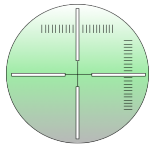
End-Site Control Plane Service (ESCaPeS) Monitoring with Perisc  pe

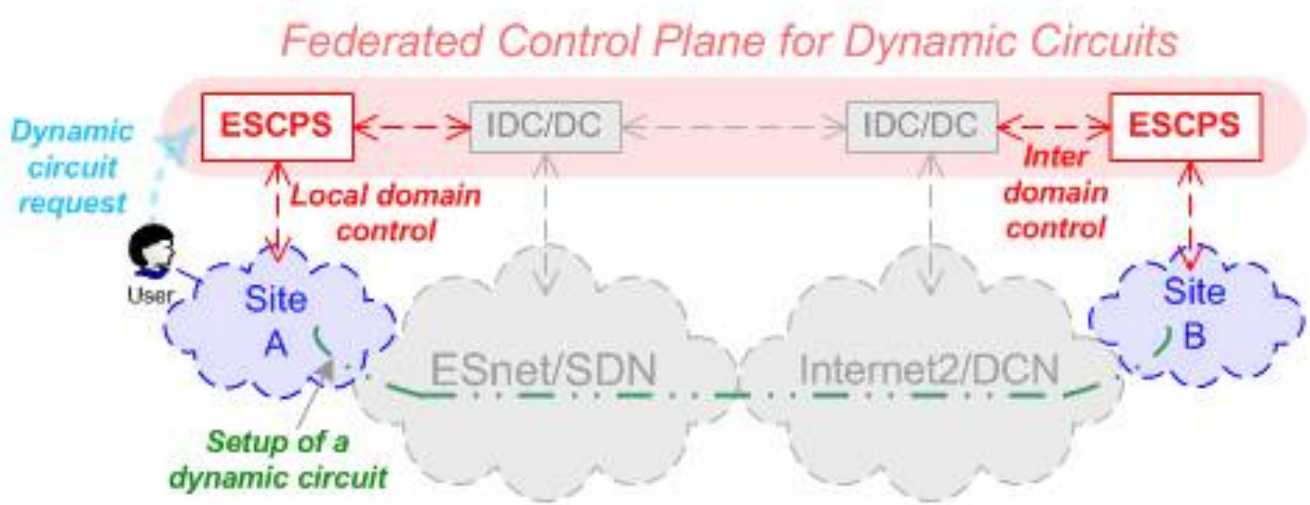
Martin Swany

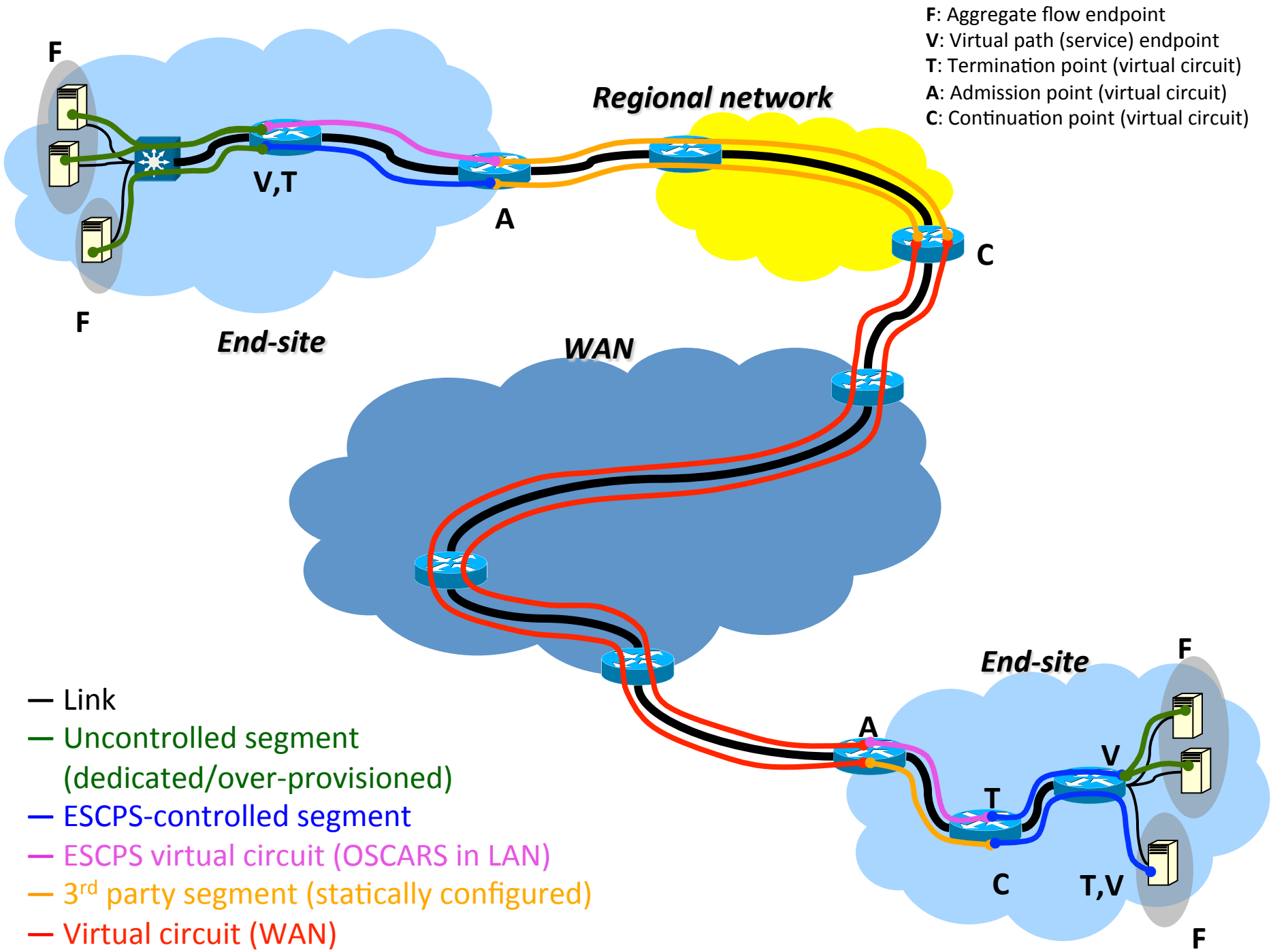
U. Delaware

(Indiana University effective 8.1.11)

End Site Control Plane System (ESCPS)

