

Voice Activated Systems

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Agenda

- Introduction
- History
- Current Technologies
- Usage and applications
- Alexa
- Alexa Voice Service



Introduction

A voice activated system is a system that performs actions and is controlled by means of the human voice.

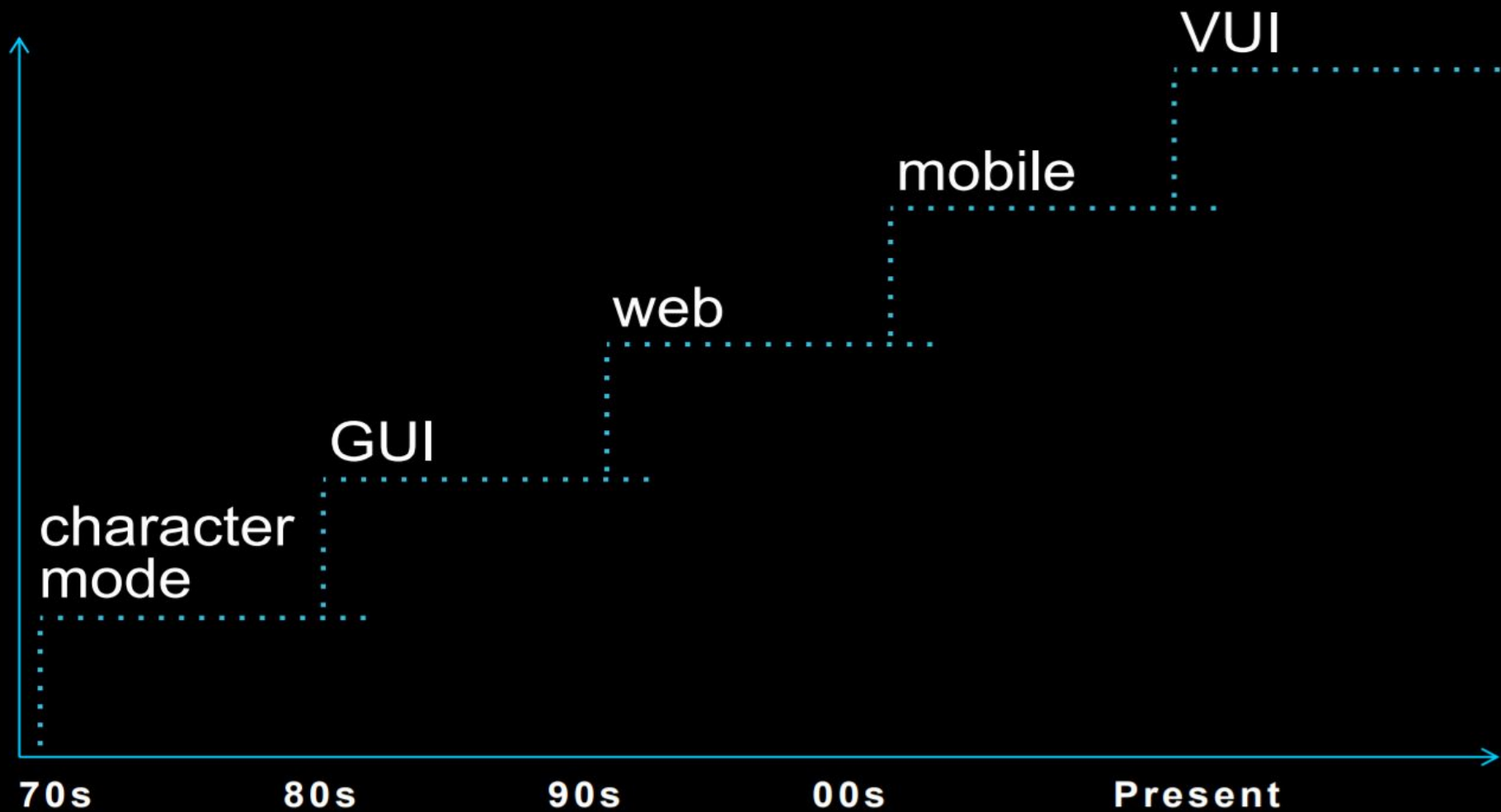
Speech is the primary means of communication between people.

