Introduction

***perf**ormance **S**ervice-**O**riented **N**etwork monitoring **A**rchitecture*

perfSONAR is developed by a partnership of

Who?

What?

Where?

When?

Why?

How?

What is perfSONAR?

performance Service-Oriented Network monitoring Architecture

A toolkit which helps you to:

- Set network performance expectations
- Find network problems (“soft failures”)
- Helps coordinate fixing these problems

… all in a multi-domain environment

Source www.freepik.com

Hard vs. Soft Failures

Source: www.whatfix.com

Hard failures

- Fibre breaks
- Power failures
- Equipment death

Soft failures

Everything's working – just…***not right***

"As long as TCP continue to function properly and the internet system does not become ***completely*** *partitioned…no transmission errors will affect the users."*

Who made perfSONAR?

perfSONAR is developed by a partnership of

ESnet
ENERGY SCIENCES NETWORK

GÉANT
Co-funded by the European Union

INDIANA UNIVERSITY

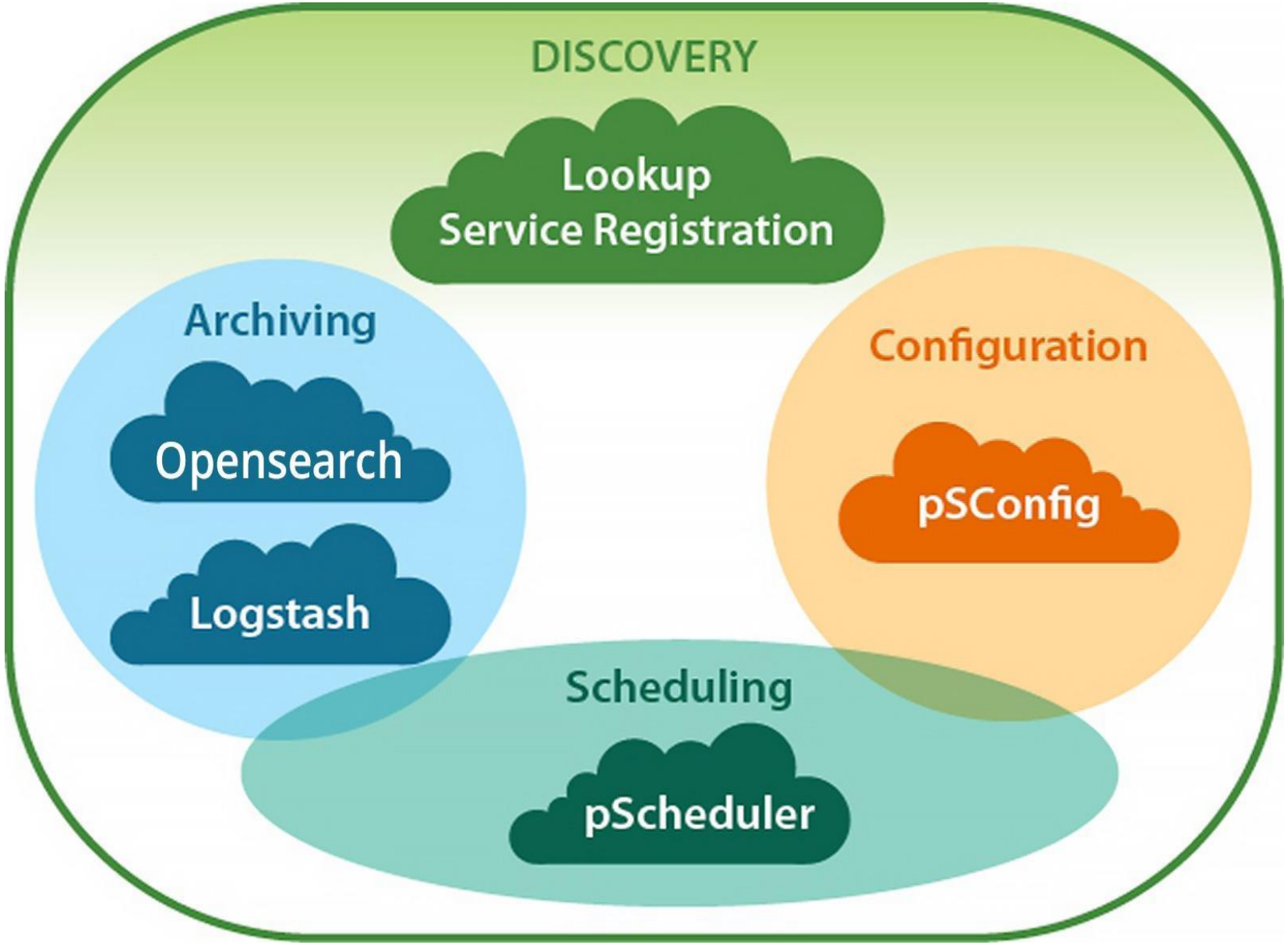
INTERNET2®

RNP
ORGANIZAÇÃO SOCIAL DO MCTI

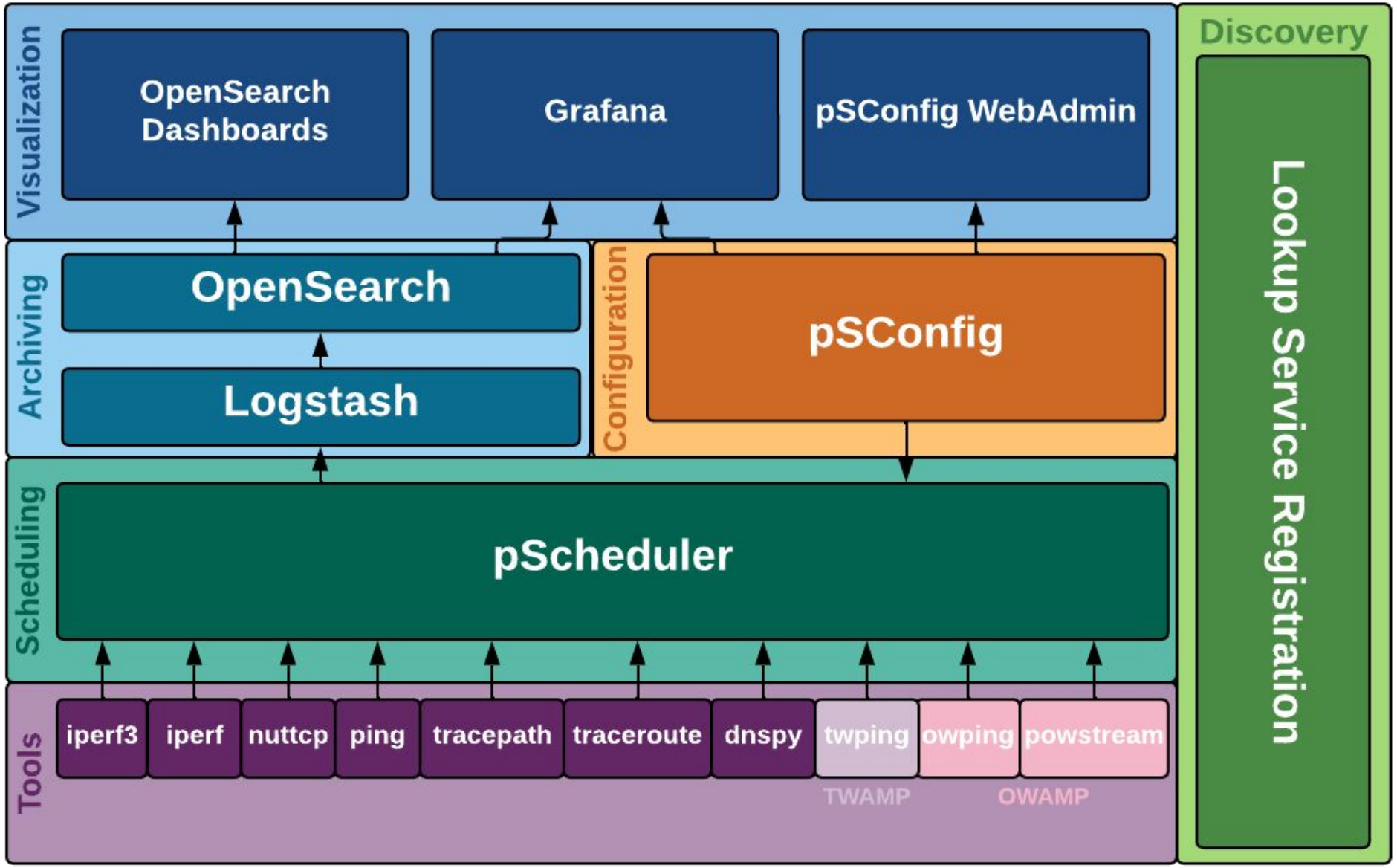
UNIVERSITY OF MICHIGAN

ESnet ENERGY SCIENCES NETWORK GÉANT INDIANA UNIVERSITY INTERNET2® RNP UNIVERSITY OF MICHIGAN

