AWS re:Invent

From 0 to 100M+ Emails Per Day: Scaling Your Email Sending with Amazon SES

Amazon SES, Blue Shell Games, and Amazon.com

November 13, 2013

amazon web services

AWS re:Invent

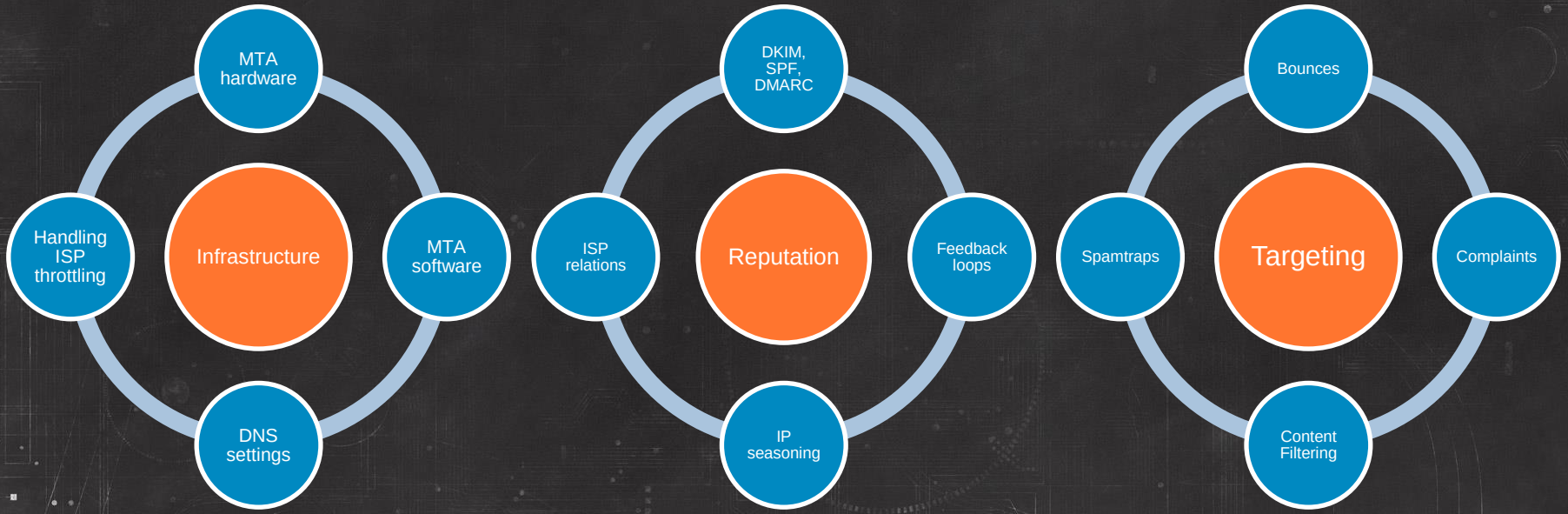
Getting Started with Amazon SES

Abhishek Mishra, Software Development Manager, Amazon SES

November 13, 2013

amazon web services

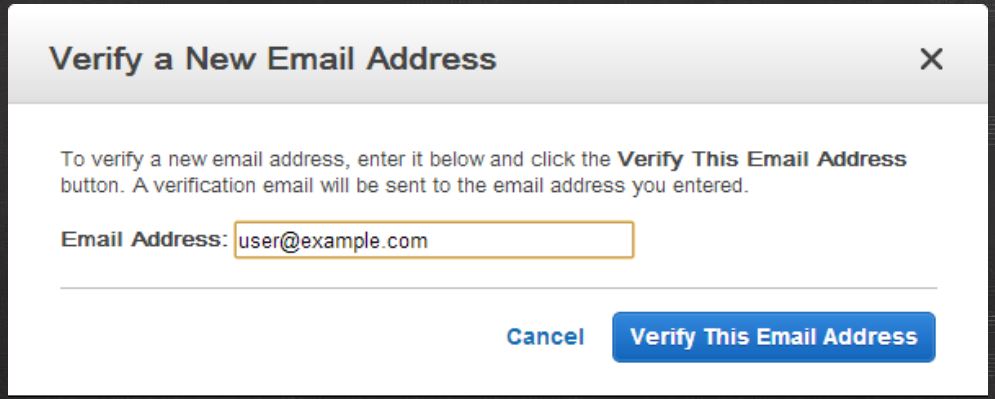
Why is sending email hard?

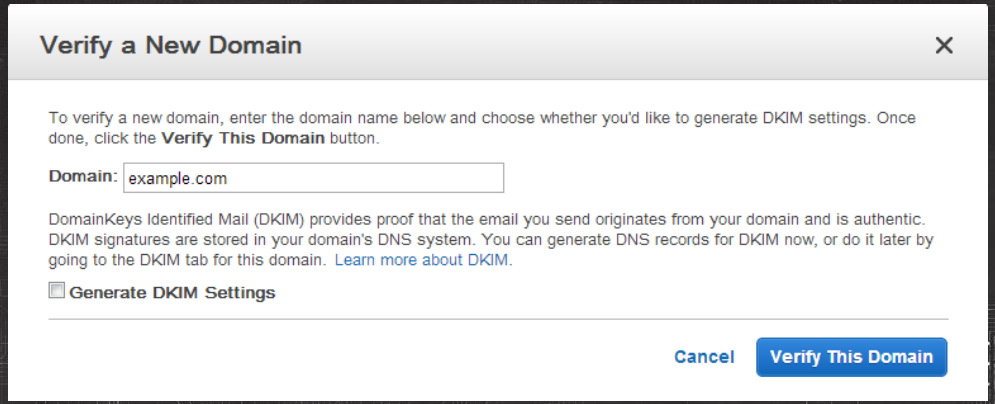


Getting Started with Amazon Simple Email Service

Getting Started (1/4)

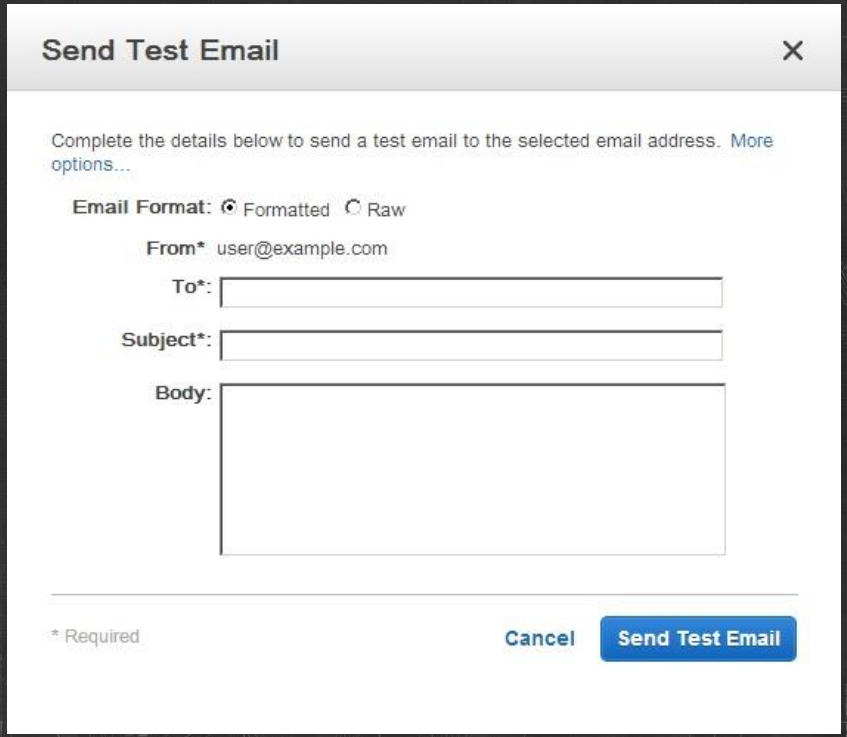
- Verify an email Address…
- …or verify a domain





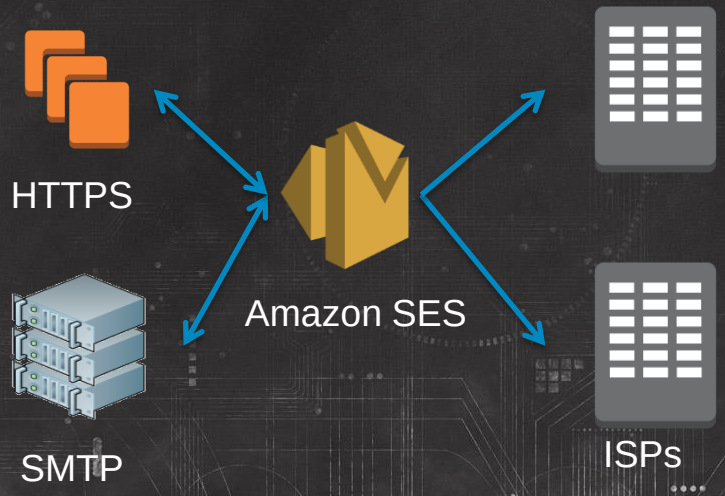
Getting Started (2/4)

