# Hey Alexa, Ask Edmunds: Building a Conversational Commerce Interface for Car Buyers

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In today's competitive digital car-buying landscape, consumers expect to be able to shop, ask questions and get responses anytime, even outside of regular dealership hours. A recently added touchpoint in this customer journey is Amazon's line of Echo devices, which are powered by a voice user interface (VUI) that allows users to ask Alexa, a virtual assistant, any question that comes to mind. With these devices in the homes of tens of millions of consumers, Edmunds was looking for an innovative way to engage potential car buyers, increase sales and bolster brand recognition via Echo devices.

Already a leader in web-based chat solutions that connect car buyers with local dealers, Edmunds decided to broaden its scope and create a conversational commerce interface (CCI), powered by artificial intelligence, that could seamlessly respond to a multitude of message types, including customer questions from sources ranging from Echo devices to Facebook Messenger. With the goals defined, EPAM and Edmunds started working together on the solution in July 2016.

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## PROCURING MORE QUALIFIED LEADS WITH USER-FRIENDLY CHAT FUNCTIONALITY

As the one-stop shop for every consumer's car-buying needs, Edmunds offers its users a wide variety of content and resources to find the right car from the right seller at the right price. Prior to the implementation of a CCI solution, Edmunds was already using linear chat functionality based on a simple decision tree with predefined responses to interact with customers and provide answers to their inquiries via chat. Edmunds recognized that its web-based chatbots were dramatically outperforming legacy methods of procuring qualified online leads, so the company decided to continue developing its natural language processing (NLP) competency. This led to a push for more sophisticated NLP systems, which meant building production dialogue systems that would be able to handle persistent conversations and beginning another engagement with EPAM, a long-term Edmunds technology partner, to help develop and implement the CCI.

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## INTEGRATING EDMUNDS INTO ECHO DEVICES & FACEBOOK

In order to make its world-class content and services ecosystem available to Amazon Echo and Facebook Messenger users, Edmunds needed a solution capable of automatically responding to both text and speech questions in real-time. To bring the solution to life, the approach consisted of these three steps:

1. Design a stream processing flow that takes messages from a source such as Facebook Messenger, Amazon Echo, etc.

2. Implement an Apache Spark Streaming prototype to ingest messaging data from selected sources

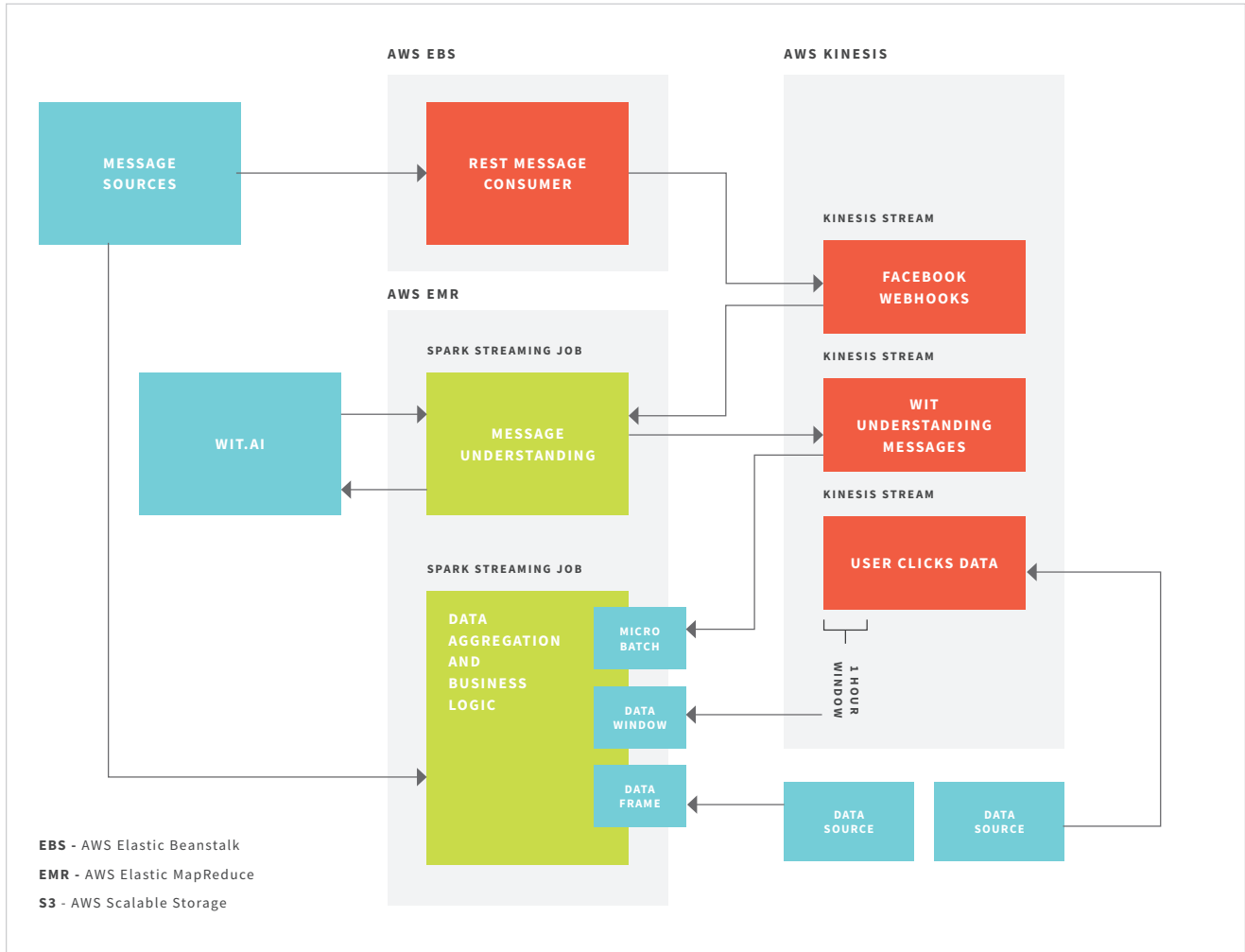3. Develop an Alexa assistant prototype for implementation with AWS

