MEASURING SCRUM

ESSENTIAL METRICS FOR HYPER PRODUCTIVE TEAMS

WITH
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&
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scruminc.

RAPID SCRUM
EXCELLENCE IN AGILITY

Agenda

- Goal of this Work
- Data Collection
- A Few Metrics & Formulas
- Comparing Teams
- RoboScrum™ version 7.6
  - Corrections
  - New Metrics
  - Comparison of Real Teams

THE GOAL

Why bother measuring Scrum?

Goal of this Work

To develop a standardized set of minimally invasive metrics that can help Scrum Masters evaluate and advise Teams while providing rich insights about Performance and the benefits of Scrum in a fully portable language for comparison of Scrum Teams across an Agile Enterprise.

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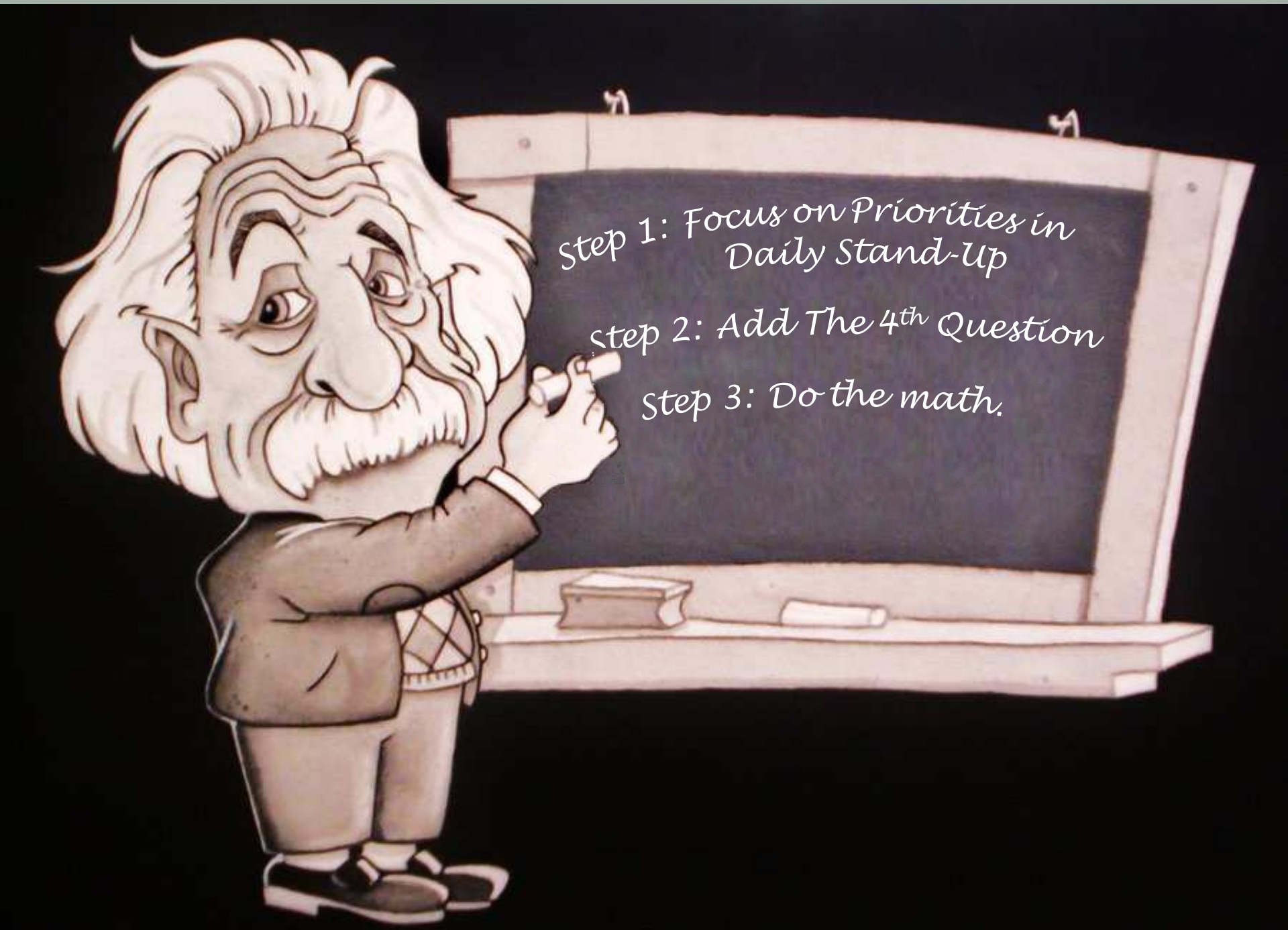
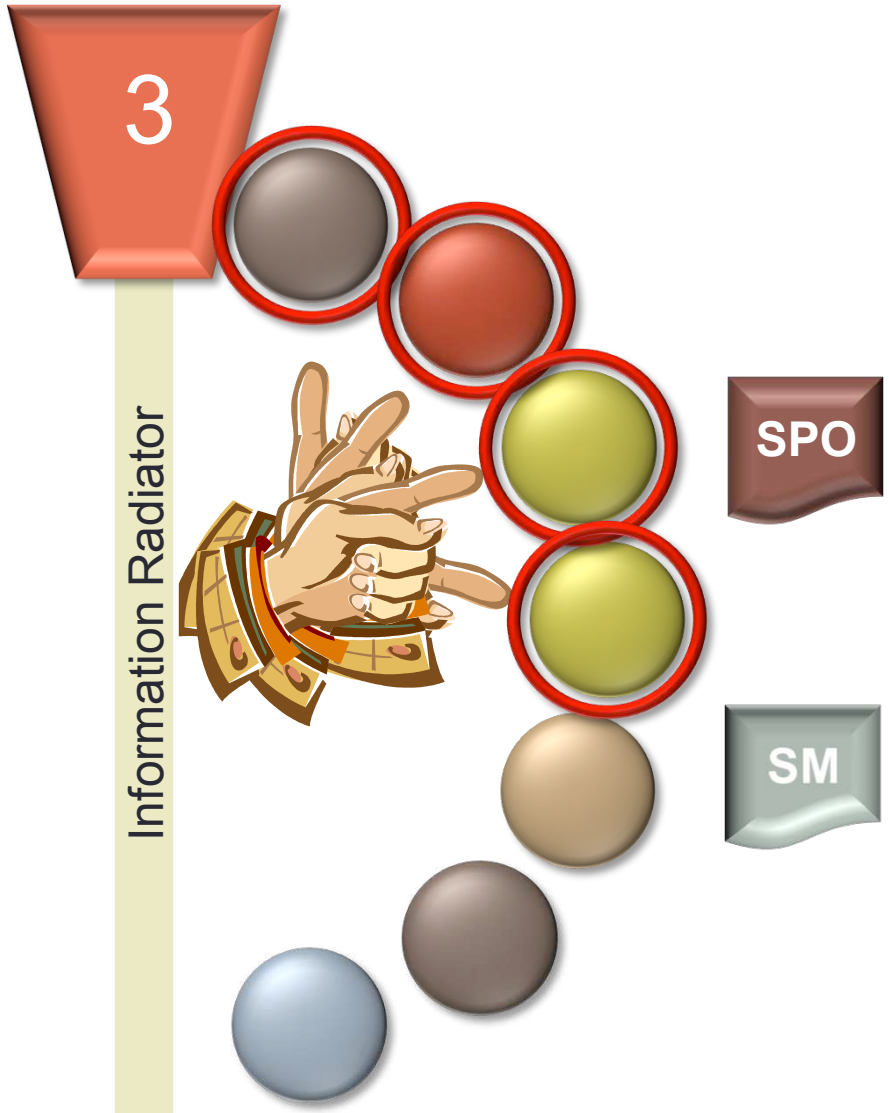
DATA COLLECTION

The minimal touch for maximum gain

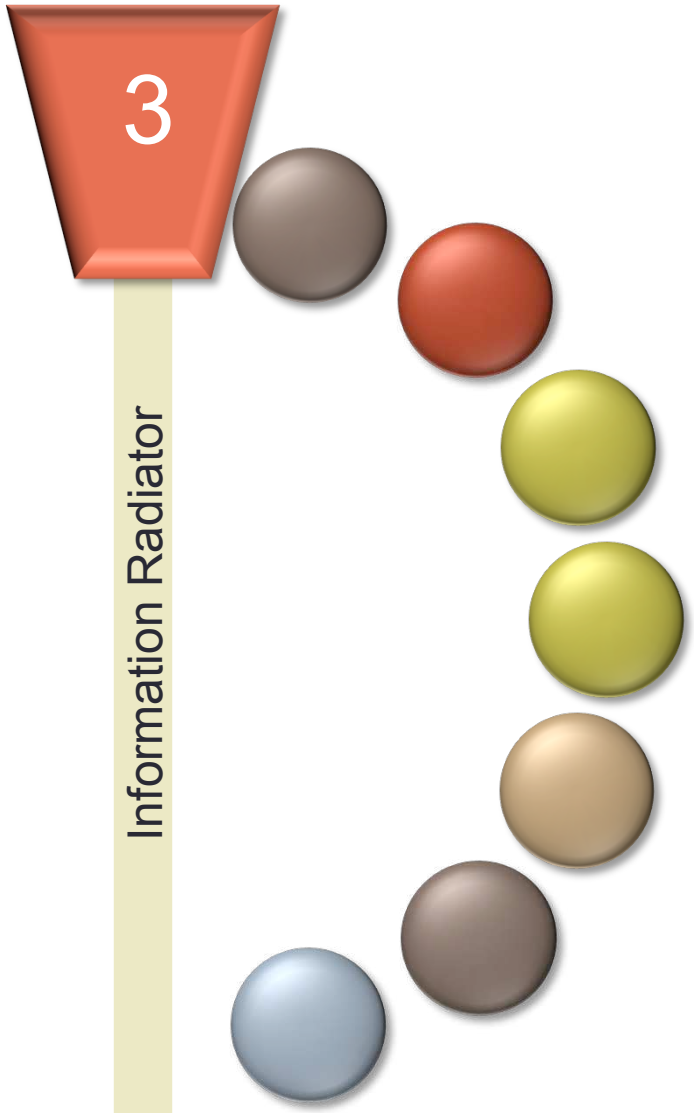

Step 1: Focus on Priorities in Daily Stand-Up
Step 2: Add The 4th Question
Step 3: Do the math.

