HOBBIT
A Brief Overview

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(Horizon 2020, GA No 688227)

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Overview

1. Fundamentals
2. Introduction
3. Project Highlights
4. Benchmarking Maching Learning
5. Future Directions

Section 1

Fundamentals

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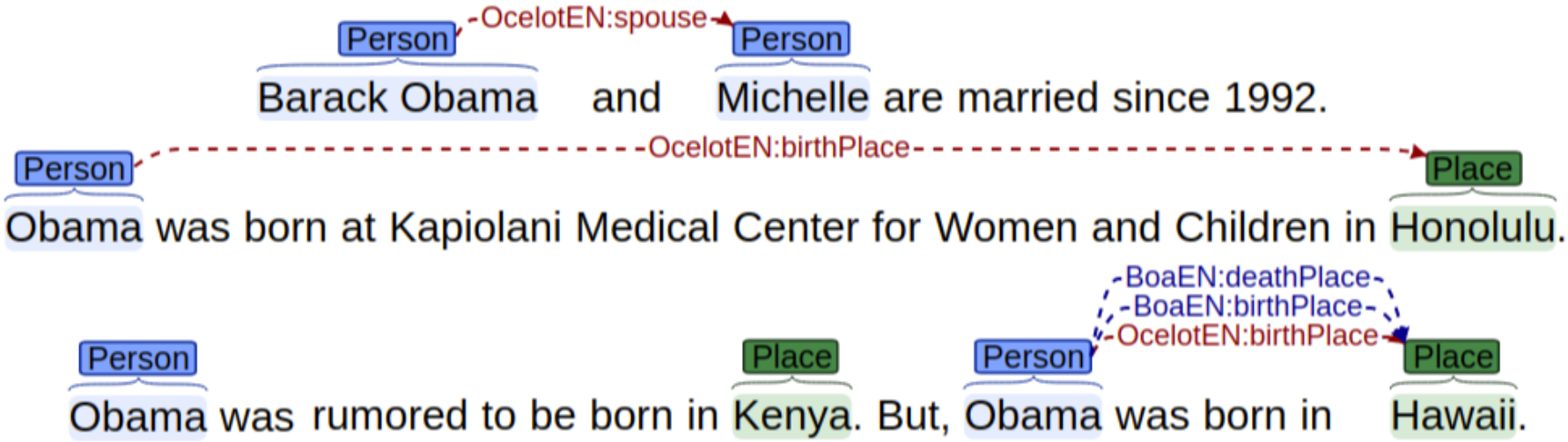
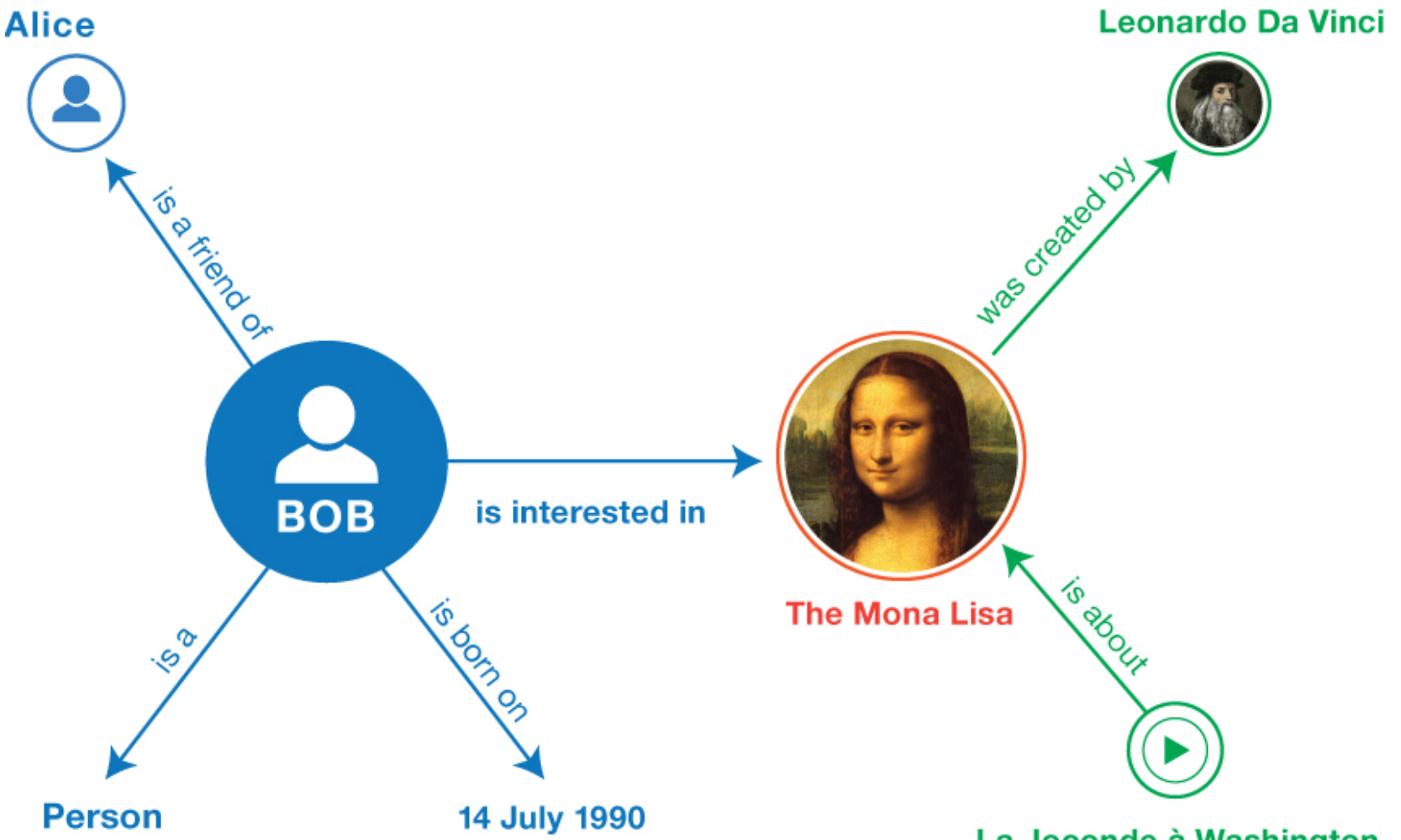
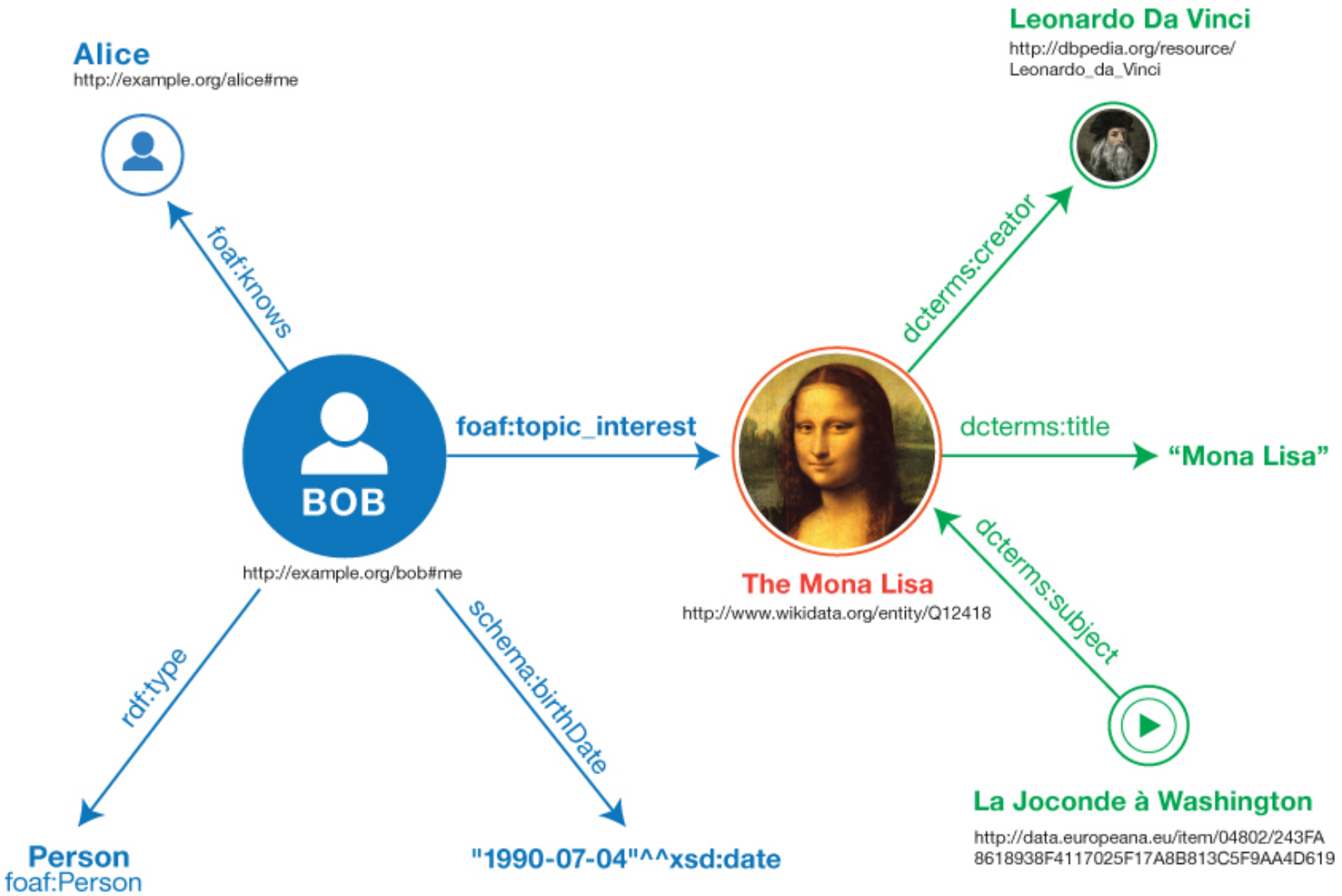




