Verint Verba Collaboration Compliance Platform

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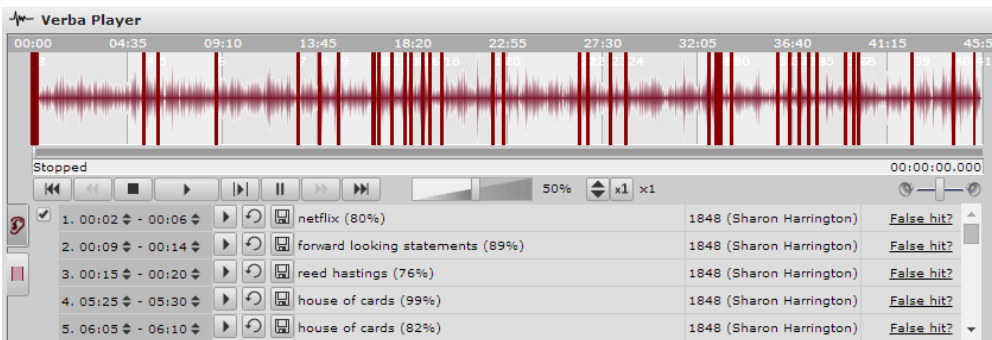
Speech Analytics Guide

Overview

This guide is for users who want to search in recordings and manage speech analytics.

The Verba Speech Analytics Solution provides ad-hoc phonetic search and categorization of your recorded voice and video conversations.

> This solution **does not provide transcripts** of your recordings, but uses phoneme recognition technology to find phrases that you are searching for.

The following articles provide detailed descriptions about

- Configuring Speech Analytics
- Administration of Search Phrases
- Using Speech Search

Why do I need Speech Analytics?

Searching the audio of your recordings will speed up quality assurance and compliance processes. We have collected a selection of ideas for using speech search as inspiration.

Licensing Speech Analytics

In order to use Verba Speech Analytics you need **Speech Analytics User Add-On licenses for each recorded user whose calls will be analyzed**.

Please contact your Verba partner or Verba sales in order to obtain the necessary licenses or to request a pilot.

> Our per user speech analytics licenses are subject to fair use capacity constraints e.g. max no. of hours audio indexed per day.

Language support

The Speech Search solution currently officially supports **US and UK English**. We will be adding more languages going forward.

Configuring Speech Analytics

Configuring your Verba Speech Analytics solution

Follow these steps to start using your speech search module:

1. Dimension your Speech Server
2. Configure speech search user rights
3. Configure speech indexes

How speech indexing works

Speech indexing is the foundation of the Verba Speech Analytics solution. The following 3 layered process is used:

- **Indexing**
    - Creates a phonetic index of voice for faster searches (processing runs at speeds *hundreds of times faster* than real time)
    - You can control the creation of phonetic indexes by Configuring speech indexes
- **Search in Indexes**
    - Searches for phrases in the phonetic indexes (searches are done at speeds of *tens of thousands times faster* than real time)
- **Result caching**
    - Stores results in a database cache for even faster retrieval (at speeds of *millions of times faster* than real time)
    - Add phrases to Configuring Phrase Auto Search to make sure results are automatically added to cache for each new call

Actual speed results may vary based on hardware, software environment and usage patterns. See Dimensioning your Speech Server.

> Review the concept of **Extended Search** in the Using Speech Search article, as your users will need to understand it, to use effectively.

Dimensioning your Speech Server

Dimensioning rules

The Verba Speech Server is a server role, which can be installed as a

- **standalone** server, or
- **co-located** with a Verba Media Repository (both Express and Enterprise Edition).

