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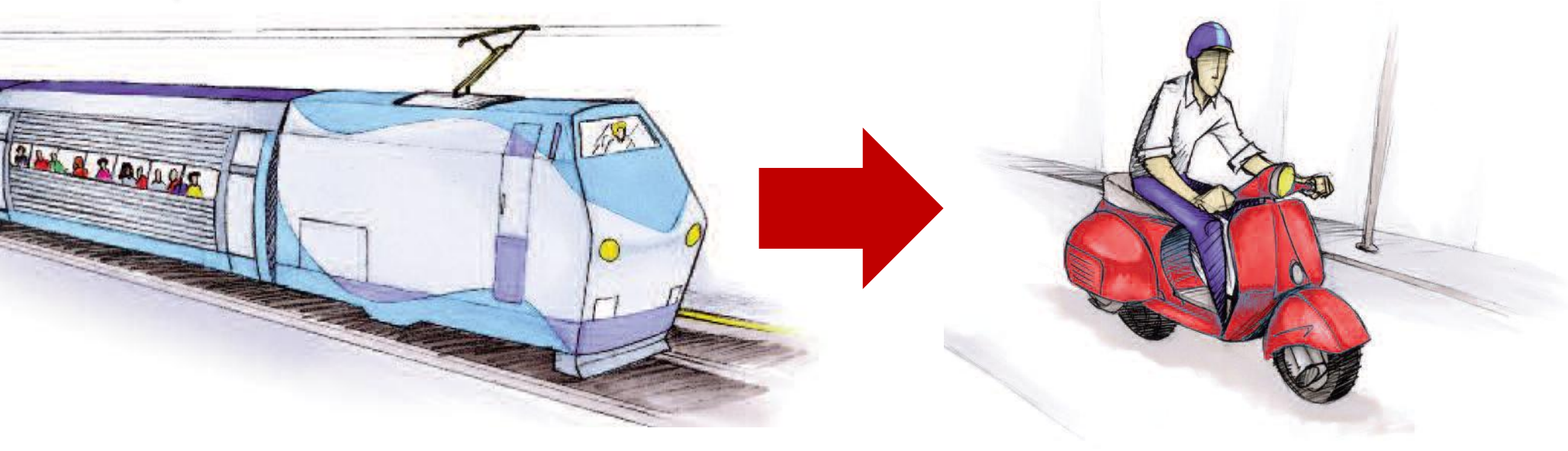
From Train to Scooter

Application Lifecycles That Address Differing IT Dynamics Within An Organization



23rd October 2015, Dr. Martin Girschick / Dr. Marion Kremer

Post questions on Twitter using Hashtag #seiipTUD

#seiipTUD

Dr. Marion Kremer

Me

- Diploma and PhD from TU Darmstadt in Computer Science
- Consulting and Support at a company with focus on software for architects
- since 1996: working for Capgemini in different roles and sectors
- since 2011: elected member of the *Präsidium* of the *Gesellschaft for Informatik* (GI)
- Currently: Head of APPS Evolve!

APPS Evolve!

- The Capgemini Apps Germany department for Research & Development on Software Engineering and Architecture
- Includes all related communities for engineering & architecture
- Producing tangible results like devonfw
- More on APPS Evolve! (only in German):
  www.de.capgemini.com/capgemini/wie-wir-arbeiten/forschung

Agenda

- The Digital Transformation
- The consequences
- Technology Building Blocks for Digital Transformation
- Project example: A classical “train” engagement
- Exercise Details & Outlook

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- **The Digital Transformation**
- The consequences
- Technology Building Blocks for Digital Transformation
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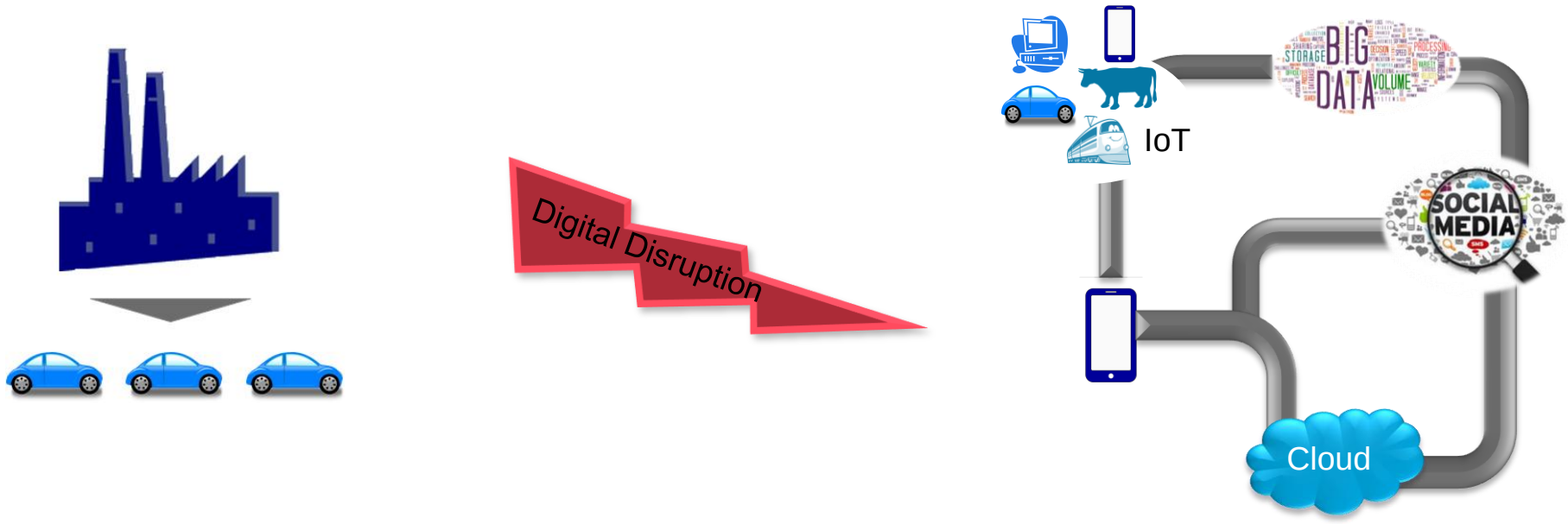
The classical company produces physical goods and services that are not too easy to copy and delivers them through standard channels

Connectivity changes everything: we are facing the Digital Disruption

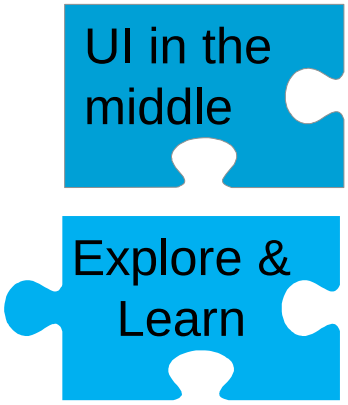


and the result: Uber, facebook, ebay, google, shoesofprey, etc.

All of them dealing with information, making people connect with each other and hereby enable new business models.

