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# One-click nameserver deployment

Jeroen Bulten | Belgrade

20 October 2022



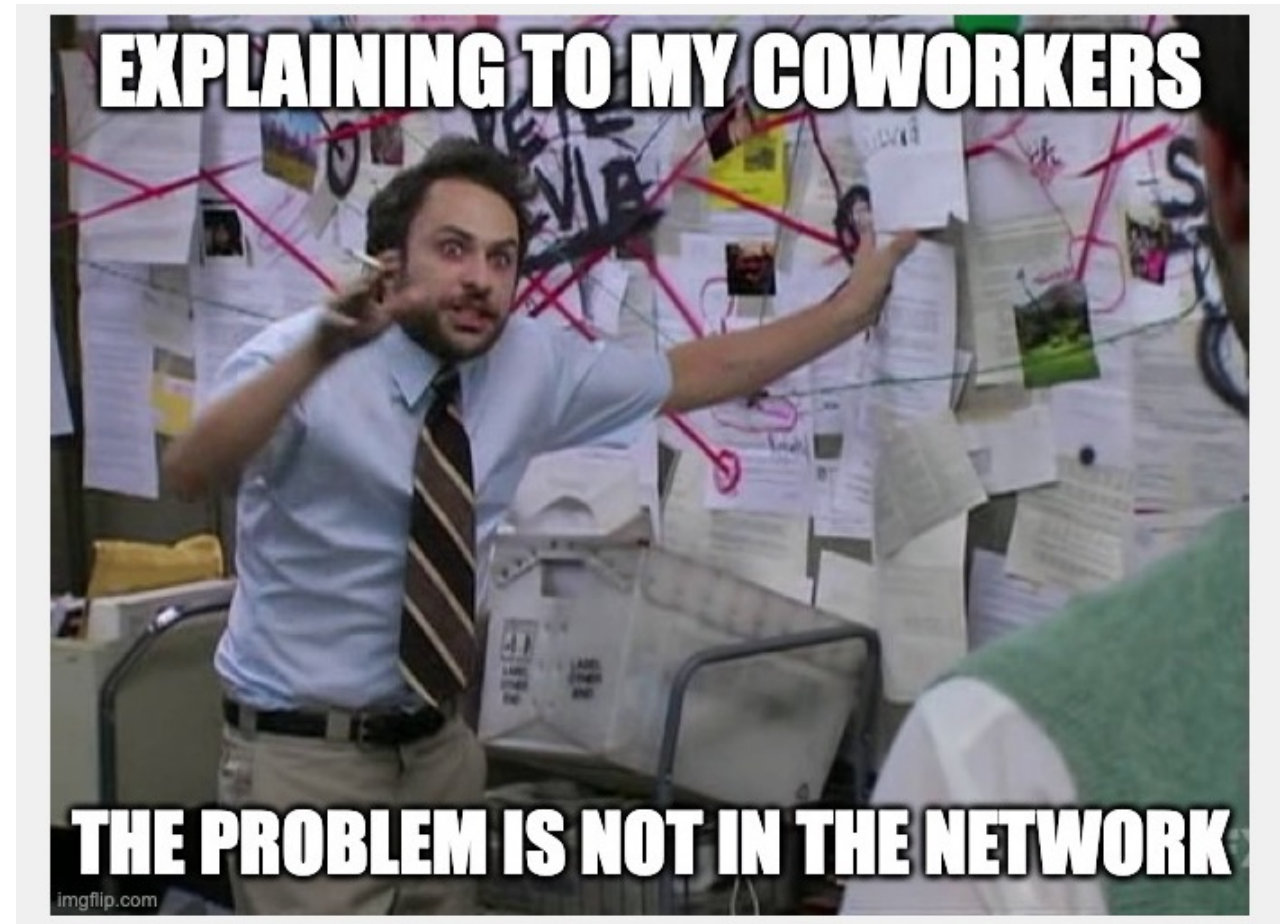
# Agenda

1. Intro and background
2. Goals
3. Challenges
4. Achievements
5. Future development

# Intro and background

Senior network engineer

- Part of the NOC team just over 5y
- Former system engineer 10+ y
- Now part of dedicated DNS team of 4 people
- Love hobbies ;-)
- Tinkering, radio amateur, home automation
- **Always keep learning**

