# System Design Workshop

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# Kim jesteśmy?

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IoT

Telco

Guest Wi-Fi


GoodLood

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# Program stażowy

https://shorturl.at/9jac3

Scala

MongoDB

Angular

Java

Kafka

Kubernetes

# Agenda spotkania

1. Wstęp
2. Wstęp teoretyczny
3. Zadanie 1 - wspólne rozwiązywanie
4. Przerwa (20 min, około 16:40)
5. Zadanie 2 - praca w grupach
6. Zadanie 2 - dyskusja
7. Feedback

# Po co się tutaj zebraliśmy?

# System Design 101

# What is System Design?

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# Distributed Systems

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# Distributed Systems

- reliability
- scalability
- availability
- maintainability

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# Reliability

- preventing cascading failures
- no single point of failure
- fault tolerant

# Ways to achieve reliability

# Rate limiter

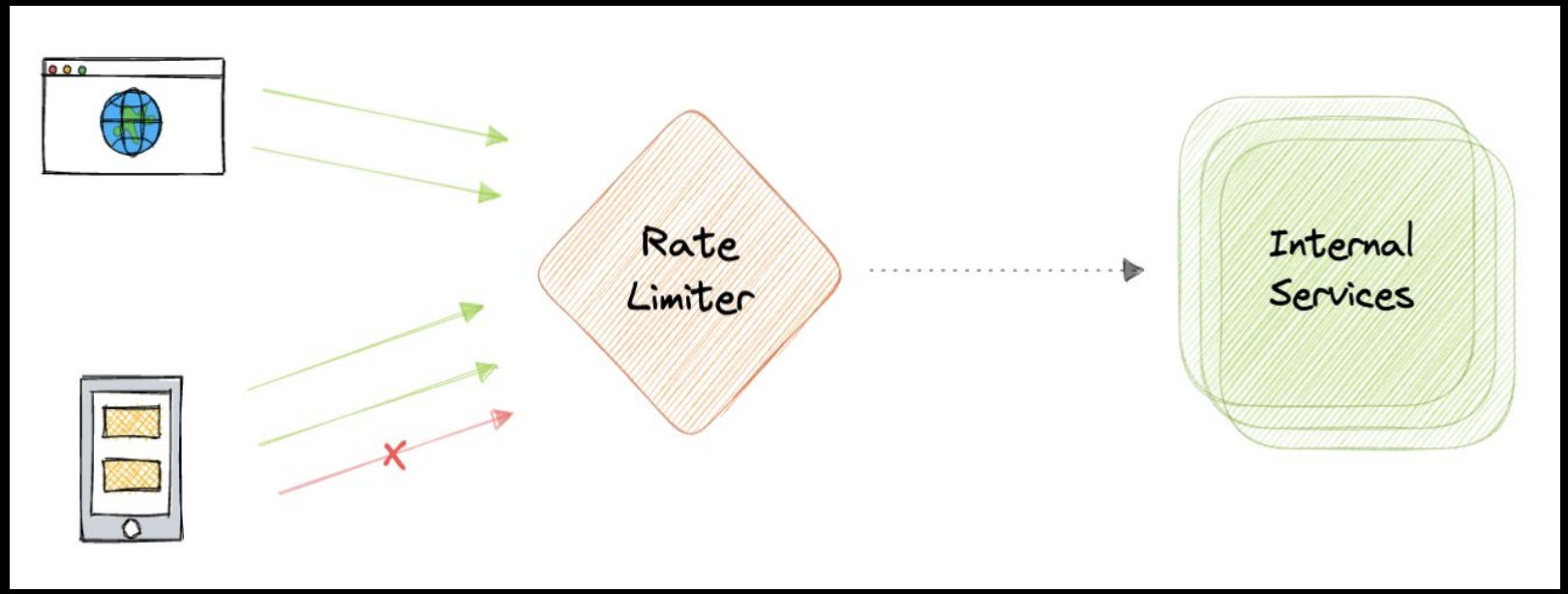


image source: https://github.com/karanpratapsingh/system-design?tab=readme-ov-file#rate-limiting

