

# Kanban, Flow and Cadence

Karl Scotland

## Kanban

- Controlled Work

## Flow

- Effective Work

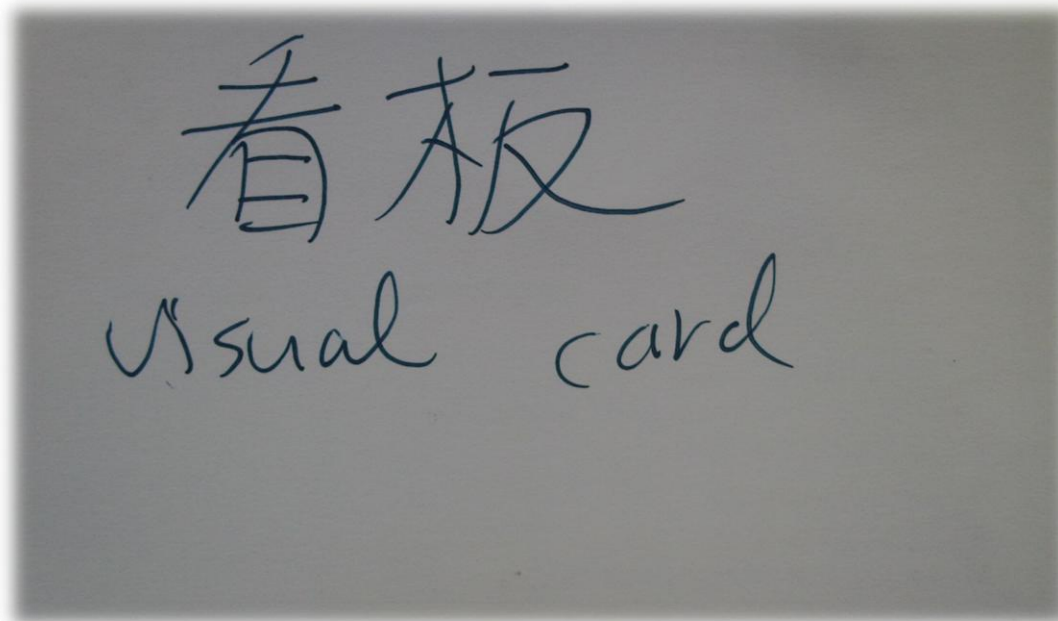
## Cadence

- Reliable Work

# Kanban

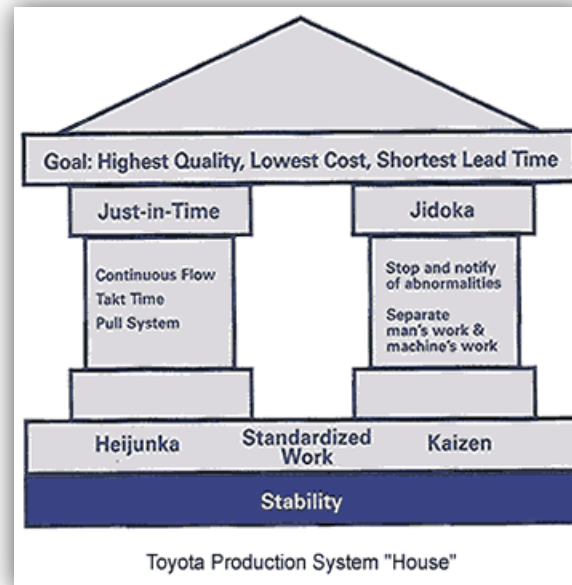
## Controlling the Workflow

**Kanban** (in kanji 看板 also in katakana  
カンバン, where *kan*, 看 カン, means  
"visual," and *ban*, 板 バン, means "card"  
or "board")



“The two pillars of the Toyota production system are just-in-time and automation with a human touch, or automation. The tool used to operate the system is kanban.”

Taiichi Ohno, Toyota Production System (adopted 1962)