This approach produced a working version of the Alexa assistant prototype that was eventually installed to work with applications and devices that use a VUI or messaging UI to interact with users.

| SOLUTION ARCHITECTURE AT A GLANCE | |
| --- | --- |
| LAYERS | KEY COMPONENTS |
| • Web layer<br>• Spark layer<br>• Kinesis layer<br>• Data sources<br>• Message sources<br>• AI layer | • Message consumer<br>• Message understanding Spark job<br>• Business logic Spark job<br>• Wit.ai understanding application<br>• Kinesis streams |

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AWS EBS

AWS KINESIS

MESSAGE SOURCES

REST MESSAGE CONSUMER

KINESIS STREAM

FACEBOOK WEBHOOKS

AWS EMR

SPARK STREAMING JOB

KINESIS STREAM

WIT.AI

MESSAGE UNDERSTANDING

WIT UNDERSTANDING MESSAGES

KINESIS STREAM

USER CLICKS DATA

SPARK STREAMING JOB

DATA AGGREGATION AND BUSINESS LOGIC

MICRO BATCH

1 HOUR WINDOW

DATA WINDOW

DATA FRAME

DATA SOURCE

DATA SOURCE

**EBS -** AWS Elastic Beanstalk

**EMR -** AWS Elastic MapReduce

**S3 -** AWS Scalable Storage

## TECHNOLOGIES USED

- Operating system: Linux

- Application and web server: Tomcat

- Programming languages: Java, SQL

- Database management system: DynamoDB

- Technologies/Frameworks: Spark Streaming, Spring, Amazon Web Services (EBS, EMR, Kinesis, S3), Amazon Alexa, Amazon Echo, Machine Learning (Wit.ai), Messengers (Facebook, Slack)
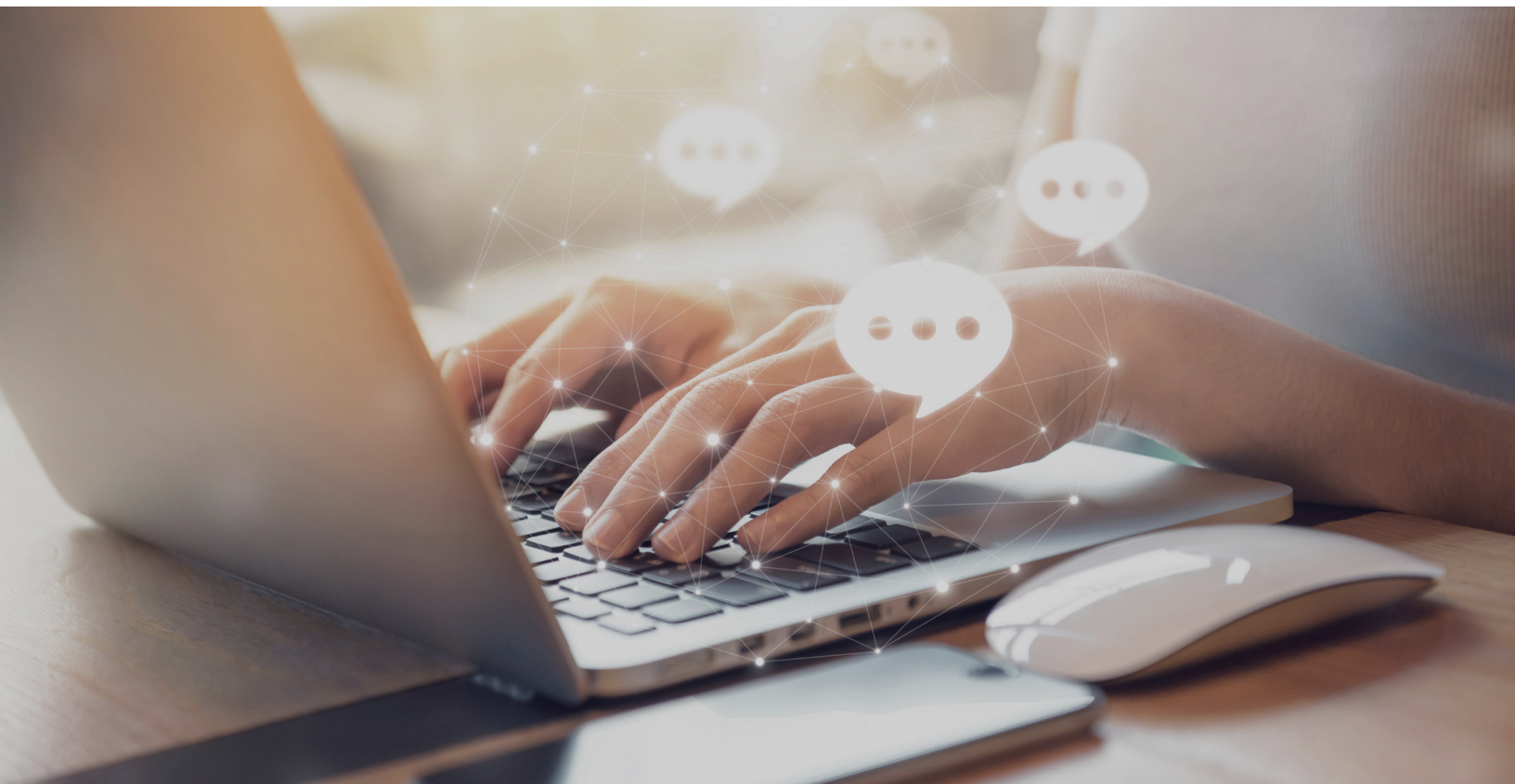
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## INTRODUCING EDMUNDS' CONTENT & SERVICES TO A WIDER AUDIENCE

With tens of millions of users, Amazon Echo devices have helped introduce Edmunds' world-class content and services to a wider audience of car buyers and researchers. Now users can simply say "Hey Alexa, Ask Edmunds…" with any question they might have, and the device will respond with expertly curated content from Edmunds, including car-leasing details based on the customer's budget, location and preferences.

To continue exploring the technology, EPAM hosted and fielded 13 teams to compete in the 2017 **Edmunds Chatbots Hackathon.** Edmunds plans to continue working with EPAM to unlock the full potential of conversational commerce.

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## ABOUT EDMUNDS + EPAM

With a singular goal to make car buying easy, Edmunds is an American online resource for automotive information, including expert car reviews, shopping tips, pricing tools and inventory listings from more than 13,000 dealer partners. EPAM, a leading global provider of product development and software engineering services, has been working with Edmunds since 2008 on a variety of project streams, including the implementation of a **NoSQL solution** to bring its data closer to the business. Every year, the two companies hold a joint hackathon to explore the latest technologies and prototype new solutions for Edmunds.

## QUESTIONS?

Contact us at Sales@EPAM.com
or visit us at EPAM.com

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