Here are a couple of rule of thumbs for dimensioning your Speech Server:

	Standalone Server	Co-located with a Verba Media Repository (installed within the same Windows Server OS)
Number of CPU Cores	Provide one CPU core per 30 simultaneous audio calls, but use minimum 2 cores. (E.g. 240 simultaneous calls: 8 CPU cores)	Provide one CPU core per 20 simultaneous audio calls, but use minimum 2 cores. (E.g. 160 simultaneous calls: 8 CPU cores)
Memory usage	Minimum 4 GB (8 GB or more is recommend)	8 GB or more
Impact on disk capacity	The size of the speech search index is ~10-12 Mbyte / hour *(This is up to 2x the size of WAV files using the GSM codec, which means your storage requirements can be up to 3x higher when you are using WAV/GSM.)* You can estimate your speech index storage requirements using the Storage requirements (make sure you select the GSM audio codec). Manage index storage impact by: - indexing only what is needed for search - deleting indexes that are not needed in the future - compromising search result confidence (not recommended - contact support, if you need help with this)	

Reference test result

Here is a reference test result run on a standard Intel server.

Server configuration

- 2.4 Ghz Quad Core Intel CPU
- 4 GB RAM 1066mhz DDR3
- Samsung hd502IJ 500GB (not SSD)

Data input

- **~22 hours** of bidirectional phone calls in WAV/PCM format (~2.5 Gbyte - 1322 minutes)

Results

- **Indexing ready in ~10 minutes** - 133x realtime - CPU above 90% (tests on SSD disks showed higher performance)
- **Search ready in ~16 seconds** - 4957x realtime - CPU at 10% due to IO bottleneck (tests on SSD disks showed much higher performance)

In our most optimized server scenarios, we have seen single server indexing performances up to 300x realtime and search results close to ~50,000x realtime.

Configuring speech search user rights

The availability and the level of access to the Speech Analytics module for a Verba user depends on two separate user rights which can be granted by a user with system administrator rights on a per-user basis (With the necessary role settings).

Speech analytics user rights

Speech rights can be configured on the configuration screens of Verba Roles **Administration > Roles > <select a role>**

- **Speech Search Right -** Allows the use of the speech search feature on the 'Search' page
- **Speech Analytics Administrator Right -** Speech Administrators can set up and modify the storage policies which schedule the speech indexing operation, and can also manage the Search Phrase list (add / remove phrases and set up auto search for select phrases)

> These user rights are only available in Verba Recording Systems with valid Speech Analytics licenses.

Assigning speech analytics user licenses

Speech analytics is licensed on a per user basis. Each person/user whose calls will be analyzed needs a Speech Analytics User Add-On license.

You can assign these licenses to roles, by setting the '**Speech Analytics > Indexed User'** checkbox on the role configuration page. This option is used as the basis of speech search enabled user licensing. This setting overrides indexing storage policies, calls of users without this setting will not be indexed and searched.

Configuring speech indexes

Speech indexes

Index files that allow fast speech search in recorded media are stored in separate files next to the recordings (see Dimensioning your Speech Server to understand the storage impact of these index files).

You can define the scope of indexing using the standard, built-in Verba Data Retention system. Users with Speech Administrator rights can create and manage the policies to **create and delete indexes** by using the appropriate page (**Speech Search > Data Retention Policies**) in the Verba Web interface.

Configuring speech indexing related data retention policies

Follow the steps below to create a new Data Retention Policy for Speech Search indexing:

Step 1 - Open the Verba Web interface and log in with a user that has the '**Speech Administrator**' right.

Step 2 - From the top menu select **Speech Search > Data Retention Policies**

Step 3 - In the top right corner click '**Add new Data Retention Policy**'

Step 4 - Fill in the Data retention policy data form according to your requirements. The following list provides details on each setting

- **Name -** Choose a name for the new policy.
- **Enabled -** Set to yes if you want the policy to start functioning right after you save the settings.
- **Priority -** Higher priority policies get executed first for calls that are selected by multiple policies
- **Action -** Choose the action the policy takes for selected calls. This can either be **Creating or Deleting Phonetic Indexes**.
- **Language and Engine -** Select the appropriate Language / Indexing Engine. Currently supported languages: English (United States), English (United Kingdom).
- **Decrypt encrypted calls -** Select this if you want to let the system decrypt formerly encrypted calls for indexing purposes
- **Transcode -** Check this if you want the policy to transcode the selected calls.
- **Format -** This is only available if the previous Transcode option is checked. Select an audio codec from the list you wish to transcode the calls with. The most typical setting is *gsm_fr*.

