Software Defined Mobility™

Provides Wireless Network Operators
Greater Control, Visibility & Profit

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Abstract

In today's cloud-enabled, everything-as-a-service (XaaS) world, the "where" of people working is undergoing a profound shift. Users today expect easy, secure, affordable mobile access to all the data and applications they need to work and play, regardless of their physical location, device type, or what kind of network is available.

Mobile users connect with services from a range of providers, both public (e.g., telecommunications carriers) and private (e.g., enterprise IT via VPN). Service providers want to make it easy for the users—their customers—to locate and connect with their services, while retaining visibility of the users' connectivity and needs for accurate billing, efficient provisioning, and personalized service offerings.

Overview

Acting between mobile users and service providers are the wireless operators, who could include anyone managing a Wi-Fi network, such as in a university, local coffee shop, hotel chain, airport, shopping mall, private enterprise, or other private venues. Wireless operators must be prepared to:

- Authenticate and authorize a disparate set of users requesting access
- Meet security, QoS, policy control, and other needs of groups of users
- Handle massive growth in mobile traffic, connections, speeds, and video, as well as increasing data offloading from cellular networks
- Support multiple network service providers, both public and private, sharing the operator's WLAN
- Easily add new network service providers onto the wireless network
- Support any type of wireless device that comes through the door
- Manage the costs and complexity of running a wireless network, even as wireless traffic swells
- Make end-user analytics data available to the core providers

To date, wireless operators have been forced to build their wireless networks by choosing from a plethora of end-to-end proprietary solutions provided by incumbent vendors. While solutions exist, the operators become locked into a proprietary platform, often end up paying for capabilities they don't need, and must wait for vendor-provided upgrades to enhance or add new features. This approach defined a generation of business models that burdened wireless operators with capital equipment costs, while failing to provide the agility required to meet the rapidly changing demands of mobile users and applications.

Tallac Networks technology offers a new Software Defined Mobility™ approach that enables wireless operators to connect mobile users to the network services they demand. Through a set of technologies combining OpenFlow-powered software-defined networking (SDN), embedded application containers for dynamic execution environments; and standards-based Hotspot 2.0 (Passpoint), Tallac delivers an SDN-enabled, multi-tenant, service-oriented Wi-Fi network as the next-generation hotspot for any wireless LAN operator.
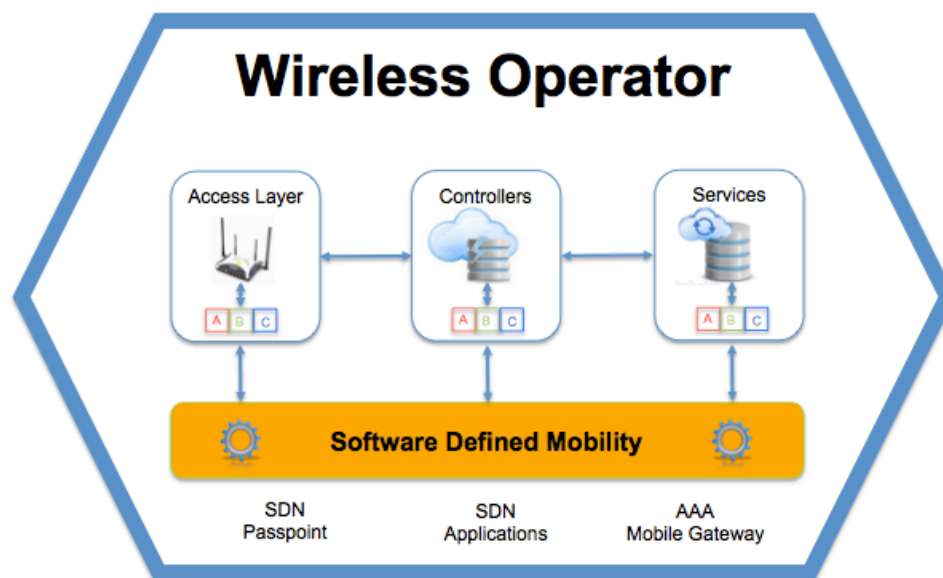

Figure 1 - Software Defined Mobility

Tallac allows wireless operators to deliver business-class *Wi-Fi-as-a-Service* to mobile users, while transitioning network IT from a CapEx to an OpEx business model. In this way, Tallac's Software Defined Mobility approach gives wireless operators greater visibility and control over their Wi-Fi networks, while creating new service and monetization opportunities to increase profits.

