



# ESnet

ENERGY SCIENCES NETWORK

## What About The Software?

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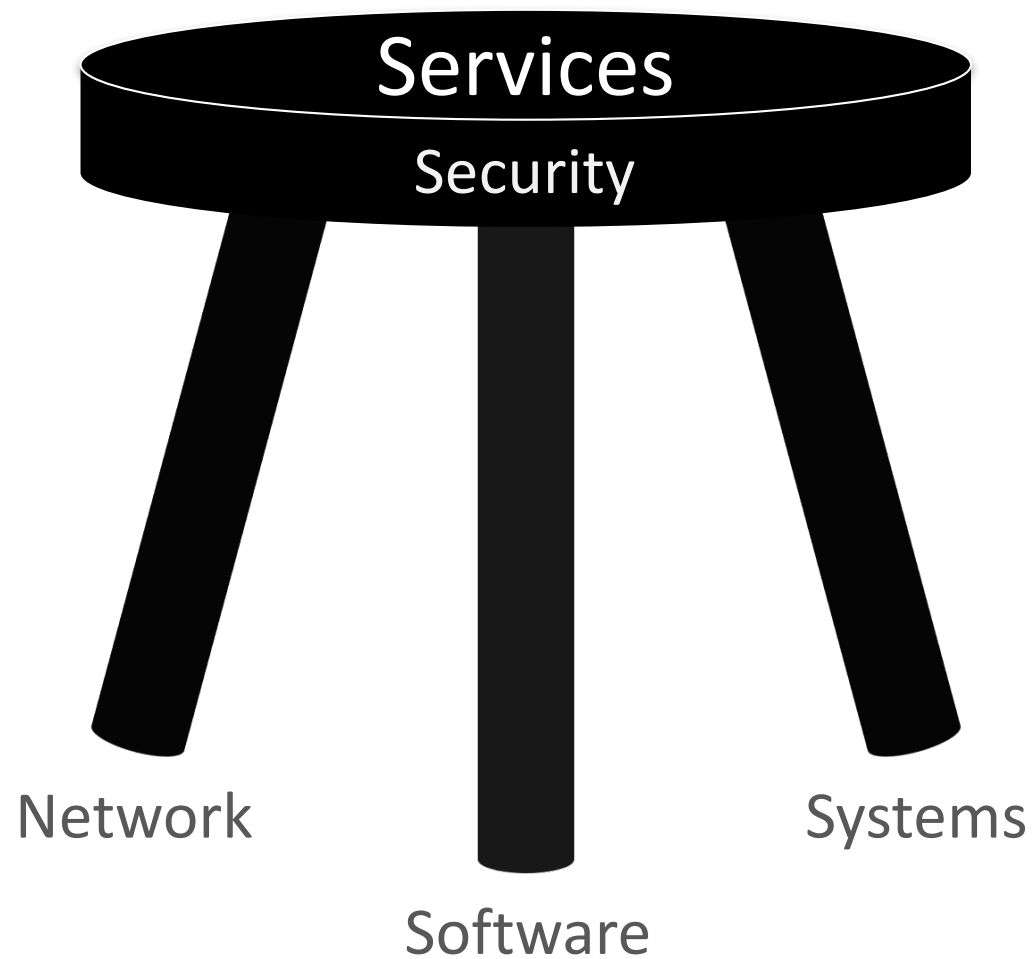
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# A Simple Anatomy of a Network



# Reality Check... (from an ISPs point-of-view)

- What do we understand well
  - **Hardware:** speeds and feeds, space and power, etc
  - **Protocols:** Reachability, Connectivity, Traffic-Engineering, etc
  - **Services:** IP routing, L2/L3VPNs, L1 circuits, etc
  - **Operations:** Monitoring, Security, Integration, etc
- What do we not understand as well
  - **Building software**
    - Architecture
    - Developing production level code
    - Verification and test
    - Support and maintenance

*R&E Networks did not evolve from software organizations*

# perfSONAR, A Case Study

- Ubiquitous deployment within the R&E eco-system
  - 2000+ known deployments in 50+ countries
- Community supported
  - 7-10 developers in 4 countries
  - 1 major release and 2-3 minor releases a year
- Took work to get here
  - Unification of perfSONAR MDM (Europe) and perfSONAR-PS (North America)
  - Building the right governance
  - Developing an appropriate support model
  - Implementing the right project management and communication channels
  - Automating various aspects of the development process

# Observations and Thoughts

- Breaking the “build it here” model is not easy, but also not intractable. Aspects to consider:
  - Policies and politics
  - Resources and responsibilities
  - Scope and scale
- You don’t have to agree on everything, but enough to sufficiently build and share core modules within a common architecture/framework.
- A single coordinated voice to help drive content delivery from vendors that benefits all.
- Each of us have limited software development resources, collaborating will allow us to go farther and better the R&E community as a whole.

# Pragmatic Considerations

- Must keep focus and commitment on this type of initiative
  - Can easily fall apart when disagreements occur or staffing pressures hit;
  - Very hard to maintain conviction internally when working on deliverables not directly impacting your network;
  - Strong leadership is a must have from all organizations.
- Structure and representation from organizations involved is important:
  - Team responsible for defining the architecture and direction of product (what needs to get done and how);
  - Team responsible for prioritizing implementation roadmap and stopping feature creep (what gets done when);
  - Team responsible for implementing product (doing the what).
- Individual organizations can influence prioritization but cannot dictate what their pooled resources implement
  - Members are working for the greater good of the product;
  - You need something done and it is prioritized too low then you add additional dedicated resources to work on it.

*For more background, see “The Software Journey from networks to visualization” NDN2016 presentation (<https://events.nordu.net/display/NDN2016/ESnet%27s+Software+Journey+-+From+Networks+to+Visualization>)*

