

## **Towards a Scalable Virtual Organization Privileges Management Environment**

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Grids enable uniform access to resources by implementing standard interfaces to resource gateways. In the Open Science Grid (OSG), privileges are granted on the basis of the user's membership to a Virtual Organization (VO). However, gateways control access privileges to resources, such as the VO need for separate or common user-based job execution environments, using user's identity and personal attributes.

Currently, access privileges are determined solely by the individual sites that own the resources. While this guarantees full control on access rights to the sites, it introduces inconsistency of VO privileges throughout the Grid and hardly fits with the Grid paradigm of uniform access to resources.

There is a need for an automated mechanism for a VO to codify privileges granted to its users as policies, to make the privilege policies available to grid sites, and to examine degree of support of VO privileges at individual sites. To address these challenges, we are developing the Scalable Virtual Organization Privileges Management Environment (SVOPME), which provides tools for VOs to define and publish desired privileges and assists sites to provide the appropriate access policies. At a site, SVOPME tools help analyze how access policies are defined for its resources for VO users. These policies are then compared with the ones published by the VO, so that sites and VOs can verify policy compliance. Upon request, SVOPME can generate directives for site administrators on how the local access policies can be amended to achieve such compliance.

We have implemented SVOPME tools to support privilege management to cover access policies of interest under the OSG environment. In this paper, we will present the designs of various tools and services that SVOPME provides to help facilitate the distribution and enforcement of VO privileges. We will describe our experiences to deploy SVOPME tools at the FermiGrid's Integration TestBed (ITB) and later to FermiGrid. Furthermore, we will demonstrate how we have used the SVOPME tools to iden-

tify several site configuration inconsistencies and how we are modifying SVOPME tools to adapt to a range of different site configurations.