How to test a storage system

watch your head not to explode!

Testing a storage system is....

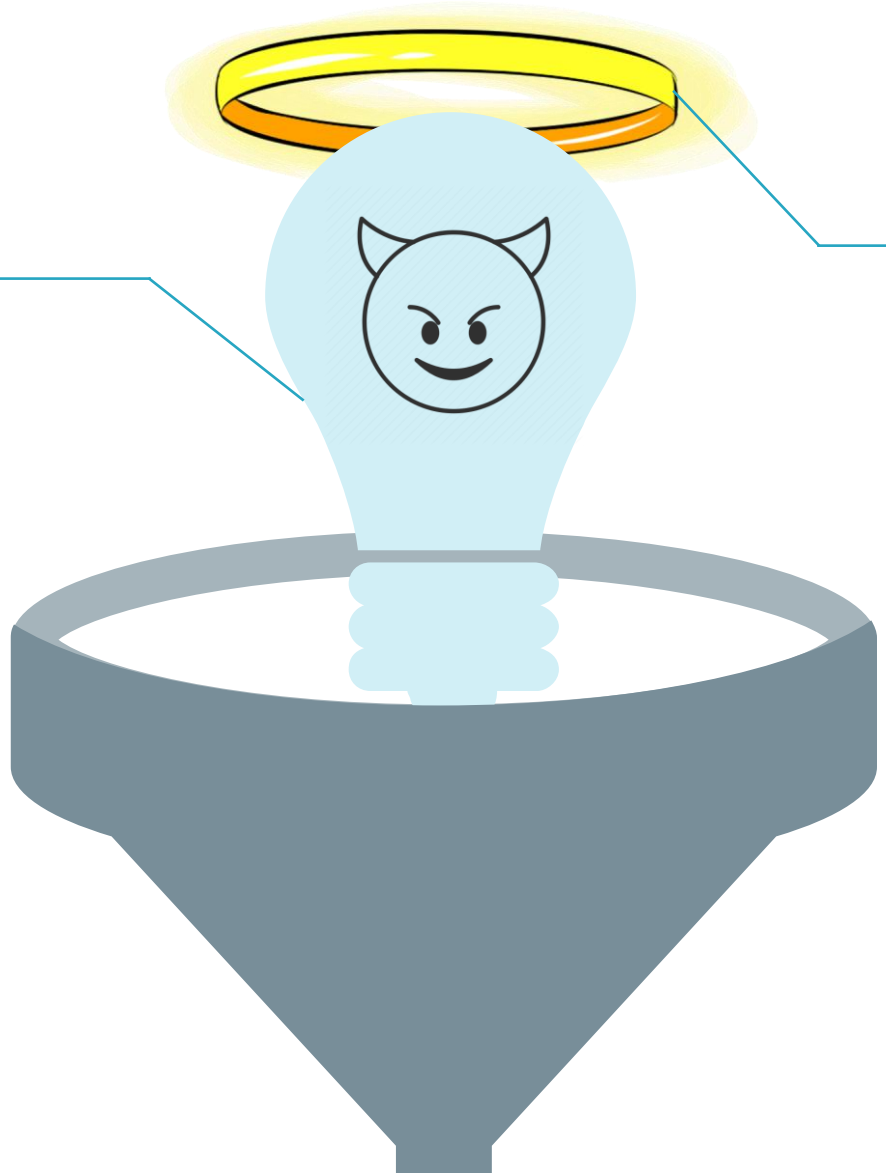
Scary
Storage Testing as something complex and scarry

Cool
Storage Testing is leet.

No idea what it is
Sorry, not mine domain

Testing a storage system is.... Versatile?!

Versatile
Able to adapt or be adapted to many different functions or activities.

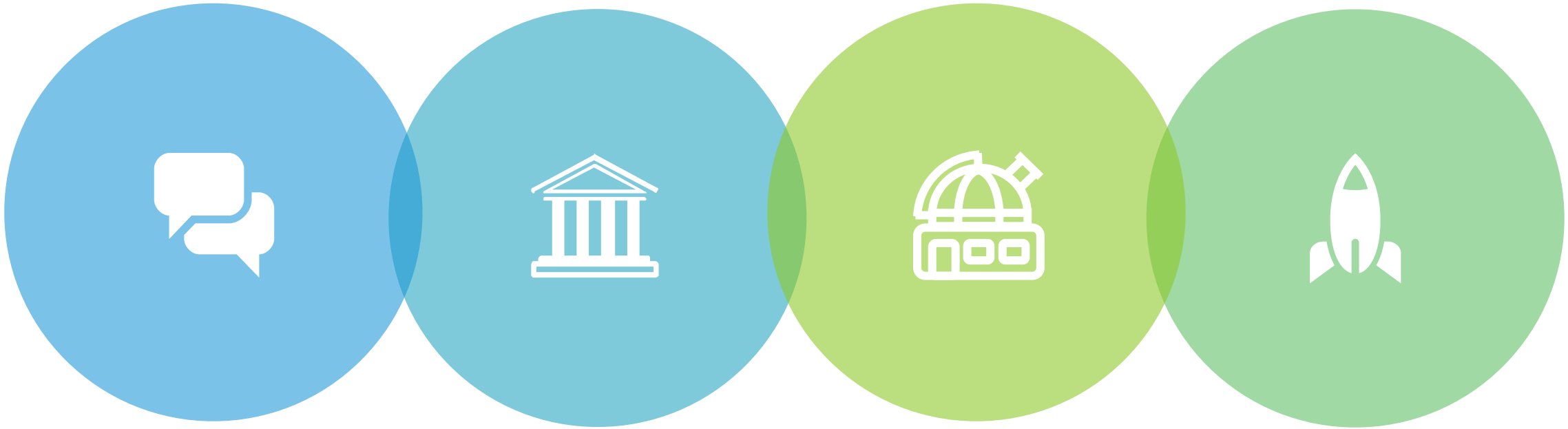


“Know-How”-driven
In fact, all Hi-end, mid-range and >50% cheaper storages include patented solutions

