EOS Production Sites
Network Performance Report: May 2009

This is a monthly summary of EOS network performance testing between production sites -- comparing the measured performance against the requirements.

Highlights:

- **Mostly stable flows with continued congestion at GSFC**
  - **GPA 3.41** (3.47 last month)
- **2 flows below "Good":**
  - **GSFC MODAPS-PDR to EROS** ("**Low**")
    - Due to EBnet to Doors congestion at GSFC
  - **ERSDAC to EROS** ("**Low**")
    - Due to LAN problems at ERSDAC
      - Fixed by the end of May
- **Bottlenecks:**
  - GSFC: EBnet to Doors Gig-E
    - Average user flow: approx 700 mbps (Similar to last month)
    - Sustained peaks over 900
    - Upgrade to 10 Gig backbone is in progress
      - Door routers upgraded to 10 Gig in April
      - EBnet routers upgraded to 10 Gig on 28 May
      - GES DISC will be moved to 10 Gig EBnet Router in early June – performance improvement expected at that time!
      - Other systems to be upgraded individually
- Significant improvements are noted in Green, Network problems in Red, System problems in Gold, and comments in Blue.
- Added reporting on tests to EOS Metrics System (section 2.3)
- Added testing from WSC to JAXA-TKSC for ALOS using multiple protocols

Ratings Changes: (See site discussion below for details)

Upgrades: ↑ : JPL →RSS: Adequate → **Good**

Downgrades: ↓: **ERSDAC →EROS:** Good → **Low**

Discontinued: X:

US ←→ JAXA (Hatoyama): JAXA test hosts retired March 31

Ratings Categories:

Rating	Value	Criteria
Excellent:	**4**	**Total Kbps** > Requirement * 3
Good:	**3**	1.3 * Requirement <= **Total Kbps** < Requirement * 3
Adequate:	**2**	Requirement < **Total Kbps** < Requirement * 1.3
Almost Adequate:	**1.5**	Requirement / 1.3 < **Total Kbps** < Requirement
Low:	**1**	Requirement / 3 < **Total Kbps** < Requirement / 1.3
Bad:	**0**	**Total Kbps** < Requirement / 3

Where Total Kbps = Integrated Kbps (where available), otherwise just iperf

Ratings History:

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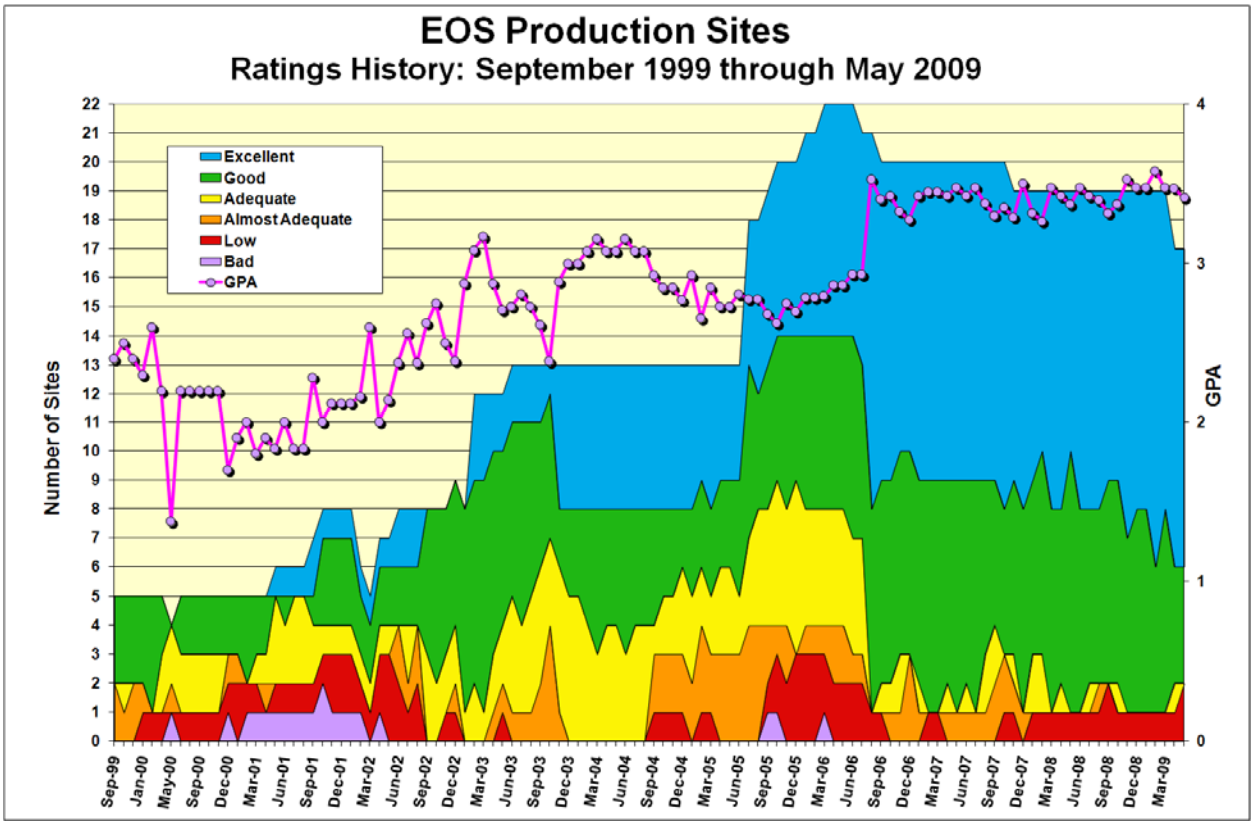
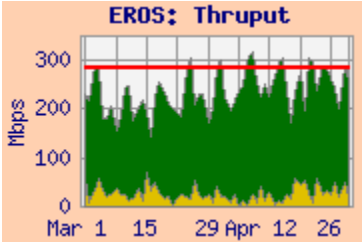


The chart above shows the number of sites in each classification since EOS Production Site testing started in September 1999. Note that these ratings do NOT relate to absolute performance -- they are relative to the EOS requirements.

Requirements Basis:

- April '08 Revisions
  - Reduced GEOS Flows
  - Increased MODIS reprocessing
- December '03 requirements from BAH.
  - Updated to handbook 1.4.1 (3/22/06)
- Additional Updates Incorporated:
  - New AIRS reprocessing flows (8/06)
  - GEOS requirements – Flows began in Nov '06
  - All LaRC-GSFC "Backhaul" Requirements removed
  - Extension of TRMM, QuikScat missions
- Plan: Switch to requirements derived from new ESDIS database
  - When available

Integrated Charts:



Integrated charts are included with site details, where available. These charts are "Area" charts, with a pink background. A sample Integrated chart is shown here. The yellow area at the bottom represents the daily average of the user flow from the source facility (e.g., GSFC, in this example) to the destination facility (EROS, in this example) obtained from routers via "netflow". The green area is stacked on top of the user flow, and represents the "adjusted" daily average iperf thruput between the source-destination pair most closely corresponding to the requirement. This iperf measurement essentially shows the circuit capacity remaining with the user flows active. The adjustments are made to compensate for various systematic effects, and are best considered as an approximation. The red line is the requirement for the flow from the source to destination facilities.

