

A Ribbit Platform White Paper

Programmable Telephony: Accelerating the Future of Communications

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August 2009

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Executive Summary

In1876 even Alexander Graham Bell, the man credited with inventing the telephone, was largely unaware of just how profoundly his "talking telegraph" would affect people's lives for the next century.[1] But the 29-year-old Bell, who had never invented anything before, recognized the phenomenal power of voice and its potential to revolutionize the way the world communicated. A university professor, Bell was also passionate about educating the deaf. He knew the value of developing rich forms of communications.

More than 130 years later, Alexander Graham Bell's vision for harnessing the power of voice and rich communications continues and exploring new forms of interaction to drive technology innovation.

Since the Web ushered in a new era of connectedness in the mid-1990s, new ways to communicate have emerged and taken hold. Mobile phone use has eclipsed fixed telephone (landline) use, with more than 4 billion subscribers worldwide in 2008.[2] At least 1.5 billion people are now connected to the Internet. Millions of people regularly use social networking sites. And more than 3 billion people regularly send SMS text messages from their mobile phones.[3]

The traditional telecommunications model, which seemed so radically innovative when Bell himself helped found the world's first phone company in 1877, is giving way to a new model, one which transcends both networks and devices.

Voice-over-IP (VoIP), the protocol for carrying voice traffic over the Internet, is significantly changing the telecommunications landscape. Businesses and consumers are increasingly looking to VoIP, or Internet telephony, as a low-cost alternative to making long distance calls.[4] What's more, devices are converging: mobile phones are adopting computing capabilities and computers are adopting phone capabilities. As a result, the boundaries that have historically separated the Internet from traditional carrier networks are quickly disappearing. And a new, programmable model for enabling integrated voice, data, and rich communications is emerging.

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[1] On his way to exhibit his invention at the 1876 world's fair in Philadelphia, Bell wrote to his wife: "There's no turning back now! Although I must confess, I don't see what good I can accomplish [here]…" Source: PBS.org

[2] Mobile cellular subscriptions worldwide surpassed 4 billion in 2008. At the same time, the world had 1.3 billion fixed telephone lines, or 19 per 100 inhabitants. The world also counted more than 1.5 billion Internet users, a growing number of which use fixed and mobile broadband services. Source: International Telecommunication Union, 2009.

[3] Last year 2008 saw the total global user base for SMS text messaging pass 3 billion. Today 76% of all mobile phone subscribers worldwide use SMS text messaging. Source: Socially Minded, UK.

[4] Because of the bandwidth efficiency and low costs that VoIP technology can provide, businesses are gradually beginning to migrate from traditional copper-wire telephone systems to VoIP systems to reduce their monthly phone costs. Source: VoIPReview.org

Introduction

Without a doubt, the Internet has revolutionized the way we communicate. And yet little has changed in the world of telecommunications—until now. With voice and data networks starting to merge, consumers, businesses, software developers, and even traditional telecommunications carriers are exploring new ways to communicate, and also new ways to manage their multiple communication streams. The challenge is that the ways in which we most commonly communicate—voice, text, email, IM—exist in largely separate, "online" and "offline" worlds today.

Ribbit was created to break down the barriers between these two worlds, enabling communications to flow freely across all networks and devices and creating a better informed, more manageable, and more connected world—while laying the foundation for a new generation of telephony innovation.

Background

Formed by a group of entrepreneurs passionate about communications and innovation, Ribbit operates more like a Silicon Valley software company than a traditional phone company. Our goal is enable massive and rapid communications innovation by removing the barriers to innovation that have existed in the past by looking at voice and data networks as separate entities. Now a wholly-owned subsidiary of British Telecom, a global telecommunications provider, Ribbit is accelerating the future of programmable communications.

What is Ribbit?

