

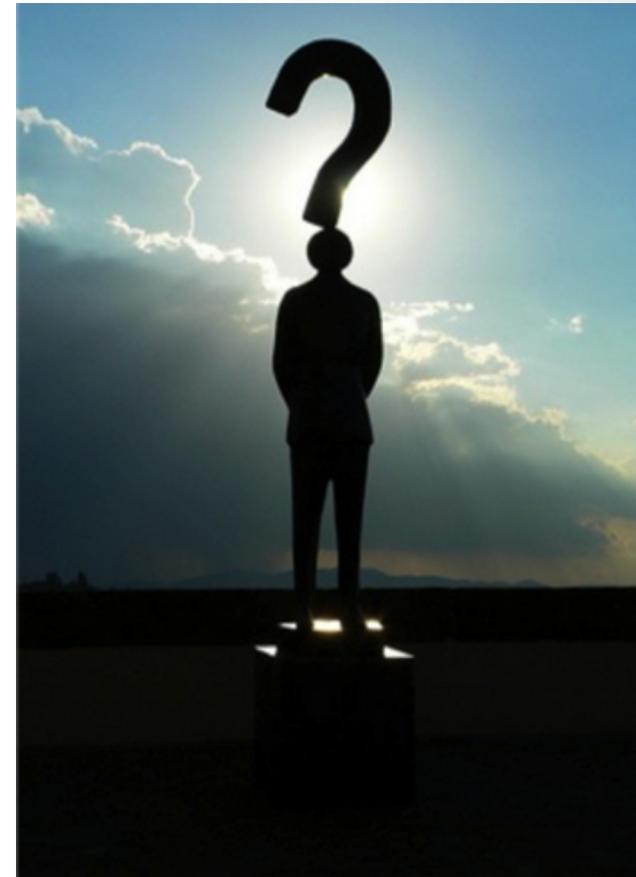


**Not everything that counts
can be counted, and not
everything that can be
counted counts**

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WHY MEASURE?

- Need to know how long and/or how much?
- Time dependencies and cost of delay risks to manage?
- Need to demonstrate ‘Improvement’?
- Need to know where to improve?
- The goal is to make better decisions.

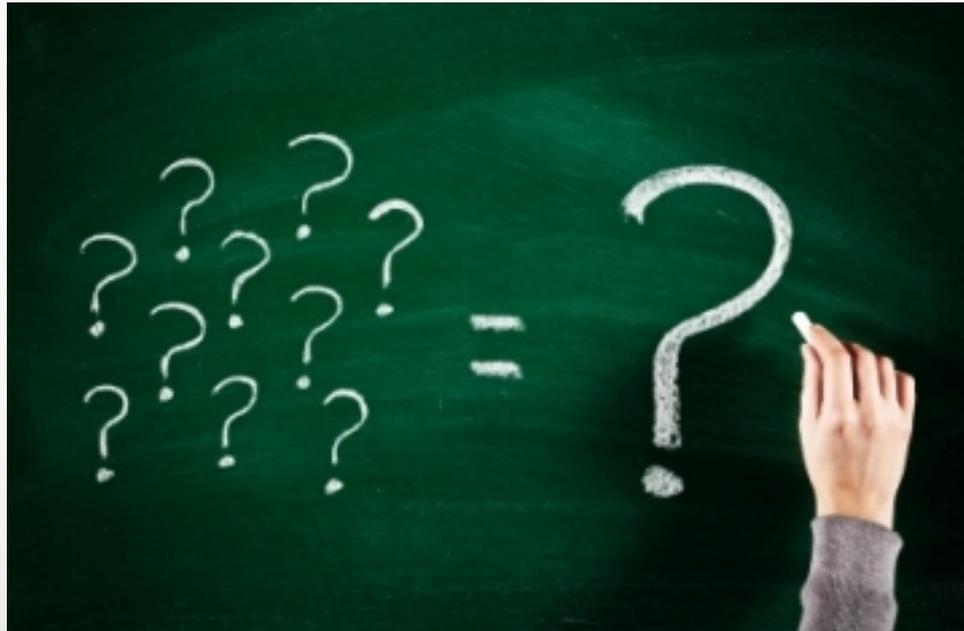


Any observed statistical regularity will tend to collapse once pressure is placed upon it for control purposes.

