

Operational hazards of managing PostgreSQL DBs over 100TB

Why?

Storage Limits

AWS RDS	64TB
Google CloudSQL	64TB
Azure Database Flexible Server	64TB

Storage Limits

AWS Aurora	256TB
Google AlloyDB	128TB

Teresa Lopes

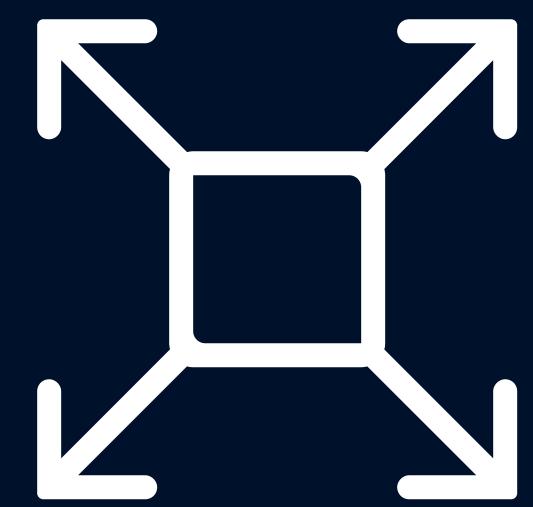
Database Engineer

Adyen



Agenda

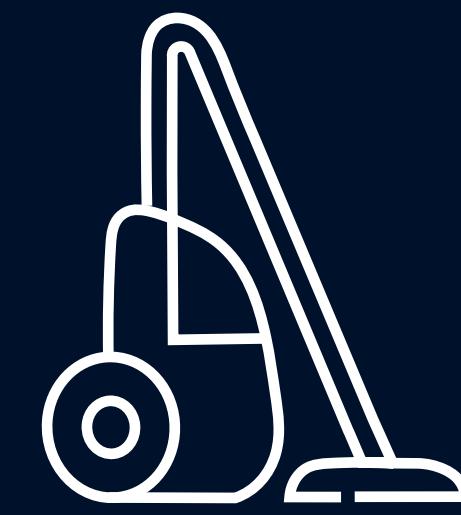




Big, but how big?



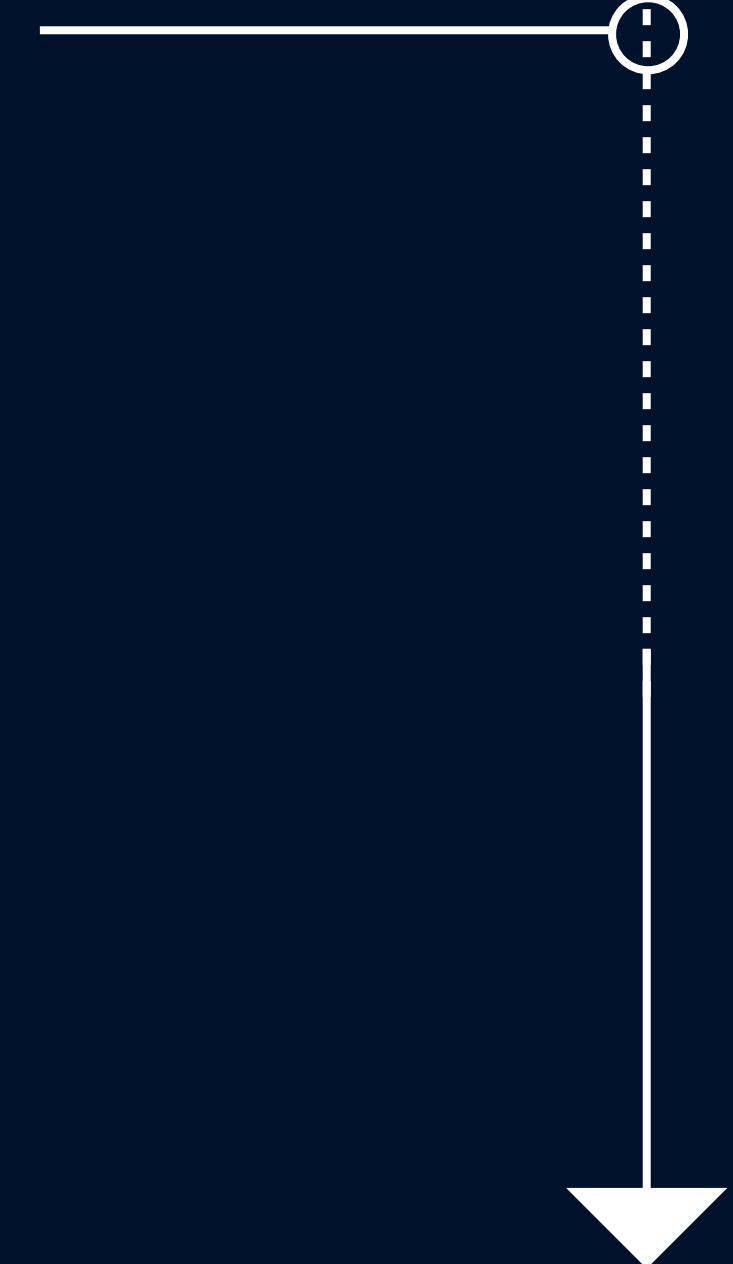
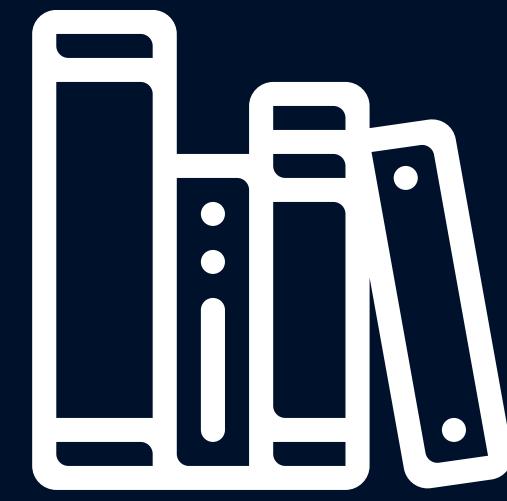
Bring balance
to the Database



Vacuum, it is
always Vacuum



To backup or
not To backup



Data, Data
everywhere



Big, but how big?



