Identity Management for Virtual Organizations

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2014 DOE NGNS PI Meeting

September 16, 2014

CENTER FOR APPLIED CYBERSECURITY RESEARCH
INDIANA UNIVERSITY
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Our Context, Mission, Approach...

The virtual organization (VO) has emerged as key enabler of science. VOs have been incorporated into traditional user-to-resource provider identity management (IdM) in numerous ways (Atlas, CMS, KBase, NFC, ESGF, etc.)

Our mission is to develop a VO-IdM model that (a) expresses and explains observed variations in collaboratory identity architectures and (b) can be leveraged into guidance for selection.

Approach: Semi-structured interviews with 20+ VO-RP relationships, analysis, publication, feedback...

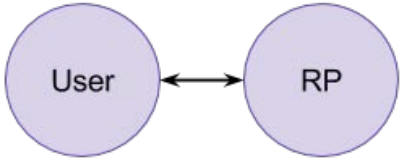
Some core findings….

1. The VO nearly always alters the traditional direct trust relationship between users and resource providers (RPs).
2. That alteration manifests itself as the RP-to-VO *delegation* of IdM tasks based on trust.
3. There are a number of factors motivating and demotivating that delegation.
4. Trend is toward *transitive trust*, utilizing the VO's capacity to represent its members.

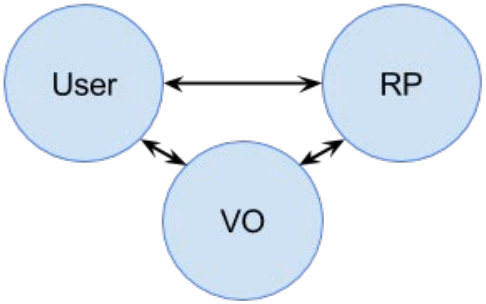
VO IdM Trust Models

... via 800-39

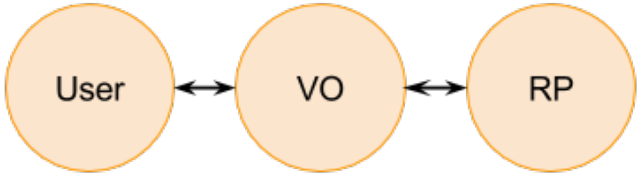
Classically RPs produced and consumed all IdM data.



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



Transitive trust relationships forego all user data consumption by RP.



Types of Factors Affecting IdM Delegation

- Motivators
  - These factors drive the delegation of IdM functions due to the perceived benefits.
- Enablers
  - These factors provide a receptive environment making the delegation of IdM functions easier.
- Barriers
  - These factors prevent or at least inhibit delegation of IdM functions.

Motivators for Delegation

- Scaling and Dynamicity of VO
  - RP incurs significant costs to supply IdM for large VOs or VOs with high turnover rates.
  - Number of institutions involved is secondary factor -- influences use of 3rd party identity provider.
- Complex VO roles and policies
  - RP must track and implement access controls.
  - Can require greater communication between VO and RP.
- VO-run collaboration services
  - Wikis or forums isolated to the VO.
  - VO-supplied IdM rather than depending on RP.
- VO using multiple RPs

