Secure Cyber Incident Information Sharing

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UTSA Engineering

I·C·S
The Institute for Cyber Security

LMI Research Institute (LRI): Academic Partnership Program

- Through formal working relationships with universities across the country, LMI bridges the gap between academia and industry to create innovative solutions and explore new research topics
- The partnership program exposes students to real-world challenges faced by the federal government through structured, funded research projects

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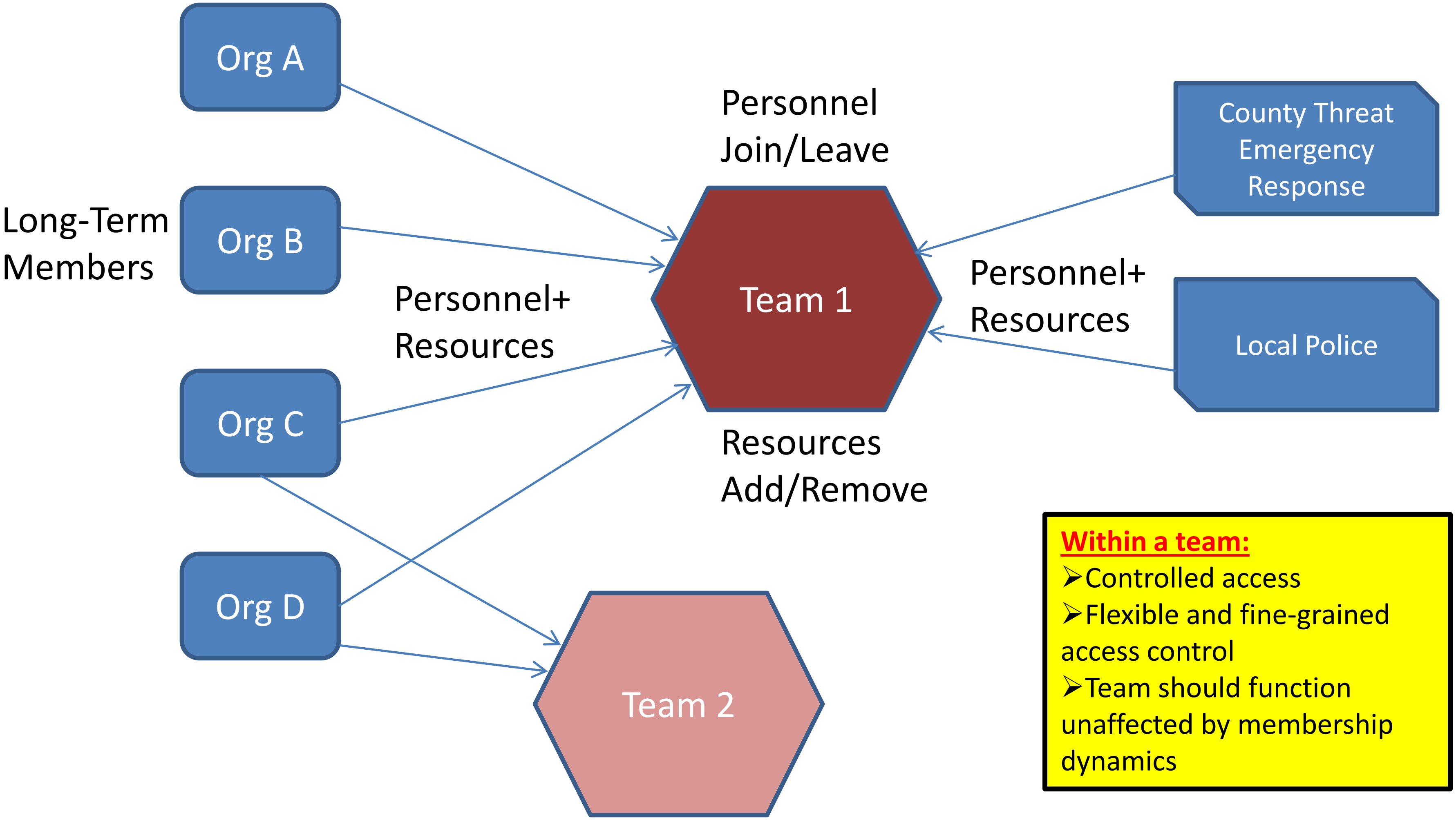
Cyber Incident Response

- Secure information sharing amongst a set of entities/organizations
  - Often ad hoc
- What are the effective ways to facilitate information sharing in such circumstances?
  - Information sharing models
  - Infrastructure, technologies, platforms

