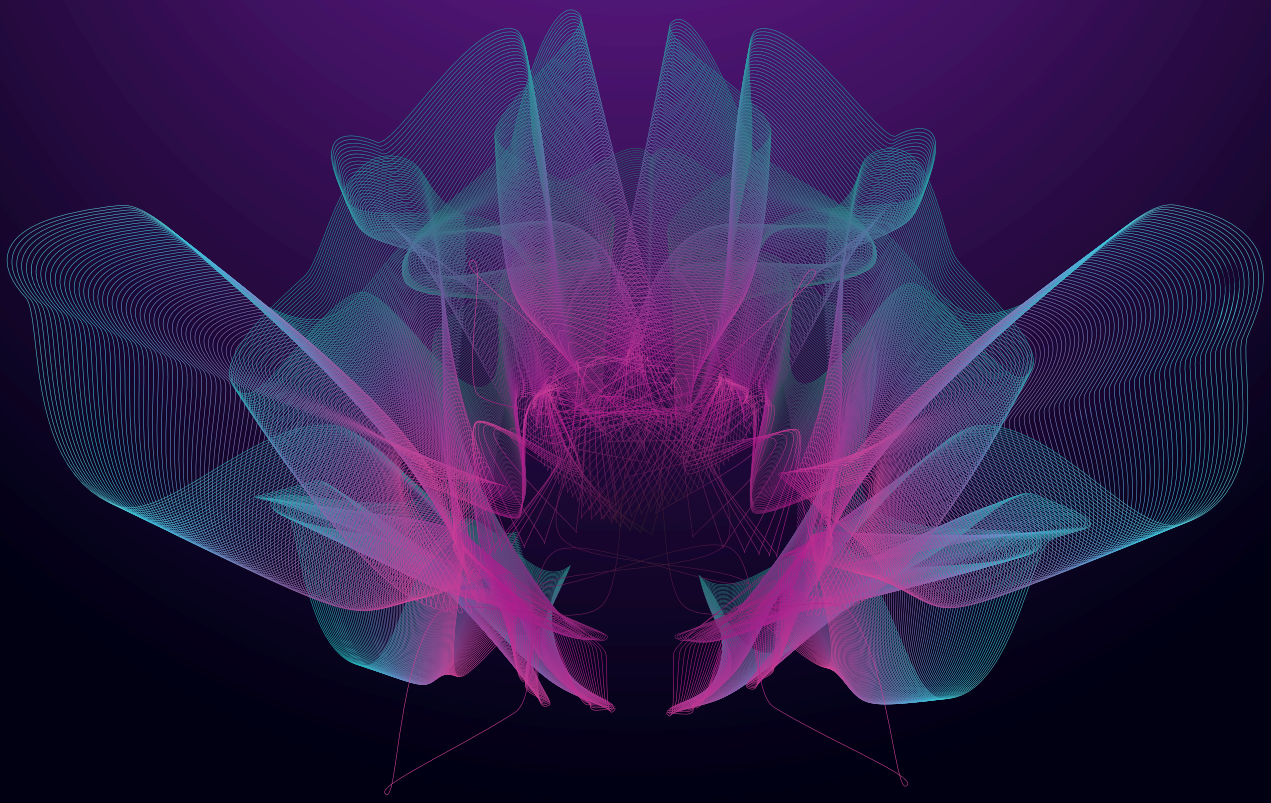
FROM BRICK AND MORTAR
TO BITS AND BYTES



WHY COGNITIVE SERVICES ARE TRANSFORMING ECOMMERCE

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From Brick and Mortar to Bits and Bytes:

Why Cognitive Services are Transforming eCommerce

In the middle of the 20th century, Sears's domestic annual revenue hovered around 1% of the entire U.S. GDP (around $180 billion in today's dollars). They were an unbeatable behemoth - selling everything from tools, to washing machines, to houses.

Fast forward to 2005. A small company known as Amazon was bringing in just 17% of Sears's revenue. The following 5 years, Sears's sales dropped 14% per year, while Amazon's quadrupled. By 2016, Amazon had revenues of $136 billion against Sears's $22 billion.