# Persistent messages

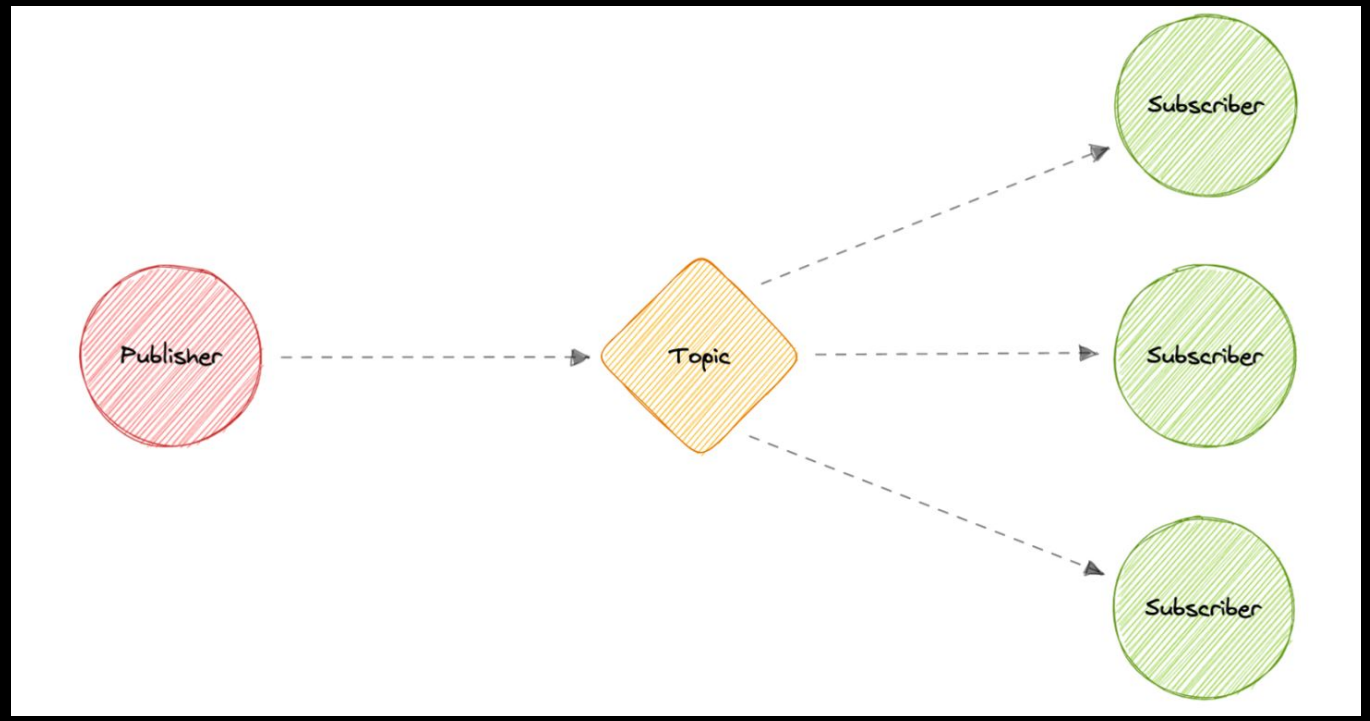


image source: https://github.com/karanpratapsingh/system-design?tab=readme-ov-file#publish-subscribe

