



SAS[®] GLOBAL FORUM 2018

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April 8 - 11 | Denver, CO
Colorado Convention Center

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“Who Watches The Watchers?”

Presenter

Andrew Howell, ANJ Solutions

Andrew has been a SAS user for 18 years, mainly as a self-employed consultant, based in Melbourne Australia but having worked across Australia. He also delivers SAS training courses.

Roles have included SAS Solutions Designer of enterprise-wide SAS platforms at 3 of Australia’s “Top 4” banks, and several Platform Administration engagements.

He is a committee member of the SAS Melbourne User Group (SMUG), the SAS Australia & New Zealand Online Community (SANZOC), and co-moderates the SAS Professional Forum LinkedIn group (*the largest SAS-dedicated LinkedIn group*)

This is his sixth year as a SAS Global Forum presenter, and second as Invited Presenter.

@AndrewAtANJ

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Who Watches the Watchers?

Enabling the business to self-manage

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Platform Administrator's Challenge

Keep the business happy

- How to:
 - Enable the various business users & business groups on an enterprise SAS platform
 - Ensure those activities do not impact other business groups, critical operational processes or the stability of the overall platform?
- Common results:
 - A highly (overly?) locked-down platform
 - Business users are able to perform “regular” SAS tasks – write & run SAS code, models, etc
 - All business-related administrative tasks (resource & process monitoring, library management, user group management, etc) is incumbent on the **SAS Platform Administrator(s)**.
 - Worse: a unmanaged platform
 - Ad-hoc querying & analysis risk impacting critical business processes (weekly reports, etc) or even the stability of the platform itself.

Business' Challenge

"Why can't we just have it all?"

- How to do their job:
 - Have the information, resources & capabilities they need.
 - Where not available, to get them as quickly as possible.
 - Technology delivery
 - Do it themselves
 - Manage their own data & metadata - libraries, tables, jobs, folders
- Common results:
 - Hamstrung by onboarding processes – users, data, software
 - **Waiting !!!**
 - Priority goes to existing operational processes
 - Bypass platform entirely
 - Set up (yet another!!) silo

My Challenge

Why am I doing this presentation?

- Previous engagement
 - Design a SAS enterprise platform which does not require a SAS Platform Administrator (*)
 - Platform Administration should only be required for project change, or for fail'n'fix (or "BreakFix").
 - In "standard support" mode (BAU, etc), platform & processes need to be self-reliant.
 - Not entirely achieved (*for a variety of reasons..*)
- My mission:
 - Simplify platform design & clarify user enablement to business & technology
- Shared administration
 - Find the right balance between "centralised" and "federated" administration.
 - Previous SAS Global Forum papers – SAS & LSF, Grid Management, SAS Software Lifecycle & Promotion Methods
 - Delegate responsibilities to nested levels of administration (whether technology or business)

Intended Audience

Who is this for?

- Platform Administrators
 - SAS v9.4 Administrator / SAS Admin on a SAS v9.4 platform?
- Platform “designers” & senior business users
 - Solutions Architects
 - Solutions Designers
 - Senior SAS users
 - SAS Team Leads

Aiming to set up a framework for businesses groups to run on a shared platform with a level of autonomy, and less reliant on a technology SAS Platform Administrator.

SAS Platform Admin #101

Users on a platform

- Who are you?
 - Identity
- What are you allowed to do?
 - Capability
- Where are you allowed to do it?
 - Security

SAS Platform Admin #101

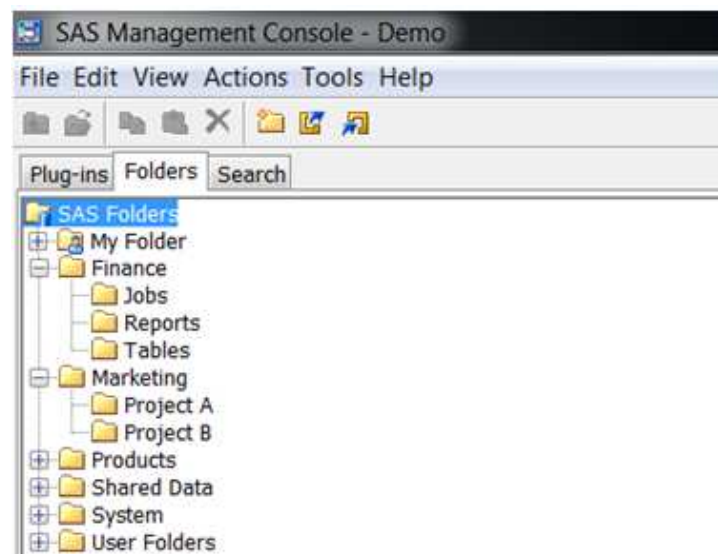
Users on a platform

- Who are you?
 - Identity
 - Set up appropriate groups
- What are you allowed to do?
 - Capability
 - Set up capability templates (“Roles”)
- Where are you allowed to do it?
 - Security
 - Set up security templates – metadata, filesystem, configuration files.

Scenario & Software

"Here's one I prepared earlier."

- Scenario
 - Two business teams
 - Finance & Marketing
 - Each group has two groups
 - Users & Admins
- Platform
 - SAS 9.4 (not SAS Viya)
- Operating system
 - No specific O/S, assuming Linux



Business Requirements

What does the business want to do themselves?

