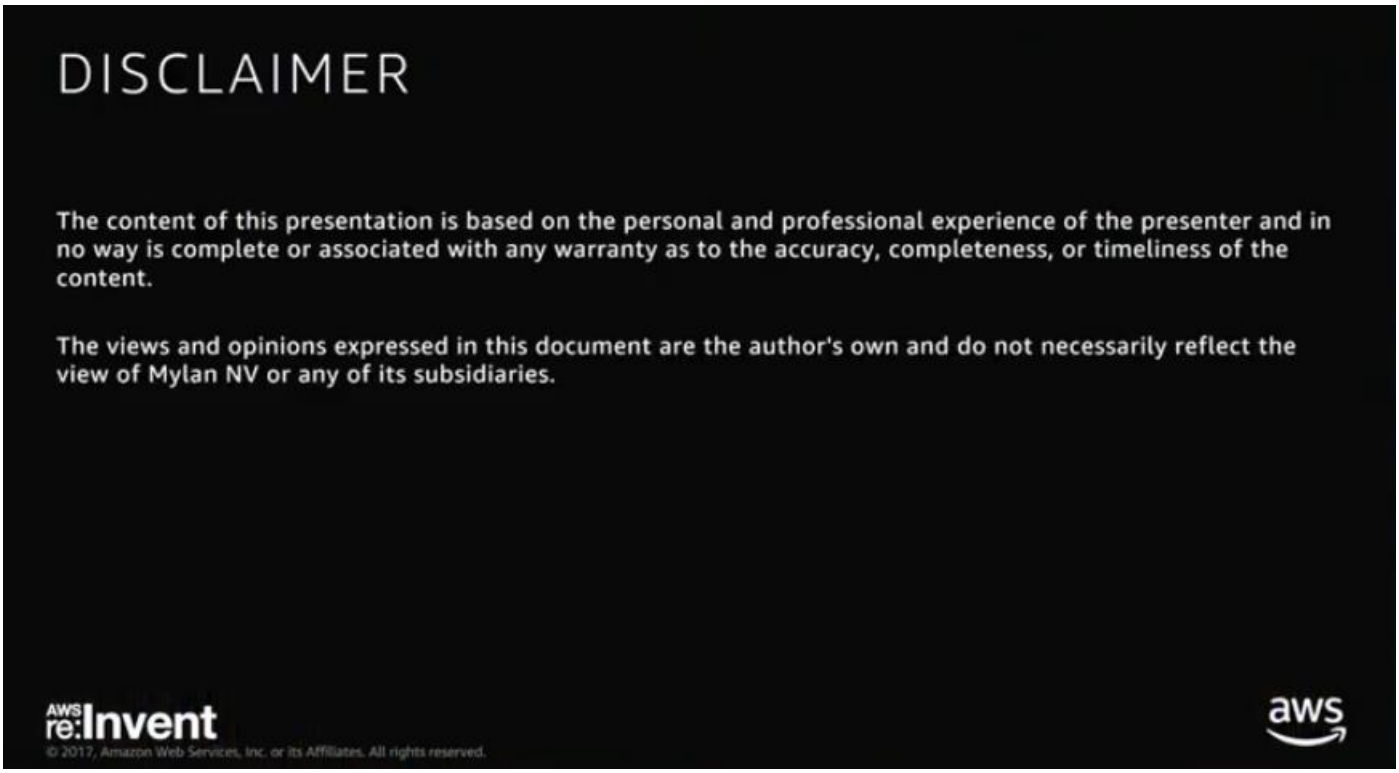
Pharmaceutical company processes tend to be slow when dealing with customer-facing applications that contain FDA-validated messages, all while maintaining infrastructure and security standards. In this session, discover how Mylan, a US–based global generic and specialty pharmaceutical company, overcame these obstacles and provided scalable solutions by leveraging AWS DevOps methods that lower time to market, while maintaining robust security and release management practices. During the presentation, learn how Mylan redefined process models such as infrastructure change management to define new security and process models. Additionally, learn how Mylan used services like Amazon S3, Elastic Load Balancing (ELB), and AWS CloudFormation to define these new models.



AGENDA

About Mylan

Why?

How?

The Future!

ABOUT MYLAN

At Mylan, we are committed to setting new standards in healthcare.

Working together around the world to provide 7 billion people access to high quality medicine, we:

- Innovate to satisfy unmet needs
- Make reliability and service excellence a habit
- Do what is right, not what's easy
- Impact the future through passionate global leadership

Mylan
Better Health for a Better World®

Mylan a champion for better health

A GLOBAL WORKFORCE OF
>35,000
IN 65 COUNTRIES

PRODUCTS IN
>165
COUNTRIES & TERRITORIES

GLOBAL MARKET PORTFOLIO
>7,500
MARKETED PRODUCTS

1 OUT OF 13
PRESCRIPTIONS FILLED IN THE U.S. IS A MYLAN PRODUCT

AWS CLOUD

Most IT departments have a cloud strategy, but what does it really take to move to the cloud?

WHERE WE WERE

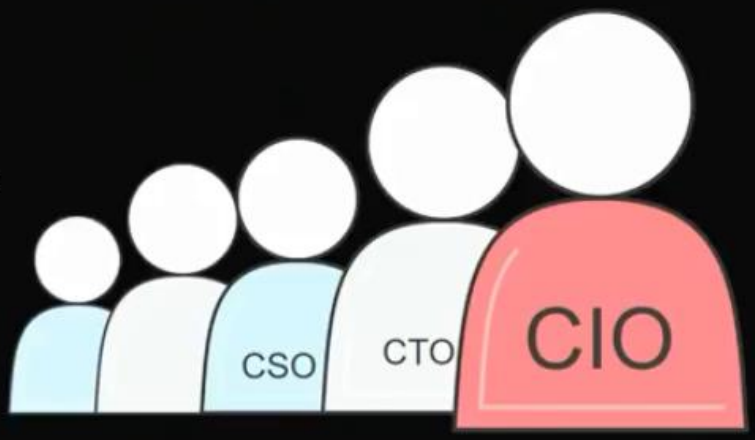
Co-located, monolithic, physical environment in a mid-west datacenter

- Dual firewalls
- Dual load balancers
- Dual WFE servers
- 100 MB internet connection
- SQL server database cluster

