



Unterstützt von: TeamSystemProTEAM

# Introduction of ALM

## Challenges at Siemens Healthcare

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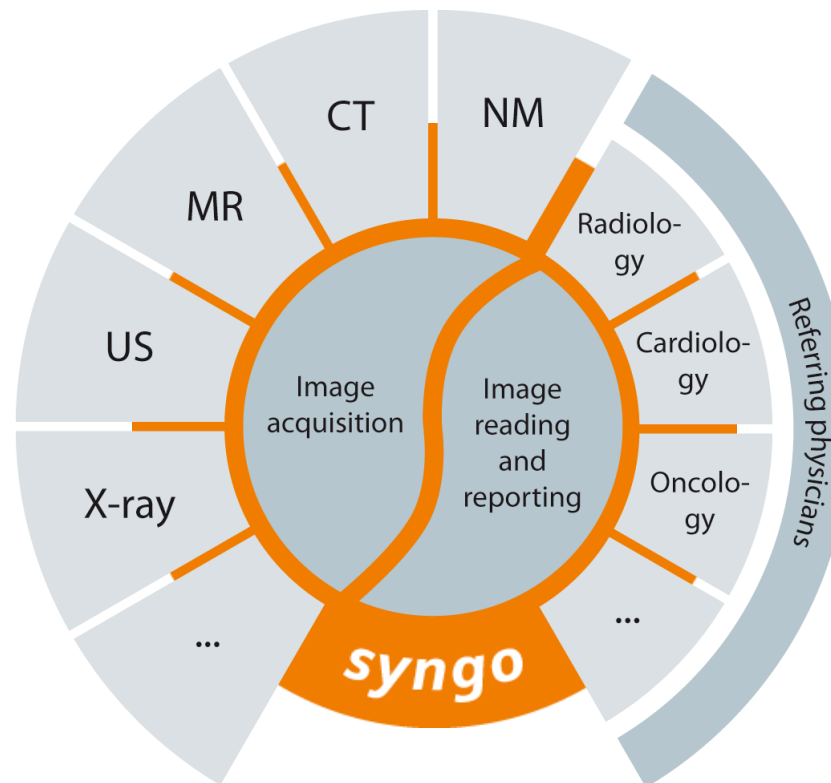
## Contents

- SYNGO – Our Situation
- TFS out of the Box?
- Technical Challenges and Solutions
- Program Lifecycle
- Outcomes and Lessons Learnt
- Backup (literature and further information)

# syngo – the Central Image Hub

SYNGO is a globally distributed organization with several hundreds of developers

**Modalities**  
(Scanner)



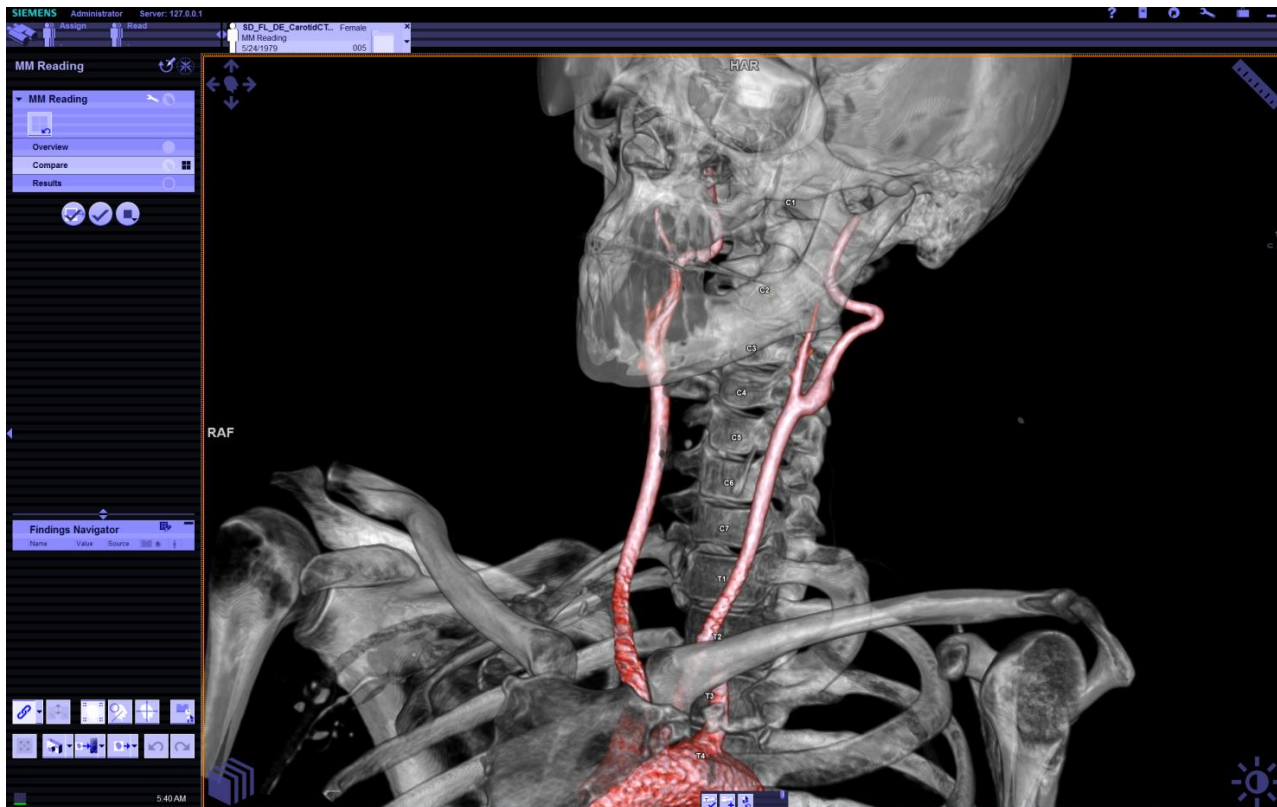
**- ologies**  
(Disease Orientation)



syngo. It's all about you.

## SYNGO Portfolio

**syngo.via<sup>1</sup> – Get the full picture.**



### Efficient

- Prior examinations pre-fetched
- Reports populated with findings
- Siemens Remote Service

### Flexible

- Customizable tools and layouts
- Access anywhere<sup>2</sup>
- Modular licensing

### Intelligent

- Preprocessed images
- Guided workflows
- Powerful tools for quantitative reading

<sup>1</sup> syngo.via can be used as a standalone device or together with a variety of syngo.via-based software options, which are medical devices in their own rights.

<sup>2</sup> Prerequisites include: Internet connection to clinical network, DICOM compliance, meeting of minimum hardware requirements, and adherence to local data security regulations.



## Our Situation @ SYNGO

- Healthcare product
  - **Regulated environment**
- Large project
  - **Many teams**
- Globally distributed project
  - **Communication needs**
- Large scale system/architecture
  - **Dependencies between teams**
- Platform/basis for other products
  - **Dependencies to other projects**



## Our Consulting Partner: AIT

- Business Case
  - **Evaluation & Planning**
- Process Consulting
  - **Productivity Improvements**
- Infrastructure Support
  - **Scalable Solutions**
- Tool Customization
  - **Specification & Implementation**
- Communication Hub
  - **Other Customers & Microsoft Product Group**





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## TFS out of the Box?