Storage system in a nutshell

file storage
&
synchronization service

Storage Types



+ Hight Performant

- Social Networks
- Streaming Video

+ High reliability

- Banks

+ Fault tolerance

- Observatory

+ Hyper-converged

- Any business right now

“Generic” storage system features

Store & retrieve data

The main system feature

Cluster features

High Availability,
ability to survive errors

Backup features

Replication

Monitoring

Notifications, alerts,

Storage QA engineer

Vasya Pupkin

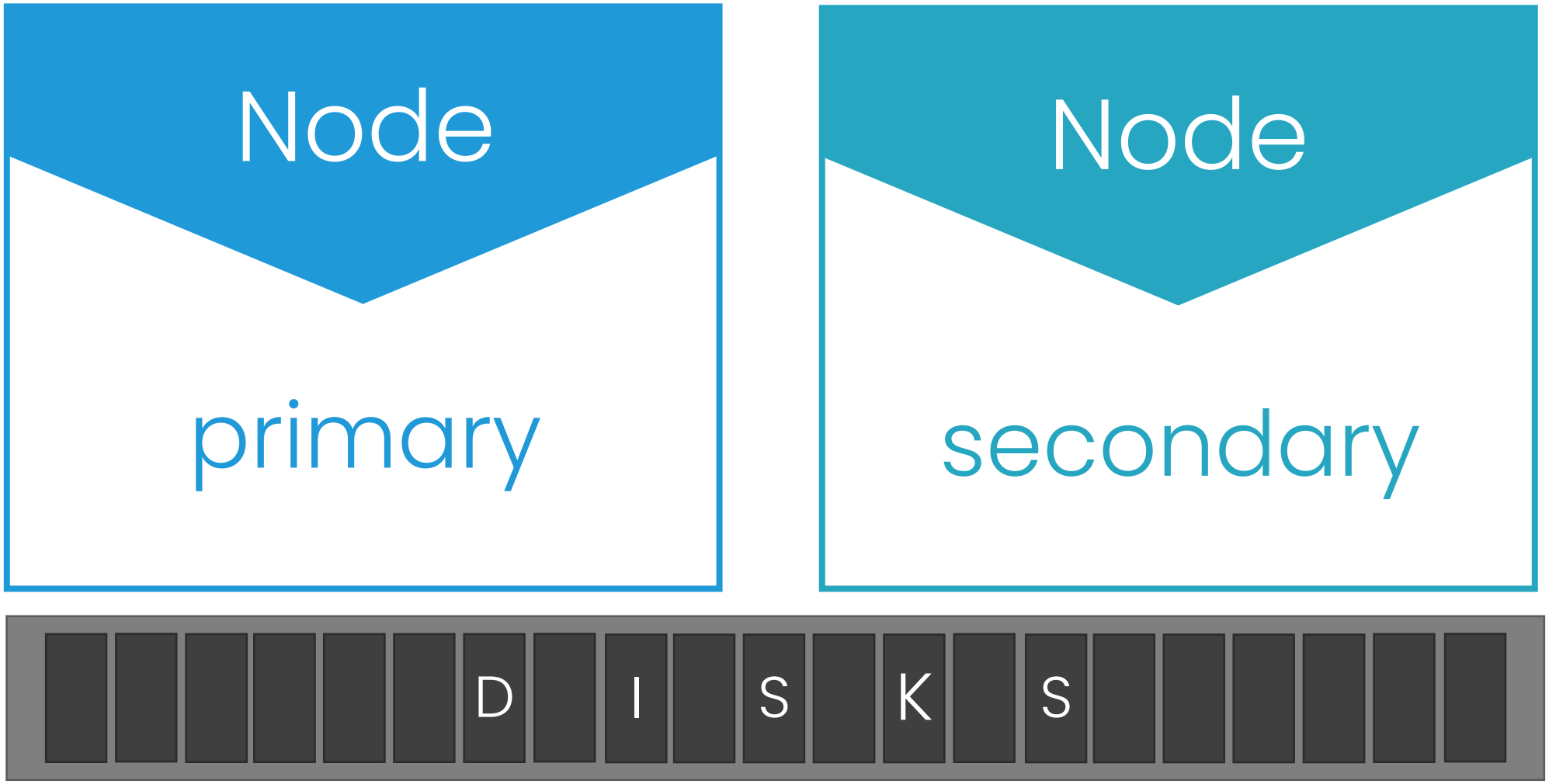
Storage developing company

ALL CHARACTERS AND
EVENTS IN THIS SHOW--
EVEN THOSE BASED ON REAL
PEOPLE--ARE ENTIRELY FICTIONAL.
ALL CELEBRITY VOICES ARE
IMPERSONATED.....POORLY. THE
FOLLOWING PROGRAM CONTAINS
COARSE LANGUAGE AND DUE TO
ITS CONTENT IT SHOULD NOT BE
VIEWED BY ANYONE

Test #1:

"Upgrade is safe, right?"

Storage Cluster



Upgrade

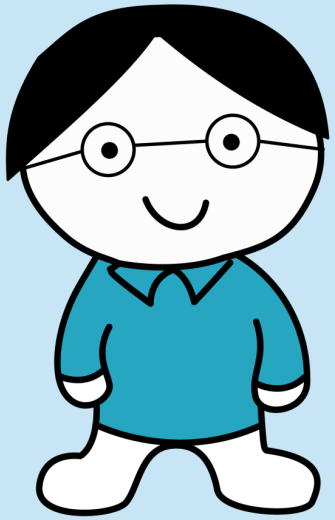
Cold upgrade
Upgrade with stopping cluster and all production processes.

