



# KANBAN ROADMAP

How to Get Started in 5 Steps

A guide from your friends at  **LeanKit**

# TABLE OF CONTENTS

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3	Foreword
4	How to Use This Guide
5	Introduction
7	<b>Step 1:</b> Map Your Current Workflow
10	<b>Step 2:</b> Put Work on the Board
13	<b>Step 3:</b> Gather 'Round the Board
18	<b>Step 4:</b> Limit Your Work in Process
21	<b>Step 5:</b> Measure and Learn
25	Conclusion
26	Resources
27	Key Terms



# FOREWORD

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By 2008, my team and I had learned enough about the benefits of Kanban to be fascinated by the possibilities. Smoother workflow. Less waste. Higher productivity. Data to measure and improve. Just considering Kanban brought us more energy.

On day one, though, we hit our first hurdle. As veterans of prescriptive work methodologies, we were used to externally imposed ways of doing things. By nature, Kanban is not prescriptive. It starts with visualizing the work your team is doing right now. But, like many people, articulating that effectively didn't come naturally to us.

In the years since, I've seen that pattern over and over again. Teams have followed prescriptive rules for so long that they're often puzzled by the freedom of Kanban and don't know where to start.

The exercises and suggestions in this book are designed to provide that help. Many are already in use by Kanban coaches around the world, and most are not things that we came up with at LeanKit. These are simple but powerful aids to thinking about your current work and understanding where queues are found, where bottlenecks may form and where work-in-process (WIP) limits can increase productivity.

I hope you'll find these exercises and suggestions helpful as your team begins its journey of continuous improvement through Kanban.

Best,



Chris Hefley  
CEO, LeanKit



*Chris Hefley, CEO and Co-founder of LeanKit, is a practitioner and thought leader in the global Lean/Kanban community. In 2011, he was nominated for the Lean Systems Society's Brickell Key Award.*

*After years of coping with "broken" project management systems in the world of software development, Chris helped build LeanKit as a way for teams to become more effective.*

*Prior to LeanKit, Chris worked with globally distributed teams in leadership positions at HCA Healthcare and IMI Health. He believes in building software and systems that make people's lives better and transform their relationship with work.*

# HOW TO USE THIS GUIDE

*Each step in the Kanban Roadmap comprises these elements.*

## CORE KANBAN

The Kanban principle and concepts upon which the step is based.

## LET'S GO

A group activity to make each step an interactive, team-based journey (includes a materials list, time involved, instructions and a real-world example).



**Observation Point:** What team leaders need to be on the lookout for during team exercises.



**Helpful Tips:** Extra guidance for the team.



**The Bottomline:** The main point.

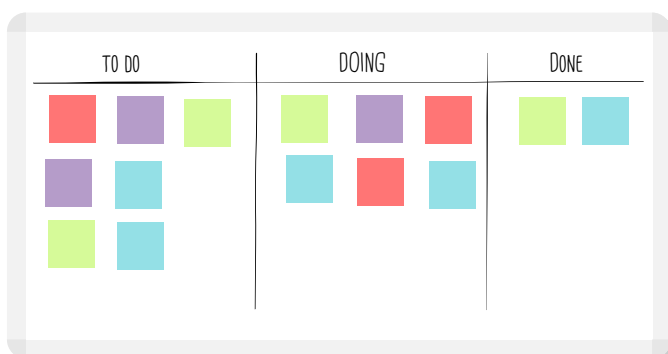
## Timing: Manage Your Expectations

*Kanban is less about finding the perfect process and more about continuously improving your process.*

*It can take as few as six weeks to more like two or three months to complete these exercises with your team. During the first month, you'll spend the majority of your time observing how your newly visualized process shakes out and solidifies. The next month or two will be more about continuous improvement, which can (and will) repeat indefinitely.*

*TIP: Teams that are already practicing Agile can include these exercises in their two-week sprints.*

## KANBAN BOARD EXAMPLES



*We include sample boards and cards throughout this guide. They're not the only way of doing things. We encourage your team to make them their own.*

**In this guide, the following terms are interchangeable:**

- board/whiteboard
- lane/a column on the board/a step in your process
- card/sticky note/work item

# INTRODUCTION

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## *A (very) Short History of Kanban and How It Works*

In the late 1940s, Toyota found a better engineering process from an unlikely source: the supermarket. They noticed that store clerks restocked a grocery item by their store's inventory, not their vendor's supply.

Only when an item was near sellout did the clerks order more. The grocers' "just-in-time" delivery process sparked Toyota engineers to rethink their methods and pioneer a new approach—a Kanban system—that would match inventory with demand and achieve higher levels of quality and throughput.

So how'd they do all that?

In simplest terms, by better communication through visual management.

*Kanban* is Japanese for "visual signal" or "card." Toyota line-workers used a kanban (i.e., an actual card) to signal steps in their manufacturing process. The system's highly visual nature allowed teams to communicate more easily on what work needed to be done and when. It also standardized cues and refined processes, which helped to reduce waste and maximize value.

A new application of Kanban emerged for knowledge work as early as 2005, and an inquisitive community formed in 2007 around the leadership of David Anderson, Jim Benson, Corey Ladas and others. Their resulting body of knowledge was influenced not only by the Toyota Production System but also by the work of W. Edwards Deming, Eliyahu Goldratt, Donald Reinertsen and other thought leaders.

**Next: Learn the Kanban core principles.**

# INTRODUCTION

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Kanban is now gaining traction as a way to smoothly implement Agile and Lean management methods in tech and non-tech companies around the world. Throughout this fresh take, Kanban's core elements have remained rooted in the following four principles:

## 1. Visualize Work

By creating a visual model of your work and workflow, you can observe the flow of work moving through your Kanban system. Making the work visible—along with blockers, bottlenecks and queues—instantly leads to increased communication and collaboration.

## 2. Limit Work in Process

By limiting how much unfinished work is in process, you can reduce the time it takes an item to travel through the Kanban system. You can also avoid problems caused by task switching and reduce the need to constantly reprioritize items.

## 3. Focus on Flow

By using work-in-process limits and developing team-driven policies, you can optimize your Kanban system to improve the smooth flow of work, collect metrics to analyze flow, and even get leading indicators of future problems by analyzing the flow of work.

## 4. Continuous Improvement

Once your Kanban system is in place, it becomes the cornerstone for a culture of continuous improvement. Teams measure their effectiveness by tracking flow, quality, throughput, lead times and more. Experiments and analysis can change the system to improve the team's effectiveness.

