



Requirements Management Infrastructures in Global Software Development

Towards Application Lifecycle Management
with Role-Oriented In-Time Notification

Matthias Heindl

Franz Reinisch

Stefan Biffel

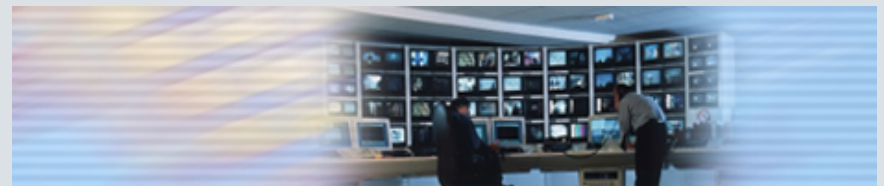




Siemens Program and Systems Engineering (PSE) Business Segments and Types of Projects



- 6000+ employees, distributed around the world (Austria, Eastern Europe, China)
- Business Segments:
 - Medical
 - Information & Communications
 - Automation & Control
 - Power
 - Transportation
 - Space Technology
- Project types range from small co-located projects to large **globally distributed projects**.





Support Center Configuration Management (SCCM)

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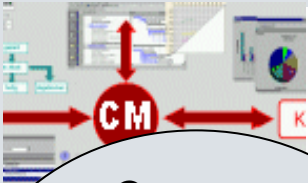
SCCM is a unit within PSE that provides:

- Configuration- and requirements management consulting and support for PSE projects
- Network meetings for employees to support experience exchange

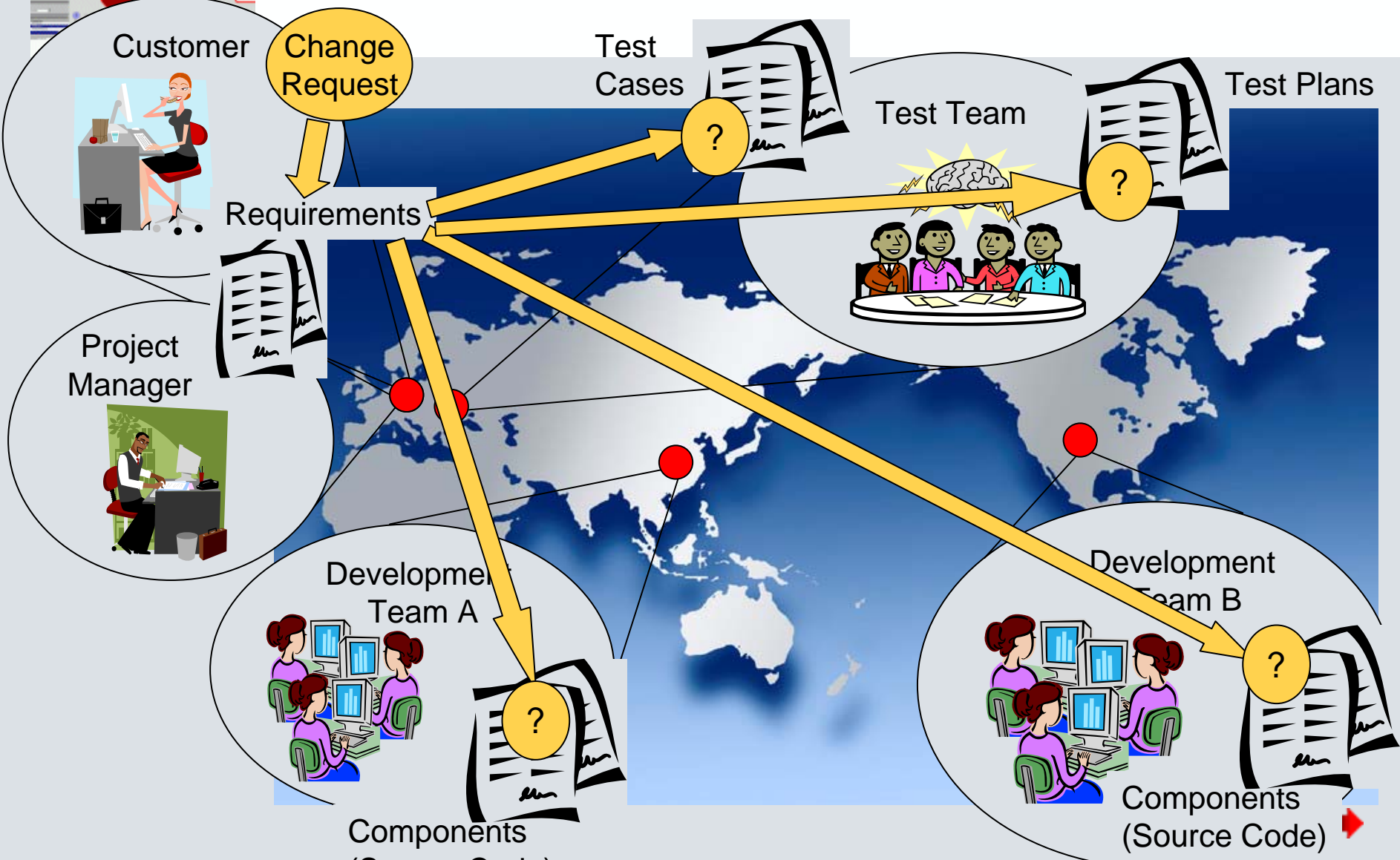
SCCM gathered experience about requirements management (REQM) in GSD projects within PSE:

- REQM needs in GSD
- REQM approaches used in practice
- Outlook: Improving REQM in GSD projects by role-based in-time notifications





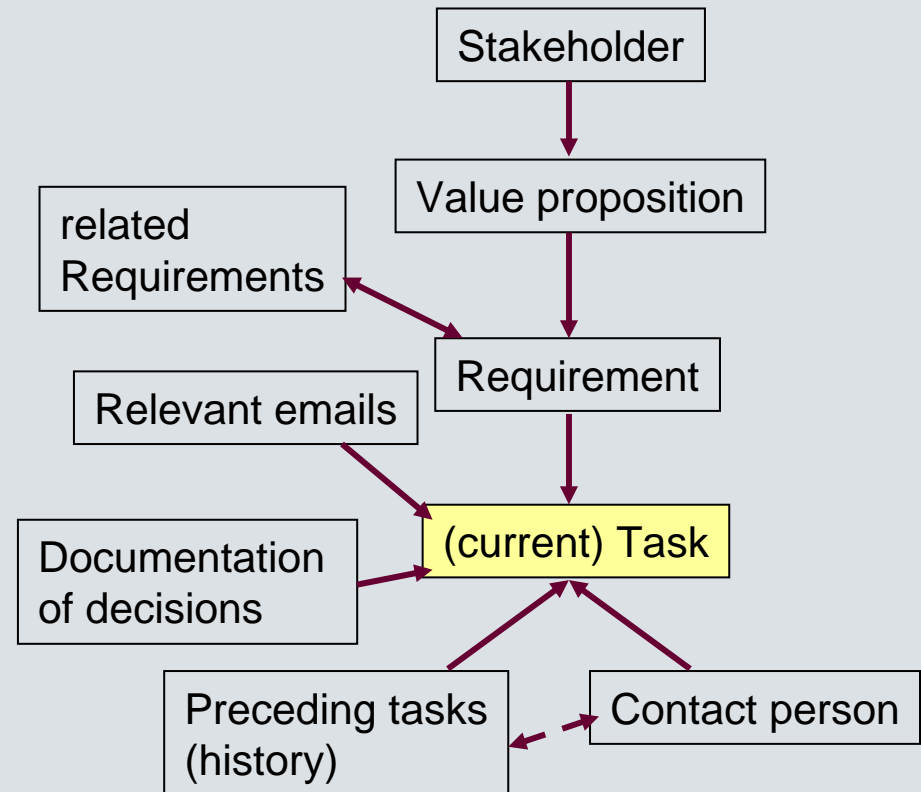
Global Software Development





Requirements Management Needs in GSD projects 1/3

- Timely and effective information exchange
 - Timely notifications about changes of relevant information (change propagation) in order to avoid re-work
 - Effective information exchange: each role gets exactly the information it needs (neither „flooded with emails“ nor „starving for information“), e.g. Ticket Management System Notifications
 - Requirements awareness mechanisms [Damian, Zowghi]





