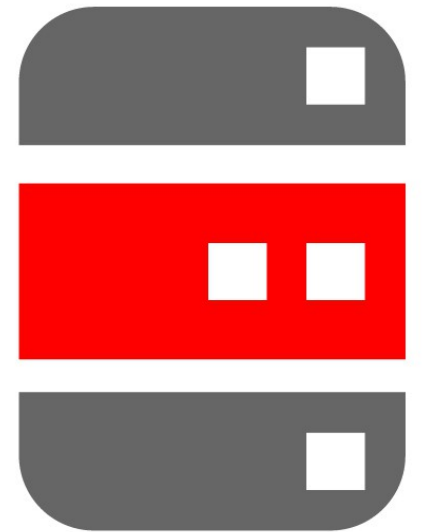


performing  
databases



Your reliability. Our concern.

# Performance is rarely an accident

Martin Klier  
Performing Databases GmbH



# Martin Klier

- Managing Partner / Database Technology  
Performing Databases GmbH
- Focus on  
Performance and High Availability
- Linux 1997
- Oracle 2003
- Email: [martin.klier@performing-db.com](mailto:martin.klier@performing-db.com)
- Weblog: <http://www.usn-it.de>



# performing databases GmbH

- Experts for Database Technology
  - Consulting for concepts and sourcing
  - Planung support = optimal architecture
  - Licensing and system design
  - Implementation, changes, troubleshooting
- Get in touch
  - Performing Databases GmbH  
Wiesauer Straße 27  
95666 Mitterteich, Germany
  - Web: <http://www.performing-databases.com>
  - Twitter: @PerformingDB



# Excellence

# Performance is rarely an accident

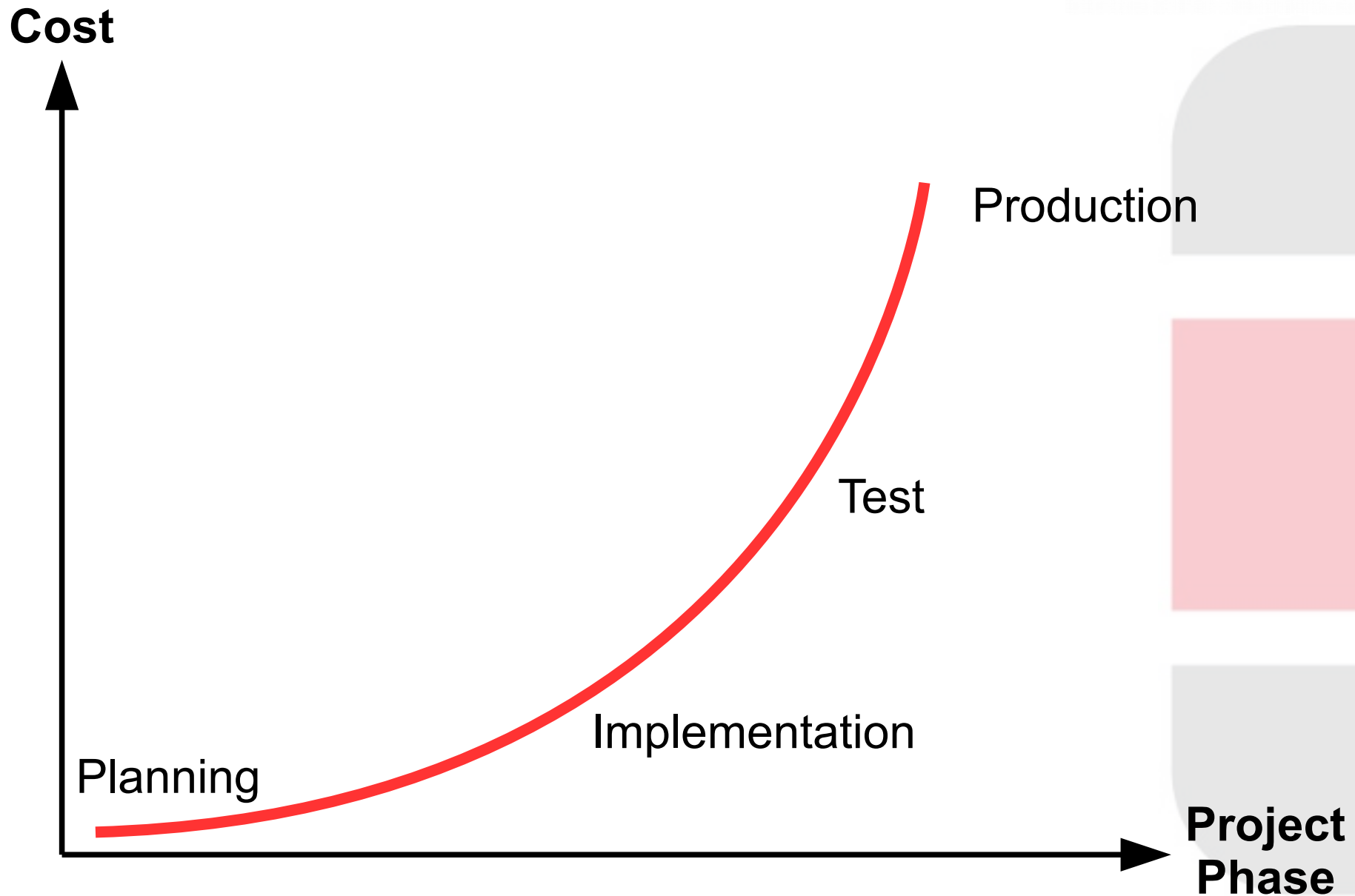
# Know it counts

# Prove it counts more

# Boehm



# Costs of a Change



# We need a plan ...

# Performance

# Performance



# Performance

## Work per Time

Kilometers per hour, tons per month ...

