WHITE PAPER | READING TIME: 15 MIN

Value Stream Management: the missing piece that makes value flow through SAFe + DevOps

The integration of SAFe and DevOps in large organizations includes operational gaps between planning, execution, and improvement. Value stream management is able to bridge those gaps by unifying the value stream into one system.

Plutora™

Part 1: The rise of Agile and DevOps

Agile offers an alternative to Waterfall

Since the release of the Agile Manifesto in 2001, Agile methodologies have revolutionized how we develop and deliver software.

Agile signaled a movement away from the Waterfall methodologies refined in manufacturing in the 20th century. Software development is fundamentally different from product development in the context of manufacturing, and required new development methodologies to address those differences.

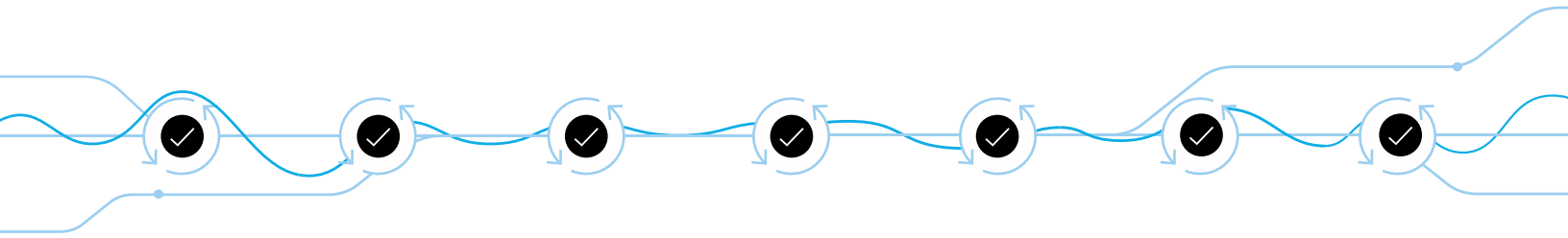
You don't create a software product and then replicate its development in a manufacturing line. You create software then improve upon it. This means you don't have a set outcome to anchor optimization around, which is the environment where Waterfall excels.

To meet the needs of software development Agile focused on small work iterations and higher collaboration. This embraced the inherent complexity and uncertainty of software development and ultimately enabled organizations to to better respond to digital disruption.

The Agile Manifesto codified common values and principles of a number of emerging software development frameworks including:

- Extreme Programming
- Dynamic Systems Development Method (DSDM)
- Scrum

Throughout the 2000's the benefits of Agile became undeniable. Breaking work into smaller iterations allowed for value to be delivered to the customer earlier and more frequently with less risk. Code was also continually inspected, improving quality.



Agile struggles to gain traction in large organizations

Throughout the 2000's the benefits of Agile became undeniable. As more organizations adopted Agile, they found it worked well in small teams. They could take strategic direction and break the work in small batches. They could deliver functional code and respond to feedback, all while planning the next iteration.

But as planning and decision making decentralized, there was concern over how to ensure software development aligned with business needs and the organization's best practices.

This tension between small Agile teams and the existing control structures quickly came to the forefront. Balancing these two needs would soon become the core of the new scaled Agile frameworks.

Jeff Sutherland and Ken Schwaber, two of the contributors to the original Agile Manifesto, published the first article on scaling Agile the same year as the Agile Manifesto called **'Agile Can Scale: Inventing and Reinventing Scrum in Five Companies'.**

Agile at scale frameworks emerge

Because success stories of Agile at scale were rare in the early 2000s, the global market was cautious to adopt Agile. And it continued to be so for several years as experimentation and learning built across industries.

However, as enterprises began successfully leveraging Agile at scale, the flood gates opened, setting the stage for greater creation and adoption of frameworks.

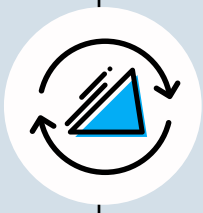
One core feature of these frameworks is to move development teams from one-off projects to long-lived products or 'value streams'. A value stream is everything involved in delivering a product or service — from idea to value realization by the customer.

