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Working in Voice Mode

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Working in Voice Mode

Executive Summary

Increasingly, we live in a world that is always accessible to us via wireless devices. It does not matter where we are. All we have to do is observe people in public places making phone calls, texting, or surfing the Internet. With wireless devices becoming more robust, voice has been augmented and, in some cases, replaced by keyboard or touch screen interaction with these devices. Never before has there been such quick access to information whenever we need it and regardless of where we are.

However, there is an increasing cost to this newfound mobility, not only in the cost of our devices and services, but also in the distraction they can create. Often we find ourselves more interested in what has just popped up on our screen or the urgent message we need to send, than we are in our surroundings. When walking, people bump into others, obstacles on the sidewalk, and even walk into swimming pools or ponds because they are absorbed with their wireless devices. While jokes have been made and cartoons drawn poking fun at those whose lives are ruled by their wireless device, it is, in reality, no laughing matter. It becomes much more dangerous when driving.

The rapidly moving business environment has put pressure on the mobile worker to report back on the last sales call or meeting and acquire new information needed for the upcoming appointment. Catching up on email and text messages, or perhaps even checking the Internet for a store or other place of interest is now routinely done between appointments. There have been a number of injuries and deaths attributed to this type of activity while driving. There have been train wrecks, bus accidents, and literally thousands of multi-vehicle collisions due to driver distractions.

Many states now require hands-free devices to be used when driving. Typically, these consist of Bluetooth® devices that are used for incoming and outgoing voice calls. However, they do nothing to address the issue of data requirements: texting, emails, Internet access, and access to corporate information and databases. The tendency is still to take one's eyes off the road when trying to complete these data-intensive tasks.

Enter Voice Mode™ by Voice Assist™. Now there is a complete solution that provides access for mobile workers regardless of what they are doing with their mobile devices, including voice calls, text, emails, Internet surfing, and accessing corporate data and information. Voice Mode enables the mobile worker to use his or her voice to complete these tasks. It is an end-to-end solution that makes use of the standard wireless device, requires no additional software, uses an existing wireless account, and a smart back-end server or cloud-based system that converts voice to text and vice versa. The back-end system not only enables the sending and receiving of text and emails, it can be used to surf the web and can be interfaced with corporate applications.

Today, mobile workers have all of the capabilities in the field that they used to have only in the office. Voice Mode has arrived due to a convergence of technologies including superior cloud-based speech recognition, better noise-canceling microphone technology, pervasive high-speed wireless connectivity,

and new techniques to provide voice access to business data and applications. Voice Mode is the result of a blending or convergence of information usage and access with the flexibility of voice in order to provide users with the best of both worlds: access to all of the information that is available using a smartphone with the safety and convenience of voice. Voice Mode was developed by Voice Assist as an end-to-end solution that combines a number of aspects of the mobile workers' interaction with their device, the wireless connection, and a cloud-based application that enables fast and easy access to all of their email, text, and corporate information.

In reality, Voice Mode converts what we have needed our fingers and eyes for to a voice-only solution. Since it works with a Bluetooth headset, it can be used anywhere—not only in the car, but also on the roam or in the office. It represents a generation leap with regard to using a cell phone in a hands-free environment. Voice Mode is changing the way business is done, making workers safer and increasing their productivity with the most basic of all communication tools—the human voice.

Working in Voice Mode

Introducing Voice Mode

Today's 1.3 billion mobile workers have unprecedented access to tools and systems to maintain their productivity while away from their office or workplace. The primary trend seen in the wireless industry over the last decade has been the movement from voice communications to data communications. People (especially younger demographics) are talking less and texting more. Mobile or wireless email has been one of the greatest productivity tools available to those who work outside the office. Wireless email is now in wide use around the world, and the number of wireless devices capable of sending and receiving email is increasing all of the time.

In today's busy "heads-down" environment, there has been a major shift in social and business communication trends. For example, texting has become a primary communication modality, making data the new conversation. Other trends include:

- The use of social networks as a collaboration tool within the business;
- Touch screens and multi-tasking functionality have given people access to even more information while they are mobile. Tasks that formerly were delayed until the mobile worker was back in the office are now completed while on the go; and
- Safe driving laws that have been enacted in 34 states in the United States now mandate hands-free communication as the only allowable means of communication while driving across 68% of the country.

