Automate GOLE Pilot

GLIF – CERN

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Automated GOLE Pilot

- Working group met at spring 2010 and agreed to create pilot
- Pilot is to be a long running service, up for at least a year after initial demo (today)
- Pilot creates an “Inter-GOLE Infrastructure” that allows users to schedule a connection between Infrastructure edges
- GOLEs participating are NetherLight, MANLAN, StarLight, JGN2, CernLight, NorthernLight, CzechLight, UvA and PSNC – others may join

- Initial version of service available today – basic capabilities work
  - Need to be hardened and enhanced
  - Need applications to use and exercise the Pilot
  - More discussion about future usage later in presentation

Pilot Goals and Capabilities

- Allow users to reserve connection between edge ports of GOLEs
- Connection may be long term or “dynamic”

- Can be used in different ways, pilot provides ability to have applications and networks experiment with different ways of using

- Pilot will last at least a year
  - Software and infrastructure will evolve over that time
  - Need real applications to figure exercise and help shape the evolution

- Initial demo uses resources controlled by GOLE providers
  - Demo happens after this meeting
- Plan to demo at SC in a month with at least one new “real” application
- Need to add additional applications over pilot timeframe to understand *how* pilot should evolve

Demo Overview

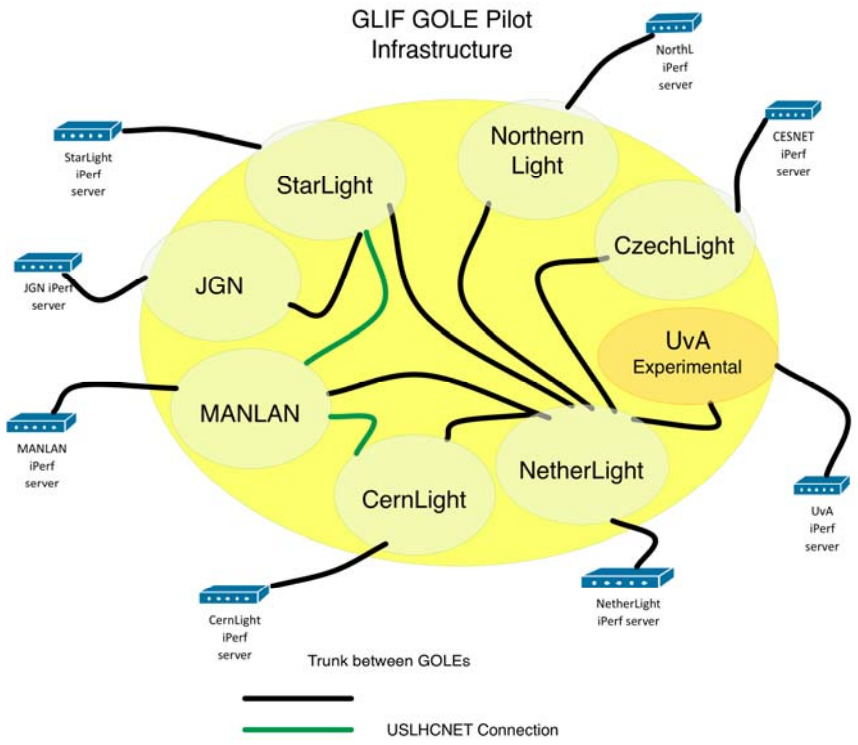
- Demo shows the very recently completed implementation of Automated GOLE pilot
- Demo shows capability of using common software interface to control switching in multiple GOLEs
- Shows multiple GOLEs on three continents interoperating to create dynamic VLANs
- All applications in this demo are on GOLE provider controlled resources

