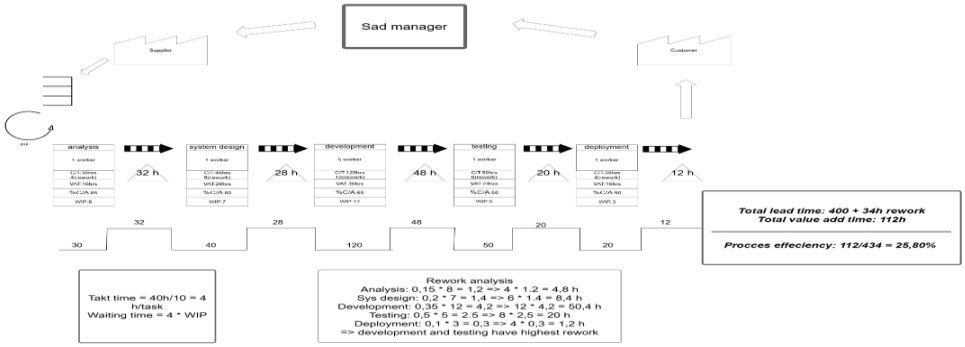
DevOps Value Stream Map

Current state value stream map



Throughput =
Available time (40 h) / Cycle time

* *Analysis: 40 / 30 = 1.33*
* *System design: 40 / 40 = 1*
* *Development: 40 * 5 / 120 = 1.67*
* *Testing: 40 / 50 = 0.8*
* *Deployment: 40 / 20 = 2*

Total: 1.33 + 1 + 1.67 + 0.8 + 2 = 6.8

Adjusted Throughput(количество работы, которое команда может выполнить за 40 ч) =
*Throughput * QR*

* *Analysis: 1.33 * 0.85 = 1.13 task/week*
* *System design: 1 * 0.8 = 0.8 task/week*
* *Development: 1.67 * 0.65 = 1.09 task/week*
* *Testing: 0.8 * 0.5 = 0.4 task/week <-(Bottleneck)*
* *Deployment: 2 * 0.9 = 1.8 task/week*

Total: 1.13 + 0.8 + 1.09 + 0.4 + 1.8 = 5.2

We need to increase number of operators in testing

Process	# of employees
Analysis	1
System Design	1
Development	5
Testing	1
Deployment	1

Process	# of employees
Analysis	1
System Design	1
Development	4
Testing	2
Deployment	1

Throughput =
Available time (40 h) / Cycle time

* *Analysis: 40 / 30 = 1.33*
* *System design: 40 / 40 = 1*
* *Development: 40 * 4 / 120 = 1.33*
* *Testing: 40 * 2 / 50 = 1.6*
* *Deployment: 40 / 20 = 2*

Total: 1.33 + 1 + 1.67 + 0.8 + 2 = 6.8

Adjusted Throughput(количество работы, которое команда может выполнить за 40 ч) =
*Throughput * QR*

* *Analysis: 1.33 * 0.85 = 1.13 task/week*
* *System design: 1 * 0.8 = 0.8 task/week*
* *Development: 1.33 * 0.65 = 0.87 task/week*
* *Testing: 1.6 * 0.5 = 0.8 task/week*
* *Deployment: 2 * 0.9 = 1.8 task/week*

Total: 1.13 + 0.8 + 0.87+ 0.8 + 1.8 = 5.4

We need to increase Quality Rate

Development QR 65% - 80%
Testing QR 50% - 70%

Adjusted Throughput(количество работы, которое команда может выполнить за 40 ч) =
*Throughput * QR*

* *Analysis: 1.33 * 0.85 = 1.13 task/week*
* *System design: 1 * 0.8 = 0.8 task/week*
* *Development: 1.33 * 0.8 = 1.07 task/week*
* *Testing: 1.6 * 0.7 = 1.12 task/week*
* *Deployment: 2 * 0.9 = 1.8 task/week*

Total: 1.13 + 0.8 + 1.07+ 1.12 + 1.8 = 6

need to decrease rework (NVAT) and waiting time in cycle time

*9 operator * 40h = 360 h / week*
360 h / week / 10 task = 36 hour / per task

C/T = 260 h (without rework)
Reduction ratio = 36 / 260 = 0.138

C/T = 260 h (without rework)
Reduction ratio = 36 / 260 = 0.138

* *Analysis: 0.138 * 30 = 4 h*
* *System design: 0.138 * 40 = 6 h*
* *Development: 0.138 * 120 = 17 h*
* *Testing: 0.138 * 50 = 7 h*
* *Deployment: 0.138 * 20 = 3 h*

