The New Customer Care Experience

Moving from Scripted Dialogs to Automation, Omni-Channel and Predictive Analytics

A Technical Paper prepared for SCTE/ISBE by

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Introduction

In the United States alone companies spend $112 billion on call centers each year,[1] but only half of all customer service issues get effectively resolved. In response, customer care is evolving from a static model of 'reactive customer care' — associated with high operations costs — to an intelligent, automated, and predictive model that reduces costs and ensures that subscribers are happy with services that just work. Cable multiple system operators (MSOs) can make life easier for subscribers, by offering an omni-channel customer care solution that includes compelling and effective self-care tools and much-improved agent-assisted care.

The time is coming fast when customer care systems, leveraging humanoid interfaces powered by machine learning, artificial intelligence (AI), and bots become so advanced that we enter the era of autonomous care. To facilitate this transformation, MSOs need to embrace next-generation customer care technologies.

Interactive bots provide an ideal interface for customers experiencing common issues that have simple solutions, such as connecting to Wi-Fi, resetting forgotten passwords, or checking on the status of a scheduled technician appointment. For many MSOs, it is these simple issues that drive a large volume of help desk calls. Interactive bots can also be used to create powerful self-care and augmented customer care solutions, which power web-based chat or instant messaging tools, as well as behind-the-scenes support for customer service representatives (CSRs).

Proactive bots — combined with advanced, predictive analytics — can determine when a customer is experiencing connectivity issues. Rather than waiting for that customer to seek technical support, remedial action can be taken proactively. The customer issue is resolved automatically, without the need for any interaction between the customer and the help desk. This is known as autonomous customer care and it is the desired objective for both MSOs and customers alike. According to industry analyst firm Analysys Mason, autonomous customer care is the fastest-growing sub-segment of customer care, with sales forecast to reach 1.486 billion USD by 2020[2].

For MSOs, a reduction in the number of help desk calls that require human intervention reduces support costs and frees up CSRs that can be trained to handle more complex tasks or to provide premium technical support. For customers, it results in faster response times and a better customer experience.

[1] "Customer service of the future is powered by artificial intelligence," Brandon Buckner, December 1, 2016; https://www.ibm.com/think/marketing/customer-service-of-the-future-is-powered-by-artifcial-intelligence

[2] "Customer care systems: worldwide forecast 2016–2020", Analsys Mason, 20 September 2016; http://www.analysysmason.com/Research/Content/Reports/Customer-care-forecast-Sep2016-RMA11/

Using Technology to Change the Fabric of Customer Care

Intelligent virtual assistants (IVAs) — such as those found in interactive audio hubs, such as Google Home and Amazon Echo — are becoming very popular with consumers. These IVAs provide hands-free, instant access for making reservations, playing music, or controlling household lighting. As a part of the Internet of Things (IoT), these devices are always on and can be awakened with a simple one- or two-word greeting, followed by a verbal instruction. For example, "Alexa, what is the weather going to be like today?" or "Okay Google, how much is 100 Euros in American dollars?" Worldwide, Ovum forecasts that 192 million interactive audio hubs will be in use by 2021.[3]

These devices have also introduced consumers to artificial intelligence (AI), machine learning, and natural language processing (NLP) technologies.

1. Artificial Intelligence (AI): Increasing efficiency and minimizing customer frustration

Artificial Intelligence (AI) has the potential to transform customer care, by making processes more intelligent. AI refers to software algorithms designed to simulate human intelligence by thinking, reasoning, planning, predicting, learning, and solving problems. AI is getting a lot of attention lately owing to a convergence of a few different factors:

- improvements in computer processing power — a trillion-fold increase in the last 60 years;
- declines in the cost of processing data — thanks to cloud and virtualization technologies; and
- increased volumes of data — that needs to be analyzed quickly if it is to provide value.

