



**Software.Process.Management**  
software processes that fit your business needs

# Requirements endlich 'richtig'

## Moderne Requirements-Tools erfolgreich einführen und nutzen

Dr. Andreas Birk, Software.Process.Management

19. November 2014, München, GI Regionalgruppe München, AK „Requirements“

Handout-Version mit Kommentaren  
und Anmerkungen

## Agenda

Why tool-based requirements management (RM)?

What is an RM tool?

Advantages of tool-based RM

- Do requirements “right”
- Improve RM practices

How to introduce & use RM tools? – Experiences & case studies

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## Why Tool-Based Requirements Management (RM)?

### Shortcomings of traditional *document-based* RM

Document-based RM using word processors, Wikis, or spread sheet applications as the only tool support usually becomes very inefficient and defect-prone

Especially for large, distributed, or long-running development endeavours, document-based RM can become particularly cumbersome:

- Where is the latest document version? Is somebody else editing it?
- Is a requirements' identifier still up to date?
- How can I express relationships between requirements?
- How can I find out which requirements in the document are stable?

Also for agile projects, suitable RM tool support can be essential

## Why Tool-Based Requirements Management (RM)?

### Objectives of good RM tool support

Good RM tool support can, among others, bring the following benefits:

- Always have the latest requirements version at hand, even if a colleague finished editing just one minute ago
- Don't bother with requirements IDs; focus on requirements contents, instead
- Work with and decide on each individual requirement, while always being able to generate a complete specification document in an instant
- Master requirements structures across different levels, tracing from requirements to code and tests, and enabling efficient requirements reuse
- Monitor and manage projects based on requirements status and regarding contribution to customer value

## Why Tool-Based Requirements Management (RM)?

„... a bicycle for our minds“

„What a computer is to me is it's the most remarkable tool that we've ever come up with, and it's the equivalent of a bicycle for our minds.“

Steve Jobs

What Steve Jobs has demanded from computers: Requirements Managers can demand it from modern RM tools, too

## What Is An RM Tool?

## Requirements Management Tools Surveys

**INCOSE** – <http://www.incose.org/productspubs/products/rmsurvey.aspx>

**Volere** – <http://volere.co.uk/tools.htm>

**Ian Alexander** – <http://www.scenarioplus.org.uk/vendors.htm>

**Making of Software** – <http://makingofsoftware.com/resources/list-of-rm-tools>

- Currently the most comprehensive & most up to date list
- Actively researched & edited by the authors

Source & additional information: <http://makingofsoftware.com/2014/lists-of-requirements-tools>

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**The Making of Software**  
software engineering applied

<http://makingofsoftware.com/resources/list-of-rm-tools>

Software Engineering | Tooling | Consulting | Profile | Resources | The Making of...

### List of Requirements Management Tools

by Andreas Birk and Gerald Heller

Looking for a tool that can support your lists might help you finding one.

This is the February 2014 version of our list. It is updated. We have tried our best to make it as up to date as possible. You find six tools, categorized by requirements definition, requirements management, requirements analysis, requirements testing, requirements validation, and requirements verification. Each tool is accompanied with latest version info where available and vendor pages.

Due to the large number of tools, we have organized them into categories. Below, you first find this list of selected tools.

What is an RM tool? This simple question has many answers. In this blog post, we discuss some of the most important characteristics of these blog posts: RM Tools – what are they? Support Requirements Management? Read our related blog post that summarizes additional requirements tool lists. It adds a list of wireframing tools, ideation tools, modeling tools, and more.

The list of RM tools contains additional comments or links to suggest additional tools. Please refer to the notes on the right side of the page.

For selection criteria, a legend of the annotations, please refer to the notes on the right side of the page.

#### Example RM Tools

- Blueprint Requirements Center, Blueprint Software Systems, Inc.
- CaliberRM, Borland (Micro Focus)
- codeBeamer Requirements Management, Intland Software GmbH
- HP Quality Center, ALM, Hewlett-Packard
- IBM Rational DOORS, IBM
- IBM Rational Requirements Composer, IBM
- Innovator for Business Analysts, MID GmbH
- inteGREAT, eDev Technologies
- Jama, Jama Software
- Kovair ALM Studio, Kovair Software, Inc.
- Polarion Requirements, Polarion Software
- PTC Integrity, PTC Integrity
- Serena Requirements Manager, Serena Software
- TestTrack RM, Seapine Software, Inc.
- Visure Requirements, Visure

These tools belong to the list of selected RM tools at the website MakingOfSoftware.com. The complete list contains links to more than 100 RM tools.

