How to marry Innovation and Standardization

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Amazon Web Services
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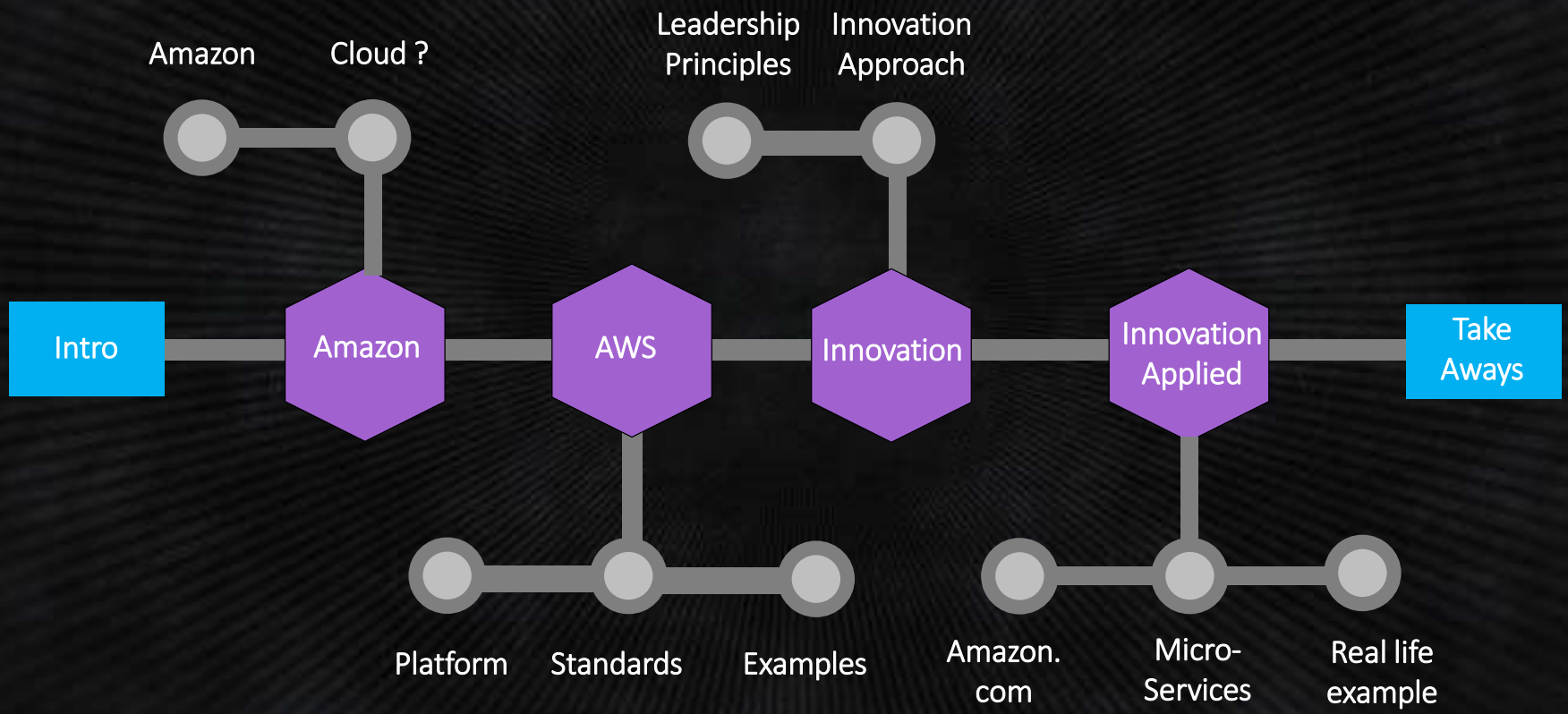
Our journey for today

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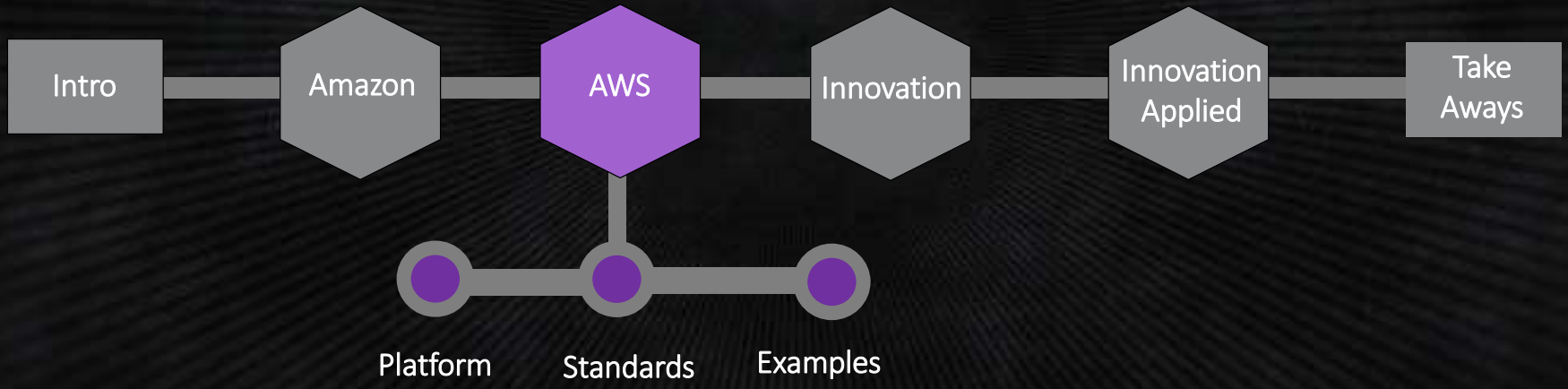
GREEN
BIN

