SD ReFocus

Value Stream Mapping for Software Delivery

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It's time to Refocus on what matters most

Even if they provide real benefits, transformation initiatives (agile, DevOps, SRE, DevSecOps, etc) do not always succeed in delivering all the expected customer value or in demonstrating it.

Our belief is that members of Software Delivery teams can draw inspiration from Lean approaches to refocus on what really matters in their specific context.

There is currently enthusiasm around **VSM (Value Stream Management) practices**, with a risk of the new silver bullet that solves all problems:

The Value Stream Management (VSM) Consortium presents value streams as the next generation of DevOps.

Methodological frameworks such as SAFe 5 or ITIL4 refocus their approach around value streams.

> *« By 2023, 70% of organizations will use value stream management to accelerate the delivery of customer value. »*
> *– Gartner "Predicts 2021: Value Streams Will Define the Future of DevOps"*

The objective of this white paper is to take a step back by addressing three points:

1. Quickly introduce these techniques and their origin;
2. Take a picture of their current use in software development;
3. Propose improvements to make the most of **value stream mapping for software delivery**.

	Understand WHAT IT IS, WHY it matters and HOW it can be applied

Special thanks to Chris Trotter and Adam Hawkins for their helpful reviews of the English version of this white paper.

What are value streams all about?

A **value stream** is the sequence of activities required to design, develop and deliver a product or service to a customer. A value stream encompasses all the activities required to turn a customer's request into a product or service.
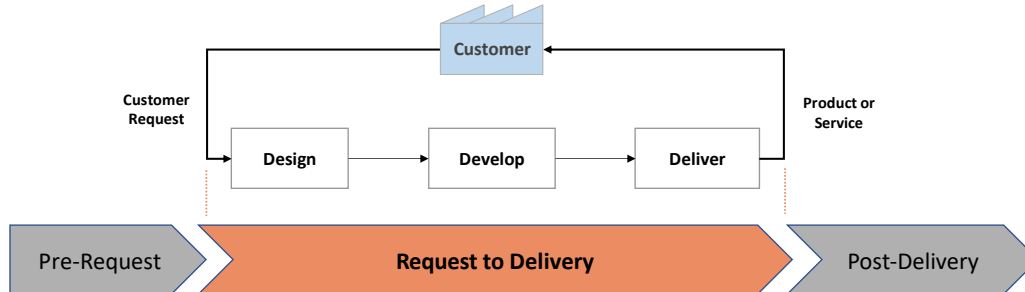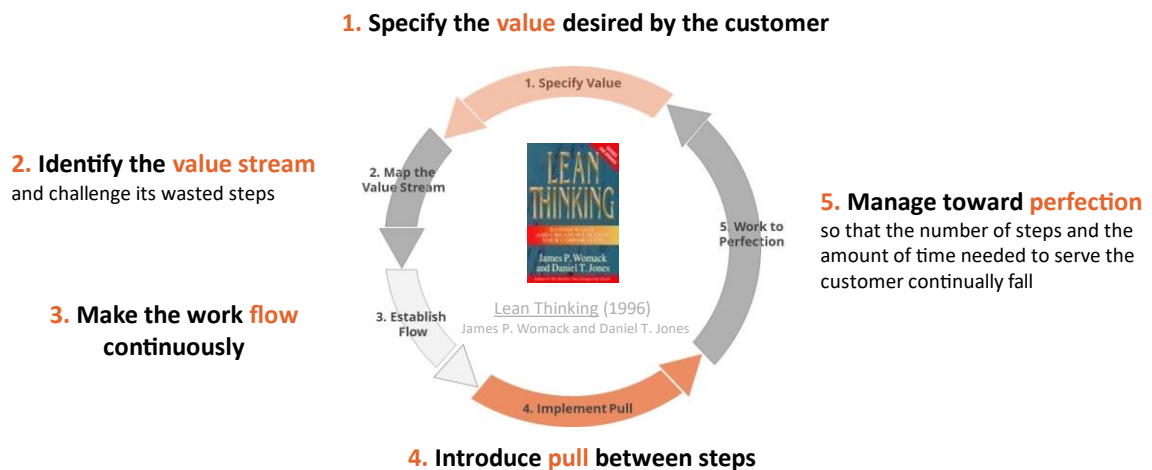

Extended value streams may include activities that precede the request or follow-up on delivery.

