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SE CZ 544 , Agile Software Process
CS-10 – Agile Metrics and Tools

Agile Metrics

- Examples:
  - Velocity, Lead time, Cycle time, Charts, Escape defects and so on.
- Helps to assess the quality of a product and track team performance.

- The Concept:
  - Define Metrics that can be used by Agile teams and Team management, Agile metrics that matter.
- The Opportunity
  - Reduced costs, Increase Product Quality, Increased team satisfaction
- The Potential
  - Auto Generate using exposed APIs provided by various PM tools.

Source: Prachi Maini, Manager, QA Engineering, Morningstar, Inc.

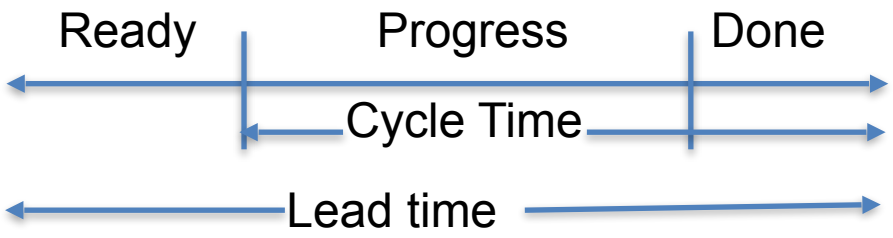
Quantitative & Qualitative Metric

- Quantitative Metric
  - Measurement number: Lead time, Number of defects ….
- Qualitative Metric
  - Based on subjective opinion: Maintainability, Team happiness index …

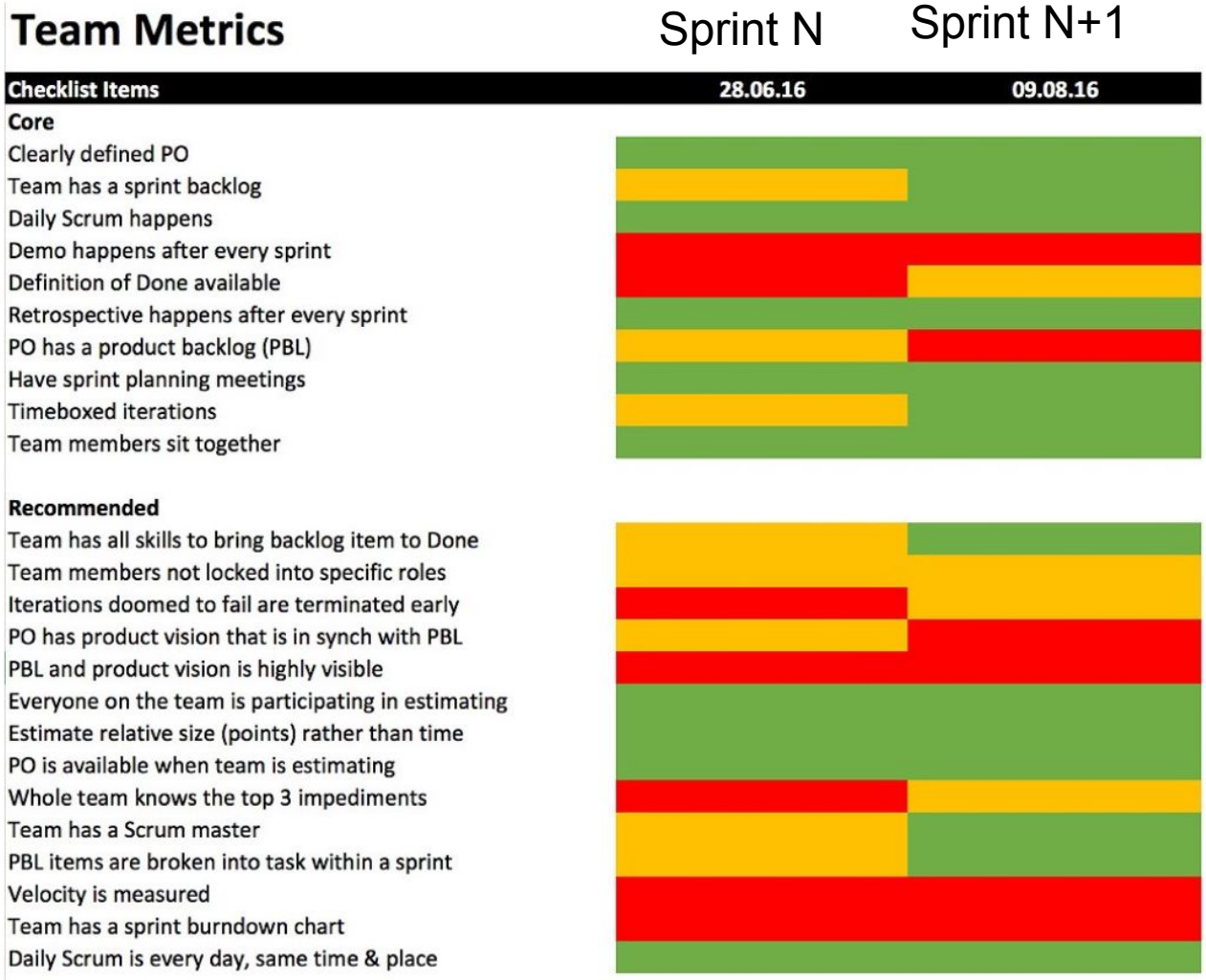
Source:https://www.infoq.com/articles/metrics-agile-teams/

An example Quantitative Metric

- Example: **Lead time** is a useful quantitative statistic for evaluating team performance.
- Determinant metrics:
  - A set of measurements related to a specific measurement
  - **Associated metrics:**
  - Flow efficiency (wait time)
  - Speeding tickets(%), (Tickets moves through multiple statuses)
  - Total sprint completion (Committed vs Actual Story points)
  - Defects returned from QA(%)
  - Escape defects(%)
  - Bug fixing Vs working on feature (% time)



An example - Good Qualitative Agile Metrics: Team Adoption to Agile



Green: It worked for the team.