DEPLOYMENTS AT AMAZON.COM

~11.6s	~1,079	~10,000	~30,000
Mean time between deployments (weekday)	Max number of deployments in a single hour	Mean number of hosts simultaneously receiving a deployment	Max number of hosts simultaneously receiving a deployment

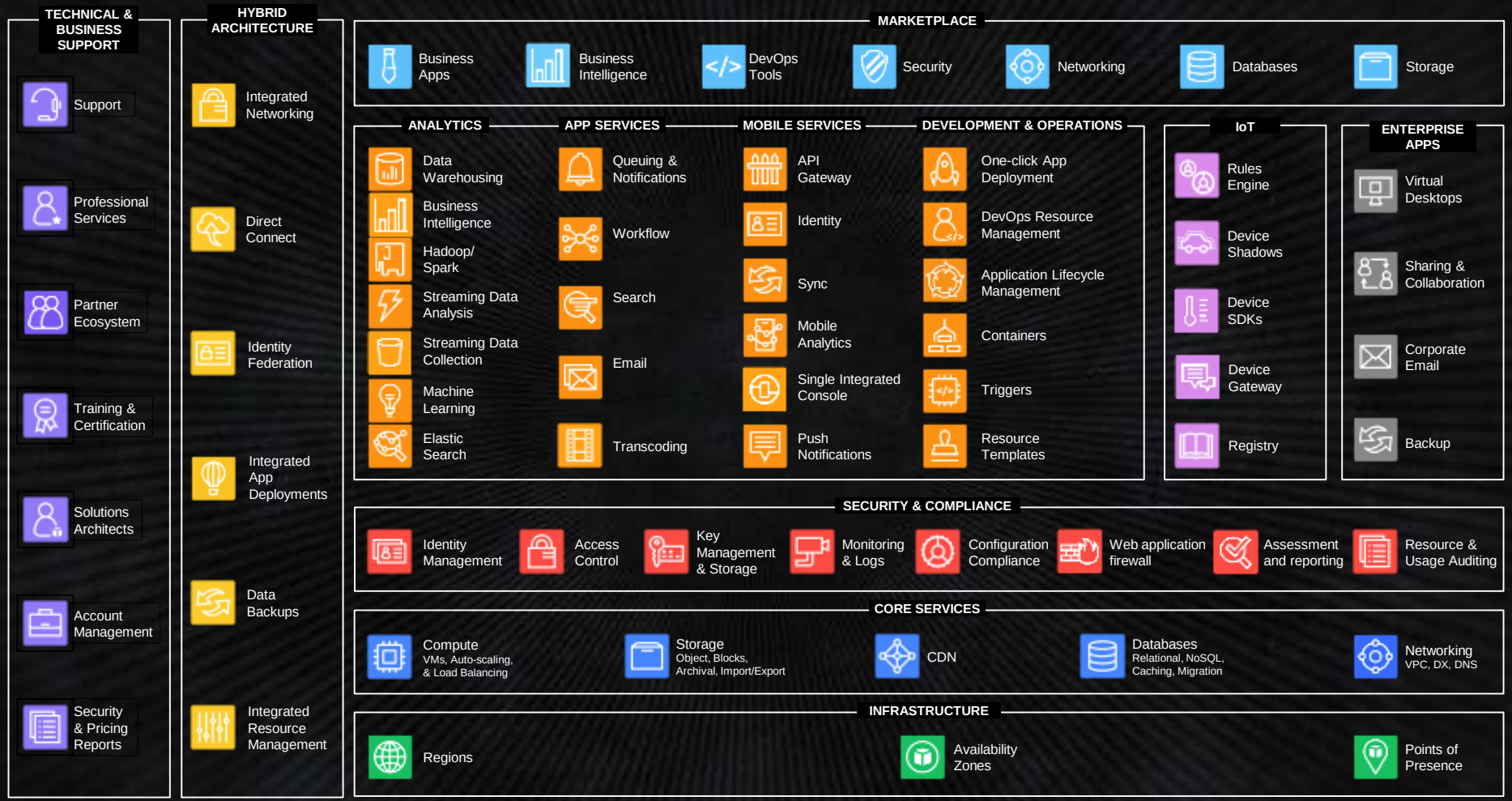

Intro
Amazon
AWS
Innovation
Innovation Applied
Take Aways
Platform
Standards
Examples

AWS Global Infrastructure

14 Regions

38 Availability Zones

63 Edge Locations


TECHNICAL & BUSINESS SUPPORT
Support
Professional Services
Partner Ecosystem
Training & Certification
Solutions Architects
Account Management
Security & Pricing Reports
HYBRID ARCHITECTURE
Integrated Networking
Direct Connect
Identity Federation
Integrated App Deployments
Data Backups
Integrated Resource Management
MARKETPLACE
Business Apps
Business Intelligence
DevOps Tools
Security
Networking
Databases
Storage
ANALYTICS
Data Warehousing
Business Intelligence
Hadoop/ Spark
Streaming Data Analysis
Streaming Data Collection
Machine Learning
Elastic Search
APP SERVICES
Queuing & Notifications
Workflow
Search
Email
Transcoding
MOBILE SERVICES
API Gateway
Identity
Sync
Mobile Analytics
Single Integrated Console
Push Notifications
DEVELOPMENT & OPERATIONS
One-click App Deployment
DevOps Resource Management
Application Lifecycle Management
Containers
Triggers
Resource Templates
IoT
Rules Engine
Device Shadows
Device SDKs
Device Gateway
Registry
ENTERPRISE APPS
Virtual Desktops
Sharing & Collaboration
Corporate Email
Backup
SECURITY & COMPLIANCE
Identity Management
Access Control
Key Management & Storage
Monitoring & Logs
Configuration Compliance
Web application firewall
Assessment and reporting
Resource & Usage Auditing
CORE SERVICES
Compute
VMs, Auto-scaling, & Load Balancing
Storage
Object, Blocks, Archival, Import/Export
CDN
Databases
Relational, NoSQL, Caching, Migration
Networking
VPC, DX, DNS
INFRASTRUCTURE
Regions
Availability Zones
Points of Presence

