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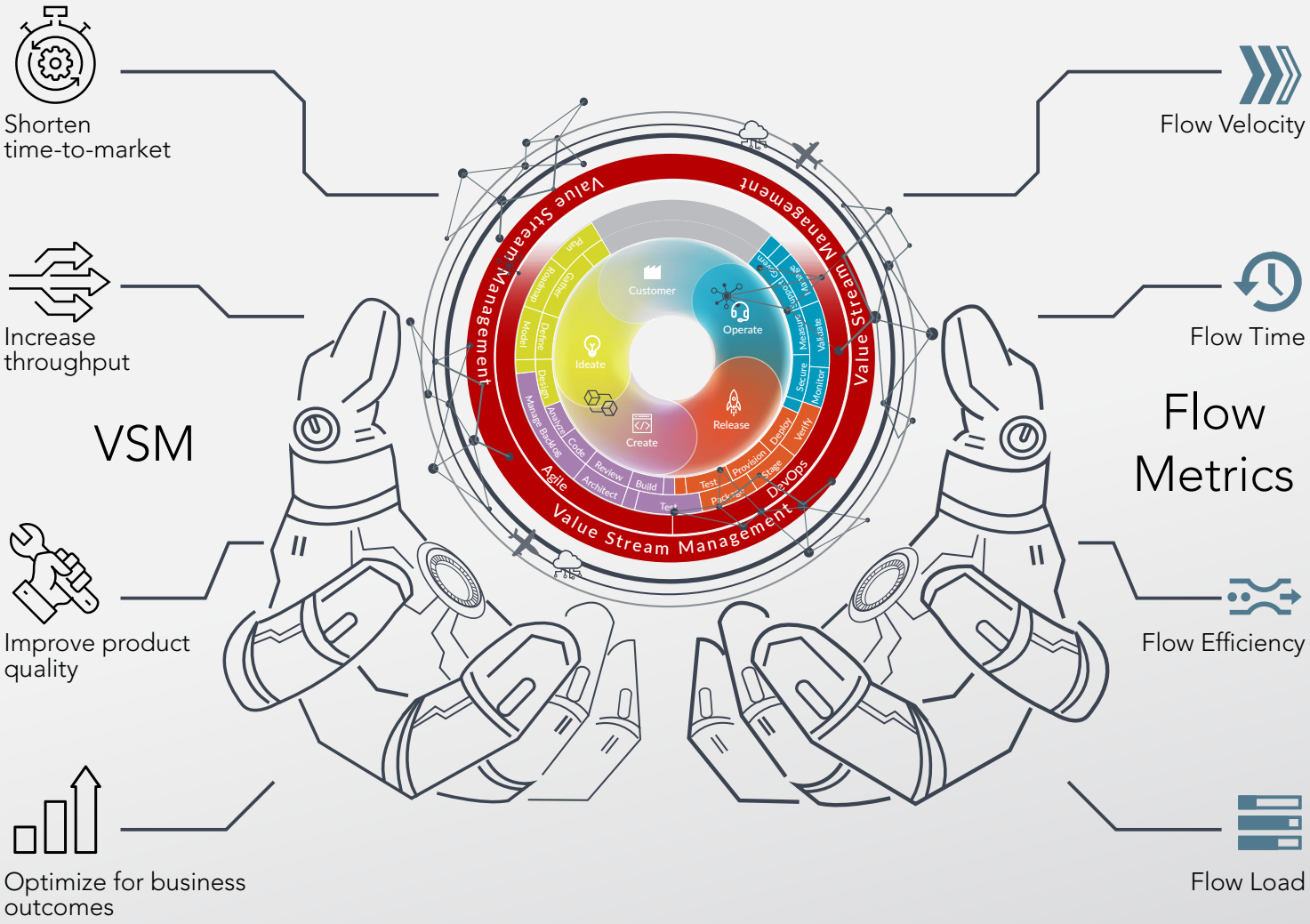

Whitepaper

The Age of Value Stream Management (VSM): Beyond Agile and DevOps

By Carmen DeArdo, VSM Practice Lead in Customer Success, Planview

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Contents

Executive Summary

"Value stream management has come of age because it's impossible to do a large-scale digital transformation without it."

Dr. Mik Kersten, CTO of Planview, author of *Project to Product*

If Agile and DevOps defined the past two decades in software delivery, value stream management (VSM) will surely define this one. At the turn of this century, you would find little information on Agile or jobs calling for expertise in that area. Ten years ago, the same was true for DevOps. Today a similar situation exists if you search for VSM. While many careers have been built around Agile and DevOps over the past 20 years, it has not been enough to help enterprises truly compete in the increasingly digital world. VSM is fundamentally different because it looks holistically from ideation to delivery and will make good the promises that Agile and DevOps have not been able to fulfill at scale. A change in thinking, tooling and job roles can get you on the right track.