How'd this happen? Though you can't 100% credit Sears's decline and Amazon's explosion to eCommerce itself, it's played a massive role in shaping the two companies. In fact, Sears has an online store. It's not just making products available for purchase on a website that makes or breaks a company.

The eCommerce space is an immensely competitive world. Standing out in the noise, where competition is a click away, comparisons are a search away, and innovation is ripe and common, and fundamental to every company's strategy. eCommerce companies are always looking for ways to differentiate themselves from other companies, deliver an efficient, delightful experience, reach new markets, and make data-driven decisions.

At the forefront of eCommerce innovation are cognitive services - a broad term for machine learning, artificial intelligence, and distributed algorithms. Cognitive services allow businesses to integrate problem solving, knowledge, language, analysis, categorization and more.

In this eBook, we'll look at how cognitive services are taking the eCommerce world by storm, and ushering in a new generation of how companies discover, engage, sell to, and retain customers.

- **The Current State of eCommerce**
- **Big Trends - Where Things Are Heading**
- **What Cognitive Services Deliver**
- **Implementations Today and Tomorrow**

The Current Challenges of eCommerce

The Internet has changed how we discover, research, purchase, and receive goods. It's an infinite world offering everything you could ever imagine. Everyone is well aware of this.

This is great for the consumer, and a huge opportunity for any eCommerce company. However, with great opportunity come great challenges:

- **Competition is always lurking:** Throughout the entire sales cycle, from discovery to order, competition is always right around the corner in so many different ways. It's never been easier to compare pricing of similar products across the web, and other eCommerce storefronts are a click away. 3rd party websites make money curating comparisons in a single page. And large Internet retailers, who sell massive catalogs of items, utilize recommendations similar to your product.

- **Who is buying from you?:** How do you truly understand who your customers are with a name, address, and email address? Who's visiting your website, but not buying from you? What's influencing browsers to be customers?
- **Spray and Pray:** Deploying display ads across the entire Internet, to everyone using it, is not efficient. You need to curate and engage prospects at the individual level.

BIG TRENDS - WHERE THINGS ARE HEADED

To remain competitive in the crowded eCommerce world, you must invest in emerging technologies and experiment with new platforms. But innovation isn't easy. You need to know that some may fail. But setting your business up as an R&D department, and choosing low-risk, high-yield technologies to deliver innovative features is key.

In the last couple years, Amazon has done this. From AI assistants, to VR/AR, to delivery drones, Amazon has heavily invested in emerging technology. AI assistants have stuck, and now handle the bulk of customer service queries, and, more recently, advising shoppers in researching products. VR/AR and delivery drones haven't hit critical mass quite yet, but are viable options of the next-generation of eCommerce, and Amazon will be ready when the time comes.

So, what are the trends that are taking the eCommerce by storm?

PERSONALIZATION

84%

84% of online shoppers would no longer buy from an organization that doesn't account for preferences and purchasing history.[1]

The days of spray and pray are over, and businesses are realizing that they need to curate a personal experience for each individual prospect and repeat customer.

1: https://www.experian.com/assets/marketing-services/white-papers/MeetingMultichannelConsumerDemands.pdf

Personalization, also known as one-to-one marketing, is utilizing tracking and predictive technology to create a personalized shopping experience for customers. This is accomplished by collecting granular details on visitors - their searches, clicks, purchases, behavior, and any external data that exists on them. This allows them to deliver more relevant recommendations, dynamically update layout for more efficient navigation, and automate interactions to retain and re-engage prospects and customers.

LOCALIZATION

Localization is a simple, but powerful eCommerce tactic that determines the customer's location (through an IP address) and delivers tailored content based on it. Not only does this build a wider audience, by enabling you to engage more personally with a wider base of customers, it also builds a strong trust between you and prospects, since the more localized the content, the more it'll resonate with them.

"SECOND-SCREEN" IN-STORE

49%

49% of customers cite not being able to touch, feel or try a product as one of their least favorite aspects of online shopping.[2]

With online shopping booming, and brick-and-mortar locations struggling, companies are beginning to utilize technology in-store to take advantage of the benefits of online resources to increase conversions and engage their customers. In browsing in-store, consumers turn to their smartphones to compare pricing, research alternatives, or even sample the product in-store and buy it online at a later date.