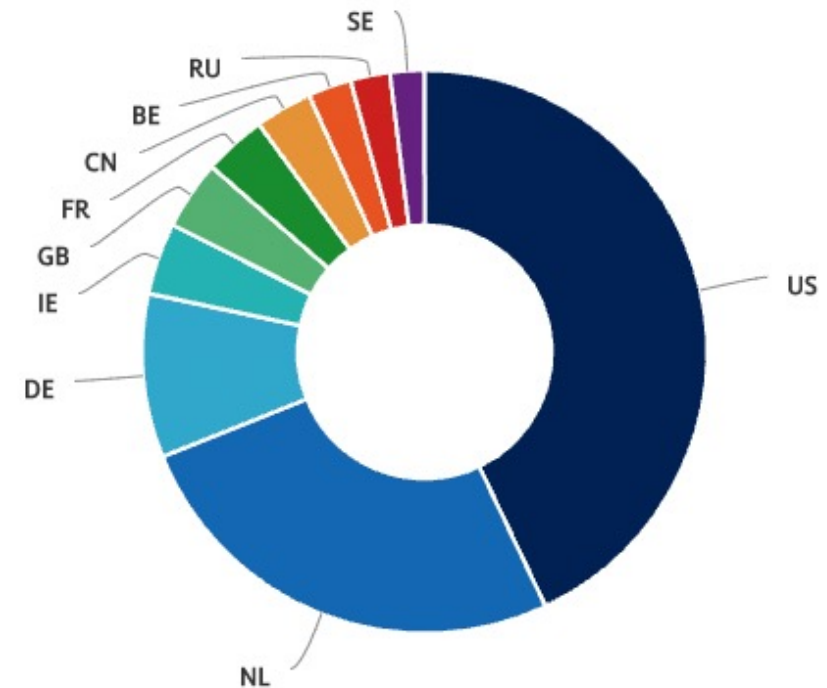


# Intro and background

- 5 yrs ago: unicast DNS with focus on NL area
- DDOS attacks
- Provider consolidation
- 60% queries from “the big five”
- Move to 3rd-party anycast services

## Top ten resolver locations

Top ten locations for resolvers



Source: sidnlabs.nl

# Goals: back at the helm

- ns1.dns.nl should be operated by SIDN
- Build a dedicated DNS team
- Global reach (anycast)
- Scale out quickly, both virtual and physical
- Adopt a DevOps mindset
- **“Stand on the shoulders of giants”**
- Data driven: use metrics to improve availability and latency



# Challenges

Both technical and organizational

- Team was largely new to CI/CD
- Building a dedicated DevOps team
- Scrum suddenly made sense

