Dialogic®

White Paper

Signaling
Short Message Service (SMS)

Succeeding with SMS Today

Competition Demands Proven Components

Executive Summary

The expansion of mobile network services as well as subscriber growth is as vibrant as ever. Today's challenge continues to be delivering signaling platforms with ever richer feature sets and improved performance at a lower cost. This paper focuses on an important mobile network service application, Short Message Service (SMS), and solutions from equipment vendors and building block suppliers that meet the challenges facing SMS service providers who constantly require new and improved signaling strategies because of increased competition.

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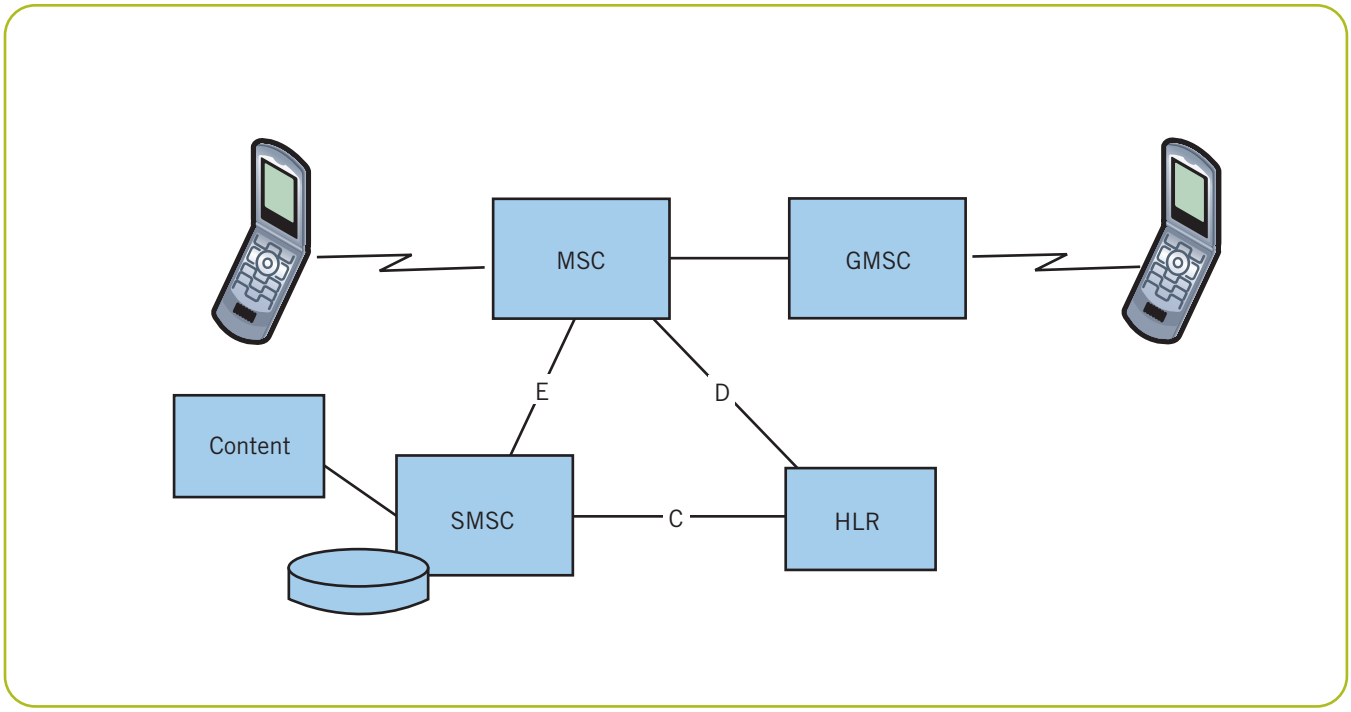

Figure 1. Traditional SMSC Architecture

SMS – Still Number One

Short Message Service (SMS) continues to be the most popular data application in the mobile network services market. Its popularity with subscribers requires ever-increasing capacity to handle demand, and rewards service providers with increased revenue, but only if they can satisfy the demand efficiently.

Market Trends and Operator Strategies

A harsh reality in the SMS market is that higher volume has not brought service providers proportionally increased revenue because of fierce competition. According to industry studies, the average price of a message is expected to fall by more than half within the next few years.

To counter the loss in revenue, mobile operators have employed the following strategies:

- Retain current subscribers by delivering a wider array of enticing services, which lowers retention costs
- Increase the number of premium services to generate more revenue from popular, high volume services
- Introduce exciting new services that improve revenue per user and attract new customers without substantially raising advertising promotional costs
- Use technical strategies to force costs down while scaling volume up

Architecture and SMS

The efficiency needed to lower costs while increasing volume requires an investment in more efficient network technologies. In the case of SMS, this need for efficiency has encouraged new architectural ideas from equipment vendors and enhanced solutions from traditional vendors.

