CONF42
CLOUD NATIVE 2025

Netrunner's Guide to AWS SES: Hacking Communication Barriers

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Cloud Engineer @ APA-Tech
March 2025

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Servas,
oida!
From Vienna

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aws sts get-caller-identity

Cloud Engineer of APA-IT or “Mr. Amazon”
AWS Community Builder
AWS User Group Vienna & Linz Leader

M.Sc. in Telecom w/h (SUITT – Odesa, Ukraine, 2022)
B.Sc in Business Management (SUITT, 2021)
In IT since 2014, has a background in
system engineering, networks, programming, operations, game design, e.t.c.

Started with AWS in 2020, with a full focus since 2022
6x AWS Certified – hunting for the “Golden Jacket”
Motorsport fan and photography hobbyist

Sending over 500k emails daily powered by AWS SES

Powered by…

Way more than just the press agency's IT department.

In-house:

APA APA COMM APA NEWS

External:

And even more, you won't even suspect!

is powering media production of Austria APA TECH

Tonight!

The Security Triangle

Communication That Doesn't Just Send—It Delivers

Three Approaches to Rate Limiting

Metrics that matter

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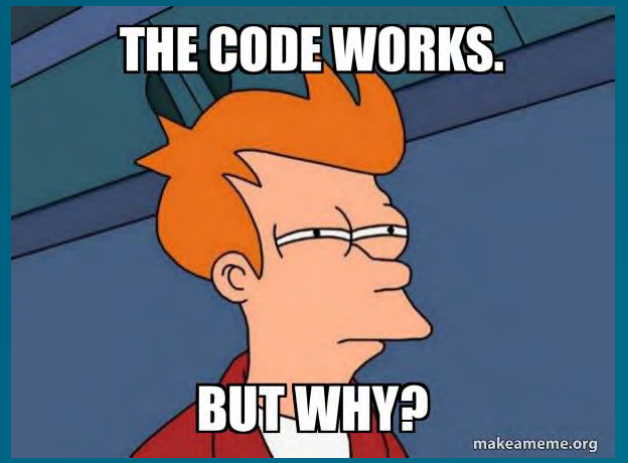
Why email is complicated?

The main challenges



Our approach

Why the simple mail service is more than simple?

Powers core media applications of APA-IT.
Reliably. APA OTS. APA PIX. APA AAP.
PRESSE MONITOR. And more.

Provides flexible ways for the integration.

Provides you with a vision. If you speak to it.

Robust integration with other AWS Services

Sometimes it’s not simple because it’s simple.

Our approach

But... the problem of SES is it’s too simple.

Are we in contact?

What I love about it:
Reliable if configured in a proper way.
It’s easy to set up and it just works.

What I hate about it:

Black magic behind the complaint rate.
Deliverability is hard to investigate.
It’s too simple.

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Our approach

We handled it.

Transparent integration with where is it necessary.

Rate limiting is not a stress anymore.

We know how are our sendings doing.

We are able to respond fast on delivery issues

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Start me up!

Some pre-start checking.

Sandbox is important. Trust is a must.

The sending rate is more important than you think.

Delegate what is necessary.

Make sure you have access to the DNS of identity.

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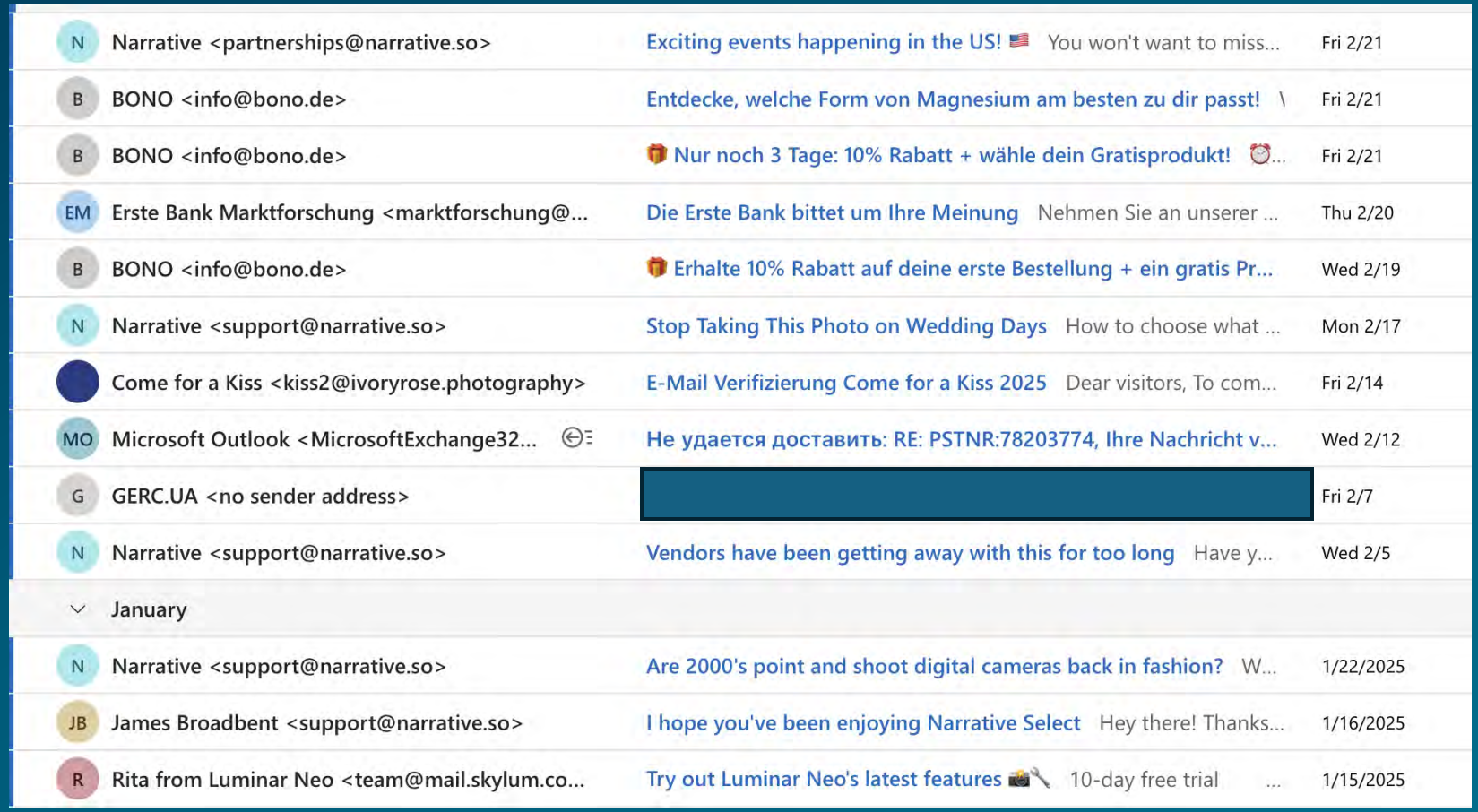
Start me up!