### Question

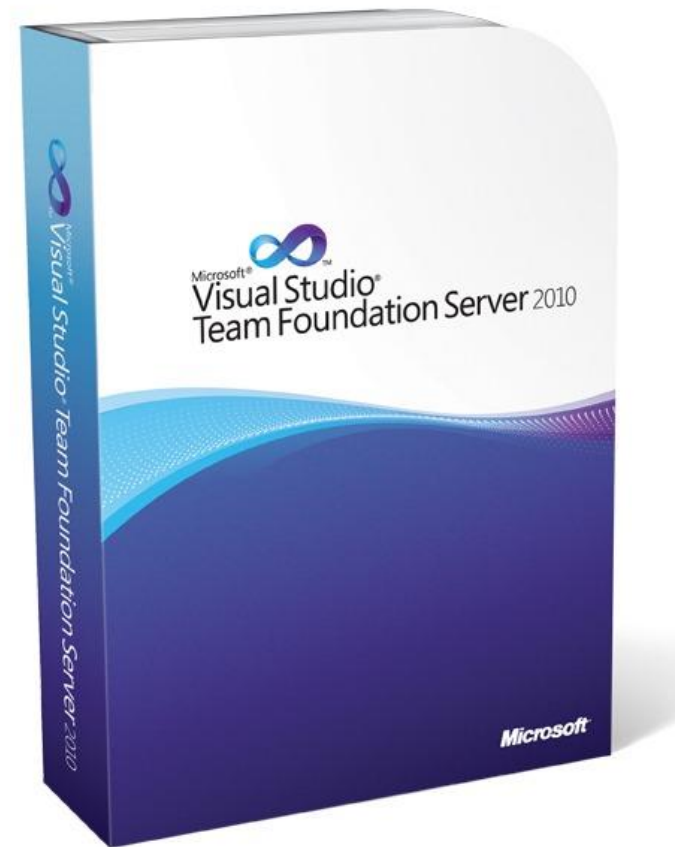
- Are we able to use Team Foundation Server **out of the box**?

### Answer

- **No**, not in a large project within a regulated environment

### Consequence: We have to

- define our process template
- develop additional extensions/tools
- implement regulatory requirements





## Evidence

### Healthcare regulations

- It is not sufficient just to do it, **evidence** is required

### Examples are

- Design input (requirements)
- Code reviews
- Test coverage & execution
- Change management

### Consequences

- Implementation of dedicated processes required in TFS
- **Results must be documented**



## Retention Period

### Healthcare regulations

- We have to keep all project data and evidences for 2 years beyond **lifecycle of the product in the field**

### Question

- Is the current TFS system still running in ~ 20 years?

### Answer

- No (or not with affordable efforts)

### Consequences

- Extraction of data into **long-term archivable format** is required, e.g. PDF-A



# Tool Validation

Healthcare regulations

- FDA (U.S. Food & Drug Administration)  
Title 21 CFR820.70(1)

**Tools** used as part of the quality system must be **validated** against its intended use.

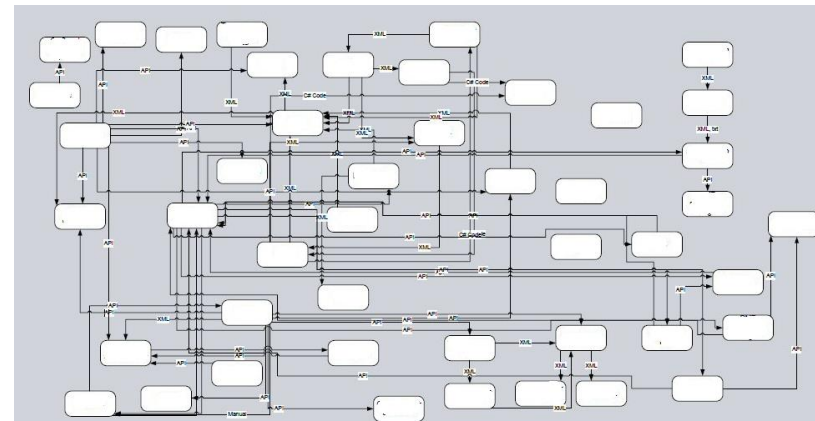
Challenges

- Validation of an **ALM tool** required
- ALM tool replaces many other tools

Consequence

- Validation of an ALM tool is a very **complex task**

Our old tool landscape



## Digital Signatures

Healthcare regulations

- FDA (U.S. Food & Drug Administration)  
Title 21 CFR **Part 11**

Guidelines on **electronic records and signatures**

Criteria to be fulfilled

- Trustworthy,
- Reliable and
- Equivalent to paper records



## Product Versions

### Version zoo

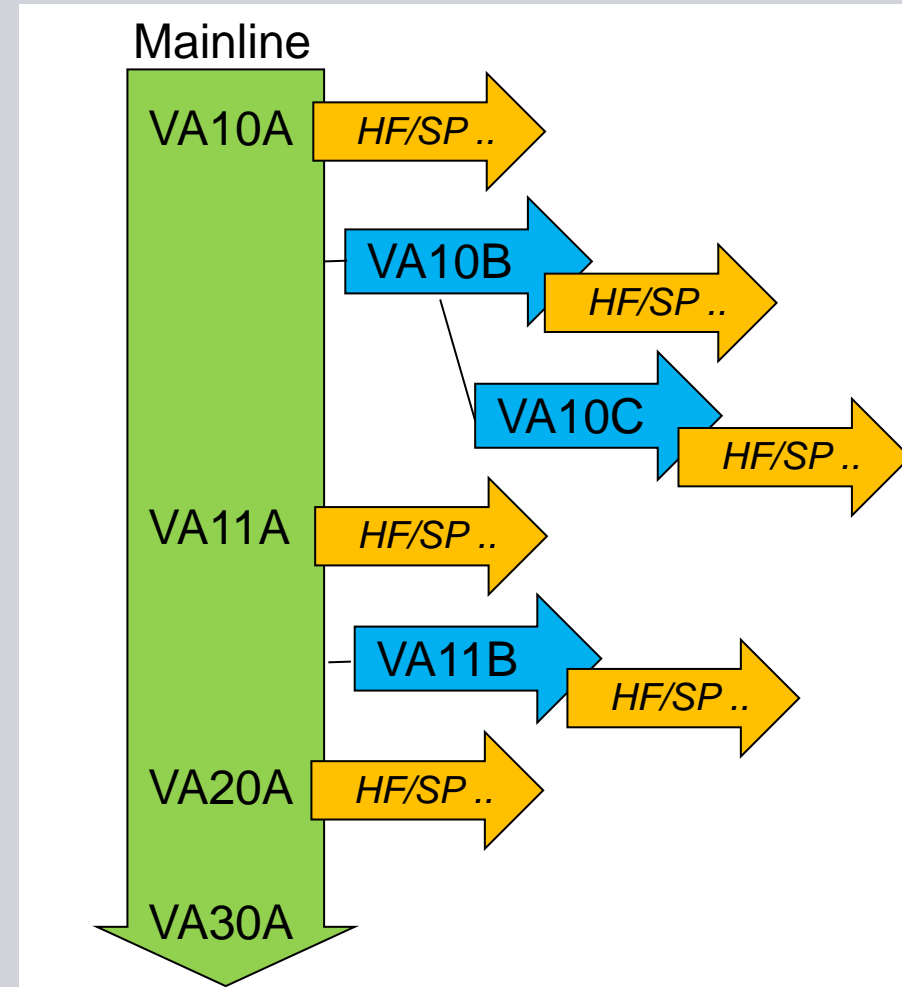
- Mainline
- Functional enhancements
- Hot fixes and service packs

