SCION

Future Internet that you can use today

FOSDEM 2020

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ANAPAYA

> *From n-gate.com:*
>
> Some academics arrive to tell us that (once again) they have Fixed The Internet, and (once again) it runs on top of the current actually-working internet, and (once again) if you sign up you can communicate with as many as twelve other computers.

$ whoami

Mateusz Kowalski

- I deploy stuff that actually works
- The bigger it is, the better it works
- I am not an academic

CERN ETH zürich ANAPAYA

Kamila Součková

- I identify problems in systems before they eat your time, your product, and your family dog
- I know a bit about a lot of things

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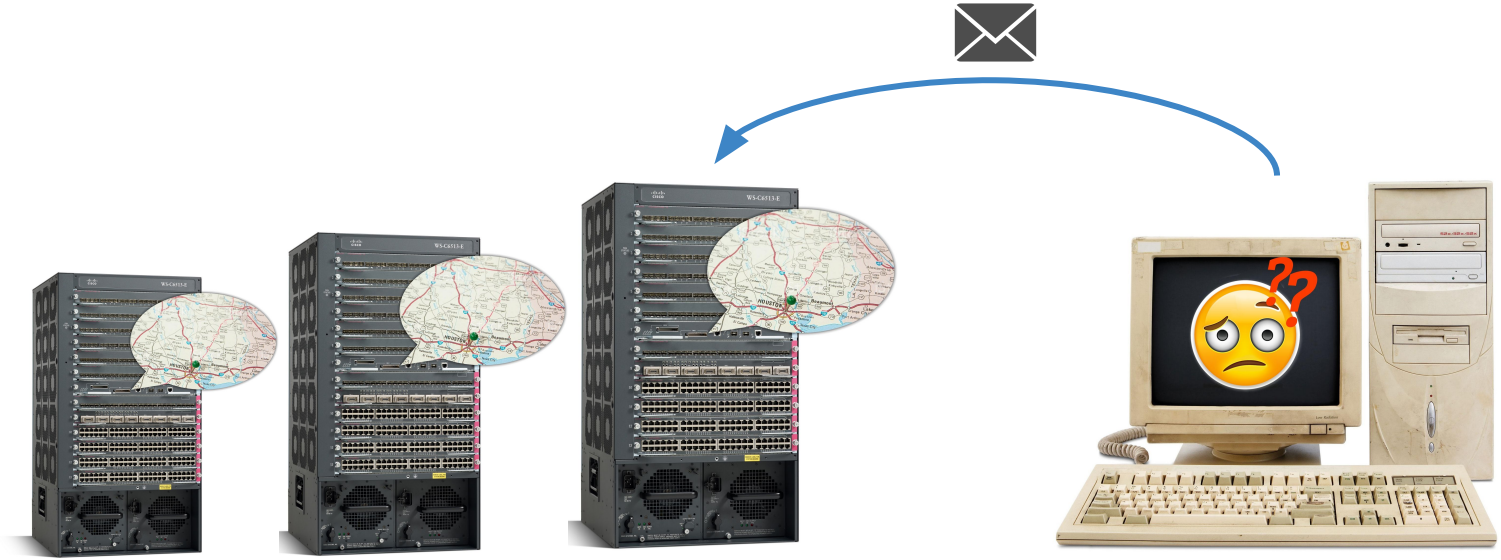
1. **Designing a new Internet**
    - What is wrong with the Internet today?
    - SCION: A clean-slate redesign
2. **How can you use it today?**
    - Deployment
    - Source code and API
    - Anapaya production network, SCIONLab research network

