



RIPE NCC
RIPE NETWORK COORDINATION CENTRE

RIPE NCC Technology Update

Secure and cost-effective services



Technology Objectives 2024



- 4.4 Ensure security and compliance
- 4.1 Keep costs within budget

- 4.4 Maintain necessary levels of security and compliance with best practices and applicable regulations
- 4.1 Ensure the organisation's stability and financial strength



Secure services

Ensuring a stable Internet

Increased relevance of security



- Contractual value of registration for IPv4 addresses
 - Unauthorised transfers can potentially cause significant financial loss for our members
- Potential large impact on network connectivity caused by unauthorised access
 - E.g. misconfiguration in RPKI can cause massive disruption

Security investigation report



- Report published on 24 April 2024
 - <https://www.ripe.net/support/documentation/disclosures-and-reports/ripe-ncc-access-security-investigation-report/>
- Leaked credentials for RIPE NCC Access accounts had been published online that were not detected during our routine monitoring
 - Further, brute force attempts were executed against RIPE NCC Access accounts
- The passwords of 870 accounts were identified as being publicly exposed through data breaches
 - 104 of these were linked to LIR accounts
 - Email addresses had been updated for 270 accounts
 - 8 accounts were possibly compromised through brute force attacks

Actions taken



- Passwords were reset for all accounts identified in public data breaches and brute force attempts
- We closely monitored the resources connected to the 104 LIR accounts identified as vulnerable for suspicious activity
- For the accounts with recently updated email addresses, we reached out to account holders to confirm whether the change was legitimate
- We checked that no unauthorised changes had taken place for the accounts that were possibly compromised through brute forcing attempts

RIPE NCC Access improvements



- Introduction of mandatory 2FA at the end of March 2024
- Required significant code changes following a replatforming implemented last year
 - Migrated the backend engine from Atlassian Crowd to Keycloak
 - Replatformed to run on a Kubernetes cluster
- 2FA implementation moved from our own custom implementation to the native Keycloak one
 - Mandatory 2FA was then switched on directly from Keycloak
- Currently implementing support to FIDO2 keys and looking into other authentication methods
- More information in the RIPE Labs article:
 - https://labs.ripe.net/author/felipe_victolla_silveira/enhancing-the-security-of-ripe-ncc-access-recent-and-upcoming-changes/



ISAE 3000 **compliance**

Ensuring trust in RPKI

ISAE 3000 certification for RPKI



- RIPE NCC acts as one of the five RPKI Trust Anchors (TA) and issues certificates to resource holders
 - Key element in routing security
- Our goal is to enhance the security and integrity of the RPKI service
 - Build members' trust and confidence we are doing the right thing
 - Ease compliance efforts for any potential regulatory requirement arising
- The goal is to develop and implement an internal control framework that both encompasses all important IT security elements and can be tailored towards specific RPKI needs

Areas covered



- Huge effort involving the entire organisation, including departments like HR and Facilities
- The main goal is to ensure we have sufficient controls in place and that those controls are implemented through relevant policies and procedures
 - Controls should leave an audit trail so they can be inspected later on by a neutral third-party (auditor)

Current status



- ISAE 3000 Type I audit is underway, EY conducting the audit between April and May 2024
- 76 controls are currently being tested by EY
- The final report is expected to be delivered in June 2024
 - The report can only be disclosed to members, on request, under NDA
- ISAE3000 Type II audit will be performed in May 2025



