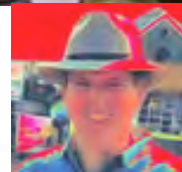




AGILE DEVELOPMENT IN THE ENTERPRISE

"Twice as much for half the price!"

With help from Google, Yahoo, Microsoft, IBM, Oracle, MySpace, Adobe, GE, Siemens, Disney Animation, BellSouth, Nortel, GSI Commerce, Ulticom, Palm, St. Jude Medical, DigiChart, RosettaStone, Healthwise, Sony/Ericsson, Accenture, Trifork, Systematic Software Engineering, Exigen Services, SirsiDynix, Softhouse, Philips, Barclays Global Investors, Constant Contact, Wellogic, Inova Solutions, Medco, Saxo Bank, Xebia, Insight.com, SolutionsIQ, Crisp, Johns Hopkins Applied Physics Laboratory, Unitarian Universalist Association, Motley Fool, Planon, FinnTech, OpenView Venture Partners, Jyske Bank, BEC, Camp Scrum, DotWay AB, Ultimate Software, Scrum Training Institute, AtTask, Intronis, Version One, OpenView Labs, Central Desktop, Open-E, Zmags, eEye, Reality Digital, DST, Booz Allen Hamilton, Scrum Alliance, Fortis, DIPS, Program UtVikling, Sulake, TietoEnator, Gilb.com, WebGuide Partner, Emergn, NSB (Norwegian Railway), Danske Bank, Pegasystems



Jeff Sutherland, Ph.D.

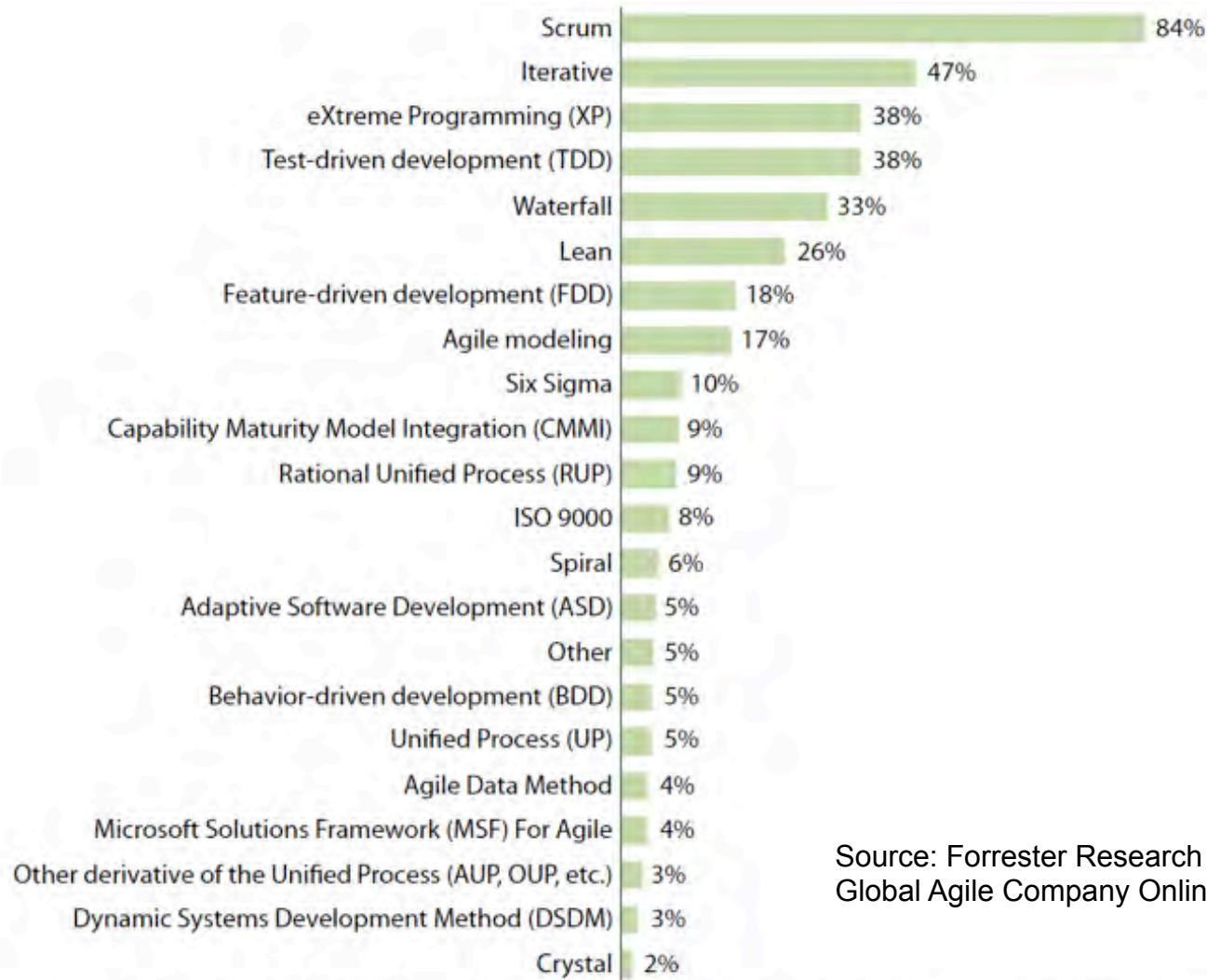


- Chairman, Scrum Training Institute
- CEO Scrum, Inc. and Senior Advisor, OpenView Venture Partners
 - Agile coach for OpenView portfolio companies
 - CTO/VP Engineering for 9 software companies
 - Created first Scrum at Easel Corp. in 1993. Rolled out Scrum in next 5 companies
 - Achieved hyperproductive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



© Jeff Sutherland 1993-2008

Techniques or Methodologies Used



Source: Forrester Research December 2008
Global Agile Company Online Survey

Base: 241 technology industry professionals in a variety of roles, including but not limited to development
(numbers have been rounded)

CSM v9.6 © Jeff Sutherland 1993-2009

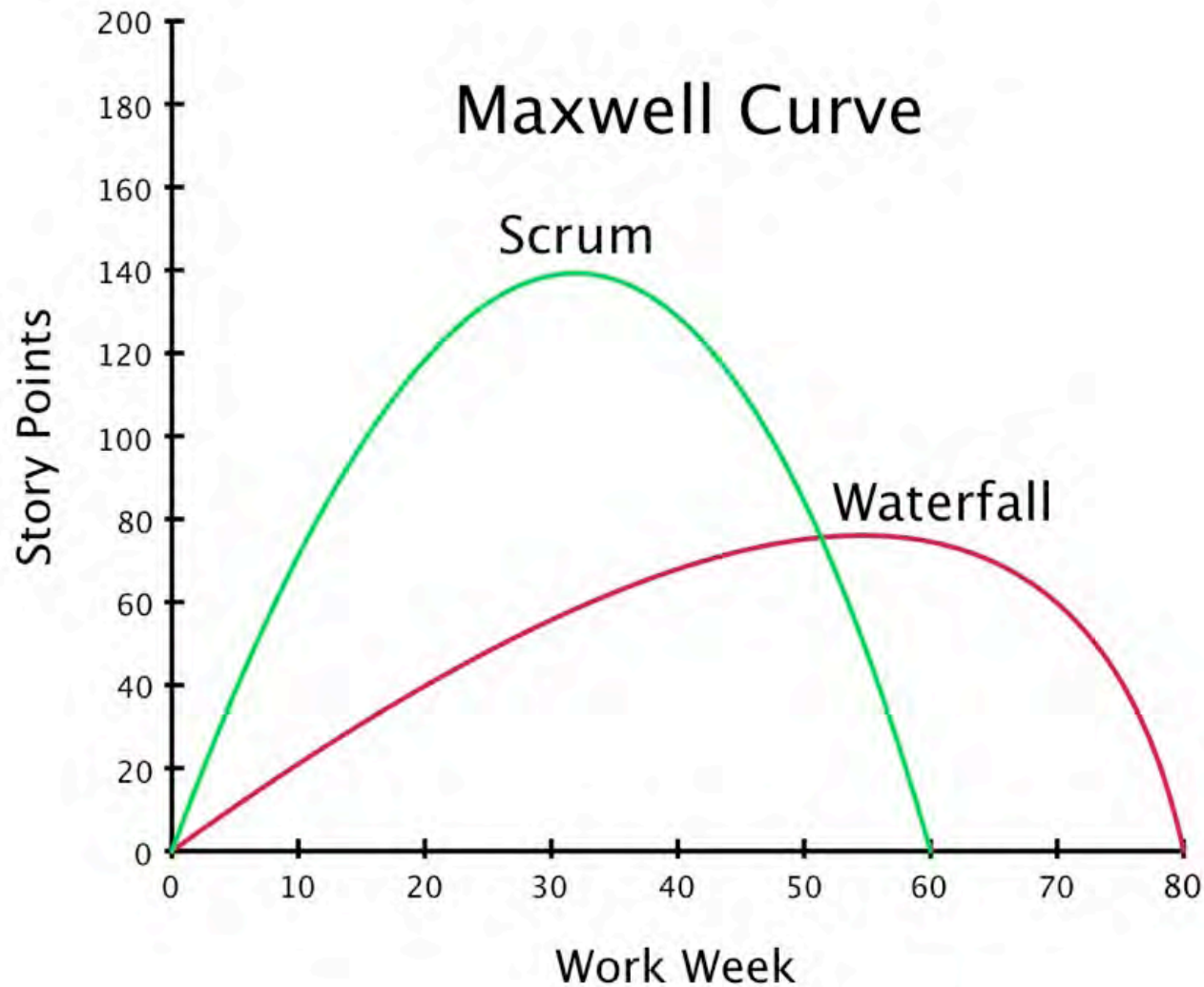
Openview Venture Partners

- We invest in organizations deploying Scrum
 - one hyperproductive company out of 10 might meet investment goals for a venture group
 - two or more hyperproductive could change investment practice
- We invest in market leading, industry standard processes
 - this means Scrum and XP
- We insure the entire company implements basic Scrum practices
 - Teams pass the Nokia test
 - Management is held accountable at Board level for removing impediments
 - Maturity level assessment for management, product marketing, and development organization



