SAS MELBOURNE USER GROUP

3 JUNE 2015

SMUG

SAS Melbourne User Group

Melbourne Users Exploring SAS working with Partners & Banking

MEET OUR SMUG COMMITTEE 2015

- **Gary Anderson – Chairperson**
- **Elisa Young**
- **Flavio Giurco**
- **Leslie Shroot**
- **Neville Ford**

"WE WANT TO HEAR FROM YOU… WHAT IS YOUR SAS STORY?"

Please introduce yourself to the committee during our networking session this evening

VOTE FOR TODAY'S BEST PRESENTATION…

DON'T FORGET TO COMPLETE THE SMUG SURVEY

By completing the survey you could win…

SAS goodies – a USB speaker

Using SAS Within a robust Data Integration Framework

Why I Don’t Just Write Code !

Spoiler Alert !

- Who am I
  Where do I come from
  Why I consider myself a hardcore programmer
- What’s a Robust DIF ?
- Using DI - SAS Data Integration Studio
- My Call To Action…

What’s a Robust DIF ?

- Have you ever wished your colleagues **kept track** of their **code** ?
- Have you ever wished you had a **data lineage** or a **catalogue** of your **reports** ?
- Have you ever wished that when your sources change stuff, the **consequential impacts** are part of a report and NOT part of three weeks of trawling through custom code ?

What’s a Robust DIF ?

Copy Paste - %include - macros - eGuide - Libraries - SAS DI

The Evolution of Code

What’s a Robust DIF ?

- Well documented
- Maintainable
- Portable
- Standard framework

Case Study

- Import SAS package and using sashelp.class:
  - Filter out all people with a ‘p’ in their name
  - Apply 10% extra to the height of all females
  - Sort by descending weight
  - Output to a DB
  - Perform Impact Analysis

So what have you just seen ?

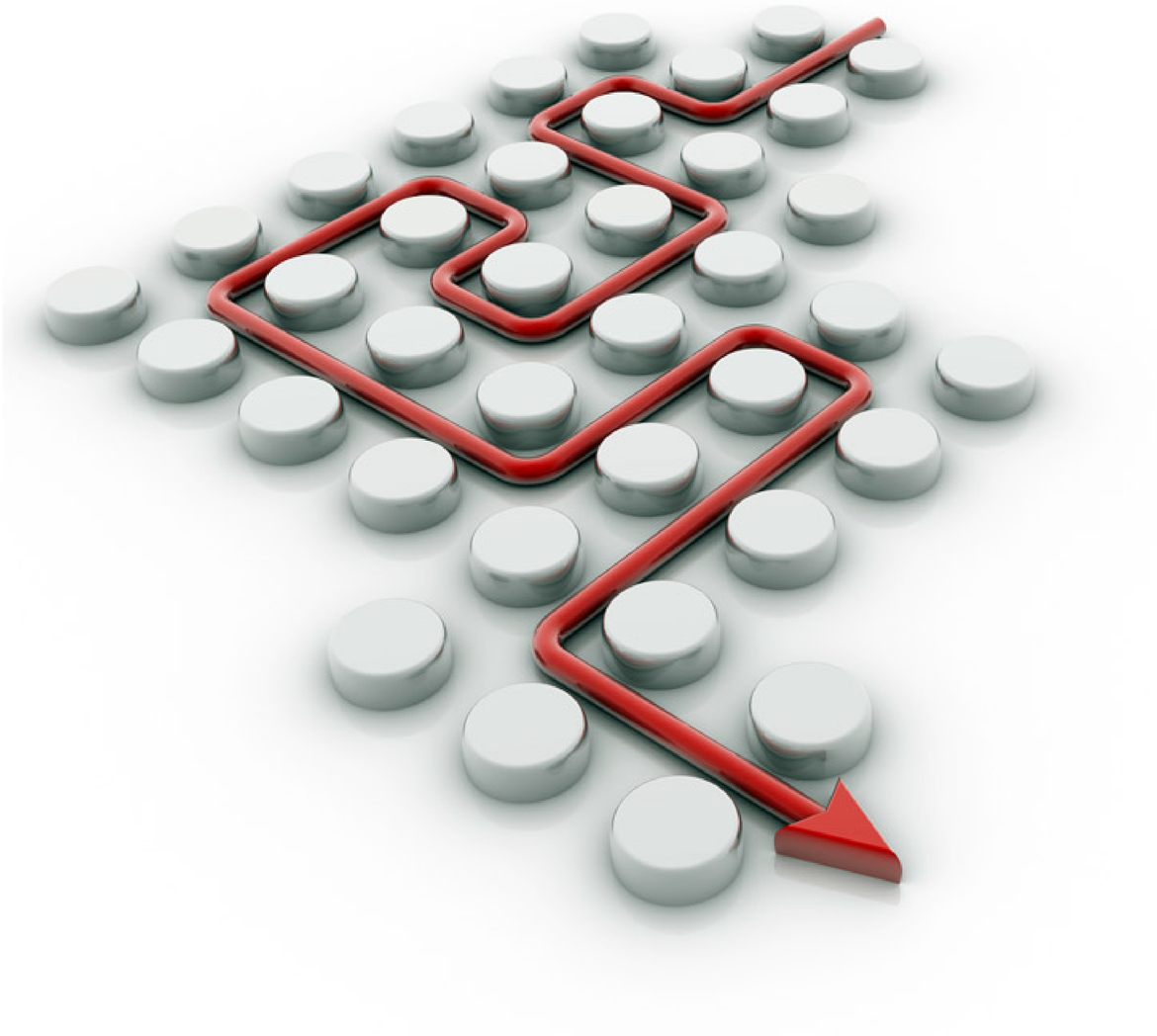
- Importing a SAS package
- Writing code by point and clicks
- Data Lineage
- An example of a Data Integration Framework

! CALL TO ACTION !

Adoption of DI Studio to support the hardening of SAS solutions

AND

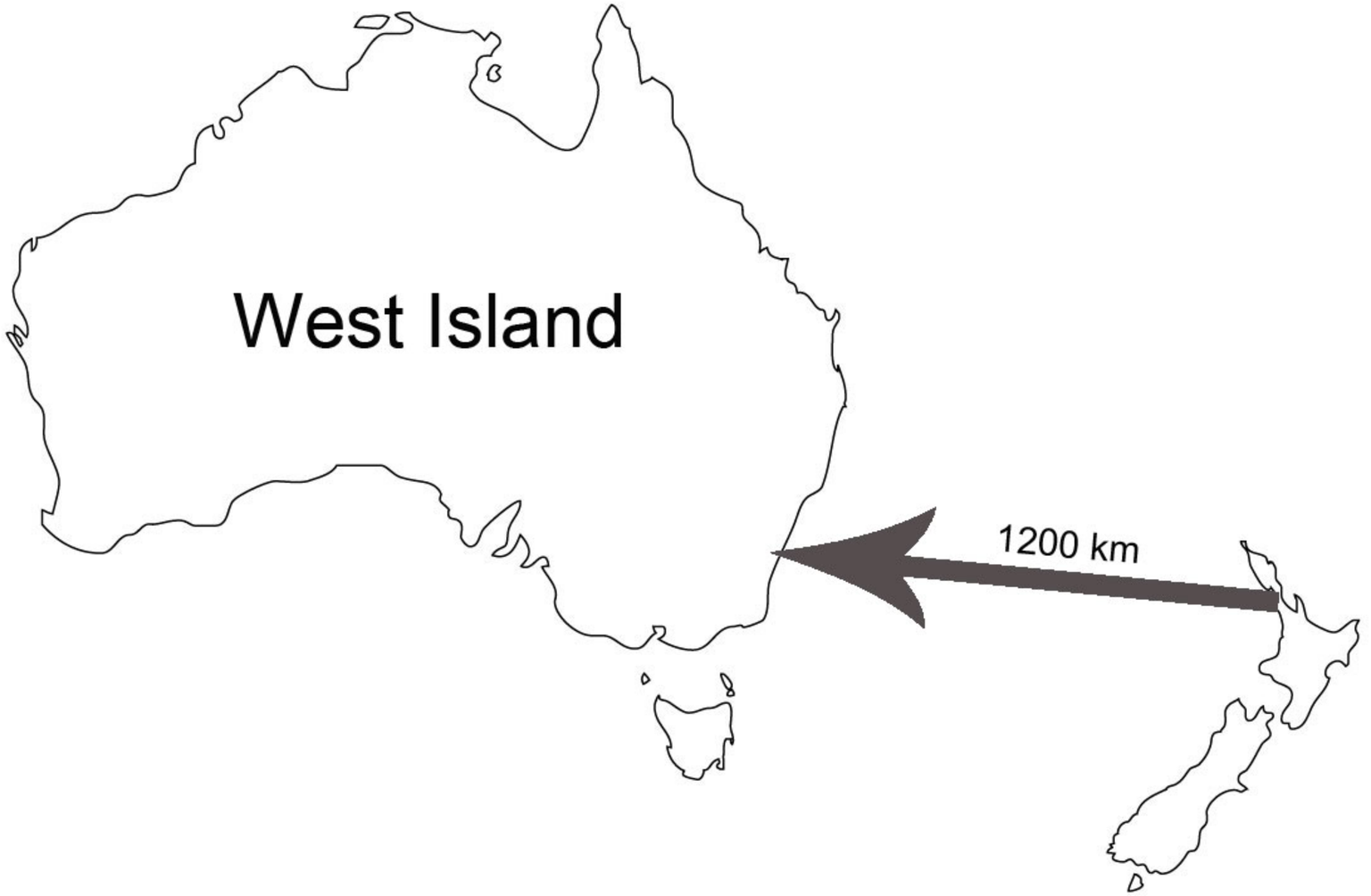
Read generated code because you ‘wrote’ it



Bridging the Gap

Between SAS Credit Risk Management for Banking and APRA regulatory reporting

Richard Carson
Senior SAS Designer


West Island
1200 km

EnergyAustralia
Deloitte Touche Tohmatsu
CARLTON DRAUGHT
SCOTTS
MELBOURNE GOLF ACADEMY
KAZ Grass
QANTAS
Smorgon
CROWN
VICTORIA BITTER
Travelex
ING
GO-GO-GO-GO-GO-GO-GO-GO-GO-GO-
WOLF BLASS
Coca-Cola
VB VICTORIA BITTER
Australia
For Gas and
Electricity

ESTERN QBE
WESTERN QBE
Collex.com.au
TR7 TR7 TR7 TR7
TOYOTA
TOYOTA

Skill
Strength
Strategy

Style
Support
Passion

Passion + Skill + Strategy

Offensive Strategy

RISK

Defensive Strategy

Banks are Taking Risk

The officers and directors of the bank are men of proven integrity and ability, and it is also under the direct supervision of the United States Treasury Department, giving double assurance of a sound, satisfactory administration of its affairs.

New Accounts Are Invited

Officers:

T. W. STUBBLEFIELD, President.

FRANCIS A. BLUNDON, First Vice President.

M. HOLZHEIMERLEIN, Second Vice President.

WM. H. DE LASHMUTT, Cashier.

Board of Directors:

W. H. Boss.
Isaac H. Ford.
M. Holzheimerlein.
H. F. Anderson.
Fred H. Gerst.
W. H. De Lashmutt.
Jesse H. Ramsburgh.
Julian P. Dodge.
Robert Allen.
Jesse Cook.
Howard Boyd.
T. W. Stubblefield.
C. E. Kline.
A. R. Reed.
W. G. Eisinger.
H. Ellsworth Sands.
Francis A. Blundon.
D. E. Buckingham, Jr.
J. H. Clemmins.
Ed. J. Hammon.
Jacob Lobster.
J. V. Stuckert.

Counsel, Howard Boyd.

AMOUNT
PURCHASED
£. S. d.
National

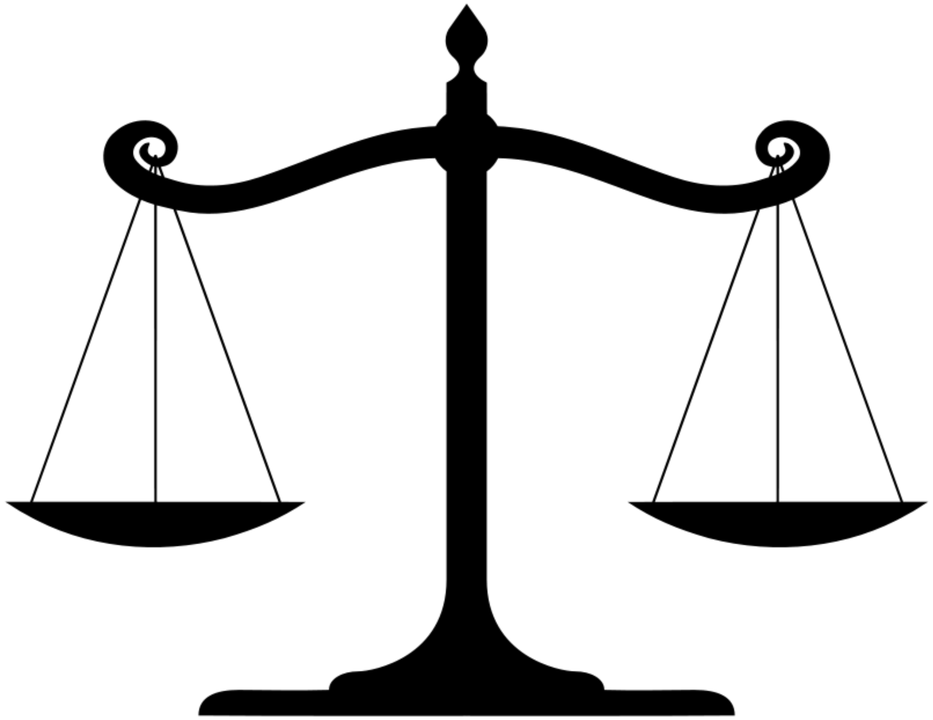
Australian Prudential Regulation Authority

Accreditation Authority
STD & IRB Reporting Specifications
Public Disclosure Requirements

The Great Credit Risk Quandary

Standard Approach

- Less Computationally Intensive
- Potentially Higher Capital Requirement
- Less Informative