Network Requirements vs. Measured Performance

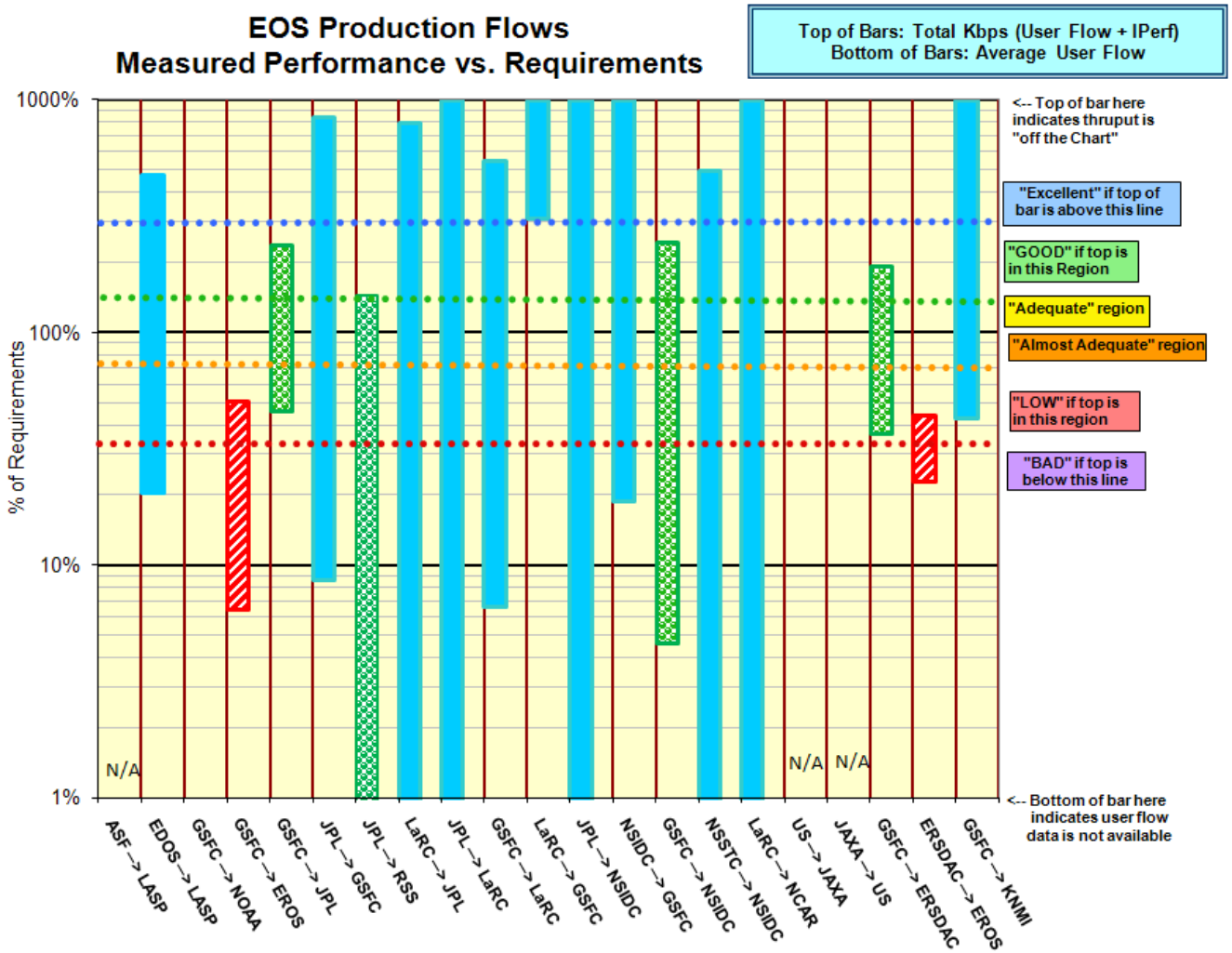
May 2009		Requirements (mbps)		Testing				Ratings		
Source → Destination	Team (s)	Current May-09	Future Oct-09	Source → Dest Nodes	Avg User Flow mbps	iperf Avg mbps	Integrated mbps	Rating re Current Requirements May-09	Rating re Current Requirements Last Month	Rating re Oct-09
WSC –> ASF	ALOS	n/a	n/a	WSC → ASF-AADN		89.1		n/a	n/a	n/a
ASF –> LASP	QuikScat	0.02	0.02	ASF → LASP [via IOnet]	Discontinued October 2007			n/a	n/a	n/a
EDOS –> LASP	ICESat, QuikScat	0.4	0.4	GSFC-EDOS --> LASP	0.08	1.8		Excellent	E	Excellent
GSFC –> EROS	MODIS, LandSat	345.9	345.9	MODAPS-PDR → EROS LPDAAC	22.5	166.9	175.1	LOW	L	LOW
GSFC –> JPL	AIRS, MLS, ISTs	43.6	38.5	GDAAC → JPL-AIRS	20.2	100.2	104.4	GOOD	G	GOOD
JPL –> GSFC	AMSR-E, MISR, etc.	7.4	7.4	JPL-PTH → GSFC-PTH	0.64	61.6		Excellent	E	Excellent
JPL –> RSS	AMSR-E	2.5	2.5	JPL-PODAAC → RSS		3.57		GOOD	A	GOOD
LaRC –> JPL	TES, MISR	43.7	43.7	LARC-DAAC → JPL-TES		347.7		Excellent	E	Excellent
JPL –> LaRC	TES	4.4	4.4	JPL-PTH → LARC-PTH		61.7		Excellent	E	Excellent
GSFC –> LaRC	CERES, MISR, MOPITT	60.5	48.7	GDAAC → LDAAC	4.0	328.6	331.3	Excellent	E	Excellent
LaRC –> GSFC	MODIS, TES	0.2	0.2	LDAAC → GDAAC	0.6	427.3	427.3	Excellent	E	Excellent
JPL –> NSIDC	AMSR-E	1.3	1.3	JPL-PTH → NSIDC SIDADS	0.00	83.5		Excellent	E	Excellent
NSIDC –> GSFC	MODIS, ICESAT, QuikScat	0.5	0.5	NSIDC DAAC → GDAAC	0.09	120.0	120.0	Excellent	E	Excellent
GSFC –> NSIDC	MODIS, ICESAT, QuikScat	34.5	34.5	MODAPS-PDR → NSIDC-DAAC	1.6	83.5	84.8	GOOD	G	GOOD
NSSTC –> NSIDC	AMSR-E	7.5	7.5	NSSTC → NSIDC DAAC		36.9		Excellent	E	Excellent
LaRC –> NCAR	HIRDLS	5.4	5.4	LDAAC → NCAR		189.4		Excellent	E	Excellent
US –> JAXA	QuikScat, TRMM, AMSR	2.0	2.0	GSFC-EDOS → JAXA DDS	Discontinued 31 March 2009			n/a	n/a	n/a
JAXA –> US	AMSR-E	1.3	1.3	JAXA DDS → JPL-QSCAT	Discontinued 31 March 2009			n/a	n/a	n/a
GSFC –> ERSDAC	ASTER	12.5	12.5	GSFC-EDOS → ERSDAC	4.6	22.6	23.9	GOOD	G	GOOD
ERSDAC –> EROS	ASTER	26.8	26.8	ERSDAC → EROS PTH	6.2	11.6	11.9	LOW	G	LOW
GSFC –> KNMI	OMI	3.3	3.3	GSFC-OMISIPS → ODPS	1.4	72.5	72.5	Excellent	E	Excellent

