Introducing Alexa

Overview

Alexa ,HCI and voice interfaces

Skills and the ASK

Invocation, utterances, intents

Alexa and AWS

Types of Alexa skills

Human-Computer Interaction (HCI) and Voice Interfaces

"Design for the way people behave, not for how we would like them to behave"

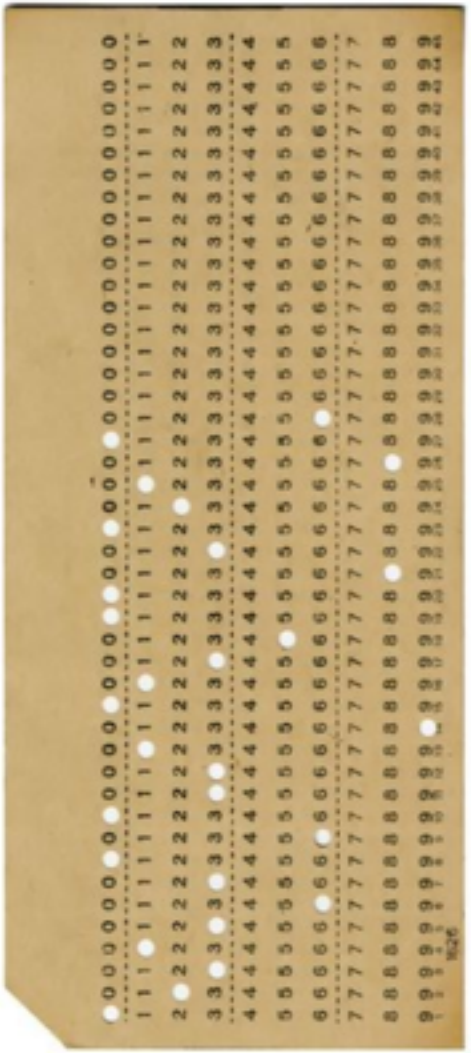
Don Norman, author of "The Design of Everyday Things"

Evolution of Human-Computer Interaction

1940s - 1960s

Punched Cards

Still used in (some) elections!



Punched Cards

First developed in the 1800s to **control** looms

Machine-readable cards - **data** storage

Data, not control, became primary use

World War II - Bletchley Park - Enigma machine

2M punched cards each week

Remained in use until well into the 1980s

Evolution of Human-Computer Interaction

1940s - 1960s

Punched Cards

Still used in (some) elections!

1960s -

Keyboards

First computer terminal - Datapoint 3300 in 1967

Keyboards

Natural extension of typewriters

Manual >> Electronic >> Keyboard

Still the workhorse mode of HCI

Decline of desktops eroding significance

Evolution of Human-Computer Interaction

1940s - 1960s

Punched Cards

Still used in (some) elections!

1960s -

Keyboards

First computer terminal - Datapoint 3300 in 1967

1970s -

The Mouse

Start: Xerox Alto in 1973

The Mouse

Natural extension of joysticks in planes

Initially treated as a military secret

Trackball technology made it mainstream

Xerox Alto (1973) and Apple Lisa

Then considered cutting-edge :-)

Evolution of Human-Computer Interaction

1940s - 1960s

Punched Cards

Still used in (some) elections!

1960s -

Keyboards

First computer terminal - Datapoint 3300 in 1967

1970s -

The Mouse

Start: Xerox Alto in 1973

1990s -

"Multimedia" Computers

Windows 3.1, Windows 95

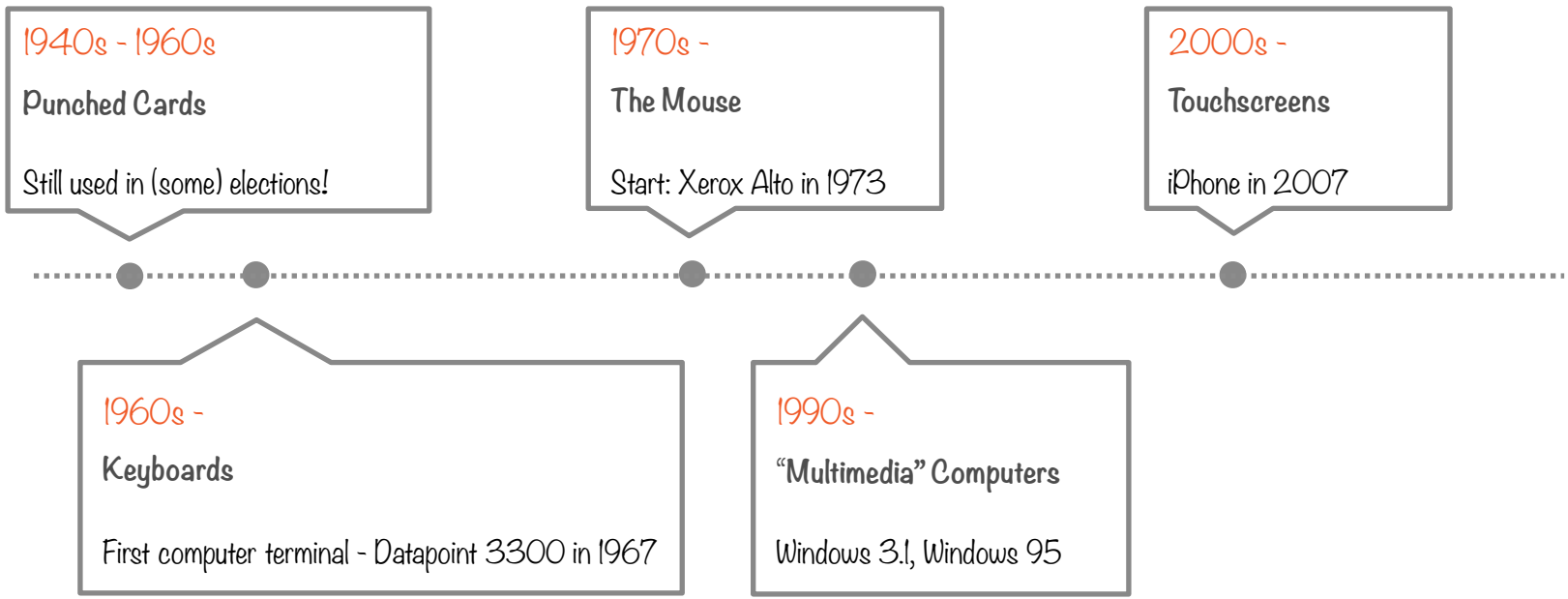
“Multimedia PCs”

First consumer-oriented PCs

Windows 95 - for families, not geeks

Speakers, microphone, ...