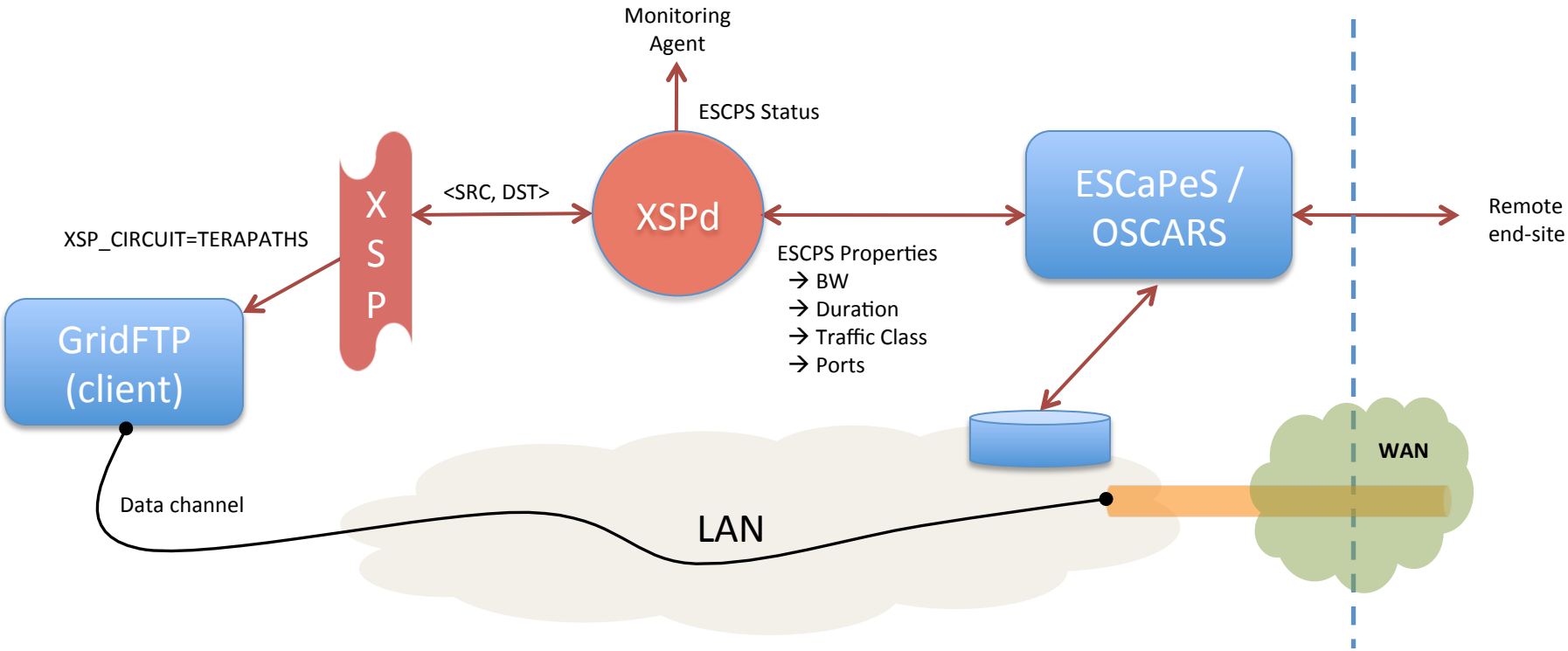
- Network service to facilitate site use of circuit services:
  - Accept and process user/app requests for circuit services
  - Provide local interface to & coordination of WAN circuit services
  - Configure local network infrastructure for use of circuits
  - Monitor local network segments of end-to-end path
  - Long term vision: End site component of federated control plane for circuit services




F: Aggregate flow endpoint
V: Virtual path (service) endpoint
T: Termination point (virtual circuit)
A: Admission point (virtual circuit)
C: Continuation point (virtual circuit)
F
V,T
A
Regional network
C
F
End-site
WAN
End-site
F
A
V
T
C
T,V
F
Link
Uncontrolled segment
(dedicated/over-provisioned)
ESCPS-controlled segment
ESCPS virtual circuit (OSCARS in LAN)
3rd party segment (statically configured)
Virtual circuit (WAN)

XSP – eXtensible Session Protocol

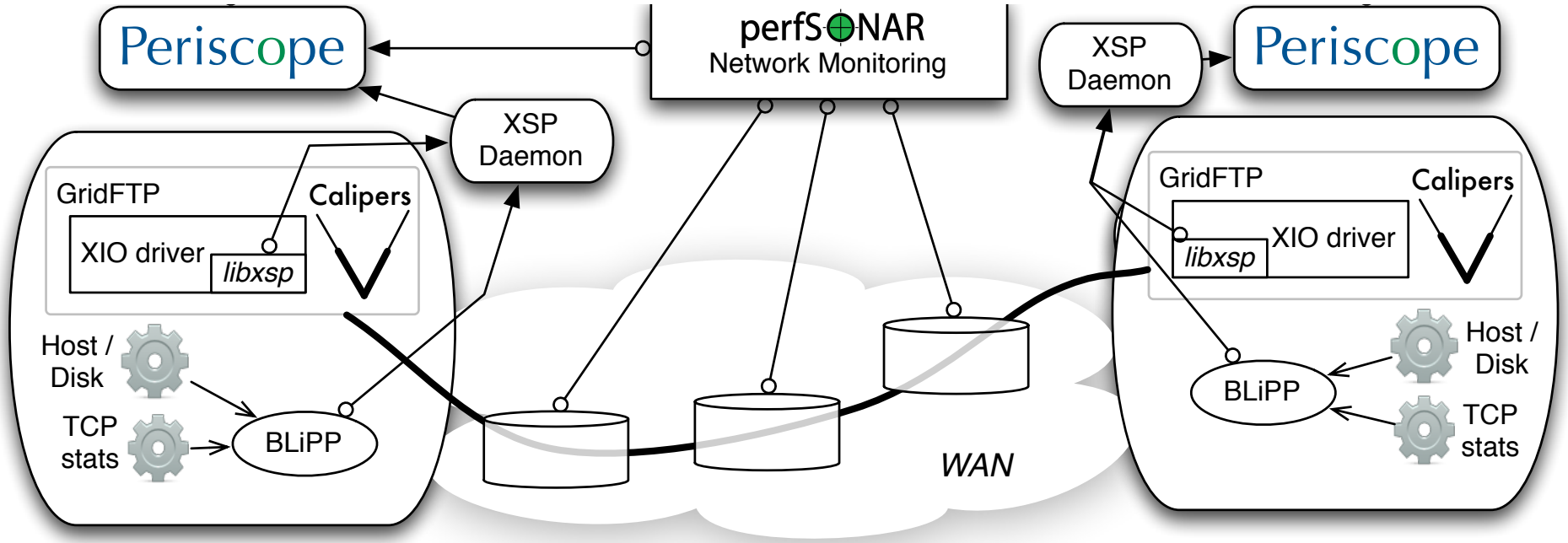
- XSPd implements protocol frontend
  - Accepts on-demand reservation requests from clients
  - Signals ESCaPeS to allocate a circuit and monitors circuit status