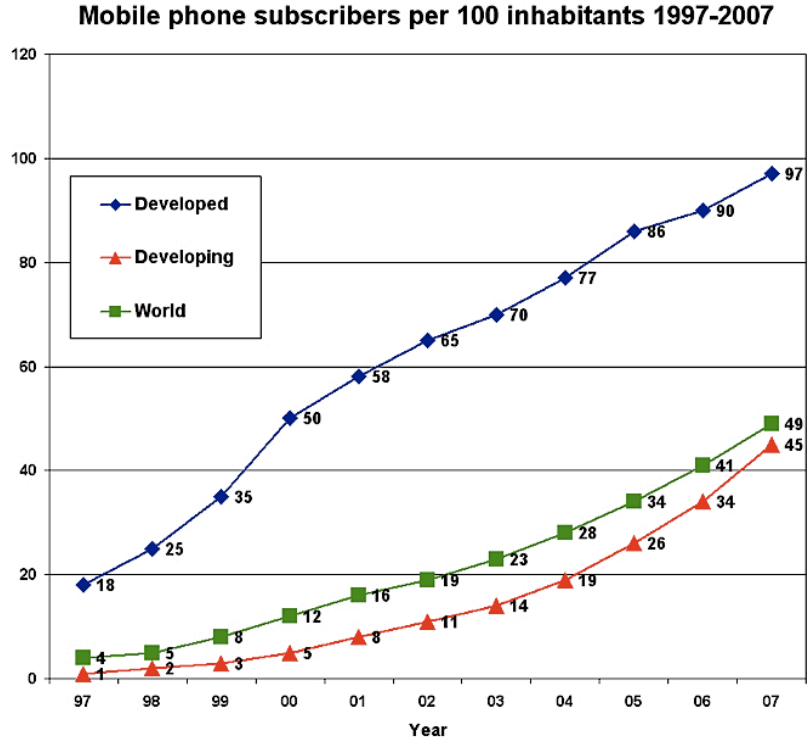
Ribbit is an open platform for communication innovation. Unlike any other phone company, we give our global community of developers unprecedented access to our technology through the Ribbit API set, allowing them to innovate at will—without any prior knowledge of telephony. We believe it's this community of developers—more than 15,000 and growing—that will create the next generation of communications solutions, adding interactive voice and messaging to Websites, online communities, and software applications. To that end Ribbit freely offers tools, code, tutorials, forums, how-to videos, and documentation to continually support its developer community.

Ribbit is also a software developer and a software-as-a-service provider. Ribbit Mobile and Ribbit for Salesforce are two examples of commercial applications built on the Ribbit Platform, aimed at consumers and mobile business users respectively (and available through telecommunications carriers as an integrated service). Ribbit offers its platform as a service to telecommunications carriers through its Bring Your Own Network (BYON) program, giving carriers a way to quickly take advantage of shifts in customer demand while increasing incremental revenues.

Market Overview: Voice and Data Converge

Just as telephony revolutionized communications more than 100 years ago, the Internet has revolutionized the way we exchange and access information—profoundly changing the way we live and work, and allowing us to interact in ways we never before imagined.

Over the past 20 years we've seen these two revolutionary technologies become even more essential to our daily lives. Mobile phones are now indispensable—most of us can't imagine a world without them. At the same time the Internet has emerged as the most important information tool in history. Not only does it give us access to the content we all need to participate and thrive in today's information economy, the Internet allows us to share our thoughts, documents, and images with literally anyone. Most of us can't imagine (and some of us can't even remember) a world without email, for example.

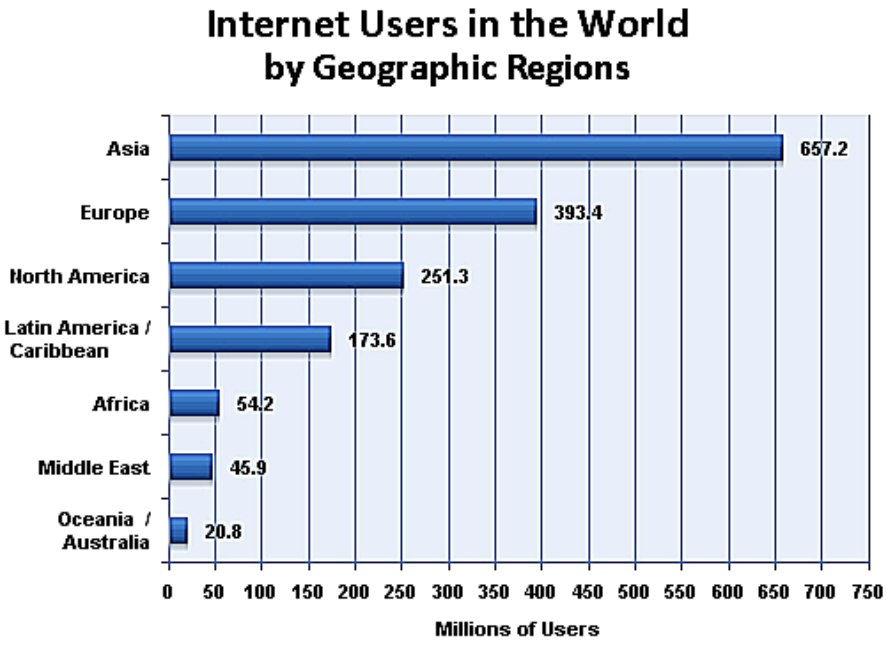


Mobile phone subscribers numbered 3.3 billion in 2007, accounting for half the world's population. Globally, mobile phone subscribers now number approximately 4.1 billion.

Source: International Telecommunications Union, 2009.

Historically, these two worlds—the world of voice and the world of data—have remained distinctly separate, divided by incompatible technologies and business models. But the worlds of telephony and the Internet are merging at an accelerated pace. Phones are being used as computers and computers are being used as phones.

