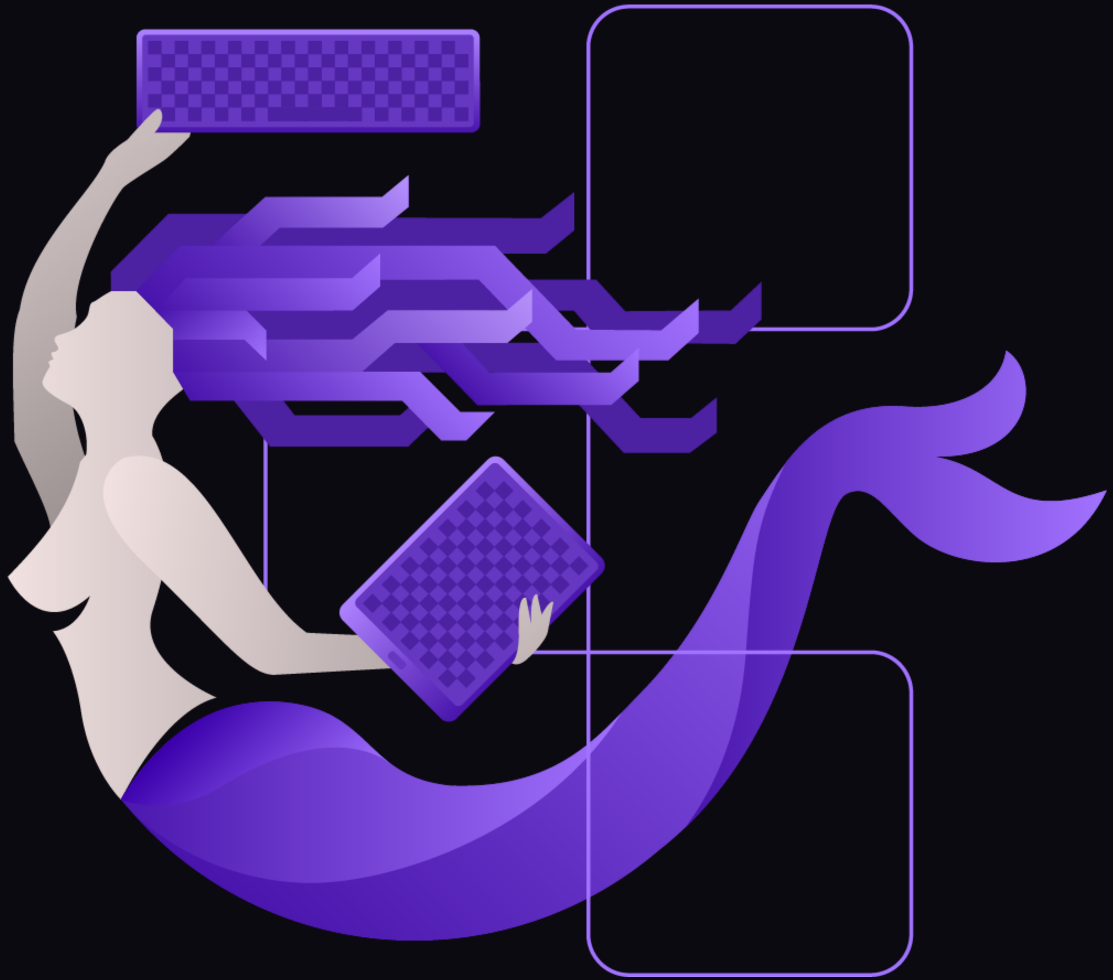
WARSAW
IT DAYS

Distributed Insomnia

When systems must never sleep

Mariusz Krzanowski
Solutions Architect, MR Matrix



MAIN ORGANIZER: AcademicPartners FUNDACJA ORGANIZING COMMITTEE: dozens of organizations from the IT / data science sector (full list on the event website

About Me

- Employed in IT since 0x7CF
  - Developer / Solutions Architect / Team Leader
- Experienced in many technologies
  - .NET, SQL, Azure, Android, Kubernetes, SharePoint, BizTalk, SCCM, Active Directory, Web Development …
- I like to share my knowledge with others
- You can meet me at
  - Warszawska Grupa .NET (WG-NET)
  - Warszawskie Dni Informatyki

Purpose

- To help us in designing reliable systems
  - I see the same design errors repeated nonstop
- To enjoy our live when our system is on production
- To focus on development and release management process
  - Infrastructure is covered in multiple conferences’ talks already

‘Nines’ availability

- Daily downtime
  - 99.00% = 14 minutes 24 seconds
  - 99.90% = 1 minute 26 seconds
  - 99.99 % = 8.6 seconds

- How much we can reserve for our software ?