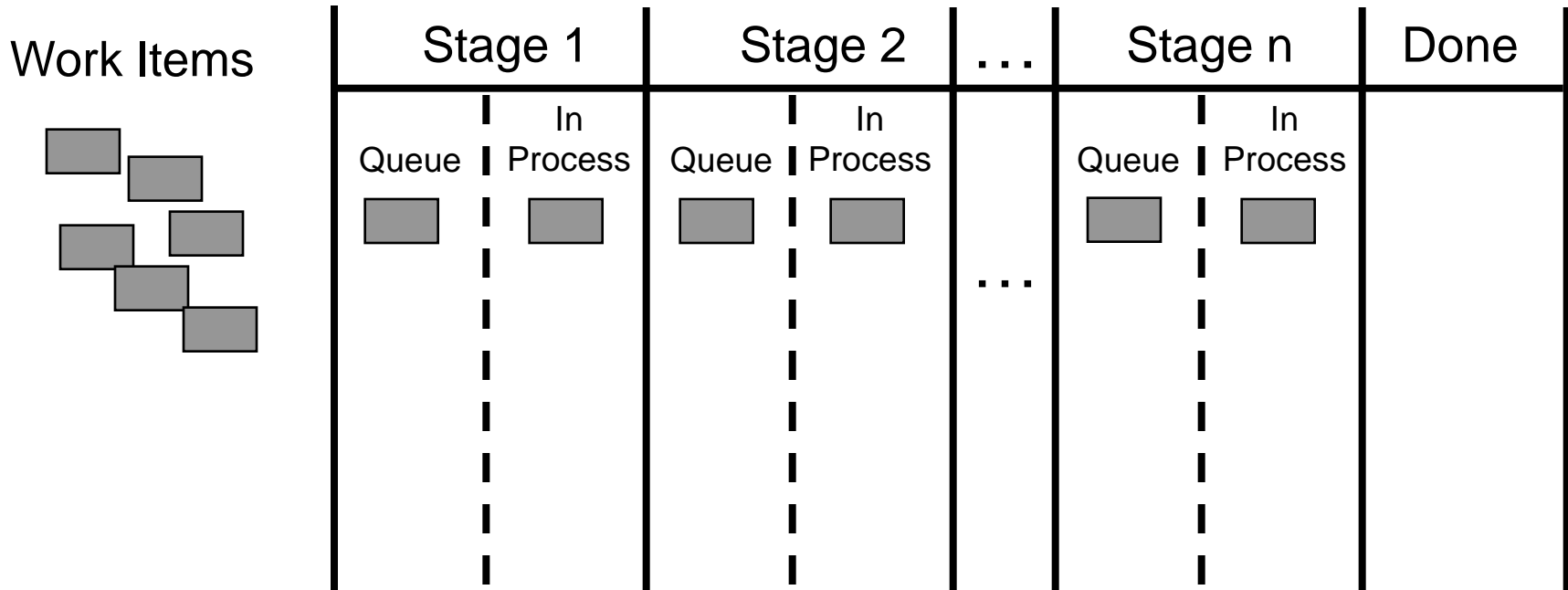


# Visual Scheduling (Heijunka Box)

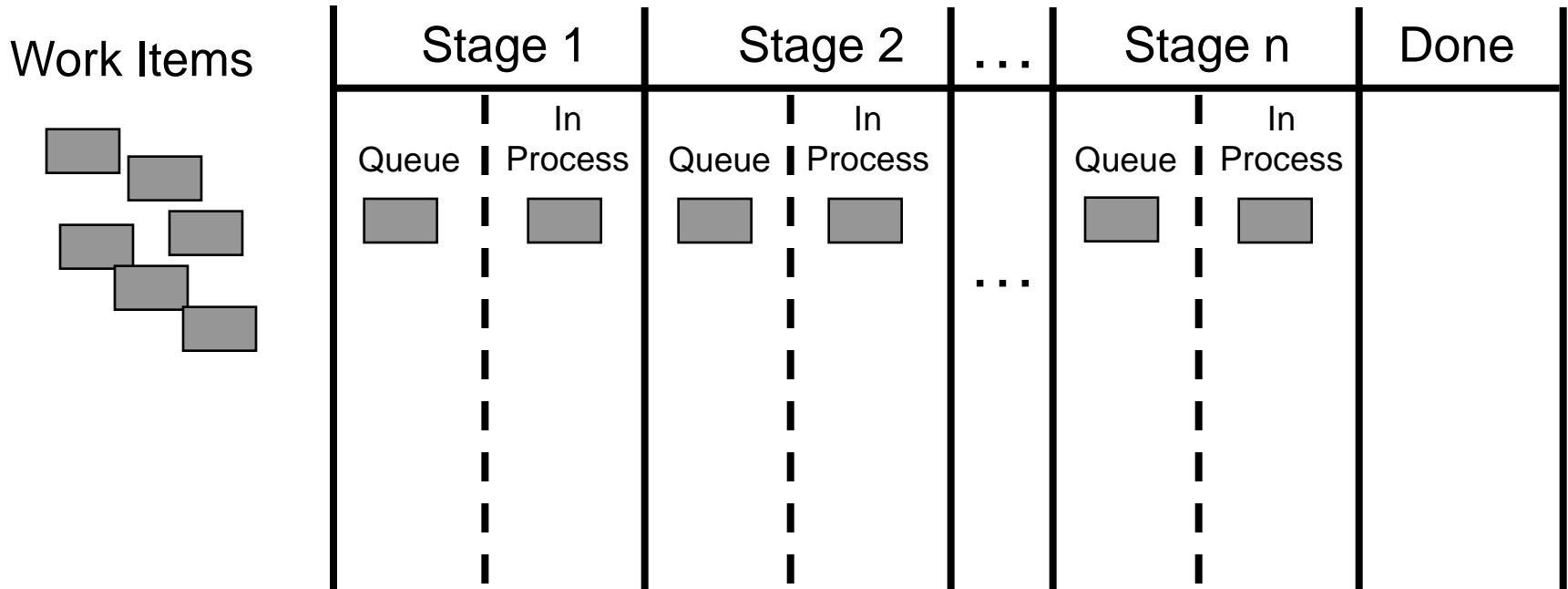


<http://www.flickr.com/photos/jnywong/2222481466/>

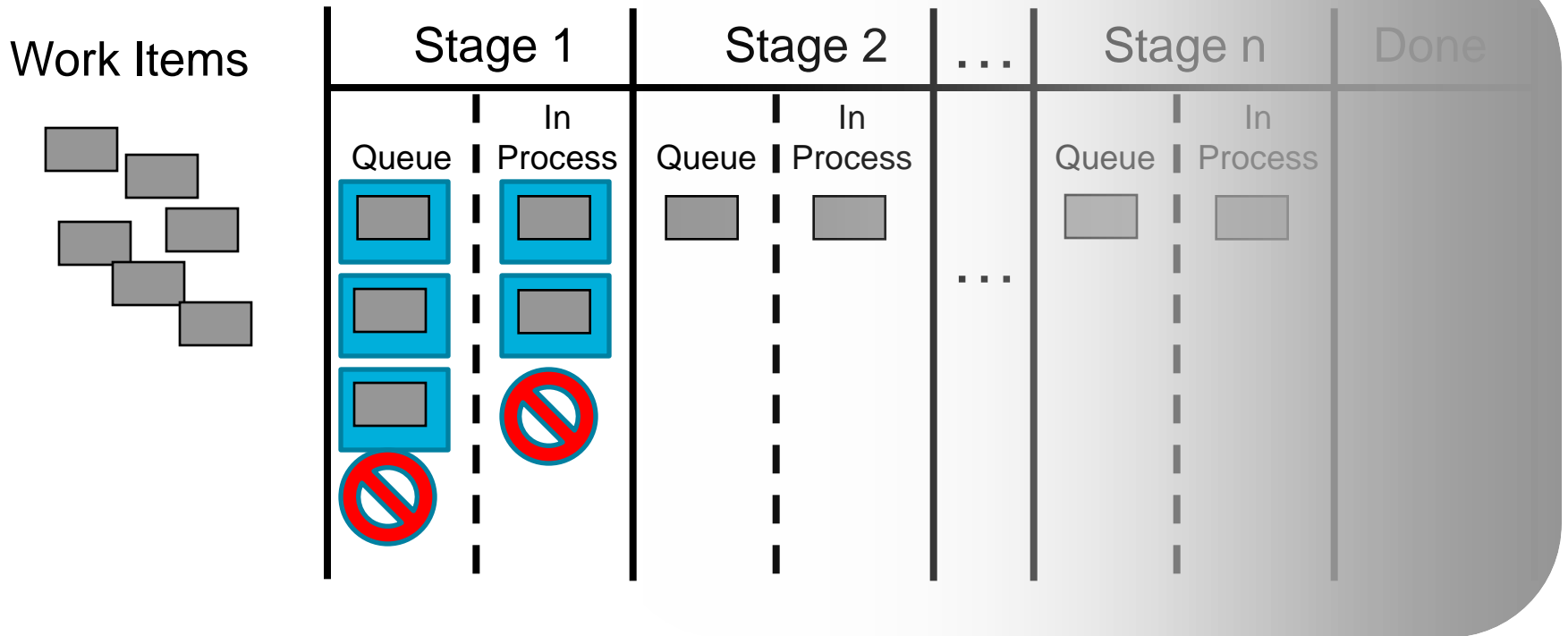
# Push



# Pull



# Kanban Pull



# Work In Progress



**Improve  
Productivity**



**Reduce  
Inventory**



**Enhance  
Teamwork**

# Productivity

**EMC<sup>2</sup>**  
where information lives®



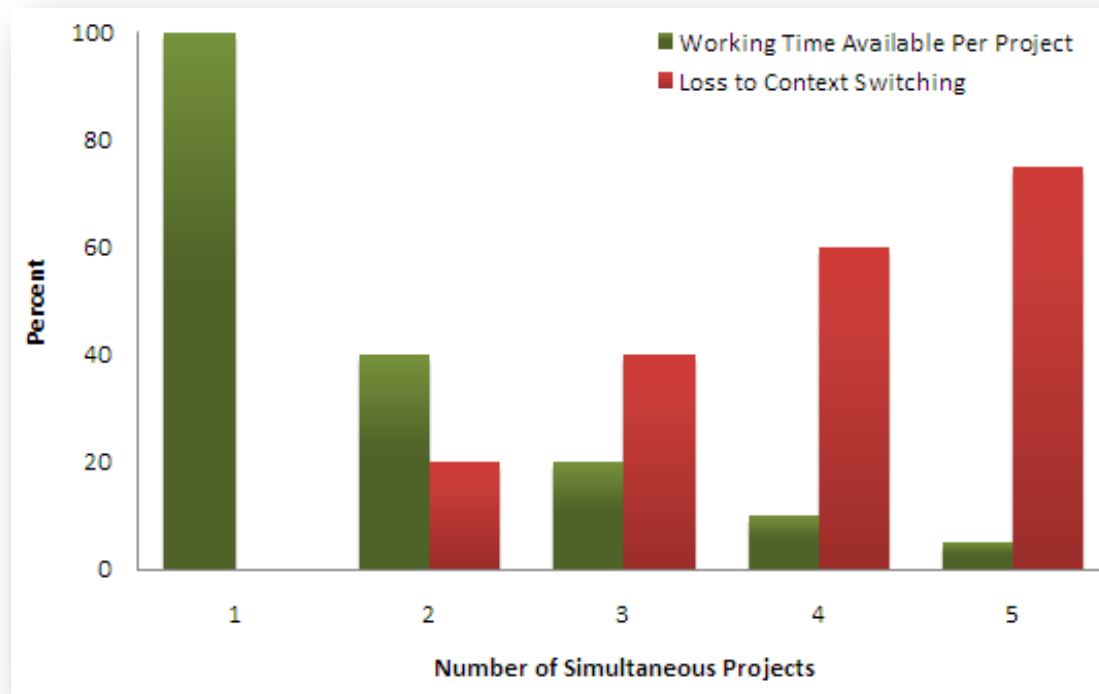
## Little's Law for Queuing Theory

$$\text{Total Cycle Time} = \frac{\text{Number of Things in Process}}{\text{Average Completion Rate}}$$

