

EOS Production Sites Network Performance Report: June 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 3.72** (3.41 last month)
- **Requirements updated to Handbook 1.4.3 (was 1.4.2)**
 - Many Requirements dropped significantly
 - GSFC-JPL requirement increased
 - See below for more details on requirements changes
- **Only 2 flows below “Good”:**
 - **GSFC MODAPS-PDR to EROS (“Low”)**
 - Due to EBnet to Doors congestion at GSFC
 - **GSFC to JPL (“Good” → “Adequate”)**
 - Due to Requirements increase
- **Bottlenecks:**
 - **GSFC: EBnet to Doors Gig-E**
 - Average user flow: approx 865 mbps (was 700 mbps last month)
 - Sustained (5 minute) peaks over 1.3 gbps
 - 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 moved to 10 Gig EBnet Router on June 3
 - performance improved 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.

Ratings Changes: (See site discussion below for details)

Upgrades: ↑ :

JPL → RSS: Good → **Excellent**
 GSFC → NSIDC: Good → **Excellent**
 GSFC → ERSDAC: Good → **Excellent**
 ERSDAC → EROS: Good → **Excellent**

Downgrades: ↓ GSFC → JPL: Good → **Adequate**

Discontinued: X:

US ↔ JAXA (Hatoyama): JAXA test hosts retired March 31

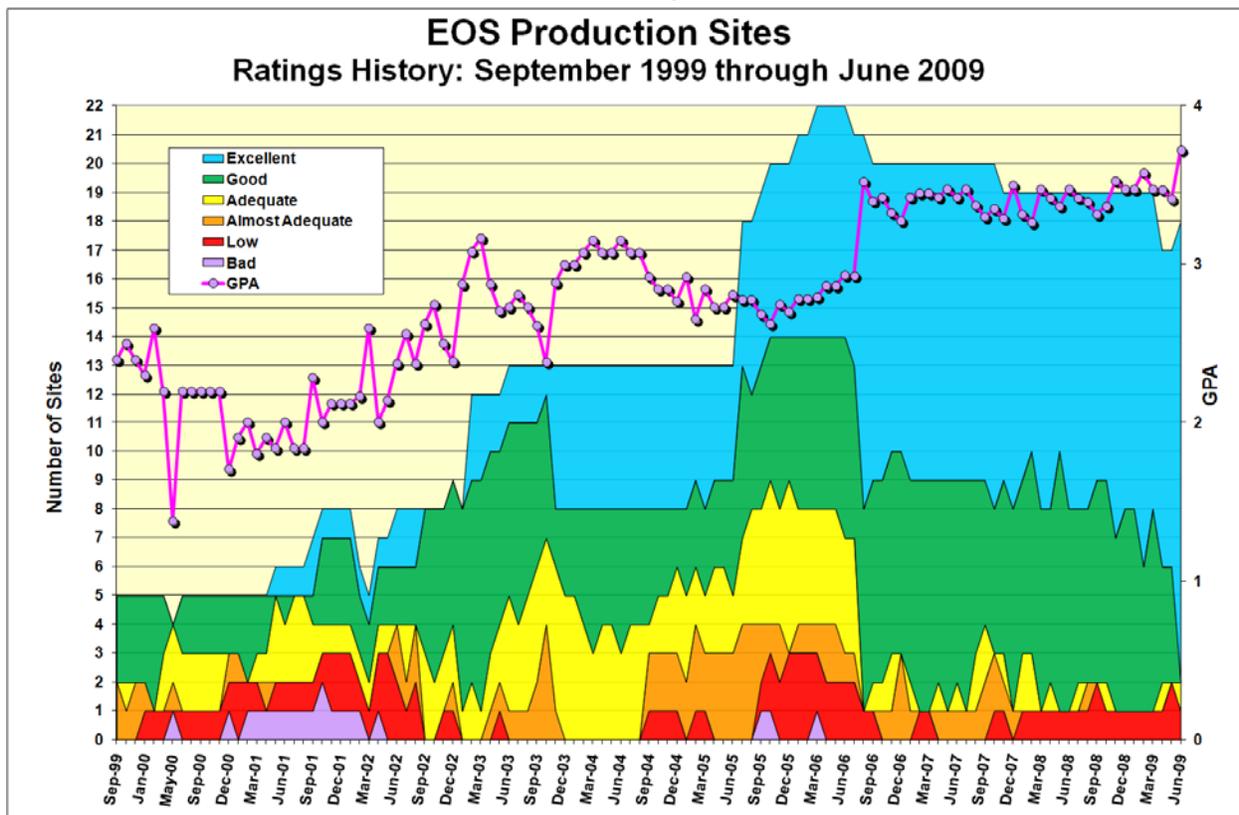
Ratings Categories:

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:

While the long term plan is to use the requirements from the EOSDIS network requirements database, the database does not appear ready to be used for that purpose at this time. Some mission flows have not been included yet (e.g., TRMM), and the network requirements based on rapid reprocessing (e.g., MODIS 27X, AIRS 20X) have not been resolved.