Orienting multi-functional teams around value streams allows them to become experts in their product or service as well as its customers. Every team becomes accountable for the quality of the features they develop and deploy, no matter where they are in or what they contribute to their value stream. It also allows organizations to develop repeatable processes, at last unlocking the ability to scale Agile.

The development of Agile at scale frameworks:

2006: Scrum of Scrums

Jeff Sutherland and Ken Schwaber published the first iteration of the Scrum@Scale Guide, which included the practice of 'Scrum of Scrums' (SoS) that later became the popular term for this Agile at scale framework.

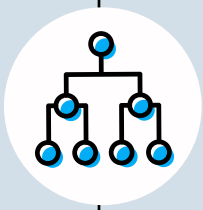


2011: SAFe

Dean Leffingwell publishes 'Agile Software Requirements' in which he described "Agile Enterprise Big Picture." It was this "Agile Enterprise Big Picture" that became the Scaled Agile Framework (SAFe) following the founding of Scaled Agile Inc by Leffingwell and Drew Jemilo, also in 2011.

2012: Spotify

Henrik Kniberg and Anders Ivarsson publish "Scaling Agile @ Spotify" which describes the Tribes, Squads, Chapters and Guilds of the Spotify model.



2013: Disciplined Agile

Scott Ambler publishes a paper, 'Going Beyond Scrum: Disciplined Agile Delivery' under the banner of the Disciplined Agile Consortium that he co-founded that year with Mark Lines.

2014: Less

The LeSS Company is set up to provide training and coaching on the Large Scale Scrum (LeSS) framework for multiple Scrum teams that Bas Vodde and Craig Larman had begun to develop together starting in 2005 when they were working together at Nokia Siemens Networks.

Agile at scale goes mainstream

With the rise of Agile at scale frameworks like SAFe, VersionOne (now Digital.ai) began including the frameworks' data in their **'State of Agile Report'** in 2015.

By 2020, 35% of the respondents for the annual report were using SAFe, making it clear that it had become the preferred choice for large organizations.