- Send a test email through the Amazon SES console



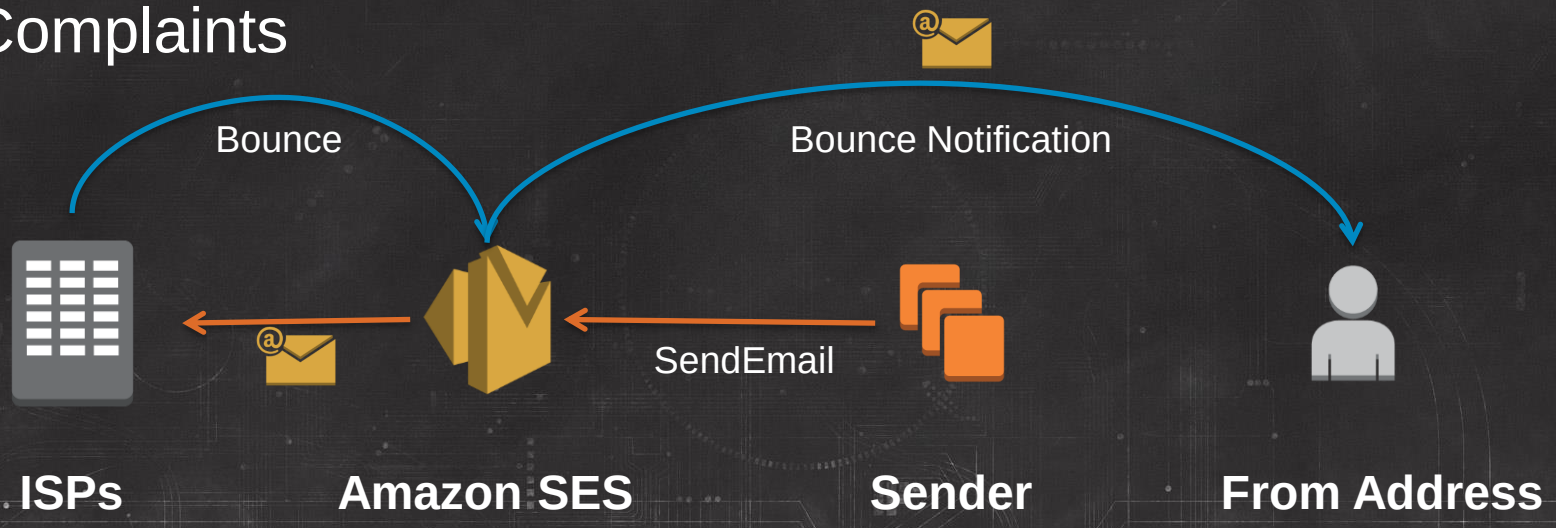
Getting Started (3/4)

- Integrate your application with Amazon SES
  - Point existing mail server (MTAs) to the Amazon SES SMTP endpoint
  - Or use the Amazon SES Query interface (HTTPS)



Getting Started (4/4)

- Expect feedback notifications over email
  - Bounces
  - Complaints



Scaling with Amazon SES

The Fundamentals of Scaling Up

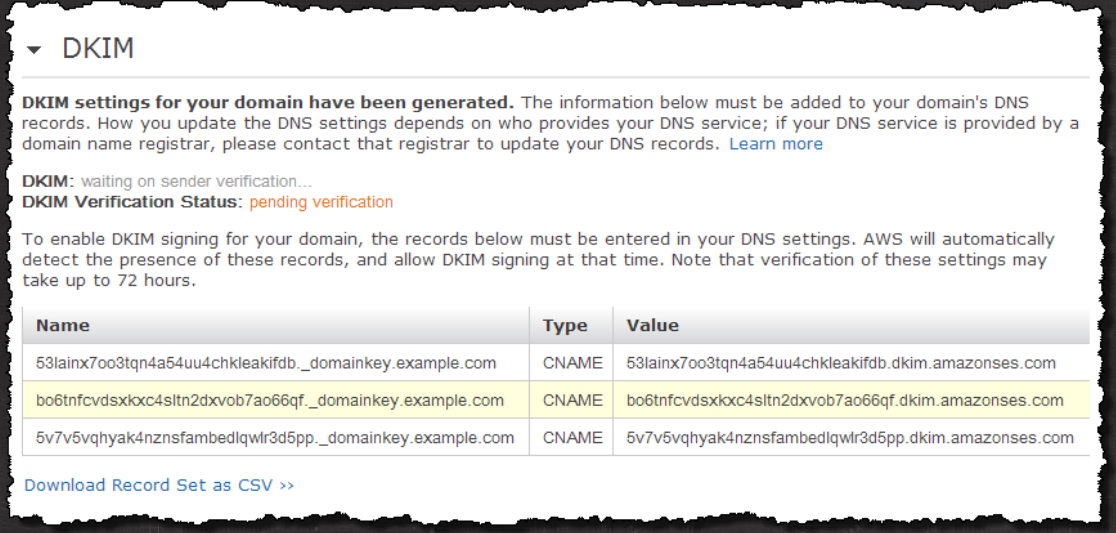
- Set up email authentication

DomainKeys Identified Mail (DKIM)

- Proves to recipient that sender of email is allowed to send from that domain
- Proves to recipient that email contents have not been tampered with during transit
- Helps ISPs associate email reputation with your domain
- Check out our blog series!

DKIM with Amazon SES (1/2)

- Set up DKIM for your domain with EasyDKIM



DKIM

DKIM settings for your domain have been generated. The information below must be added to your domain's DNS records. How you update the DNS settings depends on who provides your DNS service; if your DNS service is provided by a domain name registrar, please contact that registrar to update your DNS records. Learn more

DKIM: waiting on sender verification...
DKIM Verification Status: pending verification

To enable DKIM signing for your domain, the records below must be entered in your DNS settings. AWS will automatically detect the presence of these records, and allow DKIM signing at that time. Note that verification of these settings may take up to 72 hours.

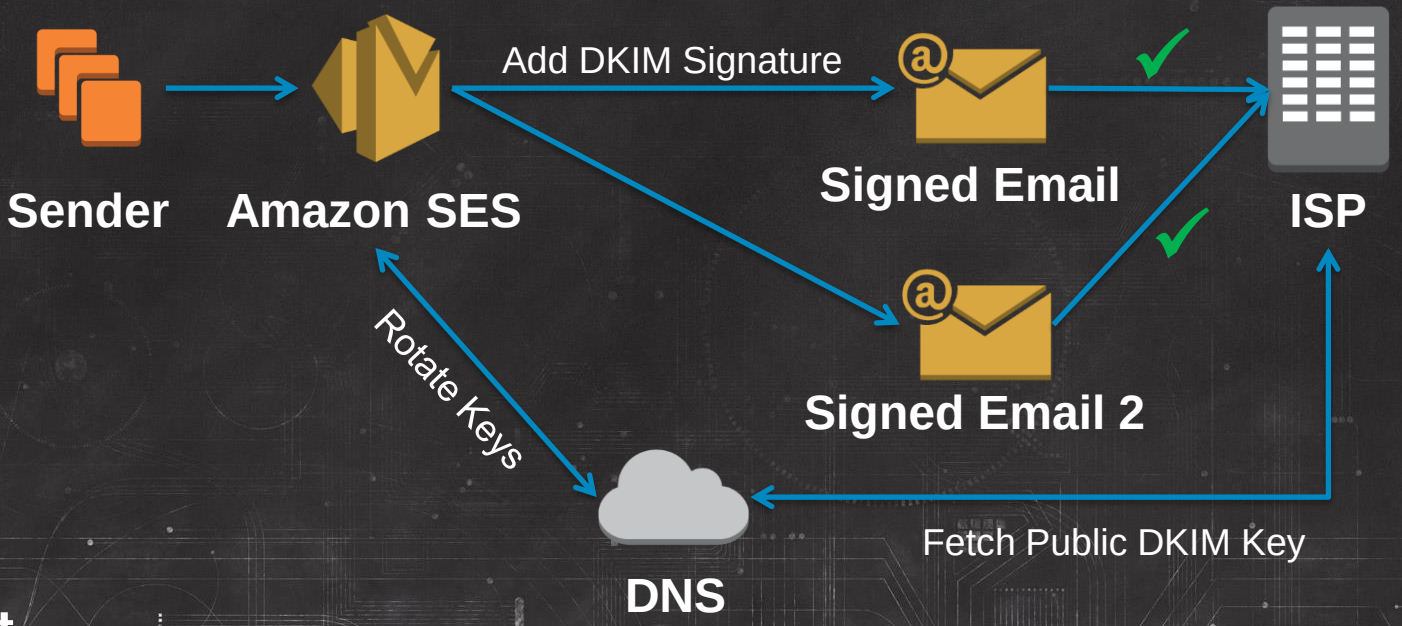
Name	Type	Value
53lainx7oo3tqn4a54uu4chkleakifdb._domainkey.example.com	CNAME	53lainx7oo3tqn4a54uu4chkleakifdb.dkim.amazonses.com
bo6tnfcvdsxkxc4sltn2dxvob7ao66qf._domainkey.example.com	CNAME	bo6tnfcvdsxkxc4sltn2dxvob7ao66qf.dkim.amazonses.com
5v7v5vqhyak4nznsfambedlqwlr3d5pp._domainkey.example.com	CNAME	5v7v5vqhyak4nznsfambedlqwlr3d5pp.dkim.amazonses.com

Download Record Set as CSV ››

- Amazon SES integrates with Amazon Route 53

DKIM with Amazon SES (2/2)

- Automatic key rotation



Sender Policy Framework (SPF)