Scope: RM, Testing

Scope: RM

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## Features of Modern RM Tools

Design requirements structures

Manage requirements structures

Reuse & manage requirements across projects

Collaborate on requirements

Visualize & explore requirements information

Integrate requirements across the application lifecycle

Among the various features of today's RM tools, these might be the most relevant ones, providing highest value to requirement management

## Examples of RM Tool Functionality

The following slides show examples of modern RM tool functionality using selected tools

The presented tools are good examples but usually by far not the only ones providing such functionality

## Design Requirements Structures (Jama)

Jama allows for defining nested folder structures of requirements and other requirements-related items

Requirements-internal information is structured using attribute/value pairs

Volere

Project | Change Project

Explorer

Add

Volere

Project Drivers

Scope

Constraints

Glossary

Functional Requirements

Non Functional-Requirements

Issues

Requirements

Look and feel

Usability

Fast page load

Performance

Operational Requirement

Non Functional-Requirement

Volere | Non Functional-Requirements | Usability

Short Name: Fast page load

ID: Vol-NFR-1

Global Id: 47503

Description: A single page load should need less than 4 seconds to display. Bulk operations may need longer.

Fit criterion: All single actions should complete in less than 4 seconds.

Source: Hugh Everett

Rationale: User aren't motivated when response times are high

Status: Accepted

Release: Unassigned

Assigned: Gina ProjectLead

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## Design Requirements Structures (HP ALM)

Requirements relationships connect requirements with other requirements or with other item types

This example of HP ALM shows creation of requirements relationships

Requirement Details

Req ID: 175

Name: Cancel Reservations

Requirement Type: Functional

Relationships

Impact Analysis

Add Requirement Traceability

Trace From: Requirements that affect <Cancel Reservation

Trace To: Requirements affected by <Cancel Reservations

Req: Name

Trace Comment

Req: Name

Trace Comment

Payment Methods

Requirements Tree

Requirements

Business Models

Mercury Tours Application

Online Travel Booking Services

Online Travel Information Source

Profile Management

Reservation Management

Booking System

Application Security

Application Usability

Task Simplicity

Correct Error Messages

Keyboard Support

Spelling And Language Correctness

Web Page Structure And Layout Consistent

Application Client System

Application Performance

Assemble order

Contract processing

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## Design Requirements Structure (HP ALM)

### HP ALM structural concepts

- Folders, Groups
- Requirements Types

HP ALM also offers nested requirements folders and requirements groups that can contain requirements items

As in most RM tools, arbitrary requirements types can be defined by tool administrators – examples are business requirements, use cases, and functional requirements

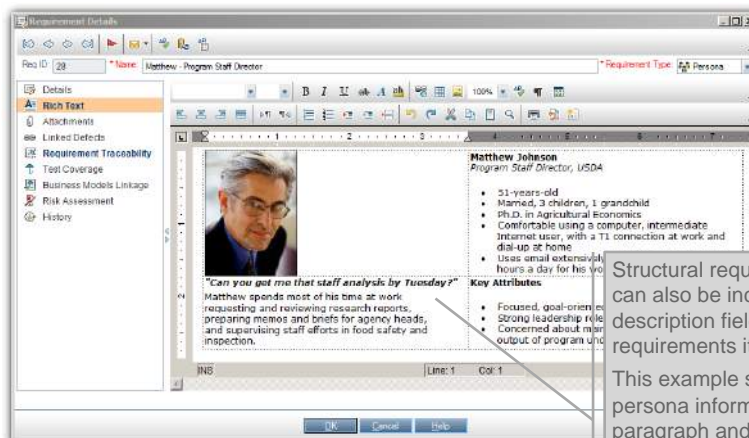
Name	Requirement Type
Requirements	Folder
Product Orion	Folder
Scope	Folder
Release 2.5	Folder
Business requirement 1	Business
Business requirement 2	Business
Business requirement 3	Business
Release 3.0	Folder
Release 4.0	Folder
Personas	Folder
Matthew - Program Staff Director	Persona
Constraints	Folder
Conventions	Folder
Functional Requirements	Folder
Functional area 1	Group
UC 1	Use Case
F4	Functional
F3	Functional
F6	Functional
Functional area 2	Group
F5	Functional
F8	Functional
F9	Functional
Usability	Folder
Performance	Folder
Security	Folder
Unclassified	Folder

