EOS Mission Support Network
Performance Report

This is a monthly summary of EMSnet performance testing -- comparing the measured performance against the requirements.   Currently using updated BAH requirements (Feb '03), including missions through 2006.

All results are reported on the web site:
http://corn.eos.nasa.gov/performance/Net_Health/EMSnet_list.html.
It shows MRTG-like graphs of the performance to various test sites, including thruput, RTT, packet loss, and hops, with 1 week, 2 month and 6 month graphs.

Highlights:

- Most test results were stable.

- JPL EMSnet redesign is in progress

.Ratings:

Rating Categories:

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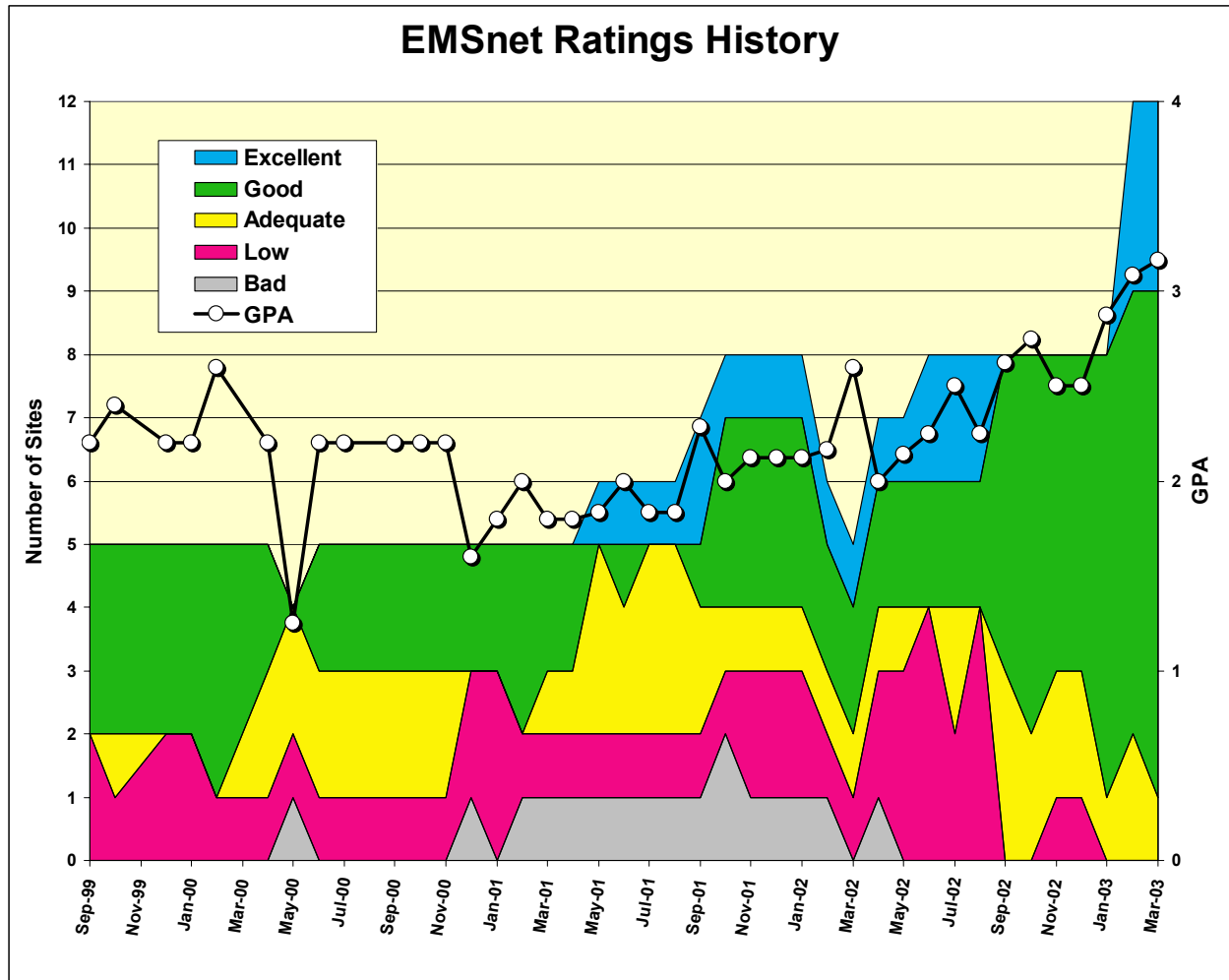**Bad** : **Total Kbps** < Requirement / 3