Therefore, to improve cycle time

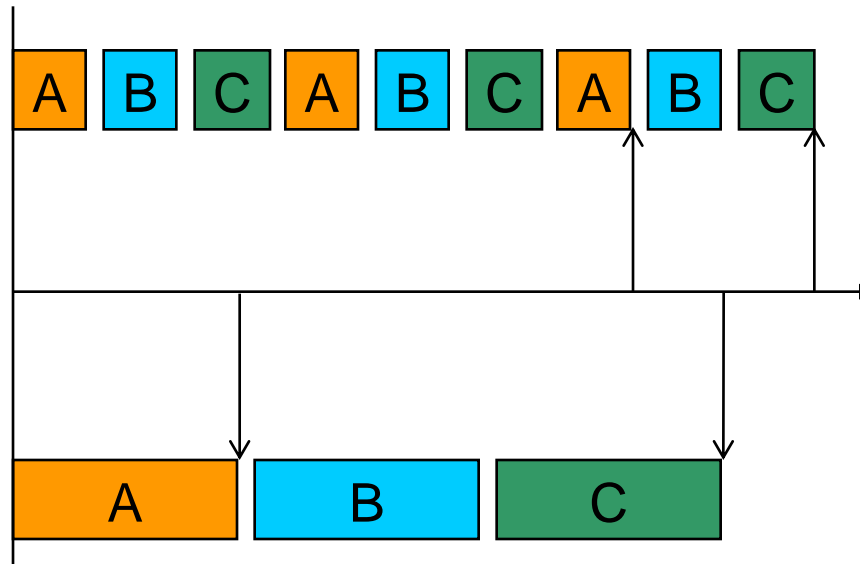
1. Reduce Number of Things in Process
2. Improve Average Completion Rate

## 20% time lost to context switching per 'task'



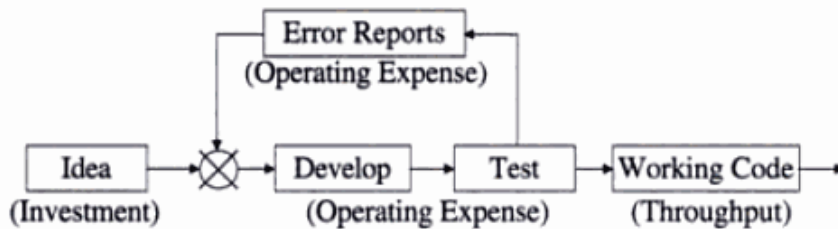
Gerald Weinberg, Quality Software Management: Systems Thinking

## Sequential yields results sooner



## Throughput Accounting

- Increase Throughput
- Decrease Operating Expense
- Decrease Inventory



Unit of Inventory = Idea  
Value of Inventory = Investment to Create the Idea  
Investment = Value<sub>Input</sub>  
Value<sub>Output</sub> = Sales Price - Direct Costs  
Value Added = Value<sub>Output</sub> - Value<sub>Input</sub>  
Throughput = Value<sub>Output</sub>

$$\text{Net Profit} = \text{Throughput} - \text{Operating Expense}$$
$$\text{Return on Investment} = \frac{\text{Net Profit}}{\text{Investment}}$$

## Enhances Teamwork

- Team focus on goals that add value not individual tasks

## Encourages Swarming

## Improves Quality



## What are you going to work on?

1. Work directly on an existing kanban to progress it
2. Collaborate with team members on an existing kanban to remove a bottleneck or constraint
3. Begin working on a new kanban if a slot is available
4. Find some other useful work

