"When will it be done?"

…and how to remove this thorn from Software Development

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What's in it for me?

-01-

"The One Big Question" and software industry results

-02-

The theory and science you need to know

-03-

How to reframe and effectively work with uncertainty

A Deterministic Approach

Determine all the things

Estimate all the things

Sum (“predict”) all the things

"More accurate estimates!"

"Working Software"

INTUITIVE PREDICTION:

BIASES AND CORRECTIVE PROCEDURES

https://apps.dtic.mil/dtic/tr/fulltext/u2/a047747.pdf

by

Daniel Kahneman and Amos Tversky

Sponsored by

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Contract N00014-76-C-0074

June 1977

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Kahneman
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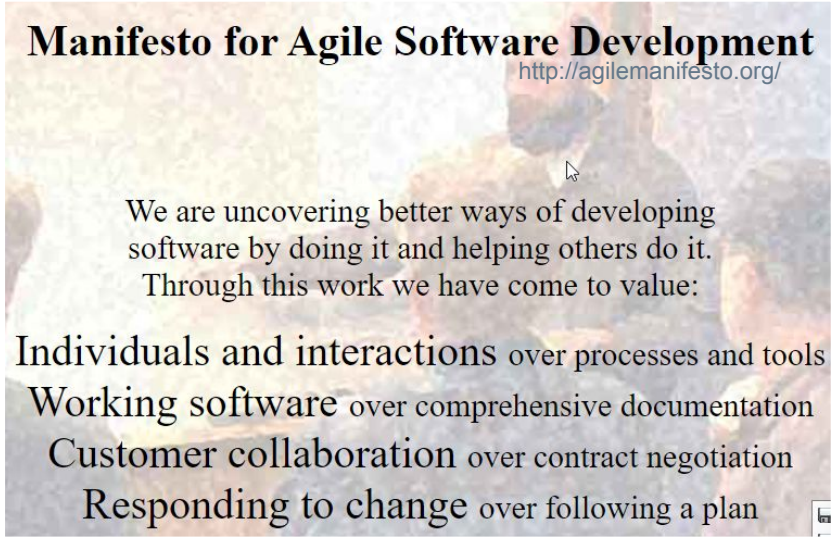
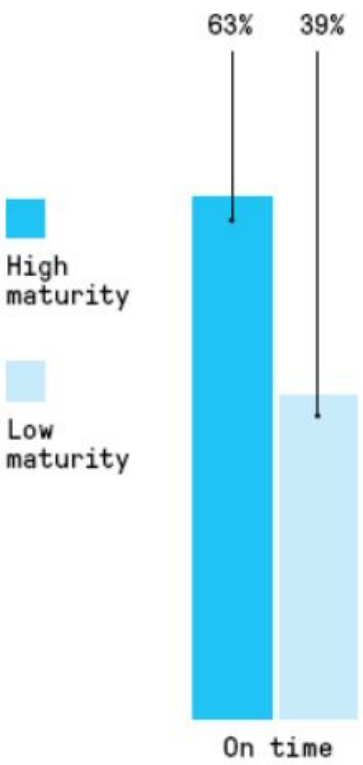
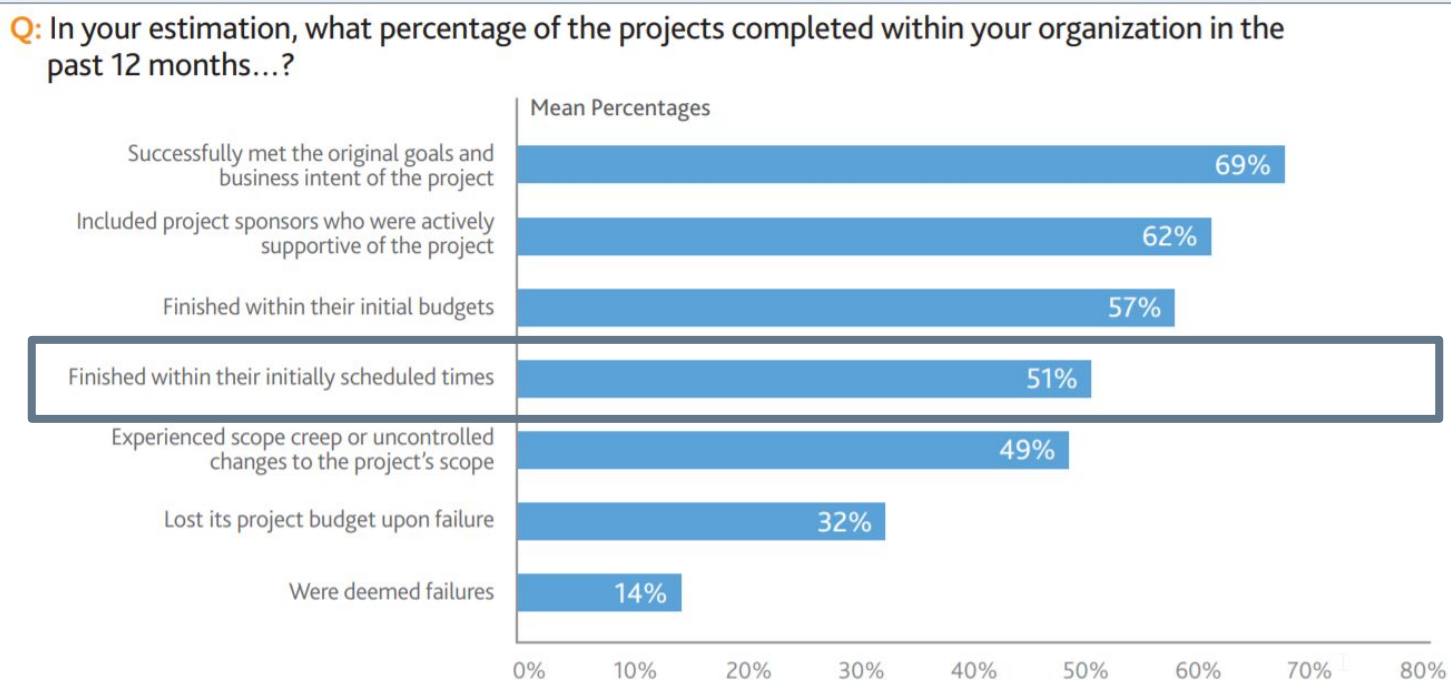
confidence from a brief and unreliable description of his
personality (Kahneman and Tversky, 1973). Apparently, sample
size and reliability have little impact on judgments of
confidence, contrary to the normative principles of statistics.