*Note: There are many ways to define Kanban. Our intent in listing the core elements in this manner is not to introduce a new definition but to distill the common principles.*

**First up: Learn how to visualize your work.**

# STEP ONE | MAP YOUR CURRENT WORKFLOW

## CORE KANBAN

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*Visualize your workflow.*

Unlike other methods that force fit change from the get-go, Kanban is about evolution, not revolution. It hinges on the fundamental truth that you can't get where you want to go without first knowing where you are.

Your first exercise will help you define your team's workflow and show you how to map the process on a whiteboard. Do this not only *with* your team but also *as* a team.

Every team has a process for completing its work, even if the workflow is as simple as to do, doing, done.

## LET'S GO

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### YOU WILL NEED

Your team, in a room, around a whiteboard. Dry-erase markers. A pen/pencil and at least five sticky notes for each team member.

### TIME

Block out at least an hour. You might need more time, depending on the size of your team and the number of your team's external touchpoints. Don't shortchange this part of the process. The workflow mapping exercise will encapsulate all of the politics of the group. Many high-value conversations will happen while your team is mapping out its process.



### OBSERVATION POINT

*It's common for team members to debate how the process works and not come to an immediate consensus. See how each person works and thinks. Different personalities may show preference for more or less rigidity. Talk through each reason. Encourage transparency, respect and perspective.*

## STEP ONE | **MAP YOUR CURRENT WORKFLOW**

### ACTIVITY

1. Each team member writes down the top three to five things that he or she has in process, using one sticky note per work item. Be granular rather than sky level. “Building the week view of the new calendar feature” is better than simply writing “Calendar” on your sticky note. Specifics help the whole team understand the details of each work item.
2. Each team member picks a sticky note from their selection of current work items, sticks it to his or her shirt and “becomes” that piece of work.
3. Figure out where your piece of work is in your team’s process by asking the following three questions: Where am I right now? Where did I come from? Where will I go next?
4. Make sure you’ve taken into account not only the work of your team members but also how work flows into the team from leaders, customers and other parts of the organization.

Remember, there’s no right or wrong process. There’s only your team’s process, as simple or as complex as it may be, at this very moment.



### HELPFUL TIPS

*Resist the urge to redesign your process.*

*Notice specific places in your process where the work isn’t really under your control. Maybe it’s waiting on approval from someone outside the team, or a piece of work is in process somewhere else.*

*Recognize where there are queues in your process and/or where work sits and waits between steps. Include these as steps in your workflow.*



## EXAMPLE

Let's say you're on a development team, and your individual work item is "Building the week view of the new calendar feature."



The answers are the steps in your process. Using the example above, we've defined three chronological steps by analyzing just one piece of work:

*Planning > In Development > Test*

Use each teammate's answers to define more steps and/or validate the steps you've already identified. In the end, you might come up with a process like this:

*Plan > Develop > Test > Deploy > Done*

Now go to the whiteboard, divide it into columns and/or rows, and write the title of each step in your workflow at the top of a column, leaving a bit of whiteboard on each side for a "To Do" lane and a "Done" lane, if they're not already in your process.

Keep your process on the whiteboard for the next exercises. You'll keep building on it.



## BOTTOMLINE

*Be honest about your workflow. This first step is all about taking a snapshot of how your team works so you can improve the big picture later.*

**Next Step: Put your work on the board.**

### CORE KANBAN

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*Visualize your work.*

Today's workforce may be armed with retina-worthy smartphones and tablets, but plenty of information still comes our way as words on a screen. Emails, spreadsheets, task lists—text is everywhere. While it fits certain scenarios, textual information is not a one-size-fits-all communication vehicle. Its effectiveness is lower than you might think.

It starts with your brain.

A picture is worth a thousand words for scientific reasons: The brain processes visual information 60,000 times faster than text. Forty percent of all nerve fibers connected to the brain are linked to the retina. Visual information comprises 90 percent of the data that comes to our brain, suggesting that our neurological pathways might even *prefer* pictorial displays over text.

Kanban helps you harness the power of visual information by using sticky notes on a whiteboard to create a “picture” of your work. Seeing how your work flows within your team's process lets you not only communicate status but also give and receive context for the work. Kanban takes information that typically would be communicated via words and turns it into brain candy.

Visualizing your work is a critical step.



### OBSERVATION POINT

*Kanban is about teams working towards a shared goal. When putting work on the board, avoid dividing work by the person responsible. Instead, group work items together by project, type of work or other process-based identifier.*

# LET'S GO

## YOU WILL NEED

Your team. The whiteboard with your team's process from exercise one. Dry-erase markers. A pen/pencil and sheet of paper for each team member. A plethora of sticky notes that are several different colors. A pack of multicolored, round stickers. A pack of sticky flags or index tabs.

## TIME

Block out an hour. You might use more or less time, depending on the size of your team and how much work is currently in process.

## ACTIVITY

1. Each team member writes down his or her work items on a separate sheet of paper. Allow about five minutes for this task. An informal list is all that's needed; try not to be too granular.
2. Post the lists and compare, looking for themes among the work. Pick one person and analyze his or her list first. For each work item, ask, "What kind of work is this?" (A development team, for example, might have these types of work: feature, defect, user story or task.) As your team members identify different types of work on the first list, they should label their lists accordingly. This part of the exercise continues until a type of work has been assigned to each work item on every list.
3. Designate a different color of sticky note to each type of work. (Note: In this guide, the terms "card," "sticky note" and "work item" are interchangeable.)
4. Each team member transfers his or her list of work items to individual sticky notes of the appropriate color.
5. Team members post their sticky notes on the whiteboard in the lane that corresponds with the work item's current status.
6. Indicate who's working on what by writing team member names on the flags/index tabs. Use round stickers for blockers.

