A Gentle Introduction to:

Kanban (看板)

Keith McMillan – CISSP, CCSP, CSP, SPC3,4,5

MKE Agile Meetup – Fall 2020

MKE AGILE

Ideas ON Tap

nvisia

connect. build. enable.

Today's Discussion

nvisia
connect. build. enable.

Kanban Overview
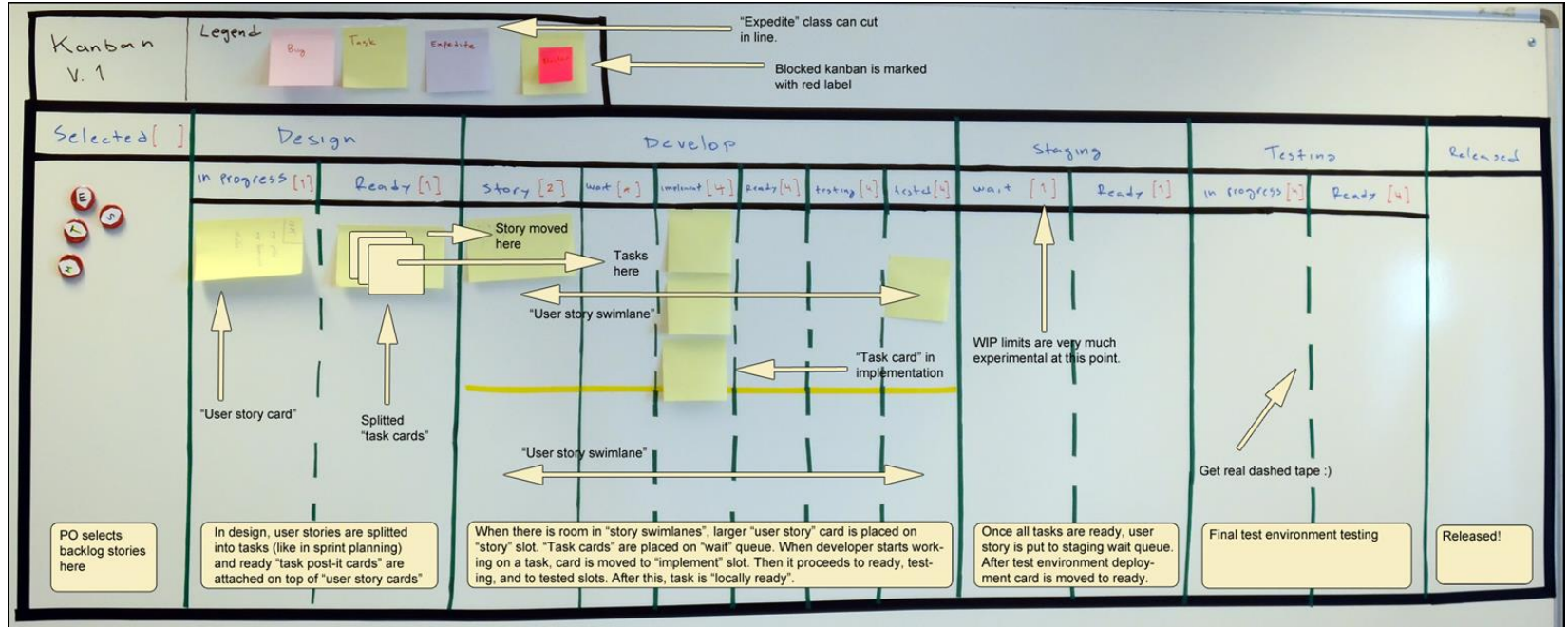
Background, Basic Rules, and Purpose

Background

- Originated at Toyota as an inventory control system

- A workflow improvement technique

- Not a workflow in itself — must be applied to existing workflow

- Workflow for each Kanban is different

Basic Rules

**Visualize workflow, Limit work in progress (WIP), Pull Work**

Why use it?

