



Bespoken

CASE STUDY

Mercedes-Benz R&D North America and Bespoken: **State-Of-The-Art Testing and Automation for Voice**

THE VOICE CONNECTED CAR – A NEW DIRECTION FOR USER INTERACTION

For Mercedes-Benz R&D North America, voice unlocks an array of new use cases for vehicles owners. Using platforms such as Alexa and Google Assistant, connected car voice experiences are new and exciting, while simultaneously intuitive and natural for drivers. They also accompany the user outside of the car with devices such as the Google Home and Amazon Echo.

Mercedes-Benz R&D North America has been an early mover in the space, and with it, they have seen the possibilities as well as become aware of the limitations of these cutting edge new technologies. Mercedes-Benz R&D North America uses Bespoken's software to bring state-of-the-art testing and automation practices to voice. The ultimate goal is to guarantee exceptional quality for its connected car voice interaction experiences – quality which is synonymous with the Mercedes-Benz name.

"We hired Bespoken to be our partner in bringing the best practices of modern development and testing to a very new and fast-moving field. Together, we have created a streamlined development process that assures higher quality and provides a high degree of test automation."

ROBERT BRUCHHARDT
Senior Software Engineer

Mercedes-Benz Research and Development North America

Mercedes-Benz Research and Development North America

Industry:

Automotive, Connected Car

Location:

Sunnyvale, CA

Teams:

R&D, QA

Testing Types:

Unit Testing, End-to-end Testing,
Continuous Testing

App Types:

Alexa, Mercedes me

Situation:

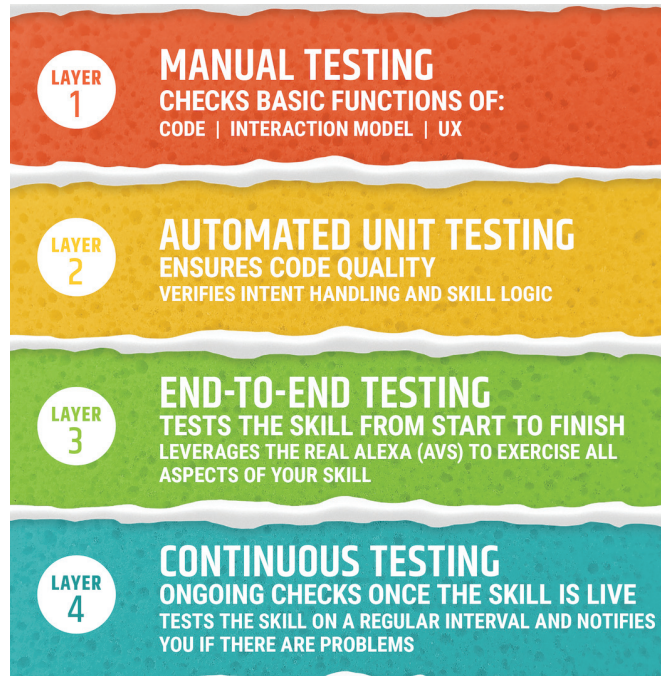
Mercedes needed to save time and reduce errors for its “Mercedes me” connected car experience. The team’s processes were highly manual, and they wanted to adopt an automated approach for testing and monitoring.

Results:

- 50% time savings on existing manual QA
- 10X greater unit-test coverage
- Hundreds of test cases run every day, ensuring total system quality

TESTING AND AUTOMATION ARE ESSENTIAL TO QUALITY

To ensure this level of quality, the Mercedes-Benz R&D North America team adopted the four-layer testing cake articulated by Bespoken here:



Prior to working with Bespoken, the development and testing process at Mercedes-Benz R&D North America was often manual. It involved:

- Manual unit-testing by developers
- Manual deployments
- Manual system and regression testing

All of this was time-intensive. The big challenge was how to automate this with the completely new voice platforms from Amazon Alexa and Google Assistant.

Bespoken’s automated testing and monitoring solutions were the answer. With them, all the steps, from unit-testing to system testing were able to be automated.

This included:

- Automated unit-tests whenever code is changed
- Automated deployments based on code milestones
- Automated end-to-end tests against new deployments

All of this was driven through a combination of Bespoken’s software (especially Virtual Alexa and Virtual Device components), as well as best-of-breed automation tools such as Jenkins for CI and CD, and SonarQube for code coverage.

VOICE IS A BARRIER TO TEST AUTOMATION

“When we went looking for a vendor to help us with automation and testing for voice, Bespoken stood out from the crowd. Their experience and expertise with testing voice is singular within the space, and they were the one of the best with a credible software offering that addressed our needs.”