For example, more than two-thirds of all mobile phone subscribers use SMS text messaging, making it the most commonly used data application today. The soaring popularity of smart phones such as the iPhone and Blackberry (and moving forward, smart phones that use Google's Android OS)—worldwide unit sales are projected to surpass 250 million in 2009—has made the ability to check email, download applications, and access the Internet from mobile phones an expectation for many.[5] In the US, 57% of all mobile subscribers now regularly surf the Web through their mobile phone.[6]



Source: Internet World Stats - www.internetworldstats.com/stats.htm
Estimated Internet users are 1,596,270,108 for March 31, 2009
Copyright © 2009, Miniwatts Marketing Group

Using computers instead of phones to make and receive calls is likewise becoming commonplace. Internet telephony has made it possible to call friends, coworkers, and family in faraway places from our desktops—often bypassing expensive long distance fees. (Skype calls, for example, accounted for about 6% of all international calls in 2008.[7]) Instant Messaging and Webcams have made it possible to chat with callers face-to-face—something we could never do previously. Session Initiation Protocol (SIP) phones, or soft phones, have even made it possible to call landline or mobile phones by "dialing" virtual phones on our desktops.

But Internet telephony services such as Skype, GoogleTalk, and voice IM apps, for example, require both parties to be logged in to the same service at the same time to communicate freely—you can't use one service to call someone using a different service. And SIP phones require you to have a VoIP account with an Internet telephony provider, which adds to costs. These limitations—in addition to quality, reliability, and extensibility issues (what else can we do with this technology besides use it to make

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[5] "Smartphone Markets Heat Up," NPR News, 06.18.09.

[6] "Critical Mass: The Worldwide State of the Mobile Web," Nielsen Research, July 2008.

[7] "2008-2009 Report on Global and China's VOIP Industry," Market Avenue Research.

calls from our desks?)—have slowed adoption and innovation of these services, even as Internet access becomes more widespread.[8]

Opportunity Talks

The real promise of Internet telephony—and the future of integrated voice and data communications—lies in making voice a programmable feature, one that can be easily added to Web pages, widgets, online communities, email, and new and existing software applications.

Imagine clicking a friend's photo to call that person instantly. Or clicking an advertisement to talk immediately to a sales representative. Or reading your voicemail and recorded notes as email. Or creating a voice blog. Or adding voice comments to your business documents. Or clicking an icon to send a text message to everyone in a particular group. With programmable voice, the possibilities for "communications-enabling" applications and creating new and interesting ways to interact (with people, businesses, and software) are limitless.

The Power of Programmable Voice

Programmable voice has the power to change the way we think about phones. (If you can click virtually any communications-enabled object to make a call, then what does a phone look like?) It has the power to make us better at what we do, to increase the value of our online experiences, to reach new audiences, and unify our online and offline worlds. Programmable voice (as well as programmable text messaging and other forms of rich communications) also has the power to bring new ideas, products, and business models to life.

But no single company could possibly innovate fast enough to take advantage of all technical and business ideas on the horizon. It's going to take thousands of developers, working thousands of hours, to satisfy the communication needs of the future. We believe an open platform model for applications development is needed to harness the power of programmable voice.

Only through an open platform and API set will developers, ISVs, small businesses, and global enterprises be able to quickly and easily voice- and communications-enable any Web page or application using familiar programming tools. Unlike existing Internet telephony solutions, these new communications-enabled applications will be device- and platform-independent, able to be used anywhere in the world.

It's All in the Cloud

In seeing voice, data, and devices converge, we're also seeing new models for developing and accessing applications emerge. Cloud computing—the practice of