Reducing data centre footprint

Cost-effective services

Reducing our data centre footprint



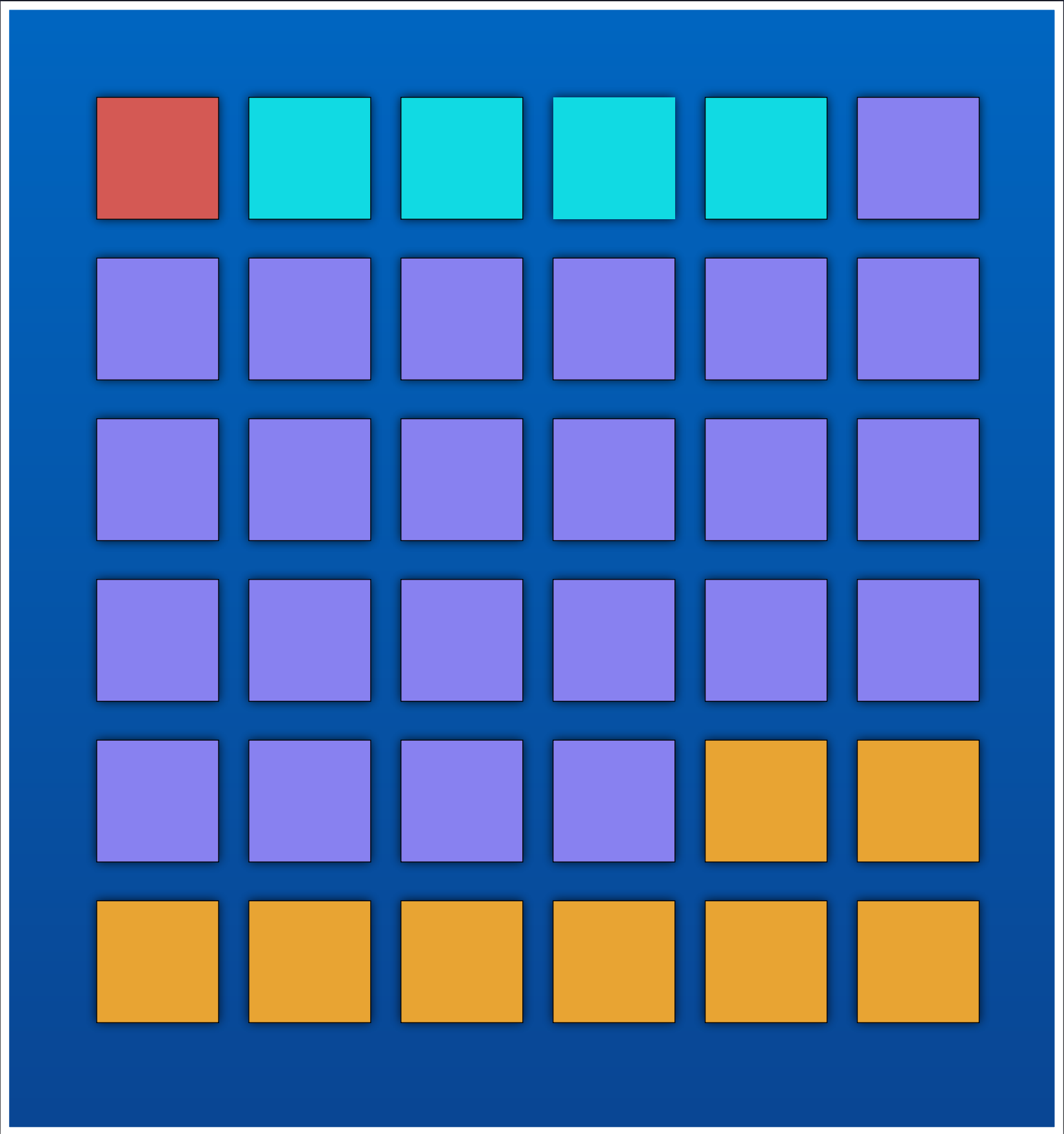
- Our current data centre footprint is large: 46 racks spread over two data centres in Amsterdam
 - Costs for housing and power alone currently approach €1M per year
- Half of that space is used for RIPE Atlas, RIS and RIPEstat datasets
 - This data is stored in a Hadoop cluster
 - These are very large datasets: over a petabyte worth of data telling the history of the Internet
- Our goal is to reduce that footprint by half before the end of 2024, and by more than 70% by the end of 2025
 - We want to achieve that by preserving all historical data and current service levels
- More information in the RIPE Labs article:
 - https://labs.ripe.net/author/felipe_victolla_silveira/reducing-the-ripe-nccs-data-centre-footprint/