### Challenges

- Keep all data **for all version** as they are in the field **in parallel**

### Implementation for

- Source code with branches is ok but
- **Work item** versioning and baselining (Requirements, Test Cases, ..) is not supported





## General Laws

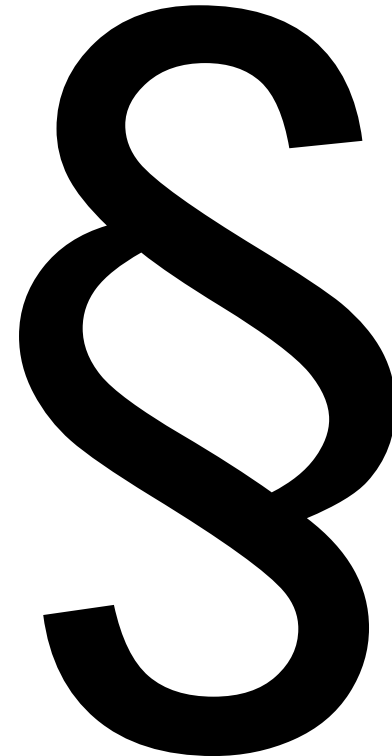
Further regulations and laws have to be fulfilled, e.g.

### **Bundesdatenschutzgesetz (BDSG)**

- Data privacy, individual-related data in IT systems
  - Involvement of BDSG responsible (Datenschutzbeauftragter)

### **Betriebsverfassungsgesetz (BetrVG)**

- Co-determination (Mitbestimmung)
  - Involvement of workers counsel (Betriebsrat)
  - Company agreements (Betriebsvereinbarungen)

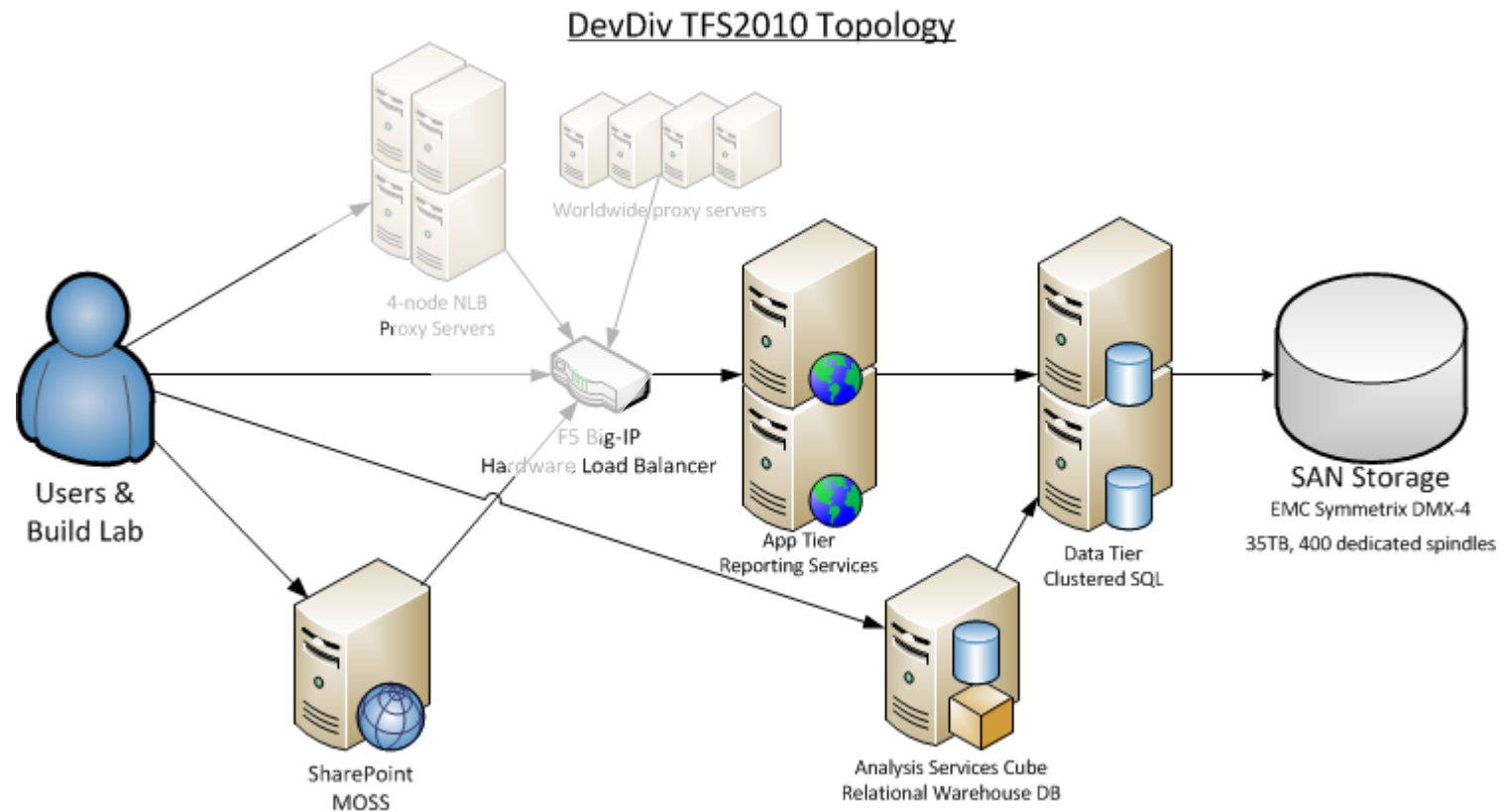




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## Infrastructure



## Microsoft vs. SYNGO TFS

	Microsoft Collection A	Microsoft Collection B	SYNGO	Microsoft Pioneer
Recent Users	3.659	1.516	like MS B and Pioneer	1.143
Build agents and controllers	2.636	284	like MS B	528
Files	16.855.771	21.799.596	like MS B	11.380.950
Uncompressed File Size (MB)	14.972.584	10.461.147	SY less (factor 1000)	6.105.303
Compressed File Size (MB)	2.688.950	3.090,832	SY less (factor 1000)	2.578.826
Checkins	681.004	2.294.794	like Pioneer	133.703
Merge History	1.512.494.436	2.501.626.195	like Pioneer	162.511.653
Workspaces	22.392	6.595	like MS B and Pioneer	5.562
Files in workspaces	4.668.528.736	366.677.504	like MS B and Pioneer	406.375.313
Work Items	426.443	953.575	SY less (factor 5-10)	910.168
Work Item Versions	4.325.740	9.107.659	SY less (factor 5-10)	9.466.640
Work Item Queries	54.371	134.668	like Pioneer	28.875