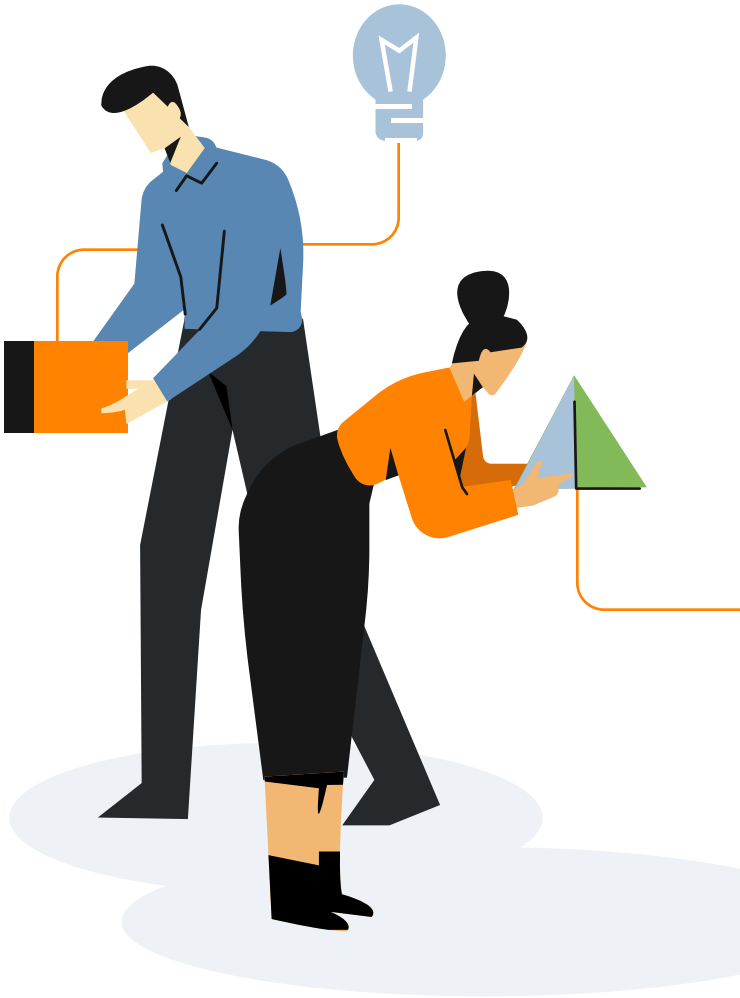
DevOps emerges to deliver value faster

At the same time Agile at scale frameworks were shifting how organizations approached software development, others were focusing on a different problem. Soon, methodologies emerged to improve the execution of software development and operations. This work would quickly become the DevOps movement.

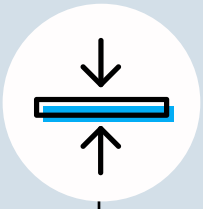
DevOps focused on rethinking the traditional operational model of software development, where organizations separated the work of those who wrote the code from those who deployed and maintained the code.

This traditional model evolved from, and was reinforced by, the disparate goals of each group. Developers aimed to ship code quickly, while operations sought stability in production.

Too often these objectives were at odds with each another. So the DevOps movement sought to break down these silos. The aim was to bring these groups together under shared objectives — first and foremost by shifting to a more collaborative culture.



Select milestones in the DevOps movement:



2007:

Patrick Debois began talking about the need to break down silos between development and operations teams with Agile methodologies.

2009:

John Allspaw and Paul Hammond in 2009 delivered a presentation titled “10+ Deploys per Day: Dev and Ops Cooperation” at Flickr. Inspired by this, Debois organized the first Devopsdays in Belgium.

2013:

The Phoenix Project written by Gene Kim, Kevin Behr, and George Spafford is published.

2016:

The DevOps Handbook by Gene Kim, Jez Humble, Patrick Debois, and John Willis is published.

2018:

Accelerate by Nicole Forsgren, Jez Humble, and Gene Kim is published.

But though culture was the main focus of DevOps, automation became the lower hanging fruit. As a result, entirely new categories of automation tools emerged to facilitate DevOps practices. These enabled traditionally siloed activities, such as testing and security, to 'shift left' and automate development activities.

The most well known of these practices is the continuous integration / continuous deployment (CICD) pipeline. CICD pipelines automate the building, testing, and deployment of code, dramatically accelerating the rate at which organizations can deliver value.

Though DevOps has a movement and a growing set of tools behind it, it does not have a centralized definition. It does, however, set out its best practices, such as those from the State of DevOps, a publication that began in 2013 as a collaboration between DORA and Puppet.

Fundamentally, DevOps is a way of working that includes culture, practices, and tools that enable organizations to deliver quality software at a high velocity.

Organizations look to adopt and scale DevOps

For a decade, DevOps teams have pushed the boundary of how quickly they can create value for their customers, well beyond what we thought was possible. And there's no end in sight.

DevOps' success, like that of Agile, has led enterprises to try to scale DevOps across their organizations. And similar to Agile, this has been a challenge. In part, this is because DevOps takes the decentralized approach started in Agile even further. DevOps aims to break down dependencies between value streams so that teams are able to develop and deliver value even faster — and do it entirely autonomously.

This has meant organizations on a DevOps journey struggle to realize its benefits. Successfully implementing and scaling DevOps ways of working not only requires the right tools, but a significant change of culture, which is notoriously difficult to scale.

A Harvard Business Review survey on DevOps found that 86% of respondents said it was important for their organizations to be able to build and deploy software quickly — but only 10% said they were successful doing so.

Organizations look to integrate SAFe and DevOps

As the 2020s begin, both Agile at scale frameworks and DevOps have matured significantly. SAFe has come to the forefront of the market, with 70% of the Fortune 100 leveraging it. DevOps has revolutionized how we think of software development and delivery.

The success of both SAFe and DevOps have put them on an intersecting path. DevOp teams are increasingly incorporating Agile planning into their toolchains to even further accelerate value delivery.