Automated GOLE demo data plane infrastructure

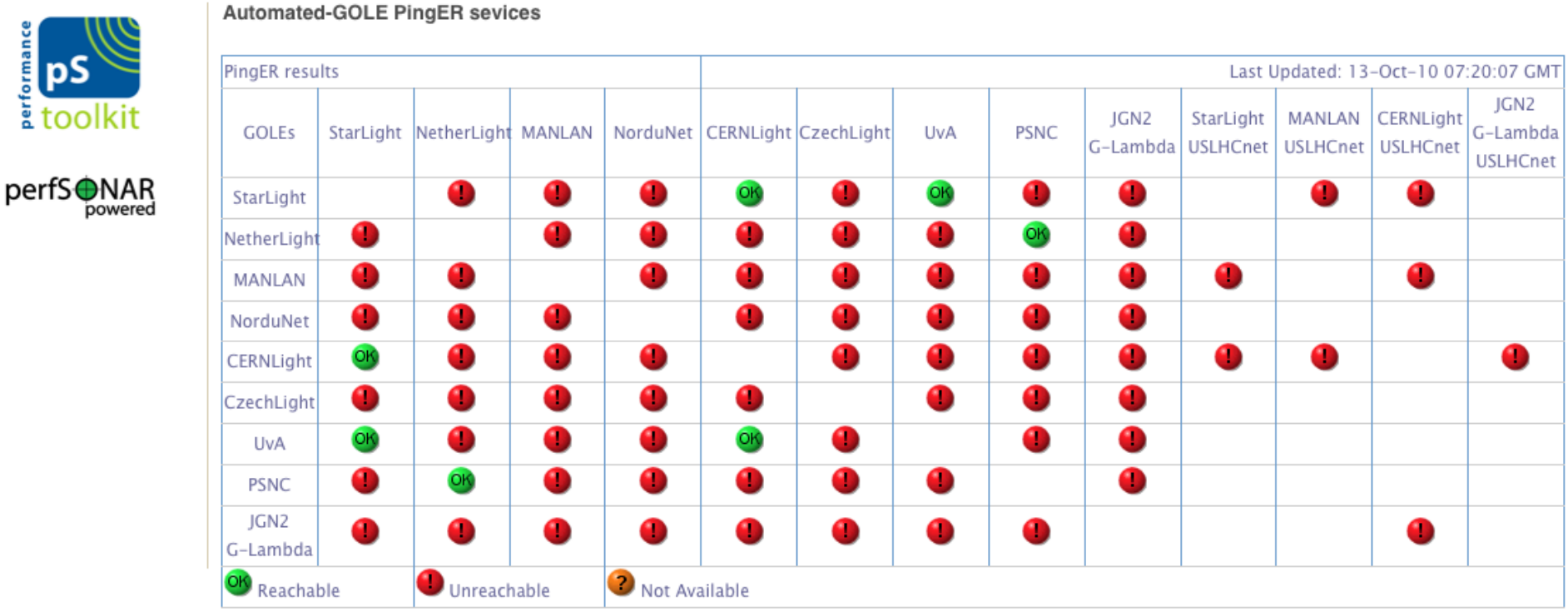
Demo consists of

- network infrastructure
- Set of servers, one at each GOLE

- Demo dynamically creates a connection between each server
- Pings between servers
- Displays show when pings are active



