WHITE PAPER:

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Why Every Enterprise Needs a VoIP High Quality Speech Enabled Auto Attendant

With growing bandwidth and the ubiquity of SIP, it is finally feasible to deliver high quality speech applications from the cloud.

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1. Introduction

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Human beings are the best! There's no denying it that real people want to talk to other real people rather than machines to get information quickly and with the minimum of frustration. In a recent LinkedIn Poll, 200 business people in the US were asked:
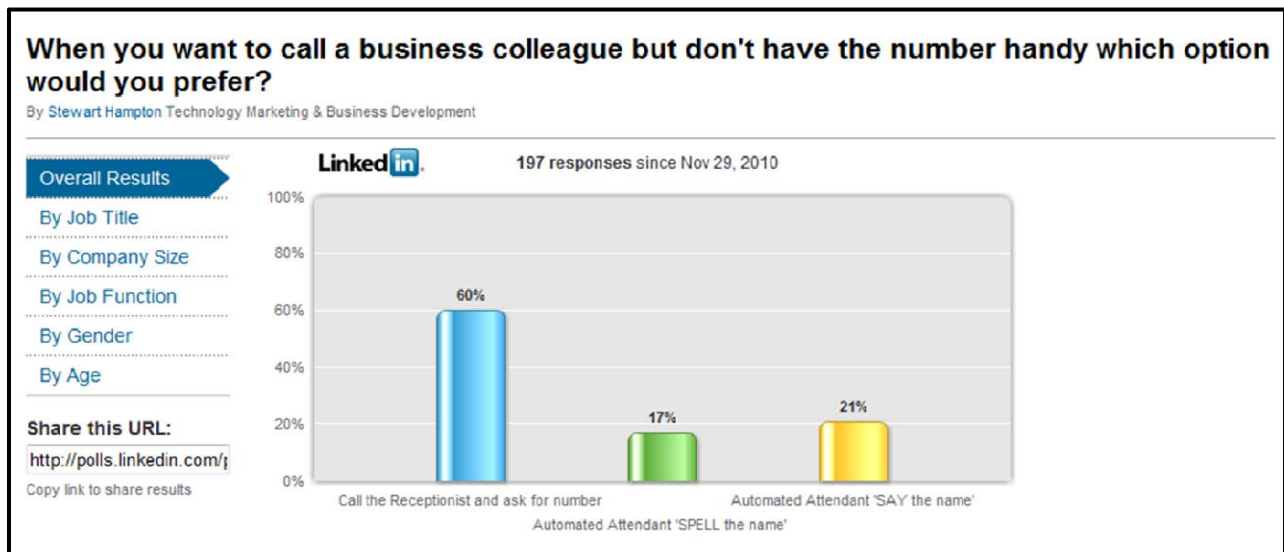
60% of respondents said they would call the Receptionist, while the remainder was slightly in favor of the 'SAY the name' 21% option over the 'SPELL the name' 17%.

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For any company large or small, answering phone calls in a high quality consistent manner and transferring that call quickly and accurately to the intended person, department, or information is a key part of running a successful business.

Statistics from <u>drvoip.com</u> indicate that:

> *"less that 3 out of 10 phone calls to a place of business are clients or prospects. Most phone calls are "friends and family", other employees, outside vendors, and other enterprise support organizations. If the reason for having a live operator answer all incoming phone calls is to provide "high touch" personal attention to the company's clients, you may want to set up a "back door" automated attendant."*
>
> - <u>Drvoip.com</u>

Why Enterprises Deploy SEAA Solutions

- Create a consistent highly polished customer call experience
- Improve internal employee-to-employee communications
- Create an option to free up live operators for "high touch" customer calls
- Create a "Numberless Enterprise" allowing employees to be highly mobile yet completely reachable through the SEAA
- SEAA used to route calls globally across Enterprise WAN to reduce telecom costs and avoid complex international dialing
- SEAA used as a "Disaster Recovery" solution to connect employee and customers

So there are good business reasons to automate some or all of your call answering. When a company does choose to automate the answering and transferring of calls the caller is often asked to "spell the name" or "speak the name" of the person they wish to reach. The spelling of names on a DTMF keypad can be tricky or impossible on some smartphones (Blackberry 8330), and is illegal in many places while driving, so the need for speech enabling the auto attendant is growing.

Until now, installing a high quality Speech Enabled Auto Attendant (SEAA) has been prohibitively expensive and technically challenging involving premised based installation of a dedicated server and expensive speech recognition licenses. For these reasons, use of SEAA has up until now been reserved for larger enterprises where the ROI makes sense. Now, there are new cloud-based solutions available that utilize architectures designed to reduce the cost of SEAA dramatically and simplify the deployment and maintenance to a simple subscription based SaaS model.

