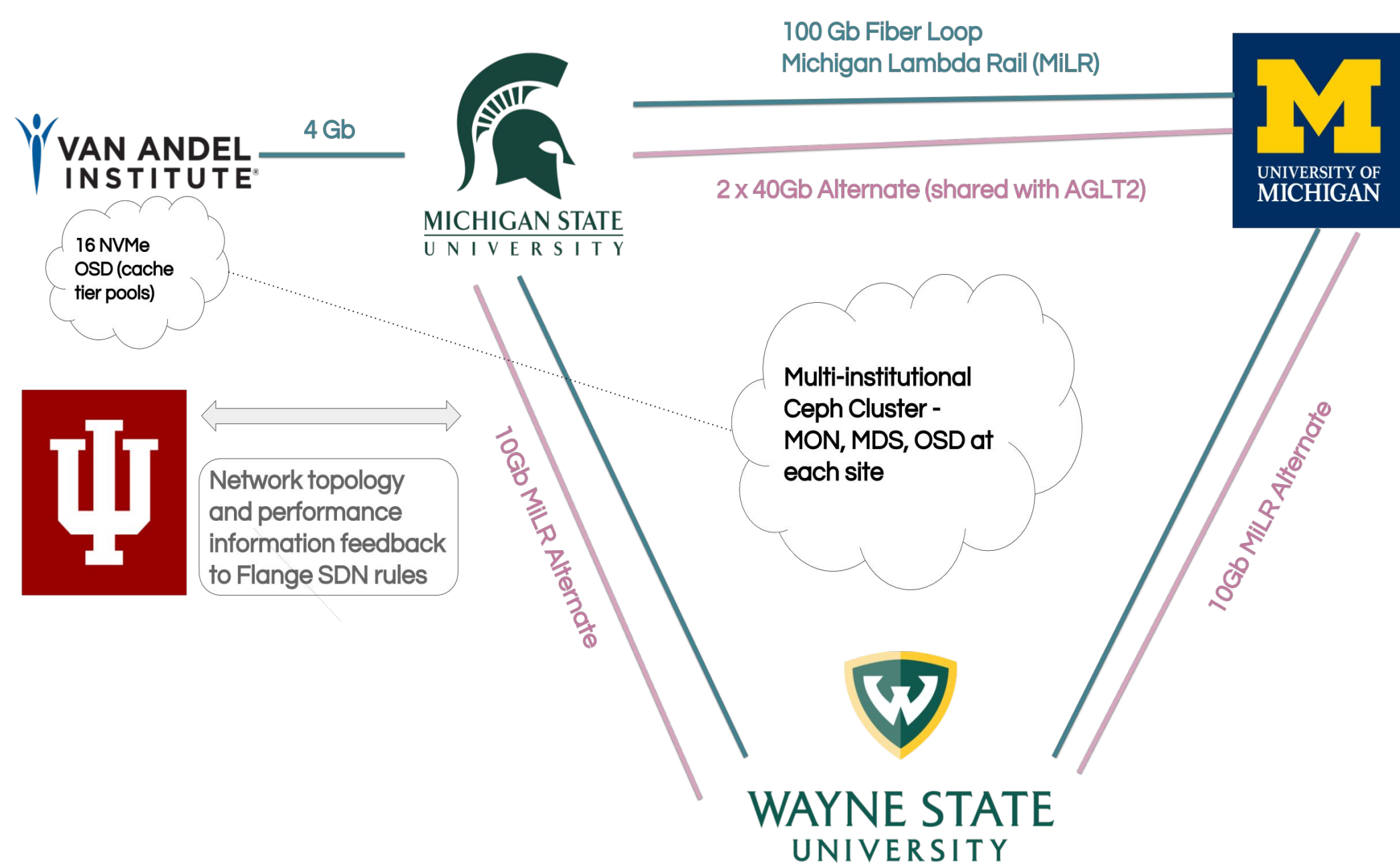


OSiRIS: Posix and object storage for research



OSiRIS is a 840 OSD, 7.4 PiB(raw) **Ceph storage** cluster expanding this month to **1368 OSD** and **13.7 PiB(raw)**. The cluster spans 3 Michigan research universities with a 'cache' component at the Van Andel Institute. Our goal is to provide transparent, high-performance access to the same storage infrastructure from any of our campuses.