## Time per work unit

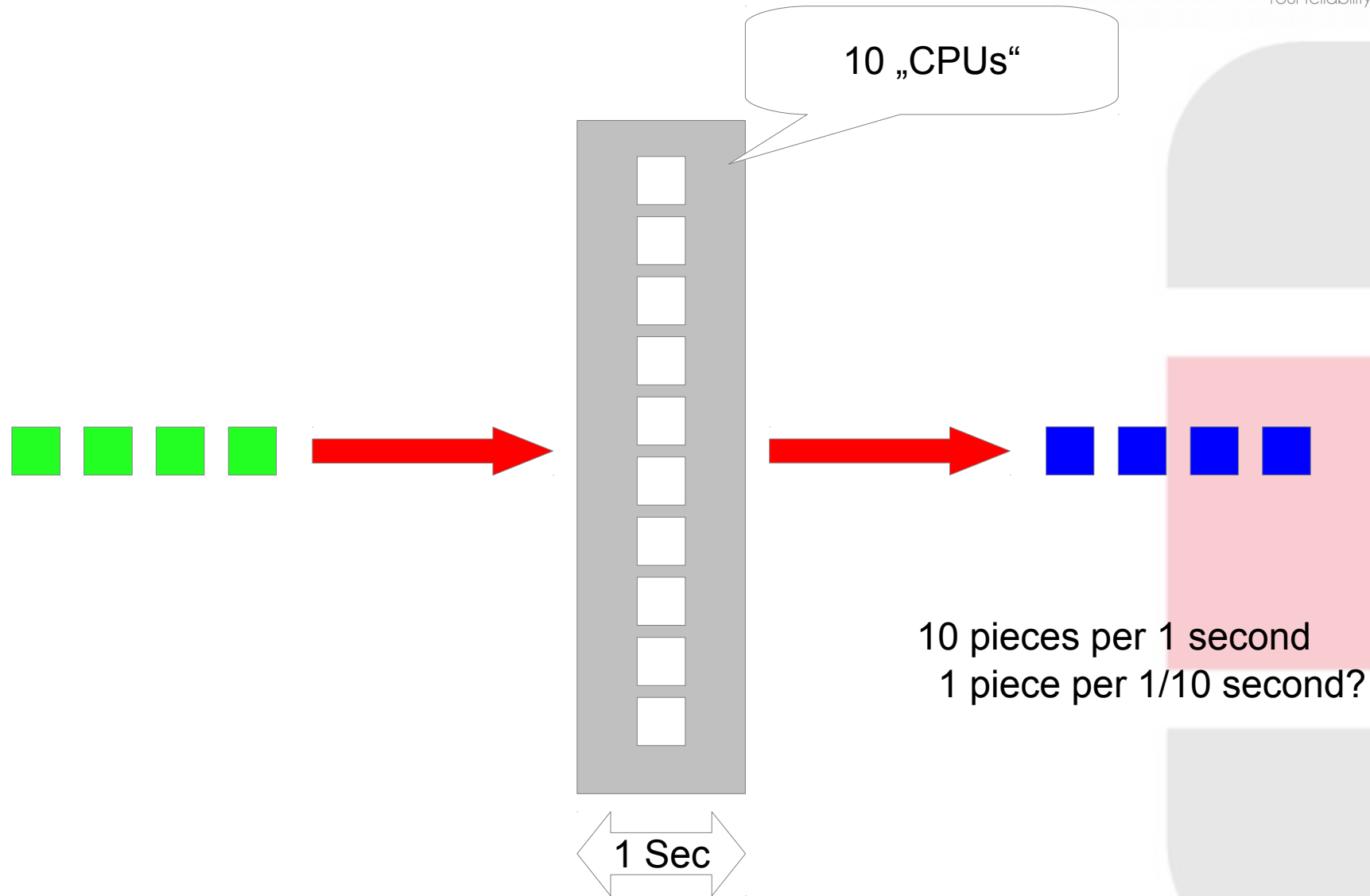
Seconds per booking, days per project

Throughput:  $p = \frac{\textit{task}}{\textit{time}}$

Response time:  $R = \frac{\textit{time}}{\textit{task}}$

BUT:  $R \neq \frac{1}{p}$

# Inverse Games



# The Mean

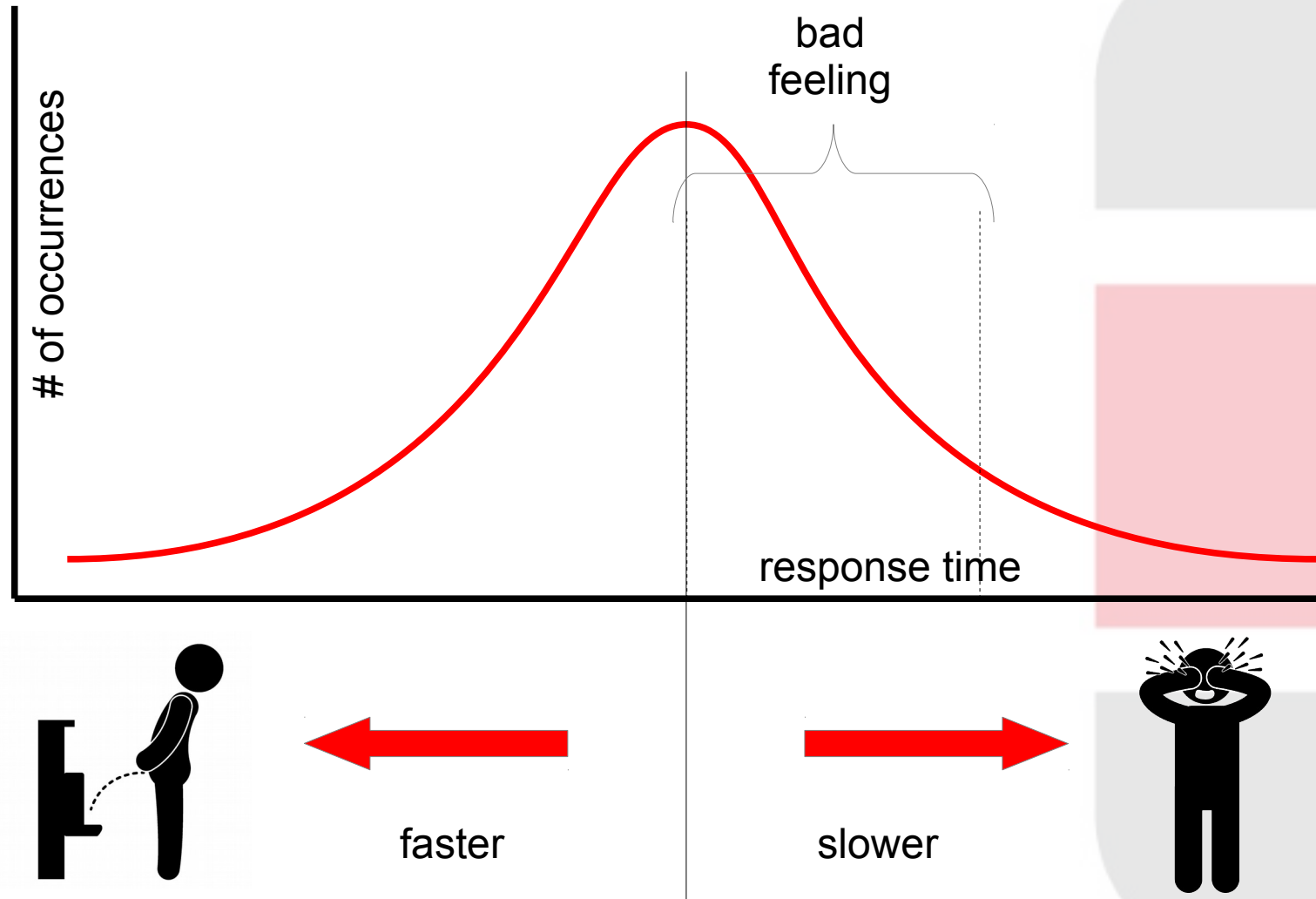


# Of the mean ...

0,9; 1,3; 0,9; 0,9;

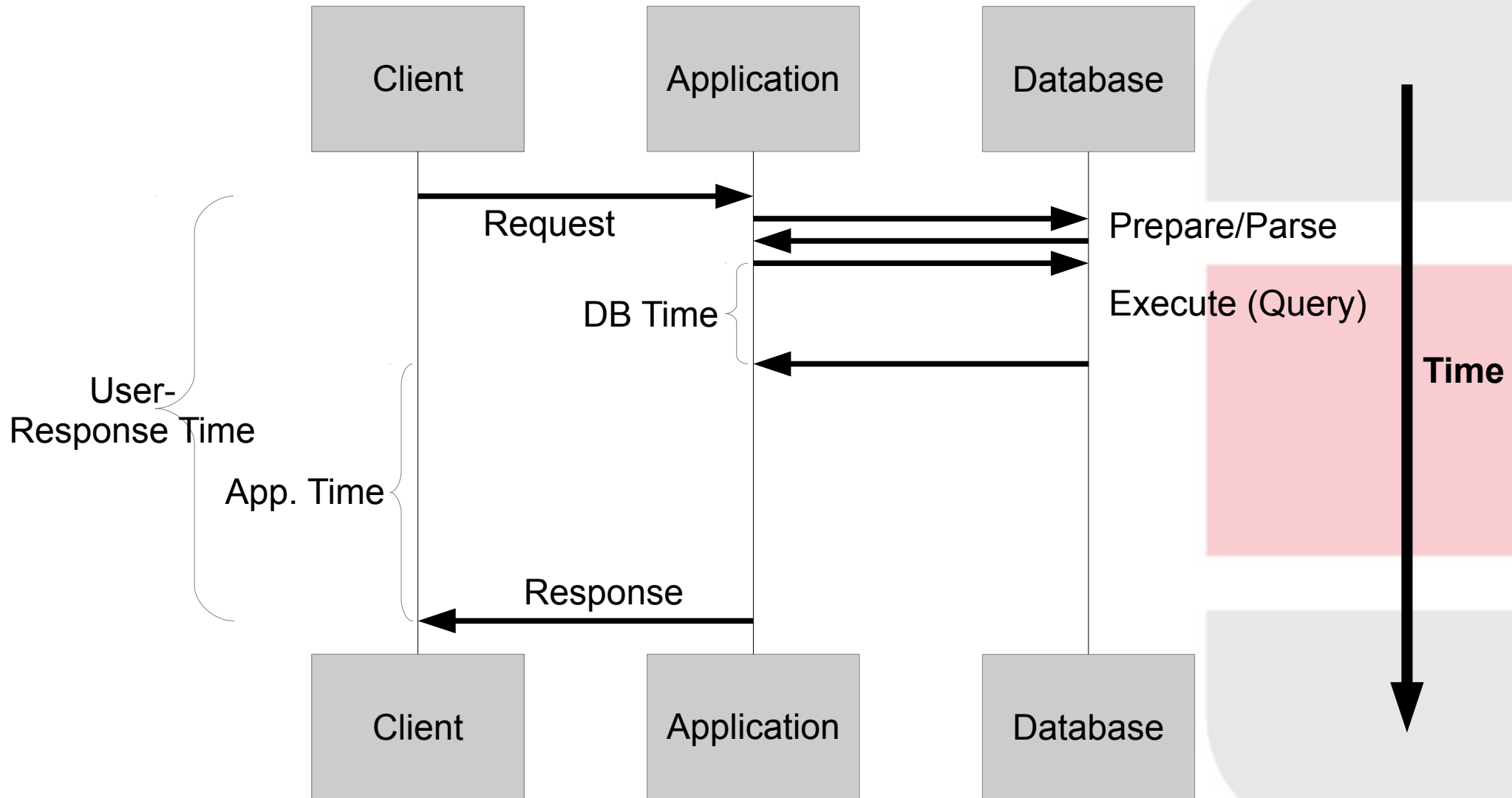
0,5; 0,5; 0,5; 0,5; 0,5; 5,5; 0,5; 0,5; 0,5; 0,5;

