MANAGING CARRIER WI-FI CUSTOMER GROWTH

MOTIVE SIMPLIFIES CARRIER WI-FI CUSTOMER ACTIVATION, MANAGEMENT AND CARE

APPLICATION NOTE

Alcatel·Lucent

ABSTRACT

Carrier Wi-Fi® is rapidly gaining momentum, driven by consumers' appetite for mobile broadband services. In many markets operators must include carrier Wi-Fi to retain their competitive positioning. Fortunately, carrier Wi-Fi also provides many benefits and opportunities for growth. Fixed operators look to carrier Wi-Fi for opportunities in community Wi-Fi, venue coverage and extended hotspot strategies. Mobile and converged operators are looking to integrate carrier Wi-Fi with their cellular networks to provide customers with a seamless mobile broadband experience across their carrier Wi-Fi and cellular networks.

Service providers who want to retain and grow their customer base must deploy a scalable, high performance, carrier Wi-Fi network infrastructure, such as one based on the Alcatel-Lucent 7750 Service Router (SR) WLAN Gateway and elements of the Motive portfolio of Customer Experience Solutions, including the Motive Authentication, Authorization and Accounting (AAA) Server, Motive Home Device Manager (HDM) and Motive Service Management Platform (SMP).

To profitably grow their carrier Wi-Fi business, operators need to look beyond the network and address the challenges of customer activation, management and care. Motive delivers tools and processes that help operators retain customers' loyalty by delivering a superior customer experience.

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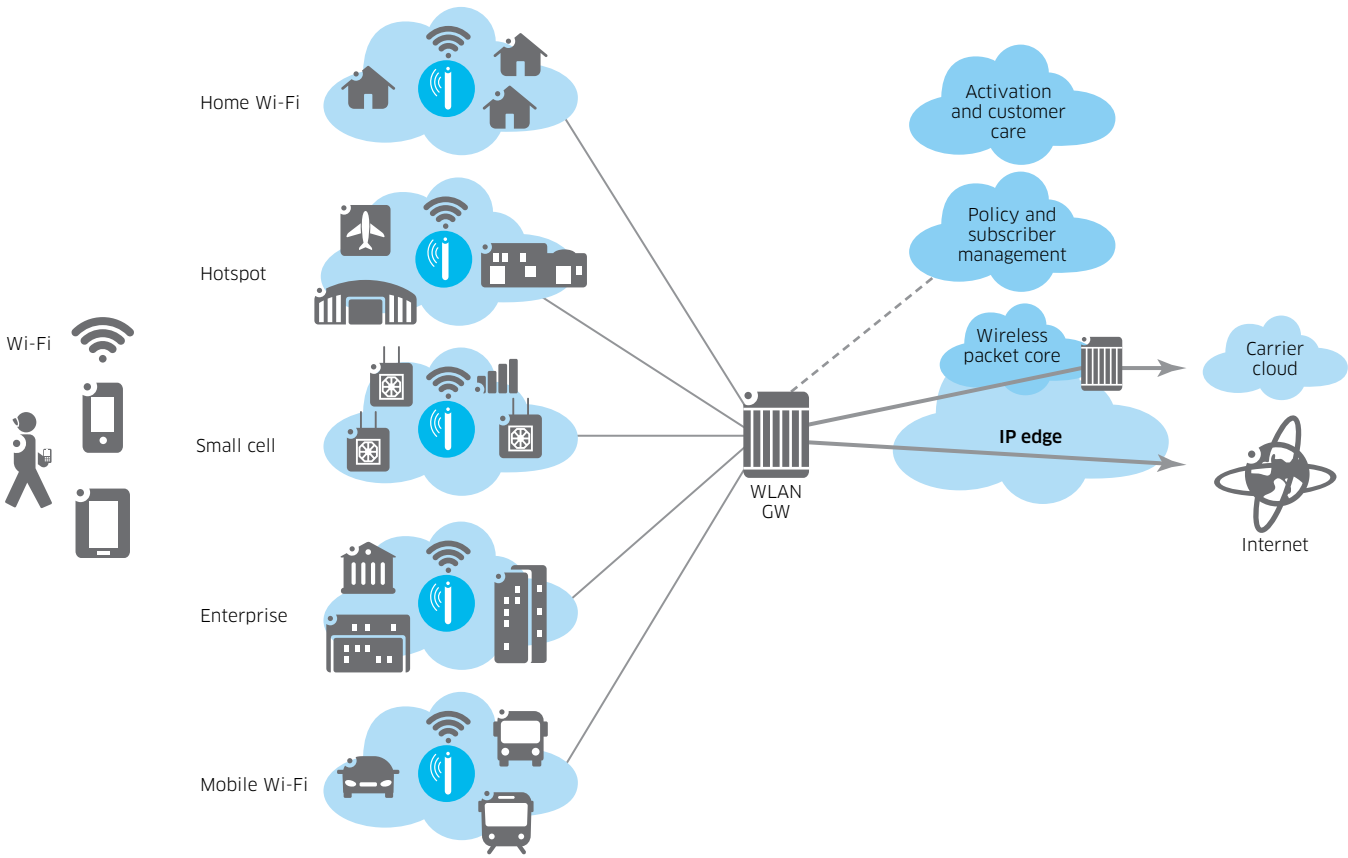
THE EVOLVING WI-FI MARKET

