International Communications (aka Long-Haul Networks)

Purpose of LSST Long-Haul Networks

Provide reliable connectivity of sufficient bandwidth between all LSST Observatory sites (Base, Archive, Headquarters, Data Access Center, Satellite Processing, and Camera sites) to meet operational requirements.

Network Engineering Team

Per the LSST Network Operations and Management Plan, the overall architecture, engineering, testing, operations and maintenance of the LSST Networks are assigned to the Network Engineering Team (NET) under the direction of the LSST Network Architects and LSST Management. The NET is formed of project/observatory and network provider technical staff. The current members of the NET are:

Members:

- Phil DeMar FNAL Co-Chair
- Julio Ibarra FIU/AmLight Co-Chair
- Cristián Silva Rubin Observatory Co-Chair

- Albert Astudillo REUNA
- Jeronimo Bezerra FIU/AmLight
- Vasilka Chergarova FIU/AmLight
- Mark Foster SLAC
- Renata Frez RNP/AmLight Brazil
- Aluizio Hazin RNP
- Joshua Hoblitt Rubin Observatory
- Richard Hughes-Jones GEANT
- Claudia Inostroza REUNA
- Jeff Kantor Rubin Observatory
- Gizella Kapus ESnet
- Unknown User (kollross) NCSA
- Stuart McLellan RENATER
- Kate Robinson ESnet
- Paul Wefel ESnet

Guests

- Vincenzo Capone (VCa) GEANT
- Ed Moynihan (EM) NEARR, Global NOC, IU

Network Engineering and Testing Mailing List

The LSST networks are being engineered and tested via a distributed team with representatives from the LSST project, as well as the sub-award partners providing networks, and their subcontractors. In order to facilitate communications among this team, a mailing list has been created and all people working on LSST Networks should subscribe to this list:

LSST-End-To-End mailing list

The Network Engineering Team is a subset of this list, and has a dedicated NET list:

LSST NET mailing list

Network Engineering Team Meetings

The NET meets monthly at 0800 PT in an online meeting on Blue Jeans Meeting ID: (varies with meeting, see meeting page.

Past meeting notes are linked below.

Specifications and Design Documents

Note: due to historical reasons, access to the baseline versions of linked documents below requires an LSST login to get into docushare. The NET will keep the most current baselined versions linked.

Data Management System-level network specifications (extracted from LSE-61 Data Management Subsystem Requirements)

180 days MTBF/year

48 hours MTTR/year

Base to Archive nightly data volume (science images and meta-data): 15TB

    Amount of time available to transfer data from Mountain to Base to Archive:

        Crosstalk-corrected images for Alert Production: 6 seconds to move (between 2.6 - 12.4 Gbytes depending on compression)

        Raw images: 24 hours

Note, there is also Observatory Control System and other operational data transferred at night, and there is daytime engineering and calibration traffic potentially at the same volume. Finally, there is periodic data transfer from the Archive to the Base, primarily as a result of annual Data Release Processing. All the data flows and allocated bandwidths are defined in the following documents.

A grouping of this traffic for purposes of network design, QoS, prioritization etc. is on the LSST Network Traffic Types.

A bandwidth allocation by link of this traffic for purposes of network design, QoS, prioritization etc. is on the LSST Bandwidth Allocation.

The LSST Long-Haul Networks are specified in LSE-78 Rubin Observatory Network Design and LSE-479 Rubin Observatory Networks Technical Document.

The budgeted cost and schedule of deployment of links and bandwidth, and their utilization is documented in LDM-142 Network Sizing Model

The requirements for the Summit Network are in LTS-577 Summit Network Specification

In addition to the top-level documents above, there are documents describing how the LSST Networks are to be tested, verified, and managed:

The LSST Network End-to-End Test Plan defines the plan for development testing and monitoring the LSST networks.

The Vera C. Rubin Network Verification Baseline defines the plan for formal verification of the LSST Networks

Rubin Observatory Network Pre-Verification Review Report is the report from the panel from the June 2020 review.

