EOS Production Sites
Network Performance Report: February 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 3.58 – NEW RECORD!** (3.47 last month)
- **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
      - Similar to last month
    - 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: ↑ :

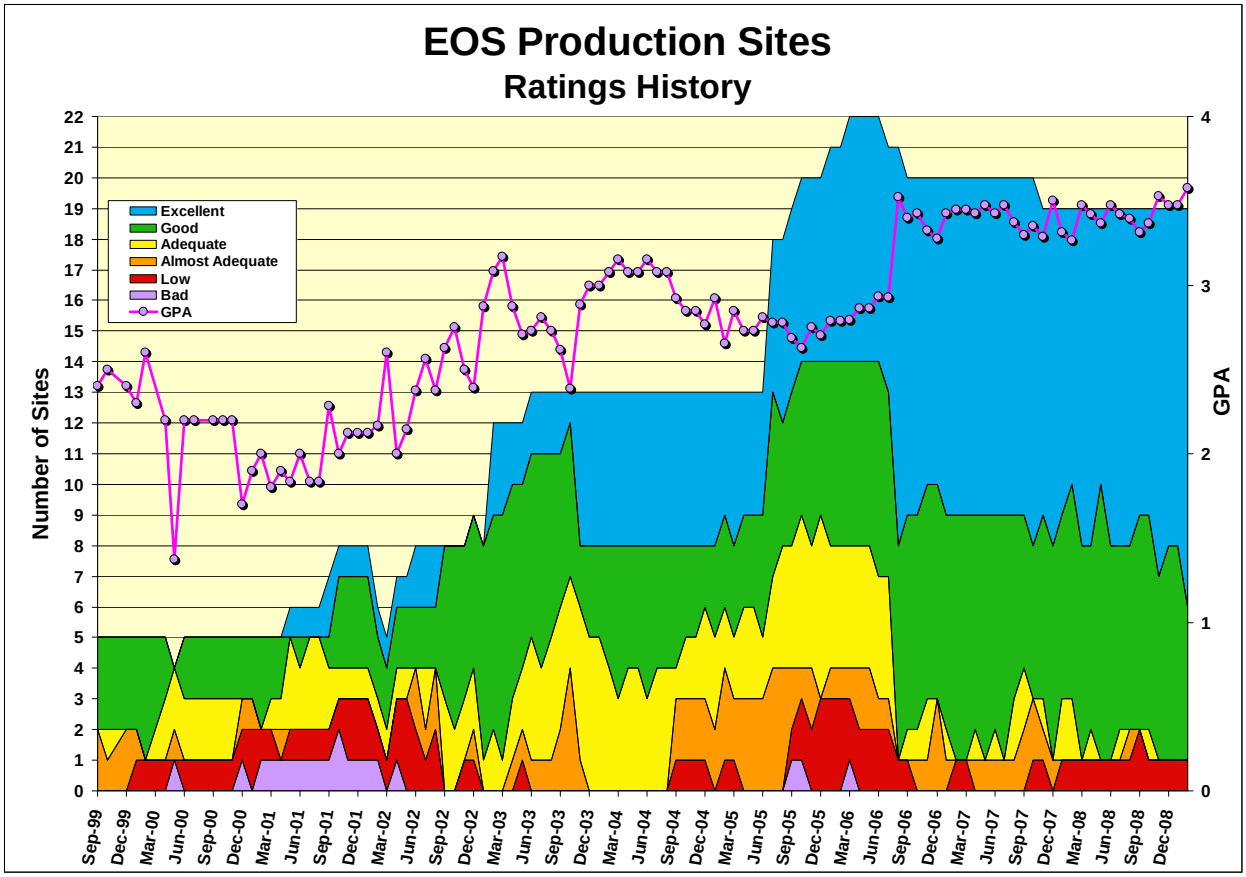
EDOS → LASP: Good → Excellent
ERSDAC → EROS: Good → Excellent

Downgrades: ↓: None

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

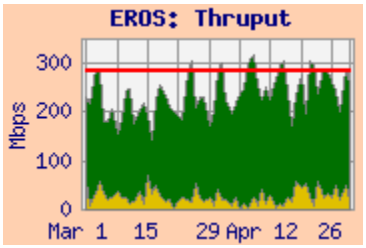


The chart above shows the number of sites in each classification since EOS Production Site testing started in September 1999. Note that these ratings do NOT relate to absolute performance -- they are relative to the EOS requirements.

