The OpenLab

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a smart networking research environment

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System and Network
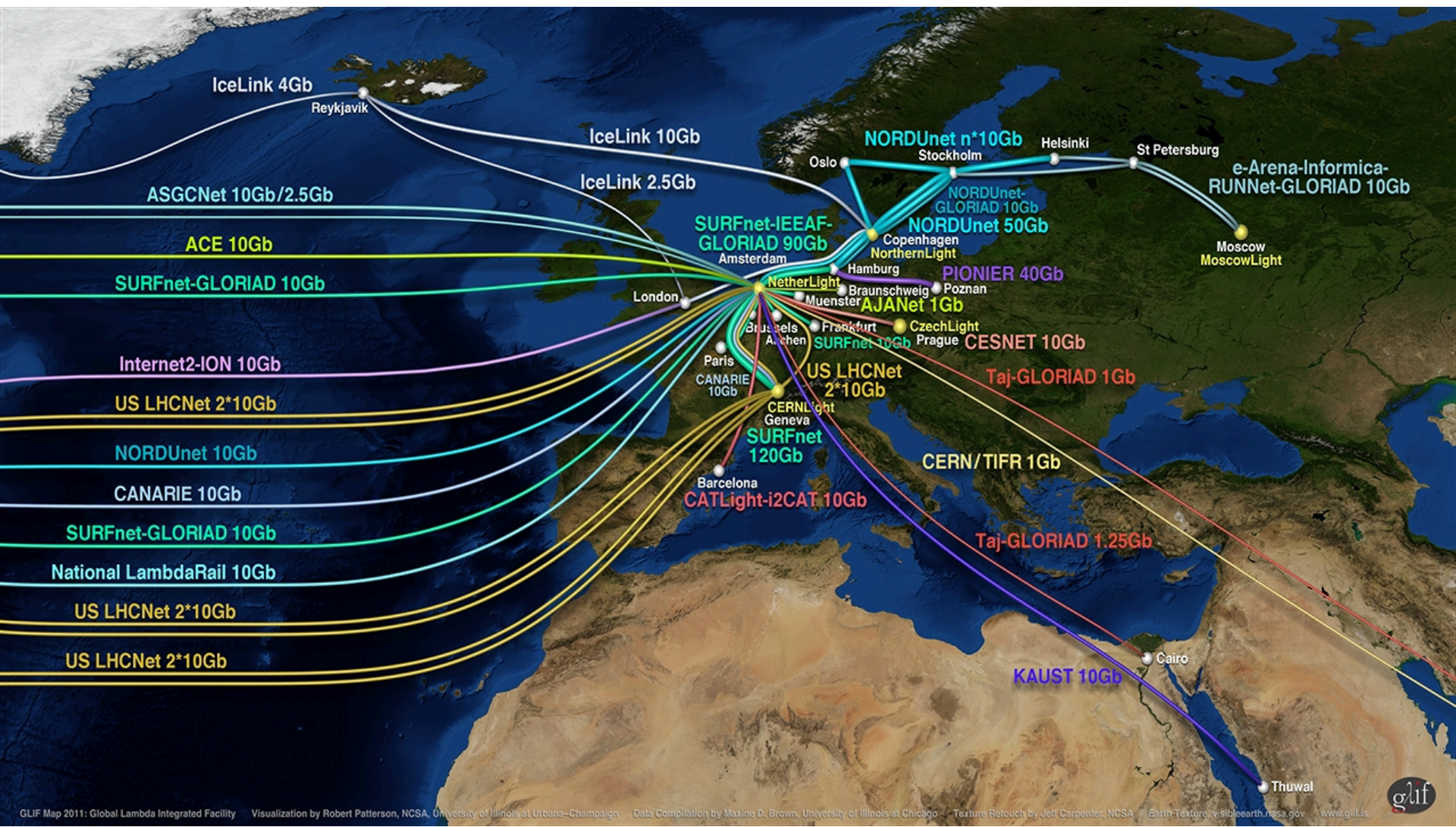Engineering