Minimal Touch Collection

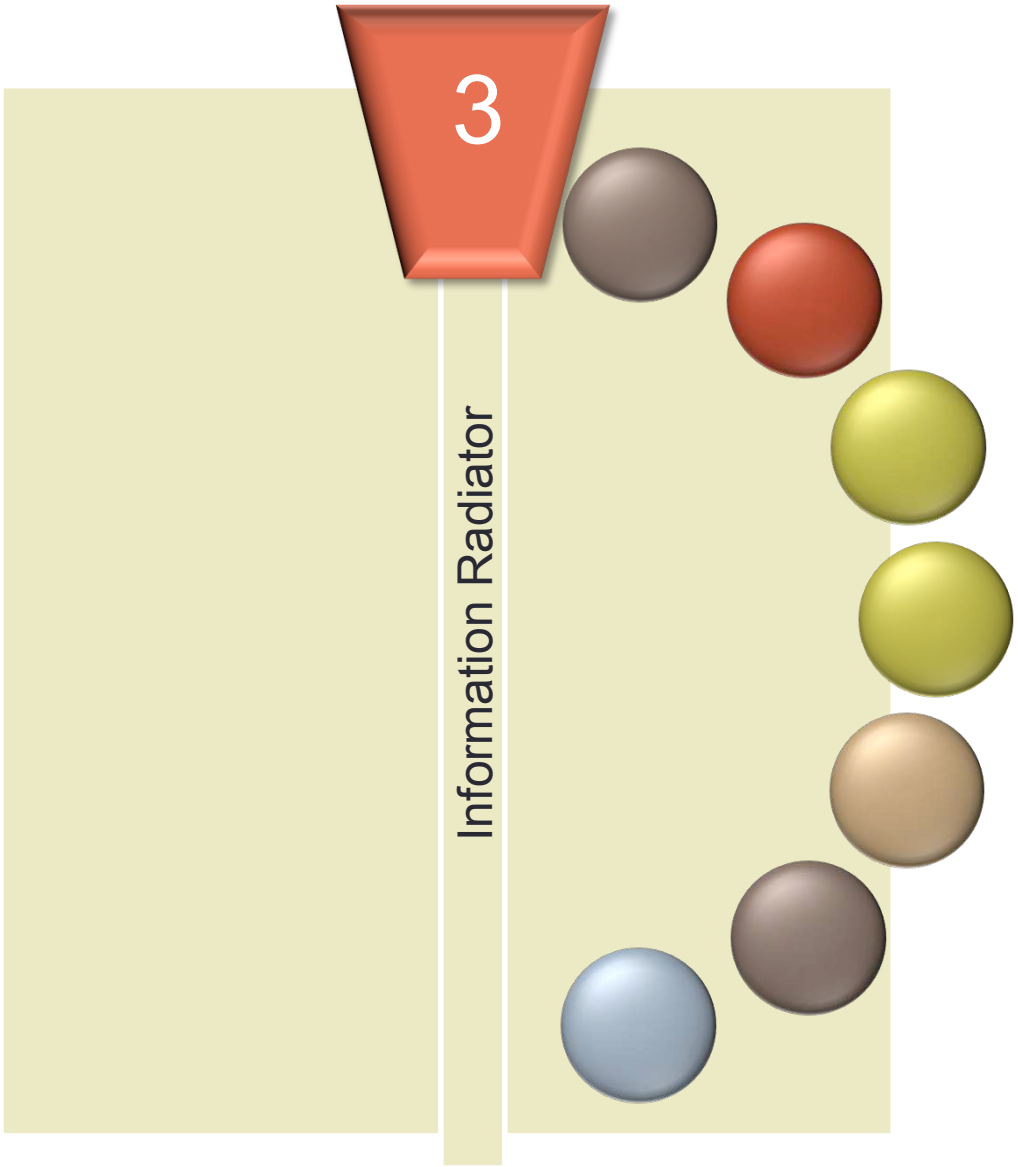


1. What did ***WE*** Achieve Yesterday? Yesterday **on Priority 1**?
2. What will ***WE*** Achieve Today **on Priority 1**?
3. How many Story Points did ***WE*** Achieve yesterday **on Priority 1**?
4. Are there any impediments or jeopardizing ***OUR*** progress **on Priority 1**?

Minimal Touch Collection



Minimal Touch Collection



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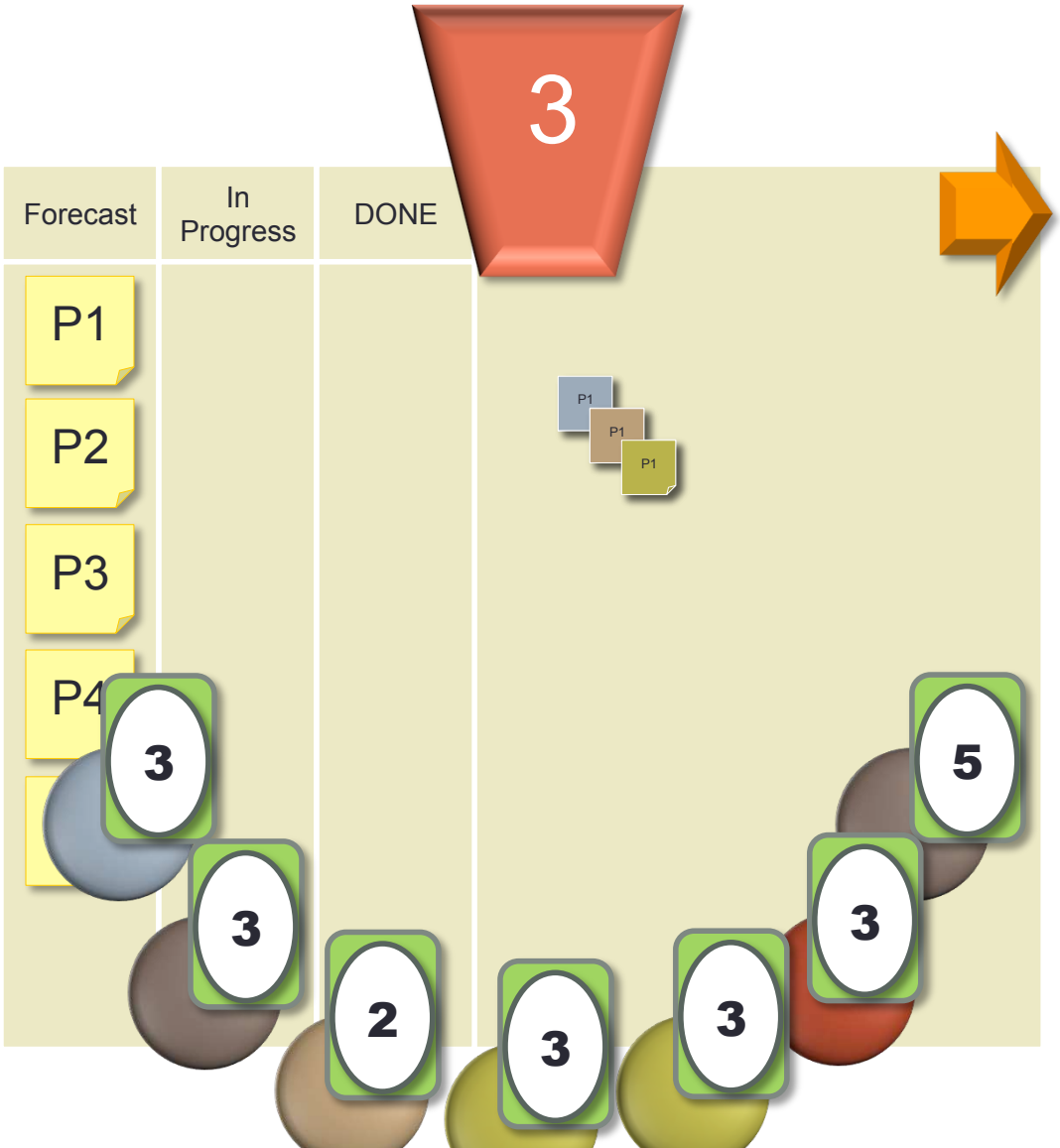
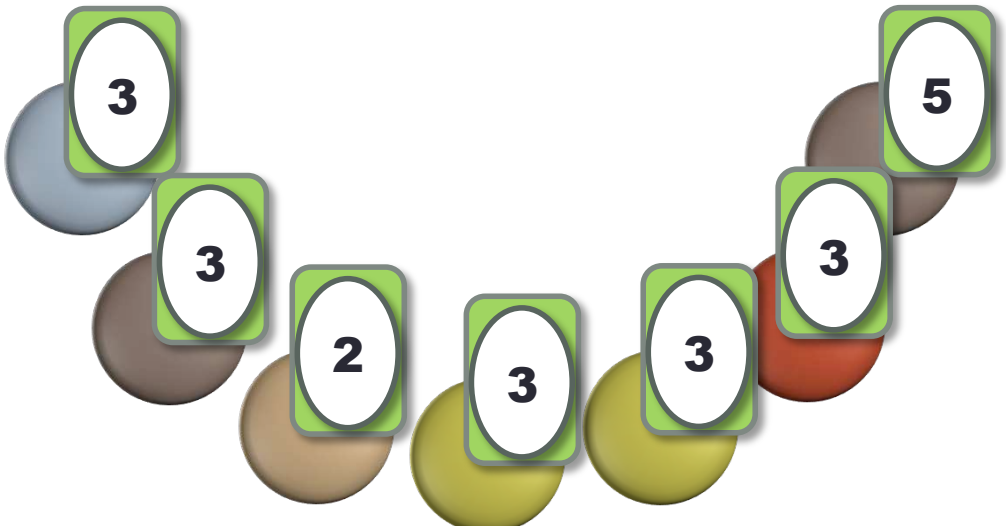


