

# NIST Public Working Group on Federated Cloud (PWGFC) IEEE P2302 Intercloud Kickoff

*John Messina, Chair, NIST PWGFC*

*Bob Bohn, Chair, IEEE P2302 Working Group*

*Steve Diamond, Chair IEEE Cloud Computing Standards Committee*

*31 August 2017*



# NIST PWGFC & IEEE P2302 Intercloud Team

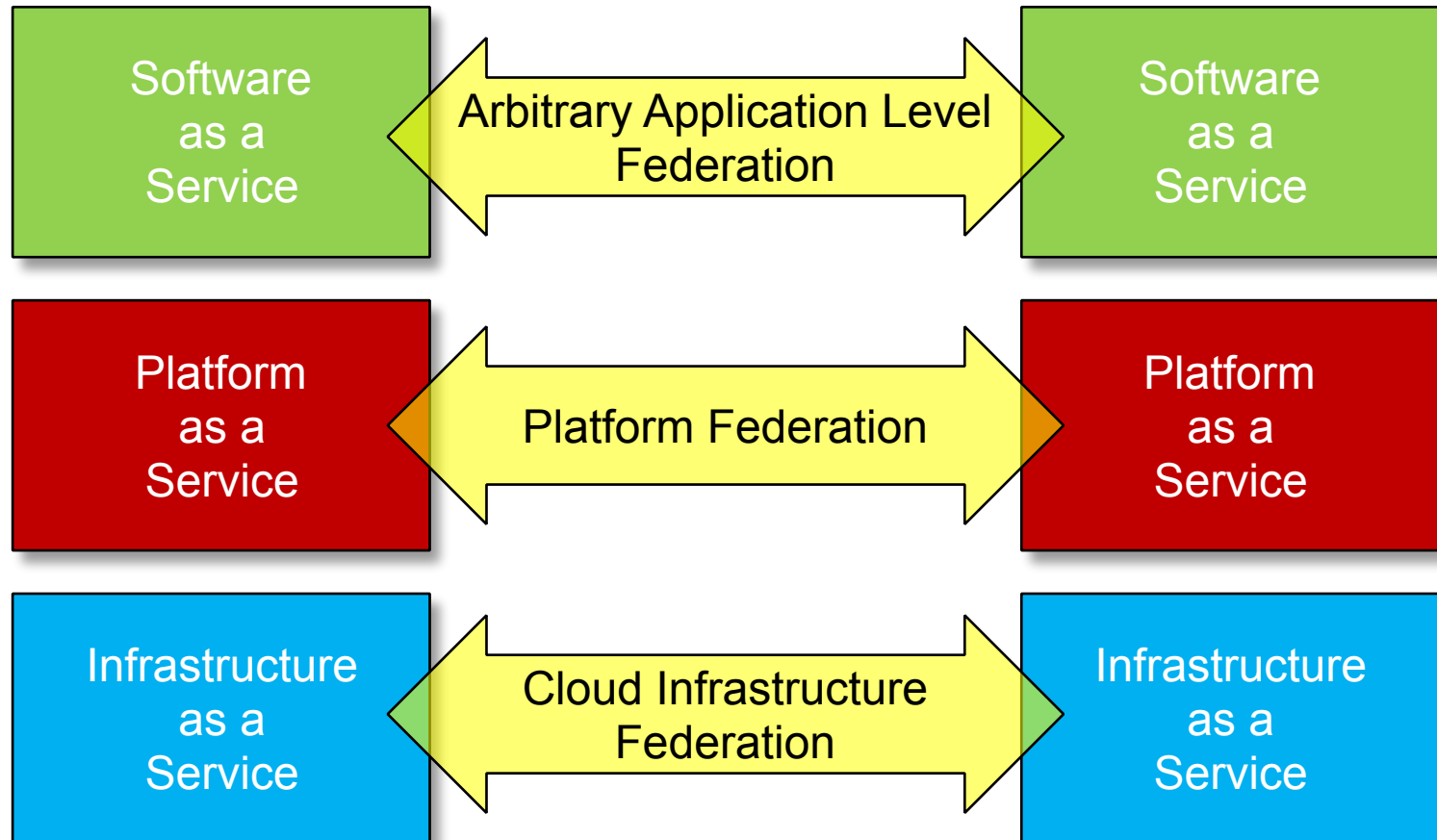
- ▶ NIST Public Working Group on Federated Cloud (PWGFC)
  - John Messina ([john.messina@nist.gov](mailto:john.messina@nist.gov))
    - Chair, NIST Public Working Group on Federated Cloud
  - Craig Lee ([Craig.A.Lee@aero.org](mailto:Craig.A.Lee@aero.org))
    - Vice Chair, NIST Public Working Group on Federated Cloud
- ▶ IEEE Cloud Computing Standards Committee (CCSC)
  - Steve Diamond ([s.diamond@computer.org](mailto:s.diamond@computer.org))
    - Chair, IEEE Cloud Computing Standards Committee (P2302 Sponsor)
  - Bob Bohn ([robert.bohn@nist.gov](mailto:robert.bohn@nist.gov))
    - Chair, IEEE P2302 Intercloud Working Group
  - David Bernstein ([david@cloudstrategypartners.com](mailto:david@cloudstrategypartners.com))
    - Vice Chair, IEEE P2302 Intercloud Working Group
  - Christy Bahn ([c.bahn@ieee.org](mailto:c.bahn@ieee.org))
    - IEEE P230 Intercloud Staff Liaison