# Users feel the difference - not the mean

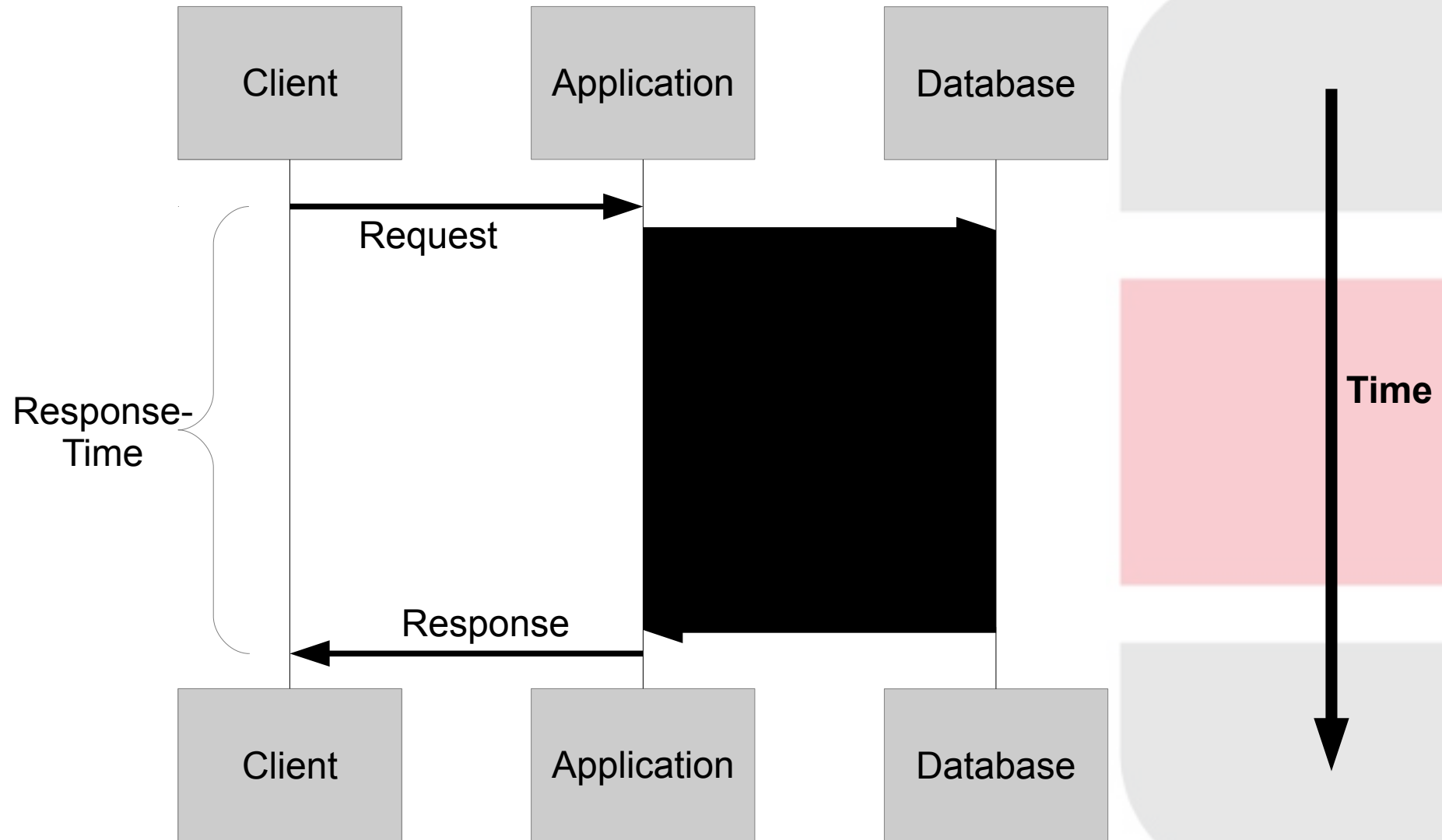


# Analysis

# Sequence Diagram (UML)



# Sequence Diagram (UML)



# Profiling

# Profile

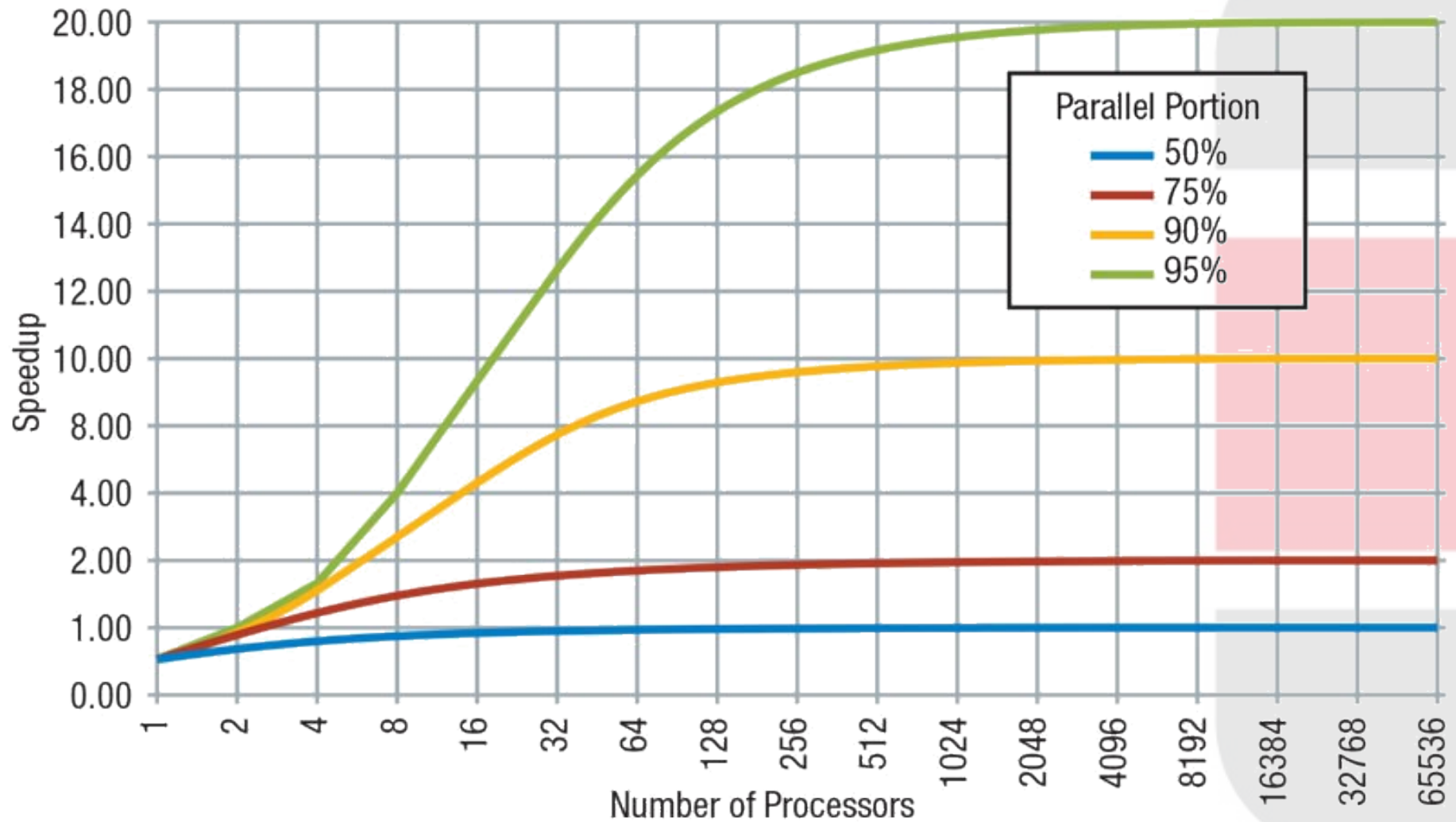
Function	R	#
Frontend Page	1700s	35.000
Frontend DB-Access	300s	2.500.000
Background- Process XML Processing	100s	100.000
Background- Process DB-Access	97s	34.000