By removing the need to use buttons, dials and switches, consumers can easily operate appliances with their hands full or while doing other tasks.

Why Voice?

“Voice is the most natural form of user interaction, and recent advancements in speech recognition and natural language understanding technology are now enabling us to control our connected devices with speech. We believe that voice can simplify the modern lifestyle, providing us with a unifying interface across devices so we can be entertained, stay informed, and organize our lives by just asking.”

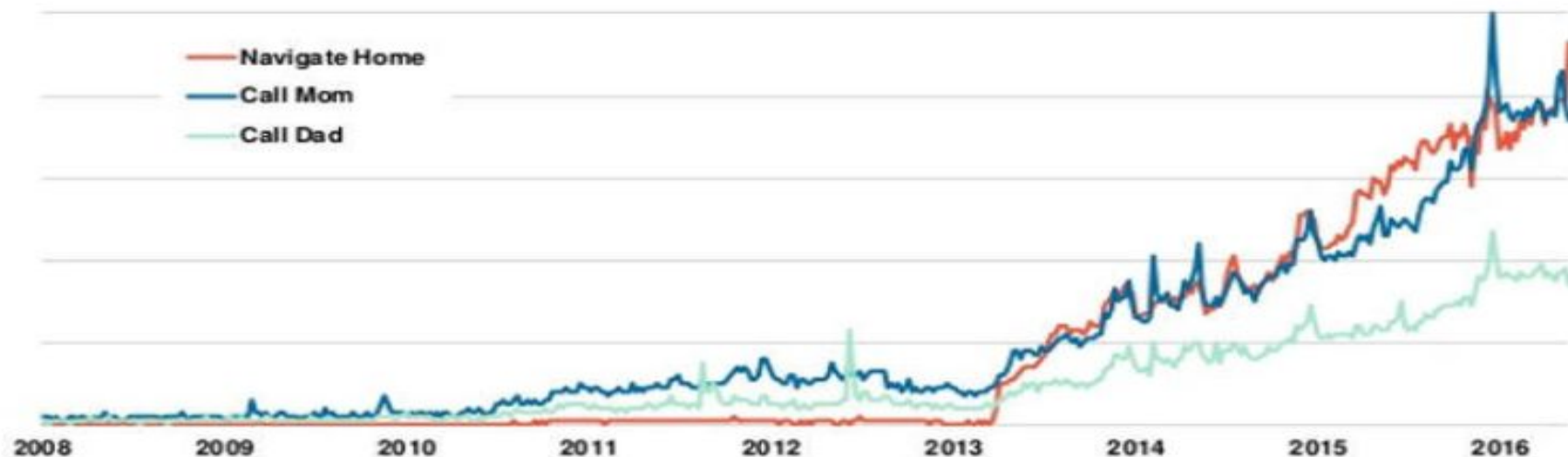
- Amazon



Google Voice Search Queries = Up >35x Since 2008 & >7x Since 2010, per Google Trends

Google Trends imply queries associated with voice-related commands have risen >35x since 2008 after launch of iPhone & Google Voice Search

Google Trends, Worldwide, 2008 – 2016



History

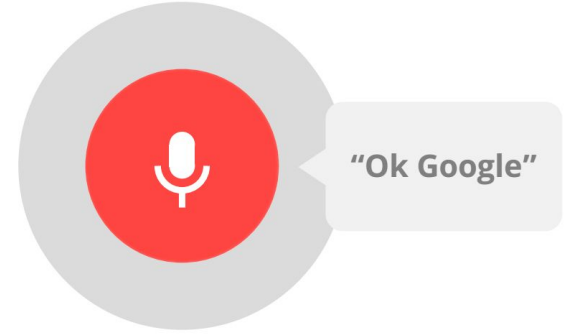
Overview

Time period	Key developments
1877–1971	Speech recognition is at an early stage of development. Specialized devices can recognize few words and accuracy is not very high.
1971–1987	Speech recognition rapidly improves, although the technology is still not commercially available.
1987–2014	Speech recognition continues to improve, becomes widely available commercially, and can be found in many products.

