

CUSTOMER STORY



TGen Secures Genome Data for Richer Healthcare AI Models with **Fortanix Confidential Computing**

Customer Profile

The Translational Genomics Research Institute (TGen) founded in 2002, is a non-profit genomics research institute based in Arizona, United States. TGen seeks to employ genetic discoveries to improve disease outcomes by developing smarter diagnostics and targeted therapeutics. Their work is focused on unravelling the genetic components of common and complex diseases, including cancer, neurological disorders, infectious diseases, and rare childhood disorders. By identifying treatment options in this manner, their objective is to make medicine become more rational, more precise, and more personal.



Role of AI in Healthcare and Genome Research

AI and machine learning have had a significant impact on healthcare and genome research. They have helped healthcare practitioners predict patient health outcomes. The role of AI in genome research has also been critical. AI/ML have helped unravel and investigate data and patterns that was previously out of bounds.



Problem: The Problem of Securing Data Privacy within AI

TGen has several researchers working on different aspects of Cancer, Alzheimer's, and other healthcare related research projects and they also have several clinicians involved in clinical trials. The primary challenge TGen faced while developing quality AI models in the past was the inadequacy of quality data. Having access to quality datasets is important for the progression of research. Even though they were accessing genome patterns from different sources, the lack of sufficient high-quality data was hampering their research initiatives. The requirement was both in terms of the adaptive breadth of the data as well as just how well it was curated.

And the primary impediment to accessing more datasets was the proliferation of data privacy regulations within healthcare. For example: In the USA, under the provisions of the Health Insurance Portability and Accountability Act 1996 (HIPAA), the HIPAA Security Rule defines the privacy requirements for all individually identifiable health information (e-PHI) that is created, received, maintained, or transmitted by a healthcare entity and stipulates protection against "anticipated impermissible uses or disclosures".

TGen also worked with specific groups of people like the native American tribes who were aware of the possible privacy risks and were hesitant to hand over the genome sequences unless assured of data security and privacy.

At the same time, the global nature of genomic data and cloud computing made it difficult to know which laws are applicable, let alone the task of ensuring compliance. TGen was also providing human genome analysis over regulated data that was held in the EU which meant that the data was under the purview of multiple privacy regulations including GDPR and Schrems II.

The other big concern about storing genomic data in the cloud is the security and control over this data. As more data that is collected and curated, it becomes a richer target for exploitation. TGen also had to be on the vigil for possible data breaches that could have lead to potential unauthorized access to patient data, penalties, as stipulated under privacy regulations like GDPR and HIPAA. A possible unauthorized access could also lead to corruption of data and damage to their reputation.



We were also working with specific groups of people like the native American tribes who were specifically looking to ensure privacy of their data even before they provided the genome sequence. They were very well aware of the security risks of having that data out in the public



Glen Otero

Vice President of Scientific Computing at
Translational Genomics Research Institute (TGen)

What the Company Needed

TGen needed a practical solution that could help them address some of the following concerns

Securing genomic data while preserving the privacy of all individual data that is analyzed

Securing data not just at rest or in transit, but also while in use or processing

Protecting the intellectual property of the AI models in cloud

Build trust among individual contributors and get access to genome data by alleviating privacy concerns and fears of any abuse of data.

Why TGen Chose Fortanix?

Data encryption is a fundamental security requirement within healthcare and genome research. While the importance of protecting data at rest and in transit are well known, the challenge was more on protection of data in use. Data is often exposed while it's processed. This vulnerability of data in use is a key concern in the secure implementation of AI modelling and often leads to restricted adoption of cloud computing, which is mostly considered as an untrusted platform. The most critical capability that TGen needed was the ability to secure data in use or processing.

TGen wanted the critical capability to encrypt the data while they are processing or sequencing individual data, in the clinic and while assembling genomes. They were aware of the kind of the security risks of having that data out in the public. Encrypting the data while its being computed allowed TGen to allay any kind of fears of abuse or corruption of the data.

Unlocking the full power of private data can only be done in a highly secure trusted execution environment. Fortanix's Cloud Computing platform offered a practical solution to the problem of protecting sensitive private data while being processed. Fortanix, a pioneer and leader in confidential computing, introduced the 'runtime encryption' technology that has created and defined this category. Fortanix Runtime Encryption® technology implements Intel® Software Guard Extensions (Intel® SGX) to provide an automated and auditable solution that can protect complex AI workloads on any enabled platform, whether on-premises or in the cloud. With its pervasive data security strategy, the Fortanix data security service offered end to end data protection, securing the data through its lifecycle, at rest, in transit and in use.



Fortanix is helping accelerate AI deployments in real world settings with its Confidential Computing technology. The validation and security of AI algorithms using patient medical and genomic data has long been a major concern in the healthcare arena, but it's one that can be overcome thanks to the application of this next-generation technology.