1. Designing a new Internet

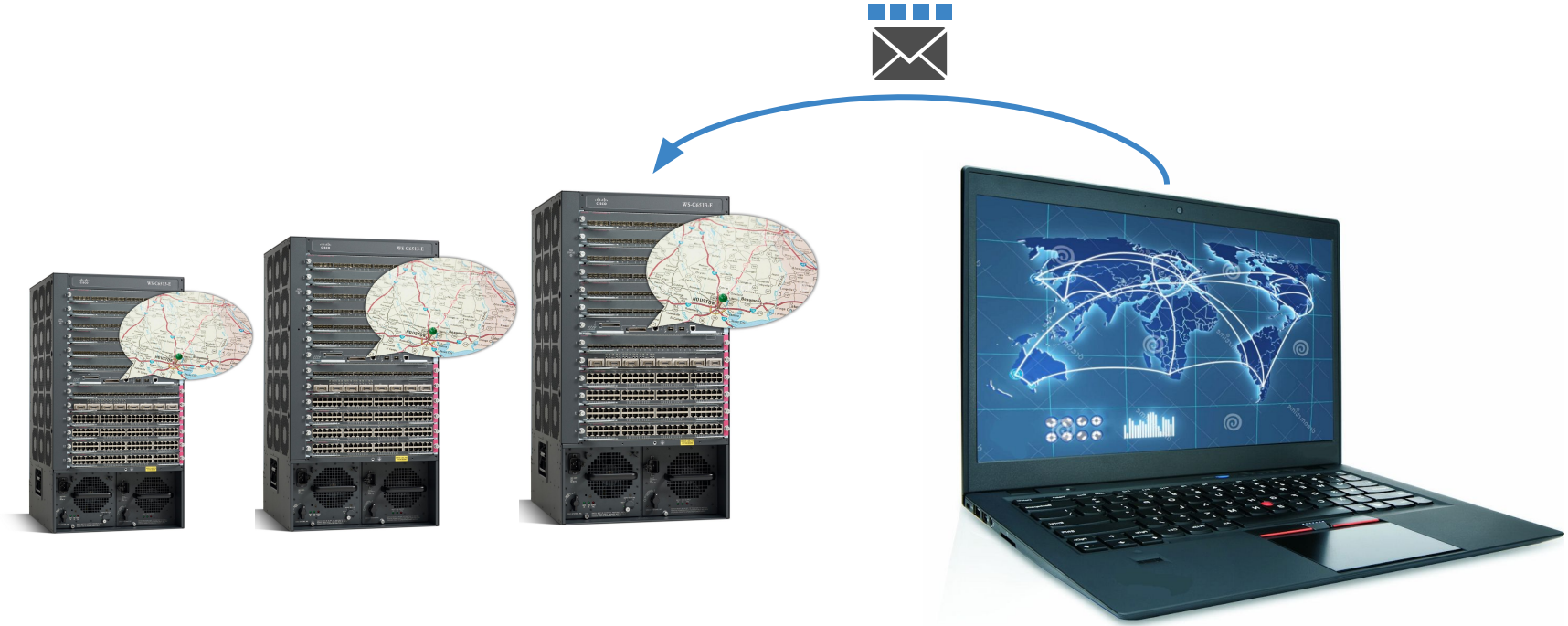
LILY HAY NEWMAN SECURITY 06.28.19 12:38 PM

