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Data Management and Access Considerations for SAS® Visual Analytics

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ABSTRACT

SAS® Visual Analytics is a very powerful tool for users to visually explore data, but in some organizations not all data should be available for everybody. And although it is relatively easy to scale up a SAS Visual Analytics environment when the need for data increases, it still would be beneficial to set up a structure where the organization can keep control over who actually has the right to load data versus providing everybody the right to load data into a SAS Visual Analytics environment. Within this paper a potential solution is shown by providing a high-level overview of the SAS® Visual Analytics data access management solution at ING Bank in the Netherlands for the Risk Organization.

INTRODUCTION

SAS® Visual Analytics provides out of the box a number of predefined roles for which specific capabilities have already been preselected for your convenience. Capabilities define what you are allowed to do within Visual Analytics, but you still need to decide how you would like to setup your permissions model to determine which user is allowed to work with which data. Like many other enterprises, ING Bank has clear policies with regard to Identity & Access Management. The key principle is that access to data is restricted to authorized users only. But how can you achieve this within Visual Analytics in an effective and maintainable manner? This paper will provide insight in the different options we have considered within Risk COO, each with their own pros and cons.

ABOUT ING

ING is a global financial institution with a strong European base, offering banking services through its operating company ING Bank. The purpose of ING Bank is empowering people to stay a step ahead in life and in business. ING Bank's more than 51,000 employees offer retail and wholesale banking services to customers in over 40 countries.

Sustainability forms an integral part of ING's corporate strategy, which is evidenced by ING Group shares being included in the FTSE4Good index and in the Dow Jones Sustainability Index (Europe and World), where ING is among the leaders in the Banks industry group.

As at end-2016, ING serves more than 35 million customers.

ABOUT RISK COO

Risk COO is a corporate staff department that integrates risk-related activities on change, support, operations, reporting as well as data and systems. It drives the information architecture and analytics capabilities of the Risk organization. It concentrates on change, data management, reporting, servicing the Risk community and optimizing processes. It also enables Business Intelligence inside the Risk organization.

RISK COO VISUAL ANALYTICS ENVIRONMENT

When we started to look at the deployment options for Visual Analytics within Risk COO we basically had two options. We could either integrate Visual Analytics with the existing Risk COO SAS Business Intelligence environment or deploy it as a separate environment. We opted for a separate deployment of a distributed Visual Analytics environment as an extension of the existing Risk COO SAS BI environment. This decision was for a large part influenced by, at that time, the relatively high frequency of release updates for Visual Analytics. This way we could perform the necessary life cycle management activities on Visual Analytics independently of our Risk COO SAS BI environment.

As the access control process for the existing Risk COO SAS BI environment was already connected to ING Bank Enterprise Identity Access Management (IAM) service, the initial intent was to reuse the similar setup as much as possible. To simplify the permission administration for our user groups and to align with ING Bank Role Based Access Control (RBAC) Model we had decided to deploy a SAS Workspace server for each functional user group in the Risk COO SAS BI environment. If you want to setup something similar in Visual Analytics you need to create a LASR server for each functional user group. Although technically possible, SAS Visual Analytics is not designed for running multiple instances of the LASR server in a single environment. So we needed to look at alternative solutions for data access management by making use of SAS Metadata to define the permissions, and for each option taking the pros and cons into account.

OPTION 1 - PERMISSION MODEL BASED ON TEAM STRUCTURE

The starting point for this permission model are the functional teams working with Visual Analytics. Each functional team is assigned to a Visual Analytics User Group registered in the SAS Metadata. Each member within a Visual Analytics User Group needs to be individually assigned to at least one Visual Analytics Role (i.e. Report Viewer, Data Builder).

All Team Members within a User Group can access all the data in the linked Visual Analytics Meta Data Folders (Datasets & Reports) pending the assigned Visual Analytics Role Rights.

Figure 1 shows the simplified view on this permission model based on team structure.

