Serverless — it all started in Vegas

Martin Buberl
VP Engineering | AWS Community Hero
Trustpilot
Martin Buberl

- VP Engineering at Trustpilot
- AWS Community Hero
- AWS User Group Leader

Copenhagen, Denmark

martinbuberl.com
@martinbuberl

🌟 Trustpilot
Trustpilot

• Open review platform
• Startup / Raised $140M
• 694 Trusties in 7 offices
  130 in Product Development

trustpilot.com

54M reviews
2.7B impressions / m
3,500 API transactions / s
560TB data
Agenda

• Back then ... and now
• What are all those Lambda functions doing?
• Some ideas to take away and start building
• Fast track to Serverless – how we did it
• Some ideas to take away to adopt Serverless
• Looking back – any advice?
Back then ...
Las Vegas, December 2016
Tatonka Challenge
Serverless “FaaS” started to make sense
Serverless “FaaS” wasn’t a total stranger back then

• Couldn’t use AWS Lambda before February 2016
  Requirement to run them in VPCs

• Already had about 40 AWS Lambda functions in Production
  Mostly tooling, data pipelines and some experiments
“Let’s actively drive Serverless adoption.”
... and now
Cloud Compute with AWS

Virtual Servers, Containers and Serverless Compute

Total # of Services in Production
Cloud Compute with AWS

Virtual Servers, Containers and Serverless Compute

- Amazon EC2
- Amazon ECS
- AWS Lambda
Cloud Compute with AWS

December 2016
- 180 Virtual Servers
- 80 Containers
- 40 Lambda functions

November 2018
- 95 Virtual Servers
- 283 Containers
- 252 Lambda functions

-53%  
+354%  
+630%
+630%
What are all those Lambda functions doing?
Trustpilot’s high-level architecture

- Cloud native
- Event-driven microservices
- REST APIs
Trustpilot’s high-level architecture

Web Clients & Applications
- Amazon CloudFront CDN
  - trustpilot.com
- Amazon CloudFront CDN
  - b2b.trustpilot.com
- Amazon CloudFront CDN
  - widgets.trustpilot.com

API Management & Orchestration
- Amazon API Gateway
  - REST APIs

Pub/Sub Messaging System
- Amazon SNS
- Amazon SQS

Compute
- Cloud Compute

Data
- RDS
- NoSQL
- Amazon S3
Trustpilot’s high-level architecture

Web Clients & Applications
- Amazon CloudFront CDN
  - trustpilot.com
- Amazon CloudFront CDN
  - b2b.trustpilot.com
- Amazon CloudFront CDN
  - widgets.trustpilot.com

API Management & Orchestration
- Amazon API Gateway
- REST APIs

Pub/Sub Messaging System
- Amazon SNS
- Amazon SQS

Compute
- Cloud Compute

Data
- RDS
- NoSQL
- Amazon S3

3rd Party Applications

Trustpilot.com
Trustpilot’s high-level architecture

Web Clients & Applications
- Amazon CloudFront CDN
  - trustpilot.com
- Amazon CloudFront CDN
  - b2b.trustpilot.com
- Amazon CloudFront CDN
  - widgets.trustpilot.com

API Management & Orchestration
- Amazon API Gateway
- REST APIs

Pub/Sub Messaging System
- Amazon SNS
- Amazon SQS

Compute
- Cloud Compute

Data
- RDS
- NoSQL
- Amazon S3

3rd Party Applications
Publish/Subscribe messaging pattern
"Traditional" auto scaling on queues

Publisher → Topic → Message → Queue

Publisher → Topic → Message → Queue

Amazon SNS

Amazon SQS

Auto Scaling group

Amazon EC2

Instances

Auto Scaling group

Amazon ECS

Containers
Serverless “instant” scaling on topics

Publisher

Publisher

Amazon SNS

Message

Topic

Instant Scaling

Lambda Function

Lambda Function

Trustpilot
Serverless “instant” scaling on queues

Publisher ➔ Topic ➔ Message ➔ Queue ➔ Amazon SNS

Publisher ➔ Topic ➔ Message ➔ Queue ➔ Amazon SQS

Instant Scaling

Trustpilot
What are all those Lambda functions doing?

Most of our Lambda functions in Production ...

- integrate with API Gateway
- subscribe to topics from our pub/sub messaging system
  
  Perfect for decoupled, event-driven microservices

Our next step is to ...

- bring back queues for “auto-healing”
Some ideas to take away and start building
Git webhook to Slack pub/sub

HTTP POST

Amazon API Gateway → AWS Lambda → Amazon SNS

Incoming Webhook(s)

AWS Lambda

developer.github.com/webhooks

api.slack.com/incoming-webhooks

Trustpilot
AWS Lambda for git security audit

• Ever accidentally committed a secret to source control?
  e.g. connection strings, tokens, API keys and secrets, private certificate keys

• Have a Lambda check for secrets and post to #secrets
• Send a message directly to the pull request in GitHub
AWS Lambda for git privacy audit

• Ever accidently committed PII to source control?
  e.g. email addresses, usernames, social security numbers

• Have a Lambda check for PII and post to #privacy

• GDPR anybody?
AWS Lambda for naming discussions

- There are only two hard problems in computer science: cache invalidation, naming things and off-by-one errors
- Have a Lambda post new repositories to #naming-things
AWS Lambda for Trello integration

- Have a Lambda automatically attach a PR to a Trello card
Git webhook to SNS pub/sub

Subscribing AWS Lambda functions for ... 

