



Unterstützt von: TeamSystemProTEAM

Introduction of ALM

Challenges at Siemens Healthcare

Gerold Herold - Siemens AG, Healthcare, SYNGO
Sven Hubert (MVP) - AIT GmbH & Co. KG



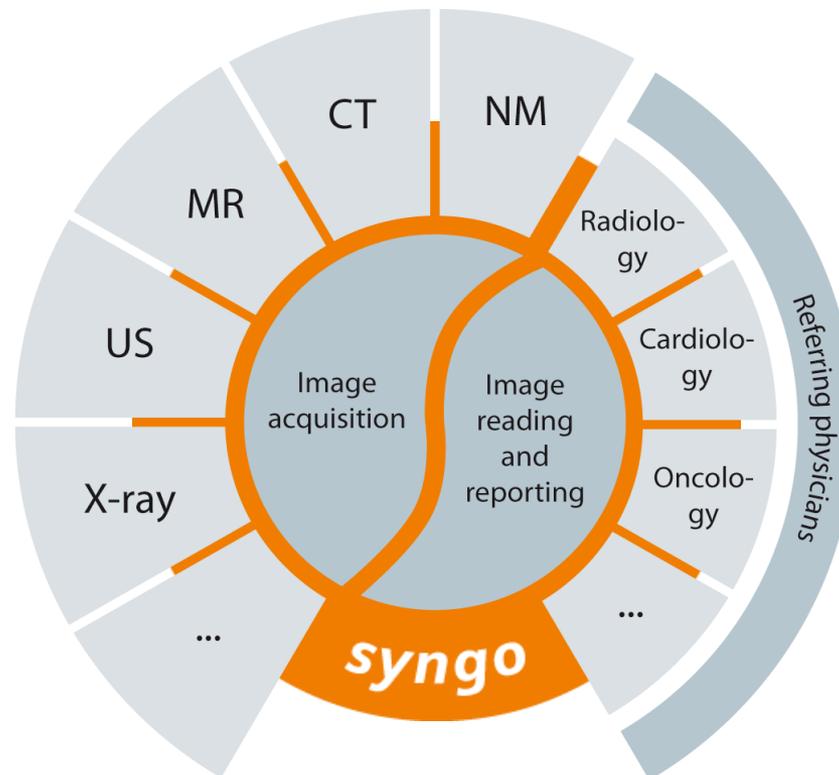
Contents

- 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)



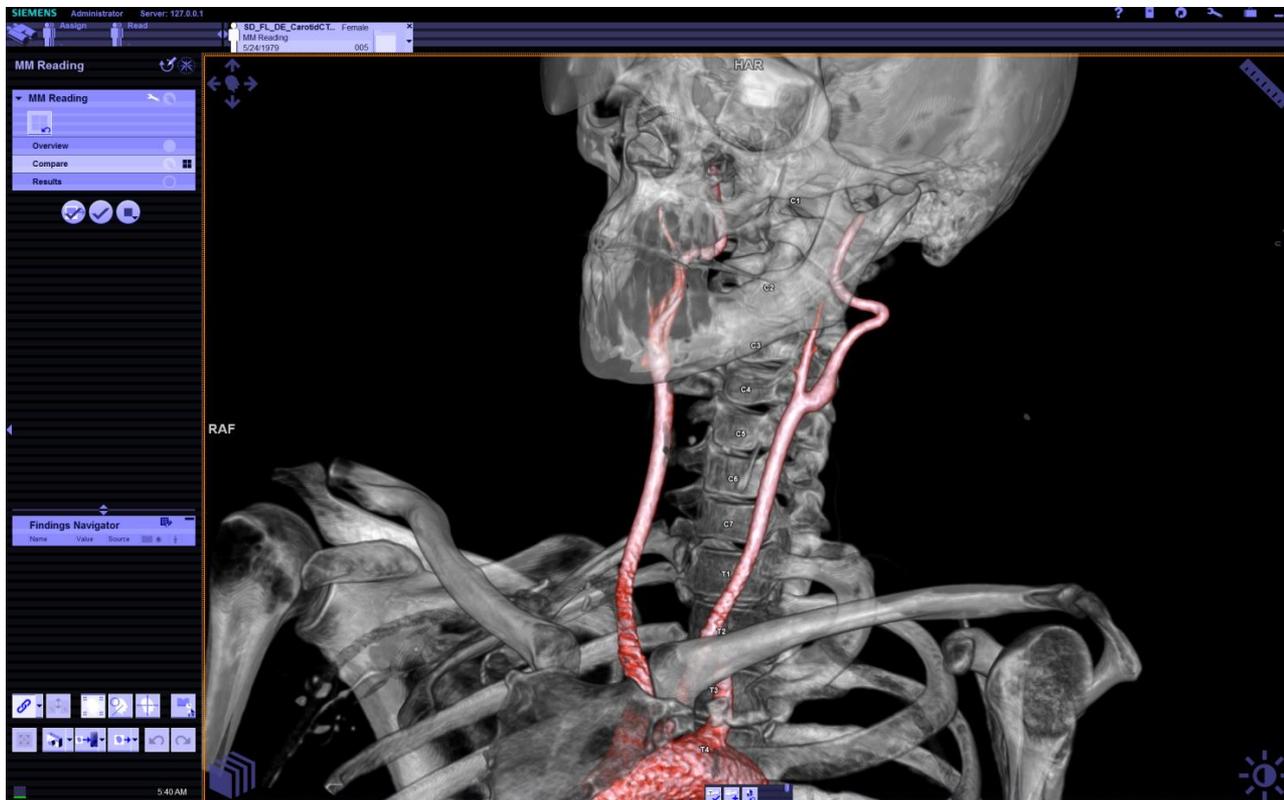
- ologies
(Disease Orientation)



syngo. It's all about you.

SYNGO Portfolio

syngo.via¹ – Get the full picture.



Efficient

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

Flexible

- Customizable tools and layouts
- Access anywhere²
- Modular licensing

Intelligent

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

¹ 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.

² 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**





Contents

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

TFS out of the Box?

