The DORA 4 Key Metrics have provided a tremendous amount of clarity in the DevOps world towards measuring the right things, and what to aim for as a modern software delivery organization. As targets, they act as compasses to guide direction and keep teams from veering away from their true north. However, compasses only truly become powerful for making decisions when they are paired with maps. Without a map, blindly following a compass can lead you to a dead end, or off a cliff. You may be staring directly at a mountain, wondering how to take your first step forward. If you're new to the DORA metrics, you may be struggling to imagine how you can start to address them. There's little guidance on taking that first step with confidence. Pairing these 4 compasses with 4 maps provides step-by-step navigation towards improvement in the form of clear alignment, better prioritization, constructive communication, and valuable collaboration. The application of these **4 Key Compasses** and **4 Key Maps** is what I call the **4x4 Method of DevOps**.

The 4x4 Method doesn't dictate any rituals, structure, or dogma. It simply provides a toolset to **map a clear path from desire to success for teams** who want to make visible, rapid, measurable progress. Once you have your compass points, and your maps of your path through the terrain, **the 4x4 Method allows you to drive forward without fear of getting stuck, or sliding off course.**

Compasses

4 Key Compasses	Measurement	Focus	Direction
Lead Time:	Time from work start to finish	Velocity	Aim for lower
Mean Time To Recover:	Time to restore service	Quality	Aim for lower
Change Fail %:	Frequency of failed changes	Quality	Aim for lower
Deployment Frequency:	Frequency of delivered change	Velocity	Aim for higher

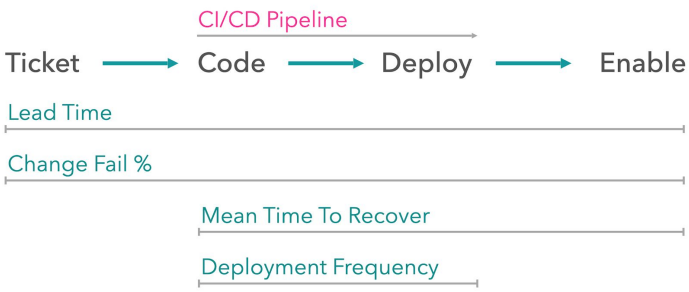
The DORA 4 Key Metrics

Aspect of Software Delivery Performance*	Elite	High	Medium	Low
Deployment frequency For the primary application or service you work on, how often does your organization deploy code to production or release it to end users?	On-demand (multiple deploys per day)	Between once per day and once per week	Between once per week and once per month	Between once per month and once every six months
Lead time for changes For the primary application or service you work on, what is your lead time for changes (i.e., how long does it take to go from code committed to code successfully running in production)?	Less than one day	Between one day and one week	Between one week and one month	Between one month and six months
Time to restore service For the primary application or service you work on, how long does it generally take to restore service when a service incident or a defect that impacts users occurs (e.g., an unplanned outage or service impairment)?	Less than one hour	Less than one day[†]	Less than one day[†]	Between one week and one month
Change failure rate For the primary application or service you work on, what percentage of changes to production or released to users result in degraded service (e.g., lead to service impairment or service outage) and subsequently require remediation (e.g., require a hotfix, rollback, fix forward, patch)?	0-15%[‡]	0-15%[‡,†]	0-15%[‡,†]	46-60%

Getting Started With DORA

Many teams are not currently measuring the 4 Key Metrics because they're not looking at their true value stream. In order to effectively measure lead time and mean time to recover, you have to be looking at the full flow of activities from when work starts to when customers experience the results.

You can certainly count change failure percentage by support tickets, but in order to affect that statistic, you have to look back through the value stream to see where quality is breaking down.



The 4 Key Metrics stretch beyond your CI/CD pipeline

You can likewise measure deployment frequency by looking at your CI/CD pipeline, but without looking at the contributing activities upstream within your value stream, you may be missing a key contributing factor that could dramatically improve your results.

