EOS Production Sites
Network Performance Report: December 2012

This is a monthly summary of EOS network performance testing between production sites -- comparing the measured performance against the requirements. Significant improvements are noted in Green, Network problems in Red, System problems and Requirements issues in Gold, Issues in Orange, and other comments in Blue.

Highlights:

- **Mostly stable flows**
  - **GPA ↓ 3.68** (was 3.74 last month).
- **Requirements**: from the Network Requirements Database
- **LaRC ASDC Outflow:** No change: very high congestion continued to reduce performance on most outflows. (Not observed from LaRC ANGe or LaRC-PTH)
- **2 flows below Good:**
  - **LaRC ASDC → JPL** ("**Adequate**")
  - **GSFC NPP → Wisconsin** ("**Adequate**")
- **Big improvement to NSIDC from all sources**

Ratings Changes:

Upgrade: ↑ None

Downgrades: ↓ None

- **GSFC NPP → Wisconsin**: **Good** → **Adequate**

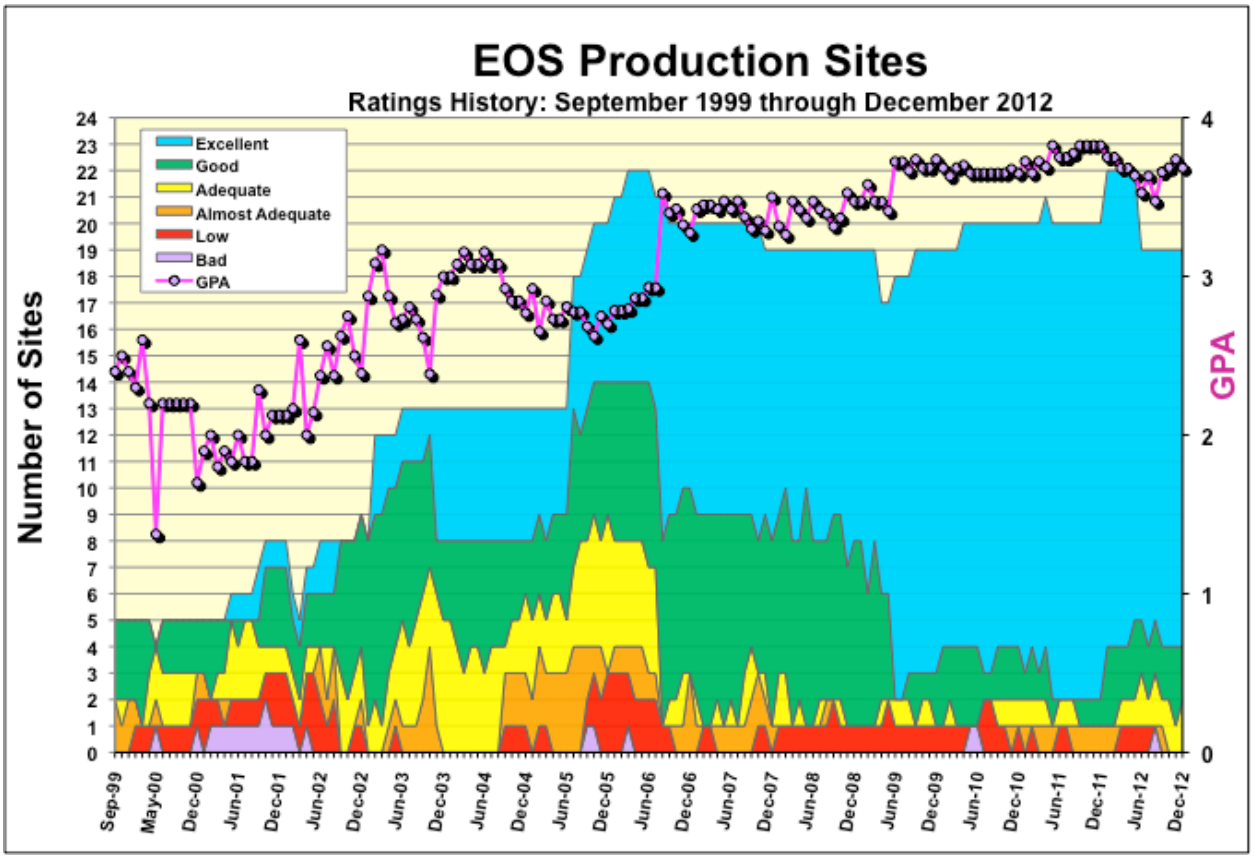
Ratings Categories:

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 / 1.5 < **Total Kbps** < Requirement
Low:	**1**	Requirement / 3 < **Total Kbps** < Requirement / 1.5
Bad:	**0**	**Total Kbps** < Requirement / 3

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

Note that "**Almost Adequate**" implies meeting the requirement excluding the 50% contingency factor.

Ratings History:



The chart above shows the number of sites in each rating category 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.

Additions and deletions:

2011 April: Added RSS to GHRC
2011 May: Deleted WSC to ASF for ALOS
2012 January: Added NOAA → GSFC-SD3E
Added GSFC-SD3E → Wisconsin
2012 June: Deleted GSFC → LASP
Deleted GSFC ← → JAXA

Requirements Basis:

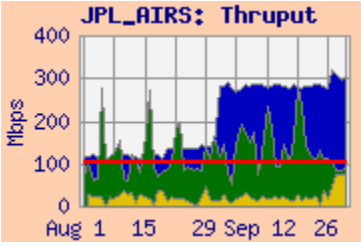
In June 2012, the requirements have been switched, as planned for quite a while, to use the EOSDIS network requirements database. ESDIS has been reviewing its network ICD's with each of the instrument teams. These ICDs are now essentially completed, and the database has been updated with the ICD values, so those values are now used here.

Previously, the requirements were based on the EOS Networks Requirements Handbook, Version 1.4.3 (from which the original database requirements were derived). Prior to that, the requirements were derived from version 1.4.2.

One main difference between Handbooks 1.4.2 and 1.4.3 is that in 1.4.3 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.

Additionally, the contingency for reprocessing flows greater than 2X reprocessing was reduced. These flows WERE a major component of the contingency, so adding additional contingency on top of these flows was considered excessive.

Integrated Charts:



Integrated charts are included with site details, where available. These charts are "Area" charts, with a "salmon" 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 (JPL, 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. 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. On some charts a blue area is also present – usually "behind" the green area – representing adjusted iperf measurements from a second source node at the same facility.

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Network Requirements vs. Measured Performance

December 2012		Requirements (mbps)		Testing				Ratings	
Source → Destination	Instrument (s)	Current Database	Old HB 1.4.3+	Source → Dest Nodes	Average User Flow mbps	iperf Median mbps	Integrated mbps	Ratings re Database Requirements: This Month	Last Month
GSFC → EROS	MODIS, LandSat	548.4	342.9	MODAPS-PDR → EROS LPDAAC	17.5	730.3	732.6	Good	Good
GSFC → JPL	AIRS, MLS, NPP, ISTs	63	116.7	NPP SD3E OPS2 → JPL-AIRS	32.6	330.7	332.3	Excellent	Ex
JPL → GSFC	MLS	0.57	0.6	JPL-PODAAC → GSFC GES DISC	3.1	59.9	59.9	Excellent	Ex
JPL → RSS	AMSR-E	0.16	0.5	JPL-PODAAC → RSS (Comcast)		31.8		Excellent	Ex
RSS → GHRC	AMSR-E	0.32	0.3	RSS (Comcast) → GHRC		3.39		Excellent	Ex
LaRC → JPL	TES, MISR	83.5	69.3	LARC-ASDC → JPL-TES	10.7	96.4		Adequate	Adq
JPL → LaRC	TES	1.1	1.5	JPL-TES → LARC-PTH	0.28	188.4		Excellent	Ex
GSFC → LaRC	CERES, MISR, MOPITT, TES, MODIS	52.2	31.3	GES DISC → LaRC ASDC	21.1	494.7	494.7	Excellent	Ex
LaRC → GSFC	MISR	0.6	0.4	LARC-ASDC → GES DISC	0.47	404.3	404.3	Excellent	Ex
JPL → NSIDC	AMSR-E	0.16	0.2	JPL-PODAAC → NSIDC		222.2		Excellent	Ex
NSIDC → GSFC	AMSR-E, MODIS, ICESAT	0.017	0.6	NSIDC DAAC → GES DISC	1.32	212.2	212.2	Excellent	Ex
GSFC → NSIDC	AMSR-E, MODIS, ICESAT	8.42	27.6	MODAPS PDR → NSIDC-DAAC	4.68	607.1	607.1	Excellent	Ex
GHRC → NSIDC	AMSR-E	0.46	0.5	GHRC → NSIDC DAAC	0.09	8.7		Excellent	Ex
NOAA → GSFC	NPP	522.3	615.6	NOAA-PTH → GSFC NPP-SD3E OPS1	297.3	916.9	975.5	Good	Good
GSFC → WISC	NPP	259.1	253.7	GSFC NPP-SD3E OPS1 → WISC	193.8	301.7	306.5	Adequate	Good
LaRC → NCAR	MOPITT	0.044	0.1	LaRC-PTH → NCAR		149.5		Excellent	Ex
GSFC → JAXA	TRMM, AMSR-E, MODIS	3.51	0.1	GSFC → JAXA	3.55	Testing discontinued: 31 March 2009		n/a	n/a
JAXA → GSFC	AMSR-E	0.16	0.1	JAXA → GSFC	0.35			n/a	n/a
GSFC → ERSDAC	ASTER	6.75	5.4	GSFC-EDOS → ERSDAC	3.9	94.8	94.8	Excellent	Ex
ERSDAC → EROS	ASTER	8.3	8.3	ERSDAC → EROS PTH	3.2	168.0	168.0	Excellent	Ex
GSFC → KNMI	OMI	13.4	0.03	GSFC-OMISIPS → KNMI ODPS	2.2	248.9	248.9	Excellent	Ex