Step 5 - Specify your Data retention filtering criteria to select the calls you want the policy to apply to. You can use this section to **restrict the scope of indexing** to reflect your **organization's policies**.

- With the '**Calls more recent than**' filter you can restrict the policy to only create / delete indexes for the desired time period.
- You can apply more complex filters by enabling one or more **call detail record criteria**. To do so, click on the '+' button, select the field you want to filter, and type / select your filter. You can add additional filters by clicking the '+' button again and repeating the process.

Step 6 - Once you are done with filling out the settings form, click '**Save**' to save your policy.

If the Role setting '**Speech Analytics > Indexed User'** is not enabled, it will override your retention policies and remove a user's calls from indexing.

Administration of Search Phrases

Search Phrases

The foundation of the Verba Speech Analytics solution is a highly efficient speech search platform.

 If you have the Speech Administrator right, you can manage phrases to enhance the user experience by configuring Auto Search and Phrase Suggestions.

There are a couple of guidelines to consider when managing phrases:

- **Numeric characters are not allowed** in search phrases (type numbers as words instead).
- **Using longer search phrases** will improve the accuracy of searches, reducing the amount of false hits.

> Users with Speech Search right can search and find any phrase they type into search in an ad-hoc manner.
>
> **No phrase preconfiguration is required.**

Managing Search Phrases

The following articles will help you work with the above contacts in the web interface:

- List Phrases
- Manage Phrases
- Configuring Phrase Auto Search
- Configuring Phrase Suggestions

List Phrases

Search phrase list and statistics

To view the configured search phrases and some statistics about them, navigate to the phrase list in the Verba web interface **Speech Search > Search Phrases**.

The list displays the following information about each search phrase

- **Language** - language is defined for each phrase, needed for multilingual systems
- **Auto Search -** shows whether the phrase is in auto-search
- **Exclude from suggestions -** phrases with this setting will not show up in search phrase suggestions
- **Searches -** the number of speech searches performed where the phrase was included (high number here signals, that the phrase is a good auto-search candidate)
- **Number of hits -** the total number of hits for the phrase since it was added to the list
- **Hit Frequency (%) -** shows the percent of analyzed calls where the phrase is present (multiple hits in the same file are counted multiple times, therefore this might become larger than 100%)
- **Added -** the date the phrase was added to the list
- **Last searched -** the date of the last search where the phrase was included (rarely used old phrases can be purged from the system to free storage and processing resources)
- **ID -** internal phrase ID

Find and List Speech Phrases — Add New Speech Phrase

Phrase	Language	Auto Search	Exclude from Suggestions	Searches	No. of Hits	Hit Frequency (%)	Added	Last Searched	ID
house of cards	English (United States)	No	No	10	36	78.261%	May 5, 2014 2:47:39 PM	May 7, 2014 4:15:05 PM	17
test phrase	English (United States)	No	No	7	15	31.915%	May 5, 2014 2:15:17 PM	May 5, 2014 3:37:28 PM	16
microsoft	English (United States)	No	No	5	56	63.636%	May 2, 2014 9:49:40 AM	May 7, 2014 4:22:31 PM	2
steve ballmer	English (United States)	No	No	3	5	12.195%	May 5, 2014 1:45:12 PM	May 6, 2014 10:37:29 AM	8
Steve Jobs	English (United States)	No	No	3	4	10.256%	May 5, 2014 12:07:03 PM	May 5, 2014 3:37:49 PM	5
doctor eric shmitt	English (United States)	No	No	2	0	0.0%	May 5, 2014 2:11:26 PM	May 5, 2014 2:11:38 PM	12
earnings before taxes	English (United States)	No	No	2	0	0.0%	May 5, 2014 2:13:17 PM	May 5, 2014 2:14:39 PM	15

Find | Phrase | begins with

No active query. Please enter your search criteria using the options above.

30 items found, displaying 1 to 20. Page(s): |< < 1 2 > >|

Adding New Search Phrases

All search phrases are automatically added to the system when users search in the system.

It is also possible to add new search phrases manually:

Step 1 - Log in to the Verba web interface with a user that has the '**Speech Administrator**' right (Users with system administrator rights can assign that right).

