

Color Ring-Back: Personalized Services for Increased Revenue

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Executive Summary

With increased saturation of the wireless market segment and the delay in 2.5 and 3G networks, telecom operators have sharpened their focus on building profitable new revenue streams by offering value-added services — both to attract new subscribers and to retain the loyalty of their existing customers. Along with these services comes a critical business challenge: how to deploy them on modular communications platforms that can lower operating costs and provide greater application flexibility to meet evolving marketplace requirements.

The voice services market segment is beginning to stabilize after a period of significant price erosion. To offset price declines, the pressure is intense for service providers to create and launch new services to increase the average revenue per user (ARPU). This makes the ability to quickly and cost-effectively develop and deliver these new services crucial for operators struggling to manage reduced capital expenditure budgets and increased profitability requirements. The quest to reduce capital expenditures is also leading operators to invest in platforms that can run several services simultaneously, reducing validation and deployment time and enabling earlier market introduction and quicker revenue streams.

One solution helping to meet these goals is Ring@Tone* from Tetco Technologies. This innovative service gives subscribers the ability to decide what a caller will hear during interconnection. Based on Intel® Architecture and the Linux* operating system, the Ring@Tone solution replaces standard ring-back tones with any tone the subscriber chooses using a simple, multi-criteria customization process. To deliver the Ring@Tone and other voice services solutions, Tetco works closely with system integrators such as Unisys, further reducing its time to market and reaping the

benefits of that company's global presence. For operators, this innovative new service offers solid revenue-enhancing opportunities in both the consumer and corporate market segments. Built on a distributed, telco-grade server architecture from Intel, the solution is also expandable, making it easy and economical to add new services to keep up with evolving user needs and marketplace requirements.

Business Challenge

Mobile telecom operators are finding it increasingly difficult to build revenue in the ever-more-saturated marketplace. Operators can only remain at the cutting edge by developing innovative advanced services that help to reduce churn, build customer loyalty, and increase ARPU.

Personalized ring-back tones are a significant advancement in wireless services for service providers. This service capitalizes on other successful personalization services such as downloading of polyphonic and monophonic ring tones, voice mail personalization, and virtual personal assistant. It also helps to deliver a chargeable, feature-rich user experience.

One crucially important difference between personalized ring-back tones and other services is that this network-based solution is independent of both handset and Subscriber Identity Module (SIM). As a result, operators can offer personalized ring-back services to all type of subscribers (postpaid or prepaid, fixed or mobile). This distinction enables wireless service providers to generate revenue from service management, using a wealth of subscriber data that already exists.

Personalized ring-back tones are already popular in several parts of the world. For example, in 2002, South Korean wireless service providers collected the equivalent of US\$91.4 million in revenue from the service, despite the fact that it was only launched in April of that year.¹ Penetration rates among cellular phone customers in that market segment reached 30% over the same 8-month period. This revenue increase came from:

- **New subscription fees**, as customers migrated to the provider with the most avant garde technology
- **Higher average connect time**, as the user experience was enriched

- **Incremental download fees** associated with service acquisition

To quickly deliver this potentially lucrative service with the high quality customers expect, operators must be able to deploy solutions that are flexible, scalable, and easy to implement in their networks infrastructure. These new services must also be compatible with both Operations Support Systems (OSS) and Business Support Systems (BSS).

Other key factors for an operator choosing a solution provider to help meet its technology, business performance, and competitive challenges include the service provider's portfolio, its capacity to adapt the service to specific customer needs, and an understanding of the operator's constraints. Operator margins also depend on the flexibility of the solution provider and its ability to react to the operator's needs.

The Tetco Ring@Tone Solution

A color ring-back tone service gives subscribers the flexibility to greet callers with their favorite tune, sound, or phrase instead of the usual ringing tone. Given this ability to choose the ring tone a caller will hear, subscribers have an instant way to express their own individuality.