Glen Otero

To add to the services, Fortanix also offered specific capabilities that allowed TGen to secure the privacy of AI model chain and source genomic data that was processed within the EU. Some of these capabilities included:



Geo-fencing

TGen was able to adopt policies based on the location of data



Support for multiple data processors

Seamless support for multiple data processors in various clouds and locations made it easier for TGen to have a compliant operation



Global logging

All accesses to data was automatically logged in a centrally viewable tamper-proof global audit trail, allowing TGen to furnish the proof of secure execution



When it came to encrypting data and having applications put into enclaves that were encrypted, the Fortanix web platform was seamless, and we were working across the globe, with lot of the data and data centers in the Netherlands and I felt like I was working from my desktop. So it was, it was very, very helpful.

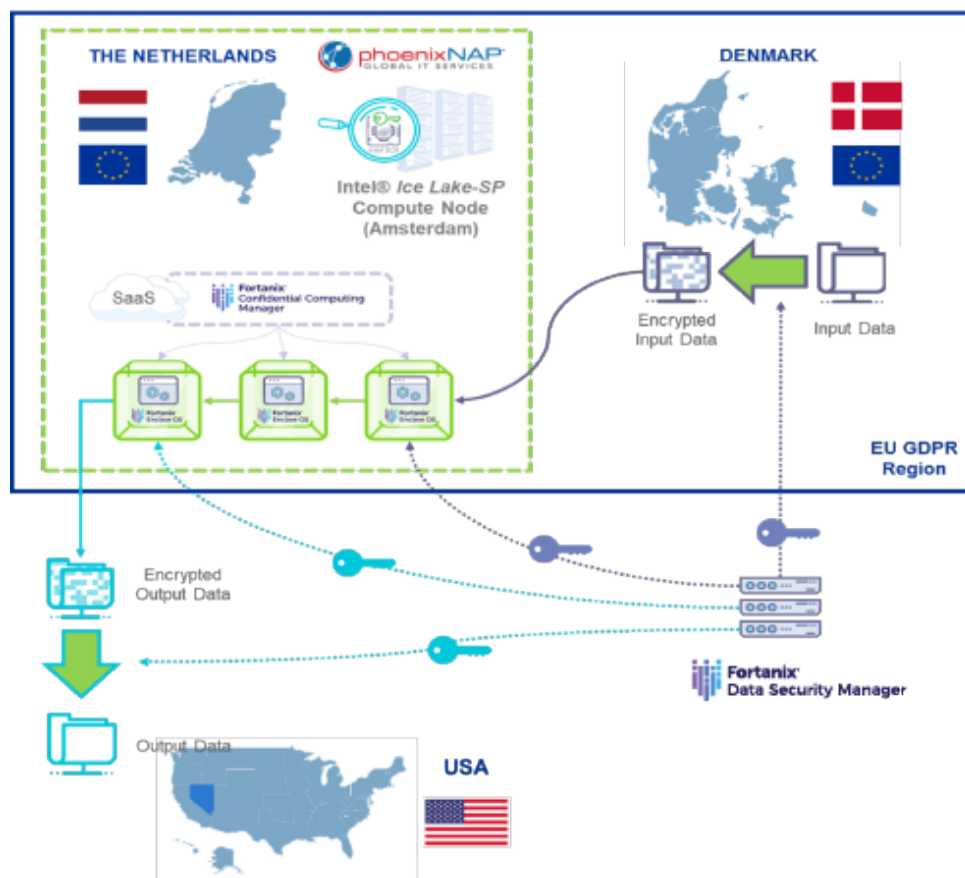
Glen Otero

SOLUTION HIGHLIGHTS

Sequential AI model chain and source genomic data is processed within the EU with auditable compliance of geo-fencing.

End-to-end data encryption with critical application security and data provenance using Intel® SGX secure enclaves.

Intel® Xeon® E-3 (Ice Lake-SP) hardware with Intel® SGX and up to 1TB EPC deployed to provide acceleration of AI workloads.





Confidential computing or, protection of algorithms as well as the data while computing will be the default requirement for data privacy and future of AI modelling over the next five to ten years.



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The Impact

Implementation of Fortanix Confidential Computing has had a far-reaching impact on the genomic research and clinical trials being conducted by TGen.



Easy to use and provision with no additional manpower or technical skills required

Fortanix offered a seamless platform that provided TGen with a readily available and easy to provision Confidential Computing Infrastructure.



Ability to access more quality datasets and build smarter AI models

The auditing and logging capabilities of the service has also helped the customer meet the most stringent privacy regulations.



Protection of intellectual property

With the company continuously embarking on expanding its footprint across North America and other parts of the globe, the service has allowed them to quickly replicate the data security practices across the newer locations.



Reduced cost of operations

Now, more data can be stored in cloud and across any location as pervasive data security provided by Fortanix secures data anywhere and across any cloud environment. This dramatically reduces the cost of operations.



About Fortanix

Fortanix® is a data-first multicloud security company solving the challenges of cloud security and privacy. Data is the most precious digital asset of businesses, but this data is spread across clouds, SaaS, applications, storage systems, and data centers. Security teams struggle to track, much less secure it. Fortanix empowers customers to secure all this data with a centralized solution. Its pioneering Confidential Computing technology means data remains protected at-rest, in-motion, and in-use, keeping it secure from even the most sophisticated attacks. For more information, see www.fortanix.com



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