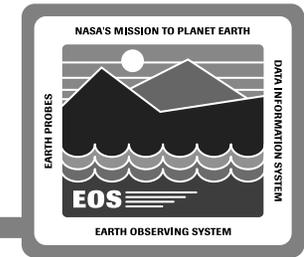


ESN Wide Area Network Sizing

Sidarth Ambardar

17 January 1995

ESN Wide Area Network Sizing



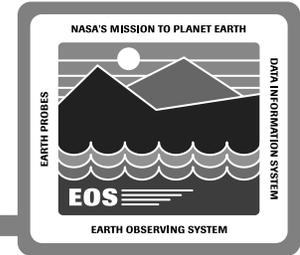
Objective:

- Estimate the ESN WAN data flows/bandwidth requirements through Release B (AM-1 platform plus TRMM)

Data flow constituents for ESN WAN sizing:

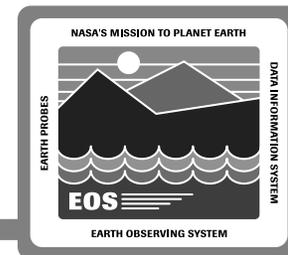
- Inter-DAAC processing and reprocessing flows
- Inter-DAAC query and response data flows
- V0 data flows
- TRMM data flow
- IST data flows
- SCF data flows
- ADC data flows

ESN WAN Data Flows



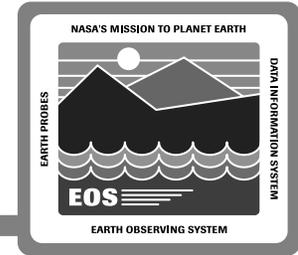
- **Inter-DAAC processing and reprocessing flows**
 - Information from Ad Hoc Working Group for Production
 - Processing scenarios provided by Instrument Teams
- **Inter-DAAC query and response data flows**
 - Traffic from queries spawned to satisfy initial user queries
 - Data flow estimates obtained from user modeling effort
- **TRMM data flow**
 - PR, TMI and GV data from GSFC to MSFC and to LaRC
- **IST data flows**
 - Data transferred from ISTs to the EOC LAN via the ESN
 - Based on FOS design team estimates of IST traffic for AM-1

ESN WAN Data Flows (cont.)



- **SCF data flows**
 - Originally thought that Quality Control would be “in-line” with production: ESN would provide better performance and reliability
 - Current understanding is that QC is not “in-line” with production
 - SCFs do not need to be connected to ESN WAN and can use NSI and existing campus facilities
 - Exception: If an IST also serves as a SCF the ESN may also carry the SCF’s data
- **ADC data flows**
 - Ancillary data sets at NOAA facility (Suitland, MD) transported via ESN WAN to GSFC

Release A (1997) Bandwidth Estimate (Mbps*)



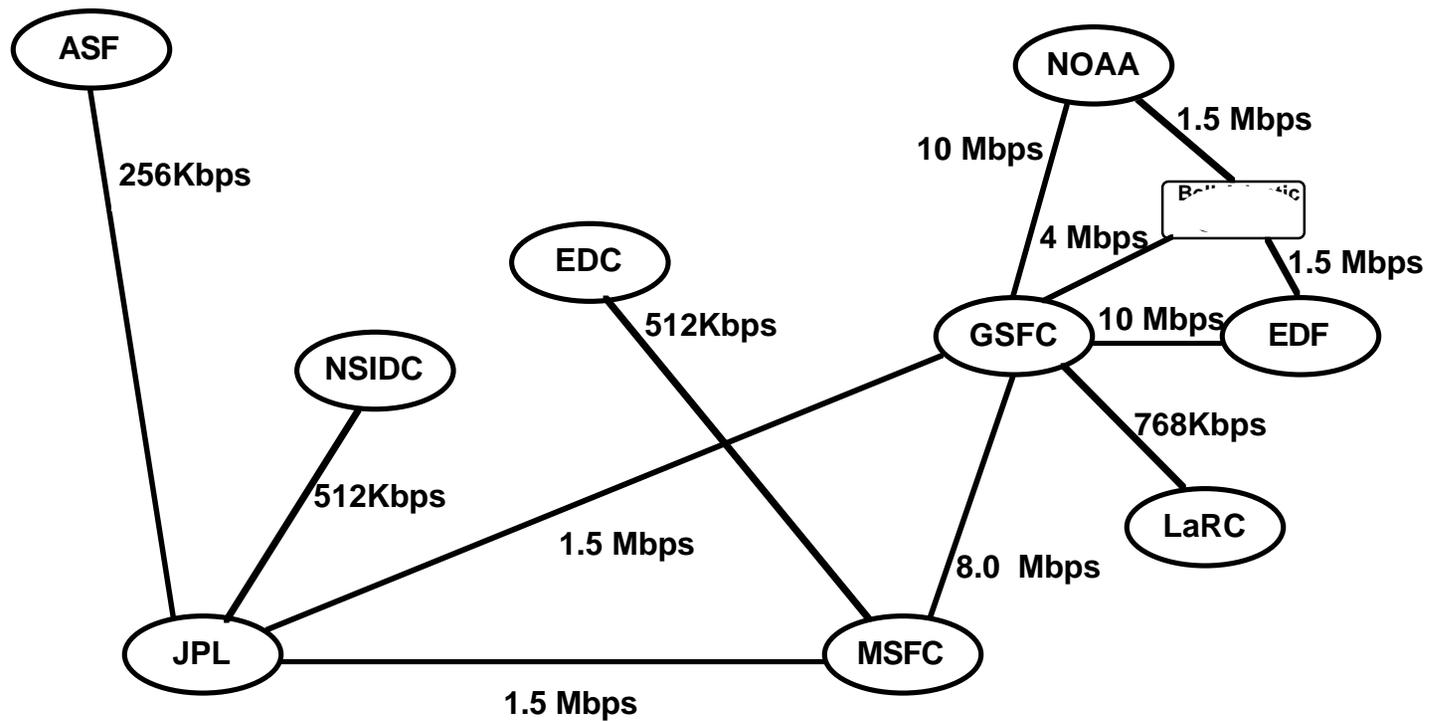
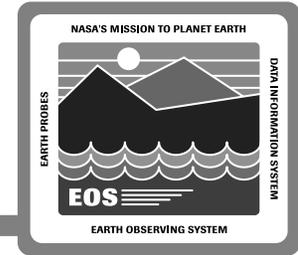
From	To	ASF	EDC	GSFC	JPL	LaRC	MSFC	NSIDC	NOAA
ASF					0.2				
EDC				T		#	#		
GSFC			T		0.6	0.7	8.0	T	T
LaRC				T					T
JPL				T					
MSFC				5.9#		0.5			T
NSIDC			T	T					
ORNL (TBD)									
NOAA				T		T	T		

