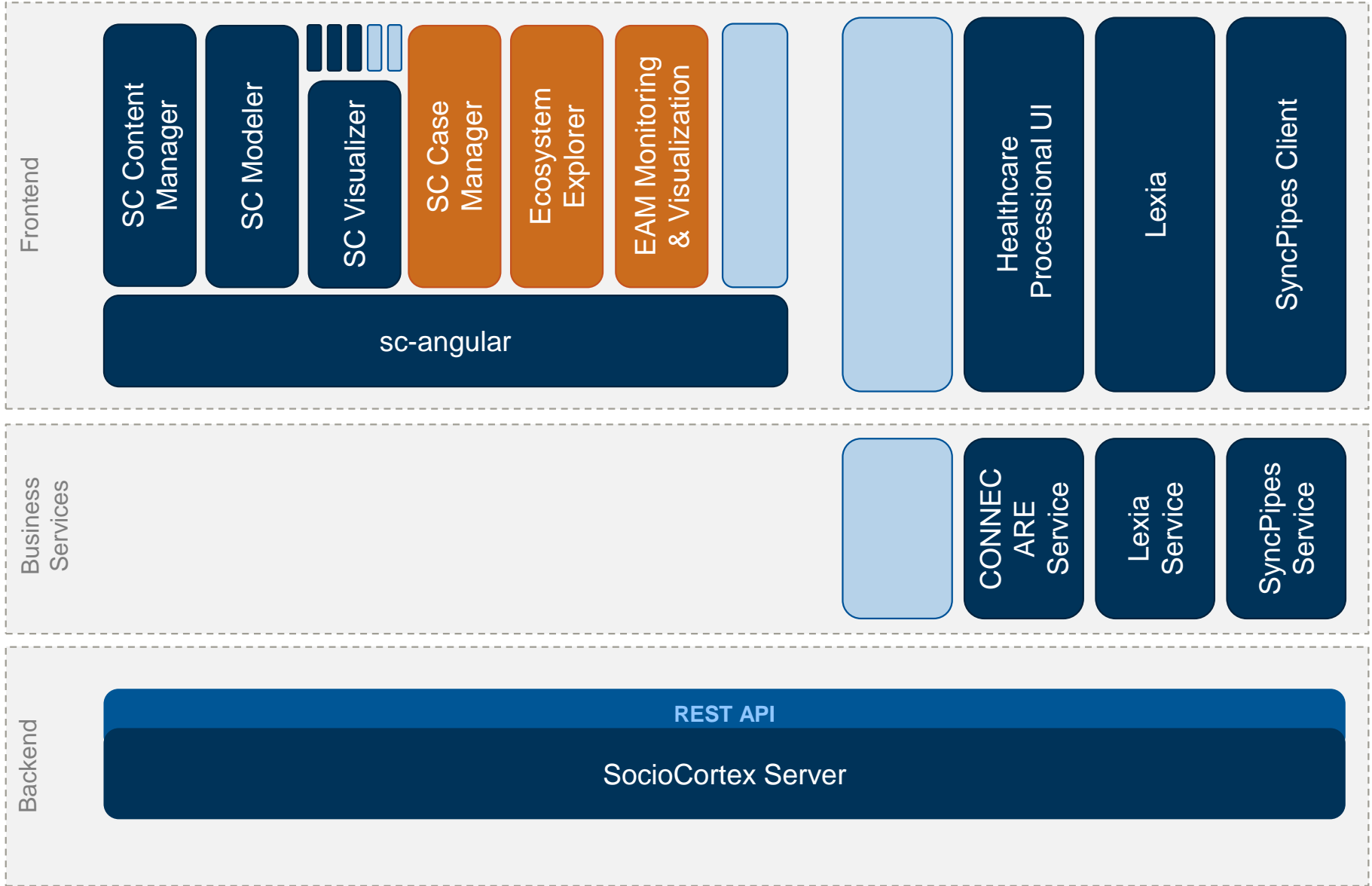
Die DSM Metriken basieren auf der Topologie der Anwendungslandschaft, die durch Anwendungen und Informationsflüsse zwischen diesen definiert wird.

Questions and Discussion

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TUM-LLCM Project

Overview



Megatrends



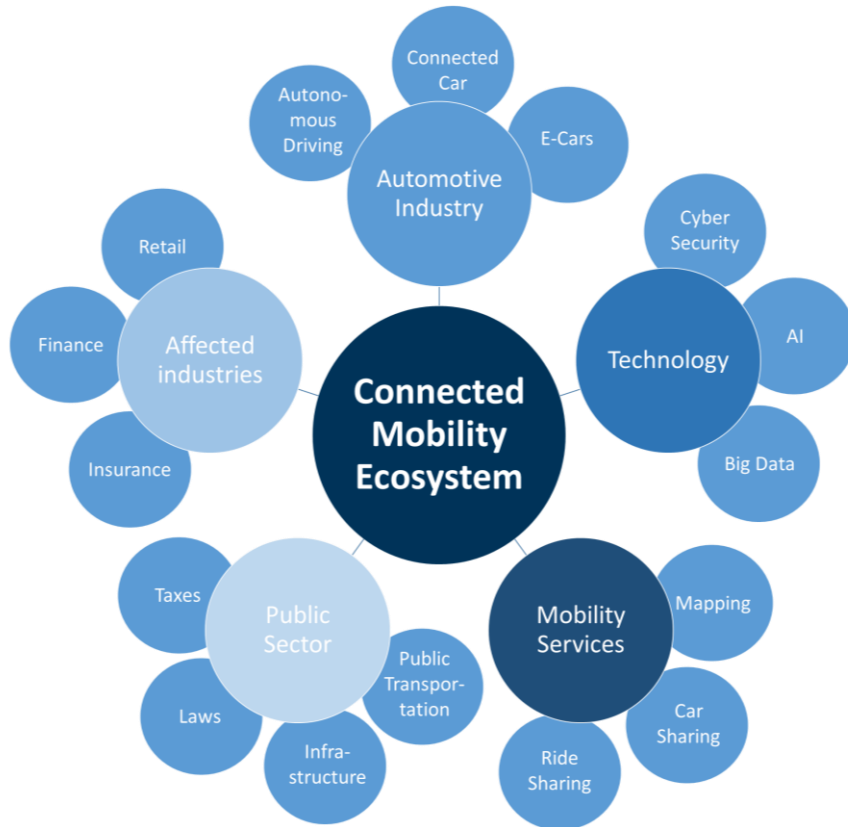
Technological Innovation



Challenges for established players

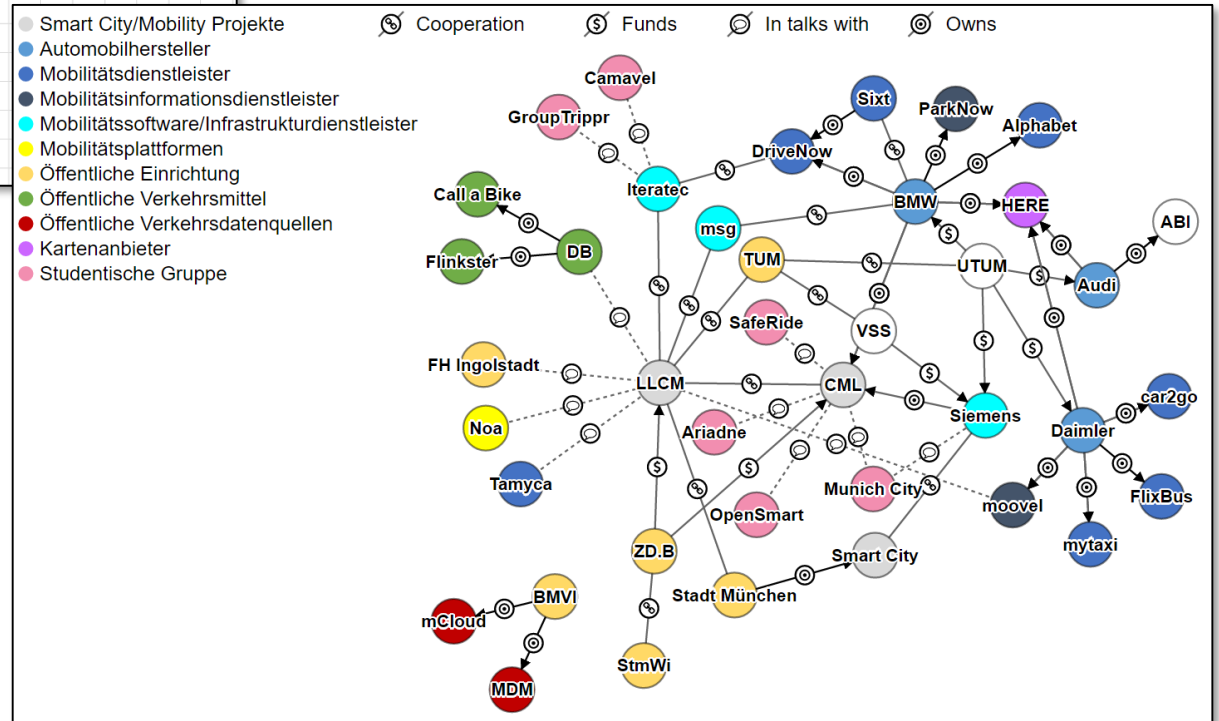
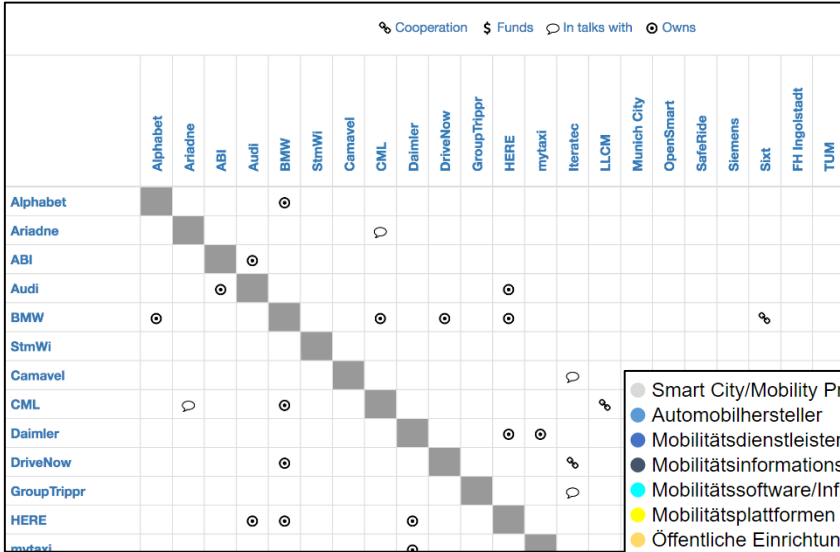