Question

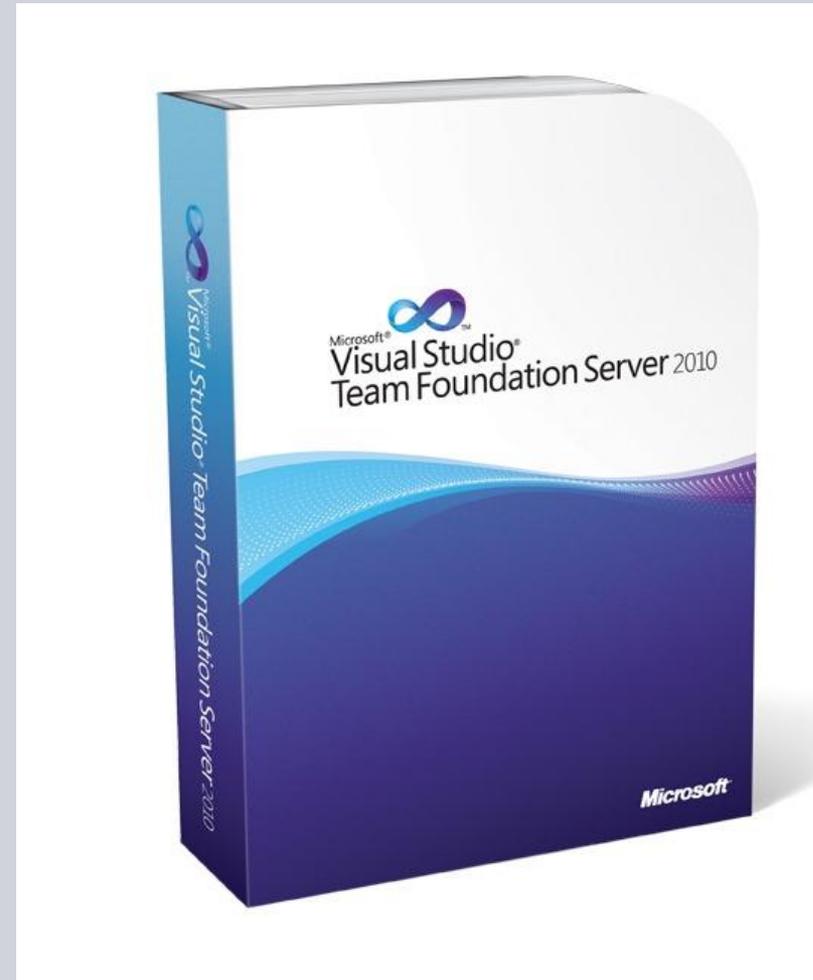
- Are we able to use Team Foundation Server **out of the box**?

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.