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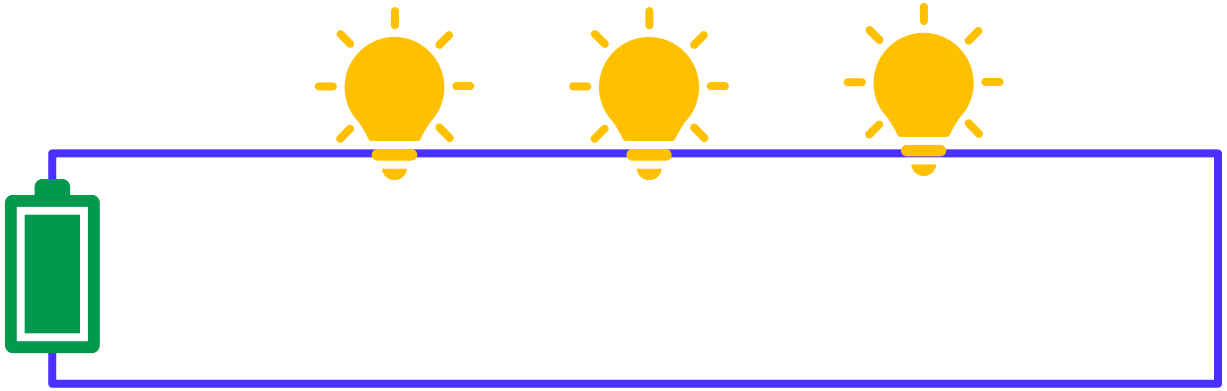
- How much we can reserve for our software ?

0 – ZERO!

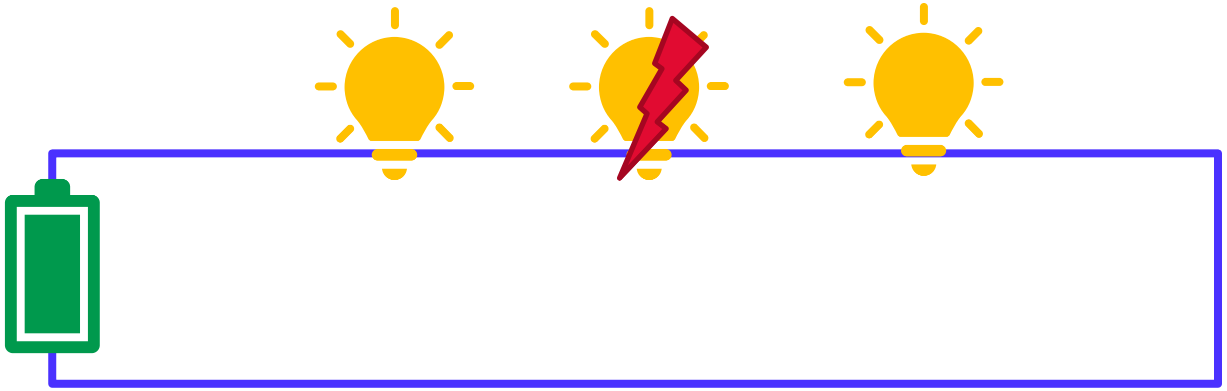
Infrastructure vs Software

Infrastructure failure

Infrastructure vs Software



Infrastructure vs Software



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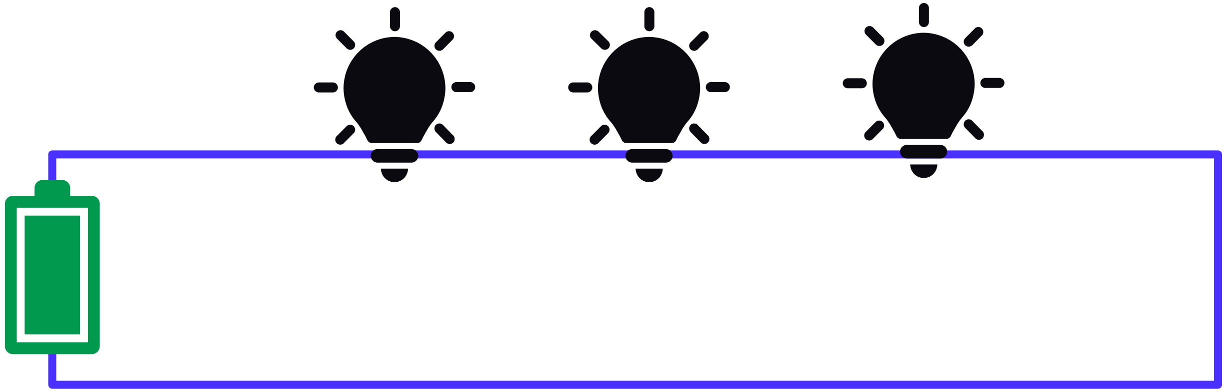

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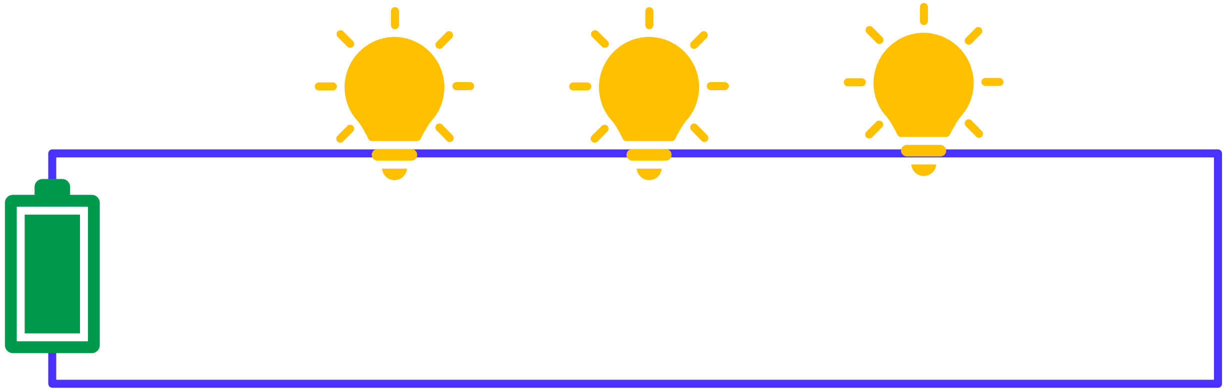