© Jeff Sutherland 1993-2008

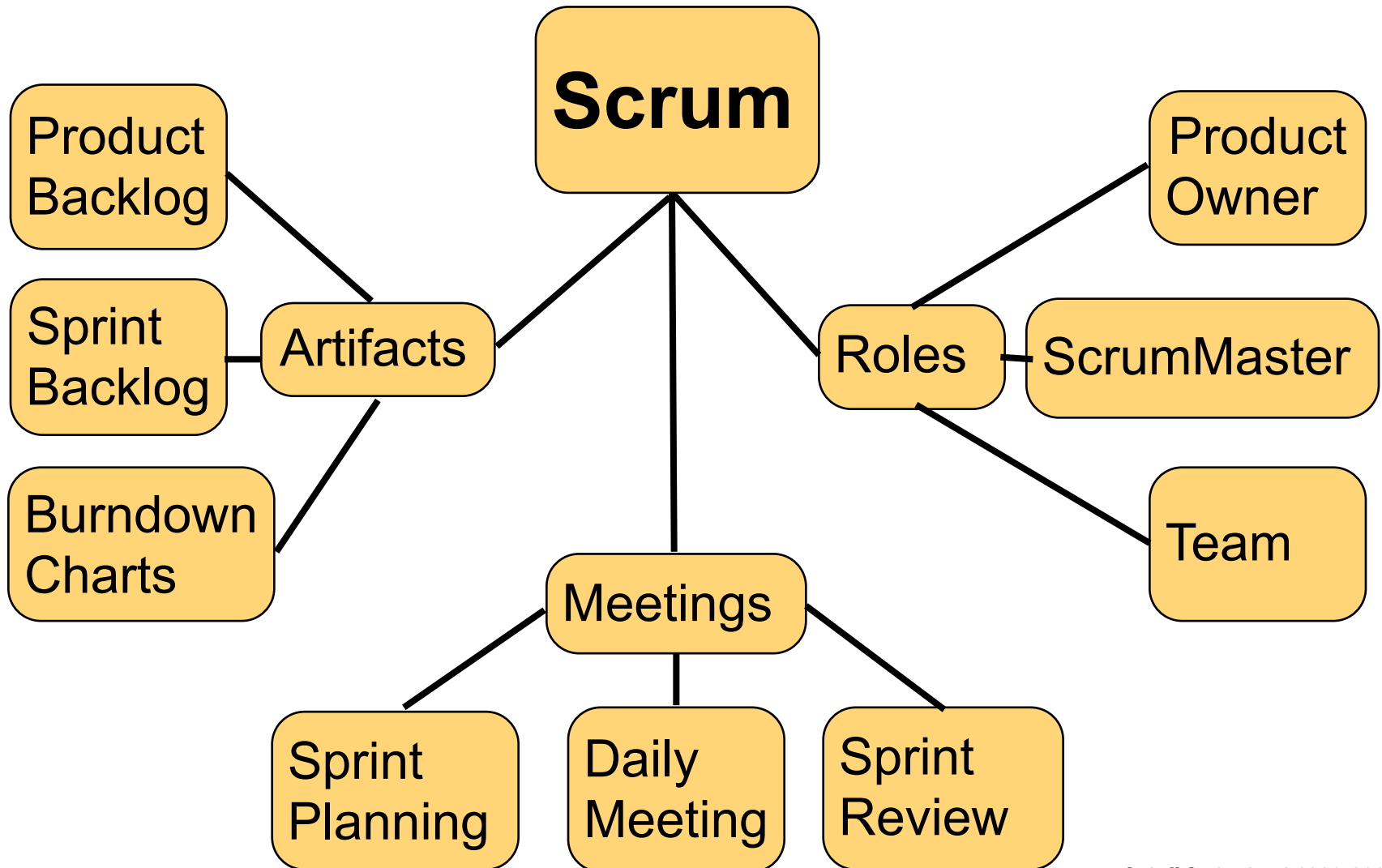
Double output and cut workload in half



www.openviewventurepartners.com

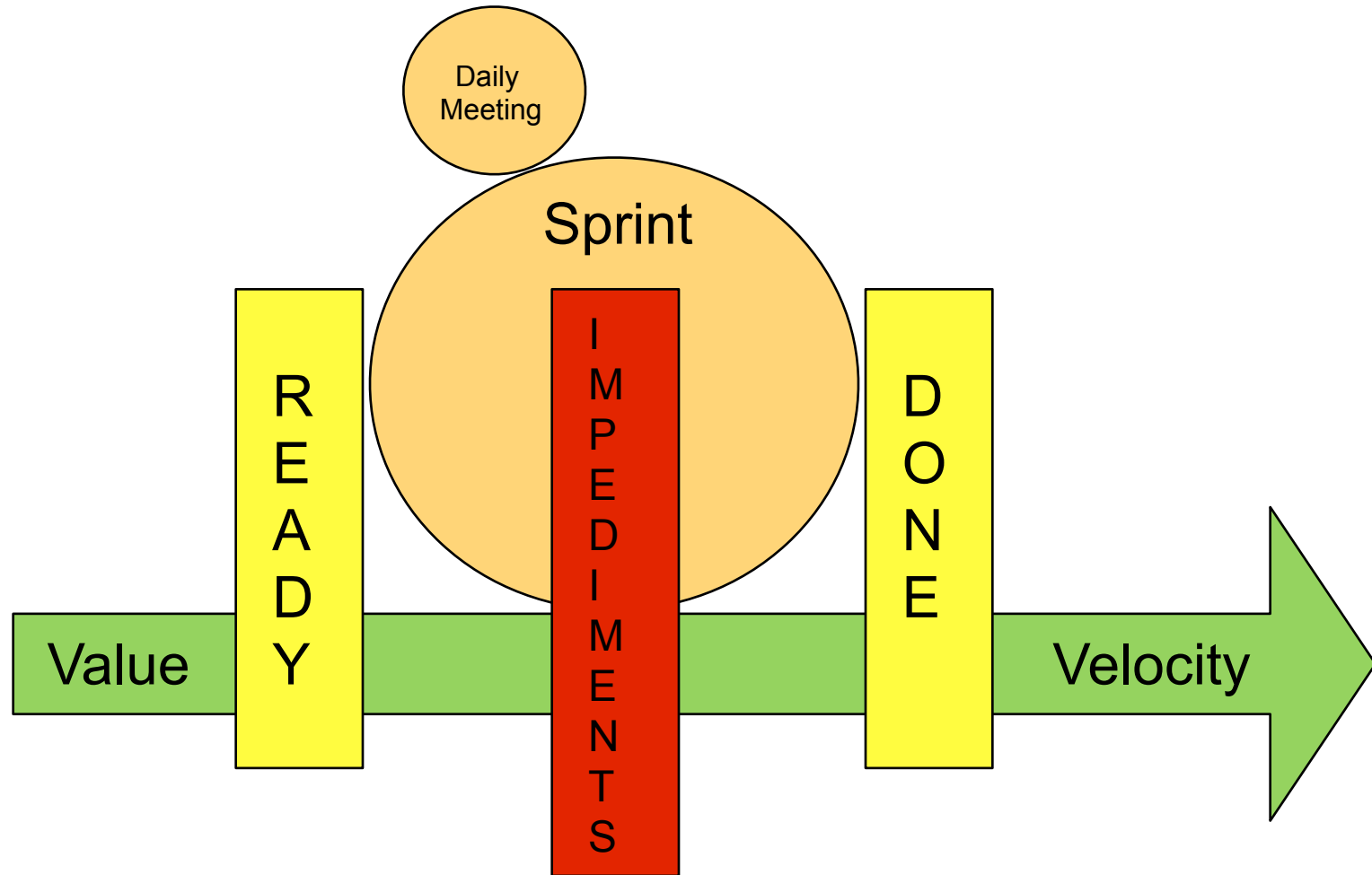
© Jeff Sutherland 1993-2008

Scrum is a Simple Framework



© Jeff Sutherland 1993-2008

Scrum Dynamic Model



CSM v10.2 © Jeff Sutherland 1993-2009

Apply Scrum Now - A 12 step program

- 1. Agree on a PO, SM, and full Team. And on a Product goal.**
- 2. Set a date now for the Sprint Review in 2 weeks and send out invites.**
- 3. Review/define a ranked Product Backlog of features**
- 4. Estimate the Product Backlog items**
- 5. Conduct Sprint Planning with Team and Stakeholders. Complete Sprint Backlog**
- 6. Commit as a team to the Sprint**
- 7. Track status and obstacles daily via the Daily Scrum**
- 8. Track progress using the Sprint Burndown**
- 9. Conduct a Sprint Review; demo done items**
- 10. Conduct a team Retrospective**
- 11. Take action on top impediment**
- 12. GOTO 2**

Source: Hubert Smits & Jean Tabaka

CSM v10.2 © Jeff Sutherland 1993-2009

Key Scrum Success Factors

- Done means acceptance tests pass (testers on team)
- Product backlog ready (remove if not ready)
 - Sized and prioritized
 - Estimated in story points
- Scrum Board
 - Burn down in priority order, test immediately
- Burn Down Chart
 - Track Done
 - Execute Emergency Procedure when needed
- Know velocity
- Remove top priority impediments
- Prevent disruption of team
 - No multitasking
 - Minimize team member change
- PO/SM/Team trained properly

© Jeff Sutherland 1993-2009

Avoiding ScrumBut - Nokia Test Origins

Nokia Siemens Networks



- **In 2005, Bas Vodde started training and coaching teams at Nokia Networks in Finland. The first Nokia test focused on Agile practices**
 - jeffsutherland.com/scrum/basvodde2006_nokia_agile.pdf
- **By 2007, Siemens joined Nokia Networks to form Nokia Siemens Networks with over 60,000 employees and 15 billion Euro in revenue. Bas Vodde moved to Nokia China to and updated the Nokia Test to include Scrum practices.**
- **In 2007, Jeff Sutherland tuned the Nokia Test for Scrum Certification and in 2008 developed a scoring system**
 - agileconsortium.blogspot.com/2007/12/nokia-test.html
 - jeffsutherland.com/scrum/Agile2008MoneyforNothing.pdf
- **Each person on the team takes a sheet of paper and prepares to score questions on a scale of 1-10.**

Question 1 - Iterations

- **Does the team have fixed length iterations that are four weeks or less?**
- **Success rate of projects in 1994 - 14%**
 - before iterative development
- **Success rate of projects in 2004 - 34%**
 - after iterative development

Source: Standish Group

Question 2 - Testing

-  **Is there working software at the end of an iteration?**
-  **Velocity increases by 100% and defects decrease by 40% with working software**

Question 3 - Agile Specification

- **Does the team have good user stories?**
- **Time to deliver is directly proportional to length of the specification**
- **Rework is generated if:**
 - The specification has implementation details
 - The specification is not clear to developers
 - The specification does not include acceptance tests

Question 4 - Product Owner



- **Does the team have a good Product Owner?**
 - Vision, roadmap, product backlog ready
 - Knows velocity of the team
 - Works with stakeholders and works with team
- **Good Product Owner increases velocity by 100%**
- **Bad Product Owner can reduce velocity to zero**

Question 5 - Product Backlog



- **Does the team have a good Product Backlog**
 - Good user stories
 - Clear to team
 - Estimated by team
 - Prioritized by product owner
 - Sized properly
 - Acceptance tests

- **Good Product Backlog will double velocity of team**

Question 6 - Estimates

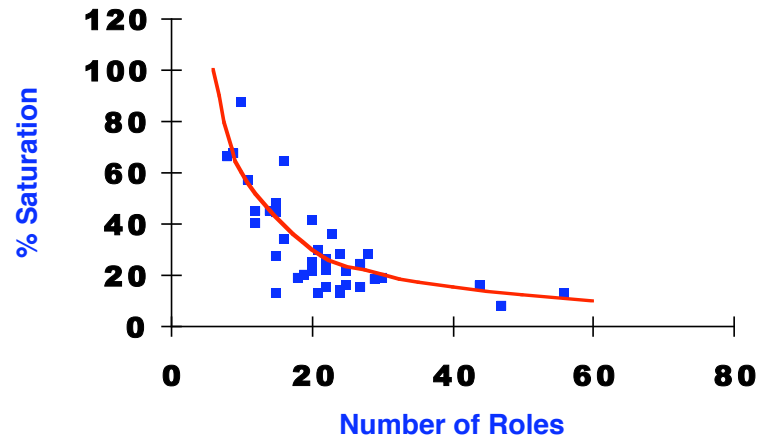
-  **Is the Product Backlog estimated by the team in story points using Planning Poker**
-  **Product Owner and Planning Poker cut costs of project planning by 80%**

Question 7 - Sprint Burndown Chart

-  **Does the team have a Sprint Burndown chart that clearly shows the status of the Sprint?**
-  **Sprint success rate will double with careful monitoring of burndown**

Question 8 - Team Disruption

- Does the team have only Scrum roles with no disruption of the team by managers, project leaders or Product Owner?
- Few roles and good daily meetings can increase velocity by 5000%



Organizational Patterns of Agile Software Development by Coplien and Harrison (2004)

CSM v9.6 © Jeff Sutherland 1993-2009

Question 9 - Team

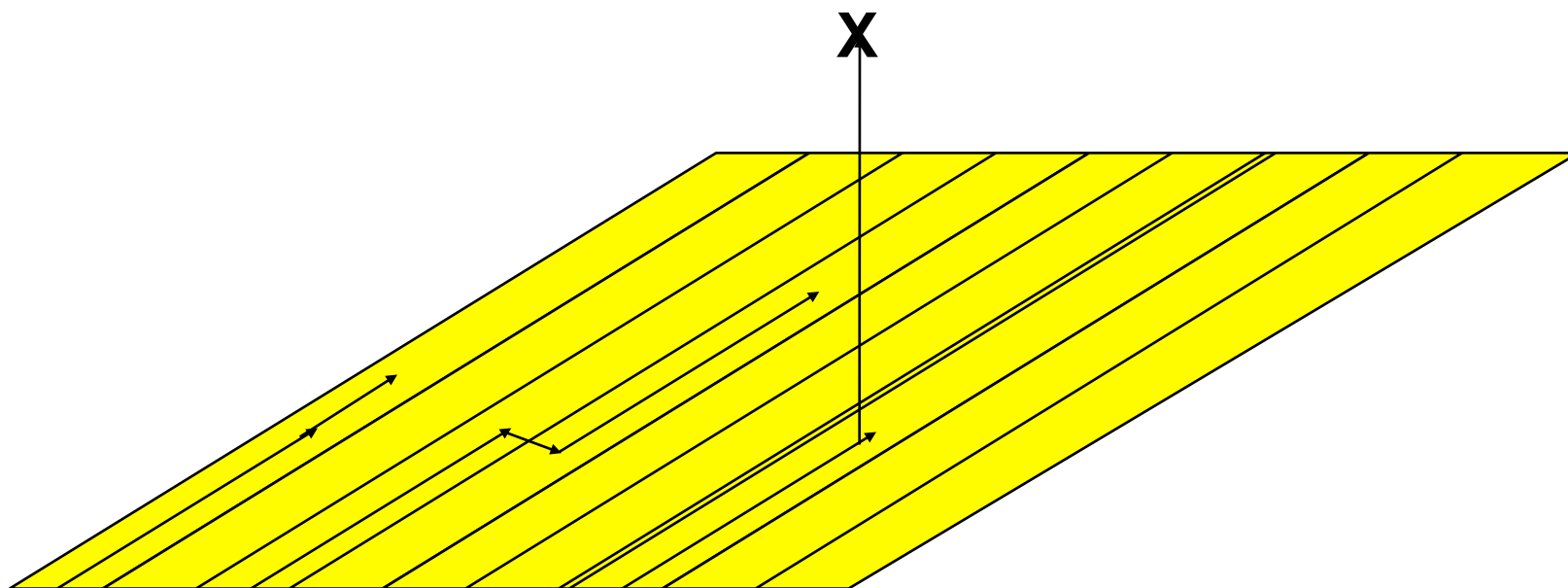
- **Does the team chose their own work to maximize velocity?**
 - Team helps each other choose the right work
 - Team helps each other to implement work
 - Team does highest priority story first together and tests immediately
 - Team commits to Sprint goal together and aggressively removes impediments
- **Self-organization is the key to hyperproductivity - 400-800% improvement in velocity and quality**