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## Design Requirements Structures (HP ALM)



Structural requirements information can also be included into rich-text description fields at each requirements item

This example shows definition of persona information using tables, paragraph and font layout, and multimedia objects

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## Manage Requirements Structures

Modify requirements contents

Modify requirements structure

Search requirements

Filter requirements

Conduct bulk edit operations

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## Reuse Requirements (Jama)

Reuse Item(s)

Select source item(s): Wireless Catalog

How do you want to reuse these items?

Select a target destination: PLF1

**Reuse Options** View: Basic Advanced

- Sync Item(s) and share Global ID
- Add a relationship from the original item
- Include all tags, attachments, and links
- Do not include relationships outside of the source selection
- Include relationships from the source selection
- Include related items and mirror relationships

Source: Item A1, Item B1, Item C1

Destination: Item A2, Item B2

Relationships: Sync, Related

Some tools, in this case Jama, offer specific support for requirements reuse, which includes well-controlled copying of existing requirements collections, and support for later two-way synchronization of requirements between source and destination

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## Manage Reused Requirements (Jama)

Only show items with differences Sync Options Configure View

Product requirements (7) View: All Results

\*Product Differences

RM Catalog: Product requirements Product A1: Product requirements

Global ID	Project	ID	Short Name	Status	Related Items	Sync All	Global ID	Project	ID	Short Name	Status	Related Item
46205	RM Catalog	RMC-PR-1	PR1	Accepted	BR1	↔	46205	Product A1	PA1-PR-1	PR1	Accepted	BR1
46206	RM Catalog	RMC-PR-2	PR2	Draft	BR1	↔	46206	Product A1	PA1-PR-2	PR2	Draft	BR1
46207	RM Catalog	RMC-PR-3	PR3	Accepted	BR2	↔	46207	Product A1	PA1-PR-3	PR3	Accepted	BR2
46302	RM Catalog	RMC-PR-4	PR4	Draft		↔						
46303	RM Catalog	RMC-PR-5	PR5	Draft		↔						
						↔	46304	Product A1	PA1-PR-4	PR4	Draft	BR1
						↔	46305	Product A1	PA1-PR-5	PR5	Draft	BR1

Page 1 of 1 Show: 20

Back Save Diff View As Save Diff View

This screenshot shows one of Jama's dialogs using which requirements managers can analyze and manage deviations between reuse source and destination

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## Collaborate on Requirements (Polarion ALM)

3 Requirements

3.1 General Operations

DP-313 - DrivePilot shall engage operations while the vehicle is at rest. Version 1.0 (2013-12-27)

DP-314 - DrivePilot may not be engaged while the vehicle is under manual control. Version 1.0 (2013-12-27)

DP-315 - DrivePilot shall be easy to operate without extensive training. Version 1.0 (2013-12-27)

DP-316 - Before any user may engage DrivePilot on public roads, that user must successfully complete a tutorial and test DrivePilot exercise. Version 1.0 (2013-12-27)

DP-317 - DrivePilot shall be easy to operate without extensive training. Version 1.0 (2013-12-27)

DP-332 - DrivePilot shall be easy to operate without extensive training. Version 1.0 (2013-12-27)

Comments

Work Item Properties

Document Properties

Document Outline

Attachments

Approvals

Test Run Planning

Planning

Modern RM tools also offer various support for collaboration on requirements

This example shows the Comments menu entry of Polarion ALM

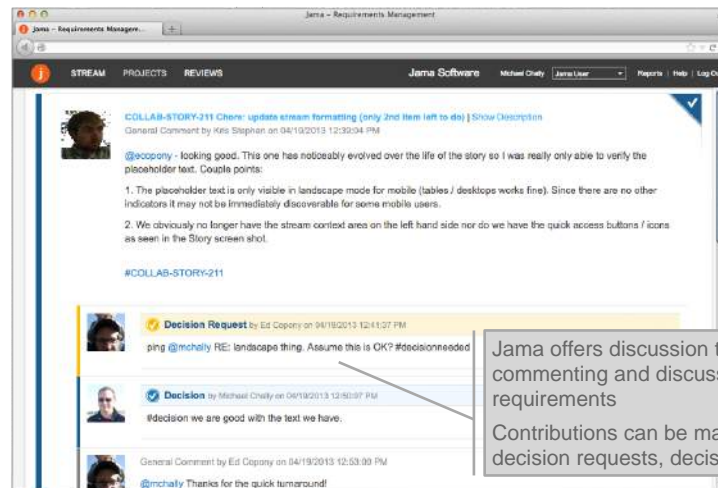
Manufacturer	Model
Toyota/Lexus	Prius, LX200
Volkswagen	Tiguan, PassatCC, Golf