Today no operator's mobile broadband strategy is complete without carrier Wi-Fi® technologies. The potential to generate new revenue is compelling and in many markets operators must include Wi-Fi to retain their competitive positioning.

Fixed operators look to carrier Wi-Fi for opportunities in community Wi-Fi, venue coverage and extended hotspot strategies. Mobile and converged operators are looking to integrate carrier Wi-Fi with their cellular networks. They want to provide customers with a seamless mobile broadband experience, which is best derived from secure and trusted connectivity across carrier Wi-Fi and cellular networks.

Wi-Fi is already part of everyday life, and its use continues to rise. There are very few devices coming to the market that do not feature integrated Wi-Fi. According to a recent ABI Research study, 6.3 million Wi-Fi public hotspots existed worldwide in 2013. Around 90% of tablet traffic used Wi-Fi. Juniper Research suggests that, by 2017, mobile data traffic generated by smartphones, feature phones and tablets will top 90,000 petabytes and the majority of the data traffic (60%) will be via the Wi-Fi network. In some regions, such as Europe, the numbers are even higher. In 2013 the European Commission reported that 71% of all EU wireless traffic in 2012 delivered to smartphones and tablets was via Wi-Fi — and the Commission projects that this will rise to 78% by 2016. The fact that 70% of users are in Wi-Fi coverage more than 70% of the time during the day shows the great potential of Wi-Fi.

Figure 1. Carrier Wi-Fi market applications



Build to win

To compete effectively, operators must build a carrier Wi-Fi infrastructure that supports a simple, secure and seamless customer experience. But reaching and maintaining this level of service is a challenge, given the dynamic environment and speed at which carrier Wi-Fi market applications are evolving. To support these applications operators must make strategic changes to their networks.

The first important step is to integrate carrier Wi-Fi applications off a common carrier Wi-Fi core infrastructure. It is also apparent that to address the range of business and consumer carrier Wi-Fi applications, the Wi-Fi network's common core must be able to interwork with Wi-Fi access point (AP) products from multiple vendors. This means that to fully reap the benefits of carrier Wi-Fi, operators must deploy scalable, high performance carrier-grade platforms and systems.

Alcatel-Lucent has a portfolio available to help operators deliver a seamless carrier Wi-Fi experience. For easy access, the Company has applied its lightRadio™ innovation to extend high-speed mobile broadband services across both cellular and carrier Wi-Fi networks. Also, the Alcatel-Lucent 7750 SR can support a WLAN Gateway to provide seamless access, authentication and subscriber management. With the gateway functionality incorporated on the 7750 SR edge platform, operators can easily integrate their multivendor carrier Wi-Fi AP infrastructures with their IP-based wireless and wireline service networks.

