Voice Mail Offload – Boosting Mobile Network Subscriber Capacity

Voice mail plays an important role in the wireless world. Some industry experts predict that up to 40 percent of all mobile calls would never be completed without voice mail. Loosely translated, that means a significant amount of network capacity is utilized for the deposit and retrieval of voice messages.

Today, the prevalence of broadband wireless IP access, in conjunction with packet-switched networks and handheld units that support applications such as mobile e-mail and push-to-talk, has created a platform on which select voice mail functions may be performed. This affectively creates an opportunity to offload voice mail retrieval traffic from the wireless digital voice network in favor of the wireless packet network.

With the growing demand for mobile phone services, carriers are facing sever congestion problems in their narrowband cellular networks. Capacity problems have been a major issue for mobile network operators (MNOs). For MNOs, the most immediate reason to select voice mail offload is to liberate network capacity associated with carrying voice mail retrieval traffic on the digital voice network (GSM or CDMA). While MNOs are motivated by a short-term need to implement capacity improvements to existing mobile networks to accommodate the growing customer base, some form of cost-effective, easy-to-implement voice mail offload enables the MNO to recover capacity from the existing narrowband cellular network.

Offloading voice mail retrieval onto broadband wireless IP networks, such as GPRS, EDGE and CDMA 1XRTT, enhances the capacity of the voice-centric narrowband cellular network. This capacity boost ultimately increases the subscriber capacity of existing spectrum and network investments.

We can expect "Voice Mail Offload" to become to the wireless world what "PRI Offload" has become to the wireline world.

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Voice Mail Offload – Definition

The term "voice mail offload" refers to a combined voice/data network architecture that allows voice mail retrieval traffic to be re-directed off the digital voice network and onto the packet data network.

Offload techniques such as Visual Voice Mail and Voice over IP Voice Mail liberate capacity on the narrowband cellular network and associated spectrum, which in turn may be used to serve a larger subscriber base. Moreover, the offload architectures being proposed by the industry are the first crucial step toward more advanced architectures that will achieve true voice/data integration. Improving the return on investment for 2.5G, 2.75G, and 3G networks.

Wireless Market Trends - Powerful Advantages of Voice Mail Offload

Capacity constraints of the existing 2G network, coupled with the rising minutes of use for voice services and the concurrent decline in average revenue per user of voice services, have driven most mobile network operators to upgrade and refashion their networks to support higher-margin mobile data services, such as mobile e-mail and mobile Web. However, the somewhat slow uptake of data services and the popularity of disruptive technologies such as Wi-Fi have left 2.5G/2.75G/3G networks with a longer return on investment cycle.

At the same time, demand for mobile voice services continues to grow as a result of two factors: more intense use of voice services by existing subscribers and the growth in the number of new subscribers. In fact, it is currently a given that the number of mobile subscribers worldwide will grow to 2 billion by the turn of the decade.

While there is no disputing these market trends, mobile network operators would do well not to take this for granted. Rather they should make a concerted effort to facilitate this potential growth without allowing voice services to mask the importance of data services.

Implementing network solutions that limit capital expenditures associated with capacity upgrades to the legacy digit voice network, while ensuring a revenue stream for the broadband wireless IP network, is a pragmatic approach that should be adopted by the MNO.

Offloading voice mail retrieval, forward and reply functions onto broadband wireless access services such as GRPS, EDGE and CDMA2000 is an excellent method of facilitating subscriber growth while limiting capital expenditures targeted at expanding the capacity of narrowband cellular networks.

Voice over IP (VoIP) Voice Mail

With VoIP Voice Mail, an embedded VoIP client on the handset enables the subscriber to access his or her voice mailbox over the broadband wireless IP network.

A key benefit of this type of voice mail offload is that it represents a seamless user experience for the subscriber – the voice mail Telephone-User-Interface (TIU) remains unchanged. Affectively, subscribers may be made unaware that their retrieval of voice mail has been offloaded onto the broadband wireless network.

An additional benefit of this type of voice mail offload rests in the fact that handset and network components put in place to support Push-To-Talk over mobile IP can be reused to support VoIP Voice Mail.