Data centre - current situation



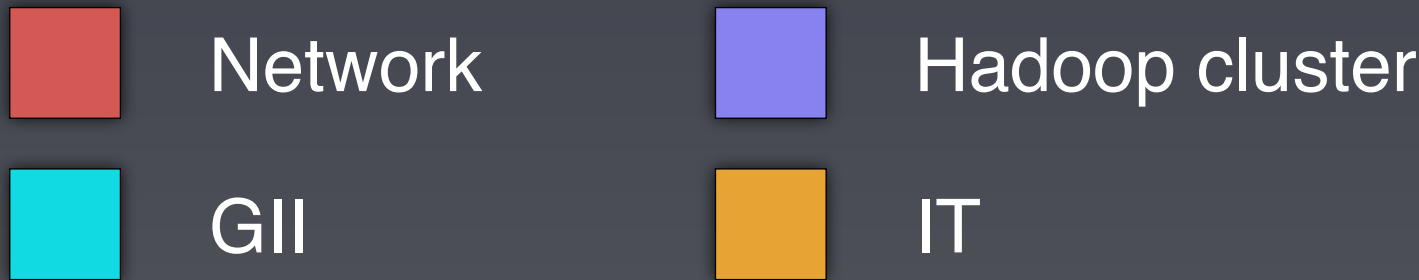
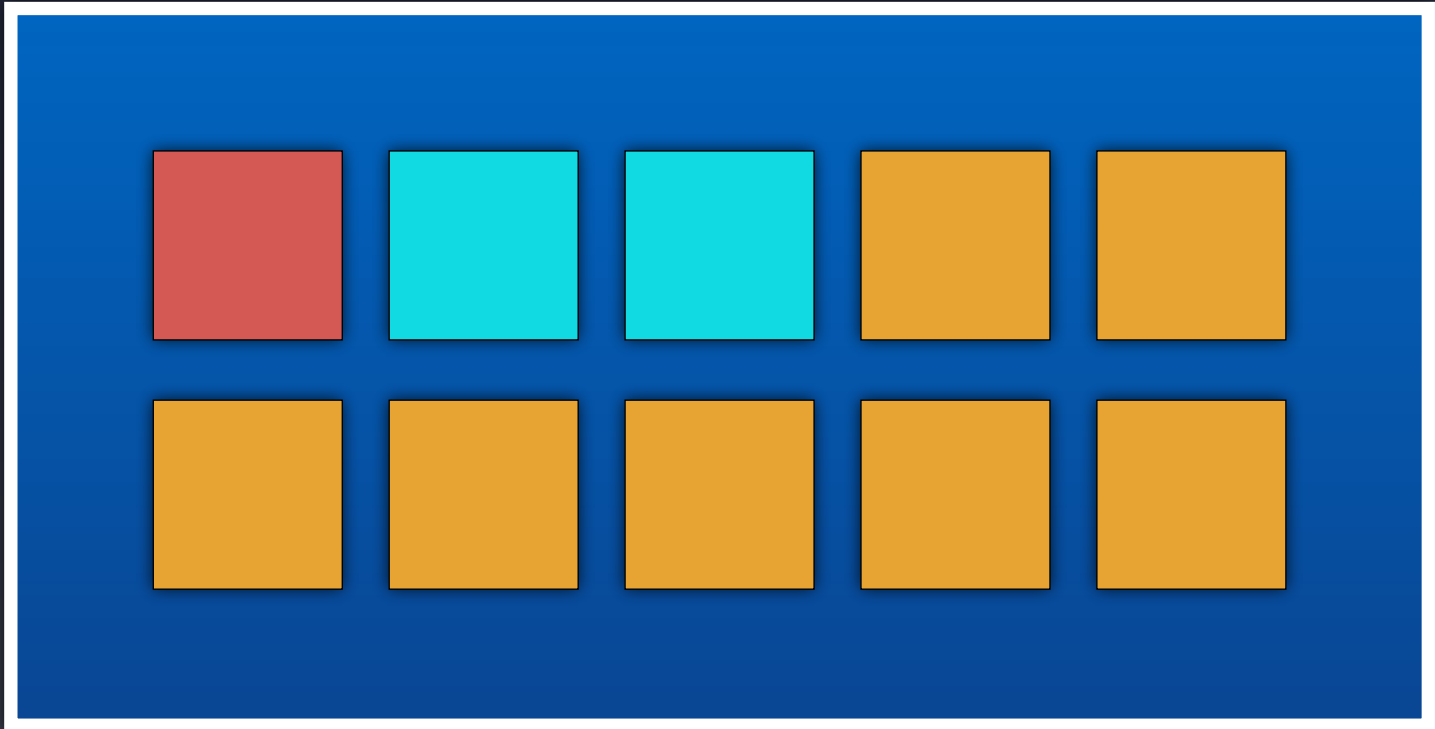
AM3