Initial applications of AI include language translation programs (like Google Translate), eCommerce applications (like Amazon, which makes product recommendations) and IVAs (like Google Home and Amazon Echo). With a market size of $100B by 2025 it is clear that AI is not just another fad.[4]

By combining AI with other technologies — including NLP and machine learning, both discussed later in this paper — powerful bots can be created and applied to customer care. Using AI technology, vast repositories of data can be analyzed, creating insights that can be used to deliver personalized services, power proactive care solutions, and empower ever-smarter CSRs.

2. Machine Learning: Welcome to the machine

At its core, AI is a series of algorithms that require human programming and, as a result, AI only knows what it is taught. The brains behind AI, and its continued advancement, is machine learning. Machine

[3] "2017 Trends to Watch: The Digital Consumer Landscape", Ovum, March 2017; https://www.ovum.com/research/2017-trends-to-watch-the-digital-consumer-landscape/
[4] "Understand The Spectrum Of Seven Artificial Intelligence Outcomes," by R "Ray" Wang, Software Insider, September 18, 2016; http://blog.softwareinsider.org/2016/09/18/mondays-musings-understand-spectrum-seven-artificial-intelligence-outcomes

learning allows algorithms and computers to learn from data. It is the science of giving computers the ability to learn without being explicitly programmed.

AI and machine learning are related concepts, but it is important to note that not all AI techniques use machine learning and that machine learning is used for other things besides AI, such as decoding genetic sequences.

Machine learning works with structured data to detect patterns that provide useful insights. Everyday examples are personalized recommendations from services like Netflix. In the context of customer care, machine learning can classify a subscriber's issue and intelligently present the best solution. Each customer issue that is processed contributes to the knowledge system, resulting in a more robust data set over time. This process of continuous improvement allows customer care systems to better classify issues and to route them more quickly and intelligently with each subsequent transaction. Eventually, machine learning allows the knowledge system to acquire more knowledge than any one human expert could ever possess.

3. Natural Language Processing: Harnessing the power of the spoken word

Natural Language Processing (NLP) uses AI to find patterns within large datasets to recognize language. One of the applications of NLP is with bots embedded in IVAs, which has introduced consumers to a 'screenless' user interface. Google recently announced that 20 to 25 percent of queries on its Android devices are voice searches. This is predicted to reach 50 percent — across all platforms — by 2020.[5] Further, about a third of Amazon Echo users use the devices three times (or more) every day.[6]

As the accuracy of speech recognition reaches 95 percent (and beyond), the problem of comprehension evaporates and we begin to interact with bots as if it were a person rather than a device. Some of the benefits of using voice instead of other interfaces include:

- convenience: hands-free, instant access when hands are occupied or when focus is on another task, like driving or cooking;
- speed: on average, humans speak 150 words per minute but can type only 40; typing speed decreases further when using mobile devices; •
- novelty: many consumers find this new interface cool and exciting, but it needs to be accurate and reliable or this level of excitement will not be maintained; and
- reliability: according to Google, at the end of 2016, their NLP engine could recognize nearly 10 million words, with 90 percent accuracy.[7]

This hands-free interface is one of the elements that makes bots applicable to customer care. Instead of having to download, install, and access an application on a mobile device, visit a web site, or call a help

[5] "Has voice control finally started speaking our language?", Rhodri Marsden, The Guardian, December 4, 2016; https://www.theguardian.com/technology/2016/dec/04/voice-control-amazon-echo-digital
[6] "Voice Is the Next Big Platform, and Alexa Will Own It", Jessi Hempel, Backchannel, December 19, 2016; https://backchannel.com/voice-is-the-next-big-platform-and-alexa-will-own-it-c2cf13fab911?mbid=synd_digg#.8ohqs4369
[7] "Mary Meeker: voice-controlled tech set for exponential rise in next few years", Danny Yadron, The Guardian, June 1, 2016; https://www.theguardian.com/technology/2016/jun/01/mary-meeker-voice-controlled-tech-boom-technology-predictions

desk and navigate a maze of structured voice menus using an interactive voice response (IVR) system, bots provide a nimble and consumer-friendly approach.

