SCTE ISBE CABLE-TEC EXPO '16
SEPTEMBER 26-29 PHILADELPHIA

Using Analytics to Extract Operational Intelligence and Redefine Customer Experience Management

A Technical Paper prepared for SCTE/ISBE by

Andrew Sundelin
Director, Product Management
Guavus
1800 Gateway Drive, Suite 160, San Mateo, CA 94404
303-883-1226
Andrew.sundelin@guavus.com

Jean-Philippe Goyet
Senior Director, Product Management
Guavus
1800 Gateway Drive, Suite 160, San Mateo, CA 94404
514-923-6175
Jean-Philippe.Goyet@guavus.com

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Introduction

At a moment when competitive pressures have made MSOs' ability to deliver superior customer care more vital than ever operators at last have access to tools that can help them achieve unprecedented levels of efficiency in responding to service issues and interacting with their customers.

The cable industry has long struggled to keep up with the requirements of customer experience management (CEM) over the course of service evolution from the early days of analog pay TV to the massive scales of today's multi-service operations. Despite efforts to streamline customer care through use of IVR (Interactive Voice Response), self-help portals and other techniques, operators have seen their CEM challenges mount with introduction of new services, an expanding base of commercial as well as residential customers and a proliferation of potential new trouble spots tied to an expanding array of new devices, network elements and access networks.

Just within the pay TV domain, multiscreen service expansion, increasing on-demand usage, including usage tied to network DVR services, and the possibility of a la carte ordering all represent new challenges in customer care. At the same time, as new connected-home services come into play, the need to automate responses with precise attention to each user's situation will be critical to preventing a drain on call center resources. And as MSOs expand commercial services operations beyond the smaller SMB segments, they are offering ever more varieties of value-added services on top of traditional broadband connectivity.

As a result, notwithstanding consolidation of call centers and technical operations, MSOs have seen customer care costs mount as annual call volumes approach an average of two per customer and information complexities related to equipment or service support lengthen call durations to twice the average time of billing calls. At the same time, issues related to customer care have been shown to be a big reason for MSOs' ongoing lag in measures of customer satisfaction both within the pay TV sector and in comparison to other industries.

This is why transforming CEM into an engine for stability, competitive differentiation and growth has become a top priority for operators large and small. Today's slow-moving, impersonal and reactive modes of addressing subscriber needs must give way to much more proactive and user-friendly processes that draw on subscriber-specific data from network, billing, usage history and other data sources to deliver a hassle-free personalized user experience across all customer care channels.

A next-generation CEM system must be able to anticipate and resolve service problems before the calls come in. If that is not an option, than the analytics applications must be able to provide CSRs or self help platforms with instant access to all information relevant to any issue, including user service profiles and trouble-shooting history as well as contextualized pan-service views of anomalies and remedial activity on alarms generated by events elsewhere. By coordinating exposure of such information across all touch points, operators can reduce the time it takes to resolve issues and the inconvenience imposed by repetitiously querying customers for information and shunting them from one agent to the next.

This transformative approach to CEM is now in reach, thanks to the availability of advanced data processing customer aware analytics that can be used to enrich customer service workflows with near real-time, holistic visibility on each individual customer's experience. By automating the compilation, analysis and formatting of data from all back-office and network monitoring systems, an industrial-scale state-of-the-art Customer Experience Analytics (CEA) solution built on an operational intelligence framework can process unprecedented amounts of data in real time. This new technology model

operationalizes CEM and enables operators to streamline all the processes and procedures that impact customers' interactions with call centers, self-help portals and technical support operations, resulting in a faster, more personalized and customer-pleasing resolution of issues.

In the discussion that follows, we look at the current state of customer satisfaction and the limitations of legacy approaches to customer care. We then explain what operators can expect from a CEA-enabled CEM system, concluding with a description of how one Tier 1 MSO has benefitted in one example of the CEM transformations now underway across the service provider ecosystem.

The Current State of Customer Care

1. The Impact on Customer Satisfaction

There are many measures pointing to the unsustainability of traditional approaches to CEM. One has to do with customers' enthusiasm or lack thereof for recommending their cable providers to other people, as reflected in Net Promoter Scores (NPSs) registered in recurring consumer surveys conducted by the Temkin Group.