Small DB + Low TPS



Large DB + Low TPS



Small DB + High TPS



Small DB + Strict Latency



Source: <https://www.redbull.com/>

Perfect Storm

Perfect Storm

Massive DB

Perfect Storm

Massive DB
+ Very High TPS

Perfect Storm

Massive DB

+ Very High TPS

+ Strict Latency

Perfect Storm

Massive DB

+ Very High TPS

+ Strict Latency

+ Hot Data

Perfect Storm



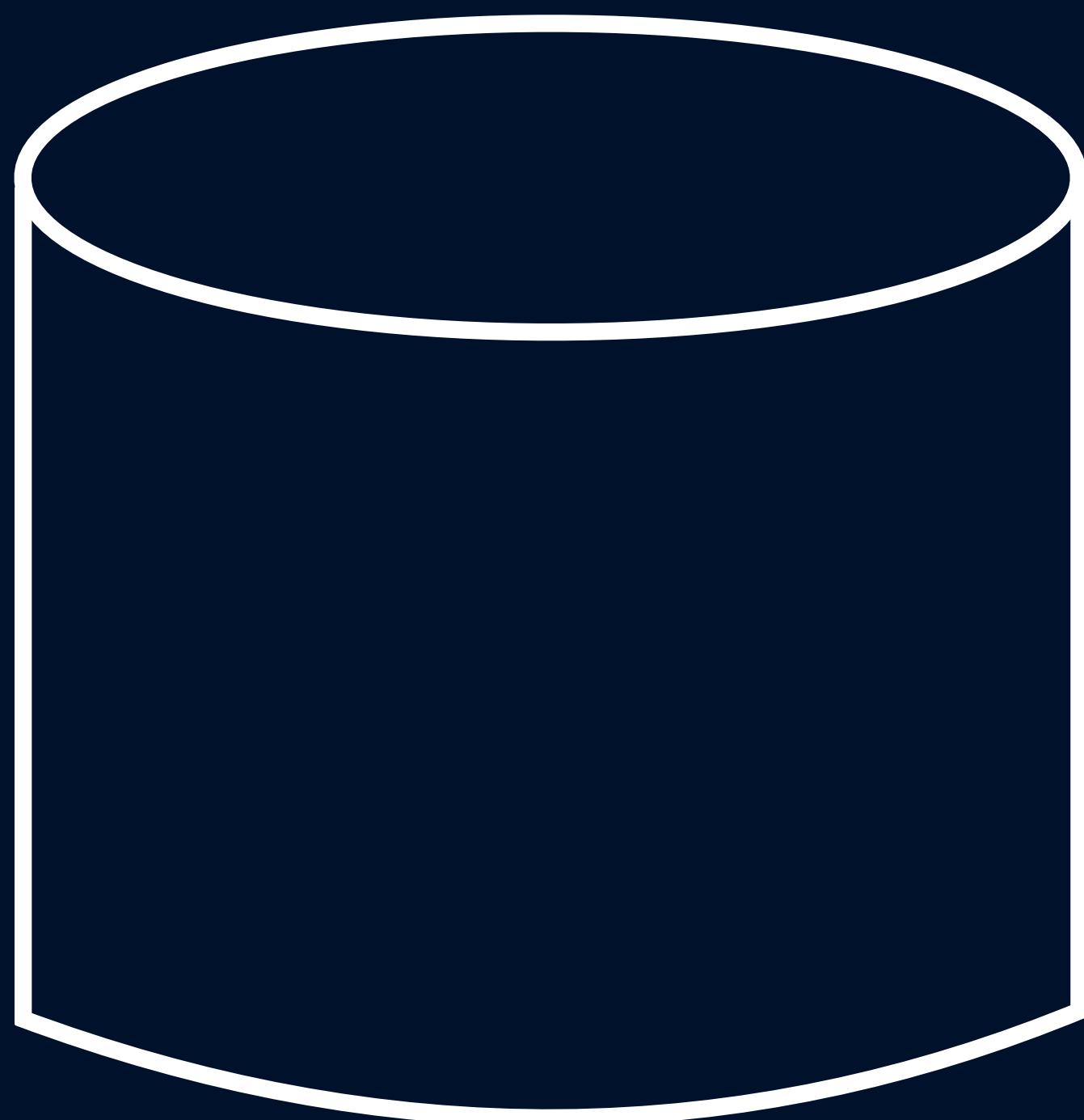
Source: <https://www.dziesmusvetki.lv>

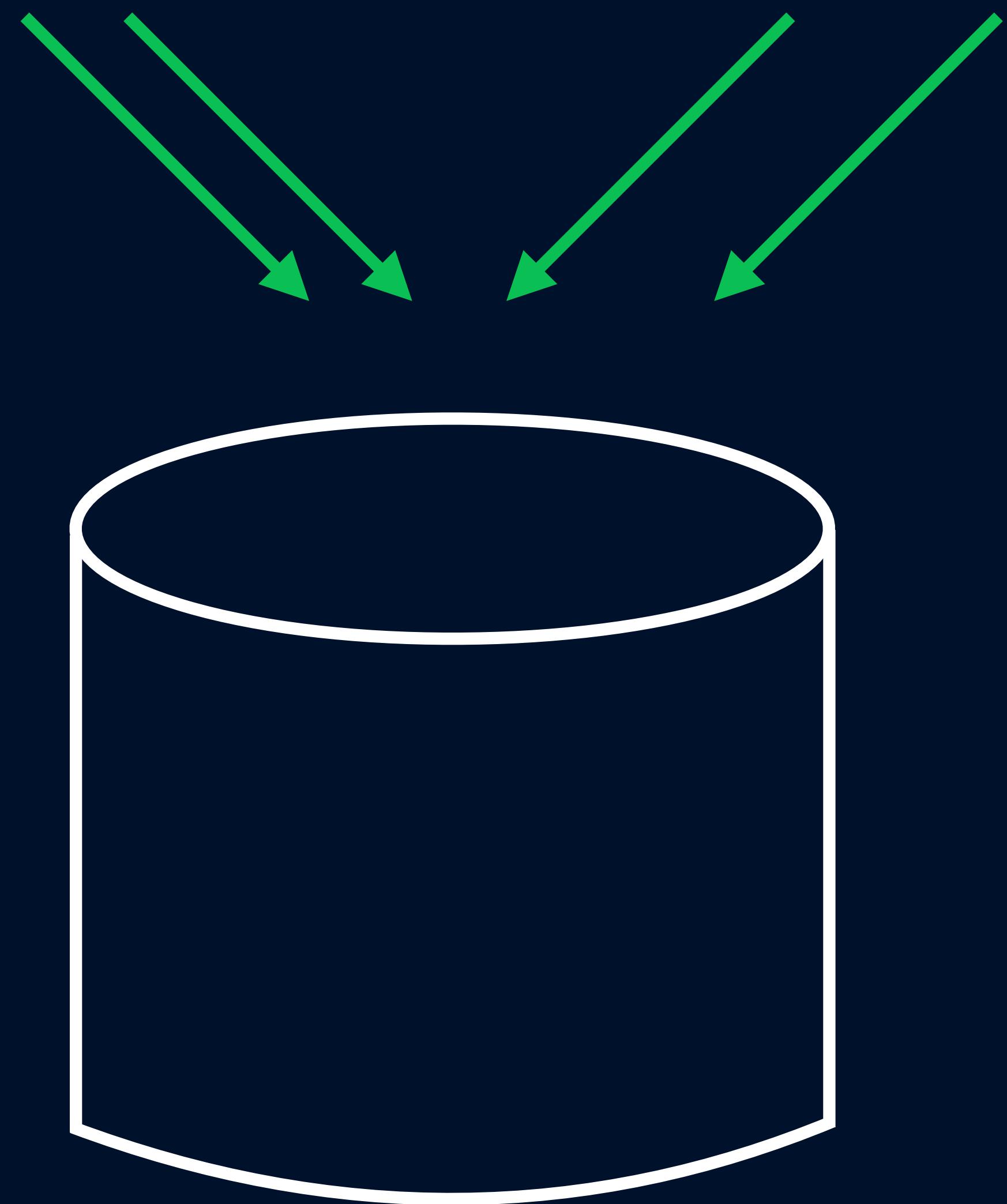


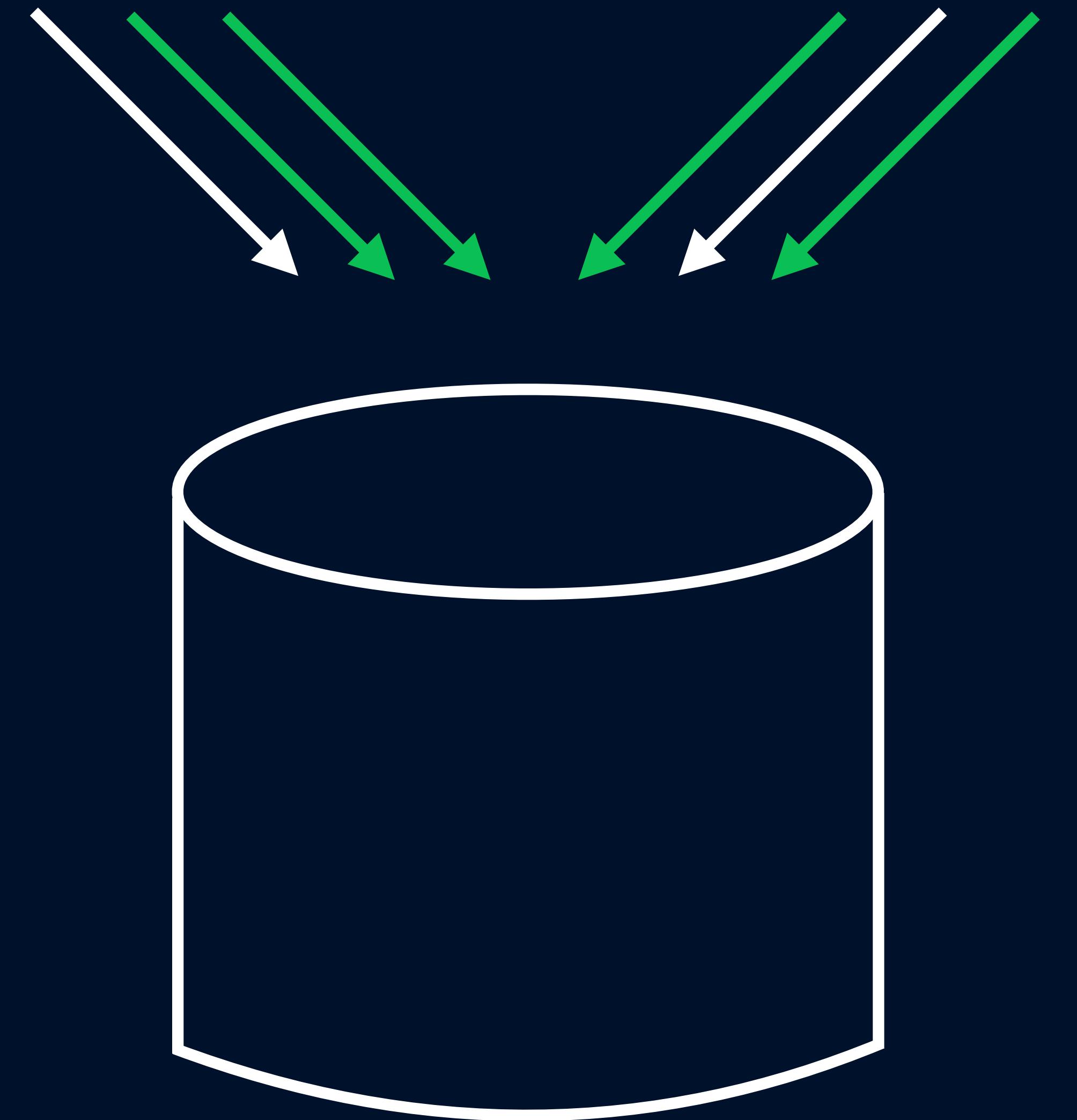
Bring balance to the Database



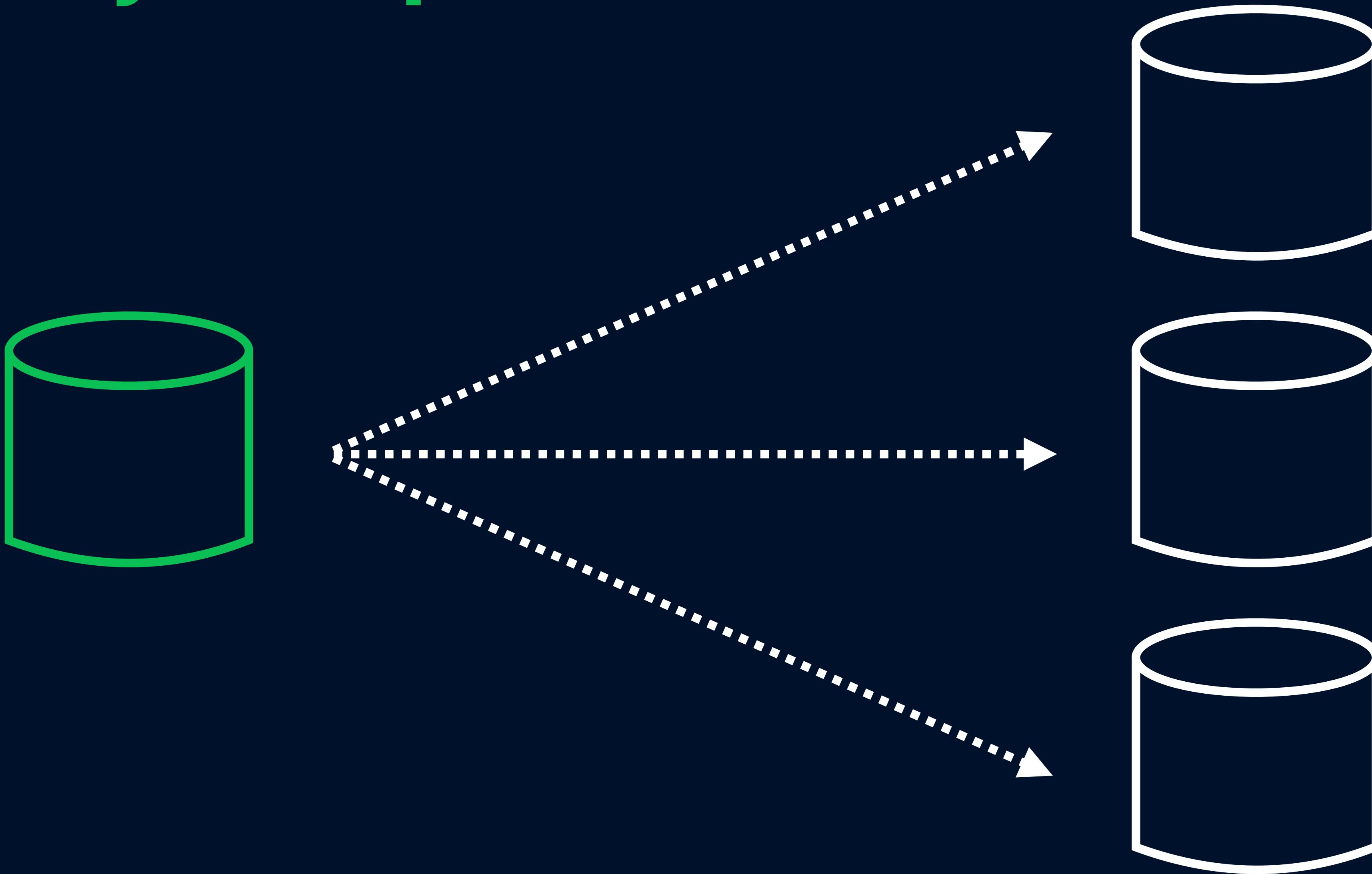
Single Instance



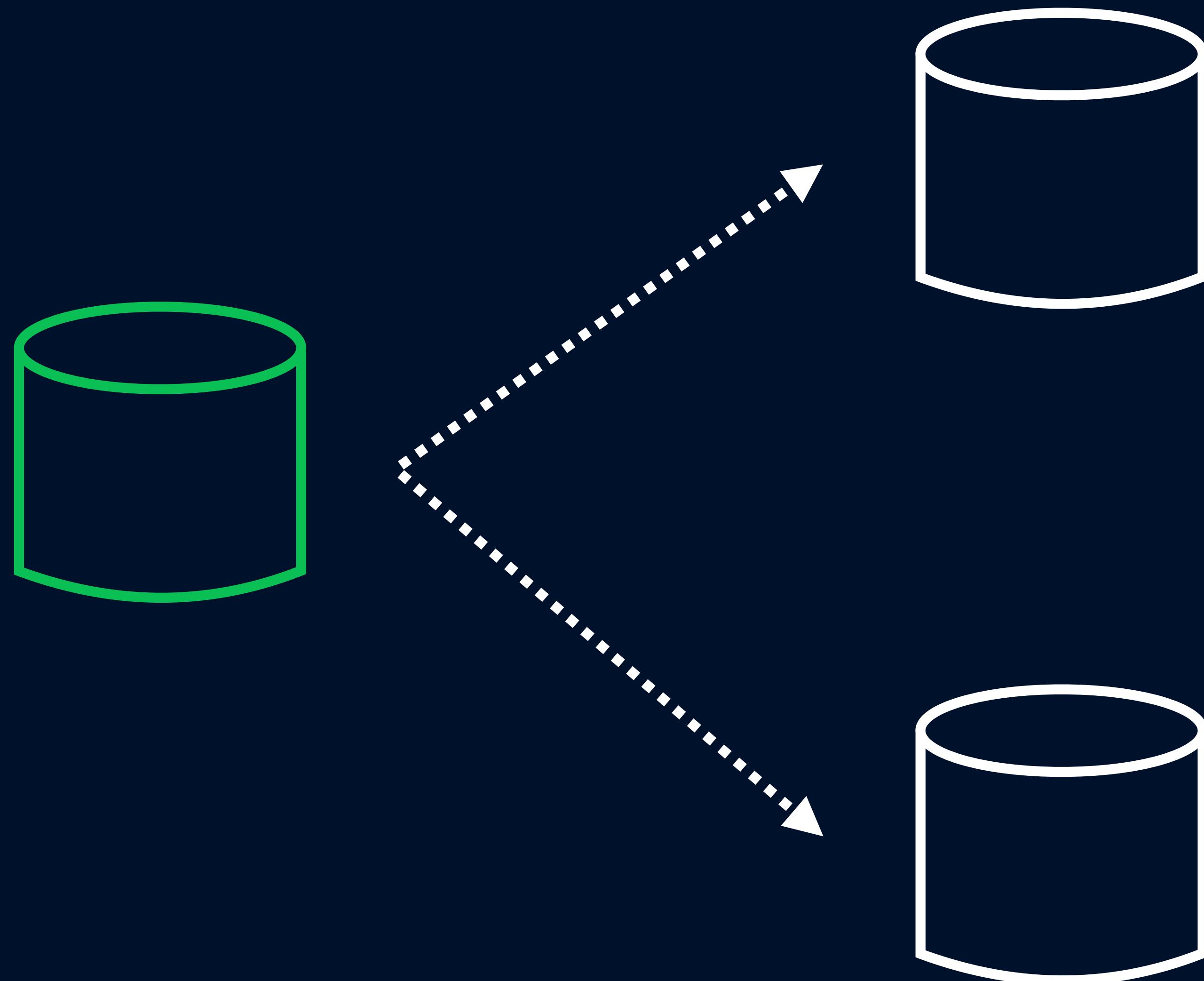




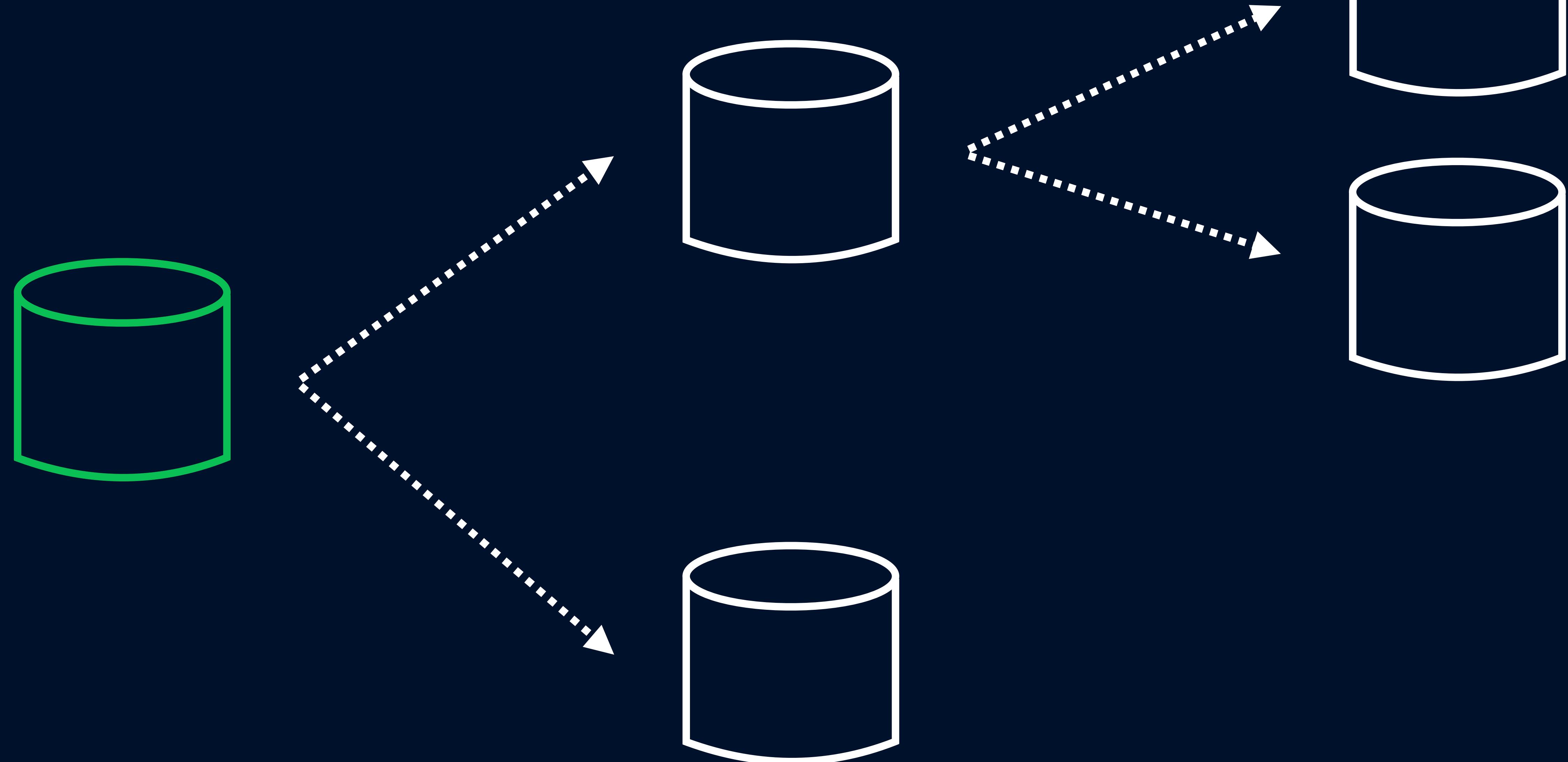
Primary + Replicas



