Service Computation 2017
February 19 – 23, 2017 – Athens, Greece

Panel on COMP TOOLS/FUTURE COMP/BUSTECH
- Tools and Applications for Service Support -

"What are Tools and Applications for Service Support –
and do we really need them?"

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A. Hausotter

- Professor at the **University of Applied Sciences and Arts, Hannover**, Germany
  - Faculty of Business and Computer Science
  - Department of **Business Information Systems**
- Teaching areas
  - Database Systems, XML Databases, Information Modeling
  - **Distributed Information Systems**
- Research areas
  - **Service-oriented Architectures**
  - Business Process Management, Business Rules Management
  - Member of the CC_ITM

What is a Tool / App for Service Support?

- Tools (in general)
  - "A tool is any **physical item** [not belonging to the body] that can be **used to achieve a goal.**" [1]

Fig. 1: Hand axe, Source: [1]

Fig. 2: Toolbox Source: [1]

- Software Tools
  - "A program that is employed in the **development**, **repair**, or **enhancement** of other programs or of hardware….
  - "It is now recognized that software tools can assist in all activities of **all phases of the software life cycle**, including management and quality assurance activities."[2]
- Tools (and Applications) for Service Support
  - A program that assists in all phases of the **service life cycle:**
    - → Requirements and Analysis
    - → Design and Development
    - → IT Operations

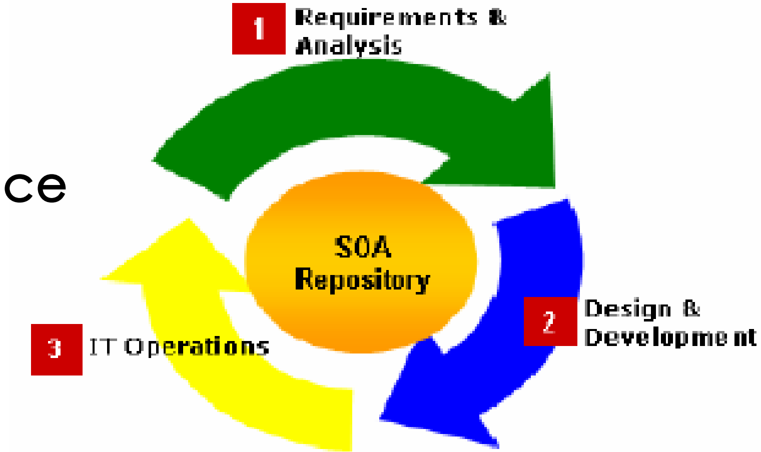
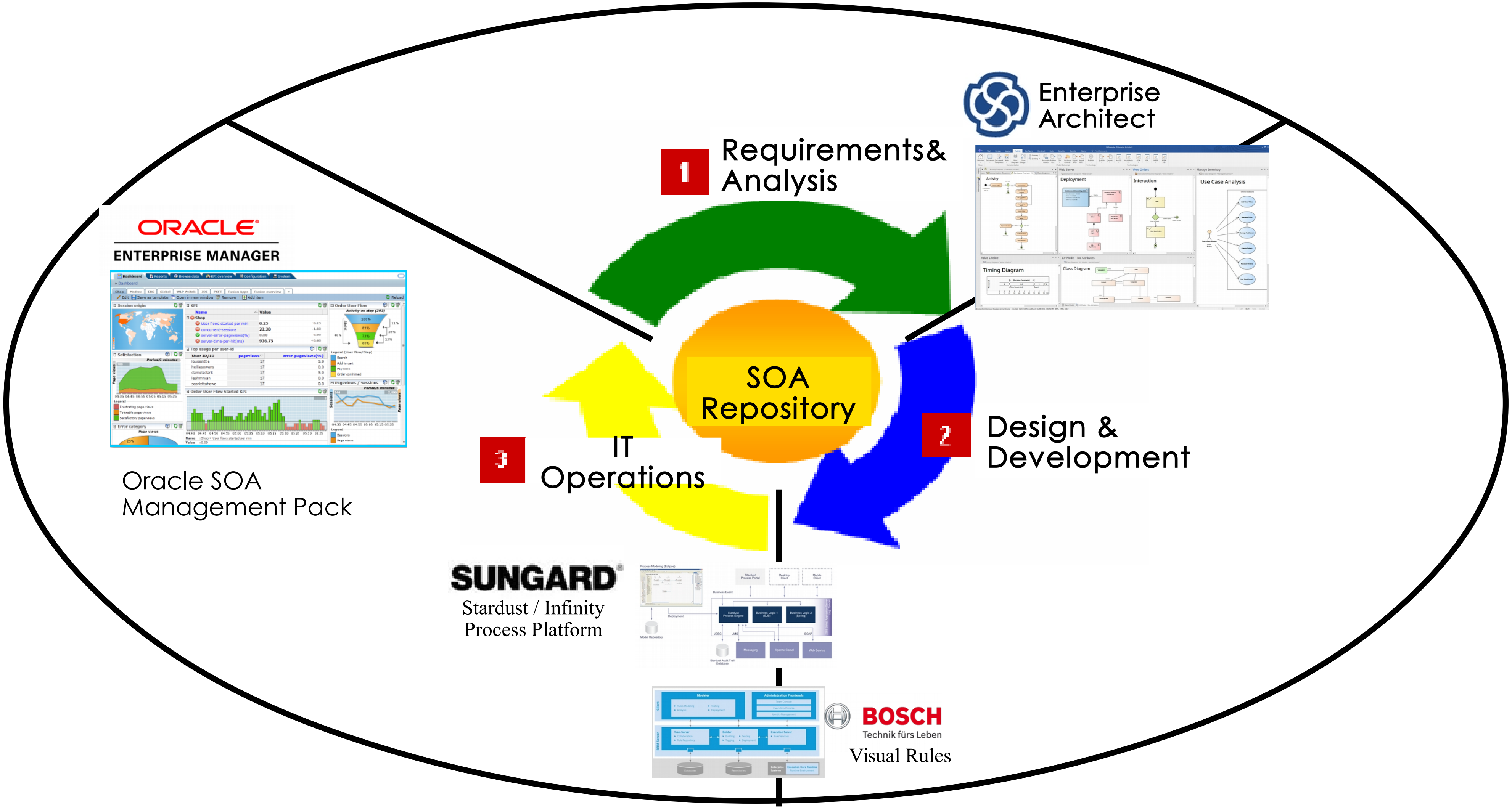


Fig. 3: Service Life Cycle , Source: [3]

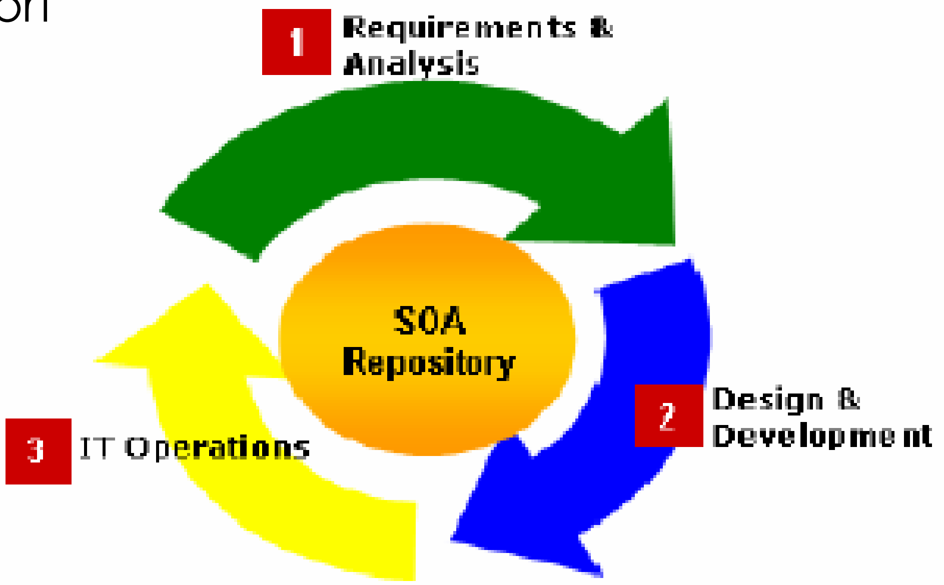
Tools and Apps for Service Support



My Position

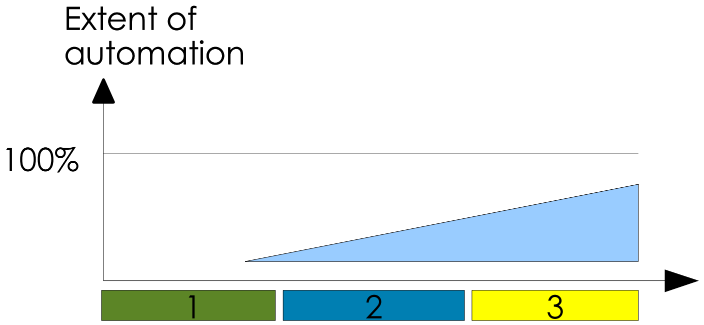
- Tools (and Applications) for Service Support
  - Are essential to design, develop, run and monitor services in a complex applications landscape
  - Some task may be **performed automatically**, e.g.

    → Test, deployment, monitoring, …
  - Many tasks may **never** be **performed automatically**



- The more creativity required, the less the task can be automated
  - Activities in 1 - Requirements and Analysis and 2 – Design and Development require a lot of knowledge, experience and creativity

    → They are **not suitable for automation**



SOA Service Registry / Repository (RR)

- Functional **requirements** for SOA Service RR
  - Design Time
    - → Service **recovery** and service reuse, **dependency** management, **versioning**, service **classification**, ...
  - Run time
    - → **User** and rights management, **life cyle** management, **change** management, **logging**, **monitoring** and accounting, **governance** & **compliance**, dynamic service recovery, ...
- Sample **provider** of SOA Service RR

ORACLE ENTERPRISE REPOSITORY
ORACLE
FUSION MIDDLEWARE
(c) Oracle Corp.

