



AIT AUSTRIAN INSTITUTE OF TECHNOLOGY

Lifecycle Management & Digital Preservation using Blockchain Technology

Blockchain and the **Data Market Austria** Project

8th Triennial International DLM Conference

2017-09-14, Brighton, UK

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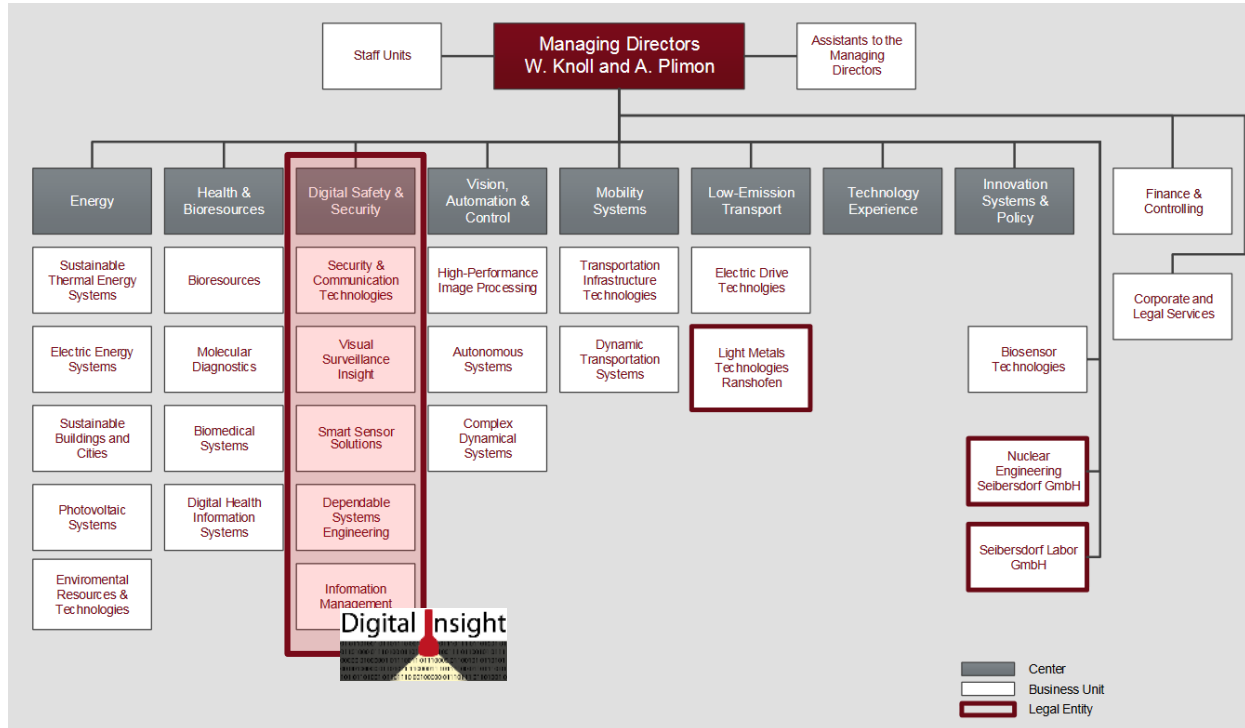
Digital Insight