... the mobility ecosystem is changing



- Challenges
 - Very dynamic, as new entities entering the ecosystem, new business opportunities arise and different ways of collaboration happen
 - Documentation, modeling and visualization of this ecosystem is missing
- Objectives
 - Model and visualize the dynamic Connected Mobility ecosystem from a German perspective
 - Address the two following use cases:
 - Public accessible ecosystem explorer
 - Firm-internal competitor analysis

First visualizations of the Connected Mobility Ecosystem



Ecosystem Explorer uses SocioCortex to store data

Entities of the Ecosystem

Organizations in workspace CMEE

Organization	abbreviation	capabilities	Categories	logo	url
<input type="checkbox"/> Alphabet International GmbH	Alphabet		Mobility providers		https://www.alphabet.com/
<input type="checkbox"/> Ariadne	Ariadne	Hackathon Project	Student Group		https://hackatum.devpost.com/submissions/#/1838-ariadne
<input type="checkbox"/> Audi Business Innovation GmbH	ABI				
<input type="checkbox"/> Audi Deutschland	Audi				
<input type="checkbox"/> Bayerisches Staatsministerium für Wirtschaft und Medien, Energie und Technologie	StMW				
<input type="checkbox"/> BetterTec GmbH	BetterTeci	Interne			
<input type="checkbox"/> BMW Group	BMW				
<input type="checkbox"/> Bundesministerium für Bildung und Forschung	BMBF				
<input type="checkbox"/> Bundesministerium für Verkehr und digitale	BMVI				

RelationTypes in workspace CMEE

RelationType	enumName	img
<input type="checkbox"/> Partially owns	PartiallyOwns	dot-circled.svg
<input type="checkbox"/> Partially owned	PartiallyOwned	dot-circled.svg
<input type="checkbox"/> Owns	Owns	dot-circled.svg
<input type="checkbox"/> Owned by	Owned	dot-circled.svg
<input type="checkbox"/> InterestedInBackwards	InterestedBack	help.svg
<input type="checkbox"/> InterestedIn	Interested	help.svg
<input type="checkbox"/> In talks with	Talks	comment-empty.svg
<input type="checkbox"/> Funds		
<input type="checkbox"/> Funded by		
<input type="checkbox"/> Cooperation		

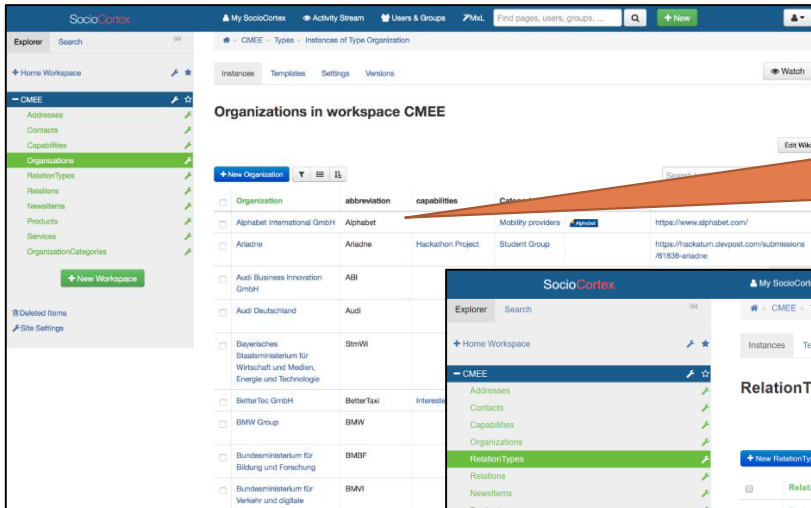
Relation types

Relations

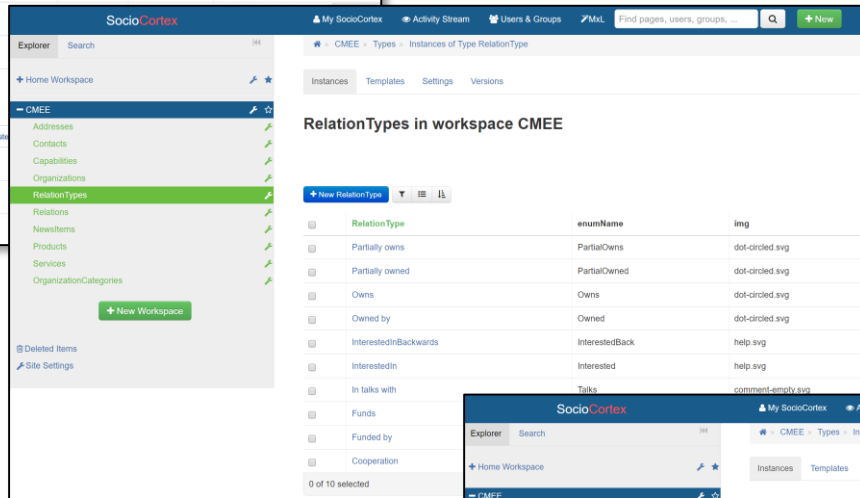
Relations in workspace CMEE

Relation	citations	dateFrom	dateTo	from	relationType	to
[TEST] Audi_ABI_Owns				Audi Deutschland	Owns	Audi Business
[TEST] BMW_Alphabet_Owns				BMW Group	Owns	Alphabet Intern
[TEST] CML_Ariadne_Talks				Connected Mobility Lab	In talks with	Ariadne
[TEST] DriveNow_ZD_B_Interested				DriveNow	InterestedIn	Zentrum Digital
[TEST] HERE_BMW_PartialOwned				HERE Maps	Partially owned	BMW Group
[TEST] HERE_Daimler_PartialOwned				HERE Maps	Partially owned	Daimler AG
[TEST] Iteratec_Camavel_talks				Iteratec GmbH	In talks with	Camavel
[TEST] Iteratec_GroupTripper_Talks				Iteratec GmbH	In talks with	Group Tripper
[TEST] msg_LLCM_Coop				msg systems ag	Cooperation	Living Lab Con
[TEST] Munich City_CML_Talks				Munich City	In talks with	Connected Mot
[TEST] mytaxi_Daimler_Owned				Intelligent Apps GmbH	Owned by	Daimler AG
[TEST] OpenSmart_CML_Talks				OpenSmart	In talks with	Connected Mot

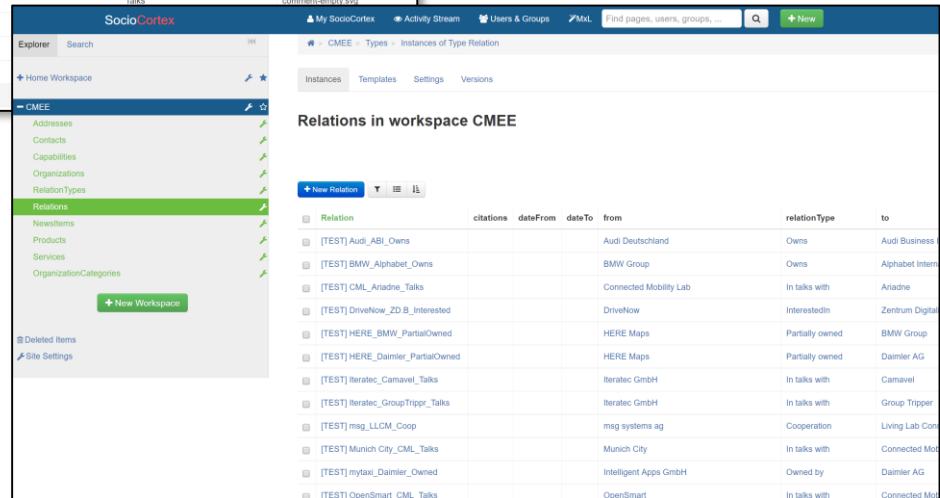
Ecosystem Explorer uses SocioCortex to store data



Entities of the Ecosystem
Storage of structured and unstructured information of relevant entities



Relation types



Relations

Ecosystem Explorer uses SocioCortex to store data

Entities of the Ecosystem

Organizations in workspace CMEE

Organization	abbreviation	capabilities	Categories	logo	url
<input type="checkbox"/> Alphabet International GmbH	Alphabet		Mobility providers		https://www.alphabet.com/
<input type="checkbox"/> Ariadne	Ariadne	Hackathon Project	Student Group		https://hackatum.devpost.com/submissions/#/1838-ariadne
<input type="checkbox"/> Audi Business Innovation GmbH	ABI				
<input type="checkbox"/> Audi Deutschland	Audi				
<input type="checkbox"/> Bayerisches Staatsministerium für Wirtschaft und Medien, Energie und Technologie	StMW				
<input type="checkbox"/> BetterTec GmbH	BetterTaxi	Interne			
<input type="checkbox"/> BMW Group	BMW				
<input type="checkbox"/> Bundesministerium für Bildung und Forschung	BMBF				
<input type="checkbox"/> Bundesministerium für Verkehr und digitale	BMDV				

RelationTypes in workspace CMEE

RelationType	enumName	img
<input type="checkbox"/> Partially owns	PartiallyOwns	
<input type="checkbox"/> Partially owned	PartiallyOwned	
<input type="checkbox"/> Owns	Owns	
<input type="checkbox"/> Owned by	Owned	
<input type="checkbox"/> InterestedInBackwards	InterestedBack	
<input type="checkbox"/> InterestedIn	Interested	
<input type="checkbox"/> In talks with	Talks	
<input type="checkbox"/> Funds	Funded by	
<input type="checkbox"/> Cooperation	Cooperation	

Relation types
Adding types of
relations if needed

Relations

Relations in workspace CMEE

Relation	citations	dateFrom	dateTo	from	relationType	to
[TEST] Audi_ABI_Owns				Audi Deutschland	Owns	Audi Business
[TEST] BMW_Alphabet_Owns				BMW Group	Owns	Alphabet Intern
[TEST] CML_Ariadne_Talks				Connected Mobility Lab	In talks with	Ariadne
[TEST] DriveNow_ZD_B_Interested				DriveNow	InterestedIn	Zentrum Digital
[TEST] HERE_BMW_PartialOwned				HERE Maps	Partially owned	BMW Group
[TEST] HERE_Daimler_PartialOwned				HERE Maps	Partially owned	Daimler AG
[TEST] Iteratec_Camavel_talks				Iteratec GmbH	In talks with	Camavel
[TEST] Iteratec_GroupTripper_Talks				Iteratec GmbH	In talks with	Group Tripper
[TEST] msg_LLCM_Coop				msg systems ag	Cooperation	Living Lab Con
[TEST] Munich City_CML_Talks				Munich City	In talks with	Connected Mob
[TEST] mytaxi_Daimler_Owned				Intelligent Apps GmbH	Owned by	Daimler AG
[TEST] OpenSmart_CML_Talks				OpenSmart	In talks with	Connected Mob