How does perfSONAR work?



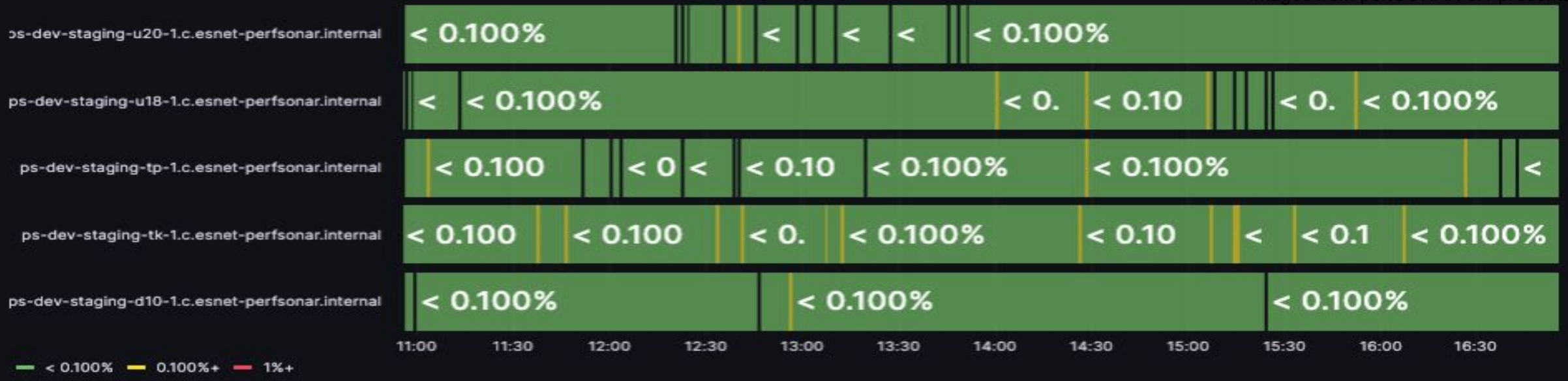
*Images from perfSONAR 5.1 presentation



Source: perfSONAR 5.1 presentation

*Images from perfSONAR 5.1 presentation

Packet Loss Over Time by Sender



Maximum Packet Loss

Highest Average Packet Loss by Sender

Sender Host	Max Packet Loss
ps-dev-staging-tk-...	0.333%
ps-dev-staging-u1...	0.333%
ps-dev-staging-d1...	0.167%
ps-dev-staging-tp-...	0.167%
ps-dev-staging-u2...	0.167%

Highest Average Packet Loss by Receiver

Receiver Host	Max Packet Loss
ps-dev-staging-tk-...	0.333%
ps-dev-staging-tp-...	0.333%
ps-dev-staging-u1...	0.167%
ps-dev-staging-u2...	0.167%
ps-dev-staging-d1...	0%

Search or jump to... cmd+k

Sign in

Home > Dashboar... > perfSONAR > perfSONAR Endpoint Pair Explorer

Share

2024-04-16 09:33:36 to 2024-04-17 09:33:36

Archive: perfSONAR Local

Source Host: ps-dev-staging-el9-tp1.c.esnet-perfsonar.internal

Destination Host: ps-dev-staging-el9-tk2.c.esnet-perfsonar.internal

*Images from perfSONAR 5.1 presentation

perf5ONAR on ps-dev-staging-el9-archive1.c.esnet-perfsonar.internal

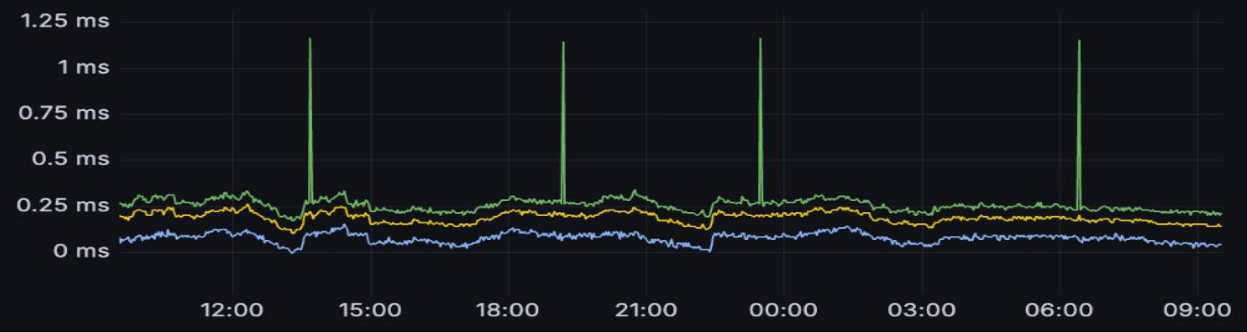
Home | Configuration | ? Help

Throughput

Retransmits

Latency

Latency (Reverse)