These new cloud-based solutions now make available high quality speech recognition at an affordable price to even the smallest and most distributed businesses allowing those enterprises to deliver a highly polished and consistent experience to the caller.

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2. Limitations of Premise based SEAA
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Premise based SEAAs have been deployed successfully at large enterprises for a number of years. For a campus or Headquarters environment it is worth the cost, effort and ongoing "care and feeding" of a dedicated server(s) and their associated speech resources. However for medium or small businesses or geographically dispersed enterprises, the business case and value of premise based SEAA is less compelling for four main reasons:

- *The cost of speech recognition resources not cost effective for premise based*
- *Recognition rates can decline with employee churn, lack of monitoring*
- *Specialized knowledge and complexity involved to setup a traditional SEAA*
- *Effort needed for Adds/Moves/Changes of Directory (Administration)*

The cost of dedicated speech recognition resources is prohibitive
The cost of speech recognition resources has previously been determined by traffic engineering sufficient voice ports on a dedicated premise based server to adequately handle peak busy hour call volumes without blocking calls. *Therefore it was necessary to always buy more ports than needed on average.* For a small or medium enterprise or a business that has highly geographically dispersed offices it has often not been cost effective to purchase a dedicated server and the necessary speech recognition ports.

Recognition rates can decline over time due to employee churn
Very high recognition rates above 95% are essential to the successful use of SEAA within a thriving business. A premise based SEAA often does not have the features in place to ensure that recognition rates start high and just as importantly stay high over the full deployment cycle. It is critical that any 'problem names" that the SEAA is not able to successfully recognize be detected automatically and routed to a linguistic programmer for tuning. It is also advantageous if the name phonetic definitions are shared among SEAAs in a 'master dictionary' so that as new definitions are added to one system they become available to all other systems. This is rarely done for premise based SEAA due to the costs involved.

Specialized knowledge and ongoing system maintenance required
Premise based SEAA deployments require hands-on installation in the customer data center and integration to the IP-PBX. Additionally ongoing maintenance of software such as patches and upgrades or system expansions due to company growth can be a headache. This makes a decision to go SEAA for valid business reasons a much less attractive proposition for many companies leading them to defer or avoid the investment.

Effort Needed for System Administration
A premise based SEAA often requires an Administrator to Update, Add and Remove employee records manually from the system. If this is not done accurately and in a timely manner, then callers will not be able to reach company personnel reliably using the SEAA.

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3. Environment for Cloud-Based SEAA

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There has been a proliferation of high quality hosted business class VoIP offerings now available and adoption rates are accelerating. This is a highly competitive marketplace with over 1000 VoIP Providers in the United States alone.* These solutions providers just like wireless and wireline carriers are now entering the phase of trying to grow or at least maintain ARPU (Average Revenue Per User) and minimizing customer churn.

* http://www.voipproviderslist.com/country/voip-usa/voip-providers-usa/

However these service providers need to avoid the trap of becoming undifferentiated from their competition which leads to price based competition. So in addition to offering excellent high quality business grade VoIP telephony, Hosted VoIP providers are aggressively seeking to add new applications to their VoIP offerings.   IP-PBX Resellers are also seeking to add ongoing value their customers by delivering value added services and applications. The ubiquity of the SIP standard makes providing a cloud-based SEAA to a premise based IP-PBX a straightforward and 'location independent' integration.

Questions to Ask for a "High Quality" SEAA?

- What is the recognition rate and how is it reported?
- Is there an SLA to backup the service availability?
- How are similar names "disambiguated" for the caller?
- Does the SEAA "learn" from caller behavior to improve – aka Logical Choice?
- How fast are name recognition errors corrected?
- Does the SEAA have additional functionality" e.g. add in personal contacts, voice conferencing?
- Are there flexible cloud-based or premise options?

Businesses are now accepting of cloud-based communications solutions. Hosted VoIP clients are of course already "converted" but many other enterprises using SaaS for applications such as CRM, Marketing Automaton, HR are already using cloud based offerings and ready to exploit the benefits of a cloud-based SEAA complementing their existing IT investments.

In addition, the concept of and "App World" has proliferated for smartphone users and is now coming to fruition for business communications apps. at such sites as GetApp.com and Application Marketplace.net. Even an IP-PBX vendors (BroadSoft) is getting into the business app delivery on its BroadSoft Marketplace.

And speech recognition is increasingly being consumerized as a way to get people quickly and safely to the information needed and being deployed on smartphones, in cars, on TV remotes, and in video games. These technical, business and individual trends provide an ideal environment for new cloud-based value added services that are of high business value yet are simple and affordable to deploy such as cloud-based SEAA.

