Measurement Mesh Workshop

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INTERNET2.

Why Performance Measurements?

- Consistent behaviour in performance requires correctness
- Correctness requires the ability to find and fix problems
  - You can't fix what you can't find
  - You can't find what you can't see
- **perfSONAR lets you see the performance of your network**
- Fix problems in your infrastructure
- Prove to other that your infrastructure is behaving well
  - Many players in an end to end path
  - Ability to show correct behaviour aids in problem localisation

What is perfSONAR?

- perfSONAR is a tool to:
    - set network performance expectations
    - find network problems (*soft failures*)
    - help fix these problems
    - all in a multi-domain environment
- Standard way to publish network monitoring and performance data:
    - Your node can be public, like many (~2000) around the world
    - You can make measurements towards any public node
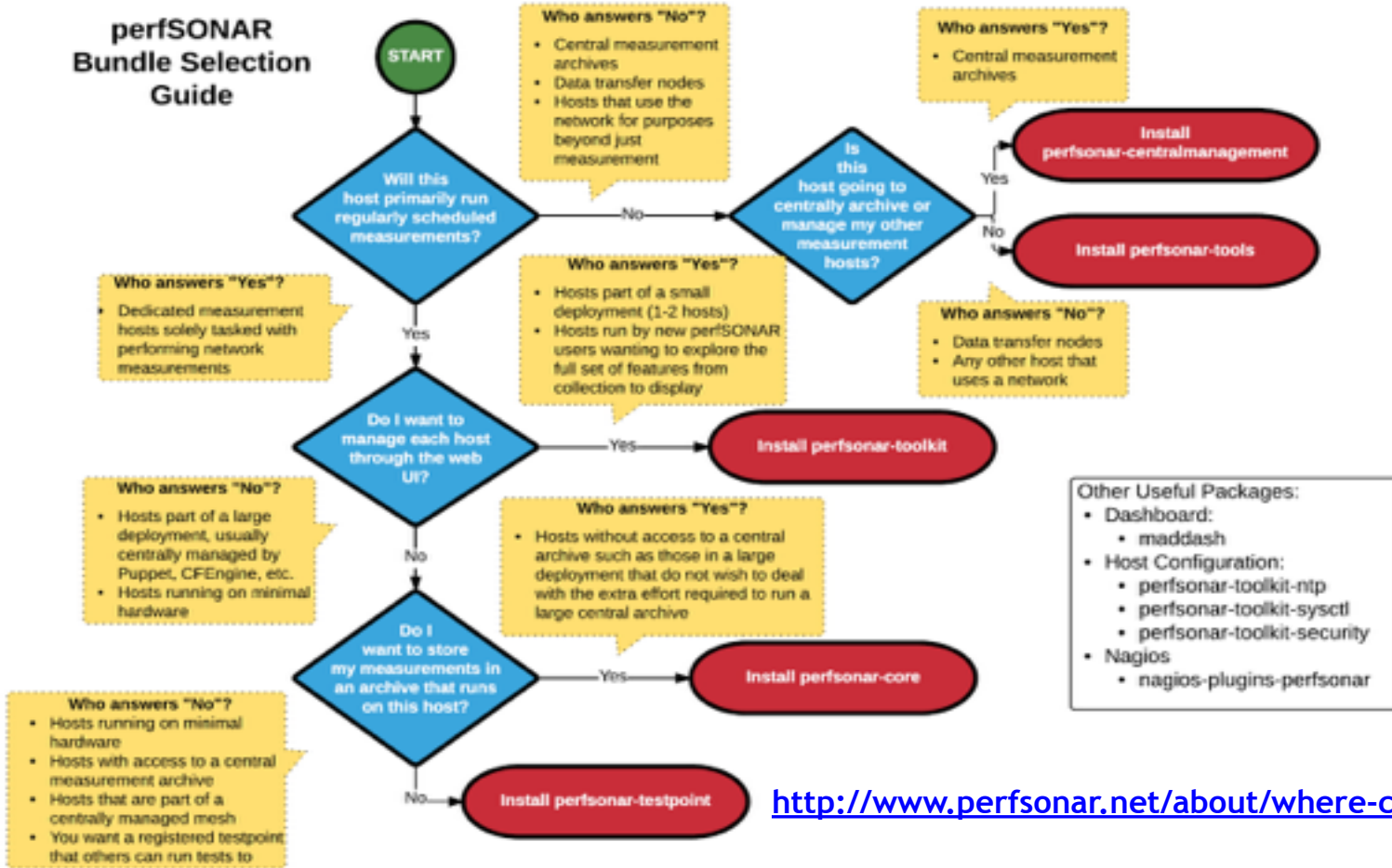   - Service Directory: http://stats.es.net/ServicesDirectory/