Evolution of Human-Computer Interaction



Touchscreens

iPhone launched in 2007

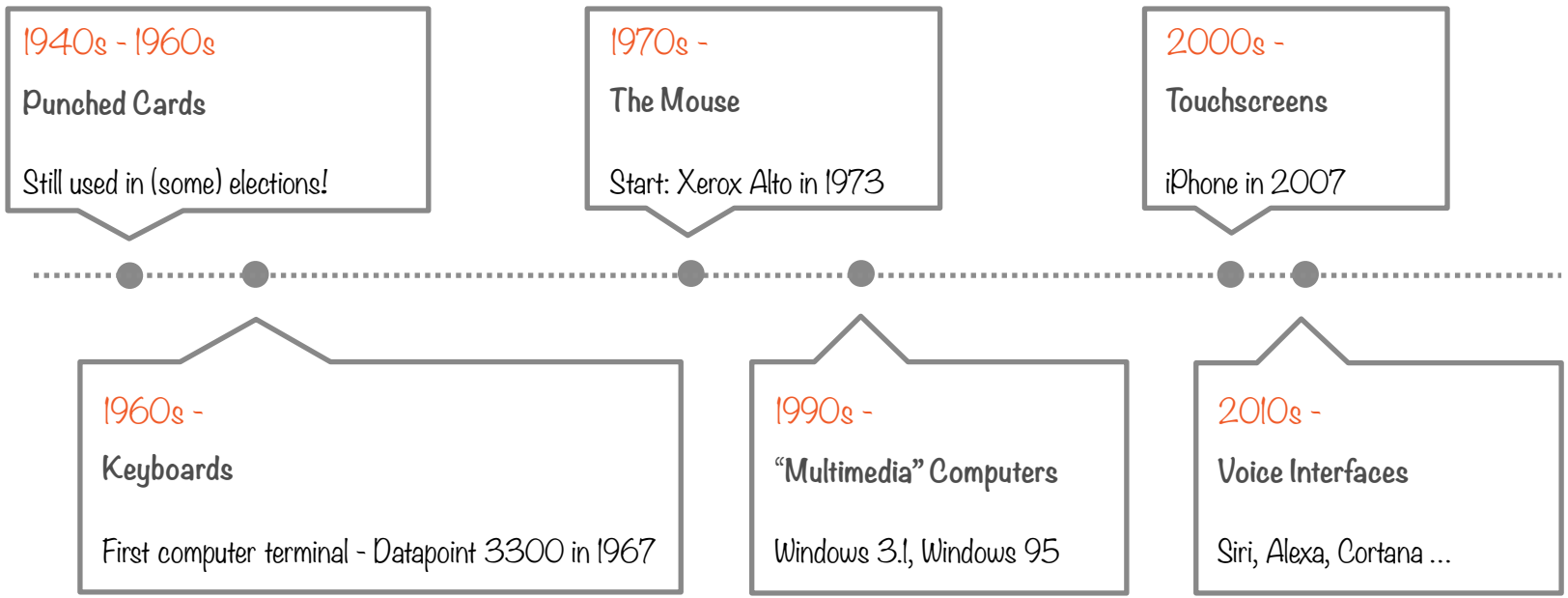
Suddenly, touchscreen everywhere

- Phones, ATMs, check-in counters...

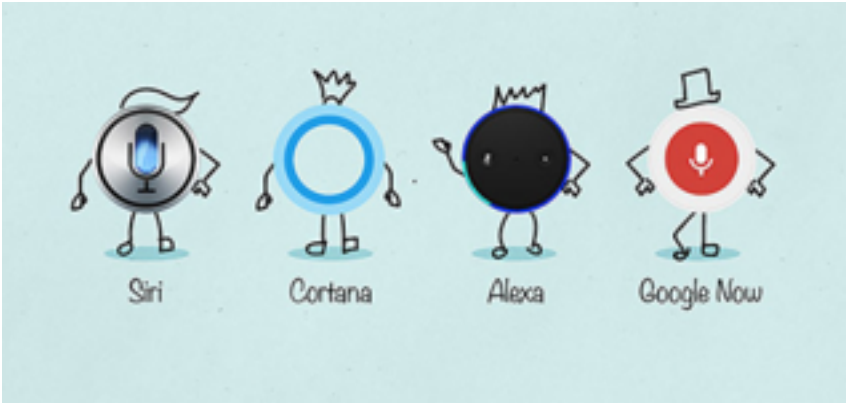
Multi-device world

- User no longer "tied" to 1 location by a wire

Evolution of Human-Computer Interaction



Voice Interfaces



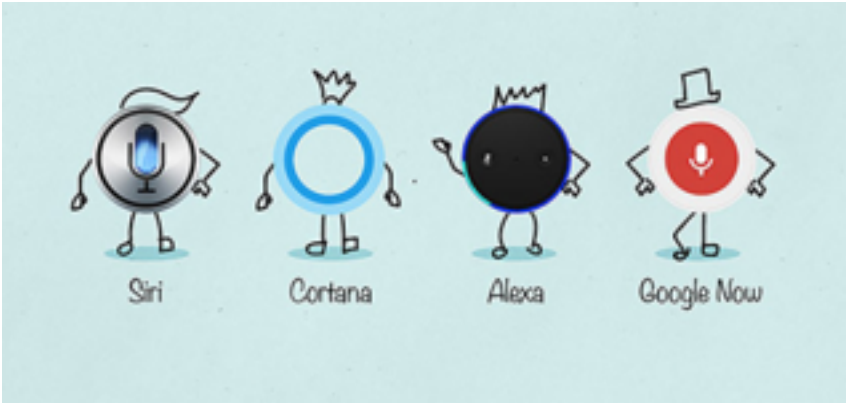
Apple's Siri - iOS app launched 2010

Google Now - launched in 2012

Microsoft's Cortana - launched in 2013

Amazon's Alexa - launched in 2014

Voice Interfaces



Intuitive

Easy to use with IOT

Keyboard to flip a switch?!

Voice request -> API calls -> Voice response

“Intelligent personal assistants” are made possible by the fact that machine learning has “solved” voice recognition and NLP

“Intelligent” Assistants

Voice Interfaces

Translate user’s voice to API calls

Chatbots

Translate user’s chats to API calls

Course Overview

Technologies covered in this course:

- Alexa Skills Kit, Amazon Web Services: Lambda, DynamoDB
- Invocation, Utterance, Intent, Slot, Dialog, Persistence
- Skill Builder (beta), echosim.io
- AlphaVantage, Intrinio, Twitter

Pre-requisites

- Some programming background
- Basic javascript
- Basic understanding of REST API calls and databases

Projects

Basics (Market Tracker)

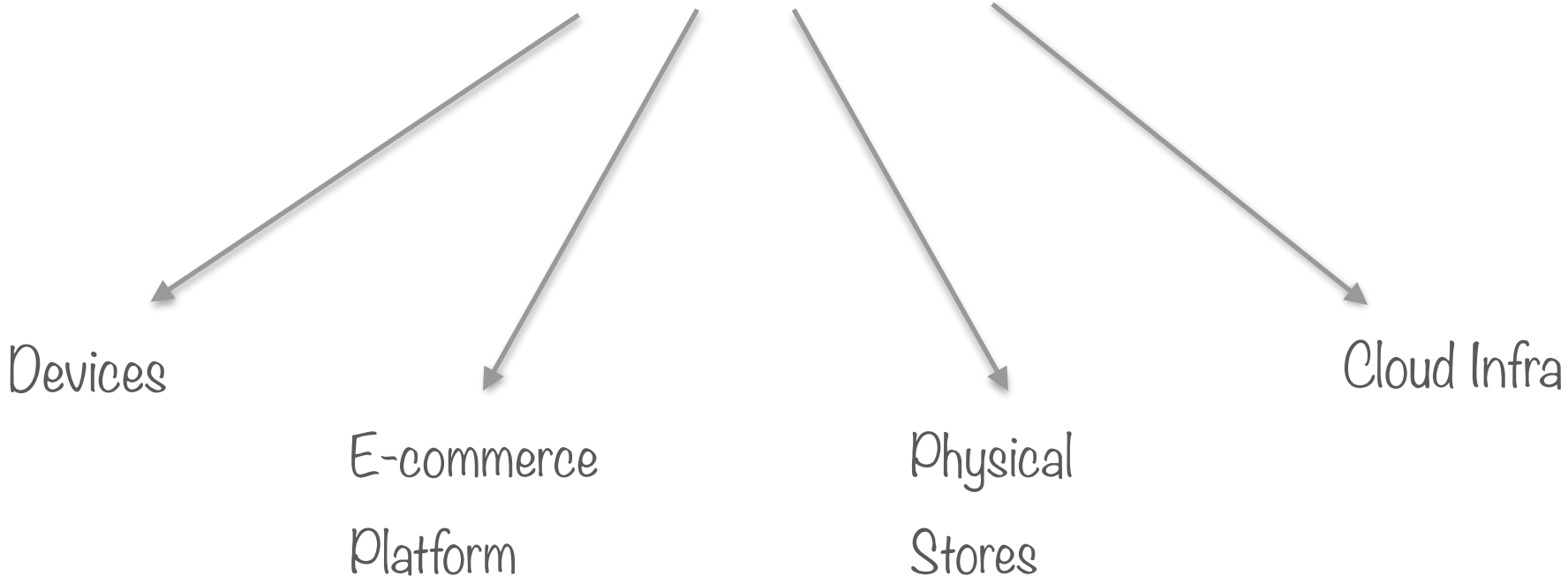
Conversations (Stock Tracker Dialog)