> Value stream management is “A combination of people, process, and technology that maps, optimizes, visualizes, measures, and governs business value flow (including epics, stories, and work items) through heterogeneous enterprise software delivery pipelines. VSM tools are the technology enabling the practices of VSM.”
>
> **- Forrester Research**

— achieving enterprise agility to stay competitive in today’s market — you need to master Agile AND DevOps. At scale.

In this paper we’ll look at how SAFe and DevOps can operate in concert, and explore how value stream management (VSM) bridges the two and finally realizes DevOps at scale.

Part 2: Integrating SAFe and DevOps into ways of working

SAFe grows beyond Agile

SAFe 5.0, first published in 2019, is much more than Agile planning. It has to be in order to help organizations achieve the business agility needed to compete in today's dynamic markets. It does this, in part, by integrating other concepts into the SAFe framework. This includes lean, systems thinking, and DevOps.

From the start, SAFe was grounded in lean thinking. Namely, it is informed by the foundational lean concept of eliminating waste to maximize flow; in this case the flow of work through value streams. This keeps practitioners on the lookout for inefficiencies that can hinder large organizations if left unchecked.

Additionally, SAFe incorporated systems thinking concepts that help take components from idea to delivery and optimize them as a whole — rather than as independent, siloed areas. Later, SAFe would add DevOps to its framework, enabling organizations to deliver more value to their customers faster.

Accelerating value delivery in SAFe with DevOps

At the core of SAFe are Agile Release Trains (ARTs) and the Program Increment (PI). The ART is meant to create a long-lived, multifunctional group centered around a value stream. There may be multiple ARTs in a value stream but not more than one value stream per ART.

The PI is the overall development cadence, usually lasting a quarter. PIs kick off with a planning event that aligns ART objectives and strategic business themes, where all stakeholders and ART members attend. This delivers visibility within the ART of the PI's development goals and how they align with business objectives.

In PI planning, the organization's strategic themes are broken down into the Agile increments of Epics and user stories. The effort to complete these stories is estimated and, ideally, the stories included in PI plan should be equal to what the ART is able to accomplish.

It is a detailed process, and optimizing PI planning over time is a challenging task that requires balancing accelerated value delivery with organizational alignment,

while also minimizing risk. That's where things get tricky.

To strike that balance, SAFe has several components that empower ARTs to make informed decisions and deliver value quickly with minimal overhead or waste. This includes advocating for lean portfolio management, decentralized decision making, and transparency. But importantly, SAFe also incorporates DevOps ways of working and a Continuous Delivery Pipeline. This integration of DevOps into SAFe is organized around the acronym CALMR.

CALMR is SAFe's take on CALMS, an acronym that succinctly describes what DevOps is all about. Comparing these acronyms is a useful way to see how SAFe aligns DevOps to the framework.

Devops CALMs	SAFe® DevOps CALMR	SAFe DevOps description
Culture	Culture	Culture of shared responsibility
Automation	Automation	Automation of Continuous Delivery Pipeline
Lean	Lean Flow	Lean flow accelerates delivery
Measurement	Measurement	Measurement of everything
Sharing	Recovery	Recovery enables low risk releases

Culture, Sharing, and Recovery in SAFe and DevOps

Within SAFe, DevOps works to create a 'Culture of shared responsibility.' This emphasis on a collaborative culture builds trust among teams and brings the 'S' (sharing) in the original CALMS acronym into the 'C' of (culture).

In DevOps, sharing is essential because effective communication leads to intra- and cross-team collaboration, which results in a faster flow of work and greater value delivery at a higher quality.

SAFe changes the 'S' in the CALMS acronym to 'R' for Recovery. In SAFe, the focus on improving recovery is directly connected to risk reduction in releases. To that end, SAFe also proposes planning and rehearsing failures (this is what is known as Chaos Engineering in DevOps). And it calls out the need for a system that allows for immediate rollback or fix forward, such as a deployment automation solution.

DevOps may not have 'Recovery' as part of the CALMS acronym, but MTTR is one of the four key DevOps metrics widely used (along with Change Fail Rate for stability).