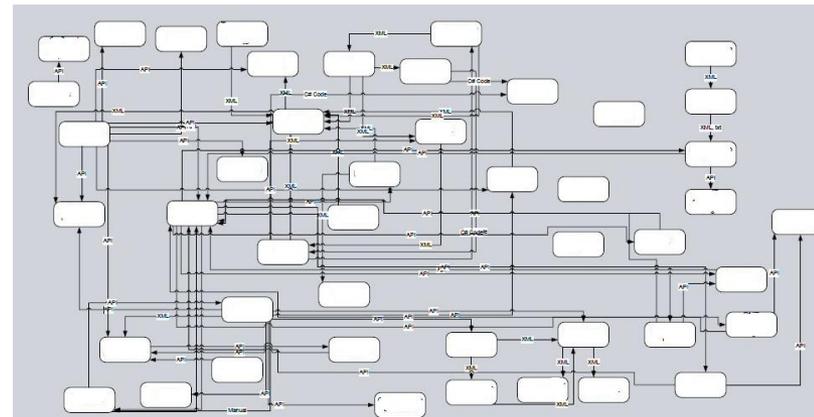
Challenges

- 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

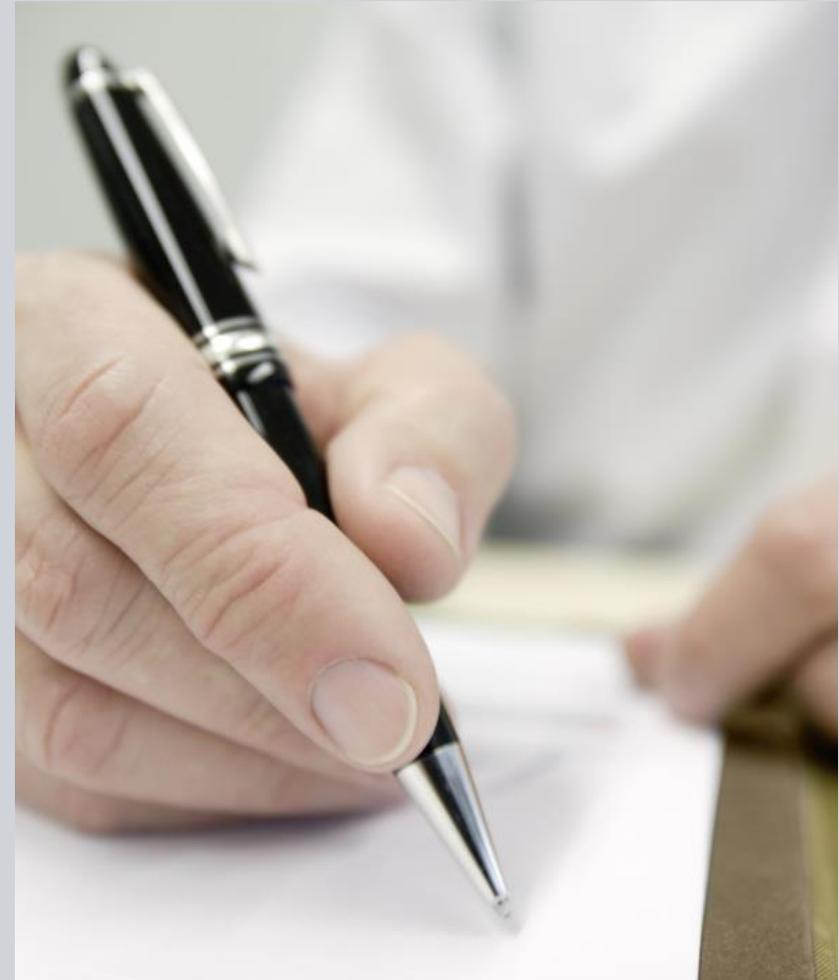
Healthcare regulations

- 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

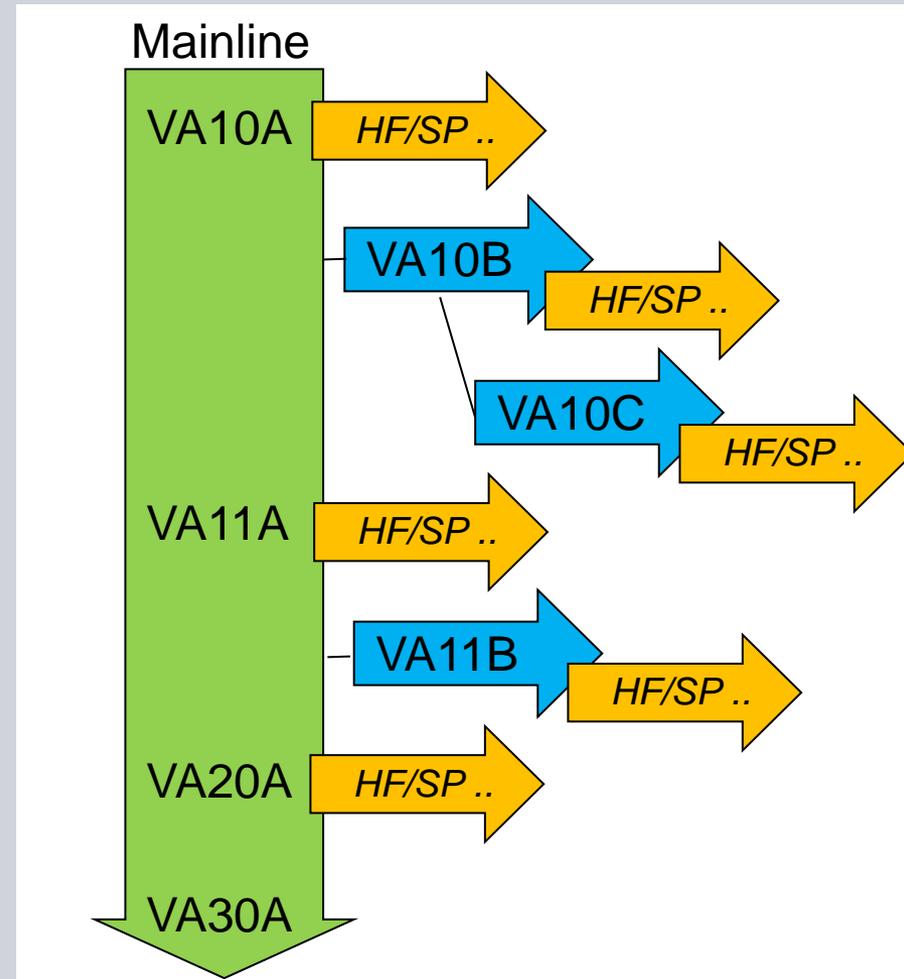
- Mainline
- Functional enhancements
- Hot fixes and service packs

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

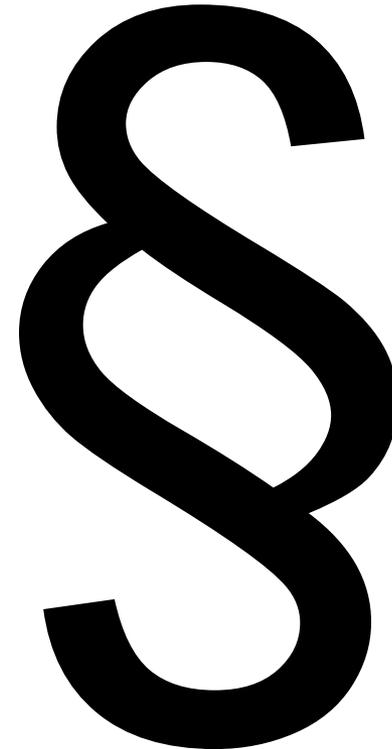
Further regulations and laws have to be fulfilled, e.g.

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)

