

“Horizon” Virtual Desktop Infrastructure (VDI) for VCU



VCU



VCUHealth

VCU Health System

February 2023

What Is It?

A NEW HYBRID (CLOUD/ON-PREM), UNIVERSAL RESEARCH COMPUTING INFRASTRUCTURE AND PLATFORM FOR VCU

Open to all users and all categories of secure research:

- ▶ HIPAA
- ▶ Controlled Unclassified Information (CUI)
- ▶ FISMA
- ▶ CMMC (Department of Defense)
- ▶ General Data Protection Regulation (GDPR)

Horizon will support all levels of VCU Data Classifications:

- ▶ Category I (Confidential and Regulated)
- ▶ Category II (Sensitive)
- ▶ Category III (Public) information

Goals

- 1. Support** the highest levels and standards for secured information and data protected under federal, state or industry regulations and / or other civil statutes (Confidential and Regulated data).
- 2. Realize** the goals of an accessible research computing infrastructure open to all VCU investigators, data sharing with external partners, team science and/or other seamless collaborative projects with partners across boundaries.
- 3. Create** a highly secured, compliant, agnostic technical solution and environment that can support multiple PHI data sources, including data from VCUHS.
- 4. Create** a scalable solution for VCU research labs and spaces requiring high-volume storage and backup.
- 5. Progressively eliminate** fragmented research computing solutions across campus that are not centralized and supported with inconsistent funding.

Startup Sponsors and Investors



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Office of the Senior Vice
President for Health Sciences



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Stravitz-Sanyal Institute for
Liver Disease and Metabolic Health
School of Medicine



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School of Medicine



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Technology Services



VCUHealth™



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Office of the Vice President
for Research and Innovation



What's Included?

STORAGE AND BACKUP

- ▶ 14 node scale out NAS: 1.76PB storage
- ▶ 246 TB Raw SSD (Performance Tier)
- ▶ 1.92 PB Raw HDD (Archive Tier)

COMPUTE

- ▶ 5 node VxRail HCI cluster
- ▶ 5 A40 GPUs (160 vGPUs available)
- ▶ 320 cores of Intel CPU compute and 5.5TB of RAM
- ▶ 25Gbps cluster interconnect communication network

DATA SCIENCE APPLICATIONS AND INTEGRATIONS

- ▶ Globus, Snowflake, Jupyter Notebook, R Studio, Python, SAS, etc.
- ▶ CryoSparc, Relion, SBGrid
- ▶ Scale on demand to Azure cloud or AWS cloud services as needed
- ▶ SOM High Performance Computing (HPC) for extended storage/compute

PROFESSIONAL SERVICES

- ▶ IPDS (VCU-approved vendor services)
- ▶ SOMTech IT support and consultation

Any new expansion needs (more licenses, more storage, more compute power, more cloud offerings) will be invoiced to the requesting School/program who will fund the requested upgrade.



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Horizon View

Planned Usage Tiers Across VCU Health Sciences

Users can be “promoted” and “demoted” to higher/lower tiers as needed

Tier 1

10 users

Genomic Analysis, Drug Discovery, Pathology, Cryo-EM, Radiology, Data Visualization

- Image intensive (GPU) users
- 8 core (vCPU), 16-32GB RAM, and 250 GB hard disk, A100 GPU

- ✓ School of Medicine
- ✓ Massey Cancer Center
- ✓ Wright Center
- ✓ Liver Institute
- ✓ VIPBG

Tier 2

40 users

Informatics, Data Science, Population Health, Public Health, Cancer Research, Knowledge Workers

- Intensive statistical modeling (CPU) users that rely on SAS, SPSS, R, Python, Jupiter, TensorFlow
- 4 core (vCPU), 16-32GB RAM, and 250 GB hard disk

- ✓ School of Medicine
- ✓ Massey Cancer Center
- ✓ Wright Center
- ✓ Liver Institute
- ✓ School of Public Health
- ✓ School of Dentistry
- ✓ School of Nursing

Tier 3

100 users

Research Labs, Instrument workstations, general computational needs

- Replacement for general research lab workstations to meet computational and data sharing needs
- 2 core (vCPU), 8GB RAM, 120GB Hard disk

- ✓ School of Medicine
- ✓ Massey Cancer Center
- ✓ Liver Institute
- ✓ School of Dentistry
- ✓ School of Nursing

