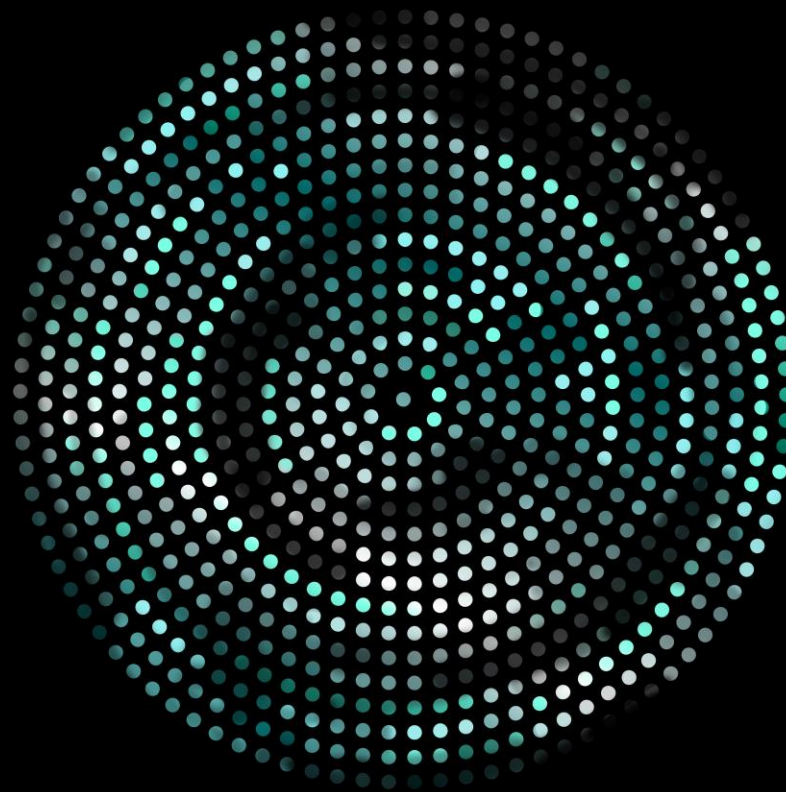


**Deloitte.**



## **ASIC's Regtech Voice Analytics Symposium**

24 September 2019

# Scope

Objective:



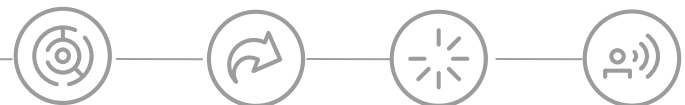
Can VA&VT help identify conduct more efficiently than manual listening?



What needs to be true of call recordings for the technology to work?



How can VA&VT be improved?



# Consent or not?



# Recording observations



🗣️ If you can't understand it, neither will the machine

🗣️ Separate the customer from the agent (dual channel)

🗣️ Have you recorded everything?

🗣️ Compression matters

🗣️ Background noise



# Where we started

## Text transcript extract (mono channel call)



00:10

I've just received a letter, I need to know when did I sign for this?



00:35

It was a simple life policy, 73.95 a month and covered TPD and a life benefit and you've had it since 2014. I've never noticed. It was done over the phone, one of the team members called you.



00:42

You've never noticed the premium coming out of your accounts? Do I get any money back, I never knew about this and I can't remember when..maybe I was drunk...can you stop it? I'm not ready for that.

Silence?

Tone?

Overtalk?

Agent talking more ?



# Speech engine - phonetic analysis

The screenshot shows a software interface for speech analysis. At the top, there is a search bar and a 'Spoken Phrase Search' section. Below this is a table listing audio files with columns for File Name, Duration, Status, and Relevance. At the bottom, there is a 'Media Player' section showing a waveform and audio controls.