Traditional SMS Architecture

Figure 1 illustrates the traditional SMS architecture in which every message was stored and forwarded to its destination using a Short Message Service Center (SMSC). The SMSC included a gateway to all the content stored on a network, and C, D, and E signify standard GSM interfaces.

Such traditional solutions typically average one million dollars per 500 message delivery attempts per second (MDA/s) or $2,000 for each MDA/s. (An MDA is equal to two MAP transactions.)

A typical network with eight million subscribers generally needs eight SMSCs. Current growth in volume per subscriber normally requires the addition of at least one new SMSC every year. Although the cost of SMS infrastructure is significant, the potential return from each deployment is normally high enough to pay for its construction and annual operating costs in less than two weeks.

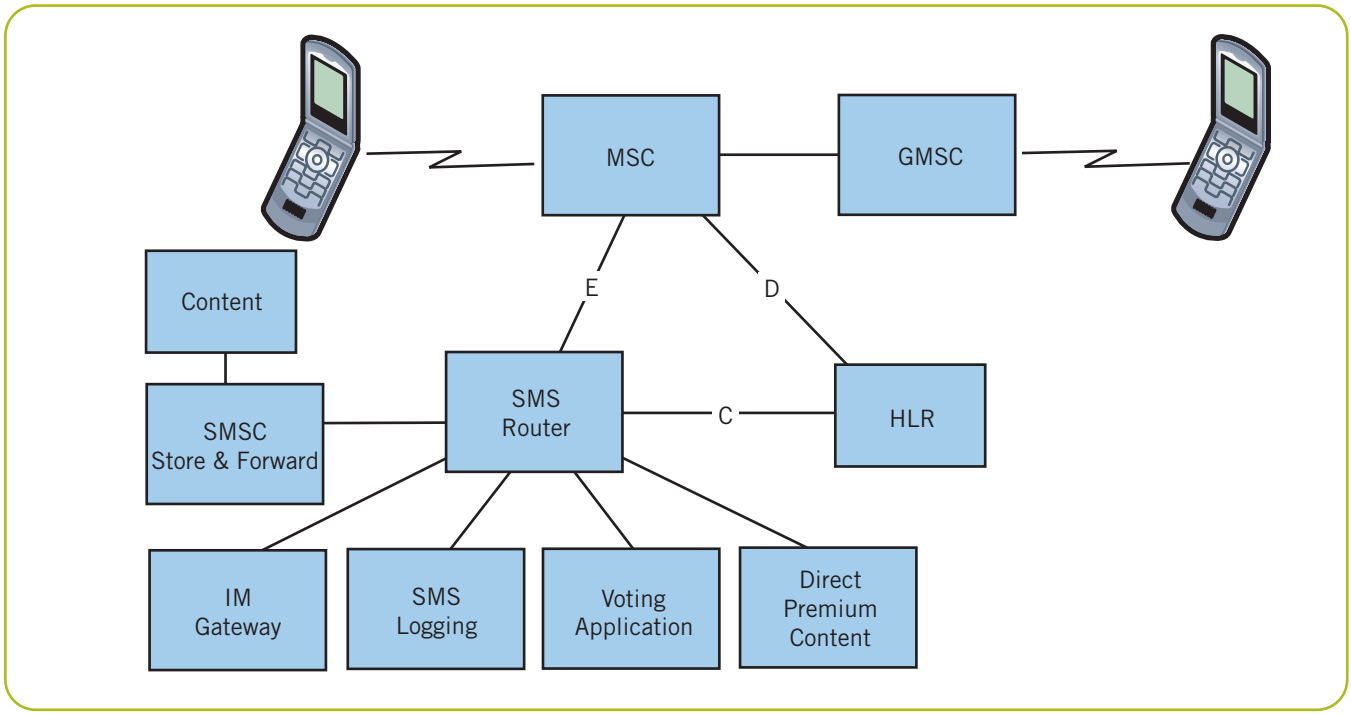

Figure 2. SMS Architecture with Router

The advent of extremely high-peak-volume applications, such as the mass voting required by popular television shows (1800+ messages per second!), significantly raises mobile operator costs. Together with an increasing pressure to offer SMS free-of-charge to attract and retain customers, skyrocketing operating expenses have prompted mobile operators to consider new architectures that promise to help them meet the demands of high-peak applications at a reduced cost.

