Towards Rapid Model-Driven Deployment of Customer Specific IT Solution Architectures

Technology Perspectives

TC002SN

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Abstract

> The need for rapid and cost-effective deployment of customer-specific IT solution architectures is a key factor for CA Services. CA Labs is researching tools and methodologies, including field architects reasoning and best practices, which will enable CA Services to model and simulate the proposed solution architectures in order to assess and compare solution alternatives. The model-driven approach encompasses reusable library blocks for IT solution architecture components as well as key performance and quality indicators. It fosters common understanding and reduces the deployment efforts, while shortening the Time-To-Value for CA customers and improving customer experience.

Biography

> **Dipl.-Inform Andreas Seibel**
PhD student at Hasso Plattner Institute, University of Potsdam, Germany

> 5 years experience in software engineering research with focus on:

- Analysis and verification of real-time systems
- Model-Driven Engineering

> 2003-2007 research assistant at University of Paderborn at the chair of software engineering

> Academic graduation at University of Paderborn, Germany, 2007

Agenda

> What Is This All About?

> Why D-MDA?

- Challenges & Benefits

> What are the Features of D-MDA?

- Modeling, Maintaining, Analyzing and Executing

> Status and Next Steps

> Summary

> Q&A

What Is This All About?

What Is This All About?

Towards Rapid Model-Driven Deployment of **Customer Specific IT Solution Architectures**

> IT solution architectures?

- A solution that fits a specific business of a customer
- Architecture of IT assets (CA / 3rd party products and IT infrastructure)

> Customer specific?

- Selected IT assets configured to customers' needs

What Is This All About?

Towards **Rapid Model-Driven Deployment** of Customer Specific IT Solution Architectures

> Model-driven deployment?

- Acquisition and configuration of IT assets
- Model-based deployment support

> Rapid?

- Models for automated deployment, analyzing requirements (KPIs), simulations, etc.

What Is This All About?

Towards Rapid Model-Driven Deployment of Customer Specific IT Solution Architectures

D-MDA

> **D-MDA** = **D**eployment-**M**odel-**D**riven **A**rchitecture Tool

- **Vision**: A collaborative architectural environment for the systematic development of IT solution architectures

What Is This All About?
D-MDA Overview

> D-MDA is a tool and a methodology

> Tool?

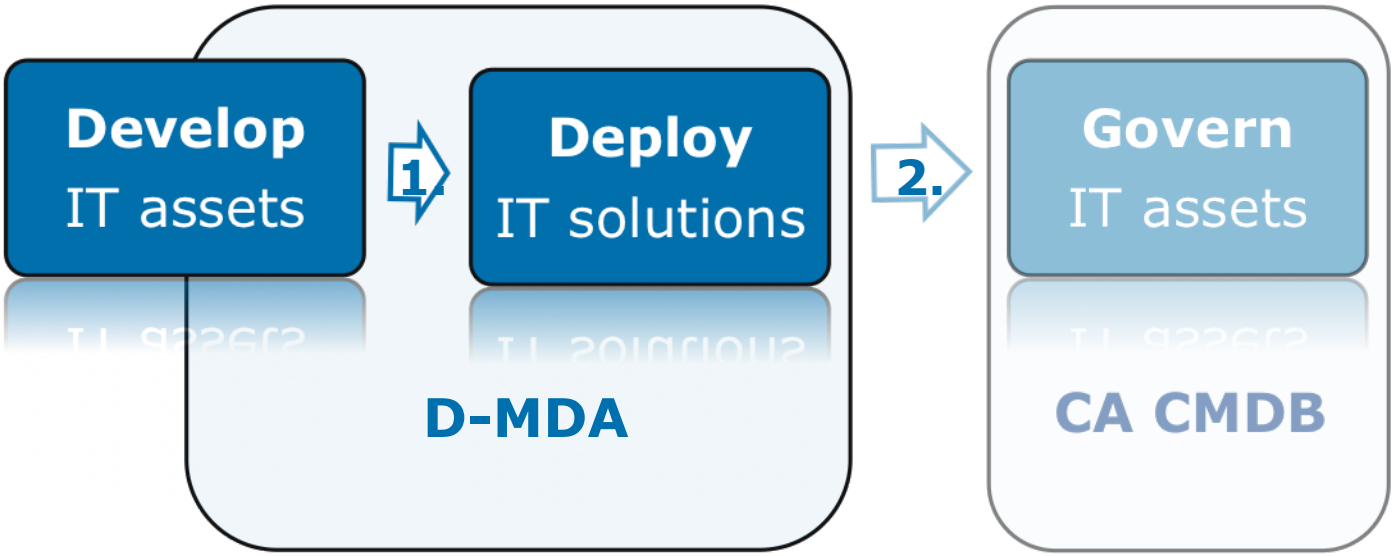
- Modeling support
  - Employs a common language for modeling IT assets, IT solution architectures and customers' requirements
- (Semi-)automated processes
  - Requirement Assessment (Analysis)
  - Executing IT solution architectures (Deployment)

> Methodology?

- Driven by a high degree of model reusability

What Is This All About?
Where Do We Fit In?

> Where is our approach being allocated?



> D-MDA **interlinks** development and deployment

> D-MDA can **support** CA's governance solutions

What Is This All About?
Who Is Concerned?

> Which roles are concerned by D-MDA?

- **CA and 3rd party R&D** (IT asset provider)
  - Use D-MDA to employ commonly specified models of their products
- **CA Services** (IT solution creator / maintainer)
  - Use the models provided by CA R&D
  - Create IT solution architectures based on these models
  - Use D-MDA for deploying IT solution architectures
- **CA customers**
  - Get all the benefits of D-MDA

Why D-MDA?

Challenges & Benefits

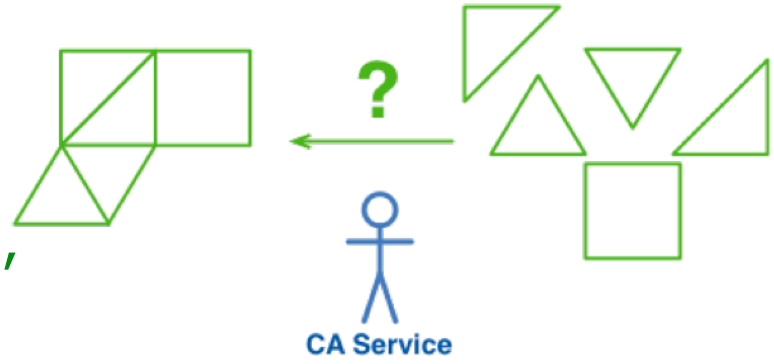
Why D-MDA?
Challenge

> Increasing utilization of CA EITM solutions (CA products)

- Increasing number of customers interested in CA products / solutions
- → Common modeling language, automated analysis & deployment support

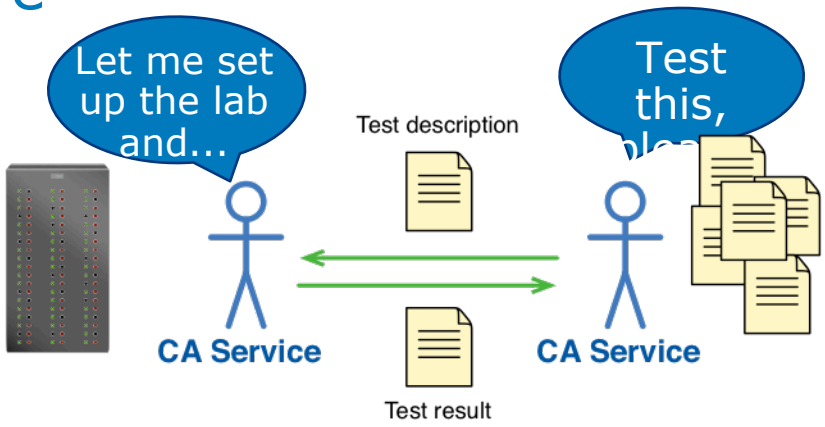
> Time-consuming customer-specific adaptations

- → Common modeling language, automated analysis support

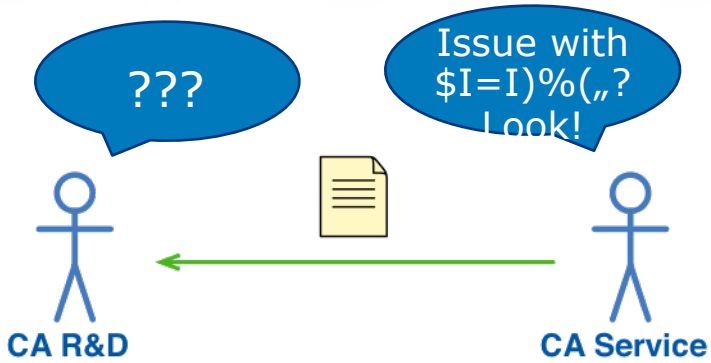


Why D-MDA?
Challenge

> Testing / validation is expensive and time consuming
  - Setting up the lab
  - Installing all required apps
  - → Automated deployment support



