

EOS Production Sites Network Performance Report: December 2008

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 3.47** (Last month: 3.53 -- Highest on record!)
- **Only 1 flow below "Good"**
 - **GSFC MODAPS-PDR to EROS ("Low")**
 - Due to EBnet to Doors congestion at GSFC
- **Bottlenecks:**
 - **GSFC: EBnet to Doors Gig-E**
 - Average user flow is approx 700 mbps
 - A bit lower than last month's 750 mbps
 - Sustained peaks over 900
 - Upgrade to 10 Gig backbone is in progress
 - Completion expected Summer '09
- Significant improvements are noted in Green, Network problems in Red, System problems in Gold, and comments in Blue.

Ratings Changes: (See site discussion below for details)

Upgrades: ↑ : None

Downgrades: ↓:

GSFC-EDOS → LASP: Excellent → **Good**

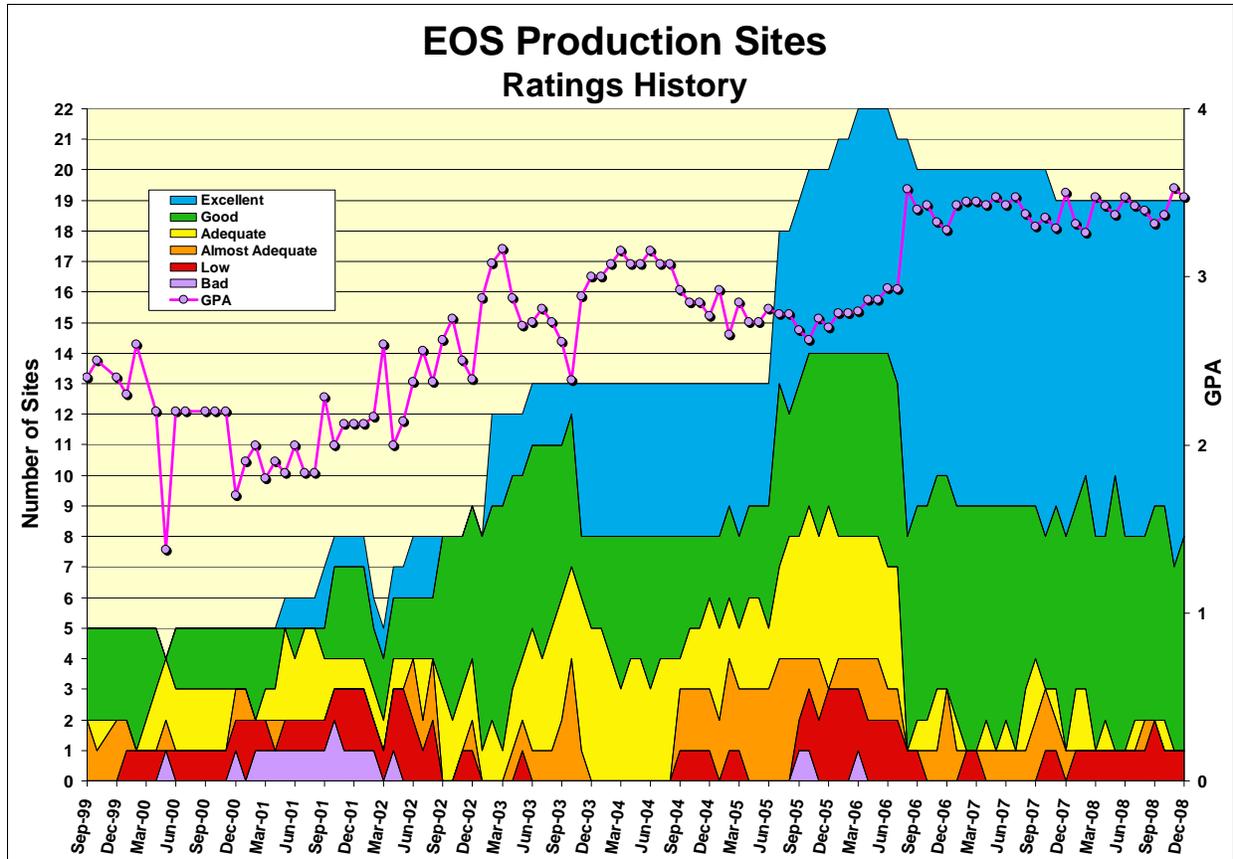
Testing Down X:

ASF → LASP, GSFC → ASF (ASF IOnet node is not available)

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



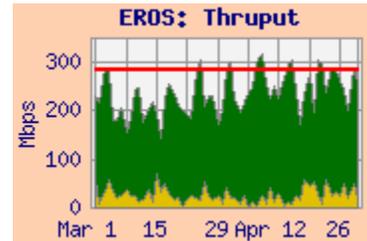
The chart above shows the number of sites in each classification since EOS Production Site testing started in September 1999. Note that these ratings do NOT relate to absolute performance -- they are relative to the EOS requirements.

