SIDN

For confidence online

One-click nameserver deployment
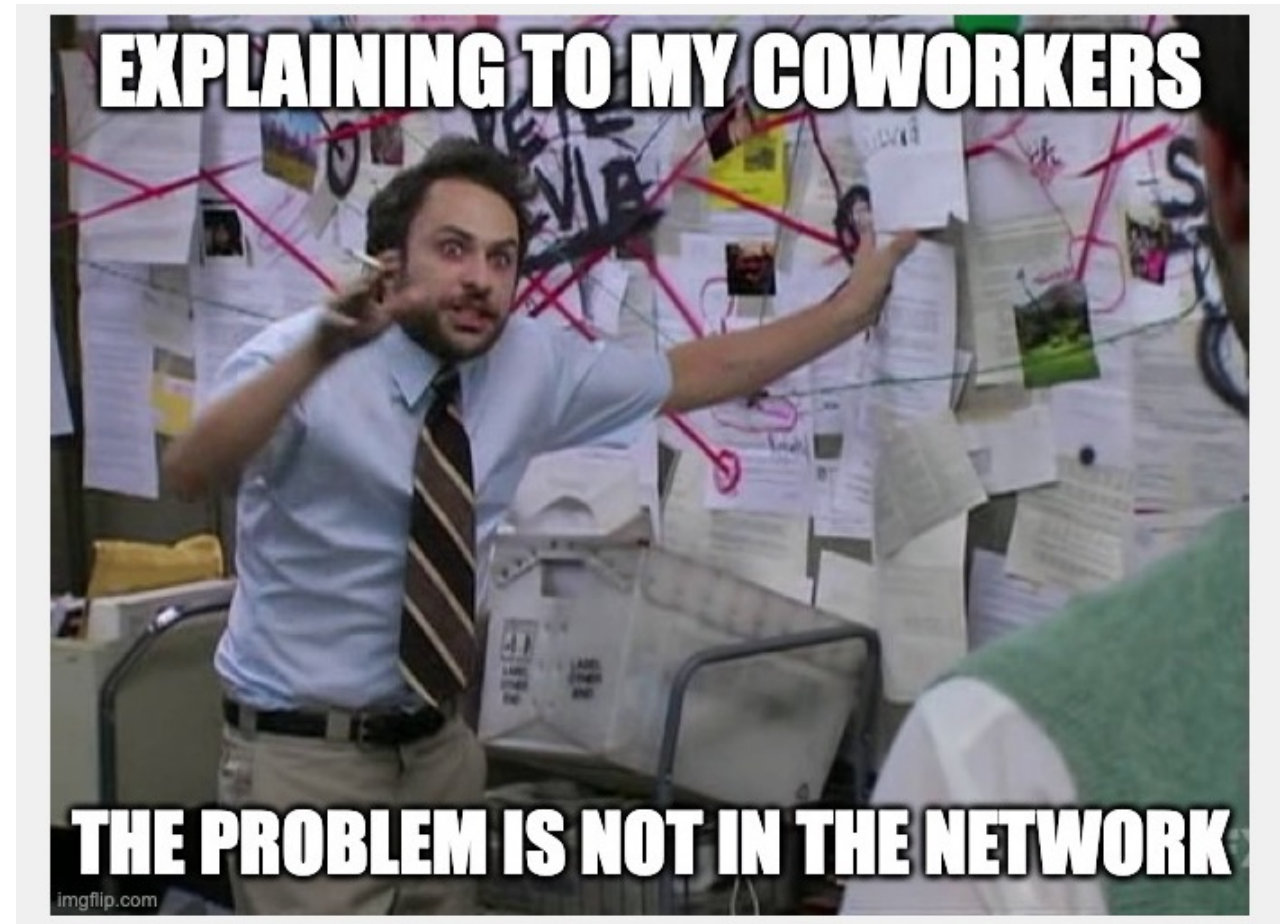
Jeroen Bulten | Belgrade