[1]

[1] https://www.w3.org/TR/rdf11-primer/



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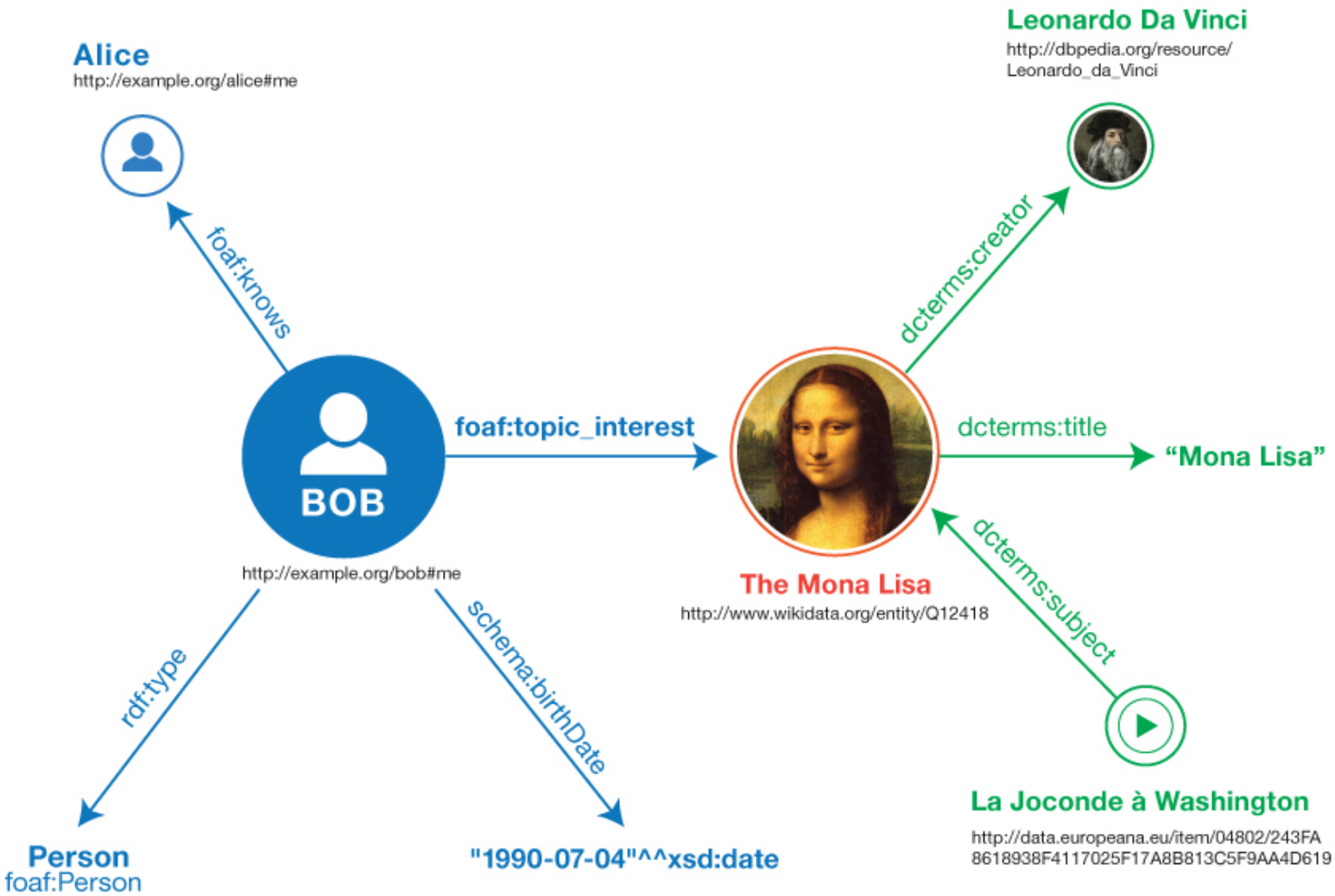