File Name	Duration	Status	Relevance
DM7.00.10.0001.0245.wav	00:14:58	Indexed	98
DM7.00.10.0001.2113.wav	00:04:06	Indexed	97
DM7.00.10.0001.2278.wav	00:45:47	Indexed	97
DM7.00.10.0001.2397.wav	00:27:22	Indexed	98
DM7.00.10.0001.2423.wav	00:34:09	Indexed	98
DM7.00.15.0001.0745.wav	00:24:46	Indexed	98
DM7.00.15.0001.0873.wav	00:26:15	Indexed	98
DM7.00.15.0001.0889.wav	00:27:05	Indexed	98
DM7.00.15.0001.0904.wav	00:14:47	Indexed	97
DM7.00.15.0001.0913.wav	00:34:19	Indexed	97
DM7.00.15.0001.0914.wav	00:20:00	Indexed	98
DM7.00.15.0001.0931.wav	00:22:53	Indexed	98
DM7.00.15.0001.0932.wav	00:23:44	Indexed	98
DM7.00.15.0001.0934.wav	00:21:51	Indexed	98
DM7.00.15.0001.0962.wav	00:50:39	Indexed	98
DM7.00.15.0001.0963.wav	00:13:22	Indexed	98
DM7.00.15.0001.1064.wav	00:44:37	Indexed	98
DM7.00.15.0001.1083.wav	00:26:03	Indexed	98
DM7.00.15.0001.1084.wav	00:39:22	Indexed	98

The screenshot shows a search results window titled 'Terms - DM7.00.10.0001.0245.wav'. It contains a table with columns for Phrase, Score, and Start Offset.

Phrase	Score	Start Offset
a lot of money for you	97	00:01:22.7
lot of money to you	92	00:01:22.9
we give you a cooling off period	94	00:06:44.0
cooling off period	97	00:06:44.3
have three policies	97	00:07:03.7
can set up the first payment as far away as	97	00:07:06.8
defer payment	91	00:07:07.4
we do work in a secure environment	98	00:10:31.5
I am not sure how else we could put it through	97	00:10:34.8
I do not understand	91	00:10:55.5
I don't understand	94	00:10:55.5
those are the only two options	95	00:11:09.2
we can't send it out until we finish the applic...	97	00:11:18.4
have a think about it	97	00:12:03.9
give you both a ten percent family discount	97	00:12:09.1
ten percent family discount	97	00:12:09.7
family discount	97	00:12:10.3

The screenshot shows a search results window titled 'Terms - DM7.00.10.0001.0245.wav'. It contains a table with columns for Phrase, Score, and Start Offset.

Phrase	Score	Start Offset
a lot of money for you	97	00:01:22.7
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can set up the first payment as far away as	97	00:07:06.8
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have a think about it	97	00:12:03.9
give you both a ten percent family discount	97	00:12:09.1
ten percent family discount	97	00:12:09.7
family discount	97	00:12:10.3



# Speech engine - audio and phonetic analysis

The main application window displays a search results list for the term '(170)\_v05\_conduct'. Below the list is a media player showing an audio waveform for the selected file.

File Name	Duration	Status
DM7.00.10.0001.0245.wav	00:14:58	Incl
DM7.00.10.0001.2113.wav	00:04:06	Incl
DM7.00.10.0001.2278.wav	00:45:47	Incl
DM7.00.10.0001.2397.wav	00:27:22	Incl
DM7.00.10.0001.2423.wav	00:34:09	Incl
DM7.00.15.0001.0745.wav	00:24:46	Incl
DM7.00.15.0001.0873.wav	00:26:15	Incl
DM7.00.15.0001.0889.wav	00:27:05	Incl
DM7.00.15.0001.0904.wav	00:14:47	Incl
DM7.00.15.0001.0913.wav	00:34:19	Incl
DM7.00.15.0001.0914.wav	00:20:00	Incl
DM7.00.15.0001.0931.wav	00:22:53	Incl
DM7.00.15.0001.0932.wav	00:23:44	Incl
DM7.00.15.0001.0934.wav	00:21:51	Incl
DM7.00.15.0001.0962.wav	00:50:39	Incl
DM7.00.15.0001.0963.wav	00:13:22	Incl
DM7.00.15.0001.1064.wav	00:44:37	Incl
DM7.00.15.0001.1083.wav	00:26:03	Incl
DM7.00.15.0001.1084.wav	00:39:22	Incl

The dialog box shows the spoken phrase 'h\_E\_n\_j\_i:u:h\_E' and its phonemes 'h E n j i: u: h E'. Below is a table of search hits.