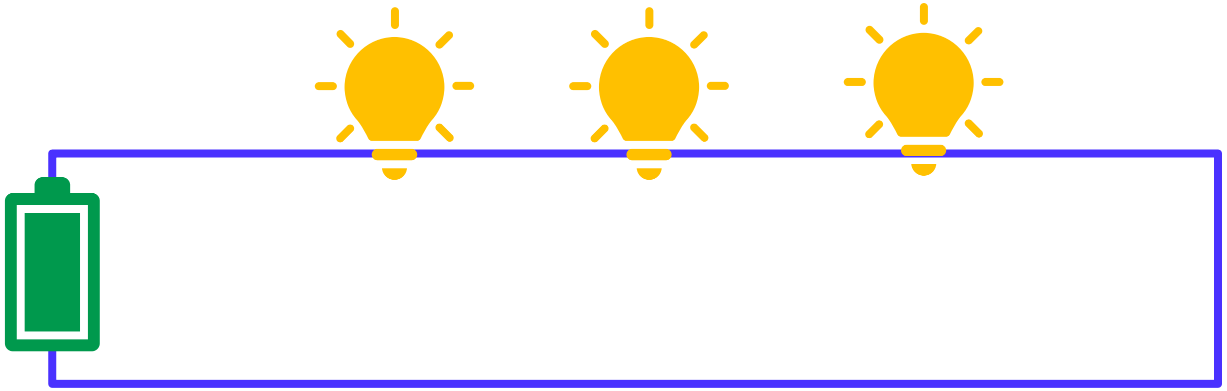

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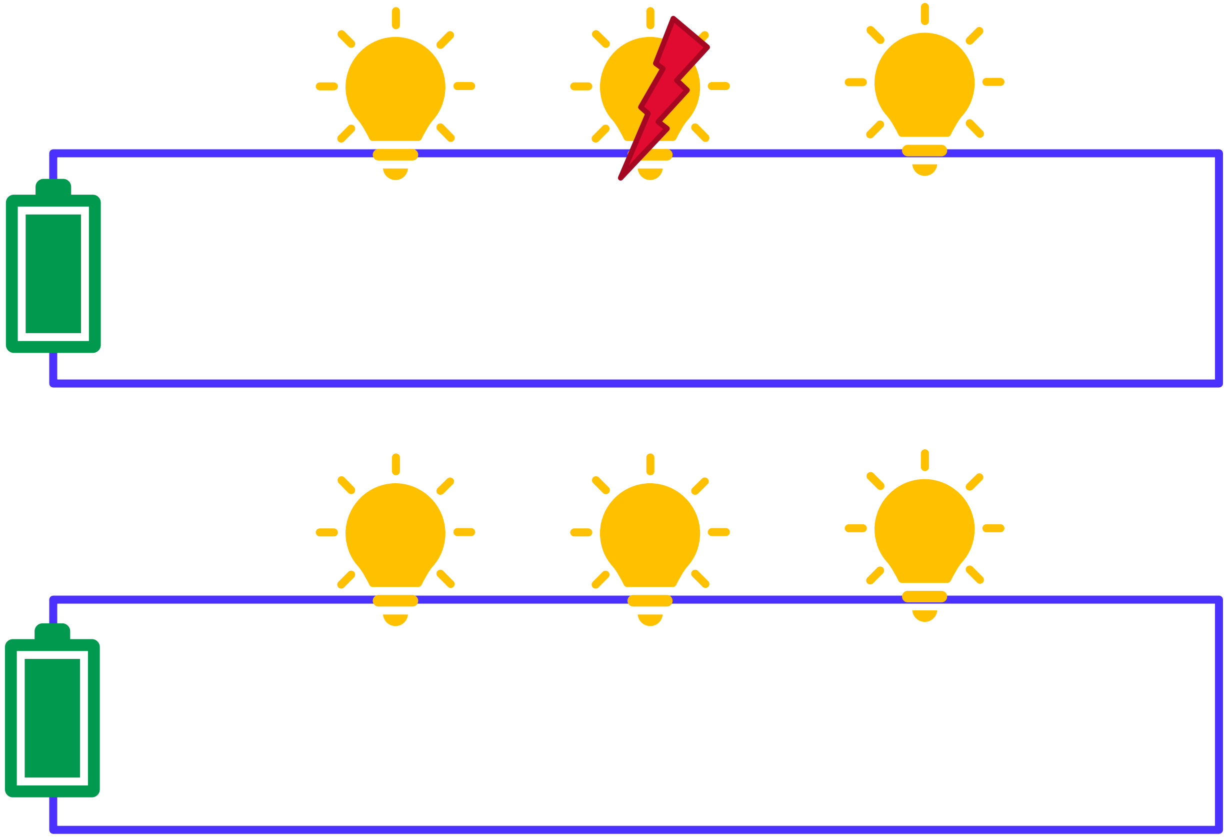