NPSs reflect respondents' willingness to recommend a provider of goods and services to other people based on a scale of one to ten. Respondents marking 9 or 10 for a particular provider are categorized as "promoters," while people at 1-6 are considered "detractors" and those at 7-8 are rated "passive." The NPS is calculated by subtracting the percentage of detractors from the percentage of promoters.

In its latest survey covering about 10,000 U.S. consumers' opinions about goods and services supplied by 283 companies across 20 industries in Q3 2015, Temkin Group again reported pay TV providers were lowest in the industry rankings with a score deeply in the detractor category at -1 while ISPs were just one rung higher at 19th with an average NPS of 2.[1] These NPSs compared to NPSs of 30 or higher for the seven top performing industries, including auto dealers, computers/tablets, supermarkets, investment firms, software suppliers, insurance carriers and retailers.

Low levels of customer satisfaction are particularly harmful when consumers have other choices. As charted by investment analysts at New Street Research, MVPD penetration of U.S. households peaked at 86 percent in 2008, one year after Netflix began its streaming service.[2]

Since then, households without pay-TV, including cord-cutters and cord-nevers, have increased by six million on an accelerating curve, with penetration falling to 81 percent as of year-end 2015.

Operators now confront a market environment where OTT options are multiplying at an accelerating rate. Ever more "skinny" bundlers are offering aggregations of programming well below the costs of traditional pay TV bundles while growing numbers of broadcast and cable TV networks are pursuing direct-to-consumer strategies as a way to gain access to consumers who don't subscribe to pay TV

[1] Temkin Group, Net Promoter Score Benchmark Study, October 2015
[2] New Street Research, 4Q15 Cable Trends Review, March 2016

bundles. This has led to unprecedented dynamism where consumers are constantly shopping for and selecting new options.

While quality of customer service at the support level plays the biggest role in indicating churn, there's evidence at multiple stages in the customer lifecycle to influence the customer experience. According to a recent report by Analysys Mason, "Customer experience Management: a multi-vendor solution is required to address all CEM needs", the influence of the experience across the lifecycle spans from "Inquire and Evaluate", "Join", "On-board", Support, and "Renew and Churn". The Support phase accounts for 50% of the impact to customer experience indicating that this is the most critical phase to address to reduce churn. Customers who call at least three times in two days are more likely to churn by a factor of 2.2.[3]

Moreover, calls relating to such problems have a much greater impact on costs than do billing and account-related calls. These calls are more complex, taking twice the average handling time (AHT) as billing calls with the average duration climbing from 430 to 860 seconds. As shown in Figure 1, 10 to 18 percent of support requests are for technical problems, which are two to three times more likely to result in escalation to Tier 2 and 3 levels of care management.

[3] Analysys Mason, Analytics in Customer Care: Application Areas that Enable CSPs to Deliver Personalised Interaction Research Short Report, March 2016