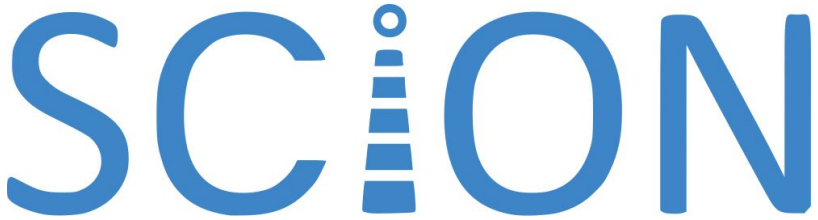
THE INFRASTRUCTURE MESS CAUSING COUNTLESS INTERNET OUTAGES

“Throw and Pray” vs Smart End Host

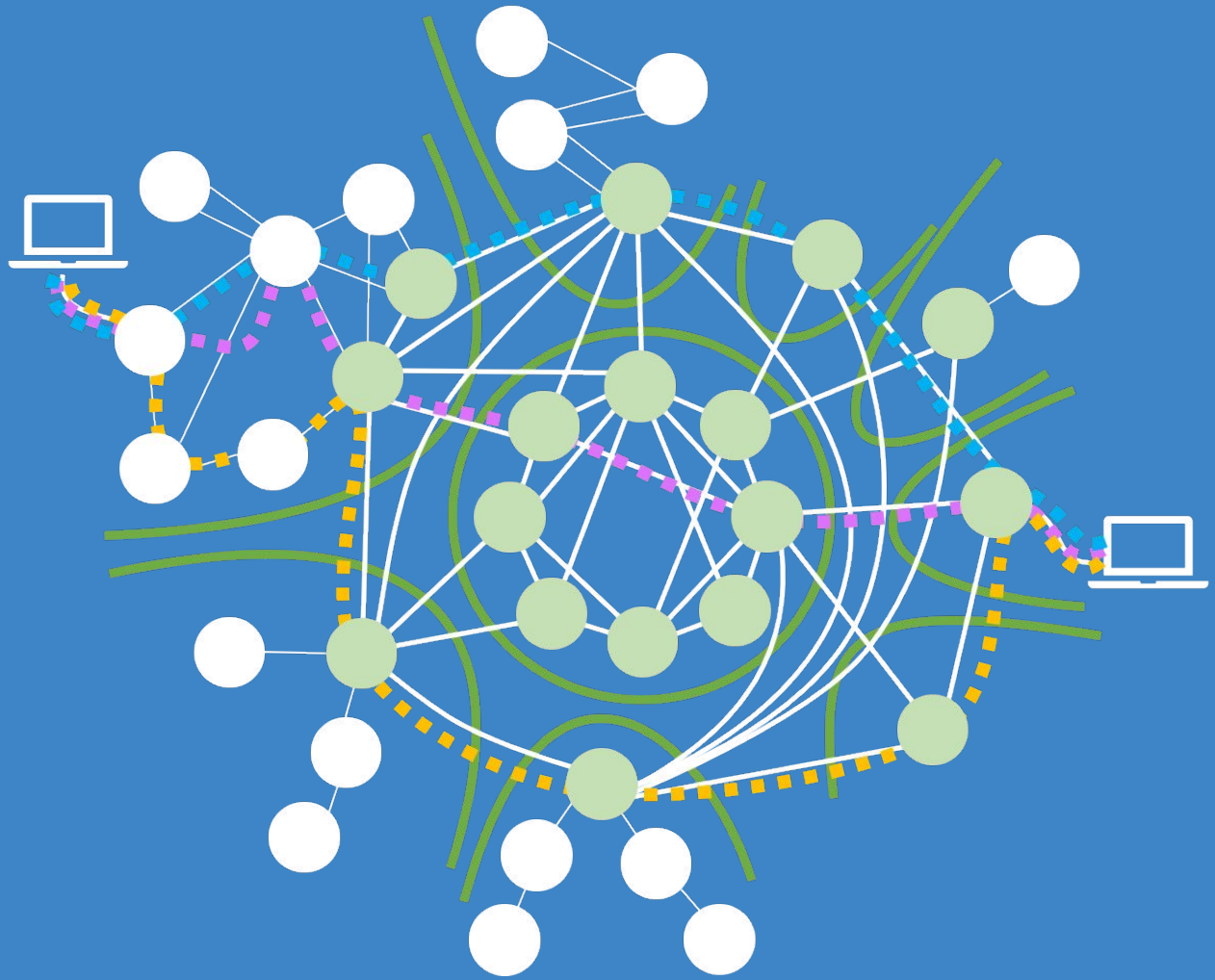


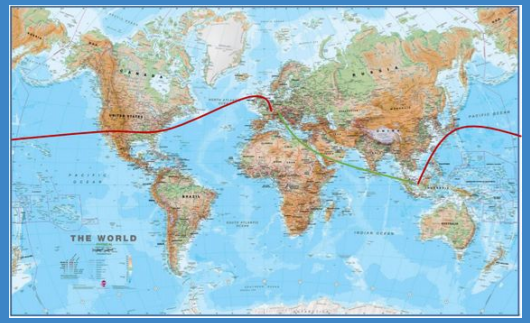
“Throw and Pray” vs Smart End Host

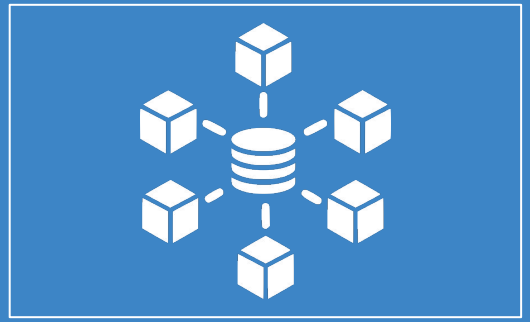


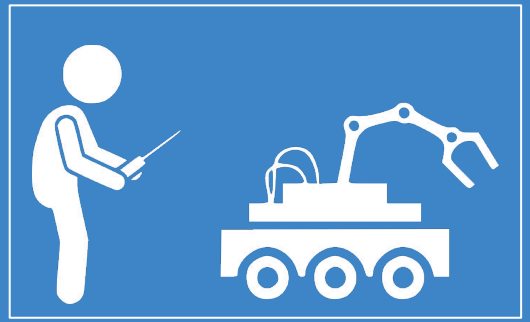


route control,
failure isolation, and
explicit trust information
for **end-to-end** communication