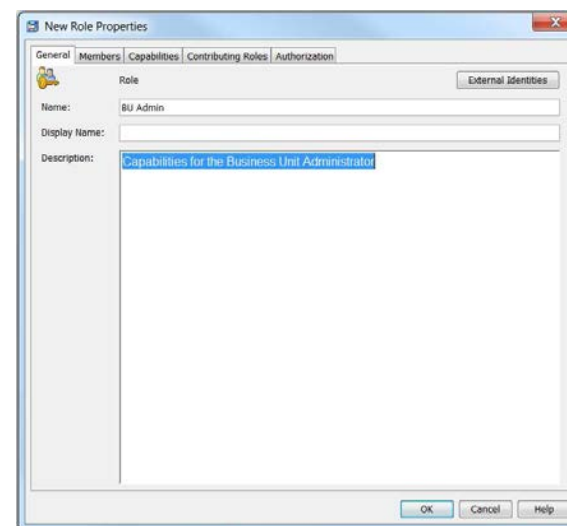
- Manage their own users
 - Change user capabilities (by modifying group memberships)
- Manage their own metadata
 - Libraries, tables, jobs, folders
- Manage their own storage
 - Disk space
- Manage their own database connections
 - Update passwords, etc.
- Manage their own jobs
 - Select application server contexts
 - Kill rogue processes

Platform Admin challenge:
How to make the business more self-reliant without impacting other businesses, operational processes or platform stability?

Manage Users

What can users do?

- Functionality is controlled by your role(s)
 - Collection of capabilities
 - Enabling/disabling software features
 - *Simplistic definition*
- Pre-defined roles exist in SAS platform
- Can create customised roles
 - Can enable capability (not disable)
 - ** Do NOT modify existing roles **



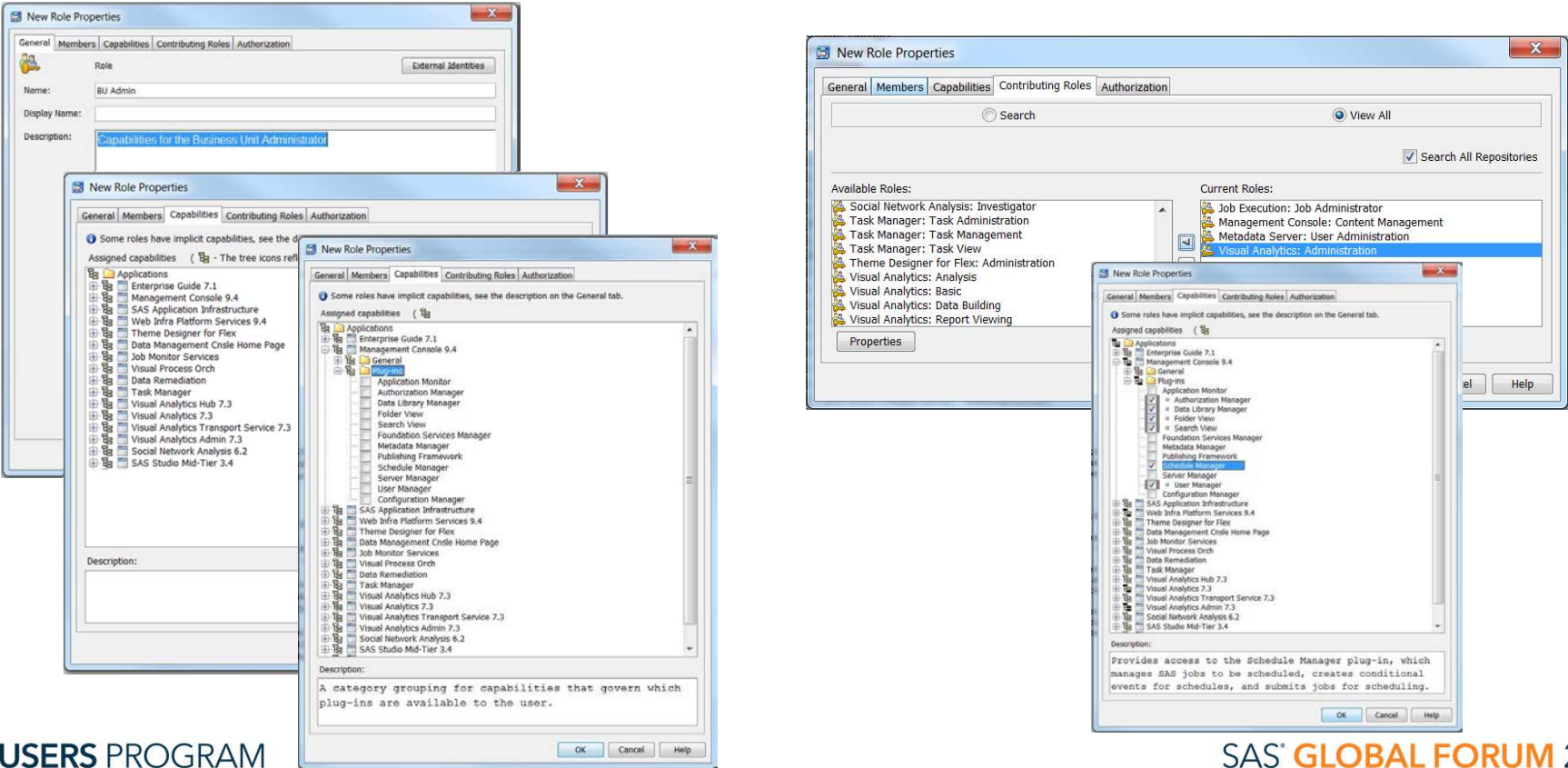
Manage Users

Make your roles functional, not organisational

- Multiple groups require a Business Admin
 - Create ONE BU Admin role, apply to multiple groups
- Multiple groups require a Job Deployer & Scheduler
 - Create ONE Job Deployer & Scheduler role
- Multiple groups require a Report Publisher
 - Create ONE Report Publisher role
- Apply roles to multiple groups