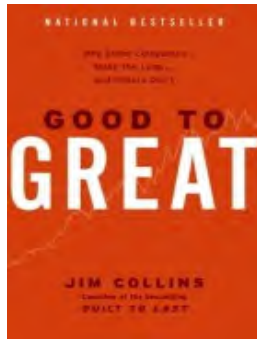
Smalltalk

Alan Kay's Innovation Strategy

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



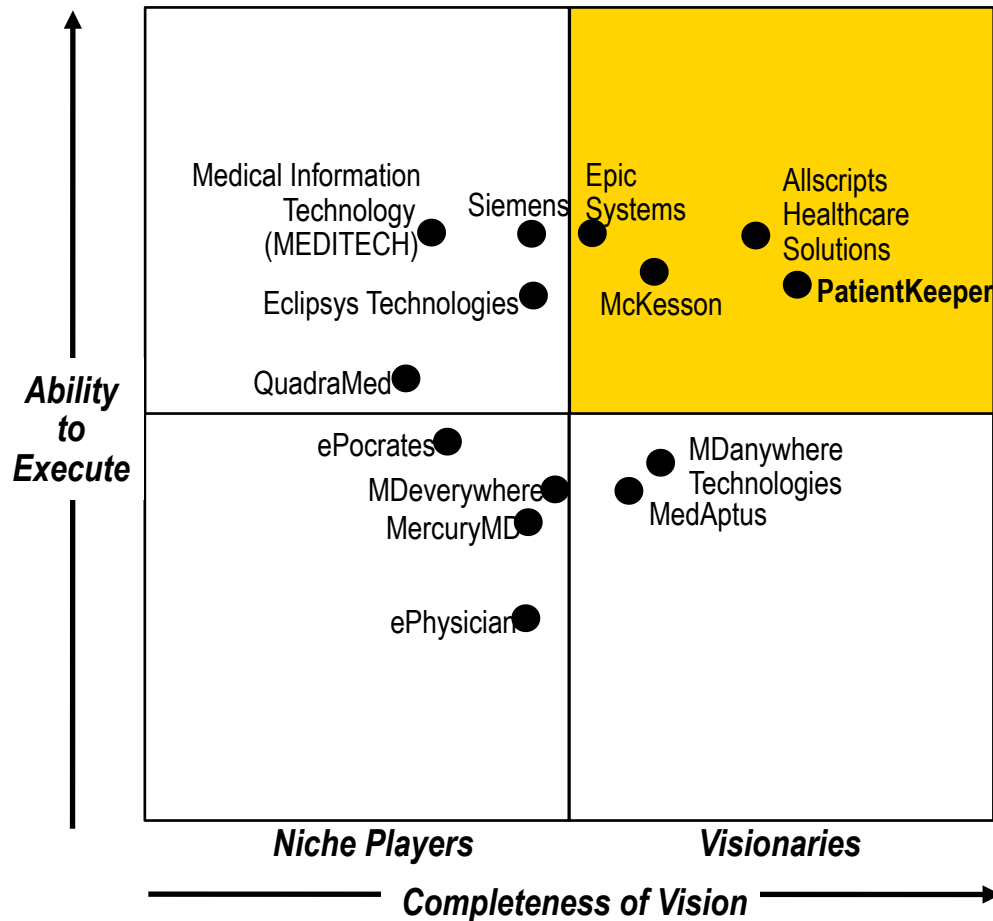
© Jeff Sutherland 1993-2009



Out of the Box

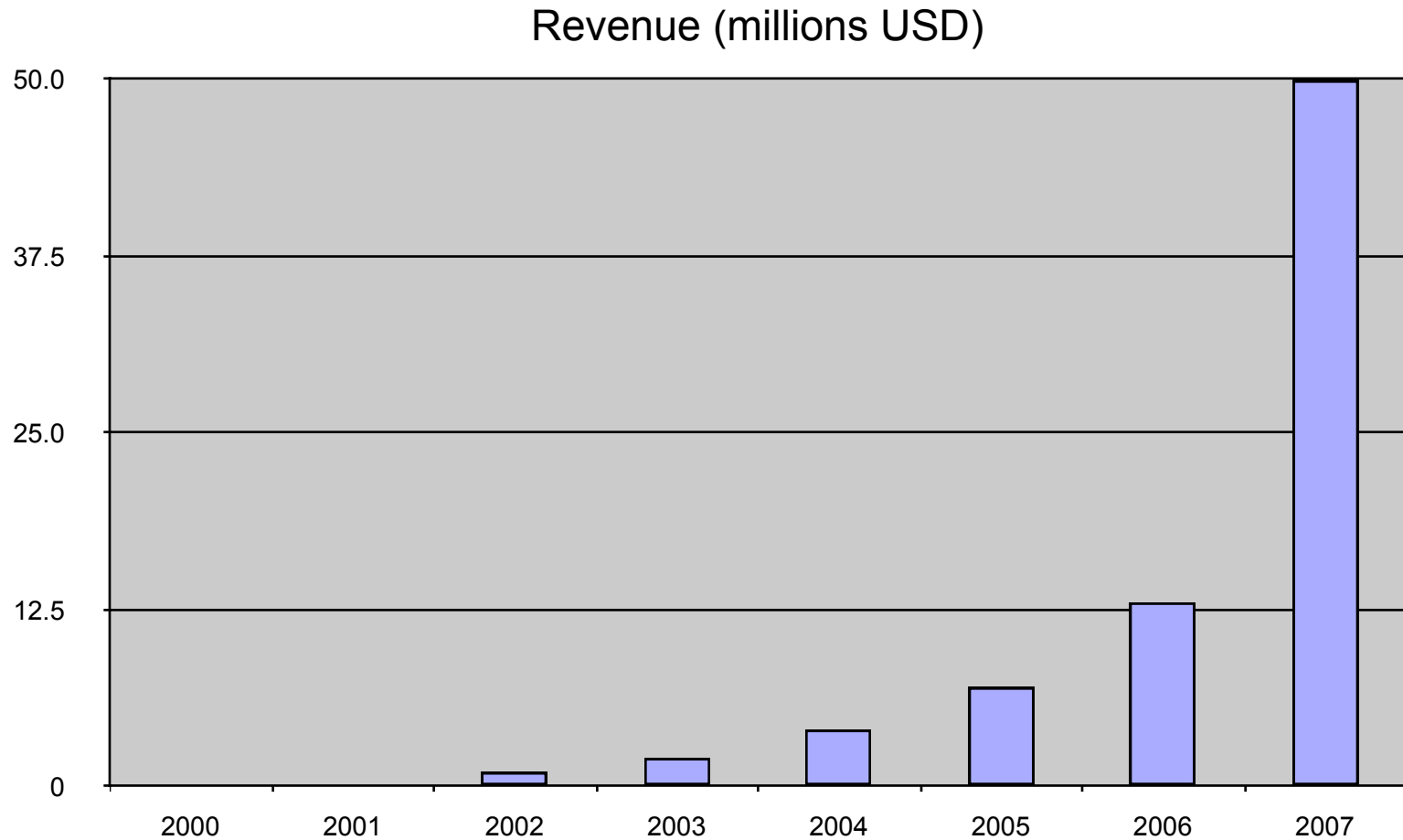
- Scrum looked at projects that were off the plate
 - IBM surgical team
 - Takeuchi and Nonaka
 - Borland Quattro Project
- *Scrum: A Pattern Language for Hyperproductive Software Development*
 - By M. Beedle, M. Devos, Y. Sharon, K. Schwaber, and J. Sutherland. In Pattern Languages of Program Design. 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



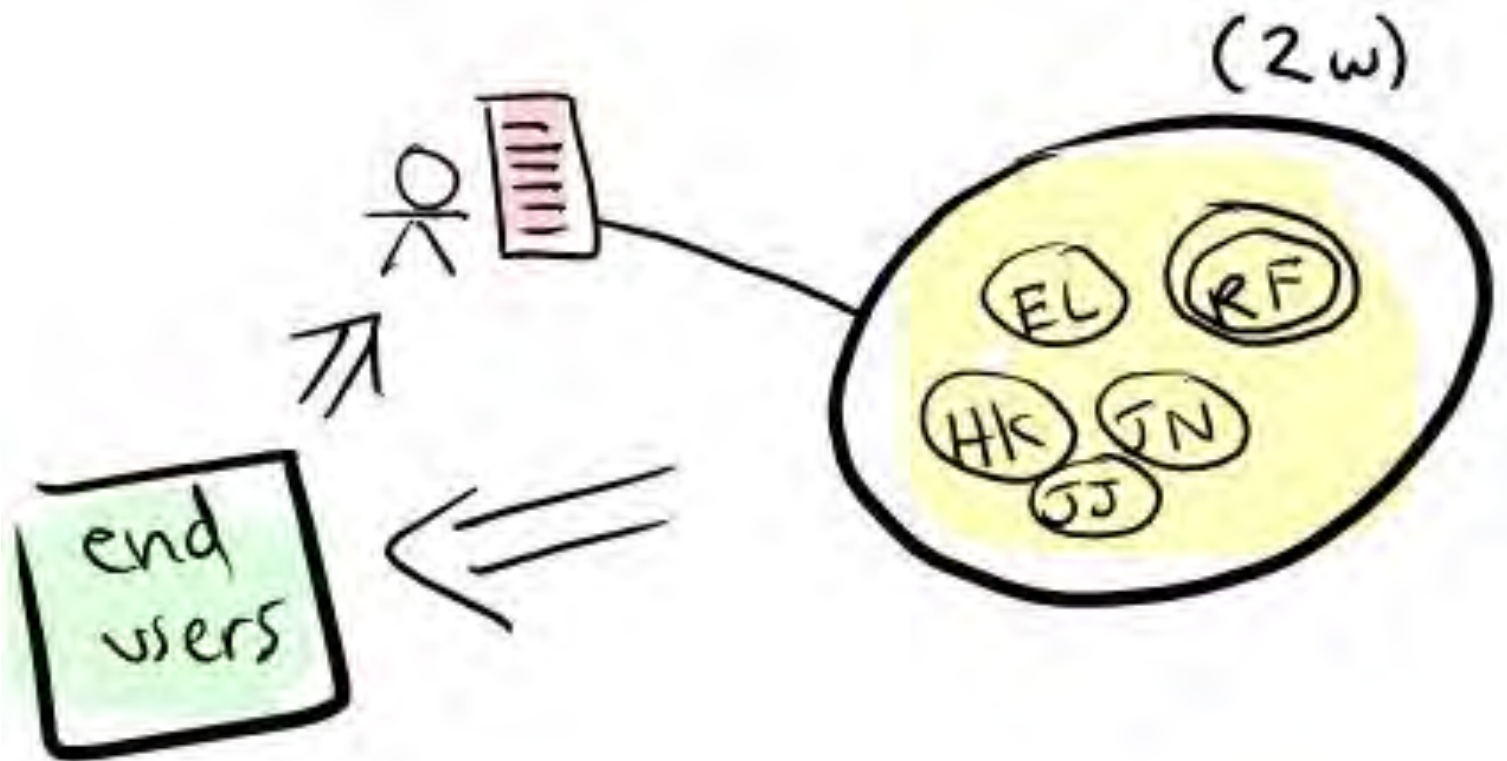
I find that the vast majority of organizations are still trying to do too much stuff, and thus find themselves thrashing. The only organization I know of which has really solved this is PatientKeeper. Mary Poppendieck

