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North America 2018

Cloud Native Transformation



Who are we?



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Pavel Nikolov

Principal Software Engineer

 pavelnikolov

Matt Hope

Principal System Engineer

 matthope

Backstory



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- We work in a 180-year old media publishing company
- Change from within is very difficult; on the other hand
- Media has zero barriers to entry (now there is more competition than ever)

Some of our mastheads



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Today's Paper | Markets Data

FINANCIAL REVIEW

NEWS WEBSITE OF THE YEAR

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Menu

AUDJ200 -0.2331%	S&P/ASX 200 -0.38%	ALL ORDINARIES -0.47%	DJ INDIAN AVERAGE -1.55%	FTSE 100 INDEX -0.37%	XETRA DAX PF -0.88%	CAC 40 INDEX -0.81%
17276 -0.0017	5671.80 -21.90	3739.20 -27.18	25017.44 -100.78	6874.24 -26.10	17142.69 -68.60	4063.31 -48.74

OPINION

How Matt Comyn ended up as CBA chief



New CBA chief executive Matt Comyn has answered one of the big questions that has perplexed corporate Australia for much of the year. How did he get the job?

- Catherine Livingstone dumps on past board
- CommBank finds 45 new money-laundering flaws
- CBA agrees 'engagement principles' with ASIC

13 mins ago

RBA governor warns on bank scandals



CKT's bid for APA officially rejected
Treasurer Josh Frydenberg has officially rejected Hong Kong-based CK Group's \$13 billion bid for Australia's east coast gas pipeline owner APA Group, two weeks after his preliminary ruling.

Livingstone dumps on CBA board
CBA chairman Catherine Livingstone has dumped on the bank's former board and executive team saying there was an overwhelming sense of complacency.

Comyn not satisfied with compliance
CBA CEO Matt Comyn says he would never be happy with the bank's compliance with anti-money laundering laws after a report last month raised 45 new issues alongside the 199 known ones.

ASX falls as tech stocks slide
Australian shares slumped on Tuesday as local technology stocks were rattled by a poor session on Wall Street.

STREET TALK

- Big CSL backer clears out: UBS handles \$266m trade 3:14PM
- RightCrowd hires Morgans for equity raising 12:03PM
- White & Case snares Gilbert + Tobin partner 8:36AM

CHANTICLEER



Comyn the Reformer throws Narev under a bus

REAR WINDOW

- Tasmania's deputy AG finally donates CPA pay 5:20PM

Our network | Tuesday 20 November 2018 | Log In

The Sydney Morning Herald

INDEPENDENT. ALWAYS.

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TOP STORIES

BREAKING POLICE

Hayne's alleged sex assault victim left bleeding profusely as taxi waited: police

The explosive new details, revealed on Tuesday evening, include graphic descriptions of the alleged assault on the young woman.

by Lucy Cormack

IMMIGRATION

Visa squeeze on families and skilled workers under Morrison's population pitch

Tougher approach from Coalition government will force aspiring migrants to wait longer for permanent residency.

by David Crowe

UPDATED NORTHERN BEACHES HOSPITAL

22-year-old chemical engineering student asked to give gynaecology advice

Juniors are so distressed at the new Sydney hospital they've been told...

Instagram

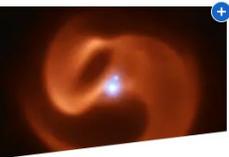


ELECTION

Turnbull family gets behind campaign to boot Tony Abbott

by Jenny Noyes

SPACE



Australian astronomers spot super-powerful 'ticking time bomb' not far from Earth

by Liam Mannix

JUST IN

- 42 minutes ago: Martin Boyle steals the spotlight in Tim Cahill's Socceroos farewell
- 1 hour ago: 'Like taking a refreshing dip in a pool of glue': Forrest blasts Rugby Australia
- 1 hour ago: OPINION / Column 8
- 7 hours ago

How is this relevant to you?



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- You are in one of these situations - you are:
 - considering a *cloud native transformation*,
 - about to begin,
 - in a transition process; or
 - already reaping the benefits of the transformation

Planning



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PLANNING



Corporate Reorganisation



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Few important things happened at the same time

- Corporate reorganisation
- Rewrite of almost all our systems (websites, mobile apps and backend systems)
- **Cloud native transformation**

Inception



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The Start of the Transformation



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- We set up a Kubernetes cluster; and then we
- Started exploring and experimenting with it
 - This didn't continue for long because we had tight deadlines...
- It was high time we setup our real cluster(s)

The Unknown



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Where do we start from?



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- With no prior Kubernetes experience at enterprise scale; and
- No prior microservices experience in the team
- There were many (unknown) unknowns...

Preparation



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PREPARATION



Important Key Decisions



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- Set up different Kubernetes clusters per environment
- Setup a namespace per application per environment
- (Almost) all our applications use the **same helm chart**
- Have a CI/CD and deployment process

Skeptic



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“No” is temporary; “Yes” is forever



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- We've been very skeptical when introducing new tech to our stack
- Resisted using **Linkerd** or **Istio** in the early days
- Same goes for **serverless** and other technologies
- What we learnt:
 - Be careful when introducing a new technology! And only do it if it's absolutely necessary!