SDN, Hotspot 2.0, and Application Containers

Current SDN efforts have focused primarily on the data center and carrier WAN, but Tallac is expanding that focus with an emphasis on the wireless access network. Tallac's innovation brings together a handful of emerging technologies and protocols—namely, SDN/OpenFlow, Hotspot 2.0/Passpoint, and application containers—to directly address the challenges facing wireless operators today.

SDN

One powerful aspect of OpenFlow and SDN is the ability to virtualize a network so it can be easily shared by a diverse set of network services—i.e. creating a multi-tenant environment. The fine-grain control of the OpenFlow protocol allows network connections and secure tunnels to be provisioned dynamically.

In addition, by separating the control plane from the data plane, SDN lets network operators add new features and support new protocols through a 'distributed' control plane rather than waiting for new features to appear in firmware upgrades in the network device itself.

Hotspot 2.0

A new set of standards known as Hotspot 2.0, building upon IEEE 802.11u, the Wi-Fi Alliance's Passpoint program and extended by the Wireless Broadband Alliance Next Generation HotSpot initiative, allows automatic sign-on and authentication of mobile users, simplifying the handoff of data traffic between cellular and Wi-Fi networks.
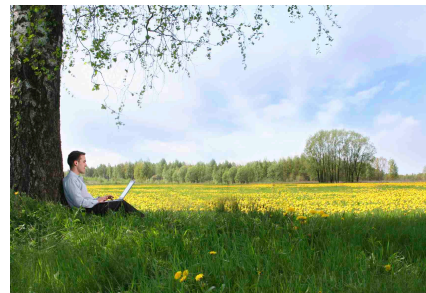
Combined with *Wi-Fi-as-a-Service* business frameworks, these new standards help wireless operators embrace the never-before-seen diversity of mobile users, and they help mobile users connect effortlessly to never-before-seen wireless networks. The current set of standards, however, assumes wireless operators will forge and maintain complex agreements with multiple service providers in order to allow the providers' customers to access their services over Wi-Fi. The unique combination of Tallac technology with Hotspot 2.0 will simplify this process and allow on-demand service provisioning.

Application Containers

An embedded application container is a general-purpose execution environment operating within an access point or WLAN controller. Application containers extend the real-time capabilities of a network control system, providing the ability to run applications inside the network via well-defined APIs.

Using application containers, wireless operators can deploy their own custom components and run their own value-added features, without upgrading their WLAN equipment or waiting for proprietary vendors to incorporate new capabilities. Wireless operators can extend and enhance offerings at their own pace and for their own gain.

Software Defined Mobility: Putting it All Together

Wireless operators have more demands and are assuming more responsibility for network access, both by consumers wanting to browse the Internet and by professionals requiring access to their enterprise networks. Delivering content and data to mobile users is rapidly changing from casual and bulk data transfer to interactive, rich multimedia sessions.