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## Collaborate on Requirements (Jama)

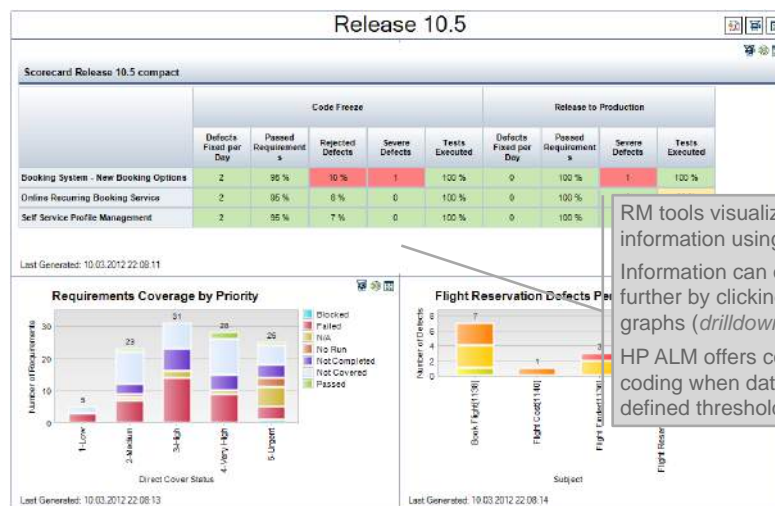


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## Visualize & Explore Requirements Information (HP ALM)



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## Visualize & Explore Requirements Information (Jama)

ID	Name	Story Points	Risk	Release	Story Rank
CR-FLD-1	Patient Profile	45	Low	Product A - Sprint 2	2
CR-STY-2	Patient Profile - Insurance	78	Medium	Product A - Sprint 2	3
CR-STY-3	Patient Profile - Contact Info	34	Low	Product A - Sprint 2	1
CR-STY-4	Patient Profile - Billing Status	76	Unassigned	Product A - Sprint 1	2
CR-FLD-5	Procedure and Notes	41	Medium	Product A - Sprint 1	1
CR-STY-6	Emergency Cases	54	Low	Unassigned	1
CR-FLD-7	X-Rays	43	Medium	Unassigned	3
CR-STY-8	X-Rays - expanded	23	High	Product A - Sprint 1	1
CR-FLD-9	Data Entry - Detail	43	Medium	Product A - Sprint 1	2
CR-STY-10	Data Entry - Detail 2	12	Unassigned	Product A - Sprint 1	2
CR-STY-11	Data Entry - Detail 3	52	High	Product A - Sprint 2	1
CR-FLD-12	Store-0	23	Medium	Product A - Sprint 3	1
CR-STY-13	E-Ordering - Insurance	43	Low	Unassigned	2
CR-STY-14	E-Ordering	15	High	Product A - Sprint 1	Unassigned
CR-FLD-15	Rates - Receipt	18	Unassigned	Product A - Sprint 1	Unassigned
CR-STY-16	Rates - GA	16	Unassigned	Product A - Sprint 2	2
CR-FLD-17	Rates - Billing	18	Medium	Product A - Sprint 2	Unassigned
CR-STY-18	Rates - Detail	29	Low	Unassigned	2
CR-FLD-19	Rates - E				

Jama provides a list view that can be enriched by color coding of picklist values  
 Users can directly edit requirements data within this view