Step 2 - Navigate to the search phrase list using the top menu: **Speech Search > Search Phrases**

Step 3 - Click on the '**Add New Search Phrase**' button in the top right corner.

Step 4 - Type the phrase you wish to add

Step 5 - Select the language. Languages currently available: English (United States), English (United Kingdom)

Step 6 - Check the 'Auto Search' option if you want to enable auto search for the phrase

Step 7 - Check the 'Exclude from suggestions' option if you want to exclude this phrase from the auto suggestion list.

Step 8 - Click '**Save**' to save the phrase. Note that the rest of the fields in the form can't be filled out manually, those are populated by the system later on.

Under the Speech Search / Manage Phrases menu item, you can add multiple phrases at once.

Manage Phrases

Bulk Phrase Update

Using the tool under the **Speech Search / Manage Phrases** menu item you can add, update or remove multiple search phrases at once.

Adding multiple search phrases

1. Go to **Speech Search / Manage Phrases**
2. Select the language you are using in your searches
3. Set Operation to **Add/Update**
4. Set **Auto Search** as required (see below)
5. List the phrases (one per line)
6. Click **Submit**

Enabling Auto Search will make searches very fast for those phrases. This will increase the system load, since the phrase will be searched in every new incoming call.

Removing multiple search phrases

1. Go to **Speech Search / Manage Phrases**
2. Select the language you are using in your searches
3. Set Operation to **Remove**
4. List the phrases (one per line)
5. Click **Submit**

When a phrase is removed, it will not show up in suggestions and auto search information will be deleted, which will make subsequent searches slower.

Adding existing phrases to Auto Search

1. Go to **Speech Search / Manage Phrases**
2. Select the language you are using in your searches
3. Set Operation to **Add/Update**

4. Set **Auto Search** as **Add to Auto Search**
5. List the phrases (one per line)
6. Click **Submit**

This will add all listed phrases to Auto Search (it will also create non-existent phrases).

Configuring Phrase Auto Search

Auto Search

Speech administrators can enable auto-search for phrases:

- phrases in auto-search are **automatically searched on all new calls**
- actual search **results are stored in database**

This process makes searches for auto-searched phrases very fast.

Configuring Auto Search

Typically **Speech Administrators** should add most used phrases to auto-search:

- See List Phrases to see how to identify most used phrases
- Add multiple phrases can be added automatically using the Bulk Phrase tool under Manage Phrases

Configuring Phrase Suggestions

Phrase Suggestions

Every time a user is searching for a phrase, it will be automatically added to the global phrase list inside the system. Already used phrases are used for suggestions when a user is defining speech search criteria.

The system provides a couple of **safeguards for phrase suggestions**:

- by default phrases are suggested only the user who have already used it by typing it in
- phrases added by administrators also become part of suggestions
- administrators have the right to remove phrases from suggestions (e.g. inappropriate words)

Excluding a phrase from suggestions

Search phrases are automatically added to the suggestion system when users search in the system.

You can exclude phrases from suggestions, by following these steps:

Step 1 - Log in to the Verba web interface with a user that has the '**Speech Administrator**' right (Users with system administrator rights can assign that right)

Step 2 - Navigate to the search phrase list using the top menu: **Speech Search > Search Phrases**

Step 3 - Click on the phrase you would like to exclude

Step 4 - Check the 'Exclude from suggestions' option

Step 5 - Click '**Save**' to save the phrase

Using Speech Search

Integrated Speech Search

Speech Search is integrated into the regular Verba search interface:

1. Speech Search Filters on the left Search tab allow you to specifiy phrase based searches
2. Search Results show a Confidence column, to show how reliable the results are
3. When you click play on a result, the player shows search phrases directly on the waveform diagram

Understanding Extended Search

> The concept of **Extended Search** is vital to understand when worknig with speech search in Verba.

