

Summary of Lecture 13.11.2019



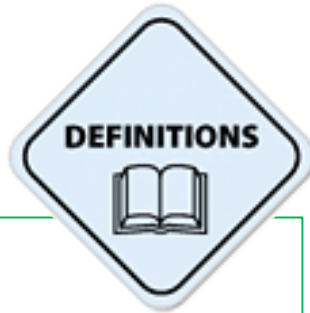
... Very condensed summary of the 13.11.2019 lecture



Summary 13.11.2019

Definition: **Industrial Architecture Framework**

Long-lived, industrially or commercially relevant IT-system



Industrial Architecture Framework =

A conceptual framework for structuring and separating the functionality and the quality properties of IT-systems to enable partitioning and life-cycle management.



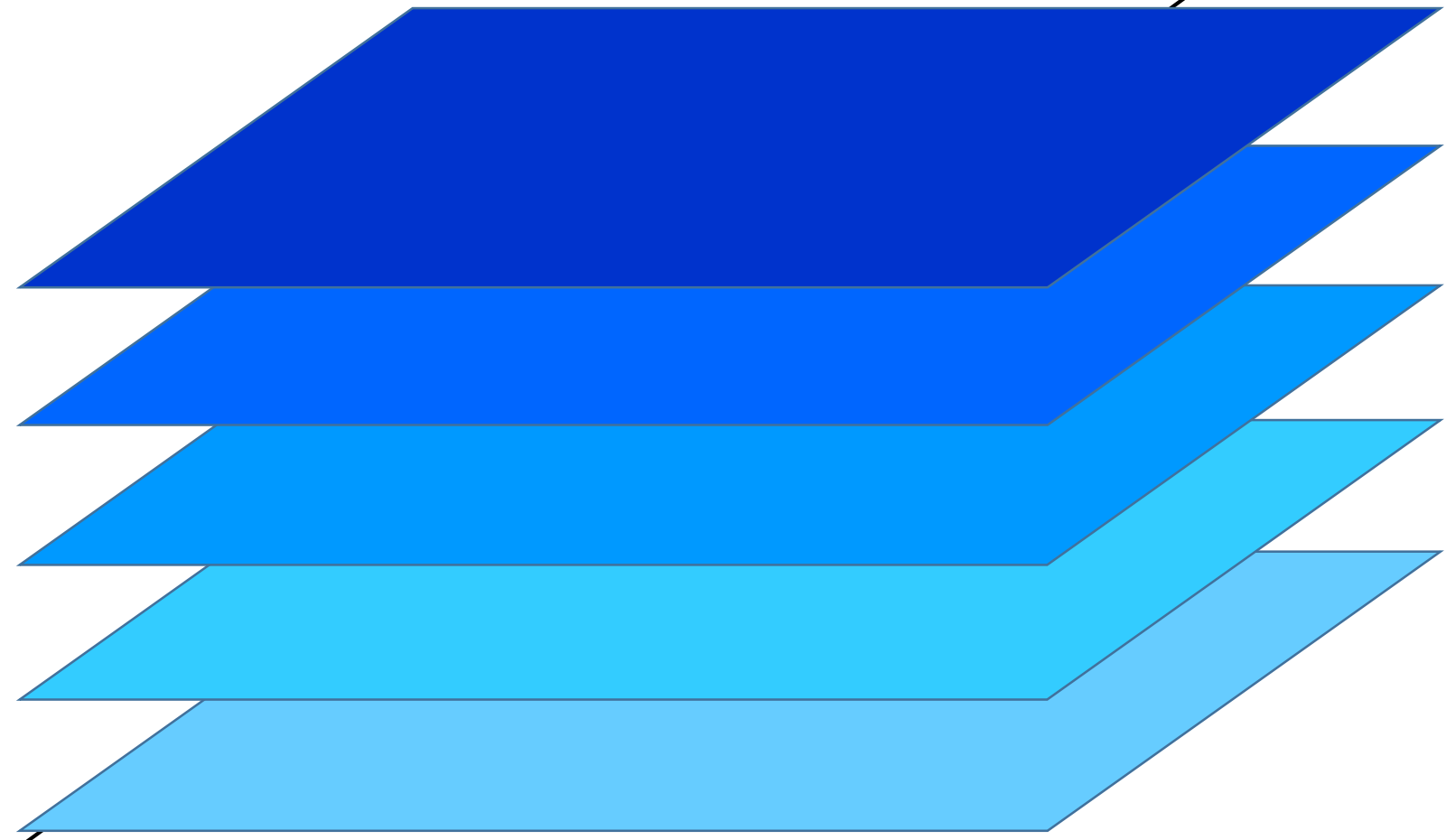
Objective:

Separate and partition the dimensions of an IT-system in order to organize and manage both complexity and the stakeholders

Horizontal Architecture Layers

Hierarchy

- Business Architecture
- Application Architecture
- Information Architecture
- Integration Architecture
- Technical Architecture



Vertical Architecture Layers

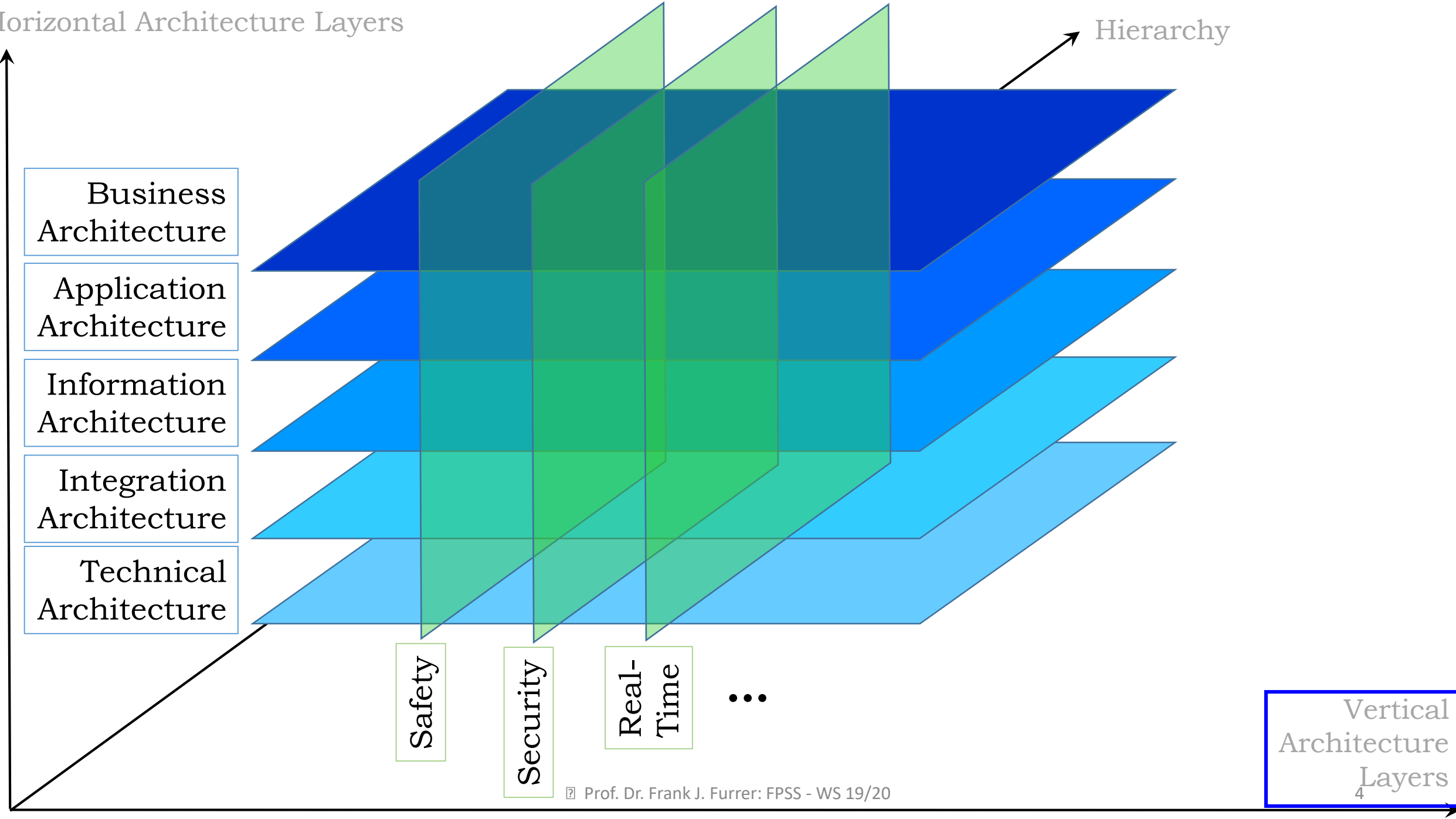
Horizontal Architecture Layers

- Business Architecture
- Application Architecture
- Information Architecture
- Integration Architecture
- Technical Architecture

Hierarchy

- Safety
- Security
- Real-Time
- ...