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
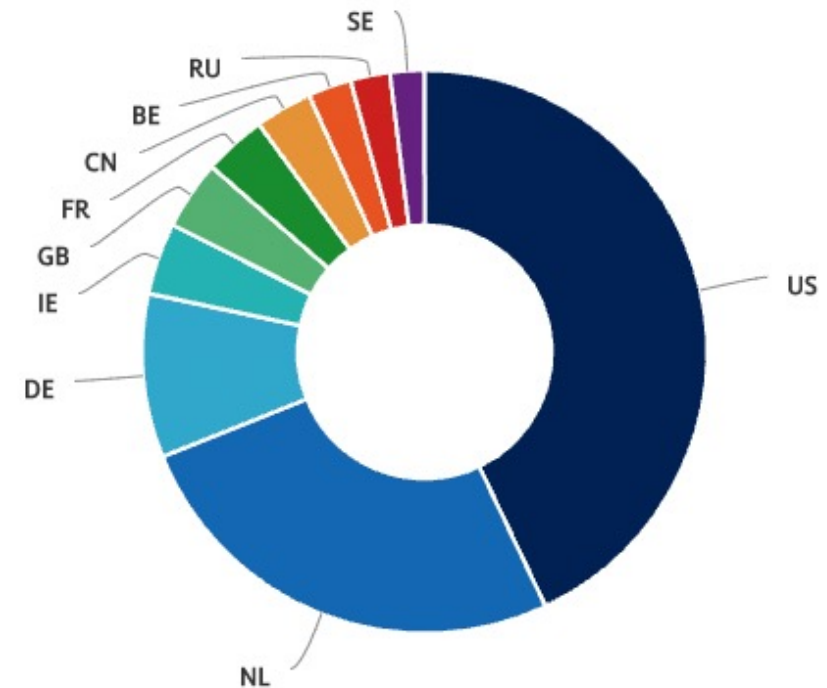
- **Always keep learning**

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
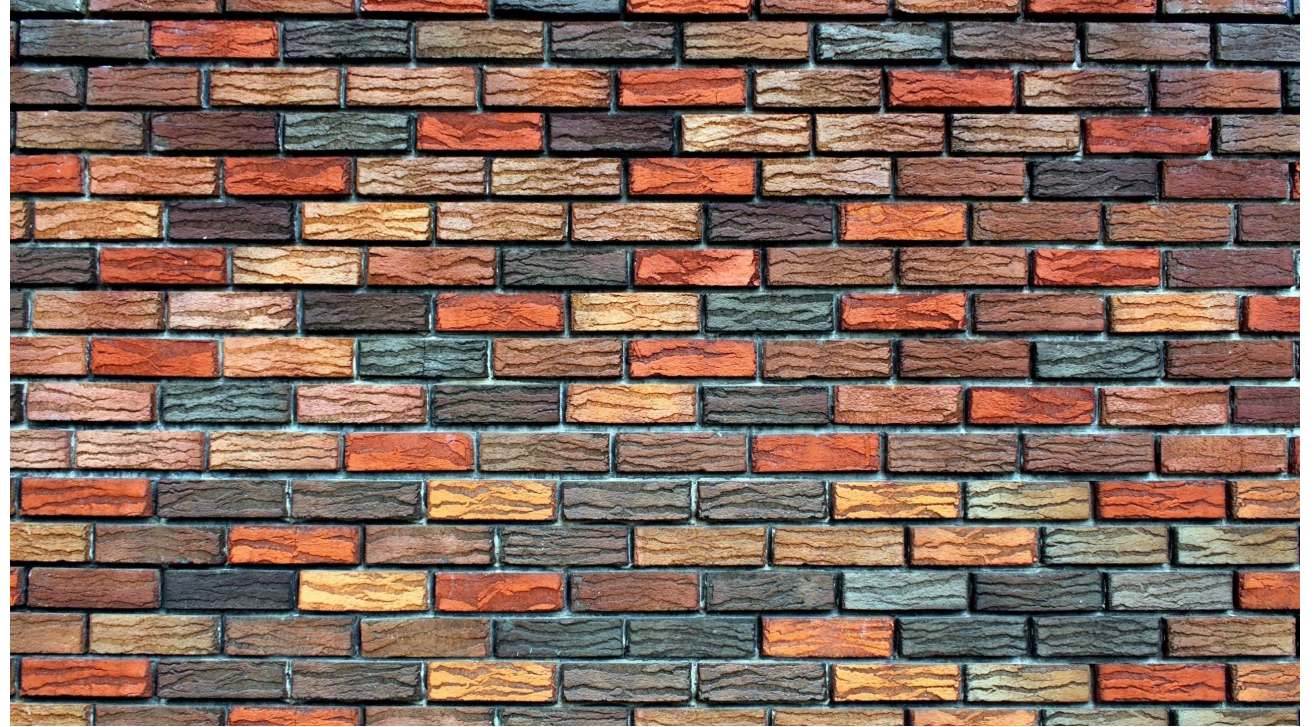
• Scrum suddenly made sense