*Criteria:		
	Excellent	**Total Kbps** > Requirement * 3
	GOOD	1.3 * Requirement <= **Total Kbps** < Requirement * 3
	Adequate	Requirement < **Total Kbps** < Requirement * 1.3
	Almost Adequate	Requirement / 1.3 < **Total Kbps** < Requirement
	LOW	Requirement / 3 < **Total Kbps** < Requirement / 1.3
	BAD	**Total Kbps** < Requirement / 3

Ratings Summary	May-09 Req Score	May-09 Req Prev	Oct-09 Req Score
Excellent	11	11	11
GOOD	4	4	4
Adequate	0	1	0
Almost Adequate	0	0	0
LOW	2	1	2
BAD	0	0	0
Total Sites	17	17	17
GPA	3.41	3.47	3.41

Notes: Flow Requirements include:
TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS

This graph shows a bar for each source-destination pair – relating the measurements vs the requirements for that pair. The bottom of each bar is the average measured user flow to a site. Thus the bottom of each bar indicates the relationship between the requirements and actual flows. Note that the requirements generally include a 50% contingency factor above what was specified by the projects, so a value of 66% (dotted orange line) would indicate that the project is flowing as much data as requested. The top of each bar represents the integrated measurement, combining the user flow with Iperf measurements – this value is used to determine the ratings



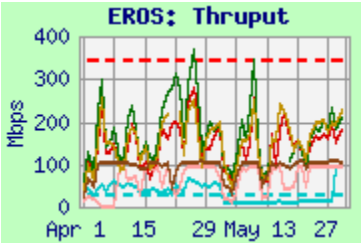
1) EROS:

Ratings: GSFC → EROS: Continued **Low**
ERSDAC→ EROS: ↓: Good → **Low**

Web Page: http://ensight.eos.nasa.gov/Organizations/production/EROS.shtml
http://ensight.eos.nasa.gov/Organizations/production/EROS_PTH.shtml

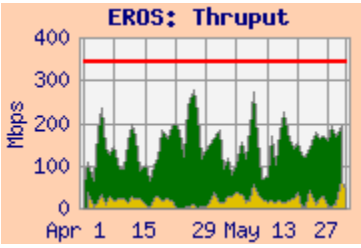
Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	**Median**	**Worst**	**User Flow**	**Integrated**
MODAPS-PDR→ EROS LPDAAC	267.2	166.9	46.3	22.4	175.1
GSFC-EDOS → EROS LPDAAC	312.7	158.5	58.0		
GES DAAC → EROS LPDAAC	254.3	151.5	34.1		
ERSDAC→ EROS LPDAAC	14.6	11.6	8.5	6.2	11.9
GSFC-EBnet-PTH → EROS PTH	97.7	40.4	19.5		
GSFC-ENPL → EROS PTH	475.7	441.1	225.2		
GSFC-NISN → EROS PTH	484.2	464.6	356.1		
NSIDC→ EROS	109.2	104.4	62.7		
LaRC→ EROS	93.0	92.9	24.2		



Requirements:

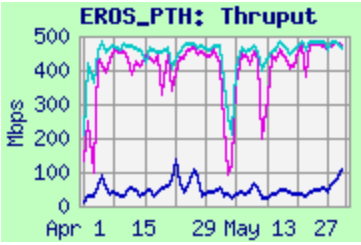
Source → Dest	Date	mbps	Rating
GSFC→ EROS	CY '08-11	346	Low
ERSDAC→ EROS	FY '06 - '09	26.8	Good



Comments:

GSFC → EROS: The rating is based on the MODAPS-PDR Server to EROS LP DAAC measurement (Results are a bit lower but similar from GES DAAC, and a little better from EDOS). The route is via the Doors to NISN SIP, via the NISN OC-48 (2.5 gbps) backbone to the NISN Chicago CIEF, then via GigE to StarLight, peering with the EROS OC-12 (622 mbps).

The user flow this month was typical of the last few months, and remains far below the nominal requirement.



Performance to EROS from all sources again dropped for three short periods in May, apparently due to a carrier problem on the Chicago to EROS OC-12.

Performance from the EBnet hosts (EDOS, GDAAC, MODAPS, and GSFC-EBnet-PTH) is predominantly limited by congestion on the EBnet to Doors Gig-E circuit at GSFC, as indicated by their large best:worst ratios. Other than the OC-12 problem above, performance from the other EBnet hosts is about the same as recent months, and remains more than 30% below the requirement so the rating remains "Low".

The GSFC-NISN host uses the same NISN route as above, but is connected outside the congested EBnet to Doors Gig-E circuit, so its performance is much higher (peak performance is almost twice that of MODAPS) and steadier than from MODAPS or the GES DAAC (the daily worst is better than MODAPS by a factor of about 8:1). It would be rated "Good". The ENPL host has a direct connection to the MAX, also bypassing the congested EBnet to Doors Gig-E circuit. Its route is via MAX to Internet2 to StarLight in Chicago. Performance is similar to the GSFC-NISN source. Both are predominantly limited by the OC-12 to EROS.

ERSDAC → EROS: Performance from ERSDAC was poor for most of May, apparently due to LAN problems at ERSDAC. See section 7 (ERSDAC) for further discussion of this performance.

NSIDC → EROS: Other than the OC-12 problem above, performance was also stable this month.

