



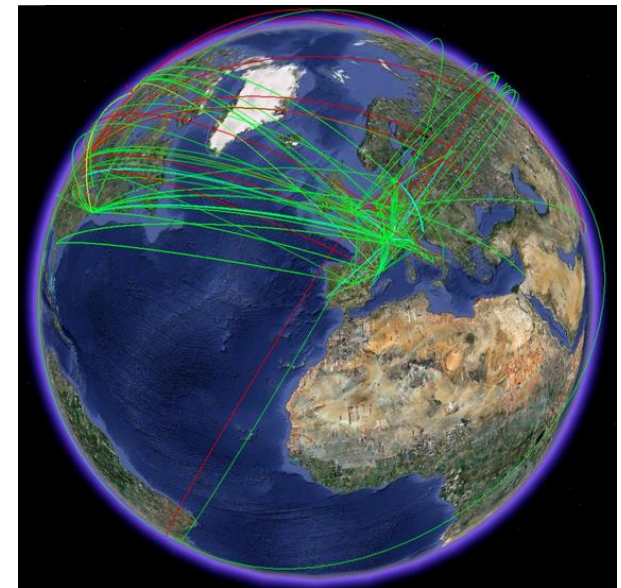
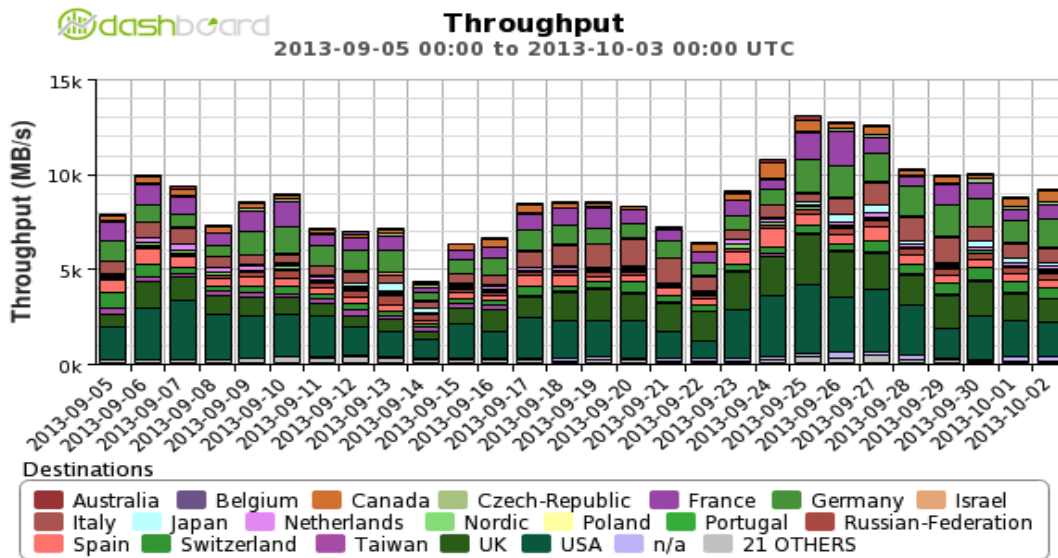
# Network Monitoring

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# Network Monitoring for WLCG

