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NEW FRONTIER GROUP

IT řešení, které přináší ovoce

Architecture and Design

Tomáš Krátký
tomas.kratky@profinit.eu

http://www.profinit.eu/cz/podpora-univerzit/univerzitni-vyuka

Obsah

- Stručný přehled tématu
- Zásadní otázky
- Zajímavá témata
- Goodies – templates, checklists
- Doporučená literatura
- Průběžné ilustrace

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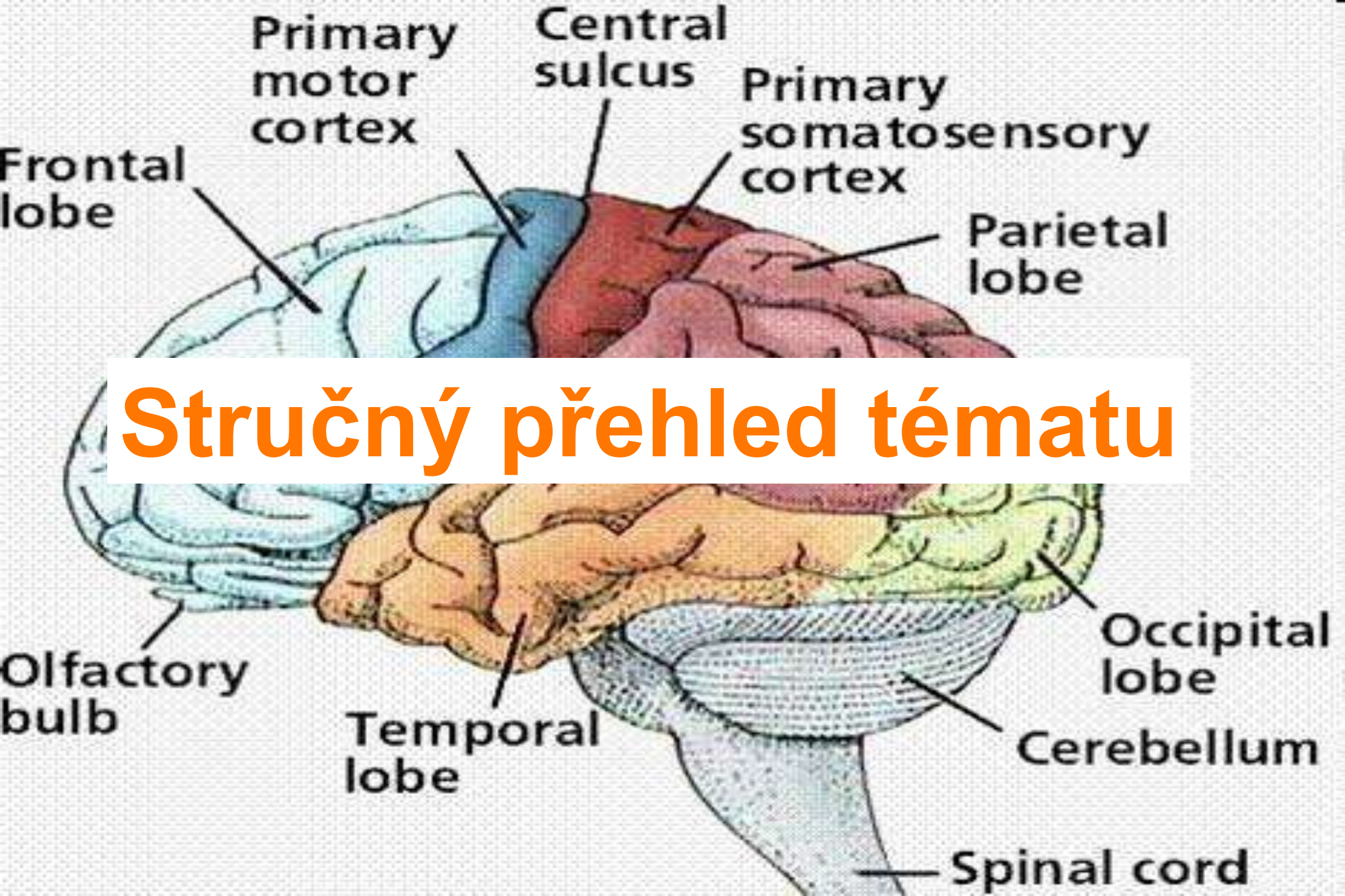
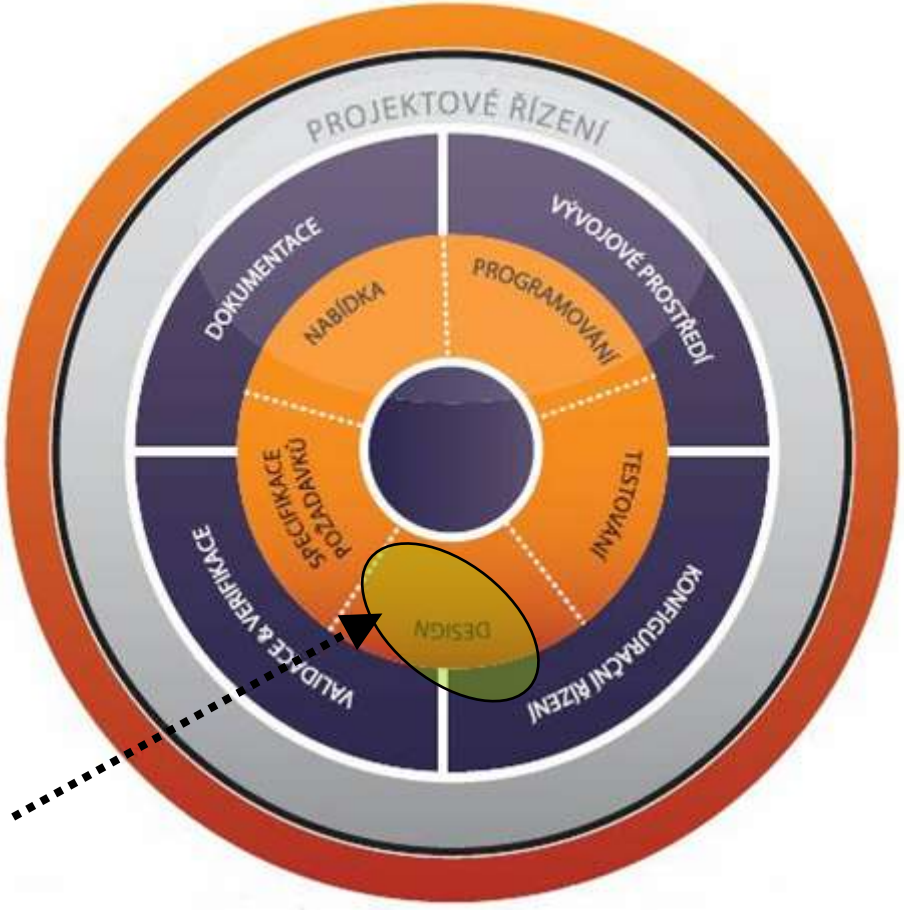
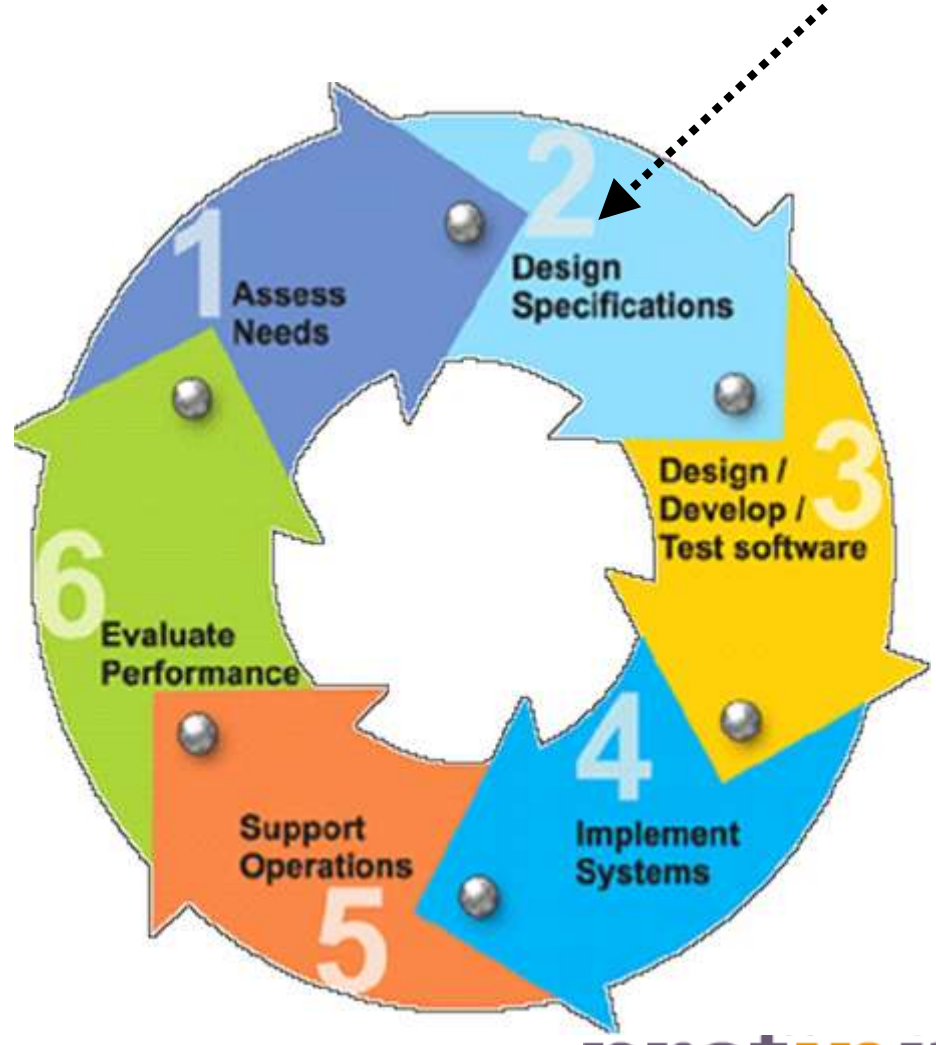