Where Total Kbps = User Flow + iperf monthly average

Upgrades: ↑
    GSFC → ERSDAC: Adequate → **Good**

Downgrades: ↓: **None**

The chart below shows the number of sites in each classification since EMSnet testing started in September 1999. Note that these ratings do NOT relate to absolute performance -- they are relative to the EOS requirements. The GPA is calculated based on Excellent: 4, Good: 3, Adequate: 2, Low: 1, Bad: 0

March 2003		Requirements (kbps)		Testing								
Source -> Destination	**Team (s)**	**Current** **Dec-02**	**Future** **Oct-03**	**Source Node : Test Period**	**Raw MRTG**	**Perf -> MRTG**	**Avg User Flow kbps**	**Perf Avg kbps**	**Total Avg kbps**	**Current Status re** **Dec-02**	**Prev Stat**	**Current Status re** **Oct-03**
ASF-> NOAA	ADEOS II	1864	1864	ASF->NESDIS: 29-Nov-02 - 30-Mar-03	308	70	207	2492	2700	GOOD	G	GOOD
GSFC->EDC	MODIS, LandSat	170741	216574	DOORS-EDCTest: 01-Mar-03 - 30-Mar-03	169100	2006	150184	50182	200366	Adequate	A	LOW
GSFC->ERSDAC	ASTER	664	664	GDAAC: 03-Jan-03 - 30-Mar-03	119	6	89	779	868	GOOD	A	GOOD
GSFC -> JPL	ASTER, QuikScat, MLS, etc.	1609	1300	CSAFS: 15-Aug-02 - 30-Mar-03	1087	150	720	5834	6553	Excellent	E	Excellent
JPL -> GSFC	ADEOS II, AMSR, etc.	4863	4693	JPL -> GSFC: 13-Jan-03 - 30-Mar-03	366	132	161	9289	9450	GOOD	G	GOOD
LaRC -> JPL	TES	0	30585	LDAAC: 15-Aug-02 - 30-Mar-03	86	49	20	5902	5922	n/a	n/a	BAD
GSFC->LARC	CERES, MISR, MOPITT	45533	52664	GDAAC: 01-Jan-03 - 30-Mar-03	14600	492	11188	59016	70204	GOOD	G	GOOD
LaRC -> GSFC	MODIS, TES	6777	44795	LDAAC --> GDAAC: 09-Sep-02 - 30-Mar-03	3039	201	2230	24116	26346	Excellent	E	LOW
US ->NASDA	QuikScat, TRMM, AMSR	1612	1379	CSAFS: 23-Aug-02 - 30-Mar-03	504	29	374	1808	2182	GOOD	G	GOOD
NASDA->US	AMSR	1559	1559	NASDA->JPL-SEAPAC: 01-Mar-03 - 29-Mar-03	77	45	16	2011	2027	GOOD	G	GOOD
JPL -> NSIDC	AMSR	770	1540	JPL: 13-Jan-03 - 30-Mar-03	36	37	0	4486	4486	Excellent	E	GOOD
NSIDC->GSFC	MODIS, ICESAT, QuikScat	8313	8313	NSIDC -> GDAAC: 23-Oct-02 - 30-Mar-03	435	131	217	15772	15988	GOOD	G	GOOD
GSFC-> NSIDC	MODIS, ICESAT, QuikScat	32603	38234	GDAAC: 01-Mar-03 - 30-Mar-03	9561	502	7147	60201	67348	GOOD	G	GOOD

