Usage Patterns of the Planetary Data System

Phase I Presentation

Kate Martin
Mark Avnet

March 23, 2006
ESD.342 Advanced System Architecture

Overview of the Planetary Data System


Image courtesy of NASA.

ESD.342 Advanced System Architecture
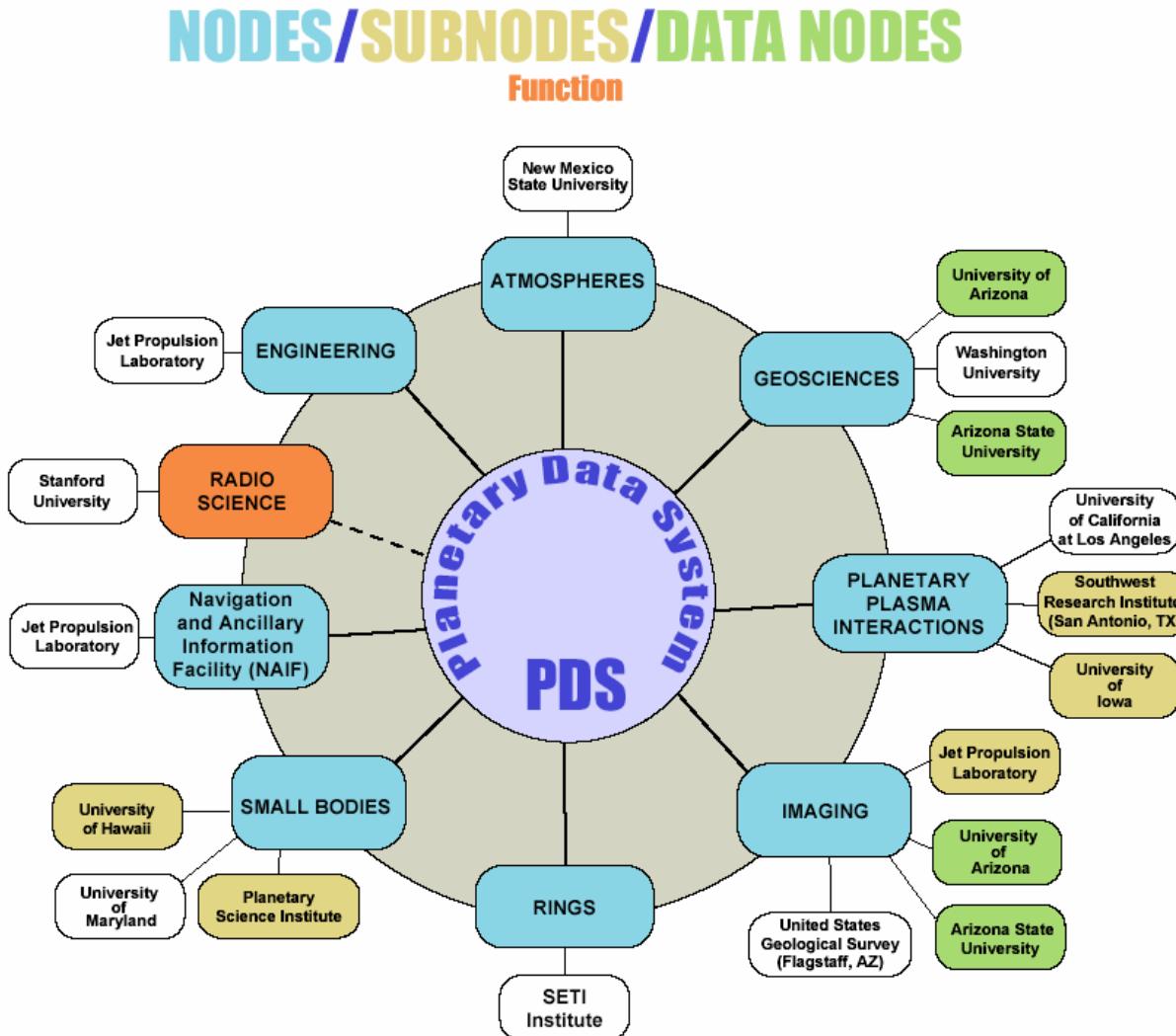
Collaborations of Data Suppliers