Every customer gets exactly the same service from AWS

amazon web services

AWS Foundation Services

- Compute
- Storage
- Database
- Networking

AWS Global Infrastructure

- Availability Zones
- Regions
- Edge Locations

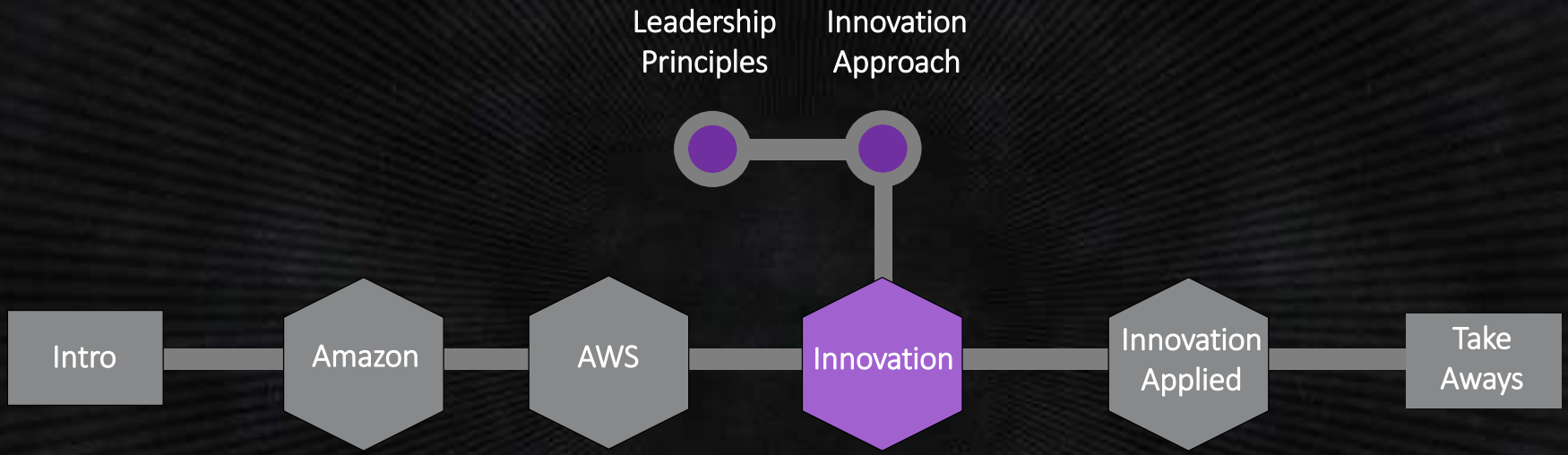
AWS is responsible for the security **OF** the Cloud

GE Oil & Gas: Cost and Operational benefits of migrating to AWS

Business Agility	Operational Resilience	Cost Avoidance	Workforce Productivity	Operational Costs
• 77% faster to deliver business applications	• 98% reduction in P1/P0's	• 52% average TCO savings	• 15 automated bots developed	• 35% reduction in compute assets (792)
• Rapid experimentation	• Improved security posture	• 80% cloud first adoption	• 8 cloud migration parties	• 50 applications decommissioned
• Reduced technical debt	• 15 cloud services created		• Shift to self-service culture	• $14M YOY Savings
• Streamlined M&A activity	• Improved performance		• DevOps in Practice	

$14.2M Investment + **18 Months** + **Focus** = **311 Apps in Cloud** & **$14M YOY Savings**

https://aws.amazon.com/blogs/aws/ge-oil-gas-digital-transformation-in-the-cloud/


Leadership Principles
Innovation Approach
Intro
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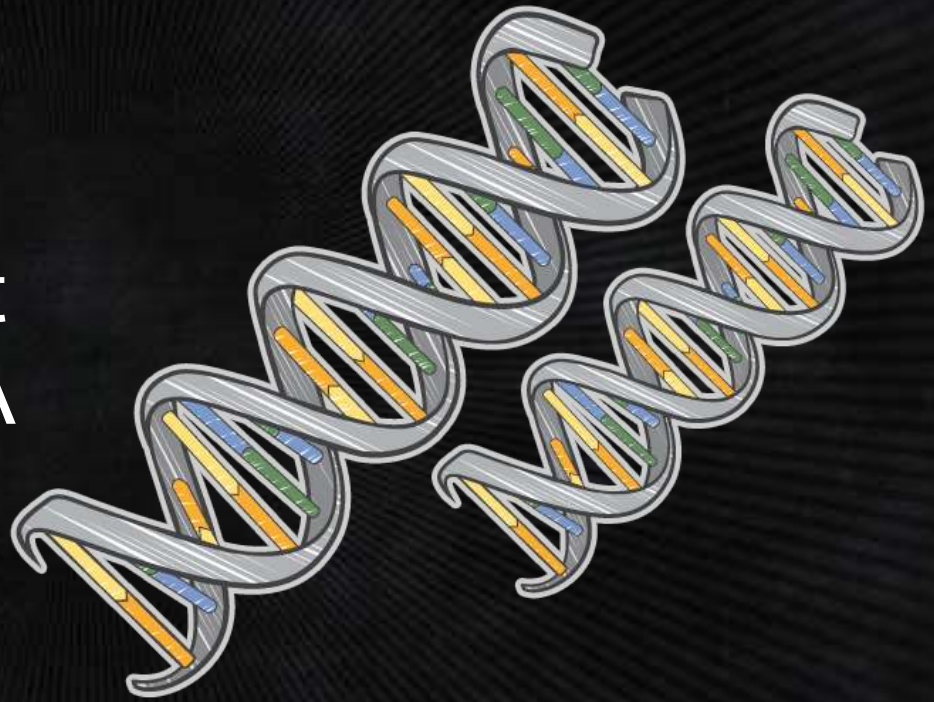
Take Aways

