

Cloud Access Service & Consulting



NYSErNet Engineers work with you to review the Cloud Access Service options.



About NYSErNet

NYSErNet is a nonprofit organization advancing the research and educational missions of our members by delivering a full range of customized, progressive, and affordable end-to-end data and networking technology solutions. We also offer our community opportunities to collaborate and improve through professional development trainings, conferences and events.



www.nysernet.org/IAS



membership@nysernet.org

With multiple options for connecting to cloud content providers, it can be difficult to determine which option best fits your institution's needs.

NYSErNet's Cloud Access Service enables your institution to access Cloud Infrastructure (IaaS) Providers directly via the NYSErNet Network. With three solutions available, we can assist you to select the connectivity which best fits your needs.

Potential Solutions

- **Campus Cloud VPNs via Content Peering Service**
NYSErNet's Content Peering Service provides access to the Amazon, Microsoft, and Google Clouds, making it possible for your institution to establish VPNs to reach your cloud instances with these providers. With NYSErNet's direct connections to content providers, campuses can offload traffic from their commercial Internet connections providing better experience at a lower cost.
- **Internet2 Cloud Connect Service**
Many institutions have network performance issues due to complex inter-cloud data flows and integrations. The Layer 3 Cloud Connect Service provided by NYSErNet and Internet2, leverages your NYSErNet R&E/IAS connection to directly access all the major cloud providers. Using the NYSErNet Network to reach cloud services provides dedicated and private pathways, better performance and seamless multi-cloud capability.
- **Optical and Fiber Connectivity to the Cloud**
A higher-speed alternative to the above two options, NYSErNet's optical and fiber optic networks can be leveraged to obtain redundant 10 Gbps private circuits to each IaaS provider.
- **Campus Redundancy Model**
Maintaining cloud access redundancy and resiliency is important to campus business continuity. A combination of the commercial Internet, NYSErNet's Content Peering Service and the above Cloud Access Services enables campuses to build a three-tier approach towards minimizing a disturbance of campus-wide cloud connectivity due to a single network outage.

Comparison matrix on next page for your review

NYSERNet Service	<u>Content Peering Service</u>	<u>NYSERNet Routed Network</u>	<u>NYSERNet Optical and Fiber Networks</u>
Cloud Connectivity Service	Cloud Provider VPN Connectivity	Internet2 L3 Cloud Connect	Circuit Connections to Cloud Providers
Cloud Technology	VPN Gateway Services	AWS DirectConnect (Hosted Connection), Azure ExpressRoute, GCP Partner Interconnect	AWS DirectConnect, Azure ExpressRoute Direct, GCP Dedicated Interconnect
Bandwidth	VPN-level performance (< 5 Gbps - approx.)	5 Gbps at I2 Cloud Peerings	Up to 10 Gbps
Cloud Provider Redundancy	Dual NYSERNet peerings with AWS and Azure; Google redundant peerings awaiting Google upgrade	Azure ExpressRoute is redundant to I2; AWS DX or GCP PI require second circuit purchase	Azure ExpressRoute is redundant to member; AWS DX or GCP PI require second circuit purchase
NYSERNet Service Redundancy Options	Redundant NYSERNet Cloud peerings in NYC and Ashburn, VA; VPN failover via the Internet	Redundant VLANs via NYC and Buffalo to I2 Routers in NYC and Cleveland; I2 MPLS service internally redundant to Cloud Providers	Redundant optical circuit or fiber link purchase required
Concurrently Operable	Yes	Yes	Yes
Multi-Cloud Capable	Yes	Yes	Circuits to each provider required
Provides Inter-Cloud Connectivity	No	Yes	No
Underlying Technology	Point-to-point Campus-Cloud VPN via NYSERNet CDN	Dual VLAN circuits between Campus and I2 Routers	Point-to-point optical circuits or fiber cross-connects between Campus and Cloud Providers
NYSERNet Connectivity Options	IAS CDN VLAN, R&E connectivity with CDN VLAN	IAS VLANs (two VLANs which count as one IAS VLAN); R&E Connectivity with two Cloud Connect VLANs	Circuit service to campus peering router
Member Requirements	Campus IAS router (802.1q enabled by default)	Campus R&E router with 802.1q enabled	Campus router with available 10Gbps interface
BGP Peering	Member and NYSERNet (BGP Communities for content selection)	Member and Internet2; Internet2 and Cloud Provider	Member and Cloud Provider
Routes Received	Cloud Provider public routes selected via BGP Communities; Member internal Cloud Routes advertised within the VPN	Member internal Cloud Routes (VPC and Vnet routes) via private Internet 2 MPLS VRF for each member	Member internal Cloud Provider Routes (VPC and Vnet routes)
Connectivity Management Interface	Cloud Provider Portal; Campus BGP router	Internet2 Cloud Connect/OESS Portal; Campus BGP Router; Cloud Provider Portal	Cloud Provider Portal; Campus BGP Router
Connectivity Cost (Does not include Cloud Provider cost)	No cost from NYSERNet	No cost from NYSERNet or Internet2	Circuit cost and/or cross-connect fees from NYSERNet