AIT: DIGITAL INSIGHT LAB



AIT AUSTRIAN INSTITUTE OF TECHNOLOGY GMBH



Federation of Austrian Industries
49,54%

bmwft
Federal Ministry for Transport, Innovation and Technology
50,46%

- 1300+ Employees
- Budget: 140 M€
- Business Model: 40:30:30

DATA MARKET AUSTRIA





FFG



DATA MARKET AUSTRIA

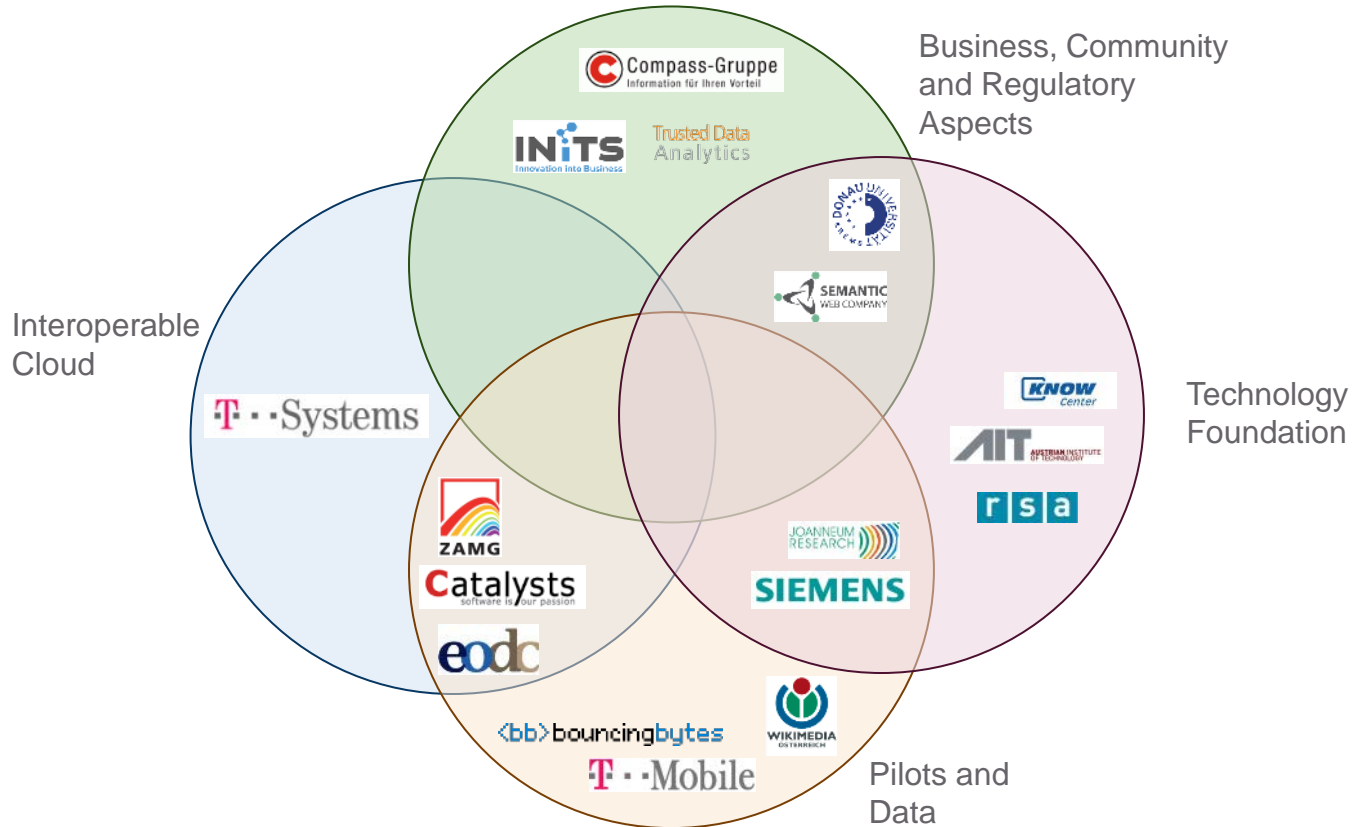
- The FFG and BMVIT are funding the creation of a Data-Services Ecosystem in Austria with €2.5 million.
- A consortium around leading Austrian research centres, universities, and industrial stakeholders will focus on the application fields of:
 - Earth Observation
 - Mobility
- Project Start: October 2016
- Project Duration: 3 Years
- Project Coordinator: Research Studios Austria (Dr. Allan Hanbury)
 - AIT leads WP5 “Data Technology Foundation”



DATA MARKET
AUSTRIA

<https://datamarket.at/>

DATA MARKET AUSTRIA



DATA MARKET AUSTRIA

Goals

1. **Advance Technology Foundations:** Research and develop the technology foundations building on blockchain technology in the areas of data handling, services and brokerage for the Austrian Data-Services Ecosystem, advancing the state-of-the-art in these areas.
2. **Interconnect Clouds:** Develop the technology for interconnecting existing clouds to allow transparent but controlled access to distributed services, and to public and proprietary data through the Data Market Austria Portal.
3. **Create a Data Innovation Environment:** Build a community of stakeholders (SMEs, start-ups, large enterprises, academics, public administration) around the Data-Services Ecosystem that operate in a clearly regulated environment using innovative business models that ensure the long-term sustainability of the Data-Services Ecosystem beyond the end of the funding period.
4. **Persuade with Pilots:** Demonstrate the reuse of data and services and resulting value generated through innovative applications built on multiple open and proprietary data sources in the Austrian Data-Services Ecosystem within ICT for Space and Mobility Pilots.