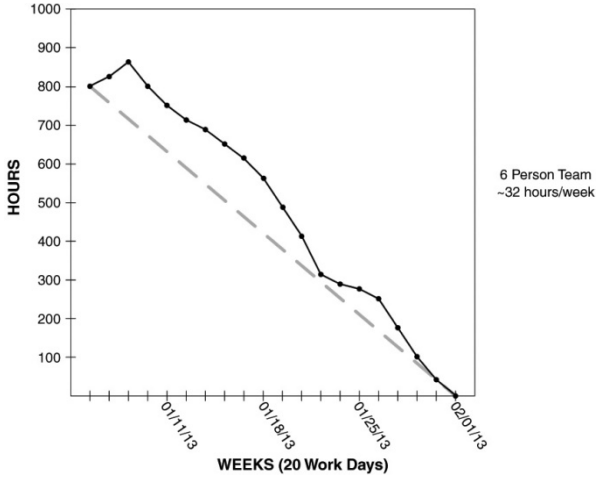
Orange: Room for improvement.

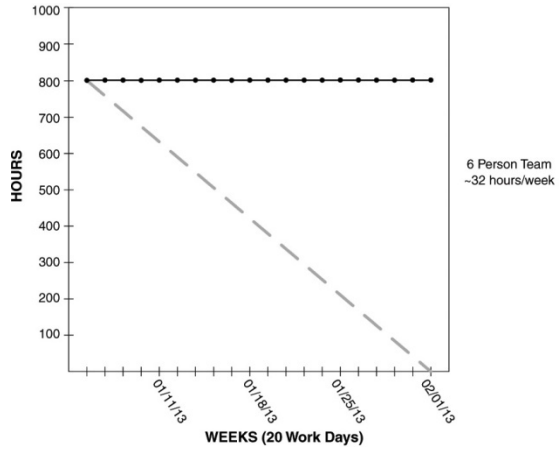
Red: Didn't apply or the practice is failing

https://www.crisp.se/wp-content/uploads/2012/05/Scrum-checklist.pdf

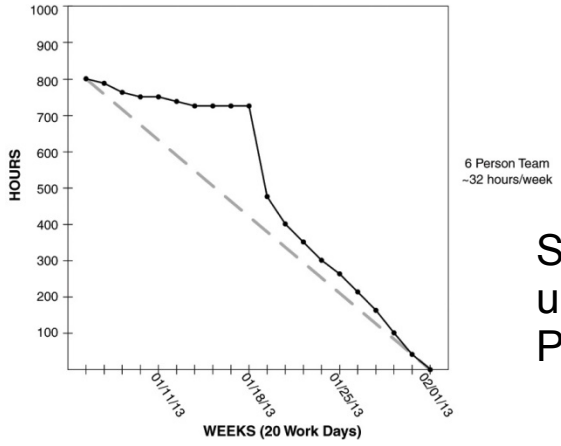
WHAT ARE SOME TRENDS OF BURNDOWN CHARTS AND WHAT DO THE PATTERNS INDICATE?

Uptick: New tasks/Stories added. Issue if continues.

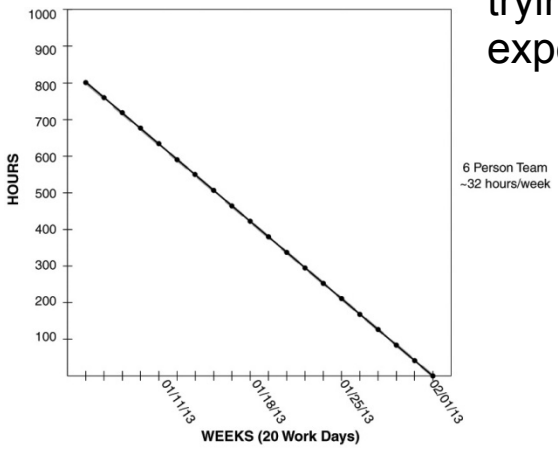




Flatline: Multiple reasons. Impediments, Task/Stories added at the same rate as work complete.



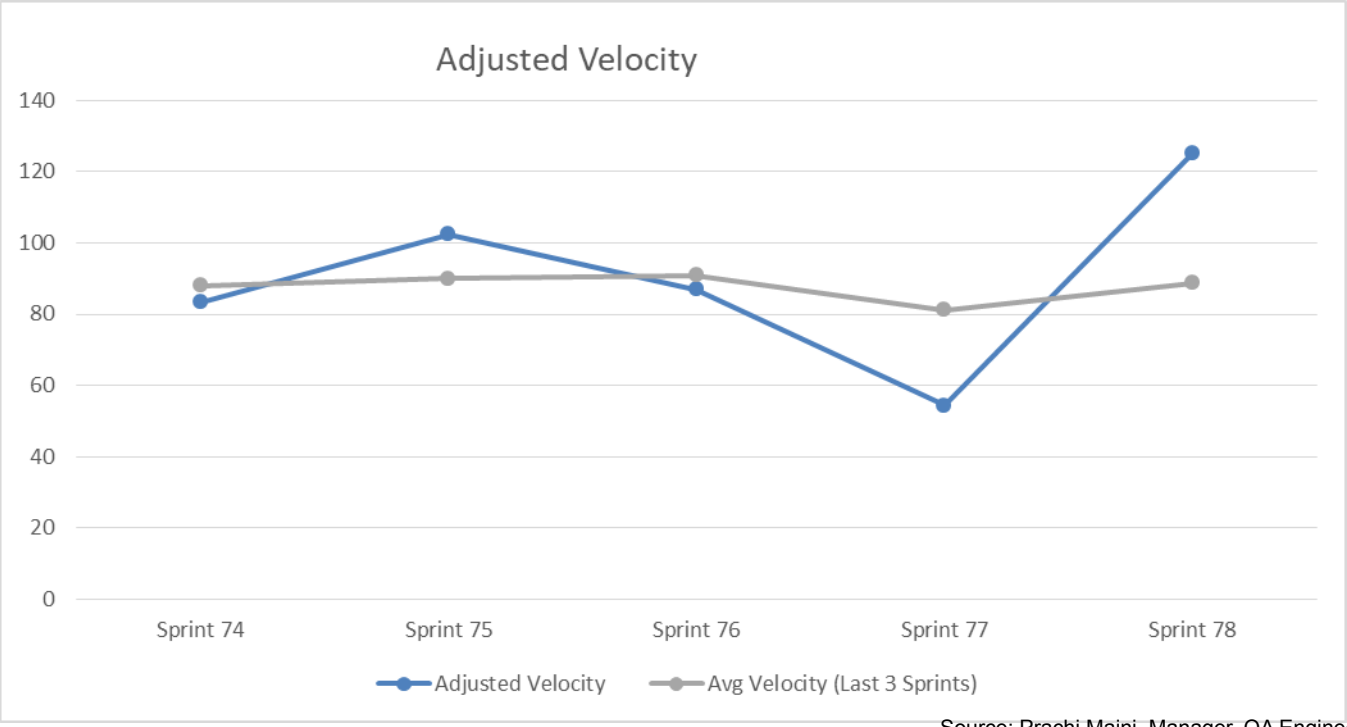
Sharpdrop: Team not updating the chart/ Pointed removed