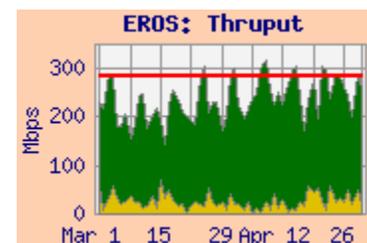
Thus this month the requirements are based on the EOS Networks Requirements Handbook, Version 1.4.3 (from which the database requirements were derived). Previously, the requirements were derived from version 1.4.2.

One main difference between Handbooks 1.4.2 and 1.4.3 is that most flows which occur less than once per day were averaged over their production period. These flows were typically monthly Level 3 data transfers, which were specified to be sent in just a few hours. However, they could easily be accommodated either between the per-orbit flows, or within the built-in contingency. Previously, these flows were added in linearly to the requirements, making the requirements unrealistically high.

However, it seems likely that there are some flows which have been omitted. For example, the GES DISC to KNMI requirement for Level 1+ data (without contingency) was 1.4 mbps in version 1.4.2, but only 22 kbps in version 1.4.3. The user flow has been averaging about 1.4 mbps, suggesting that version 1.4.2 was correct, and that version 1.4.3 has omitted something.

Integrated Charts:

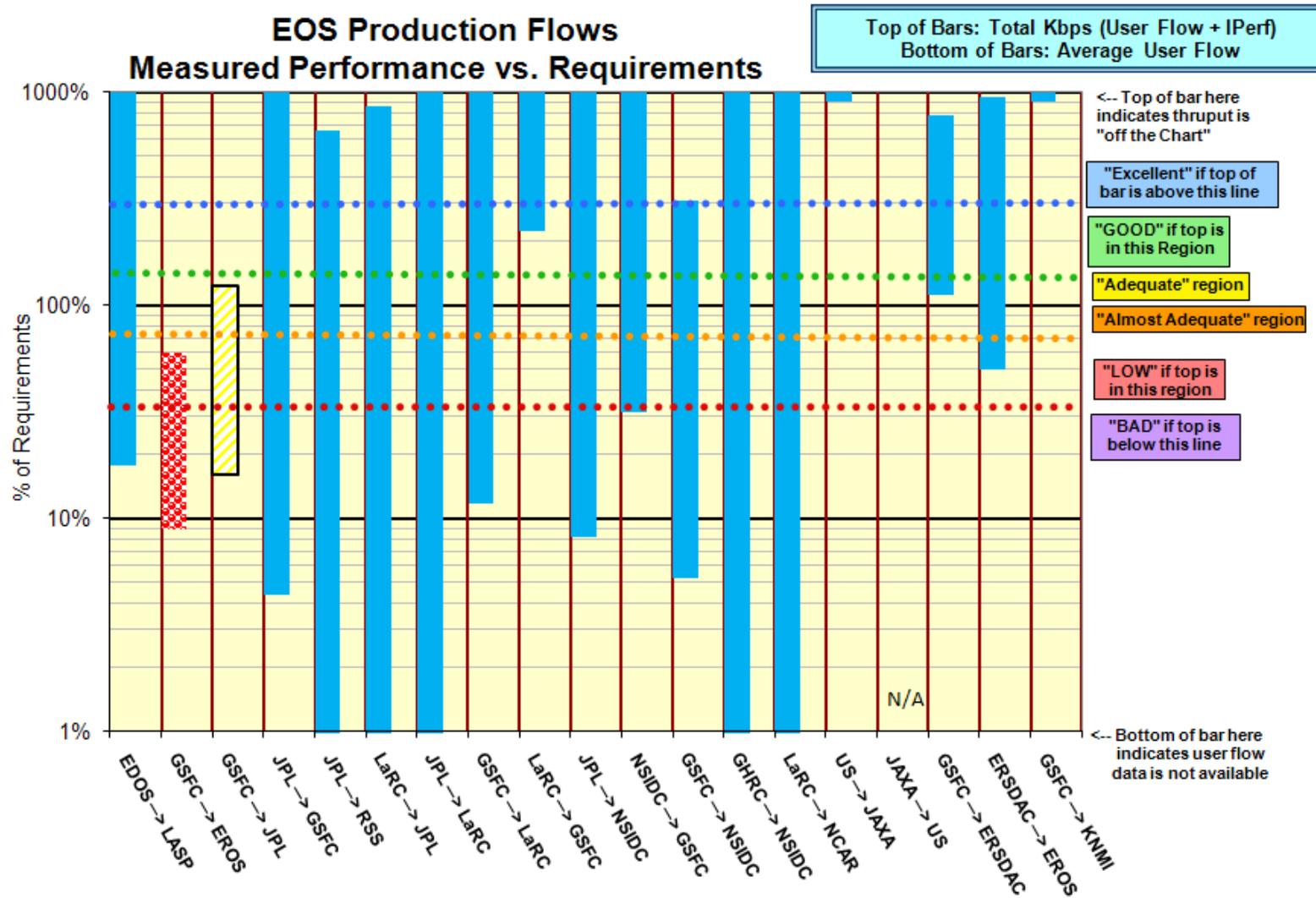
Integrated charts are included with site details, where available. These charts are “Area” charts, with a pink background. A sample Integrated chart is shown here. The yellow area at the bottom represents the daily average of the user flow from the source facility (e.g., GSFC, in this example) to the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