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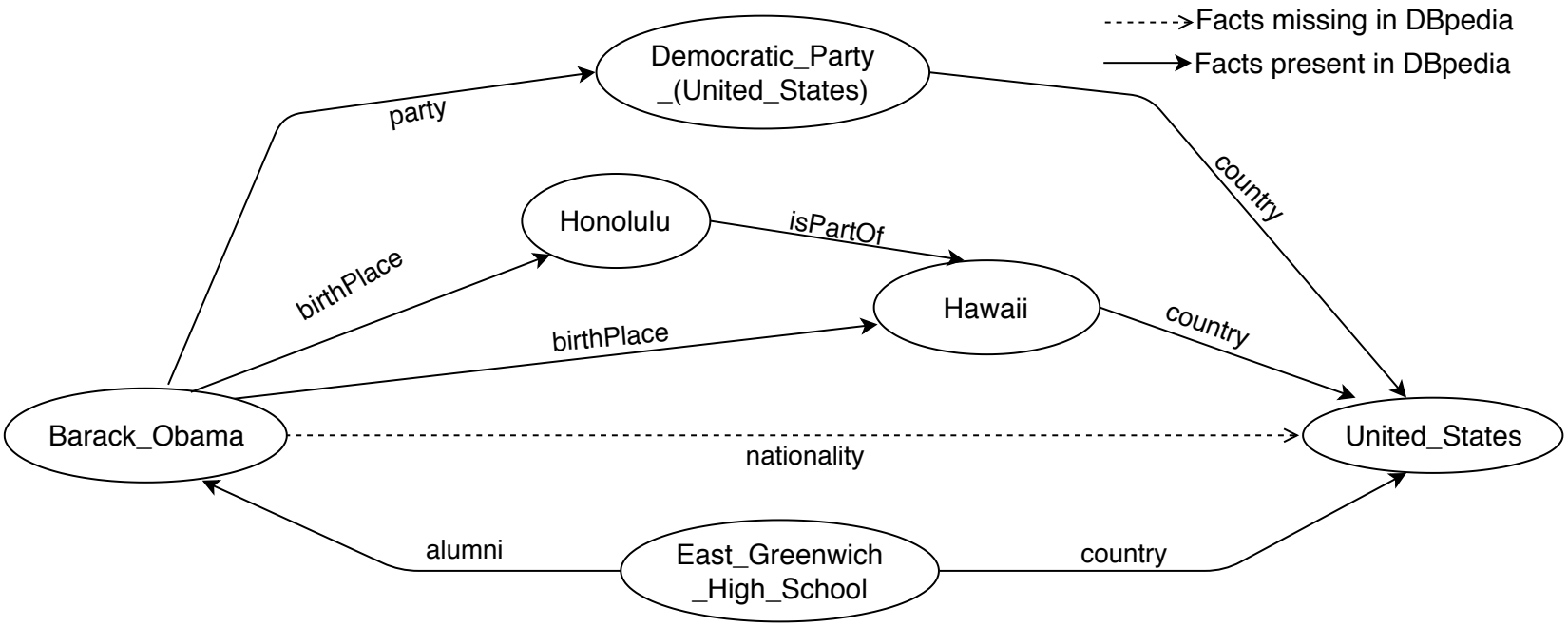
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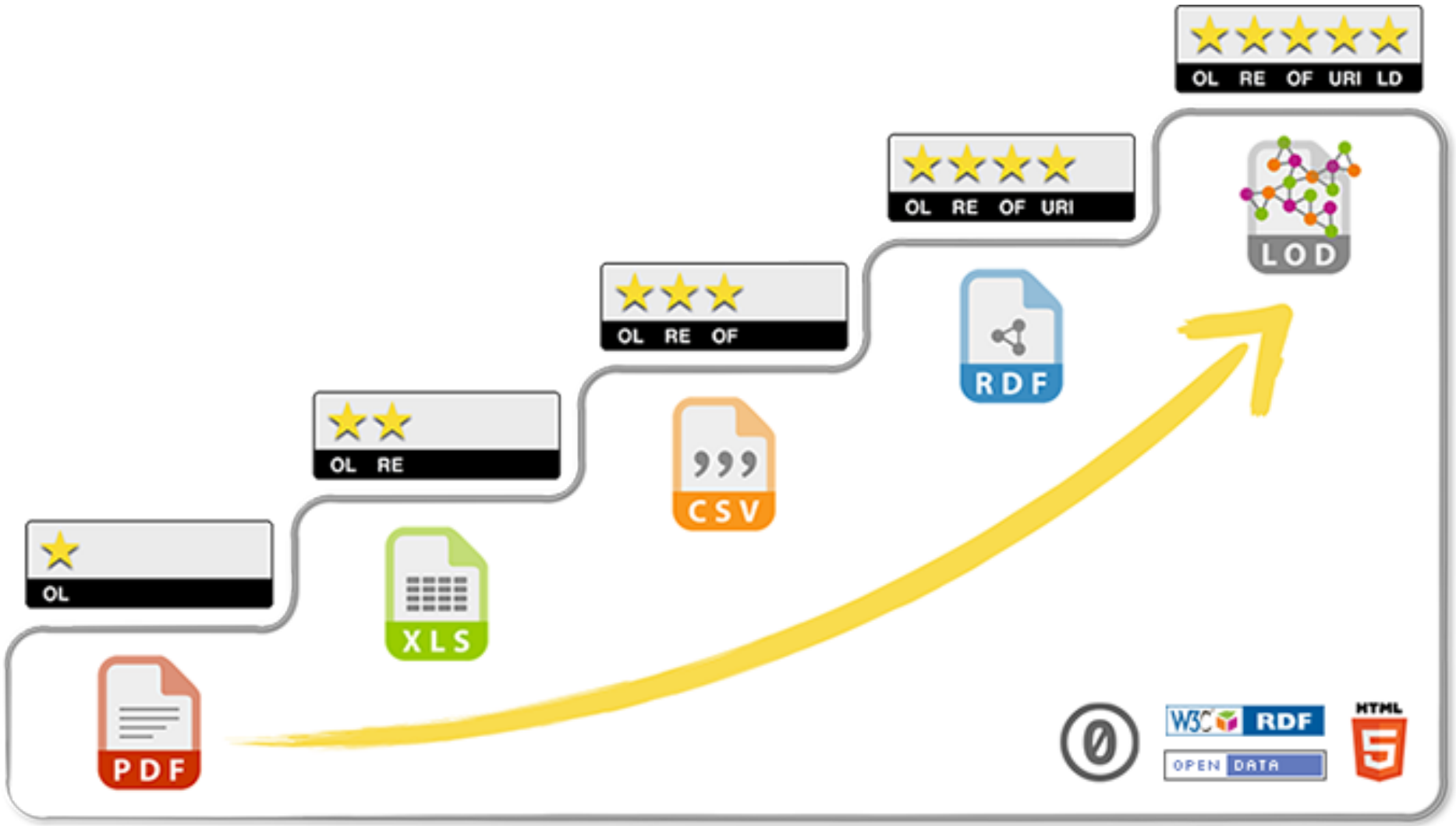
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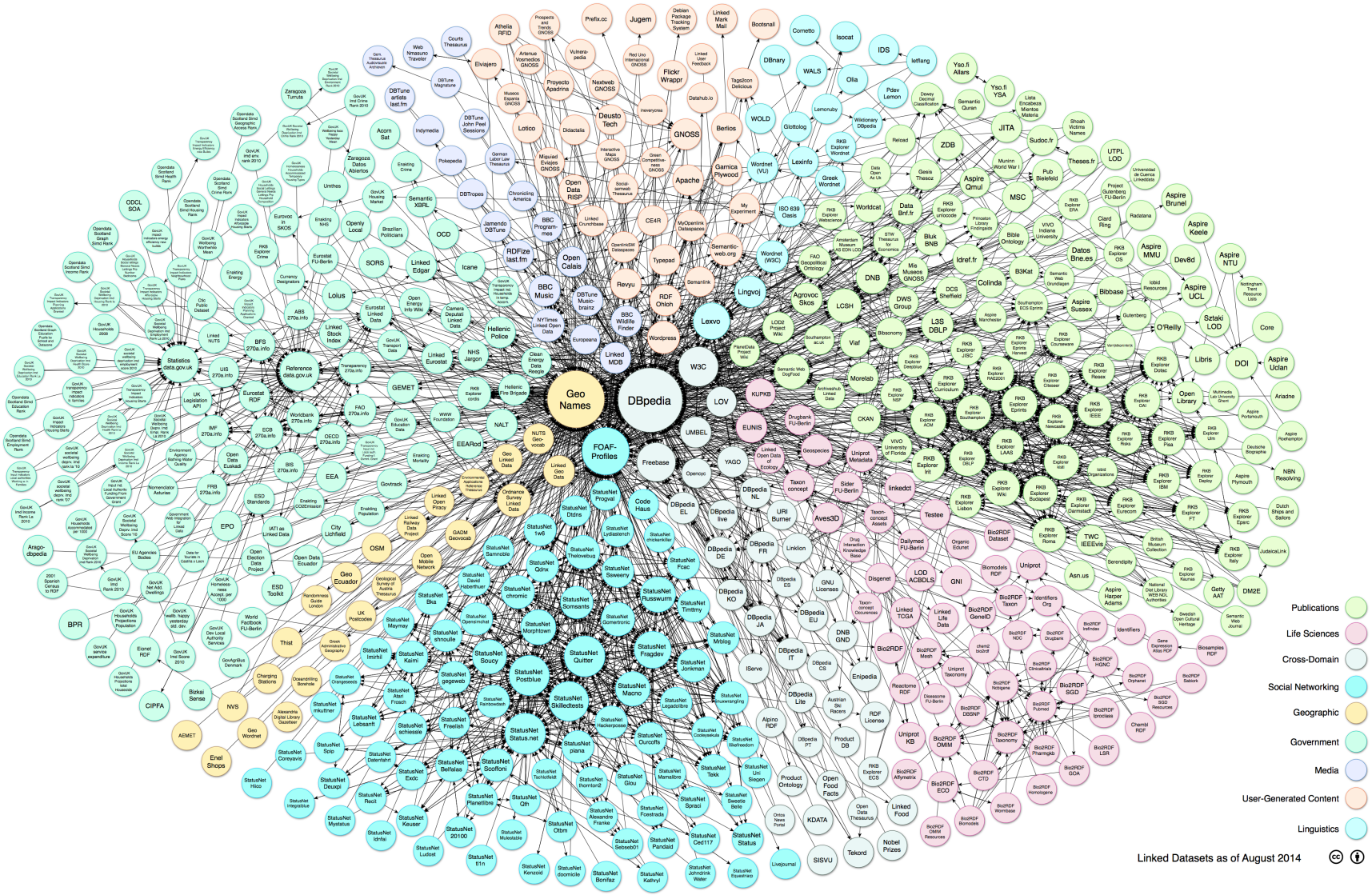
Fundamentals