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BLOCKCHAINS AND SMART CONTRACTS FOR A DATA ECOSYSTEM



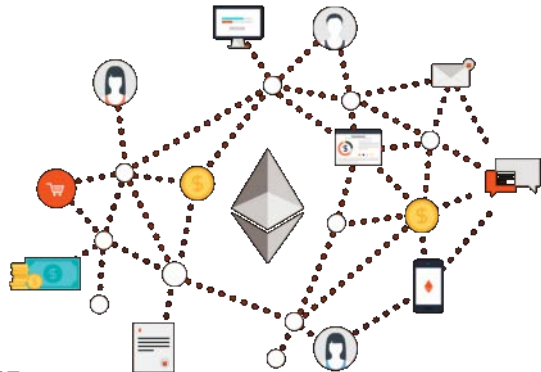
DATA MARKET AUSTRIA: BLOCKCHAIN ADVANTAGES

- **Veracity**
 - How can we be sure about the source of data?
 - A Blockchain provides an indelible transaction history (provenance)
- **Integrity**
 - How can we be sure that data has not been changed?
 - A Blockchain makes use of hash algorithms to ensure integrity
- **Sustainability**
 - How do we avoid dependencies on single organizations?
 - A Blockchain provides a decentralized, peer-to-peer backbone

DATA MARKET AUSTRIA: BLOCKCHAIN TECHNOLOGY

Criteria

- Open Source Licensing
- Maturity of Development
- Community Support
- Smart Contract Support



Ethereum

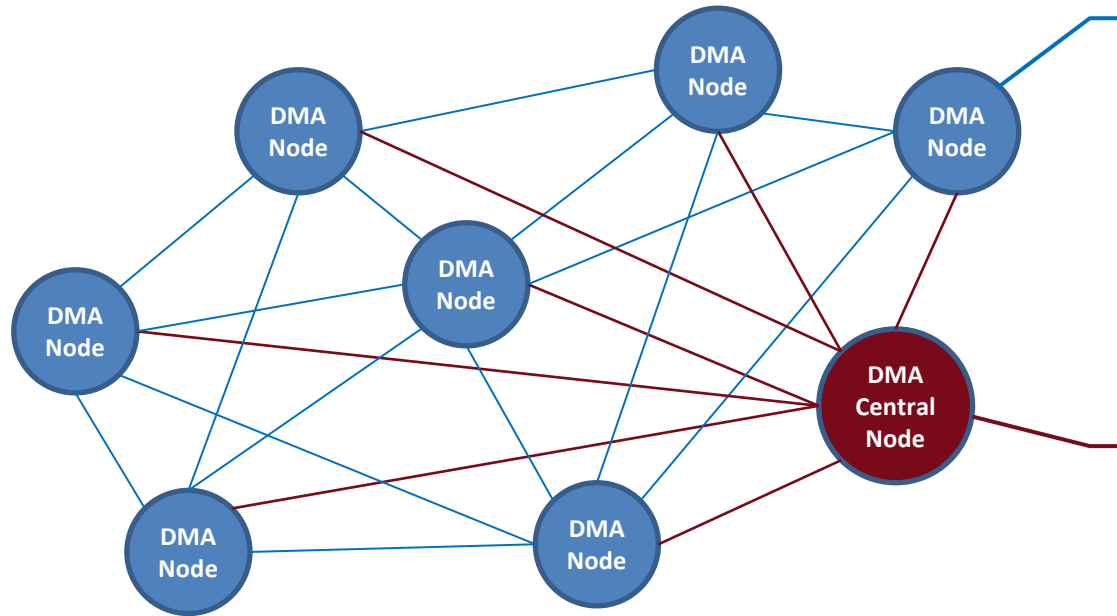


- GPLv3 License
- Proposed in 2013, online since 2015
- Extremely active Community
- Turing-complete Smart Contract language is its main USP

Drawbacks

- Proof of work consensus
- Additional complexity of Ether or “gas”
- “Anti-scaling” property