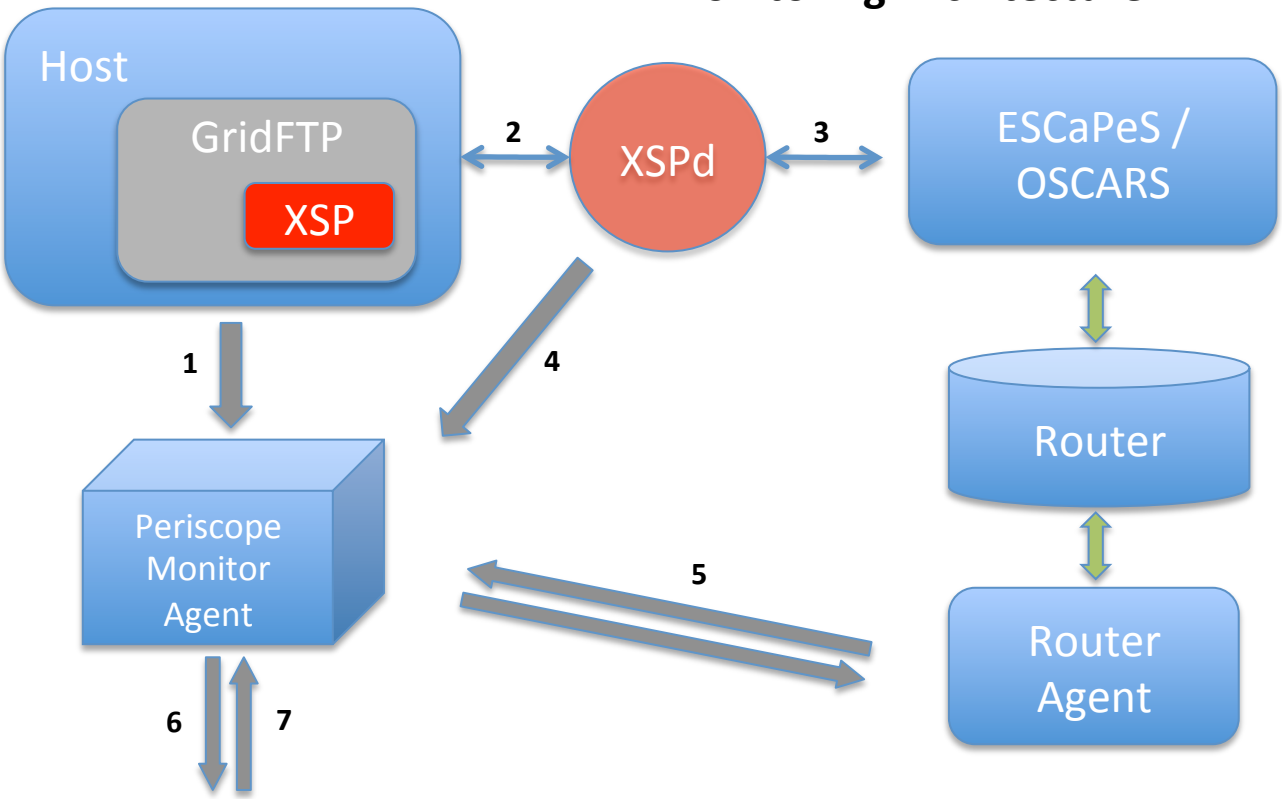
Periscope

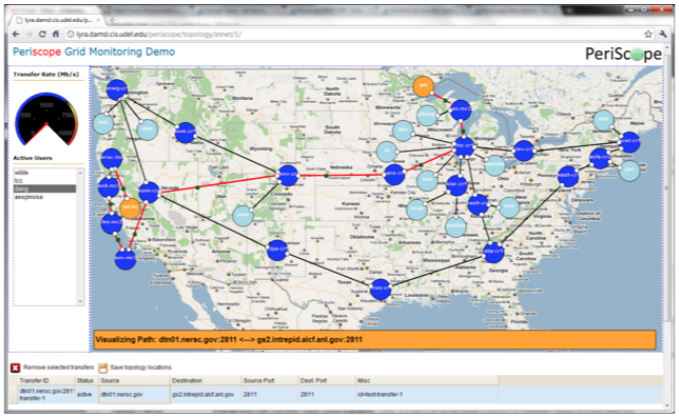
- A Django-based application that gathers, caches, analyzes and displays performance data
  - Also presents data via RESTful and WS interfaces
- A user- (or session-) oriented tool that captures context
- Proactive gathering of data improves response time
  - Caching the user's world