Stručný přehled tématu

Softwarový proces





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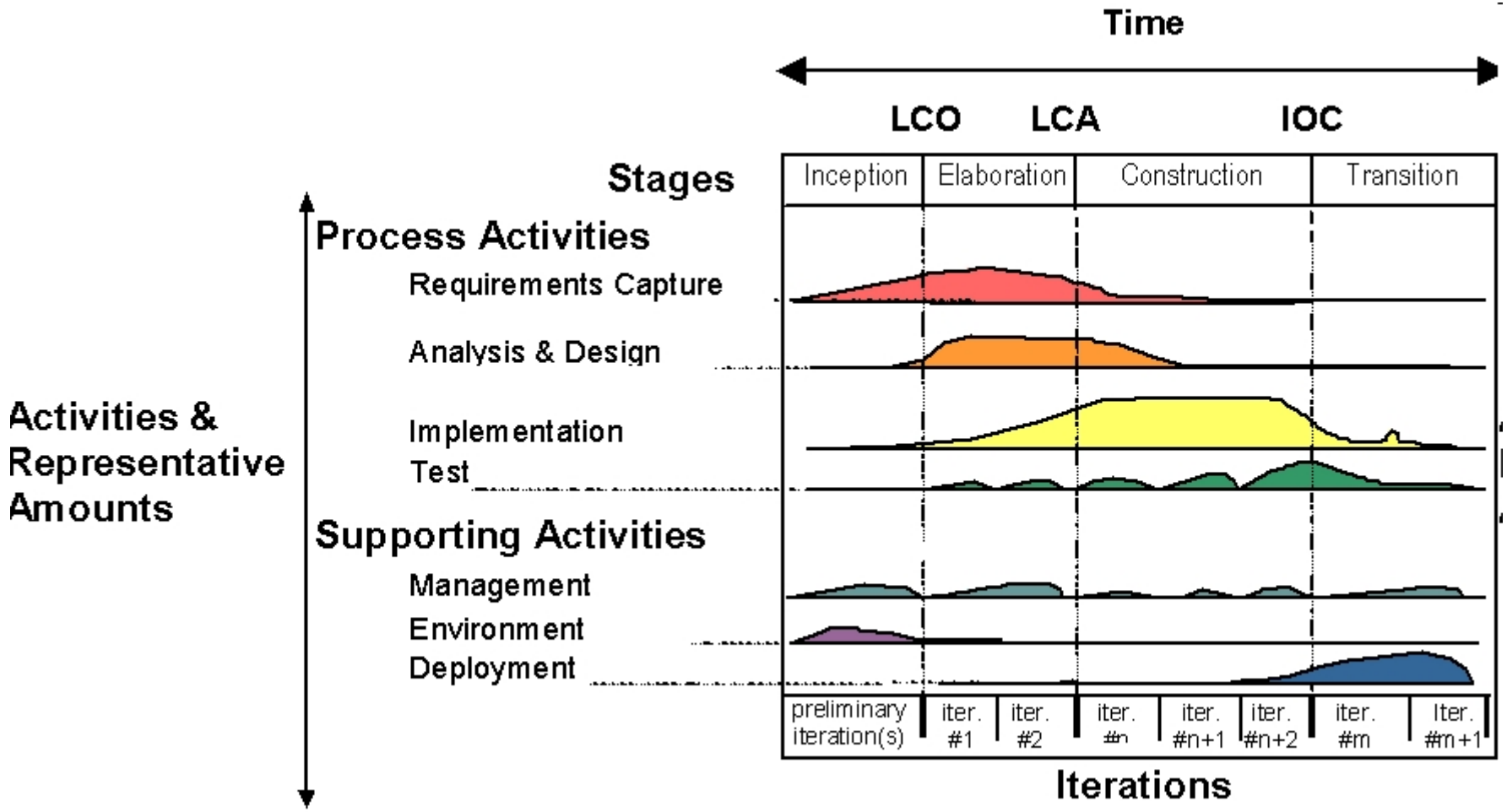
Softwarový proces



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Převzato z http://csse.usc.edu/csse/research/CORADMO/

