

National Aeronautics and Space Administration

HECC Network Services

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NASA High-End Computing

Here's What We Can Do For You!

- End-to-End Networking Services
  - We maintain the network infrastructure connecting HECC resources to our global user community, including high-speed internal networks and connections to external networks that link HECC to user institutions around the world.
  - We know that the ability to access HECC resources anytime and from anywhere is critical to the success of our user community's computational projects. Our philosophy is that any problems you have in accessing HECC assets, or in moving data to or from our data center, is our problem to solve.
- Multiple Methods for Data Transfer
  - Secure Unattended Proxy (SUP), SSH Passthrough
  - Multiple file transfer protocols available for transferring large files:
    - shiftc
    - bbftp/bbscp



You can also get in-depth support

- TCP Performance Tuning for WAN Transfers
  - We work closely with you to optimize multiple aspects of end-to-end flows, select the most efficient transfer methods and protocols, and fine-tune your systems.
- Network Troubleshooting
  - We collaborate with remote network teams and system administrators to identify and address bottlenecks along the network path to improve the throughput of your network transfers.
    - OCIO Networking and Telecommunications Services (NaTS) engineers
    - Wide-area network (WAN) service providers
    - Campus local-area network (LAN) engineers
- User Education
  - We provide users with guidance on tools and techniques for improving data transfer speeds and diagnosing network issues.



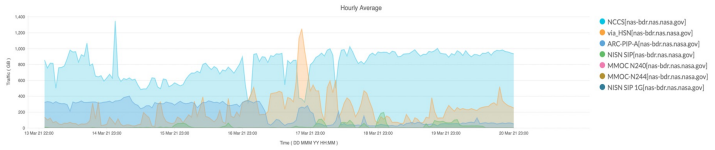
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- Performance Analysis
  - We monitor both the overall performance the network and specific performance of large network transfers to identify potential problems or opportunities for optimization.

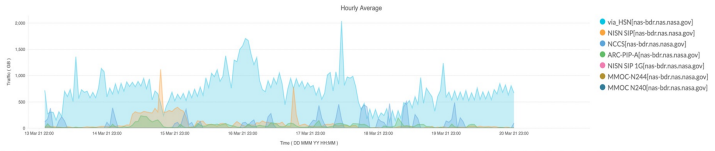
Total bytes transferred into/out of NAS (per external network connection)

Interface Name	In Traffic	Out Traffic
NCCS	1076.232 TB	88.631 TB
via_HSN	300.717 TB	970.837 TB
ARC-PIP-A	246.776 TB	58.917 TB
NISN SIP	27.302 TB	111.219 TB
MMOC N240	310.720 MB	280.144 KB
MMOC-N244	310.347 MB	287.024 KB
NISN SIP 1G	25.962 MB	15.543 GB