36 racks



AM5

10 racks

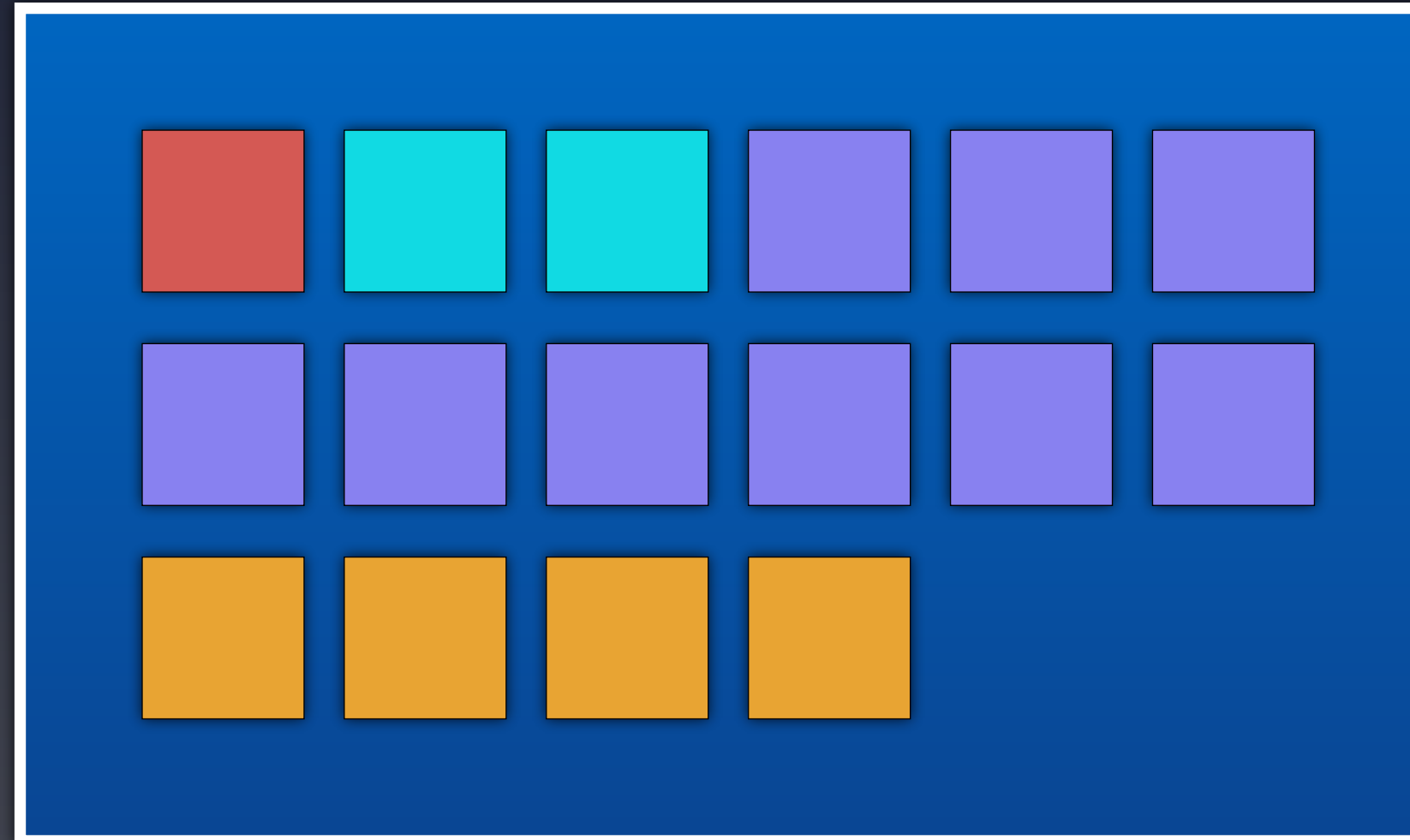


Data centre - goal end of 2024



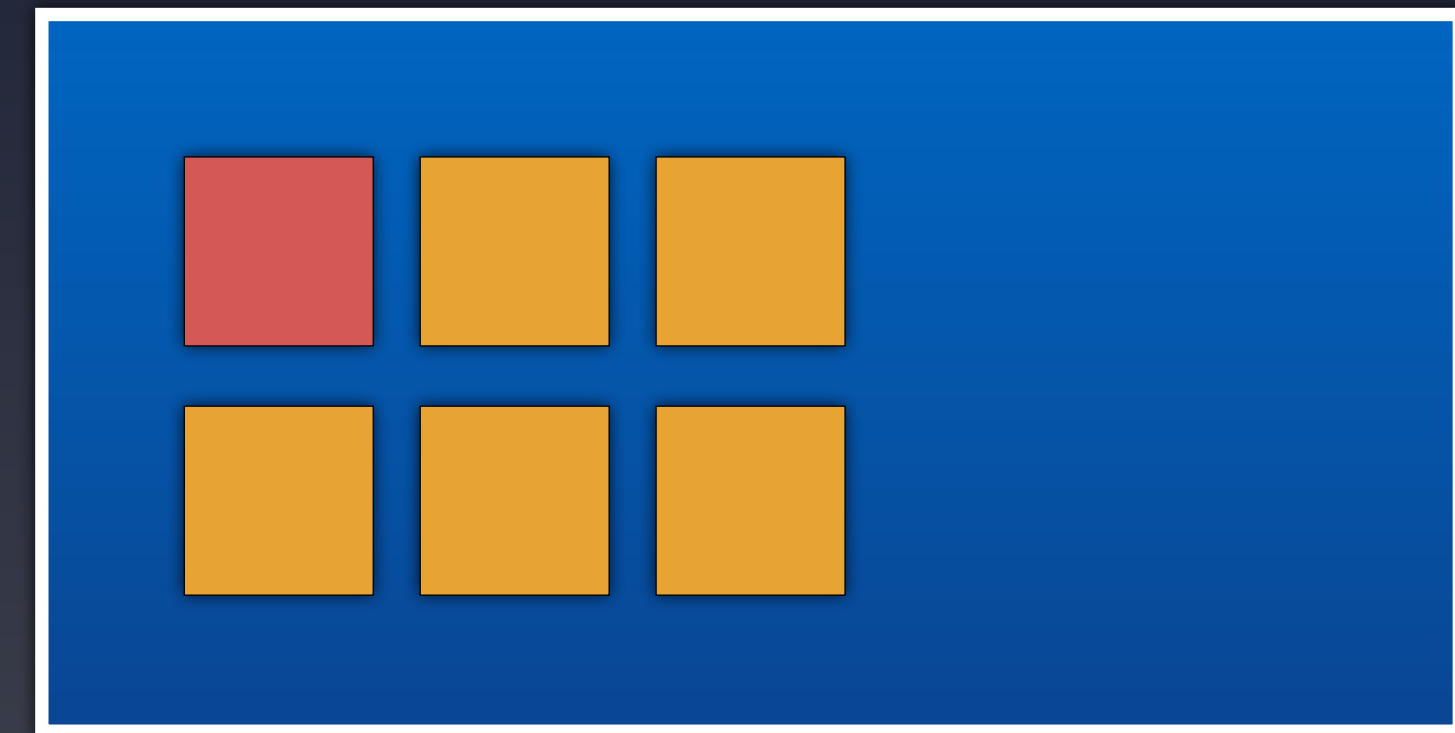
AM3

16 racks



AM5

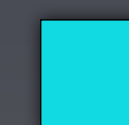
6 racks



From 46 to 22 racks - 52% reduction



Network



GI



Hadoop cluster

