Agile Development in the Enterprise

"The Relentless Pursuit of Perfection"

J P Morgan, London, 21 May 2009

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Jeff Sutherland, Ph.D.

SCRUM TRAINING INSTITUTE

- Chairman, Scrum Training Institute
- CEO Scrum, Inc. and Senior Advisor, OpenView Venture Partners
  - Agile coach for OpenView Venture Partners portfolio companies
  - CTO/VP Engineering for 9 software companies
  - Created first Scrum at Easel Corp. in 1993. Rolled out Scrum in next 5 companies
  - Achieved hyperproductive state in all companies. Signatory of Agile Manifesto and founder of Agile Alliance

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openview venture partners

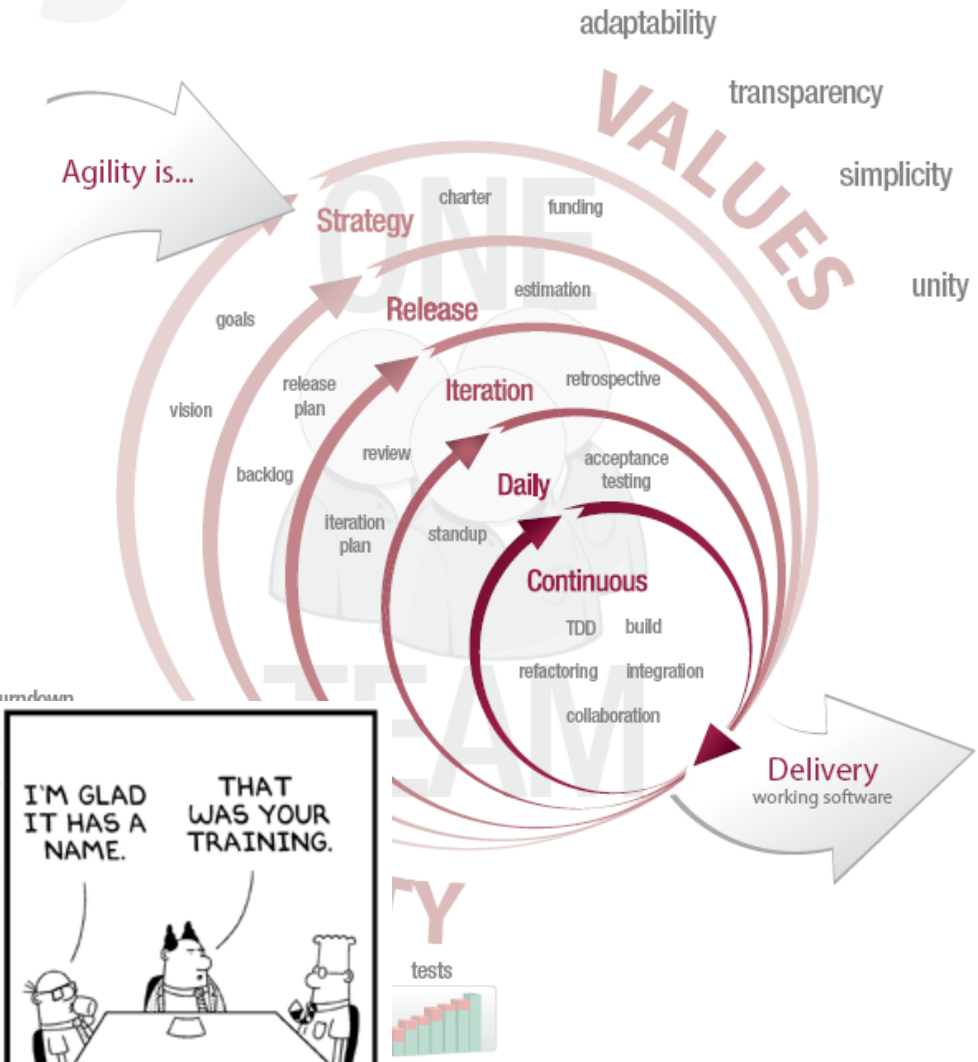
CERTIFIED Scrum Trainer

CERTIFIED Scrum Product Owner

Agile Alliance founders

Agile Development

What is Agile



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Accelerate Success

VERSIONONE
Simplifying Software Delivery

Agile Manifesto

Where did Agile Development come from?

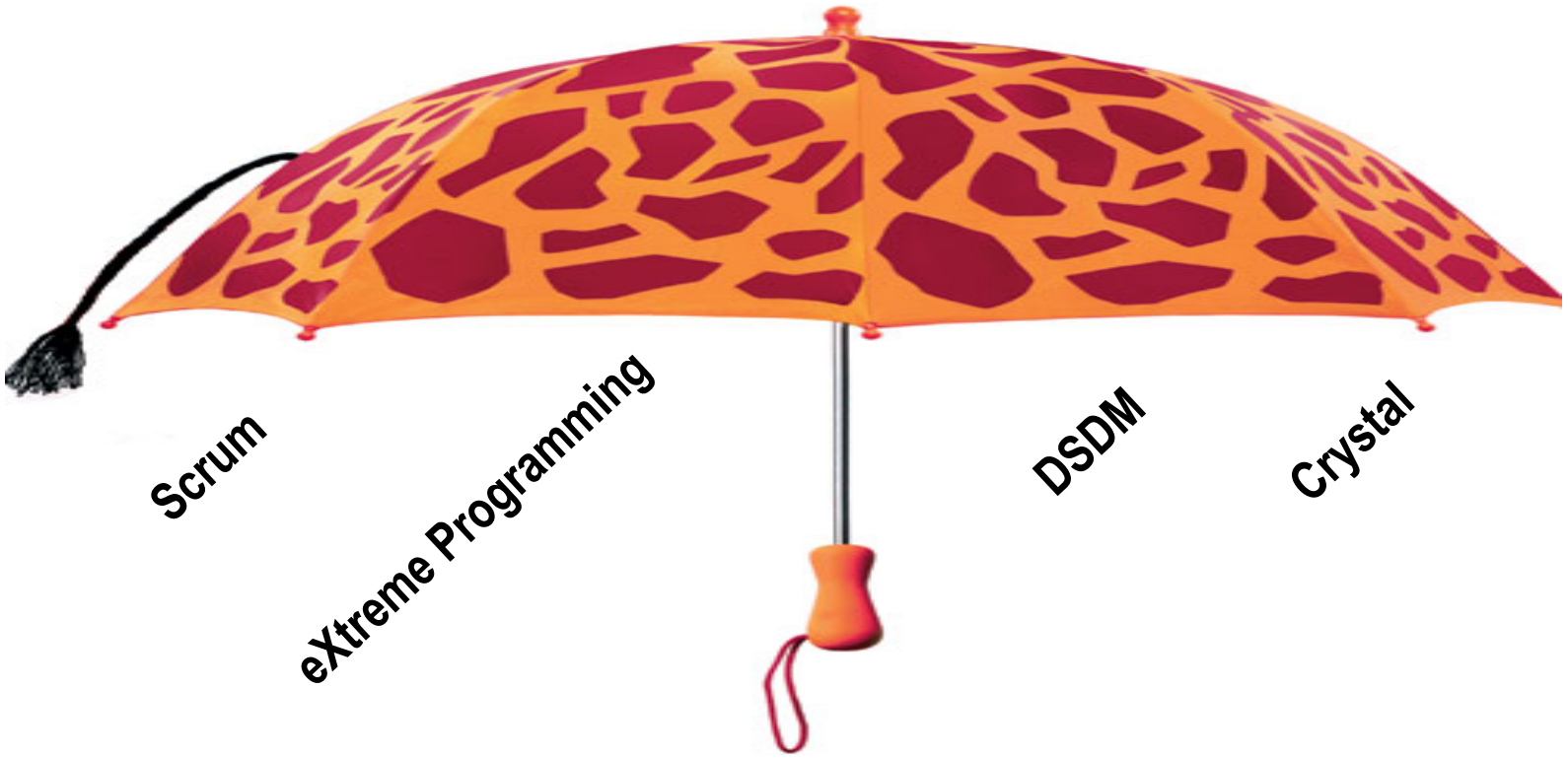
www.agilemanifesto.org

We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

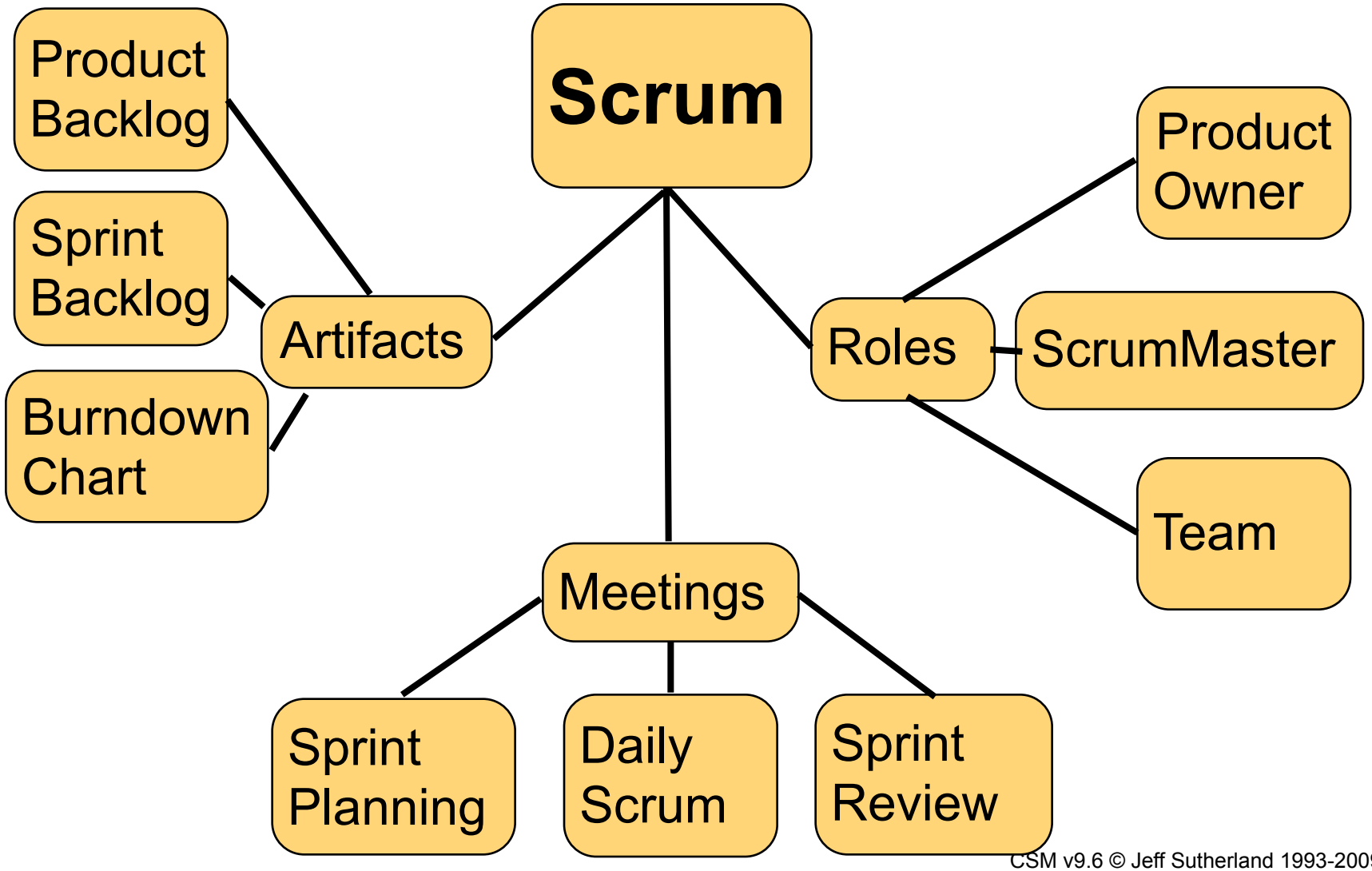
Individuals and interaction	over	Processes and tools
Working software	over	Comprehensive documentation
Customer collaboration	over	Contract negotiation
Responding to change	over	Following a plan

That is, while there is value in the items on the right, we value the items on the left more.