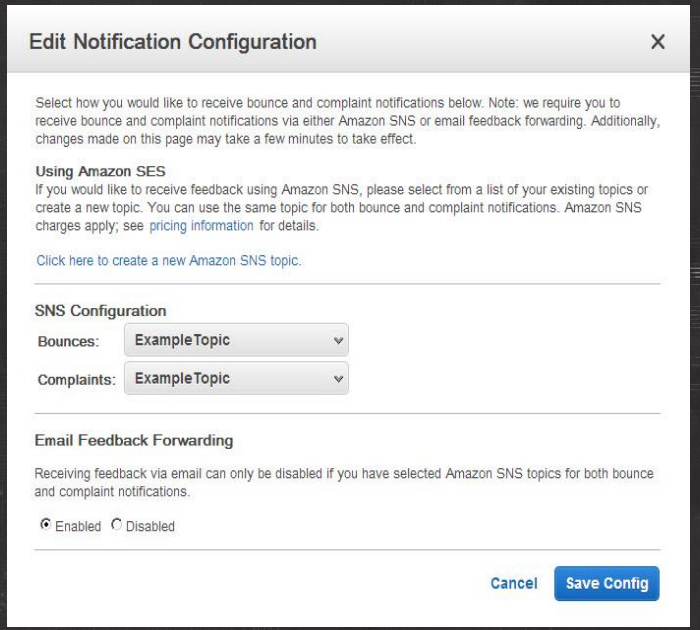
- Authenticates sending mail server IPs
  - Are these IP addresses allowed to send on behalf of the sending identity (domain)?
- See Amazon SES documentation for DNS record to publish

The Fundamentals of Scaling Up

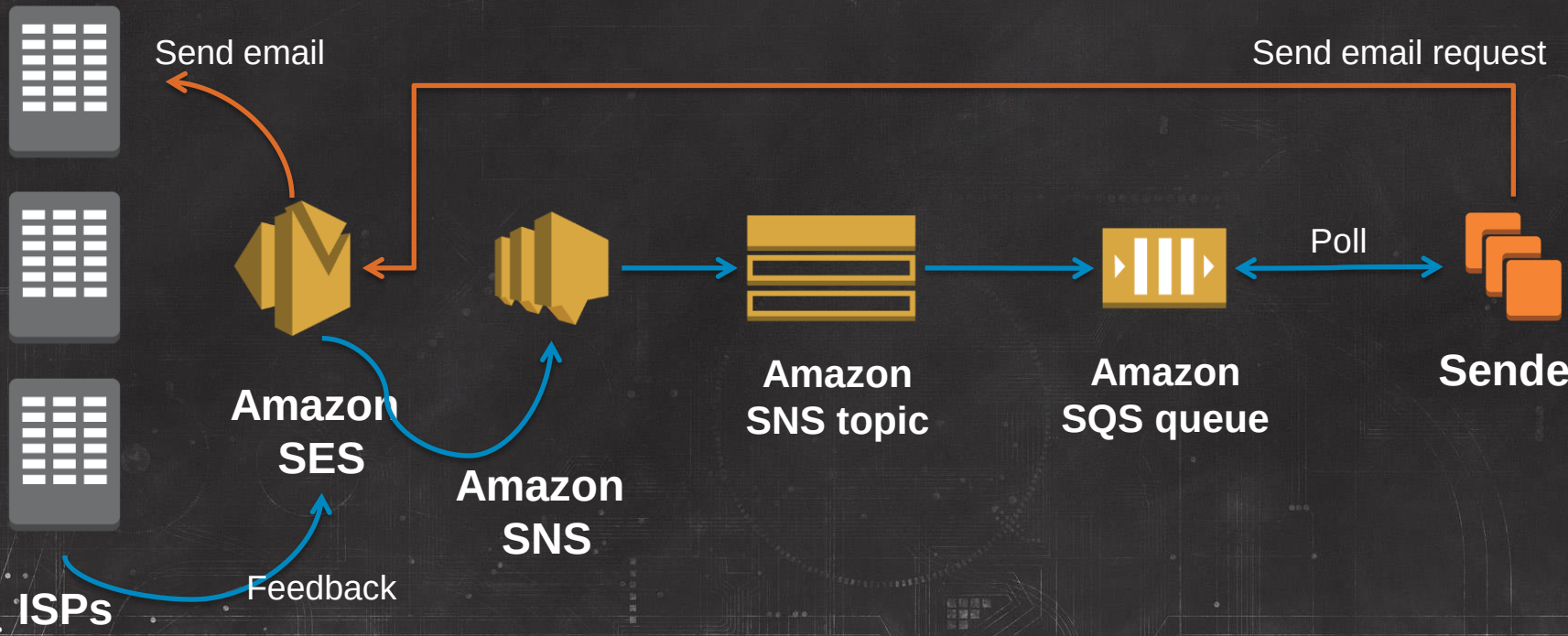
- Set up email authentication ✓
- Set up a reliable feedback processing system

Set Up Feedback Processing over Amazon SNS

- Bounces and complaints
  - Treat as opt-outs
- Email or Amazon SNS notifications
- Test with the mailbox simulator
  - Success, bounce, complaint, OOTO, etc.

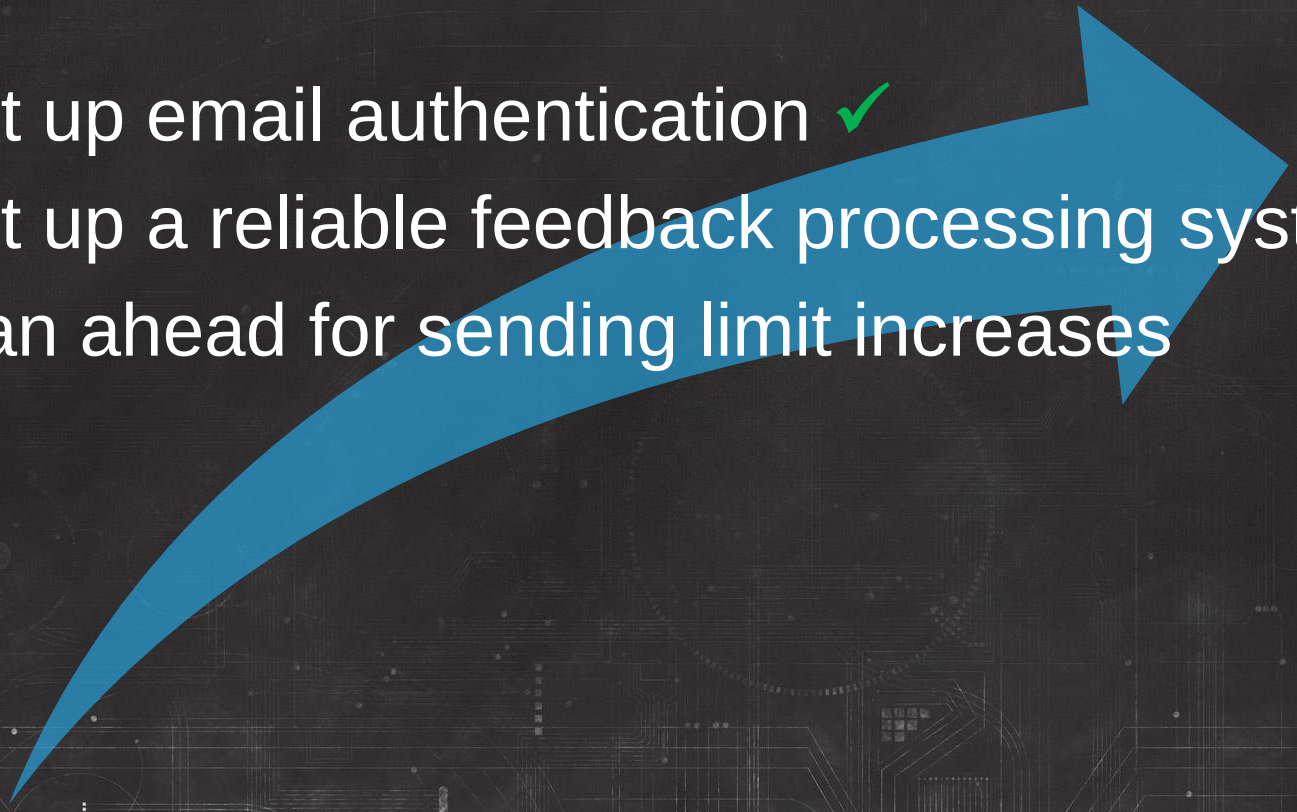


More on Feedback Processing



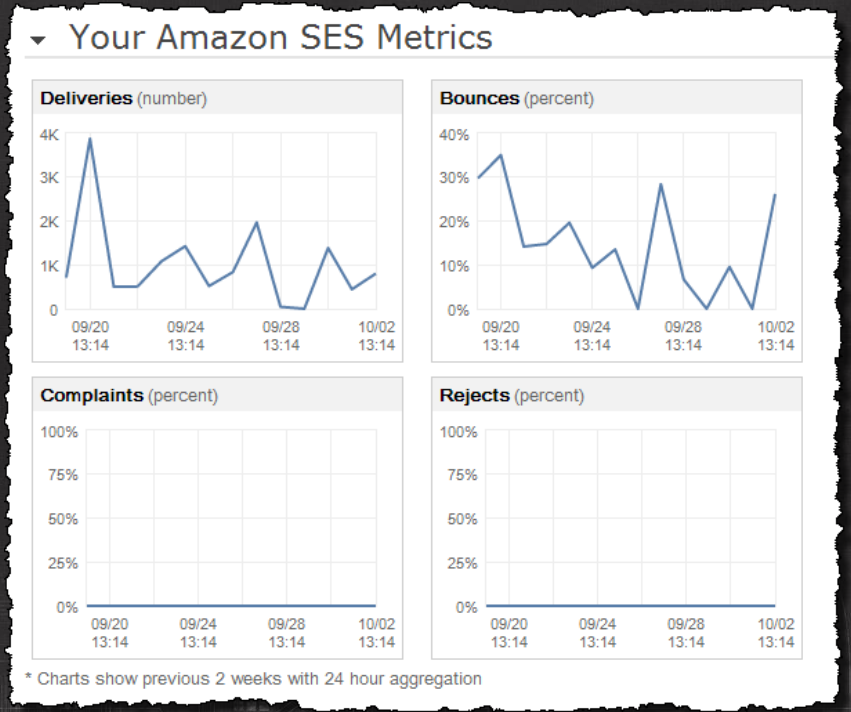
The Fundamentals of Scaling Up

- Set up email authentication ✓
- Set up a reliable feedback processing system ✓
- Plan ahead for sending limit increases