Real world example. A sad one.



N	Narrative <partnerships@narrative.so>	Exciting events happening in the US! 🇺🇸 You won't want to miss...	Fri 2/21
B	BONO <info@bono.de>	Entdecke, welche Form von Magnesium am besten zu dir passt! \	Fri 2/21
B	BONO <info@bono.de>	🎁 Nur noch 3 Tage: 10% Rabatt + wähle dein Gratisprodukt! ⏰...	Fri 2/21
EM	Erste Bank Marktforschung <marktforschung@...	Die Erste Bank bittet um Ihre Meinung Nehmen Sie an unserer ...	Thu 2/20
B	BONO <info@bono.de>	🎁 Erhalte 10% Rabatt auf deine erste Bestellung + ein gratis Pr...	Wed 2/19
N	Narrative <support@narrative.so>	Stop Taking This Photo on Wedding Days How to choose what ...	Mon 2/17
	Come for a Kiss <kiss2@ivoryrose.photography>	E-Mail Verifizierung Come for a Kiss 2025 Dear visitors, To com...	Fri 2/14
MO	Microsoft Outlook <MicrosoftExchange32...	Не удается доставить: RE: PSTNR:78203774, Ihre Nachricht v...	Wed 2/12
G	GERC.UA <no sender address>		Fri 2/7
N	Narrative <support@narrative.so>	Vendors have been getting away with this for too long Have y...	Wed 2/5
	January		
N	Narrative <support@narrative.so>	Are 2000's point and shoot digital cameras back in fashion? W...	1/22/2025
JB	James Broadbent <support@narrative.so>	I hope you've been enjoying Narrative Select Hey there! Thanks...	1/16/2025
R	Rita from Luminar Neo <team@mail.skylum.co...	Try out Luminar Neo's latest features 📸🔧 10-day free trial ...	1/15/2025

Start me up!

Some pre-start checking.

Use SMTP for:
- fast translition to SES for your legacy applications

Use native AWS API:
- for service development and integration
– template controlling
– use all the potential of AWS SES

Scan me for the CloudFormation template!

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Is this really you?

You have only 72 hours!

The golden triangle of **VALIDATION**.
Otherwise, you will send emails only to **yourself**.

EasyDKIM works in 99% of cases. **AWS manages it for you.**
Usage of the CUSTOM MAIL FROM is a **must**:

- increases your delivery rate
- makes you able to pass Gmail and O365 Spam filters
- Allows you to separate DMARC record from the main domain

Also, works for the domain validations!

SPF. **Just copy it.**
Subdomain can allow you to separate SES from the main domain config.

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Is this really you?

You shall not pass!