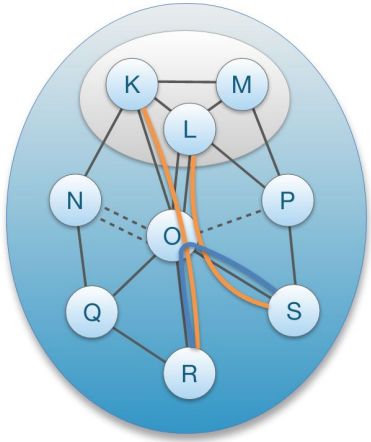

THE WORLD

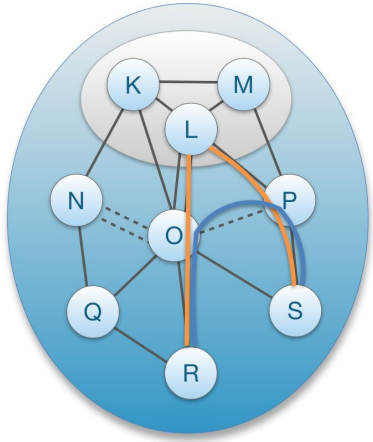


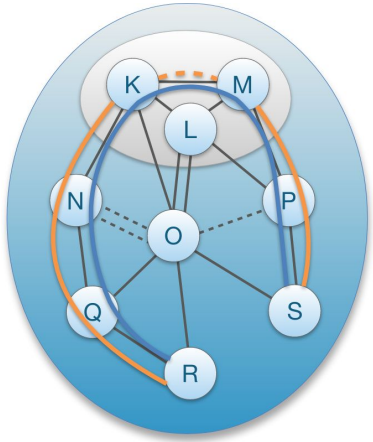


Path control in SCION

- end host selects path (from given options: != source routing)
- routers just follow the instructions
- ISP policies enforced (user cannot “invent” paths)

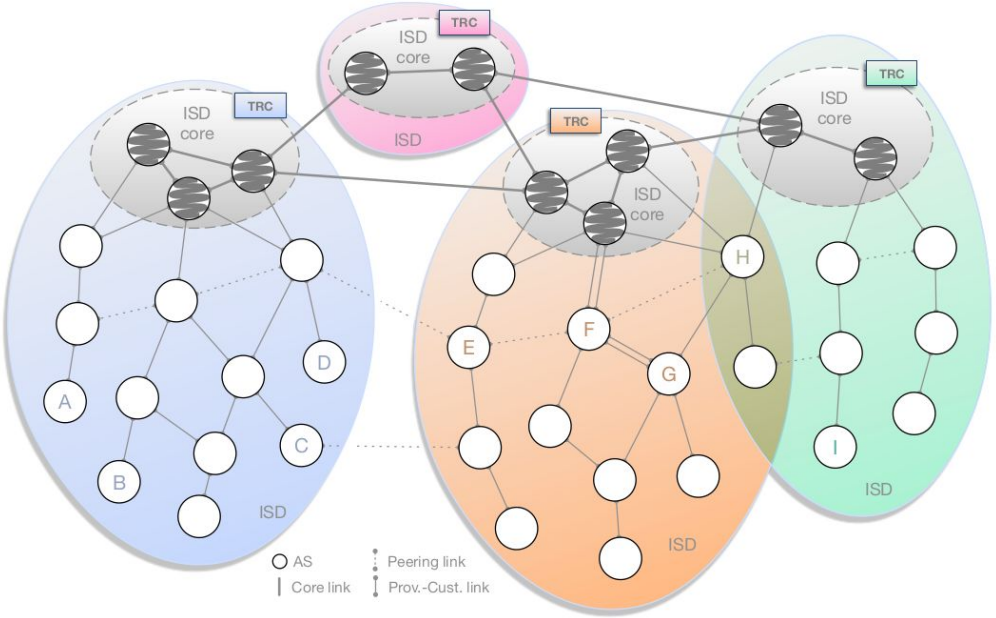






Isolation Domains (ISDs)

- an ISD is connected, but **sovereign**
- ISD independently chooses policies
- trust + routing in an ISD are independent