> Handling the feedback between CA R&D and CA Services
  - No common language
  - → Common modeling language



Why D-MDA?
Benefits to CA

> Common modeling language

- Reduced costs for planning and setting up deployment
  - Directly reuse existing expertise and best practices
- Improved feedback from CA Services to CA R&D

> Automated analysis support

- Improved quality for deployed IT solutions
  - Existing solutions optimized for given requirements
  - Support for comparing IT solution alternatives

Why D-MDA?
Benefits to CA

> Automated deployment support

- Reduced deployment and maintenance costs
  - Deployment support by means of automation
  - Optimize ongoing costs by means of specific characteristic analysis

Why D-MDA?
Benefits to CA Customers

> Improved time-to-value

- Shortening IT solution design, deployment and maintenance cycles

> Improved CA product quality

- Tighter integration between CA Services and CA R&D

> Decreased operation costs

- E.g., optimally planned virtualization for green IT, etc.

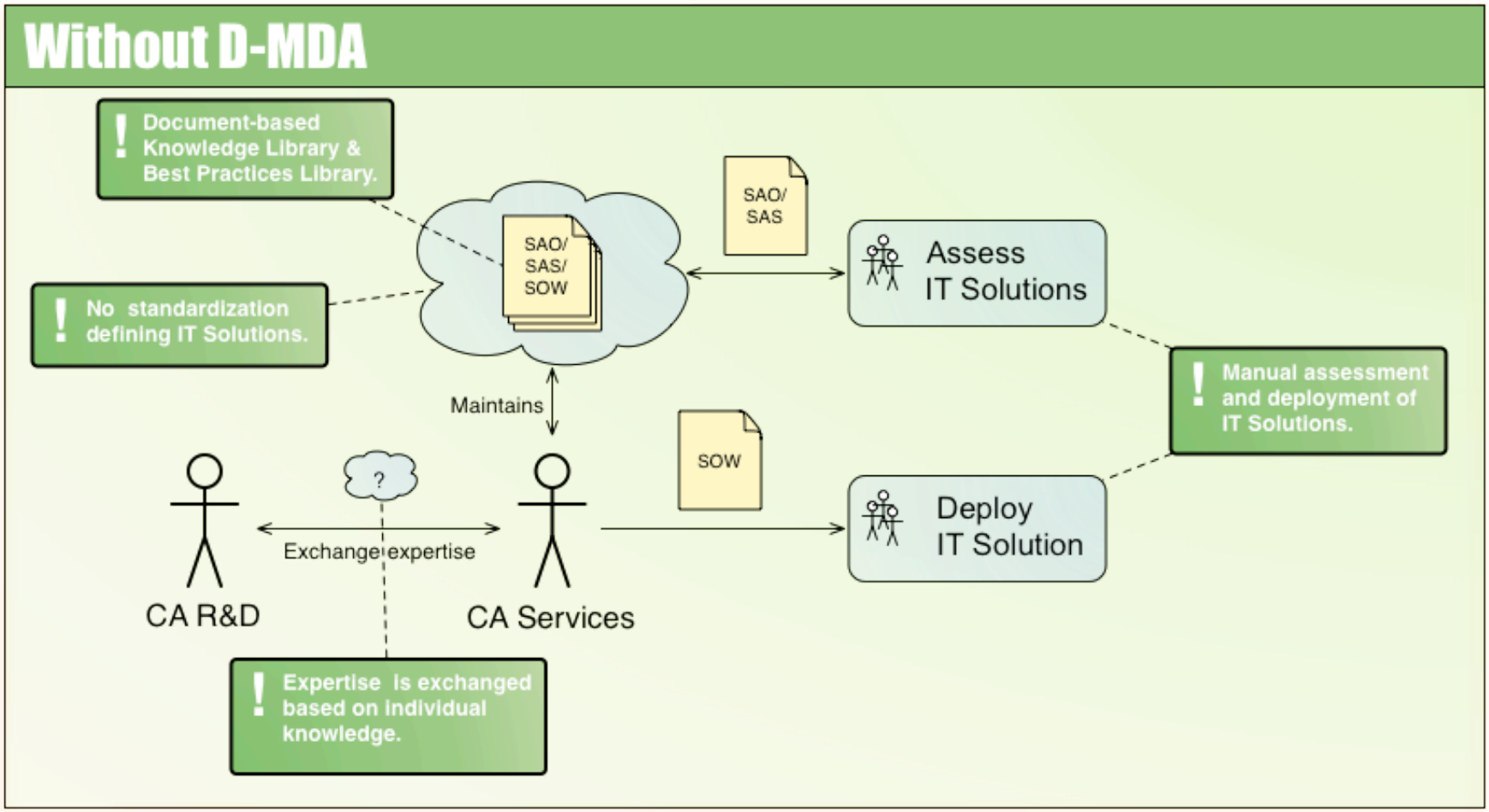
> Decreased risk of failure

- After deployment and during maintenance

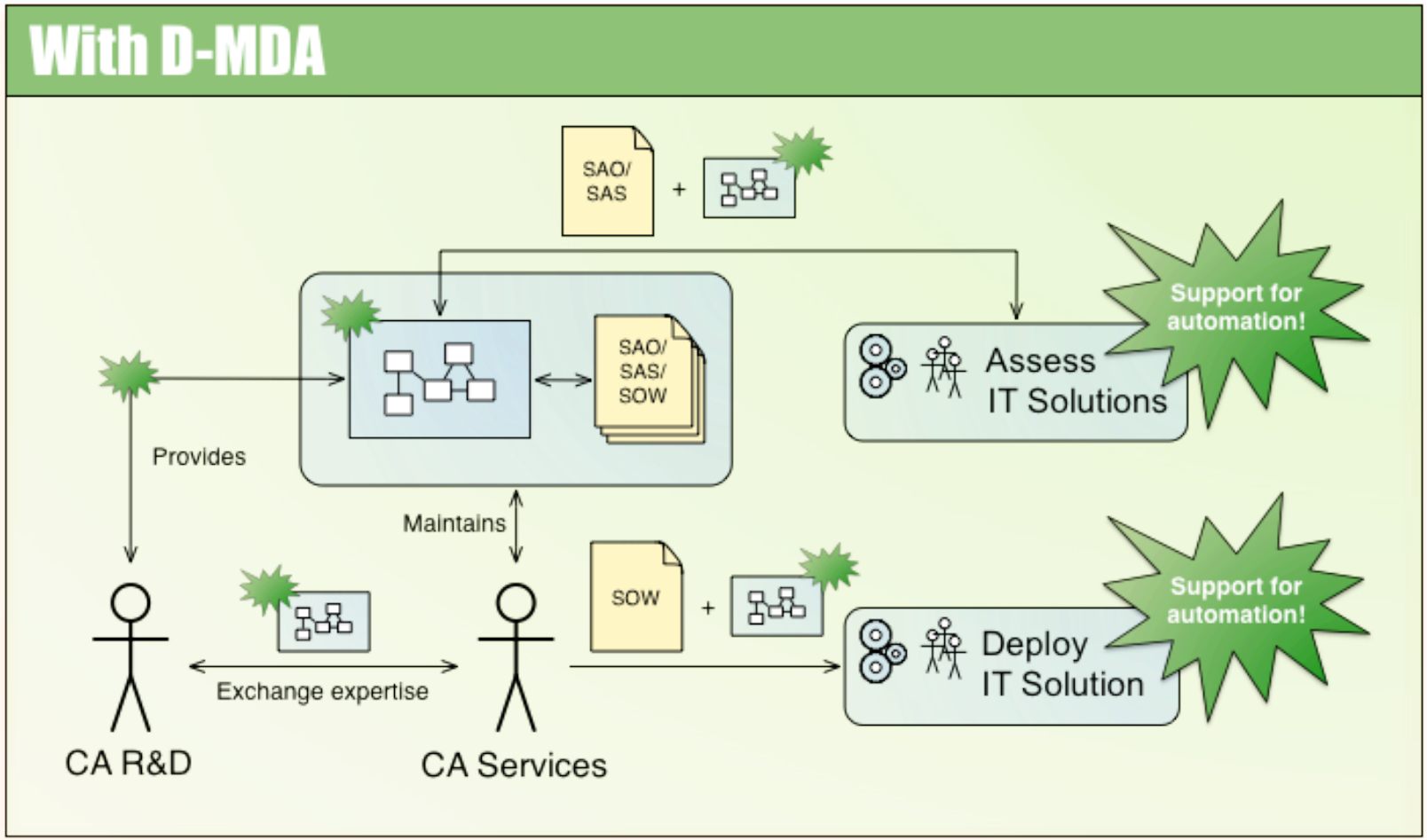
Why D-MDA?