PatientKeeper Revenue



© Jeff Sutherland 1993-2009

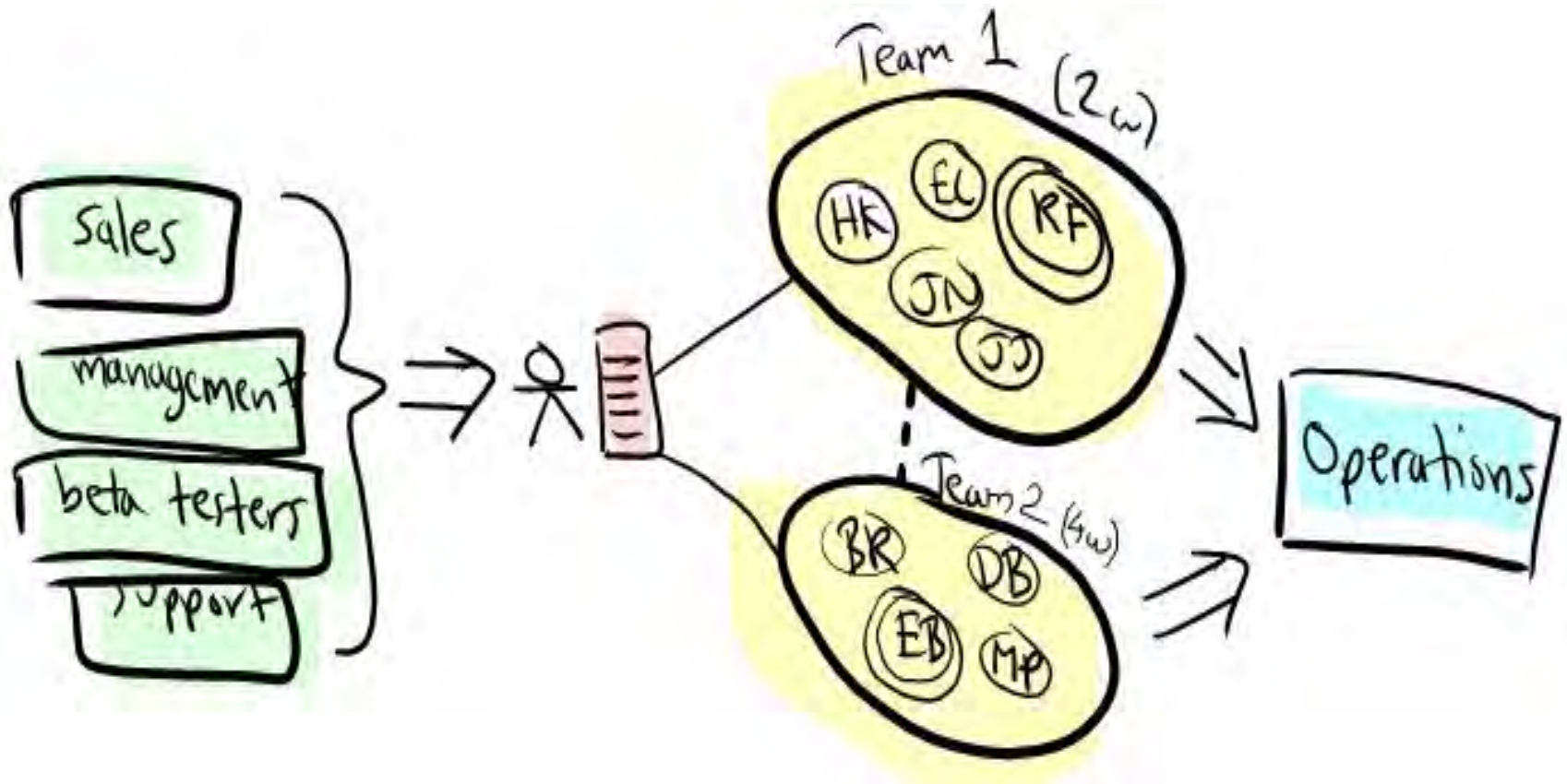
What's happening with Scrum?



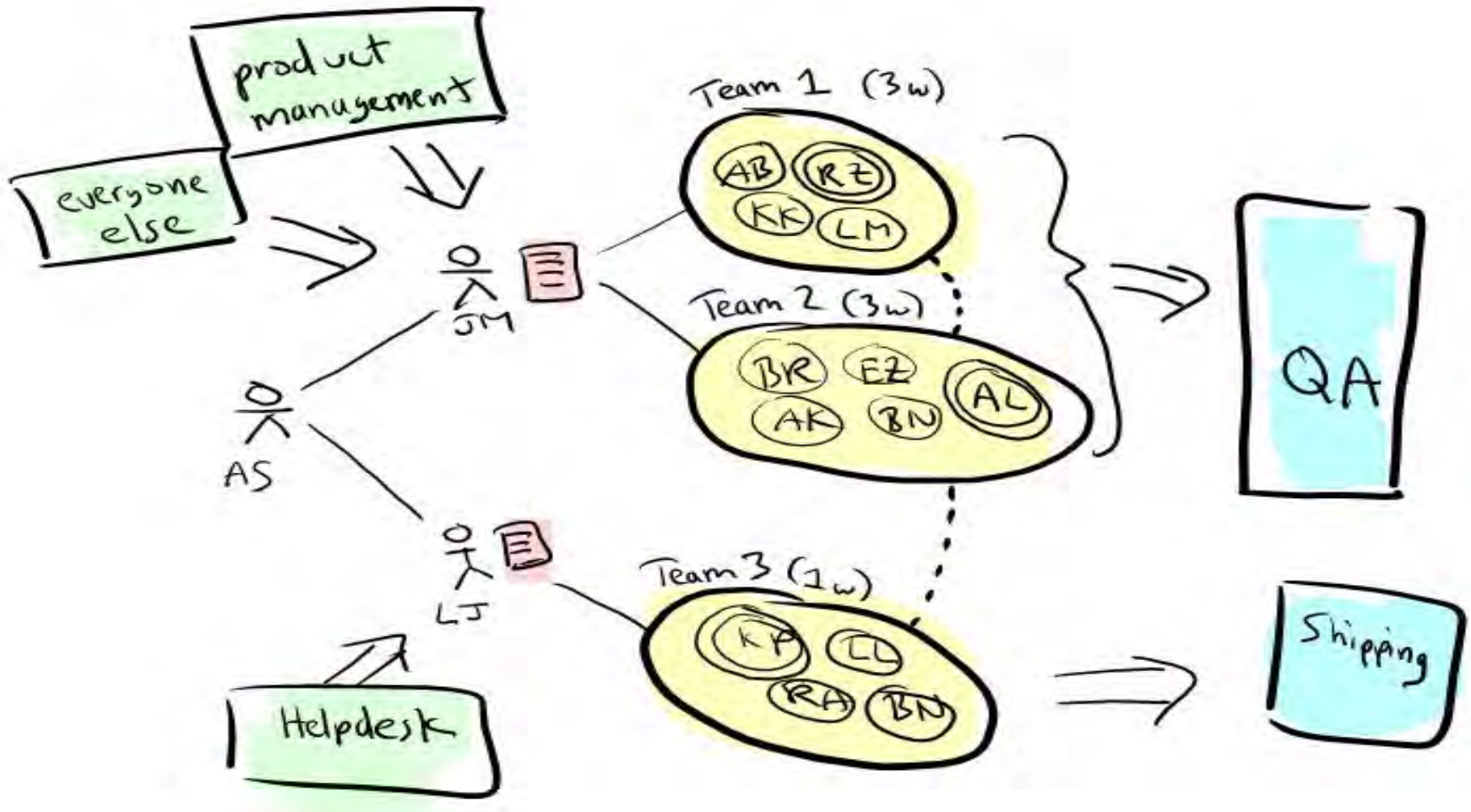
ScrUML by Henrik Kniberg

© Jeff Sutherland 1993-2009

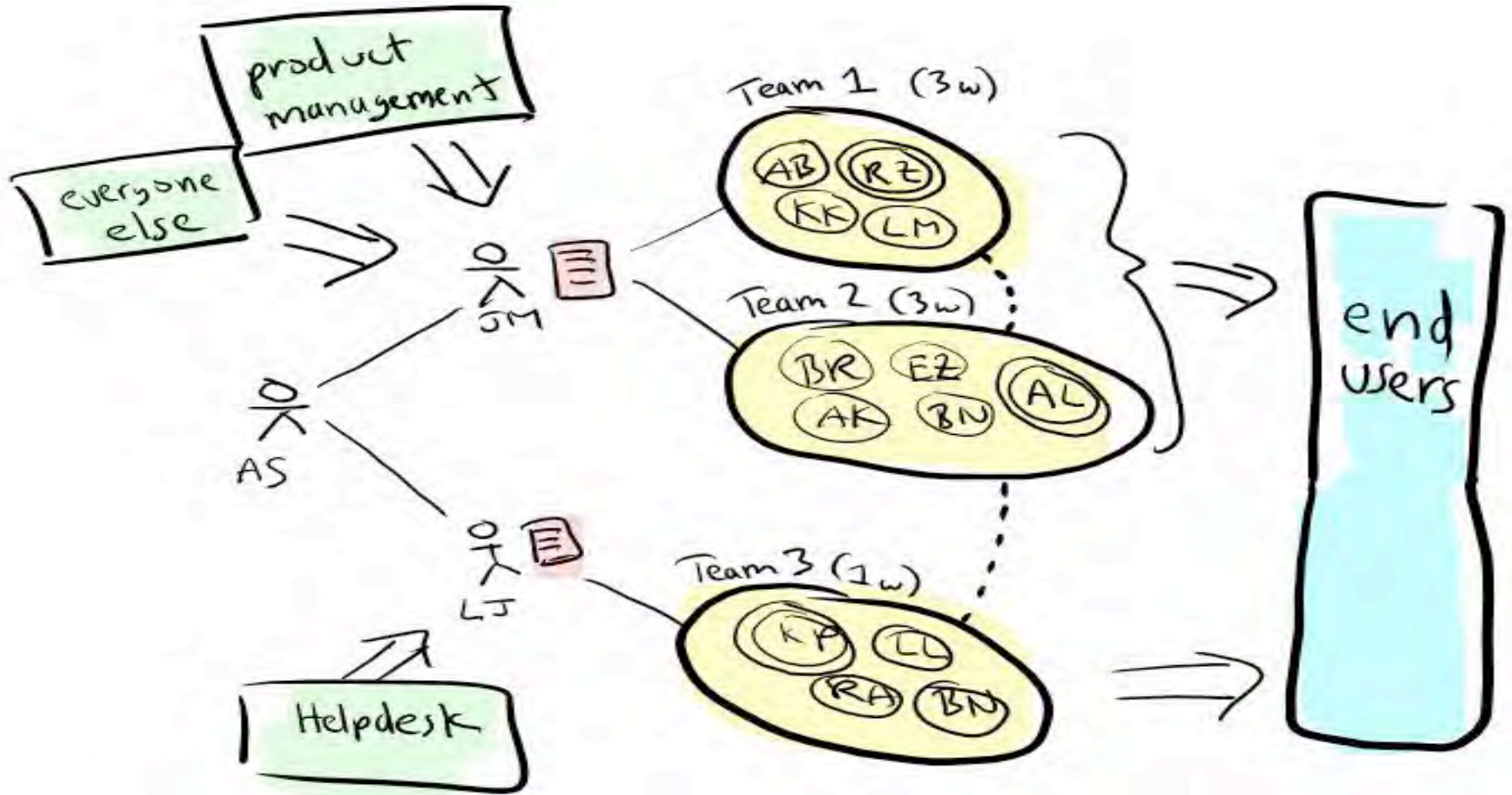
Multiple Team Scrum



Scrum in Transition



Delivering to End Users



© Jeff Sutherland 1993-2009

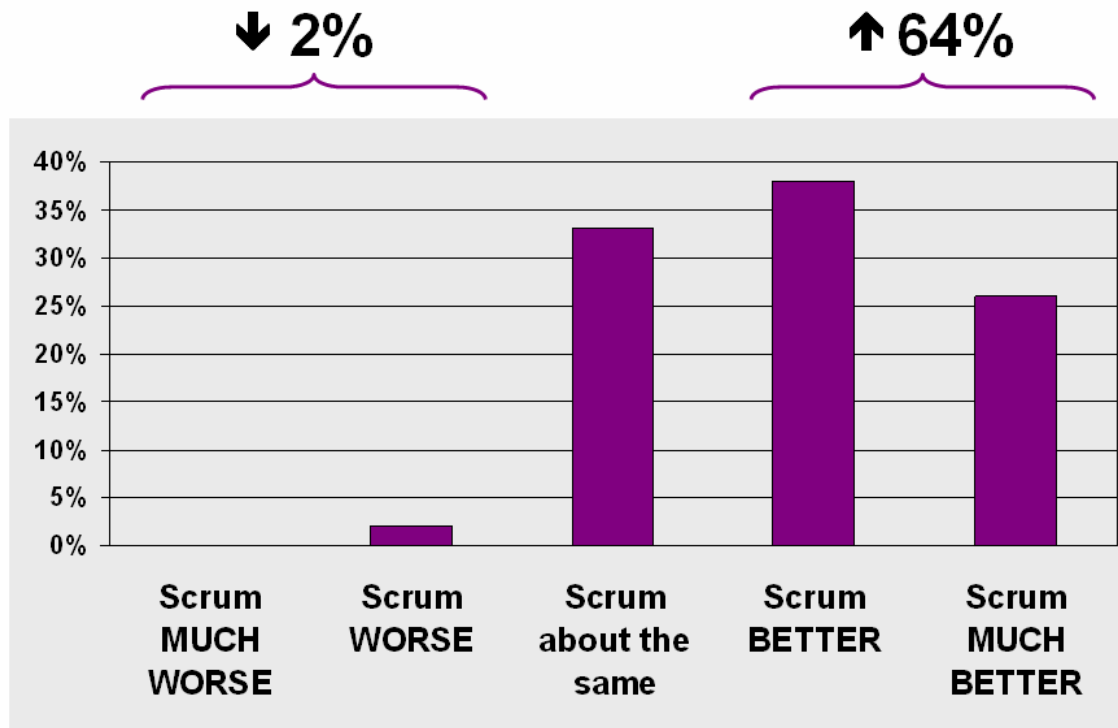
How do you scale Scrum to thousands of developers?