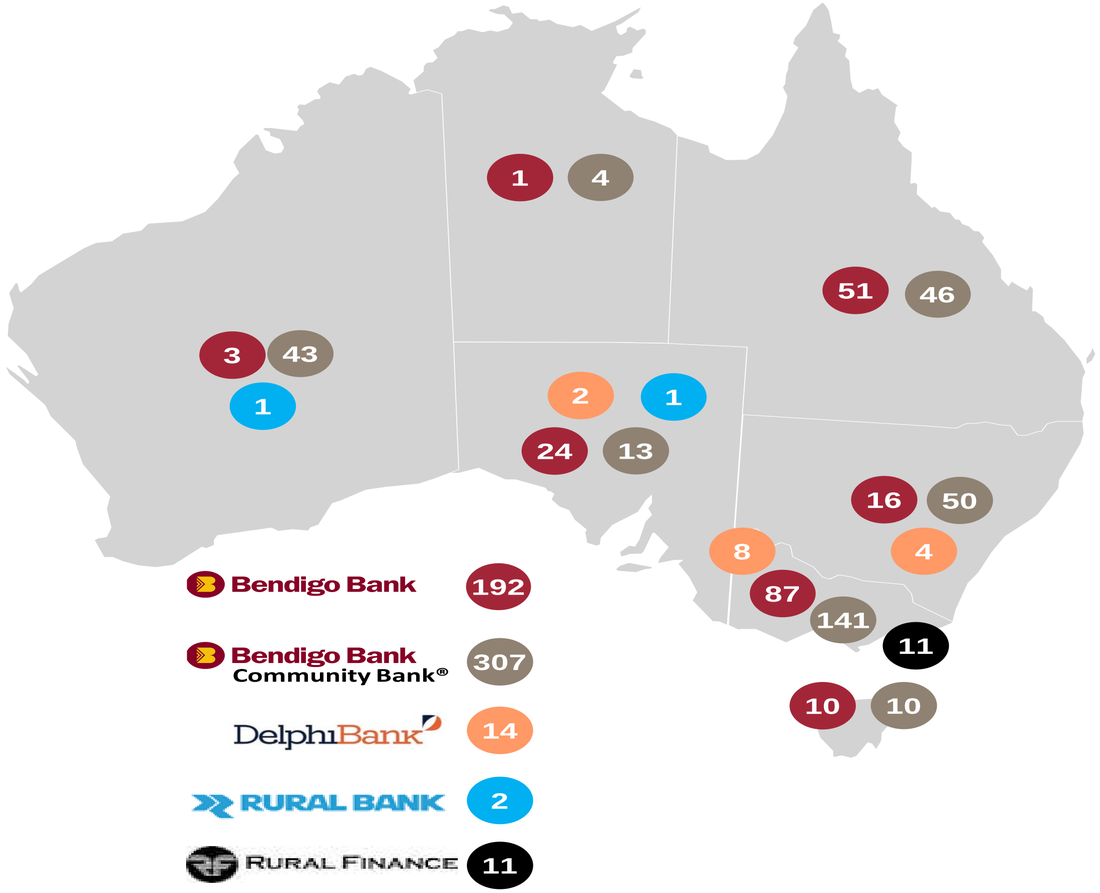


IRB Approach

- More Computationally Intensive ($$$)
- Potentially Better Capital Utilisation
- Detailed Risk Analysis

DIVERSE RETAIL BANK

Business	Segment
Bendigo and Adelaide Bank	Domestic bank operating five distinct brands
Bendigo Bank	Consumer and SME banking
Adelaide Bank	Third party channel
Bendigo Wealth	Margin lending, wealth management, superannuation
Rural Bank / Rural Finance	Agri-business banking
DelphiBank	Consumer and SME banking for Hellenic communities



We're aiming to be Australia's most customer connected bank

Bendigo and Adelaide Bank

GOALS

Business

- Contribute towards our customer connected vision
- Generate analytics that provide meaningful insights
- Contribute towards value creation
- Improve responsiveness and efficiencies
- Build a strategic, adaptive and enduring capability

Regulatory

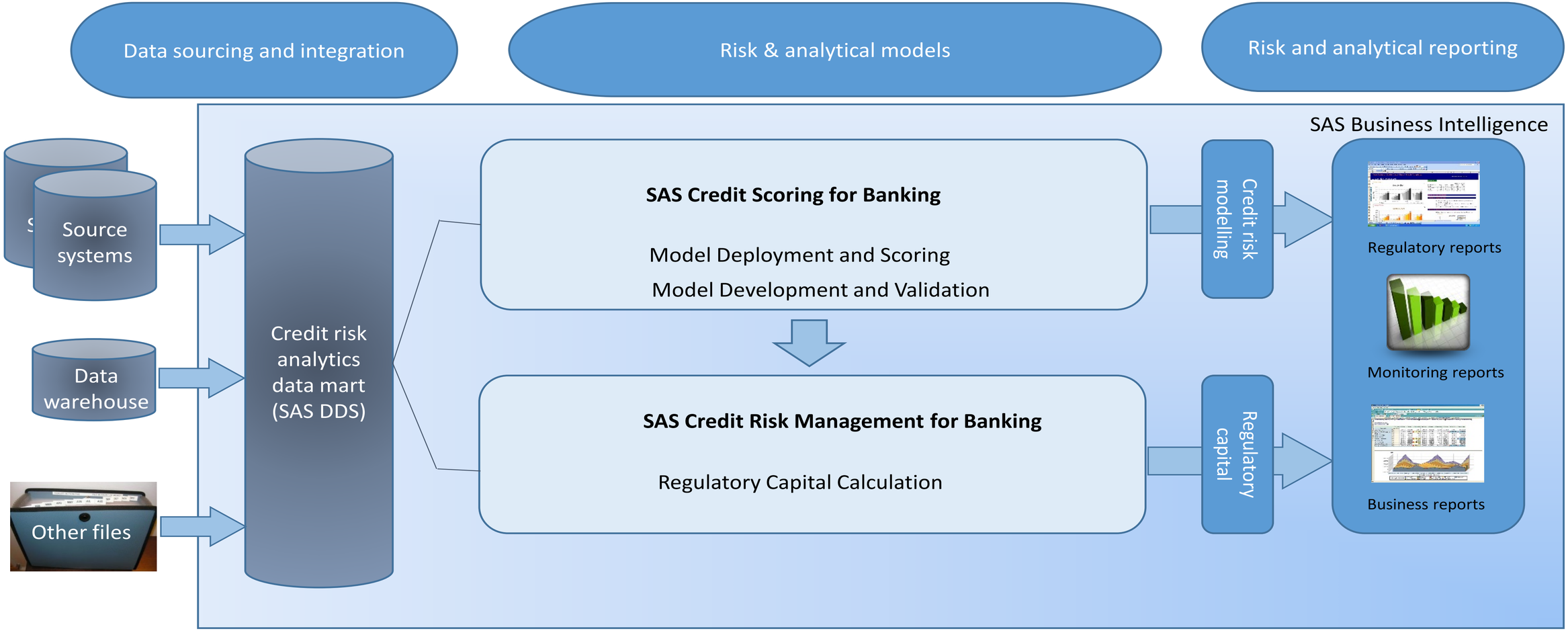
- Establish a stable and efficient platform for credit risk modelling and reporting
- Support business growth and regulatory changes
- Promote confidence in, and integrity of, data and information
- Establish auditability and traceability of end to end process
- Support accreditation goals

supporting and enabling a customer connected strategy

Bendigo and Adelaide Bank

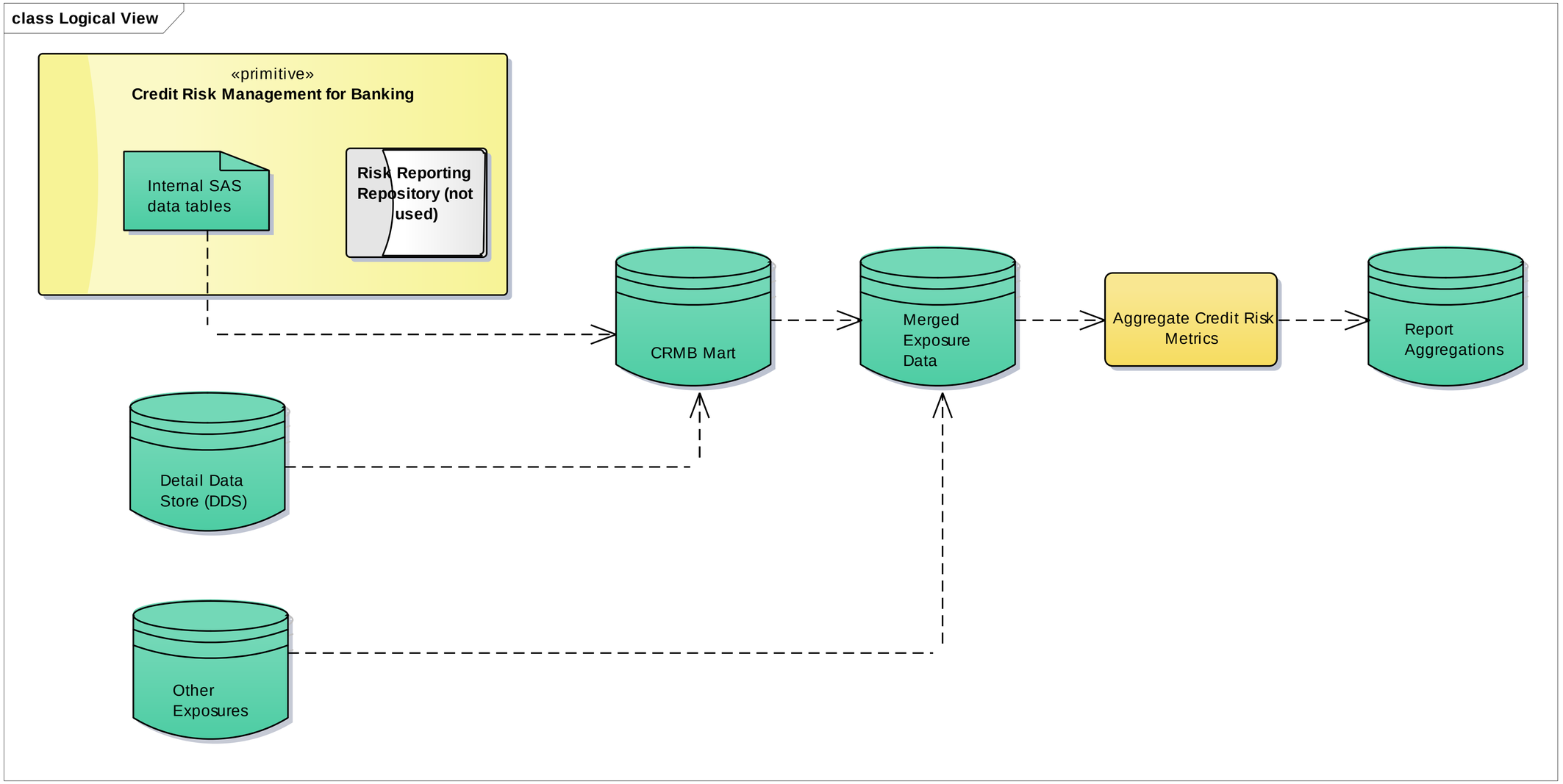
CREDIT RISK BUSINESS PLATFORM

Contemporary and scalable



Bendigo and Adelaide Bank

Credit Risk Reporting Store



DI Studio implementation of Aggregation process

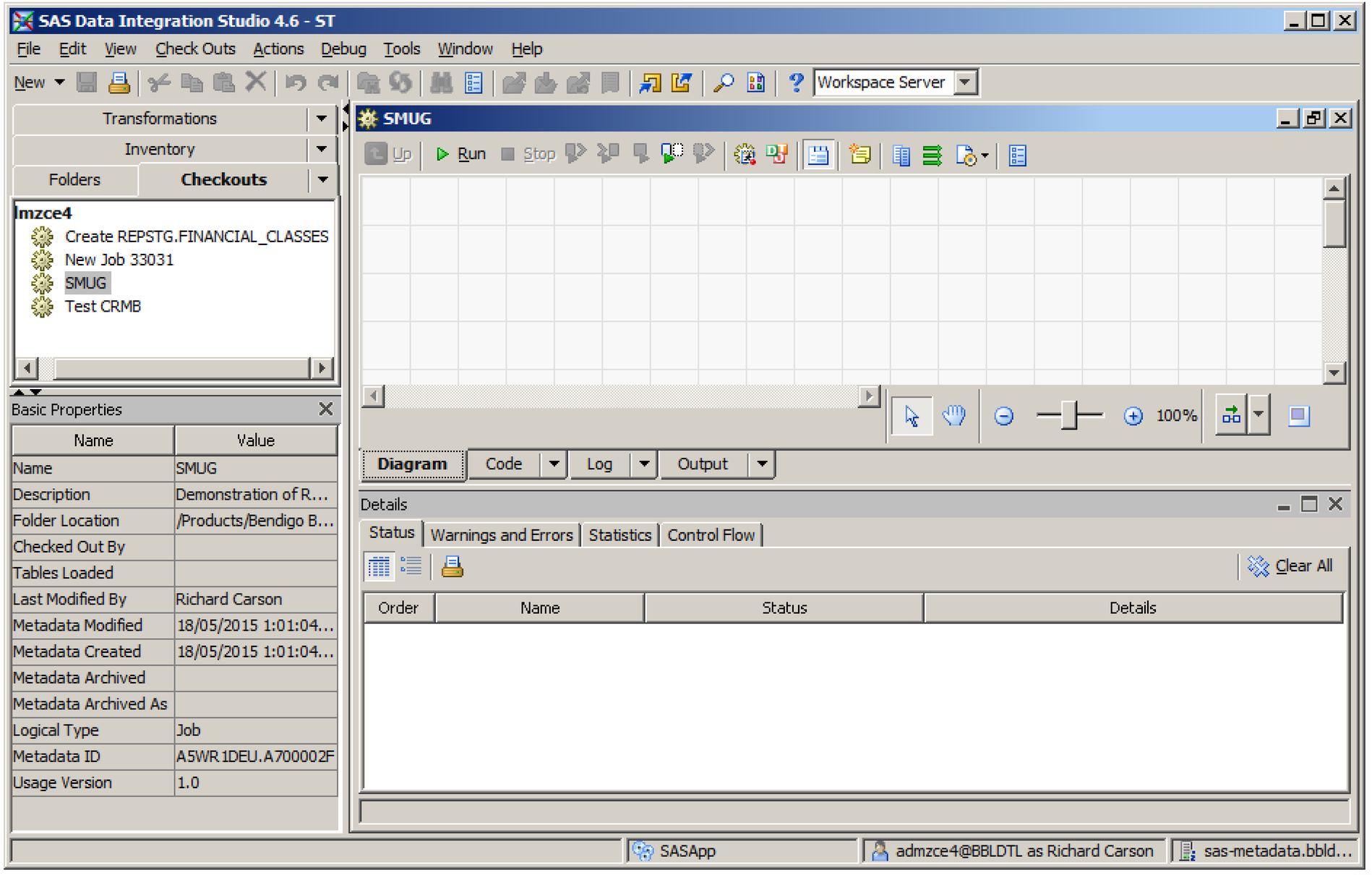
1. Consistent with other processes in Credit Risk Reporting Store
2. Job will be run as a step within the Reporting process flow
3. Preserves Data Lineage