An Illustrative Comparison of Pre and Post D-MDA

Why D-MDA?
An Illustrative Comparison



Why D-MDA?
An Illustrative Comparison



What are the Features of D-MDA?

What are the Features of D-MDA?

> The primary D-MDA features are introduced by means of four sections

- Modeling
- Maintaining
- Analyzing
- Executing

What are the Features of D-MDA? (Modeling)
Employing C3A Methodology

> CA Agile Architecture (C3A) was proposed by Gabriel M. Silberman and Ethan Hadar from CA Labs [SH08]

> C3A captures:

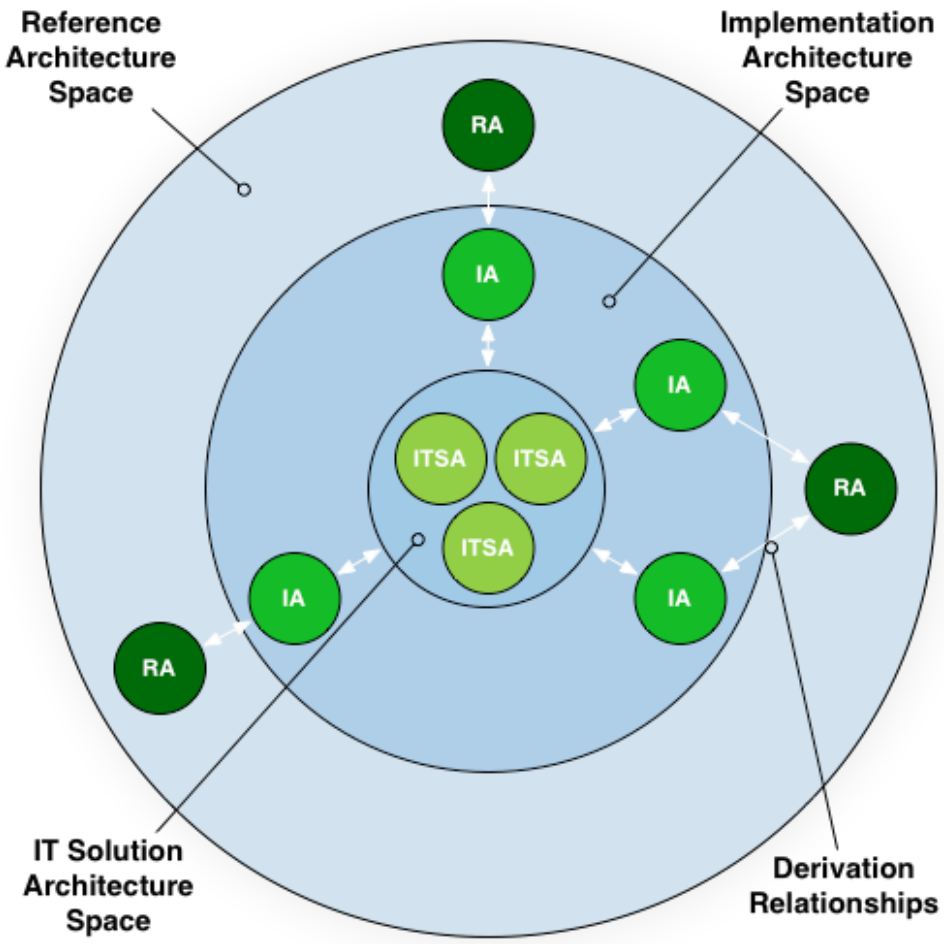
- product models at different levels of granularity
- Different kinds of product evolution
  - Long-term changes in future (larger changes)
  - Agile changes (smaller changes)

> Two kinds of architectures

- Reference Architecture (RA)
- Implementation Architecture (IA)

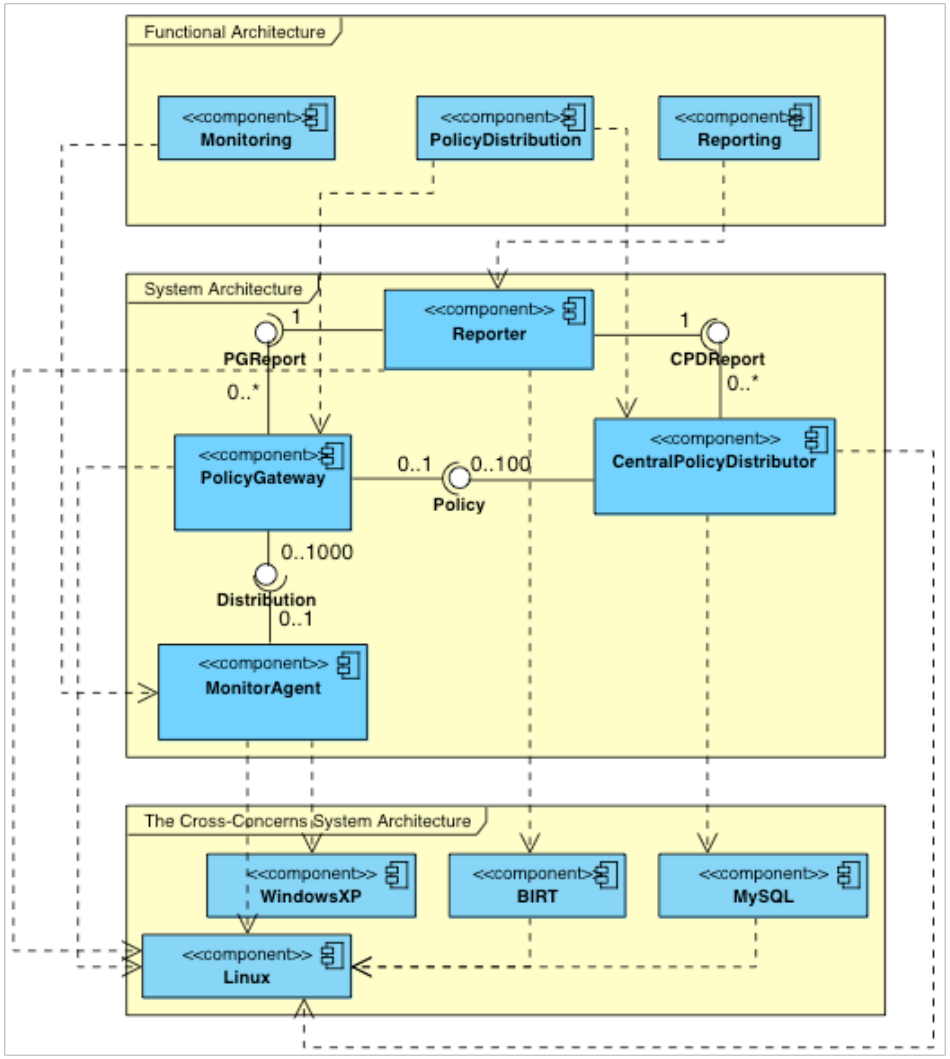
What are the Features of D-MDA? (Modeling)
D-MDA Modeling Cosmos

- Development process (CA R&D)
  - Reference Architecture
  - Implementation Architecture
- Acquisition and configuration process (CA Services)
  - Implementation Architecture is blueprint for ITSA
  - Many alternative ITSAs

