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Information Technology and Management
Institute at the University of Applied Sciences
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IARIA

A Technical Reference Architecture for Microservices-based Applications in the Insurance Industry

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Presenters

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Agenda

- **Competence Center Information Technology & Management (CC_ITM)**
  - Institute at the University of Applied Sciences and Arts, Hanover;
  - Founded in 2005 by colleagues from the departments of **Business Information Systems and Computer Science;**
  - Members: **Faculty staff and industry partners** (practitioners) of different areas of businesses.
- Main objective
  - **Knowledge transfer** between university and industry.
- Research topics
  - Management of information processing;
  - Service computing, including Microservices, Service-oriented Architectures (SOA), Business Process / Rules Management (BPM/BRM);
  - Cloud Computing.

Introduction

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The ultimate goal of our current research is to develop a '**Microservices Reference Architecture for Insurance Companies**' jointly with our partner companies.

The topics of our current research are '**the Implementation of Workflows in Microservices Architecture**' with the consideration of orchestration and choreography and ' **the feasibility of the logical Reference Architecture through a technical realization**'.

Questions to be answered:

Which Business processes / workflows can/do utilize a choreography-based approach?

What common scenarios occur during diverse use cases?

How can the logical architecture be mapped to the technical architecture?

How can a cloud-native approach be used in the insurance industry?

Agenda

Service-based Reference Architecture

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Coexistence: Legacy applications, SOA and MSA based applications will be operated in parallel for a longer transition period.

Business processes are critical elements in an insurance company's applications landscape.

To keep their competitive edge, the enterprise must **change their processes** in a flexible and agile manner.
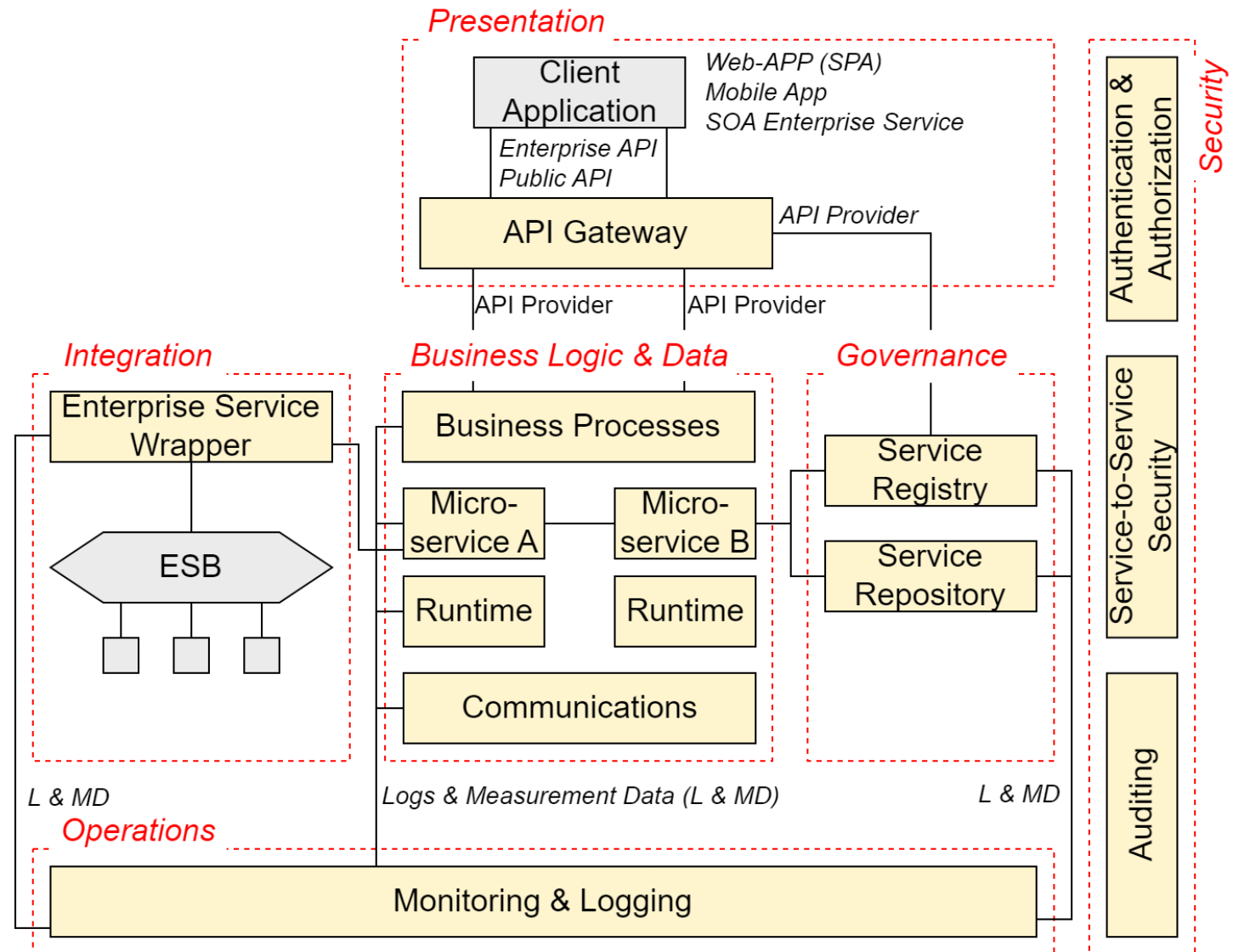
Agenda

