

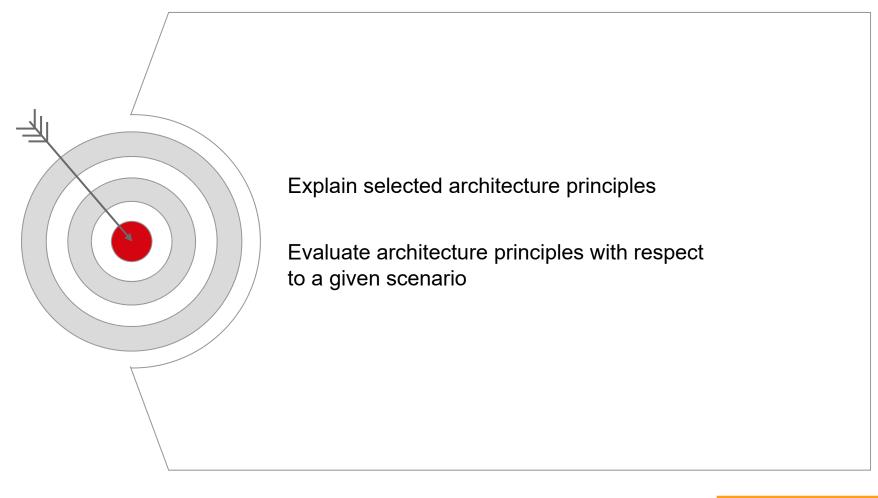
# **Architecture and Integration**

**Architecture Principles** 

Fachbereich 2 Informatik und Ingenieurwissenschaften



# Learning Objectives: Architecture Principles





# **Architecture Principles: Motivation**

#### **Challenges**

- An architecture's quality can only be evaluated based on its purpose
- Existing measures are rather technical and do not address purpose and context
- Experience is needed in order to assess an architecture
- Architectures fail if they are not helpful

#### **Principles**

#### Principles support ...

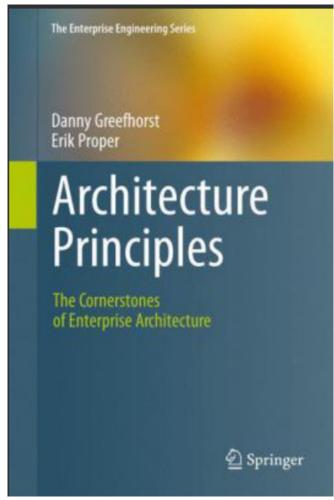
- · ... design good architecture
- ... evaluate an architecture
- ... improve existing architectures
- ... following business needs

#### Principles ...

- ... are based on best practices
- · ... document expert knowledge
- ... incorporate economic aspects
- · ... are not just formal measures



# Architecture Principles: Book





# **Architecture Principles: Definition**

Architecture Principle: A design principle included in an architecture. As such, it is a declarative statement that normatively prescribes a property of the design of an artifact, which is necessary to ensure that the artifact meets its essential requirements.

Greefhorst/Proper: Architecture Principles. Springer 2011



# Architecture Principles: Definition Explained

"design principle"

- Principle for designing an artifact (i,.e. architecture)
- Used in a constructive way

"declarative"

- · Describing requirements on a solution or the target state
- Does not prescribe how to achieve the target state

"normatively prescribes"

- Setting a norm for a given context
- Prescription for designing an architecture
- It's not a law per se but you can make it a law

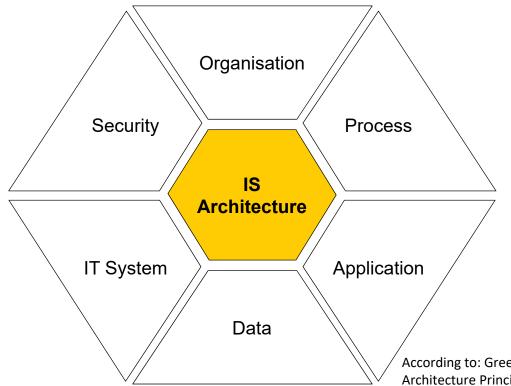
"essential requirements"

- Requirements define the applicability of the principle
- Requirements are derived from business context



### Principles: Overview

Architecture principles aim at providing guidance (based on best practices) for designing good architectures in a corporate environment, covering different aspects.



### Principles aim to ensure

- Provision of functionality
- Availability of information systems
- Performance as required
- Security and data protection
- Scalability with respect to business needs
- Compliance
- Sustainability (technologically and economically)

According to: Greefhorst, D.; Proper, E.: Architecture Principles. Springer, 2011



# Principle: Standardisation

### IT Systems Are Standardized and Reused Throughout the Organization

#### **Rationale**

- Cost reduction by preventing redundant investments
- Exploitation of economies of scale
- Focussing attention, resources, knowledge and investments due to enterprise-wide standards

- Determine standards for any IT functionality
- IT systems do not provide functionality that overlaps with other IT systems.
- IT systems are reused throughout the organization by all business units.
- Concessions may be needed in user requirements



# Principle: Availability

### IT Systems Are Available at Any Time on Any Location

#### **Rationale**

- People perform work at various locations (office, at client, home)
- Work at various times (day and evening)
- Mobile employees: No fixed office space and facilities (e.g. workstations) required

- Software is server-based, allowing access from all locations.
- Strong authentication services are available to ensure secure



# Principle: Partner Integration

### **Integration with External IT Systems Is Localized in Dedicated IT Components**

#### **Rationale**

- More efficient as interface costs are spent only once
- Changes limited to one component only
- First line of defence for security attacks
- B2B integration is complex (special protocols)

- Dedicated integration middleware
- Applications contain integration components
- Integration components can be reused
- Agreements needed for integration with other organizations



# Principle: Partner Integration

### **IT Systems Communicate Through Services**

#### **Rationale**

- Reuse of functionality
- Assembling new solutions based on services
- Shorter time-to-market

- Services are defined for all data and functionality
- Services defined as reusable as possible
- Hiding implementation details
- Adhering to interface standards and formats
- Services published in a service directory



### Exercise

You will be assigned one of the architecture principles. Read the principle's description carefully and discuss within you group:

- Mark new or unfamiliar terms. Try to figure out their meaning (i.e. web search).
- Explain the principle in your own words.
- Clarify terminology.
- Is the principle relevant for the IS architecture of examination?
  - If no: Explain, why not
  - If yes: Provide an example
- Did you find the principle helpful? Why (not)?

Create a presentation on the topics above in order to explain the principle to your fellow students.