Welcome to the preparatory webinar of the Big Data Analytics School

We will start shortly!
Stay tuned....

April 25, 2019

BROUGHT BY
"LAMBDA" PROJECT

LAMBDA - Learning, **A**pplying, **M**ultiplying **B**ig **D**ata **A**nalytics

Project presentation

LEARNING, APPLYING, MULTIPLYING BIG DATA ANALYTICS

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 809965.

Project Funding

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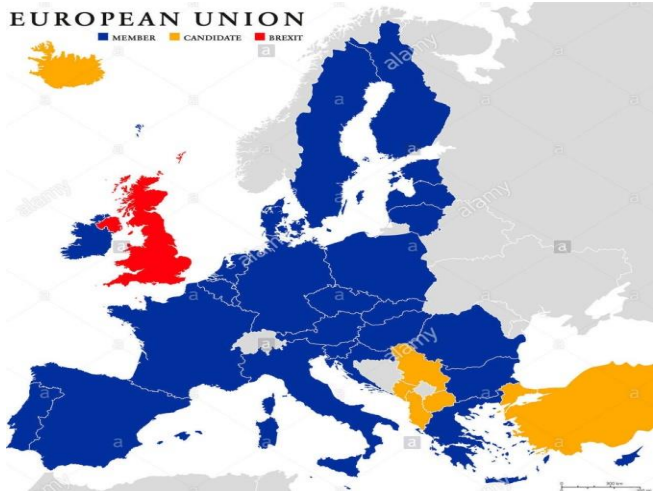
LAMBDA – Position in the H2020 Work Programme	
Work Programme /	H2020-WIDESPREAD-2016-2017
Pillar	Spreading Excellence and Widening Participation
TOPIC	**Twinning**
Scope	…significantly strengthening a defined field of research in a university or research organisation from a Widening country by linking it with at least two internationally-leading research institutions in other Member States or Associated Countries.

Vision and Primary Objectives

BDA·HUB

institute MIHAILO PUPIN

Strengthening the Human capital and Education, Research and Development capacities of "Mihajlo Pupin" Institute the leading Serbian R&D institution in information and communication technologies in order to serve as a Big Data & Analytics HUB that connects and integrates scientists and professionals from the West Balkans and the entire region into the European Research Area.



Decreasing the existing European regional R&I disparity by Fostering excellence in the Big Data Ecosystem areas unlocking and raising the scientific profile of academics institutions from Serbia and the region while contributing to European progress beyond the state-of-the-art of related research and technology, as well as establishing productive and fruitful long-term cooperation.

Specific Objectives

OBJ 1: Strategic Partnership - Establishment and development of productive and fruitful long-term cooperation that continues after project completion

- 4 partners, 3 different countries (Serbia, Germany, UK)

OBJ 2: Boosting scientific excellence of the linked institutions and capacity building of the widening country and the region in Big Data Analytics and semantics

- Different capacity building activities (**Big Data Analytics Summer School**)

OBJ 3: Spreading excellence and disseminating knowledge throughout the West Balkan and South-East European countries

- 5 workshops at International conferences in the region

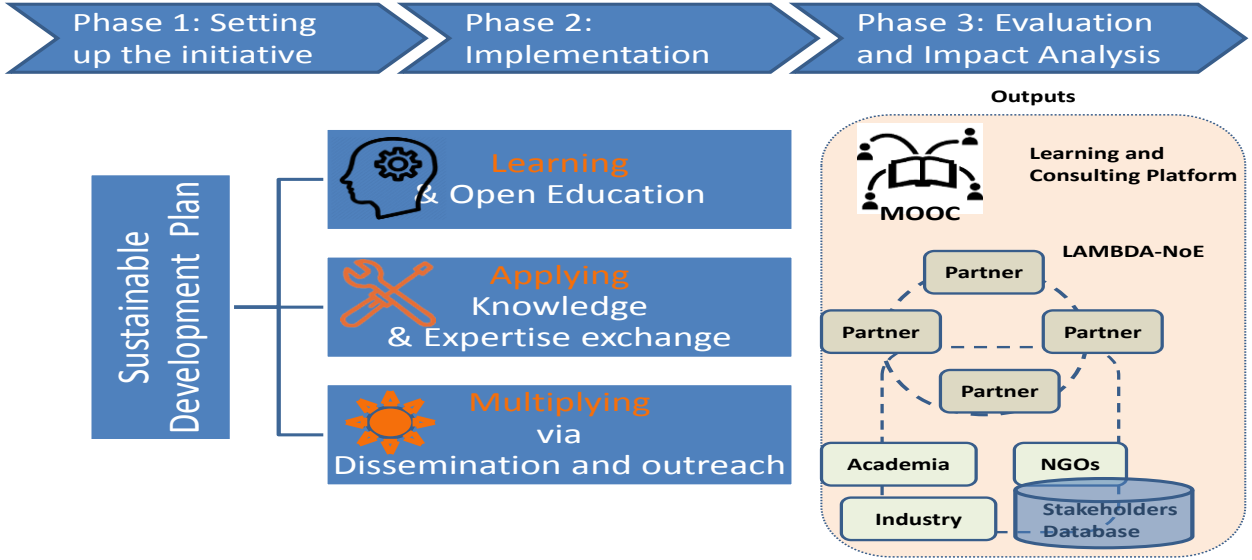
ICIST2019 PSWCIS CECIIS 30TH EDITION ACT