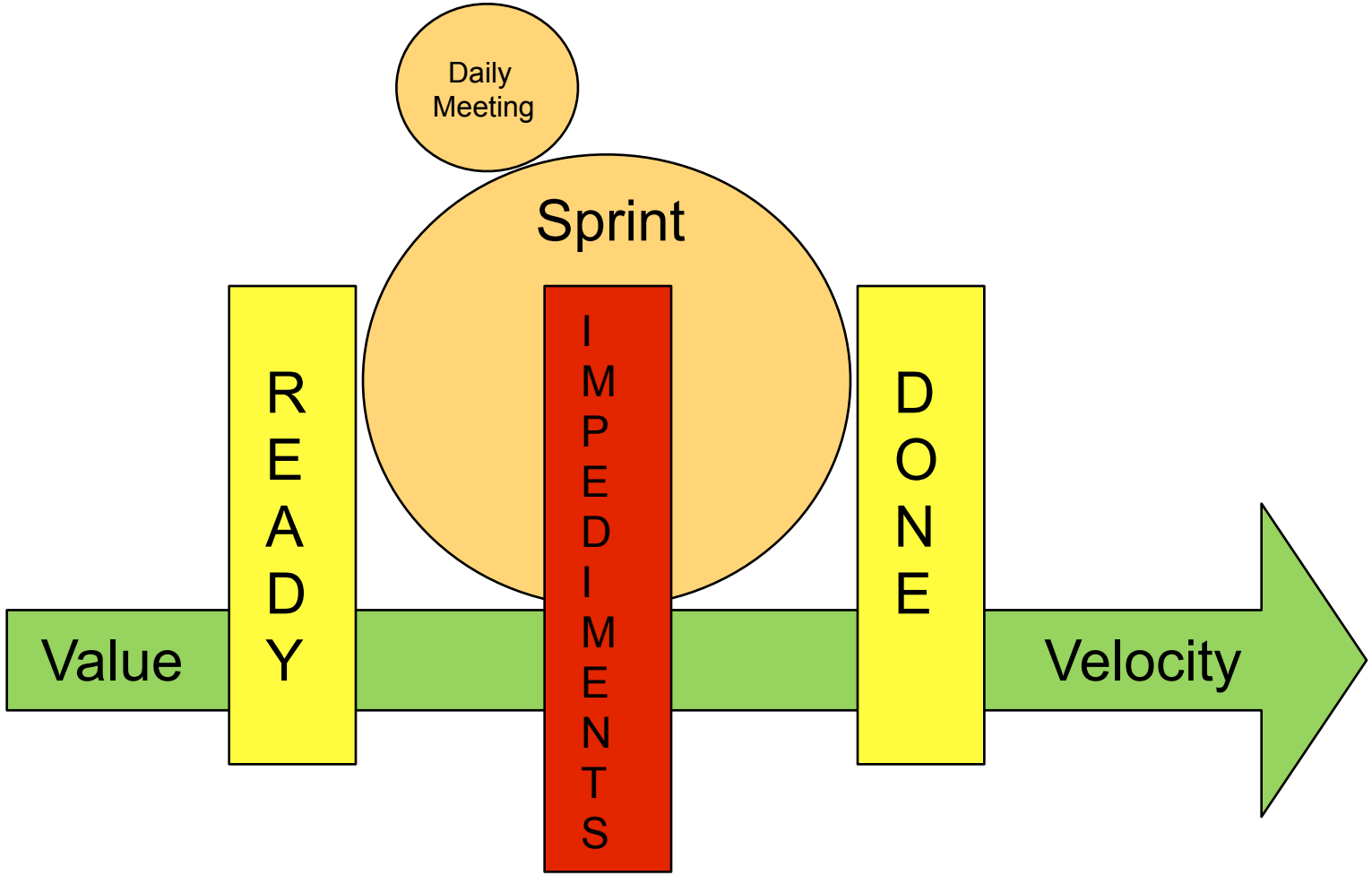
Agile Methods



Scrum Static Model



Scrum Dynamic Model



How we invented Scrum:

Learning about innovation from Xerox Parc

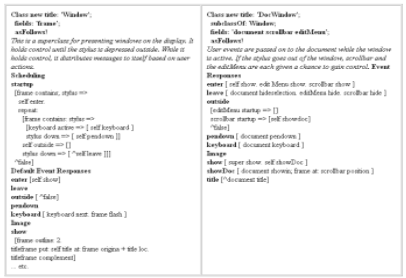
Personal Workstation

Mouse (SRI)