Data Summary
1047 unique datasets
~700 with authors recorded
~30% in UCINET
(Geosciences, Rings, Part of Small Bodies,)

Network Representations
- Collaboration Network
- Bipartite Network

Data Set ID	Data Set Description / Long Name	Instrument Host	Node	Subnode	Author 1	Author 2
VL1/VL2-M-LR-2-EDR	S LABELED F	VL2	Geosciences		G.V.Levin	P.A.Straat
VO1/VO2-M-IRTM-4	HERMAL MAF	VO2	Geosciences		H.H.Kieffer	
VO2-M-RSS-4-LOS-GRAVITY	JBSYSTEM R	VO2	Geosciences		W.L.Sjogren	
CO-D-CDA-3/4/5-DUST-V1.0	f the Cassini C	CO	SBN	DUST	N.Altobelli	S.Kempf
DI/EAR-C-KECK1LWS-3-9P-IMAGES-PHOT-V1.0	Y.Fernandez e	KECK1	SBN	COMET	Y.R.Fernandez	C.M.Lisse
DS1-C-IDS-3-RDR-BORRELLY-V1.0	from the DS1	DS1	SBN	COMET	M.D.Henry	
DS1-C-MICAS-2-EDR-VISCCD-BORRELLY-V1.0	S instrument d	DS1	SBN			
DS1-C-MICAS-5-BORRELLY-DEM-V1.0	and illuminated	DS1	SBN	COMET	R.L.Kirk	J.Oberst
DS1-C-PEPE-2-RAW-DATA-V1.0	during the Dec	DS1	SBN			
EAR-A-2CP-3-RDR-ECAS-V3.1	sociated data	VARGBTEL	SBN	ASTEROID	B.Zellner	D.J.Tholen

… Author 31 →

Collaborations of Data Suppliers
Bipartite Collaboration Network

■ 205 datasets

● 193 authors

Bipartite Networks
- Datasets
- Nodes/subnodes
- Data target
- Instrument host

What do scientists
consider similar
problems?

And, are collaborations
constrained?
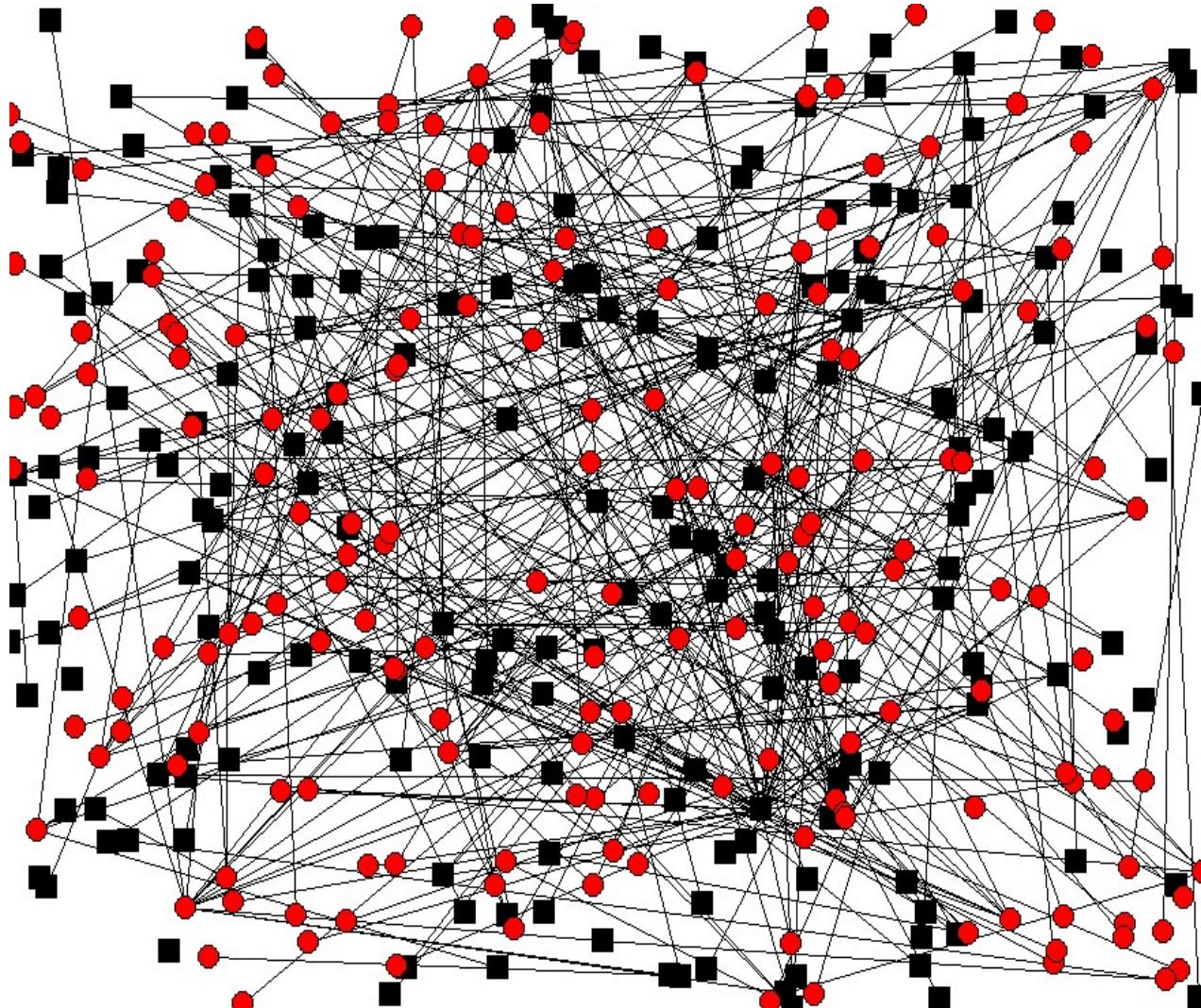
Collaborations of Data Suppliers
Collaboration Network