SWEBOK

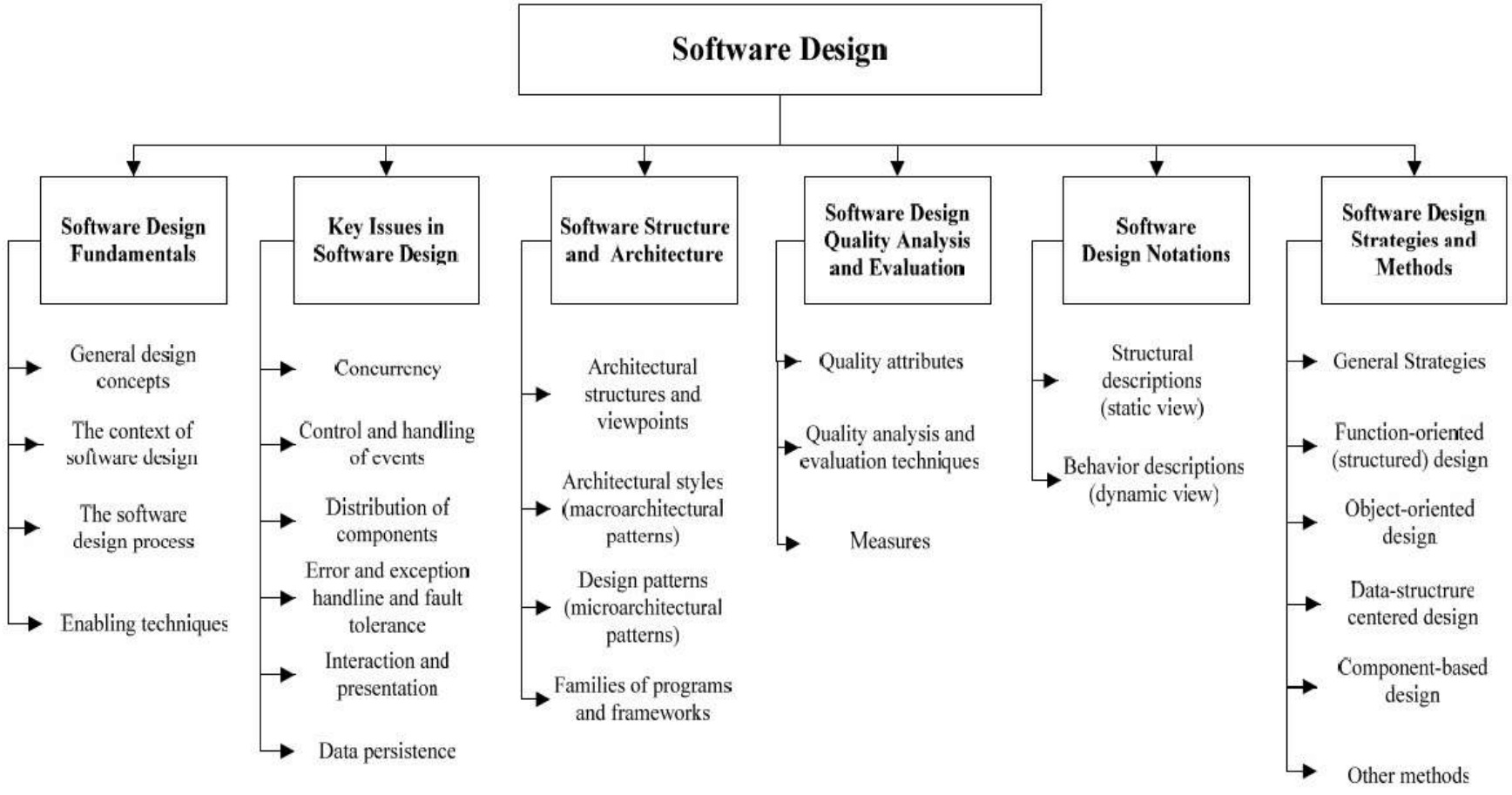

Figure 1 Breakdown of topics for the Software Design KA

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Zásadní otázky

Zásadní otázky

- Co je to vlastně architektura ?
- Typy architektury ?
  - Software architecture
  - System architecture
  - Process architecture
  - Enterprise architecture
  - …
- Jakou roli hraje architektura na projektu ?
- Architektura vs. design (viz další slajd)

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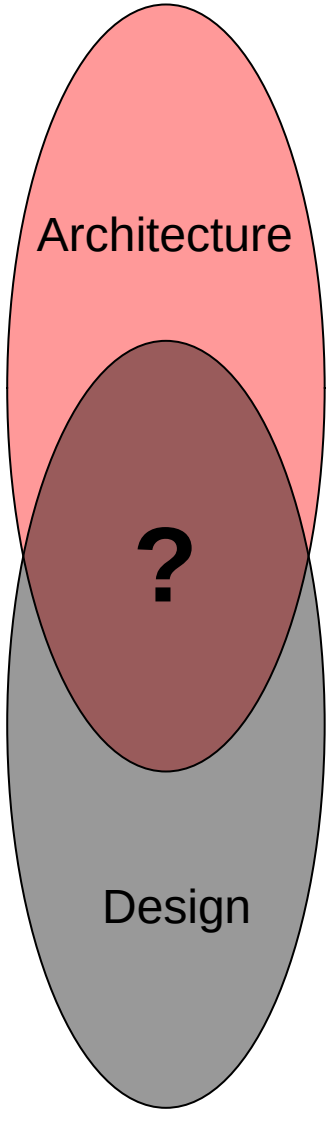
Architecture vs. design



- Co je to architektura, co návrh ?
- Kde je hranice mezi nimi ?
- Architektonicky významné rozhodnutí ?
- Jak poznám, co je důležité ?

*„Architecture is about the **important** stuff. Whatever that is …“*
Martin Fowler, Who needs an Architect ?

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Architecture vs. design

Software architecture

- Realizace **nefunkčních** požadavků
- Strategický design
  - Programovací paradigmata, architektonické styly, principy, standardy, …

Software design

- Realizace **funkčních** požadavků
- Taktický design
  - Design patterns, programovací idiomy, refaktoring, …

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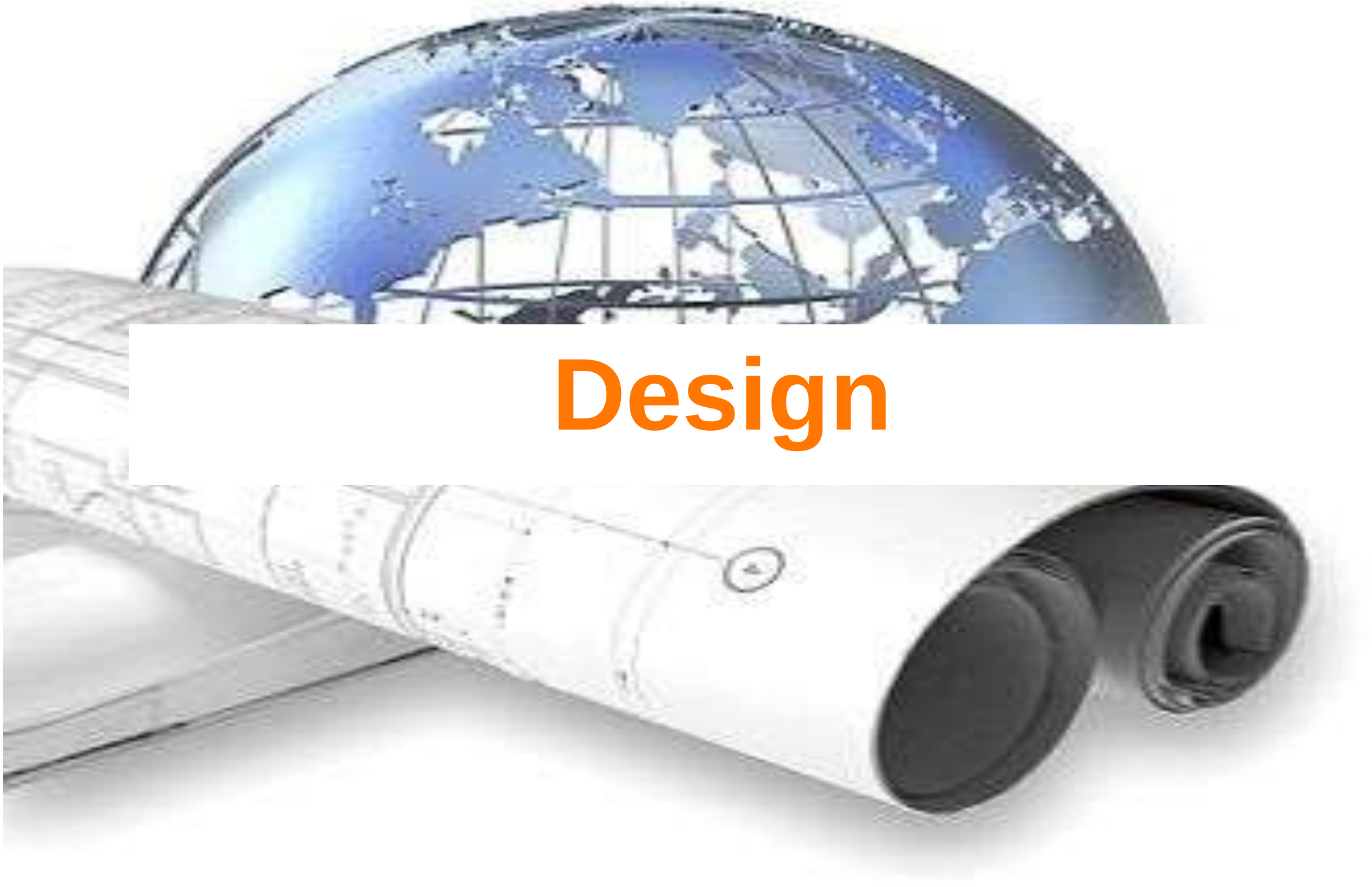