DevOps Is Part of a Bigger Picture

Agile sped up development to accelerate value delivery, while DevOps removed the bottleneck between development and operations for further gains. Yet that's only part of the value stream. (See figure 1)

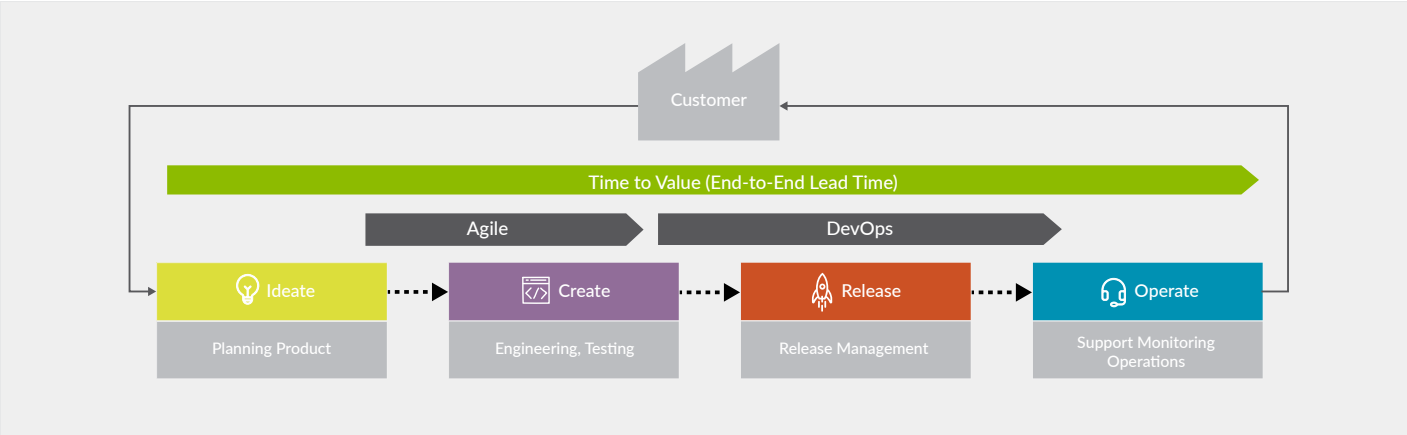


Figure 1

Being good at CI/CD and code to cloud are necessary, but insufficient to keep pace with the breakneck speeds of the tech oligopoly who grow richer by the day. We must consider the end-to-end flow of all the software delivery work that creates, and protects, business value — after all, for most organizations, half of their time and half of their money is spent before a card ever gets to a development team's backlog. That's why VSM is vital: It doesn't just focus on accelerating one silo, it focuses on accelerating the whole system. The flow diagnostic of a Planview customer perfectly illustrates how little actual development time is used in the delivery of a product. (See figure 2).

