



**SPEECHPRO**

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# Deploying Voice Biometrics: A How-To-Guide

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# Baby Alisa Khitrova!



**SpeechPro** is the US subsidiary of the Speech Technology Center (STC)

**STC** is a World Leader in Voice Technology with customers in 70 countries

**STC** was established in 1990 & fully Certified ISO-9001:2008

**STC** has offices in US, Mexico, Germany, Finland with HQ in St. Petersburg Russia



**“SpeechPro has established a leadership position in a fast-growing and potentially large sector of the voice biometrics marketplace”**

**Dan Miller,  
Senior Analyst at Opus Research, USA**

# SPEECHPRO HAS DEPLOYED LARGE SCALE PROJECTS:



## 2010 – First Nationwide voice biometric system in Mexico

- Identification of suspects and criminals (VoiceGrid)
- First system of this scale in the world
- Current capability of the database: over 1 Million
- Access by 250 jurisdictions across the country
- Peak performance – 300K searches per minute



## 2012 – Nationwide biometric system in Ecuador

- Identification of suspects and criminals (VoiceGrid)
- Enrollment of inmate population
- Bi-modal solution – integration and fusion
- Collection – fewer challenges than expected
- Voice + Face- Two non-intrusive modalities

## Voice Biometric Deployment

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1. Reiterate Business Case
2. Vendor Selection Criteria
3. Determine Modes
4. Passphrase Management
5. Architecture
6. Liveness Detection
7. Threat Protection
8. ID Authentication
9. Go-To-Market Planning

# Who do I buy from? Integrator or Vendor?


## Integrator

- Customer prem or cloud based
- Flexible to SLA requirements
- Closer to customer infrastructure
- Localized, familiar resources
- Provides ancillary technologies :
  - *Pillphone*
  - *CloudID, OOB interactive authentication*



# Who do I buy from? Integrator or Vendor?

## Vendor

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- **Global availability**
  - **Best practices across many customers**
  - **Deeper knowledge of biometric algorithms**
  - **Broader feature set availability**
  - **Deeper customization to customer infrastructure**
  - **Scientific team engaged from inception to completion**
  - ***Vyatka Bank- customized to needs of VIP clients***

# Voice or Multi-modal

## Voice

- Ease of implementation, enrollment, use, maintain
- Ubiquity of audio collection devices, voices
- Fast efficient processing
- TD or TI verification, short leap to fraudster ID
- Vulnerable to situational impairments

## Multi-modal

- Combined EER's: much higher accuracy
- Billions of multimodal biometric devices already deployed
- Link for better anti-spoofing
- Provides dynamic situational impairment solution
- Let user decide





# Passphrase: Static, Prompted or Text Independent

## Static

- Typically higher accuracy
- Shorter utterance
- Might be perceived less secure by users (need to say out loud)

## Prompted

- 20% longer utterances
- Need to read / repeat
  - Less convenient user experience
- Spoofing protection
- Higher security

## Text Independent

- Transparent for users
- Speaker change detection
- Fraudster detection
- Longer samples (5-7 seconds for a voice print) Hard to use for login

# Architecture: Client vs Client/Server

## Client

- **Biometric model creation is done on the device**
- **Matching is done on the device**
- **No internet req'd**
- **Question of liability**
- **Question of security**

## Client/Server

- **Thin-client, no data stays on device**
- **Model created in device or on server**
- **No data stays on device**
- **Binary data xferred to server for matching**
- **Potential slowness**

