How to improve Flow Efficiency

Remove the Red bricks!

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Agile/Scrum/XP
Lean, Kanban & Flow

I'M STUCK.
I'M TOO BUSY.
I'M IDLE.
LET'S DO SOMETHING ABOUT IT!

Created by Håkan Forss @hakanforss http://hakanforss.wordpress.com
I’m a huge LEGO fan!

DISCLAIMER

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Non value adding: Required waste

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> 1000 hours

< 60 hours

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A Question of focus
Strategy to increase utilization

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Strategy to fulfill needs a.s.a.p.
Strategy to increase utilization
Strategy to fulfill needs a.s.a.p.
High utilization
Long lead-times
High Work-In-Process
Large batches
Focus on unit cost

Lots of waiting for flow unit
Slow to respond to change

Low utilization
Short lead-times
Low Work-In-Process
Small batches
Focus on customer value

Little waiting for flow unit
Fast to respond to change

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Which process is most expensive?
Flow efficiency in numbers

- Usually **1-5%** value added of total lead-time
- **20%** value added is a high number
How many **RED** and **YELLOW** bricks do you have?
Non value adding: Wait time
Non value adding: Required waste
Value adding: Actual demand
Support team responds
Non value adding: Wait time
Non value adding: Required waste
Value adding: Actual demand

Support team responds

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We need to
Shift our focus
BUSY WORKERS
High Resource Efficiency

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BUSY FLOW UNITS
High Flow Efficiency

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Q & A

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Effort estimation is flawed
#NoEstimates
Non value adding: Wait time

Non value adding: Required waste

Value adding: Actual demand

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Use historical data
Non value adding: Wait time
Non value adding: Required waste
Value adding: Actual demand
Use Probabilistic forecasting based on historical data
How to improve Flow Efficiency?
Start with the **RED** bricks

- **Non** value adding: Wait time
- **Non** value adding: Required waste
- **Value** adding: Actual demand

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Non value adding

RED bricks: Wait time

- Waiting in a queue
- Waiting for a decision
- Waiting on dependency
Non value adding: Wait time

Non value adding: Required waste

Value adding: Actual demand

Then take on the Yellow bricks
Non value adding

**YELLOW bricks: Required waste**

- Over processing
  - Backlog maintenance
- Reporting and status meetings
- Rework due to
  - Defects
  - Handovers
  - Long lead-times
  - Lack of understanding the requirements

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Yes!! But how?
Try!

Nirvana

Flow efficiency

Resource efficiency

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We need to

Shift our focus

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From local awareness...
..to global awareness
Go from local understanding...
...to a shared and visual understanding of End-To-End flow
We need to
Shift our focus
From big batch, low frequency...
...to small batches with high frequency
Reducing batch size

- Smaller features
- Smaller slices first, MMF, MVP second
- Deliver continuously, or more often
- Avoid projects
We need to
Shift our focus
From what we are working on...
...to what is not progressing

<table>
<thead>
<tr>
<th>Backlog (6)</th>
<th>Analysis (3)</th>
<th>Dev (5)</th>
<th>Test (3)</th>
<th>Deployed</th>
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</thead>
<tbody>
<tr>
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*Urgent!*
Blockers and Impediments are like **Gold** and **Gems** for improving flow in your process.
The three "laws"

- Little’s Law
- Law of bottlenecks
- Law of variation
Little’s Law

\[
\text{Lead Time} = \frac{\text{Work-in-Process}}{\text{Throughput}}
\]
Little’s Law

1 min = \frac{12}{12 \text{ / min}}
Little’s Law

\[
0.5 \text{ min} = \frac{6}{12 / \text{min}}
\]
Little’s Law

2 min = \frac{24}{12 \text{ / min}}

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### Table 1: Feature A Completion Status

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<tbody>
<tr>
<td>1</td>
<td>Feature A</td>
<td>15d</td>
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### Table 2: Feature B Completion Status

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<tbody>
<tr>
<td>2</td>
<td>Feature B</td>
<td>5d</td>
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### Table 3: Feature C Completion Status

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<tr>
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<td>Feature C</td>
<td>5d</td>
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<th>aug 2011</th>
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Plan for less than 100% utilization

Inspired by Mårten Pehrson

Utilization planed at 70%

Time for improvements

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Lower planned utilization

Inspired by Mårten Pehrson

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Acts as an insurance policy for shorter lead-time

- **Lead-time Insurance**
  - Capability
  - Time
  - 100% Utilization planned at 70%

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Inspired by Mårten Pehrson
Creates option to do the important things when you need it.