## Visualize & Explore Requirements Information (HP ALM)

Req ID: 175 \* Name: Cancel Reservations \* Requirement Type: Functional

Relationships | Impact Analysis

Legend: ▷ Child ◁ Parent L Trace From L Trace To Recursive

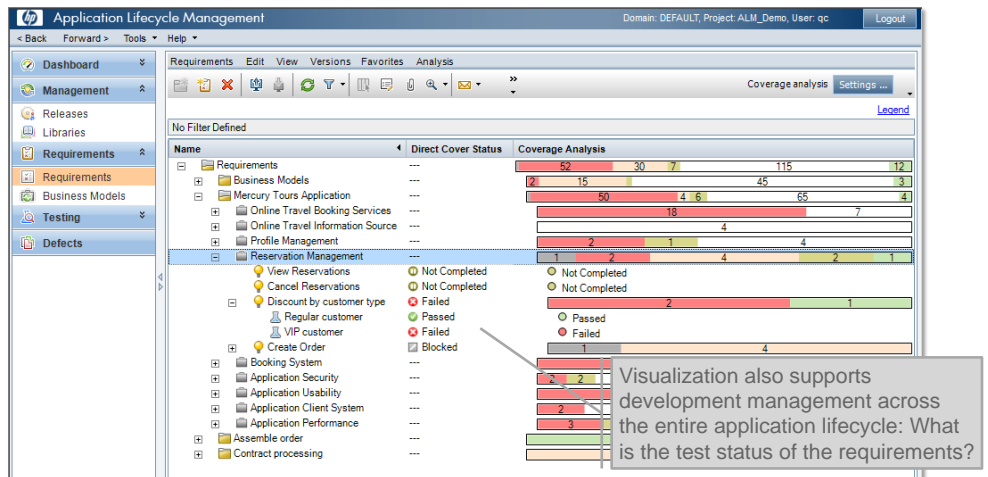
Trace From (Requirements that affect <Cancel Reservations>):

Trace To (Requirements affected by <Cancel Reservations>):

- Cancel Reservations
  - Payment Methods
  - Credit Card
  - Airline Companies
    - Blue Skies Airlines
    - Pangea Airlines
    - Unified Airlines
  - Flight Search

Visualization of trace relationships supports impact analysis: If we change a requirement, what other requirements might be affected?

## Integrate Requirements across the Application Lifecycle (HP ALM)



## Advantages of Tool-Based RM

## Do Requirements “Right”

Focus on individual requirements items

Establish clear requirements ownership

Determine requirements status & quality

These principles help ensuring quality of requirements management  
RM tools can significantly ease implementation and practice of these principles

## Fit Criterion: Link RM with Testing

Requirement #: **Unique id** Requirement Type: **Ever**  
Description: **A one sentence statement of the intention of the**

The type from the template

Fit criteria establish testable requirements  
They should be part of every individual requirements definition  
This example is from the Volere method

**Fit Criterion: A measurement of the requirement such that it is possible to test if the solution matches the original requirement**

Dependencies: **A list of other requirements that have some dependency on this one**  
Supporting Materials: **Pointer to documents that illustrate and explain this requirement**  
History: **Creation, changes, deletions, etc.**  
Conflicts: **one is**

**Volere**  
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Degree of stakeholder happiness if this requirement is successfully implemented.  
Scale from 1 = uninterested to 5 = extremely pleased.

Measure of stakeholder unhappiness if this requirement is not part of the final product.  
Scale from 1 = hardly matters to 5 = extremely displeased.

## Requirements Definition in HP Quality Center

Requirement Details

Req ID: 29 \* Name: Data compatibility with previous major version \* Requirement Type: Functional

Details

Rich Text  
Attachments  
Linked Defects  
Requirement Traceability  
Test Coverage  
Business Models Linkage  
Risk Assessment  
History

Author: sam Direct Cover... No Run  
Priority: 3 High Source: Joe Baumann  
Status: 3 Accepted Target Cycle: Iteration 3  
Target Release: 0 2.5 Testability: open

Description Comments

The new product release must support the same data structures as in the previous version.

Rationale:  
The last major release was painful for a lot of customers. We need to avoid a similar experience. Otherwise we risk to loose customers.

Fit criterion:  
Migration of our top 3 beta customers works without any modifications on the DB side.

Here, the fit criteria is a section of a requirements definition template  
It could as well be a separate requirements attribute

Testability attributes document review & acceptance of fit criteria

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## Improve RM Practices & Beyond

RM tools can help to ...