The Digital Business is Different; also from a Software Engineering Point of View

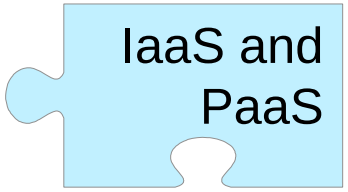
Everything and everyone is only one mouse click away



- Customer satisfaction has to be in the middle
  - User Interfaces are more important than ever (incl. the UI itself and the related processes in the background)
  - A long theoretical upfront evaluation is misleading in many cases
  - Engineers are often not the perfect human interface designers
- The competitors are not lazy: ongoing innovation is necessary
- The number of aggressors in the internet is much higher than in a intranet

- Short **real life** learning and optimization cycles are key
- UIs have to be state of the art (gamification, cool layouts, good layouts for the silver surfer, integration with social media etc.)
- Professional evaluation is necessary (both for usability and security)

IT like Electricity from a Socket



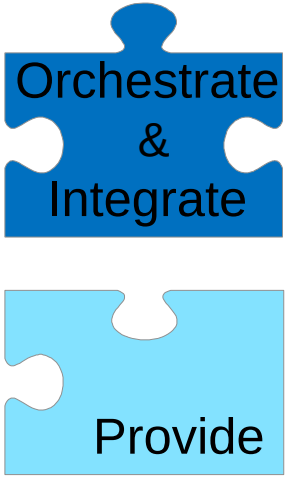
- Standards are covering more and more areas especially IaaS and PaaS (for example: Cloud Foundry, Open Stack), implemented by the big players
- Highly flexible and cheap infrastructures become more and more available for everybody

- Not being your own PaaS supplier becomes a real option for companies

But also:

- The platform is typically not what companies are earning money with

The IT Business Becomes a Mature Profession



- Ready to use services, packages, modules etc. can reduce your production depth
- The big players (IBM, hp, pivotal, SAP, Google, Microsoft, Amazon etc.) tend to provide a closed shop ecosystem (like IBM blue mix) where you
  - can choose from a large and really compelling warehouse but
  - step out hardly
- The same holds true for Open Source software
- The technical complexity / heterogeneity rises

- Service orchestration is the new build
- Services are the new products

Existing IT must not be neglected

- The old economy has spent a lot of money in existing IT systems
- These IT systems often build the backbone of the company, implement a lot of core business know how and host a lot of the core business data about customers, etc.
- These systems at least need to be integrated into the new world

- Digital Disruption does not mean to build everything new!

But:

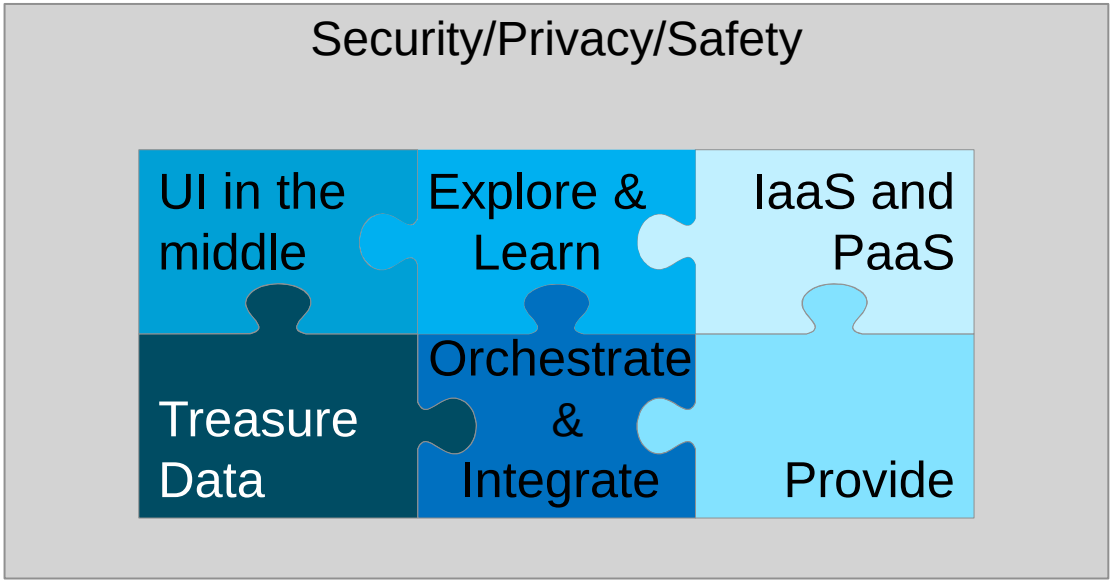
- in some cases rebuilding is better than refactoring
- Integration patterns are as important as building

The Role of Data changes from a *Need to Have* to a Business Enabler

- The amount of data available for computers is rising inconceivably fast (from people, from sensors, …)
- The way people look at data becomes different (new user groups, flexible aggregation, softened constraints on integrity, consistency in some cases etc.)
- Data no longer comes along as well structured objects and some blobs filled with pictures etc. but occurs in many different manifestations that need to be analysed
- Companies like Google and facebook already know more about us than our friends and they create new business models out of this knowledge (insurance etc.)

- Separation of transactional processes and business intelligence is no longer reasonable
- Dealing with data becomes an art of its own

Security has always to be taken into account



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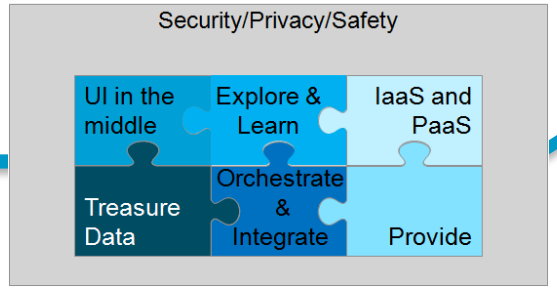
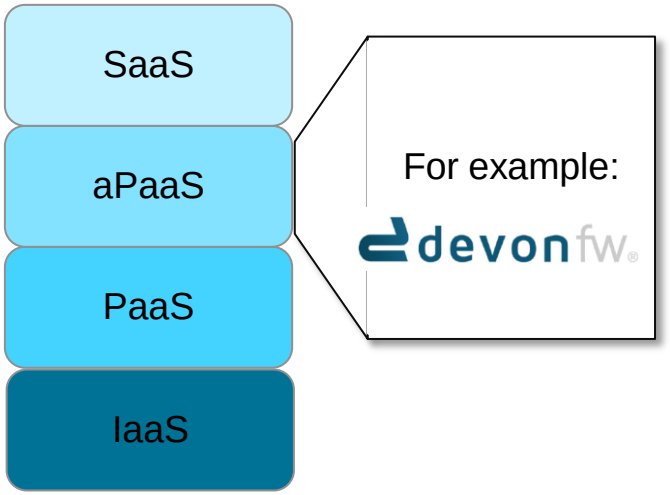
Choose your area of expertise and your first palette



- The different ecosystems are evolving in parallel typically becoming richer and richer
- The legal models for usage become more complex as well

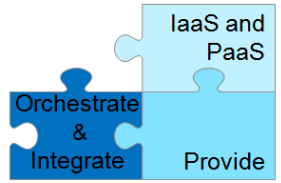
- Learn where to get your build blocks and under which conditions
- Use evaluated standards / blueprints to glue your blocks together as far as reasonable to support speed and quality



More on devonfw can be found here:
www.de.capgemini.com/devonfw
The Open Source part of it (OASP) is available here:
http://oasp.github.io/

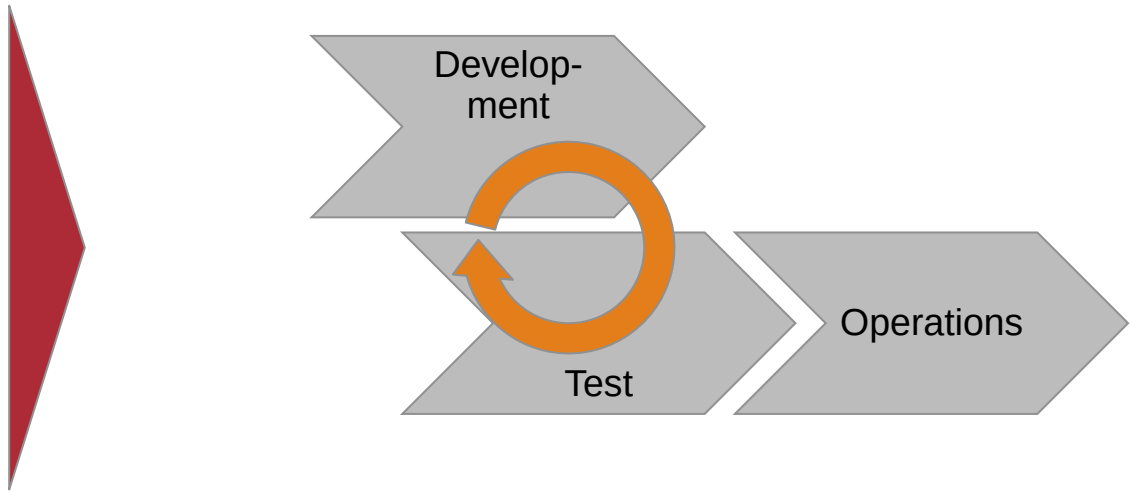
SaaS: Software as a Service
aPaaS: application Platform as a Service