The LSST Observatory Network Verification Plan defines plan for formal verification of the LSST networks. OBSOLETE, SUPERCEDED BY LDM-732 and JIRA LVV Project

The LSST Observatory Network Verification Matrix defines requirements and methods for formal verification of the LSST networks. OBSOLETE, SUPERCEDED BY LDM-732 and JIRA LVV Project

The LSST Network Operations and Management Plan defines the plan for operating and maintaining the LSST networks as a single integrated process.

SLAC US Data Facility Networks (ppt, pdf)

ESnet - Europe Networks (pdf)

Pages and other documents related to LSST Long-Haul Networks

- 2017-03-23 Network Engineering Team Meeting notes
- 2017-05-04 Network Engineering Team Meeting notes
- 2017-07-06 Network Engineering Team Meeting notes
- 2017-07-20 Network Engineering Team Meeting notes
- 2017-08-24 Network Engineering Team Meeting notes
- 2017-09-21 Network Engineering Team Meeting notes
- 2017-10-12 Network Engineering Team Meeting notes
- 2017-11-09 Network Engineering Team Meeting notes
- 2017-12-14 Network Engineering Team Meeting notes
- 2018-02-01 Network Engineering Team Meeting notes
- 2018-03-02 Network Engineering Team Meeting notes
- 2018-04-09 Network Engineering Team Meeting notes
- 2018-05-17 Network Engineering Team Meeting notes
- 2018-07-26 Network Engineering Team Meeting notes
- 2018-08-23 Network Engineering Team Meeting notes
- 2018-10-26 Network Engineering Team Meeting notes
- 2018-12-07 Network Engineering Team Meeting notes
- 2019-01-10 Network Engineering Team Meeting notes
- 2019-02-14 Network Engineering Team Meeting notes
- 2019-03-12 Network Engineering Team Meeting notes
- 2019-04-11 Network Engineering Team Meeting notes

- [2019-04-18 Network Engineering Team Meeting notes](#)
- [2019-05-21 Network Engineering Team Meeting notes](#)
- [2019-07-11 Network Engineering Team Meeting notes](#)
- [2019-08-08 Network Engineering Team Meeting notes](#)
- [2019-09-12 Network Engineering Team Meeting notes](#)
- [2019-10-10 Network Engineering Team Meeting notes](#)
- [2019-10-22 Network Engineering Team Meeting notes](#)
- [2019-11-14 Network Engineering Team Meeting notes](#)
- [2019-12-19 Network Engineering Team Meeting notes](#)
- [2020-01-09 Network Engineering Team Meeting notes](#)
- [2020-02-13 Network Engineering Team Meeting notes](#)
- [2020-03-12 Network Engineering Team Meeting notes](#)
- [2020-04-09 Network Engineering Team Meeting notes](#)
- [2020-05-14 Network Engineering Team Meeting notes](#)
- [2020-06-11 Network Engineering Team Meeting notes](#)
- [2020-08-20 Network Engineering Team Meeting notes](#)
- [2020-09-10 Network Engineering Team Meeting notes](#)
- [2020-10-08 Network Engineering Team Meeting notes](#)
- [2020-11-12 Network Engineering Team Meeting notes](#)
- [2020-12-10 Network Engineering Team Meeting notes](#)
- [2021-01-14 Network Engineering Team Meeting notes](#)
- [2021-02-11 Network Engineering Team Meeting notes](#)
- [2021-03-11 Network Engineering Team Meeting notes](#)
- [2021-05-27 Network Engineering Team Meeting notes](#)
- [2021-06-17 Network Engineering Team Meeting notes](#)
- [2021-07-08 Network Engineering Team Meeting notes](#)
- [2021-08-12 Network Engineering Team Meeting notes](#)
- [2021-09-09 Network Engineering Team Meeting notes](#)
- [2021-10-14 Network Engineering Team Meeting notes](#)
- [2021-11-18 Network Engineering Team Meeting notes](#)
- [2021-12-09 Network Engineering Team Meeting notes](#)
- [2022-01-27 Network Engineering Team Meeting notes](#)
- [2022-02-17 Network Engineering Team Meeting notes](#)
- [2022-03-10 Network Engineering Team Meeting notes](#)
- [2022-04-14 Network Engineering Team Meeting notes](#)
- [2022-05-12 Network Engineering Team Meeting notes](#)
- [2022-06-09 Network Engineering Team Meeting notes](#)
- [2022-07-14 Network Engineering Team Meeting notes](#)
- [2022-08-11 Network Engineering Team Meeting notes](#)
- [2022-09-08 Network Engineering Team Meeting notes](#)
- [2022-10-13 Network Engineering Team Meeting notes](#)
- [2022-11-10 Network Engineering Team Meeting notes](#)
- [2022-12-15 Network Engineering Team Meeting notes](#)
- [2023-01-12 Network Engineering Team Meeting notes](#)
- [2023-02-09 Network Engineering Team Meeting notes](#)
- [2023-03-09 Network Engineering Team Meeting notes](#)
- [2023-04-13 Network Engineering Team Meeting notes](#)
- [2023-05-25 Network Engineering Team Meeting notes](#)
- [2023-06-22 Network Engineering Team Meeting notes](#)
- [2023-07-13 Network Engineering Team Meeting notes](#)
- [2023-09-14 Network Engineering Team Meeting notes](#)
- [2023-10-12 Network Engineering Team Meeting notes](#)
- [2023-11-09 Network Engineering Team Meeting notes](#)
- [2023-12-21 Network Engineering Team Meeting notes](#)
- [2024-1-18 Network Engineering Team Meeting notes](#)
- [2024-02-08 Network Engineering Team Meeting notes](#)
- [CONUS Network Implementation team](#)
- [LSST Demonstration December 18 - 22, 2017](#)
- [LSST La Serena 100G-DTN topology](#)
- [LSST LHN Network Path Documentation](#)
- [LSST LHN Network Reports and Meeting notes](#)
- [LSST LHN PerfSonar information - end-to-end plan deployment](#)
- [LSST Network Bandwidth Allocation](#)
- [LSST Network Traffic Types](#)
- [LSST QoS Policy Test Plan](#)
- [LSST use of ESnet](#)
  - [2017-11-21 LSST use of ESnet Meeting notes](#)
- [Network Design Diagrams](#)