Notes:	All flow requirements listed are the greater of inflow or outflow	**Ratings**	
	Flow Requirements (from BAH) include TRMM, Terra , Aqua, QuikScat, ADEOS II	**Summary**	Dec-02 / Oct-03

Ratings Summary

			Dec-02	Oct-03
			Score **Prev**	**Score**
*Criteria:	**Excellent**	**Total Kbps** > Requirement * 3	**Excellent** 3 / 3	1
	GOOD	1.3 * Requirement <= **Total Kbps** < Requirement * 3	**GOOD** 8 / 7	9
	Adequate	Requirement < **Total Kbps** < Requirement * 1.3	**Adequate** 1 / 2	0
	LOW	**Total Kbps** < Requirement	**LOW** 0 / 0	2
	BAD	**Total Kbps** < Requirement / 3	**BAD** 0 / 0	1
Change History:	27-Sep-99	Original - TRMM, Terra, and QuikScat	**Total** 12 / 12	13
	19-Jan-01	Incorporated BAH requirements including additional missions		
	9-Apr-01	Updated BAH requirements	**GPA** 3.17 / 3.08	2.54
	4-Jun-01	Added 50% contingency to BAH requirements		
	16-Nov-01	Added MRTG to Iperf, updated requirements, Revised criteria		
	2-Oct-02	Updated to revised BAH requirements		

Comparison of measured performance with Requirements:

This graph shows two bars for each source-destination pair. Each bar uses the same actual measured performance, but compares it to the requirements for two different times (Dec '02, and Oct. '03). Thus as the requirements increase, the same measured performance will be lower in comparison.

EMSNet
Measured Performance vs. Requirements
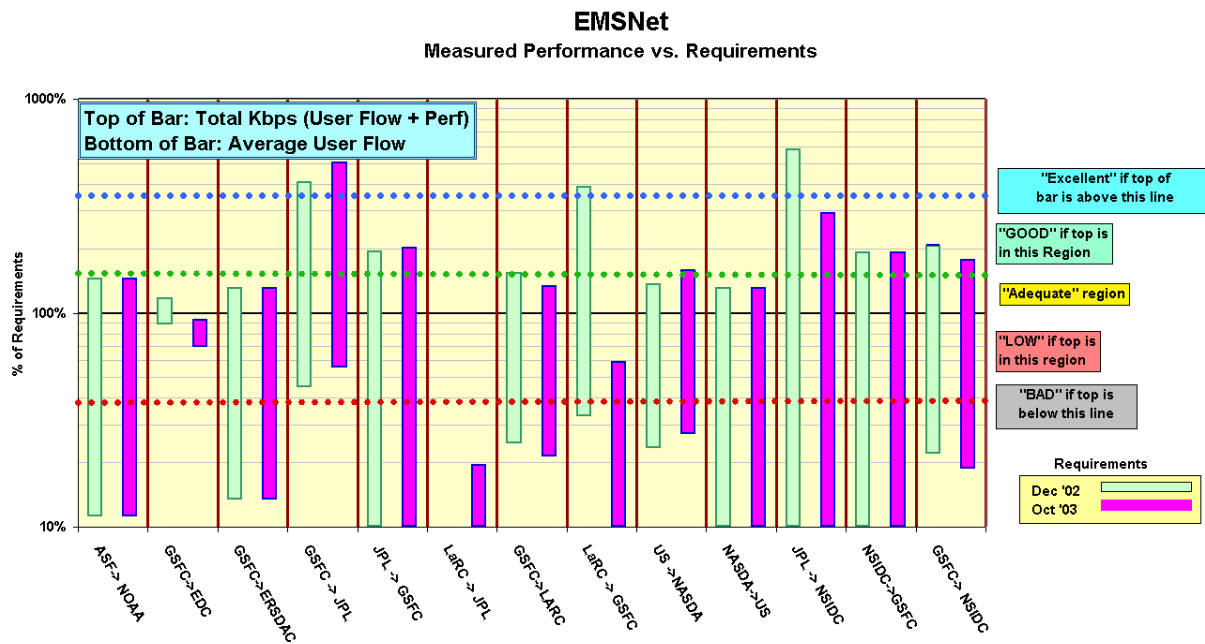
Note: this chart shows that the performance to most sites is remarkably close to requirements. In the past, some sites have had performance way above the requirements, others way below.