**Is the requested time REALISTIC?**

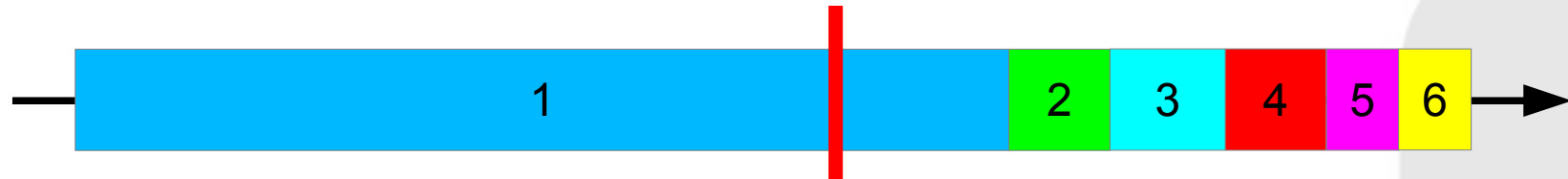
# Amdahl's Law



# Amdahl's Law - Special



# Amdahl's Law - General



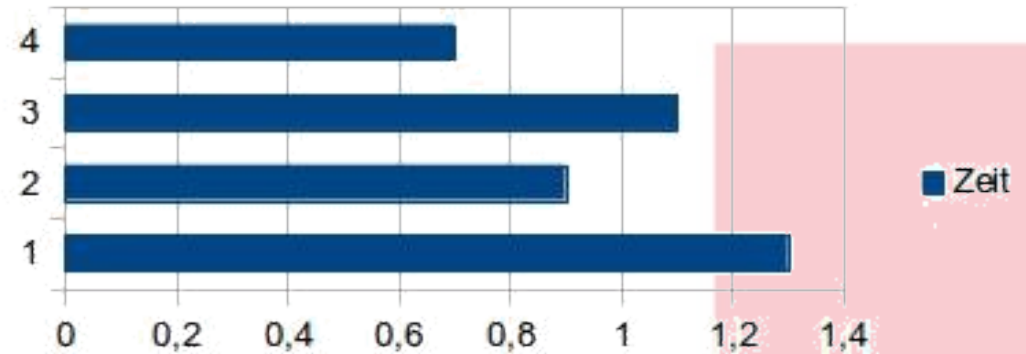
#	Poss. Improvement	Cost	R	R%
1	34%	€€€€	1.700s	70%
2	12 %	€	300s	13%
3	none	-	100s	6%
4	4 %	€	97s	4%
5	0,1%	€€€€	58s	3%
6	1,6%	€	48s	2%
...	...	...	...	...

# Skew

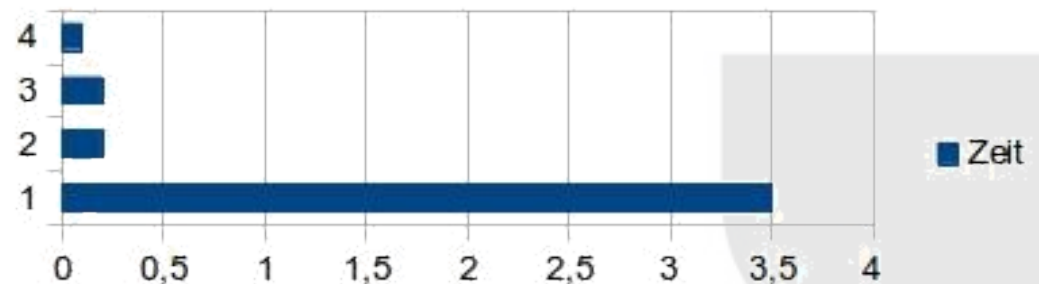
# Catching runaways

4 calls = 4 sec  
2 calls = ? sec

Event	Duration (s)
4	0.7
3	1.1
2	0.9
1	1.3



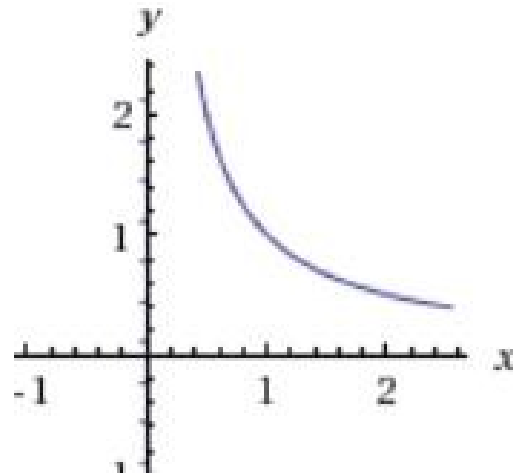
Event	Duration (s)
4	0.1
3	0.2
2	0.2
1	3.5



# Efficiency

# Efficiency

$$\text{efficiency} = \frac{1}{\text{wastage}}$$



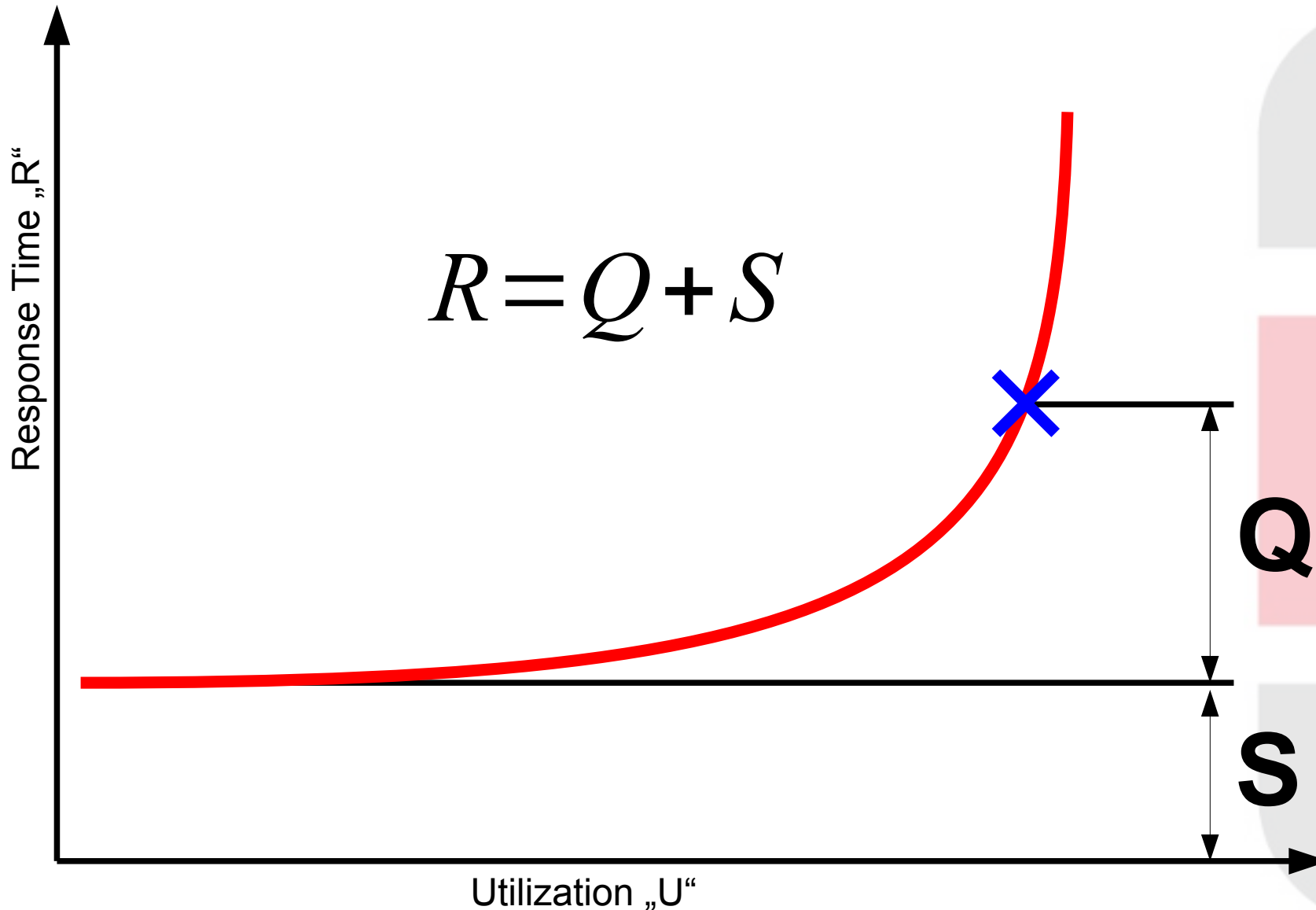
Obviously, the highest type of efficiency is  
that which can utilize existing material  
to the best advantage

