

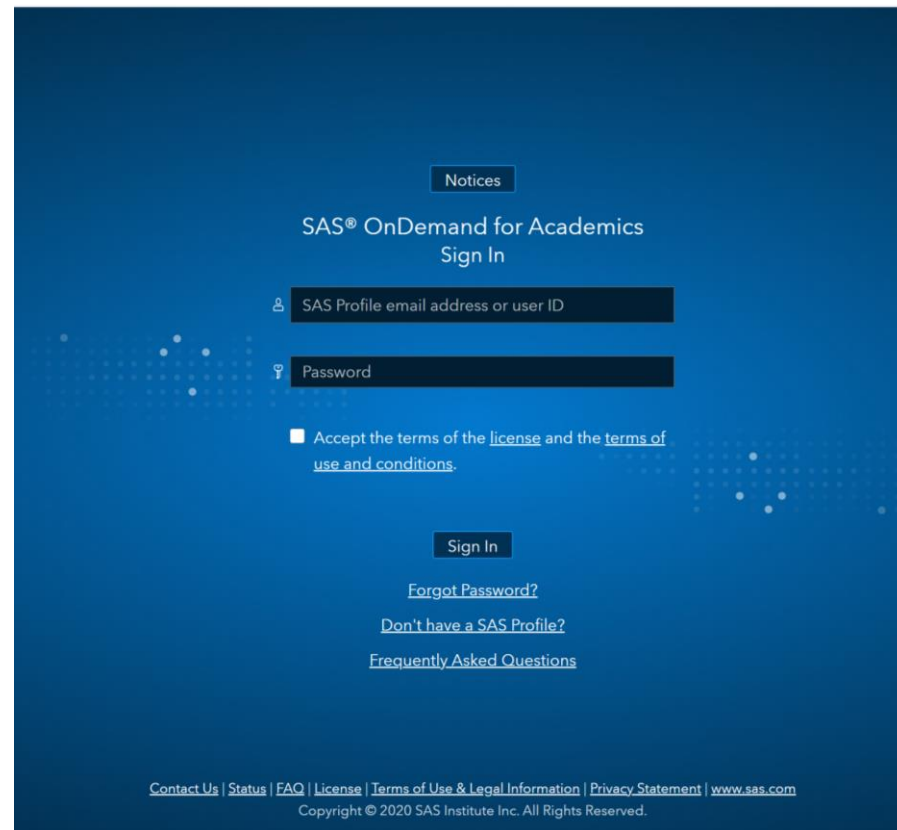
ANLT5050

Unit 6 Assignment 1 Tutorial



Access the SAS OnDemand for Academics Control Center

<https://odamid.oda.sas.com/SASODAControlCenter>



The screenshot shows the SAS OnDemand for Academics Sign In page. The background is a dark blue gradient with a subtle pattern of white dots. At the top, there is a 'Notices' button. Below it, the text 'SAS® OnDemand for Academics' and 'Sign In' are displayed. The sign-in form includes two input fields: 'SAS Profile email address or user ID' and 'Password'. Below the password field is a checkbox labeled 'Accept the terms of the [license](#) and the [terms of use and conditions](#)'. A 'Sign In' button is positioned below the checkbox. At the bottom of the form, there are three links: 'Forgot Password?', 'Don't have a SAS Profile?', and 'Frequently Asked Questions'. The footer contains a row of links: 'Contact Us', 'Status', 'FAQ', 'License', 'Terms of Use & Legal Information', 'Privacy Statement', and 'www.sas.com', followed by the copyright notice 'Copyright © 2020 SAS Institute Inc. All Rights Reserved.'



SAS OnDemand for Academics (SODA) Control Center

The screenshot displays the SAS OnDemand for Academics (SODA) Control Center dashboard. At the top left is the SAS logo. At the top right, it shows the location as 'United States' and the user as 'Stefanie Reay'. The main heading is 'SAS® OnDemand for Academics Dashboard'. Below this are two buttons: 'Planned Events' and 'Notices'. A navigation bar contains three tabs: 'Applications', 'Enrollments', and 'Courses'. The 'Applications' tab is active, showing a list of SAS applications with icons, names, descriptions, and actions. The 'Reference' section on the right includes links to the 'Support Site', 'Step-by-Step Reference Guides', and 'Frequently Asked Questions'. Below this is the 'Quotas' section, which shows progress bars for 'Home Directory' (1% of 46.5MB/5120MB) and 'Course Directory' (7% of 207.0MB/3072MB). At the bottom, there is a link to 'Other Ways to Access SAS® OnDemand for Academics Resources'.

SAS® OnDemand for Academics Dashboard

Planned Events Notices

Applications Enrollments Courses

SAS® Studio
Write and run SAS code with a Web-based SAS development environment.
Actions: [Clear my saved tabs.](#)

SAS® Enterprise Guide®
Deliver the power of SAS from an easy-to-use, point-and-click interface. ([Download Required](#))

SAS® Enterprise Miner™
Reveal valuable insights with powerful data mining software. ([Configuration Steps Required](#))
Actions: [Clear my project locks.](#)

SAS® Forecast Studio
Generate large numbers of high-quality forecasts automatically. ([Configuration Steps Required](#))
Actions: [Manage your personal environment.](#)

JMP® Software access to SAS® hosted servers
Statistical discovery software. Users must have a copy of JMP® software. ([Configuration Steps Required](#))

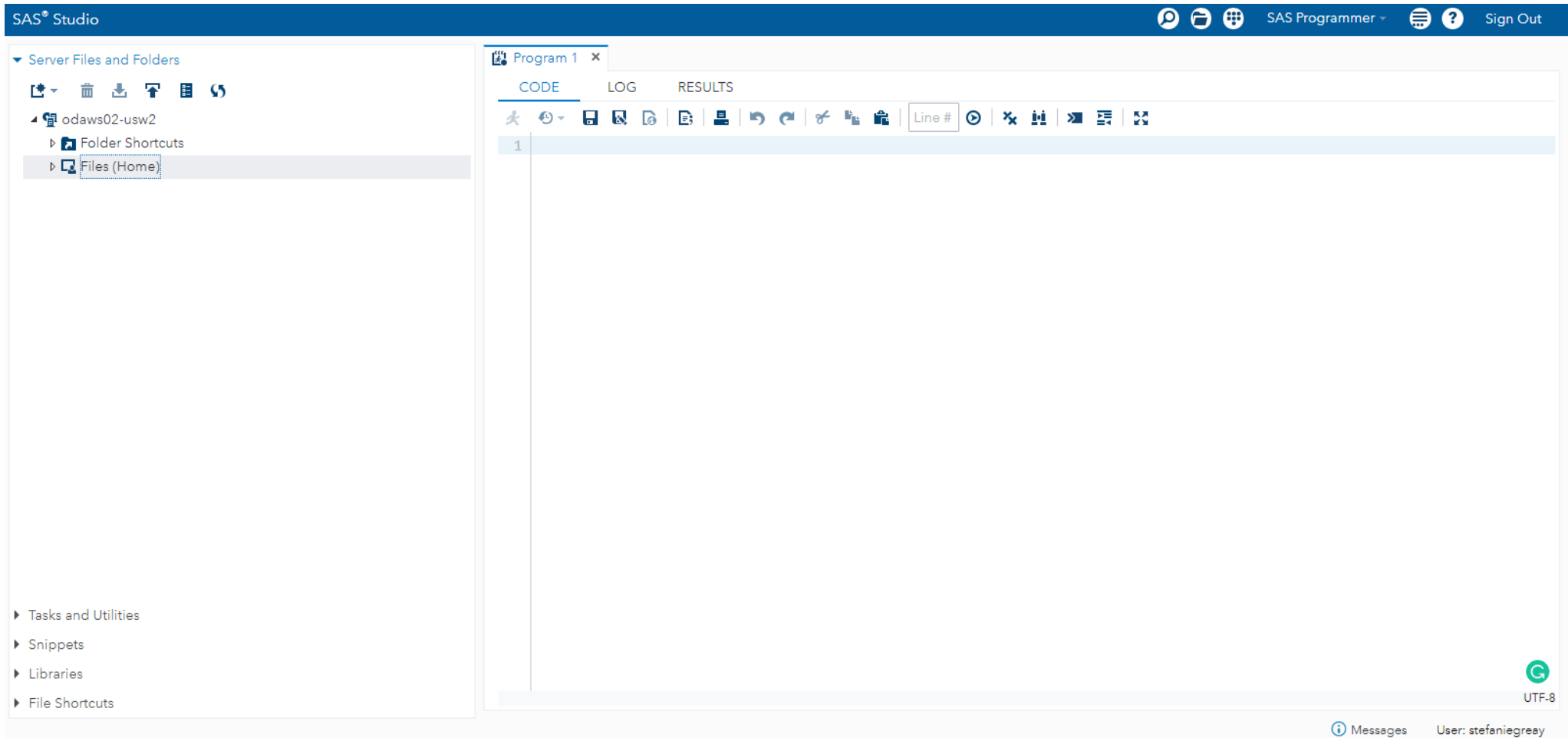
Reference
[Support Site](#)
[Step-by-Step Reference Guides](#)
[Frequently Asked Questions](#)

Quotas ([learn more](#))
Home Directory (46.5MB/5120MB)
1%
Course Directory (207.0MB/3072MB)
7%

[Other Ways to Access SAS® OnDemand for Academics Resources](#)



To upload the dataset to the SAS server, open SAS Studio, then click on “Files (Home)” and click the upload button.



Click on “Choose Files” to browse to the file you want to upload, then click “Upload.”

Upload Files

×

Upload files to:

/home/stefaniegreay

Choose Files

Selected files:

1

SAS7BDAT

vila_health_loss_and_readmission.sas7bdat

134.8 mb

Upload

Cancel



Verify that the upload was successful by scrolling down in your Files(Home) area.



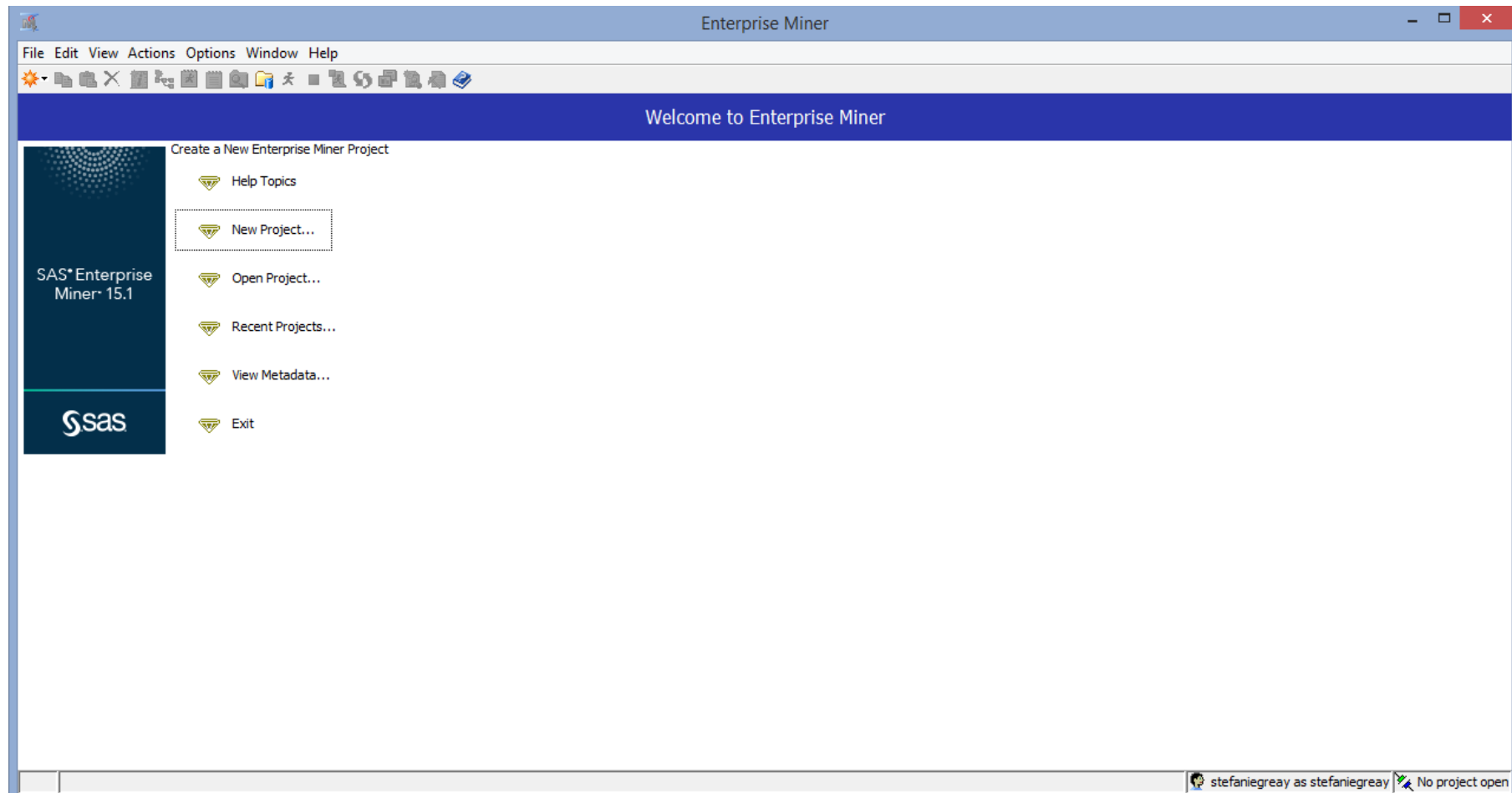
SAS Enterprise Miner Instructions

The following slides provide instructions on how to complete this task in SAS Enterprise Miner.