Monitoring Overview



Monitoring Architecture



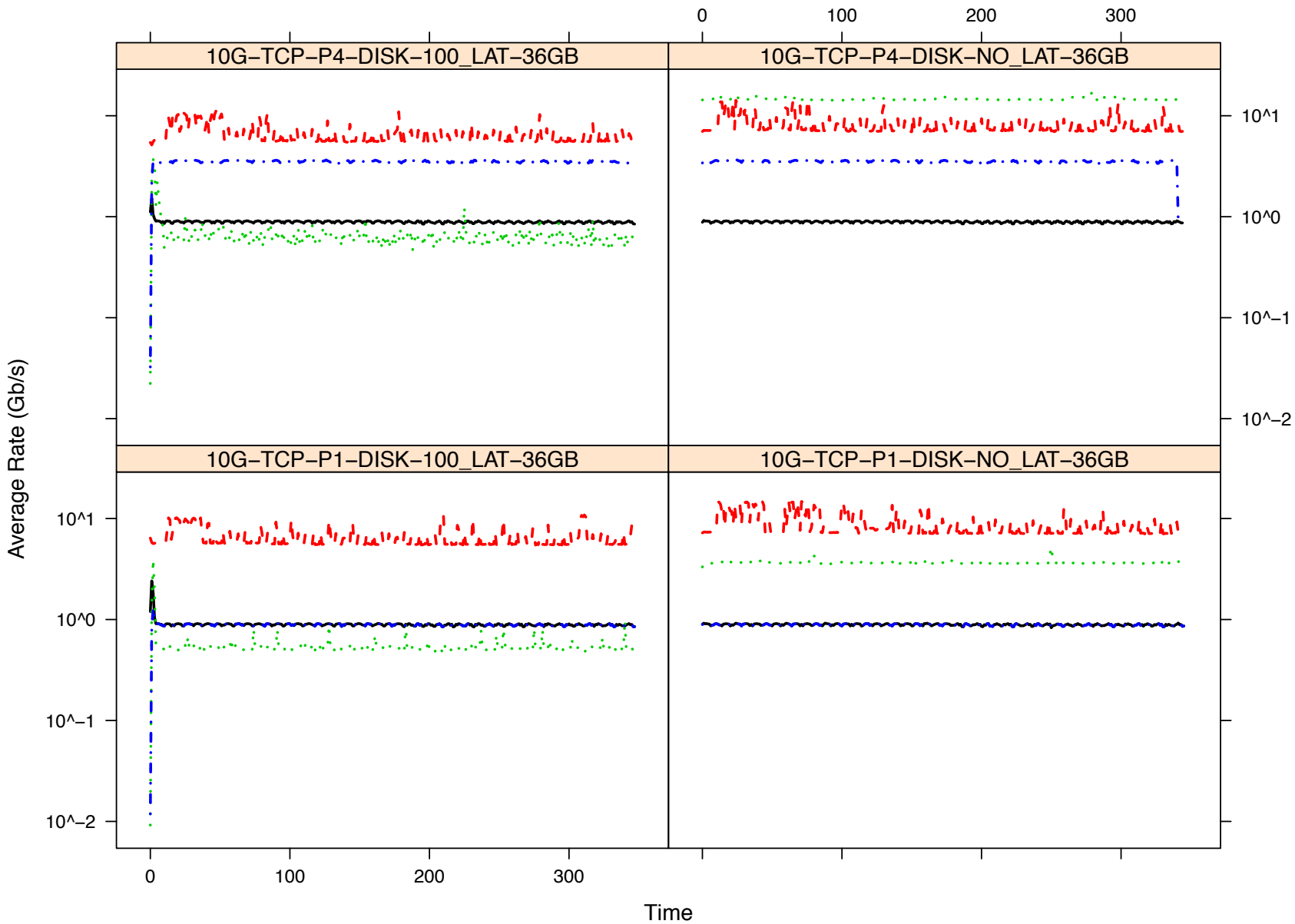


1. Host statistics collection and reporting with event daemon.
2. XSP client requests path on application request, sends path and application-specific parameters.
3. XSPd signals ESCPS to reserve path based on local config.
4. XSPd monitors path status and reports state to monitoring agent.
5. Agent requests Filter based forwarding or policy based routing counters from router monitor when path is active.
6. Monitoring agent caches measurement data (SNMP).
7. The agent visualizes the network topology and handles client requests for dynamically updated charts and path status.

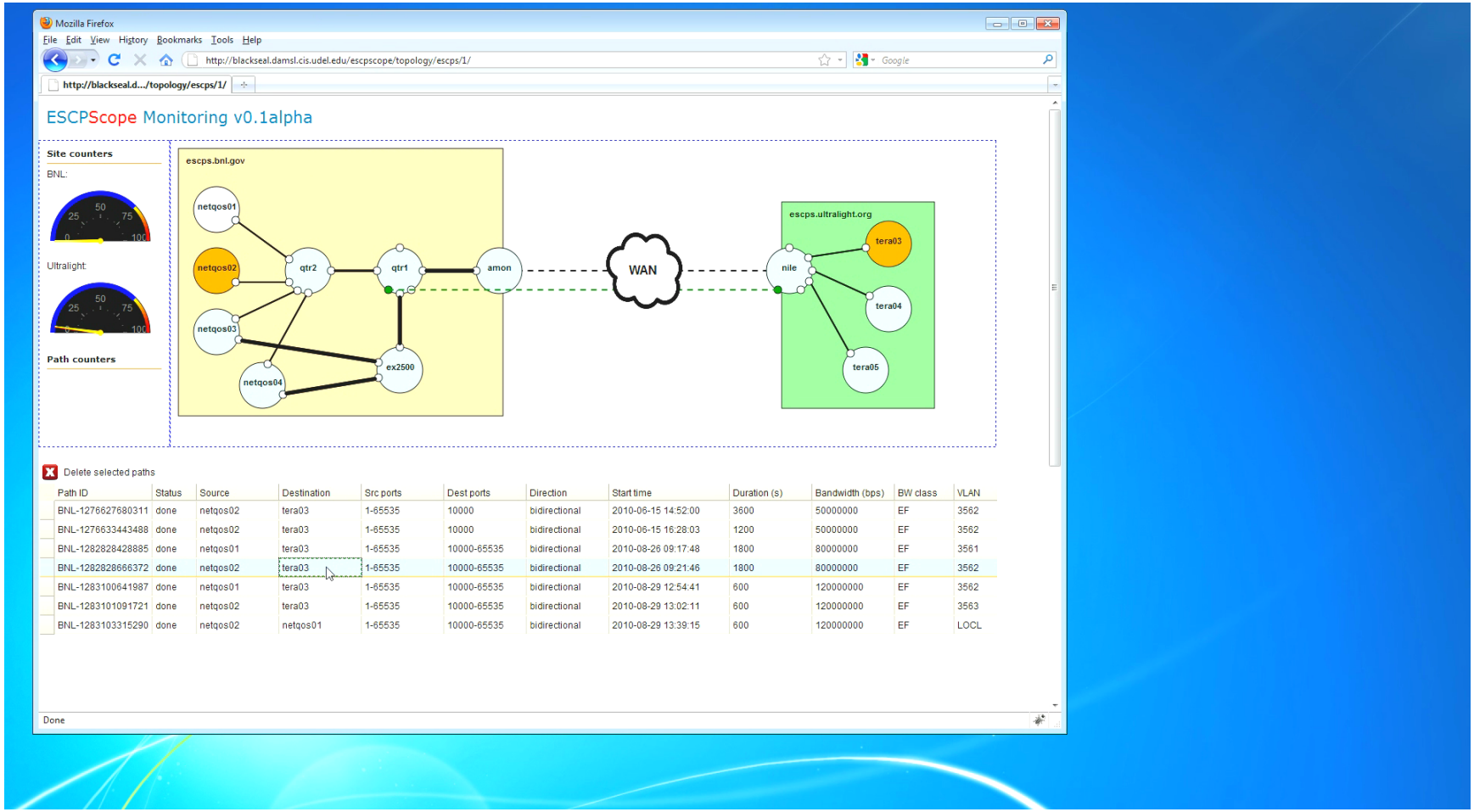
Host and Application Metrics

- Basic Lightweight perfSONAR Probes (BLiPPs) gather host performance data
  - From /proc, etc
- NetLogger and Calipers instrument read() and write() system calls, calculate duration, summarize over time with varying granularity