Visual Voice Mail

With Visual Voice Mail, an embedded e-mail client on the handset is used to access the subscriber's mobile voice mailbox over the broadband wireless IP network.

Subscribers are able to browse and manipulate voice messages within their voice mailbox as they would any e-mail mailbox. They can view message details, such as caller ID, data and time, as well as manage their voice messages

in the same way they manage e-mail messages.

Issues & Challenges for Voice Mail Offload

The following are key issues and challenges that must be addressed when implementing a voice mail offload strategy.

Handset Dependencies

The availability and cost of mobile handsets that support mobile IP is a key challenge that confronts the MNO implementing some form of voice mail offload. Whether choosing to offer Visual Voice Mail and/or VoIP Voice Mail, handset dependencies are a fundamental challenge. As such, a voice mail offload strategy should be integrated with the larger mobile data strategy – building on the business case/ROI and momentum of other mobile IP services such as mobile e-mail and push-to-talk.

Coverage

A lack of ubiquitous broadband wireless coverage is another challenge that may confront the MNO implementing voice mail offload. Voice mail offload strategies that remove the subscriber's ability to access voice mail over the narrowband cellular network are not recommended.

In the case of VoIP Voice Mail, it is suggested that the subscriber not be given the choice of access but rather that he or she always be given some form of access at the discretion of the handset and mobile network. This allows the subscriber to seamlessly switch between the broadband wireless network and narrowband cellular network as network presence dictates.

Quality of Service (QoS)

Packet delay and jitter are challenges that the MNO may face when implementing a voice mail offload strategy that includes VoIP Voice Mail. However, unlike real-time two-way communication, packet delay and jitter are less of a concern, given VoIP Voice Mail functions in a single user mode in which a single voice stream is played (retrieval) or recorded (replay). Furthermore, the ability to re-invoke a function such as the playing of a voice message provides the capability for the subscriber to manually compensate for instances of muddled communications.

As a final point, user experiences of spotty cellular service have produced a mobile customer base that is likely to be tolerant of packet delay and jitter. However, in cases where there are few QoS mechanisms in place within the broadband wireless network, the use of mobile IP should be limited to voice mail retrieval, prohibiting the use of two-way communication features such as call return.

Paradigm Shift

Although subscribers are able to manage voice messages as they do e-mail messages with Visual Voice Mail, the use of an e-mail client for voice mail retrieval, reply and forward tasks does represent a paradigm shift for the subscriber.

The MNO can expect Visual Voice Mail to be met with a certain level of reluctance by a significant cross section of the existing customer base. Ideally, the subscriber should be given the choice of using Visual Voice Mail and/or VoIP Voice Mail. Where VoIP Voice Mail represents a seamless user experience from the perspective of the user interface.

Billing

Billing is a key challenge especially in environments where mobile rate plans dictate that tariffs be levied on minutes used in the retrieval of voice messages. In such cases, voice mail retrieval is an important source of revenue. Any change to the method of voice mail retrieval, such as Visual Voice Mail, must include some compensation for potential revenue losses. This could take the form of a flat rate or per minute charge for mobile IP.

Technology Overview

Voice mail offload is achieved by redirecting voice mail retrieval requests onto the wireless broadband IP network within the Radio Access Network (RAN) before ever reaching the Mobile Switching Center (MSC). This provides offload relief at the earliest possible point in the network.

Today, Voice Mail Systems (VMS), such as the SS8 ServiceController™ 3100, simultaneously support TDM and IP connectivity. TDM connectivity enables interconnectivity with the circuit-switched voice network, and IP connectivity enables interconnectivity with the packet-switched network.

Within the Application Layer of modern Voice Mail Systems there continues to be support for ITU and ANSI standards (ISUP) as well as a growing adherence to open Internet Engineering Task Force (IETF) standards. Support of the IETF Internet Message Access Protocol (IMAP) is typically used to facilitate Visual Voice Mail, and support of the IETF Session Initiation Protocol (SIP) is typically used to facilitate VoIP Voice Mail.