perfSONAR components

- Measurement tools, providing the data
- Archives, receiving and storing the data
- Middleware and scheduler: orchestrating and passing the data around
- Presentation and visualisation tools
- Administration tools

perfSONAR bundles

- Different ways to install perfSONAR
- Full toolkit install:
  - standalone and versatile
  - need a dedicated and powerful enough machine
- Bundles of components (more flexibility)
  - testpoint: make measurements
  - central server: organise, store and present measurements
  - toolkit: the toolkit, managed your way

perfSONAR Bundle Selection Guide

START

Who answers "No"?
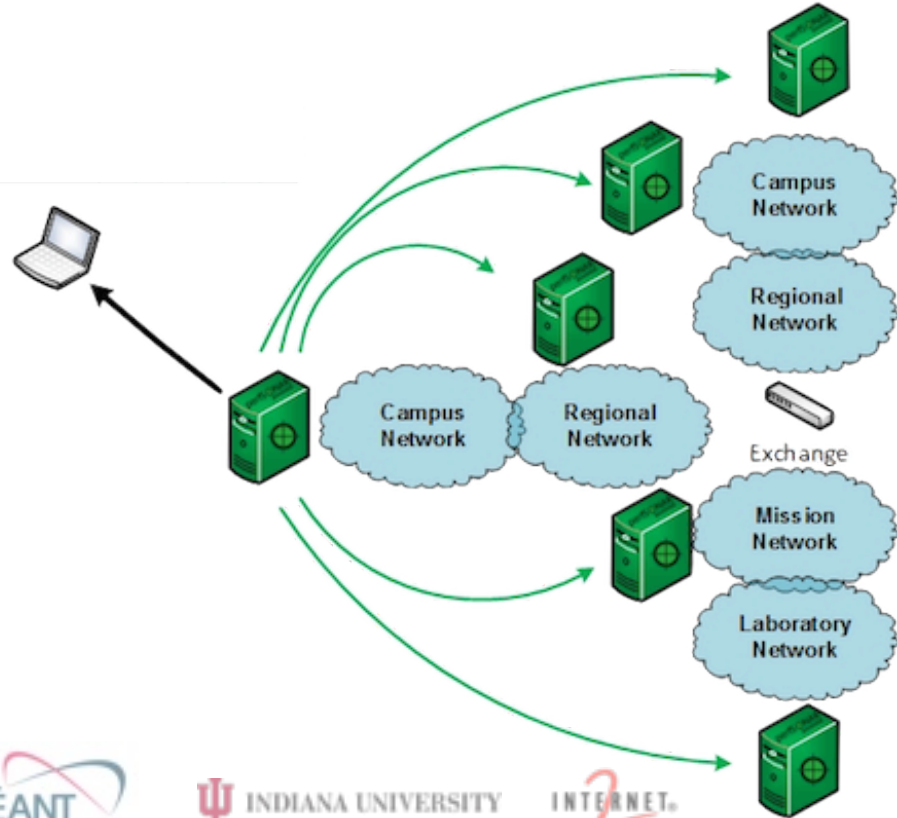- Central measurement archives
- Data transfer nodes
- Hosts that use the network for purposes beyond just measurement

Who answers "Yes"?
- Central measurement archives

Will this host primarily run regularly scheduled measurements?