Application Metrics

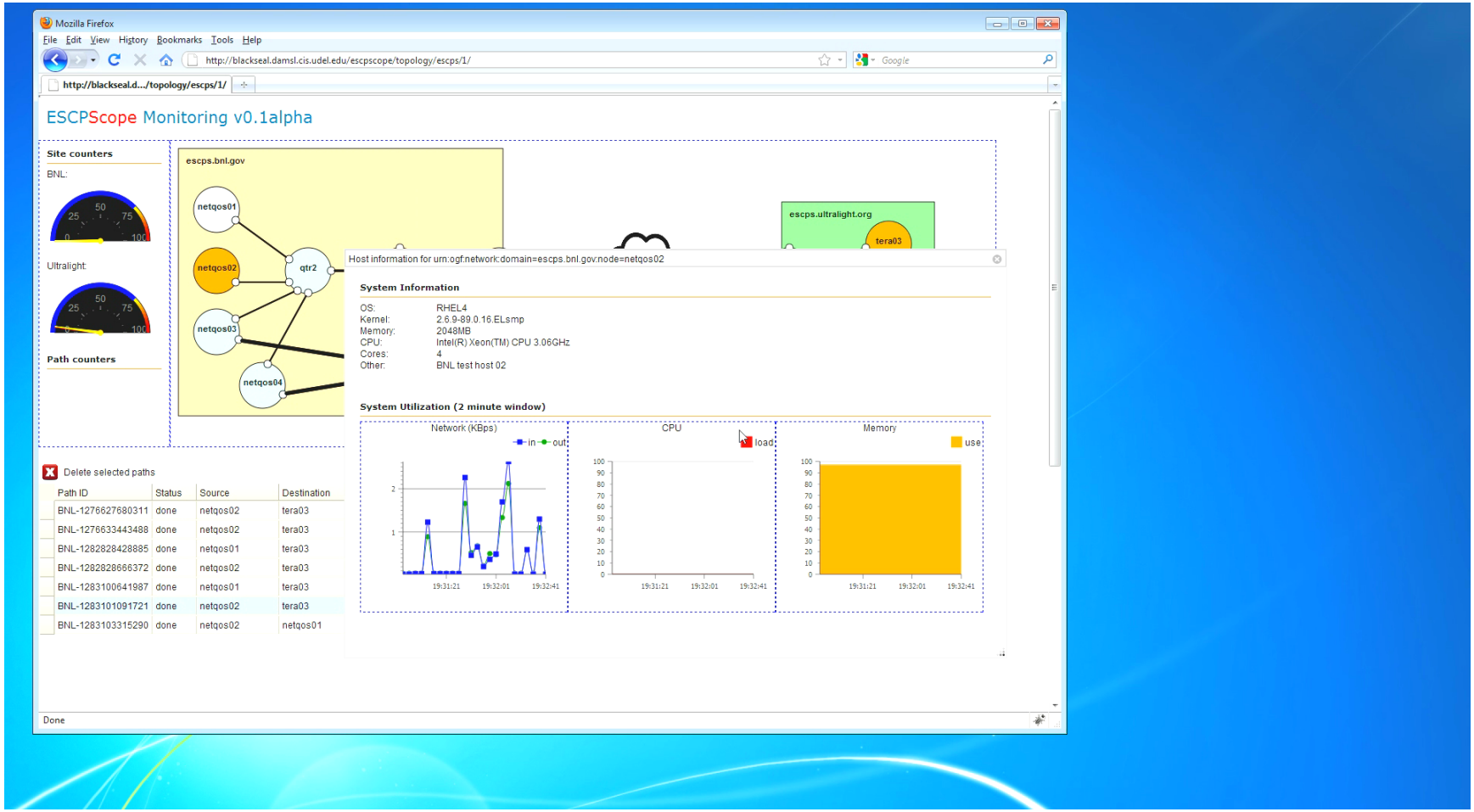


ESCaPeS Monitoring

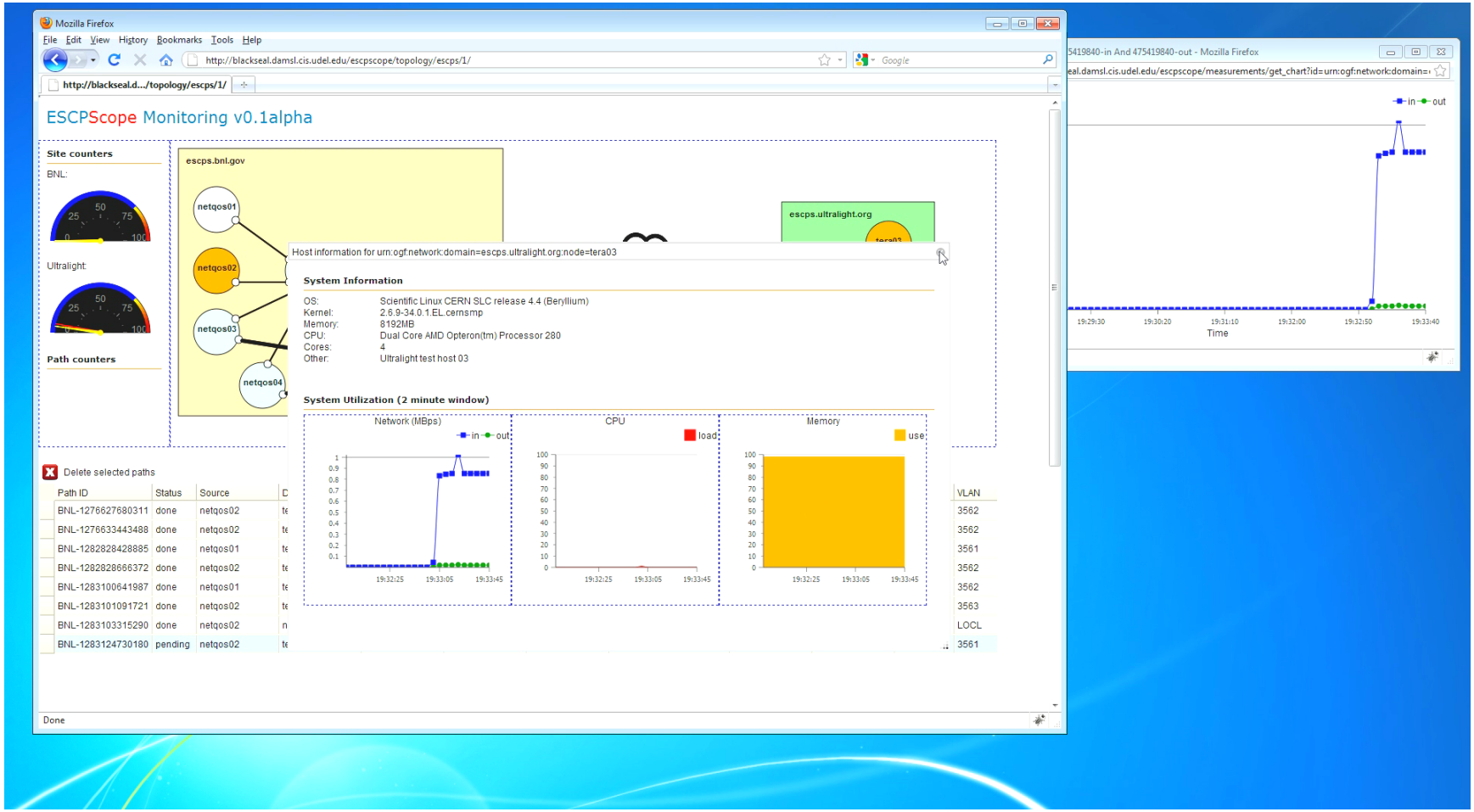


Path ID	Status	Source	Destination	Src ports	Dest ports	Direction	Start time	Duration (s)	Bandwidth (bps)	BW class	VLAN
BNL-1276627680311	done	netqos02	tera03	1-65535	10000	bidirectional	2010-06-15 14:52:00	3600	50000000	EF	3562
BNL-1276633443488	done	netqos02	tera03	1-65535	10000	bidirectional	2010-06-15 16:28:03	1200	50000000	EF	3562
BNL-1282828428885	done	netqos01	tera03	1-65535	10000-65535	bidirectional	2010-08-26 09:17:48	1800	80000000	EF	3561
BNL-1282828666372	done	netqos02	tera03	1-65535	10000-65535	bidirectional	2010-08-26 09:21:46	1800	80000000	EF	3562
BNL-1283100641987	done	netqos01	tera03	1-65535	10000-65535	bidirectional	2010-08-29 12:54:41	600	120000000	EF	3562
BNL-1283101091721	done	netqos02	tera03	1-65535	10000-65535	bidirectional	2010-08-29 13:02:11	600	120000000	EF	3563
BNL-1283103315290	done	netqos02	netqos01	1-65535	10000-65535	bidirectional	2010-08-29 13:39:15	600	120000000	EF	LOCL

