Extending Enterprise Architecture Modeling Languages: Application to Telecommunications

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Agenda

- How and why introduce domain specificity in Enterprise Architecture?
- Through Enterprise Architecture Modeling Language (EAML) extension
- Instanciating to Telecommunications
- Applying the extended EAML to a case study
- Conclusion and Perspectives
Context: Why introduce domain specificity in Enterprise Architecture?

- **Enterprise** = complex adaptive system.

- **Enterprise Architecture (EA)** = a way to document, understand and master this complexity.
  - EA Framework = describe a wide range of domains;
    - Integrated models of the enterprise:
    - Business and Application layer - OK;
    - Technical layer – **more details are needed to describe a system**.
  - EA Modeling Language (ML) = a language for visualizing, specifying, constructing and documenting the artifacts of a software-intensive enterprise.
Problem: How to introduce domain specificity in Enterprise Architecture?

- Use EA framework and ML at Business and Application layer
- AND Introduce more domain specificity at Technical layer

- HOW?
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Solution/Contribution: Through EAML extension

- **Profile** = generic extension mechanism for customizing reference languages with constructs that are specific to particular domains, platforms.

- **Advantages:**
  - Reuse of reference language and tools;
  - Strictly additive extension => profile tools have to process only additions;
  - Reference language – facilitates interoperability between all its profiles.
Solution/Contribution: Through EAML extension

- Language extension with the Meta-modeling approach
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Solution/Contribution: Instanciating to Telecommunications

- **Service creation = complex activity because of:**
  - difficult technical issues, but also
  - big number of actors,
  - difference in each actor's perspective and objectives.

- **One actor: Service Provider = organization that creates value-added services.**

- **Service Provider requirements:**
  - Req 1: An overall model;
  - Req 2: Domain specificity;
  - Req 3: Rapid prototyping;
  - ...
Solution/Contribution: Instanciating to Telecommunications

How EAMLs answer Service Provider's requirements:

- Req 1: An overall model
  - EA frameworks and MLs;
- Req 2: Domain specificity
  - Introduce telecommunications specificity as profiles of EAMLs;
- Req 3: Rapid prototyping
  - Meta-modeling approach, through code generation and easy integration with tools for reference language.
Solution/Contribution: Extending ArchiMate EAML for Telecommunications

- Extending the Abstract Syntax

![Diagram showing extended ArchiMate EAML for Telecommunications]

- Extending the Abstract Syntax

- Extending EAMLs
Solution/Contribution: Extending ArchiMate EAML for Telecommunications

- Extending the Concrete Syntax
Solution/Contribution: Extending ArchiMate EAML for Telecommunications

- Operational semantics: excerpt of generated Java code

```java
public class Clientpart1ofconferencesystem {
    private String name = "Clientpart1ofconferencesystem";
    private String id = "78d717c8";
    public Clientpart1ofconferencesystem() {} 
    public void setName(String newName) {
        this.name = newName;
    }
    public String getName() {
        return name;
    }
    public void setId(String newId) {
        this.id = newId;
    }
    public String getId() {
        return id;
    }
    public void joinconference() {
    }
    public void launchconferenceconsole() {
        this.joinconferencebysendingInvite();
    }
    public void joinconferencebysendingInvite() {
        Conferencesystem conferencesystem = new Conferencesystem();
        conferencesystem.checkresponse();
    }
    public void displayerror() {
    }
    public void subscribetoconference() {
        this.joinconference();
    }
}
```
Solution/Contribution: Extending ArchiMate EAML Tools for Telecommunications

Overview of language tools

Extended Archi
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Applying the Extended EAML to modeling a telecommunications conferencing service

The model of a conferencing service at the ArchiMate Business layer

- Conference creation
  - Moderator decision
  - Conference creation
  - Conference joining
  - Conference termination

- Conference joining
  - Customer
  - Participant
  - Chat
  - Enter conference
  - Start
  - Speak
  - Stop
  - Exit conference
  - Broadcast video
Applying the Extended EAML to modeling a telecommunications conferencing service

- Excerpt from the model of a conferencing service at the ArchiMate Application layer
Applying the Extended EAML to modeling a telecommunications conferencing service

- Excerpt from the model of a conferencing service at the **Telecom ArchiMate Technology layer**

![Diagram of a conferencing service model with nodes and connections representing terminals, servers, interfaces, and communication paths.](image-url)
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Conclusion and Perspectives

- Identified a real need for extending EAMLs with domain specificity.
- Proposed as solution the extension of EAMLs as profiles, with the Meta-modeling approach.
- Future (already done): Integrated a transversal ML for capturing Decision Rationale, thus enhancing collaboration.