> « *If you can't describe what you're doing as a value stream, you don't know what you're doing* »
> – *Karen Martin and Mike Osterling*

This **value stream** concept comes from the **Lean** movement. Lean started in Toyota factories after the Second World War.
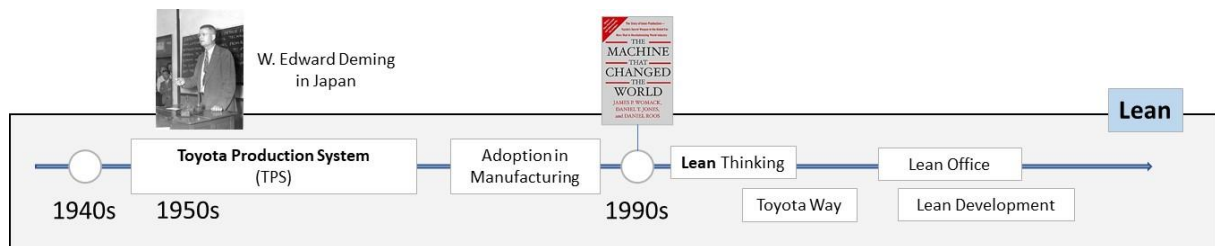
The book "The Machine That Changed the World" by James P. Womack, Daniel Roos, and Daniel T. Jones introduces the **Lean thinking** process. In their following book "Lean Thinking", James P. Womack and Daniel T. Jones describe it as **a cycle of five principles**:

1. Specify the value desired by the customer

2. Identify the value stream
and challenge its wasted steps

3. Make the work flow continuously

Lean Thinking (1996)
James P. Womack and Daniel T. Jones

5. Manage toward perfection
so that the number of steps and the amount of time needed to serve the customer continually fall

4. Introduce pull between steps

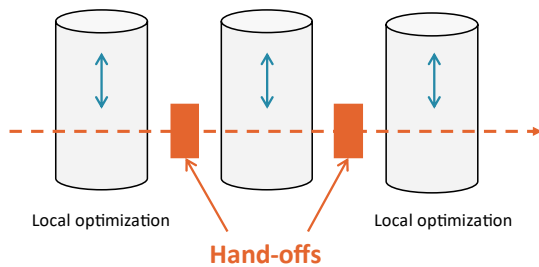Without going into too much detail, it is important to note that value streams are only the second step.

The entire focus of Lean is customer driven.

Customers determine the **value** and the amount they are willing to pay for the product or service.

Therefore, the first step is to specify the value desired by the customer. That aligns the whole process with the realization of this value and the satisfaction of the customers.

Photo by Devin Avery on Unsplash

The second step focuses management on optimizing the operation of the entire value stream ('Systems Thinking') rather than each of the vertical functions.
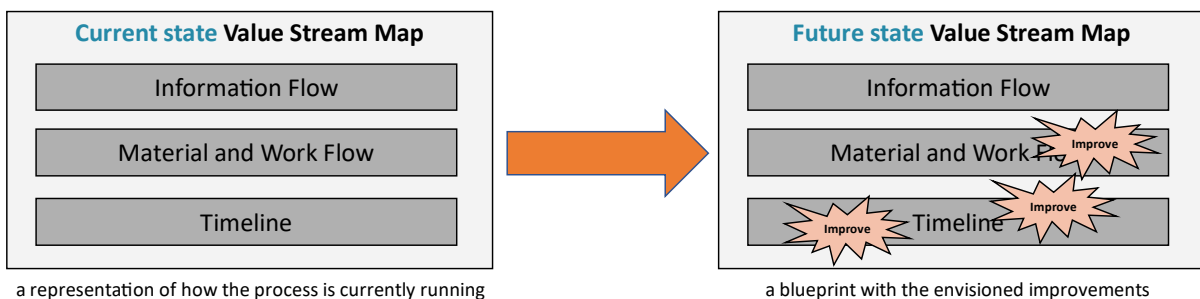
From locally optimizing vertical functions

To optimizing the overall flow of a value stream across technologies, assets, and departments.

Local optimization   Local optimization

Hand-offs

Whole Value Stream

Global optimization
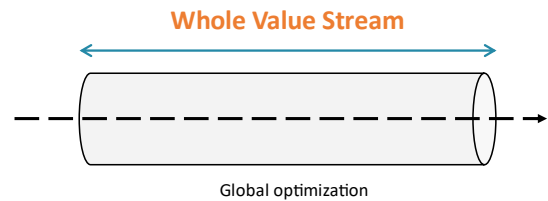
Toyota's initial technique "Material & Information Flow Chart" was renamed "**Value Stream Mapping**" by John Shook and Mike Rother in their book "Learning to See: Value Stream Mapping to Add Value and Eliminate Muda" (1999).