Also note that the interpretation of these bars has changed from Sept '01. The bottom of each bar is the average measured MRTG flow to that site (previously daily minimum). Thus the bottom of each bar can be used to assess the relationship between the requirements and actual flows. Note that the requirements include a 50% contingency factor above what was specified by the projects, so a value of 66% would indicate that the project is flowing as much data as requested.

Details on individual sites:

1) ASF ←→ CONUS: Rating: Continued Good
Web Page: http://corn.eos.nasa.gov/performance/Net_Health/files/ASF-EMS.html

Test Results:

Source → Dest	Medians of daily tests (kbps)			User Flow	TOTAL
	Best	Median	Worst		
ASF → NESDIS	2544	2492	717	207	2699
ASF → GSFC-CSAFS	2620	2360	1314		
ASF→ JPL-SEAPAC	2799	2612	1330		
GSFC-CSAFS → ASF	2219	1429	479	34	

Requirements:

Source → Dest	FY	mbps	Rating
ASF → NESDIS	'03, '04	1.86	Good

Comments: The 2.7 mbps total is very good for a 2 * T1 (3.1 mbps) circuit. Since this is more than 30% over the Dec '02 requirement, the rating is "Good". The user flow decreased this month (was 424 kbps last month) – the median daily worst values improved as a by-product.

There was a problem from JPL to ASF, which began as a slow degradation in January, after correction of serious problems from mid October '02 to Dec '02. The thruput was very noisy, even in the absence of user traffic. This problem was fixed in late March.

Also, after going down for a few days (March 24-26), the ASF test node has recovered, but testing with NASDA and SEAPAC is disabled.

2) GSFC → EDC: Rating: Continued Adequate
Web Page: http://corn.eos.nasa.gov/performance/Net_Health/files/EDC.html

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	TOTAL
	Best	Median	Worst		
DOORS → EDC Test	95.4	50.2	31.8	150.2	200.4
DOORS → EDC DAAC	156.5	59.3	33.4		
G-DAAC→ EDC DAAC	109.2	37.5	19.1		

Requirements:

Date	mbps	Rating
Dec '02	170.7	Adequate
Oct '03	216.6	Low

The three test cases above continue to show the effects of the DAAC firewalls: the test shown on the top row has no firewalls in the path, just vBNS+. The next test goes through the EDC firewall, and the last test goes through both the GSFC and EDC firewalls. From these values, it does not appear that the EDC firewall has much of an effect on thruput, but the GSFC firewall does

This month the user flows were increased about 16 mbps, but the corresponding thruput tests were about 18 mbps lower, with the total therefore about the same.   The combined MRTG + thruput is above the Dec '02 requirement, but not by a 30% margin, so the rating remains "Adequate". The total is also now lower than the Oct '03 requirement, so that rating remains "Low".