Persistence (My Stock List)

Flash Briefing (Market Flash)

Alexa, Echo and Amazon's Ecosystem

Amazon Ecosystem



Amazon Ecosystem

Amazon Devices

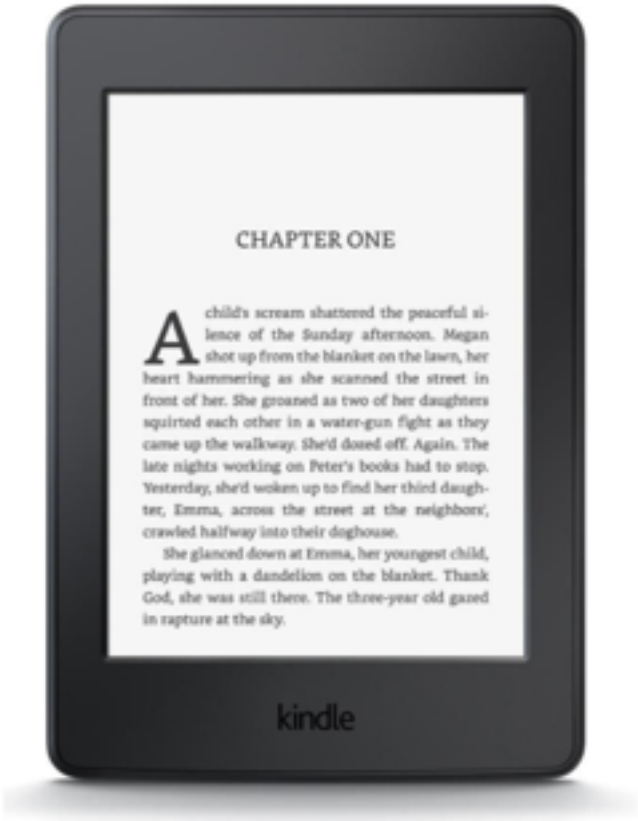
Kindle

Echo

Dash

Fire tablets

Fire TV and TV stick



Kindle

e-reader, first launched 2007

Integrates with Amazon.com, Kindle Store

Content in proprietary Amazon file formats

Estimated sales $5B in 2014

Echo

Smart speaker, launched in 2015

Activated by voice commands (Alexa!)

Echo Dot - smaller version

Echo Tap - portable version

Echo Look - Camera with Alexa built-in (fashion recommendations)

Echo Show - 7-inch screen to play video

Echo Plus - smart home hub

Dash

Smart button - order consumer goods

Proprietary device for ordering from Amazon

- Dash Wand: Wifi connected barcode scanner with voice command device
- Dash Button: Physical button programmed to order specific product
- Dash Replenishment Service

Fire Tablet

Regular tablet...

...that nudges consumers to buy Amazon content

- access to Amazon Appstore
- Streaming content (movies, TV shows)
- Kindle Store

Alexa support added in September 2016

Fire TV

Small network appliance that streams to HDTV

Competes with Apple TV and Roku

Also can play video games, but not geared to compete with gaming consoles

Fire TV Stick

HDMI plug-in with same functionality as Fire TV

Initially controlled with a remote control...

...Alexa Voice Support added in 2016

amazon

amazon

amazon
alexa

?

nest
COOLING
75

Amazon Devices

Kindle

Echo

Dash

Fire tablets

Fire TV and TV stick

Alexa is a voice interface for all of Amazon's many devices

as well as a way to integrate voice services with 3rd party devices

Alexa and Third-Party Devices

OFFICIAL

BMW, Mini to offer Amazon Alexa in all models beginning next year

BMW's video for in-car Alexa is pretty fantastic, too.

JOHN BELTZ SNYDER

Sep 29th 2017 at 3:39PM

subscribe

0

comments

Alexa and Third-Party Devices

OFFICIAL

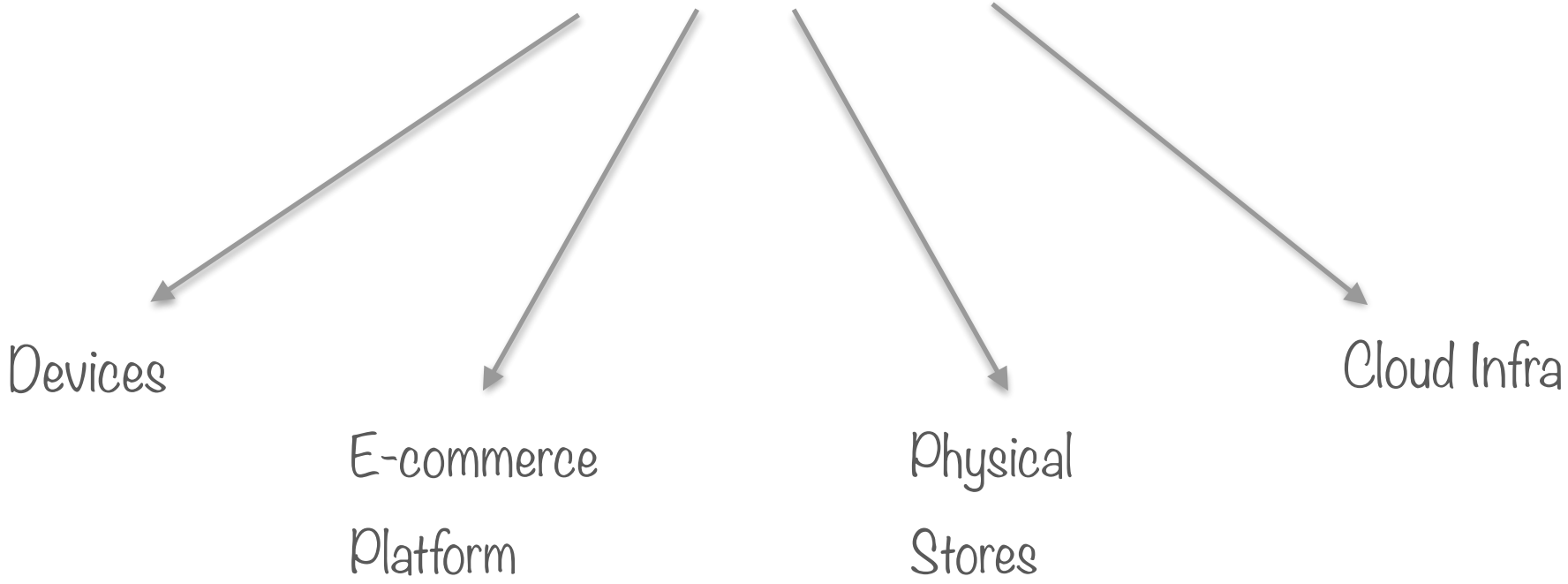
BMW, Mini to offer Amazon Alexa in all models beginning next year

