

Voice Biometrics: Pre-deployment Test

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Voice-based authentication of callers, or voice biometrics, provides a user-friendly method to secure customer care interactions. In order to ensure users receive the greatest benefits from this technology, the applications for voiceprint enrollment and ongoing fraud detection must be fast and friction-free. Pre-production testing enables organizations to find and correct faults in call flows and workflows at an early stage, before they become larger issues. Organizations need to develop a methodical, repeatable test plan to:

- Detect issues before a voice biometrics project goes live
- Keep projects on time and on budget
- Improve the customer experience

OVERVIEW

A growing number of corporations and mobile application developers are using voice biometrics, a technology that authenticates users via their unique voiceprints, which allows them to access important services. Typically, this technology is used to “front-end” contact center applications and create a more user-friendly solution for mobile customers.

Speaker verification also offers a user-friendly method of adding another layer of security to any application. In fact, analysts predict that the financial services sector's spend on voice biometric technology will surpass 750 million dollars this year¹.

While the upfront perception is that voice biometrics is an anti-fraud/security feature protecting an organization's assets, the real return on investment is realized through reduced operational expenses thanks to the downstream effects of the voice biometric program on contact center operations.

Through voice biometrics, the average agent handle time can be reduced by more than 42 seconds, as callers are pre-authenticated in the interactive voice response system (IVR) with a high level of confidence before reaching the agent. The reduced handle time enables the handling of more calls per hour with fewer agents, which in turn reduces staffing requirements.

TECHNICAL OVERVIEW

There are three basic stages of voice-biometric-based applications. The first is the enrollment of customers and creation of their voice identities. The second is the recognition and authentication of callers in IVRs, allowing access to a range of follow-on services. The third stage is passive analysis at the agent level, which adds another level of confidence that the agent is speaking to the authorized account owner.

As with any solution that directly interfaces with customers, applications using voice biometrics must be thoroughly tested before they can be released. A poor experience or failure to authenticate will have the inverse effect of the technology's intent, negatively impacting customer satisfaction and increasing agent handle times.

BEST PRACTICES

A methodical, repeatable test plan ensures that issues are detected early, keeping projects on time and on budget.

