A Unified Wireless Strategy for Cable Operators

Cable operators (MSOs) are leveraging the use of unlicensed Wi-Fi® spectrum to enable reliable and persistent wireless access for their customers. This involves integrating Wi-Fi capabilities into the cable infrastructure to create Wi-Fi hotspots that can connect to wireless 3G/LTE carrier networks. These Wi-Fi hotspots are in urban centers, densely populated areas and home environments. Offering Wi-Fi hotspots reduces churn, creates loyalty and allows operators to get in on the rapidly growing mobility market. This strategy allows cable operators to offer expanded wireless data services for their customer base to leverage their robust existing infrastructure footprint. The Wi-Fi network relieves congested mobile networks by offloading and backhauling mobile data traffic to the operator’s reliable Wi-Fi and fixed-line network infrastructure. An offload strategy also can support new business models that include revenue sharing partnerships between 3G/LTE and Wi-Fi service providers. Cost-effectively managing the growth and flow of traffic to/from the wireless and cable networks is crucial to customer satisfaction and attracting/retaining high-value Quad Play subscribers.

Consumer Usage Trends

Availability of smart phones, tablets, eReaders, gaming devices, etc., is driving data usage in mobile networks at a very rapid rate. End users are agnostic about the access technology as long as the network provides the best end user experience. Key areas of end user experience include data rate, QoS, simplicity to register for services, ease of connection to the network, security, and prepaid and usage based billing. A large number of popular data applications have been optimized around Wi-Fi capability in the broadband data devices and as a result, end users are more comfortable with Wi-Fi access.

Due to high consumption of data by smart phones, North American 3G and LTE operators are moving away from unlimited data packages and introducing usage based billing. The end user does not have a lot of control with such plans except for curbing the heavy data usage until the beginning of the next billing cycle. Some users may prefer a prepaid plan where they have the full control of what they pay for and top-it up any time when the balance runs out compared to the overage based plan. In emerging markets prepaid is becoming a key part of the data service offering for residential customers and operators are closely following the prepaid voice services for selling prepaid data plans.

Telecom authorities and governments in many countries are introducing legislature for operators to display bill shock prevention notifications to customers in advance such that the customer can make an informed decision before consuming broadband data in their own network or when roaming. This accentuates the need for On demand bandwidth/QoS, Fair User Policy Management (FUP), and bill shock prevention features as part of the broadband data offering.

Service bundling across multiple data access technologies is a key requirement for operators to increase data ARPU and customer retention. Many operator networks have multiple OSS/BSS systems. In these cases, a unification and upgrade of the OSS/BSS is a must for deploying a unified core network.
Mobile Data On-load: A Key Contributor to the Cable Quad-Play

Mobile data on-load leverages Wi-Fi to enable alternative wireless access for cable customers. Creating Wi-Fi hotspots in urban centers and home environments connected to the cable infrastructure allows cable operators to instantly extend the customers’ service beyond the home as part of the customer retention and revenue generating strategy. This strategy allows cable operators to offer a new set of wireless data services for their customer base, while leveraging the footprint of their existing cable networks.

For example, Cablevision Optimum Wi-Fi is being offered in some coveted heavily trafficked areas, including downtown sites, parks and various outdoor locations. The Cablevision Optimum Wi-Fi service is available in 96 percent of the Long Island Railroad and Metro North railroad platforms and parking lots throughout its service footprint. These are areas where Cablevision customers greatly desire access to mobile communications. Optimum Wi-Fi has been touted as a data offloading solution, a customer acquisition tool, and even a cheaper way to roll out 4G.

The importance of Wi-Fi to mobile operators is growing. A unified mobile data strategy helps cable operators manage a secure and transparent subscriber experience across multiple access networks — for example, across cable, Wi-Fi, and 3G/4G.

Why Offload? To Address Congestion Pain Points

Smartphone applications have been adopted rapidly by consumers, driving a massive increase in web surfing, video content downloads, and enormous numbers of small data updates. AT&T™ Wireless, in the three years since the introduction of the iPhone, saw a mobile data increase of 5000%, according to the National Broadband Plan (at [http://www.broadband.gov/plan/5-spectrum/](http://www.broadband.gov/plan/5-spectrum/) ). By 2015, 67% of mobile data content will comprise video, and 17% will relate to web browsing. Unlimited data plans have also opened networks for extremely high use by a few laptop users and highly active smartphone owners.

The costs of offloading are a small fraction of cellular expansion costs.

According to ABI Research 2011, mobile data offloading is forecasted to triple in the next four years. About 16% of mobile data was diverted from mobile networks in 2010, and that is expected to increase to 48% by 2015. However, over this period, data traffic should grow by a factor of 30, meaning that offload data will actually expand 100-fold.
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A key strategy is to relieve overburdened core network elements by routing traffic directly to the Internet before it reaches core network elements, such as the SGSN (Serving General packet radio service Support Node), GGSN (Gateway General packet radio service Support Node), and service grooming servers in specific geographical areas. This offloading reduces traffic to these elements, thereby reducing cellular backhaul costs.