The smartphone is the now dominant mobile phone.¹ This is the result of a convergence of technologies and social trends. Processors have become more powerful yet consume less power. Multi-touch screens and new user interfaces have improved usability. Pervasive wireless access to high-speed networks means the mobile worker is almost always connected. Downloadable applications make both the smartphone and tablets powerful business tools. Beyond these trends, the rise of social networks enables people to stay connected in more ways than simply making phone calls. But all of this requires data entry, which is inherently difficult on a mobile device.

All of these forms of data communications—email, text, social networking, and interaction with other data systems, including the Internet—require keyboards or keypads. Mobile keyboard technology, either on-screen or built into the mobile device, has become a standard and accepted component of most wireless devices. In fact, many wireless customers now spend more time on their devices using the keyboard than they do using the voice features built into the device and networks. However, in certain environments the need to use a keyboard and the need to be mobile are diametric opposites. Efficient use of data communication services in these environments might pose difficult and dangerous situations for mobile workers.

¹ *iPhone Life Magazine*, by Hal Goldstein, May-June 2011; *Business Insider*, Henry Blodget, April 2, 2011.

This is a gap that is quickly growing within the mobile worker community. Without an effective hands-free solution for their business communications needs, mobile workers may:

- Suffer lower motivation and productivity while mobile or roaming;
- Be placed at risk when using mobile devices while driving; and
- Create a liability for the business owner and/or corporation.

A convergence of technologies and social/business trends is creating a solution to this challenge. This solution uses voice to navigate through and input data into the applications while using a mobile device on the road or on the roam. A more detailed component set of the solution includes the following:

- Reliable, cloud-based voice recognition software and services;
- Hands-free Bluetooth headsets with superior noise cancellation;
- Hands-free Bluetooth speakerphones with high-definition audio and noise-cancelling microphones;
- VoIP (Voice over IP) calls move voice traffic to the data network for reduced cost;
- Programming interfaces that enable existing backend systems for voice access; and
- Technology improvements that enable two-way text-to-speech and speech-to-text communications, making data the conversation.

These technologies, when integrated into an end-to-end solution, allow the mobile worker to safely access text messages, email, voicemail, social networks, and corporate business applications by voice. This concept is known as working in **Voice Mode**. Voice Mode leverages both voice commands and voice transcription to enable the mobile professional to efficiently use wireless services and applications hands-free. Voice Mode is a powerful concept that will revolutionize how the mobile worker operates on a daily basis.

Using applications in Voice Mode goes beyond hands-free access while driving. Scenarios also exist for usage while on the roam or in the office. For examples of what it is like to work in Voice Mode, please see the Voice Mode Solution Scenarios at the end of this paper.

Besides being a more convenient way to access your email, text, or other data, the need for Voice Mode is also being driven by legal requirements for hands-free access to phones. New laws are driving awareness and interest in voice solutions for mobile workers. Many states already have hands-free laws, and many cities and counties are enforcing them on a daily basis. Recently in one city in California, the local police set up an observation post on a busy street, much akin to a DUI checkpoint. They pulled motorists over and cited them for using their cell phone while driving, which included not only voice usage—some of those cited were also cited for tweeting, texting, and sending emails while driving.²

² Michelle Nelson, "Goleta Police Cite 74 Drivers for Violation of 'Hands-Free' Cell Phone Law," *Noozhawk.com*, January 20, 2011.

Voice Mode solves the problem of hands-free access for data communications. It also keeps the mobile professional safer and makes the use of a wireless device more efficient and effective. The concept of using Voice Mode to access business applications is a powerful complement to wearing a Bluetooth headset. Since Voice Mode is a cloud-based solution, no special phone or application is required for the mobile worker. Voice Mode works with any phone (mobile or landline) that can place a voice call. This presents the business with an easier deployment since mobile workers can continue to use their existing phones. This can significantly lower the total cost of ownership over the years.