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# Scalability

- scaling up and out
- sharding

# Ways to achieve scalability

# Message queue

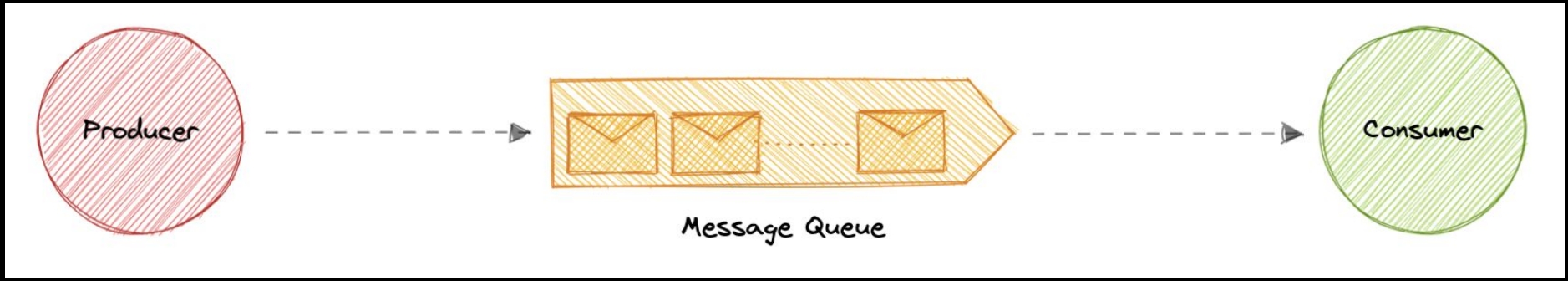


image source: https://github.com/karanpratapsingh/system-design?tab=readme-ov-file#message-queues