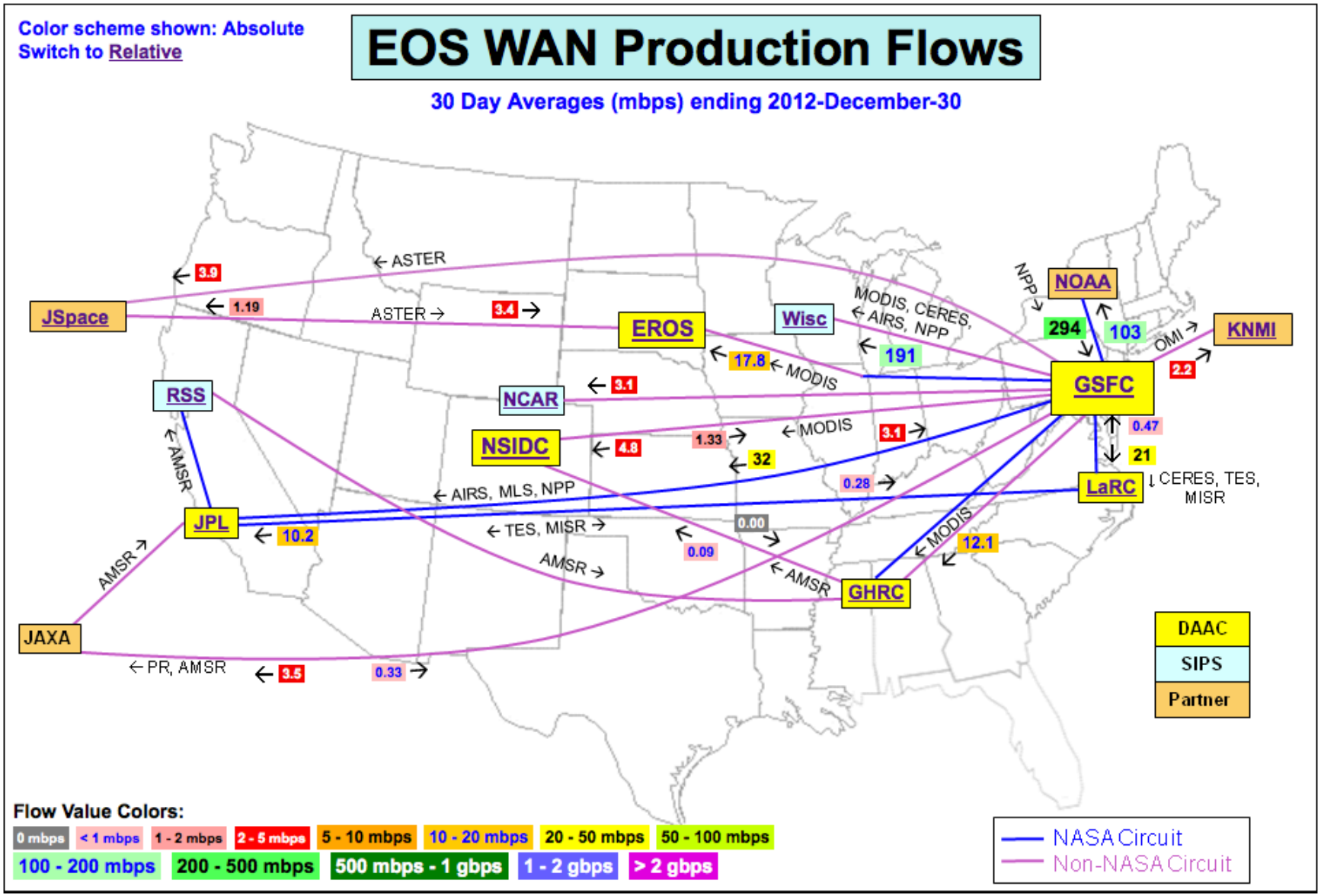
Significant change from HB v1.4.3 to Requirements Database

Value used for ratings

*Criteria:		
	Excellent	**Total Kbps** > Requirement * 3
	Good	1.3 * Requirement <= **Total Kbps** < Requirement * 3
	Adequate	Requirement < **Total Kbps** < Requirement * 1.3
	Almost Adequate	Requirement / 1.5 < **Total Kbps** < Requirement
	Low	Requirement / 3 < **Total Kbps** < Requirement / 1.5
	Bad	**Total Kbps** < Requirement / 3

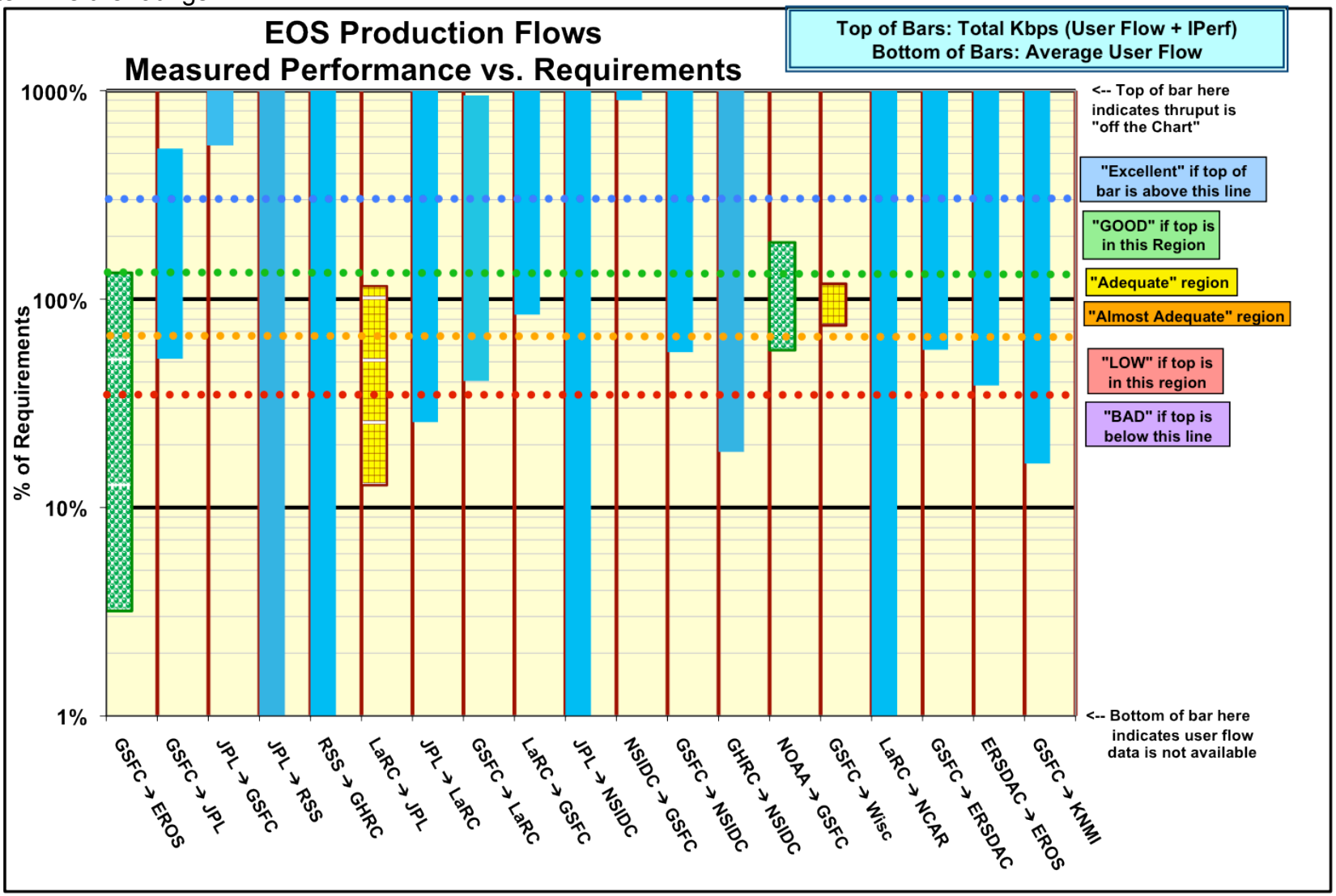
Ratings Summary	Database Req Score	Prev
Excellent	15	15
Good	2	3
Adequate	2	1
Almost Adequate	0	0
Low	0	0
Bad	0	0
Total Sites	19	19
GPA	3.68	3.74