# How to Find Information

- ▶ NIST Public Working Group on Federated Cloud (PWGFC) URL
  - <http://collaborate.nist.gov/twiki-cloud-computing/bin/view/CloudComputing/FederatedCloudPWGFC>
- ▶ Request to be on NIST PWGFC Mailing List
  - [fedcloud@nist.gov](mailto:fedcloud@nist.gov)
- ▶ IEEE P2302 Intercloud Working Group URL
  - <http://sites.ieee.org/sagroups-2302/>
- ▶ Request to be on IEEE P2302 Intercloud Working Group List
  - [STDS-P2302@ieee.org](mailto:STDS-P2302@ieee.org)

# This Is Not Just “Cloud” Federation!

*Services Can Be Federated at Any Level in the System Stack*

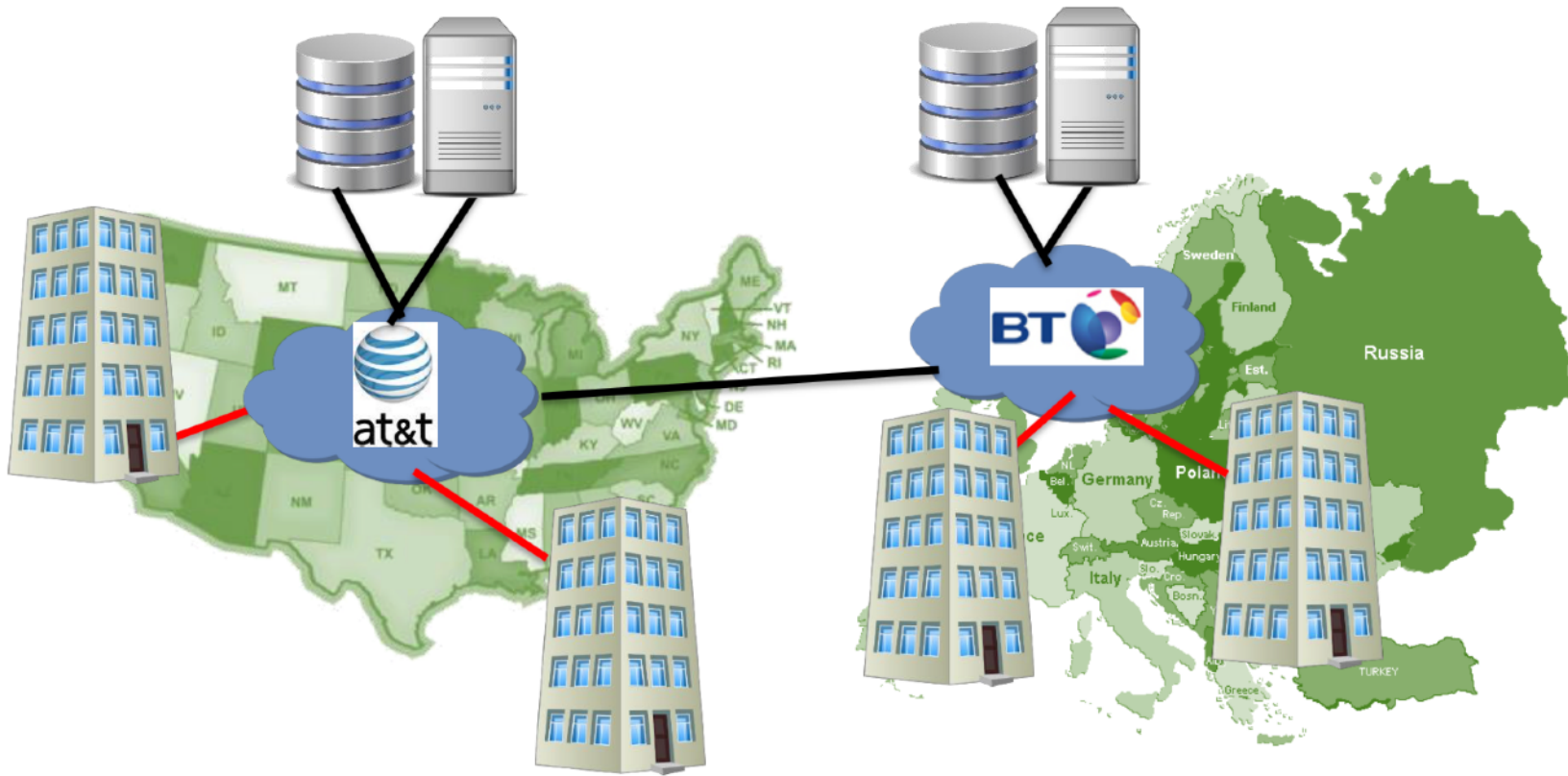


***Cloud federation is a special case of general service federation***



# IEEE Intercloud Use Case

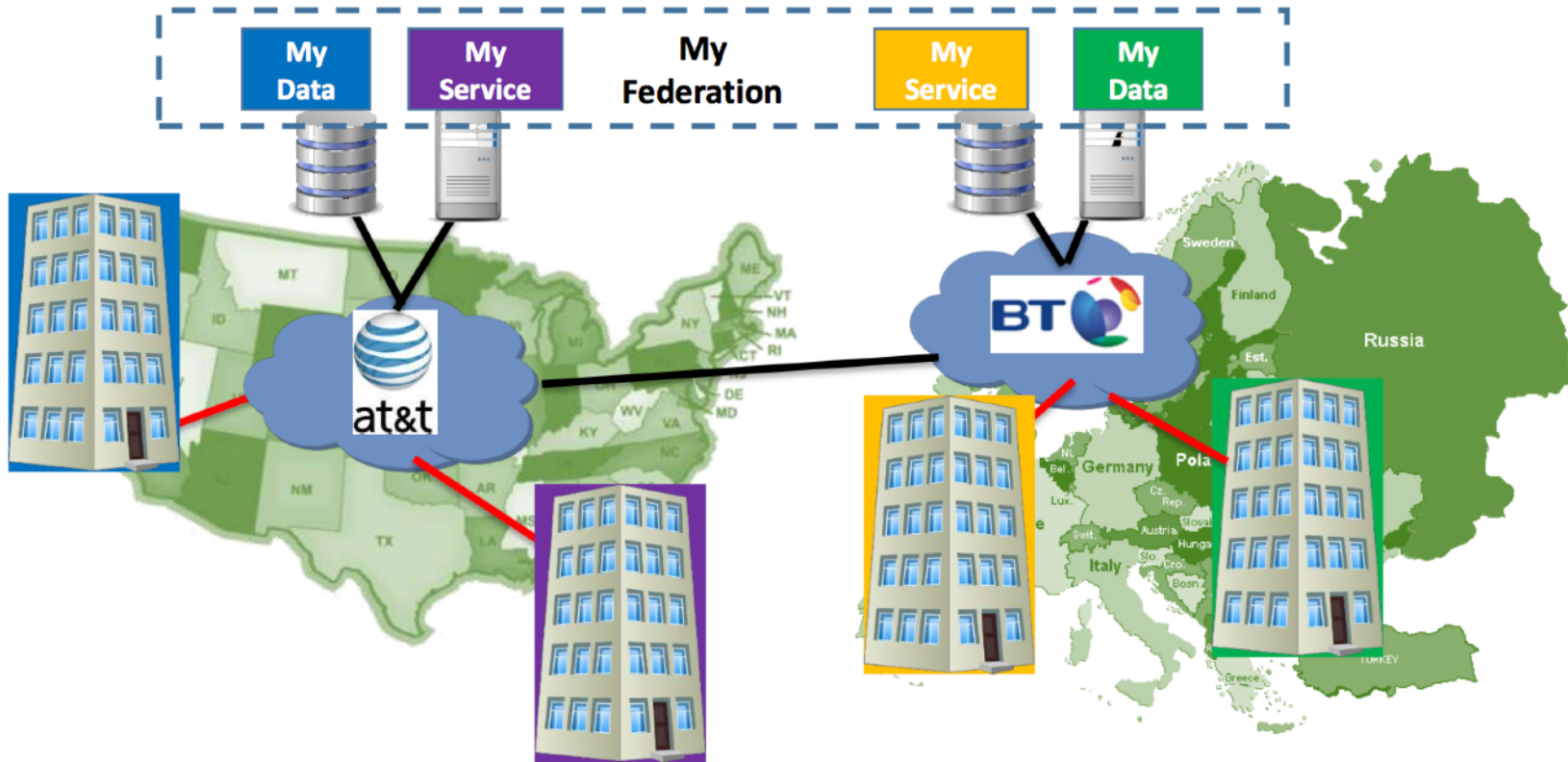
*Future: Wholesale Computing/Storage*



**Cloud Services such as Compute and Storage can ALSO be Wholesaled by US Carrier through the MPLS VPN in area where they don't operate infrastructure**