*Images from perfSONAR 5.1 presentation

perf5ONAR on ps-dev-staging-el9-archive1.c.esnet-perfsonar.internal

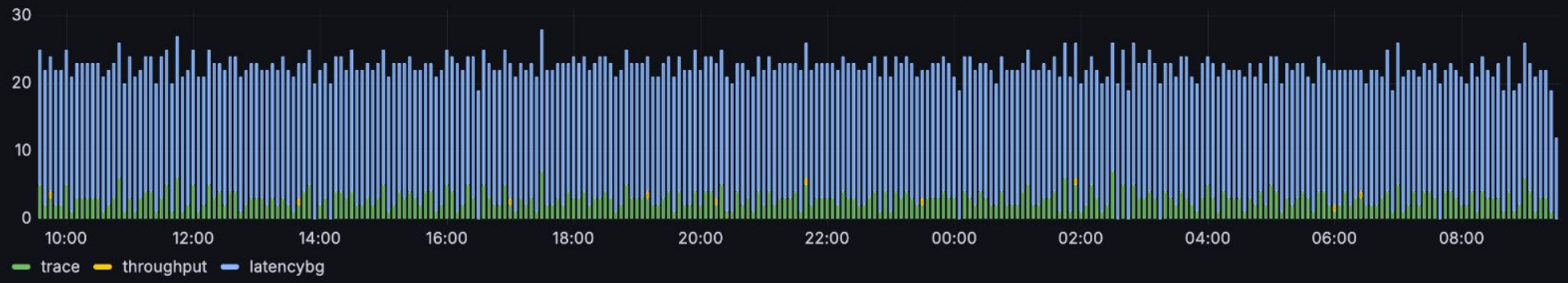
Home | Configuration | ? Help

Throughput (Max)
7.98 Gb/s

Packet Loss (Max)
100%

Jitter (Max)
2.75 ms

Number of Tests Run



Test Result Summary

Source	Destination	IP Version	Packet Loss (Max)	Throughput (Min)	Latency (Min)	RTT (Min)
ps-dev-staging-...	ps-dev-staging-...	4	0%	7.95 Gb/s	-0.01000 ms	null
ps-dev-staging-...	ps-dev-staging-...	4	0%	7.94 Gb/s	-0.01000 ms	null
ps-dev-staging-...	ps-dev-staging-...	4	100%			null
ps-dev-staging-...	ps-dev-staging-...	4	100%			null

