Lean & Kanban 2009 Miami

May 6th-8th MANDARIN ORIENTAL

The Next Wave in Software Process

NetObjectives

VERSIONONE
Simplifying Software Delivery

Ultimate Software

InfoQ

wordclay

StickyMinds.com

BETTER SOFTWARE MAGAZINE

David J Anderson & Associates
Management Consulting for Knowledge Workers

Best Medium Company to Work for in America

Ranked #1

2008

Kanban is a very simple idea that isn’t restricted to manufacturing.
Recipe for Success

- Focus on Quality
- Reduce Work-in-Progress, Deliver Often
- Balance Demand against Throughput
- Prioritize

And for advanced credit...
- Reduce variability and improve the process
Kanban is a collaborative cooperative game
Map the value stream and track work on a white board

Hold a standup meeting every day in front of the board
... and track electronically to create a data stream that can be used for objective analysis
Example: Microsoft XIT
Manage quantitatively and objectively using only a few simple metrics

- Quality
- WIP (work-in-progress)
- Lead time
- Waste / Efficiency
- Throughput

Across those five:
- Trend
- Variation
Kanban uses a daily standup meeting as a central enabler of a Kaizen culture.

In this example more than 40 people attend a standup for a large project with 6 concurrent development teams. The meeting is usually completed in approximately 10 minutes. Never more than 15.
Hold a monthly Operations Review and present all the data, invite anyone who wants to come
In general, empirical observation of ragged flow or visibility of waste generates a quality circle resulting in a kaizen event.
It’s not about the Japanese words!

Focus on cultural change and risk management!
Change a Culture by focusing on…

Management Decisions and Policies
Agile Decision Filter

• Are we making Progress with imperfect information
  “perfect is the enemy of good enough”

• Are we encouraging a High Trust Culture
  Empowerment
  Collaboration
  Tolerant of Failure / Encourage Innovation

• Are we treating WIP as a liability rather than an asset
  Reduce cycle time
Lean Decision Filter

- Value trumps Flow
  *Expedite at the expense of flow to maximize value*

- Flow trumps Waste Elimination
  *Increase WIP if required to maintain flow even though it will add waste*

- Eliminate waste to improve efficiency
  *Do not pursue economy of scale*
Kanban sets an expectation of High Maturity

Root cause analysis on defects
“stop the line”
(CMMI) CAR

Kaizen events
(CMMI) OID
Kanban limits create a pull system and white board provides visualization of flow through to delivery.

**Kanban Limit** – regulates WIP at each stage in the process.

**Flow** – from Engineering Ready to Release Ready.
Kanban has been called *iterationless* development

- Releases were agreed and planned for every 2nd Wednesday
- Prioritization Board meetings were held every Monday
- Release content is bound and published only 5 days prior
- Prioritization meetings are required only to answer the question, “Which items from the backlog do we want to select this week to fill any empty slots in the input queue?”
- Prioritization holds change request selection until the *last responsible moment*
- It keeps (real) options open
But *iterationless* is a misnomer

- Input cadence, release cadence should be deiced based on transaction costs and will be unique to value chain
- Cycle time will be unique to type of work and analysis breakdown
- Concept that input cadence, output cadence and cycle time should be synchronous e.g. 2 week iterations, will be seen as edge case 5 years from now
- Kanban still allows for iterations but decouples prioritization, delivery and cycle time to vary naturally according to the domain and its intrinsic costs
Don Reinertsen’s observations on Corbis Kanban system and how it differed from Toyota

- No FIFO queuing
- Tasks prioritized by “cost of delay” or resource availability
- Cost of delay is heterogeneous
- Resources are often specialist, not generalist or cross-trained at prev/next stations
- Task durations have much wider variability – no tight 3 sigma limit, no takt time concept
Many Kanban implementations are **estimationless**

- Removing estimation is a choice
- Based on risk
- When applicable replace estimation with a commitment to a regular release
- Use classes of service to mitigate risks (see later)
- Kanban does not mandate estimationless approach. Estimationless process is a risk-aware choice
Your situation is *unique!*

- At the code and compile level things are the same
- But…
- The value stream
- The bottleneck
- The resources and proficiencies
- The risk profile of the project
- All of these are unique
- Every process should be tailored to unique circumstances

*Every kanban implementation should be different!*
Educate the workforce to recognize process problems that affect performance.
Bottlenecks
Variability in processes and flow of work
Our build engineer was a non-instant availability bottleneck
One month later in April, more changes to Kanban limits and forward extension of the process to business analysis.
Waste bin spontaneously introduced by team to visually communicate rejected CRs that wasted energy and sucked productivity
A report was created to detail rejected or canceled work items.

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<thead>
<tr>
<th>ID</th>
<th>Work Item Type</th>
<th>Title</th>
<th>Business Dept.</th>
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<th>Business Priority</th>
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<th>Approved Date</th>
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Quantity of pink issue tickets on board directly indicates flow impacting problems that need attention from management.