Monitor Your Sending

- Deliveries, bounces, complaints, and rejected emails
- Console or API

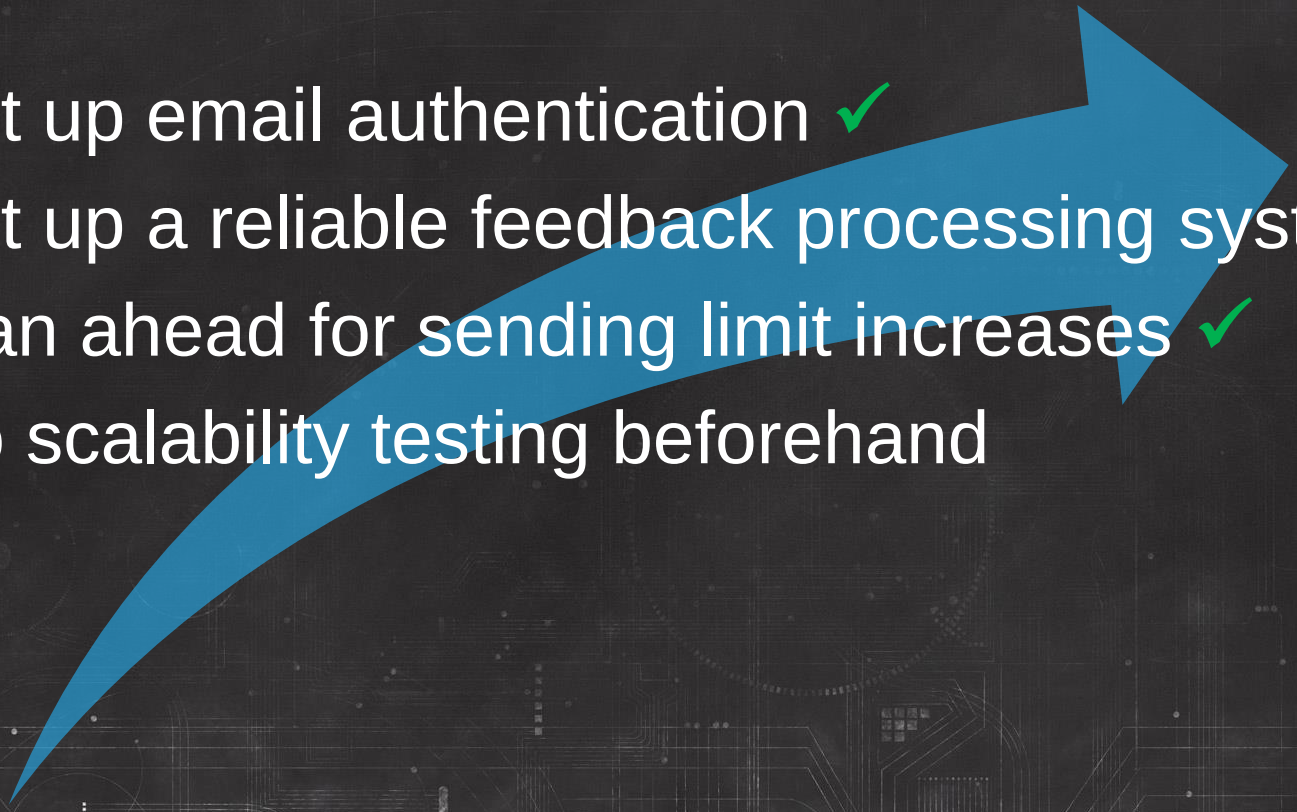


Starting to Scale

- Know your sending limits
  - Daily sending quota
  - Maximum send rate
- Open a sending quota increase case in support center well in advance

The Fundamentals of Scaling Up

- Set up email authentication ✓
- Set up a reliable feedback processing system ✓
- Plan ahead for sending limit increases ✓
- Do scalability testing beforehand

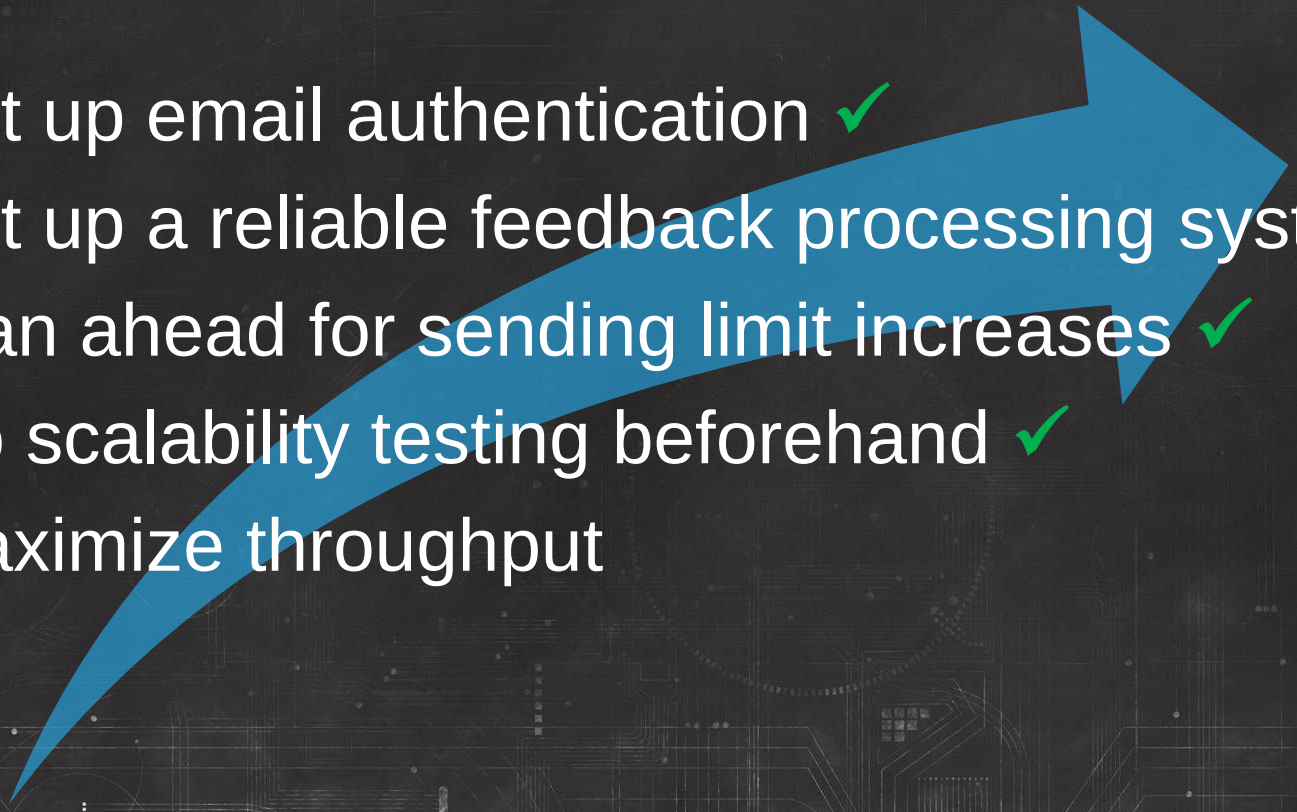


Scalability Testing

- Use the mailbox simulator for testing
  - Doesn’t contribute to sending quota or bounce/complaint metrics
- Test the email sizes appropriate to your use case
- Test at volumes appropriate to your use case
- Test to ensure your feedback processing system can handle the load

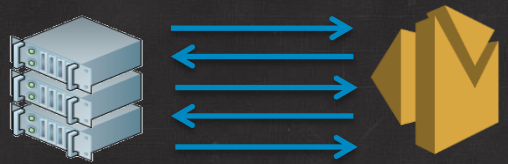
The Fundamentals of Scaling Up

- Set up email authentication ✓
- Set up a reliable feedback processing system ✓
- Plan ahead for sending limit increases ✓
- Do scalability testing beforehand ✓
- Maximize throughput

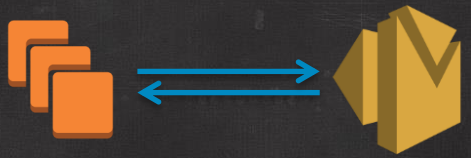


Scaling your Sending

- Use HTTP instead of SMTP



SMTP



HTTPS

- Use persistent connections
- Send in parallel
  - Use multiple processes/threads
  - Use multiple hosts

The Fundamentals of Scaling Up

- Set up email authentication ✓
- Set up a reliable feedback processing system ✓
- Plan ahead for sending limit increases ✓
- Do scalability testing beforehand ✓
- Maximize throughput ✓
- Maximize deliverability

Deliverability Tips

- Send content that your recipients want
- Only send to those who have signed up for your mail
  - Double opt-in
- Unsubscribe recipients who haven’t interacted with your business recently
- Remove bounced/complained addresses from your list
- Check out Email Sending Best Practices white paper

The Fundamentals of Scaling Up

- Set up email authentication ✓
- Set up a reliable feedback processing system ✓
- Plan ahead for sending limit increases ✓
- Do scalability testing beforehand ✓
- Maximize throughput ✓
- Maximize deliverability ✓

AWS re:Invent

Blue Shell Games: From Zero to 80M+ Emails Per Week

Dave Young, CTO and Co-Founder, Blue Shell Games

November 13, 2013

amazon web services

Who are we?