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

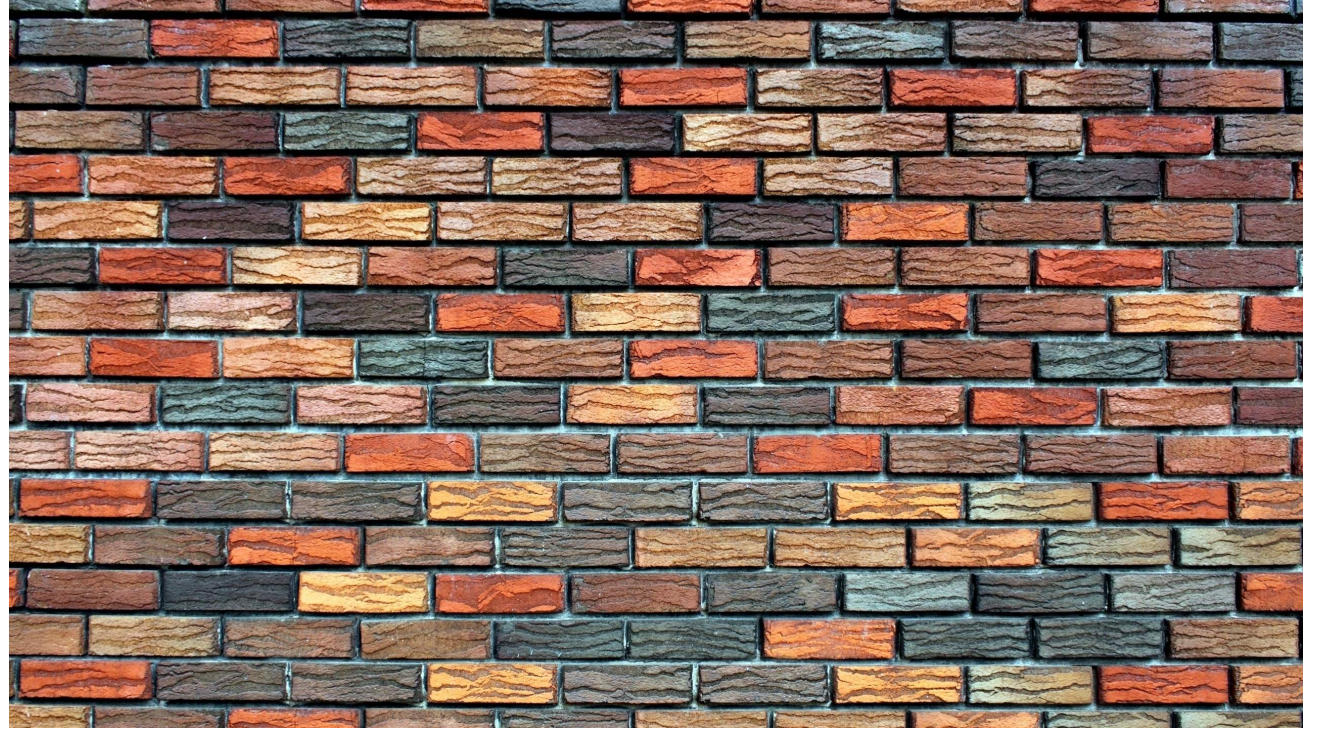- **Enforce config sync** by periodically re-deploying