● authors

193 authors

Do communities map
to PDS nodes?
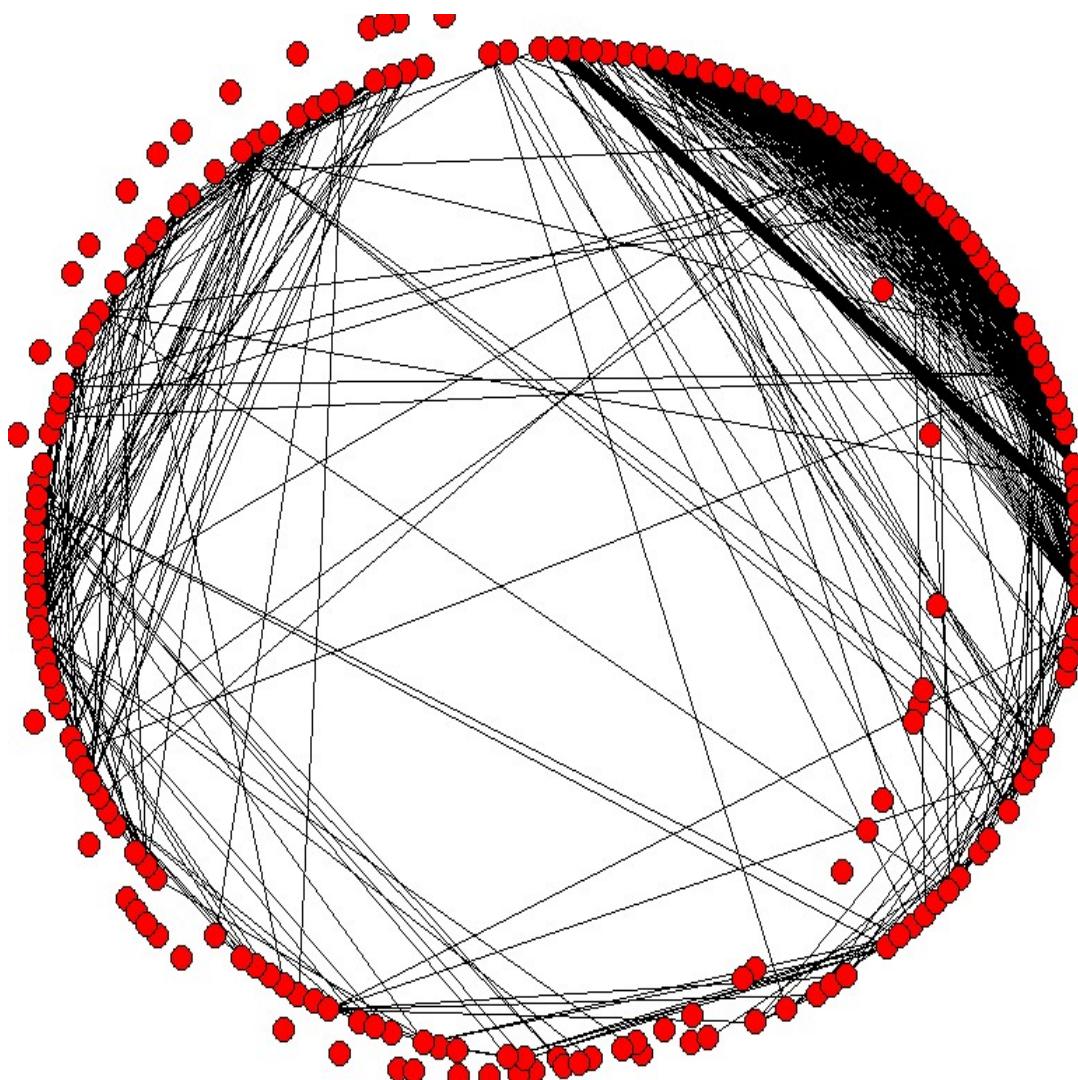
Collaboration Network
Component Structure