DMARC is your permit to represent the sender.

works with SPF and DKIM to prevent email spoofing and phishing

```
v=DMARC1;p=none;sp=none;pct=100;rua=mailto:dmarc_reports@example.com;ruf=mailto:forensic_reports@example.com;fo=1;adkim=r;aspf=r
```

Implementation Keys: Requires either SPF or DKIM authentication to pass
Ensures "domain alignment" between visible From address and authentication domains
Provides reporting and policy enforcement options

1. Phased Implementation: Monitor (p=none) → Analyze reports
2. Quarantine (p=quarantine) → Send to spam if fails
3. Reject (p=reject) → Block delivery if fails

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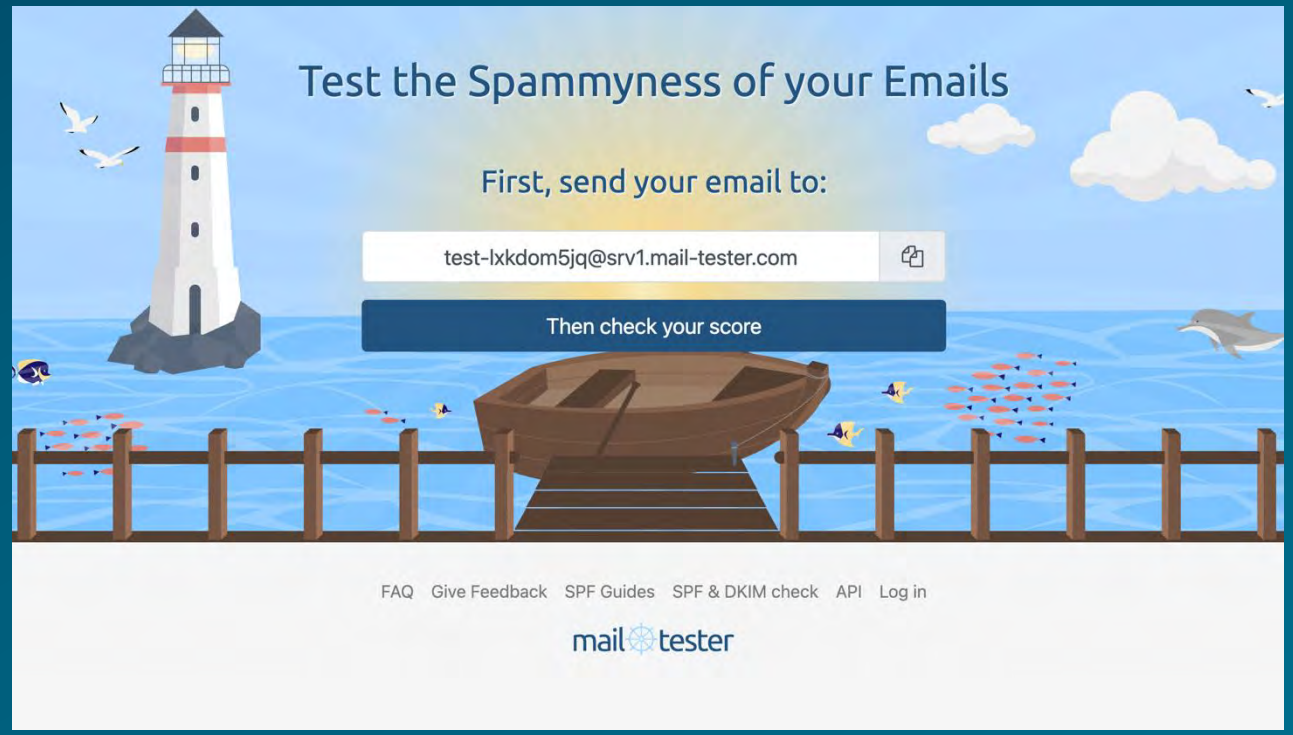
Is this really you?

You shall not pass!

Must use service!

https://www.mail-tester.com/

You are amazing!



Is this really you?

Think Different.

By default, AWS SES is not compatible with Apple Private Relay.

Problem:
All the deliveries has bounced. Full suppression list of the private relays.

Solution:
You must verify your SES identity including CUSTOM MAIL FROM in the Apple Developer Console.

Optional:
Lambda to clean up @privaterelay.appleid.com emails.

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Can we already send it???

Matrix of the success.

Bounce rate. <5%
Complaint rate < 0.1%
Delivery rate > 95%

Please be fair.

Separate transactional emails from the marketing ones.
Feedback loops are important.

Can we already send it???

Dedicated doesn’t mean easy.

When – you are a big enterprise with more than 100k+ emails daily

Key benefit – complete control over reputation

Essential – proper IP warming + sending consistency

Best practices:

Monitor reputation metrics daily
Maintain separate IPs for different sending purposes
Implement proper authentication (DKIM/SPF)
Set up dedicated feedback loops
Get the external IP check for the Blacklisting

Can we already send it???

Or still not…

Just call me maybe? NO.

NOT THE SES.Client.send_email(**kwargs)

I am serious.

You don’t come nude to it.

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Can we already send it???

Some understanding.

When AWS gives you a limit of X then X is the number of targets you can do per sending per second!

There is a burst of the limit but no one knows how much.

1 email itself doesn’t mean endless number of recipients.

