Value Stream Maps

One of the most powerful tools in Lean Software Development is using Value Stream Maps (VSMs). One reason is that Value Stream Maps allow you to visually see the workflow and to help you follow the Lean Principles of:

<table>
<thead>
<tr>
<th>From the Perspective of Fast-Flexible-Flow</th>
<th>From the Perspective of Lean Software Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>Optimize the whole</td>
</tr>
<tr>
<td>Value Stream</td>
<td>Eliminate Waste (particularly the waste of delay)</td>
</tr>
<tr>
<td>Flow</td>
<td>Deliver Without Delay</td>
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</tbody>
</table>

Value stream maps present a way for us to see the flow of the original idea into something that provides value to the business and its customers. Its purpose is to help identify:

- Where time is spent that does not add value to the product being built
  - Which of this time is pure waste
  - Which of this time is preparatory to adding value
- Delays in the process
- Areas of possible improvement

Drawing Value Stream Maps

Value stream maps must always begin and end with a customer. The beginning is typically a request from the customer while the end is when value is delivered to the customer.

There are seven main steps in drawing value stream maps:

1. Identify the actions taken in the value stream
2. Calculate the time for each action
3. Calculate time actually worked on each action
4. Identify time between actions
5. Identify any loop backs required
6. Identify how many items are waiting before an action starts
7. Calculate the process cycle efficiency

Step 1: Identify the actions taken in the value stream
Step 2: What was the real time from start to finish of the action?

- **Request**: 0.5 hrs
- **Approve**: 8 hrs
- **Reqs**: 160 hrs
- **Sign Off**: 8 hrs
- **Analysis**: 100 hrs

- **Design**: 120 hrs
- **Review**: 2 hrs
- **Code**: 280 hrs
- **Test**: 240 hrs
- **Deploy**: 8 hrs

Step 3: What was the average time working on this vs working on other things?

- **Request**: 0.5 / 0.0 hr
  - 0.5 hrs
- **Approve**: 1 / 7.9 hrs
  - 8 hrs
- **Reqs**: 60 / 100 hrs
  - 160 hrs
- **Sign Off**: 1 / 7 hrs
  - 8 hrs
- **Analysis**: 40 / 600 hrs
  - 100 hrs

- **Design**: 40 / 80 hrs
  - 120 hrs
- **Review**: 2 / 0 hrs
  - 2 hrs
- **Code**: 80 / 200 hrs
  - 280 hrs
- **Test**: 40 / 200 hrs
  - 240 hrs
- **Deploy**: 3 / 5 hrs
  - 8 hrs
Step 4: Identify Time Between Actions

Step 5: Identify any loop backs required.
Step 6: Compute Process Cycle Efficiency

Total Cycle Time = 3433

\[
0.5 + 320 + 8 + 80 + 160 + 320 + 8 + 80 + 100 + 80 + 120 + 160 + 2 + 1 \times 0.2 \times (120 + 160 + 2) + 80 + 280 + 80 + 240 + 3 \times 0.65 \times (280 + 80 + 240) + 80 + 8 = 3433
\]

Time Work Taking Place = 509

\[
0.5 + 0.1 + 60 + 1 + 40 + 40 + 2 + 1 \times 0.2 \times (40 + 2) + 80 + 40 + 3 \times 0.65 \times (80 + 40) + 3 = 509
\]

Process Cycle Efficiency = \((\text{Average Time Worked} / \text{Total Cycle Time})\) = 509 hrs / 3433 hrs = 14.9%
It’s actually worse as no credit should be given for making and fixing errors as that is not time that value is being added.

Actual value added time was:

\[0.5 + 1 + 60 + 1 + 40 + 40 + 2 + 0.2(40 + 2) + 80 + 40 + 3 + 0.65(80 + 40) + 3 = 267\]

So actual process cycle efficiency is 267 hours / 3433 hrs = 7.8%

**Frequently Asked Questions**

**What do I do when there are parallel activities?** Value streams often have actions taken in parallel. When this happens, the calendar time is the longest of the parallel efforts. The value added time is the average of all the parallel streams.

**Isn’t rework waste? I thought I’m not supposed to count that towards value?** While this is true, the first few value streams you do don’t need to be concerned with this. Technically, you could track value added time, worked time that isn’t value added and calendar time.

**Using Value Stream Maps in Transitioning To Lean**

Value stream maps are very useful when transitioning to Lean or Lean-Agile methods. Use value stream maps to detect time delays that may not be tracked by your looking at dollars spent. Value stream maps can also be useful to see how one group affects another group.

**Using Value Stream Maps in as a Continuous Process Improvement Tool**

Value stream maps detail both your value added time and your delay (waste) time. Any time that isn’t value added time is time that should be eliminated. Value stream maps give us an opportunity to identify this waste and come up with improvements while considering the effect to the whole process.