Timeline

- In 1877, **Thomas Edison**'s phonograph becomes the first device to record and reproduce sound. Later in 1879, he invents the first dictation machine, a slightly improved version of his phonograph.
- In 1936, A team of engineers at Bell Labs, led by **Homer Dudley**, begins work on the Voder, the first electronic speech synthesizer. It was granted a patent in 1939.
- Later, **IBM** brings the Shoebox (1962), Automatic Call Identification (1971), Tangora (1980), MedSpeak (1996).
- **Microsoft** integrates speech in Office (2002), Windows Vista (2007) and launches Cortana (2014).
- **Google** introduces GOOG-411 in 2007.
- **Apple** announces Siri in 2011.
- **Amazon** launches Alexa in 2014.

Current Technologies



Hi, I'm Cortana.

Usage and Applications

- In-car systems
- Health care
- Military
- Telephony
- Education and daily life
- Home automation
- Video games
- Robotics
- Virtual Assistant



Alexa



"Alexa, turn up the volume"



"Alexa, ask CloudStatus about all regions"



"Alexa, move the car forward"



"Alexa, ask Fantasy Scoreboard who's playing today"



"Alexa, turn on the kitchen light"



"Alexa, ask Shark Week for a fact"



"Alexa, ask Lyft to get me a ride to work"



"Alexa, set my first floor to 75 degrees"

Alexa Voice Service

The Alexa Service



What is AVS?

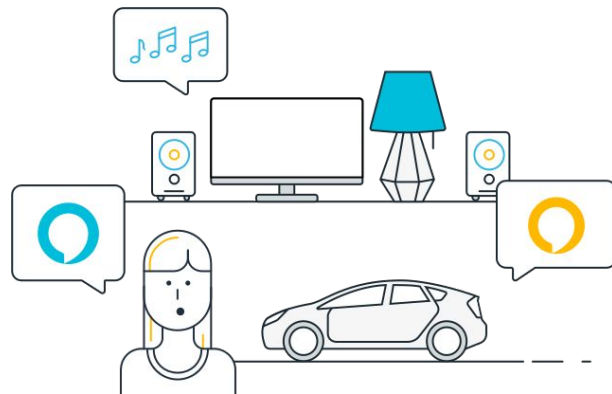
Cloud-Based Intelligence:

- Alexa Voice Service is a Amazon cloud service which helps in building Alexa skills and Alexa-enabled products easily and rapidly.
- Alexa is always getting smarter with new capabilities through machine learning.
- Complex technologies like Automatic Speech Recognition and Natural Language Understanding are handled for you in the cloud.
- AVS provides you easy-to-use APIs for core functionality like audio playback, volume control, or text-to-speech.
- AVS helps build your own custom skill with the Alexa Skills Kit (ASK).
- The AVS Device SDK provides C++ based (11 or later) libraries that leverage the AVS API to create device software for Alexa-enabled products.

AVS Device SDK

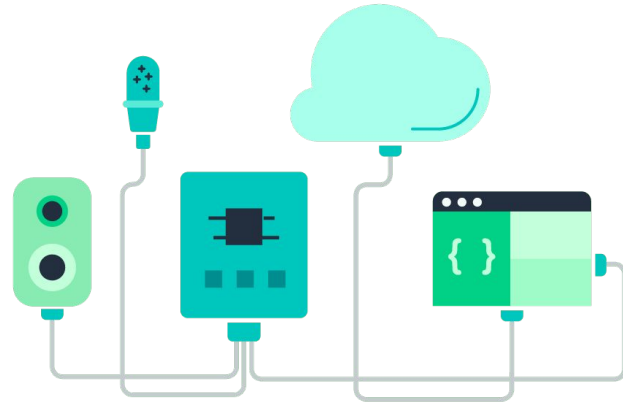
AVS Device SDK

- The Alexa Voice Service (AVS) enables you to integrate Alexa directly into your products.
- Amazon provides you with access to a suite of resources to quickly and easily build Alexa-enabled products, including APIs, hardware and software development tools, and documentation.
- With AVS, you can add a new intelligent interface to your products and offer your customers access to a growing number of Alexa features, smart home integrations, and skills.