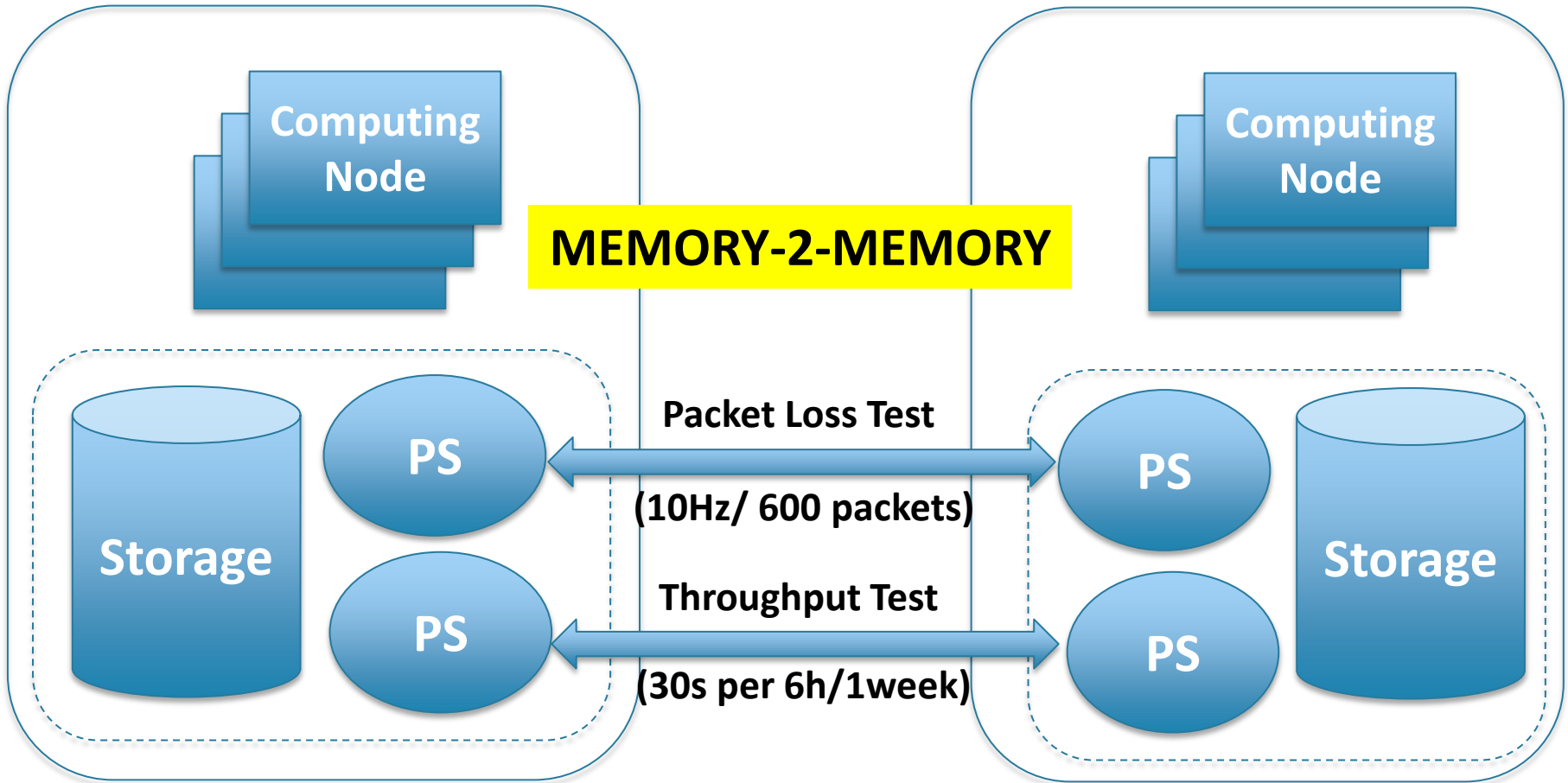
- WLCG relies heavily on the underlying networks
  - Interconnect sites and resources