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
- 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 (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 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

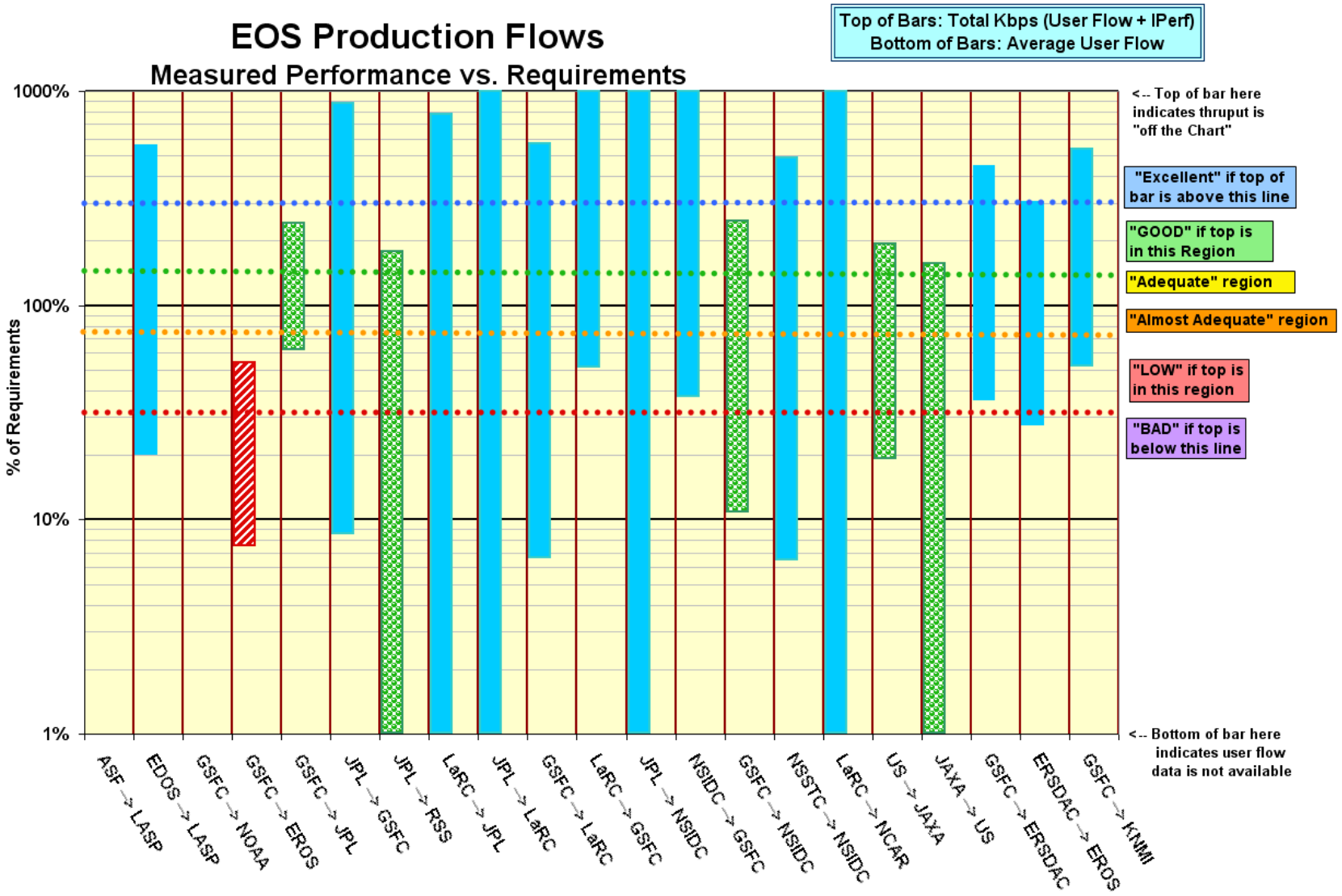
February 2009		Requirements (mbps)		Testing				Ratings		
Source → Destination	Team (s)	Current Feb-09	Future Oct-09	Source → Dest Nodes	Avg User Flow mbps	iperf Avg mbps	Integrated mbps	Rating re Current Requirements Feb-09	Last Month	Rating re Oct-09
WSC –> ASF	ALOS	n/a	n/a	WSC → ASF-AADN		n/a		n/a	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	0.08	2.2		Excellent	G	Excellent
GSFC –> EROS	MODIS, LandSat	345.9	345.9	MODAPS-PDR → EROS LPDAAC	25.8	179.5	187.1	LOW	L	LOW
GSFC –> JPL	AIRS, MLS, ISTs	43.6	38.5	GDAAC → JPL-AIRS	26.8	103.1	106.2	GOOD	G	GOOD
JPL –> GSFC	AMSR-E, MISR, etc.	7.4	7.4	JPL-PTH → GSFC-PTH	0.63	64.3		Excellent	E	Excellent
JPL –> RSS	AMSR-E	2.5	2.5	JPL-PODAAC → RSS		4.4		GOOD	G	GOOD
LaRC –> JPL	TES, MISR	43.7	43.7	LARC-DAAC → JPL-TES		339.7		Excellent	E	Excellent
JPL –> LaRC	TES	4.4	4.4	JPL-PTH → LARC-PTH		61.8		Excellent	E	Excellent
GSFC –> LaRC	CERES, MISR, MOPITT	60.5	48.7	GDAAC → LDAAC	4.0	345.3	345.3	Excellent	E	Excellent
LaRC –> GSFC	MODIS, TES	0.2	0.2	LDAAC → GDAAC	0.10	487.5	487.5	Excellent	E	Excellent
JPL –> NSIDC	AMSR-E	1.3	1.3	JPL-PTH → NSIDC SIDADS	0.010	84.9		Excellent	E	Excellent
NSIDC –> GSFC	MODIS, ICESAT, QuikScat	0.5	0.5	NSIDC DAAC → GDAAC	0.18	120.1	120.1	Excellent	E	Excellent
GSFC –> NSIDC	MODIS, ICESAT, QuikScat	34.5	34.5	MODAPS-PDR → NSIDC-DAAC	3.7	85.8	86.1	GOOD	G	GOOD
NSSTC –> NSIDC	AMSR-E	7.5	7.5	NSSTC → NSIDC DAAC	0.48	36.7	36.8	Excellent	E	Excellent
LaRC –> NCAR	HIRDLS	5.4	5.4	LDAAC → NCAR		186.2		Excellent	E	Excellent
US –> JAXA	QuikScat, TRMM, AMSR	2.0	2.0	GSFC-EDOS → JAXA DDS	0.38	3.75	3.86	GOOD	G	GOOD
JAXA –> US	AMSR-E	1.3	1.3	JAXA DDS → JPL-QSCAT		2.0		GOOD	G	GOOD
GSFC –> ERSDAC	ASTER	12.5	12.5	GSFC-EDOS → ERSDAC	4.5	55.9	55.9	Excellent	E	Excellent
ERSDAC –> EROS	ASTER	26.8	26.8	ERSDAC → EROS PTH	7.4	80.9	81.2	Excellent	G	Excellent
GSFC –> KNMI	OMI	3.3	3.3	GSFC-OMISIPS → ODPS	1.7	17.5	17.7	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	Feb-09 Req Score	Feb-09 Req Prev	Oct-09 Req Score
Excellent	13	11	13
GOOD	5	7	5
Adequate	0	0	0
Almost Adequate	0	0	0
LOW	1	1	1
BAD	0	0	0
Total Sites	19	19	19
GPA	3.58	3.47	3.58