Pilot Demo display



Automated-GOLE PingER sevices

PingER results — Last Updated: 13-Oct-10 07:20:07 GMT

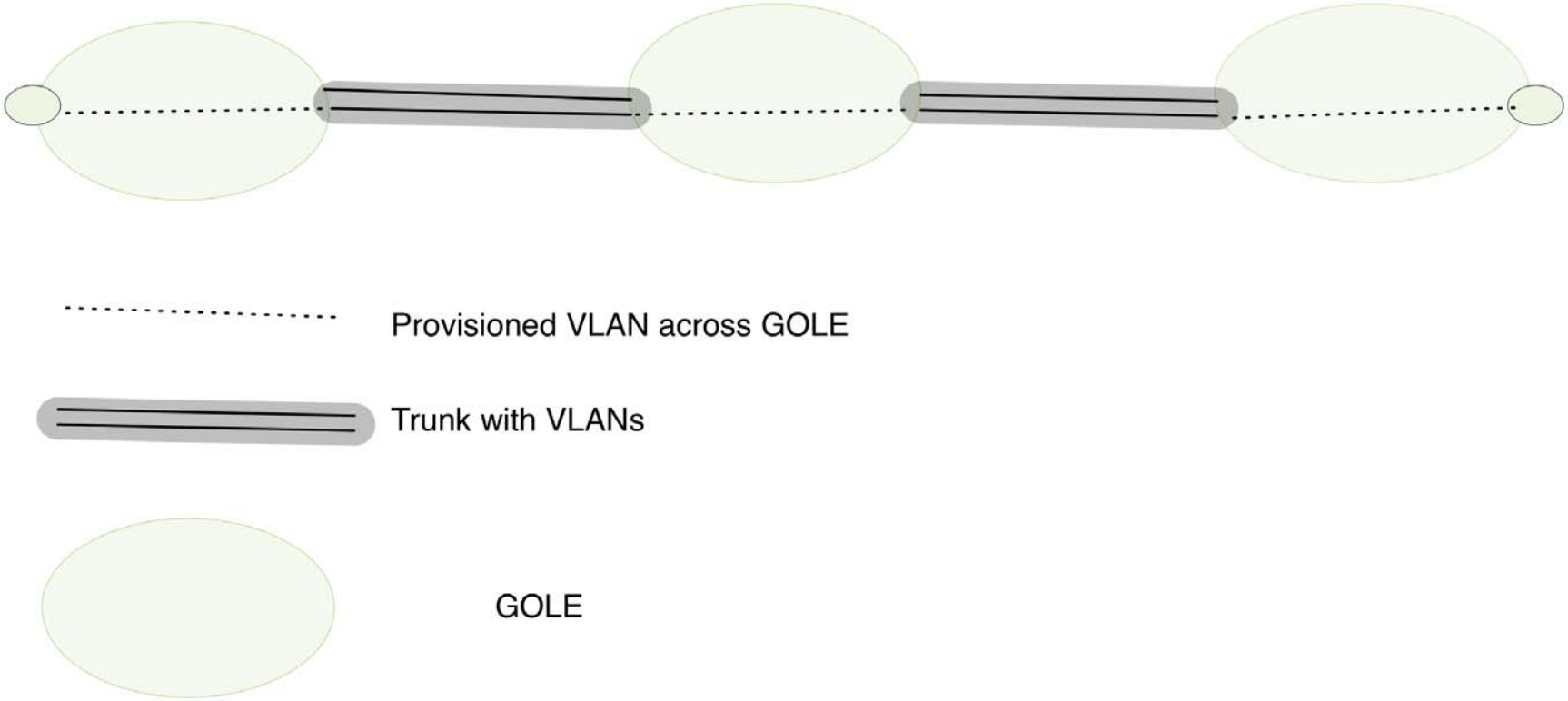
GOLEs	StarLight	NetherLight	MANLAN	NorduNet	CERNLight	CzechLight	UvA	PSNC	JGN2 G-Lambda	StarLight USLHCnet	MANLAN USLHCnet	CERNLight USLHCnet	JGN2 G-Lambda USLHCnet
StarLight		!	!	!	OK	!	OK	!	!		!	!	
NetherLight	!		!	!	!	!	!	OK	!				
MANLAN	!	!		!	!	!	!	!	!	!		!	
NorduNet	!	!	!		!	!	!	!	!				
CERNLight	OK	!	!	!		!	!	!	!	!	!		!
CzechLight	!	!	!	!	!		!	!	!				
UvA	OK	!	!	!	OK	!		!	!				
PSNC	!	OK	!	!	!	!	!		!				
JGN2 G-Lambda	!	!	!	!	!	!	!	!				!	

OK Reachable ! Unreachable ? Not Available

Pilot Infrastructure

- Each GOLE has a dynamically controlled switch
- Links between are of different types
  - Dedicated ethernet,
  - groups of VLANs,
  - VLANS created dynamically on USLHCNet
- Connections are VLANs that at connected at GOLEs
- VLANs are connected at multiple GOLEs to create an ete VLAN (or connection)