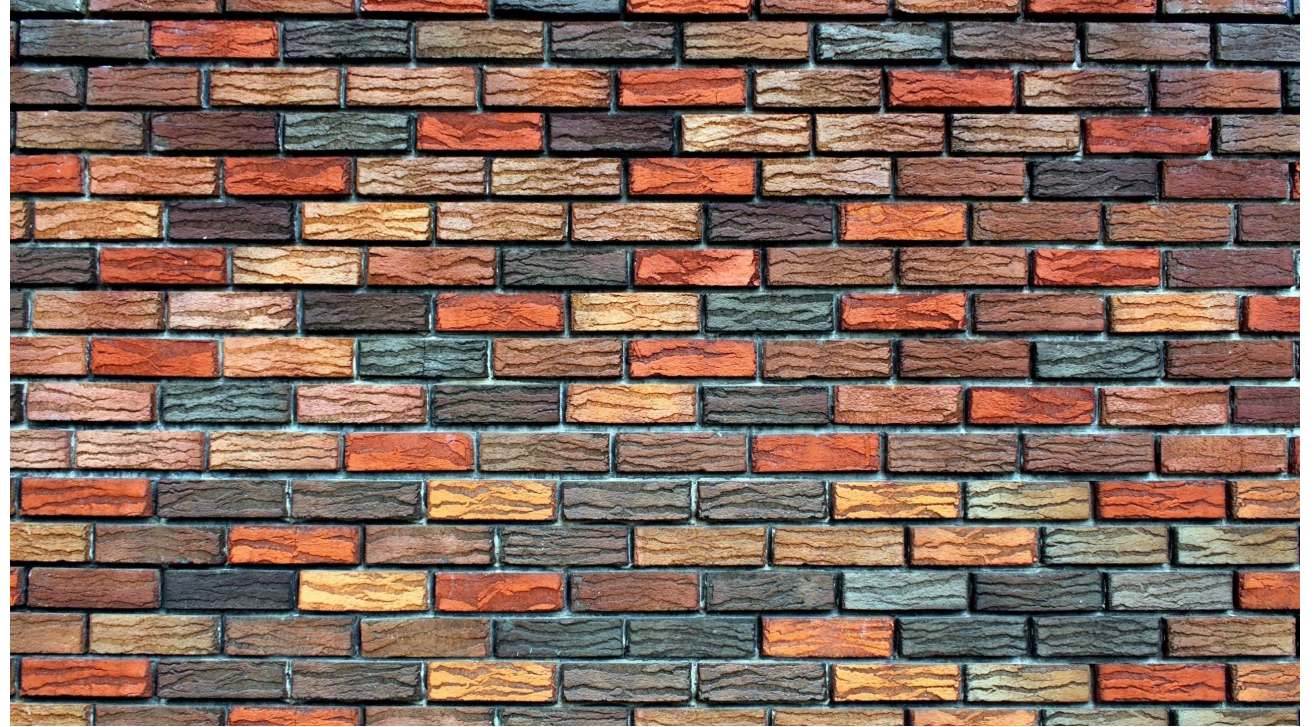




# GitOps: Manage all moving parts

Code in git should be a true representation of servers in production:

- Build, test and deploy a **golden image** using a CI/CD pipeline
- All changes are versioned
- Ability to move forward and backward using releases
- **Enforce config sync** by periodically re-deploying