Agile Incident Response



Within a team:

- ➢Controlled access
- ➢Flexible and fine-grained access control
- ➢Team should function unaffected by membership dynamics

Cyber Incident Information Sharing Scenarios

- Community
  - Cyber incidents across critical infrastructure providers in a community
    - Emergency response, healthcare, banks, utility
- Electric grid
  - Cyber incidents in electric power provider orgs
    - Local utilities, ISOs, ERCOT, NERC

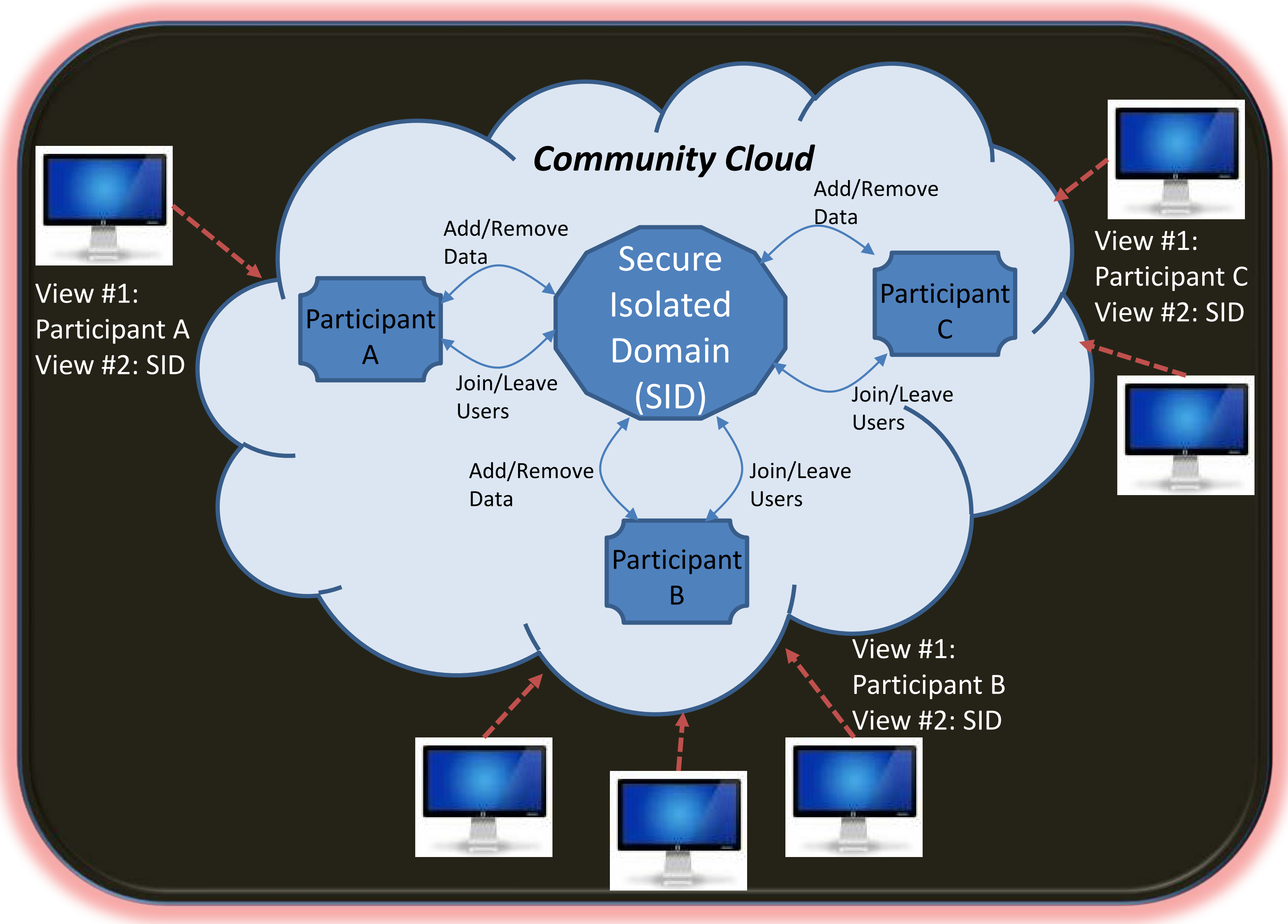
Key Requirements

- Cyber infrastructure sharing to support data and compute
  - Need a community information sharing platform
    - Controlled access
- Light-weight and agile
- Rapid deployment and configuration
- Secure environment