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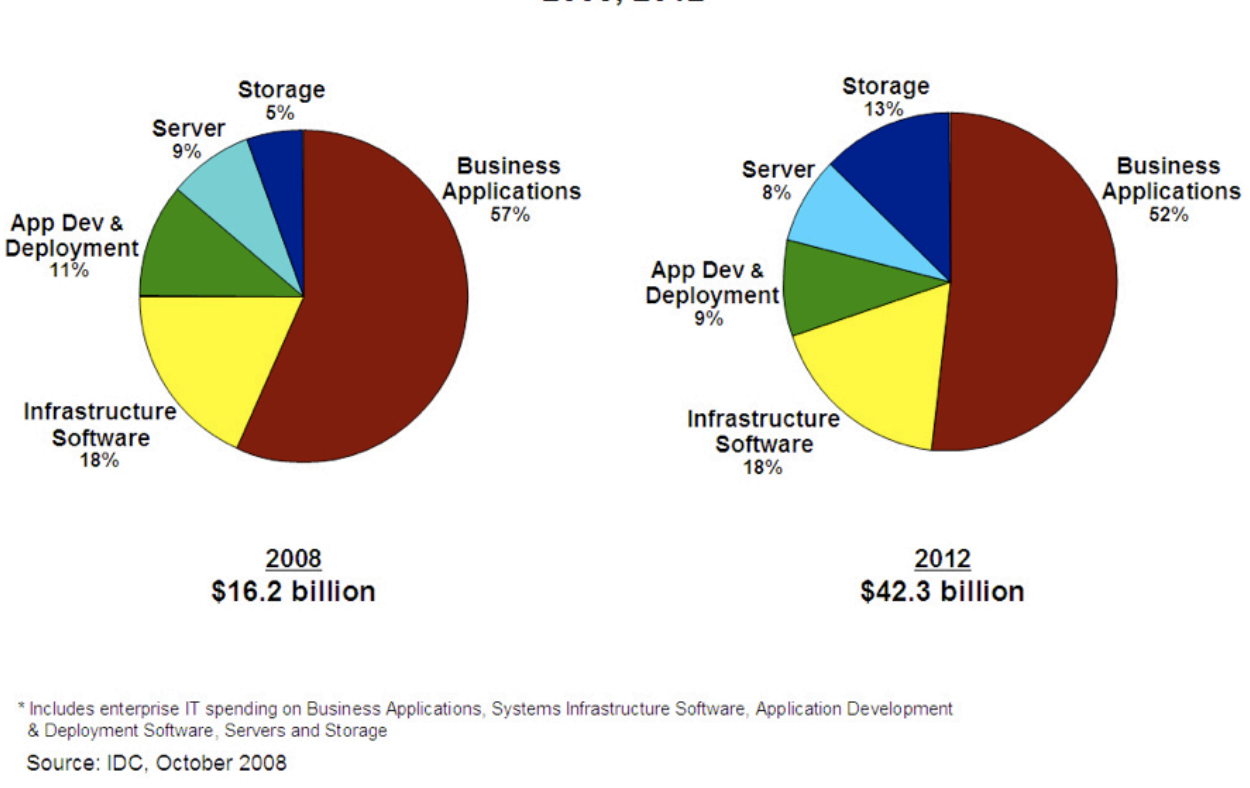
[8] Global VoIP subscribers are projected to surpass 55 million in 2009, according to In-Stat Research (http://www.in-stat.com).

running applications on someone else's network and servers rather than on your own—is gaining popularity. The global market for cloud computing is today worth $16 billion, and is expected to be worth $42 billion by 2012, estimates research firm IDC.

The advantage to running (and hosting) applications in the cloud is that you don't have to administer and maintain your own servers. Basically, server maintenance, related costs and scalability issues become someone else's problem—you don't care where your applications run as long as they work. Faster and faster computers, bandwidth, and massive amounts of storage have made it possible to create applications specifically to be hosted in the cloud. Developers pay only for usage costs. This allows for rapid deployment of highly scalable, highly available applications at a fraction of the cost of traditional app development and hosting.

Likewise, many businesses faced with "doing more with less" in lean economic times are choosing software-as-a-service (SaaS) and pay-as-you-go software usage models over purchasing and installing software locally. Analysts say SaaS cuts up-front costs and reduces total cost of ownership, providing businesses with much-needed flexibility and improved ROI. In fact, global revenues for SaaS are expected to top $8 billion in 2009, up 22% from revenues in 2008.[9]

[9] "Market Trends: Software as a Service Worldwide 2009-2013," Gartner Group, May 2009.



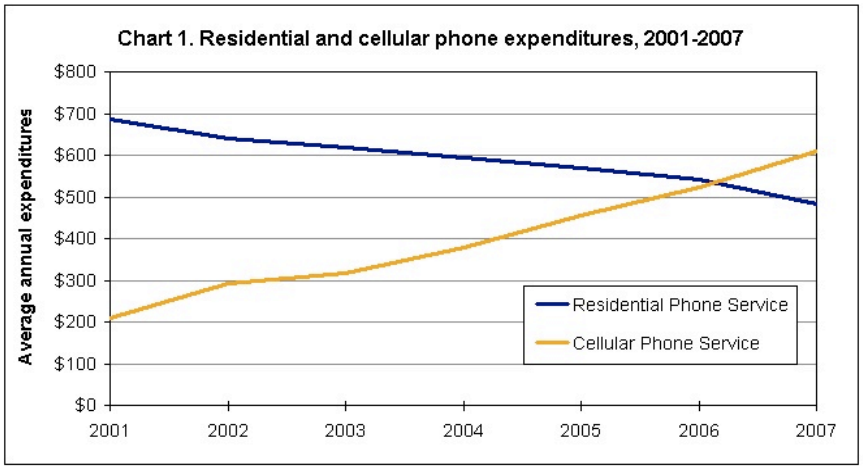
Challenges and Solutions: A World of Integrated Communications

New ways to communicate—email, IM, SMS text messaging, video conferencing, SIP phones, VoIP—as well as new ways to host and develop applications are demanding new ways to manage our multiple communications streams.

For consumers and business users, unifying online and offline communications has become more important than ever. Mobile phones, landline phones for work and home, and various Internet telephony accounts (Skype, SIP, MSN, IM, VoIP) have made staying on top of one's calls and messages a time-consuming task. Just checking voicemail for various phones several times a day quickly becomes a productivity drag. Trying to coordinate Web calls among various people—all using different Internet telephony service providers—is difficult to impossible. And trying to reach someone by phone often requires dialing multiple phone numbers.