# Liveness Detection Options

## Prompted password

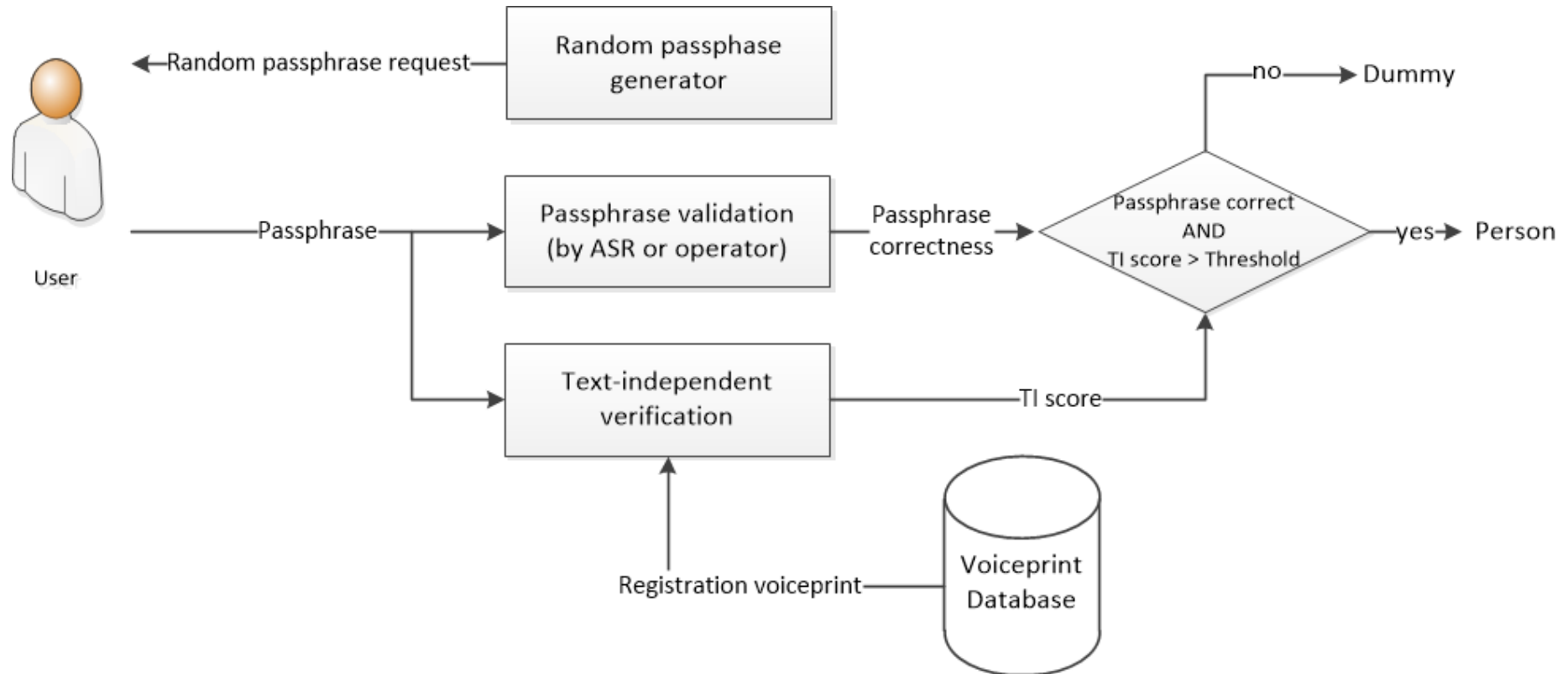
**Replace static with prompted password  
(ask user to read random combination of enrolled words/ numbers)**