Automation in SAFe and DevOps

In some spaces, DevOps has become nearly synonymous with CICD pipelines. But there is more to DevOps than just automation, and more to its automation than merely CICD.

It was Agile that actually started the conversation about continuous delivery. In fact, the first of the twelve principles of Agile software as described in the **Agile Manifesto** is: "Our highest priority is to satisfy the customer through early and continuous delivery of valuable software."

In the SAFe framework, DevOps automation is anchored in the thinking that manual processes '**are the enemy of fast value delivery, high productivity, and safety.**' This means that automation, while focused on the Continuous Delivery Pipeline in SAFe, is about more than simply saving time.

SAFe makes clear that automation can improve the reliability of engineering workflows, and create repeatable, self-documenting processes that are more efficient, secure, and auditable.

Lean in SAFe and DevOps

From both the SAFe and DevOps perspectives, an automated Continuous Delivery Pipeline allows organizations to accelerate the flow of work by making the value stream more lean. This lean flow is achieved through creating an integrated DevOps toolchain which can optimize the flow of work as a system rather than specific tools.

'The DevOps Handbook' guides us to think like a value stream, to center DevOps adoption around this concept, and to use a lean tool, Value Stream Mapping, as a starting point. SAFe follows this guidance and includes Value Stream Mapping as part of the SAFe DevOps Practitioner course and as the first core concept of DevOps and Release on Demand.

Though Value Stream Mapping is a heavily manual and people-oriented process, it is an effective way to gain insight and alignment. Visual collaboration is a key benefit and the profound system understanding that participants gain, along with empathy for each other's challenges, is unparalleled.

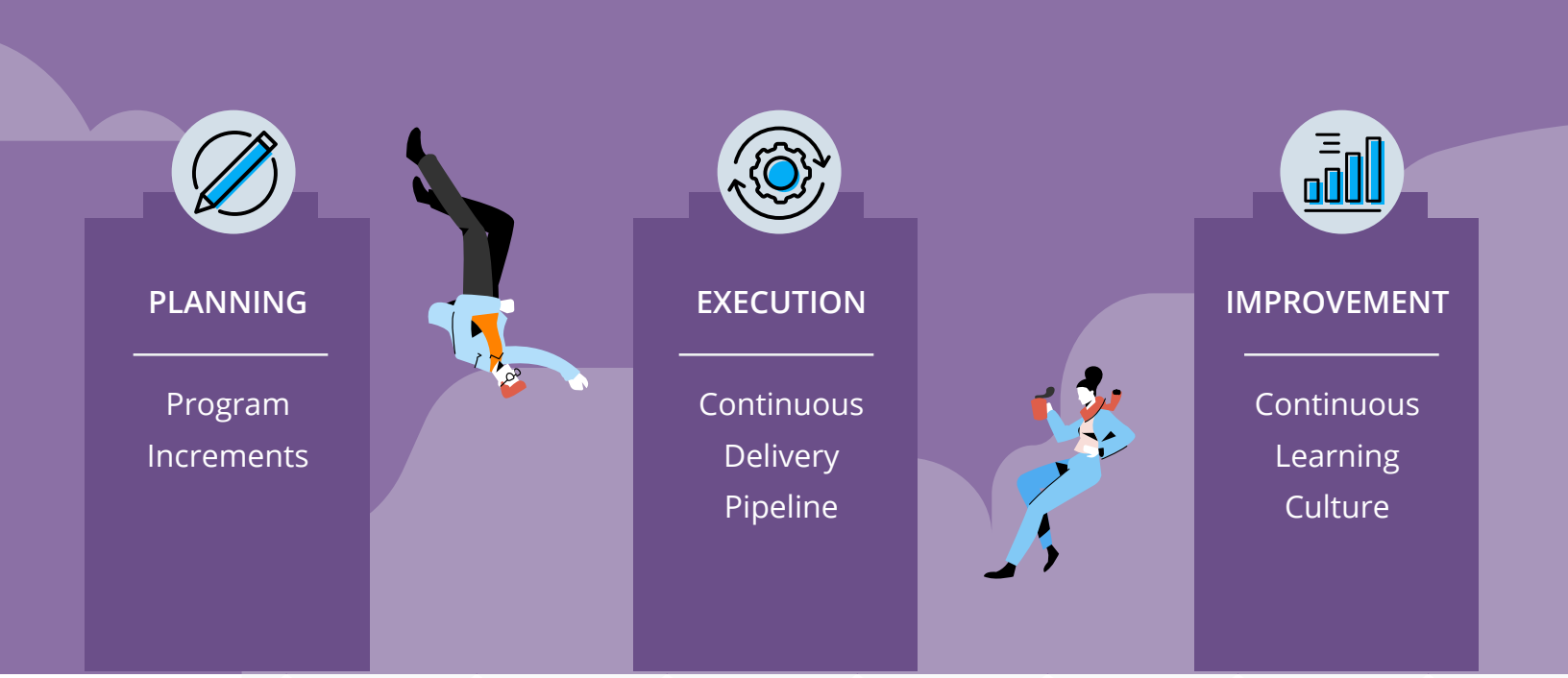
Removing bottlenecks, reducing wait times, and decreasing batch sizes will accelerate the delivery of value to the customer. Once organizations achieve a continuous flow they can then continuously improve lead time with analytics and automation that take advantage of efficiency opportunities.