# Load balancing

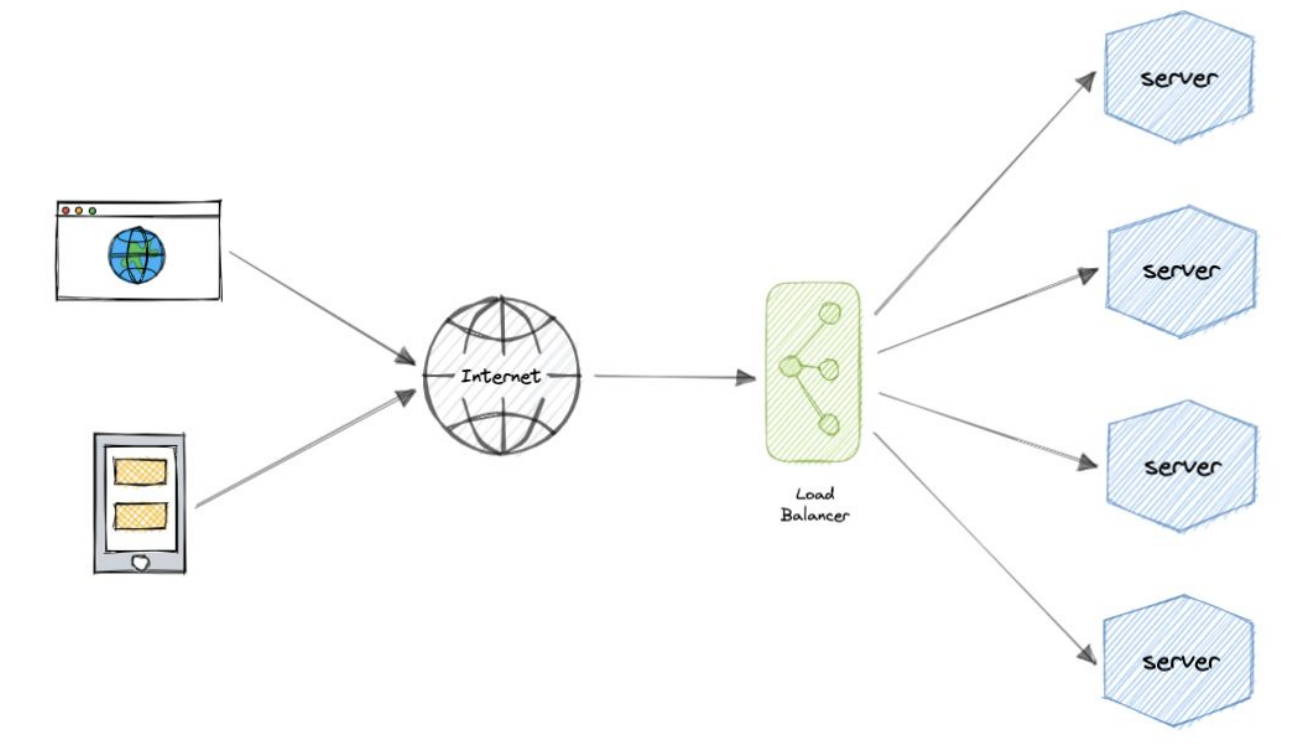


image source: https://github.com/karanpratapsingh/system-design?tab=readme-ov-file#load-balancing