LaRC → EROS: Other than the OC-12 problem above, the thruput from LaRC-PTH to EROS-PTH was again stable this month via NISN to the Chicago CIEF. Thruput is limited to 100 mbps by the Fast-E connection at LaRC-PTH.

2) to GSFC

Ratings: NSIDC → GDAAC: Continued **Excellent**
LDAAC → GDAAC: Continued **Excellent**
JPL → GDAAC: Continued **Excellent**

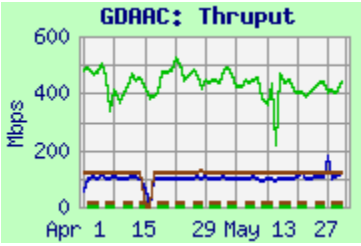
Web Pages:
http://ensight.eos.nasa.gov/Organizations/production/GDAAC.shtml
http://ensight.eos.nasa.gov/Organizations/production/GSFC_PTH.shtml

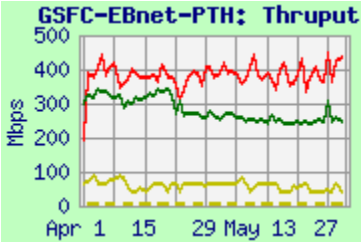
Test Results:

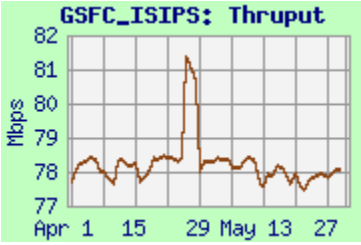
Source → Dest	Medians of daily tests (mbps)			
	Best	**Median**	**Worst**	**User Flow**
EROS LPDAAC → GSFC DAAC	114.2	101.6	75.3	
EROS PTH→ GSFC-EBnet PTH	431.5	386.9	332.2	
JPL-PTH→ GSFC-EBnet PTH	64.6	61.6	23.1	0.64
LDAAC → GDAAC	478.4	427.3	244.3	0.57
LARC-ANGe → GSFC-EBnet PTH	312.5	249.7	205.6	
NSIDC DAAC → GSFC-DAAC	120.9	120.0	108.3	0.08
NSIDC DAAC → GSFC-ISIPS	78.3	78.0	76.0	

Requirements:

Source → Dest	Date	Mbps	Rating
NSIDC → GSFC	CY '06 – '09	13.3	**Excellent**
LDAAC → GDAAC	FY '07 – '09	0.2	**Excellent**
JPL→ GSFC combined	CY '06-09	7.4	**Excellent**







Comments:

EROS → GSFC: The thruput for tests from EROS to GSFC (both DAAC to DAAC and PTH to EBnet-PTH) were mostly stable this month, but note that the DAAC to DAAC flow cannot use most of the WAN capability (compared to the EROS-PTH to GSFC-EBnet-PTH results).

JPL → GSFC: Thruput was stable at 65 mbps this month, after exhibiting its occasional bimodal characteristic (at either 65 or 90 mbps) until mid April. With the modest requirement, the rating remains "Excellent".

LaRC → GSFC: Performance from LDAAC → GDAAC remained much more than 3 x the modest requirement, so the rating continues as "Excellent". The user flow was down from 2.2 mbps last month, but above the 100 kbps typical before that.

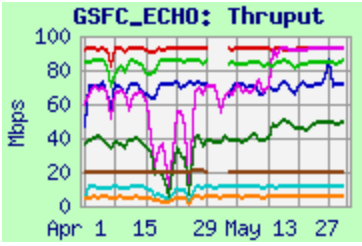
NSIDC → GSFC: Performance from NSIDC to GSFC (DAAC and ISIPS) was again very steady this month. With the low requirement, the rating remains "Excellent". Most of the user flow between these nodes was re-routed onto Internet2, so the NISN user flow was greatly reduced from the 1.2 mbps last month.

2.2 GSFC-ECHO: EOS Metadata Clearinghouse

Web Page: http://ensight.eos.nasa.gov/Organizations/gsfc/GSFC_ECHO.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
EROS LPDAAC	78.4	71.0	51.1
EROS LPDAAC ftp	12.3	11.9	6.4
GES DAAC	93.0	92.6	90.2
GES DAAC ftp	93.2	92.0	37.7
LaRC ASDC DAAC	86.7	84.3	71.5
LaRC ASDC DAAC ftp	50.1	46.2	26.1
NSIDC DAAC	20.1	20.0	19.5
NSIDC DAAC ftp	5.6	5.5	2.3



Comments:

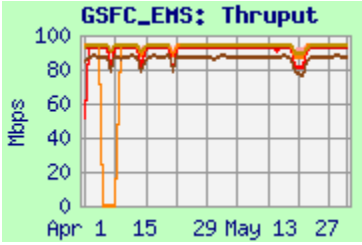
Testing is performed to GSFC-ECHO from the above nodes, both iperf and ftp. Results are generally steady. Performance limitations are from the 100 mbps fast-E and TCP window size – especially on ftp.

2.3 GSFC-EMS: EOS Metrics System

Web Page: http://ensight.eos.nasa.gov/Organizations/gsfc/GSFC_EMS.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
EROS-PTH	93.3	93.2	88.6
GDAAC	93.1	93.1	92.3
GSFC-PTH	94.1	94.1	78.7
LARC-PTH	94.0	94.0	92.9
MODAPS-PDR	94.1	94.1	92.4
NSIDC-PTH	89.4	87.1	73.4



Comments:

Testing is performed to GSFC-EMS from the above nodes, iperf only. Results are very steady. Performance limitation is from the 100 mbps fast-E connection.

3) JPL:

3.1) GSFC → JPL:

Ratings: GSFC → JPL: Continued **Good**

Web Pages:

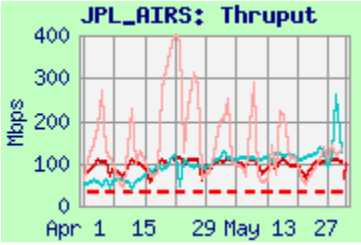
http://ensight.eos.nasa.gov/Missions/aqua/JPL_AIRS.shtml
http://ensight.eos.nasa.gov/Missions/aura/JPL_MLS.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_QSCAT.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_PODAAC.shtml

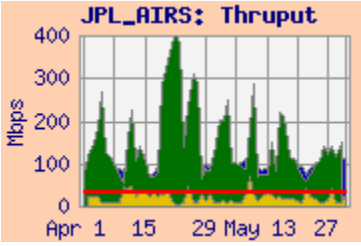
Test Results:

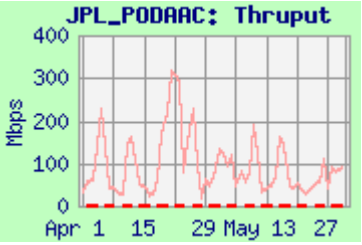
Source → Dest	Medians of daily tests (mbps)				
	Best	**Median**	**Worst**	**User Flow**	**Integrated**
GSFC-DAAC→ JPL-AIRS	124.2	100.2	36.7	20.2	104.4
GSFC-EBnet-PTH → JPL-AIRS	306.6	110.0	27.4		
GSFC-EBnet-PTH → JPL-PODAAC	197.5	67.1	14.8		
GSFC-EBnet-PTH → JPL-QSCAT	91.5	65.3	13.0		
GSFC-EBnet-PTH → JPL-MLS	149.6	52.2	11.4		
GSFC-NISN → JPL-MLS	361.9	337.9	261.9		

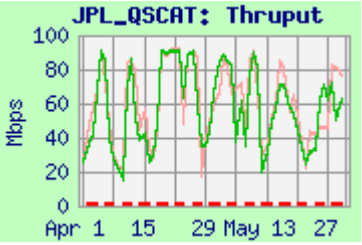
Requirements:

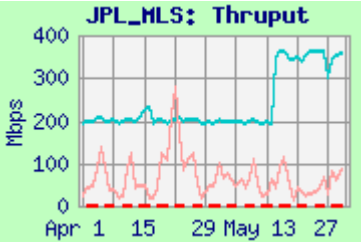
Source → Dest	Date	Mbps	Rating
GSFC → JPL Combined	FY '08-'09	**43.6**	**Good**
GSFC → JPL AIRS	FY '08-'09	35.2	**Good**
GSFC → JPL PODAAC	FY '08-'11	1.5	**Excellent**
GSFC → JPL QSCAT	FY '08-'11	1.0	**Excellent**
GSFC → JPL MLS	FY '08-'09	5.9	**Excellent**











Comments: The EBnet to Doors congestion at GSFC is the bottleneck for most of these flows, and creates large variations in performance. The user flow from GSFC/EOS was about the same as last month's, and was consistent with the requirement without contingency.

AIRS, Overall: The median thruput from GES DAAC remained above the AIRS requirement, but below 3x the requirement; so the AIRS rating remains "Good". **The JPL overall rating** is based on this test compared with the sum of all the GSFC to JPL requirements – the overall rating remains "Good"

PODAAC: Daily thruput peaks averaged almost 200 mbps, while the median thruput is about a third of that, due to congestion at GSFC. The GSFC-PODAAC requirement (for MODIS data) is only 1.5 mbps, rating "Excellent"

QSCAT: The thruput from GSFC-EBnet-PTH peaks close to 100 mbps – limited by a Fast-E connection at QSCAT, and congestion at GSFC. The QSCAT requirement is only 1.3 mbps, rating "Excellent". Performance to a second QScat node (ketch) (green line), is very similar to the primary node.

MLS: The GSFC-MLS requirement is for MLS and GEOS flow, and was reduced in April '08. Thruput from GSFC-PTH was noisy (best to worst ratio of 13:1) and about the same as last month. Testing from GSFC-NISN avoids the EBnet congestion seen from GSFC-EBnet-PTH, with much more stable results (best to worst ratio of only 1.4:1). This test was retuned in May, with further improvement to the performance.

3.2) LaRC ←→ JPL

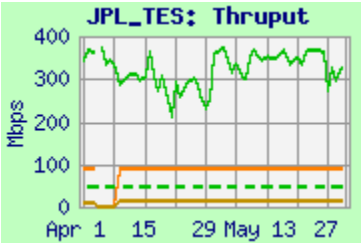
Ratings: LaRC → JPL: Continued **Excellent**
JPL → LaRC: Continued **Excellent**

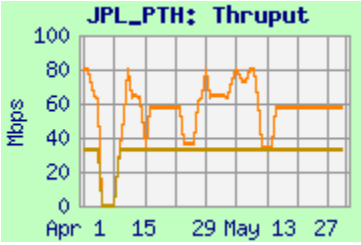
Web Pages:

http://ensight.eos.nasa.gov/Organizations/production/JPL_TES.shtml
http://ensight.eos.nasa.gov/Missions/terra/JPL_MISR.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
LaRC DAAC → JPL-TES	371.1	347.7	98.5
LaRC PTH → JPL-TES	91.1	91.0	91.0
LaRC PTH → JPL-TES sftp	13.7	13.6	11.7
LaRC PTH → JPL-PTH	57.9	57.3	33.8
LaRC PTH → JPL-PTH sftp	33.2	33.2	33.0
LaRC DAAC → JPL-MISR	77.2	75.2	35.3
LaRC PTH → JPL-MISR	87.8	71.9	47.7
JPL-PTH → LaRC PTH	85.5	61.7	60.2





Requirements:

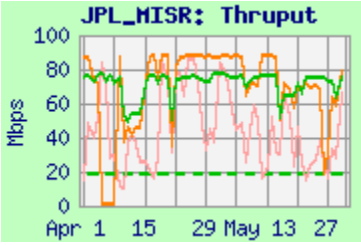
Source → Dest	Date	Mbps	Rating
LaRC DAAC → JPL-TES	FY '07 – '09	29.8	Excellent
LaRC DAAC → JPL-MISR	FY '07 – '09	18.5	Excellent
LaRC → JPL-Combined	FY '07 – '09	45.8	**Excellent**
JPL PTH→ LaRC PTH	FY '07 – '09	4.4	Excellent

Comments: LDAAC was moved to campus address space in March '07.
User flow data is no longer available from LaRC (has been requested but not implemented). Thus no integrated graphs are available from LaRC.

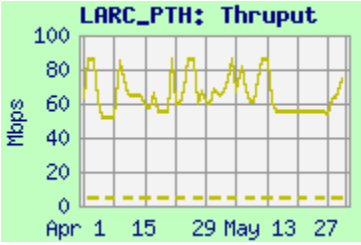
LaRC→ JPL (Overall, TES): Median performance from LDAAC to JPL-TES remains well over 3 x the TES and combined requirements, so the TES and Overall ratings remain "Excellent".

The TES system was upgraded in February '08; the sftp window size and sftp performance increased with that upgrade. Sftp results are even better from LaRC-PTH to JPL-PTH which uses an even larger window size.

LARC → JPL (MISR): Median thruput was again noisy this month, with a best:worst ratio from the ASDC DAAC of 2.2:1 (was 2.6:1 last month); from LaRC-PTH the ratio is similar. The rating remains "Excellent".



JPL → LaRC: This requirement is primarily for TES products produced at the TES SIPS at JPL, being returned to LaRC for archiving. Thruput this month was bimodal (alternating between 60 and 85 mbps, as has often been the case in the past). The requirement was reduced in April '08 from 52.6 mbps previously, so the rating improved to "Excellent" at that time.