Make innovation part of the corporate DNA



Customer Obsession

Ownership

Invent and Simplify

Are Right, A Lot

Hire and Develop the Best

Insist on the Highest Standards

Think Big

Bias for Action

Frugality

Learn and be Curious

Earn Trust of Others

Dive Deep

Have Backbone; Disagree and Commit

Deliver Results

« I think frugality drives innovation, just like other constraints. One of the only ways to get out of a tight box is to invent your way out »

Jeff Bezos

CEO, Amazon.com

Amazon's Innovation Approach

Focus on Your Customers
Experiment Frequently
Measure, Improve and Iterate
Move Fast, and Be Nimble
Foster Leadership

Focus on Your Customers

Work backwards from the customer

(1) Press Release

(2) FAQ

(3) User Manual

Amazon Web Services Launches New Capabilities for Mobile Developers

AWS Mobile Services make it simpler and more cost-effective to build and scale mobile apps on the AWS Cloud

SEATTLE--(BUSINESS WIRE)--Mon. XX. 2014-- Amazon Web Services, Inc. (AWS), an Amazon.com company (NASDAQ:AMZN), today announced several new capabilities to make it easier for developers to build, deploy, and scale mobile applications. Amazon Cognito is a new service that provides simple user identity and data synchronization that lets developers create apps that authenticate users through popular public login providers, and then keep app data such as user preferences and game state synced between devices. The new Amazon Mobile Analytics service allows developers to easily collect and analyze app usage data, up to billions of events per day, from millions of users, and delivers usage reports within an hour of data being sent by the app. AWS is also introducing a new unified Mobile Software Development Kit (SDK) that makes it easy for iOS, Android, and Fire OS developers to access the new Amazon Cognito and Amazon Mobile Analytics services as well as popular AWS services like Amazon S3 and Amazon DynamoDB. To get started with AWS Mobile Services, visit http://aws.amazon.com/mobile.

Today, many app developers around the world use the AWS Cloud as infrastructure building blocks for the back-end services that power their mobile applications. Still, these mobile app developers have had to spend valuable time on undifferentiated heavy lifting like connecting apps to storage and database services and integrating core functionality such as authentication, user management, notifications, and usage data analytics. With Amazon Cognito, Amazon Mobile Analytics, and the AWS Mobile SDK, developers are now able to focus more of their energy on what matters, the differentiated functionality of their app that attracts and retains end users.

With AWS Mobile Services, developers can:

- **Securely store, manage, and sync user identities and data (Amazon Cognito)**

As more and more users utilize the same apps across various devices running different mobile platforms, developers often have to manage multiple user logins to securely store and retrieve data for their users, reconcile different versions of the data as devices go on and offline, and keep data in sync between devices. With Amazon Cognito, developers can incorporate these capabilities into their apps with just a few lines of code. Amazon Cognito lets developers build apps that allow users to start off as unauthenticated guests and then sign in with Amazon, Facebook, or Google. Amazon Cognito manages the complexity of keeping app data in sync on all devices associated with a user identity. Developers can also use Amazon Cognito client SDK to create a local data store, which caches user data on the device so that apps can keep working the same way regardless of whether the device is on or offline. Additionally, Amazon Cognito makes it simple to implement AWS security best practices (such as not embedding AWS credentials into source code) by providing a set of temporary, limited-privilege AWS credentials that developers can use to access AWS services such as Amazon Mobile Analytics, Amazon SNS, Amazon S3, or Amazon DynamoDB from their mobile app. Developers receive 10 GB of storage for synced data and one million sync operations per month for free for up to 12 months with the AWS Free Tier.

- **Quickly access and understand app usage data (Amazon Mobile Analytics)**

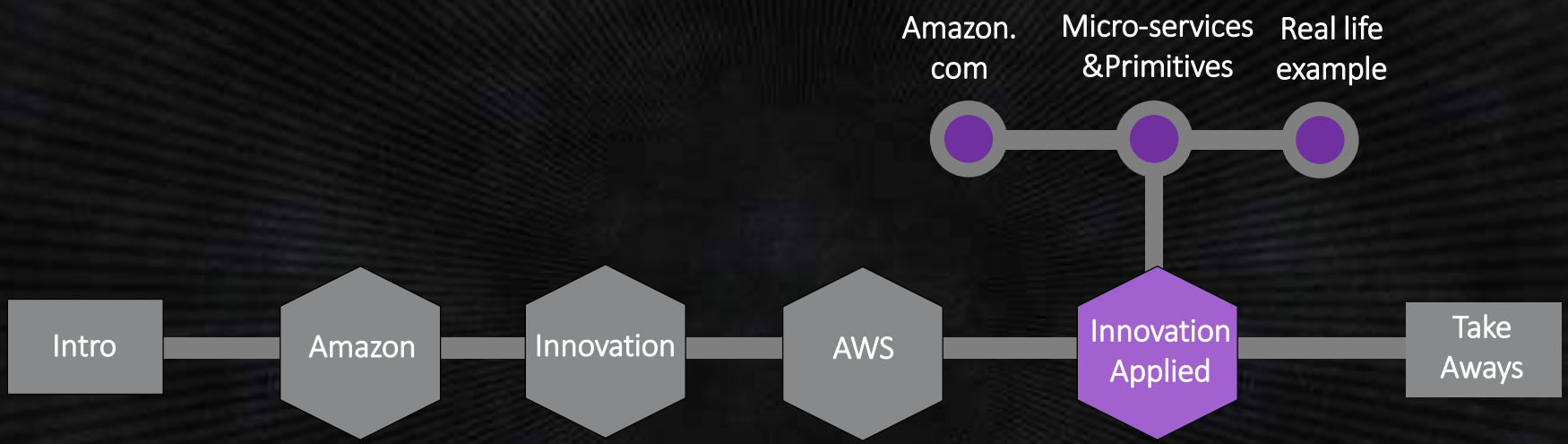
Move Fast and Be Nimble

"*When a feature or enhancement is ready, we push it out and make it instantly available to all.*" – Jeff Bezos