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
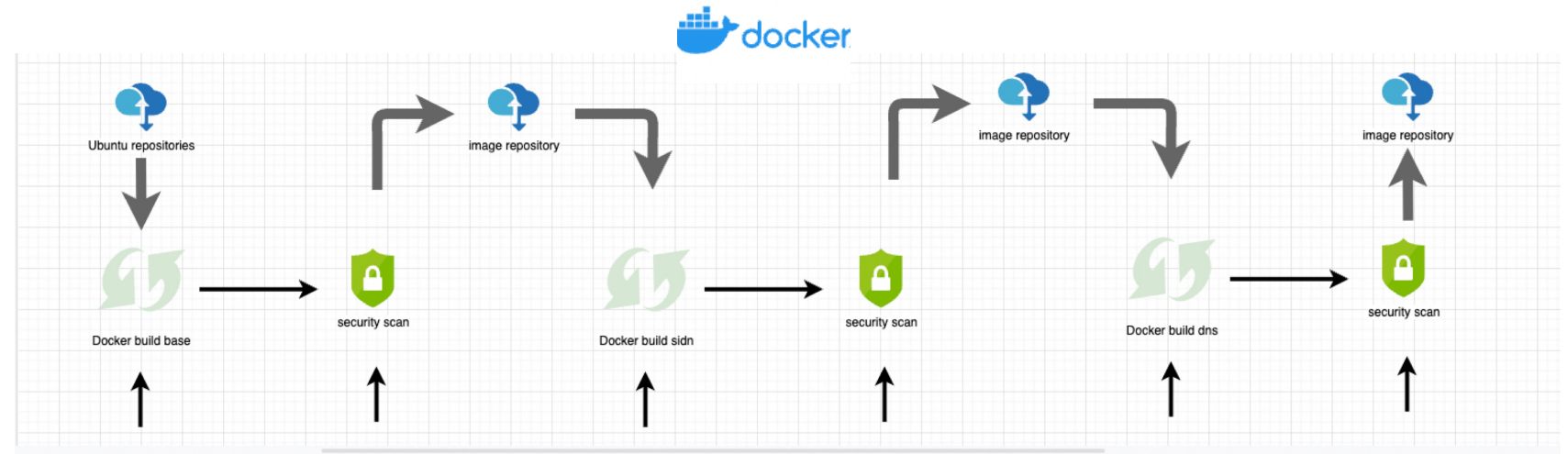
- PCAP and metrics data need to be transferred asap