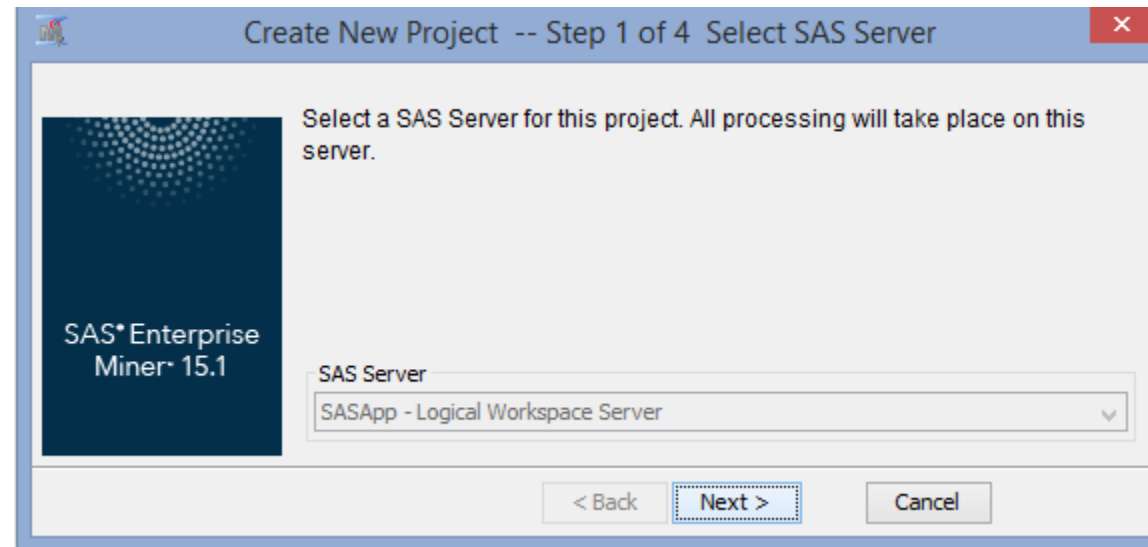
Once you have uploaded the dataset for this unit onto the SAS servers using SAS Studio, you may proceed from here using SAS Enterprise Miner.



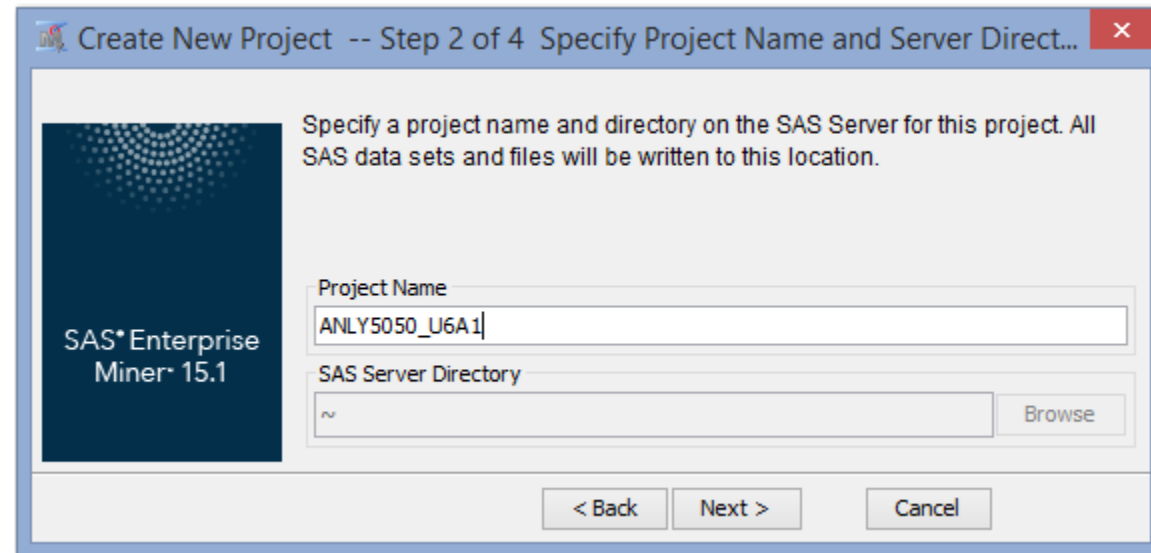
Once you download and start SAS Enterprise Miner, open a new project by clicking on “New Project.”



Click “Next>” to use the default SAS Server



Enter a project name and click “Next>”



Create New Project -- Step 2 of 4 Specify Project Name and Server Direct...

Specify a project name and directory on the SAS Server for this project. All SAS data sets and files will be written to this location.

SAS*Enterprise Miner 15.1

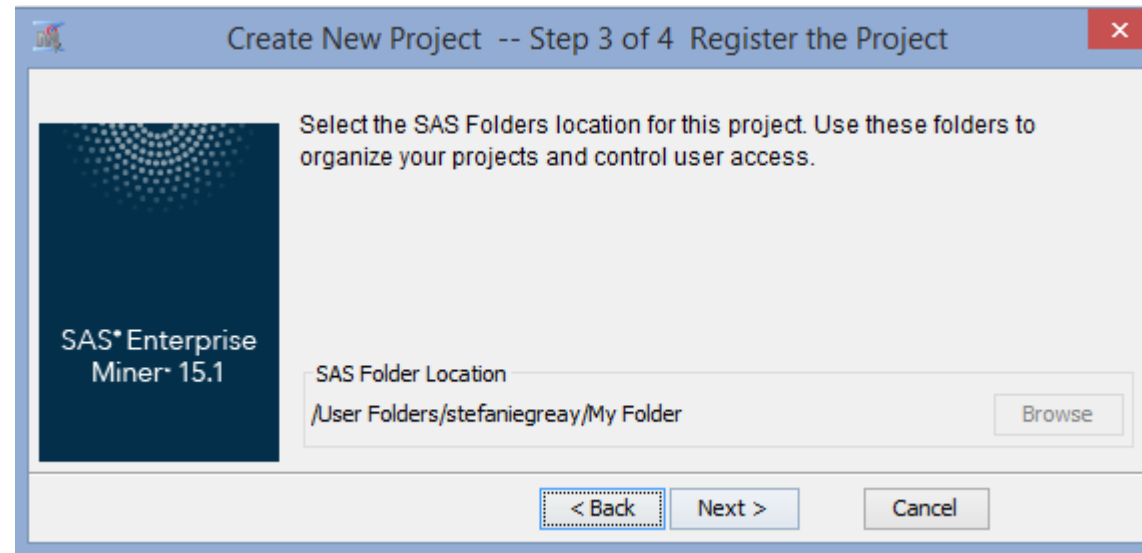
Project Name
ANLY5050_U6A1

SAS Server Directory
~ Browse

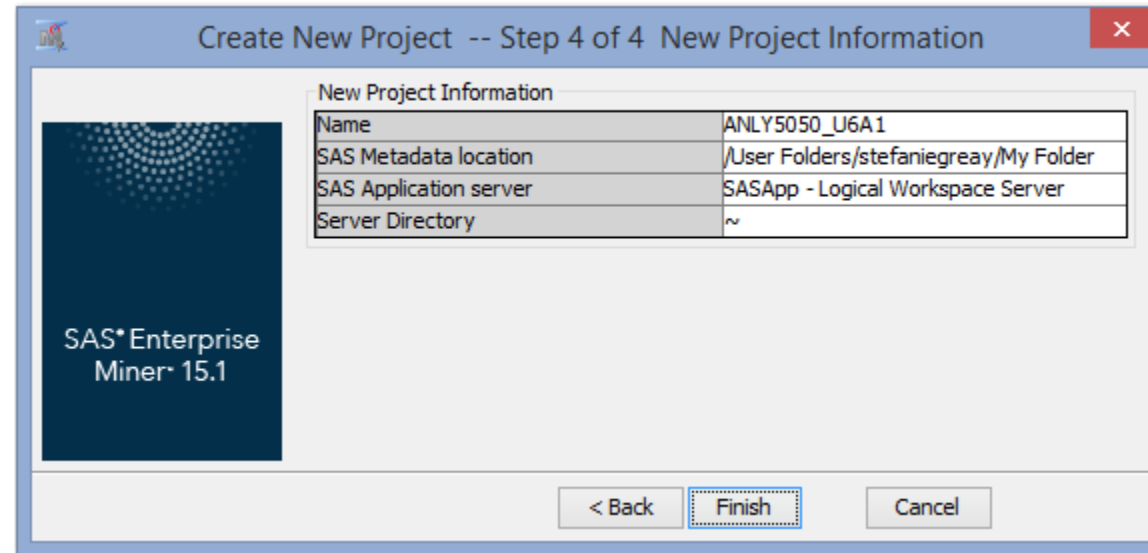
< Back Next > Cancel



Click “Next>”



Verify your entries and click “Finish”



Create New Project -- Step 4 of 4 New Project Information

New Project Information

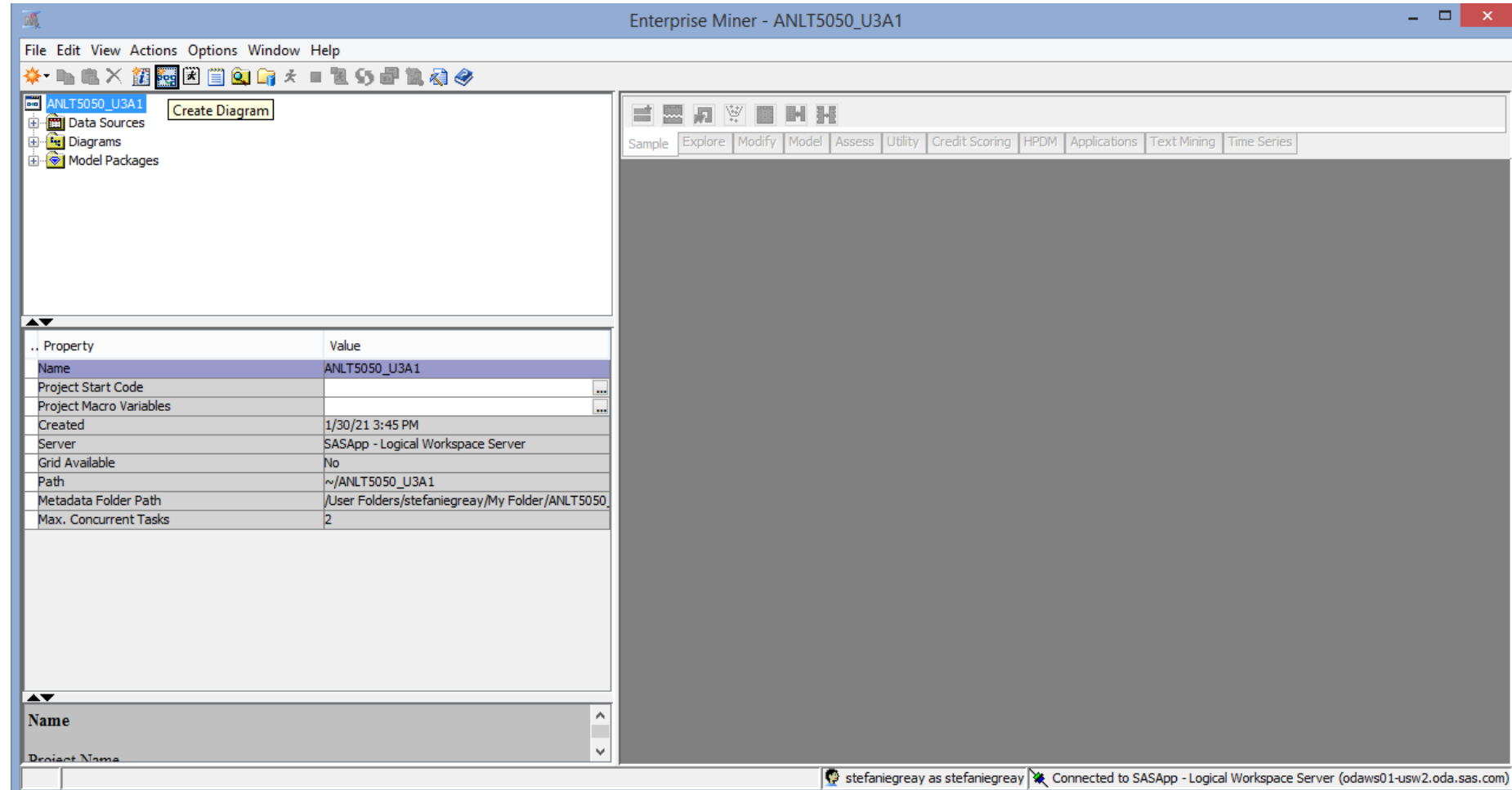
Name	ANLY5050_U6A1
SAS Metadata location	/User Folders/stefaniegreay/My Folder
SAS Application server	SASApp - Logical Workspace Server
Server Directory	~