1. What did ***WE*** Achieve Yesterday **on Priority 1**?
2. Compared to our **Keystone**, how many Story Points did ***WE*** Achieve yesterday **on Priority 1**?
3. What will ***WE*** Achieve Today **on Priority 1**?
4. Is anything blocking or jeopardizing ***OUR*** progress **on Priority 1**?

Example

Forecast	In Progress	DONE
P1		
P2		
P3		

Mon	Tue	Wed	Thu	Fri
3	3	5		
	3	1	2	
			8	1



Example

Forecast	In Progress	DONE
		P1
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Mon	Tue	Wed	Thu	Fri
3	3	5		
	3	1	2	
			8	1

The Fourth Question causes…

- …swarming on the highest priority.
- …the Team practice Story Points daily.
- …the Team to self-police the quality of the DSU.
- …everyone to stay engaged throughout DSU.
- …people who don't understand Story Points to speak up.

THE ORIGINAL 8 METRICS

Creating cross-team clarity & conversation

The Original Metrics & The Math

1. **Velocity – How much Value do we deliver per Sprint?**
2. **Work Capacity – How much effort can we expend in a Sprint?**
3. **Focus Factor – What percentage of our Effort becomes Value?**
4. **Adopted Work – How much work do we add to the Sprint after Planning?**
5. **Found Work – How much unexpected work is associated with our SBIs?**
6. **Velocity Increase – How much better are we now than when we began?**
7. **Estimation Accuracy – When we estimate X=5pts, how often are we right?**
8. **Forecast Accuracy – How much of our ability does our Forecast represent?**

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The Original Metrics & The Math

1. **Velocity – How much Value do we deliver per Sprint?**
   - ∑OE[2] for SPO[5] Approved Work
2. **Work Capacity – How much effort can we expend in a Sprint?**
   - ∑DSU[1] Votes
3. **Focus Factor – What percentage of our Effort becomes Value?**
   - Velocity ÷ Work Capacity
4. **Adopted Work – How much work do we add to the Sprint after Planning?**
   - (∑OE[2] for Work Pulled Forward Mid-Sprint) ÷ OF[3]
5. **Found Work – How much unexpected work is associated with our SBIs?**
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   - OF[3] ÷ (∑OF[3] + ∑Adopted (pts) + ∑Found (pts))

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Example: Velocity & Capacity

Original Estimates

P1

P2

P3

Work Invested

Mon	Tue	Wed	Thu	Fri
3	3	5		
	3	1	2	
			8	1

Example: Velocity & Capacity

Original Estimates	Work Invested	SPO Accepted
5	11	Yes
5	6	Yes
3	9	No
5 + 5	11 + 6 + 9	

Velocity Capacity

Velocity is the sum of the Original Estimates for all work approved by the SPO by the end of the Sprint.

Work Capacity is the sum of all Daily Stand-Up votes for daily complexity resolution whether the SPO ultimately accepts the Sprint Backlog Item or not.

Example: Focus Factor

$$\frac{\text{Velocity}}{\text{Work Capacity}} = \frac{5 + 5}{11 + 6 + 9} = 38.5\%$$

Focus Factor is a measure of how much of the Team's effort becomes requested Value.

Example: Found vs. Adopted Work

	Work Type	Original Estimates	Work Invested	Found Work
P1	Planned	5	11	5
P2	Planned	5	6	0
P3	Adopted	3	9	4

Found Work occurs when the Original Estimate was too low.

Adopted Work occurs when the Team finishes their Forecast early.

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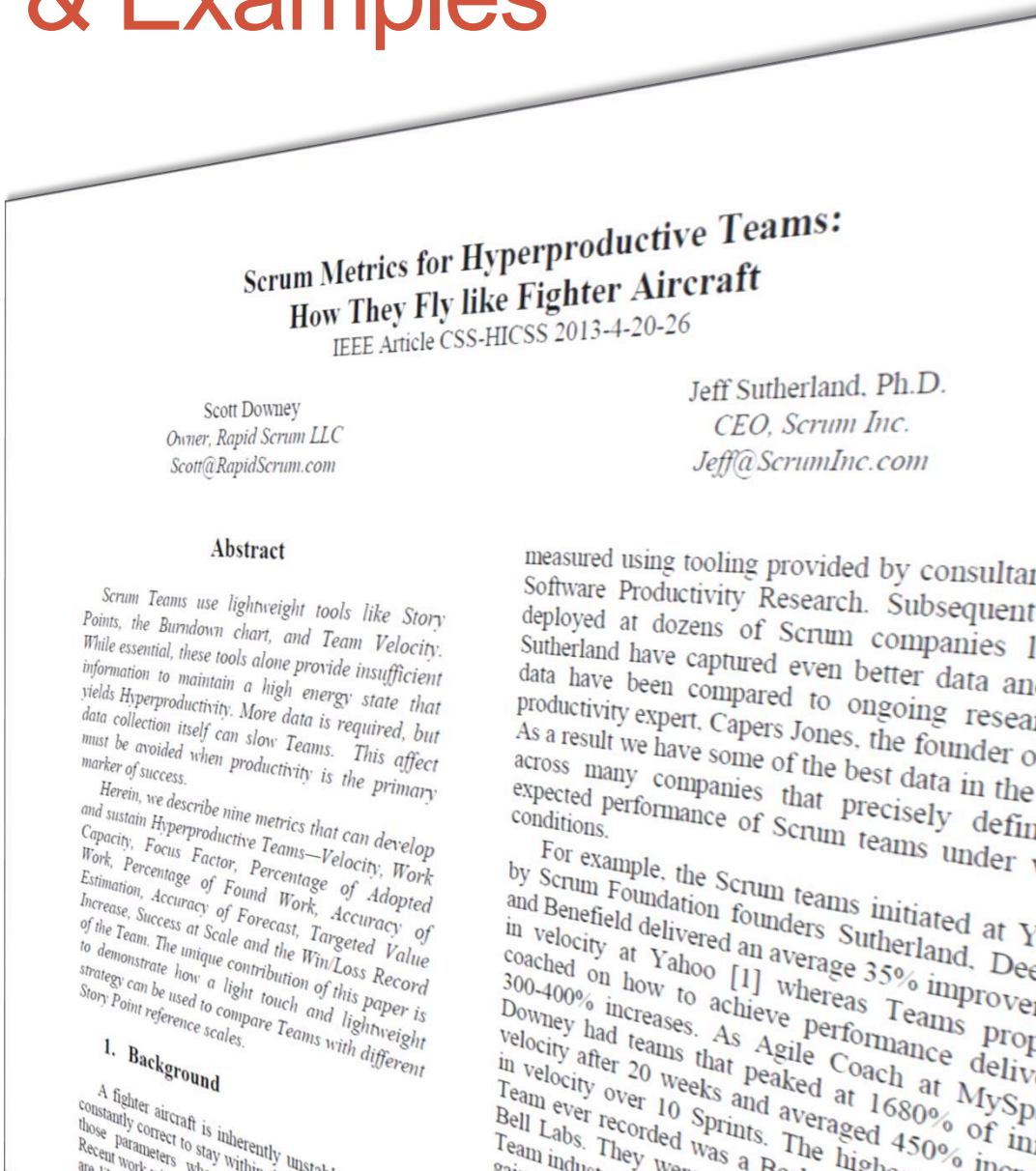
Further Reading & Examples

http://www.scruminc.com/wp-content/uploads/2014/05/Hyper-Productive-Metircs.pdf



Scrum Metrics for Hyperproductive Teams: How They Fly like Fighter Aircraft

IEEE Article CSS-HICSS 2013-4-20-26

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Abstract

Scrum Teams use lightweight tools like Story Points, the Burndown chart, and Team Velocity. While essential, these tools alone provide insufficient information to maintain a high energy state that yields Hyperproductivity. More data is required, but data collection itself can slow Teams. This affect must be avoided when productivity is the primary marker of success.