Manage Users

Create a custom role for the "BU Admin"



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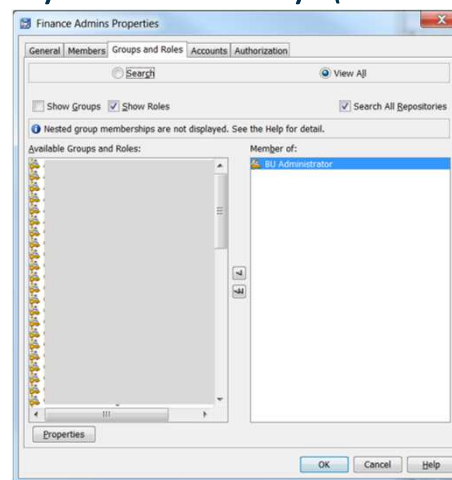
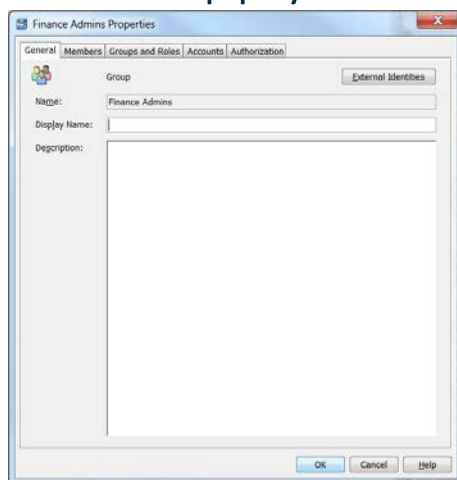
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Manage Users

Create a custom role or the “BU Admin”

- Apply role(s) to groups(s)
 - Group members now have the role’s capabilities
 - Where to apply that capability? Security (*later..*)



Identity Management

Requirement: Business needs to manage their own metadata groups

- Within any one Business Unit, there may be multiple groups performing specific functions. For example:
 - BU Admin group
 - BU Analysts group – typically a large group
 - BU Model Manager group – typically a small group or an individual who manages deployed models for the BU.
- Users' capabilities are generally managed through their memberships of certain metadata groups, and the roles assigned to (or inherited by) those groups.
 - Most organisations synchronise SAS metadata groups with Active Directory, using the AD_Sync scripts supplied by SAS, or the powerful user synchronisation capabilities of the Metacoda plug-in, typically run overnight.

Metadata User Management

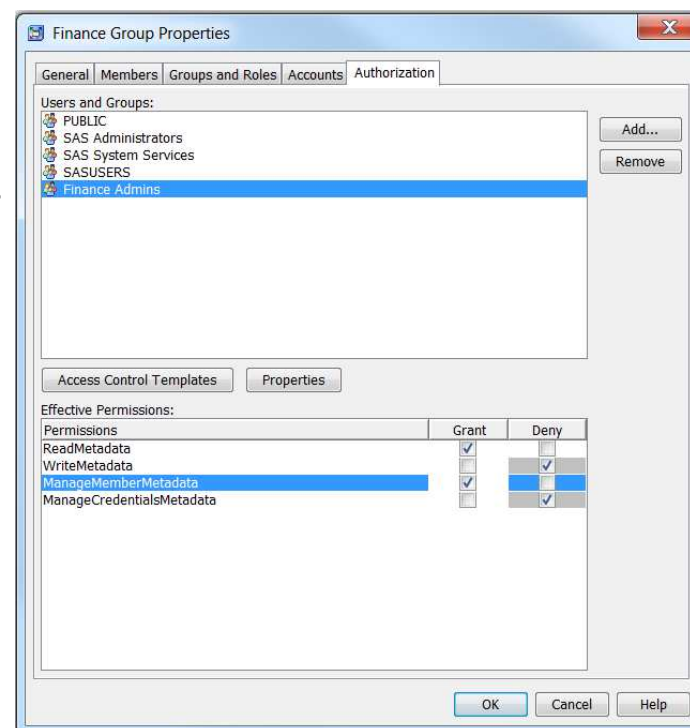
Requirement: Business needs to manage their own metadata groups

- Requirement: To override the Active Directory synchronisation of metadata groups, in order to temporarily assign a user to a business group.
 - For example, should the Model Manager for a Business unit be away (on emergency leave) at a critical time, the BU Admin can appoint someone else to be the (temporary) Model Manager.
- Note: By default, the group memberships will re-sync with AD the next time the AD_Sync scripts are run (unless the scripts have been customised)

Metadata user management

Requirement: Business needs to manage their own metadata groups

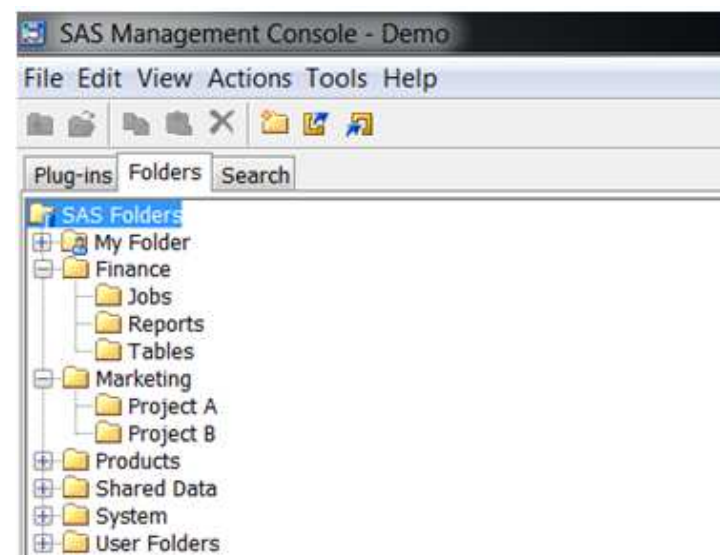
- **ManageMemberMetadata (MMM)**
 - Change the membership of the Group and Role. Cannot change security or other account attributes.
 - E.g, promote user to another group.
- **ManageCredentialsMetadata (MCM)**
 - Manage accounts and trusted logins of User and Group. Cannot change security or other account attributes.
 - E.g, manage shared database credentials
- **New to SAS 9.4 M2**