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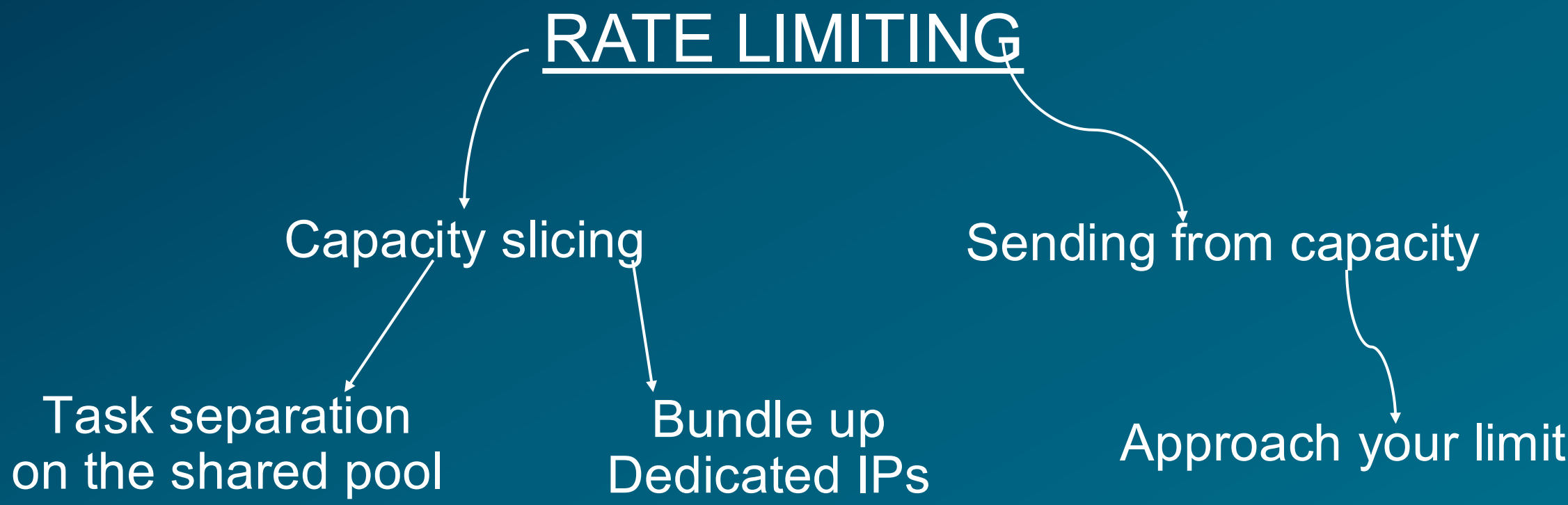
Take it seriously!

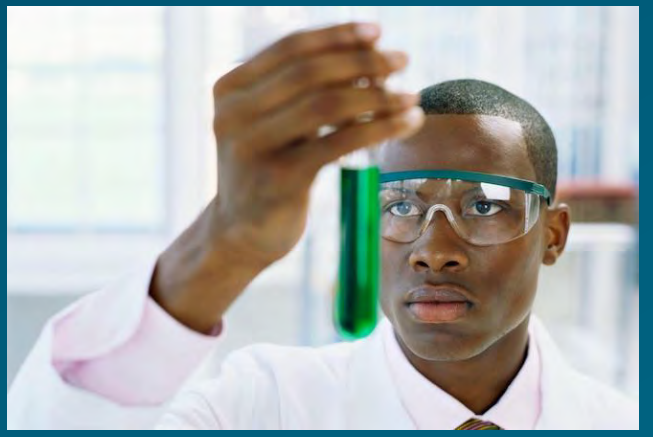
More serious than ever.



Take it seriously!

You have a choice!

Scenario one. “Leaky Bucket”



One (two) core components:

- Precision rate limiter (Like Resilience4j for Java or leaky_bucket for Python)
- Recipient pool chunking * - optionally
- Uses standard AWS Libraries

Pros: Provides a baseline reliability for the sending API calls
Cons: is not dynamic, still a chance of losing an email

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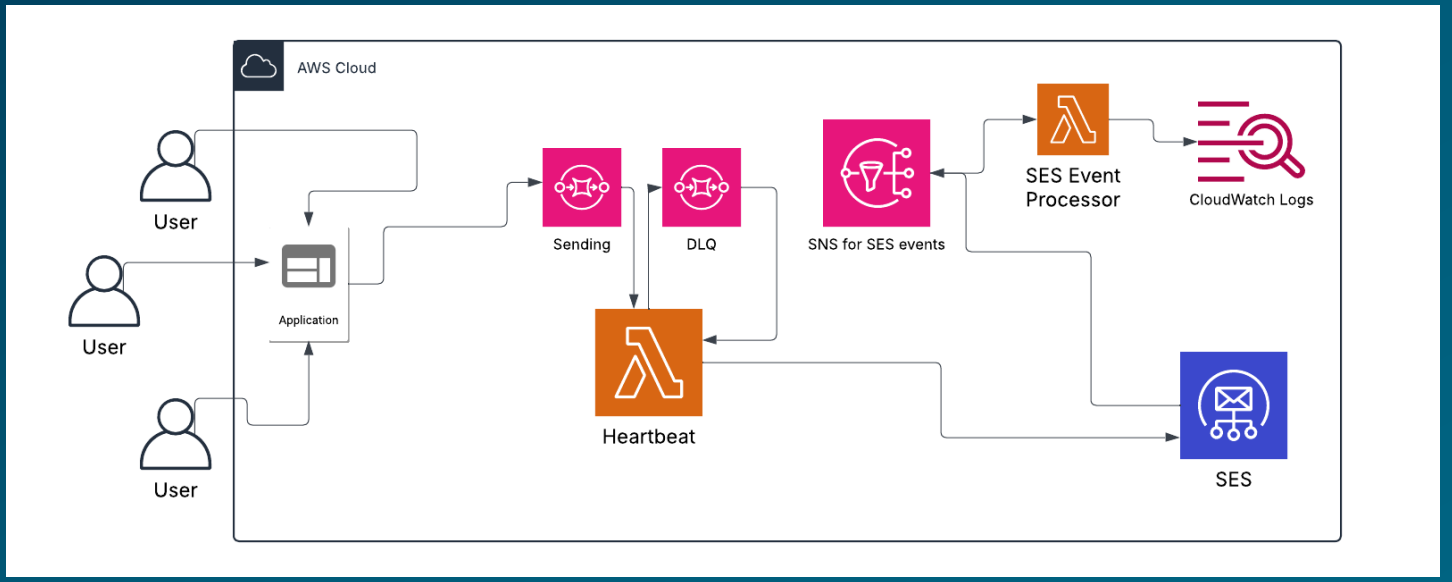
Take it seriously!