Requirements Management Needs in GSD projects 2/3

- Requirements traceability (RT) as a means to support collaboration and common understanding in GSD projects
 - Requirements tracing automation and traceability across tool borders
 - RT supports: progress monitoring, coverage analysis, change impact analysis

Roadmap

Milestone: Ende Iteration 3
1 week late (07/30/07)
 Closed tickets: 16 Active tickets: 15 52%

In der Iteration 3 sollen alle Objekte der Discipline-Beschreibung identifiziert (Work products, Tasks, Activities, Guidances, Rollen,...), mit der Kurzbeschreibung versehen und in EPF angelegt (bis E7/07). Ziel ist ein vollständiges inhaltliches „Gerüst“. Dieses Gerüst wird dann A8/07 im Steering Committee review.

Milestone: Ende Iteration 4
Due in 3 weeks (08/30/07)
 Closed tickets: 2 Active tickets: 2 40%

In der IT4 (bis E8/07) werden die inhaltlichen Detailbeschreibungen mittels EPF-C ergänzt, mit dem Ziel, die Beschreibung der jeweiligen Discipline abzuschließen.

Add new milestone

Note: See [TracRoadmap](#) for help on using the roadmap.

Download in other formats:
[iCalendar](#)

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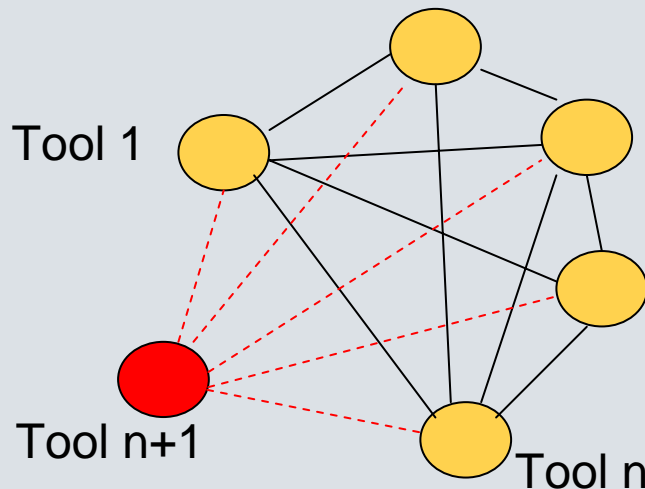
SEM NG
<http://trac.edgewall.org/>



Requirements Management Needs in GSD projects 3/3

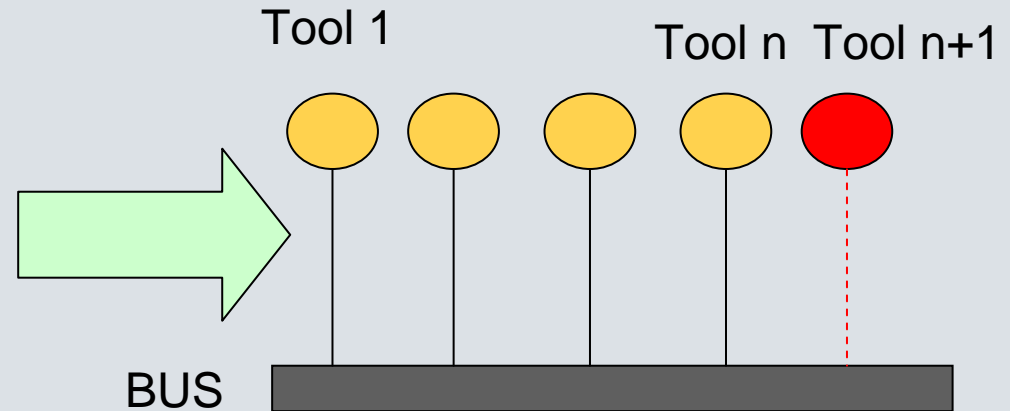
- Flexible (and cheaper) integration of lifecycle tools to support
 - Requirements traceability across tool borders
 - Data retrieval from other tools, e.g. retrieve test results of the test management tool from within the requirements management tool