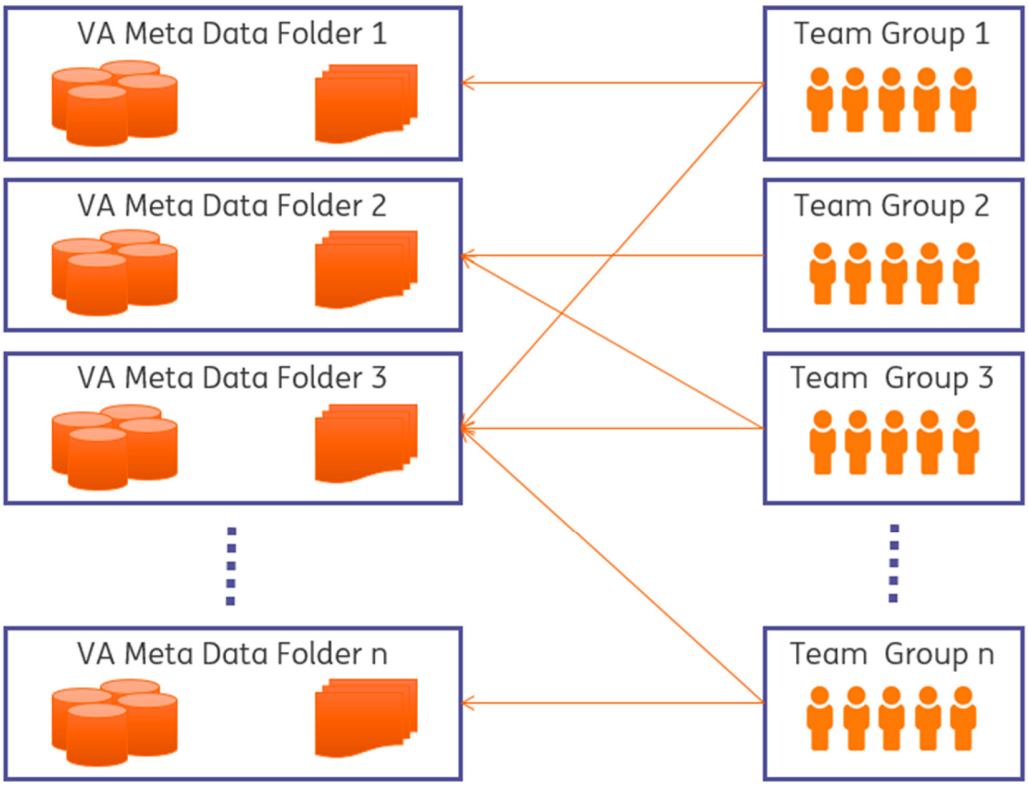

Figure 1 - Visual Analytics Permission Model based on team structure

Pros

- Reuse of the existing ING Bank Enterprise IAM Roles created for our Risk COO SAS BI environment
- Clear separation of permissions (to data and reports)

Cons

- Unclear separation of capabilities: Each individual needs to be manually assigned a Visual Analytics role by a SAS administrator
- Permissions to data and reports can only be set for the complete group, not for individuals

OPTION 2 - PERMISSION MODEL BASED ON DATA AUTHORIZATION

This permission model is based on the users' authorization to access specific data. Each user group has its own dedicated Visual Analytics Meta Folder. Each Member within a user group needs to be manually assigned to at least one Visual Analytics Role. All Team Members within a User Group can access all the data in the linked Visual Analytics Meta Data Folders (Datasets & Reports) pending the assigned Visual Analytics Role Rights.
Figure 2 shows the simplified view on this permission model based on data authorization.