# IEEE Intercloud Use Case

*Future: Federating PaaS- and SaaS-level Business Functions*

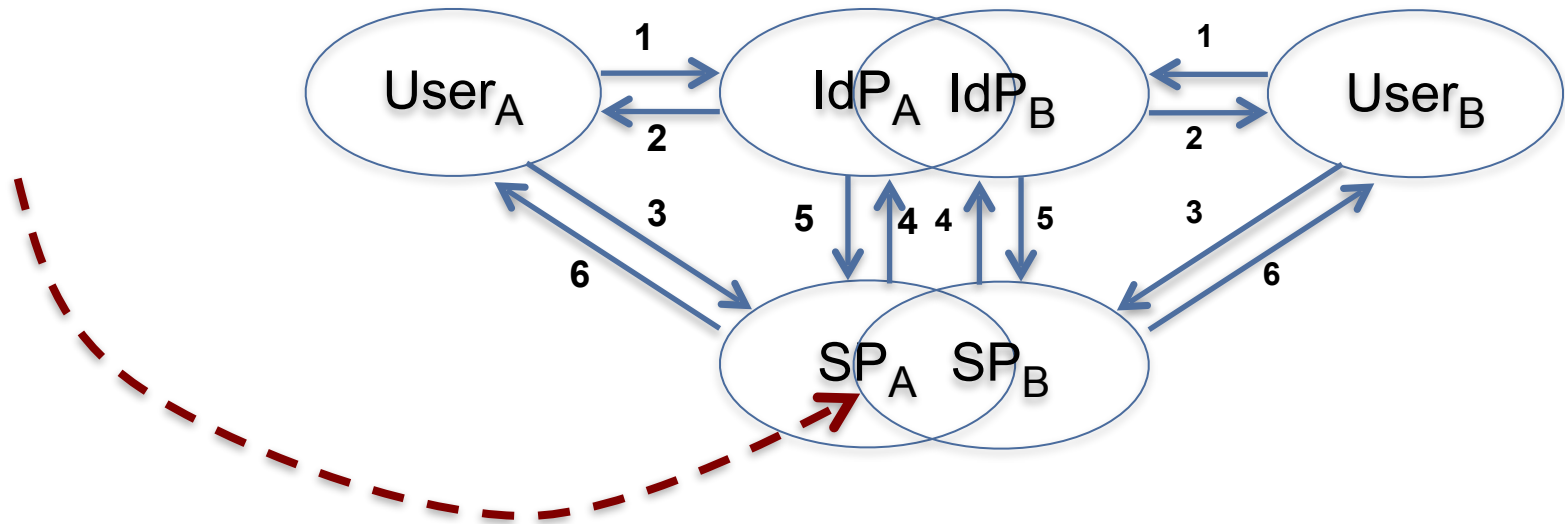


Different organizations that need to collaborate on joint business goals can securely share resources (data and services) among a defined set of federation partners

# Functionally What Does Federation Require?

The Basic AuthN/Z Process  
(IdP = Identity Provider, SP = Service Provider)