3.1. Natural language understanding (NLU): Determining intent

The term natural language understanding (NLU) is often used interchangeably with the term NLP, but NLU is an important subtopic of NLP that deals with language comprehension. While NLP lets people and machines communicate with each other, NLU is used to determine how to best handle unstructured inputs and to convert them into a structured form that a machine can understand and act upon.

When engaged in a conversation, humans are (for the most part) able to handle mispronunciations, contractions, colloquialisms and other idiosyncrasies associated with language. Machines are less capable of dealing with unpredictable inputs and NLU is used to improve a machine's ability to understand language. In fact, while NLP is reaching 90 percent accuracy, NLU typically struggles to achieve 60 percent accuracy. Understanding intent is more difficult than speech recognition.

NLP is sometimes used as an umbrella term that refers to the systems that work together to handle all interactions between machines and humans. An effective NLP system can process what is said, analyze it, comprehend its meaning and determine the intent, establish the appropriate action, and respond in language the user will understand.

Enhancing the omni-channel customer experience

One of the biggest trends in the modern call center is 'omni-channel' customer care. More than just a proliferation of ways that customers have to seek information or assistance — such as visiting a web site, using instant messaging/chat, sending email, engaging via social media, using custom mobile applications or calling the help desk — a true 'omni-channel' customer experience requires that each of the available channels be integrated.

If one channel doesn't lead to resolution, the customer must be able to access another channel without having to duplicate actions or re-enter information. An omni-channel experience eliminates the time needed to recapture lost information when moving between channels. By integrating bots, existing omni-channel customer care solutions are enhanced, providing further improvements to the customer experience.

4. Interactive Bots: Changing expectations in customer care

Unlike a CSR, a bot can analyze real-time and historical data before initiating a response. Interactive bots can provide an ideal interface for customers experiencing common issues that have simple solutions, such as resetting forgotten passwords or checking on the status of a technician appointment. For many MSOs, it is these simple issues that drive a large volume of help desk calls. For consumers, this prevents waiting in call center queues, navigating through Q&As on websites, or finding the right app on their smartphone.

Interactive bots can also provide behind-the-scenes support to CSRs; what is known as 'augmented customer care'.

5. Improved Reactive Care; Providing CSRs with an 'extra set of hands'

When it comes to reactive, agent-assisted care, the art is in handling the escalation as fast and as accurately as possible. Here too AI comes increasingly into play to provide better diagnostics and accurate insights.

It can be difficult for CSRs to multi-task when speaking with a customer. Augmented customer care solutions utilize interactive bots in the background, to review network and device information, access a library of use cases, pinpoint customer issues, and present CSRs with resolution options – all in real time.

6. IVR Integration: Leveraging cutting-edge technology for improved problem resolution

When calling the help desk to report a problem, or to seek assistance, most consumers are hoping to speak with a live person. To start, however, most interactions begin with an IVR system. Most callers are frustrated with existing IVRs because they lack the ability to understand intent. One of the benefits of AI is its ability to sift through large volumes of unstructured data. One of the challenges, however, is for NLP to understand the literal meaning of customer requests. It is essential that NLPs determine customer intent.

In the context of customer care, intent represents the purpose found within a subscribers' statement, question, or request; whether provided with a voice command or via a web-based chat or instant messaging tool. For example, when a subscriber asks "What is my guest Wi-Fi network password?", the customer care system must be able to interpret the specifc intent of that request. To do this, the phrase must be parsed and given structure:

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need:guest {intent} / need:Wi-Fi {intent} / password {intent}
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Then, the intent must be mapped to an appropriate remediation procedure or proactive action.

7. Empowering connected consumers to help themselves

Owing to the increasing amount of human-computer interaction, some people are more comfortable accessing information and seeking assistance using self-service portals. Customers feel empowered when they can resolve problems themselves.