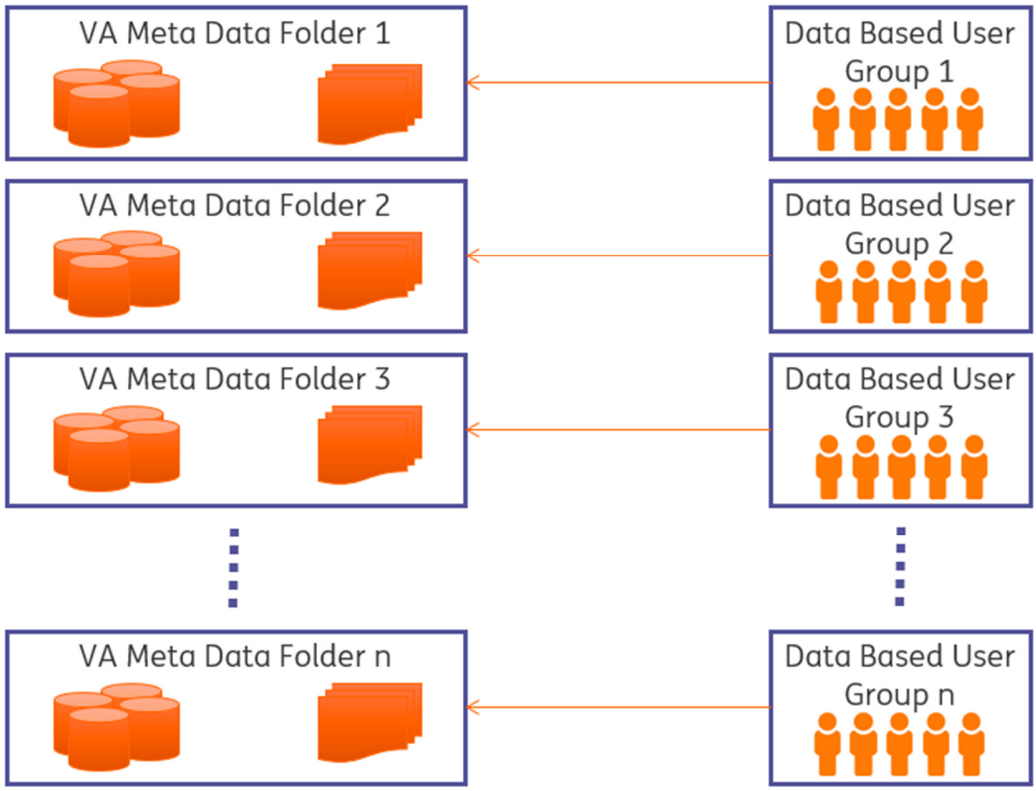

Figure 2 - Visual Analytics Permission Model based on data authorization

Pros

- Very clear separation of permissions (to data and reports)

Cons

- Unclear separation of capabilities: Each individual needs to be assigned a Visual Analytics role manually by a SAS administrator
- Introduction of complete new group definitions based on data authorization, this concept is deviating from the concept used in the Risk COO SAS BI environment
- Inflexible model

OPTION 3 - PERMISSION MODEL BASED ON VISUAL ANALYTICS ROLES

The basis for this permission model is based on predefined role definitions.

Every group member is assigned to the Visual Analytics Role linked to the User Group registered in the SAS Metadata.

Figure 3 shows the simplified view on this permission model based on Visual Analytics Roles.