June 2009		Requirements (mbps) from Handbook 1.4.3			Testing				Ratings			
Source → Destination	Instrument (s)	Current	Old Version	Future	Source → Dest Nodes	Avg User Flow mbps	iperf Avg mbps	Integrated mbps	Ratings re Jun 09 Requirements		Ratings re Oct 2010 Reqmnts	
		Jun 2009	(1.4.2)	Oct 2010					This Month	Last Month		
WSC → ASF	ALOS	n/a	n/a	n/a	WSC → ASF-AADN		191.5		n/a	n/a	n/a	
EDOS → LASP	ICESat, QuikScat	0.4	0.4	0.4	GSFC-EDOS → LASP	0.07	8.70		Excellent	E	Excellent	
GSFC → EROS	MODIS, LandSat	342.9	345.9	342.9	MODAPS-PDR → EROS LPDAAC	30.3	191.4	204.9	LOW	L	LOW	
GSFC → JPL	AIRS, MLS, ISTs	101.7	43.6	101.7	GES DISC → JPL-AIRS	16.4	122.9	125.4	Adequate	G	Adequate	
JPL → GSFC	MLS	3.2	7.4	0.6	JPL-PTH → GSFC-PTH	0.14	43.2		Excellent	E	Excellent	
JPL → RSS	AMSR-E	0.5	2.5	0.5	JPL-PODAAC → RSS		3.17		Excellent	G	Excellent	
LaRC → JPL	TES, MISR	39.9	43.7	23.0	LARC-DAAC → JPL-TES		347.2		Excellent	E	Excellent	
JPL → LaRC	TES	1.5	4.4	1.5	JPL-PTH → LARC-PTH		78.3		Excellent	E	Excellent	
GSFC → LaRC	CERES, MISR, MOPITT	31.3	60.5	31.3	GES DISC → LDAAC	3.7	461.3	461.3	Excellent	E	Excellent	
LaRC → GSFC	CERES, MODIS, TES	0.4	0.2	0.4	LDAAC → GDAAC	0.8	434.3	434.3	Excellent	E	Excellent	
JPL → NSIDC	AMSR-E	0.2	1.3	0.2	JPL-PTH → NSIDC SIDADS	0.01	73.8		Excellent	E	Excellent	
NSIDC → GSFC	MODIS, ICESAT, QuikScat	0.6	0.5	0.6	NSIDC DAAC → GDAAC	0.18	120.1	120.1	Excellent	E	Excellent	
GSFC → NSIDC	MODIS, ICESAT, QuikScat	27.6	34.5	27.6	MODAPS-PDR → NSIDC-DAAC	1.5	86.2	86.2	Excellent	G	Excellent	
GHRC → NSIDC	AMSR-E	0.5	7.5	0.5	GHRC → NSIDC DAAC		11.2		Excellent	E	Excellent	
LaRC → NCAR	MOPITT	0.1	5.4	0.1	LDAAC → NCAR		190.6		Excellent	E	Excellent	
US → JAXA	QuikScat, TRMM, AMSR	0.1	2.0	0.1	GSFC-EDOS → JAXA DDS	2.5	Testing discontinued: 31 March 2009		Excellent	n/a	Excellent	
JAXA → US	AMSR-E	0.5	1.3	0.5	JAXA DDS → JPL-QSCAT				n/a	n/a	n/a	
GSFC → ERSDAC	ASTER	5.4	12.5	5.4	GES DISC → ERSDAC	6.0	40.2	42.2	Excellent	G	Excellent	
ERSDAC → EROS	ASTER	8.3	26.8	8.3	ERSDAC → EROS PTH	4.1	78.4	78.4	Excellent	L	Excellent	
GSFC → KNMI	OMI	0.03	3.3	0.03	GSFC-OMISIPS → ODPS	1.4	58.3	58.7	Excellent	E	Excellent	
significant change from last version												
							Ratings Summary					Oct-10
										Jun-09		Req
										Score	Prev	Score
*Criteria:	Excellent	Total Kbps > Requirement * 3					Excellent	16	11	16		
	GOOD	1.3 * Requirement <= Total Kbps < Requirement * 3					GOOD	0	4	0		
	Adequate	Requirement < Total Kbps < Requirement * 1.3					Adequate	1	0	1		
	Almost Adequate	Requirement / 1.3 < Total Kbps < Requirement					Almost Adequate	0	0	0		
	LOW	Requirement / 3 < Total Kbps < Requirement / 1.3					LOW	1	2	1		
	BAD	Total Kbps < Requirement / 3					BAD	0	0	0		
							Total Sites	18	17	18		
Notes: Flow Requirements include: TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS							GPA	3.72	3.41	3.72		

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 → **Excellent**

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	314.3	191.4	54.5	30.3	204.9
GSFC-EDOS → EROS LPDAAC	292.7	108.1	27.0		
GES DAAC → EROS LPDAAC	441.2	355.7	191.6		
ERSDAC → EROS LPDAAC	87.1	78.4	36.7	4.1	78.4
GSFC-EBnet-PTH → EROS PTH	414.5	138.0	29.3		
GSFC-ENPL → EROS PTH	474.9	426.0	303.6		
GSFC-NISN → EROS PTH	476.1	435.7	331.9		
NSIDC → EROS	107.8	102.0	58.8		
LaRC → EROS	93.0	91.7	27.8		

Requirements:

Source → Dest	Date	mbps	Rating
GSFC → EROS	CY '08-11	343	Low
ERSDAC → EROS	FY '06 - '09	8.3	Excellent

Comments:

GSFC → EROS: The rating is based on the MODAPS-PDR Server to EROS LP DAAC measurement, since that is the primary flow. (Results are a little better than 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, which is mostly based on a high level of MODIS reprocessing.