Well no, not so much...

https://www.pmi.org/learning/library/forging-future-focused-culture-11908



https://www.pmi.org/-/media/pmi/documents/public/pdf/learning/thought-leadership/pulse/pulse-of-the-profession-2017.pdf


WHAT'S
GOING
ON?!

"Understanding variation is the key to success in quality and business."

– W. Edwards Deming

(Walter) Shewhart's discovery

People who do not understand variation frequently increase it with their actions.

Common Cause

Harry Alpert

Variation which is predictable, constant.

Historical data is a good predictor of probability.

"Noisy Variation..."

Special Cause

W.E. Deming

Variation which arrives as a surprise.

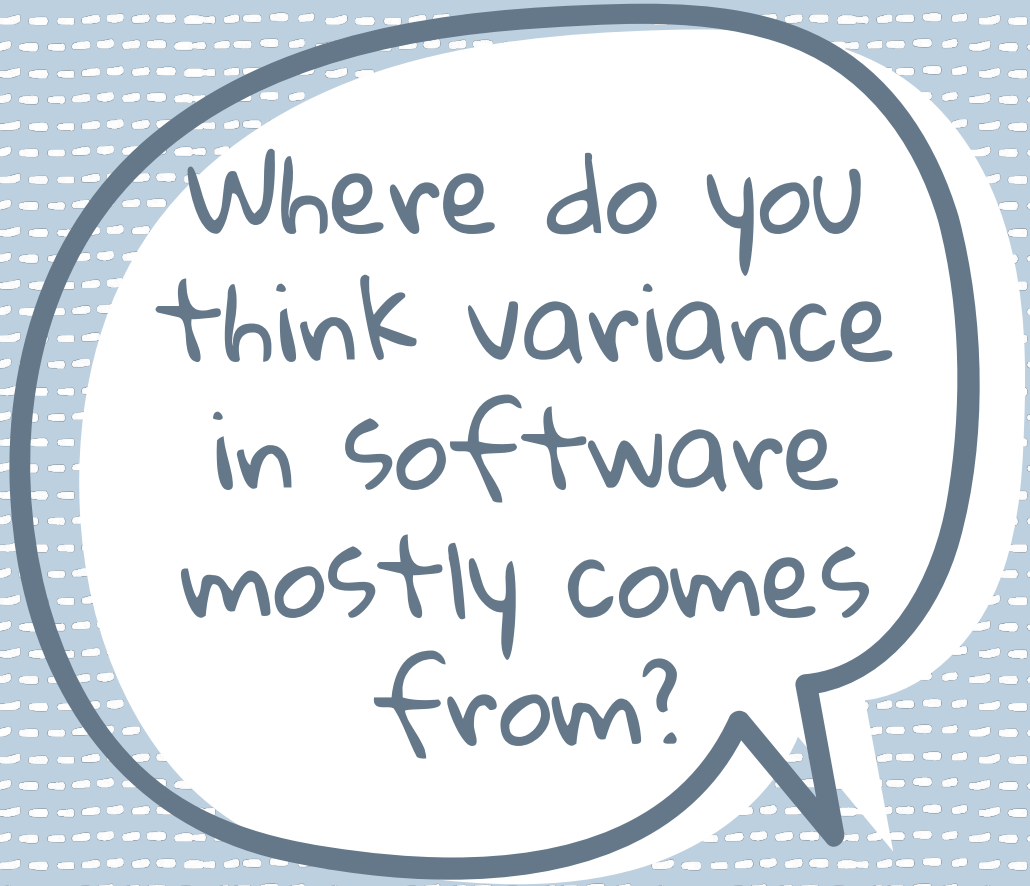
Historical data can't predict. Emergent phenomena.

"Assignable Variation..."

Wheel Friction?
Wheel outcomes?
Range of bounces?

Wheel axle breaks?
Player spills drink on wheel?
Force of played ball?

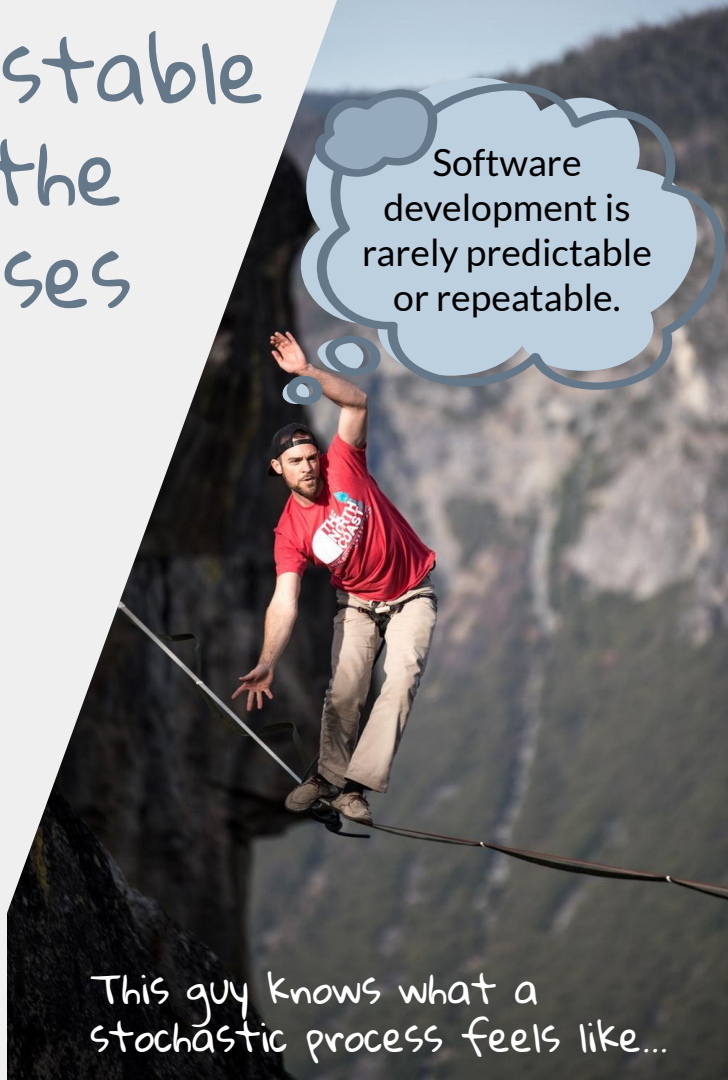
Artwork by Yonatan Frimer
https://pixels.com/featured/roulette-maze-yonatan-frimer.html