Hit?	File	Offset	Relevance
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.1027.0003.0018.wav	00:01:33.1	97
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.0015.0001.1017.wav	00:06:35.6	97
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.0015.0001.0774.wav	00:12:24.5	96
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.1028.0001.0244.ogg	00:01:02.7	96
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DS4.0010.0001.0298.mp3	00:03:02.8	96
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.0010.0001.0245.wav	00:06:37.7	96
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.0010.0001.0245.wav	00:06:37.7	96
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.1027.0004.0221.wav	00:12:42.9	96
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DS4.0010.0001.0623.mp3	00:03:55.0	95
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.1027.0003.0112.wav	00:09:12.4	95
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.1028.0001.0395.ogg	00:25:17.8	95
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DS4.0010.0001.0842.mp3	00:05:14.8	95
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.0010.0001.1696.wav	00:14:00.7	95
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.0015.0001.1017.wav	00:07:31.3	95
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.1026.0004.0012_A.wav	00:22:30.0	95
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.1026.0004.0011_A.wav	00:22:30.0	95
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.0010.0001.2278.wav	00:42:20.3	94
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.0010.0001.2278.wav	00:42:20.3	94
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.0015.0001.1027.wav	00:14:18.0	94
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.0015.0001.1017.wav	00:06:19.9	94
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.0015.0001.0752.wav	00:20:08.6	94
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DM7.1027.0004.0349.wav	00:12:00.0	94
<input checked="" type="radio"/> Y <input type="radio"/> N <input checked="" type="radio"/> ?	DM7.0010.0001.1013.wav	00:14:55.8	94
<input checked="" type="radio"/> Y <input type="radio"/> N <input type="radio"/> ?	DS4.0010.0001.0438.mp3	00:10:15.6	94

Validated Hits: 18 False Alarms: 4 Not Validated: 113 (84%)

Save this pronunciation

IMPROVE IT... OK CANCEL HELP

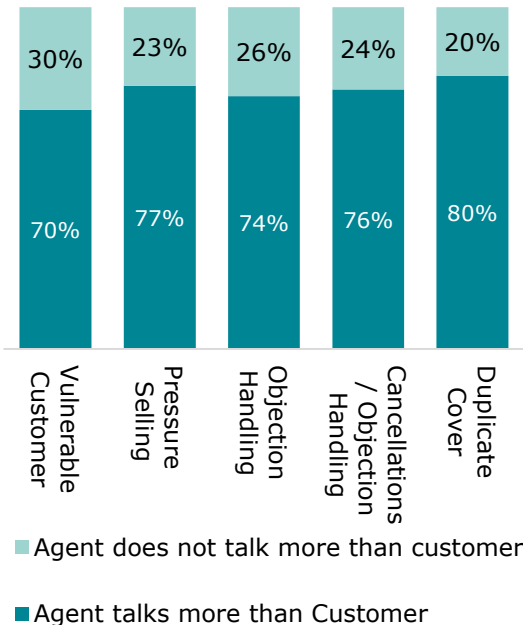


# Key observations – non verbal indicators

Given the sample was not from a general population, rather than considering whether non verbal indicators predicted an outcome we compared them against calls with phrase matches vs non phrase matches.