Secret



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Think Secrets First



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Another advice from us:

- Start with your secrets solution from day one! We can't stress this enough!
- Before you deploy any code to prod try to:
 - Use, rotate and revoke secrets

Forbidden

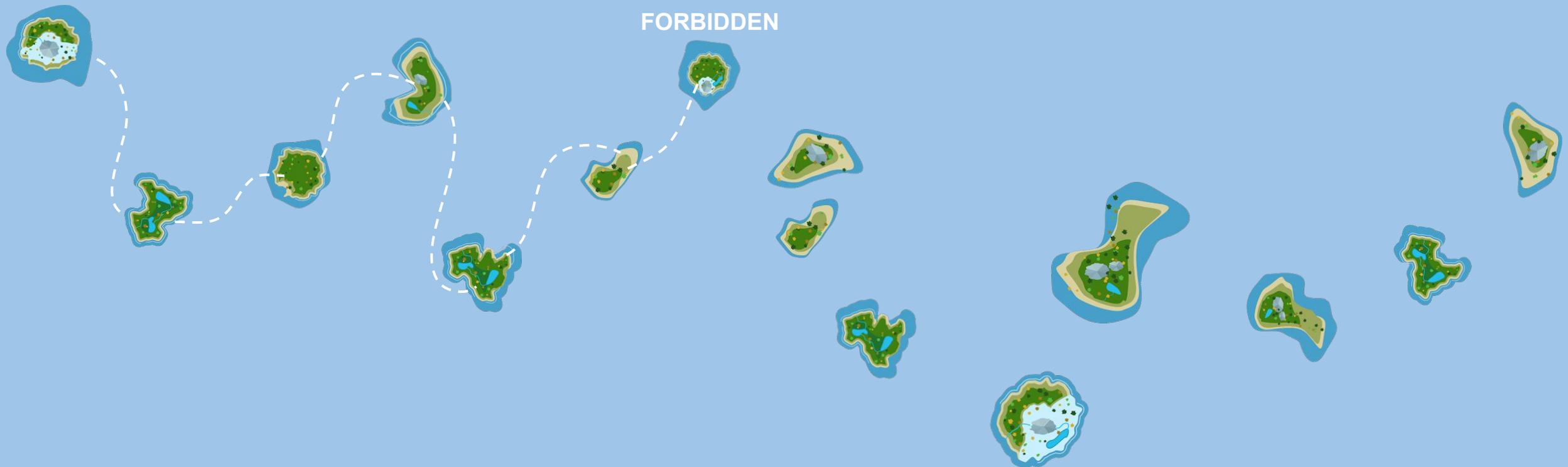


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Don't leave access control for later



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- Regardless of your company size or use cases, make sure you have an access control plan from the beginning
- Security is a fundamental step during the design phase of every system
- Security and access control is hard to retrofit

North Observability

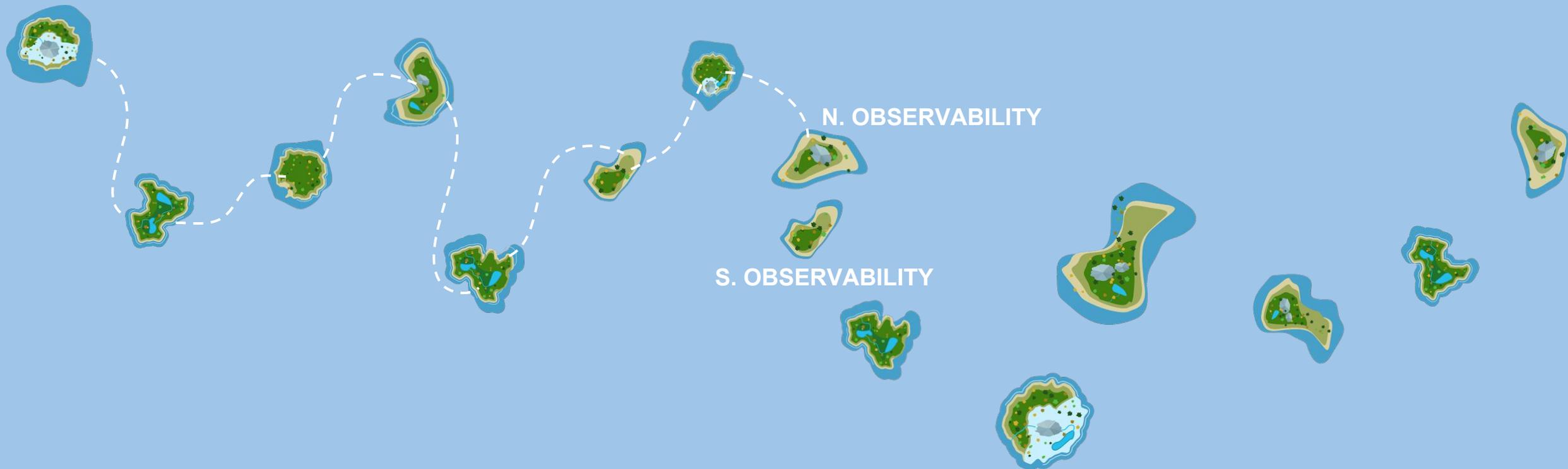


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Setup Observability Infrastructure