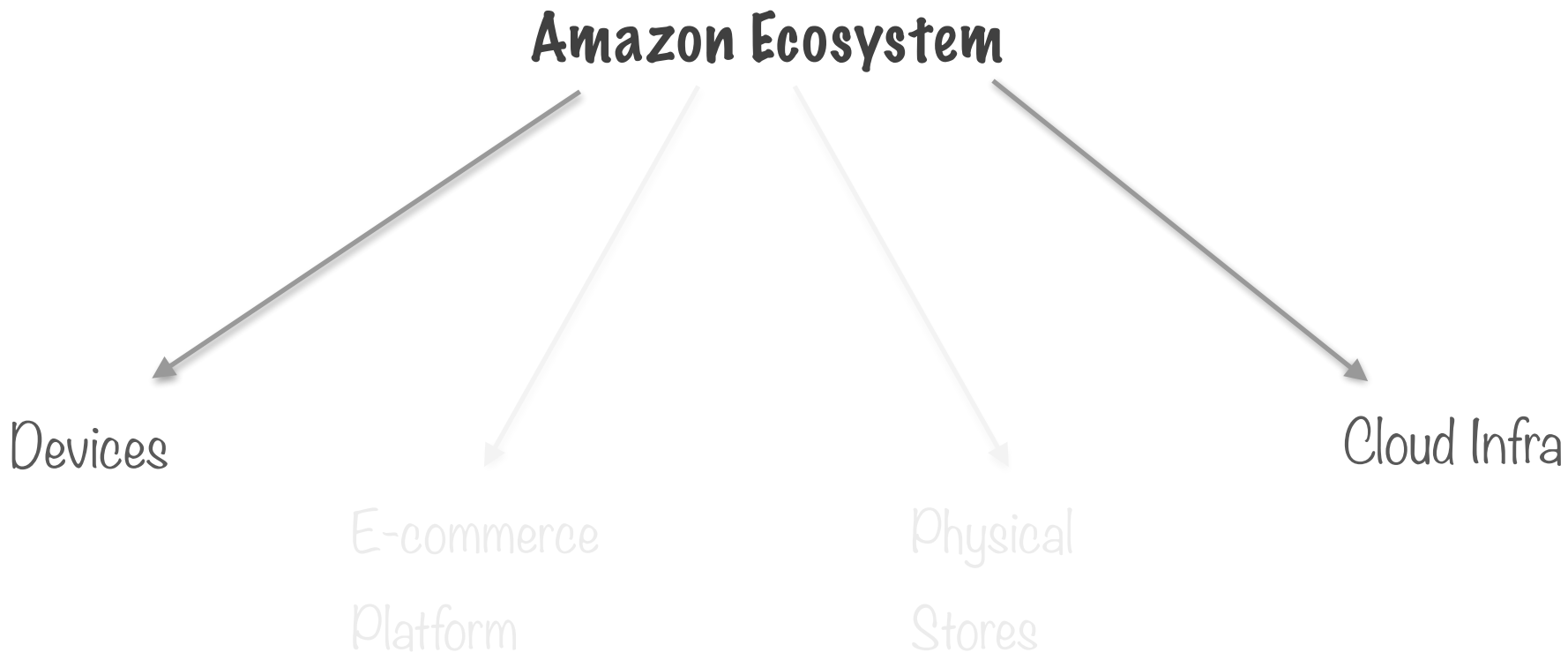
Voice recognition has been available in cars for years now, but the technology has improved, and found its way into our pockets and our homes. With applications like Siri and gadgets like the Amazon Echo essentially acting as digital personal assistants, the ways we interact with technology through our voice have advanced significantly in recent years. BMW plans to take advantage of the evolved voice technology, and will offer Amazon Alexa in every BMW and Mini model beginning in the middle of 2018.

Drivers will be able to use the usual Alexa features (or "skills" in Amazon speak) to get the latest news and weather, provide entertainment, or remotely control their smart home gadgets. Alexa will also perform car-specific duties, such as navigation or locating nearby businesses. Users can also check on movie times, request specific playlists or even order products from Amazon through Alexa.

Alexa, AWS and the Cloud

Amazon Ecosystem




Amazon Ecosystem
Devices
E-commerce Platform
Physical Stores
Cloud Infra

Invoking an Alexa Skill

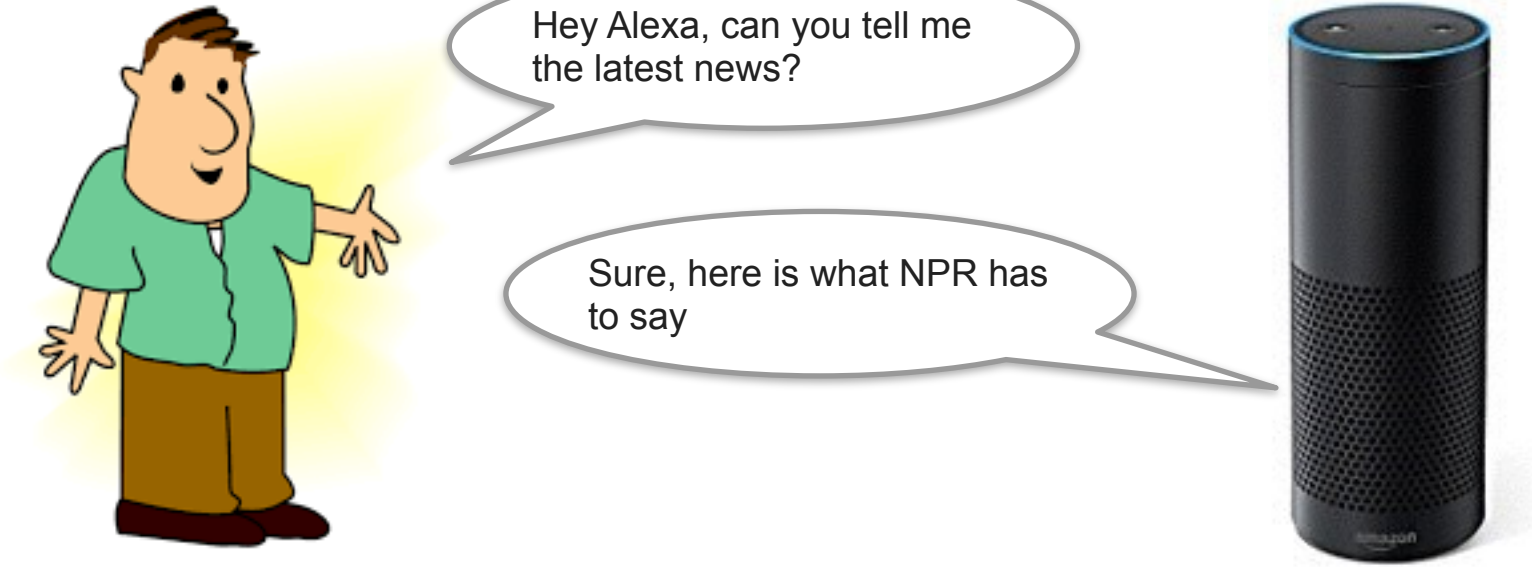
Hey Alexa, do you have information on the stock market?