Herein, we describe nine metrics that can develop and sustain Hyperproductive Teams—Velocity, Work Capacity, Focus Factor, Percentage of Adopted Work, Percentage of Found Work, Accuracy of Estimation, Accuracy of Forecast, Targeted Value Increase, Success at Scale and the Win/Loss Record of the Team. The unique contribution of this paper is to demonstrate how a light touch and lightweight strategy can be used to compare Teams with different Story Point reference scales.

1. Background

A fighter aircraft is inherently unstab
constantly correct to stay within
those parameters
Recent work

measured using tooling provided by consultan
Software Productivity Research. Subsequent
deployed at dozens of Scrum companies
Sutherland have captured even better data an
data have been compared to ongoing resea
productivity expert, Capers Jones, the founder o
As a result we have some of the best data in the
across many companies that precisely defin
expected performance of Scrum teams under
conditions.

For example, the Scrum teams initiated at Y
by Scrum Foundation founders Sutherland, Dee
and Benefield delivered an average 35% improve
in velocity at Yahoo [1] whereas Teams prop
coached on how to achieve performance deliv
300-400% increases. As Agile Coach at MySp
Downey had teams that peaked at 1680% of in
velocity after 20 weeks and averaged 450% in
in velocity over 10 Sprints. The highe
Team ever recorded was a Re
Bell Labs. They were
Team indust

THE NEW METRICS

Creating even *more* opportunity for conversation

Some NEW Metrics & Formulas

1. **Caution, Clarity & Bravery** – Why are our estimates incorrect?
2. **The Happiness Metric** – How Happy is our Team?
3. **Kaizen Investment** – How much energy do we dedicate to continuous improvement?
4. **Honoring Priority** – How well do we put work in progress in priority order?
5. **Success at Scale** – How often do we succeed when work is of scale X?

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Some NEW Metrics & Formulas

1. **Caution, Clarity & Bravery** – Why are our estimates incorrect?
   1. Caution: What percentage of the Original Forecast was due to Anxiety Voting?
      - (∑(OE[2] Bucket Min – DSU[1] Votes for each SBI[4]) for all SBIs[4]) ÷ OF[3]
   2. Clarity: What percentage of the Original Forecast was seen Clearly during Planning?
      - (∑OE[2] (where OE Bucket Min <= ∑DSU Votes <= OE Bucket Max)) ÷ OF[3]
   3. Bravery: What percentage of the Team's Work Capacity was invested in underestimated SBIs?
      - (∑DSU[1] Votes – OE[2] Bucket Max) ÷ Work Capacity

2. **The Happiness Metric** – How Happy is our Team?
   - Team Votes on a Scale of 1-5 how happy they are with:
     1. Their Position within the Company (Averaged for all Team Members)
     2. The Company as a Whole (Averaged for all Team Members)

     NOTE: The Team then must discus what changes would make them happier in the next Sprint and take action to make it so!

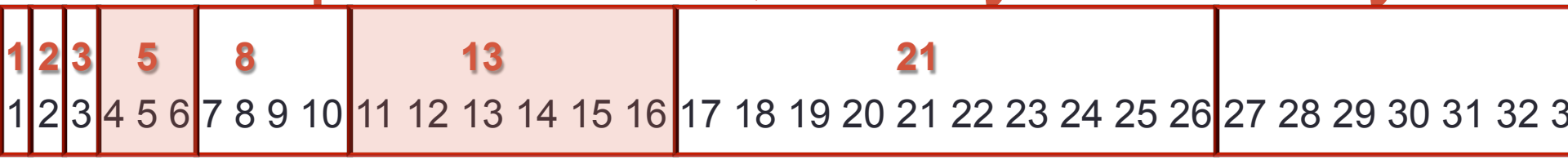
3. **Kaizen Investment** – How much energy do we dedicate to continuous improvement?
   - (∑Work Invested in Kaizen) ÷ Work Capacity

4. **Honoring Priority** – How well do we put work in progress in priority order?
   - ∑(∑Bad Relationships per SBI) for all SBIs ÷ (#SBIs x (#SBIs – 1))

5. **Success at Scale** – How often do we succeed when work is of scale X?
   - Number of SBIs[4] Accepted of scale X ÷ Number of Attempted SBIs[4] at Scale X

[1]DSU: Daily Stand-Up *[2]OE: Original Estimate* *[3]OF: Original Forecast* *[4]SBI: Sprint Backlog Item* *[5]SPO: Scrum Product Owner*

Example: Caution, Clarity & Bravery



	Original Estimates	Work Invested	Anxiety	Clarity	Bravery
Underestimated	5	11	0	6	5
Correctly Estimated	5	6	5	6	0
Underestimated	3	9	0	9	3
Overestimated	8	2	5	2	0
			5	17	11

33 pts.

Caution: 5 ÷ 33 = 15.15%

Clarity: 17 ÷ 33 = 51.52%

Bravery: 11 ÷ 33 = 33.33%

Example: Honoring Priority

	Days of the Sprint				
Priorities	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**
1	2	1	3		
2		3	3		
3		2	2	3	
4			3	5	
5				2	1

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4			3	5	
5	3	2			

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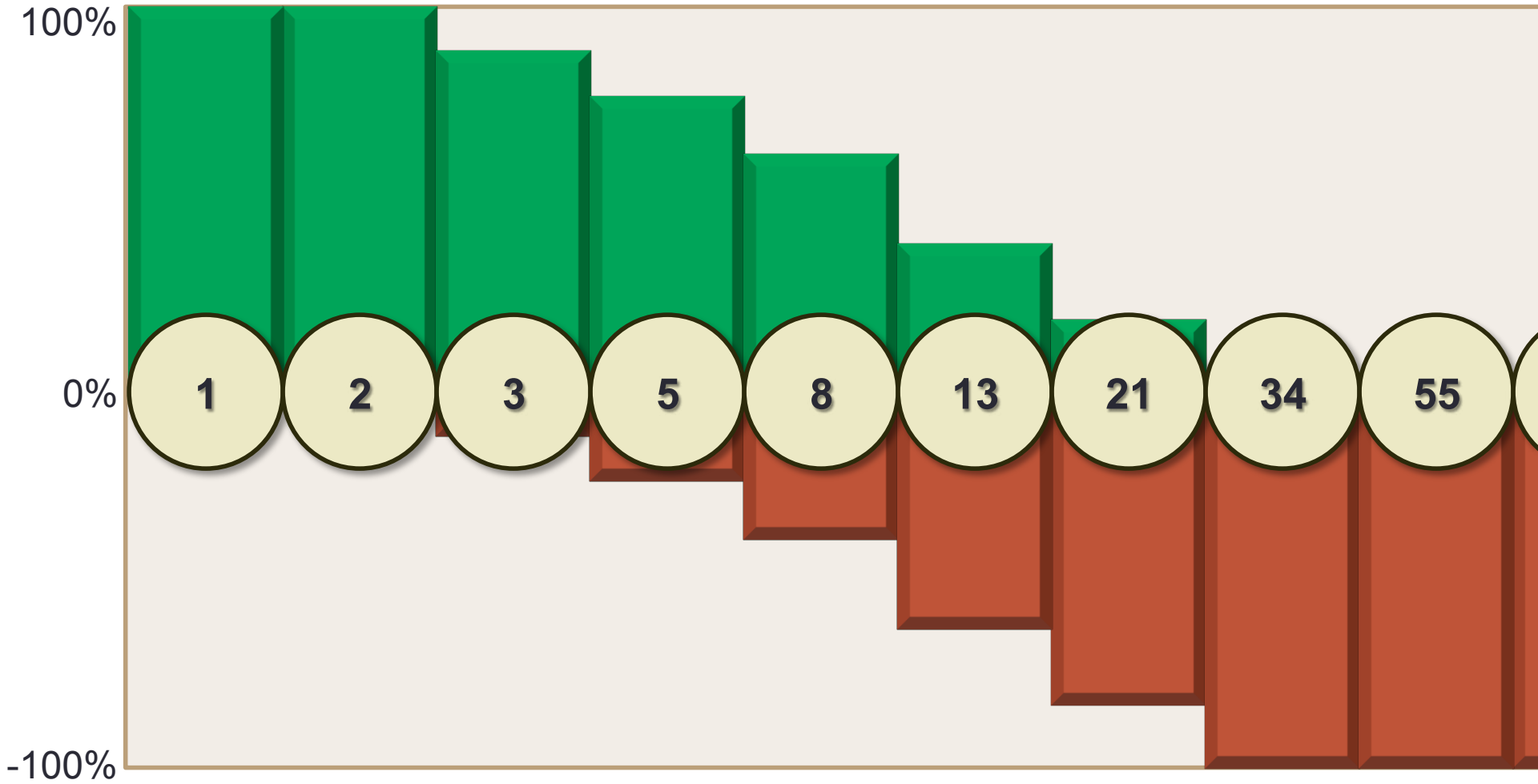
3				3	1
4			3	5	
5	3	2			