Metadata content management

Requirement: Business needs to manage their own metadata content

- Arrange metadata to suit the business
 - Technology may provide metadata template
 - Business need to customise
 - Typically set up when the business unit is added to the platform
 - Security? (*Discussed later..*)



Filesystem management

Requirement: Business to self-manage file storage

- Typical filesystem deployment
 - Operating System
 - SASHome
 - SASConfig
 - Environments
 - Metadata
 - Logs
 - SASData
 - SASWork / SASUtil
 - Backup



Filesystem management

Requirement: Business to self-manage file storage

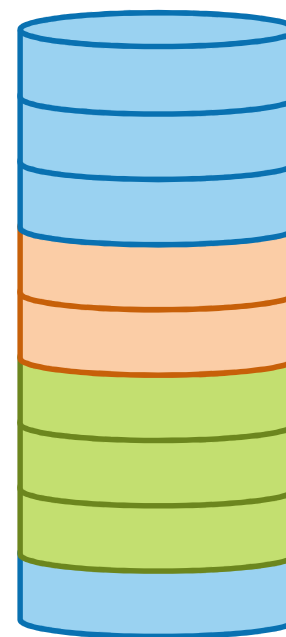
- Common Risks
 - Shared SASData volume
 - Shared SASWork volume
 - Shared Logs volume
 - *Shared Metadata volume (*)*



Filesystem management

Requirement: Business to self-manage file storage

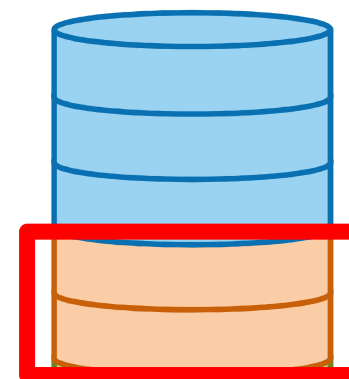
- Self-managed filesystem deployment
 - Operating System
 - SASHome
 - SASConfig
 - **Metadata**
 - **Logs (system, metadata, etc)**
 - **Logs (per BU)**
 - **SASData (per BU)**
 - **SASWork / SASUtil (per BU)**
 - Backup



Filesystem management

Requirement: Business to self-manage file storage

- Self-managed filesystem deployment
 - Operating System
 - SASHome
 - SASConfig
 - Metadata
 - Logs (system, metadata, etc)



The Foundation repository is shared with all users of that particular environment, therefore the storage of the metadata files (and the memory they occupy when the metadata server is started) is also shared. Although unlikely, those with rights to create metadata objects (in their particular metadata folders) could potentially impact the size of the metadata data sets. Mitigation: Monitoring by Platform Administrator / Disk alerts.

Filesystem management

Requirement: Business to self-manage file storage

- Set up Business Unit specific filesystems
 - SASData, SASWork/SASUtil, Logs
- How to leverage the filesystem for business groups?
 - Separate Application Server Contexts
 - SASApp, SASFinance, SASMktg, etc.
 - Customise configuration files - \$SASCONFIG/Levn/SAS_BU folder
 - sasv9_usermods.cfg
 - appserver_autoexec_usermods.sas
 - Options:
 - SASWORK & SASINITIALFOLDER
 - Workspace server logs
 - LSF Queues

Filesystem management

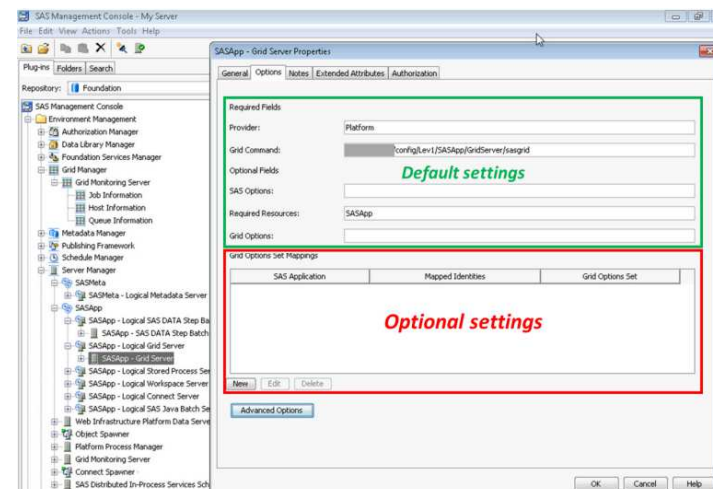
Requirement: Business to self-manage file storage

- Configuration alternatives
 - Restricted Options
 - Set at O/S user or group level
 - Cannot be overridden by user
 - Global restricted options !SASROOT\rstropts\rsasv9.cfg
 - User restricted options !SASROOT\rstropts\userid_rsasv9.cfg
 - PROC OPTIONS:
 - RESTRICT lists the options currently restricted.
 - LISTRESTRICT lists the options that can be restricted.