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# Database sharding

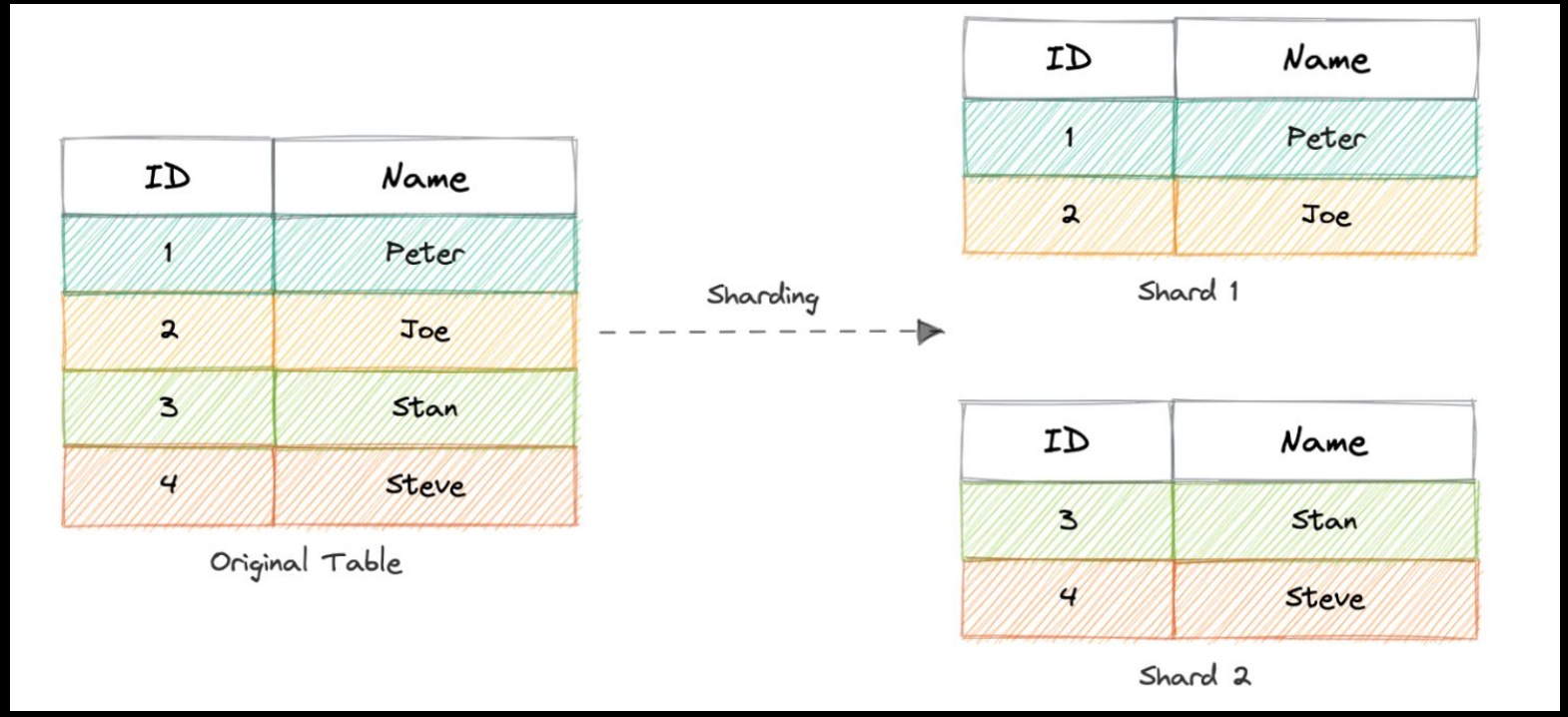


image source: https://github.com/karanpratapsingh/system-design?tab=readme-ov-file#what-is-sharding

# (High) Availability

- operational and accessible

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# Availability in numbers

| Availability SLA | Daily | Weekly | Monthly | Yearly |
|---|---|---|---|---|
| 95% | 1h | 8h | 1d | 18d |
| 99% | 15m | 2h | 7h | 3d |
| 99.9% | 1m | 10m | 40m | 9h |
| 99.99% | 10s | 1m 0.48s | 4m | 50m |
| 99.999% | 1s | 6s | 40s | 5m |
| 99.9999% | 0.1s | 0.6s | 4s | 30s |