One example of a color ring-back tone service is the Ring@Tone solution from Tetco Technologies, a leading developer of advanced converged communications solutions headquartered in Paris, France. The Ring@Tone solution enables subscribers to decide what their callers will hear during interconnection. Based on Intel® Architecture and the Linux operating system, the Ring@Tone solution replaces standard ring-back tones with any tone the subscriber chooses using a simple, multi-criteria customization process. For operators, this innovative new service offers solid revenue-enhancing opportunities in both the consumer and corporate market segments.

The Tetco Ring@Tone solution provides a rich set of personalized ring-back features on a multi-services, modular communications platform. The solution is designed as an integrated system of servers and applications, ensuring a highly available, robust, multi-service platform. Incorporating many carrier-grade components from Intel and the Linux operating

¹ "New Wireless Service Entertains Callers Before Phone Is Answered," *Wall Street Journal*, 6/17/03.

system ensures a scalable, modular architecture that can grow and evolve as operator needs and service requirements develop. (For example, using telecom protocol stacks from Intel can ensure a smooth migration path to 3G networks.) Designed for seamless introduction into the operator network, the platform can easily migrate from ISUP to INAP configurations.

Features include:

- **Multiple ring-back tones** depending on caller ID, together with “white” or “black” lists of callers, allowing subscribers to uniquely customize the tone a caller will hear and choose whether a caller hears a personalized or standard tone.
- **User-provisioned deactivation capabilities** that deliver control into the hands of the subscriber.
- **Provisioning interface** that, along with an interactive voice response (IVR) system capability and a Web application, can enable subscribers to easily configure their personal profiles.
- **Billing ticket generation** for calls and events, plus statistics generation that allows complete operational management for the service provider.

Deployment of a color ring-back tone service provides wide-ranging benefits to service providers, individual subscribers, and enterprises and their users.

Service provider benefits include

- **Increased ARPU** from a new subscriber service that can generate both recurring and download revenue
- **Ability to attract new subscribers** by offering a new service
- **Increased usage** due to the fun of calling subscribers with the new ring-back tones
- **Enhanced image** from being able to offer a lifestyle service before competitors do, providing the potential for no-cost media coverage
- **Reduced customer churn and increased loyalty** by being a proactive operator who regularly offers new services to satisfy customer needs
- **Reduced development and deployment costs** by using standards-based, modular platforms and systems
- **Reduced operating costs and lower capital investments** through the use of standards-based communications and

computing products

- **Flexibility** that comes with using a modular communications architecture that easily can evolve and scale as the needs of the service provider and users change

Subscriber benefits include:

- **Increased satisfaction** from being the first to use and enjoy the benefits of a new lifestyle service
- **Heightened loyalty to their service provider** due to the early availability of innovative personalized services

Enterprise user benefits include:

- **Enhanced company image** and visibility to callers and customers
- **Potential to improve the caller experience** through personalized communications
- **Opportunity to integrate voice communications into the company’s marketing** by offering segment-based information on promotions, special events, etc.

UNISYS GLOBAL SYSTEM INTEGRATION SERVICES

Large telecommunications operators traditionally work closely with a few key system integrators. To ensure the highest possible quality of service for its subscribers, telecom operators generally choose a system integrator based on its network knowledge, integration capacity, and maintenance organization. Unisys brings a strong knowledge of operators’ organizations and already has its systems running inside the operators’ networks. It also has a strong network of local technical resources, with the capacity to install and maintain platforms throughout the EMEA region. Working together, Tetco and Unisys can offer telecom operators value-added services with a reduced time-to-market (Tetco), plus the support of a large company (Unisys) with resources in every required country.

TECHNOLOGIES

The Tetco Ring@Tone solution is based on a multi-services platform with a distributed architecture. This gives the service provider maximum flexibility to scale and adapt the platform as marketplace needs evolve. It also delivers a highly redundant, fault-tolerant platform that can meet the rigorous system up-time demands of carrier-grade applications.

Tetco chose Linux as the underlying operating system because of the robust feature set offered in carrier-grade Linux, which makes it easy for the system to continue to evolve to meet the operator's changing needs. Linux provides a cost-effective solution and, importantly, supports all the security and management functionalities a telco-grade platform requires. Choosing an open, standards-based operating system allows Tetco to provide critically secure and robust solutions while delivering cost-effective platforms to service providers.