## HELPFUL TIPS

*Although this exercise correlates card color with type of work, your team may want to use card color to indicate priority, source of demand or some other theme unique to your work.*

*Think about how you will want to analyze the work later. By bug? Feature? Task? This will help you discern which types of work are present with your team.*

*Use the language you use among your team to describe the work.*

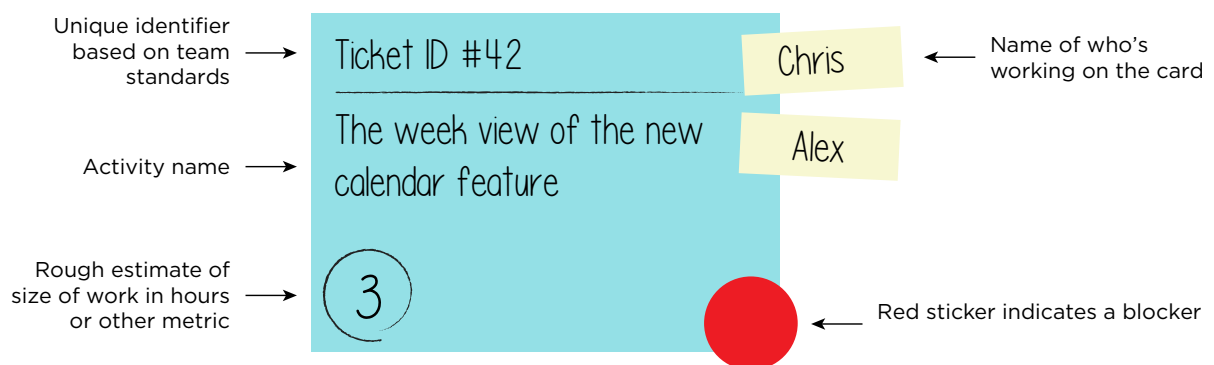
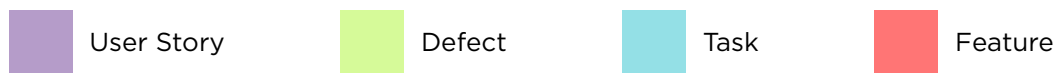
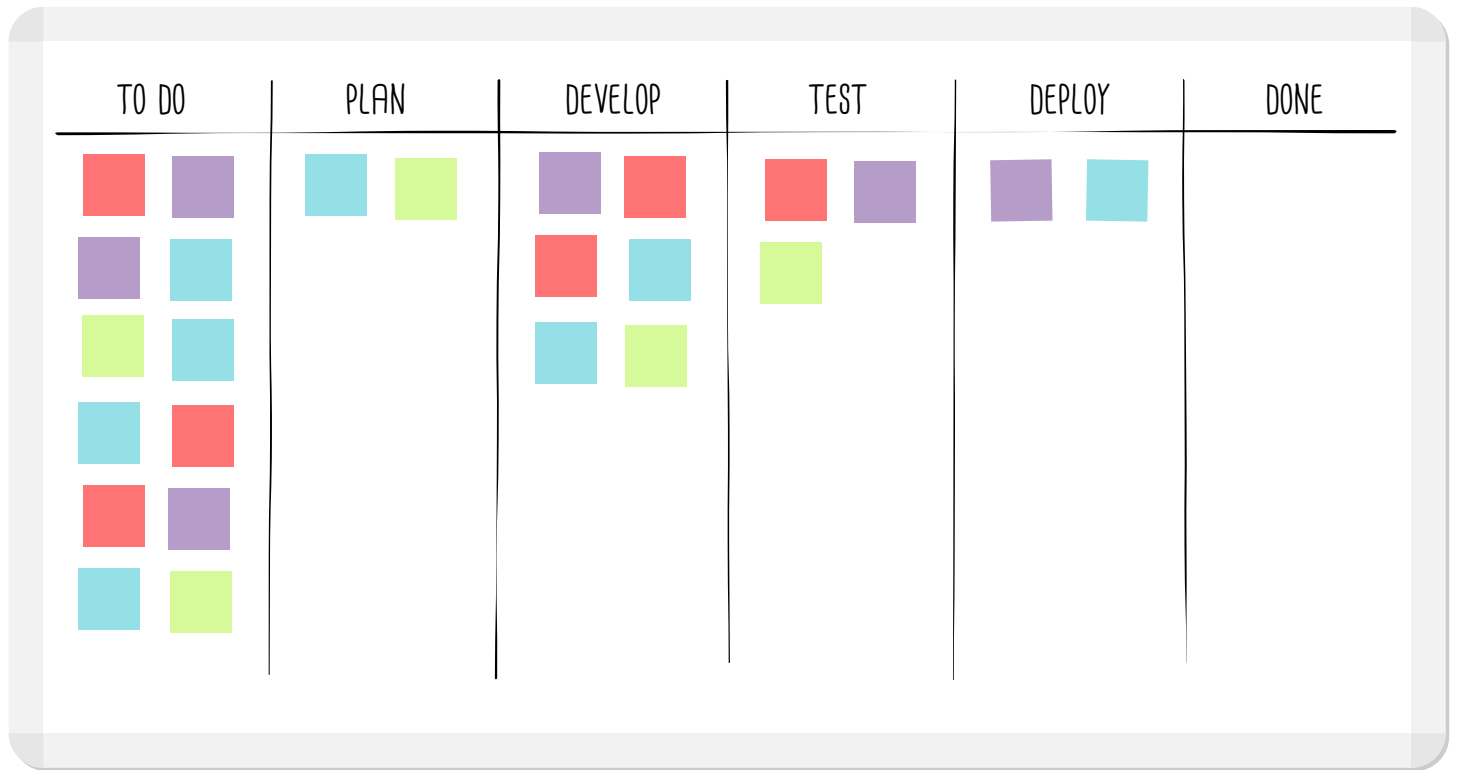
*Recognize that you may have different priorities of work. Instead of high, medium and low, use meaningful descriptions of priority that indicate how you will treat each type of work (e.g., expedite, production break-fix and regulatory requirement).*

## BOTTOMLINE

*Do your best to capture all of your work in process. Don't worry too much about the granularity of work items at this point. You'll have items of varying size (i.e., tasks that require more or less time to complete) that will unfold later.*

## STEP TWO | PUT WORK ON THE BOARD

### SAMPLE BOARD & CARD EXAMPLE\*



*\*We include sample boards and cards throughout this guide. They're not the only way of doing things. We encourage your team to make them their own.*

**Next Step: Gather 'round the board.**

## STEP THREE | **GATHER ‘ROUND THE BOARD**

### **CORE KANBAN**

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#### *Focus on flow.*

Now that your work is on the board, it's time to start moving it. Work items move across the board, from left to right, as progress occurs. When a team member is ready to start work on something new, he or she pulls a new work item into the appropriate lane on the board.

Treat the board—and all of the work on the board—as an asset that belongs to the entire team, rather than work items that are owned by the manager or individual team members. It's important to think about the entire board as a single system. It has a purpose and a capacity, as well as capabilities and interactions. Focus on managing the flow of work through the system, rather than directing the work of each team member.