Enabling Science Collaborations



Building on existing collaboration between **MSU** and the **VAI**, OSiRIS has installed 'cache' hardware and NFS gateway services at the institute to enable direct access and faster access to key research data. OSiRIS at VAI is enabling VAI bioinformaticians to work with MSU researchers to better understand Parkinson's disease and cancer.



Global Nightlights: NOAA has transferred to researchers at **UM** its archive of nighttime satellite imagery comprised of all images captured from 2 different satellite programs: DMSP (1993-2016) and VIIRS (2012-ongoing). By keeping portions of this archive on OSiRIS we enable wider usage of the datasets by researchers outside the institution.



The **JETScape** collaboration at **WSU** is an NSF funded multi-institutional effort to design the next generation of heavy-ion event generators. OSiRIS provides the collaboration with a universally available storage platform for collaborative access to data.



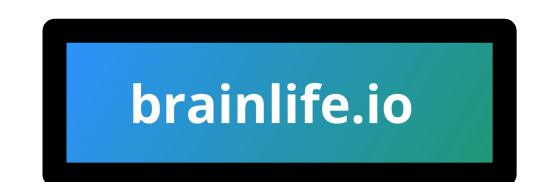
U.S. Naval Research Lab is collaborating with researchers at **UM** sharing high-resolution ocean models with the broader community. This unclassified data was stored on Navy computers that were not easily accessible to many researchers. OSiRIS has enabled scientists worldwide to leverage these models.



The **ATLAS Event Service** is designed to leverage object stores like OSiRIS for fine grained physics event data which can be retrieved and computed in small chunks and leverage transient compute resources.



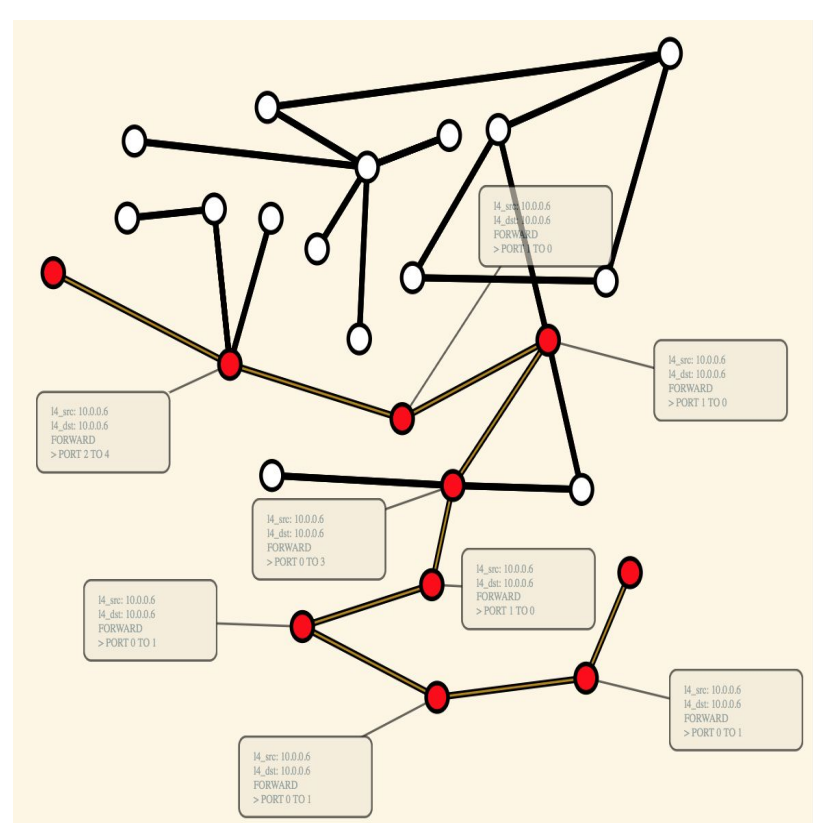
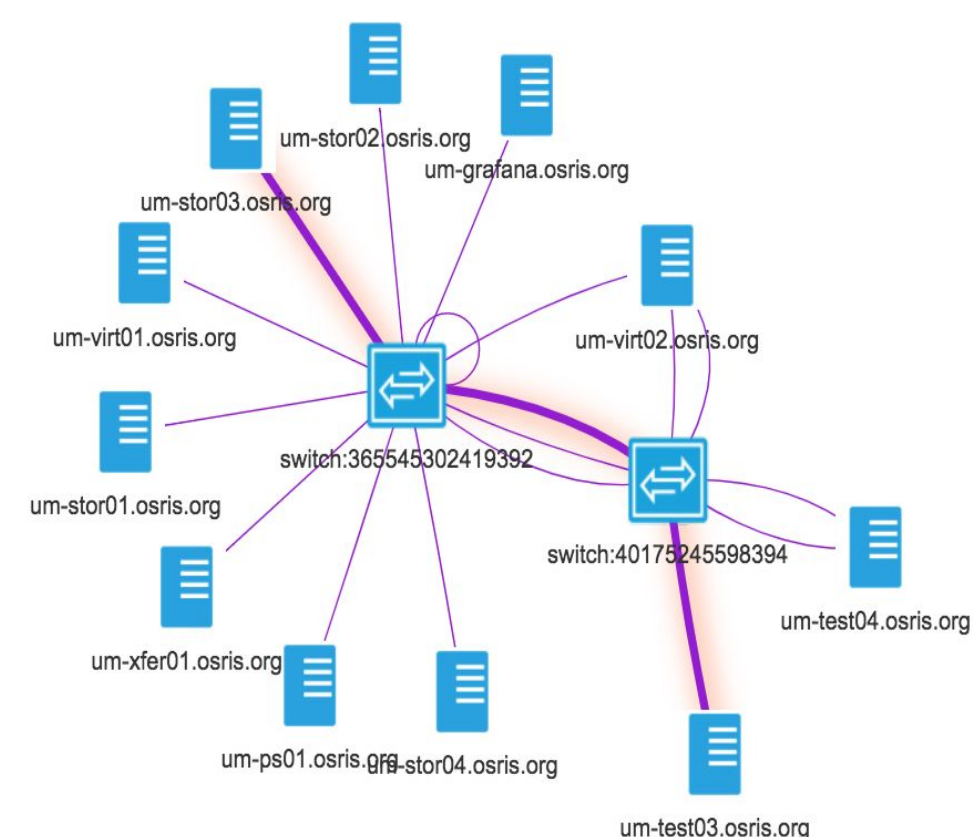
Homed at the **UM ISR**, the NIH funded 5 year project 'Effect of the Placental Epigenome on Stunting in a Longitudinal African Cohort' uses OSiRIS to store and share selected data to a wider community