Example: Success at Scale

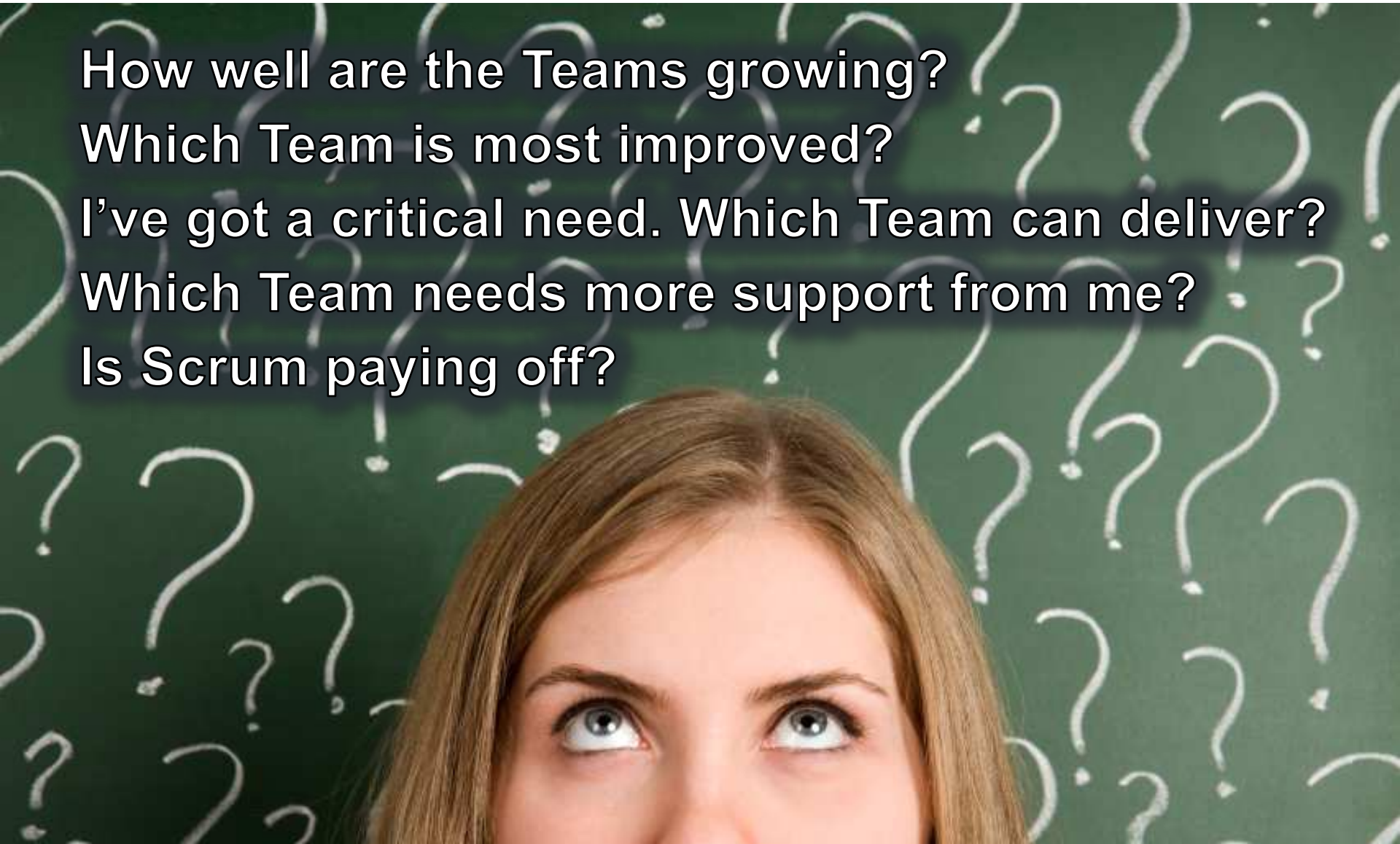
What scale of Backlog Item gives my Team the best chance for success?