The AuthN/Z Challenge in a Distributed Environment

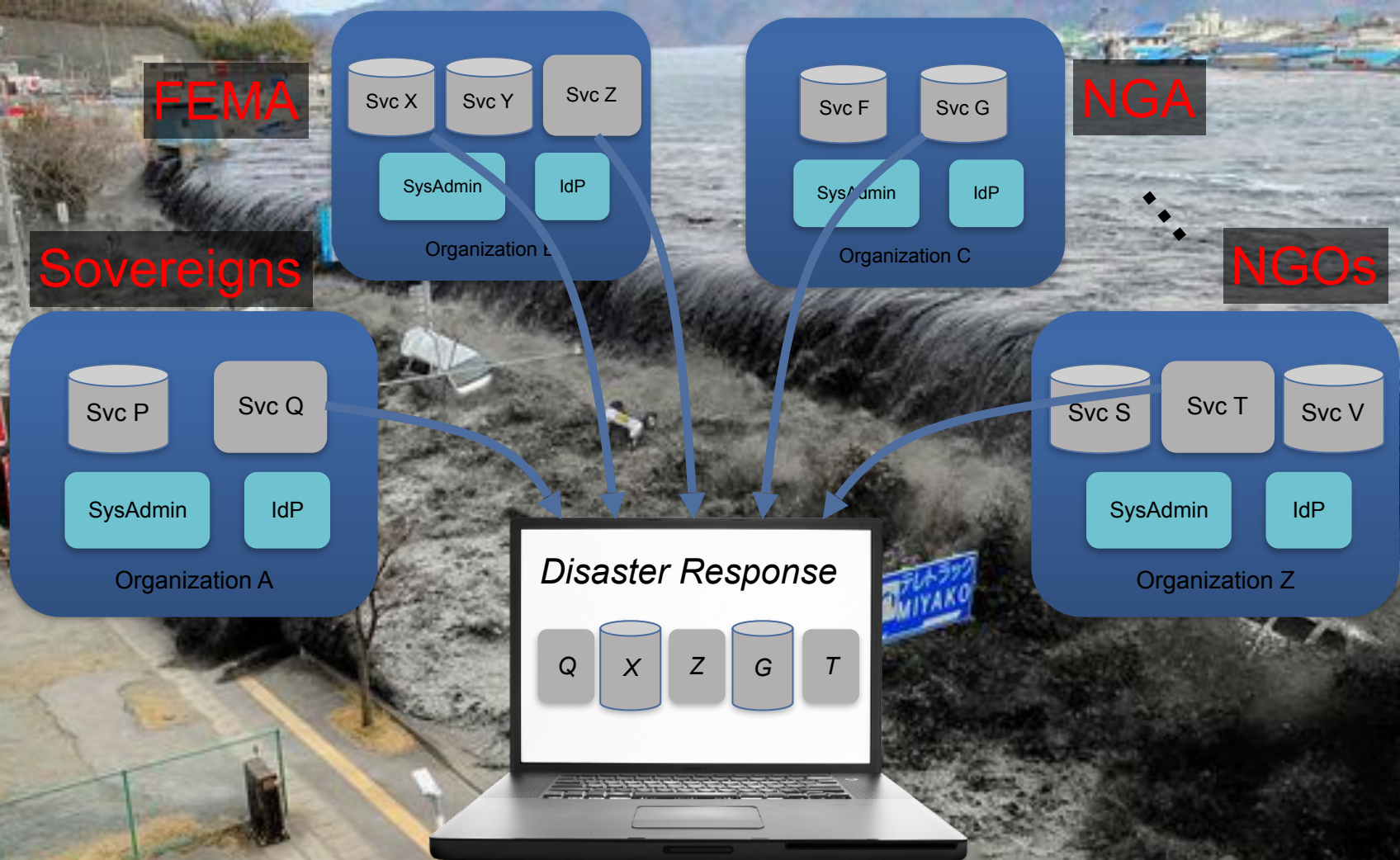


**How can User<sub>A</sub> find (discover) SP<sub>B</sub>?**

**How can SP<sub>B</sub> validate User<sub>A</sub>'s credentials and make access decision?**

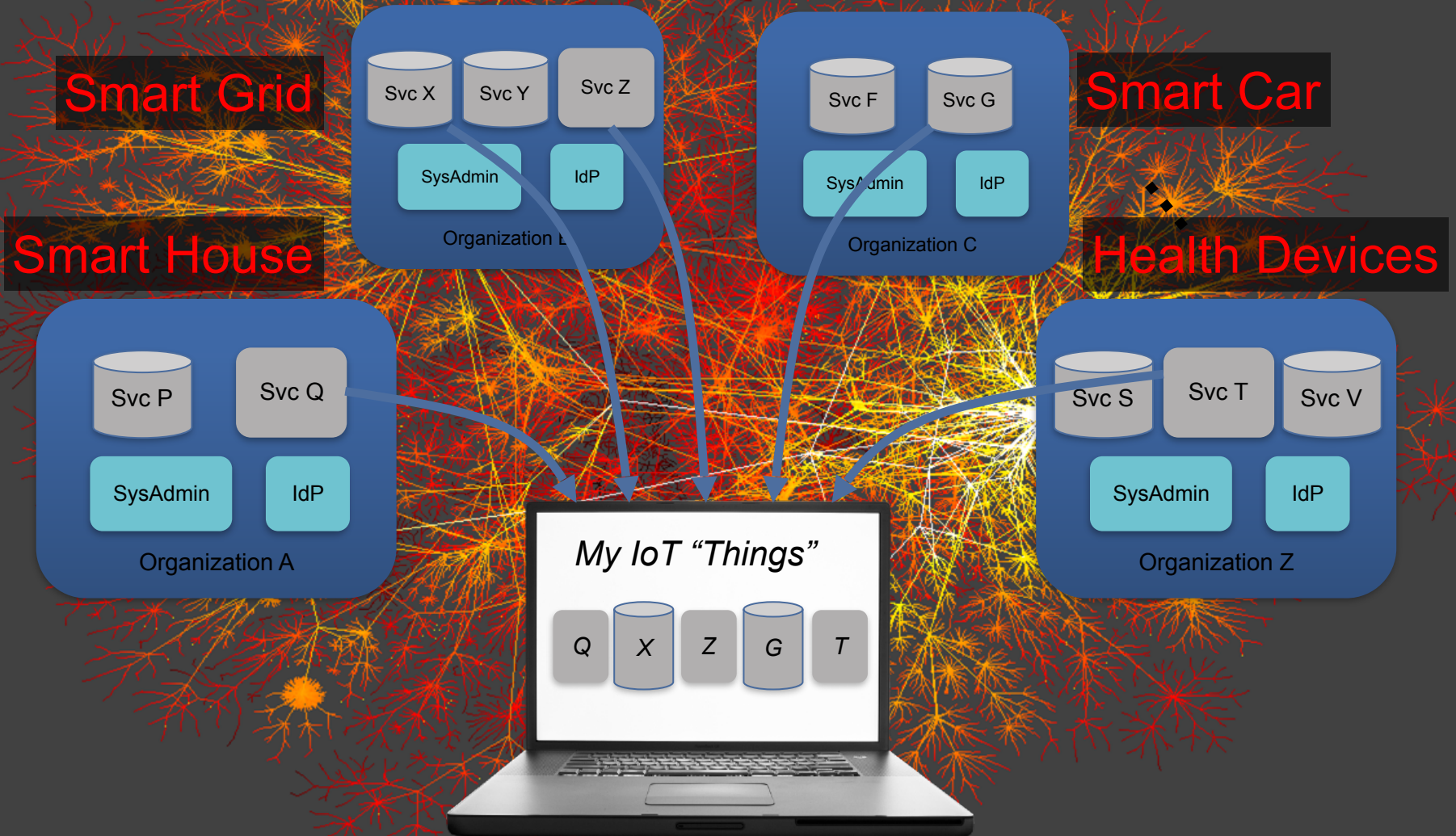
# International Disaster Response:

Stakeholders will need to collaborate and share data on-demand in response to an unpredictable disaster





# The Internet of Things: The IoT will involve many inherently distributed applications on a potentially global-scale



Skitter data depicting internet connectivity. CAIDA.org, used by permission.

# PWGFC/P2302 Intercloud Goals & Outputs

- ▶ The NIST PWGFC will develop a **cloud federation vocabulary and conceptual model** based on the Scope and Purpose.
  - The PWGFC interim outputs will be contributed to the IEEE P2302 Working Group in real-time.
  - The PWGFC ultimate output will be a NIST Technical Report.
- ▶ The IEEE P2302 Intercloud Working Group will develop a **cloud federation standard** based on the Scope and Purpose.
  - The PWGFC interim contributions will serve as input.
  - Feedback on PWGFC vocabulary and conceptual architecture contributions will be provided to the PWGFC in real-time.
  - The P2302 initial output is expected to be an IEEE Standard.
  - We then plan to contribute the P2302 Standard to ISO/JTC1/SC38 to create an International Standard.