## Lower priority work...

- Spikes
- Analysis

## Other interesting work...

- Refactoring
- Tool Automation
- Personal Development
- Innovation

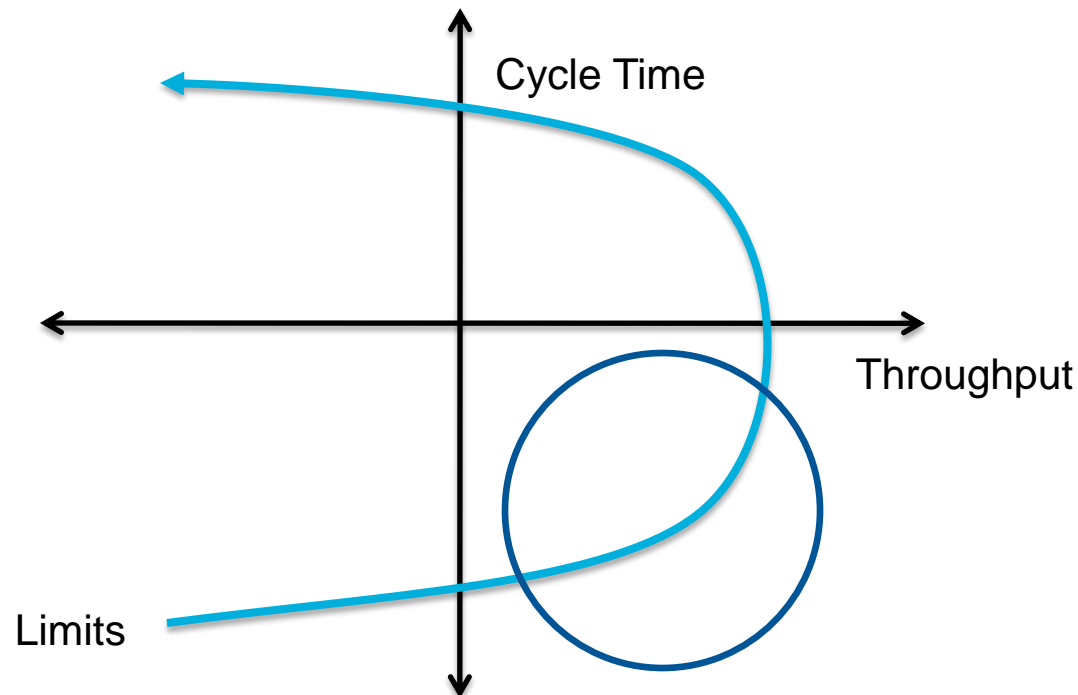
## But NOT

- Anything which will create work downstream

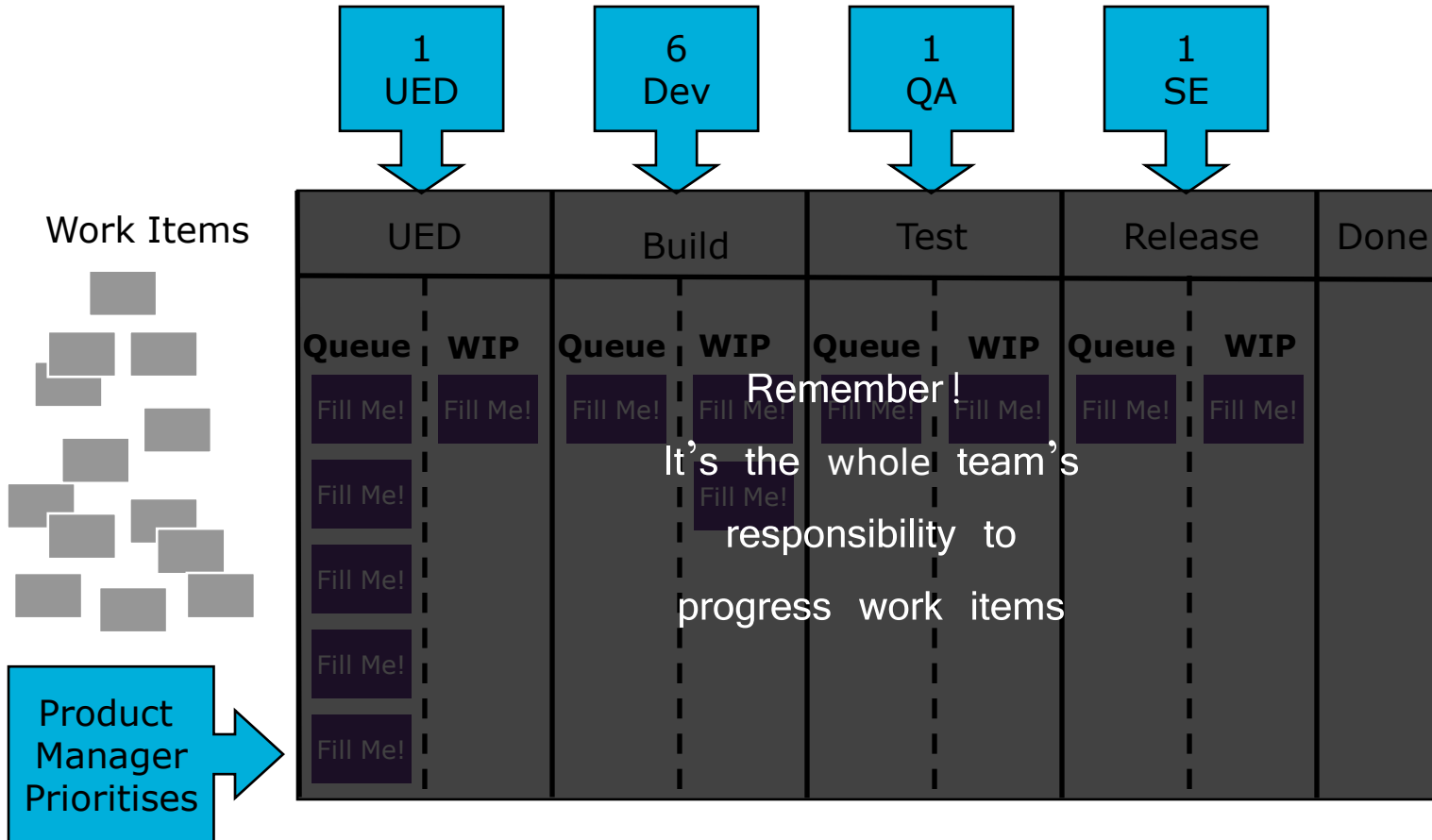
- Depends on type of work and size of team
- Should be adjusted to achieve maximum flow

Queue limits help to keep the flow smooth by:

- Keeping the team busy
- Avoiding premature prioritisation



# Example



## Why Kanban?

If you spend time managing large, complex backlogs, they could be eliminated

If you find the ceremony of time-boxing interrupts your work they could be eliminated

If estimation is not helping planning, it could be eliminated



Flow



The Work in the System

“In lean enterprises, traditional organizational structures give way to new team-oriented organizations which are centred on the flow of value, not on functional expertise.”

<http://www.poppendieck.com/papers/LeanThinking.pdf>

Moving one piece at a time between stages in a workflow

as opposed to

Moving batches of work between stages in a workflow

“A minimal marketable feature is a chunk of functionality that delivers a subset of the customer’s requirements, and that is capable of returning value to the customer when released as an independent entity”

M Denne & H Cleland-Huang, Software by Numbers

## As small as possible

- Progressive delivery (realise product sooner)
- Reduce feature bloat (the core features are the most important)
- A feature has a cost to a user (added complexity)

I will be able to write an entry  
in our product blog about this  
new feature



# Kano Model



## Table Stakes

- Parity to the competition
- Minimum needed to be in the game

## Differentiator

- Differentiates from the competition
- Delights the customer

## Spoiler

- A competitors differentiator
- Raises the bar for parity

## Cost Reducer

- Reduces cost
- Improves the margin



## Distinct, Deliverable, Observable

### Fits the INVEST acronym

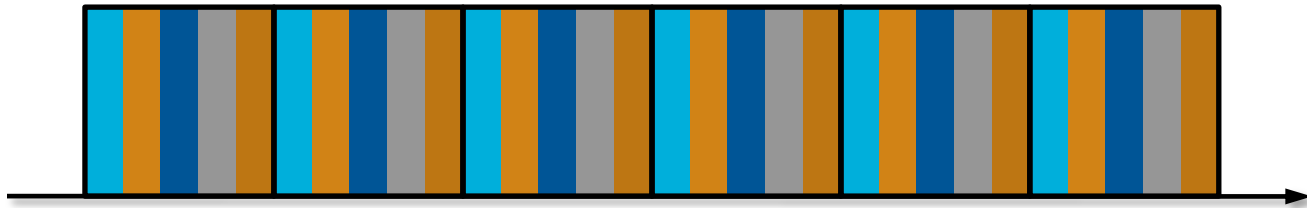
- Independent
- Negotiable
- Valuable
- Estimable
- Sized Appropriately
- Testable