Goodhart's original 1975 formulation

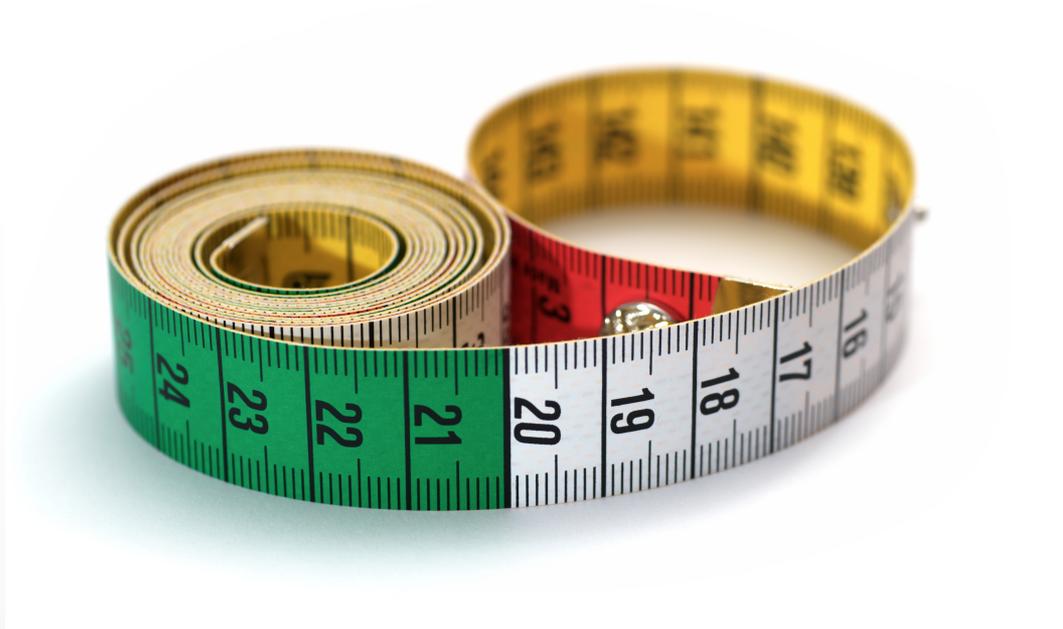
What not to measure

- Touch time
- Have a bias against proxy measures



Measurement types

- Qualification vs Quantification
- Deterministic vs Probabilistic
- Domain specific vs Domain agnostic