Issues are the exception – attached to work items that are blocked for external reasons and call attention to problems preventing smooth flow.
September 2007 – Business Analysis and Systems Analysis merged eliminating 25% of lead time consumed as queuing waste
Major project with two-tiered kanban board
Major Project with two-tiered kanban board using swim lanes for feature sets
Bargaining, Democracy & Collaboration

- First 8 weeks prioritization board would bargain against the available slots and WIP limit
  - I’ve got two small requests can you treat them as one?
- People started to lobby each other and build business cases to get items selected
- Familiarity with the system led to the consensus decision to adopt a democratic process
- 3 months later it was evident that democracy didn’t always select the best candidate
- And it was replaced with a collaborative process based on strategic and current tactical marketing objectives
The process has shown remarkable robustness to gaming from the business

- Prioritization board consists of VPs from 6 business units
- Understanding that expediting costs throughput and lead time has resulted in an expectation that only critical items qualify for *Silver Bullet* status
- Attempts to game prioritization by setting a delivery date are tightly scrutinized by the board
- As a result the process is self-regulating with the prioritization board enforcing the anti-gaming rules
- As a result the *Silver Bullet* and delivery date options are seldom used
Measures used in Kanban to facilitate quantitative measurement and predictability...
Cumulative Flow

WIP growth due to additional resource allocation (good) and some sloppy management of kanban limits (bad)

Business encouraged to re-triage backlog
Issue Management Cumulative Flow

Issues and Blocked Work Items

How many issues and blocked work items do we have?
Due Date Performance Detail

### MARCH

**Lead Time Distribution**

Days

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<tr>
<th>Days</th>
<th># CRs</th>
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### APRIL

**Lead Time Distribution**

Days

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Majority of CRs range 30 -> 55

Outliers

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Kanban summary

- **Culture Change**
  - Trust, empowerment, objective data measurement, collaborative team working and focus on quality

- **Policy Changes**
  - Late-binding release scope, no estimating, late-binding prioritization

- **Delivery cadence based on domain costs**

- **Cross-functional collaboration**
  - Previously unheard of VP level selfless collaboration on business priority

- **Self-regulating process robust to gaming and abuse**

- **Continuous Improvement**
  - Increased throughput, high quality, process continually evolving, kanban limits empirically adjusted
Kanban creates the desired cultural shift to an objective, consensus-based, empowered kaizen culture
Managing Risk with Classes of Service
Kanban tickets hold a lot of information that enable decentralized control and local decision making when deciding priority of items to pull through the system.

**Electronic ID number**

**Date Accepted** – clock starts on SLA

**Assigned engineer**

**Issue attached to change request** – indicates management attention required

**Hard delivery date** – for regulatory, legal, or strategic reasons

**Signifies item that has exceeded SLA** – indicates that item should be prioritized if possible
Empower team members with policies enabled by transparency of information
Colors are used to designate classes of service for work items:

- Change Requests and Production Bugs – Customer valued and prioritized by governing board.
Quantity of blue tickets on the board is an immediate indicator of development quality that is impeding flow of customer valued work and reducing throughput.

Engineering Defects – direct indicator of quality impact on productivity, linked to yellow sticky, not counted against kanban limit.
Non-customer valued but essential work is tracked as a different class of work.

**IT Maintenance Work** – Technology department reserving capacity for its own maintenance – difficult to prioritize with business – count against kanban limits.
Expediting – the Silver Bullet

- Process allows for a single Silver Bullet expedite request
- Silver bullet is *hand carried* through the system
  - Personal attention from project manager
  - Automatically jumps queues
  - Required specialist resources drop other work in preference to working the silver bullet
- Release dates may be adjusted to accommodate required delivery date
Temporary classes of work may be introduced tactically to maximize exploitation of the system

Extra Bug – Special class of production bug, worked by slack developer resources and specially selected not to impact solutions analysis. Tested by developers not testers. Allows maximum exploitation for improved throughput
Generally speaking class of service should be defined according to “cost of delay”.

Cost of delay function for an online Easter holiday marketing promotion is integral under curve prior to release.
Example classes of service

- Expedite
- Fixed Delivery Date
  - Unit step cost of delay function (or near approximation)
- Standard Class
  - Linear tangible cost of delay function
- Intangible Class
  - Intangible cost of delay
    - Examples brand identity change, usability fix
Policies for Expedite Class of Service

- Expedite requests will be shown with white colored cards.
- Only one expedite request will be permitted at any given time. In other words, a kanban limit of 1 is assigned to the Expedite class of service.
- Expedite requests will be pulled immediately by a qualified resource. Other work will be put on-hold to process the expedite request.
- The kanban limit at any point in the workflow may be exceeded in order to accommodate the expedite request.
- If necessary a special (off-cycle) release will be planned to put the expedite request in production as early as possible.
Policies for **Fixed Date** Class of Service