A TALE OF TWO TEAMS

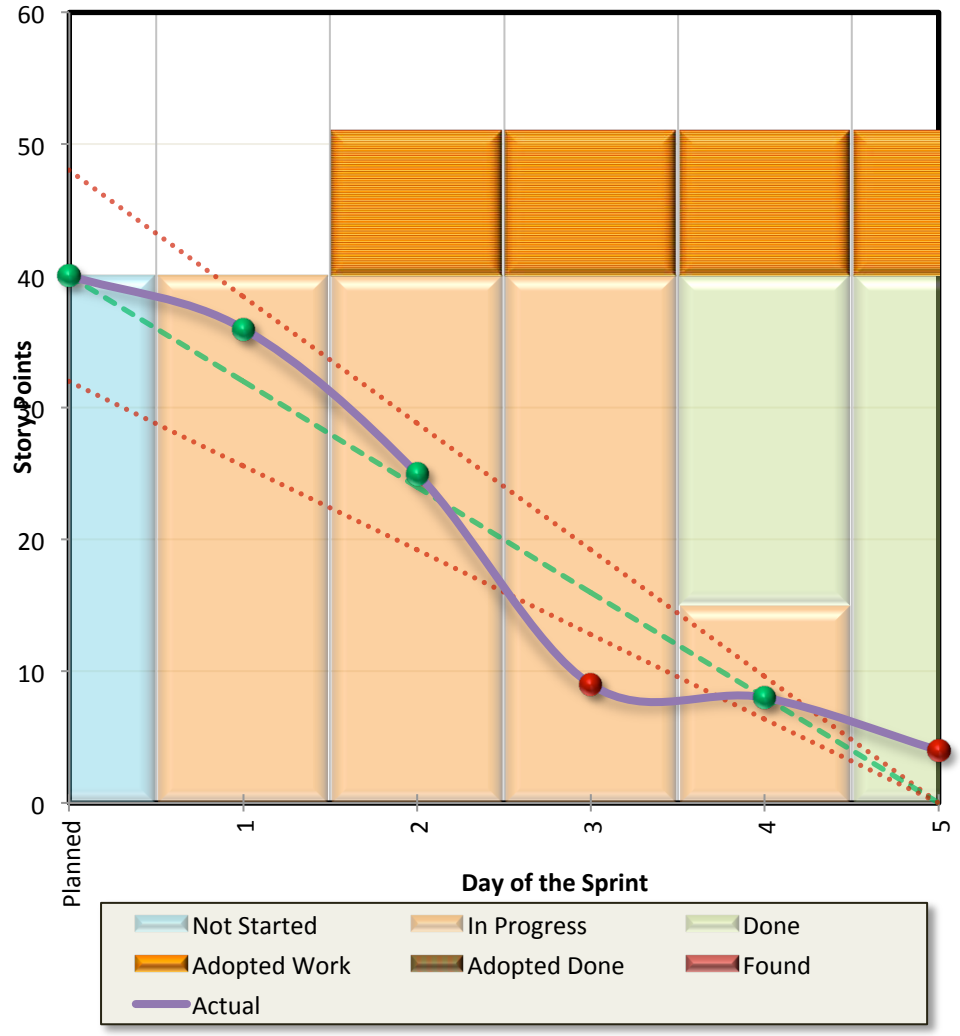
It was the best of Teams…

Comparing Two Teams

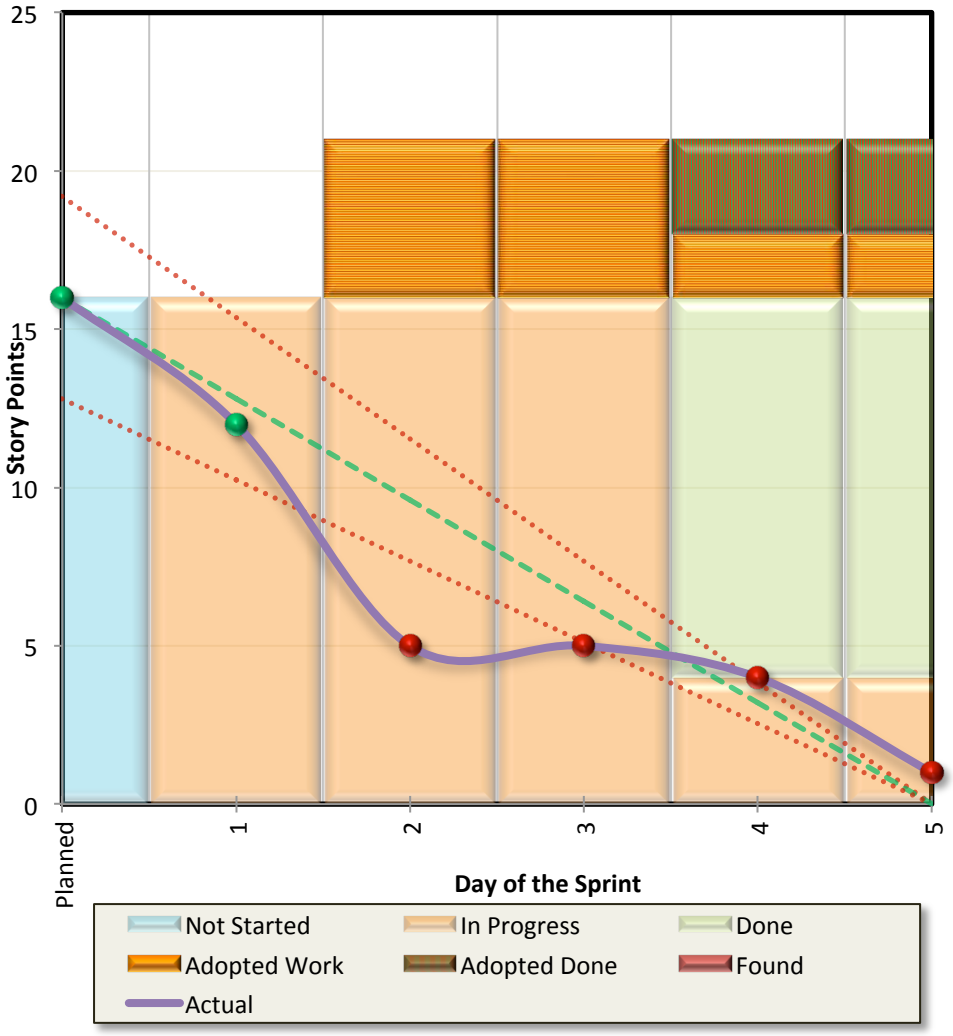


Comparison #1: Burndown Charts

Team Enterprise

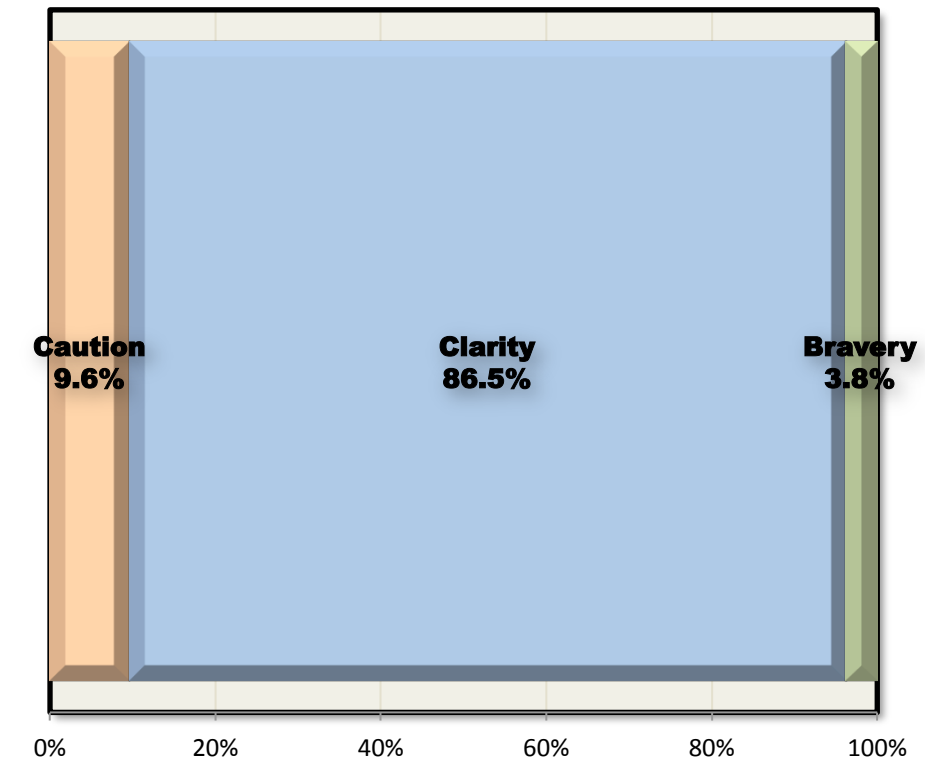


Team Brady Bunch



Comparison #2: Caution vs. Bravery

Team Enterprise



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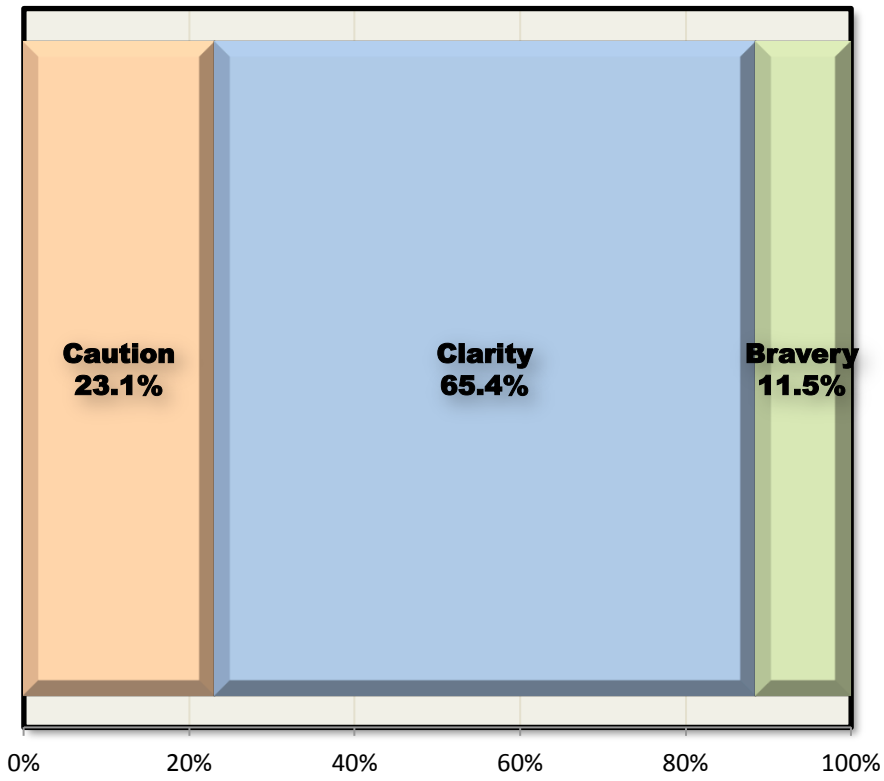
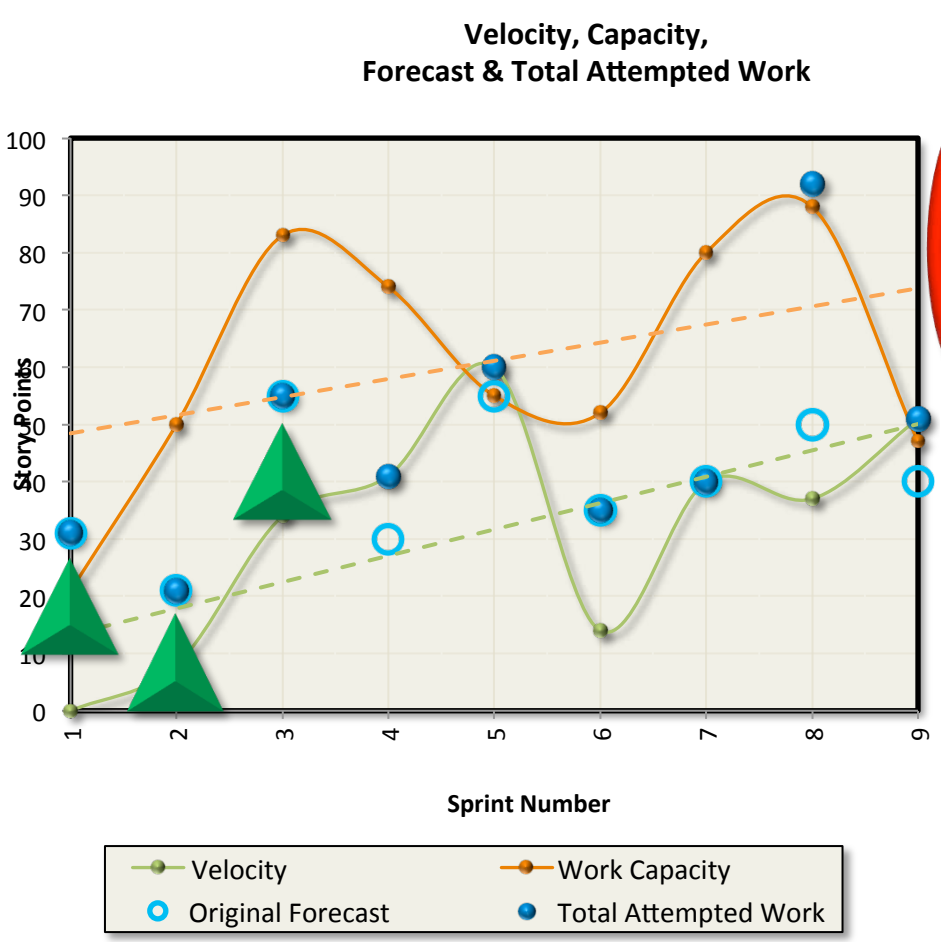