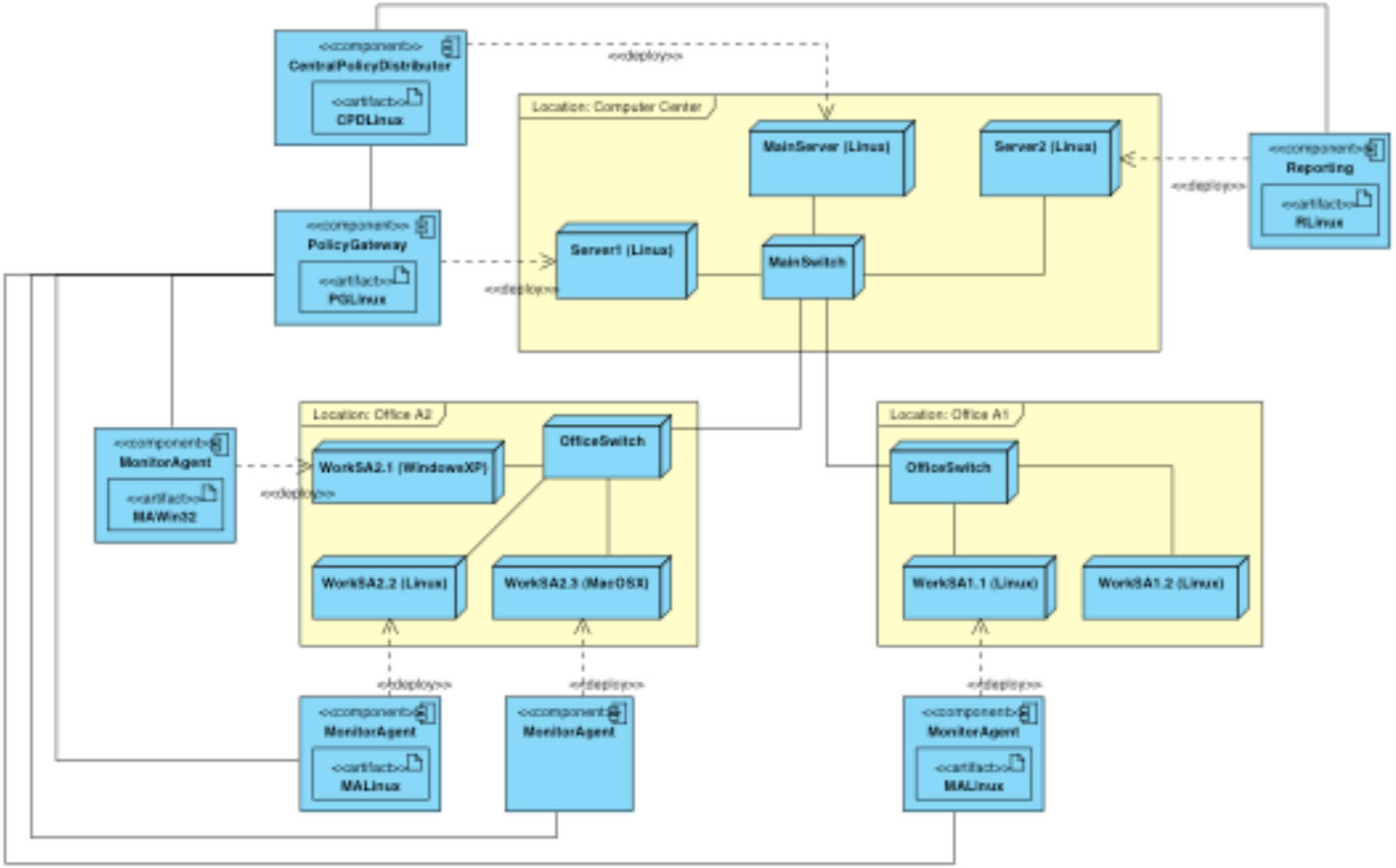


What are the Features of D-MDA? (Modeling)
Modeling Configurable IT Assets Example

- C3A architectures reused by CA Services
  - C3A contains reference and implementation architectures
- Implementation architectures are blueprint for IT solution architectures
  - Provide major components and configuration variability



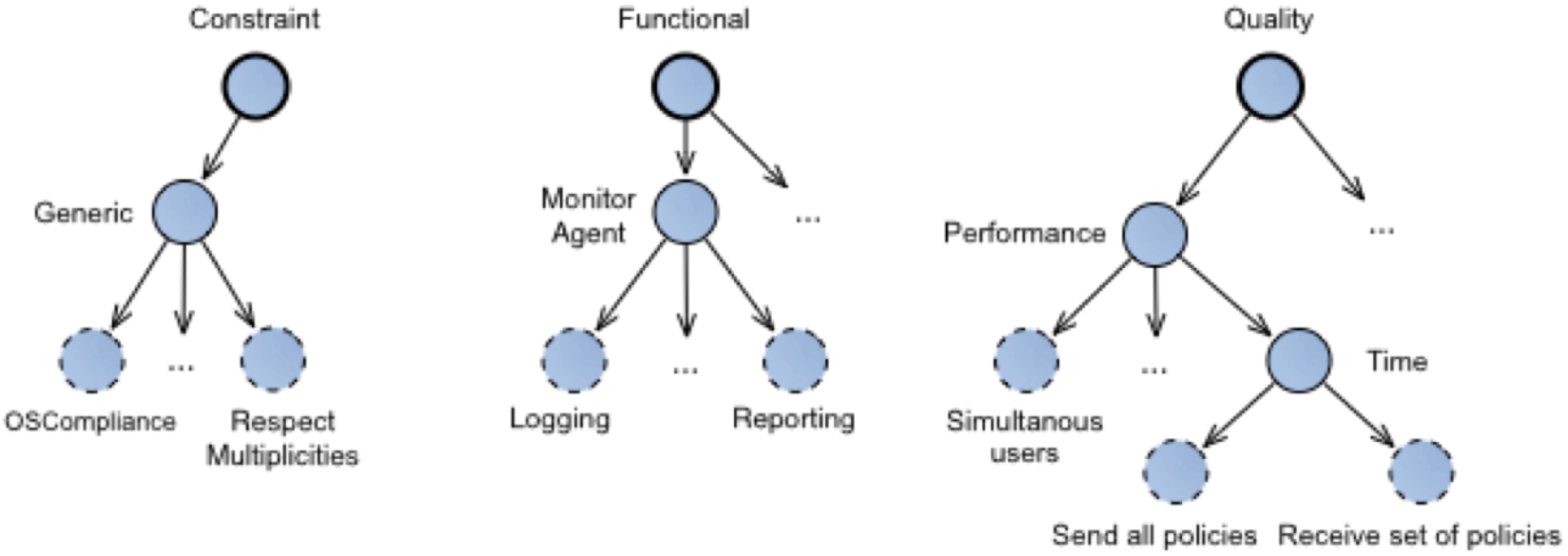
What are the Features of D-MDA? (Modeling)
IT Solution Architecture Example



What are the Features of D-MDA? (Modeling)
Specification of a Requirement Model

> Requirements are centrally organized in a requirement specification model (RSM)

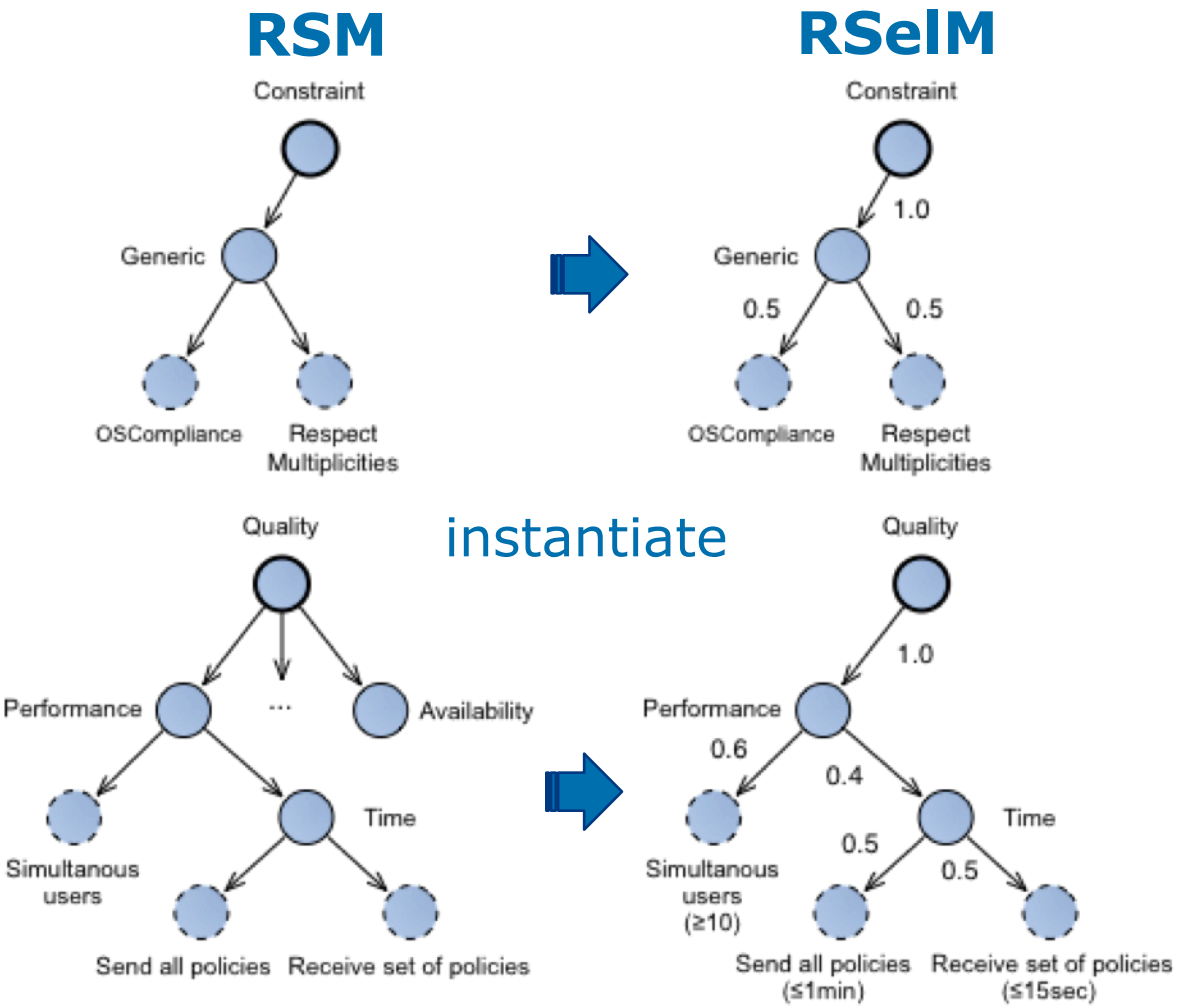
> Nodes are requirement categories and leaves are assessable requirements