Where do you think variance in software mostly comes from?

The difference between a stable and unstable process is the occurrence of special causes

The longer an unstable process runs, the greater negative impact variation has.

Reducing batch size naturally reduces impact of special cause variation.



How many steps will it take to walk the perimeter of our room?

OK then... how many steps will it take to walk ten feet?

"When will it be done" proxy questions

"Pynchon's Questions"

"If they can get you asking the wrong questions, they don't have to worry about answers."
— Thomas Pynchon, Gravity's Rainbow

Story Points!

(aka, "What's the estimate, approximately?")

Enablers of Pynchon's Questions...

Statistical Data Types

Categorical	**Nominal**	Variable labels, no quantitative value
Categorical	**Ordinal**	Discrete, ordered units. Unknown magnitude.
Numerical	**Interval**	Ordered units with equal difference. No absolute zero.
Numerical	**Ratio**	Ordered units with equal difference. Absolute zero exists.

We love ratio data because we can do all sorts of math!

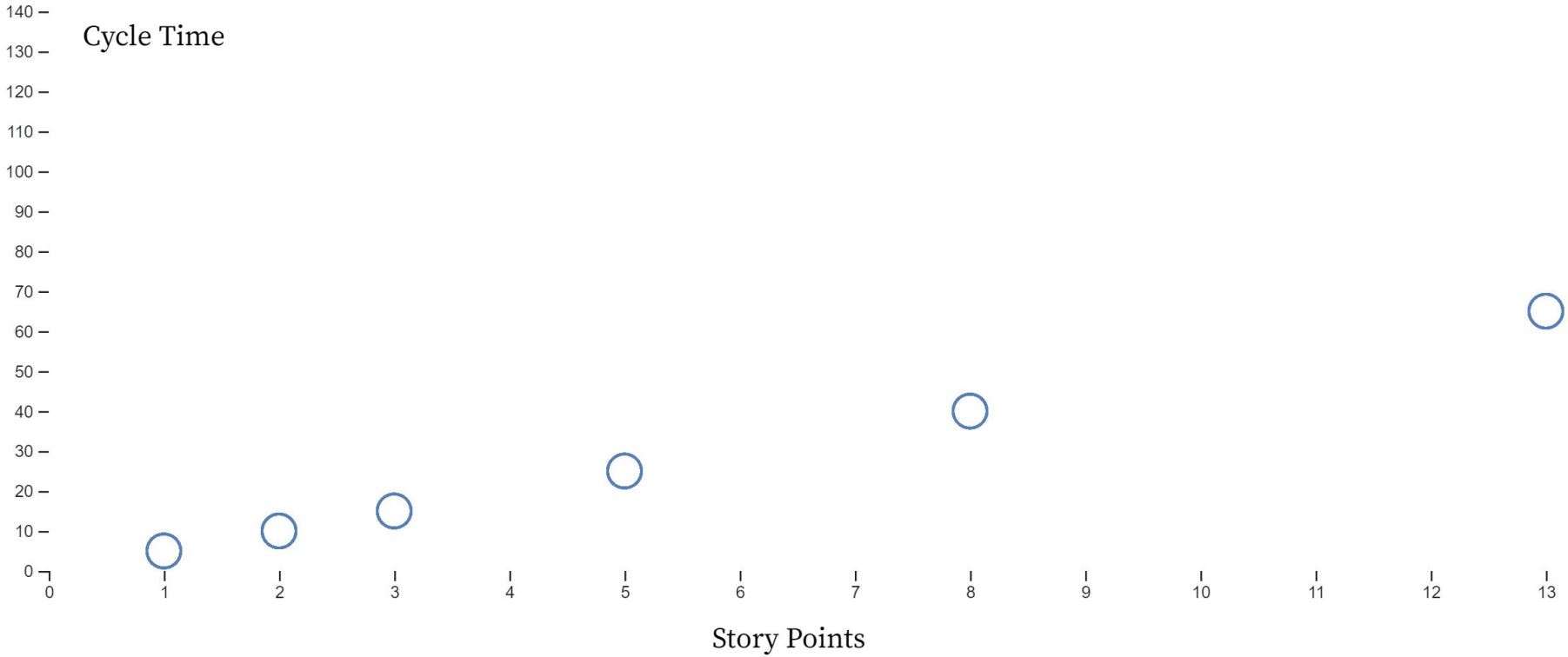


Chart generated via Troy Magennis
https://observablehq.com/@troymagennis/story-point-velocity-or-throughput-forecasting-does-it-mat

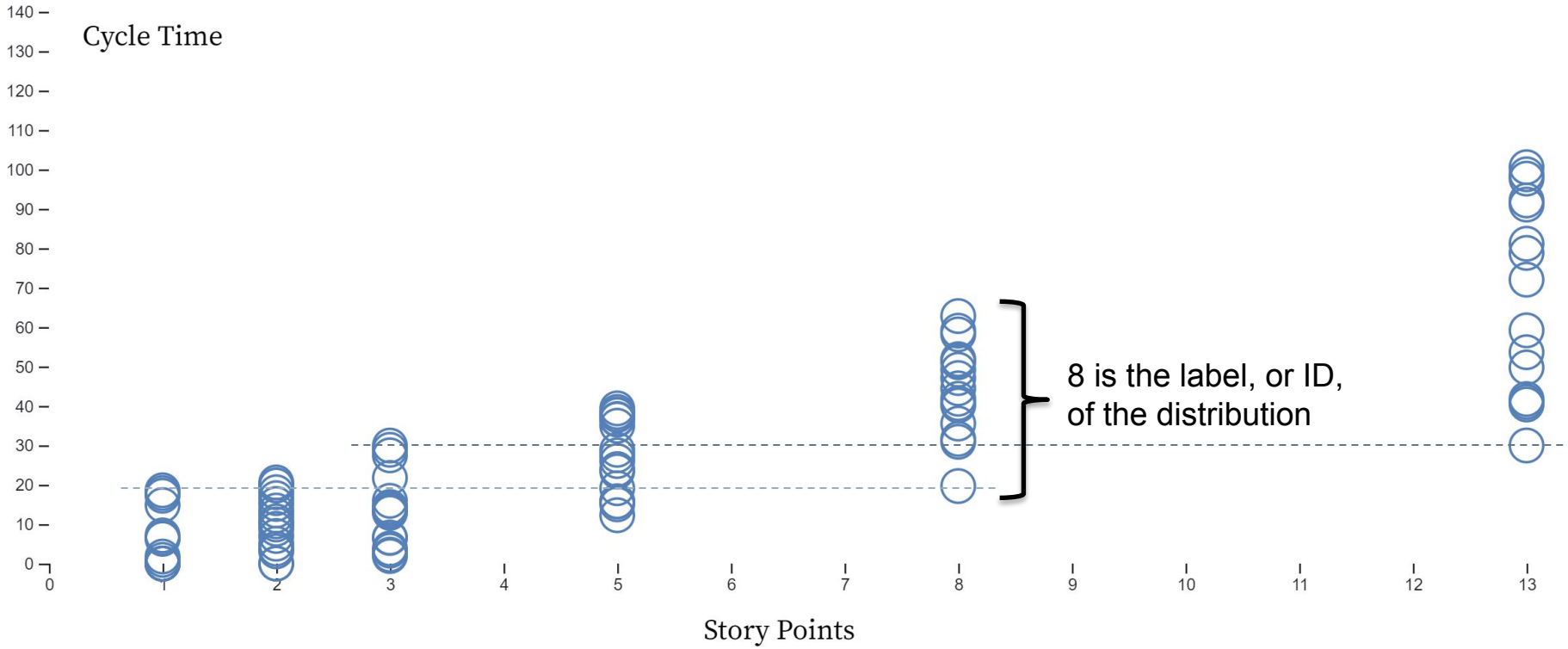


Chart generated via Troy Magennis
https://observablehq.com/@troymagennis/story-point-velocity-or-throughput-forecasting-does-it-mat

Red + Blue + Red + Green = 15 points?