Make RM more effective & efficient

Increase involvement & interaction among RM actors & stakeholders

Integrate activities across the entire development lifecycle, starting with RM

Modern RM tools can be an excellent vehicle for improving RM practices

# Case Studies: Introduce & Consolidate Tool-Base RM

The following case studies illustrate possible implementations and benefit of RM tool support  
Check out the original reports to learn more about them

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## Intel Mobile Communications: RM Tool Migration & Improvement

Migrate long-established tool-based RM practices to new tool generation

Continuously improve & align RM practices

Further advance large-scale catalog-based reuse

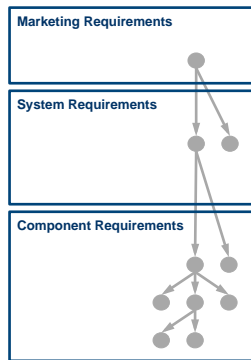
Request case study report from REConf 2014 by e-mail to [info@swpm.de](mailto:info@swpm.de)

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## Requirements Practices at Intel Mobile Communications since 2004



### Key Characteristics

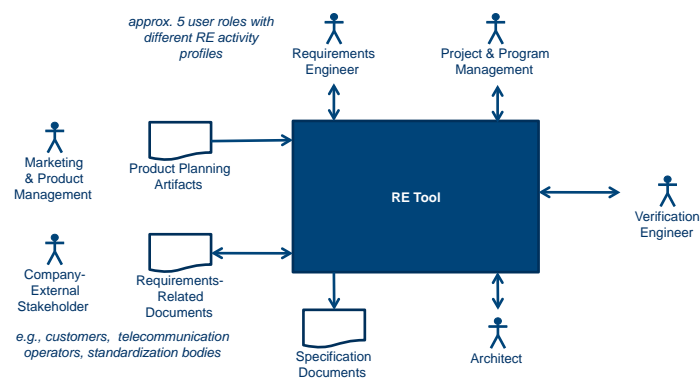
- Tool-based RM
- Central repository with several 10K requirements and for several hundreds of users
- Multi-stage requirements hierarchy from marketing requirements via system to component requirements
- Requirements traces from product management to component development and testing