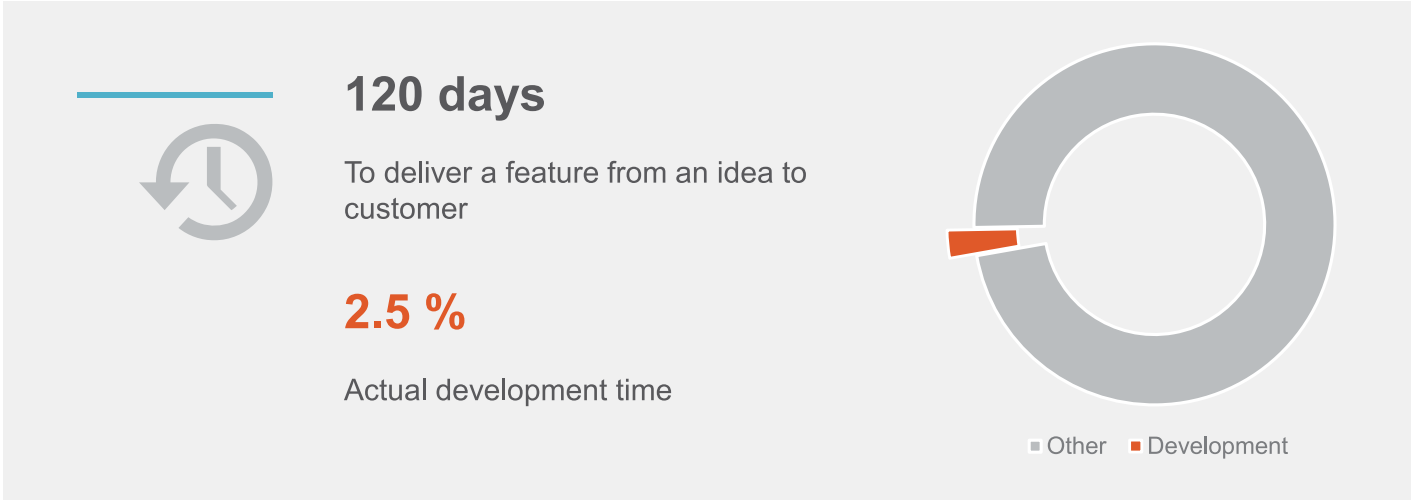
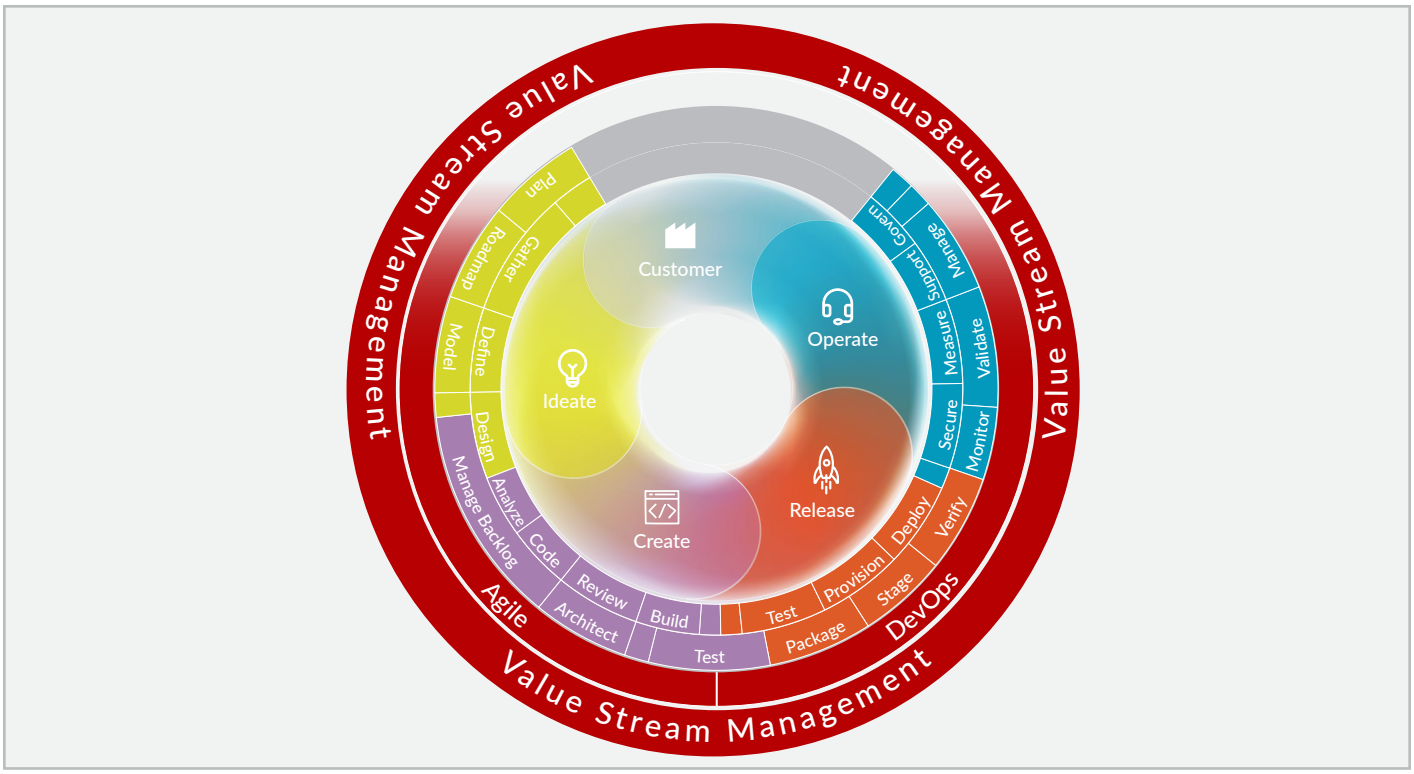


Figure 2

VSM: The Whole Picture

In the context of software development, Forrester defines VSM as: "A combination of people, process, and technology that maps, optimizes, visualizes, and governs business value flow (including epics, stories, and work items) through heterogeneous enterprise software delivery pipelines. [Value stream management] tools are the technology enabling the practices of VSM."[1]