SAS® Enterprise Miner® 15.1

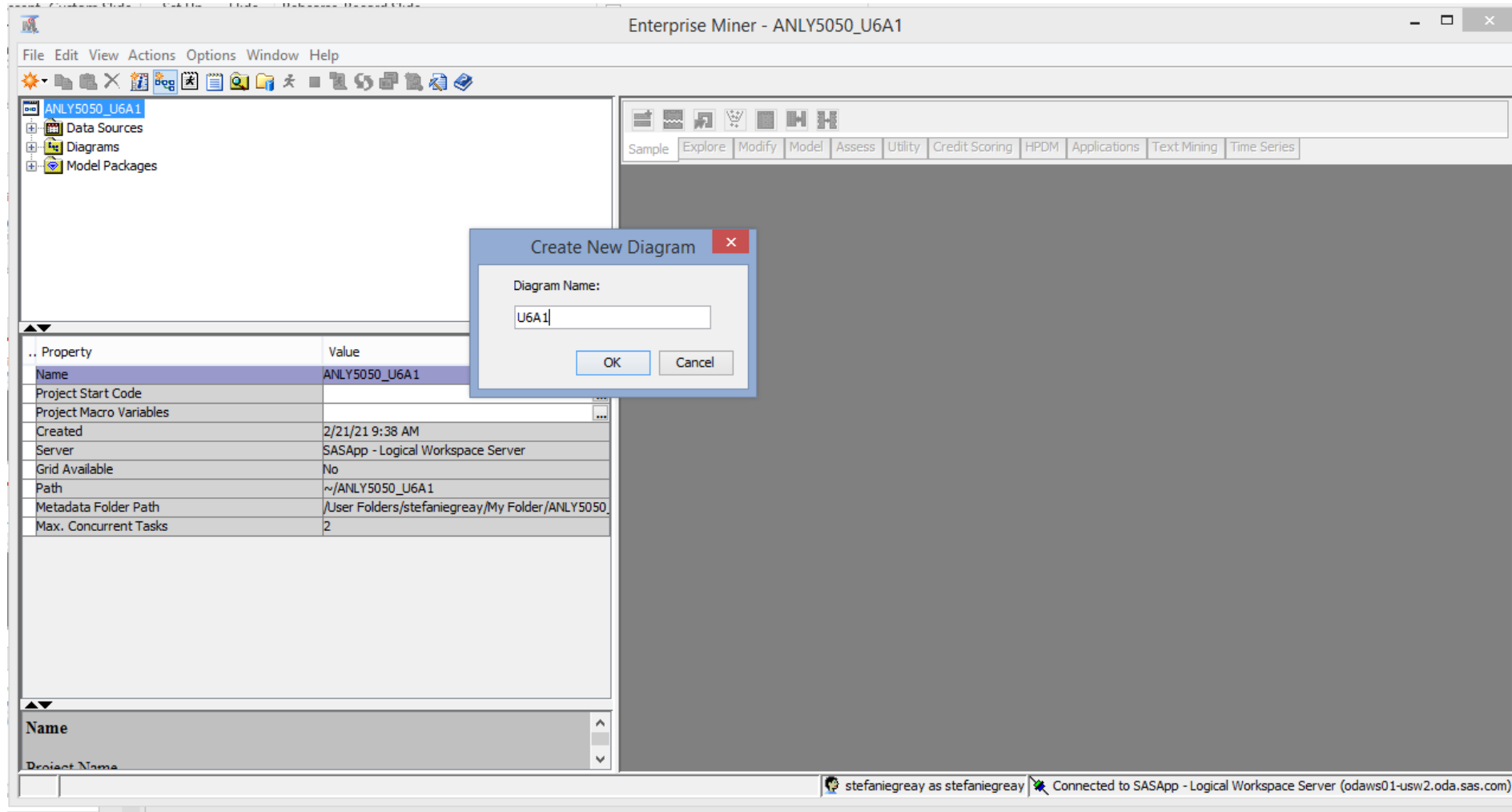
< Back Finish Cancel



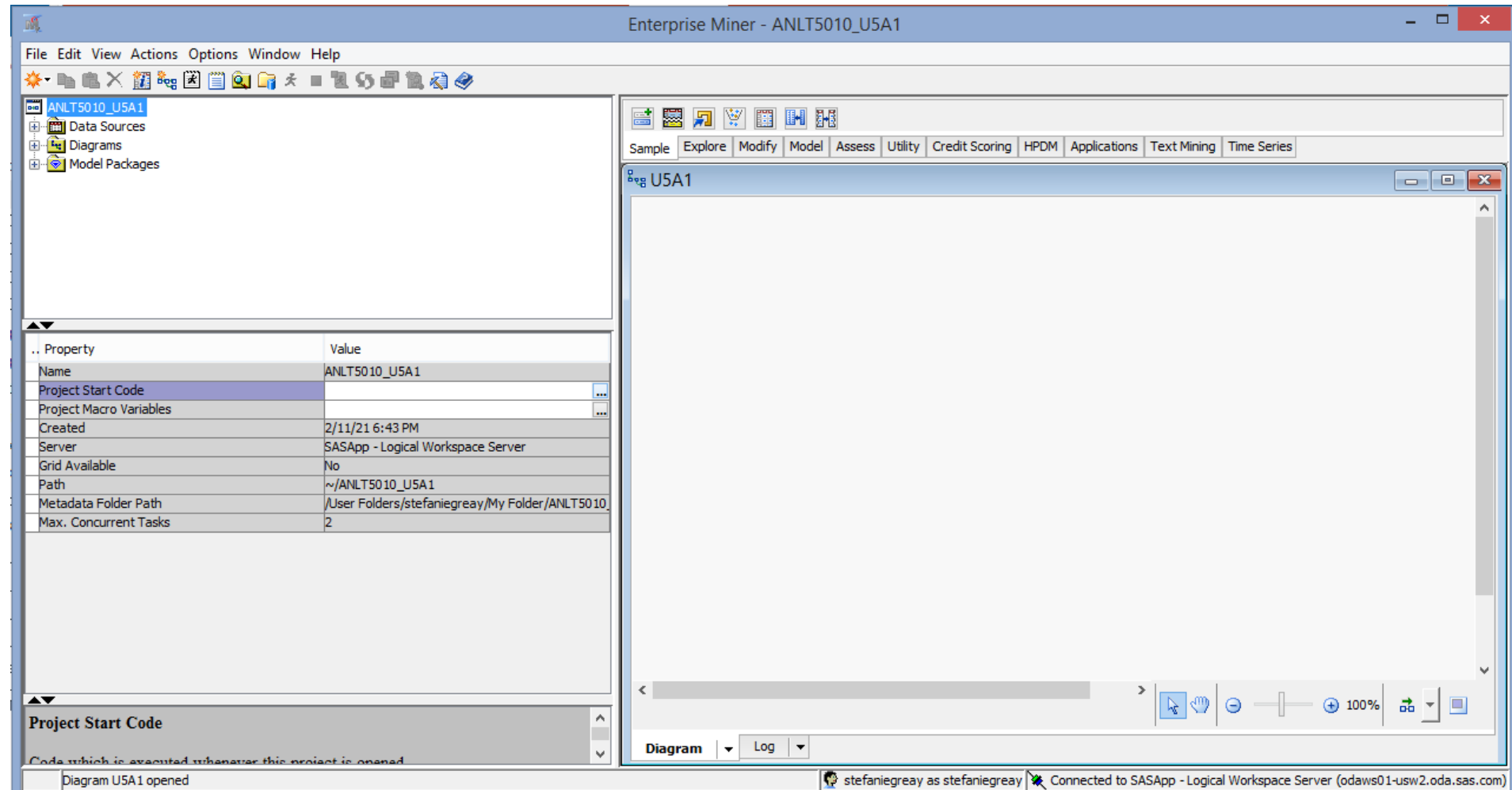
Click on the “Create Diagram” icon.



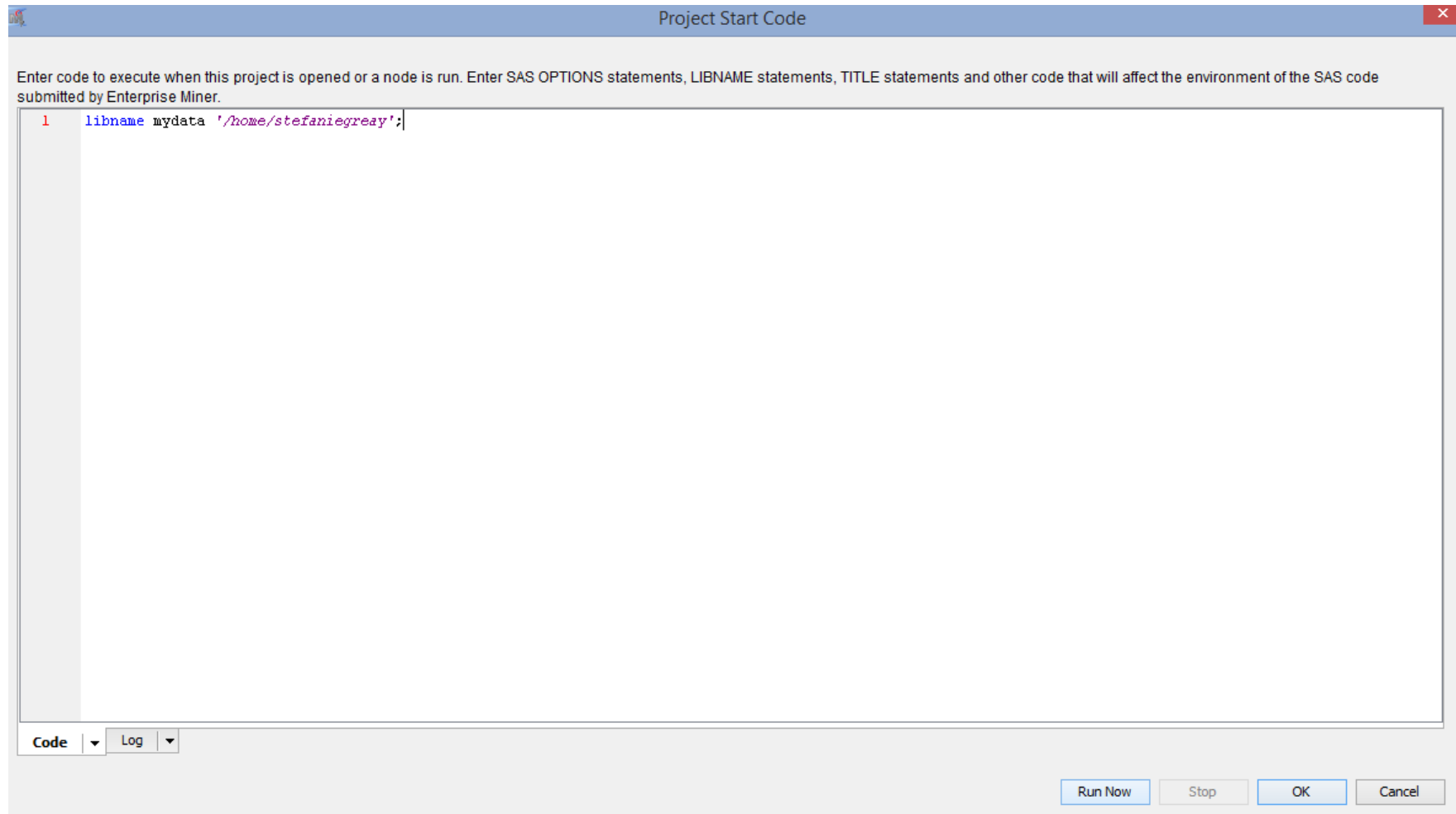
Name your diagram and click “OK.”