As you look at the board, notice: How does the work flow? Or, conversely: Where does the work get stuck? The best way to start observing the flow of work is with routine meetings called daily standups and weekly retrospectives.

Daily “standups” received their name because teams meet while standing, rather than sitting, when gathered around a board. Standing encourages brevity and staying on task.

“Retrospectives” are held on a regular basis (we suggest weekly). They give the team a focused opportunity to evaluate the health of the system, make adjustments and devise experiments.

When implemented effectively, standups and retrospectives are powerful tools for teams that seek transparency and open collaboration. Without targeted discussion, however, standups can morph into what's-on-my-schedule recitations, and retrospectives can turn into personnel critiques. The next two exercises will help keep your team focused on the work and the process, while laying the groundwork for a team culture of continuous improvement.



### **OBSERVATION POINT**

*Traditional leadership often manifests itself in rank-and-file rules of engagement. As a team lead or project manager, you may be tempted to jump in and steer standups and retrospectives. Empower your team members to see the bottlenecks and flow for themselves. The best results come from engaging the entire team.*

## STEP THREE | **GATHER ‘ROUND THE BOARD**

### LET’S GO

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#### YOU WILL NEED

Your team, circled around your work on the board. Extra sticky notes, pens and stickers.

#### TIME

Block out 30 minutes for each daily standup during the first couple of weeks. As you become more familiar with the routine, you’ll optimize the meeting to a maximum of 15 minutes. Block out an hour for your first few weekly retrospectives. You might use more or less time, depending on the size of your team, how much work is currently in process and if you currently hold standups or retrospectives.

#### ACTIVITY

##### How to Hold a Kanban Standup

For optimal efficiency, team members should update the status of their work items prior to standup, so everyone sees a current picture of the work in process.

Each day, a different team member leads the discussion. The leader begins by “walking the board” from right to left—to focus first on work items that are closest to completion—and asks of those cards, “What do we need to do to advance this piece of work?”

Always favor finishing something over starting something new. When the team views the entire system as belonging to them, then the most important outcome is for the team/system to get something all the way to “done.” So when the leader asks, “What do we need to do to complete this piece of work?”, and a person assigned to the work answers, “I just need a little help today to push it over the line,” a team that’s working as one system won’t be short of volunteers.

#### **HELPFUL TIPS**

*Try this exercise even if your team already works with standups and retrospectives. The Kanban format is a bit different than Scrum’s and offers a new vantage point.*

After walking the board, ask the team:

**Q: “Is anyone working on anything that’s not on the board?”**

A: If no, continue to the next question. If yes, pause to let team members add work items.

**WHY**

To gain the truest possible understanding of the team’s workload.

**Q: “What are we looking to finish, as a team?”**

A: Look at business value, encroaching deadlines or your team’s chosen unit of value to reprioritize or reassign work, as needed.

**WHY**

To reinforce that all work is the team’s work and to help move prioritized work over the goalline first.

**Q. “Can we spot any bottlenecks or other impediments to the flow of work?”**

A: Look for queues of work, loaded lanes or other indicators of risks and issues.

**WHY**

To observe both the upstream and downstream ramifications of stalled flow and to figure out how to get work flowing again.

During the first month of holding standups, it’s likely that you’ll notice discrepancies in the granularity of work items. Continue to divide work into smaller tasks and subtasks, as necessary. Look to have your cards represent not only the units of value that your team is expected to deliver but also your capacity to deliver them. The finest of fine-grained tasks may not need to be separate cards on the board; instead, attach them to the main card as to-do lists or subtasks. Work items should be small enough to move across the board at a relatively uniform pace.



**HELPFUL TIPS**

*When is a work item truly done? It should mean that a card will not move backwards after reaching “done.” If it does, add a verification, policy or definition of done to your process.*

## STEP THREE | **GATHER ‘ROUND THE BOARD**

### **How to Hold a Kanban Retrospective**

At the end of every week, gather around the board to evaluate your Kanban system. Observe the flow of work and add a new question each week. **By week four, you'll be asking four questions.**

#### **WEEK 1**

**Q: Is there any hidden work in process (WIP) that we haven't gotten onto the board yet?**

A: Searching for hidden WIP will be an ongoing theme for your first few weeks. It's not always evident and can take time to reveal itself. As you find it, add it to the board. (Stop here, or if in weeks two through four, move on to question two).

#### **WEEK 2**

**Q: Can we identify any impediments to the flow of work?**

A: Look at where work is piling up on the board, where work is getting blocked, or parts of the workflow that may be "starved" for something to work on. Discuss ways in which the process or the team's policies could be modified to remove impediments to flow. Even after you finish these exercises, ask this question during every retrospective. (Stop here, or if in weeks three or four, move on to question three).

#### **WEEK 3**

**Q: Are we tracking things at the right level of granularity?**

A: If some of the work items are so big that they'll take months to move across the board, break them down into cards you can complete in a few days or weeks. If your board is littered with very small tasks, consider using task lists associated with the card instead of a card for every small task that must be done in a day. (Stop here, or if in week four, move on to question four).

#### **WEEK 4**

**Q: A queue or buffer happens when work is in a holding pattern before it goes to the next step. Are there queues or buffers in your workflow that aren't represented on the board?**

A: If yes, add lanes into your process to represent these queues. Managing the size of queues in your kanban system is a key success factor to improving the flow of work. Identifying queues will be an ongoing activity, even after you've completed the exercises in this guide.