• git security audit
• git privacy audit
• naming discussions
• Trello integration

★ Trustpilot
Fast Track to Serverless
Engineering Principle
Engineering Principle

Serverless First

If Serverless is not available or practical, containers are recommended. Virtual servers are considered legacy and should be avoided.
Start With Why
by Simon Sinek
Engineering Principle

Serverless First

If Serverless is not available or practical, containers are recommended. Virtual servers are considered legacy and should be avoided.

We do this because we strongly believe that Serverless (FaaS, BaaS, DBaaS) is the future of the cloud and we’d like to be on the forefront of that movement. Serverless might not necessarily be the right choice for everything today, but start your architecture discussions there. We’re in the process of fading out virtual servers and want to avoid creating new ones. The benefits of Serverless and containers over virtual servers are diverse: simplified and faster autoscaling, better service orchestration, reduction of cloud service costs, reduction of operational costs and modernizing our cloud stack.

github.com/trustpilot/principles

⭐️ Trustpilot
Why should I care?

Because we ...

• have a vision and want to be part of the movement
• acknowledge it’s not always right but start there
• want to modernize our cloud compute stack
• see operational benefits
• anticipate cost savings

🌟 Trustpilot
Engineer Principle

Serverless First

If Serverless is not available or practical, containers are recommended. Virtual servers are considered legacy and should be avoided.
Virtual Servers are considered legacy

If that’s the case ...

• Amazon EC2s are legacy

which means also ...

• .NET Framework is legacy
  as it’s not supported with Docker containers
Some ideas to take away to adopt Serverless
Hackathons

• Hackathons are great for Serverless
  not just FaaS, all fully managed cloud services

• Serverless lets us ship prototypes that scale
  which we still probably shouldn’t ship
Trustpilot Labs is an experimental playground where customers get free access to our prototypes. Send us your feedback or suggestions via labs@trustpilot.com.

- **Review Search**: Search the content of your service reviews.
  - Search your reviews

- **Slack Integration**: Receive and reply to reviews directly in Slack.
  - Hook me up

- **Export Audiences**: Use Audiences in your retargeting and remarketing campaigns.
  - Export audiences

- **Webhooks**: Use webhooks to get instant notifications about your reviews.
  - Go to Webhooks
Trustmap

Amazon SNS → AWS Lambda → Amazon ElastiCache for Redis → 24h Cache → Node.js Application

Trustpilot
Event “anomaly” detection

Event Logs → Amazon S3 → S3 Event Trigger → AWS Lambda → Analyze Event → Amazon DynamoDB → Notification
GTFO initiative
GTFO EC2

• Inventory of Amazon EC2s per team
• Weekly check-ins with Tech Leads
• Dedicated Slack channel
  #gtfo-ec2
#gtfo-ec2

Jørn Schou-Rode 2:27 PM
I just wrote a λ that notifies this channel when new EC2 services are created.

devops-cfg 2:28 PM
New EC2 service: trustpilot-admonitor
#gtfo-ec2

Kalina Todorova 1:17 PM
Today #business-systems is officially out of EC2 😎

Kalina Todorova 1:18 PM
left #gtfo-ec2.

Thursday, February 15th
The Cake Alert

AWS IoT Button: guide

- Cake Alert!
  - Optional/Spontaneous event
    - Tech-random: Beer, tech-talk, any optional social activity
  - Mandatory event
    - Tech-general: Most hands, any mandatory official event
AWS IoT to Slack

#tech-cph-cake-alert

Don't just talk about cake. Be cake!

Cake Alert! 1:54 PM
@here Hurry up, there is cake on the table!

Astrid Birch Friis 1:56 PM
The Admin team got you cake, just because we though you'd deserved it

Dana Aonofriesi 3:08 PM
Sweets from Bucharest (made in Moldova). They are called "Joy".

Michelangelo Giorgi 9:53 AM
I'm turning 18 for the second time in my life!

[Link to the cake alert thread](tech.trustpilot.com/the-cake-alert-28652f13607d)
How did we fast track Serverless?

• Serverless First
  Engineering Principle

• Hackathons and Labs

• GTFO EC2
Looking back – any advice?
Are Lambda functions really cheaper?
Lambda functions

• Gut feel is – for us™ – they are 10x cheaper
Lambda functions

- Gut feel is – for us™ – they are 10x cheaper
- Less Ops heavy
- Faster development for services at scale
Lambda functions

• Gut feel is – for us™ – they are 10x cheaper
• Less Ops heavy
• Faster development for services at scale
• Decrease of observability and traceability

We’re investing in this area
Thank you!

Martin Buberl
@martinbuberl