Comparison #3: Velocity & Capacity

Team Enterprise



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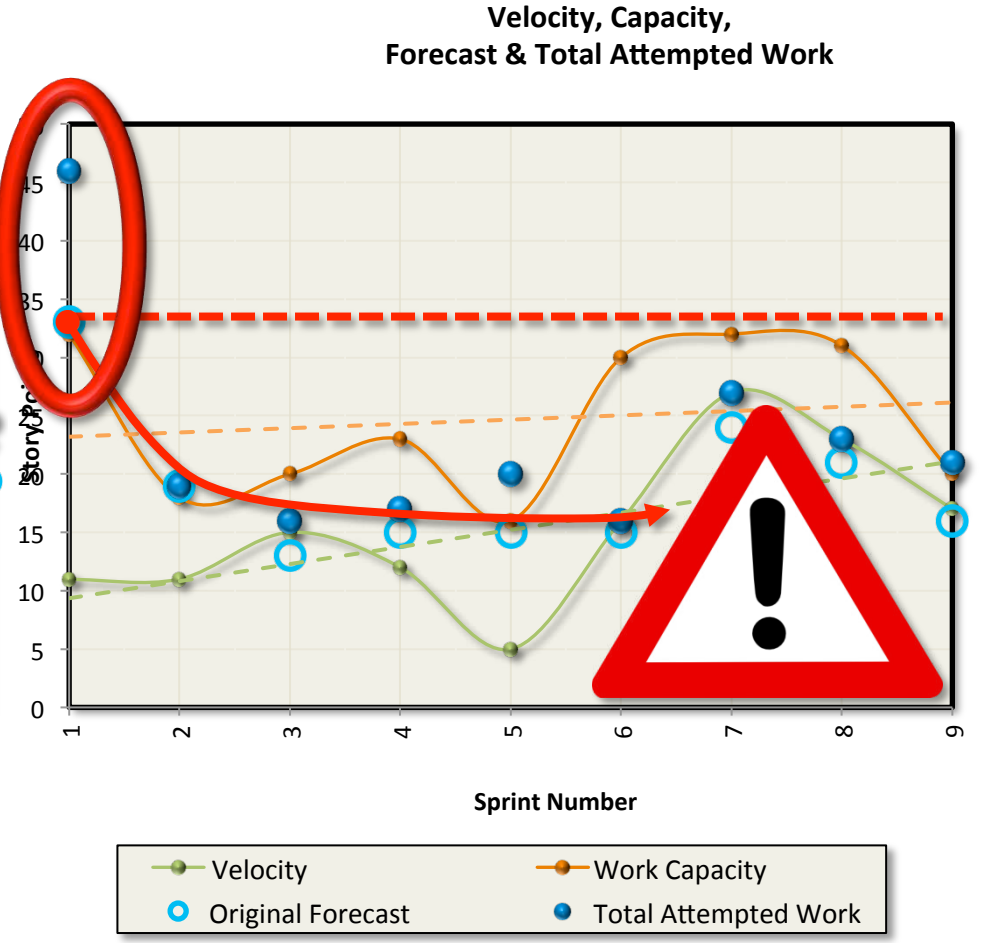
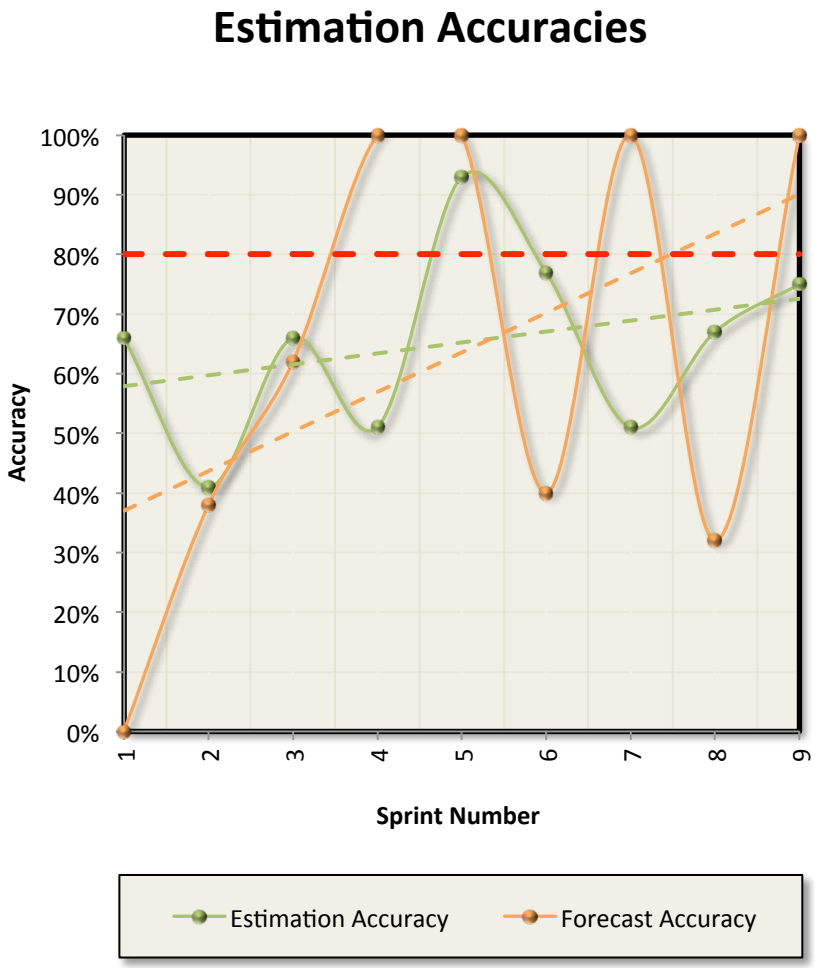


Comparison #4: Estimation Accuracy

Team Enterprise



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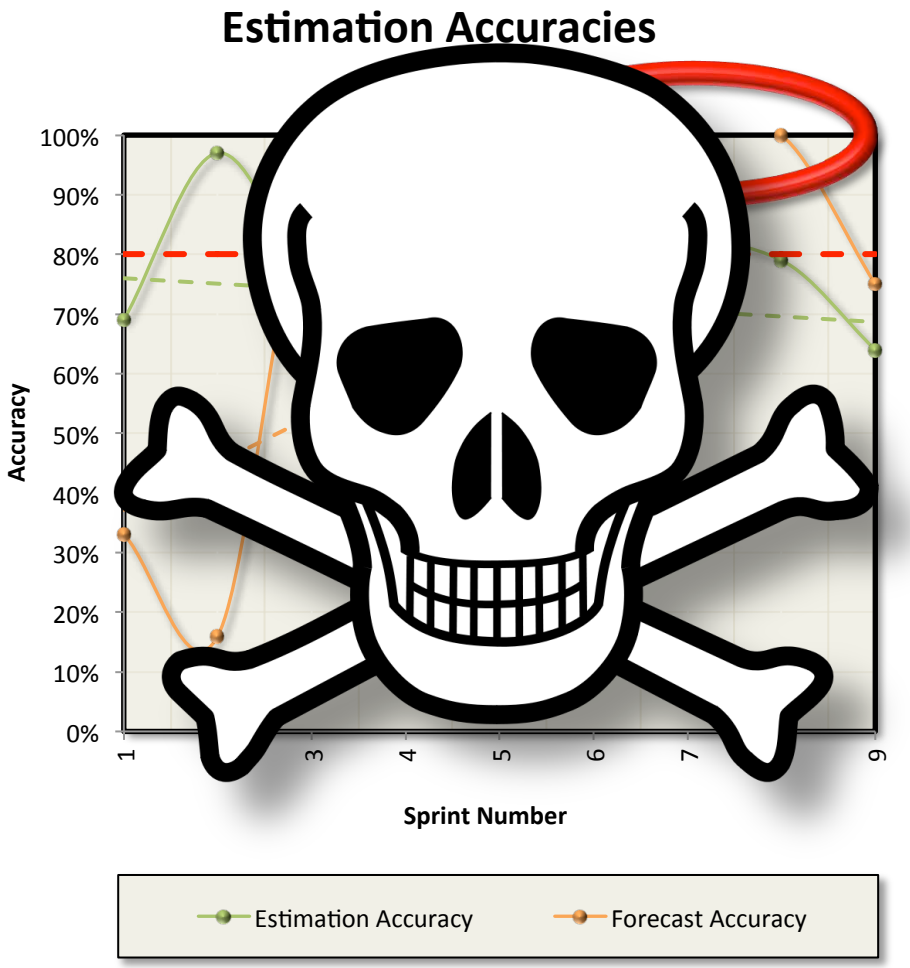
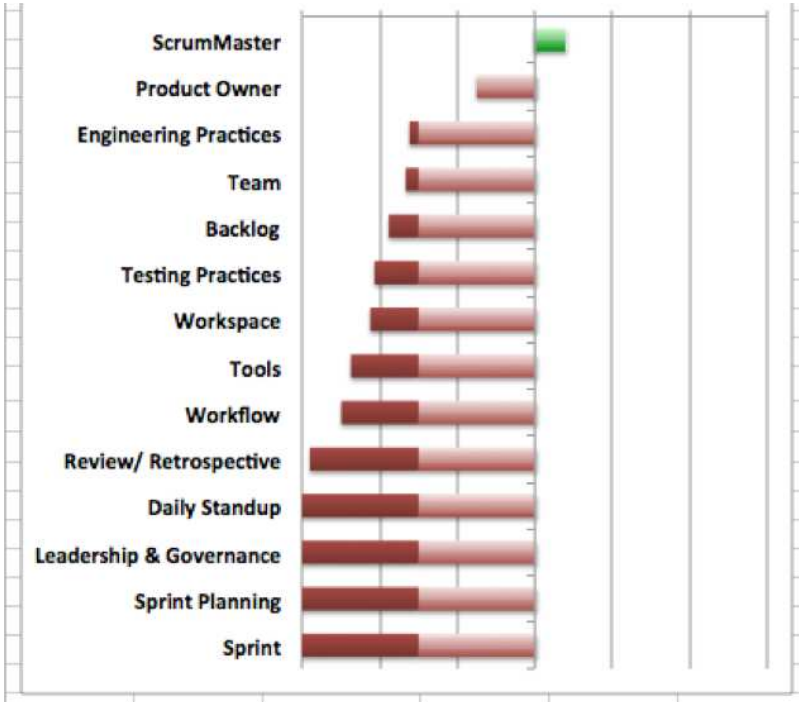