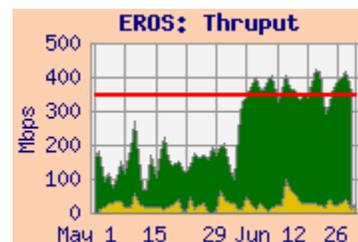
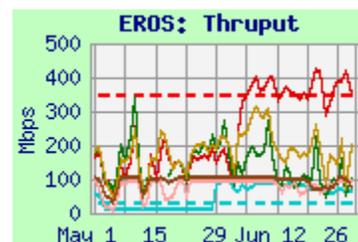
Performance from the hosts on the 1 Gig EBnet (EDOS, MODAPS, and GSFC-EBnet-PTH) is predominantly limited by congestion on the EBnet GigE circuit at GSFC, as indicated by their large best:worst ratios (e.g., 5.8:1 from MODAPS). Performance from these hosts is about the same as recent months, and remains more than 30% below the requirement so the rating remains "Low".

The GES-DISC node was moved to the new 10 Gig EBnet this month, with much better performance! While the median daily best thrupt from GES DISC is 40% higher than from MODAPS, its median daily worst thrupt is 250% higher! It would be rated "Good". Likewise, 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 also much higher. 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 improved in late May, when LAN problems at ERSDAC were fixed. See section 7 (ERSDAC) for further discussion of this performance.

NSIDC → EROS: Performance was also stable this month.

LaRC → EROS: The thrupt from LaRC-PTH to EROS-PTH was again 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
	Best	Median	Worst	
EROS LPDAAC → GSFC DAAC	107.9	99.6	54.1	
EROS PTH → GSFC-EBnet PTH	416.0	360.7	296.0	
JPL-PTH → GSFC-EBnet PTH	64.4	43.2	24.5	0.14
LDAAC → GDAAC	482.3	434.3	264.7	0.84
LARC-ANGe → GSFC-EBnet PTH	284.6	238.5	168.1	
NSIDC DAAC → GSFC-DAAC	120.6	120.1	110.2	0.18
NSIDC DAAC → GSFC-ISIPS	78.2	77.8	76.6	

Requirements:

Source → Dest	Date	Mbps	Rating
NSIDC → GSFC	CY '06 – '09	0.6	Excellent
LDAAC → GDAAC	FY '07 – '09	0.4	Excellent
JPL → GSFC combined	CY '06-09	3.2	Excellent

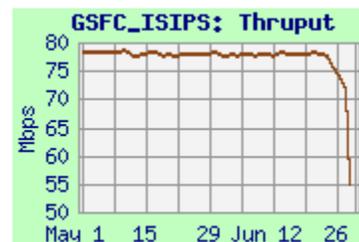
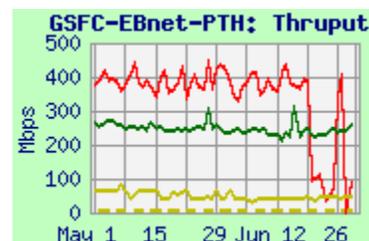
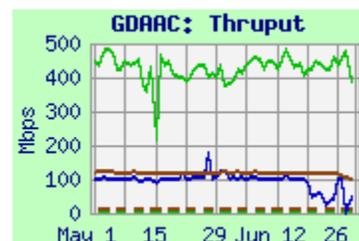
Comments:

EROS → GSFC: The throughput 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: Thruptut 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 (reduced from 7.4 mbps last month), 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 close to the typical 100 kbps.

NSIDC → GSFC: Performance from NSIDC to GSFC (DAAC and ISIPS) was again very steady this month. With the low requirement (reduced from 13.3 mbps last month), 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 in May.

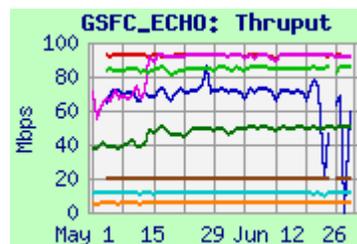


2.2 GSFC-ECHO: EOS Metadata Clearinghouse

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	78.0	71.1	24.3
EROS LPDAAC ftp	12.4	12.1	6.3
GES DAAC	93.1	92.5	90.7
GES DAAC ftp	93.2	92.8	59.0
LaRC ASDC DAAC	86.9	85.0	69.1
LaRC ASDC DAAC ftp	51.0	49.8	33.8
NSIDC DAAC	20.0	20.0	19.8
NSIDC DAAC ftp	5.6	5.5	2.5



Comments:

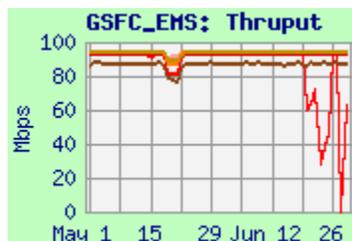
Testing is performed to GSFC-ECHO from the above nodes, both iperf and ftp. Results are generally steady. Performance limitations are from the 100 mbps fast-E and TCP window size – especially on ftp.