New Architectures

As shown in Figure 2, new architectures introduced the concept of the SMS router, which eliminates the need to store messages and delivers each message immediately if the recipient is available. As more subscribers began to keep their phones switched on at all times, immediate delivery became progressively more feasible with the result that increasing amounts of "store and forward" could be avoided, reducing costs.

"Always on" subscribers also tend to be eager adopters of new high-peak, high-volume applications, allowing SMS routers to become the facilitators for new applications and features that do not require storage but need fast and responsive signaling such as football alerts, voting, intercept duplication, and SPAM filtering. Router performance is key. Adding a router significantly reduces the cost per MDA/s (below $1,000) and enables thousands more attempts per second to satisfy increasing volume requirements.

To fend off the competition from vendors touting the new architecture, suppliers of traditional SMS architecture equipment have modified their configurations to allow direct delivery and SMS filtering, which has resulted in lower platform costs. The competition between older and newer solution providers remains fierce with some casualties, but such competition has helped mobile operators keep costs down and ultimately benefits subscribers.

Using Components to Reduce Costs

Solution providers have rapidly revised their architectures to reduce equipment costs. Immediate delivery reduces storage requirements, and the signaling network has been re-designed to achieve the highest possible throughput. The downward pressure on operation expense squeezes the price of SS7 signaling components, which can be more than 20% of the equipment cost for solution vendors or 10% of the total price to the mobile operator. Currently signaling costs can be as high as $200 for each MDA/s.

Finding a Solution in a Constantly Changing Market

In the search for low cost and very high performance signaling, SMS solution providers have tried many different combinations of products and technologies to minimize costs while delivering a dependable, predictable, scalable solution. This has been difficult particularly when a promising solution requires migrating applications from one equipment platform to another.

When high volume, low cost MDA/s is the goal, a signaling architecture must provide very high performance and yet be portable so it can interoperate in a variety of network configurations, be flexible enough to be easily scaled when very-high-peak volume is anticipated, and use components that are not only competitively priced but also have a predictable cost per MDA/s and interface seamlessly with other SMSC components using various protocols, eliminating any need to change suppliers.

Architecture First

Delivering price-performance first requires an easily scalable and configurable architecture because a high-performance solution is not cost-effective if it delivers more or less capacity than is needed. While this is a straightforward concept, realization of right-size capacity in an SMS system requires precise management of messages and processing resources.

Applications may be distributed across several computers, and each may be interacting with different signaling protocol servers. A reliable work distribution mechanism is critical, and that mechanism must be flexible enough to change size and shape as required to meet the varying configurations. In addition, the architecture must be flexible enough to meet the changing and evolving technology mix both deployed and planned.

Along with coordinating the delivery of thousands of messages, the architecture can also distribute the protocol layers and their connections to the network without impacting applications, a valuable attribute.

Hardware Acceleration

Although architecture is critical, the nature of the application deployed has an extremely high value to the network operator. Enough processing power must be available for the application's demands, and the best way to assure enough power is to use the hardware acceleration available from either channel-ized links or high-speed links to process as many of the protocol layers as possible (such as from MTP3 up to MAP) on a signaling board. Again this seems straightforward, but it is important to make sure each application is written to take advantage of hardware acceleration.

Know Your Components

SMS solution developers need to understand the big picture – how architecture and application come together to deliver the required performance and efficiency (in terms of MDA/s) that both anticipates and exceeds the needs of today's mobile operators. But to actually build the ideal solution, developers need access to hardware and software components that deliver field-proven levels of performance in SMS environments. Only when the throughput potential is known will component pricing have real meaning in solution development.

Dialogic: A Decade of Experience

Dialogic products have been deployed for more than ten years by solution developers worldwide as part of SMS signaling systems. These years of field experience have resulted in a portfolio of industry-leading hardware and software signaling components on which a wide variety of solid SMS solutions can be created.

Dialogic has codified its know-how in products ideal for a distributed architecture implemented as a suite of signaling middleware that spans not only server operating systems but also embedded operating systems in signaling board firmware. Figure 3 shows how protocol stacks are controlled by a middleware layer that Dialogic calls its Signaling Distributed Architecture (SigDiA). Each instance interoperates with other instances in the network including the one running on the signaling board, and signaling connections may be hosted by any of the operating systems in use. This enables the signaling to take place independently of server/board distribution or the mix of operating systems and allows an application complete flexibility in utilizing signaling hardware acceleration engineered into components.