## Self Servicing

### Team Project Management without IT

- Saves IT efforts

### Website for Project Creation

- Extend TFS project creation wizard
- No Project Administrator necessary
- Partial service account impersonation
- Additional automation options

### AD Group Delegation

- Responsibles can manage permissions without IT

### Additional Rule Sets

- Naming conventions
- Process Template Selection

The screenshot shows a web interface titled "TFS PROJECT CREATION". It has a navigation bar with "Home" and "About" links. Below the navigation bar, the main heading is "CREATE TFS PROJECT". The form contains the following fields and options:

- Project Collection:** TPC.Projects
- Process Template:** Siemens Syngo Agile Software Development v2.5
- Project Name:** SY
- Create SharePoint Portal:** ☒
- Create Reporting Site:** ☒
- Create Project:** (button)

At the bottom, there is a red text note: "Please note that the creation of a new project can take several minutes due to the requirement..."



# Server Automation

## Enforcing Rules on Server-Site

- Naming conventions for checked-in files
- Build quality changes

## Automate Work Item Changes

- Aggregation across hierarchy
- Work Item field dependency
- Rules on Iteration and Area Path

## Additional Features

- Scheduled Jobs
- Weekly Notification Reports
- Consistency Checks

**CONFIGURE TEAM PROJECT**

Individually configure automations for team project syngo.net

**Trigger based Automations for TeamProject**

Automation	Status
Build Quality Automations	<input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>
Change Status Automation	<input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>
Count Children Automation	<input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>
Covered Charms	<input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>
Dependent Field Automation	<input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>
Dependent Efforts Aggregation	<input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>
Impeded Aggregation	<input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>
Initialize Children	<input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>
Is Covered Automation	<input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>
Is Leaf Automation	<input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>
Is Top Automation	<input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>
Iteration Path Automation	<input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>
Ready For Merge Label	<input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>
Retain Indefinitely based on Build Quality	<input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>
Root ID Automation	<input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>
Root Title Automation	<input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>
Story Point and Leaf Item Count Aggregation	<input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>

**Scheduled Automations for TeamProject**

Scheduled Automation	Status
Apply Permissions on Build Definitions	<input type="button" value="Run now"/> <input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>
Build Label Cleaner	<input type="button" value="Run now"/> <input type="button" value="Deactivate"/> <input checked="" type="button" value="Active"/>

## Reporting Issues

### Metrics per Person limitation

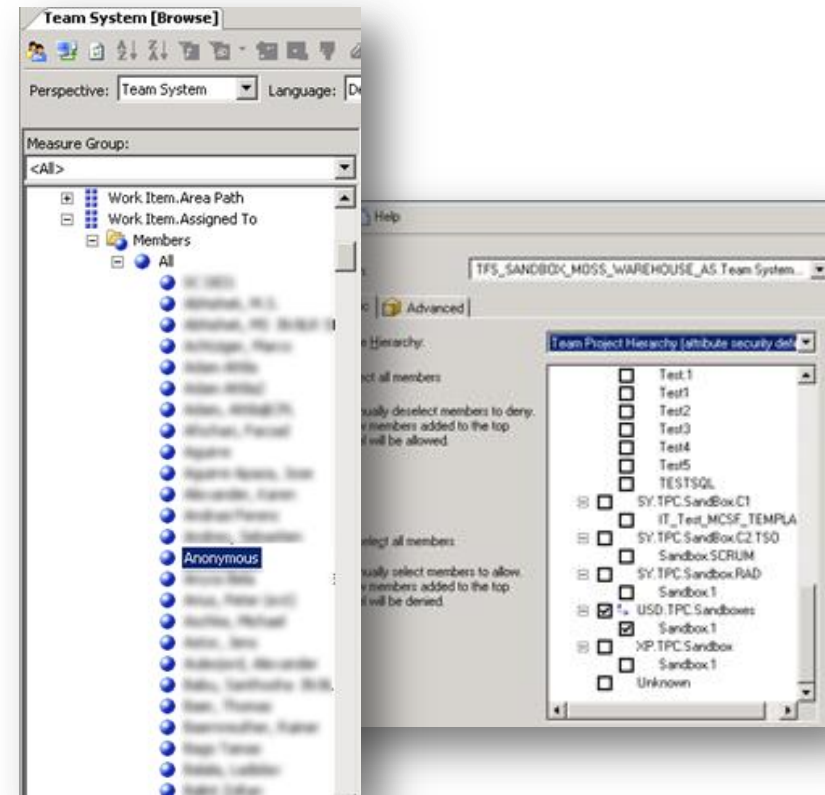
- Different law in U.S. and Europe

### Team Project Scoping

- Limit report data to team project
- Enable individual Excel reports

### Additional Features

- Automated role enforcement
- Additional code and test metrics
- Avoid scaling issues of File dimension



## Other Challenges

### Baselining Requirements and Tests

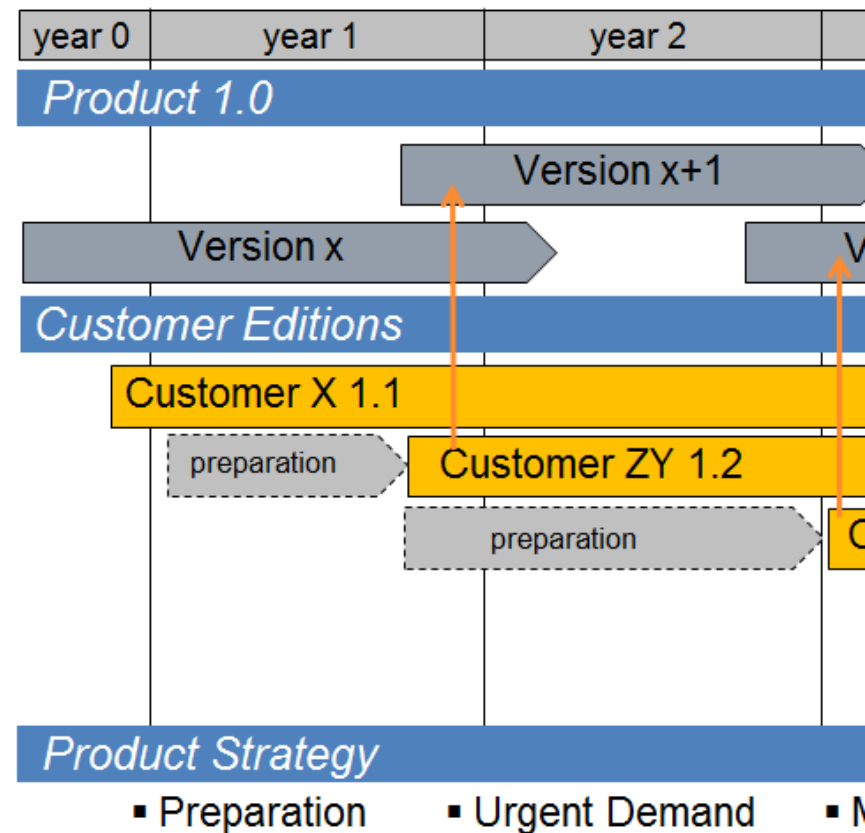
- Parallel product version requirements
- Scheduled exports for validation