Many teams see rapid success by focusing efforts on their delivery pipelines, provided a bottleneck is within their build and deploy process,that process is highly independent, and their teams are highly capable of automation. If all of that is true, once your pipeline runs in less than an hour, you'll see diminishing returns and your bottleneck almost certainly resides either upstream or downstream of your pipeline.

By visualizing and measuring your value stream, you can collect critical metrics data, and see what is contributing to the measurements - all in a picture you can easily share. Before we start mapping your value stream, we start with a clear outcome in mind. That's coming up next.

Beyond Metrics

Tracking the 4 DORA metrics is an excellent way to measure your team's ability to successfully deliver software. So how can you actually improve these metrics? It's great to have a target, but how can you actually move towards it without wasting time, effort, money, or morale? This is where maps guide the way.

Imagine the path of your workflow from idea to customer as a stream of value that currently winds throughout the landscape, off into the distance around you, from upstream to downstream. From where you stand, you can see part of the stream as it approaches you from upstream, and you can see a part downstream as it continues into the distance. If you wanted to improve the flow, you could widen the portion around you, or perhaps carve a more direct path from one curve to the next. You wouldn't truly be able to see what effect your change had on the stream without a view of the entire flow, and the downstream outcome. The stream could be restricted far upstream beyond your view, or downstream. If you had a map of the stream's path, and measurement of the flow within the stream, you could ensure it followed the most direct path to your destination, and improve the flow precisely where it would have the most positive effect.

This is the power of a mapping approach to improvement. By creating and leveraging maps of the flow of value in our organizations, we can create the optimal flow of value, by changing precisely what will have the greatest impact.

Maps

4 Key Maps	Visualization	Focus
Outcome Map:	Factors contributing to your desired state	Clarity, Direction
Value Stream Maps:	Measured workflow performance and constraints	Flow
Dependency Map:	External influences on the stream	External Effects
Capability Map:	Internal influences on the stream	Internal Effects

The 4 Key Maps provide a comprehensive view of the landscape that your value stream traverses. Using the maps to guide our focus, decisions, and efforts, we can scientifically approach our improvement efforts using a visual and easily understood medium.

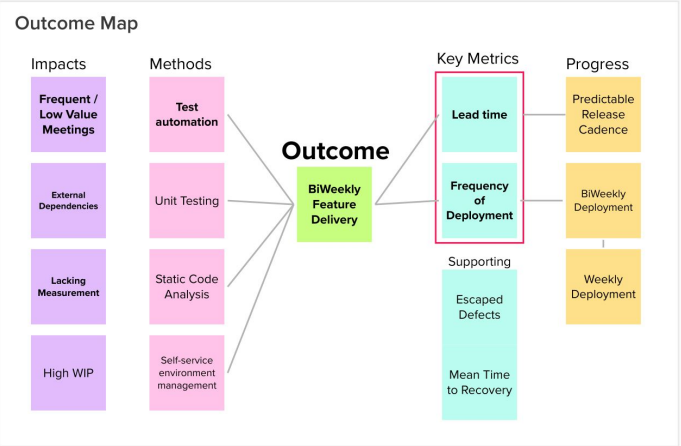
The 4 Key Maps *Simplified for illustration*

The Outcome Map

Why? Begin with the end in mind. See and share factors between you and your goal. The Outcome Map allows team members to dig into a desired outcome and begin charting the path to achieving it with open eyes. Doing so will help the team define a clear roadmap towards better.

How do you build it? The team comes together to define their desired outcome, and then consider what could impact their ability to deliver it. Methods describe the main contributing activities, Metrics describe how those methods are performing, Progress defines milestones along the way, and Impacts surface concerns that may affect success.

How do you use it? The Outcome Map is an excellent way to create energetic communication, clarity, and alignment from the start. It also reminds you to stay on track as you progress, and how to know when we're drifting from the path. By combining methods and measurements, you can describe where you want to go and how you plan to get there.