However…
Default DI Studio options for Summary Statistics do not produce an output table

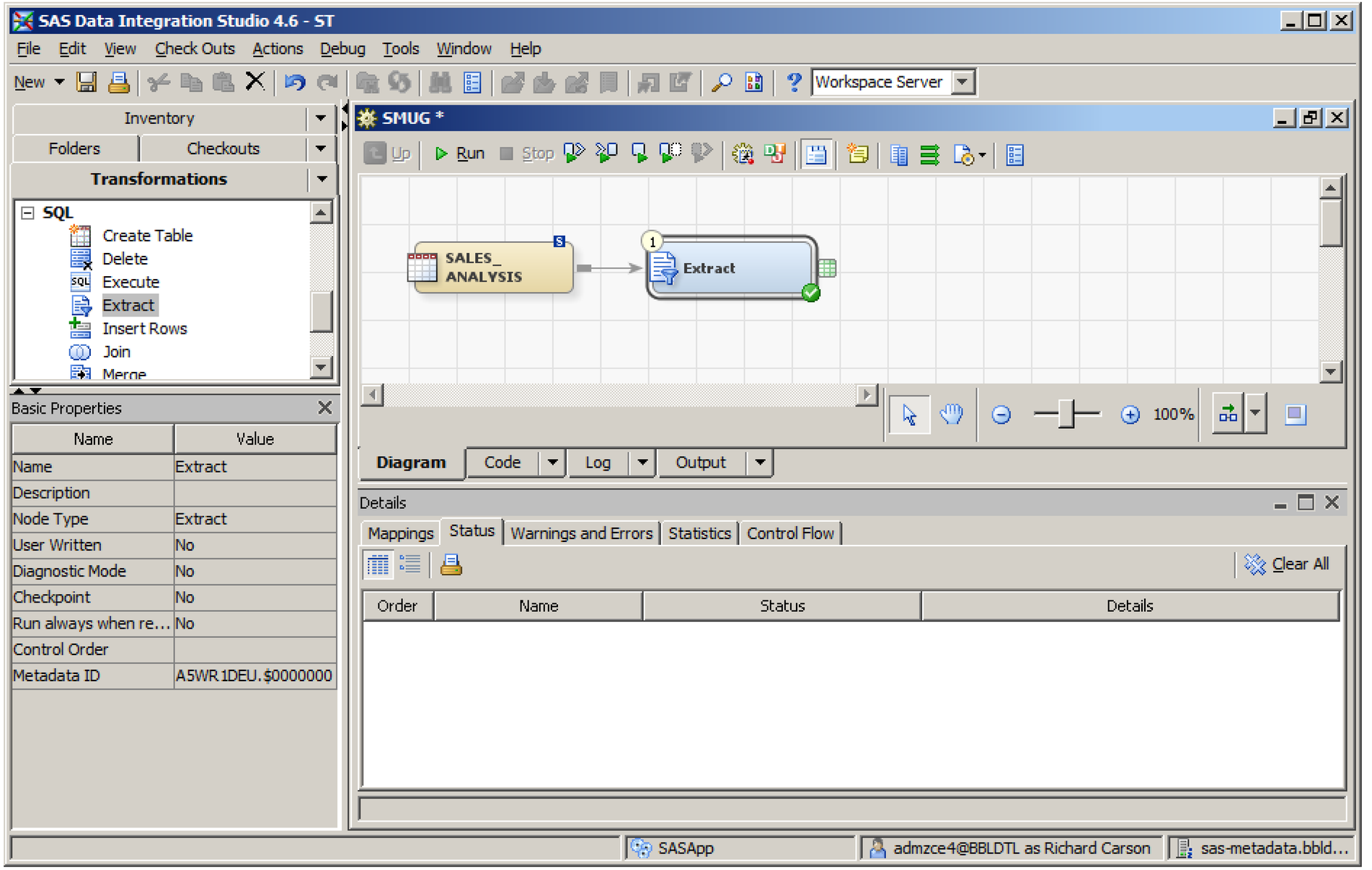
Base SAS view of aggregation process

```
LIBNAME ossalesa BASE "S:\workshop\OrionStar" ;

Proc SQL ;
    Create table Sales_Analysis_Dec2005 As
        Select  *
        From    ossalesa.sales_analysis
        Where   Year    =    2005
            And Month   =    12
            ;
Quit ;

Proc Means NoPrint
            Data    =    Sales_Analysis_Dec2005
            ;
    Class   Vendor
            ProductCategory
            ProductSubcategory
            ProductName
            ;
    Var     TotalSales
            ;
    Id      Year
            Month
            ;
    Output  Out =   Sales_Summary_Dec2005
            Sum =
            / ways
            ;
    Types   Vendor
            Vendor * ProductCategory
            ProductCategory * ProductSubcategory * ProductName
            ;
Run ;
```