### Build Processes

- Large existing code-base
- Build automation has architectural impact

### Test Management

- Permissions and views
- Limit accidental changes
- Versioning against requirements base





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## Business Case

A **business case** is required to

- define the **benefits**
- define the **resource** needs
- calculate the project **costs**
- calculate the **return of investment**
- define the project **risks** and
- prepare the **decision**

and additionally valuable to

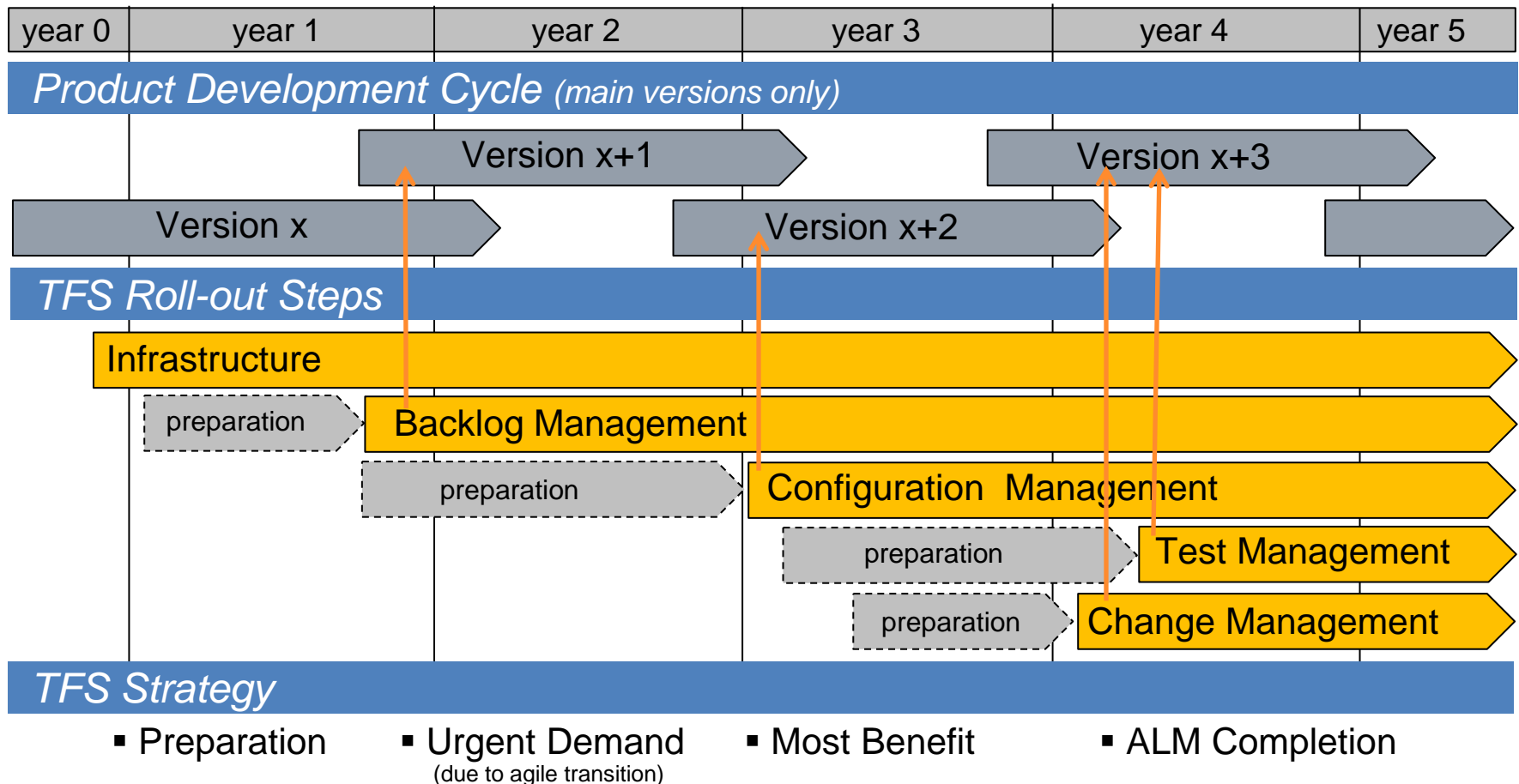
- get **focus** on important topics
- define a **roadmap** for proceeding
- get the **buy-in** of stakeholders