Utilization planned at 70%

Options

Inspired by Mårten Pehrson

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Creates the time for increasing capability

- Time for improvements
- Utilization planned at 70%

Inspired by Mårten Pehrson
Plan for less than 100% utilization

Inspired by Mårten Pehrson

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Lowering the water level uncovers process improvement opportunities

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Lower Work-In-Process
The three "laws"

- Little’s Law
- Law of bottlenecks
- Law of variation

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Law of Bottlenecks

Every process has one
You can’t go faster than your bottleneck

Capacity = 6
Capacity = 4
Capacity = 6

Throughput = 4
You can’t go faster than your bottleneck

Equal too or greater capacity in front

You can go as fast as your bottleneck
You can’t go faster than your bottleneck

Full use of a higher capacity in front of the bottleneck will make lead-time go up
You can’t go faster than your bottleneck.

Capacity => 4

Capacity = 4

Capacity >= 4

Throughput = 4

Equal to or greater capacity after

You can go as fast as your bottleneck.

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You can’t go faster than your bottleneck

Higher capacity after the bottleneck will not improve throughput over time
Process stage without WIP Limits

Demand

Stage 1  Stage 2  Stage 3
WIP Limit  WIP Limit

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Process stages without WIP Limits

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Process stages without WIP Limits
Set WIP Limits on every process stage!
Setting first WIP Limits

- Current average WIP x2
- Current WIP + small safety
- WIP = people/pairs per stage
- WIP = ½ people/pairs per stage

Organizational friction

Low  High

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Adjust WIP 20-30%

Identify the problems

Resolve the problems

Stabilize process

Repeat

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The three “laws”

- Little’s Law
- Law of bottlenecks
- Law of variation

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High variation

Lead time

Resource efficiency

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Common sources of variation

- Large batches
- Ad-hoc processes
  - Swarming on work
  - Load balancing processes
- Uneven arrival rate of work
- Uneven work duration
- Uneven availability of capacity

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Reduce unnecessary process variation

- Use a mixed feature portfolio
- Remove iterations, or reduce length
- Avoid Ad-hoc processes
  - Swarming on work
  - Loadbalancing processes

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Plan for less than 100% utilization
Absorbs unwanted variation

Inspired by Mårten Pehrson

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Improvements are experiments
Puff
Oh, I did NOT expect that!
The sound of learning
Expect at least 50% of the experiments will not give the **expected** result

This is when we REALLY learn!
Make improvements and changes in small batches

Daily work

Delivering value

Improving the work

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Plan
- Define hypothesis
- Make Prediction

Do
- Run Experiment
- Closely observe

Check
- What did we learn?

Act
- Update or new hypothesis

I told you so!

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Actively encourage an experimentation culture
“A bad system will beat a good person every time.”

 epid W. Edwards Deming
Q & A

Håkan Forss
Mail: hakan.forss@avegagroup.se
Twitter: @hakanforss
Blog: http://hakanforss.wordpress.com

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Are you too busy to improve?

No thanks!

We are too busy
Don’t Be(e) a busy worker!
Lower WIP to find rocks and critters that blocks flow
Effort estimation is flawed

#NoEstimates
#Agile2014 photo session
#Agile2014 photo session
#Agile2014 photo session

Great work Maria!

Just a few more shots
On my way to #Agile2014
Set WIP Limits on every process stage!

Demand → Backpressure → Stage 1 → WIP Limit → Stage 2 → WIP Limit → Stage 3 → WIP Limit

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Why Work-In-Process and not Work-in-Progress?

Non value adding: Wait time

Non value adding: Required waste

Value adding: Actual demand

You tell me!

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Time to take sides