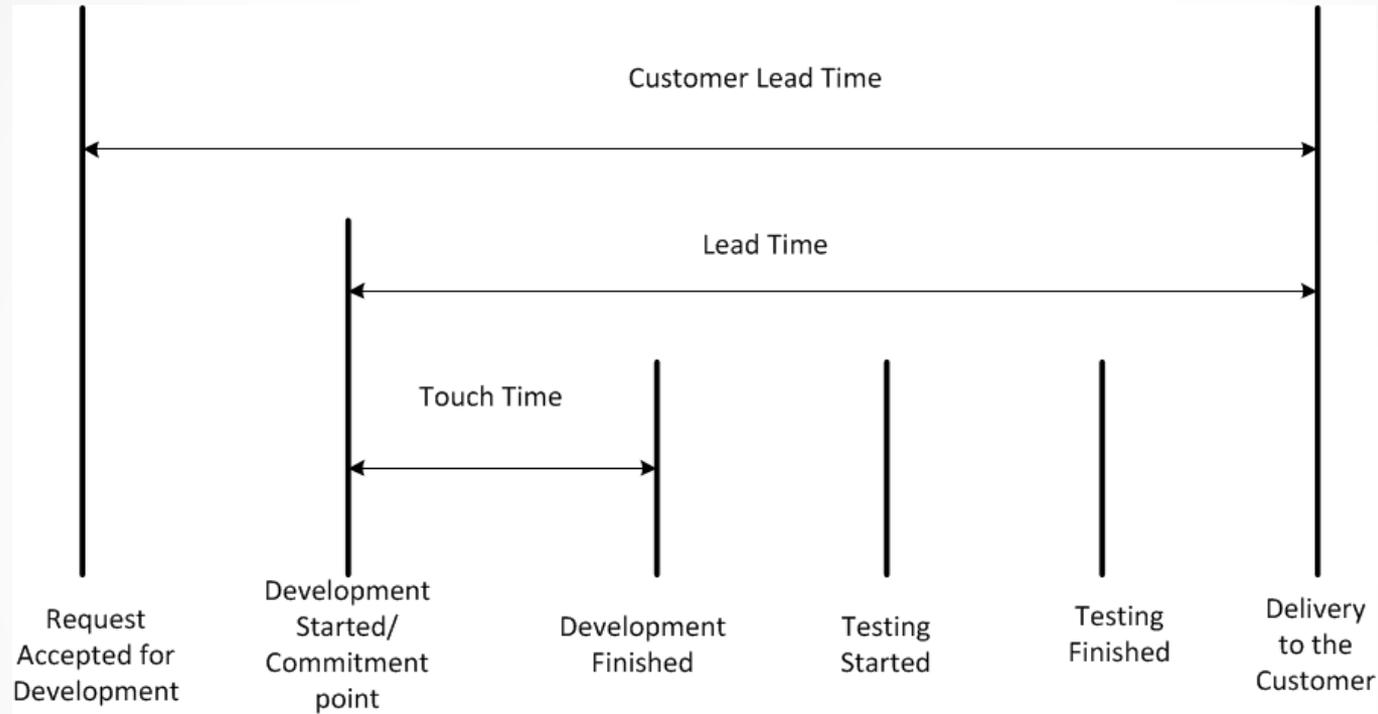


Refresher

- Collection of Observations and Distributions
- Mean, Median, Variance



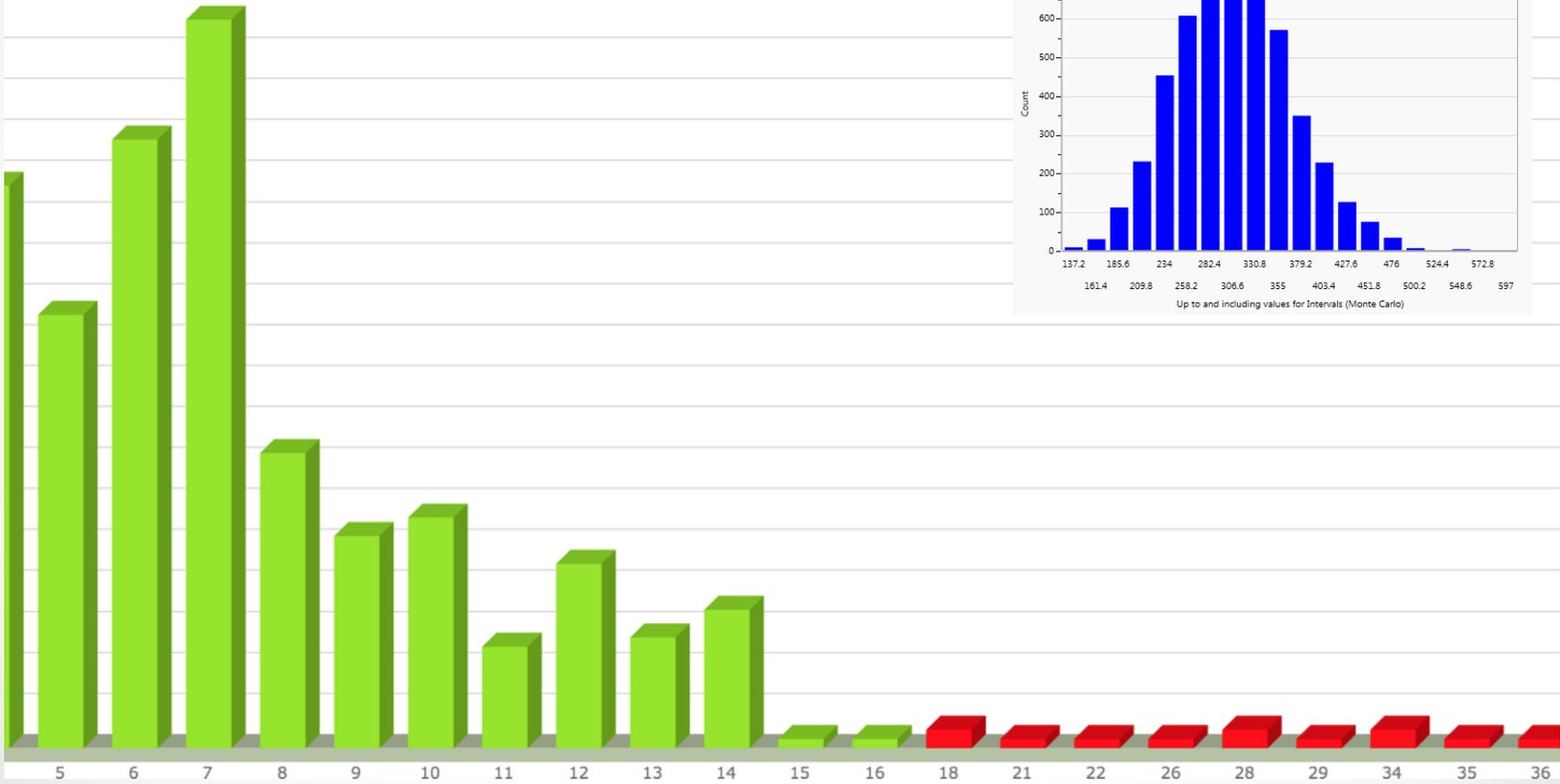
Lead Time



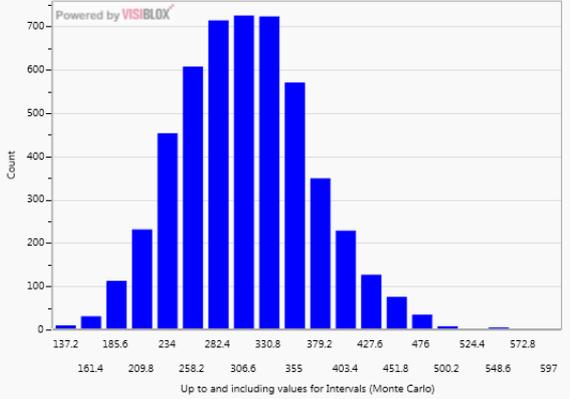
Lead time is defined as a random variable representing the time required to deliver a work item (measured from the commitment through delivery into the first infinite queue).