4) Boulder CO:

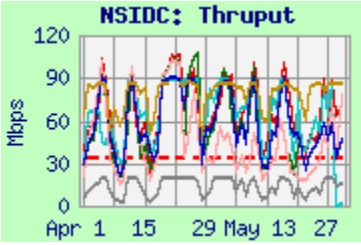
4.1) GSFC → NSIDC:

Ratings: GSFC → NSIDC: Continued **Good**

Web Page: http://ensight.eos.nasa.gov/Organizations/production/NSIDC.shtml

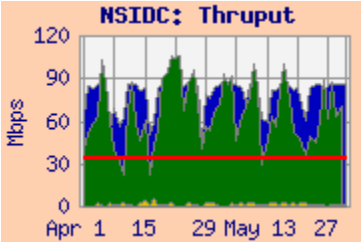
Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
MODIS-PDR → NSIDC-DAAC	88.5	83.5	27.5	1.6	84.8
GSFC-DAAC → NSIDC-DAAC	107.3	65.6	16.8		
GSFC-EDOS → NSIDC-DAAC	103.5	53.3	14.1		
GSFC-ISIPS → NSIDC (iperf)	90.2	69.5	15.7		
GSFC-ISIPS → NSIDC (ftp)	19.4	15.2	2.0		
GSFC-ENPL → NSIDC_u	117.6	117.3	115.2		
MODIS-PDR → NSIDC_u	8.2	7.1	5.4		



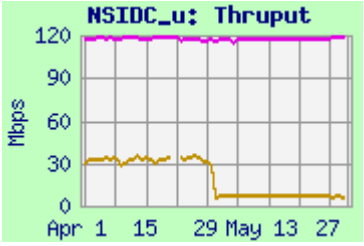
Requirements:

Source → Dest	Date	Mbps	Rating
GSFC → NSIDC	CY '07 – '09	34.5	Good



Comments: GSFC → NSIDC: This rating is based on testing from the MODAPS PDR server to the NSIDC DAAC via NISN PIP, since this is the primary production flow. The thruput values remain noisy, due to EBnet congestion at GSFC, but were otherwise stable this month. The requirement was reduced in April '08 (was 64 mbps previously) due to the use of compression in MODIS collection 5. The Integrated thruput is above this lower requirement, by more than 30%, so the rating remains "Good". Note that the user flow remains **MUCH lower,** even than the reduced requirement.

GSFC → NSIDC_u via Internet2: Results via Internet2 are also shown, since it is planned to switch the production flows from PIP to Internet2. Thruput on this path to SIDADS from ENPL was steady and well above the requirement. Performance via Internet2 from MODAPS to n4ftl01 was similar to those from MODAPS to this same node via NISN until mid March, when it dropped off in two separate steps (with a further drop in May). Note that this route is asymmetric; the return path from NSIDC to MODAPS remains via NISN. This issue remains under investigation.



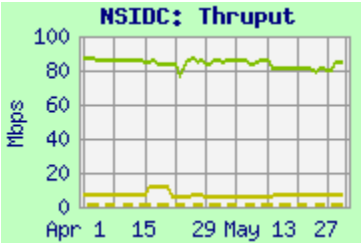
GSFC-ISIPS ← → NSIDC: Results are consistent with previous tests and similar to other GSFC sources.

4.2) JPL → NSIDC:

Ratings: JPL → NSIDC: Continued **Excellent**

Test Results:

Source → Dest	Medians of daily tests (mbps)			
	Best	Median	Worst	Requirement
JPL PTH → NSIDC-PTH	85.2	83.5	54.1	1.34
JPL PODAAC → NSIDC	6.5	6.5	6.2	

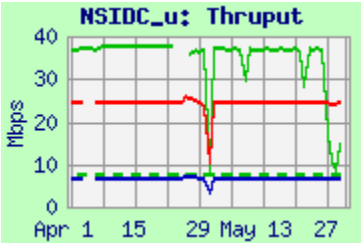


Comments: The test from JPL-PTH to NSIDC-PTH has much higher thruput than from PODAAC, and more fully assesses the true network capability. Thruput from JPL-PTH has been stable since February, not bistable, as is often the case. Thruput from PODAAC to NSIDC-SIDADS was much lower. User flow on this path averaged only about 2.6 kbps this month! (The flows are probably going via Internet2) The rating remains "Excellent".

4.3) GHRC → NSIDC:

Ratings: GHRC → NSIDC: Continued **Excellent**

Web Pages: http://ensight.eos.nasa.gov/Missions/aqua/NSIDC_u.shtml



Test Results:

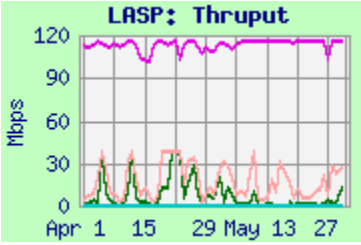
Source → Dest	Medians of daily tests (mbps)			
	Best	Median	Worst	Req.
GHRC → NSIDC DAAC (iperf)	37.7	36.9	9.1	7.5
GHRC → NSIDC DAAC (ftp pull)	24.5	24.5	11.0	
GHRC → NSIDC SIDADS (ftp pull)	8.0	8.0	7.0	

Comments: GHRC (NSSTC, UAH, Huntsville, AL) sends AMSR-E L2/L3 data to NSIDC via Internet2, with the return route via NISN SIP . The ftp performance is limited by the TCP window size, and improved in late January with a node upgrade at GHRC. The median thruput is more than 3x the requirement, so the rating remains "Excellent". The user flow is no longer measurable due to reconfiguration.

4.4) LASP:

Ratings: GSFC → LASP: Continued **Excellent**

Web Page: http://ensight.eos.nasa.gov/Organizations/production/LASP.shtml



Test Results:

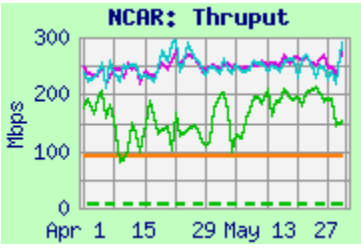
Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC EDOS → LASP	25.1	1.8	0.01
GSFC EBnet-PTH → LASP (iperf)	38.6	11.2	2.0
GSFC ENPL → LASP	115.7	115.4	102.3
GSFC EBnet-PTH → LASP (sftp)	0.46	0.46	0.43

Comments: GSFC → LASP: Iperf thruput is very noisy (note the 19:1 best:worst ratio from GSFC-PTH; much noisier from EDOS); attributed mostly to EBnet congestion at GSFC. The median thruput from EDOS remains over 3x the 0.4 mbps requirement, so the rating remains "Excellent". Sftp thruput is MUCH lower than iperf, due to TCP window size limitations. Performance is much higher and steadier from GSFC-ENPL to a node on LASP's green network via Internet2, which avoids the EBnet congestion at GSFC. The average user flow this month was a typical 87 kbps.