Measurement in SAFe and DevOps

Both SAFe and DevOps endorse metrics as a key part of their framework or principles and practices. SAFe notes that implementing and continuously improving the telemetry of the business, application, and infrastructure - as well as the Continuous Delivery Pipeline itself - enables data-driven decision making. This leads to objective, blameless improvement efforts that reinforce a culture of trust and sharing.

However, neither SAFe nor DevOps go far in proposing platforms to automate the collection of metrics for inspection and adaptation. And since these metrics lie within many different parts of the DevOps toolchain, collection is challenging and can present significant manual overhead.

Fundamentally, this data needs to be transparent so that all team members can understand and react to it. This allows for everyone in the value stream to make improvement suggestions and understand the reasoning behind decisions.



The remaining gaps between SAFe and DevOps

Integrating DevOps into a SAFe implementation is essential to realizing the enterprise agility needed to stay competitive. DevOps will enable organizations to react to market changes faster and deliver value to customers more frequently. However, this acceleration will create a pull toward decentralizing decision making and breaking dependencies.

This will change established processes as the bottlenecks that hold back the continuous flow of value delivery are removed. And this is where the gaps between planning, execution, and improvement within SAFe will become apparent.

Gaps between planning and execution

Though SAFe incorporates multiple knowledge bases into the framework, it's strongest in planning. The planning and development cadence of the PIs breaks strategic themes down into actionable user stories in even the largest organizations, and enables continuous, incremental change.

However, as work moves through the Continuous Delivery Pipeline, SAFe has fewer built-in processes to manage work. For example, SAFe doesn't have a specific method for **managing dependencies across teams** in real-time as work is executed and release scopes shift. Nor does it provide guidance on how to break dependencies while integrating DevOps ways of working. These become ever increasing pain points as release frequency increases.

Gaps between execution and improvement

As value delivery accelerates, existing methods of telemetry and transparency will begin to break down. Without telemetry throughout the value stream — including the Continuous Delivery Pipeline — organizations will not be able to achieve transparency, measure performance, and identify opportunities for improvement. It results in a lot of guesswork which is a lot of work to guess.

Value Stream Mapping is a key step in establishing and improving a DevOps toolchain. It helps teams identify bottlenecks, reduce wait times, and establish a continuous flow of value.

However, as previously noted, the time and effort required to execute that exercise means that it is not revisited as frequently as it should be. And this holds organizations back from achieving a **Continuous Learning Culture**.

Part 3: Bridging the gaps between SAFe and DevOps with Value Stream Management

Value Stream Management

Value Stream Management (VSM) is an emerging set of practices and a tools category that builds on DevOps' evolution from a focus on Dev and Ops toward an e xpanded scope that includes the entire value stream. VSM brings a systems thinking approach to software development to optimize the flow of value from idea to realization with transparency, telemetry, workflow automation, and lean governance.