Alternatives to filesystem management

Is there another way?

- Configuration alternatives
 - Grid Options Sets
 - Share a single Application Server Context
 - Share common settings
 - Customise setting per business group and/or application
 - Enterprise Guide
 - Visual Analytics
 - etc



Grid Options: queue=Normal

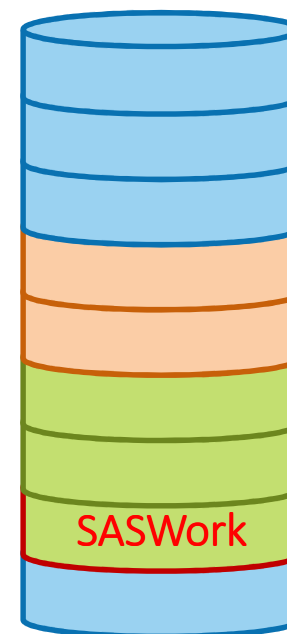
Grid Options Set Mappings

#	SAS Application	Mapped Identities	Grid Options Set
1	SAS Enterprise Guide	SAS Administrator;SAS Administrators	EG_Admin

Filesystem management

Requirement: Business to self-manage file storage

- CleanWork utility
 - Cleans orphaned work libraries
 - Must be run with higher O/S privileges
 - Unlikely to grant to business
 - Solution:
 - CleanWork stored process
 - Runs higher privilege script
 - Only BU Admins can access
 - Alternatives?
 - Parameterised Control-M flow
 - BU Admins can run but not reconfigure



Business Requirements

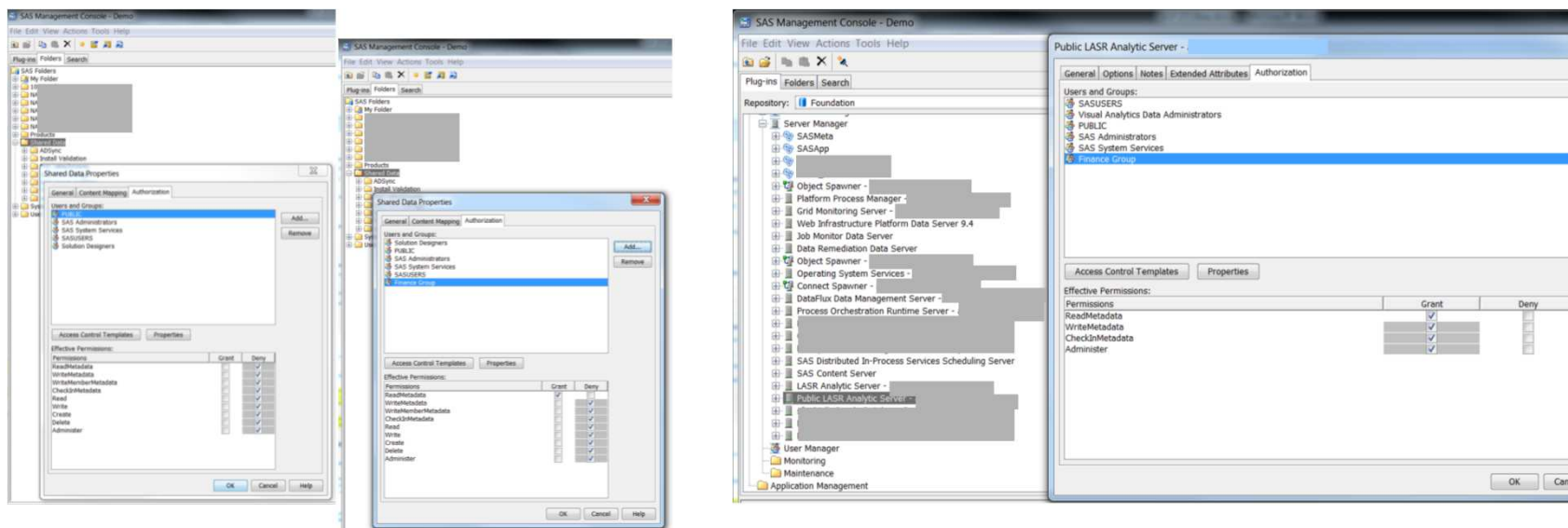
What does the business want to do themselves?

- Manage their own jobs / servers
 - Kill rogue processes
 - Select application server contexts
 - Requires access to Server Manager plug-in – yes/no?
 - Alternatives – SAS Grid
 - Different business groups run on different queues
 - But with the same priority..
 - Can nominate managers of individual queues
 - BU Admins can use SAS RTM to manage (but not modify) their own queue's jobs.
 - *Requires SAS Grid (naturally..)*

Applying Security

The “wrong” way

- Applying individual security settings (Access Control Entries, or “ACEs”) to folders and/or objects.