Interfaces

Interface	Speed	M
eth0	n/a	146

Tests Configured by Type

Type	#
trace	6
throughput	2
latencybg	4

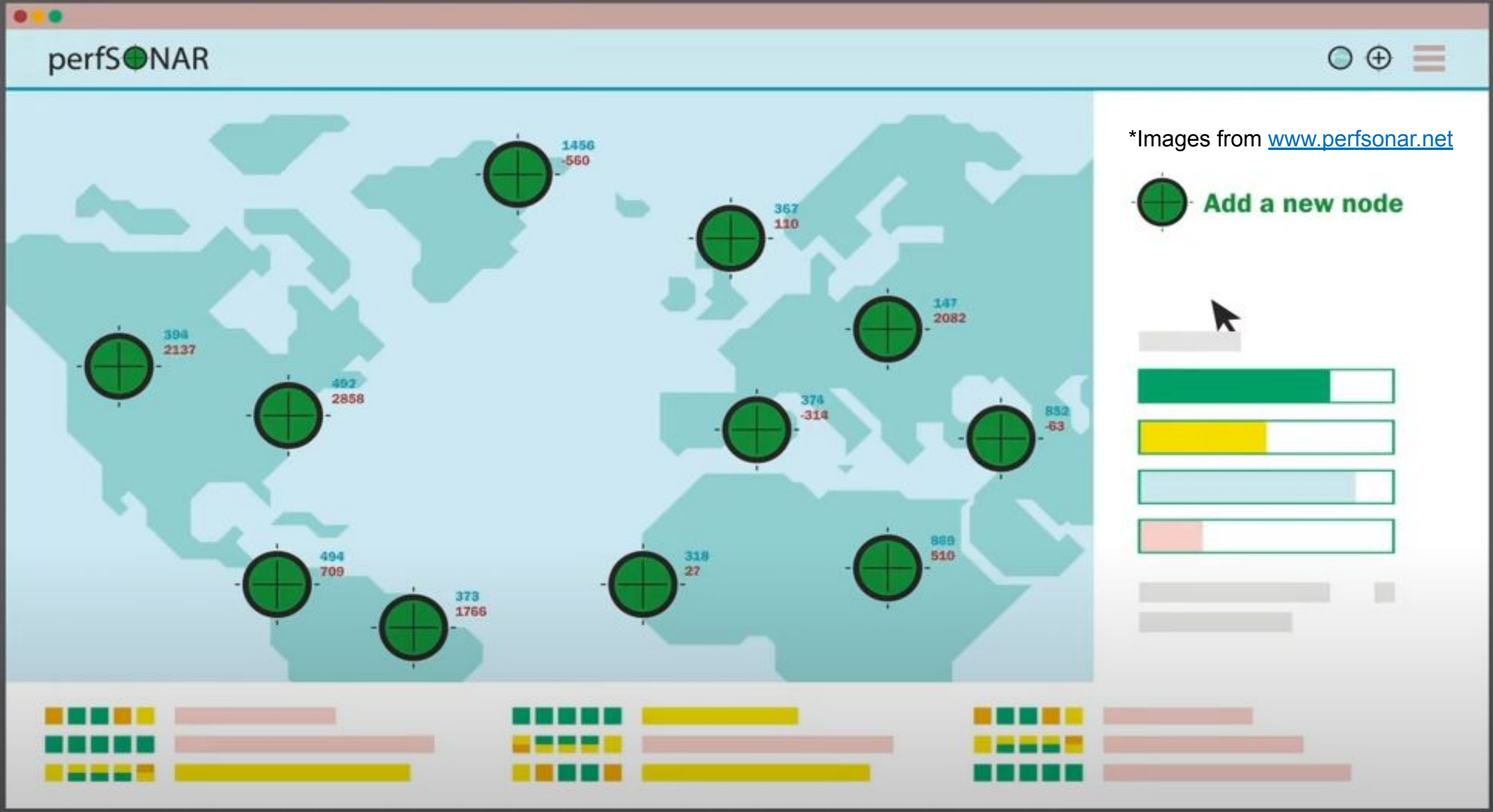
Host Info

My Dashboards

pSConfig Dashboards

All perfSONAR Measurements
perfSONAR pSConfig

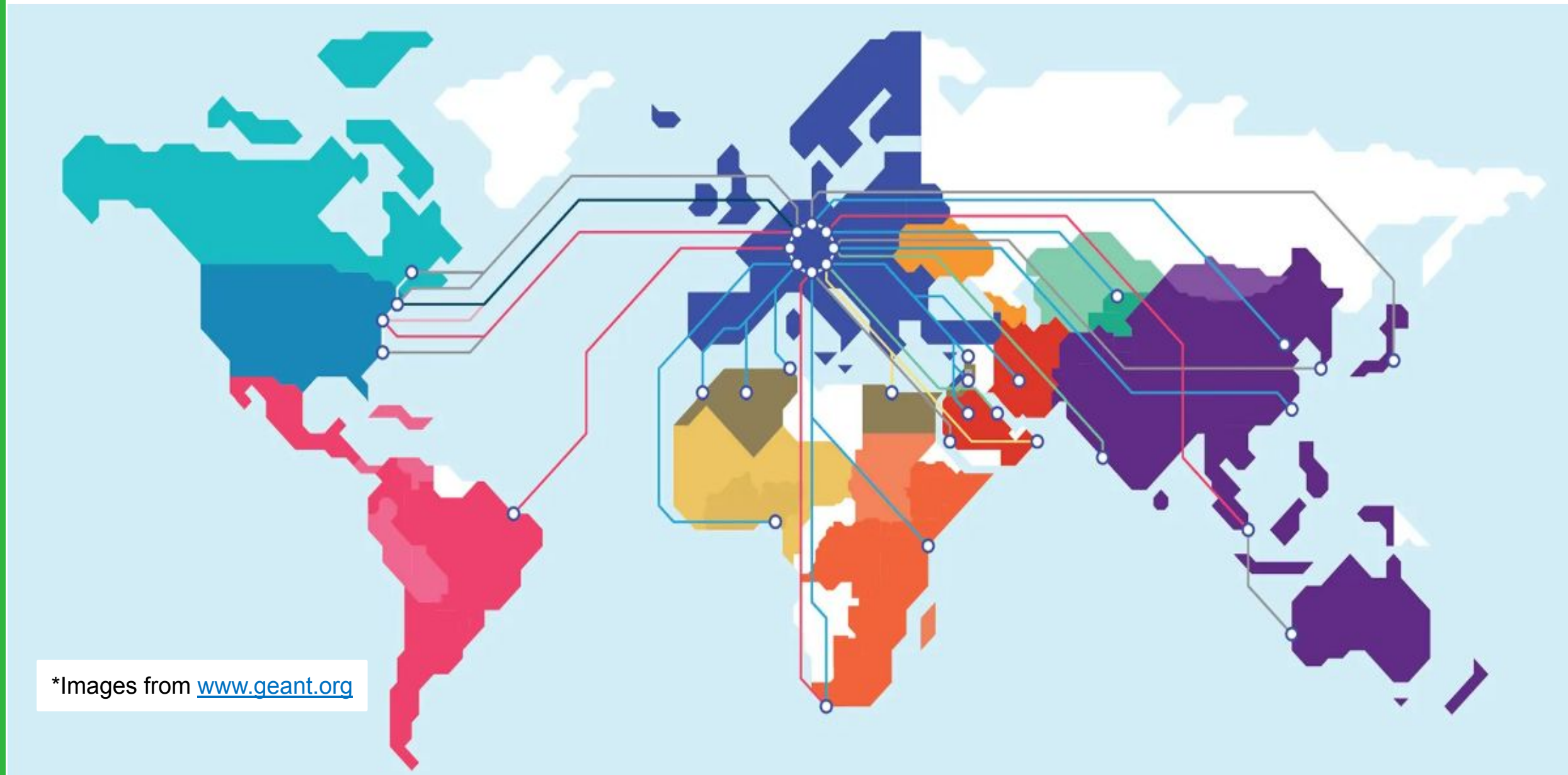
GCP Tests
perfSONAR pSConfig


perfSONAR
1456
-560
367
110
147
2082
394
2137
492
2858
374
-314
852
-63
494
709
373
1766
318
27
889
510
*Images from www.perfsonar.net
Add a new node

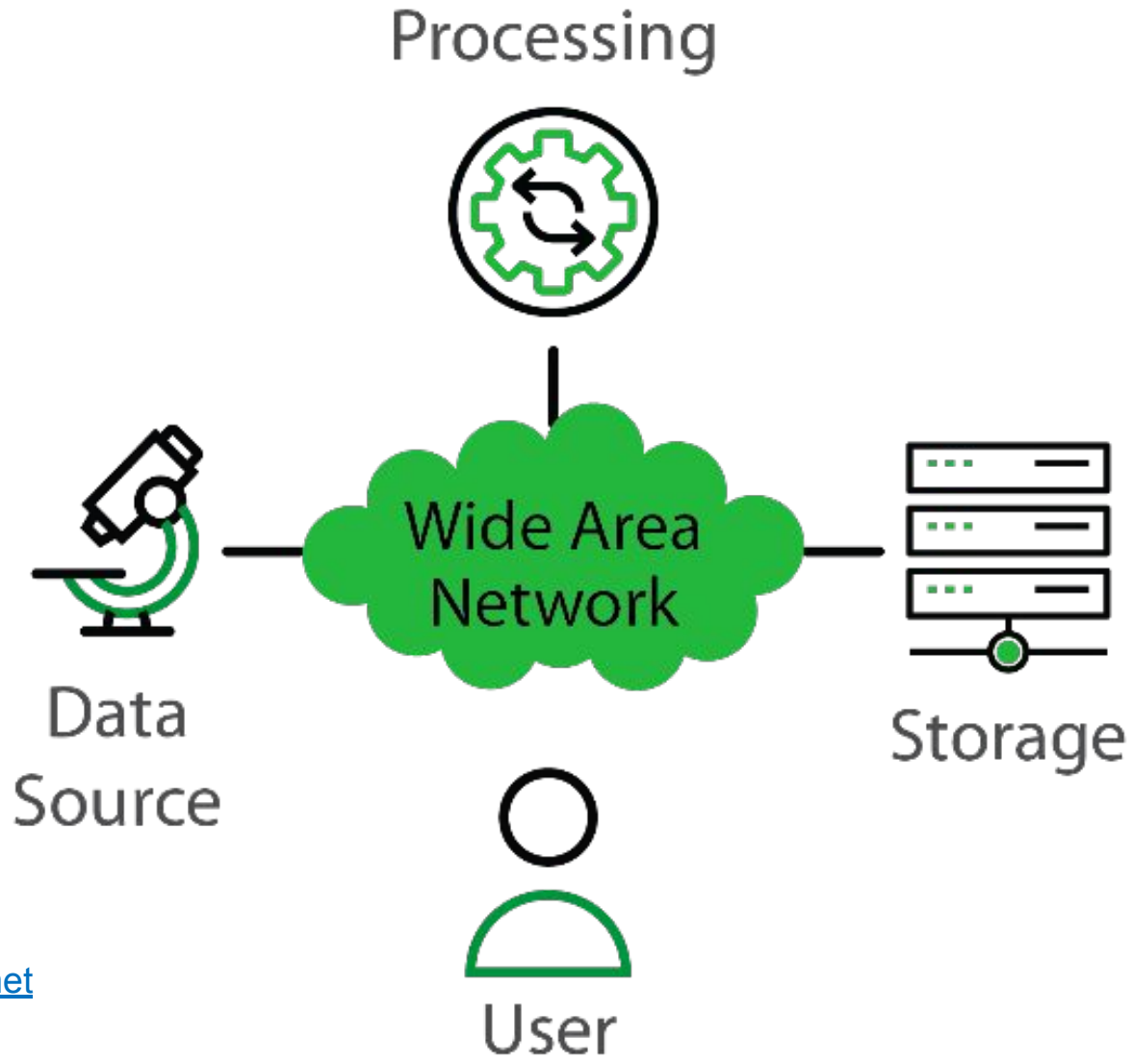
Why use perfSONAR?