Ethernet

Windows Interface

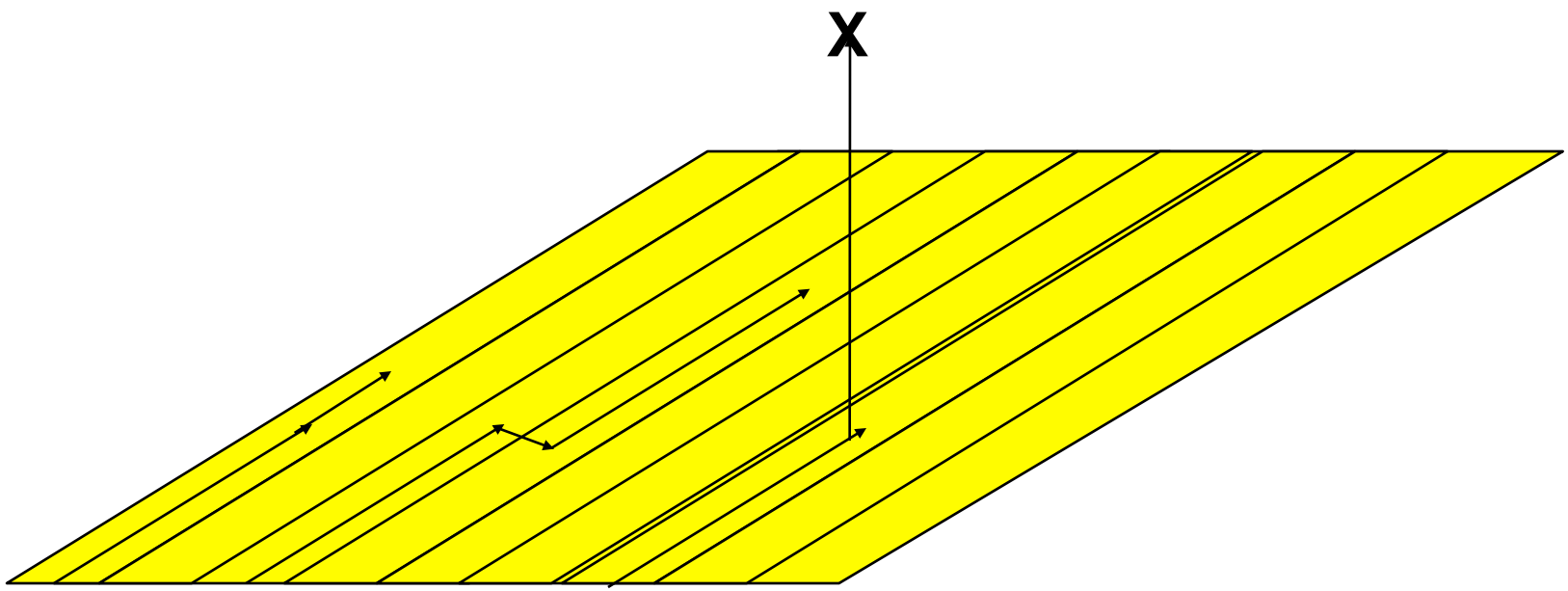
Laser Printer

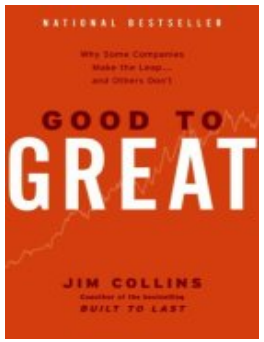


Smalltalk

Alan Kay's Innovation Strategy

- Incremental - No
- Cross Discipline - Nyet
- Out of the Box - Yes

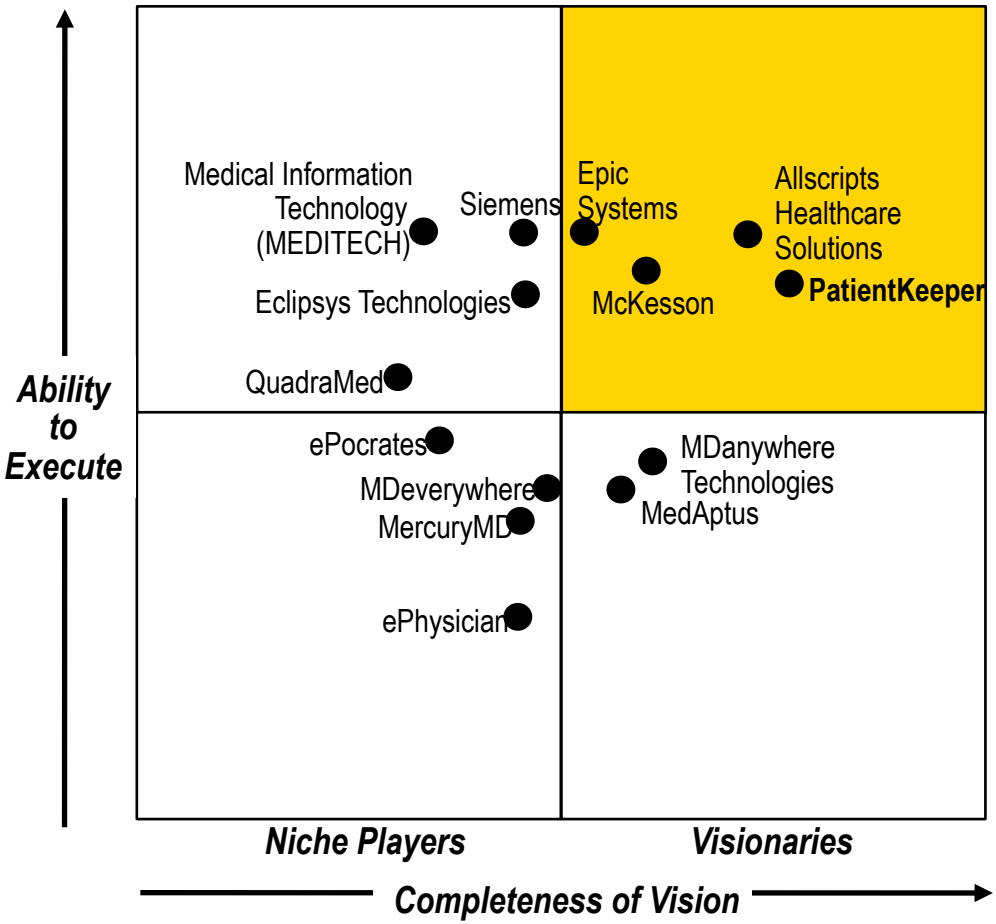




Out of the Box

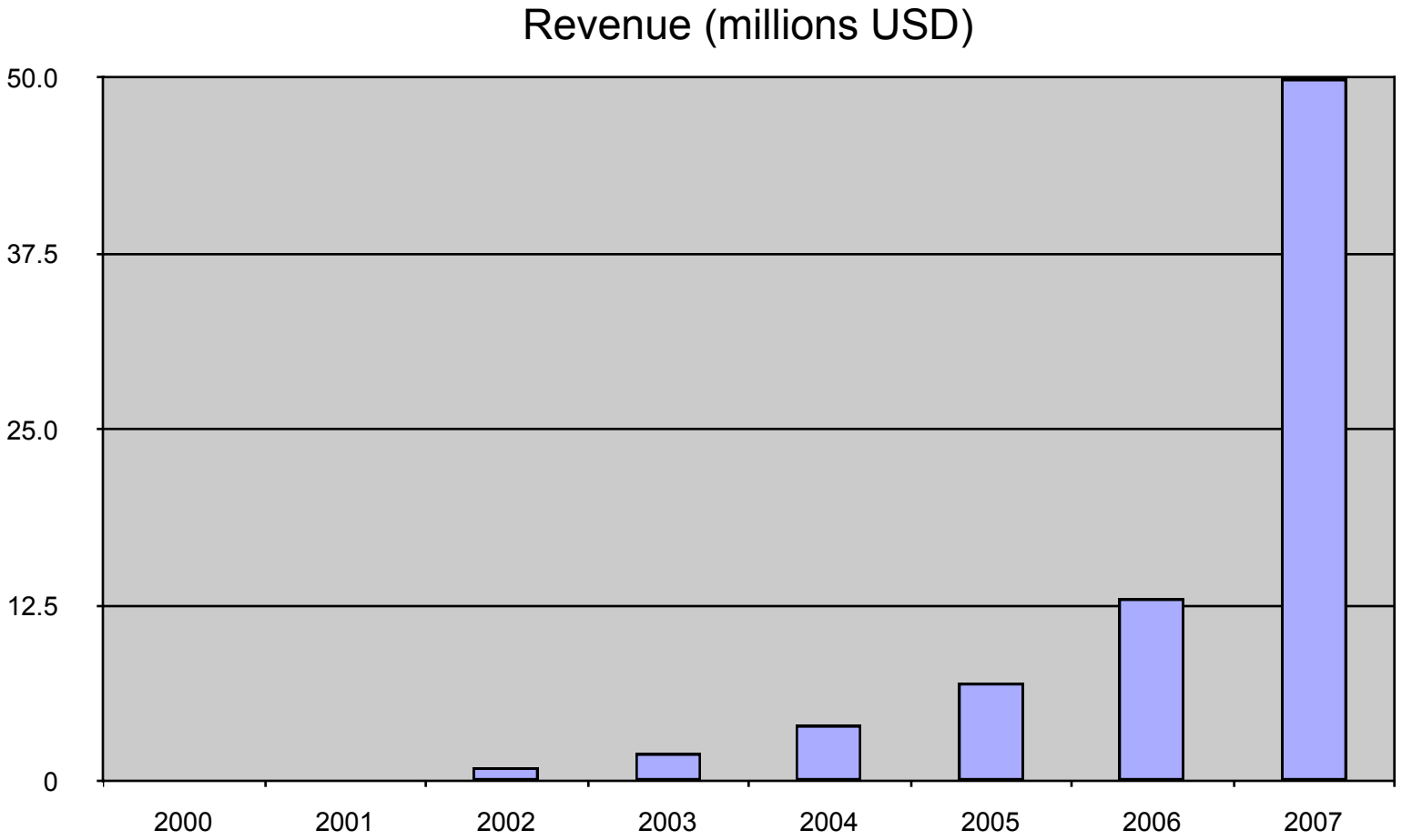
- Scrum looked at projects that were off the plate
  - IBM surgical team
  - Takeuchi and Nonaka
  - Borland Quattro Project
- *Scrum: A Pattern Language for Hyperproductive Software Development*
  - By M. Beedle, M. Devos, Y. Sharon, K. Schwaber, and J. Sutherland. In Pattern Languages of Program Design. vol. 4, N. Harrison, Ed. Boston: Addison-Wesley, 1999, pp. 637-651.
- Going from good to great means Toyota or better.

PatientKeeper All-at-Once Scrum

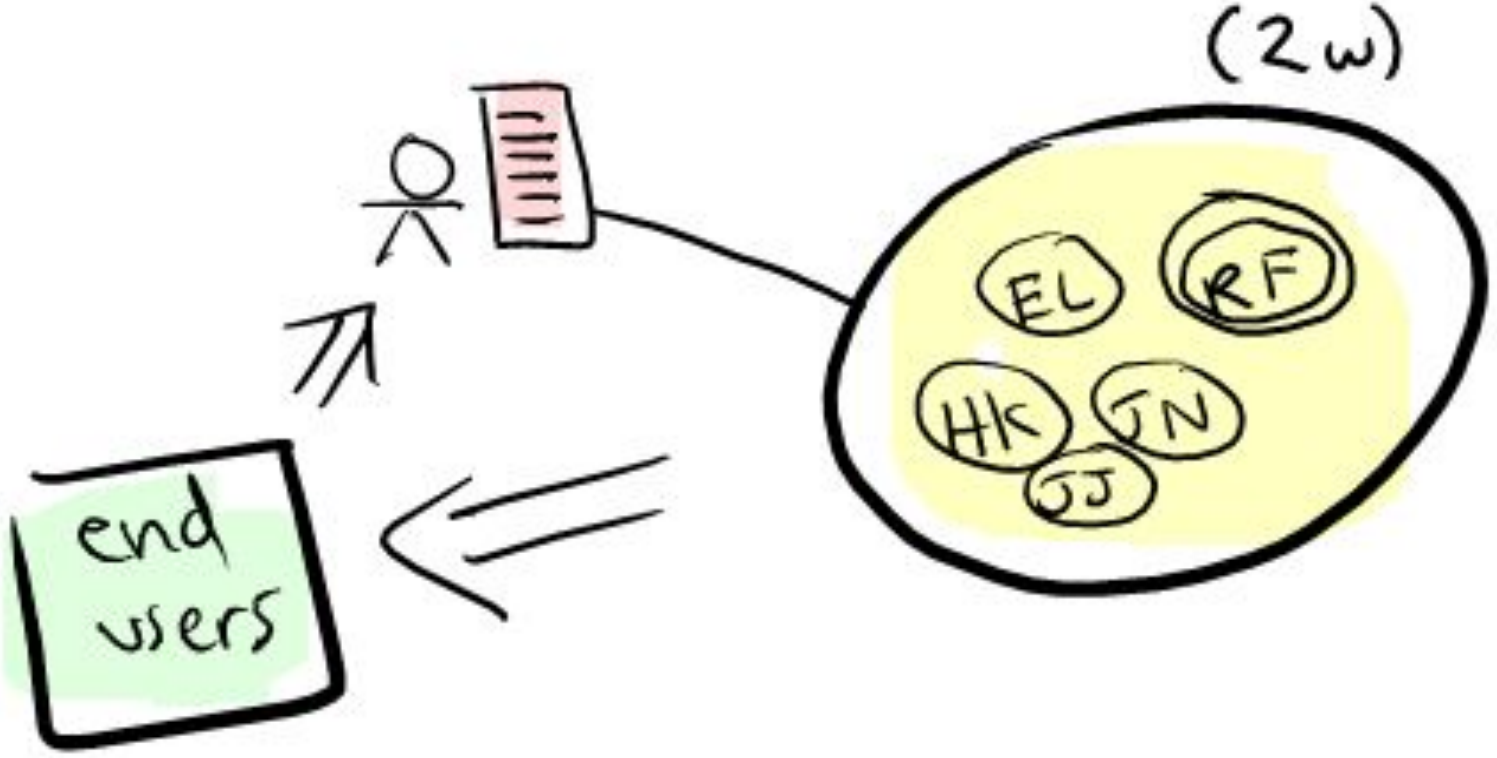


I find that the vast majority of organizations are still trying to do too much stuff, and thus find themselves thrashing. The only organization I know of which has really solved this is PatientKeeper. **Mary Poppendieck**

PatientKeeper Revenue

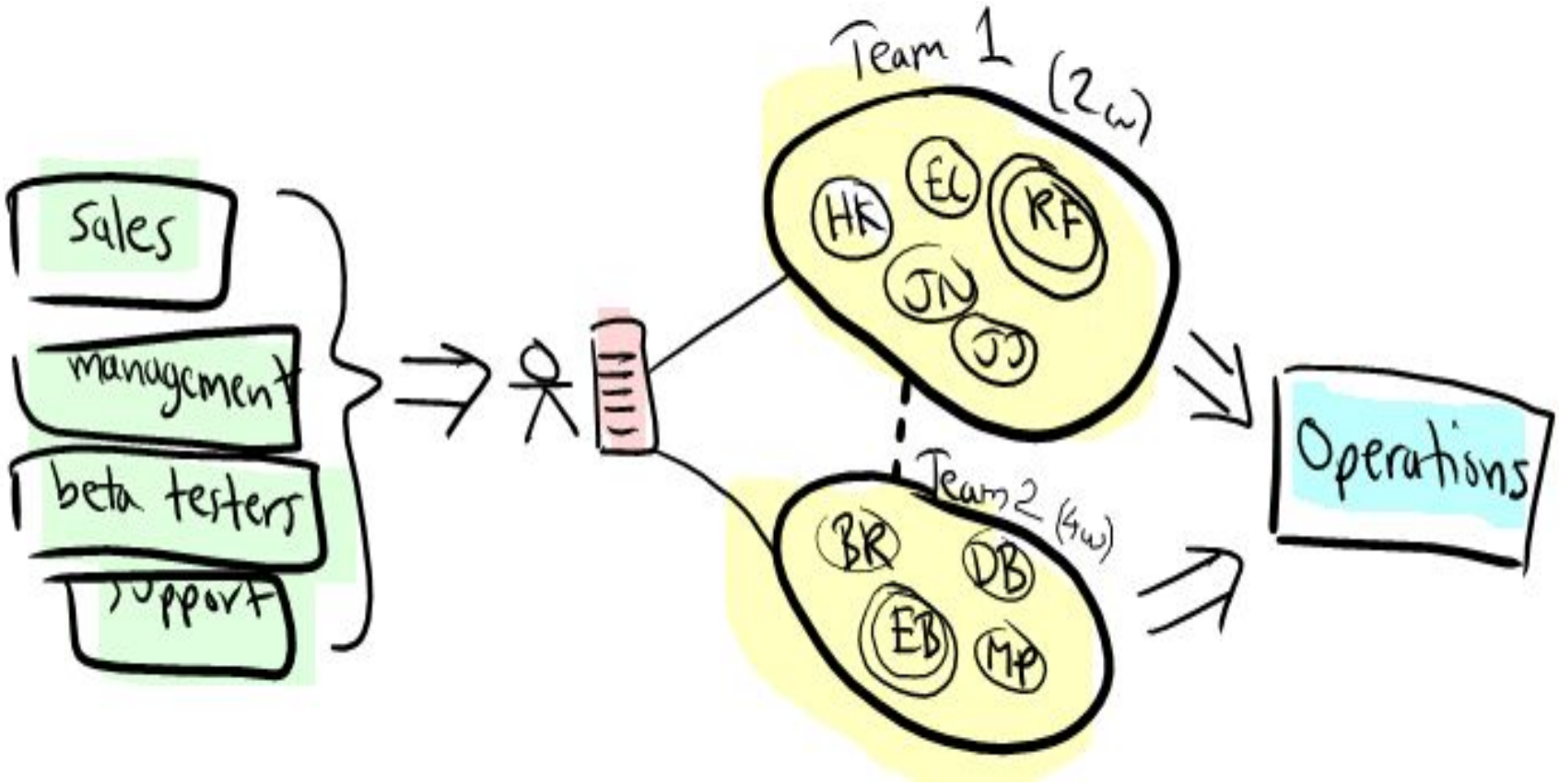


What's happening with Scrum?