# Large Batch

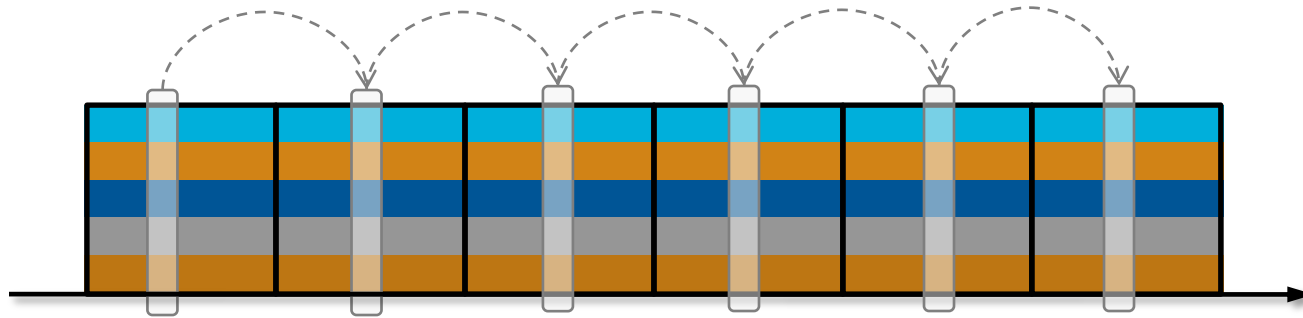


-  Analysis
-  Design
-  Build
-  Test
-  Release

# Smaller Batches

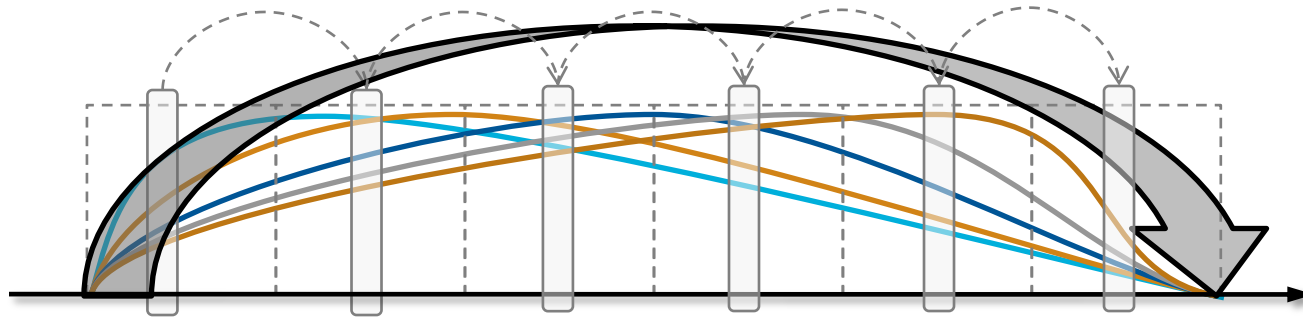


-  Analysis
-  Design
-  Build
-  Test
-  Release

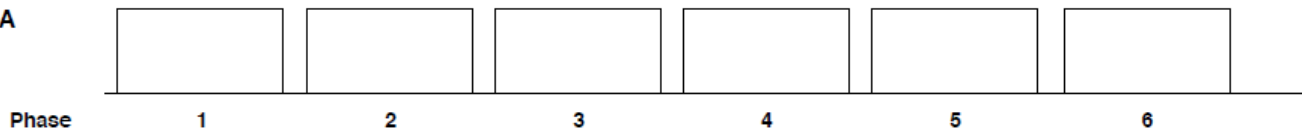


-  Analysis
-  Design
-  Build
-  Test
-  Release

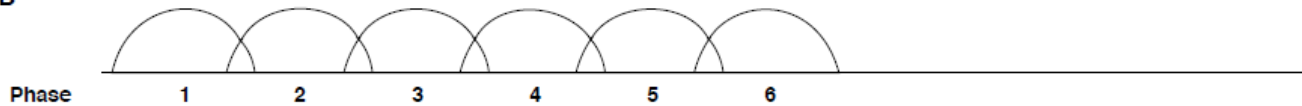
# One Piece Flow



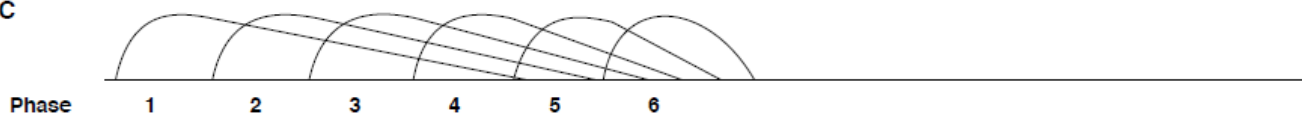
Type A



Type B



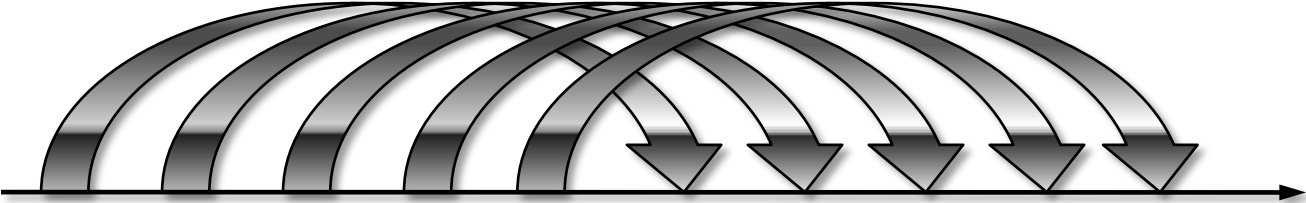
Type C



-  Analyze
-  Design
-  Implement
-  Demonstrate
-  Reiterate

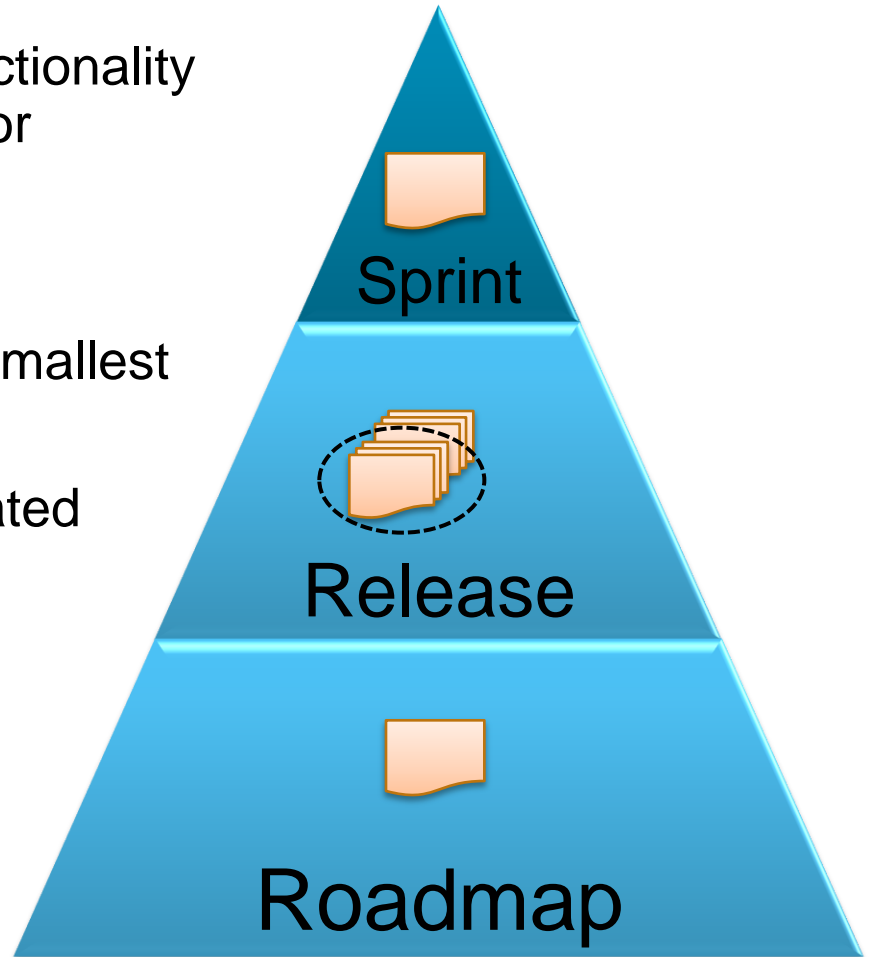
The New New product Development Game, Hirotaka Takeuchi and Ikujiro Nonaka