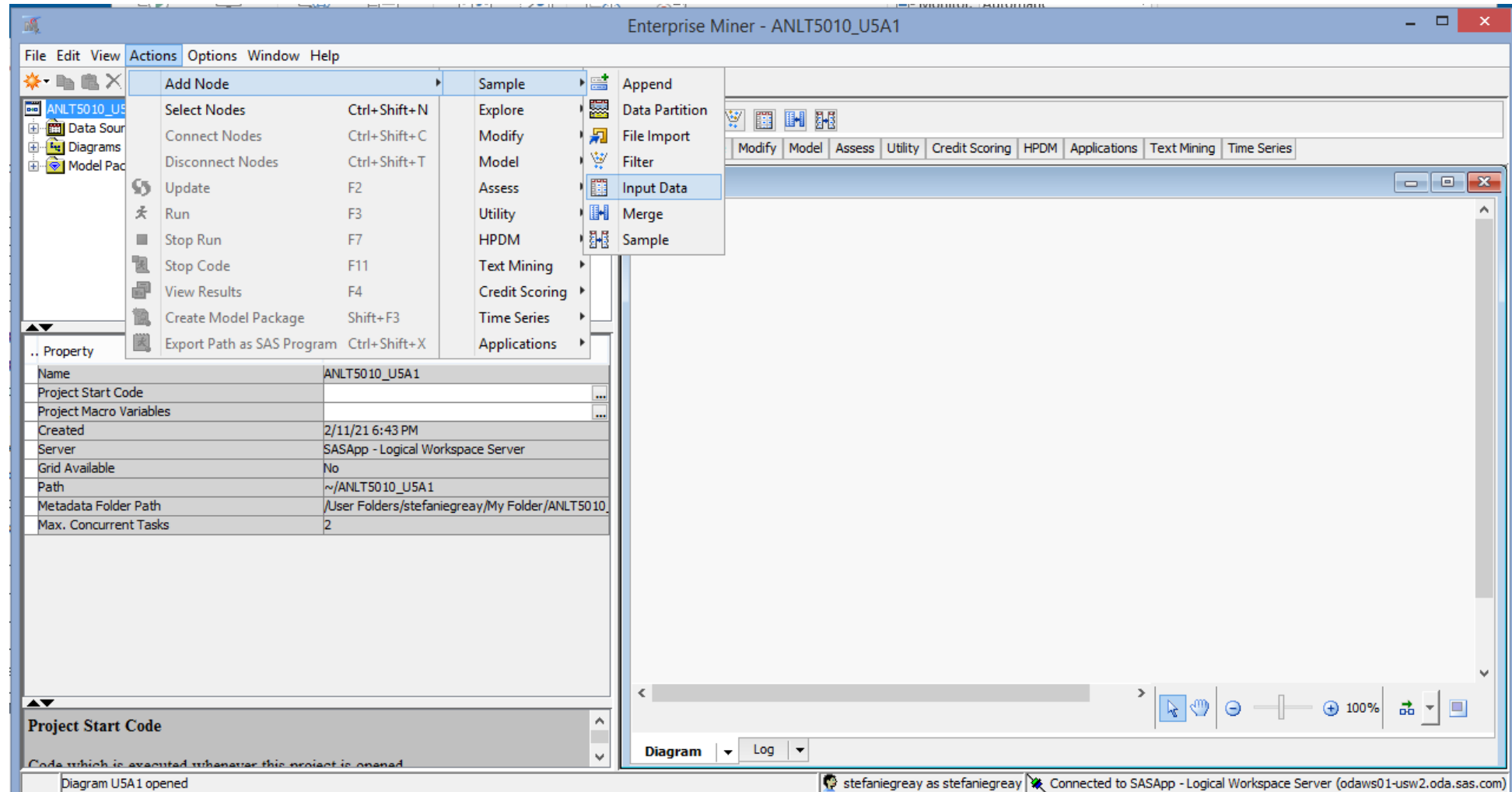
Click on the project, then click on the ellipses next to “Project Start Code.”



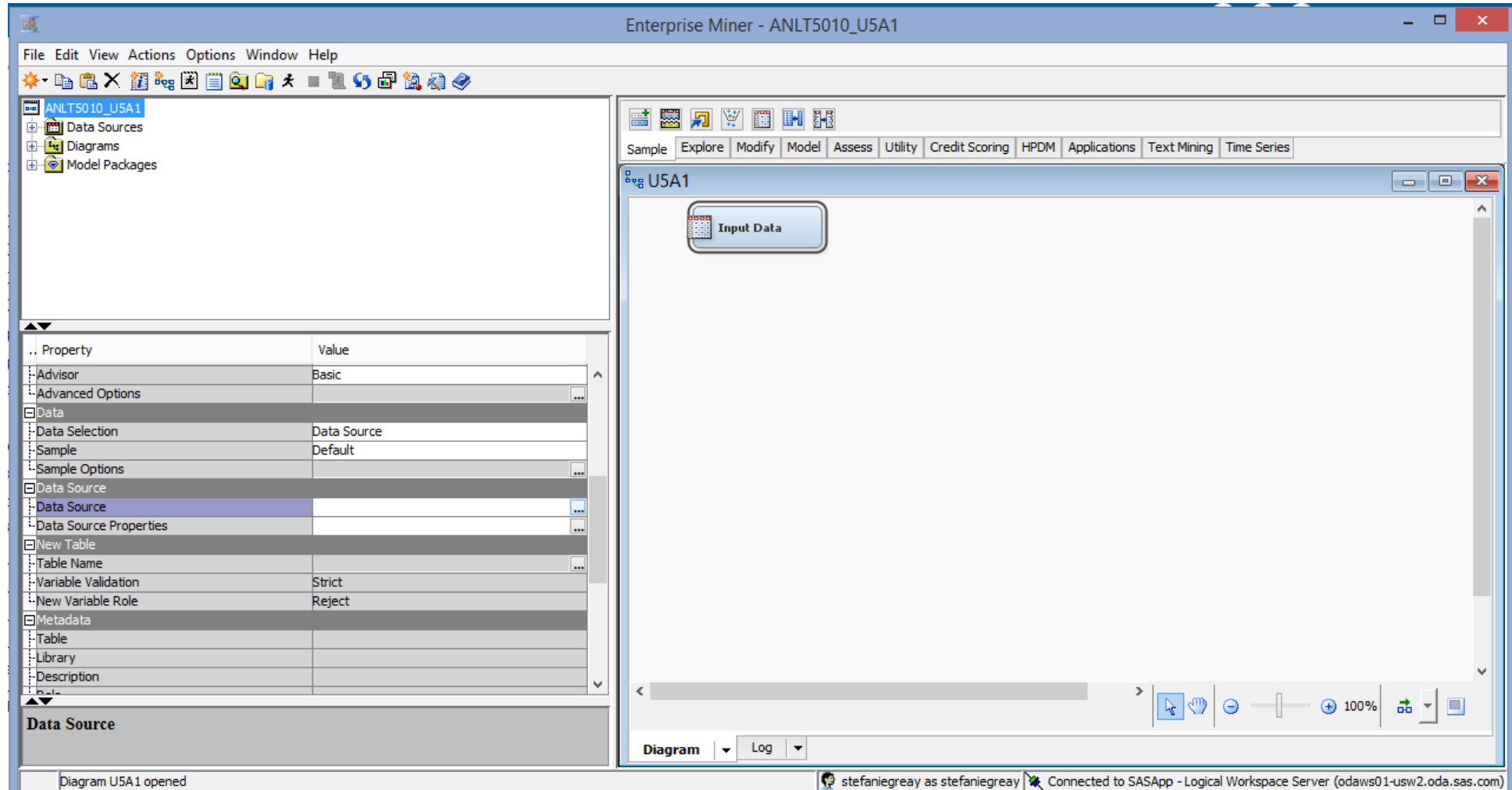
Add the library reference for where you uploaded the dataset in SAS studio, and click “Run Now.” Once it completes, click “OK.”



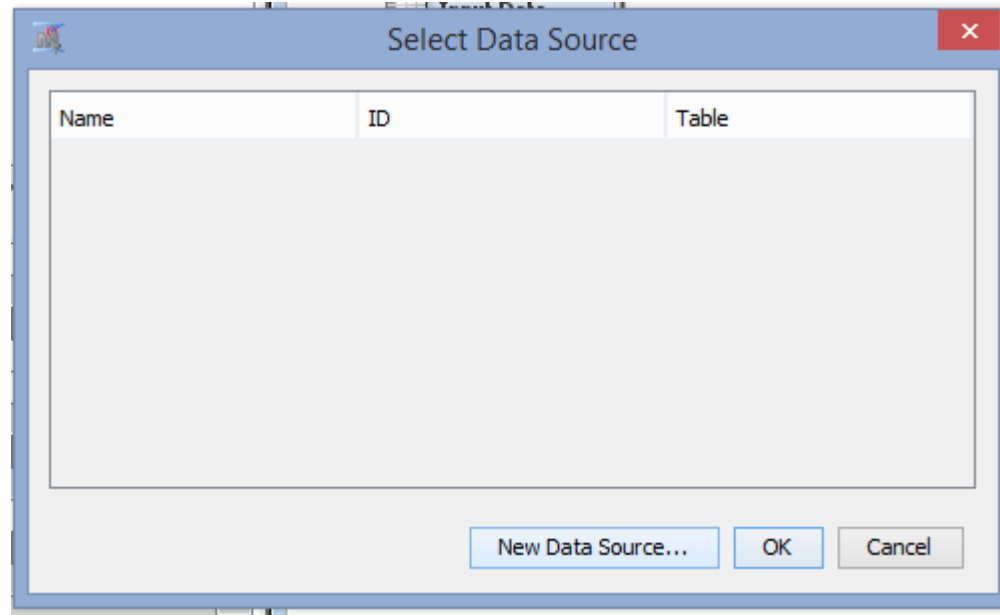
Click on Actions>Add Node>Sample>Input Data



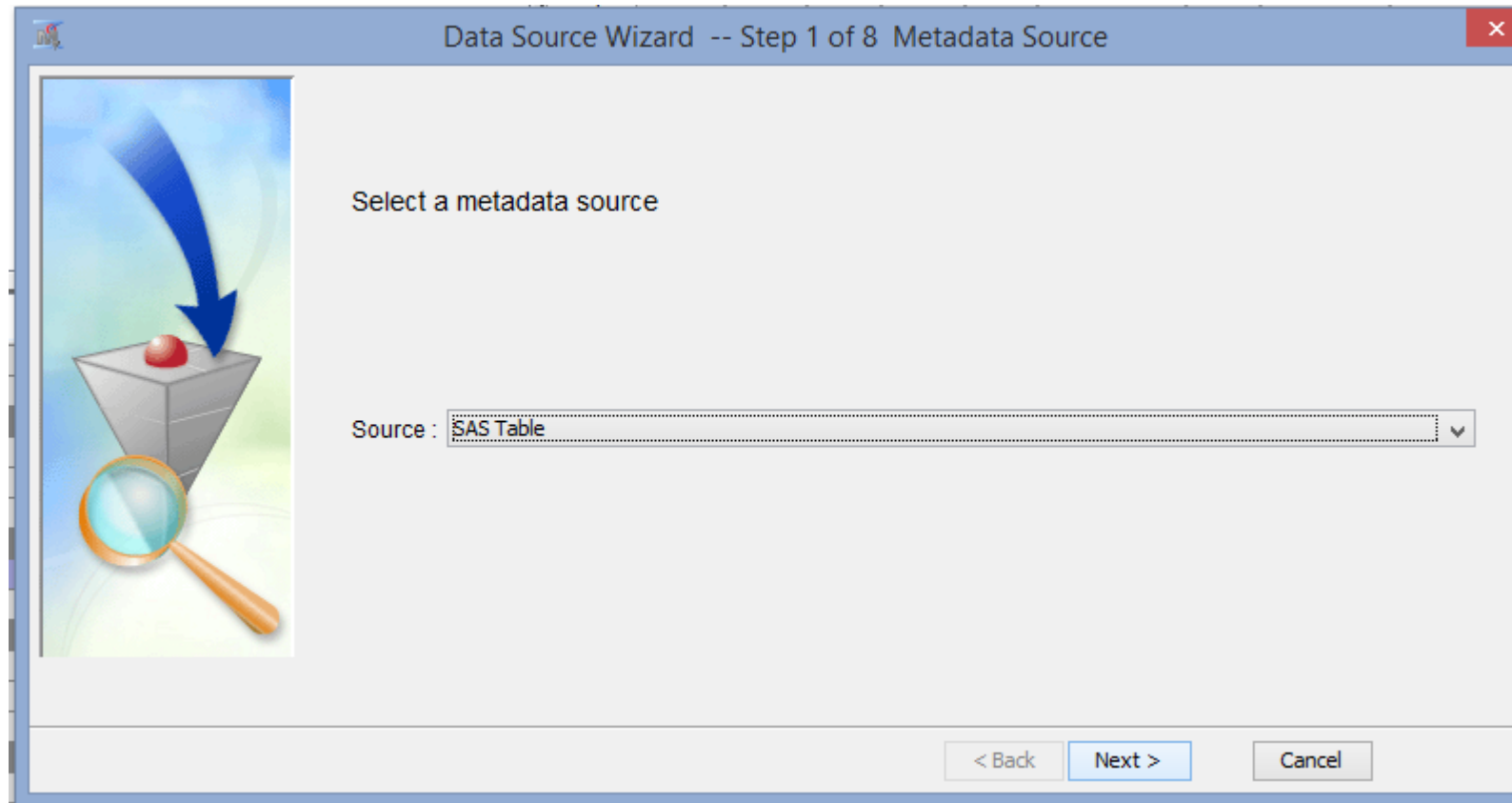
Click the ellipses (3 dots) next to “Data Source.”