Offloading intelligently can also be critical. To achieve better routing results, service providers deploy intelligent policy controls that reside in the core network to offload subscribers attached to congested cell sites based on a real-time knowledge of cell-site conditions, subscribers and their respective entitlements, and device and applications usage.

Most importantly, balancing traffic requirements across networks reduces cost and improves economies of scale. The cost savings are significant. Wireless service providers deploying a multi-access offload strategy can expect savings in the range of 20 to 25 per cent per annum. Offloading solutions are cheaper than scaling up the mobile network. The solutions examined by ABI Research save approximately $45 and $490 in capital and operating savings respectively for every dollar spent toward offload.

3G to Wi-Fi Data Offload

The increasing prevalence of dual-mode 3G/Wi-Fi devices such as the iPhone, other smartphones, and laptops creates an opportunity to shift mobile data users from the fixed line network, thereby reducing congestion and opening up new revenue streams. 3G to Wi-Fi data offload can take place in several locations:

- In the home, existing Wi-Fi E-MTAs and home gateways attached to cable networks already play a role
- In urban centers with a high prevalence of public Wi-Fi hotspots — offload can relieve 3G network congestion and provide a better user experience. For example, Verizon Wireless is partnering with hotspot provider Boingo®, to provide competitive 3G/Wi-Fi packages, attractive bundled services, and common access to services across multiple networks.

The cable operator needs to ensure a secure and transparent subscriber experience without the need to sign in again when the subscriber moves to another network.

With 3G to Wi-Fi data offload, service providers also require a centralized view of 3G and Wi-Fi user entitlements, while leveraging existing network investments such as the data store or Home Location Register (HLR) to ensure the most efficient use of network resources and subscriber data.

Successful 3G to Wi-Fi offload deployments enable seamless interworking between a wireless service provider’s core 3G network and the cable operators’ Wi-Fi network. This includes standard-based support under the 3G Partnership Project Authorization, Authentication, and Accounting (3GPP AAA) standard for Wi-Fi and secure authentication and authorization of 3G subscribers onto the Wi-Fi network. This ensures a transparent access experience for the end user while reducing the authentication load on the HLR.
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The Mobile Data Offload Reference Architecture

Unified Wireless Solutions

- Seamless Data Off-Loading between 3G/4G Wireless network to Wi-Fi hotspots or small cells in a cable network. This gives cable operators the opportunity to shift mobile data users onto the fixed line network, thereby reducing congestion and opening up new revenue streams.

- Seamless Data On-Loading by cable operators. This offers a new set of wireless data services for their captive customer base, while leveraging the existing footprint of the cable network. To do this, an operator adds Wi-Fi support to cable infrastructure to create Wi-Fi hotspots in urban centers and home environments in order to offer services that compete with existing 3G and 4G services.

- Seamless Service Off-Loading between 3G/4G Wireless network to Wi-Fi hotspots or small cells in a cable network. This gives cable operators the opportunity to shift mobile voice, SMS, MMS and data users onto the fixed line network, thereby reducing congestion, providing a consistent service experience and opening up new revenue streams.

- Tiered billing and data rate shaping. This requires backoffice support for mapping multiple SSIDs for different use cases and integration with cable operator’s existing OSS/BSS systems

- End-to-end solution and systems integration by a single vendor
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What ARRIS Offers to Help – An End to End Solution

ARRIS offers the following to support a unified data and Voice strategy across multiple networks:

- **Ruckus™ Wireless –** Wi-Fi Access Points and AP controllers (capable of wide coverage with a mesh architecture)
- **Aptilo Networks –** Complete Call Set Up / Subscriber Management / Backoffice system solution that includes Captive Portal, Identity Management, AAA Radius, Wi-Fi Policy Management and Subscriber Gateway for local and centralized deployments
- **ARRIS Fixed Mobile Convergence –** securely offload of voice, Data, MMS and SMS/text messaging to the broadband network via Wi-Fi
- **ARRIS Professional Services provides the range of services such as design, planning, permitting, Systems Integration, Network Deployment and management**
- **Highly scalable ARRIS architectures for the backend system**
- **Expertise from the leading provider of cable solutions, cable telephony, E-MTAs, cable modems, and Whole Home Solution Gateways**
- **Single point of contact for support**

ARRIS Value Propositions

- **A cost-effective solution that can be tested and deployed rapidly for commercial services.** The ARRIS Solution has minimal impact on the existing OSS/BSS, yet at the same time makes full use of the functions that are relevant for the proposed Wi-Fi Service.
- **Seamless Wi-Fi broadband access with consistent services (QoS, Bandwidth, FUP, etc.).** The ARRIS solution has automatic MAC address authentication from both at home and public locations for seamless access and roaming in the Wi-Fi network.
- **Superior broadband user experience.** By offloading mobile customers (2.5G/3G/4G network) to a cable operator’s Wi-Fi network, Cable operators will provide not just best broadband user experience to its customer base but also give them choice to select the cheapest option.
- **Seamless upgrade for new services.** Service and Subscriber Management functions of Wi-Fi Solution can also be used for HSPA and residential fixed broadband services with PCRF (Policy and Charging Rules Function), which provides seamless integration with the operator OSS/BSS with minimal intrusion and least upgrades.