A quarter of online shoppers (25%) have made an online purchase from a brick-and-mortar store.[3]

2 & 3: https://www.bigcommerce.com/blog/ecommerce-trends/##chapter1

To engage with in-store shoppers, businesses are utilizing geo-proximity aware applications to stream offers and content the moment shoppers enter the store. A smartphone acts as a shopping assistant throughout sales cycle, providing additional info and as a comparison tool for other products .

Research from Deloitte (September 2016) indicates that 37% of all retail purchases last year were influenced by mobile device search, discovery, research, or price comparison. Among digital buyers, 60% researched while in-store, and 64% used a retailer's app (ComScore for UPS, Feb 2016).

EMAIL AUTOMATION

Email automation has come a long way, and is a core table stake of eCommerce. It's a proven channel for increasing brand awareness, bringing back customers, and updating the database on new features and products.

However, email automation has started utilizing other advanced techniques to make it even more powerful. This includes connecting your email automation system to the behaviors and actions an individual user takes on your website, and sending personalized, tailored content to them. With that, you can send more targeted and timely emails that are more relevant to the user when they want it, whether they know it or not.

CHATBOTS

85% Business Insider predicts that 85% of customer interactions will be managed without a human by as soon as 2020.[4]

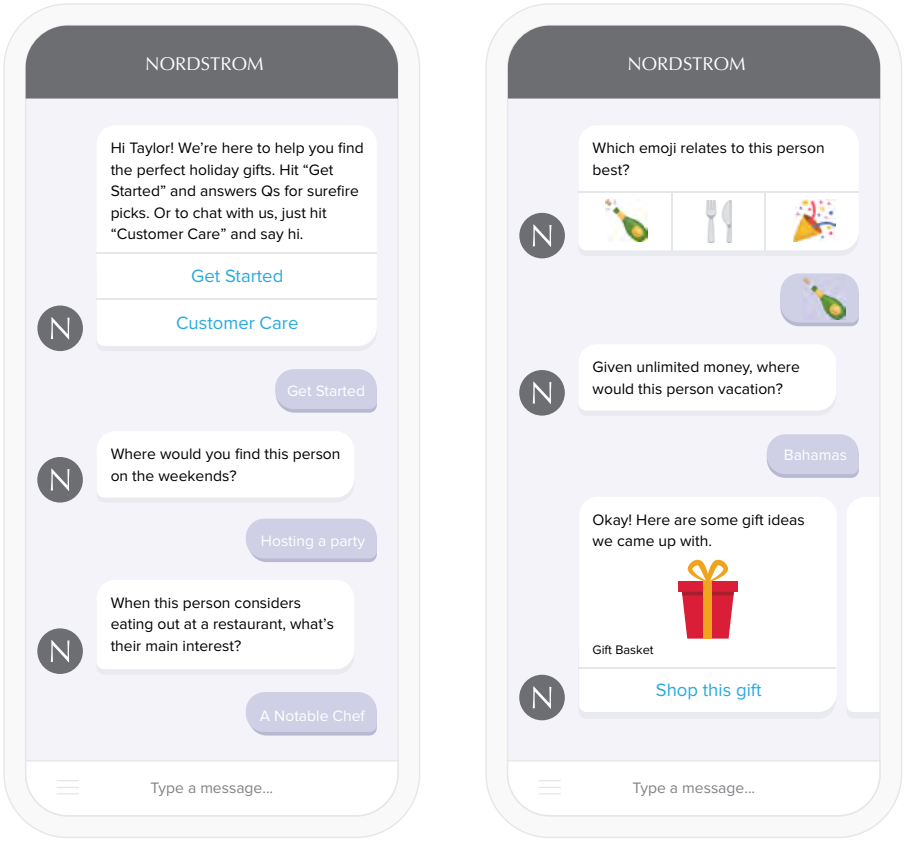
Though online shopping has completely changed the way we buy goods, eCommerce lacks one key component that you get in a

4: https://www.gartner.com/imagesrv/summits/docs/na/customer-360/C360_2011_brochure_FINAL.pdf

brick and mortar store - a helpful employee. At the scale at which online stores operate, having actual people staffing live chat simply isn't economically viable.