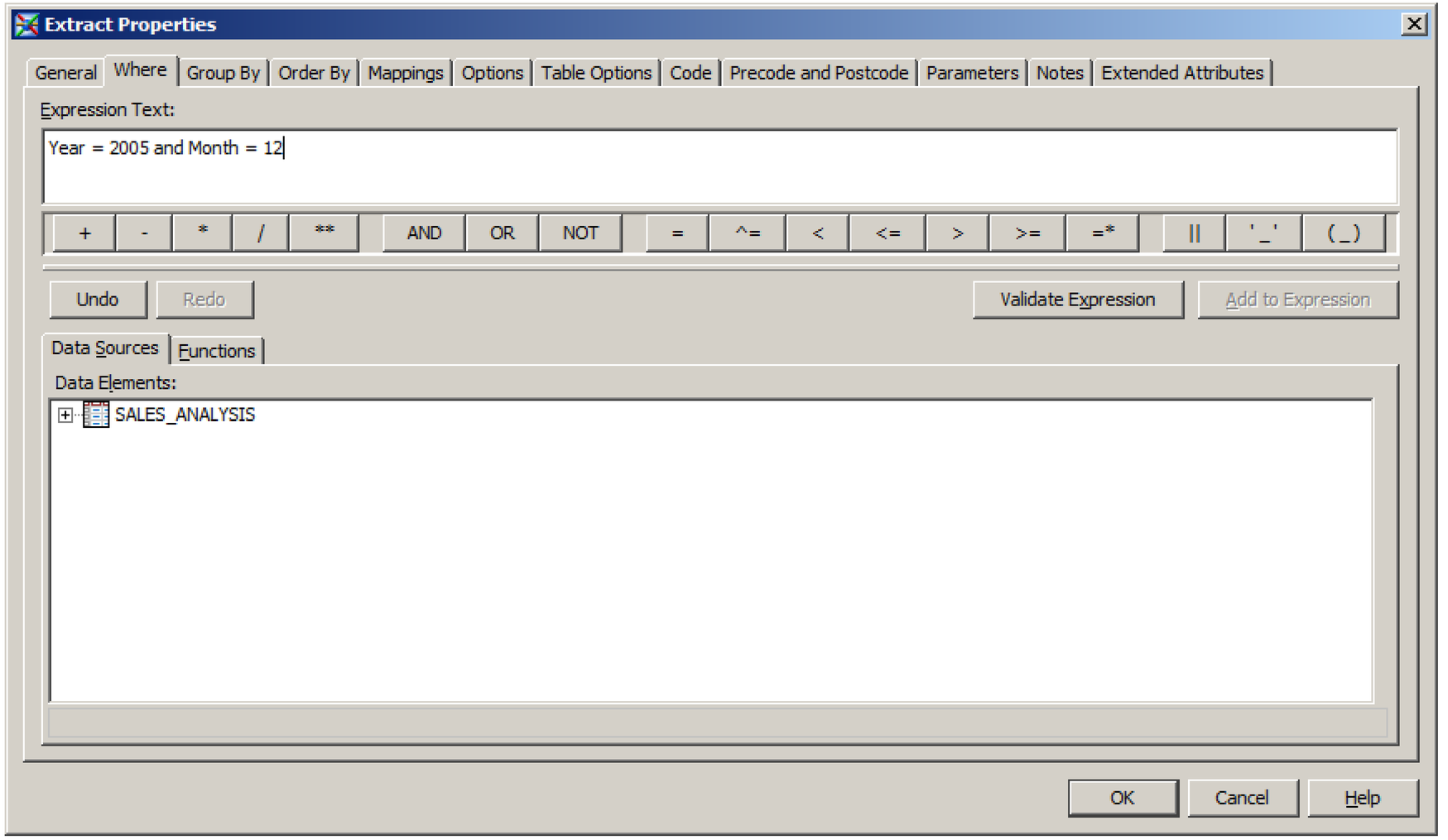
Bendigo and Adelaide Bank



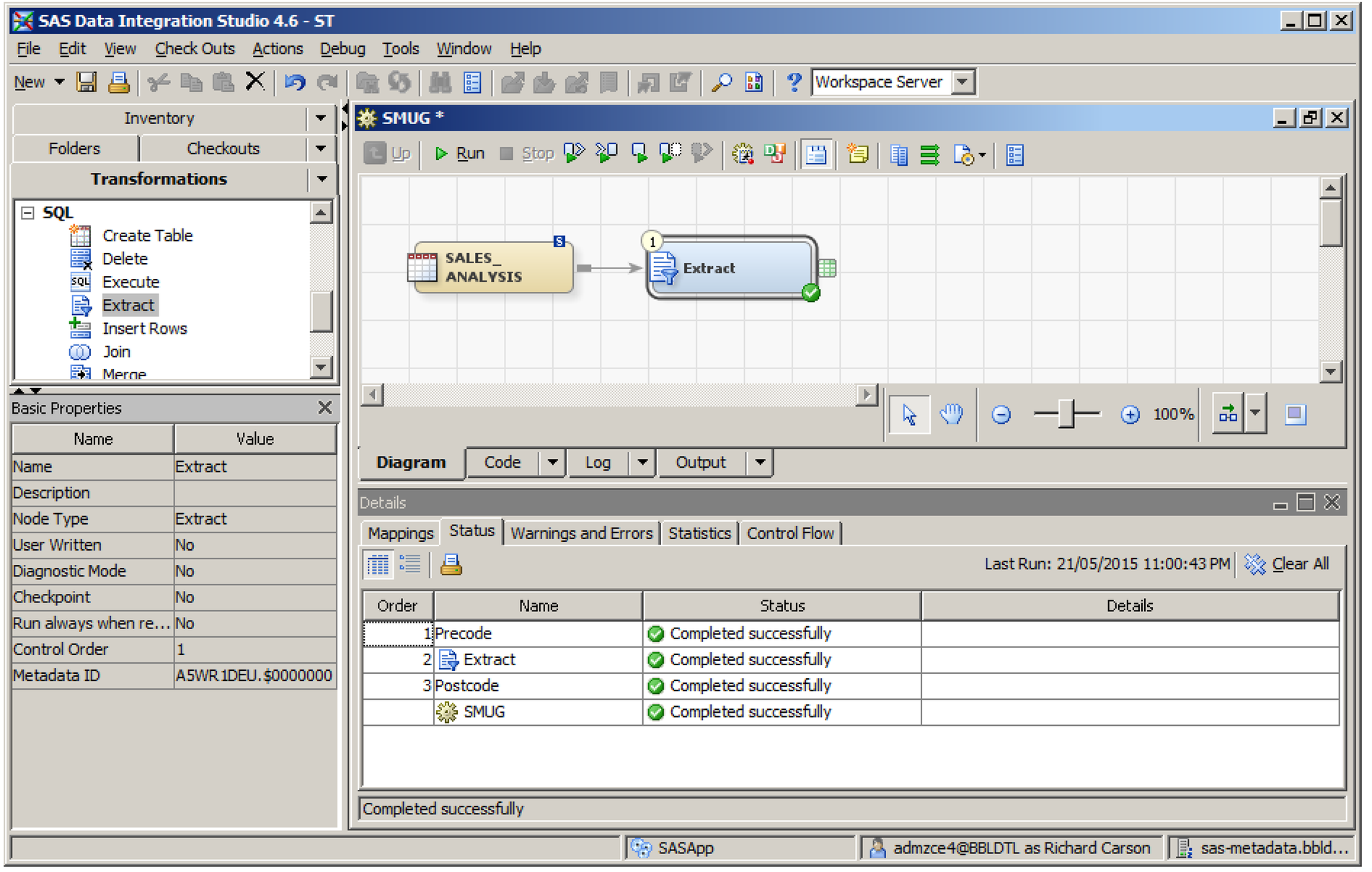
Bendigo and Adelaide Bank



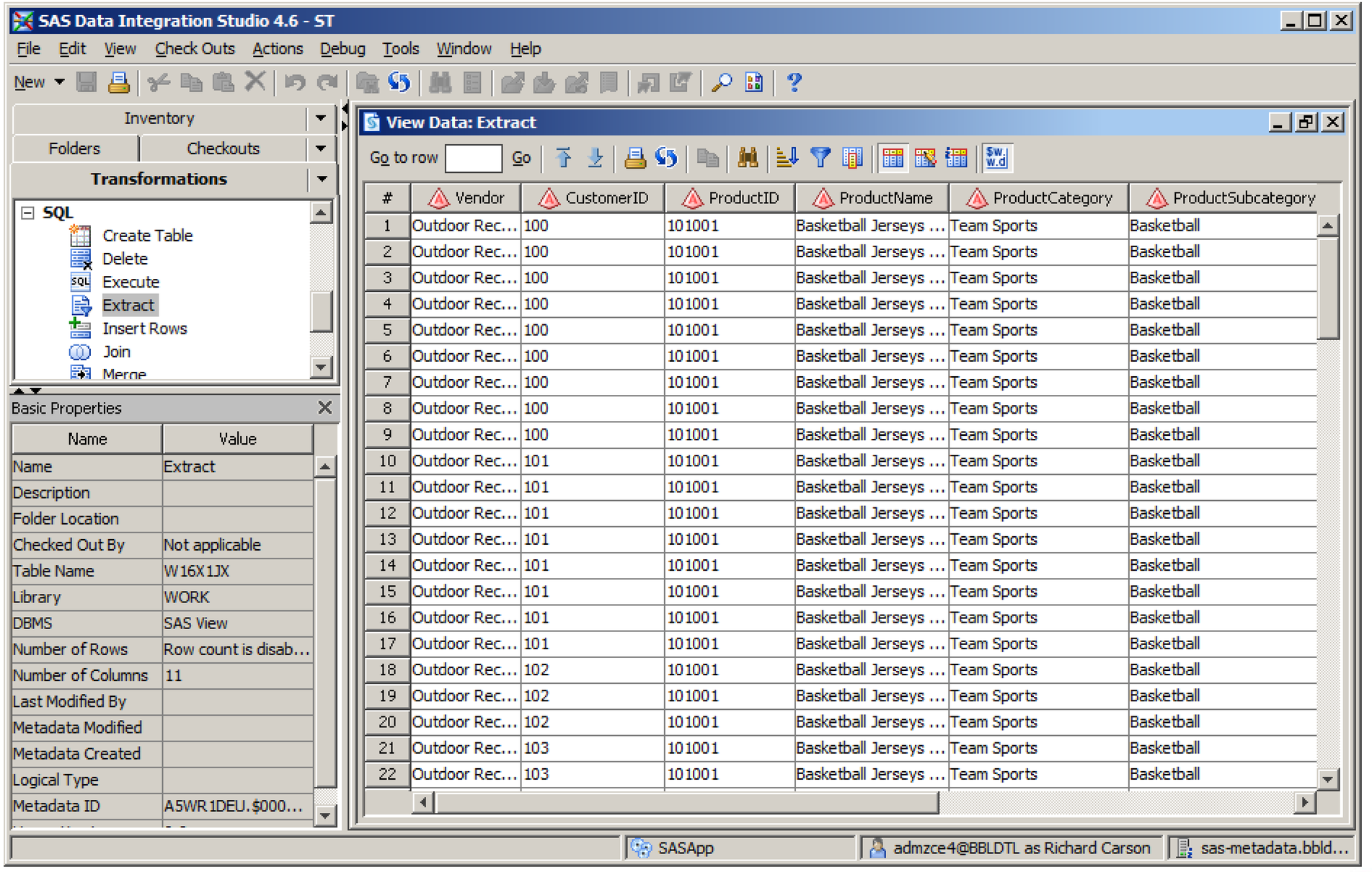
Bendigo and Adelaide Bank



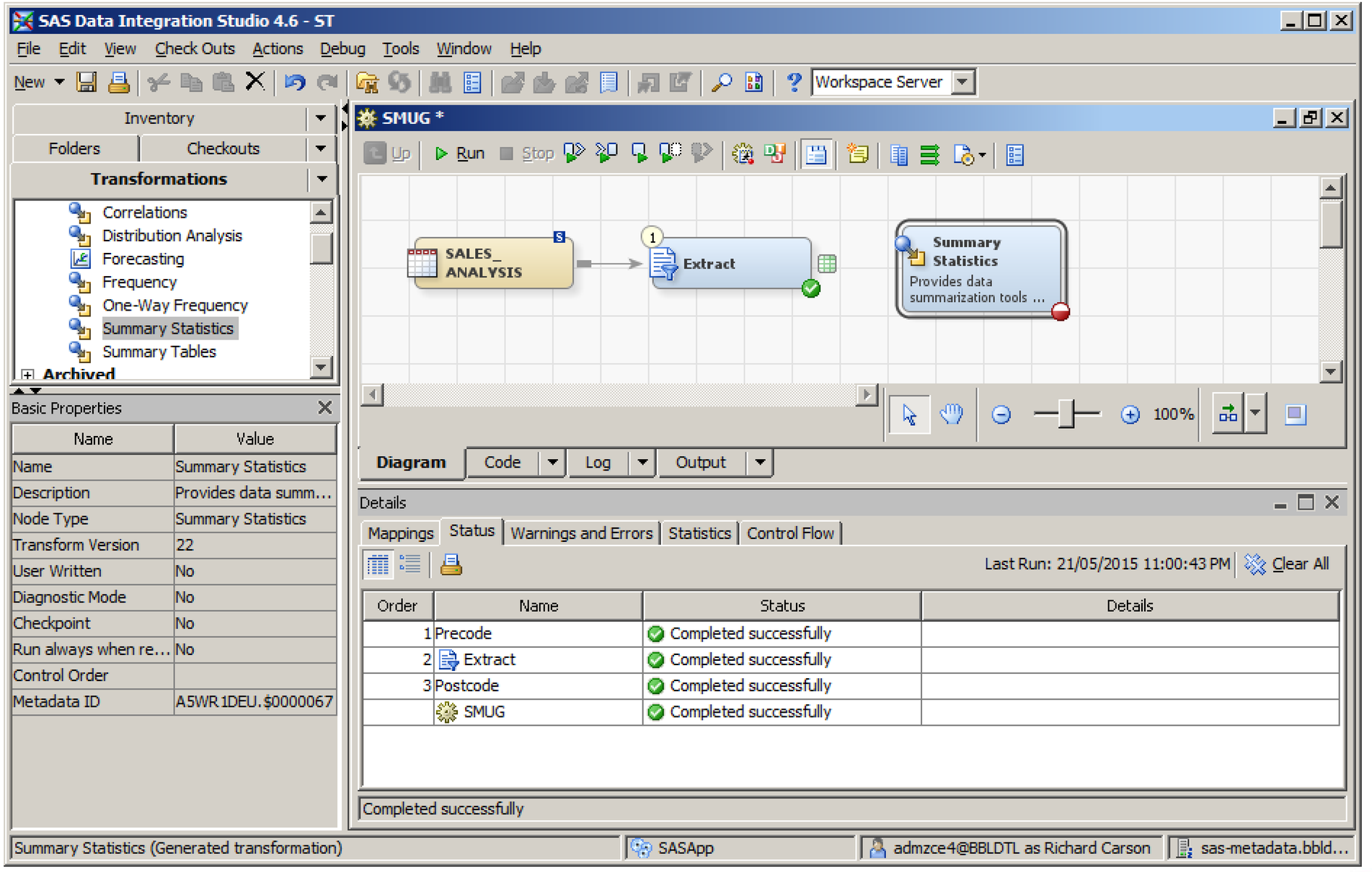
Bendigo and Adelaide Bank



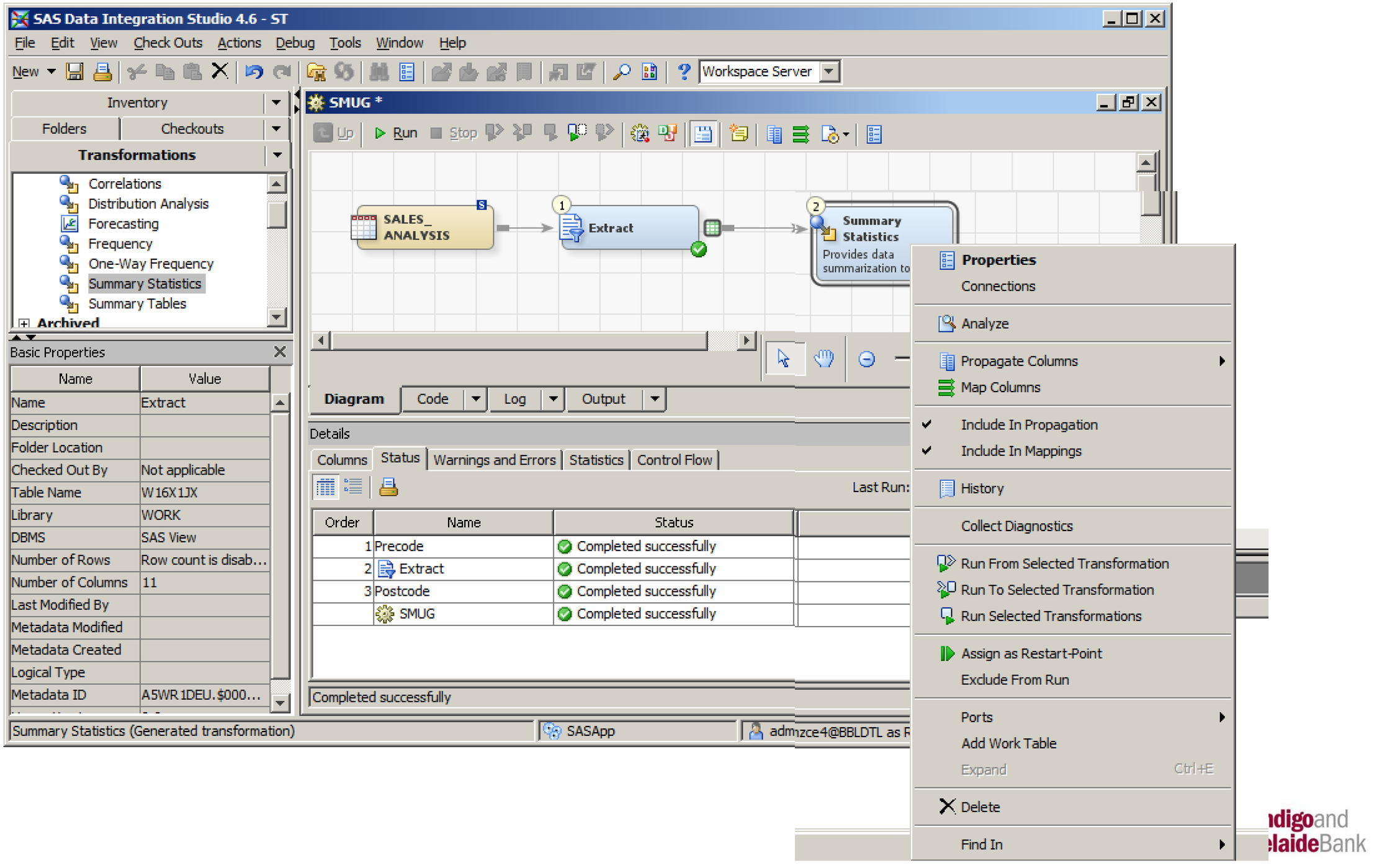
Bendigo and Adelaide Bank

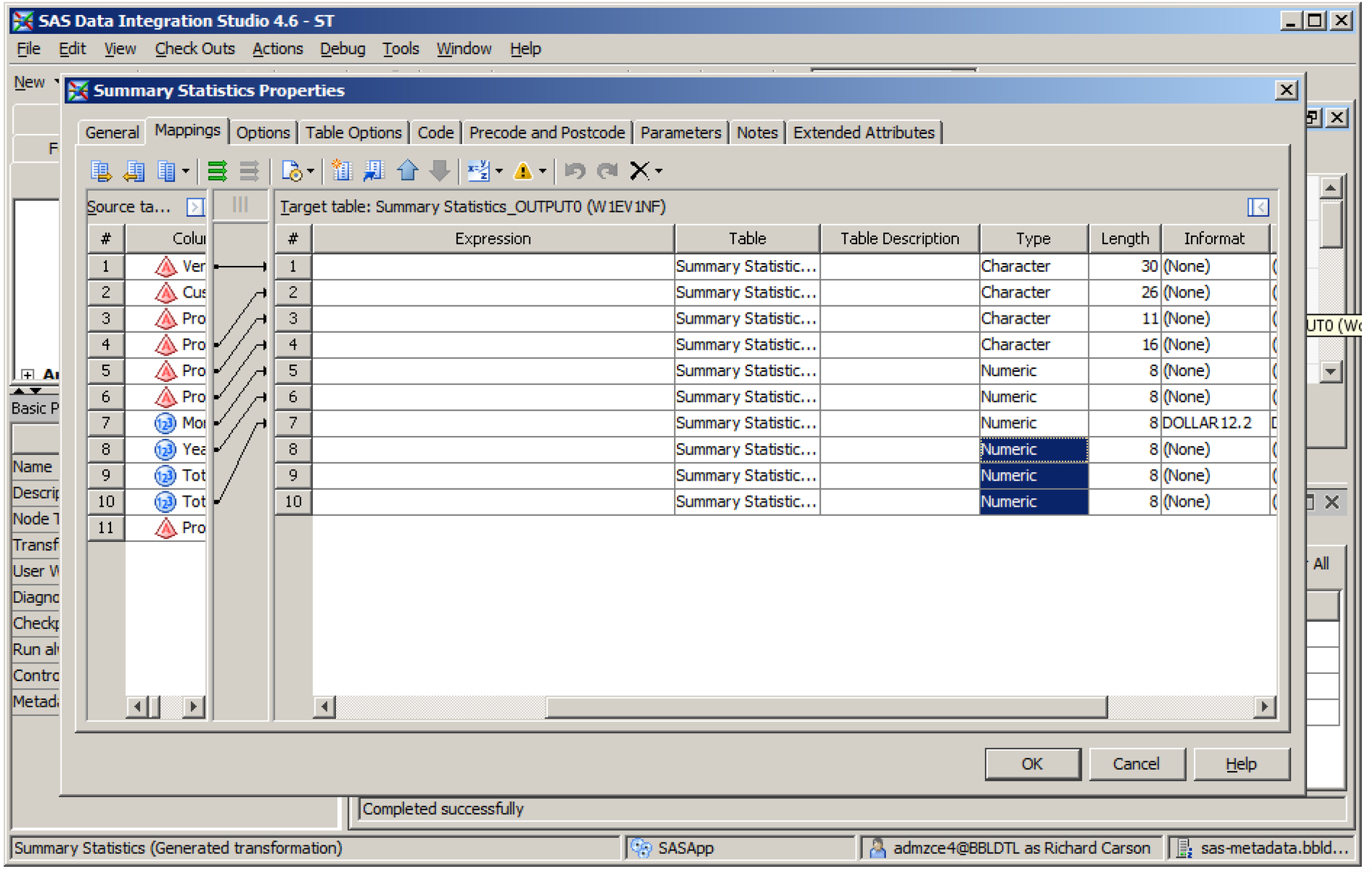


Bendigo and Adelaide Bank

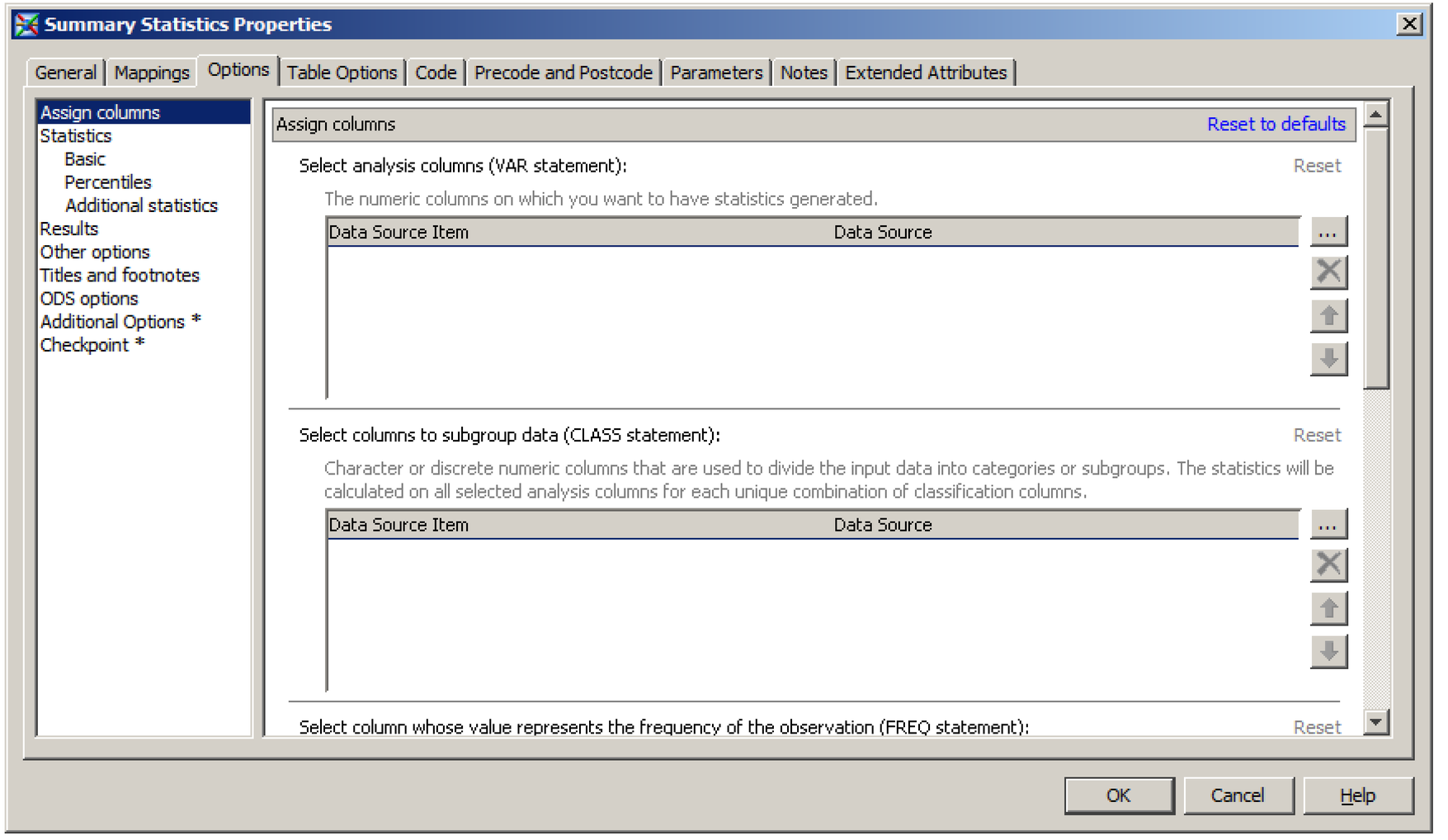


Bendigo and Adelaide Bank

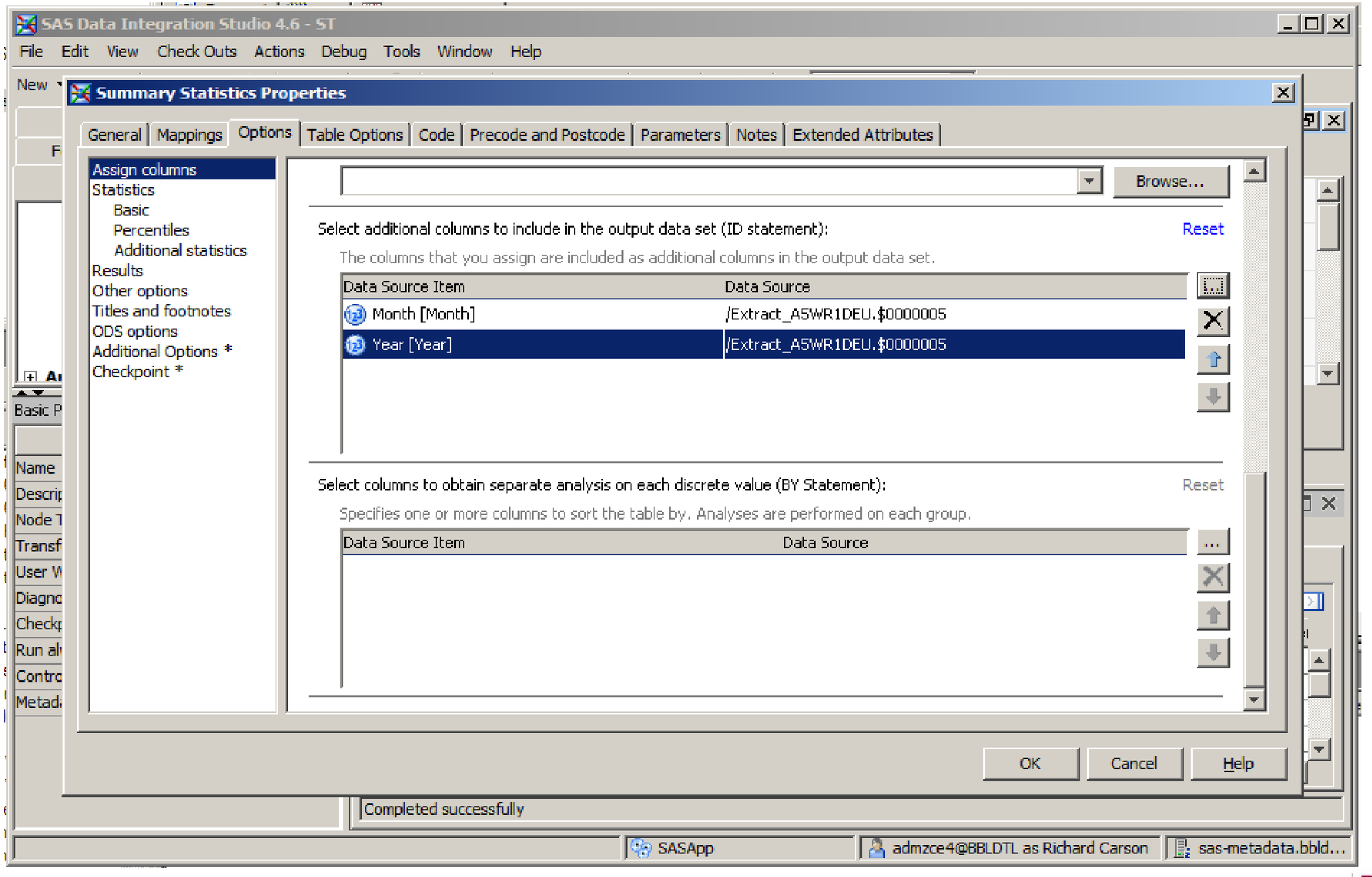

SAS Data Integration Studio 4.6 - ST
File Edit View Check Outs Actions Debug Tools Window Help
New
Workspace Server
Inventory
Folders
Checkouts
Transformations
Correlations
Distribution Analysis
Forecasting
Frequency
One-Way Frequency
Summary Statistics
Summary Tables
Archived
Basic Properties
Name
Value
Name
Extract
Description
Folder Location
Checked Out By
Not applicable
Table Name
W16X1JX
Library
WORK
DBMS
SAS View
Number of Rows
Row count is disab...
Number of Columns
11
Last Modified By
Metadata Modified
Metadata Created
Logical Type
Metadata ID
A5WR1DEU.$000...
SMUG *
Up
Run
Stop
SALES_ ANALYSIS
Extract
Summary Statistics
Provides data summarization to
Diagram
Code
Log
Output
Details
Columns
Status
Warnings and Errors
Statistics
Control Flow
Last Run:
Order
Name
Status
1 Precode
Completed successfully
2 Extract
Completed successfully
3 Postcode
Completed successfully
SMUG
Completed successfully
Completed successfully
Summary Statistics (Generated transformation)
SASApp
Properties
Connections
Analyze
Propagate Columns
Map Columns
Include In Propagation
Include In Mappings
History
Collect Diagnostics
Run From Selected Transformation
Run To Selected Transformation
Run Selected Transformations
Assign as Restart-Point
Exclude From Run
Ports
Add Work Table
Expand
Ctrl+E
Delete
Find In