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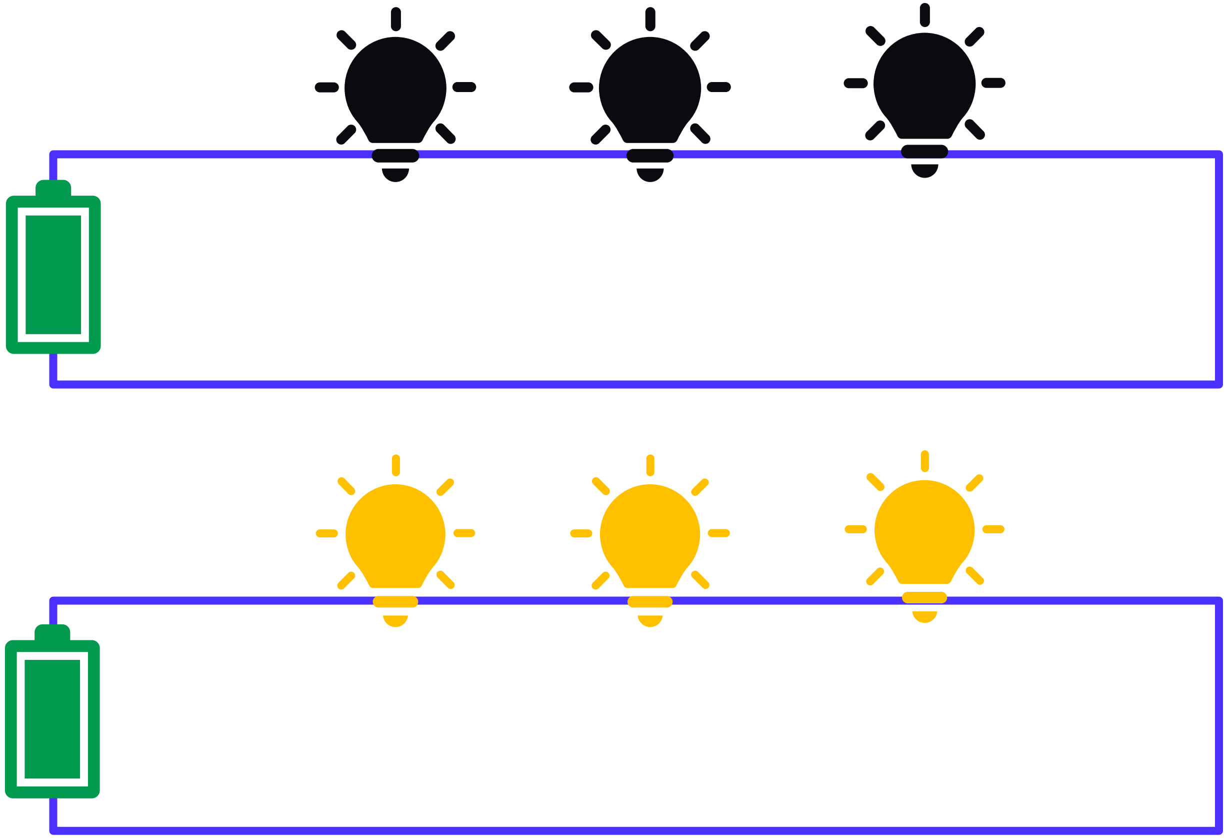


