

Verge.io: Revolutionizing Research Through Virtual Infrastructure

BACKGROUND

U-M established Advanced Research Computing – Technology Services (ARC-TS). ARC-TS currently supports 2,600 independent groups and provides researchers across campus with the computational resources they need to produce groundbreaking scientific discoveries. To allow researchers to securely analyze sensitive datasets while maintaining regulatory guidelines and agreements, Verge.io teamed with ARC-TS to provide high performance, secure, and flexible computing environments.

CHALLENGE

Researchers at academic institutions face an interesting challenge as their research calls for the analysis of ever-growing and complex datasets – many with regulatory restrictions. To establish a traditional IT infrastructure for each research group is time consuming and expensive. U-M researchers require flexible compute and storage environments that provide consistency, performance, and reliability.



Research at the University of Michigan

Research is integral to the University of Michigan – a world renowned institution with a rich history in interdisciplinary research initiatives and annual expenditures in excess of \$1 billion. Their achievements are wide and varied across many fields, including science, engineering, medicine, social sciences, management, education and the humanities. Research institutions like U-M require a custom approach to storage, networking, and analysis to meet their expanding and ever-changing needs. The question of how to connect people, labs, data, and computers while addressing security and regulatory concerns – without breaking the bank – has historically been a tough one to answer.

To accelerate the availability of state-of-the-art cyberinfrastructure services and provide a competitive advantage to the academic community, U-M established Advanced Research Computing – Technology Services (ARC-TS). ARC-TS currently supports 2,600 independent groups and provides researchers across campus with the computational resources they need to produce groundbreaking scientific discoveries. ARC-TS designs, obtains,

and maintains cutting-edge resources for data-intensive and computationally demanding research. They provide these services to many groups, each with their own unique computing needs. A large majority of these groups have specific data security requirements such as the Health Insurance Portability and Accountability Act (HIPPA) and the Children's Online Privacy Protection Act (COPPA).

To allow researchers to securely analyze sensitive datasets while maintaining regulatory guidelines and agreements, Verge.io teamed with ARC-TS to provide high performance, secure, and flexible computing environments. These flexible computing environments are secure enclaves that can be set up on a moment's notice, and are much less labor intensive and costly than a traditional IT infrastructure.



THE CHALLENGE

Enable Infrastructure to Support U-M Researchers

Researchers at academic institutions face an interesting challenge as their research calls for the analysis of ever-growing and complex datasets – many with regulatory restrictions. To establish a traditional IT infrastructure for each research group is time consuming and expensive. To overcome these obstacles and strengthen their ability to stand at the forefront of academic and scientific research, U-M researchers require flexible compute and storage environments that provide consistency, performance, and reliability.

To be sure, health care research alone involves large amounts of sensitive information and diverse datatypes. While this research is imperative to the advancement of patient care, it requires the analysis of millions of clinical observations that can include genomic, hospital, outpatient, pharmaceutical, laboratory and cost data. This requires a secure, high-

performance computing framework with multi-tiered storage.

U-M researcher Dr. Bryant Oliphant, who focuses on orthopedic trauma health services, notes that he's had to spend much of his time figuring out how to get the datasets he needs under the constraints of his computing power.

“Traditionally I’ve had to basically totally modify the database to get datasets, and [then I have to] append and merge them accordingly just to get them underneath the RAM limit for my computer. It just doesn’t work.”

- U-M RESEARCHER DR. BRYANT OLIPHANT

THE SOLUTION

The Virtualized Data Center

Verge.io is the University of Michigan's private cloud environment for research; it encompasses a collection of processors, memory, storage, and networking and enables scalable storage with quick and easy deployment of applications as needed. This collection can be subdivided into smaller units and allocated to research projects on an as-needed basis to be accessed by virtual machines and containers. The infrastructure automatically reconfigures as resources are added, allowing flexibility without the need for changing hardware or capacity planning.

Global governance ensures security and allows greater collaboration among researchers, as each data center operates with its own set of automatically enforced policies and requirements. Stringent security protocols – such as two-factor authentication, next-generation firewalls, and system intrusion detection – allow researchers to safely and easily access the data centers over the internet.