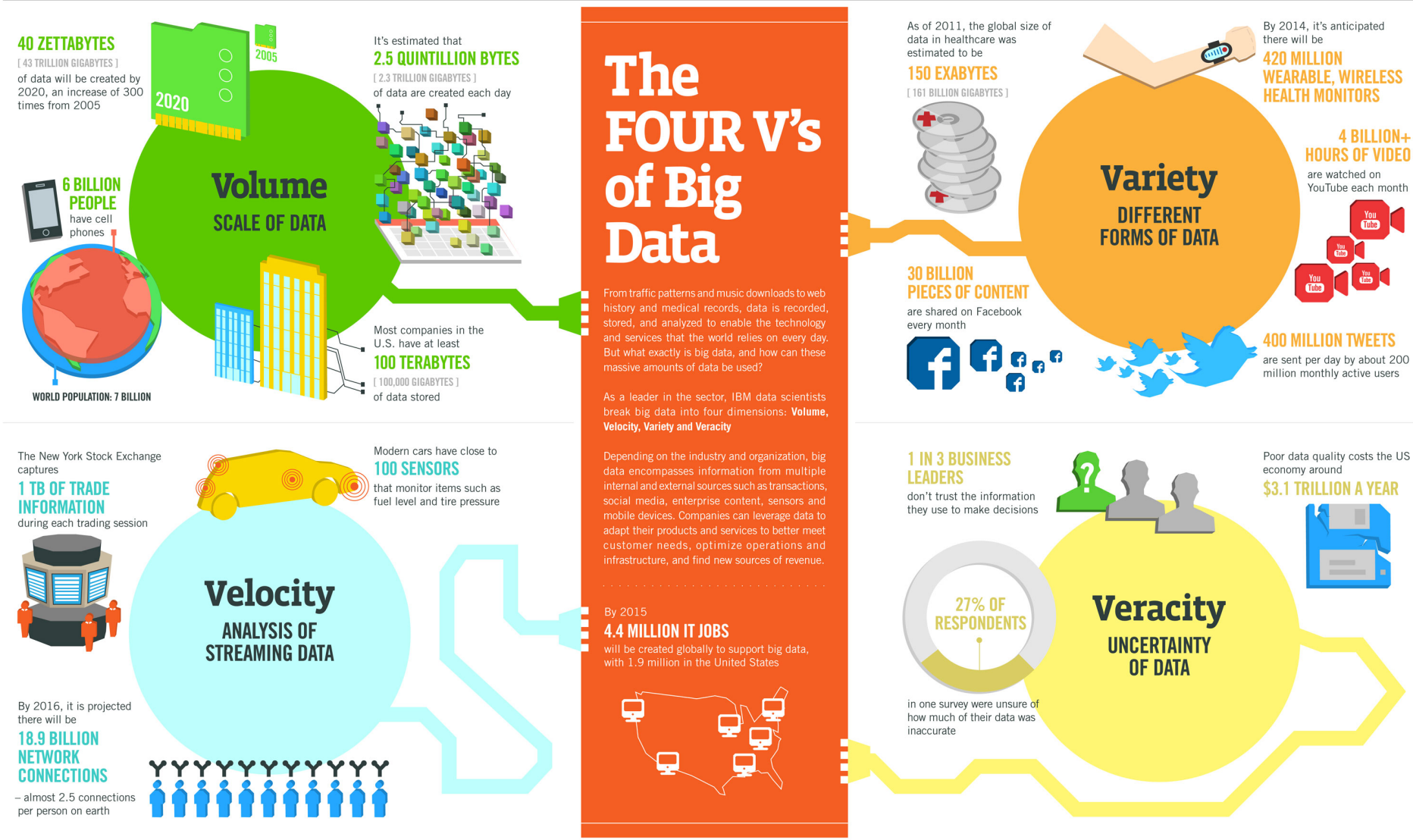
Linked Data

HOBBIT
Holistic Benchmarking of Big Linked Data



Section 2

Introduction



[3]

[3] http://www.ibmbigdatahub.com/infographic/four-vs-big-data

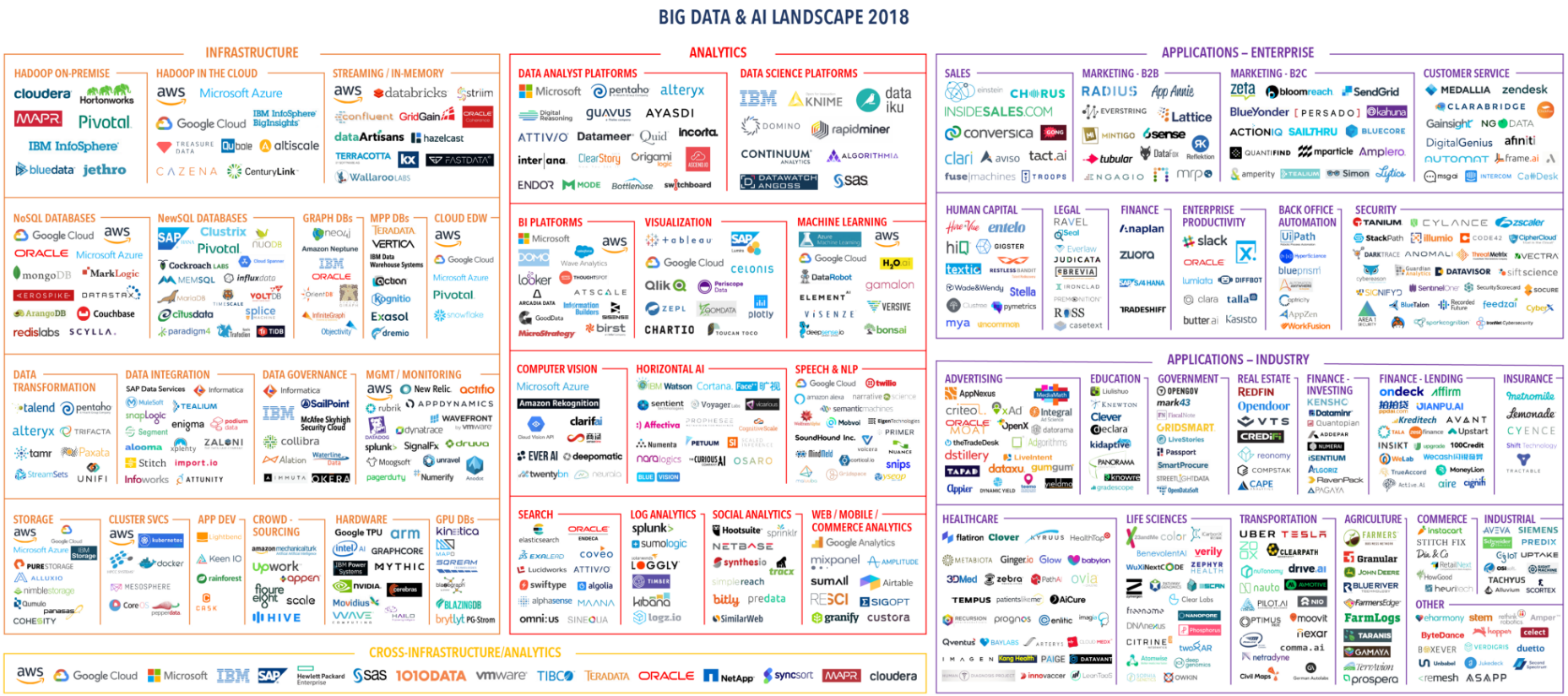
[4]

[4] https://cdn.datafloq.com/cms/os_big_data_open_source_tools-v2.png

Introduction

A Lot of Tools

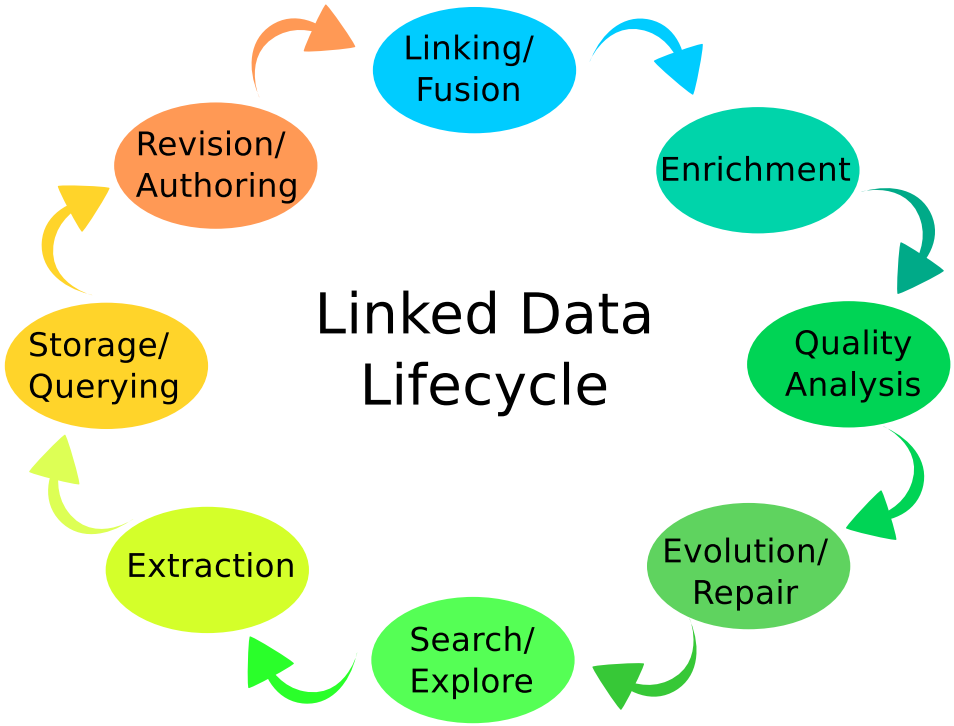
HOBBIT
Holistic Benchmarking of Big Linked Data



Which tool(s) should I use for my use case?