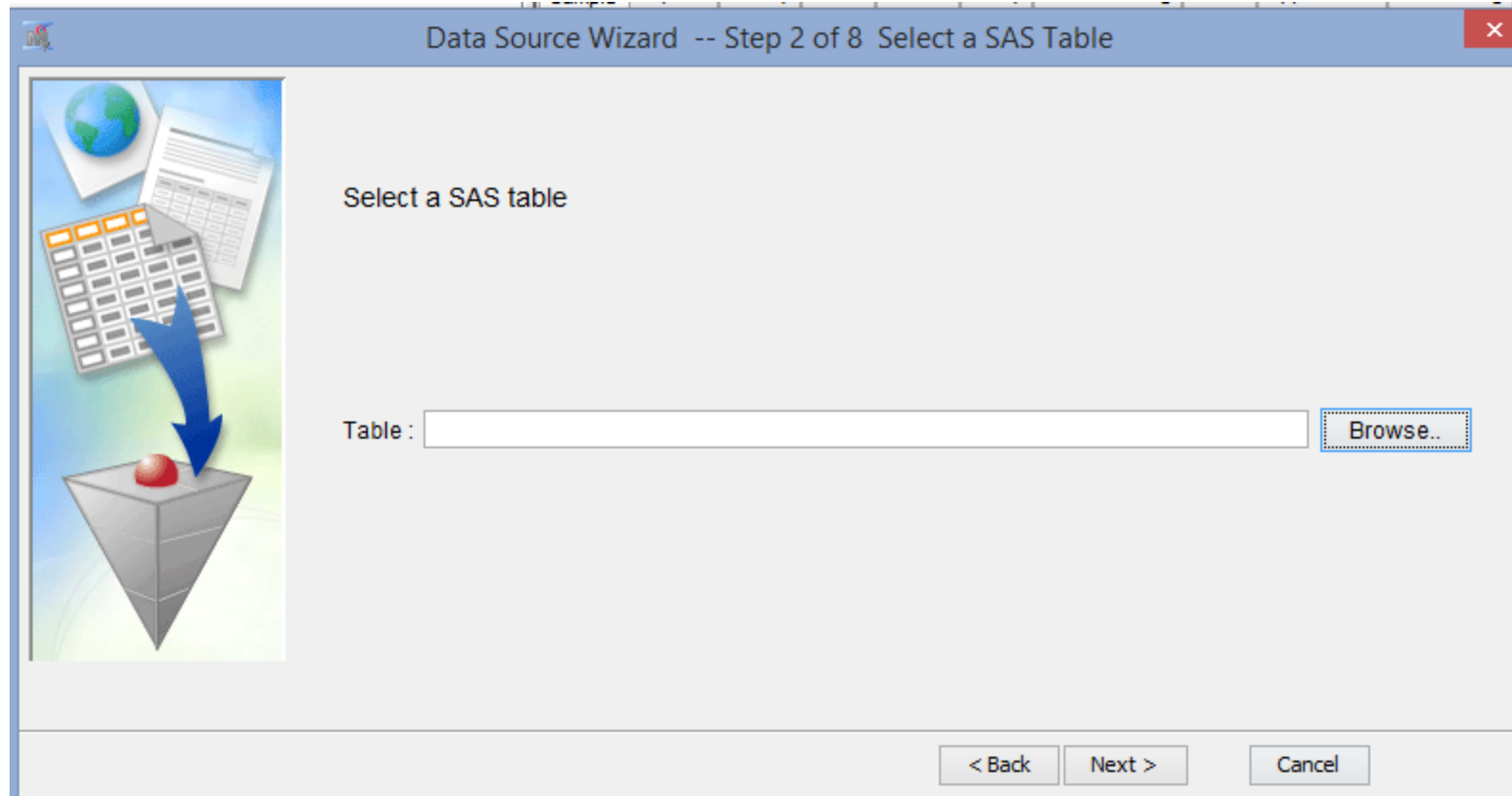
Click on “New Data Source”



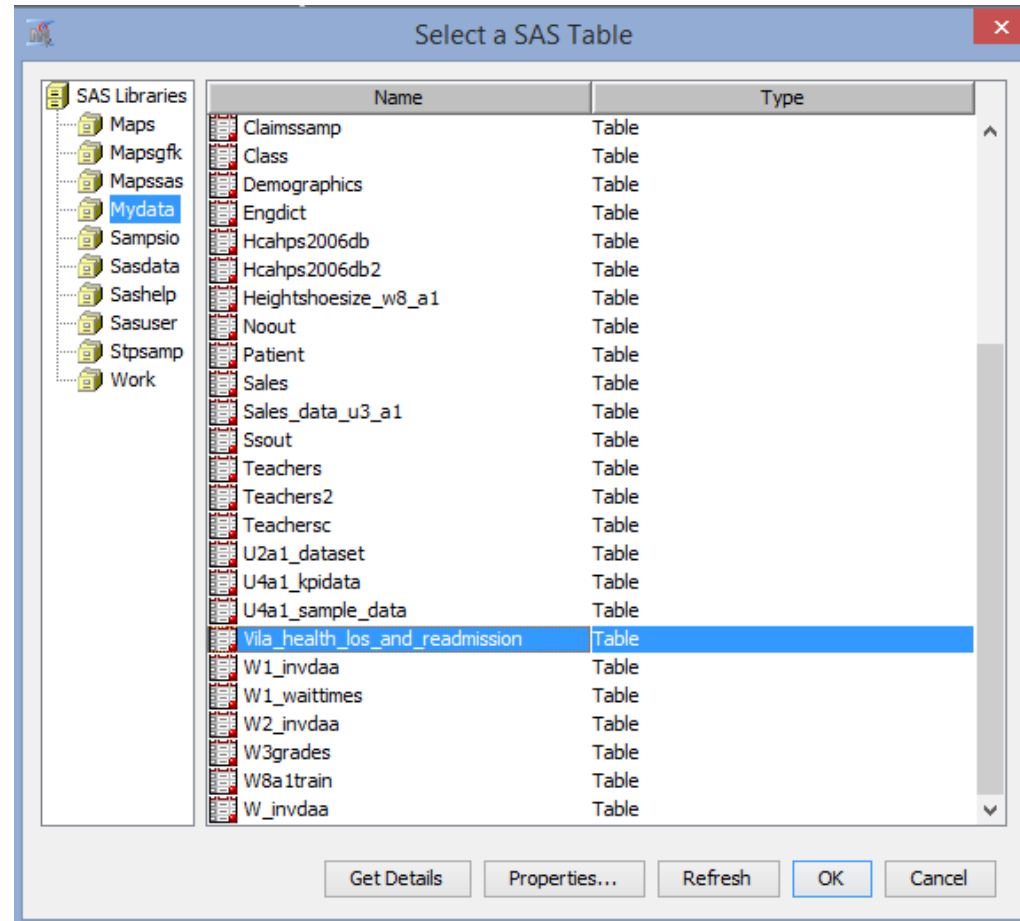
Leave it as “SAS Table” and click “Next >”



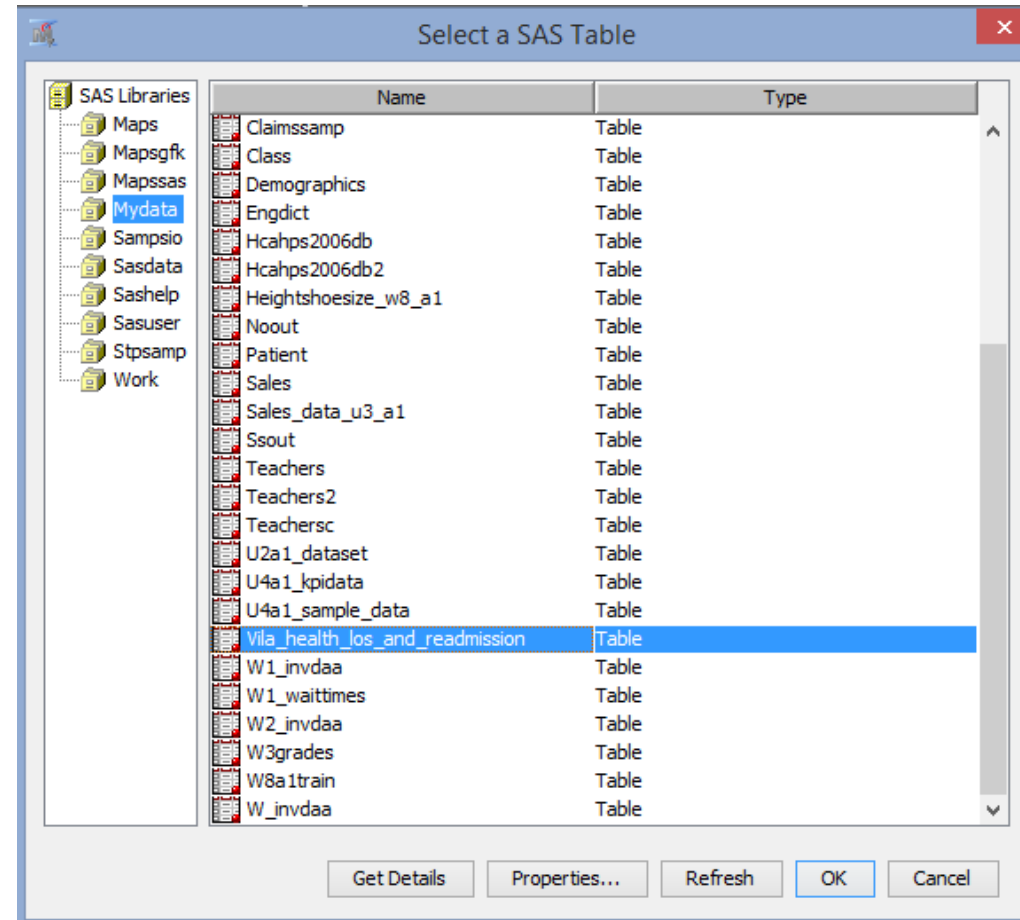
Click on “Browse”



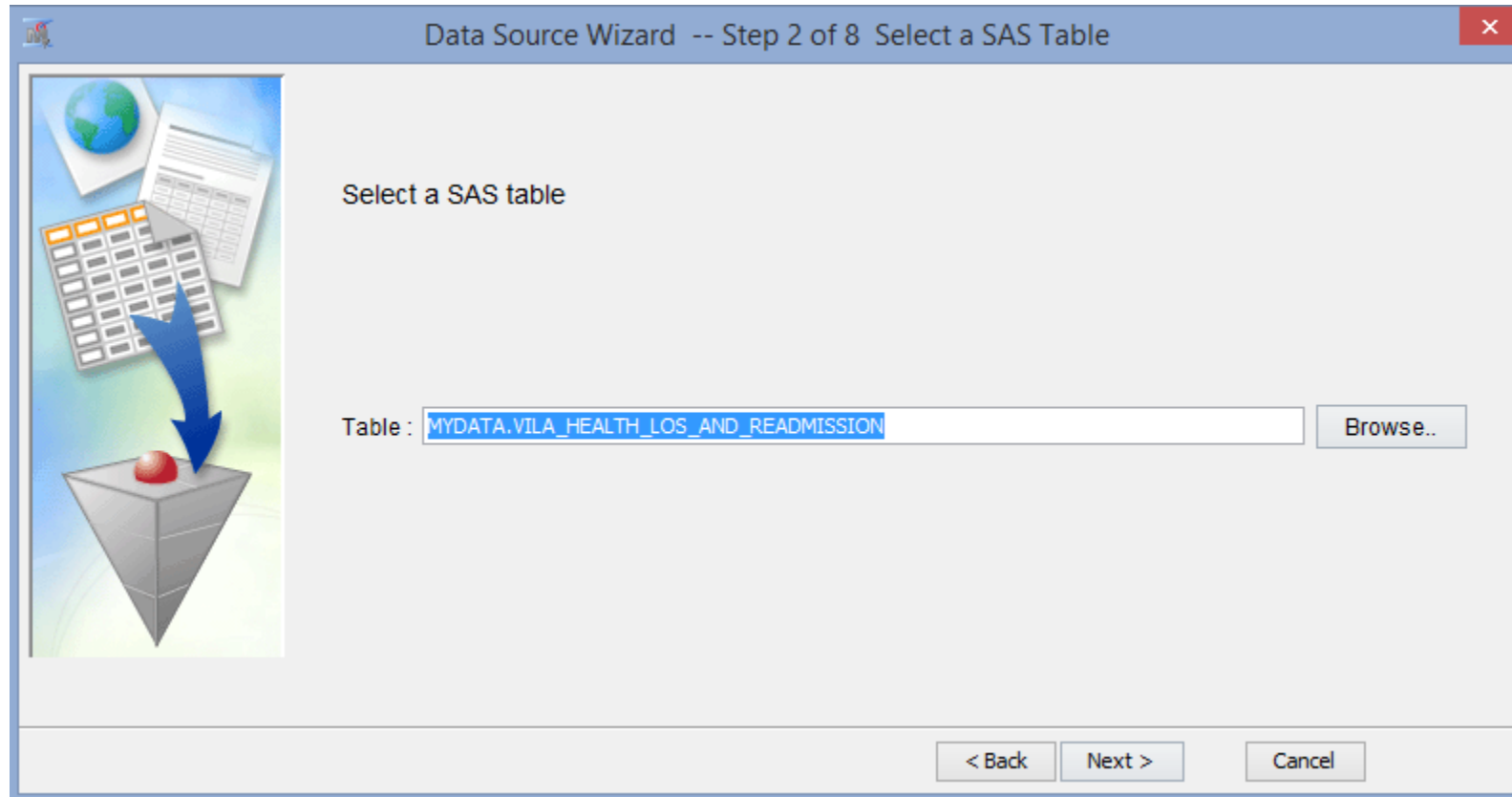
Double click on the libname you just set up in the project startup code.