For carriers, offering value-added communications services has become vital. Globally, mobile phone subscriptions outnumber landlines by almost four to one. In the US,

mobile phone subscriptions have outnumbered landlines since 2005.[10] Not surprisingly, carriers' average revenues per user (ARPU) have seen rapid decline. To compensate, carriers have reinvested revenues in expanding wireless and broadband infrastructures. But as bandwidth requirements accelerate, carriers are finding it increasingly difficult to realize decent returns on their investments. Moreover, powerful companies such as Apple, Google, and Microsoft have entered the market with competing new smartphone handsets, services, and applications that threaten carriers' traditional market share. For example, visual voicemail—made popular by the iPhone—has revolutionized the way people view, listen, and respond to their messages.



Annual expenditures for cellular phone services per consumer rose from $210 in 2001 to $608 in 2007, an increase of 190%. Expenditures for residential phone services per consumer fell from $686 to $482 over that period, a decrease of 30%.

Source: Bureau of Labor Statistics' 2007 Consumer Expenditure Survey (CE).

For developers, an enormous opportunity has emerged in meeting the need to integrate our various communications streams and "bridge the gap" between online and offline worlds. At the same time, the growing popularity of applications and services designed for smart phones is inspiring countless new development possibilities. And with cloud computing and software-as-a-service now widely accepted concepts, developers are searching for innovative, standards-based solutions that allow them to experiment with programmable voice and messaging with minimal risk and expense.

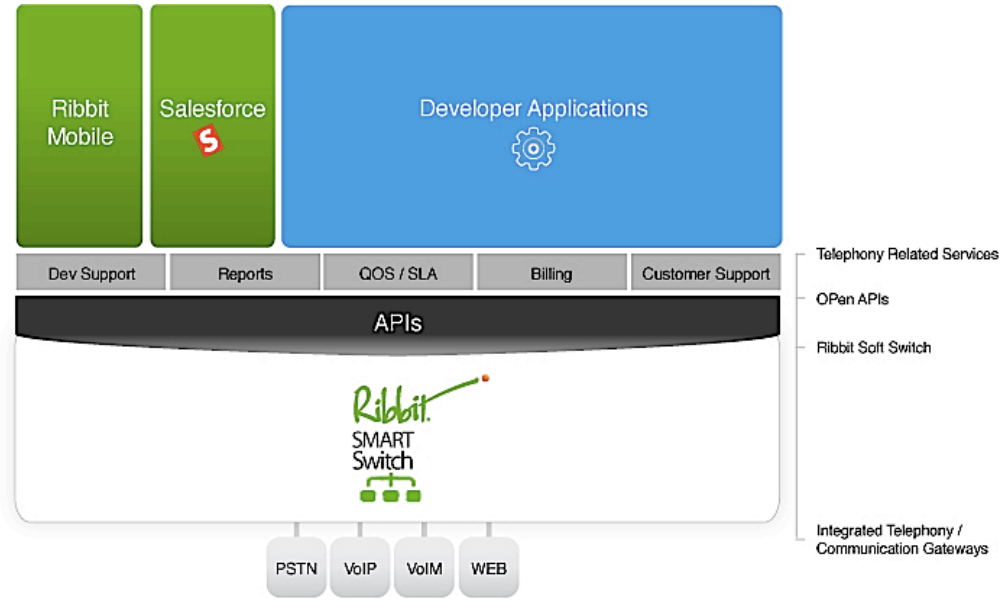
Ribbit: Enabling A New Generation of Innovation

With its growing, global community of more than 15,000 developers, Ribbit is accelerating the future of voice and rich communications as programmable features. For developers, ISVs, and businesses across industries, the Ribbit Platform and APIs create limitless opportunities for adding integrated voice, messaging, and rich communications functionality to applications, Web pages, and online communities.

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[10] Source: International Telecommunications Union, 2009.

For consumers and business professionals, Ribbit provides intelligent, intuitive solutions for merging the worlds of telephony and the Internet. Free from traditional handsets and telecommunications networks, voice and rich communications can now be managed across multiple devices, anywhere in the world. For telecommunications carriers, Ribbit's core platform software-as-a-service business model provides immediate opportunities to integrate rich communications functionality into existing networks, building revenues and attracting and retaining customers as a result.



The Ribbit Platform is an open, scalable, multiprotocol platform that supports rich voice and communications innovation and integration.