A 'Value Stream Map' is a high-level visual representation of the flow of material, work, and information, as well as queues and wait times between activities for a specific customer request.

Current state Value Stream Map

Information Flow

Material and Work Flow

Timeline

a representation of how the process is currently running

Future state Value Stream Map

Information Flow

Material and Work Flow — Improve

Improve — Timeline — Improve

a blueprint with the envisioned improvements

Under Toyota's Lean "**Go and See**" principle, managers do more than just map value streams from their desks. They must go and discover real facts on the workplace (Gemba), among those on the frontline.
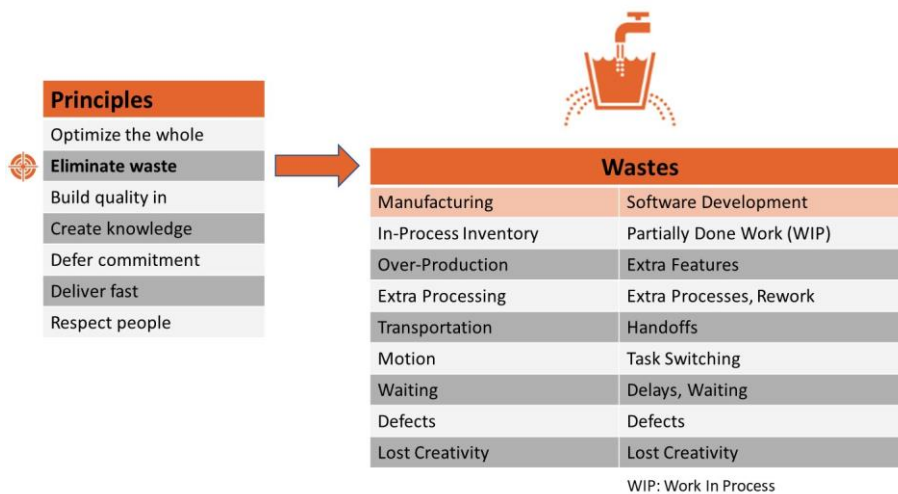
Use in software development

During the early 2000s, Lean principles began were applied to software development following the introduction of **agile development** and with Mary and Tom Poppendieck's book, "**Lean Software Development**".
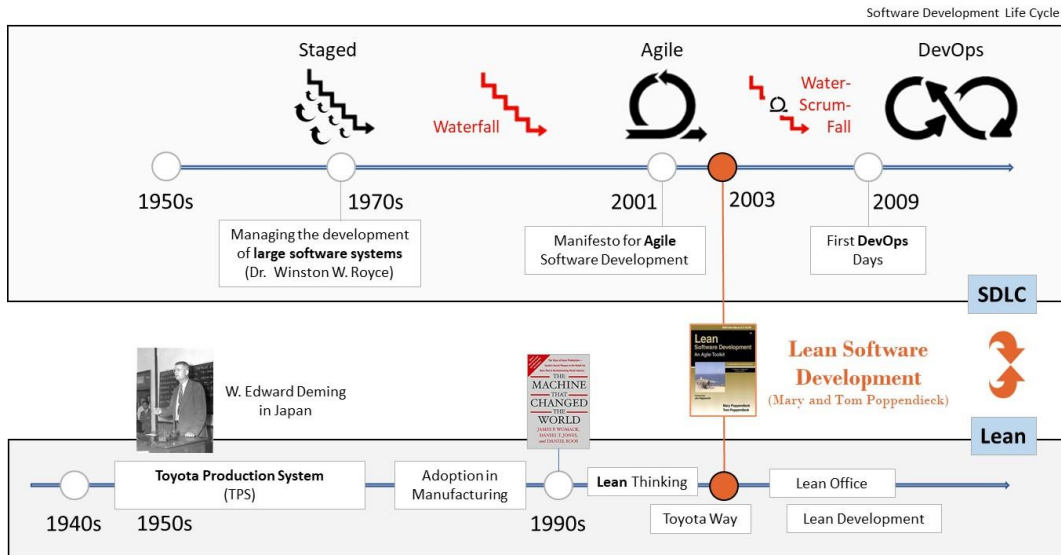
The **principles and types of waste** were adapted to software development:

Efforts continued over the next decade with the **DevOps** movement.