- Speed of iteration beats quality of iteration
- Encourage single-threaded focus
- Enables self-directed teams
- Fosters ownership & autonomy

« Invention requires two things: the ability to try a lot of experiments, and not having to live with the collateral damage of failed experiments »

Andy Jassy
CEO, Amazon Web Services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&Primitives
Real life
example
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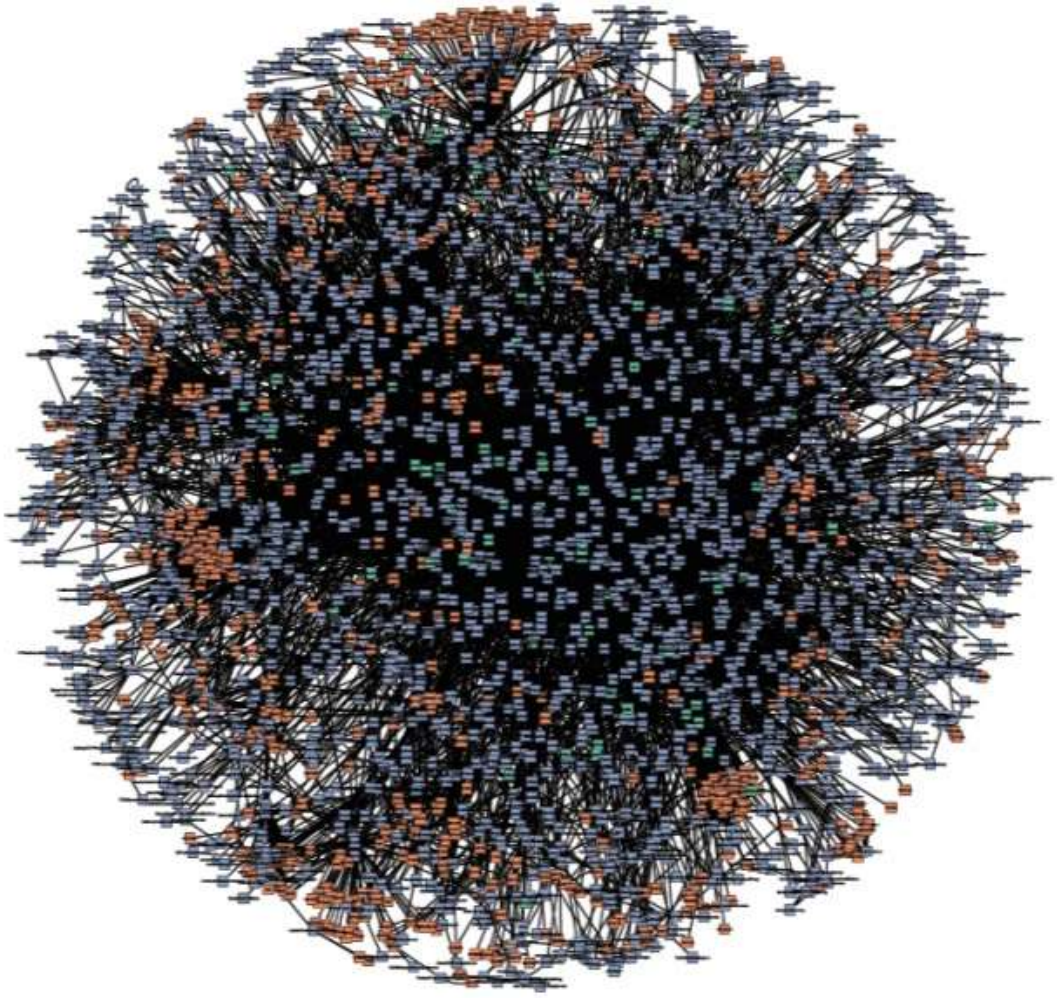
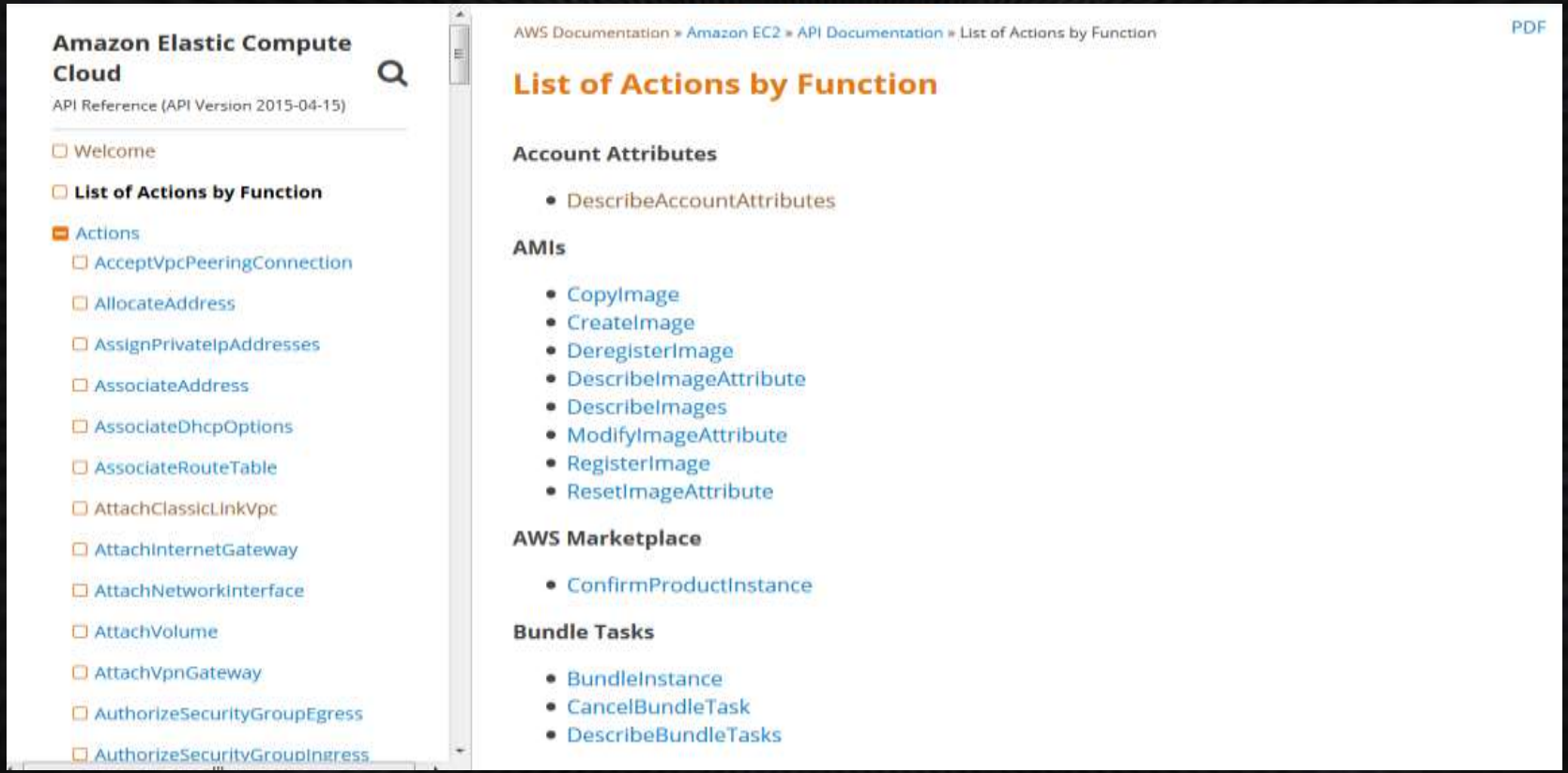
Take
Aways