EVENT 1: Q1 2015 QUARTERLY CALL

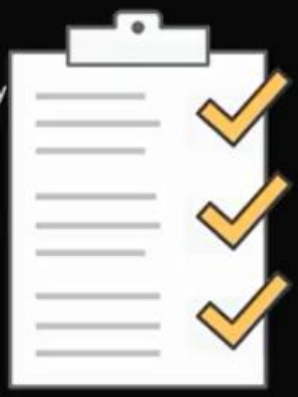
Quarterly Call War Room

- Still at our colo provider
- Call begins normally
- Typical traffic spike
- Sites become unresponsive
- Resolves itself 25 minutes later
- Cause: sustained network traffic over 100 MB



REQUIREMENTS

- Logging and visibility
- Automation
- Support requirements for audits by Quality, Regulatory, and Security
- Highly available and scalable environment
- Cost can be managed and optimized as we learn

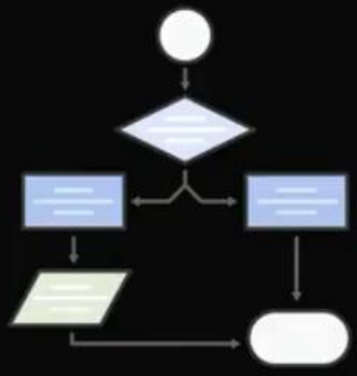


QUALITY ASSURANCE

For Mylan, the Quality Assurance team ensures that digital infrastructure processes conform to good change management practices.

What was considered when moving into AWS?

- No personal health information (PHI)
- Infrastructure validated as non-GxP
- Separation of responsibility for areas
- Standard Operation Procedures (SOP)
- Focus on change management processes
- Source control and deployment processes

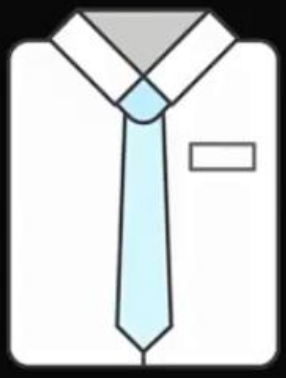


REGULATORY & COMPLIANCE

For Mylan, the Regulatory team approves all customer-facing content on our web and mobile applications to ensure that it meets all legal requirements set by the various public governing organizations for accuracy, claims, and usage.

What was considered when moving into AWS?