You have a choice!



Scenario two.

“In honor of the dear community members Luc and Yan”
- Emails are getting delivered to the SQS queue
- Lambda processes it and does the actual call
- Failures are going to the DLQ queue
- Sending logic is outside of the application (reusable!)

Pros: Provides a baseline reliability for the sending API calls
Cons: still not that dynamic, requires fine tuning, latency

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Take it seriously!

Then I started to think…

Inspired by:

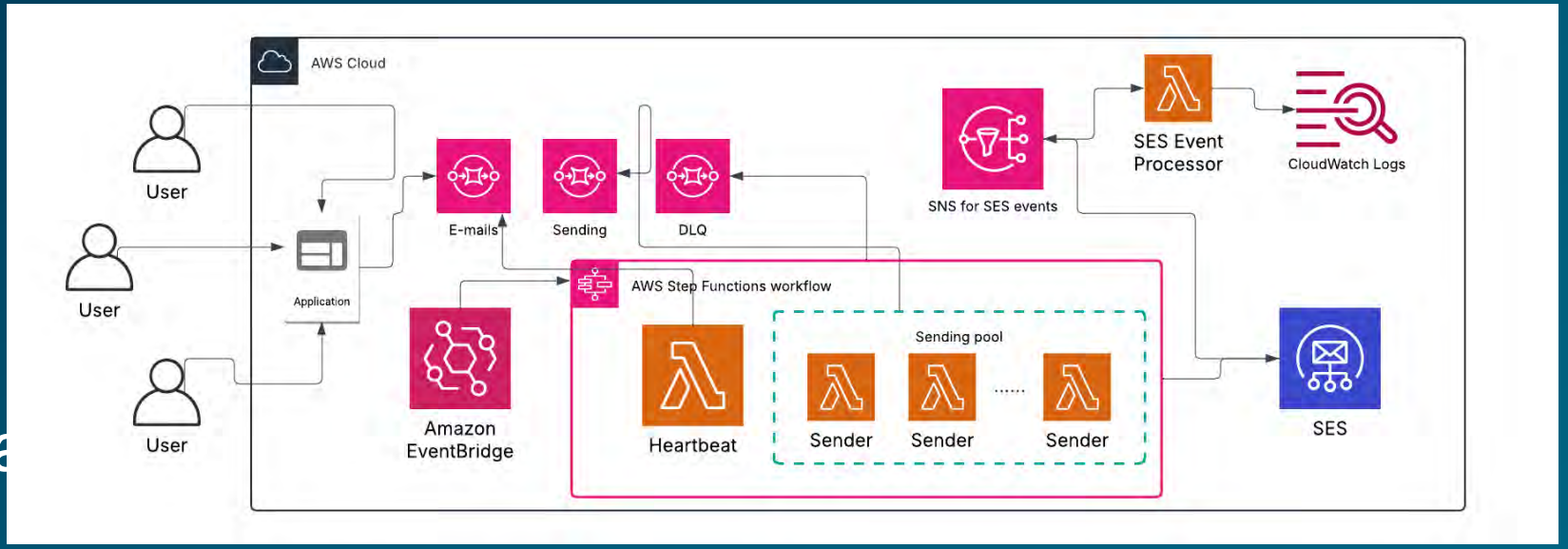
How to invoke an AWS Lambda function at the top of a minute using AWS Step Functions by Dennis Traub

How to Automatically Prevent Email Throttling when Reaching Concurrency Limit
by Mark Richman and Guy Loewy

Heimdall-Burstable-SES by Michael Haar – reference design

Take it seriously!

You have a choice!
Scenario three.