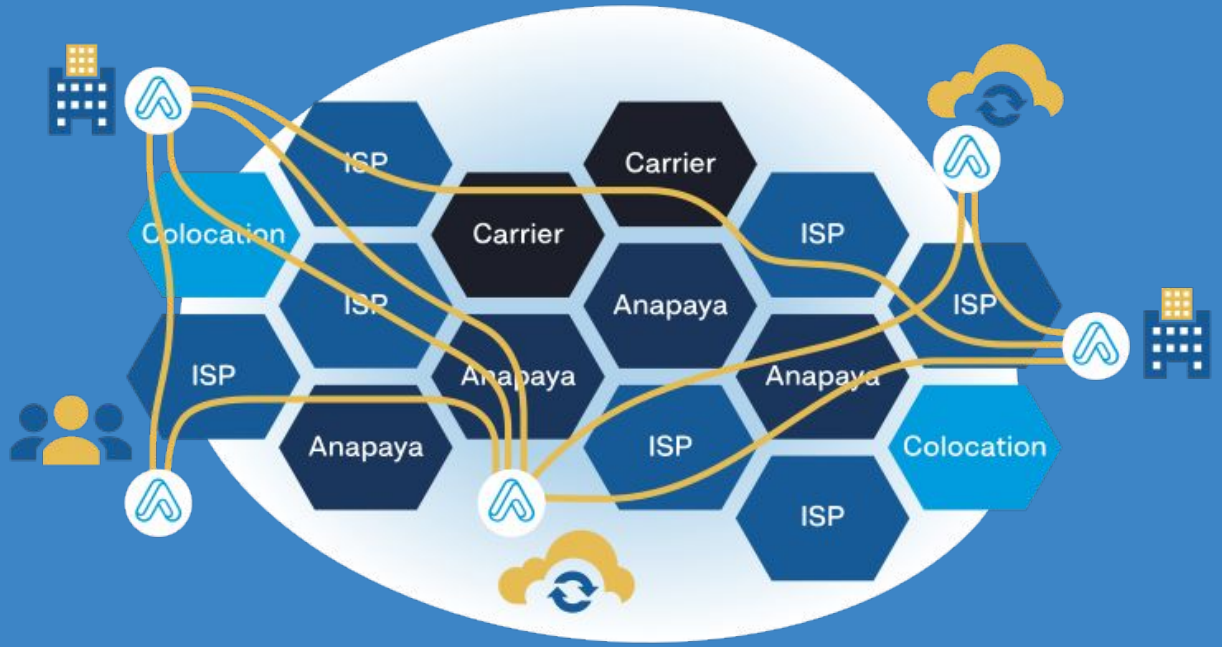
SCION goodies

- Scalability
  - routers are stateless
  - hierarchical routing
- Native multipath
- Fault tolerance
  - control plane: the usual
  - + “DIY”: if a path stops working, just switch to another one ⇒ **instant**