Making a connection

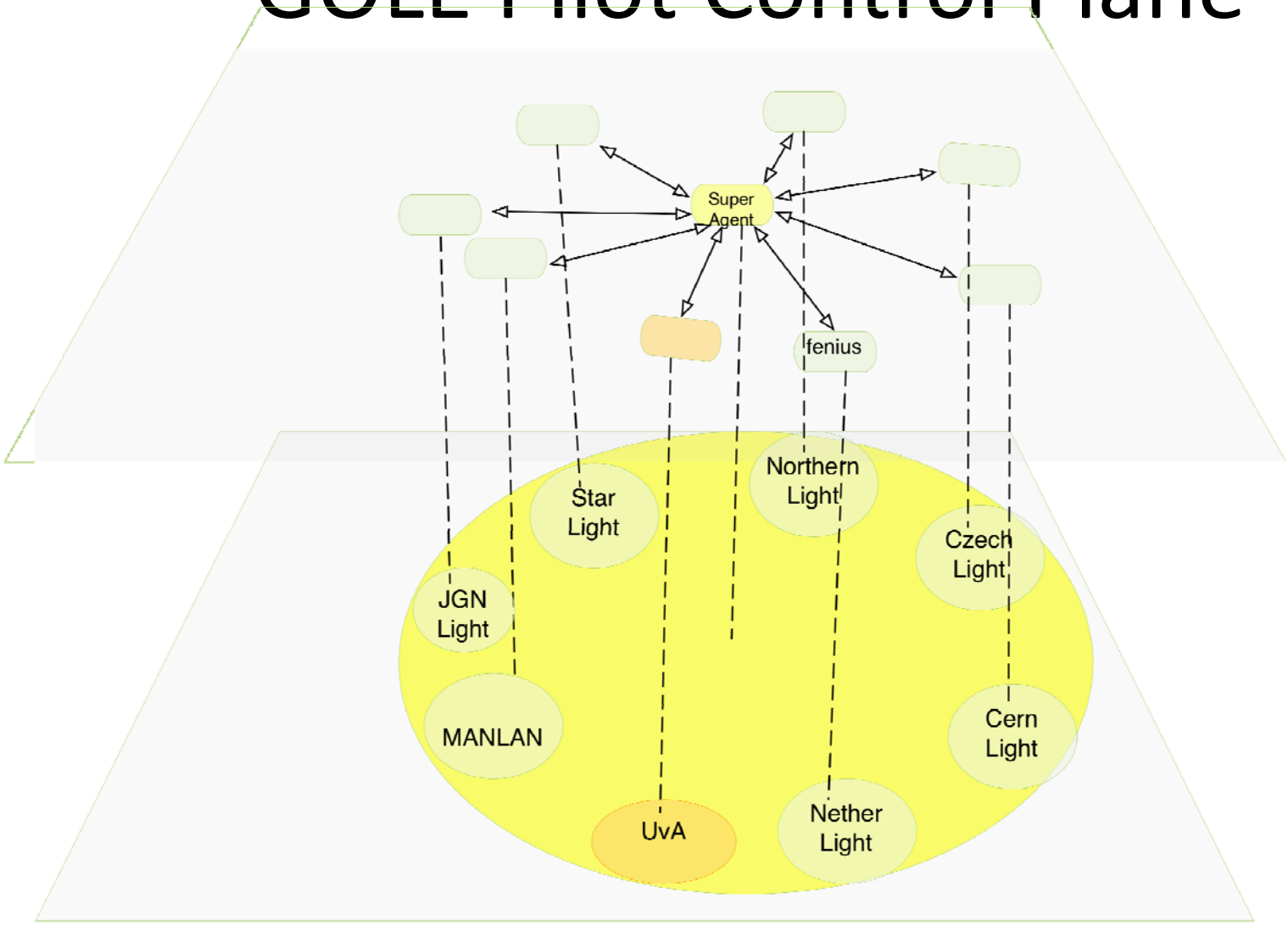


Demo Trunks

3 types of trunks exist in the demo

- Dedicated ethernets
  - VLANs on ethernet – all VLANs able to be carried
    - E.g. NetherLight to MANLAN
- Groups of VLANs sharing an ethernet with other VLANs
    - E.g. set of VLANs between StarLight and NetherLight
- Dynamic VLANs created by dynamic providerer
    - E.g USLHCNet connections between Cern and StarLight