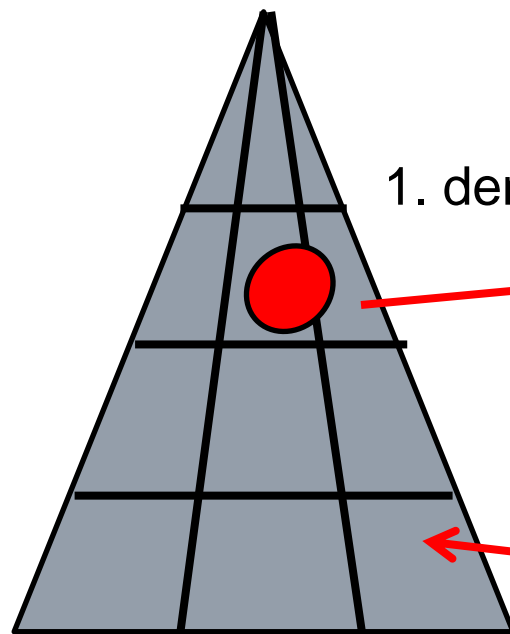
## Roadmap

TFS introduction is aligned with product development cycle



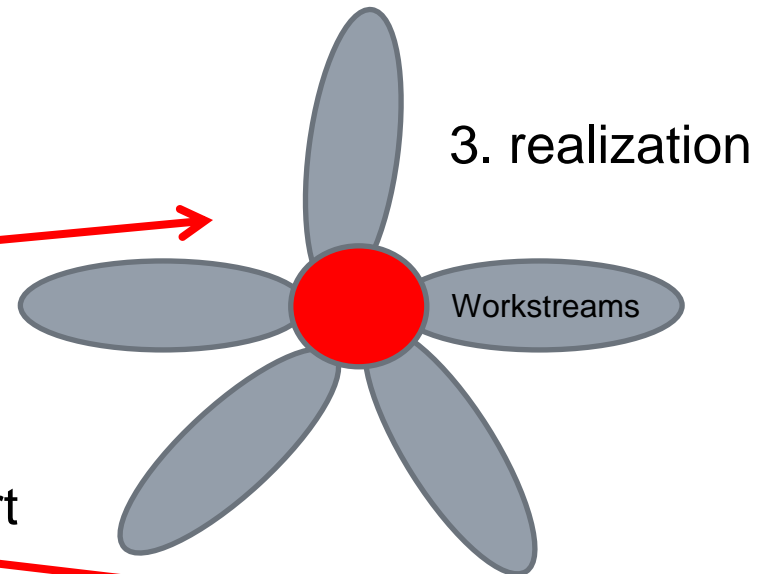
# Program Lifecycle

## Matrix Organization (Line + Project)



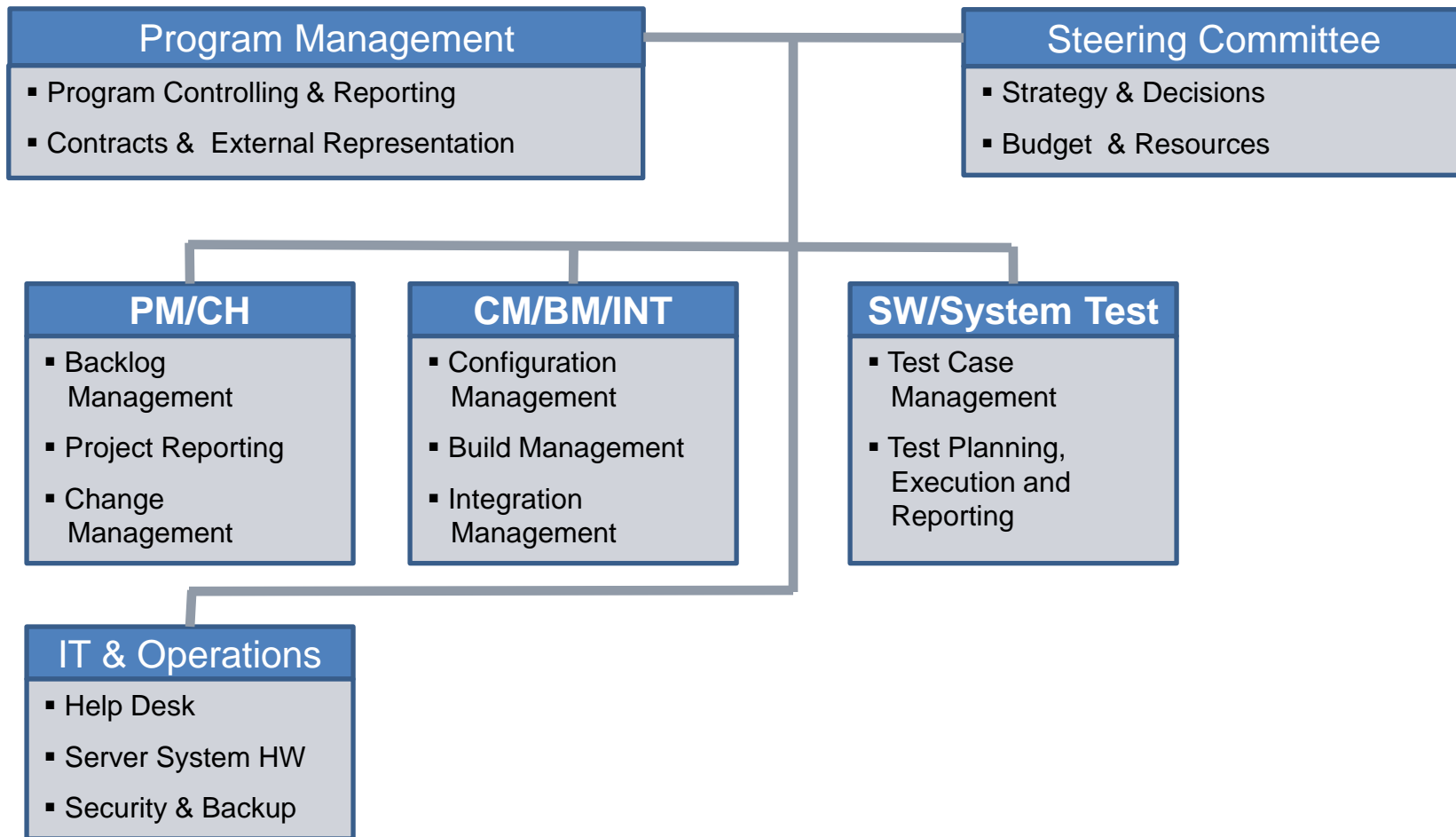
5. operation

## Program Organization



source: freely adapted from W. Wintersteiger

# Initial TFS Program Organization



## **Extension of TFS Program**

### **Training**

- Professional trainers are required to perform many training sessions worldwide

### **Validation**

- Tool validation is a complex task, needs coordination and expert knowledge

### **Other product lines**

- Ensure that other sites and product lines are involved as well

### **SW Development**

- Many development support tools needs to be adapted

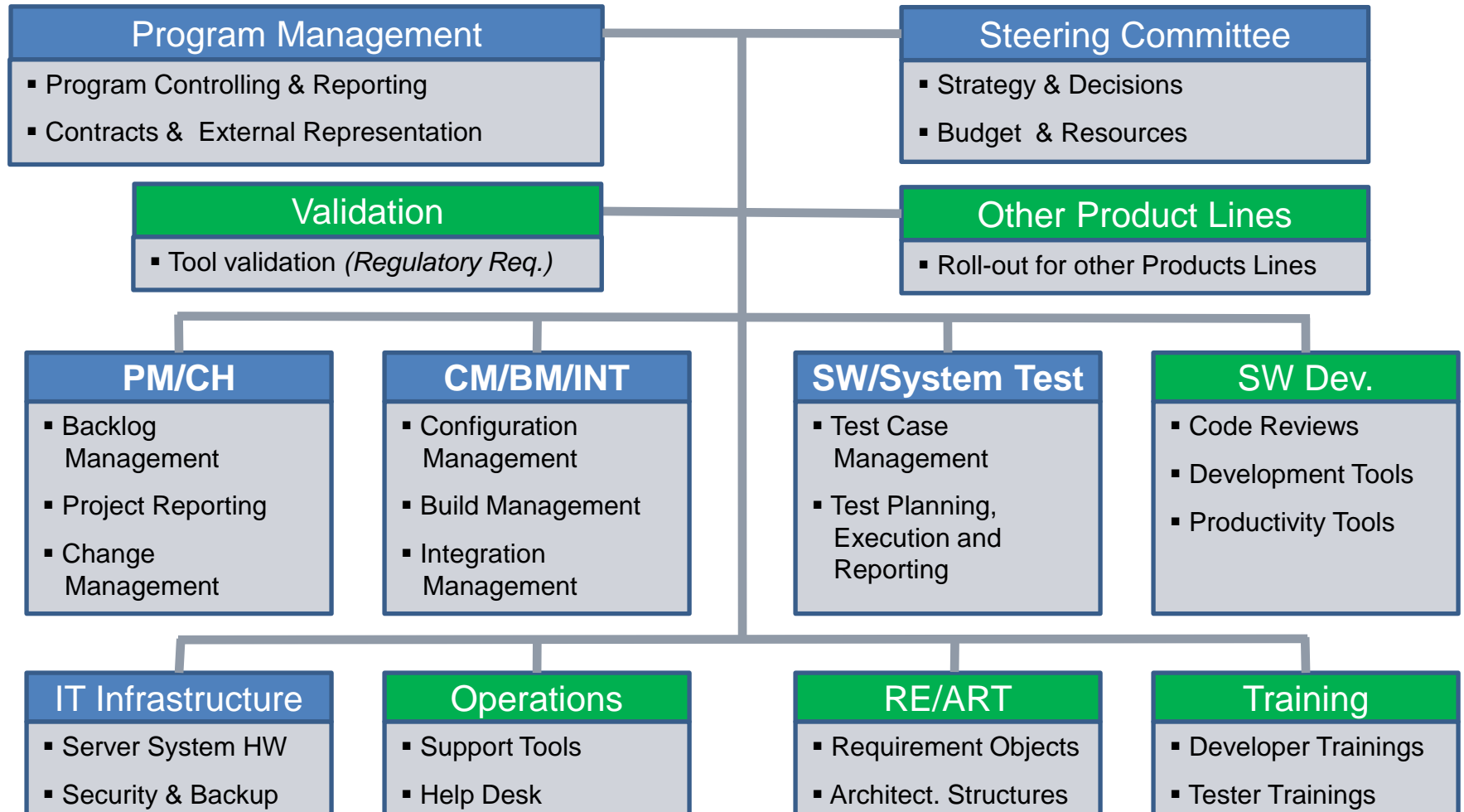
### **Requirements Engineering / Architecture**