- We make free-to-play casino games
- Founded in 2010
- Cash-flow positive in 9 months
- We’re hiring, talk to me after ☺

Email in the Social/Mobile Games Industry

- Collaborative play
  - Deliver messages quickly between users on many platforms
  - Email works everywhere
- Loyalty programs/retention
  - Returning players are our best customers
  - Email rewards programs set player cadence
- New product launches
  - Marketing to our existing user base gives us a head start

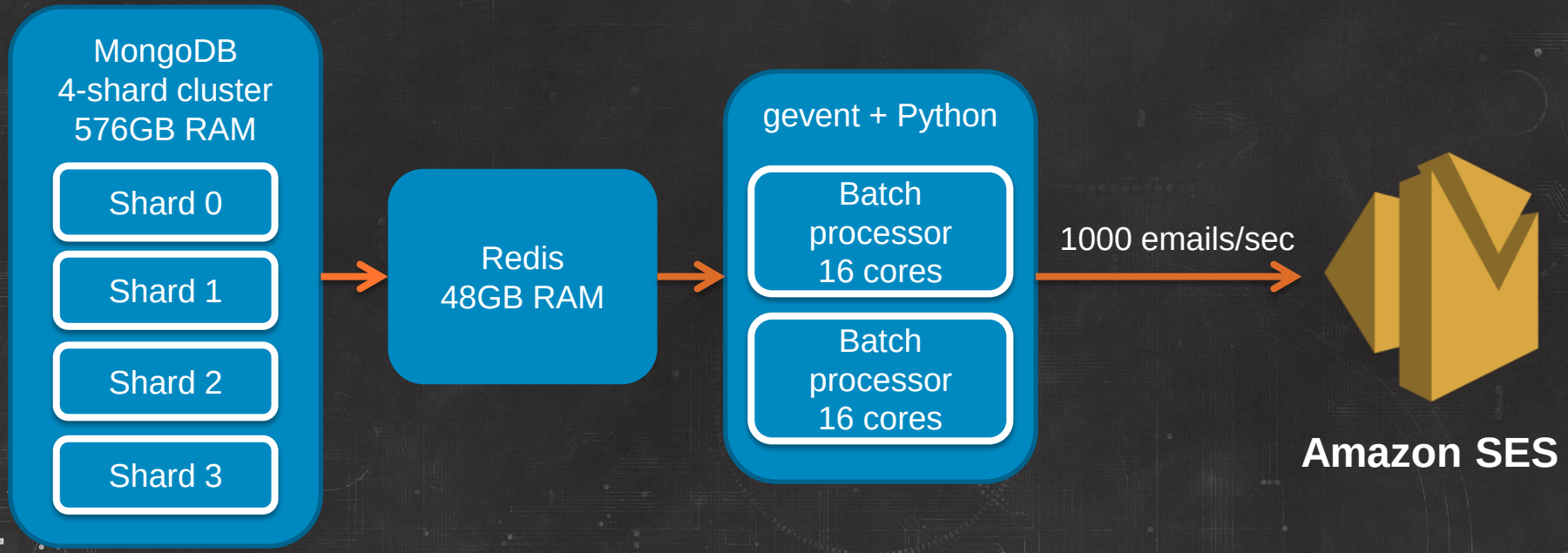
Our Requirements

- Reliable
  - We need a partner who has better uptime than we do
- Quick to integrate
  - Many competing engineering priorities in a growing startup
- Scalable
  - Email needs = N users * C campaigns * T time
  - 1200% user growth from 1/2012 to 2/2013
  - 2010: 1 campaign. 2011: 12 campaigns: 2012: micro-targeting

Why Amazon SES?

- Great reliability reputation
  - AWS is the de facto choice for startups
- Open-source driver support (boto)
  - Complete, well-tested Python API wrapper
- Building your own SMTP server is very expensive
  - Tried in 2010, 2011…

Feeding Amazon SES



How We Set Up Amazon SES

- Deferred execution for transactional messages
  - Python + gevent.spawn(send_mail, …)
  - Doesn’t block the response
- Batch processes for loyalty programs
  - Redis + gevent.queue
  - 1000 messages/sec on just a few cores
- Amazon SNS HTTP callback for bounces
  - Easy for you/your team to integrate

What We Learned When Getting Started

- Using the SES/SNS APIs is easy
  - Any web programmer can implement. We were live in 2 days
- Email marketing is not easy
  - Focus on what to send, when to send it, to whom to send
  - Amazon SES internal suppression list helps here
- Scaling is hard
  - Just increase your Amazon SES quota (your reputation is good)
  - Concentrate on scaling DBs, caches, batches, etc.

Email Challenges As We Grow

- Smarter targeting
  - Segment your users into behavioral cohorts
  - Message them with personalized, relevant content
  - Social content, friends' profile pictures, 1:N graph queries
- Mobile integration
  - Users are on desktop client, webmail, mobile client
  - Rendering, mobile web, app store, and app-url://screen

Our Advice for Senders Growing with Amazon SES

- Maintain list quality
  - Mark inactive @ 90, 120, 180 days (depending on your market)
  - Offer 1-click unsubscribe
- Handle bounces properly
  - Nothing is worse for your brand than dead mailboxes
  - Also wastes $$$/message

AWS re:Invent

Amazon.com: Migrating High-Volume Traffic to Amazon SES

Anderson Imes, Software Development Manager, Amazon Email Marketing Platform

November 13, 2013

amazon web services

Why Am I Here?

- Amazon is a very large email sender!
- We are an Amazon SES user.

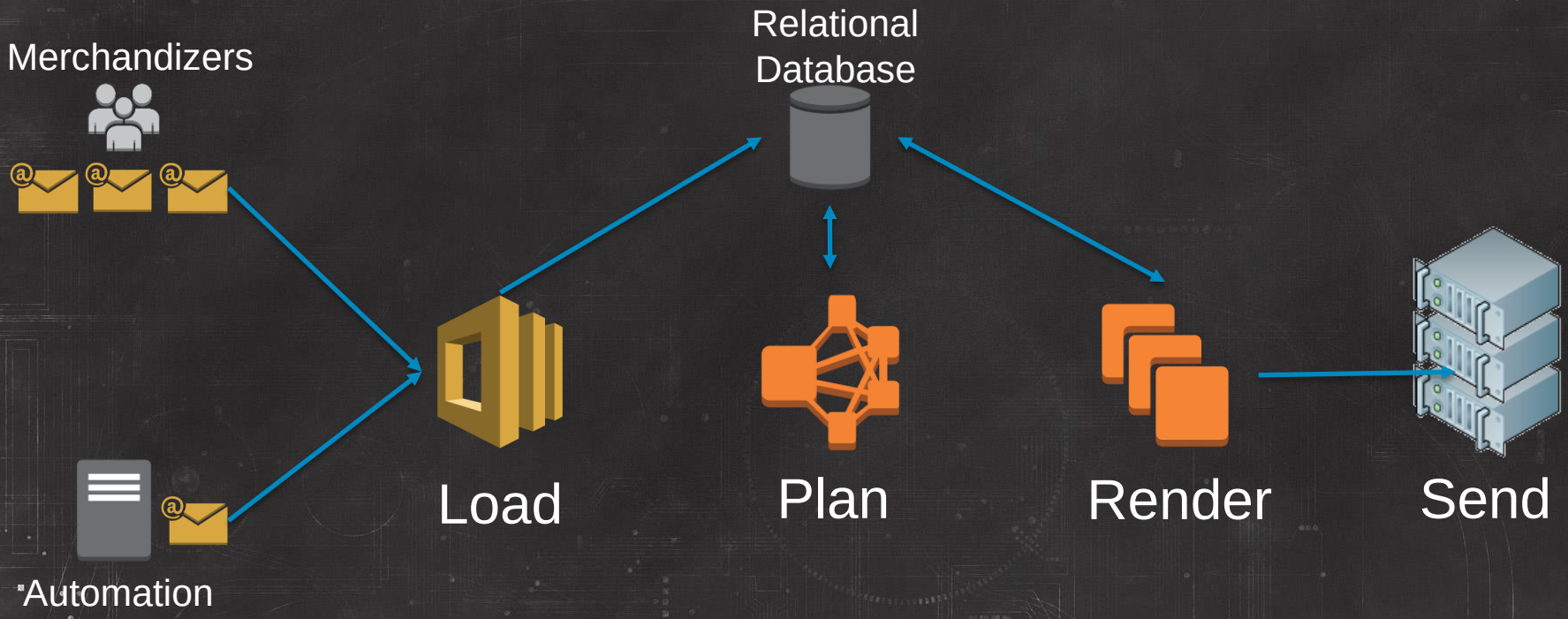
What Do We Send?