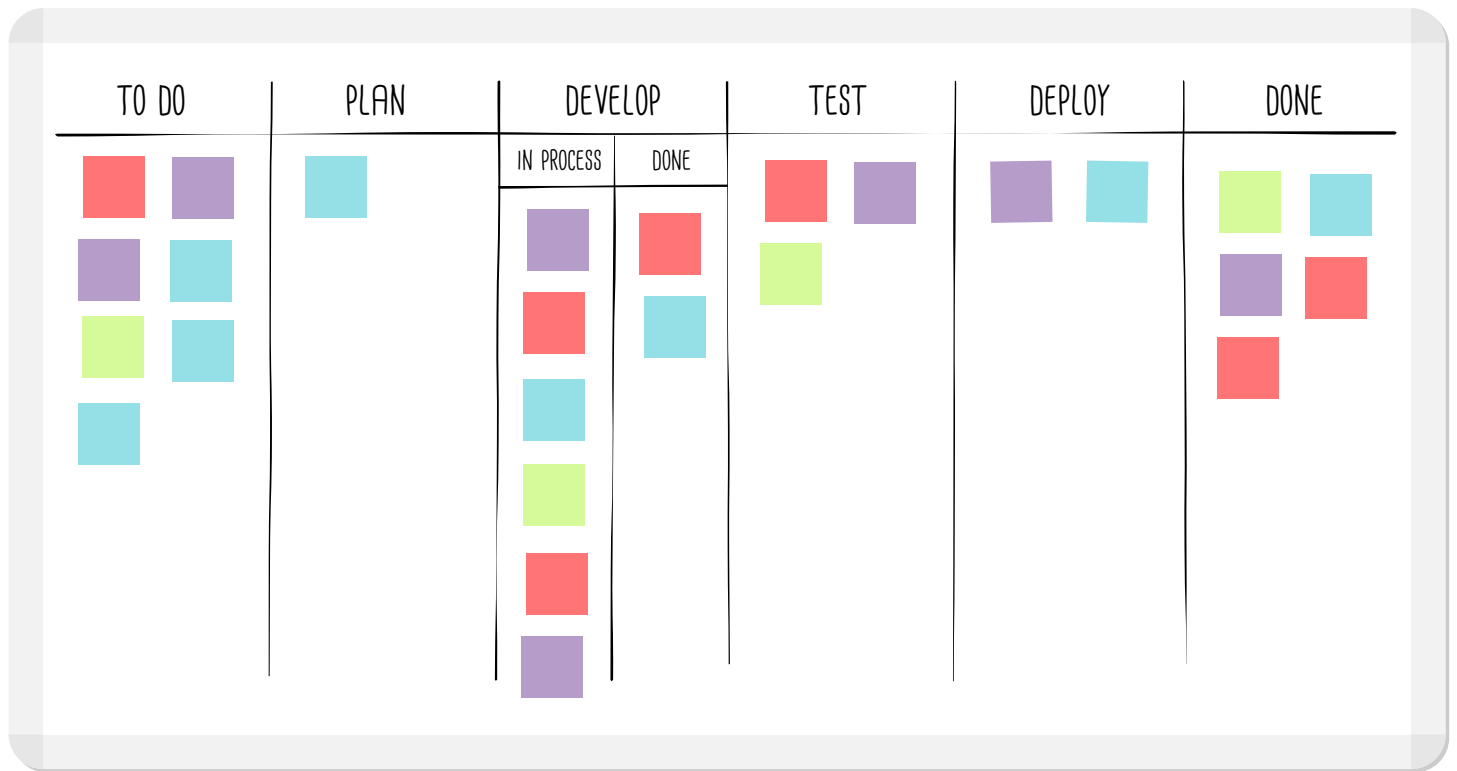


### **HELPFUL TIPS**

*You don't have to wait until a retrospective to make an improvement.*



## SAMPLE BOARD



Pay special attention to the start and end states. Where does the work for this team originate? What is the source of demand?

If you find that you have two teams working towards separate goals, and those teams' work rarely intersects, you may have more than one process. Try to reserve one board for each process or add a swimlane to the team board to show there are parallel processes at work.



## BOTTOMLINE

*Empower individuals to work together toward a common goal. Kanban is about continuously improving your system and managing the flow of work, rather than managing team members and their work directly.*

**Next Step: Limit your work in process.**

## STEP FOUR | **LIMIT YOUR WORK IN PROCESS**

### **CORE KANBAN**

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*Limit your work in process.*

It may sound counterintuitive, but limiting your work in process can help you finish more work, more quickly. The more you dive into multiple tasks at once, the less effective you become.

Work in process (WIP) can be defined as all of the tasks you're working on right now. Although often revered in today's culture, task switching—also known as multitasking or context switching—has less than glamorous effects. Juggling simultaneous work doesn't make you more productive. It just makes you more distracted.

Each time your attention switches to a different task, your brain slogs through a neurological warm-up period that prevents you from being wholly present with your work. Error and delay increase. The drain of multitasking on the team, as a whole, manifests in repeatedly reprioritized work. Too much work in process also leads to larger and larger queues, further decreasing productivity.

The practice of limiting your work in process is what makes this a Kanban system, rather than a visual to-do list. By using WIP limits, you can improve the flow of work through the process steps you've defined on your board. Limiting WIP also helps to focus the team's attention on shared goals and encourage collaboration. Having less work in process creates shorter feedback loops within the process and gives more flexibility to learn from how your work is flowing through the system, allowing you to make adjustments on the fly.

### **LET'S GO**

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#### **YOU WILL NEED**

Your team, circled around your work on the board.

#### **TIME**

Block out 30 minutes. You might use more or less time, depending on the size of your team and how much work is currently in process.



#### **OBSERVATION POINT**

*It's not important that workers stay busy; it's important that the work keeps moving.*

*Hitting a WIP limit isn't a failure or a problem to be avoided. On the contrary, it's an opportunity to change your system so it benefits the team and its effectiveness. You should run up against your WIP limits regularly. If you don't, they're probably not low enough. Team buy-in is critical; let the team set its own WIP limit.*

*WIP limits won't prevent our cultural proclivity for multitasking, but they will show you the detriments that task switching can have on your work.*

## ACTIVITY

1. Consider how a piece of work flows through your system by looking at a card that's recently made it to "Done." Preferably, choose a card that several team members worked on while it moved through most of the defined workflow on your board.
2. Ask: "How long did that card take to complete?" For this example, let's say that 10 days passed between the card being pulled onto the board and reaching the "Done" lane. (This is known as a card's cycle time.)
3. Now, ask each person who worked on the card how much time they spent *actively* working on it. You'll probably hear a much smaller number. For this example, we'll say that your team invested a total of six hours of active work. So why did the card take 10 days to complete? One reason to consider is queues. When step one was finished, the card waited in line for 1.5 days before anyone picked it up to start step two. The card continued in this fashion until it reached the "Done" lane. It's fairly typical—and sometimes even worse—for a card to spend 85 percent of its time in a queue. Using WIP limits, you can keep the size of the queues in your process lower, so that each item moves more quickly from step to step.

**Side note:** This is why many Kanban teams have acquired a "no-estimate" reputation. Once you see that asking people to estimate how much time something will take makes up only a small percentage of how long it takes to realistically complete the work, many people feel the freedom to stop estimating small- to medium-sized tasks and focus instead on improving throughput of the Kanban system.