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



This chart shows the averages for the main EOS production flows for the current month. Up to date flow information can be found at http://ensight.eos.nasa.gov/Weather/web/hourly/Production_Flows-A.shtml

This graph shows a bar for each source-destination pair – relating the measurements to the requirements for that pair. The bottom of each bar represents the average measured user flow from the source site to the destination site (as a percent of the requirement) – it 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 67% (dotted orange line) would indicate that the project is flowing as much data as requested. The top of each bar similarly represents the integrated measurement, combining the user flow with Iperf measurements – this value is used to determine the ratings.



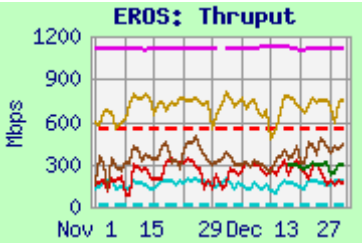
1) EROS:

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

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

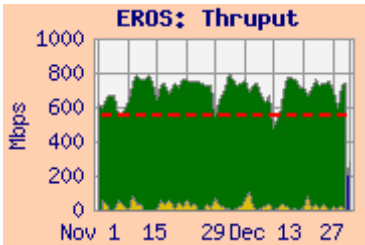
Test Results:

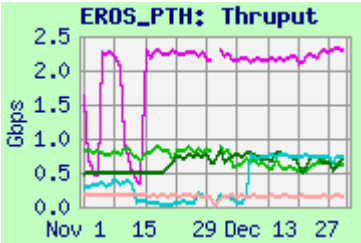
Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
MODAPS-PDR→ EROS LPDAAC	822.0	730.3	338.0	17.5	732.6
GSFC-EDOS → EROS LPDAAC	307.2	299.2	47.5		
GES DISC → EROS LPDAAC	337.0	248.9	89.9		
GSFC-ENPL → EROS LPDAAC	1115.6	1113.8	1046.2		
ERSDAC→ EROS LPDAAC	206.8	168.0	68.3	3.4	168.0
NSIDC SIDADS→ EROS PTH	557.7	348.5	134.4		
GSFC-ENPL → EROS PTH	2316.7	2187.9	1838.1		
GSFC-ENPL → EROS PTH (IPv6)	731.6	633.8	514.0		
GSFC-NISN → EROS PTH	813.7	732.1	310.9		
LaRC PTH→ EROS PTH	179.5	160.7	115.0		



Requirements:

Source → Dest	Date	mbps	prev	Rating
GSFC → EROS	CY '12 -	548.4	343	Good
ERSDAC → EROS	FY '06 –	8.33	8.3	Excellent





Comments:

1.1 GSFC → EROS: The rating is based on the MODAPS-PDR Server to EROS LP DAAC measurement, since that is the primary flow. The requirement was switched in June, from using the Handbook v1.4.3 to now use the requirements database. This resulted in a 60% increase in the requirement, based primarily on increased MODIS reprocessing. As MODIS is not conducting reprocessing at present, the user flow this month is only about 3.2% of the new requirement (same as last month).

The route from MODAPS-PDR is via EBnet to the Doors to NISN SIP, via the NISN 10 gbps backbone to the NISN Chicago CIEF, then via GigE to the StarLight Gigapop, peering there with the EROS OC-48 tail circuit.

Packet loss on all flows leaving EBnet was FIXED IN SEPTEMBER! EBnet to EROS measurements improved dramatically! The median integrated thruput from MODAPS-PDR to LPDAAC remains above the requirement, with contingency, by slightly more than 30%! **So the rating remains Good**. Thruput was stable from GES DISC (also on EBnet). Testing from GSFC-EDOS resumed in December.

Iperf testing for comparison is performed from GSFC-ENPL to both LPDAAC (now to the "FTL" node outside the EROS firewall, and retuned in mid-October) and to EROS-PTH (switched to a 10 gig host at EROS in late October). The GSFC-ENPL host has a direct 10 gig connection to the MAX; its route is via MAX to Internet2 to StarLight in Chicago. GSFC-ENPL to EROS-PTH now typically gets over 2 gbps. This result shows that the capacity of the network is in excess of the requirement – it would be rated **Excellent**. A test from GSFC-ENPL to EROS-PTH using IPv6 was added in November – it appears limited below 1 gbps.

1.2 ERSD → EROS: **Excellent**. See section 9 (ERSD) for further discussion.

1.3 NSIDC → EROS-PTH: Performance has been noisy but stable since September.

1.4 LaRC → EROS: The thruput from LaRC-PTH to EROS-PTH was very stable. The route is via NISN SIP to the Chicago CIEF to StarLight – similar to EBnet sources. Note that LaRC-PTH outflow is limited to 200 mbps by NISN at LaRC.

2) to GSFC

Ratings: NOAA → NPP SD3E: Continued **Good**
NSIDC → GES DISC: Continued **Excellent**
LDAAC → GES DISC: Continued **Excellent**
JPL → GSFC: Continued **Excellent**

Web Pages:

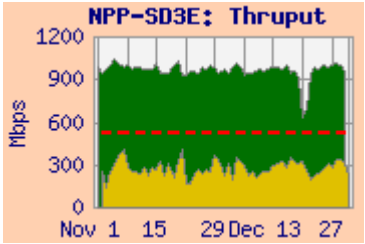
http://ensight.eos.nasa.gov/Missions/NPP/GSFC_SD3E.shtml
http://ensight.eos.nasa.gov/Organizations/production/GDAAC.shtml
http://ensight.eos.nasa.gov/Organizations/production/ESDIS_PTH.shtml
http://ensight.eos.nasa.gov/Missions/icesat/GSFC_ISIPS.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
NOAA-PTH → NPP-SD3E-OPS1	939.3	916.9	838.3	297.3	975.5
EROS LPDAAC → GES DISC	210.4	170.3	66.3		
EROS PTH→ GSFC-ESDIS PTH	645.1	545.9	318.9		
JPL-PTH→ GSFC-ESDIS PTH	87.8	85.7	82.3	3.1	
JPL-TES→ GSFC-NISN	497.1	290.9	100.0		
LaRC ASDC → GES DISC	506.4	404.3	116.2	0.47	
LARC-ANGe → GSFC-ESDIS PTH	543.1	539.4	533.9		
NSIDC DAAC → GES DISC	247.7	212.2	91.3	1.32	
NSIDC DAAC → GSFC-ISIPS (scp)	73.9	71.4	30.3		

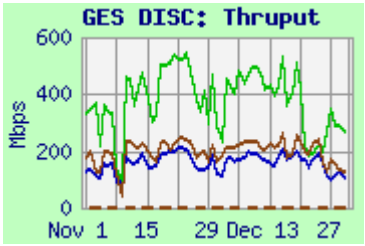
Requirements:

Source → Dest	Date	Mbps	Prev	Rating
NSIDC → GSFC	CY '12 –	0.017	0.6	Excellent
LaRC ASDC → GES DISC	CY '12 –	0.6	0.4	Excellent
JPL→ GSFC combined	CY '12 –	0.57	3.2	Excellent
NOAA → NPP SD3E	CY '12 –	522.3	615.6	Good



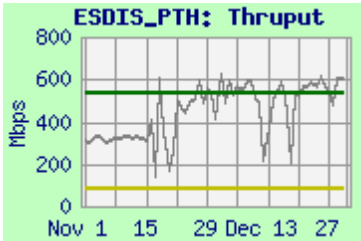
Comments: Note: all requirements were updated in June…see above.

NOAA → NPP-SD3E: Performance from NOAA-PTH to GSFC NPP-SD3E-OPS1 was very steady at over 900 mbps, limited by the gig-E interfaces on the test machines (the circuits are all 10 gbps). User flow was similar to last month, and close to the requirements (without contingency).