- Initially postponed, but required as basis for ALM implementation, e.g. for test

### **Split of IT Infrastructure and Operations**

- Align program to organizational structure

# Current TFS Program Organization





## Benefit of a Program Organization

### Program Benefits

- Harmonization, alignment, synergies
- Driving results with focus on the topic

### Especially for the phases

- **Vision**
- **Concept**
- **Implementation**
- **Roll-out**

### But no more for

- **Improvements**
- **Maintenance**

Both are ongoing, continuous activities

→ should be driven by organization

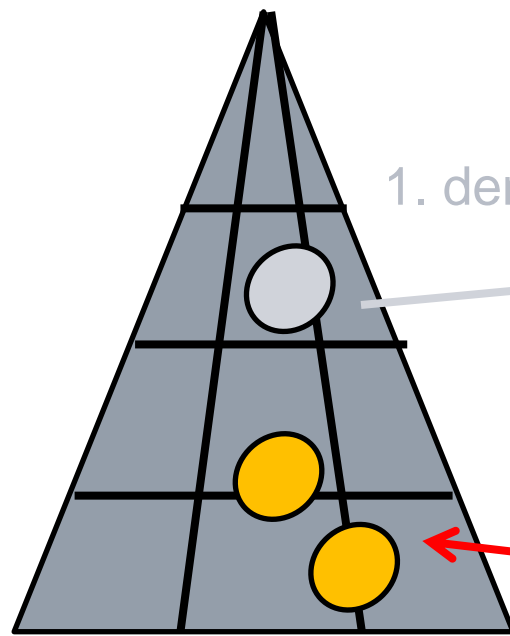


# Current TFS Program Status

		TFS Program >>				>> Organization	
		Vision	Concept	Implementation	Roll-out	Improvements	Maintenance
Core Areas	PM (Project Management)						
	CH (Change Management)						
	CM/BM/INT						
	SW Dev. (Code Review)						
	Test						
	RE/ART						
	IT Infrastructure						
	Operations						
Support	Other Prod. Lines						
	Training					on demand	
	Validation						