Basic image building pipeline
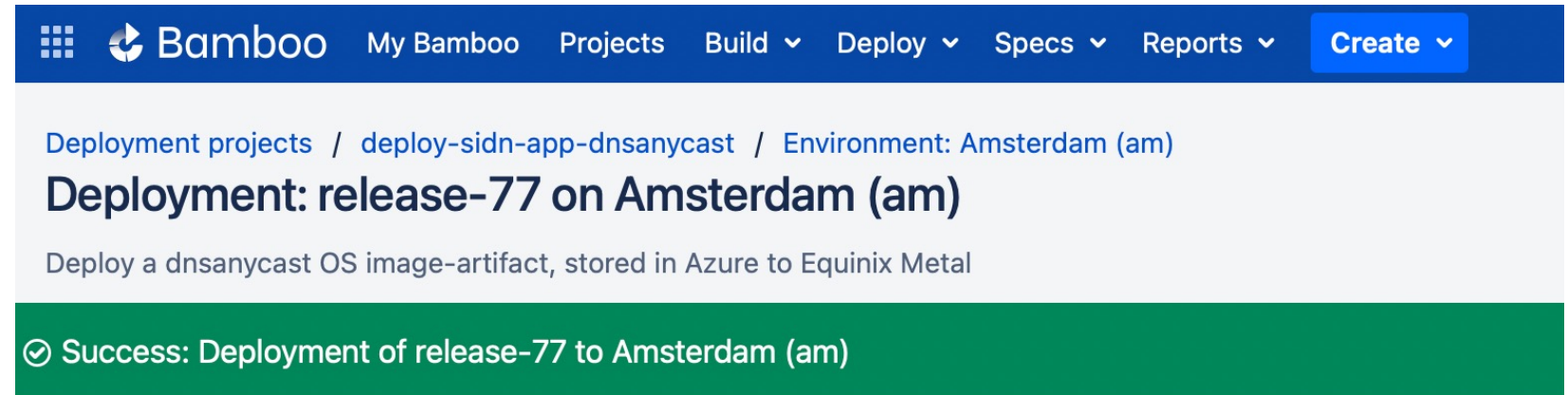
Build a minimal OS image in three stages