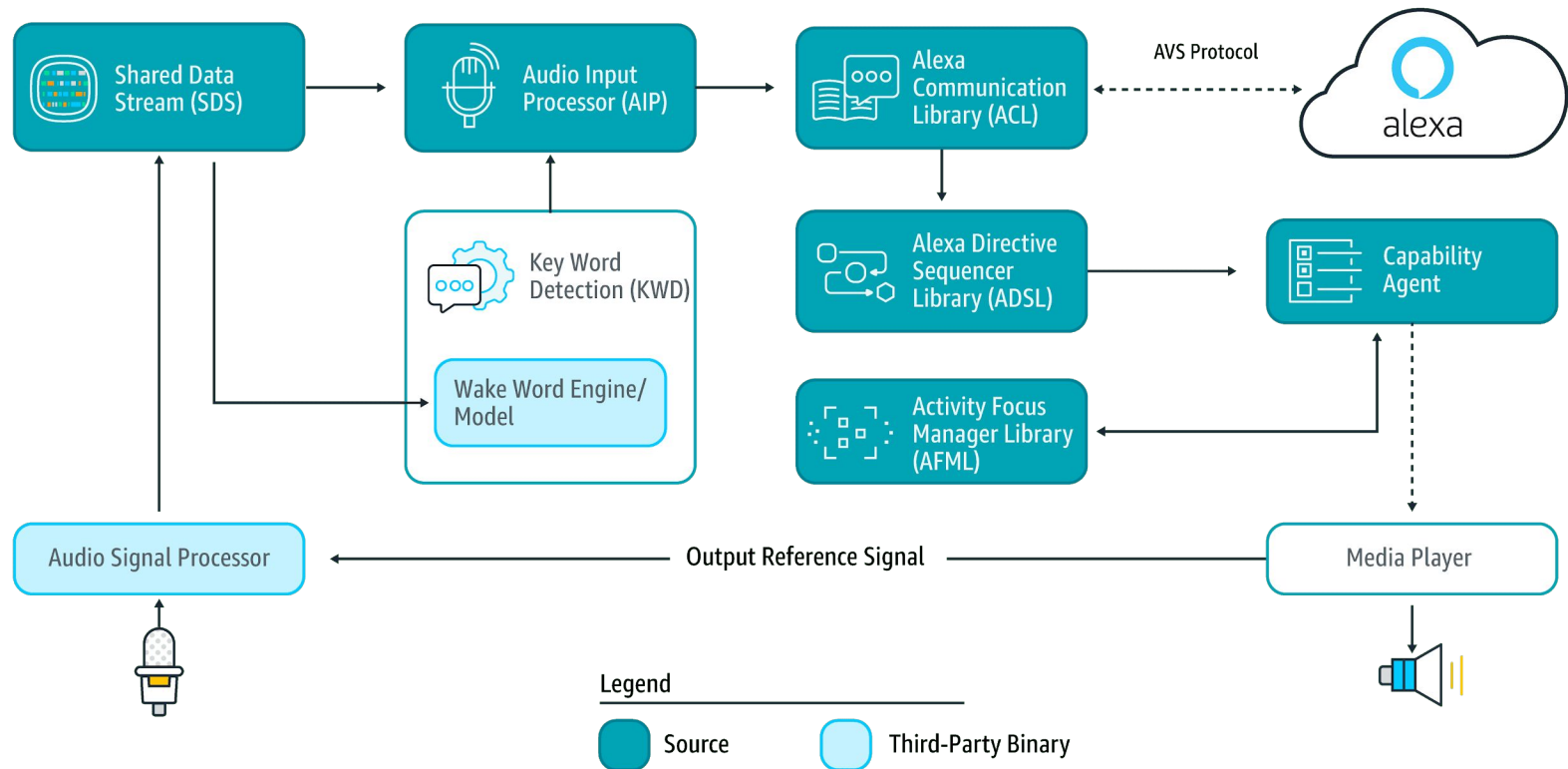


Building with AVS

- Developer Tools:
 - AVS APIs and Device SDK
 - Development Kits
- Solution Providers:
 - Systems Integrators
 - Original Design Manufacturers