MARTIN DUREJA

Product Owner for Voice Assistants

Mercedes-Benz Research and Development North America

One of the most significant barriers to overcome in working with voice is how to automate when the applications rely so much on speech. Bespoken solves this by leveraging text-to-speech processing, which allows test creators to easily automate almost any scenario. An example test is shown below:

“ask mercedes me what is my primary car”:

“your primary car is your white GLE”

“what is the current range”:

“The current range is 300 miles.”

“Anything else I can help with?”

“No”:

“thanks and goodbye”

In this simple test, the skill is launched by saying “open Mercedes me” – we then setup a series of tests against the reply from Alexa – the transcript of the spoken response as well as the card output.

Under the covers, Bespoken Virtual Devices convert the text input into speech, send it to Alexa and the skill being tested, and in turn compare the result to the expected outcome. There is some hard work going on, but for the user, it’s a piece of cake :-)

PUTTING QA PEOPLE IN THE LEAD

One critical marker of success: allowing the quality assurance team to take ownership of its end-to-end and regression tests. Using Bespoken’s simple test scripting syntax, they were able to do exactly this. The QA team turned what was hours of manual work into automated test scripts that can be run at the drop of the hat.

Additionally, they can be easily augmented as new questions and bugs arise, so when a call comes in from senior management about any aspect of the application, the team can quickly provide an authoritative answer.

“Using Bespoken, we were able to save a huge amount of time on testing. The test scripts are easy to execute, write, and maintain, allowing us to focus on the more challenging use cases. We were also able to find bugs that we would not otherwise have been able to, and test scenarios far more thoroughly than would be possible with just manual interactions.”

DORATHY DEVADASS

Development Quality Engineer

Mercedes-Benz Research and Development North America

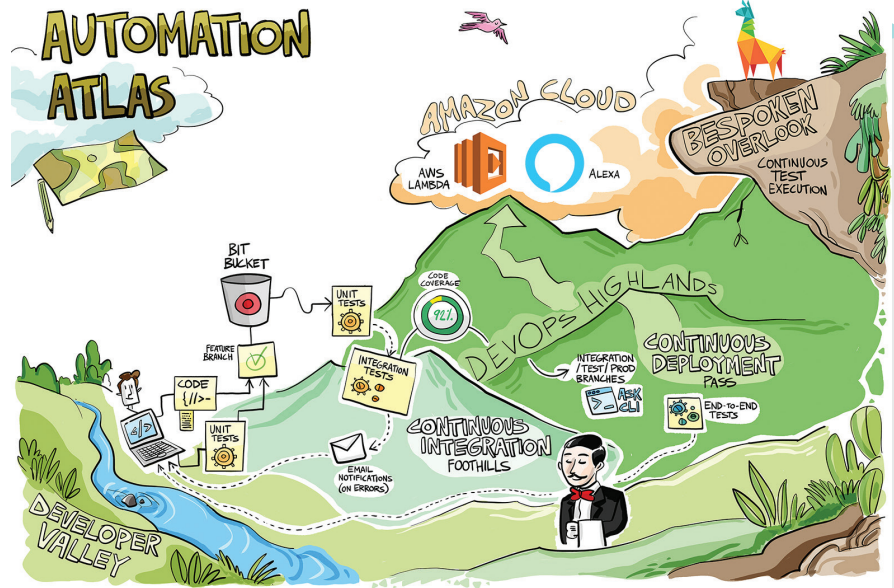
CONTINUOUS TESTING – THE NEW NORMAL FOR AI

Once the hurdle of creating automated tests is cleared, it is relatively easy to tie the end-to-end tests into other best-of-breed components, such as:

- BitBucket for source code control
- Alexa Skills Kit CLI for automated deployment
- Jenkins for continuous integration and delivery
- SonarQube for code coverage

Using these tools, the dev cycle was completely automated, with quality assurance baked into each step. The drawing to the right illustrates the overarching process.

And thanks to the Bespoken Dashboard, the whole system is monitored continuously. If there are any issues with the skill behavior, whether due to something with the code itself, Alexa, or any other piece of the ecosystem, the team at Mercedes-Benz R&D North America is notified right away.



KEY OUTCOMES

The ROI was significant for the existing Mercedes me voice application:

- 50% time savings on existing manual QA
- Hundreds of test cases run on a DAILY basis, across environments, languages and regions – manifold increase over what was previously possible
- 10+ bugs identified while setting up the test automation suite
- 10X greater unit-test coverage

What's more, the team incorporated a complex voice interaction model that is simultaneously open-ended and command-driven, an especially challenging scenario for the new "Ask Mercedes" functionality – a remarkable AI user manual for voice. To ensure the speech recognition worked successfully, the team ran through thousands of scenarios with Bespoken – something that simply would not have been feasible using a manual approach.

All of it comes together to provide the best possible connected car experience to Mercedes owners, one that provides convenience and delight. Bespoken is proud to assist in this effort.

To learn more about how Bespoken can you help you with testing and monitoring for voice, contact us at sales@bespoken.io.



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