(Maybe you're better off using ROYGBIV...)

So, what are the RIGHT questions?

Let's work inside out.

"Pynchon's Questions"

What's the estimate?
OR
How big is it?

Is it small enough?

"Right Sizing"

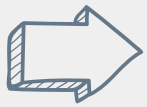
Ratio data!

Rather than increase possibilities for variability, we aim to reduce them.

Small Enough! Too big!

Finally, we're ready to reframe the big question.

WHEN WILL IT BE DONE?!



When can it start?

How probable is it to complete by…?


When can it start?

Little's Law

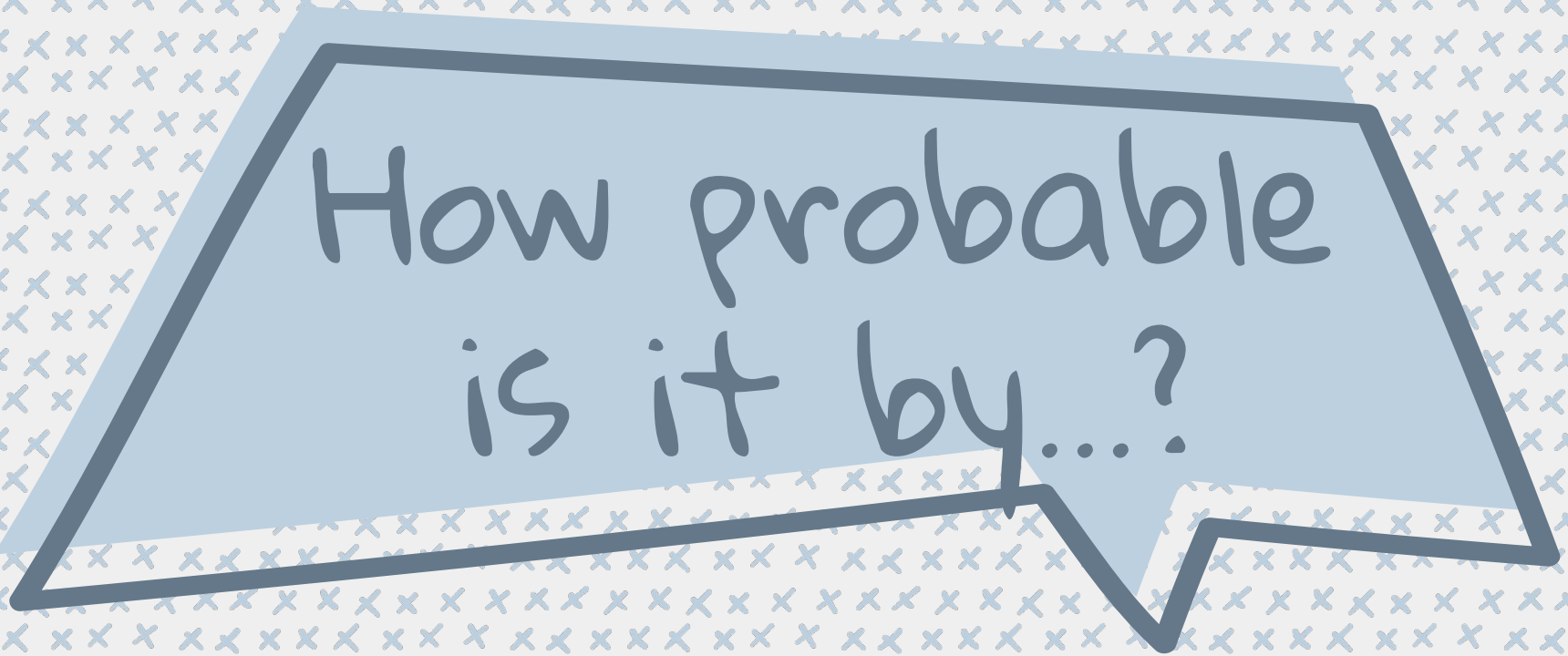
$$AverageCycleTime = \frac{AverageWorkInProgress}{AverageThroughput}$$