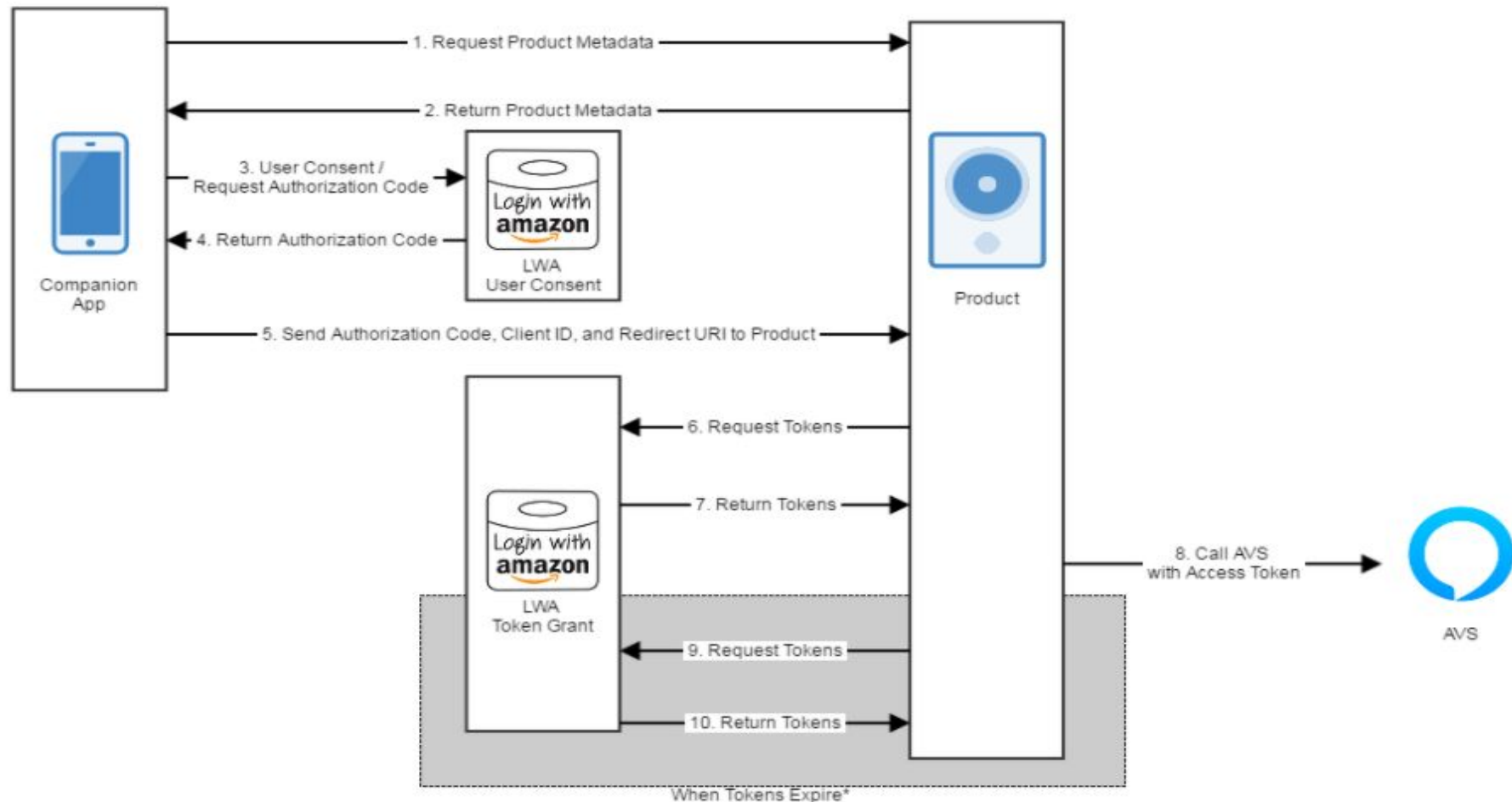


Alexa Client SDK Architecture



Authorization to Access AVS

- Authorize from a Companion App
- Authorize from a Companion Site
- Authorize from an AVS Product
- Code-Based Linking (CBL) for Other Devices and Platforms





User



AVS Device



Browser



Web Service



Login With Amazon

1. Product registers with your web service.

2. User clicks "Login" on your companion site and is redirected to LWA.

3. User enters credentials and allows access.

4a. User is redirected to your companion site.

4b. Access token or auth code is sent to your web service.

If and only if the product uses auth code grant.

5. Auth code, client ID, and client Secret are sent to LWA.

6. Access and refresh tokens are sent to your web service.

7. Refresh token, client ID, and client Secret are exchanged for new access tokens hourly.

8. Access token is sent to your product.

Authorize from an AVS Product

1. Register a mobile app in the Alexa developer portal and generate an API key for your app
2. Add LWA to your Android/iOS project by importing *Login with Amazon Library*.
3. Import the LWA API to your source file.
4. Use this API and access key to call authorization and prompt the user to login with Amazon credentials and authorize your application.



User



AVS Device



LWA Auth Service



2nd Device Browser



LWA User Consent

1. Initiate Authorization

2. Device Authorization Request

3. Metadata Returned

4. Display User Code and URL

5. Device Token Request

Begin Polling for Tokens

6. Response

7. User Navigates to the Provided URL

8. User Logs In and Enters Code

9. Success Message Shown to User

User Authorized and Tokens Available to the Device Token Request

10. Device Token Request
(see step 6)

Get Tokens

11. Access and Refresh Tokens Returned

12. Success Message Shown to User

Alexa Skill Kit

ASK