Tier 4

Basic terminal

- Secure VCU shares access
- Basic word processing and web browser users
- 2 core, 4GB RAM, 120 HDD for share access

- ✓ School of Medicine
- ✓ Massey Cancer Center
- ✓ Wright Center
- ✓ Liver Institute
- ✓ School of Public Health
- ✓ School of Dentistry
- ✓ School of Nursing

Clinical Research: An Agnostic Solution For Multiple PHI Data Sources



Epic



RAMS/IRB + Honest
Broker
Process
with Approved
Protocol



VCUHealth
Snowflake



VCU



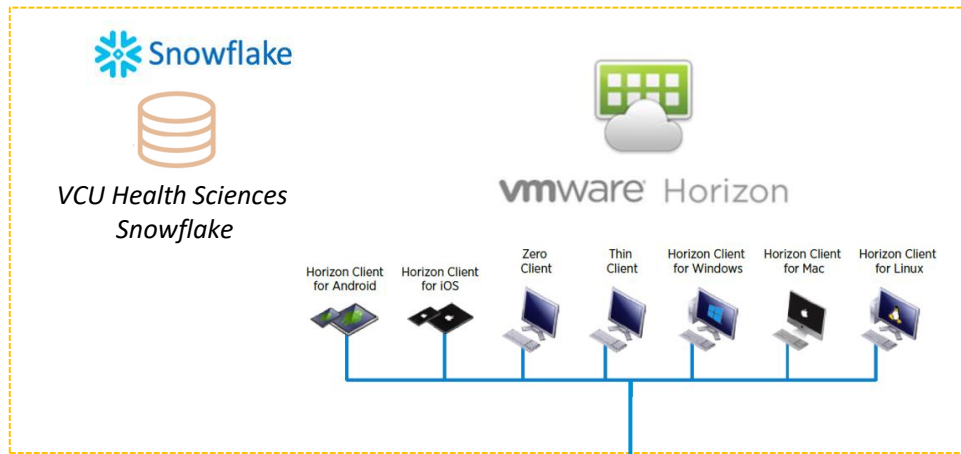
External Academic Health
Science Centers, Hospitals, Registries,
Healthcare Providers

NIH National Library of Medicine
National Center for Biotechnology Information

DASH Data and
Specimen Hub

VDH VIRGINIA
DEPARTMENT
OF HEALTH

NIH NATIONAL
CANCER
INSTITUTE



Wright Center for Clinical
and Translational Research
(CCTR)

Massey Cancer
Center

Stravitz-Sanyal Institute
for Liver Disease
& Metabolic Health

Other Universities,
External Partners,
Collaborative Programs,
Specialized Research

Risks Addressed



WHAT DOES THIS PROVIDE VCU?

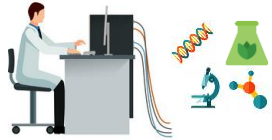
- ✓ Secure/Compliant computing space instead of local workstations (Zero trust computing space)
- ✓ High Volume Data Storage / Power Computing
- ✓ Visibility and Insight into studies
- ✓ Safe delivery and storage for datasets
- ✓ Eliminate piecemeal infrastructure solutions across campus
- ✓ “Future-proof” environment for receiving IRB-approved datasets, external datasets from collaborative research projects with external partners

WHAT DOES THIS PROVIDE VCU HEALTH?

- ✓ Secure/Compliant computing space instead of local workstations (Zero trust computing space)
- ✓ Safe and trustworthy delivery and storage for datasets
- ✓ Controlled access for VCU investigators requesting VCUHS datasets
- ✓ Unified research computing infrastructure with highest technical safeguards (encryption, role based access, etc).

Basic Health / Life Sciences: VCU Research Labs and Spaces

Proliferation of unmanaged workstations, personal servers/data storage, across VCU research labs creates risk and compliance issues.



Personal server/data storage (NAS devices, external hard drives, USB, etc)



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VCU Health Sciences Snowflake



vmware Horizon



SOM High Performance Computing (SOM HPC)

With Horizon, investigators can be upgraded to THIN CLIENTS with high volume data storage / power computing, backup, and consistent security controls.

This creates a secure computing environment for legacy lab instruments/software running old OS.