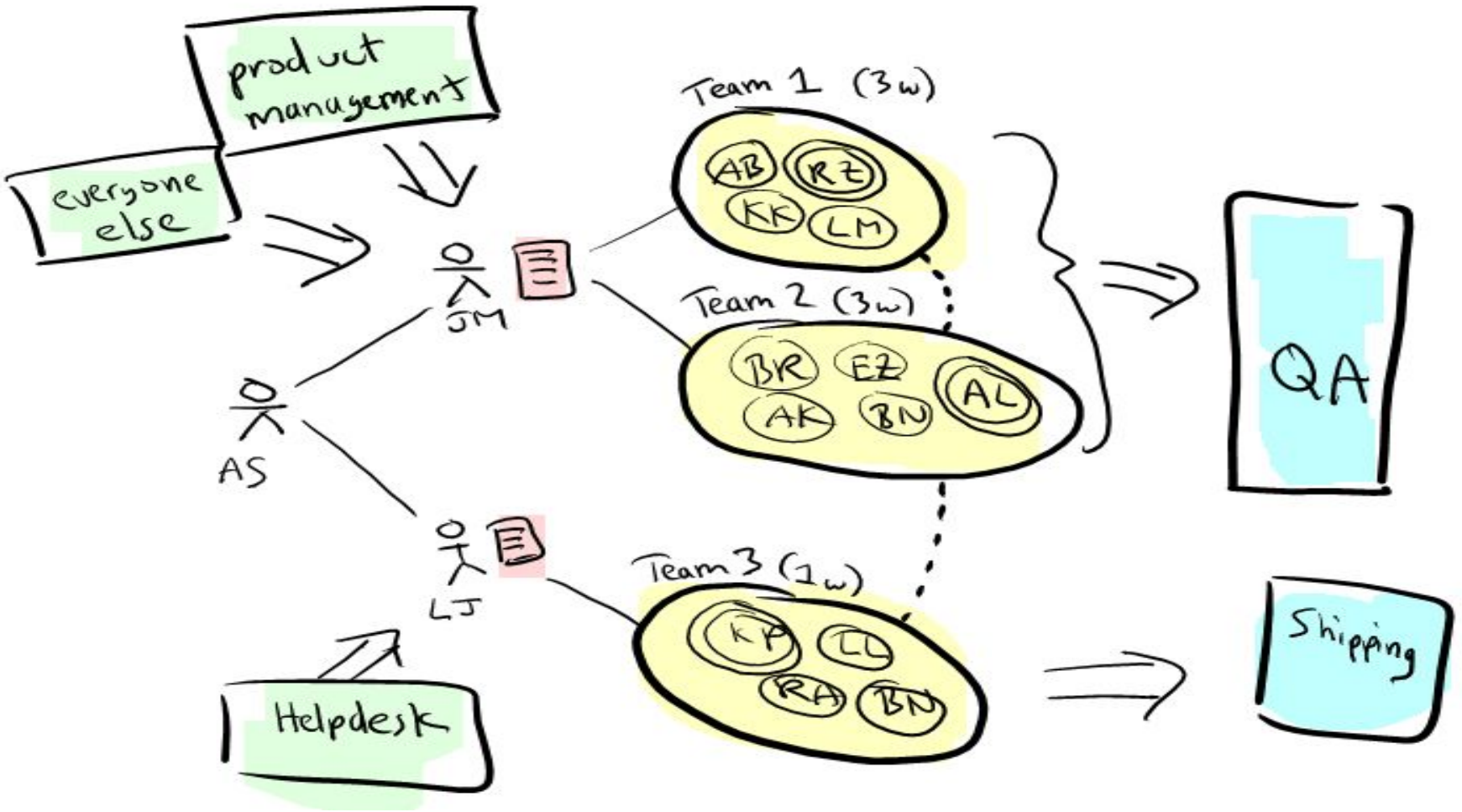


ScrUML by Henrik Kniberg

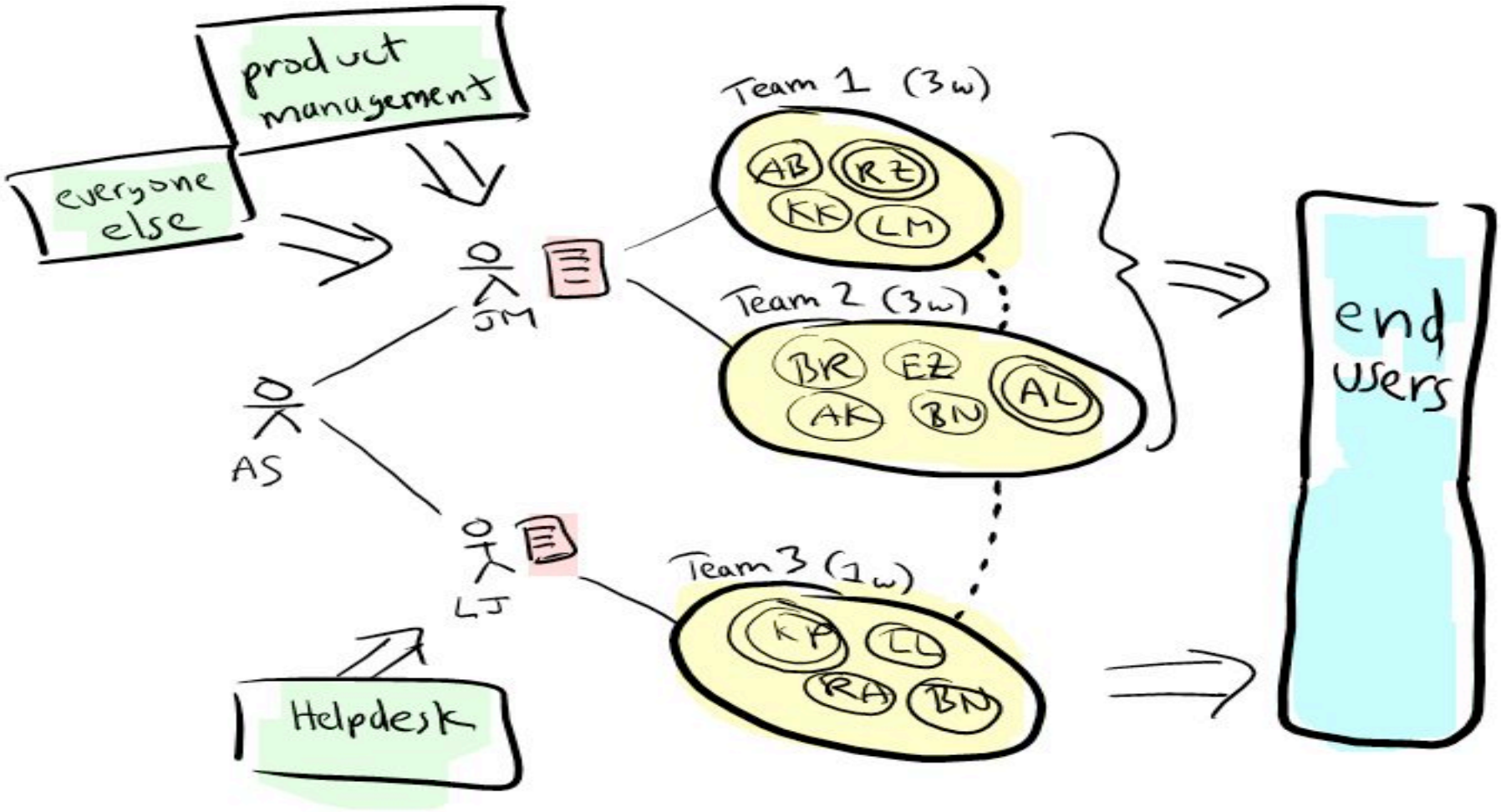
Multiple Team Scrum



Scrum in Transition



Delivering to End Users

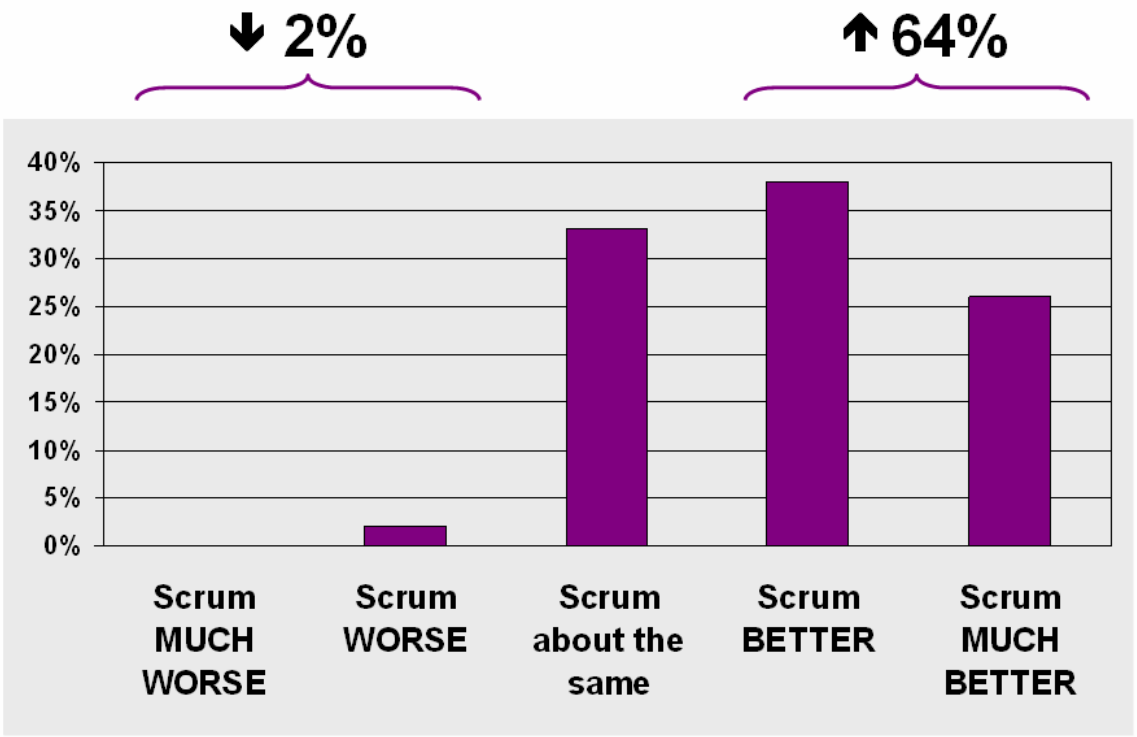


How do you scale Scrum to thousands of developers?

- Step by step
- Training and coaching is critical
  - A internal trainer at Yahoo can train, launch, and coach about 10 new teams a year
  - Teams that are not coached do not do so well. Average increase in productivity is 35% company wide.
  - Coached teams get 300-400% improvement.
- Yahoo launched over 200 teams in three years in Silicon valley where they have 2000 developers.

Rate Scrum relative to how the team was building products previously:

Business value of what the team produced in 30 days?

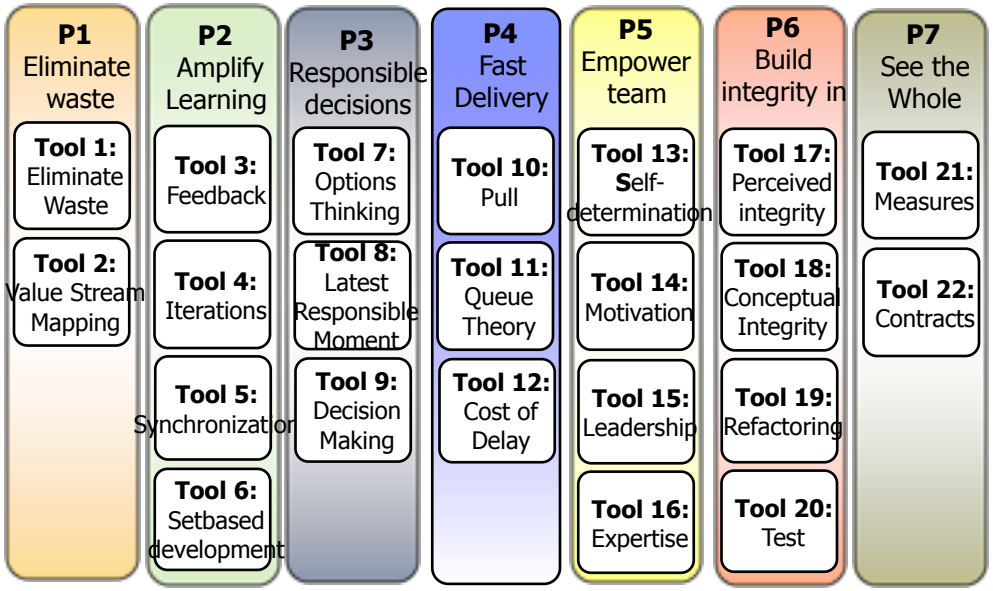


Yahoo Return on Investment

- Each Scrum Trainer starts up and coaches 10 new Scrum teams a year
- Coached velocity increase is 200-400%
- Uncoached average increase is 35%
- Conservative cost reduction per trainer is over $1M/yr