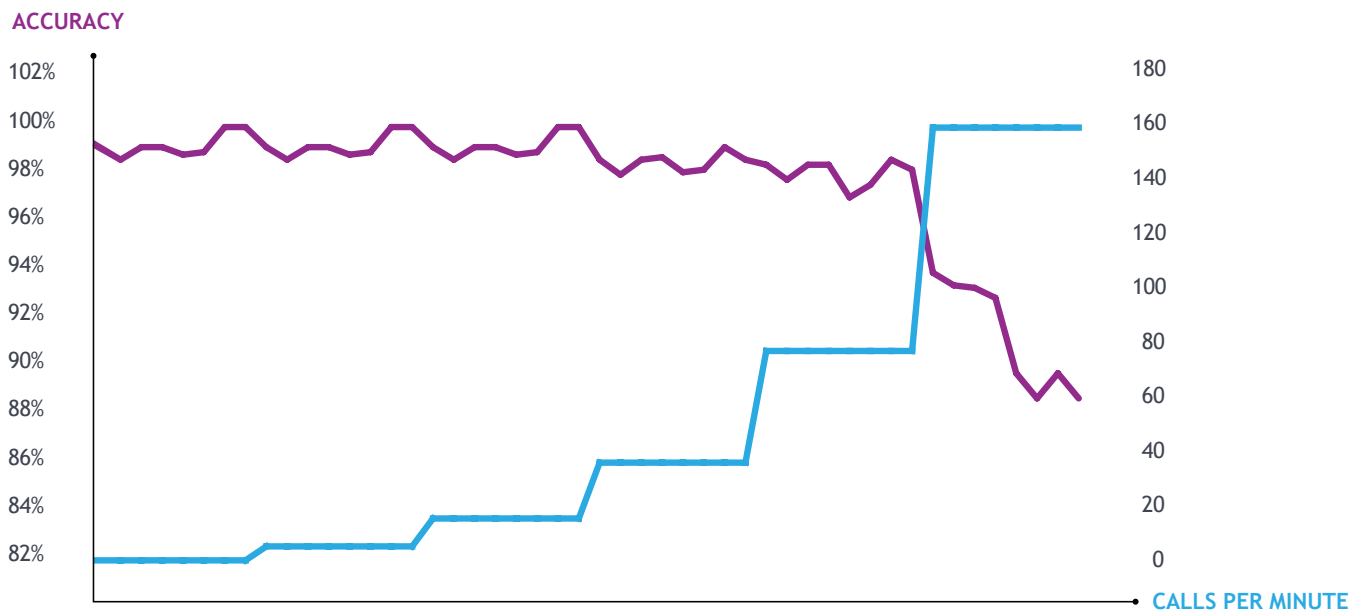


FIGURE 1 RECOGNITION ACCURACY VS LOAD – 4 VOICE

Voice biometrics is an exciting solution capable of enhancing the customer experience and improving application-level security.

NETWORK ASSESSMENT TESTING

While speaker verification technology has improved dramatically over the last ten years, it still requires strong infrastructure to ensure proper functionality. The baseline performance of foundational elements (carrier to IP network) for background noise, signal distortion, and signal strength must be tested first. Issues at this level will affect the quality of the voiceprint itself, as well as the quality of feature extraction in the voice biometrics engine. Problems at this level can lead technology teams to waste hundreds of hours troubleshooting a recognition engine for an issue actually caused by a misconfigured session border controller or router.

IVR AND VOICE PORTAL PERFORMANCE TESTING

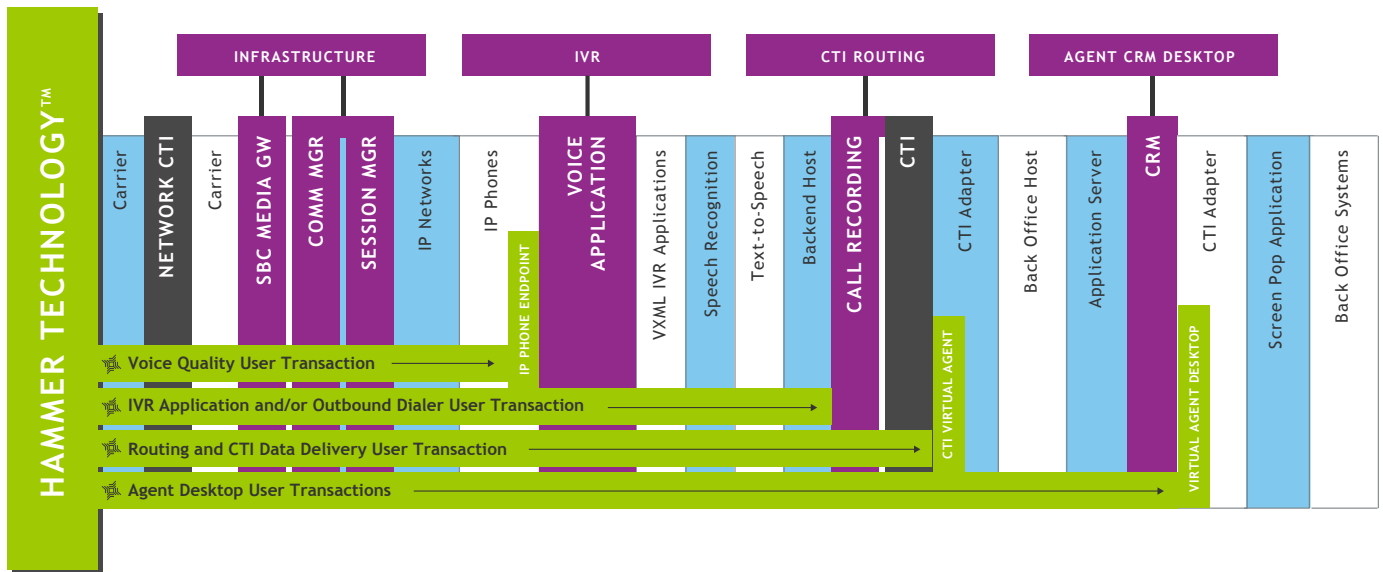
Once the IP infrastructure's integrity is confirmed, performance through to the IVR must also be assessed to ensure that jitter, echo, and other network issues at this layer will not impact application performance or the customer experience. As an example (Figure 1) would be a baseline and load test against an application set up to recognize "Boston" versus "Austin" do you need 'in a generic?' U.S. city's grammar in both male and female voices while ramping up volume to determine the nominal first-time recognition accuracy rate for in-grammar utterances.