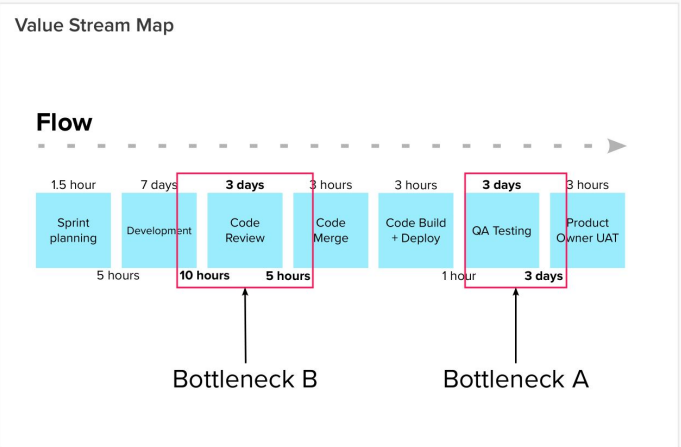
Similar to: Impact maps, fishbone diagrams

The Value Stream Maps

Why? Visualize the flow of Value through your team and organization. Measure performance, identify bottlenecks, target opportunities.

How do you build it? Your defined outcome allows you to identify the primary contributing stream. The team records the flow of activities towards delivery, and then collects activity and wait timing. Beyond the core components, you can layer on quality, value, role and other data to create a rich visualization of reality. Beyond the current state, you define an ideal state (your 'what if?' to inspire innovation) and target state (your 'what next?' to define a short term iteration) to align next steps.

How do you use it? The mapping exercise brings the team together under a common understanding. Everyone is encouraged to contribute their perspective to build the richest



Similar to: Traditional Value Stream maps, process maps

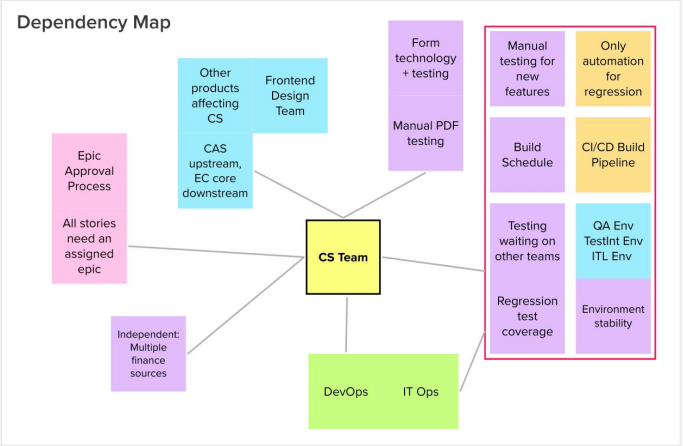
illustration. The measurements reveal bottlenecks, and allow you to not only focus, but prioritize as well. You can use the map to target improvement efforts to start on immediately, provided we're not constrained by external dependencies.

The Dependency Map

Why? Now that you have value stream maps along with a few key bottlenecks and opportunities, you can work together to define what is affecting the team and stream in question from beyond the team boundaries. By mapping dependencies, you can identify opportunities to mitigate them.

How do you build it? The team brainstorms factors (shared services, SLAs, approvals, challenging work, obligations, etc) that affect their ability to deliver work in the value stream. They then cluster them around common areas or themes to highlight and discuss the effects of each. For extra clarity, the team can also add data related to turnaround time or SLAs.

How do you use it? This map shows every member of the team (and anyone who sees it) what is involved in -and affecting- their ability to deliver value. This brings another dimension of clarity to the bottlenecks identified in the value stream, and confidence that the team has targeted truly valuable focus areas. The map reveals key dependencies that can be mitigated or broken, provided the team possesses the capability.