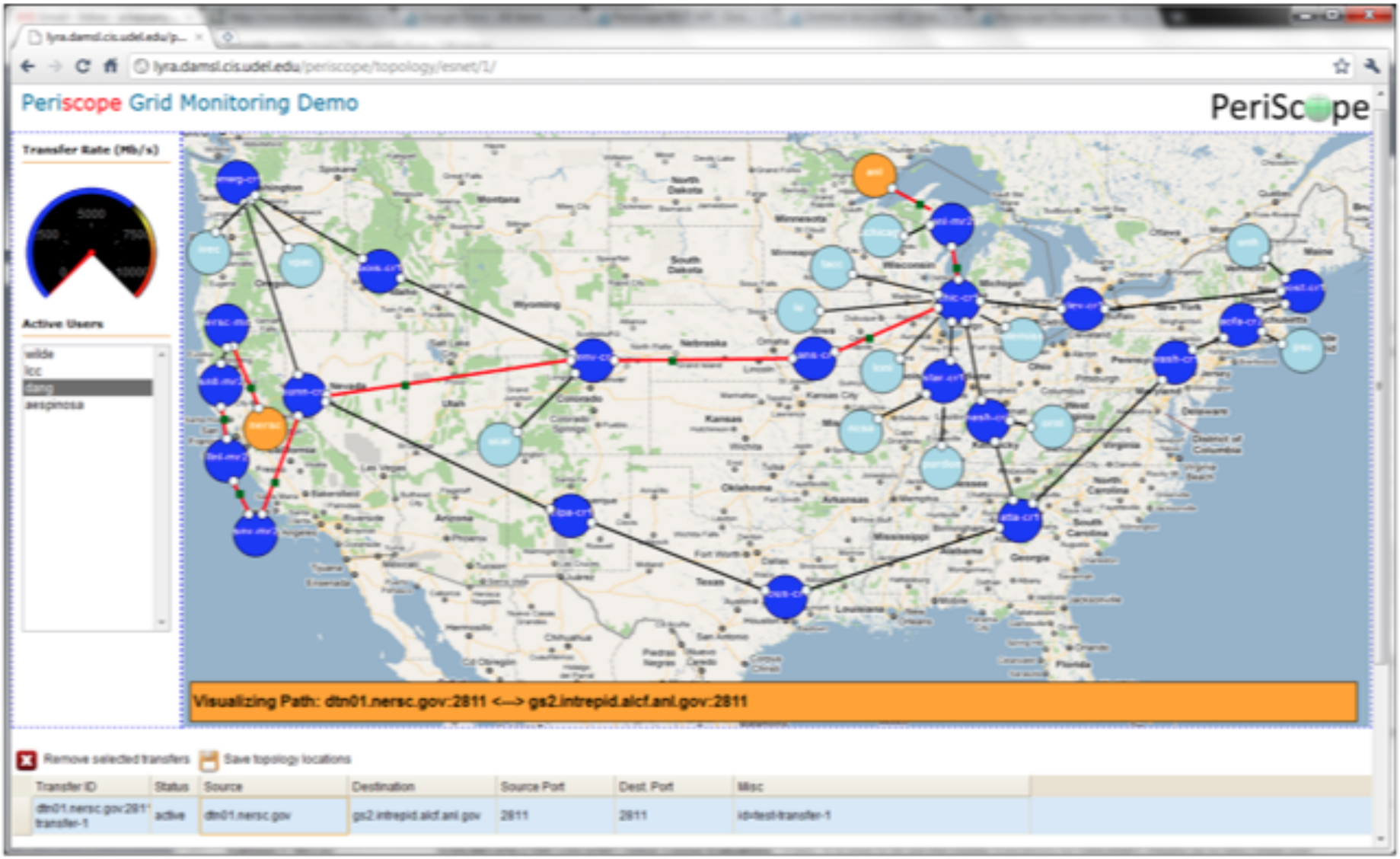
ESCaPeS Monitoring



ESCaPeS Monitoring

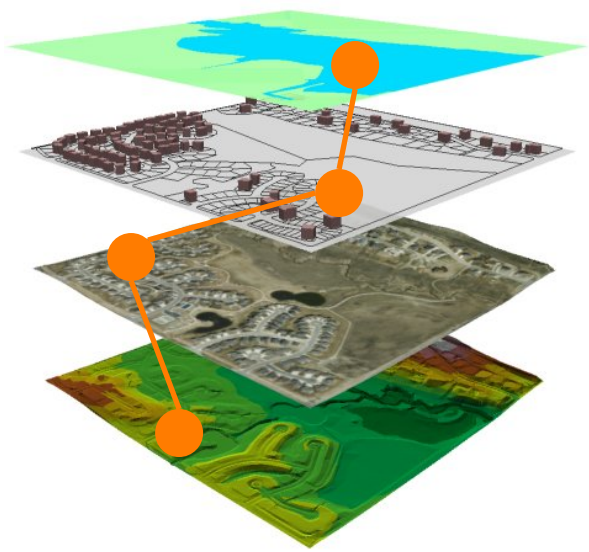


GridFTP Monitoring

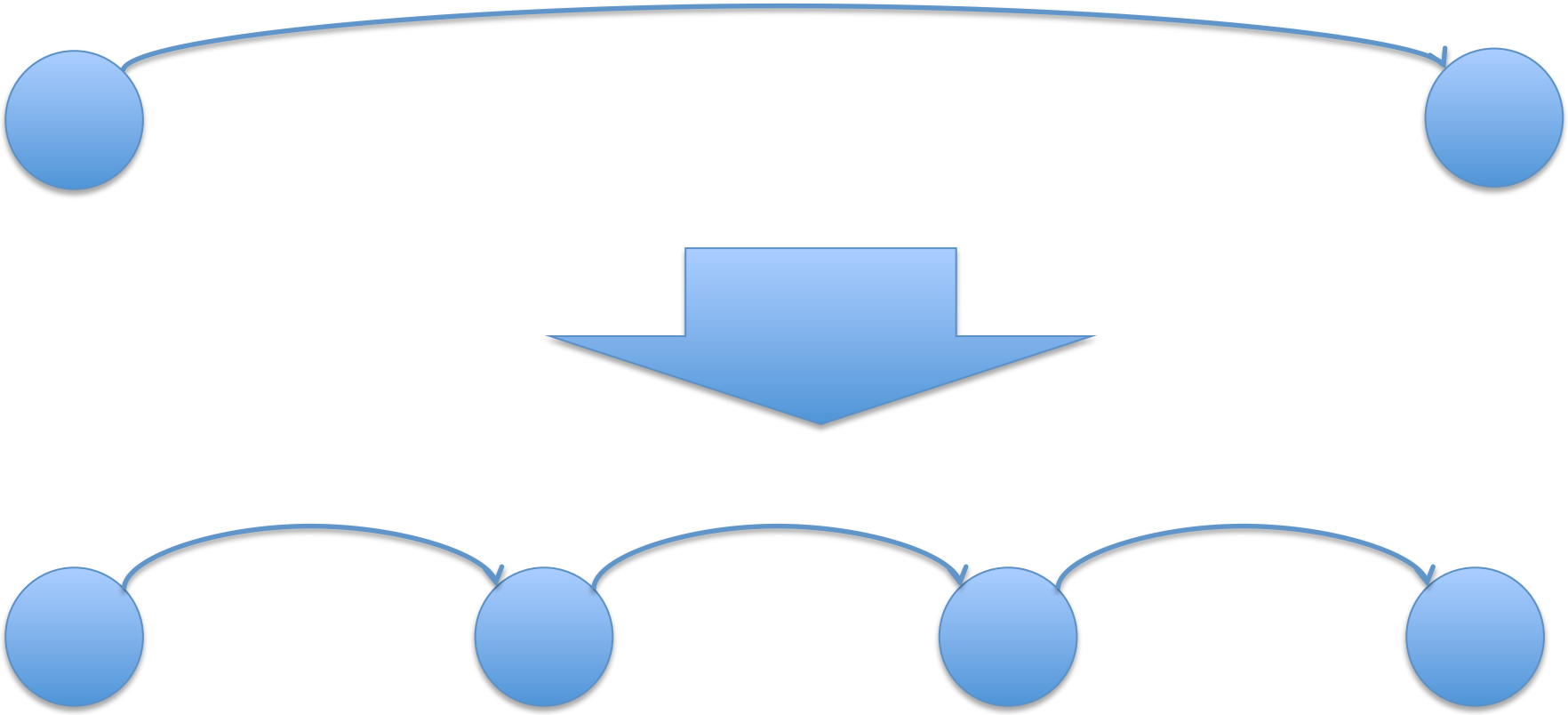


Unified Network Information Service (UNIS)

