



AmLight_{EXP}
Americas Lightpaths Express & Protect

AmLight Express and Protect (AmLight-ExP)
NSF #OAC-1451018

2020 SAACC Meeting:
AmLight-ExP: International Links

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News since 2019 SAACC meeting

■ September 2019:

1) Using Monet cable system (in pink), we activated:

- 2x100G from Boca Raton to Sao Paulo
- 2x100G from Boca Raton to Fortaleza
- 2x100G from Sao Paulo to Fortaleza

2) Using new dark fiber from Boca Raton to Miami, 2x 400Gbps transponders were installed:

- 6x100G activated

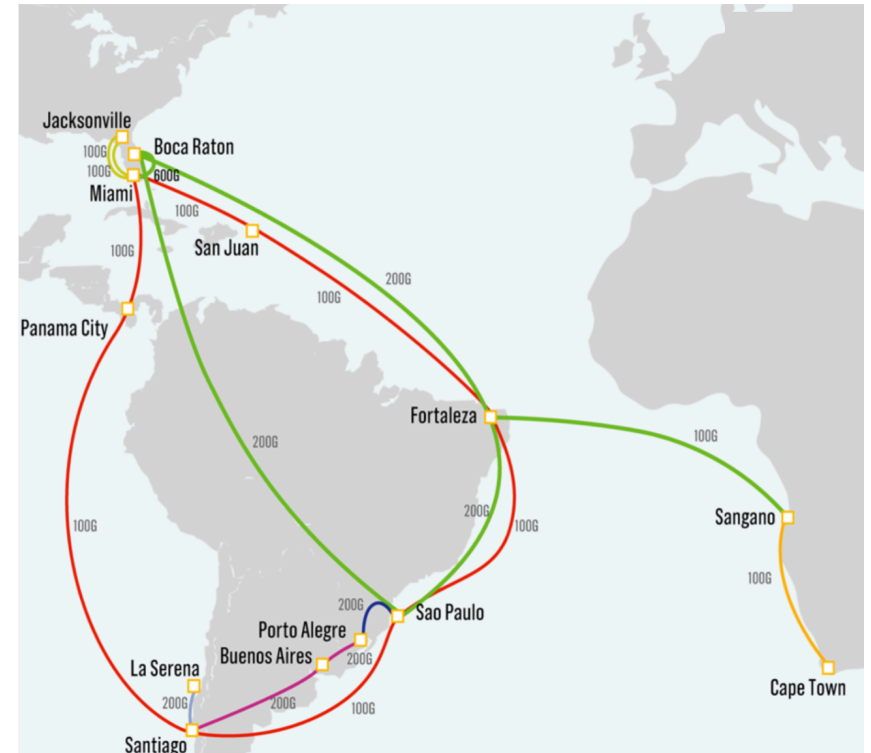
■ February 2020:

Using SACS (in green) and WACS cable systems (in blue), 1x100G was activated between SAX/Fortaleza and ZAOXI/Cape Town



Current Network Infrastructure

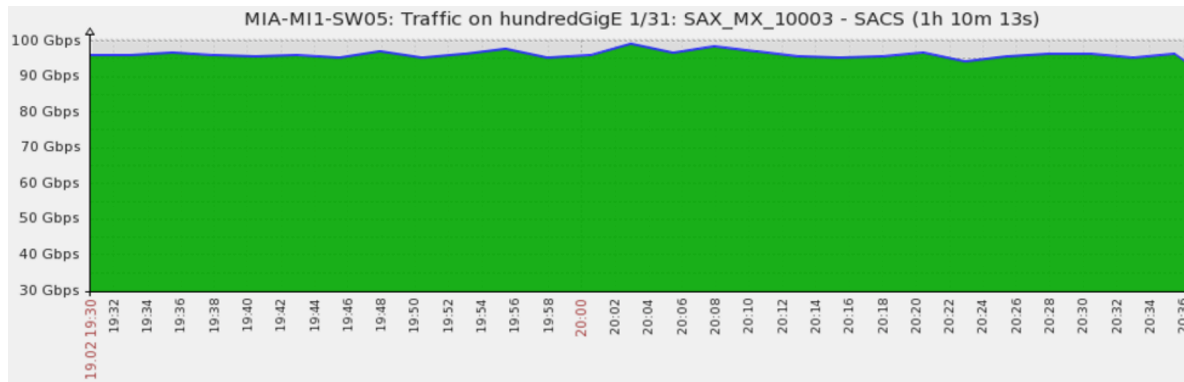
- (NEW) Using Monet cable system (in green), 600Gbps were activated:
 - 200G from Boca Raton to Sao Paulo
 - 200G from Boca Raton to Fortaleza
 - 200G from Sao Paulo to Fortaleza
- (NEW) Using SACS and WACS cable systems (in green), 100G was activated between Fortaleza and Cape Town
- 100G ring Miami-Fortaleza, Fortaleza-Sao Paulo, Sao Paulo-Santiago, Santiago-Panama, and Panama-Miami (solid red)
- 10G ring from Miami-Sao Paulo-Miami and 10G Miami-Santiago for protection (not shown)
- 100G and 10G rings are diverse, operating on multiple submarine cables:
 - Ready for the Hurricane Season!!
- Total network capacity presently at **1.2 Tbps!**