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

Integrated Charts:

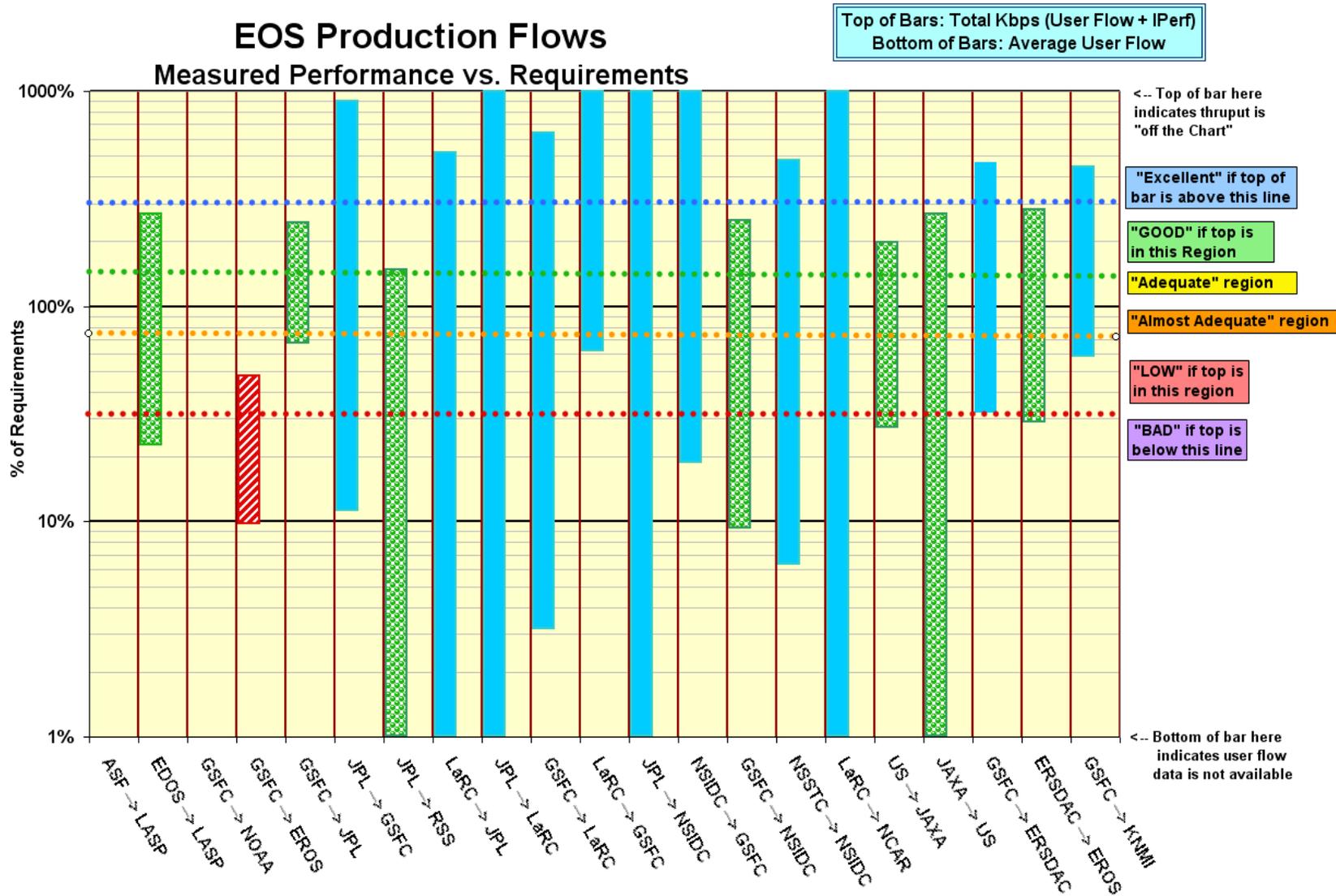
Integrated charts are included with site details, where available. These charts are “Area” charts, with a pink background. A sample Integrated chart is shown here. The yellow area at the bottom represents the daily average of the user flow from the source facility (e.g., GSFC, in this example) to the destination facility (e.g., 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 thruptut 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