VSM originated in lean as an ongoing process of removing the bottlenecks in manufacturing. The concept has expanded as it has been applied to software development, but the goal remains the same - make the flow of work through the value stream visible to eliminate bottlenecks and accelerate the flow of value realization.

Since a fundamental building block of SAFe is value streams, value stream

centric thinking is part of the behavior and organizational design that SAFe promotes. VSM goes a step further to provide a platform for SAFe to drive cultural change through end-to-end visibility. This enables leadership to align work around value streams and set a vision across them.

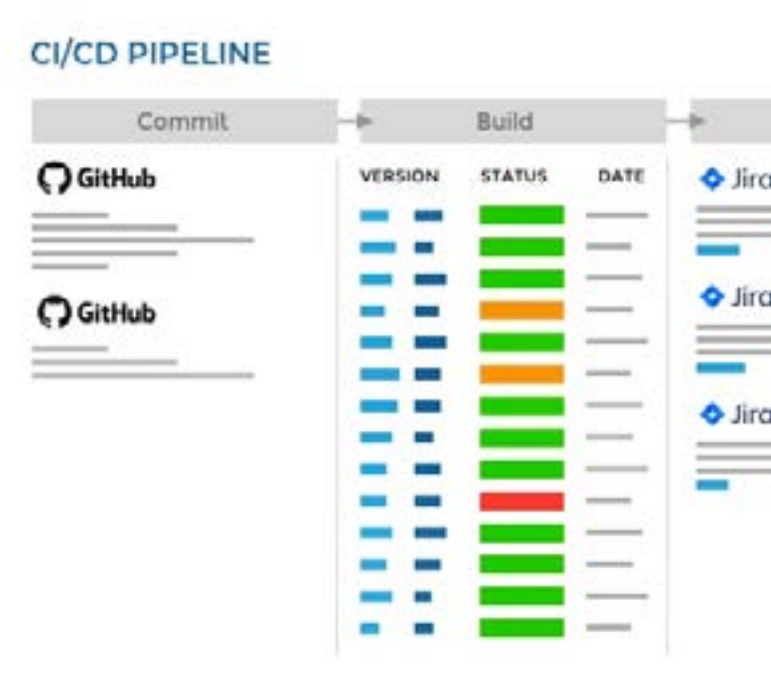
With VSM, you are able to bridge the gaps between planning, execution, and improvement within SAFe and DevOps.

Unify planning and the Continuous Delivery Pipeline into a single system

Plutora, a VSM solution, empowers you to converge your tools from planning and the Continuous Delivery Pipeline into one system. And it is able to do this not only for one ART, but for your entire portfolio.

This unification delivers end-to-end visibility, bridging the gap between SAFe planning and DevOps execution. With complete visibility, teams can apply systems thinking in real-time.

This enables teams to understand the entire value stream and facilitate cross-team collaboration.