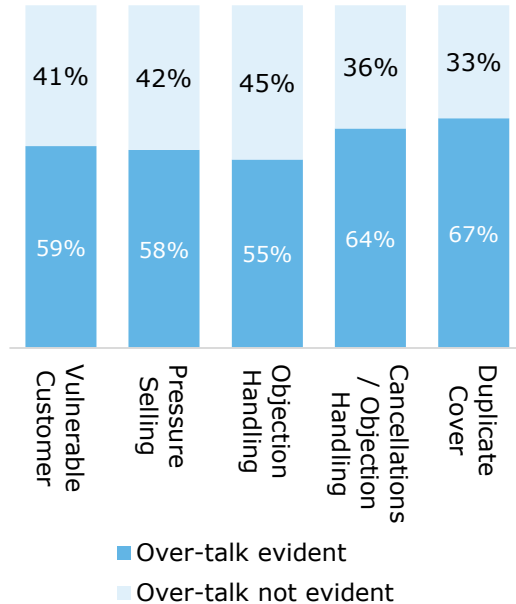
## Agent spoke more

The agent spoke more than the customer more than **2/3rds of the time**



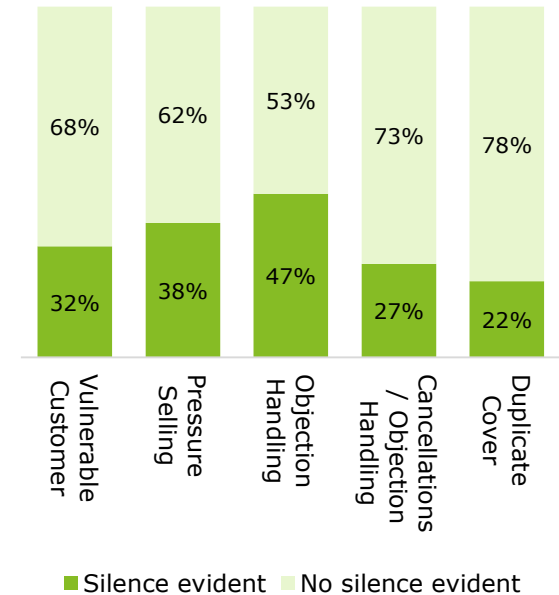
## Overtalk

The agent and customer spoke over each-other in 69% of all calls  
**Mean 105.5%**



## Silence?

**28% of calls** had Silence (after adjusting for background noise)



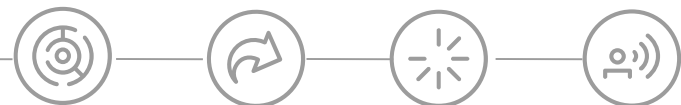
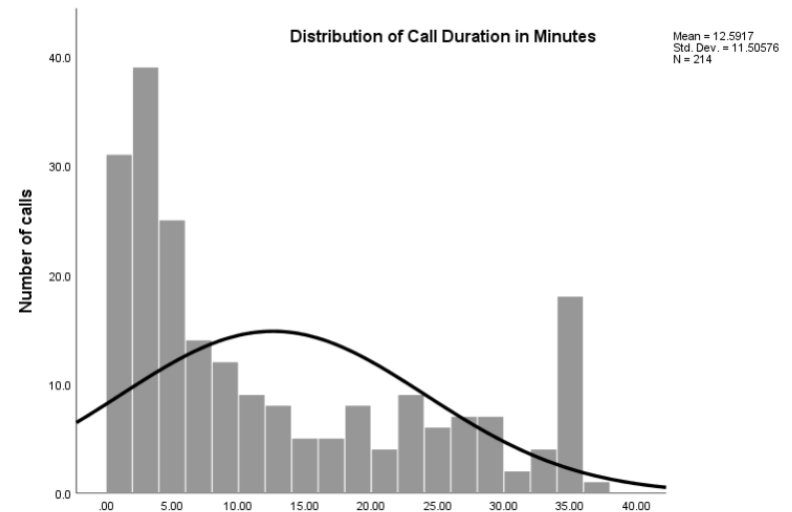
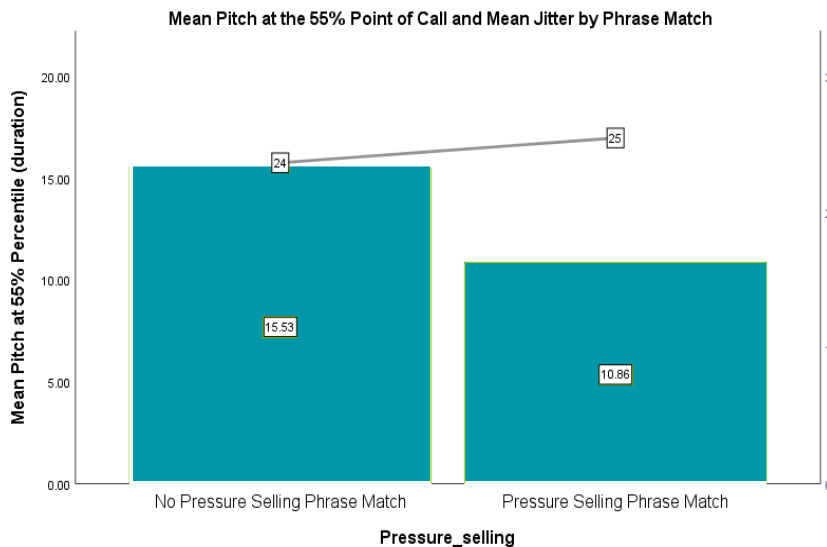