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



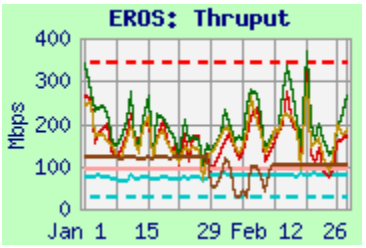
1) EROS:

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

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

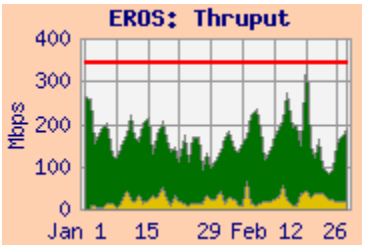
Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	**Median**	**Worst**	**User Flow**	**Integrated**
MODAPS-PDR→ EROS LPDAAC	267.7	179.5	72.4	25.8	187.1
GSFC-EDOS → EROS LPDAAC	361.5	201.5	71.9		
GES DAAC → EROS LPDAAC	317.0	160.0	53.6		
ERSDAC→ EROS LPDAAC	86.2	80.9	43.0	7.4	81.2
GSFC-EBnet-PTH → EROS PTH	106.9	39.6	23.1		
GSFC-ENPL → EROS PTH	474.4	452.1	361.5		
GSFC-NISN → EROS PTH	479.0	456.8	398.9		
NSIDC→ EROS	106.3	102.0	92.7		
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

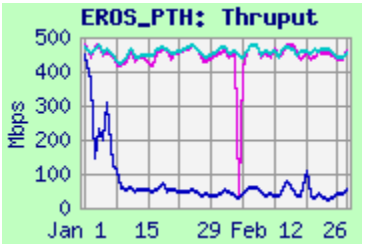


Comments:

GSFC → EROS: The rating is based on the MODAPS-PDR Server to EROS LP DAAC measurement (Results are similar from EDOS and GES DAAC). The route is 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 about the same as the 24 mbps last month (33 mbps the previous month), and remains far below the nominal requirement.

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. The performance from GSFC-EBnet-PTH dropped in early January, and is under investigation. 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 5:1). 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 very similar to the GSFC-NISN source. Both are predominantly limited by the OC-12 to EROS.

ERSDAC → EROS: Performance was stable this month. See section 7 (ERSDAC) for further discussion of this performance.

NSIDC → EROS: Performance was also stable this month.