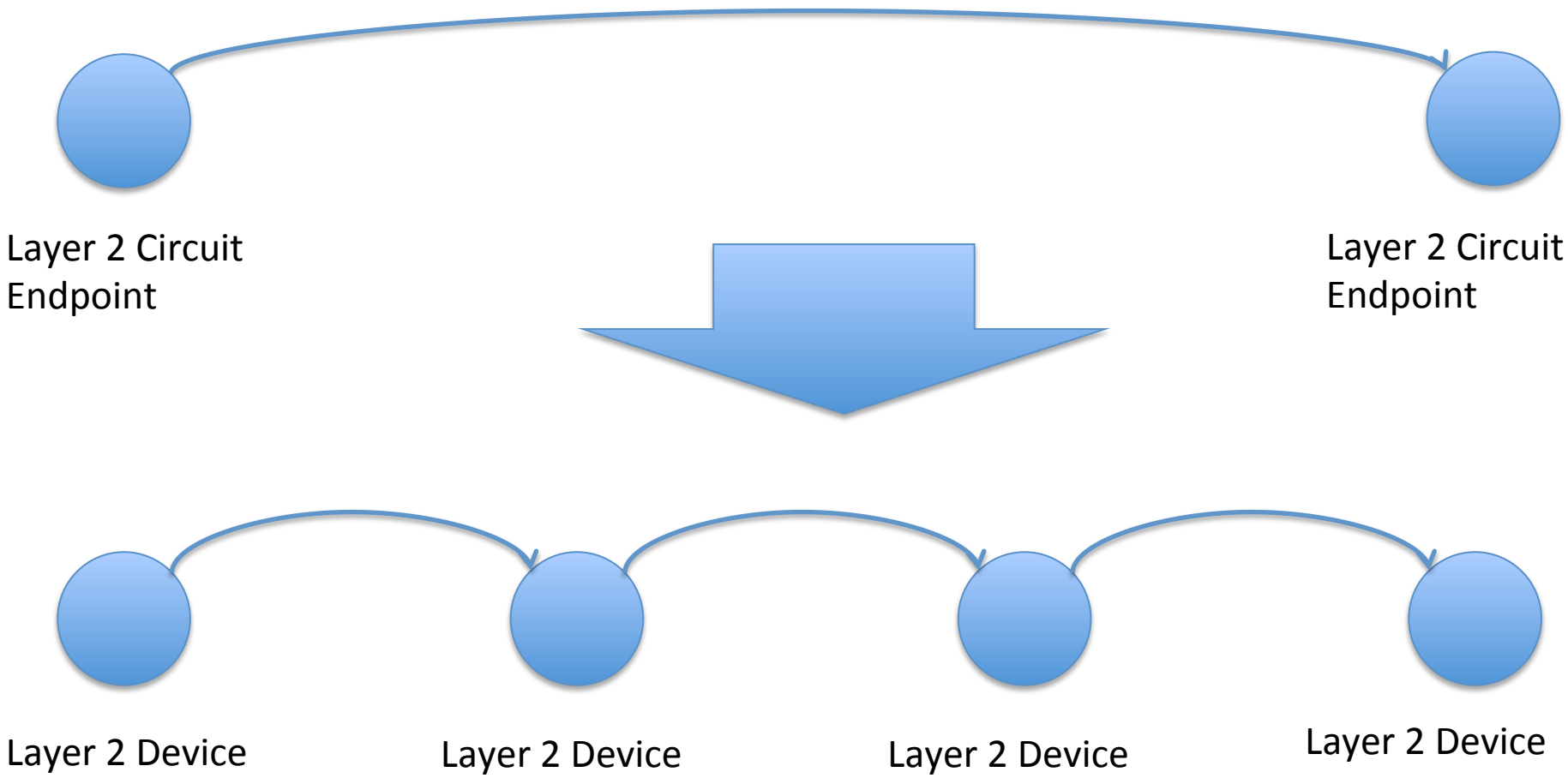
- Merges TS & LS
- Topology model
  - Tree of nodes at different layers (Network/Node/Port)
  - *Relations* between arbitrary nodes
  - Node properties
- 'GIS for networks'
- Relates MPs, MAs to topology



Links and Paths (and Links)



Links and Paths (and Links)



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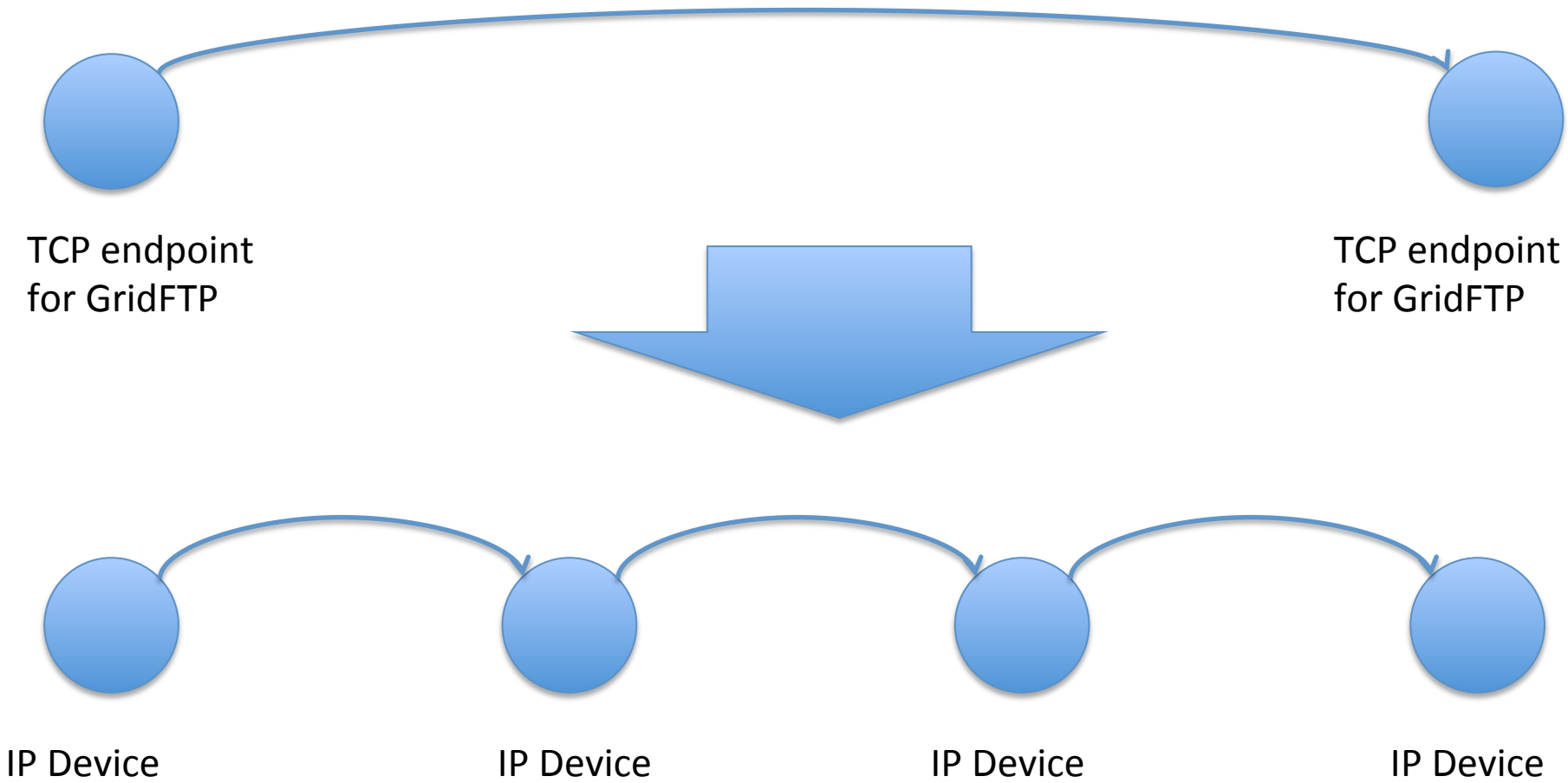

Circuit Monitoring

- Another perfSONAR circuit monitoring approach (for DYNES and DYGER) polls OSCARS for reservations and relies on ESxSNMP's ability to detect new interfaces
- Periscope relies on integration with the control plane
- This allows creation of the router monitoring agent and the host metrics with BLiPP
- Also facilitates active measurements (coming soon)

Thanks

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