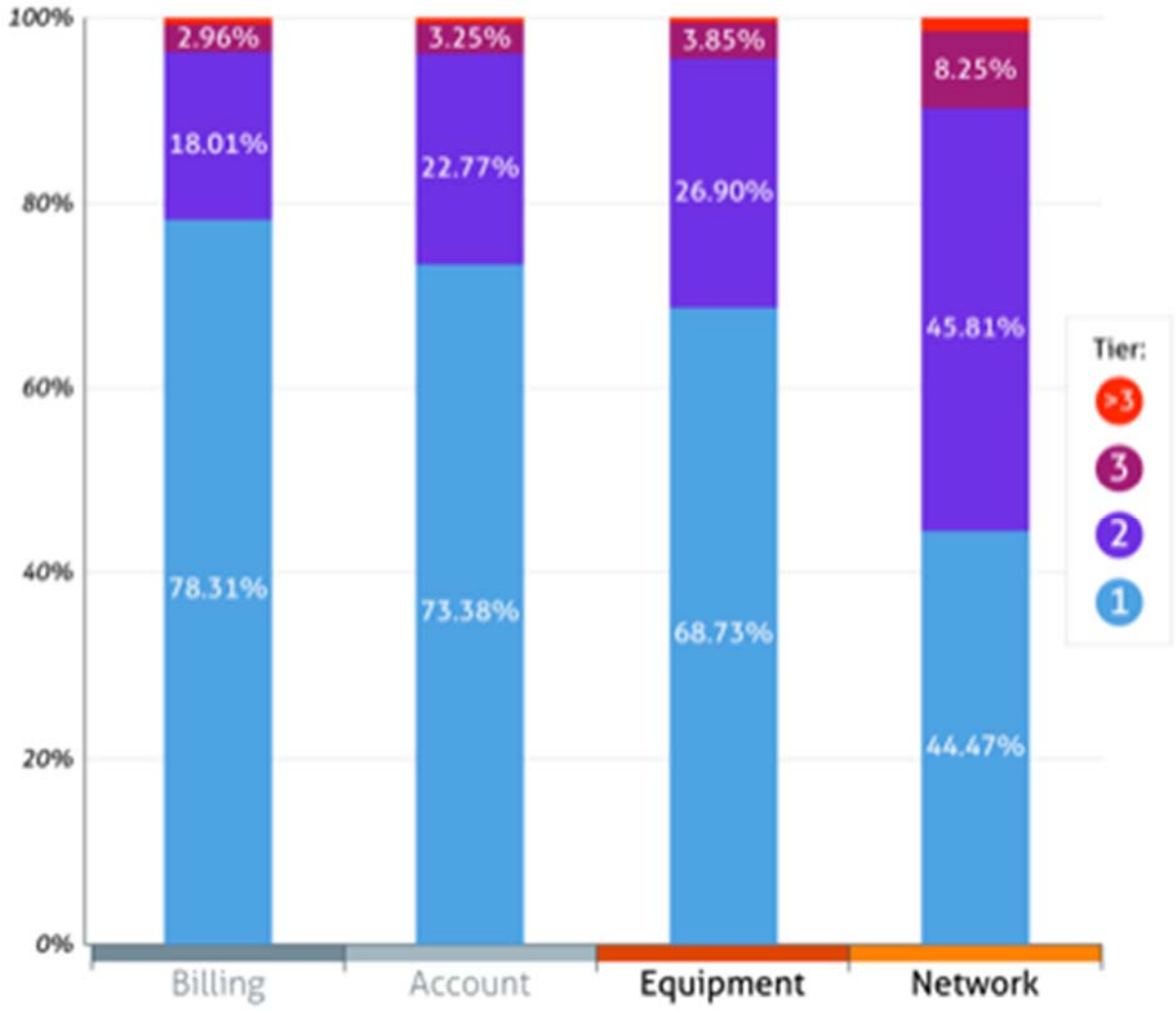

Figure 1 - Customer support calls stemming from technical issues yield 2-3 times more escalations (source: Guavus)

More generally, another survey conducted by Temkin Group attests to the positive impact better customer experience management has on a company's wellbeing. Looking at 210 companies with $500 million or more in annual revenues, Temkin Group's Q1 2016 CX (Customer Experience) Management survey found that CEM leaders as determined by four areas of competency have stronger financial results, use more analytics in CEM endeavors and have greater support for customer care from senior management.[4]

[4] Temkin Group, The State of CX Management, June 2016

2. The OpEx Impact

Beyond the impact on customer satisfaction that comes with limited approaches to customer care, the costs to operators of maintaining legacy methods has become an untenable burden. As a case in point, one large Tier 1 North American service provider with tens of millions of subscribers reports that its call centers receive upwards of 400,000 calls daily.

The staffing and other resource costs associated with handling such a staggering volume of calls are greatly exacerbated by inefficiencies intrinsic to traditional CEM processes. Moreover, the complexities of doing the job add to training costs, which are a big budget expense in light of staffing turnover rates that can range anywhere from 20 to 45 percent annually.

CSRs, burdened with using several applications to process customer requests, use up valuable time trying to access accurate customer and network-related information from siloed data sets. And they don't have an efficient means of linking service issues to real customer experience.

Not only do these problems contribute to long call durations; they make it hard to resolve subscribers' issues on the first call, which leads to the repeat-call syndrome that has become a major factor in customer dissatisfaction. The extent of the problem was illustrated in a recent report on customer service issues produced by the minority staff of the Senate Permanent Subcommittee on Investigations. Relying on data supplied by five of the leading pay TV service providers in the U.S., including the top three cable MSOs, the staff found that the percentage of callers to each company who found it necessary to call again about unresolved problems ranged from 20 percent to over half.[5] One cable company reported that an internal study found that over one third of its subscribers called customer service three or more times over a six-month period.

3. The Need for a New Approach to CEM

Clearly, MSOs have much to gain through implementation of approaches to CEM that overcome the deficiencies that commonly characterize today's operations. While near-term fixes targeting the most glaring customer service issues within specific service silos may once have held appeal, today's market conditions dictate a trans-silo, proactive and highly automated approach to ensuring superior customer care that touches on data, processes and procedures across call centers, self-help portals, back-office systems and technical support operations.