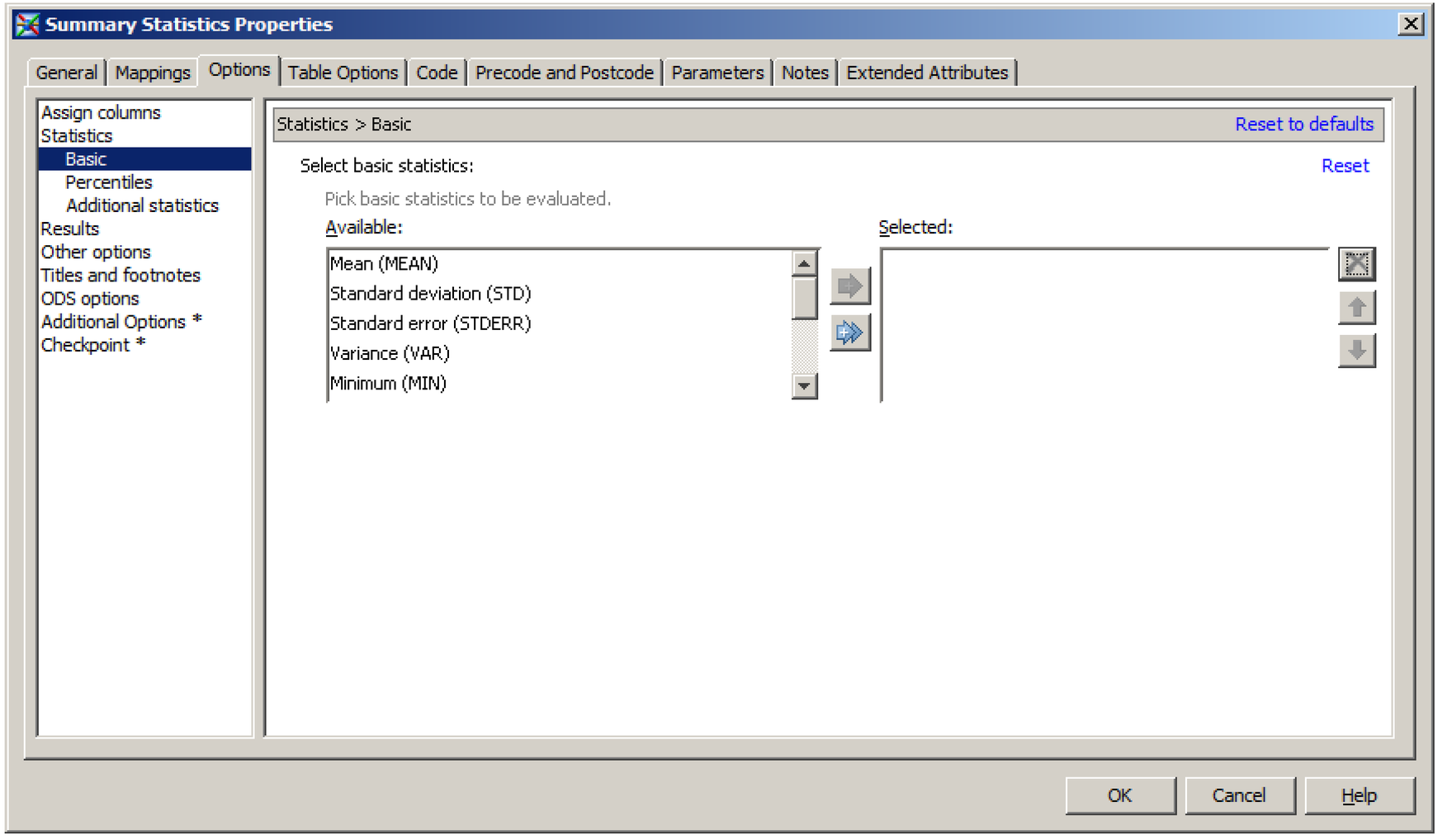
Bendigo and Adelaide Bank



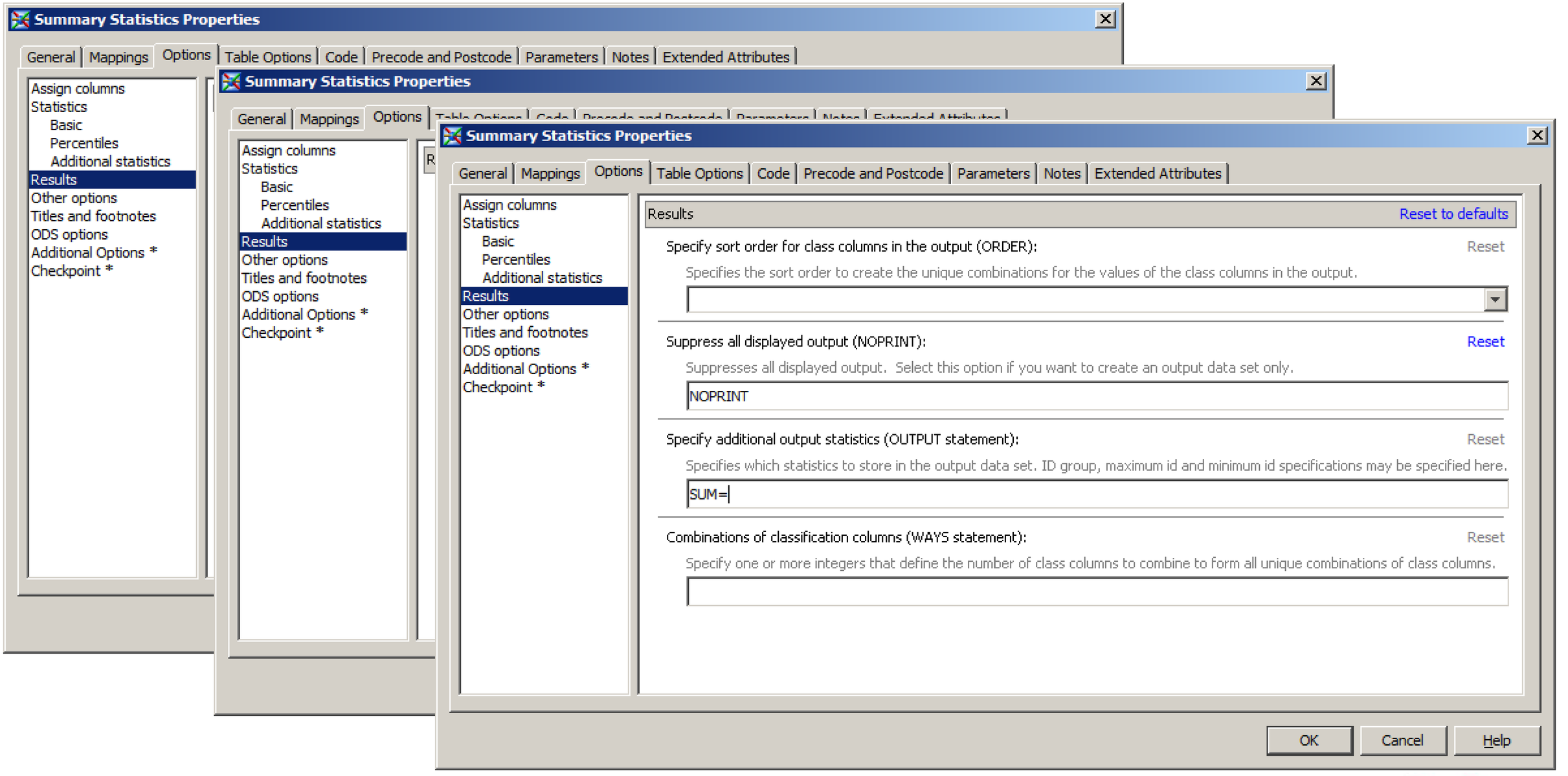
Bendigo and Adelaide Bank



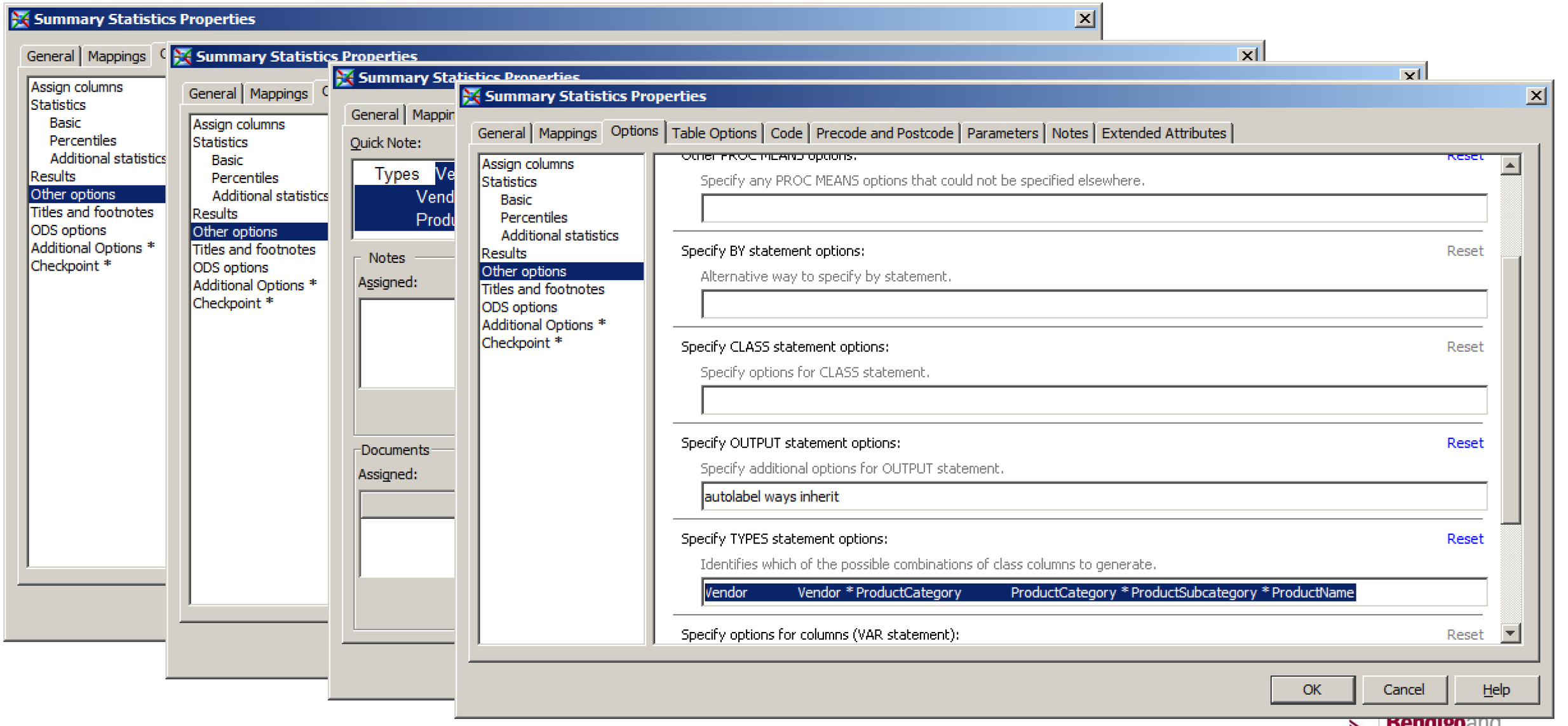
Bendigo and Adelaide Bank

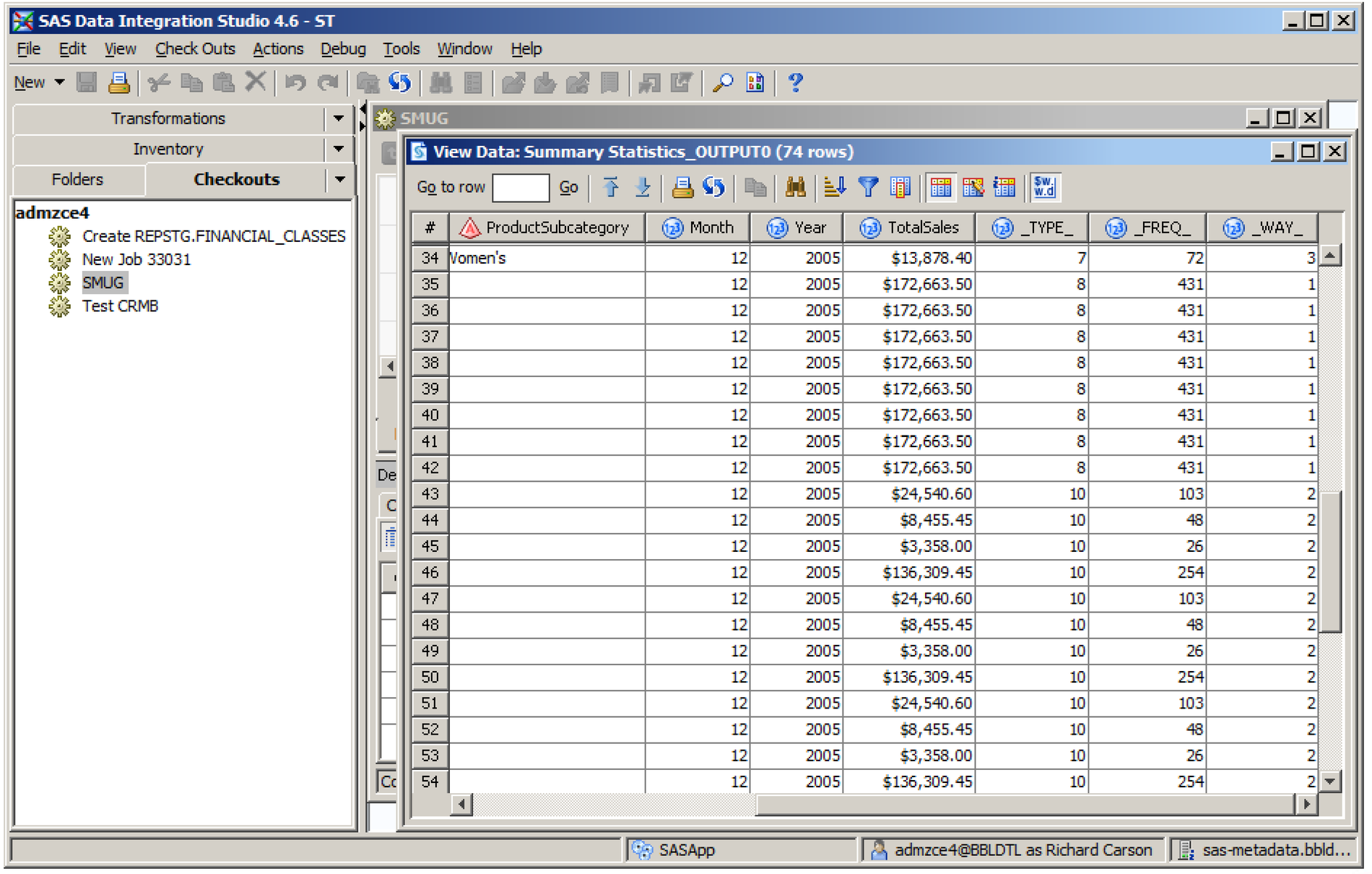


Bendigo and Adelaide Bank



Bendigo and Adelaide Bank


Summary Statistics Properties
General
Mappings
Options
Table Options
Code
Precode and Postcode
Parameters
Notes
Extended Attributes
Assign columns
Statistics
Basic
Percentiles
Additional statistics
Results
Other options
Titles and footnotes
ODS options
Additional Options *
Checkpoint *
Specify any PROC MEANS options that could not be specified elsewhere.
Specify BY statement options:
Reset
Alternative way to specify by statement.
Specify CLASS statement options:
Specify options for CLASS statement.
Specify OUTPUT statement options:
Specify additional options for OUTPUT statement.
autolabel ways inherit
Specify TYPES statement options:
Identifies which of the possible combinations of class columns to generate.
Vendor
Vendor * ProductCategory
ProductCategory * ProductSubcategory * ProductName
Specify options for columns (VAR statement):
Quick Note:
Notes
Assigned:
Documents
Assigned:
OK
Cancel
Help



#	ProductSubcategory	Month	Year	TotalSales	_TYPE_	_FREQ_	_WAY_
34	Women's	12	2005	$13,878.40	7	72	3
35		12	2005	$172,663.50	8	431	1
36		12	2005	$172,663.50	8	431	1
37		12	2005	$172,663.50	8	431	1
38		12	2005	$172,663.50	8	431	1
39		12	2005	$172,663.50	8	431	1
40		12	2005	$172,663.50	8	431	1
41		12	2005	$172,663.50	8	431	1
42		12	2005	$172,663.50	8	431	1
43		12	2005	$24,540.60	10	103	2
44		12	2005	$8,455.45	10	48	2
45		12	2005	$3,358.00	10	26	2
46		12	2005	$136,309.45	10	254	2
47		12	2005	$24,540.60	10	103	2
48		12	2005	$8,455.45	10	48	2
49		12	2005	$3,358.00	10	26	2
50		12	2005	$136,309.45	10	254	2
51		12	2005	$24,540.60	10	103	2
52		12	2005	$8,455.45	10	48	2
53		12	2005	$3,358.00	10	26	2
54		12	2005	$136,309.45	10	254	2

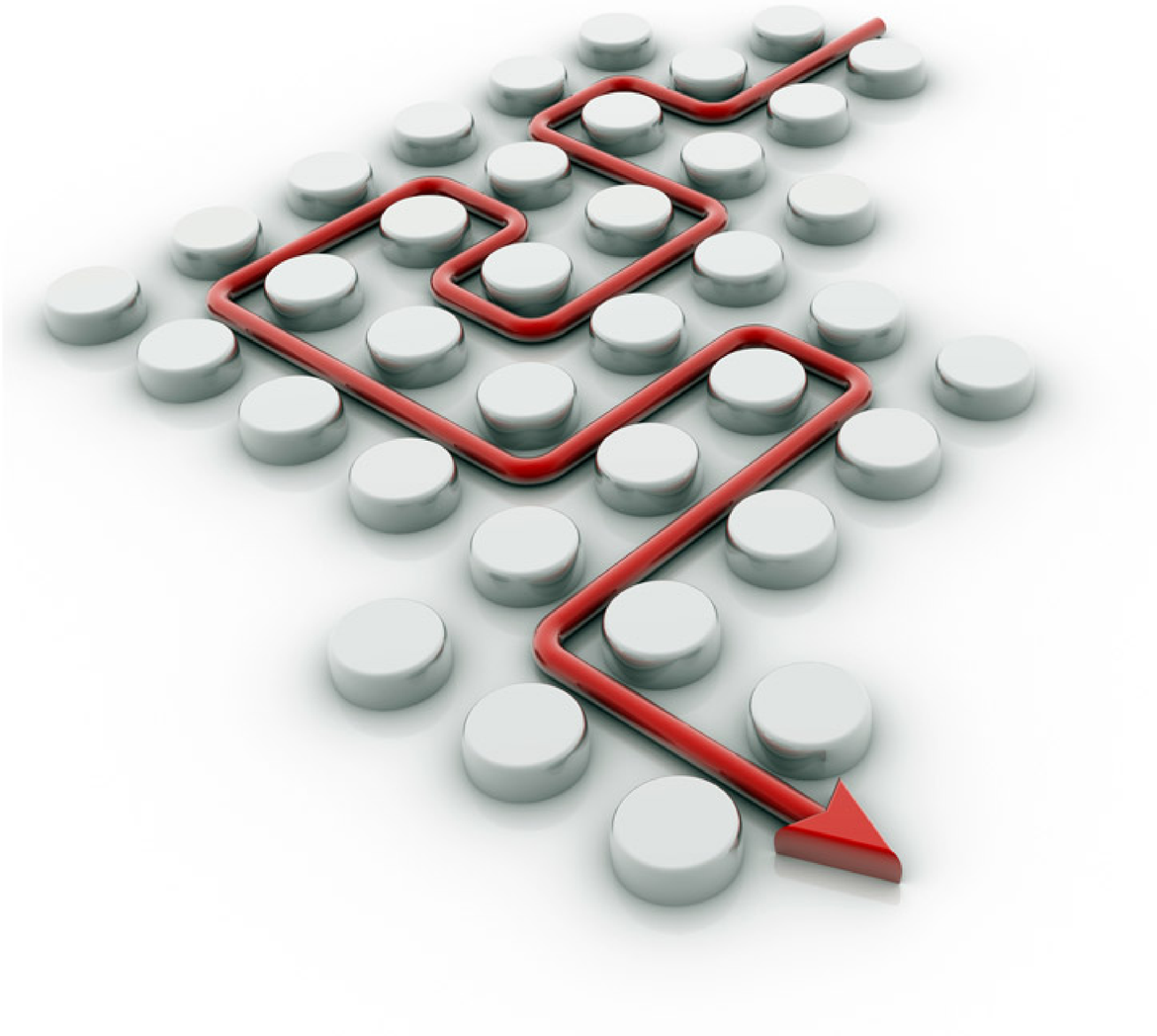
Bendigo and Adelaide Bank

Summary Statistics in DI Studio:

1. **Turn of Propagation**
2. **Add work table for output**
3. Propagate class, id, by and analysis (var) variables from source to output
4. Add _TYPE_, _FREQ_ and _WAY_ as required to output table columns
5. Under Options, Assign columns: add as required for VAR, CLASS, ID and BY variables
6. Statistics: Basic – **delete all**
7. Results: specify NOPRINT and SUM= (in the OUTPUT options)
8. Other options: delete print specs and **autoname** option from OUTPUT options
9. Create a note containing the TYPES specification, and copy into the TYPES statement options