# Policies, Membership, Outputs

Common Scope and Purpose

Anyone Can Join Either or Both Groups

No Other Memberships Required

## NIST PWGFC

NIST PWGFC P&P

NIST PWGFC Members

NIST PWGFC Technical  
Report/Special Publication

## IEEE P2302

IEEE P2302 P&P

IEEE P2302 Members

IEEE P2302 Standard

International Standard

# Next NIST/IEEE Joint WG Meeting

*September 28, 19:00 — this evening*

**NIST PWGFC and IEEE P2302 Meeting (1:00pm-3:00pm EDT)**

Connect via: [join.me/ieeesa\\_robert.bohn](https://join.me/ieeesa_robert.bohn)

## To dial in by phone:

United States - Atlanta, GA  
[+1.404.400.8750](tel:+14044008750)

United States - New York, NY  
[+1.646.307.1990](tel:+16463071990)

United States - Camden, DE  
[+1.302.202.5900](tel:+13022025900)

United States - San Francisco, CA  
[+1.415.594.5500](tel:+14155945500)

United States - Hartford, CT  
[+1.860.970.0010](tel:+18609700010)

United States - Tampa, FL  
[+1.813.769.0500](tel:+18137690500)

United States - Los Angeles, CA  
[+1.213.226.1066](tel:+12132261066)

United States - Washington, DC  
[+1.202.602.1295](tel:+12026021295)

**Conference ID:**

**169-282-407 #**

# Candidate Discussion Topics

*Very Briefly!*

- Federation Definition
- Federation Use Cases
- Federation Actors and Their Fundamental Capabilities
- Federated Cloud Deployment Models
- Existing Relevant Tools and Systems
- Existing Relevant Standards (and How They Relate to Necessary Capabilities)
- Areas for Federation-Specific Standardization

# How to fund this work??

- There is well-established, wide-spread need for flexible, on-demand, standardized, secure collaboration tools, *including federation*
- There are many existing, relevant “piece parts” and systems that address different aspects of general federation management
- ***There needs to be some serious integration to identify best practices and promote an emergent dominant practice based on standardized federation tools that get widely deployed***
- This is the typical standards adoption chicken-and-egg problem:
  - *Nobody wants to adopt a standard that is not widely adopted, but standards don't get widely adopted until people start adopting them!*
- ***Some organization with a undeniable need for secure collaboration and federation (and there are many of them) needs to step-up to the plate and demonstrate that integration***
  - ***Show vendors what's needed and what's possible***
  - ***Ignite a new marketplace***

# The Open Geospatial Consortium Testbed Process

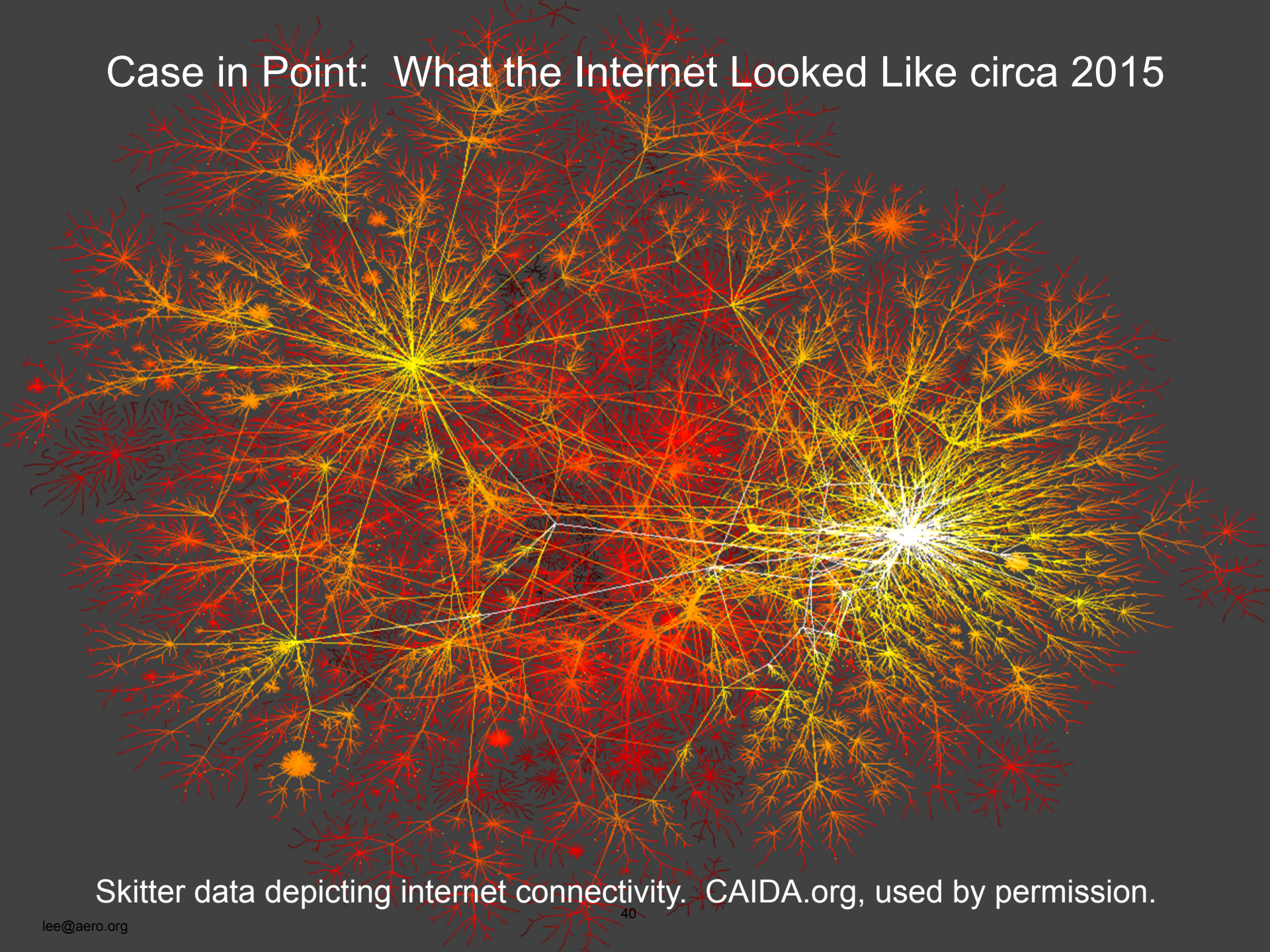
- OGC runs roughly annual testbed process to develop standards, implementations and use case demonstrations
- OGC Sponsors fund overall testbed tasks (typically \$3-5M/year)
- Testbed 14 in Planning Phase
- <http://www.opengeospatial.org/projects/initiatives/testbed14>