1 Elevate Agile-Plus-DevOps with Value Stream Management, Forrester Research, Inc., February 19, 2020



VSM in software delivery takes a systematic approach to measuring and improving end-to-end flow to help organizations to:

- Shorten time-to-market
- Increase throughput
- Improve product quality
- Optimize for business outcomes, such as time-to-market, revenue, customer retention and employee happiness

Accelerating value work requires an understanding of what value is. In *Project to Product*, Dr. Mik Kersten helped technology leaders articulate that by defining four flow item types for which someone is willing to exchange an economic unit (time or money). This data is abstracted from complex software delivery toolchains that enterprises use to manage the complex flow of work:

Flow Items		Delivers
	Features	New business value
	Defects	Quality
	Risks	Security, governance, compliance
	Debts	Removal of impediments to future delivery

An organization's focus must be on prioritizing, optimizing and balancing the flow of these items across the software portfolio. For that, you need the right type of measurement — as Adrian Cockcroft, VP of Cloud Architecture Strategy, Amazon Web Services puts it: "The most critical metric is how long it takes for an innovative idea to reach a customer. If it takes your company months, how can you compete with an organization that delivers in days?"[2]

2 Cloud for CEOs: Measure Innovation with one metric, AWS executive insights, Adrian Cockroft

Customer Story: A healthcare leader doubled its feature Flow Velocity, introducing new business capabilities faster than ever.

New Practices Require New Measures

"Measuring only one area of the value stream is like only using two inches of a 12-inch ruler."

John Willis, Senior Director of the Global Transformation Office at Red Hat, co-author of *The DevOps Handbook*[2]

Unlike discipline metrics that focus on activities in a specific area of the value stream (such as DevOps Research and Assessment (DORA) metrics), VSM requires end-to-end metrics that levitate above all practices and processes to focus on the flow of business value. Discipline metrics that measure a specific silo are only meaningful if the silo itself is the bottleneck.

While DORA's four metrics — Lead Time (from code commit to deploy), Deployment Frequency, Mean Time To Restore (MTTR) and Change Failure Rate — have set the gold standard for operational efficiency for releasing new code, they are not sufficient on their own. While you must become more proficient at releasing code rapidly, securely and confidently, there are now table stakes across the industry. Your organization will remain competitive only if it can deliver business value — not just code changes — at an ever-increasing clip.

By the same token, we must all be cautious of only using Agile metrics like sprints completed, story points and t-shirt sizing, or the ceremonies and certifications associated with Scaled Agile Framework® (SAFe®); they only mean something if you can correlate such activities and processes with business outcomes.

That's why VSM metrics, such as Flow Metrics, are so significant: they measure the rate of business value delivery for software products through the lens of your customers (whether internal or external) to help enable you to understand your current state. They enable you to determine where work is flowing, and more importantly, where it isn't. They provide shared visibility into business and development metrics for everyone involved in the value stream. That includes leadership, who are often balancing resources and budgets across a portfolio. **Where will those budgets produce the highest ROI in terms of improved flow?**

- Flow Velocity® gauges whether value delivery is accelerating. Flow Velocity is the number of Flow Items of each type completed over a particular period of time. This allows us to measure throughput.

2 Mik + One (Project to Product) Podcast, Episode 17: John Willis (September 22, 2020)

- Flow Time can identify when time-to-value is getting longer. Flow Time measures the time it takes for Flow Items to go from "work start" to "work complete", including both active and wait times. This allows us to measure time-to-market for the throughput that we are after to ensure that it is fast enough for the short feedback cycles needed when dealing with uncertainty.
- Flow Efficiency® can identify when waste is increasing or decreasing in your processes. Flow Efficiency is the ratio of active time vs. wait time out of the total Flow Time.
- Flow Load® monitors over and under-utilization of value streams, which can lead to reduced productivity. Flow Load measures the number of Flow Items currently in progress (active or waiting) within a particular value stream.

Each of these is based on end-to-end flow through a value stream. For example, the Flow Time clock starts when work is started, (e.g., via a commitment to a plan item or objective). It does not stop until running software has been delivered. As such, these end-to-end metrics avoid the pitfalls associated with measuring just the cycle time of development or code-commit to code-deploy time, which can be an order of magnitude shorter than the bottlenecks upstream of development. Flow Time provides a customer and business-centric measure of time to market, and Flow Velocity does the same for throughput. Flow Efficiency measures how effective investment turns into value and Flow Load is an early warning indicator of overloaded value streams declining due to too much work-in-progress (WIP). Using these value stream metrics, we can glean insights to create a culture based on data-driven CI.