LaRC → EROS: The thruput from LaRC-PTH to EROS-PTH was again very 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**

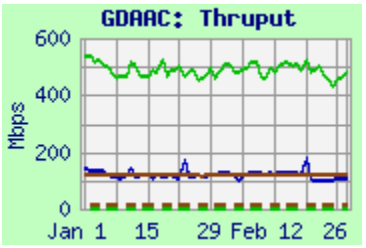
Web Pages:
http://ensight.eos.nasa.gov/Organizations/production/GDAAC.shtml
http://ensight.eos.nasa.gov/Organizations/production/GSFC_PTH.shtml

Test Results:

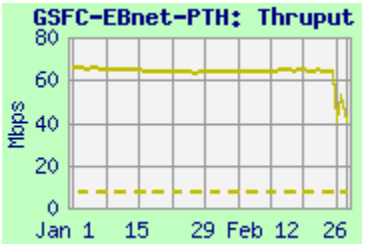
Source → Dest	Medians of daily tests (mbps)			
	Best	**Median**	**Worst**	**User Flow**
EROS LPDAAC → GSFC DAAC	136.8	121.9	96.3	
EROS PTH→ GSFC-EBnet PTH	414.4	365.4	290.6	
JPL-PTH→ GSFC-EBnet PTH	64.6	64.3	63.5	0.63
LDAAC → GDAAC	523.5	487.5	314.7	0.10
LARC-ANGe → GSFC-EBnet PTH	373.5	337.3	181.9	
NSIDC DAAC → GSFC-DAAC	120.9	120.1	116.0	0.18
NSIDC DAAC → GSFC-ISIPS	78.4	78.0	77.2	

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**

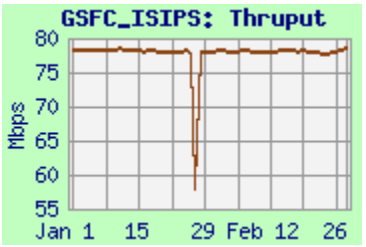


EROS → GSFC: The thruput for tests from EROS to GSFC (both DAAC to DAAC and PTH to EBnet-PTH) were mostly stable this month, but note that the DAAC to DAAC flow cannot use most of the WAN capability (compared to the EROS-PTH to GSFC-EBnet-PTH results).



JPL → GSFC: Thruput has been stable at 65 mbps for the last several months (but is occasionally bimodal at either 65 or 90 mbps). 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 only 100 kbps, typical for recent months.

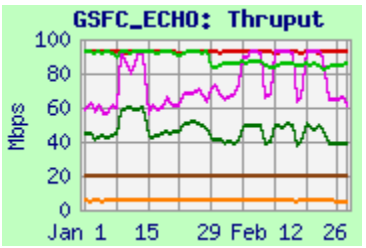


NSIDC → GSFC: Performance from NSIDC to GSFC (DAAC and ISIPS) was very steady this month; with the low requirement the rating remains "Excellent". The user flow on this path averaged only 180 kbps.

2.2 GSFC-ECHO

Test Results:

Source	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
EROS LPDAAC	84.2	77.6	63.3
EROS LPDAAC ftp	12.3	11.7	7.7
GES DAAC	93.0	92.7	90.0
GES DAAC ftp	93.2	88.5	20.4
LaRC ASDC DAAC	87.3	85.3	70.9
LaRC ASDC DAAC ftp	50.4	47.4	22.1
NSIDC DAAC	20.1	20.0	19.4
NSIDC DAAC ftp	5.6	5.5	2.2



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:

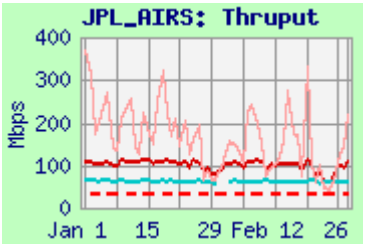
Ratings: GSFC → JPL: Continued **Good**

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

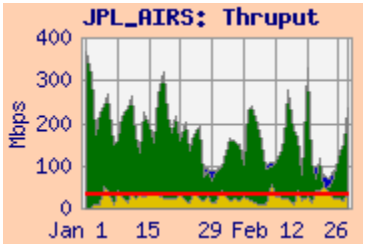
Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	**Median**	**Worst**	**User Flow**	**Integrated**
GSFC-DAAC→ JPL-AIRS	121.5	103.1	41.1	26.8	106.2
GSFC-EBnet-PTH → JPL-AIRS	345.5	130.2	37.5		
GSFC-EBnet-PTH → JPL-PODAAC	216.0	82.4	16.9		
GSFC-EBnet-PTH → JPL-QSCAT	91.5	74.4	14.3		
GSFC-EBnet-PTH → JPL-MLS	153.7	46.3	14.1		
GSFC-NISN → JPL-MLS	225.6	217.6	185.4		

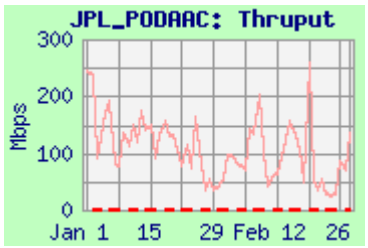


Requirements:

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**

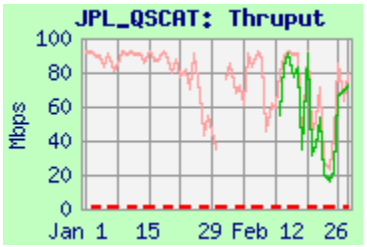


Comments: The EBnet to Doors congestion at GSFC is the bottleneck for most of these flows, and creates large variations in performance. The user flow from GSFC/EOS was about the same as last month's, and was consistent with the requirement without contingency.