## OGC TB13 Sponsors





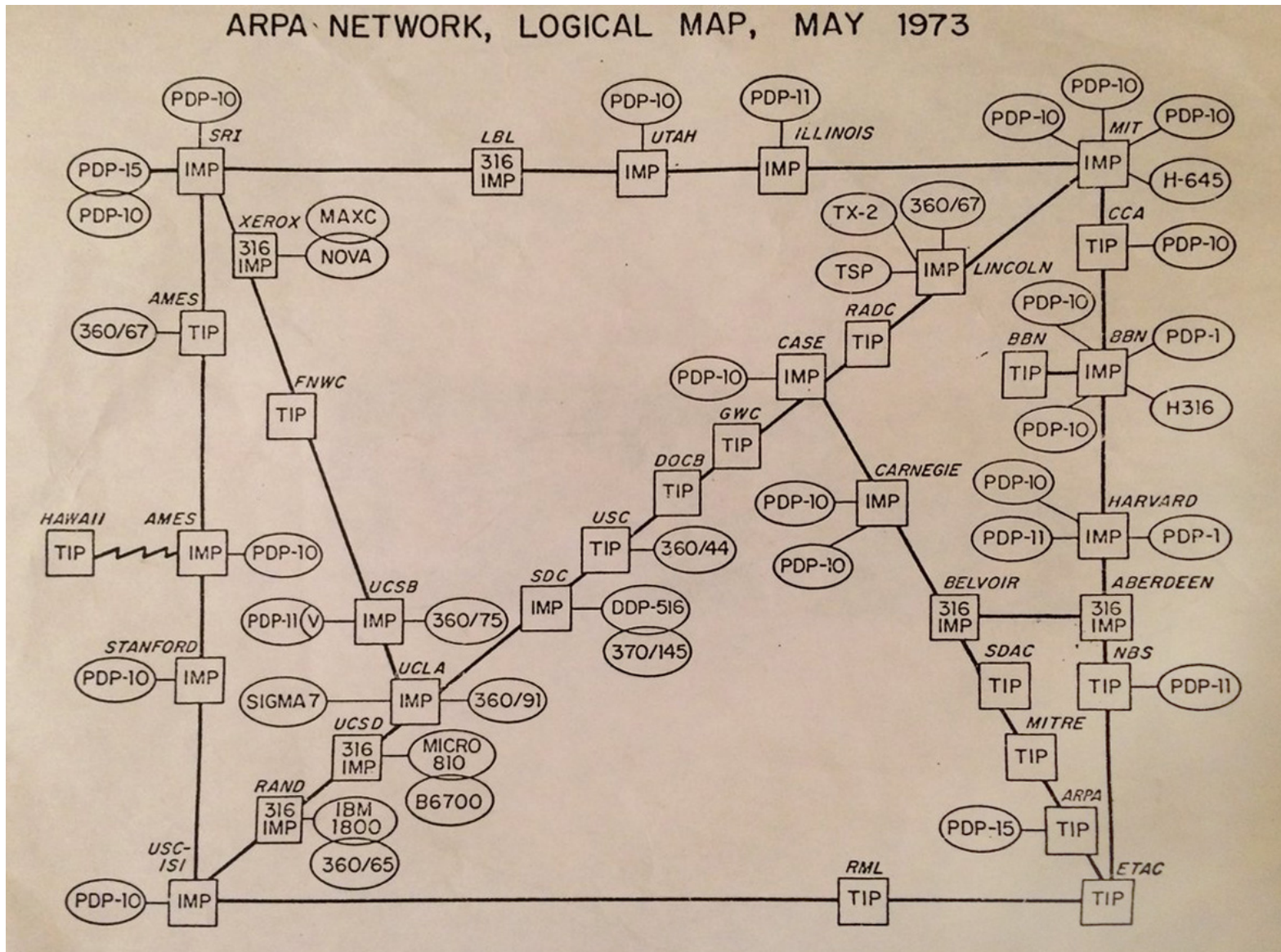
# Case in Point: What the Internet Looked Like circa 2015



Skitter data depicting internet connectivity. CAIDA.org, used by permission.