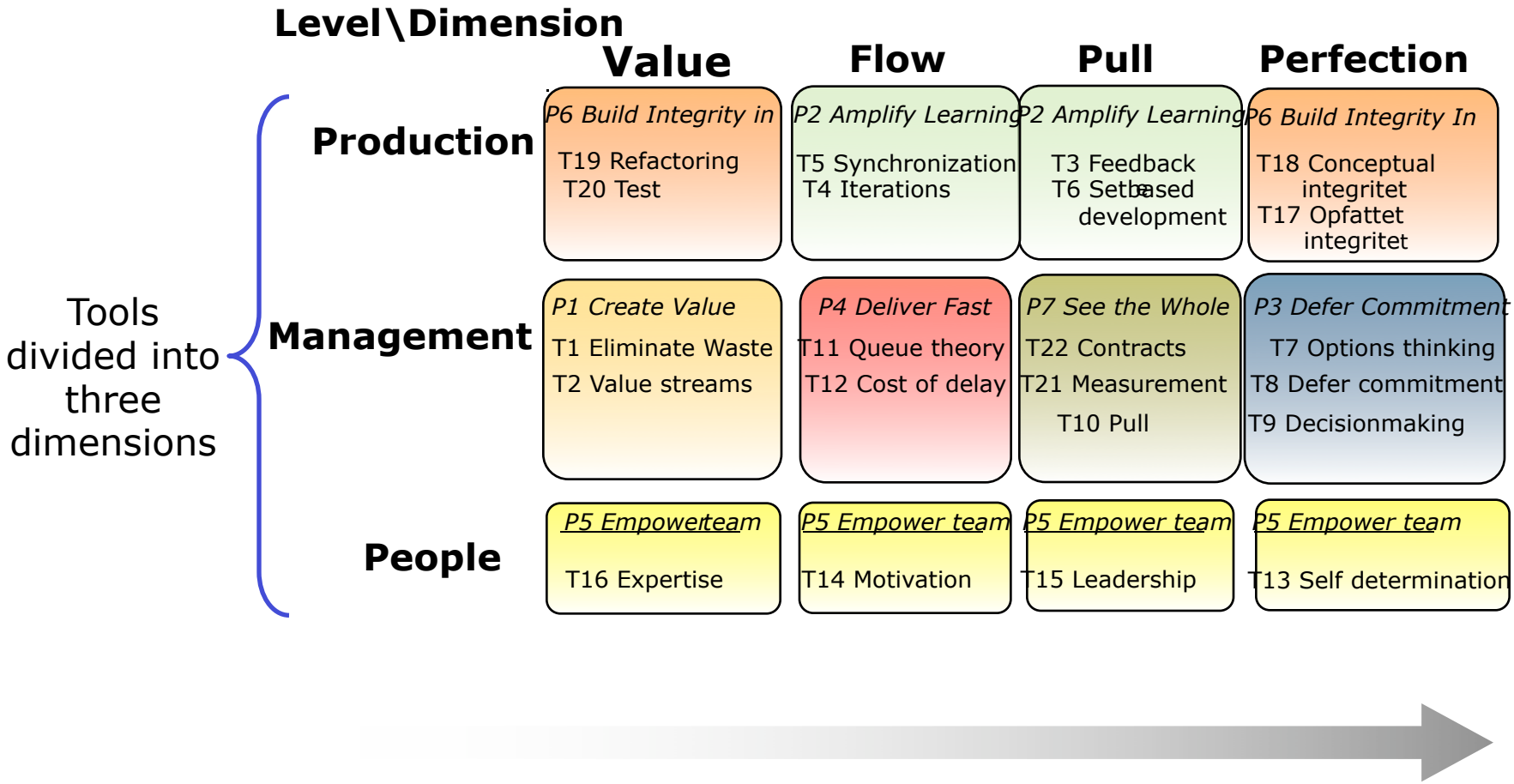
G. Benefield, "Rolling Out Agile at a Large Enterprise," in *HICSS'41, Hawaii International Conference on Software Systems*, Big Island, Hawaii, 2008.

Lean Thinking Tools



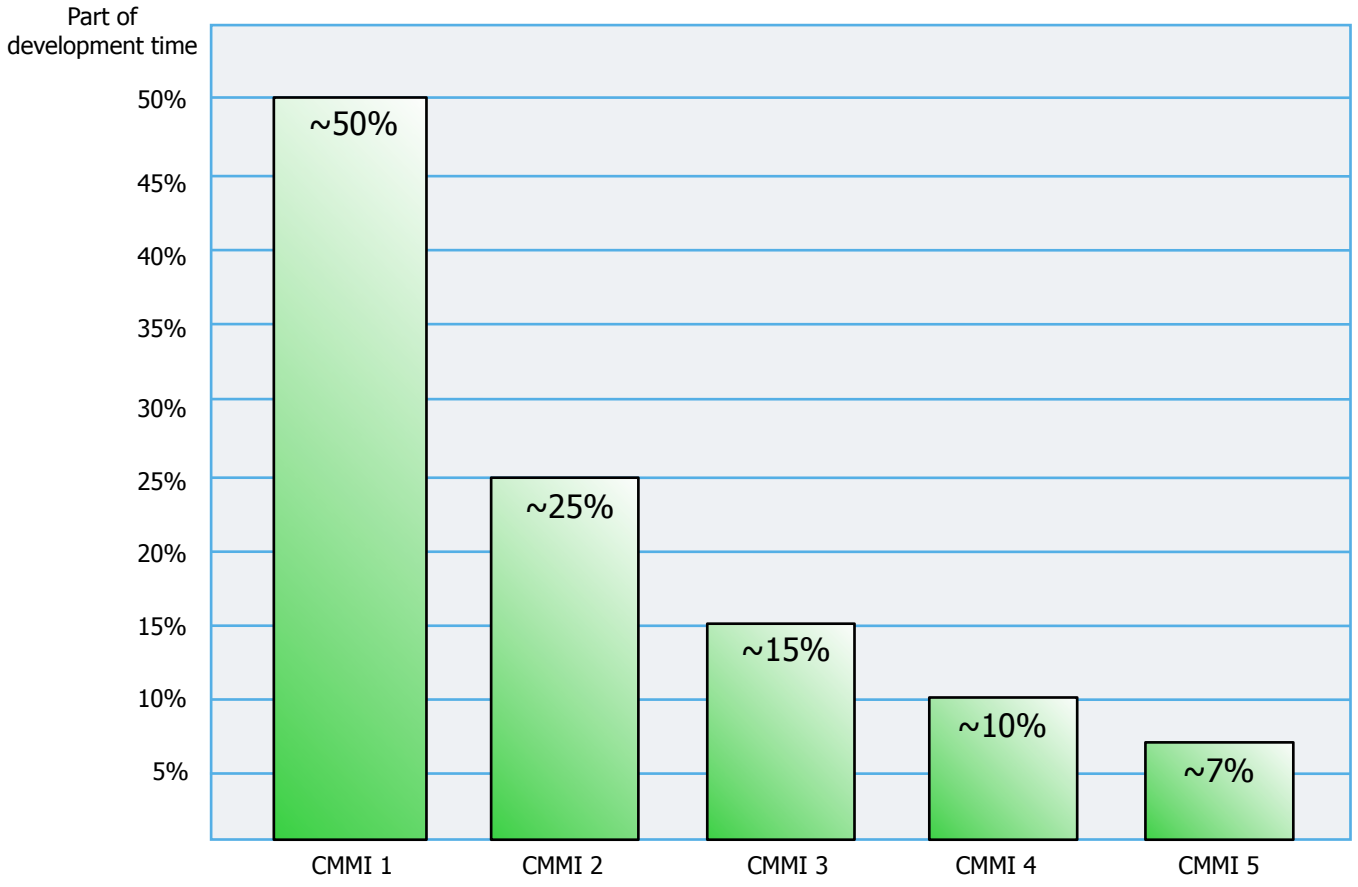
- Systematic Software Engineering used the tools from Lean Software Development to develop their Scrum implementation
- Analyzing dependencies, they produced a strategy for ordering the implementation of Lean.

Causal Dependencies



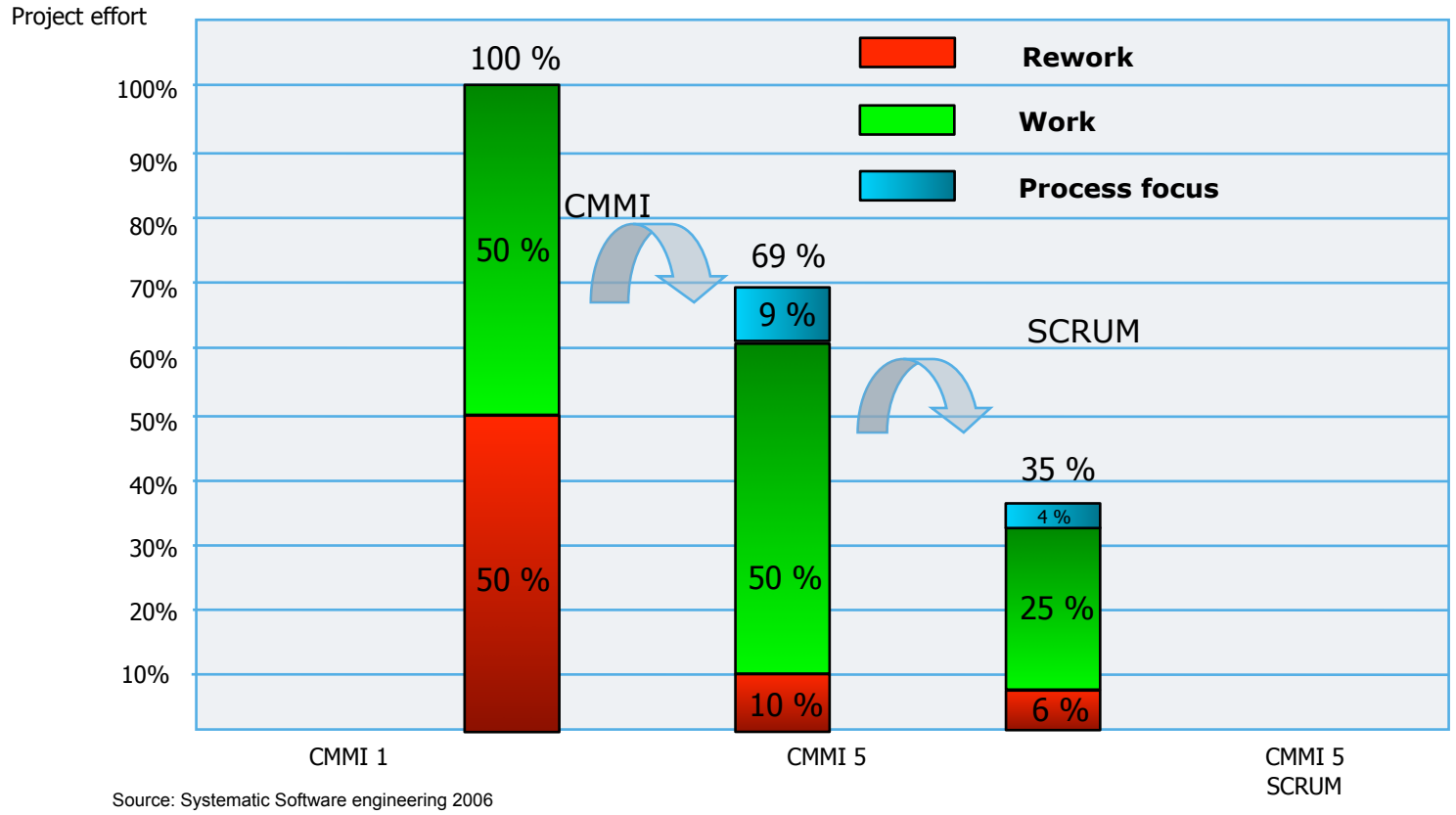
Thinking tools are best transformed by people and projects

Published experiences with ”rework”



Source: Krasner & Houston, CrossTalk, Nov 1998
Diaz & King, CrossTalk, Mar 2002

CMMI/SCRUM Performance analysis



Source: Systematic Software engineering 2006

Systematic CMMI 5 Analysis
First six months of Scrum

- 80% reduction in planning cost
- 40% reduction in defects
- 50% reduction in rework
- 100% increase in overall productivity
- Estimation error < 10%
- Project completion on time > 95%
- Waterfall projects (required by some defense and healthcare contracts) are now contracted for twice the cost of Scrum projects (and produce lower quality).

Systematic is going from "beginners Scrum" to

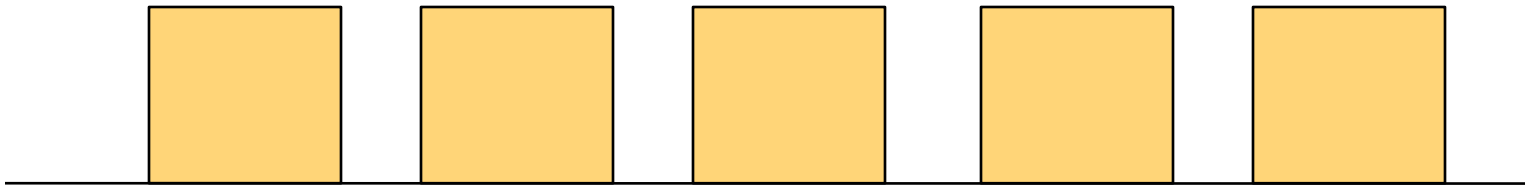
- First doubling of velocity comes from software DONE at the end of the sprint.
- Second doubling come from product backlog READY at the beginning of the sprint.
- Systematic now has several teams executing the second doubling model successfully
- Will role this out to whole company

Carsten Jakobsen and Jeff Sutherland. Scrum and CMMI - Going from Good to Great: are you ready-ready to be done-done? Agile 2009, Chicago.