Lead Time Histogram

Lead Time Distribution

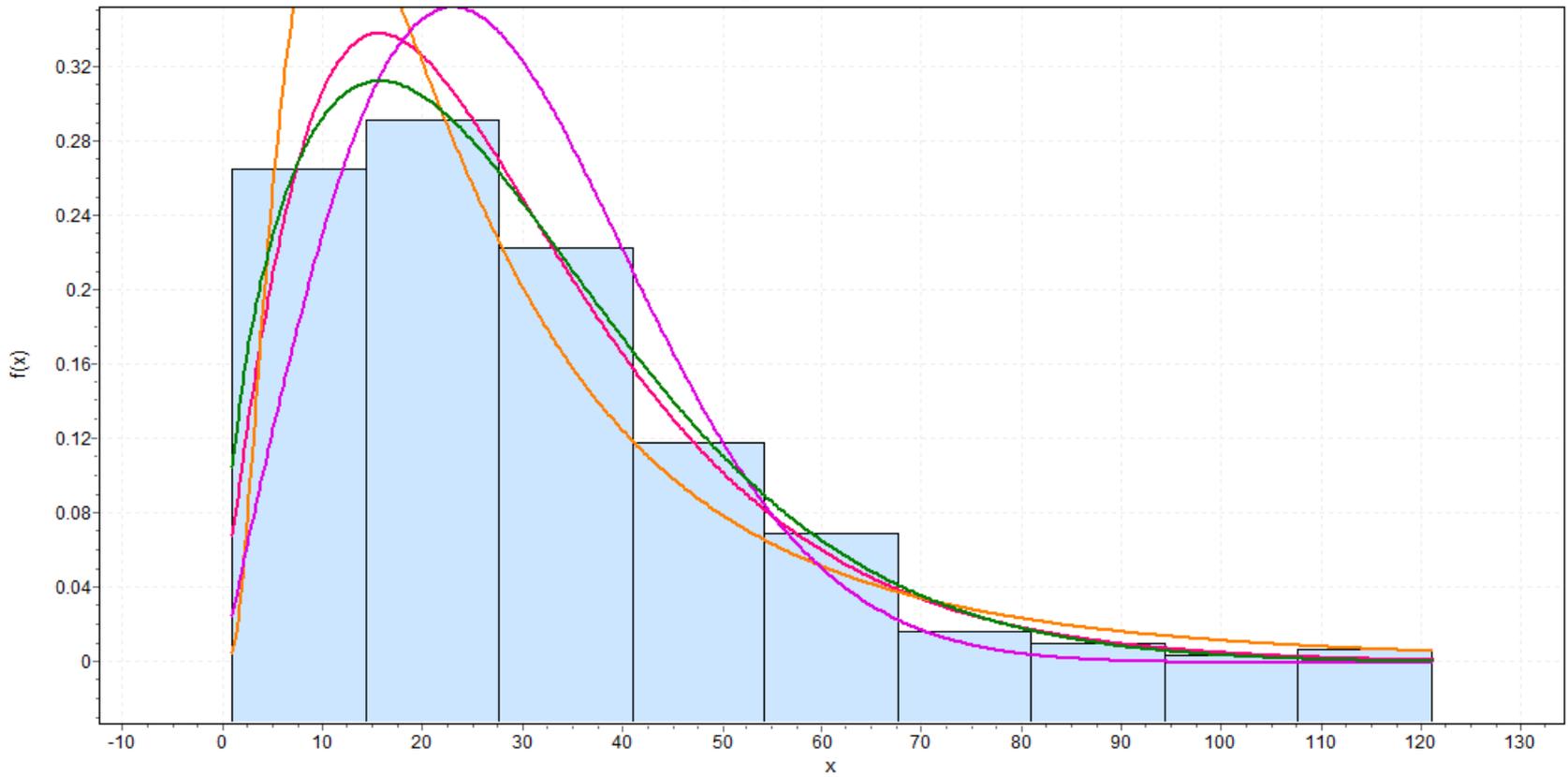


Histogram



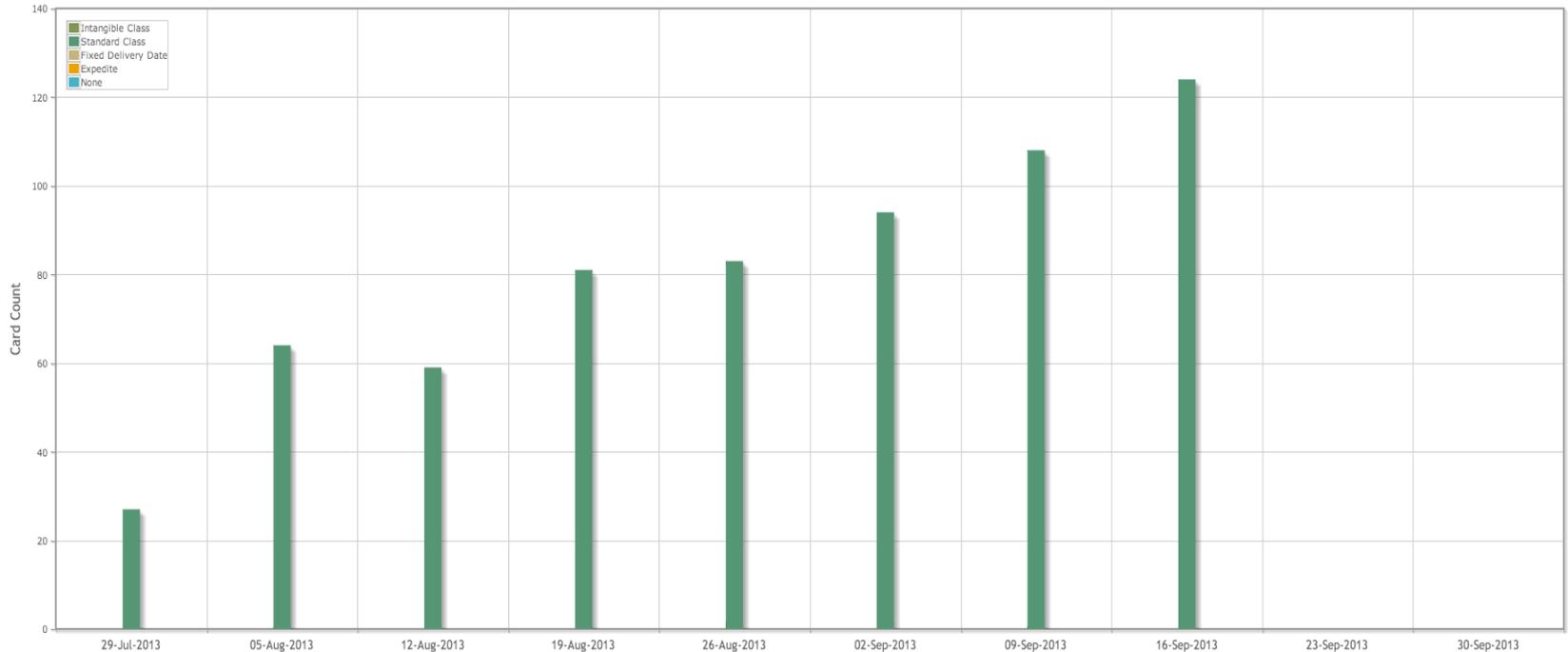
Lead Time distributions

Probability Density Function



Legend: Histogram (blue square), Gamma (3P) (pink line), Lognormal (orange line), Rayleigh (magenta line), Weibull (green line)

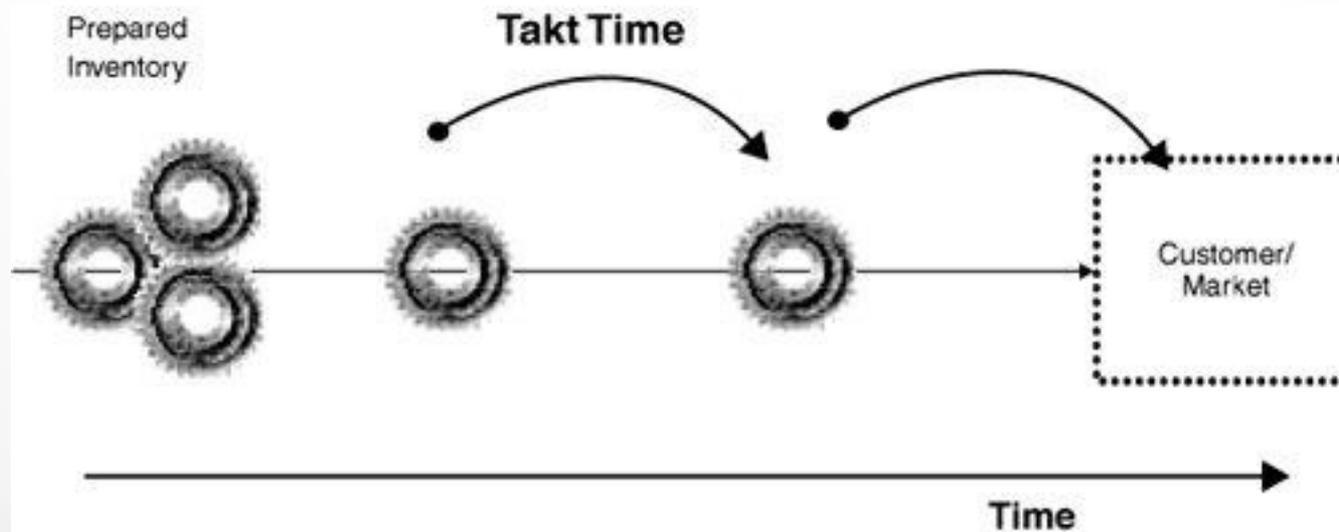
Throughput



- Throughput is defined as a random variable representing the number of work items delivered in a given time period.
- Throughput is used as an indicator of how well the organization is performing and to demonstrate continuous improvement.
- If you are processing other things such as features, change requests, use cases measure the number of those. Everyday count the number of the cards in the Done column. If we don't deliver quality we have not delivered so the card should not be in the Done column.

Takt Time

- Take Time helps
 - Define the maximum size of a work item (or aggregate) that you would fit within that planning horizon as part of commitments around responsiveness
 - Set up the harmonic cadences that we use for internal learning and feedback as we move towards those larger goals, which in turn leads into replenishment cadences needed. The cadence at which customers are comfortable receiving new versions
- Takt time is the average time between successive deliveries or the reciprocal of Throughput.



WIP

- WIP stands for Work In Process and refers to all partly finished work items that are at various stages of the production process.
- You can measure only the average WIP because the value can change through the day several times.