- Visualizing workflow helps us identify bottlenecks

- Limiting work in progress increases throughput, minimizes waste from context-switching, and increases quality

- Pulling work empowers workers to own the process, increases commitment and encourages self-optimization
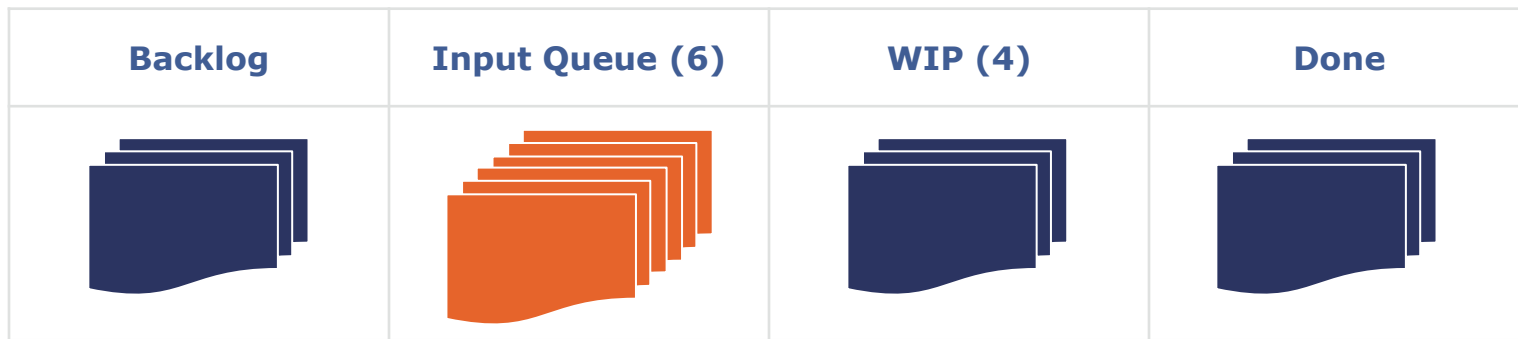
The Workflow Steps

Backlog, Input Queue, Work In Progress

nvisia
connect. build. enable.

Workflow Steps: The Backlog

| Backlog	Input Queue (6)	WIP (4)	Done
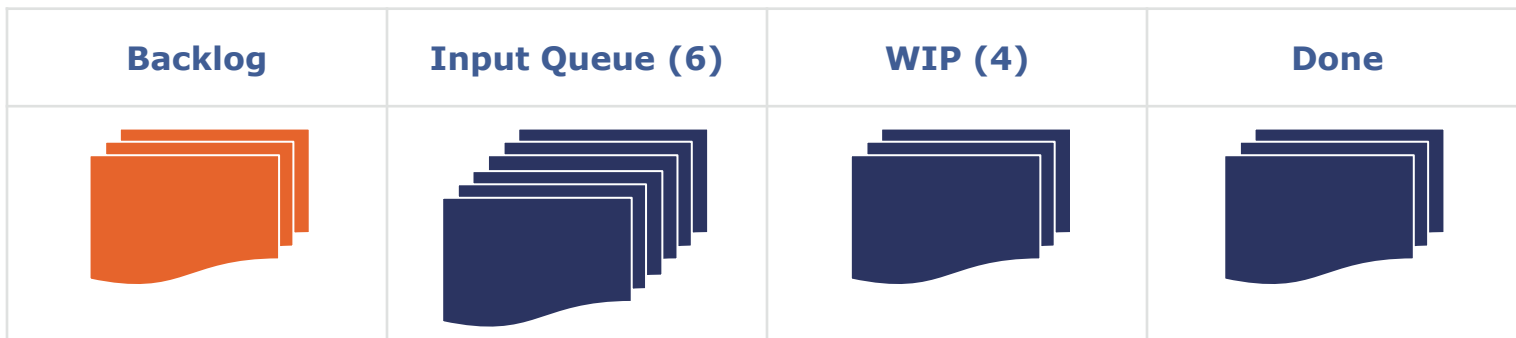
- All requested work
- Unordered
- Unlimited*

- No current work being done on items
- No guarantee on how long an item will remain here*

Workflow Steps: Input Queue

Backlog	Input Queue (6)	WIP (4)	Done

- Items to work on next, as selected by the business
- WIP limited (6 in this example)
- No active work (otherwise it would be work in progress!)

- SLA clock starts when items enter this state
- Items may be selected at a scheduled or ad-hoc prioritization meeting
- Business is free to choose how items are selected for input queue

nvisia
connect. build. enable.

