

# Research on the GREN

RIPE82 / NREN

2100.05.14

Randy Bush <randy@psg.com>

# GREN?

*The Global Research and Educational Network*

An interconnected network of high speed research networks such as Internet2, NORDUNet, Dante, WIDE, etc.

This is NOT the commercial Internet

# GREN != Internet

*See The Interdomain Connectivity of PlanetLab Nodes, Suman Banerjee, Timothy Griffin, Marcelo Pias, PAM 2004*

"Over 70 percent of the end-to-end measurements between PlanetLab node pairs represent measurements of GREN characteristics"

Of course this was when PlanetLab still existed.

But keep this in mind when measuring between universities, labs, ...

Or even from a university to the Internet

# Annotate Your Data

- Ambiguity
- Accuracy = Resolution, Precision, and Validity
- Inconsistencies
- Missing Data and Bias
- Missing Meta-Data
- Issues of duration of measurement and shifts in what one is measuring
- Issues with resolution of results over sample size/rate
- Bias of sample set, e.g. Route Views sees the 'clue core', GREN bias
- Be sure to understand how the data were collected

RIPE Atlas is amazing

But it only measures  
the data plane



## The Data Plane



## The Control Plane

And the Interaction  
of the Data Plane  
and the Control Plane  
Can be Very Interesting



# *Hidden broken pieces in the Internet: BGP lies and forwarding detours*

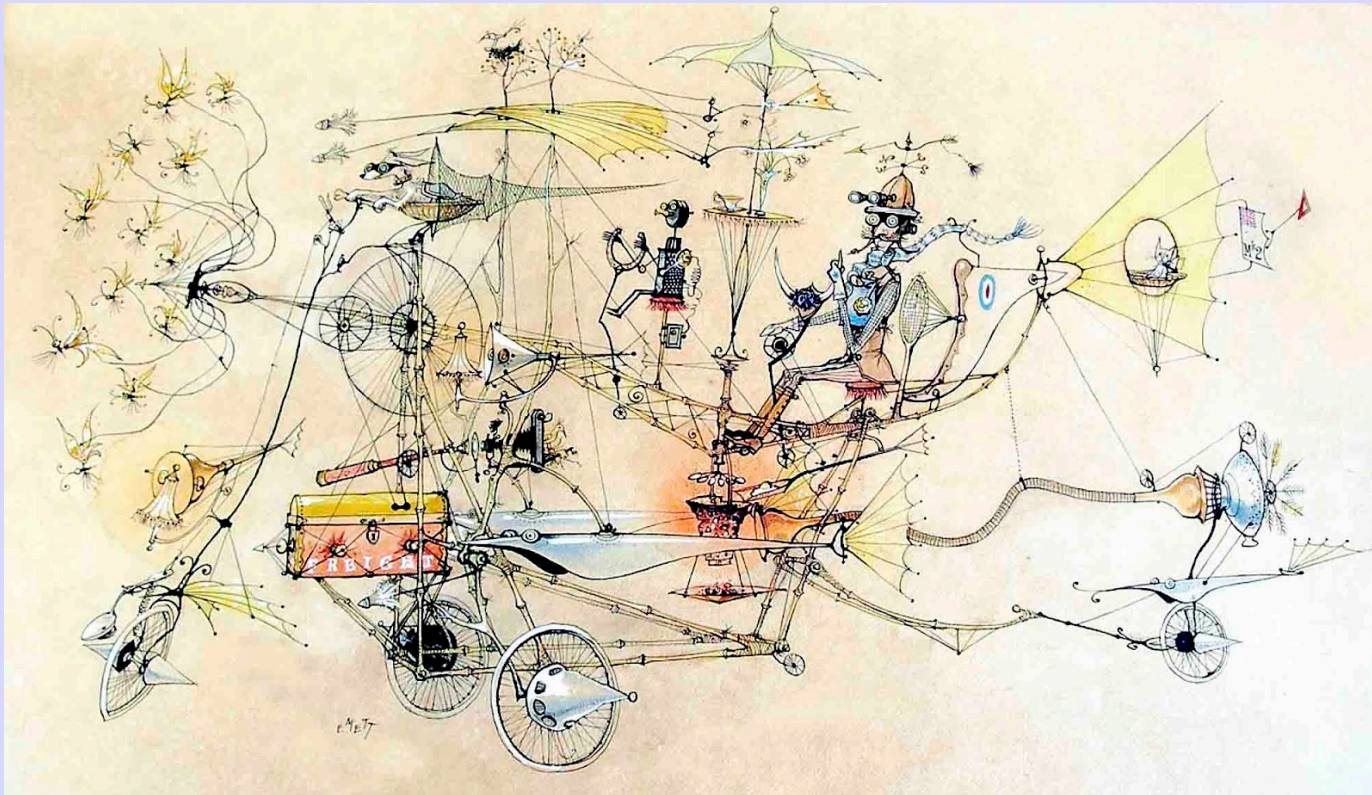
Cristel Pelsser PAM 2021 Keynote

traceroute tells a very  
different story than BGP!

# A Dream

Atlas and NLRing  
Nodes had BGP  
(and IGP)

# And then there is the Management Plane Which No One Measures



# Do Not Forget Ethics

- Protect Personally Identifiable Information (PII) and all things living or not
- Uni Minnesota's recent security experiment repository commit poisoning
- Researchers injected BGP which they knew would break a lot of routers
- Researcher who kept breaking the IETF network after being asked nicely to stop

Once it Leaves the  
NREN, it is NOT our  
network in many ways

Researchers are guests  
on the Internet