

# CASE STUDY



## CAMH

### PROJECT

Google Cloud Research Accelerator Portal

### OVERVIEW

The Centre for Addiction and Mental Health (CAMH) in Toronto is Canada's largest mental health teaching hospital and a leading research institution. The Krembil Centre for Neuroinformatics (KCNI) and Research Informatics team provide advanced computing infrastructure and platforms to support data-intensive mental health research.

To complement CAMH's existing on-premises high-performance computing (HPC) cluster, KCNI/Research Informatics worked with Improving and Google Cloud to deploy a Google Cloud-based research computing portal. This portal provides researchers with governed, on-demand access to scalable cloud compute resources alongside CAMH's established on-prem environment.

### BUSINESS PROBLEM

KCNI supports a growing portfolio of projects that rely on large-scale simulations, machine learning, and multimodal data analysis. While CAMH's on-prem HPC cluster remains a core asset, several challenges were emerging:

- **Bursty and exploratory workloads** that benefit from short-term, elastic compute capacity
- **New types of analysis** requiring hardware configurations not yet available on-premises
- **Researchers without cloud engineering expertise** needing a simple way to access advanced resources without managing low-level infrastructure

KCNI/Research Informatics sought a solution that would **extend**, not replace, its on-prem infrastructure by adding a secure, easy-to-use cloud option for appropriate workloads.

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## OUR APPROACH

Google Cloud had developed an initial deployment portal concept to simplify provisioning of research compute resources on GCP. However, in its original form it required further refinement to be reliable, user-friendly, and suitable for deployment within CAMH's research computing environment.

Improving worked with KCNI/Research Informatics and Google Cloud to:

- **Address deficiencies and gaps** in the original Google portal implementation
- **Harden and stabilize** the solution for day-to-day use by researchers
- **Adapt the user experience** so non-expert users could launch and manage compute environments via a simple web interface
- **Align configuration and controls** with KCNI's research workflows and institutional requirements

The resulting **Google Cloud Deployment Portal** is now an operational tool used by KCNI-supported research teams as a complement to CAMH's on-prem HPC cluster.

## BUSINESS BENEFITS

Within the KCNI/Research Informatics environment, the deployment portal has delivered several benefits:

- **Complement to On-Prem HPC**  
Cloud resources are used alongside CAMH's on-premises cluster, providing additional flexibility for suitable research workloads.
- **Streamlined Access for Researchers**  
Researchers can request and access high-performance compute resources through a web interface, without needing deep cloud engineering knowledge.
- **Scalability and Elasticity**  
The portal allows teams to scale up compute capacity on demand for bursty or time-sensitive analyses, then scale down when work is complete.
- **Faster Time to Compute**  
Provisioning that previously required manual setup can now be completed much more quickly, accelerating experimentation and iteration.

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- **Improved Suitability of the Original Product**

By resolving deficiencies in the initial Google product and tailoring it to KCNI's context, Improving and Google Cloud helped transform a prototype into a solution appropriate for real-world research use.

## TECHNOLOGIES AND METHODOLOGIES USED

- **Google Cloud Platform (GCP)**

Used to provide compute, storage, and networking services for research workloads.

- **React**

Powers the portal's front-end interface, enabling a responsive, user-friendly experience for researchers.

- **Scala ZIO**

Supports the backend services, providing robust, scalable server-side functionality.

- **Terraform**

Manages infrastructure provisioning as code, ensuring consistent, repeatable deployments.

- **Cloud Run and Cloud Functions**

Enable serverless execution of components, optimizing resource utilization and operational overhead.

- **Identity-Aware Proxy (IAP)**

Used to secure access based on user identity and integrate with CAMH's approach to controlled access for research tools.

## PARTNERSHIPS

This project brought together:

- **KCNI / Research Informatics at CAMH**, defining research requirements and integration with existing HPC and data platforms
- **Improving**, enhancing and extending the original Google Cloud portal to meet functional, usability, and reliability needs
- **Google Cloud**, providing the underlying platform and technical support to enable a robust deployment

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## LESSONS LEARNED

### 1. **Cloud as a Complement, Not a Replacement**

A cloud portal can effectively extend an existing on-prem HPC environment, particularly for bursty and exploratory workloads.

### 2. **Product Maturity and Fit Matter**

Early products often require targeted work to address deficiencies before they are suitable for deployment to real users in research settings.

### 3. **Ease of Use Drives Adoption**

Abstracting away cloud complexity and offering a clear, guided interface enables a broader range of researchers to benefit from advanced compute.

### 4. **Iterative Collaboration is Essential**

Continuous feedback between KCNI, Improving, and Google Cloud allowed the solution to evolve to meet practical day-to-day needs.

### 5. **Governed Flexibility**

Combining governance and access controls with elastic compute creates a foundation for sustainable, scalable research computing.

## CONCLUSION

By working together, KCNI/Research Informatics, Improving, and Google Cloud transformed an initial Google-developed deployment portal into a production-grade cloud compute portal that is appropriate for use by CAMH researchers. The solution now serves as a complement to CAMH's on-prem HPC cluster, providing secure, on-demand access to scalable resources for suitable research workloads and supporting CAMH's broader mission to advance mental health research through data and technology.