- The Alexa Skills Kit (ASK) is a collection of self-service APIs, tools, documentation, and code samples that makes it fast and easy for you to add skills to Alexa.
- There are now tens of thousands of skills from companies like Starbucks, Uber, and Capital One as well as other innovative designers and developers.
- ASK enables designers, developers, and brands to build engaging skills and reach customers through tens of millions of Alexa-enabled devices.
- With ASK, you can leverage Amazon's knowledge in the field of voice design.

Design Process

1. Establish the purpose and user stories

- **Identify the purpose and capabilities.**
- **Identify the user stories**

2. Write scripts

User: Alexa, ask Paragon how my investments did today.

Alexa: Your portfolio grew by 0.27% today. A total of \$322. Would you like a breakdown of your investments?

User: Yeah.

Alexa: Crystal Cleaner grew by 0.35% for a total gain of \$165.03 (half second pause) Pizza Barn is up by 0.21% for a total gain of \$157. (half second pause) And Belle's Boats is up 1.41% for a gain of \$27.68. (half second pause) What other portfolio details would you like?

User: Exit.

Alexa: Okay, have a nice day.

3. Develop the flow

- **Outline the shortest route to completion**
- **Outline alternate paths and decision trees**
- **Outline behind-the-scenes decisions the system logic will have to make**
- **Outline how the skill will help the user**
- **Outline the account linking process, if present**

4. Get ready to build

- **Identify intents**
- **Identify utterances**

Alexa Skills Kit: Processing a request



Alexa Skills Kit: Utterances and Intents



Link an Alexa User with a User in Your System

Some skills require the ability to connect the identity of the end user with a user in another system. This is referred to as *account linking*, since the goal is to create a link between the Alexa user and the user account in your system.

Questions?