Voice Assist is the industry's first implementation of Voice Mode. It has some other key features that companies should consider when evaluating this technology. Specifically, it is:

- Independent of any handset, smartphone operating system, or mobile network technology;
- Independent of a specific voice recognition engine. Voice Assist employs "Best of Breed" speech technology to ensure the highest possible confidence with regard to speech recognition;
- Easy to voice-enable existing business applications. Voice Assist's SpeechScript™ rapid development environment supports third-party developers; and
- Already integrated with popular mobile worker applications such as Salesforce.com.

Finally, it should be clear that Voice Mode is as useful for the small business or home office worker as it is for the enterprise mobile professional. While the specific applications may be different, the value of hands-free mobile interaction is the same.

Voice Mode: An "End-to-End" Solution

Voice Mode is the natural evolution of hands-free access. Whereas hands-free is synonymous with the use of a Bluetooth headset to make a phone call, Voice Mode leverages advances in technology for creating an "end-to-end" data solution for the mobile professional. Voice Mode requires three components, and all three must be present for a successful solution:

1. Cloud- (e.g., server-) based voice recognition software and services;
2. A hands-free Bluetooth headset or speakerphone with superior noise cancellation; and
3. Connectivity to business-critical applications.

It is only in the last couple of years that the technologies behind these components have evolved to the point where Voice Mode can be used on a commercial basis. This section examines these technologies.

Cloud-Based Voice Recognition

Highly accurate voice recognition requires a high degree of computing power. Voice recognition services that are remotely hosted (or "in the cloud") provide superior computation power for performing voice recognition, transcription, and action. These are the bare essentials of a voice recognition system: The ability to recognize a spoken "word" or "phrase" and then the ability to either transcribe that spoken

word or phrase into text, or to take a specific action. This latter concept is called a Voice Command, and the libraries of Voice Commands are known as Voice Scripts.

A critical advantage for cloud-based systems is the availability of vast storage for storing recognition dictionaries. These dictionaries may be used for translating or recognizing different languages or dialects. In the last few years, “cloud” services have developed in sophistication so that a recorded voice segment can be immediately dispatched for quick recognition and conversion into text.

Cloud-based services provide the added advantage of being easy to access and set up. Users do not have to download an application to their mobile phone or desktop. Access can take place through a simple IP-based interface, or in some cases through a phone call. This reduces the need for client customization for different devices and lowers the total cost of ownership of deploying the service.

Well-architected voice recognition systems should have the ability to interpret Voice Commands or Voice Scripts that result in specific actions.

Finally, the growth of 4G/high-speed networks has reduced the latency associated with access to the cloud. As network speeds continue to increase, the user experience will improve accordingly.

Noise-Cancelling Headset

A moving automobile is a very noisy environment. Conversations through a Bluetooth headset may involve distorted or even missed words. The good news is that the human brain is usually able to fill in these gaps. Because Voice Mode requires speech-text recognition and transcription, removing background noise from conversations is imperative to ensuring that the Voice Mode commands are understood each and every time. Without active noise cancellation, the voice recognition software may not perform well.

Noise cancellation in a Bluetooth headset requires both engineering skill and an understanding of the complexities of filtering out the noise while highlighting the voice component of the audio. There are many ways in which noise cancellation is implemented, but most of the techniques make use of two microphones, one that is tuned to the voice frequencies of normal speech, and one that is tuned to other noises. The two audio signals are then processed by a Digital Signal Processor (DSP) and very sophisticated software. The DSP produces sound waves that are identical to the incoming sound waves with one exception: The noise cancellation process produces waves that are 180 degrees out of phase or reversed from the incoming sound. This is known as destructive interference and causes the two waves to cancel out, resulting in silence. In this way, the noise components are filtered out leaving the voice elements intact so the cloud speech recognition system can distinguish the words and the commands.

There are a number of Bluetooth devices on the market that claim to incorporate noise cancellation and many different ways of implementing them. The most important criteria for working in Voice Mode is to ensure that the Bluetooth headset is “tuned” for the speech recognition. Most noise-cancelling Bluetooth headsets provide four to eight hours of talk time before needing to be recharged.