- Fixed delivery date items will use purple colored cards.
- The required delivery date will be displayed on the bottom right hand corner of the card.
- Fixed delivery dates will receive some analysis and an estimate of size and effort may be made to assess the flow time. If the item is large it may be broken up into smaller items. Each smaller item will be assessed independently to see whether it qualifies as a fixed delivery date item.
- Fixed delivery date items will be held in the backlog until close to the point where they must enter the system in order to be delivered on-time given the flow time estimate.
- Fixed delivery date items will be given priority of selection for the input queue at the appropriate time.
- Fixed delivery date items will be pulled in preference to other less risky items. In this example, they will be pulled in preference to everything except expedite requests.
- Unlike expedite requests, fixed delivery date items will not involve putting other work aside or exceeding the kanban limit.
- If a fixed delivery date item gets behind and release on the desired date becomes less likely it may be promoted in class of service to an expedite request.
Policies for **Standard** Class of Service

- Standard class items will use yellow colored cards
- Standard class items will be prioritized into the input queue based on an agreed mechanism such as democratic voting and will typically be selected based on their cost of delay or business value
- Standard class items will use First in, First out (FIFO) queuing approach to prioritize their pull through the system. Typically when given an option a team member will pull the oldest standard class item from an available set of standard class items ready for the next step in the process
- Standard class items will queue for release when they are complete and ready for release. They will be released in the next scheduled release
- No estimation will be performed to determine a level of effort or flow time.
- Standard class items may be analyzed for size. Large items may be broken down into smaller items. Each item may be queued and flowed separately
Policies for **Intangible** Class of Service

- Intangible class items will use green colored cards.
- Intangible class items will be prioritized into the input queue based on an agreed mechanism such as democratic voting and will typically be selected based on their intangible business value.
- Intangible class items will be pulled through the system in an ad hoc fashion. Team members may choose to pull an intangible class item regardless of its entry date so long as a higher class item is not available as a preference.
- Intangible class items will queue for release when they are complete and ready for release. They will be released in the next scheduled release.
- No estimation will be performed to determine a level of effort or flow time.
- Intangible class items may be analyzed for size. Large items may be broken down into smaller items. Each item may be queued and flowed separately.
- Typically, the preference would be to put aside an intangible class item in order to process an expedite request.
- It is therefore sensible and shows a good spread of risk when intangible class items are flowing through the system.
Managing Requirement Risk
Describe a market and its players

- Who is the cost leader?
  - (there can be only one)
- How are the other players differentiated?
  - What product features or services are offered that create that differentiation?
  - How much profit or market share is associated with those differentiators?
- Are there any niche players?
  - Don’t compete in the whole broad market
  - Small but defensible market share
  - What is their niche?
  - How big a share does the niche represent?
Aligning with strategic planning is critical

- Commodity features
  - Undifferentiated
  - Table stakes for the market
  - “must have”
- Differentiators
  - Drive customer choice/selection
  - Drive profits
- Spoilers
  - Spoil a competitors differentiators
- Cost Reducers
  - Reduce cost to produce, maintain or service and increase margin
How to map features to strategic planning

**Commodities**
- => the minimal set of features to enter a market niche
  => The Cost Leader

**Differentiators**
- => features that enable a differentiated profit or share opportunity
  => align with the positioning of a Differentiated Player or Niche Player

**Spoilers**
- => features that copy a profit or share driver for a competitive Differentiated or Niche Player
Market Risk Varies by Requirement Type

- **Highly likely to change**
- **Very unlikely to change**

- **Differentiator**
- **Spoiler**
- **Cost Saver**
- **Commodity**

- **Value**
Mapping requirements against iterations

- Commedities
- Commedities
- Cost Savers
- Spoilers
- Differentiators

Iterations:
1 - 2 - 3 - 4 - 5

Time:
Desired Release Date
As a result MMFs can be hugely variable in size.

MMFs for commodities are large.

MMFs for differentiators and spoilers are small.

Size of MMF depends on stage in product lifecycle and strategic positioning.
Portfolio Risk varies by Product Lifecycle

- **Market Risk**
  - Highly likely to change
  - Very unlikely to change

- **Growth Market**
  - Innovative/New

- **Cash Cow**
  - Requires Investment
  - Profit

Requires Investment
Managing Portfolio Risk
Allocate portfolio according to risk

Cash Cow – safe but boring

Growth Market – requires serious investment but known returns

Innovative new product – requires investment but risky
Similar to allocating a 401K…

Bonds – safe but boring

Large Caps – requires serious investment but known returns

Small Caps – requires investment but risky
Do not prioritize portfolio – allocate resources by risk

No projects!

Initiatives with Kanban workflow per line of business

Allocate headcount per initiative according to designation as cash cow, growth market or innovation
Thank you!

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