- Which tool(s) should I use for my use case?
- Which key performance indicators are relevant?
- How do existing solutions perform w.r.t. relevant indicators?
- Where are the current bottlenecks?
- Which steps of the data lifecycle are critical?
- ...

- Research project from 2015 – 2018 (Horizon 2020, GA No 688227)
- Focus on Big Linked Data
- Cover the business-critical steps of the Linked Data lifecycle
- Used by a growing number of companies
- Mature and maturing technologies



1. Gathered real requirements
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   - Gathered relevant performance indicators
   - Gathered relevant performance thresholds
   - Gathered real datasets

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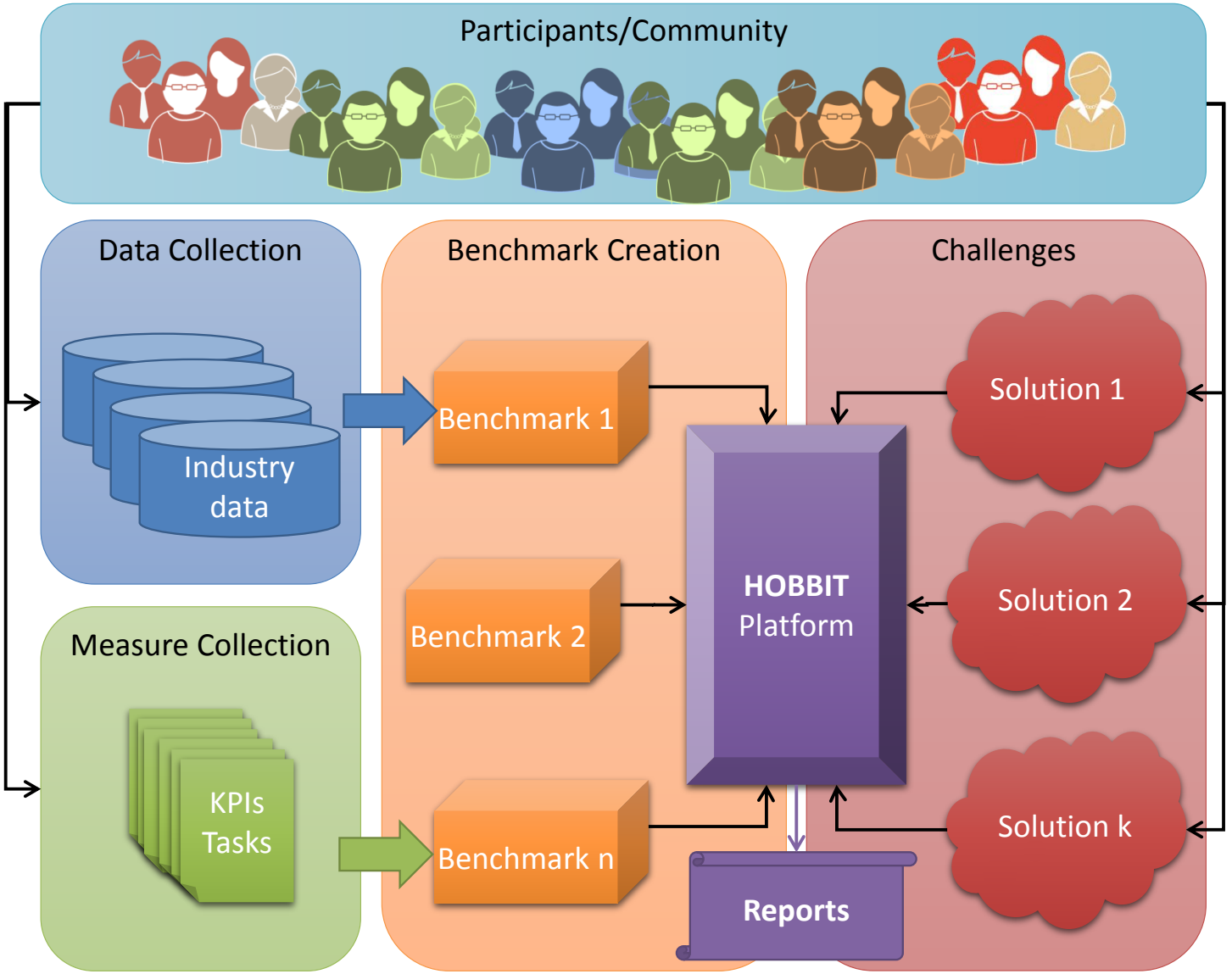
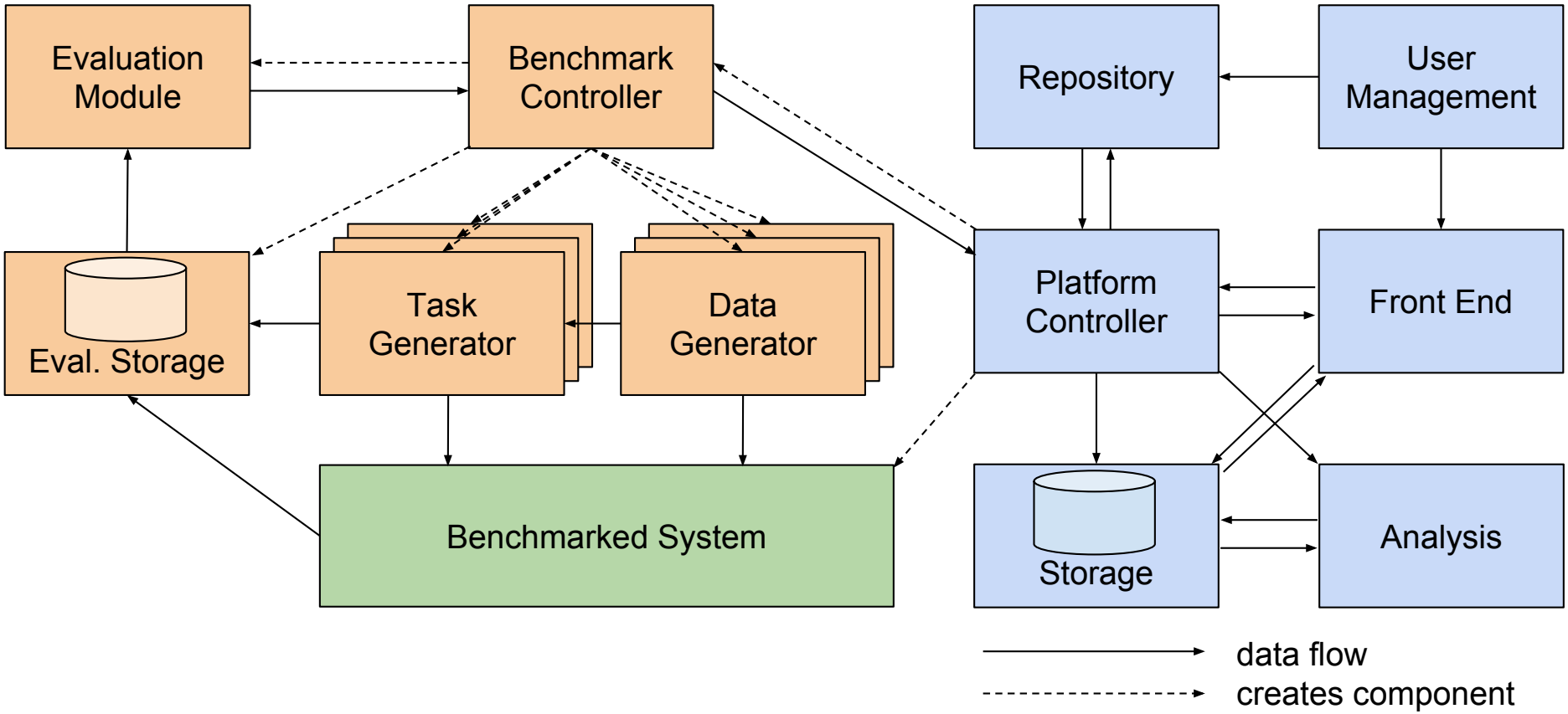
4. Periodic benchmarking challenges and reporting
5. Created an association (Special Group 7 of Task Force 6)