OBJ 4: Sustainability of research related to key societal challenges (sustainable transport, sustainable energy, security, societal wellbeing) and financial autonomy in the long run

- 7 brainstorming sessions on key societal challenges

Methodology

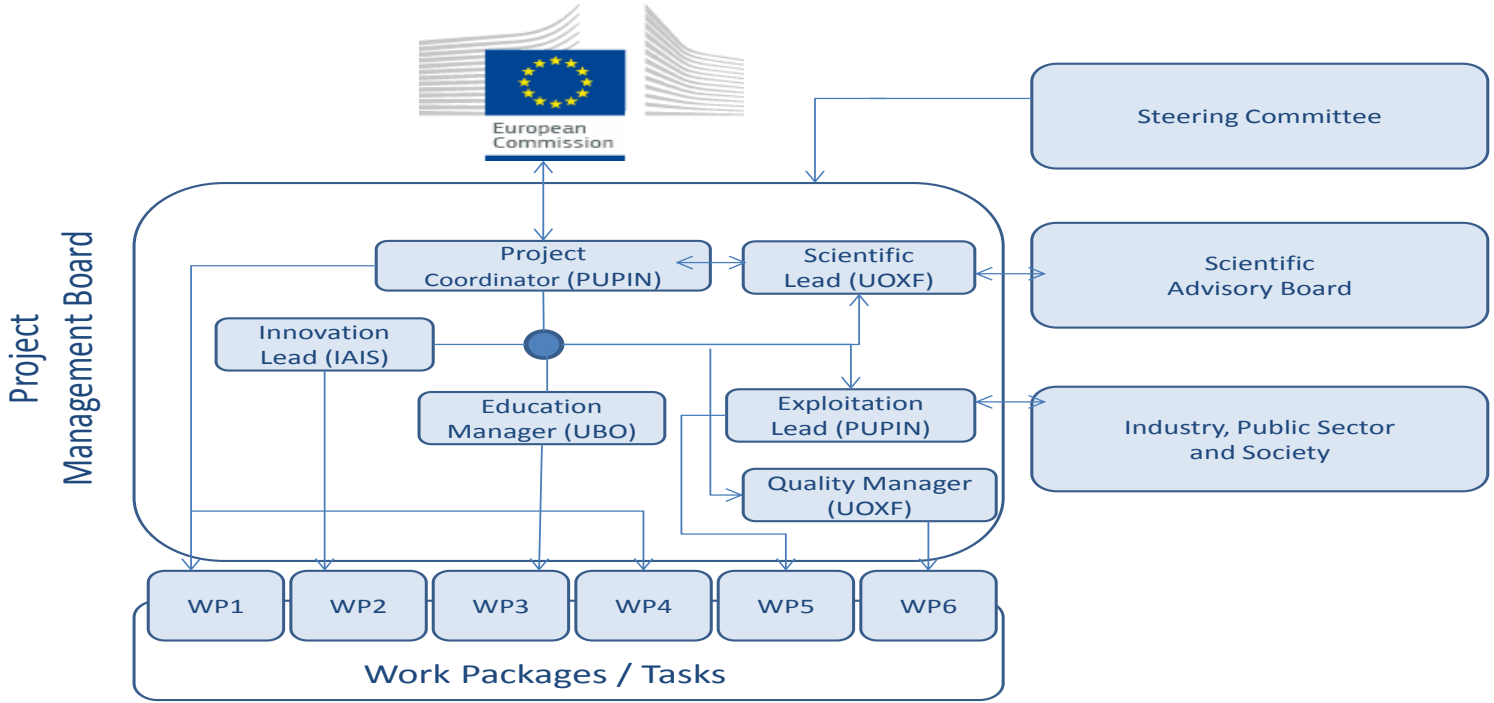
- Phase 1: Setting up the Initiative and preparing the Twinning Strategy and Action Plan for 2018-2020, Phase 2: Execution / Implementation and Phase 3: Closure / Evaluation and Impact Analysis and delivery of the Strategy and Action Plan for 2021-2025.