Ecosystem Explorer uses SocioCortex to store data

Entities of the Ecosystem

Organizations in workspace CMEE

Organization	abbreviation	capabilities	Categories	logo	url
<input type="checkbox"/>	Alphabet International GmbH	Alphabet	Mobility providers		https://www.alphabet.com/
<input type="checkbox"/>	Aniada	Aniada	Hackathon Project		https://hackatum.devpost.com/submissions/#/1838-aniada
<input type="checkbox"/>	Audi Business Innovation GmbH	ABI			
<input type="checkbox"/>	Audi Deutschland	Audi			
<input type="checkbox"/>	Bayerisches Staatsministerium für Wirtschaft und Medien, Energie und Technologie	StMW			
<input type="checkbox"/>	BetterTec GmbH	BetterTeci	Interne		
<input type="checkbox"/>	BMW Group	BMW			
<input type="checkbox"/>	Bundesministerium für Bildung und Forschung	BMBF			
<input type="checkbox"/>	Bundesministerium für Verkehr und digitale Infrastruktur	BMVI			

RelationTypes in workspace CMEE

RelationType	enumName	img	
<input type="checkbox"/>	Partially owns	PartialOwns	
<input type="checkbox"/>	Partially owned	PartialOwned	
<input type="checkbox"/>	Owms	Owms	
<input type="checkbox"/>	Owned by	Owned	
<input type="checkbox"/>	InterestedInBackwards	InterestedBack	
<input type="checkbox"/>	InterestedIn	Interested	
<input type="checkbox"/>	In talks with	Talks	
<input type="checkbox"/>	Funds		
<input type="checkbox"/>	Funded by		
<input type="checkbox"/>	Cooperation		

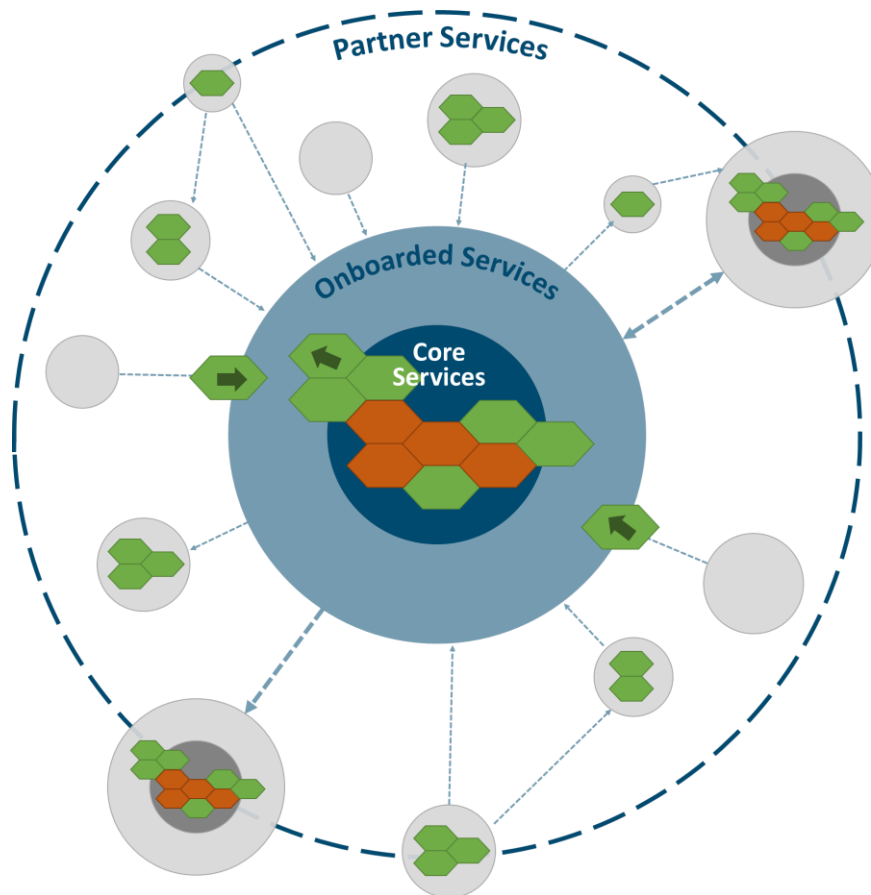
Relation types

Relations in workspace CMEE

Relation	citations	dateFrom	dateTo	from	relationType	to
<input type="checkbox"/>	[TEST]			Audi Deutschland	Owms	Audi Business
<input type="checkbox"/>	[TEST]			BMW Group	Owms	Alphabet Intern
<input type="checkbox"/>	[TEST]			Connected Mobility Lab	In talks with	Aniada
<input type="checkbox"/>	[TEST]			DriveNow	InterestedIn	Zentrum Digital
<input type="checkbox"/>	[TEST]			HERE Maps	Partially owned	BMW Group
<input type="checkbox"/>	[TEST]			HERE Maps	Partially owned	Daimler AG
<input type="checkbox"/>	[TEST]			Iteratec GmbH	In talks with	Camavei
<input type="checkbox"/>	[TEST]			Iteratec GmbH	In talks with	Group Tripper
<input type="checkbox"/>	[TEST]			msg systems ag	Cooperation	Living Lab Con
<input type="checkbox"/>	[TEST]			Munich City	In talks with	Connected Mo
<input type="checkbox"/>	[TEST]			Intelligent Apps GmbH	Owned by	Daimler AG
<input type="checkbox"/>	[TEST]			OpenSmart	In talks with	Connected Mo

Relations

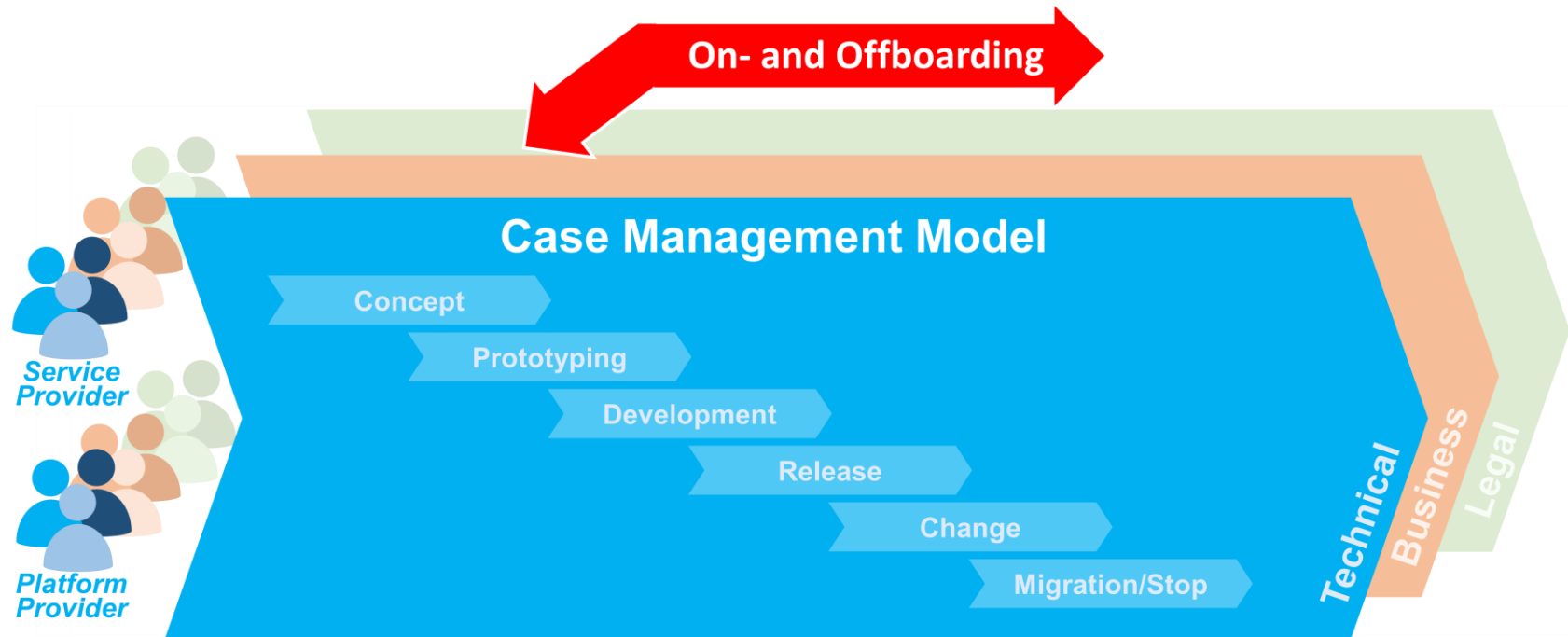
Each relation is linked to the associated companies and can be linked to additional information



Dynamic Partner and Service Network

Challenges

- ✓ Integrating services to an ecosystem implies several perspectives such as legal, business and the technical perspective
- ✓ Many different internal and external stakeholders involved
- ✓ Several disconnected tools are used to complete the onboarding process
- ✓ No seamless integrated tool chain