Workflow Steps: Work In Progress

Backlog	Input Queue (6)	WIP (4)	Done
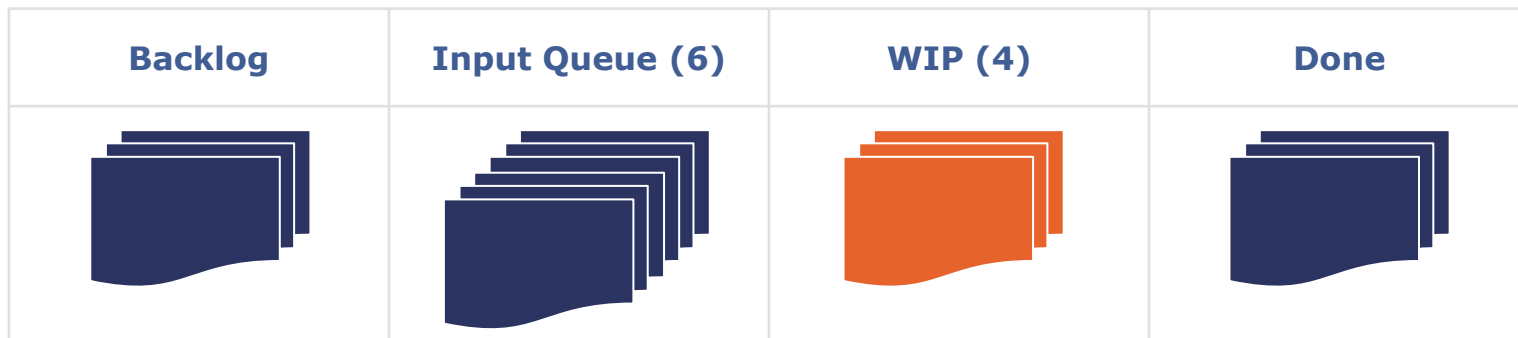
- WIP limited (4 in this example)
- Pulled from input queue when capacity permits

- WIP workflow is **customized** to team
- May have internal buffers to smooth flow

A More Complicated Kanban

Backlog	Input (6)	Dev (3)		Test (3)	UAT	Done
		In Progress	Done			

- An example customized workflow
- Limits apply across "input" and "test"
- UAT is unlimited

- Another single limit applies across both "dev in progress" and "dev done"
- In this case, Dev should be helping Test if possible

Getting Started

Installation, Workflow Identification, Structure

Installing your Kanban

- Identify workflow

- Determine WIP limits

- Make policies explicit
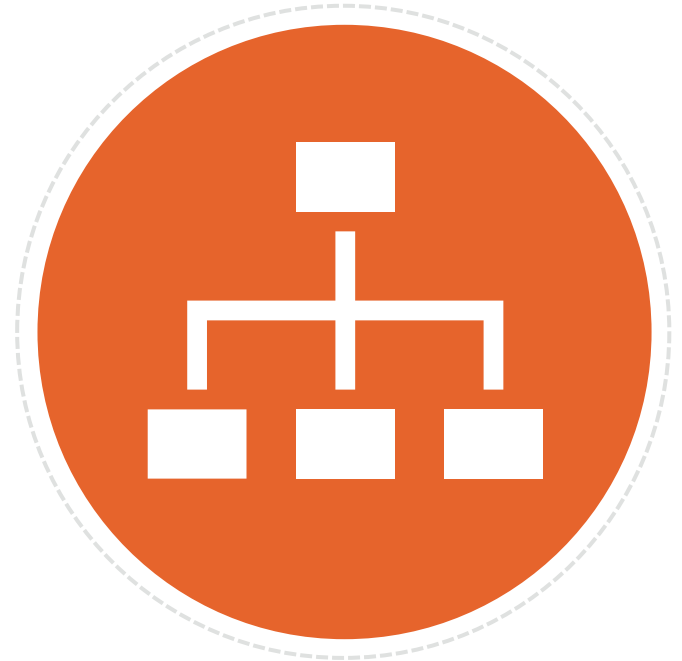
Identifying Workflow

- Determine up and downstream boundaries of the Kanban system

- Identify workflow based on current work process(es)

- Determine Classes of Service required (if any)

Structuring Workflow

- An input queue should be created at the upstream boundary. This queue should be limited. (The Input Queue below is such a boundary)

- Workflow should model how the team currently works

Backlog	Input (6)	Dev (4)		Test (3)	UAT	Done
		In Progress	Done			

Workflow: Classes of Service

- Classes of service may be needed for some Kanban systems, in order to manage different SLA commitments for work items. It helps to think of this as similar to handling physical mail

- These typically appear on Kanban boards as **swimlanes**, but may also be represented by card color

Some typical CoSs are:

- Expedited

- Standard

- Fixed Due Date

- "Bulk" (goes by many names)