HP SOA Systinet
(c) HP Corp.

IBM WebSphere. software
WebSphere Service Registry and Repository
(c) IBM Corp.

software AG
CentraSite
(c) Software AG

Stardust BPM Suite

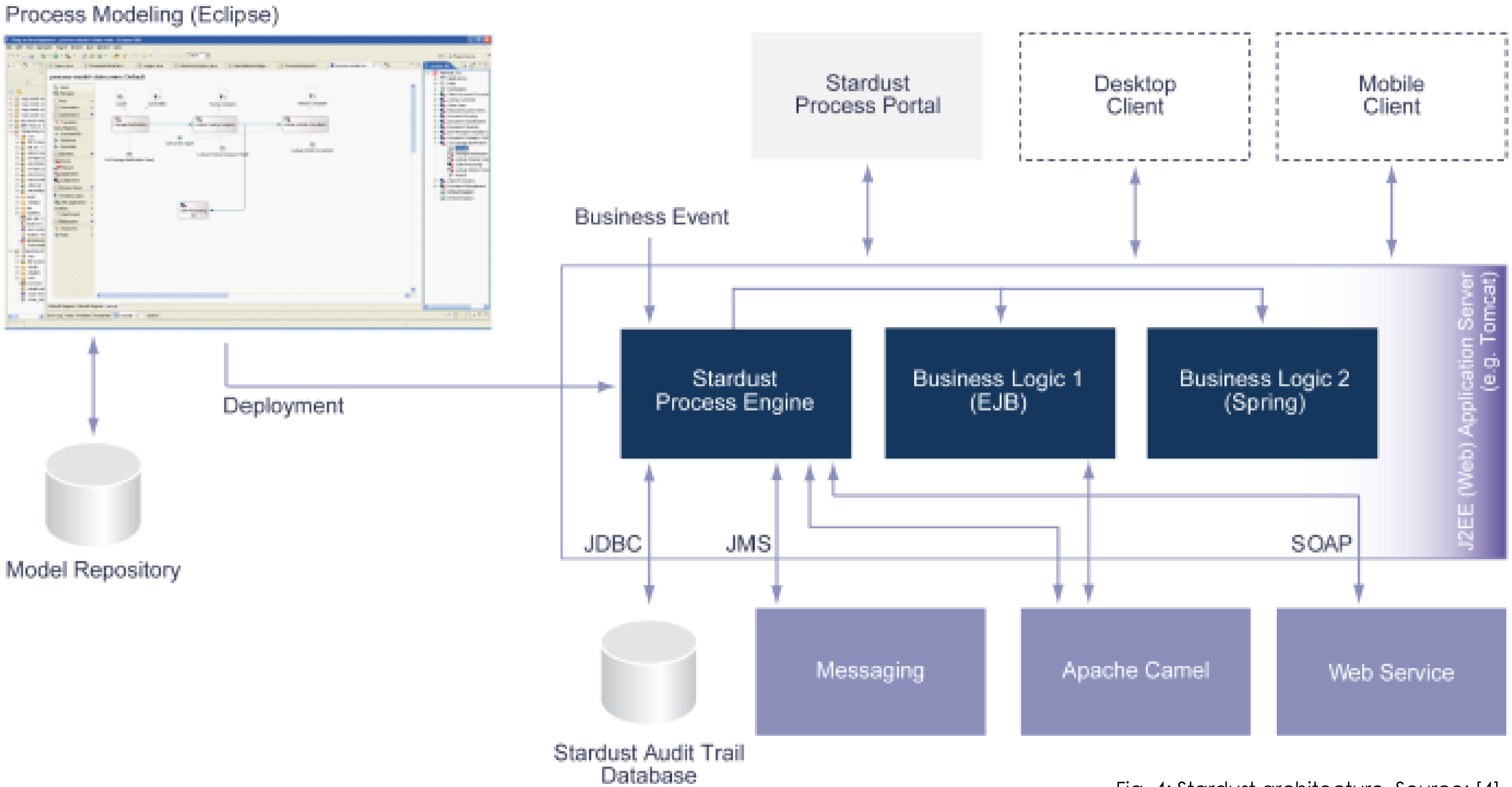


Fig. 4: Stardust architecture, Source: [4]

Visual Rules BRM Suite

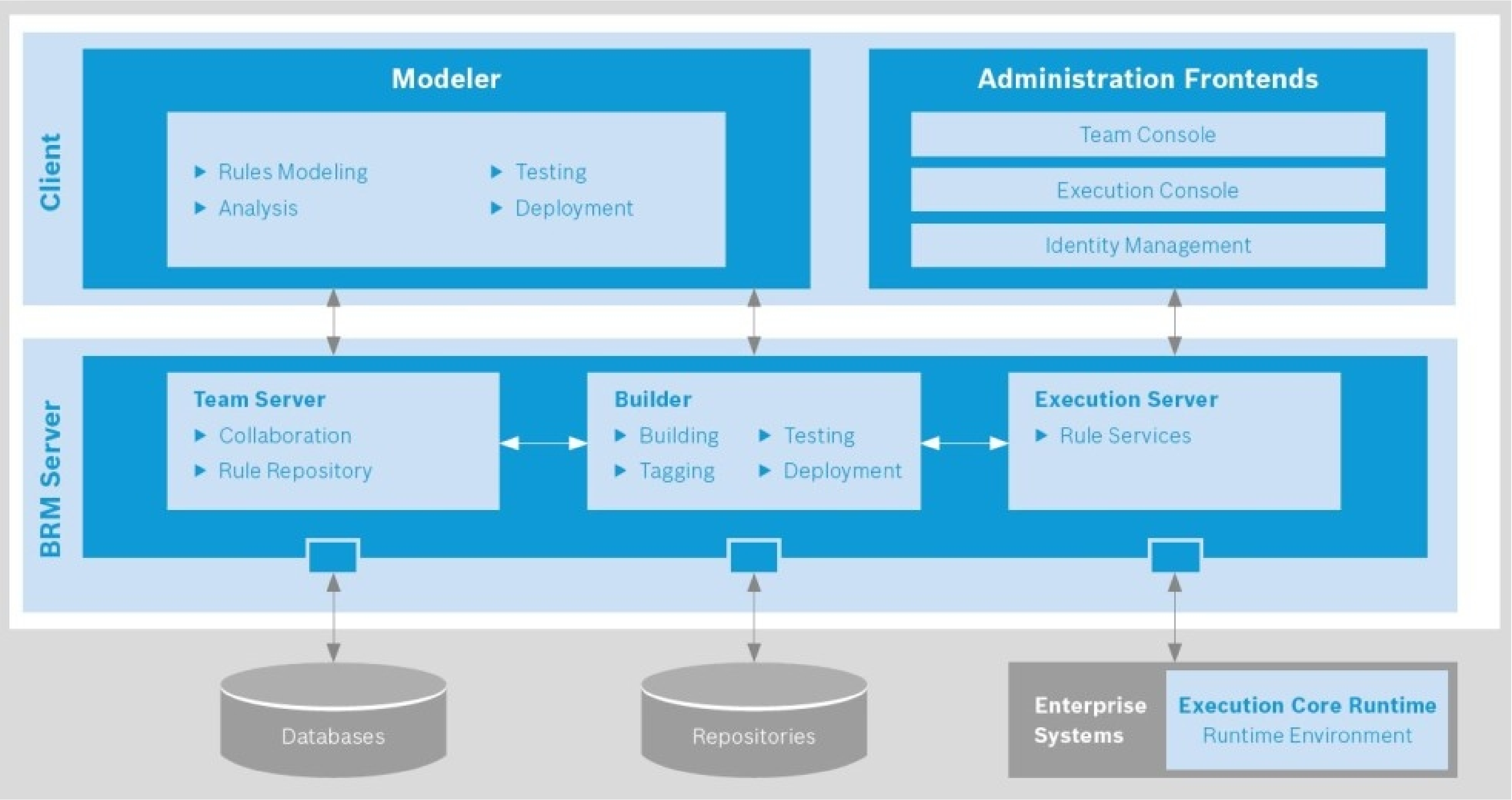


Fig. 4: Visual Rules architecture, Source: [6]

References

[1] Wikipedia [Online]. URL: https://en.wikipedia.org [accessed: 2017-02-18].

[2] Encyclopedia.com [Online]. URL: http://www.encyclopedia.com [accessed: 2017-02-18].

[3] Surekha Durvasula et al. SOA Practitioners' Guide Part 3 - Introduction to Services Lifecycle, 2006.

[4] Simone Seuerer et al., Stardust – eine vollständige BPM-Suite in Eclipse, Eclipse Magazin, 2013.

[5] Oracle Corp. (edt.), Oracle SOA Management Pack Enterprise Edition [Online]. URL: http://www.oracle.com/us/ products/middleware/soa/ management-pack/overview/index.html [accessed: 2017-02-18].

[6] Software Innovations, Visual Rules Architecture [Online]. URL: https://www.bosch-si.com/de/produkte/business-rules-management/aufbau-architektur/mandantenfaehigkeit.html [accessed: 2017-02-18].