- 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?



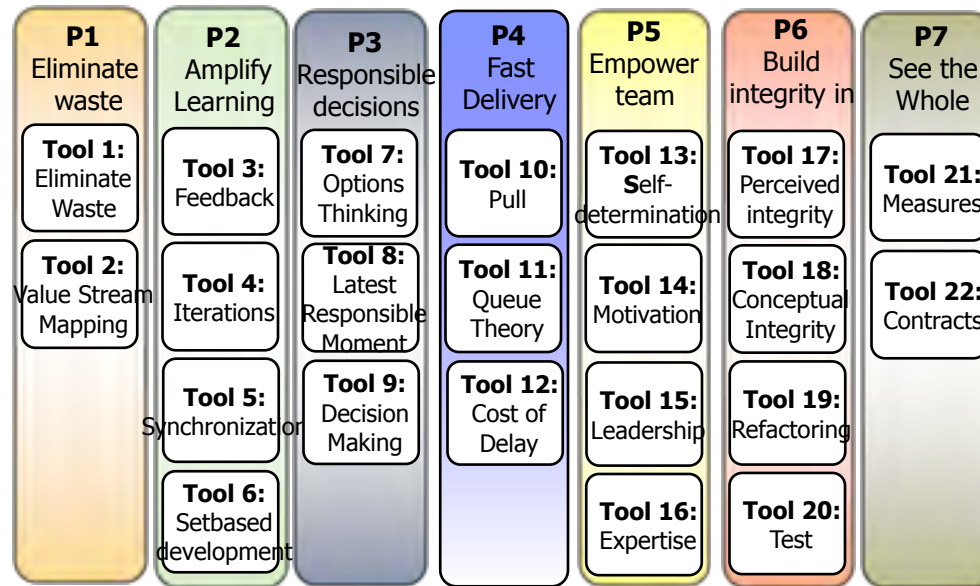
© Jeff Sutherland 1993-2009

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

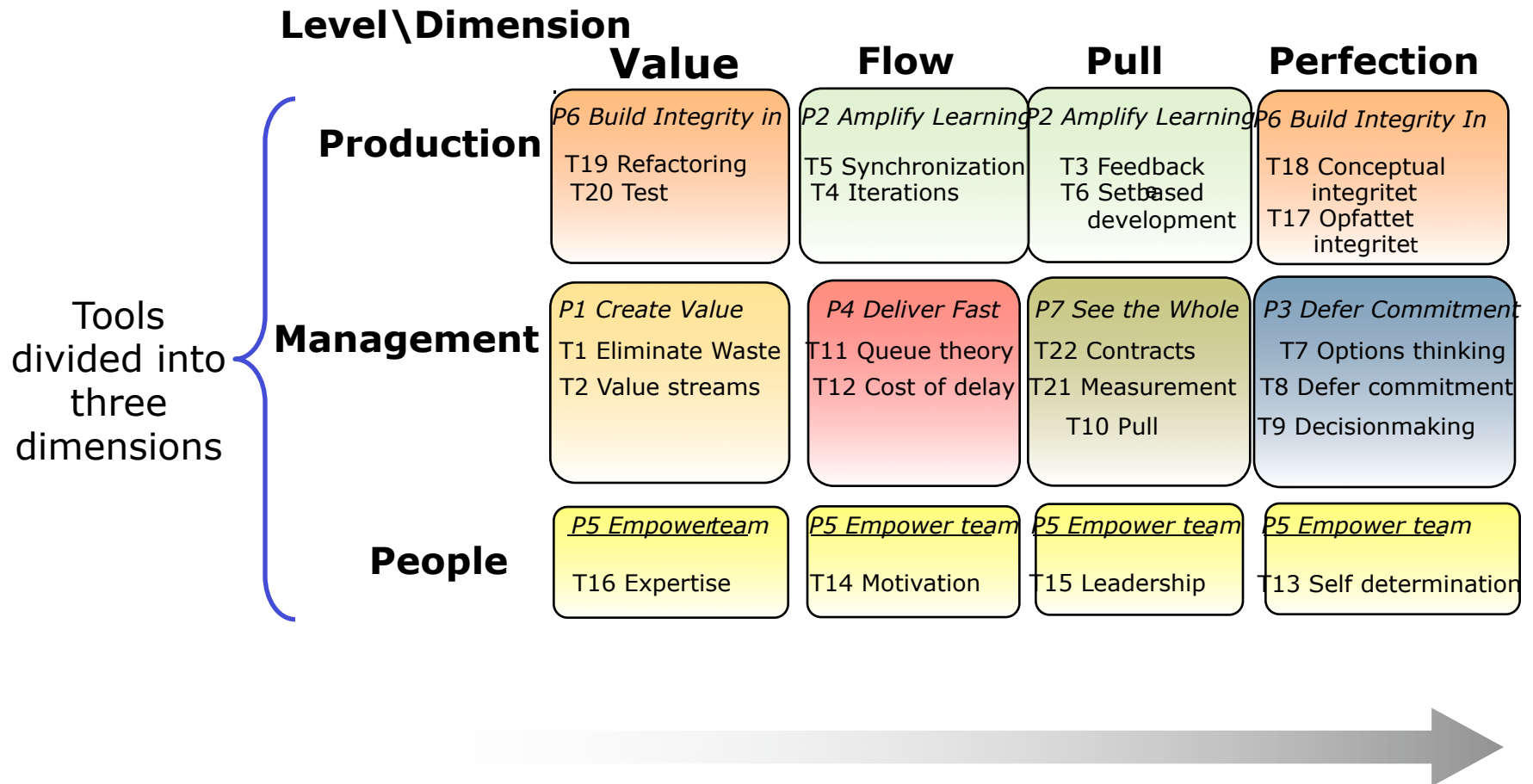
G. Benefield, "Rolling Out Agile at a Large Enterprise," in *HICSS'41, Hawaii International Conference on Software Systems*, Big Island, Hawaii, 2008.

Lean Thinking Tools



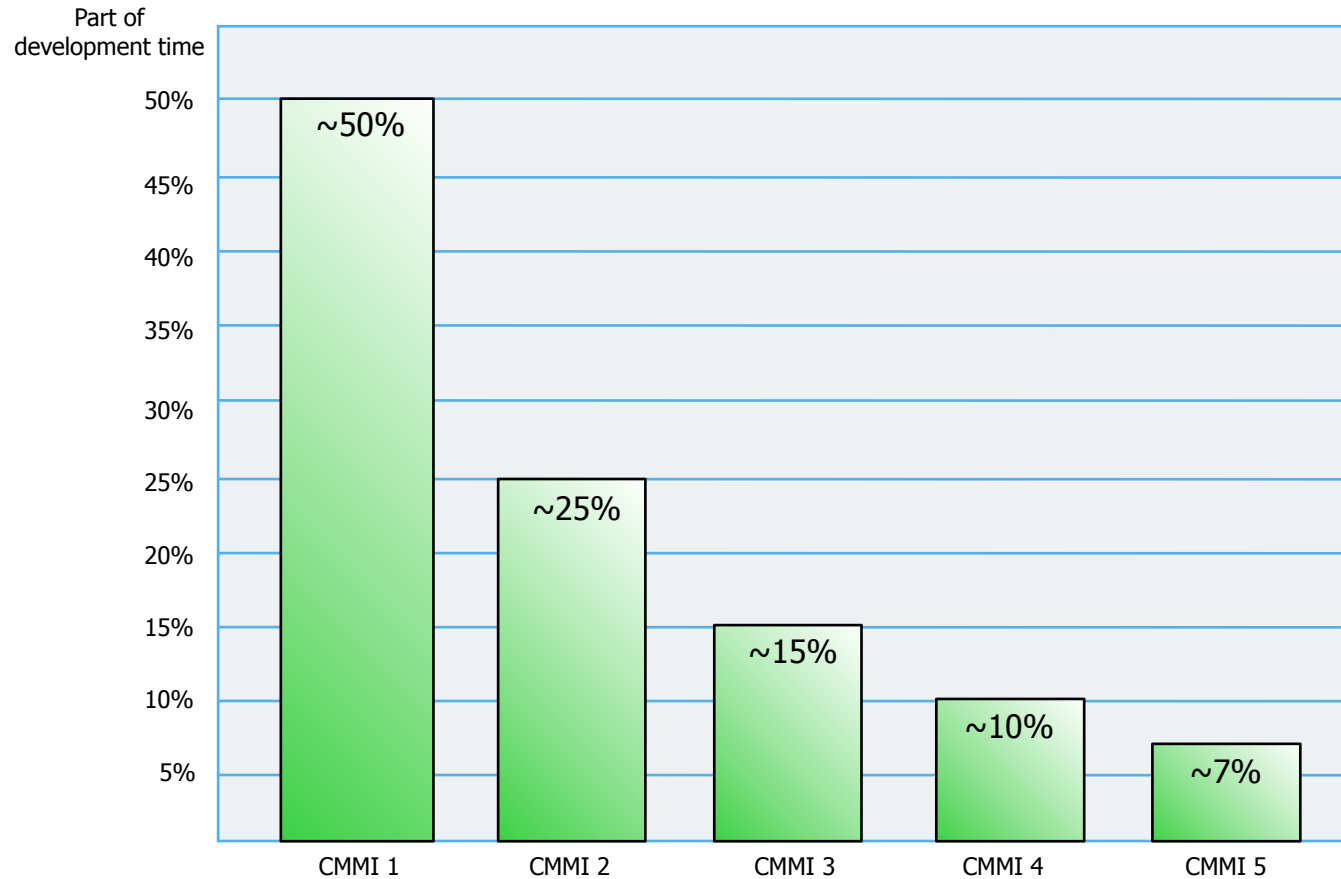
- Systematic Software Engineering used the tools from Lean Software Development to develop their Scrum implementation
- Analyzing dependencies, they produced a strategy for ordering the implementation of Lean.

Causal Dependencies



Thinking tools are best transformed by people and projects

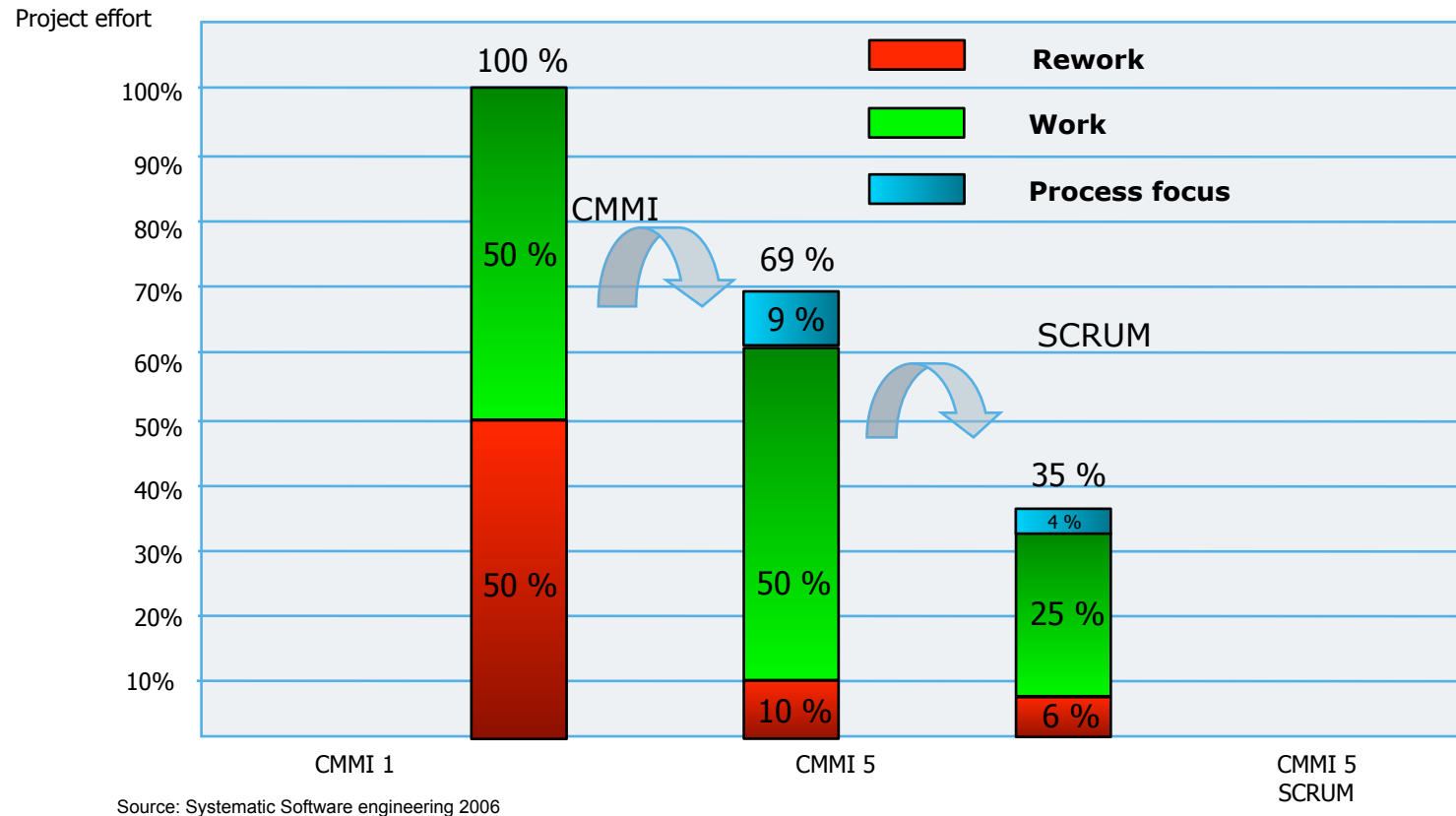
Published experiences with "rework"