- [Summit Infrastructure (Telescope and Site page with linked physical infrastructure diagrams)](#)
- [Meeting notes from LSST Network Engineering Day January 11, 2017](#)

Quick Display Action Items (Incomplete)

Description	Due date	Assignee	Task appears on

		Due date	Assignee	Task appears on
☐	Cristián Silva Enlist Joshua Hoblitt to write report documenting disk - disk testing to date. **10 Sep 2020**	10 Sep 2020	Cristián Silva	2020-08-20 Network Engineering Team Meeting notes
☐	Cristián Silva Develop plan for disk - disk, disk - memory tests with various protocols, engaging other NET expertise **30 Sep 2020**	30 Sep 2020	Cristián Silva	2020-08-20 Network Engineering Team Meeting notes
☐	Kate Robinson Confirm ESnet has plans to maintain Peachtree - SOCS backhaul. FIU would like a way to provide redundancy in Atlanta. **18 Feb 2021**	18 Feb 2021		2020-08-20 Network Engineering Team Meeting notes
☐	Paul W will check on whether ESnet has a long term commitment to maintaining their peering with SoX.			2021-01-14 Network Engineering Team Meeting notes
☐	Julio will create a catalog of all relevant LHN documents for review/update/discussion at the upcoming NET meeting.			2021-01-14 Network Engineering Team Meeting notes

Quick Display Action Items (Complete)