**Variation - Static-Prompted Password  
- part of the password always the same, part is variable**

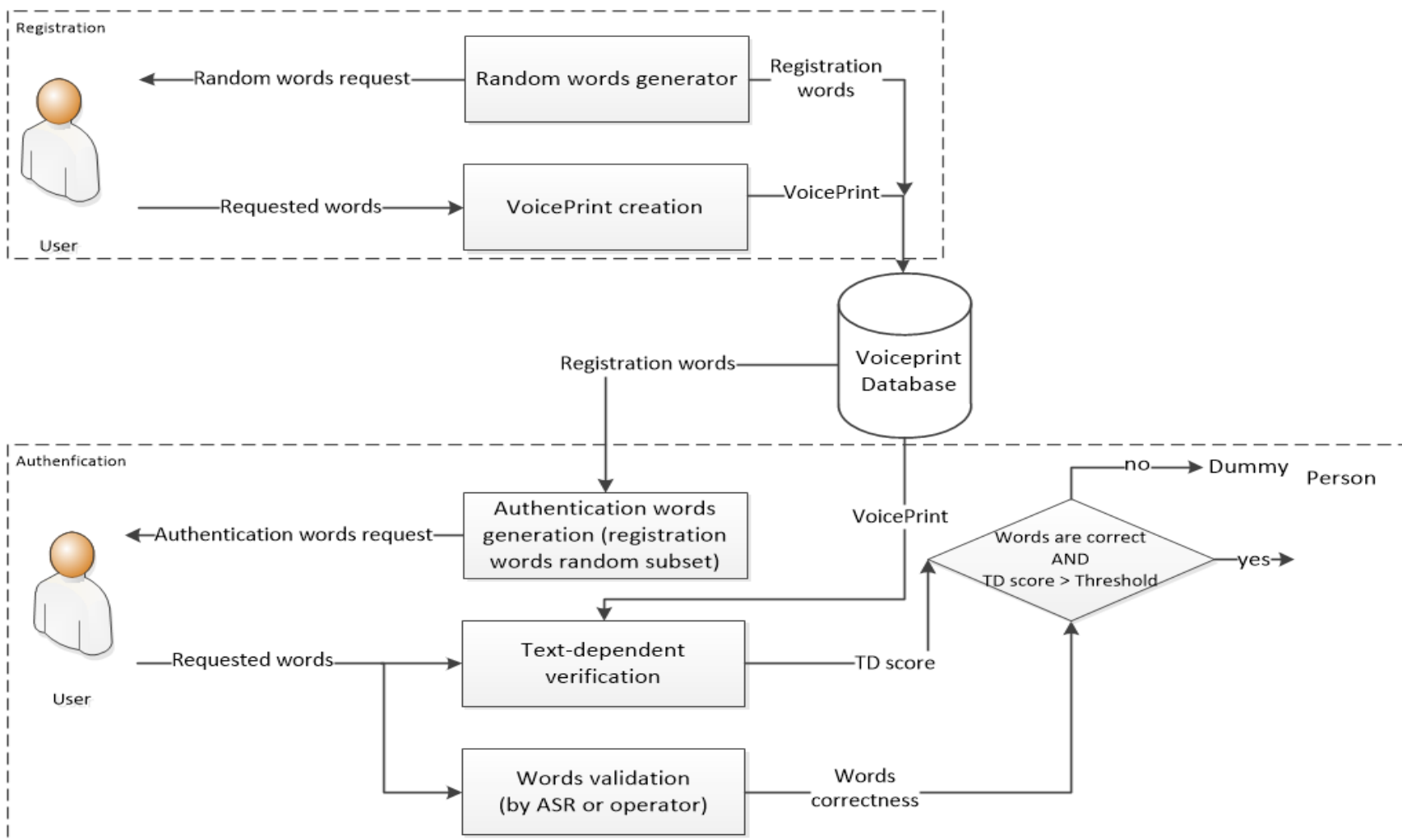
## Multi-modal

**Connecting facial movements