Digital Transformation Reinforces the Need to Think about Non Functional Requirements



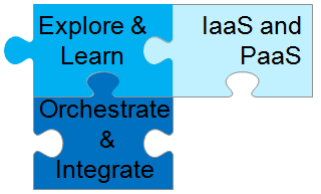
Service usage and service provisioning both come along with the need for early treatment of non functional requirements: conceptual and analytically

- Performance
- Stability
- Availability
- ...

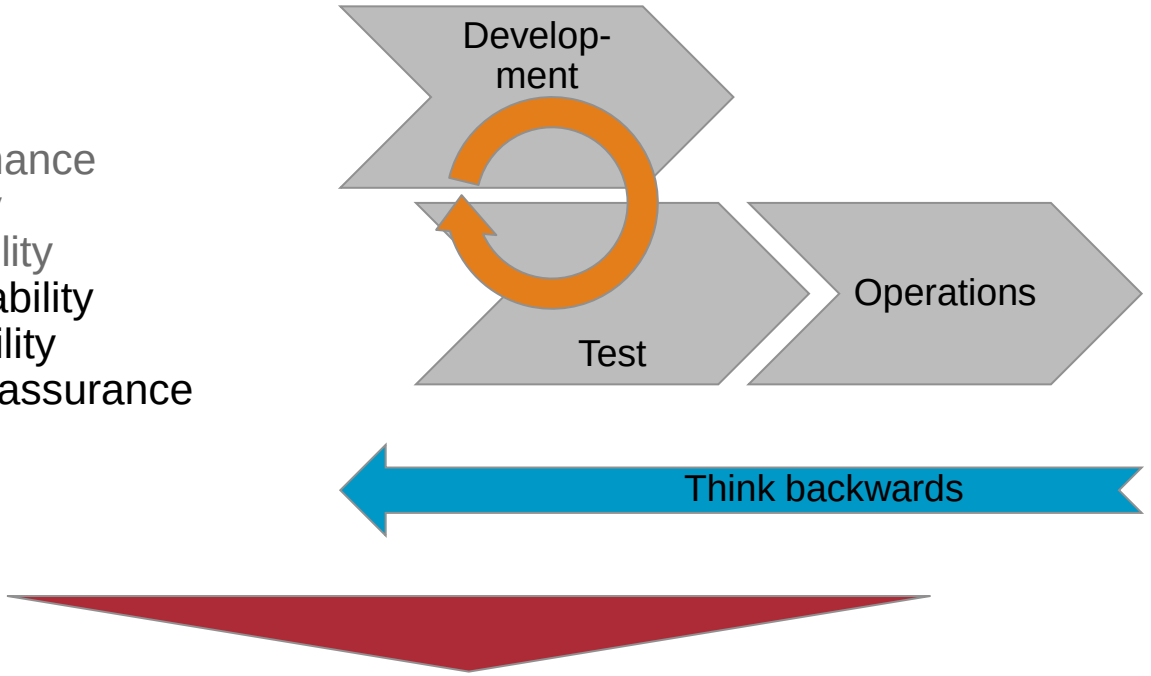


ongoing monitoring is necessary as well

Think backwards and automate



- Performance
- Stability
- Availability
- Deployability
- Operability
- Quality assurance
- ...



- Let the needs of you operations guide your development process.
- Improve quality and speed by automation.
- Make use of DevOps as far as reasonable.
- Keep in mind that SaaS changes the game because of ongoing and provider-driven evolution.

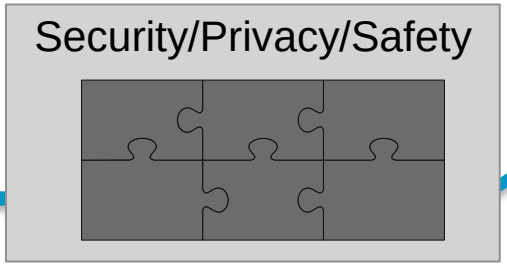
There are new concepts for evolutional development

- Agile alone is too much IT driven
- Changing only IT systems is often not enough
- Test during development is not enough: *Real* life evaluation is needed

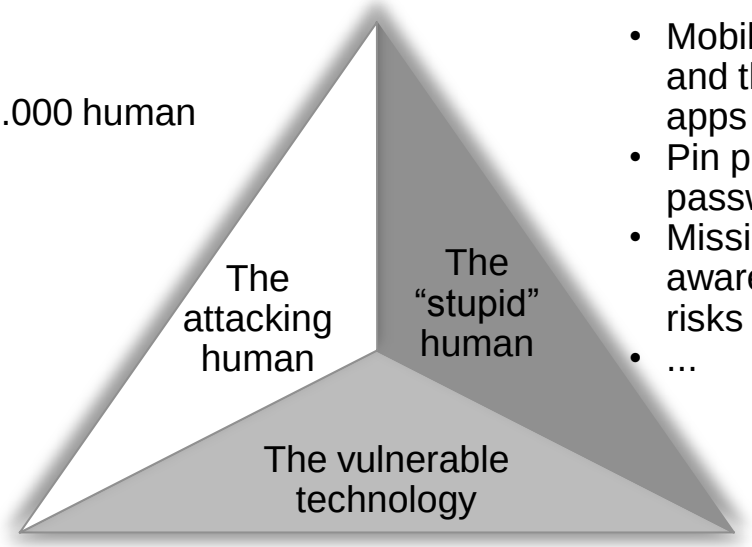
There are proven new approaches:

- **Design Thinking** (from Wikipedia: https://en.wikipedia.org/wiki/Design_thinking)
  "Design thinking is a formal method for practical, creative resolution of problems and creation of solutions, with the intent of an improved future result. In this regard it is a form of solution-based, or solution-focused thinking – starting with a goal (a better future situation) instead of solving a specific problem. "
- **Hot housing** (by Capgemini) where your implement new ideas in a small portion of the real life environment (one shop, one sub section of your portfolio etc.) not only taking IT into account but also business processes.

Security, Safety and Privacy: again not only IT topics



- 7.300.000.000 human beings

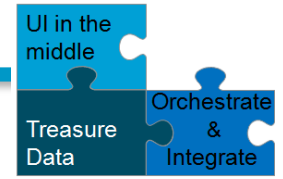


- Mobile devices and the related apps
- Pin posts with passwords
- Missing awareness of risks
- ...