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

© Jeff Sutherland 1993-2009

CMMI/SCRUM Performance analysis



© Jeff Sutherland 1993-2009

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

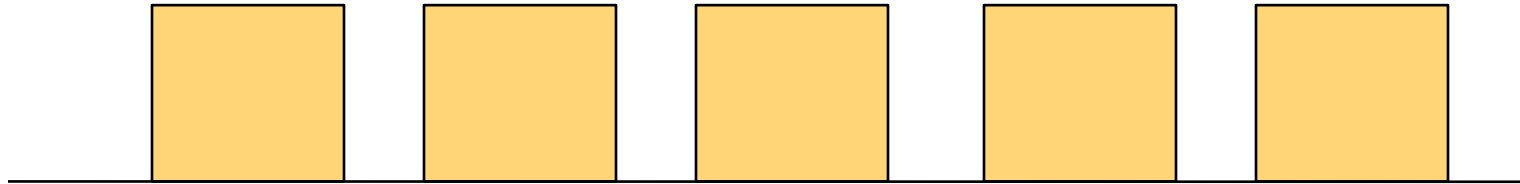
- First doubling of velocity comes from software DONE at the end of the sprint.
- Second doubling come from product backlog READY at the beginning of the sprint.
- Systematic now has several teams executing the second doubling model successfully
- Will role this out to whole company

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

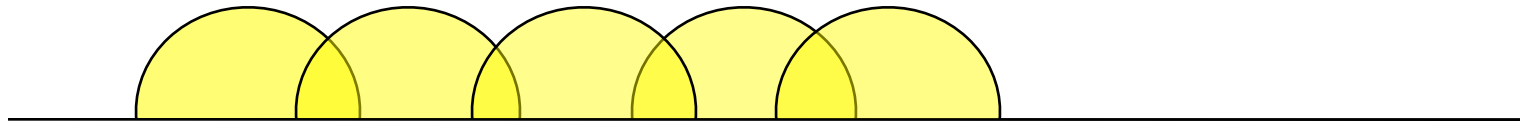
Case Study: Scrum and XP

- 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.