Based on the Tetco Multi-Services Platform,* the Ring@Tone solution contains three subsystems:

- Services Platform (SPF)
- Data and Provisioning Management Platform (DPMP)
- Administration Platform (ADPF)

SERVICE PLATFORM (SPF)

The SPF, based on an Intel® NetStructure™ SIU520 SS7 Signaling Gateway, includes a NEBS-compliant server running the Red Hat* Linux operating system and application servers hosting the service logic and voice resources. To maintain high availability, the Tetco system simultaneously uses a pair of SIU520 gateways sharing the same point code. In a default operation mode, signaling is shared on the two SIU520 gateways. In the rare event of fail-over, the remaining SS7 gateway automatically manages all signaling flows for all the applications. The SIU520 gateways also provide signaling information required for up to 32 telecom applications servers through IP. The application server can act only as a Signaling Control Point (SCP) to provide INAP-based service or as a Service Node (SN) to provide ISUP-based service.

The Tetco Ring@Tone solution uses high-density CompactPCI* boards from Intel to handle voice resource functions. These boards enable the creation of powerful, scalable solutions that conform to widely used open standards, while delivering resilient, carrier-grade performance. The resulting high-availability computing platform is well suited for demanding mission-critical applications.

Hardware

- **Intel® Net Structure™ SIU520 SS7 Signaling Gateway** — This carrier-grade, programmable 2U server provides

signaling for multiple clients over a LAN and is available in configurations up to 12 T-1/E-1 digital network interfaces, 6 V. 35 interfaces, and 12 SS7 links.

- **Intel® NetStructure™ ZT 5085 12U Redundant Host Packet Switched Platform** — This carrier-grade platform features a PICMG* 2.16-compatible mid-plane and supports redundant-host architecture for I/O-intensive applications.
- **Intel® NetStructure™ DMN160TEC Network Interface Board** — Provides high-density TDM network interface support for up to 16 spans or 480 ports. Programmability delivers a flexible solution that supports worldwide network interfaces and allows platforms to scale effectively as systems grow.
- **Intel® NetStructure™ DM/V2400A Combined Media Board** — This board provides up to 240 ports of rich voice processing features such as speech preprocessing (for speech applications), conferencing, tone signaling, global tone detection and generation, and call progress analysis.

DATA AND PROVISIONING MANAGEMENT PLATFORM (DPMP)

The DPMP manages subscriber profiles and user parameters. It is comprised of:

- **A database cluster** that contains the list of subscribers and their related profiles
- **A front end** that communicates with the operator information system, interactive voice response (IVR) system, and Web customer profile management

Databases are stored and managed on PCI servers from Intel, running the Red Hat Linux operating system. These servers are organized in clusters to provide load-sharing and fault-tolerance capabilities. Intel® Carrier Grade Servers are based on industry standards and are NEBS-3/ETSI certified. All Intel telecom server platforms feature robust server management, high availability, and an extended life cycle for superior customer investment protection.

The application server accesses the database cluster through an IP-based protocol that provides all the information related to the call and receives the name of the personalized ring-back tone. The front end provides interfaces for provisioning subscribers