Sure, welcome to the Stock Market Tracker

User

Alexa-enabled device

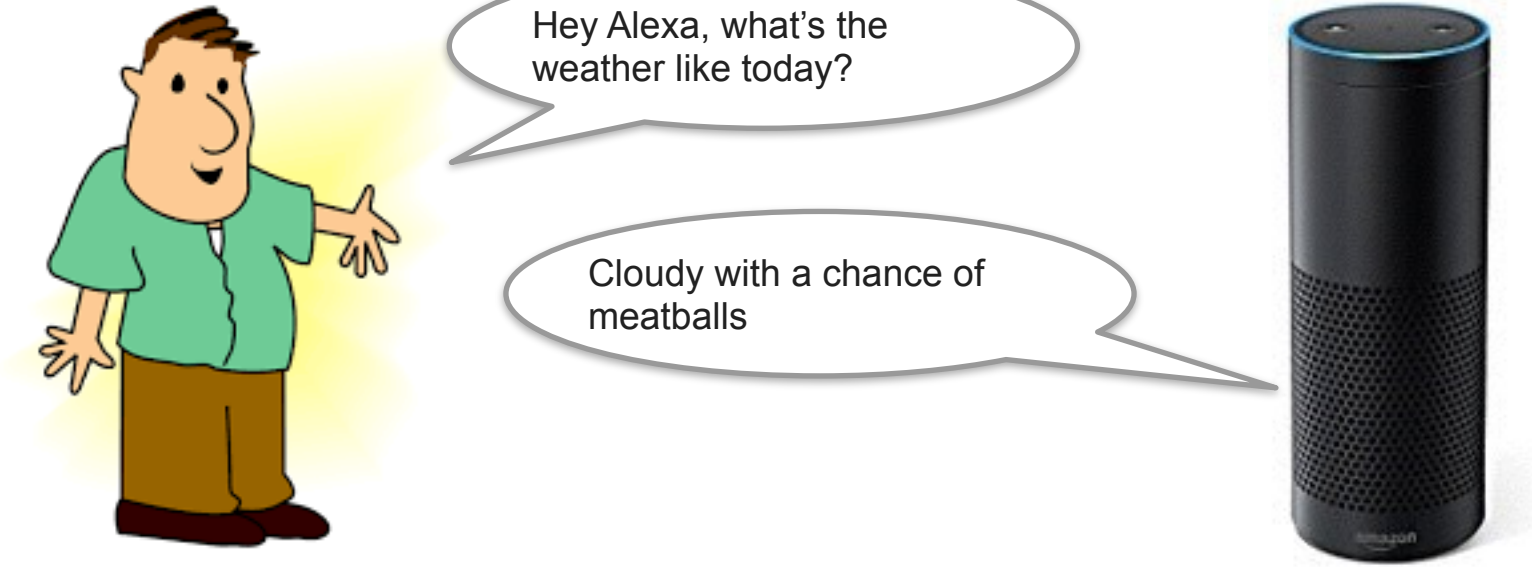
Invoking an Alexa Skill



User

Alexa-enabled device

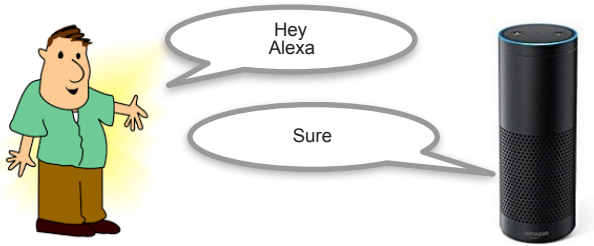
Invoking an Alexa Skill



User

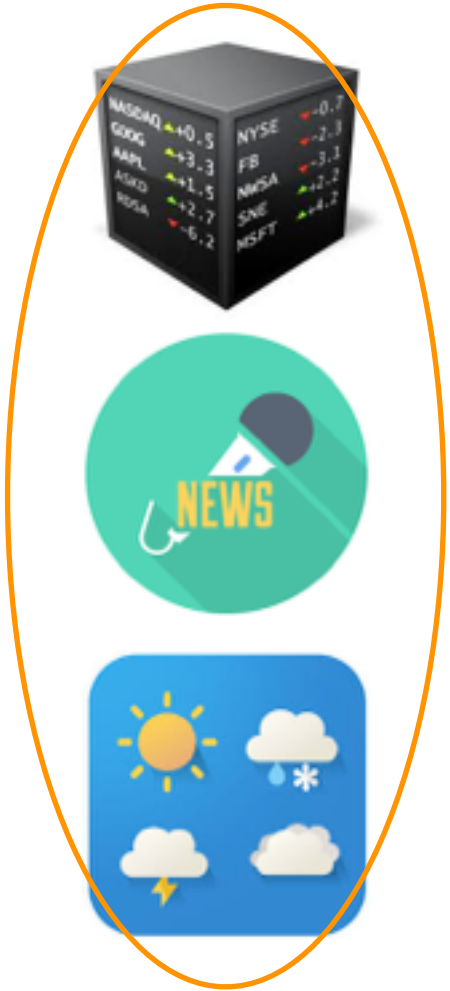
Alexa-enabled device

Invoking an Alexa Skill

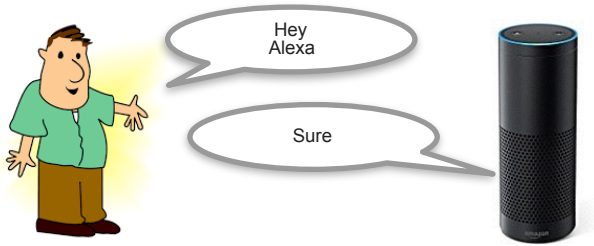


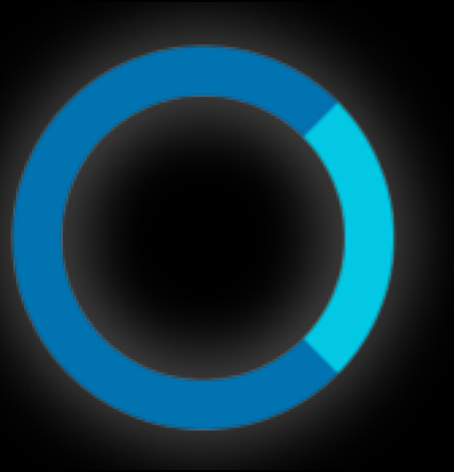
amazon alexa

Skills



Invoking an Alexa Skill





Amazon provides the Amazon Skills Kit (ASK) to help developers build skills for Alexa

Invoking an Alexa Skill

Hey Alexa, please can I talk to the Market Tracker?

Sure, welcome to the Market Tracker

User

Alexa-enabled device

Invoking an Alexa Skill

Hey Alexa, please can I talk to the Market Tracker?

Sure, welcome to the Market Tracker

"Invocation"

(Heard and acted upon by Echo)

User

Alexa-enabled device

Using an Alexa Skill

Hey Alexa, what is the stock price of Amazon today?

Hey, the current price is $950

User

Alexa-enabled device

Using an Alexa Skill

Hey Alexa, what is the stock price of Amazon today?

"Utterance"

(Heard and acted upon by Echo)

User

Alexa-enabled device

Using an Alexa Skill

How much has Google gone up today?