The Alcatel-Lucent 5780 Dynamic Services Controller (DSC) includes the Wi-Fi Control Module, which is based on the 3GPP-defined Access Network Discovery and Selection Function (ANDSF). This Wi-Fi Control Module allows operators to have control across Ultra-Broadband Mobile radio access networks (LTE, 3G and carrier Wi-Fi) using multi-dimensional parameters (including analytics, network resource state, subscriber and commercial) to intelligently and dynamically make decisions for policy driven radio access network selection and application steering. This helps ensure that users are connecting to the best possible radio access for their services and applications.

Elevate your game with customer care

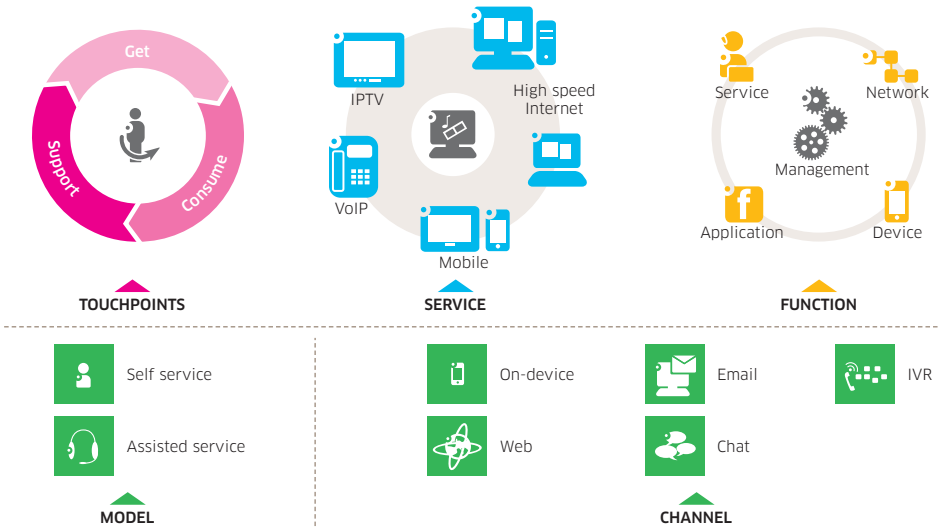
To profitably grow their carrier Wi-Fi business operators also need to look beyond the network, to address the new challenges of customer activation, management and care. Research indicates that price is no longer an effective differentiator for operators. Consumers increasingly join or leave operators due to the customer experience. Does the operator offer personalized services that meet the consumer's lifestyle? How quickly can service agents resolve a service problem? Three out of four customers spend more after a positive experience and 85% will pay more — up to 25% more — for a better experience. Conversely, 89% of consumers switch operators after a bad experience, and one in four vent their frustrations using social media.

In the customer experience lifecycle, there are three key touch points that have direct relationships to communications services and their technologies. These three are Get, Consume, and Support.

- **Get** – the provisioning and activation of the service and associated equipment and devices so that it can be consumed
- **Consume** – end users actively using services on their associated device(s), such as browsing the Internet on their tablet
- **Support** – end users calling customer support or using self-service tools to diagnose, troubleshoot and resolve their issues when service expectations are not met

To remain competitive, operators must provide an excellent quality of experience at each of these touch points. Signing up for a service and activating devices must be simple and quick. The carrier Wi-Fi network must provide seamless access for all their mobile data devices: smartphones, tablets, net-books and laptops. Efficient handling of support calls and the provision of self-care tools are also strong business differentiators for carrier Wi-Fi providers. Providing seamless carrier Wi-Fi access goes beyond building the necessary network infrastructure. Operators must also develop processes for connecting and activating devices for services, and troubleshooting when things do not go as expected.