# Key observations – non verbal indicators

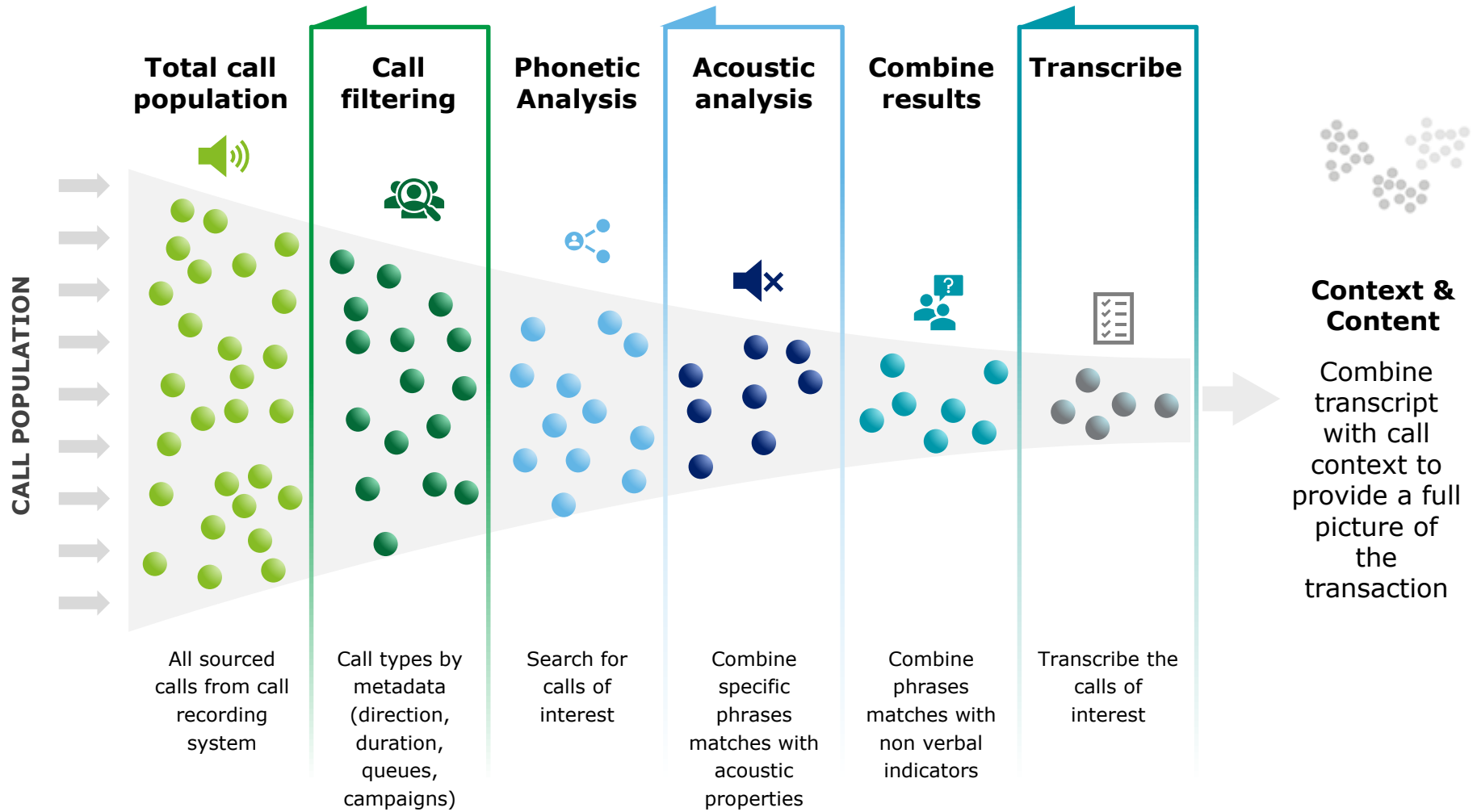
At just over half-way in the call (55%),

- pitch was higher for calls with no phrase matches vs phrase matches
- Jitter was higher for calls with phrase matches vs no phrase matches

The call duration distribution is skewed towards shorter calls – a significant variance from what might be observed in the standard population.



# The process



# Conclusions



Can VA&VT help identify conduct more efficiently than manual listening?

Yes, but before automation, accurate libraries and modelling to cater for things that cannot be controlled (Accents, screaming toddlers) is needed. This helps remove the "Computer says no" scenario



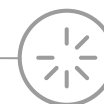
What needs to be true of call recordings for the technology to work?

Optimal networks, dual channel, full record, Lossless formats, Reduce background noise



How can VA&VT be improved?

- Bulk cleaning of customer background noise,
- Join the dots and use data to fill in the blind spots
- Better SME knowledge and integration
- Realise the limitations of a technical installation





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