- MARC process (Veeva Vault)
- Visibility into the lifecycle of content

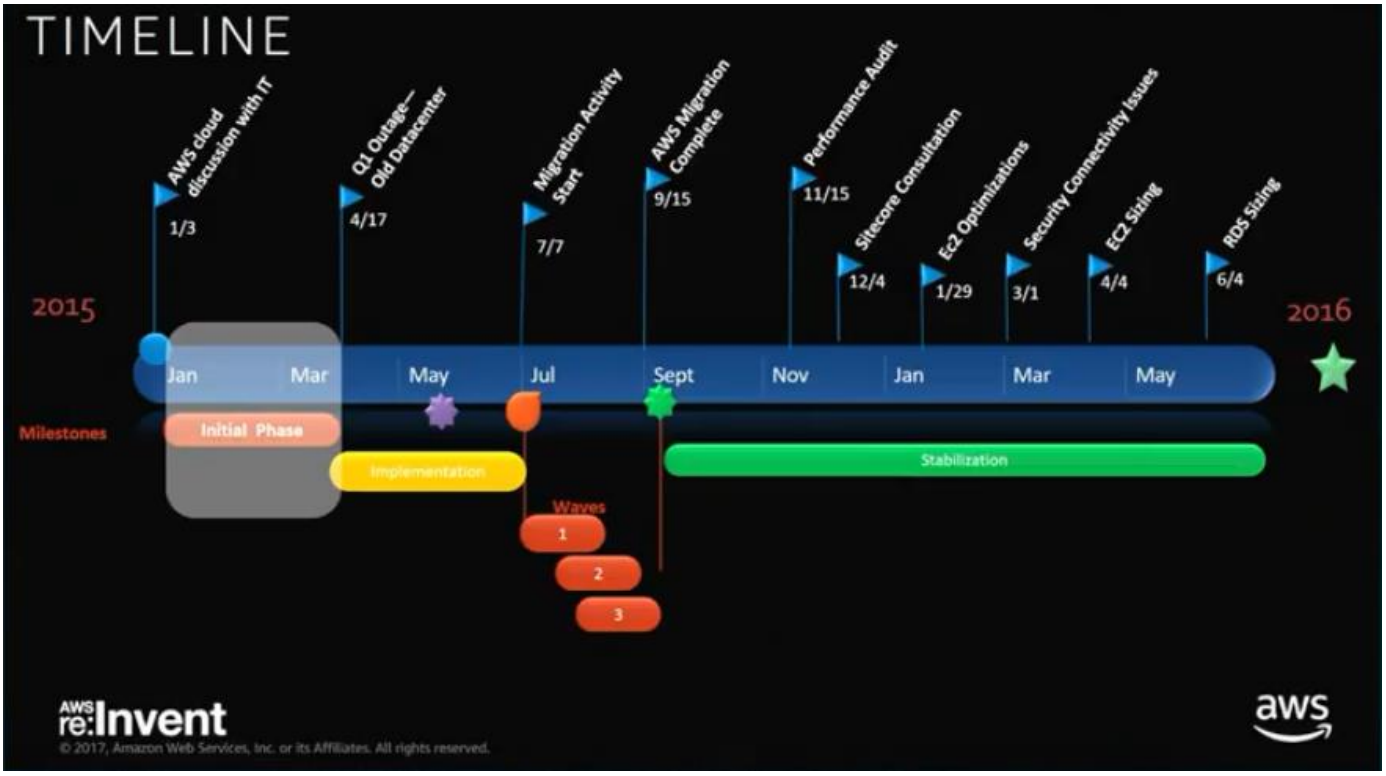


SECURITY

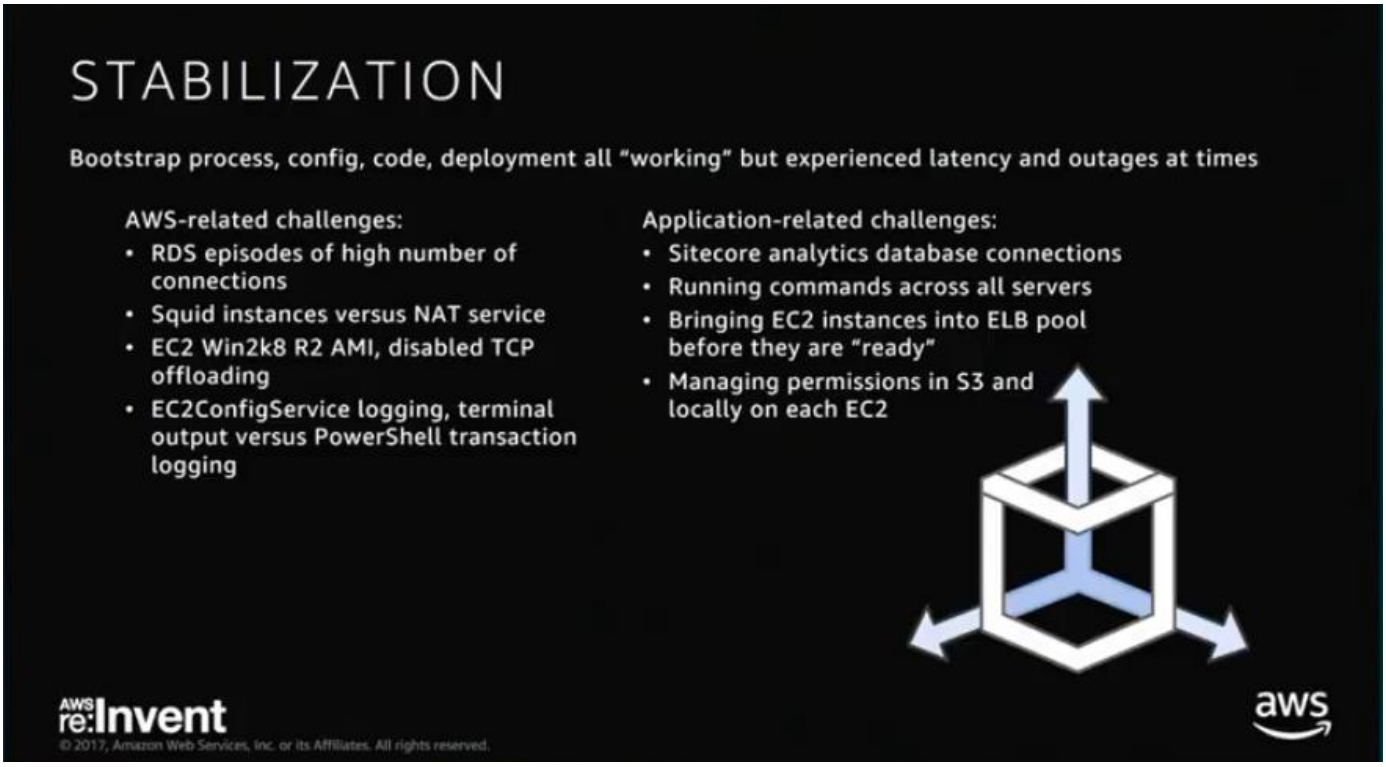
For Mylan, the Security team advises on requirements, best practices, and testing of the security posture for infrastructure, systems, and applications.

What was considered when moving into AWS?

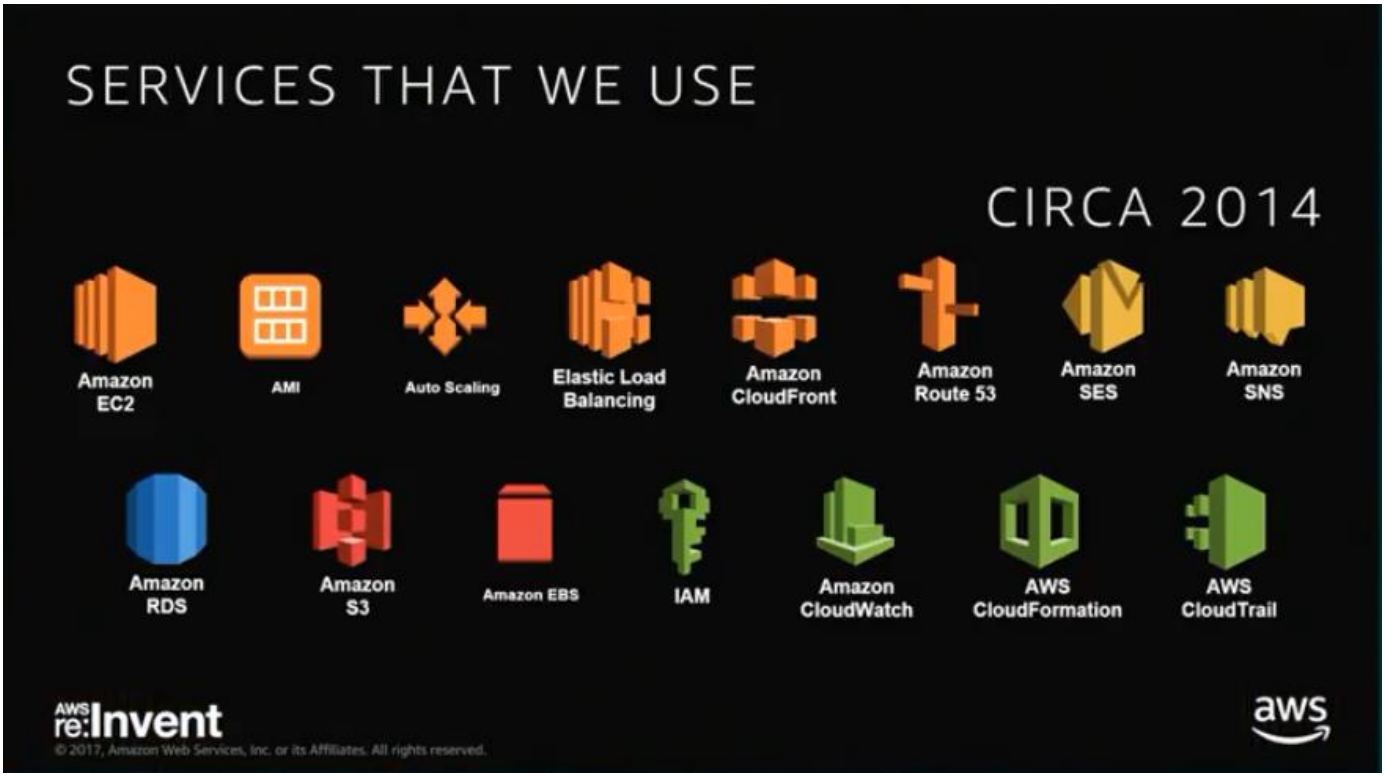
- Risk management
- Intrusion detection and prevention
- Virus detection