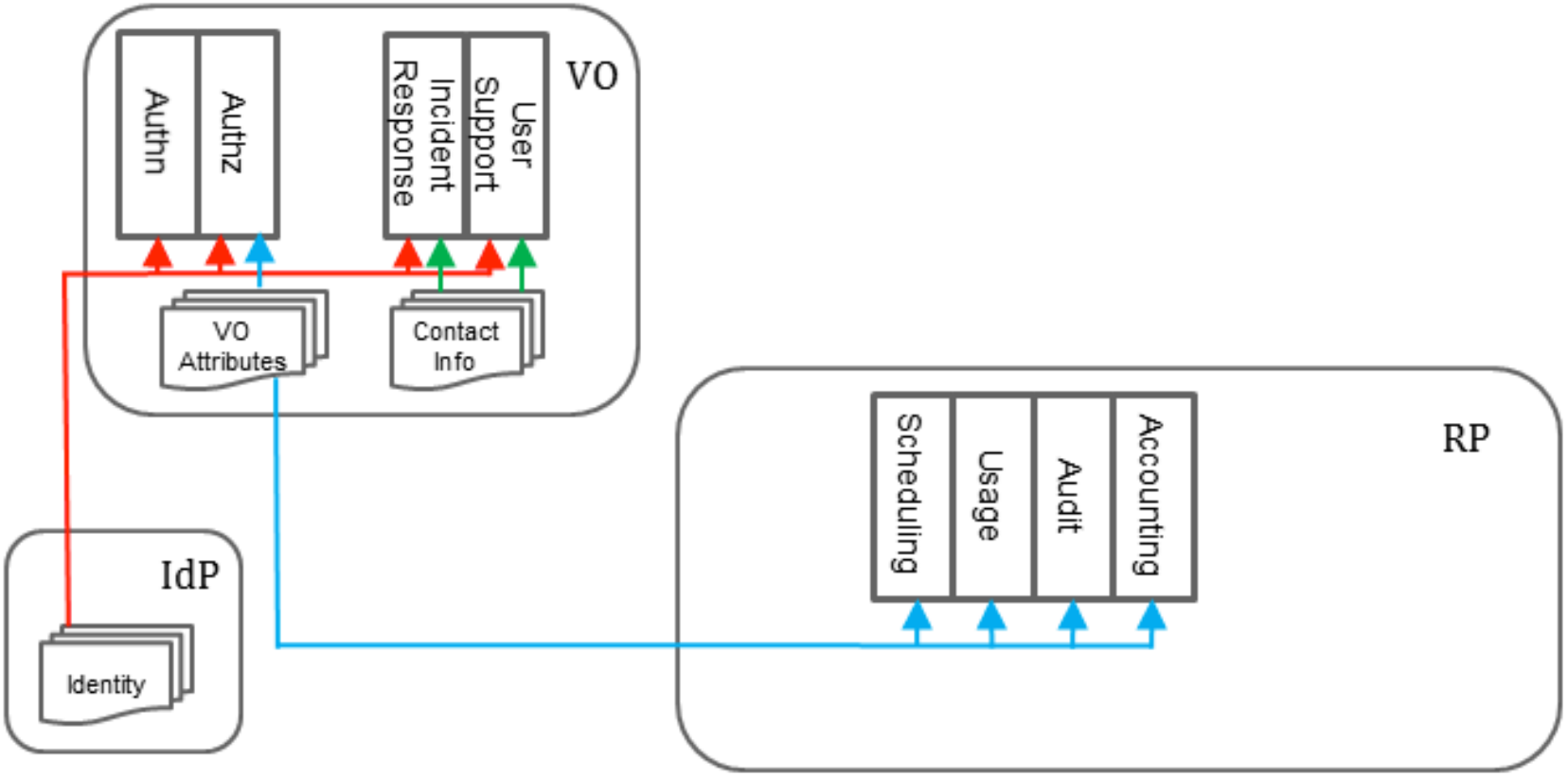
Enablers of Delegation

- Available VO IT/IdM effort and expertise
  - IT knowledgable staff to install/maintain servers.
  - IdM knowledgeable staff for secure configuration.
- Established trust relationships
  - VO has close association with RP or good reputation.
  - VO has history or prior collaboration with RP.
- Available tracing mechanisms
  - Facilitate user support and incident response.
  - Helps mitigate perceived risks from delegation.
- Alignment with RP's mission

Barriers to Delegation

- Low risk tolerance and historical inertia
  - or "We've always done it this way"
  - Changes risk profile
- Compliance and assurance requirements
  - Government regulations or
  - Other oversight or stakeholder requirements
- Technology limitations
  - e. g. Software requires userid/password

