On Viewpoint-specific Microservice Modeling

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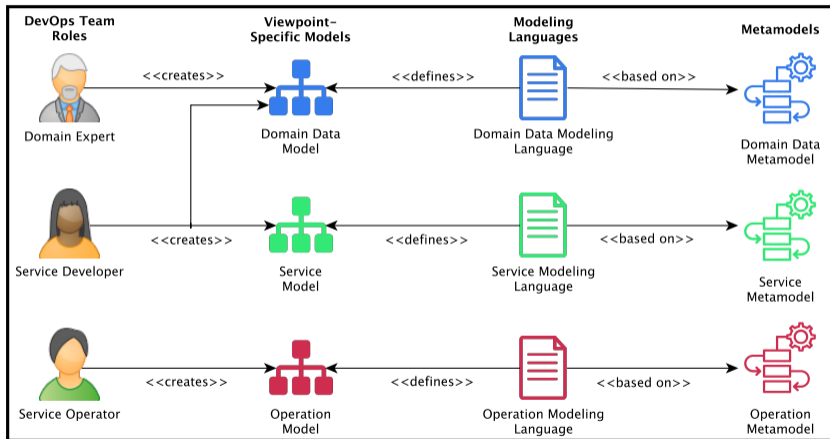## Model-driven Development in Microservice Architecture

- Model-driven Development (MDD) is an approach to software engineering
  - Abstracts from implementation details by the usage of models
  - Models provide a viewpoint-specific understanding of the system
  - Beneficial in the engineering of complex and distributed systems
- Benefits of MDD in MSA engineering:
  - Increase of service identification efficiency and domain model value
  - Reduction of architectural definition efforts and costs
  - Facilitation of exchanging microservice technology
  - Increase of software quality
  - Reduction of conceptual clutter by domain-specific MSA modeling
  - Reuse of models across different viewpoints
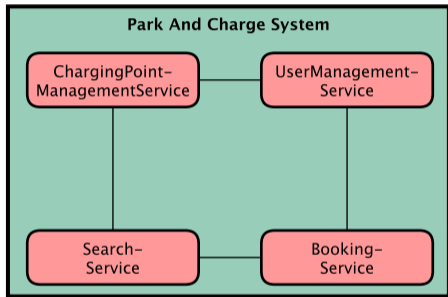
Running Example

Figure 1: Running example Park and Charge System

- Park and Charge System
  - Provisioning of private charging points for electric vehicles in urban city areas
  - Realized as a distributed system based on MSA
  - Each microservice is developed by a single team
  - Each team is using the DevOps paradigm
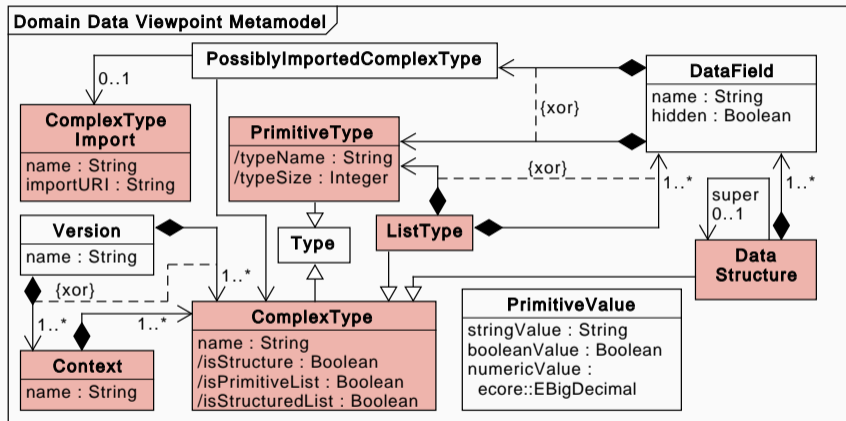 - Team-specific technology stack

Figure 2: Domain data, service and operation viewpoints in DevOps teams

Viewpoint-specific Metamodels for MSA Modeling

Figure 3: Domain Data Viewpoint Metamodel for the Domain Data Modeling Language used by Domain Experts and Service Developers
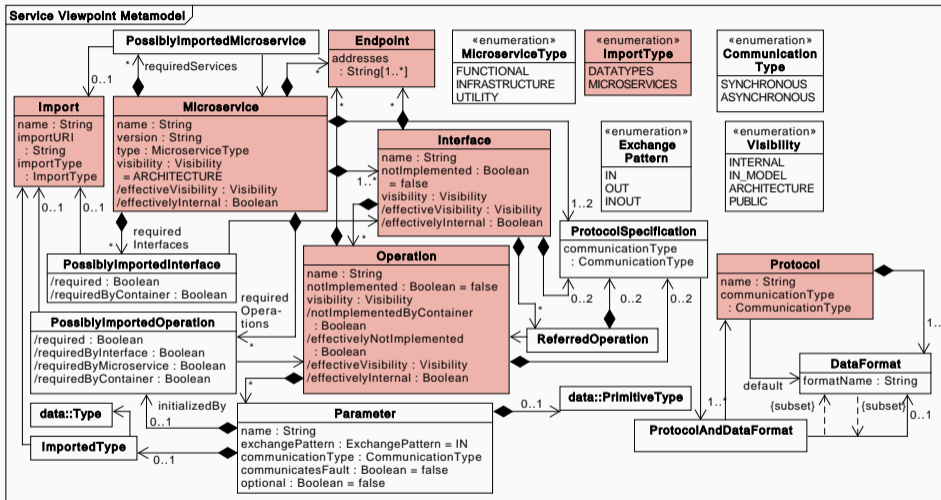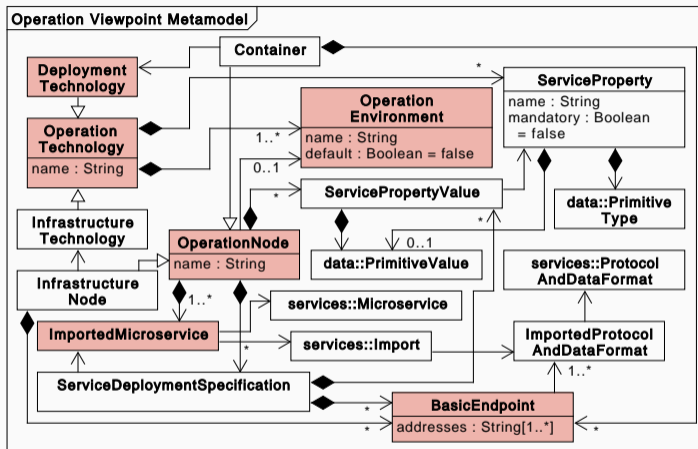
Service Viewpoint Metamodel

Figure 4: Service Viewpoint Metamodel for the Service Modeling Language used by Service Developers

Operation Viewpoint Metamodel

Figure 5: Operation Viewpoint Metamodel for the Operation Modeling Language used by Service Operators

Practical usage of the Domain Data, Service and Operation Modeling Languages

Conclusion

- Model-driven Development in Microservice Architecture
- Viewpoint-specific modeling in DevOps-based MSA teams
- Explanation of the Domain Data, Service and Operation Metamodel
- Usage of the Domain Data, Service, and Operation Modeling Language
- Future Work:
    - Integration of the approach into an agile modeling process
    - Implementation of code generators for several programming languages

Discussion Time