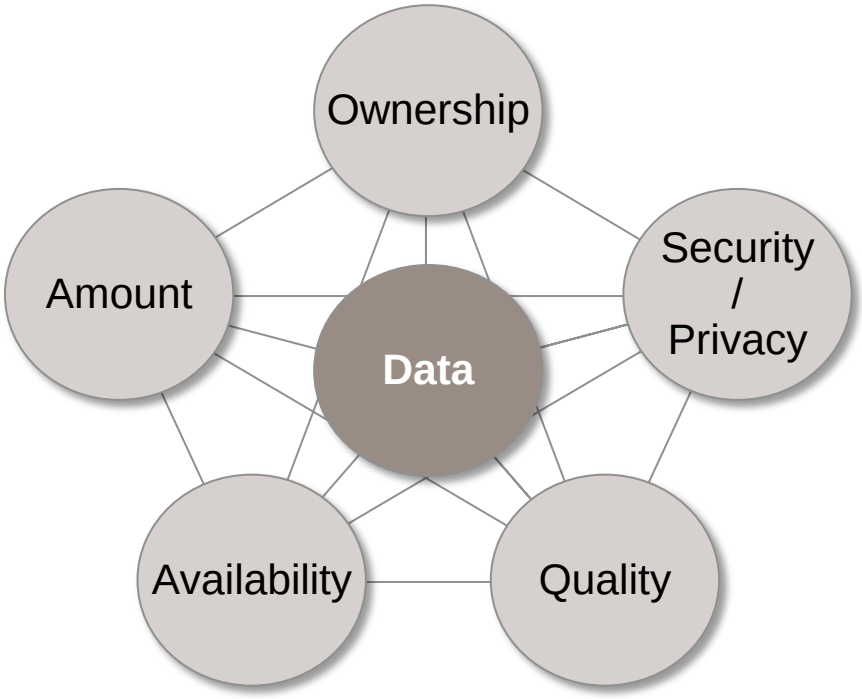
- Fast updates of all elements of an IT landscape
- Even more evolving technologies with Bring your own device etc.

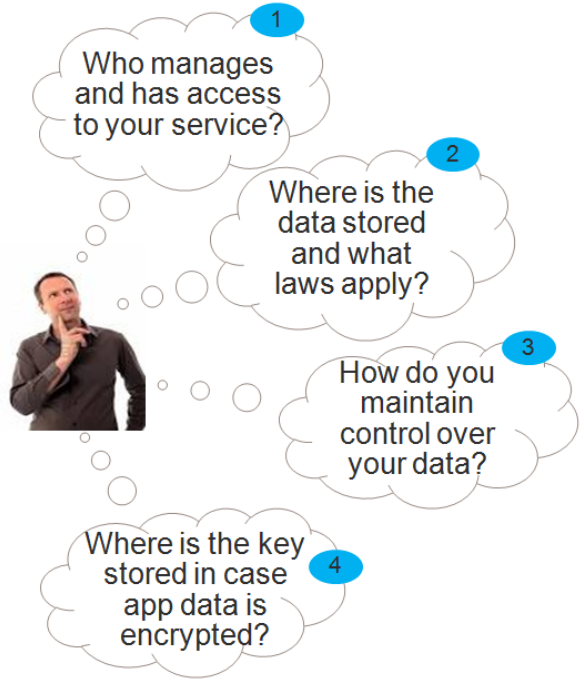
- As soon as there is a cable there is no 100% protection (same holds for other connections)
- The user has always to be taken into account and integrated in procedures
- Applying standards is the least that has to be done (ISO 27001 etc.)
- As in the case of the external services there is no one and final quality assurance
  - ⇒ ongoing surveillance is necessary
  - ⇒ Intrusion detection (on data, on service usage etc.) has to be provided
  - ⇒ Data analytics might help

Data: there are many facets to be taken into account



When you start thinking about a software system always think in parallel about the related data and the related security and privacy questions





Impact

1. Investigate Data Export Restrictions
2. Comply With Export Restrictions on Encryption Technologies
3. Understand Host Nation Data Access Laws
4. Understand the Nature and Location of the Stored Data
5. Review the Data Encryption Options

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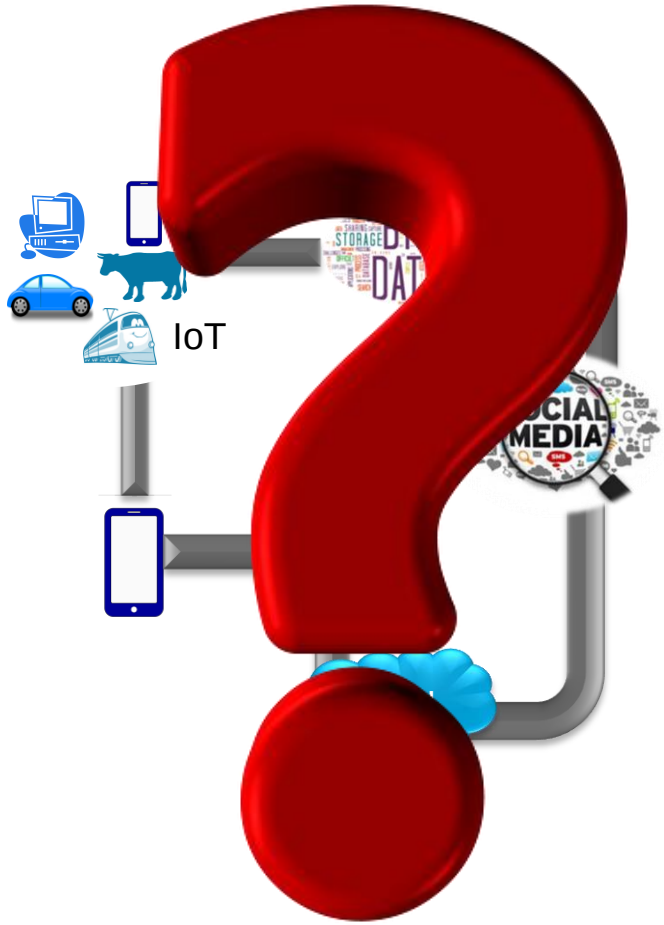
The digital disruption requires faster action, closer integration with the customer and a better differentiation of lifecycles.



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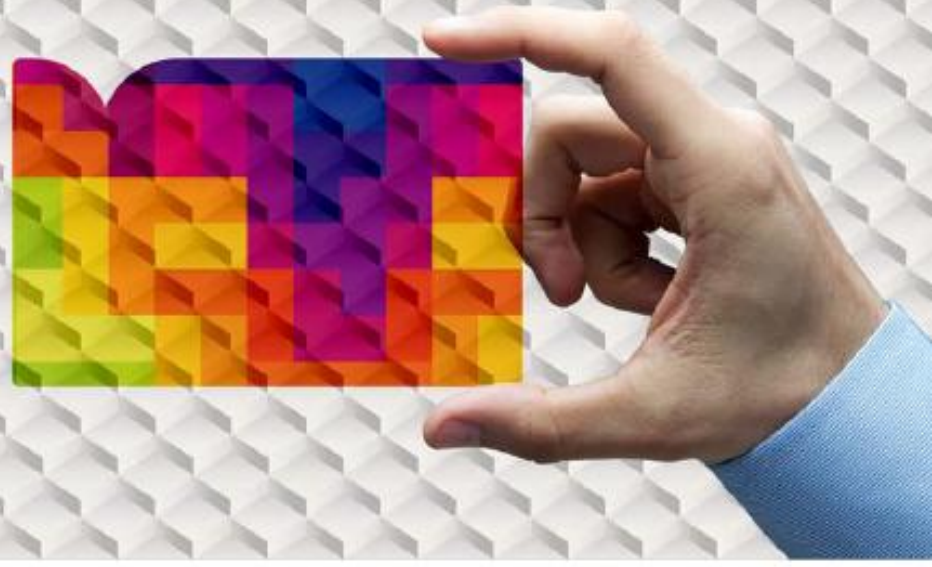
TechnoVision 2015