Connectivity to Critical Business Applications

Most business-critical applications have a standardized interface that enables secure connectivity to third-party services. An efficient and well-attuned Voice Script library will enable companies to build a layer of “voice command and control” on top of this API such that the user can access and navigate through the application via a simple set of voice commands. In addition, as use of the application in Voice Mode grows, and the demands for more complex transactions with the application grow, more commands can be added to the vocabulary.

For example, Electronic Mail is one of the most important mission-critical application services of a business. A handful of Voice Commands can be used to successfully navigate and use this application in Voice Mode. These commands include Get, Listen, Delete, Next, Previous, and Reply.

An End-to-End Solution

In summary, the hands-free solution is more than simply a Bluetooth headset. The concept of Voice Mode is an end-to-end solution and should be designed from the ground up to include all of the elements described above. A properly designed solution will give mobile workers access to all of their needed modes of communications as well as access to the applications they need to perform their job function.

Voice Mode: Driven by Regulatory, Business, and Social Forces

In a recent study, the Insight Research Corporation reports:³

“Over the past decade, wireless networks, devices, and applications were developed to support the most basic enterprise applications, such as voice, email, ordering and tracking. These developments were largely independent of the enterprise applications on the wire line side, which were expanding to support broadband access to Intranet and Internet applications. The next decade will witness the integration of wire line and wireless applications, enabled by new technologies such as IMS, 3G networks, the smartphone, and WiMAX devices.”

Information access on the mobile device has vastly transformed the workplace. Corporate expectations run high with regard to the mobile worker participating in real-time information flow. But as stated earlier, there is a gap between the expectations of the mobile workers to be connected in real-time through their data applications, and their ability to be connected while they are mobile.

³ The Insight Research Corporation, “The Mobile Workforce and Enterprise Applications 2007 – 2012,” May 2, 2007.

Using the phone while driving to control application and input data is inherently dangerous. Numerous reports and analyses point to the dangers of driving while trying to manipulate a cell phone:

- Distraction from cell phone use while driving extends a driver's reaction time as much as having a blood alcohol concentration at the legal limit of 0.08 percent (University of Utah);
- The number one source of driver inattention is use of a wireless device (Virginia Tech/NHTSA); and
- Drivers who are on the phone are four times as likely to be involved in crashes serious enough to injure themselves (Insurance Institute for Highway Safety).

These ominous statistics have motivated more than 34 states to enact some type of hands-free driving law. In some states there is a total ban on using a cell phone while driving unless it is used with a hands-free device. In other states, the ban only applies to the use of certain applications such as texting. However, the trend is clear. State and Federal regulatory pressure will almost certainly restrict cell phone usage throughout the fifty United States without a hands-free solution.

In addition to the implicit danger to the driver, passengers, and other vehicles on the road, businesses are realizing both the danger and liability that their workers and their company are exposed to without prudent safe driving practices. There are numerous examples of companies losing millions because of accidents their mobile workers caused while on the cell phone:

- In the winter of 2001, a multi-million dollar verdict was rendered against the employer in a lawsuit where a passenger in the opposing vehicle was seriously injured by a salesperson who was making sales calls while driving;
- In 2004, in Virginia, a law firm was found responsible when one of its attorneys, driving and using her cell phone, struck and killed a 15 year old pedestrian. The multi-million dollar lawsuit was settled for an undisclosed amount; and
- Finally, in Georgia, late 2007, International Paper settled a multi-million dollar injury case, resulting from a rear-end auto collision that cost a Georgia woman her arm. She was rear-ended by a company employee driving a company car and using a company-issued mobile phone at the time of the accident.

Many companies have moved to email, text messages, and data applications to dispatch their field workers to the proper location. If the workers are driving and receive a dispatch there is a natural tendency on their part to read the message and respond to it so they can modify their route of travel if necessary. This creates a safety hazard for the employee as well as potential liability for the corporation that sent the dispatch message.

Voice Mode is the solution to the challenges presented by trying to operate a cell phone while driving. Voice Mode enables the mobile worker to converse with key applications in a natural way that allows focus on driving and a reduction in the hazardous distractions that could lead to a serious accident.