Figure 2 - Multi-Tenant Access & Authorization
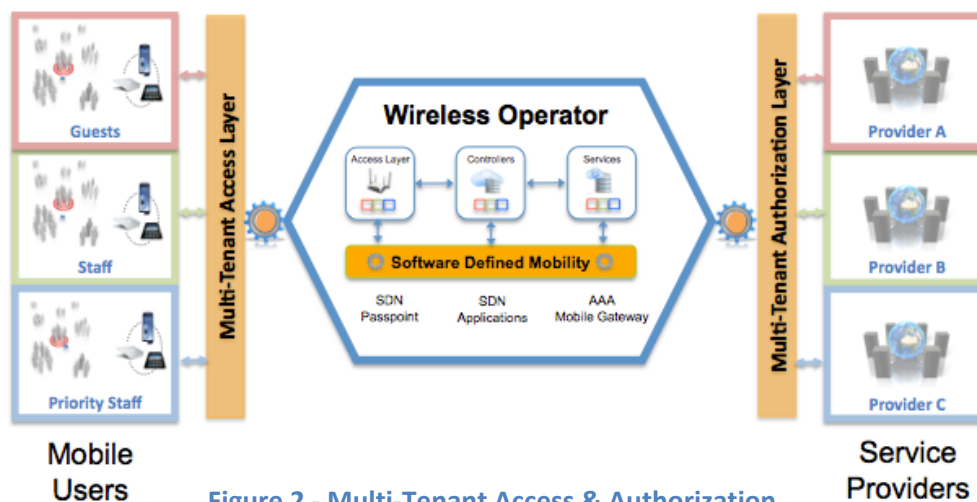
Serving this wide range of needs by throwing hardware at the problem (i.e. buying, deploying, managing, and upgrading WLAN equipment—the classic CapEx business model) is too expensive and inflexible for wireless operators.

Under a CapEx model, it's difficult for wireless operators to monetize their networks in a way that keeps pace with their capital expenditures. Instead, they must focus on managing capital depreciation and constant upgrades.

Besides tying wireless operators to proprietary, closed solutions, the CapEx approach also threatens wireless network performance. As the wireless edge becomes more predominant, adding more Wi-Fi equipment to accommodate multiple tenants eventually causes interference. To support multiple tenants without interference, the wireless network must be virtualized and well managed.

In contrast to the CapEx approach, Tallac combines the centralized control and flexibility of SDN/OpenFlow—currently not specifically defined for wireless networks—with the inherent multi-tenancy of WLANs enabled by Hotspot 2.0/Passpoint, while also supporting additional operator customization through embedded application containers. These building blocks—which Tallac has melded together for the first time—give wireless operators the agility to address needs such as dynamic roaming agreements, multi-tenancy, cloud networking, analytics, and security.

Tallac technology empowers wireless operators to use Wi-Fi in a unique new way, dynamically and transparently making a hotspot look like a connection to a network service with which the user already has a relationship. Tallac helps wireless operators switch from outdated proprietary, CapEx-based business models to an OpEx model by freeing them to embrace *Wi-Fi-as-a-Service*.

Figure 3 - New OpEx Model

Instead of wireless operators having to shoulder the full burden of managing multiple relationships with various service providers, Tallac's Software Defined Mobility technology will include a brokerage service, establishing dynamic service provider agreements on behalf of wireless operators, automatically and in real time.
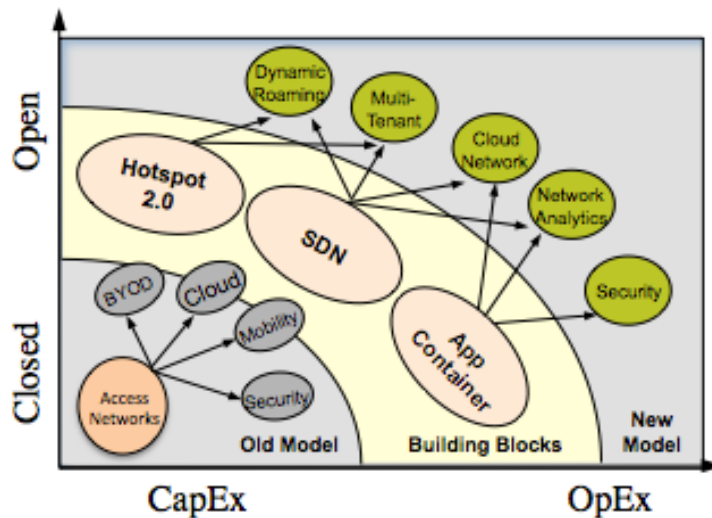
Greater Control, Visibility, and Profit for Wireless Operators

Tallac's Software Defined Mobility provides wireless operators with greater control, visibility, and profit.