Recognizing the importance of providing flexible support options, some MSOs have launched self-service care applications designed to help consumers troubleshoot and resolve issues themselves. Interactive bots can provide an effective interface for these tools, in addition to web-based chat or instant messaging tools, like the one embedded in Facebook.

Self-service apps have proven to be very effective, in some cases reducing the number of calls to the help desk by as much as 75 percent and reducing the number of truck rolls — that is, sending technicians to consumers' homes to troubleshoot and resolve issues — by more than 25 percent.

8. Dynamic Intelligent Workflows

For reactive customer care, CSRs typically use guided troubleshooting processes — sometimes called workflows. Workflows provide step-by-step instructions that ensure best practices are followed and that all agents have a consistent approach to problem resolution. These same workflows can also be used for self-service care applications.

Typically, the steps included in a workflow are fixed, with a pre-defined sequence based upon a series of educated guesses. In reality, the most appropriate actions will differ from call to call, depending on the customer context. Until recently, however, workflows were not able to adapt to changing contexts; it was seen as too much effort to have a workflow respond to various options.

Using machine learning – which collects information on each successfully (and unsuccessfully) completed workflow – and adapting the sequence for every customer's unique situation, dynamic intelligent workflows can predict the optimal sequence of tasks that should be taken to resolve specific issues.

The effectiveness of these workflows can (and should) also be monitored. Further, this data should be stored and analyzed, resulting in a series of best practices that can be leveraged for future calls.

Algorithms use all of the information available – workflow history, customer information and network status – to prescribe specific workflows to agents using a recommendation engine that selects the next-best action (NBA) that has the highest probability of resolving a customer issue in the shortest time.

Instead of the fixed sequence that characterized workflows in the past, dynamic intelligent workflows start with a common set of introductory steps. Then, based on the available data — some of which is collected in near real time — quickly diverge into customized paths.

As a result, not only do all workflows get continuously optimized, but each individual workflow has the highest probability to resolve a customer issue in the shortest time. This enables faster response times, reduced support costs and a better customer experience. It also simplifies the workflow design since special cases based on context do not need to be hard coded into the workflows.