Is this host going to centrally archive or manage my other measurement hosts?

Yes → Install perfsonar-centralmanagement

No → Install perfsonar-tools

Who answers "Yes"?
- Dedicated measurement hosts solely tasked with performing network measurements

Who answers "Yes"?
- Hosts part of a small deployment (1-2 hosts)
- Hosts run by new perfSONAR users wanting to explore the full set of features from collection to display

Who answers "No"?
- Data transfer nodes
- Any other host that uses a network

Do I want to manage each host through the web UI?

Yes → Install perfsonar-toolkit

Who answers "No"?
- Hosts part of a large deployment, usually centrally managed by Puppet, CFEngine, etc.
- Hosts running on minimal hardware

Who answers "Yes"?
- Hosts without access to a central archive such as those in a large deployment that do not wish to deal with the extra effort required to run a large central archive

Other Useful Packages:
- Dashboard:
  - maddash
- Host Configuration:
  - perfsonar-toolkit-ntp
  - perfsonar-toolkit-sysctl
  - perfsonar-toolkit-security
- Nagios
  - nagios-plugins-perfsonar

Do I want to store my measurements in an archive that runs on this host?

Yes → Install perfsonar-core

Who answers "No"?
- Hosts running on minimal hardware
- Hosts with access to a central measurement archive
- Hosts that are part of a centrally managed mesh
- You want a registered testpoint that others can run tests to