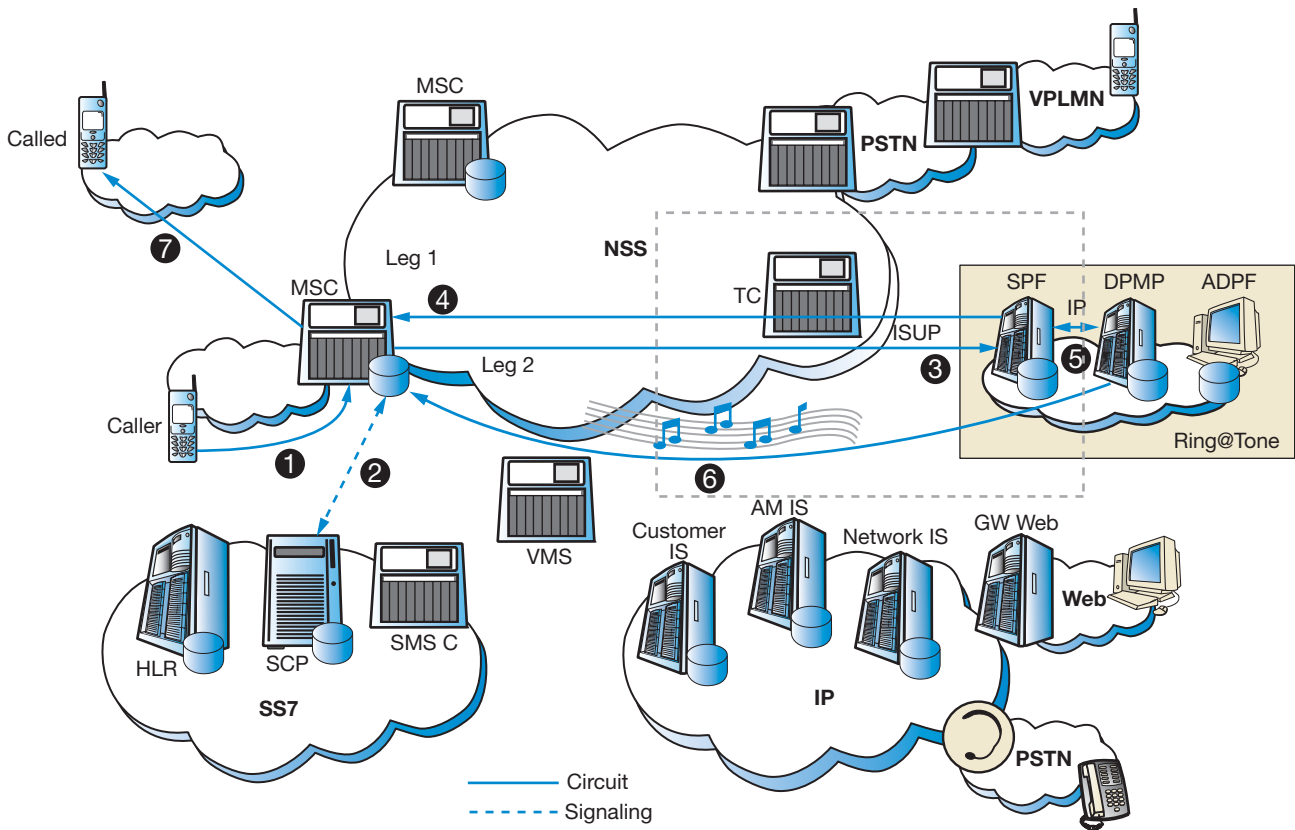


Figure 1. Service node architecture

from the operator's Information System (IS), interfaces for customer care access on subscriber request, and interfaces for external customer profile management system through an HTTP protocol. The DPMP also provides content provider interfaces and, optional features of Short Message Service (SMS), sending and real-time billing.

This subsystem depends directly on the implemented services on the platform. Specifically, it depends on the optional connectors the operator chooses to use (e.g., SMS for password sending, Home Location Register (HLR) interface for auto provisioning). Finally, the subsystem is directly dependent on the interfunctionality specifics of the operator's IS.

ADMINISTRATION PLATFORM (ADPF)

The ADPF manages supervision, statistics, logs, and complete system backup. It receives and displays the application server's alarms and allows viewing of the status of the solution's various components. Again, the use of carrier-grade servers from Intel and the Red Hat Linux operating system ensures a highly available platform.

The ADPF generates extensive statistics of service usage with counters, call detail records, and event detail records.

Information it can provide includes:

- Number of subscriptions or cancellations
- Average number of sound message modification per subscriber
- Total number of sound message modifications
- Number of incoming calls with a successful sound message
- Average length of the sound messages played
- Average call times

A robust Backup & Restore tool is supplied as part of the solution. It provides a save-and-restore utility for data (both systems and services) from all the platforms, using DAT storage media.