Operators are delivering more types of services than ever before to both residential and business customers who take multiple services that rely on common network, headend, datacenter and other infrastructure elements as well as elements specific to executing each service. The imperative behind a more holistic, less manually intensive approach to CEM is farther intensified by the need to consolidate and streamline operations at the regional and national levels.

Generally speaking, today's cable CEM systems are not adequate for meeting these requirements. At the most basic level, long delays in answering calls in help centers often lead to abandoned call rates several times greater than the 5-6 percent call abandonment rate that customer care centers in all industries generally aspire to. And, once calls are answered, the time it takes for CSRs to get answers to questions, if

[5] Senate Permanent Subcommittee on Investigations Minority Report, Inside the Box: Customer Service and Billing Practices in the Cable and Satellite Industry, June 2016

they're able to find answers at all, increases customer dissatisfaction as well as cost-per-call averages that contribute to excessive OpEx. Too often the pro forma response from CSRs instructing callers to reboot their modems doesn't fit the situation, adding time and frustration to the customer care experience.

CSRs have to spend valuable time going to the specific service assurance platform related to a particular caller's complaint, often without sufficient visibility into other events in that caller's service location that could help identify a possible cause and determine whether action on the problem is already underway. If the customer is calling about more than one service, the representative has to spend time accessing multiple service assurance platforms to address the customer's queries, further adding to the delays.

Worse still, without ready access to the information they need, CSRs are needlessly forced to escalate the problem to tier 2 and 3 agents. At this point the problem becomes far worse from a customer satisfaction standpoint, going from an unacceptably long call to an unacceptably long wait for answers and remedial action. Making matters worse, often when someone calls in after an initial complaint to determine what the status on a trouble ticket is, the service rep cannot immediately provide specific information other than the original time of repair estimate.

Lack of ready access to information about the customer on a call is another contributor to the time-consuming "swivel-chair" phenomenon all too familiar in today's care and operations centers. Frequently, the CEM platform in use wasn't designed to communicate nuances such as varying levels of service quality guarantees, applications-based service enhancements, information about different types of premises devices or throughput levels on high-speed data tiers. In such instances the CSR must take time to access billing and installation records or rely on the customer's answers to questions in order to understand the problem and to ascertain what the target parameters for trouble ticket resolution should be.

Adding to customer frustration with care performance is the amount of repetition they have to go through with each call. Information already entered into the IVR or self-help system prior to contact with the help desk often isn't conveyed to the CSR. Sometimes, even when the information has already been provided in a conversation with a CSR, it's not readily available to the next CSR in a call handoff or on a subsequent call.

Most CEM platforms currently in operation also lack means to deliver proactive diagnostic data to CSRs' screens that could be used to accelerate identification of the root cause behind a particular customer's problem. For example, if a customer has been unable to view a movie ordered through the VOD system, the CSR should be able to see that his customer's order was unfulfilled and to deliver suggestions on actions the customer might take to fix the problem.

The absence of real-time access to data collated from service assurance platforms and other elements such as workforce and facility management systems prevent implementation of proactive care procedures that would greatly contribute to improving customer satisfaction. An efficient CEM platform should be able to aggregate and analyze data from these sources so that when certain thresholds are reached or pre-defined patterns are generated over time, the system can produce alarms and trouble tickets that lead to remedial action before customers start calling. In the case of enterprise customers with service level agreements, the system should be able to access and routinely monitor all the data records that pertain to validating that the terms of service level agreements are met and to generate alarms when they're not.

While MSOs have reduced customer care costs with use of IVR systems and self-help portals, these systems typically aren't equipped to dynamically utilize data feeds to serve each user's needs based on each user's service profile. Nor can most such systems tap into the databases related to customer care that could be used to generate answers to users' questions and provide a means by which they could be automatically directed to help desks for follow up on specific service issues.

Self-help portals are an especially important aspect of customer service in today's culture. As noted in research conducted by Forrester, 72 percent of US online consumers prefer to use a company's Web site to get answers to their questions rather than contact companies via telephone or email.[6] The ability to go beyond automated presentations of service status to search for answers to specific questions is essential to rapid resolution of issues and avoidance of the need to make a call.