The authors of «The Phoenix Project» reveal its lineage:

> **« In this book, we refer to "DevOps" as the outcome of applying Lean principles to the IT value stream »**
> *– The Phoenix Project*

"The DevOps Handbook" and "Accelerate" books also recommend using the Value Stream Mapping technique to identify bottlenecks and priorities for optimizing the end-to-end flow from the customer request to its availability to users.

In its first report, the VSM Consortium notes **an intermediate level of adoption of the value stream mapping technique**:

> *« Value stream mapping is highly effective at identifying where waste can be removed in a value stream, but the consortium has also observed limitations ... Over half (56%) of respondents said that they did not use value stream mapping to obtain data about flow. »*
> *– The State of Value Stream Management Report 2021*

Though workshops around the end-to-end value stream facilitate the development of group dynamics, it is sometimes difficult to agree on not only how to prioritize improvements, but how to measure their impact on customer value.

Representations of value streams for software development are heterogeneous and sometimes quite different from the original Lean symbols.
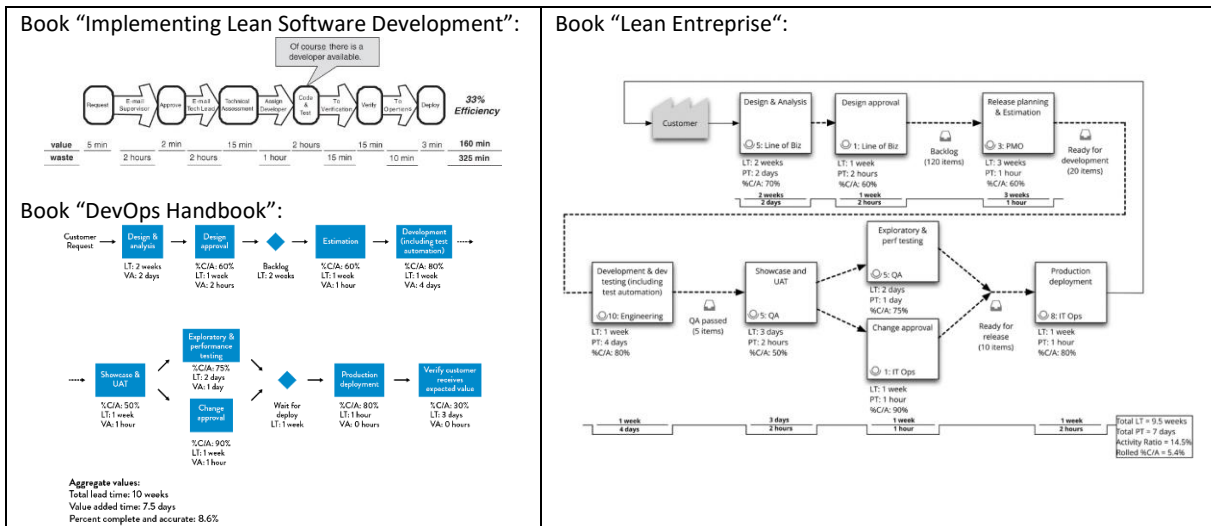
Value Stream Mapping workshops focus on the software development lifecycle.

Lack of clarity on the software lifecycle (SDLC), process-based improvement culture, lack of metrics… these are potential reasons to focus on the workflow of activities with their macroscopic timelines.

In such cases, the maps correspond more to process maps than to value stream maps centered on the value and analysis of the different types of flows. It's not a problem in itself, it's just not the same technique, so don't expect the same benefits.

The mapping tends to focus on the development of new features.

If you are only using value stream mapping for new features, e.g., how can we reduce time to market, you are missing important factors. Software delivery is not just about building features!

Fixing bugs, resolving production incidents, anticipating and fixing vulnerabilities, responding to support requests, reducing technical debt, etc. is work that, when accomplished, brings value to users and whose flows are different than features.

How to benefit from Value Stream Mapping for Software Delivery?

First, remember that the goal of Lean is to increase the value delivered to customers by optimizing end-to-end flow and reducing waste.

Start by understanding and agreeing on the value expected by the customer (principle n°1). Then, scope the value stream with its flows in and out (principle n°2).

Achieving this common understanding and agreement of **value** is key to a successful workshop. Prepare carefully by identifying **customers** and their expectations, as well as all the actors involved in the value stream.