Participants/Community
Data Collection
Industry data
Benchmark Creation
Benchmark 1
Benchmark 2
Benchmark n
Challenges
Solution 1
Solution 2
Solution k
HOBBIT Platform
Reports
Measure Collection
KPIs Tasks

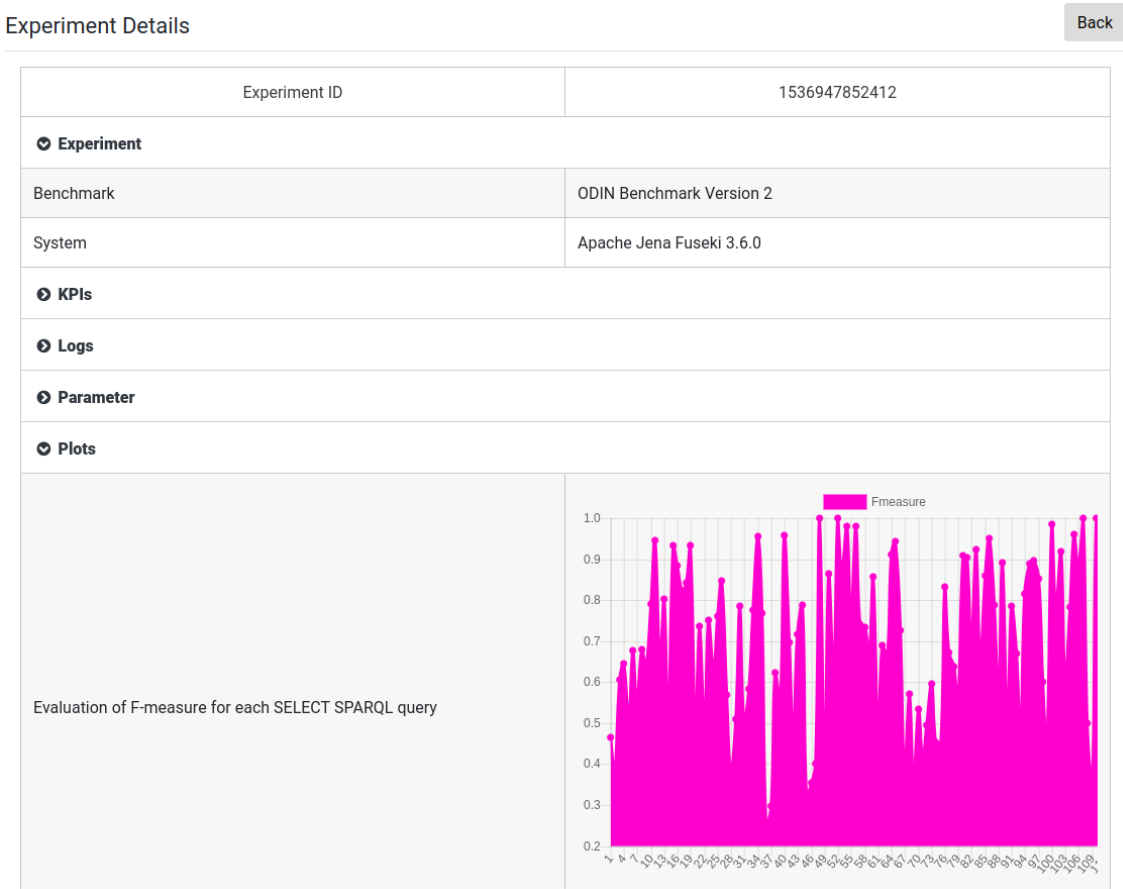
Section 3

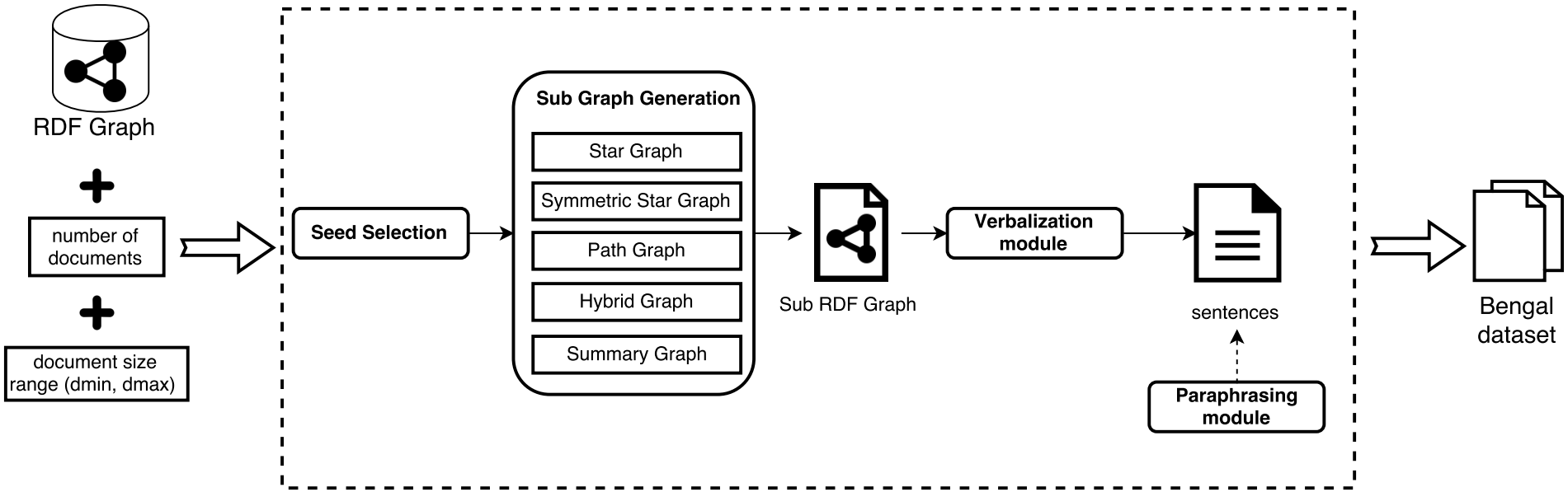
Project Highlights



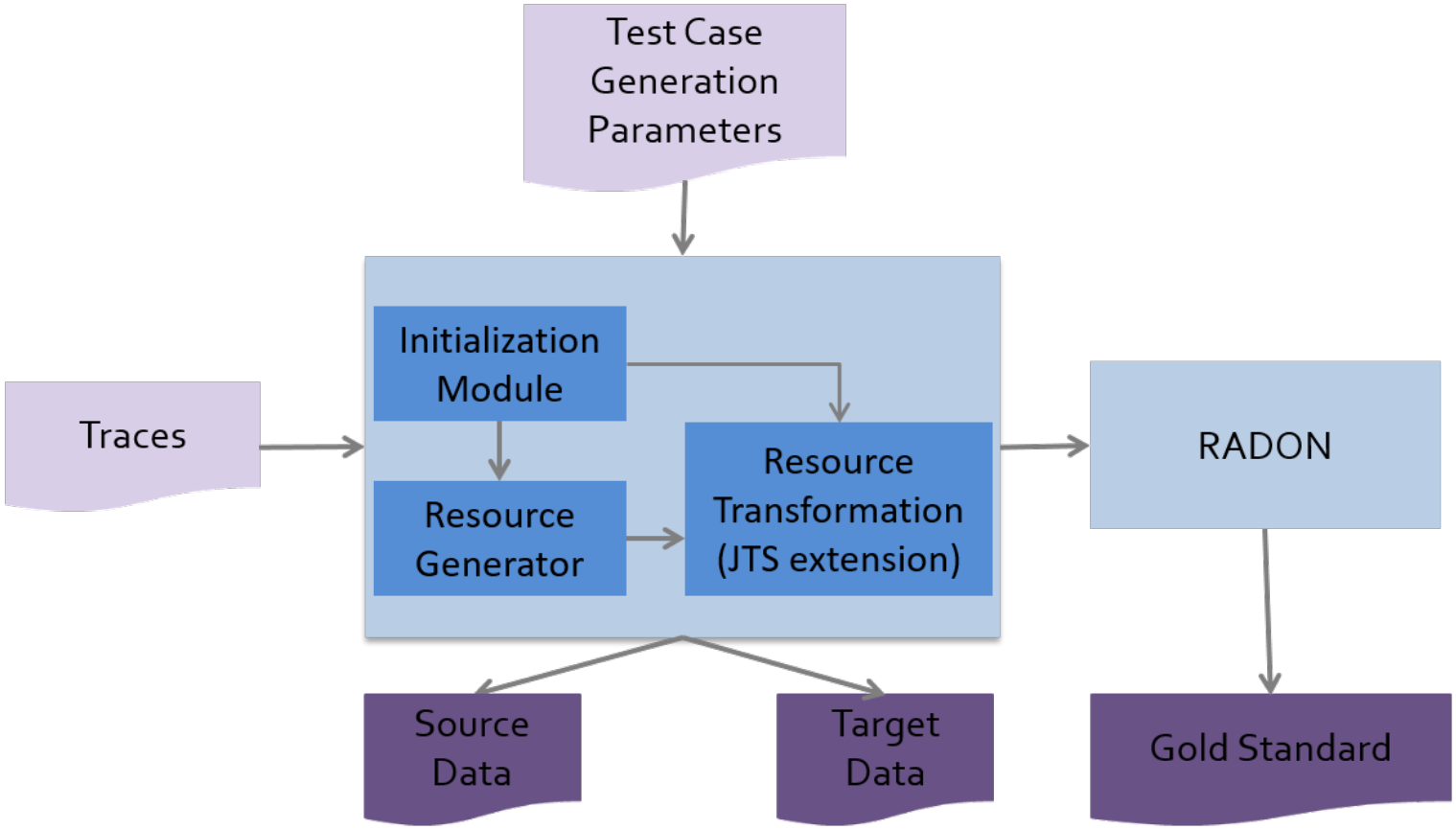
- Scalable open-source benchmarking platform
- Local, distributed and remote (AWS) deployment