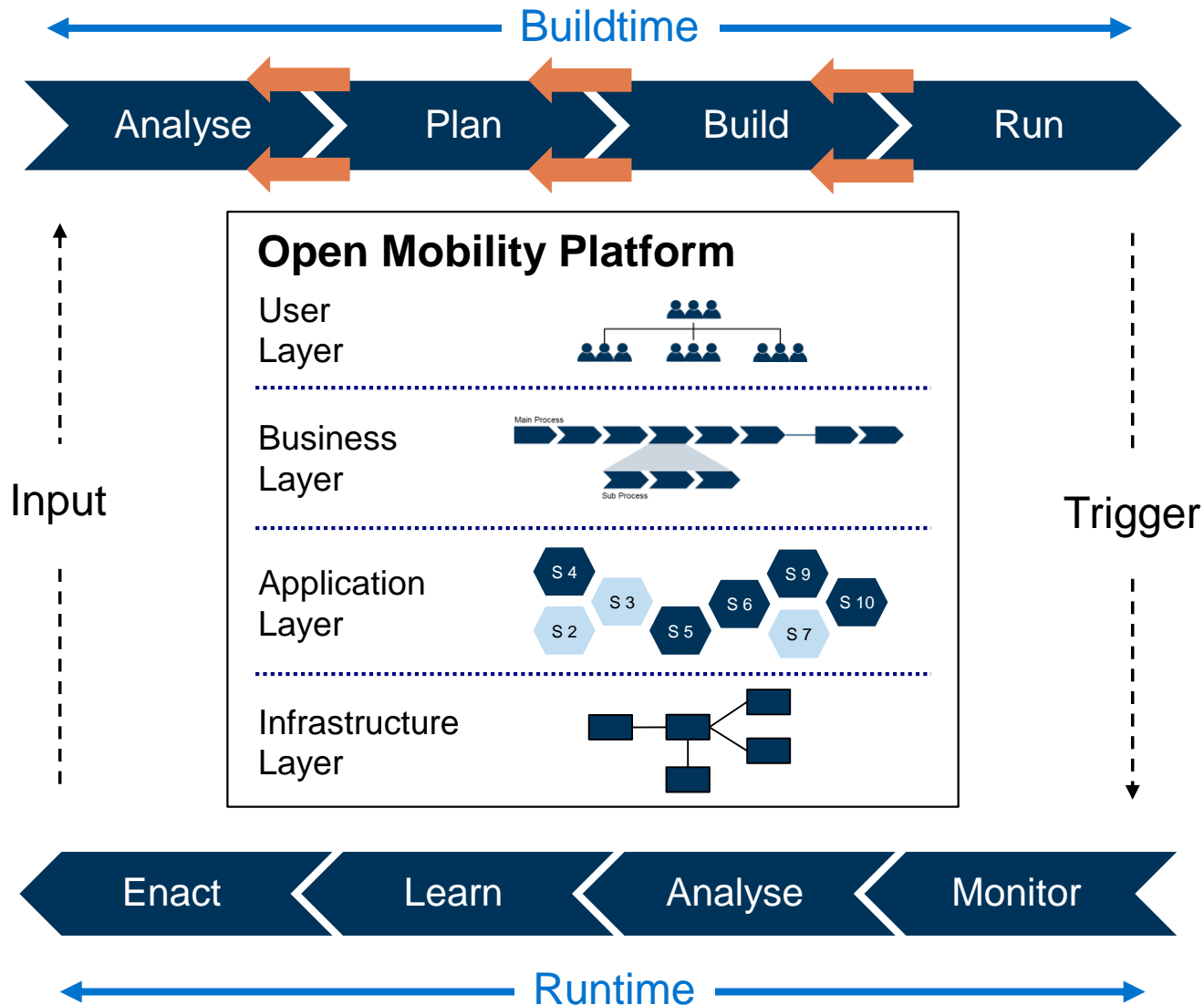


Objectives

Support and document the partner and service onboarding process with three perspectives and several stakeholders.

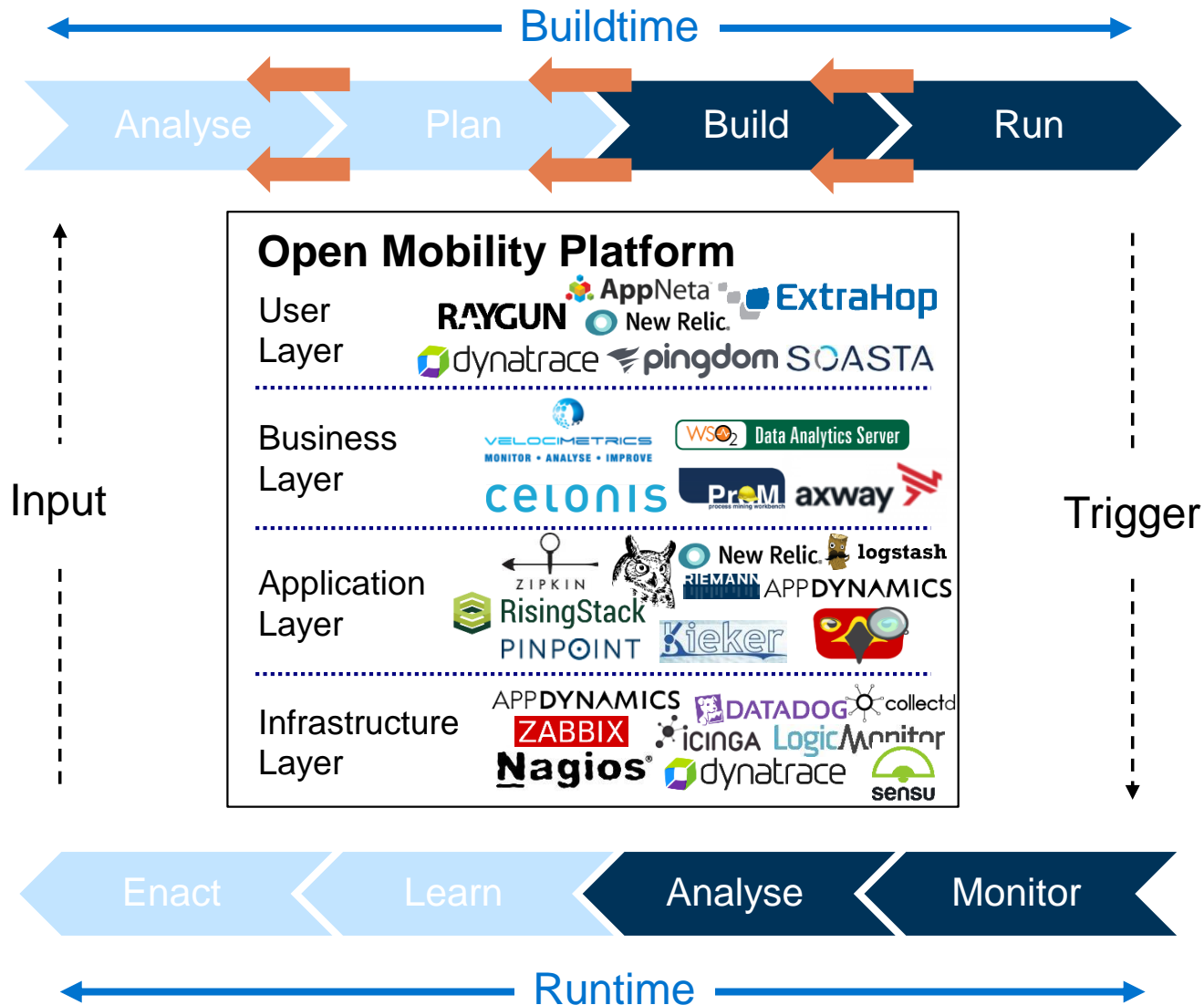
TUM-LLCM Project

The Platform consists of multiple layers



TUM-LLCM Platform

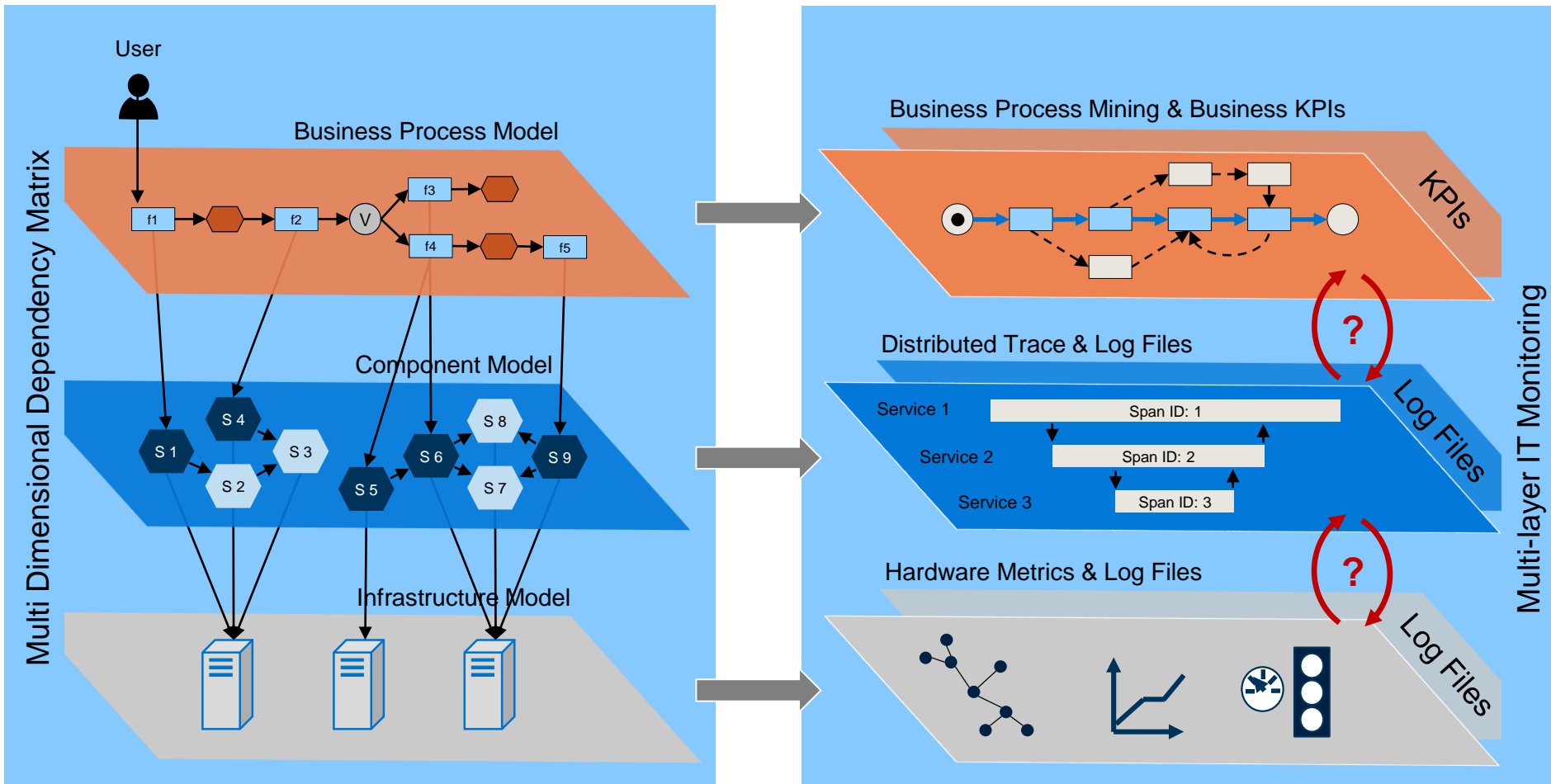
Plethora of different monitoring solutions exists