# Continuous Flow

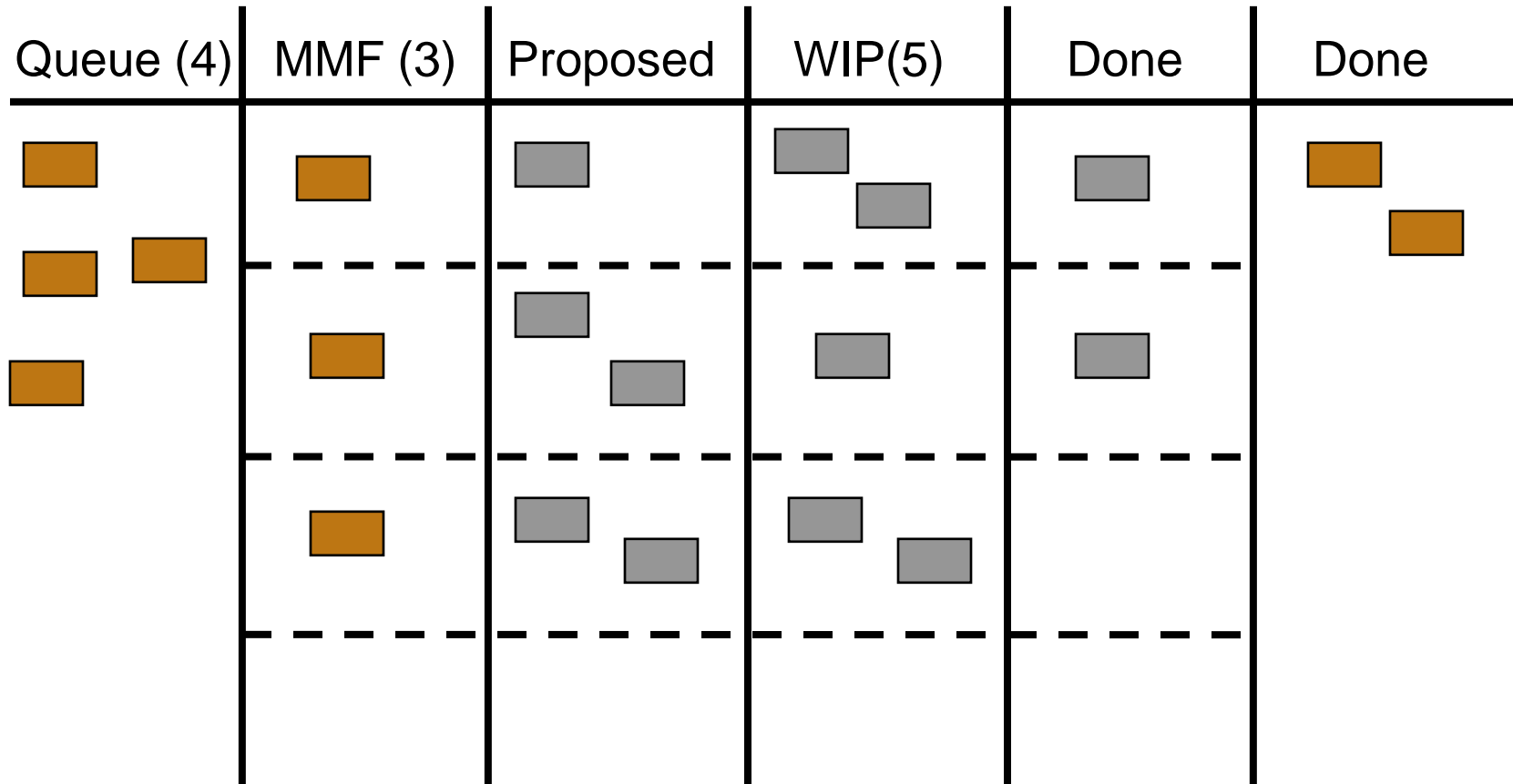




# The Backlog Iceberg

- Story – a description of desired functionality told from the perspective of a user or customer
- Minimal Marketable Feature – the smallest valuable set of Stories in a Theme
- Theme – a collection of smaller related Stories
- Epic – a large Story



# Two Tier Kanban



 MMF  User Story

## Why Flow?

If you struggle to break down functionality into time-box sized increments, then you could just focus on larger MMFs.

If you deliver frequent User Stories, but struggle to deliver business value, then you could focus on delivering larger MMFs.



Cadence

Commitment and Reliability

“If the team isn’t estimating or planning with fixed time-boxes, how can it make reliable commitments?”

Anonymous(es)

“A regular cadence, or ‘heartbeat,’ establishes the capability of a team to reliably deliver working software at a dependable velocity. An organization that delivers at a regular cadence has established its process capability and can easily measure its capacity.”

<http://www.poppendieck.com/pipeline.htm>

twitter

@marick Iteration-based agile is like a metronome where we seek feedback at every tick, Kanban is like a drummer who feels the rhythm



*06:59 PM November 28, 2008 from Syrinx in reply to marick*



**andypalmer**

Andy Palmer

- Input (Planning/Prioritisation)
- Output (Release)
- Review
  1. Stop the Line for special cause problems
  2. Monthly Retrospectives with Operations Reviews for common cause problems
  3. Quarterly Value Stream Mapping to re-assess the whole value stream
- Operational

- Throughput - the amount of output of a process in a given period of time
- Cycle Time - the length of time to complete a process

$$\text{Throughput} = \text{WIP} / \text{Cycle Time}$$

Throughput allows forecasting of future capability

Cycle Time allows appropriate prioritisation

## Cycle Time becomes an SLA with the business

- *“When we agree to take on a work request, we intend to deliver it within n days”*

<http://leansoftwareengineering.com/2007/09/10/striking-a-different-bargain-with-the-business/>

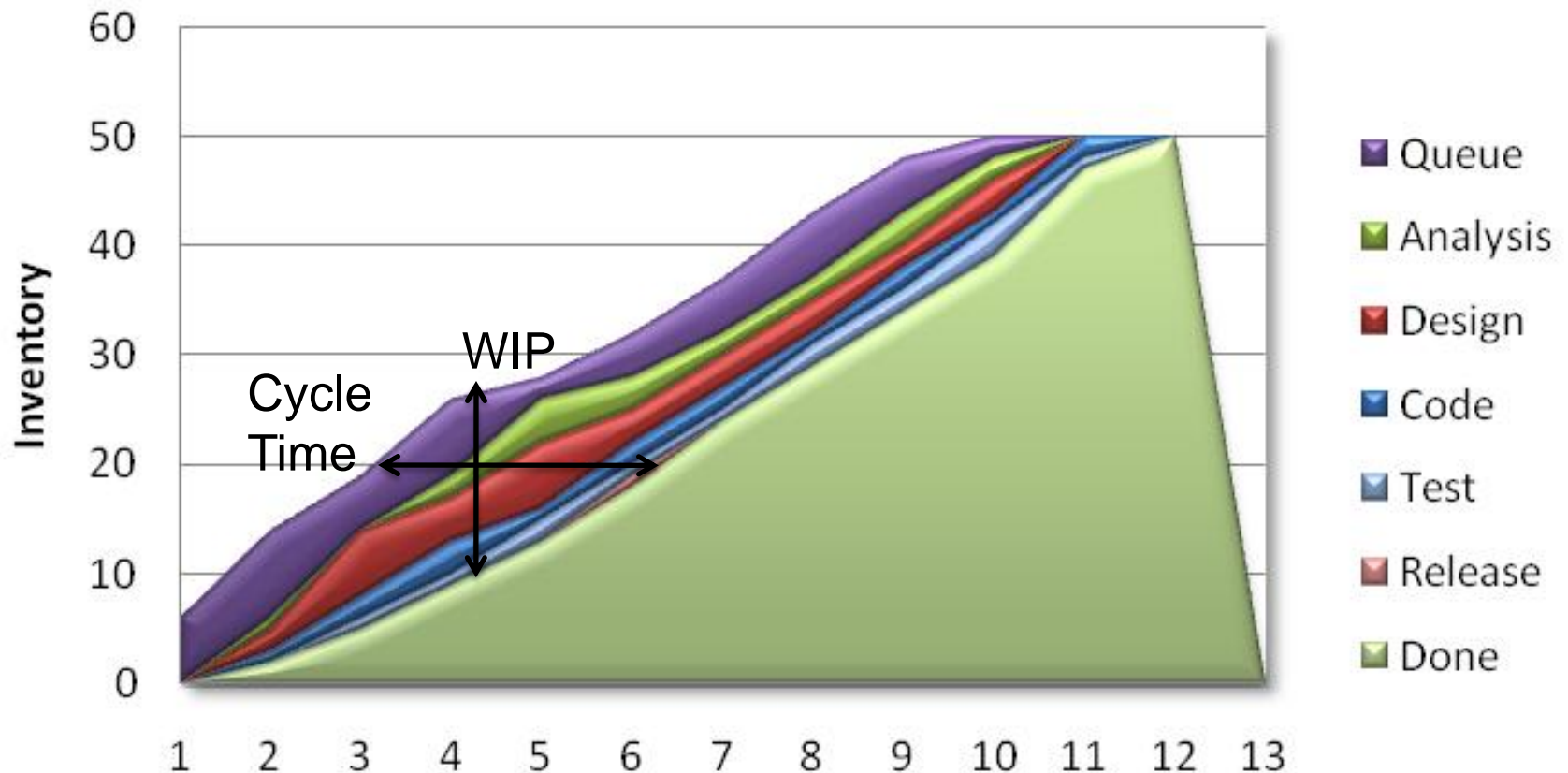
May need to size and/or classify MMFs where there is variation