* Bandwidths have been derived from 24 hour average flows. Factors of 1.33 for protocol overhead, 1.25 for line utilization and 1.6 for contingency/scheduling have been used.

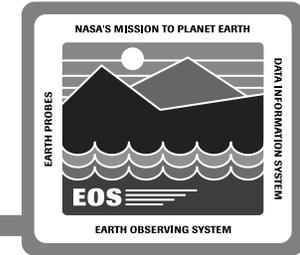
T Indicates a flow of less than 0.1Mbps

Reflects changes to ECS Project baseline as of December 21, 1994

ESN WAN at Release A



1999 Bandwidth Estimate (Mbps*) (Processing only for AM-1)



From	To	ASF	EDC	GSFC	JPL	LaRC	MSFC	NSIDC	NOAA
ASF					0.2				
EDC		T		T					
GSFC		T	77.3		0.2	72.0#	8.0#	0.6	T
LaRC		T	6.4	T					T
JPL		T		T					
MSFC		T		6.9#		1.5			T
NSIDC		T	0.2	0.2					
ORNL (TBD)									
NOAA				T		T	T		

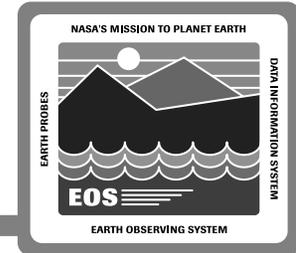
V0, TRMM and AM-1 instruments. TRMM reprocessing is included.

* Bandwidths have been derived from 24 hour average flows. Factors of 1.33 for protocol overhead, 1.25 for line utilization and 1.6 for contingency/scheduling have been used.

T Indicates a flow of less than 0.1Mbps

Reflects changes to ECS Project baseline as of December 21, 1994

1999 Bandwidth Estimate (AM-1 Processing and Reprocessing) (Mbps*)



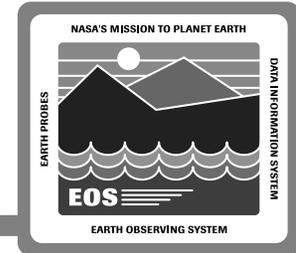
From	To	ASF	EDC	GSFC	JPL	LaRC	MSFC	NSIDC	NOAA
ASF					0.2				
EDC	T			T			#		
GSFC	T	154.5			0.6	143.7#	8.0	1.1	T
LaRC	T	12.7		T					T
JPL	T			T#					
MSFC	T			6.9		1.5			T
NSIDC	T	0.4		0.4					
ORNL (TBD)									
NOAA				T		T	T		

* Bandwidths have been derived from 24 hour average flows. Factors of 1.33 for protocol overhead, 1.25 for line utilization and 1.6 for contingency/scheduling have been used.

T Indicates a flow of less than 0.1Mbps

Reflects changes to ECS Project baseline as of December 21, 1994

Bandwidth to NSI Interface (Mbps*)

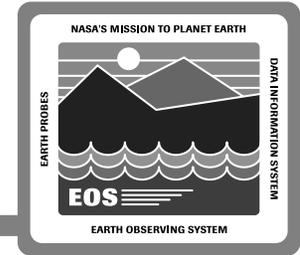


From	December '96 (For 1997)	December '97 (For 1998)	December '98 (For 1999)
ASF	0.0	T	T
EDC	1.0	20.0	38.0
GSFC	3.0	40.0	77.0
LaRC	T	9.0	26.0
JPL	0	1.0	1.0
MSFC	T	0.3	0.4
NSIDC	0.0	0.4	0.8
ORNL (TBD)	TBD	TBD	TBD

* Based on distribution of 1X production volume at each DAAC to science users

- Includes data products migrated from V0, AM-1, TRMM, SWS and Color
- Landsat-7 data distribution of 50GB/day is included
- ALT Radar and ACRIMSAT data are not included
- Factors for protocol overhead (1.33) and line utilization (1.25) are included

Mitigation for High Bandwidth Requirements



- **ESN and NSI bandwidth requirements for Release B are higher than initially expected**
- **Subsetting data prior to transfer can reduce the large flows significantly**
 - **The GSFC to EDC and GSFC to LaRC flows could be reduced to within a T3 (45Mbps) capacity (ROM for processing only)**
 - **Potential impacts on processing and storage capacity need further analysis**
- **Expected breakthroughs in WAN service offerings (ATM) may significantly reduce costs by 1998-2000**
- **Transferring production data via media offers an alternative to transfer via the ESN WAN**