Total lead time: 37 + 140 + 34h rework
Total value add time: 112h

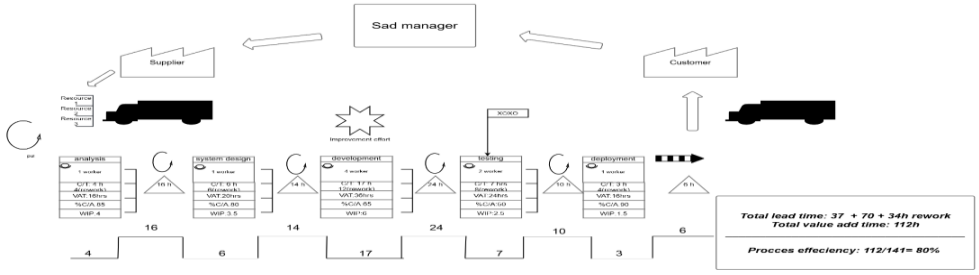
Procces effeciency: 112/211 = 53%

need to decrease WIP to 50% for solve the problem of waiting time

Total lead time: 37 + 70 + 34h rework
Total value add time: 112h

Procces effeciency: 112/141= 80%

Future state value stream map



Total lead time: 37 + 70 + 34h rework
Total value add time: 112h

Procces effeciency: 112/141= 80%

Calculations:

Takt time = $\frac{\text{Available time}}{\text{Customer dem.}} = \frac{40h}{10} = 4h$

Waiting time = Takt time . WIP

Analysis: WT = 4 . 8 = 32 h

Sys Des: WT = 4 . 7 = 28 h

Dev: WT = 4 . 12 = 48 h

Test: WT = 4 . 5 = 20 h

Deplag: WT = 4 . 3 = 12 h

Lead time without rework = (30 + 40 + 120 + 50 + 20) + (32 + 28 + 48 + 20 + 12) = 260 + 140 = 400 h

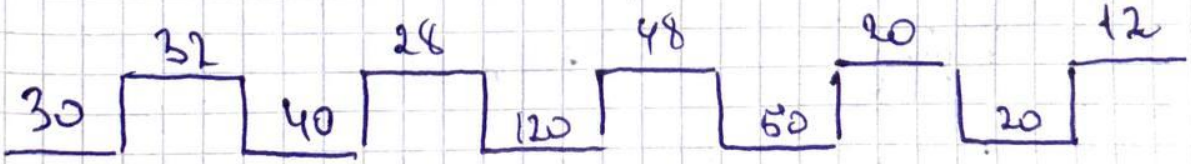
Σ rework = 4 + 6 + 12 + 8 + 4 = 34 h

LEAD TIME = 400 + 34 = 434 h

Σ VAT = 16 + 20 + 36 + 24 + 16 = 112 h

Process efficiency = $\frac{\Sigma \text{ VAT}}{\Sigma \text{ LT}} = \frac{112}{434} = 25,8\%$

WASTED TIME = 74,2 %



$= \frac{\Sigma \text{ L/T} = 434}{\Sigma \text{ VAT} = 112}$

Rework analysis:

Analysis: $1 - QR_1 = 0,15 \Rightarrow 0,15 \cdot WIP_1 \cdot r_1 =$

$0,15 \cdot 8 \cdot 4 = 4,8\ h$

Sys. Des: $1 - QR_2 = 0,2 \Rightarrow 0,2 \cdot WIP_2 \cdot r_2$

$0,2 \cdot 7 \cdot 6 = 8,4\ h$

Development: $1 - QR_3 = 0,35 \Rightarrow 0,35 \cdot WIP_3 \cdot r_3 =$

$0,35 \cdot 12 \cdot 12 = 50,4\ h$

Testing: $1 - QR_4 = 0,5 \Rightarrow 0,5 \cdot WIP_4 \cdot r_4 =$

$0,5 \cdot 5 \cdot 8 = 20\ h$

Deploy: $1 - QR_5 = 0,1 \Rightarrow 0,1 \cdot WIP_5 \cdot r_5 =$

$0,1 \cdot 3 \cdot 4 = 1,2\ h$

The most high are Dev. and Test

Analysis	4,8 h	
Sys. Des:	8,4 h	
Develop	50,4 h	↑
Testing	20 h	↑
Deploy	1,2 h	

SUM = $4,8 + 8,4 + 50,4 + 20 + 1,2 = \underline{84,8\ h}$

Throughput = $\frac{\text{Available time}}{\text{cycle time}}$

Adjusted throughput = throughput · QR

Analysis:

$$AT = \frac{40 \cdot 1}{30} \cdot 0{,}85 = 1{,}13 \text{ task/week}$$

Sys Des:

$$AT = \frac{40 \cdot 1}{40} \cdot 0{,}8 = 0{,}8 \text{ task/week}$$

Devolopm:

$$AT = \frac{40 \cdot 5}{120} \cdot 0{,}66 = 1{,}09 \text{ task/week}$$

Testing:

$$AT = \frac{40 \cdot 1}{60} \cdot 0{,}5 = 0{,}4 \text{ task/week}$$

Bottle neck!

Deploy:

$$AT = \frac{40 \cdot 1}{20} \cdot 0{,}9 = 1{,}8 \text{ task/week}$$

$SUM = 1{,}13 + 0{,}8 + 1{,}09 + 0{,}4 + 1{,}8 = 5{,}2 \frac{\text{task}}{\text{week}}$

* have to be 10!

Formula

$$SUM = 40\left(\frac{\Sigma QR}{\Sigma CT}\right) ?$$

Analysis: 1 Sys Des: 1 Develop: 5
Test: 1 Deploy: 1

We need to increase number of operators in testing.

Analysis: 1 Sys. Des: 1 Develop: 4
Test: 2 Deplay: 1

Analysis: AT = 1,13 task/week
Sys. Des: AT = 0,8 task/week
Develop: AT = $\frac{40 \cdot 4}{120} \cdot 0{,}65 = 0{,}87$ task/week
Testing: AT = $\frac{40 \cdot 2}{50} \cdot 0{,}5 = 0{,}8$ task/week
Deploy: AT = 1,8 task/week

SUM = 1,13 + 0,8 + 0,87 + 0,8 + 1,8 = 5,4 task/week

Development QRQ 65% → 80%
Testing QRQ 50% → 70%

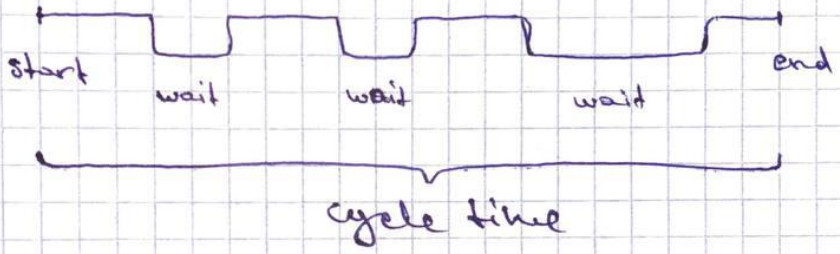
Develop: AT = $\frac{40 \cdot 4}{120} \cdot 0{,}8 = 1{,}07$ task/week
Testing: AT = $\frac{40 \cdot 2}{50} \cdot 0{,}7 = 1{,}12$ task/week
SUM ≈ 6 task/week

If all 100% = DR SUM = 7,26 $\frac{\text{tasks}}{\text{week}}$

So, 9 oper. 40 = 360 h/week

$\frac{360\ \text{h/week}}{10\ \text{tasks}} = 36$ hour / per task

We have to decrease cycle time



Σ C/T = 260 h

$\downarrow \eta = \frac{36}{260} \approx 0,138$

Analysis : 30 · 0,138 ≈ 4 h
Sys. Des : 40 · 0,138 ≈ 6 h
Develop : 120 · 0,138 ≈ 17 h
Testing : 50 · 0,138 ≈ 7 h
Deplay : 20 · 0,138 ≈ 3 h
Sum : 37 h

Σ L/T = 37 h + 34 h = 71 h + 140 h (r) = 211 h
434 h ↓ ~ 211 h