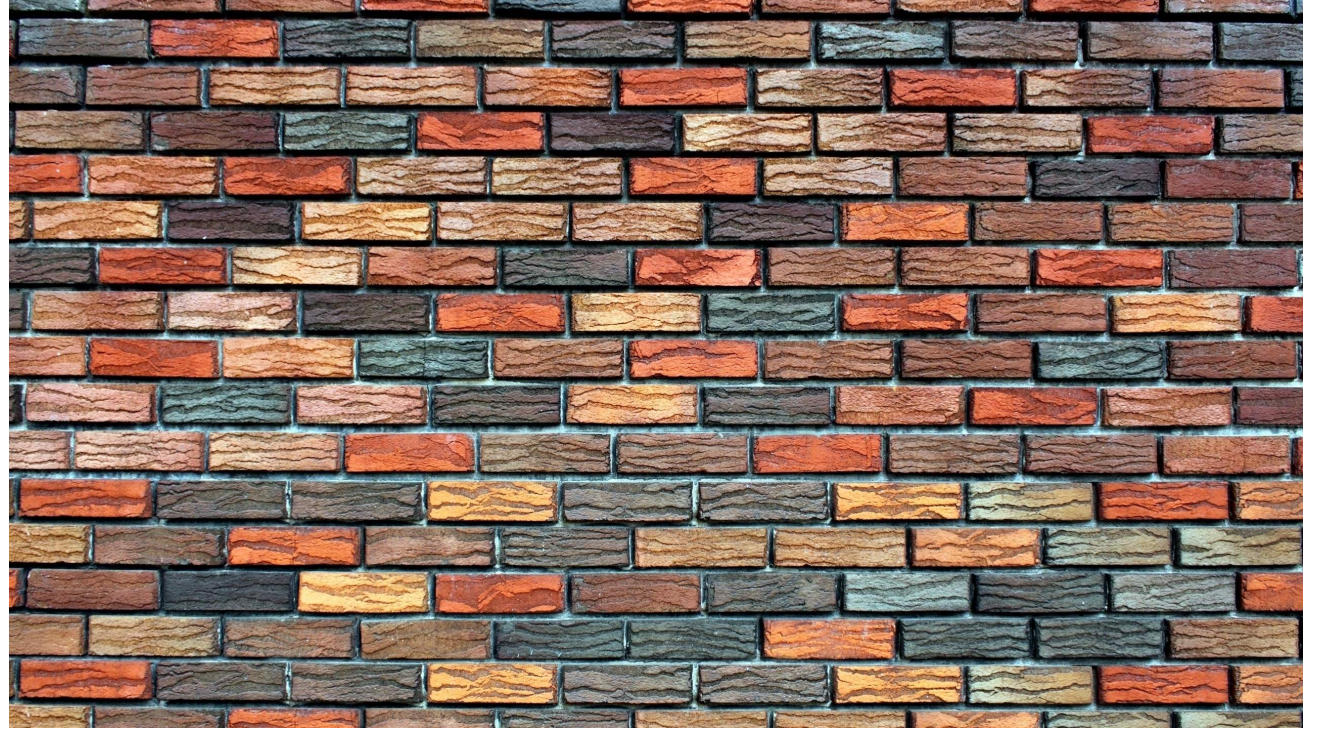




# Single artifact deploy

Almost perfect fit for DNS

- Anycast takes care of load balancing and fault tolerance
- DNS is almost **stateless**
- Very little need for configuration management after deployment
- Zone data can be automatically retrieved
- PCAP and metrics data need to be transferred asap