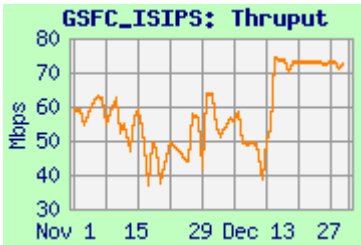


EROS LPDAAC, EROS-PTH → GSFC: The thruput for tests from EROS and EROS-PTH to GES DISC and ESDIS-PTH were mostly stable.

JPL → GSFC: Thruput from JPL-PTH was again very stable this month, limited by the Fast-E interface on JPL-PTH. With the modest requirement the rating remains **Excellent**. The actual user flow is close to the old requirement, but well above the new reduced requirement. Testing from JPL-TES to GSFC-NISN (not graphed) more clearly shows the capability of the network. Note that some JPL → GSFC flows take Internet2 instead of NISN, based on JPL routing policies.



LaRC → GSFC: Performance from LaRC ASDC to GES DISC was again variable, apparently due to congestion at ASDC. Thruput from LaRC ANGe to ESDIS-PTH was much more stable. Both results remained way above 3 x the modest requirement, so the rating continues as **Excellent**. The user flow this month was close to the requirement.



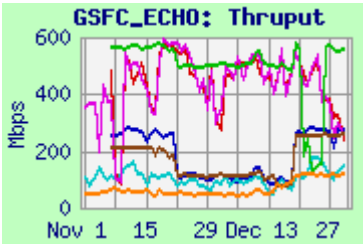
NSIDC → GSFC: Performance from NSIDC to GES DISC was steady, and way above the tiny requirement; the rating remains **Excellent.** The user flow was again above the old requirement, and well above the new lower requirement. Thruput to GSFC-ISIPS using SCP (iperf testing still down after reconfiguration due to firewall blocking) is lower than iperf previously, as expected, but is well above the requirement.

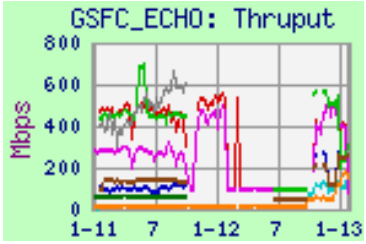
2.2 GSFC-ECHO: EOS Metadata Clearinghouse

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	164.1	118.4	83.3
EROS LPDAAC ftp	173.9	100.9	32.6
GES DISC	539.7	463.2	213.0
GES DISC ftp	563.4	452.6	195.6
LaRC ASDC DAAC	533.5	505.0	402.2
LaRC ASDC DAAC ftp	n/a	n/a	n/a
NSIDC DAAC	143.5	118.7	92.5
NSIDC DAAC ftp	115.1	84.0	27.7





Comments:

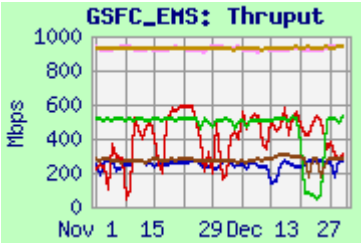
In late January '12, thruput from GES DISC to ECHO dropped to just under 100 mbps, suggesting that a fast-E interface was in use. Performance returned to the higher state for occasional short periods until mid October, when the ECHO firewall was replaced. Performance improved dramatically from all sources at that time. FTP performance is mostly limited by TCP window size – especially from sites with long RTT.

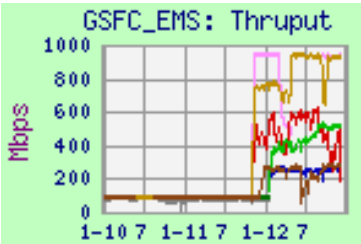
2.3 GSFC-EMS: EOS Metrics System

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

Test Results:

Source	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
EROS LPDAAC	280.9	253.3	145.9
ESDIS-PTH	937.9	922.4	760.2
GES DISC	570.3	452.8	136.2
LARC ASDC	527.3	508.3	262.3
MODAPS-PDR	938.0	932.4	753.8
NSIDC-SIDADS	291.9	279.8	177.5





Comments:

Testing is performed to GSFC-EMS from the above nodes, iperf only. The testing was transitioned to the new EMS test node (FS1) between November '11, and January '12 with much improved thruput. The performance limitation to the old server was its 100 mbps Fast-E connection; the new server is gigabit connected.

Thruput from all sources was pretty stable this month.

3) JPL:

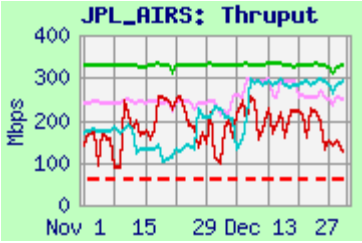
3.1) GSFC → JPL:

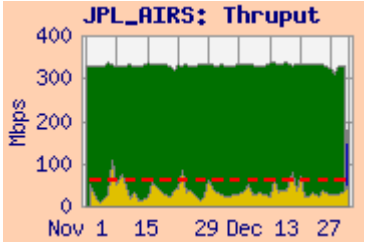
Ratings: GSFC → JPL: Continued **Excellent**

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/Missions/NPP/JPL_SOUNDER.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-GES DISC→ JPL-AIRS	255.7	192.5	70.4	32.6	197.9
NPP-SD3E-OPS2→ JPL-AIRS	336.5	330.7	308.3		
GSFC-NISN → JPL-AIRS	298.8	284.0	185.5		
ESDIS-PTH → JPL-AIRS	299.2	255.3	234.1		
NPP IDPS-Mini → JPL-Sounder	167.6	139.7	93.6		
GSFC-NISN → JPL-MLS	379.4	336.9	210.5		
ESDIS-PTH → JPL-MLS	273.5	262.4	219.2		
ESDIS-PTH → JPL-PODAAC	117.9	96.3	70.3		
GSFC-NISN → JPL- PODAAC	168.2	117.3	55.4		
MODAPS-PDR → JPL-PODAAC	78.7	54.0	31.7		
GSFC-NISN → JPL-QSCAT	88.4	86.8	80.7		
ESDIS-PS → JPL-QSCAT	83.4	81.2	71.4		





Requirements:

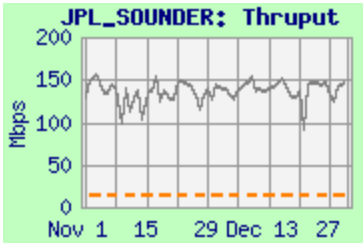
Source → Dest	Date	Mbps	Prev	Rating
GSFC → JPL Combined	CY '12-	**63**	**116.7**	**Excellent**
GSFC → JPL AIRS	CY '12-	40	98	**Excellent**
GSFC NPP → JPL Sounder	CY '12-	15	15	**Excellent**
GSFC → JPL MLS	CY '12-	1.0	2.1	**Excellent**

Comments: **Thruput from EBnet sources** (GES DISC, NPP-SD3E, ESDIS-PS, and ESDIS-PTH) **increased greatly in September** with the EBnet firewall upgrade (due to EBnet reduced outgoing packet loss), compared with GSFC-NISN, which was more stable. Thruput from GSFC-NISN improved to JPL destinations in early December.

AIRS , Overall: The requirements were switched in June '12 to use the requirements database, instead of the Handbook v1.4.3 previously. This resulted in a 46% decrease in the overall requirement.

The AIRS Integrated thruput from GES DISC was higher than last month, with the same user flow; it remains above 3 x the reduced AIRS requirement, so the AIRS rating remains **Excellent**.

The **JPL overall rating** is based on the NPP-SD3E-OPS2 to JPL AIRS thruput, compared with the sum of all the GSFC to JPL requirements. The median thruput remained above 3 x this requirement, so the overall rating remains **Excellent**. Note that the user flow this month was about half the requirement (including contingency).



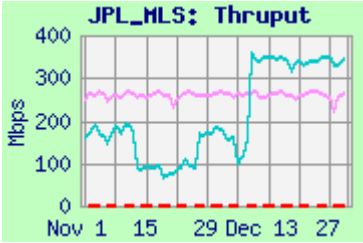
NPP to JPL Sounder: Thruput from NPP IDPS-Mini to the JPL Sounder PEATE was mostly stable after improving in September due to reduced EBnet packet loss. The rating remains **Excellent**.

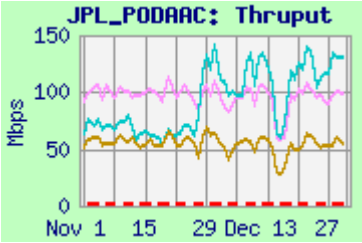
3.1) GSFC → JPL: continued

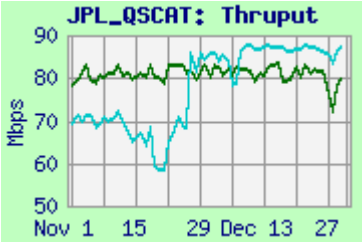
MLS: Thruput from ESDIS-PTH improved in September due to reduced EBnet packet loss. Thruput from GSFC-NISN dropped at the same time, but improved back to previous levels in December. Both were way above the modest requirement, so the rating remains **Excellent**.