Due Date Performance (DDP) is the percentage of MMFs delivered with the SLA

- Forecast quarterly goals and objectives
- Prioritise MMFs to meet those goals and objectives
- Release regularly
- Build trust that the team is working to its full capacity

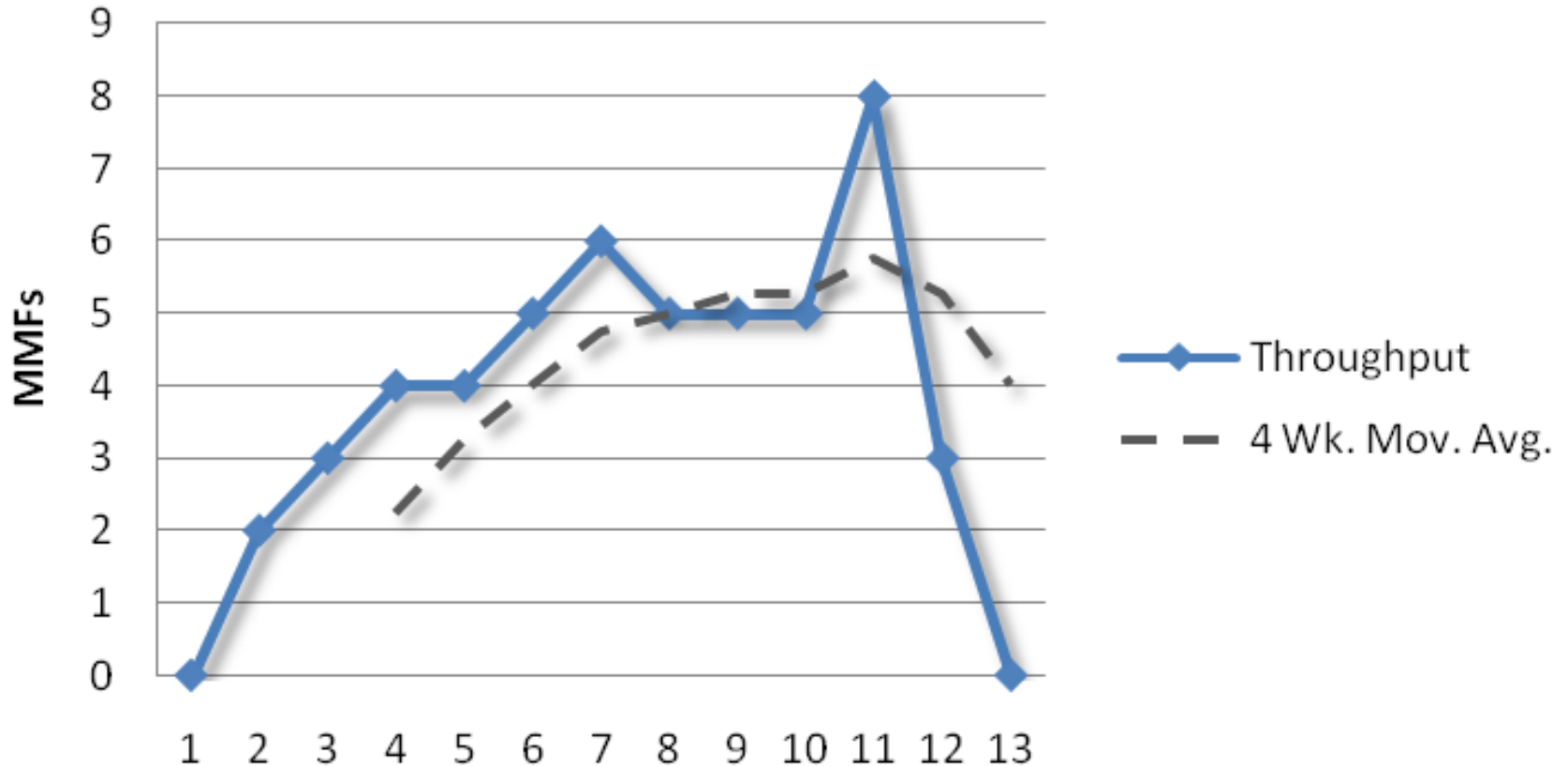
# Cumulative Flow Diagram

## Cumulative Flow



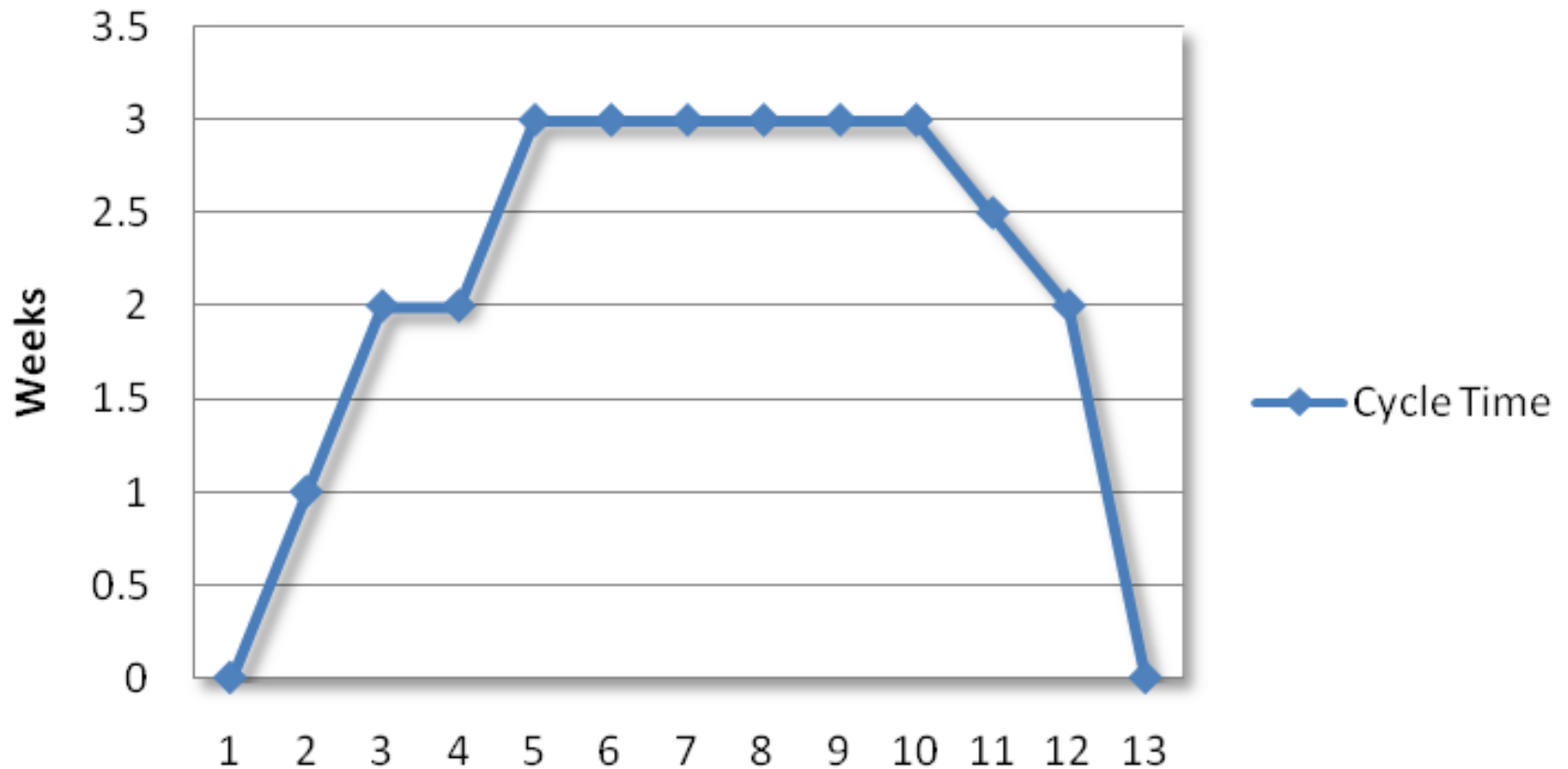
# Throughput Chart

## Throughput



# Cycle Time Chart

## Cycle Time



## Why Cadence?

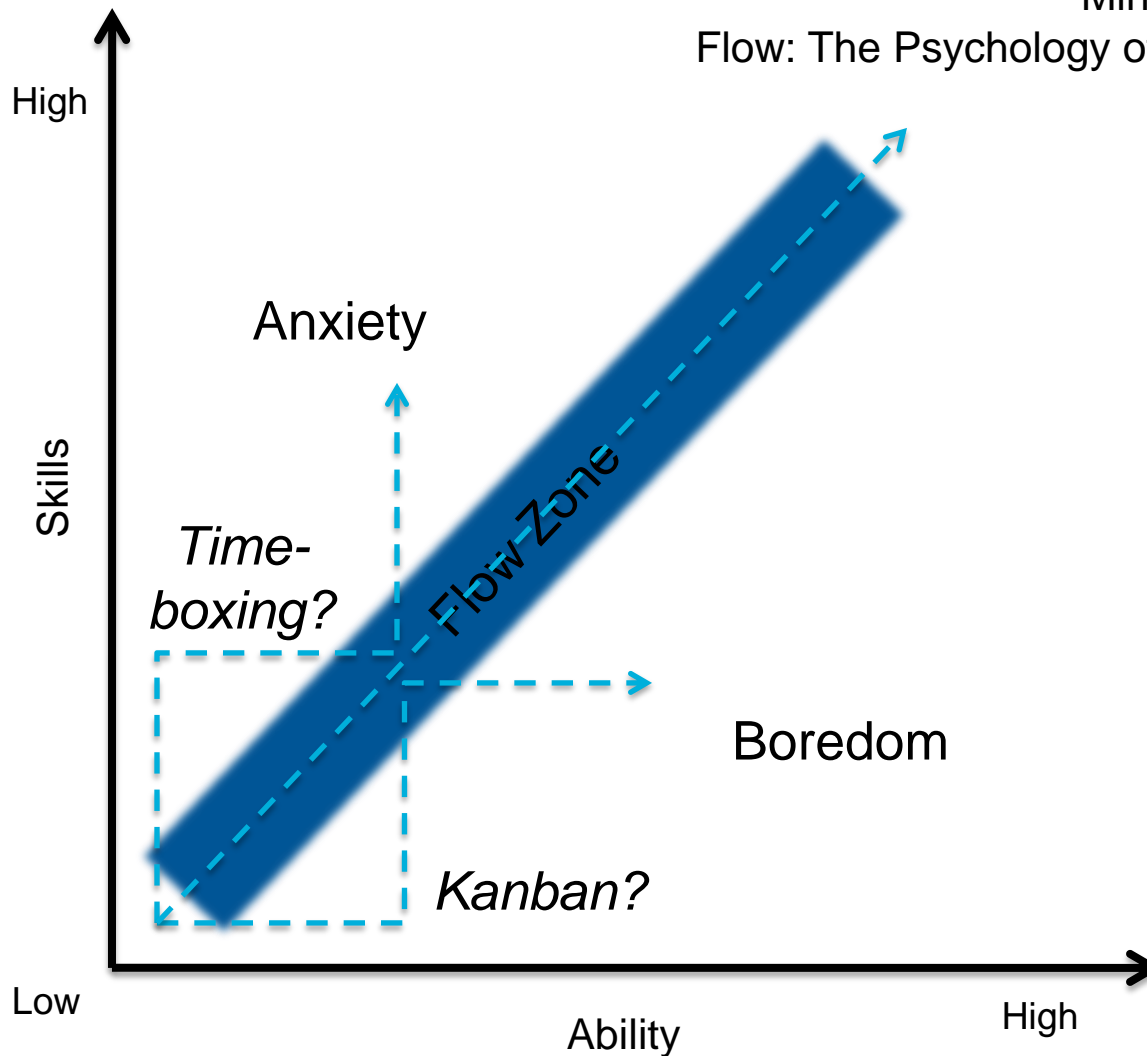
If you find the time-box ceremonies too restricting, or unproductive, then they can be de-coupled to allow a more natural rhythm

If your estimation and planning is not accurate or reliable, then it can be replaced with measurements to forecast capability



# Summary

Mihalyi Csikszentmihalyi,  
Flow: The Psychology of Optimal Experience



Kanban is an alternative, not a replacement

However, rather than focusing on being Agile which *may* (and *should*) lead to being successful, Kanban focuses on becoming successful, which *may* lead to being Agile.


Therefore, Kanban can sit on top of any existing process

1. Map the Value Stream
2. Visualise the Value Stream
3. Limit Work in Progress
4. Establish a Cadence
5. Reduce the Kanban Tokens

# UK Lean & Kanban Conference

UK LEAN CONFERENCE 2009

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Join us at the prestigious RSA in London for the first annual UK Lean and Kanban software management conference. The conference, which will be held over two and a half days from 27 through to 29 September brings together the leading innovators, practitioners, and influential thought leaders in Lean software management.

The Lean and Kanban 2009 event was created to drive further progress in software development by providing a unique opportunity to share best practices and innovation within the growing community of software engineers, managers, and executives adopting Lean and Kanban systems. It provides a unique opportunity to meet with and learn directly from industry luminaries and practitioners from around the world.