VERGE.IO SOLUTION

The Verge.io solution is comprised of a suite of key services:



SECURE ENCLAVE SERVICE

A restricted data desktop and server solution



ON DEMAND SERVICES

A container provisioning and management solution



RESEARCH VIRTUAL DESKTOP INFRASTRUCTURE (VDI)

Similar VDI capabilities to the Secure Enclave Service, but is suitable for unrestricted data



DATABASE HOSTING

Research-oriented offerings including traditional RDBMS, NoSQL, and time-series databases



DATA PIPELINING TOOLS

A wide variety of data ingestion, management, and storage tools

The Verge.io Secure Enclave Service is the first generally accessible enclave service for non-restricted, HIPAA, and Controlled Unclassified Information (CUI) on campus. This enables researchers to easily access data while maintaining security and compliance controls – revolutionizing the world of research.

A CLOSER LOOK: THE VERGE.IO HARDWARE SPECS



COMPUTE NODES

40x Verge.io H2400i-E5:

2x Intel E5-2680V4

512GB DDR4 2400MHz RAM

2x 40GbE network adapters

2x 800GB NVMe SSD DC P3700 drives



STORAGE NODES

20x S2400i-E5-HDD:

2x Intel E5-2620V4

128 GB DDR4 2133MHz RAM

4x 10GbE network adapters

2x 800GB DC S3610 SSD

12x 6 TB 7200 RPM SATA Disks

THE BENEFITS

Secure, Efficient Research Technology

Verge.io enables researchers across multiple disciplines to deploy and manage resources in a secure, scalable environment.

Verge.io does this by providing out-of-the-box capabilities:

- **Efficiency:** Based on cutting-edge Intel components (NVMe storage)
- **Flexibility:** Robust and feature-rich software-defined networking
- **Cost-Effective:** Data deduplication for more efficient use of storage

At U-M, IT administrators can quickly spin-up complete virtual enclaves and researchers experience secure access to restricted data through a virtual private network. Tasks are automated – such as system auditing and updates – making it easier to oversee administration of the system. ARC-TS no longer has to undergo data center recertification and compliancy on HIPAA and CUI, saving time and resources. Additionally, consultants and support staff have a common platform to provide support.

ARC-TS is able to quickly spin up environments and provide better support to their researchers. U-M researchers are subsequently able to access their research securely and on-demand.

Verge.io delivers a more achievable and easier to manage solution for universities and institutions, providing scalability and flexibility to meet the ongoing needs of the research community. This is helping U-M implement its Data Science Initiative, a huge investment for U-M that will expand opportunities for students and faculty researchers across fields such as transportation, health sciences, learning analytics, and social science.

“I used to be locked to my desk,” says Oliphant. “And if I had to do something big, it was like, do I have to drive in on the weekend... or if you’re away on a trip, you can’t. This is huge. This is a gamechanger.”

- U-M RESEARCHER DR. BRYANT OLIPHANT

The Future of Research

The Verge.io Research Cloud provides U-M researchers with scalable, secure data centers. YBRC ensures data integrity, maximizes collaboration capabilities, and aids in the production of groundbreaking scientific discoveries. The partnership between ARC-TS and Verge.io opens access to data-intensive research by removing the cost barriers and minimizing the time associated with building a traditional architecture. ARC-TS administrators can continuously meet the ongoing needs of the research community – something of vital importance to such a large research institution. Verge.io makes attainable what once seemed insurmountable: a simplified and manageable system for research faculty and students.

This approach has the potential to forever change the way research data is stored and managed – far beyond the University of Michigan.

Verge.io continues to look for additional opportunities to create greater collaboration and data sharing among researchers across universities, organizations, or enterprises. The advancements of Verge.io technologies provide the foundation to accelerate innovation, remove barriers, and foster collaboration that will revolutionize the research community and far beyond.



Schedule a demo with us today to find out if we're the right fit for your company's needs.

SCHEDULE