University
of Economics
in Katowice

your place

your space

your future

Principles and Architectures for IT Service Support Applications

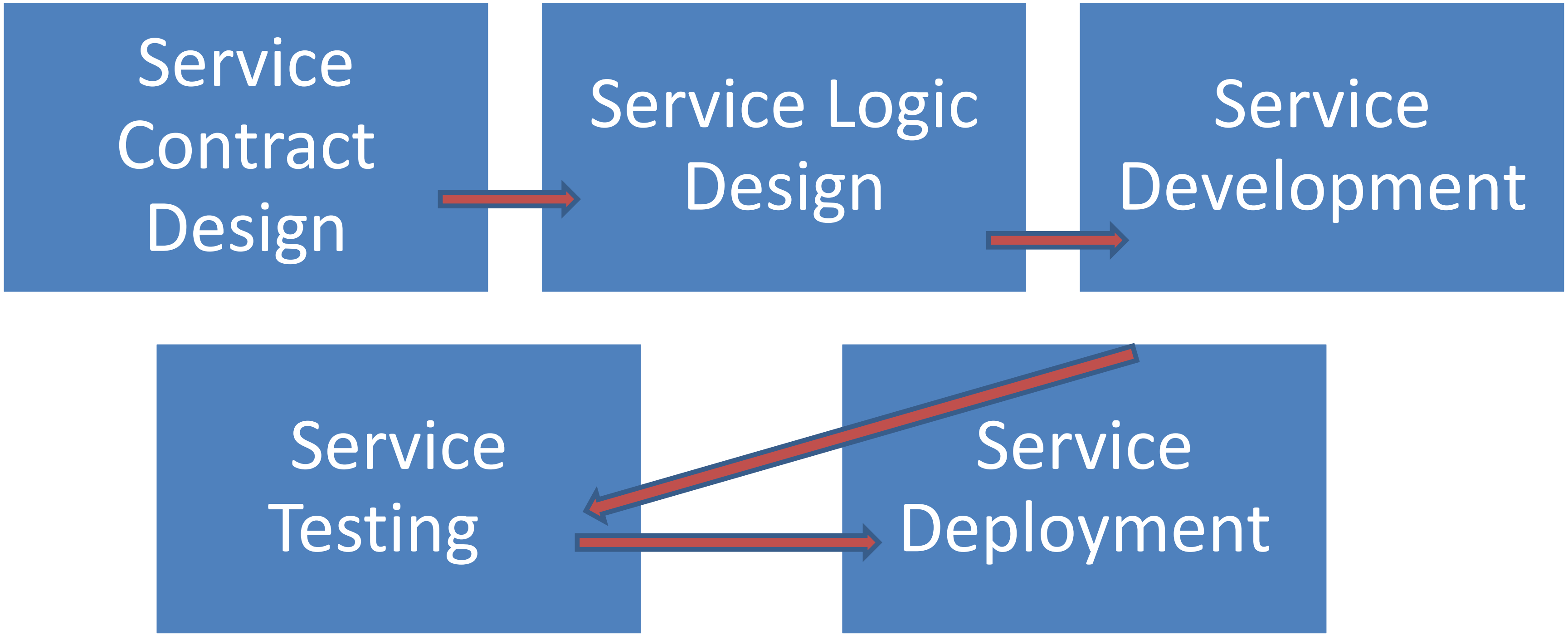
Małgorzata Pańkowska

Panel on COMP TOOLS/FUTURE

COMP/BUSTECH 2017

Topic: Tools & Applications for Service Support

From Service-Oriented Analysis to Service Governance



Service Contract Design

Service Logic Design

Service Development

Service Testing

Service Deployment

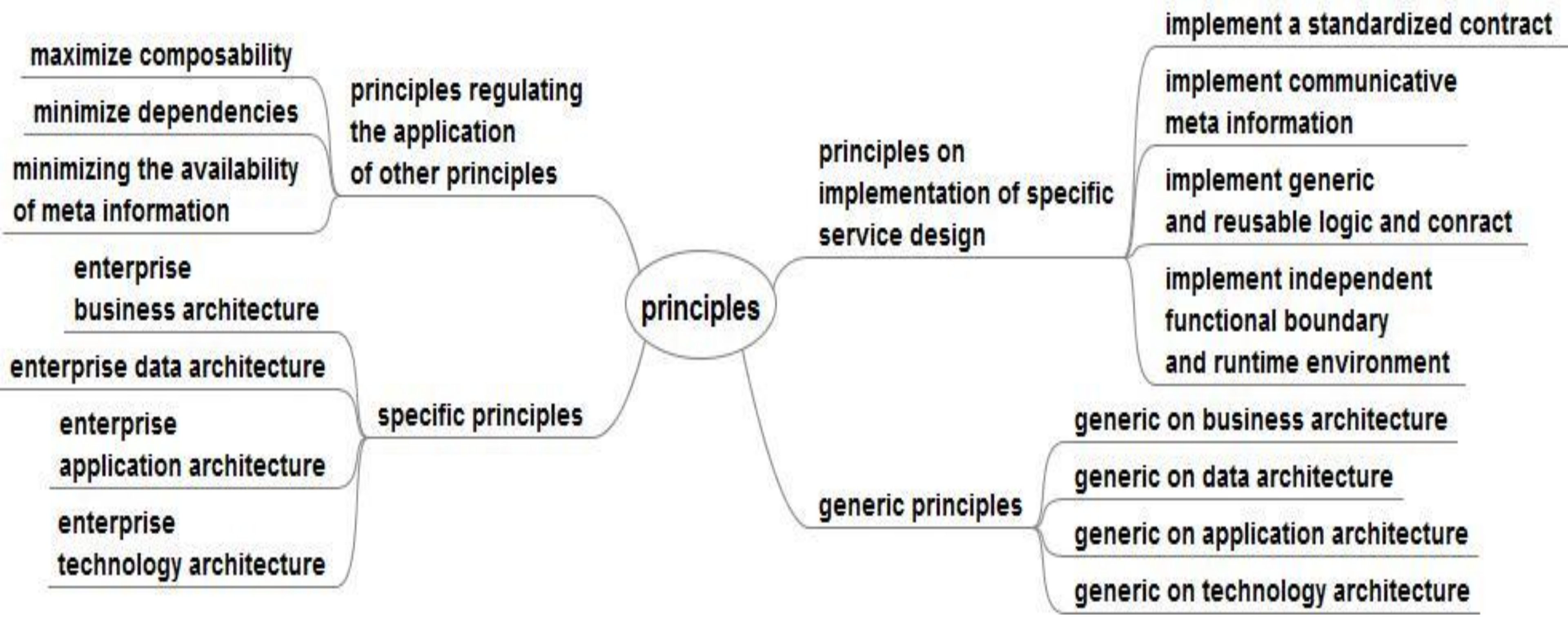
Serviceology

service science, management & engineering (SSME)

Principles

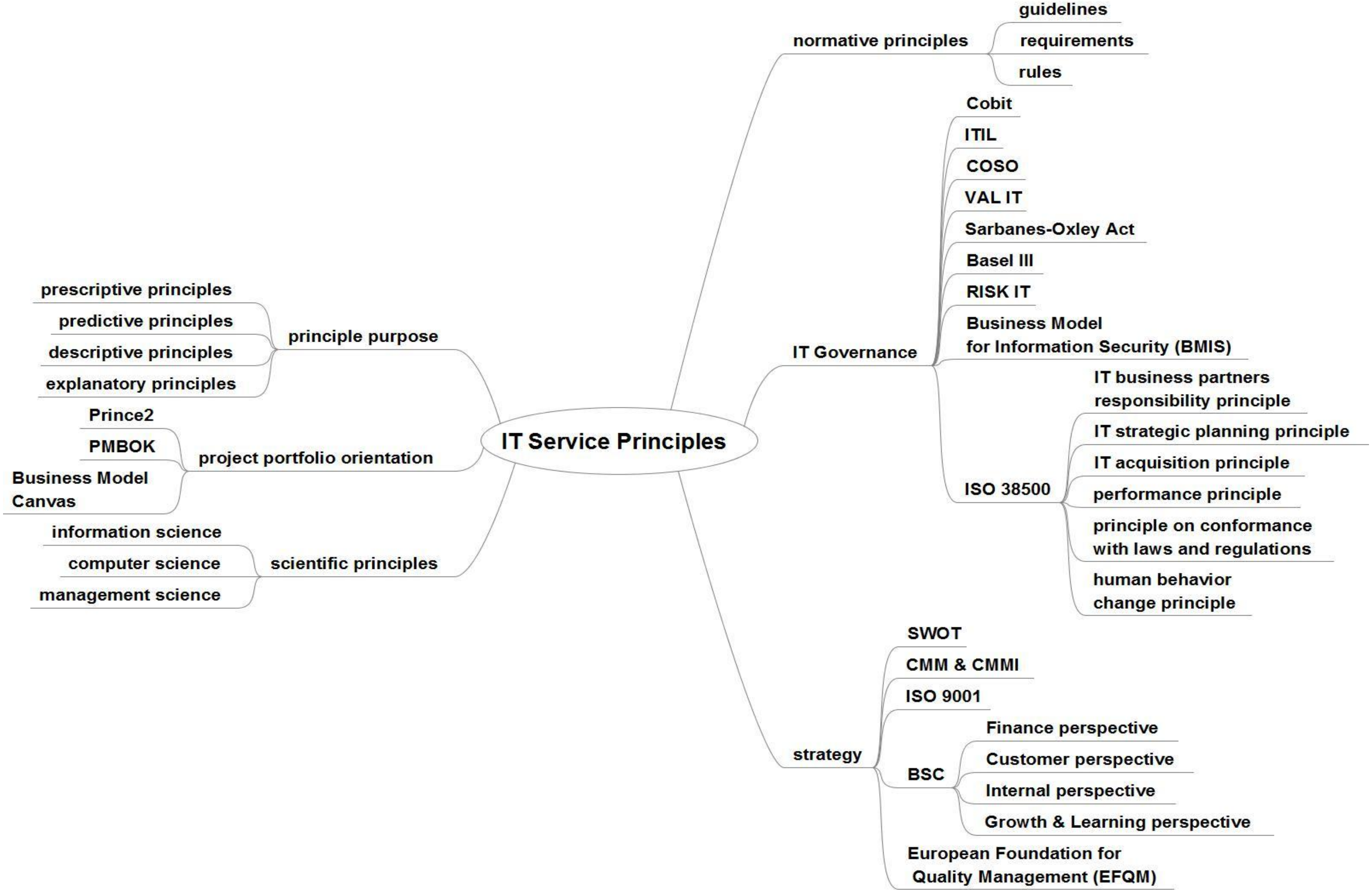
- laws of nature, beliefs, rules of conduct, (explicitly defined to influence behaviour, and typically based on facts and beliefs [Greefhorst & Proper, 2011]
    - scientific principles correspond to their interpretation as a law or fact of nature underlying the working of an artificial device [Meriam-Webster 2003]
    - normative principle is a declarative statement that normatively prescribes a property of something
    - design principle is a normative principle on the design of an artifact. That principle is realized by applying as part of formal analysis and design processes
- a generalized, accepted industry practice [Erl, 2008]