"Utterance"

(Heard and acted upon by Echo)

User

Alexa-enabled device

Using Alexa

Alexa Skill (app)

Developer

Using Alexa

"Utterance"

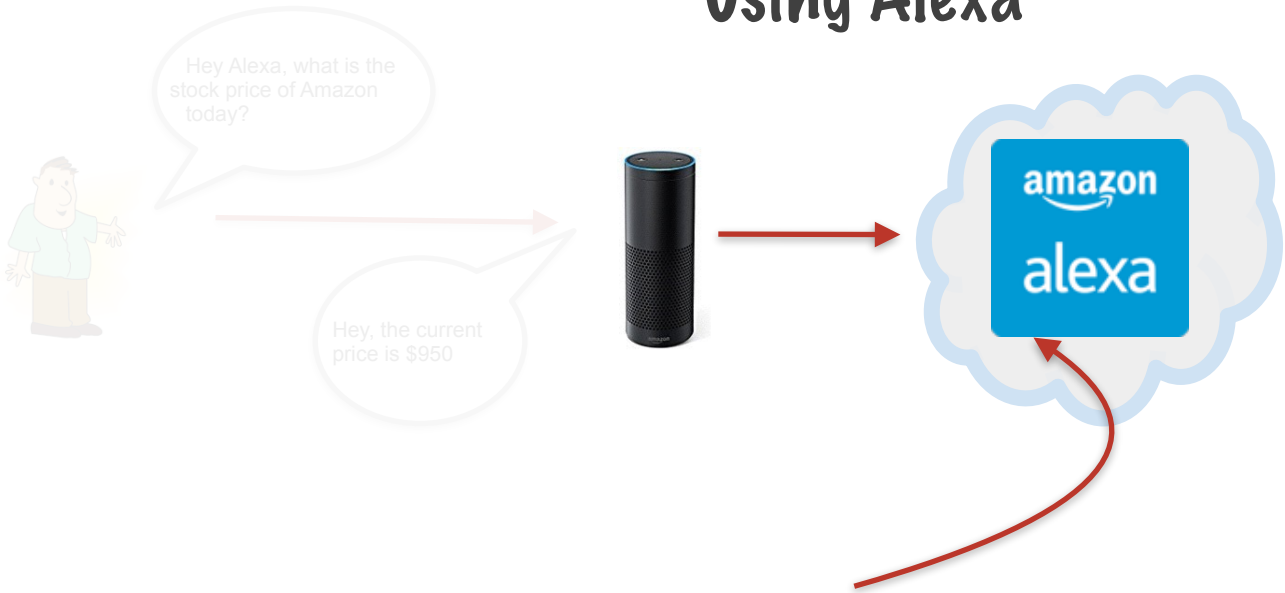
(Heard by Echo)

Alexa Skill (app)

Using Alexa

Alexa Skill (app)

Using Alexa



"Intent"

Voice recognition, NLP to determine what is being asked

Alexa Skill (app)

Developer

Alexa

Service

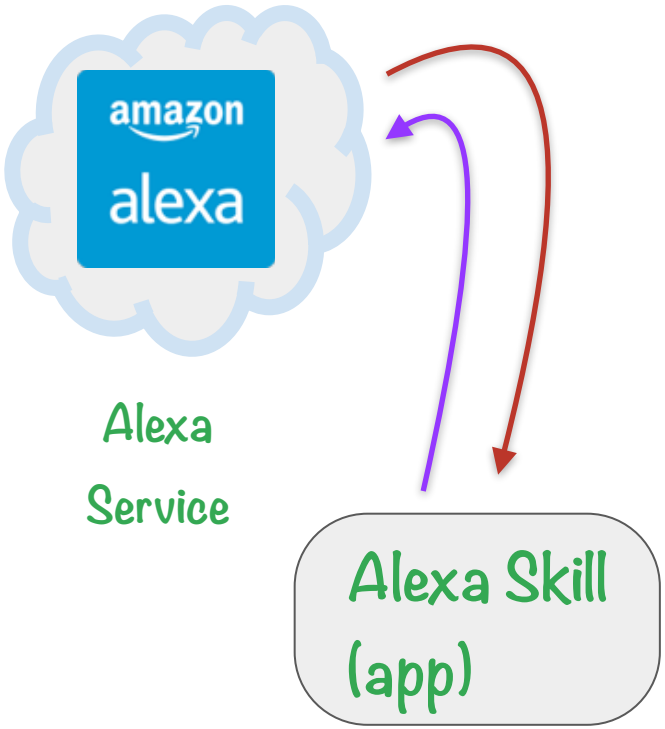
The Brains of the Operation

Sits on the cloud

Parses speech and figures out the **intent** of the speaker

Also figures out which **skill** (app) to route the command to

Sends back the response from the skill (on the way back)