You’re now good to go

Bendigo and Adelaide Bank



Bridging the Gap

Between SAS Credit Risk Management for Banking and APRA regulatory reporting

Richard Carson
Senior SAS Designer

SMUG meeting – Big Data Analytics

Felix Liao
Business Solutions Manager
SAS Australia/New Zealand

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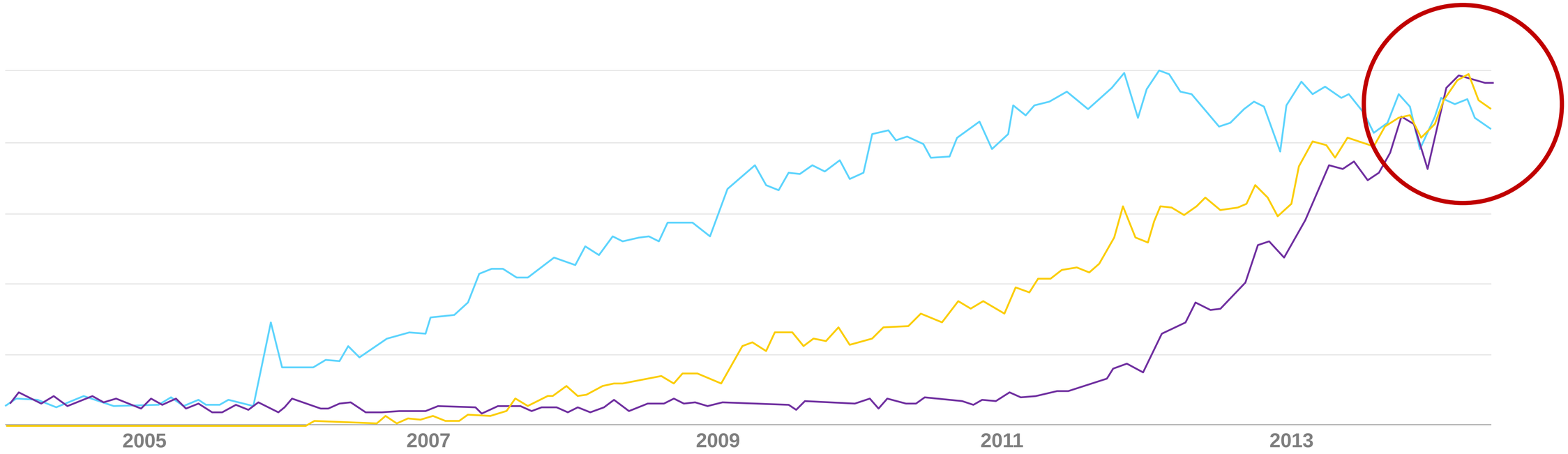
Big Data Analytics

WHERE WE ARE NOW

Google trends



BIG DATA

Lots of data

HADOOP

Processing Power

ANALYTICS

Accurate /Decisions

sas THE POWER TO KNOW.

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COMPUTERWORLDUK
THE VOICE OF IT MANAGEMENT

British Airways' BI lead: 'If you don't adopt Hadoop at least in part, you won't exist in a few years' time'

British Airways cuts memory costs and sees ROI within one year after deploying Hadoop

By Margi Murphy | Computerworld UK | Published 15:55, 15 April 15

0 14 2 2 103

Enterprise business intelligence departments will 'not exist in a few years' time' if they do not adopt Hadoop in at least one instance, British Airways' data exploitation manager warned during the Hadoop Summit in Brussels today.

Also in this channel

News

In Depth

SAS and Hadoop – The big Picture

SAS and Hadoop are made for each other

SAS and Hadoop will help you answer bigger questions

SAS is making it easy for our users to leverage Hadoop

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What is Hadoop ?

- An Apache Software Foundation project
  - Open-source
  - Origins in early 2000s with contributions from Google, Yahoo! and Facebook
- Framework/Ecosystem of tools for processing Big Data

1. Hadoop Common: The common utilities that support the other Hadoop subprojects
2. Hadoop Distributed File System (HDFS): A distributed file system that provides high –througput access to application data
3. Hadoop MapReduce/YARN: A software framework for distributed processing of large data sets on compute clusters

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Idea #1 - HDFS. Never forgets!

Head Node	Node 1	Node 2	Node 3	Node 4…
MYFILE.TXT				
..block1 ->	block1copy1			
..block2 ->		block2copy2		
..block3 ->			block3copy3	

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Idea #1 - HDFS. Never forgets!

Head Node	Node 1	Node 2	Node 3	Node 4…
MYFILE.TXT				
..block1 ->	block1copy1		block1copy2	
..block2 ->		block2copy2		block2copy2
..block3 ->	block3copy2		block3copy3	

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Idea #1 - HDFS. Never forgets!

Head Node	Node 1	Node 2	Node 3	Node 4…
MYFILE.TXT				
..block1 ->	block1copy1		block3copy2	
..block2 ->		block2copy2		block2copy2
..block3 ->	block3copy2		block3copy3	

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Idea #2 - MapReduce

- We Want the Minimum Age in the Room

- Each Row in the audience is a data node
- I'll be the coordinator
  - From outside to center, accumulate MIN
  - Sweep from back to front. Youngest Advances

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SAS® Within the HADOOP ECOSYSTEM

SAS® User

Next-Gen SAS® User

User Interface

SAS® Data Loader for Hadoop | SAS® Data Integration | SAS® Enterprise Miner™ | SAS® Visual Analytics | SAS® In-Memory Statistics for Hadoop

Metadata

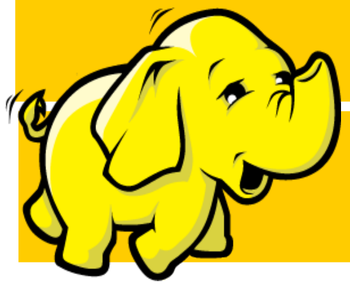
SAS Metadata

Data Access

Base SAS & SAS/ACCESS® to Hadoop™ | In-Memory Data Access

Data Processing

Pig | **Hive** | SAS Embedded Process | SAS® LASR™ Analytic Server | SAS® High-Performance Analytic Procedures



Map Reduce/YARN

File System

HDFS

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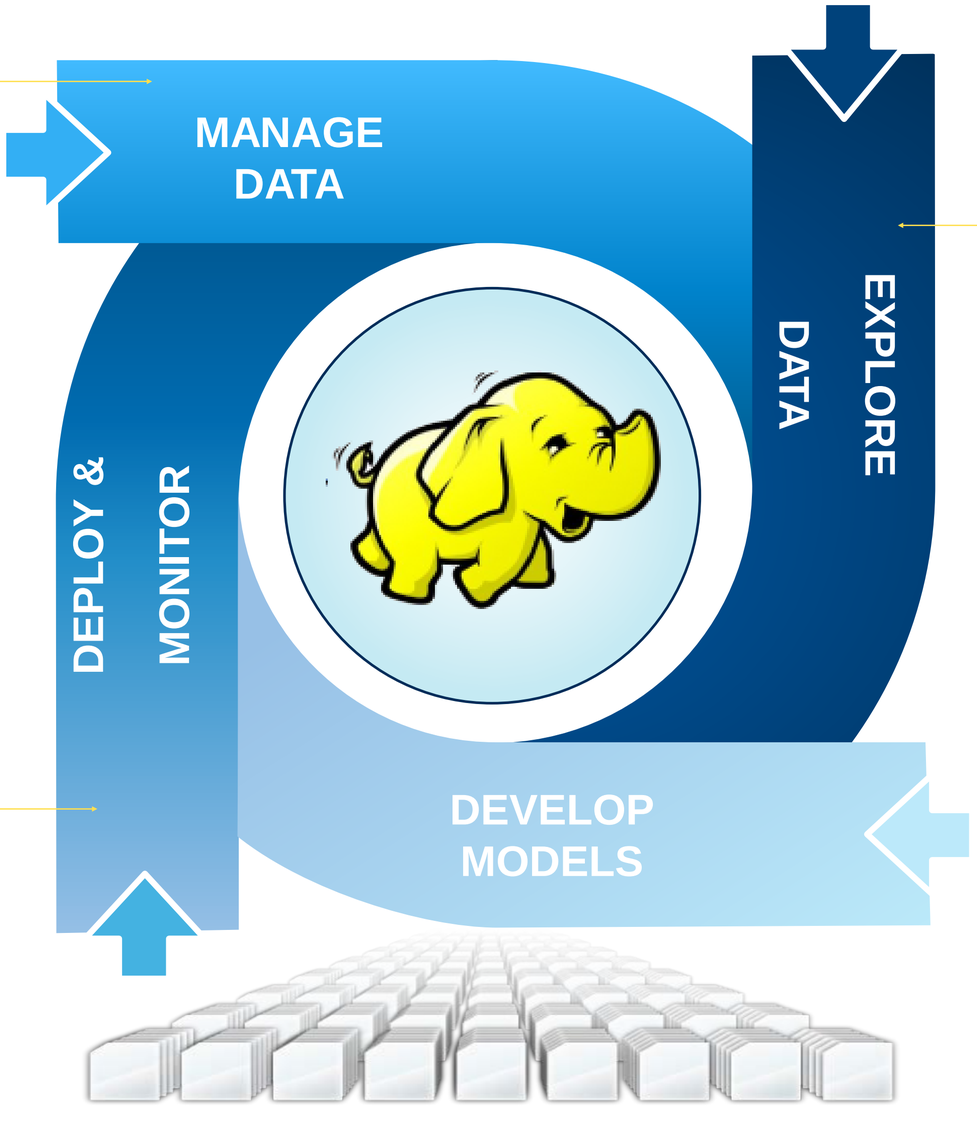
DATA TO DECISION LIFECYCLE on Hadoop

- SAS/ACCESS (Hadoop/Impala)
- SAS Data Management
- SAS Federation Server
- SAS Data Quality Accelerator for Hadoop
- SAS Code Accelerator for Hadoop
- SAS Data Loader for Hadoop



- SAS Visual Analytics
- SAS In-memory Statistics for Hadoop

- Model Manager
- SAS Scoring Accelerator for Hadoop

- SAS HPA Products
- *SAS Visual Statistics*
- SAS In-memory Statistics for Hadoop

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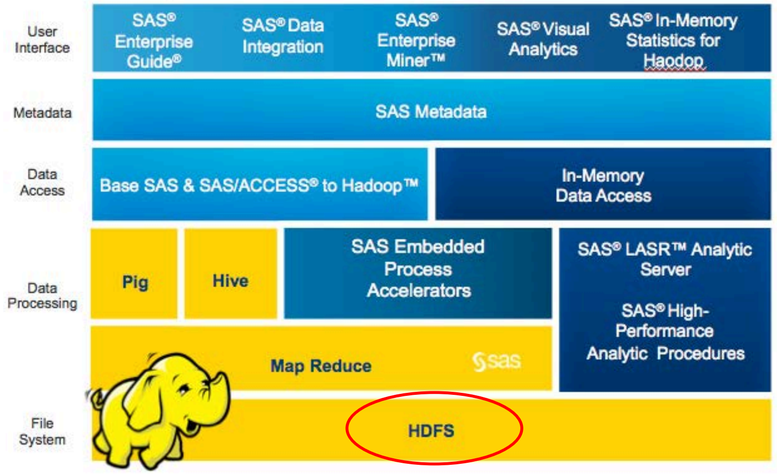
MANAGE DATA READ/WRITE TO HDFS




```
/*
Create directory on HDFS
*/
filename cfg "C:\Sample_Data\hadoop_config.xml";
proc hadoop options=cfg username="hadoop" password="hadoop";
     hdfs mkdir="/user/hadoop/testfolder" ;
run;
/*
Copy file from local SAS to HDFS
*/
filename cfg "C:\Sample_Data\hadoop_config.xml";
proc hadoop options=cfg username="hadoop" password="hadoop";
     hdfs copyfromlocal="C:\Sample_data\dept.txt" out="/user/hadoop/testfolder/";
run;
/*
Copy file from HDFS to local SAS
*/
filename cfg "C:\Sample_Data\hadoop_config.xml";
proc hadoop options=cfg username="hadoop" password="hadoop";
     hdfs copytolocal="/user/hadoop/testfolder" out="C:\Sample_data\" ;
run;
```

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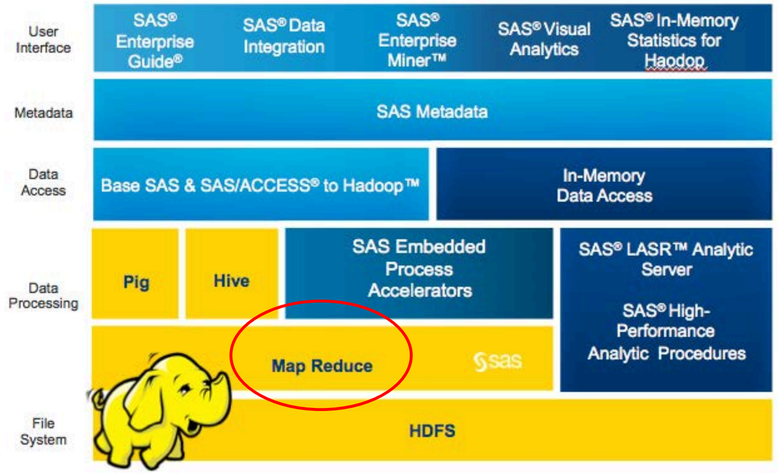
MANAGE DATA **MAPREDUCE**




```
/*
Invoke MapReduce Word Count program
*/
filename cfg "C:\Sample_Data\hadoop_config.xml";
proc hadoop options=cfg username="hadoop" password="hadoop" verbose;
hdfs delete="/user/hadoop/output_MR1";
     mapreduce
     input="/user/hadoop/gutenberg“ output="/user/hadoop/output_MR1"
     jar="C:\Sample_data\hadoop-examples-2.0.0-mr1-cdh4.1.2.jar"
     outputkey="org.apache.hadoop.io.Text"
     outputvalue="org.apache.hadoop.io.IntWritable"
     reduce="org.apache.hadoop.examples.WordCount$IntSumReducer"
     combine="org.apache.hadoop.examples.WordCount$IntSumReducer"
     map="org.apache.hadoop.examples.WordCount$TokenizerMapper"
     reducetasks=0
      ;
run;
```