- 1. Introduction

- 2. Service-based Reference Architecture for Insurance Companies

- 3. Cloud-native Architecture

- 4. Cloud-native Technical Reference Architecture for Insurance Companies
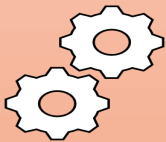
- 5. Conclusion and Future Work

Cloud-native architecture

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Cloud Computing

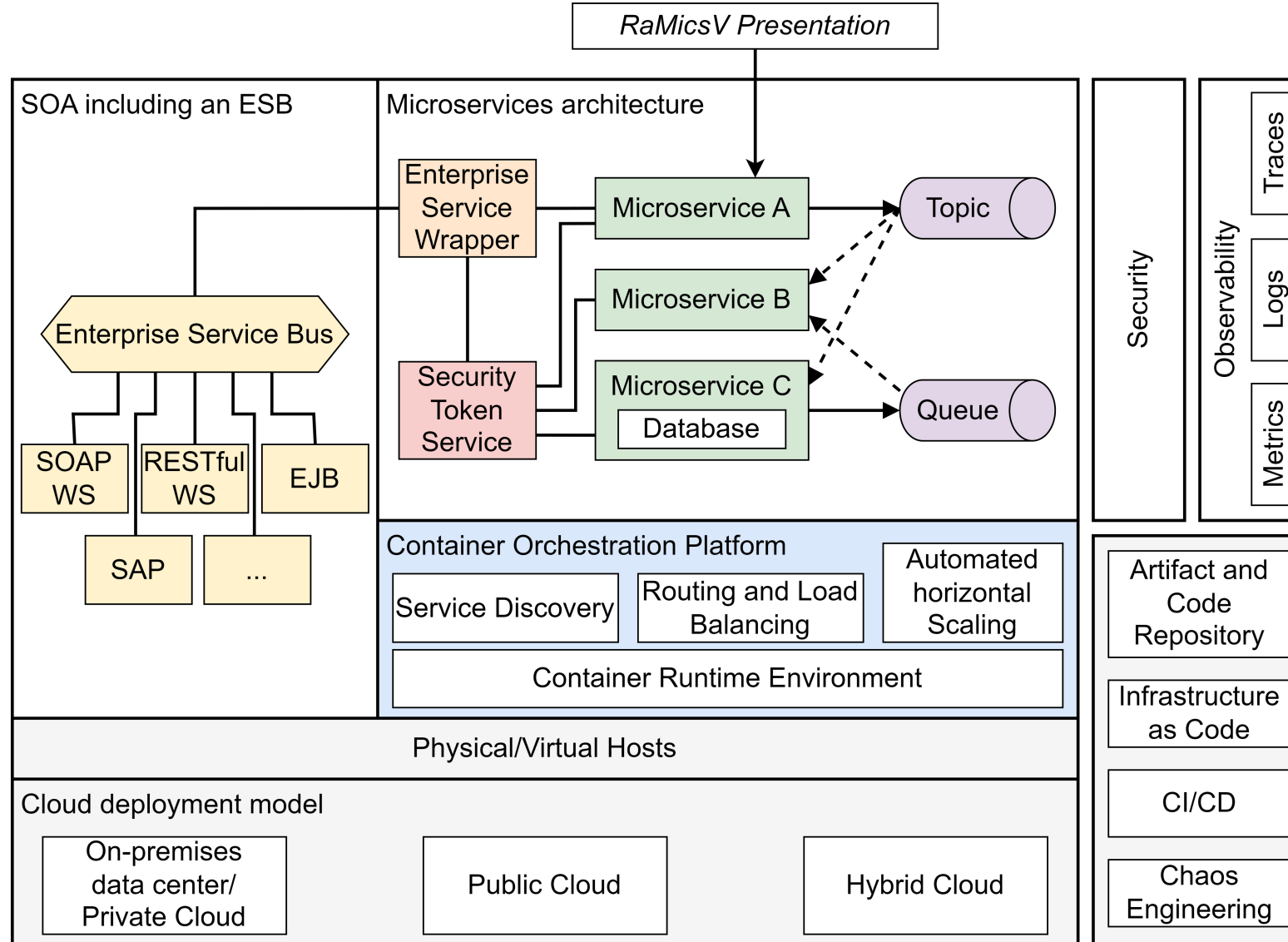Microservices

Containerization
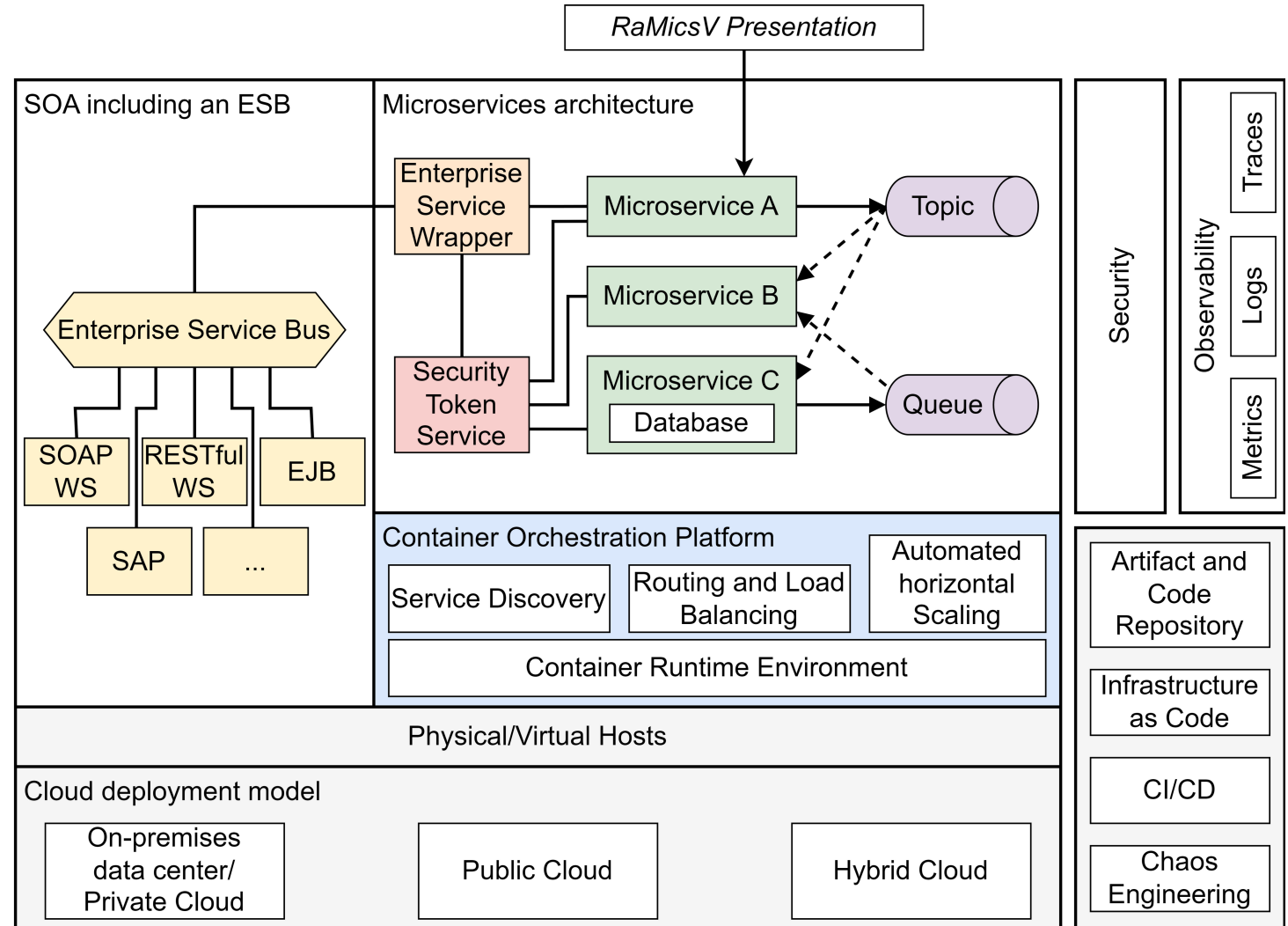
Automation

Observability

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Technical Reference Architecture