# Ways to achieve availability

# Fail-over

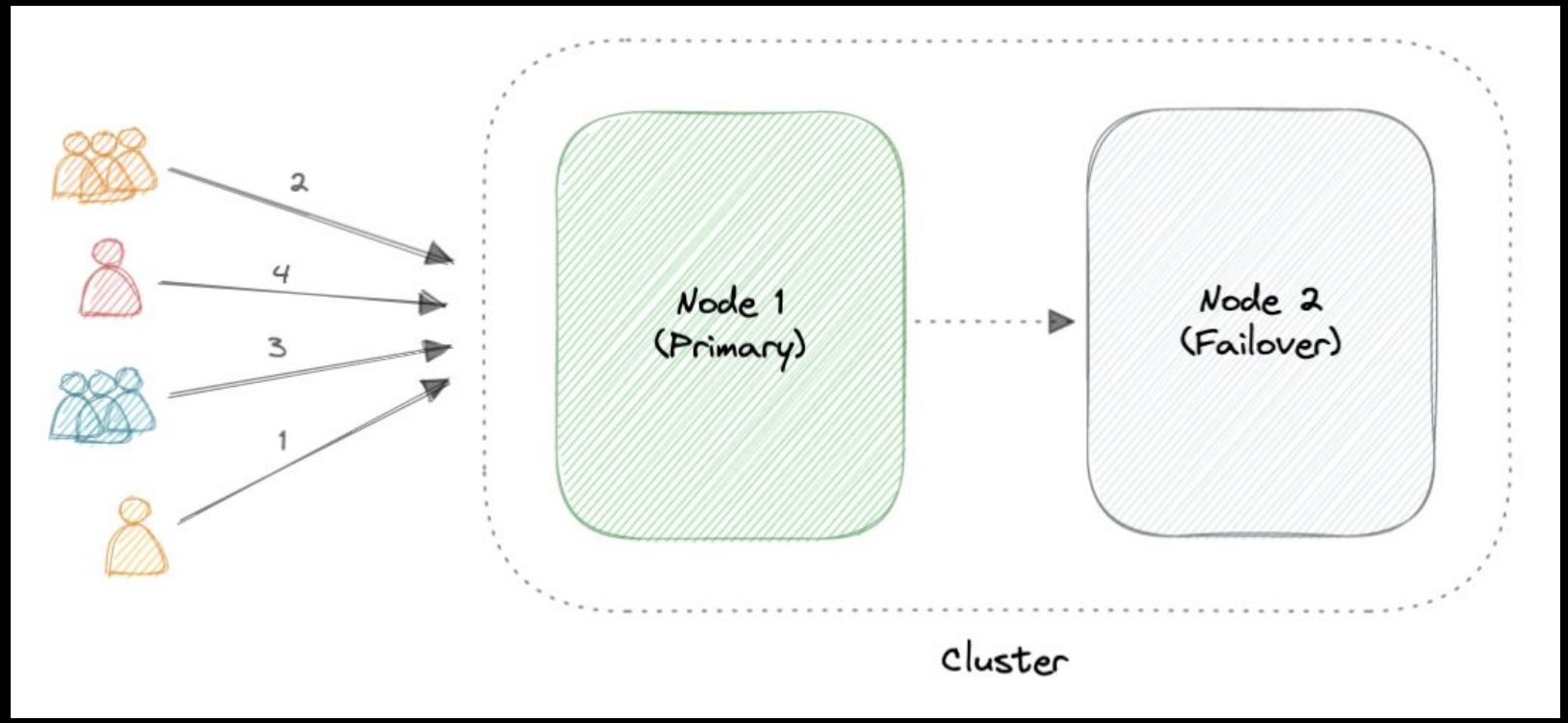


image source: https://github.com/karanpratapsingh/system-design?tab=readme-ov-file#active-passive

