



# Kubernetes, Resistance is Futile

Adnan Hodzic | Lead SRE: DAP Public Cloud | [@foctrl](#)

April 2023





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- ★ High level overview
- ★ Talk revolves around my time with MLP
- ★ MLP = Machine Learning Platform



# Setup and premise



do your thing

- ★ ING has 60000 employees
- ★ 18000 working in Tech
- ★ Offices in 40 countries
- ★ Serving 38 million customers

# Setup and premise



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- ★ ING has 60000 employees
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- ★ Not as easy to deploy workloads to Prod
- ★ Even more complicated for a data scientists
- ★ MLP serves as a model hosting platform



# Setup and premise



do your thing

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- ★ Python + Docker > Docker Compose
- ★ Ansible > Docker Compose > VM's
- ☆ Kubernetes ☹️

## VM setup problems & annoyances

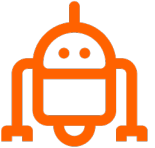
# VM setup problems & annoyances



★ VM patching, risk, security operations taking a lot of our time



★ VM's treated like pets, deployment & development too long and error prone



★ Developed "chameleon", mimicking Prod VM's in a local container



★ Risk on horizon if there was a sudden & exponential growth of MLP



★ Large number of unplanned migrations

**Making K8s migration a possibility**



# Making K8s migration a possibility



★ Containerize everything!



★ The more open source/CNCF software you use, the better



★ Spread the principles of SRE among all team members

☆ Building a football/soccer team, not having a single striker or a goalie

☆ Anyone being able to pick up anything, while sticking to their expertise

# Making K8s migration a possibility



★ Containerize everything!



★ The more open source/CNCF software you use, the better



★ Spread the principles of SRE among all team members



★ Document everything

*"idea is only 5%, the rest of it (95%) is execution"*

# Resistance to the idea & unwelcoming circumstances



★ Team wasn't onboard with move to Kubernetes



★ Research, POC's & demos of MLP v2 as part of ING "mastery days"

☆ MLP v2 on ArgoCD or Helm charts, Kustomize instead of Ansible?



# Resistance to the idea & unwelcoming circumstances



★ Team wasn't onboard with move to Kubernetes



★ Research, POC's & demos of MLP v2 as part of ING "mastery days"



★ Demonstrate how existing problems can be fixed with K8s



★ Attempt to go to public cloud

# Resistance to the idea & unwelcoming circumstances



- ★ Attempt to go to public cloud on GKE (Google Kubernetes Engine)
  - ☆ ICHP (ING Container Hosting Platform) as a destination target?
  - ☆ Move to the cloud, MLP GKE POC

# Resistance to the idea & unwelcoming circumstances



- ★ Failed attempt to go to public cloud on GKE (Google Kubernetes Engine)
  - ☆ ICHP (ING Container Hosting Platform) as a destination target?
  - ☆ Move to the cloud, MLP GKE POC (success!)
  - ☆ “Schrems 2” law dispute stopped us in our tracks, but things are better now

**Why migrate to Kubernetes?**



# Why migrate to Kubernetes?



★ Eliminate need for patching, other VM maintenance



★ A lot of great out of box features: HPA, cluster autoscaling, service discovery ...