No → Install perfsonar-testpoint

http://www.perfsonar.net/about/where-can-it-be-downloaded/

November 4, 2016   6
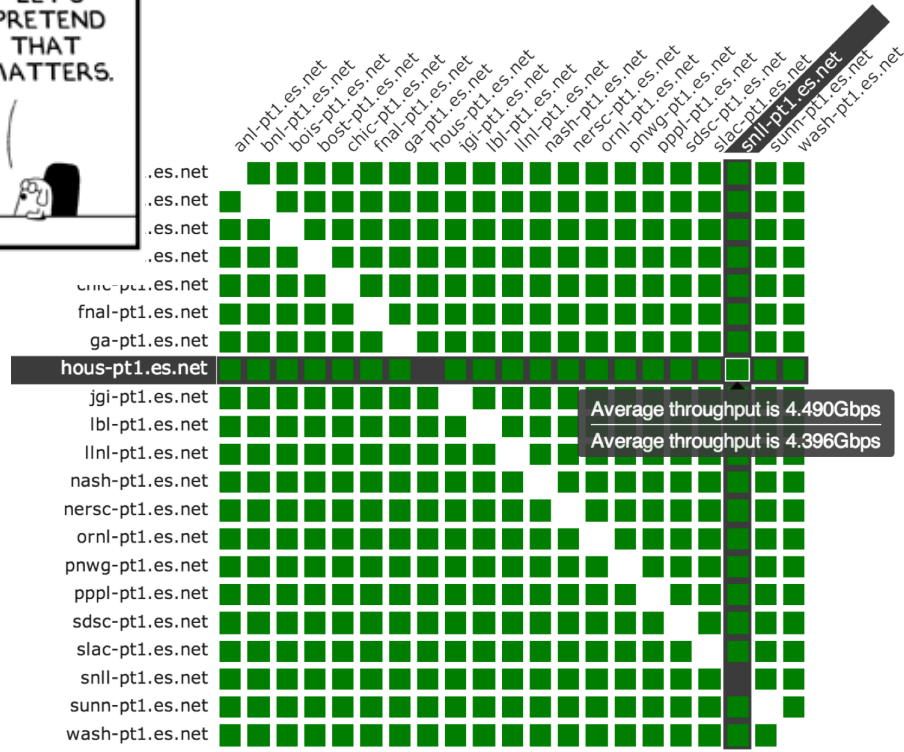
Performance Island

Performance Coordination

Importance of Regular Testing

- We can't wait for user to report problem, soft failures can go unseen for years!
- Things just break sometimes:
  - failing optics
  - broken fibers
  - hardware goes bad
- Problems that get fixed have a way of coming back
  - system defaults, restoring of old configurations
  - new people don't know history of problems and corrections
- Important to continually collect, archive and alert on measurements. See trends
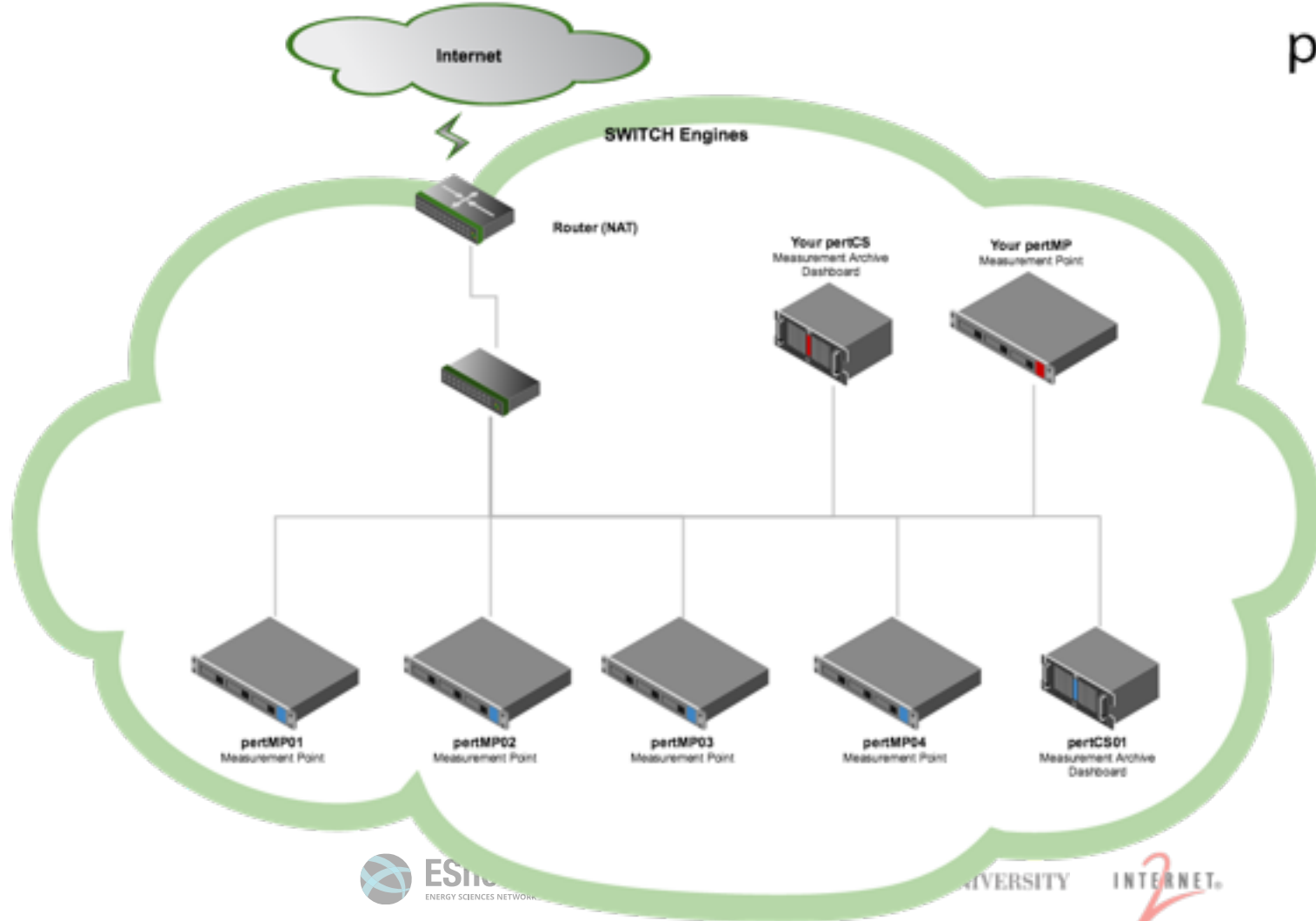
Workshop Objectives

- Being able to deploy a central perfSONAR server (Archive and Dashboard) for a set of preconfigured perfSONAR clients.