- Transactional
- Marketing
- For Amazon and subsidiaries

What We Need From an Email System

- Reliability
- Scalability
- Deliverability

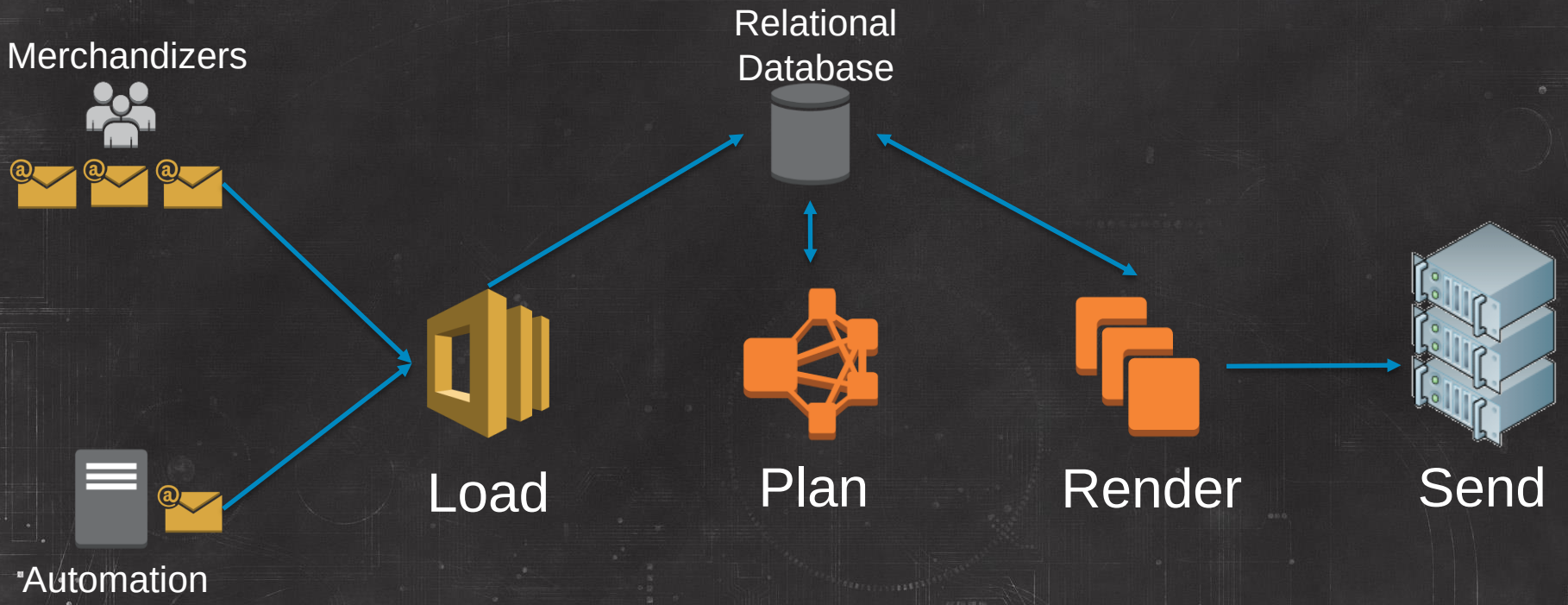
Where We Started



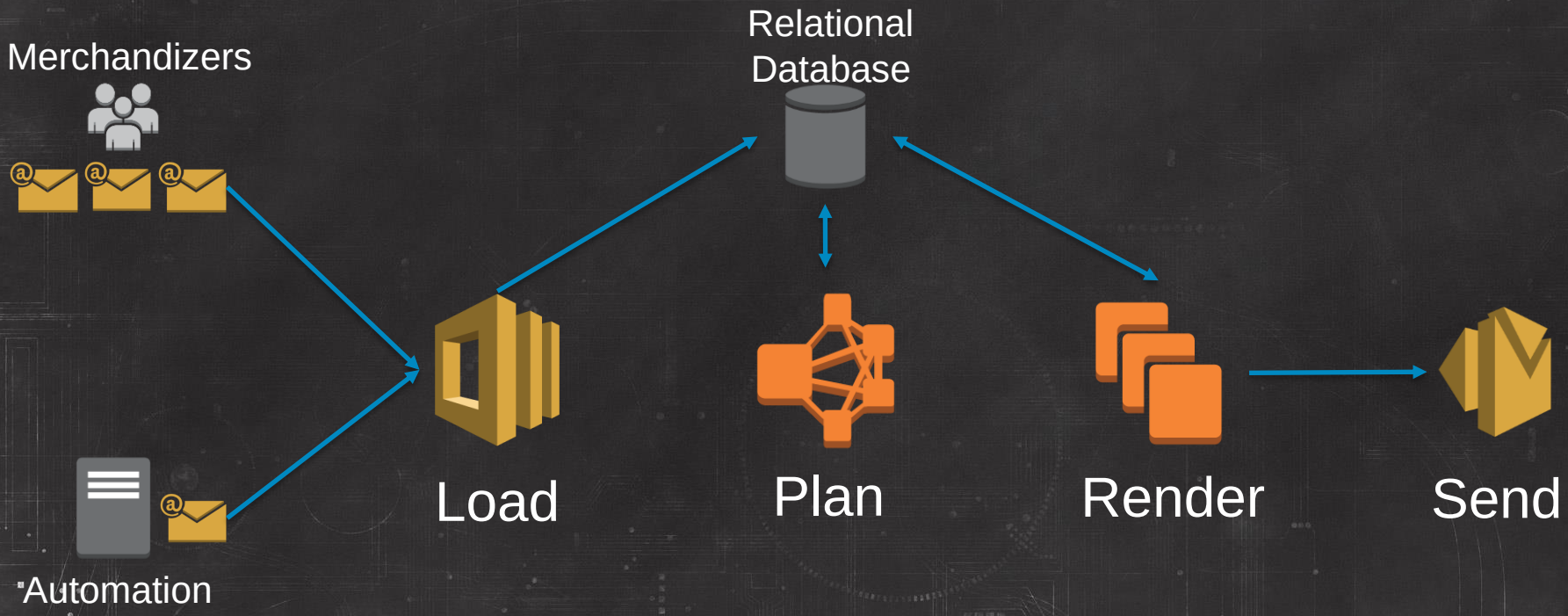
Problems We Wanted to Solve

- Scalability – When asked “When can you scale?”, we wanted to say “now”
- Maintainability – Email sending should “just work”
- Cost – Cost of sending should scale with demand.