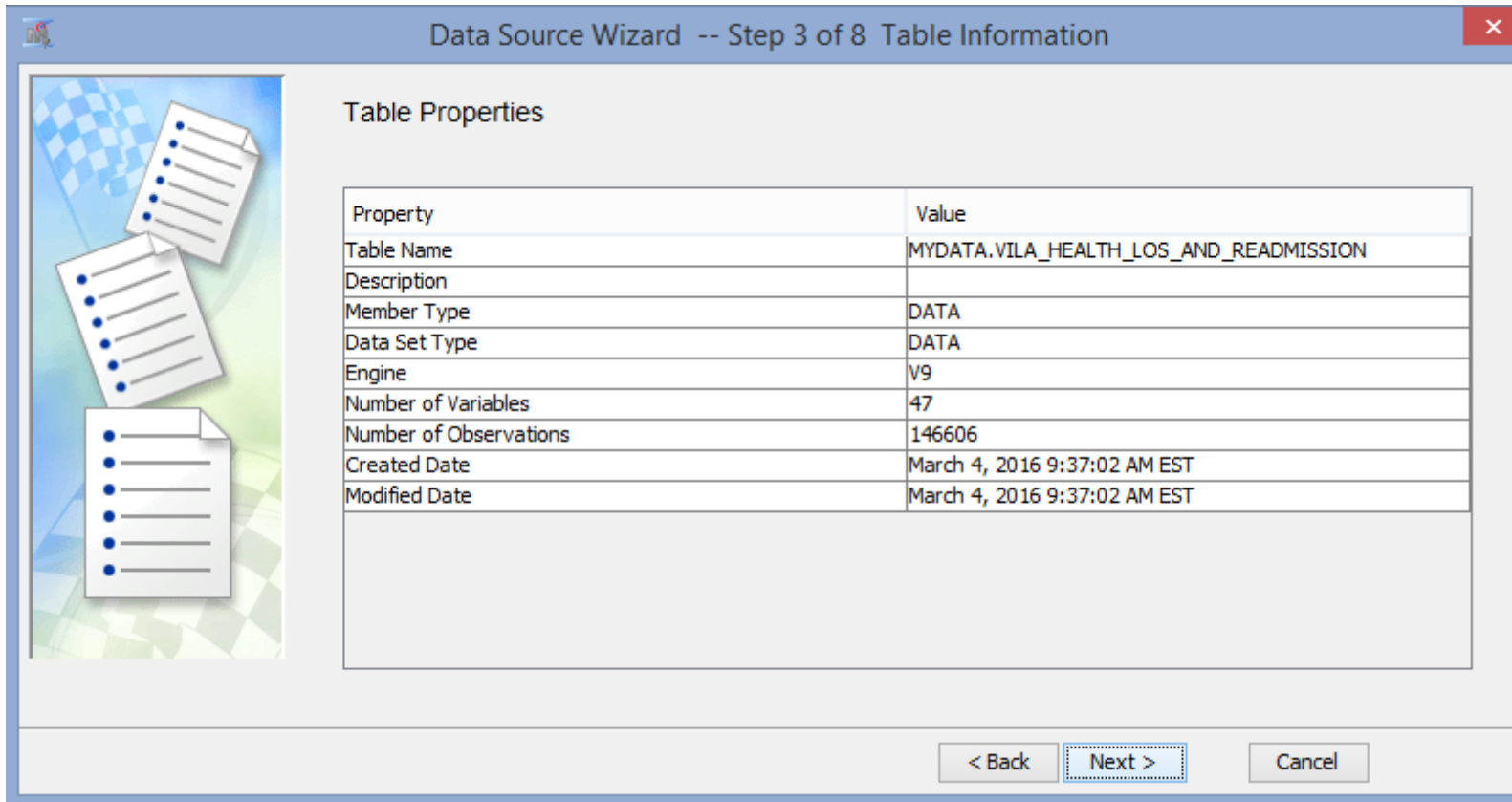
Double click to select the dataset for this unit, and click “OK”



Click “Next>”



Verify the options and click “Next>”

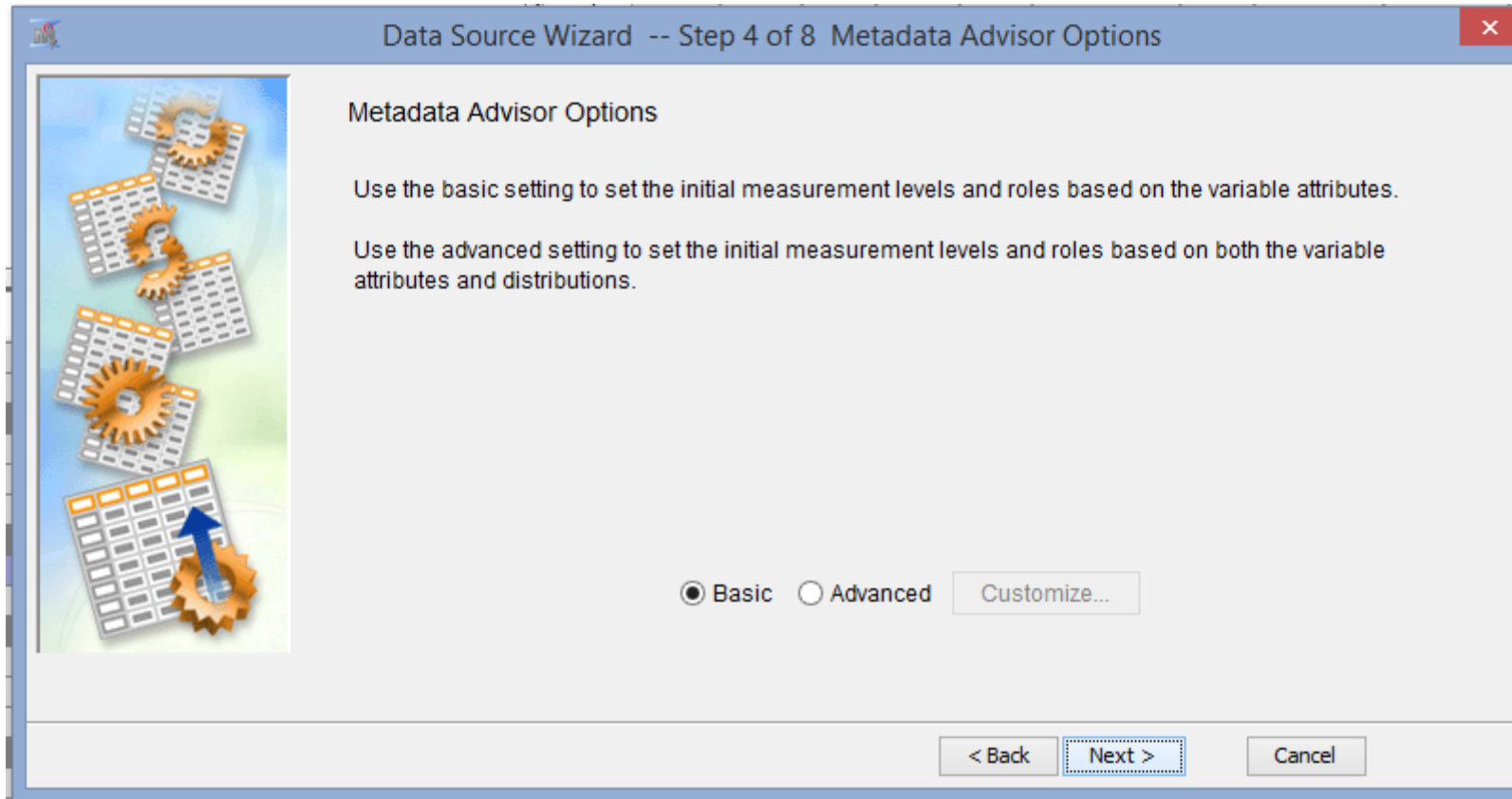


The screenshot shows a software window titled "Data Source Wizard -- Step 3 of 8 Table Information". On the left is a decorative graphic of three overlapping document icons. The main area is titled "Table Properties" and contains a table with two columns: "Property" and "Value". The table lists various metadata for a data source, including the table name, description, member type, data set type, engine, number of variables, number of observations, and creation/modification dates. At the bottom right, there are three buttons: "< Back", "Next >" (which is highlighted with a dotted border), and "Cancel".

Property	Value
Table Name	MYDATA.VILA_HEALTH_LOS_AND_READMISSION
Description	
Member Type	DATA
Data Set Type	DATA
Engine	V9
Number of Variables	47
Number of Observations	146606
Created Date	March 4, 2016 9:37:02 AM EST
Modified Date	March 4, 2016 9:37:02 AM EST



Click “Next>”



Verify the variables and settings, adjust if necessary, and then click “Next>”

Data Source Wizard -- Step 5 of 8 Column Metadata

(none) ☐ not Equal to ☐ Apply

Columns: ☐ Label ☐ Mining ☐ Basic ☐ Statistics

Name	Role	Level	Report	Order	Drop	Lower Limit	Upp
ADMIT_DATE	Time ID	Interval	No		No	.	
admit_month	Input	Interval	No		No	.	
City	Input	Nominal	No		No	.	
County_name	Input	Nominal	No		No	.	
Diagnosis_Group	Input	Nominal	No		No	.	
DIAGNOSIS_ICD	Input	Interval	No		No	.	
DIAGNOSIS_LO	Text	Nominal	No		No	.	
DIAGNOSIS_SUE	Input	Interval	No		No	.	
DIAGNOSIS_SUE	Input	Nominal	No		No	.	
DISCHARGED_T	Input	Nominal	No		No	.	
DISCHARGE_DA	Time ID	Interval	No		No	.	
Disch_Nurse_ID	ID	Nominal	No		No	.	
DOCTOR	Input	Interval	No		No	.	
DRG_APR_CODE	Input	Nominal	No		No	.	
DRG_APR_DESC	Input	Nominal	No		No	.	

Show code Explore Compute Summary < Back Next > Cancel



You may choose to sample the dataset here, or just keep the full dataset, then click “Next>”

Data Source Wizard -- Step 6 of 8 Create Sample

Do you wish to create a sample data set?