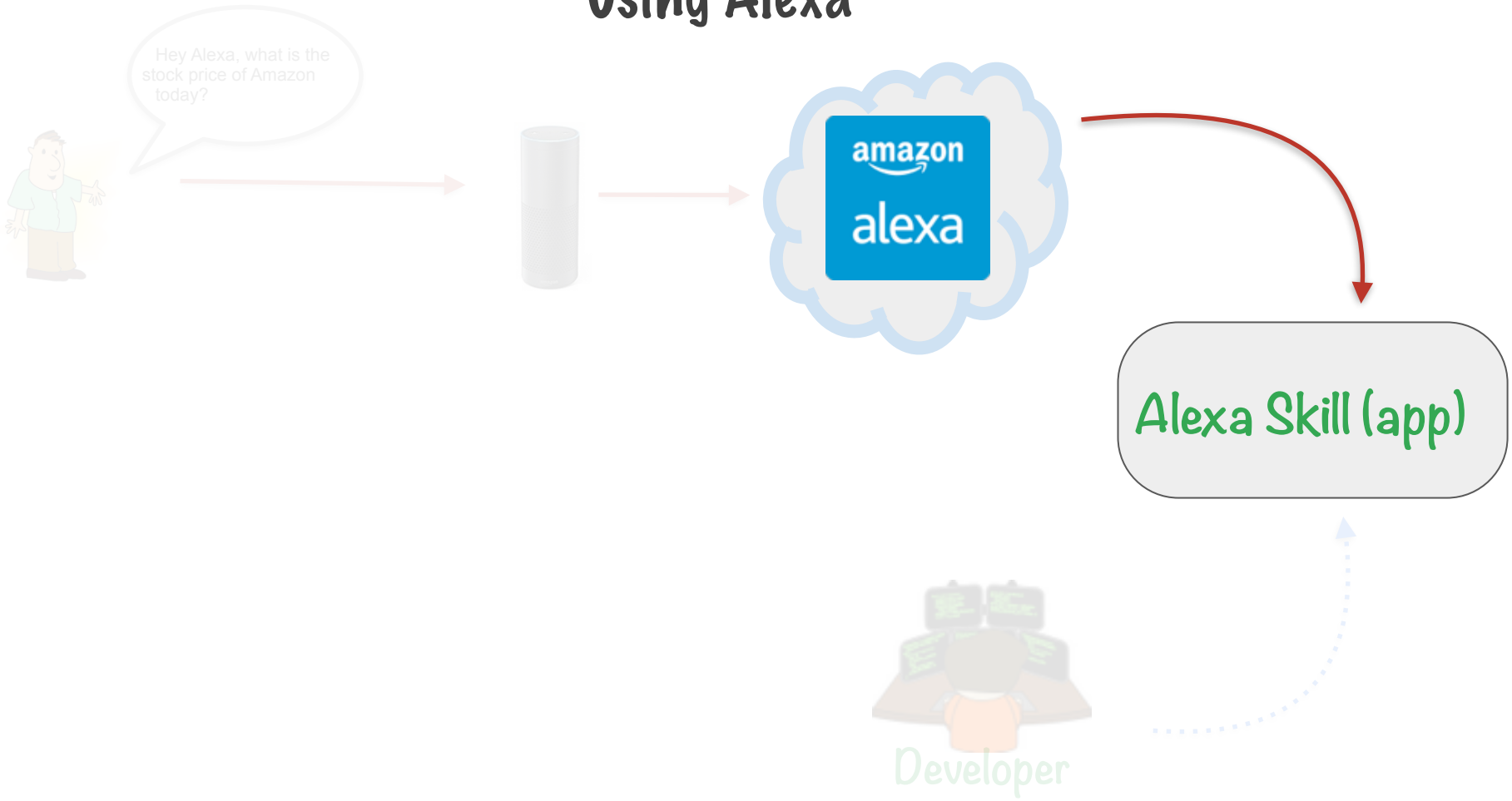
Important Questions

Which skill did the user mean to call? **"Invocation"**

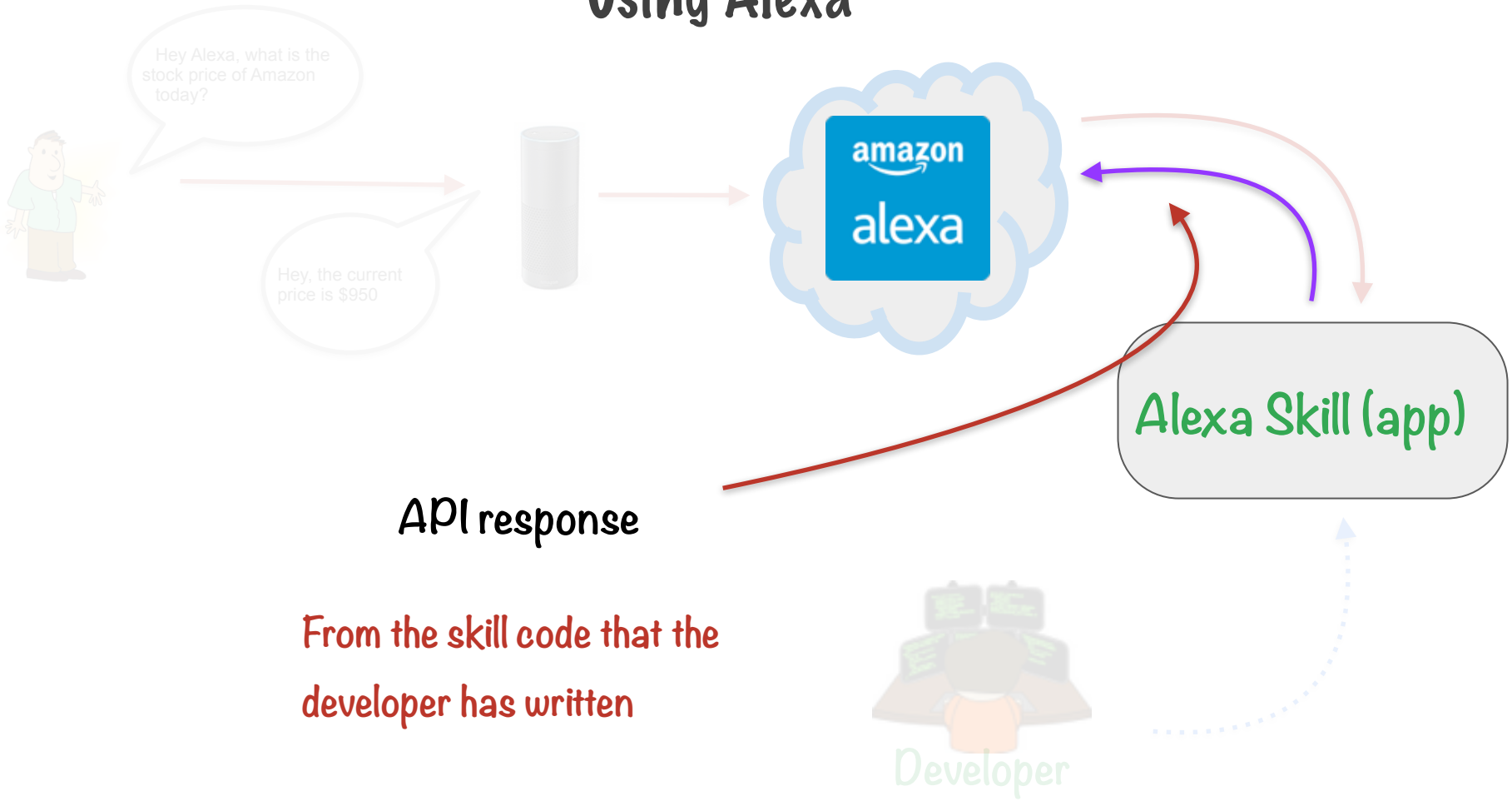
What did the speaker want to ask the skill? **"Intent"**