- Doing a deployment similar to what we've done in the *perfSONAR on Small Devices in GÉANT* project.
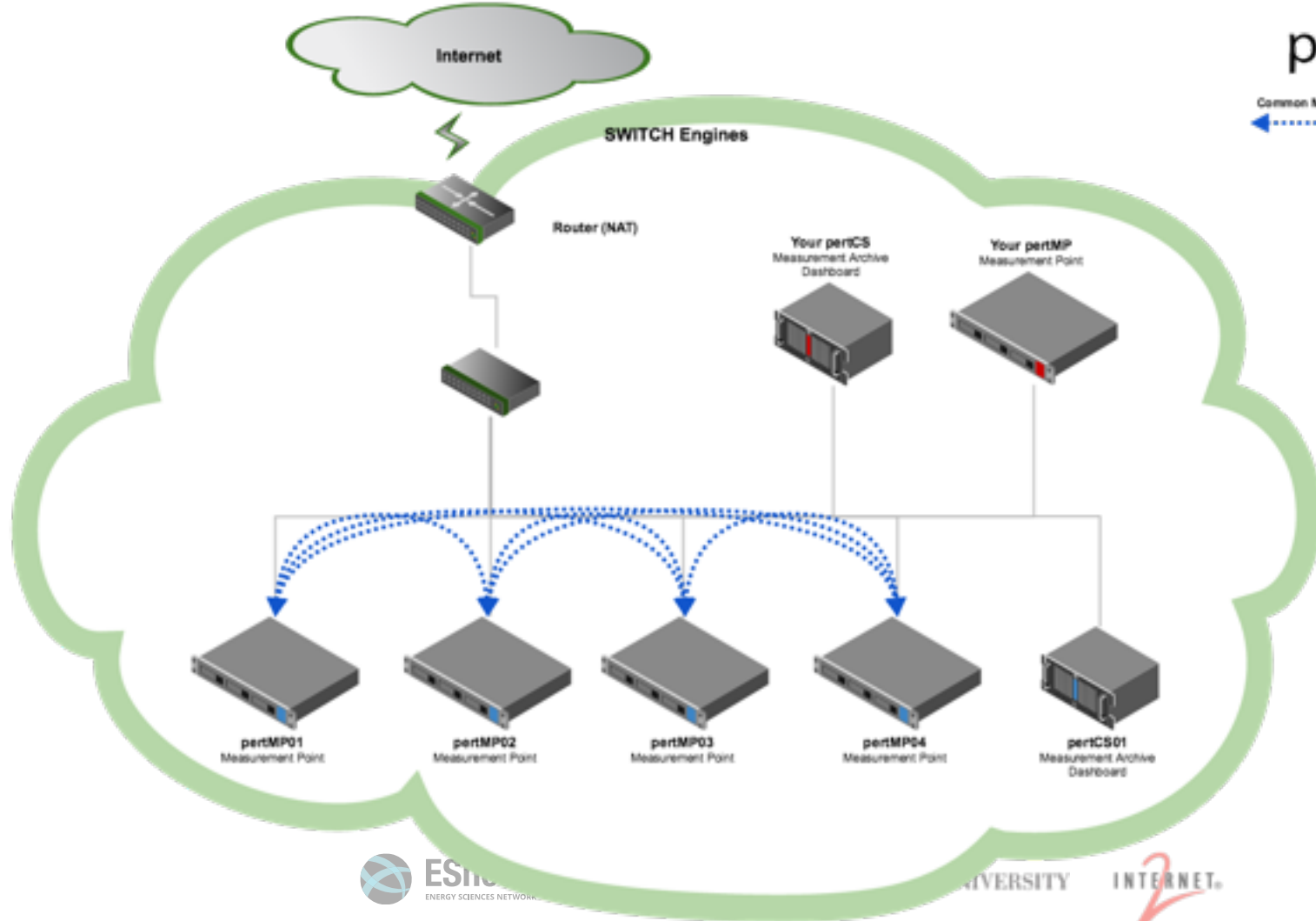
Workshop context and ... warning