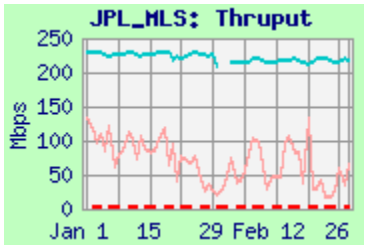
AIRS, Overall: The median thruput from GES DAAC remained a bit more than 3x the AIRS requirement; so the AIRS rating continues "Excellent". **The JPL overall rating** is based on this test compared with the sum of all the GSFC to JPL requirements – the overall rating remains "Good"

PODAAC: Daily thruput peaks averaged over 200 mbps, while median thruput is less than half 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". A test to a new QScat node (ketch) was added in February (green line), with very similar results to the existing 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 11:1) and slightly lower than 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 1.2:1).



3.2) LaRC ←→ JPL

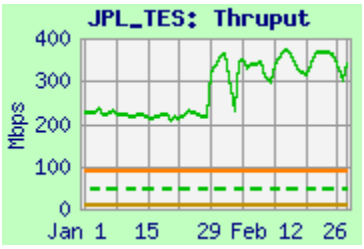
Ratings: LaRC → JPL: Continued **Excellent**
JPL → LaRC: Continued **Excellent**

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

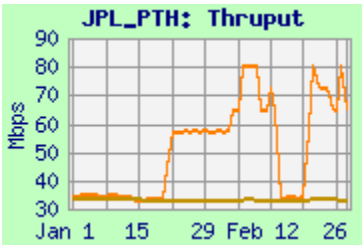
Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
LaRC DAAC → JPL-TES	372.0	339.7	92.1
LaRC PTH → JPL-TES	91.0	91.0	91.0
LaRC PTH → JPL-TES sftp	11.5	11.3	9.7
LaRC PTH → JPL-PTH	80.4	64.8	46.9
LaRC PTH → JPL-PTH sftp	33.2	33.2	33.1
LaRC DAAC → JPL-MISR	77.5	77.0	29.6
LaRC PTH → JPL-MISR	87.9	87.7	33.4
JPL-PTH → LaRC PTH	65.3	61.8	58.3



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**

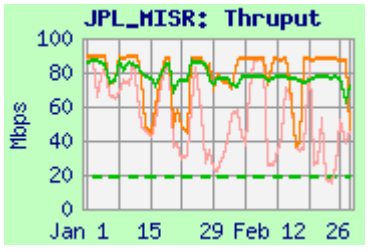


Comments: LDAAC was moved to campus address space in March '07. User flow data is no longer available from LaRC (has been requested but not implemented). Thus no integrated graphs are available from LaRC.

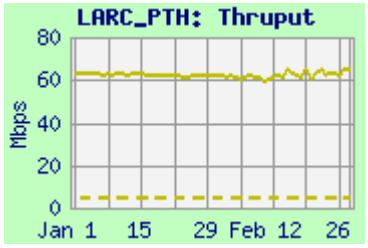
LaRC→ JPL (Overall, TES): Performance from LDAAC to JPL-TES increased in late January, possibly due to a route change by NISN. Median performance from LDAAC to JPL-TES remains well over 3 x the TES and combined requirements, so the TES and Overall ratings remain "Excellent".

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 somewhat noisy this month, with a best:worst ratio from the ASDC DAAC of 2.6:1 (was 3.0:1 last month); from LaRC-PTH the ratio is the same. 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 '08 from 52.6 mbps previously, so the rating improved to "Excellent" at that time.