# Replication

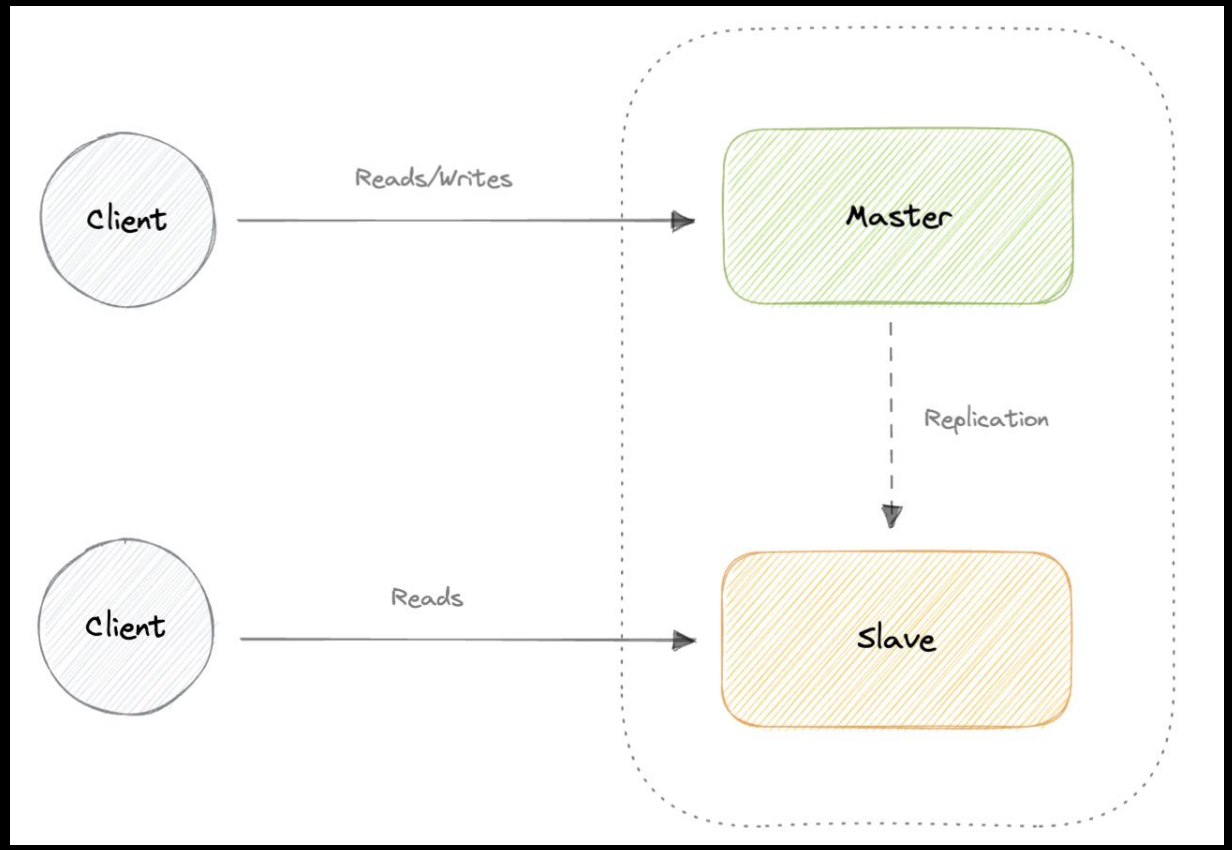


image source: https://github.com/karanpratapsingh/system-design?tab=readme-ov-file#active-passive

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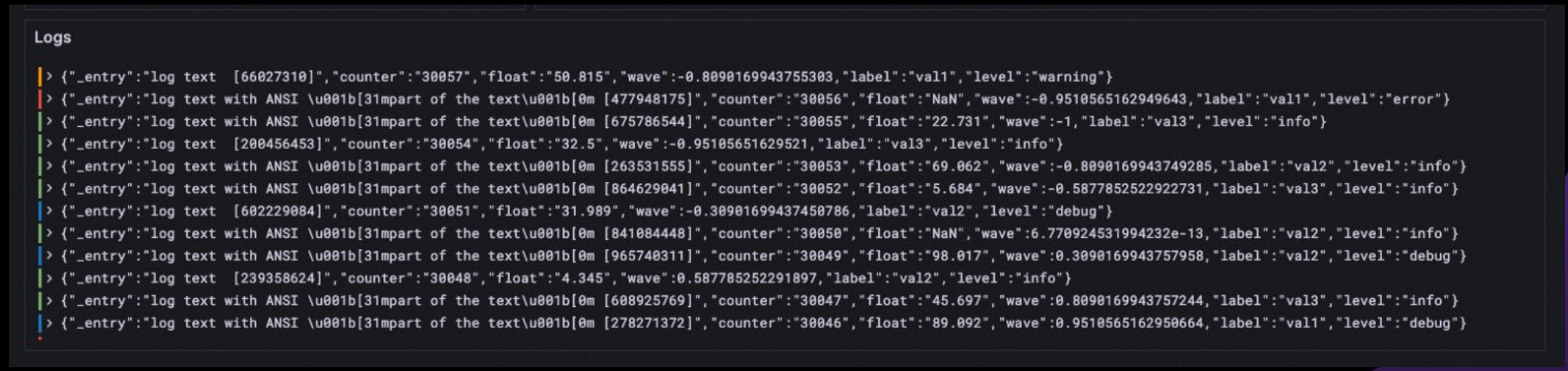
# Maintainability