4.5) NCAR:

Ratings: LaRC → NCAR: Continued **Excellent**
GSFC → NCAR: Continued **Excellent**

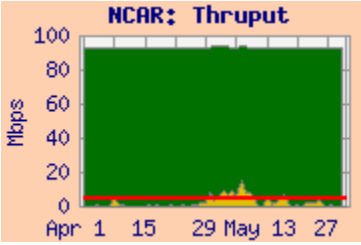
Web Pages http://ensight.eos.nasa.gov/Missions/terra/NCAR.shtml



Test Results:

Source	Medians of daily tests (mbps)			
	Best	Median	Worst	Requirement
LaRC	211.8	189.4	55.5	5.4
GSFC-ENPL-GE	293.7	252.1	203.0	5.1
GSFC-ENPL-FE	93.1	93.0	92.9	
GSFC-NISN	295.9	248.5	190.1	

Comments: NCAR (Boulder, CO) is a SIPS for MOPITT (Terra, from LaRC), and has MOPITT and HIRDLS QA (Aura, from GSFC) requirements. Thruput from LaRC was again noisy this month, but the median remains well above 3 x the requirement, so the rating remains "Excellent".



From GSFC-ENPL-GE, with a Gig-E connection to MAX, the median thruput is less noisy, and also well over 3 x the requirement, so that rating also remains "Excellent". Thruput was extremely stable from the ENPL node using a Fast-E interface.

From GSFC-NISN, the route is via NISN to the MAX (similar to the route from LaRC). Performance is very similar to GSFC-ENPL.

The average user flow this month was about 3.1 mbps – higher than the 0.5 mbps typical of recent months.

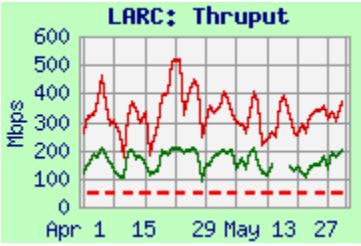
5) GSFC → LaRC:

Rating: Continued **Excellent**

Web Pages: http://ensight.eos.nasa.gov/Organizations/production/LARC.shtml
http://ensight.eos.nasa.gov/Organizations/production/LARC_ANGe.shtml

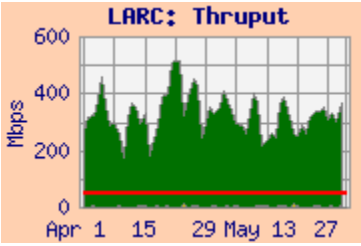
Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
GES DAAC → LDAAC	449.3	328.6	138.1	4.0	331.3
GSFC-EDOS → LDAAC	209.3	150.2	50.1		
GSFC-EBnet-PTH → LaRC-ANGe	404.2	297.8	120.0		
GSFC-NISN → LaTIS	368.0	343.4	319.1		



Requirements:

Source → Dest	Date	Mbps	Rating
GSFC → LARC (Combined)	CY '09	60.5	**Excellent**



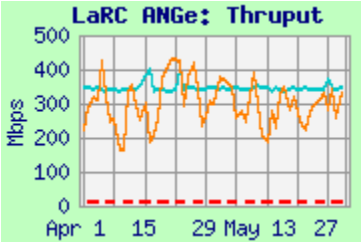
Comments:

GSFC → LaRC: The requirement was reduced effective January '08 due to decreased GEOS flows (was 86.9 mbps previously). The rating is based on the GES DAAC to LaRC ASDC DAAC thruput, compared to this combined requirement. The integrated thruput remains more than 3 x this requirement, so the rating remains "Excellent"

Results from EDOS are lower than from GES DAAC

The difference between the daily best, median, and average values from GES DAAC and EDOS is attributed to congestion at GSFC.

As seen on the Integrated graph, the 4 mbps average user flow (typical for recent months) was only about 7% of the requirement.



ANGe (LaTIS): The thruput to ANGe via PIP (from GSFC-EBnet-PTH) was again noisy due to EBnet congestion at GSFC. Testing to LaTIS from GSFC-NISN avoids this congestion, with much more consistent results.

6) US ←→ JAXA:

Ratings: US → JAXA: **X** Testing Discontinued
JAXA → US: **X** Testing Discontinued

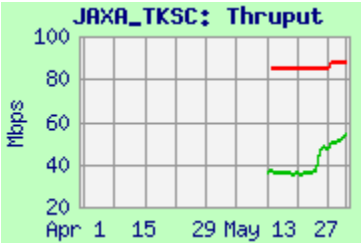
Web Pages http://ensight.eos.nasa.gov/Organizations/production/JAXA_EOC.shtml
http://ensight.eos.nasa.gov/Organizations/production/JAXA_HEOC.shtml
http://ensight.eos.nasa.gov/Missions/ALOS/JAXA_TKSC.shtml

The JAXA test hosts at Hatoyama were retired on March 31 (the end of the Japanese government's fiscal year). No additional testing is planned for AMSR or TRMM.

However, the following tests have been conducted between WSC and JAXA – Tsukuba, in preparation for the ALOS data transfers. Both results below are from the same host at WSC to the same host at JAXA, but use different protocols. Both protocols were stable; bbftp was retuned late in May, with improved thruput – but still lower than Aspera

Test Results:

Protocol	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
Aspera	85.7	85.1	82.9
BBftp	37.7	36.4	16.9



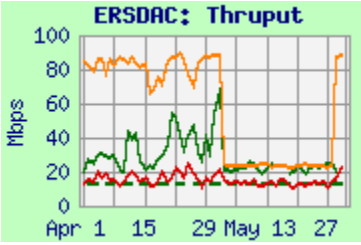
7) ERSDAC ←→ US:

Ratings: **GSFC → ERSDAC:** Continued **Good**
ERSDAC → EROS: ↓: Good → **Low**

Web Page :http://ensight.eos.nasa.gov/Organizations/production/ERSDAC.shtml

US → ERSDAC Test Results

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
GSFC-EDOS → ERSDAC	27.8	22.6	11.7	4.6	23.9
GDAAC → ERSDAC	19.5	13.5	7.5		
GSFC ENPL (FE) → ERSDAC	26.3	23.8	17.1		

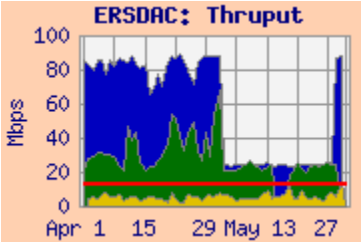


Requirements:

Source → Dest	FY	Mbps	Rating
GSFC → ERSDAC	'05 - '09	12.5	Good

Comments: The route from GSFC to ERSDAC has been via MAX to Internet2 to APAN since February '05.