Design

Design – základní koncepty

- Dekompozice (decomposition)
- Abstrakce (abstraction)
- Zapouzdření (encapsulation)
- Koheze (cohesion (high))
- Vazby (coupling (low))

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Design – základní pojmy

- Abstraktní datový typ (ADT)
- Typ (Type)
- Třída (Class)
- Objekt (Object)
- Instance
- Modul (Module)

… composition, asociace, delegace, inheritance, implementation inheritance, multiple inheritance, dynamic binding, static x dynamic type, information hiding, encapsulation, ad hoc polymorphism, component, OO framework, class category, members (data m., method m.), behavior (external), messages, reflection …

… a mnoho dalších …

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Dobrý design …

Program to interface, not implementation !

Favor object composition over class inheritance !

Keep it DRY, shy and tell the other guy !

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Architektura

Architecture needs, stakeholders

Stakeholder	Concern
Customer	• Schedule and budget estimation • Feasibility and risk assessment • Requirements traceability • Progress tracking
User	• Consistency with requirements and usage scenarios • Future requirement growth accommodation • Performance, reliability, interoperability, etc.
Architect and System Engineer	• Requirements traceability • Support of tradeoff analyses • Completeness, consistency of architecture
Developer	• Suffi cient detail for design • Reference for selecting / assembling components • Maintain interoperability with existing systems
Maintainer	• Guidance on software modifi cation • Guidance on architecture evolution • Maintain interoperability with existing systems