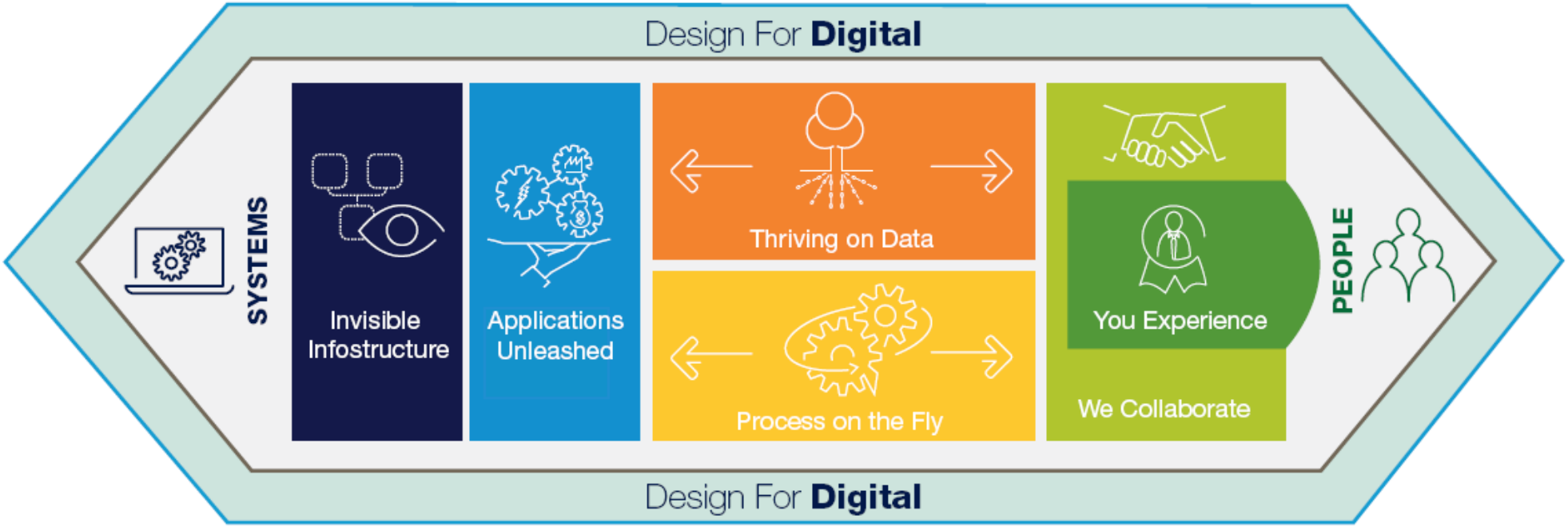
Technology Building Blocks for Digital Transformation



People matter, results count.

What is TechnoVision?

Analysis of trends in IT both from a business and a technological perspective. Written by leading technology experts of the Capgemini Group. The first Edition was published in 2007 and since then updated on a yearly basis.



„Design For Digital“ build the framework for the six clusters. It describes concepts such as „From Train to Scooter“ and how ever closer integration with the customer is necessary to drive Digital Transformation.

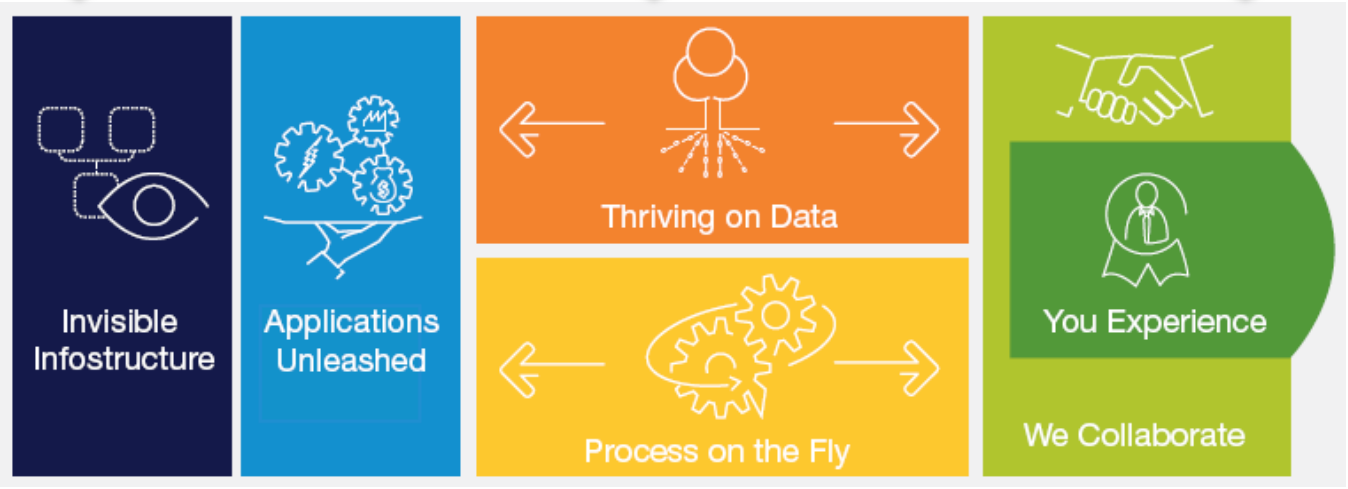
www.capgemini.com/thought-leadership/technovision-2015

TechnoVision Clusters – Overview

Seamless integration…
…into the infrastructure
…with physical entitites
…of your applications
…

Big Data with all its consequences: Analysis, Visualization, Management, …

Trends, which focus on groups: Social networks, Crowd Sourcing, Sharing Economy, …



Mobile devices, Apps and how they increasingly enter our lives and blur the line between work and home.

How to create and use services in a cloud-based environment.

Taking Business Process Management to the next level.

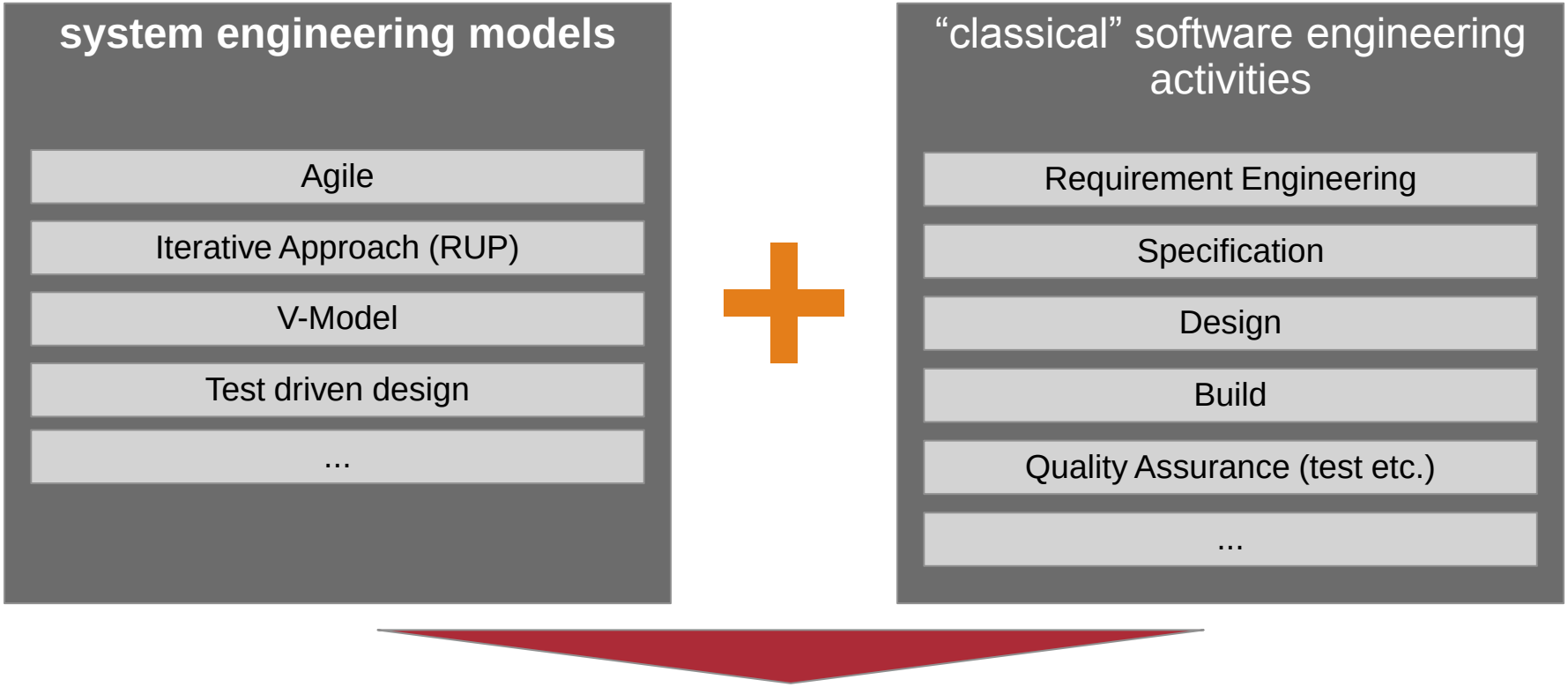
One central building block of the “Design for Digital”: *From Train to Scooter* or why “One size fits all” does not hold true any longer