The R&E Community

perfSONAR

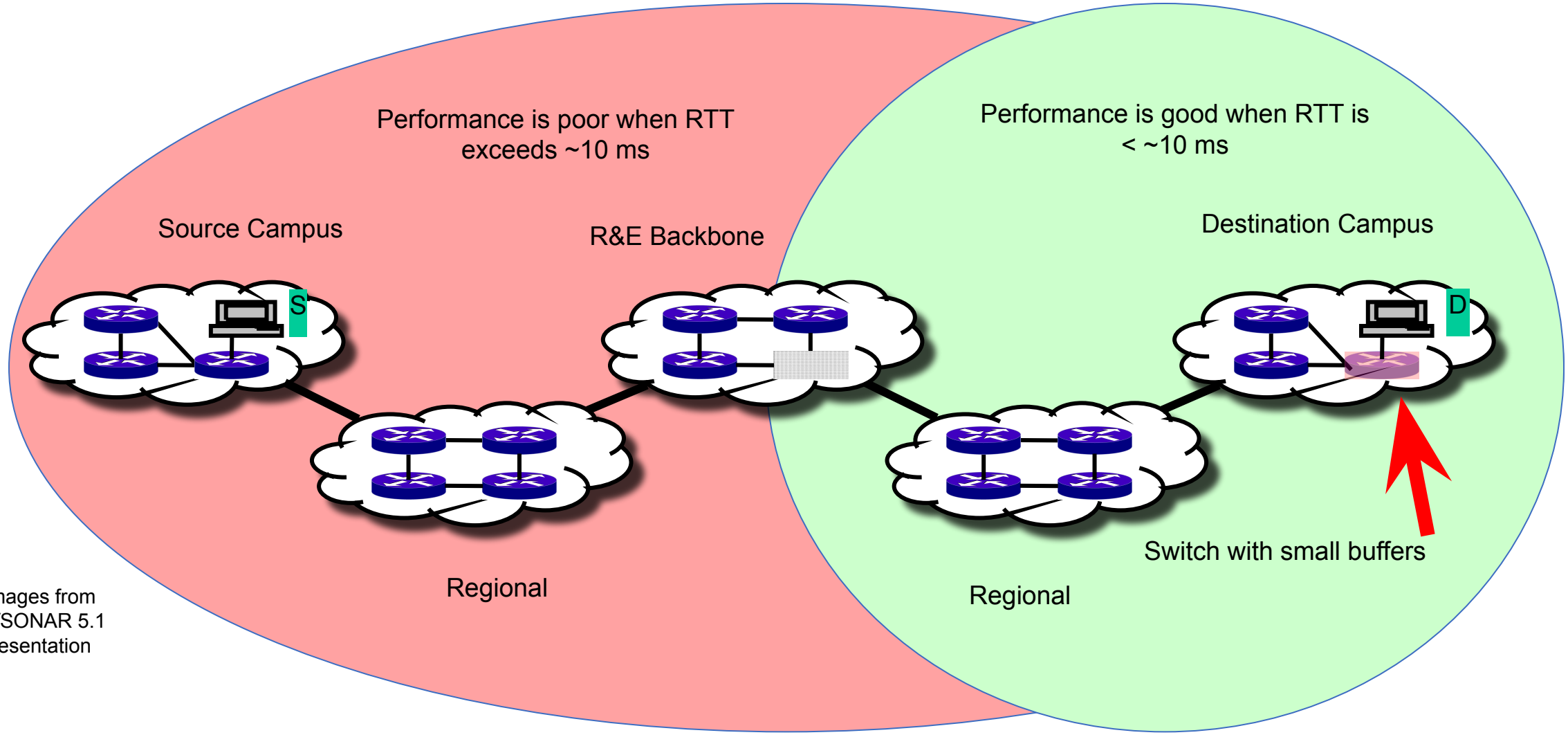


*Images from www.geant.org

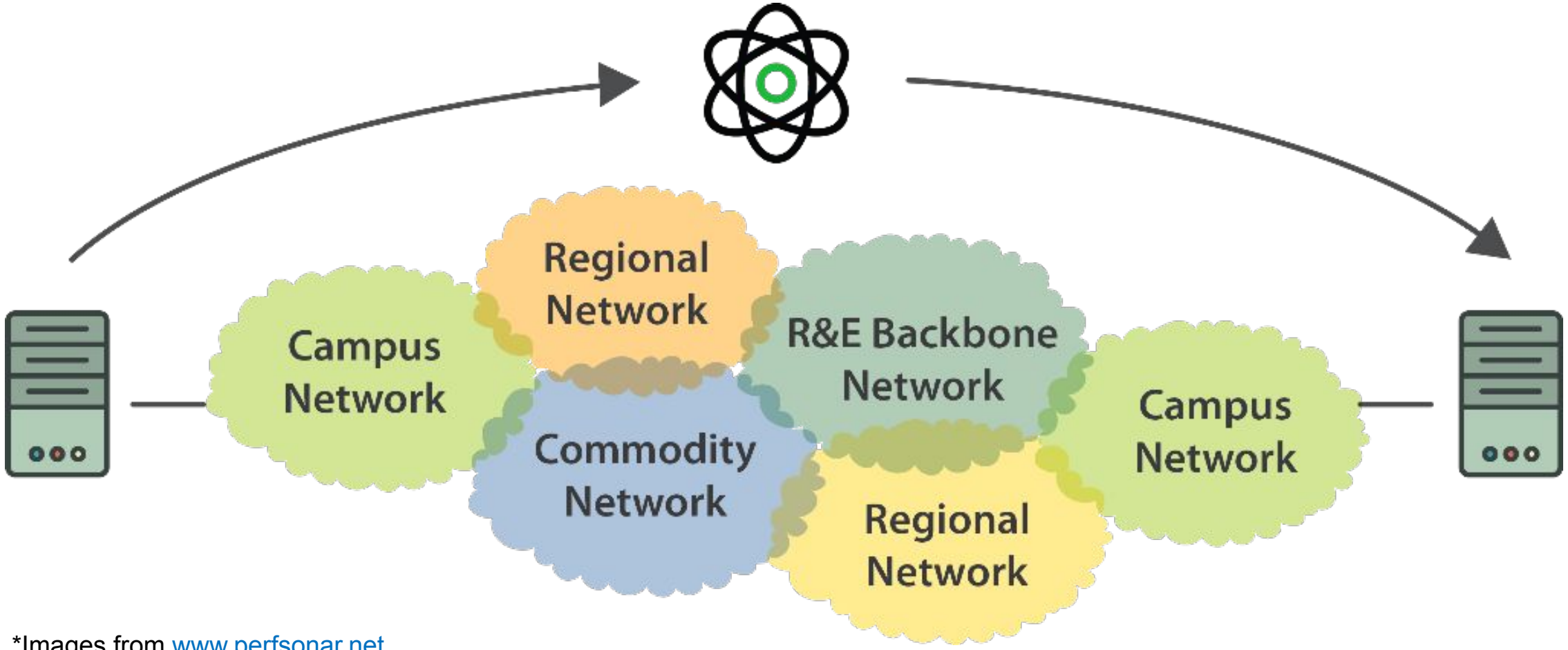


*Images from www.perfsonar.net

Local Testing Will Not Find Everything



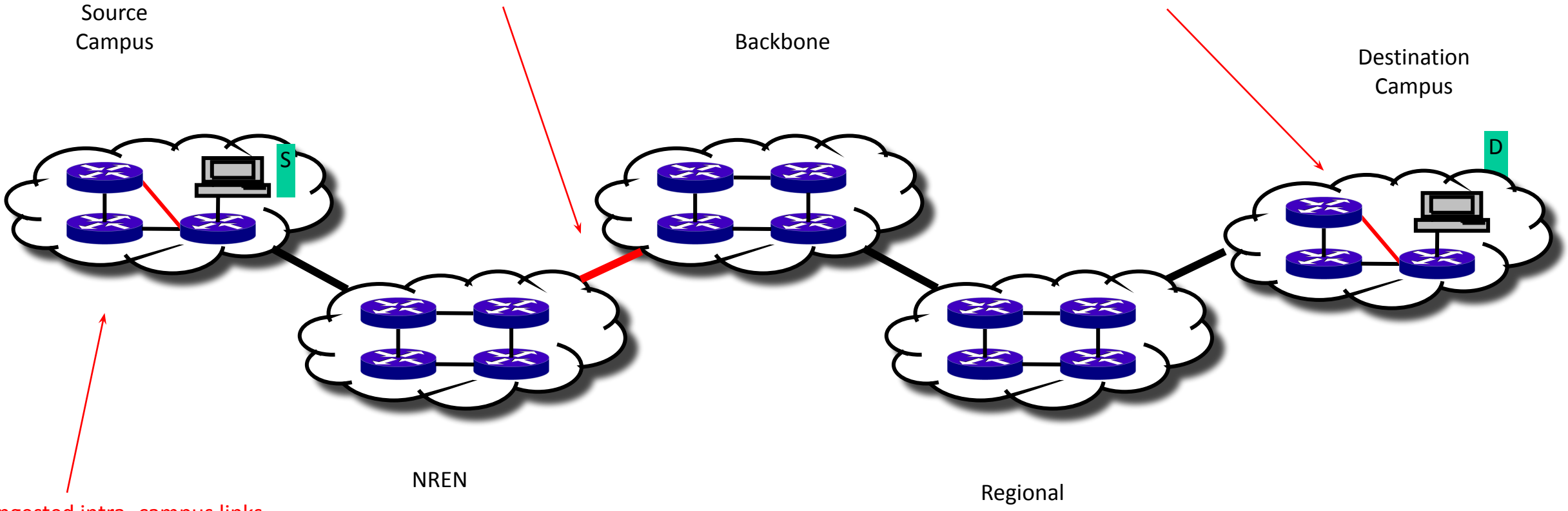
*Images from perfSONAR 5.1 presentation



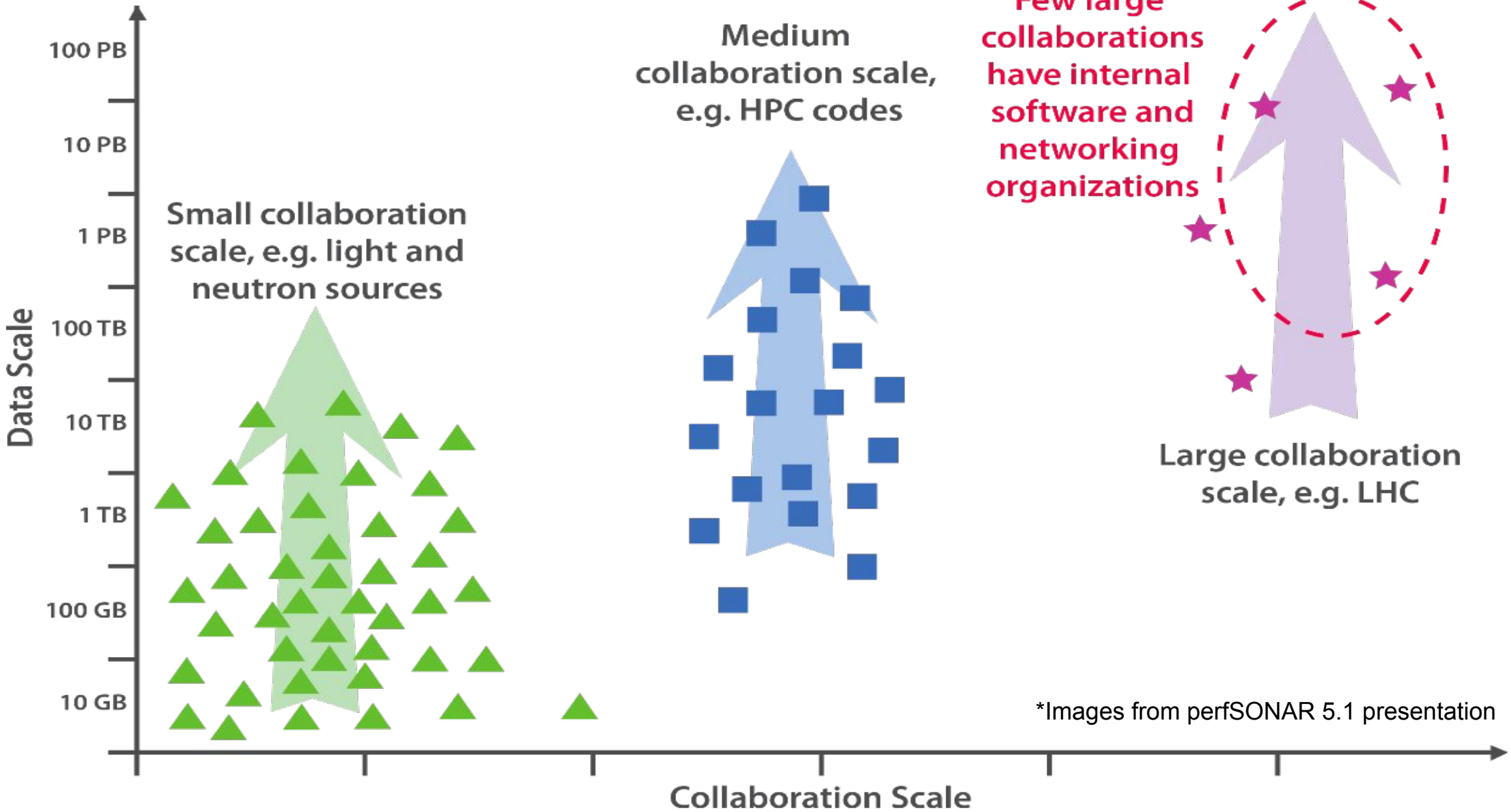
*Images from www.perfsonar.net

Congested or faulty links between domains

Latency dependant problems inside domains with small RTT



*Images from perfSONAR 5.1 presentation



*Images from perfSONAR 5.1 presentation