Infrastructure vs Software

Conclusion

- Replicated infrastructure increases resiliency

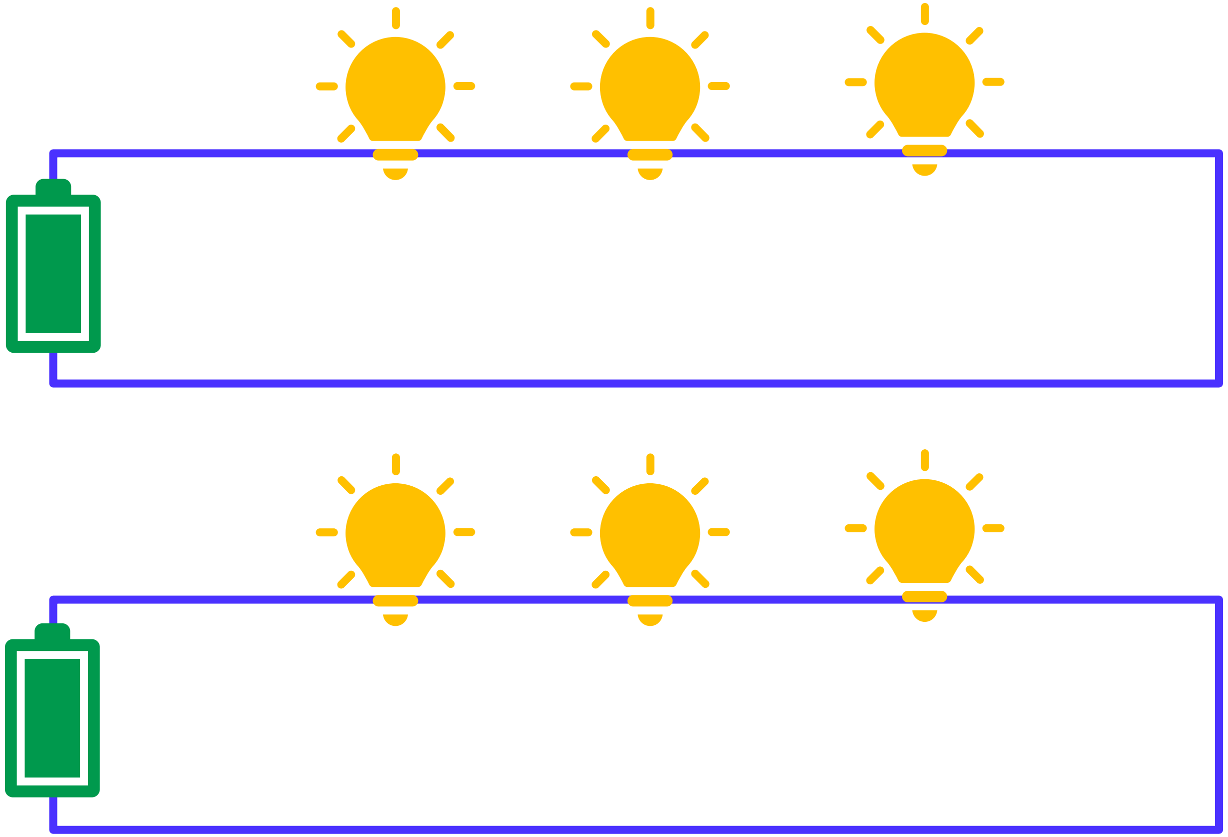
Infrastructure vs Software

Conclusion

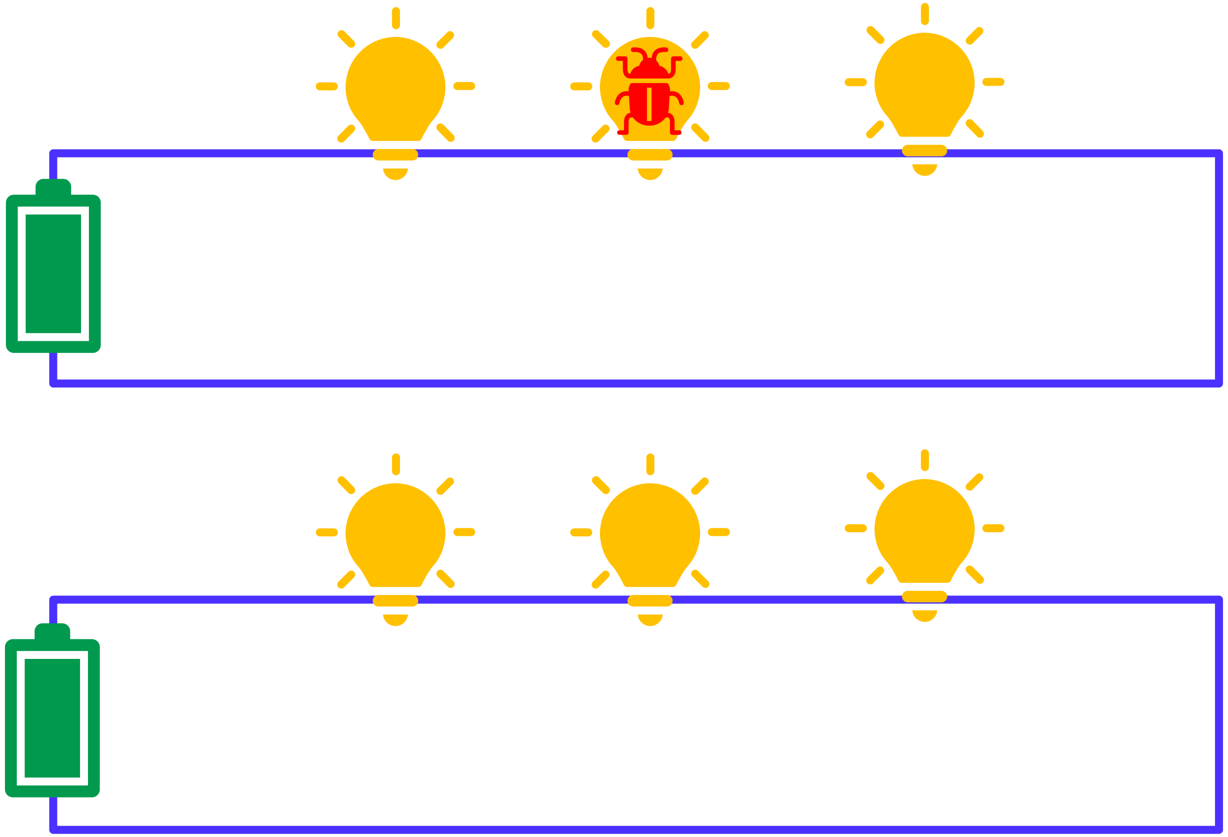
- Replicated infrastructure increases resiliency

What about software?