LIFECYCLE	 TRAIN	 BUS	 HUB	 CAR	 SCOOTER
RHYTHM	YEAR	SEASON	MONTH	WEEK	DAY
APPLICATION AREAS	ERP, Legacy core apps	CRM, HCM, SCM, Procurement	Data market, Apps store, Mobile platform, API catalog	BPM, BI, ECM, Mobile, Apps	Rules, Portal, Collaboration site, active forms
GOVERNANCE	Central IT, outsourced, requirements	IT & Business, value scenarios	Central IT, platform-driven	Business, IT-enabled	Business / personal
ARCHITECTURE	Stability, predictability, robustness	Agility, model-driven, vanilla	Open, patterns, standards, service-oriented	Ease of use, flexible, model-driven	Self-service, configurable
TESTING	Formal, regression	Value / Use Case-driven	Industry Strength	Built-in, exploratory, integration	No harm, legal testing
DELIVERY	Linear, offshore	Agile, off /onshore, SaaS	Agile, project-by-project	Agile, model-driven, visual	Ad-hoc, visual, configuration
KEY CAPABILITIES	AM, reqs mgmt, rationalization	Scrum, template-driven	SOA, Cloud, integration	Business analysis, orchestration	End-user tools

https://www.capgemini.com/resource-file-access/resource/pdf/From_Train_to_Scooter.pdf

The right system engineering model and knowledge of all “classical” software engineering activities is required.

No matter whether you are developing a scooter or a train: it is necessary to know about design, testing etc. This holds true even if you are moving to the world of package based software where the way requirements engineering are done etc. again differ quite strongly.



Example for activities within a typical “Train” project

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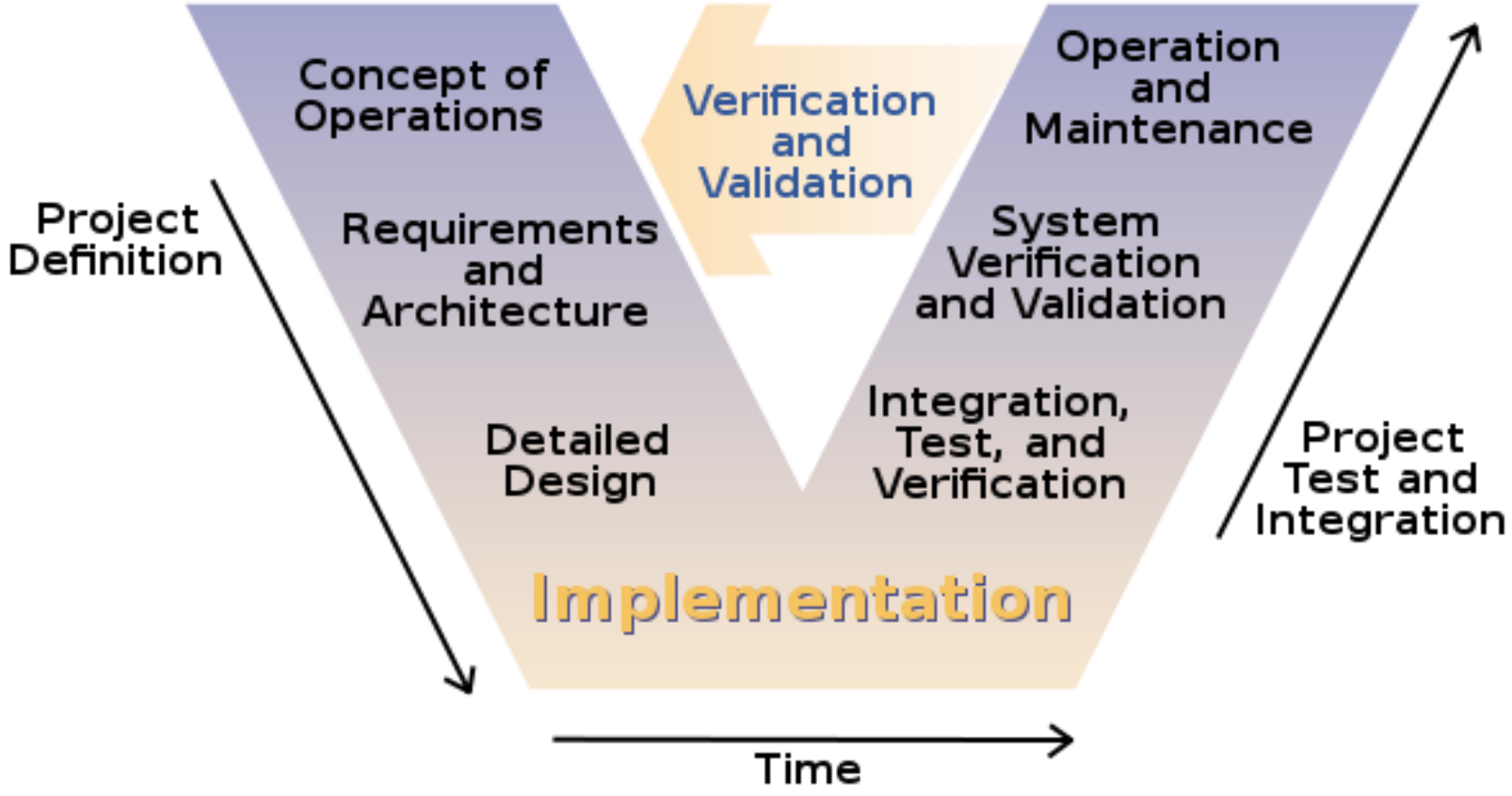
A system engineering model for train projects: The V-Model

When you do a project in the public sector in Germany you are required to apply the V-Model (https://en.wikipedia.org/wiki/V-Model). The complete documentation is 842 pages.



The different roles within the V-Model

4.2 Roles

4.2.27 Software Architect

Description

The »Software Architect is responsible for designing and developing all »Software Unit s and products of the type External Software Module of a »System.

Tasks and Responsibilities

- Designing the »Software Architecture,
- implementing the requirements posed on the software units,
- defining the requirements posed on the products of the type External Software Module,
- assuming responsibility for the software implementation, integration and evaluation concept,
- assuming responsibility for the External Software Module Specification,
- cooperating in the integration into the sgement and - possibly - system,
- cooperating in the development of the »System Architecture and the »Enabling System Architecture,
- cooperating in the preparation of the »System Specification or »External Unit Specification.