Perfect line: Team trying to align with expectations

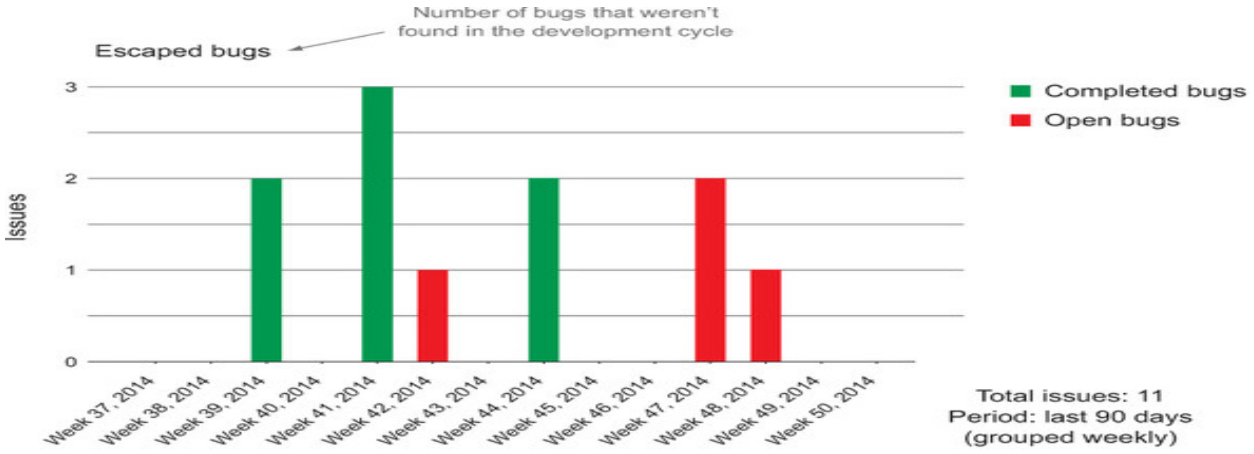
Velocity

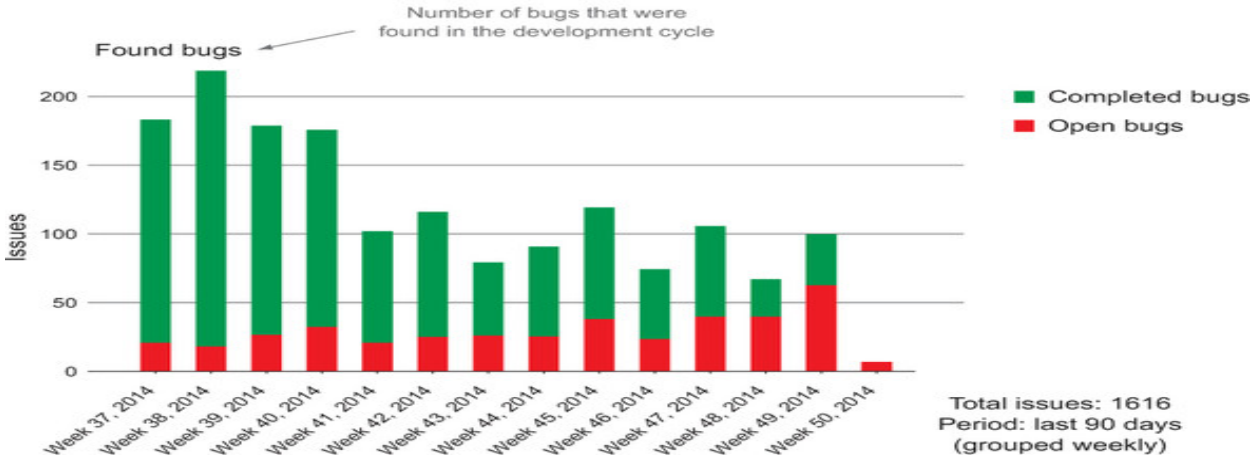
Capacity	Sprint 74	Sprint 75	Sprint 76	Sprint 77	Sprint 78
Team Size	8	8	8	8	8
Available Days	80	80	80	80	80
Unavailable Days	10	12	11	5	0
Net Days (Capacity)	70	68	69	75	80
Velocity					
Total Points Completed	73	87	75	51	125
Adjusted Velocity	83	102	87	54	125
Avg Velocity (Last 3 Sprints)	88	90	91	81	89



Source: Prachi Maini, Manager, QA Engineering, Morningstar, Inc.

Bug counts





Source: Agile Metrics in Action: How to measure and improve team performance by Christopher W. H. Davis , Published by Manning Publications, 2015

Summary

- Metrics never convey the whole picture. Management by metrics and dashboards needs to be supplemented with management **by context and conversations**.
- Stop measurements that lead to counterproductive behavior and stop at measurements (i.e., don't continue to targets) that lead to desired behavior.
- Prefer outcome-oriented metrics to activity-oriented ones. Prefer aggregate metrics to fine-grained ones.
- Get comfortable with lagging (or trailing) indicators. When fast feedback is available, lagging indicators are a reliable alternative to speculative leading indicators.