Innovation Applied

Everything gets a Service Interface



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“Microservices” or Primitives

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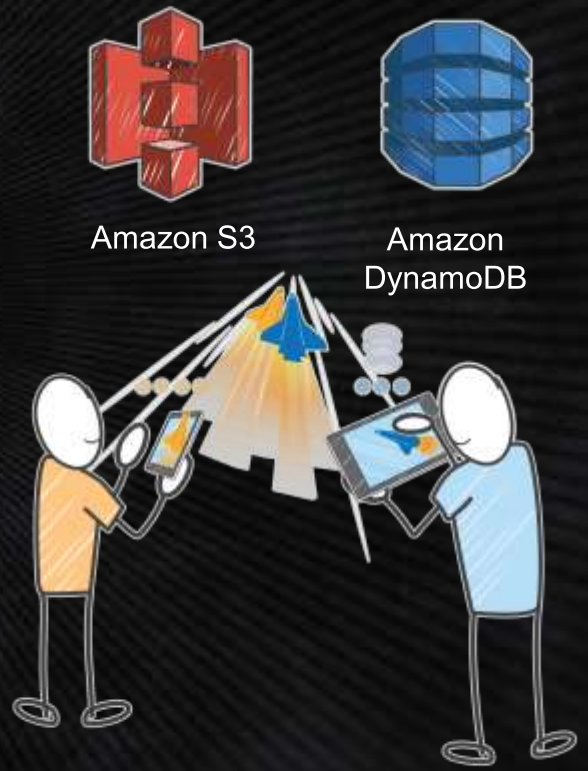
Mobile and AWS, 2012

- What worked:
  - Scale
  - Powerful
  - Global
  - Low Cost



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Working backwards from Customer

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Reported Challenges

Login, permissions, security, for their app users

Syncing data across devices

Messaging across platforms

Back end development

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- **Quickly access and understand app usage data (Amazon Mobile Analytics)**

Analytics such as how many users an app has, how much revenue it's generating, and what a user is doing with the app are

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Real Life Example

Actually launched July 10, 2014

Amazon Web Services Announces Amazon Cognito, a New Service for Mobile App Developers

Cognito makes it easy for mobile app developers to identify end users and securely store user information that is synchronized across multiple devices

Identity Synchronization Push

AWS Identity and Access Management (IAM)

Provided

- Secure and scalable identity, authentication, authorization
- Temporary credentials

Needed

- Support for identity federation from leading web identity providers

AWS IDENTITY AND ACCESS MANAGEMENT ADDS WEB IDENTITY FEDERATION

Connecting mobile apps to the cloud using identities from Facebook and Google

SEATTLE – (BUSINESS WIRE) – Month, 2013 – Amazon Web Services, Inc., an Amazon.com company, today announced web identity federation; new AWS Identity and Access Management (IAM) functionality that enables creating powerful, cloud-enabled mobile apps that integrate with Amazon, Facebook and Google identities. AWS developers can now allow their users to log into their mobile apps using their existing Amazon, Facebook, or Google, username and password, and then grant them controlled access to resources within their AWS account such as objects in Amazon Simple Storage Service (S3), keys in Amazon DynamoDB, or messages in Amazon Simple Queue Service (SQS). All of this can now be done without writing any server-side code.

Billions of users increasingly depend on major web identity providers such as Amazon and Facebook to identify them on the Internet. Mobile app developers want to leverage these identities as an alternative to maintaining their own user management and authentication systems. Developers want to utilize these identities to grant access to AWS services from their mobile apps, but were previously unable to do so without compromising on security, user experience, or investing in developing backend services.