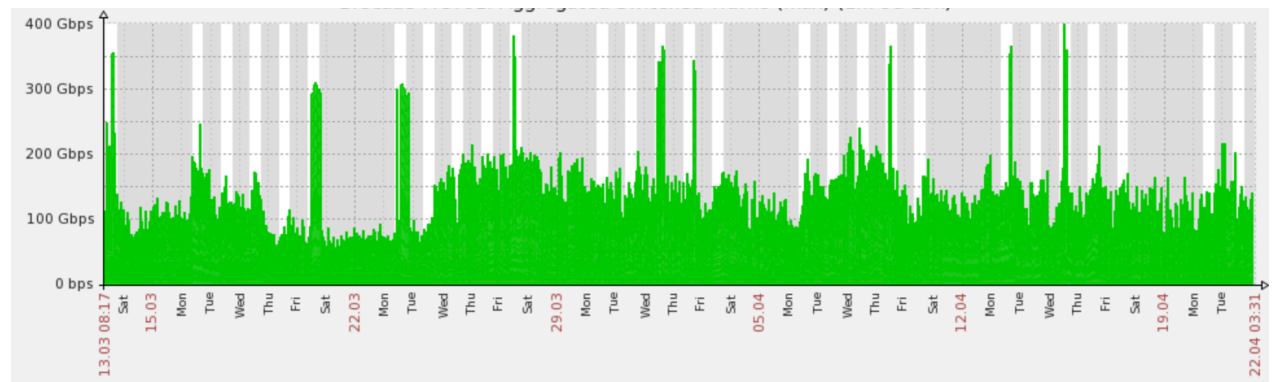
AmLight is collaboration between FIU, NSF, ANSP, AURA, RNP, REUNA, and RedCLARA

AmLight-Exp: Network Utilization

Testing from
the U.S.
to Africa:

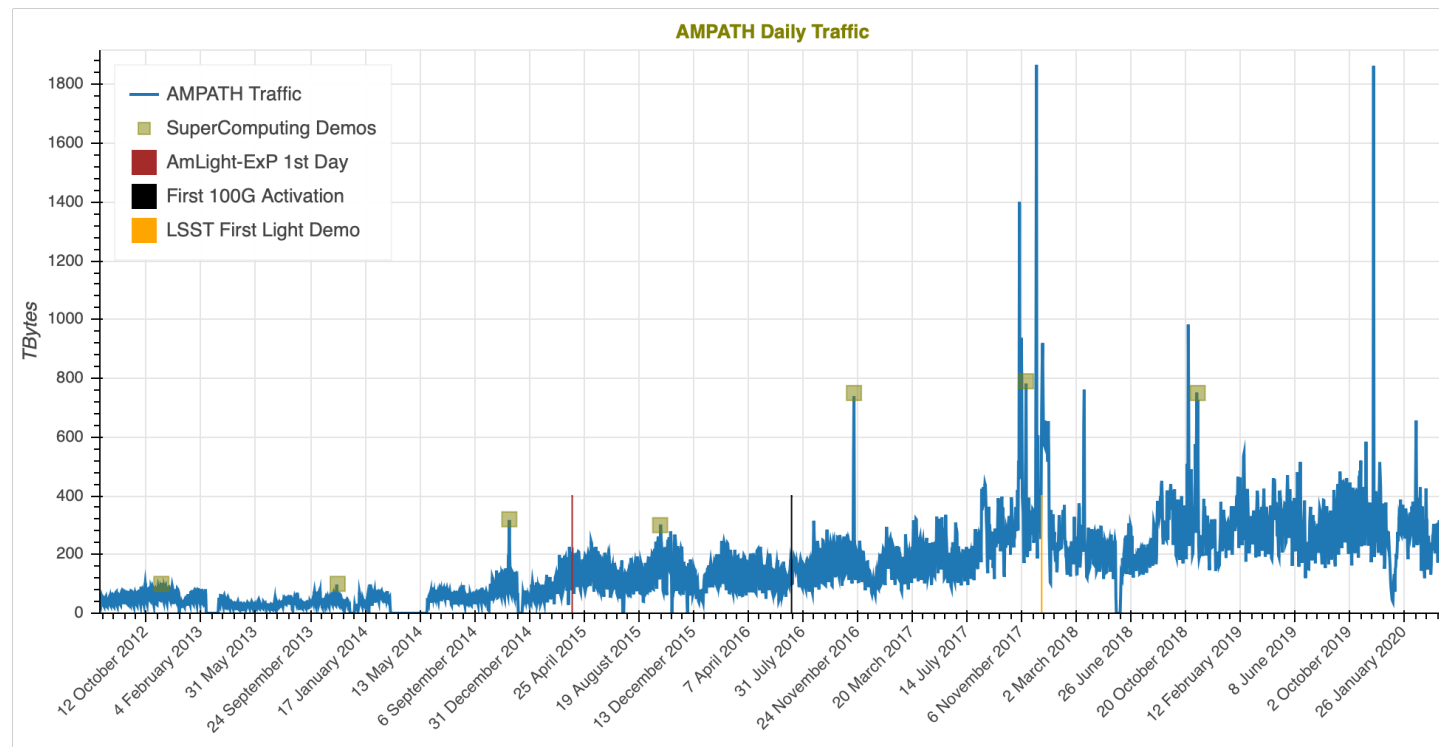


AmLight
aggregated
traffic
(last 40 days):



AmLight-ExP: Network Utilization [2]

AmLight traffic from 2012 to 2020: from avg 40 TB to 360 TB/day (9x)

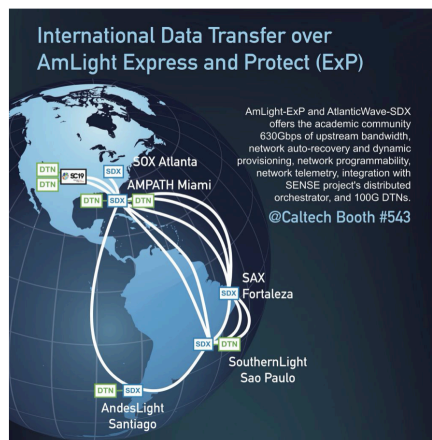


What can we do with all this bandwidth?

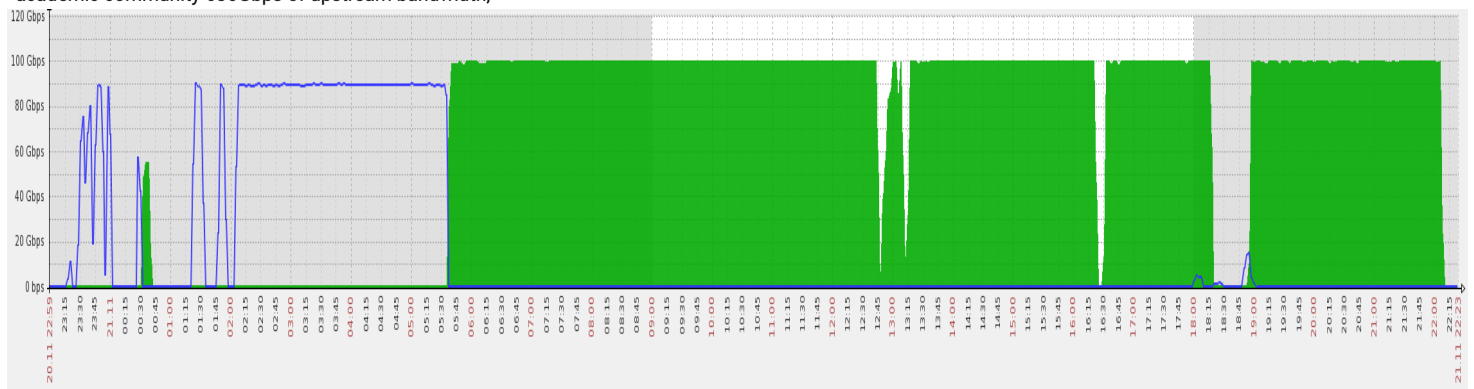
Evaluating the network: SC19 demo!