Figure 2. Customer experience management elements



Motive provides tools and processes that empower operators to meet and exceed customers' expectations at all three touch points by facilitating and automating service and device activation, customer management and customer support.

ACTIVATING CARRIER WI-FI SERVICE

Carrier Wi-Fi activation involves the Wi-Fi network, service and end-user devices, along with backend provisioning processes. There are three facets to activation for carrier Wi-Fi. These are:

- Creation of the AP or CPE activation within the network, and configuration to provide the carrier Wi-Fi service for subscribers to access
- Subscriber sign up and registration to activate the service for the user
- Device activation and configuration so a device can use the carrier Wi-Fi service

CPE or access point activation and configuration

There are a number of carrier Wi-Fi applications, including:

- **Home Wi-Fi.** Home Wi-Fi refers to the Wi-Fi homespot or residential gateway-based service many people use for wireless Internet access within their homes. Some home Wi-Fi services are delivered using off-the-shelf routers purchased from electronics stores and are not manageable by the service provider. This scenario does not allow for carrier Wi-Fi enablement. In other cases, however, the service provider provides and manages the homespot or residential home gateway device. This device can be used to deliver both home Wi-Fi services and appropriate devices can be incorporated into community Wi-Fi based services.

- **Public (hotspot) Wi-Fi.** This can be an indoor (such as conference centers, stadiums, shopping centers) or outdoor deployment of carrier Wi-Fi. Outdoor deployments rely on weatherproof Wi-Fi APs strategically located on poles or buildings. The carrier Wi-Fi APs are often element managed using the vendor-supplied control system, which may or may not be standards-based. Wi-Fi enabled small cells, such as metro cells, could be incorporated into public Wi-Fi services.
- **Community Wi-Fi.** Community Wi-Fi is the term used to describe a public or carrier Wi-Fi service that leverages homespot or residential home gateway devices to create a shared resource, sometimes in conjunction with hotspot access points. In this case the homespot or residential home gateway device is configured with a public Wi-Fi service profile in addition to the private home Wi-Fi profile. The public portion of all of the devices in a geographic area (a community), along with any appropriate hotspots, becomes a shared resource available to all subscribers of the community Wi-Fi service. The public profile on the home device is configured by the service provider, not the home owner. The traffic on each Wi-Fi connection (home and community) is securely separated and managed over a common backhaul connection.

As part of the service provider's solution definition, a community Wi-Fi network can be either open or secure. Open networks only require users to select the Service Set Identifier (SSID) from the list of available networks seen by their device. There is no passphrase or other credential required to set up the network connection. However, the user may be required to pass through a captive portal by signing in or signing up to the service.

Secure networks require that the home Wi-Fi or hotspot AP's be configured to require credentials. These credentials may be a passphrase or a more secure method such as EAP-PEAP or EAP-TTLS. The user and end device must be preauthorized and the end device be provisioned with the access credentials.

While each of these models has its own benefits and considerations, a combination of models appears to be the most effective at delivering carrier Wi-Fi services. Current market activity indicates a combination of indoor and outdoor hotspot, home Wi-Fi and community carrier Wi-Fi application models are being used to provide carrier Wi-Fi service to subscribers.

Motive provides operators with tools and processes that automate the activation of all carrier Wi-Fi indoor, outdoor and community APs using the same platform. When a subscriber activates home Wi-Fi, the community Wi-Fi service can be set up at the same time if the operator provided a self-service tool. Motive Customer Experience (CX) solutions interwork with the third-party systems of carrier Wi-Fi access infrastructure devices so all devices are managed by a single tool.

Motive's zero-touch activation encompasses:

- Activation of the CPE/AP in device management system
- Registration of the home gateway with the customer profile in business and operations support systems (B/OSSs)
- Configuration of carrier Wi-Fi settings, including EAP parameters, if needed
- Configuration of AP connection policies on device

Motive's solutions automatically retrieve device names and model numbers, IDs and security settings from devices so the service can be set up very quickly.