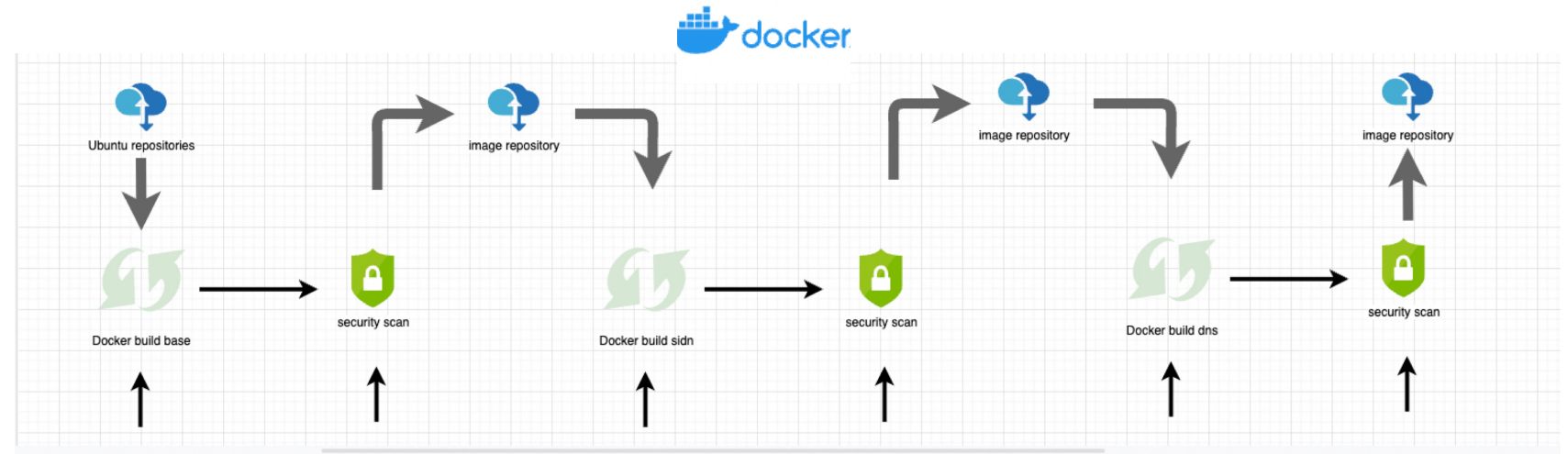


# Basic image building pipeline

Build a minimal OS  
image in three  
stages

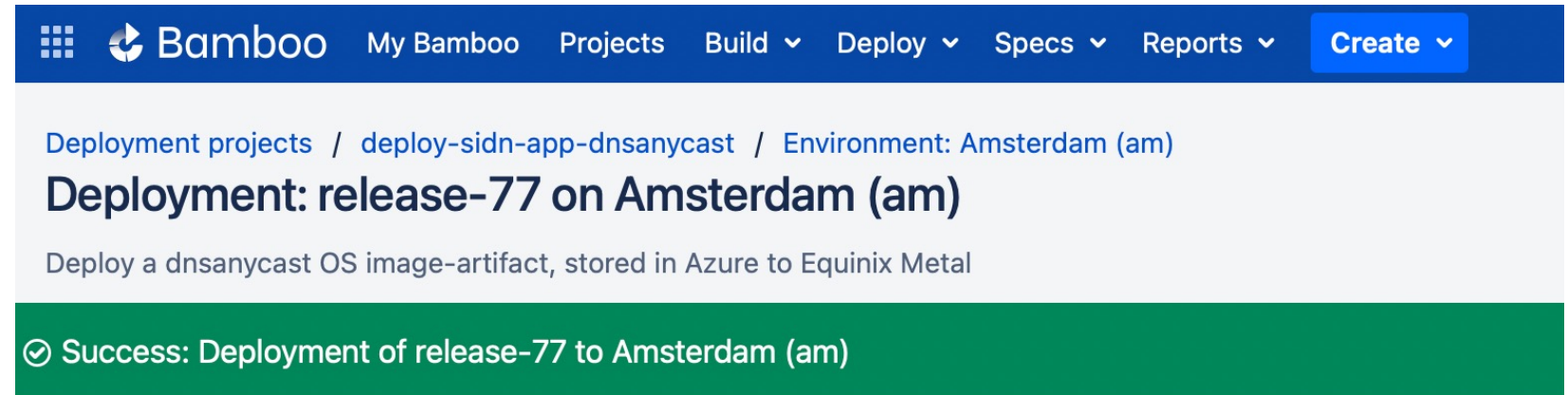
Do security scans

Flatten and upload  
to cloud storage



# One-click deployment on BMaaS

Deployment  
triggered manually  
< 10 min from start  
to running server



The screenshot shows the Bamboo web interface. The top navigation bar is dark blue with the Bamboo logo and links for 'My Bamboo', 'Projects', 'Build', 'Deploy', 'Specs', 'Reports', and a 'Create' button. Below the navigation bar, the breadcrumb trail reads 'Deployment projects / deploy-sidn-app-dnsanycast / Environment: Amsterdam (am)'. The main heading is 'Deployment: release-77 on Amsterdam (am)'. Below this, a description states 'Deploy a dnsanycast OS image-artifact, stored in Azure to Equinix Metal'. A large green banner at the bottom of the deployment card displays a checkmark icon and the text 'Success: Deployment of release-77 to Amsterdam (am)'.

## Details

Release [release-77](#)

 master

Trigger Manual run by [Jeroen Bulten](#)