Goal: Demonstrate the new capacity using spectrum on Monet!

International Data Transfer over AmLight Express and Protect (ExP) at Supercomputing Conference (SC19)



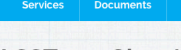
The AmLight-ExP Network Engineering Team participated in multiple collaborative SC19 Network Research Exhibitions at the Supercomputing Conference (SC19) which took place on November 17-22, 2019 at the Colorado Convention Center, in Denver, Colorado. AmLight-ExP and AtlanticWave-SDX offered the academic community 630Gbps of upstream bandwidth,



Evaluating the network: SC18 demo!

Goal: Demonstrate the new Vera Rubin Obs. 100G capacity from La Serena to NCSA!

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LSST 100 Gbps Network Demonstration at Supercomputing Conference 2018

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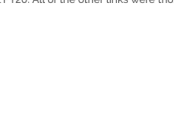
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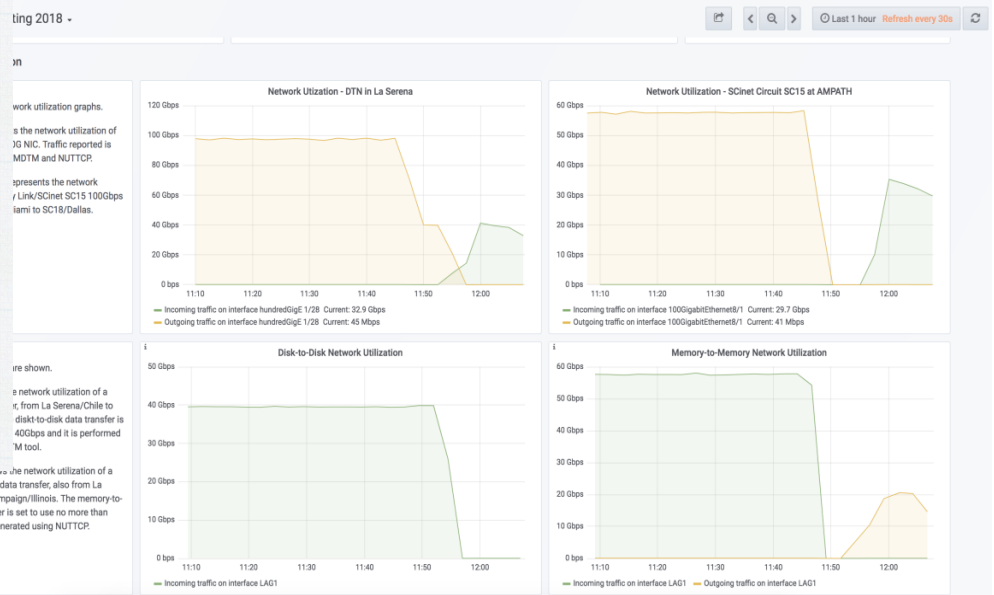
LSST 100 Gbps Network Demonstration at Supercomputing Conference 2018

On 19 Nov 2018 By lsstpo

November 20, 2018 - The LSST Network Engineering Team (NET) had a strong presence at the Supercomputing 2018 Conference (SC18) in Dallas, TX, last week, including a successful demonstration of the data transfer capabilities of the fiber optic networks that will be used during LSST operations. Digital data were transferred from the Base Site in La Serena, Chile, to the LSST Data Facility at the National Center for Supercomputing Applications (NCSA) in Champaign, IL. During the data transfer demonstration, a peak rate of 100 Gigabits/second (Gb/s) was achieved for short periods, and a sustained rate of 80 Gb/s was achieved over a three hour period, exceeding the test target. This test was run over links provisioned by several networking organizations: REUNA from La Serena to Santiago, FIU/Amlight from Santiago to Miami, SCinet from Miami to Chicago (Starlight), and NCSA from Chicago to Champaign. SCinet links provided by CenturyLink and internetz were used to transfer the data from Miami to Chicago because LSST 100 Gb/s links will not be available in that path until FY20. All of the other links were those that will be used by LSST during operations.