Key Pillars

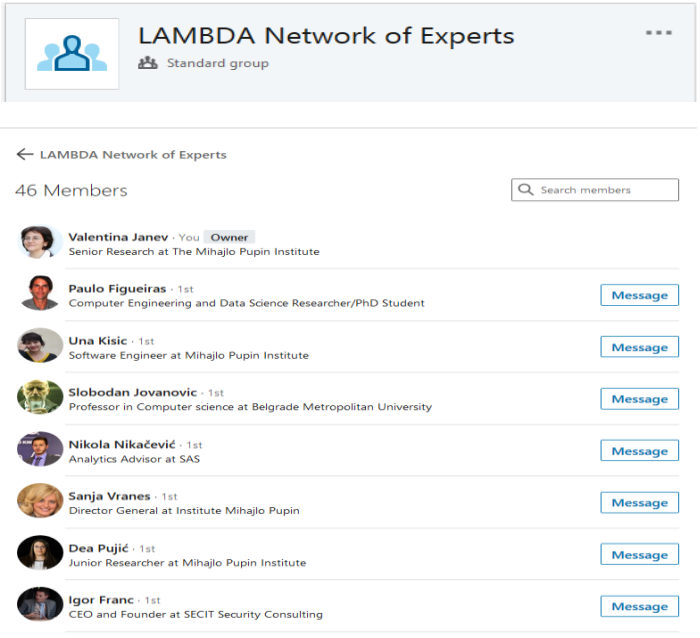
Component	Description
Learning & Open Education	Knowledge repository as part of the **LAMBDA Learning and Consulting Platform** will be established to facilitate spreading learning materials, as well as exchange of best practice between research institutions from South-Eastern Europe and leading EU partners: • https://project-lambda.org/Learning • https://project-lambda.org/Knowledge-repository/Lectures
Applying Knowledge & Cooperation	**LAMBDA Experts Exchange Program** for teachers, researchers and developers) will open possibilities for collaborative research on open issues in Big Data related areas: • Industry 4.0 • ICT for Energy
Multiplying Dissemination and outreach	Raising awareness about future trends in Big Data, Emerging Tools and Technologies, and standards by organization of events at international (e.g. DEXA, ESWC, SEMANTiCS) and regional (e.g. ICIST, ICT Innovations) conferences, organization of the Belgrade Big Data Analytics Summer/Winter School, https://project-lambda.org/Announcement-1
Sustainable Development Plan for PUPIN (20121-2025)	Strategy development and monitoring activities; Self-assessment of research accomplishments at PUPIN aimed at increasing the shared awareness about the research capacities, primarily human resources.

Project Management



Join Us

LinkedIn



LAMBDA - Learning, Applying, Multiplying Big Data Analytics

Belgrade Big Data Analytics
Summer School

18-20 June 2019

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under grant agreement No 809965.

Location

Volgina 15, 11060 Belgrade, Serbia

Organizers

Participants - Universities

institute MIHAILO PUPIN

UNIVERSITY OF BELGRADE

SVEUČILIŠTE U ZAGREBU
FAKULTET ORGANIZACIJE I INFORMATIKE
VARAŽDIN

University of Tuzla
Bosnia and Herzegovina

FACULTY OF SCIENCE AND MATHEMATICS

UCG Univerzitet Crne Gore

"Ss. Cyril and Methodius" University - Skopje
FACULTY OF COMPUTER SCIENCE AND ENGINEERING

University of Niš
Faculty of Mechanical Engineering

UNIVERZITET U NOVOM SADU
UNIVERSITY OF NOVI SAD

UNIVERZITET METROPOLITAN
BEOGRAD

Collaboration

Home Project Methodology eLearning News & Events Results Join Us

Stakeholders Section Summer School Knowledge Repository

- Invited Teachers - Keynotes - Lectures
- Education & Research Organizations
- Faculties/ Departments
- Industry
- Public Administration & NGO

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Posted on: Fri, 10/26/2018 - 15:37 **By**: valentina.janev

One of the objectives of the project is organization of a **Big Data Analytics Summer School in E 2020**. The event will bring together researchers and professionals from respectable EU Universit stakeholders from the West Balkan countries to discuss state-of-the-art in Big Data research and Analytics Summer School will allow the invited PhD students (participants of the School from Se learn about the newest technologies and trends in this and related fields.

The 3-day event is scheduled as follows

- 1st day LAMBDA Research-Industry Forum - Keynotes + Presentations from Companies
- 2nd day Big Data Analytics Summer School - Invited Lectures and Lectures from LAMBDA partners (UBO and UOXF)
- 3nd day Big Data Analytics Summer School - Lectures from LAMBDA partners (UBO and UOXF)

Advisory Board Meeting: TIB, OntoText, UPM, SZTAKI, UVT

		1st Day	2nd Day	3rd Day	
8.30		Registration	Registration	Registration	

bda-school@mail.project-lambda.org

Guest Speakers

Sören Auer, Director,
German National Library
for Science and Technology

Atanas Kiryakov
CEO, OntoText

Maria Esther Vidal
German National Library for
Science and Technology

Mari Carmen Suárez-Figueroa
Universidad Politécnica de Madrid

Logistics

- Arrival 17 or 18 June 2019
- Departure 20 June 2019
- Accommodation at

Holiday Inn Express

AN IHG® HOTEL

BELGRADE - CITY

Looking forward to seeing you soon !