December 2008		Requirements (mbps)		Testing				Ratings			
Source → Destination	Team (s)	Current	Future	Source → Dest Nodes	Avg User Flow mbps	iperf Avg mbps	Integrated mbps	Rating re Current Requirements		Rating re	
		Dec-08	Oct-09					Dec-08	Last Month	Oct-09	
WSC → ASF	ALOS	n/a	n/a	WSC → ASF-AADN		n/a		n/a	n/a	n/a	
ASF → LASP	QuikScat	0.02	0.02	ASF → LASP [via IOnet]				n/a	n/a	n/a	
EDOS → LASP	ICESat, QuikScat	0.4	0.4	GSFC-EDOS → LASP	0.09	1.0		GOOD	E	GOOD	
GSFC → EROS	MODIS, LandSat	345.9	345.9	MODAPS-PDR → EROS LPDAAC	33.4	157.9	165.3	LOW	L	LOW	
GSFC → JPL	AIRS, MLS, ISTs	43.6	38.5	GDAAC → JPL-AIRS	29.0	101.0	107.5	GOOD	G	GOOD	
JPL → GSFC	AMSR-E, MISR, etc.	7.4	7.4	JPL-PTH → GSFC-PTH	0.82	65.5		Excellent	E	Excellent	
JPL → RSS	AMSR-E	2.5	2.5	JPL-PODAAC → RSS		3.67		GOOD	G	GOOD	
LaRC → JPL	TES, MISR	43.2	43.7	LARC-DAAC → JPL-TES		224.2		Excellent	E	Excellent	
JPL → LaRC	TES	4.4	4.4	JPL-PTH → LARC-PTH		63.1		Excellent	E	Excellent	
GSFC → LaRC	CERES, MISR, MOPITT	60.5	48.7	GDAAC → LDAAC	1.9	388.6	388.6	Excellent	E	Excellent	
LaRC → GSFC	MODIS, TES	0.2	0.2	LDAAC → GDAAC	0.12	514.7	514.7	Excellent	E	Excellent	
JPL → NSIDC	AMSR-E	1.3	1.3	JPL-PTH → NSIDC SIDADS	0.009	81.6		Excellent	E	Excellent	
NSIDC → GSFC	MODIS, ICESAT, QuikScat	0.5	0.5	NSIDC DAAC → GDAAC	0.09	120.3	120.3	Excellent	E	Excellent	
GSFC → NSIDC	MODIS, ICESAT, QuikScat	34.5	34.5	MODAPS-PDR → NSIDC-DAAC	3.2	86.0	86.2	GOOD	G	GOOD	
NSSTC → NSIDC	AMSR-E	7.5	7.5	NSSTC → NSIDC DAAC	0.47	36.5	36.0	Excellent	E	Excellent	
LaRC → NCAR	HIRDLS	5.4	5.4	LDAAC → NCAR		237.1		Excellent	E	Excellent	
US → JAXA	QuikScat, TRMM, AMSR	2.0	2.0	GSFC-EDOS → JAXA DDS	0.54	3.95	3.97	GOOD	G	GOOD	
JAXA → US	AMSR-E	1.3	1.3	JAXA DDS → JPL-QSCAT		3.45		GOOD	G	GOOD	
GSFC → ERSDAC	ASTER	12.5	12.5	GSFC-EDOS → ERSDAC	4.0	57.2	58.2	Excellent	E	Excellent	
ERSDAC → EROS	ASTER	26.8	26.8	ERSDAC → EROS PTH	7.7	72.8	75.6	GOOD	G	GOOD	
GSFC → KNMI	OMI	3.3	3.3	GSFC-OMISIPS → ODPS	1.9	14.5	14.6	Excellent	E	Excellent	
							Ratings Summary			Oct-09 Req	
								Dec-08 Req			Req
								Score	Prev		Score
*Criteria:	Excellent	Total Kbps > Requirement * 3				Excellent	11	12		11	
	GOOD	1.3 * Requirement <= Total Kbps < Requirement * 3				GOOD	7	6		7	
	Adequate	Requirement < Total Kbps < Requirement * 1.3				Adequate	0	0		0	
	Almost Adequate	Requirement / 1.3 < Total Kbps < Requirement				Almost Adequate	0	0		0	
	LOW	Requirement / 3 < Total Kbps < Requirement / 1.3				LOW	1	1		1	
	BAD	Total Kbps < Requirement / 3				BAD	0	0		0	
							Total Sites	19	19	19	
Notes:	Flow Requirements include: TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS						GPA	3.47	3.53	3.47	

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: Continued **Good**

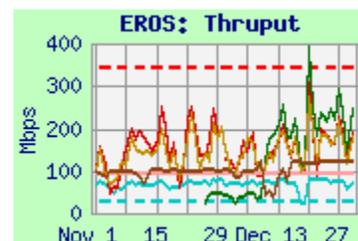
Web Page: <http://ensight.eos.nasa.gov/Organizations/production/EROS.shtml>
http://ensight.eos.nasa.gov/Organizations/production/EROS_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → EROS LPDAAC	238.8	157.9	68.0	33.4	163.5
GSFC-EDOS → EROS LPDAAC	317.6	183.0	70.0		
GES DAAC → EROS LPDAAC	265.4	162.6	56.2		
ERSDAC → EROS LPDAAC	83.7	72.8	30.1	7.7	75.6
GSFC-EBnet-PTH → EROS PTH	410.9	177.4	46.4		
GSFC-ENPL → EROS PTH	476.8	438.7	315.4		
GSFC-NISN → EROS PTH	481.2	444.5	332.3		
NSIDC → EROS	124.7	116.5	88.4		
LaRC → EROS	93.0	93.0	93.0		

Requirements:

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

**Comments:**

GSFC → EROS: The rating is based on the MODAPS-PDR Server to EROS LP DAAC measurement (Results are very similar from EDOS and GES DAAC). The route is via 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 lower than the 46 mbps last month, and remains far below the nominal requirement. The lower user flow contributed to higher iperf measurements, especially the daily worst (the average was 50 mbps from MODAPS last month)

Testing from GSFC-EDOS to EROS was started in late November, and was retuned until December. Results are similar to other EBnet hosts.

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 shown by their large best:worst ratios. The performance 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 more than 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 7:1). 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. It uses the previous Internet2 route. Performance is very similar to the GSFC-NISN source. Both are predominantly limited by the OC-12 to EROS.

ERSDAC → EROS: Performance was slightly improved this month. See section 7 (ERSDAC) for the graph and further discussion of this performance.

NSIDC → EROS: Performance was slightly improved this month.