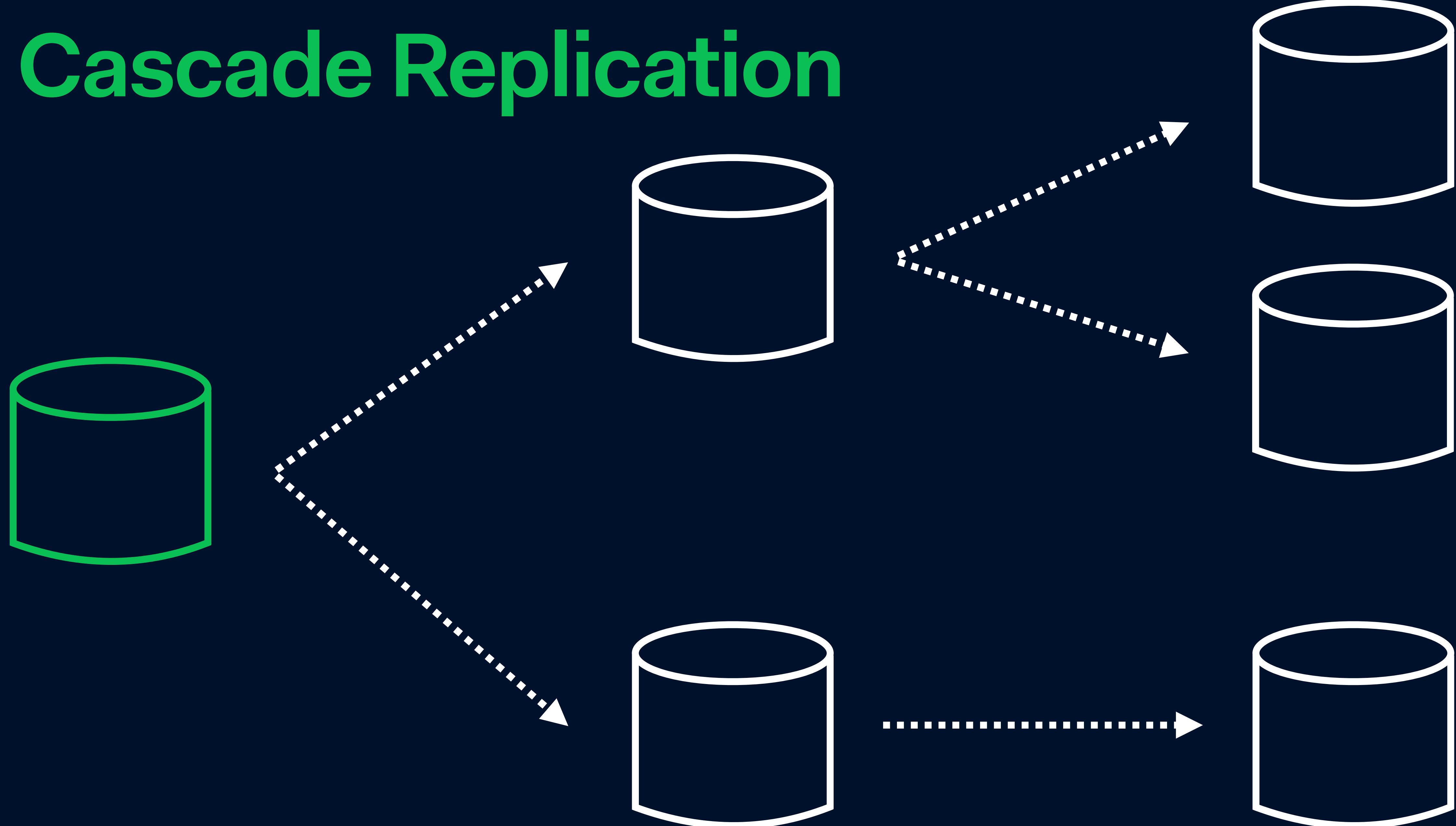
Cascade Replication



Cascade Replication



Cascade Replication



Replication



Replication

PGConf.DE 2025

Myths and Truths about Synchronous Replication in PostgreSQL

Fri. 11:10–11:55 — Berlin 1

Alexander Kukushkin  

PGConf.EU 2025

The SyncRep Detective Story: Chasing Ghosts in PostgreSQL, Finding Demons in Storage