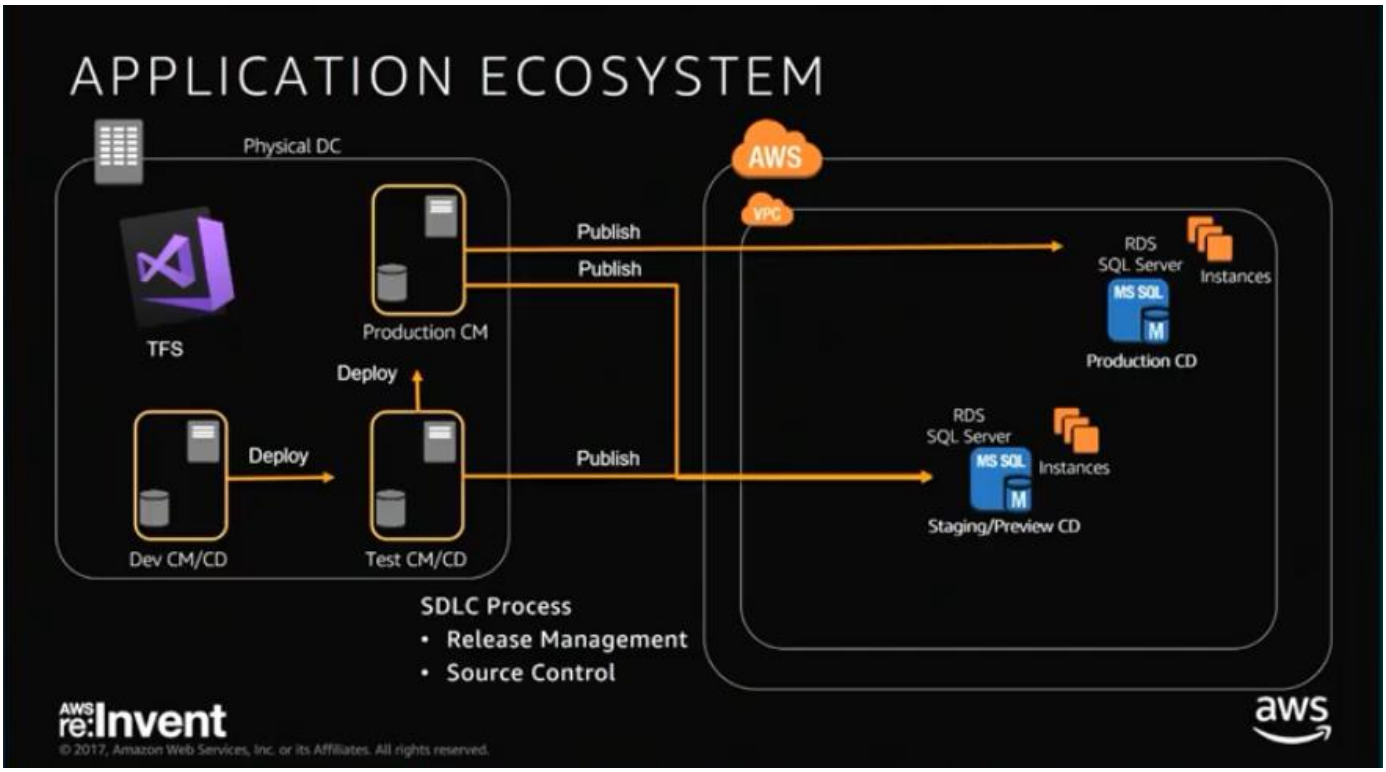


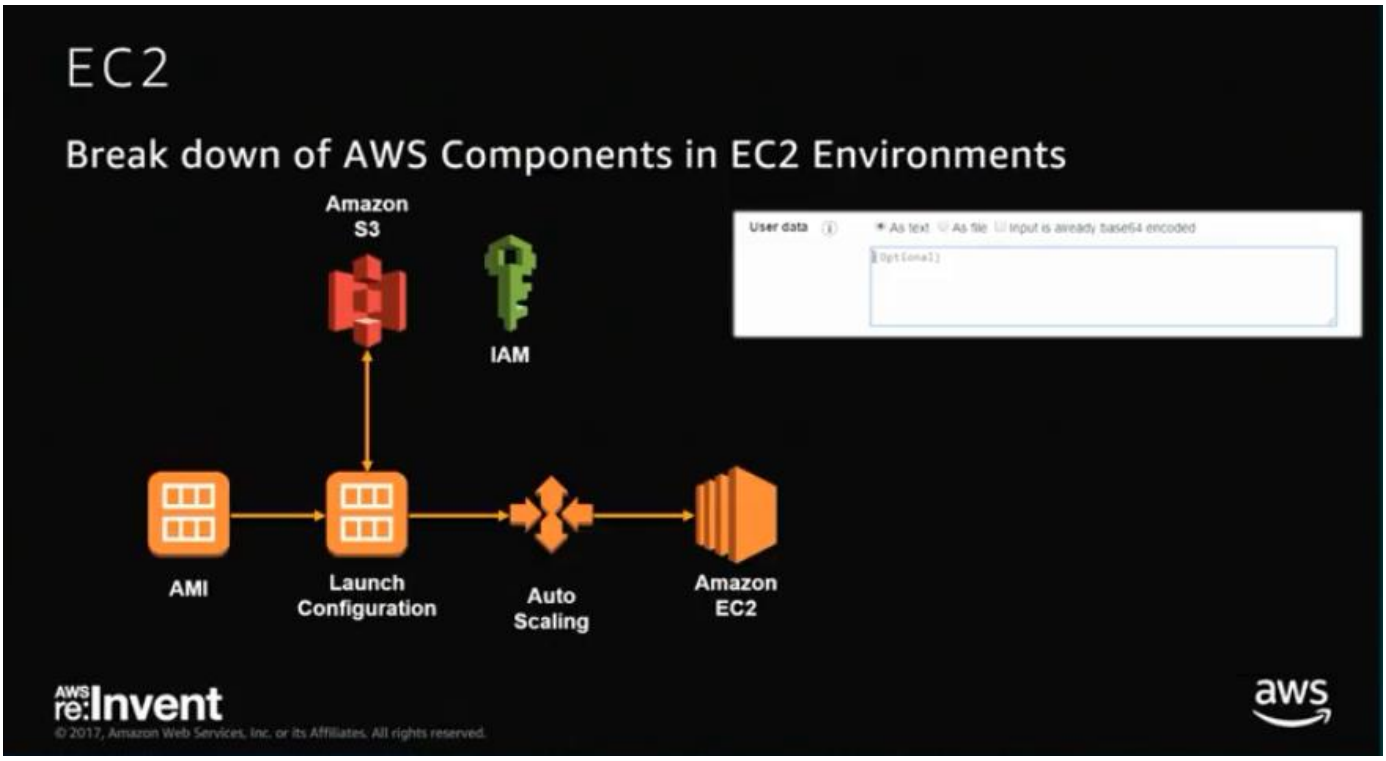
We launched 60 different websites and then stabilized them over time in AWS, we are now serving over 160 websites in Mylar.