to the speech to establish a speaker in front of a device**

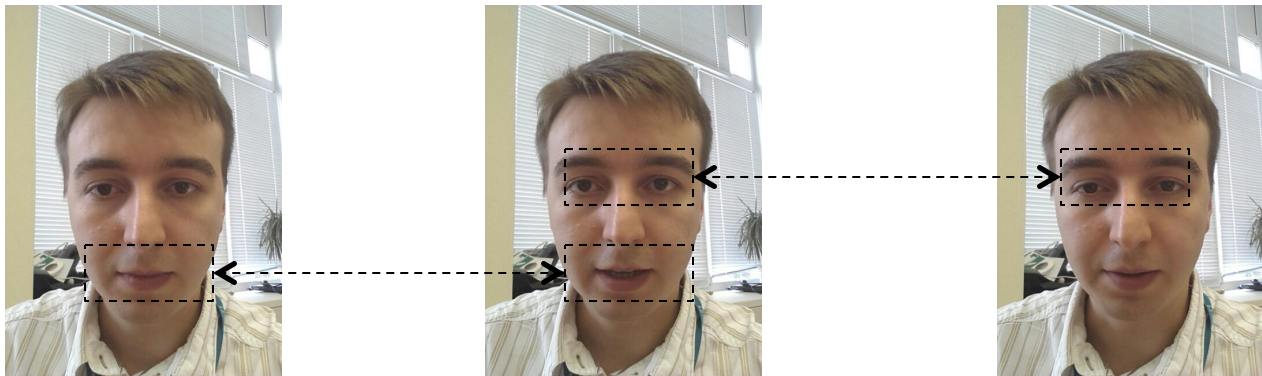
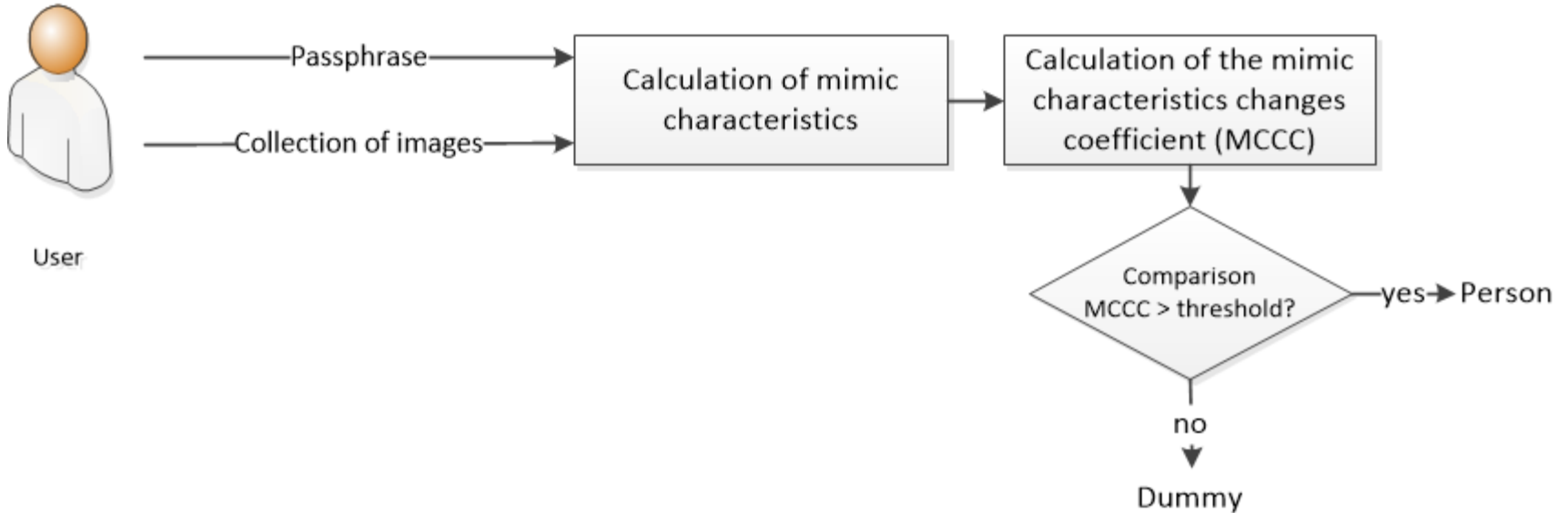
# Random passphrase TI liveness detection