-- Jawaharlal Nehru

# Load



# „Q“ - Diagram



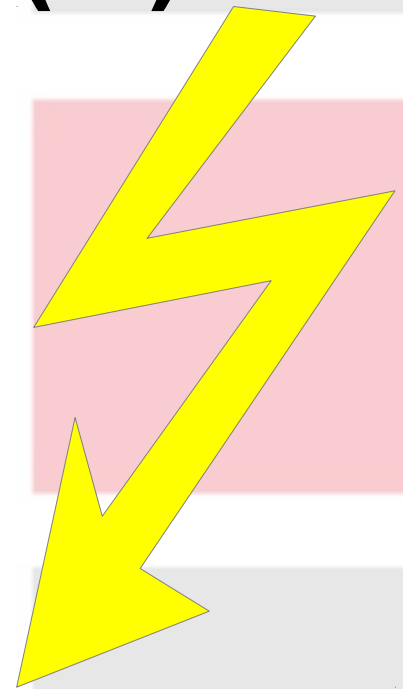
# The Elbow

# The Elbow

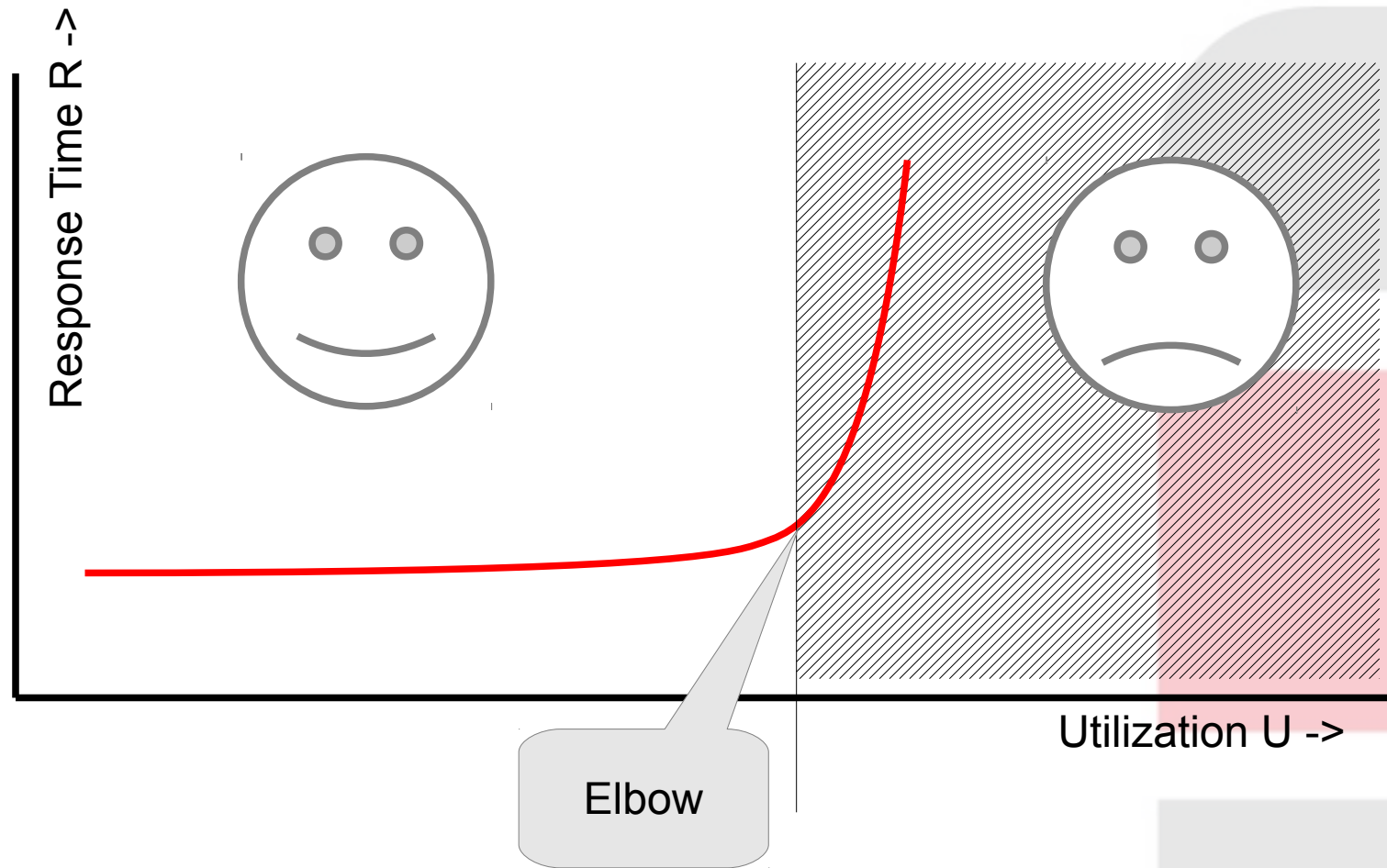
# Fast Response Times (R)

vs.