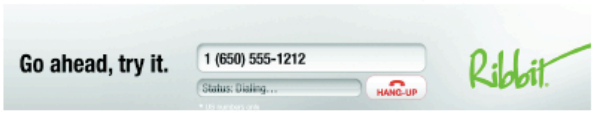
Ribbit Platform

The Ribbit Platform is an open, scalable, cloud-based environment for communication innovation. Developers, ISVs, and businesses across all industries—from advertising and media to healthcare, financial services, and real estate—can use Ribbit Platform tools, services, and APIs to quickly add voice, messaging, and rich communications features to virtually any Web page or application. Opportunities for creating new ways to communicate—with people, businesses, and software—are limitless. With little or no knowledge of telephony, developers can directly access Ribbit's global phone network using Flex, Flash, Java, PHP, .Net, REST, and other familiar programming tools.

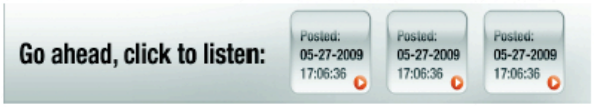
Digital agencies, for example, can use the Ribbit Platform to communications-enable online ads, dramatically shortening sales cycles by connecting customers directly to sales reps using voice. Or build brand loyalty by using celebrity voice blog updates and promotional SMS texting to create "sticky" new media experiences.

With the Ribbit Platform, digital agencies can communications-enable any campaign, putting enterprise-grade functionality and carrier-grade performance into tiny ads.

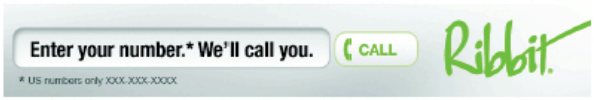
Ribbit



- Turn ads into phones and connect customers *directly* to sales representatives



- Record "audio blog" voice updates by phone to keep customers immersed in branded experiences



- Bridge consumers from their mobile or home phones to call centers, reservation desks, or recorded media
- Deliver promotional messages using SMS text broadcast

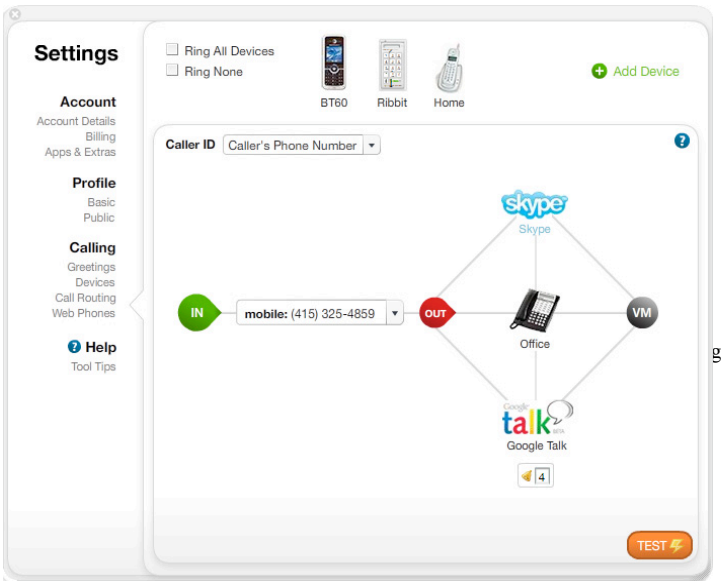
Applications

Built on the Ribbit Platform, Ribbit's three flagship applications—Ribbit Mobile, Ribbit for Salesforce, and Ribbit for Oracle on Demand CRM—demonstrate how rich voice and messaging functionality can be integrated into high-value applications and critical business workflow systems to save time, money, and maximize efficiency.

Ribbit for CRM (Ribbit for Salesforce, Ribbit for Oracle CRM)

Ribbit for Salesforce and Ribbit for Oracle on Demand CRM are easy-to-use, award-winning apps[11] built on the Ribbit Platform that link mobile voice communications to the software industry's leading CRM applications. With Ribbit for CRM, voicemail, email, SMS text messages, voice memos, and recorded meeting notes flow automatically into popular CRM systems, integrating a salesperson's most critical tools—phone and email. Messages and notes map to existing contacts and opportunities; voicemails are easily read, saved, searched, and forwarded. Productivity on-the-go is dramatically increased.

Ribbit Mobile



Ribbit Mobile is a powerful suite of applications built on the Ribbit Platform that merges phone and Internet capabilities to accelerate a new era of communications productivity. With Ribbit Mobile, busy professionals can have constant, real-time access to message content

g Corporation (TMC) in 2008; and Best Mobile App of 2008 by

and connectivity, no matter where they are. Ribbit Mobile integrates voicemail, email, text messaging, and inbound and outbound Internet calling into a personalized, Web-based communications dashboard. It addresses the need for unifying multiple communications streams, so that consumers can easily manage calls from their various phones (mobile, work, home, computer) in a single location.

Ribbit Mobile gives busy professionals an easy way to answer and incoming manage calls and messages on all their devices, and also make person-to-person and conference calls from virtual, "soft" phones.