★ No need to spend time creating your own tooling, like service discovery

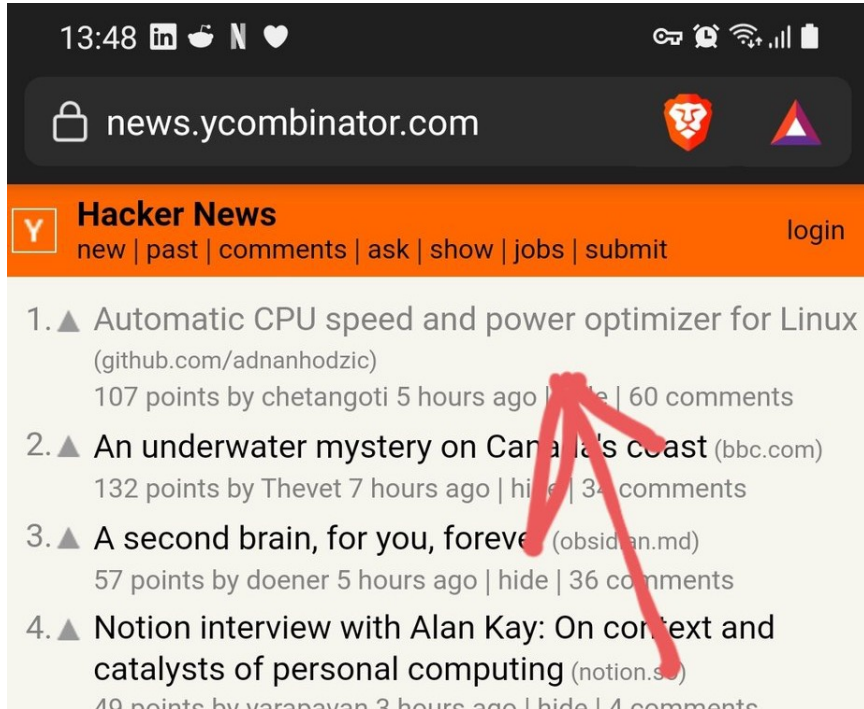


★ Fits ING's ambition to go green



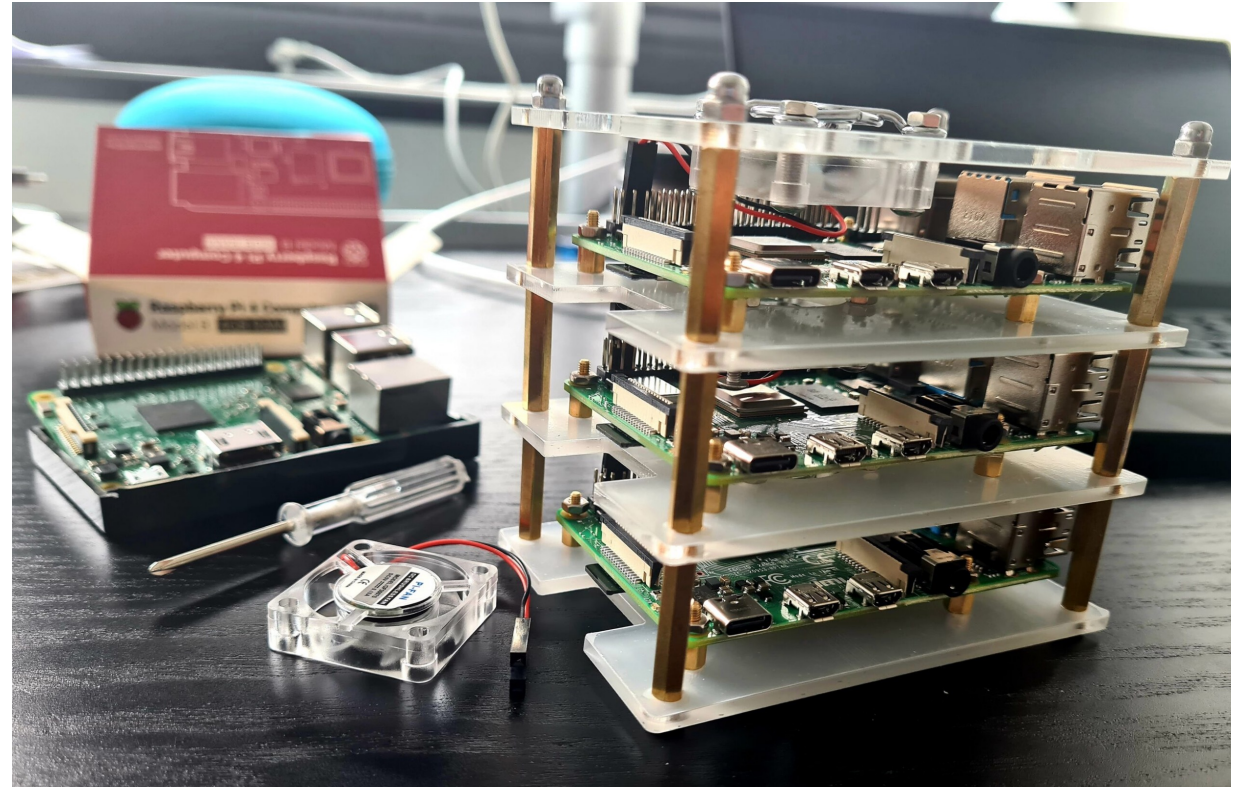
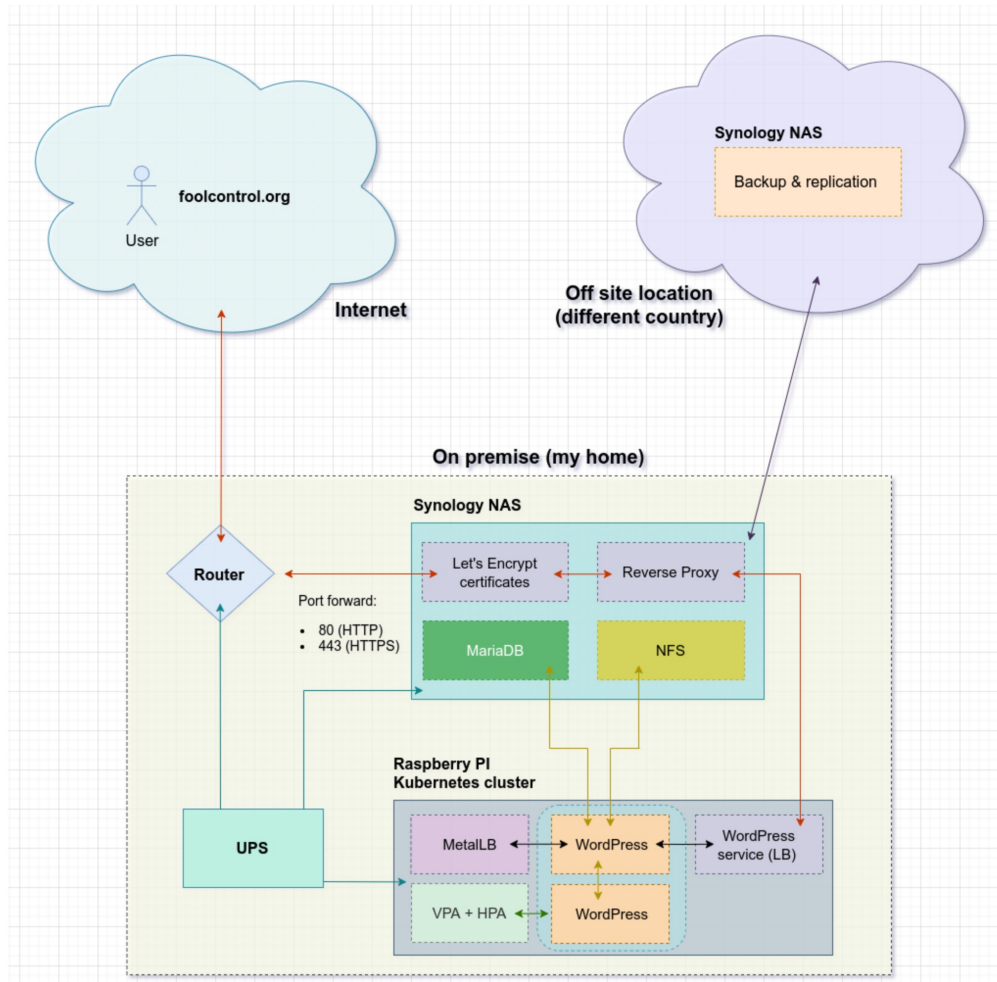
★ Once you're on K8s, you can seamlessly move anywhere