Skill profile

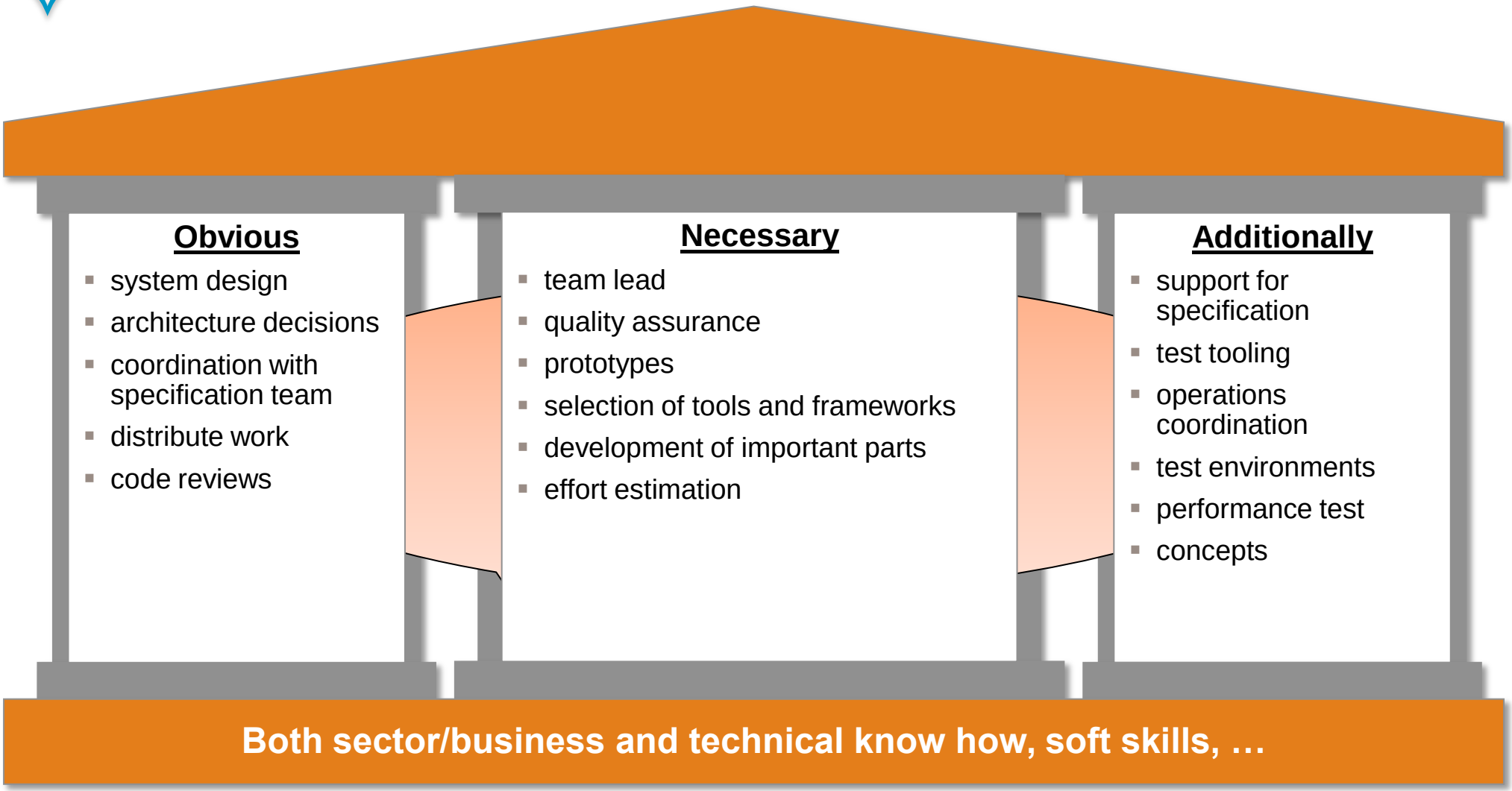
- Knowledge of application, environment and use of the system,
- knowledge of the system's interfaces,
- knowledge of architectural principles and different software architectures,
- knowledge of the system's software interfaces,
- knowledge of the standard software,
- knowledge of methods and tools,
- capability to recognize weak points and risks,
- capability to analyse problems with due consideration of the software/hardware and to develop appropriate solutions,
- capability to abstract and simplify,
- capability to recognize dependencies,
- capability to communicate with hardware developers, logistic experts and users.

Responsible for

Database Design, External Software Module Specification, Software Implementation, Integration and Evaluation Concept, Software Architecture, Software Specification

Participating in

My activities as the team-lead for development



Project View

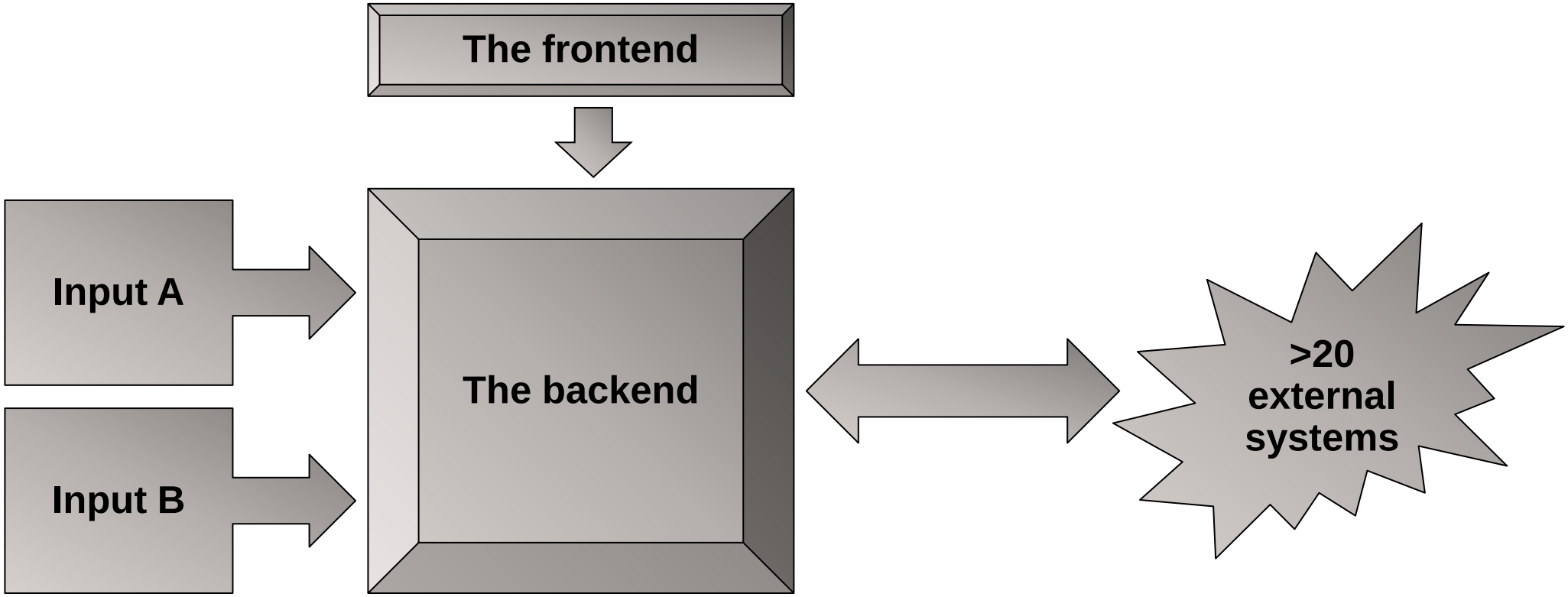
- **Duration**: ~2 years for first release, 6-9 months for each following release
- **Project time**: „time and material“ (usually without „material“)

- **Team size:**
- - more than 25 FTEs (Full Time Equivalents)
- - 6 from customer, 15 from Capgemini
- - 6 Developer, 2 Solution Architects, 6 Business Analysts, 7 Quality Assurance

- **Requirements**: 130 pages + Appendix, ~800 requirements (each 2-3 sentences)
- **Specification**: >600 pages + user interface prototype
- **System Design**: ~100 pages
- **Open issue tracking**: > 600 issues
- **“official” bug tracking:** ~120 tickets, additional „developer bugzilla“