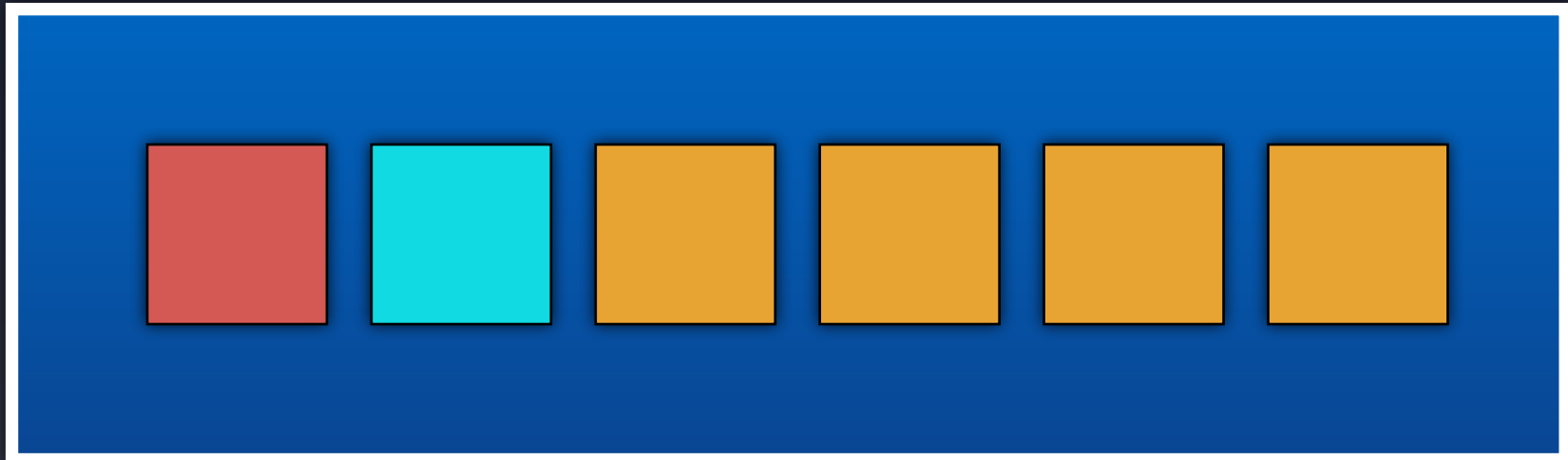


IT

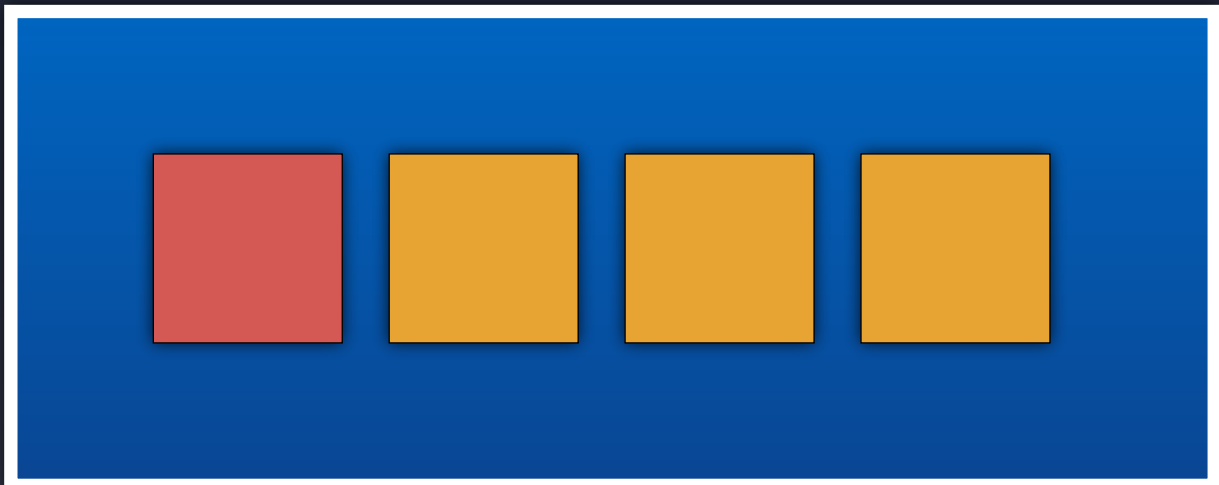
Data centre - goal end of 2025



AM3



AM5



From 46 to 10 racks - 78% reduction

Network

GII

Hadoop cluster

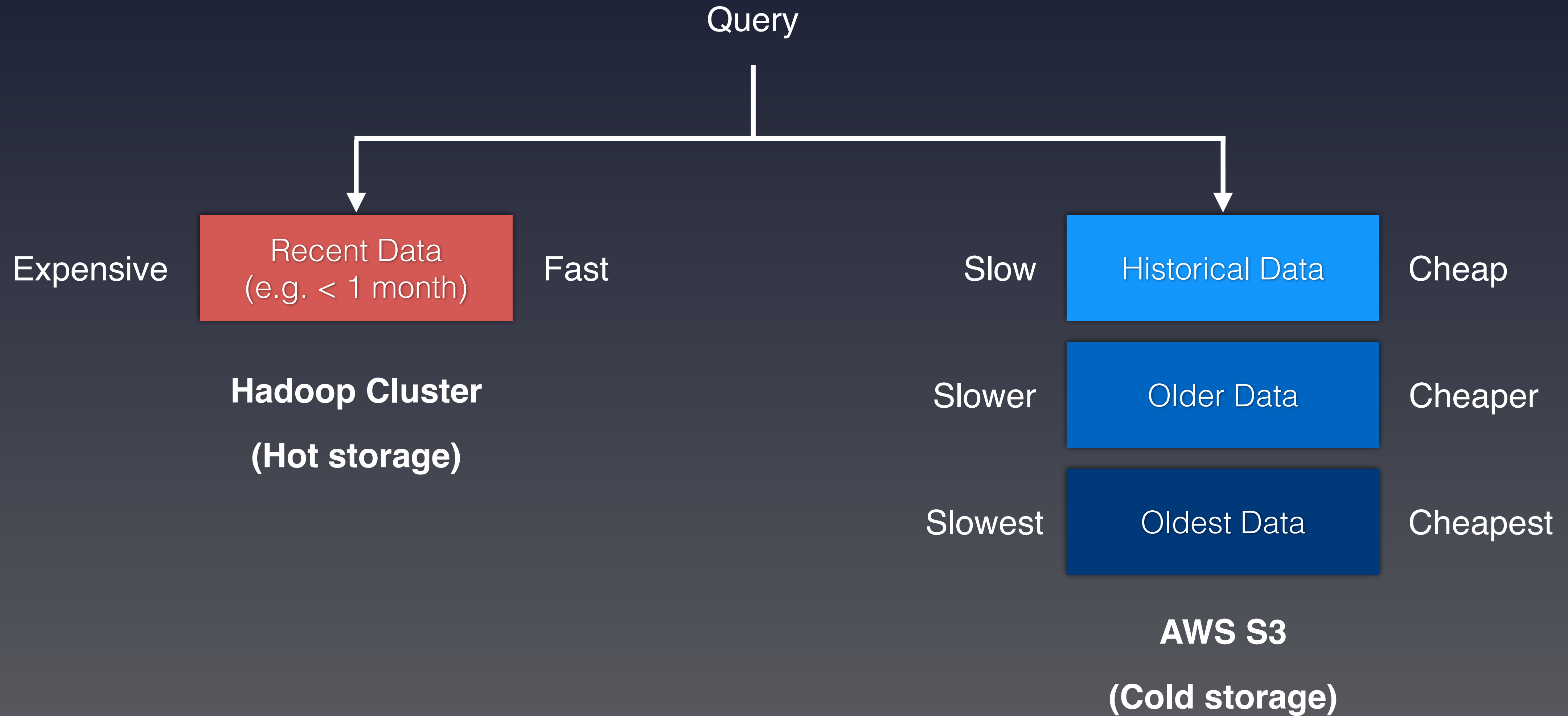
IT

RIPE Atlas backend migration



- Since last year we have started with the migration of RIPE Atlas datasets from our on-premise infrastructure to a hybrid solution
 - Smaller cluster built using rented bare metal from a European cloud provider for recent data (e.g. less than one month old)
 - AWS S3 storage for historical data (very large datasets that comprise most of the current storage)
- New solution costs only a fraction of the current one while being future-proof at the same time
 - Expectation is that costs will be reduced by half
 - Service quality won't be affected (e.g. search will still quickly return results)