# Meanwhile, in my private life ...



- ★ [auto-cpufreq](#) is trending as #1 on Hacker News
- ★ Under the load, my blog crashes
- ★ Inability to scale in current setup on VM's
- ★ Work in progress: [wp-k8s](#) project (scalable WordPress on Kubernetes)
- ★ Fix the scalability issue in minutes by moving to K8s
- ★ Birth of wp-k8s project for GKE: [foolcontrol.org/?p=3754](https://foolcontrol.org/?p=3754)

# Meanwhile, in my private life ...



★ wp-k8s: WordPress on privately hosted Kubernetes cluster (RPI 4 + Synology): [foolcontrol.org/?p=4004](https://foolcontrol.org/?p=4004)

★ Potentially useful project for the attendees: [atuf.app](https://atuf.app) (Amsterdam Toilet & Urinal Finder)

# Hitting the wall



★ Shared my private life K8s event & learnings with the team



★ More and more time needed to keep the lights on in current setup



★ Influx of a lot of big models which are requesting a lot of resources



★ Inability to grow at scale in current setup



# Hitting the wall



★ Shared my private life K8s event & learnings with the team



★ More and more time needed to keep the lights on in current setup



★ Influx of a lot of big models which are requesting a lot of resources



★ Inability to grow at scale in current setup

☆ 1. Hire more people to keep scaling in current setup?

☆ 2. Move to Kubernetes?

# Decision has been made to migrate to K8s



- ★ Create a design page, with acceptance criteria and scope of work



- ★ Conclude research and choose your target destination

- ☆ **ICHP** (ING Container Hosting Platform) vs **DAP** (Data Analytics Platform) Kubernetes cluster

- ☆ Option 1: **DAP** Kubernetes cluster:

- ☆ Vanilla Kubernetes, dedicated nVidia GPU cores, part of our area, match made in heaven?

- ☆ Option 2: **ICHP**:

- ☆ Stable, running in multiple zones, handles huge portion of risk & maintenance

# Decision has been made to migrate to K8s



★ Create a design page, with acceptance criteria and scope of work



★ Conclude research and choose your target destination



★ At this point, it was a “just do it”. Step consisting of putting all the pieces together

# Takeaways



# Takeaways



★ During the migration, best approach is run 2 setup in parallel



★ Good monitoring & alerting setup will go a long way



★ Be brutally pragmatic, stick to the vision & design



★ Whole journey will take time



★ Perseverance and not giving up, re-evaluate the landscape

# Takeaways

★ keep in mind that everything changes, certain ideas along with certain circumstances will match the changes in the landscape, and it might lead to a perfect storm as it did in the MLP's case

# Thank you / Questions



do your thing

★ We're hiring: [ing.jobs/tech](https://ing.jobs/tech)

★ Slides available on:

[foolcontrol.org](https://foolcontrol.org)

★ Questions & comments about the talk:

[adnan.hodzic@ing.com](mailto:adnan.hodzic@ing.com)

★ Connect with me on LinkedIn:

<https://linkedin.com/in/adnanhodzic>

★ Visit us at ING booth (S75):

☆ Meet today's ING Speakers, ask any remaining questions to Adnan, Diana or Thijs (Wed: 18:30 – 19:30)

☆ Meet the ING Speaker: "Kubernetes, Resistance is Futile" Adnan Hodzic (Thu: 15:30 – 16:30)



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