☒ No ☐ Yes

Table Info

Columns 47
Rows 146606

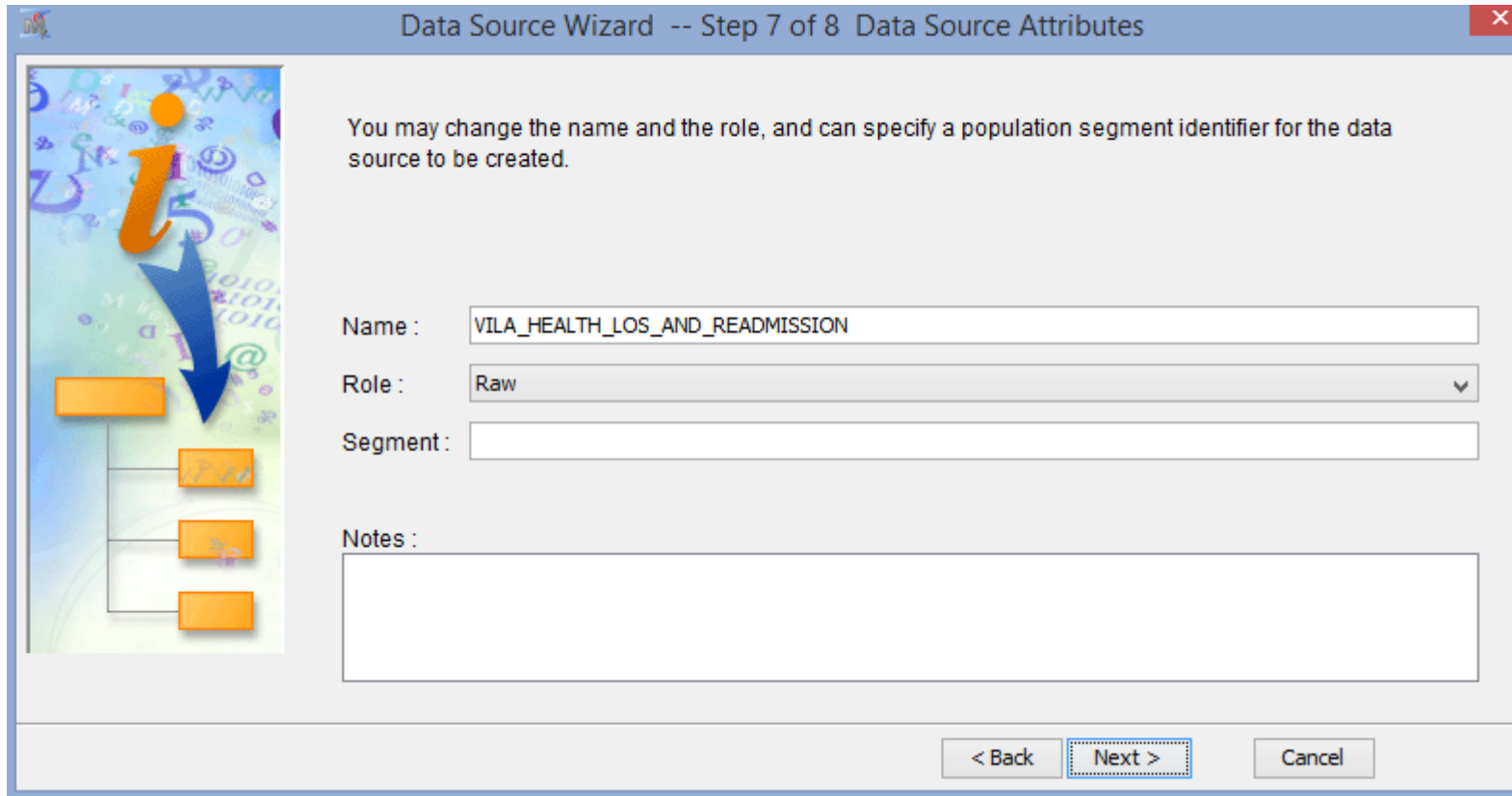
Sample Size

Type Percent
Percent 20
Rows

< Back **Next >** Cancel



You may choose to adjust the role of the dataset, or leave it as the default, then click “Next>”



The image shows a screenshot of the 'Data Source Wizard -- Step 7 of 8: Data Source Attributes' window. On the left is a decorative graphic with a large orange 'i' icon, a blue arrow pointing down, and several orange rectangular boxes connected by lines. The main area contains the following text and fields:

You may change the name and the role, and can specify a population segment identifier for the data source to be created.

Name :

Role :

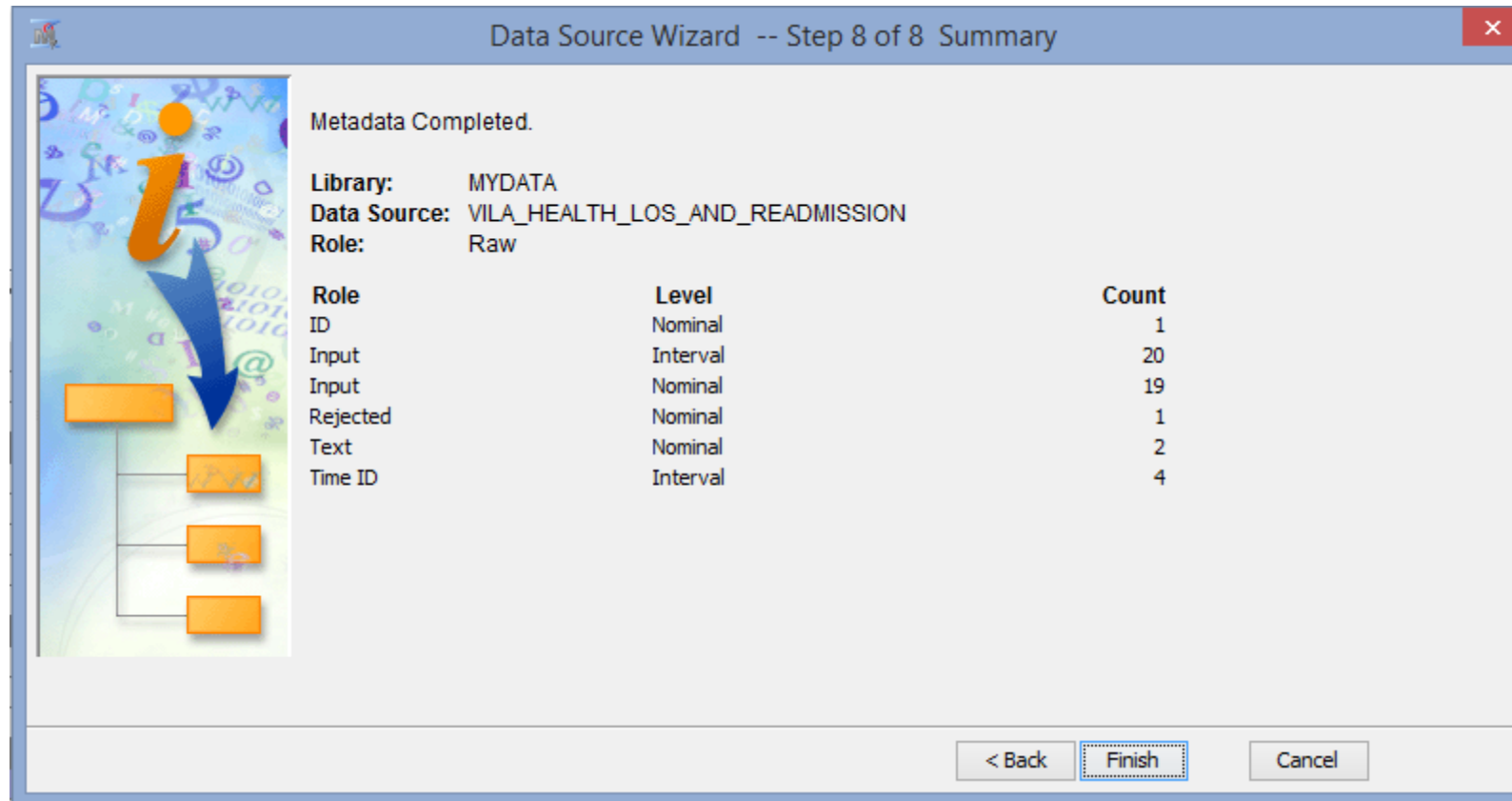
Segment :

Notes :

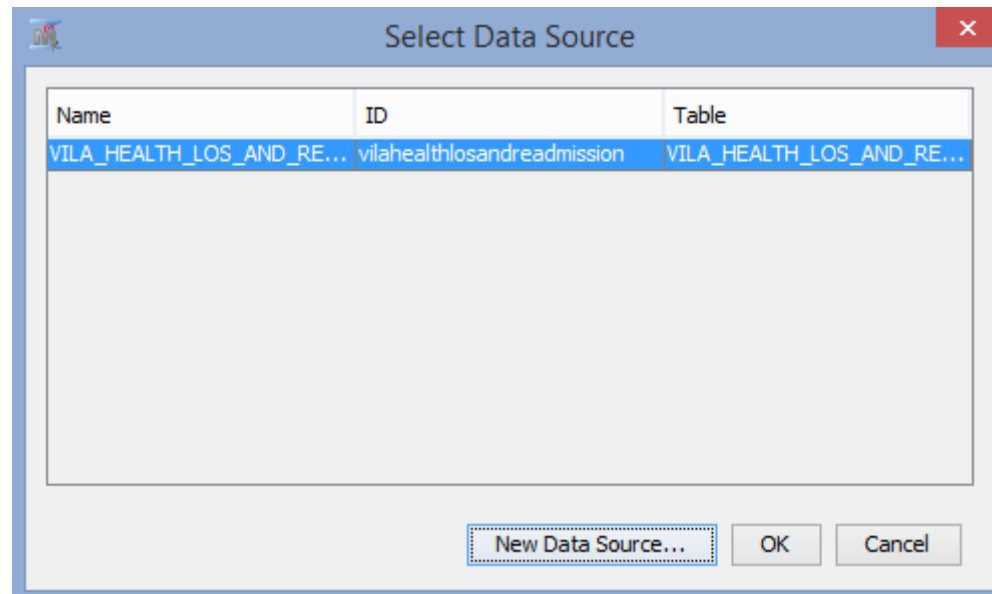
At the bottom right are three buttons: '< Back', 'Next >' (which is highlighted with a dashed border), and 'Cancel'.



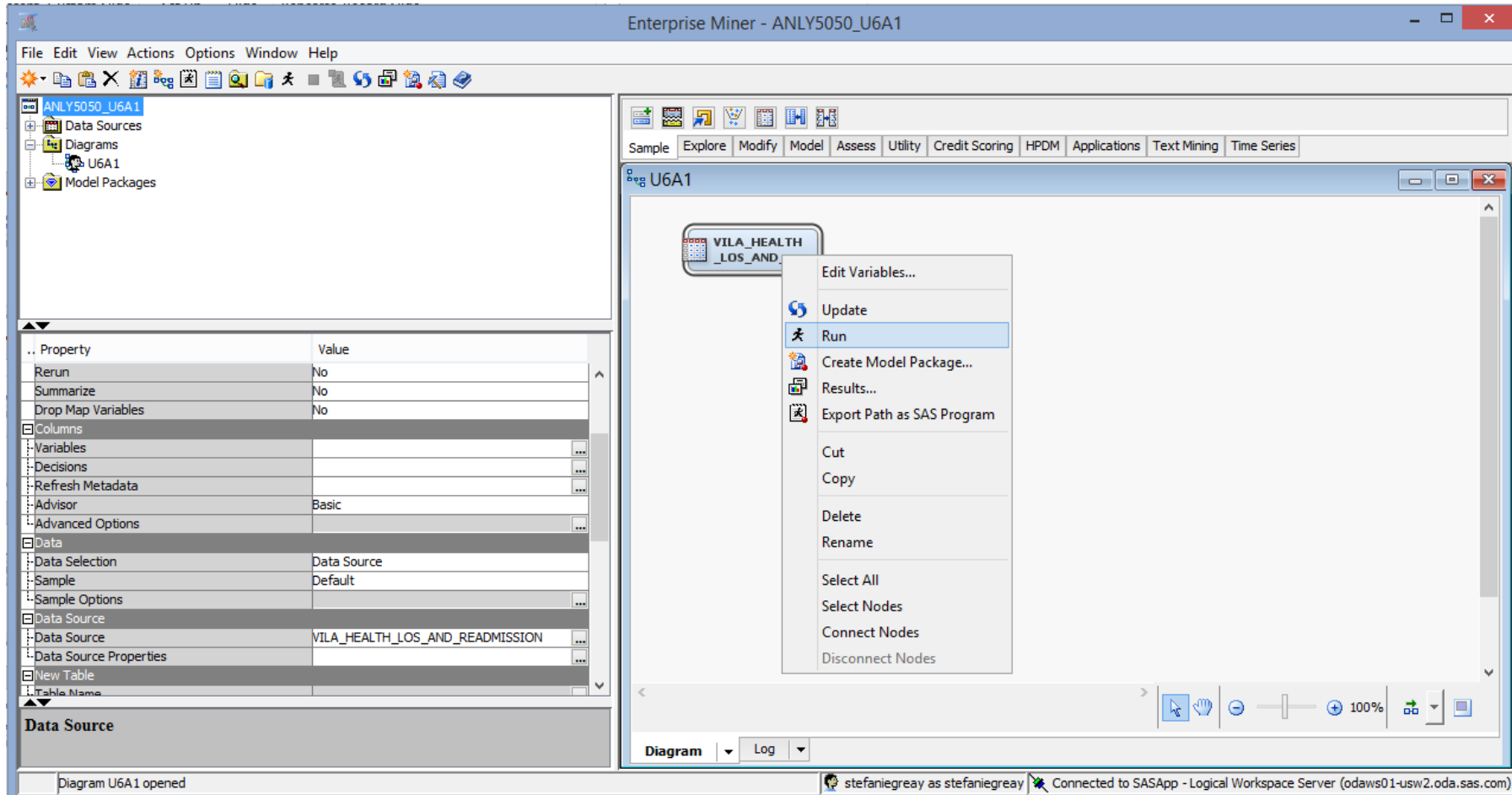
Click “Finish” to finish the data source registration within EM.