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- Your immediate next step is to ensure good observability infrastructure
- What we mean by observability:
 - Centralised logging (preferably with asynchronous processing)
 - Metrics (Prometheus)
 - Tracing (OpenTracing / Jaeger)
 - Alerting (Prometheus + 3rd party services)

South Observability



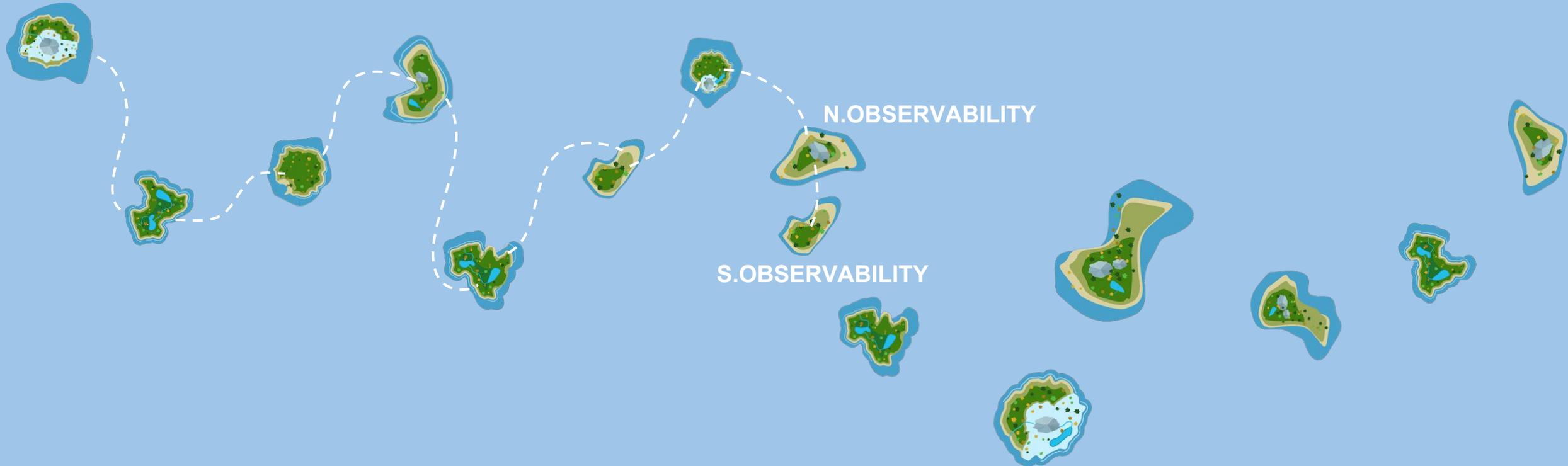
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PLANNING



Observability is key!



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Once the infrastructure is in place you have to ensure that:

- All your applications use a levelled and structured logger
- Send tracing data
- Export application metrics
- Export system metrics
 - Link metrics to k8s resource/limits/HPA

Micro



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Do you speak *microservices*?



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- Does your team have any prior experience with microservices?
 - Ours did not...
 - We had to learn a lot on the fly
- It might not be immediately obvious but microservices are related to multiple CNCF projects and you better be prepared

Don't just use JSON



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- Early on we decided not to use JSON for message serialisation for service-to-service communication
- Instead we use gRPC in (almost) all of our services

The Skeleton



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The (app) Skeletons



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When you build a new system of microservices from scratch you generally have two options:

- Use a microservice library; or
- Create an application skeleton (boilerplate)
 - This ensured that all our apps use metrics, tracing, proper logging, same helm chart, same CI configuration, health/readiness probes, gRPC, useful middlewares, infrastructure code and more

Knowledge



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Knowledge Sharing



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In order to avoid silos and ensure that everyone on the team has enough knowledge about everything we organize:

- Regular “brown bag” sessions
- “Level up” sessions
- Trainings
- Time for experiments

We also try to get involved with open-source as much as possible

DevOps



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DevOps culture



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For all apps we try to apply the following rules:

- You build it, you own it
- Developers from each team get paged if their apps are not behaving well
- Platform engineering team gets paged only for system-wide issues
- ChatOps
- GitOps
- Strict pre-deployment checks

Business



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Benefits for the business



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- Our culture changed significantly
- Lead time to feature delivery decreased from months to days
- More frequent production releases
 - before – once every 3 weeks
 - after – a dozen times per day
- The teams are much more motivated now

There are more islands to visit



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It's a journey, not a destination!



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Questions?



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