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	93.2	93.1	88.8
GDAAC	93.1	93.0	92.2
GSFC-PTH	94.1	94.1	90.3
LARC-PTH	94.0	94.0	92.9
MODAPS-PDR	94.1	94.1	93.0
NSIDC-PTH	89.8	87.3	83.1



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: ↓ Good → **Adequate**

Web Pages:

http://ensight.eos.nasa.gov/Missions/aqua/JPL_AIRS.shtmlhttp://ensight.eos.nasa.gov/Missions/aura/JPL_MLS.shtmlhttp://ensight.eos.nasa.gov/Organizations/production/JPL_QSCAT.shtmlhttp://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-GES DISC → JPL-AIRS	150.7	122.9	106.7	16.4	125.4
GSFC-EBnet-PTH → JPL-AIRS	207.5	106.4	32.3		
GSFC-EBnet-PTH → JPL-PODAAC	287.6	130.0	22.1		
GSFC-EBnet-PTH → JPL-QSCAT	91.5	87.5	15.3		
GSFC-EBnet-PTH → JPL-MLS	169.3	79.8	11.4		
GSFC-NISN → JPL-MLS	373.8	344.8	274.8		

Requirements:

Source → Dest	Date	Mbps	Rating
GSFC → JPL Combined	FY '08-'09	101.7	Adequate
GSFC → JPL AIRS	FY '08-'09	98	Adequate
GSFC → JPL PODAAC	FY '08-'11	1.5	Excellent
GSFC → JPL QSCAT	FY '08-'11		n/a
GSFC → JPL MLS	FY '08-'09	2.1	Excellent

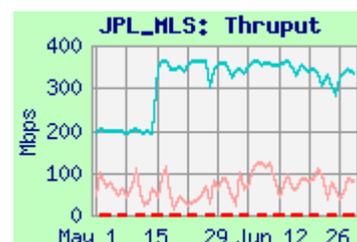
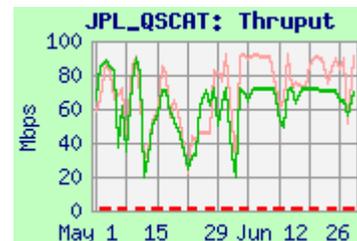
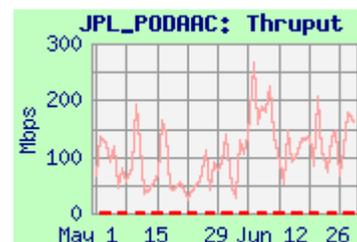
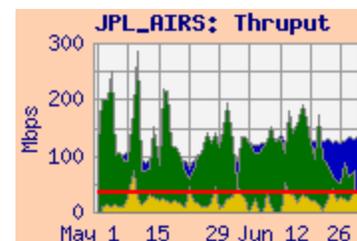
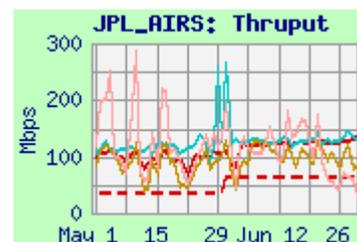
Comments: The EBnet to Doors congestion at GSFC was the bottleneck for the flows from GES DISC until the GES DISC was moved to the 10 Gig EBnet in late May. The user flow from GSFC/EOS was about the same as last month's, and was consistent with the requirement without reprocessing or contingency.

AIRS, Overall: The median thrupt from GES DISC increased from 100.2 mbps last month, but the requirement also increased (from 43.6 mbps last month) to accommodate 20X AIRS reprocessing, which has apparently not started yet. It remained above the AIRS requirement, but below a 30 % margin, so the rating drops to "Adequate". The JPL overall rating is based on this test compared with the sum of all the GSFC to JPL requirements – the overall rating also drops to "Adequate"

PODAAC: Daily thrupt peaks averaged almost 300 mbps, while the median thrupt is less than half of that, due to congestion at GSFC. The GSFC-PODAAC requirement (for MODIS data) is only 1.5 mbps, rating "Excellent"

QSCAT: The 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 was only 1.3 mbps, but does not appear in the 1.4.3 handbook (the rating would remain "Excellent", based on the old requirement). Performance to a second QScat node (ketch) (green line), is similar to the primary node.

MLS: The GSFC-MLS requirement is for MLS and GEOS flow, and was reduced again (was 5.9 mbps since April '08). Thrupt from GSFC-PTH was noisy (best to worst ratio of 15:1) 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 returned in May, with further improvement to the performance.