“Let’s be smart”
- We create a “heartbea
+
approach 2
- Lambda Concurrency in a core
- The Sending rate on the unit of time depends on the num. of recipients
- And also never goes above sending rate because of the concurrency
- Precise launch by the EventBridge trigger

Pros: You never able to hit sending limit trotting
Cons: A bit complex

Take it seriously!

You have a choice!

Use chunking and rate limiters when you have a fixed repeatable scenario and you can afford losing the email.

Use SQS+DLQ when you can’t afford losing the email and you have predicable sending pattern.

Opt for the Lambda Concurrency if you need reliable sending.

Opt for the Heartbeat machine if you need a workhorse.

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It’s out! What’s now?

Communicate!

AWS SES events is a thing you have no right to overlook.

Open you opportunity for event processing.
Logging.
Metric fetching.
Event response.
Application integration.
Forming of CloudWatch metrics.
... and many more.

And don’t forget about the message-id!

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It’s out! What’s now?

Communicate!

AWS SES events is a thing you have no right to overlook.

This + AWS “Swiss Army Knife”= desired business logic!

Time for the architectural inspirations!

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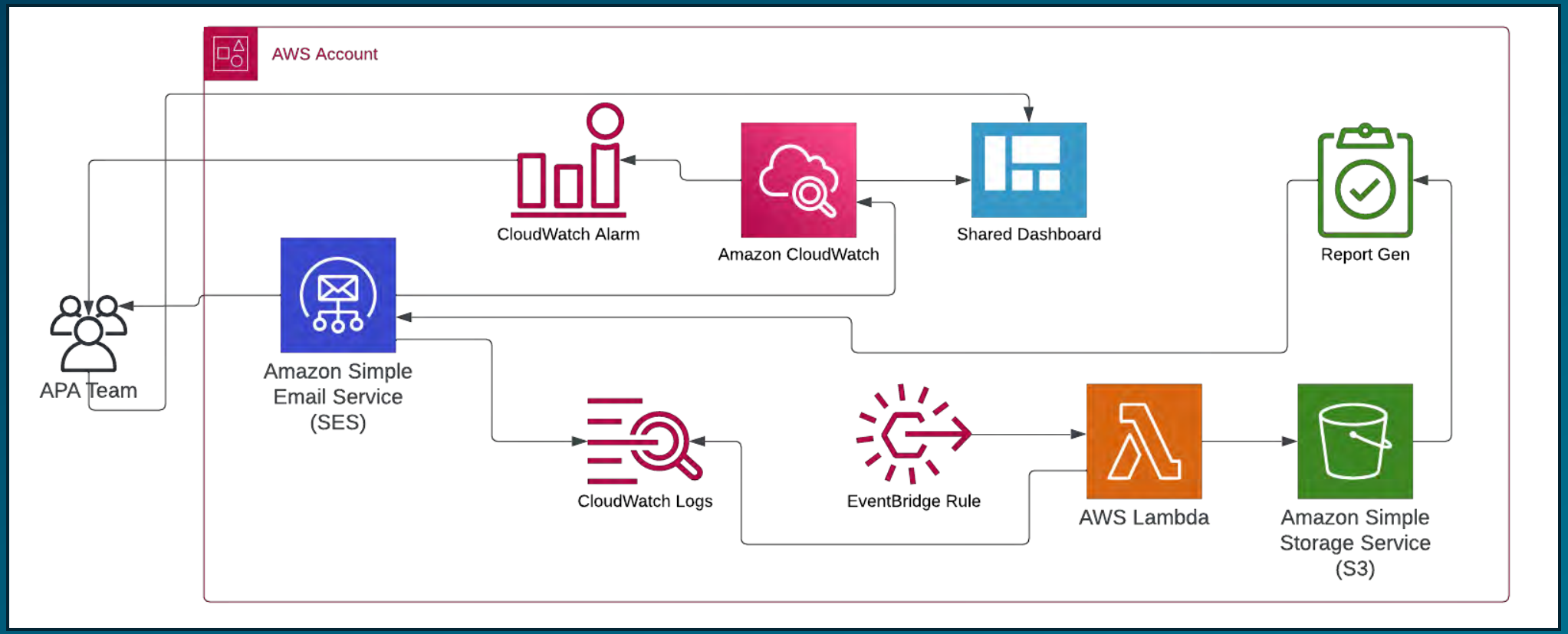
It’s out! What’s now?

Communicate!