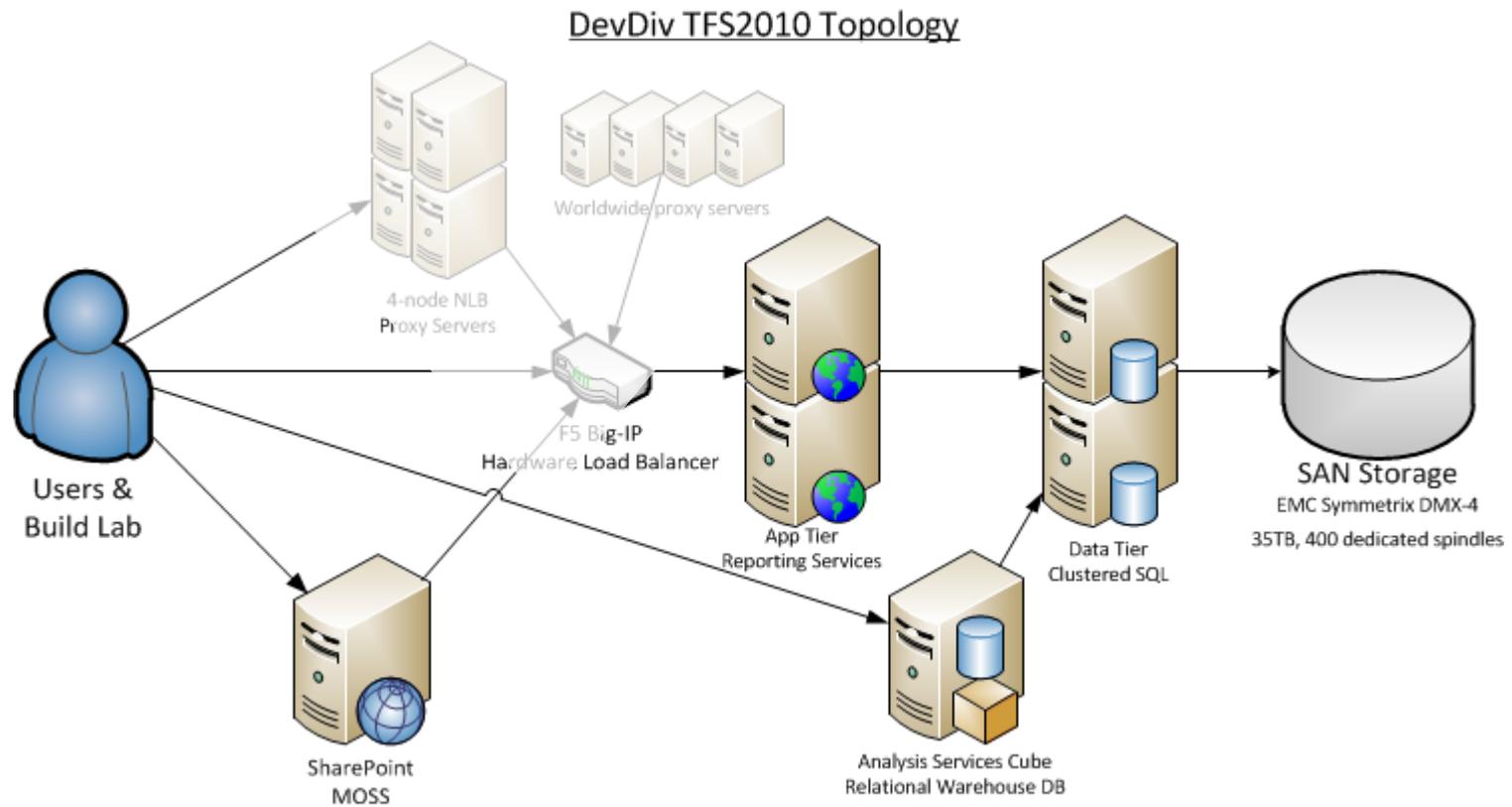




Contents

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

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 application titled "TFS PROJECT CREATION". It has a navigation bar with "Home" and "About" links. The main content area is titled "CREATE TFS PROJECT" and contains a form with 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:

Below the form is a "Create Project" button. At the bottom of the page, there is a red warning message: "Please note that the creation of a new project can take several minutes due to the require..."

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

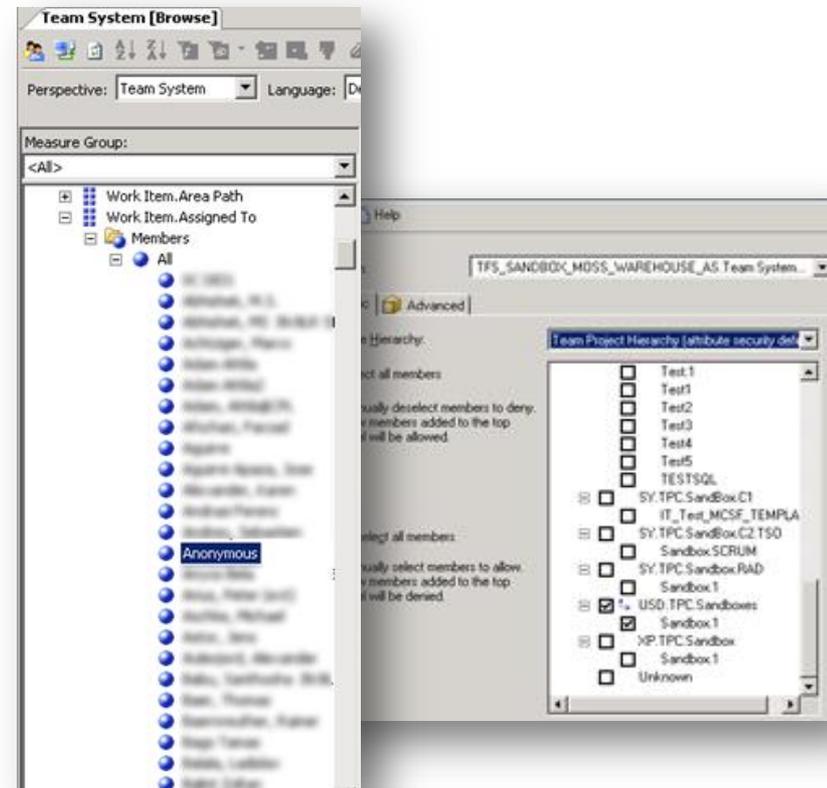
- Different law in U.S. and Europe

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

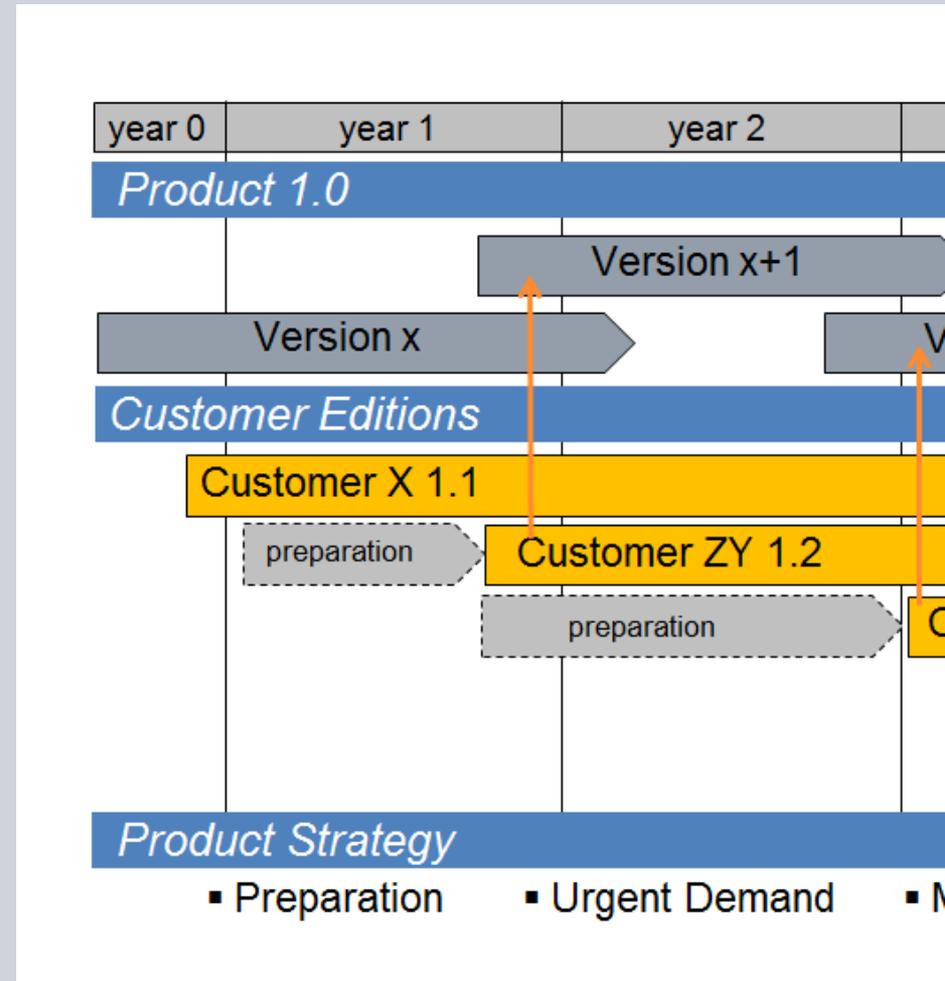
- Parallel product version requirements
- Scheduled exports for validation