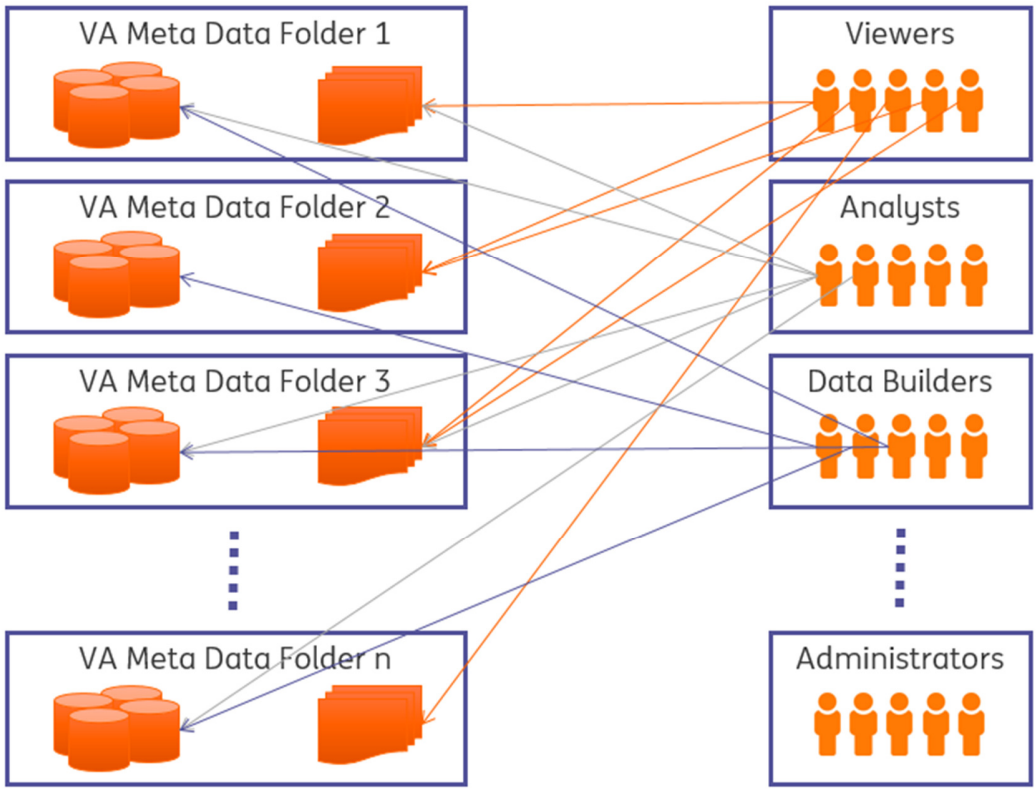

Figure 3 - Visual Analytics Permission Model based on roles

Pros

- Very clear separation of capabilities
- Limited number of new RBAC Roles required in ING Bank Enterprise IAM Solution
- Very flexible administration options

Cons

- Unclear separation of permissions: The access to specific datasets and reports or Visual Analytics metadata folder needs to be configured for each member individually
- Separate and custom request approval process required for requesting and administrating access to datasets and reports, this process is also expected to be very labor intensive and time consuming

PERMISSION MODEL CHOSEN - A HYBRID PERMISSION MODEL

As none of the three described permission models could support all business requirements we had to look for an alternative solution. In the end we chose a hybrid approach, primarily based on the permission model based on team structure.

To understand how we came to the design of the hybrid permission model, it is useful to understand some of the business requirements and design principles followed.

According to one of the business requirements it had to be possible to provide individual users access to specific Visual Analytics Reports. This requirement was inherited from an existing business process, which our Visual Analytics environment was going to replace, where many risk related reports built in Microsoft Excel had to be distributed to many different users within ING Bank. Some of the reports were even distributed to only one user. In theory we could have defined the large number of IAM roles required to cover all possible combinations of reports and users, but it just didn't make sense to create an IAM role for a single user, especially when you take the overhead of getting an IAM role registered in the ING Bank Enterprise IAM service into consideration.

Instead we decided to create one IAM role: 'Visual Analytics Role Viewer". Users who request access to this role via the ING Bank Enterprise IAM Service will automatically be provisioned to the corresponding user group in the SAS Metadata, but have by default no access rights to SAS Metadata objects. These users will be granted access to specific Visual Analytics Reports by way of SAS Visual Analytics Administrator. The challenge with this approach is that the approval process cannot be supported by the automated ING Enterprise IAM service and it has to be administered manually which is expected to be labor intensive and time consuming. So we are currently looking into options to group this special group of report viewers as much as possible to reduce the administrative overhead supporting these group of users. And as the integrity of the report data and layout had to be secured for this user group we introduced a separate controlled SAS Metadata folder: "Reporting". In all the other SAS Metadata folders users are free to create, edit and delete reports on an Ad Hoc basis for analytical purposes.

One of the recommended principles within ING Bank for the RBAC model is to minimize the total number of RBAC Roles. This was achieved by merging the predefined Visual Analytics roles of Analyst and Data Builder into one role, Visual Analytics Role Advanced, as we considered the difference in capabilities very small.

As the datasets to be used in Visual Analytics are created in the Risk COO SAS BI environment, we decided to re-use the user group definitions defined in the Risk COO SAS BI environment and provision them via ING Bank Enterprise IAM Service to represent the merged Analyst/Data Builder role. Membership of the merged Analyst/Data Builder role will in turn be required in the Risk COO SAS BI environment to provision data from the Risk COO SAS BI environment to the Visual Analytics environment.

Figure 4 shows the simplified view on our chosen hybrid Permission Model.