University of Amsterdam

System and Network Engineering

The Systems and Network Engineering (SNE) lab conducts **research on leading-edge computer systems of all scales**, ranging from global-scale systems and networks to embedded devices. Across these multiple scales our particular interest is on extra-functional properties of systems,
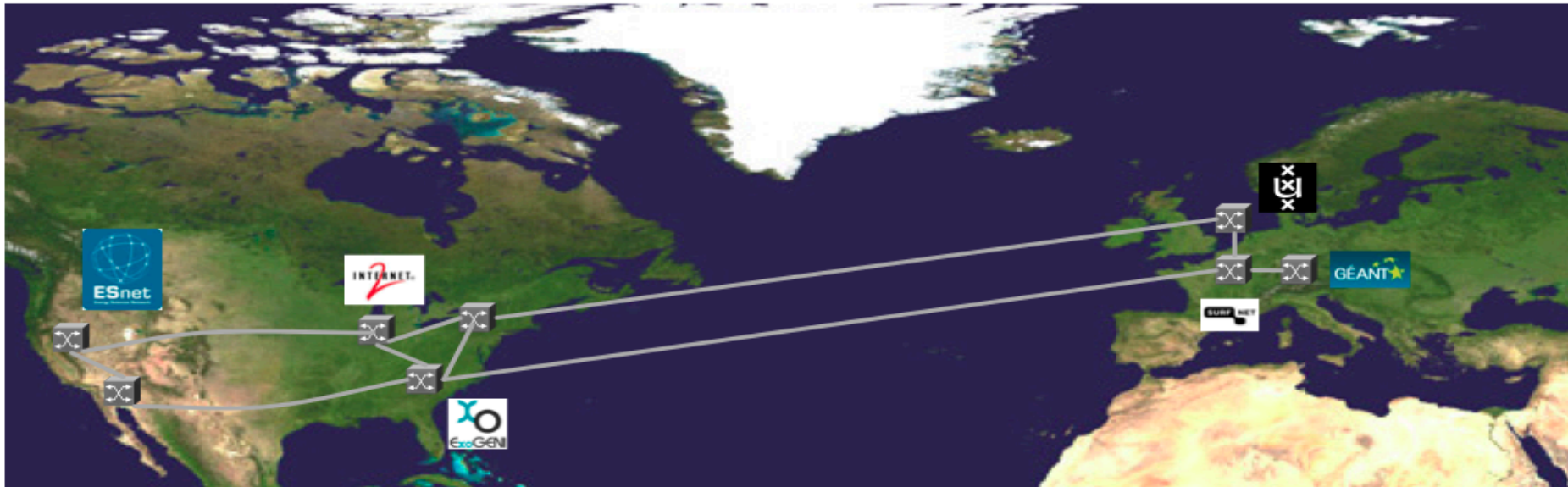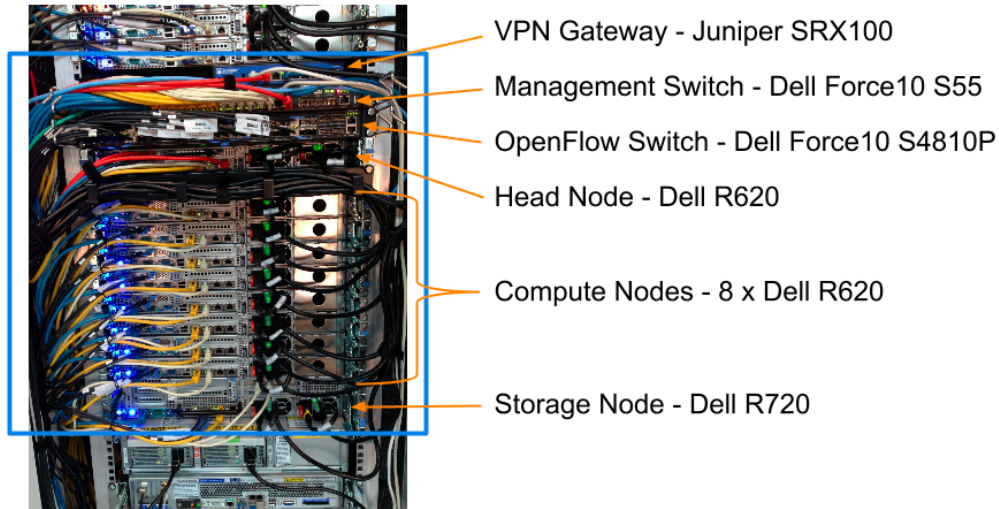
such as **performance, programmability, productivity, security, trust, sustainability**

and, last but not least, the societal impact of emerging systems-related technologies. Our approach to research is a practical and engineering-oriented one that regularly involves the design, implementation and maintenance of prototypical tools and proof-of-concept applications that demonstrate and promote our research results.