Build Processes

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

Test Management

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





Contents

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

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**

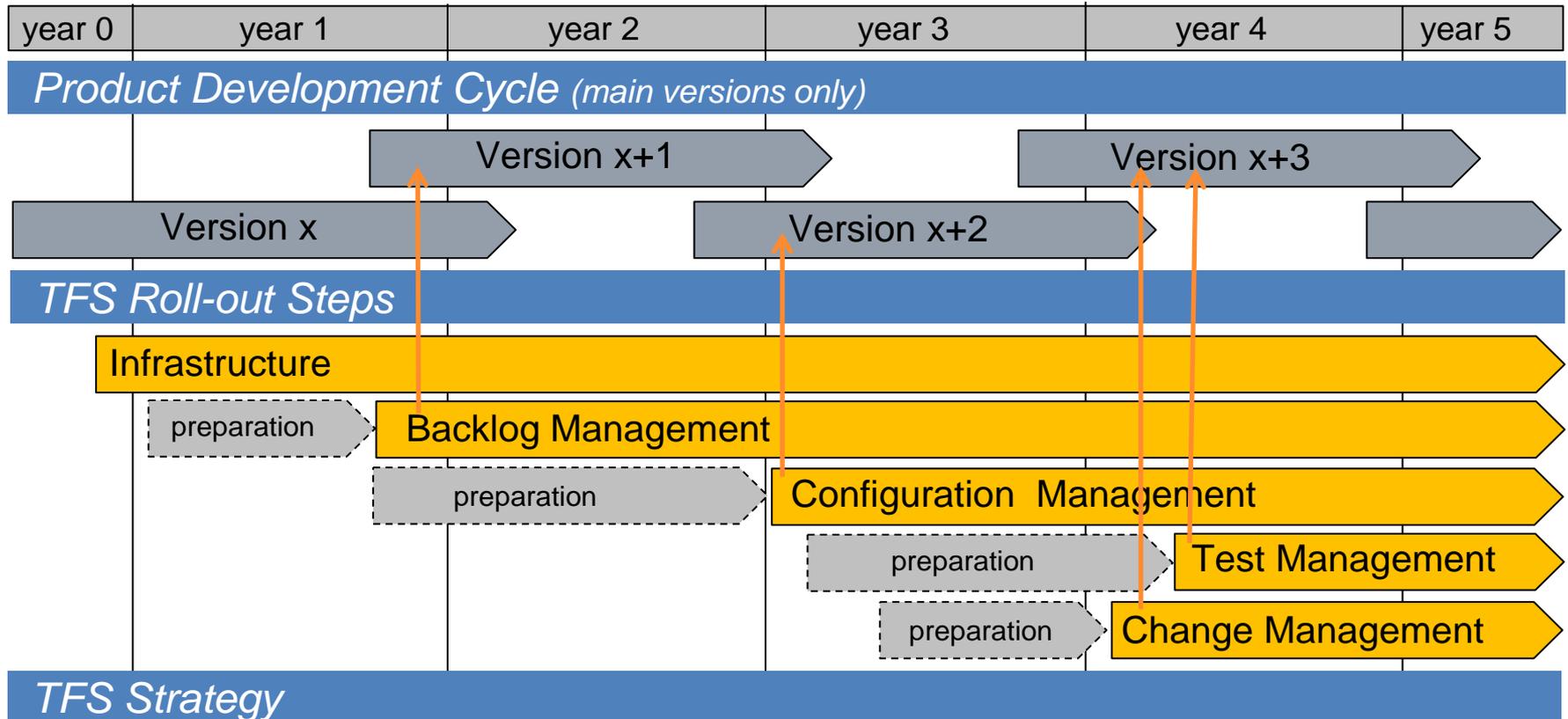
and additionally valuable to

- 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

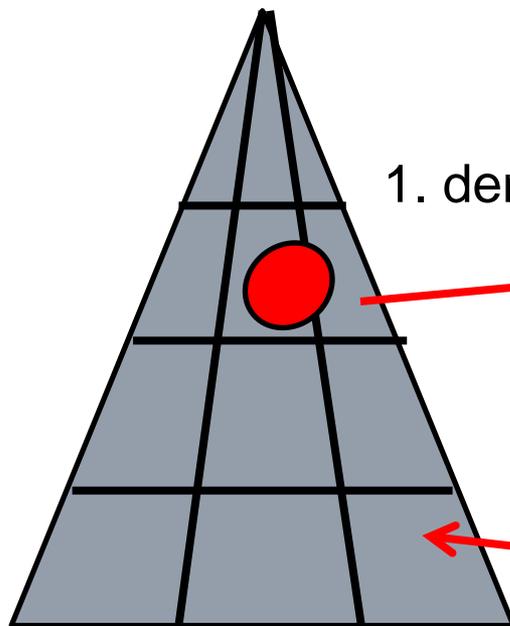


- Preparation
- Urgent Demand (due to agile transition)
- Most Benefit
- ALM Completion

Program Lifecycle

Matrix Organization

(Line + Project)