Ribbit Bring Your Own Network (BYON)

Ribbit's BYON program solves two key market dynamics affecting telecommunications carriers today: Increasing customer demand for enhanced new services, and decreasing costs for traditional telephony services. With its platform-as-a-service model, Ribbit gives telcos access to prepackaged apps—including Ribbit Mobile and Ribbit for CRM—to offer consumers and mobile business users alike leading-edge productivity solutions. In addition, Ribbit enables carriers to use Ribbit Platform tools and APIs to develop new services (call routing, voicemail access, contact management, etc.) in-house with little or no financial risk, and with no long development lead times or up front capital costs. There's no support staff to hire, no new equipment to buy.

Technology Overview: Ribbit Platform

Known as the Internet's first phone company, Ribbit is seamlessly bridging the gap between networks and devices—changing the way we think about phones specifically, and about communications in general.

At Ribbit's core is the Ribbit SmartSwitch™, a multiprotocol, Lucent-certified, Class 5 soft switch. The Ribbit SmartSwitch is what allows calls to initiate on multiple devices, and transverse multiple communications protocols, networks, and device types.

Incoming calls may be answered through a Web browser, Flash application or widget, or VoIP client such as Skype. Outgoing calls may be answered on a soft phone, landline phone, mobile phone, or through a desktop widget. The Ribbit SmartSwitch makes call routing transparent to end users, and allows users to set preferences such as which devices should "ring" when, where, and under what circumstances. For example, users might choose to have Ribbit ring their mobile phones with incoming calls while they're at work during the week, and ring their home phones on the weekends. Or, users might choose to have Ribbit ring their soft phones with incoming calls at certain times of the day or on specific days.

Ribbit's technology makes complicated technical barriers disappear by spanning communications protocols and allowing developers to tap these protocols using

languages they already know. With Ribbit, developers can easily add integrated telephony and next-generation communications functionality to any Web application—without having to become a telephony expert or hire expensive consultants.



Developers can use Ribbit to easily add integrated voice and rich communications functionality to any Web page.

Additionally, Ribbit provides customer and developer infrastructure support services including customer use reports, billing information, and user preferences. Backed by BT's global telecommunications infrastructure and knowledge resources, Ribbit maintains quality of service, administration, and security across the network, freeing developers to concentrate on optimizing their applications. Ribbit's developer ecosystem provides educational, technical, and marketing resources to support developers in deploying apps on the Ribbit Platform.

Ribbit APIs

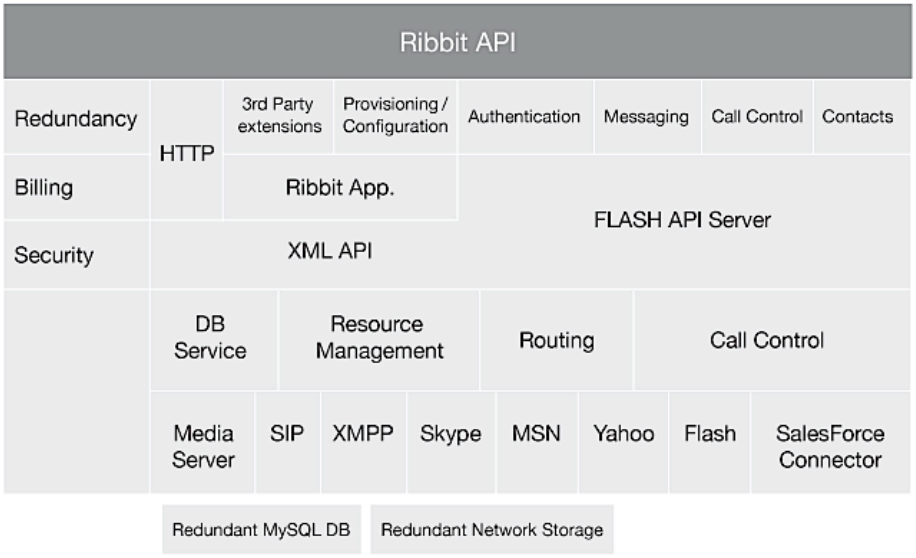
Legacy phone companies are built on the premise that the infrastructure layers are proprietary, and opening them up would represent not just a radical change in thinking but even a perceived threat to existing revenue structures. We believe that tomorrow's technology models will be inverted. The more open the platform, the more applications are likely to be developed, and the more valuable the total developer ecosystem. Accordingly, Ribbit offers access via APIs to much of our switch today, allowing third-party developers to create rich, integrated apps with little or no knowledge of telephony.

Flash, Flex, and REST

Ribbit APIs are currently optimized for Flash Professional and Flash Builder (Flex) developers because of the pervasiveness of those technologies (Flash is resident on 98% of all computers). This means that communications-enabled apps based on Ribbit and written in Flash will run anywhere without requiring users to download anything. Due to Flash's inherent richness, the resulting apps will reflect new levels of design excellence and usability.