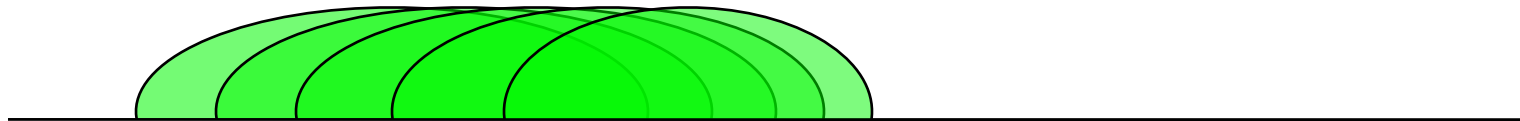
Distributed/Outsourcing Styles



Isolated Scrums



Distributed Scrum of Scrums



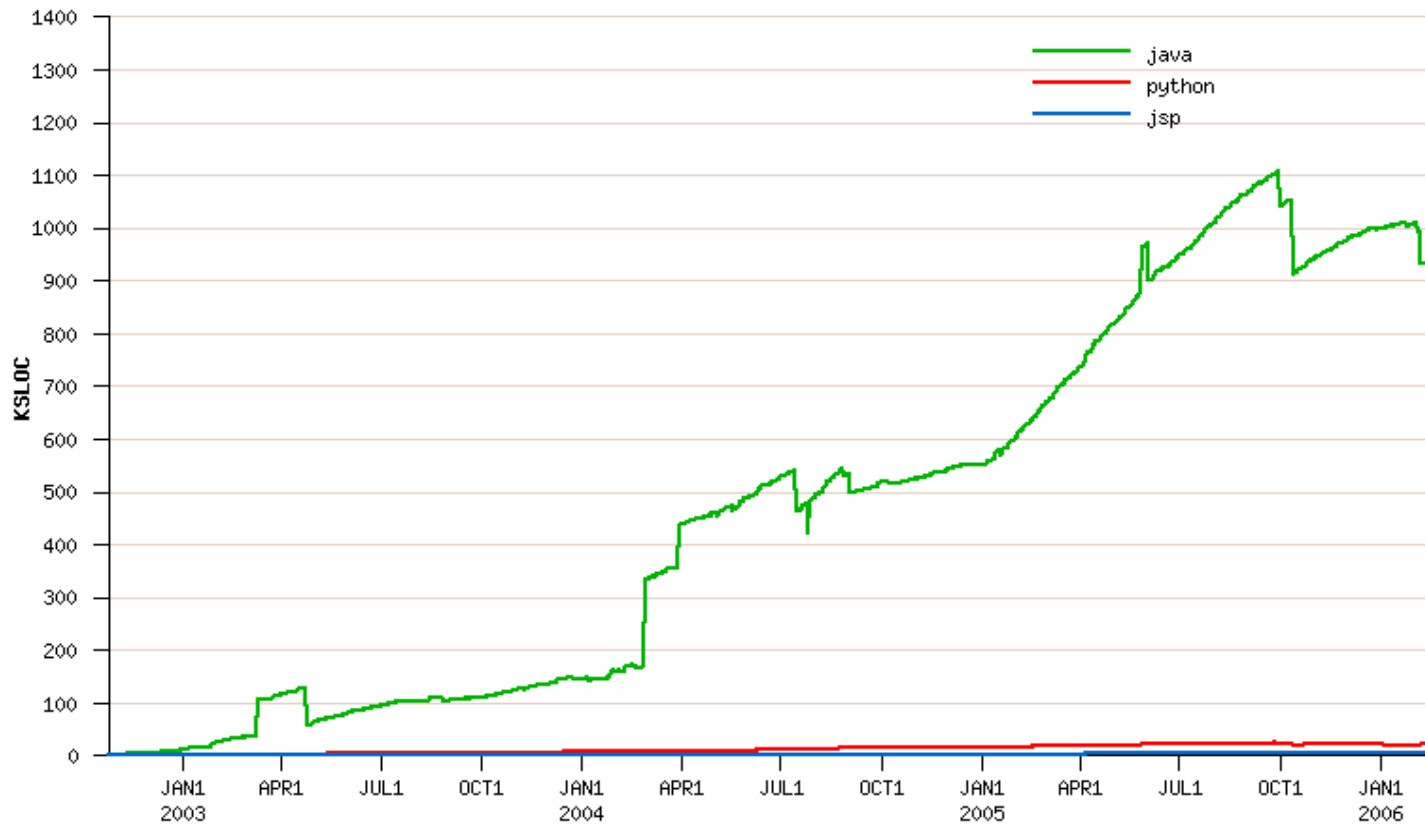
Totally Integrated Scrums

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

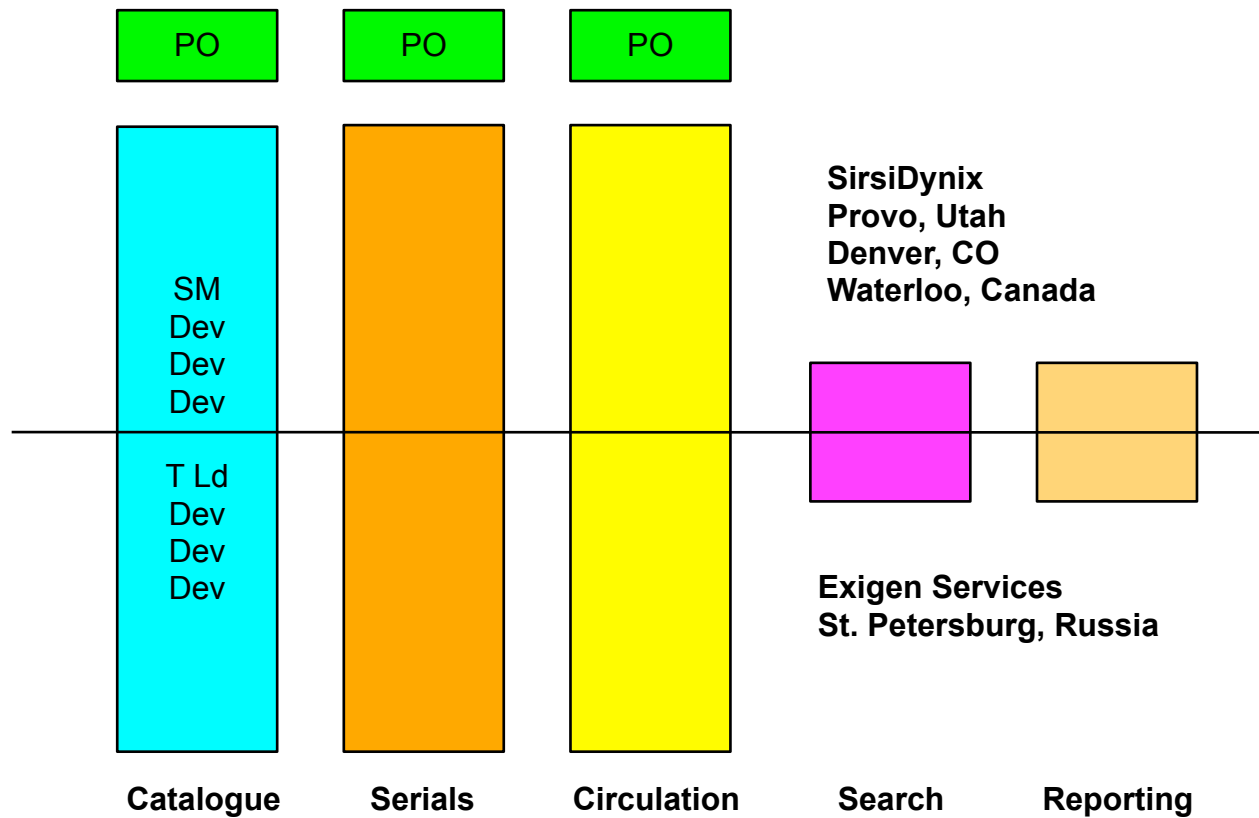
- Over a million lines of Java code



© Jeff Sutherland 1993-2009

SirsiDynix Distributed Scrum

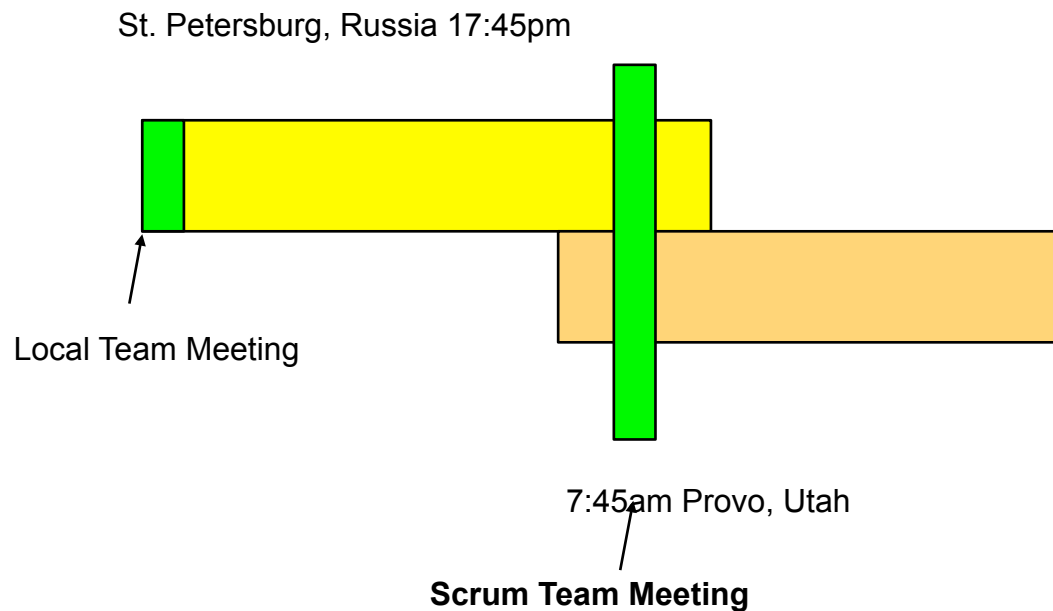
56 developers distributed across sites



© Jeff Sutherland 1993-2009

SirsiDynix Distributed Scrum

🌐 Scrum daily meetings

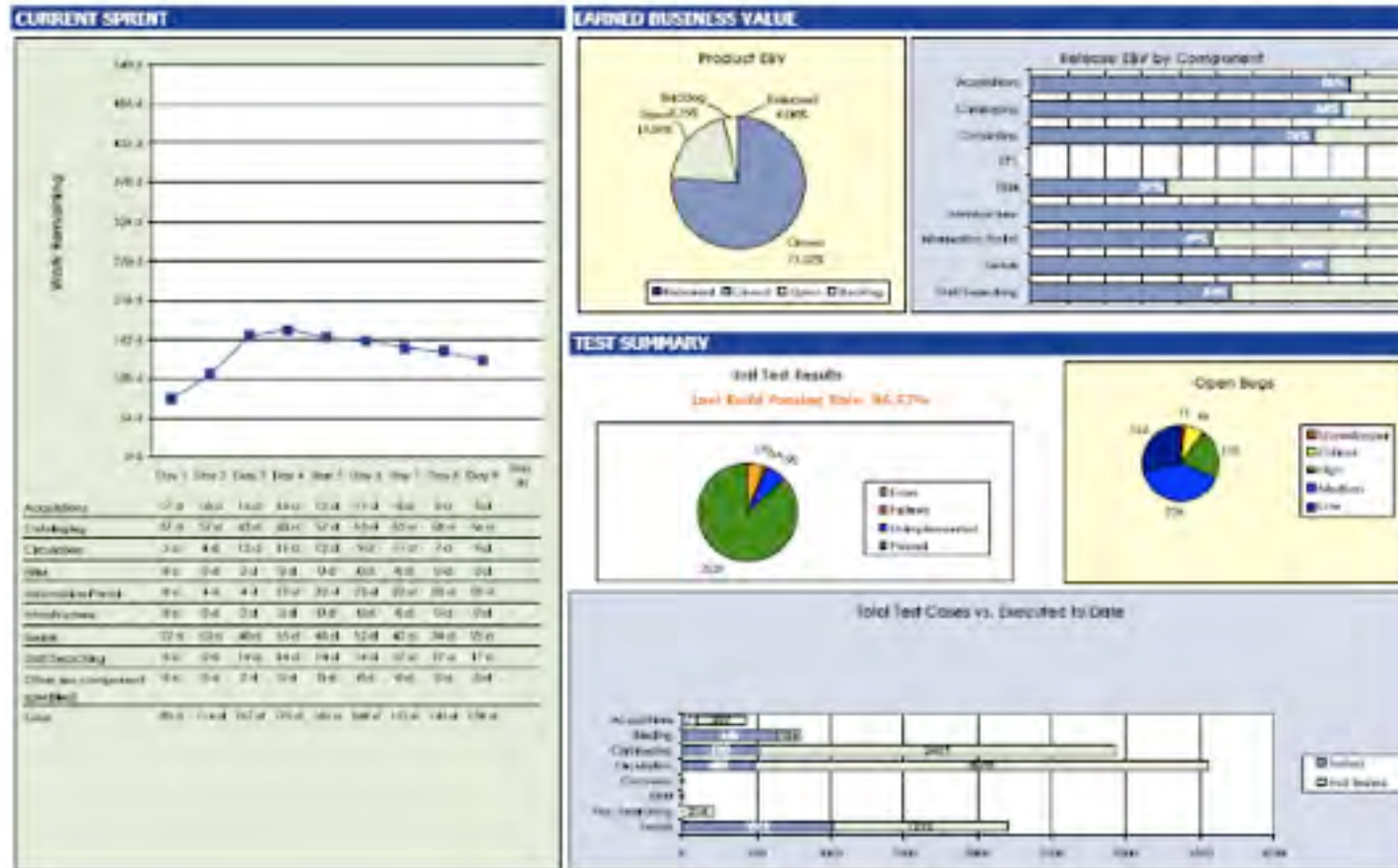


SirsiDynix Distributed Scrum



Horizon 8.0

Report Ending: Monday, 12 Oct 2009



© Jeff Sutherland 1993-2009

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

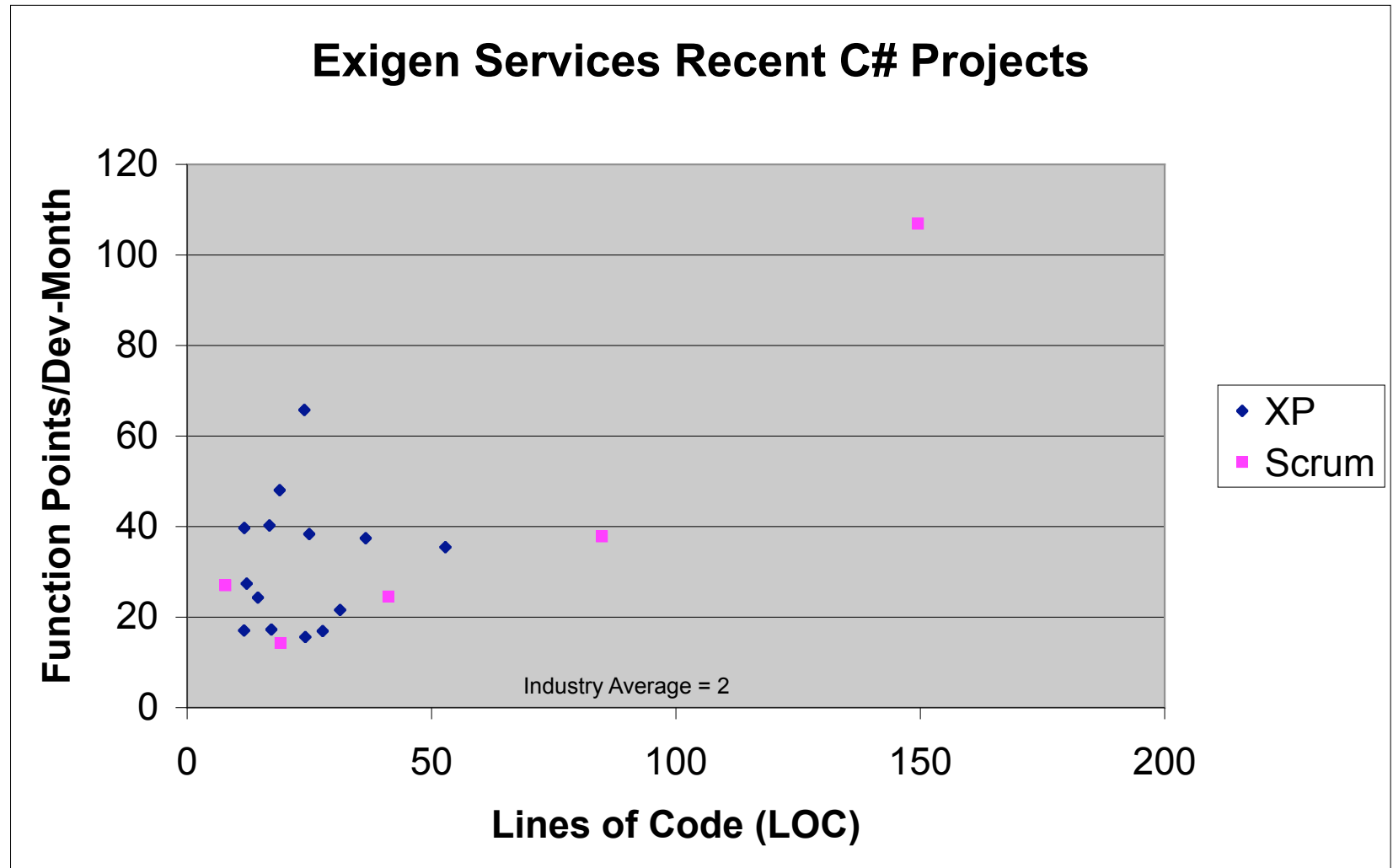
1. M. Cohn, User Stories Applied for Agile Development. Addison-Wesley, 2004

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

- ScrumBut
- 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

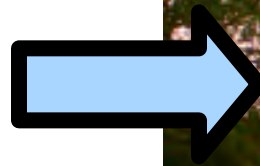
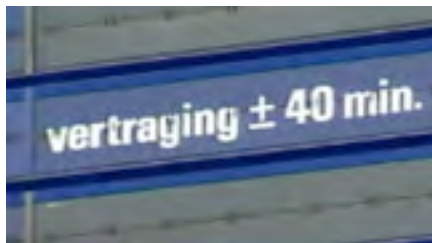
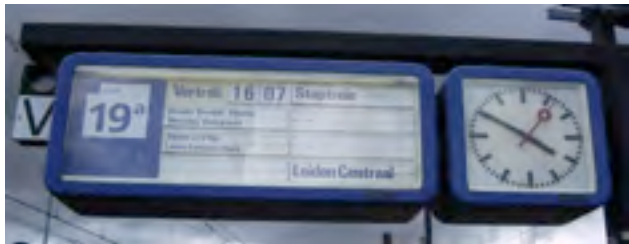