Identity Flow for Transitive Trust

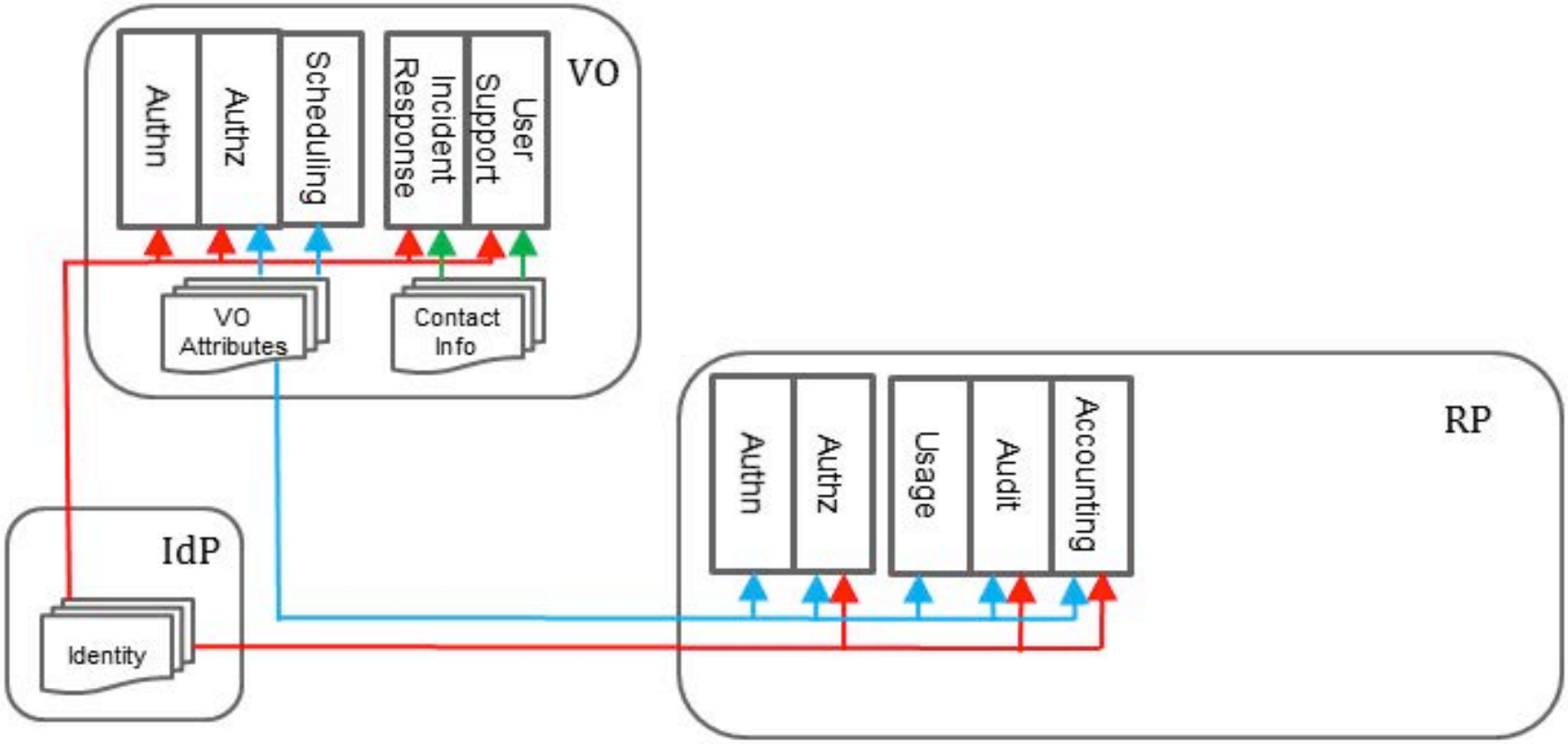


Issues for Transitive Trust

- Lack of persistent personal storage at RP
  - RP is not aware of user identity
  - Data must be staged in/out as part of batch job
- Shared collaborative services
  - Wikis or forums isolated to the VO
  - VO-supplied IdM
- User Support and Incident Response
  - RP has no ability to contact user
  - RP must trust VO to resolve issues

- Roadmap
  - Start with a transitive trust approach (simple) and adjust, as needed, to address particular risks or requirements

Identity Flow--Modified Transitive Trust



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."
- Efforts funded in the EU such as FIM4R and SCI
  - Federated Identity Management for Research https://indico.cern.ch/event/301888/
  - Security for Collaborating Infrastructures https://www.eugridpma.org/sci/

FY2014 XSIM Papers and Documents

Robert Cowles, Craig Jackson and Von Welch. *Identity Management for Virtual Organizations: A Survey of Implementations and Model.* 9th IEEE International Conference on eScience, 2013.
http://www.vonwelch.com/pubs/VOIdM13

Robert Cowles, Craig Jackson and Von Welch. *Identity management factors for HEP virtual organizations*. 20th International Conference on Computing in High Energy and Nuclear Physics (CHEP2013), 2013. http://www.vonwelch.com/pubs/CHEP2013

Robert Cowles, Craig Jackson, Von Welch and Shreyas Cholia. *A Model for Identity Management in Future Scientific Collaboratories*. (DRAFT) International Symposium on Grids and Clouds (ISGC) 2014, 2014.
http://www.vonwelch.com/pubs/XSIMISGC2014

Von Welch, Robert Cowles, and Craig Jackson. *Identity Management Guidance to OSG Virtual Organizations and Resource Providers*. 2014. OSG Documentation Database.
http://osg-docdb.opensciencegrid.org/cgi-bin/RetrieveFile?docid=1199;filename=XSIM%20OSG%20IdM%20Guidance%20-%20June%202014%20-%20v1.pdf;version=1

Bob Cowles, Craig Jackson, and Von Welch (PI). *DESC Identity Management: Analysis and Recommendations* (DRAFT) for review by DESC. August, 2014.

(Pending) Article in monthly OSG Newsletter.

What questions does your research motivate you to now ask?

- What are the failure modes (and possible mitigations) for different IdM delegations?
- Can a risk-based approach allow us to more quickly converge on consensus for such situations (despite social factors)?
- How will “big data” impact the RP-VO relationship?

Thank you

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

We thank the Department of Energy Next-Generation Networks for Science (NGNS) program (Grant No. DE-FG02-12ER26111) for funding this effort.

Extra Slides

"Essentially, all models are wrong, but some are useful."

--George E. P. Box