Q1

https://forms.gle/jWqnUxRgTDg83phf9

Project Progress

- Burndown Chart
  - Graphical representation of work remaining vs time.
- Committed vs Completed
  - The percentage of points completed by the squad as a percentage of the committed points for the sprint
- Tech Category
  - This helps identify how an agile team is spending its time. The possible values for tech category can be client customization, new product development, operations or maintenance.

What To Watch For

- ✓ The team finishes early sprint after sprint because they are not committing enough points
- ✓ The team is not meeting its commitment because they are overcommitting each sprint.
- ✓ Burndown is steep rather than gradual because work is not broken down into granular units.
- ✓ Scope is often added or changed mid-sprint.
- ✓ Time spent on Feature<>Defects

Source: Prachi Maini, Manager, QA Engineering, Morningstar, Inc.

Q2

https://forms.gle/7FvNAirb5Qnv8Drf8

Quality of Code

- First Pass Rate
  - Used for measuring the amount of rework in the process
  - Defined as number of test cases passed on first execution.

    FPR = Passed\Total on First Execution
  - For stories that deal with the development of new APIs or Features
  - For stories that deal with addendums to APIs or Features FPR should include regression.

What To Watch For

- Lower first pass rates indicate that Agile tools like desks checks , unit testing are not used sufficiently.
- Lower first pass rate could indicate lack of understanding of requirements.
- Higher first pass rate combined with high defect rate in production could indicate lack of proper QA.

Source: Prachi Maini, Manager, QA Engineering, Morningstar, Inc.

Q3

https://forms.gle/zkRxgknW7knAtzkp9

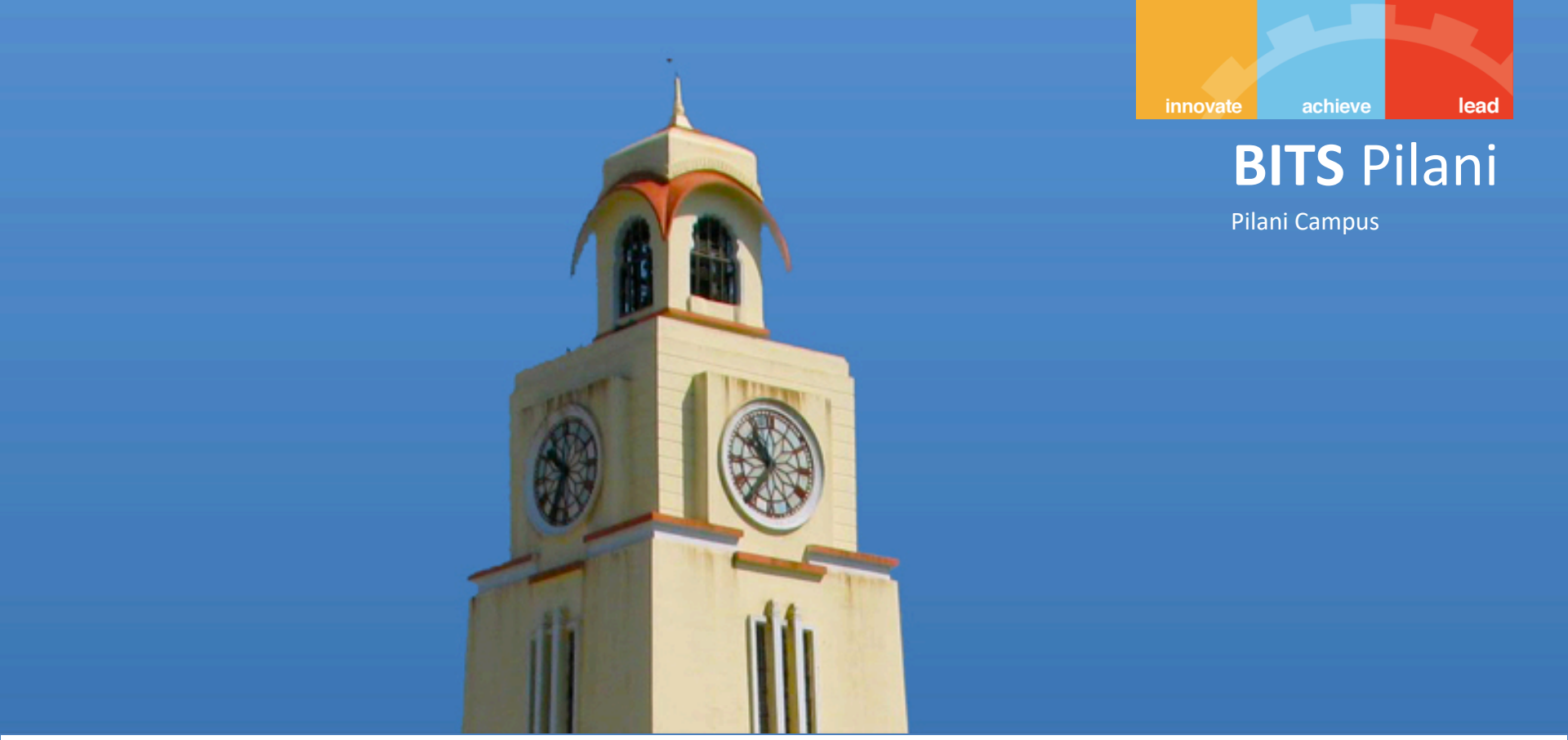
Bug Dashboard

- **Net Open Bugs / Created vs Resolved**
  - This gives a view of the team flow rate. Are we creating more technical debt and defects than what the team can resolve.
- **Functional Vs Regression Bugs Trend**
  - This helps identify the defects found in new development vs regression.
- **Defects Detected in**
  - This helps identify the environment in which the defect is detected. (QA, Staging, UAT, Production)
  - For defects detected in environment higher than QA, an RCA is needed.

What To Watch For

- An increase in regression bug count indicates the impact of code refactoring.
- An increase bug count in non-QA environment due to environment differences requires revisiting the environment strategy.
- An increase bug count in non-QA environment due to QA oversight requires revisiting the testing strategy.