Proposal

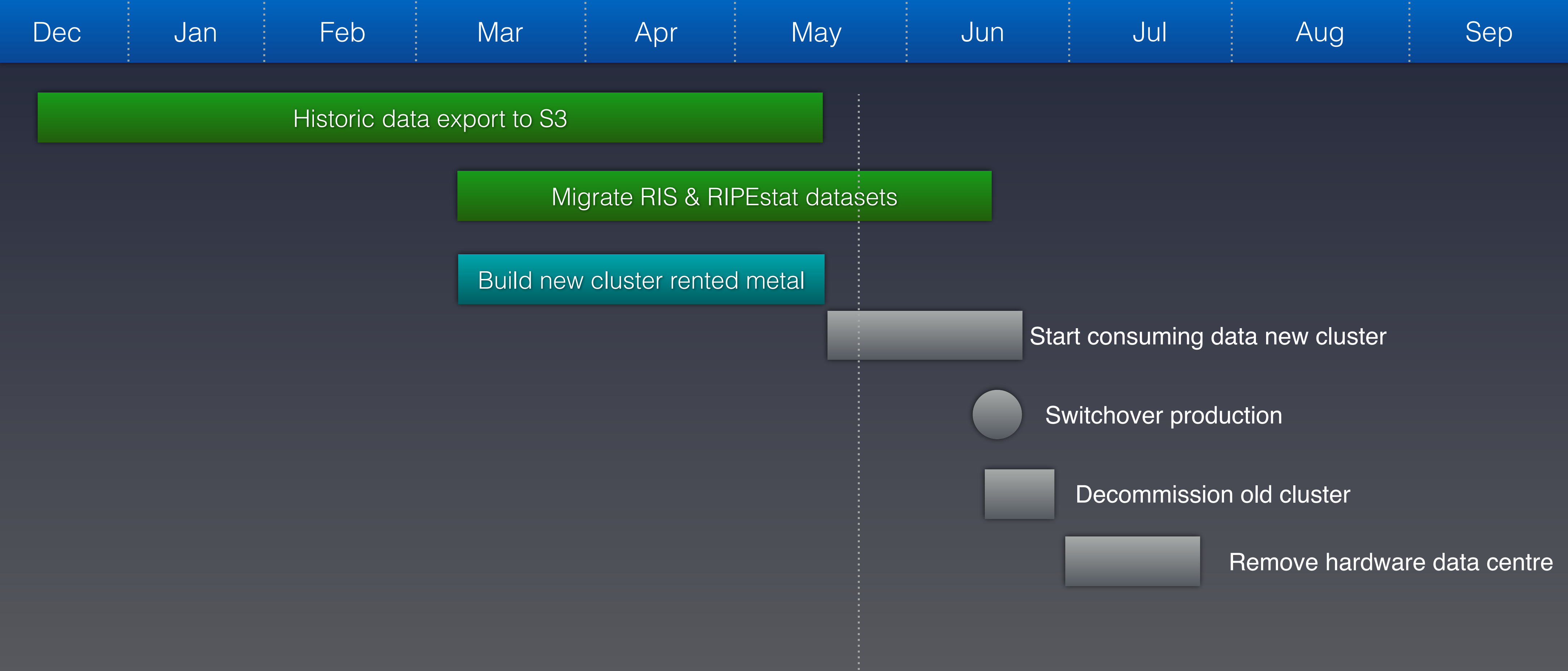


Cost savings



- Whether moving to the cloud is cheaper or not depends on each use case
 - Here, AWS S3 proved to be significantly cheaper than doing it on-premise
- Cost of AWS S3 and of the new cluster are roughly the same
 - Total budget for new storage solution is €190K
- Since parameters are adjustable (e.g. size of the hot storage, tiering) we can optimise for cost, performance or find a good balance between both

Migration timelines



Takeaways



- Ensuring the security of our services is the top priority in Technology
 - The goal is to contribute to the stability of the Internet
- Cost effectiveness is our second priority
 - We are aiming to achieve significant cost reductions by modernising the infrastructure used by our Internet Measurement services



Questions



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