GOLE Pilot Control Plane

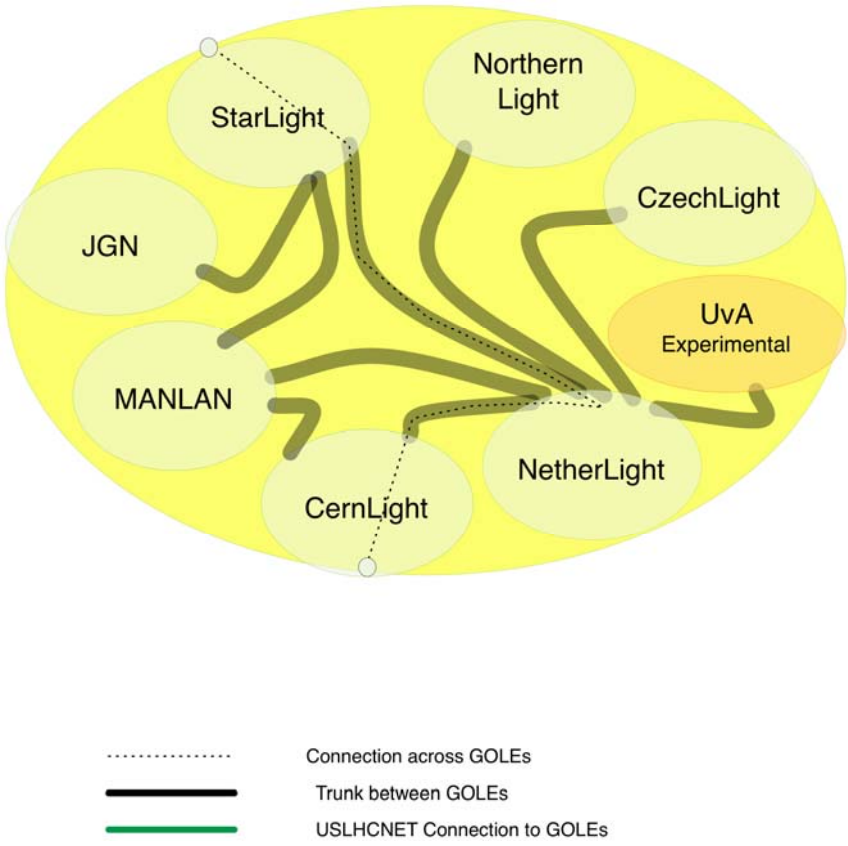


Contol of GOLEs

- Each GOLE has an Control program that can connect VLANS between ports on edge of the GOLE
- Each GOLE has implemented a common interface to their control plane
  - Interface is fenius
  - Adapted to translate requests to
    - OSCARS (Evangelo Chaniotakis)
    - DRAC (John MacAuley)
    - ARGIA (Scott Campbell)
- A SuperAgent has been implemented that will can accept a request, break it into parts controlled by different GOLEs and send requests to each GOLE
- Fenius and SuperAgent implemented by Evangelos Chaniotakis of ESNet