- First FAIR platform for benchmarking Big Linked Data in a holistic manner

- ★ 5 mimicking algorithms
- ★ 52 benchmarks
- ★ 200+ systems
- ★ 14 challenges
  DEBS GC 2017 and 2018
- ★ 300+ users
- ★ 13K+ experiments

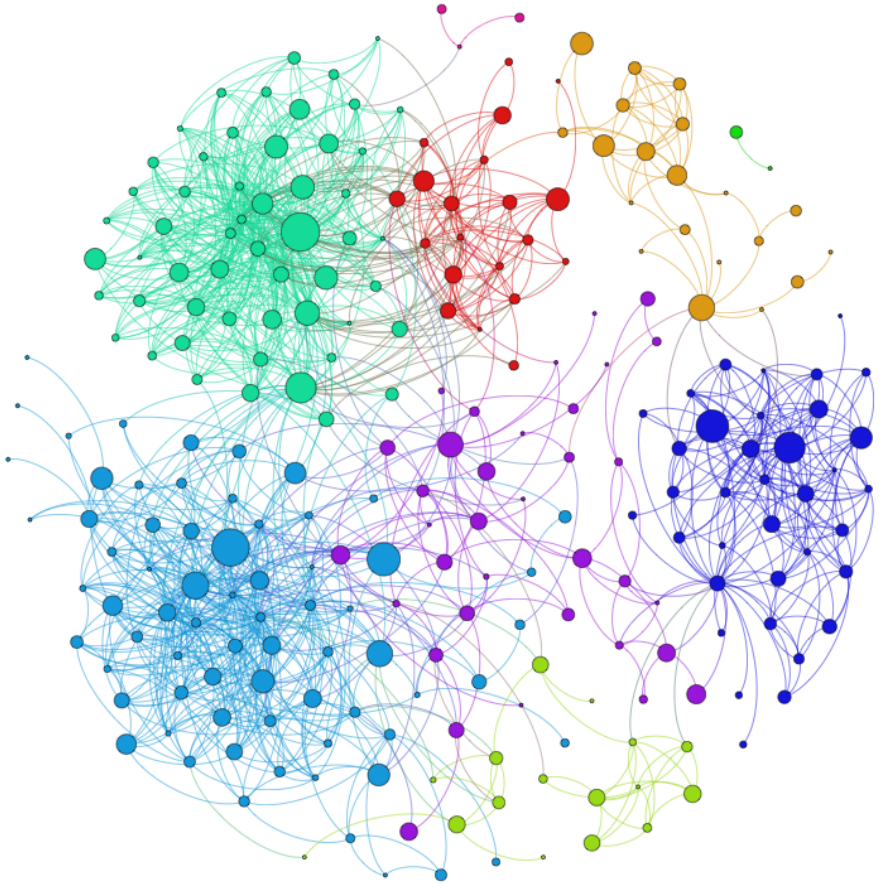




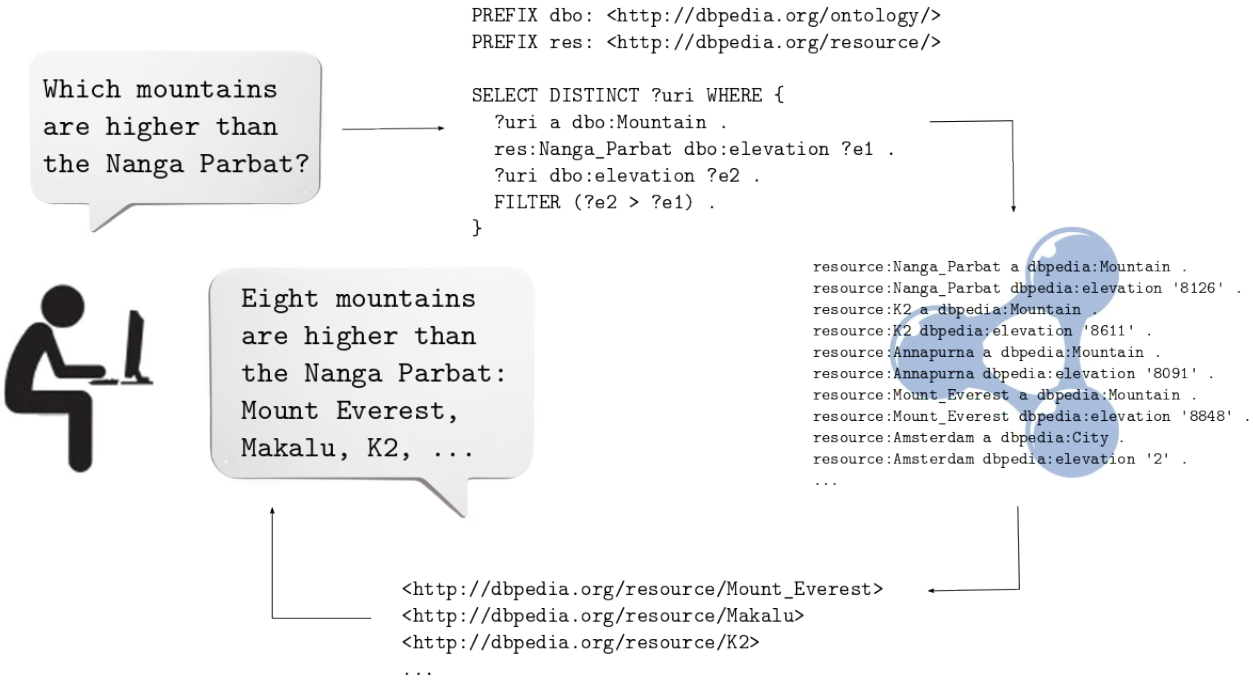
- ⋆ 21 systems benchmarked
- ⋆ 2 challenges organized
- ⋆ 2 mimicking algorithms (BENGAL and TWIG)
- ⋆ Integration with GERBIL