4. As a team, identify all of the queues in your process. (Any place a handoff occurs is most likely a hidden queue.) Now identify the largest queues.
5. Add a WIP limit to your board to try to reduce the size of one or more of the largest queues. You may add the WIP limit to the lane that has the queue, or you may find that adding a WIP limit to the lane before or after the queue reduces WIP better. If the queue is a child of some top-level lane, you may consider



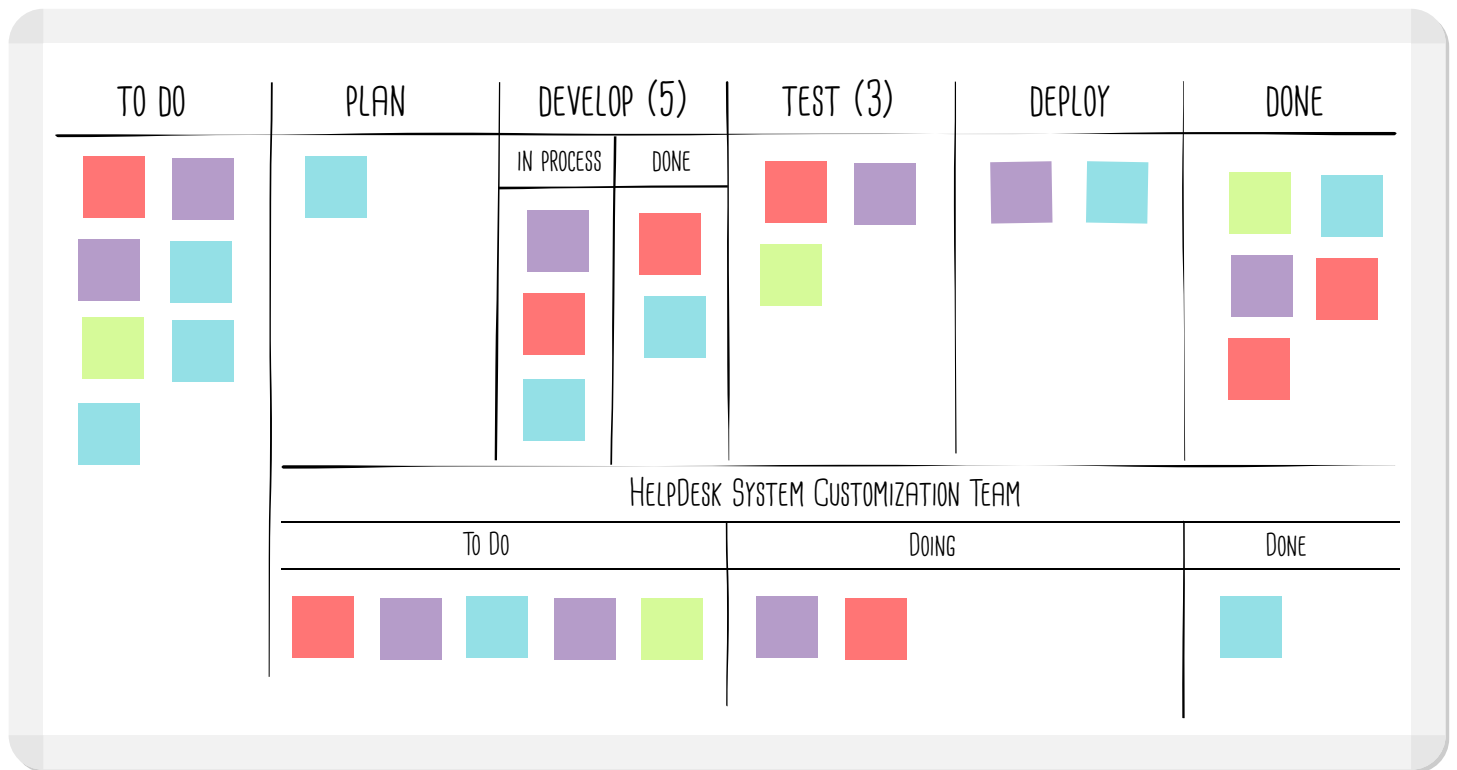
## HELPFUL TIPS

*Kanban seeks to "pull" rather than "push" work through your process.*

*A push system "pushes" finished work to the next step, whereas a pull system "pulls" work from the preceding step only when it has capacity. Limiting WIP based on capacity (a pull system) can help work flow smoothly through the board at an optimal rate. Pushing large amounts of work into the system clogs it up and slows everything down (and often makes for poor quality, too).*

## STEP FOUR | LIMIT YOUR WORK IN PROCESS

### SAMPLE BOARD



putting the WIP limit on the parent lane. In the sample board above, a WIP limit covers the “Develop” lane so it applies to the number of cards in both sublanes.

6. If a team member is consistently responsible for too many work items, experiment with personal WIP limits (e.g., “Jason has a WIP limit of three. Only three items can be assigned to him at any one time.”). In general, we recommend process stage WIP limits, but if there’s a particular person who is often overloaded, it’s appropriate to use personal WIP limits.

#### What to do when you run up against the WIP limit

When you hit a WIP limit, stop doing the kind of work that adds to that queue. Instead, let the work continue to flow through the system. Go help a teammate or work on a task that doesn’t add WIP on the board. Go run some errands. Start an online class. But whatever you do, don’t pile on more WIP at this point.



### BOTTOMLINE

*Limiting work in process is the primary way to modify your Kanban system to improve the flow of work. Reducing the size and number of queues present in the process will lower overall WIP and tend to make the work flow through more smoothly.*

**Next Step: Measure and learn.**

### CORE KANBAN

#### *Continuous improvement.*

Managing your work via a Kanban system reveals how the work is flowing through your process. It also gives you the tools to measure flow and the levers to pull to improve it.

The exercises you've gone through so far can lay a foundation for a team culture of continuous improvement. Now that you've tried your first WIP limits, narrowed down the granularity of your work items and found as much hidden WIP as possible, it's time to start measuring flow.

You'll start by tracking four simple things: total WIP, blockers, throughput and lead time.

#### **Total WIP**

Total work in process is all of the tasks currently on your Kanban board. It's anything that's been started (by anyone) but not completely finished. As you start limiting your work in process, you'll start seeing this topline number decrease. As a gut check, divide your total WIP by the number of members on the team to get an average WIP per person. Does it show that each person is "doing," for example, an average of 15 things? Does that seem like too many?