Completed 17 Oct 2022 12:48 PM

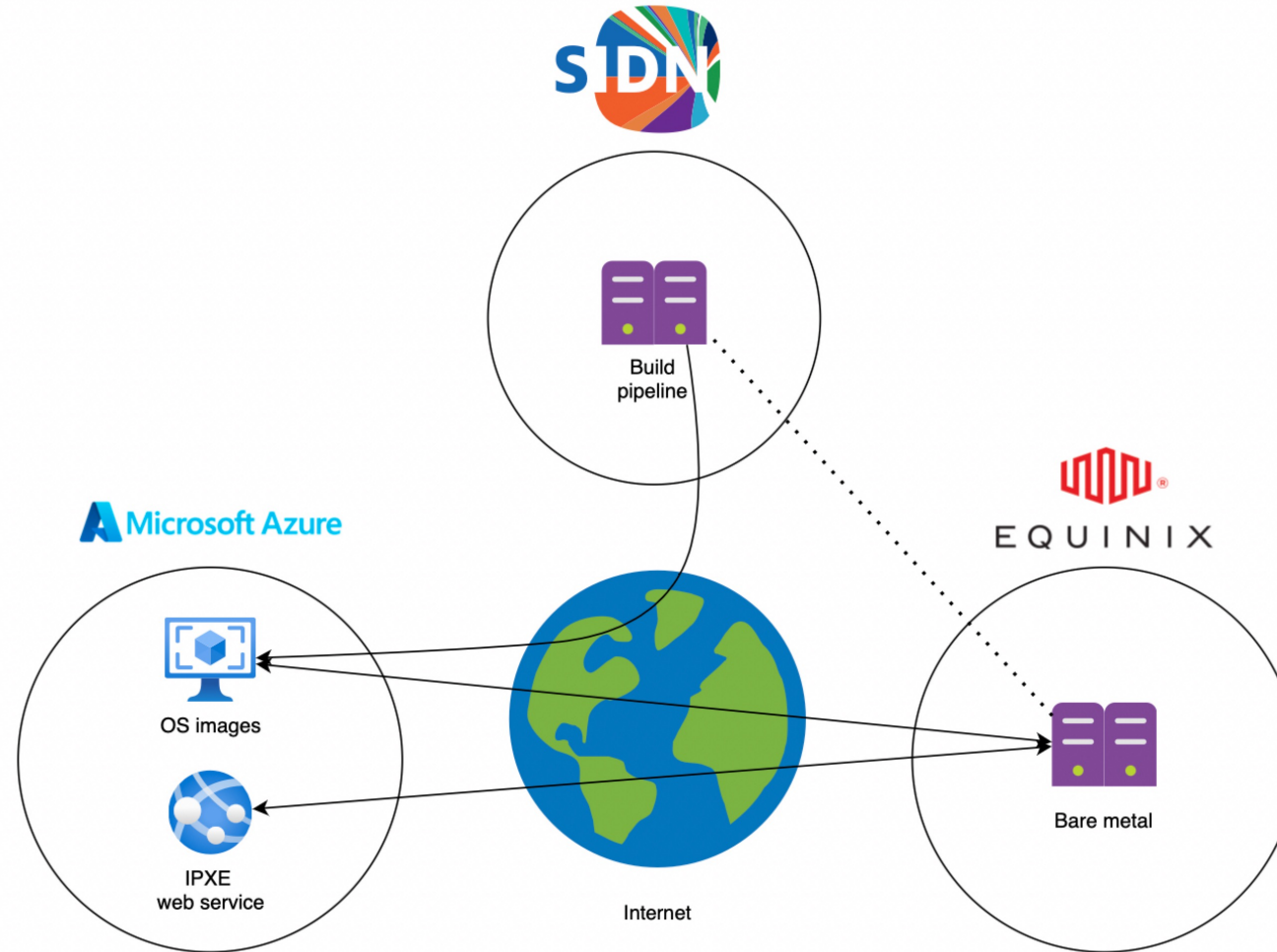
Duration 9 minutes

On agent [ops-bmbagent02-o.dev.sidn.nl](#)