Do security scans

Flatten and upload to cloud storage

One-click deployment on BMaaS

Deployment
triggered manually

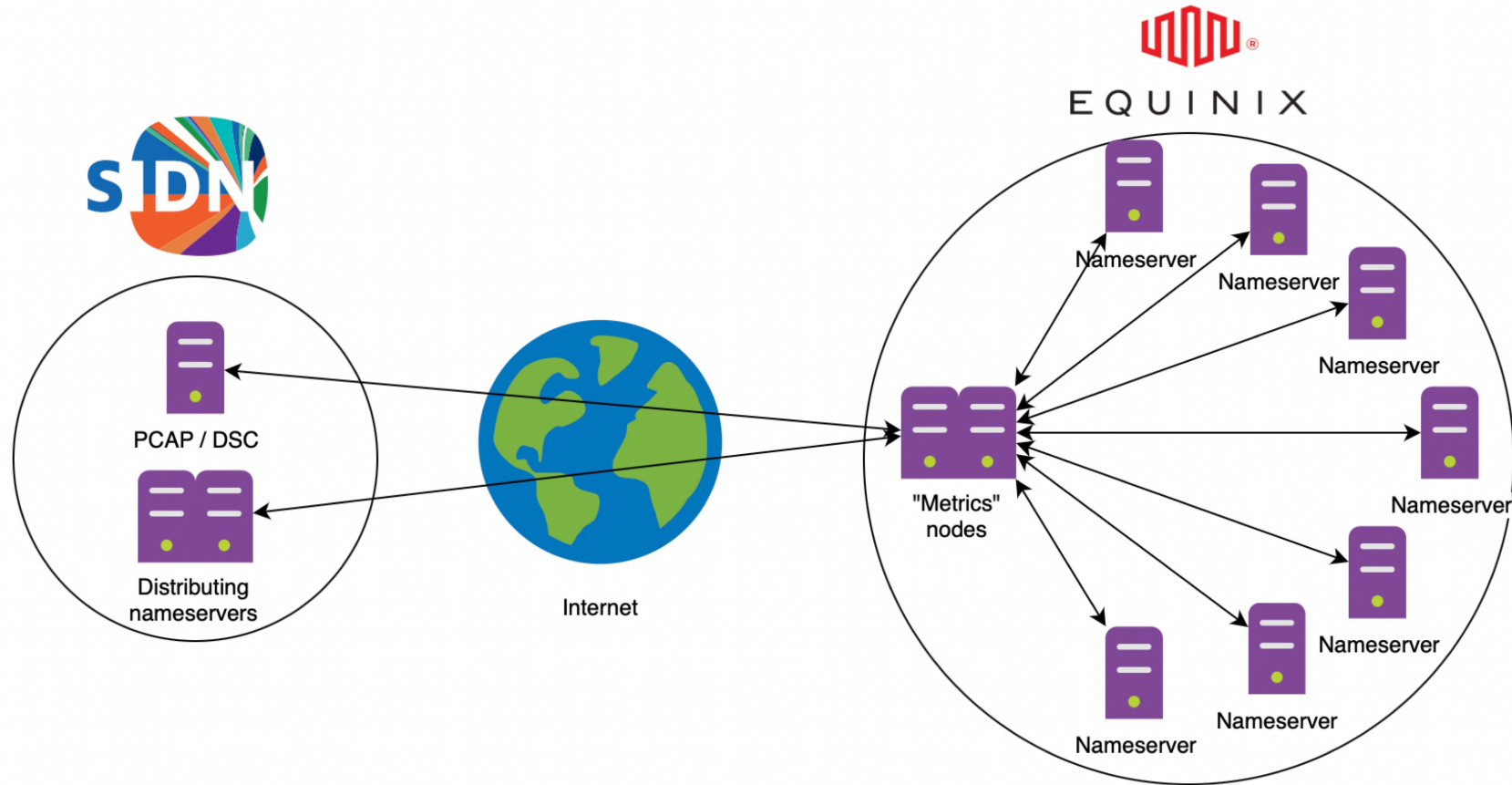< 10 min from start
to running server

One-click deployment on BMaaS
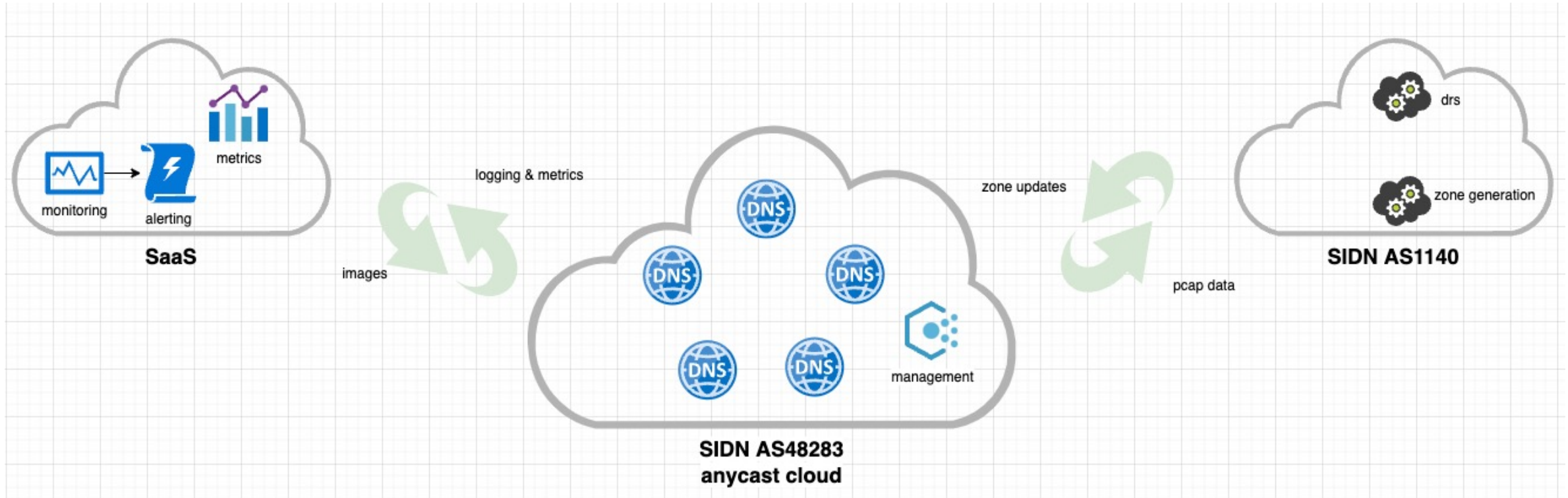
Building a platform

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?

Thank you for your attention!