#### **Blockers**

A blocked item can't move to the next stage in your process because of an issue. While similar to a bottleneck (both create delays), a blocker typically signals an unfinished dependency, a defect or an unavailable skillset. For example, a blocker may arise when you've sought information from an external source and can't complete further work until you receive a response.

Focus on three things when measuring blockers: How often are items blocked? How long do they stay blocked? Where in the process do blockers happen? In each daily standup, add "1" to the "blocked days" for that card and note where the block occurred.



#### **OBSERVATION POINT**

*As you get better at analyzing these metrics, you'll want to segment them by card type, priority or another dimension that's important to your team. For example, you could say that your lead time for standard priority items is an average of 8.5 days but that your lead time for production break-fix items is 1.8 days.*

## STEP FIVE | MEASURE AND LEARN

### Throughput

Throughput is the number of items completed per time period. At the end of each week, record how many items were completed (i.e., moved to “Done” and never moved backwards). Track this number from week to week to see how changes made in your Kanban system affect how much total work actually gets done.

### Lead Time

Lead time is how long a card takes to travel across the entire board. The clock starts when a card is pulled onto the board and stops when it reaches the “Done” lane. On the back of each card, record the start date. Then, when the card reaches “Done,” record the date and calculate how many days (or working days) passed since its start date (see the example card on page 24).

Many calculations are possible with lead time and throughput metrics. Keep it simple in the beginning and only record the average lead time of every card that was finished that week (i.e., the cards you counted to measure throughput).

On an ongoing basis, compare these four metrics to see what effect they have on each other. As you reduce the size of queues in your system, it should start to reduce your average lead time. As you experiment with ways to manage blockers more effectively, you should also see lead time reduced. As you continue to limit your WIP, and work together as a team to complete work collaboratively, you should see throughput improve.

## LET'S GO

### YOU WILL NEED

Your team. On the whiteboard, data collected from the last three to four weeks since you began recording metrics on the back of the cards.

### TIME

Do this during your weekly retrospective.

### HELPFUL TIPS

*As you continue to seek improvements to your process in the coming months, follow these ideas to keep the energy up among your team:*

*Focus your experiments and metrics on improving one or more of your team's capabilities, whether it's quicker delivery, predictable delivery or the capability to deliver higher quality, measured in lower defect rates and instances of rework.*

*Continue to encourage team ownership of the process and focus improvement efforts on the Kanban system, rather than individuals.*

As soon as you've finished the exercise in step four, take time during every weekly retrospective to record data on the back of your cards for blockers, start date, completed date, throughput and lead time.

At each weekly retrospective, calculate and record:

- Throughput: the number of cards completed this week
- Lead time for each card (completed date and start date)
- Average lead time for this week
- Cards completed with > 0 blocked days
- Total blocked days
- A list of places where cards were blocked

Tally the above for three to four weeks before beginning this exercise.

### Running Experiments in a Kanban Retrospective

Instead of asking the four questions from exercise two, you'll run experiments out of your retrospectives.

An experiment, in this instance, isn't much different from a basic scientific experiment. Evaluate the current state, form a hypothesis, test the hypothesis with an experiment, measure the result and then draw a conclusion.

As a team, review your throughput, average lead time, blocker data and total WIP metrics. Have the team pick one of those four metrics for your first experiment.

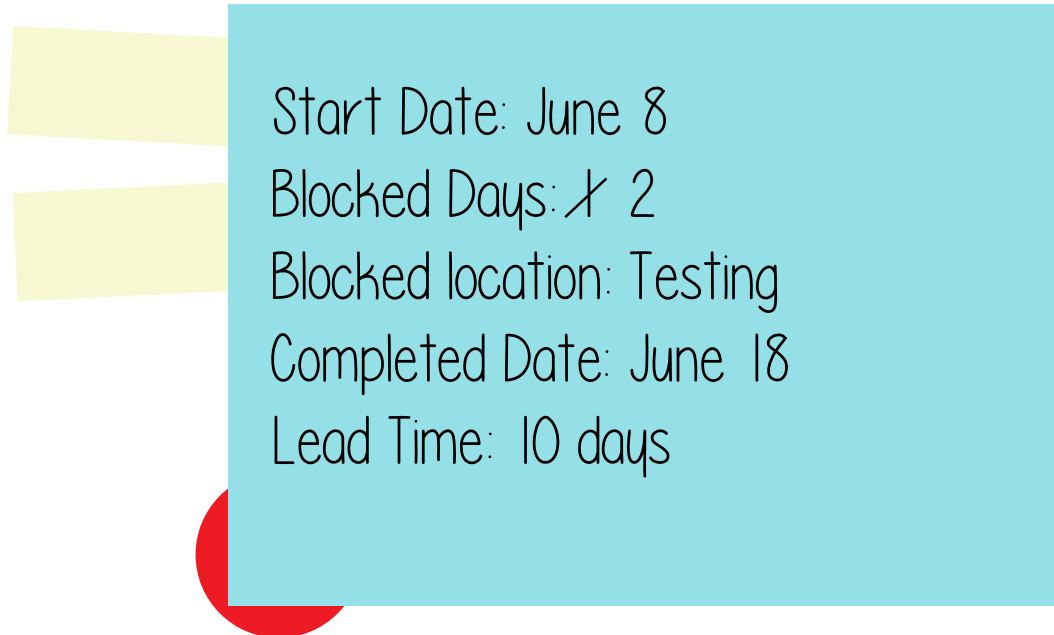
For example, if your average lead time for the past three to four weeks is 11 days (varying between two and 19), you might decide to shoot for less than 10 days. If your blocker data suggests that you might be leaving items blocked longer than necessary, your experiment might be to modify the way your team responds to blockers. Perhaps your team will decide to adopt a "stop the line" mentality; if a card is marked as blocked, it's "all hands on deck" to remove the blocker as quickly as possible.

### HELPFUL TIPS

*Continue to study ways to improve your Kanban system by using the resources section of this guide.*

## STEP FIVE | MEASURE AND LEARN

### SAMPLE CARD



Or, if your throughput is three items per week, you might decide to try to increase it. If your total WIP still says that you have, on average, seven items in process per person, your team might try to reduce total WIP to see if it affects throughput. You could then look for queues in the process where you could reduce the WIP limit and watch to see what it does for throughput.

One final example, coming at it from another direction. If your blocker data suggests that you could improve by managing blockers differently, your team could adopt a change in policy for how blockers are managed and monitor lead time, WIP and throughput to see what effect the policy change has on those metrics.