Thursday, October 23 at 11:25–12:15



Dmitry Fomin
Adyen

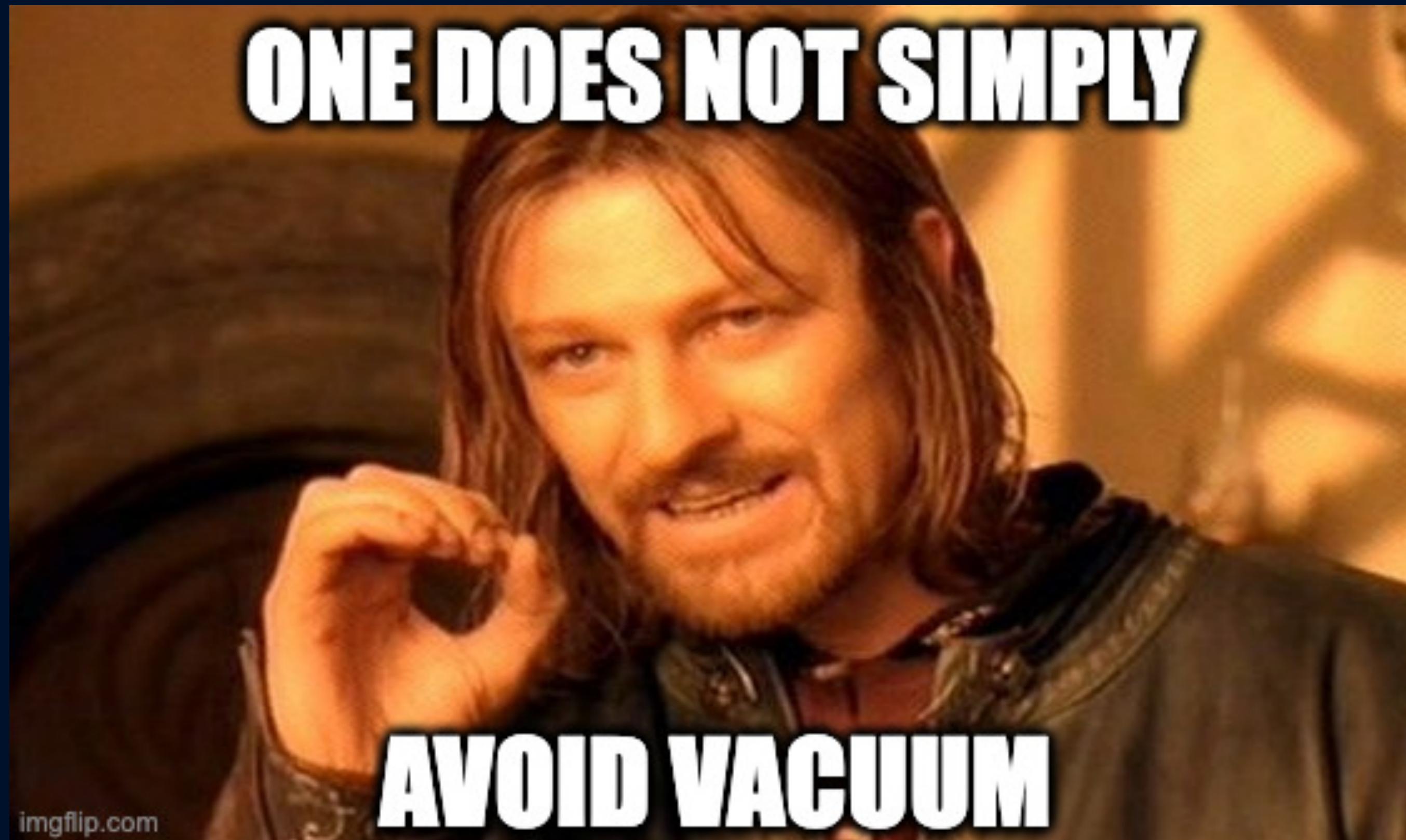


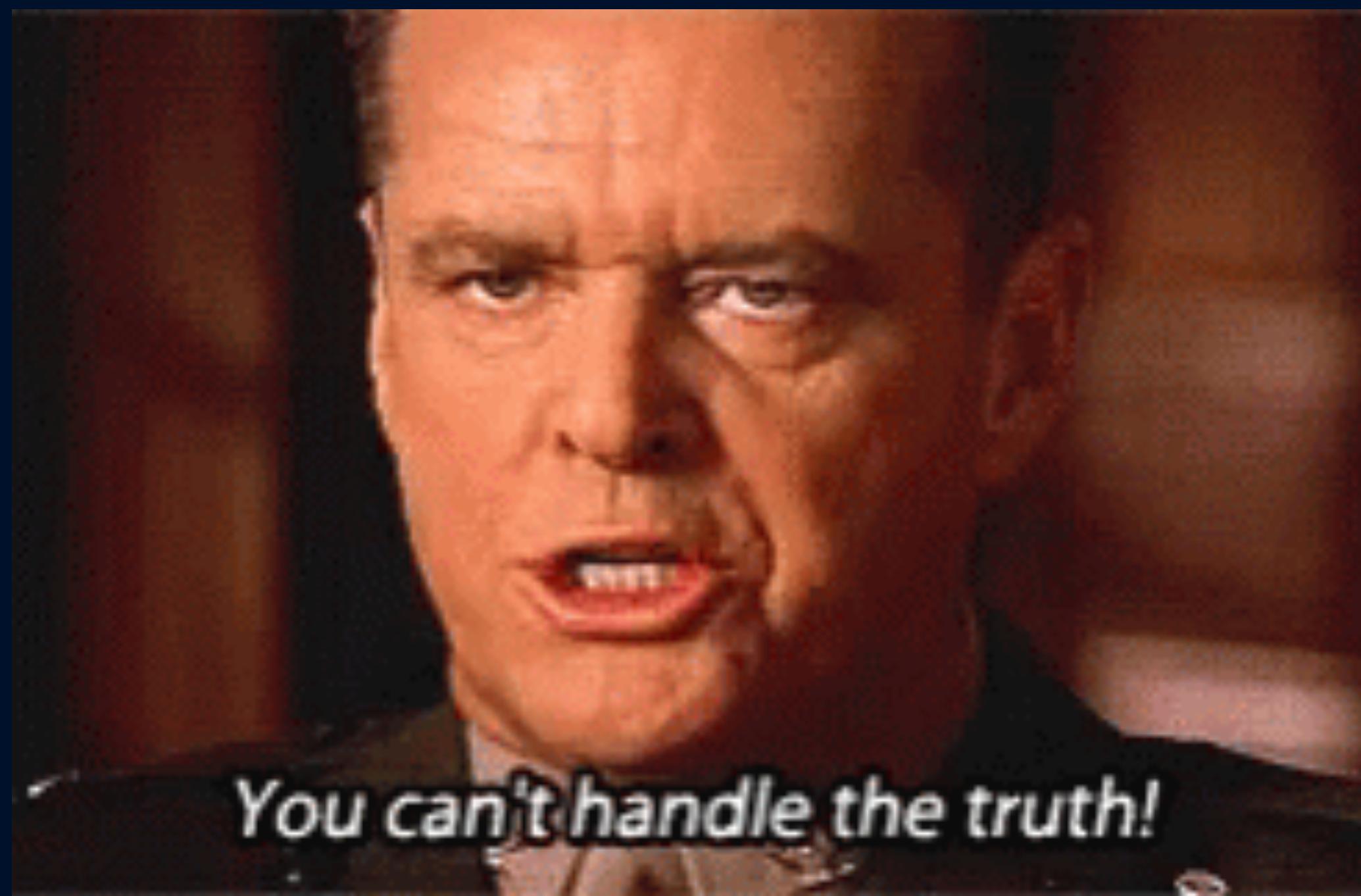
Vacuum, it is
always Vacuum...



ONE DOES NOT SIMPLY

AVOID VACUUM





You can't handle the truth!

Why?

I DON'T
ALWAYS VACUUM,



BUT WHEN I
DO, IT TAKES 3 DAYS

How?