- We will be working with perfSONAR 4.0-RC
- Release Candidate, still some rough edges
  - Final release expected early December ... or January
- Deployed in a lab environment, which is not what perfSONAR is at ease with
- The most important are the concepts
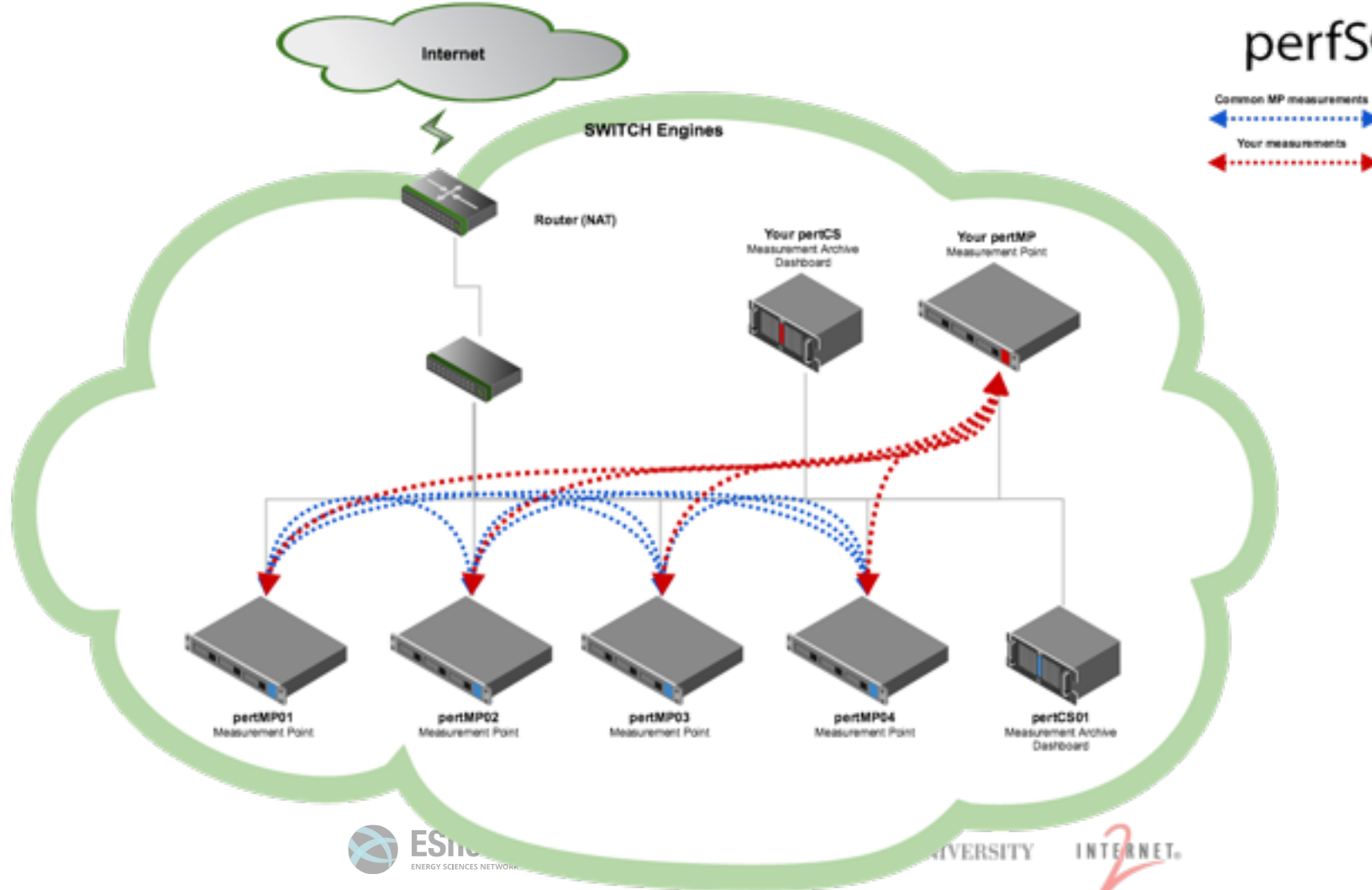- Better that then a workshop on an outdated version of perfSONAR