3) JPL:

Ratings: GSFC → JPL: Continued **Excellent**
JPL → GSFC: Continued **Good**
LaRC → JPL (Oct '03): Continued **Bad**

Web Pages:

http://corn.eos.nasa.gov/performance/Net_Health/files/JPL-SEAPAC.html
http://corn.eos.nasa.gov/performance/Net_Health/files/JPL-PODAAC.html
http://corn.eos.nasa.gov/performance/Net_Health/files/JPL-TES.html

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	TOTAL
	Best	Median	Worst		
GSFC-CSAFS → JPL-SEAPAC	6.09	5.83	3.70	0.72	6.55
LaRC DAAC → JPL-TES	6.02	5.90	4.33	0.02	5.92
GSFC-MTVS1 → JPL-PODAAC	5.96	5.70	4.63		
JPL-PODAAC→ GSFC DAAC	11.62	9.29	5.34	0.16	9.45

Requirements:

Source → Dest	Date	mbps	Rating
GSFC → JPL combined	Dec '02	1.61	**Excellent**
GSFC → JPL combined	Oct '03	1.30	**Excellent**
JPL → GSFC combined	Dec '02	4.86	**Good**
LaRC DAAC → JPL-TES	Oct '03	30.6	**Bad**

The GSFC-JPL requirement above was revised in August '02 to include all flows on the GSFC-JPL circuit, including flows from LaRC and flows to NASDA and ASF. The rating is based on testing via EMSnet from CSAFS at GSFC to SEAPAC at JPL. Note that the user flow value above also includes these flows.

Performance on this circuit has been very stable since the BOP switchover on 15 August '02. With the revised combined requirement of 1.6 mbps, the rating remains "Excellent".

Performance from LDAAC to JPL-TES has also been very stable since it improved from 2.9 to 6.0 mbps on Aug 15, due to BOP. However, the new Oct. '03 requirement for this flow is 30 mbps. This is well above the current capability, which was not designed to accommodate this flow (the current route is via NSIDC). Accordingly, an NSR is in progress to provide a direct VC with increased capability.

The route from GDAAC to JPL-TES and JPL-PODAAC changed to EMSnet on 12 February '03 – it had been using NISN SIP since May 8 '02. GSFC to JPL-PODAAC performance testing is still sourced from MTVS1. Performance has been very steady at 6 mbps since the BOP upgrade on 15 August '02. Performance from the G-DAAC to PODAAC is very similar

Also now being tracked is the requirement from JPL to GSFC. It includes flows from NASDA and ASF which go via JPL, and includes GSFC and NOAA destinations. The combined Dec. '02 requirement is 4.8 mbps, and the thruput (9.45 mbps) is more than 30% above that, so the rating remains "Good"

4) NSIDC:

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

Web Page: http://corn.eos.nasa.gov/performance/Net_Health/files/NSIDC-EMS.html

GSFC ←→ NSIDC Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	TOTAL
	Best	Median	Worst		
GSFC-DAAC → NSIDC	88.7	60.2	28.7	7.1	67.3
NSIDC → GSFC-DAAC	16.5	15.8	10.0	0.2	16.0

Requirements:

Source → Dest	Date	mbps	Rating
GSFC → NSIDC	Dec '02	32.6	Good
GSFC → NSIDC	Oct '03	38.2	Good
NSIDC → GSFC	'03, '04	8.3	Good

Performance from GSFC to NSIDC and from NSIDC to GSFC remains steady, with the ratings for both FY '03 and '04 remaining "Good".

Other Testing:

Source → Dest	Medians of daily tests (mbps)			Requirement	Rating
	Best	Median	Worst		
JPL → NSIDC-SIDADS	5.83	4.49	3.07	0.77	Excellent
LDAAC - NSIDC	4.80	4.66	4.47	0.07	Excellent

Performance has been very steady from JPL since the Aug '02 BOP switchover, exceeding the modest requirement. This requirement grows to 1.5 mbps in April '03, and to 2.3 mbps in April '04; the rating would be "Good" compared to these requirements.

Thruput from LDAAC to NSIDC has been steady at about 4.5 mbps since 28 November. The very low requirement produces a rating of "Excellent".