What we have



- Point-to-point integrations ($M \times N$) (each new tool has to be integrated with each other tool)

What we want



- a central bus for integration ($M+N$) ($N \rightarrow \text{BUS} \rightarrow M$)





Where we are at the moment - Current REQM solutions at PSE

- Requirements Tracer (PSE CN)
- Requirements Management Tools (Doors, Requisite Pro, etc.)
- Integrations between REQM tools and test management tools
- Requirements Tracing Plug-ins for Eclipse and Visual Studio
 - Display and work on data from other tools from within the own tool, e.g. display requirements in the IDE or test results in the requirements management tool
 - Get relevant information not only from the own tool but also from the whole toolset)



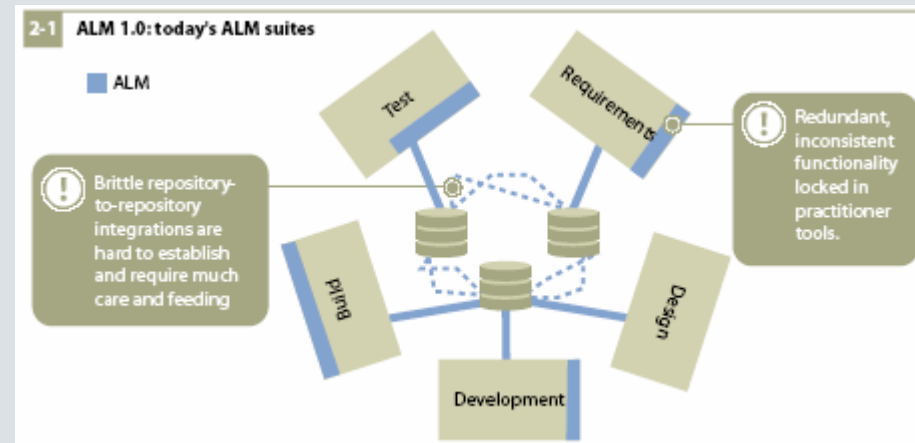
Where we want to go - Application Lifecycle Management (ALM)

Source: [C. Schwaber, The Changing Face of ALM, Forrester Research 2006](#)

- Most of the needs mentioned above can be covered by ALM approaches
- The goal of ALM at PSE is: **Integration of software lifecycle tools** (REQM, CM tool, test management tools, ticket management systems, IDEs, PM tool, collaboration platforms)

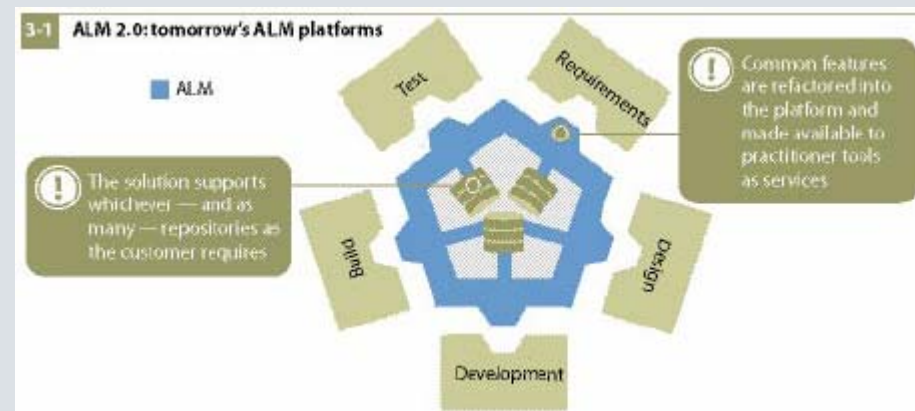
TODAY

- Point-to-point integrations
- Redundant, inconsistent functionality (each tool has a separate user administration, etc.)