ENTERPRISE INFORMATION SYSTEMS

Department Introduction
Schloss Birlinghoven, Sankt Augustin, Germany
2019

Agenda

1. Overall information
2. Products and Services
3. Research Projects

EIS
ENTERPRISE
INFORMATION SYSTEMS

Team Leaders

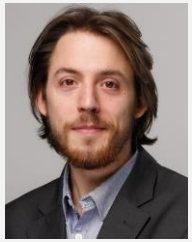
Dr. Christoph Lange
Head of Department

Prof. Dr. Jens Lehmann
Lead Scientist
Professor of Smart Data Analytics

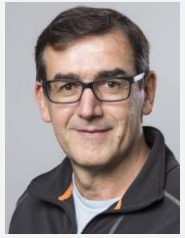
Dr. Ing. Steffen Lohmann
Deputy Head of Dep't
EII Business Unit Leader

Smart Data Ecosystems

Dr. Simon Scerri



Dr. Damien Graux



M.Sc. Luigi Selmi

Data Integration

Dr. Ioanna Lytra

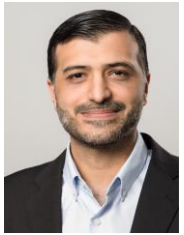
Dr. Giulio Napolitano

Industrial Information Interaction

Dr. Christian Mader

Business Developers

Richa Sharma



Mohammad K. Nammous

Secretary

Martina Wiegand

intern

Fraunhofer IAIS

1.2. Important Facts about EIS

~35 Employees, including 1 professor, 8 postdocs,
13 PhD students, 7 software developers, 2 business developers, etc.

Semantic Technologies & Linked Data

Research Group

Dr. Christoph Lange,
Head of Department

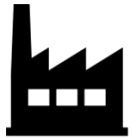
8 EU Research Projects
(**1** as Coordinator;
lots of coordination experience)

9 National Research Projects

Enterprise Information Integration

Business Unit

Dr. Steffen Lohmann,
Deputy Head of Dep't
Business Unit Leader



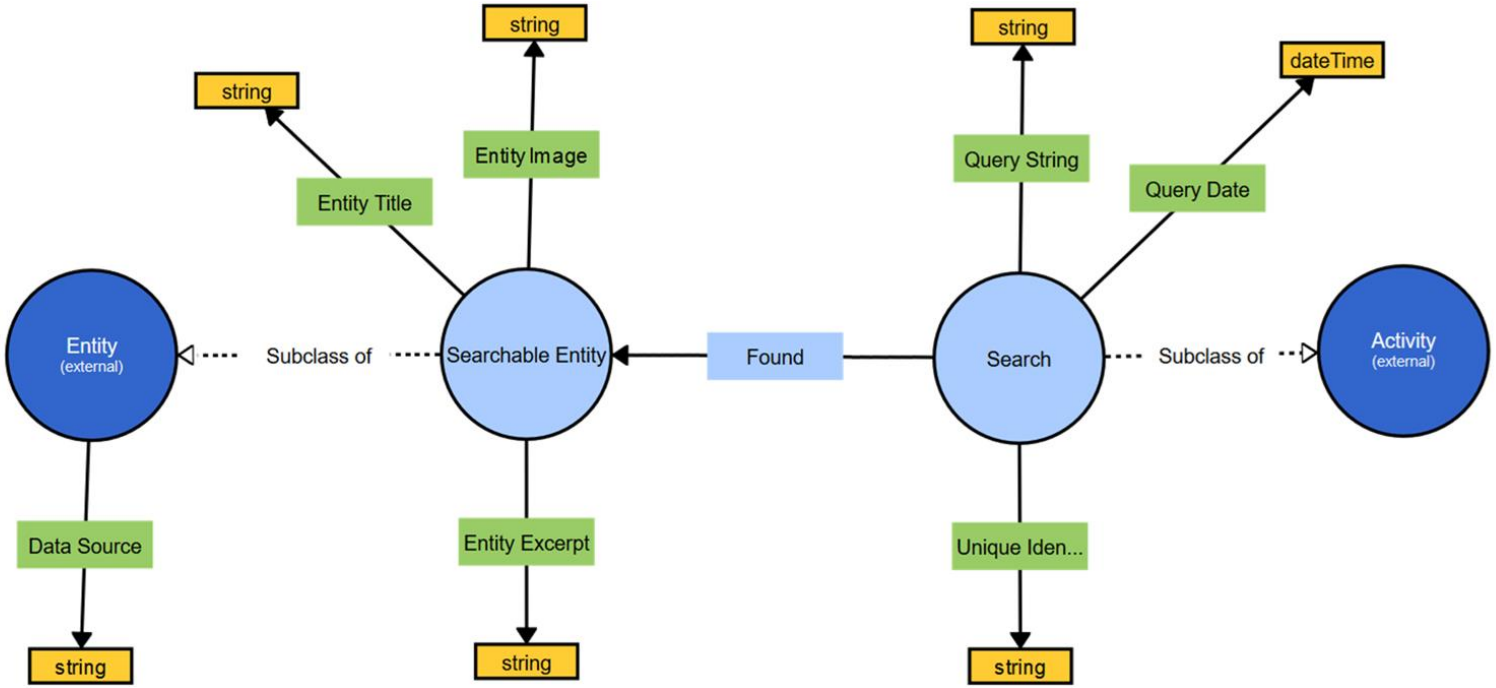
Industrial Projects with
8 Customers since 2016

Strategic Networks:
Big Data Value Association
Industrial Data Space Association

2. Products and Services

- Vocabulary-based Data Integration
- AskNow - Question Answering
- Federated Hybrid Search Engine
- Enterprise Data Market
- Enterprise Knowledge Graphs
- Semantic Big Data Architecture