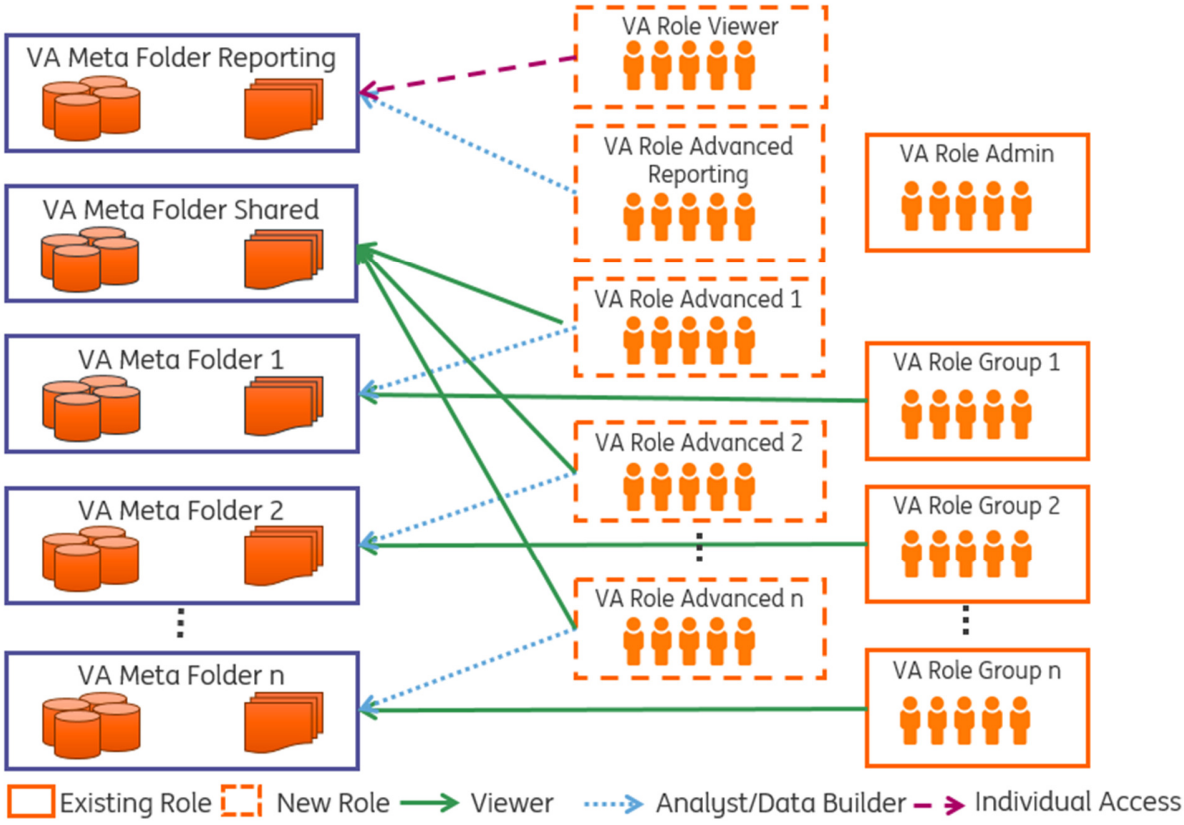

Figure 4 - Visual Analytics hybrid Permission Model

Pros

- Limited number of new RBAC Roles in ING Bank Enterprise IAM solution required
- More flexible compared to the permission model purely based on Team Structure

Cons

- Mixed permission model: more complex to administer (Change frequency for the viewers is low, review once every 6 months)
- Separate and custom request approval process required for access to the reports for the viewers

CONCLUSION

As there are many different ways to implement data access permissions within Visual Analytics, the three options we initially considered have shown that it is very important to clearly define upfront what you would like to achieve with regard to managing data access in your SAS Visual Analytics environment.

You also need to have a clear idea of how your organization is structured and the preferred way to structure and manage your data. One important lesson learned is that the need for individually managing users, datasets and reports in Visual Analytics should be reduced as much as possible allowing the Visual Analytics environment to be managed in a more efficient way.

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