TOMORROW

- Common features are refactored into the platform and made available as services
- Open integration standards (e.g. Requirements interchange format)





Based on ALM: Improvement of REQM by role-based in-time notifications in GSD

- Based on well-integrated tools, think about events (in tools) that should trigger notifications to certain project participants
 - Avoid spamming with notifications (see screenshot)
 - Ensure that relevant notifications are not ignored

- **Role-based definition of rules** that allows to define/adjust the notification behavior according to current interests of project participants:
 - Context and dependencies
 - What we have: **Normal local context** (in 1 tool)
 - What we want: **Extended context** (1+n tools)

- This approach can support collaboration in GSD by providing the following benefits:
 - lower entry hurdle for team members to access project information,
 - faster, more reliable information flow, and,
 - reduction of delay and avoidable rework due to lost or late information.

Posteingang			
Von	Betreff	Erhalten	Größe
Hendt, Matthias	Re: [SEM NG Req2] #9: Create content for SEM NG discipline "Project Management"	Do 2007-08-09 14:22	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #42: Create classicSEM standard process	Do 2007-08-09 14:22	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #42: Create classicSEM standard process	Do 2007-08-09 14:15	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #9: Create content for SEM NG discipline "Project Management"	Do 2007-08-09 14:12	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #9: Create content for SEM NG discipline "Project Management"	Do 2007-08-09 14:10	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #42: Create classicSEM standard process	Do 2007-08-09 12:53	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #42: Create classicSEM standard process	Do 2007-08-09 12:36	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #9: Create content for SEM NG discipline "Project Management"	Do 2007-08-09 11:40	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #42: Create classicSEM standard process	Do 2007-08-09 11:00	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #42: Create classicSEM standard process	Do 2007-08-09 10:34	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #42: Create classicSEM standard process	Do 2007-08-09 10:17	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #12: Create content for Discipline "Implementation"	Do 2007-08-09 10:05	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #48: Meaning of Obligation:Mandatory unclear	Do 2007-08-09 09:51	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #9: Create content for SEM NG discipline "Project Management"	Do 2007-08-09 09:42	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #42: Create classicSEM standard process	Do 2007-08-09 09:20	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #76: Missing Activity diagram in Page "Delivery Process: classicSEM" (Hans Kopf)	Do 2007-08-09 09:25	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #74: different icon for external mails: reference?	Do 2007-08-09 09:20	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #76: Missing Activity diagram in Page "Delivery Process: classicSEM" (Hans Kopf)	Do 2007-08-09 09:19	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #69: Layout and Publishing Ticket	Do 2007-08-09 09:10	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #73: expanded RoleSets could look nicer (layout)	Do 2007-08-09 09:00	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #75: on padding and margins and spaces in between	Do 2007-08-09 08:29	7 KB
Hendt, Matthias	[SEM NG Req2] #76: Missing Activity diagram in Page "Delivery Process: classicSEM" (Hans Kopf)	Do 2007-08-09 08:25	7 KB
Pöppelery, Luis	Cooper Journal of Design - August 2007	Do 2007-08-09 08:24	22 KB
Stefan Bitt	Re: AW: VASPO: Sales - comments	Mo 2007-08-09 23:44	4 KB
Hendt, Matthias	Re: [SEM NG Req2] #42: Create classicSEM standard process	Mo 2007-08-09 19:53	7 KB
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Hendt, Matthias	Re: [SEM NG Req2] #42: Create classicSEM standard process	Mo 2007-08-09 19:27	7 KB
Hendt, Matthias	Re: [SEM NG Req2] #42: Create classicSEM standard process	Mo 2007-08-09 18:30	7 KB



Next steps - Issues to tackle 1/2

Issues:

- Which data from which data pool should be shared among the tools?
 - define/extend the amount of data to be exchanged between tools
 - Integration of new tools
 - extend user interface in the tools to manage data that comes from other tools, e.g., requirements management-development integration, requirements- and test-management integration
 - How to implement the rules that define which notifications to be sent and which not → should depend on a role's (person's) preferences

Events in the REQM tool
new requirement is inserted
Existing requirement is changed
New user is added
User privileges are changed
Events in the IDE
Trace is created between source code element and requirement
Events in the Configuration Management tool
New change request was submitted
State of an artifact changed
Check-in of an artifact
Events in the test management tool
Bug report is inserted
Test cases for a particular requirement are reported as successfully tested.

Table 1. Examples for events in GSD tool support.