LaRC → EROS: The thrupt from LaRC-PTH to EROS-PTH was again very stable this month via NISN to the Chicago CIEF. Thrupt 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:

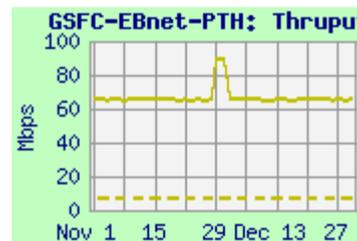
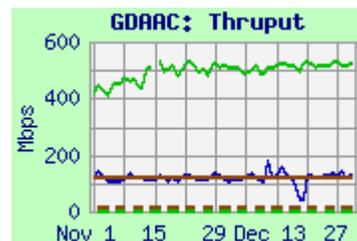
- <http://ensight.eos.nasa.gov/Organizations/production/GDAAC.shtml>
- http://ensight.eos.nasa.gov/Organizations/production/GSFC_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
EROS LPDAAC → GSFC DAAC	150.6	120.8	99.3		
EROS PTH → GSFC-EBnet PTH	440.2	405.0	350.2		
JPL-PTH → GSFC-EBnet PTH	66.2	65.5	64.9	0.8	
LDAAC → GDAAC	536.3	514.7	318.6	0.1	514.7
LARC-ANGe → GSFC-EBnet PTH	367.5	326.7	217.8		
NSIDC DAAC → GSFC-DAAC	121.0	120.3	114.5	0.1	

Requirements:

Source → Dest	Date	Mbps	Rating
NSIDC → GSFC	CY '06 – '08	13.3	Excellent
LDAAC → GDAAC	FY '07 – '08	0.2	Excellent
JPL → GSFC combined	CY '06-09	7.4	Excellent



EROS → GSFC: The thrupt 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: Thrupt has been stable at 65 mbps for the last several months (but is occasionally bimodal at either 65 or 90 mbps -- thrupt from JPL-PTH to LaRC-PTH is similar). With the modest requirement, the rating remains "Excellent".

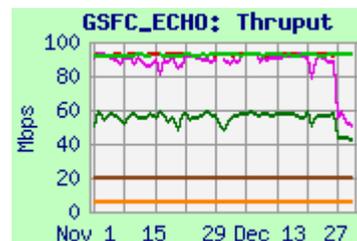
LaRC → GSFC: Performance from LDAAC → GDAAC remained much more than 3 x the modest requirement, so the rating continues as "Excellent". The user flow dropped back to only 120 kbps, below normal for recent months.

NSIDC → GSFC: Performance from NSIDC to GSFC was very steady this month; with the low requirement the rating remains "Excellent". The user flow on this path averaged only 85 kbps.

2.2 GSFC-ECHO

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	78.8	67.3	49.6
EROS LPDAAC ftp	12.2	11.7	7.7
GES DAAC	93.0	92.7	90.2
GES DAAC ftp	93.2	90.0	33.1
LaRC ASDC DAAC	92.8	92.5	79.3
LaRC ASDC DAAC ftp	60.6	56.6	27.4
NSIDC DAAC	20.2	20.2	20.0
NSIDC DAAC ftp	5.7	5.6	5.0



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.

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)			User Flow	Integrated
	Best	Median	Worst		
GSFC-DAAC → JPL-AIRS	119.8	101.0	51.3	29.0	107.5
GSFC-EBnet-PTH → JPL-AIRS	362.1	165.8	46.0		
GSFC-EBnet-PTH → JPL-PODAAC	274.3	109.6	23.4		
GSFC-EBnet-PTH → JPL-QSCAT	91.6	83.7	21.7		
GSFC-EBnet-PTH → JPL-MLS	150.3	70.3	13.4		
GSFC-NISN → JPL-MLS	131.5	95.4	84.7		

Requirements:

Source → Dest	Date	Mbps	Rating
GSFC → JPL Combined	Jan '08-Sept '08	43.6	Good
GSFC → JPL AIRS	Jan '08-May '09	35.2	↑ Excellent
GSFC → JPL PODAAC	Jan '08-May '11	1.5	Excellent
GSFC → JPL QSCAT	Jan '08-May '11	1.0	Excellent
GSFC → JPL MLS	Jan '08-Sept '08	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 lower user flow from GSFC to EROS this month contributed to higher iperf measurements, especially the daily worst. The user flow from GSFC/EOS was a bith higher than last month's 25 mbps, and was consistent with the requirement without contingency.

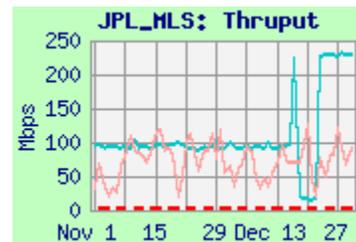
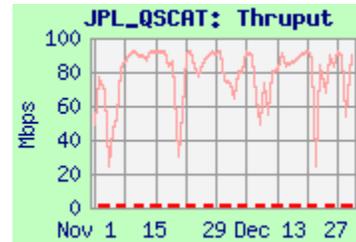
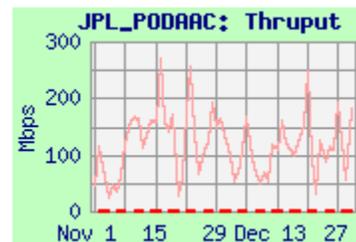
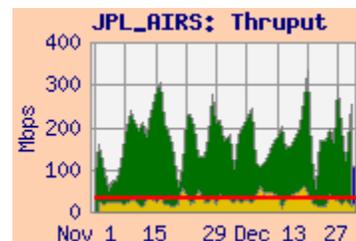
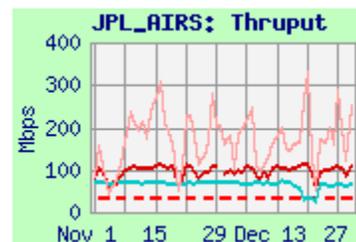
AIRS, Overall: The median thrupt from GES DAAC improved to a bit more than 3x the AIRS requirement; so the AIRS rating improves to "Excellent".