Where We Started

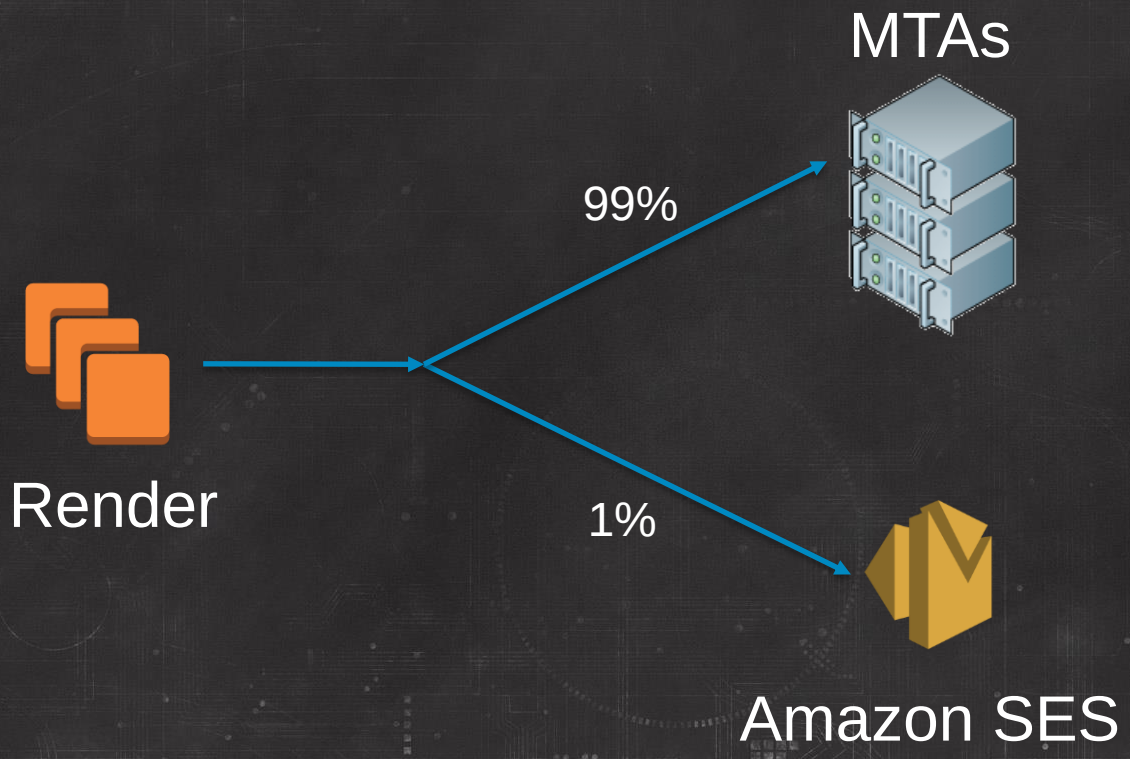


1. Amazon SES

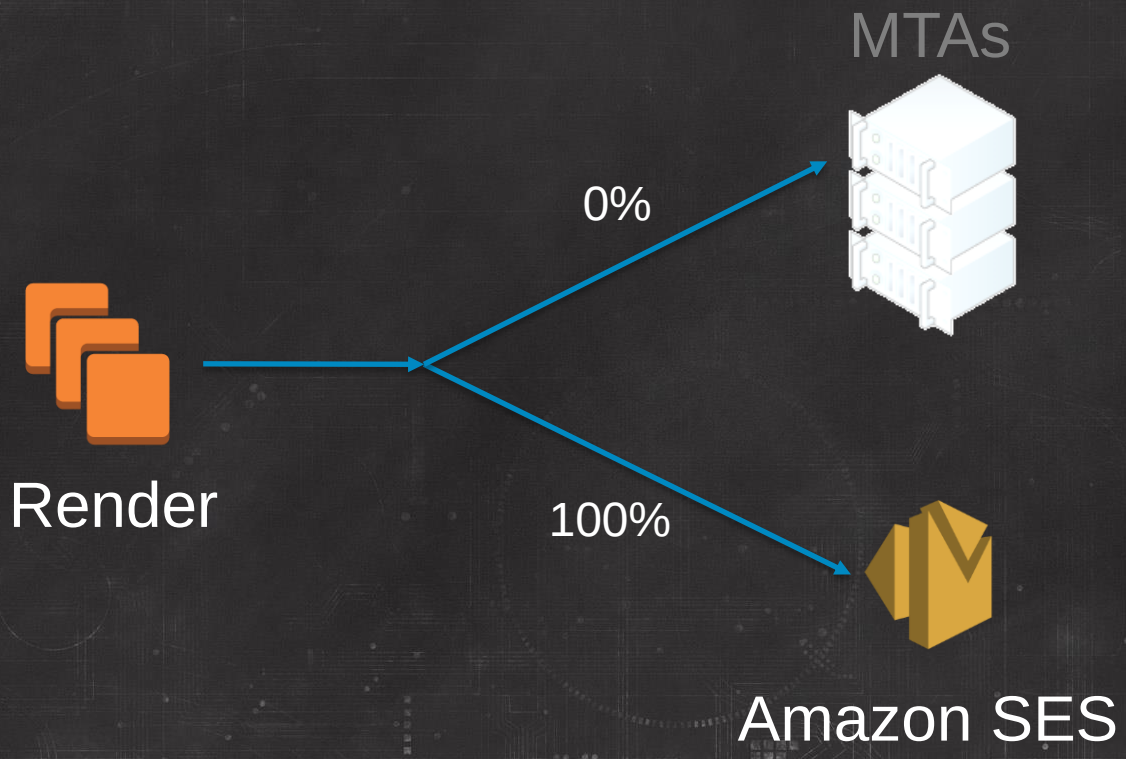

Merchandizers
Relational Database
Load
Plan
Render
Send
Automation

The Switch to Amazon SES

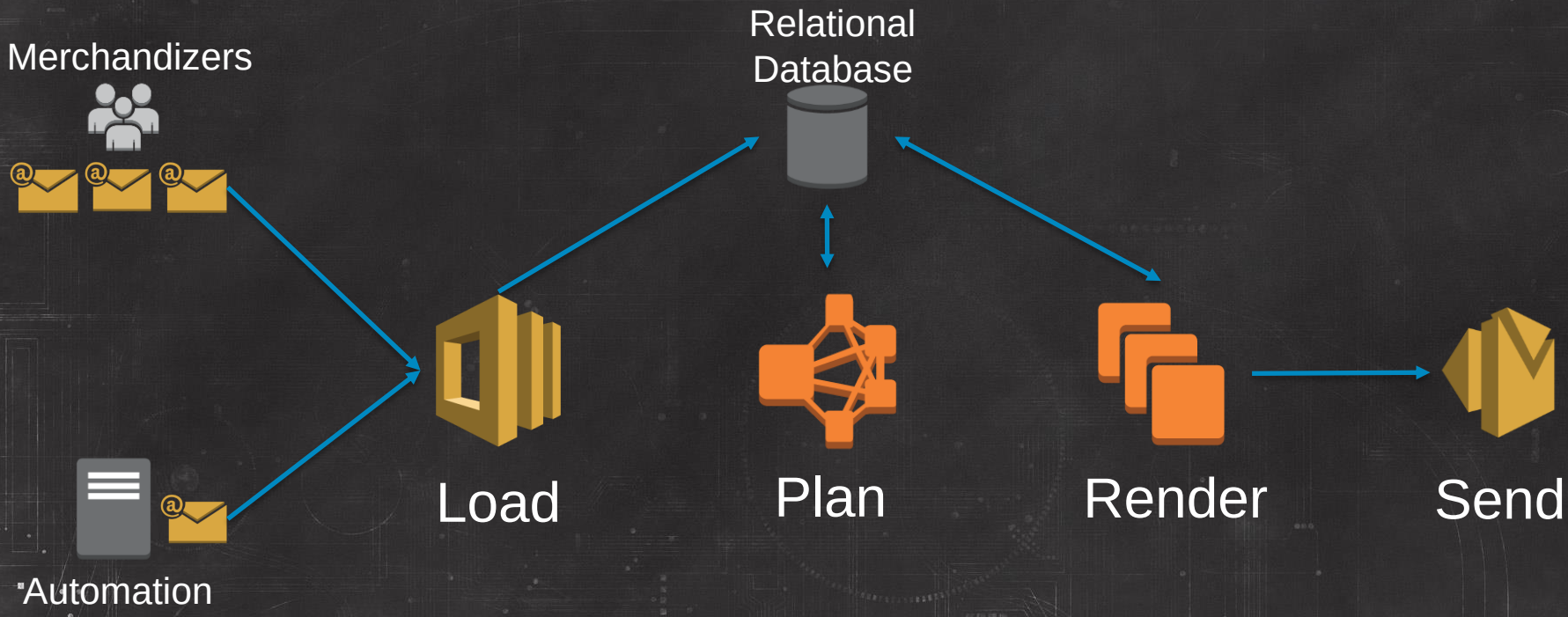
The Switch to Amazon SES



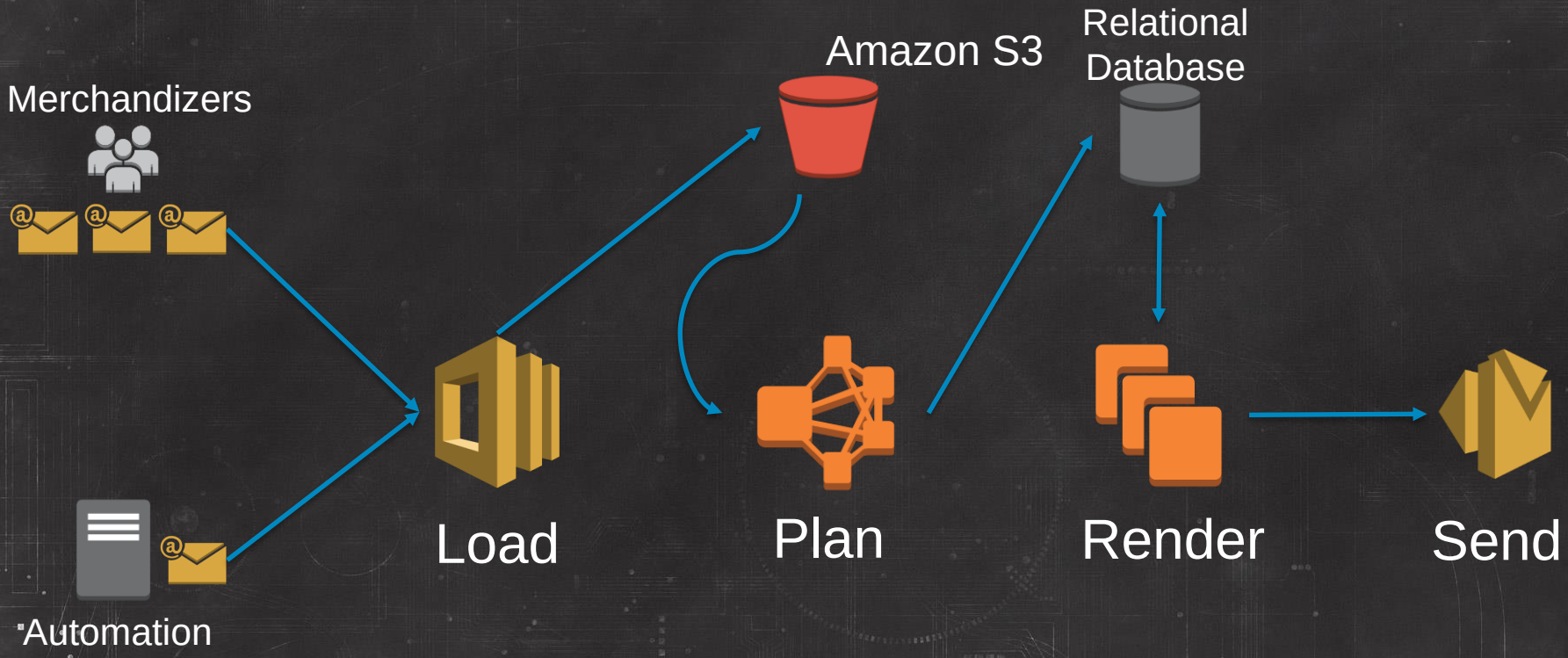
The Switch to Amazon SES



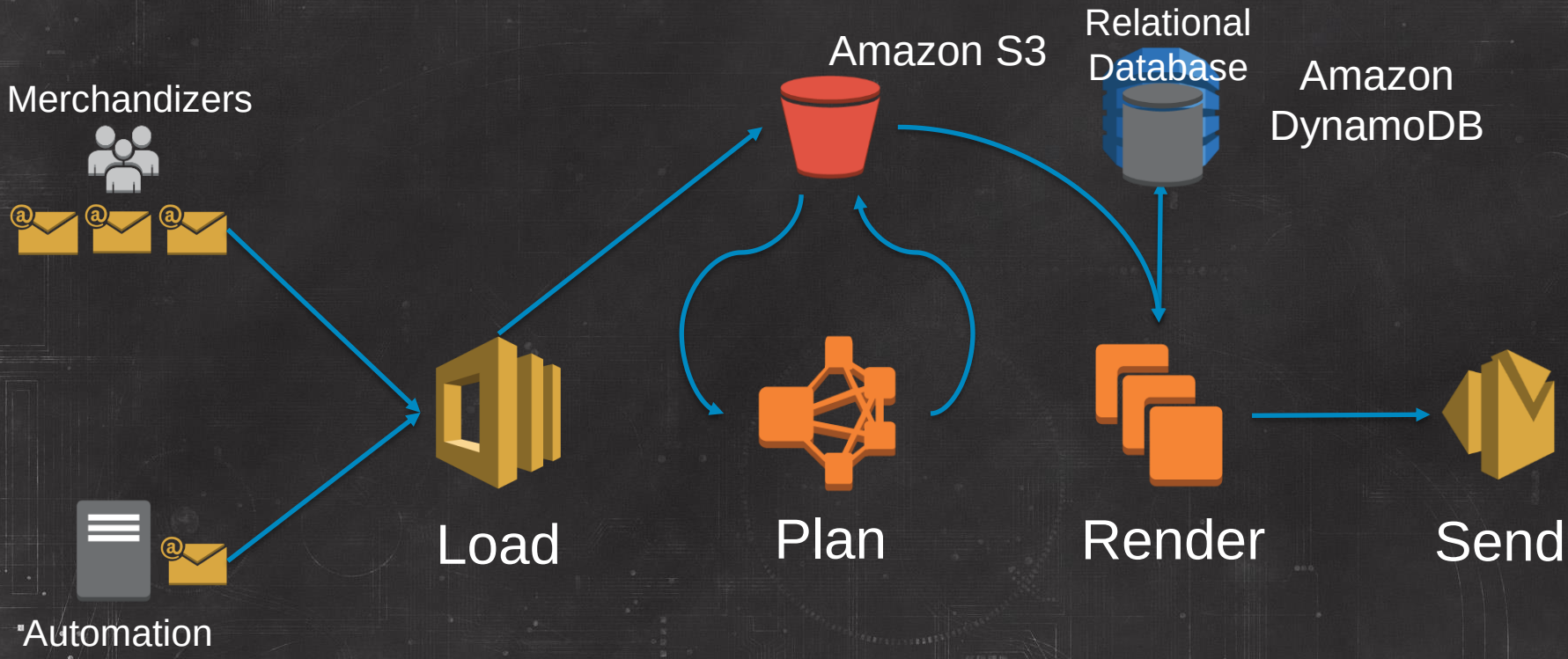
2. Move Away from Relational DB



2. Move Away from Relational DB (Part 1)



2. Move Away from Relational DB (Part 2)



Our Idempotency Needs

- Fast
- Scalable
- **At most** once

Idempotency

(Hash)	(Range)
Recipient	**Campaign**

```
PUT(
    recipient=bob@ses-example.com,
    campaign=1234,
    CONDITION=DOES_NOT_EXIST)
```

Idempotency

(Hash)	(Range)
Recipient	**Campaign**
bob@ses-example.com	1234

```
PUT(
    recipient=bob@ses-example.com,
    campaign=1234,
    CONDITION=DOES_NOT_EXIST)