Cloud Infrastructure as a Service

- Virtualized IT infrastructure (servers, storage, networks, OS, etc.)
  - Delivered as a service over a network, on demand, dynamic scaling, etc.
- Prominent examples
  - Amazon AWS
  - OpenStack

Enforcement in Cloud IaaS



Next Steps

- UTSA to incorporate INL input
- Develop prototype in OpenStack
- Share research results with INL
  - August/September

Thanks

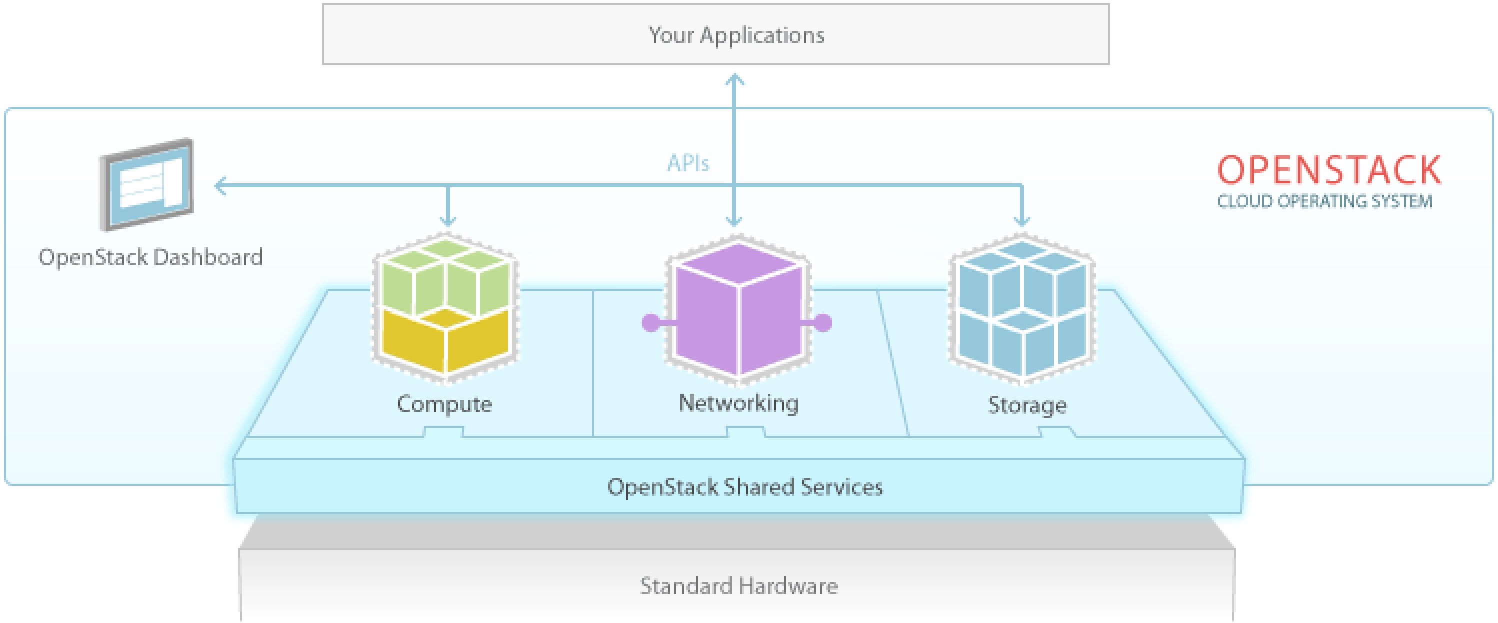
- Comments, Q&A

Backup

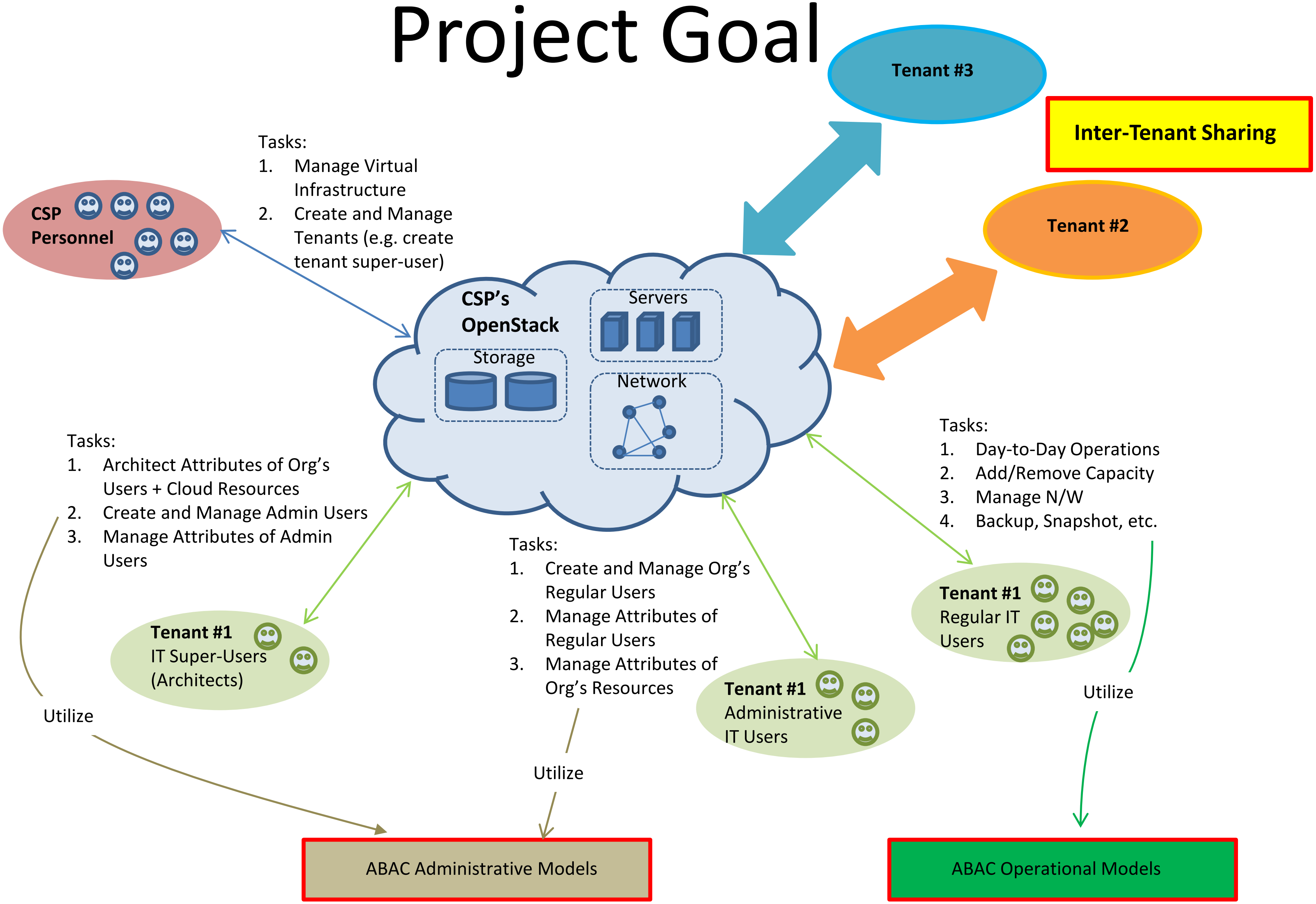
OpenStack

- OpenStack
  - Dominant open source cloud IaaS platform

- ➢ > 200 companies
- ➢ ~14000 developers
- ➢ >130 countries



Project Goal



Tenant #3

Inter-Tenant Sharing

Tenant #2

CSP Personnel

Tasks:

1. Manage Virtual Infrastructure
2. Create and Manage Tenants (e.g. create tenant super-user)

CSP's OpenStack

Servers

Storage

Network

Tasks:

1. Architect Attributes of Org's Users + Cloud Resources
2. Create and Manage Admin Users
3. Manage Attributes of Admin Users

Tenant #1 IT Super-Users (Architects)

Tasks:

1. Create and Manage Org's Regular Users
2. Manage Attributes of Regular Users
3. Manage Attributes of Org's Resources

Tenant #1 Administrative IT Users

Tasks:

1. Day-to-Day Operations
2. Add/Remove Capacity
3. Manage N/W
4. Backup, Snapshot, etc.

Tenant #1 Regular IT Users

Utilize

Utilize

Utilize

ABAC Administrative Models

ABAC Operational Models

Closed Network Scenario

- Unusual activity in Air Force, Navy & Army networks
- A physically secure and air-gapped meeting room with members from AFCYBER, ARCYBER and FLTCYBER
- Members bring data for analysis and collaboration
  - Maps, a VM configured with software tools, a VM image with a virus/worm, log files, etc.
- Strict control on data import/export

Data Exfiltration Scenario

- Unusual file transfers from IP addresses within an org to an external IP address
- Similar activities observed in partner orgs
- Need to find if these events are connected
  – Any correlation between those files?
- Members bring data for analysis+collaboration