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: Thrupt peaks are close to 300 mbps, while median thrupt is much lower, due to congestion at GSFC. The GSFC-PODAAC requirement (for MODIS data) is only 1.5 mbps, rating "Excellent"

QSCAT: The median thrupt 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".

MLS: The GSFC-MLS requirement is for MLS and GEOS flow, and was reduced in April '08. Thrupt from GSFC-PTH was noisy and slightly lower than last month. Testing from GSFC-NISN avoids the EBnet congestion seen from GSFC-EBnet-PTH –although the peaks were similar, the median and daily worst were much higher than from GSFC-EBnet-PTH. This test was retuned in late December, with improved results.



3.2) LaRC ↔ JPL

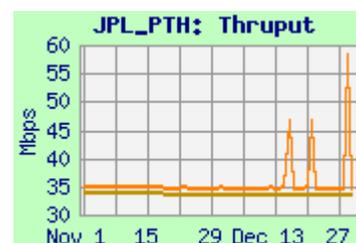
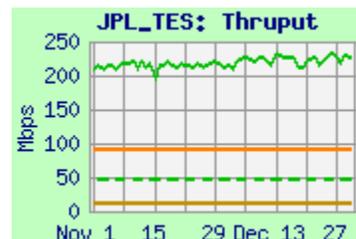
Ratings: LaRC → JPL: Continued **Excellent**
 JPL → LaRC: Continued **Excellent**

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	253.8	224.2	163.9
LaRC PTH → JPL-TES	91.1	91.1	91.0
LaRC PTH → JPL-TES sftp	11.5	11.4	10.5
LaRC PTH → JPL-PTH sftp	33.7	33.7	33.5
LaRC DAAC → JPL-MISR	88.8	80.9	33.9
LaRC PTH → JPL-MISR	89.3	88.9	48.9
JPL-PTH → LaRC PTH	85.7	63.1	61.7



Requirements:

Source → Dest	Date	Mbps	Rating
LaRC DAAC → JPL-TES	FY '07 – '08	29.8	Excellent
LaRC DAAC → JPL-MISR	FY '07 – '08	18.5	Excellent
LaRC → JPL-Combined	FY '07 – '08	45.8	Excellent
JPL PTH → LaRC PTH	FY '07 – '08	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): Performance for most tests improved in Sept. '07 with the NISN to JPL Ethernet upgrade, and the ratings improved at that time. The LaRC DAAC test node was replaced in July '08; median performance from LDAAC to JPL-TES was lower from the new system than the old one (median was 325 mbps), but is still 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 not noisy very this month, with a best:worst ratio from the ASDC DAAC of 2.6:1 (same as last month); from LaRC-PTH the ratio is now only 1.8:1. 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 was again mostly stable this month (although the 90 mbps alternative bimodal value appears occasionally). The requirement was reduced in April 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)			User Flow	Integrated
	Best	Median	Worst		
MODIS-PDR → NSIDC-DAAC	88.5	86.0	46.1	3.2	86.2
GSFC-DAAC → NSIDC-DAAC	108.0	88.9	29.5		
GSFC-EDOS → NSIDC-DAAC	99.1	70.3	18.5		
GSFC-ENPL → NSIDC_u	115.3	114.5	98.9		
MODIS-PDR → NSIDC_u	91.4	87.5	42.1		
GSFC-ISIPS → NSIDC (iperf)	88.8	82.8	22.8		
GSFC-ISIPS → NSIDC (ftp)	19.0	18.9	3.2		

Requirements:

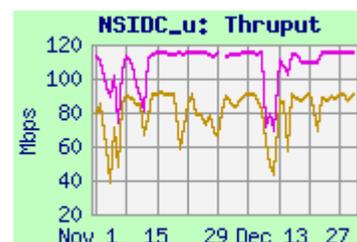
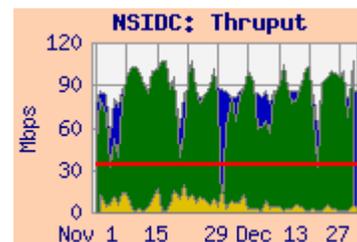
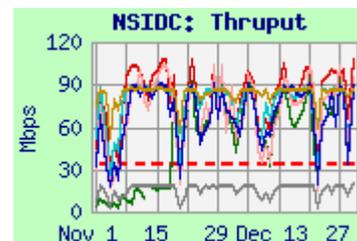
Source → Dest	Date	Mbps	Rating
GSFC → NSIDC	CY '07 – '08	34.5	Good

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 thrupt values were mostly stable this month, but were noisy, due to congestion at GSFC. The requirement was reduced in April '08 (was 64 mbps previously) due to the use of compression in MODIS collection 5. The Integrated thrupt 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.