Implementing Next-Generation CEM

All the deficiencies characterizing legacy customer care systems can be remedied with a CEM strategy that makes full use of all the data at the operator's disposal in conjunction with application of a powerful Customer Experience Analytics (CEA) engine to create a tightly orchestrated and automated approach to maximizing the effectiveness of call center, IVR and self-help resources. With such capabilities in place operators can run customer care from a user-centric as opposed to a network- or technology-centric point of view.

The requirements that must be met by analytics engines to achieve these next-generation CEM goals go well beyond the capabilities of processes typically employed with legacy customer care platforms. In order to ensure the greatest possible accuracy and speed in the delivery of meaningful information to call centers, IVR systems, self-help portals, maintenance personnel and e-messaging directly to customers, the CEA platform must be able to track and identify issues based on a comprehensive base of information drawn from network monitoring systems, end-user devices, subscriber account data and other sources.

1. Including all Relevant Data in CEA Processes

The challenge for MSOs, like enterprises in many other industries, isn't a lack of data; it's the amount of processing power and algorithmic sophistication required to use it. The pan-industry dilemma is well articulated in research conducted by Gartner, which projects that by the end of 2018 90 percent of the deployed "data lakes" under control of companies worldwide could be full of information that is rendered useless through lack of means to apply it to company needs.[7]

In the cable business, the amount of data that must be processed as operators continue to consolidate operations and regional and national levels requires an operational intelligence solution with power to collect, correlate and normalize multiple data sources at petabyte scales and create specific experience markers such as tracking care calls and NPS survey results. Such capabilities are now available and in use among Tier 1 MSOs and other network service providers, thanks to innovative processing architectures utilizing machine-learning algorithms and open-source IT technologies like Apache Spark and Hadoop that can be implemented in virtualized datacenter environments.

[6] Forrester Research, Do Your Customers Want to Telephone You for Service?, April 2010
[7] Gartner, Prediction Is Hard – Especially about the Future, December 2014