4) Boulder CO:

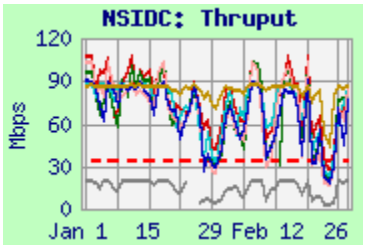
4.1) GSFC → NSIDC:

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

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

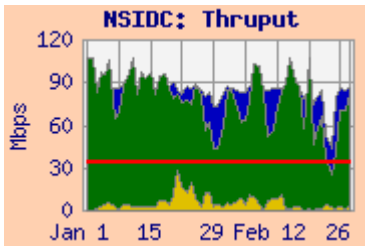
Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
MODIS-PDR → NSIDC-DAAC	88.7	85.8	38.3	3.7	86.1
GSFC-DAAC → NSIDC-DAAC	107.8	70.5	18.1		
GSFC-EDOS → NSIDC-DAAC	103.1	64.1	13.5		
GSFC-ENPL → NSIDC_u	115.4	114.5	104.6		
MODIS-PDR → NSIDC_u	90.8	77.6	18.9		
GSFC-ISIPS → NSIDC (iperf)	88.4	71.3	19.7		
GSFC-ISIPS → NSIDC (ftp)	19.4	14.4	2.1		



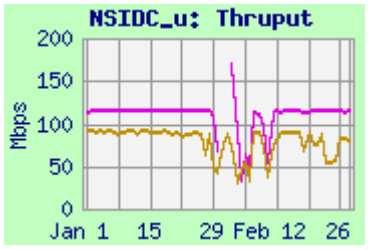
Requirements:

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 thruput values were mostly stable this month, but remain 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 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 above, since it is planned to switch the production flows from PIP to Internet2. Thruput 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



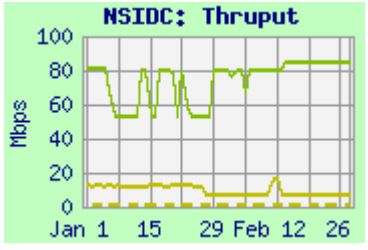
GSFC-ISIPS ← → NSIDC: Results are consistent with previous tests and similar to other GSFC sources.

4.2) JPL → NSIDC:

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

Test Results:

Source → Dest	Medians of daily tests (mbps)			
	Best	Median	Worst	Requirement
JPL PTH → NSIDC-PTH	85.0	84.9	53.2	1.34
JPL PODAAC → NSIDC	6.9	6.7	6.5	

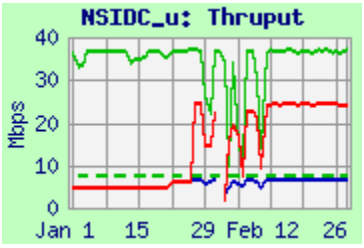


Comments: The test from JPL-PTH to NSIDC-PTH has much higher thruput than from PODAAC, and more fully assesses the true network capability. Thruput from JPL-PTH was stable in February, not bistable, as is often the case. Thruput from PODAAC to NSIDC-SIDADS was much lower. User flow on this path was only about 11 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:

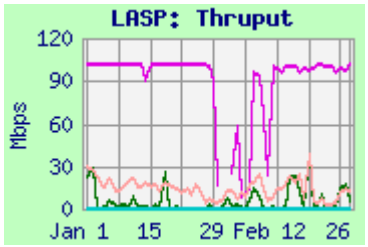
Source → Dest	Medians of daily tests (mbps)			
	Best	Median	Worst	Req.
GHRC → NSIDC DAAC (iperf)	37.6	36.7	23.4	7.5
GHRC → NSIDC DAAC (ftp pull)	24.4	24.1	3.7	
GHRC → NSIDC SIDADS (ftp pull)	6.8	6.7	2.8	

Comments: GHRC (NSSTC, UAH, Huntsville, AL) sends AMSR-E L2/L3 data to NSIDC via NISN PIP or Internet2. 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 again averaged only 475 kbps this month, about 6% of the requirement.

4.4) LASP:

Ratings: GSFC → LASP: ↑ Good → **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	35.6	2.2	0.014
GSFC EBnet-PTH → LASP (iperf)	34.5	11.8	1.8
GSFC ENPL → LASP	101.8	97.1	74.5
GSFC EBnet-PTH → LASP (sftp)	0.46	0.46	0.43

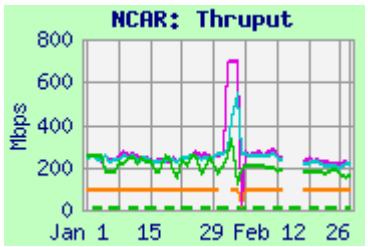
Comments:

GSFC → LASP: Iperf thruput is very noisy (note the 19:1 best:worst ratio from GSFC-PTH; much noisier from EDOS); attributed to EBnet congestion at GSFC. This month the median thruput from EDOS is over 3x the 0.4 mbps requirement, so the rating improves to "Excellent". Sftp thruput 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 this month was a typical – 79 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	186.2	54.2	5.4
GSFC-ENPL-GE	279.1	244.4	169.4	5.1
GSFC-ENPL-FE	92.2	92.2	92.0	
GSFC-NISN	271.3	238.7	183.0	

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. 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 0.5 mbps – a value typical of recent months

5) GSFC → LaRC:

Rating: Continued **Excellent**

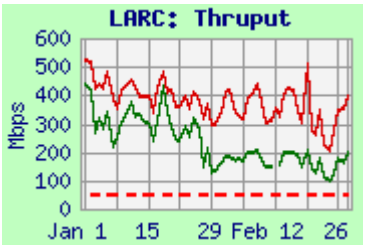
Web Pages: http://ensight.eos.nasa.gov/Organizations/production/LARC.shtml
http://ensight.eos.nasa.gov/Organizations/production/LARC_ANGe.shtml

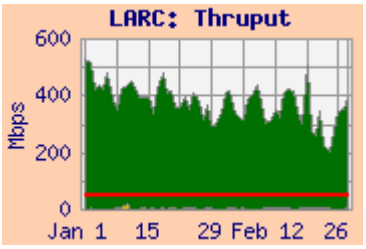
Test Results:

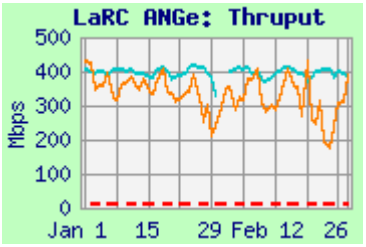
Source → Dest	Medians of daily tests (mbps)				
	Best	**Median**	**Worst**	**User Flow**	**Integrated**
GES DAAC → LDAAC	493.0	345.3	200.6	4.0	345.3
GSFC-EDOS → LDAAC	206.2	175.1	77.9		
GSFC-EBnet-PTH → LaRC-ANGe	425.9	315.5	150.7		
GSFC-NISN → LaTIS	428.1	397.8	338.6		

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 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 similar to but 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 4.0 mbps average user flow was typical for recent months, and only about 6.6% 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.

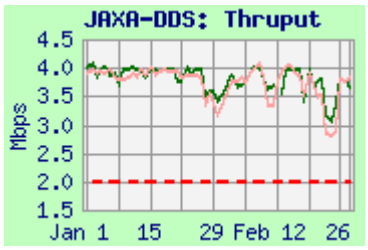
6) US ←→ JAXA:

Ratings: US → JAXA: 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

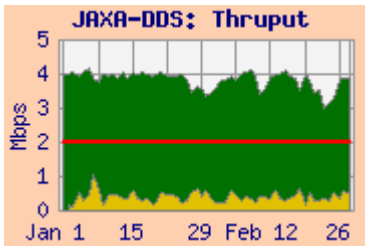
Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	**Median**	**Worst**	**User Flow**	**Integrated**
GSFC-EBnet-PTH → JAXA-DDS	4.24	3.77	2.45	0.38	3.86
GSFC-EDOS → JAXA-DDS	4.30	3.75	2.86		
GSFC-ENPL → JAXA-azusa	73.9	61.8	47.4		
GSFC-EBnet-PTH → JAXA-azusa	41.6	22.6	6.1		
GSFC-EDOS → JAXA-azusa	33.7	23.1	8.6		
GSFC-EBnet-PTH → JAXA (sftp)	0.85	0.82	0.71		
JAXA-DDS → JPL-QSCAT	2.04	2.01	1.99		
JAXA-azusa → JPL-QSCAT	42.9	38.1	16.1		
JAXA-DDS → GSFC-DAAC	1.11	1.10	1.09		
JAXA-azusa→ GSFC-MAX	85.8	84.9	27.4		



Requirements:

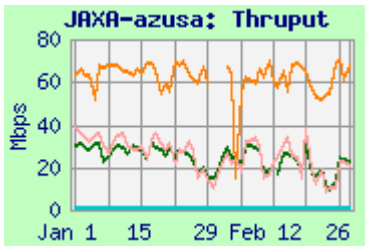
Source → Dest	Date	Mbps	Rating
GSFC → JAXA	Nov '03 – Dec '08	1.99	Good
JAXA → US	Nov '03 – Dec '08	1.28	Good



Comments:

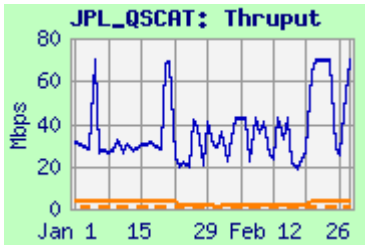
US → JAXA: DDS: Performance from GSFC is limited by TCP window size and the 10 mbps Ethernet at JAXA. Performance was mostly stable, but subject to the EBnet to Doors congestion at GSFC. Thruput was above the requirement, by more than 30%, but by less than 3x; so the rating remains "Good". Performance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

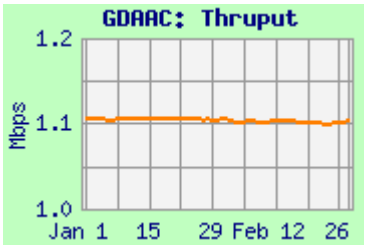
The integrated graph shows a small drop in user flow, now averaging about 20% of the requirement (or 30% of the requirement without the contingency).