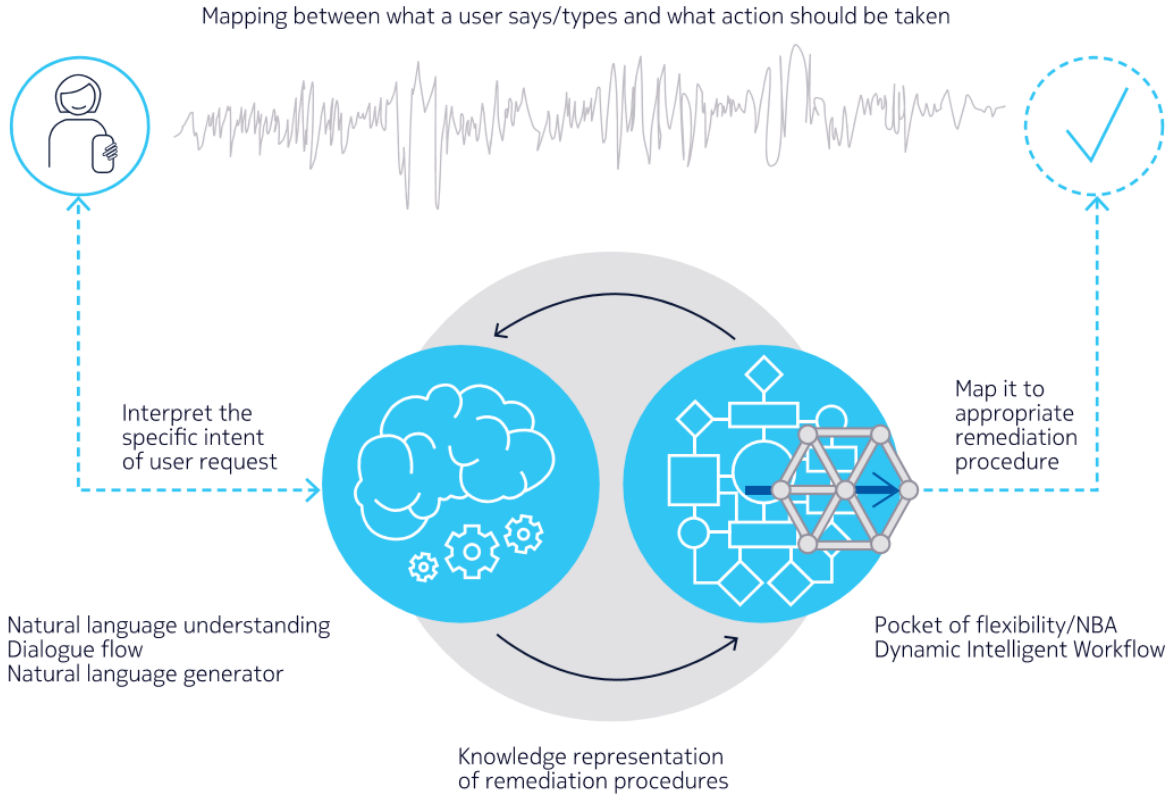

Figure 1 - Using technology to harness the power of the human word.

9. Personalization

MSO networks produce vast amounts of data every minute. Using this data, machine learning and AI technologies provide the foundation for advanced customer experience metrics. The ability to deal with varying amounts of data in real time will allow a much more detailed sensing of network and service conditions and the resulting user experience in real time.

In addition to being used for enhancing the omni-channel customer experience, analytics, AI, and machine learning can also be used to understand subscriber behavior and deliver personalized services.

By analyzing network and subscriber data, insights can be generated that allow for the compilation of subscriber profiles that can be used to classify subscriber issues, present the best solution, and provide a basis for targeted marketing activities that deliver the right offers to subscribers on the right devices at the right time.

Providing a personalized experience — combined with reduced complexity around customer care and offering self-service — are essential to increasing revenue, minimizing customer churn, and maximizing customer satisfaction.

Automating customer care

Advanced, predictive analytics today can determine that a customer is experiencing connectivity issues. Rather than waiting for that customer to seek technical support, remedial action can be taken proactively. The customer issue is resolved automatically, without the need for any interaction between the customer and the help desk.

10. Anticipating service disruptions using predictive analytics algorithms

Most MSOs rely on customer complaints (usually calls to the help desk) to learn about service disruptions. This is because existing systems, like network operations support systems (OSSs), cannot easily identify issues with the access network, customer premises equipment (CPE), or applications.

It's also important to note that 96 percent of customers don't complain after a poor customer experience, but 91 percent of them will switch providers. These customers are referred to as "silent churners" and they represent a major challenge for MSOs. If a customer doesn't call to complain, how do you know they even have a problem?

What is required is another way to identify and diagnose issues; without the customer having to contact the help desk. That would present a tremendous opportunity. Analytics provide the means to move toward proactive care, by capturing and storing data from the network, CPE, trouble tickets and more. Through analysis of this historical data, algorithms can be developed to better predict service disruptions and take proactive actions to address issues before the customer notices or calls in. Although it would be ideal for the network to always know when service degradations occur, it's often the spike in customer calls that is the first indication of a problem.

Based on this reality, algorithms can be used to track incoming calls to the help desk, correlate the rate of calls to each network element or service to the expected level of calls. The algorithm can then detect (in real time) when outage spikes are starting to happen and identify the offending network entity or service without needing to look at customer ticket records or check on past service disruptions. This is called a "call anomaly detection" algorithm.

The process starts with an examination of all calls received by CSRs. When a sudden burst of calls (a spike) is identified, the algorithm correlates the calls with the network and service topologies. Using real-time statistical signal processing algorithms, calls concerning possible service disruptions affecting multiple subscribers are categorized and separated from other calls being received. This call anomaly

detection can discover the outage within minutes and update IVR systems to play the appropriate message, thereby ensuring the call centers are not overwhelmed and can stay focused on solving the real issues.