APPLICATION TESTING

Once the environment has been validated, testers can begin assessing the performance and functionality of the enrollment and authentication applications themselves. To start, testers need to create a database of test accounts, complete with fields including the "character" names and a variety of recorded responses used during enrollment, along with audio manipulation parameters.

RUNTIME LOGIC IS CRITICAL

When designing test plans, the quality of the recordings as well as speaker verification rates must be measured. Authentication applications should be tested using runtime logic in the automated test scripts in order to detect and respond to "live- speaker detection" functionality. SSH/webservice calls and other test automation framework hooks will be included in the scripts to assist with enabling automation capabilities. Both positive and negative test case voiceprints from authorized and unauthorized callers should be included and verified using those SSH/webservice functions before, during, and after the call in order to automate pass/fail determination and ensure fraudulent users are not able to access private information.



After low volume testing proves that these applications are functioning as designed, voice biometric applications must be evaluated under real-world conditions to gain an accurate picture of customer experience. Therefore, testers must fully understand how many customers will be using these applications and when. From that analysis, testers can then create the demographics, user profiles, caller interactions, and traffic loads that will define the full scale of the test.

Test volumes should ramp slowly until they reach the projected load. It is also important to test the applications under oversubscribed conditions and determine exactly when problems such as low public switched telephone network capacity, memory leaks, or incorrectly licensed speaker verification servers will negatively impact performance.

REGRESSION TESTING

In technology environments, Moves, Adds and Changes occur daily. It is extremely important to ensure that the enrollment and authentication process does not impact existing IVR applications or cause service degradation. Regression testing, (a set of tests that mimic how customers currently interact with IVR applications), ensures that any changes do not impact existing functionality, introduce response delays, disrupt database connections or alter call transfer programming.

END-TO-END TESTING

Contact Centers are extremely complex environments, with many applications sharing resources. The only way to ensure a great customer experience when any change in information exchange between IVR and agent desktop is introduced is to undergo complete end-to-end testing under expected real-world traffic conditions. In this phase, it is important to test the additional technology layers (CTI, CRM, presence, chat, etc.) successively, all the way out to the desktop screen pop (Figure 2).

The average agent handle time can be reduced by more than 42 seconds.

In voice biometrics, should it be agent-side passive functionality of speaker verification takes a little longer and is more CPU intensive; however, it is critical to the fraud detection feature and will require automation scripts with longer “customer to agent talking” scenarios. The right criteria to record 30-, 60-, and 90- second conversations for use in agent side passive test automation scenarios will be important.

The end-to-end procedure is accomplished by automating actual calls into a Call Center in a controlled manner and measuring the results at every stage. Isolating performance issues at each layer enables testers to pinpoint the sources of issues. Bidirectional voice quality tests are also important for ensuring the quality of customer/agent conversations, as this has most likely changed network paths from the previous carrier to SBC to IVR voice quality tests executed earlier.

RESULTS

Voice biometrics is an exciting solution capable of enhancing the customer experience and improving application-level security. Enabling customers to authenticate via voice gives them the freedom to do business wherever and whenever they please. However, the failure of these systems can negatively impact customer satisfaction and may actually hinder Call Center operations, especially if staffing has been reduced to take advantage of the efficiencies promised by voice biometrics in the first place.

Following best practice test methodologies and using automated testing solutions allows companies to confidently deploy voice biometric solutions while keeping projects on time and on budget, and also helps set and measure realistic expectations based on real-world operational parameters.

1. Rawlson O’Neil King - Lead researcher, Biometrics Research Group, Inc, 2014