3.2) LaRC ↔ JPL

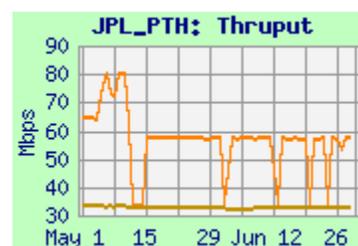
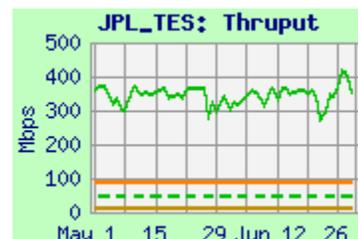
Ratings: LaRC → JPL: Continued **Excellent**
 JPL → LaRC: Continued **Excellent**

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	370.4	347.2	91.7
LaRC PTH → JPL-TES	91.1	91.0	91.0
LaRC PTH → JPL-TES sftp	13.6	13.1	11.7
LaRC PTH → JPL-PTH	57.6	57.2	33.6
LaRC PTH → JPL-PTH sftp	33.2	33.1	32.9
LaRC DAAC → JPL-MISR	77.2	75.3	42.6
LaRC PTH → JPL-MISR	87.7	85.5	57.3
JPL-PTH → LaRC PTH	85.8	78.3	61.2



Requirements:

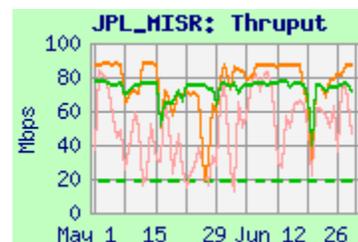
Source → Dest	Date	Mbps	Rating
LaRC DAAC → JPL-TES	FY '07 – '09	7.0	Excellent
LaRC DAAC → JPL-MISR	FY '07 – '09	32.9	Good
LaRC → JPL-Combined	FY '07 – '09	39.9	Excellent
JPL PTH → LaRC PTH	FY '07 – '09	1.5	Excellent

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 requirement was reduced from 29.8 mbps last month.

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 less noisy this month, with a best:worst ratio from the ASDC DAAC of 1.8:1 (was 2.2:1 last month); from LaRC-PTH the ratio is similar. The requirement increased from 18,5 mbps last month – the median thruput is slightly below 3 x this requirement, so the MISR rating drops to “Good”.



JPL → LaRC: This requirement is primarily for TES products produced at the TES SIPS at JPL, being returned to LaRC for archiving; it was reduced from 4.4 mbps last month (and had been reduced in April '08 from 52.6 mbps). Thruput this month was bimodal (alternating between 60 and 85 mbps, as has often been the case in the past). The rating remains “Excellent”.



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	88.6	86.2	37.7	1.5	86.2
GES-DISC → NSIDC-DAAC	104.5	97.9	86.8		
GSFC-ISIPS → NSIDC (iperf)	40.0	15.3	5.1		
GSFC-ISIPS → NSIDC (ftp)	19.4	13.7	2.0		
GSFC-ENPL → NSIDC_u	116.2	116.0	114.7		
MODIS-PDR → NSIDC_u	7.8	6.8	5.5		

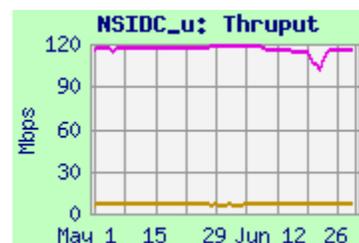
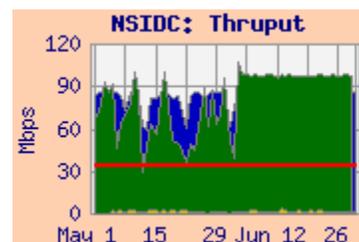
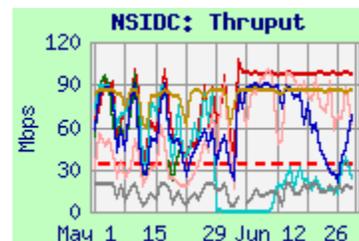
Requirements:

Source → Dest	Date	Mbps	Rating
GSFC → NSIDC	CY '07 – '09	27.6	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 **remain noisy, due to EBnet congestion at GSFC**, but were otherwise stable this month. Thrupt was much less noisier from GES DISC, now on the 10 gig backbone. The requirement was reduced this month from 34.5 mbps (and in April '08 from 64 mbps). 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.**

GSFC → NSIDC_u via Internet2: Results via Internet2 are also shown, since it is planned to switch the production flows from PIP to Internet2. Thrupt on this path to SIDADS from ENPL was steady and well above the requirement. Performance via Internet2 from MODAPS to n4ft101 was similar to those from MODAPS to this same node via NISN **until mid March, when it dropped off dramatically, apparently due to routing asymmetry; the return path from NSIDC to MODAPS remains via NISN.** This issue remains under investigation.