In order to provide a highly responsive search experience, the **search is separated into two steps**:

Summary	Description
Step 1 **Initial Results** Initial results are **fast**, but **might not be complete**	These are shown *every time* you press the Search button (with speech phrases included). To achieve faster response times **this will only show results from the database:** • results of previous searches • results of auto searches
Step 2 **Extended Search** Extended search **can take longer**, but are **complete** *(within the reasonable limitations of speech search - see below)*	When the Initial Results are not sufficient, you can ask the system to do discovers further calls that: • have not been searched before or • were not in auto search for the phrases in question Since this step might take longer, a counter at the top of the results will show you progress.

After performing a Search, the Initial Results are shown in the list to the right and an **Extended Search button** appears above the list.

Extended Search takes longer to complete, since it potentially requires processing thousands of speech index files. Therefore, Extended Search is performed as a **background task** with a progress indicator above the

search results. If you leave the search interface and come back (even logout and login later), you will see the updated progress in the Search interface.

During the Extended Search you **can not modify your search criteria**. In order to do that, **Cancel** the Extended Search using the button above the call list and start a new search.

Limitations of speech search

Speech search solutions are never 100% accurate. Sound quality and regional language variations impact the actual accuracy of searches.

For all speech search results the system calculates a **Confidence** value. High (>90%) confidence values mean, that the hits are most likely correct.

Always consider this value to determine the success of your search. If you notice a *false hit* there is an option in the Verba player to remove that result from future searches.

Searching for longer phrases will drastically reduce the possibility of false hits.

Speech Search Filters

Using Speech Search

The Speech Search function is integrated into the main Search tool of the Verba web interface. Users who have the **'Speech Search' right** are able to see additional search filters on the Verba Search page called **'Speech Search'**. Note that if the user performing the search is not a System (or group) Supervisor, they will **only be able to search among their own calls**, just like with regular searches.

Speech Search related filtering options include the following:

- **Language:** This shows the language of the search phrases you are entering
- **Confidence:** Allows filtering based on the 'Probability' value of the hits (see details on probability below)
- **Search in:** Allows restricting the search to just one party of the call (recorded party, other party or both)
- **All of these keywords:** The search will only return calls where all of the specified keywords are found.
- **Any of these keywords:** The search will only return calls where at least one of the specified keywords are found
- **None of these keywords:** The search will only return calls where none of the specified keywords can be found.

The last three fields can be used together in the same search to form complex search criteria. There is an auto-complete function integrated to allow fast application of previously used keywords.

> Make sure **Language** in the search interface is properly set, otherwise phrase suggestions and speech search results will be incorrect.

Speech Search Results

Search results

Speech search results include an additional **Confidence** field, it shows how confident the system is regarding the accuracy of a particular hit.
There is only one confidence value for each call, if there are multiple phrase hits in a call, the highest confidence value will be shown here.

	Confidence	Start DateTime	Duration	Caller Number	Caller Info	Called Number	Called Info
▶ 🖫 ✉ 🗑 ✎ 🛡 ☑	94%	Apr 30, 2014 2:41:23 PM	00:52:00	1848	Sharon Harrington	1-800-5551234	Microsoft Fiscal Year 2014 - Second Quarter Earnings Conference Call
▶ 🖫 ✉ 🗑 ✎ 🛡 ☑	94%	Apr 30, 2014 2:15:26 PM	01:15:00	1848	Sharon Harrington	1-800-5551234	Google 2012 Annual Meeting of Stockholders
▶ 🖫 ✉ 🗑 ✎ 🛡 ☑	93%	Apr 30, 2014 2:30:08 PM	00:56:00	1848	Sharon Harrington	1-800-5551234	Google Q3 2011 Earnings Call
▶ 🖫 ✉ 🗑 ✎ 🛡 ☑	92%	Apr 30, 2014 2:44:40 PM	00:45:19	1848	Sharon Harrington	1-800-5551234	Netflix Q4 2013 Earnings Interview
▶ 🖫 ✉ 🗑 ✎ 🛡 ☑	92%	Apr 30, 2014 2:43:42 PM	01:00:00	1848	Sharon Harrington	1-800-5551234	Netflix Q3 2013 Earnings Interview

> Speech search will only work for calls that have been **indexed**. Indexes are created automatically based on configured Data Retention Policies.