# New Program Focus

## Matrix Organization (Line + Project)

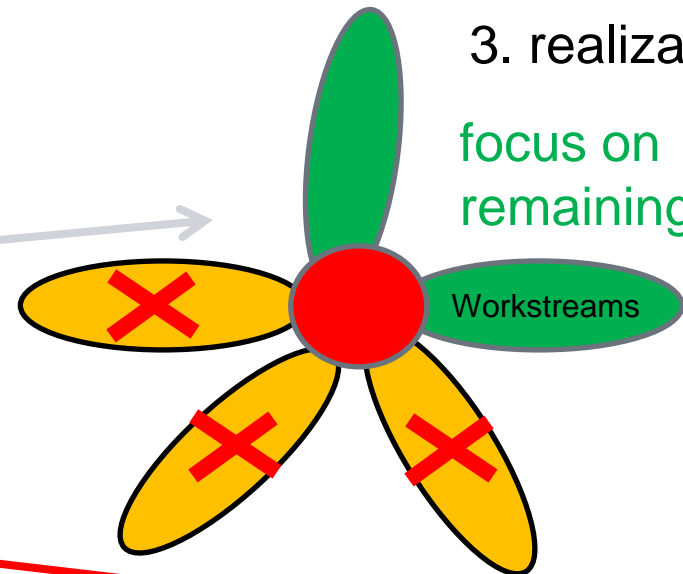


1. demand

2. export

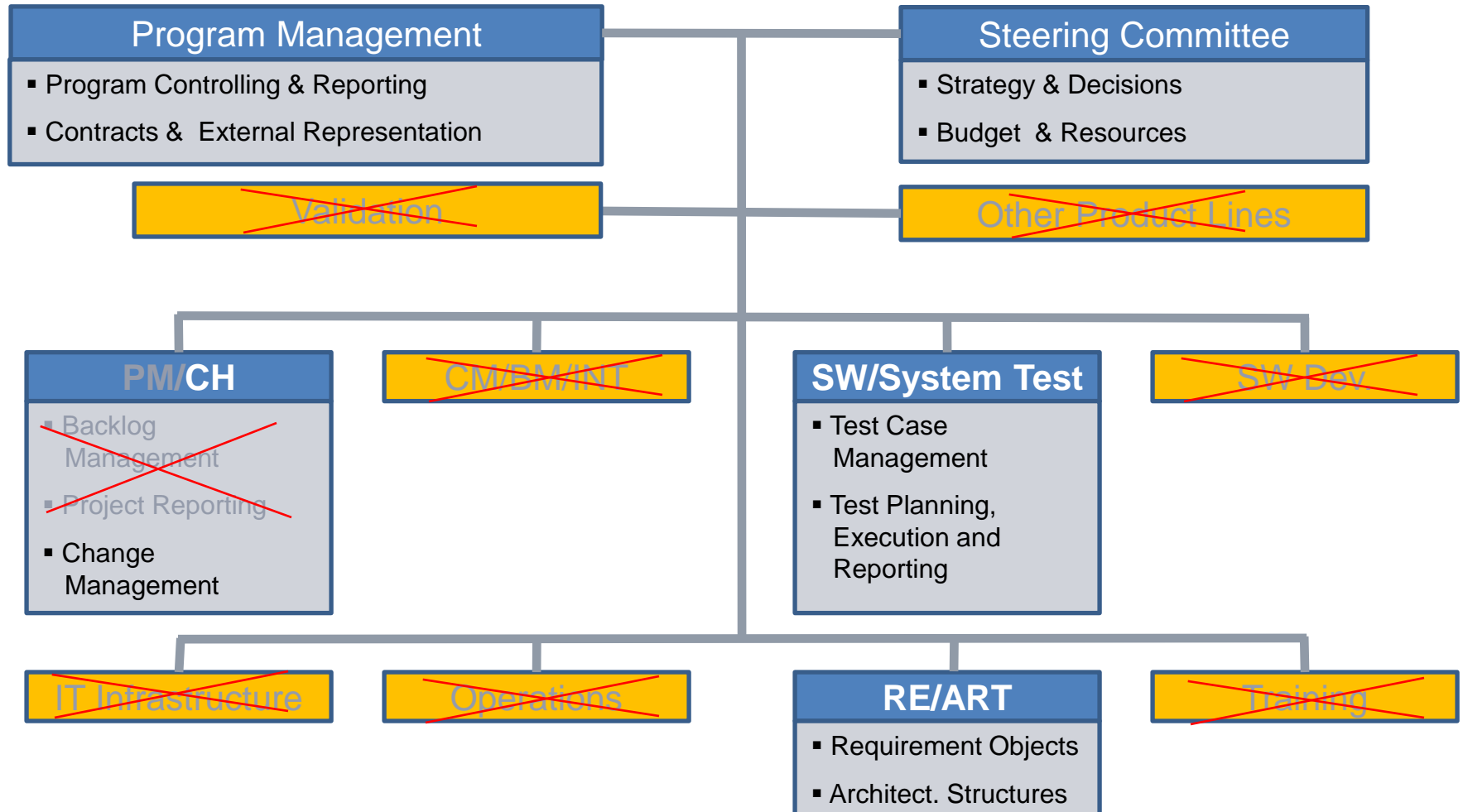
5. operation

## Program Organization



4. partial import

# Refocussed TFS Program Organization

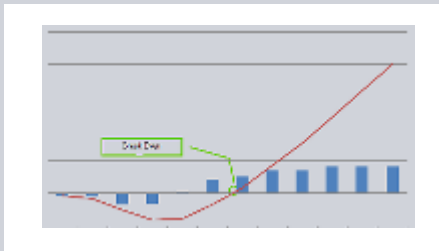




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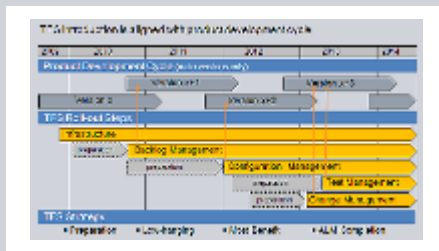
## Set-up of TFS Program is required



- A **business case** is more than just a business case. It **guides** through the change.



- Establish a TFS **program organization** with „independent“ workstreams (areas) to manage the complex change process with **many key people**.



- An **ALM tool** cannot be introduced at once in a settled environment, **step-wise roll-out of areas** is preferred. But do a big-bang migration for the single areas to avoid efforts for hybrid/parallel operations.



## Simplicity for the Users is a Key Factor



- The **users are the most critical part** regarding consistency and quality in an highly automated and interconnected ALM system

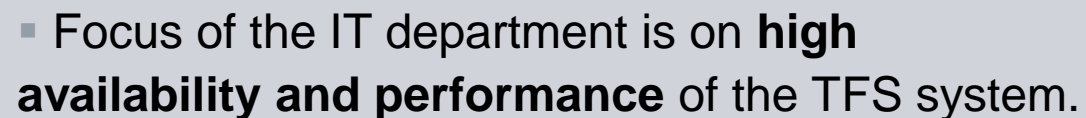
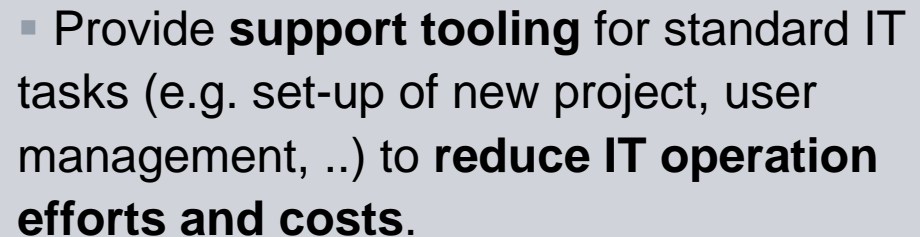
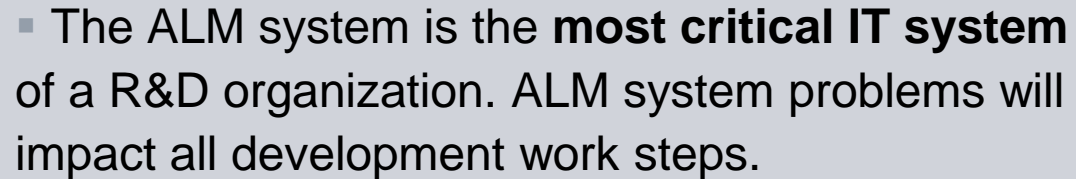
**ERROR**



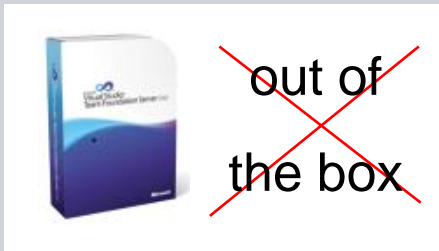
- **Training** is necessary, but not sufficient.



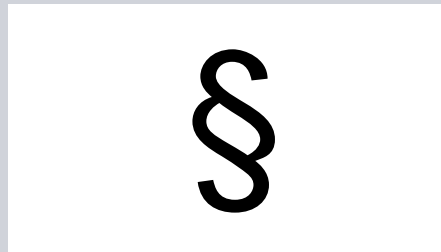
- Establish **automation services** to avoid manual tasks which could cause errors. **Quality gates and quality checks** are required to ensure high data quality.



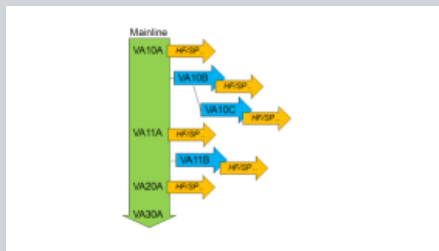
## Use of TFS out of the Box is not possible



- TFS **out of the box** is **not suitable** for a **regulated environment** with additional tool requirements.



- Check for **legal requirements**. These ones will impact your concepts and your roll-out plans.



- Concept for **versioning and baselining of work items** (e.g. requirements and test cases) is still a challenging topic.



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# Bibliography

## *syngo.via*<sup>1</sup>

- <http://www.medical.siemens.com/> ,search for "syngo.via"

## TFS @ SYNGO

- Rudorfer/Herold/Schu: Team Foundation Server bei Siemens Healthcare im weltweiten Einsatz, Heise Developer Channel, 08/2011, <http://heise.de/-1349216>
- Rudorfer/Herold: TFS Program @ SYNGO, Infoteam TechTalks, 03/2011
- Herold: ALM - Challenges of an Introduction, Vector Forum „Change Management“, 06/2012
- Herold : Agile Project Management - Combining Agile & Conventional Methods, ASQF PM-Day, 10/2012
- Further SYNGO Employees: see also previous ALM Days and TeamConfs



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**Thank you for your attention!**



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**Thank you for your attention!**



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