*Images from perfSONAR 5.1 presentation

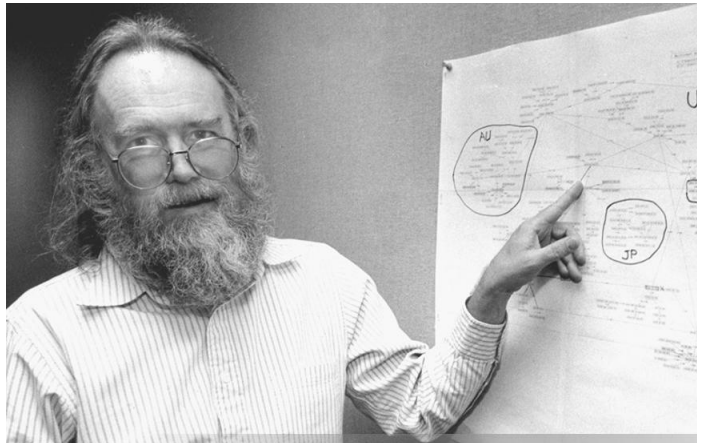
Data size	1 Minute	5 Minute	20 Minute	1 Hour
10PB	1,333.33 Tbps	266.67 Tbps	66.67 Tbps	22.22 Tbps
10TB	1.33 Tbps	266.67 Gbps	66.67 Gbps	22.22 Gbps
1TB	133.33 Gbps	26.67 Gbps	6.67 Gbps	2.22 Gbps
100GB	13.33 Gbps	2.67 Gbps	666.67 Mbps	222.22 Mbps
10GB	1.33 Gbps	266.67 Mbps	66.67 Mbps	22.22 Mbps
100MB	13.33 Mbps	2.67 Mbps	0.67 Mbps	0.22 Mbps

Time to transfer

Let's Talk Performance …

"In any large system, there is **always** something broken."

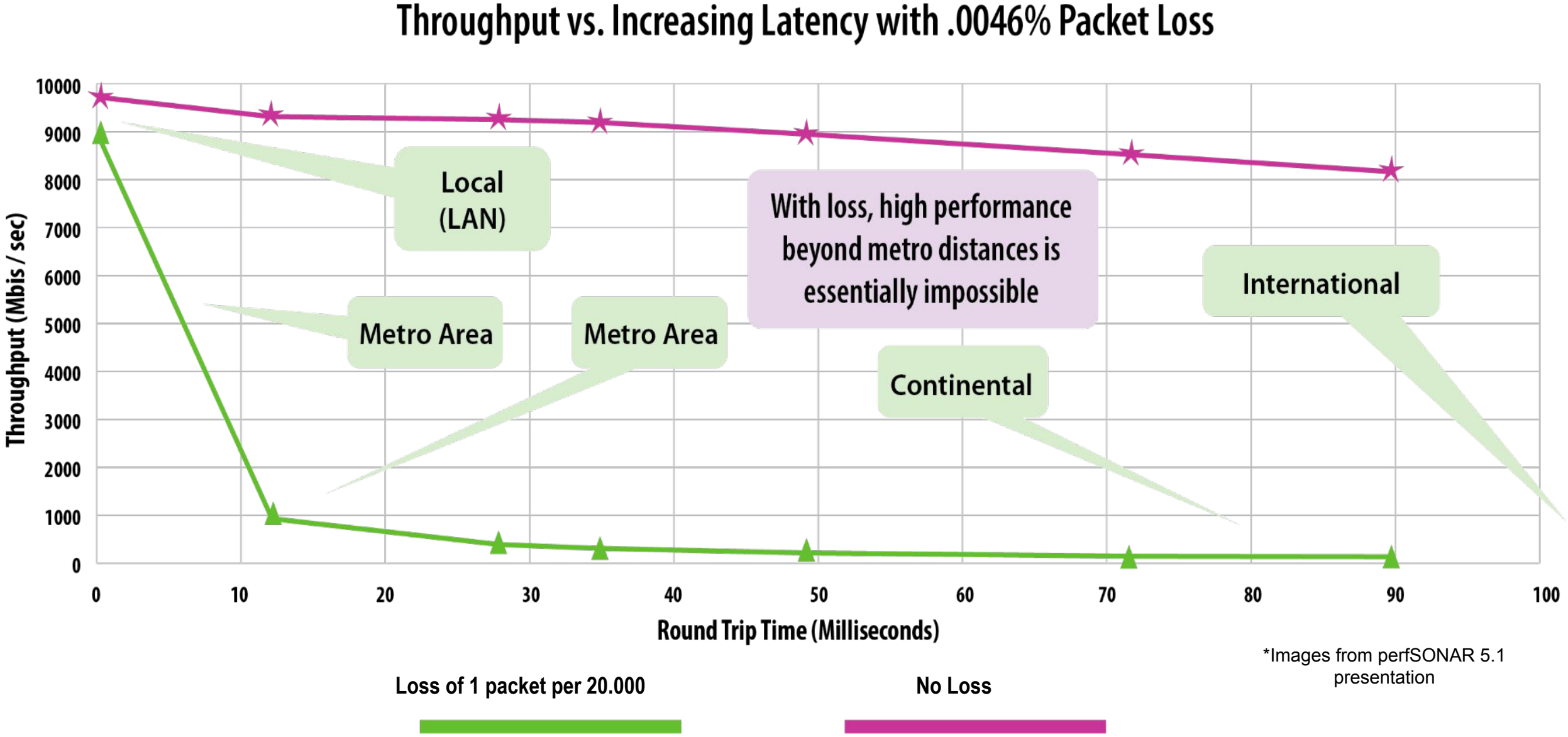
- ***Jon Postel***



Modern networks are occasionally designed to be *one-size-fits-most*

- It's mostly all TCP
- TCP suffers the most from unpredictability; packet loss/delays are the enemy
- It all starts with knowing your users, and knowing your network

*Images from www.wikipedia.org and www.incompliancemag.com



*Images from perfSONAR 5.1 presentation

And … It's Not Just the Network

Perhaps you are saying to yourself "I have no control over parts of my campus, let alone the 5 networks that sit between me and my collaborators"