Who Is the Mobile Worker?

According to a 2010 study by IDC,⁴ a global provider of IT market intelligence, the world's mobile worker population has passed the one billion mark. "Vast opportunities exist for bringing a variety of mobile technologies to the world's workforce," said Sean Ryan, research analyst, Mobile Enterprise Software. "By 2013, the total of office-based, non-office-based and home-based mobile workers will grow to nearly 1.3 billion people representing more than a third of the world's workforce."

The United States will remain the most highly concentrated market for mobile workers with 75.5% of the workforce, or 119.7 million workers, being mobile in 2013.

Business psychologist Pearn Kandola identified five types of mobile workers in a report for Cisco⁵:

- **On-site movers** are individuals who work on one site but move around within it, e.g., security agents and IT technicians;
- **Yo-Yos** occasionally work away from a fixed location, e.g., in jobs that require business trips;
- **Pendulums** alternate between working at two fixed locations, e.g., the employer's office and a client's office or a home office;
- **Nomads** work in a number of different places and are constantly moving among them, e.g., a sales agent visiting many customers a day, management consultants working at different client sites, and engineers; and
- **Carriers** work while on the move, transporting goods or people, e.g., train conductors or flight attendants. Other examples include hospitality workers and healthcare providers.

Of course, almost anyone who commutes to and from a job is a mobile worker. But the mobile worker is more than simply a commuter or road warrior. Those who commute to and from their place of employment tend to use their driving time or down time to catch up on voicemails, emails, text messages, and other forms of communications. In addition, many people need to use their hands while performing other tasks:

- On the move—at home, running errands, walking through the airport; and
- Multitasking—hands-free while accessing data on a PC or tablet.

In other words, hands-free access is not only a solution to the safety issue; it is also a productivity enhancer. This is why businesses are motivated to support their mobile workers:

- Improve productivity;
- Improve collaboration among colleagues;
- Decrease isolation of remote/mobile employees;
- Increased safety: eyes on the road, hands on the wheel; and
- Companies want to avoid lawsuits from injured workers.

⁴ IDC, "Worldwide Mobile Worker Population 2009-2013 Forecast," February 18, 2010.

⁵ Cisco, "Understanding and Managing the Mobile Workforce," July 2007.

Working in Voice Mode, mobile workers can be much more a part of their team since they have contact with their colleagues and have visibility through their regular appearance via online applications and business tools.

Finally, the right support for the mobile worker can aid in work-life balance. Brian Osborne, writing in Geek.com⁶ says:

“So, what’s the appropriate balance? I would say the best use of mobile technology is maximizing workers’ productivity, even while on the go, to ensure they make the most of their family time. In other words, maximizing my 8-10 hour day to ensure it doesn’t have to become a 12-18 hour day, which cuts into family time. That’s using mobile technology as a freedom enabler.”

Voice Mode Solution Scenarios

Voice Assist is a great example of a Voice Mode solution. It offers access to email, contacts, social networking, and business applications. The following scenarios illustrate how Voice Assist enables busy people to integrate Voice Mode into their daily professional and personal lives.

On the Road

Joseph McConnell is a territory sales manager for Division Enterprise and is constantly on the road visiting customers and potential clients. He spends at least 25% of his workweek in the car traveling throughout his territory and likes to use his time in the car to make phone calls to current and potential clients. To help increase his productivity while maintaining a hands-free and safe driving environment, Joseph purchased a hands-free driving solution consisting of a subscription to Voice Assist and Jabra® FREEWAY in-car speakerphone system. With this solution, Joe can make calls and operate a number of business applications through voice commands.

On a typical working session while he is driving, Joseph can dial key contacts and prospects through voice commands, and also send email. He can also update Opportunities and complete tasks in his Salesforce.com database, which pleases his management team as this ensures relevant sales information is updated in a timely fashion for his senior directors’ weekly sales meetings.

Solution: Voice Assist (with access to Salesforce.com) + Jabra FREEWAY in-car Speakerphone system.

Benefits: Hands-free access to business information systems that provides a safe and productive driving environment.