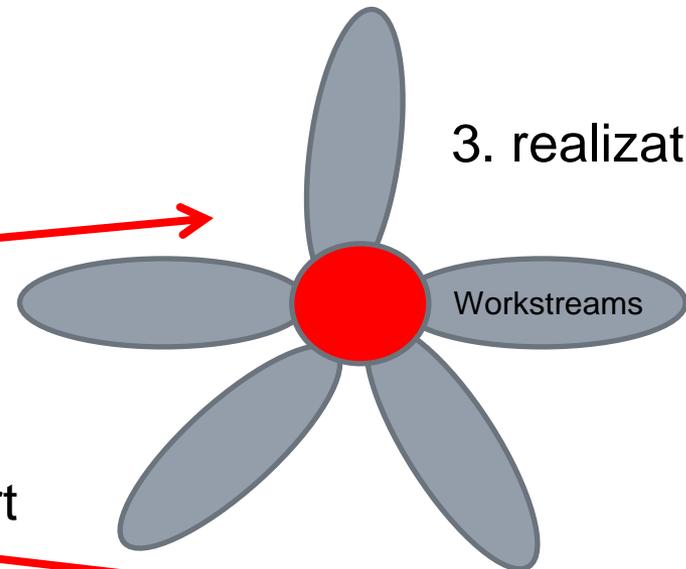
1. demand

2. export

4. import

5. operation

Program Organization

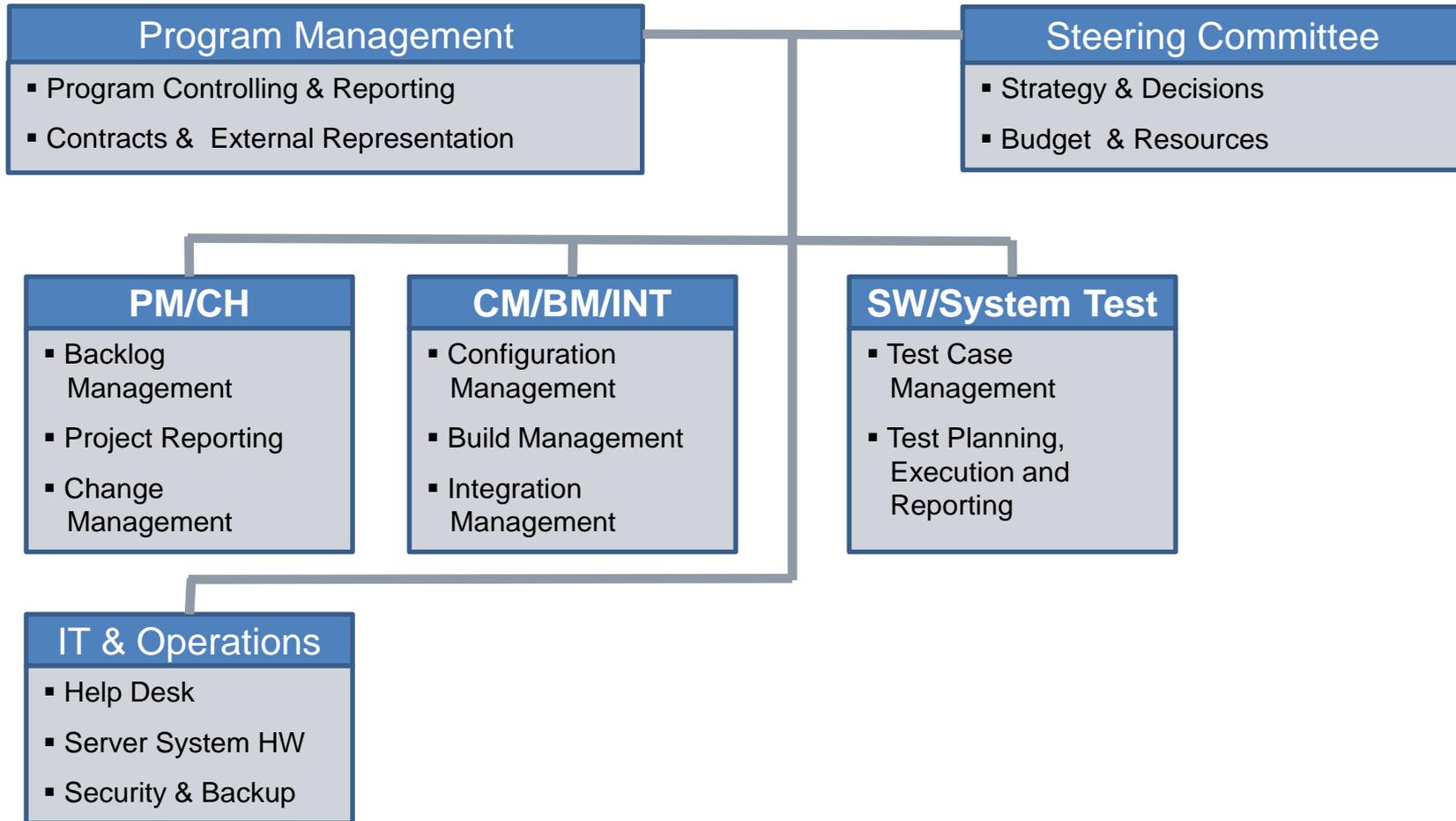


3. realization

Workstreams

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

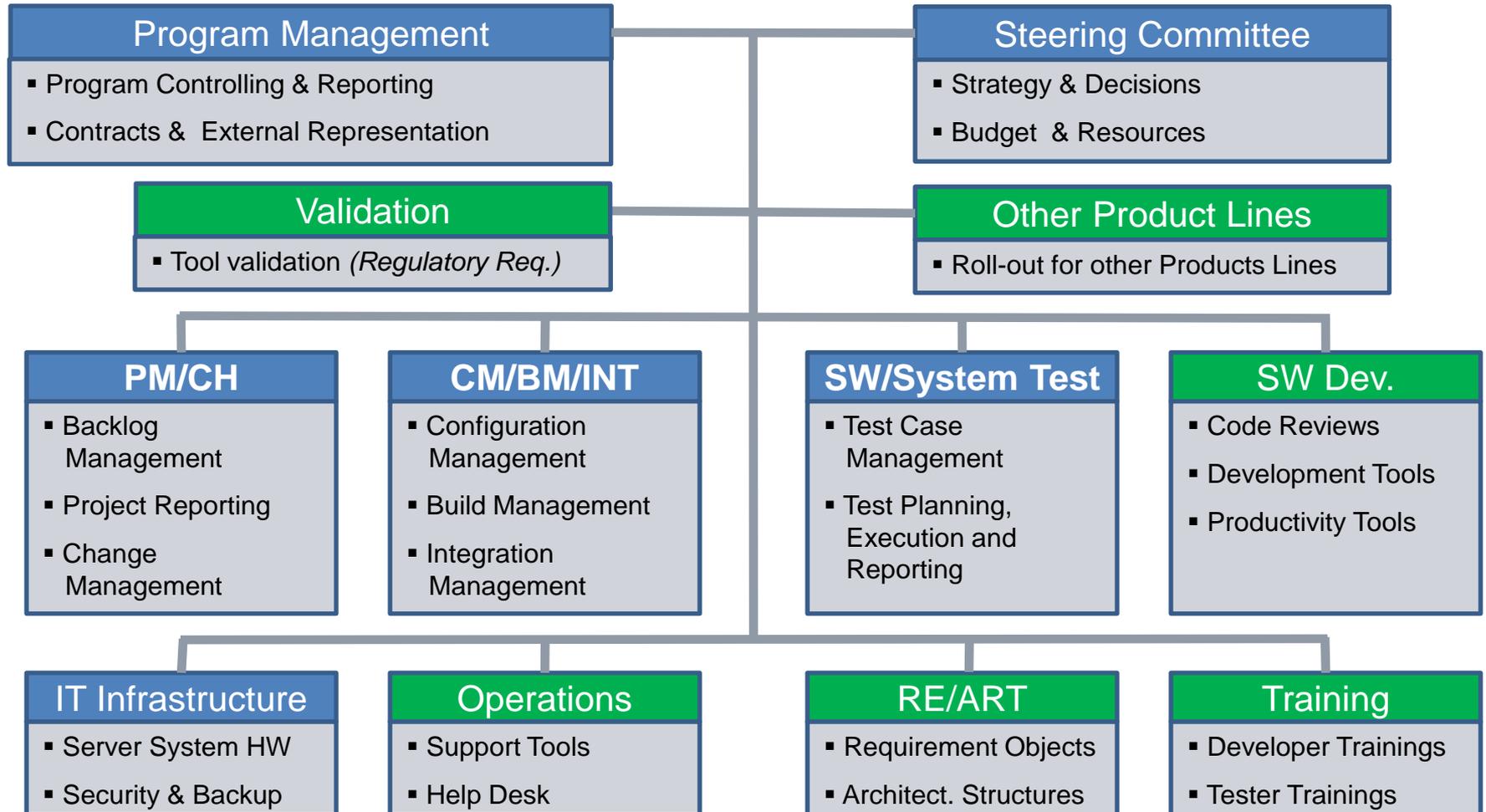
Requirements Engineering / Architecture

- 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

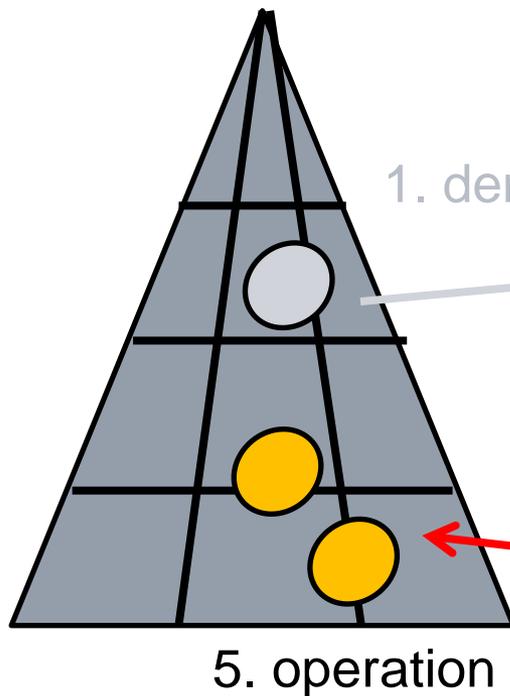