Testing to NSIDC from EDOS was returned in mid-November. Results are now similar to but somewhat lower than from GDAAC

GSFC → NSIDC_u via Internet2: Results via Internet2 are also shown above, in the interest of possibly switching the production flows from PIP to Internet2. Thrupt on this path from ENPL was steady and well above the requirement. Performance via Internet2 from MODAPS is similar to those from MODAPS via NISN – it would also rate "Good". So from a performance viewpoint, this is a viable option

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



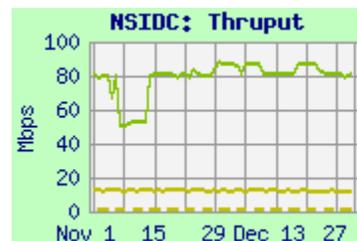
4.2) JPL → NSIDC:

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

Test Results:

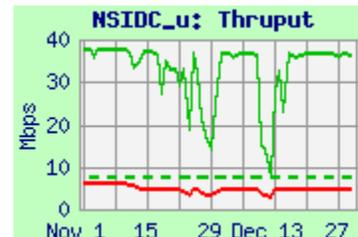
Source → Dest	Medians of daily tests (mbps)			Requirement
	Best	Median	Worst	
JPL PTH → NSIDC-PTH	86.6	81.6	35.5	1.34
JPL PODAAC → NSIDC	13.2	12.3	10.9	

Comments: The test from JPL-PTH to NSIDC-PTH has much higher thrupt than from PODAAC, and more fully assesses the true network capability. Thrupt from JPL-PTH was stable; it had increased in June '08 back to its higher bimodal value,. Thrupt from PODAAC to NSIDC-SIDADS was much lower. User flow on this path was only about 9 kbps this month! (Or maybe the flows are 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:**

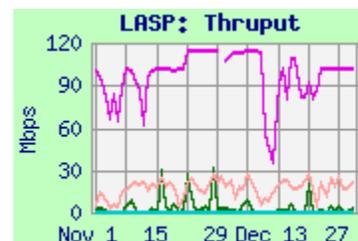
Source → Dest	Medians of daily tests (mbps)			Req.
	Best	Median	Worst	
GHRC → NSIDC DAAC (iperf)	37.4	36.5	17.3	7.5
GHRC → NSIDC DAAC (ftp)	4.9	4.8	4.5	



Comments: GHRC (NSSTC, UAH, Huntsville, AL) sends AMSR-E L2/L3 data to NSIDC via NISN PIP. The iperf thrupt improved in August '08, when NISN increased the SCR. The ftp performance was limited by the TCP window size, so did not benefit. The median thrupt is more than 3x the requirement, so the rating remains "Excellent". The user flow again averaged only 500 kbps this month, about 7% of the requirement.

4.4) LASP:Ratings: GSFC → LASP: ↓ Excellent → **Good**Web Page: <http://ensight.eos.nasa.gov/Organizations/production/LASP.shtml>**Test Results:**

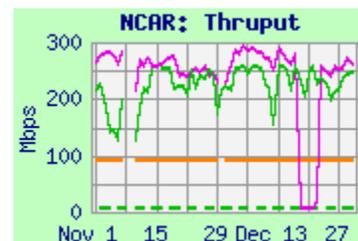
Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC EDOS → LASP	33.8	0.98	0.01
GSFC EBnet-PTH → LASP (iperf)	33.6	18.5	2.9
GSFC ENPL → LASP	113.7	102.0	73.8
GSFC EBnet-PTH → LASP (sftp)	0.46	0.46	0.44

**Comments:**

GSFC → LASP: Iperf thrupt is very noisy (note the 11.4:1 best:worst ratio from GSFC-PTH, and much noisier from EDOS); attributed to EBnet congestion at GSFC. The median thrupt from EDOS is over 2x the 0.4 mbps requirement, but now by less than 3 x, so the rating drops to "Good". Sftp thrupt is MUCH lower than iperf, due to TCP window size limitations. Performance is much higher and steadier from GSFC-ENPL via Internet2, which avoids the EBnet congestion at GSFC. The average user flow was typical this month – 82 kbps.

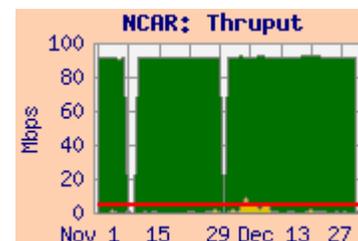
4.5) NCAR:Ratings: LaRC → NCAR: Continued **Excellent**GSFC → NCAR: Continued **Excellent**Web Pages <http://ensight.eos.nasa.gov/Missions/terra/NCAR.shtml>**Test Results:**

Source	Medians of daily tests (mbps)			Requirement
	Best	Median	Worst	
LaRC	260.3	237.1	79.5	5.4
GSFC-ENPL-GE	306.7	261.6	188.4	5.1
GSFC-ENPL-FE	92.2	92.2	92.1	



Comments: NCAR (Boulder, CO) is a SIPS for MOPITT (Terra, from LaRC), and has MOPITT and HIRDLS QA (Aura, from GSFC) requirements. Thrupt from LaRC was again noisy this month, but slightly less so (Daily worst was 53 mbps last month). 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 thrupt is somewhat noisy, but also well over 3 x the requirement, so that rating also remains "Excellent". Thrupt was extremely stable from the ENPL node using a Fast-E interface.