Non disruptive upgrade
Allows you to upgrade without production noticing it

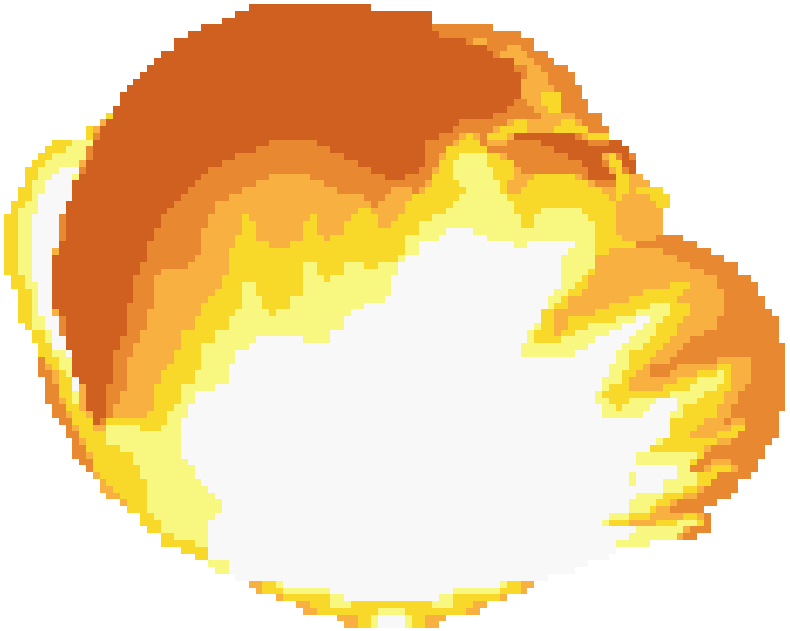
NDU to new version

Expected result: 2 nodes

Cluster version is N+1



Actual result:



Clues:

Data is gone = DU

Sad_cat.jpeg

Web UI is dead

“What means cluster is not operational!?”

Cannot login to Nodes

No more SSH for you

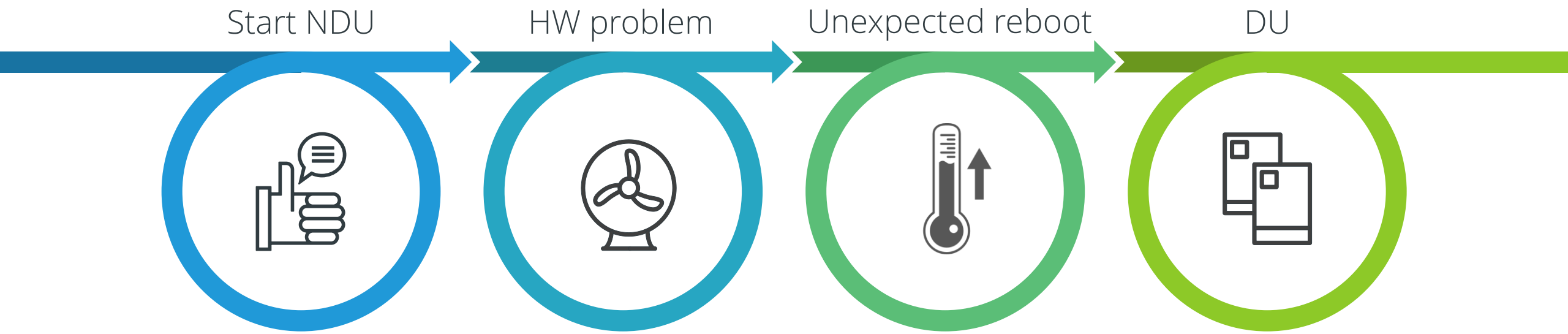
Hypotheses

Stolen by storage gnomes

Physically disconnected

Hardware problem .... Just in a right time

BUG scenario:



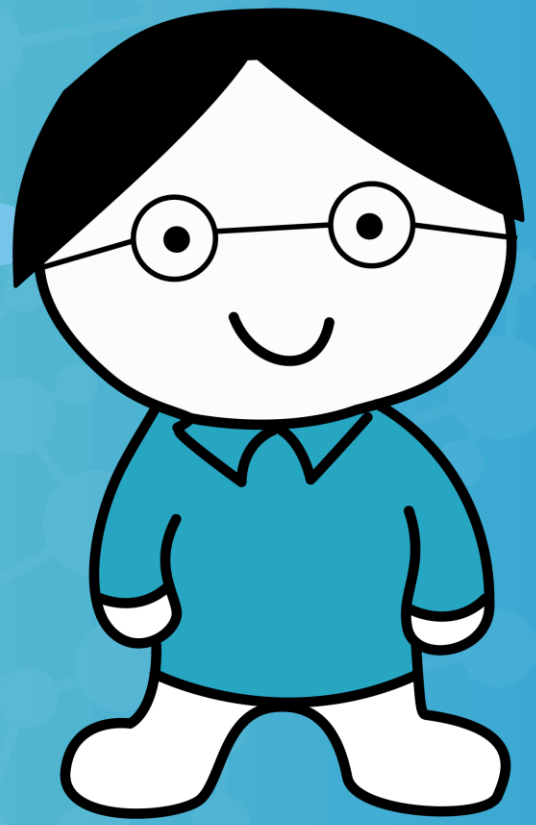
NODE1: ready to reboot
NODE2: on duty

NODE2: FAN1 is broken & goes down

NODE1 ignores it and goes for reboot

0 NODES are avalable

The BUG

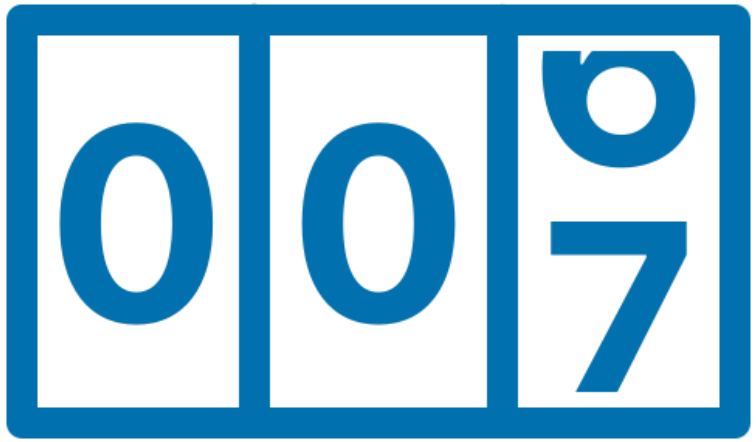


NODE1 decided to reboot despite it was the last available cluster node

Test #2:

"Statistics? There is never enough!"

What are counters and events



Counters
increment if something happened
(counter += 1)

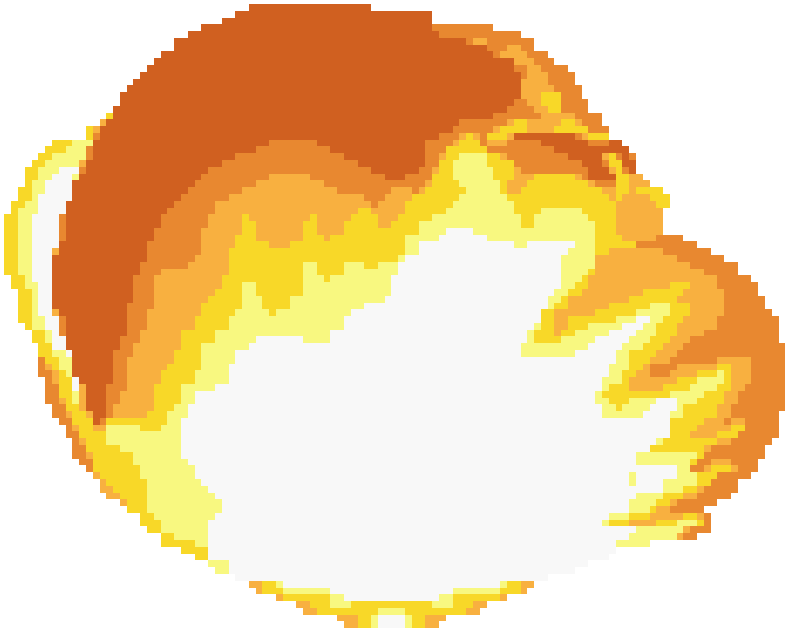
Events
rise if something happened
(if counter == X)

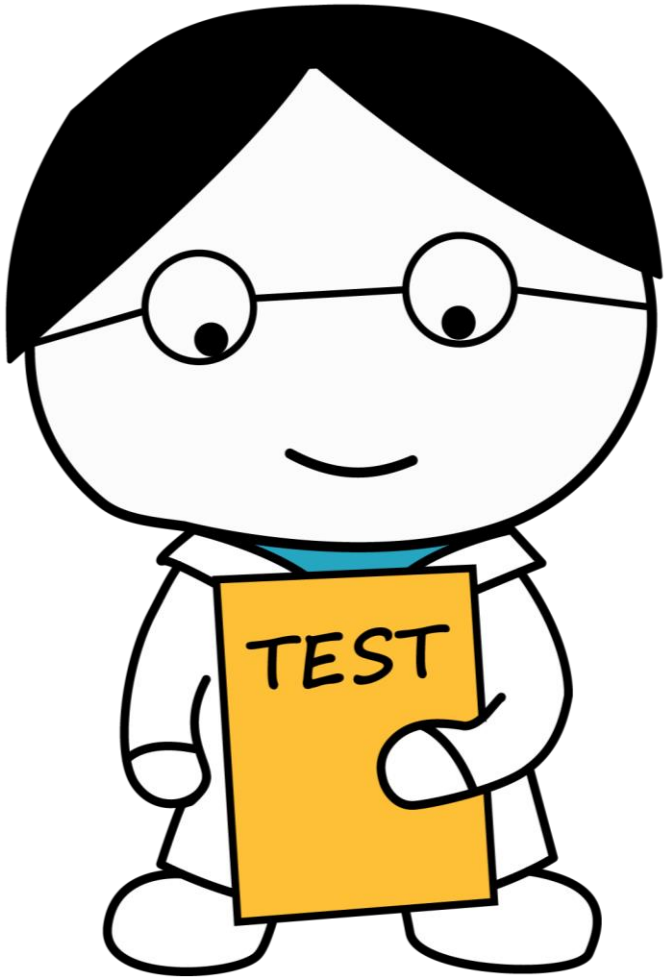
Dump ALL stats every 1 sec by REST

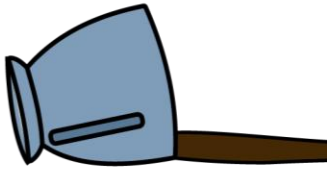
Expect result: tasty stats are collected, and all is fine

VASYA M.D.

Actual result:







Clues:

Reads OK, Writes NO

Not so bad, this is not a DU, but 1\2 of main funcs are not working

MailBox is burning

100500 email notifications say "no more storage left in the system"

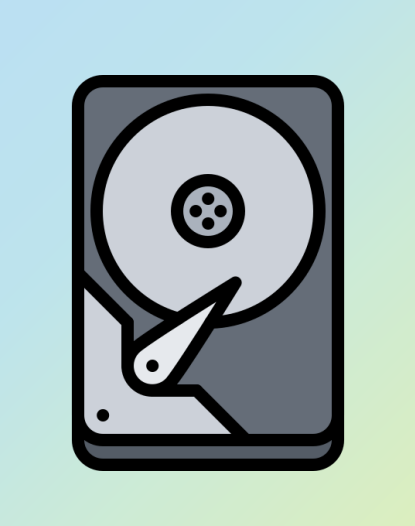
No more storage

3GB of 1000TB are used by UD

Where are 997TB?