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## Usage Context of RE-Tool

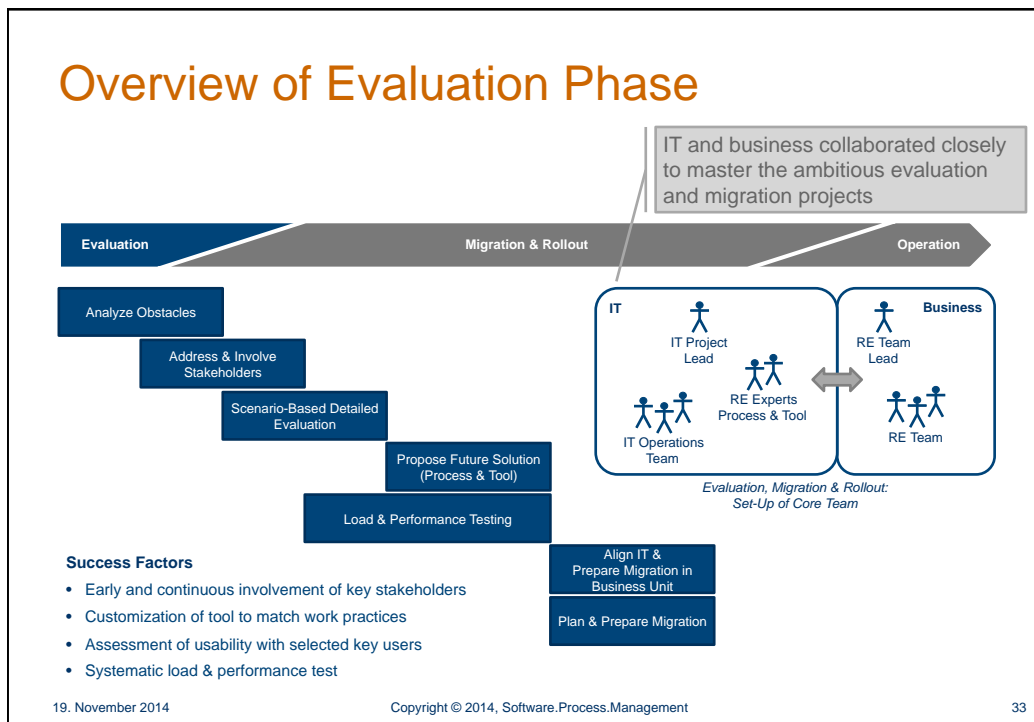


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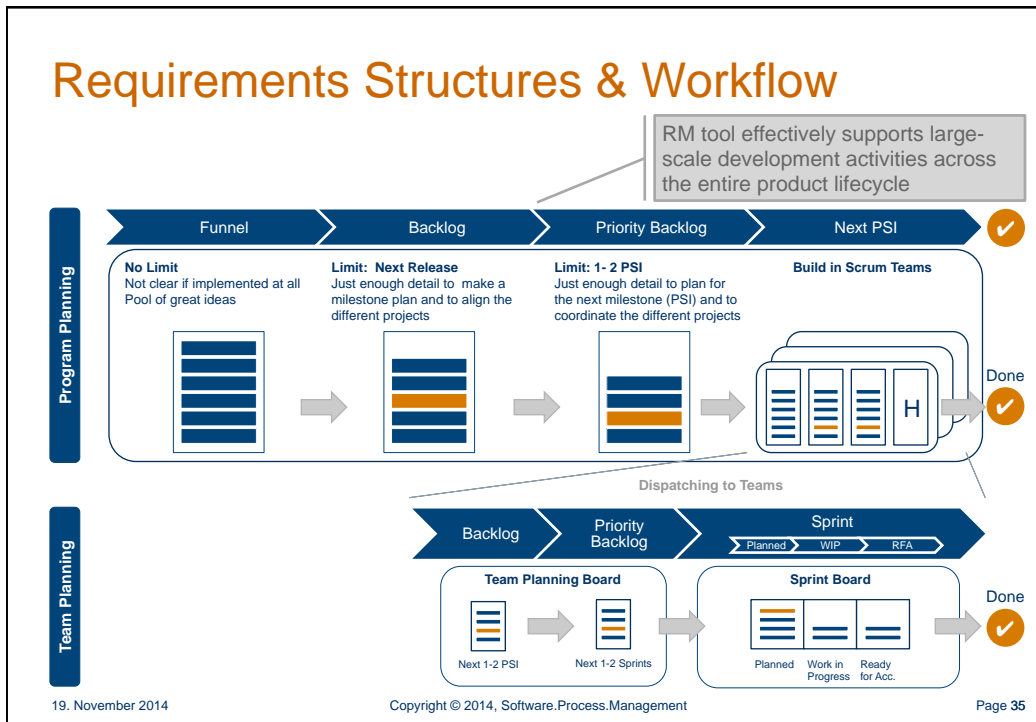
## Advantest: Establish New Agile RM Practices

Introduce new tool platform for request management, task management & requirements management (Jira & Jira Agile)

Introduce agile practices

Further integrate planning change for products & requirements

Request case study report from Scrum Day 2013 by e-mail to [info@swpm.de](mailto:info@swpm.de)



## Establish Dependency Management

Dependency management could only be implemented with RM tool support

**Integrate dependency management into the value chain model**

- Identify & manage dependencies across projects
- Mark blocked & blocking items in the backlog
- Generate & visualize dependency trees

Quote of a product owner:  
 “Dependency management is still one of our most challenging areas, but we could not make it without our tool support.”

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## Key Achievements & Contributors

### Key Achievements ...

Transparency & focus across the entire organisation

Effective & easy coordination

Successful planning & management of dependencies

Most key achievements have only been possible with RM tool support

### Due to ...

- Requirement abstraction model
- Core contributions
- PSI planning
- Cadence & synchronisation
- User stories
- Acceptance tests
- Backlog grooming
- Using the Scaled Agile Framework
- Synchronization of sprints
- Program and Scrum team planning
- Early tool support

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## It's All about People

Let the system grow

Use agile principles that conform with existing culture

Start at the pain points

Keep activities focused on impediments

Try out new ideas & learn

When introducing RM tool support, start with simple solutions that can easily be used

Remove impediments fast

If needed, extend the solutions

Although modern RM tools can be an excellent support, primarily it is people who count

RM tool support shall be designed so that it helps people achieving their best job results



Image Source: Microsoft Clip Art, j0427683.jpg

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# Summary

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## Success Factors of Tool-Based RM

Introduce & establish tool-based RM using concrete  
usage scenarios (not checklist-based evaluation only)

Select application areas on current needs & capabilities

Ensure to integrate process & tool well with each other

Build people-centred support infrastructure & commitment

Improve continuously & grow gradually

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**Thank you!**

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**Blog & Resources**

<http://MakingOfSoftware.com>