Determine WIP Limits

- WIP limits, along with buffers, are a primary means to tune a Kanban

- Should be **set on the input queue**, and all steps within the workflow (Downstream steps may be unlimited)

- Initial limits will be suboptimal, and only **a rough approximate should be sought**. It will be tuned after the Kanban is in operation

- One way to establish initial limits is to multiply the number of workers by the number of tasks they should be working on simultaneously. The number of concurrent tasks should ideally be small in order to **discourage multitasking**, which hurts productivity

# Prioritization and Delivery Cadence

- Work prioritization and Delivery can proceed on their own schedule

- Prioritization refills the input queue based on current business priorities

- Delivery can occur on demand, or on a schedule

- Work item SLA will influence delivery cadence

Monitoring and Analysis

Is Your Kanban Working Correctly?

- **Cumulative Flow Diagram** is the primary tool for monitoring your Kanban system

- Bands show the number of items in each state

- Vertical line represents WIP, the number of items in progress at that time

- Horizontal line shows lead time at that point

- WIP bands should flow smoothly if Kanban is working

- See: http://brodzinski.com/2013/07/cumulative-flow-diagram.html
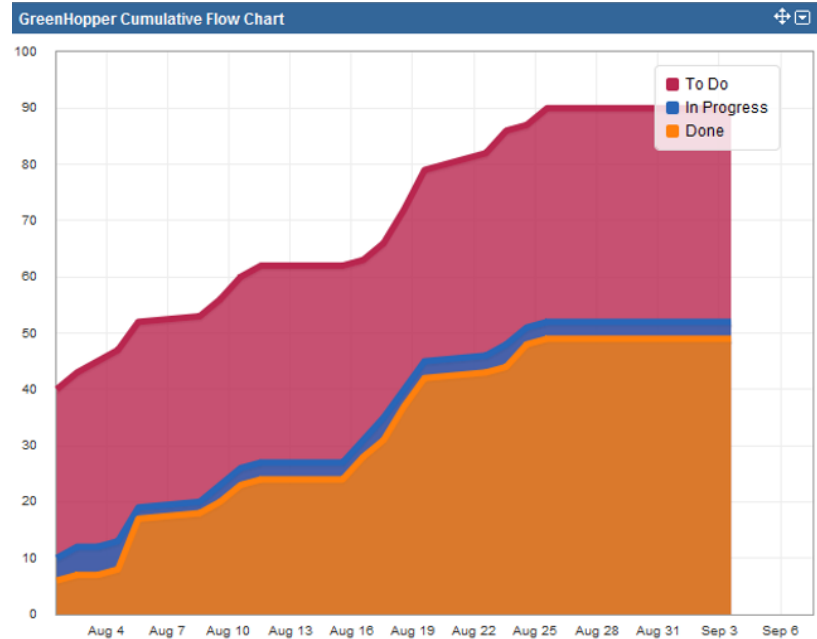
Actual Cumulative Flow Diagram: Analysis?
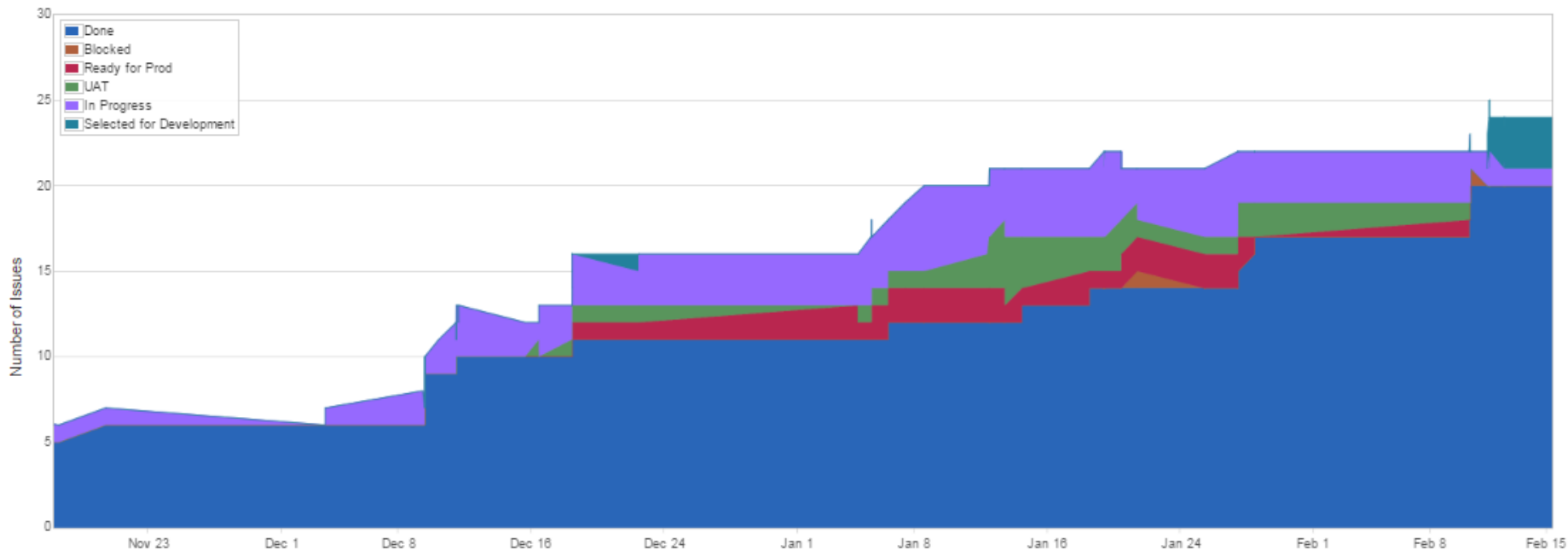
Tuning using Cumulative Flow