The cycle between the customer and the company is defined, with the input flows of requests and output to deliver the application or service. The focus on flows begins at this stage by identifying the characteristics of these **input/output flows with their types, volumes, and variability**.
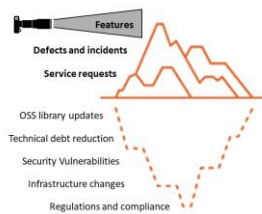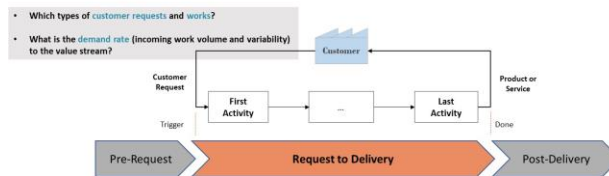
> How can we improve the flow within a value stream if we do not identify the flows in and out?
> Note that none of the three previous maps for software development present this information.

These elements define the boundaries of the value stream. They also guide the analysis of the current state and the search for improvements for each type of request. Without them, it is easy to list numerous internal improvements without being able to objectively assess their interest in end customers.

Adopt visual symbols to represent flows and identify types of waste specific to software (principles n°2 and n°3)

The objective is to define a balanced level of symbols that support valuable concepts in the specific case of software while avoiding unnecessary complexities.

As mentioned in the first point, a "value stream map" consists of **three areas to represent the flows of information, material and work, and the timeline** including queues and wait times between activities. This structure is well adapted to software delivery:

1. **Information systems and flows** make it possible to identify silo, collaboration and communication issues between actors, i.e. the original purpose of the DevOps movement.
2. **The material and work flows** make visible and optimize towards a lean flow of work in order to reduce handoffs, batch sizes, work in progress (WIP) or pending items in inventories such as product backlogs.
3. **The timeline** measures lead times and wait times throughout value streams and delivery pipelines.

> Note that the above examples partially cover one or two of these areas.

Maps like the one below corresponding to the "Water-Scrum-Fall" flow pattern provide **a holistic view of the value stream for a particular type of request and way of working**:
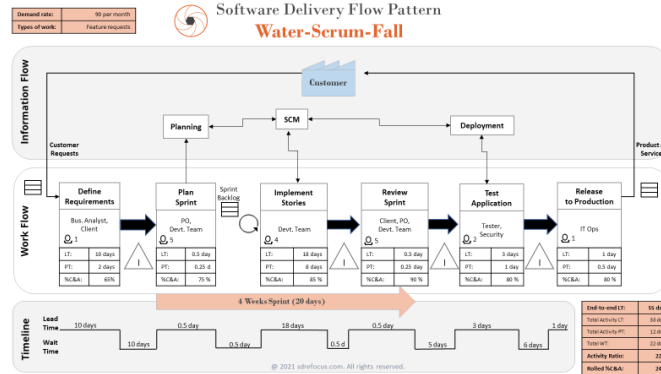
Obstacles or bottlenecks to a continuous flow can be identified. **Flows and types of waste are visible** (*Partially done Work (WIP), Extra processes, Handoffs, Delays and Waiting*) **and identifiable to analyze the causes of the performance problems of the value stream as a whole,** i.e., differences between the current and desired future states.

NB: A value stream map is a high-level representation with between 5 and 15 activities.

> *« If you can't visually depict an entire value stream on a single sheet of paper, it's unlikely you'll achieve outstanding performance. »*
> *– Karen Martin*

Use more advanced concepts like push/pull to improve flow and increase the value delivered to customers (principles n°4 and n°5)

The visual representation makes it possible to **distinguish two types of flow** (principle n°4):

- **Push**: the movement regardless of the need for the downstream process or activity.
- **Pull**: the movement when required by downstream process or activity.

For example, agile planning of a sprint is a pull mechanism to limit the flow of entry depending on the team's development capacity. The team pulls from the backlog the user stories and other priority tasks to be delivered during the next sprint of a few weeks.

The collection of metrics (*Lead Time, Process Time, %Complete & Accurate*) makes it possible to **identify other types of waste related to the organization of work and the quality produced** (*Task Switching, Defects, Rework*).
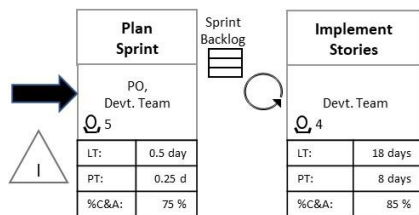
Lead Time (LT): elapsed time from start to end of the activity
Lead Time = Process Time + Wait Time

Process Time (PT): time to do the work without any interruption

%C&A (Complete & Accurate): quality of the output
Percentage of the time downstream activities receive work that is 'usable as is' without having to correct it.