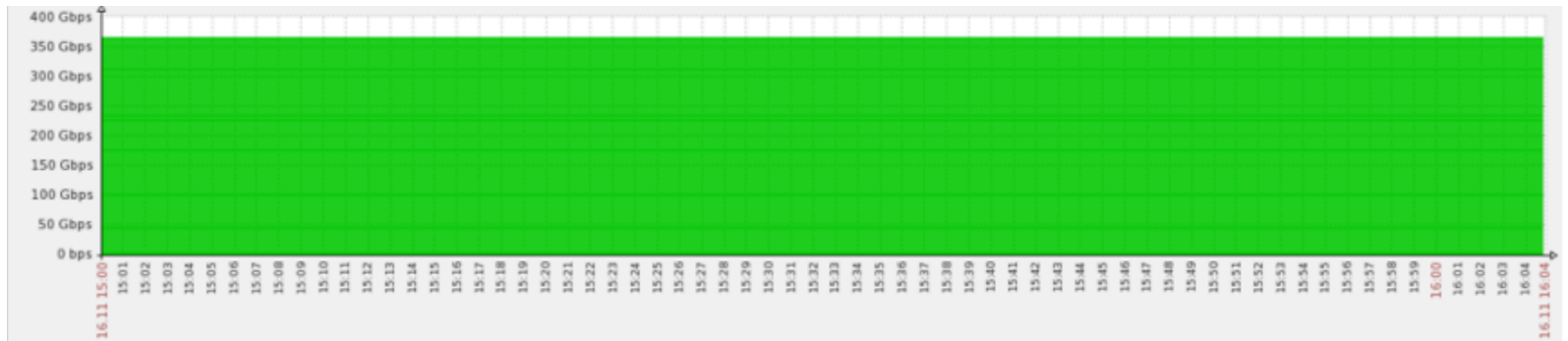
110e high-gigabit network memory-to-memory La Serena/Chile to Champaign Champaign to Chicago memory data transfer 600Gbps. Traffic is ge



Evaluating the network: SC17 demo!

Goal: Introduce the new AmLight 100G ring and DTNs!

Amlight -Exp Network Infrastructure Demonstrate Large Data -Sets Transfer at SC17



Future

■ 2020:

- Miami - Jacksonville (Internet2): +100Gbps
- Sao Paulo - Santiago: +200Gbps (RNP & RedCLARA)
 - 100Gbps to support Vera Rubin Observatory
 - 100Gbps for AmLight users

■ 2021:

- Boca Raton to Atlanta (ESnet): 300Gbps
 - 100Gbps to support Vera Rubin Observatory
 - 100Gbps for AmLight users
 - 100Gbps for FABRIC testbed

Future [2]

- AmLight Data Plane refreshment:

- Increase the number of 100G ports for users and links
- NoviFlow 100G Tofino/Tofino 2 switches as the new switching fabric:
 - 32 x 100G ports, 64 x 100G ports, and 32 x 400G ports
 - Supports SDN, programmable data planes, and In-band Network Telemetry

- AmLight Control Plane refreshment:

- New SDN controller being rolled out this year
 - Developed by AmLight members and open source community (Kytos)
- Focused on the Vera Rubin Observatory and AmLight's needs
- Integrated solution for intra (SDN) and inter-domain (SDX) provisioning and INT

A dark blue background featuring a map of the Americas. White lines represent network connections, radiating from Miami, Florida, to other cities: Los Angeles, New York, Panama, Santiago, and Rio de Janeiro. The text "THANK YOU!" is centered in white.

THANK YOU!

Next: Monitoring @ AmLight