Status **SUCCESS**

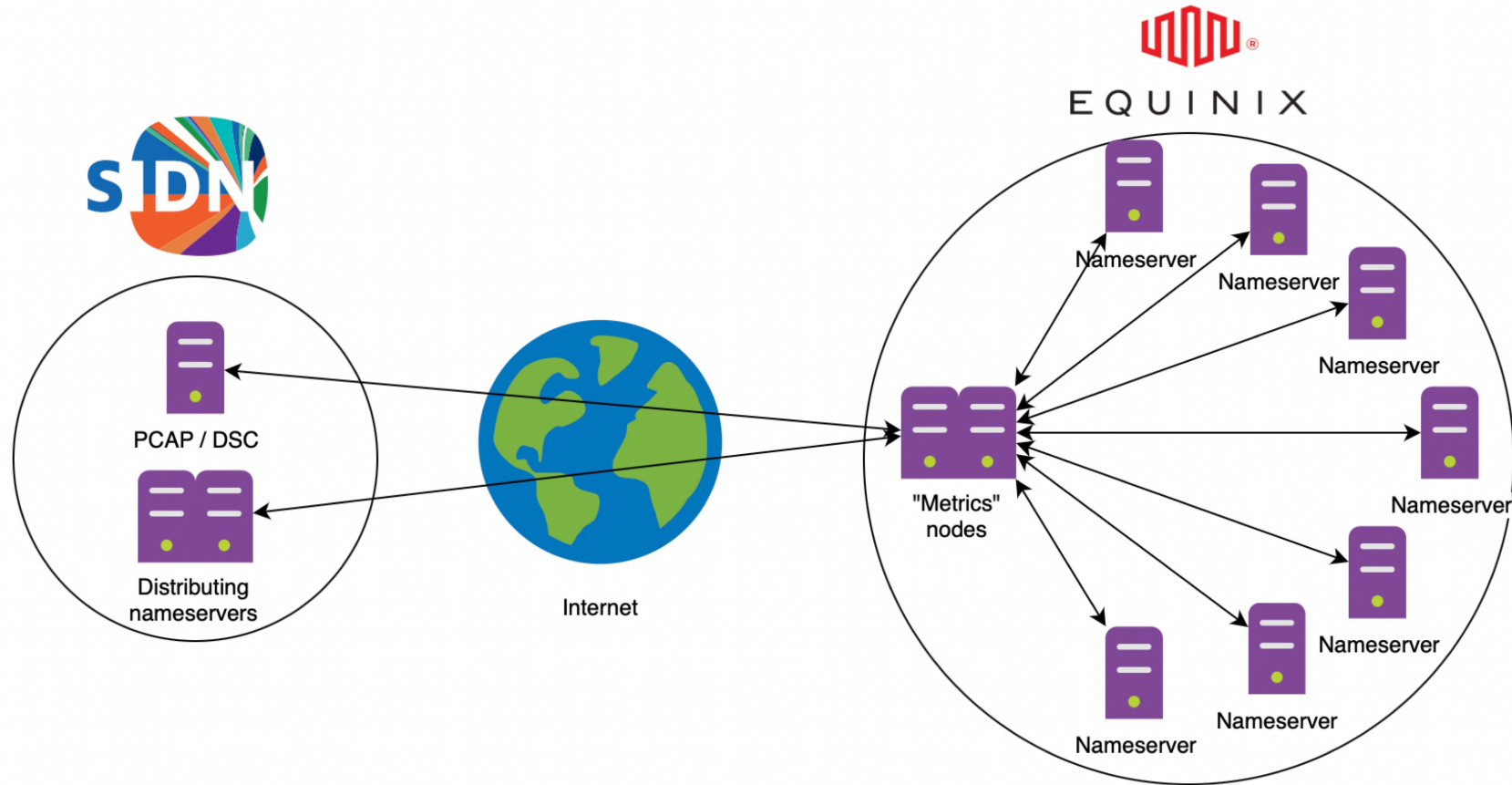


# One-click deployment on BMaaS





# Building a platform





# Summary

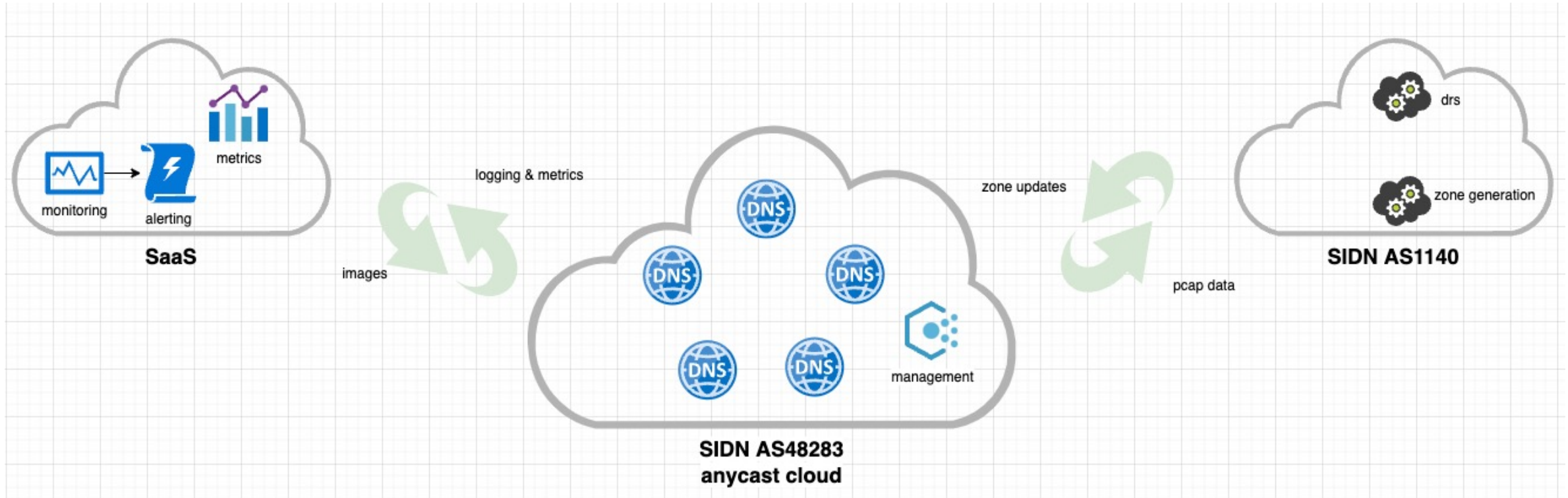
Automation of:

- Building and testing a custom image
- Deploying the image on BMaaS
- Doing pre-flight checks
- Enabling BGP
- Doing zone transfers
- Monitoring, metrics and data collection
- The CI/CD pipeline itself

Bonus: becoming best friends with your auditor



# Target platform architecture



# Future development



- Optimize PCAP processing
- Re-evaluate our tool chain
- Improve deployment concurrency
- Add more tests
- Use metrics to optimize the platform
- Provide services to other TLDs



Are there any questions?



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Thank you for your attention!