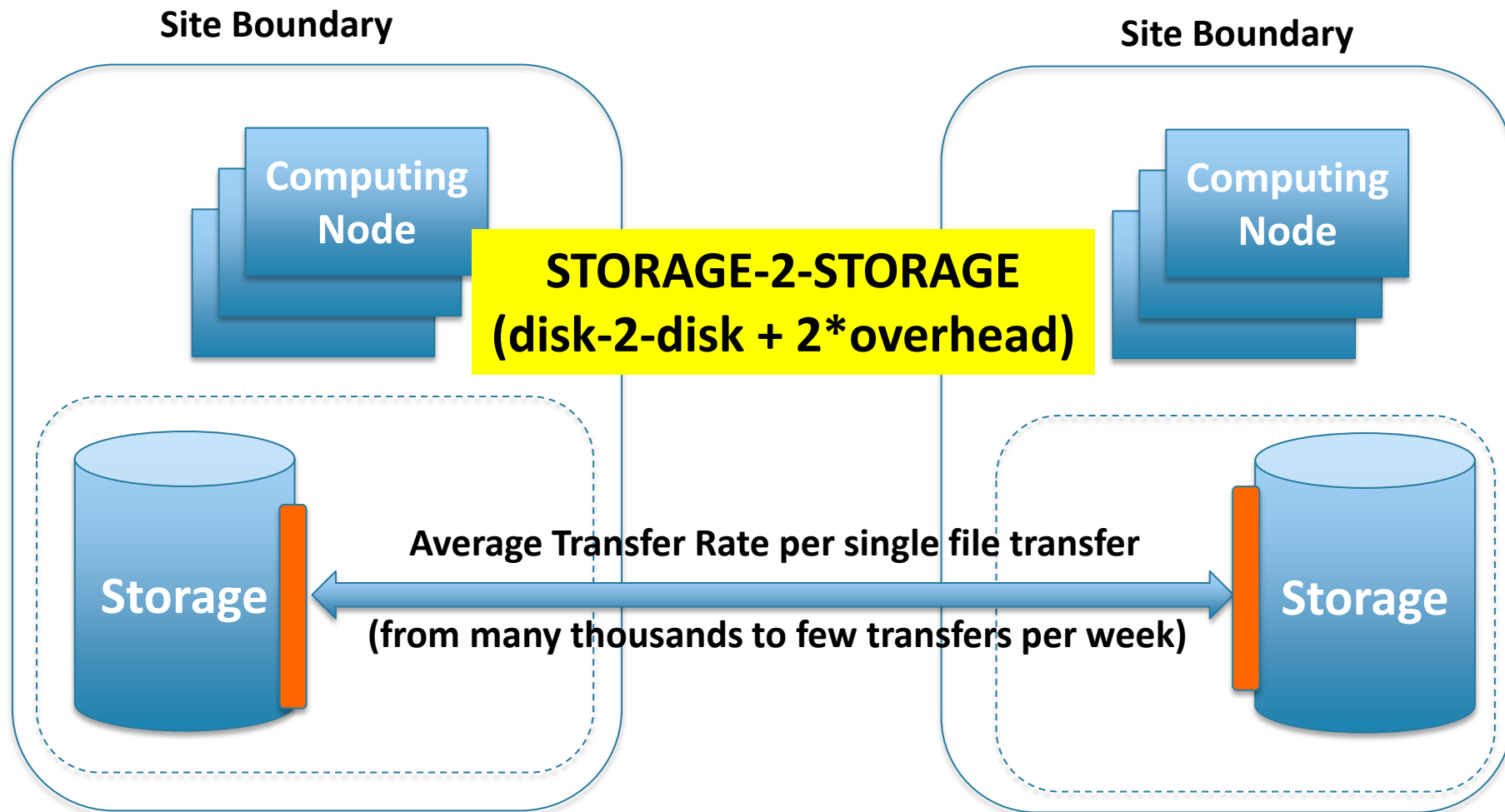
# perfSONAR

Site Boundary

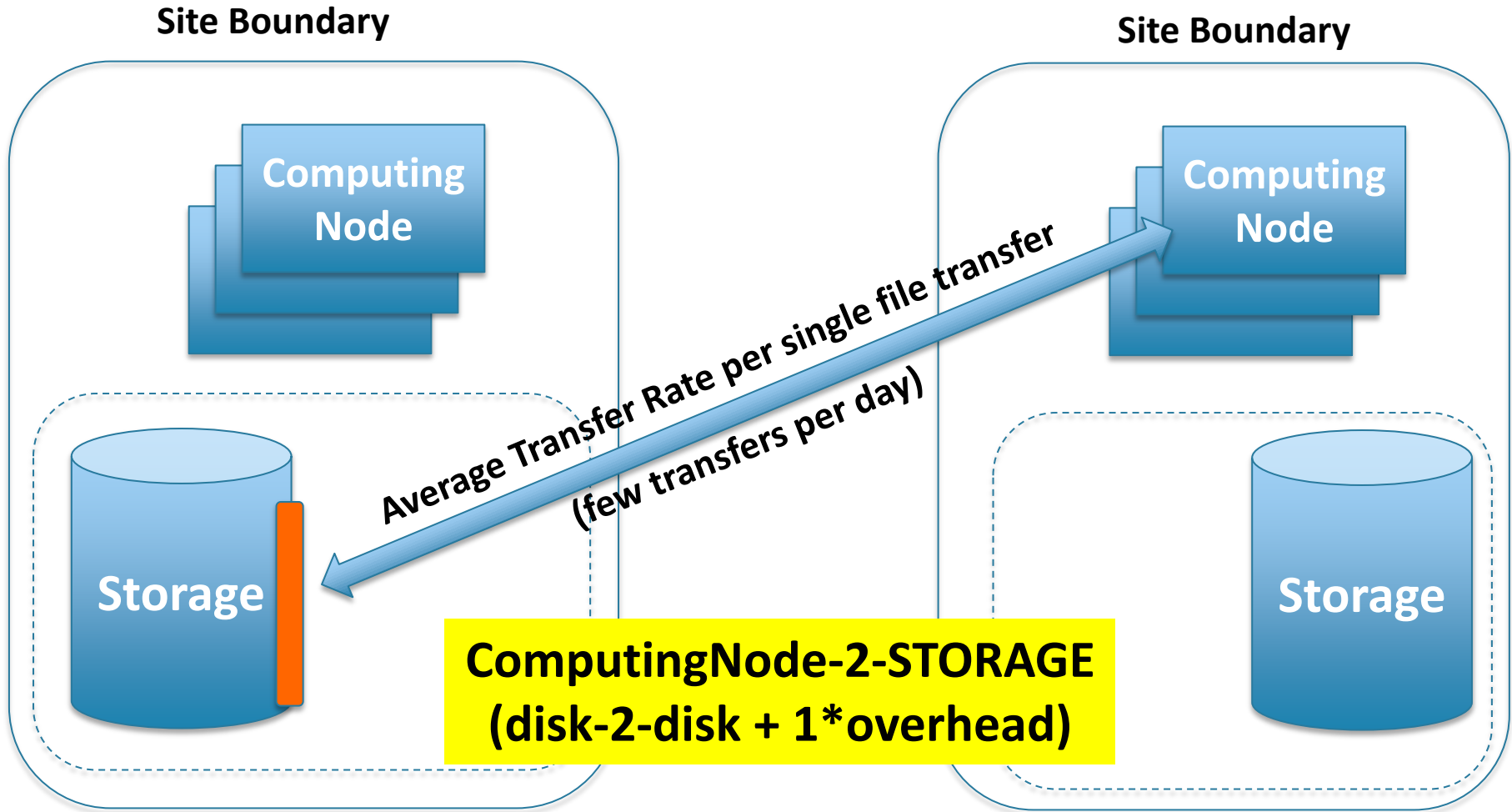
Site Boundary



# FTS transfers



# WAN data access tests



# Putting all together ...

ATLAS aggregates complementary network information in the Site Status Board

Topology						FTS transfer (per file)						perfSONAR						FAX xrdcp rate	WAN data access (WN-SE)
SrcSite	SrcCloud	SrcTier	DstSite	DstCloud	DstTier	DDM Sonar						perfSONAR							
						AvgBRS (MB/s)	EvS	AvgBRM (MB/s)	EvM	AvgBRL (MB/s)	EvL	MinThr (MB/s)	AvgThr (MB/s)	MaxThr (MB/s)	MinPL	AvgPL	MaxPL		
Taiwan-LOG2	TW	T1	RAL-LOG2	UK	T1	0.51+/-0.63	285	7.25+/-5.02	336	7.88+/-5.47	649	0.3	0.3	0.3	0.0	65.7	329.0	n/a	
Taiwan-LOG2	TW	T1	IN2P3-CC	FR	T1	0.52+/-0.66	55886	6.34+/-2.94	6121	16.10+/-6.07	1617	0.5	0.5	0.5	600.0	600.0	600.0	1.33	
TRIUMF-LOG2	CA	T1	Taiwan-LOG2	TW	T1	0.41+/-0.41	400	1.25+/-0.24	38	2.89+/-1.30	5	0.4	0.5	0.6	0.0	0.0	1.0	n/a	
pic	ES	T1	Taiwan-LOG2	TW	T1	0.04+/-0.09	162	0.00+/-0.00	0	0.00+/-0.00	0	0.3	0.6	0.8	0.0	0.0	0.0	n/a	