Demo connections

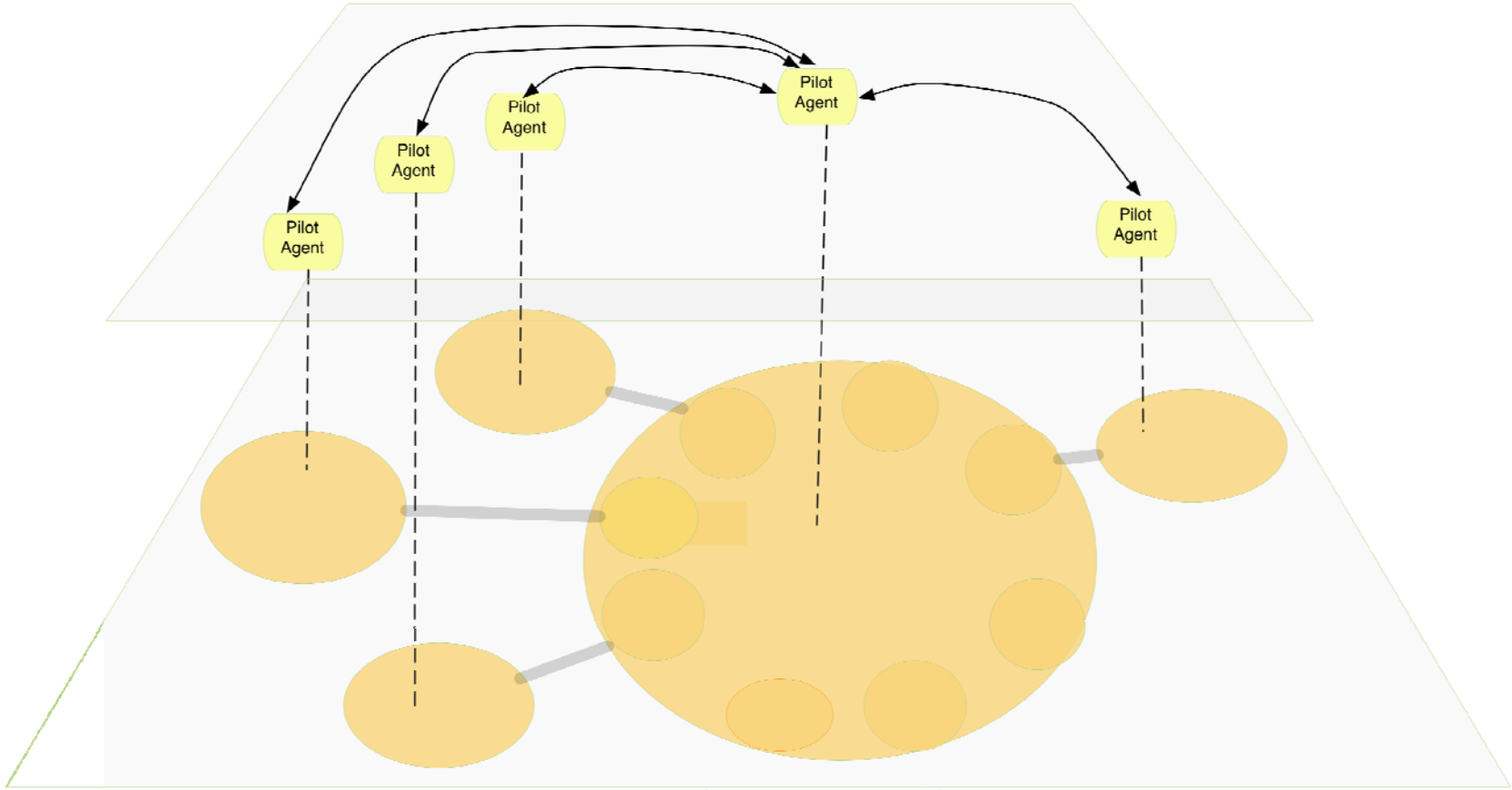
- A script schedules connections between ***most*** servers
- Some connections during the demo are made using web interface so viewers can see request interface
- Traffic on connections is created by Pings and collected and reported by perfSONAR



Automated GOLE Pilot Futures

- Applications –
  - The pilot seems most valuable for applications that want to test implementations, do demos themselves
  - Not hard operational system
  - Might be used by operators to create long term connections
  - Might be used buy applications that do ad-hoc connections
  - One application looking to use this is EAGER- a visualization project that includes LSU, NCSA, and Masaryk University

GOLE Pilot and Connecting Networks



Adding Connecting Networks to GOLE Pilot

Automated GOLE Pilot Demo

Pilot and Research

- Some issues to be resolved over time
  - Authorization and policy
    - Identifying users and what they are allowed to do
  - Topology and pathfinding
    - Defining how topology is defined and shared by GOLEs
  - Interoperation with connecting networks
  - Application user interface

What is available
Possible enhancements

- GE trunks between many GOLES
- 10GE connections between CERN and NetherLight
- 10GE over USLHCNet between
    - MANLAN-CERN
    - MANLAN-StarLight
    - StarLight-Cern
- Each GOLE has separated out pilot switch from its production
    - In long run this could become production

Pilot and Standards

- The pilot implements a common interface for creating connections
- NSI wg at OGF is developing a standard for this interface

- I suggest that GLIF agree to implement standard as it becomes available
- Will report state of current GLIF work to NSI at meeting in two weeks

Group Structure for demo

- Coordinator – John Vollbrecht
- Software implementation and deployment
  - Evangelos Chaniotakis
- Pinger and perfSONAR coordination
  - Thomas Tam
- VLAN and IP address coordination
  - Alan Verlo
- Significant contributions from many others

Next steps

- I will coordinate a report on the project and send to GLIF
- We will add applications and repeat demo at SC
- I am retiring end of November so the group will need a new coordinator
  - It has been a great pleasure to work with this group