PopMedNet: A Flexible Access Control System for Distributed Research Networks

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Introduction and Background

- Distributed research networks are increasingly being used to facilitate comparative safety and effectiveness research and support public health surveillance activities.[1-4]
- **PopMedNet™** is a scalable and extensible informatics platform designs to facilitate the implementation and operation of distributed health data networks.[1-5]
- PopMedNet supports a range of distributed networks, including the FDA Sentinel, NIH Health Care Systems Research Collaboratory Distributed Research Network (DRN), MDPHnet, HCSRNnet, CRNnet, and PCORnet.[1-4]
- Distributed research networks use different governance models that require systems to address issues such as:
  - Interactions between coordinating centers, investigators, and data partners.
  - Access controls and permission to manage users and activities within a network.
  - Facilitation of workflows and implementation of local governance policies.
- PopMedNet is a common infrastructure that can support multiple networks with unique governance models, enabling networks to:
  - Define their **structure** and **governance**.
  - Mitigate **privacy** and **security** concerns of participants via strict access restrictions.
  - Enable **custom workflows** for participants.[4-5]
- PopMedNet has a **flexible and granular** access control system to create and operate distributed research networks with **highly customized** configurations and permissions.

Number of requests and entities in PopMedNet networks:

Network	Requests	Organizations	DataMarts	Users
Mini-Sentinel	1457	29	28	178
MDPHnet	857	5	7	87
PCORnet	458	124	102	278
Health Data Collaboration	275	21	30	91
NIH Collaboratory DRN	205	21	21	67

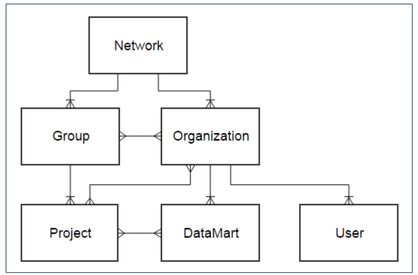
* As of 8/24/2015, inclusive of test request and entities

Innovation

The PopMedNet access control system is a **hierarchical, role-based** system

Providing the ability to create custom network configurations

- Define relationships between entities.
- Efficiently configure settings across network entities – entities are organized in a hierarchy – permissions applied to parent entities are inherited by their children.



PopMedNet Network Entity Diagram

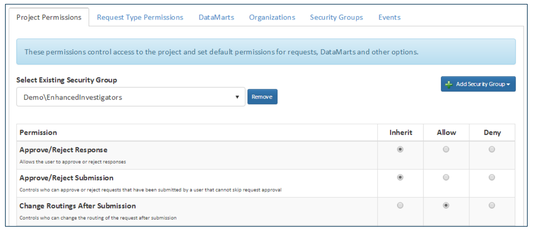
PopMedNet Entities:

Entity	Description
Group	A collection of Organizations and Projects that form a sub-network.
Organization	A collection of Users and DataMarts that represents a real-world organization/site. May be standalone or linked with another Organization as a Parent or Child.
Project	A collection of DataMarts, Organizations, request types, and permissions used to delineate network activity.
DataMart	A data source. Used to process requests.
User	A person participating in a network.

For more information visit https://popmednet.atlassian.net/wiki/ or scan the QR code on the left.

Enabling networks to define custom roles

- Administrators define permissions for custom roles as they apply to specific entities within the network.
- **Permission:** Allows an action within or upon an entity. Granted to a security group.



Project Permission Page

- **Security group:** A collection of permissions that may be assigned to a user. Named as "[Organization or Project]\[Role]", e.g. "FDA Sentinel\EnhancedInvestigator"
- **Role:** A defined position fulfilled by one or more users.

Standard PopMedNet Roles:

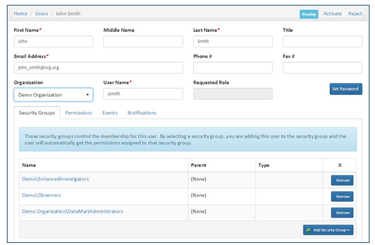
Standard Roles	Description
DataMart Administrator	Review and respond to requests.
Investigator	Submit requests and review/export aggregated results within a Project.
Enhanced Investigator	Submit requests and review/export disaggregated results within a Project.
Network Administrator	Create network entities, manage access controls, approve/create users.
Observer	View and audit network/Project activity, excluding request results.
Enhanced Observer	View and audit network/Project activity, including request results.
Organization Administrator	Manage Organization and DataMart metadata.
Request Reviewer	Review requests before release to DataMart(s).
Response Reviewer	Review responses for specific DataMart(s) before release to Investigator.

Discussion

- The PopMedNet access control system provides a high degree of network customization. As governance policies at the network level or at local sites change, the system configuration can be changed on demand.
- Standard roles and configurations are recommended for ease of administration and consistency across networks.
- Balancing granularity, complexity, and user experience is a challenging design consideration.
- Implementations have shown that the system helps mitigate network participants' concerns regarding who has permission to query them and the privacy of their participation and data.

Conclusion

- A flexible, granular access control system is a critical component of any distributed network.
- PopMedNet has been used to configure multiple large-scale distributed research networks. As these networks grow and evolve, their access controls may be modified to support new configurations, workflows, or governance decisions.
- Enhancements are planned to improve the usability of the system for administrators and to provide additional workflow options for network participants.



User Profile Page

References

1. Curtis LH, *et al.* Four Health Data Networks Illustrate The Potential For A Shared National Multipurpose Big-Data Network. Health Affairs, 33, no.7 (2014):1178-1186.
2. Fleurence RL, *et al.* Launching PCORnet, a national patient-centered clinical research network. J Am Med Inform Assoc. 2014 Jul-Aug;21(4):578-82.
3. Vogel J, *et al.*, MDPHnet: Secure, Distributed Sharing of Electronic Health Record Data for Public Health Surveillance, Evaluation, and Planning. American Journal of Public Health 2014; 104(12): 2265-70. doi: 10.2105/AJPH.2014.302103
4. Brown J, *et al.*, Distributed Health Data Networks: A Practical and Preferred Approach to Multi-Institutional Evaluations of Comparative Effectiveness, Safety, and Quality of Care. Medical Care 2010; 48 Suppl: S45-S51.
5. Maro JC, *et al.*, Design of a national distributed health data network. Annals of Internal Medicine 2009; 151:341-4.