```

SUCCESS

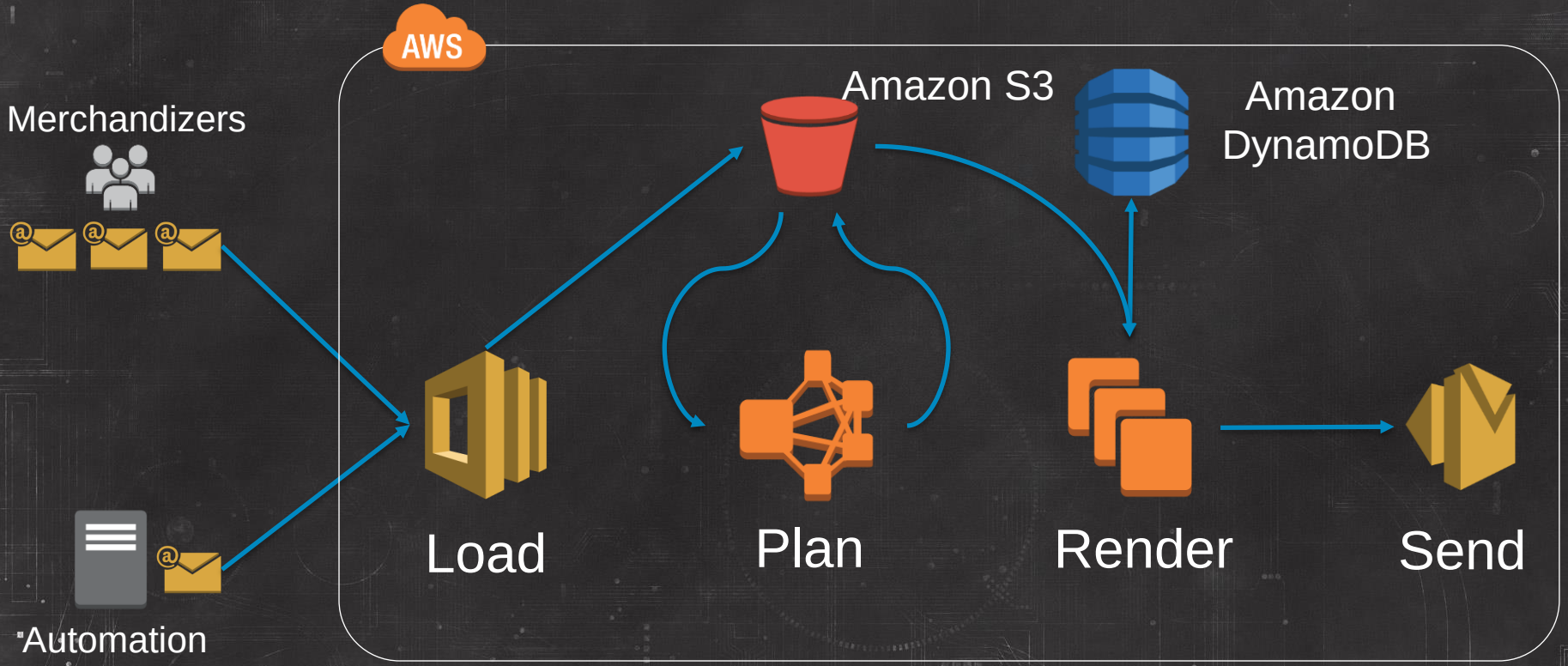
Idempotency

(Hash)	(Range)
Recipient	**Campaign**
bob@ses-example.com	1234

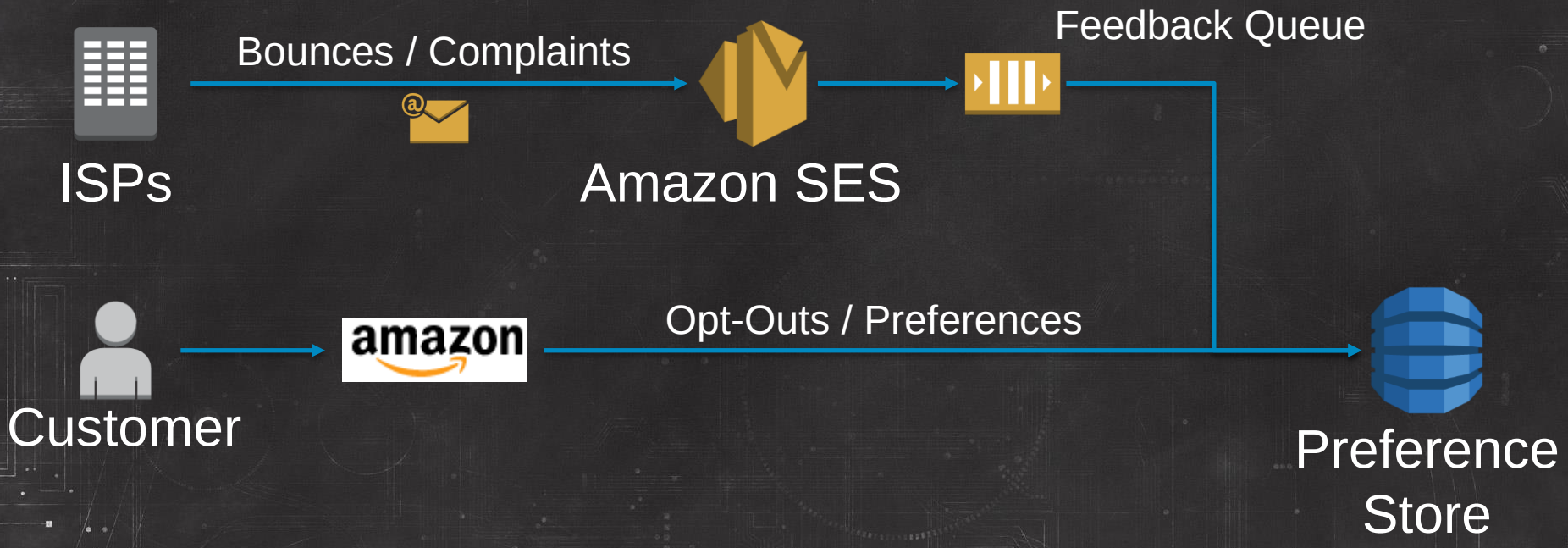
```
PUT(
    recipient=bob@ses-example.com,
    campaign=1234,
    CONDITION=DOES_NOT_EXIST)
```

FAIL

The Best Part?



Our Feedback Processing



Our Advice To Other Large Senders

- Start with your customer
- Think about feedback loops
- Test your throughput early and often

Questions?

Amazon SES Resources

- SES detail page: http://aws.amazon.com/ses
- SES documentation: http://docs.aws.amazon.com/ses/latest/DeveloperGuide/
- SES forum: https://forums.aws.amazon.com/forum.jspa?forumID=90
- SES blog: http://sesblog.amazon.com/

AWS re:Invent

Please give us your feedback on this presentation

SVC301

As a thank you, we will select prize winners daily for completed surveys!

amazon web services