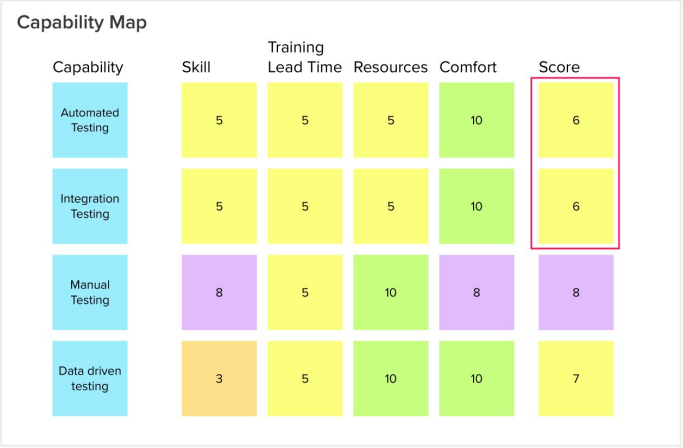
Similar to: Dependency graphs, system maps

The Capability Map

Why? You need to see, consider and share what will affect your ability to execute on improvements and foster more autonomy. Once you know your dependencies, a capability map allows you to see what would allow you to break or mitigate them.

How do you build it? Based on prior maps, the team identifies critical capabilities to deliver the desired outcome, votes to rank them and choose the top 8-10, then votes on each of the contributing factors (Skill, Training, Resources, Comfort) to create a score for each. For an extra dimension of clarity and actionability, a prime owner and a backup owner can be identified for each, ensuring someone (with support) is leading improvement efforts.

How do you use it? The map will identify where the team requires support, training, tooling etc to reach a point where they can confidently break dependencies and improve delivery. The map allows us to target investment in improved capabilities where it is most needed, directly connected back to your key opportunities and outcome.



Similar to: Skills matrix, competency maps

In the example, you can see how feature delivery is being affected by your two primary bottlenecks which are dependent on validation and test automation, how they are connected to external tooling and infrastructure, and a gap in capabilities. By combining the 4 Key Maps, you can trace a clear path from desired outcome to actionable next steps. In fact, this method will work for any situation, not just identifying how to improve your DORA metrics for technical teams, but any process or outcome you want to improve.

4x4 In Action

Set the Compass

“We want to deliver software twice as fast (*Deployment Frequency + Lead Time*) without sacrificing quality (*MTTR + CF%*)”

Map the Path

1. You **clarify the goal against contributing factors** (*Outcome Map*), to explore the challenge/opportunity and align those involved.
2. You **visualize and measure the current, ideal and target state workflow** (*Value Stream Maps*) to identify constraints and prioritize opportunities. The current state value stream map can inform
3. You **identify external influences** (Shared Services, SLAs etc) on workflow (*Dependency Map*) to identify contributing factors beyond the team.
4. You **identify internal influences** (Skills, Resources, Support) on workflow (*Capability Map*) to identify contributing factors within the team.

The 4 key maps allow you to see factors affecting your ability to progress towards your 4 key compass targets.

Create your Turn-By-Turn Navigation

1. By starting with the clarity of the Outcome Map, the team is heading in one direction together. Having a map makes it easy to communicate within and beyond the team.

> *"We're all on the same page and aware of what may lie ahead. We revealed that our regulatory requirements will demand a careful mitigation strategy, but our lack of test automation is impacting quality and velocity."*

2. By creating the Value Stream Maps, the team can clearly see and share where flow, quality, and value are being affected. The map is easily shared and understood within and beyond the team. A clear set of prioritized countermeasures can be formed based on the data revealed.

> *"We can now see what's affecting our ability to rapidly deliver high quality work, and what you can address or improve. We've revealed how quality issues are resulting in frequent rework and testing time is 1/3 of the total value stream. Our target state map shows that you can easily deliver in half the time with a few adjustments to workflow and simple automation."*

3. By creating the Dependency Map, the team can see how their performance is being impacted by external factors that they could potentially influence or mitigate.

> *"We can now see how factors beyond our control are affecting our performance, and you can target dependencies to break or mitigate. Our dependence on creating tickets and a long SLA with our infrastructure team keeps us from quickly resolving test environment issues."*

4. By creating the Capability Map, the team can see how their performance is being impacted by internal factors that could affect their ability to perform at a higher level, or take on more autonomy. The Value Stream Map has highlighted where constraints exist, and what capabilities are required to address them. You can see how lacking skill, support, or resources is influencing your constraints. You can also evaluate what dependencies we're capable of internalizing within the team.