What information, if any, did the speaker wish to pass to the skill? **"Slots"**

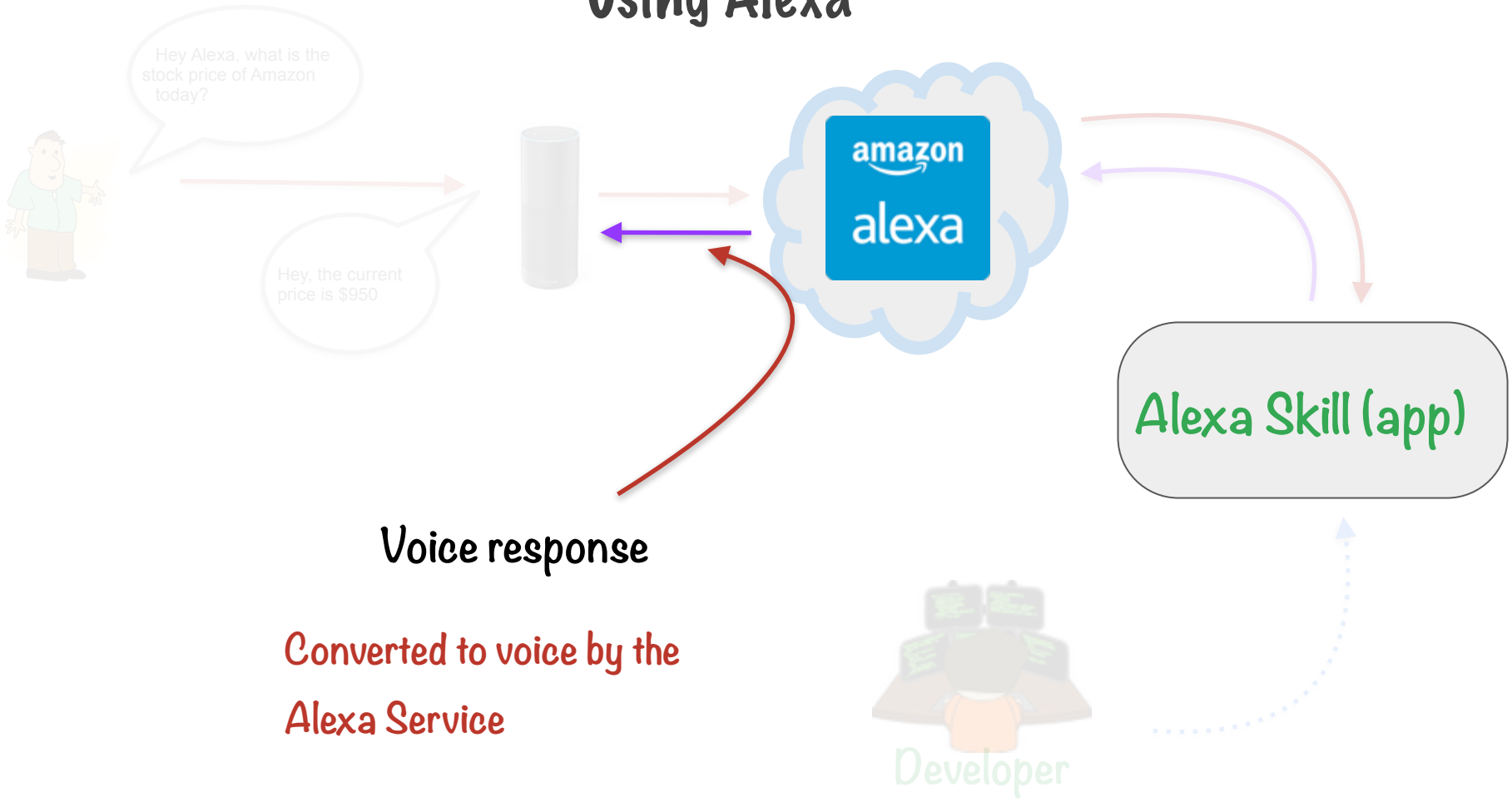
Using Alexa


Hey Alexa, what is the stock price of Amazon today?
amazon
alexa
Alexa Skill (app)
Developer

Using Alexa


Hey Alexa, what is the stock price of Amazon today?
Hey, the current price is $950
amazon
alexa
Alexa Skill (app)
API response
From the skill code that the developer has written
Developer

Using Alexa


Hey Alexa, what is the stock price of Amazon today?
Hey, the current price is $950
amazon
alexa
Alexa Skill (app)
Voice response
Converted to voice by the Alexa Service
Developer

Using Alexa

Hey Alexa, what is the stock price of Amazon today?
Hey, the current price is $950
amazon
alexa
Alexa Skill (app)
Developer

Platforms and Tools Used in Demos

Platforms and Tools

Amazon Web Services

Amazon Developer Console

Echosim.io

Platforms and Tools

AWS - holds the compute engines, databases where you can host code

Amazon Developer Console

Echosim.io

Platforms and Tools

AWS - holds the compute engines, databases where you can host code

Dev Console - contains the Alexa Skills Kit to configure apps

Echosim.io

Platforms and Tools

AWS - holds the compute engines, databases where you can host code

Dev Console - contains the Alexa Skills Kit to configure apps

Echosim.io - Allows end to end testing of Alexa apps without a speaker

Platforms and Tools

AWS - holds the compute engines, databases where you can host code

Dev Console - contains the Alexa Skills Kit to configure apps

Echosim.io - Allows end to end testing of Alexa apps without a speaker

Demo

Introduces the following platforms and tools:

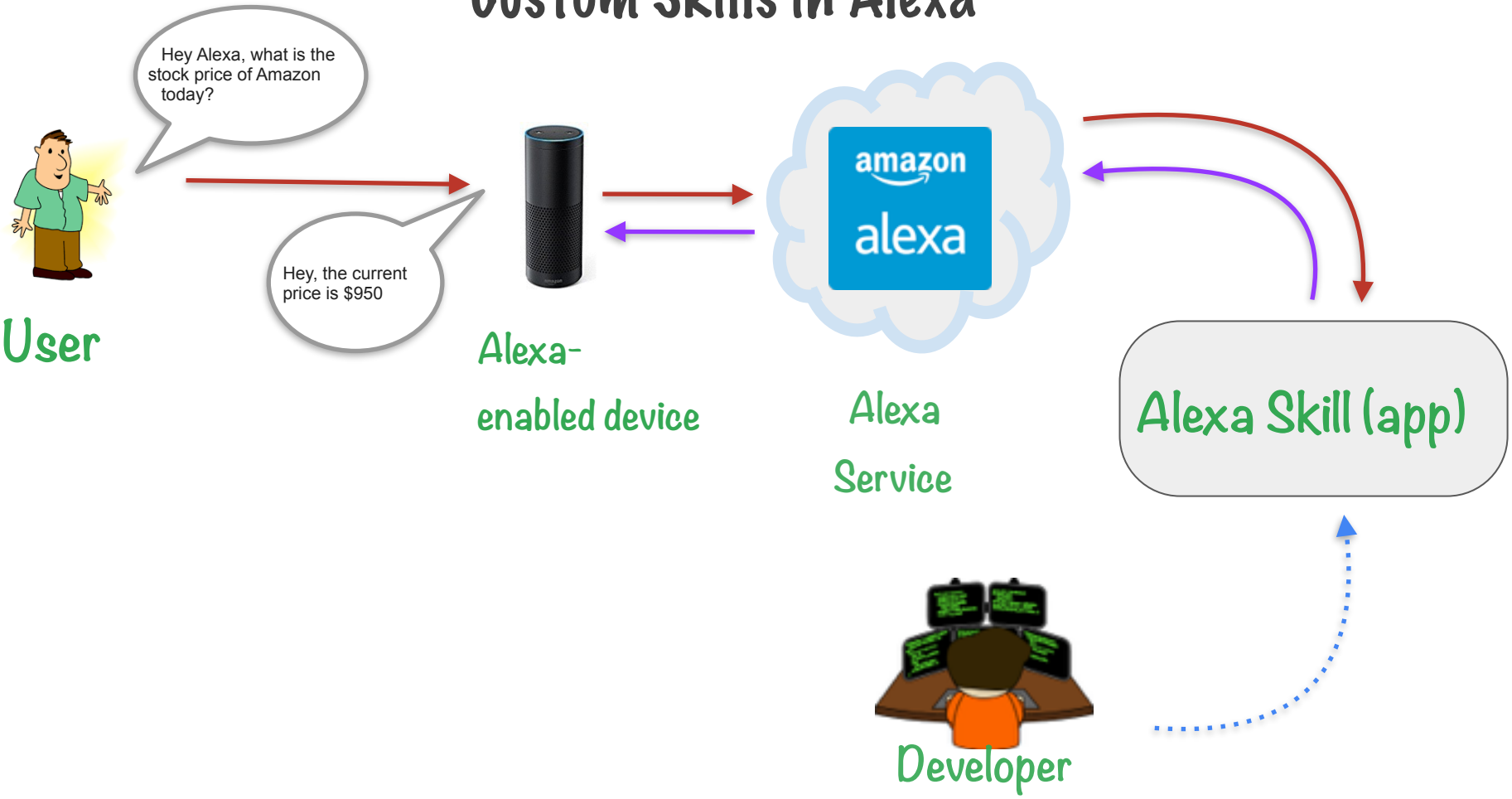
- Amazon Web Services
- Amazon Developer Console
- Echosim.io

Types of Skills

Custom Skill

Invocation, utterances and intents are all specified by developer - most general type of app

Custom Skills in Alexa



Flash Briefing Skills

Invoked by users saying something like “tell me the news” - the skill simply defines the content (audio/video/text from RSS feed) that gets added to the briefing - developer merely provides content

Smart Home Skills

Specifically for controlling smart home devices such as lights or thermostats - invocations are standardised by Alexa (e.g. “dim the lights”), developer just implements the intents

Video Skills

Invoked by users saying something like “change to BBC” - the skill implements the intent and defines the video content that gets served up in response

	Custom	Smart Home	Flash Briefing	Video
Utterance	Developer	amazon alexa	amazon alexa	amazon alexa
Intent	Developer	Developer	amazon alexa	Developer
Properties	Anything	Appliance Specific	Content Needed	Device/ Service
Uses	Anything	Smart Home Devices	Short Content	Video Content