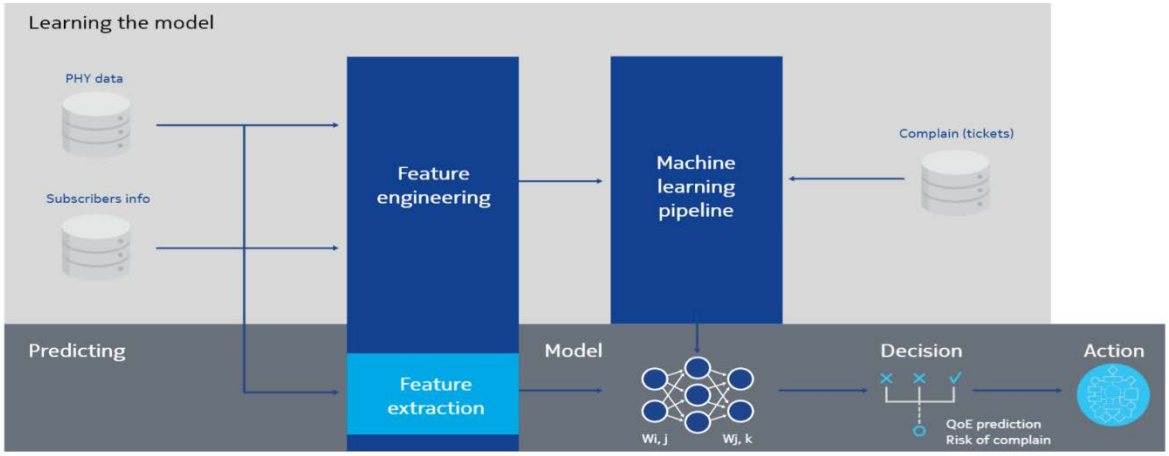

Figure 2 - Using predictive analytics to anticipate service disruptions.

The algorithms must be constantly tested, updated and refined using real-time data from the network and customer calls. In addition, the ability to implement actions automatically provides the MSO with the flexibility to adapt the actions according to the MSO's desired business processes. This is also known as autonomous customer care and it is the desired objective for both MSOs and customers alike.

11. Proactive Bots for automated problem detection and correction

Unlike a CSR, a bot can analyze real-time and historical data before initiating a response. Proactive bots, combined with analytics and machine learning, can identify service-affecting issues and fix them automatically, without any interaction between the customer and traditional support channels. The time is coming fast when customer care systems, leveraging bots, become so advanced that we enter the era of autonomous customer care.

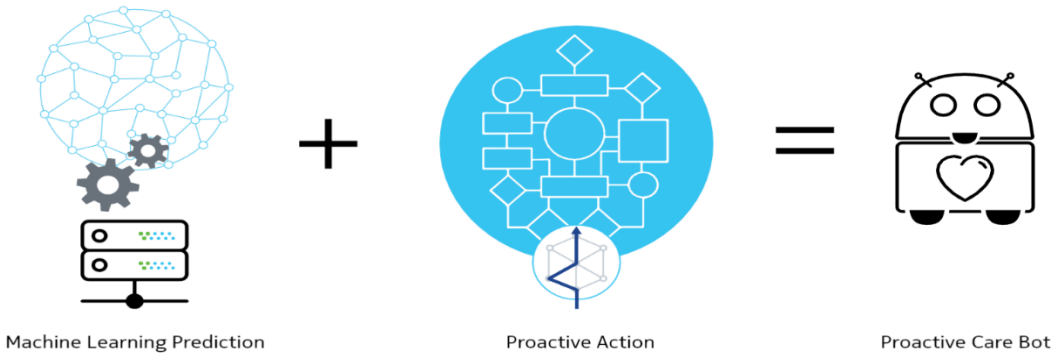

Figure 3 - Proactive bots, combined with analytics and machine learning, can identify service-affecting issues and fix them automatically.