Subscriber and service activation

Service providers have many ways of reaching out to subscribers to encourage them to sign up for carrier Wi-Fi. For example, when a subscriber is first signing on as a customer, they can be asked whether they want Wi-Fi. Most operators will likely choose to offer carrier Wi-Fi as a value-added service, something to encourage customers to choose them over competitors. Whether the customer is signing up with a service provider via a self-service portal on the web or a telephone call to a customer service representative, signing up can be very straightforward. A checkmark on a sign-up form or selection on a quick-pick menu can be all it takes from the subscriber's perspective.

When a service provider adds carrier Wi-Fi to its existing broadband services, subscribers can be encouraged to sign up for the new service in a number of creative ways. For example, an SMS text or email can be sent to subscribers encouraging them to reply "yes" to sender. A positive reply will authorize the service provider to activate the carrier Wi-Fi service on the subscriber's homespot or residential gateway, which in turn adds that access point to the Wi-Fi community. In the background, the home gateway is re-configured with the additional SSID and connectivity attributes, and the subscriber policies and account profile are updated.

Behind the scene, Motive solutions ensure the account is completely activated and all necessary information is passed to the network's B/OSSs. This may include enabling device activation and configuration in the self-service tools for that subscriber.

User device activation and configuration

The final stage of the activation process is to activate the individual devices the subscriber wants to use on the carrier Wi-Fi service. Often at least one device will be activated when the subscriber signs up for the service. From that point on, the subscriber should be able to easily add or delete devices at any time. Motive solutions work with both Google® Android™ and iOS devices as well as PCs and Apple® computers.

Motive solutions automate device activation, so customers never need to enter long strings of numbers or intimidating security parameters. All of the details the network needs from the device are detected automatically. Similarly, the settings needed for the device to work are automatically sent to it by Motive solutions. This includes:

- Registering the device with the customer profile in B/OSSs
- Ensuring Authentication, Authorization and Accounting sources have the device MAC address and other required identifying parameters
- Generating a carrier Wi-Fi access profile for the device's operating system, in compliance with security requirements
- Delivering the profile to the device and confirming the delivery
- Delivering ANDSF-based policy to the user device, if required
- Turning on the Wi-Fi radio, if required by policy or the user
- Setting device-specific authorizations for Wi-Fi access

While the system undertakes several steps to activate the device, to the customer, the process will appear simple and straightforward.

With Motive solutions, customers can:

- Activate a Wi-Fi only device while in their home for use on their home network and the carrier Wi-Fi network
- Access a sign-up portal from their mobile device using a mobile or Wi-Fi connection, whether or not they are in a carrier Wi-Fi zone and activate a service, a device or both
- Use one device to activate service on another device (for example, use a laptop to activate a mobile device)

Using intelligent workflow-based processes, operators can easily keep activated devices up-to-date with the latest software and firmware loads. As the network grows, there's no additional effort required to keep customers connected, which helps service providers keep operating costs in check. The service provider can change, add or delete APs without involving customers.

Service providers who implement and grow their carrier Wi-Fi market applications and services can offer subscribers complete freedom of movement — without relying on the cellular network. This is already becoming a reality in concentrated urban areas, where operators can offer seamless connectivity to subscribers whose wireless devices are transparently handed off from one Wi-Fi AP to another.

CUSTOMER MANAGEMENT

To be able to offer compelling, cost-effective customer care, operators must be able to intelligently manage subscribers' devices and carrier Wi-Fi APs. And to manage them, operators must be able to see the devices and APs and know what they are doing. Motive solutions help operators:

- Make sure they are getting the best coverage from Wi-Fi APs
- Monitor traffic loads on each AP
- Identify coverage gaps and bottlenecks before they become service-affecting
- Understand how many people are connecting to each AP and what they are doing

The Motive portfolio of Customer Experience Solutions enable operators to ensure their customers enjoy a seamless experience across all their devices. When problems do occur, operators have the information they need to resolve issues quickly and correctly.