PODAAC: There is no longer a requirement from GSFC to JPL PODAAC in the database. But performance to PODAAC improved in September due to reduced EBnet packet loss – thruput was way above the previous 1.5 mbps PODAAC requirement.

QSCAT: There is no longer a requirement from GSFC to JPL QSCAT in the database. Thuput from ESDIS-PS to QSCAT also improved in September due to reduced EBnet packet loss (unlike from GSFC-NISN, which was stable). It remains well above the modest previous 0.6 mbps requirement.







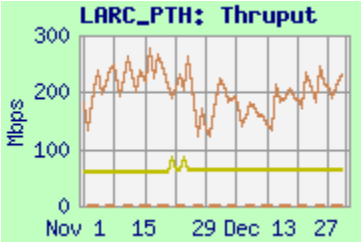
3.2) JPL → LaRC

Rating: Continued Excellent

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

Test Results:

Source → Dest	Medians of daily tests (mbps)			
	Best	Median	Worst	User Flow
JPL-PTH → LaRC PTH	75.7	63.0	60.3	0.28
JPL-TES → LaRC PTH	313.7	188.4	78.8	



Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL → LaRC	CY '12 –	1.1	1.5	**Excellent**

Comment: This requirement is primarily for TES products produced at the TES SIPS at JPL, being returned to LaRC for archiving. This month the thruput from JPL-TES was again noisy but remained much higher than the requirement; the rating remains **Excellent**. The user flow this month was below the usual and the requirement.

Thruput from JPL-PTH to LaRC-PTH was again mostly at the lower of its two common states – 60 and 85 mbps, limited by a Fast–E interface on JPL-PTH.

3.3) LaRC → JPL

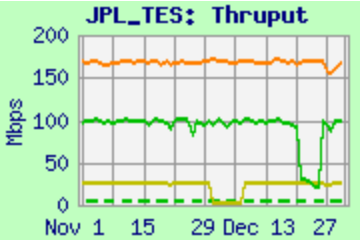
Rating: Continued **Adequate**

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

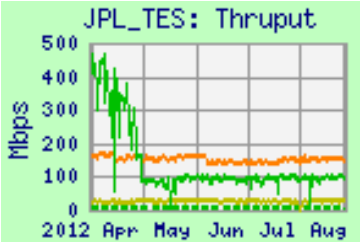
Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
LaRC ASDC → JPL-MISR	83.1	80.6	37.0	1.04	80.6
LaRC PTH → JPL-MISR	79.3	76.3	60.7		
LaRC ASDC → JPL-TES	102.1	96.4	44.8	0.02	
LaRC PTH → JPL-TES	177.6	168.3	146.0		
LaRC PTH → JPL-TES sftp	26.5	25.8	11.2		
LaRC ANGE → JPL-PTH	90.9	88.9	81.2	10.7	

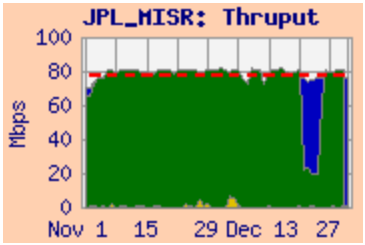


Requirements:

Source → Dest	Date	Mbps	Prev	Rating
	CY '12 –	83.5	69.3	**Adequate**
LaRC ASDC → JPL-MISR	CY '12 –	78.1	62.3	**Adequate**
LaRC ASDC → JPL-TES	CY '12 –	5.5	7.0	**Excellent**



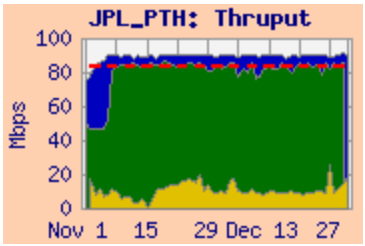
Note: Performance from **LaRC ASDC** to JPL (also from **LaRC ASDC** to most other destinations) was very variable (typically on a 3 hour cycle), beginning at the end of April, apparently due to congestion at ASDC. After mid July, the 3 hour cycle disappeared, but the thruput from **LaRC ASDC** stayed low. Performance from LaRC ANGe and LaRC PTH to JPL was stable and did not exhibit this characteristic.



LaRC → JPL (MISR): The **LaRC ASDC** to JPL MISR testing was retuned in November, with slightly increased thruput. User flow was much lower than the requirement. The thruput is limited by the Fast-E connection to the MISR node, and the ASDC congestion. The median integrated thruput is now slightly above the MISR requirement, so the MISR rating improves to **Adequate**.

LaRC→ JPL (Overall, TES): Median performance from LaRC ASDC DAAC to JPL-TES dropped way down at the end of April, due to the congestion above. Thruput remained well over 3 x the TES requirement, so the TES rating remains **Excellent**. But it is now only 15% above the increased combined requirements, so the Overall rating remains **Adequate .** User flow to TES is very low.

The JPL-PTH integrated graph shows the overall LaRC to JPL user flow (vs. the overall requirement). The true capacity of the network is better seen with the LaRC PTH → JPL-TES thruput, which is not subject to the ASDC congestion (but is limited to 200 mbps by NISN). The Overall rating based on this test would be **Good .**



4) GSFC → LaRC:

Rating: Continued Excellent

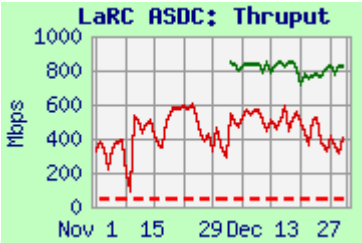
Web Pages : http ://ensight.eos.nasa.gov/Organizations/production/LARC.shtml
http://ensight.eos.nasa.gov/Organizations/production/LARC_ANGe.shtml
http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

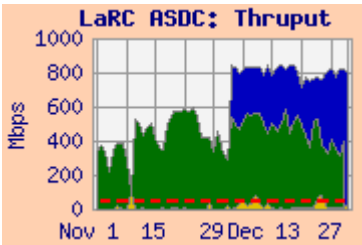
Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
GES DISC → LaRC ASDC	568.3	494.7	232.4	21.1	494.7
GSFC-EDOS → LaRC ASDC	863.2	824.7	130.4		
ESDIS-PTH → LaRC-ANGe	476.7	475.2	469.6		
GSFC-NISN → LaRC-ANGe	498.5	495.1	483.2		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → LARC (Combined)	CY '12 –	52.2	31.3	Excellent

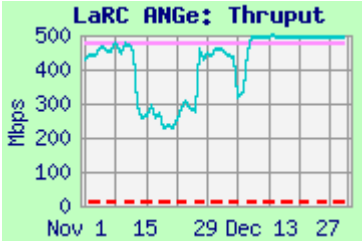


Comments: Thruput from all EBnet sources (GES DISC, EDOS, and ESDIS-PTH) improved in September due to reduced EBnet packet loss, compared with GSFC-NISN, which was stable. Note that packet loss does not have much effect on thruput for these flows – TCP recovers quickly due to the short RTT.



GSFC → LaRC ASDC: Thruput from GES DISC to LaRC ASDC DAAC remained well above 3 x the increased combined requirement, so the rating remains **Excellent**. Thruput to ASDC from GSFC-EDOS was down in November due to a switch of the EDOS test node to Open EBnet – testing resumed in December. Thruput had improved more than from GES DISC, and improved further in October with retuning.

As seen on the integrated graph, the user flow was below the requirement this month, after being higher than normal in October, exceeding the requirement.



ANGe (LaTIS): Testing to ANGe ("Bob") from ESDIS-PTH improved in September due to reduced EBnet packet loss, and was more consistent from GSFC-NISN.

The node "Darrin" has been retired – all tests formerly to or from Darrin have been switched to use "Bob" instead.

5) Boulder CO sites:

5.1) NSIDC:

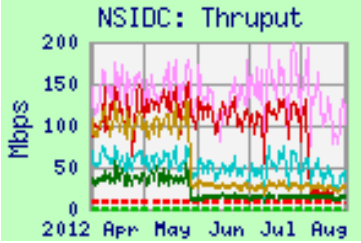
Ratings: GSFC → NSIDC: Continued **Excellent**
JPL → NSIDC: Continued **Excellent**
GHRC → NSIDC: Continued **Excellent**

Web Pages: http://ensight.eos.nasa.gov/Organizations/production/NSIDC.shtml
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_SIDADS.shtml
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_PTH.shtml

Thruput from some (but not all) sources to NSIDC destinations dropped dramatically at the end of May. But no corresponding change in route or packet loss was observed! (It is suspected that the problem might relate to the return route. Whatever the problem was, it was fixed in December. Thruput is now much higher than previous levels!