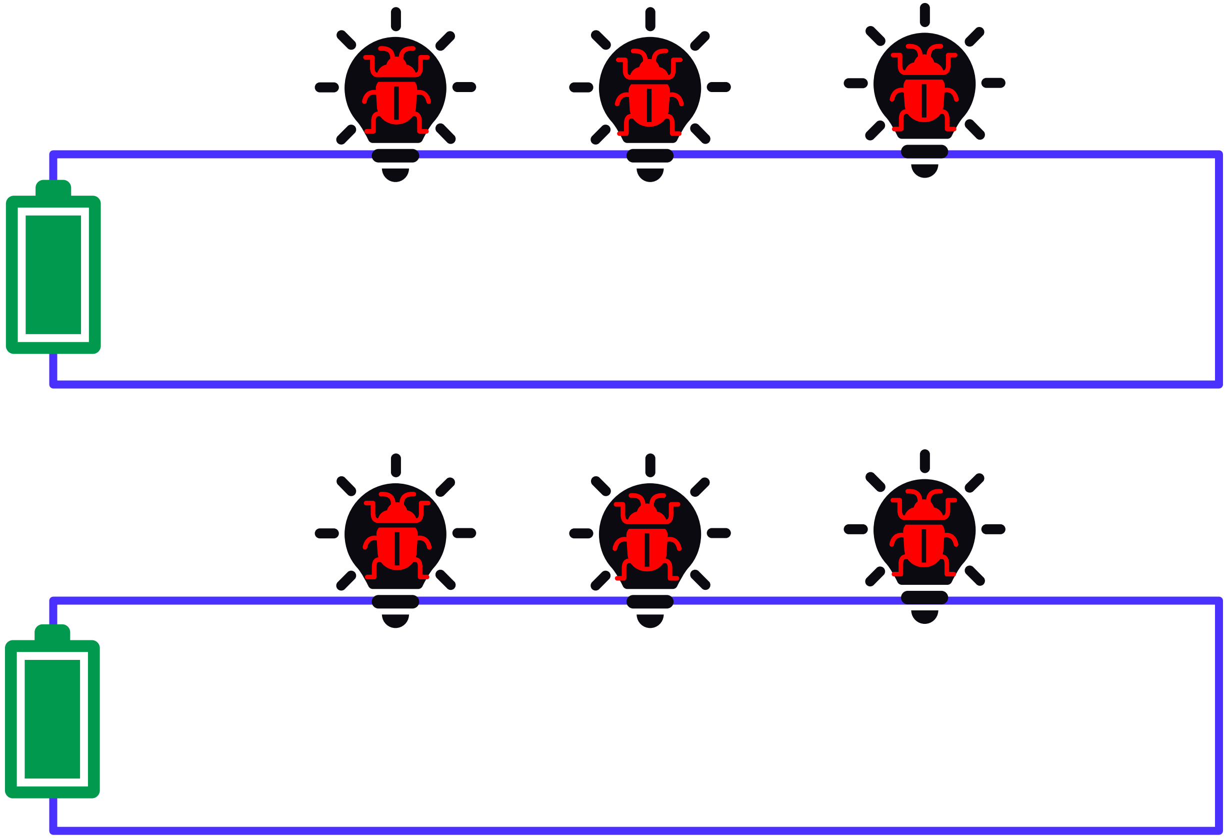
Infrastructure vs Software



Infrastructure vs Software



Infrastructure vs Software



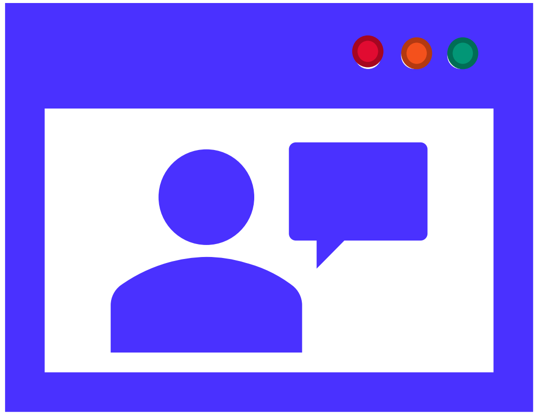
Infrastructure vs Software

Conclusion

- Replicated infrastructure increases resiliency
- Software tests are more critical because broken copy means disaster

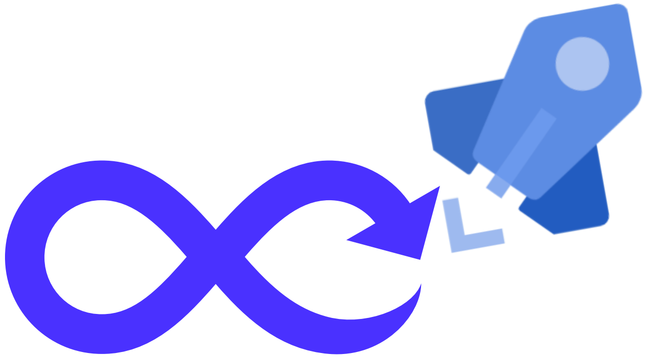
End user does not care

- Reliability must be focused on user facing parts
  - Retries on browser level
  - Predict what user does next
- Background processes can be less reliable
- Business must decide what is critical
  - Creating highly available software is expensive!



Automation

- Continuous integration
- Automated tests
  - Unit tests
  - Integration tests
  - Load tests
  - Canary testing
  - Feature toggles
- Continues delivery
  - Automatic rollback strategy
- Metrics



Redundancy everywhere

- Connection Strings
  - Note that Azure exposes primary and secondary keys
- Datacenters
- Databases
  - Use read replicas
  - Scaling database can disconnect your process
- IP Addresses/DNS (paranoic mode)

Health metrics

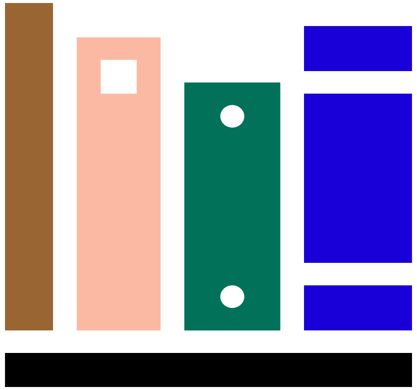
- Is our process available?
    - When we are overloaded report it to supervisor
- Is our process healthy?
    - Our process must report resources inaccessibility

Cache is your friend

- On server
- On CDN (Content Delivery Network)
- On client
  - Zero network downtime to access local cache
  - Less traffic higher availability