GSFC-ISIPS ← → NSIDC: **The routing asymmetry problem is apparently affecting ISIPS as well.**



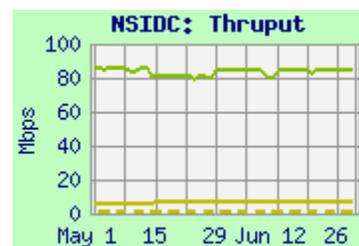
4.2) JPL → NSIDC:

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

Test Results:

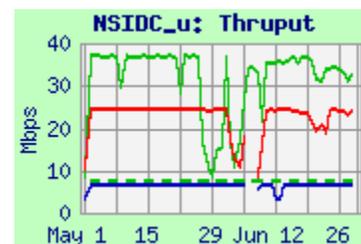
Source → Dest	Medians of daily tests (mbps)			Requirement
	Best	Median	Worst	
JPL PTH → NSIDC-PTH	85.0	85.0	57.3	0.2
JPL PODAAC → NSIDC	6.5	6.5	6.4	

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 has been stable since February, not bistable, as is often the case. Thrupt from PODAAC to NSIDC-SIDADS was much lower. **User flow on this path averaged only about 14 kbps this month! (The flows are probably going via Internet2)** The requirement was reduced from 1.34 mbps last month; 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:**

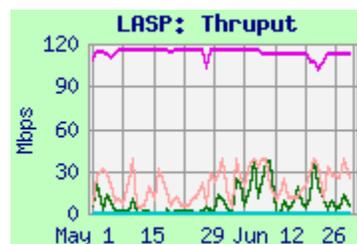
Source → Dest	Medians of daily tests (mbps)			Req.
	Best	Median	Worst	
GHRC → NSIDC DAAC (iperf)	37.0	34.1	11.2	0.5
GHRC → NSIDC DAAC (ftp pull)	24.4	23.9	4.8	
GHRC → NSIDC SIDADS (ftp pull)	8.0	7.9	6.9	



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. The median thruput is more than 3x the requirement (reduced from 7.5 mbps last month), 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:**

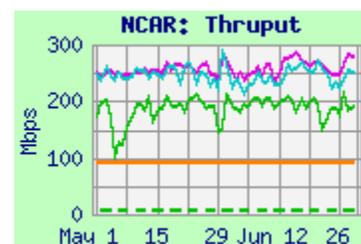
Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC EDOS → LASP	37.7	8.7	0.0085
GSFC EBnet-PTH → LASP (iperf)	38.5	25.7	1.9
GSFC ENPL → LASP	113.2	113.1	106.7
GSFC EBnet-PTH → LASP (sftp)	0.46	0.45	0.41



Comments: GSFC → LASP: Iperf thruput is very noisy (note the 20:1 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 71 kbps.

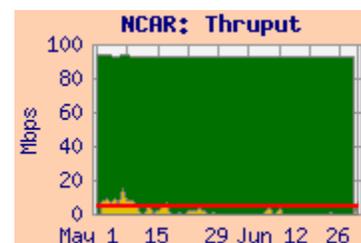
4.5) NCAR:Ratings: LaRC → NCAR: Continued **Excellent**Web Pages: <http://ensight.eos.nasa.gov/Missions/terra/NCAR.shtml>**Test Results:**

Source	Medians of daily tests (mbps)			Requirement
	Best	Median	Worst	
LaRC	209.5	190.6	77.1	0.1
GSFC-ENPL-GE	301.3	261.9	197.9	n/a
GSFC-ENPL-FE	93.1	93.0	92.8	
GSFC-NISN	295.7	241.9	177.7	



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 reduced requirement (was 5.4 mbps last month), so the rating remains “Excellent”.

From GSFC-ENPL-GE, with a Gig-E connection to MAX, the median thruput is less noisy. The previous 5.1 mbps requirement is not present in the new version. 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 70 kbps – note the unusual peak last month.

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 DISC → LDAAC	510.0	461.3	293.0	3.7	461.3
GSFC-EDOS → LDAAC	210.6	169.4	43.6		
GSFC-EBnet-PTH → LaRC-ANGe	400.9	300.6	94.6		
GSFC-NISN → LaTIS	406.1	381.3	323.4		

Requirements:

Source → Dest	Date	Mbps	Rating
GSFC → LARC (Combined)	CY '09	31.3	Excellent

Comments:

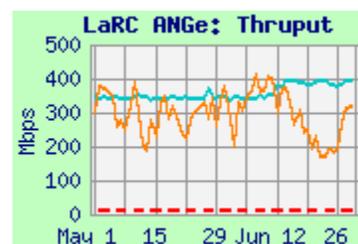
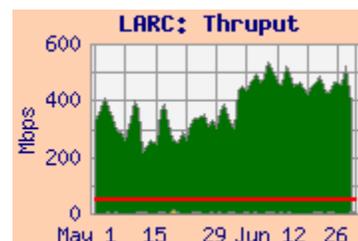
GSFC → LaRC: The new requirement was reduced from 60.5 mbps (after being reduced effective January '08 from 86.9 mbps due to decreased GEOS flows). The rating is based on the GES DISC to LaRC ASDC DAAC thrupt, compared to this combined requirement. The integrated thrupt remains well above 3 x this requirement, so the rating remains "Excellent"

The GES DISC results improved this month due to GES DISC moving to the 10 Gig EBnet LAN.

Results from EDOS are lower than from GES DISC. The difference between the daily best, median, and average values from EDOS and GSFC-EBnet-PTH is attributed to congestion on the 1 gig part of EBnet at GSFC.