Example for notification rules

- Notification rules describe
 - *<whom>* (list of persons or roles) to notify
 - *<in what way>* (e.g., e-mail, SMS, entry in change log)
 - *<when>* (e.g., immediately; batch every hour/day) due
 - to *<what change>*. Change can be an observable event or state change regarding an artifact or project state, e.g., some expected event did not happen during the specified time window.
- Example: an SQL-like example rule for build automation could be:
if TESTRUN 0815 FAILS NOTIFY (PM, Peter Mayer) BY (ReqPro, IDE) and SEND FAILED TEST CASES.
- The rule says: in case of an erroneous test run the project manager (whoever has this role) should be notified via Requisite Pro, and Peter Mayer (a developer) gets notified via his IDE. The “send” option defines which data to send with the notification, e.g., the failed test cases as info for the PM and the developers, so that they know, which code to check.

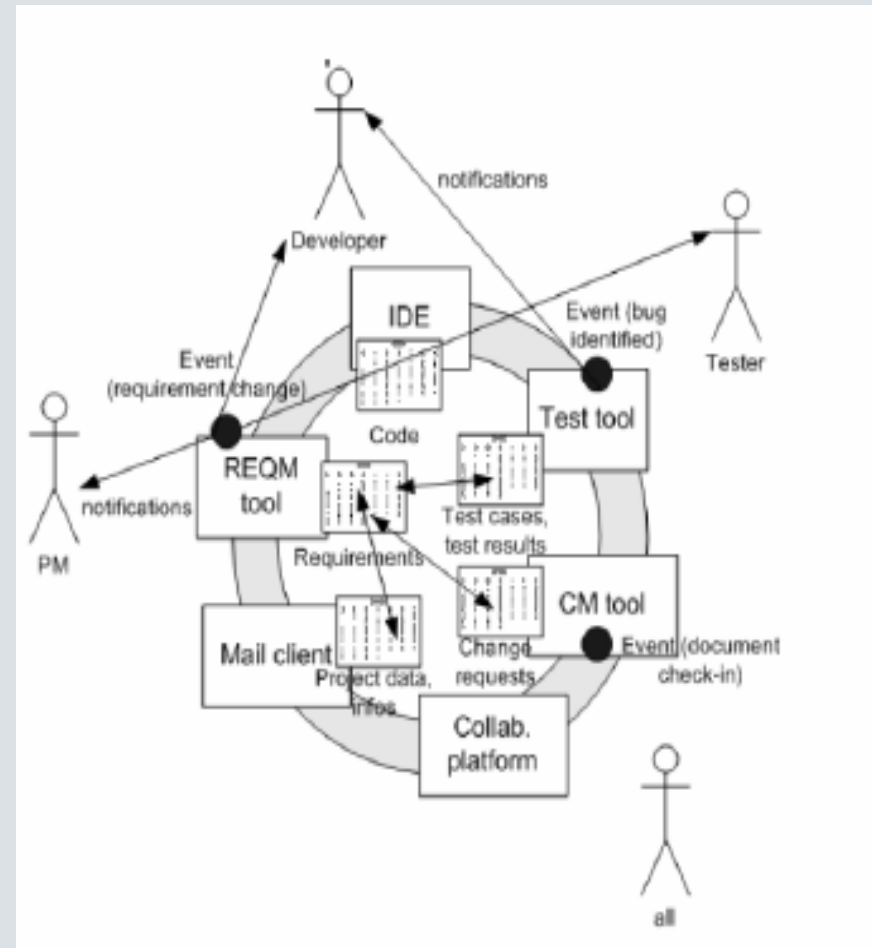




Next steps - Issues to tackle 2/2

Technical issues:

- What to use as an **enterprise bus** (Mule, etc.)?
- How to support the data exchange between tools (XML, etc.)?





Conclusion

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- The needs timely and effective information exchange, requirements traceability across tool borders, and flexible tool integrations will be addressed by our ALM/notification approach
 - Siemens PSE practitioners found our **first prototypes useful and useable**
- With this approach we expect to **increase the speed and reliability of important parts of project communication** and to reduce risks coming from inconsistent data stored in different tools.