The reliability of the SigDiA distributed architecture has been proven in hundreds of Dialogic software, board, and integrated signaling server deployments connecting to mixed IP and TDM networks. Dialogic's demonstrated performance levels together with price points geared to the demands of today's mobile operators leads to MDA/s at a predictable cost with built-in flexibility. For example,

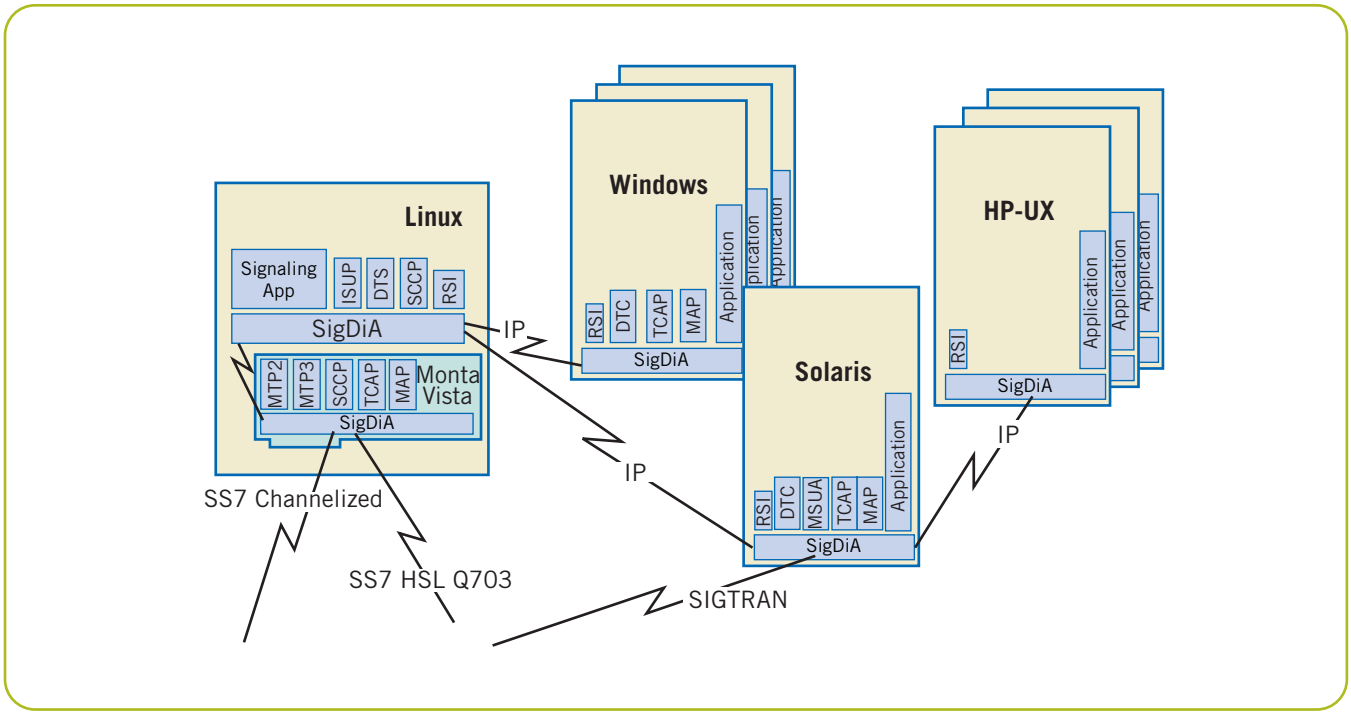

Figure 3. Dialogic's Signaling Middleware Architecture

a single Dialogic SS7HD board or integrated front end can support more than 2,000 MDA/s at a cost of only tens of dollars per MDA/s.

Success with SMS

The seemingly unbounded growth of the SMS market is constantly challenging technology and business models. Usage and volume continue to increase at the same time as intense competition creates pressure to lower costs in order to deliver an affordable service that will retain subscribers who are increasingly price sensitive.

To find the perfect blend of performance and price for signaling solutions, developers of SMS platforms must be able to predict accurately the capabilities of underlying building blocks. Success with SMS lies in balancing cost and performance by choosing the best architecture and then building with the right components. With its products incorporated into SMS signaling systems for a decade, Dialogic's experience allows it to deliver proven results at a predictable cost. Dialogic signaling components are also engineered to deliver scalability and configuration flexibility to meet ever-changing requirements in a fiercely competitive environment.

Acronyms

GMSC	Gateway Mobile [service] Switching Center
HLR	Home Location Register
IM	Instant Messaging
MDA/s	Message Delivery Attempts per second (two MAP transactions)
MSC	Mobile Service Switching Center
SMS	Short Message Service
SMSC	Short Message Service Center

For More Information

For more information about Dialogic signaling components, visit the Dialogic web site at http://www.dialogic.com.

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To learn more, visit our site on the World Wide Web at **http://www.dialogic.com/**.

Dialogic Corporation
9800 Cavendish Blvd., 5th floor
Montreal, Quebec
CANADA H4M 2V9

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