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GLIF Map 2011: Global Lambda Integrated Facility Visualization by Robert Patterson, NCSA, University of Illinois at Urbana–Champaign Data Compilation by Maxine D. Brown, University of Illinois at Chicago Texture Retouch by Jeff Carpenter, NCSA Earth Texture: visibleearth.nasa.gov www.glif.is

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The SƎ ExoGENI Rack

VPN Gateway - Juniper SRX100

Management Switch - Dell Force10 S55

OpenFlow Switch - Dell Force10 S4810P

Head Node - Dell R620

Compute Nodes - 8 x Dell R620

Storage Node - Dell R720

Current (inter)national collaborations

Industrial collaborations

Ecosystems: fieldlabs
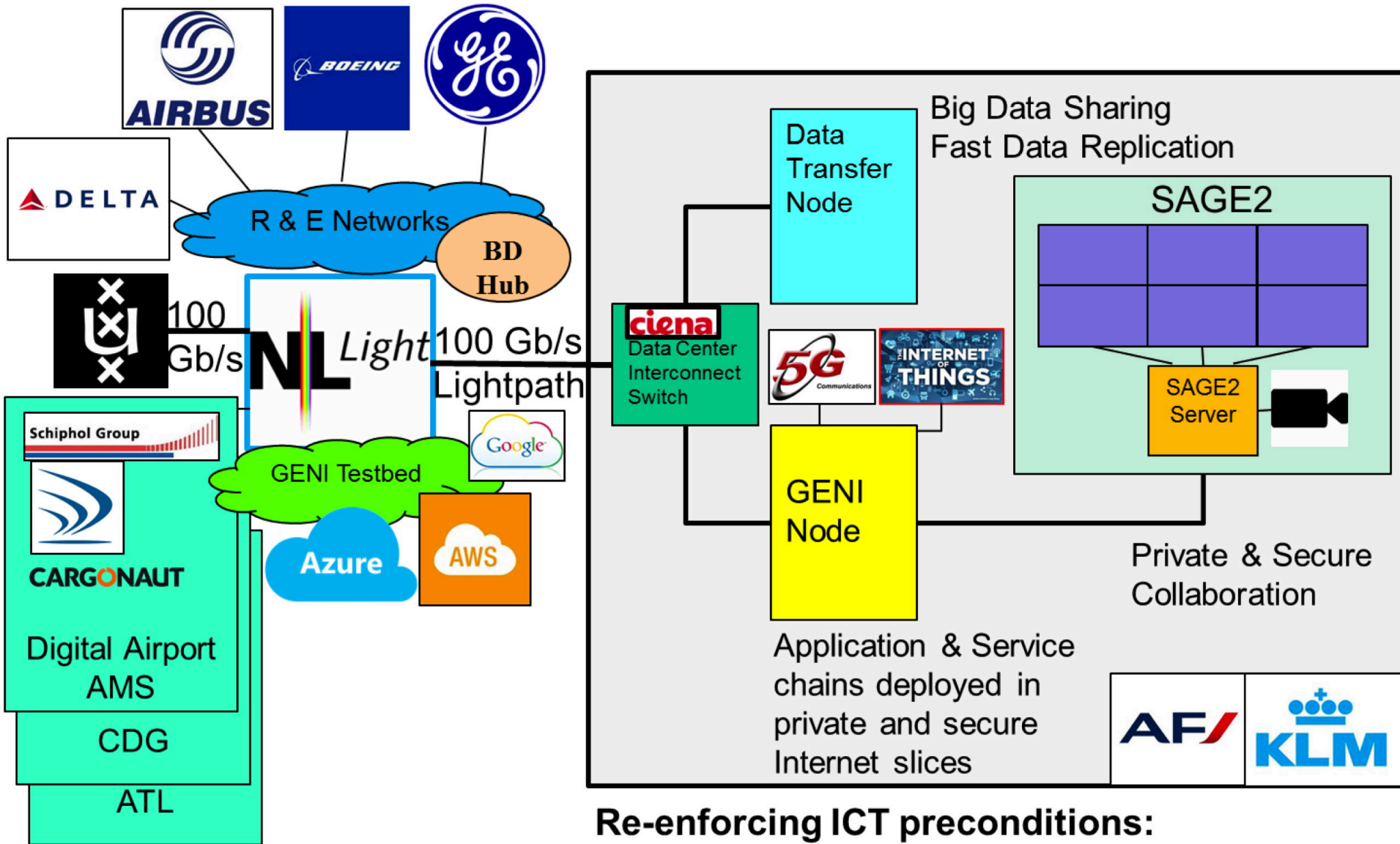
Figure courtesy of Leon Gommans (KLM)

Thoughts on collaborations driving future developments

- Research funding schemes (in the NL and Europe) will require even closer collaboration with **industry**.

