# XSIM

Extreme Scale Identity Management

# Facilitating Scientific Collaborations by Delegating Identity Management

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http://cacr.iu.edu/collab-idm

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Second Workshop on the Changing Landscape in HPC Security

# The XSIM Team

- **Von Welch** – CACR Director, long time distributed science security researcher.
- **Bob Cowles** – BrightLite Information Security, former CISO of SLAC.
- **Craig Jackson** – CACR Senior Policy Analyst, recovering litigator.

# IdM is Critical for Enabling Science

- Access to instruments and data
- Embodying the membership and structure of the VO
- Ensuring credit / names on papers

# Virtual Organization IdM

We have 15 years+ of applied experimentation in virtual organization (VO) IdM.

A number of approaches have been tried:

VOMS, Glide-ins, Science gateways, COManage, Community/group accounts

# XSIM’s Goals

1. Develop a descriptive VO-IdM model that expresses observed variations in collaboratory identity architectures…

   ...in a way that scientists/Craig can understand.

2. Understand the reasons for and factors influencing those observed variations.

3. Leverage that model into guidance for structuring new VO-RP relationships and evolving existing ones.

# Our Process

# Semi-Structured Interviews with ~20 VOs and RPs

Collaboratories

- Atlas
- BaBar
- Belle-II
- CMS
- Darkside
- Engage
- Earth System Grid
- Fermi Space Telescope
- LIGO
- LSST/DESC

Resource Providers

- Atlas Great Lakes T2
- FermiGrid
- GRIF
- U. Nebraska (CMS)
- LCLS
- RAL
- GRIF/LAL
- LLNL
- NERSC
- Blue Waters

# We were like….

- What did you do?
- What did you want to do?
- Why did you do what you did?

# Our Model

# *Some core findings….*

1. The VO can and often does play a role in collaboratory IdM implementation.
2. This VO role alters the traditional direct trust relationship between users and RPs.
3. We've seen a variety of different approaches at this RP-to-VO *delegation* of IdM tasks.
4. Trends are toward *mediated trust*, utilizing the VO's capacity to represent its members.

# VO IdM Model: *Data-centric needed to describe all this variation.*

Identity data is ***produced*** to enable workflows.

Identity data is ***consumed*** to perform IdM functions.

## Types of Identity Data

1. User “identity”
2. User contact info
3. VO membership / role

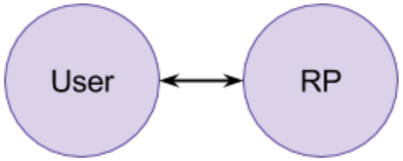
## IdM Functionalities

A. authentication
B. authorization
C. allocation/scheduling
D. accounting
E. auditing
F. user support
G. incident response

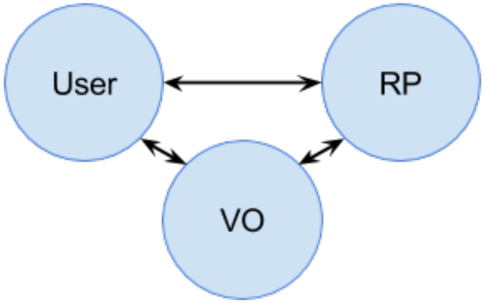
# VO IdM Trust Model Extremes

… via 800-39

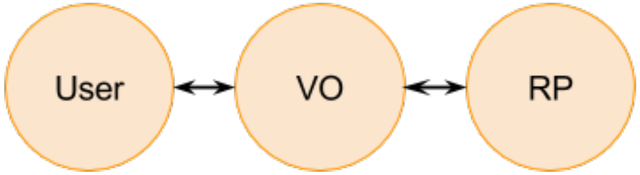
***Classically*** RPs produced and consumed all IdM data.