Autovacuum 101

Autovacuum 101



`autovacuum_vacuum_threshold`

`autovacuum_vacuum_scale_factor`

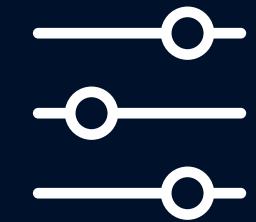
`autovacuum_work_mem` (or `maintenance_work_mem`)

`autovacuum_analyze_threshold`

`autovacuum_analyze_scale_factor`

`autovacuum_max_workers`

`log_autovacuum_min_duration`



Autovacuum

Difficulty Level: HARD

Autovacuum

Difficulty Level: HARD



cost

Autovacuum

Difficulty Level: HARD

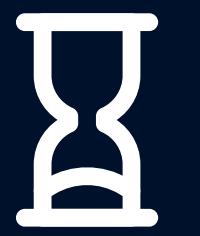
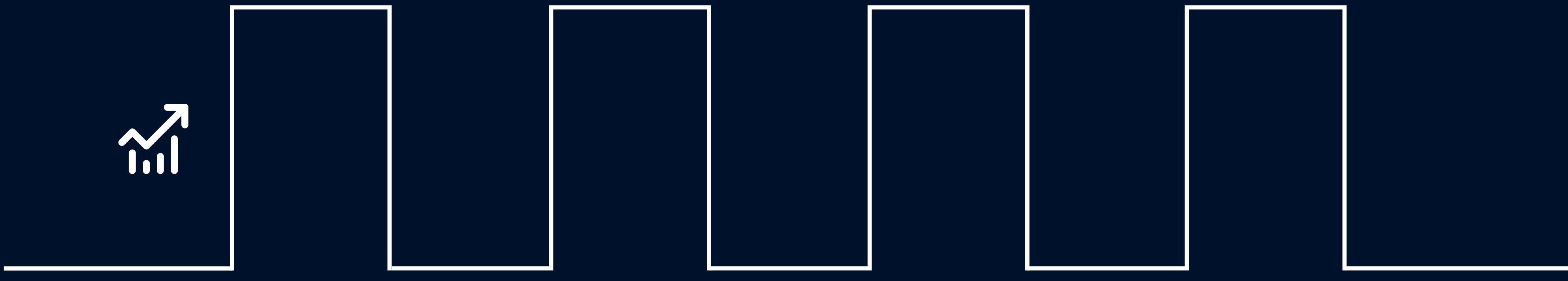


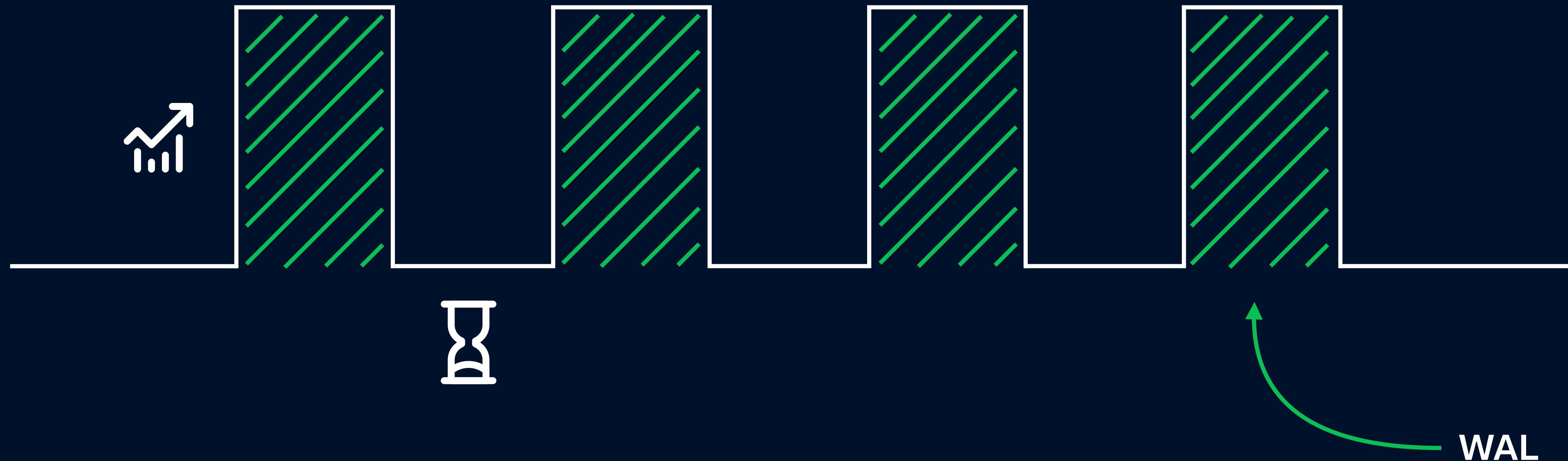
cost

vs



delay

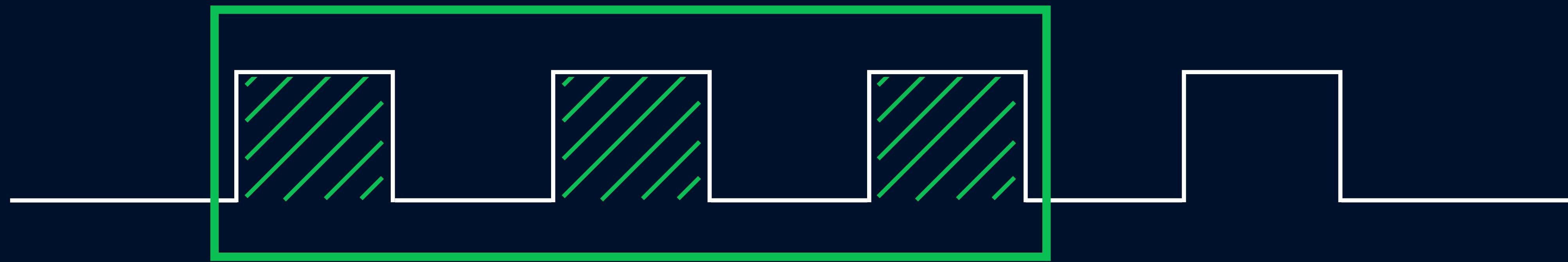


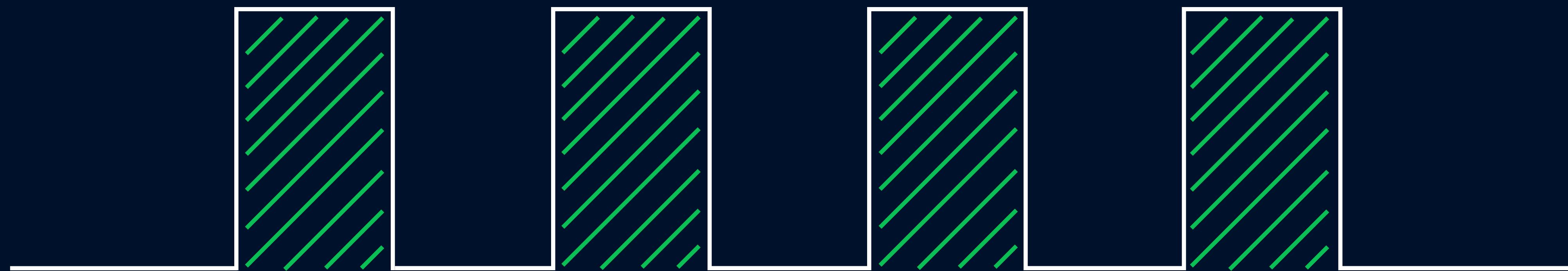
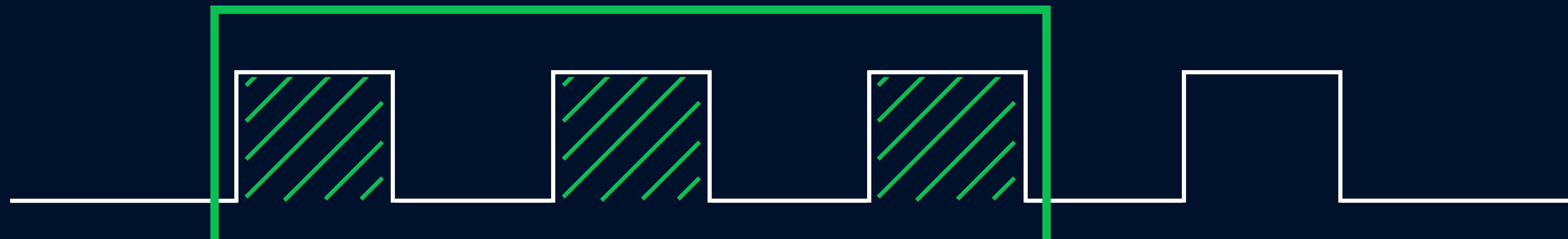