5) GSFC ←→ LaRC:

Ratings: GDAAC → LDAAC: Continued **Good**
LDAAC → GDAAC: Continued **Excellent**

Web Page: http://corn.eos.nasa.gov/performance/Net_Health/files/LARC.html

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	TOTAL
	Best	**Median**	**Worst**	**User Flow**	**TOTAL**
GDAAC → LDAAC	89.9	59.0	26.9	11.2	70.2
LDAAC → GDAAC	25.4	24.1	15.5	2.2	26.3

Requirements:

Source → Dest	Date	mbps	Rating
GDAAC → LDAAC	Dec '02	45.5	**Good**
GDAAC → LDAAC	Oct '03	52.7	**Good**
LDAAC → GDAAC	Dec '02	6.8	**Excellent**
LDAAC → GDAAC	Oct '03	44.8	**Low**

Performance has been very stable since the BOP switchover in August '02. The requirements from GSFC → LaRC increased last month from 37.7 mbps. The Dec. '02 and Oct. '03 rating remain "Good".

The LaRC → GSFC requirement is now tracked. While the current performance is "Excellent", by FY '04 it is planned to backhaul all LaRC science outflow via GSFC, greatly increasing this requirement. A circuit upgrade will be required to meet this future requirement.

6) GSFC → ERSDAC:

Rating: ↑ Adequate → **Good**

Web Page: http://corn.eos.nasa.gov/performance/Net_Health/files/ERSDAC.html

Test Results:

Source → Dest	Medians of daily tests (kbps)			User Flow	TOTAL
	Best	**Median**	**Worst**	**User Flow**	**TOTAL**
GSFC → ERSDAC	797	779	424	89	868

Requirements:

Source → Dest	FY	kbps	Rating
GSFC → ERSDAC	'03, '04	664	**Good**

Thruput since June '02, using the 1 mbps ATM connection had been very stable (except for a problem period from 12 November '02 to 3 Jan '03). The user flow increased a little this month (was 57 kbps previously), but it was enough to increase the total to a bit above 30% over the requirement, raising the rating to "Good".

7A) US → NASDA: Rating: Continued Good

Web Page: http://corn.eos.nasa.gov/performance/Net_Health/files/NASDA-EMSnet.html

Test Results:

Source → Dest	Medians of daily tests (kbps)			User Flow	TOTAL
	Best	Median	Worst		
GSFC-CSAFS → NASDA-EOC	2150	1808	509	374	2182
ASF → NASDA-EOC	2254	1903	511		

Requirements:

Source → Dest	FY	kbps	Rating
GSFC → NASDA	Dec '02	1612	Good
GSFC → NASDA	Oct '03	1379	Good

Performance steady -- about as expected for the 3 mbps ATM PVC (using multiple TCP streams to mitigate TCP window size limitation at NASDA). Results from ASF to NASDA were slightly better than from CSAFS. The ratings remain "Good".

7B) NASDA → US: Rating: Continued Good

Web Pages: http://corn.eos.nasa.gov/performance/Net_Health/files/JPL-SEAPAC.html
            http://corn.eos.nasa.gov/performance/Net_Health/files/GSFC-SAFS.html

Test Results:

Source → Dest	Medians of daily tests (kbps)			User Flow	TOTAL
	Best	Median	Worst		
NASDA-EOC → JPL-SEAPAC	2315	2011	1088	16	2027
NASDA-EOC → GSFC-CSAFS	1394	1262	596		

Requirements:

Source → Dest	FY	kbps	Rating
NASDA → GSFC	'02, '03	1559	Good

Performance continues stable on the new circuit. The rating remains "Good".

Note: NASDA has not yet implemented testing with multiple tcp streams. So performance to GSFC is limited by the TCP window size on NASDA's test machine, in conjunction with the long RTT. Therefore, in order to reflect the actual capability of network, the rating is derived from testing from NASDA to JPL. This test uses the same Trans-Pacific circuit, but has a shorter RTT, so will not be as severely limited by the TCP window size. The Trans-Pacific circuit connects into the higher speed domestic EMSnet at JPL, which is not expected to be the limiting factor.