***Brokered trust relationships*** entail VOs & TTPs generating user data, to be consumed by RPs.

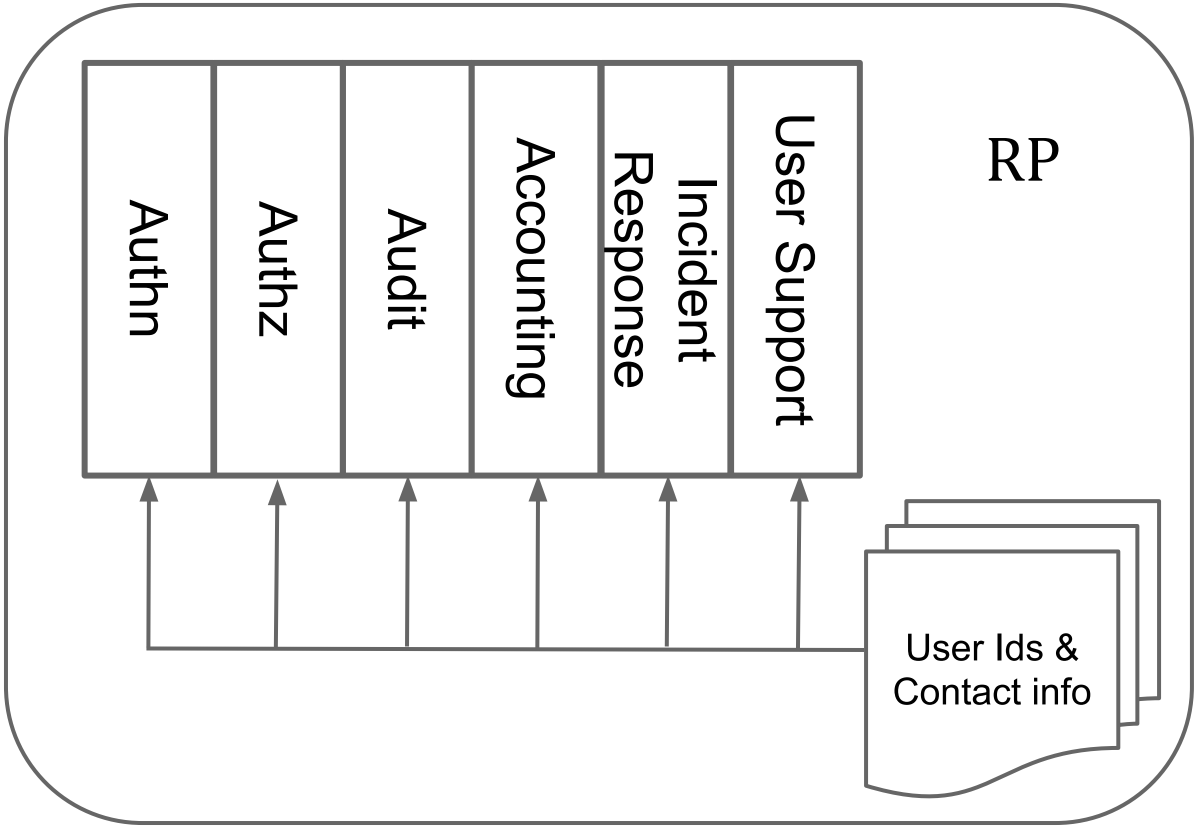


***Transitive trust relationships*** forego all user data consumption by RP.

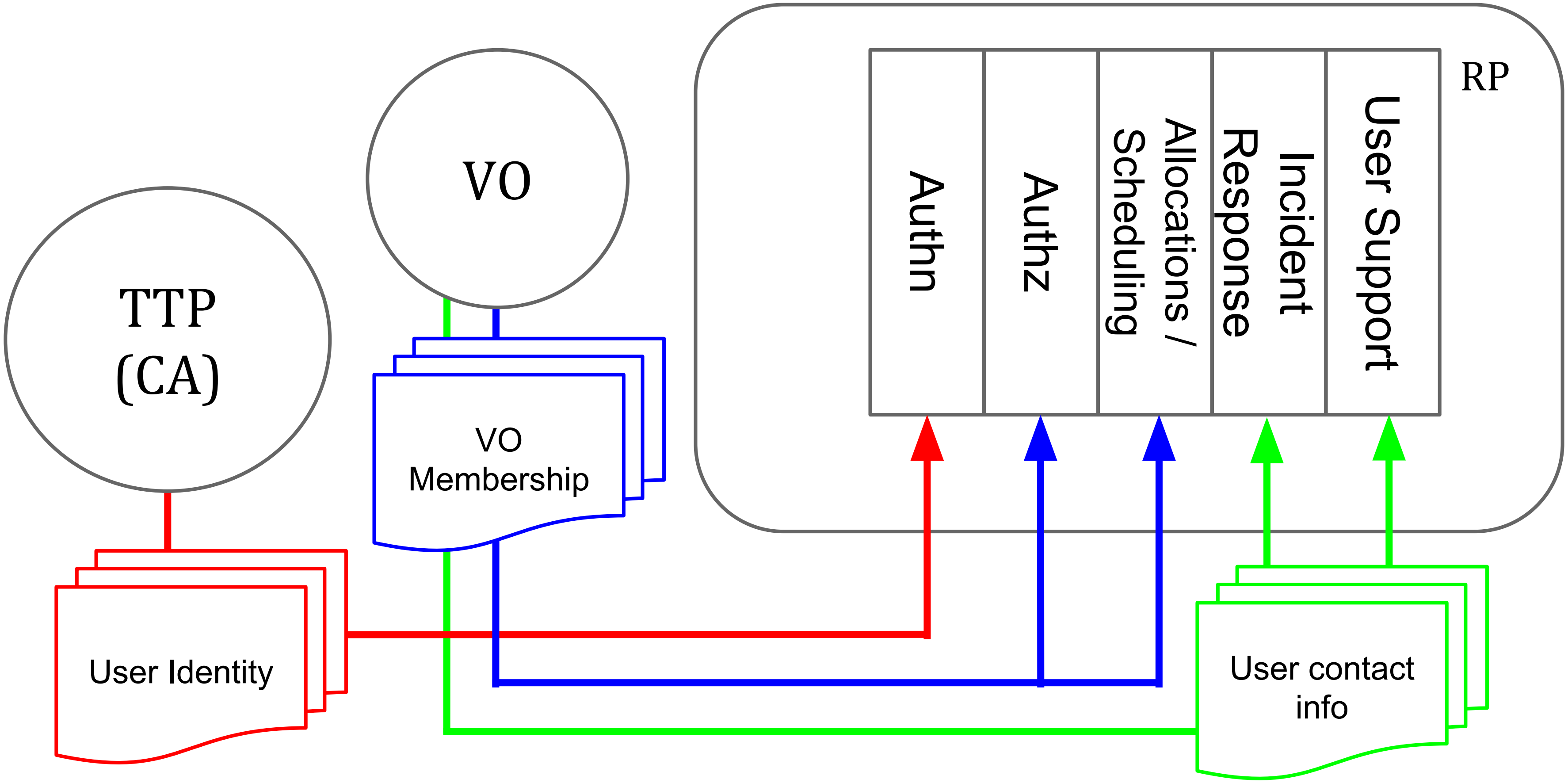


# Identity Data Flow in the "Classic Model"

RP produces and consumes all IdM information.



# Identity Data Flow in Multi-user Pilot Jobs Brokered Trust



# Goal 1: ACHIEVED

1. ~~Develop a descriptive VO IdM model that expresses observed variations in collaboratory identity architectures….~~

   ~~…in a way that scientists/Craig can understand.~~

Why this shift toward more delegation?

Why isn’t everybody going there?

What enabled delegation where there was resistance?

# Drivers and Benefits of Sharing IdM

- Allows scaling to more scientists.
- Centralized management of VO policies.
- Places effort where most appropriate.
- Avoid unneeded duplication of IdM data.
- Eases collaboration inside of and across VOs.
- Improves ease of use through better integration with science workflows.
- Efficiency...

# Barriers to Delegating IdM Functions

1. Compliance and Assurance Concerns

2. Risk Aversion / Trust Aversion

3. Historical Inertia *We've always done it this way.*

4. Technology Limitations

# Enablers of Delegation

1. RP-VO existing relationships and explicit agreements

2. User traceability (OSG)

3. Sandboxes (VMs, limited APIs, etc.)

4. *A closer look at the policy and risk environment...*

# Goals 2 and 3:

2. Understand the reasons for and factors influencing those observed variations.

*Pretty good handle on this….*

3. Leverage that model into guidance for structuring new VO-RP relationships and evolving existing ones.