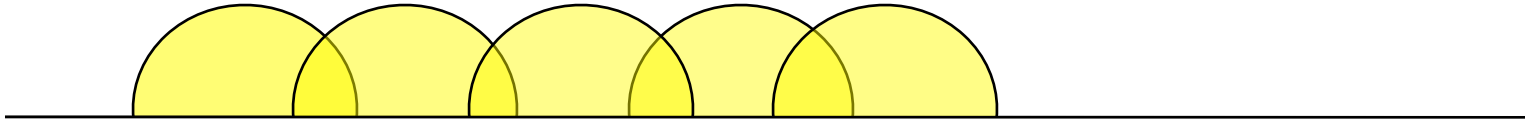
Case Study: Scrum and XP

- The first Scrum used all the XP engineering practices and set-based concurrent engineering.
- Most high performance teams use Scrum and XP together.
- It is hard to get a Scrum with extreme velocity without XP engineering practices.
- You cannot scale XP without Scrum.

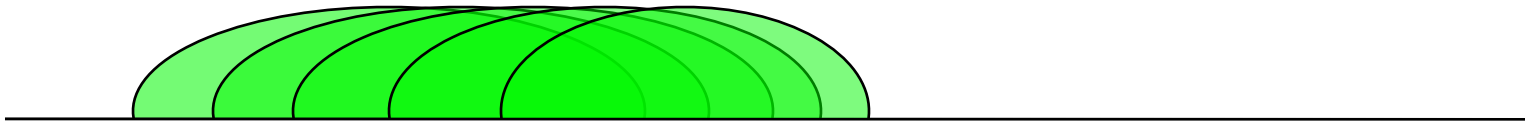
Distributed/Outsourcing Styles



Isolated Scrums



Distributed Scrum of Scrums



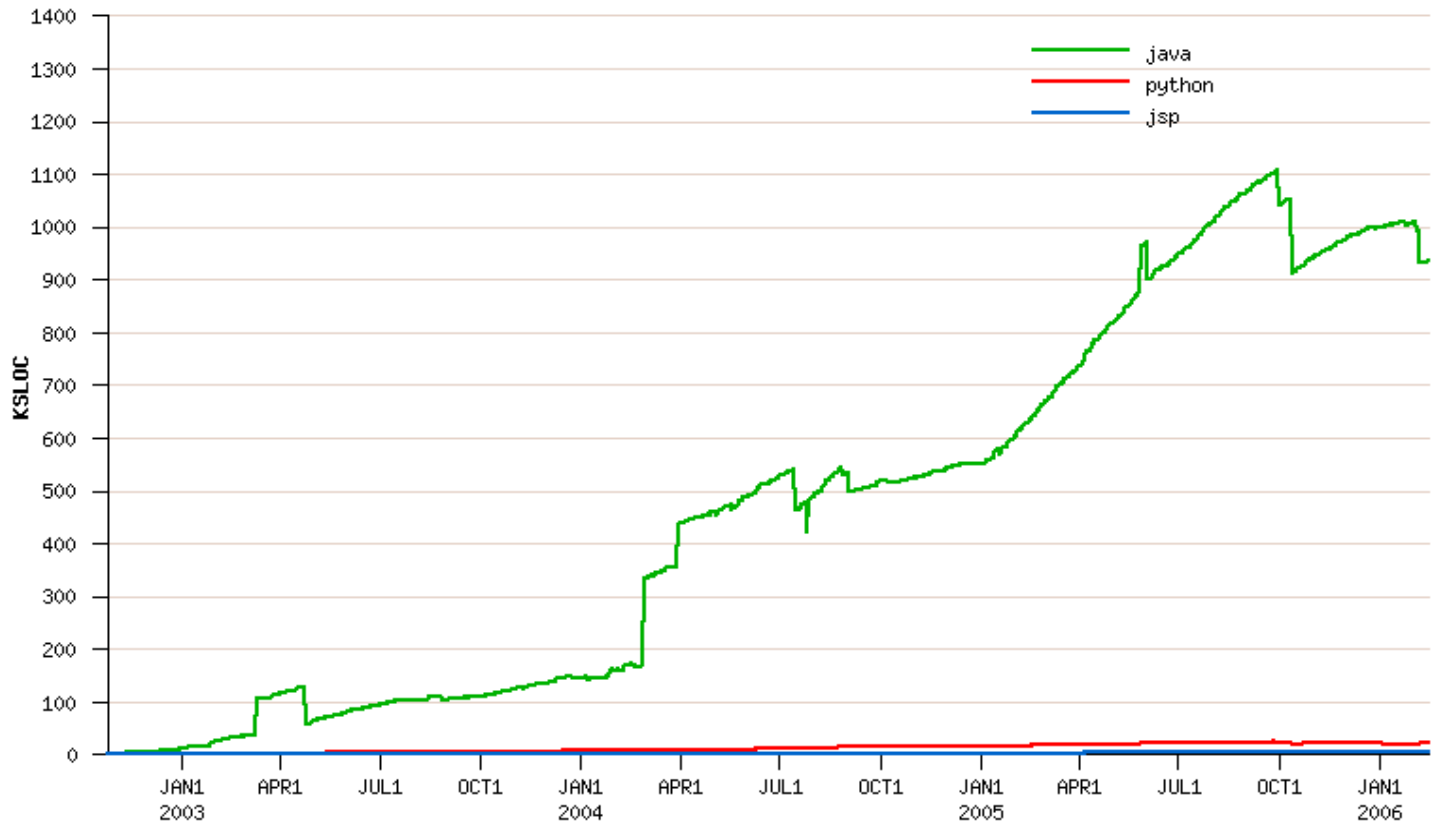
Totally Integrated Scrums

Outsourcing

- What happens if you outsource $2M of development?
  - Industry data show 20% cost savings on average
- Outsourcing from PatientKeeper to Indian waterfall team:
  - Two years of data showed breakeven point occurs when Indian developer costs 10% of American Scrum developer
  - Actual Indian cost is 30%
- $2M of Scrum development at my company costs $6M when outsourced to waterfall teams
- Never outsource to waterfall teams. Only outsource to Scrum teams.

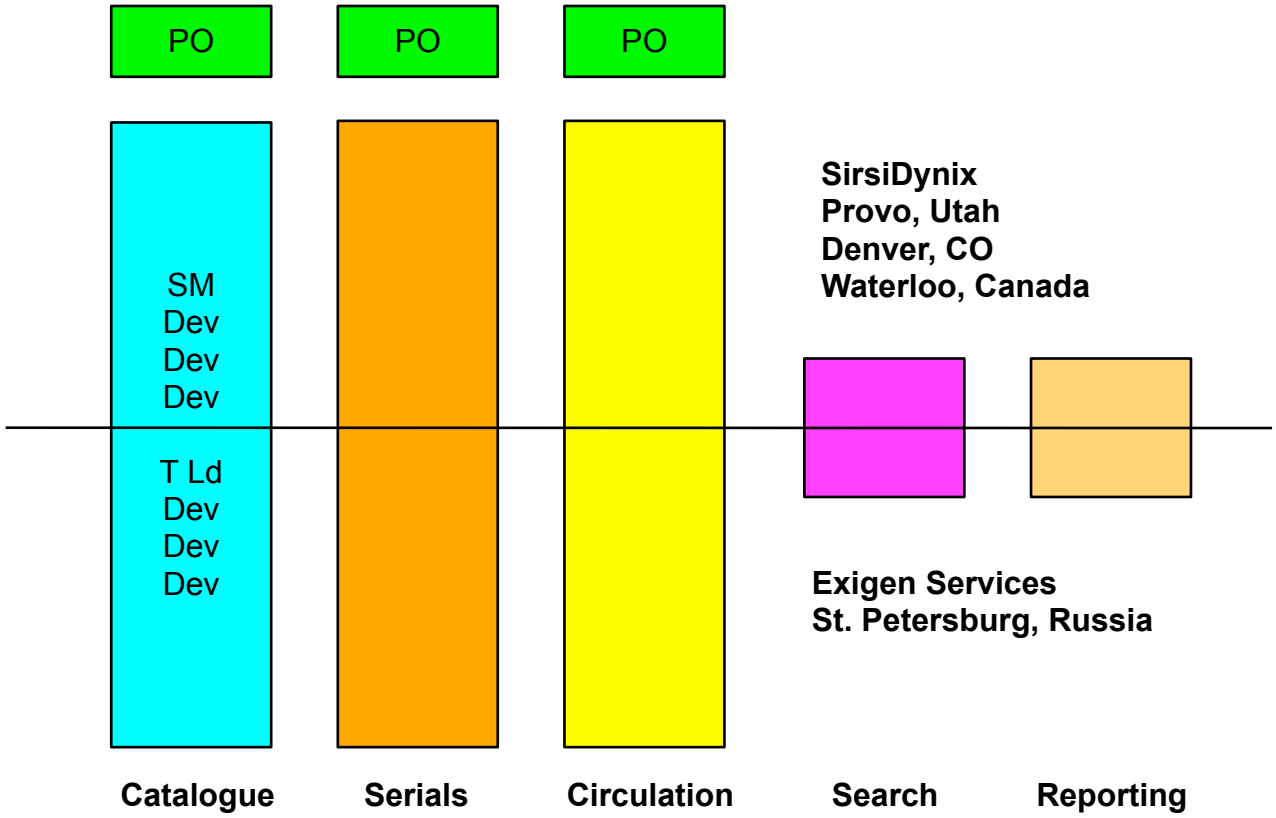
SirsiDynix - Anatomy of a “failed” project