2.1. VoCol - Vocabulary-based Data Integration



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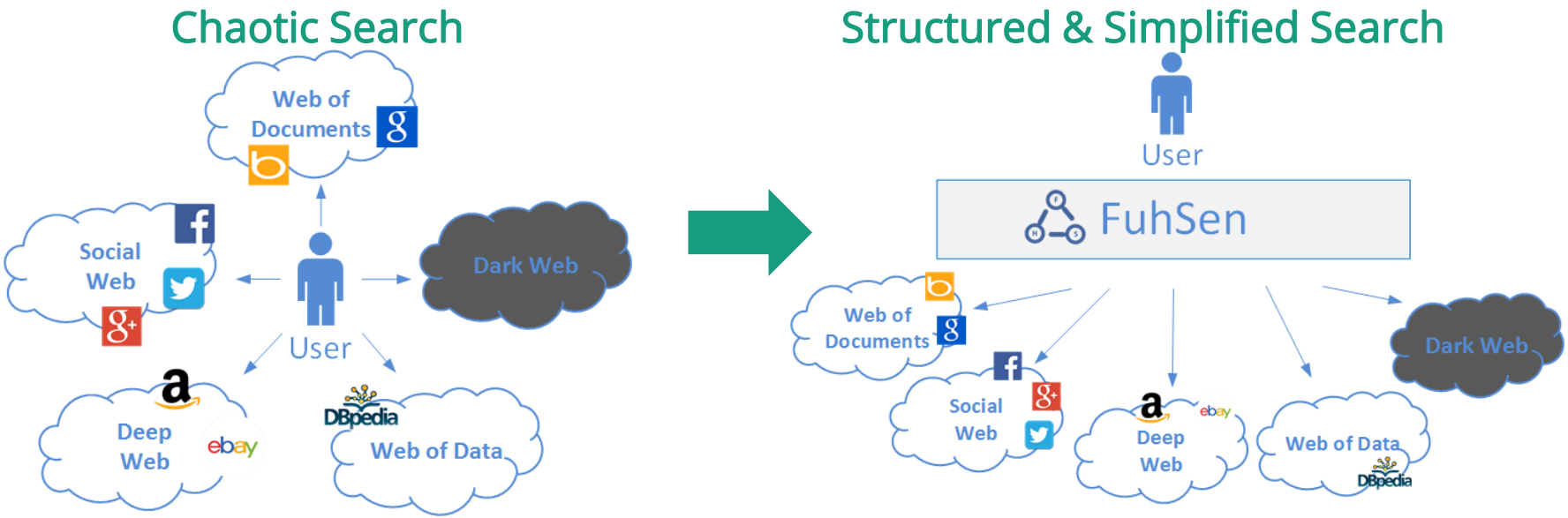
2.2. Federated Hybrid Search Engine

FuhSen



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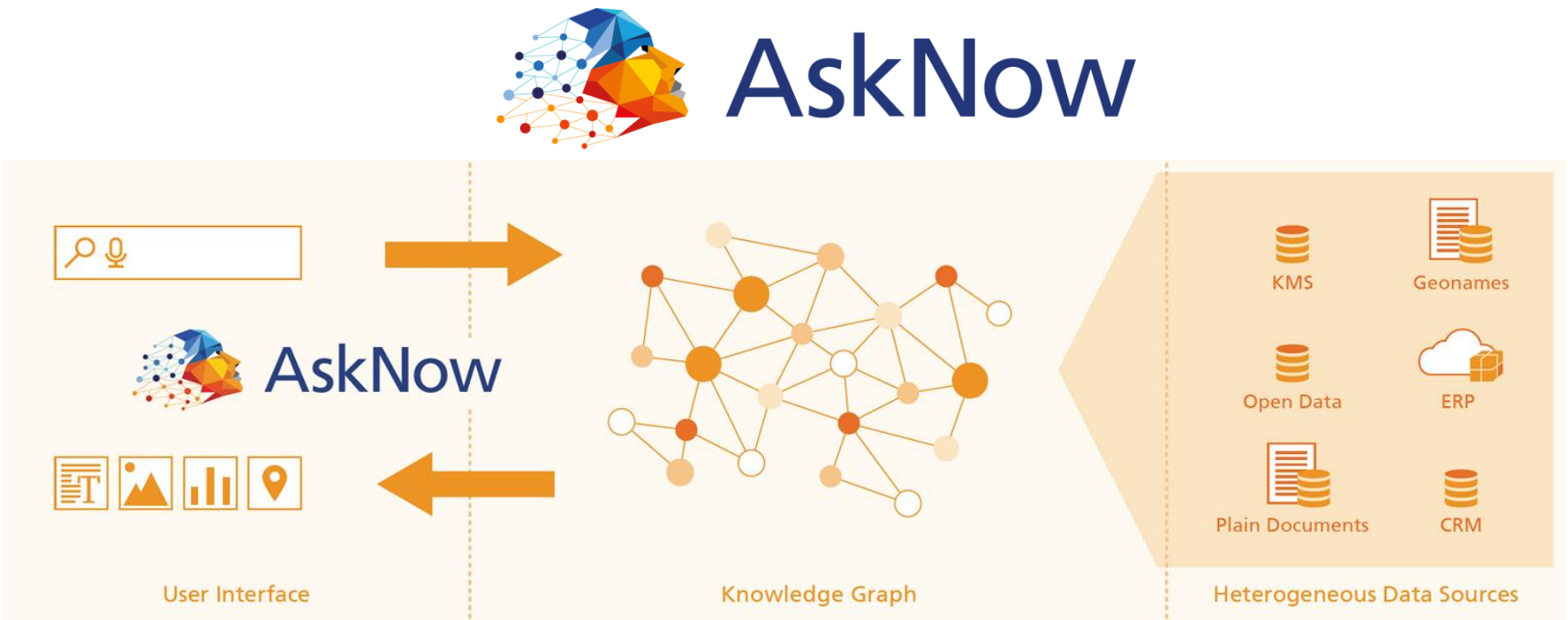
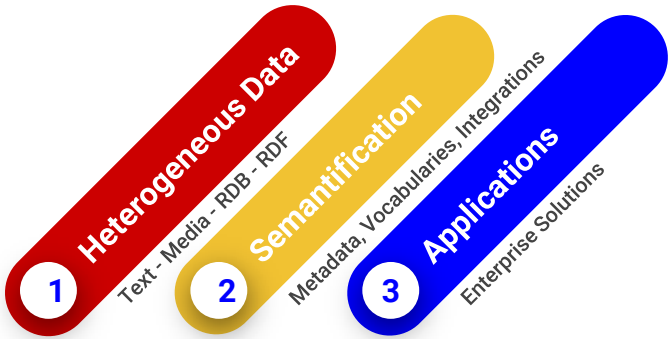
2.3. AskNow - Question Answering System