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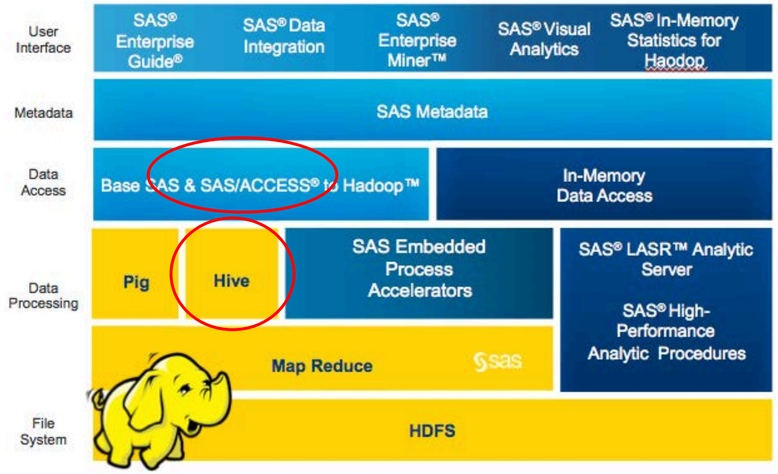
MANAGE DATA **SAS/ACCESS**



- Base SAS Procedures executed in-database for Hadoop
  - `FREQ, REPORT, SORT, SUMMARY/MEANS, TABULATE`
- Supported Hadoop distributions & combinations*
  - Cloudera CDH 5.0 running Hive/Hive2
  - Hortonworks HDP 2.0 running HiveServer2
  - IBM InfoSphere BigInsights 2.1 running Hive
  - MapR M5 2.0.1 running Hive
  - Pivotal/Greenplum HD running Hive
  - Pivotal/Greenplum MR 2.0.1 running Hive

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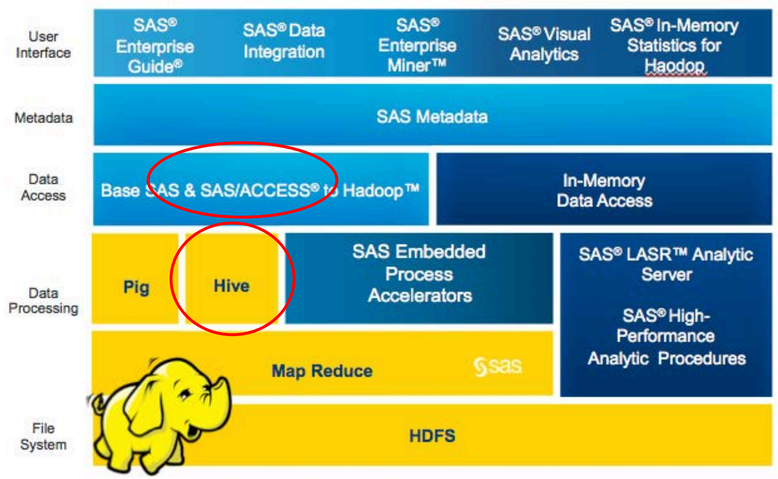
MANAGE DATA **SAS/ACCESS**




```
LIBNAME cdh_hdp HADOOP  PORT=10000 SERVER=sascldserv02 user=hadoop
password=hadoop ;
/*
Create new table
*/
proc sql;
connect to hadoop(PORT=10000 SERVER=sascldserv02  USER=hadoop
PASSWORD="hadoop");
exec( create table cars_prc (make string,  model string,  msrp double) ) by
hadoop;
quit;

/*
Copy from another table
*/
proc sql;
  insert into cdh_hdp.cars_prc
  select make, model, msrp
  from sashelp.cars ;
quit;
/*
List contents
*/
proc sql;
select * from cdh_hdp.cars_prc;
quit;
```

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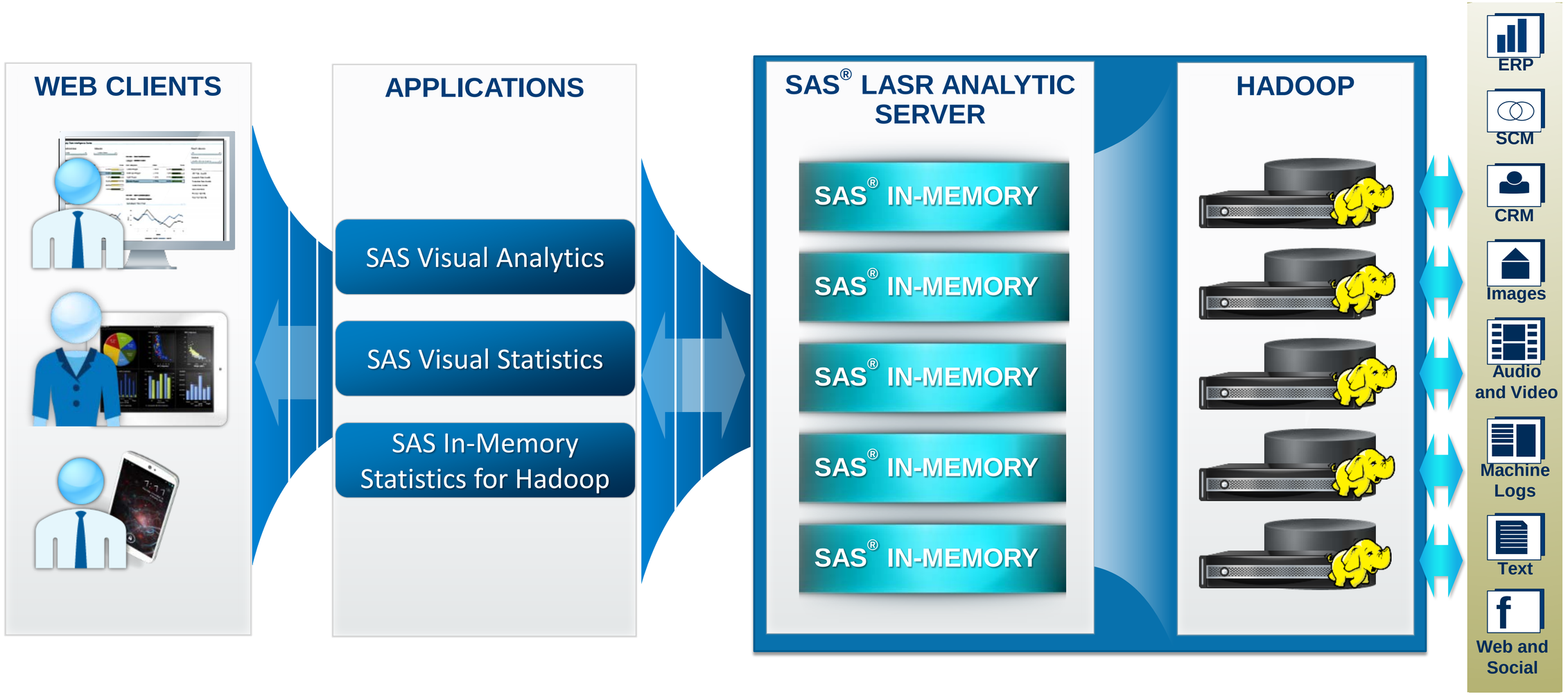
DATA DISCOVERY/VISUALISATION

SAS IN-MEMORY ANALYTICS

In-memory processing; use Hadoop for storage persistence and commodity computing



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MODEL DEVELOPMENT

SAS HIGH PERFORMANCE ANALYTICS

High-Performance Statistics

- HPLOGISTIC
- HPREG
- HPLMIXED
- HPNLMOD
- HPSPLIT
- HPGENSELECT
- HPFMM
- HPCANDISC
- HPPRINCOMP
- HPPLS
- HPQUANTSELECT

High-Performance Data Mining[1]

- HPREDUCE
- HPNEURAL
- HPFOREST
- HP4SCORE
- HPDECIDE
- HPCLUS
- HPSVM
- HPBNET
- HPTSDR

High-Performance Text Mining

- HPTMINE
- HPTMSCORE

High-Performance Optimization

- OPTLSO
- Select features in
  - OPTMILP
  - OPTLP
  - OPTMODEL
  - OPTGRAPH

High-Performance Econometrics

- HPCOUNTREG
- HPSEVERITY
- HPQLIM
- HPPANEL
- HPCOPULA
- HPCDM

Common Set (HPDS2, HP DMDB, HPSAMPLE, HPSUMMARY, HPIMPUTE, HPBIN, HPCORR)#

[1]Includes SAS High-Performance Statistics

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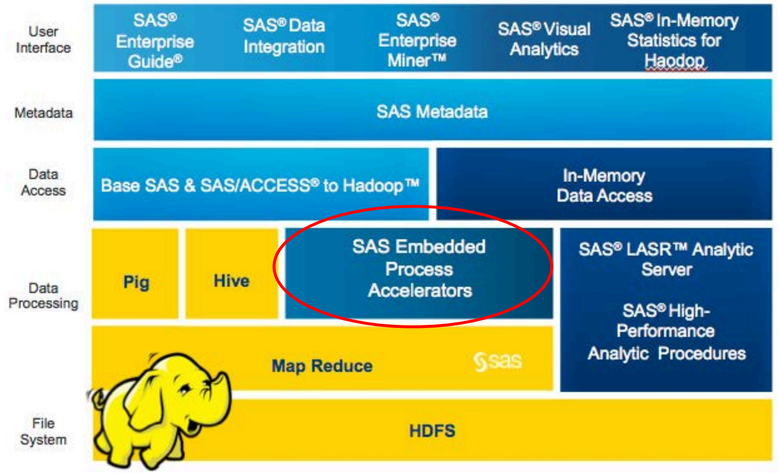
DEPLOY & MONITOR SAS SCORING ACCELERATOR FOR HADOOP



- Publish SAS® Enterprise Miner™ models or SAS/STAT linear models inside the Hadoop
- Fully integrated with SAS® Model Manager to streamline registration, validation and performance monitoring
- Reduced data movement and improve data governance by streamlining model deployment processes within Hadoop

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THANK YOU!

4 short years and…

- Hadoop is on the opening session, 2 Hadoop leaders's share the panel discussion at Exec Track
  - 50% of the people attending an executive conference talk have an active Hadoop project
- SAS has built a family of applications that take full advantage of Hadoop as an analytics platform

For more Information: http://www.sas.com/hadoop

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felixliao

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QUESTIONS?

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AUSTRALIA & NZ 2015

TECHNOLOGY ROADSHOW

October 2015

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sas THE POWER TO KNOW.

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ROADSHOW DATES & LOCATIONS

Dates	Locations
Fri, 16 Oct	Perth
Tue, 20 Oct	Melbourne
Thu, 22 Oct	Canberra
Tue, 27 Oct	Brisbane
Fri, 30 Oct	Sydney

SAS FORUM AUSTRALIA & NZ 2015

DRAFT AGENDA OUTLINE

8:00AM	Registration				Discovery Area
9:00AM	Plenary				
10:30AM	Morning Tea				
Stream	**Stream #1**	**Stream #2**	**Stream #3**	**Stream #4**	
11:00AM	Presentation #1	Presentation #1	Presentation #1	HOWs #1	
11:45AM	Presentation #2	Presentation #2	Presentation #2	HOWs #2	
12:25PM	Networking Lunch				
1:35PM	Presentation #3	Presentation #3	Presentation #3	HOWs #3	
2:20PM	Presentation #4	Presentation #4	Presentation #4	HOWs #4	
3:00PM	Afternoon Tea				
3:30PM	Presentation #5	Presentation #5	Presentation #5	HOWs #5	
4:15PM	Presentation #6	Presentation #6	Presentation #6	HOWs #6	
4:55PM	Closing with Networking Drinks				

Status: *To be reviewed & approved*

Presentation duration - 40mins

SAS FORUM AUSTRALIA & NZ 2015

EXAMPLE TOPICS AREAS

- What's new in SAS® Visual Analytics 7.2
- Tips from the Techies
- SAS Certification preparation session
- SAS® Text Analytics - How to get the most out of your unstructured data
- R - Integrating your open source into your eco-system
- SAS® Visual Statistics - Interactive predictive modelling and visualisation
- Machine learning – It's not new to SAS
- Best practice on SAS Migration
- Introducing SAS Studio – New programmers interface
- What's New in SAS® Enterprise Guide
- Big data governance
- Convergence of data prep, analytical processing

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CALL FOR SPEAKERS

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Selected speakers will:

- Receive complimentary registration at the event
- Receive professional presentation coaching session with a 3rd party provider
- Have their return flights and accommodation arranged and funded by SAS (pending probity restrictions within government agencies)

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INTERESTED IN CALL FOR SPEAKERS?

Make sure you contact Hanlie Myburgh on hanlie.myburgh@sas.com to find out more

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WATCH THIS SPACE!

www.sasforum.com/anz

felix.liao@sas.com

@felixliao

felixliao

Thank You!

http://www.sas.com/au/sashadoop

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SAS LIVE WEB TRAINING

BRENDAN KIELY
EDUCATION ACCOUNT MANAGER
SOUTHERN REGION

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CURRENT SAS TRAINING DELIVERY METHODS

Public Classes

Private Classes

Mentoring

e-Learning

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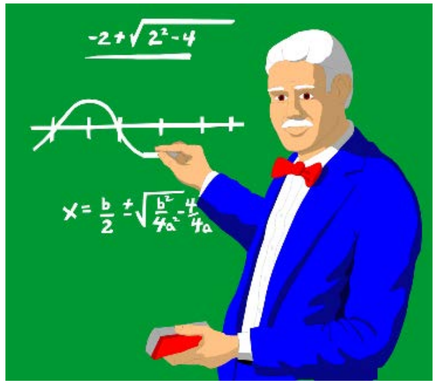
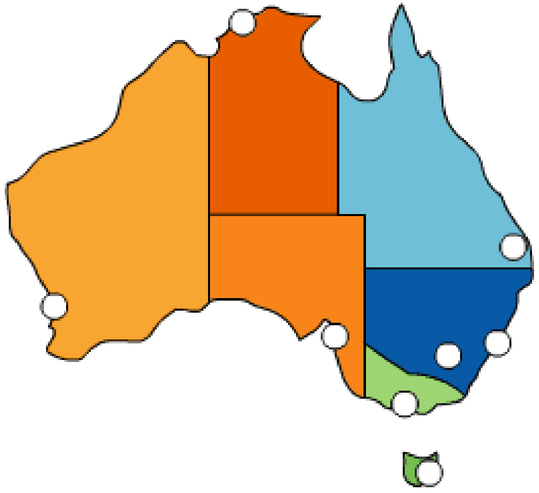
WHAT IF?

Course is not scheduled locally?

Specialist trainer located overseas?



Training is required by people in different locations?



Can’t afford to spend all day out of the office?

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brendan.kiely@sas.com

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QUESTIONS FOR THE PRESENTERS?

Q & A

SMUG

SAS Melbourne User Group

THANK YOU

FOR YOUR ATTENDANCE

DON'T FORGET TO COMPLETE THE EVALUATION SURVEY

Please join us outside for Refreshments & Networking