Source: Prachi Maini, Manager, QA Engineering, Morningstar, Inc.



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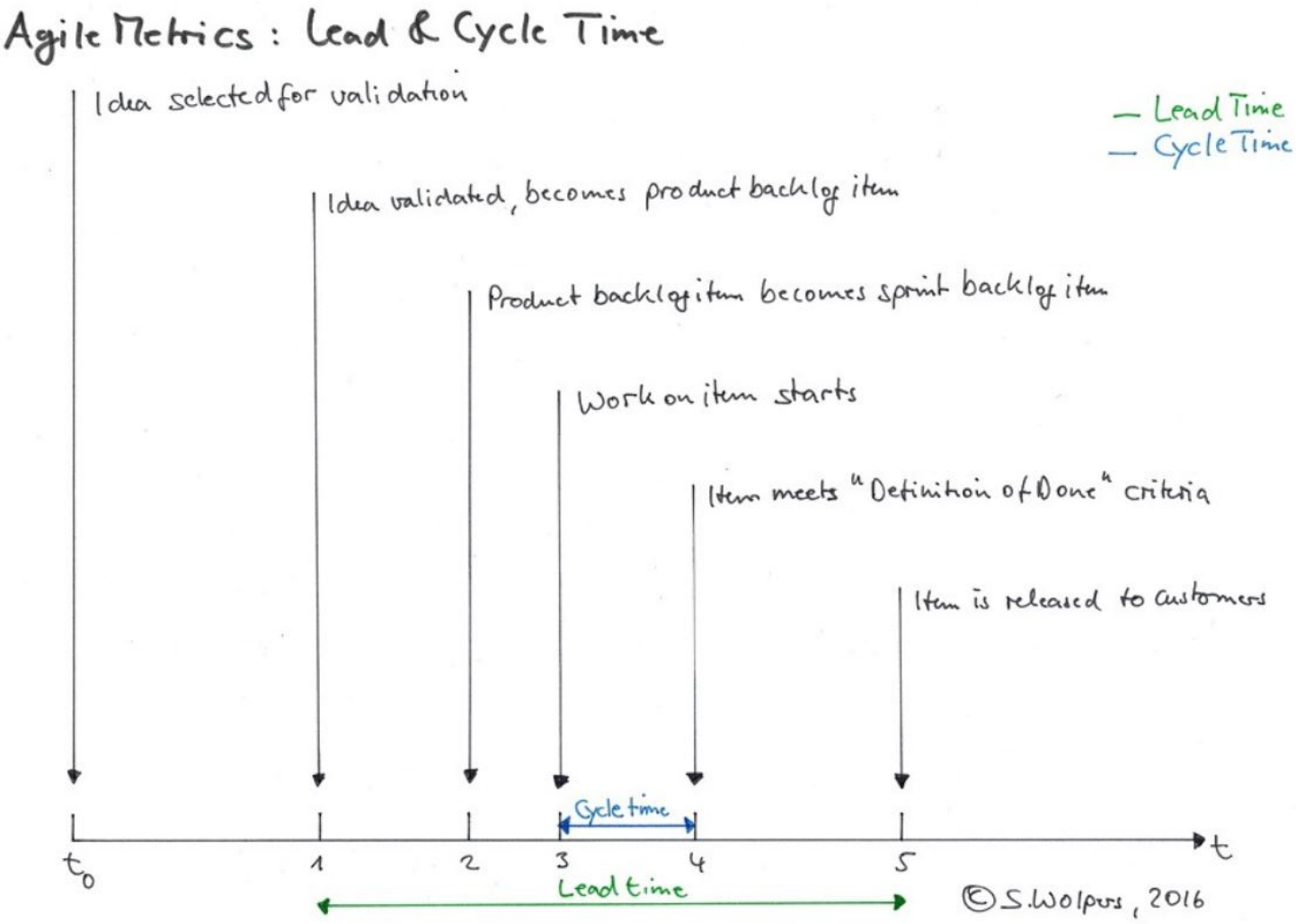
Additional Notes - Measuring Agile Performance

Good Quantitative Agile Metrics: Lead Time and Cycle Time



Important to measure the things that drive/determine Lead Times. Levers that teams can actively (e.g. determinant metrics like Flow Efficiency).

Most common and meaningful metrics for Team SI

Simple SI metrics	Metric	Comment
Overall SI goal metrics	Lead Time, Cycle Time	Good measures of overall Time to Value
Determinant metrics:		
Best practice and tool use	Speeding tickets (%)	Tickets that have been moved through multiple Statuses (e.g. in Jira) after the event (so there is no real visibility of workflow stages)
Timing accuracy	Total Sprint Completion (%)	Percentage of completed story points for a given sprint(s). The factor takes into account story points added once a sprint has started.

Source:https://www.infoq.com/articles/metrics-agile-teams/

Most common and meaningful metrics for Team SI …

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Simple SI metrics	Metric	Comment
Productivity	Flow efficiency (%)	Percentage of time spent active versus inactive within a workflow
	Return rate (%)	Percentage of tickets returned from QA (for whatever reason) during the dev process. This generates Rework.
	% Time bug fixing (**The ratio of fixing work to feature work.)**	Percentage of time a team spends bug fixing versus feature contribution.
	Number of defects escaping to production.	This is category of fixing the work.

Source:https://www.infoq.com/articles/metrics-agile-teams/

Most common and meaningful metrics for Team SI …

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Simple SI metrics	Metric	Comment
Team Wellness	Team Happiness Team Sprint Effectiveness Rating	Self Assessment tests: Individual engineers polled each Sprint/cycle.