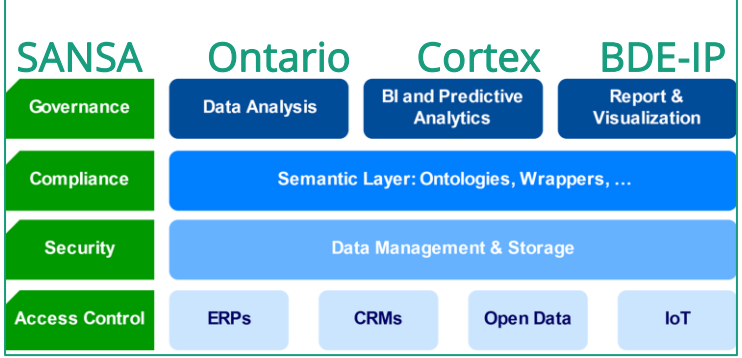
2.4. Enterprise Solutions

Enterprise Data Market

Enterprise Knowledge Graphs



Semantic Big Data Architecture



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3. Research Projects (Public Funding)

8 EU and 9 national projects

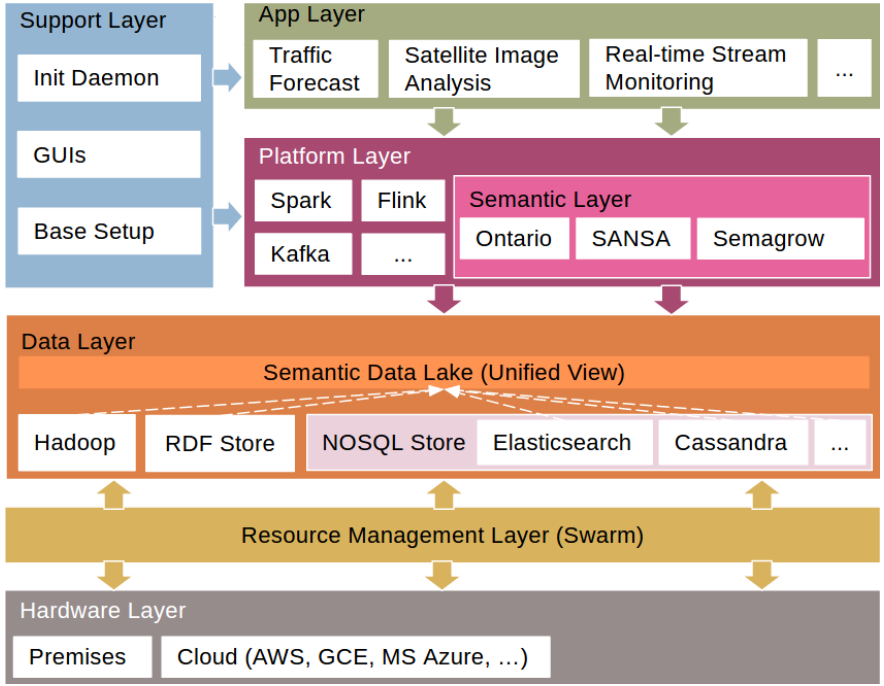
Some highlights on the following slides, plus:

- **WDAqua** (Question Answering ITN)
- **SLIPO** (Scalable Linking and Integration of Big POI Data)
- **BETTER** (Big-data Earth observation Technology and Tools Enhancing Research and development)
- **LiDaKrA** (linked data based crime analysis)
- **LiMbo** (linked mobility data)
- **Urban Data Space**
- **Inclusive OpenCourseWare**
- **HOBBIT** (Big Linked Data Benchmarking)
- **Be-IoT** & **bIoTope**

and a few more…

BIG DATA EUROPE

- EU H2020 project for the **development** of an **integrated platform** of Big Data **management** tools (2015–2017)
- Semantic layer allows for the integration of **heterogeneous** data sources on-demand
- CSA brought together big data users/producers from the 7 societal challenges
  - One pilot per challenge: health, food and agriculture, energy, transport, climate, social sciences, and security



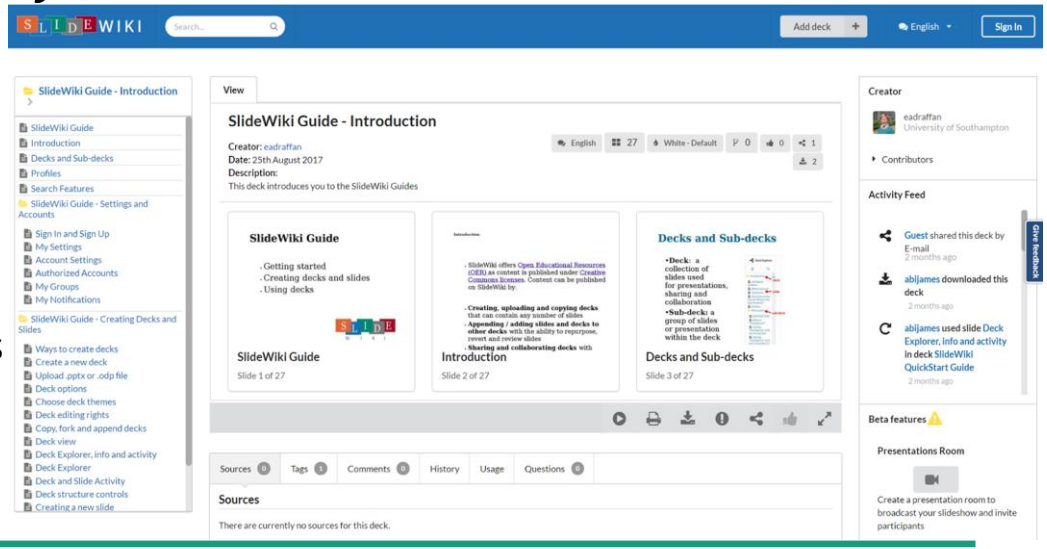
 https://www.big-data-europe.eu/

Fraunhofer IAIS

Large-scale pilots for collaborative OpenCourseWare authoring, multiplatform delivery and Learning Analytics

- EU ICT-20-2015 Project
- 17 partners from 8 countries
- Cooperation between IAIS departments
- Re-developing the SlideWiki platform
- Integration with other learning platforms
- Testing and evaluation in trials
- Fraunhofer IAIS is coordinator

https://slidewiki.eu



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INDUSTRIAL DATA SPACE

Creating an ecosystem to establish sovereignty over data

- Funded by BMBF 2015–2020 and Fraunhofer (CIT Cluste
- 12 Fraunhofer Institutes: AISEC, FIT, FKIE, FOKUS, **IAIS**, IAO, IESE, IML, IOSB, IPA, ISST, SIT
- **IDS Association**: 75+ industry partners, 5 working groups, 18 use cases
- **IAIS** has a leading role in:
  - developing the architecture
  - establishing a common information model
  - overseeing DIN standardization

intern

Fraunhofer IAIS

THANK YOU

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Computer Science @ Oxford

UNIVERSITY OF OXFORD

Oxford CS at a Glance

- Founded in 1957 (very old by international standards!)
- Historically very small, but rapid expansion this century
- As of January 2018:
  - 75 faculty (professors etc)
  - 100 contract research staff (government, EU funding etc)
  - 140 DPhil (=PhD) students (not enough – need more)
  - 10 research themes
- Growth has been **research led** – undergrad numbers are low
- Admitted just 34 students to undergrad computer science programme in 2017
- Why? History!
  - Undergrad admissions @ Oxford are college-driven
- Desire to grow undergrad and DPhil population

UNIVERSITY OF OXFORD

Rankings, Rankings, Rankings…

- In 1st ever subject ranking for computer science, **THES** placed Oxford **3rd in the world, 1st in UK**
- The **2016 QS World University Rankings place us third in the world for computer science** (1st in Europe)
- **First in 2015 Sunday Times league table for CS**
- **Complete University Guide** placed us first in UK for CS

- Any one ranking is nonsense; but if they all point in the same direction, they are probably telling you something meaningful

- Right now, Oxford is one of the most exciting places for CS research in Europe

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Research Themes

- Algorithms & Complexity Theory
- **Artificial Intelligence & Machine Learning**
- Automated Verification
- Computational Biology & Health Informatics
- Cyber-physical systems
- Foundations, Structures, and Quantum
- Human-centred computing
- Information Systems
- Programming Languages
- Security

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Artificial Intelligence & Machine Learning

- **Knowledge Graphs**
- Deep Learning, Reinforcement Learning
- Adversarial ML
- **Reasoning**
- Learning Theory
- Constraints
- Multi-agent Systems

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Group Members (VADA - Value-Added Data Group)

Lecturers for the school:

- **Emanuel Sallinger**
  Senior Researcher at Oxford, Director of the VADA Laboratory, CTO of DeepReason.ai
- **Luigi Bellomarini**
  Deputy Director of IT Research at the Central Bank of Italy, Senior VADA Collaborator
- **Tim Furche**
  Departmental Lecturer at Oxford, co-I of VADA, Senior Director Engineering at Meltwater Inc.

