

Summary of Lecture 18.10.2017



Summary 18.10.2017

Oral Exam

Participants can receive a grade via an **oral exam**
(3 credits ECTS)

Examination dates: katrin.heber@tu-dresden.de



Deutsch

Examination Language
(**Your** Choice)

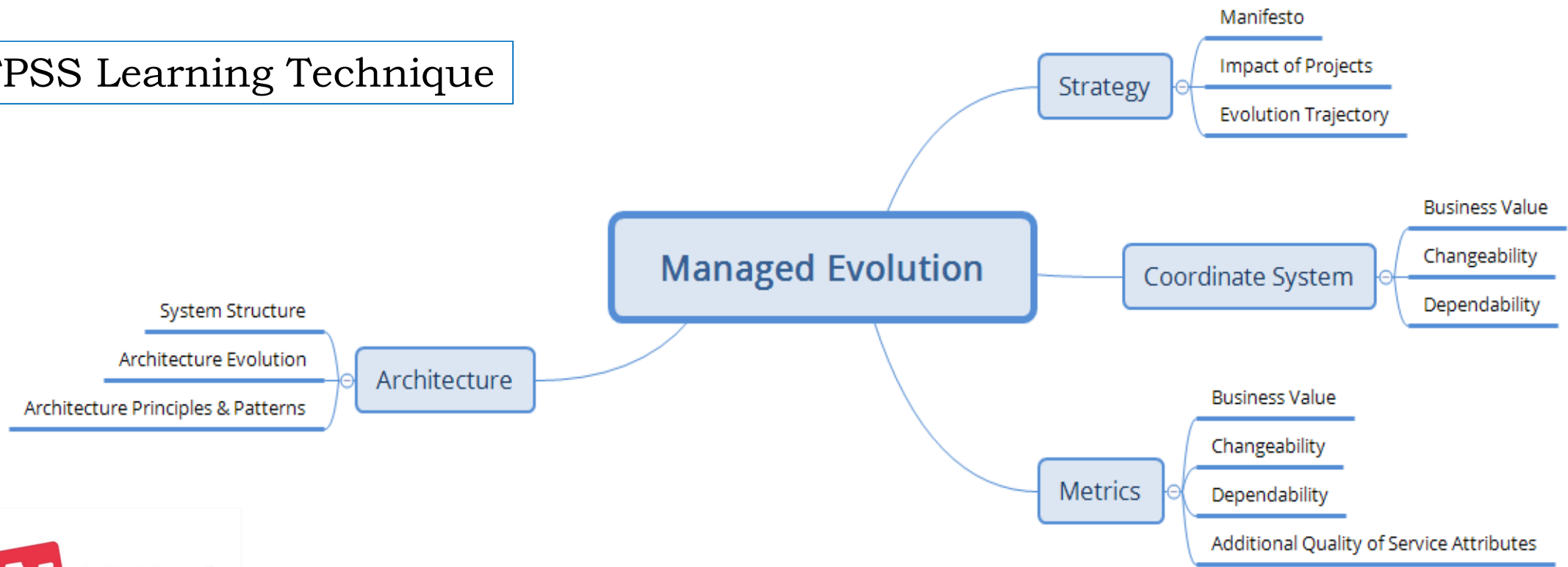


English

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Hierarchical Representation:
«Mind Map»

FPSS Learning Technique



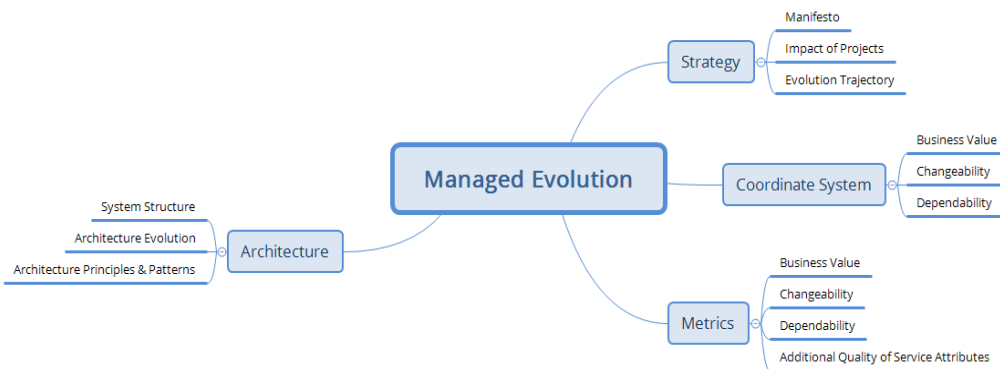
<http://www.xmind.net>

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Step 2:
Representation as «learning cards»

Front: Concept Hierarchy

Back: Notes



- *Negative: Technical debt, architecture erosion, business + market pressure*
- *Business value, changeability and dependability are continuously improved*
- *Managed Evolution coordinate system: ME evolution channel*
- *Tracking through metrics (BV, TTM, DevC, size)*
- *Dependability = survival / Changeability = adaptability to new requirements (TTM, DevC)*
- *Architecture = Key success factor*
- *Business ↔ IT interests/conflict*

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«Software Everywhere»

Success Stories

Failure Stories



IBM WATSON

Demonstration of Watson Cancer Care Solution

Treatment Plan	Confidence	Patient Preference Match
Treatment plan 1	95	Acceptable
Treatment plan 2	45	Unacceptable
Treatment plan 3	8	Preferred

IBM Watson Oncology Advisor

IBM Confidential. References to potential future products are subject to the Important Disclaimer provided earlier in the presentation.