ARCHITECTURES

The Ring@Tone service is offered in three different architectures to ensure complete compatibility with differing service provider network architectures.

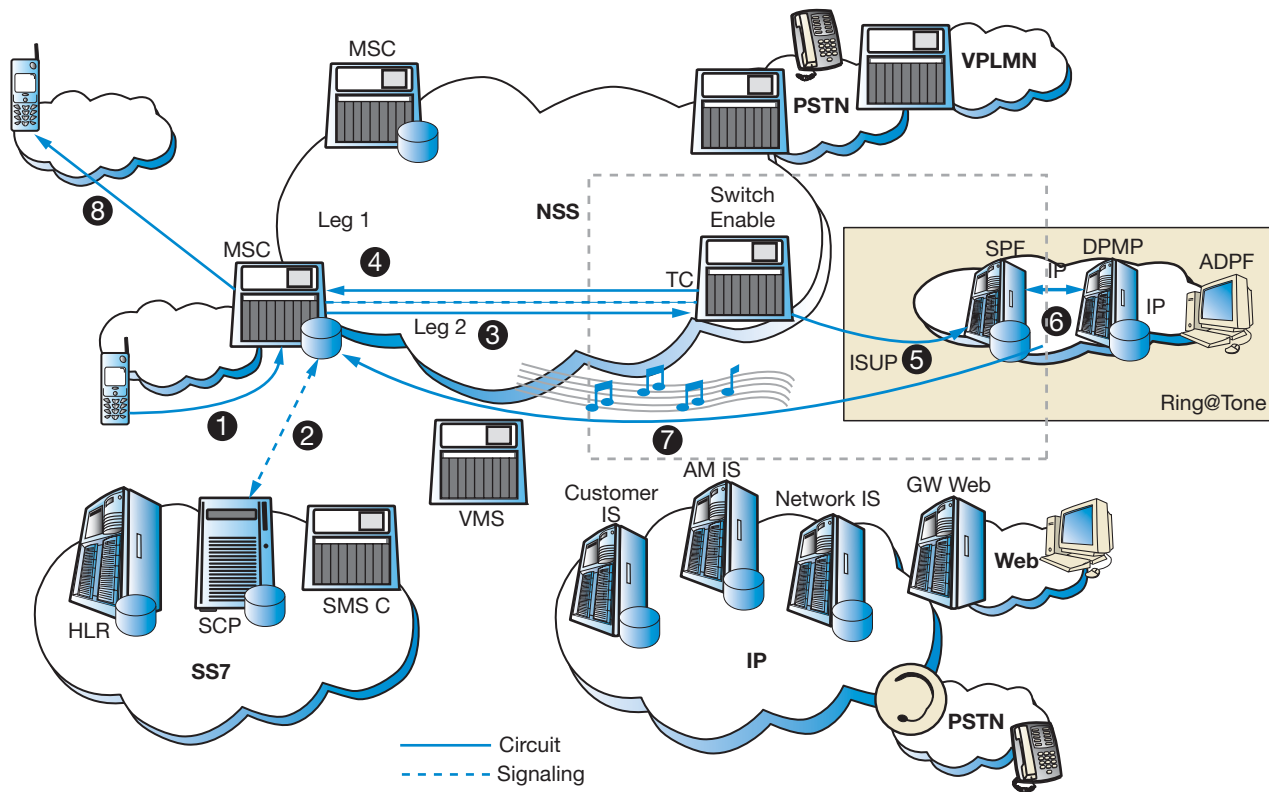


Figure 3. Switch-based architecture

time, the SPF generates an INAP message to the Mobile Switch Center (MSC) to generate a leg call to the destination number.

7. When the SPF receives the information that the subscriber's phone is ringing, a leg call is generated to the Intelligent Peripheral to play the ring-back tone and connect to the caller.
8. When the SPF receives the information that the called subscriber has answered, the caller and called subscriber legs are connected and the voice resource leg used to play the ring-back tone is liberated.