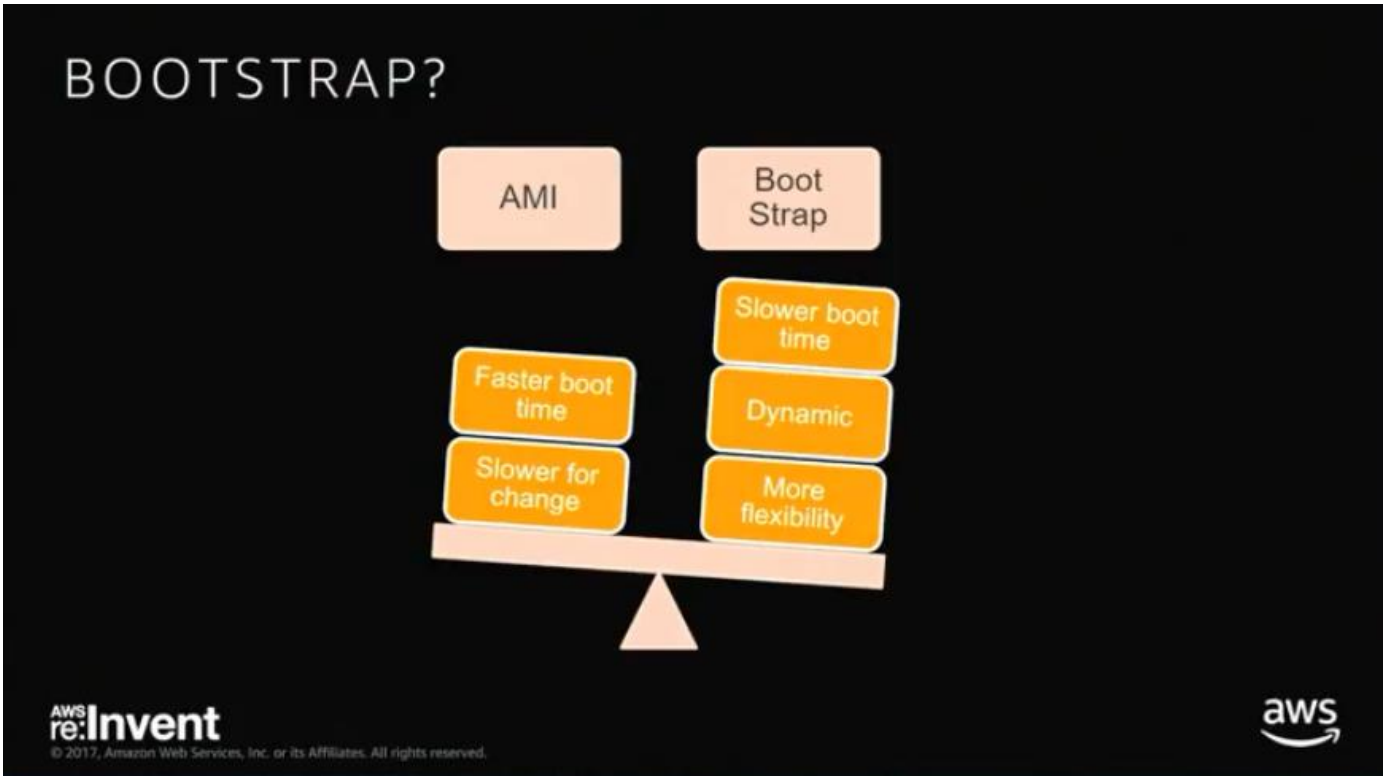
After a press release in the media, we saw a spike in traffic but this time AWS was scaling the ASG groups and we can see everything happening in real-time.