⁶ Geek.com, Brian Osborne, “75% of U.S. workforce to be mobile by 2011,” January 16, 2008.

On the Roam

Susan Stephenson is a line manager for a large manufacturing plant. She spends much of her day walking through and inspecting the manufacturing line between meetings. Although she has an office, she does most of her work while mobile. She finds the Voice Assist solution to be an extremely efficient solution for keeping up with her communication needs and her quick-paced work lifestyle.

During a typical workday, Susan will call into Voice Assist through a Jabra earpiece, such as the Jabra EXTREME. Voice Assist will tell her about new email and text messages she has received and will read her email and incoming text messages to her while she is on the move. With Voice Assist she can even respond to these emails and text messages on the fly. Voice Assist also enables her to connect to Chatter, a business-focused social networking application, and post updates by voice to the Chatter database about issues and updates regarding the various manufacturing lines around the plant. These updates are a critical communication component to ensure that any issues with the manufacturing line are addressed to avoid line shutdown.

Solution: Voice Assist (with access to Chatter) + Jabra EXTREME earpiece.

Benefits: Efficient and productive information update and communication system.

In the Office

John Wright is a financial portfolio manager for a large northeast hedge fund. He spends most of his day studying real-time information systems and a variety of global financial and commodity exchanges with a number of screens on his desk. John is a believer in efficiency and technology. He has found that Voice Assist provides him a productive and ergonomic solution for maintaining communication access to his clients and partners without disrupting his daily workflow.

Using Voice Assist with the Jabra EXTREME for the PC, John is constantly making phone calls and sending out email, all through voice commands. He can even have his new email read to him through the phone and can respond instantly to new email, all through voice commands and transcription.

Solution: Voice Assist + Jabra EXTREME for PC headset or Jabra GO 6340.

Benefits: Real-time and hands-free access to business information systems while in the office.

Conclusion

Voice Mode is much more than attaching a Bluetooth headset to your wireless device for hands-free operation. It leverages both voice commands and voice transcription to enable the mobile professional to efficiently use wireless services and applications hands-free. Voice Mode is a powerful concept that will revolutionize how the mobile worker operates on a daily basis.

From 1981 until the early 2000s, cellular phones were about voice: making and receiving voice calls. Text was then added, followed by data services, which have grown faster with each passing year. Today,

mobile professionals carry a wireless device with them at all times. During this same period of time, the networks have been built to provide wireless coverage in places where it never existed before. This enables the mobile professional to connect anywhere he or she happens to be.

The usage patterns for wireless devices have also changed radically. Wireless users now spend more time texting, emailing, social networking, surfing the web, and accessing corporate data files. All of this is done today using a keyboard or touch screen and requires a higher level of concentration than merely making a voice call. While this provides the mobile professional with access to the services and applications that he has never had access to before, it also means that he is less focused on his surroundings. There are numerous stories about vehicle accidents that have been the result of drivers taking their eyes off of the road to read or send a text message. There are also cases of bus drivers, railroad engineers, and others causing accidents that have resulted in serious injuries or death to scores of people. While technology has given mobile professionals the ability to carry and have access to their data and applications in the palm of their hand, it has come at the price of safety.

Making use of Voice Mode for access to information that would normally require interacting with the device's screen and keyboard provides a number of benefits. First, the device can now be used in a vehicle because it meets the hands-free requirements of many states. Second, it gives mobile workers access to all of their email, texting, social networking, and corporate information. Not only is this a much safer mode of access, it makes the mobile worker's drive time much more efficient.

Third, because Voice Mode has been designed to interface to corporate and business applications, it not only provides access to email, text messages, and other data, it can also provide access to the business applications and information that are needed in the field. For example, sales representatives can access and retrieve the latest information regarding the clients they are driving to visit. Once the sales call is complete, they can dictate the results of the call and any actions that need to be taken without ever having to type a single character or refer to the screen on the device. Voice Mode is not only about enabling voice interaction with the more generic applications, it is also about being flexible enough to interact with business-specific applications.

Voice Mode is the next logical progression of the advancement of mobile workers' wireless lives, changing the way they interact with their mobile devices, and keeping them safe at the same time.

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