What are the Features of D-MDA? (Modeling)
Instantiation of a Requirement Model

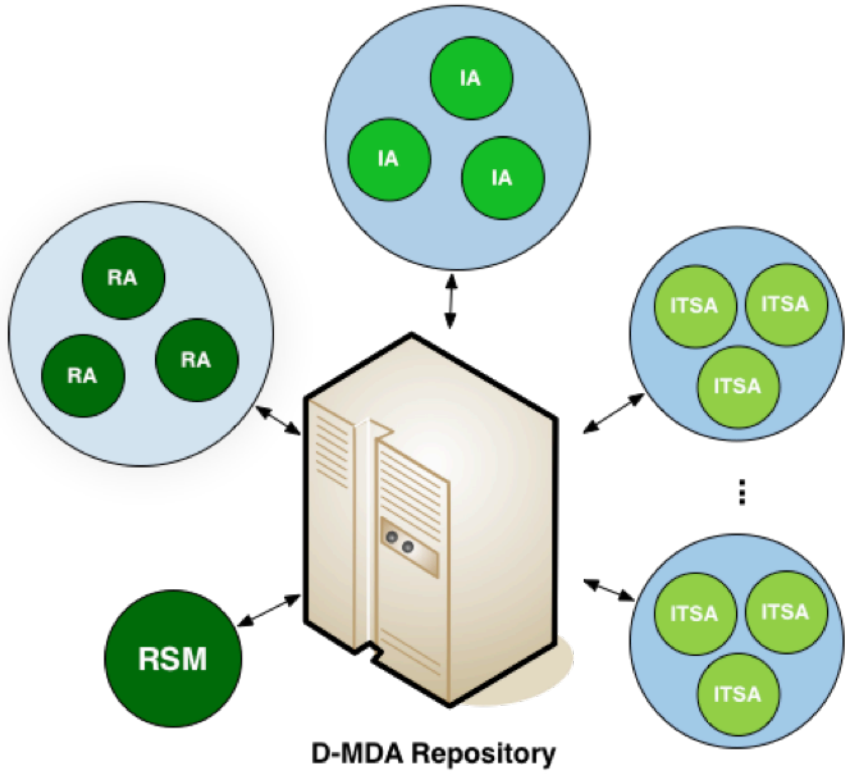
> Requirements are instantiated in a Requirement Selection Model (RSelM)

- Instantiation is customer-specific
- Contains prioritization and concrete goals



What are the Features of D-MDA? (Maintaining)
Maintaining a Central D-MDA Repository

- Location-independent access
  - Accessible by CA R&D to maintain RAs and IAs
  - Accessible by CA Services to maintain ITSAs and RSM
- Existing IT solution architectures are reused
- Improves communication and knowledge / exchange of expertise



What are the Features of D-MDA? (Analyzing)

ITSA Analysis for Requirement Assessment

> An IT solution architecture can have several Requirement Selection Models (RSelM)

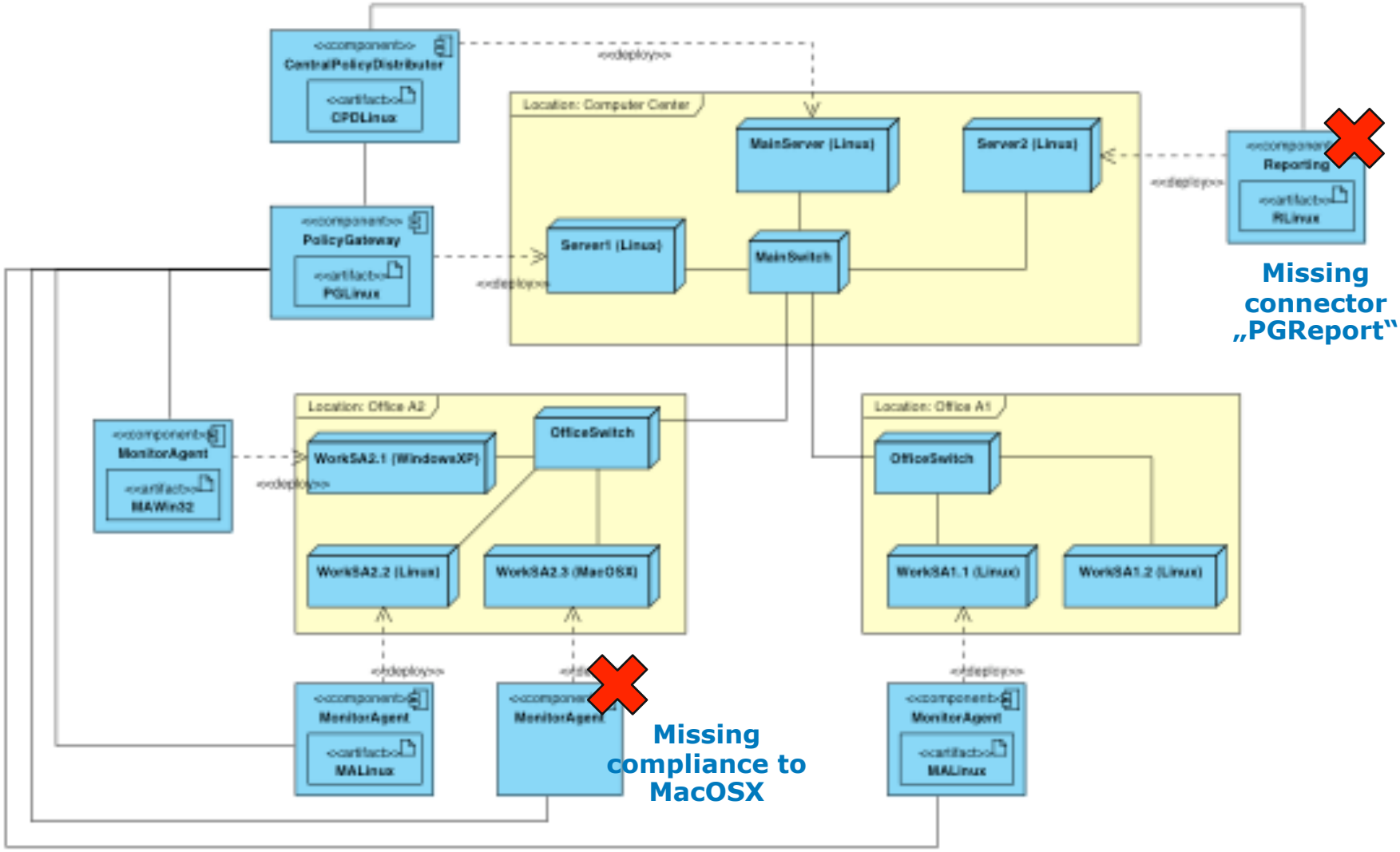
- Each requirement selection model covers interests of a stakeholder

> A RSelM is related to several alternative IT solution architectures

- Is assessed for each related IT solution architecture each

What are the Features of D-MDA? (Analyzing)