The measurements and facts observed in the workplace (Gemba) make it possible to monitor progress, to learn from experiments, and above all to ensure customer satisfaction (principle n°5).

Where to start?

Value Stream Mapping is a proven technique applicable to software delivery, especially in conjunction with clearly defined business and customer outcomes.

Value stream maps are not an end, but a means to combine with other techniques (*Gemba walks, A3 report, 5 Whys…*). Value streams snapshot the current state and enabling designing the desired future state.

Our experienced consultants use Value Stream Mapping for software delivery to help organizations take ownership of this technique in a mindset of mutual learning.

Our approach builds on the practices recommended by Lean experts and provides a framework that is customizable to your specific context and goals.

SD ReFocus – Value Stream Mapping Services
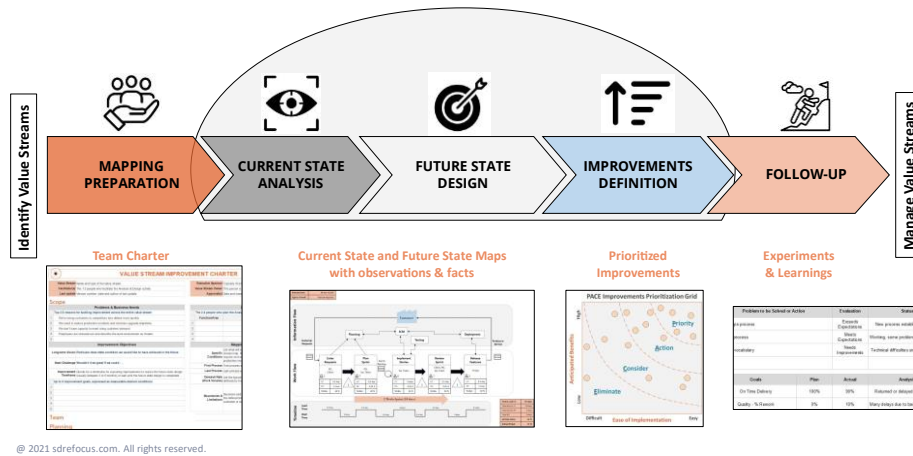
> « It matters more that you take a step than what that first step is. »
> – *Mike Rother, Toyota Kata*

Above all, you have to start and learn these techniques by using them.

The first step is to identify a software with clear business challenges and whose stakeholders are ready to engage in the momentum of improvement.

Do not hesitate to reach us for a first discussion using our contact details on the following page (e-mail, website, LinkedIn, etc.)
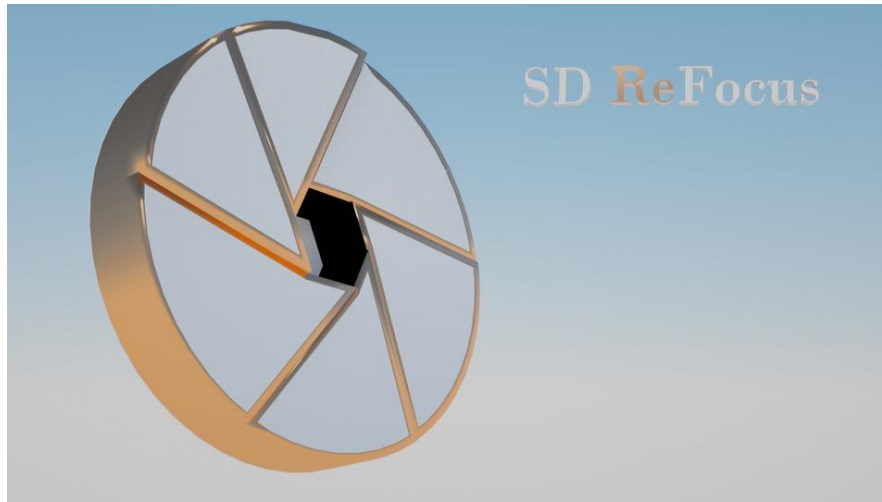
3D Design by Nicolas Corbard

Value Stream Mapping for Software Delivery

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