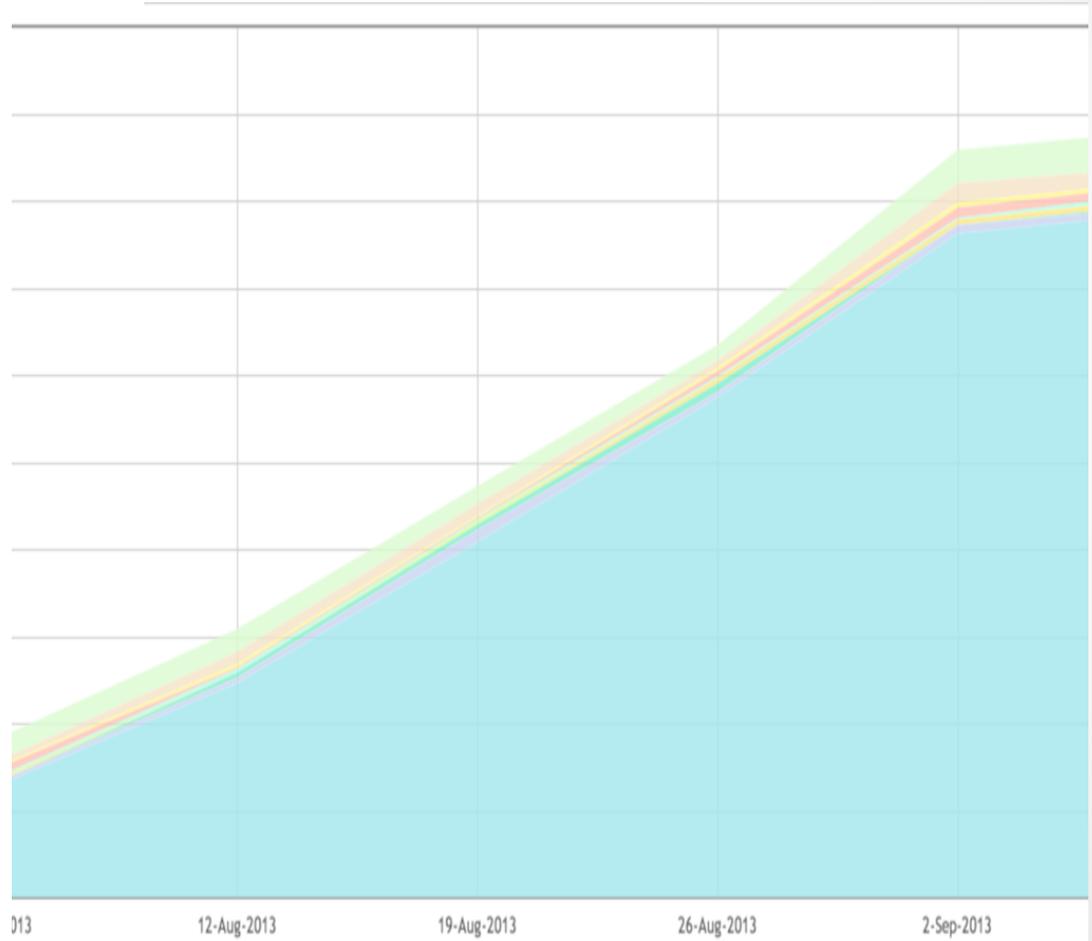
Aging of WIP

- As Deming suggested before improve a process - stabilize it! To show that the stochastic process is stable over time we need some assurance that the average age or latency of the WIP is neither growing nor declining
- Calculation
 - Through Lead Time and Little's Law
 - Through Prisoner's metrics
- Lead time and lead time distribution is a lagging indicator. You need something to tell you in advance if your flow is stable or stationary.

CFD

CFD shows the quantities of work in progress (WIP) at each stage in the system.

If the Kanban system is operating correctly the bands of the diagram should be smooth and their height should be stable. CFD is a visual representation of Little's Law.