Table 2: Stakeholder Concerns

Dokumentace architektury

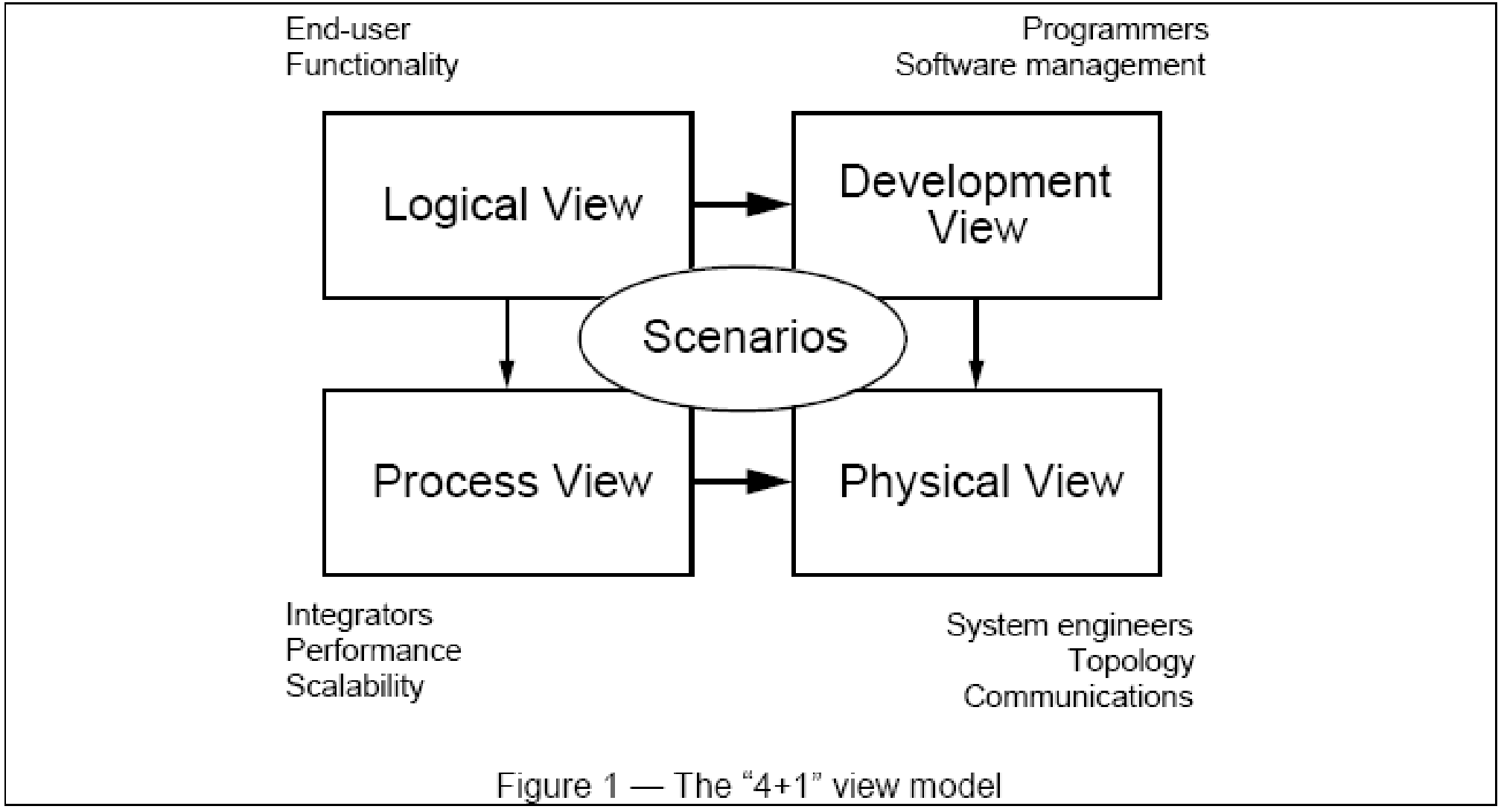

Figure 1 — The "4+1" view model

Dokumentace architektury

View	*Logical*	*Process*	*Development*	*Physical*	*Scenarios*
Components	Class	Task	Module, Subsystem	Node	Step, Scripts
Connectors	association, inheritance, containment	Rendez-vous, Message, broadcast, RPC, etc.	compilation dependency, "with" clause, "include"	Communica-tion medium, LAN, WAN, bus, etc.	
Containers	Class category	Process	Subsystem (library)	Physical subsystem	Web
Stakeholders	End-user	System designer, integrator	Developer, manager	System designer	End-user, developer
Concerns	Functionality	Performance, availability, S/W fault-tolerance, integrity	Organization, reuse, portability, line-of-product	Scalability, performance,av ailability	Understand-ability
Tool support	Rose	UNAS/SALE DADS	Apex, SoDA	UNAS, Openview DADS	Rose

Table 1 — Summary of the "4+1" view model

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Softwarová architektura dle IEEE 1471

- Functional / logic view
- Code / module view
- Development / structural view
- Concurrency / process/thread view
- Physical / deployment view
- User action / feedback view
- Data view

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Vliv kontextu na architekturu

- databázový systém / subsystém
- web systém / subsystém
- (tlustý) klient systém / subsystém
- OO systém / subsystém
- data warehouse systém
- integrační systém / subsystém
- ...

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Zajímavá témata

OO systémy

Výhody

- Reusability
- Maintainability
- Portability
- Customizability
- Extensibility

Techniky

- Data encapsulation
- Data abstraction
- Interface and code sharing
- Polymorphism
- Design sharing

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Design patterns

- Katalog
  - základní GOF návrhové vzory
  - prakticky nekonečné kombinace a variace
- Význam
  - Znovupoužitelnost
  - Společný jazyk
  - ...
- Pozor
  - na počáteční nadšení
  - na nadbytečné užívání patterns

Jaké znáte patterns ?
Nejpoužívanější pattern ?

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Architectural styles

- Pipes and filters
- Event driven architecture
- Layered architecture
- Multi-tier architecture
- MVC
- Repositories
- „Table driven” interpreters
- Big ball of mud ☺
- … a mnoho dalších …

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OO frameworks

- Znovupoužitelný návrh pro SW systém
- Podpora (základna) při vývoji jiných SW aplikací
- **Diktuje architekturu** systému, určuje jak dekomponovat systém a jak budou jeho jednotlivé části komunikovat
- Frozen spots a hot spots (abstraktní třídy, anotace)

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Integrace

- Velmi zajímavé a časté téma prakticky u každého většího projektu
- Často spojené s tématikou enterprise architektury
- Často velmi netechnologické (procesy, entity)
- Uživí se zde mnoho buzzwords (EAI, SOA, MOM, …)
- Obvykle velmi problematické (odpovědnost a peníze chybí, neochota, …)

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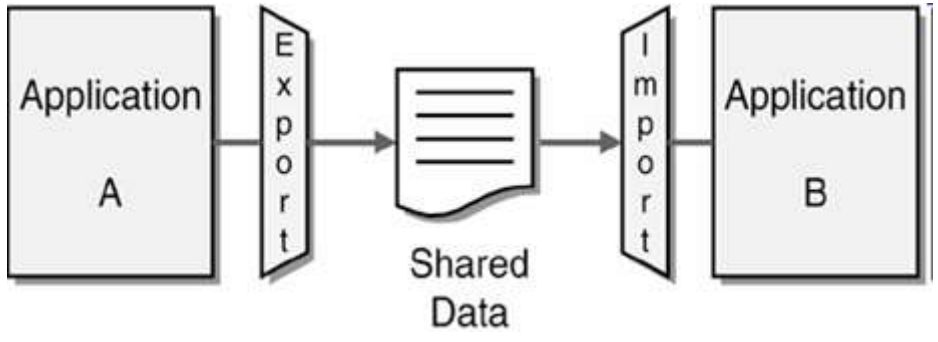
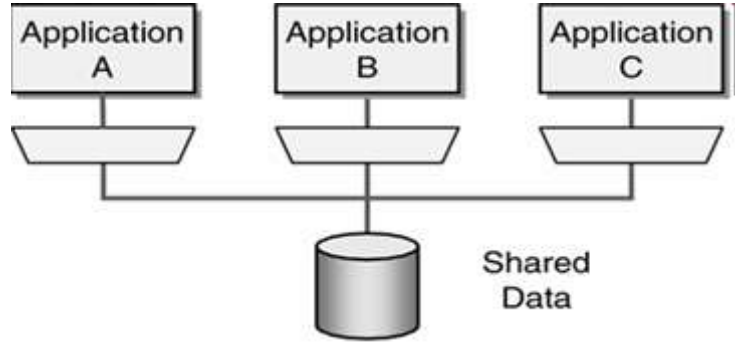
Integrace – základní koncepty