Bridging web Identities to AWS

"Our users have been asking if they can use their Facebook accounts to publish images to our photo sharing mobile app" Said Adam Smith, President of FooApps. *"Previously we had to develop backend services running in EC2 that could authenticate those users. We didn't have a lot of experience writing and maintaining that code - with web identity federation we eliminated the cost and complexity."*

Using web identity federation, apps can now exchange valid Amazon, Facebook or Google access tokens for a set of temporary AWS security credentials. Users of the mobile app simply authenticate using their Amazon, Facebook or Google account and the app is able to request temporary AWS security credentials for each user. This allows the developer to exercise fine-grained control over the way mobile apps consume AWS resources. For example, users can be restricted to a specific S3 bucket that contains their unique user id.

Easy to configure, free to use

Web identity federation does not require setup and can be managed using the AWS Management Console, command-line tools, or APIs. To get started a developer needs to:

1. *Create an IAM role for the app*: The developer creates a role and specifies an access policy. The policy determines which identity providers are accepted and what AWS resources can be accessed.
2. *Update the app:* The developer needs to update the apps so it can exchange the user's access token for temporary AWS security credentials.

Amazon DynamoDB

Provided

- Highly available datastore
- High scale
- Low latency
- Low cost

Needed

- Row level access control

Announcing Fine-Grained Access Control for Amazon DynamoDB

Posted On: Oct 31, 2013

We are excited to announce Fine-Grained Access Control (FGAC), a novel security feature for Amazon DynamoDB. Requests to a DynamoDB table can now be restricted to specific items and even attributes. Additionally, requests can now be authenticated and authorized directly by DynamoDB.

FGAC gives a DynamoDB table owner a high degree of control over data in the table. Specifically, the table owner can indicate *who* (caller) can access *which* items or attributes of the table and perform *what* actions (read / write capability). FGAC is used in concert with AWS Identity and Access Management (IAM), which manages the security credentials and the associated permissions.

Any application that tracks information in a DynamoDB table, where the end user (or application client acting on behalf of an end user) wants to read or modify the table directly, without a middle-tier service, can benefit from FGAC. For instance, a developer of a mobile game can use FGAC to track the top score of every user in a DynamoDB table. FGAC will ensure that the application client is only able to modify the top score for the user that is currently running the application.

To enable FGAC, please use the Access Control Policy Generator in the DynamoDB Console. You can learn more by visiting the Fine-Grained Access Control Documentation page or Jeff Barr's blog post.

Amazon Simple Notification Service

Provided

- Highly scalable messaging service
- Secure, reliable, simple, inexpensive

Needed

- Simple and cost-effective way to push to Apple, Google, Fire OS, and Windows devices

Amazon Web Services Makes Mobile App Development Easier with Amazon SNS Mobile Push

New cross-platform notification service is a fast, scalable and cost-effective way for mobile apps to proactively keep their users aware of critical events and relevant information

August 13, 2013 08:48 AM Eastern Daylight Time

SEATTLE--(BUSINESS WIRE)--Amazon Web Services, Inc. (AWS), an Amazon.com company (NASDAQ:AMZN), today announced Amazon Simple Notification Service (Amazon SNS) with Mobile Push, a fast, fully managed, cross-platform push notification service in the cloud. With one simple API, application developers can easily send notifications to Apple iOS, Google Android and Kindle Fire devices. All AWS customers can begin using Mobile Push for Amazon SNS at no charge and send up to one million notifications each month for free. After that, customers pay $.50 for every million messages published, and $.50 for every million messages delivered ($1.00 total per million push notifications). To learn more about Amazon SNS Mobile Push, visit: http://aws.amazon.com/sns.

"Many customers tell us they build and maintain their own mobile push services, even though they find this approach expensive, complex and error-prone"

Supporting push notifications at large scale has been incredibly complicated for mobile app developers. Each popular mobile platform maintains a different free relay service that delivers notifications through persistent connections to devices running the platforms they own. This means that to support millions of users on multiple mobile platforms, developers must integrate with each of these platform-specific relay services, which introduces operational complexity and cost. In addition, the nature of mobile app distribution is such that successful apps can become popular almost overnight, exacerbating these challenges for customers.

"Many customers tell us they build and maintain their own mobile push services, even though they find this approach expensive, complex and error-prone," said Raju Gulabani, Vice President of Database Services, AWS. "Amazon SNS with Mobile Push takes these