	Description	Due date	Assignee	Task appears on
☑	Jeff Kantor, Julio Ibarra Set meeting coordinate for 8AM pacific, add meeting time and BJ ID information to the Confluence page. 19 Apr 2017	19 Apr 2017	Jeff Kantor	2017-03-23 Network Engineering Team Meeting notes
☑	Jeff Kantor Add Humberto to NET Team 19 Apr 2017	19 Apr 2017	Jeff Kantor	2017-03-23 Network Engineering Team Meeting notes
☑	Jeronimo Bezerra, Unknown User (kollross), Albert Astudillo, Humberto Galiza Have comments back on LDM-142, LSE-61, Verification Plan and Verification Matrix 28 Apr 2017	28 Apr 2017	Jeronimo Bezerra	2017-03-23 Network Engineering Team Meeting notes
☑	Jeff Kantor Confirm guarantee of 2x40 minimum capacity during observing night 28 Apr 2017	28 Apr 2017	Jeff Kantor	2017-03-23 Network Engineering Team Meeting notes
☑	Unknown User (kollross) Inquire from Lyon about required bandwidth and provisioning 28 Apr 2017 By Mid 2017 will have 20Gbps. 2018 will have possibility of 100Gbps	28 Apr 2017		2017-03-23 Network Engineering Team Meeting notes
☑	Jeronimo Bezerra to update the bw_reservation.xlsx and share it with NET 15 May 2017	15 May 2017	Jeronimo Bezerra	2017-05-04 Network Engineering Team Meeting notes
☑	Jeronimo Bezerra, Unknown User (kollross), Albert Astudillo, Humberto Galiza Review E2E plan to determine if to leverage with VP 17 May 2017	17 May 2017	Jeronimo Bezerra	2017-03-23 Network Engineering Team Meeting notes
☑	Unknown User (kollross) to provide information on NCSA plans for dedicated wave, 500G backbone, etc. 22 Jun 2017	22 Jun 2017		2017-05-04 Network Engineering Team Meeting notes

☑	Jeronimo Bezerra to update the LSST End to End Test Plan to address his 100G concerns discussed during the meeting 22 Jun 2017	22 Jun 2017	Jeronimo Bezerra	2017-05-04 Network Engineering Team Meeting notes
☑	Unknown User (kollross) to get IN2P3 scope of work and confirm NCSA - IN2P3 bandwidth requirements, get more details about the 20G Ethernet service 22 Jun 2017	22 Jun 2017		2017-05-04 Network Engineering Team Meeting notes
☑	Jeff Kantor Configure a work team to work this in next 2 weeks 07 Jul 2017	07 Jul 2017	Jeff Kantor	2017-07-06 Network Engineering Team Meeting notes
☑	Julio Ibarra Poll for an interim meeting by July 20 10 Jul 2017	10 Jul 2017	Julio Ibarra	2017-07-06 Network Engineering Team Meeting notes
☑	Jeronimo Bezerra Schedule next demonstration coordination meeting 27 Jul 2017	27 Jul 2017	Jeronimo Bezerra	2017-07-20 Network Engineering Team Meeting notes
☑	Jeff Kantor Propose change to LDM-142 table with total of 100 Gbps rather than 130 Gbps 02 Aug 2017	02 Aug 2017	Jeff Kantor	2017-07-20 Network Engineering Team Meeting notes
☑	Jeff Kantor Add link to E2E test plan from Network Verification Plan 02 Aug 2017	02 Aug 2017	Jeff Kantor	2017-07-20 Network Engineering Team Meeting notes
☑	Jeff Kantor Add link to LTS-577 on NET home page in confluence 02 Aug 2017	02 Aug 2017	Jeff Kantor	2017-07-20 Network Engineering Team Meeting notes
☑	Jeff Kantor ensure traffic types referenced in LDM-142 are defined in LSE-78. Updated due date, this is in work and will be in the next LSE-78 LCR, goal is before LSST 2017. 09 Aug 2017	09 Aug 2017	Jeff Kantor	2017-05-04 Network Engineering Team Meeting notes
☑	Jeronimo Bezerra publish QoS document 25 Aug 2017	25 Aug 2017	Jeronimo Bezerra	2017-08-24 Network Engineering Team Meeting notes
☑	Jeronimo Bezerra, Unknown User (rlambert) publish First Light plan 28 Aug 2017	28 Aug 2017	Jeronimo Bezerra	2017-08-24 Network Engineering Team Meeting notes
☑	Albert Astudillo to provide detailed DWDM installation schedule 21 Sep 2017	21 Sep 2017	Albert Astudillo	2017-08-24 Network Engineering Team Meeting notes