The real value for autonomous care will be found within the extensive library of use cases, known as the knowledge system. It will be the ability to match subscribers' intents to the appropriate remediation procedures (found in the knowledge system) that will provide the key to unlocking the evolution toward autonomous care.

As the knowledge system continues to improve with each subsequent transaction, it will eventually acquire the ability to perform complex inferences on that knowledge (reasoning), to the point where it approaches human-like intelligence. The result is a reduction in the number of help desk calls that require human intervention. This will free up CSRs that can be trained to handle more complex tasks or to provide premium technical support.

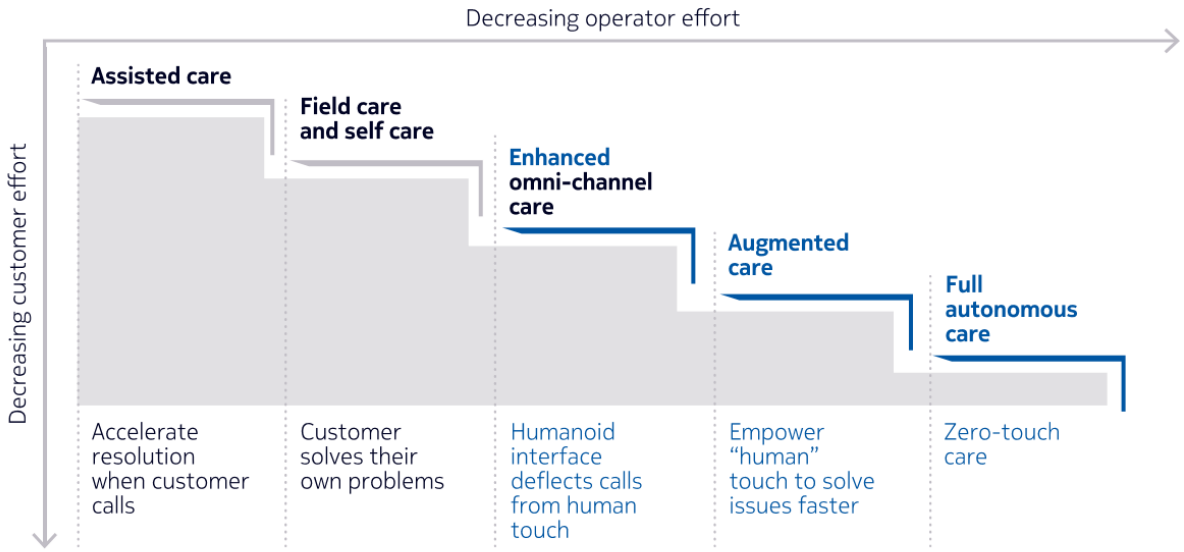

Figure 4 - The evolution of customer care, moving from assisted and self care, to autonomous care, leveraging new technologies and the power of the knowledge system.

By effectively mining and analyzing the vast quantities of network and subscriber data, MSOs can gain valuable insights about customers' experiences, preferences and predicted behaviors. These analytics provide real-time business intelligence that can be applied at every customer touch point. The first step is to determine the types of data that should be collected based on what the data is going to be used for. The data needs to be very specific to the customer care business; not just collecting data and storing it in data warehouses for its own sake. Ideally, the objective is to collect data that is connected to the network and mapped to various key performance and key quality indicators.

Once collected, this data can be used by various AI technologies to automate different tasks. For example, data can be collected from all managed CPE. An examination of that data might highlight an issue with a specific brand of CPE, for example. Then, rather than waiting for subscribers to seek technical support using traditional channels, action can be taken proactively. Customer issues will be resolved automatically, without the need for any interaction between the customer and the help desk.

This data can also be used to create the "self-healing network", which allows MSOs to accumulate a list of known issues, map them to available solutions (found in the knowledge system), then allow for the automatic remediation of common issues that affect a significant number of customers. These common transactions fall in to what some MSOs call the 80:20 rule; 80 percent of the calls are related to 20 percent of the troubleshooting use cases.