From this point forward, think of your retrospectives as a place to formulate and evaluate experiments. You may have more than one experiment running at once, but always run at least one.



### BOTTOMLINE

*Kanban is an evolution, not a revolution. When you understand the why and how of your process, your team can begin to make small but continuous improvements.*



# CONCLUSION

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## *Congratulations.*

You now have a running Kanban system. You're visualizing your work, limiting your work in process, measuring your team's effectiveness and beginning a habit of continuous improvement.

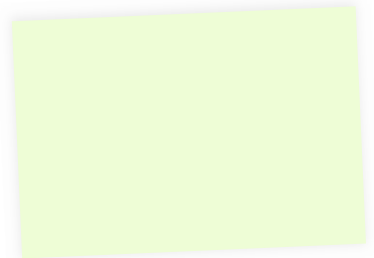
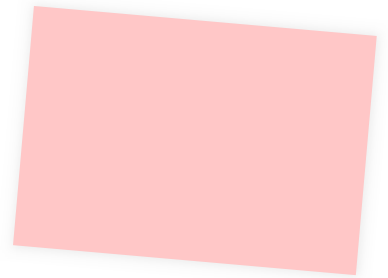
### **A NOTE FROM THE AUTHORS**

W. Edwards Deming once said, "A bad system will beat a good person every time."

At LeanKit, we believe that all people want to do their best work. We believe that people encounter obstacles that prevent them from doing great work when systems fail.

When you adopt Kanban to manage your system for work—and embark on a journey of continuous improvement—you are freeing people and organizations to do their best work, own the systems in which they work and collaborate to improve those systems.

You've now begun the journey that leads to systems thinking and continuous improvement so that bad systems are no longer in the way of good people doing good work.



**Next: Learn more from the Resources section.**

# RESOURCES

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## [WEBINAR]

### DESIGNING YOUR KANBAN BOARD TO MAP YOUR PROCESS

with Chris Hefley

Creating your first Kanban board isn't always easy—and you don't have to get it 100-percent right. With the help of some good advice you can build the right foundation to improve incrementally over time. In this webinar, you'll learn how to map your process to reflect your reality as closely as possible, design your board to capture the right metrics for improvement and address common gotchas such as wait time and hidden work. Watch the webinar:

[leankit.com/blog/map-your-process](http://leankit.com/blog/map-your-process)

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## [BOOKS & AUTHOR WEBSITES]

*Kanban: Successful Evolutionary Change for Your Technology Business* by David J. Anderson ([djaa.com](http://djaa.com))

*Personal Kanban: Mapping Work | Navigating Life* by Jim Benson and Tonianne DeMaria Barry ([Personalkanban.com](http://Personalkanban.com) and [ModusCooperandi.com](http://ModusCooperandi.com))

*The Phoenix Project: A Novel About IT, DevOps, and Helping Your Business Win* by Gene Kim ([RealGeneKim.me](http://RealGeneKim.me))

*Stop Starting, Start Finishing* by Arne Roock ([Software-Kanban.de](http://Software-Kanban.de))

## [BLOGS]

“Kanban Kata” by Håkan Forss ([hakanforss.wordpress.com](http://hakanforss.wordpress.com))

“Kanban and Its Flight Levels” by Klaus Leopold ([klausleopold.com/2013/07/kanban-and-its-flight-levels](http://klausleopold.com/2013/07/kanban-and-its-flight-levels))

“Kanban Maturity Model” by Yuval Yeret ([leansystemssociety.org/mashing-up-kanban-cmmi](http://leansystemssociety.org/mashing-up-kanban-cmmi))

## [EDUCATION]

LeanKanban University ([LeanKanbanUniversity.com](http://LeanKanbanUniversity.com))

## [GAMES]

getKanban Board Game by Russell Healy ([getkanban.com](http://getkanban.com))

Online getKanban Game by Dan Vacanti ([getkanban.corporatekanban.com](http://getkanban.corporatekanban.com))

## About LeanKit

*LeanKit is recognized by the Agile and Lean IT community as the most flexible and powerful tool available for implementing visual project management based on Kanban systems. In addition to IT, our customers use LeanKit to manage and collaborate on projects in fields as diverse as engineering, manufacturing, marketing, customer service, technical support and many more. LeanKit was recognized by Gartner, Inc. as a “Cool Vendor” in Program and Portfolio Management (PPM) for 2013.*

*Since our founding in 2009, we've grown to serve more than 250,000 users around the world at companies such as Adobe, DuPont, JetBlue, Nokia, Siemens, Spotify and Steelcase. For more information, visit [www.LeanKit.com](http://www.LeanKit.com).*

# KEY TERMS

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## BLOCKER

An internal or external factor preventing progress, thereby limiting the ability for the work to move from one phase in your process to the next.

## BOTTLENECK

A constraint in the system that limits the flow of work. Identifying bottlenecks makes it easier to reduce their impact and provides a mechanism for controlling work flowing through the process.

## HIDDEN WIP

Work that a team member is working on but hasn't added to the board.

## KANBAN SYSTEM

A display of visual indicators, namely cards, that signals what the process needs exactly when the process needs it. Also: a way to visualize work and workflow.

## PROCESS

The series of actions, steps or stages that a piece of work goes through to be considered "done."

## PROCESS MAP

A visual representation of the steps needed to complete a piece of work.

## PULL MECHANISM

The action of pulling work based on the opportunity and capacity to fulfill the needs of the system.

## PULL SYSTEM

A work process where each stage only pulls work into progress when it has capacity to do so; the opposite of a push system, where work is assigned and added to a queue, regardless of capacity.

## SOURCE OF DEMAND

The business goal that is driving the requirement for work. The source of demand is sometimes an external customer and sometimes an internal business stakeholder.

## TASK SWITCHING *also known as Context Switching or Multitasking*

Shifting attention between multiple pieces of work. Limiting task switching can allow a person to work more efficiently by minimizing the amount of time required to redirect cognitive function to a new activity.

## VISUAL MANAGEMENT

A philosophy that work is better managed through visual systems, such as Kanban, than text-based lists or spreadsheets. The philosophy posits that visualizing work as it's being done better reveals problems at earlier stages, leading to lower cost solutions.

## WIP LIMIT

A constraint that can be applied to either parts of a workflow (e.g., a process step) or to an entire workflow to help prevent potential bottlenecks that hinder the continuous flow of work in the system.

## WORK IN PROCESS (WIP)

Work that has been started but is not yet "done."