Current TFS Program Status

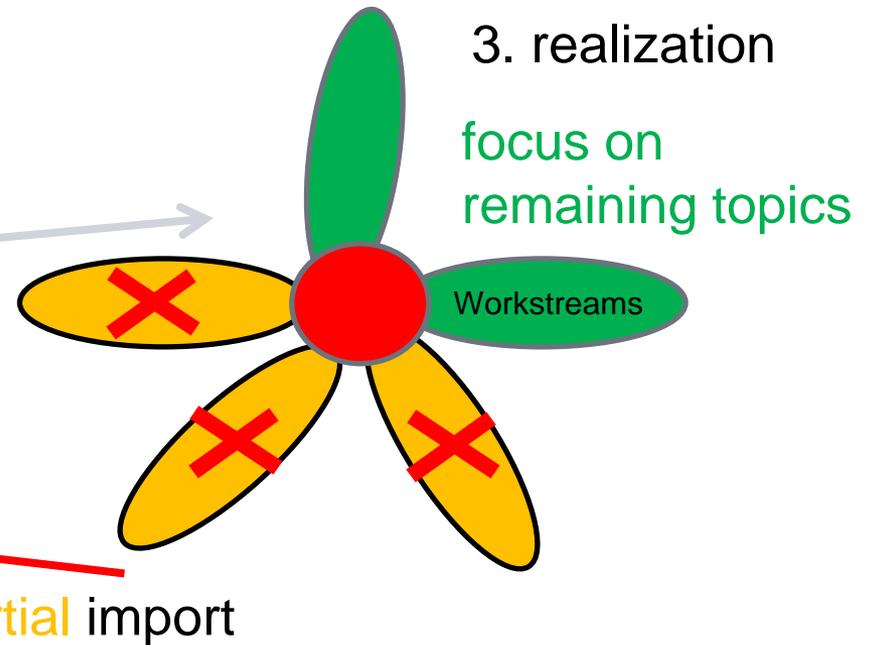
		TFS Program >>				>> Organization	
		Vision	Concept	Implementation	Roll-out	Improvements	Maintenance
Core Areas	PM (Project Management)	Green	Green	Green	Green	Green	Green
	CH (Change Management)	Green	Yellow	Red	Red	Red	Red
	CM/BM/INT	Green	Green	Green	Green	Yellow	Yellow
	SW Dev. (Code Review)	Green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