Medicine



Pharmacy



Dentistry



Nursing



Health Professions



Wright Center for Clinical and Translational Research (CTR)



Massey Cancer Center



Stravitz-Sanyal Institute for Liver Disease & Metabolic Health



VIPBG

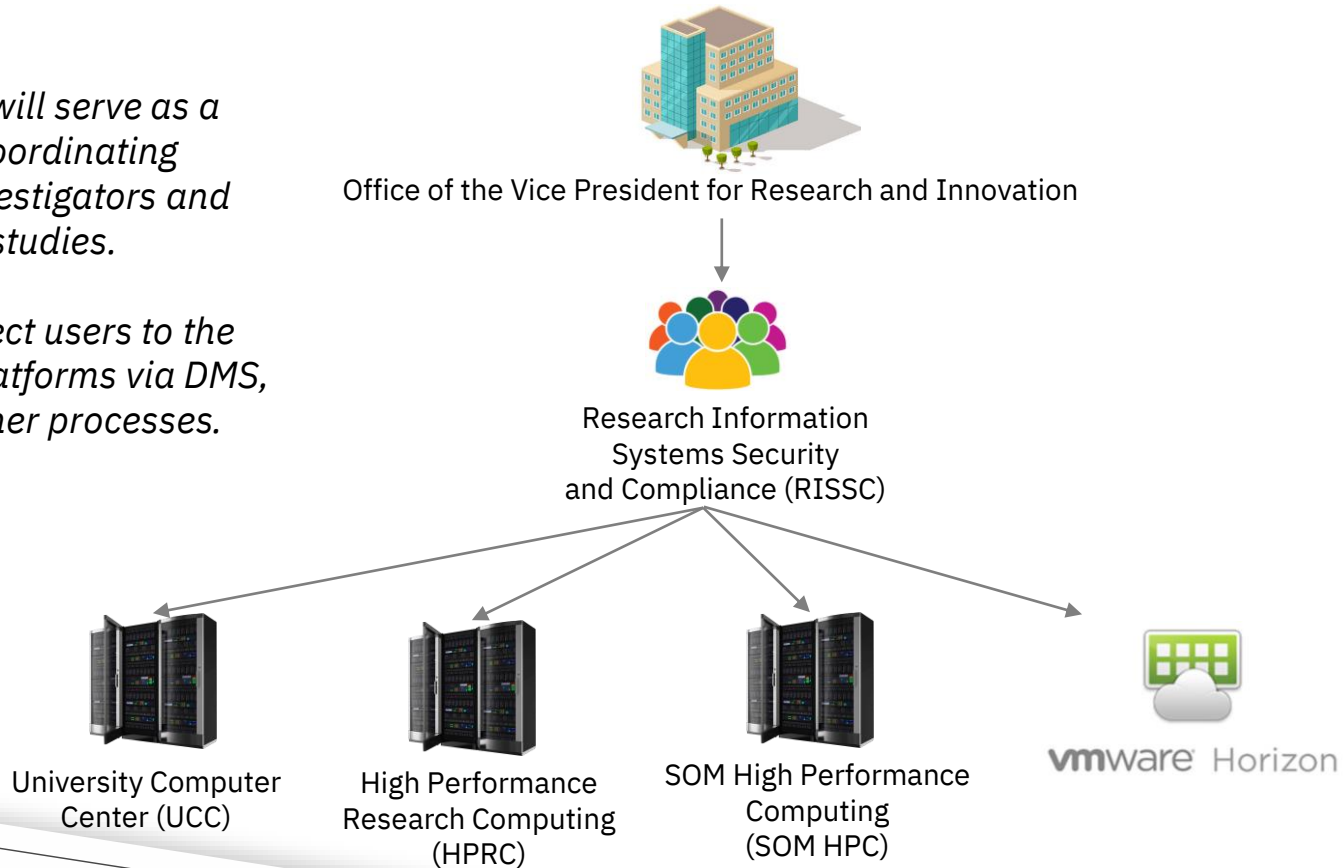


VCU

Governance and Coordination

The OVPRI will serve as a central coordinating office for investigators and their studies.

They will direct users to the appropriate platforms via DMS, IRB, and other processes.



Policy Requirements

As part of a controlled, consistent, and standardized research computing environment, the senior vice president for health sciences, the vice president for research and innovation, and VCU Technology Services will craft and implement policies that mandate the use of the new “virtual desktop infrastructure” (VDI) environment that is appropriate for the relevant data classification.