  - *How does industrial/commercial needs map to research goals and research deadlines?*

- Our testbed will need even better integration with **education**. We want to become an advanced labs for network and data science students/graduates.

  - *How do we make our testbeds accessible to students?*
  - *How do we provide access to other testbeds?*

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Thoughts on research driving future developments

- We are experiencing a convergence of networking/ infrastructure research and data science research.
  - *How will machine learning will inform the operations in our testbeds/experimental facilities?*

- The Science DMZ model is becoming ubiquitous.
  - *How can we identify the workflows of scientists engaging in communication between DMZs in testbeds? How do we support them in our testbeds?*

A common theme? Software at the core of the research done in the testbeds.

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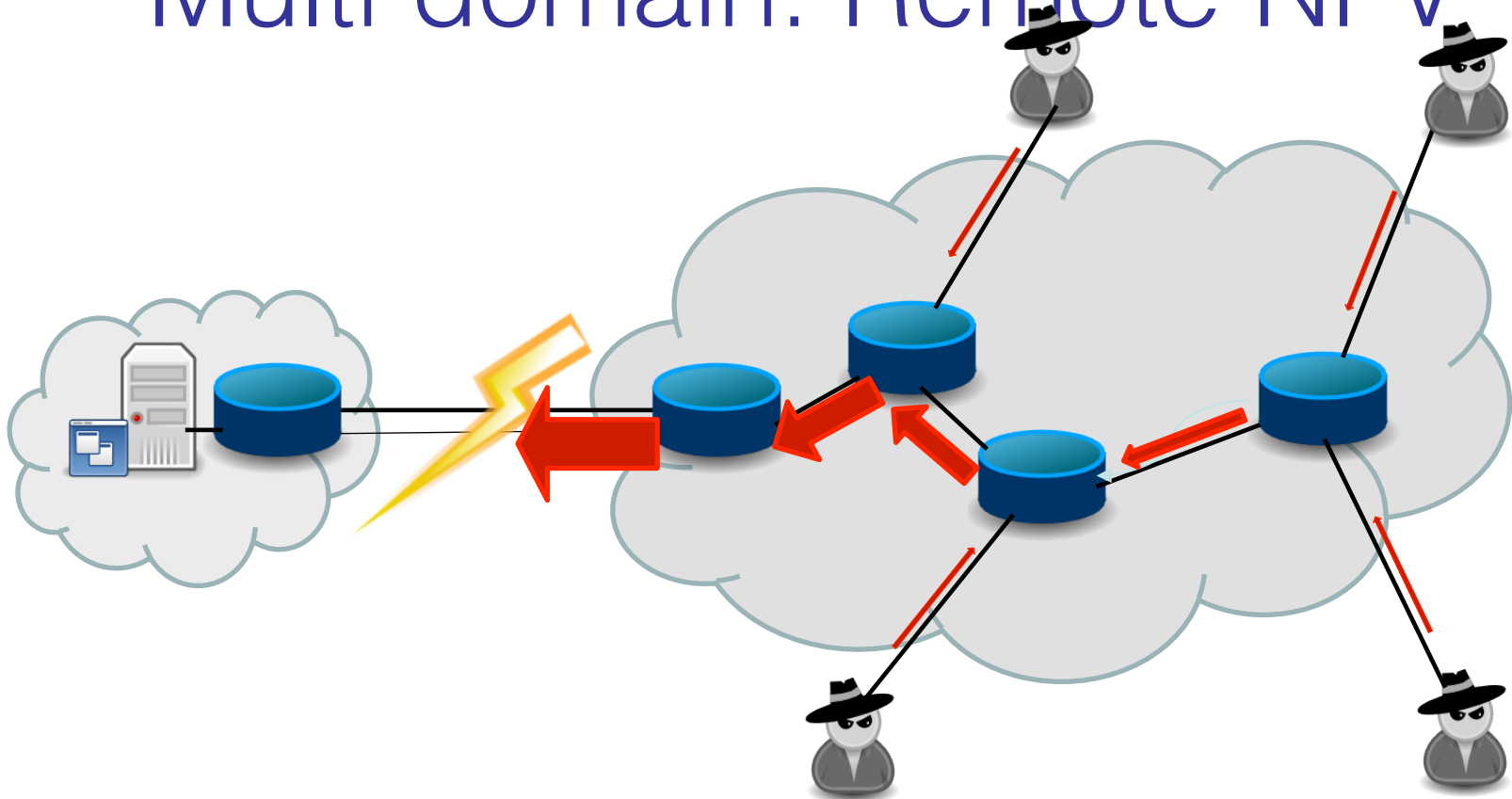System and Network Engineering