Proposed partitioning of architecture principles



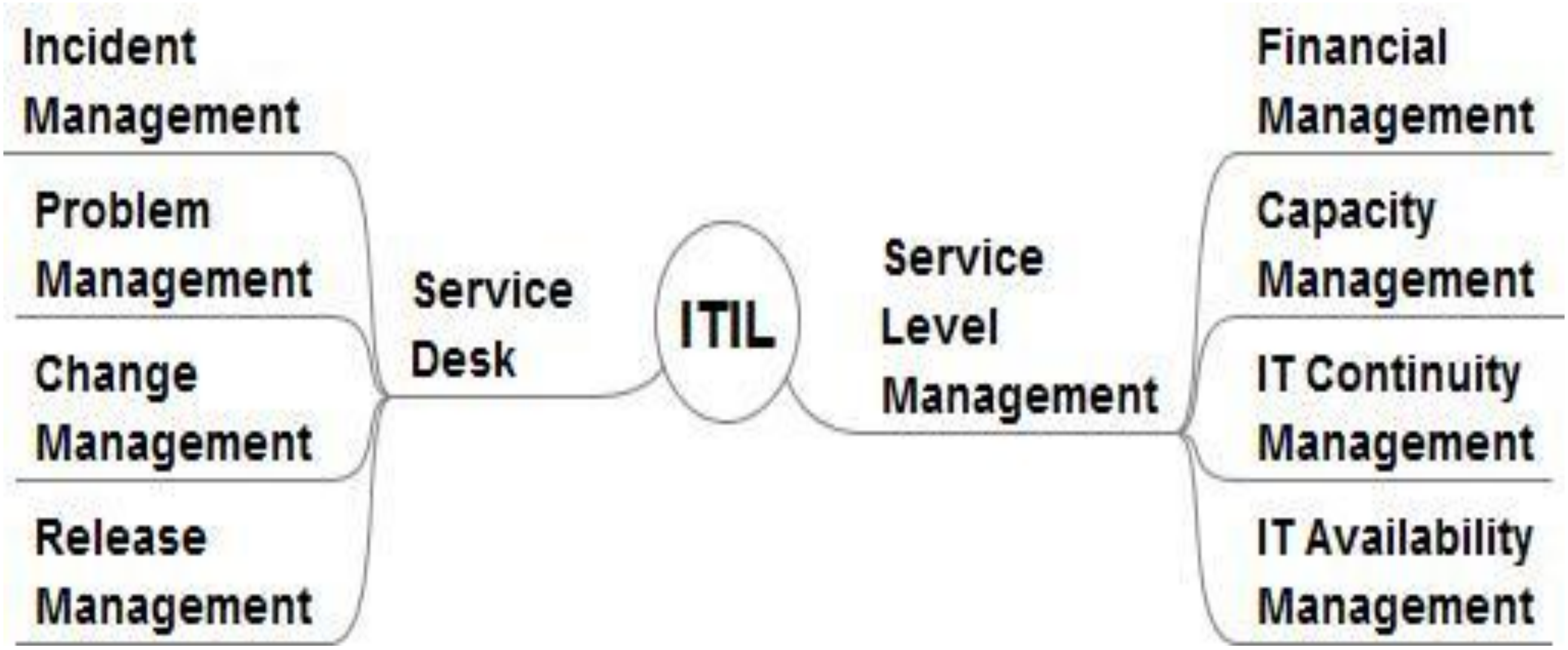
principles
principles regulating the application of other principles
maximize composability
minimize dependencies
minimizing the availability of meta information
specific principles
enterprise business architecture
enterprise data architecture
enterprise application architecture
enterprise technology architecture
principles on implementation of specific service design
implement a standardized contract
implement communicative meta information
implement generic and reusable logic and conract
implement independent functional boundary and runtime environment
generic principles
generic on business architecture
generic on data architecture
generic on application architecture
generic on technology architecture

IT Service Development Principles

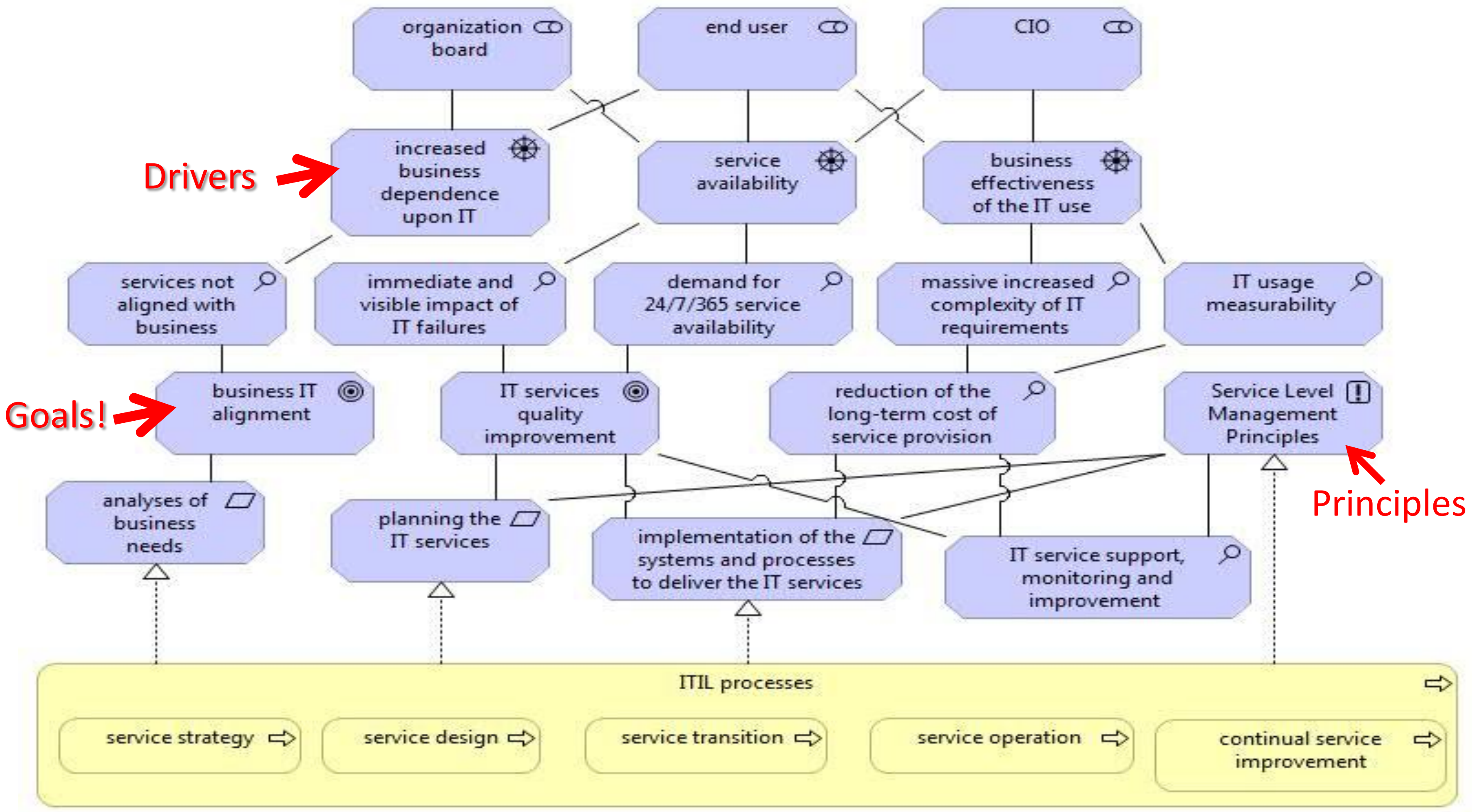


- IT Service Principles
  - normative principles
    - guidelines
    - requirements
    - rules
  - IT Governance
    - Cobit
    - ITIL
    - COSO
    - VAL IT
    - Sarbanes-Oxley Act
    - Basel III
    - RISK IT
    - Business Model for Information Security (BMIS)
    - ISO 38500
      - IT business partners responsibility principle
      - IT strategic planning principle
      - IT acquisition principle
      - performance principle
      - principle on conformance with laws and regulations
      - human behavior change principle
  - strategy
    - SWOT
    - CMM & CMMI
    - ISO 9001
    - BSC
      - Finance perspective
      - Customer perspective
      - Internal perspective
      - Growth & Learning perspective
    - European Foundation for Quality Management (EFQM)
  - principle purpose
    - prescriptive principles
    - predictive principles
    - descriptive principles
    - explanatory principles
  - project portfolio orientation
    - Prince2
    - PMBOK
    - Business Model Canvas
  - scientific principles
    - information science
    - computer science
    - management science