Component	Nodes	Proportion
1	17	0.088
2	48	0.247
3	5	0.026
4	8	0.041
5	10	0.052
6	33	0.170
7	3	0.015
8	1	0.005
9	1	0.005
10	1	0.005
11	4	0.021
12	1	0.005
59	1	0.005

Do communities map to PDS nodes?

Planetary Data System

Image courtesy of NASA.

ESD.342 Advanced System Architecture
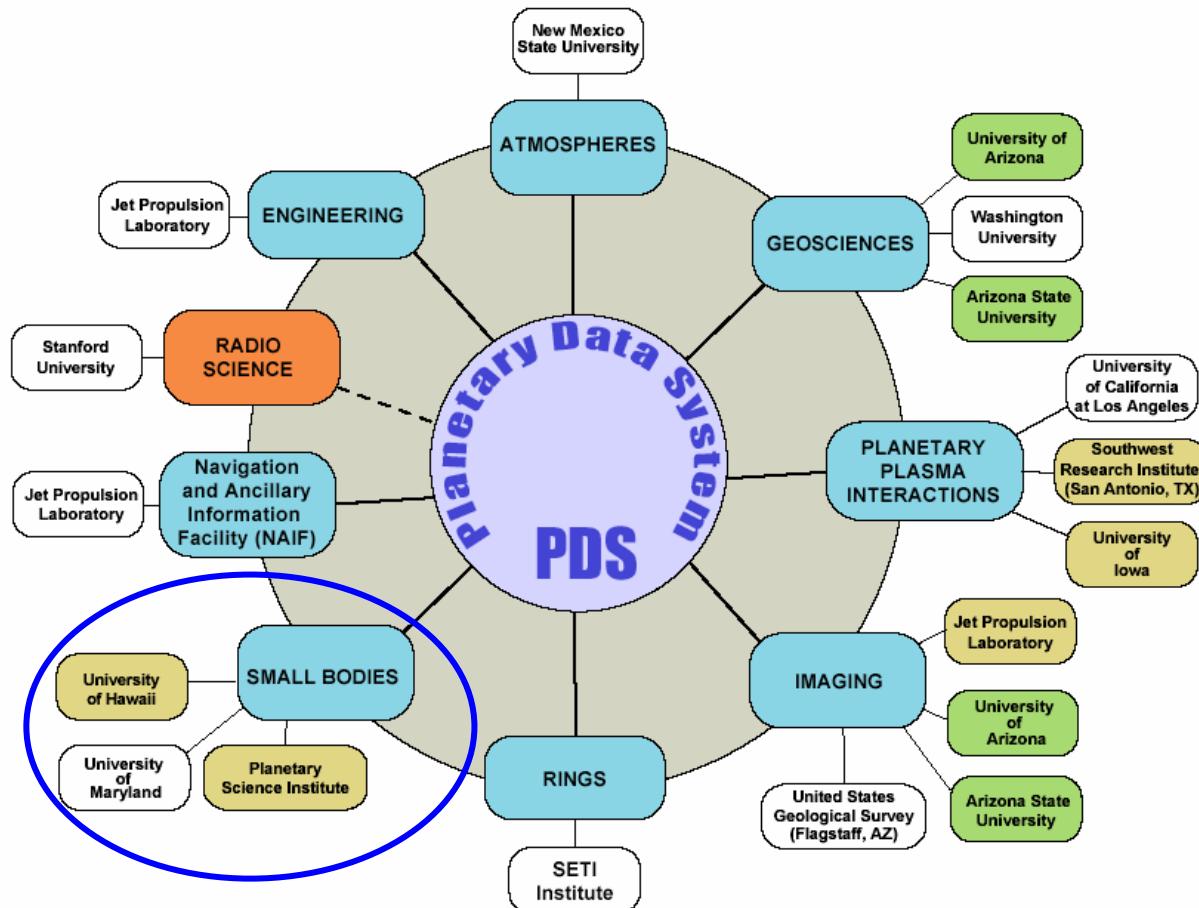
Behavior of Data Users