Multi-layer IT Infrastructure - Static vs. Dynamic Representation of an EA

Static Representation

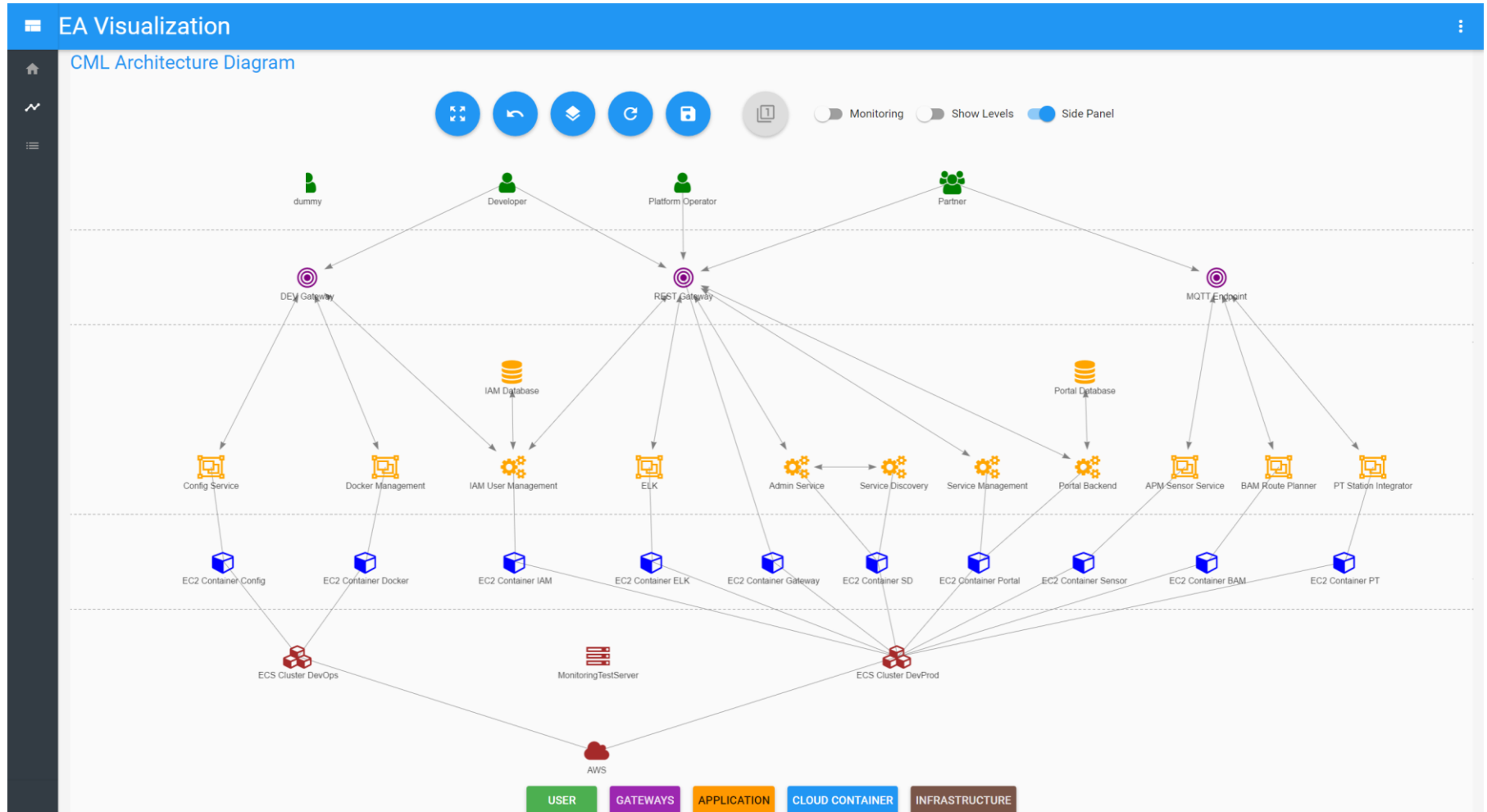
Dynamic Representation



TUM-LLCM Project



Multi-Level Monitoring - Visualization of the dependency model in a distributed environment



Multi-Level Monitoring

SocioCortex – A configuration management database



EA Visualization

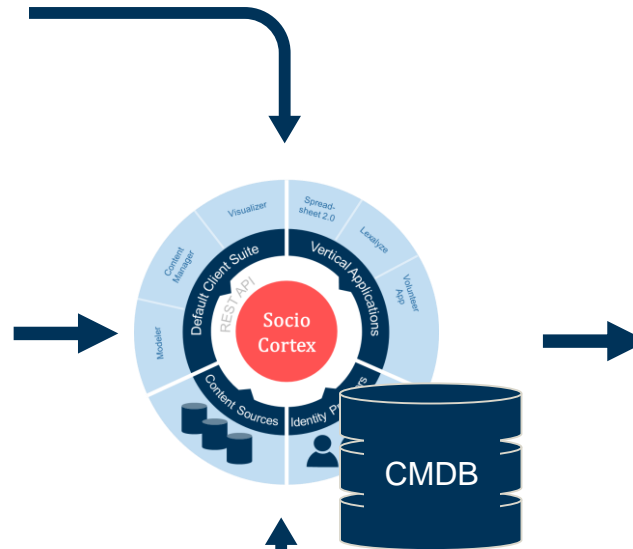
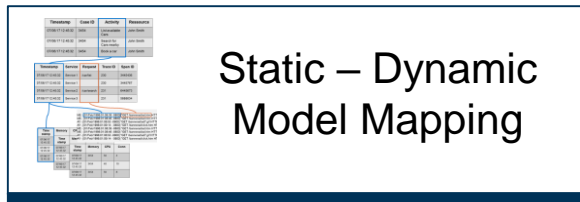
Architecture Overview

COMPONENTS COMPONENT TYPES RELATIONSHIPS LAYERS SUB COMPONENTS SUB RELATIONSHIPS

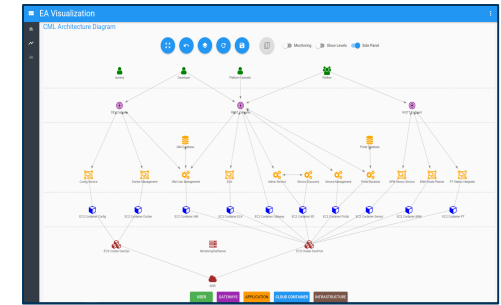
Name	Type	Layer	Icon	Level	Log Path	Agent Configuration	Information
<input type="checkbox"/> APM Sensor Service	Microservices	Application	0x1f247	4	/logs/apmsensorsevice	Add agent configuration ...	Add information ...
<input type="checkbox"/> ELK	Stack	Application	0x1f247	4	Add log path ...	Add agent configuration ...	Add information ...
<input type="checkbox"/> PT Station Integrator	Microservices	Application	0x1f247	4	Add log path ...	Add agent configuration ...	Add information ...
<input type="checkbox"/> Portal Database	DB Server	Application	0x1f1c0	5	Add log path ...	Add agent configuration ...	Add information ...
<input type="checkbox"/> Admin Service	Service	Application	0x1f085	4	Add log path ...	adminconfig	Add information ...
<input type="checkbox"/> Docker Management	Service	Application	0x1f247	4	Add log path ...	Add agent configuration ...	Add information ...
<input type="checkbox"/> IAM User Management	Service	Application	0x1f085	4	Add log path ...	Add agent configuration ...	Add information ...
<input type="checkbox"/> Config Service	Microservices	Application	0x1f247	4	Add log path ...	Add agent configuration ...	Configuration Service
<input type="checkbox"/> Service Management	Service	Application	0x1f085	4	Add log path ...	Add agent configuration ...	Add information ...
<input type="checkbox"/> Service Discovery	Service	Application	0x1f085	4	Add log path ...	Add agent configuration ...	Add information ...

Page: 1 Rows per page: 10 1 - 10 of 34

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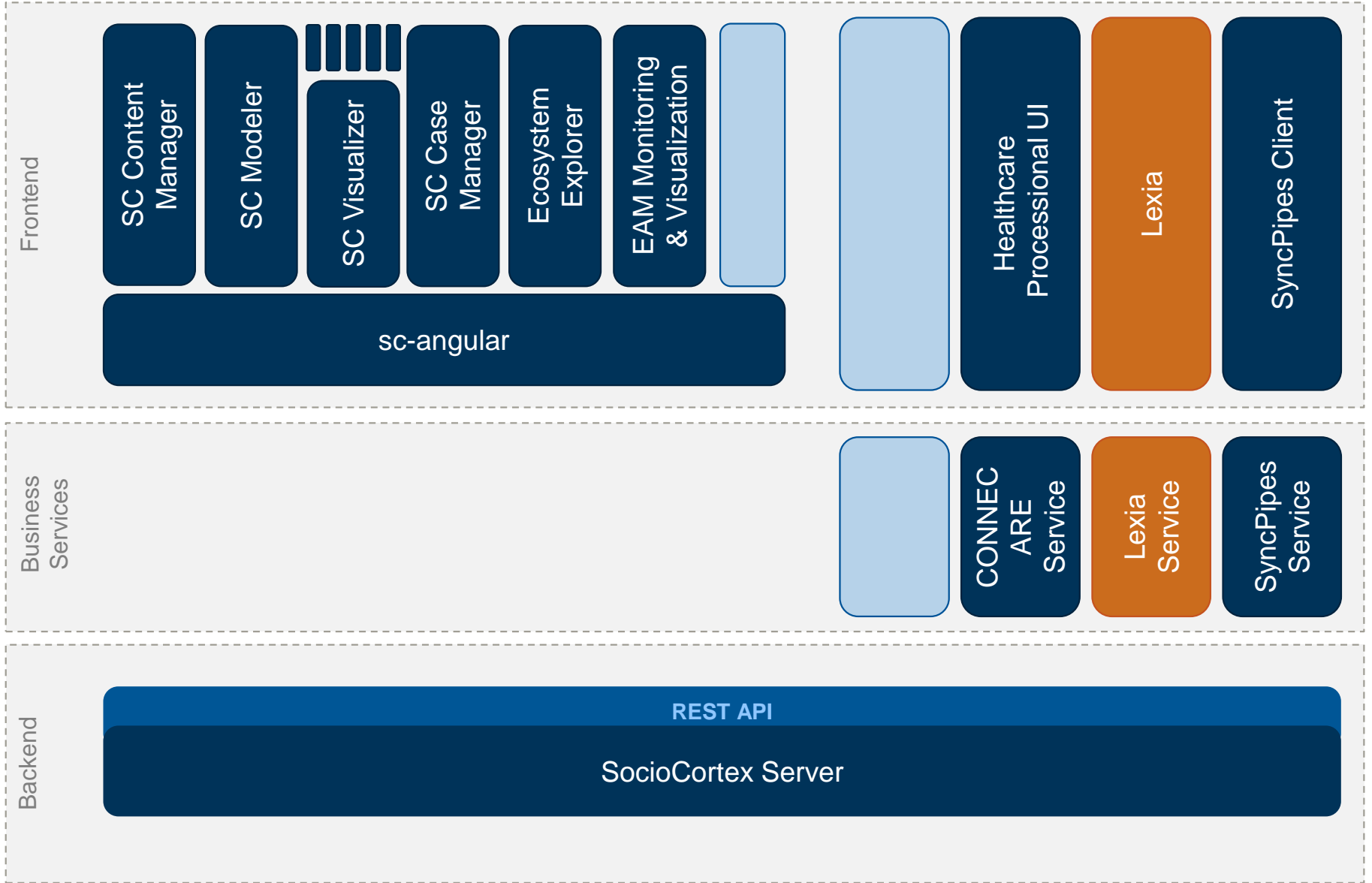


Platform Architecture & Metrics Visualization



Questions and Discussion

13:30	Kaffee und Ankunft	Alle Teilnehmer
13:40	Introduction	Prof. Dr. Florian Matthes
13:50	SocioCortex Backend <ol style="list-style-type: none">1. Core Architecture2. Importer - SyncPipes	Felix Michel, Klym Shumaiev
14:00	SocioCortex Frontend <ol style="list-style-type: none">1. Content Manager2. Modeler3. Visualizer	Patrick Holl, Daniel Braun, Felix Michel
14:20	Using SocioCortex in the context of mobility service platforms and ecosystems <ol style="list-style-type: none">1. Visual Ecosystem Modelling2. On- and Off-boarding Process Support3. Platform Monitoring	Anne Faber, Adrian Hernandez-Mendez, Felix Michel Martin Kleehaus
14:55	Extending SocioCortex for semantic analysis of legal document collections	Bernhard Waltl
15:20	Collaborative Project-Management with Cplace	Dr. Rupert Stuffer (CEO Collaboration Factory)



1. Introduction
2. Research Method and Data
3. Reference Architecture for Collaborative Data Science Environment
 - Data Storage and Data Access Layer
 - Importer and Exporter
 - Text Analysis Engine
 - User Interface
4. Conclusion and Outlook

- Processes of knowledge workers (e.g., legal experts) are...
 - ... time-intensive
 - ... knowledge-intensive
 - ... data-intensive
- (Legal) Data Science is becoming more and more attractive, because
 - ... process time and memory space are cheap
 - ... algorithms can process data fast and accurate
 - ... data is digitally available.
- In order to achieve highest accuracy, algorithms and data models need an adaption to the domain
 - German legal texts (laws, contracts, etc.)
 - Data model tailored to legislative data
 - Data mapping / transformation to fit modern information systems

1. Maat and Winkels (2010)
 - Classification of norms regarding linguistic structures
 - Regular Expressions
 - Limitation: no consideration of linguistic properties, such as nouns, auxiliary sentences, etc.