FZK-LOG2	DE	T1	Taiwan-LOG2	TW	T1	0.17+/-0.24	1178	1.01+/-0.23	505	16.93+/-11.49	5	0.5	1.3	2.2	0.0	0.0	0.0	n/a	
BNL-ATLAS	US	T1	RAL-LOG2	UK	T1	0.29+/-0.51	45183	3.71+/-1.71	2697	21.06+/-15.41	879	1.5	1.7	1.9	0.0	18.2	229.0	n/a	
Taiwan-LOG2	TW	T1	FZK-LOG2	DE	T1	0.83+/-1.08	280	4.70+/-2.82	36	16.37+/-9.10	125	1.9	2.0	2.3	0.0	0.1	2.0	1.15	
INFN-T1	IT	T1	Taiwan-LOG2	TW	T1	0.29+/-0.46	540	1.87+/-0.76	6	0.00+/-0.00	0	1.7	2.0	2.3	0.0	0.0	0.0	n/a	
pic	ES	T1	RAL-LOG2	UK	T1	0.61+/-0.31	5202	6.32+/-2.22	216	20.80+/-9.55	4	1.5	2.4	2.5	0.0	57.5	357.0	n/a	
BNL-ATLAS	US	T1	IN2P3-CC	FR	T1	1.63+/-2.05	101375	15.30+/-6.78	28627	39.26+/-12.94	5481	2.5	3.3	4.4	0.0	0.0	0.0	1.34	
NDGF-T1	ND	T1	Taiwan-LOG2	TW	T1	0.09+/-0.13	4488	1.40+/-0.62	67	19.33+/-0.81	5	3.7	3.8	4.3	0.0	0.0	0.0	n/a	
IN2P3-CC	FR	T1	Taiwan-LOG2	TW	T1	0.36+/-0.57	4641	3.58+/-2.00	3840	9.12+/-6.52	1067	3.3	4.2	5.3	0.0	0.0	0.0	n/a	
FZK-LOG2	DE	T1	RAL-LOG2	UK	T1	0.47+/-0.74	70705	7.44+/-6.32	7598	14.03+/-16.74	6770	2.8	4.4	9.9	0.0	24.2	193.0	n/a	
RAL-LOG2	UK	T1	Taiwan-LOG2	TW	T1	0.06+/-0.19	13355	0.96+/-0.34	528	0.00+/-0.00	0	6.7	6.7	6.7	0.0	0.6	5.0	n/a	

WAN data access (WN-SE)



# Data Mining

- While we have a lot of data, making some sense out of it is not obvious
  - Measurements span different time periods
  - They measure different things (while all related to network)
  - They might be affected by other measurements and/or events
- Therefore one might need to look
  - Correlations in time
  - Correlations in the topology

# Data Mining: examples

- Time correlation
  - During a PS throughput test, was there any known activity in the same link?
  - There is packet loss, does this appears as degraded performance somewhere at the same time
- We observe loss of performance in some network link
  - Is it a network problem and where?
  - Is it a storage problem?



# Possible steps

- Analyze the existing data, mine the information looking for known issues in the past
- Make the system predictive, identify issues as they appear, before the user notices