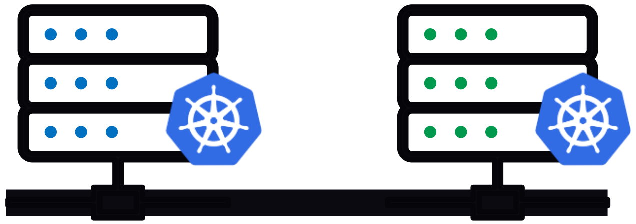
Read models

- Render once – deliver multiple times
  - Many independent replicas
  - Hot and cold storage
- Key values stores are faster than database



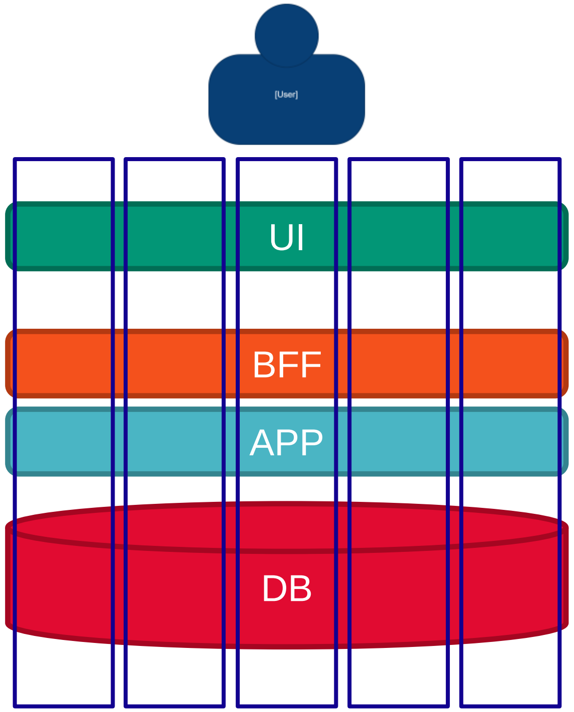
No singletons

- Single HTTP call can be replicated
  - See circuit breakers
  - Idempotency key
- Distributed locks / session's support
  - Only for background jobs
  - Prefer optimistic over pessimistic lock
- Infrastructure blue/green deployment
  - Be aware of single background jobs



New release

- Database migration
- UI → BFF → APP → Database
- Multi-versions



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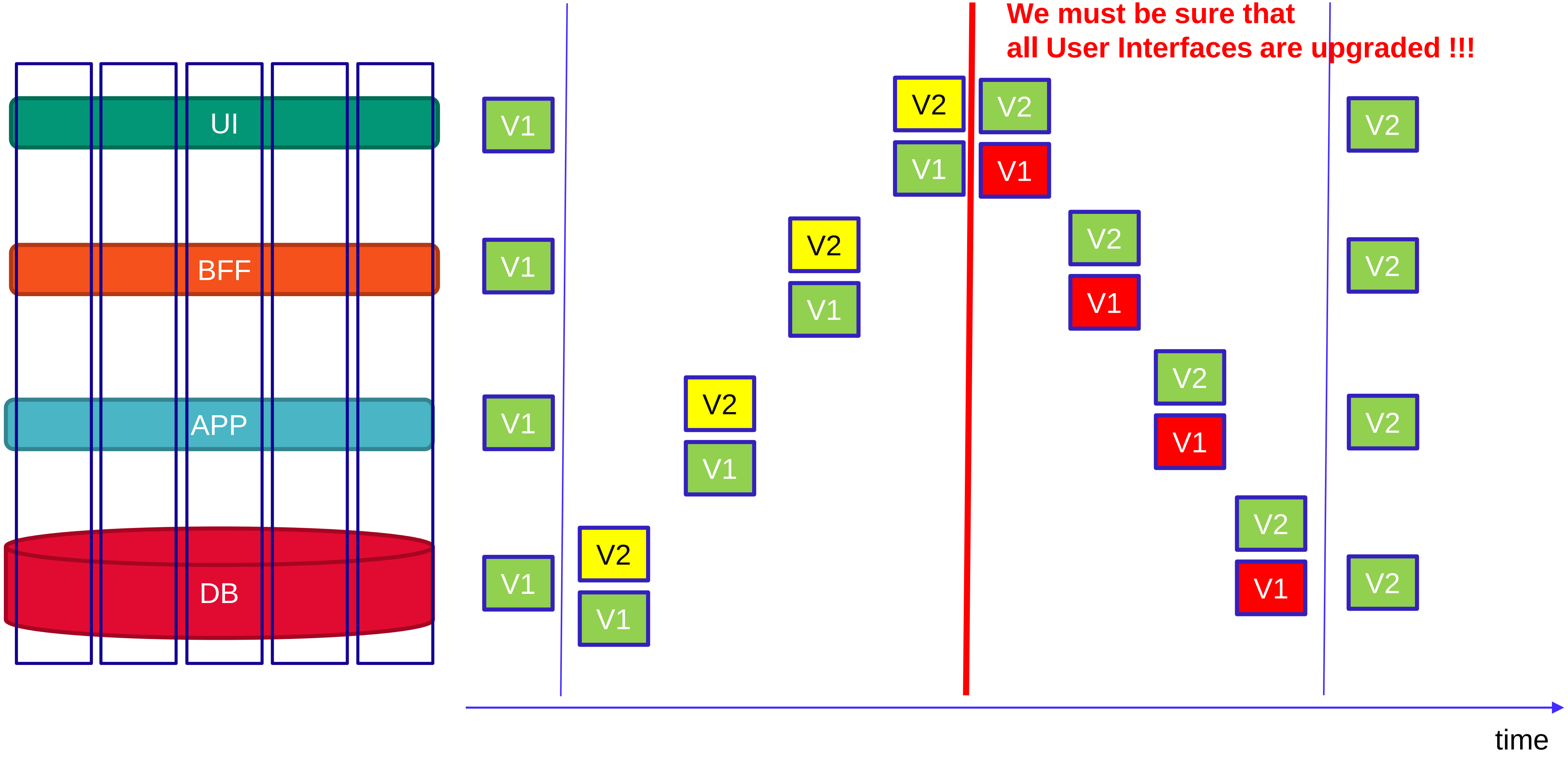