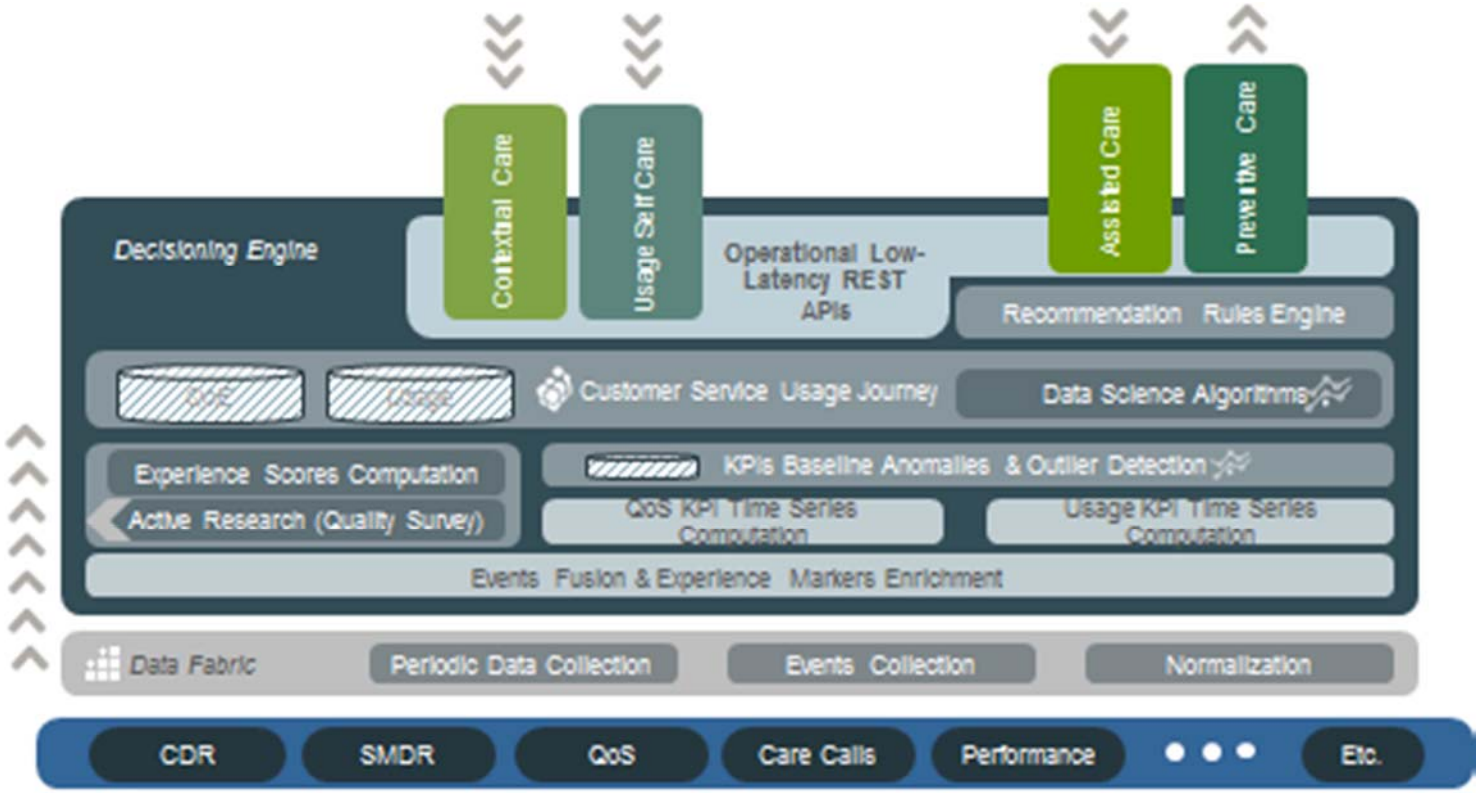

Figure 2 - Next-gen CEM architecture

MSOs are well-positioned to exploit the power of CEA solution that provides operational intelligence to support an approach to CEM suited to today's needs by virtue of the vast amounts of data at their disposal. With an analytics platform that integrates with existing data sources, including the SMNP (Simple Network Management Protocol)- and IPDR (Internet Protocol Detail Records)-generated flows tied to DOCSIS OSSI, outdoor plant status monitoring systems, set-tops, Wi-Fi gateways and other CPE, billing systems and much else, operators can implement everything they need to transform CEM in very short timeframes. Moreover, with the flexibility to interact with and leverage existing analytics platforms, the customer aware analytics solution extends the value of existing investments and lowers the technology risk.

2. What to Expect from a Next-Generation CEM

This new generation of CEA is enabling operators to go beyond simply reacting to network events by responding proactively and pre-emptively to customers' needs with personalized care solutions delivered in real time. By virtue of its system-wide view, the CEA engines can immediately sort through processes that are engaged in enabling any sub-par or potentially sub-par service experience to identify single or multiple points of contribution to any anomaly, thereby greatly expediting the problem-solving process.

The analytics interprets a customer's state to make real-time prescriptions for optimizing her experience. In doing so, it derives associations between the events it is seeing, the relevant history of the associated customer and the knowledge (e.g., care issues) it has accumulated from other customers and systems. Ontologies are dynamically grown and used to manifest the knowledge. Behavioral analytics and

reasoning are employed to gather intelligence about the customer and draw conclusions on what actions should be taken to affect a positive outcome for that customer. In care, for example, behavioral modeling and stochastic methods map observed customer events into classes, such as risk buckets, which are used to predict the likelihood of the customer to call about particular issues. Powerful latent analysis and graph algorithms enable inferences between the customer's stated issues, and/or events observed by the system, and a likely resolution thereby yielding preventative actions.

With potentially tens or hundreds of millions of data combinations to be analyzed, the CEA engines are able to ingest and correlate all the data essential to generating results and triggering action in accord with policies set by the operator for help desk, IVR, maintenance and self-help operations and messaging. For CSRs, the time-consuming swivel-chair, multiscreen processes employed to address callers' problems are replaced with a single-screen view of highly correlated compilations of the information they need to address each subscriber's issue, such as the subscriber's device type and whether the subscriber is a new customer or chronic caller experiencing frequent problems – all within less than a second of taking the call.

The automated diagnostics processes provide insight into those issues that often allow CSRs to know what the call is about even before the caller speaks. For example, automatically discovering when an increase in inbound calls for a specific set of device owners is related to a faulty device OS rather than a coverage issue can save a lot of time. Along with greatly reducing the initial call time, these automated diagnostic capabilities eliminate much of the time and subscriber inconvenience that comes with moving calls to tier 2 and 3 levels of technical support.