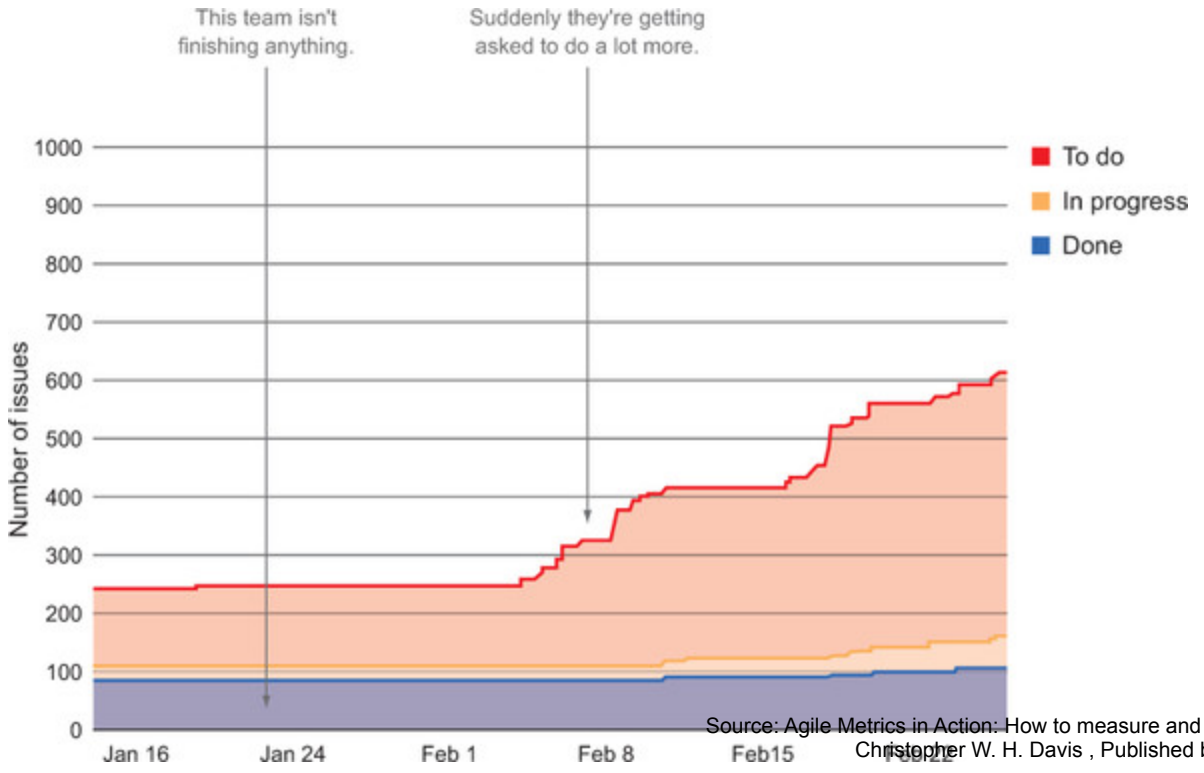
Source:https://www.infoq.com/articles/metrics-agile-teams/

The Importance of Metrics to Agile Teams

- The philosophy of Continuous Improvement (CI) is central to Agile.
- CI- should not be imposed and driven top-down – instead it should be led by Agile teams themselves, so Self-Improvement (SI) is a more suitable terminology.
- SI is hard requires organization leadership long term support, recognition and suitable framework. Crucially,
  - **A set of meaningful and agreed Agile metrics to** track performance improvement over time; **and a means to surface these metrics in near real time**, with minimum/no effort involved for the teams themselves.
  - Keep metrics **simple and deterministic (no ambiguity).**
  - For each of these metrics, it is the *trend* that is important, not an absolute number. The trend will tell you if your attempts at improvement are having an effect.

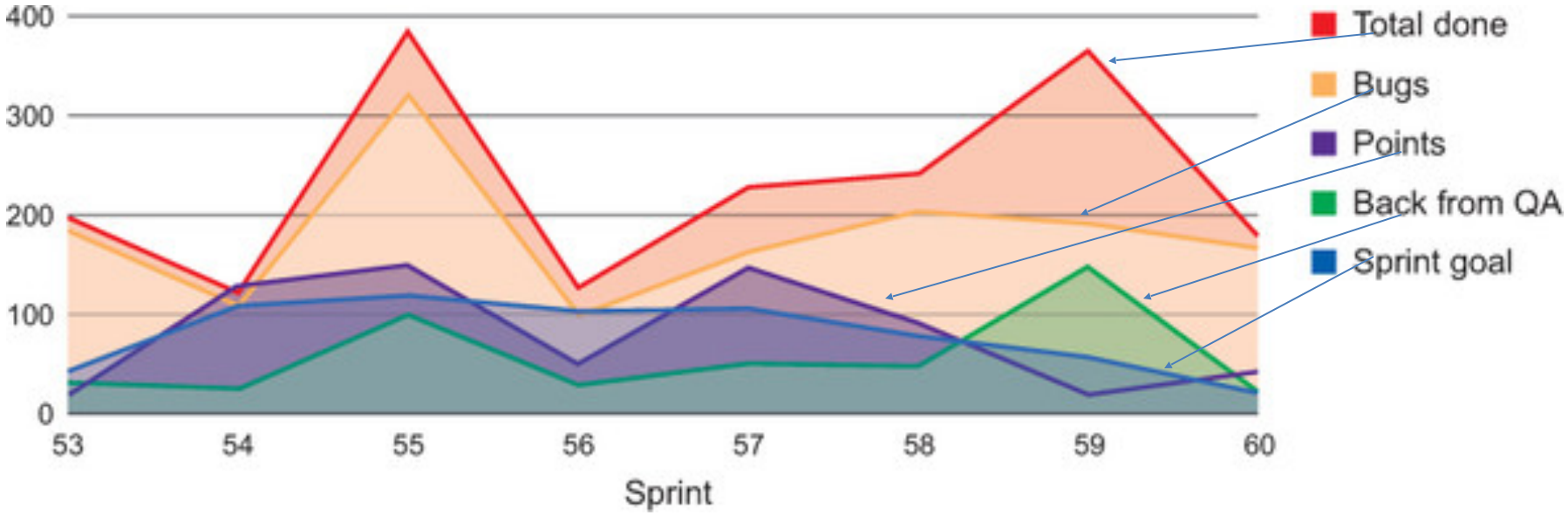
Cumulative Flow

- An example cumulative flow diagram showing a team getting asked to do a lot more than they have been able to accomplish historically



Source: Agile Metrics in Action: How to measure and improve team performance by Christopher W. H. Davis , Published by Manning Publications, 2015