Hypotheses

Stollen by storage gnomes



All Drives are empty

Disks are used by the system itself

The Cascade


This makes counters in RestAPI dumps grow faster
Each x sec RestAPI dumps are stored in DB
System alerts notications & counters related to this
no more space left
DB becomes larger and larger
Total UD avalible capacity goes down
DB is stored on the same drives as UD

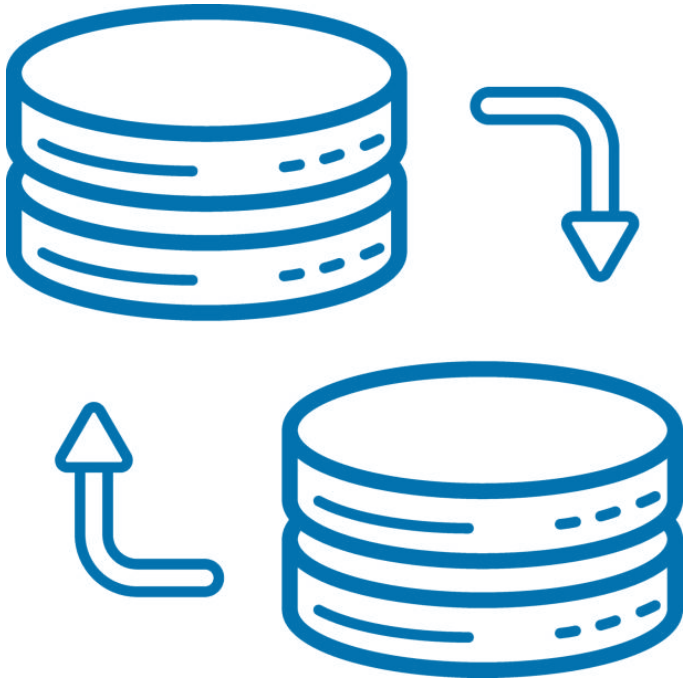
The BUG

The MAX quantity of simultaneously kept REST-requested stats dumps is not limited and may lead to mgmnt DB over growing

Test #3:

"Wanna be safe - do backups!"

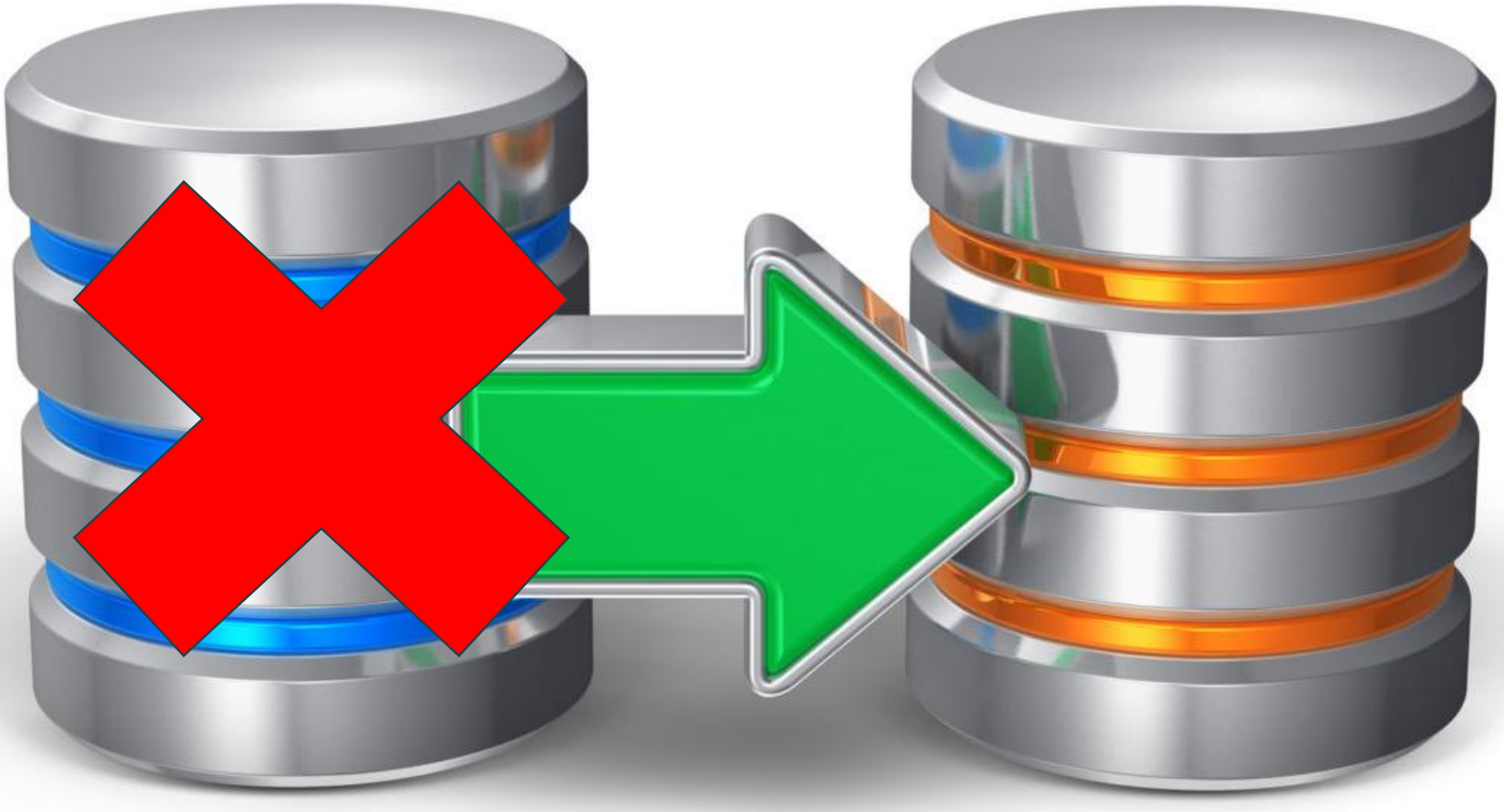
Replication and RPO (in short)