Together these trends create a ready environment in which to add voice apps to VoIP offerings.

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4. New Deployment Model
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Deployment of a Speech Enabled Auto Attendant has previously been technically challenging and financially costly. Removing these barriers by putting the SEAA in the cloud has enabled small and medium businesses access to the high quality SEAA previously only available to large enterprises with deep pockets.

Key Elements
In order to facilitate high quality cloud-based delivery of SEAA several key elements are required to be in place. Several of these key elements are listed to the left.

The SEAA platform should:
- Have a distributed architecture to ensure high availability and sharing of SIP and speech recognition resources

The SEAA platform should:
- Be hosted in one or more highly trusted third party hosting location or within the Hosted VoIP datacenter with Broadband Internet

The SEAA platform should:
- Handle SIP Based integration to any IP-PBX / SIP Trunk or SIP End Point

The SEAA platform should:
- Handle automated provisioning from VoIP Service Providers

The SEAA platform should:
- Provide secure tenant partitioned access for VoIP Service Provider Administration of customers, End Customer Administration

The SEAA platform should:
- Provide Usage Reporting, Linguistics Updates

The SEAA platform should:
- Provide SIP access over Internet.*

Key Elements of a Hosted SEAA Platform

* Note that there is generally a benefit to using SIP clients over SIP trunks. For a distributed SEAA platform in the case of Internet failure or site failure, a backup system at another location is activated and registers as a SIP endpoint to all cloud-based SEAA customers and begins taking calls transparently.

This deployment model lays the foundation for adding on each new SEAA end customer quickly, easily, and cost effectively.

Adding New SEAA Customer Quickly, Easy, and Cost Effectively

Using this new deployment model, a cloud-based SEAA application can be activated for a new customer in a day. A set of information is collected from the customer or from the Hosted VoIP provider on their behalf. See the two **Sign Up Examples** below for both SIP Client and SIP Trunk

configurations. This information is provided to the cloud-based SEAA service provider for activation of each new customer account.

Setup Method #1: SIP Client Registration
Set up a user account with SIP registration capabilities as you would normally for user's that connect with a SIP soft phone. Please note that Mobiso uses Port 5060/UDP for SIP communications.

Step 1: Create a user for Mobiso according to your system requirements and be sure to do the following:
Assign the appropriate "SIP Phone" profile
Assign an available phone number
Verify the delivered DNIS is the full phone number
Configure SIP authentication credentials
Assign the "Call Transfer" privilege
Assign ANI/Caller ID privileges

Step 2: Provide the information below to connect your system to our Mobiso Speech Assistant platform:
Proxy Server Address or SBC
SIP Domain
Mobiso Phone Number
Mobiso Extension
Mobiso Authentication User Name
Mobiso Authentication Password

Operator Number
Voicemail Number

Setup Method #2: SIP Trunk Registration
Set up a SIP trunk directed at colo1.mobiso.com. Please note that Mobiso uses Port 5060/UDP for SIP communications and your configuration must reflect this.

Step 1: Create a SIP Trunk according to your system requirements and be sure to do the following:
Create the SIP Trunk with communications on port 5060/UDP
Assign an available phone number
Verify the delivered DNIS is the full phone number
Assign the "Call Transfer" privilege
Assign ANI/Caller ID privileges

Step 2: Provide the information below to connect your system to our Mobiso Speech Assistant platform:
Proxy Server Address or SBC   - this is the address that will send requests to Mobiso
Mobiso Phone Number
Mobiso Extension

