

UK Healthcare Body Ensures Security and Quality Assurance of an App Designed to Keep the UK Safe Through Covid



Challenges

The Client needed to ensure adequate app security to mitigate any issues arising to avoid them being magnified and discussed in the media.

An additional challenge for the Client was ensuring app accessibility for the entire UK population.



Solutions

Enabled a Performance & Security test approach by selecting the right environment and workload to conduct Regression Performance and Security testing at each week release level.

Performed exhaustive accessibility testing across all aspects of the app.



Results

The Client was able to ensure there was less margin for errors due to the number of people using the app and security updates were released weekly.

Identified and fixed 35+ accessibility bugs across the app.



Client overview

Our Client was established to lead the digital transformation of health and social care across every NHS healthcare setting in the UK, driving the safe sharing of patient data to all clinicians, improving patient care and safety

The NHS response to the COVID19 pandemic was driven by our Client. They were responsible for the “The Covid Pass Program” – the “Covid Status” certification program which was both a digital and a non-digital program. It aimed to provide the vaccination/diagnostic status of the UK’s residents (England and Devolved administrations within Wales, Scotland, NI and Crown Dependencies like Isle of Man, Guernsey, Jersey, and Overseas Territories such as Gibraltar) as a 2D Barcode which could be scanned by a verifier app to gain access to international travel, domestic travel, retail outlets and sport and social events.

Innovative solutions needed for keeping the UK safe and moving during the pandemic

Our Client’s work involved the delivery and aintenance of the UK’s “Covid Passport”, which interfaced with the overall vaccination program within the UK to help in opening the economy post-pandemic in a safe and controlled manner. It was a critical transformation program with multiple integrations and data sources and strict timelines, based upon changes by the UK Government with approval from Parliament. The ultimate stakeholder was the Cabinet Health Secretary for whom the Department for Health and Social Care works

Our Client faced several challenges with this, including:

- **Performance:** A high demand on the app from travellers and domestic users during peak Covid times and frequent government policy changes meant the immediate programme deliverables changed often and fast.
- **Quality assurance:** Strong collaborative quality assurance governance and planning was required to ensure all features in a release had undergone the required quality assurance testing to accommodate last-minute changes to sprint and release backlog prioritisation.
- **INVEST principles:** Functional and non-functional requirements for key stories/epics did not initially conform to INVEST principles. The quality assurance team introduced a governance process to ensure that all user stories entering the current release cycle had been reviewed and followed the principles of INVEST. This enabled rapid deliveries of functionality to be assessed appropriately, test coverage reviewed, and prioritised test cases written and executed in sprint.
- **Environment availability/config synchronisation:** This was a challenge to concurrent testing across all services. This led to issues logged as defects because test environments were out of sync. The quality assurance team collaborated with wider teams across the programme to establish the root cause of environmental issues and manage resolution, redeployment, and retest activities to ensure the issues did not reoccur. It soon became apparent that several contractors lacked the interpersonal skills, collaborative approach and knowledge to be effective. Over several weeks, we replaced under-performers with experienced Qualitest Staff, executing effective knowledge transfer for a seamless transition at no additional cost to the Client.

Safety first through robust app quality assurance

As part of ensuring quality for “The Covid Pass Program”, Qualitest provided a comprehensive quality assurance solution for this service and validated the Azure FHIR-based solution setup hosted in the Azure Cloud platform, which is utilized by both Web and Native Mobile application. The project’s main objectives included:



- Derive and validate critical Non-Functional Requirements for the entire service specifically focusing on Performance, Accessibility and Security.
- Certify scalability of Azure cloud hosted services, to handle usage of up to 1Million requests in peak day across different business transactions.
- Setup Non-Functional test regression test suite to quality assure the weekly release cadence.
- Benchmark the application and identify hardware sizing needed for services to handle 5X to 10X peak load for mandate use of this service across country.
- Validate the App against WCAG 2.1 guidelines for both Web and Mobile application.
- Detect potential Performance, Accessibility & Security bottlenecks early, protecting the service and ensuring rapid release capabilities.

To ensure accessibility for the “The Covid Pass Program”, our solutions included exhaustive accessibility testing which identified 35+ bugs across the application. In addition, we also provided continuous performance evaluation on the weekly release cadence, performance monitoring and diagnosis, security testing on the weekly release cadence and accessibility-testing-as-a-service (ATAAS).

Performance and quality provided for healthier outcomes

When it came to the performance of the testing, Qualitest identified several improvements that were made to the Covid Passport Program as a result:

- Detected Memory leak during soak & load tests with 5X-10X load in the system.
- Captured Cosmos DB timeout issue during series of load & soak tests.
- Resolved caching issue while running multiple combinations of test scenarios.
- Identified peak number of Function Apps during soak test, enabling the number of instances on the right OS to be configured to support 10X peak load.
- Discovered load balancing issue, enabling fix to be applied to correctly balance at each region.
- Reported increase in response time trend for several business transactions on each release, recommending appropriate tuning initiatives.

In addition, a further 25+ bugs were in the Web App with severity levels ranging from ‘Very high’ to ‘Low’ against WCAG 2.1 guidelines. When it came to testing the mobile app, 10+ bugs were identified with severity levels from ‘Very high’ to ‘Low’. The accessibility of the app was also validated across multiple browsers, devices, and OSs on all pages.

When undertaking security testing a ‘Critical’ vulnerability was detected on key length in the RSA cipher algorithm during SAST testing, and multiple ‘High’ vulnerabilities on the package version were also identified which could potentially cause a DDoS attack and Session steal. These vulnerabilities were fixed to help improve the security of the app.

“ To ensure accessibility for the “The Covid Pass Program”, our solutions included exhaustive accessibility testing which identified 35+ bugs across the application.”



- Increased automation coverage to 90% and introduced parallel testing in respective environments to accelerate testing and reduce the testing window by over 50%. Against the 600+ user stories, there were 3,000+ test items linked.
- A robust framework that maximized automated testing was fully integrated for every release. This increased speed and quality, resulting in no severity 1 major defects being leaked into live during this period.

Key benefits

The “Covid Passport Program” was so successful it won the Pandemic Innovation category at the Digital Leaders Impact Awards in 2022, with Qualitest’s contribution being recognized as key to its success. In addition, the program also won the “Best Agile project with Qualitest at the European Software Testing Awards 2022.

- The number of users of the app rose from 4 million to over 30 million since the launch of the NHS COVID Pass.
- The Client was able to share their knowledge and best practices into NHS teams to ensure they were better equipped to deal with incidents and outbreaks of Covid in their areas.
- The Client successfully deployed shift-left non-functional testing along with shift-right production monitoring.





“The “Covid Passport Program” was so successful it won the Pandemic Innovation category at the Digital Leaders Impact Awards.”



QUALITEST™

Connect with Us

www.qualitestgroup.com

-  <https://www.linkedin.com/company/qualitest>
-  <https://www.instagram.com/lifeatqualitest>
-  <https://twitter.com/Qualitest>
-  <https://www.facebook.com/Qualitestgroup>