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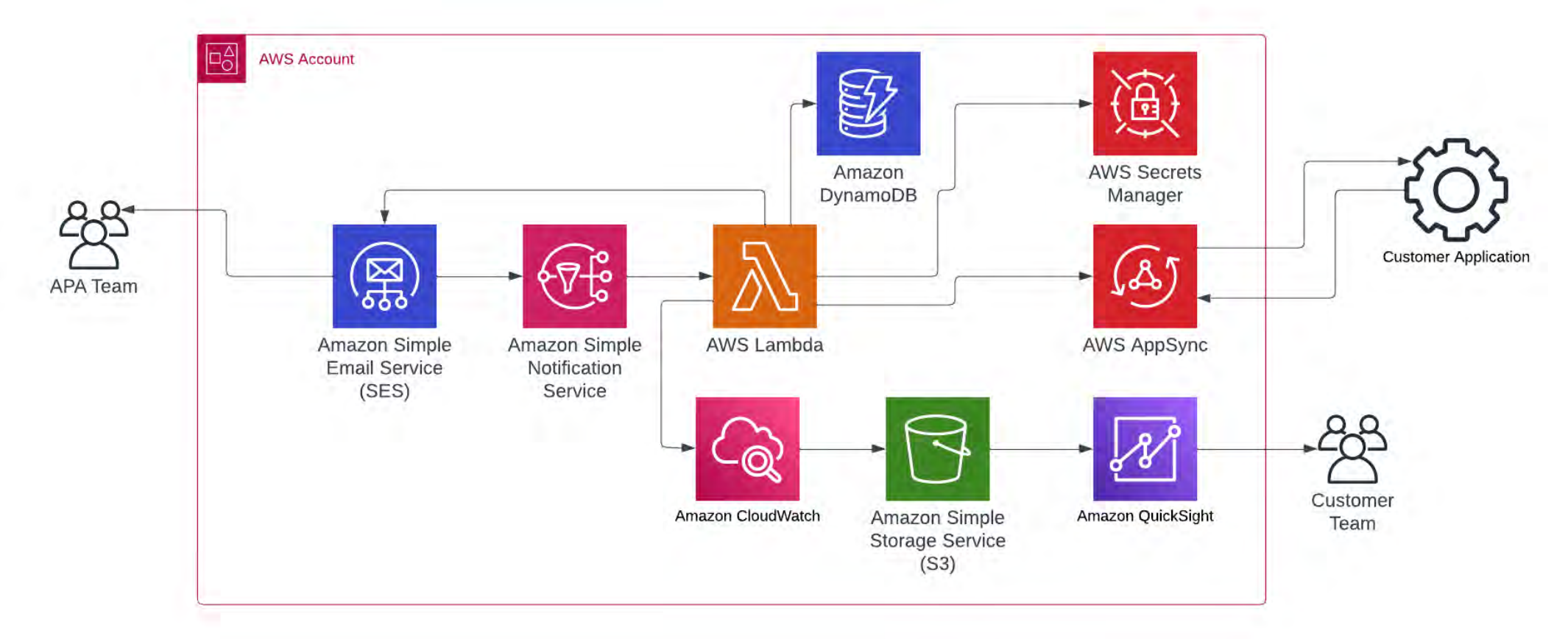
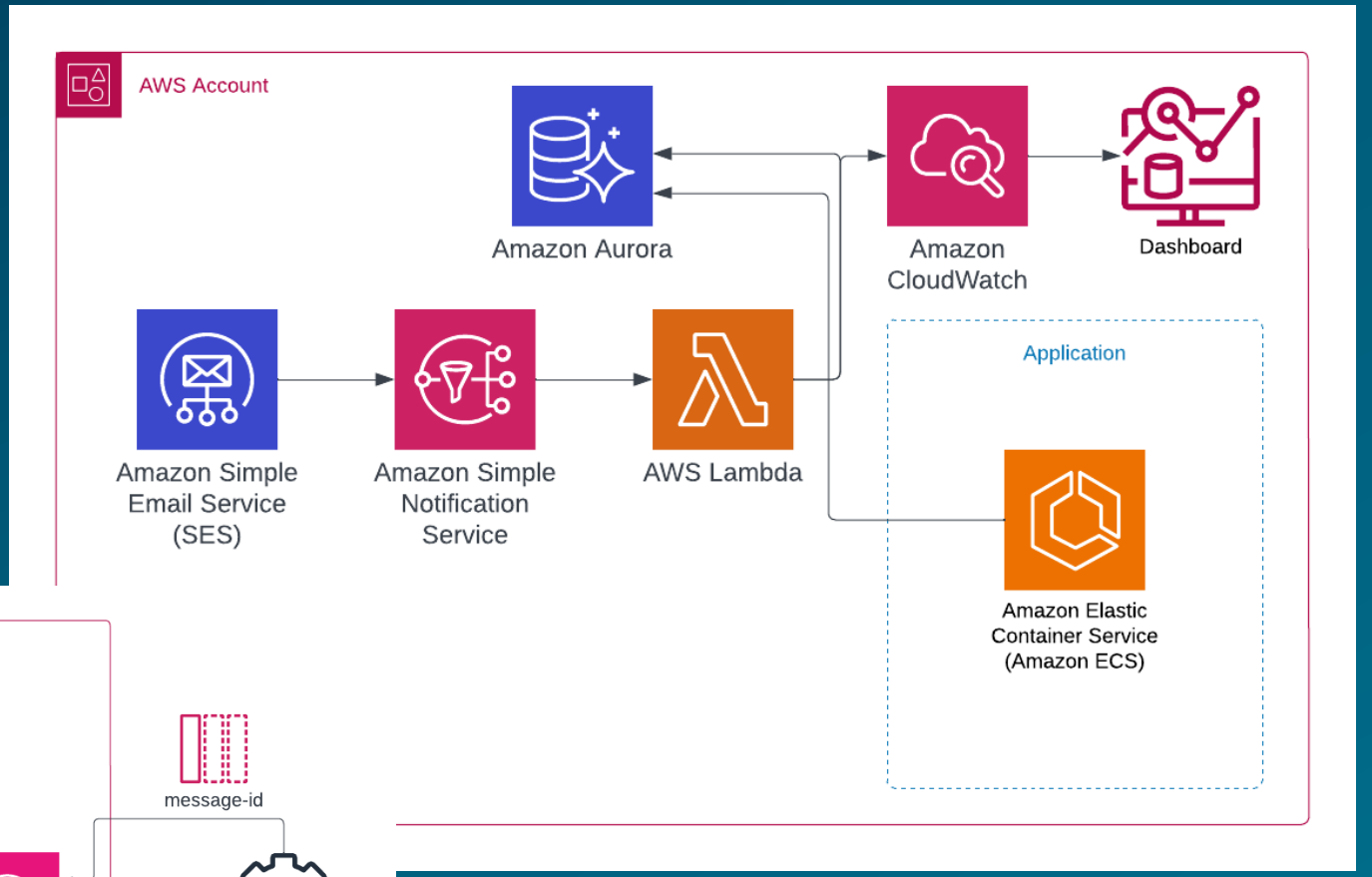
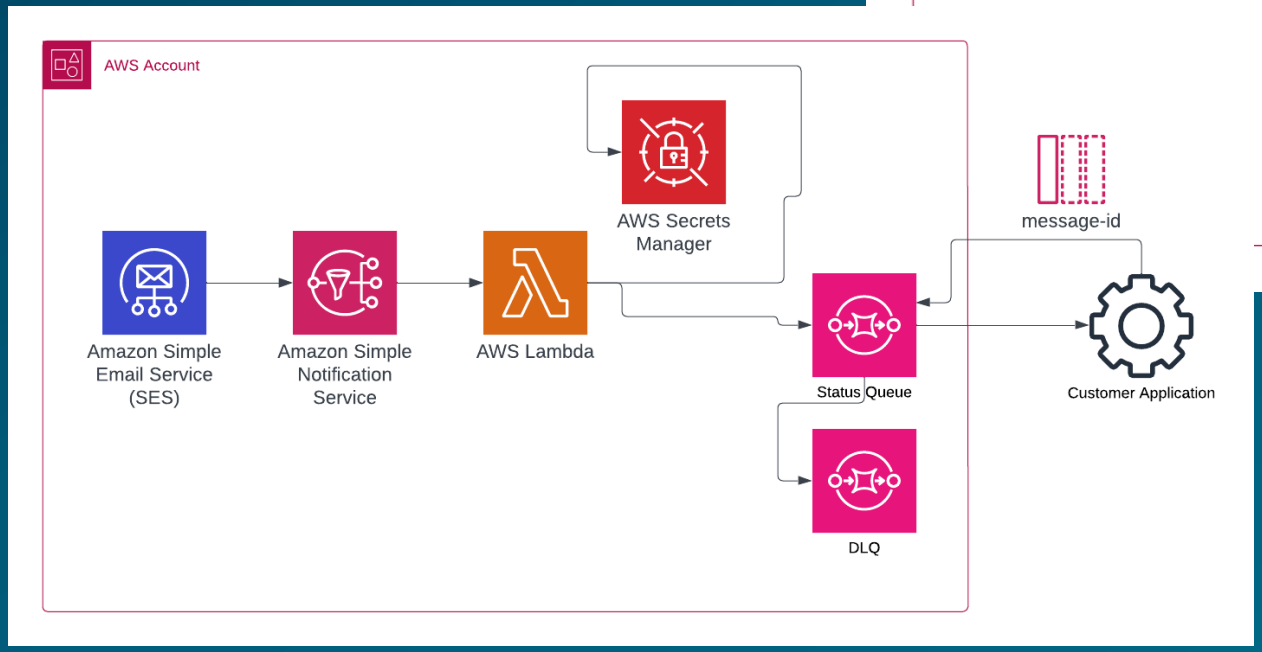


It’s out! What’s now?

Communicate!





It’s out! What’s now?

Communicate!

Special shootout… to a good friend.

Use AWS QuickSight for data representations and visualizations

- Often the only AWS touchpoint for business users
- No cloud expertise required
- Self-service analytics:
- Create custom dashboards and reports
- ML-powered insights without data science skills
- Promotes data-driven culture across the organization

… or just cook the data in the way you need!

Let’s sump it up

SES is your friend!

- Configuration is 99% of the success with SES.
- M365 and Google Workspace spam filtering is aggressive
- Take a control of your reputation. It’s a must.
- Sending Rate is yours key consideration.
- Co-work with your developers to work with API in a style.
- AWS Swiss Army Knife makes Simple Email Service Your Email Service
- Don’t be afraid to cloud architect! Be creative!

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Thank you!

Proposals? Questions?

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Let’s connect at the LinkedIn!

Join us for AWS Community Day DACH 2025!
7th October – Munchen – Smart Village
Join me at AWS Community Day Italy!
2 April 2025 – Milan

https://www.aws-community-day.de/

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