Operator Number
Voicemail Number

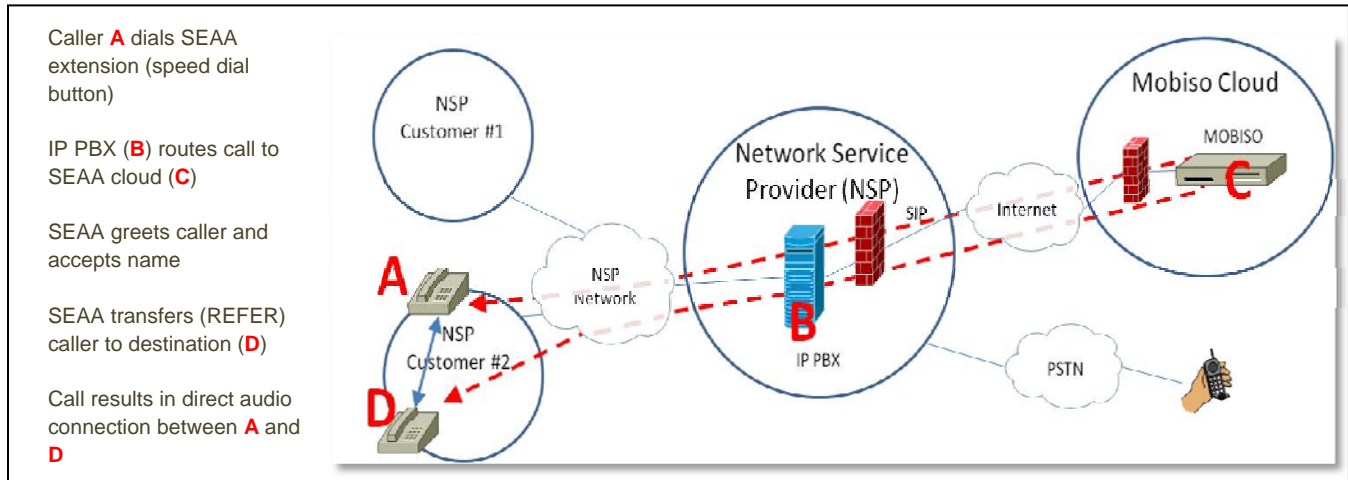**Hosted SEAA Sign Up Examples: SIP Client and SIP Trunk**

Providing an easy Sign Up experience for customers is key to getting customers up and running quickly.

Cloud-based SEAA Call Routing

Once enabled, a user dials the SEAA through the IP PBX and is passed to the SEAA system over SIP, where the system converses with the caller to determine their destination. The call is brief, and the satisfied user is transferred to the extension or phone number stored within their particular tenant partition.

The user may speak people, places, product names, customers…whatever names the customer feels is useful.   External callers, trying to reach your customer's users, can be serviced by a cloud-based SEAA the same way, with a company greeting welcoming the caller and then routing the caller to the correct destination; in this way, the SEAA serves as a customer service application in addition to a speech dialer for the customer.

See the sample call flow below for a SIP over Internet Hosted SEAA Call.

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Caller **A** dials SEAA extension (speed dial button)

IP PBX (**B**) routes call to SEAA cloud (**C**)

SEAA greets caller and accepts name

SEAA transfers (REFER) caller to destination (**D**)

Call results in direct audio connection between **A** and **D**

SIP Access over Internet Sample Call Flow

Testing by Lyrix including with live Hosted VoIP providers concludes that performance of SIP over Internet is feasible for a high quality SEAA application.

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5. New Business Model
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The new Deployment Model model above enables a new Business Model. Concentrating expensive technology resources and expertise and making them available on an "as-needed" basis is a perfect model for the resources and skills needed to deliver and maintain a high quality SEAA. Here are some of the reasons this model works.

Lower Costs Mean Lower Prices and Bigger Market There are obvious efficiencies when expensive telephony and speech resources are shared among many customers with varying usage patterns. These efficiencies are improved when you add the cost of redundancy and fail over. The cloud-based SEAA has a pool of ASR licenses and efficiently makes the most of that pool as follows:

- Since the SEAA is only in the call for the period of recognizing the utterance (not the entire phone call) the ASR license is tied up for seconds instead of minutes or hours. Once the

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utterance is recognized the call is transferred back to originating SIP connection for completion and the ASR license is freed up for the next incoming call

- Traffic engineering principles allows a pool of ASR licenses and SIP ports to be accessed efficiently when the busy hours of the customers are spread among time zones and countries. If the pool is nearing a threshold of say 80% usage, more licenses can be added.
- SIP over Internet is of more than sufficient quality for a brief call to allow the SEAA to recognize the utterance (typically 10 seconds) so that no expensive dedicated voice trunk is required to be allocated to activate the service.

Together these three approaches allow the cost of high quality SEAA to be dramatically lower than premise based SEAA.