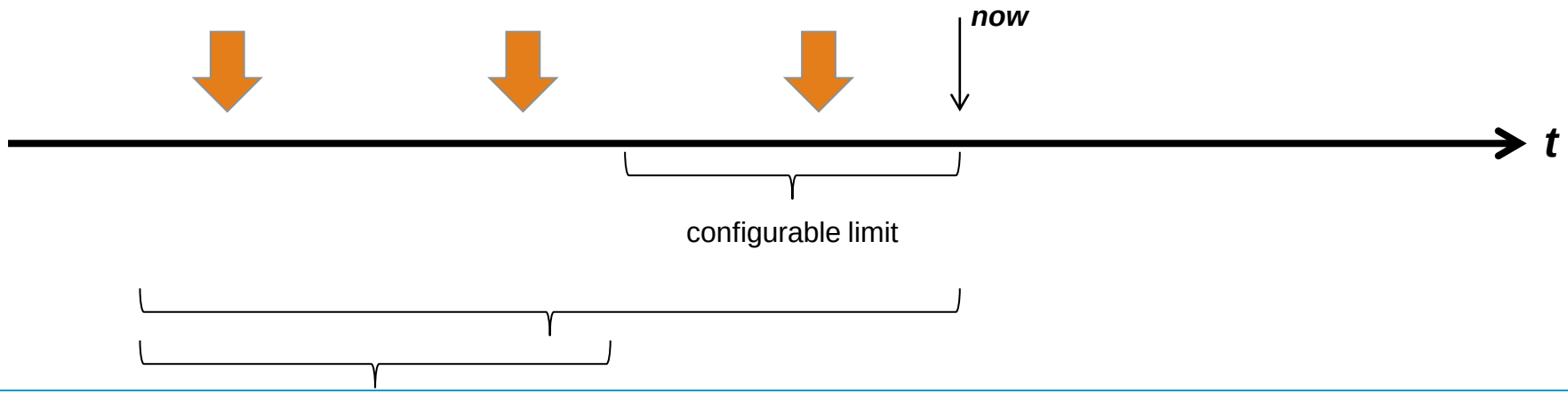
- **Java Code**: 109kLoC for all components (main component 71kLoC)
  includes test code (1206 JUnit tests), code coverage of main component: 86%

Simplified Business View
(no details due to project restrictions)



Example requirement

ID	Description	Importance	Release
UC_EX_123	The dialog has to show an (ignorable) notification, if the the selection contains entries, whose delivery date has not yet exceeded a (configurable) limit, which has to pass between reception of the delivery and the export of the containing entries.	Must	1.0



Technology View

- Runtime:
  - x86, SuSe Linux
  - WebSphere Portal Server 8.0
  - WebSphere Application Server 8.0
  - Oracle 11g Database, currently upgraded to 11c

- Standards and Frameworks:
  - Java SE 6, Java EE 6, EJB 3.1, Spring 3.2, Apache Commons, Log4J
  - Portal Server: JSF 2.0 (IBM MyFaces), Tomahawk 1.1, Portlet 2.0
  - Application Server: JPA 2.0 (Hibernate), JMS 1.1, Spring Batch, Groovy 2.2

- Developer tools:
  - Modelling: Rational Software Architect (RSA) 9.0 (Eclipse based)
  - Development: Rational Application Developer (RAD) 9.0 (also Eclipse based)
  - Version control: Rational Synergy

Administration - Benachrichtigungen

Wird nach erfolgreicher oder fehlgeschlagener Speicherung angezeigt.

Die Änderungen an der Konfiguration der E-Mail-Benachrichtigungen wurden gespeichert.

Discussion

E-Mail-Adresse	Alle	Problem / Fehlerfall	Ein…	…	…
Peter.Puste@abcde.de	☒	☐	☒	☒	
Maria.Matsch@abcde.de	☐	☐	☒	☐	
notification@abcde.de	☐	☒	☒	☐	
Max.Muster@abcde.de	☐	☐	☒	☐	
Ingrid.Schneider@abcde.de	☐	☐	☒	☒	
neue E-Mail-Adresse eingeben	☐	☐	☐	☐	

Technical topics:
- validation
- Javascript
- sorting/internationalization
- data model
- interface to backend
- mass testing
- white/blacklist
- templates
- …

Ein Klick auf das "Löschen" Symbol, löscht die E-Mail-Adresse und lädt den Dialog neu.

1.) Beim Öffnen des Dialogs wird immer eine neue leere Zeile angezeigt, die zur Eingabe einer neuen E-Mail-Adresse dient. "Speichern" speichert alle Änderungen im der kompletten Tabelle (inkl. einer neuen E-Mail-Adresse).
2.) Die Tabelle ist nach aufsteigendem Erstellungsdatum einer E-Mail-Adresse sortiert.

"Alle" aktiviert alle Benachrichtigungen für den Benutzer nach dem Speichern und zeigt die Änderungen nach dem Speichervorgang in dem Dialog an.

Speichern

Paging: in diesem Dialog wird keine Paging-Funktionalität angeboten-

Operations View

- New runtime platform for customer (both hard- and software)
- Cluster configuration with two nodes
- Separate developer and operations team
- Portal to integrate applications
- applications run on a shared server system
- applications have to be deployable in multiple versions
- four test environments (with identical configuration)

Agenda

- The Digital Transformation
- The consequences
- Technology Building Blocks for Digital Transformation
- Project example: A classical “train” engagement
- **Exercise Details & Outlook**

Cluster contents are discussed in the Workshop (27th of November 2015)

1. Make yourself familiar with the content of TechnoVision 2015 (Introduction, Digital Transformation): https://www.capgemini.com/resource-file-access/resource/pdf/technovision15.pdf
2. Choose your favorite cluster (e.g. “You experience”). Registration in moodle starts October 27th until November 2nd noon.
3. Your are assigned to one of the five building blocks of your cluster (e.g. “Digital Self”).
4. Read the building block description and do additional research in order to answer the questions in moodle. You have approximately one week for that.
5. Your answers will be checked (e.g. not copied from another student or from an internet page).
6. All answers will be made available and we form cluster groups of about 10 students, which organize a meeting and find answers to additional questions and prepare a presentation for the workshop.
7. For the workshop groups are reorganized, so each workshop team has members from all clusters. In the workshop the cluster content is presented and discussed.

Again: Exercise and workshops are not mandatory, but you will earn bonus points for exam, if you participate.

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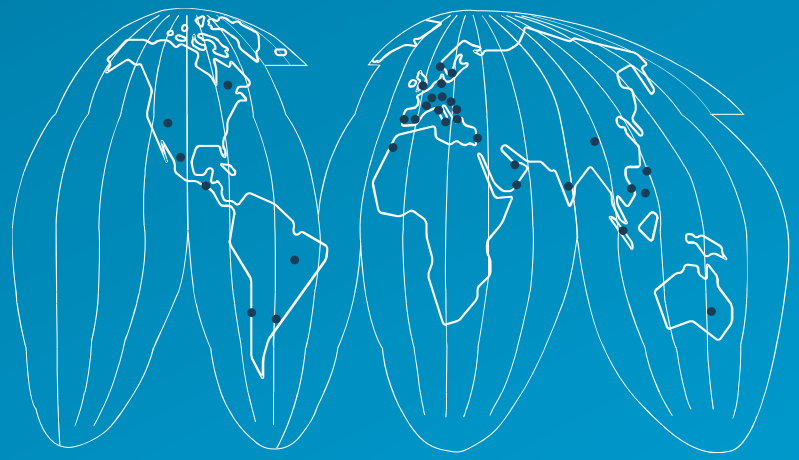

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Research and science live on the exchange of ideas, the clear arrangements are thereby useful.

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