"We can now see how contributions within the team are affecting our most critical constraints and our ability to address dependencies. If we can create a playbook to fix the simplest 80% of our build failures, we could resolve issues quickly within the team. We've identified a lead and backup to focus on building out test automation, and highlighted necessary support and training."

5. Armed with these compasses and maps, the team has a clear direction, knowledge of the landscape between their position and destination, and supporting metrics to keep them on track. They can easily tackle a prioritized set of initiatives aligned to their true north. They have velocity and quality metrics to inform them when something is pulling them in the wrong direction. They can see the path to success, which they have confidently defined to avoid obstacles and mitigate challenges. They can clearly and constructively collaborate along the way with everyone involved or affected.

"We can now see a clear path to success, together. Everyone from individual contributors to leadership can share the same view and alignment. We went from 8 different ideas of where to focus to 2 clear, prioritized opportunities. We know exactly what to do next, and can act safely in the knowledge that our compasses and maps will keep us on track. We can craft data-driven hypotheses that drive rapid, measurable experiments. We can periodically measure against our baseline to see, share and celebrate progress."

Whether you're aiming to start improvement, continue successful efforts, or restart in a new direction, **the 4x4 Method provides a clear, collaborative, and rapid kick start** to get your team on the same page, and confidently moving in the right direction.

If you're interested in getting started with the 4x4 Method and looking for a boost, I'd be happy to guide you. Grab a spot on my calendar here and I'll gladly get you moving in the right direction.

Frequently Asked Questions

Why do any of this?

Take it from DORA's research on thousands of organizations:

- Increase the speed of your deployments: The best teams deploy 208x more frequently and have lead times 106x faster when compared to low performers.
- Improve the stability of your software: High performers don't trade off speed and stability. The best teams recover from incidents 2.604x faster and have change fail rates 7x lower.
- Build security in from the start: High performers spend 50% less time fixing security issues compared to low performers.

Many teams have embraced the idea of tracking the 4 Key Metrics, and are enthusiastic about making these improvements, but lack a clear starting point - much less a path to success. The 4x4 Method provides that path.

Why should we measure these four metrics?

The Four Key Metrics of DevOps have been successfully linked to high performing software delivery organizations. They're the result of over 6 years of research and data collection from thousands of organizations along a spectrum of low to high performance. They correspond to the most critical factors affecting delivery performance, and each pair of velocity (Lead Time and Deployment Frequency) and quality (MTTR and Escaped Defects) balance each other to ensure sustained performance. **You can absolutely**

choose any metrics you like and use the 4x4 Method with them. Tracking 2-4 balanced metrics means you can ensure you don't pull too hard in any single direction and compromise elsewhere.

Are these the only metrics I need to improve?

The Four Key Metrics are a great balance of velocity and quality measurement, but they are by no means exhaustive. To create the outcomes you want, you may have to measure any number of things that will allow you to track progress and performance. That could include anything from 'how often developers are paged outside of business hours' to 'how many people skip sprint review'. However, any measurement impacts the systems being measured and it is important to take care not to fall prey to carelessly measuring the wrong things. Effects such as perverse incentives, the Hawthorne Effect and Goodhart's law should be taken into account.

Why is mapping valuable in DevOps?

Knowledge work in general, and software delivery specifically is incredibly complex. The systems, human interactions, and pace of change all combine to create a very challenging machine to debug and improve. DevOps is about collaboration and aligning groups with different incentives, so shared understanding is like gold. If a picture is worth a thousand words, a good map is novel delivered in a second. The best maps can be easily and quickly understood by anyone from the C-Suite to the new hire, and across any department. In an age of constant collaboration, sharing the same understanding is a superpower.

Is this only for software teams?

The 4x4 Method is primarily focused on improving software delivery performance, but you could also leverage it to improve outcomes in incident response, infrastructure automation, or even a sales process. Anywhere you need to improve the delivery of valuable outcomes, whether it's to employees, the business or customers.

Who guides this process?