Applying Security

The “wrong” way

- Example:
 - Apply change for BU group on a metadata folder
 - Grant admin for BU admin, grant RM, WMM for BU users
 - Apply similar change to BU admin group
 - Grant admin for BU admin
 - Apply similar change to other BU groups
 - Apply similar change to SASUSERS
 - Repeat for other folders - tedious
- Better: Create one pattern, apply many

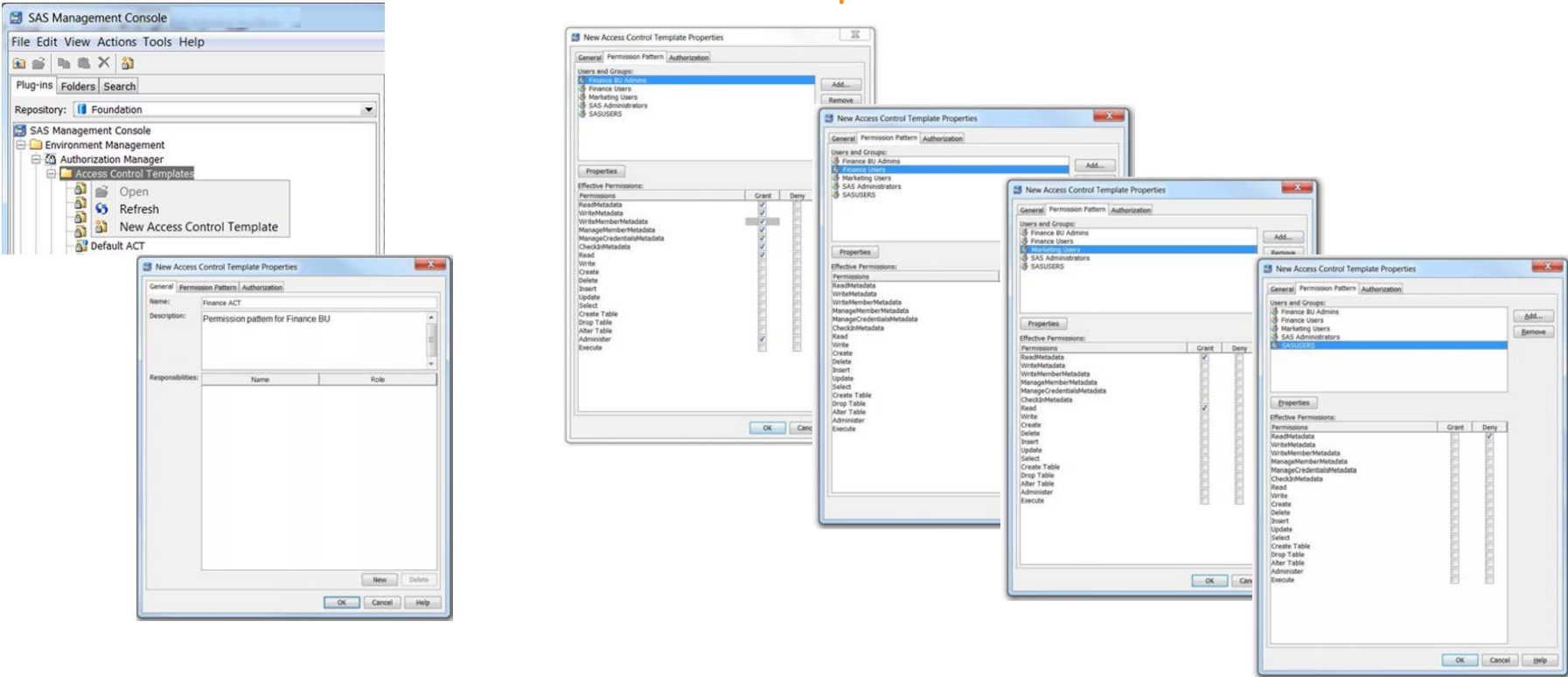
Access Control Templates (ACTs)

Every Platform Administrator's best friend

- Create a collection of security templates
 - Much easier to centrally manage
 - Updating template instantly updates object where template as been applied
 - Not having to track individual Access Control Entry changes
 - Conflicts better managed
 - ACE permissions override ACTs & inherited permissions (therefore avoid)
 - User permissions override group permissions (therefore avoid)
 - If ACTs conflict (one Grants, another Denies), result is a Denial (safest)

Access Control Templates (ACTs)