Customer experience management (CEM) requires clear understanding of the situations and processes that a user is expected to go through. These include the signup and activation processes, reconnecting in various locations, trying to use the service in congested areas, changing devices, and contacting support to resolve issues. In an ideal customer management scenario, the operator performs the appropriate actions at the appropriate time without the customer having to adapt their individual behavior. An underlying philosophy is that customers should not be asked to provide any information that the operator already knows, such as the service profile and status, location, device type, signal parameters, and volumes of nearby users.

Key elements to delivering a compelling carrier Wi-Fi customer experience include intelligent workflow, analytics, device management, and service management. Using these elements of CEM in a comprehensive service offering, Wi-Fi operators can manage the experiences of their customers from initial sign up and activation through usage to resolving issues.

The Motive portfolio of CX solutions help to simplify operations and the experience they deliver. For example, without a Motive CX implementation, if an operator changed the name of the network, it would have to send out instructions to every single subscriber asking them to make the change on their devices. It's highly likely that many customers wouldn't get it right or wouldn't pay attention. They would not realize that their failure to implement the change or to do it correctly was behind their loss of service. This simple change in the network could generate a storm of calls to the customer service center, each of which would take time and cost money to resolve. Adding to the cost, a technician would be required to implement the change on each of the outdoor APs. Using Motive CX solutions, this change can be implemented simply by pushing the updated information to the managed devices — saving operators time, money and a huge amount of subscriber good will. Motive CX solutions allow operators to implement policy-based updates (for example, according to a given schedule or for specific model numbers) for things like bulk firmware upgrades or software updates.

Operators can use Motive's CX solutions to quickly track down the root of a problem when subscribers complain about coverage issues. Instead of sending technicians into the field, the operator can use the management tools to look for possible channel interference, check the settings on each AP in the area and optimize them for better service by, for example, changing the Wi-Fi channel or radio frequency.

An operator will have more extensive data analytics available if it has implemented Application Assurance (AA) capabilities on the Alcatel-Lucent 7750 SR WLAN Gateway. Operators with AA can collect data at various levels from the Wi-Fi devices to determine (for example) which type(s) of end-user devices are generating problems, details on the performance of each AP, and what kind of traffic is generating problems. Collecting and analyzing traffic flows and usage data will help operators to proactively manage the carrier Wi-Fi network to ensure a consistent quality of experience for subscribers. By keeping traffic flowing, operators will minimize calls to service centers and resources spent troubleshooting.