Brainlife.io is an online platform homed at **IU** to accelerate scientific discovery by automated data management, large-scale analyses, and visualization for brain science. OSiRIS is helping them address challenges in open sharing and reproducibility.

NMAL: Advanced Network Management

OSiRIS Network Management Abstraction Layer
Advanced network monitoring and control services - led by the team at **Indiana University CREST**.

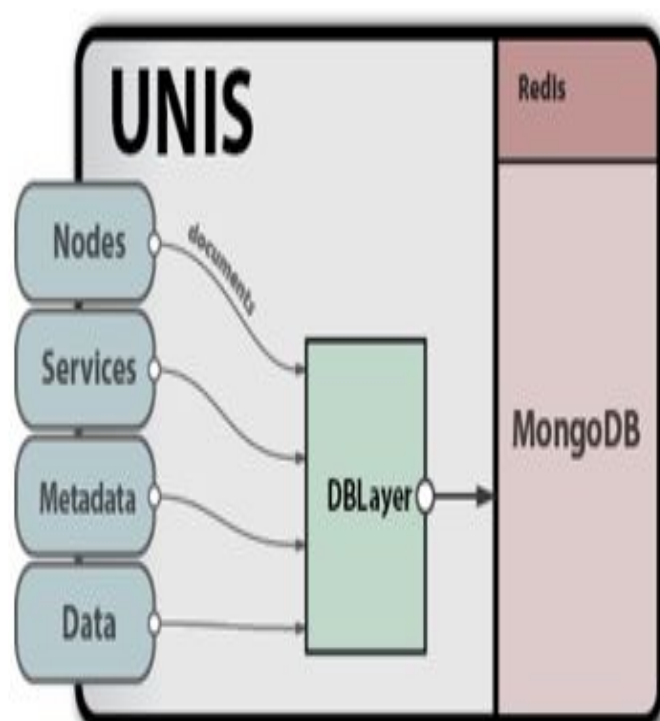


UNIS - Unified Network Information Service

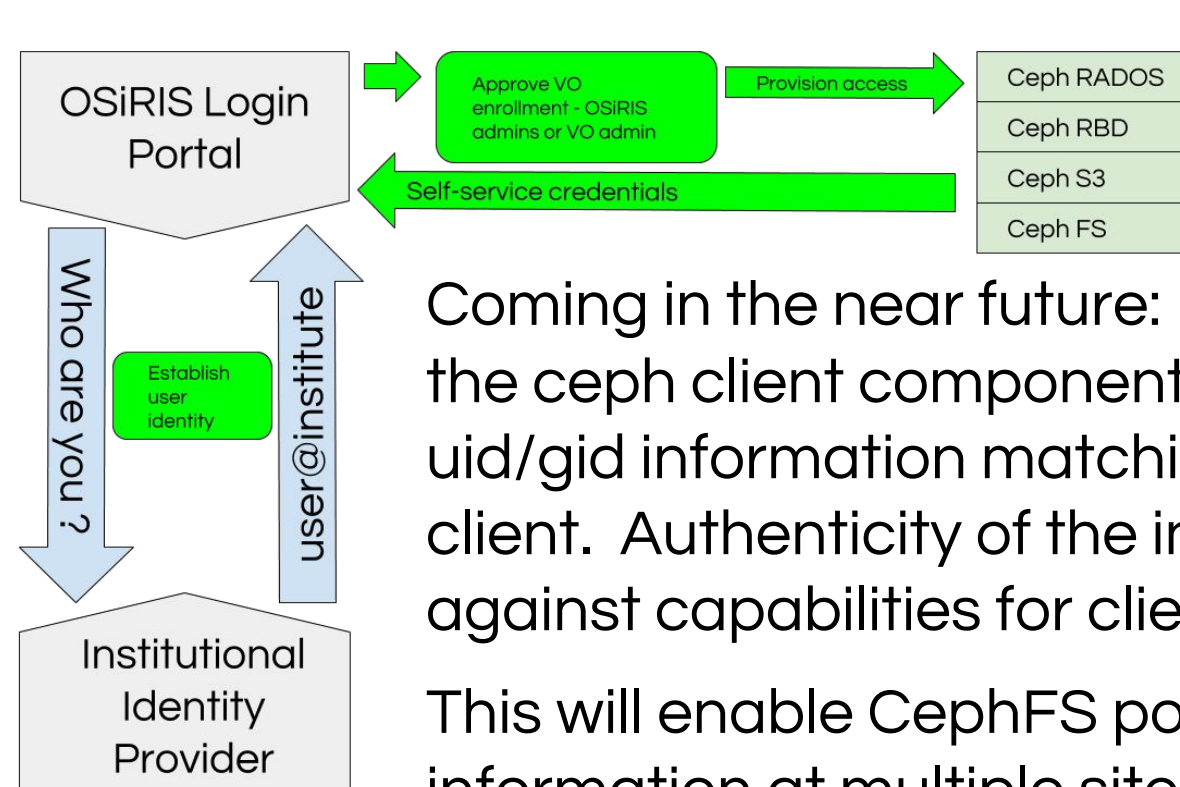
UNIS-DB aggregates network performance, LLDP topology, and host metrics from our perfSonar mesh sent to it by the perfSonar Periscope extension so it can be applied to network control and discovery.

NMAL gives us real-time feedback into the topology of our network from hardware switches and software Openvswitches

Which we'll use for real-time network pathing decisions with Flange rules



Bridging Ceph and Institutional Credentials



Mapping Identities in CephFS

Coming in the near future: We are making modifications to the ceph client component which will allow us to set unix uid/gid information matching OSiRIS rather than the local client. Authenticity of the information will be matched against capabilities for client keys kept on our cluster.

This will enable CephFS posix mounts with consistent uid information at multiple sites.

Self service enrollment and credentials with Internet2 CManage

Using OSiRIS requires only a brief onboarding flow which uses existing institutional credentials to establish an identity with us. We can enroll users from widely established auth federations including InCommon and eduGain.

Thanks to CManage plugins we authored, enrolling in an OSiRIS virtual organization automatically grants access to OSiRIS storage and enables self-service of the necessary Ceph client credentials.

Leveraging campus auth and NFSv4

In some cases we can also leverage institutional Kerberos domains and provide Kerberos authenticated NFSv4 mounts to campus users which map their on-campus identity to their OSiRIS identity.

Users of the **UM** and **MSU** computing clusters have direct mount access to OSiRIS storage on HPC login and transfer nodes.