e-Health Centre (CeZ): case study

For more than 20 years, e-Health Centre has been responsible for carrying out wide-reaching IT projects essential to the functioning of healthcare in Poland. The solutions implemented by CeZ are used by millions of Poles as well as tens of thousands of medical and pharmaceutical entities. The Centre's portfolio of digital products includes, among others, the Online Patient Account, gabinet.gov.pl, and e-services such as e-prescription or the EU COVID Certificate.

Challenge

To design and develop software for the purpose of carrying out a nationwide program of population vaccinations against COVID-19, and to implement it in an infrastructure that would be able to handle sudden spikes in load and provide true 24/7 availability for millions of users.

The e-Registration system had to be universally accessible and support many key processes (both front and back office) related to vaccinations. It had to enable millions of citizens, tens of thousands of medical workers, and several thousand vaccination centers across the country to handle vaccinations. The solution also had to be integrated with many existing public IT systems.

Work on e-Registration began immediately after the first types of COVID-19 vaccines had been approved by the relevant institutions at the European Union level and in Poland. The short deadline for production launch (seven weeks from the start of work) was due to the urgent social need and widespread expectations of access to inoculation as the key weapon in the fight against the coronavirus.

Solutions

Within the e-Registration system, the OChK team created three applications for the following groups:

1. patients - an application for self-scheduling of appointments online with verification of identity through a trusted profile

2. hotline agents - an application for making appointments for vaccinations for people who choose the option to register by telephone

3. vaccination centers - an application for making patient appointments for their first and subsequent doses as soon as possible, recording completed appointments, and flexibly arranging schedules

The applications were linked to the central database of vaccination centers, their schedules, available dates, appointments made and completed, and patients eligible for and benefiting from vaccinations.

The system also provided comprehensive real-time reporting and up-to-date data for the Ministry of Health and the Prime Minister's Chancellery to use in ongoing communications to the public.

Results

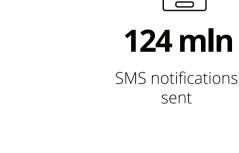From January 2021 to June 2022, in the e-Registration system there were:
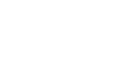
72 mln
vaccination visits created

48 mln
vaccinations completed

124 mln
SMS notifications sent

During the days of peak interest in the system, the following were recorded:

750
logins
per second

350 thous.
date searches
per hour

888 thous.
appointments
made **per day**

Technologies used

OChK experts built the system almost entirely on the Google Cloud technology stack:

- Go Programming Language
- Memorystore Redis
- Pub/Sub
- Firestore
- Google Kubernetes Engine BigQuery
- Cloud Storage
- Cloud Spanner
- Google Data Studio
- Cloud Armor

The whole system was managed based on the paradigm of Infrastructure as Code (IaC) using Terraform, and all changes were implemented using automated CI/CD procedures.

The entire project team, on the sides of both OChK and e-Health Centre, remained in direct contact with each other at every stage of the project – 7 days a week, virtually 24 hours a day. Thanks to their vast experience and skills at conducting projects quickly and swiftly, not only was the system implemented in a record-breaking seven weeks, but also a number of necessary changes were made to the mechanisms and rules of the system in a very short time.

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„The system – designed, developed, and maintained by the OChK team under an order from and in close cooperation with e-Health Centre – provides the flexibility and reliability needed to deal with the uncertainties of the COVID-19 pandemic. The software and its subsequent modifications, as dictated by ongoing needs and changes in the pandemic situation, were delivered quickly, thus facilitating adaptation to the circumstances that changed over time. The cloud infrastructure coped well with sudden peaks in usage and allowed for virtually zero downtime, ensuring reliable, round-the-clock service availability for all categories of users."

Justyna Pancerow, Director of the e-Health System Implementation Department, e-Health Centre (CeZ)