- Once a Kanban is operational, the CFD can be used to evaluate the results of adjusting WIP limits.

- Adjust a WIP limit

- Wait for the system to stabilize

- Evaluate delivery lead time impacts
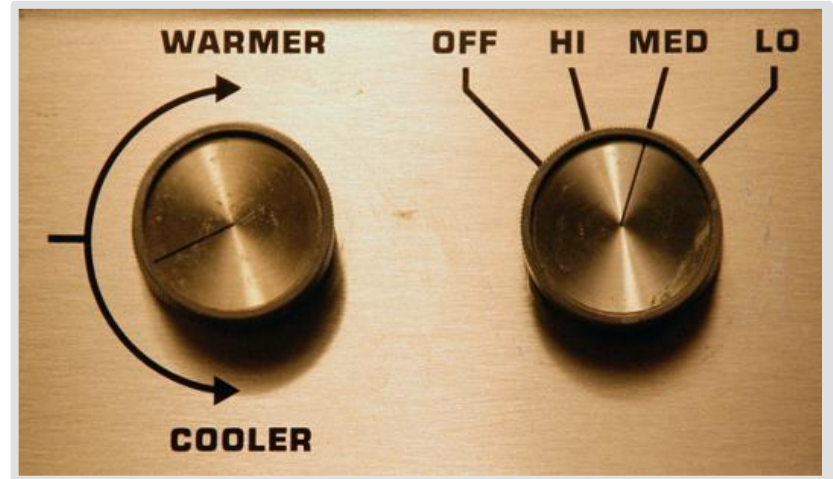
Identifying Bottlenecks

- All systems contain bottlenecks

- Bottlenecks determine how fast the overall system can proceed

- WIP limits help identify bottlenecks

- New work can't be started because completed work can't be taken up by a downstream bottleneck

- Increasing WIP on a state in the Cumulative Flow may indicate a bottleneck, or occur upstream of a bottleneck

Tuning Bottlenecks

I. Identify the bottleneck (aka constraint)

II. Protect the bottleneck with a buffer upstream

III. Use the Theory of Constraints **"Five Focusing Steps"**

1. Identify the Constraint

2. Exploit the Constraint (optimize current capabilities, identify how to get better performance)

3. Subordinate Everything to the Constraint (change any other aspect of the system to tune for optimal performance in the bottleneck)

4. Elevate the Constraint (add more staff or resources)

5. Re-evaluate where the constraint now resides

Q&A

Presenter

Keith McMillan
Technical Fellow

Expertise:
Information Risk & Security
Applications Architecture
Agile/Lean Engineering
DevSecOps

- In addition to hands-on development work for consulting clients, for decades I've been training, coaching and managing engineering teams through Agile and Lean transformations, security initiatives and enterprise scale system development projects.

- I've delivered dozens of solutions in multiple technology stacks across a range of industries, including insurance, public sector retirement, IoT and retail.

- I believe in collaborative leadership and fostering the advancement of individuals and teams. Providing guidance, while allowing space to learn from and correct failures, nurtures innovation and promotes personnel and organizational growth.

Thank You.

Keith McMillan
kmcmillan@nvisia.com

nvisia
connect. build. enable.