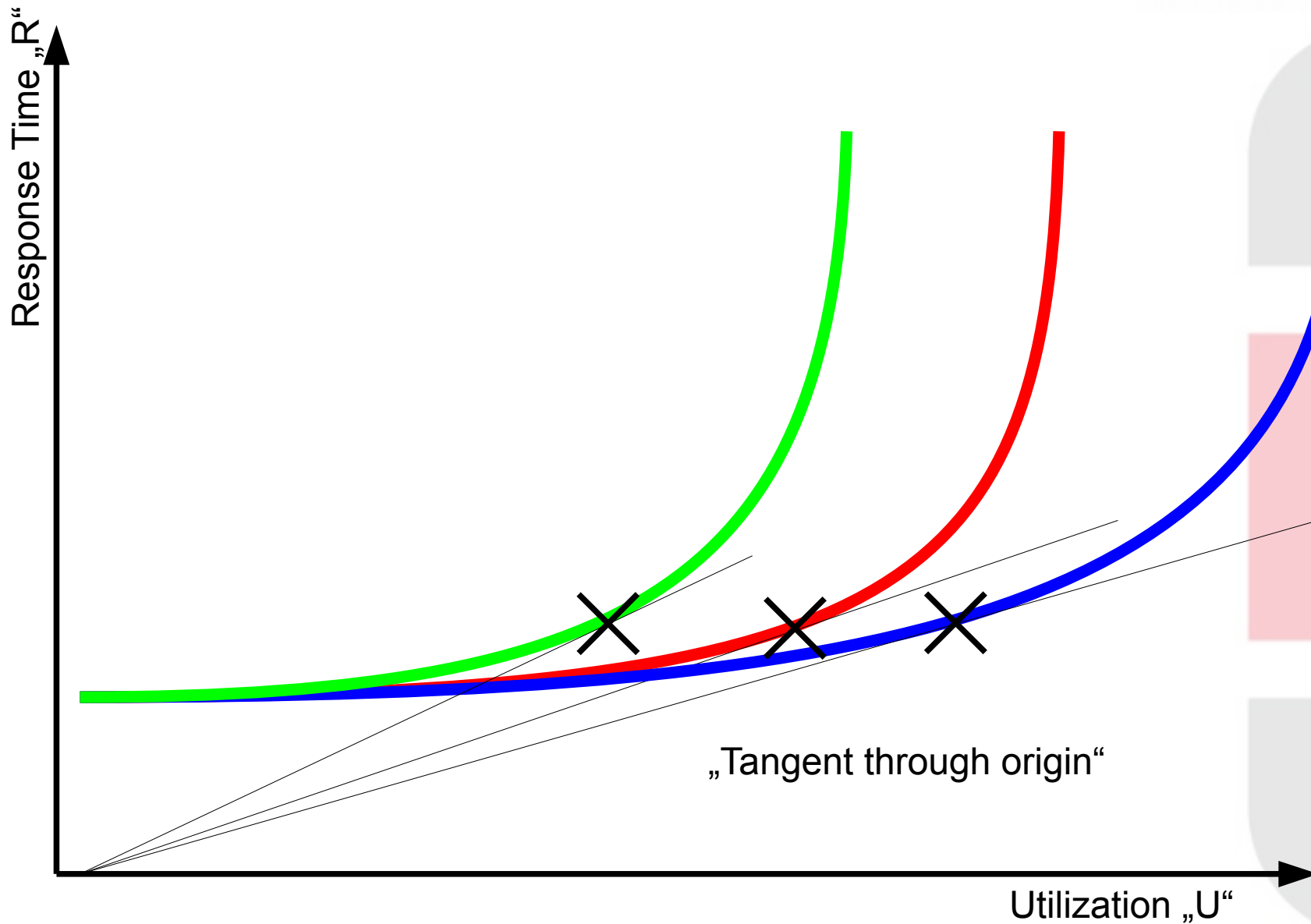
# High Throughput



# Relevance of the elbow



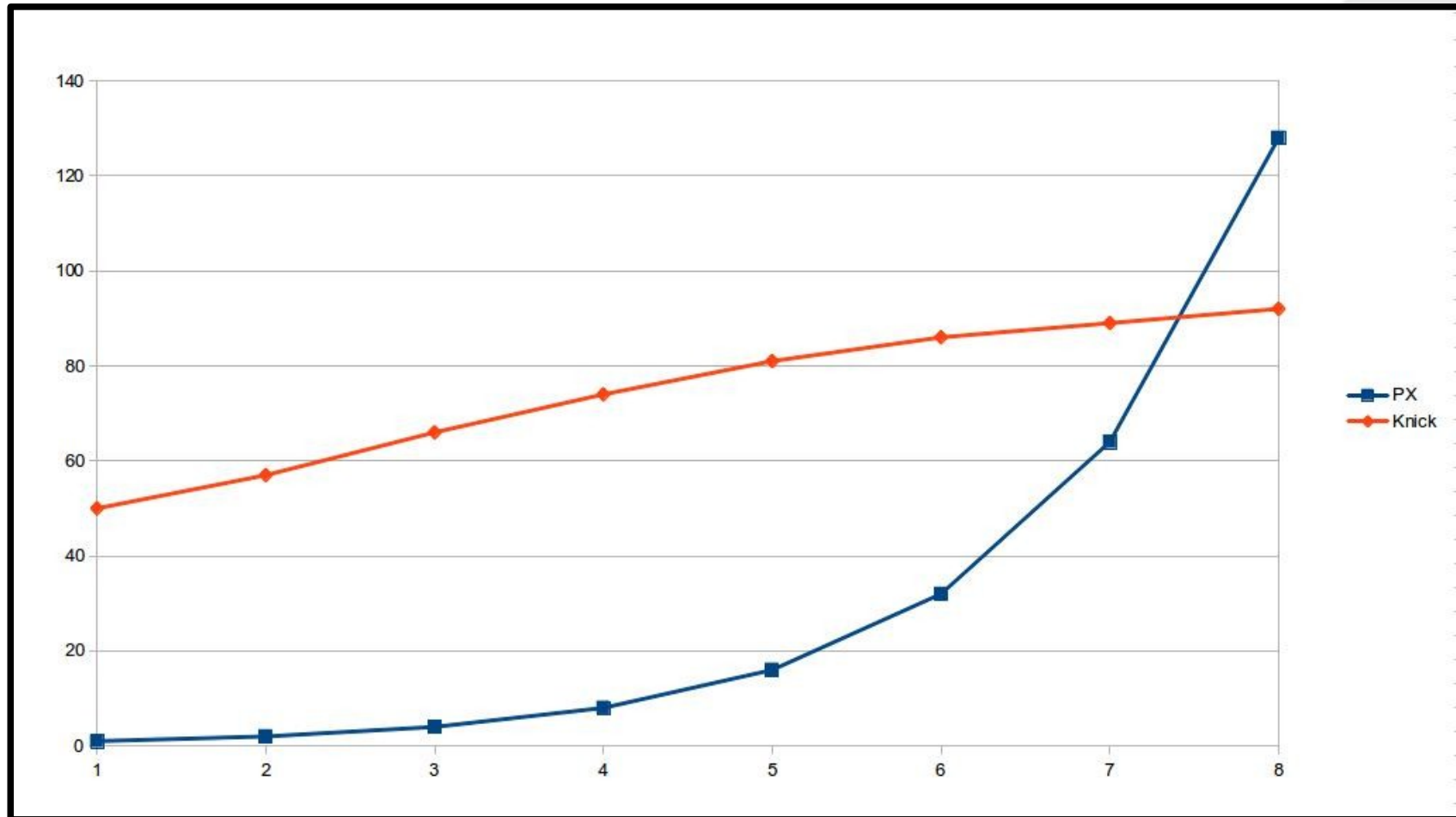
# Where is the elbow?



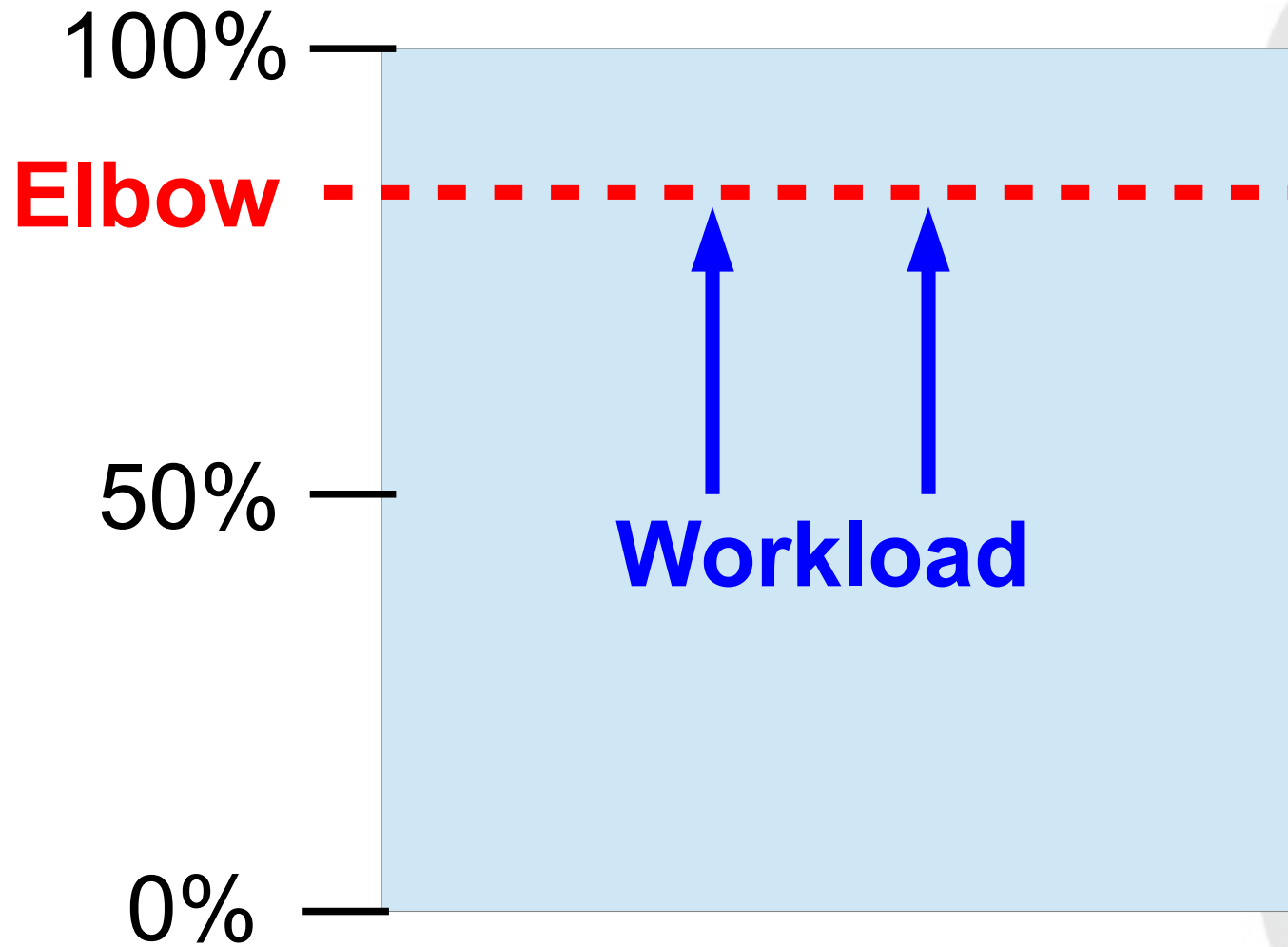
# Scalability: Elbow follows delayed

Service channels / degree of parallelism	Elbow at % of overall utilization
1	50%
2	57%
4	66%
8	74%
16	81%
32	86%
64	89%
128	92%

# Scalability: Elbow follows delayed



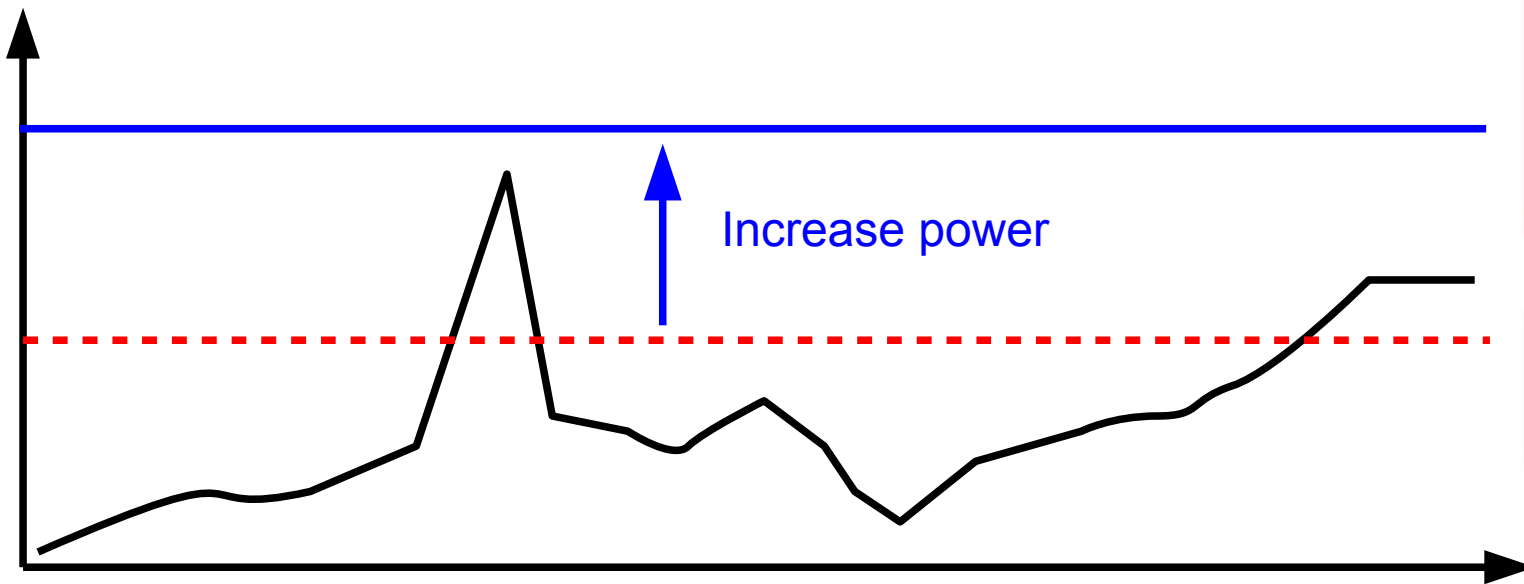
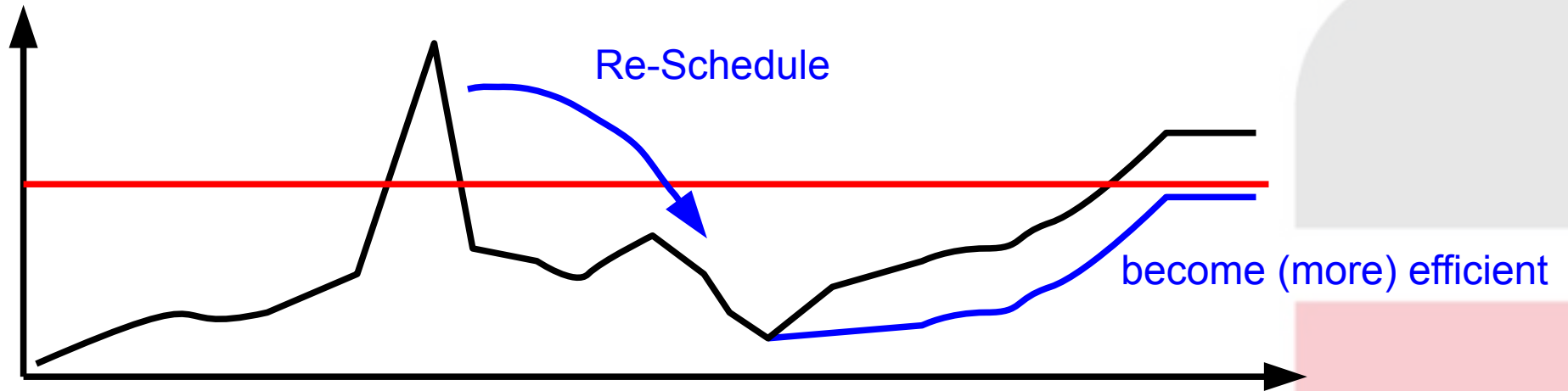
# Capacity planning