# What the "Internet" Looked Like in 1973

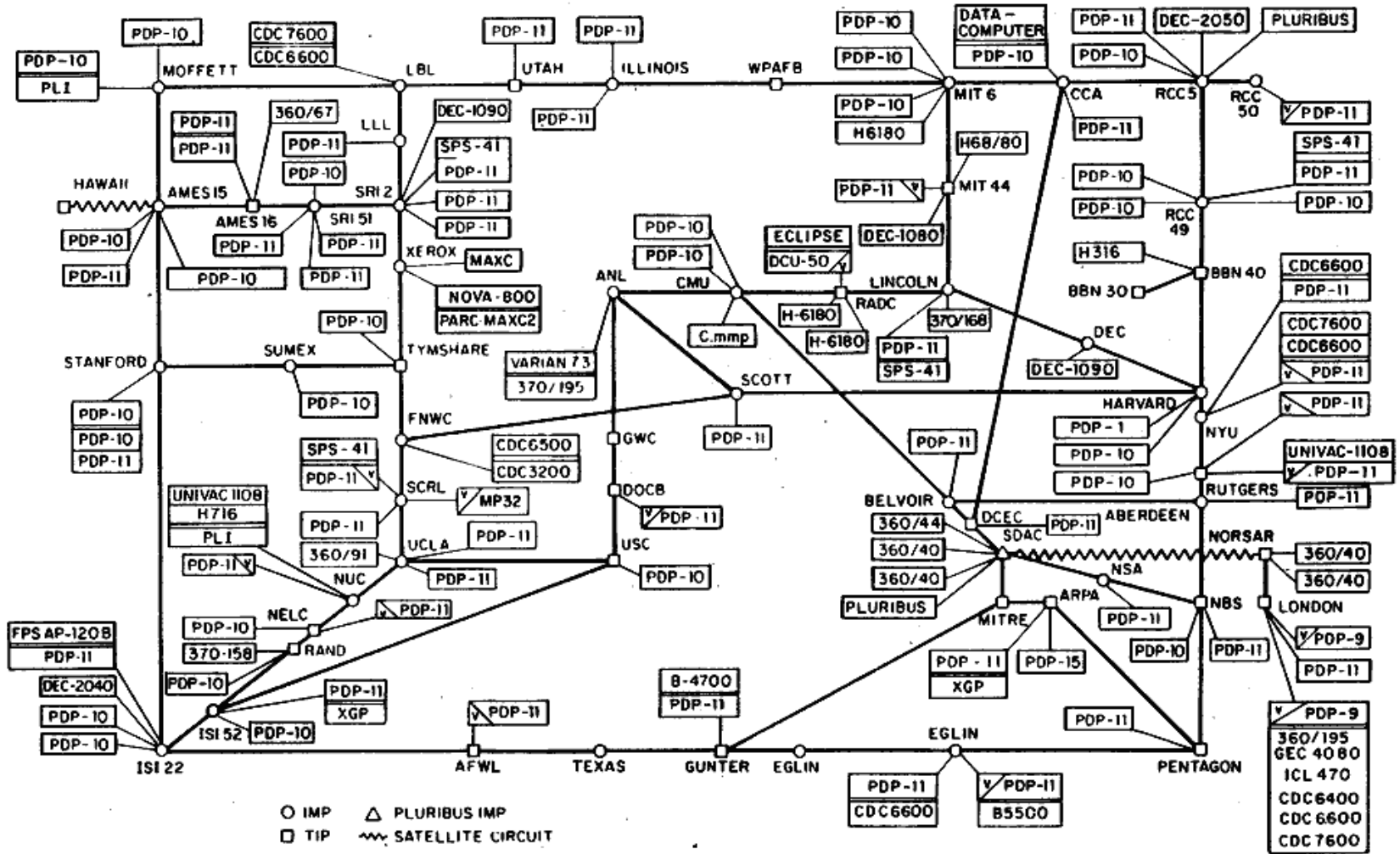


36 organizations and 41 machines, if I counted correctly

Wikipedia, in the Public Domain

# Four Years Later

ARPANET LOGICAL MAP, MARCH 1977



# Summary, Future Work, and Recommendations

- **Major stakeholders need to step up to the plate**
  - *Federation is widely applicable to many, many application domains*
    - Collaborations of many kinds, Inter-Clouds, the Internet of Things, ...
  - *How much would it take to deploy a prototype federation of ~10 organizations?*
- **Goals:**
  - **BUILD:**
    - Build out prototype tooling and demo scenarios
    - A notional Federation Agent design is available
  - **DEMONSTRATE:**
    - KeyVOMS prototype built to demonstrate the concepts and benefits for international disaster response, commercial satellite data, etc.
  - **ENGAGE:**
    - Raise awareness and understanding with our government customers as to what federation is, and why it is critical to future ground systems
    - Engage with academia/industry/consortia/open source projects to promote and develop federation tools and standards
- **New NIST/IEEE Joint Federated Cloud WG is a rare opportunity**
  - *A place where stakeholders and vendors can find common ground for federation tooling, standards, and adoption*