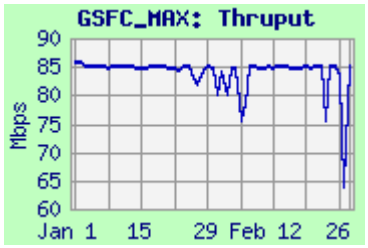


Azusa: Performance from GSFC-ENPL to the JAXA azusa test node is not limited by a 10 mbps Ethernet, so its much higher performance more accurately shows the capability of the networks. The lower values from GSFC-EBnet-PTH and GSFC-EDOS are due to EBnet congestion, not seen from GSFC-ENPL. But thruput 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-sim 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 DDS to JPL was above the requirement by more than 30%, so the rating remains "Good". Thruput was much higher from Azusa to JPL (testing added last month) and to GSFC-MAX, with a 100 mbps Ethernet connection, and larger TCP windows.







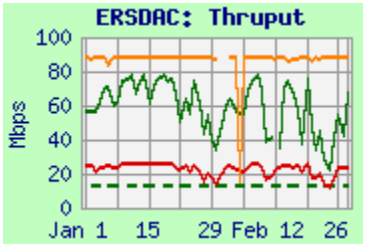
7) ERSDAC ←→ US:

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

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

US → ERSDAC Test Results

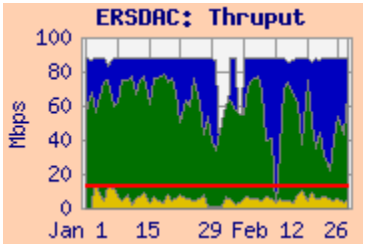
Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
GSFC-EDOS → ERSDAC	81.7	55.9	18.1	4.5	55.9
GDAAC → ERSDAC	26.4	23.3	8.0		
GSFC ENPL (FE) → ERSDAC	88.5	88.3	29.5		



Requirements:

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

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

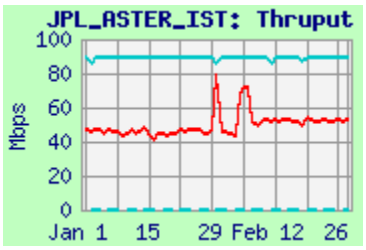


Testing from EDOS to ERSDAC is used as the basis for the rating -- the requirement includes the level 0 flows which used to be sent by tapes. In November '08, Class Based Queueing (cbq) was initiated from EDOS to limit the outflow rate to 100 mbps, in order to avoid overloading a switch at Tokyo-XP (see below), with a big increase in thruput (median was 24 mbps previously – similar to GDAAC). Performance was noisy as usual, due to EBnet congestion, but the median thruput 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.

Thruput 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	89.7	38.5
ERSDAC → EROS	86.2	80.9	43.0

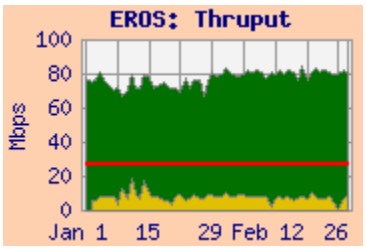


Requirements:

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

Comments:

ERSDAC → JPL-ASTER-IST: The performance this month was stable, and appear to 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 a bit higher than last month -- thruput improved to this level in April '05. The median thruput is now slightly more than 3 x the requirement **so the rating improves to "Excellent".** The user flow averaged 7.4 mbps this month , about 28% of the requirement (was 8.6 mbps last month).

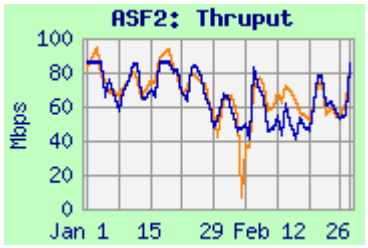
8) ASF

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	n/a	n/a	n/a
GSFC	92.3	62.5	27.4
JAXA	83.7	54.8	18.5



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).

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.

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9) Other SIPS Sites:

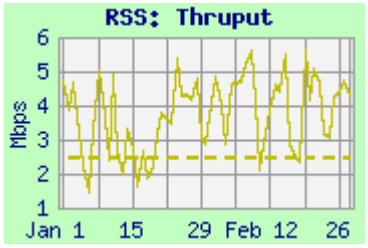
Web Pages http://ensight.eos.nasa.gov/Missions/aqua/RSS.shtml
http://ensight.eos.nasa.gov/Missions/aura/KNMI_OMIPDR.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	**Median**	**Worst**	**Reqmt**	**Rating**
JPL → RSS	5.67	4.43	1.60	2.5	Continued **Good**
OMISIPS → KNMI-ODPS	18.7	17.5	10.6	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 thruput 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 thruput 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 1.7 mbps this month, lower than the 2.5 mbps last month, as shown on the integrated graph, but consistent with the requirement. The KNMI test node was changed in late February, with a significant performance increase.