As seen on the Integrated graph, the 3.7 mbps average user flow (typical for recent months) remains much lower than the [even the reduced] requirement.

ANGe (LaTIS): The thrupt 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: **Excellent**
 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 user flow to JAXA continues to be measured. This month the average user flow was 2.5 mbps. Comparing this value to the requirement of 0.1 mbps produces a rating of “Excellent”.

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

Test Results: to JAXA-TKSC

Protocol	Medians of daily tests (mbps)		
	Best	Median	Worst
Aspera	88.4	88.1	85.3
BBftp	37.2	36.1	19.3
FTP	1.1	1.1	1.0



All testing to JAXA-TKSC was terminated at the end of June.

7) ERSDAC ↔ US:

Ratings: **GSFC → ERSDAC:** ↑ Good → **Excellent**
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)			User Flow	Integrated
	Best	Median	Worst		
GES DISC → ERSDAC	42.0	40.2	35.6	6.0	41.3
GSFC-EDOS → ERSDAC	n/a	n/a	n/a		
GSFC ENPL (FE) → ERSDAC	89.1	89.0	86.9		

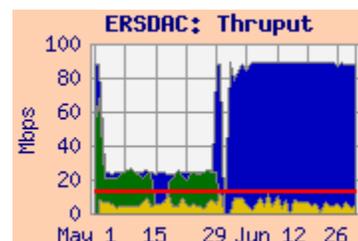
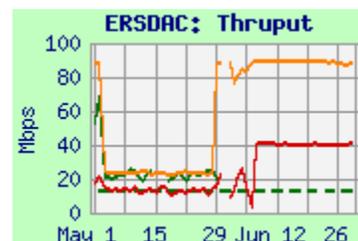
Requirements:

Source → Dest	FY	Mbps	Rating
GSFC → ERSDAC	'05 - '09	5.4	Excellent

Comments: The route from GSFC to ERSDAC has been via MAX to Internet2 to APAN since February '05. The ERSDAC LAN was reconfigured in early June, in response to LAN problems in May.

Testing from EDOS to ERSDAC is normally used as the basis for the rating. But with the ERSDAC LAN configuration above, the ERSDAC test node address was changed. This requires a change in EBnet firewall rules, which was not completed until July. So testing from EDOS was blocked during June. Thus the rating this month will be from GES DISC.

Performance from all sources returned to previous levels at the end of May, with the ERSDAC LAN reconfiguration. The median thruput is again above 3 x the reduced requirement (was 12.5 mbps previously), so the rating improves to "Excellent". The integrated chart shows that the user flow is stable, and now consistent with the requirement.



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	90.0	89.7	83.0
ERSDAC → EROS	87.1	78.4	36.7

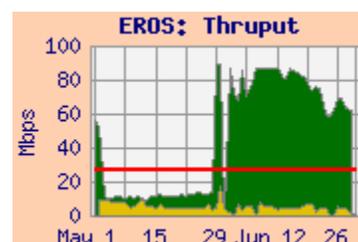
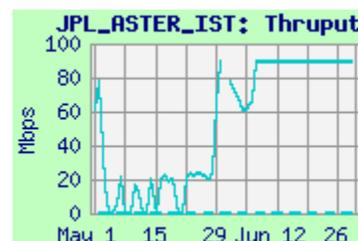
Requirements:

Source → Dest	Date	mbps	Rating
ERSDAC → JPL-ASTER IST	FY '07- '09	0.31	Excellent
ERSDAC → EROS	FY '07- '09	8.3	Excellent

Comments:

ERSDAC → JPL-ASTER-IST: The ERSDAC LAN problems were fixed, and the thruput stabilized. The median thruput is well above of the [unstated] requirement (IST requirements are generally 311 kbps), so the rating remains "Excellent".

ERSDAC → EROS: The ERSDAC LAN problems were fixed, and the thruput stabilized. The requirement was reduced from 26.8 mbps previously; the new requirement is much closer to the actual flow of 4.1 mbps (was 6.2 mbps last month). The median thruput is now more than 3 x the reduced requirement, so the rating improves to "Excellent".



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	213.5	191.5	136.9
GSFC	274.3	269.4	218.3



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 circuit to campus, then via campus LAN to the Alaska Satellite Facility (ASF). The PNW to UAF circuit was upgraded from OC-3 to OC-12 in June, with improved performance as shown above..

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	5.49	3.17	1.17	0.5	↑ Good → Excellent
OMISIPS → KNMI-ODPS	99.7	58.3	8.0	0.03	Continued Excellent
GSFC-ENPL → KNMI-ODPS	97.5	82.8	54.6		

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, 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 requirement was reduced this month (was 2.5 mbps previously). The median iperf was stable, but it is now more than 3 x the reduced requirement, so the rating improves to "Excellent".

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 over 10:1 best to worst ratio is attributed to EBnet congestion, not present from GSFC-ENPL. The user flow averaged a typical 1.4 mbps this month, as shown on the integrated graph. This is not terribly far from the previous 3.3 mbps requirement, but much higher than the current 0.03 mbps requirement (bringing the new requirement into question).