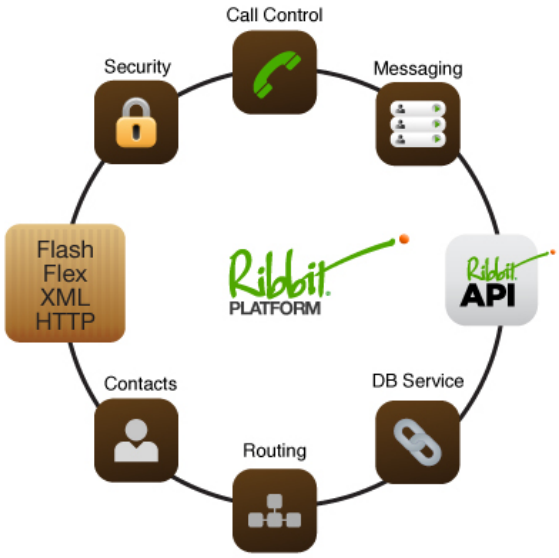
Soon, Ribbit APIs will extend to other standard programming languages such as REST, PHP, Java, Javascript, Silverlight, and .NET so that even more developers can participate in the voice- and rich communications-enabled revolution.

Ribbit's RESTful API (now in private beta) allows developers to build applications using Ribbit's core communication services in a platform-agnostic format, using simple and secure HTTP calls. RESTful support allows developers to interact with Ribbit at the server level, enabling new kinds of application-to-person and application-to-application communications. The RESTful API can be used with any programming language, such as PHP, Javascript, Java, PHP, Silverlight, and many others.

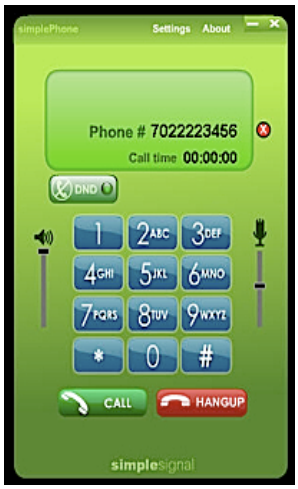


The Ribbit SmartSwitch™ integrates multiple communication gateways; The Ribbit API layer in turn allows developers to access the technology layer. Ribbit then provides multiple telephony services to the developers including security, administration, reporting, and quality of service.

Ribbit Platform Features



- Scalable, enterprise-class infrastructure
- Carrier integration (SIP interoperability)
- Voice, messaging, and SMS text notification
- Voice-to-text transcriptions
- Personal phone numbers (purpose numbers)
- Bridge / conference calling
- Address book / contact management
- Voice mailbox with audio playback
- Telephone User Interface (TUI)
- Embeddable Flash (Web) phone
- Multiuser functionality (token authentication)
- Established, global developer community
- Free sample code, how-to documentation, tutorials, and Webinars
- RESTful support for Flex, Flash, PHP, Silverlight, .NET, Java, Javascript, and other programming environments
- Pre-packaged, high-value applications for businesses and consumers (Ribbit Mobile, Ribbit for Salesforce, Ribbit for Oracle CRM on Demand)



Use Cases: Third-Party Apps Built on the Ribbit Platform

SimplePhone
Created by independent developer Joe Farrar for VoIP provider SimpleSignal, SimplePhone is a desktop-based Adobe Air phone application integrated with Ribbit that allows callers to place voice calls using a computer microphone. SimplePhone integrates with Broadsoft's globally-recognized VoIP platform for carriers, and will be offered as an add-on service to SimpleSignal's business customers nationwide this fall.

Rocketvox
Startup Rocketvox is using Ribbit to create an innovative personal communications portal for online users feeling overloaded by numerous voicemail, text, and social networking accounts. Integration with the Ribbit Platform will allow Rocketvox to offer a consolidated view of all their communications, using Ribbit's voice-to-text transcription and call management functionality.

Summary: Destination Innovation

The next revolution in real-time communications is underway, and traditional business models are being rapidly overturned. Communications infrastructures are merging, and with that a new communications paradigm is emerging, one where voice is no longer standalone application, but a communications medium integrated into other applications. Ribbit fills an important gap in this new communications marketplace. To date next-generation, communications-enabled solutions can be characterized as either being very expensive custom applications—starting at $250,000 and running into the millions—or relatively simple and limited "spot" solutions such as Internet "click-to-call" deployments. The Ribbit Platform solution satisfies the middle ground between these alternatives. Now developers can create high value, Web-based communications solutions with virtually no knowledge of telephony.

We're already seeing developers use Ribbit APIs to build innovative new types of consumer and enterprise solutions, such as new types of call center solutions, order and operation management systems, social networking mashups, productivity and communication tool integrations, unified messaging programs, and Web and phone widgets. We're also seeing developers use Ribbit APIs to explore new frontiers in communications, such as interactive voice response (IVR) and augmented reality (the combination of real-world and computer-generated realities). Our goal is to help developers build the most innovative, high-value applications they can using the Ribbit Platform—we know the more successful our developers become, the more successful we become.



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