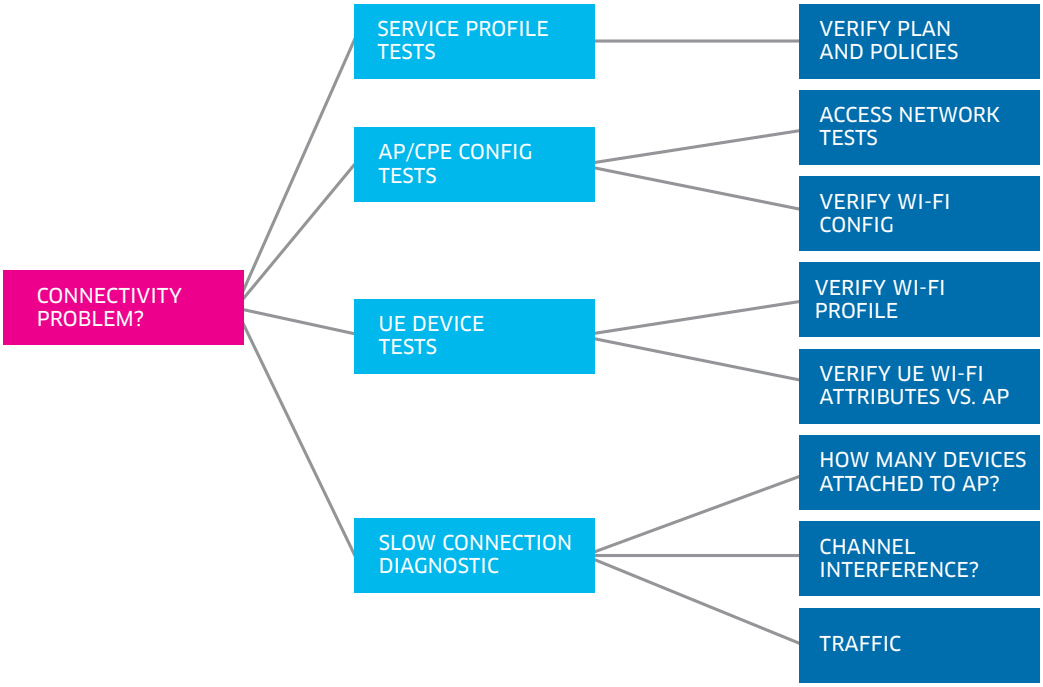
CUSTOMER CARE

Customer care is about having the information needed to identify customers' problems, and the ability to do something to resolve those problems. A high-quality customer experience is a powerful asset that inspires loyalty, generates up-sell opportunities and attracts new customers. But in today's connected home, advanced broadband services combine with a multitude of Internet-ready devices to create a challenging environment for both operators and consumers to manage. Without Motive CX solutions, operators may have little or no visibility into what devices are connected in the home network, what services consumers are using, and how these services and the home network are performing. This can result in increased support costs for operators and quality of experience issues for consumers.

Motive CX solutions, in combination with the AA abilities of the 7750 SR WLAN Gateway, help the operator get to the root of a problem quickly. Motive solutions also provide an end-to-end view of the carrier Wi-Fi network that enables the operator to establish easy-to-follow workflows for Customer Service Representatives (CSRs). When a subscriber calls with a problem, the CSR can quickly determine whether the problem originates with the subscriber's device or the system. Does the subscriber's profile have

all the necessary information and is it correct? Are the connectivity parameters for the AP correctly set? With AA, the operator can even tell how many applications are running on the end-user device and advise the subscriber to turn some of them off to improve performance.