The VCU Data Classification Standard provides the classification of all data generated, processed, stored, transmitted, or used by all VCU faculty, staff, contractors, and third-party business partners on behalf of VCU. VCU data classification levels include Category I (Confidential and Regulated), Category II (Sensitive), and Category III (Public) information.

Investigators and VCU units will be required to use Horizon by default for clinical research and/or Category-1 data projects for VCU Health System (VCUHS) datasets. Any requests for alternative infrastructure platforms or mechanisms outside of Horizon for clinical research projects and/or that include VCUHS datasets must be justified via the VCUHS Data Governance process and obtain approval from the Chief Information Officer (CIO) and Chief Information Security Officer (CISO).

These policies will be integrated with the existing VCU Data Management System (DMS) and all related IRB systems. Users will be directed to use the required infrastructure based on policy, the established data classification, and at the direction of the OVPRI and local IT teams.

Horizon Model and Cost Structure Summary



Thin Clients vs. Workstations



	Dell Wyse 5470 All-in-One Thin Client	Dell Power User / Researcher Desktop Workstation
Price	\$800/unit	\$3500-\$5000/unit
Lifespan Replacement	Every 8-9 years	Every 4-5 years
Software, storage, and backup	100% centrally managed on servers	Locally managed on desktop/laptop/external drives
IT Support Effort	None/Minimal	Continuous troubleshooting
Upgrades Needed	None	Additional Storage, Backups, Upgrades over time, etc.
Security	Highest data security, no locally saved data, less vulnerable to malware	Hard drive data may be compromised if stolen or with malware/ransomware

Getting Access

LICENSES

- ▶ Schools and programs must purchase their own VMWare licenses to access Horizon. Storage, Compute, and FTE Tech Support are already included.
- ▶ 1 pack of 10 licenses = **\$12,203**
- ▶ Cost per license changes with bulk purchases

CONSULTATION AND SETUP

- ▶ SOMTECH, TS, and OVPRI will coordinate to ensure the appropriate software, security image, and other configurations are set on Horizon

DESKTOP REPLACEMENTS

- ▶ Schools and programs must purchase their own THIN CLIENTS as a replacement for standard desktops if desired
- ▶ SOMTECH will help coordinate testing and connectivity



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Horizon View

Contact Us To Get Started!

Next Steps and Projected Timeline

PRE-LAUNCH

- ▶ Finalize procurement and on-prem installation
- ▶ TS/IPDS/SOMTech coordination on setup, testing, and 2023 migration to new data center
- ▶ Develop prioritization matrix for Horizon projects and users
- ▶ Develop database and dashboard for user tracking and project monitoring (users, MBUs, Departments, storage/compute analytics)
- ▶ Develop Research software catalog and determine licensing needs
- ▶ Work with PMO and OVPRI on intake and consultation process
- ▶ Develop issue tracking categories in Cherwell
- ▶ Develop invoice/PO processes for new license requests and provisioning accounts

VCU HEALTH AND VCU HONEST BROKER PROCESSES

- ▶ Work with VCU Health on technical/operational processes for data acquisition, data transformation, and data transfer
- ▶ Work with VCU Health to ensure alignment between policies, governance, DMS, and IRB processes for approved protocols
- ▶ Ensure alignment between VCU and VCU Health Info Sec standards for Horizon

POST-LAUNCH

- ▶ Dashboard reporting on usage analytics, logs, and project requests
- ▶ Work with OVPRI to develop a centralized VCU Research Dataset Catalog for downloads
- ▶ Virtualize research labs workstations that are ideal candidates for thin clients

Next Steps and Projected Timeline



**January
2023**

Cost-share and MOA executed, PO submitted for purchase of core infrastructure upfront (storage, compute, IPDS services)



**March-May
2023**

Complete all Pre-launch checklists. Work towards alignment with VCU Health Compliance and Info Sec requirements.



**June-July
2023**

**GO-LIVE
LAUNCH**



**February
2023**

Resolve any/all Procurement requirements for processing



**May-June
2023**

Hardware and VMWare installation, configuration, and testing via IPDS



**July-December
2023**

Provisioning users, active monitoring and usage analytics reporting