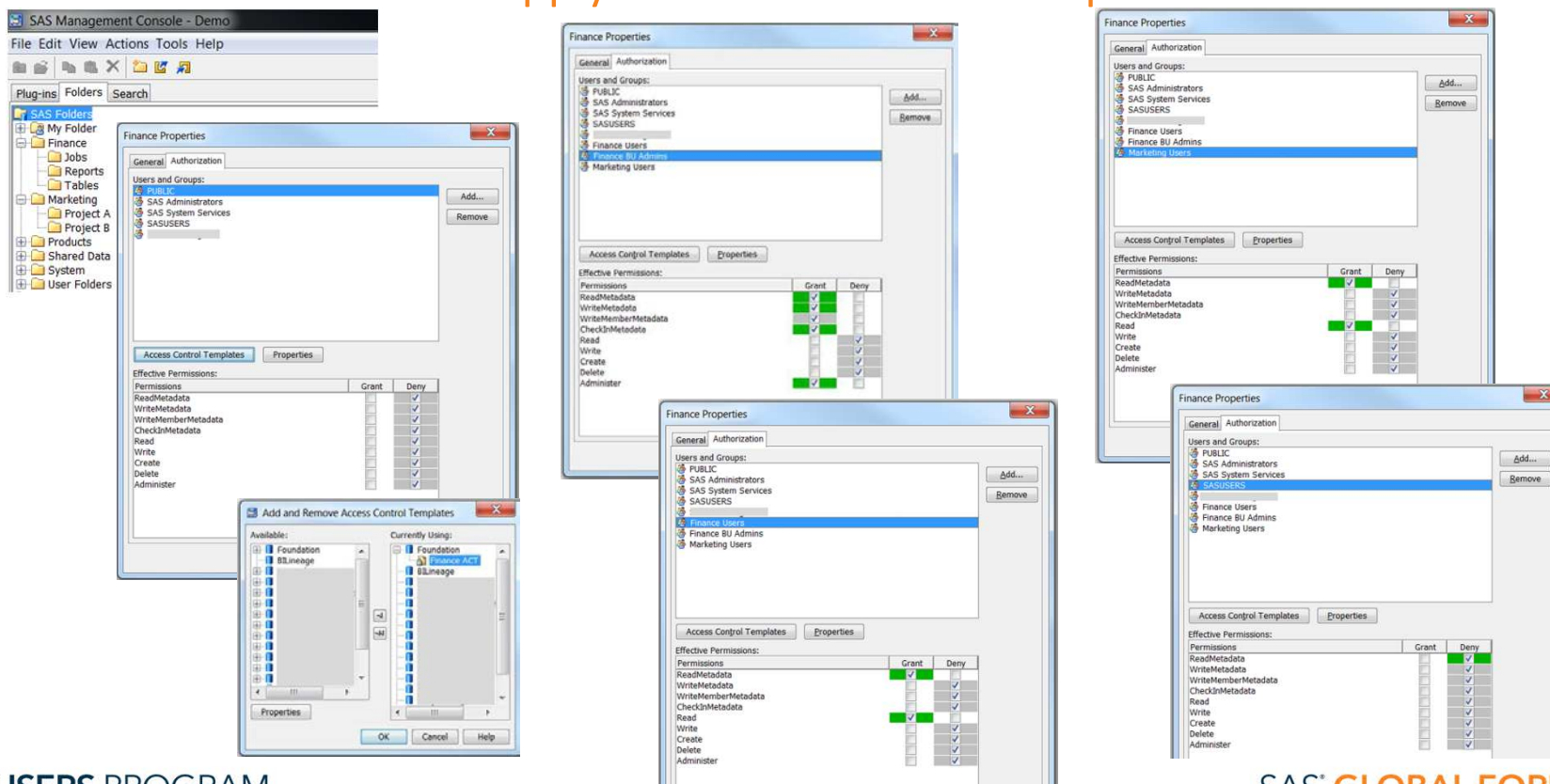
Create an Access Control Template for a Business Unit



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Access Control Templates (ACTs)

Apply BU Access Control Template



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Application Administration

What can be done OUTSIDE of Management Console or Env Manager?

- Application-specific administration
 - Visual Analytics Administrator
 - Allows adding/loading/unloading of LASR tables
 - Allows restarting of LASR servers
 - Keem some LASR servers & tables technology-managed
 - Allow some LASR servers & tables to be business managed

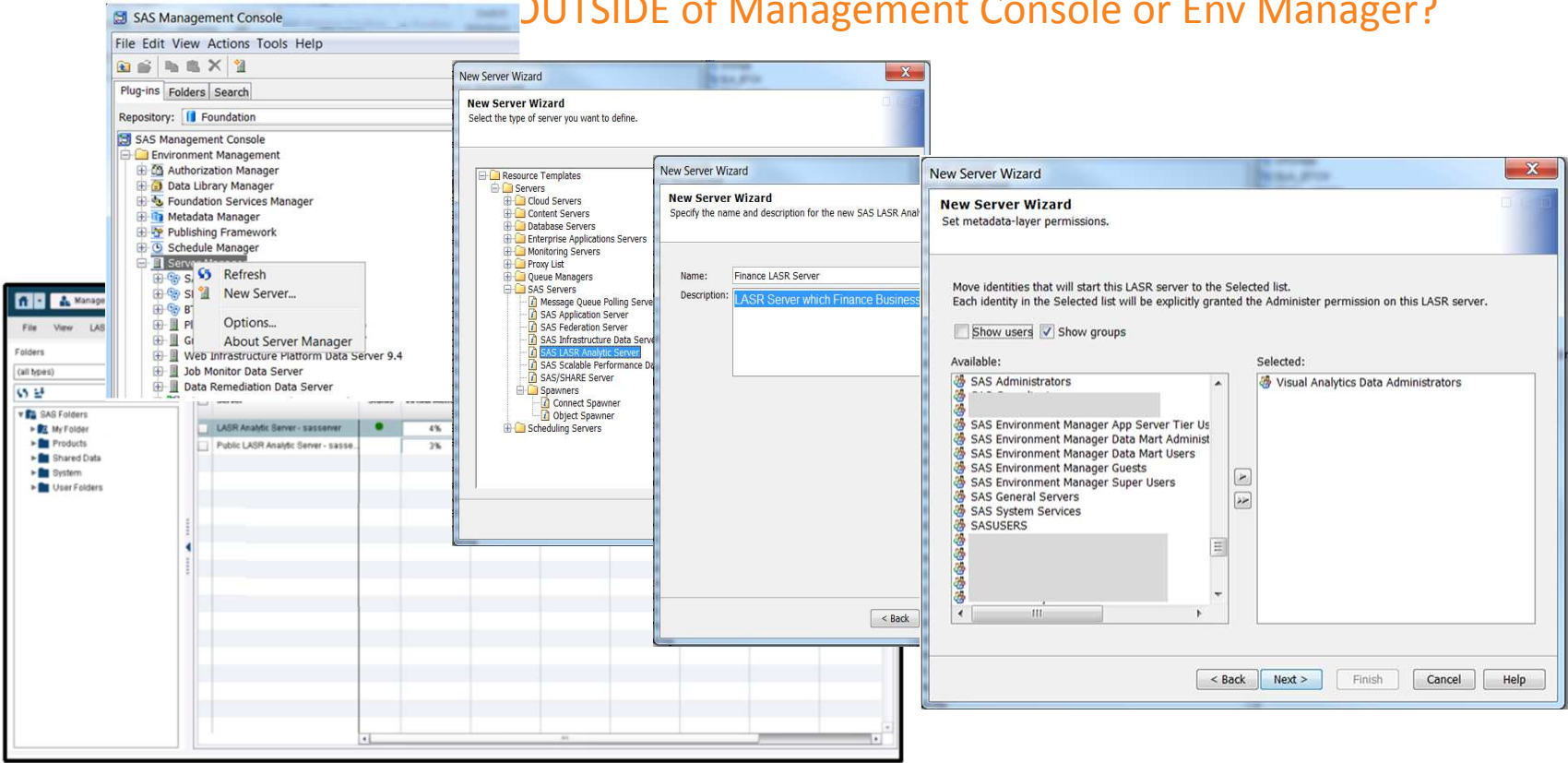
The screenshot displays two windows from the Visual Analytics Administrator. The 'LASR Servers' window shows a list of servers with columns for Server, Status, Virtual Memory, Tables Memory (MB), Tables Limit (MB), Host, Port, Started By, and Description. The 'LASR Tables' window shows a list of tables with columns for Table, Status, Size, Location, Server, and Loaded.