Control is achieved through the SDN approach and OpenFlow protocol, which allow virtualization of the network and fine-grain traffic control. Combining this open-system virtualization with Hotspot 2.0/Passpoint, wireless operators can create multi-tenant networks instantly. They can support and control traffic from multiple tenants—both public and private service providers—to meet each tenant's QoS, security, and policy requirements.

Visibility is achieved for service providers and for wireless operators. Software Defined Mobility allows service providers to maintain visibility of their mobile customers as they move from 3G/4G networks to Wi-Fi. As a result, service providers retain access to valuable user analytics even after the users roam to wireless networks.

At the same time, the virtual multi-tenancy enabled by SDN/OpenFlow lets wireless operators see, monitor, and account for each service provider's footprint on the wireless network—providing per-tenant visibility and control. Application containers enhance wireless operators' visibility, as well. By enabling wireless operators to run applications embedded in the wireless devices themselves, application containers lead to efficient detection of and access to the forwarding data. From the other direction, the applications have better visibility and lower latency because they run directly on the mobile platform itself.

Profit for wireless operators through Software Defined Mobility comes from saving money during the move from a CapEx to an OpEx model as well as increasing revenues through additional innovation.

On the savings side, Hotspot 2.0/Passpoint protocols help wireless operators offer *Wi-Fi-as-a-Service* in an open and efficient way, thus lowering the costs of running the network. Breaking the stranglehold of proprietary, all-or-nothing dependence, Software Defined Mobility enables open OpEx operating models that encourage more competition from equipment vendors, which over time leads to lower costs for wireless operators.

Decoupling proprietary protocols between the access point and the controller via SDN/OpenFlow encourages the creation of new business models—among mobile users, service providers, and wireless operators—to bring mobile devices to the wireless network. And all of these shifts toward flexibility and openness offer wireless operators more ways to deliver value to their customers, through enhanced features and entirely new services.

Tallac Networks - Core Expertise
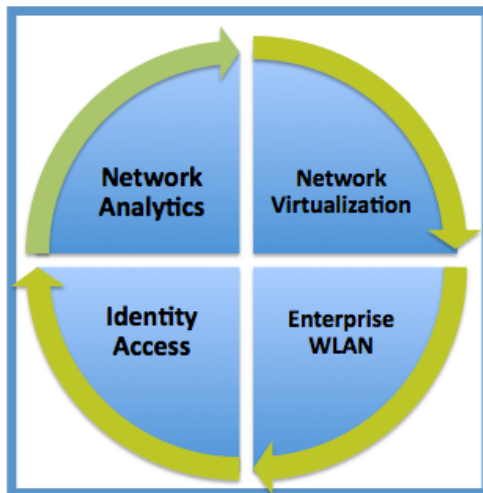
Working at the access layer, Tallac connects multiple providers to different groups of users, creating an open mobile network that benefits mobile users, service providers, and particularly wireless operators.

Tallac was founded by technologists with core expertise in all the areas foundational to Software Defined Mobility, including network analytics, network virtualization, identity access, and enterprise WLAN.

Tallac's founding team has spent a combined 150 years immersed in the networking industry, exploring how proprietary solutions have been put together and appreciating the value of open alternatives. By taking a different perspective from the industry's entrenched leaders, and by creating and delivering successful alternative solutions at scale, the Tallac team members have gained valuable insights into leveraging open-model approaches to meet real customer needs.

Join the Software Defined Mobility Revolution

Through its Software Defined Mobility approach, Tallac empowers wireless operators: allowing them to provide users with the transparent wireless experience they want, while gaining more visibility and control over their networks so they can monetize them more effectively.

Are you a wireless operator interested in seeing for yourself how Tallac Software Defined Mobility could help you create—and profit from—a more flexible infrastructure? If so, contact Tallac at betaprogram@tallac.com about joining Tallac's beta pilot program.

For more information on Tallac and its Software Defined Mobility approach, visit www.tallac.com.