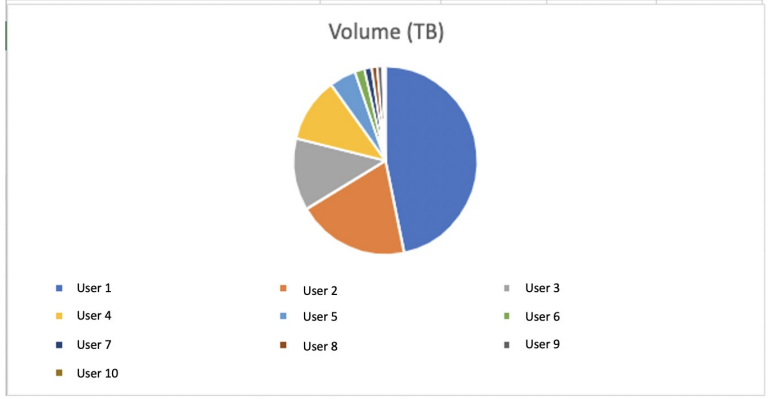
Bytes transferred into NAS



Bytes transferred out of NAS

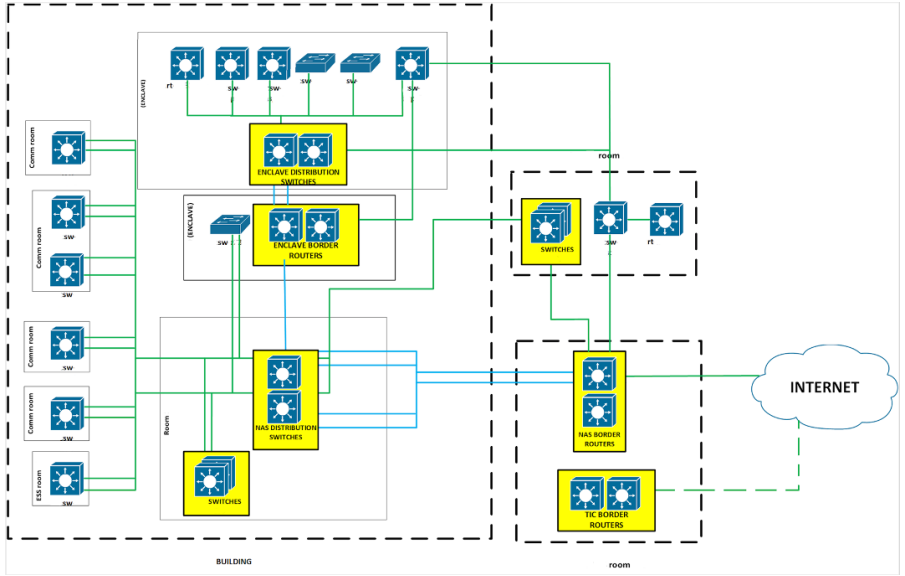


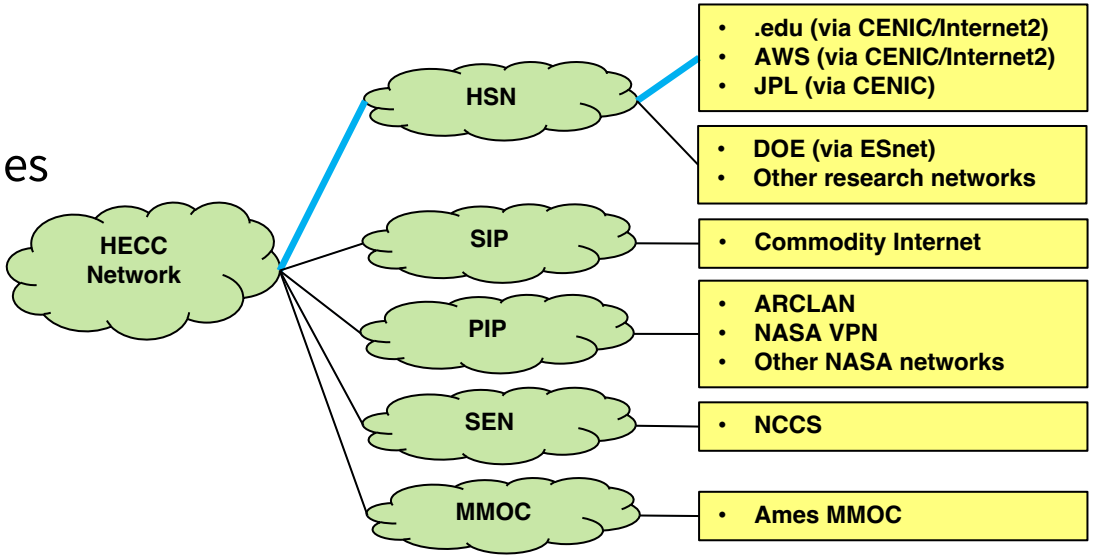
User	Volume (TB)	Min (Gb/s)	Avg (Gb/s)	Max (Gb/s)
User 1	3.21	0.08	0.09	0.13
User 2	1.35	0.13	2.46	3.59
User 3	0.85	0.00	0.18	0.52
User 4	0.77	0.10	0.10	0.10
User 5	0.32	0.00	0.13	0.38
User 6	0.12	0.02	1.22	3.94
User 7	0.09	0.00	0.03	0.09
User 8	0.07	0.00	0.05	0.08
User 9	0.07	0.00	0.06	0.12
User 10	0.03	0.00	0.04	0.11



Network Infrastructure

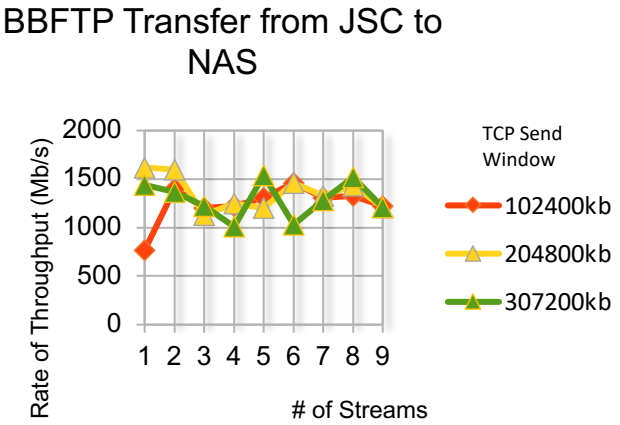
- Local Area Network (LAN) Connectivity
  - 100 Gbps infrastructure with key components implemented as redundant pairs for high availability
- Wide Area Network (WAN) Connectivity
  - HECC resources are available to the users across the Agency and global Internet through multiple paths.
  - Dedicated connections to transit networks reduce contention with non-HECC traffic.
  - The Networks Group recently established its first 100 Gbps connection to the CENIC network, which provides connectivity to Internet2





Success Stories

- 10x Transfer Speed Improvement to Johnson Space Center (JSC)
  - HECC network engineers detected suboptimal transfer speeds from the JSC AeroLab to the NAS facility at Ames.
  - Initial throughput for single- and multi-stream transfers averaged 125 Mbps.
  - The network team worked with JSC engineers to tune TCP window sizes and other operating system network parameters for AeroLab hosts and upgrade local network links, resulting in throughput speeds up to 1.5 Gb/s for the bbSCP transfer method and 1.2 Gbps for the rsync method—about a 10x performance improvement.
  - By actively working with JSC engineers, the HECC team identified areas where we can improve the network and help the users understand the most effective way to use different file transfer tools.





Looking Forward

- Recent upgrades have resulted in increased network bandwidth and resilience
  - Increased performance of user data transfers
- Ongoing efforts to enhance network performance
  - Improved connectivity to other external networks
  - Maintain compliance with evolving NASA IT security standards
- User requirements are a key guiding factor
  - If you have specific networking needs, let us know!



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Ideas?
Questions?
Suggestions?

We want to hear from you!
support@nas.nasa.gov
1 (800)-331-8737