© Jeff Sutherland 1993-2009

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

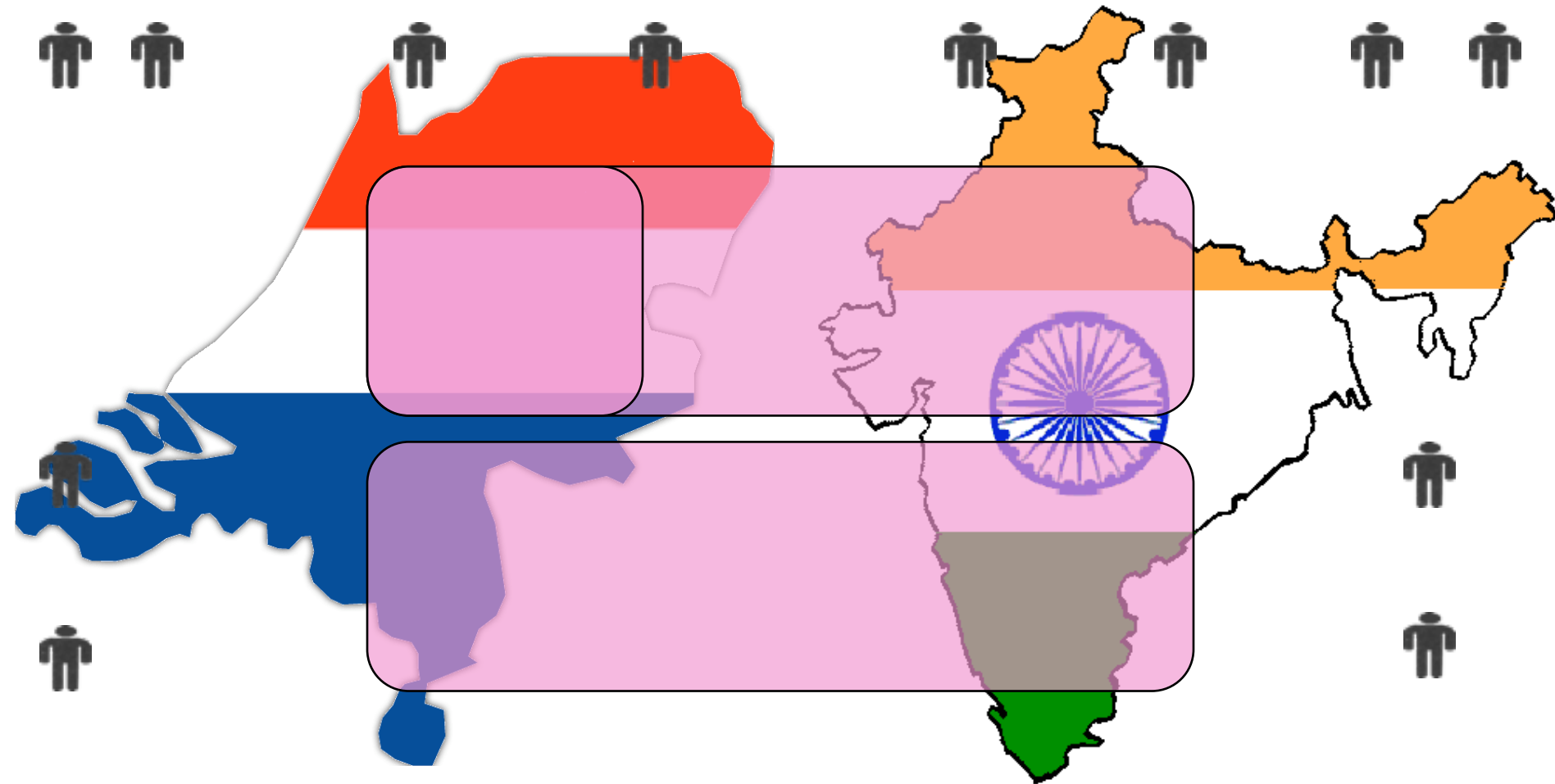


© Jeff Sutherland 1993-2009

ProRail PUB Example

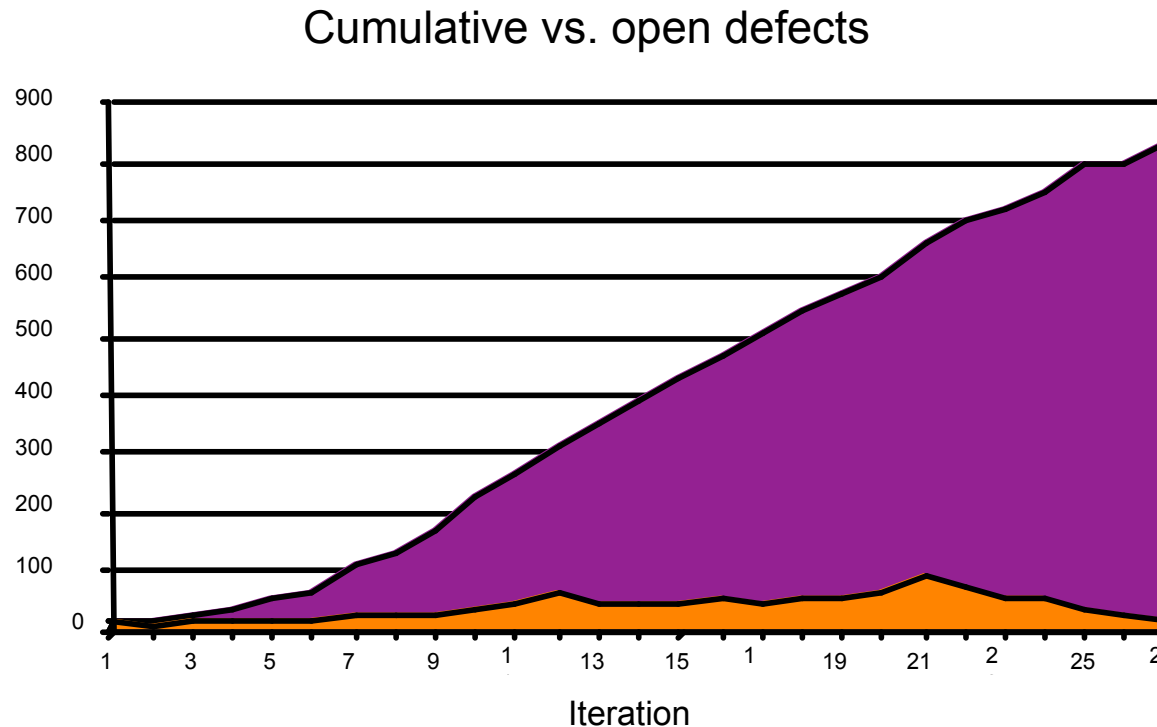
- ProRail rescued a failed waterfall project to build a new scheduling system and automated railway station signs at all Netherlands railway stations
- An 8 person Scrum team started the project and established local velocity (half Dutch, half Indian).
- After establishing local velocity at 5 times other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

Scaling Fully Distributed Scrum



© Jeff Sutherland 1993-2009

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.

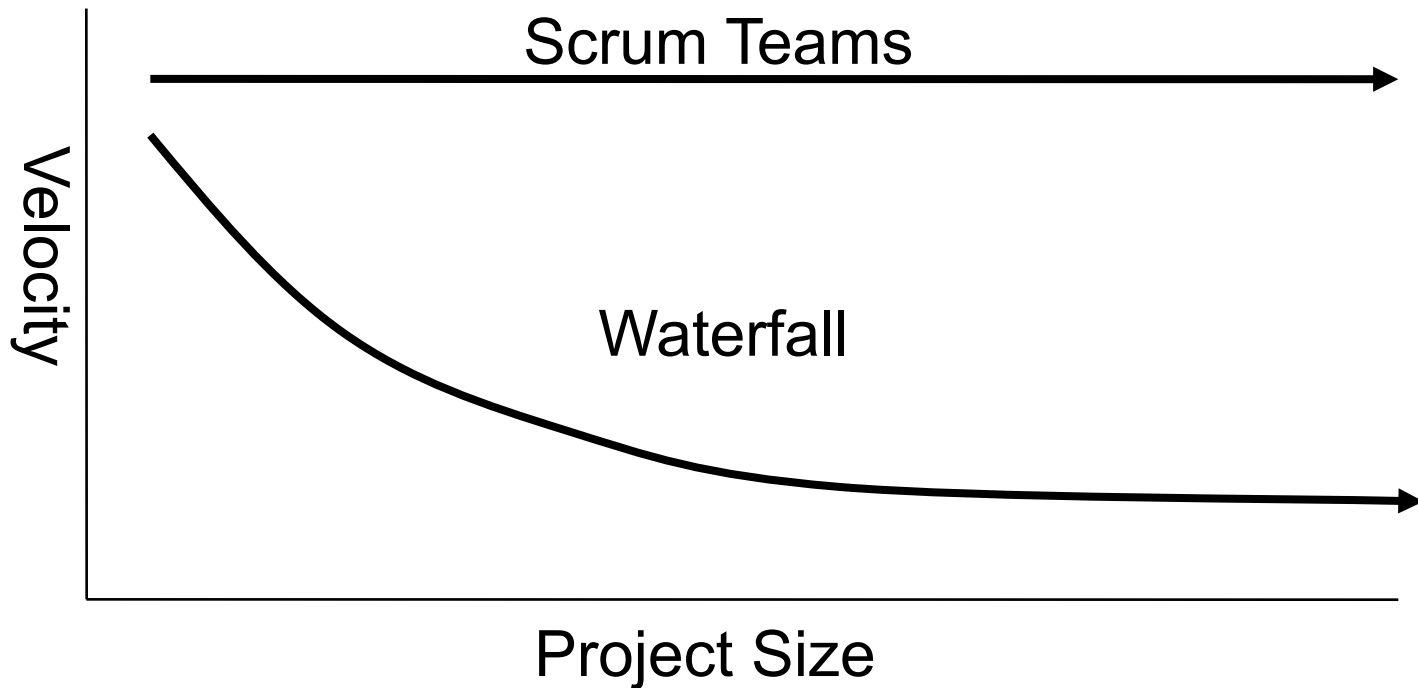
Dutch Velocity vs. Russian Velocity

	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)

© Jeff Sutherland 1993-2009

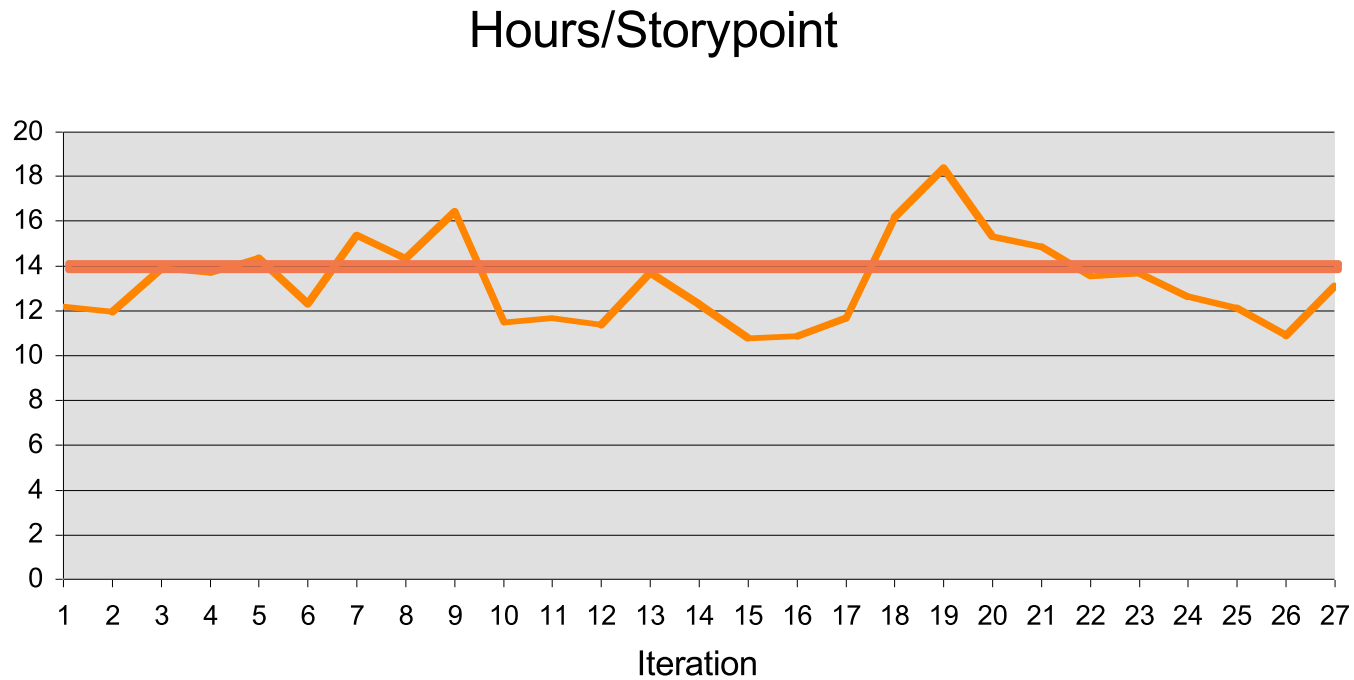
Linear Scalability of Large Scrum Projects



- 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.

© Jeff Sutherland 1993-2009

Linear scalability



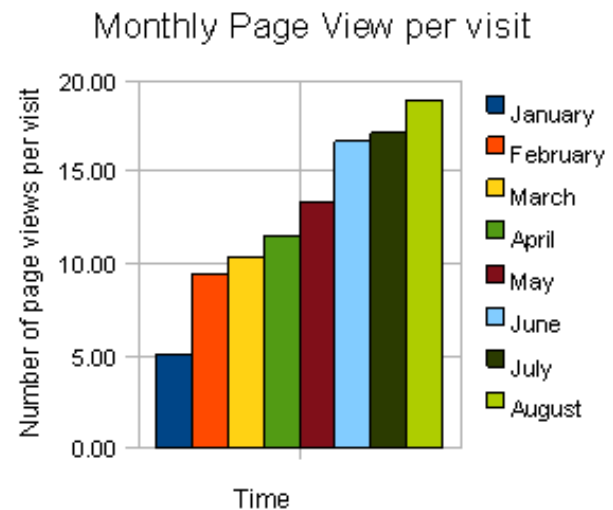
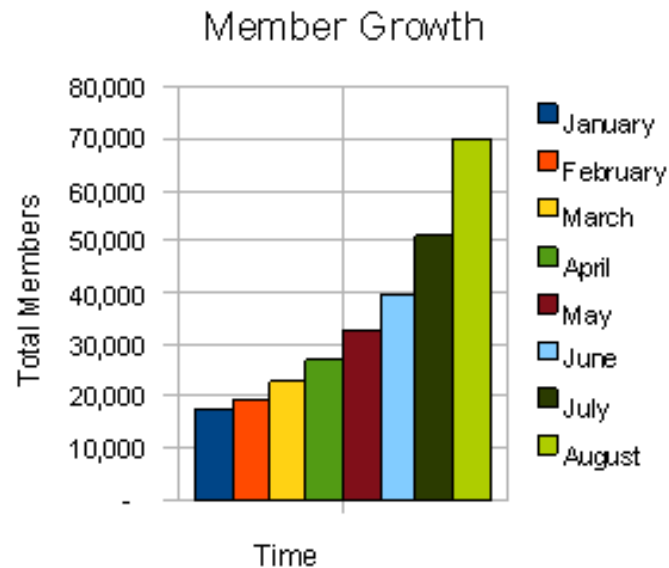
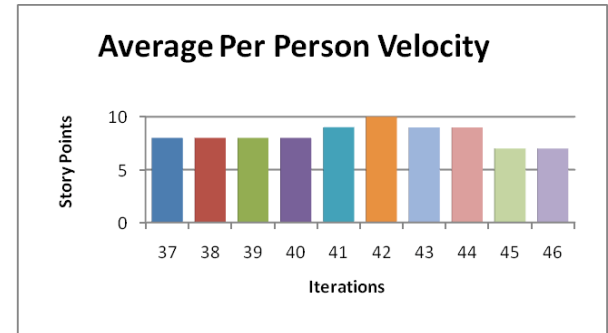
Xebia's Conclusions

- 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.

Agile 2009

TBD.com San Francisco - Xebia India

- All the benefits of ProRail plus
 - Quadrupled new user acquisition rate
 - Quadrupled web site page views



© Jeff Sutherland 1993-2009

Questions?



Emergent Architecture

© Jeff Sutherland 1993-2009