New Program Focus

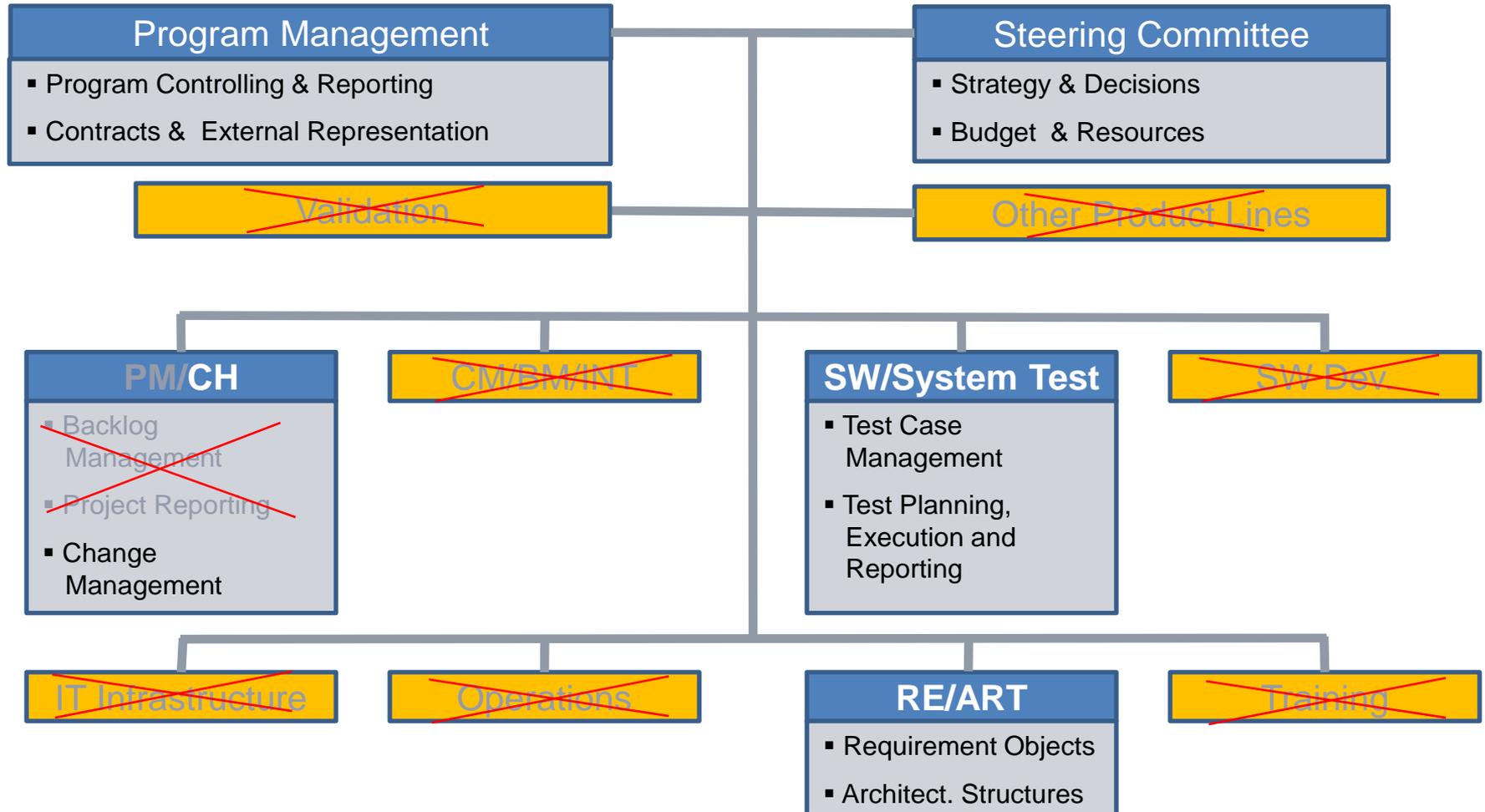
Matrix Organization (Line + Project)



Program Organization



Refocussed TFS Program Organization

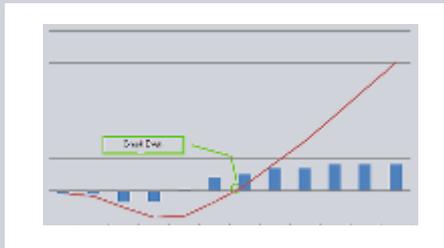




Contents

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

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**.

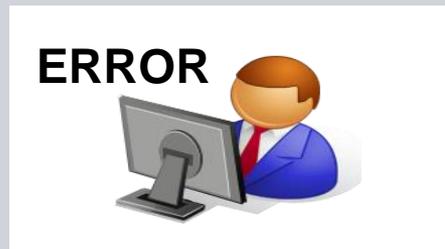


- An **ALM tool** cannot be introduced at once in a settled environment, **step-wise roll-out of areas** is preferred. But do a big-bang migration for the single areas to avoid efforts for hybrid/parallel operations.

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

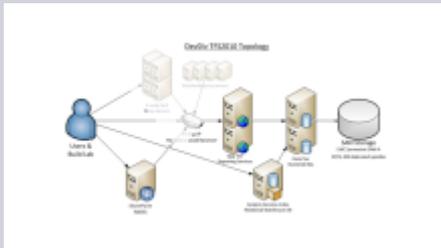


- **Training** is necessary, but not sufficient.



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

Reliable IT Infrastructure is required



- The ALM system is the **most critical IT system** of a R&D organization. ALM system problems will impact all development work steps.

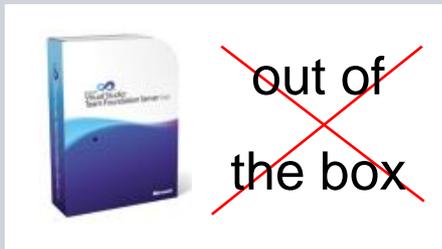


- Provide **support tooling** for standard IT tasks (e.g. set-up of new project, user management, ..) to **reduce IT operation efforts and costs**.

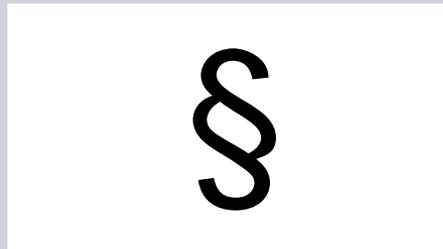


- Focus of the IT department is on **high availability and performance** of the TFS system.

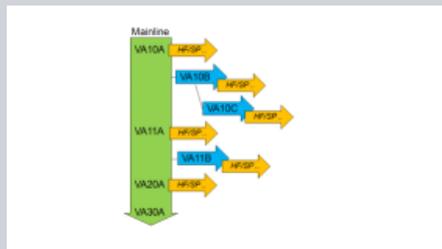
Use of TFS out of the Box is not possible



- 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.



Contents

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

Bibliography

*syngo.via*¹

- <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



¹ *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.

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

Thank you for your attention!



Gerold Herold

Process & Program Manager
Siemens AG, Healthcare Sector, SYNGO
H IM SY R&D VIA PM1

Hartmannstr. 16
91052 Erlangen

Phone: +49 9131 84-5991
Fax: +49 9131 84-8691

E-mail: gerold.herold@siemens.com

Thank you for your attention!



Sven Hubert

MVP Visual Studio ALM

AIT - Applied Information Technologies GmbH &
Co. KG, AIT TeamSystemPro Team

Leitzstrasse 45
70469 Stuttgart

Phone: +49 (711) 49066 431

Mobile: +49 (151) 5505 2622

Fax: +49 (711) 49066 440

E-mail: Sven.Hubert@aitgmbh.de

syngo. It's all about you.