I TESTED MY DEMO
JUST BEFORE PRESENTATION
imgflip.com

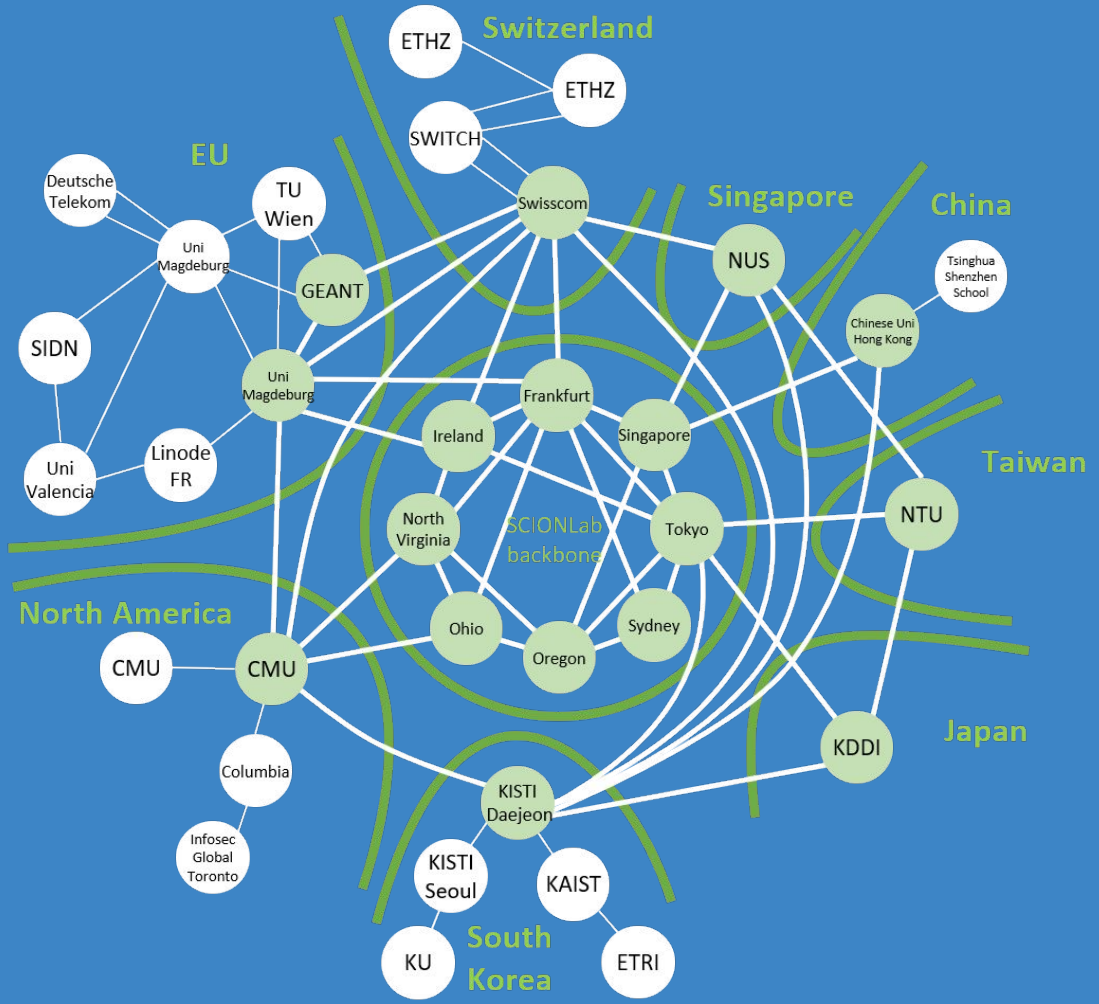
2. Join the hype train

Anapaya Production Network



join at
www.anapaya.net

SCIONLab Research Network



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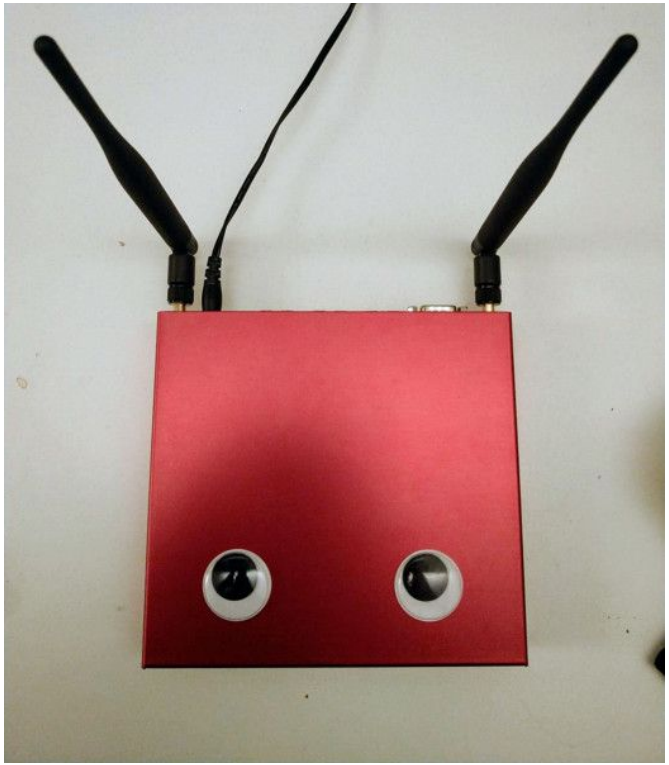
“How can I run it?”

- reference SCION implementation can run on any server
- SCION-IP Gateway enables IP-based applications to transparently use SCION
- SCION over IP enables mixed networks



“Hello world” in SCION

```
import scion

scion.init()
paths = scion.get_paths(my_destination)
print(f'Got {len(paths)} paths')
my_path = my_choose_path(paths)  # implement whatever you need
with scion.connect(my_destination, my_path) as s:
    s.write(b'Hello SCION!')
```

* Python API not final yet; contact us to get an early version

What can **you** do with it?

We can’t wait to see:

- interesting use-cases for path control
- efficient use of multipath
- using path awareness for better network utilisation
- implications for security
- ISP issues: traffic engineering, path policies…
- …

DEMO

www.scionlab.org

Resources

- https://www.scion-architecture.net
- https://www.scionlab.org
- https://www.anapaya.net
- https://github.com/scionproto/scion
- https://github.com/netsec-ethz/scion-apps

Say hi!

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#scion:inf.ethz.ch