Things "you" control

Things that need some help

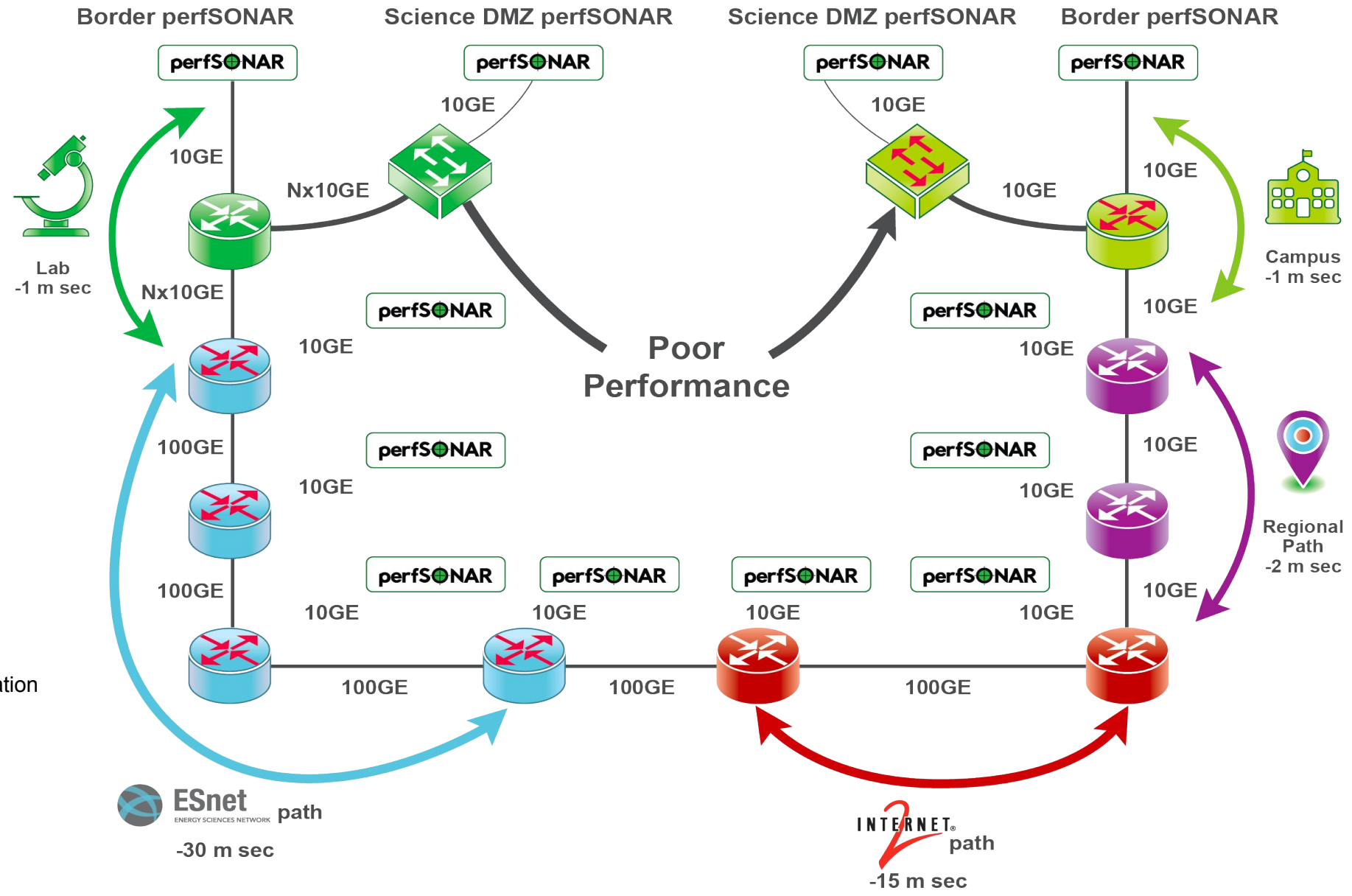
*Images from www.cleanpng.com

You can’t fix what you can’t find

You can’t find what you can’t see

perfSONAR let you see

*Images from perfSONAR 5.1 presentation



Simulating Performance

*Images from www.telecoms.com

Network performance comes down to a few key metrics:

- Throughput
- Latency
- Packet loss/duplication/ordering
- Network utilisation

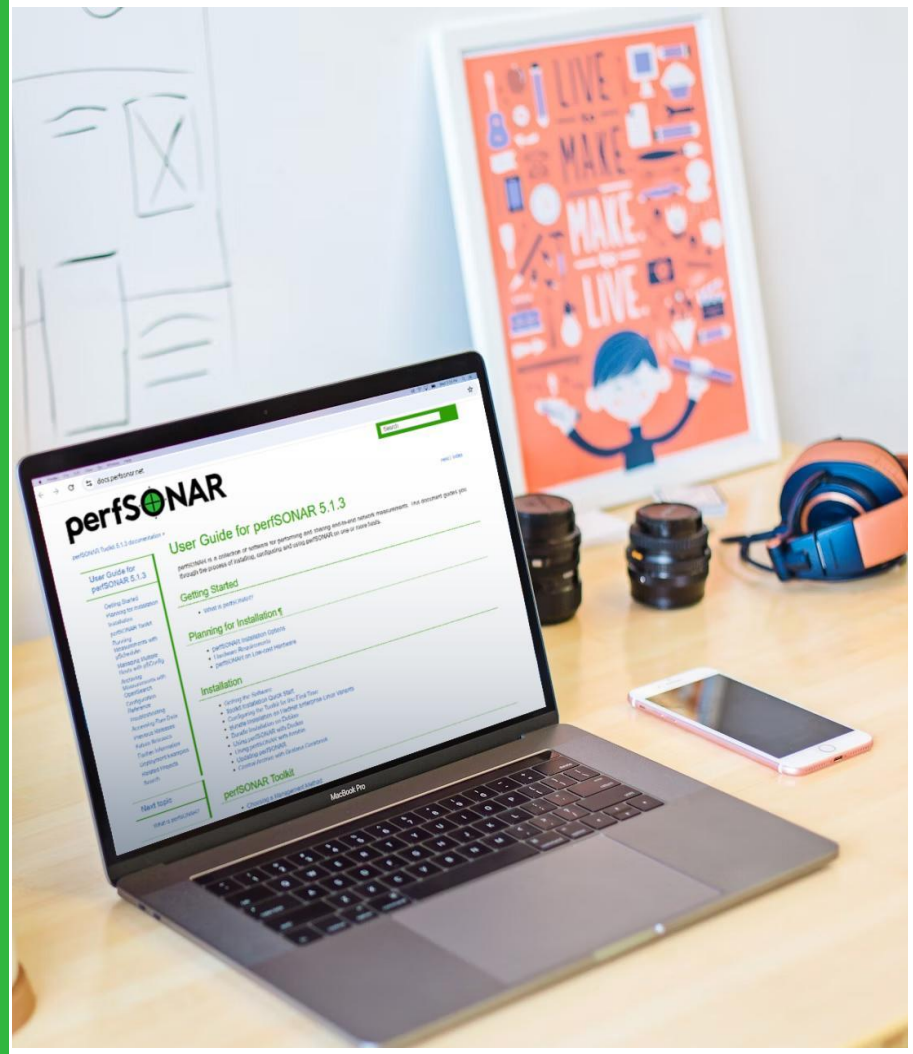
We can get many of these from a selection of active and passive measurement tools – enter the perfSONAR Toolkit

Where can I learn more about perfSONAR?

perfSONAR Community

- The perfSONAR collaboration is working to build a strong user community to support the use and development of the software.
- perfSONAR Mailing Lists
  - Announcement List: https://lists.internet2.edu/sympa/subscribe/perfsonar-announce
  - Users List: https://lists.internet2.edu/sympa/subscribe/perfsonar-user
  - GÉANT Consultancy & Expertise: perfSONAR@lists.geant.org

Resources



- perfSONAR Website http://www.perfsonar.net/
- perfSONAR Documentation http://docs.perfsonar.net/
- Lookup Service Dashboard https://stats.perfsonar.net/
- YouTube Channel

  https://www.youtube.com/perfSONARProject
- FasterData Knowledge Base http://fasterdata.es.net/

*Modyfied Image source from unsplashn

Summary

*Summary Icon Vector Images

- End-to-End Performance Monitoring
- Multi-Domain Capabilities
- Open Standards & Interoperability
- Scalable & Modular Architecture
- Community & Support
- Proactive Issue Detection

When should I start using perfSONAR?

perfSONAR Installation & Basic Configuration– section 2

Thank you

If you have questions about this presentation you can contact perfSONAR@lists.geant.org

Co-funded by
the European Union

ESnet ENERGY SCIENCES NETWORK
GÉANT
INDIANA UNIVERSITY
INTERNET2
RNP
UNIVERSITY OF MICHIGAN