2. Bommarito and Katz (2014)
 - Complexity measures of the US Code
 - Analysis of semantic and structural properties

3. Reconstruction of arguments from legal cases
 - Gordon et al. (2007): Formalization of argument structures
 - Walter (2009): Extraction of Definitions from German court decisions
 - Wyner et al. (2010): Identification of arguments in court decisions
 - Houy et al. (2014): Detection of arguments in German court decisions

4. Grabmair et al. (2015)

- Using Apache UIMA for legal text analysis (LUIMA)
- „law-specific semantic extraction toolbox based on the UIMA framework“
- Automated sub-sentence annotation
- Case Study: Vaccine Injury Decisions

Short summary

- Data analysis is well established in legal informatics
- Adaption to domain is crucial to achieve highest accuracy ...
 - ... data model
 - ... algorithms
- Reusable code and implementations to avoid re-inventions

SECTIONS

Show Close

ANNOTATIONS

▶ Linguistic

▶ Legal Information

- ArtWithAdj
- ArtWithManyAdjAndNoun
- IndWord
- InternalReference
- LegalDefinedEntity
- LegalDefinition
- LegalEntity
- NounWithAdj
- OutgoingReference

All None

▶ Other annotations

▶ Comments

Aktiengesetz

§ Eingangsformel

§ 1 Wesen der Aktiengesellschaft

§ 2 Gründerzahl

§ 3 Formkaufmann. Börsennotierung

(1) Die Aktiengesellschaft gilt als Handelsgesellschaft, auch wenn der Gegenstand des Unternehmens nicht im Betrieb eines Handelsgewerbes besteht.

(2) Börsennotiert im Sinne dieses Gesetzes sind Gesellschaften, deren Aktien zu einem Markt zugelassen sind, der von staatlich anerkannten Stellen geregelt und überwacht wird, regelmäßig stattfindet und für das Publikum mittelbar oder unmittelbar zugänglich ist.

§ 4 Firma

§ 5 Sitz

§ 6 Grundkapital

§ 7 Mindestnennbetrag des Grundkapitals

§ 8 Form und Mindestbeträge der Aktien

(1) Die Aktien können entweder als Nennbetragsaktien oder als Stückaktien begründet werden.

(2) Nennbetragsaktien müssen auf mindestens einen Euro lauten. Aktien über einen geringeren Nennbetrag sind nichtig. Für den Schaden aus der Ausgabe sind die Ausgeber den Inhabern als Gesamtschuldner verantwortlich. Höhere Aktiennennbeträge müssen auf volle Euro lauten.

(3) Stückaktien lauten auf keinen Nennbetrag. Die Stückaktien einer Gesellschaft sind am Grundkapital in gleichem Umfang beteiligt. Der auf die einzelne Aktie entfallende anteilige Betrag des Grundkapitals darf einen Euro nicht unterschreiten. Absatz 2 Satz 2 und 3 findet entsprechende Anwendung.

(4) Der Anteil am Grundkapital bestimmt sich bei Nennbetragsaktien nach dem Verhältnis ihres Nennbetrags zum Grundkapital, bei Stückaktien nach der Zahl der Aktien.

(5) Die Aktien sind unteilbar.

QUANTIFICATION

▼ Law KPIs

Flesch-Reading-Ease	38
Indeterminate Words	33
Internal References	25
LaesbarhedsIndex	49
Outgoing References	2
Paragraph Count	20
Sentence Count	144
Structural Depth	12
Total Word Count ADJ	164
Total Word Count NN	593
Total Word Count VV	189
Vocabulary Variety ADJ	90
Vocabulary Variety NN	240
Vocabulary Variety VV	74
Vocabulary Variety	399
Wiener Sachtextformel	14
Word Count	1846

SECTIONS

Show Close

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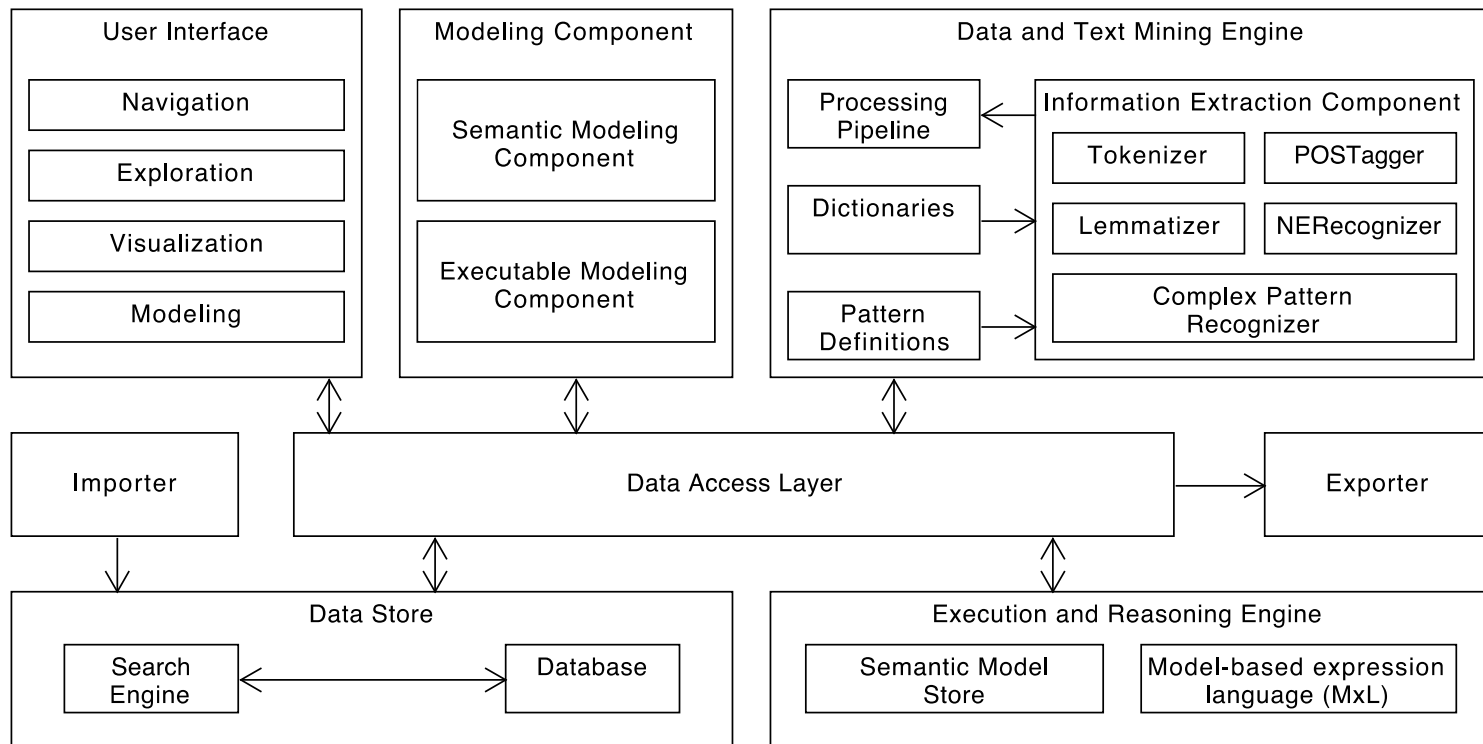
QUANTIFICATION

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Flesch-Reading-Ease	38
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Vocabulary Variety VV	74
Vocabulary Variety	399
Wiener Sachtextformel	14
Word Count	1846