Knowledge is shared and maximized across the cloud for maximum user satisfaction
A key benefit of provisioning SEAA out of the cloud is that all tenants benefit from the shared knowledge base of recognition results across service providers and users. Tasks such as failed recognition analysis and names tuning in multiple languages require sophisticated tools and deep linguistics expertise. A cloud-based SEAA allows all name recognition improvements to be shared among all tenants daily through a 'master dictionary' allowing customers to benefit each other's recognition performance. Thus, sophisticated centralized and automated utterance characterization and distributed multi language linguistics tuning are available to even the smallest customer at an affordable price.
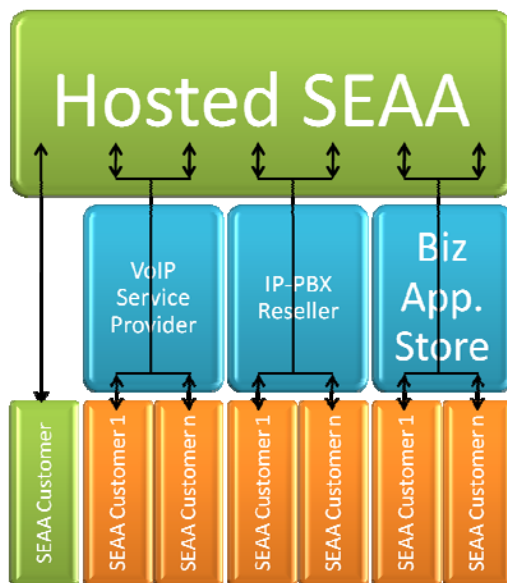
Multiple Distribution Channels to suite customers
Businesses are now able to activate a high quality SEAA for their business regardless of the number of employees or call volumes. They are able to pay as they go without any contract commitments or capital investment as they would with any other SaaS offering.

Depending on the degree of technical knowledge within their organization and their relationship with their VoIP telephony provider a cloud-based SEAA could be activated through a variety of possible business models:

Hosted SEAA Multiple Options

1. Customer purchase (as a service) from their IP-PBX Reseller
2. Customer sign up with their VoIP or Hosted VoIP service provider

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3. Direct sign up with a dedicated Hosted SEAA Provider such as Lyrix, Inc.
4. Customer self sign up on a Business App Store. Simply provide the SIP client information and authentication information for access to the Company Directory. Billing is monthly based on the size of directory

With the ubiquity of SIP and of broadband Internet, services such as cloud-based SEAA can be marketed, sold, and fulfilled by a variety of channels putting the power firmly in the hands of the customer to "try before they buy" and "cancel any time."

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6. Everybody Wins – Value Creation through Innovation
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By lowering the cost and complexity of deploying high quality speech applications for business, cloud-based solutions when properly architected and provisioned can unlock a previously untapped market.

Benefits to ASR Engine Providers:
- Maintain R&D focus on high quality engine development
- Maintain premium pricing while selling more licenses through hosted providers
- Expand market adoption by lowering cost of entry for their product

Benefits to Hosted VoIP Providers
- Add SEAA as value added service – vast improvement over DTMF dial by name directory
- Recurring value to client and recurring revenue
- Ties into other hosted VOIP services – speech enable follow me, conferencing,

Benefits to IP PBX Vendors (Cisco, Avaya, ShoreTel, Mitel, etc)
- Follow simple set of instructions to connect to SEAA cloud
- No additional investment in IP PBX required
- Add SEAA as value added service – vast improvement over DTMF dial by name directory
- Recurring value to client and recurring revenue

Benefits to Customers
- High quality SEAA previously only available to Large Enterprise now available to all SMB.
- No premise equipment required, or dedicated trunking
- Low entry cost, scales to reduce cost per user. SaaS based pricing scales to low and high
- Multi-languages available
- Ease-of setup - ask Hosted VoIP provider to add on
- Ease of Admin - automated MACs, easy Holiday, Weekend, Operator settings.
- Custom Professional Greeting (big company sound)

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7. Conclusions

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Hosted SEAA Checklist

✔	SEAA is High Quality (See Attributes Listed Above)
✔	Tenant Partitioned Platform
✔	Distributed Architecture
✔	Auto provisioning to VoIP Service Providers
✔	Centralized and automated utterance characterization
✔	Multi language linguistics tuning available
✔	Multiple Licensing Options
✔	Large Enterprise Experience
✔	24 * 7 Live Technical Support
✔	Customization / Re-Branding
✔	Guaranteed S L A
✔	No long term contracts

As we've discussed in this paper, new cloud-based solutions now make available high quality speech recognition at an affordable price to even the smallest and most distributed businesses allowing those enterprises to deliver a highly polished and consistent experience to the caller.

As a business and technology decision maker, when looking for a Hosted SEAA partner, we recommend looking carefully at the criteria list at left and including these and the other data provided in this paper in your evaluation and decision processes.

Contact us:

Lyrix, Inc.
900 Chelmsford St.
Tower III, 4th Fl.
Lowell, MA 01851
978-442-3000
mobiso.com [t] [f] Blog

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About Lyrix

Since 1996, Lyrix has been providing the industry's most accurate speech-enhanced directories for use as Speech Attendants and Speech-assisted Mobile Address books. Deployed worldwide by the world's most successful enterprises and technology vendors, Mobiso delivers better business agility while easing the costs and inefficiencies of communicating in an increasingly mobile and distributed world.

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