The Integrated graph shows that the peak user flow from GSFC is fairly consistent with the stated requirement. The average user flow this month was 1.4 mbps (higher than the 0.5 mbps typical value).

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)			User Flow	Integrated
	Best	Median	Worst		
GES DAAC → LDAAC	511.3	388.6	219.4	4.3	388.6
GSFC-EDOS → LDAAC	454.6	282.4	96.6		
GSFC-EBnet-PTH → LaRC-ANGe	416.9	329.1	166.4		
GSFC-NISN → LaTIS	413.3	394.5	327.1		

Requirements:

Source → Dest	Date	Mbps	Rating
GSFC → LARC (Combined)	CY '08	60.5	Excellent

Comments:

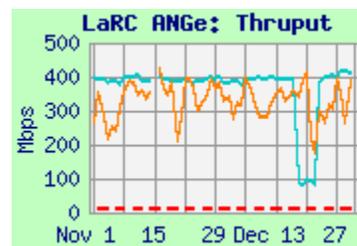
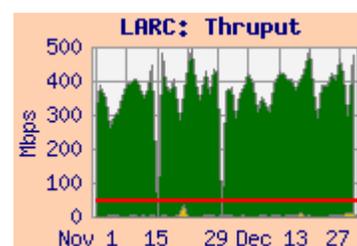
GSFC → LaRC: The requirement was reduced effective January '08 due to decreased GEOS flows (was 86.9 mbps previously). The rating is based on the GES DAAC to LaRC ASDC DAAC thrupt, compared to this combined requirement. The integrated thrupt remains more than 3 x this requirement, so the rating remains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

Testing from EDOS resumed in December after LaRC changed its firewall rules to work with the new EDOS host. Results are similar to but somewhat 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 4.3 mbps average user flow was similar to last month's 4.7 mbps, and only about 7% of the requirement.

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



6) US ↔ JAXA:

Ratings: US → JAXA: Continued **Good**
 JAXA → US: Continued **Good**

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/Organizations/production/JPL_QSCAT.shtml

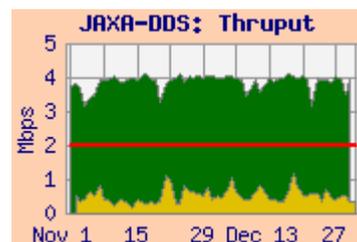
Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-EBnet-PTH → JAXA-DDS	4.19	3.87	2.74	0.54	3.97
GSFC-EDOS → JAXA-DDS	4.34	3.95	2.67		
GSFC-ENPL → JAXA-azusa	72.3	59.3	43.0		
GSFC-EBnet-PTH → JAXA-azusa	44.8	31.8	10.3		
GSFC-EDOS → JAXA-azusa	35.7	27.5	10.7		
GSFC-EBnet-PTH → JAXA (sftp)	0.85	0.83	0.74		
JAXA-DDS → JPL-QSCAT	3.48	3.45	3.40		
JAXA-DDS → GSFC-DAAC	1.11	1.11	1.10		
JAXA-azusa → GSFC-MAX	86.0	85.0	27.8		



Requirements:

Source → Dest	Date	Mbps	Rating
GSFC → JAXA	Nov '03 – Dec '08	1.99	Good
JAXA → US	Nov '03 – Dec '08	1.28	Good

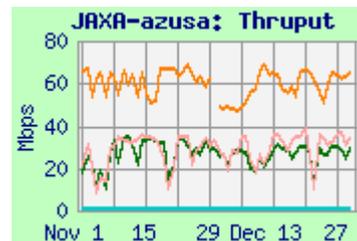


Comments:

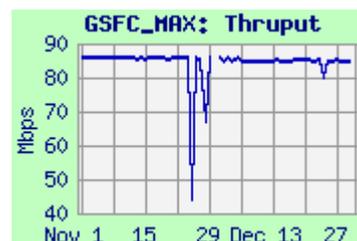
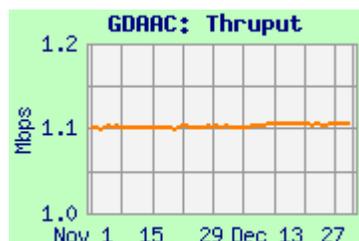
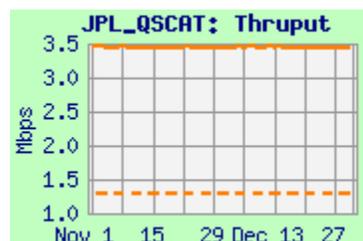
US → JAXA: DDS: Performance from GSFC is limited by TCP window size and the 10 mbps Ethernet at JAXA. Performance was mostly stable, but subject to the EBnet to Doors congestion at GSFC. Thruput was above the requirement, by more than 30%, but by less than 3x; so the rating remains “Good”. Testing to JAXA-DDS was initiated last month from GSFC-EDOS, with results very similar to those from GSFC-EBnet-PTH.

The integrated graph shows fairly consistent user flow, averaging about 27% of the requirement (or 40% of the requirement without the contingency).

Azusa: Performance from GSFC-ENPL to the JAXA azusa test node is not limited by a 10 mbps Ethernet, so its much higher performance more accurately shows the capability of the networks. The lower values from GSFC-EBnet-PTH and GSFC-EDOS are due to EBnet congestion, not seen from GSFC-ENPL. But thruput using sftp between these same nodes is much lower, limited by ssh TCP window size. A patch is available, but is not installed on azusa.