SWITCH-BASED

Ring@Tone also offers a fully integrated solution for Mobile Switching Centers (MSC), which support switch-enabled implementations. For such an implementation, the SCP functionality is integrated in the switch, significantly reducing costs for the operator and allowing complete integration into the network.

1. The caller generates a call, which is routed to a GMSC of the called subscriber network.

2. The GMSC check a specific mark in the Home Location Register (HLR).
3. The GMSC routes the call to MSC or Transit Center (TC).
4. The TC or MSC creates a leg from the GMSC to the SPF and simultaneously, a leg is created to the destination number.
5. The SPF extracts the calling number, the MSRN, and the called number.
6. The SPF extracts the calling number, the MSRN, and the called number and sends it to the DPMP to determine the ring-back tone to be played. The DPMP sends back the ring-back tone name.
7. The SPF plays the ring-back tone.
8. When the GMSC receives the information that the called subscriber has answered, the caller and called subscriber legs are connected and the voice resource leg used to play the ring-back tone is liberated.

INCREASING REVENUE WITH RING@TONE

To calculate your potential return on any investment, it is important to apply the knowledge gained from the experience of others in the same business. Using actual information, it is possible to frame the return on investment (ROI) of offering a Ring@Tone service for your specific situation.

Assume a model where subscribers pay a monthly subscription fee plus a download fee for each new ring-back tone they choose to add. We can build a conservative scenario with the following parameters:

- 40% of postpaid subscribers pay only a subscription fee.
- 40% of prepaid subscribers pay only for content downloads.
- 20% of enterprise subscribers pay half-price.

We then apply the following fees and usage patterns:

- A typical monthly subscription fee for supplementary services is approximately US\$3 per month.
- A conservative download fee is US\$1.
- Assume that each subscriber generates two downloads per month.

We factor in the following market information:

- The wireless service provider has 10 million subscribers.
- The new Ring@Tone service will have a 1% penetration rate after one month.
- The penetration rate will expand to 5% after five months.

Finally, we factor these cost components into the equation:

- Platform hardware costs
- Platform software costs
- Ring@Tone software costs

Based on this scenario, the operator will recover the costs of its initial investment, and of the platform itself, in less than six months.

Summary

The Ring@Tone service, developed by Tetco Technologies and based on modular communications technologies and components from Intel, offers mobile service providers the opportunity to attract new customers, reduce churn, and increase revenue.

Service providers are able to satisfy market demand for leading edge services and applications, regardless of a user's handset.

Because color ring is network based, full control over operations and billing remains with the service provider.

Since it is based on standards-based, carrier-grade components from Intel, including the signaling interface units and carrier grade servers, and on the Red Hat Linux operating system, the Ring@Tone solution provides the high availability, scalability, and lower operating costs service providers demand in today's competitive marketplace. In short, the Ring@Tone solution from Tetco is an investment for today that provides the foundation and flexibility for operators to continue adding new services to the same platform tomorrow.

For more information on Tetco Technologies, visit www.tetcotechnologies.com. To learn more about telecom products and solutions from Intel, visit <http://www.intel.com/design/network/products/telecom/index.htm>.

Definitions and Acronyms

- **ADPF** – Administration Platform
- **ARPU** – Average revenue per user
- **BSS** – Business Support System
- **DPMP** – Data and provisioning management platform
- **DTMF** – Dual-tone multi-frequency
- **GMSC** – Gateway Mobile Services Switching Center
- **HLR** – Home Location Registration
- **I/O** – Input/output
- **INAP** – Intelligent Network Application Part
- **ISUP** – Integrated Services Digital Network User Part
- **IVR** – Interactive voice response
- **LAN** – Local area network
- **MSC** – Mobile Switch Center
- **OSS** – Operations Support System
- **ROI** – Return on investment
- **SCP** – Signaling Control Point
- **SIM** – Subscriber Identity Module
- **SN** – Service Node
- **SPF** – Services platform
- **SS7** – Signaling System 7

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