Replication
sync-ed copies of data are distributed between sites

RPO
Recovery Point Objective
(how many info we may lose, measured in min)

Typically made between 2 geographical sites

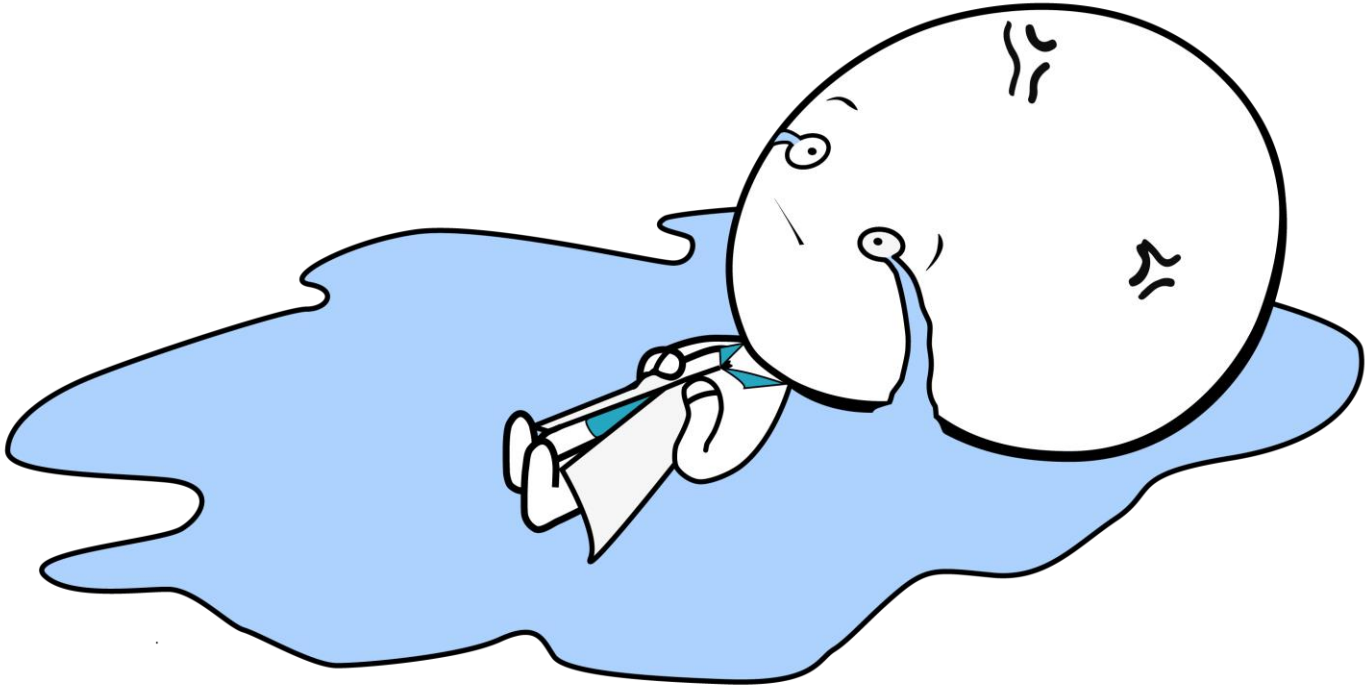


Tokyo --> NY Replication RPO 5 min

Expect result: Storage is secured, RPO completed

PROF. VASYA X

Actual result:



Clues:

Web UI is dead

Again

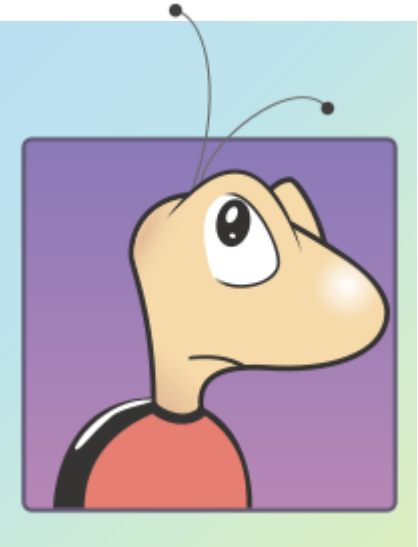
Write\Read is ok

Clients are in Lab A, access the storage by wires

Labs are gone

Tokio and NY Labs don't respond to ping…

Hypotheses

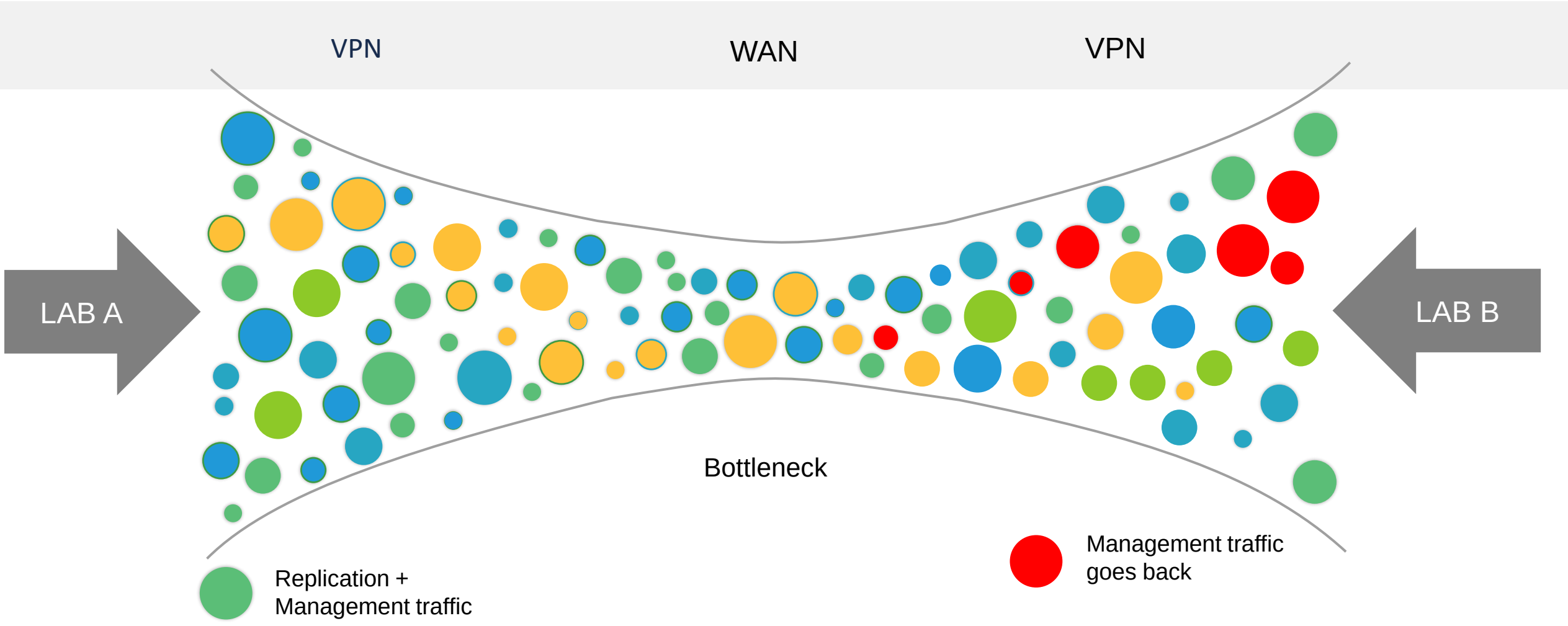


The Bugzilla

The storage gnomes

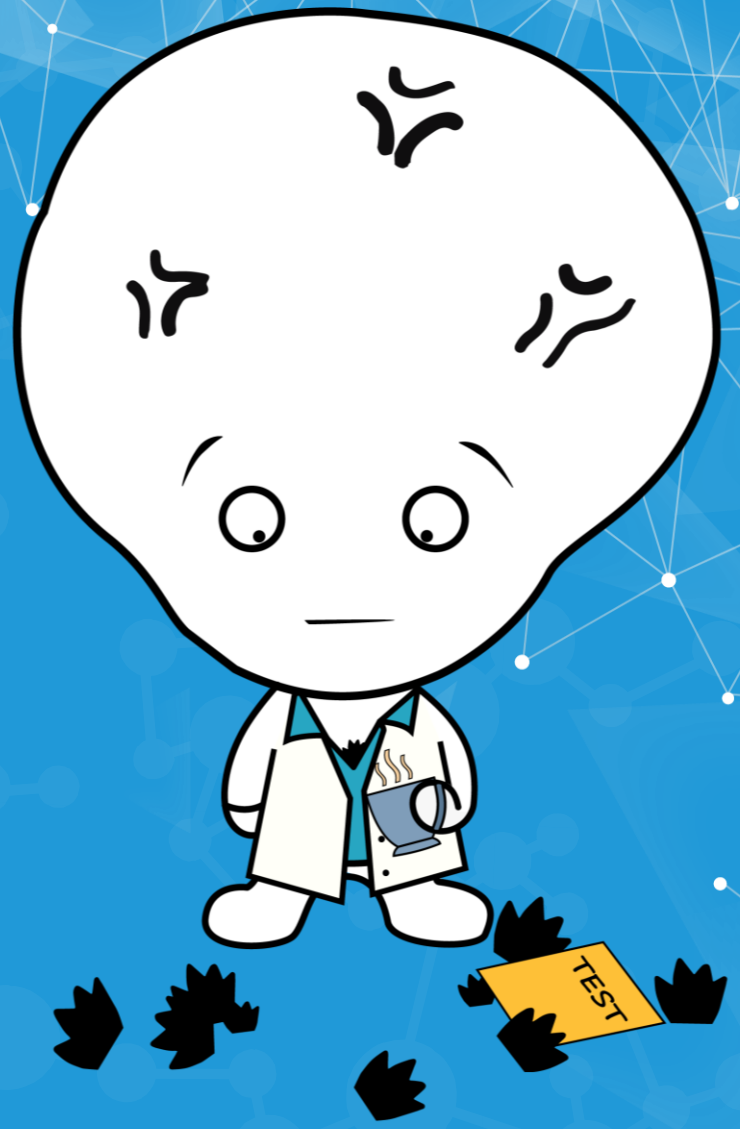
Connection

The overflow