As a result, many online stores are turning to intelligent shopping assistant bots to assist shoppers with their questions, to make recommendations, and even to check out.

Nordstrom dominated the 2017 holiday season with their Messenger chatbot, which went beyond simple predefined questions and answers and used cognitive services to truly understand what the customer was looking for and assist as needed. It offered gift recommendations, and could even assist with fulfilling the order.



Chatbots are also saving us from the dreaded customer support phone calls, waiting an hour for a representative to deal with a simple problem. Amazon, with who knows how many orders per day, has deployed chatbots to deal with most small issues that a customer faces if they need help with their order.

ENTER COGNITIVE SERVICES

WHAT ARE COGNITIVE SERVICES?

"Cognitive services" is a broad term for machine learning, artificial intelligence, and distributed algorithms that empower you to integrate vision, speech, language, knowledge, problem solving, analysis, categorization, moderation, and more into your apps and businesses.

In a nutshell, cognitive services augment and expand human capabilities, allowing us to do our jobs faster, more efficiently, and more sustainably.

And luckily for us, we're seeing a massive number of cognitive services enter the market, from the big players like Watson, AWS, and Microsoft, to fast-moving startups like SiftNinja and Clarifai. And they've made these services available as discrete components through APIs that make it a snap for developers to fold them into new applications.

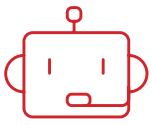
EXAMPLES OF COGNITIVE SERVICES

- **Translation:** Enable two users to chat in their own - different! - languages by translating their messages in realtime.
- **Natural Language Processing:** Analyze massive amounts of data inputs and gauge the sentiment of the messages.
- **Chatbots:** Create an intelligent bot that parses natural language from a human and responds as accurately as another human could.
- **Facial Recognition:** Detect human faces and organize them into groups based on predetermined categories.
- **Machine Learning:** Intelligently sense, process and act on information delivered by sensors to control devices in response to environmental factors like temperature, rain, or earthquakes.

eCommerce Transformed: Cognitive Service Implementations

Cognitive services are the technology that's transforming how we build apps, and ushering in a new era of interactivity and engagement. One of the areas with the biggest opportunity for transformation is eCommerce, and we're already seeing cognitive services make a massive impact across a wide variety of uses.

NATURAL LANGUAGE PROCESSING > CHATBOTS AND SHOPPING ASSISTANTS



Natural language processing (NLP) is one of the core tenets of chatbots and shopping assistants that continue to pop up. NLP technology enables an AI to understand and respond to natural language. Ruled-based chatbots, literally ones that respond to established questions, are easy to build. But is that really a smart bot?

Think for a moment. How many possible ways could a shopper ask for a recommendation on what blazer to buy? The AI needs to be able to

use context to determine what the shopper is looking for, and give a recommendation accordingly. This requires a combination of NLP and machine learning to mimic a real-life helpful conversation.

The good news for any business looking to build chatbots is that there is a wide-variety of service providers that deliver the technology for you. They supply the base technology, and you train and implement the chatbot accordingly. Watson Assistant, Amazon Lex, and Microsoft Bot Framework are examples of services providing the technology you need to quickly train and deploy bots across your business.

KNOWLEDGE/DISCOVERY **TRENDS, RECOMMENDATIONS, AND PREDICTABILITY**

35%

It has been estimated that Amazon's recommendation engine drives 35% of total sales.[5]

eCommerce creates a massive amount of data. Buyer personal information, behavior, how they found your website, and more. Manually making sense of this data is a challenge, and only grows more complex as more data is created. Knowledge and discovery services analyze and map large sets of data to create insights and unlock value in datasets to deliver answers, trends, and patterns within them.

Trends and predictability go hand in hand. By extracting and understanding trends, you can make more educated predictions on what trends will come next. For eCommerce, this gives you an advantage in both understanding your own space and the competition, and gives you a baseline for changes to how you interact with your customers.