JAXA → US: Thruput from DDS to JPL and GSFC is limited by the DDS node's TCP window size (which has not been tuned to fully utilize the increased network capability) and its 10 mbps Ethernet. Average thruput from JAXA to JPL was above the requirement by more than 30%, so the rating remains “Good”. Thruput was much higher and very stable from Azusa to GSFC-MAX, with a 100 mbps Ethernet connection, and larger TCP windows.



7) ERSDAC ↔ US:

Ratings: GSFC → ERSDAC: Continued **Excellent**
 ERSDAC → EROS: Continued **Good**

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

US → ERSDAC Test Results

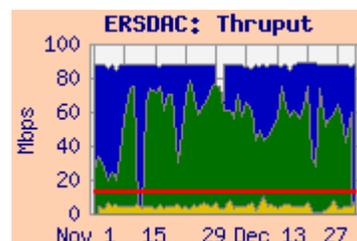
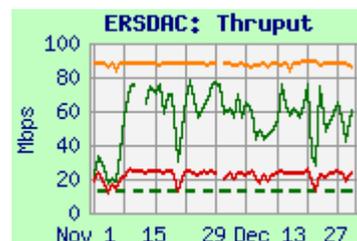
Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-EDOS → ERSDAC	82.5	57.2	20.7	4.0	58.2
GDAAC → ERSDAC	26.2	23.4	9.6		
GSFC ENPL (FE) → ERSDAC	88.6	88.2	71.7		

Requirements:

Source → Dest	FY	Mbps	Rating
GSFC → ERSDAC	'05 - '08	12.5	Good

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

Testing from EDOS to ERSDAC is used as the basis for the rating -- the requirement includes the level 0 flows which used to be sent by tapes. In November, Class Based Queueing (cbq) was initiated from EDOS to limit the outflow rate to 100 mbps, in order to avoid overloading the switch at Tokyo-XP (see below), with a big increase in thrupt (median was 24 mbps previously). Performance was noisy as usual, due to EBnet congestion, but median thrupt remains above 3 x the requirement, so the rating remains "Excellent". The integrated chart shows that the user flow continues to be below the requirement, by about a 3:1 factor.



Thrupt from GDAAC to ERSDAC is 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 much higher. .

ERSDAC → US Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
ERSDAC → JPL-ASTER IST	89.9	89.6	35.8
ERSDAC → EROS	83.7	72.8	30.1

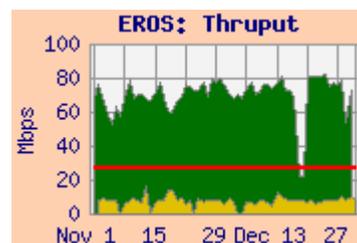
Requirements:

Source → Dest	Date	mbps	Rating
ERSDAC → JPL-ASTER IST	FY '07- '08	0.31	Good
ERSDAC → EROS	FY '07- '08	26.8	Good

Comments:

ERSDAC → JPL-ASTER-IST: The performance this month was very stable, and must be well in excess of the [unstated] requirement (IST requirements are generally 311 kbps).

ERSDAC → EROS: The results from this test (in support of the ERSDAC to EROS ASTER flow, replacing tapes) were less noisy this month (Daily worst was 25 mbps last month). Thrupt improved to this level in April '05. The median thrupt is more than 30% above the requirement, but by less than 3 x, so the rating remains "Good". The user flow averaged 7.7 mbps this month (was 8.0 mbps last month), about 30% of the requirement.



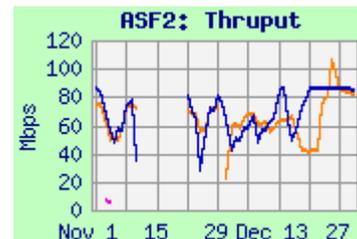
8) ASF

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	n/a	n/a	n/a
GSFC	73.6	63.1	31.9
JAXA	86.0	71.3	26.2



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, then via campus LAN to the Alaska Satellite Facility (ASF).

Testing from WSC stopped in early October when the WSC test node failed. A replacement is being constructed. Performance from GSFC and JAXA improved in late October, when the test node was moved outside the ASF firewall.

9) Other SIPS Sites:

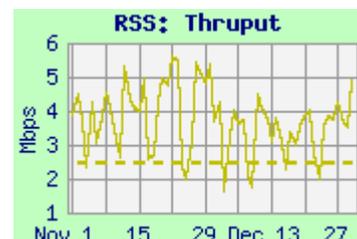
Web Pages <http://ensight.eos.nasa.gov/Missions/aqua/RSS.shtml>
http://ensight.eos.nasa.gov/Missions/aura/KNMI_OMIPDR.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			Reqmt	Rating
	Best	Median	Worst		
JPL → RSS	5.66	3.67	1.01	2.5	Continued Good
OMISIPS → KNMI-ODPS	14.9	14.5	11.1	3.3	Continued Excellent

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 thrupt from JPL remained noisy. 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 thrupt remained above the requirement by more than 30%, so the rating remains "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 user flow averaged only 1.9 mbps this month, similar to the 1.8 mbps last month, as shown on the integrated graph.