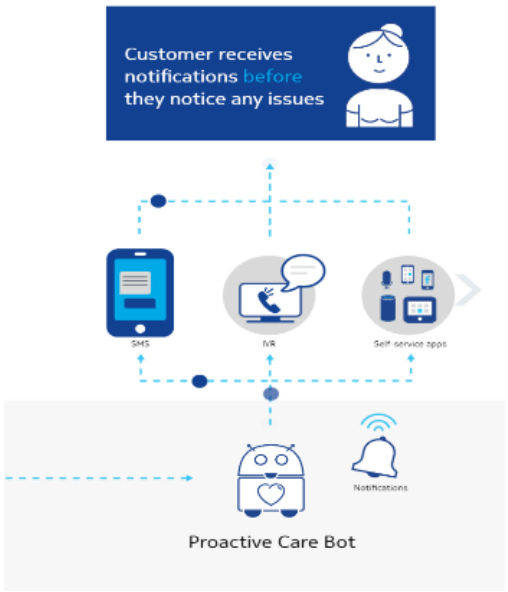

Figure 5 - Data can also be used to create the "self-healing network", mapping known issues to available solutions, then remediating common issues would otherwise affect a significant number of customers.

With these assets in place, a customer care system can respond automatically or assign interactions to appropriately-skilled CSRs. The system also allows customers to escalate to a live agent at any time. Gartner predicts that, by 2020, 10 percent of initial engagement requests will be taken by bots, up from less than one percent today.[8]

Use cases

Below are two use cases that illustrate the use of bots to resolve customer issues more quickly and efficiently.

12. Wi-Fi Network Password

One of the biggest call drivers for many MSOs are when subscribers forget their Wi-Fi network passwords. As they are often set once and forgotten, this information is not always readily available. This

[8] "Predicts 2017: CRM Customer Service and Support", Gartner, November 2016; https://www.gartner.com/doc/3505517/predicts--crm-customer-service

is especially true for subscribers that set up sub-networks, typically for guests. This is a great use case to automate with your IVA.

- Subscriber: “Alexa, what is my guest Wi-Fi network password?”
- Bot: “I can send that to you. Do you want me to send it via e-mail or text message?”
- Subscriber: “By text message, please.”
- Bot: “Okay, a text message with your guest Wi-Fi network password has just been sent.”

13. Technician Locator

Another common call driver for many MSOs is when subscribers are awaiting the arrival of a technician at their home to either install new equipment or troubleshoot a technical problem. This is another great use case that can be automated with your IVA.

- Subscriber: “Okay Google, when will the GlobalComms technician arrive?”
- Bot: “Your GlobalComms technician, Lauren, is en route. She will arrive at your home no later than 1:15pm.”

Conclusion

Contact centers are playing an increasingly important role in the context of the overall customer experience. Tolerance for legacy customer care solutions is waning. There is an appetite for change and emerging technologies are generating substantial interest with consumers.

When done right, customer care can be a unique differentiator that delivers great value. Ineffective customer care, on the other hand, is very expensive and can turn loyal customers into detractors. Customer care solutions that leverage bots, AI, machine learning and NLP can enable the kind of efficient interaction that consumers are demanding.

Making customers more self-sufficient, providing CSRs with tools that result in faster, more accurate customer care and ultimately resolving issues automatically not only makes customers happier, but it also generates a number of significant business benefits for MSOs, such as fewer help desk calls, more efficient agents, lower customer churn, and fewer truck rolls; all leading to reduced support costs and improved profitability.

Abbreviations

AI	artificial intelligence
CPE	customer premises equipment
CSR	customer service representatives
IoT	Internet of Things
IVA	intelligent virtual assistant
IVR	interactive voice response
NBA	next-best action
NLP	natural language processing
NLU	Natural language understanding
OSS	operations support system
MSO	multiple system operator

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