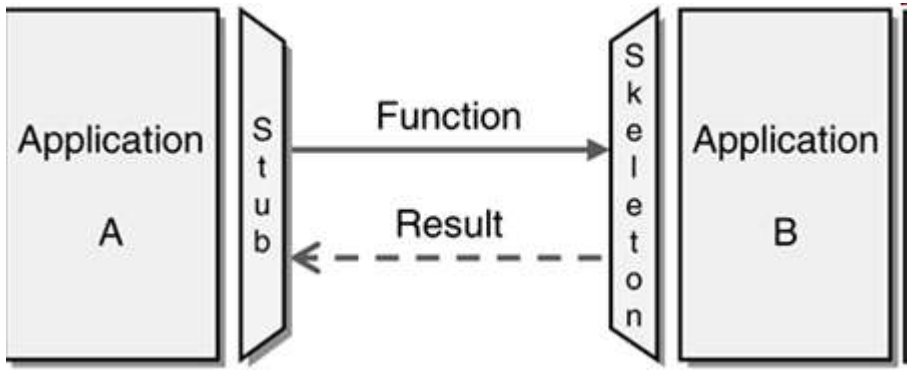
File transfer



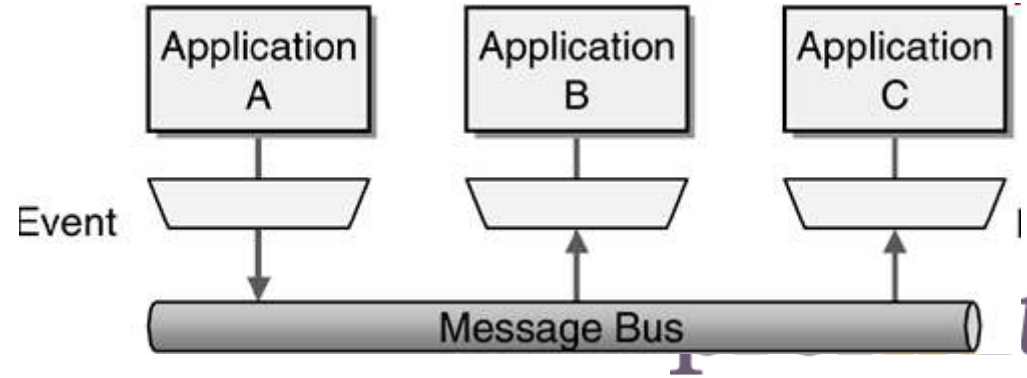
Shared database



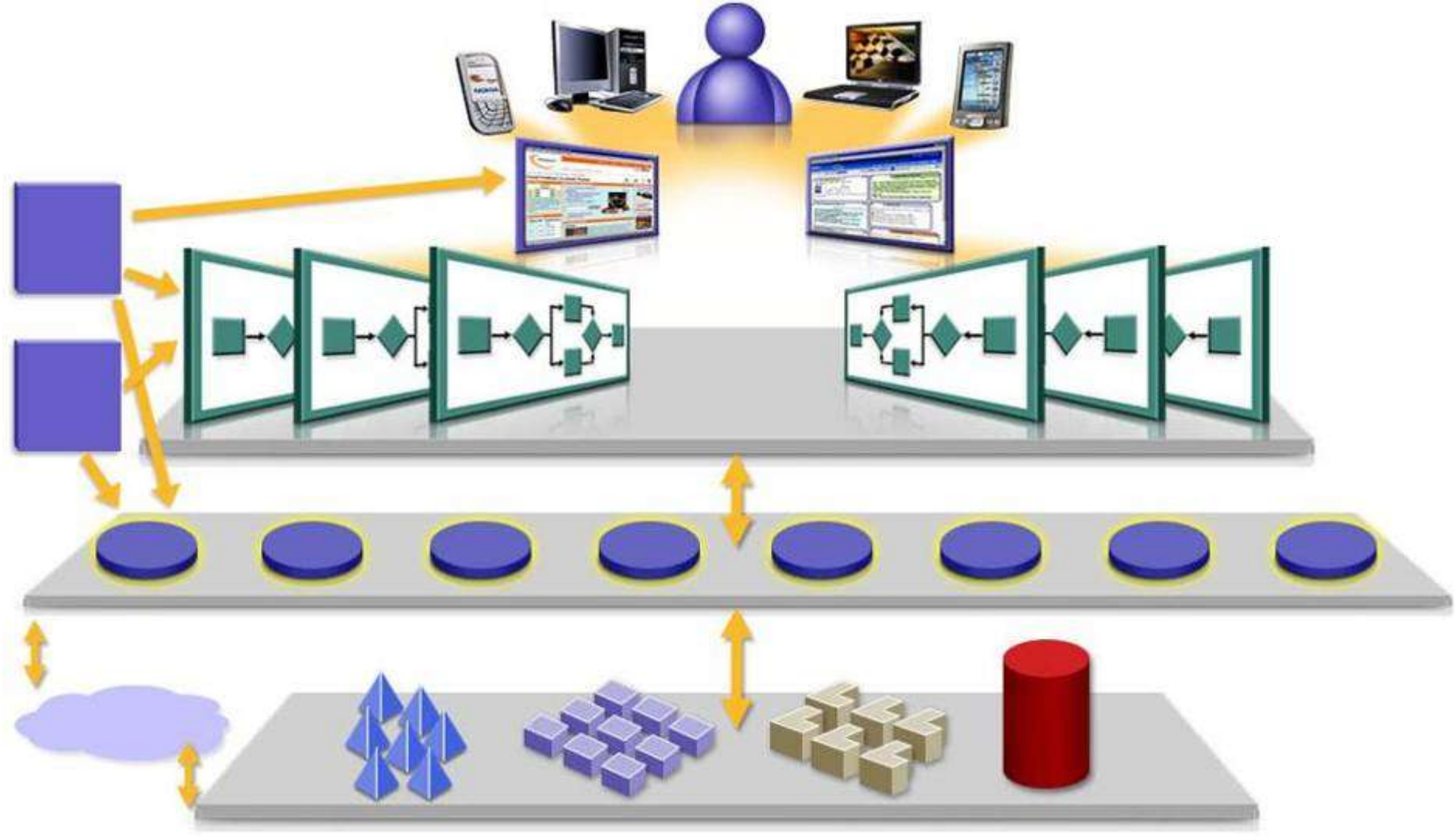
Remote procedure call



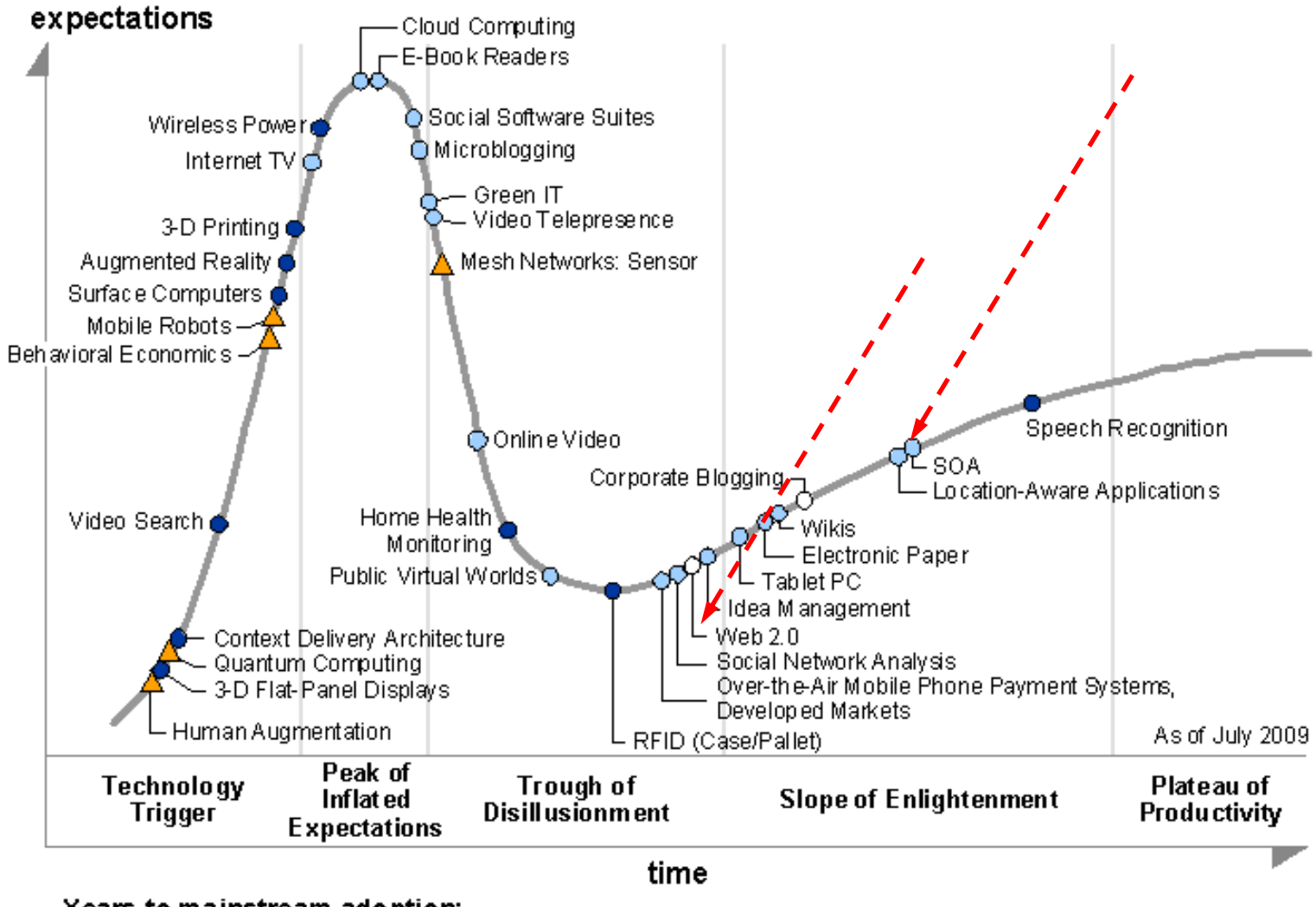
Messaging



Moderní trendy …



Gartner Technology Hype Cycle



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Goodies

Templates, checklists, literatura

ARCHITECTURE AND DESIGN MATERIÁLY

Články

- Softwarová architektura - rozšířený, klasický, úvod do softwarové architektury
- An Introduction to Software Architecture
- On the Definition of Software System Architecture
- On the Criteria To Be Used in Decomposing Systems into Modules
- Architectural Blueprints - The "4+1" View Model of SW Architecture - článek diskutující způsob a formu dokumentace architektury systému
- Who Needs an Architect?
- A Rational Design Process: How and Why to Fake It

Checklists

- CxCheck_SwArchitecture.txt
- CxCheck_HighLevelDesign.txt
- CxCheck_HighQualityModules.txt

Templates

- SwDesignSpec.doc
- MIL-STD-498_InterfaceReqsSpecification.doc
- MIL-STD-498_InterfaceDesignDescrption.doc
- MIL-STD-498_SwDesignDescription.doc
- MIL-STD-498_SysSubsysSpecification.doc
- MIL-STD-498_SysSubsysDesignDescription.doc

Všechny odkazované materiály jsou poskytnuty výhradně za účelem výuky softwarového inženýrství.

Diskuse

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