We must be sure that
all User Interfaces are upgraded !!!

Pre and post database migration

BONUS

- Database premigration
  - Prepare database for new version of application
- Application upgrade
- Database post migration ←
  - Remove structure required by older version

Possible problems with infrastructure blue green deployment !!!

Blue green read models

BONUS

- Create new read model structure
- Feed newly created read model with data
- Switch application to new read model when it is in sync

Summary

- Reliable infrastructure does guarantee reliable software
- Testing software is critical
- Automate all you can
- Reliability means coexistence of multiple versions
- Prepare your code for infrastructure update
- Each request can be delivered at leas once
- Focus on customer facing parts

Where can you find me?

- Web
  - https://lastboardingcall.pl
  - https://mrmatrix.net
- GitHub
  - https://github.com/MariuszKrzanowski
- YouTube
  - Mariusz Krzanowski `mrmatrix.net`
- Tweeter
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Mariusz Krzanowski

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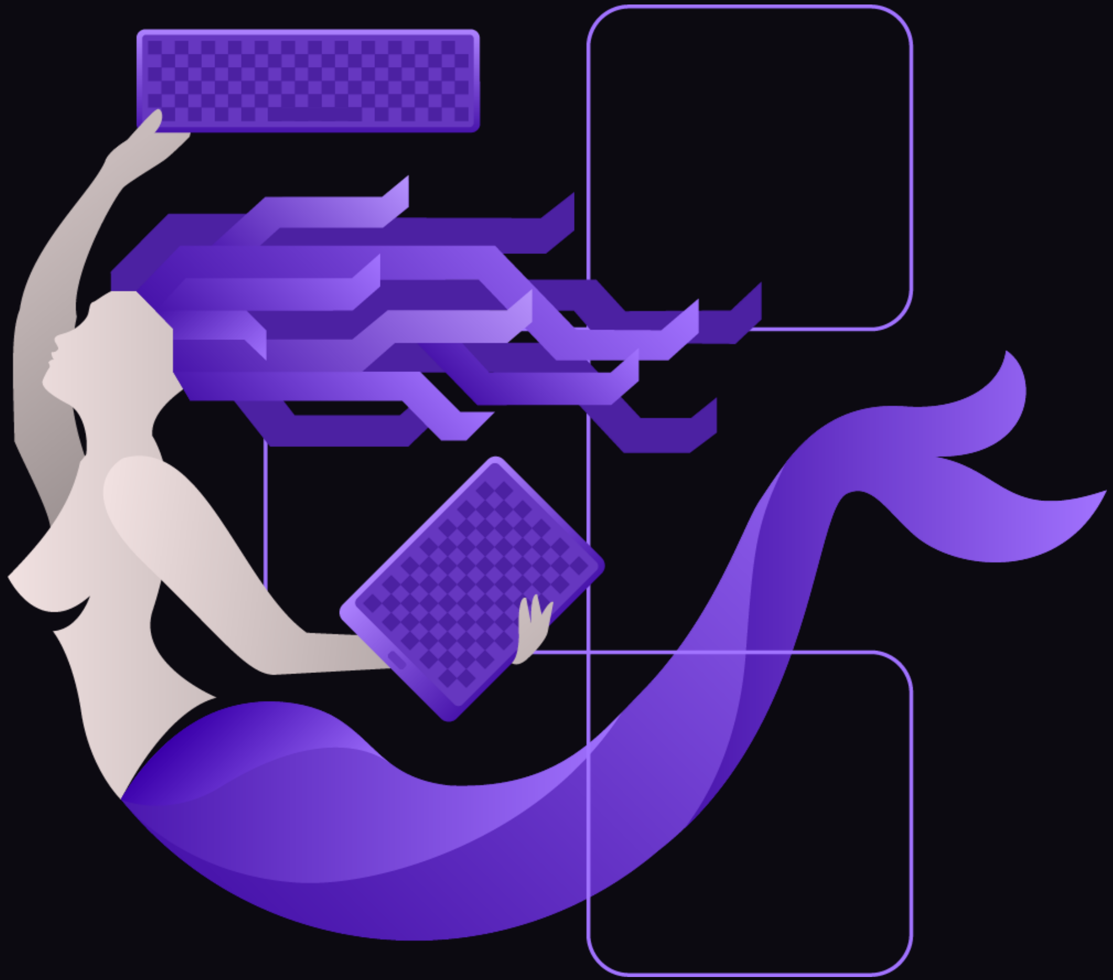

Thank you for watching!

Remember to rate the presentation and leave your questions in the section below.

www.WarszawskieDniInformatyki.pl

31 March - 1 April 2023

Politechnika Warszawska + online

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