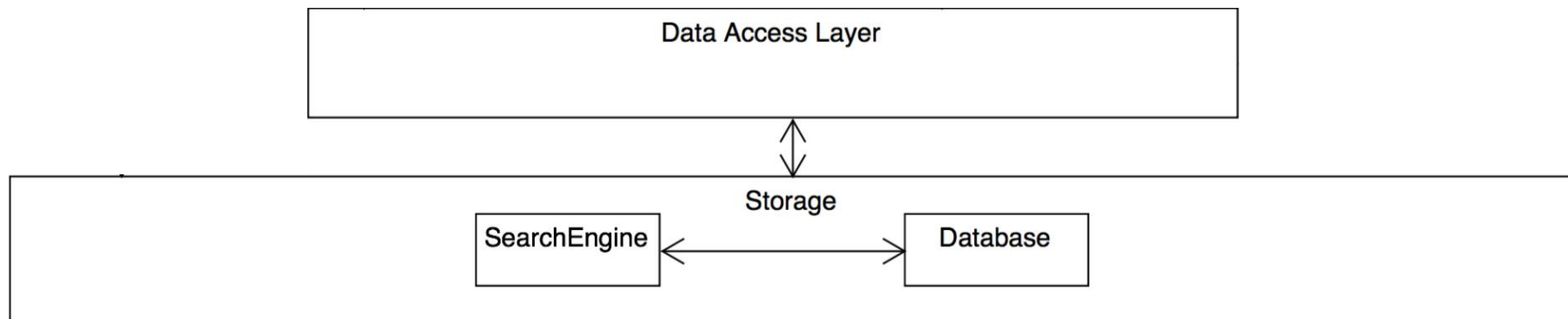
Implementation Details

- Java Web Application (Play Framework)
- ElasticSearch



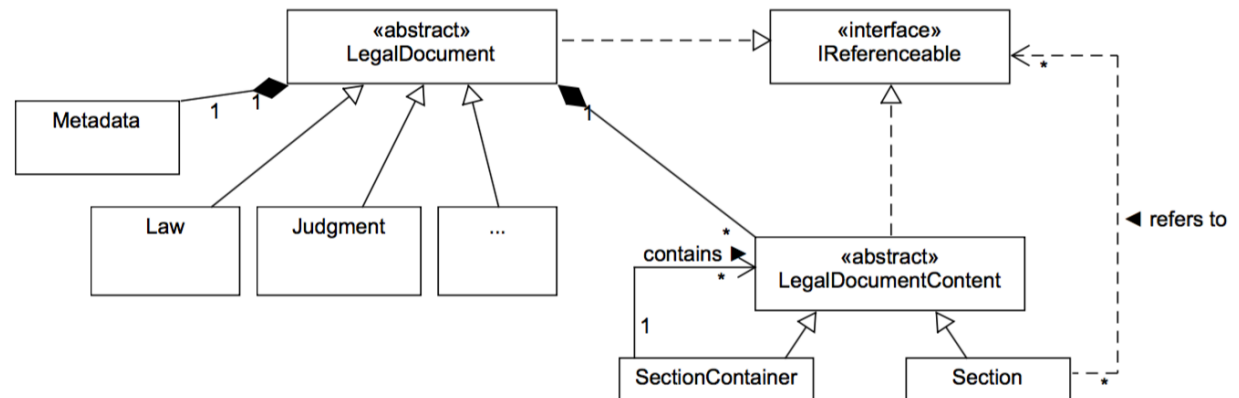
Adapted 3-Tier Application

- CRUD operations on data
 - Create, Read, Update, Delete
- Bulk operations are crucial while processing huge data corpora
- ElasticSearch as data storage
 - Excellent handling of textual data (legal texts)
 - Aggregations and facets to provide filtering mechanisms



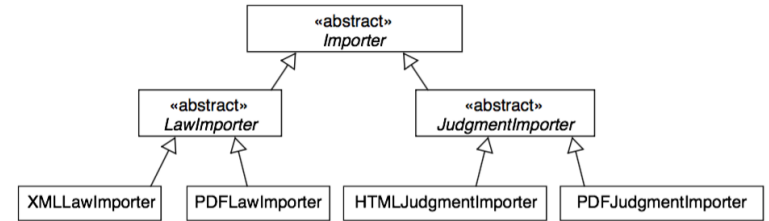
Representing Legal Text Data

- Generic data model that can be persisted in SocioCortex
 - Law, Judgments, Contracts, Patents,...
- Nested structure (SectionContainer → Section) to keep structural information
- Additional attributes as Key-Value-Pairs (Wiki-Approach)
 - Structured & unstructured data



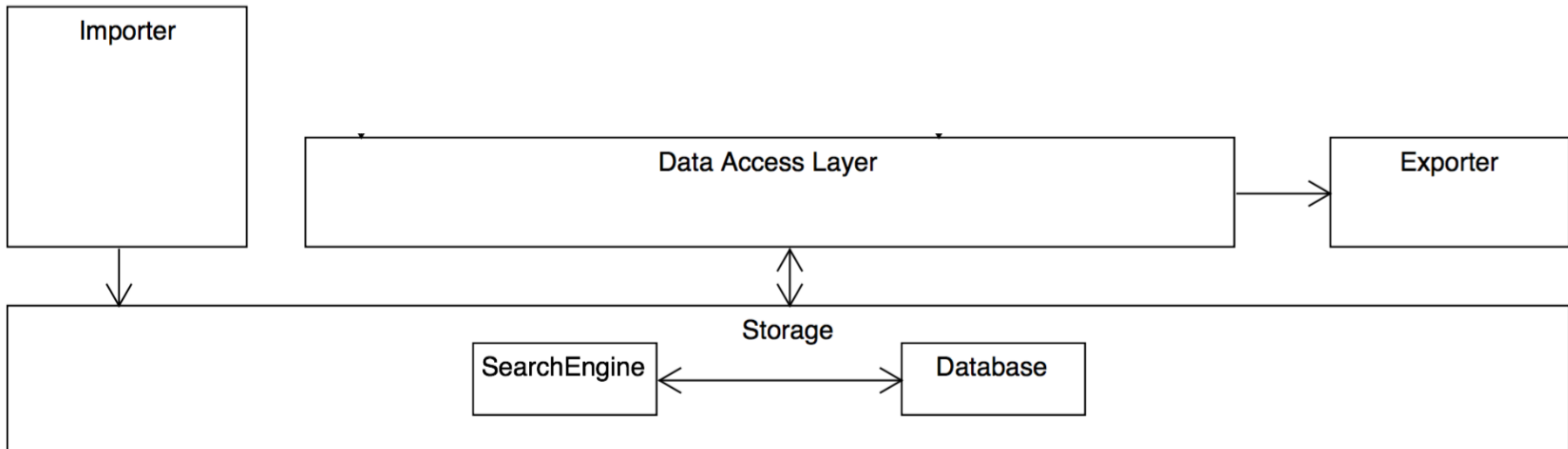
Easy adaption to data sources

- Laws, Judgments, Contracts, Patents
- Various file formats are supported
 - PDF, XML, Words, Txt, etc.



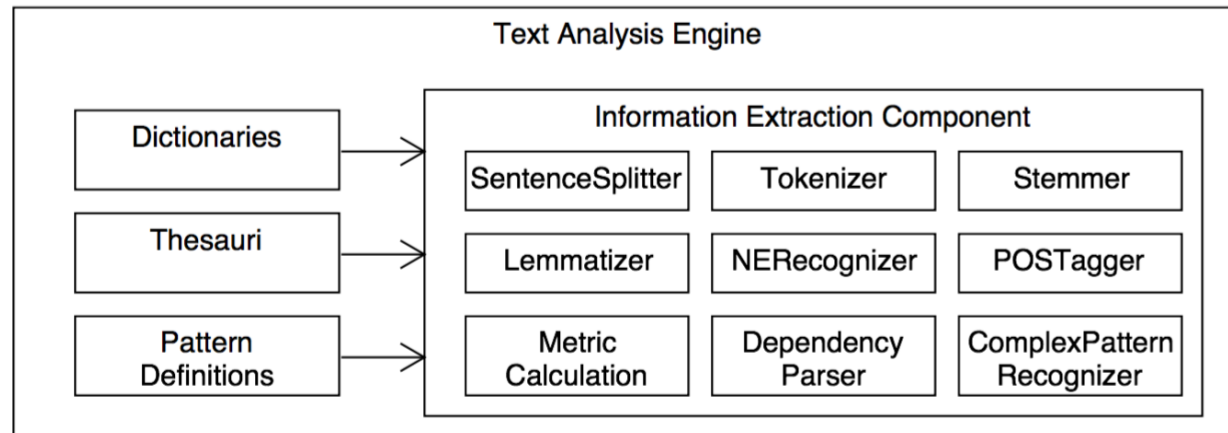
Export of results

- CSV, RESTful API, etc.



State-of-the-art text analysis engine

- Parallel and thread-safe implementation
- Standard components and easy reusability
- Management of dictionaries, thesauri and linguistic patterns

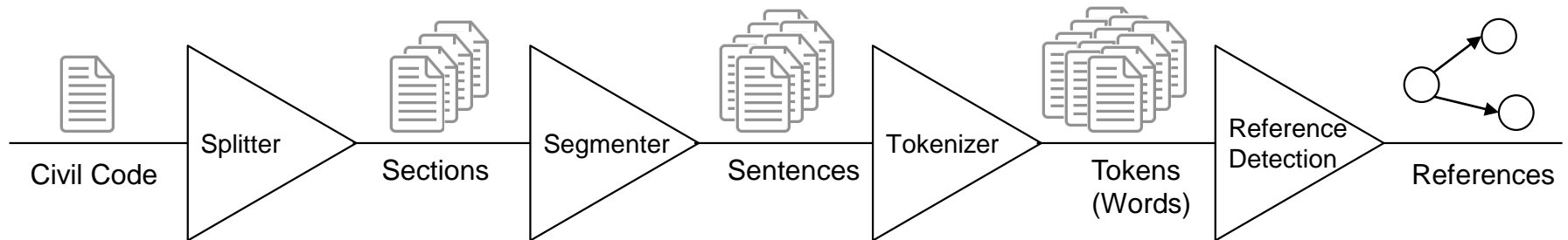


→ Named Entity Recognition

→ Active Machine Learning Integration

UIMA (Unstructured Information Mining Architecture)

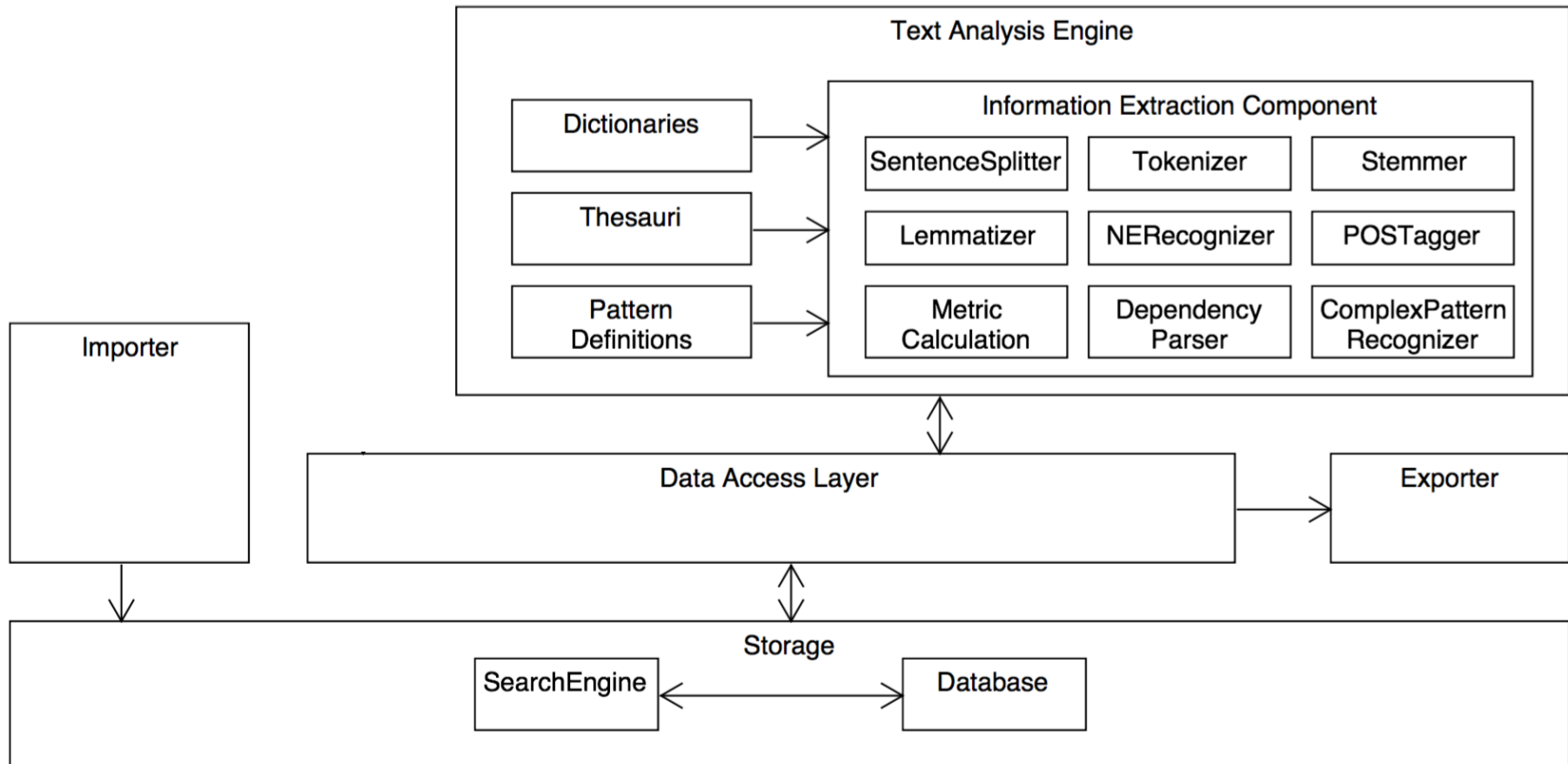
- A common software architecture for text mining/processing
 - Alternatives: GATE, NLTK, etc.
 - Base line for IBM Watson
- Pipes & Filters architecture