Workshop Lab Setup

- Private network (OpenStack based, private address space)
- 4 *Global/Common* Measurement Points (MP)
- Group of 2:
  - 1 Measurement Point (toolkit bundle install)
  - 1 Central Server (centralmanagement bundle)
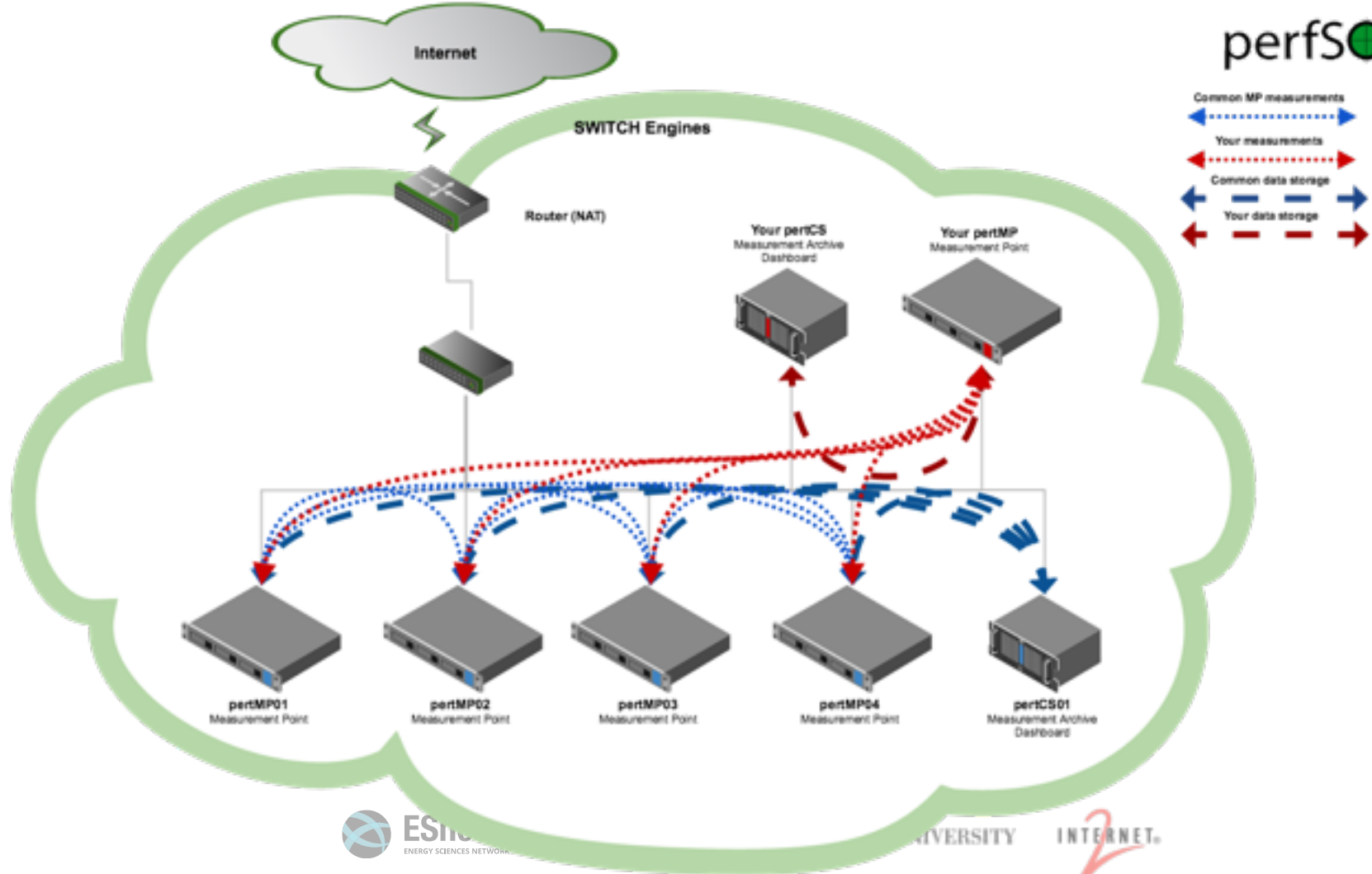- Building a mesh of 5 MP