It pays to have skilled, outside facilitation for this process for a few reasons: A perspective from outside the organization is far less likely to bring an agenda, bias, or political influence to the process, which will drive superior results. A skilled facilitator knows where to dig, and when to move on. They will know what questions to ask, and what seems like a strange measurement based on experience with other teams. All of that saves valuable time and maximizes value. Gathering a team can be expensive if you're not getting value from the session, and it can impact morale and trust to waste time. A skilled facilitator can likely complete a session in half the time, while keeping the team engaged. You may find you have skilled facilitators right now as agile coaches, scrum facilitators, dojo trainers, community of practice leads, or teachers. It's ok to pilot the process with a facilitator and team willing to try and learn!

Who participates in mapping?

It's important to involve representation from at least the responsible and accountable parties within a given value stream. That means if design is a part of the stream, there should be someone from design present during mapping. That also means that leadership and those who are able to change the system, workflow, and team must be present and involved. Once you identify your key bottlenecks, you can narrow the involved parties to those who are critical to those areas, but until the number of people exceeds a manageable 12, it's better to include as many voices and perspectives as possible.

How should we build the maps?

Any shared visual board tool will work well for these maps. There are dozens of free tools that allow for real-time collaboration, and many allow for anonymous voting and other powerful facilitation capabilities. The

important part is to build them collaboratively, or at least get fast and varied feedback from everyone involved and affected. These days, that means online, but this is all possible with a whiteboard, paper, post-its or almost anything you can write on together. For each map, you'll likely need 2 hours for an extremely skilled facilitator with prior experience, or 4 hours for a new attempt.

When should we do this?

You know the saying: The best time to plant a tree is 20 years ago, and the second best time is today. If you don't have clear performance data on your workflow today, clear pictures of what it looks like, and a clear path to better, wouldn't you like to have that ASAP? After right away, this practice is valuable every 6 months. Let's say after 4x4 you identify 3 high priority, relatively simple improvements to implement right away. It will likely take at least 3 months to see measurable progress, and then with 3 more months of progress and operation you'll have enough data and experience with the current state that you can map it again and look to a new outcome. In six months you'll have both made enough progress that you'll have a new desired outcome, as well experience with new bottlenecks to identify and tackle.

How do we get accurate results?

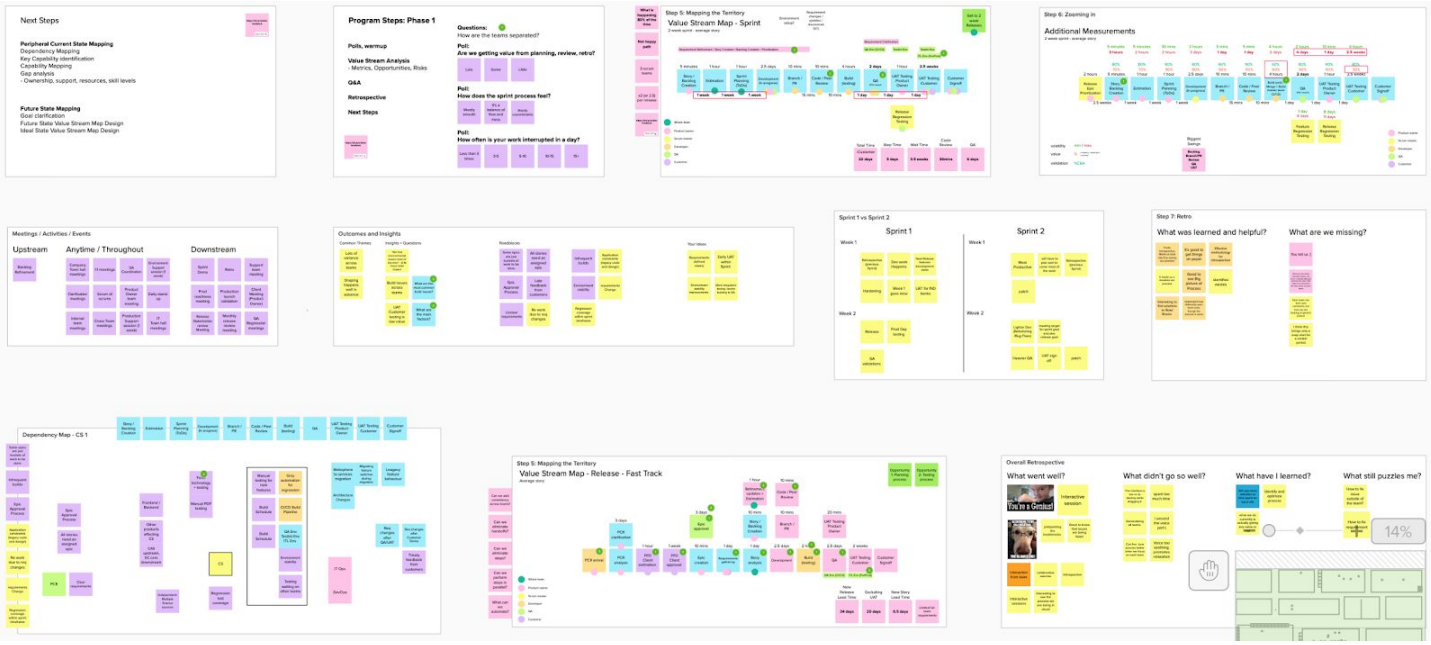
The short answer is, you likely don't need them (yet). If you are going from nothing to something, all that matters is relative measurement. When collecting data for a value stream map, it's ok to guess that an activity takes 5 hours instead of its actual 6 hours, because your biggest bottleneck may be days of delay elsewhere. When creating a capability map, every member of the team votes on the capability of the team, and the values average out to what the team believes. Based on the prior mapping activities, the facilitator can act as a control to gauge the accuracy and dig deeper if a measurement seems unrealistic.