ITIL processes



ITIL motivation & processes


organization board
end user
CIO
Drivers
increased business dependence upon IT
service availability
business effectiveness of the IT use
services not aligned with business
immediate and visible impact of IT failures
demand for 24/7/365 service availability
massive increased complexity of IT requirements
IT usage measurability
Goals!
business IT alignment
IT services quality improvement
reduction of the long-term cost of service provision
Service Level Management Principles
Principles
analyses of business needs
planning the IT services
implementation of the systems and processes to deliver the IT services
IT service support, monitoring and improvement
ITIL processes
service strategy
service design
service transition
service operation
continual service improvement

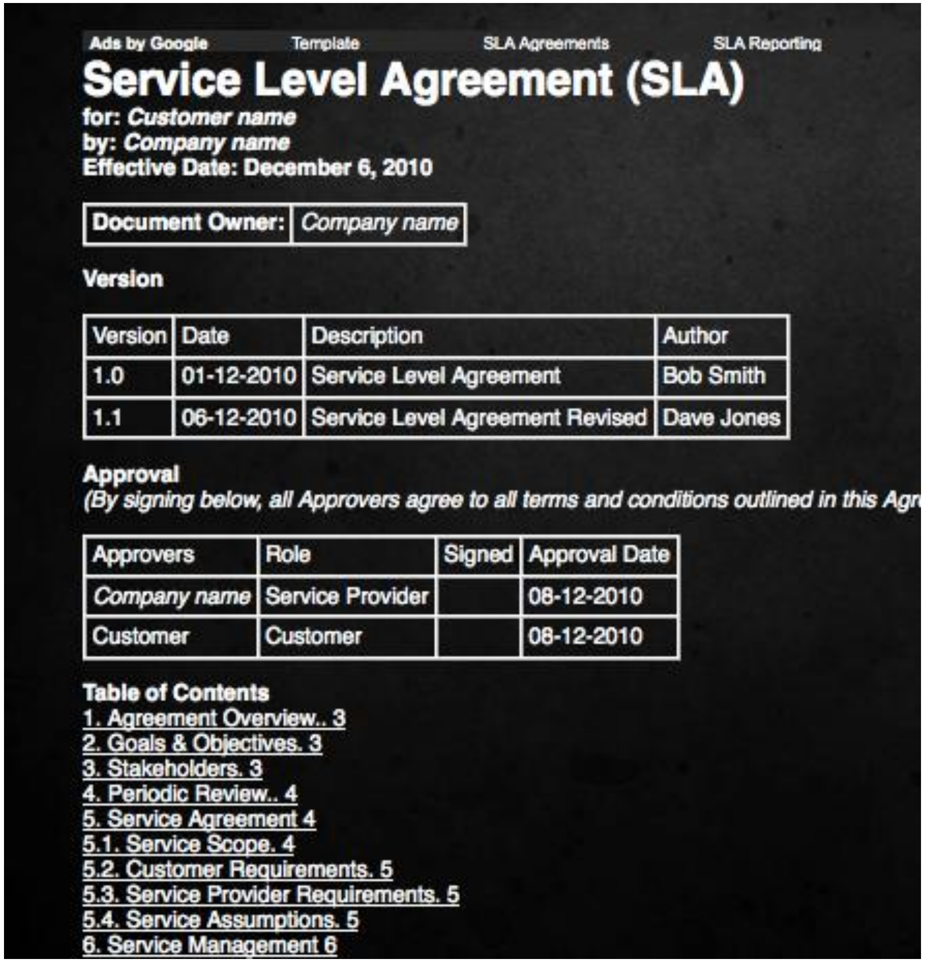
SLA as central point in IT service mngt architecture

Service Level Agreement (SLA) is a part of a service contract between customer and service provider where the level of service (QoS) is formally defined

Examples

- Delivery time, Performance, Availability, Uptime, Speed, Accuracy, Response, Security
- Reliability
- MTBF: Mean Time Between Failure
- MTTR: Mean Time To Repair
- Response time

http://en.wikipedia.org/wiki/Service_level_agreement



Service Level Agreement (SLA)

for: *Customer name*
by: *Company name*
Effective Date: December 6, 2010

Document Owner:	*Company name*

Version

Version	Date	Description	Author
1.0	01-12-2010	Service Level Agreement	Bob Smith
1.1	06-12-2010	Service Level Agreement Revised	Dave Jones

Approval
(By signing below, all Approvers agree to all terms and conditions outlined in this Agr

Approvers	Role	Signed	Approval Date
Company name	Service Provider		08-12-2010
Customer	Customer		08-12-2010

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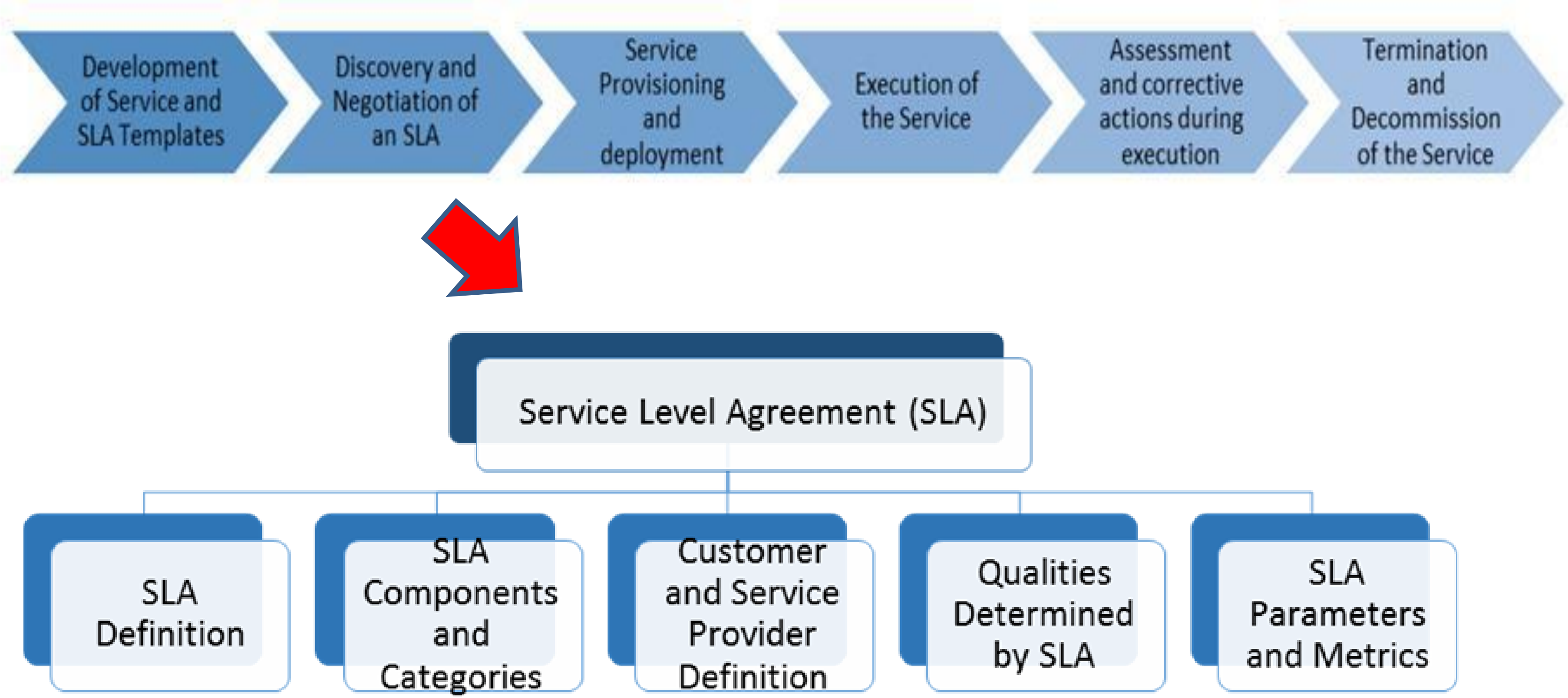
[http://www.slatemplate.com/]

SLA as central point in IT service mngt architecture



Development of Service and SLA Templates

Discovery and Negotiation of an SLA

Service Provisioning and deployment

Execution of the Service

Assessment and corrective actions during execution

Termination and Decommission of the Service

Service Level Agreement (SLA)

SLA Definition

SLA Components and Categories

Customer and Service Provider Definition

Qualities Determined by SLA

SLA Parameters and Metrics

[http://dx.doi.org/10.14257/ijgdc.2015.8.5.02]