Hands-On: Central MA

- Central Measurement Archive (MA)
  - esmond
  - part of the perfsonar-centralmanagement bundle
- What we'll do:
  - Configure repository
  - Install software bundle
  - Configure esmond
  - Look at log files
- Wiki for commands: https://wiki.geant.org/display/gn42na1/During+the+training#Duringthetraining-CentralMeasurementArchive

Central MA: Commands

```
rpm -hUv http://software.internet2.edu/rpms/el6/x86_64/main/RPMS/Internet2-
repo-0.6-1.noarch.rpm

rpm -hUv https://dl.fedoraproject.org/pub/epel/6/x86_64/epel-release-6-8.noarch.rpm

yum install perfsonar-centralmanagement

# Log files

tail /var/log/httpd/error_log

less /var/log/esmond/esmond.log

ps aux | grep httpd

ps aux | grep cassandra

netstat -tunlep
```

Hands-On: Sending data to MA

- Toolkit install
  - storage on local MA
  - authentication through API key (part of regular installation)
- Central Server
  - authentication through API key, must distribute key
  - authentication based on IP, must know the MP IP
- Workshop
  - IP based authentication setup
  - Wiki for commands: https://wiki.geant.org/display/gn42na1/During +the+training#Duringthetraining-IPAuthentication

MA Config: Commands

```
cd /usr/lib/esmond

source /opt/rh/python27/enable

/opt/rh/python27/root/usr/bin/virtualenv --prompt="(esmond)" .

. bin/activate

python esmond/manage.py add_user_ip_address example_user 10.0.172.1

python esmond/manage.py add_user_ip_address another_example_user
10.0.182.1/24
```

Hands-On: MaDDash

- Already installed (part of perfsonar-centralmanagement bundle)
- Configuring web interface (YAML format)
  - default dashboard, multiple dashboards
  - external menu, grid colours and sizes
  - welcome/redirect page
- Look at MaDDash report (on your mesh) and log files
- See wiki: https://wiki.geant.org/display/gn42na1/During+the +training#Duringthetraining-Dashboardsetup
- Example: https://pertcs01.switch.ch/maddash-webui/

MaDDash Config: Commands

```
cd /etc/maddash/maddash-webui

# Compare config.json and config.example.json

vi config.json

# Reload http://pertcsXY.switch.ch/maddash-webui/etc/config.json

# Add a redirect in /var/www/html/index.html

# Running processes

ps aux | grep maddash

ps aux | grep httpd

# Log files

tail /var/log/httpd/access_log

/etc/init.d/maddash-server start|stop|restart
```