*Been working on this. Produced guidance targeted at OSG, DESC, DOE Labs.*

# Policy Analysis in the CLHS paper:

A closer reading of DOE policy on **Deemed Export** and **Unclassified Foreign Visits** as presumed reasons for identity data production at RPs (DOE Labs), against the backdrop of DOE's **risk management orientation**.

# Deemed Export

- " … the release of controlled technology to a foreign person … "
- An export license is required, EXCEPT:
    - Research involving public information
    - Fundamental research
    - Suppliers of grid or cloud computing
- Can eliminate requirement for identity proofing (needs legal review)

# Unclassified Foreign Visits

- DOE O 142.3A (2010)
- Policy for access to computing resources responsibility of DOE CIO; no policy exists
- Access to scientific information and commercially available technology is not within scope of the order
- Can eliminate requirement for identity proofing (needs legal review)

# Risk Management

- DOE recognized need to shift to risk-based security with O 205.1B in 2011
  - Cyber programs can be flexible if risks are documented and residual risks accepted
  - Implication… If brokered and transitive trust better enable science *and* significantly reduce costs, with little increase in residual risk, then why not go there?
- But, that means embracing a truly risk-based and mission-enabling approach to cybersecurity.

# Related Work

- Work by I2, Klingenstein, et al.
- NSTIC IDESG Functional Model Group.
- NIST 800-39 (Trust Models).
- Lin, Vullings, and Dalziel. “Trust-based Access Control Model for Virtual Organizations.”

# Thank you

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