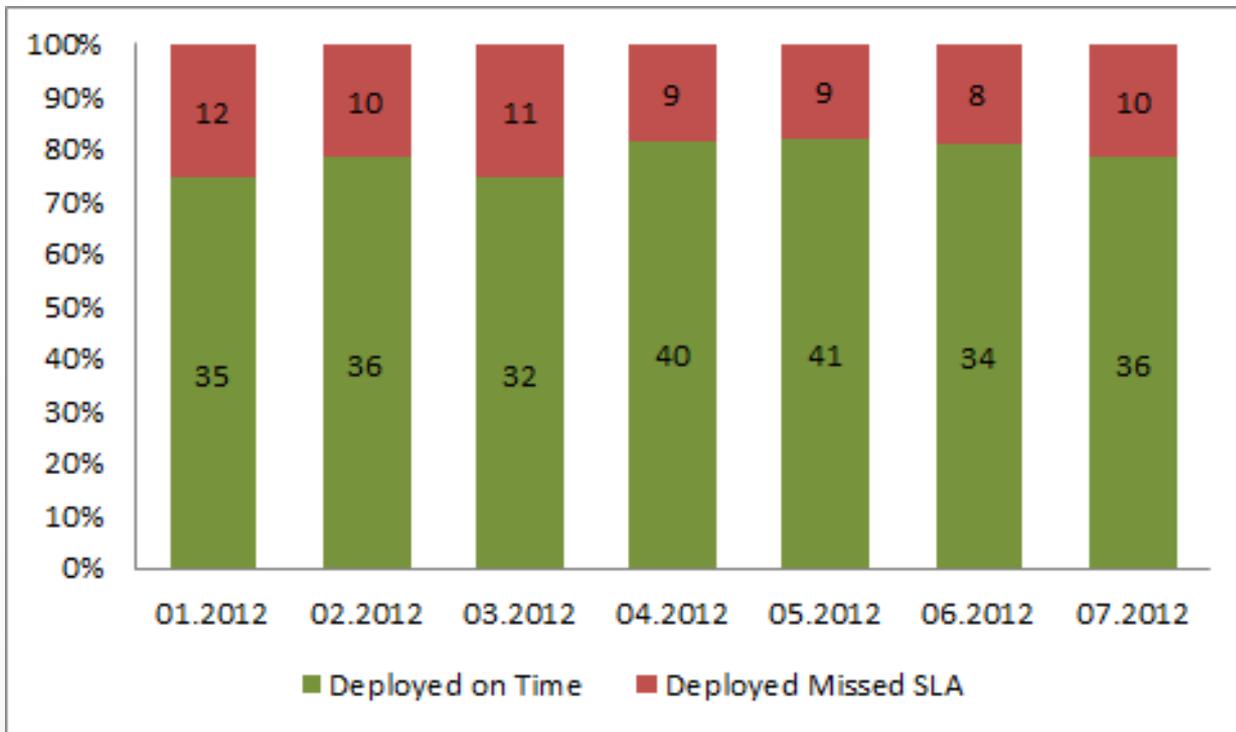


Flow Efficiency

- Calculated as lead time against touch time.
- The flow efficiency metric is not useful as a runtime indicator but can be an indicator for improvement.
- It indicates how much room for improvement by eliminating waste is available without changing the engineering methods. It seems that in knowledge work we are very inefficient because the values reported are in to range 5-40%.
- A way to improve this is smaller batch sizes and continuous flow