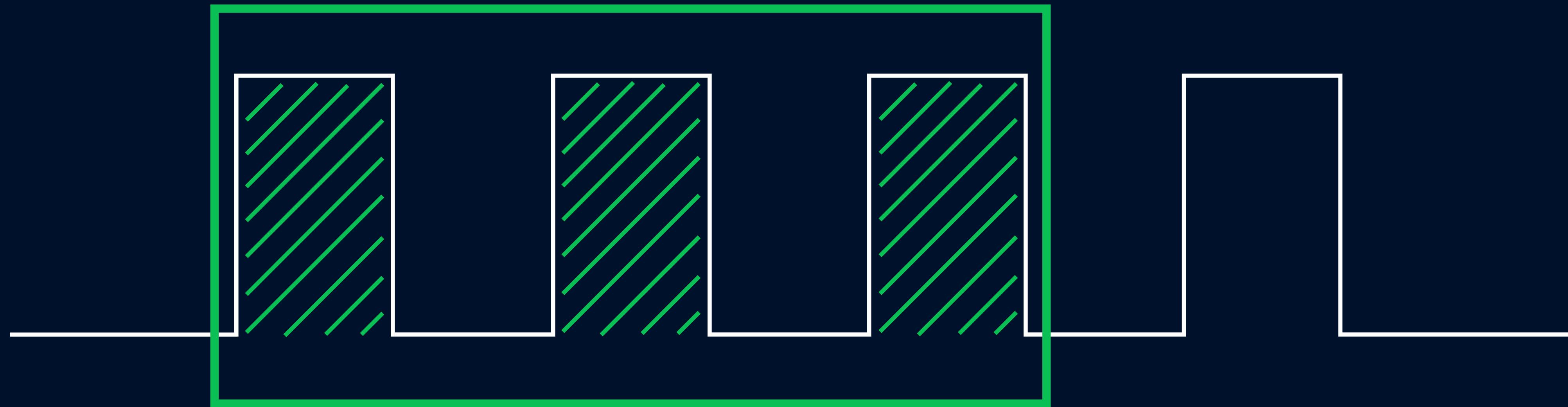
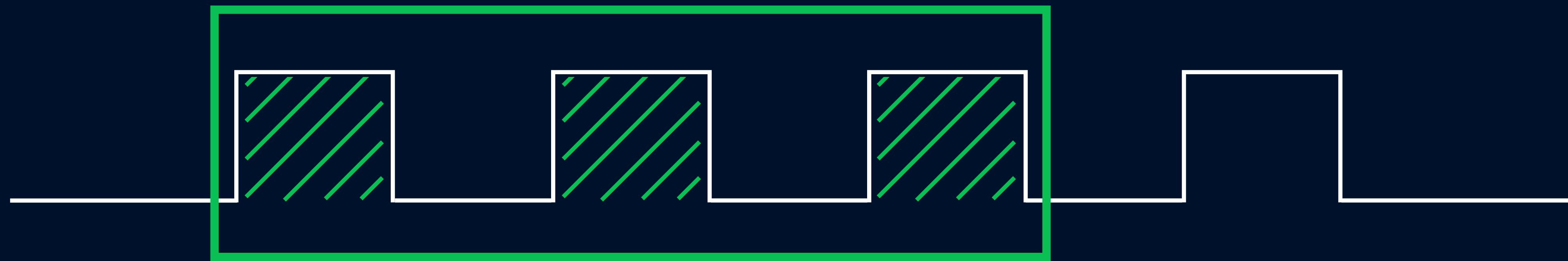