Image courtesy of NASA.
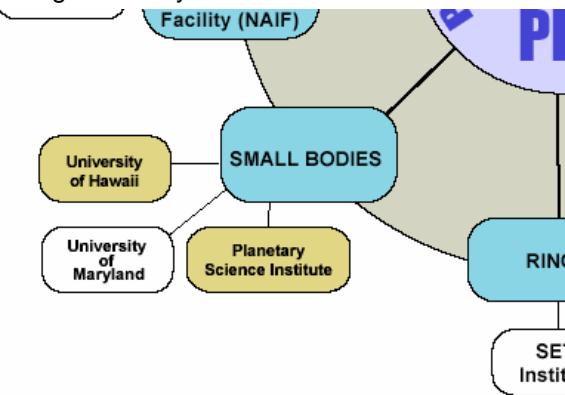
Overall data usage by sub-node

	UMD	PSI	Net
	-----	-----	-----
Internet File Transfer ("selected")	80371	10420	90791
Internet Mbyte Transfer ("sele cted")	42011	1990	44001
Unique IP addresses	4800	2395	6840*
No. of CDs distributed	0	0	0
No. of tables distributed	0	0	0
No. of special orders	0	0	0
No. of special processing hours	1.0	0.0	1.0

<u>Example: Small Bodies Node</u>

<u>Sub-nodes</u>
Comets at UMD
Asteroids at U. of Hawaii and PSI
(Dust at U. of Arizona)

Data downloads by sub-node and by:
domestic hosts and foreign hosts

```
reqs:    bytes: host
----: -------- : ----
   1:    28560:           dfw -gate5.raytheon.com
   2:    18320:  dhcp -9687b3b2.rescomp.arizona.edu
   1:    10800:           love325.me.gatech.edu
   1:   159680:        arbiter.astro.indiana.edu
   1:    14800:              mac18.bilby.nau.edu
   1:     2688:  conundrum.earth.northwestern.edu
   1:  1289171:     geo191.geology.ohio  -state.edu
   1:     5680:     rescomp  -05-70458.stanford.edu
```

Does higher usage correspond to nodes with
user-friendly acquisition procedures?

ESD.342 Advanced System Architecture

Summary of Future Work

- Complete data entry
- Examine different bipartite networks
- Relate community structure to PDS nodes
- Obtain user download data for other nodes
- Construct host-node networks

Image courtesy of NASA.

ESD.342 Advanced System Architecture