- Thread-safe (usage in a web application with multiple users/requests)
- Apache Ruta for complex pattern specification engine

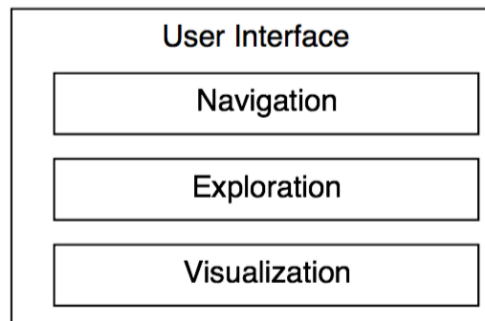
Reference Architecture

Text Analysis Engine



User Interface

- Exploring and visualizing the results of the legal data analysis processes
- Annotations of legal texts
- Modeling interfaces to formalize legal decision structures



SECTIONS

Show

Close

ANNOTATIONS

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▶ Legal Information

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- ArtWithManyAdjAndNoun
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- InternalReference
- LegalDefinedEntity
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All

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(3) Stückaktien lauten auf keinen Nennbetrag. Die Stückaktien einer Gesellschaft sind am Grundkapital in gleichem Umfang beteiligt. Der auf die einzelne Aktie entfallende anteilige Betrag des Grundkapitals darf einen Euro nicht unterschreiten. Absatz 2 Satz 2 und 3 findet entsprechende Anwendung.

(4) Der Anteil am Grundkapital bestimmt sich bei Nennbetragsaktien nach dem Verhältnis ihres Nennbetrags zum Grundkapital, bei Stückaktien nach der Zahl der Aktien.

(5) Die Aktien sind unteilbar.

QUANTIFICATION

▼ Law KPIs

Flesch-Reading-Ease	38
Indeterminate Words	33
Internal References	25
LaesbarhedsIndex	49
Outgoing References	2
Paragraph Count	20
Sentence Count	144
Structural Depth	12
Total Word Count ADJ	164
Total Word Count NN	593
Total Word Count VV	189
Vocabulary Variety ADJ	90
Vocabulary Variety NN	240
Vocabulary Variety VV	74
Vocabulary Variety	399
Wiener Sachtextformel	14
Word Count	1846

SECTIONS

Show Close

ANNOTATIONS

▶ Linguistic

▼ Legal Information

- ArtWithAdj
- ArtWithManyAdjAndNoun
- IndWord
- InternalReference
- LegalDefinedEntity
- LegalDefinition
- LegalEntity
- NounWithAdj
- OutgoingReference

All None

▶ Other annotations

▶ Comments

Aktiengesetz

§ Eingangsformel

§ 1 Wesen der Aktiengesellschaft

§ 2 Gründerzahl

§ 3 Formkaufmann, Börsennotierung

(1) Die Aktiengesellschaft gilt als Handelsgesellschaft, auch wenn der Gegenstand des Unternehmens nicht im Betrieb eines Handelsgewerbes besteht.

(2) Börsennotiert im Sinne dieses Gesetzes sind Gesellschaften, deren Aktien zu einem Markt zugelassen sind, der von staatlich anerkannten Stellen geregelt und überwacht wird, regelmäßig stattfindet und für das Publikum mittelbar oder unmittelbar zugänglich ist.

§ 4 Firma

§ 5 Sitz

§ 6 Grundkapital

§ 7 Mindestnennbetrag des Grundkapitals

§ 8 Form und Mindestbeträge der Aktien

(1) Die Aktien können entweder als Nennbetragsaktien oder als Stückaktien begründet werden.

(2) Nennbetragsaktien müssen auf mindestens einen Euro lauten. Aktien über **einen geringeren Nennbetrag** sind nichtig. Für den Schaden aus der Ausgabe sind die Ausgeber den Inhabern als Gesamtschuldner verantwortlich. Höhere Aktiennennbeträge müssen auf volle Euro lauten.

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(5) Die Aktien sind unteilbar.

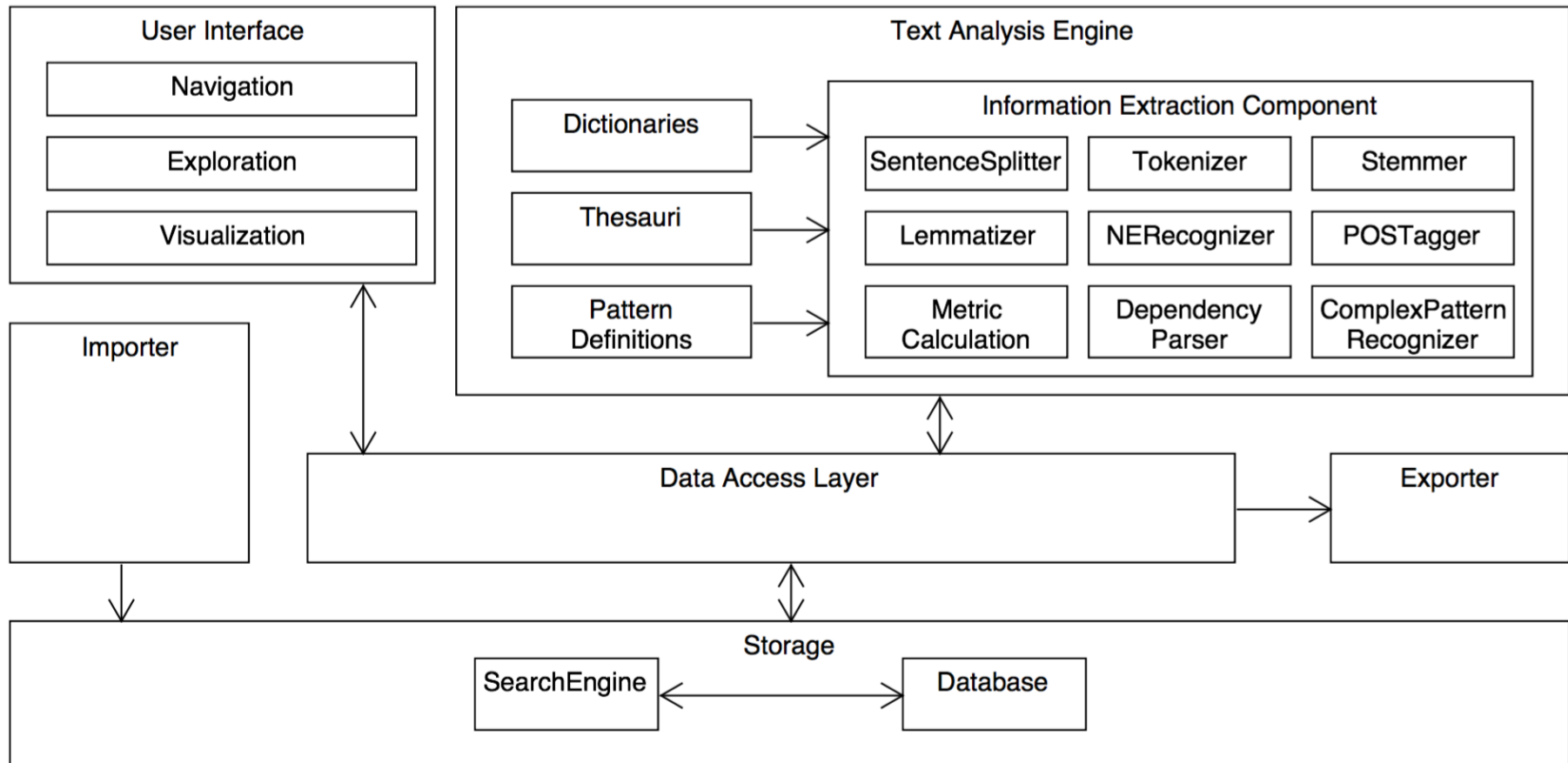
QUANTIFICATION

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Reference Architecture

Overview



- Legal data analysis is well established in legal informatics
 - Related work since decades
 - Text mining is becoming in particular relevant
 - Several approaches exist but lack of reuse in the domain
- LEXIA: A Data Science Environment for German Legal Texts
 - Collaborative and interactive web application tailored to German legislation
 - Easy to extend, adapt and reuse components
 - Strongly connected
- Lexalyze: An interdisciplinary research program
 - www.en.lexalyze.de



Questions and Discussion

13:30	Kaffee und Ankunft	Alle Teilnehmer
13:40	Introduction	Prof. Dr. Florian Matthes
13:50	SocioCortex Backend <ol style="list-style-type: none">1. Core Architecture2. Importer - SyncPipes	Felix Michel, Klym Shumaiev
14:00	SocioCortex Frontend <ol style="list-style-type: none">1. Content Manager2. Modeler3. Visualizer	Patrick Holl, Daniel Braun, Felix Michel
14:20	Using SocioCortex in the context of mobility service platforms and ecosystems <ol style="list-style-type: none">1. Visual Ecosystem Modelling2. On- and Off-boarding Process Support3. Platform Monitoring	Anne Faber, Adrian Hernandez- Mendez, Felix Michel Martin Kleehaus
14:55	Extending SocioCortex for semantic analysis of legal document collections	Bernhard Waltl
15:20	Collaborative Project-Management with Cplace	Dr. Rupert Stuffer (CEO Collaboration Factory)

Uhrzeit	Inhalt
13:30	Kaffee und Ankunft
13:40	SocioCortex Workshop
15:45	Kaffee und Ankunft
16:05	Sebis Workshop
18:00	Stammtisch und Diskussion (Brotzeit, Bier, nicht-alkoholische Getränke)



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