Consider a team that rates their test automation capabilities based on a high degree of end-to-end integration testing, but with knowledge of their outcome, value stream and dependency maps I knew that the tests failed often, and there was very little unit testing present in their process. In this case, the inaccuracy may have resulted in the team missing an improvement opportunity, but by leveraging the combined data present across all 4 maps, a clear insight arises.

Once you've run the 4x4 even a few times with just your team estimations, you may be able to measure more accurately by looking at your systems for data, but what you find may in fact be less accurate. For instance, you may have lots of data in Jira, but it's only useful for measurement if people diligently record their activities on time. By getting a few guesses from across your team and averaging them out, you're asking the people who know, and informing those who don't. There's a benefit to the human activity of that data collection. And again, perfect detail isn't necessary. You'll find bottlenecks, and you won't be splitting hairs to prioritize them. Most teams find that 20% of their existing workflow is waste they can get rid of right away - that means seconds and minutes are not the problem.

What does this really look like?

In practice, the mapping process consists of 4-6 2 hour sessions to define, analyze, and design the value stream you target. You can create separate boards for each map, or combine them all. As you go from the raw input towards insight, you can rearrange the maps as you like, and easily export them to be shared throughout the organization. In the board below, you can see a value stream map (and an additional level of detail) in the top middle-to-right, a loosely defined dependency map in progress in the bottom left corner, and a target state map in the bottom centre. Capability mapping is elsewhere and connected here through a link. You can also see various other maps to collect supporting context - the middle row contains information about meetings, collected insights, and a mini retro.



Example map board in progress

Where can I find more information?

Although these practices are based on decades of experience, study, and existing techniques, this is a new method. You can find a wealth of information about the techniques these maps are based on as well as the measurement context from these sources:

- DORA: Metrics, Capabilities
- Impact maps, Fishbone diagrams, Outcome orientation
- Value Stream maps, process maps
- Dependency graphs, system maps
- Skills matrix, competency maps (this is suggested at a team level rather than individual)
- Automated stream data capture and visualization: Open source, commercial

I'll also be creating much more content on 4x4 which will be published on LinkedIn, Twitter and thinking.visible.is. You can also subscribe here to get the latest info as it's published.

How should I get started?

If you're not ready to dive in on your own based on the examples here (and they are rather slimmed down for illustration), I'd be happy to guide you. Grab a spot on my calendar here and I'll gladly give you a tour!