On the steering committee of LAMBDA:

- **Georg Gottlob**
  Professor of Computer Science at Oxford, PI of VADA, CSO of DeepReason.ai

Many more: postdoctoral researchers **Ruslan Fayzrakhmanov, Stephane Reissfelder, Evgeny Sherkhonov, Yavor Nenov,** students, collaborators, our VADA colleagues at Edinburgh and Manchester, ...

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Lecture 1: **Introduction to Knowledge Graphs**

- From Databases to Knowledge Graphs
  - Databases, Knowledge Bases, and Knowledge Graphs
  - Knowledge Graphs as Large “World” KBs
    - Ontology
    - Reasoner
- Data Models and Querying Languages
  - Relational Databases, SQL and NOSQL
  - RDF Data model and SPARQL
  - Datalog and Beyond Datalog: Expressing Knowledge
- The Vadalog System: Oxford’s KG Management Systems based on Datalog

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Lecture 2: **Reasoning in Knowledge Graphs**

- Reasoning: New Implicit Data from Existing Data
- Reasoning over Knowledge Graphs
- Core Reasoning
- Vadalog Reasoning
- Theory and Practice of Reasoning in Knowledge Graphs

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Lecture 3: **Extraction for Knowledge Graphs**

- Web Data Extraction
- Making information available on the Web
- Making information accessible and usable by Knowledge Graphs
- Vadalog System
- OXPath System

Thank you!

University of Bonn:

- Ranked 48th by THES, Ranked 2nd in Germany
- 4,600 International Students (12.7%) from 140 countries
- 900 Doctoral Students
- 2019’s Candidate for Excellent University in Germany

Computer Science department of University of Bonn:

- Computer Science I - Theoretical Informatics and Formal Methods
- Computer Science II - Computer Graphics and Computer Animation
- **Computer Science III - Databases and Information Systems, Programming Languages and Software Technologies, Artificial Intelligence, Enterprise Information Systems, Computer Vision, Intelligent Databases, Knowledge Discovery and Machine Learning**
- Computer Science IV - Security and Networked Systems
- Computer Science V - Theoretical Computer Science
- Computer Science VI - Autonomous Intelligent Systems, Humanoid Robots Lab, and Technical Computer Science

Smart Data Analytics
Research Group Overview

UNIVERSITÄT BONN

SMART
DATA
ANALYTICS
FROM DATA TO KNOWLEDGE

Fraunhofer
IAIS

Sub-groups

- Founded in 2016
- 40 Members:
  - 1 Professor
  - 14 PostDocs / Seniors
  - 25 PhD Students
  - Many master students

Distributed Semantic Analytics

Semantic Question Answering

Structured Machine Learning

Deep Learning

Software Engineering for Data Science

Semantic Data Management

Knowledge Extraction and Validation

Lectures Presentation (University of Bonn & Fraunhofer)

Lectures at BDA School

- **Lecture - 1 Introduction to Big Data Architecture**
  - Advanced Big Data architectures
  - Design and architect scalable solutions
  - Cluster managers
  - Distributed file systems
  - Storage systems
- **Lecture - 2 Big Data Solutions in Practical Use-cases**
  - Components in realizing system architectures
  - Real-world example of practical use-cases

Lectures at BDA School

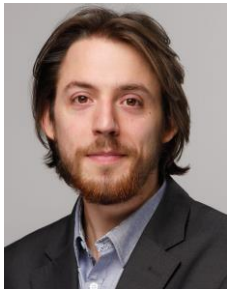
- **Distributed Big Data Frameworks**
  - Batch-only frameworks (Hadoop)
  - Stream-only frameworks (Storm, Samza)
  - Hybrid frameworks (Spark, Hive and Flink)
- **Distributed Big Data Libraries**
  - Big Data frameworks use different APIs
  - Graph computations and graph processing
  - SparkSQL, GraphX and MLlib
  - Scalable algorithms in Spark using Scala

Lectures at BDA School

- **Distributed Semantic Analytics I**
  - Scalable semantic analytics stack (SANSA)
  - knowledge graph processing
- **Distributed Semantic Analytics II**
  - Setup, APIs and different layers of SANSA
  - execute examples and create programs that use SANSA APIs

LAMBDA Bonn Key Contacts

Prof. Jens Lehmann



Dr. Damien Graux

Dr. Hajira Jabeen

Dr. Sahar Vahdati

Welcome to the preparatory webinar of the Big Data Analytics School

Q & A...

April 25, 2019

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