Vertical Architecture Layers



Horizontal Architecture Layers

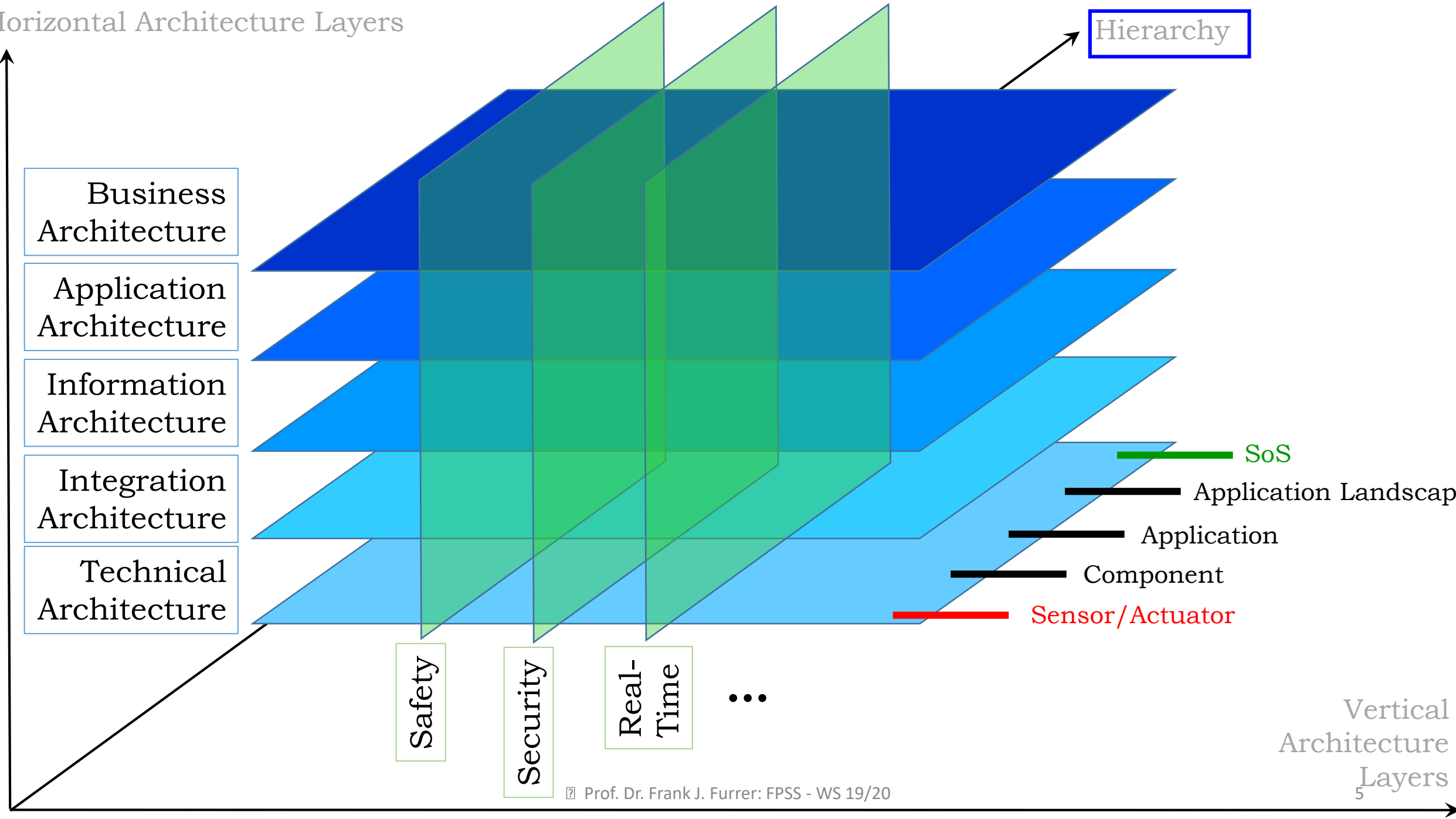
- Business Architecture
- Application Architecture
- Information Architecture
- Integration Architecture
- Technical Architecture

Hierarchy

- Safety
- Security
- Real-Time
- ...