Customer Story: A telecom giant was able to change its outsourcing strategy and renegotiate better terms with its managed service partners

Reaching the Summit of Data-Driven Continuous Improvement

Many teams appear mature in the application of Agile and DevOps practices but are not very mature when it comes to the cultural side of implementing CI.

First, how are teams measuring maturity? Is the goal to do DevOps well? Are you measuring outcomes or are you simply measuring activities? The goal is not to implement all of the DevOps practices — it is to accelerate the delivery and protection of business value. Maybe you don't need to put all DevOps practices into play. Maybe different teams need different practices. It's a mistake to simply say, "We're going to implement this practice or that one" without having a measure of what it can provide from the perspective of the business.

You've got to know what the business needs first — what is the problem? What will unlock the flow of business value? The Age of VSM is about measuring what matters in software delivery in terms of business outcomes. This provides the capability to look at these problems differently in order to create a continuous feedback loop between IT and the business to supercharge market response and adaptability.

Treat Your Pipeline as Your Most Important Product

When it comes to accelerating customer value, it's dangerous to focus only on the development and delivery of a digital product. Most time is invested before a single line of code has been written. By extending your visibility further upstream where work originates, you can begin measuring the entire journey. Thinking about how software delivery work moves between all teams in the value stream (from request to operation) leads to the significant realization that the tooling pipeline is the most important product and should be treated as such. (See figure 3).

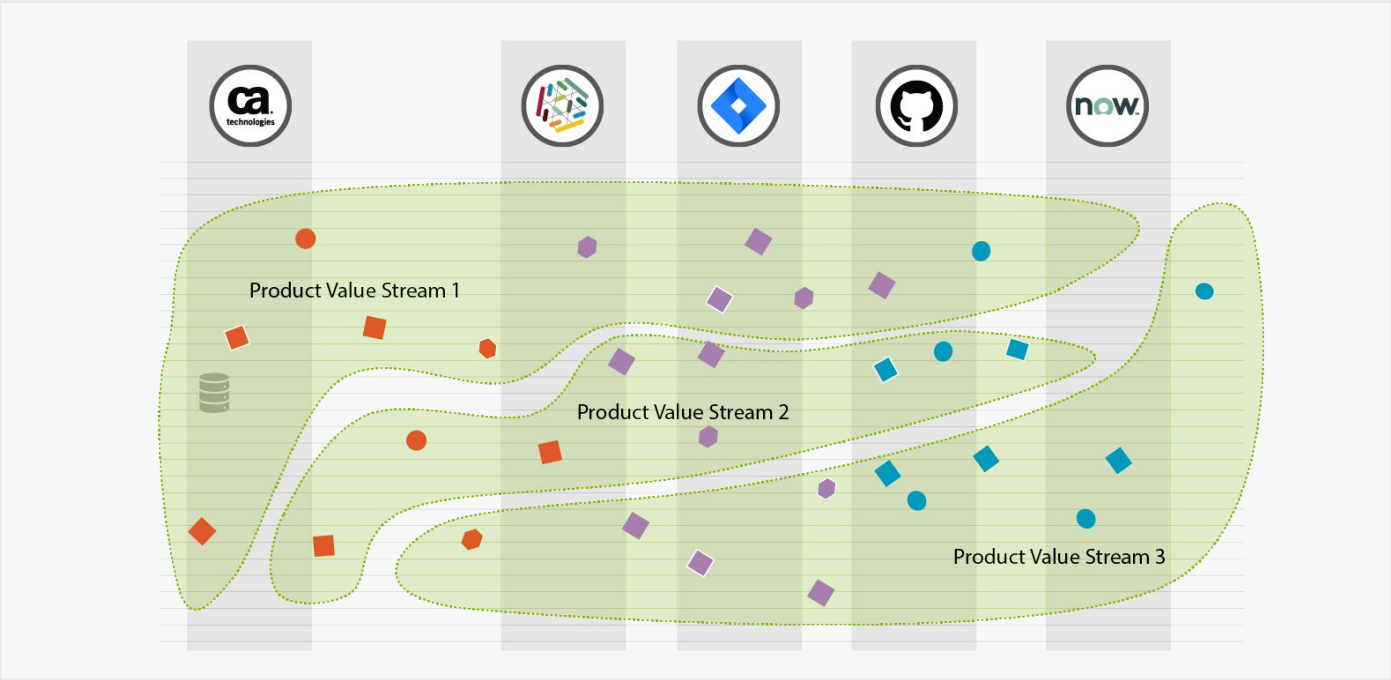


Figure 3

Customer Story: An online investment firm discovered the system bottleneck impeding digital channel innovation and began working to dismantle it

The Rise in VSM Tooling

New tooling is emerging across the software delivery spectrum to support organizations in the Age of VSM as we think end-to-end in how we collaborate and work faster together — and measure our productivity and effectiveness in terms of business outcomes.