Example - Combination of data

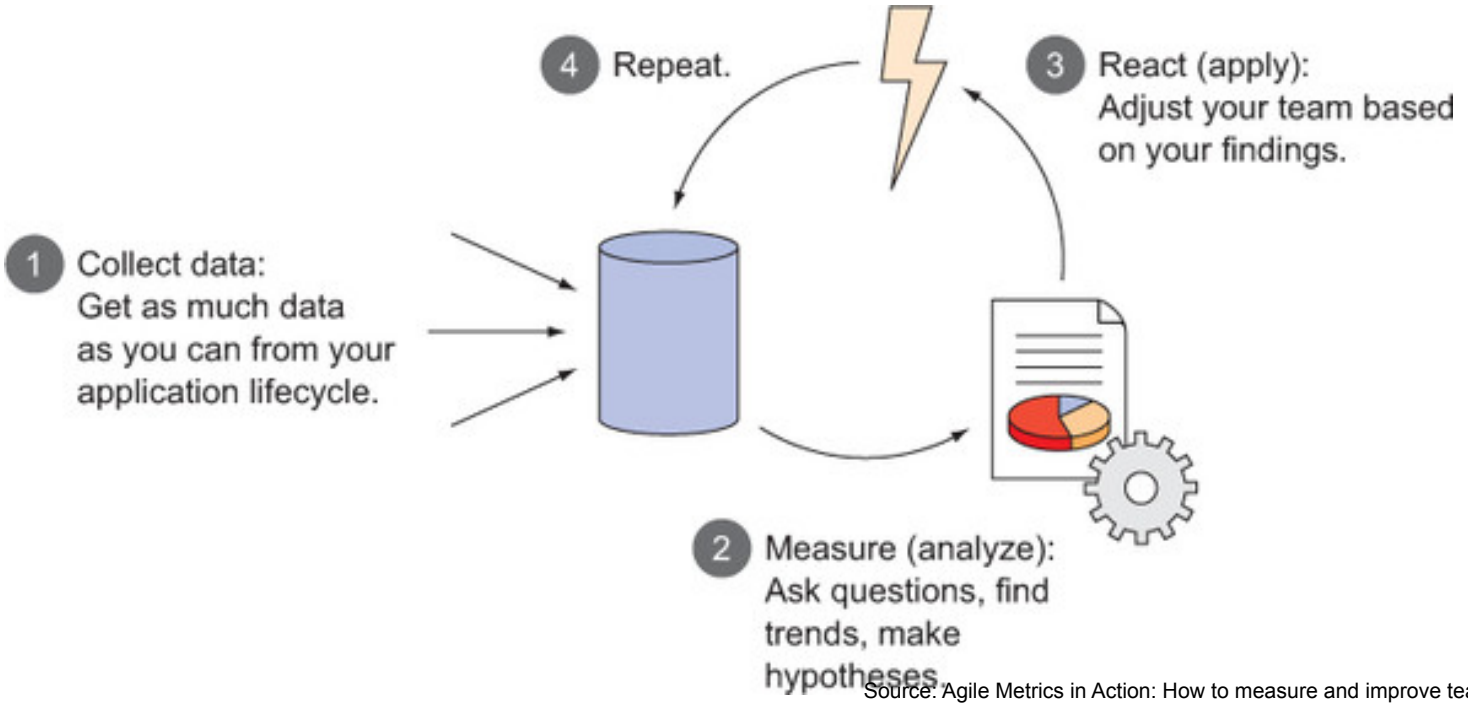


- **Spikes in this data point can indicate potential problems:**
- There's a communication gap somewhere on the team.
- Completion criteria (a.k.a. done) are not defined clearly to everyone on the team.
- Tasks are being rushed, usually due to pressure to hit a release date.

Source: Agile Metrics in Action: How to measure and improve team performance by Christopher W. H. Davis , Published by Manning Publications, 2015

COLLECT, MEASURE, REACT, REPEAT—THE FEEDBACK LOOP

- There isn't a silver-bullet metric that will tell you if your agile teams are performing as well as they can.
- Collecting and analyzing data in the form of metrics is an objective way to learn more about your team and a way to measure any adjustments you decide to make to your team's behavior.