Figure 3. Motive CX solutions help CSRs diagnose problems quickly

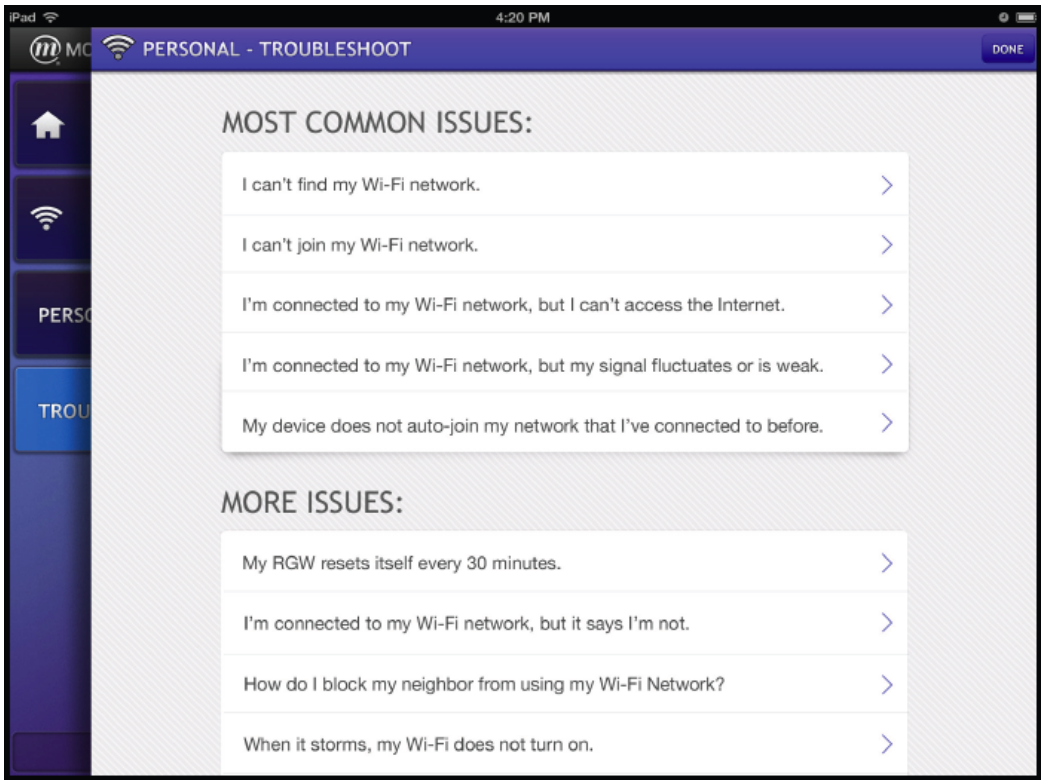


To ensure ongoing profitability, operators must be able to keep operating costs down and that means customer call centers must be as efficient as possible. Motive CX solutions help operators keep the average handle time low and increase first call resolutions. Furthermore, by giving CSRs the tools they need to resolve problems quickly, operators can ensure a minimum number of calls require escalations.

Customer tolerance for poor service is very low. Motive CX solutions allow operators to proactively monitor the network and take action to relieve congestion and other service issues before they impact customers. Motive CX solutions also combine Alcatel-Lucent and partner products to provide the functions needed to execute on a holistic CEM vision. Spanning applications, platforms, management functions and services, Motive CX solutions' flexible architecture can be deployed quickly and efficiently in multivendor network environments. Motive CX solutions also offer an open framework that supports easy integration with B/OSSs and network management systems.

Another key aspect of customer care is providing subscribers with tools that allow them to look after their needs themselves. Subscribers want multi-channel access — such as via a mobile phone on LTE or a PC on a home network — to self-care applications. These applications should allow them to activate a new mobile device and undertake basic problem solving for their carrier Wi-Fi service.

Figure 4. An example of a self-care portal



For example, a self-care portal could help a subscriber determine why connectivity to the carrier Wi-Fi is poor. It could provide a map of all the carrier Wi-Fi APs in the area with a capacity usage measure so the subscriber could choose to move closer to another AP.

CONCLUSION

Carrier Wi-Fi has come of age, thanks to end-user device support as well as improvements and standardization in the technology. As a result, carrier Wi-Fi is now an important strategic initiative that operators of all types want to and are beginning to leverage. For many operators, carrier Wi-Fi will become an important component within their overall mobile broadband strategy to keep their subscribers loyal to their network.

The flexibility of carrier Wi-Fi means that it can be deployed in many different market applications, resulting in reduced churn, enhanced customer loyalty and brand value. It also opens possibilities for new revenue streams. All of these applications, however, will only be successful if they can be implemented in a way that meets customers' expectations in terms of quality of service and experience. The Motive portfolio of CX solutions provides the tools and processes operators need to deliver a superior quality of experience to their carrier Wi-Fi customers at all three touch points in the customer experience: service and device activation, customer management and customer support.

ACRONYMS

AA	Application Awareness
AAA	Motive Authentication, Authorization and Accounting (AAA) Server
ANDSF	Access Network Discovery and Selection Function
AP	Access point
B/OSS	Business / Operating Support System
CPE	Customer premises equipment
CSR	Customer service representative
CEM	Customer Experience Management
CX	Customer experience
DSC	Alcatel-Lucent 5780 Dynamic Services Controller (DSC)
EAP	Extensible Authentication Protocol
HDM	Motive Home Device Manager (HDM)
PEAP	Protected Extensible Authentication Protocol
QoE	Quality of Experience
SMP	Motive Service Management Platform (SMP)
SR	Alcatel-Lucent 7750 Service Router
SSID	Service set identifier
TTLS	Tunneled Transport Layer Security
UE	User equipment

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