Example Assessment of an IT Solution Architecture

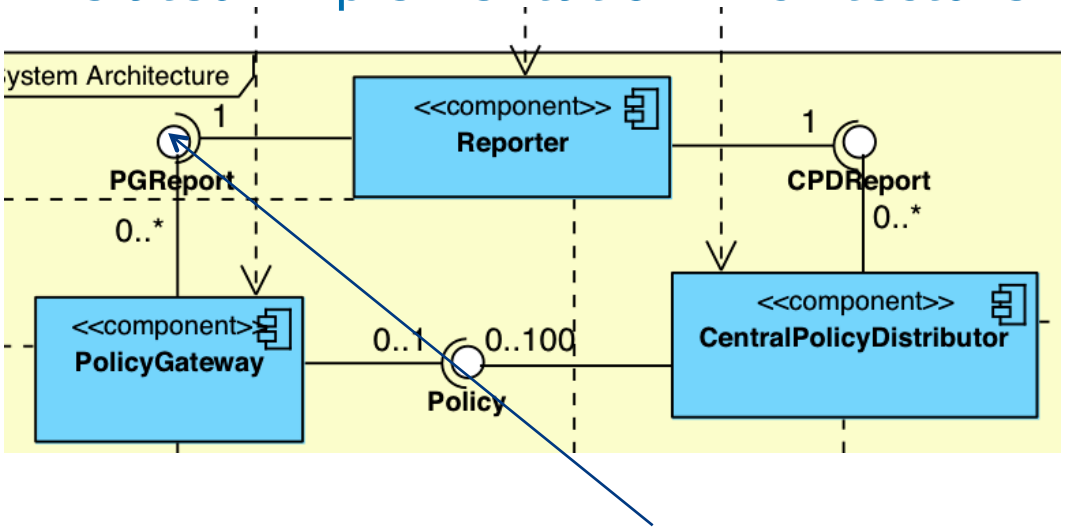


What are the Features of D-MDA? (Analyzing)

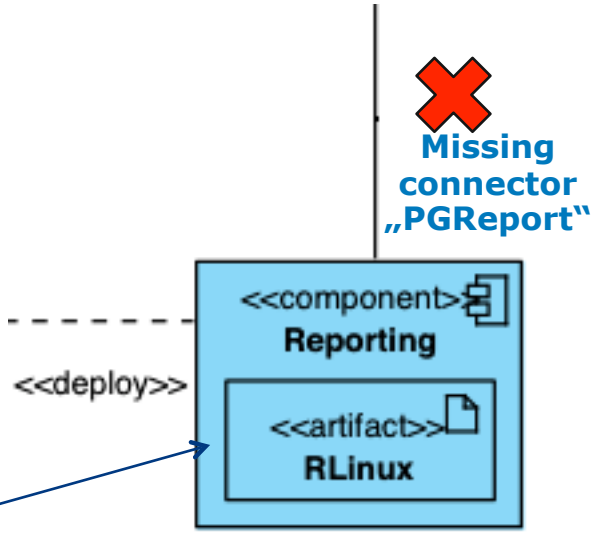
Example Assessment of an IT Solution Architecture

> Issue: missing connector “PGReport”