- Over a million lines of Java code



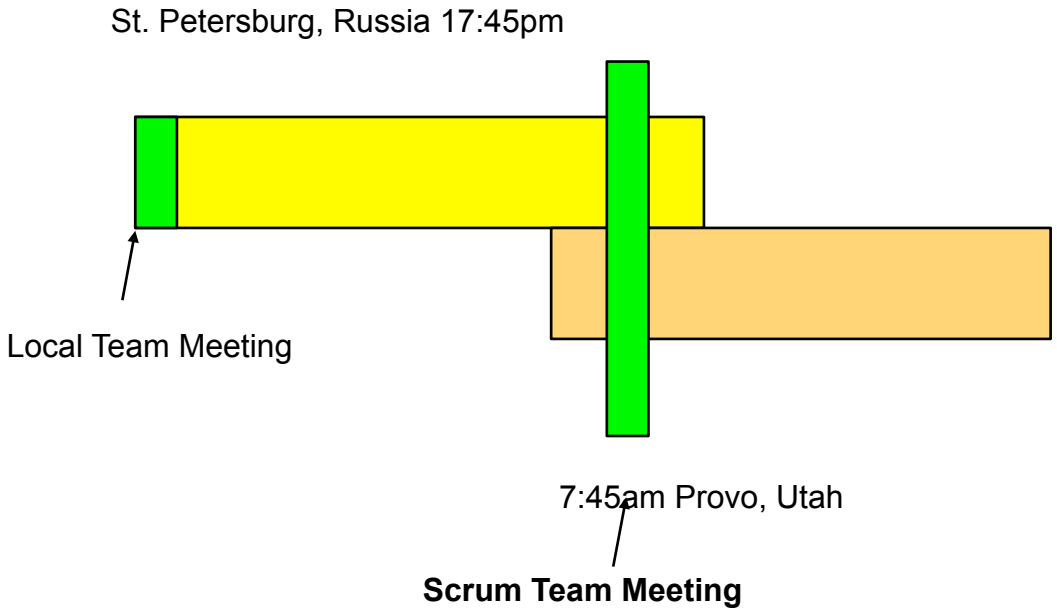
SirsiDynix Distributed Scrum

- 56 developers distributed across sites

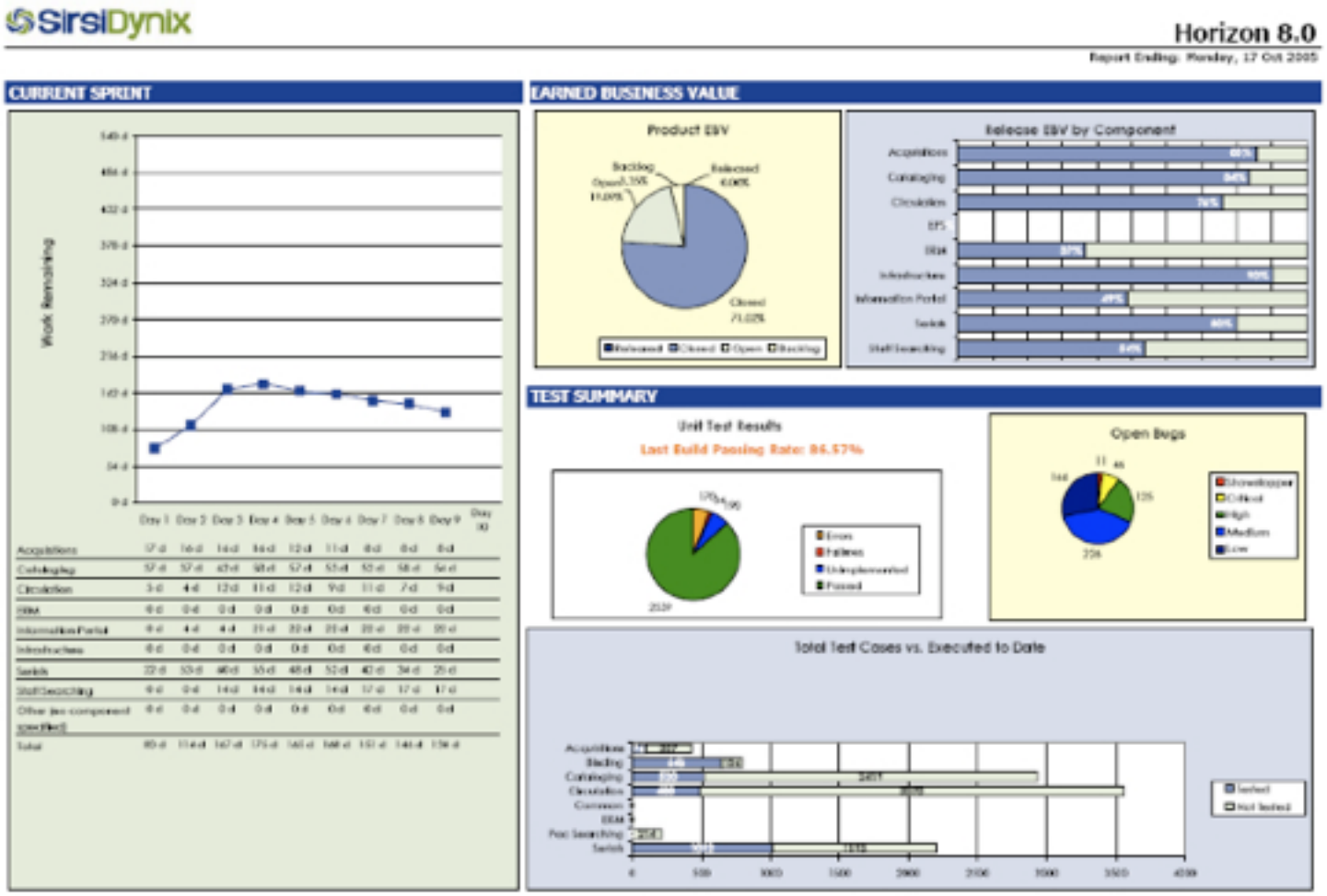


SirsiDynix Distributed Scrum

- Scrum daily meetings



SirsiDynix Distributed Scrum



Velocity in Function Points/Dev month

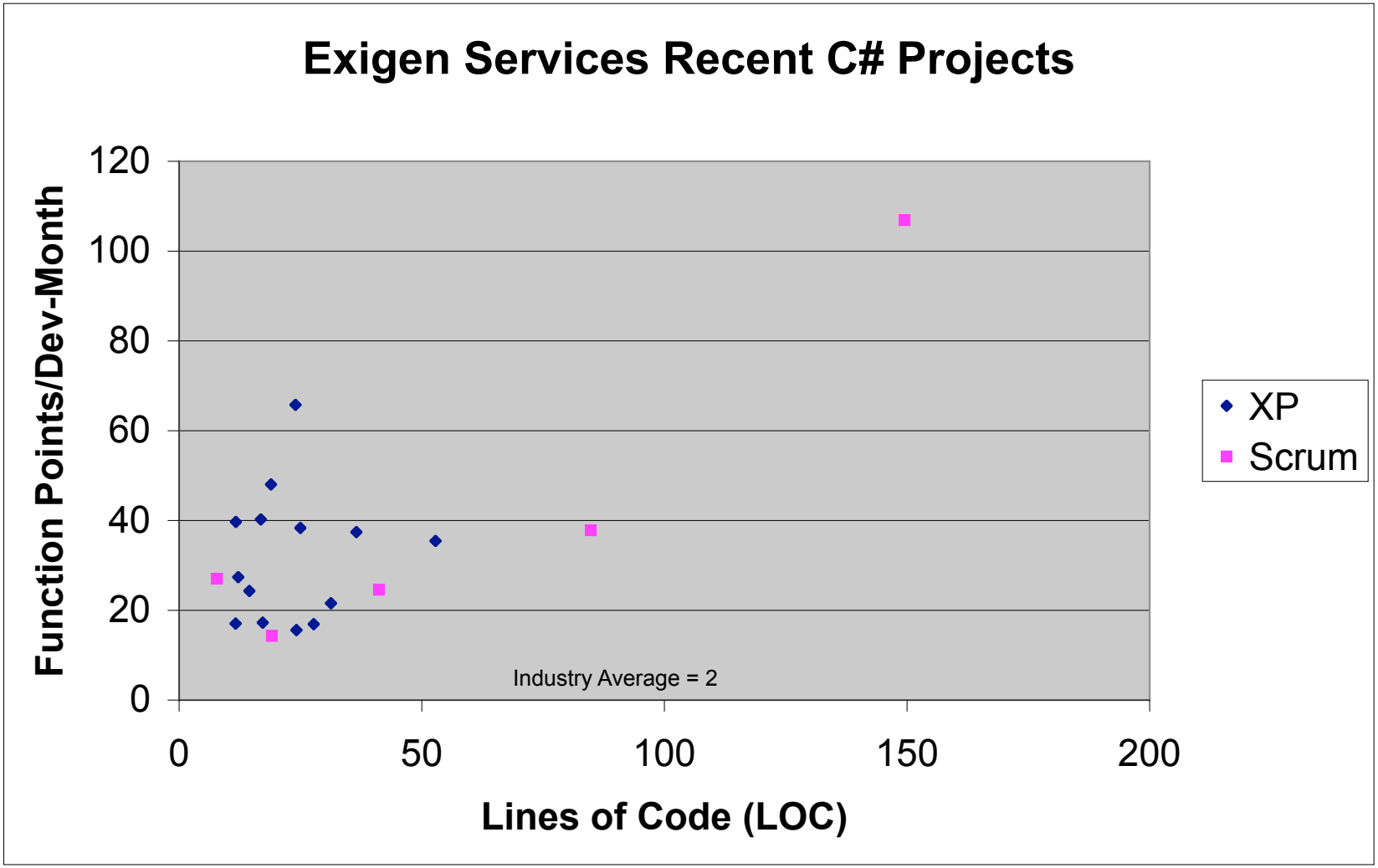
	Scrum[1]	Waterfall[1]	SirsiDynix[2]
Person Months	54	540	827
Lines of Java	51,000	58,000	671,688
Function Points	959	900	12673
Function Points per Dev/Mon	17.8	2.0	15.3

1. M. Cohn, User Stories Applied for Agile Development. Addison-Wesley, 2004
2. J. Sutherland, A. Viktorov, J. Blount, and N. Puntikov, "Distributed Scrum: Agile Project Management with Outsourced Development Teams," in HICSS'40, Hawaii International Conference on Software Systems, Big Island, Hawaii,

SirsiDynix Challenges

- ScrumButt
- Builds were stable only at Sprint boundaries
- No XP in U.S, only in Russia, did not have equal talent across teams
- No face to face meetings
- Low test coverage
- Poor refactoring practice
- Company merger created competitive products

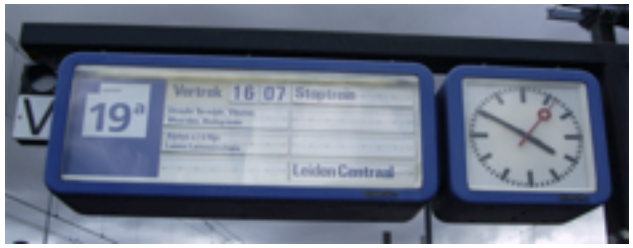
Russian projects velocity data suggests high velocity is not an accident

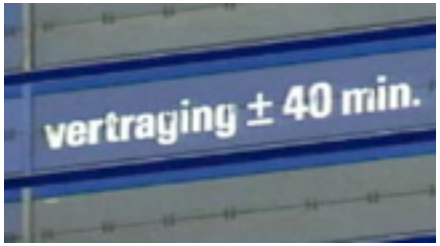


Setting up a prospective study

- Define the distributed team model before projects start
- Assure consistent talent, tools, process, and organization across geographies
- Establish high quality data gathering techniques on velocity, quality, cost and environmental factors.
- Run a consistent team model on a series of projects and look for comparable results
- Demonstrate that local velocity = distributed velocity
- Demonstrate that local quality = distributed quality
- Demonstrate linear scaling at constant velocity per developer

Case study: Building a new railway information system

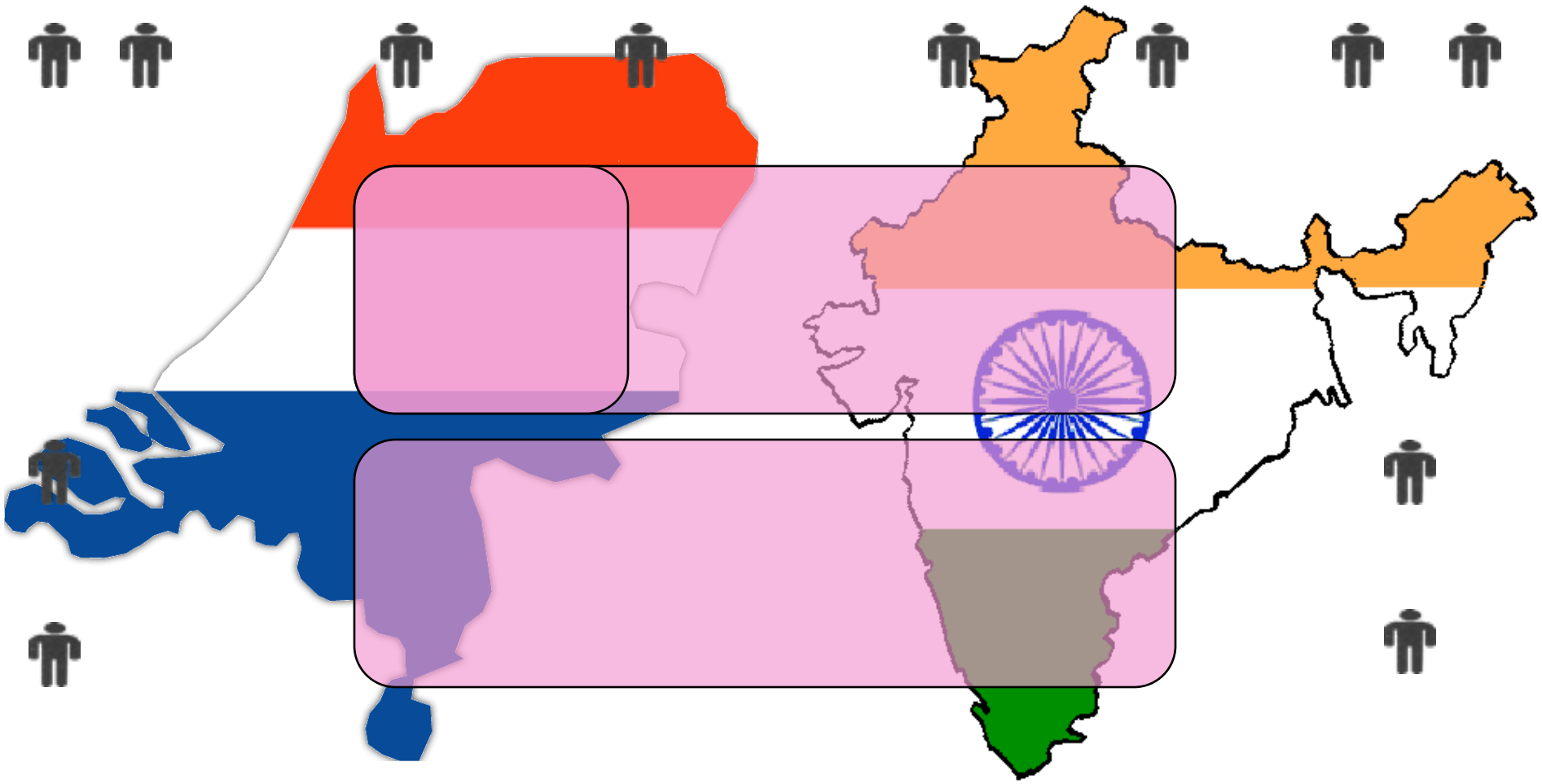




ProRail PUB Example

- ProRail rescued a failed waterfall project to build a new scheduling system and automated railway station signs at all Netherlands railway stations
- An 8 person Scrum team started the project and established local velocity (half Dutch, half Indian).
- After establishing local velocity at 5 times other waterfall vendors on the project, the Indian half of the team went back to India