DATA MARKET AUSTRIA PEER-TO-PEER NETWORK



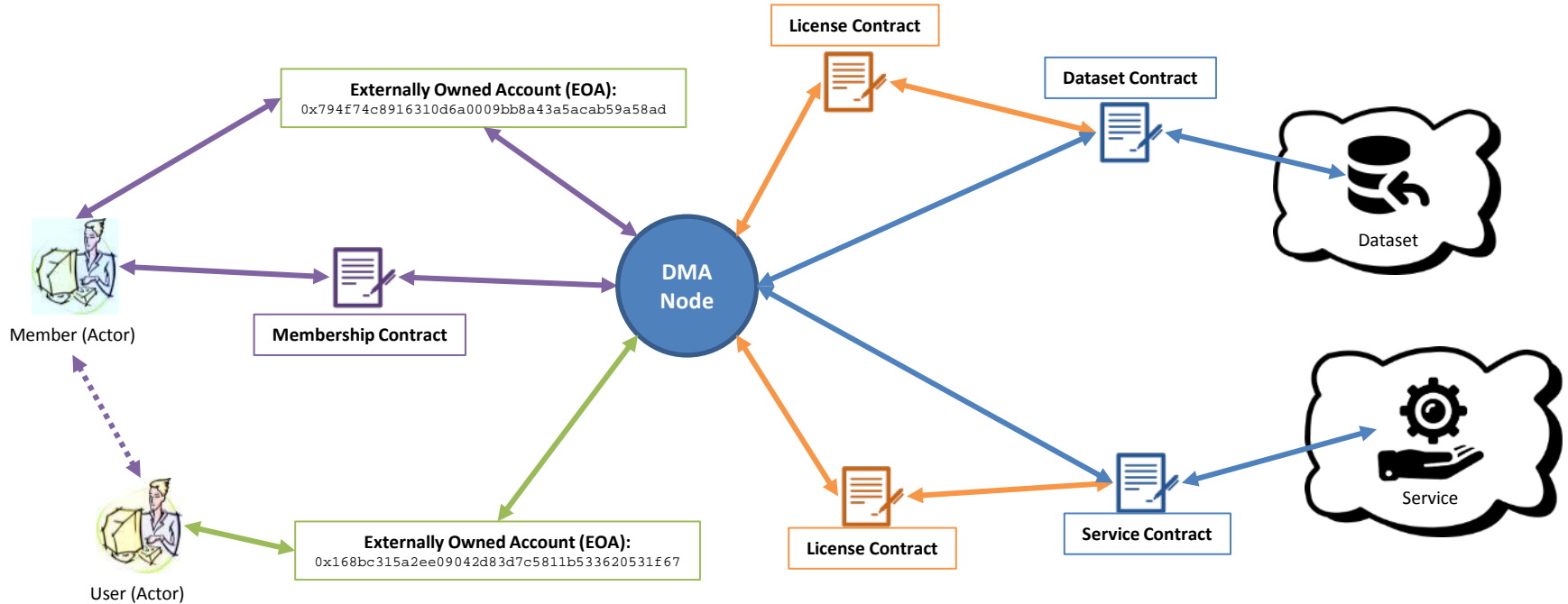
Provider Node

- Data Management
- Object store
- Metadata store
- Local Indexing
- Ethereum Node

Central Node

- Federated Indexing
- Central Search
- Ethereum Bootstrap Node
- DMA Website

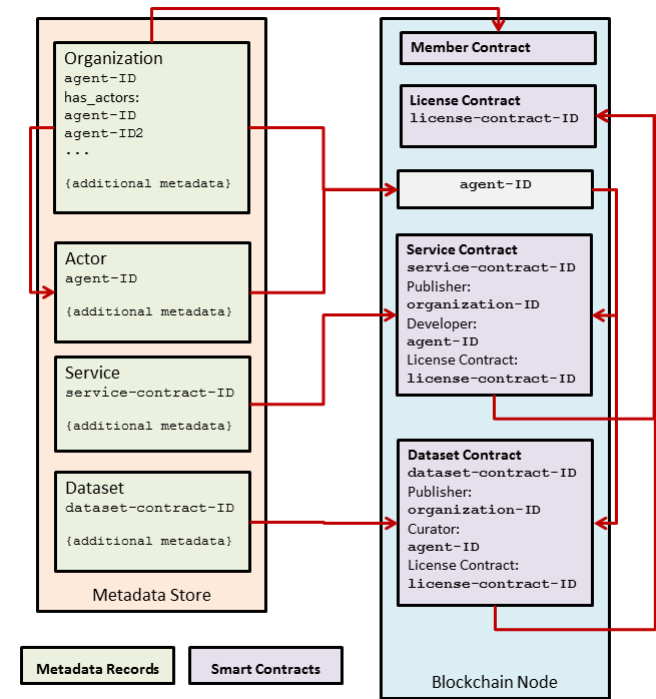
DATA MARKET AUSTRIA PEER-TO-PEER NETWORK



DATA MANAGEMENT AND SMART CONTRACTS

DMA Entities

- Agents
 - entities that have agency in the Blockchain, that is, those entities that can initiate transactions.
 - (Organization, Actor) – [Externally Owned Account]
- Contracts
 - represent either those DMA entities whose state (and historical provenance of that state) should be stored in the DMA Blockchain (the “State” contract type), or the conditions under which those entities may be accessed (the “License Contract” type).
 - (Organization) – [Membership]
 - (*License*) – [License]
 - (Dataset, Service) – [Dataset, Service]



(Data Management) – [Blockchain]

DEMONSTRATION



DMA RESULTS SO FAR

- D2.2 – Community-driven Data-Services Ecosystem Requirements
 - Stakeholder requirements
- D5.1 - Data Technology Specification and Development Roadmap
 - Technical design
- D5.2 - DMA Blockchain Design
 - Blockchain-specific design aspects
- Prototype implementations
 - Conduit – Ingest workflow and metadata management (based on E-ARK Web)
 - Private Ethereum Network test deployment
 - Prototype Smart Contracts

THANK YOU FOR YOUR ATTENTION!

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