Related Implementation Architecture

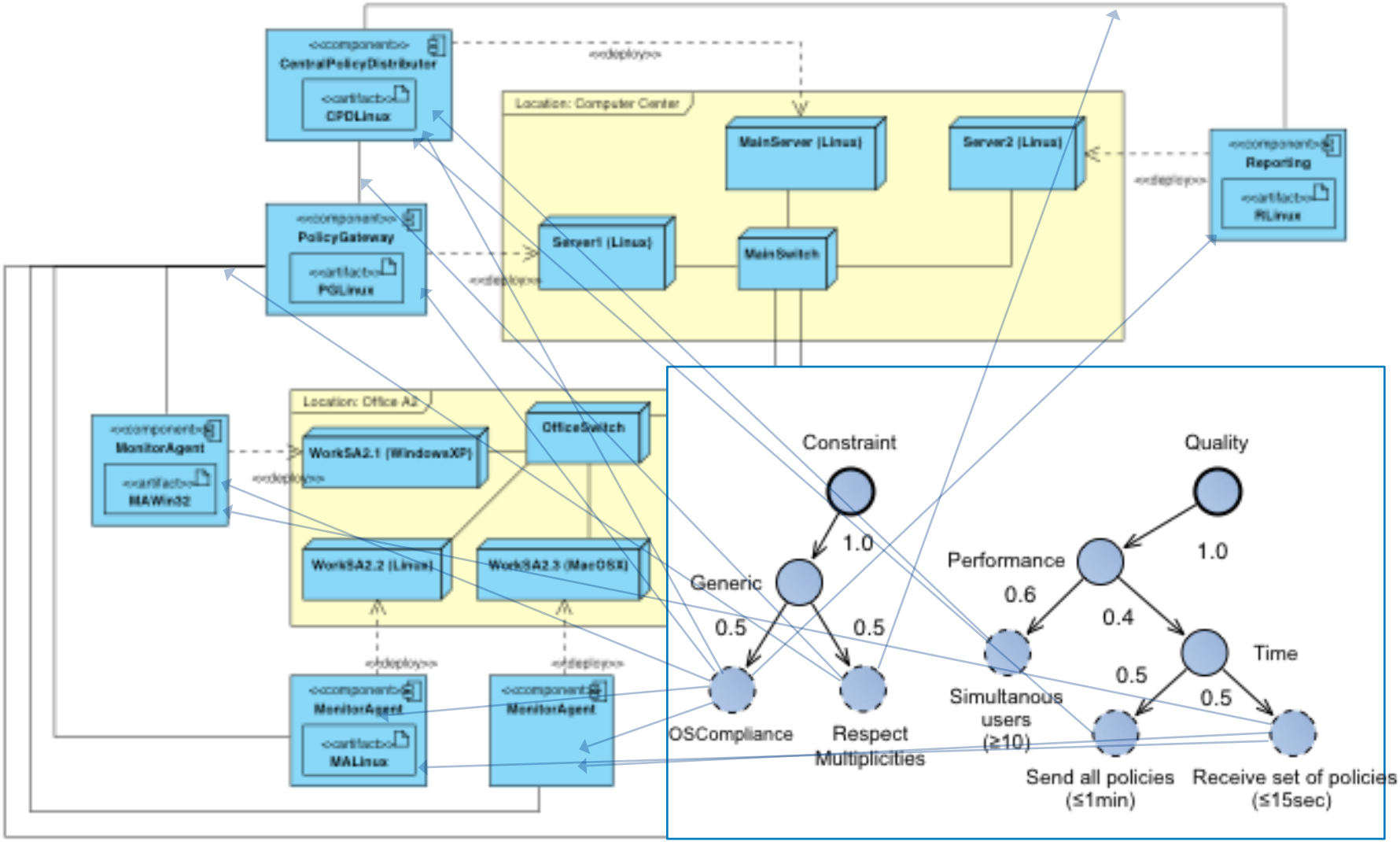


An instantiation of connector „PGReport“ is missing

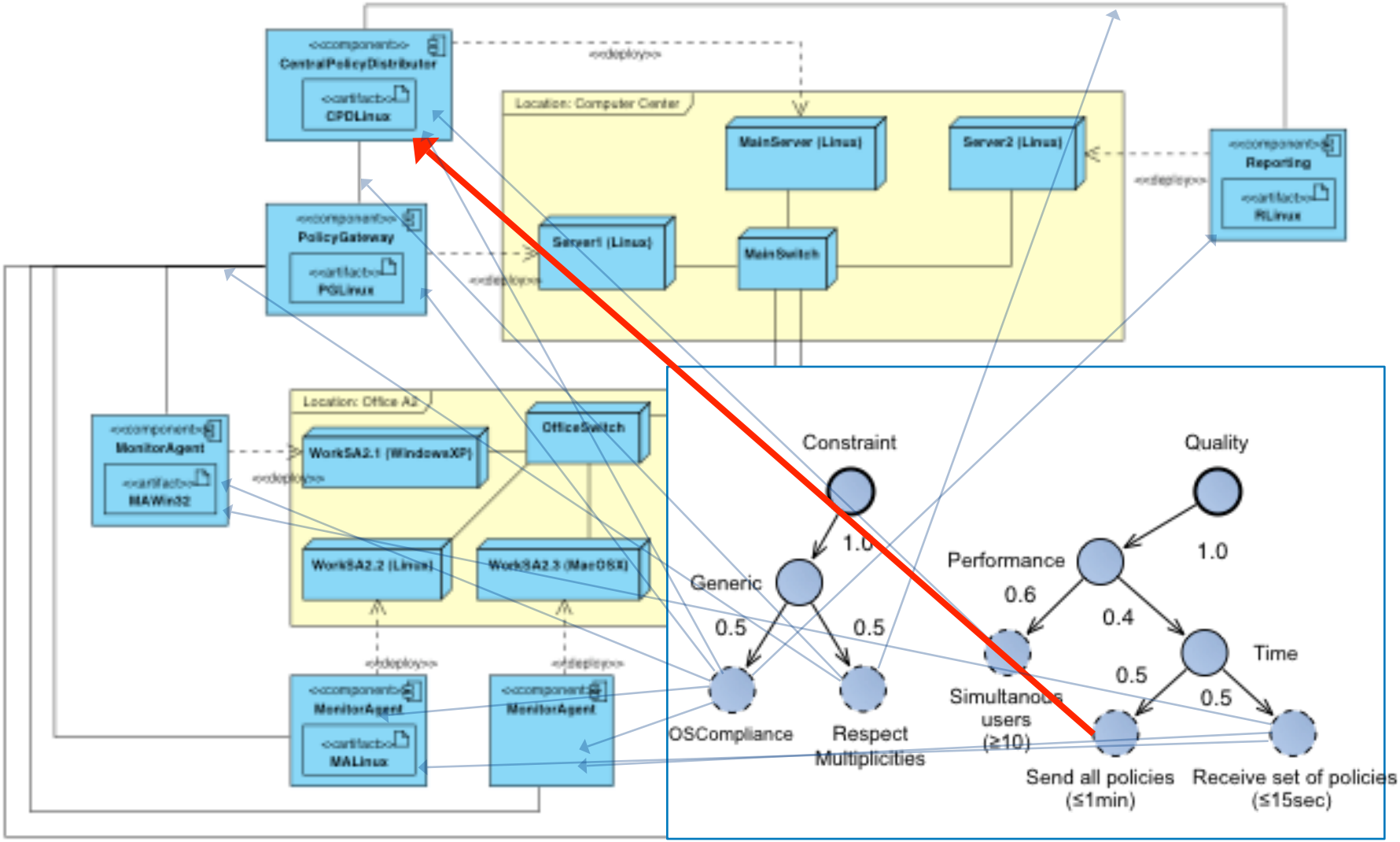


IT Solution Architecture

What are the Features of D-MDA? (Analyzing)
Traceability of Requirements



What are the Features of D-MDA? (Analyzing)
Traceability of Requirements



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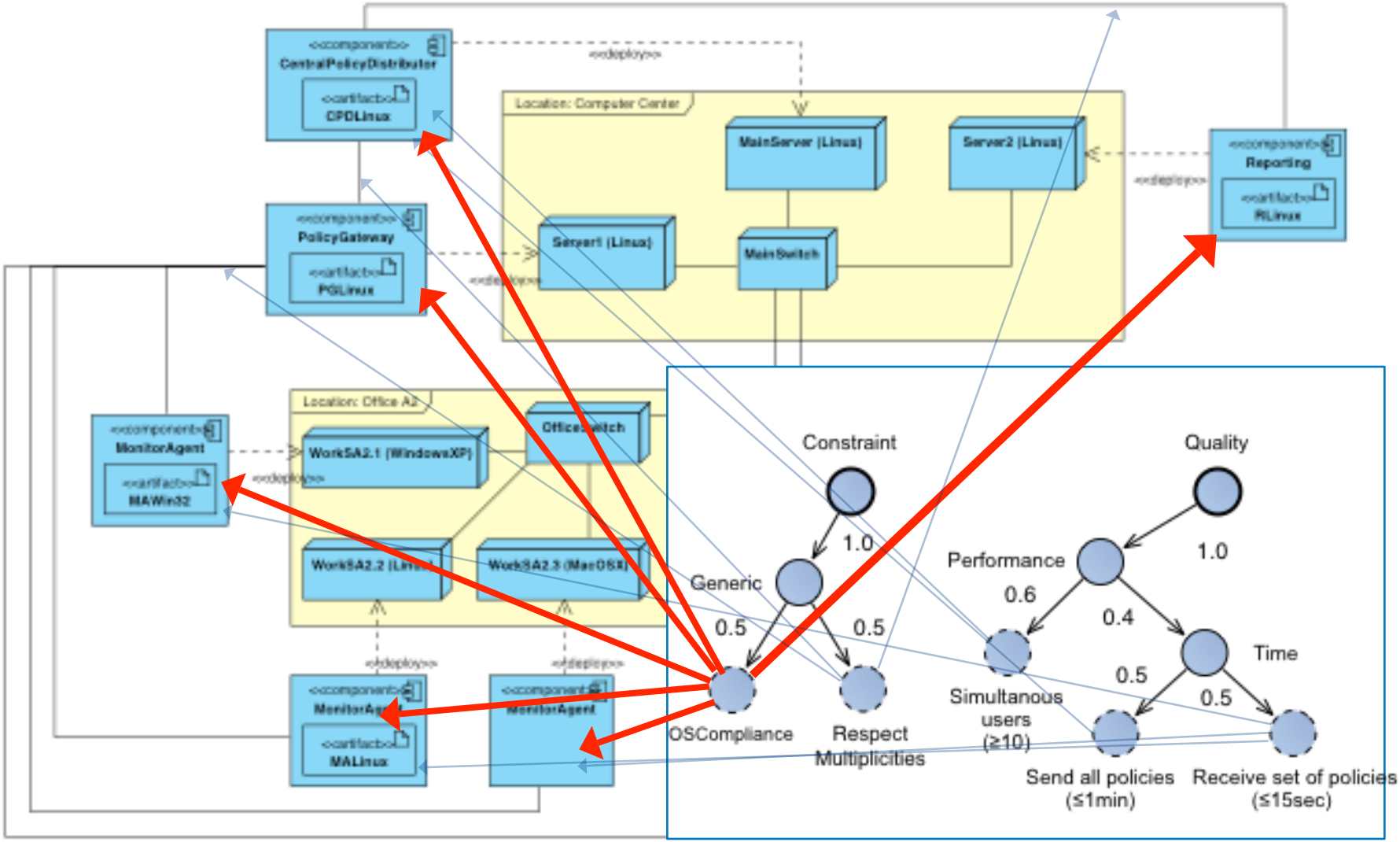
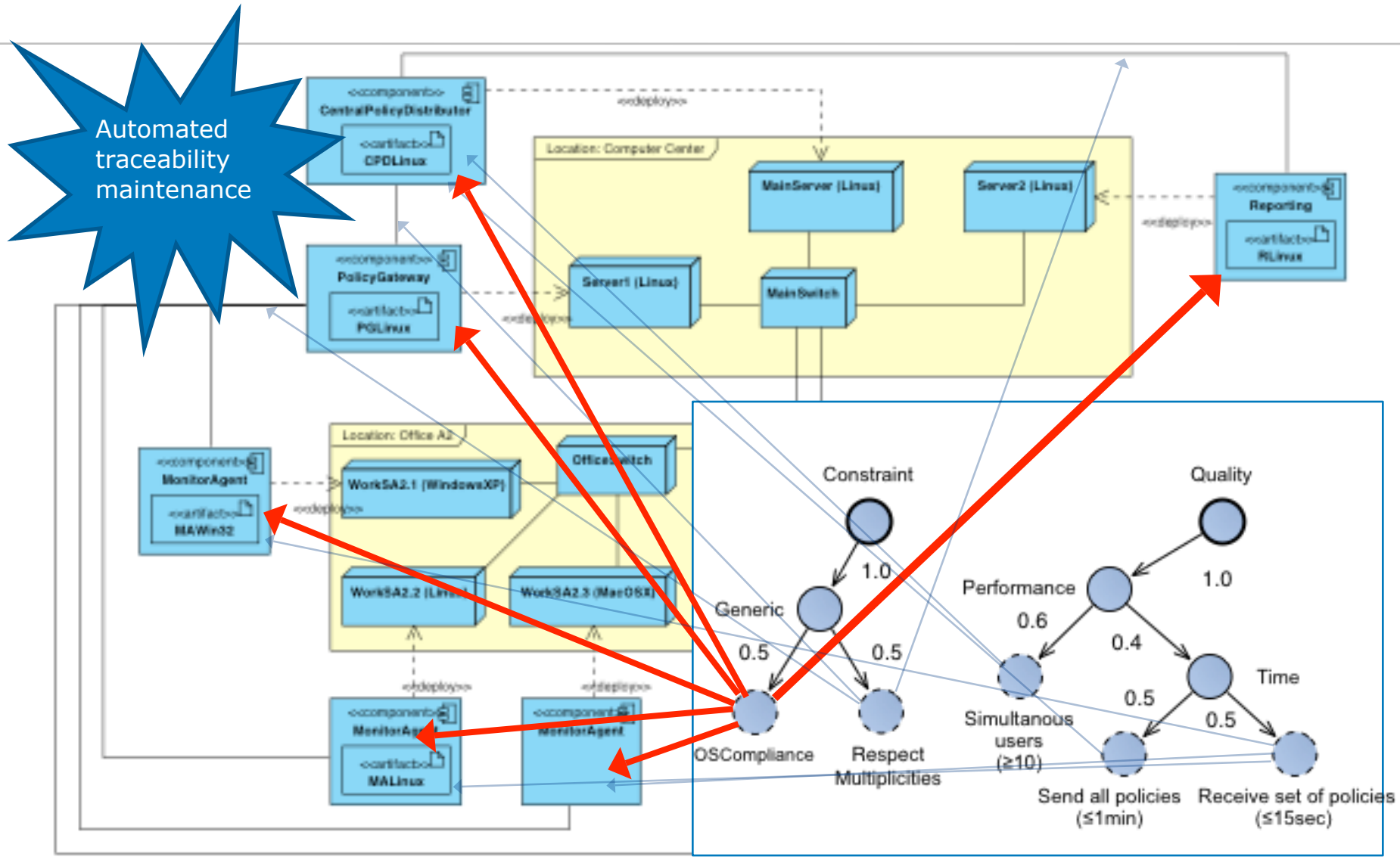