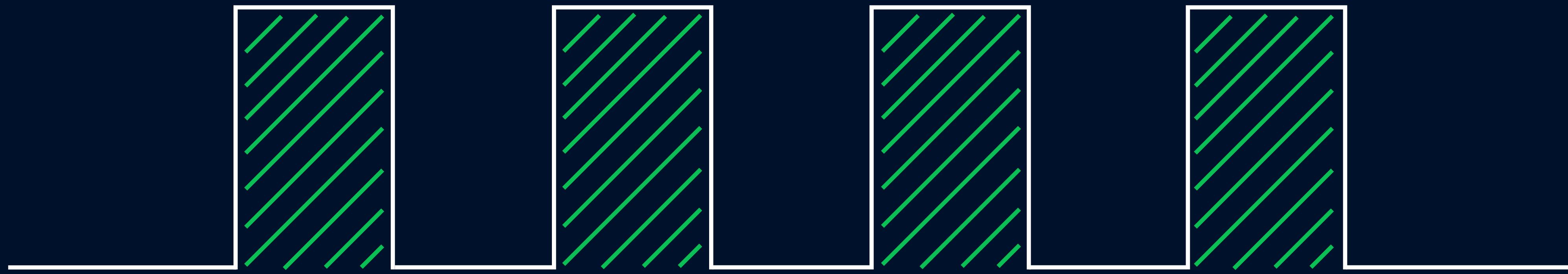


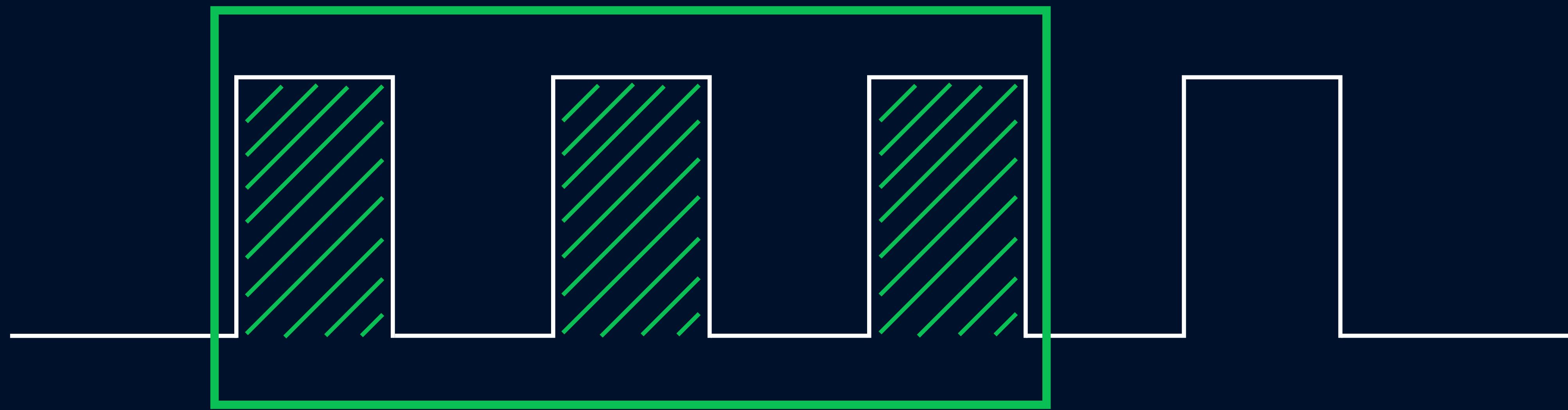


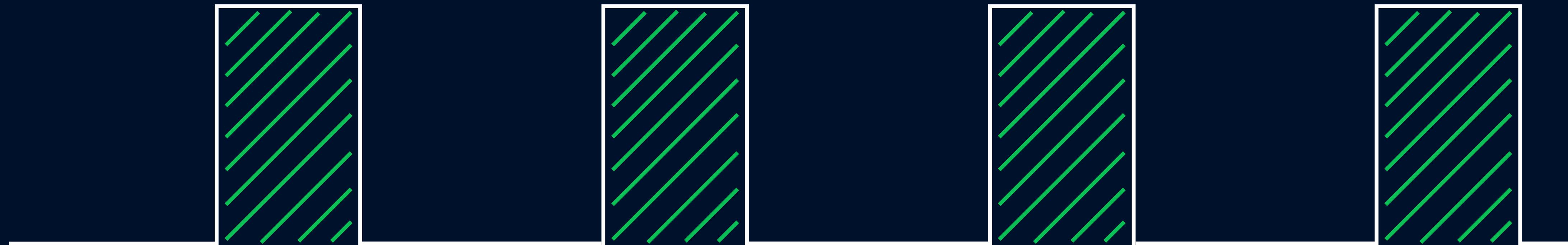
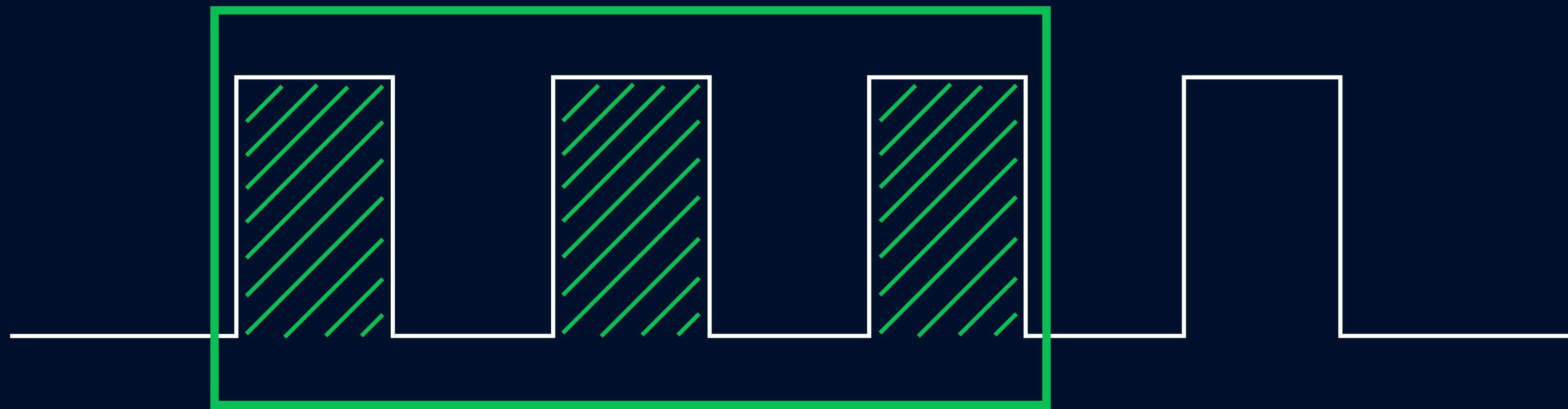


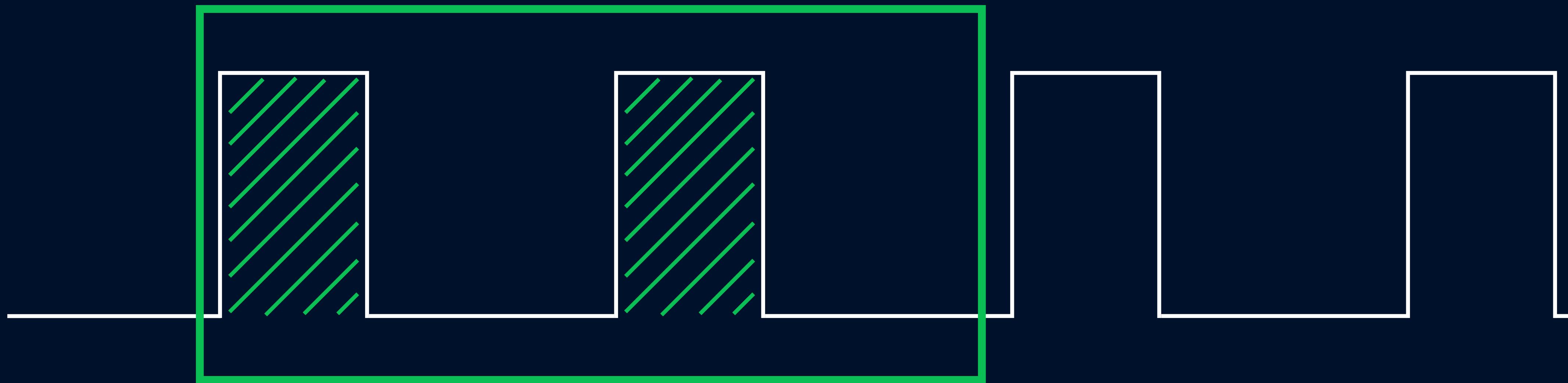
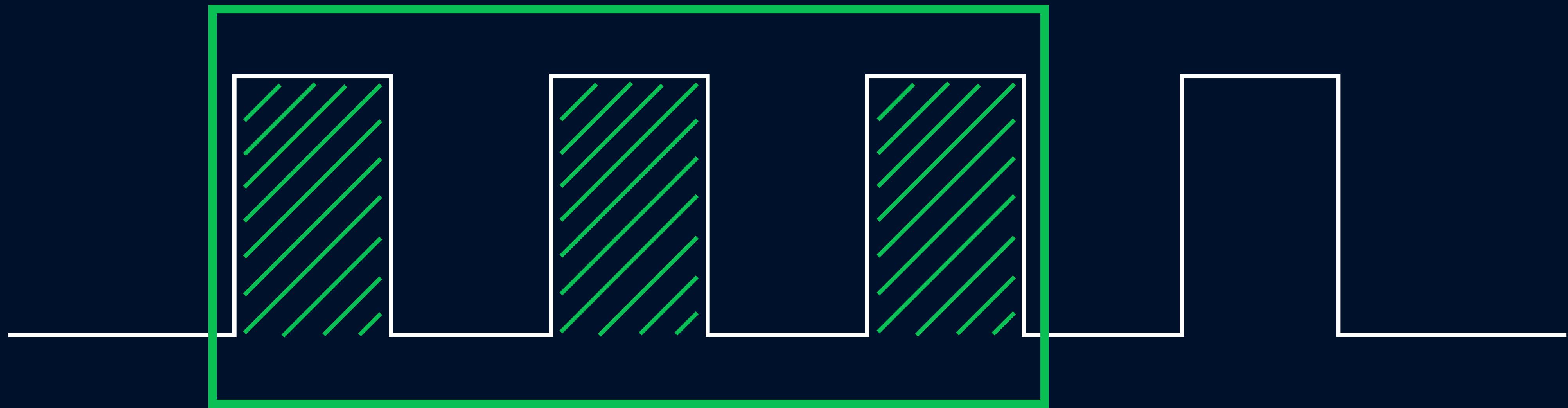












Manual Vacuum

Ruthless!

Manual Vacuum



Manual Vacuum



- Top bloated tables

Manual Vacuum



- Top bloated tables
- Freeze tables

Manual Vacuum



- Top bloated tables
- Freeze tables
- Wraparound

Manual Vacuum



- Top bloated tables
- Freeze tables
- Wraparound
- Top N big tables

Manual Vacuum

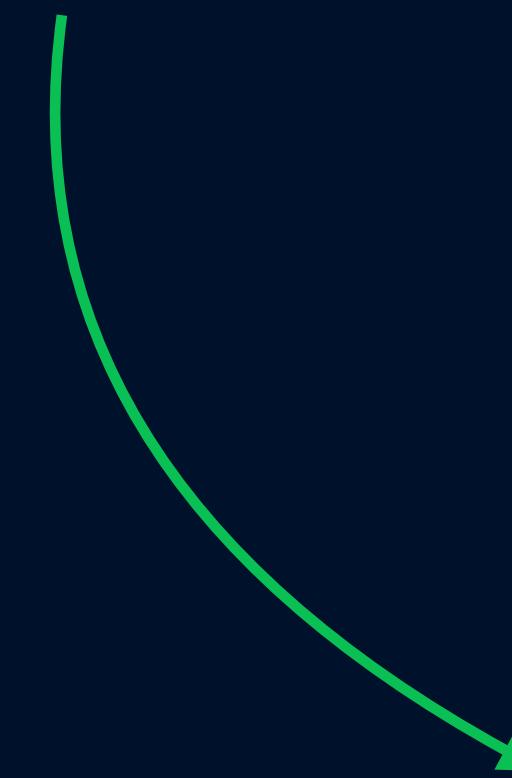


- Top bloated tables
- Freeze tables
- Wraparound
- Top N big tables
- index_cleanup off ⚡

“So, unless you are sure **you know** what you are doing (that is, you are in a wraparound-point emergency), please **pretend** this option [**index_cleanup off**] **doesn’t exist**. Really.”

Christophe Pettus

PostgreSQL v17



"New memory management system for VACUUM...

- **Allow vacuum to more efficiently remove and freeze tuples**
(Melanie Plageman, Heikki Linnakangas)
- **Allow vacuum to more efficiently store tuple references**
(Masahiko Sawada, John Naylor)"

Manual Vacuum



Manual Vacuum

Do not forget the Analyze!



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