5: https://www.mckinsey.com/industries/retail/our-insights/how-retailers-can-keep-up-with-consumers

Equally important is building a recommendation engine to deliver relevant products and services to users who might be interested based on previous activities. Beyond just related items to prior purchases, cognitive services allow you to pull in as many collections of data as you want - location, demographics, age, and more - allowing you to supply recommendations based on those as well. Combined with trends and predictability, recommendations are an incredibly powerful way to increase conversions and engage a wider audience.

LANGUAGE TRANSLATION GLOBAL REACH

95%

95% of the online content that companies generate is available in only one language.[6]

Language translation, allowing you to instantly convert text and spoken language to any other language instantaneously, is breaking the barrier of language across the web. In the past, it cost a fortune to manually translate an entire website to multiple languages, and, whenever changes were made, the entire site would need to be retranslated. It simply didn't scale, making it hard for businesses to connect with a global audience.

There are a number of benefits to adding translation to your eCommerce website:

- Reach global audiences with low investment. Translate to multiple languages, and see which regions are interested before investing heavily in those markets.
- Translate user-generated content - customer and product reviews.
- Build a global call center, allowing your agents and your customers to speak in their native language.
- Analyze big data sets in multiple languages to a single source.

5: https://www.microsoft.com/en-us/translator/business/web/

Even companies on the cutting-edge, who are collecting massive amounts of data, run into issues with how they utilize that data. One of the biggest challenges to solve is 'data silos,' where data collected by one part of the business is kept separate from other parts, intentionally or unintentionally.

Data enrichment services tear down the silos to collect, organize, synthesize, and deliver insights on the massive sets of data. This is where cognitive services are a massive advantage to traditional BI - able to draw conclusions from a breadth of data, find the insights in the relationships between different sets of data, and help eCommerce companies optimize their decision making.

In a sales cycle, data enrichment can bring together customer conversations, marketing activities, backend metrics like time-to-close, and demographics, and break them down into understandable insights.

An Architecture Example:

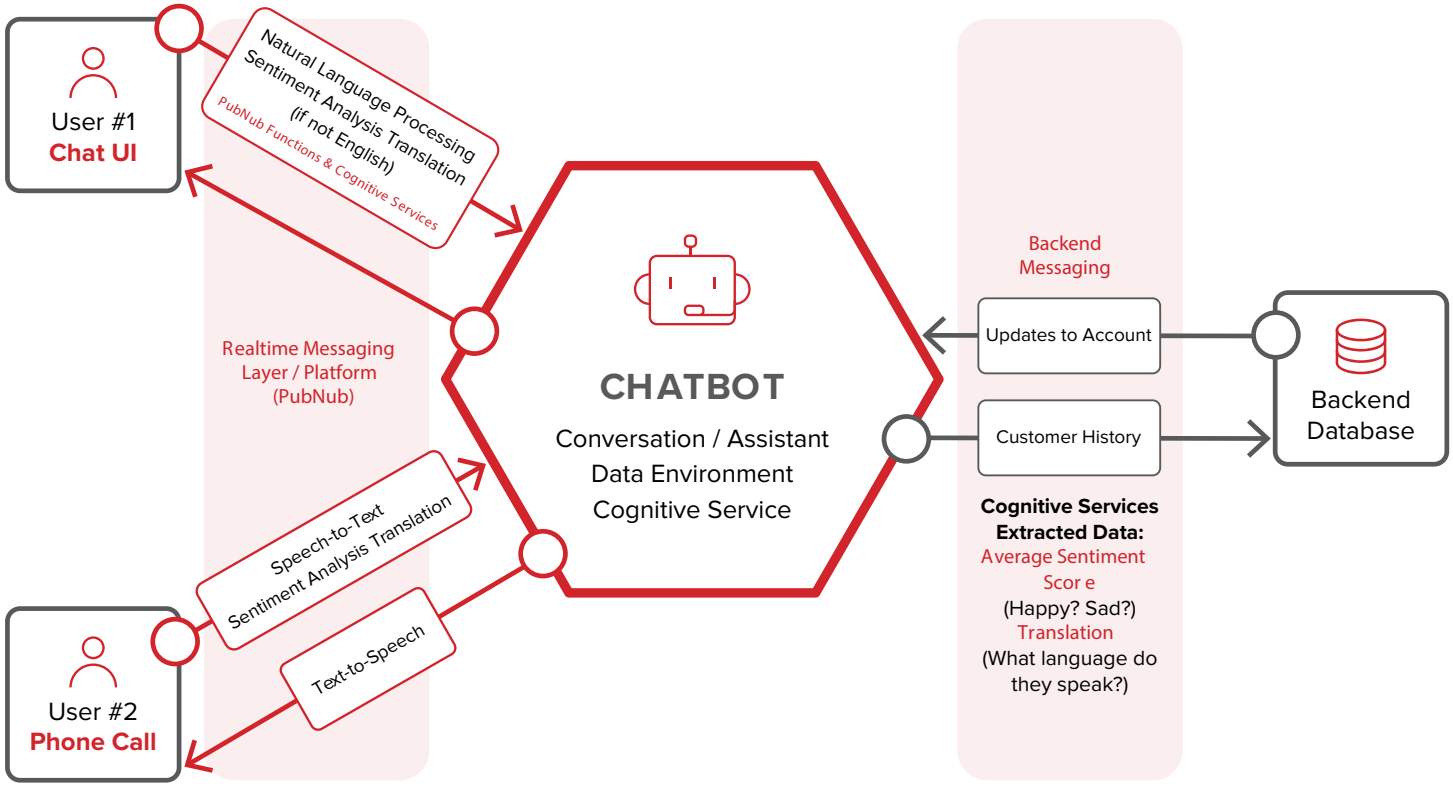
Shopping Assistant Chatbot

To build a shopping assistant chatbot, you need to deliver three things:

- **The voice:** The voice enables our chatbot to talk, retrieving information and making informed decisions via the brain, and delivering it verbally or through text in a natural, human-like manner.
- **The brain:** The brain is the command center for our chatbot, where we analyze and process data, use our memory to retrieve information we already have stored, and control our voice to have interactions.
- **The memory:** The memory is where we store all the information we need, from prior interactions to business logic, so the brain can make more informed decisions.

In more technological terms, the voice is powered by a realtime messaging layer, the brain is powered by cognitive services, and the memory is the backend database. The real magic happens between the realtime messaging layer and the cognitive services.

Serverless compute is the key for the two technologies to work seamlessly together. With serverless compute, the cognitive services can run directly in the realtime messaging layer, rather than via an external server, so interactions are fast and efficient. This is what creates a natural, life like conversation with the end user, and allows the chatbot to run a number of cognitive services simultaneously (sentiment analysis, translation, etc), all in realtime.



So, in this specific example, the eCommerce company has launched a chatbot that accepts both text chat and voice chat via phone. The realtime messaging layer (PubNub Realtime Messaging) between the chat UI/phone service run a number of cognitive services (IBM Watson's suite of cognitive APIs) within their data stream channel, the communication pipeline, via PubNub Functions.

Cognitive services are integrated directly into messaging channels via PubNub Functions. Each cognitive service is a pre-built 'BLOCK' that runs on Functions, and BLOCKS can be dropped into messaging channels to run the cognitive service. Because it runs on serverless Functions, there's no need for any 3rd party servers. All computation happens in the network.

For the text chat (User #1), natural language processing gauges the sentiment of the user's messages to better understand if they're happy, neutral, or angry, and language translation to determine what language the user is speaking, and translate it accordingly..