Measuring and understanding end-to-end flow isn't easy. Software delivery is highly technical and creative knowledge work that can span thousands (or tens of thousands) of IT practitioners. Information is scattered across heterogenous toolchains comprising discipline-specific tools. In fact, some 42% of large-scale software delivery organizations use four to 10 core collaboration tools for portfolio management, design, enterprise agile planning, testing and ITSM, and dozens of additional tools to support the CI/CD pipeline and operations. (See table 4).[3]

Table 4. Tool usage by the organizations.

No. of tool endpoints	No. of organizations	Percentage
1	4	1.3
2	91	29.4
3	83	26.9
4	55	17.8
5	41	13.3
6	21	6.8
7	7	2.3
8	3	1.0
9	2	<1.0
10	1	<1.0

Measuring flow, therefore, involves tracing constituent units of value creation and protection as they traverse all team tooling in the form of artifacts like activities, capabilities, epics, features, stories, bugs and incidents. Yet for too long we've been too focused on "the right side" of the value stream, thinking about how products are built and delivered through Agile and DevOps tools, without visibility on how they're requested, analyzed, processed and designed. Our ability to support customers is hindered because we don't know where and why work is slowing down outside of development. Our product pipeline is broken, our visibility fractured.

A "Broken" Product Pipeline

Traditionally, CI/CD tools include source code management, build, deploy, quality management and service management. Moving more to the right, you have release management and service management. But too often organizations have ignored integrating tools further to the left such as planning and portfolio management, product management, as well as requirements management and risk management (static and dynamic security scanning tools). This impacts our ability to see and measure end-to-end flow.

Project to Product: Moving from a temporal view of managing initiatives to a persistent view where you are focusing on improving products that are the lifeblood of the organization.

3 Mik Kersten, "Mining the Ground Truth of Enterprise Toolchains, IEEE (Volume 35, Issue 3, May/June 2018, p12-17

In Accelerate, lead time is defined as the portion of the value stream from (last) code commit until deployment. While this is essential to improve, it only covers the time from the build being produced through deployment. We need to account for the time that elapses before it hits a developer's backlog. In order to shift IT from a project to a product focus and better align with business results, you need to reduce end-to-end flow time by measuring earlier in the delivery life cycle by "shifting left." As such, you need tooling across the whole value stream through the ideate, create, release and operate phases. A focus only on optimizing the CI/CD tooling and practices is too narrow a view that produces diminishing returns over time.

Customer Story: IT and business consulting firm CGI unlocked capacity equivalent to over 7,500 days per year

The Great Disconnect Between IT and the Business

Because of this lack of a holistic view, IT teams don't feel like they are able to influence the business side of the house, where most of the WIP starts, such as requests for features or application changes. These intake processes result in teams taking on too much WIP and neglecting work. Many teams need to "stop starting" and "start finishing" to deliver business value more quickly.

Crucially, this area upstream is where business leaders have their own processes and where tools are less likely to be used; it's a world dominated by spreadsheets, documents and PowerPoint presentations. This is where work is least visible or measurable. And this is precisely where we need VSM: to turn the light on, starting with customer needs to continuously improve end-to-end flow. This requires a culture shift from both IT and business/product owners. And that requires taking a broader, more holistic view of the tools and practices in the business space.

Architecting for Flow

An end-to-end integrated pipeline product can be architected for flow. For example, tools used for visual system management (e.g., Jira, Azure DevOps) are becoming more of a commodity with the real differentiation being how they can be integrated with tools used for portfolio, defect and service management, because those are the sources of work that will flow into product-based teams for development of business value and unplanned work. Teams should think about how they can work more closely with business portfolio teams on continuous flow (and funding), because eventually this work will become the next bottleneck that must be addressed on the journey to accelerate business delivery capability.

Protect Your Business

With end-to-end visibility into work across the pipeline, you can abstract that connected technical data into overarching value stream metrics to identify areas for experiments to improve end-to-end flow. Here the focus isn't just on work that creates value but on what protects it too. It's key to remember that the more features you build in a big push to market, the more debt and risk that you will take on. Like a balanced diet, you need a balanced mix of work to keep your products healthy.