Cloud deployment model:

- On-premises data center/Private Cloud
- Public Cloud
- Hybrid Cloud
  - ➜ Use specific public cloud services while keeping highly regulated data in the company's own data center

Technical Reference Architecture

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Container orchestration:

- Container orchestration platform is one central element of T-RaMicsV
- All microservices are operated as containerized workloads
- The platform provides: Container runtime environment, Service discovery, Routing and load balancing as well as automated horizontal scaling

Technical Reference Architecture
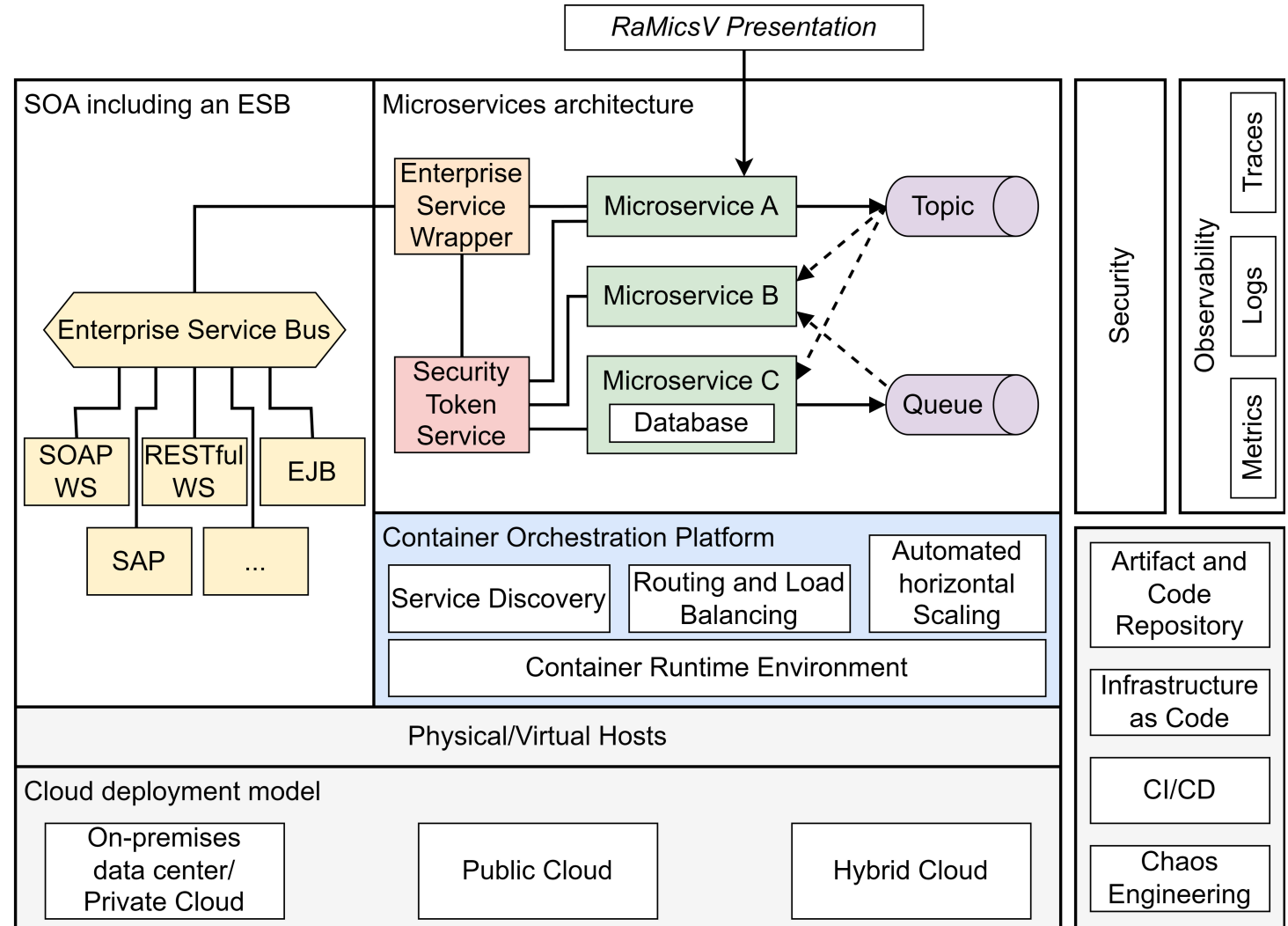
Microservices architecture:

- Microservices communicate mainly in asynchronous, message-driven fashion
- Each microservice exclusively uses its own database, if persistence is needed

Technical Reference Architecture
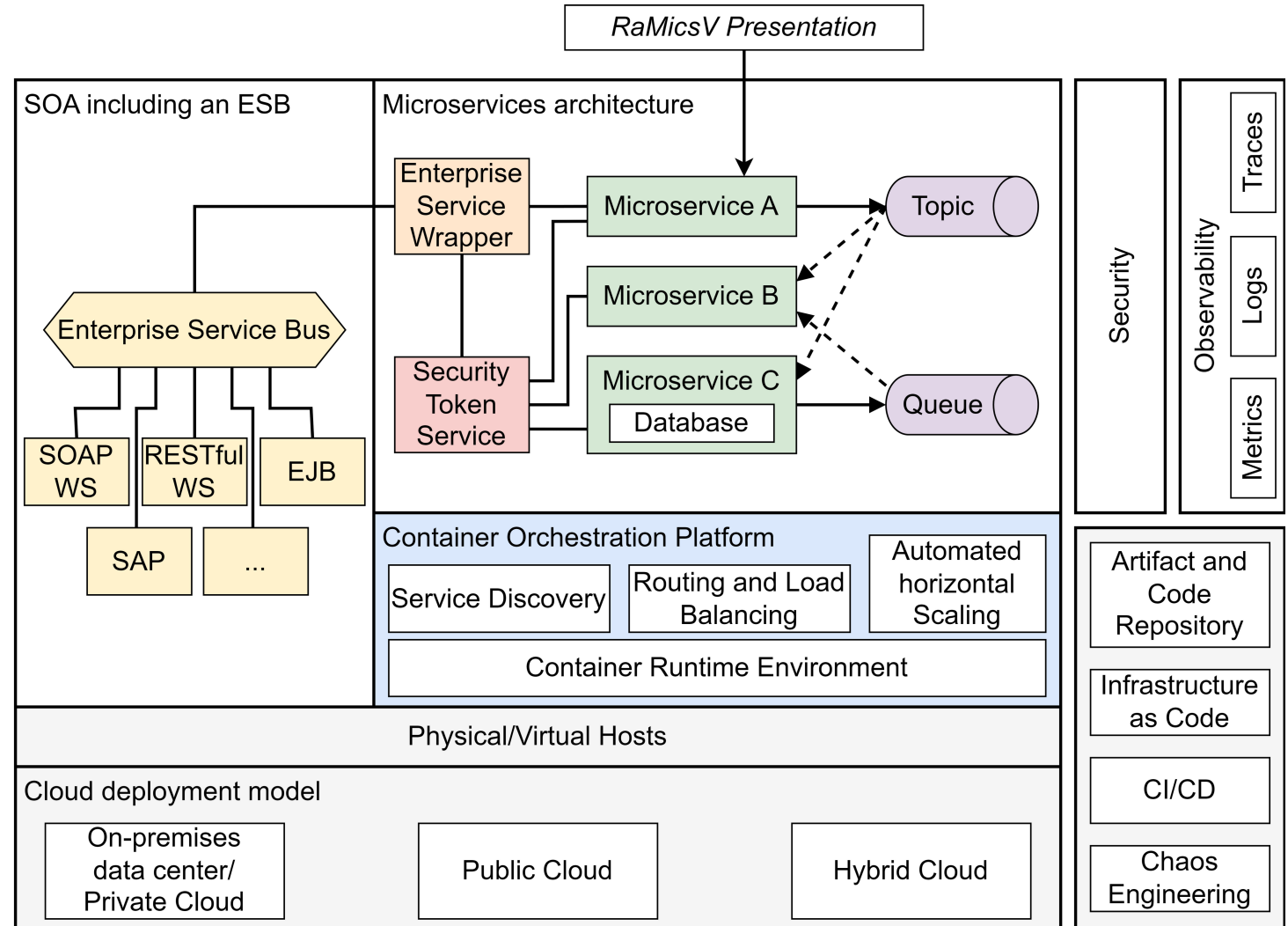
SOA including ESB:

- Integration of MSA and SOA is an integral part of RaMicsv and therefore important requirement for T-RaMicsV
- Different SOA services are conceivable: SOAP, REST, EJB, SAP, and more
- Enterprise Service Wrapper directly derived from RaMicsV as central transition from the MSA to the ESB of the SOA
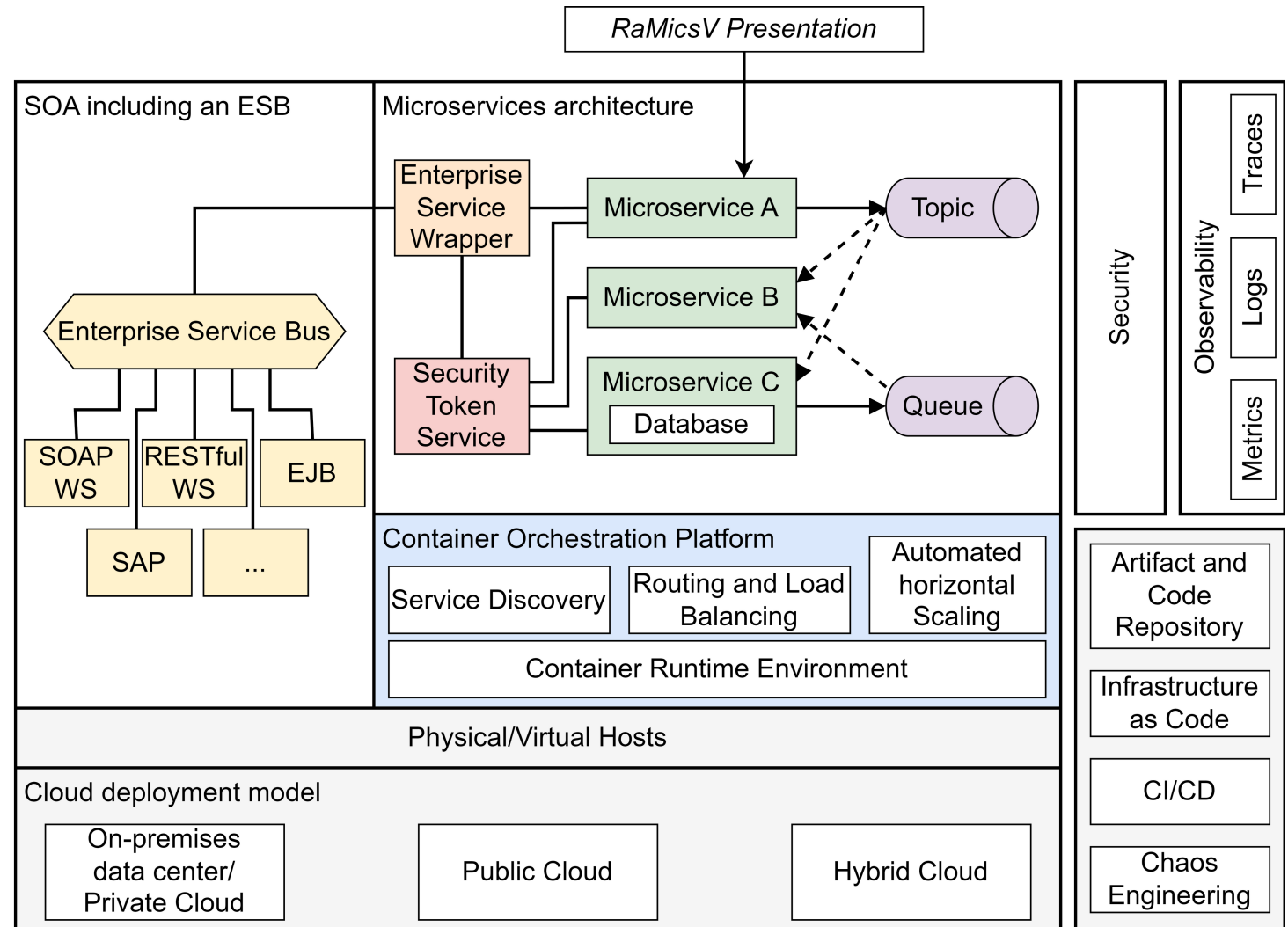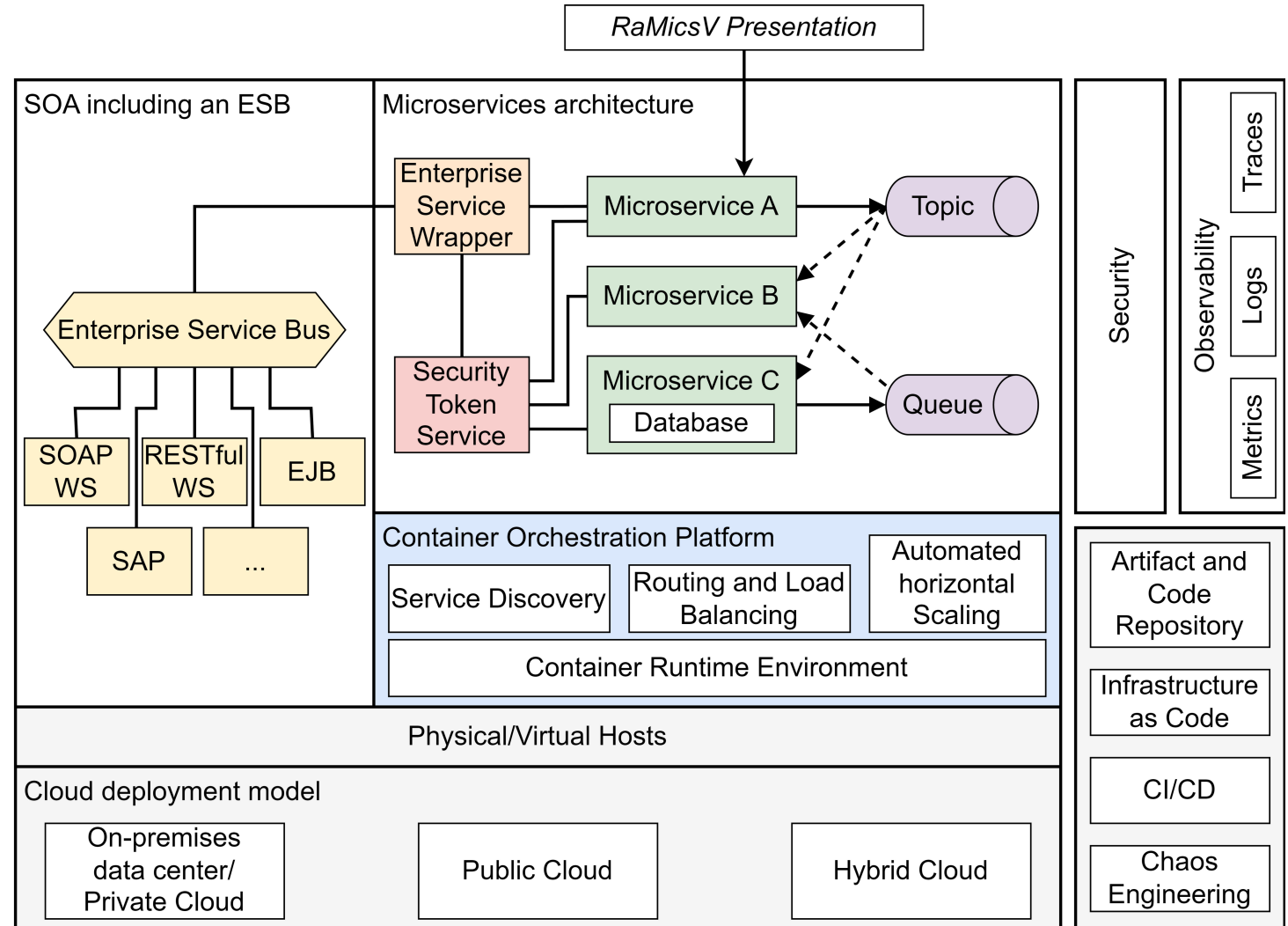
Security:

- For AuthN and AuthZ purposes, Microservices exchange JWT issued by the Security Token Service
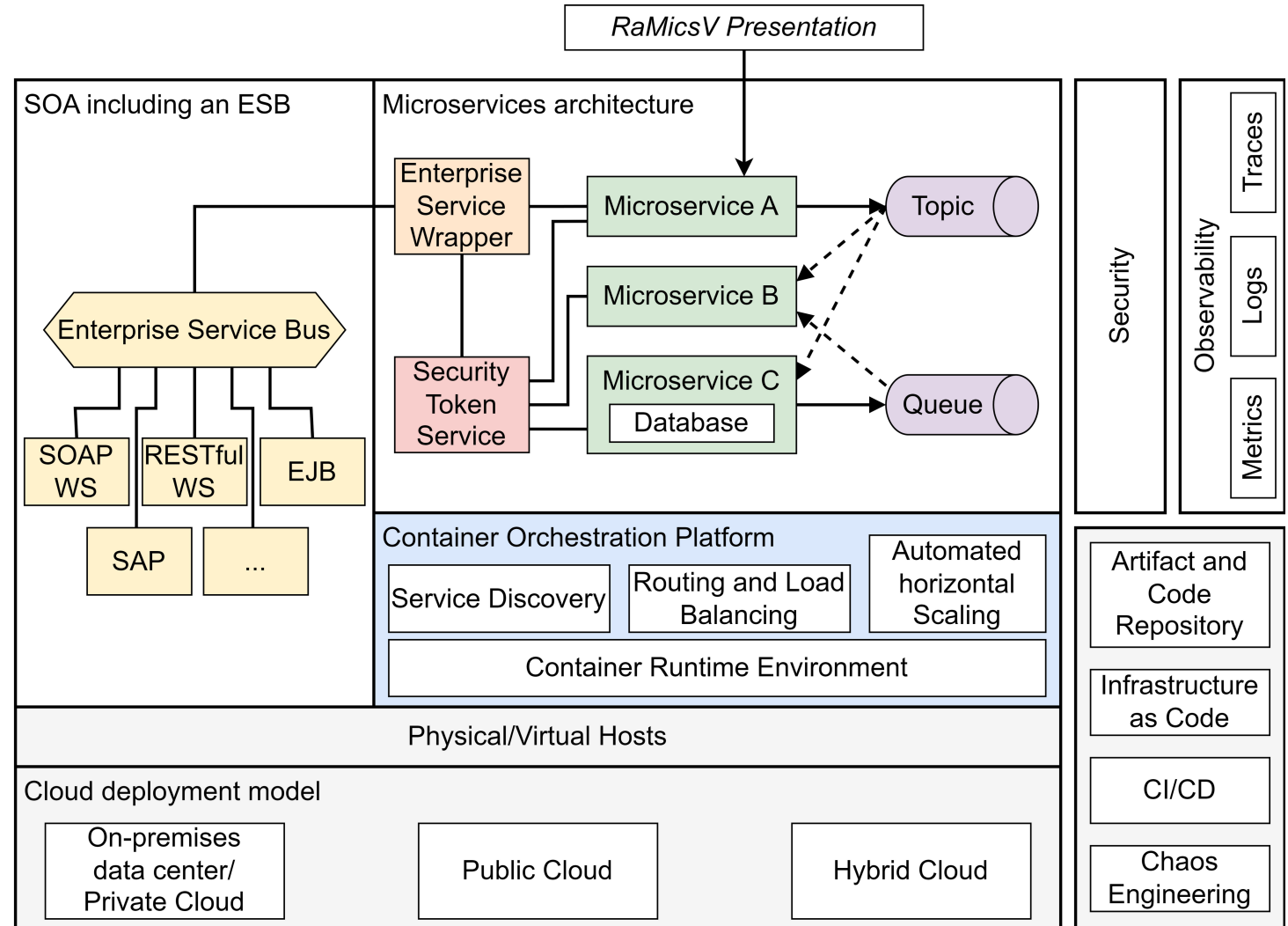- Additionally, microservices communicate in an mTLS-encrypted way

Observability:

- To gain transparency in the architecture, metrics, logs, and traces of the services are collected

Technical Reference Architecture

Delivery:

- Software delivery process is planned to be automated as much as possible, using approaches of CI/CD and infrastructure as code
- All code and artifacts are tracked and managed in version control systems
- Chaos engineering methods may additionally be used with the aim of increasing resiliency

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Conclusion and Future Work

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- Insurance Companies need a cooperative integration of **Microservices** in their historically grown, **heterogenous system landscape** characterized by **SOA** and the usage of an **ESB**, which is adressed by **RaMicsV**.

- We presented our **Technical Reference Architecture** for Microservices-based Applications in the Insurance Industry (**T-RaMicsV**), derived from RaMicsV and based on **Cloud-native** Architecture.

- Our approach still **needs to be evaluated** by applying it to a typical business process in the insurance industry.
  - ➜ Selection of concrete technologies
  - ➜ Prototypical implementation of an application-specific architecture

- Redesign or Refinement of parts of the architecture may be needed as a result of more findings

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Thank you for your attention!

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