Advent of AI chat bots for customer service

Marcelo De Barros

Principal Group Engineering Manager – Bing - Microsoft

The cost of customer service

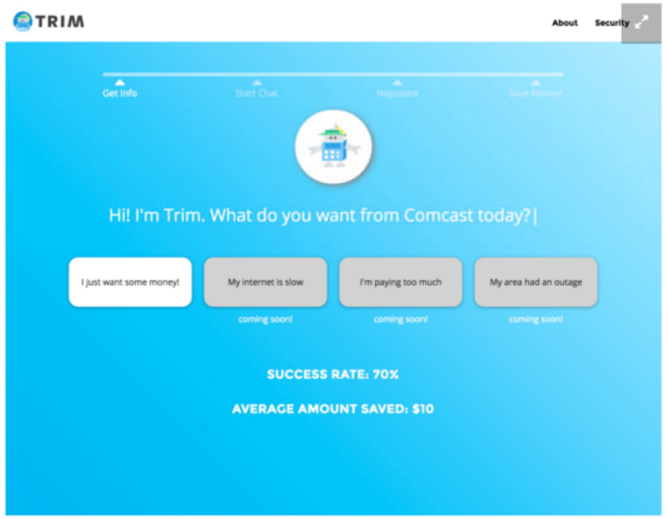
- 72% of the businesses name improving customer experience their top priority (*source: Forrester https://www.forrester.com/72+Of+Businesses+Name+Improving+Customer+Experience+Their+Top+Priority/-/E-PRE9109*)
- US businesses lose a total of $62B due to poor customer service (*source: Newvoicemedia https://www.newvoicemedia.com/blog/the-62-billion-customer-service-scared-away-infographic/*)

Advent of AI (Artificial Intelligence)

- Industry is heavily moving into this direction (bots and personal assistants):
  - Amazon Alexa
  - Google Allo
  - Microsoft Cortana
  - Apple Siri
- 2017 trends in Customer Service (*source: Forbes* *http://www.forbes.com/sites/shephyken/2017/01/07/10-customer-service-and-customer-experience-cx-trends-for-2017/#3b0ecc167348*) :
  - *"AI and IA assist those who assist the customer.* ***Artificial Intelligence is coming to the forefront of how a company creates a better CX****. Machines' ability to interact with humans is stronger than ever. AI will help us make better business decisions, many of them positively impacting the customer. AI won't necessarily take over the human function, although in some places it can and will, but it will assist customer support people, becoming an IA , or Intelligent Assistant."*
  - *"Chatbots are getting better. This ties into AI.* ***The online text conversation we have with a company's customer support center may not be with a live person, but a computer****. When a machine can create a positive experience for the customer, everyone wins. The best chatbots are able to not only respond to requests and questions, but also recognize when the customer is confused and seamlessly hand off the conversation to a live customer support rep."*

And that’s already happening

- **Taco Bell**: ordering Tacos via chat bots
- **UPS**: check the status of UPS packages via Facebook Messenger Bots
- **Staples**: ordering office supplies with AI bots
- **Wynn hotels**: querying for hotel and room information using Bots
- **Comcast’s Trim Chat Bot**



Hi! I'm Trim. What do you want from Comcast today?|

SUCCESS RATE: 70%

AVERAGE AMOUNT SAVED: $10

Screenshot/Jason Lederman

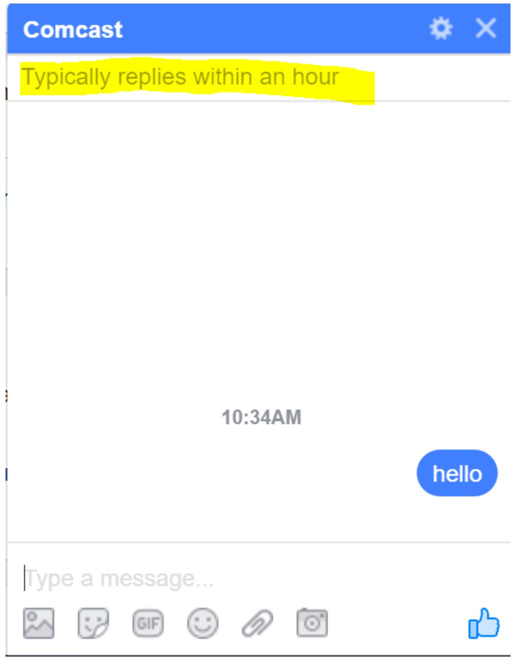
The first step of Trim's Comcast chatbot

General Chat Bots vs. Customer Chat Bots

Key Chat Bots Principles	
General Chat Bots	*Customer Chat Bots*
Notification: re-engaging users	Might be interesting in a hybrid scenario
Structure: much less NLP, more quick replies	NLP becomes more appealing (intent discovery)
Contextual: location-aware, subject-aware, personal	Same principle applies
Social: shareable, embedded into H2H conversation	Private
Fundamentals: blazingly fast, platform-agnostic	Same principle applies
Purpose: created with one purpose	Multi-purpose but with quick funneling
Autonomous: no human intervention	Hybrid with reduction in human resources

Bots will replace people before they replace apps (*source: VentureBeat* *http://venturebeat.com/2017/01/16/bots-will-replace-people-before-they-replace-apps/*)

But it will take some time…

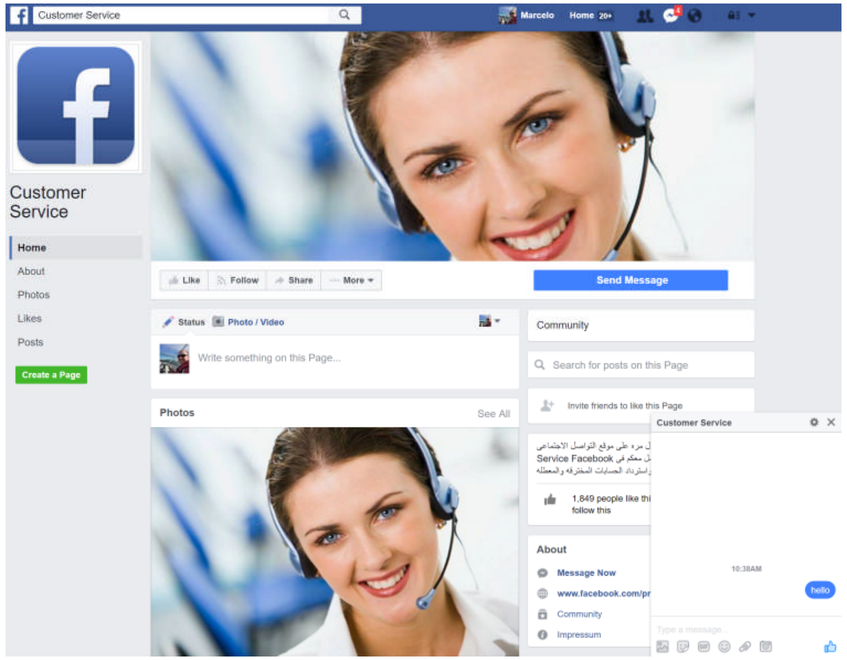


Comcast

Typically replies within an hour

10:34AM

hello



Customer Service

10:38AM

hello

- What do you think? Are Chat Bots the future of Customer Service?

Microservices for Business Applications - Future directions, challenges, and limitations

Panel COMP TOOLS / FUTURE COMP / BUSTECH ”Tools and Applications for Service Support”

Athens, Greece
February, 21st 2017

Prof. Dr. Sascha Alda

Department of Computer Science
Bonn-Rhine-Sieg University of Applied Sciences
Sankt Augustin, Germany

Hochschule
Bonn-Rhein-Sieg
University of Applied Sciences

Short introduction to Prof. Dr. Sascha Alda

Professor for Computer Science, Bonn-Rhein-Sieg University of Applied Sciences (BRSU)

Contact:
E-Mail: sascha.alda@h-brs.de
Web: sascha-alda.de

Finisher at Ironman 70.3
Zell am See, Austria
(August, 2016)

Guest Lecturer at the VGU
Ho Chi Minh City, Vietnam
(December, 2015)

Background:

- Main areas of interests: software engineering, software architecture

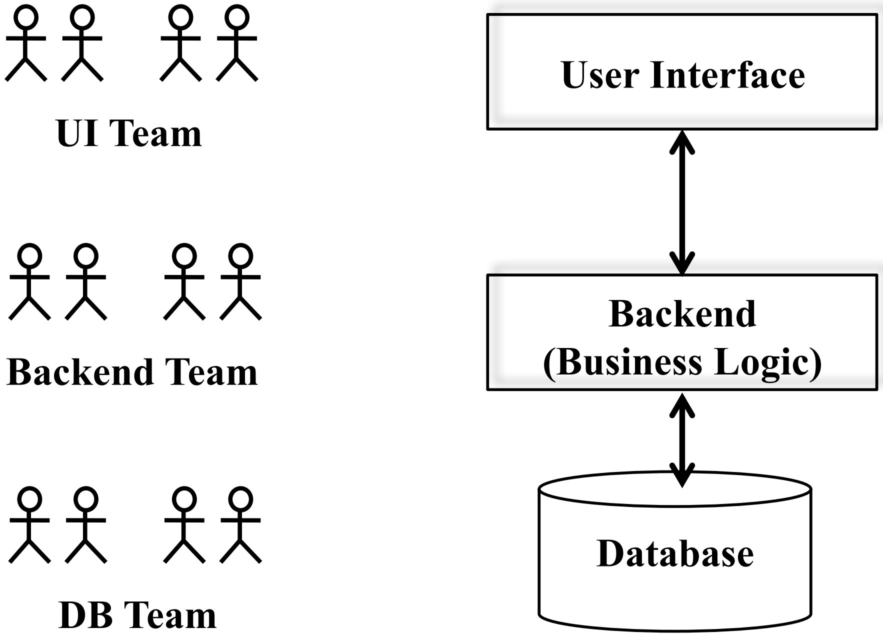
A short CV:

- Three years of industrial experience (IBM and Accenture)
- Doctoral degree, University of Bonn, Germany (2006)
- Diploma in computer science, University of Koblenz, Germany (2000)

Conway‘s Law (Conway, 1968)

„Organizations which design systems […] are constrained to produce designs which are copies of the communication structures of these organizations“

One Example: **Technical decomposition of teams**



New feature:

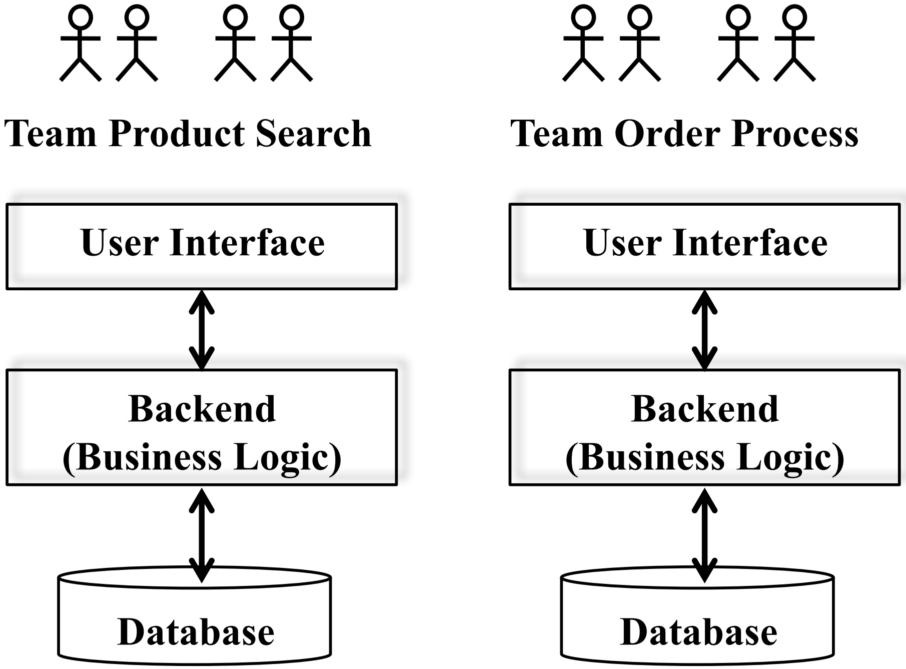
e.g. a new UI-Element

Communication in all three teams!!
Eventually: bad design due to (bad) communication overhead

Conway‘s Law (Conway, 1968) as an Enabler for good design

„Organizations which design systems […] are constrained to produce designs which are copies of the communication structures of these organizations“

Alternative: **Functional decomposition of teams**



Team Product Search

User Interface

Backend (Business Logic)

Database

Team Order Process

User Interface

Backend (Business Logic)

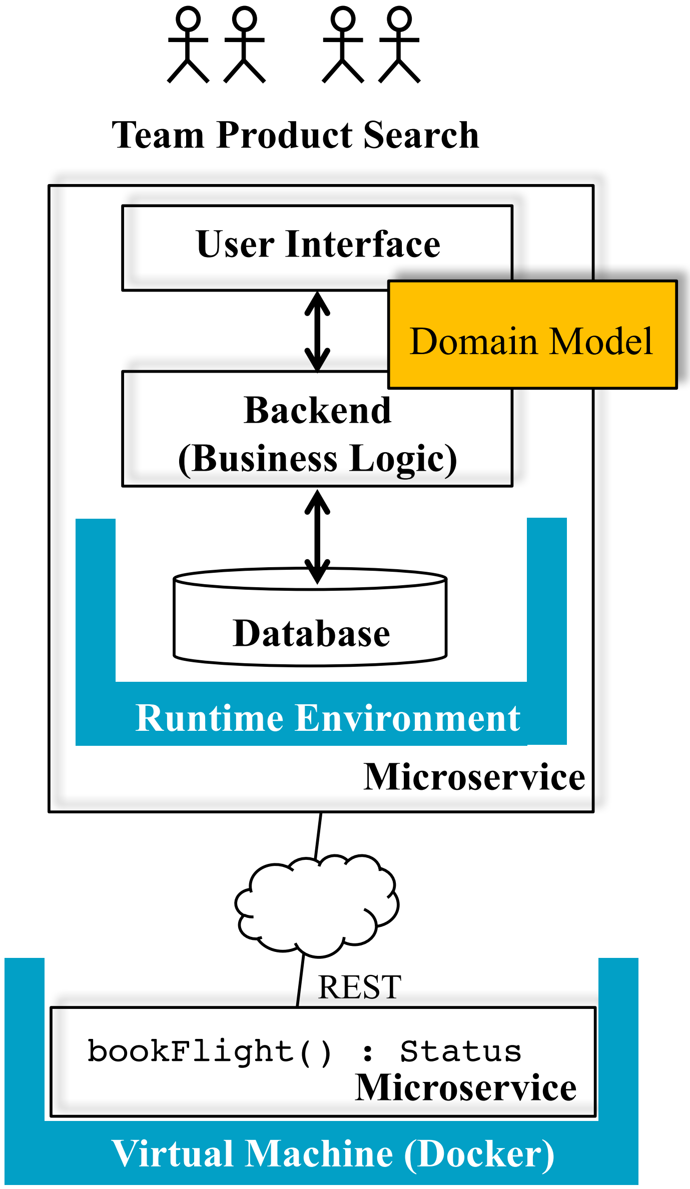
Database

New feature:

e.g. a new UI-Element

Communication in one teams, only!
Better design, when no dependencies among functions are given

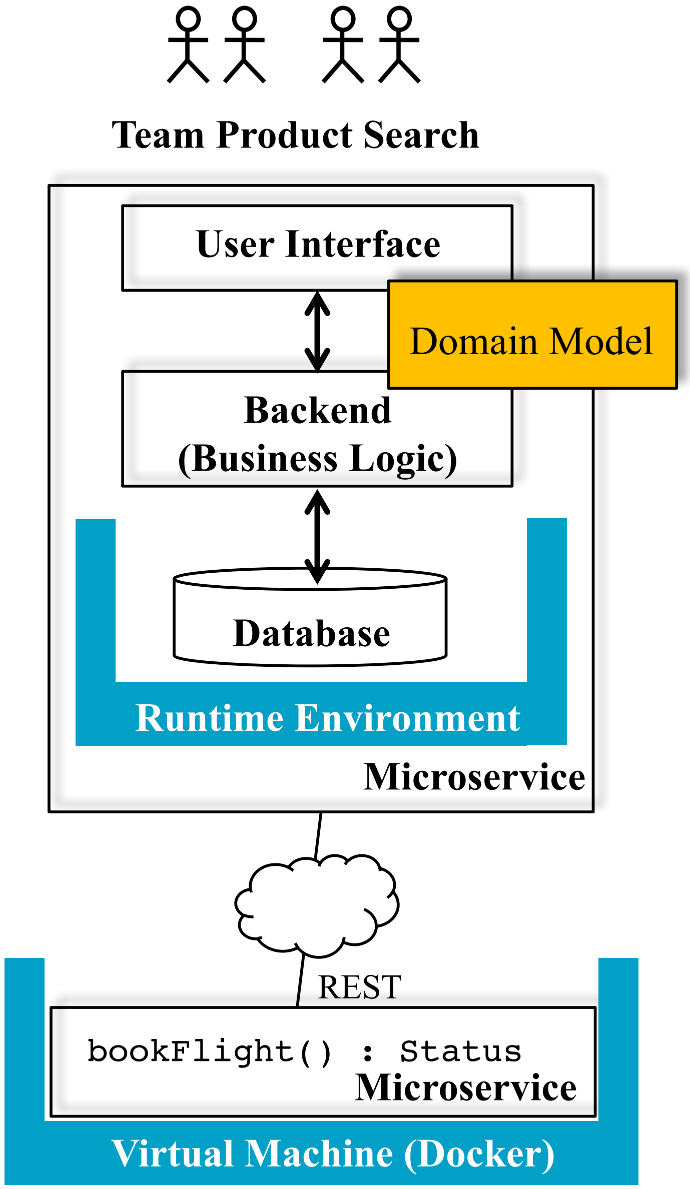
Definition and Properties of Microservice



A Microservice indicates an architectural style (..), in which the software system is decomposed into functional modules, so called Microservices. (Starke, 2015)

- Each Microservice has its own runtime environment and, thus, runs independent to other Microservices.
- A Microservice has its own domain model (Bounded Context) (Evans, 2004) (Wolff, 2016)
- Communication with other Microservices across network (REST, http)
- Flexible deployment with *thin* virtual machines (e.g., Docker)
- Size: Nanoservice (some 100 LoC) vs. self-contained Microservice (with own UI) (Wolff, 2016)