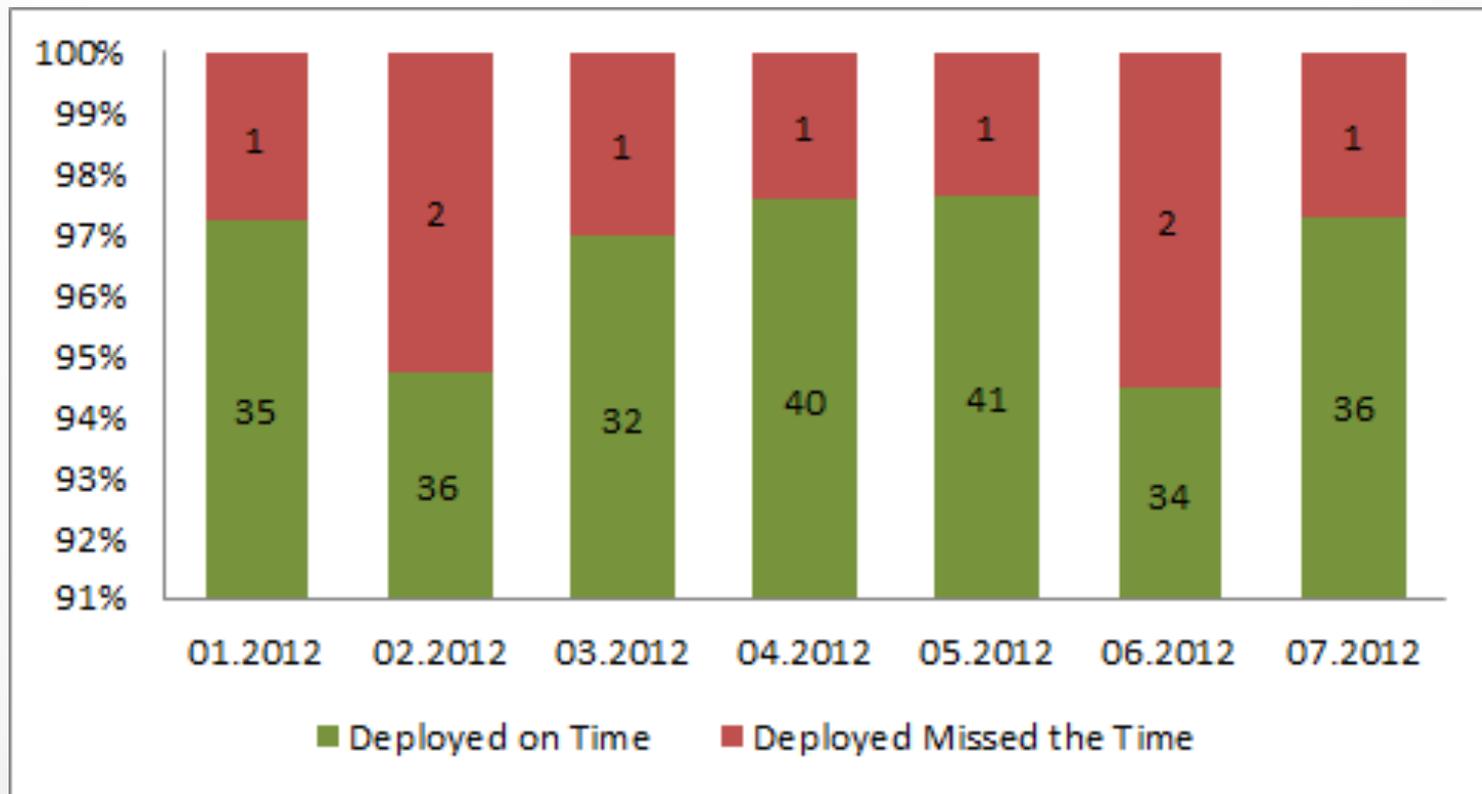
SLA Performance

- Classes of service allow us to spread the risk by aggregating a large collection of requests and promising only aggregate performance



Due Date Performance

- For Fixed Date class of service we should show the answer of the question “Was the work item delivered on time?”



Issues and Blocked items

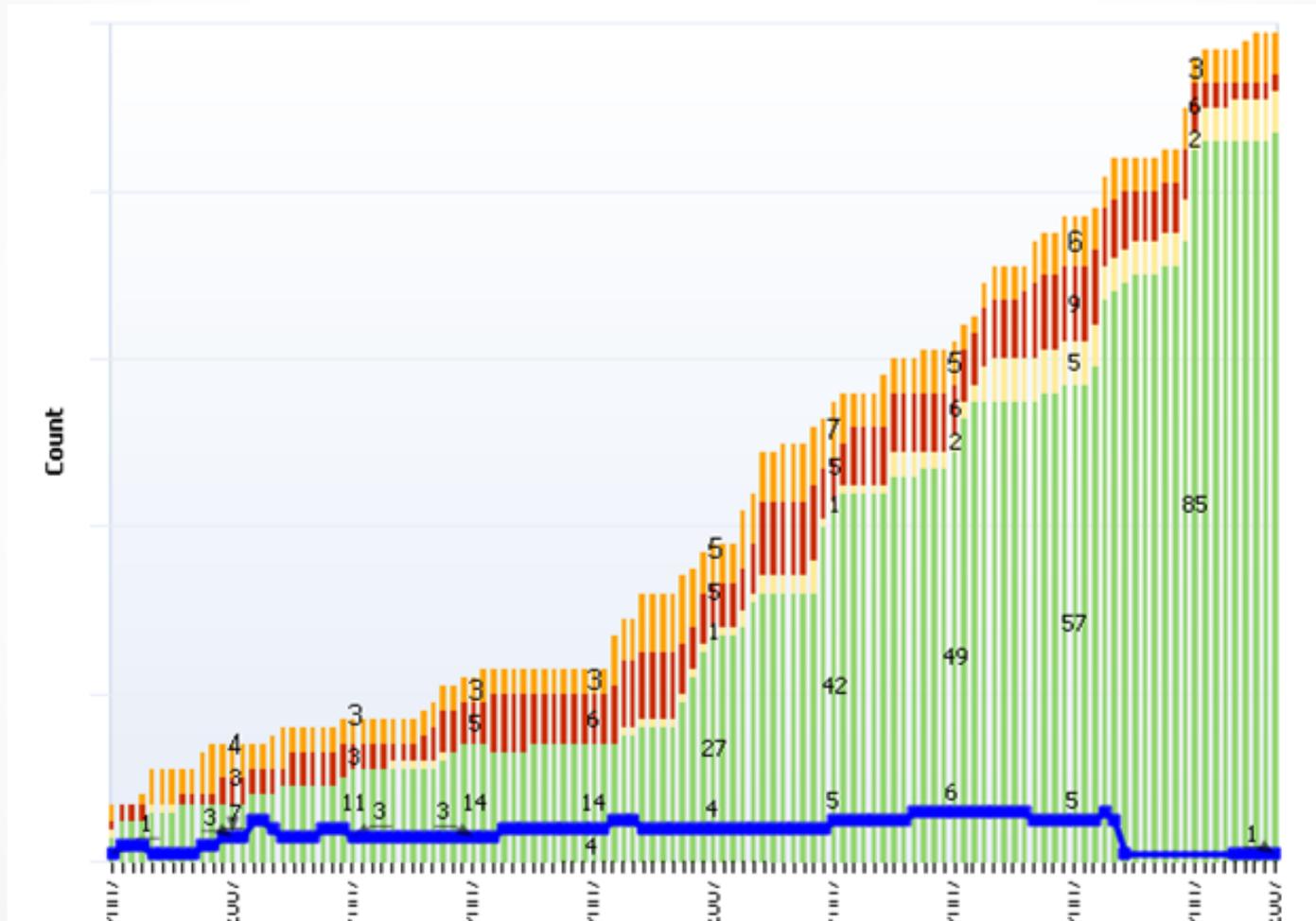


Image from Kanban, David J. Anderson

"The most important things cannot be measured."

Deming, W. Edwards (1986). *Out of the Crisis*. MIT Press.