A major driver: trust and policies

- Collaborations between experimenters and extensions toward industries require parties to trust each other.

  - *How do we support trust among parties and implement the appropriate multi-domain policies?*
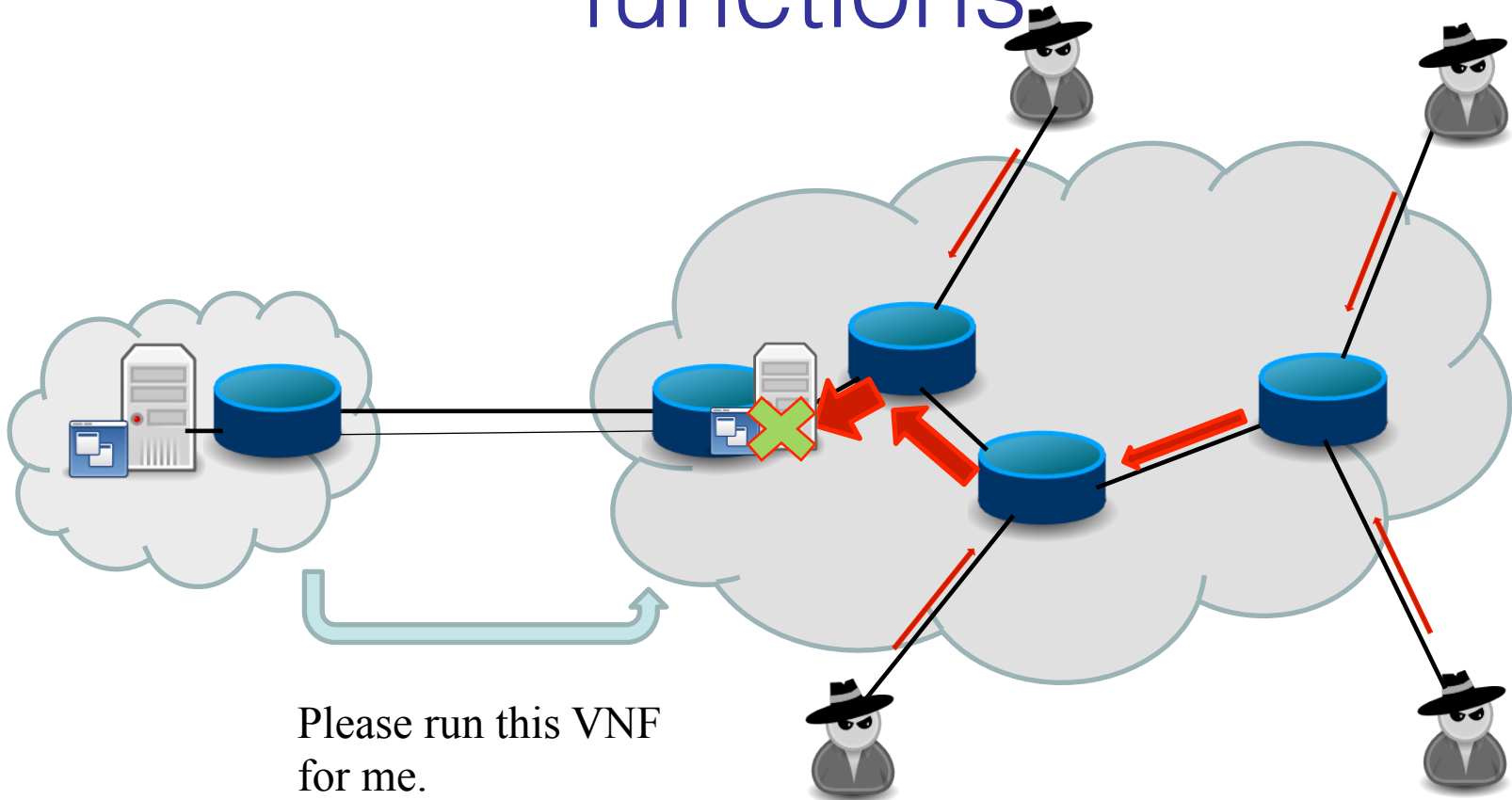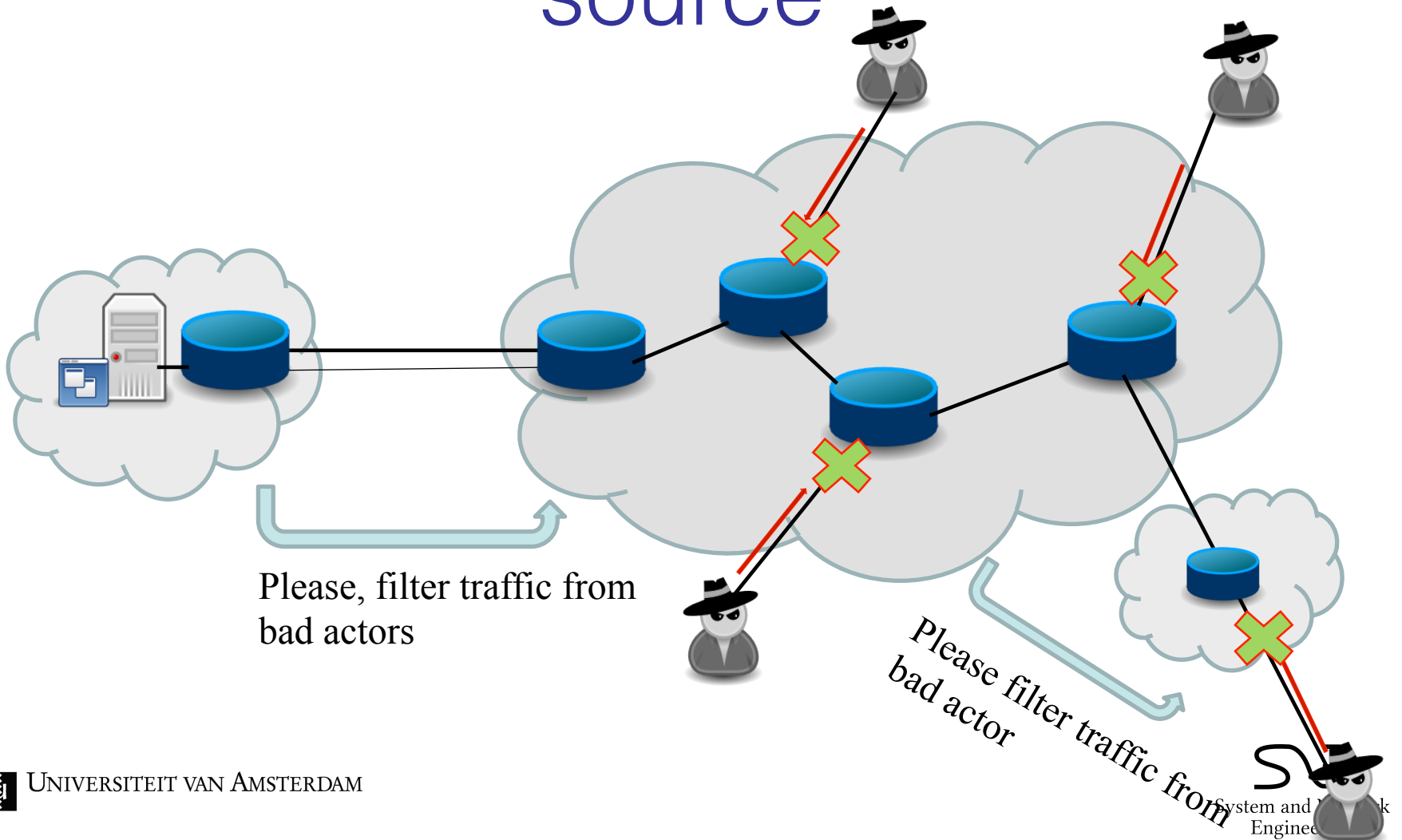
A concrete example:
Multi domain: Remote NFV

Slides courtesy of Ralph Koning (UvA)

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Multi domain: Remote network functions

Please run this VNF for me.

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Multi domain: blocking close to source

Please, filter traffic from bad actors

Please filter traffic from bad actor

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