What are the Features of D-MDA? (Analyzing)

Traceability of Requirements

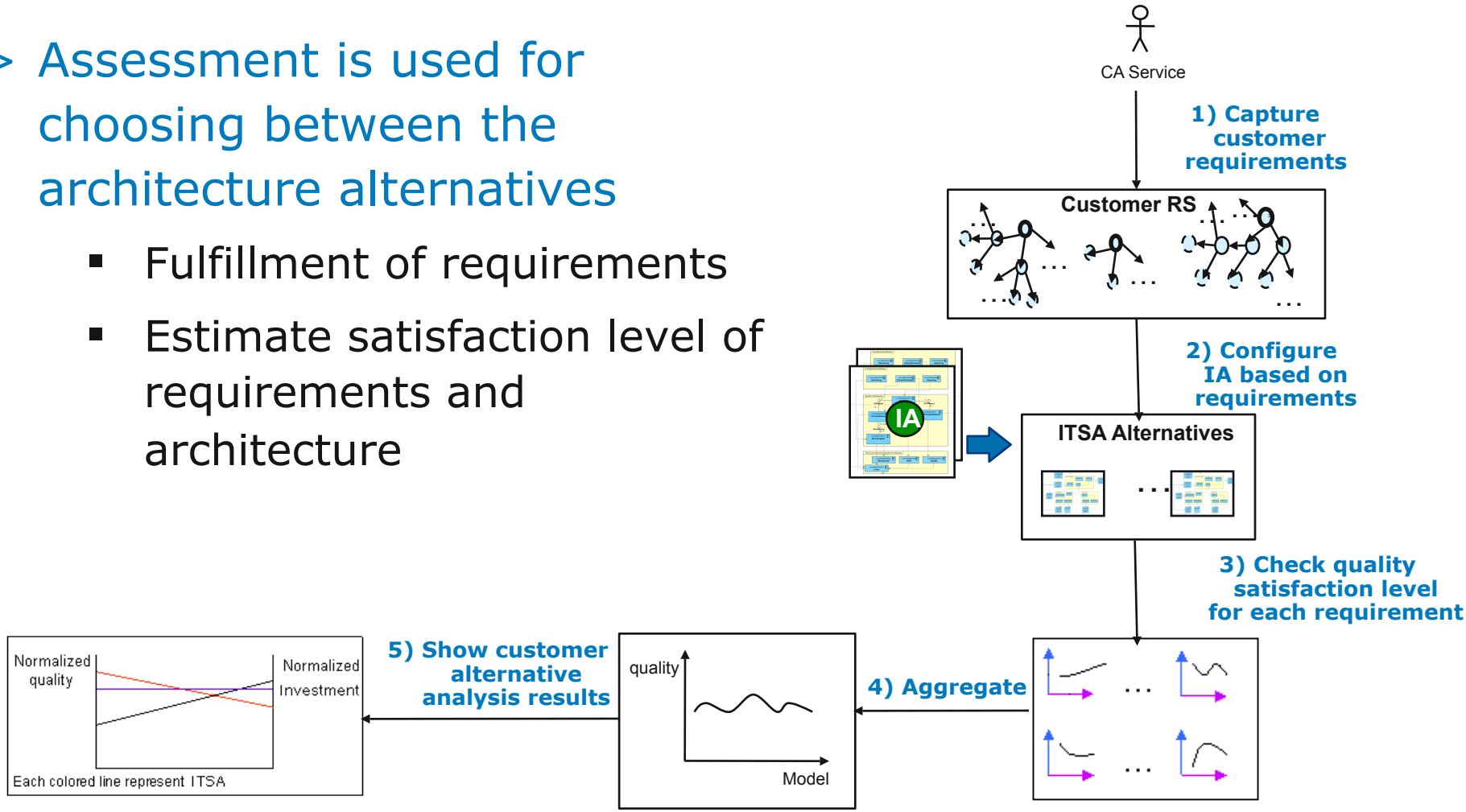


What are the Features of D-MDA? (Analyzing)

Assessment of IT Solution Architectures (Alternatives)

> Assessment is used for choosing between the architecture alternatives

- Fulfillment of requirements
- Estimate satisfaction level of requirements and architecture



What are the Features of D-MDA? (Executing)

Support for Automated Deployment of IT Solutions

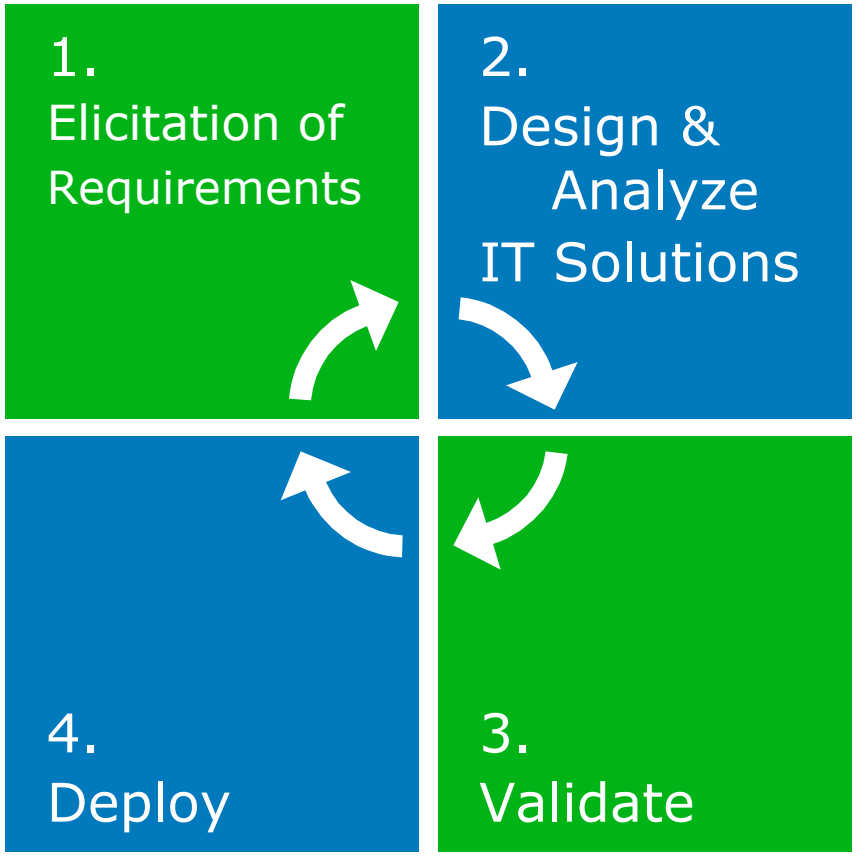
> Support automated deployment by means of
  - Transforming IT solution architectures into Solution Deployment Descriptors (SDD)
  - Support for automatically executing SDDs

> SDD is a common language for describing a deployment plan
  - OASIS proposes the SDD as a standard language for deploying IT assets

> Accelerates deployment
  - Also accelerates deploying IT solution architectures into test environments

Session Summary
A Few Words to Review

D-MDA supports all major deployment steps!



Status and Next Steps

Status and Next Steps

> Where are we?

- A first prototypical D-MDA tool is implemented
  - Modeling of IT assets by means of C3A
  - Definition of reusable IT solution architectures
  - Specification and assessment of requirements
  - Creation of assessment reports / charts

> Where do we want to go?

- Improve the prototypical D-MDA tool
  - Automated IT solution architecture alternative comparison
  - Provide automated support for optimizing the deployment
  - Expand D-MDA to more CA products (currently AC only)

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