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Our objective is:

To build, evolve, and maintain
long-lived IT-systems
with a strong dependability,
an easy changeability
and a high business value.

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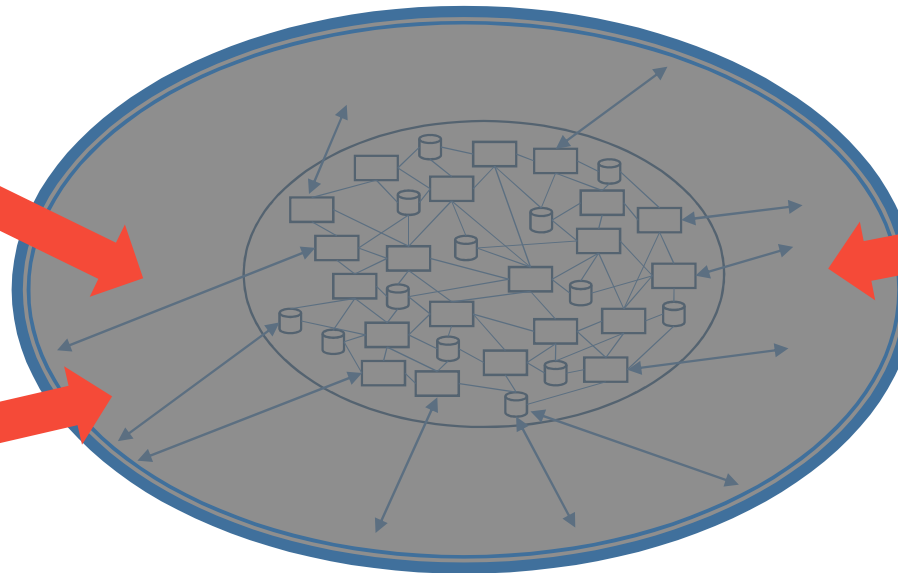
Three Devils of Systems Engineering



Change



Uncertainty



Complexity

... you cannot fight complexity, change and uncertainty
⇒ **You can only manage it !**

... by using principles, methods, strategies, and processes for **future-proof software-systems**

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FPSS Definition

Managed Evolution Strategy

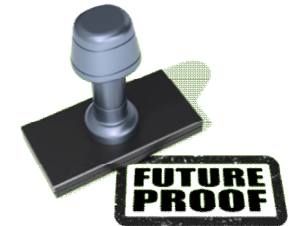
Architecture Principles

A *future-proof software-system* is a structure that enables the management of complexity, change and uncertainty with the least effort, with acceptable risk, and with specified quality properties

Changeability

Dependability

Domain-specific
Quality Properties



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FPSS Primary Properties & Metrics

Business Value

$$NPV = \sum_n \frac{\text{Benefit}_{\text{year}-n}}{(1 + i)^n} - I$$

NPV = Net Present Value(€)

Changeability

$$\text{Changeability} = \frac{(\sum \text{Size}_i)^2}{\sum \text{TitM}_i * \sum \text{DevC}_i}$$

Unit: #UCP²/(days*k€)

Dependability

Domain-specific
Quality Properties

Taxonomy
&
Individual Metrics

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Business Value

= Reason for the Creation of the Software

Changeability

= Competitive Advantage (DevC, TtM)

Dependability

= Assures Survival in today's World

Domain-specific
Quality Properties

= «Fit for Function»

FPSS



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Business Value

Changeability

Dependability

Dependability expectations

Dependability properties

General
property

Specific
properties

Resilience

- **Safety**
- **Security**
- **Integrity**
- **Confidentiality**
- **Real-time capability**
- ...



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Dependability **expectations**



e-banking system:

- *security* (= defense against hackers)
- *integrity* (= don't digitally lose my money)
- *confidentiality* (= "it's my business")
- *availability* (= 24 h/7 days).



Car:

- *safety* (= no accidents)
- *security* (= no hostile influence)
- *reliability* (= no engine failures on the motorway)
- *conformance* to all laws and regulations

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Dependability

Resilience

Domain-specific
properties

Resilience is the *capability* of a system

- to absorb the **incident**,
- to recover to an acceptable level of performance,
- to sustain that level for an acceptable period of time

<http://www.incose.org/practice/techactivities/wg/rswg/>