Software delivery teams must have the psychological safety to devote time to address debt and neglected work. Debt creates a drag on feature velocity because changes become more complex and take longer to make. In addition, with higher technical debt, more time is spent on addressing defects, which starves the capacity to perform feature work. As debt builds, the following is observed:

- Flow velocity decreases
- Flow time increases
- Quality decreases as the code base becomes more fragile/costs increase

All of this results in reduced happiness for both the customer and the team, increasing the risk of team burnout. There are many cautionary tales of market leaders losing considerable market share because their teams did not have the runway to address technical debt. These stories exemplify why it is necessary to observe Flow Distribution—the ratio of business value creation work vs. business value protection in a given time period—to ensure that prioritization decisions made with product owners include providing necessary capacity to address technical debt. The health of the value stream is measured not only by code but by the morale and engagement of the people in the process too. The dissatisfaction of your teams is a leading indicator your value stream is in trouble.

New VSM Roles

As with Agile and DevOps, there are key new roles emerging to support cross-functional teams in the VSM journey. There are several cultural and organizational aspects to address when transitioning, and the following roles can help address these challenges:

Value Stream Lead

This role is responsible for the overall performance of one or more value streams, aligning teams to the value stream, correlating the business value delivery to business goals, communicating value stream performance with the business leadership, adjusting goals and setting direction.

Good leadership at the value stream level will assure that the priorities of the technical teams will be set to comply with business drivers and, conversely the business leadership will have clear, objective visibility into the performance of the value stream. This role is the key liaison between the total set of teams that make up the software delivery value stream and the business leadership.

Value Stream Analyst

They are responsible for identifying and modeling product value streams, interpreting value stream metrics around flow, identifying contributing factors to bottlenecks, designing and executing improvement experiments to meet business objectives, and coaching.

This role is somewhat a jack of all trades. Armed with a solid understanding of lean principles, software delivery processes, experience as a member of a delivery team, as well as a willingness to experiment, this individual is crucial to instituting a culture of continuous improvement. Center to the tools used of this role is the modeling and measurement of the value stream. Measurement feeds the plan-do-check-act improvement kata that is shepherded by this role across all practitioners among the teams of teams that make up the value stream.

Value Stream Architect

This role is responsible for the tool network and artifact network optimization, integration strategies, managing artifact types, states and flow among the enterprise tools supporting the value streams.

The value stream architect is an expert in software delivery tools and the flow of artifacts that underpin the value stream, end-to-end. Spanning portfolio, ideation, requirements, tracking, testing, build, deployment, operations and beyond, this role is responsible for designing, implementing and improving the tooling that team members use on a daily basis.

Cross-functional Teams

Beyond these roles, it is critical to extend what we have learned from Agile and DevOps about the value of cross-functional teams and their ability to continuously deliver on a product. As discussed, that means going beyond code through deploy. Cross functional teams should include members from the end-to-end functions across the value stream to independently deliver value to the customer.

Uplift in three key areas — business acumen, leadership and technology — enable the team members to become T-shaped contributors (individuals who have deep knowledge and skills in a particular area) to deliver value to the customer and further serves to align business and IT needs. In a digital-first world, encouraging teams to innovate, learn their products and broaden their skill sets allows them to better serve their customers.

Beginning Your Continuous Improvement Journey

Once you've connected your toolchain and modeled your Product Value Stream (PVS), you begin to baseline your Flow Metrics and measure against desired business results to guide your decision-making. Each PVS is likely to have different desired business outcomes. Here are some examples:

- Are shorter Flow Times in Q1 correlated with increased revenue in Q2?
- Does an investment in debt in Q1 (Flow Distribution) result in improved quality (e.g., fewer escaped defects) in subsequent releases?
- Does an improvement in Flow Efficiency in Q3 result in reduced cost in Q4?
- Does a reduction in Flow Load in Q2 correlate with an improvement in employee NPS scores in Q2 and lower delivery time to market (Flow Time)?

Based on this picture, you can calibrate your value stream accordingly — allocate more resources, set priorities, change workflows or modify tooling — essentially run experiments — to drive improvements in flow and the correlated business results.

Like all CI initiatives, VSM is a perpetual journey where Flow Metrics serve as a compass. With the right mindset, metrics and conversations across the organization, you can visualize the impact of your improvements to ensure you're moving in the direction to succeed in aligning delivery with business strategy.

Kick-start Your VSM Journey

Contact us today for a VSM workshop to:

- Identify and measure value and protection in software products
- Analyze a baseline of software delivery performance using Flow Metrics
- Pinpoint bottlenecks, reduce waste and improve velocity

Author: Carmen DeArdo

After a quarter-century at Bell Labs as the company revolutionized the telecommunications market, and as a catalyst in helping Nationwide Insurance digitally transform its software delivery through Agile, DevOps and Lean practices, there are few areas of business technology that Carmen DeArdo has not galvanized — and upon which, left his unmistakable mark.