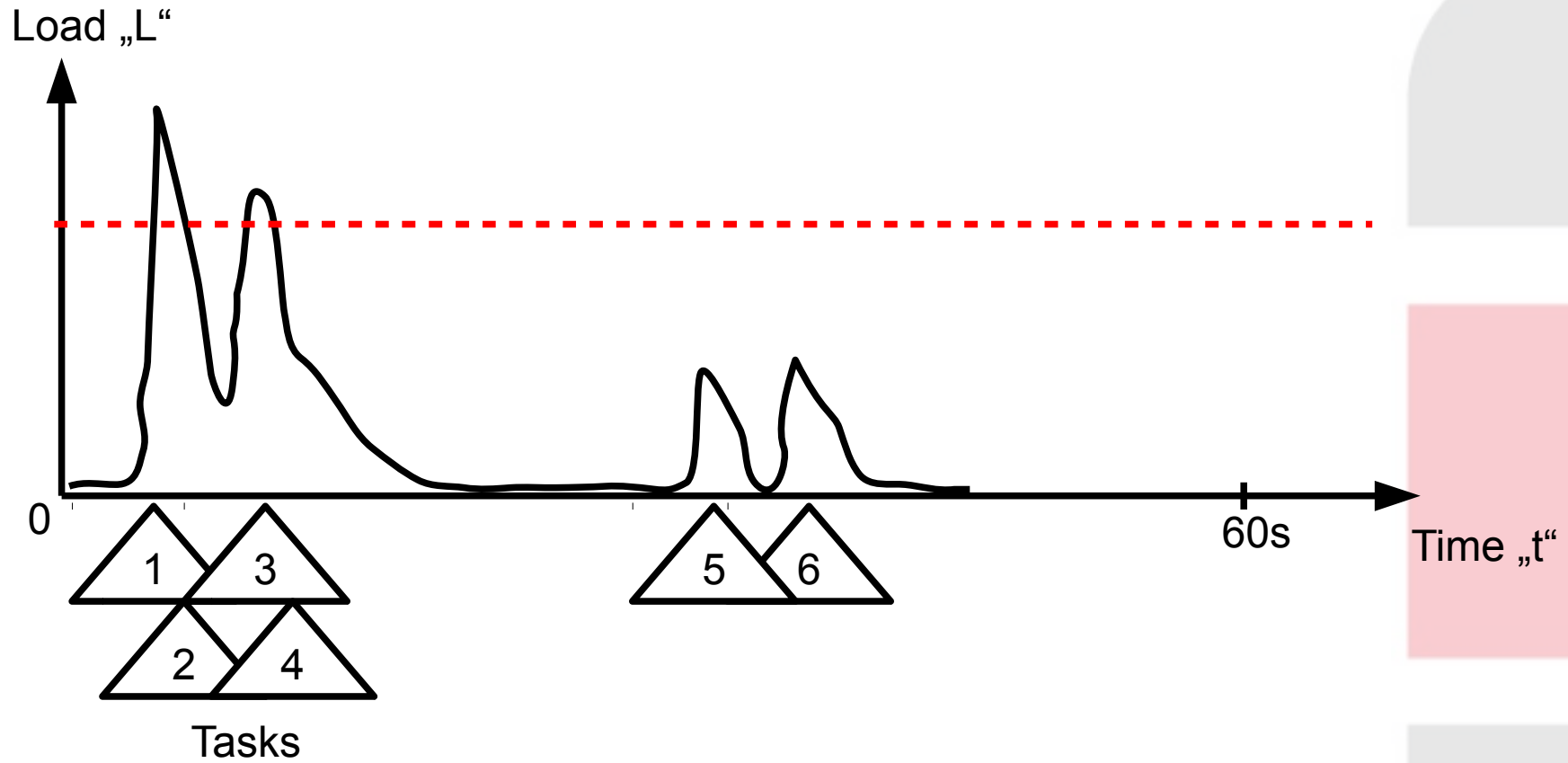
# Reducing Peaks

# Peaks

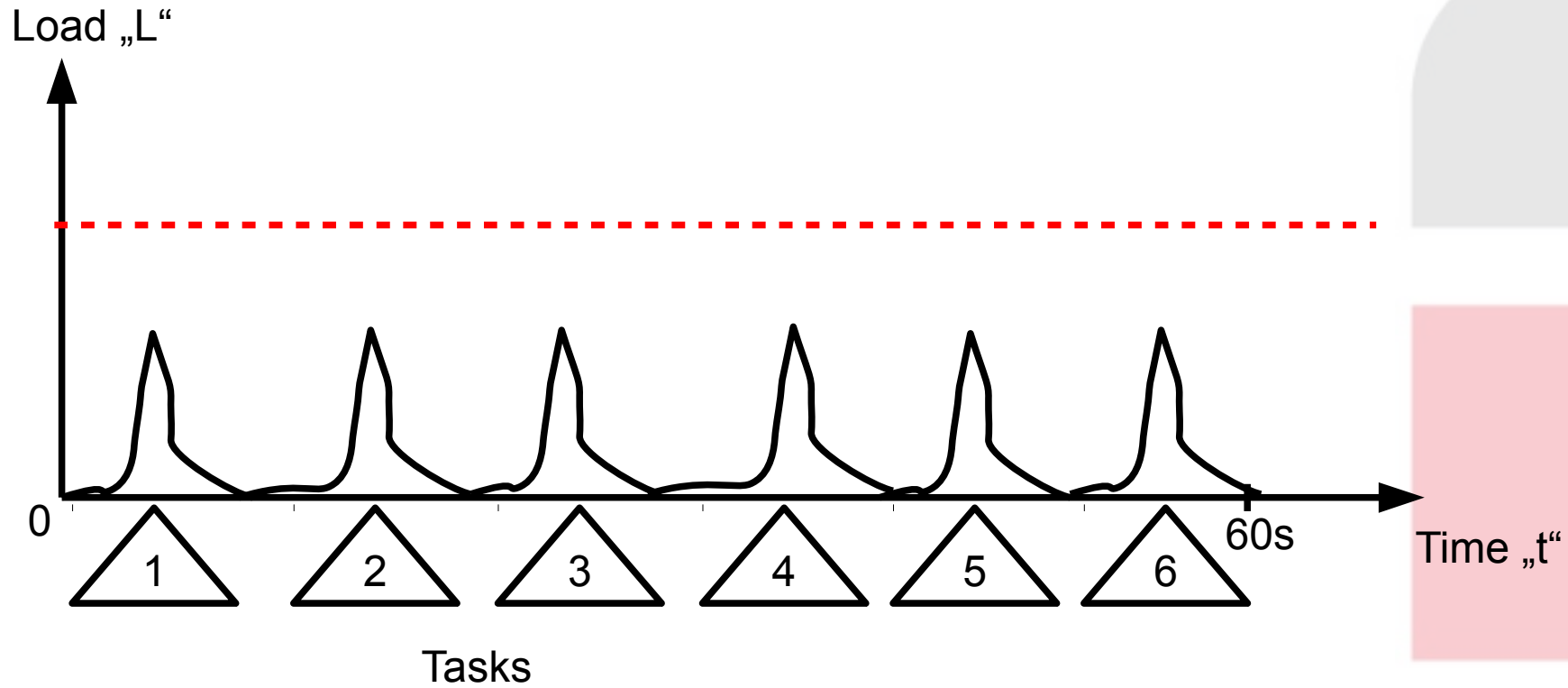


# Random Arrivals

# Random

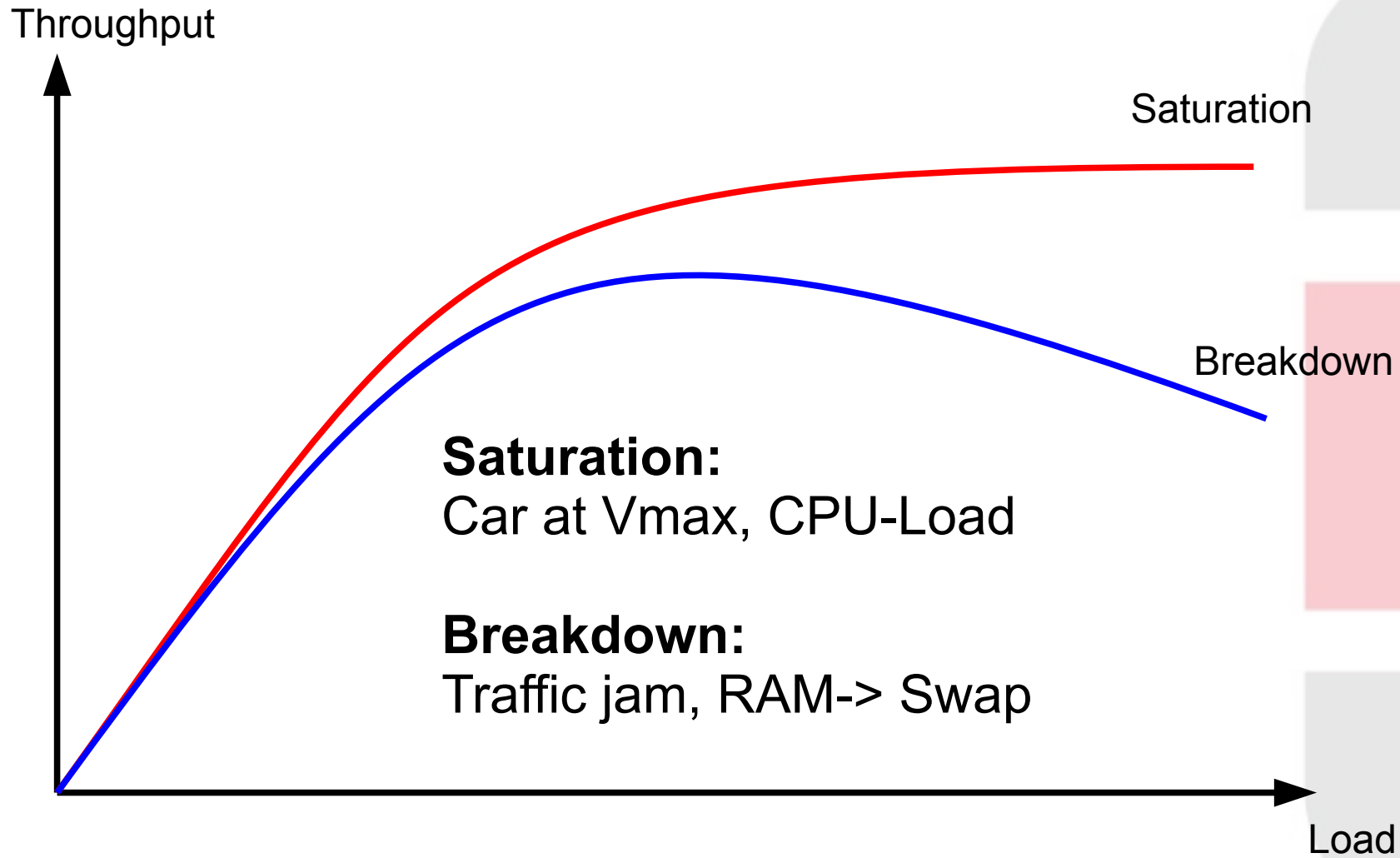


# Deterministic



# The delay in the bigger picture

# Two-class Society







# Performance Testing

# Performance Testing

## Just do it!

You'll find more if you try ...

**You'll never find everything.**

# to measure

/'tu: 'meɜə/

**Measure what?**

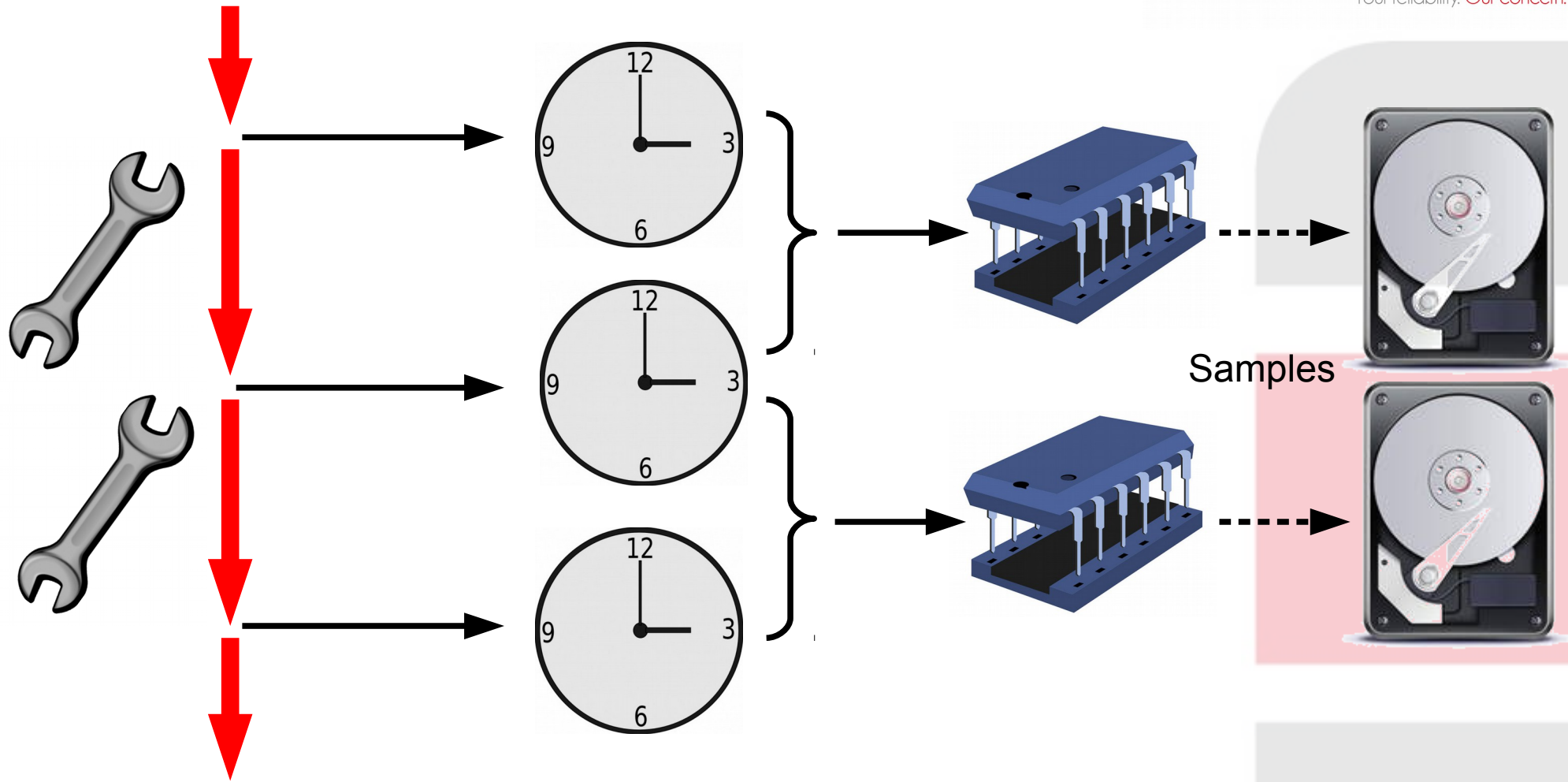
# **Throughput!** and **Response time!**

# S.M.S.

Seiner Majestät Schiff?  
Short Message Service?

# Surrogate Measure Sucks

Measure everything



# Code Instrumentation

# Performance is a feature

**Performance is a feature!**

**Planning <- Cost**  
**Implement -> Use**

Specify in same detail  
as you do with other features



# Overhead

## - 30%

By qualified Instrumentation (=Feedback) you'll improve quality.  
This leverages the additional cost by far.



# Thank you very much!

# Performance

is rarely  
an  
accident



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