- simple to understand
- simple to change
- simple to debug

# Ways to achieve maintainability

# Logging


Logs
> {"_entry":"log text  [66027310]","counter":"30057","float":"50.815","wave":-0.8090169943755303,"label":"val1","level":"warning"}
> {"_entry":"log text with ANSI \u001b[31mpart of the text\u001b[0m [477948175]","counter":"30056","float":"NaN","wave":-0.9510565162949643,"label":"val1","level":"error"}
> {"_entry":"log text with ANSI \u001b[31mpart of the text\u001b[0m [675786544]","counter":"30055","float":"22.731","wave":-1,"label":"val3","level":"info"}
> {"_entry":"log text  [200456453]","counter":"30054","float":"32.5","wave":-0.95105651629521,"label":"val3","level":"info"}
> {"_entry":"log text with ANSI \u001b[31mpart of the text\u001b[0m [263531555]","counter":"30053","float":"69.062","wave":-0.8090169943749285,"label":"val2","level":"info"}
> {"_entry":"log text with ANSI \u001b[31mpart of the text\u001b[0m [864629041]","counter":"30052","float":"5.684","wave":-0.5877852522922731,"label":"val3","level":"info"}
> {"_entry":"log text  [602229084]","counter":"30051","float":"31.989","wave":-0.30901699437450786,"label":"val2","level":"debug"}
> {"_entry":"log text with ANSI \u001b[31mpart of the text\u001b[0m [841084448]","counter":"30050","float":"NaN","wave":6.770924531994232e-13,"label":"val2","level":"info"}
> {"_entry":"log text with ANSI \u001b[31mpart of the text\u001b[0m [965740311]","counter":"30049","float":"98.017","wave":0.3090169943757958,"label":"val2","level":"debug"}
> {"_entry":"log text  [239358624]","counter":"30048","float":"4.345","wave":0.587785252291897,"label":"val2","level":"info"}
> {"_entry":"log text with ANSI \u001b[31mpart of the text\u001b[0m [608925769]","counter":"30047","float":"45.697","wave":0.8090169943757244,"label":"val3","level":"info"}
> {"_entry":"log text with ANSI \u001b[31mpart of the text\u001b[0m [278271372]","counter":"30046","float":"89.092","wave":0.9510565162950664,"label":"val1","level":"debug"}

# Monitoring


Public / tado° dashboard (celsius)
Last 24 hours
10s
Zones
Gästezimmer
Temperature Scale
celsius
tado°
Temperature: Gästezimmer
23 °C
22 °C
21 °C
20 °C
11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 00:00 01:00 02:00 03:00 04:00 05:00 06:00 07:00 08:00 09:00 10:00
Current Temperature Current: 21.6 °C
Set Temperature Current: 22.0 °C
Temperature
21.6 °C
Max:
22.5 °C
Avg:
22.0 °C
Min:
21.2 °C
Heating Power
74%
Set Temperature
22 °C
Humidity
44.3 %H
Max:
54.3 %H
Avg:
49.0 %H
Min:
43.5 %H
Temperature
22.1 °C
Bad
20.8 °C
Eingang
21.0 °C
Esszimmer
21.3 °C
Flur
18.4 °C
Gäste WC
21.6 °C
Gästezimmer
21.9 °C
Schlafzimmer
20.3 °C
Wohnzimmer
Value
24.0 °C
Value
21.2 °C
Value
18.2 °C

# Agenda rozmowy system design

# 1. Zbieranie wymagań

**Funkcjonalnych:**

- co system ma robić?
- czego nie musi robić?

**Niefunkcjonalnych:**

- jak system ma się zachowywać?
- jak dużo danych / użytkowników?

# 2. Wstępne planowanie

Estymacja zasobów:

- ile danych przechowujemy?
- ile odczytów musimy przetworzyć?
- ile zapisów musimy przetworzyć?

Jakie są główne encje w naszym systemie?

# 3. Wysokopoziomowy szkic

- główne komponenty
- przepływ danych
- realizacja wymagań funkcjonalnych

# 4. Zagłębienie w szczegóły

- wybór bazy danych
- zaprojektowanie API
- zaprojektowanie modeli bazodanowych

# 5. Rozszerzenie systemu

- jak możemy spełnić dodatkowe wymaganie X?
- co trzeba zmienić w systemie żeby obsłużyć 10x większy ruch? gdzie są wąskie gardła?
- jak monitorować system, jak znaleźć potencjalne awarie?

# Materiały pomocnicze

https://github.com/AVSystem/system-design-workshop

# Pytania?

# Zadanie 1 - wymagania

# Zadanie 1 - dyskusja

# Przerwa (~20min)

# Zadanie 2 - zbieranie wymagań

# Zadanie 2 - praca w grupach (~30min)

# Zadanie 2 - dyskusja

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# Feedback

https://shorturl.at/Nfopp

# Losowanie

# Dziękujemy za uwagę