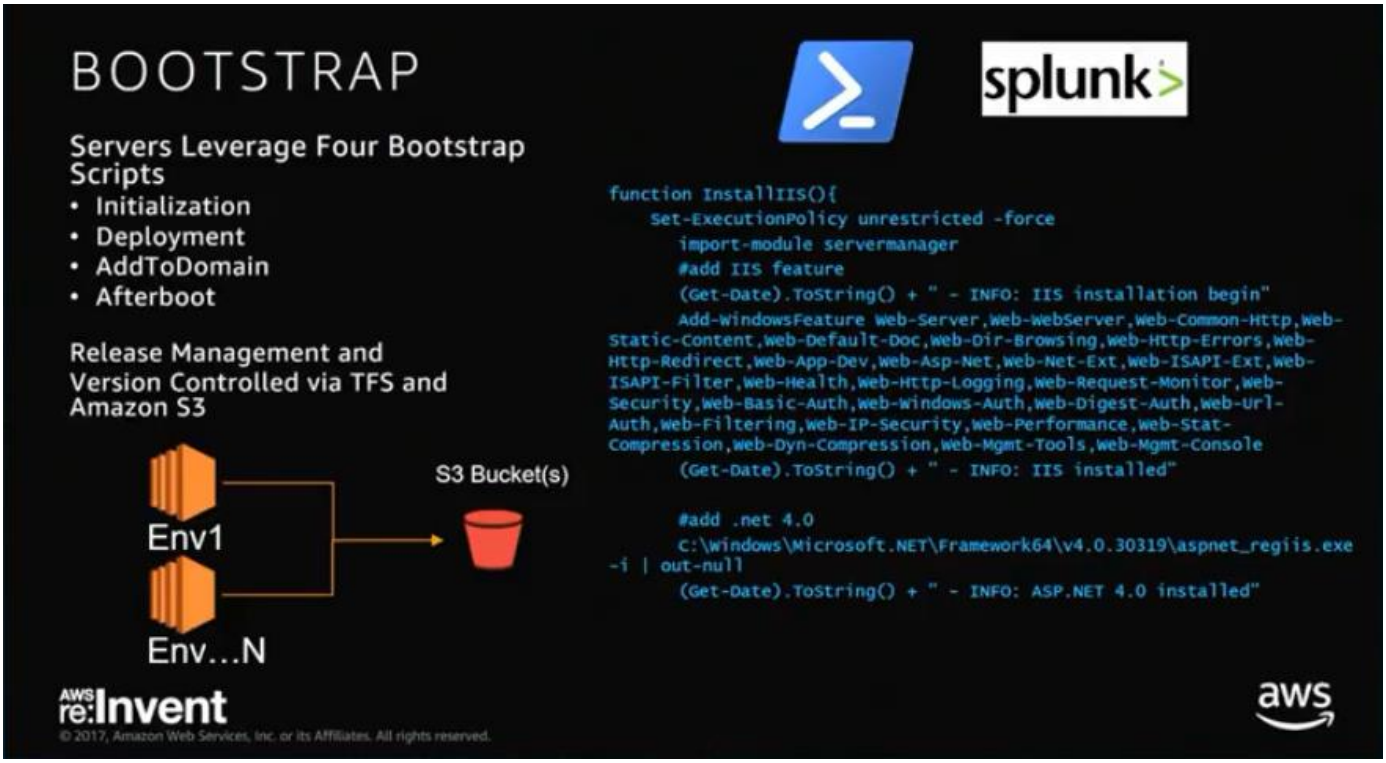




We start with a base AMI that we reuse across our fleet of EC2 instances, then we create and configure our launch configuration that is used to pull in low level details like what IAM role are we using? What instance size we need? What EBS volume to use? we then map that into our ASG and have it scale in and out based on capacity or traffic.

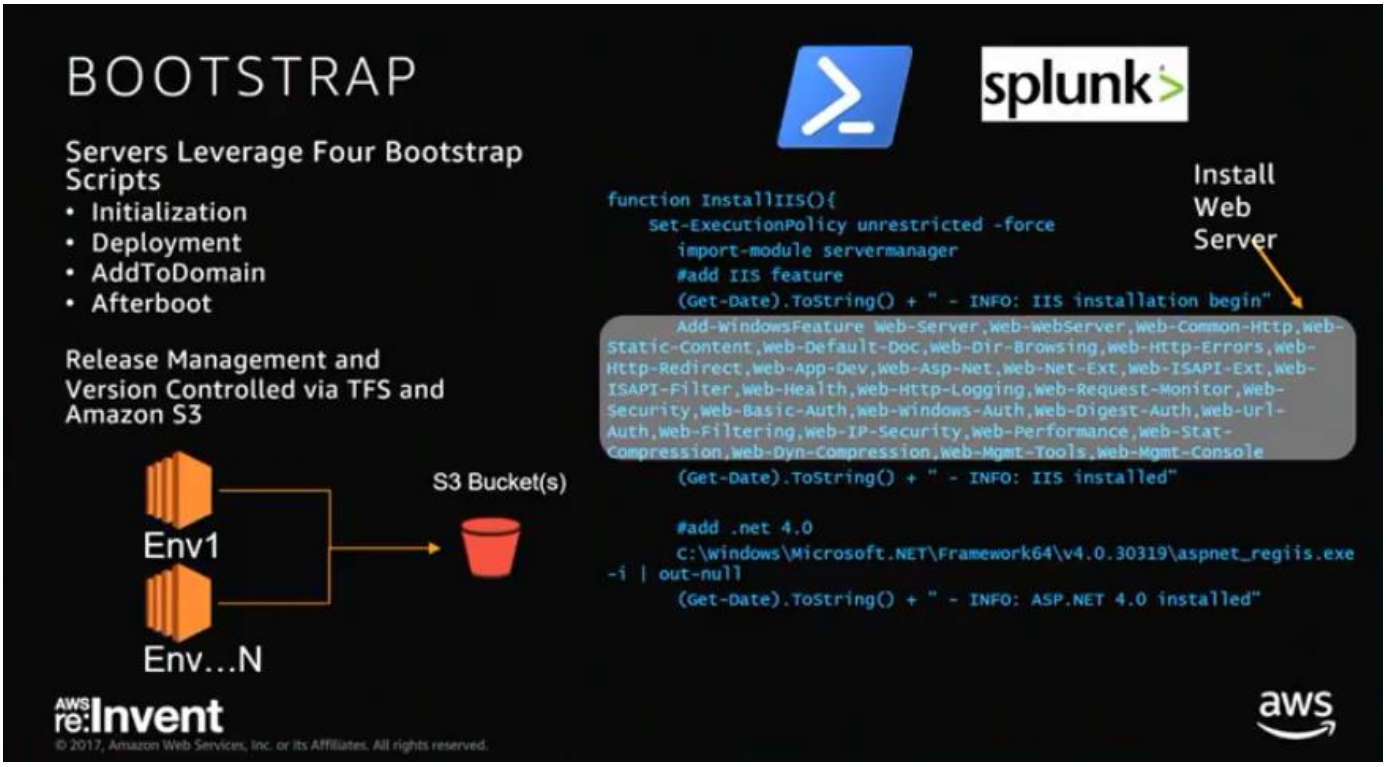


Bootstrapping allows you to pass in user scripts at launch time when getting your instances up, we can use a hybrid approach that uses some form of base AMI across the fleet