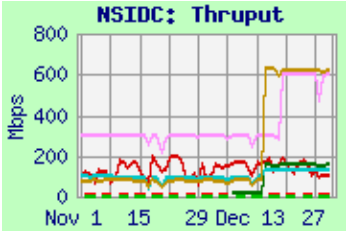
Test Results: **NSIDC S4PA**

Source → Dest	Medians of daily tests (mbps)				
	Best	**Median**	**Worst**	**User Flow**	**Integrated**
MODAPS-PDR → NSIDC DAAC	622.1	607.1	205.7	4.68	607.1
GES-DISC → NSIDC DAAC	194.5	156.0	48.8		
GSFC-EDOS → NSIDC DAAC	157.8	156.0	16.3		
ESDIS-PTH → NSIDC DAAC	301.2	300.9	299.8		
GSFC-ISIPS → NSIDC (iperf)	135.8	132.9	98.8		
JPL PODAAC → NSIDC DAAC	237.8	222.2	169.8		
GHRC → NSIDC DAAC (nuttcp)	14.0	8.7	3.0		
GHRC → NSIDC DAAC (ftp pull)	2.1	1.6	1.3		

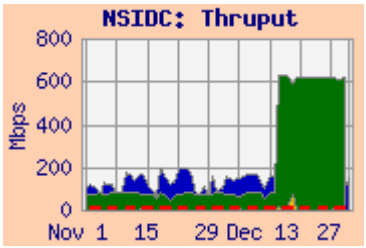


Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → NSIDC	CY '12 –	8.42	27.6	**Excellent**
JPL → NSIDC	CY '12 –	0.16	0.2	**Excellent**
GHRC → NSIDC	CY '12 –	0.46	0.5	**Excellent**

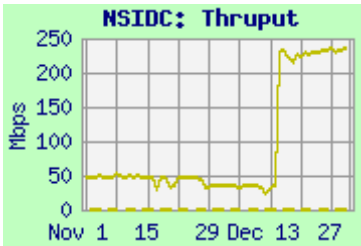


Comments: GSFC → NSIDC S4PA: Thruput from all EBnet sources (MODAPS-PDR, GES DISC, GSFC-EDOS, ESDIS-PTH, and GSFCISIPS) improved in September due to reduced EBnet packet loss. Thruput had dropped from GSFC-EDOS and MODAPS-PDR at the end of May, but remained stable at that time from GES DISC, ESDIS-PTH and GSFC-ISIPS. Thruput from GES DISC dropped in August, corresponding with an address change for GES DISC (but recovered in September). This supports the hypothesis that the problem related to the return route.



The rating is based on testing from the MODAPS-PDR server to the NSIDC DAAC. The requirement was reduced in May '09 from 34.5 mbps (and was 64 mbps in April '08). The integrated thruput from MODAPS-PDR remains more than 3 x the requirement, so the rating remains **Excellent**. The 4.68 mbps average user flow was higher than typical, and was 83% of the reduced requirement (without contingency).

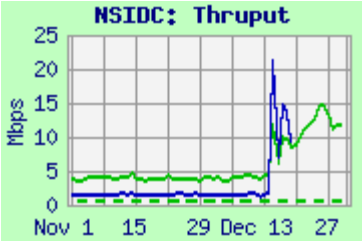
Testing from GSFC-EDOS stopped in mid October while the EDOS node was being moved to Open EBnet – resumed in December.



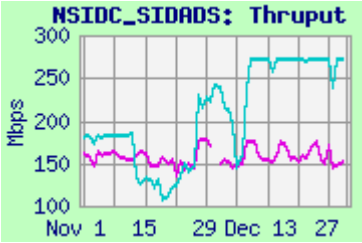
JPL PODAAC → NSIDC S4PA: The requirement was reduced from 1.34 mbps in May '09. Thruput from PODAAC to NSIDC dropped in May from over 300 mbps previously; it had been mostly stable since testing was moved to use Internet2 in September '09. Performance also improved dramatically in mid December; the rating remains **Excellent**.

5) Boulder CO sites (Continued):

5.1) NSIDC: (Continued):

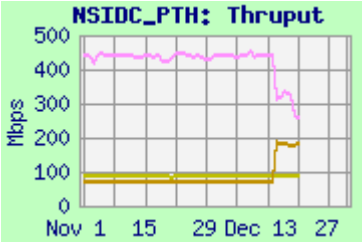


GHRC, GHRC-ftp → NSIDC S4PA: GHRC (NSSTC, UAH, Huntsville, AL) sends AMSR-E data to NSIDC via NLR / Internet2. Thruput from GHRC experienced a drop (similar to the other drops above) at the end of May, but also improved again in mid December. The median thruput remained more than 3x the 0.46 mbps requirement, so the rating remains **Excellent**. User flow averaged 0.09 mbps this month, well below the requirement and the typical flow.



Test Results: NSIDC SIDADS, NSIDC-PTH

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL → NSIDC-SIDADS	184.6	154.1	113.6
GSFC-NISN → NSIDC-SIDADS	272.0	270.8	219.2
ESDIS-PTH → NSIDC-PTH	472.3	438.5	323.2
MODAPS-PDR → NSIDC-PTH	71.4	70.1	68.4
JPL PTH → NSIDC-PTH	88.8	88.8	77.6



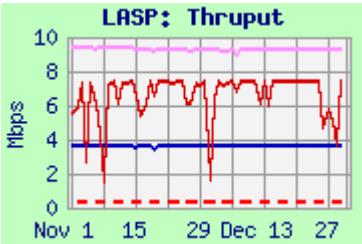
GSFC → NSIDC-SIDADS: The performance to SIDADS via NISN improved this month, and was pretty stable via Internet2 (note expanded scale on graph).

NSIDC-PTH: Thruput from EBnet sources (ESDIS-PTH and MODAPS-PDR) improved in September due to reduced EBnet packet loss. Thruput to NSIDC-PTH had dropped at the end of May (similar to the drop to S4PA) from MODAPS-PDR, but was steady from ESDIS-PTH and JPL PTH (limited by its Fast-E connection). Testing went down to NSIDC-PTH in mid December, but recovered in early January.

5.2) LASP:

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

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

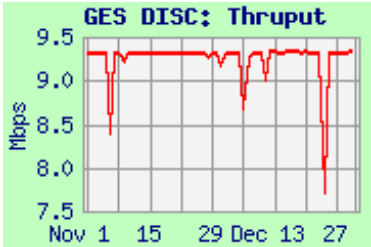


Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
ESDIS-PTH → LASP blue (scp)	3.71	3.67	3.56
ESDIS-PTH → LASP blue (iperf)	9.29	9.26	8.13
GES DISC → LASP blue (iperf)	7.44	7.36	1.72
LASP → GES DISC	9.33	9.32	6.40

Requirement:

Source → Dest	Date	Mbps	Rating
LASP → GES DISC	CY '10 -	0.016	**Excellent**



Comments: In January '11, LASP's connection to NISN PIP was rerouted: it previously was 100 mbps from CU-ITS via NSIDC; this was changed to a 10 mbps connection to the NISN POP in Denver.

Iperf and SCP testing from GES DISC and ESDIS-PTH was mostly stable, and consistent with the circuit limitation. Return testing from LASP to GES DISC was also stable, rating **Excellent**.

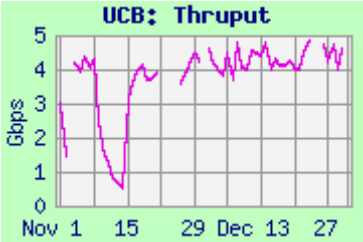
5) Boulder CO sites (Continued):

5.3) UCB:

Web Page http://ensight.eos.nasa.gov/Organizations/daac/UCB.shtml

Test Results:

Source	Medians of daily tests (gbps)		
	Best	**Median**	**Worst**
GSFC-ENPL-10G	5.3	4.3	3.3



Comments: Testing is to a 10 gig connected test node at UCB. The route is via Internet2 to FRGP, similar to NCAR, with similar performance, as well.