Server	Status	Virtual Memory	Tables Memory (MB)	Tables Limit (MB)	Host	Port	Started By	Description
LASR Analytic Server - sasserver					sasserver.dem...	10010		SAS LASR Anal...
Public LASR Analytic Server - sassee...	●		0.00		sasserver.dem...	10031	Ahmed	Visual Analytics... 0:

Table	Status	Size	Location	Server	Loaded
VA_SAMPLE_TELCO03	●	213.37 MB	/Products/SAS Visual Analytics/Samples	Public LASR Analytic Server - sass...	08/16/15 06:48 PM
VA_SAMPLE_RETAIL_RO_PROMO_EF...	●	126.32 KB	/Products/SAS Visual Analytics/Samples	Public LASR Analytic Server - sass...	08/16/15 06:47 PM
VA_SAMPLE_WARRANTY_CLAIMS	●	280.84 MB	/Products/SAS Visual Analytics/Samples	Public LASR Analytic Server - sass...	08/16/15 06:48 PM
VA_SAMPLE_RETAIL_RO_COST_GT...	●	22.92 MB	/Products/SAS Visual Analytics/Samples	Public LASR Analytic Server - sass...	08/16/15 06:47 PM
VA_SAMPLE_K12_STUDENT	●	10.70 MB	/Products/SAS Visual Analytics/Samples	Public LASR Analytic Server - sass...	08/16/15 06:47 PM
VA_SAMPLE_RETAIL_RO_MD_CANDI...	●	106.84 MB	/Products/SAS Visual Analytics/Samples	Public LASR Analytic Server - sass...	08/16/15 06:47 PM
VA_SAMPLE_CASINO_REV_FCST2	●	1.33 MB	/Products/SAS Visual Analytics/Samples	Public LASR Analytic Server - sass...	08/16/15 06:47 PM
VA_SAMPLE_ACME_BANK	●	259.34 MB	/Products/SAS Visual Analytics/Samples	Public LASR Analytic Server - sass...	08/16/15 06:47 PM
VA_SAMPLE_SMALLINSIGHT	●	486.59 MB	/Products/SAS Visual Analytics/Samples	Public LASR Analytic Server - sass...	08/16/15 06:46 PM
VA_SAMPLE_BANKCAMPAIGN	●	218.36 MB	/Products/SAS Visual Analytics/Samples	Public LASR Analytic Server - sass...	08/16/15 06:47 PM

Application Administration

OUTSIDE of Management Console or Env Manager?



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Consolidate or federate platform administration

Who does what?

- Discussions?
 - Deploy SAS Management Console to the business?
 - Grant BU Admin access to the Server Manager plug-in?
 - Kill workspace server jobs
 - Add new data sources (databases, etc)
 - Grant XCMD?

Enabling the Business to self manage

Making a Platform Administrator's & Business Users' lives easier

- Custom roles for the BU Administrators
- Custom Access Control Templates for each group
- Careful application of ACTs to metadata components to be managed by the business:
 - Metadata folders
 - Logical metadata servers (e.g, LASR servers)
- File system segregation
 - Separate disk partitions or group-based disk quotas

Wrap up

References & Acknowledgements

• References

- SAS 9.4 Intelligence Platform: System Administration Guide, Fourth Ed.
- SAS 9.4 Intelligence Platform: Security Administration Guide.
- SAS Training Course: SAS Platform Administration (Fast Track)
- SAS Training Course: SAS Visual Analytics Administration
- SAS Blogs - <http://blogs.sas.com/content/sasdummy>
- Paul Homes blog: <http://PlatformAdmin.com>
- Metacoda: <http://metacoda.com>
- SAS VA images taken from Bobbie Wagoner's SAS blog
 - "SAS Visual Analytics 7.3: Check out the sample reports!"
 - <https://blogs.sas.com/content/sgf/2015/09/02/sas-visual-analytics-7-3-check-out-the-sample-reports>

Wrap up

References & Acknowledgements

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- <http://support.sas.com/resources/papers/proceedings17/1190-2017.pdf>
- Howell: “Easier Platform Administration using SAS® v9.4 Grid Option Sets”
- <http://support.sas.com/resources/papers/proceedings16/11100-2016.pdf>
- Ivlov & Blake: “Multi-Tenancy in SAS® - Is It Worth the Fight?”
- <http://support.sas.com/resources/papers/proceedings16/11684-2016.pdf>

- Acknowledgements

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Wrap up

Any questions?

- Contact me anytime
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 - SAS Communities: <https://communities.sas.com/people/AndrewHowell>

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