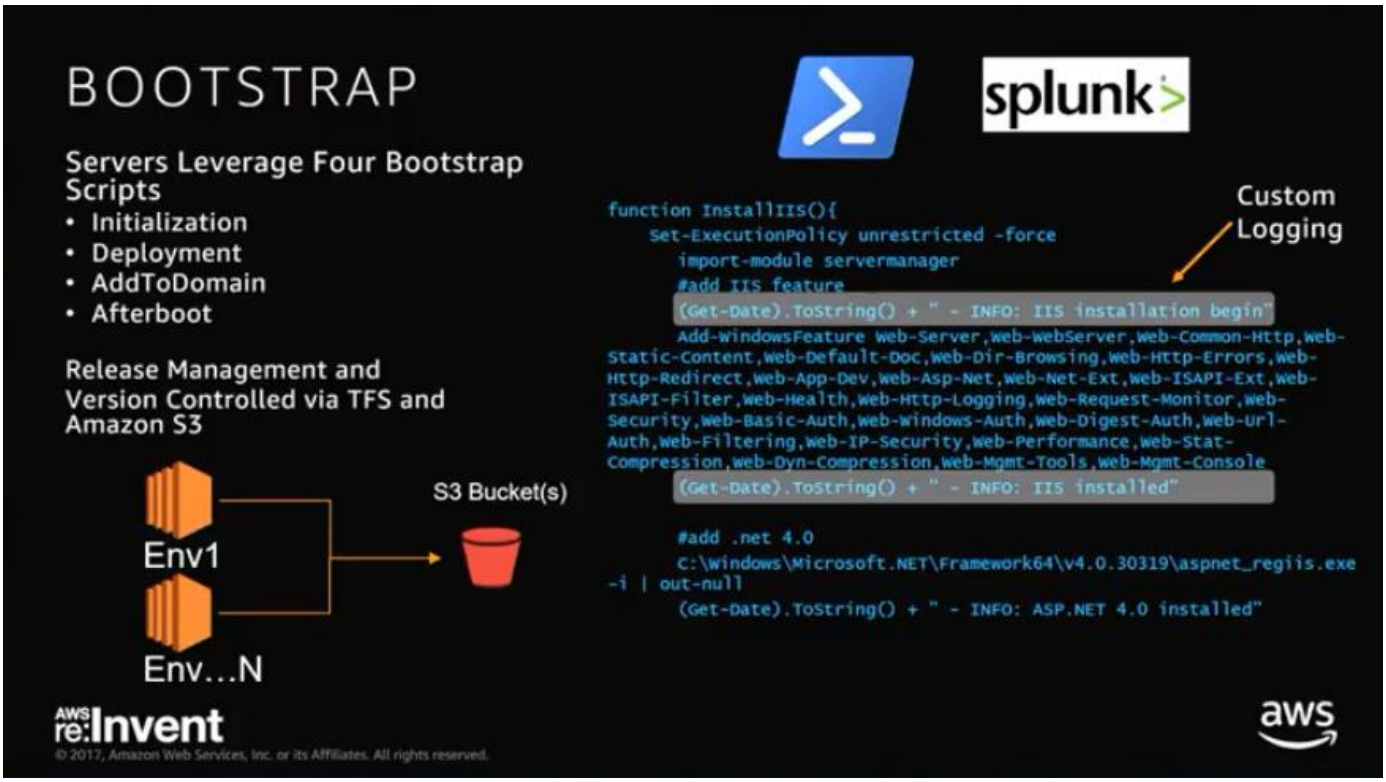


Each environment that we manage have its set of bootstrap scripts in their S3 buckets that gets versioned and managed. The scripts leverage a common ***includes*** function that gets pulled down at run time. The ***initialization scripts*** do some base level downloading of needed software and tools that is required, splunk is one of the needed tools at this stage. ***Deployment scripts*** handle extracting and configuring our web apps, this is the code behind for our websites to function properly. ***AddToDomain scripts*** adds the web service to a known/correct domain, this is done for group policies needed.

Afterboot scripts are scripts that gets launched once the servers are already up and running, it contains scripts for things like scheduled tasks, folder permissions, web log cleanup in the server, etc. all these give us a working web service.



This is a one-line configuration for our IIS web application within the script as above



We also have custom code within our scripts as above

We write all our bootstrap scripts to transaction log files, we point to the EC2ConfigLogs to see all our logs

LOGGING—QA

splunk>

Application

- Code deployments
- Content publishing

```
10/20/2017 1:17:08 PM: Deployed GWMP (GWMP 2017-10-20_3.zip) to Production (Comment: ~... ConfigOnly deployment)
10/20/2017 1:23:48 PM: Deployed GWMP (GWMP 2017-10-23_4.zip) to QA (Comment: !!Rollback from GWMP 2017-10-20_3.zip to GWMP 2017-10-02.zip)
10/23/2017 5:02:01 AM: Deployed GWMP (GWMP 2017-10-23.zip) to Development (Comment: ~... ConfigOnly deployment)
10/23/2017 6:22:48 AM: Deployed GWMP (GWMP 2017-10-23_4.zip) to QA (Comment: ~... ConfigOnly deployment)
10/24/2017 6:45:16 AM: Deployed EpipenCom (EpipenCom 2017-10-24.zip) to Development
10/24/2017 7:18:33 AM: Deployed TasmarGuideCoUk (TasmarGuideCoUk 2017-10-24.zip) to Development
10/24/2017 7:52:51 AM: Deployed LowTCa (LowTCa 2017-09-27.zip) to ExternalPreview (Comment: ~)
```

Logs are consumed real time

- Auditability of every action

```
10/30/2017 16:59:51 INFO  AUDIT (mylan\x99999): Publish item: master:/sitecore/Mylan.Dura.DE/Home/Privacy Policy/Page Data/Introduction Content, language: de-DE, version: 2, id: {E08B2E36-5B5A-41C9-AB48-98021B93C503}
```


LOGGING—QA

splunk>

Application

- Code deployments
- Content publishing

Date/Time Stamp

Site/Build ID

Target

Rollback

```
10/20/2017 1:17:08 PM: Deployed GWMP (GWMP 2017-10-20_3.zip) to Production (Comment: ~... ConfigOnly deployment)
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Logs are consumed real time

- Auditability of every action

Date/Time Stamp of Action

Who Published

Target

What Was Published