- ⋆ 7 systems benchmarked
- ⋆ 2 challenges (2× OAEI)
- ⋆ Collaboration with OAEI

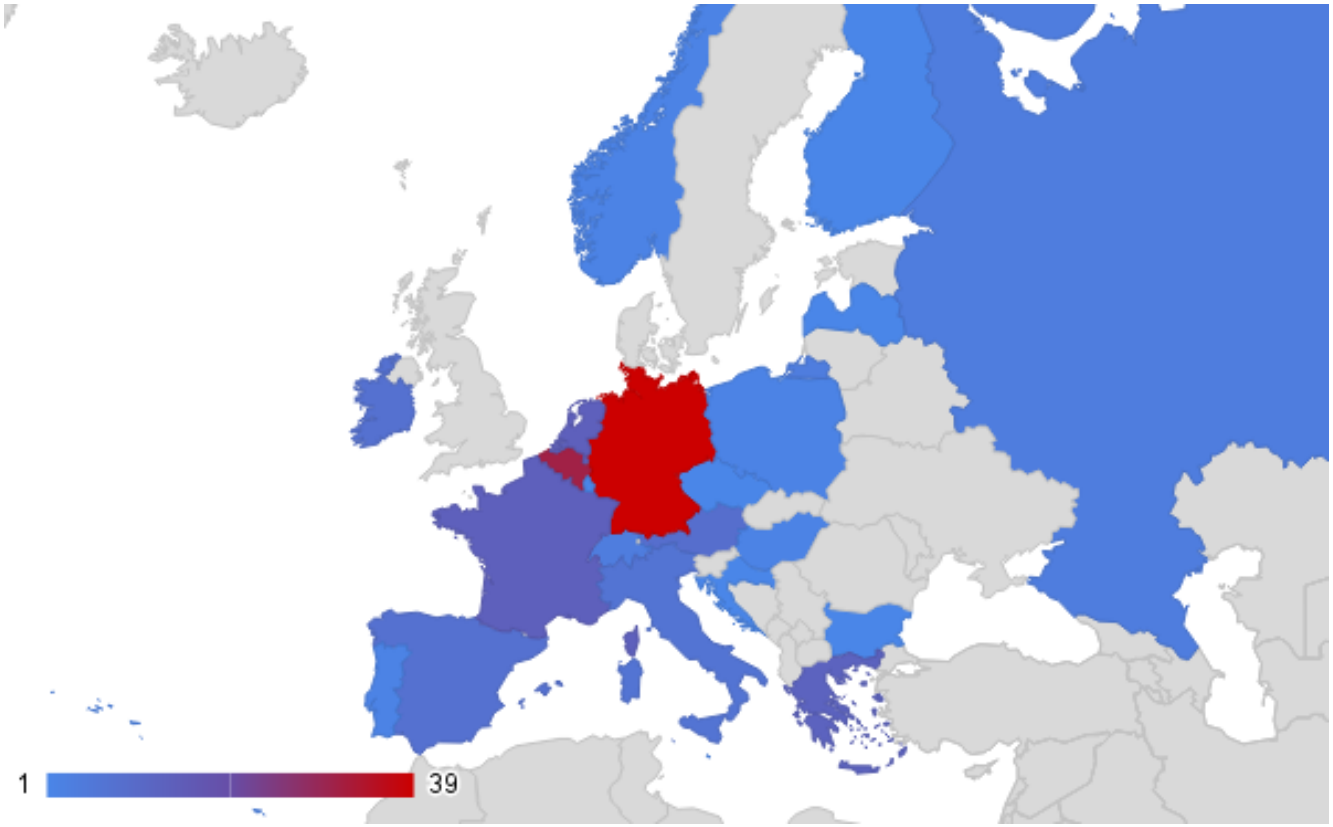


- ⋆ 9 systems benchmarked
- ⋆ 3 challenges organized
- ⋆ Improvement of world's most scalable triple store



- ★ 7 systems benchmarked
- ★ 3 challenges organized
- ★ More realistic benchmarks unveiled current systems' drawbacks

- ⋆ 14 challenges over 8 benchmarks organized (ESWC, ISWC and DEBS)
- ⋆ 77 systems benchmarked overall



- ⋆ Association created as Special Group 7 of Task Force 6 of BDVA
- ⋆ 300 members in industry-focused contact list
- ⋆ Participation in 40+ events with 10K+ participants
- ⋆ European focus with members from outside Europe

Section 4

Benchmarking Machine Learning

- The task: find anomalies in molding machine sensor data to predict maintenance intervals (predictive maintenance).
- Mimicking algorithm based on real data
- Data was streamed as in the real world
- Participants had to use Markov Models to identify anomalies
- 14 Participants, 7 made it into the last round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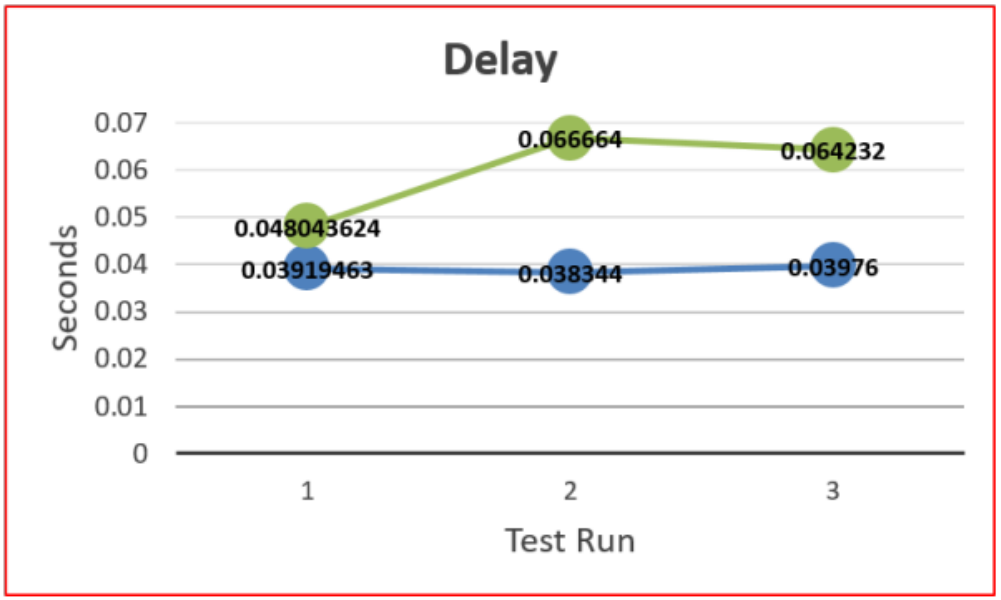
Test Run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Test Run

- The task: predictions about ship routes based on AIS data
  - Spatio-temporal streaming data
  - Predictions for vessels' destinations and arrival times

BIG DATA OCEAN

Team	Earlyness rate	A	Working time (sec)	B	Total Q1
University of Iasi	0.685	1	99	2	1.25
University of Illinois	0.672	2	86	1	1.75
Jean Monnet University	0.668	3	149	5	3.5
Chungnam National University	0.653	4	102	3	3.75
University of Iasi (2nd)	0.647	5	157	6	5.25
Israel Institute of Technology	0.5	6	129	4	5.5
Dresden University of Technology	-	-	-	-	-
Insight Centre	-	-	-	-	-
University of Carthage	-	-	-	-	-

Team	Mean Absolute Error (min.)	A	Working time (sec)	B	Total Q2
University of Iasi	959.839	1	100	2	1.25
Jean Monnet University	1099	2	145	4	2.5
Chungnam National University	1251.15	3	100	2	2.75
Israel Institute of Technology	1493.18	4	133	3	3.75
University of Illinois	5425.53	5	86	1	4.75
University of Iasi (2nd)	1705.35	6	164	5	5
Dresden University of Technology	-	-	-	-	-
Insight Centre	-	-	-	-	-
University of Carthage	-	-	-	-	-

Team	**Q1**	**Q2**	**Total Score**
University of Iasi	1.25	1.25	2.5
Jean Monnet University	3.5	2.5	6
Chungnam National University	3.75	2.75	6.5
University of Illinois	1.75	4.75	6.5
Israel Institute of Technology	5.5	3.75	9.25
University of Iasi (2nd)	5.25	5	10.25
Dresden University of Technology	-	-	-
Insight Centre	-	-	-
University of Carthage	-	-	-

Section 5

Future Directions

- KnowGraphs (Innovative Training Networks (ITN))
  - 4 years, starting in October 2019
  - 15 Early-Stage Researchers (ESRs)
  - HOBBIT will be used as central benchmarking platform
  - Further datasets will be integrated (e.g., UICML datasets)
- RAKI (BMWi project)
  - 3 years, starting in September 2019
  - HOBBIT will be used for evaluation
- More projects pending

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→ Further development of the HOBBIT platform

- HOBBIT is open for the community! Benchmarks, systems, datasets can be added
- Not limited to linked data

Thank you

HOBBIT offers

- Scalable benchmarking
- Based on real world data in an
- Extendable,
- Open source platform
- Following the FAIR data principles

`http://project-hobbit.eu/`
`https://dice-research.org/about/`