This persistent, holistic approach to performance analytics also allows operators to reduce call volumes by generating messages through self-care portals to notify customers that remedial actions are underway before the customer makes a call. And, for instances when calls are made, the system can push context-specific messages to the IVR system and reduce the number of agent-handled calls.

The system can also be tuned to handle proactive care situations based on how each customer typically reacts to a given situation or how valuable that customer is based on the type of service package in use. Perhaps there's an issue of screen pixilation where, in the case of VIP customers, the operator may want to trigger a personal call, with apologies for inconvenience and potential offers for remuneration, while in other cases an SMS message will do.

With implementation of CEA, operators are able to create a far more useful self-care environment that is personalized based on the reason for support, allows customers to search for and quickly obtain answers to technical issues and proactively modify self service content and workflows to highlight the best path to resolution. In addition, the SEARCH function can be personalized using the same operational intelligence. And through tight integration of self-care with call center operations, the CEA-enabled CEM platform allows a customer to move from an online self-care session to engagement with a CSR without having to repeat information already provided.

It's also important to note that CEA capabilities allow operators to better manage customer experience when it comes to enabling self-care to provide subscribers with greater control over billing issue remediation. With the ability to break down usage by types of application, a CEA-enabled self-care system allows subscribers to see exactly where their allowance is being used up. Similarly, the CEA can combine real-time usage data with machine-learned historic and peer patterns to detect when customer

consumption deviates from normal behavior and automatically trigger an alert preventing the risk of bill shock or fraudulent activity

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Results from One MSO's Implementation of Next-Generation CEM

Cable MSOs and other service providers have begun putting CEA to use to great effect. In the case of one MSO, there was great concern over mounting customer care costs and dissatisfaction stemming from high Mean-Time-To-Understands (MTTU), low call deflections and limited visibility into the impact of outage evens on care calls.

It took only 90 days for this Tier 1 operator to implement the CEA solution to transform its operations processes and begin registering quantifiable savings. MTTUs in some use-case categories were reduced from hours to minutes by identifying anomalies that led to care calls. One big factor was the ability to use this information in orchestrating IVR messaging to automatically deflect customer calls.

Additional savings were realized through immediate identification and correlation of specific outage and scheduled maintenance events with care calls and truck rolls. Over a one-year span, by identifying 5,606 outage and maintenance events with 120,476 technical calls the operator was able to realize a 36 percent reduction in average MTTU and $6.7 million in savings from call deflections and elimination of unnecessary truck rolls.

Conclusion

Putting CEA to use to generate real-time insights from a vast range of quality-of-service data gives MSOs much greater control over the quality of experience at critical points in each customer's journey. As a result, problems are identified and resolved faster, resulting in preventive maintenance and proactive personalized care service that improves customer satisfaction and reduces operational expense.

Moreover, the ability to link customer journey information with service quality events offers unprecedented opportunities for operators to leverage superior customer experience to gain a much stronger edge over competitors. Significantly, CEA-enabled CEM platforms can lead to NPS ratings that transform subscribers from detractors to promoters.

Such labels are more than just convenient categories. They actually reflect behavior in the current cultural environment, where people are just as eager to tell people what they like as they are to promulgate negative information about goods and services.

This is born out in a McKinsey & Company study that found that, depending on age group, 38 to 48 percent of survey respondents agreed with the statement: "I want to help other customers with problems and questions about the brands I love and use."[8]

In sum, a CEM program powered by CEA allows operators to cut care costs and improve customer satisfaction by:

- Achieving much faster resolutions to subscriber issues through all care connections, including help desks, IVR systems and self-help portals;
- Enabling preventive responses to emerging issues before they generate service calls;
- Facilitating sensitivity and responsiveness to an increasing number of quality assurance parameters across all services; and
- Personalizing care through all care connections in ways that let subscribers know they matter.

[8] McKinsey & Co., Higher Customer Satisfaction at Lower Costs: Digitizing Customer Care, August 2015

Abbreviations

AHT	Average handling time
CDN	Content delivery network
CEA	Customer experience analytics
CEM	Customer experience management
CPE	Customer premise equipment
CSR	Customer service representative
DOCSIS OSSI	OSS interface
IPDR	Internet Protocol Detail Records
ISP	Internet service providers
IVR	Interactive voice response
MTTU	Mean-time-to-understand
MVPD	Multichannel video programming distributor
NOC	Network operations center
NPS	Net promoter score
OTT	Over-the-top
SMB	Small and midsize business
SMNP	Simple Network Management Protocol

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