I call this, "Conservation of Flow".

a valid application of Little's Law. When WIP never goes to zero, then the assumptions that are necessary to make Little's Law (in the form of Equation (2)) work are:

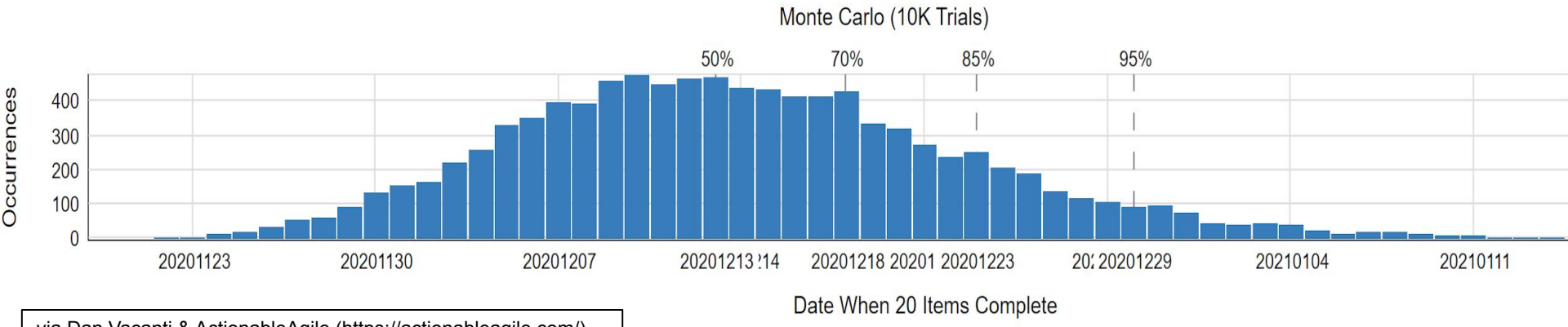
1. The average input or Arrival Rate (λ) should equal the average output or Departure Rate (Throughput).
2. All work that is started will eventually be completed and exit the system.

Snippets from:
"When Will It Be Done?" (Vacanti, 2018)


How probable
is it by...?

Monte Carlo simulation helps us explore the possible answers to "when will it be done?"

Monte Carlo Simulation is the process of repeated random sampling to describe a system using a probabilistic model



via Dan Vacanti & ActionableAgile (https://actionableagile.com/)

Note: I highly endorse Dan's suite of tools. Wonderful stuff!

Effectively answering “the big question” is a system of work… not an estimation practice.

Special Cause variation in software will always be the primary source of instability.

Reframe to reduce variability. Always work with ratio data.

Simulate your real system, rather than estimate it. Probabilistically make trade-offs, rather than hope & status reports.

Another MCS Example

Likelihood	1 week's	Date
100%	34	2/2/2018
95%	27	12/15/2017
90%	25	12/1/2017
85%	23	11/17/2017
80%	22	11/10/2017
75%	21	11/3/2017
70%	20	10/27/2017
65%	19	10/20/2017
60%	19	10/20/2017
55%	18	10/13/2017
50%	17	10/6/2017
45%	16	9/29/2017
40%	16	9/29/2017
35%	15	9/22/2017
30%	14	9/15/2017
25%	13	9/8/2017
20%	12	9/1/2017
15%	11	8/25/2017
10%	11	8/25/2017
5%	9	8/11/2017
0%	7	7/28/2017

Almost certain

Somewhat certain

Less than coin-toss odds. But if you are game?

Via Troy Magennis: www.focusedobjective.com

Note: Can you believe Troy makes this free for our use? Go forth and prosper!

"When will it be done?"

Now!

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