Testing from EDOS to ERSDAC is used as the basis for the rating. In November '08, Class Based Queueing (cbq) was initiated from EDOS to limit the outflow rate to 100 mbps, in order to avoid overloading a switch at Tokyo-XP (see below).

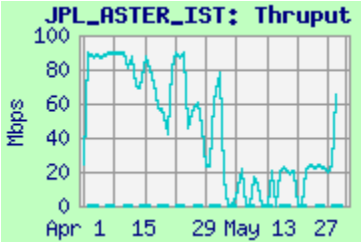


Performance dropped dramatically in early May, due to LAN problems at ERSDAC, which were corrected at the end of May. The median thruput remained above the requirement, however, so the rating remains "Good". The integrated chart shows that the user flow continues to be below the requirement, by about a 3:1 factor.

Thruput from GDAAC to ERSDAC is further limited by packet loss at the GigE to FastE switch at Tokyo-XP. The GDAAC GigE source does not see any bottlenecks until this switch (The Internet2 and APAN backbones are 10 Gbps), and thus exceeds the capacity of the switch's FastE output circuit, causing packet loss. But the FastE connected ENPL node is limited to 100 mbps by its own interface, so does not suffer performance degrading packet loss – and the performance is [usually] much higher and steadier .

ERSDAC → US Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
ERSDAC → JPL-ASTER IST	27.3	19.9	0.2
ERSDAC → EROS	14.6	11.6	8.5

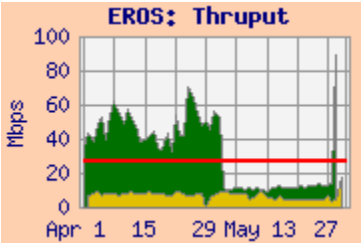


Requirements:

Source → Dest	Date	mbps	Rating
ERSDAC→ JPL-ASTER IST	FY '07- '09	0.31	Excellent
ERSDAC→ EROS	FY '07- '09	26.8	Low

Comments:

ERSDAC → JPL-ASTER-IST: The performance this month was affected by the ERSDAC LAN problem above, but the median thruput remained well above of the [unstated] requirement (IST requirements are generally 311 kbps), so the rating remains excellent.



ERSDAC → EROS: The performance this month was affected by the ERSDAC LAN problem above. The median thruput dropped below the requirement, so the rating drops to "Low".. The user flow averaged 6.2 mbps this month, about 29% of the requirement (a bit below the 7.7 mbps last month).

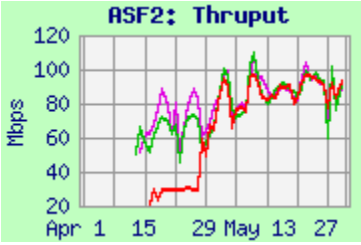
8) ASF

Ratings: IOnet: X Discontinued
WSC → ASF: n/a

Web Page: http://ensight.eos.nasa.gov/Organizations/production/ASF2.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
WSC	99.6	89.1	49.3
GSFC	108.2	88.9	57.1



Comments: **IOnet:** The ASF IOnet host and firewall was reconfigured in October '07, and all IOnet testing stopped at that time.

Testing to ASF is for the ALOS mission. The route from WSC is via NISN SIP, peering with Internet2 at one of several possible peering points. Internet2 connects to the "Pacific Northwest Gigapop" (PNW) in Seattle. From there the University of Alaska – Fairbanks (UAF) has a dedicated OC-3 circuit to campus (planned to be upgraded to OC-12 in the spring), then via campus LAN to the Alaska Satellite Facility (ASF).

The ASF test machines were taken off line in March; testing from WSC and GSFC resumed in April. Performance improved in late April when the NISN interface at WSC was upgraded to GigE, and the test parameters were retuned.

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9) Other SIPS Sites:

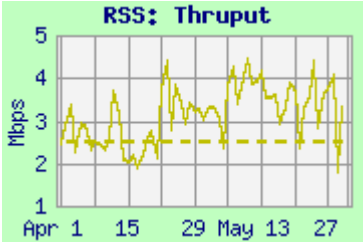
Web Pages http://ensight.eos.nasa.gov/Missions/aqua/RSS.shtml
http://ensight.eos.nasa.gov/Missions/aura/KNMI_OMIPDR.shtml

Test Results:

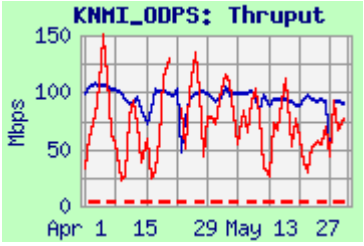
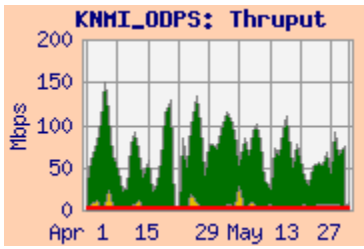
Source → Dest	Medians of daily tests (mbps)				
	Best	**Median**	**Worst**	**Reqmt**	**Rating**
JPL → RSS	5.34	3.57	1.29	2.5	↑ Adequate → Good
OMISIPS → KNMI-ODPS	128.7	72.5	13.2	3.3	Continued **Excellent**
GSFC-ENPL → KNMI-ODPS	104.4	93.0	79.0		

Comments:

9.1 RSS: RSS (Santa Rosa, CA) is a SIPS for AMSR-E (Aqua), receiving data from JPL, and sending its processed results to GHRC (aka NSSTC) (UAH, Huntsville, AL). This month the thruput from JPL remained noisy, as usual -- periods of low performance are believed to be attributable to correspondingly high user flow (User flow data remains unavailable on this circuit). The median iperf thruput remained above the requirement, now by more than 30%, so the rating improves to "Good".



Note that with the present configuration (passive servers at both RSS and GHRC), the RSS to GHRC performance cannot be tested.



9.2 KNMI: KNMI (DeBilt, Netherlands) is a SIPS and QA site for OMI (Aura). The route from GSFC is via MAX to Internet2, peering in DC with Géant's 10 gbps circuit to Frankfurt, then via Surfnet through Amsterdam. The rating is based on the results from OMISIPS at GSFC to the ODPS primary server, protected by a firewall, and remains "Excellent". The almost 10:1 best to worst ratio is attributed to EBnet congestion, not present from GSFC-ENPL. The user flow averaged only 1.4 mbps this month, as shown on the integrated graph, about typical for this flow, and not terribly far from the requirement.