Part technical guru, part storyteller, Carmen is an award-winning public speaker and published author. His latest works include a number of IT Revolution Forum papers and the 2019 book, *Standing on Shoulders: A Leader's Guide to Digital Transformation*.

Drawing upon his vast and varied experience — including three patents in software engineering — Carmen is VSM Practice Lead in Customer Success at Planview, helping software organizations to accelerate the flow of business value through the implementation of integrated delivery pipeline and the pioneering Flow Framework®.

Standing on Shoulders:

A Leader's Guide to Digital Transformation

Making your organization "digital" is a lot more than creating a compelling mobile app and moving to the cloud. To thrive in the new marketplace, you must think and act differently. In this guide you'll get practical, actionable information on building an employee and customer-obsessed culture that drives speed and efficiency while leveraging technology to create and deliver your value.

Further Reading

- E-book: Data-driven Value Stream Management: Accelerating Your Market Response and Adaptability
- Report: The Forrester Wave™: Value Stream Management Solutions, Q3 2020
- Report: GigaOm Radar for Value Stream Management
- Webinar: Driving Digital Transformation Insights with Value Stream Management: Christopher Condo (Forrester Research) and Dr. Mik Kersten (author of *Project to Product*)
- GigaOm Radar for Value Stream Management report

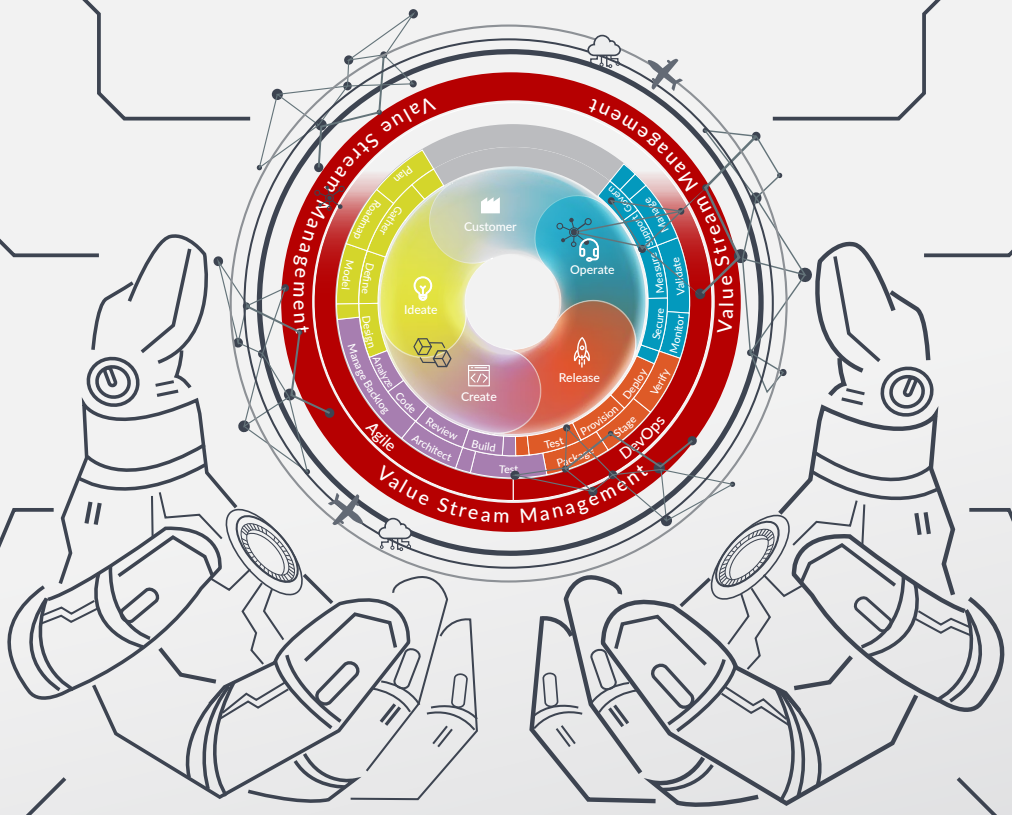
Shorten time-to-market

Increase throughput

VSM

Improve product quality

Optimize for business outcomes



Flow Velocity

Flow Time

Flow Metrics

Flow Efficiency

Flow Load

Discover More

The Buyer's Guide for Value Stream Management and Flow Metrics

The Forrester New Wave™: Value Stream Management Solutions, Q3 2020

Project to Product by Dr. Mik Kersten

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