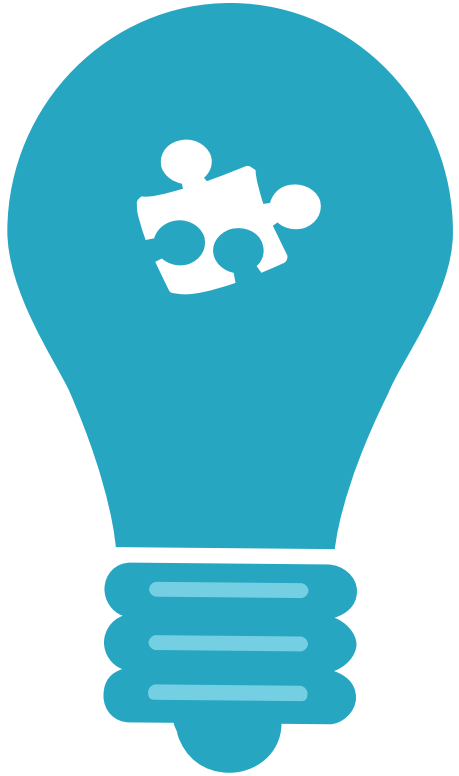
The BUG

Replication has no QoS policies for management & data traffic balancing

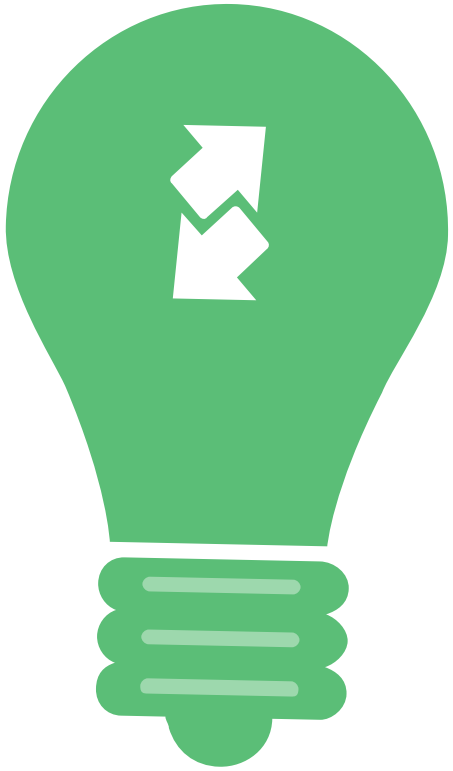


How to test a storage system?

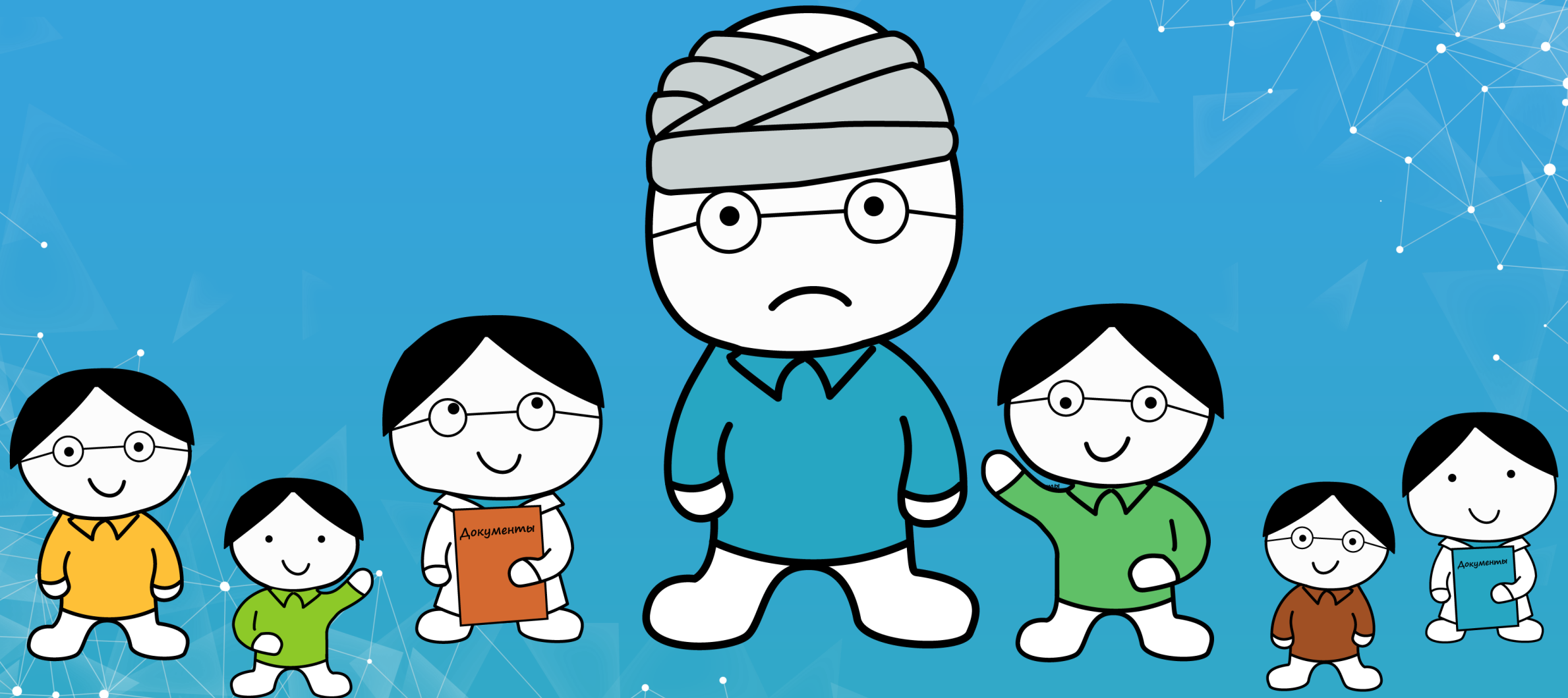
Focus on interesting Knowledge Domains



Be a team player, create own network



Beware of STORAGE GNOMES



Q&A session

Thanks for watching