Comparison #5: The Numbers

	Team Enterprise	Team Brady Bunch
Velocity	500%	164%
Work Capacity	305%	81%
Focus Factor	67% (1.61:1)	65% (1.43:1)
Adopted	27%	17%
Found	20%	28%
Estimation Accuracy	73%	73%
Forecast Accuracy	74%	82%
Avg. SBI Size	33% of Velocity	22% of Velocity
Avg. Daily Achievement	33% of Forecast	27% of Forecast
Bravery	4%	12%
Caution	10%	23%
Volatility	17.3%	22.5%

Initial Team Assessment



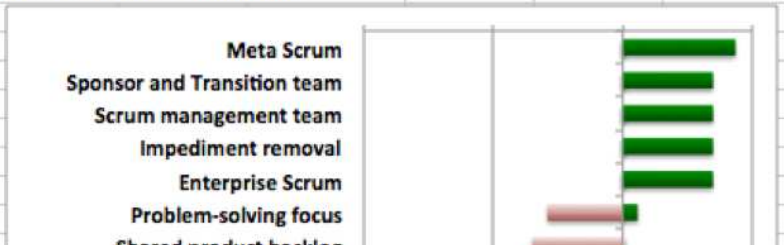
Top Levers for Improvement

	Category	Lever	Team
1	XII. TESTING PRACTICES	Testing within sprint	Team 1
2	XI. ENGINEERING PRACTICES	Continuous Integration	Team 1
3	XII. TESTING PRACTICES	Automated testing	Team 1
4	XII. TESTING PRACTICES	Regression testing	Team 1
5	VII. DAILY STANDUP MEETING	Impediments addressed	Team 1

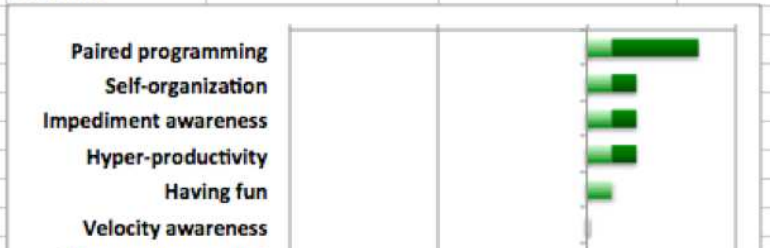
Key Strengths to Maintain and Expand

	Category	Lever	Team
1	II. SCRUMMASTER	Team empowerment	Team 1
2	XII. TESTING PRACTICES	Performance Optimizatic	Team 1
3	III. PRODUCT OWNER	Non-interupt	Team 1
4	XII. TESTING PRACTICES	Exploratory testing	Team 1
5	II. SCRUMMASTER	Active facilitation	Team 1

A. Leadership & Governance



B. Team



One Sprint Later

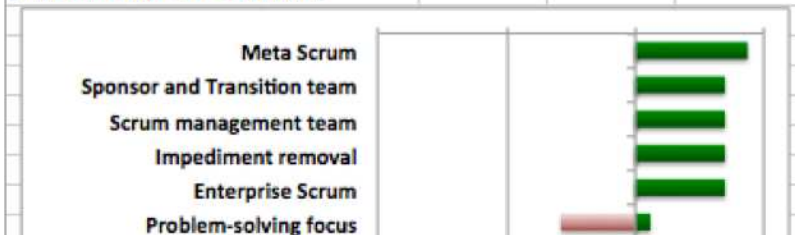
Top Levers for Improvement

	Category	Lever	Team
1	XI. ENGINEERING PRACTICES	Continuous Integration	Team 1
2	XII. TESTING PRACTICES	Automated testing	Team 1
3	XII. TESTING PRACTICES	Regression testing	Team 1
4	XII. TESTING PRACTICES	Testing within sprint	Team 1
5	XII. TESTING PRACTICES	Unit testing	Team 1

Key Strengths to Maintain and Expand

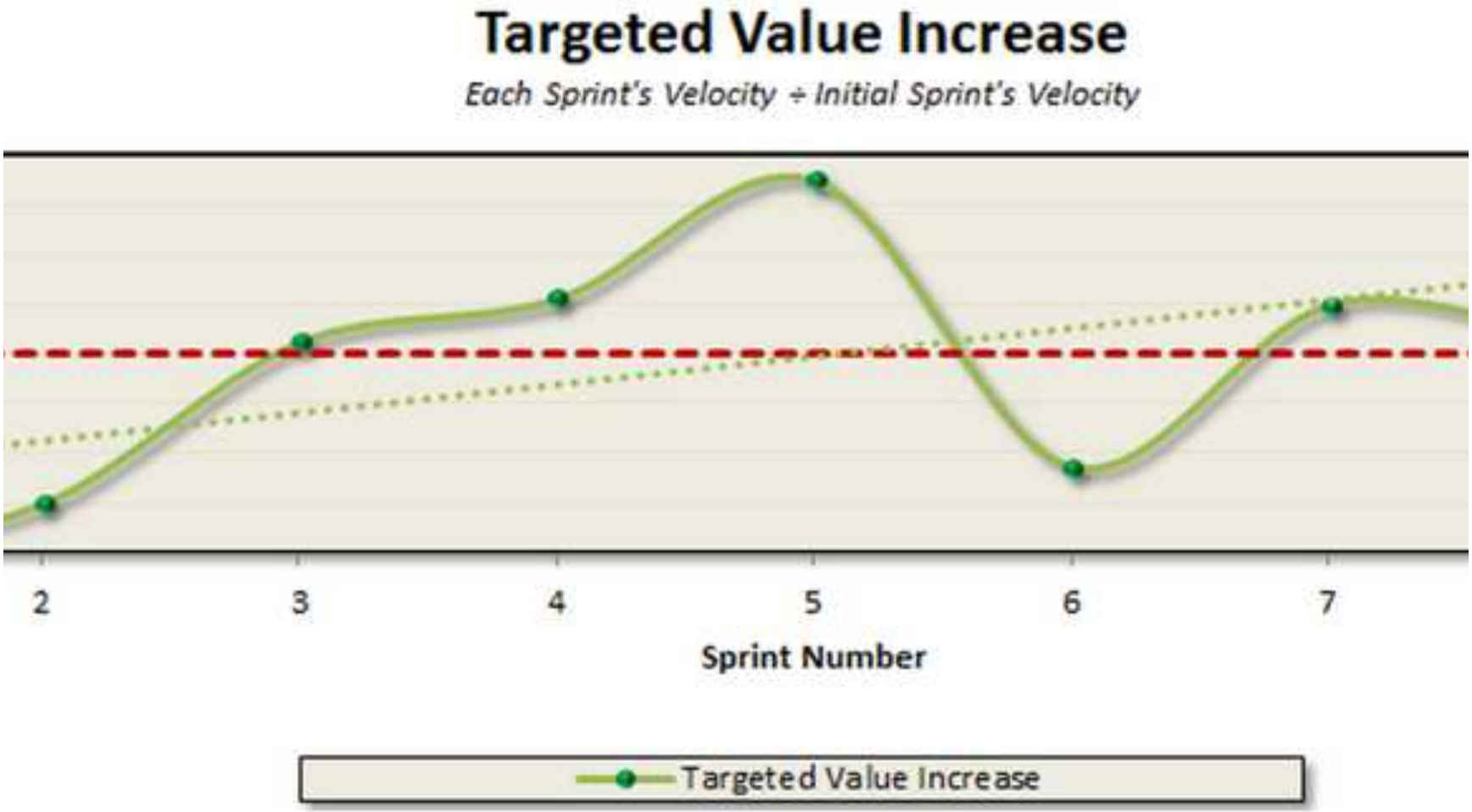
	Category	Lever	Team
1	VIII. SPRINT REVIEW AND RETROSPECTIV	Kaizen identified	Team 1
2	VI. SPRINT PLANNING MEETING	PO participation	Team 1
3	VI. SPRINT PLANNING MEETING	All stories estimated	Team 1
4	VII. DAILY STANDUP MEETING	Standing at board	Team 1
5	VIII. SPRINT REVIEW AND RETROSPECTIV	Whole team participates	Team 1

A. Leadership & Governance



B. Team

After a Few Sprints



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