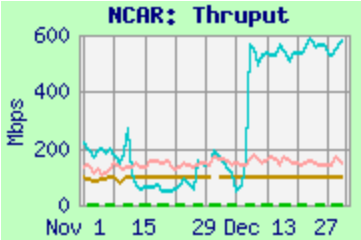
5.4) NCAR:

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

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

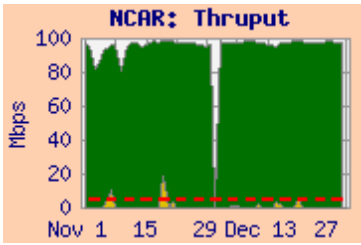
Test Results:

Source	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
LaRC PTH	182.0	149.5	92.4
GSFC-ENPL-10G	5436.6	2993.9	498.4
GSFC-ENPL-FE	98.8	98.1	90.7
GSFC-NISN	650.7	533.3	289.5



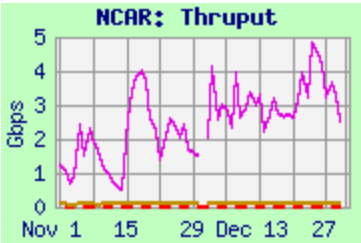
Requirement:

Source	Date	Mbps	Prev	Rating
LaRC	CY '12 -	0.044	0.1	**Excellent**
GSFC	CY '12 -	0.111	5.0	**Excellent**



Comments: NCAR has a SIPS for MOPITT (Terra, from LaRC), and has MOPITT and HIRDLS (Aura, from GSFC) QA requirements.

Testing was switched to NCAR's PerfSonar server in March '12 – testing was discontinued from LaRC ASDC at that time; testing from LaRC-PTH continued. This node is 10 gigabit capable. Performance from most nodes was similar to the previous test node, but somewhat noisier.



From LaRC: Thruput from LaRC-PTH was well above 3 x the modest requirement, so the rating remains **Excellent**. Note that outflow from LaRC-PTH is limited to 200 mbps by NISN.

From GSFC: From GSFC-NISN, the route is via NISN to the MAX (similar route as from LaRC-PTH). **Thruput improved substantially in December.** It was well above 3 x the requirement, so the rating remains **Excellent**. The average user flow from GSFC this month was only 0.5 mbps, which was above the requirement.

From GSFC-ENPL-10G, with a 10 Gig-E interface, and a 10 gig connection to MAX, performance to NCAR's 10 Gig PerfSonar node gets over 5 gbps on peaks.

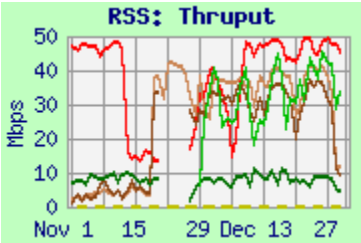
6) Remote Sensing Systems (RSS):

Ratings: **JPL → RSS:** Continued **Excellent**
RSS → GHRC: Continued **Excellent**

Web Page http://ensight.eos.nasa.gov/Missions/aqua/RSS.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
JPL PODAAC → RSS (Comcast)	37.2	31.8	12.5
JPL TES → RSS (Comcast)	42.9	36.9	13.8
GSFC-NISN → RSS (Comcast)	49.7	45.1	40.0
GHRC-UAH → RSS (Comcast)	45.3	33.6	9.2
GHRC-NISN→ RSS (Comcast)	17.5	8.3	2.6
RSS (Comcast) → GHRC (UAH)	4.14	2.66	1.15
RSS (Comcast) → GHRC (NISN)	3.73	3.39	1.55



Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL PODAAC → RSS	CY '12 -	0.16	0.49	**Excellent**
RSS → GHRC	CY '12 -	0.32	0.34	**Excellent**

Comments: RSS (Santa Rosa, CA) is a SIPS for AMSR-E (Aqua), receiving L1 data from JAXA via JPL, and sending its processed L2 results to GHRC (aka NSSTC) (UAH, Huntsville, AL).

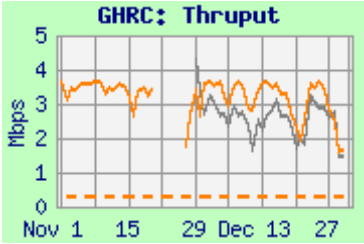
At the end of March '12, RSS switched its production node from the NISN SIP circuit (4 x T1s to NASA ARC -- total 6 mbps) to the Comcast circuit, rated at 50 mbps incoming, and 12 mbps outgoing (installed in April 2011). Testing via the NISN circuit to RSS was discontinued at that time.

It appears that the peering between JPL and Comcast improved in late November – previously, thruput was low and packet loss high. The route from JPL is via Los Nettos, CENIC, peering with Comcast in LA.

In October, testing with the UAH server at GHRC was discontinued – testing with a replacement server was initiated in late November. Results are consistent with the circuit limitations.

The median iperf remained well above 3 x the reduced requirement, so the rating from JPL remains **Excellent**.

RSS → GHRC: In addition, the new servers at RSS connected to the Comcast circuit allows "3rd party testing", as does the server at GHRC. Testing is therefore performed between RSS and GHRC, both with a UAH address and a NISN address at GHRC (In October, testing with the UAH server at GHRC was discontinued – testing with a replacement server was initiated in December.



The results to the two destinations are very similar, indicating that the congestion is close to RSS. The performance to the NISN address yields a rating of "**Excellent**" vs the 0.32 mbps requirement.

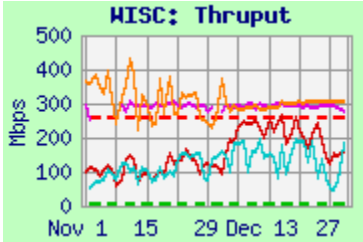
7) Wisconsin:

Rating: ↓ **Good** → **Adequate**

Web Pages http://ensight.eos.nasa.gov/Missions/NPP/WISC.shtml

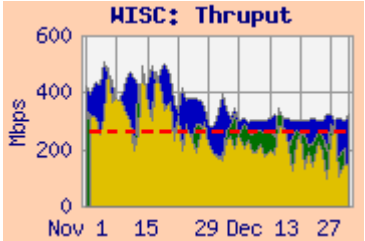
Test Results:

Source Node	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
NPP-SD3E	305.6	301.7	224.8	193.8	306.5
GES DISC	263.3	203.2	94.7		
GSFC ENPL	316.2	292.2	246.6		
LaRC ANGe	200.4	145.6	45.0		



Requirements:

Source Node	Date	mbps	Prev	Rating
NPP-SD3E	CY'12 -	237.2	237.2	**Adequate**
GSFC MODAPS	CY'12 -	21.9	16.5	**Excellent**
GSFC Combined	CY'12 -	259.1	253.7	**Adequate**
LaRC Combined	CY'12 -	n/a	7.9	**Excellent**



Comments: The Univ of Wisconsin is included in this Production report due to its function as Atmosphere PEATE for NPP. Wisconsin continues to be an SCF on the MODIS, CERES and AIRS teams.

GSFC: Thruput from NPP-SD3E (on EBnet) dropped a bit this month. User flow was also a bit lower than previously. The integrated thruput was above both the NPP and GSFC combined requirements, by now by less than 30%, so the rating drops to **Adequate**.

Thruput from GES DISC, however, improved. Thruput from EBnet sources had improved in September 2012 due to the EBnet firewall replacement (Thruput from EBnet previously had dropped in February due to EBnet outgoing packet loss).

The route from EBnet at GSFC is via MAX to Internet2, peering with MREN in Chicago.

From GSFC-ENPL thruput was similar, and had been unaffected by the EBnet packet loss. In late September, testing from GSFC-ENPL was switched to a PerfSonar node at Wisconsin, with much higher thruput, but this dropped in October.

LaRC: Although there is no longer a CERES requirement from LaRC to Wisconsin, thruput from LaRC ANGe is pretty steady and well above the previous 7.9 mbps requirement, and would be rated **Excellent**. The route from LaRC is via NISN, peering with MREN in Chicago. Testing from LaRC was switched in November due to the old test node at LaRC being retired.

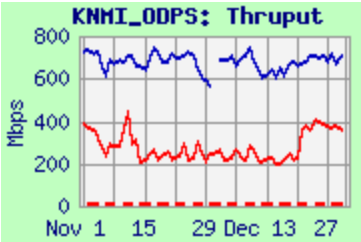
8) KNMI:

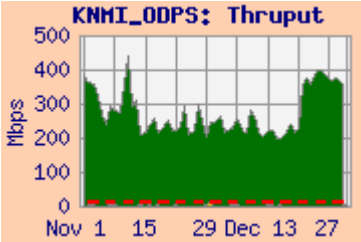
Rating: Continued **Excellent**

Web Pages http://ensight.eos.nasa.gov/Missions/aura/KNMI_ODPS.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			
	Best	**Median**	**Worst**	**Reqmt**
OMISIPS → KNMI-ODPS	500.4	248.9	157.5	13.4
GSFC-ENPL → KNMI-ODPS	787.1	674.5	487.1	





Comments: 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 3 x 10 gbps circuit to Frankfurt, then via Surfnet through Amsterdam.

The requirement was increased with the use of the database to 13.4 mbps, a much more realistic value than the previous 0.03 mbps.