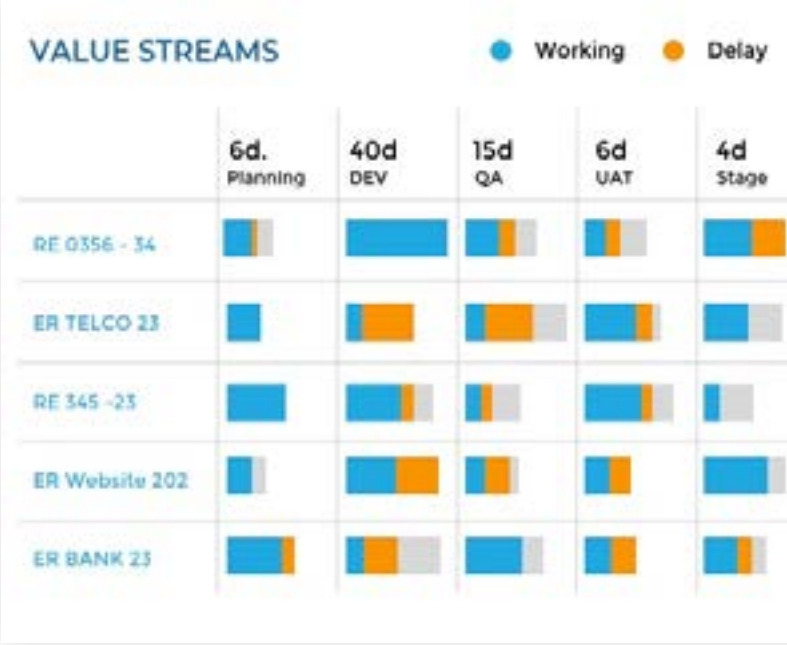


Decentralize decision making safely with lean governance

SAFe implementations also need to coordinate release governance in value streams. Often governance is centrally managed as part of Lean Portfolio Management in SAFe. However, this contrasts with the DevOps principle that teams are able to deliver value faster with decentralized decision-making.

VSM enables ARTs to build lean governance into their workflows to drive continuous compliance. Combined with complete traceability and on-demand audit reports, VSM allows you to decentralize decision making with less risk by decentralizing governance activities.

Manage releases and dependencies across teams in real-time



With visibility and governance in place from Agile planning through the Continuous Delivery Pipeline, you are able to accelerate delivery through DevOps ways of working. Plutora builds on the Value Stream Mapping within SAFe, helping you manage the dependencies between teams and allowing work to flow freely through the value streams.

Though the ideal is fast-moving, autonomous teams, the reality is that there will be interdependencies across ARTs and value streams. And this will remain an issue even as organizations work to decouple release elements in their architecture and move toward independent and on-demand releases.

VSM helps you get to your ideal state while helpingyou where you are now. Being able to efficiently manage work flowing through the value stream and manage the scope of releases as statuses change is vital to being able to release value to customers on demand.

Plutora delivers workflow automation and orchestration in release management, test environment management, and deployment management. With these tools, teams can manage complex releases in and across teams, streamline environment management, and benefit from real-time visibility into deployments.

Together this enables your organization to efficiently move work through value streams, safely increasing value delivery as you adopt DevOps ways of working.

Gain insights to improve execution with end-to-end telemetry

SAFe aims to establish a Continuous Learning Culture with traceability and telemetry. Measurement is not only a component of CALMR, but it is also one of the four practices associated with Release on Demand. But

though measurement is fundamental to driving continuous improvement, SAFe is missing the bridge between execution and improvement that makes it possible. That is where VSM comes in.

Plutora delivers real-time measurements, including the **4 main DevOps metrics** and flow analytics across the value stream. This allows ARTs to continuously **inspect and adapt**. By having continuous and real time insight into the value stream map, ARTs are able to identify bottlenecks in the flow of work and identify opportunities for improvement.

These insights into the value stream enable teams to drive the **relentless improvement** that DevOps and the Continuous Delivery Pipeline require to achieve release on demand.

Conclusion

SAFe and DevOps have changed the way we work. Agile originated from solving problems in planning software development, while DevOps sought to solve development and delivery problems.

The two have become essential for organizations to stay competitive. However, they need to be treated as one system with end-to-end visibility — from planning to execution — to be able to coordinate work and drive continuous improvement.

VSM is the framework that bridges the gaps between SAFe and DevOps and at last enables organizations to scale DevOps throughout their SAFe implementation and deliver value faster with less risk.

About Plutora

Plutora, the market leader of value stream management solutions for enterprise IT, improves the speed and quality of software creation by capturing, visualizing and analyzing critical indicators of every aspect of the delivery process. Plutora orchestrates release pipelines across a diverse ecosystem of development methodologies, manages hybrid test environments, correlates data from existing toolchains, and incorporates test metrics gathered at every step. The Plutora Platform ensures organizational alignment of software development with business strategy and provides visibility, analytics and a system of insights into the entire value stream, guiding continuous improvement through the measured outcomes of each effort.

Plutora™

Learn more: www.plutora.com

Email: contact@plutora.com