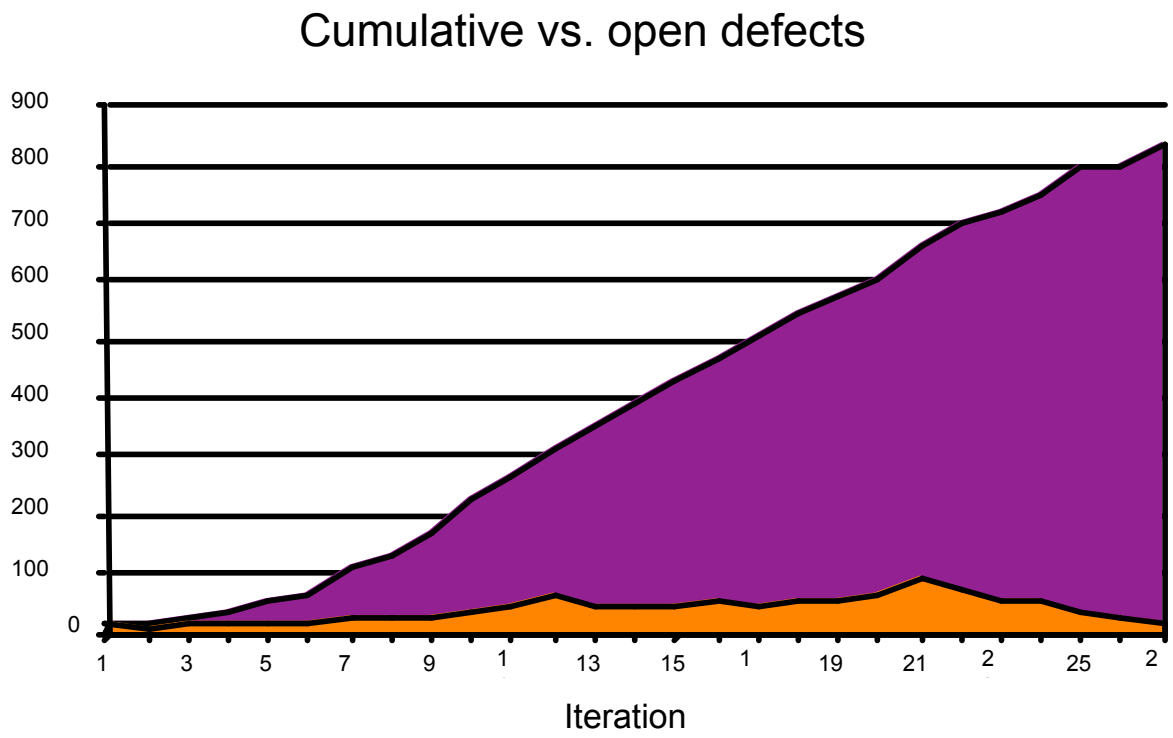
Scaling Fully Distributed Scrum



XP Practices in PUB Project

- Pair programming
- Continuous integration
- Collective code ownership
- Refactoring
- Simple design, emergent architecture
- Test driven development

ProRail Defect Tracking



- Defect rate gets lower and lower as code base increases in size
- 95% of defects found inside iteration are eliminated before the end of the iteration

Team Characteristics

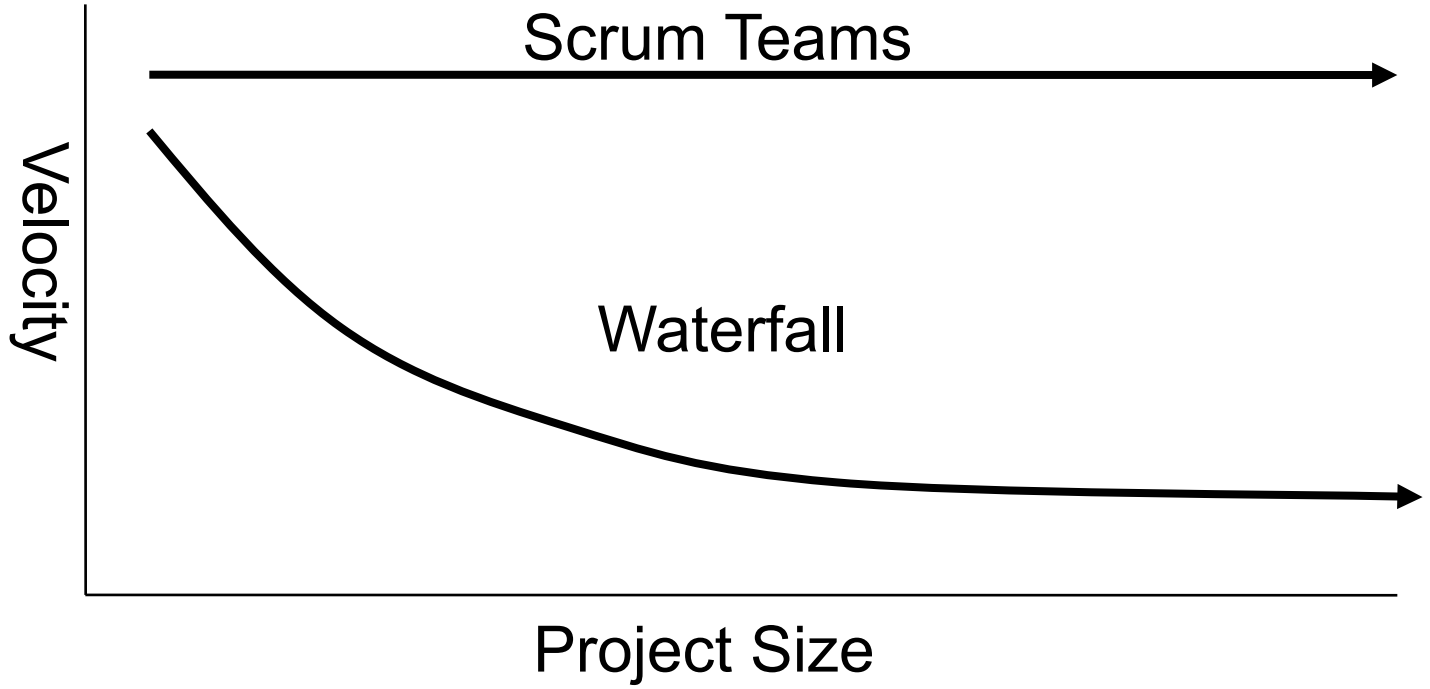
- TDD, pair programming, continuous integration. Same tools and techniques onshore and offshore.
- Daily Scrum meeting of team across geographies.
- SmartBoards, wikis, and other tools used to enhance communication.
- Indians say it feels exactly the same in India as it does in Amsterdam. They do the same thing in the same way.

Dutch Velocity vs. Russian Velocity

	SirsiDynix[2]	**Xebia[3]**
Person Months	827	125
Lines of Java	671,688	**100,000**
Function Points	12673	**1887**
Function Points per Dev/ Mon	15.3	**15.1**

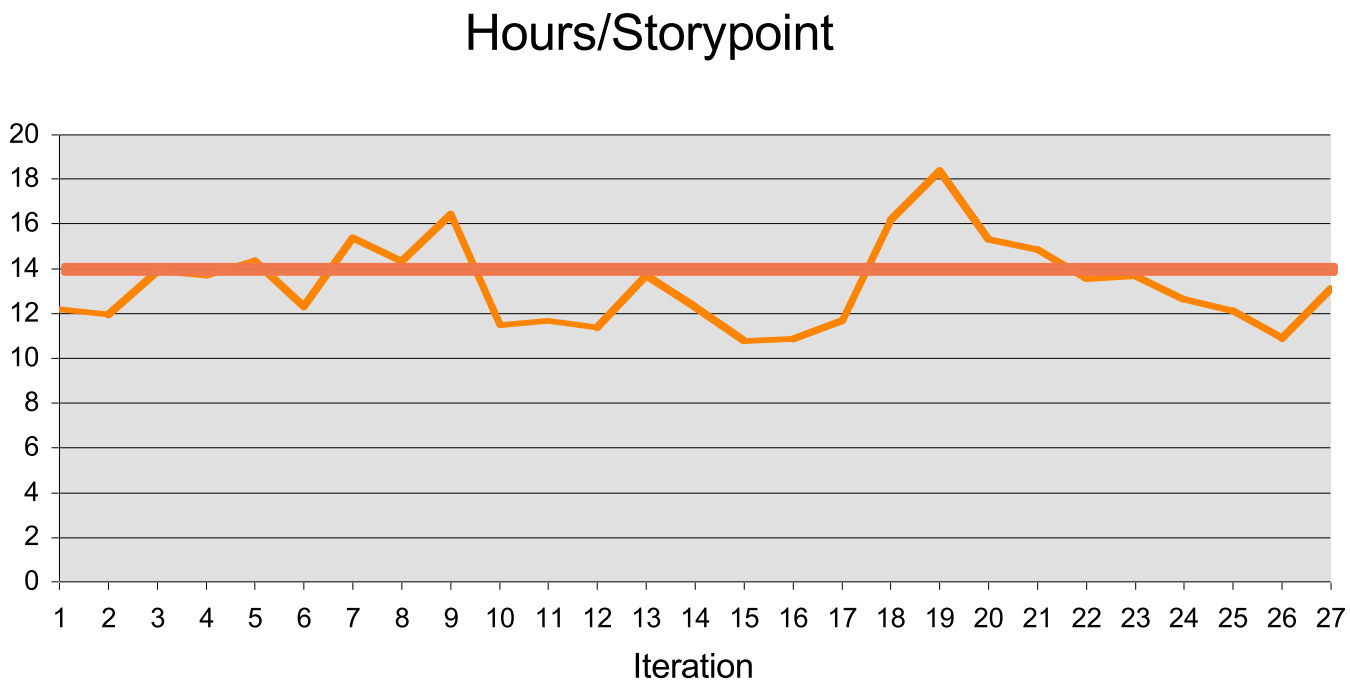
1. M. Cohn, User Stories Applied for Agile Development. Addison-Wesley, 2004
2. J. Sutherland, A. Viktorov, J. Blount, and N. Puntikov, "Distributed Scrum: Agile Project Management with Outsourced Development Teams," in HICSS'40, Hawaii International Conference on Software Systems, Big Island, Hawaii,
3. J. Sutherland, G. Schoonheim, E. Rustenburg, M. Rijk. Fully Distributed Scrum: The Secret Sauce for Hyperproductive Outsourced Development Teams. Agile 2008, Toronto, Aug 4-8 (submission, preliminary data)

Linear Scalability of Large Scrum Projects



•J. Sutherland, A. Viktorov, J. Blount, and N. Puntikov, "Distributed Scrum: Agile Project Management with Outsourced Development Teams," in HICSS'40, Hawaii International Conference on Software Systems, Big Island, Hawaii, 2007.
•J. Sutherland, C. Jacobson, and K. Johnson, "Scrum and CMMI Level 5: A Magic Potion for Code Warriors!," in Agile 2007, Washington, D.C., 2007.

Linear scalability



Xebia's Conclusions

- Fully Distributed Scrum has the full benefits of both local hyperproductive teams and offshoring
- Fully Distributed Scrum has more value than localized Scrum.
- All Xebia projects of more than a few people are fully distributed today.

Questions?

Emergent Architecture