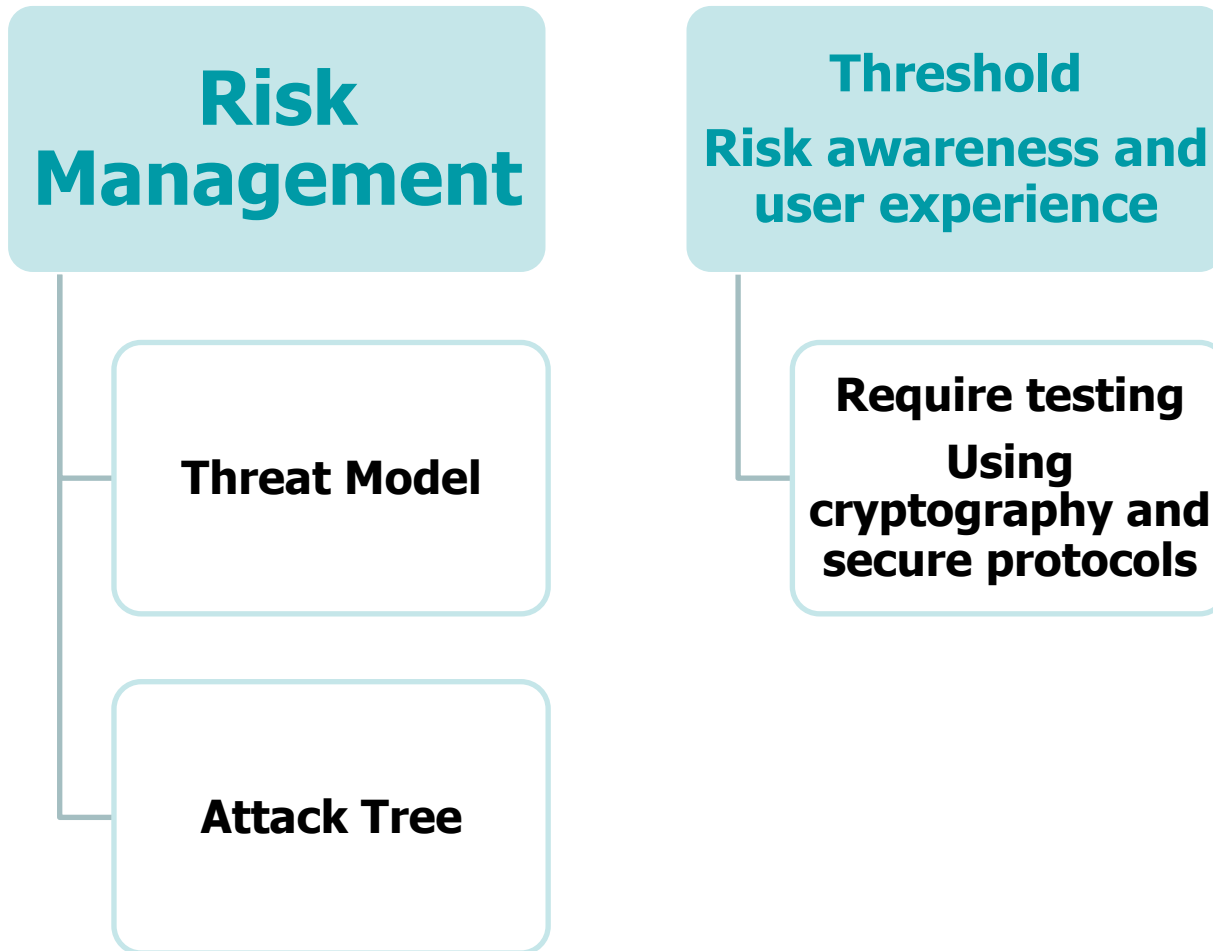
# Random words TD liveness detection



# Facial liveness detection (OnePass)



# Threat Protection: Thresholds single score vs multiple thresholds



# User Enrollment

- **Active/Live Enrollment, opt-in, opt-out, marketing approach**
- **Enrollment from existing recordings, passive natural speech**
- **Define enrollment process for business/use case**



# Getting Started

- **Define business case, reiterate through project**
- **Select vendor or integrator, not just on technology performance**
- **Test against benchmarks, business case separately**
- **POC with clear criteria with business buy-in**
- **Pilot implementation should include real customers**
- **Phase production rollout**
- **Reiterate business case**

## Conclusion

**Choose partners/type of partner carefully**

**Make sure to have a clear picture of business case before you start.**

**Test, establish, evaluate performance thresholds and timelines**