```
10/30/2017 16:59:51 INFO  AUDIT (mylan\x99999): Publish item: master:/sitecore/Mylan.Dura.DE/Home/Privacy Policy/Page Data/Introduction Content, language: de-DE, version: 2, id: {E08B2E36-5B5A-41C9-AB48-98021B93C503}
```

aws re:Invent
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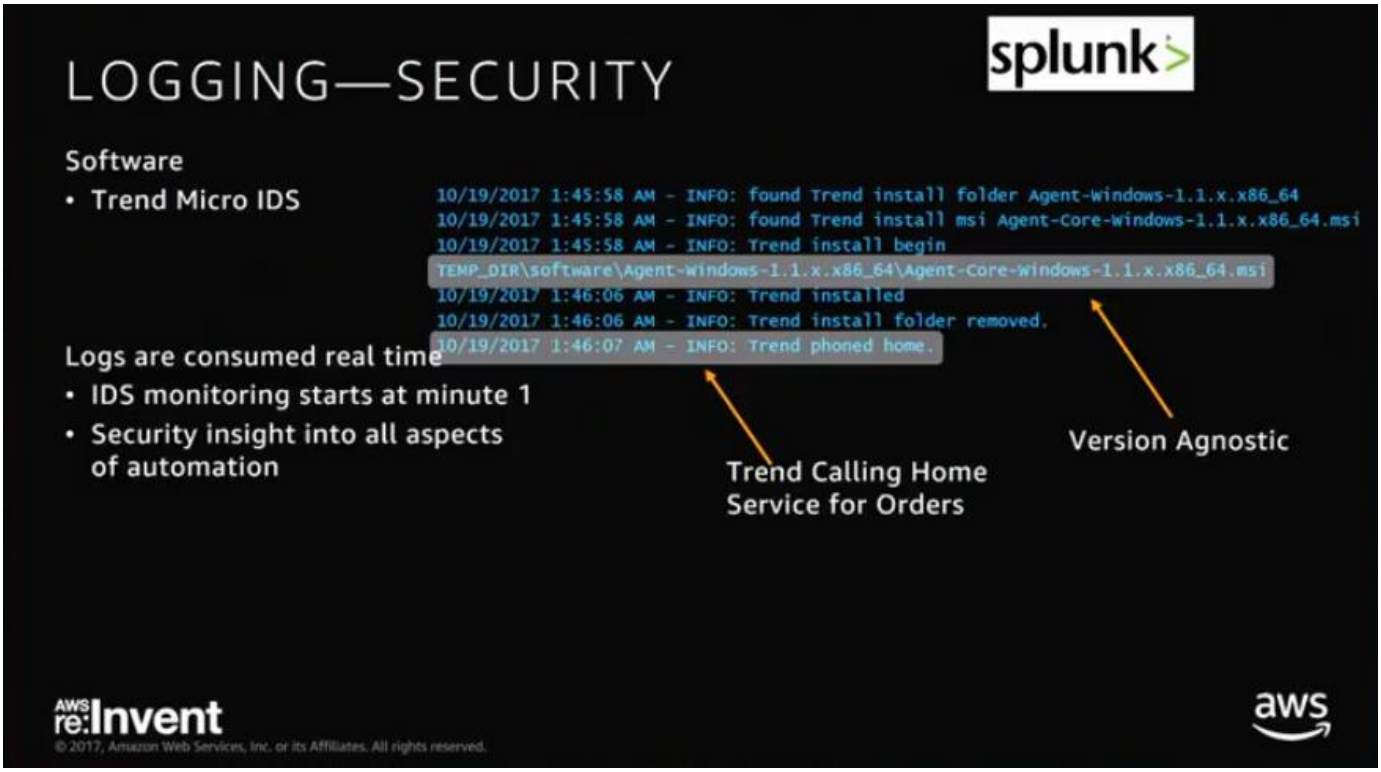
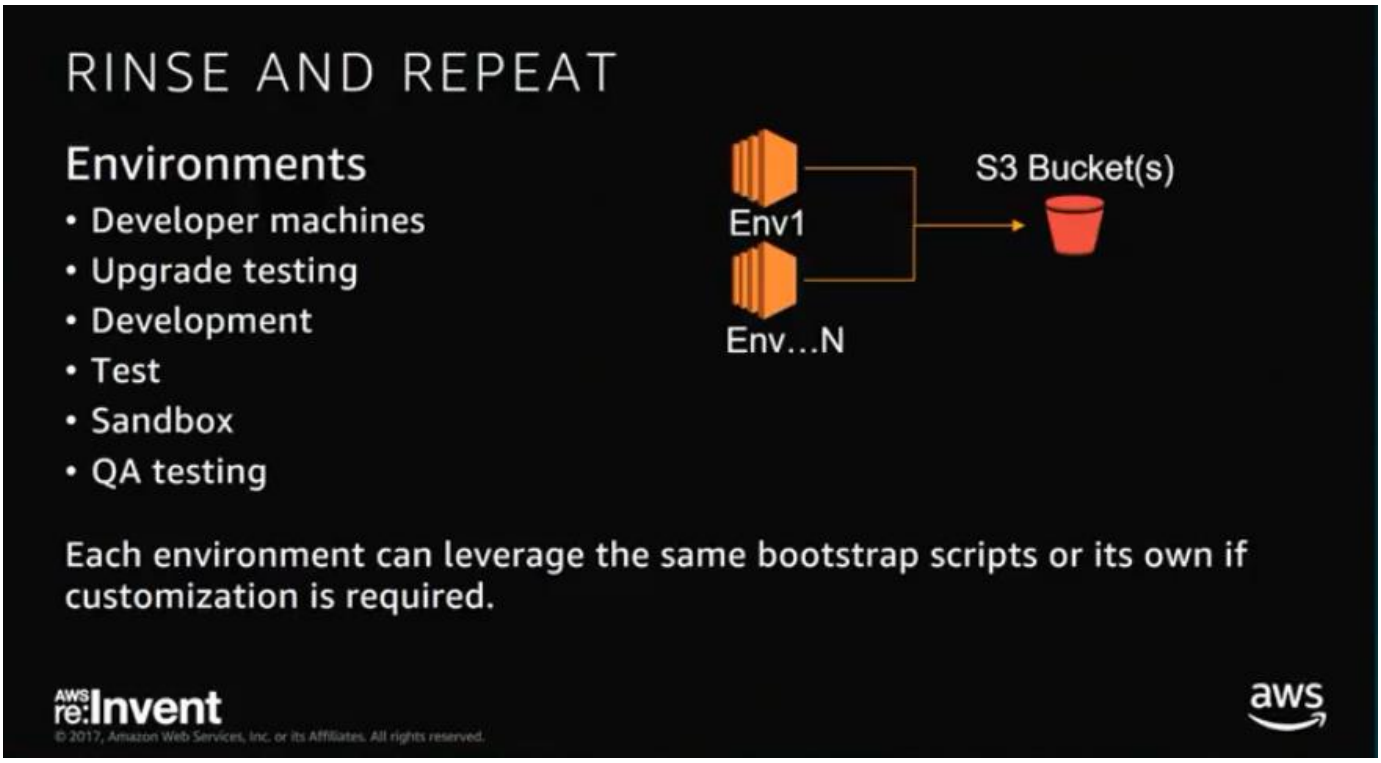
aws



The security tool gets installed dynamically during the initialization step so that we can prevent the web server from serving traffic if it is not protected



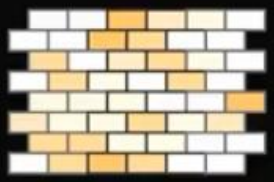
REVIEW & LESSONS LEARNED

The environment is alive!

- Mega automation
- Real-time log visibility
- Tools for quality, security, and regulatory compliance
- Controlled release management and roll back

Don't boil the ocean all at once!

- Start with what you know and build on it
- Make sure your requirements are clear, then focus one step at a time
- Spend ample time on the planning phase
- Work closely with AWS



You will **succeed**!

The Journey Not the Destination

Next Steps

NEXT STEPS

DynamoDB

CloudFormation

RDS—MySQL

Lambda

Amazon API Gateway*

Amazon WorkSpaces