- SoS
- Application Landscape
- Application
- Component
- Sensor/Actuator

Vertical Architecture Layers



Horizontal Architecture Layers

- Business Architecture
- Application Architecture
- Information Architecture
- Integration Architecture
- Technical Architecture

Hierarchy

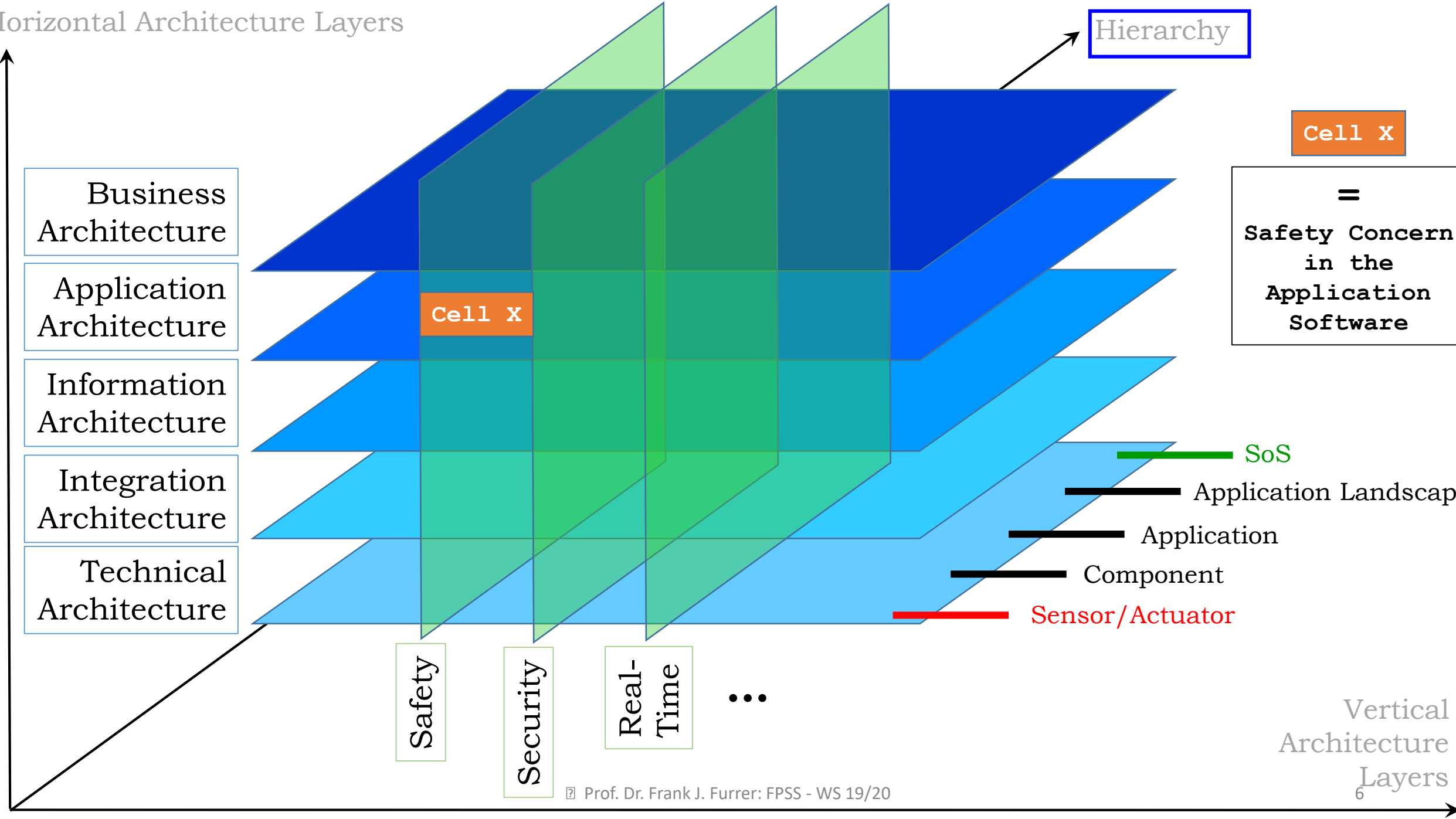
Cell x

=
Safety Concern
in the
Application
Software

- Safety
- Security
- Real-Time
- ...

- SoS
- Application Landscape
- Application
- Component
- Sensor/Actuator

Vertical
Architecture
Layers



Summary 13.11.2019



Change



Complexity



Uncertainty

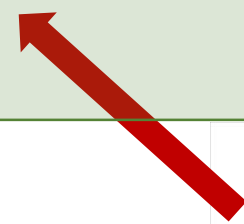
Software-System

Technical Debt

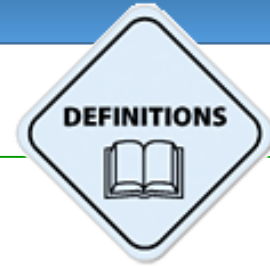
Architecture Erosion



Architecture Knowledge



Good architects



Summary 13.11.2019

Architecture Principles:

Fundamental insights – formulated as *enforcable rules* – how a good software-system should be built [← «Eternal Truths»]



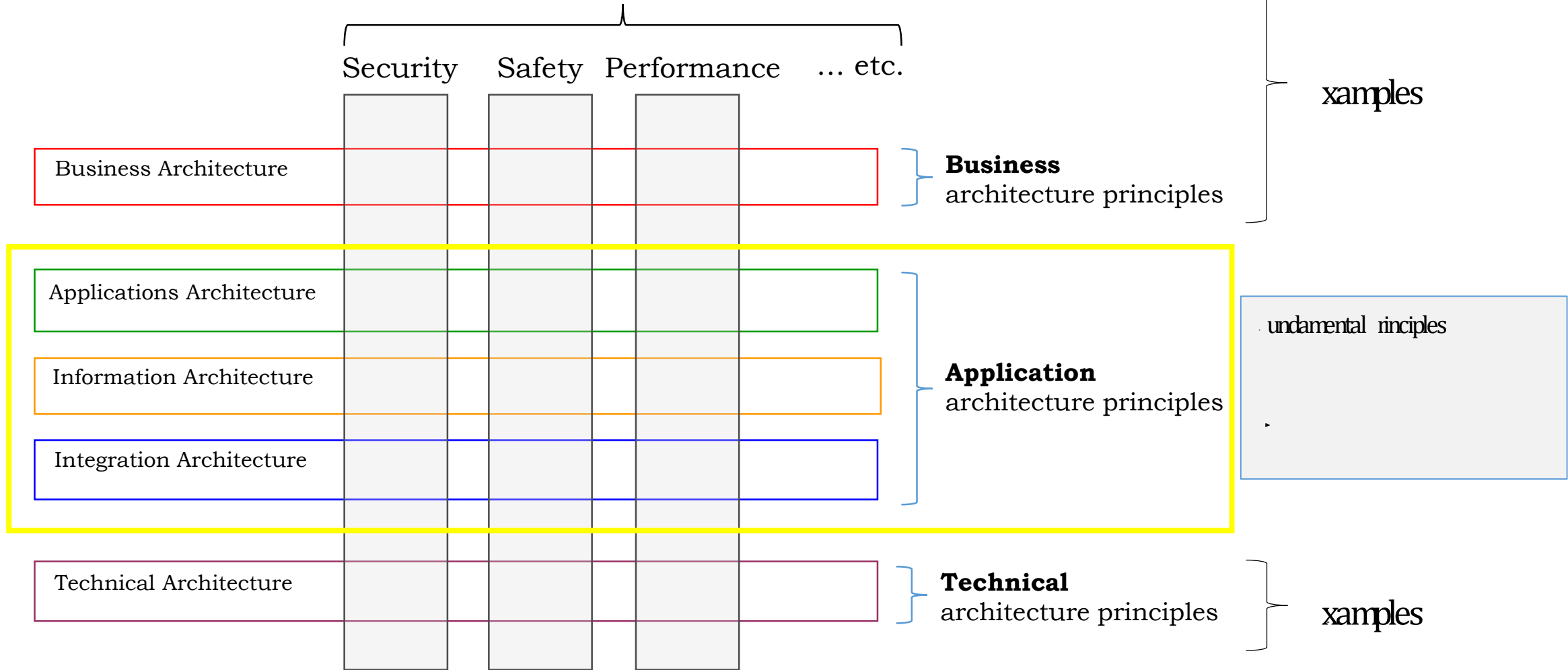
Architecture Principles:

- highly valuable architecture knowledge in proven & easily accessible form
- teachable & enforcable
- the foundation for the design, implementation and evolution of future-proof software-systems

Summary 13.11.2019

Software Structure: **Horizontal** Principles

Vertical architecture principles („Quality properties“)



Summary 13.11.2019

 Fundamental Architecture Principles for **Changeability**

- A1: Architecture Layer Isolation
- A2: Partitioning, Encapsulation and Coupling
- A3: Conceptual Integrity
- A4: Redundancy
- A5: Interoperability
- A6: Common Functions
- A7: Reference Architectures, Frameworks and Patterns
- A8: Reuse and Parametrization
- A9: Industry Standards
- A10: Information Architecture
- A11: Formal Modeling
- A12: Complexity and Simplification



Summary 13.11.2019

Architecture principles and patterns are the **knowledge-carriers** for future-proof software-systems



The **future-proof software-systems engineer** must know and understand the architecture principles and patterns. He must correctly apply them to his/her design

Summary 30.10.2019

... Continue with Part 3A