Showing search phrases

When performing a speech search and playing the media in the Verba Player (pressing the play button) the system automatically places **markers** in the audio to **highlight the location of the keywords** the user searched for.
The Verba Player will present speech search results tab (the **Ear icon**) in the Verba player in two cases:

- **During speech search** - when a speech search is executed the player will only show the keywords used in the search criteria
- **Outside speech search** - when there are no speech phrases in the search criteria, the player will show all stored phrase hits

Removing false hits

From time to time the system might find phrase hits, that are not actually corresponding with the actual search phrases.

If you notice a false hit, **click the 'false hit' link** next to the phrase marker of every hit.

By pressing this link (**twice**) the system will remove that hit from your future searches.

Ideas for using speech search

Overview

This article provides some ideas and use cases for the Verba speech search feature. Most used scenarios all revolve around finding certain topics in a particular conversation and identifying sentiments on either party.

Search is a great tool for quality assurance and enables e.g. contact center supervisors to quickly find key points in conversations and provide feedback to agents. Enabling Auto Search for frequently used phrases with greatly increase the speed of searches for those phrases.

Examples of speech search in quality assurance and compliance

> The ideas presented here are just the tip of the iceberg. Speech search and analytics requires an ongoing refinement process.
>
> The effective techniques are heavily dependent on your field of business.

The following categories represent just a few of the countless scenarios, where your business can benefit from the Verba Recording System with Quality Management and Speech Analytics.

- Agent evaluations
  - Proper greetings
  - Compliance message
  - Inappropriate phrases
  - Agent insecurities
- Voice of Customer
  - Customer satisfaction
  - Campaign responses
  - Competitors' names
  - Money back policies
- Sales Performance
  - Opportunities for up-selling and cross-selling
  - Identify buying signals
  - Sales delivery

Agent evaluations

You can use Verba speech analytics to support your contact center agent evaluation process.

Proper greetings

Checking if agents properly greeting your customers:

- "Welcome to <your company name>"
- "Thanks for calling <your company name>"

Compliance message

You might want to check if your agents properly inform the customer about recording:

- "Call will be monitored"
- "Call will be recorded"

Verify if your agents are following legal compliance guidelines:

- "Your contract comes with 2 years binding period"
- "Past performance does not guarantee"

Inappropriate phrases

Spot rude or inappropriate language quickly and efficiently.

Agent insecurities

Certain phrases point to situations where the agent needs more training or better processes:

- "I need to ask my"
- "I am not sure"
- "I'll be right back"
- "let me talk to a colleague"
- "hang on a second"
- "let me put you on hold"

Voice of Customer

Customer satisfaction

Collect and auto-search phrases that indicate satisfaction and dissatisfaction with your services, like:

- "I am not happy"
- "I would expect better service"

Campaign responses

Your ongoing marketing campaigns will change communication patterns of your customers:

- "Buy One, Get Two" (notice, how numbers are written as text, it is a requirement of the search solution)
- "Complimentary Subscription"

Using this technique your marketing team can get qualitative feedback about campaigns.

Competitors' names

You can learn a lot by listening to what your customers have to say about your competition. If those names are too short, try to put them into relevant phrases that provide good context for the recognizer.

Money back policies

If you want to investigate your money back policies in action, try to create saved searches for:

- money back (might be too short for high accuracy, so you can try longer typical phrases)
- credit on the invoice
- service credit
- reimbursement

Sales Performance

Opportunities for up-selling and cross-selling

Find opportunities by searching for customer needs:

- "My internet connection is slow"
- "My new car" - you might sell insurance

Identify buying signals

Search for buying signals and train agents when opportunities are missed:

- "Before I order, I would like to"
- "Can you go into more details"

Sales delivery

Evaluate how your sales team talks to customers and listen to responses.

Identify typical phrases from your companies pitch and focus on reactions after the pitch is delivered.

- "Is that something you are looking for?"

- "Do you find this information valuable for you?"

You can use **Saved Searches** in Verba, to easily create reusable queries that focus on multiple phrases. In **Q3 2014** we will release functionality that allows you to create and use categories (like Money Back Policy in the example above), that will automatically classify calls based on your phrases and rules.