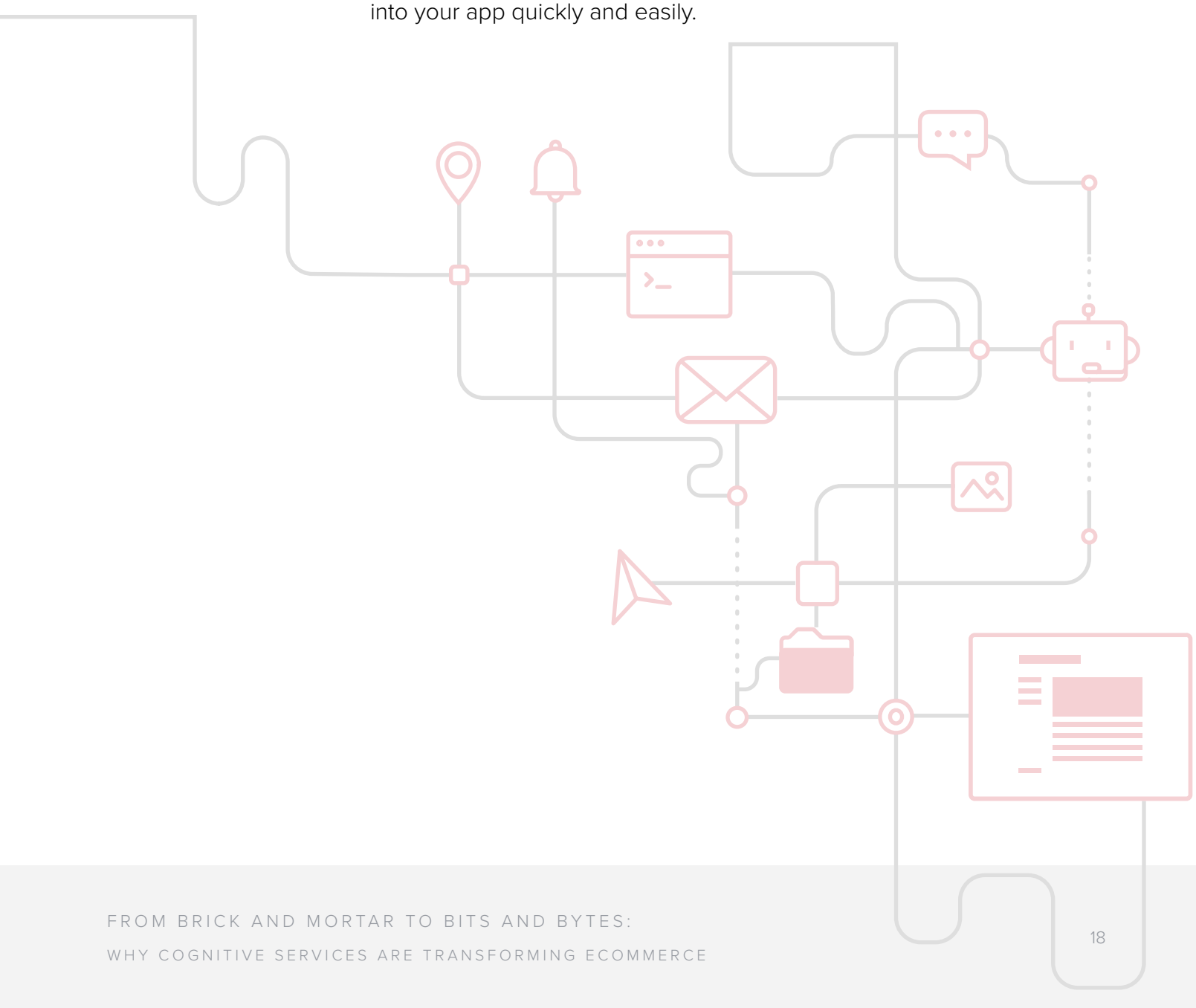
For voice chat over the phone (User #2), the messaging layer converts the spoken words into text with speech-to-text, then runs the same cognitive services as the aforementioned text chat.

From there, the chatbot, which uses a chatbot cognitive service, Watson Assistant, receives the processed chat messages, creates an informed response based on the context of the messages, and returns the response. It also writes any account updates to the backend database or triggers an action (like initiating a return). Combining these multiple cognitive services allows the chatbot to have any number of simultaneous conversations in realtime.

LOOKING FORWARD

Cognitive services will continue to innovate how eCommerce companies expand their markets and build better experiences for their customers. Businesses at the forefront of implementing cognitive services will yield more efficient buying cycles for customers, and have better insights to make data driven decisions.

Even better, cognitive services have never been more accessible. Delivered through powerful APIs, cognitive service providers train, deliver, and scale the powerful functionality so you can just focus on implementation. Whether you're on a team of one or a thousand, these API-driven services help you build next-generation intelligence directly into your app quickly and easily.



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