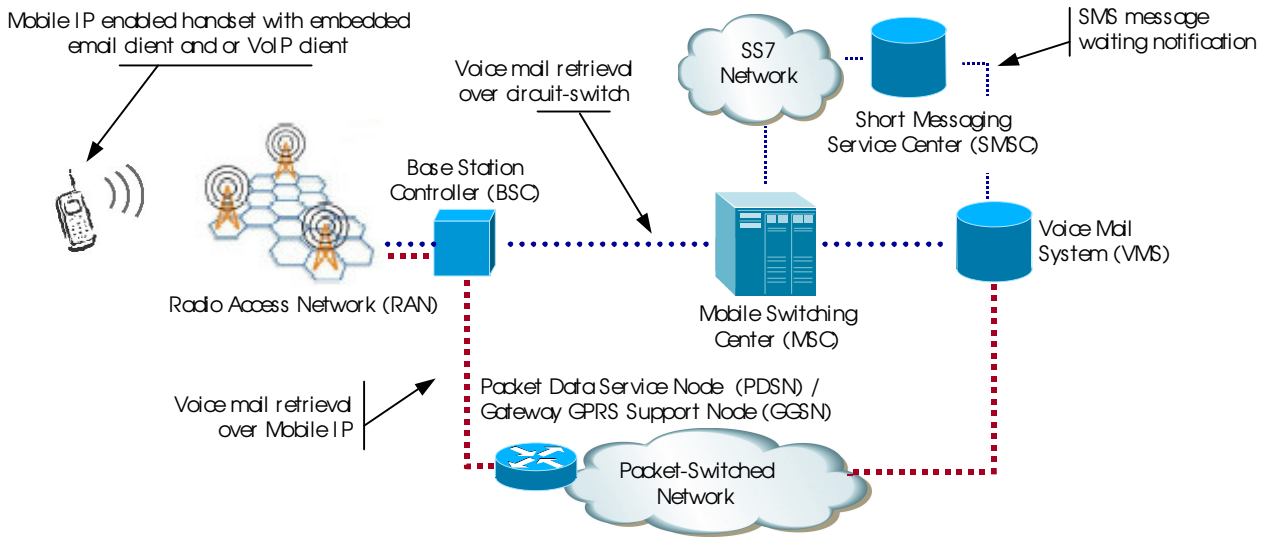
By employing the use of mobile IP enabled handsets, such as GSM/GRPS mobile phones, subscribers are able to establish IP sessions with the Voice Mail System over the broad wireless network. Using either an IMAP-compliant e-mail client or a SIP-compliant VoIP client, users perform voice mail functions such as play, reply and forward.

Short-term benefit: Boosting the mobile network's subscriber capacity

The mobile network operator must find efficient ways of increasing network capacity while at the same time ensuring future revenue streams for today's capital expenditures. In the core of the network, new technology has reduced packet switched prices to well below circuit switched prices. The transport of voice over a packet-switched core network has provided the MNO with the means by which to increase voice capacity while investing in an infrastructure that maybe utilized to simultaneously transport voice and data.

Voice mail offload from the existing narrowband cellular network onto the wireless broadband network adheres to the same business principals as that of a packet-switched core network. Freeing up voice capacity for use by new subscribers (growing customer base) and improving the ROI for wireless broadband access services.

Voice Mail Offload – Technology Overview



Long-term benefit: A major step toward next generation networks

While MNOs are motivated by a short-term need to implement some form of voice mail offload, they also are facing long-term competition from carriers who are building lower cost networks based on next-generation technology.

The MNOs' response to this market pressure is a balancing act between short-term cost avoidance and long-term strategy. An integrating strategy, which combines some form of voice mail offload with wireless IP telephony is recommended. This type of strategy will not only achieve cost avoidance through voice mail offload, but also, it will position the MNO to take advantage of low cost data transport and prepare for future multimedia services such as video.

Voice Mail Offload - Case Study

At a later date, a voice mail offload case study will be added to this white paper to quantify the benefits of offloading voice mail retrieval traffic onto the wireless broadband network.

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