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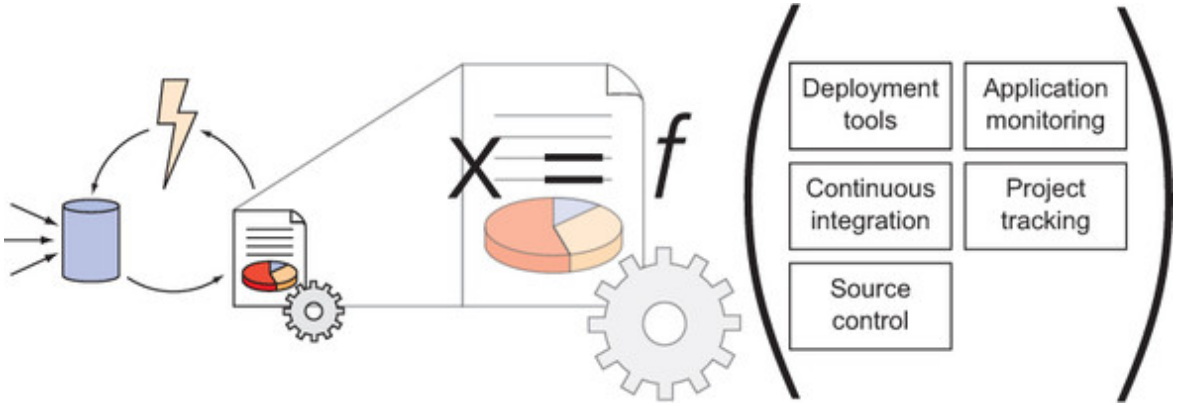
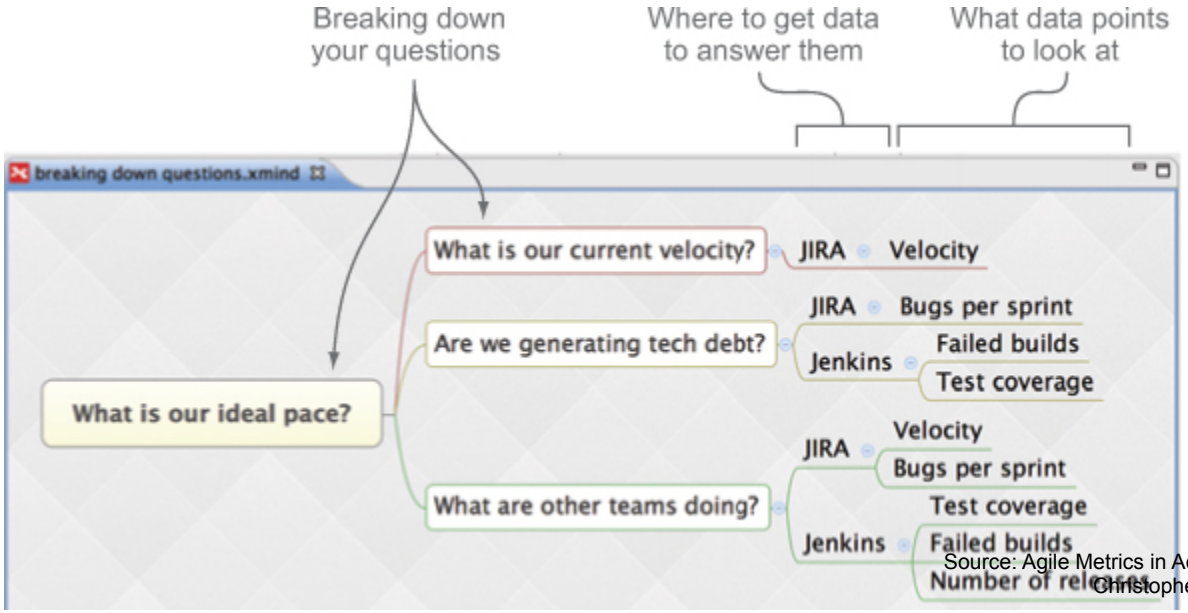
Figuring out what matters

(X is what you want to answer; some combination of your data can get you there.)

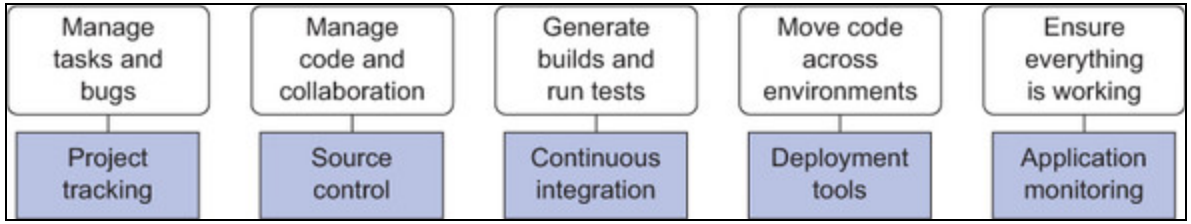




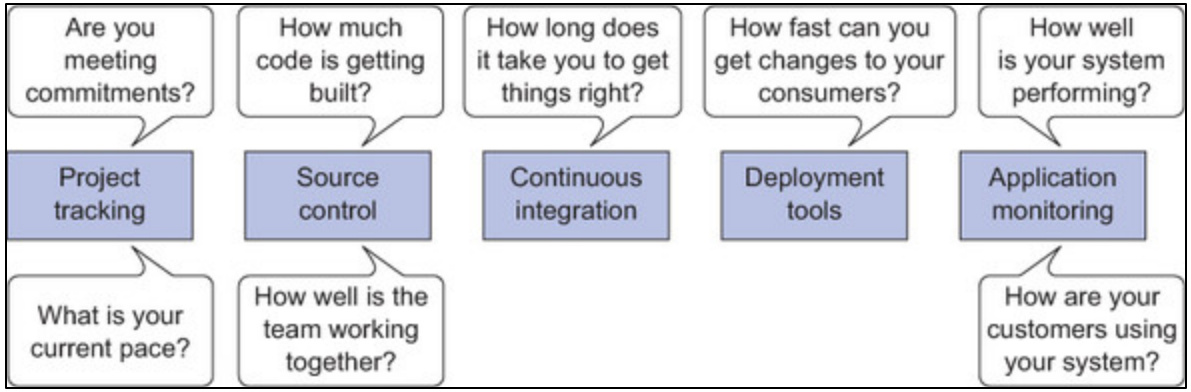
- Mind mapping is a brainstorming technique where you start with an idea and then keep deconstructing it until it's broken down into small elements. XMind (www.xmind.net/),

Source: Agile Metrics in Action: How to measure and improve team performance by Christopher W. H. Davis , Published by Manning Publications, 2015

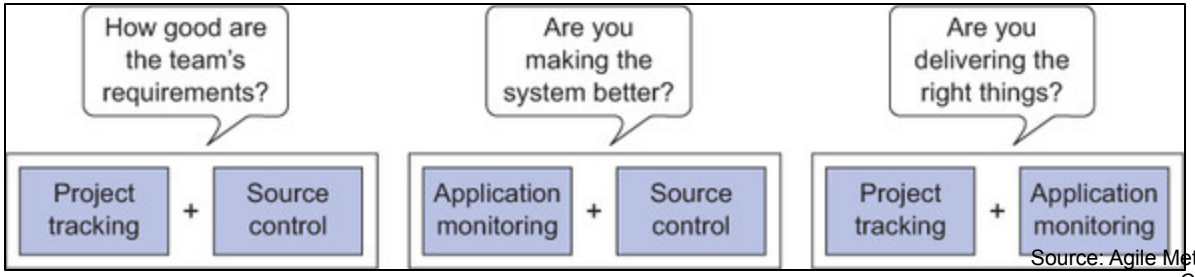
Project performance data



Data is all over the place without a unified view



Questions you can answer with data from systems in your SDLC.



Adding data together to answer high-level questions

Source: Agile Metrics in Action: How to measure and improve team performance by Christopher W. H. Davis , Published by Manning Publications, 2015

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Thank you