Confirmed speakers include:


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- [Corey Ladas](#)
- [Kerji Hiranbe](#)
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## Keynote Speakers


Confirmed keynote speakers include:



**Mary Poppendieck** wrote the award-winning book *Lean Software Development* to explain how the lean principles from manufacturing could be applied to software development. Later Mary lectured with her husband Tom and co-wrote a second book, *Implementing Lean Software Development*.



**Don Reinertsen** is recognised internationally for his contribution to the management of product development. In 1983 he wrote a landmark article that first quantified the value of development speed, indicating that 6 months delay can be worth 33 percent of lifecycle profits.



**David J Anderson** is a thought leader in managing highly effective software teams. His first book, *Agile Management for Software Engineering – Applying the Theory of Constraints for Business Results*, introduced many ideas from Lean into software engineering.

## Useful Links

### Conference Venue – The RSA

For over 250 years the Royal Society for the encouragement of Arts, Manufactures and Commerce (RSA) has been a cradle of enlightenment thinking and a force for social progress. Ideally situated on London's Strand, the RSA provides the prestigious venue for this year's event.

[www.thersa.org](http://www.thersa.org)

### US Conference, May 2009

If you are unable to make it to the UK event, a similar event is being held in Miami in May.

[www.leankanbanconference.com](http://www.leankanbanconference.com)

### Organisers - IndigoBlue

For press and sponsorship enquiries, please contact Jason Smith on +44 (0)20 7692 4832.

[www.indigoblue.co.uk](http://www.indigoblue.co.uk)

UK Lean & Kanban Conference  
September 27-29 2009  
<http://ukleanconference.com/>

Thank You

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<http://availagility.wordpress.com>

<http://groups.yahoo.com/group/kanbandev/>

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