The rating is based on the results from OMISIPS at GSFC to the ODPS primary server at KNMI. Thruput from OMISIPS (on EBnet) improved in mid September due to the EBnet firewall replacement! The median thruput remains much more than 3 x the increased requirement, so the rating remains **Excellent**.

The user flow, however, averaged only 2.2 mbps this month, similar to last month (and close to the typical 4 mbps), but below the requirement.

9) JSpace - ERSD:

Ratings: **GSFC → ERSD:** Continued **Excellent**
ERSD → EROS: Continued **Excellent**
ERSD → JPL-ASTER-IST: N/A

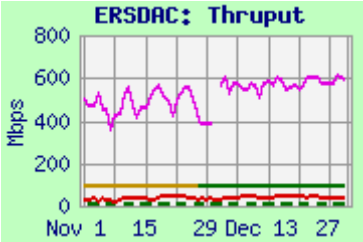
Web Page: http://ensight.eos.nasa.gov/Organizations/production/ERSDAC.shtml

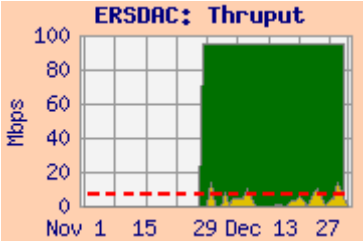
US ←→ JSpace - ERSD Test Results

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
GSFC-EDOS → ERSD	95.0	94.8	26.6	3.85	94.8
GES DISC → ERSD	54.3	41.5	21.6		
GSFC ENPL (FE) → ERSD	92.4	92.0	91.5		
GSFC ENPL (GE) → ERSD	620.7	574.7	266.4		
ERSD → EROS	206.8	168.0	68.3	3.44	168.0
ERSD → JPL-ASTER IST	n/a	n/a	n/a		

Requirements:

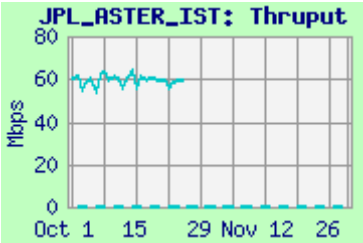
Source → Dest	CY	Mbps	Prev	Rating
GSFC → ERSD	'12 -	6.75	5.4	**Excellent**
ERSD→ JPL-ASTER IST	'12 -	0.31	0.31	**Excellent**
ERSD→ EROS	'12 -	8.33	8.3	**Excellent**





Comments:

GSFC → ERSD: As of approximately September '11, the ERSD test node is connected at 1 gbps – formerly was 100 mbps. The median thruput from most nodes improved at that time. Peak thruput from GSFC ENPL is over 500 mbps. However, some nodes have been using QoS (HTB) to reduce loss previously seen in the 1 gig to 100 meg switch at Tokyo-XP – those nodes remain limited by their HTB settings, and did not see much improvement.



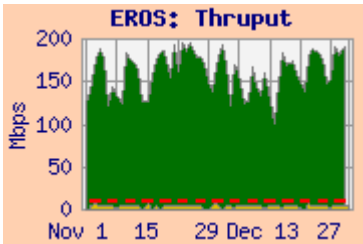
Thruput from EBnet sources (GSFC-EDOS, GES DISC) improved in mid September due to the EBnet firewall replacement. Thruput had dropped from EBnet sources in February, and dropped further in August, due to EBnet outgoing packet loss.

Testing from GSFC-EDOS to ERSD was suspended from late October until late November for the EDOS node to move from closed EBnet to Open EBnet, until new firewall rules were installed.

Thruput remains well above 3 x the reduced requirement, so the rating remains **Excellent**. The integrated chart shows that the user flow is mostly stable, and consistent with the requirement.

The FastE connected GSFC-ENPL-FE node is limited to 100 mbps by its own interface, and gets very steady thruput.

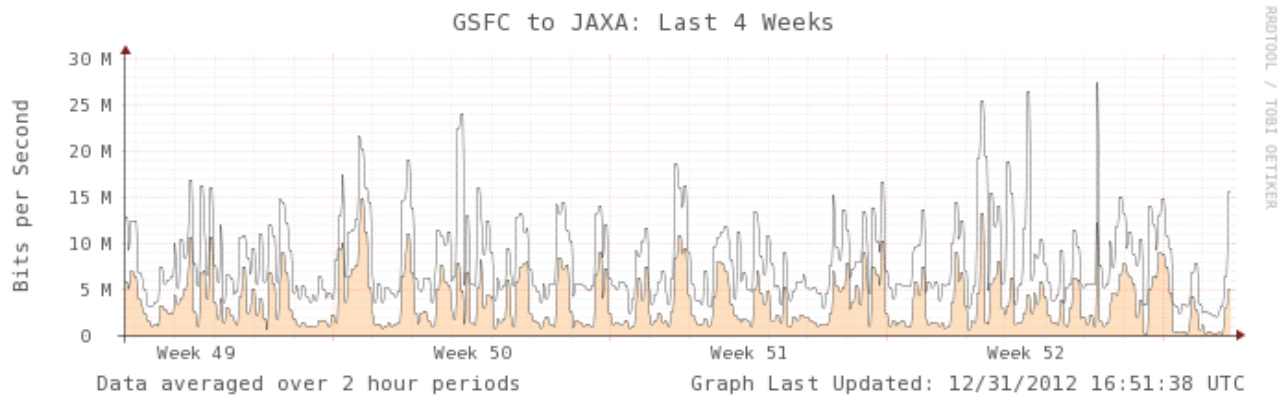
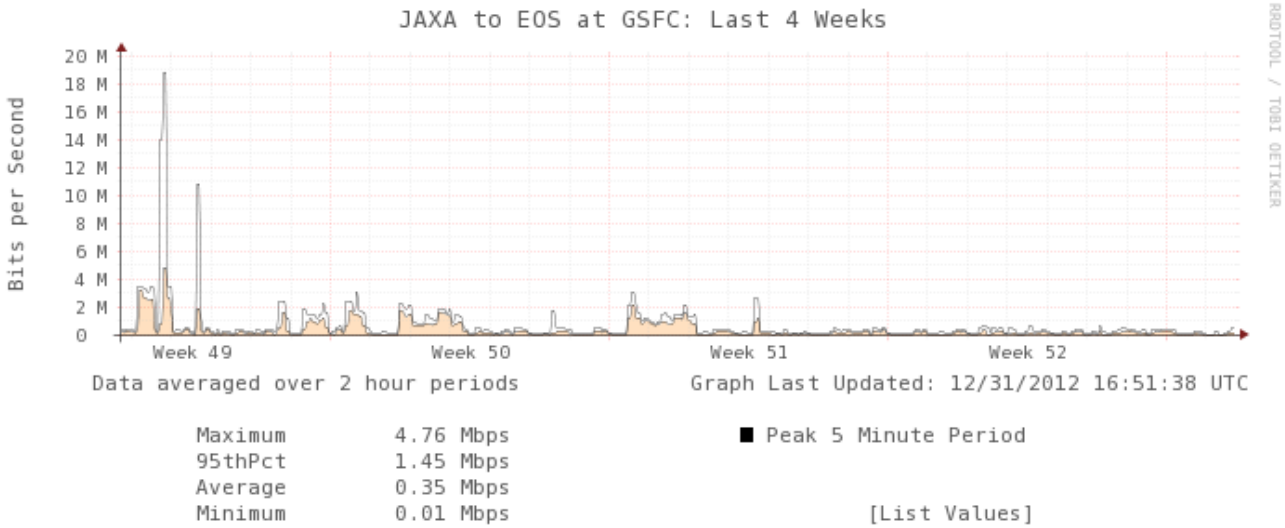
ERSD → JPL-ASTER-IST: The JPL-ASTER-IST test node was retired in October; a replacement node is being sought.



ERSD → EROS: The thruput improved with retuning in October '11, after the ERSDAC Gig-E upgrade; it remains well above the reduced requirement (was 26.8 mbps previously). The user flow was near normal this month. The median thruput is more than 3 x the reduced requirement, so the rating remains **Excellent**.

10) US ←→ JAXA

The JAXA test hosts at EOC Hatoyama were retired on March 31, 2009 (the end of the Japanese government's fiscal year). No additional testing is planned for AMSR or TRMM. All testing to JAXA-TKSC for ALOS was terminated at the end of June '09. JAXA has been requested to restore these tests, but they have declined to participate.

However, the user flow between GSFC and JAXA continues to be measured. As shown below, the user flow this month averaged 3.55 mbps from GSFC to JAXA, and 180 kbps from JAXA to GSFC.

These values are consistent with the new (database) requirements of 3.5 mbps to JAXA, and 0.35 mbps back to JPL. However, since no iperf tests are run, the true capability of the network cannot be determined, and therefore no rating is assigned.