AWS Mobile Services

5/28/13

Login with Amazon

OpenID Connect 10/23/14

AWS Mobile SDK

7/10/14

Amazon Cognito

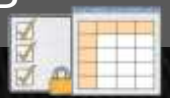
7/10/14

Amazon SNS Mobile Push

8/13/13

IAM

Amazon DynamoDB



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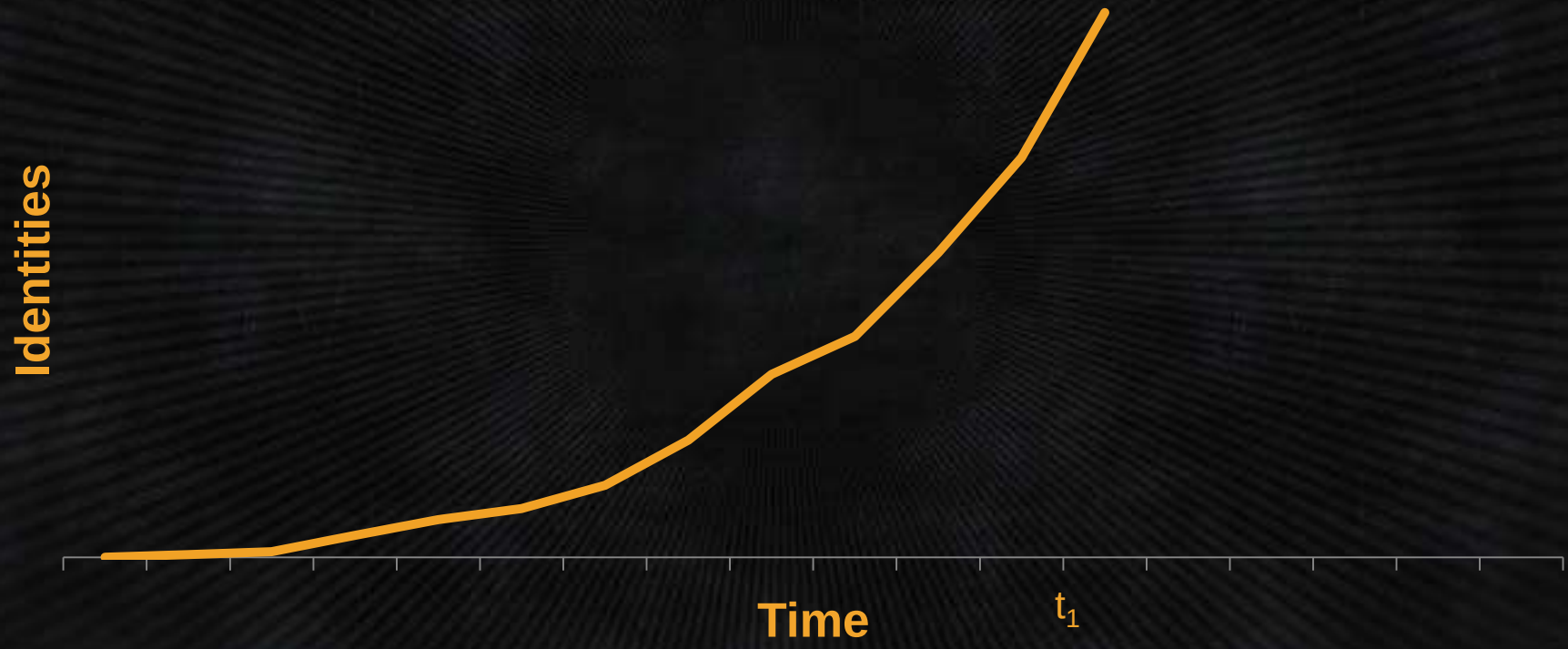
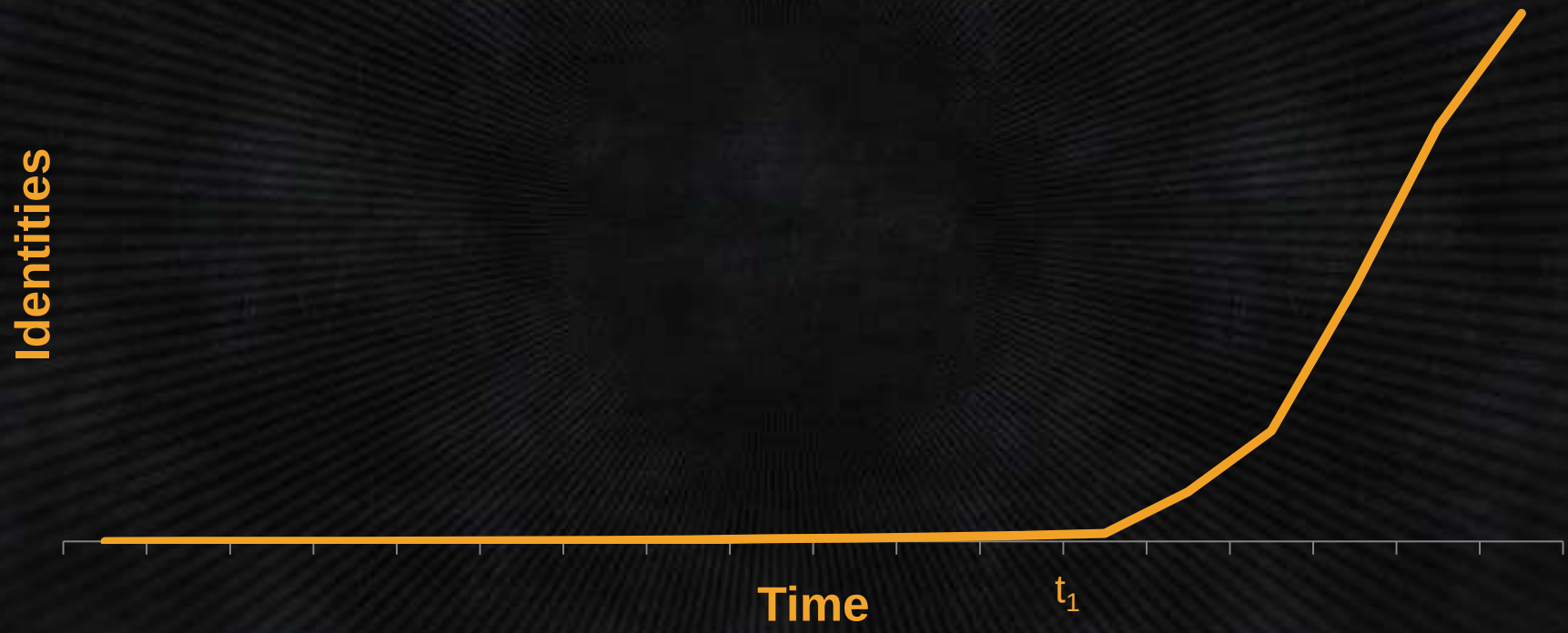
Amazon SNS

Cognito Adoption



Cognito Adoption




Intro
Amazon
AWS
Innovation
Innovation Applied
Take Aways

Key Take-Aways

- Focus on customer and work backwards
- It is always the right time to Innovate
- Experiment rapidly at low cost is key to innovation
- Small cross-functional teams with authority
- Standardize on primitives with clear boundary, interface and service description

Thank You !