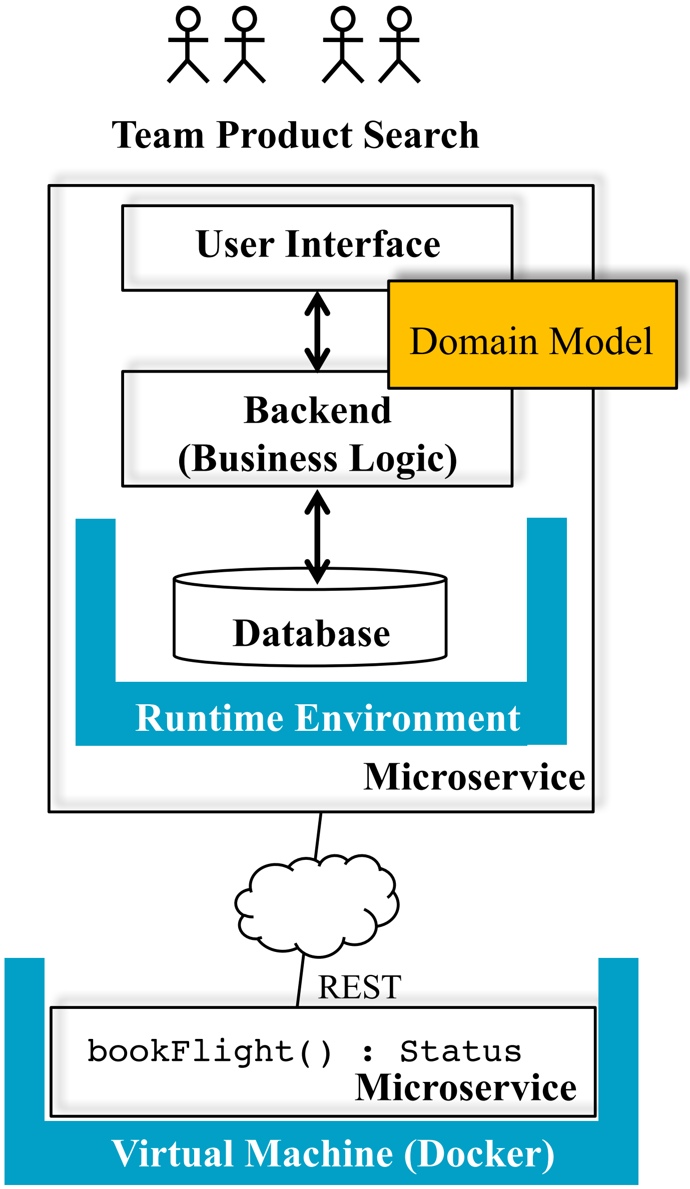
Future Directions (Arguments in favor of Microservices)



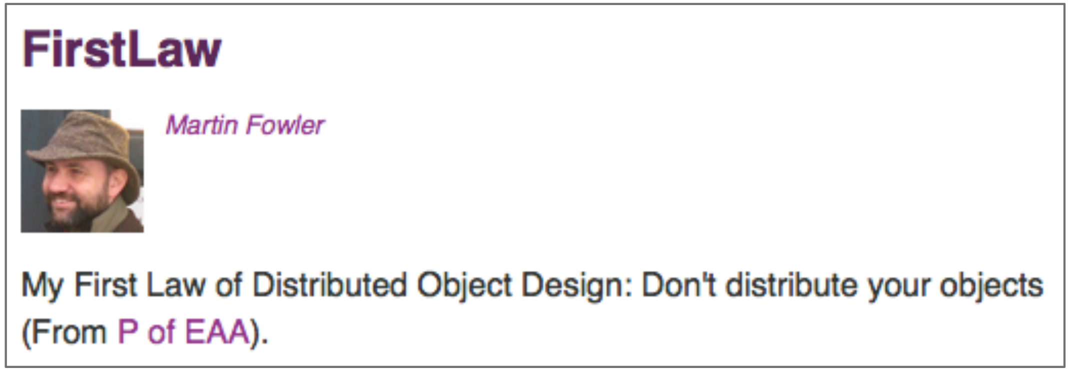
- Strong method for the flexible adaptation of software architectures even at runtime
- Reduction of time-to-market leads to cost-reductions
- Strong when combined with tools from Continuous Delivery: Development and Operation can be automated to a great extend (DevOps)
- Based on both modern technologies, tools, and appreciated methods from Software Engineering
- Yet, mostly applied in big digital Internet businesses (e.g. Netflix, Amazon) ….

Adoption of Microservices to (On-Premise, Cloud) Business Applications will expose many benefits!

Problems and Limitations



- Flexible deployment of (too) many Microservices: No software architecture can be maintained in a long run
- Communications among (too many) Nanoservices breaks Martin Fowler's First Law (Fowler, 2003):



FirstLaw

Martin Fowler

My First Law of Distributed Object Design: Don't distribute your objects (From P of EAA).

- Independent modules and domain models: Monitoring of KPIs of the whole systems will be challenging
- Flexible deployment and independent modules: hard to implement in application scenarios with long running transactions (e.g. insurance domain)

References

- Wolff, E.: Microservices – Grundlagen flexibler Software-Architekturen. dpunkt.verlag. 2016 (English Version available at LeanPub: https://leanpub.com/microservices-book; last visit: 20.2.2017)
  (*Remark*: The team scenarios in slide 3-4 are taken from this book (chapter 4))

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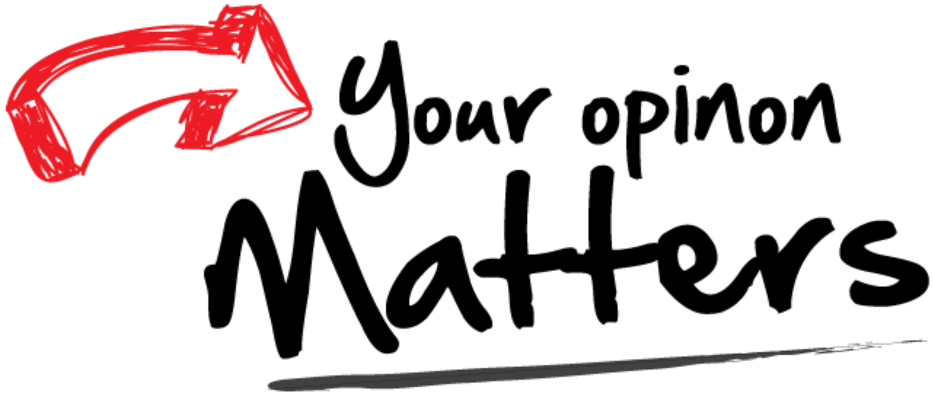
- Conway, M.E.: „How Do Committees Invent“, in: F. D. Thompson Publications, Inc. (Hrsg.): Datamation. Vol. 14, Nr. 5, April 1968 (pp. 28–31). URL: http://www.melconway.com/research/committees.html (20.02.2017)

Your opinion?!

Thank you!!

So, what‘s *your* opinion about Microservices?
What about *effective tool* support for building and running Microservices?



Security Risks with Open Sources

Woomin Hwang

National Security Research Institute

South Korea

Open Sources Everywhere

- “There are people out there
running open source web frameworks
on open source server frameworks,
with open source SSL stacks
on open source web servers,
sitting in an open source container,
running on an open source kernel
in an open source hypervisor.”*

- Nicko van Someren, Linux Foundation CTO

* “Security is the biggest bug of open source, says Linux® Foundation CTO,” by Roland-Moore Colyer, the Inquirer, April 13, 2016

Vulnerabilities of Tools affect entire system

- Robert O'Callahan
  - Former Mozilla developer
  - “now that I've left Mozilla for a while, it's safe for me to say: **antivirus software vendors are terrible; don't buy antivirus software, and uninstall it if you already have it (except, on Windows, for Microsoft's)”**

- Of course not limited to open source softwares
- Indicates increasing risk of vulnerable tools

http://robert.ocallahan.org/2017/01/disable-your-antivirus-software-except.html

For example,*

CVE : Common Vulnerabilities and Exposures

CVE Number	Open Source Target /Affected Softwares	Description
CVE-2015-7547	all Linux servers/web frameworks /API web services which use the GNU C library.	Enabled hackers to compromise apps via a man-in-the-middle attack
CVE-2016-5340 /-2059/-2504/-2503	Android	After the malware's installation, the attacker could gain root access to the device. This put all system contents and controls (including sensitive data, microphone, GPS and system changes) at risk of exploitation.
CVE-2016-6662	Oracle's MySQL DB (5.7.15, 5.6.33 and 5.5.52), MariaDB and PerconaDB (clones)	By injecting malicious settings into MySQL configuration files, it allowed attackers to gain full access to the server on which the affected MySQL was running. This meant hackers could view/change/erase any entries they wished.
CVE-2016-0636	OpenJDK (Oracle Java SE 7 Update 97, and 8 Update 73 and 74 for Windows/Solaris /Linux/Mac OS X)	Could be remotely exploited without any need for authentication details, such as passwords or usernames. This meant a single visit to a malicious web page could allow an attacker to degrade the availability, integrity and confidentiality of a user's system.
CVE-2016-0728	Android OS, Linux 3.8 and higher	The Linux bug had been around since **2012**
CVE-2016-5696	Android 4.4 or later, as well all Linux OS running version 4.6 and earlier	Exploiting a weakness in the TCP of all relevant systems. It enabled the attacker to degrade the privacy of anonymous networks (e.g. Tor browser), track users' online activity, hijack a conversation between hosts and terminate a conversation.

* : Selected CVEs and descs from https://www.whitesourcesoftware.com/whitesource-blog/open-source-security-vulnerability/

Is Open Source good for security?

‘Many Eyes’ theory to open sources

- “The enemy knows the system”
- “A cryptosystem should remain secure even if everything about it other than the key is public knowledge”

- Linus Torvalds - “Given enough eyeballs, all bugs are shallow”

Given a large enough beta-tester and co-developer base,
almost every problem will be characterized quickly
and the fix will be obvious to someone.

Supporters say,

- More peoples can look at source codes
  - With various technical backgrounds
  - More enthusiastic experts can be involved
- ‘many eyes’ enforces contributors write more clear code, adhere standards, …
- Fast feedback
  - Reported important vulnerabilities in an open source project is patched within a day or two

Opponents say,

- Simply being ‘open’ source is not enough

- Also opened to hostile eyes
  - Helps reverse engineering
  - Learn from the open source
    - E.g.) Learn from Linux vulnerabilities, try it to Windows

- Only popular open sources are inspected by the ‘many eyes’
  - The number of contributors/involved people
  - Expert eyes are better than random ones
    - Technical/Technological level of participants
  - Source code coverage of ‘volunteer inspectors’ effort

- Lazy Feedback
  - Many projects are left unmanaged for a long time

So, what do you think about this?