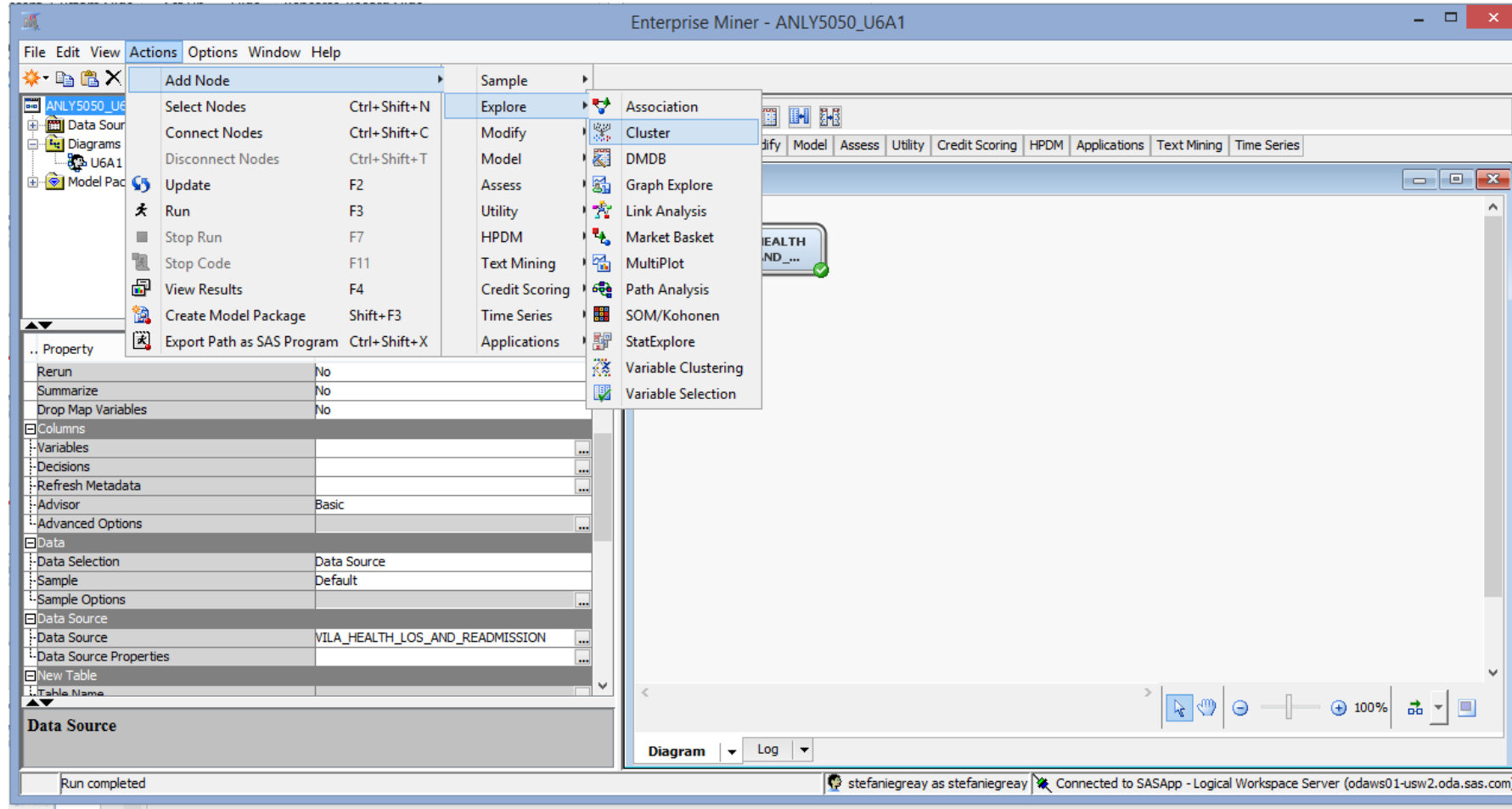
Click “OK” to complete the process. The name of the node should then change to the name of the dataset.



Right click on the dataset node and click “Run.”



Click on “Actions” > “Add Node” > “Explore” > “Cluster”



Connect the nodes

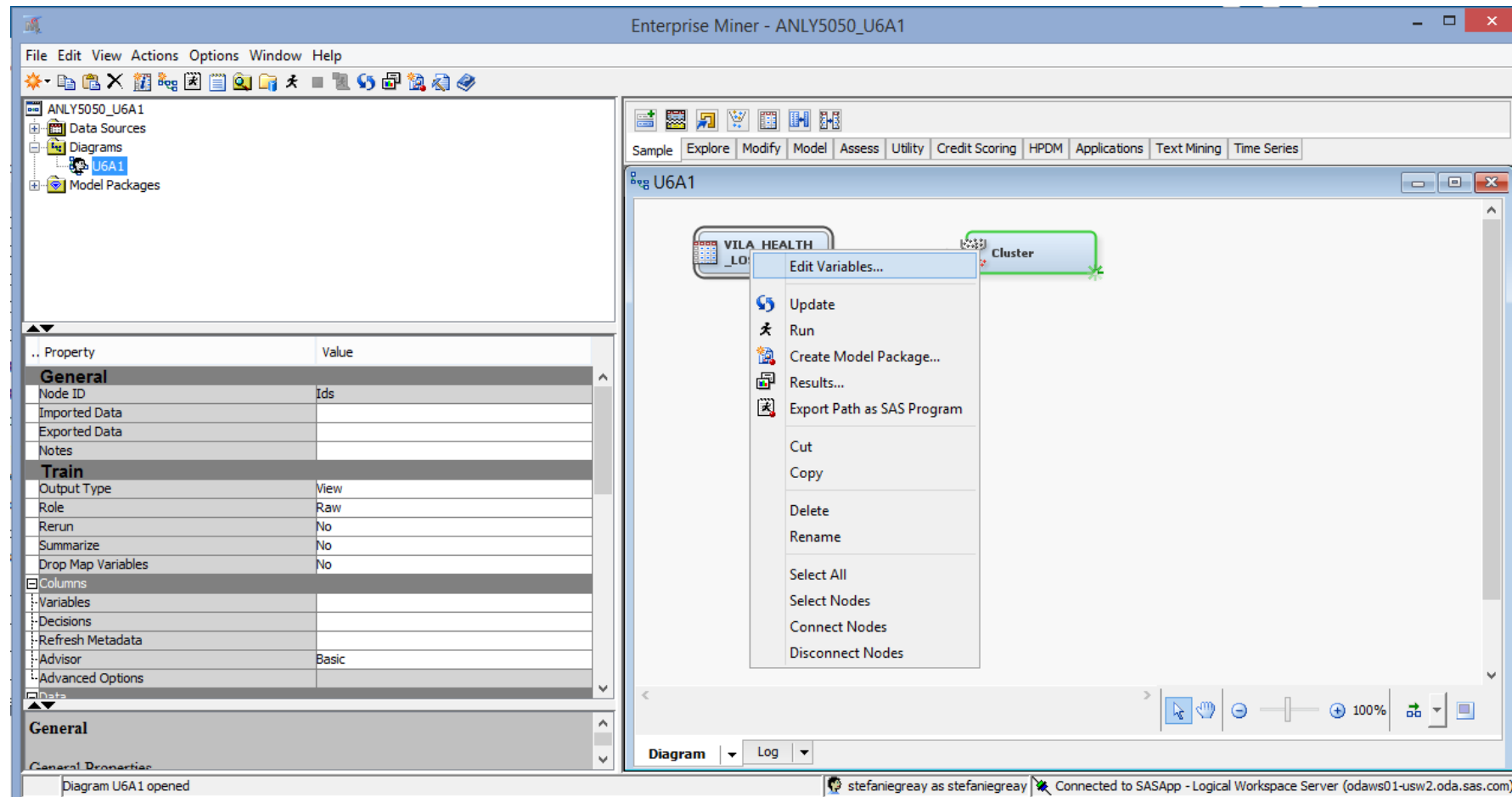
The screenshot displays the SAS Enterprise Miner interface. The main workspace shows a workflow diagram with two nodes: 'VILA_HEALTH_LOS_AND_...' and 'Cluster'. An arrow connects the output of the first node to the input of the second node. The 'Cluster' node has a sub-label 'Cluster' below it. The left pane shows a project tree with 'ANLY5050_U6A1' selected, containing 'Data Sources', 'Diagrams', 'U6A1', and 'Model Packages'. Below the tree is a properties window for the selected node.

Property	Value
General	
Node ID	Clus
Imported Data	
Exported Data	
Notes	
Train	
Variables	
Internal Standardization	Standardization
Number of Clusters	
Specification Method	Automatic
Maximum Number of Clusters	10
Selection Criterion	
Clustering Method	Ward
Preliminary Maximum	50
Minimum	2
Final Maximum	20
CCC Cutoff	3
Encoding of Class Variables	
General	
General Properties	

The bottom status bar indicates 'Run completed' and shows the user 'stefaniegreay' is connected to the SASApp - Logical Workspace Server.



Right click on the dataset node and choose “edit variables.”



Change the description variables to “text,” the Patient_ID variable to “ID,” and all others to “Input”

Variables - Ids

(none) ☐ not Equal to

Columns: ☐ Label ☐ Mining ☐ Basic ☐ Statistics

Name	Role	Level	Report	Order	Drop	Lower Limit	Upper Limit
ADMIT_DATE	Input	Interval	No		No	.	.
City	Input	Nominal	No		No	.	.
County_name	Input	Nominal	No		No	.	.
DIAGNOSIS_ICD_CODE	Input	Interval	No		No	.	.
DIAGNOSIS_LONG_DESC	Text	Nominal	No		No	.	.
DIAGNOSIS_SUBCAT_CODE	Input	Interval	No		No	.	.
DIAGNOSIS_SUBCAT_DESC	Text	Nominal	No		No	.	.
DISCHARGED_TO	Input	Nominal	No		No	.	.
DISCHARGE_DATE	Input	Interval	No		No	.	.
DOCTOR	Input	Interval	No		No	.	.
DRG_APR_CODE	Input	Nominal	No		No	.	.
DRG_APR_DESC	Text	Nominal	No		No	.	.
DRG_APR_SEVERITY	Input	Nominal	No		No	.	.
Diagnosis_Group	Input	Nominal	No		No	.	.
Disch_Nurse_ID	Input	Nominal	No		No	.	.
ENCOUNTER_KEY	Input	Interval	No		No	.	.
HOSPITAL	Input	Nominal	No		No	.	.
ICU_DAYS	Input	Interval	No		No	.	.
LENGTH_OF_STAY	Input	Interval	No		No	.	.
MS_DRG_CODE	Input	Interval	No		No	.	.
MS_DRG_DESC	Text	Nominal	No		No	.	.
Num_Chronic_Cond	Input	Interval	No		No	.	.
PATIENT_NUMBER	ID	Interval	No		No	.	.
PROCEDURE_ICD_CODE	Input	Nominal	No		No	.	.
PROCEDURE_LONG_DESC	Text	Nominal	No		No	.	.
PROCEDURE_SUBCAT_CODE	Input	Nominal	No		No	.	.
PROCEDURE_SUBCAT_DESC	Text	Nominal	No		No	.	.
PatientAge	Input	Interval	No		No	.	.
STATECODE	Input	Nominal	No		No	.	.
Standard_Orders_Used	Input	Nominal	No		No	.	.
ZIP	Input	Nominal	No		No	.	.
admit_month	Input	Interval	No		No	.	.
dx_code	Input	Interval	No		No	.	.
dx_group	Input	Nominal	No		No	.	.
gender	Input	Nominal	No		No	.	.
i	Input	Interval	No		No	.	.
icd9_target	Input	Interval	No		No	.	.
op_visits6	Input	Interval	No		No	.	.
operationcount	Input	Interval	No		No	.	.
order_set_used	Input	Interval	No		No	.	.
order_total_charges	Input	Interval	No		No	.	.
race_cd	Input	Nominal	No		No	.	.
readmit_date	Input	Interval	No		No	.	.



Second part of list (for reference). Leave the readmit_date and readmit_discharge_date as Time ID variables. Click “OK” once you finish editing.

PROCEDURE_ICD_CODE	Input	Nominal	No		No	.	.
PROCEDURE_LONG_DESC	Text	Nominal	No		No	.	.
PROCEDURE_SUBCAT_CODE	Input	Nominal	No		No	.	.
PROCEDURE_SUBCAT_DESC	Text	Nominal	No		No	.	.
PatientAge	Input	Interval	No		No	.	.
STATECODE	Input	Nominal	No		No	.	.
Standard_Orders_Used	Input	Nominal	No		No	.	.
ZIP	Input	Nominal	No		No	.	.
admit_month	Input	Interval	No		No	.	.
dx_code	Input	Interval	No		No	.	.
dx_group	Input	Nominal	No		No	.	.
gender	Input	Nominal	No		No	.	.
i	Input	Interval	No		No	.	.
icd9_target	Input	Interval	No		No	.	.
op_visits6	Input	Interval	No		No	.	.
operationcount	Input	Interval	No		No	.	.
order_set_used	Input	Interval	No		No	.	.
order_total_charges	Input	Interval	No		No	.	.
race_cd	Input	Nominal	No		No	.	.
readmit_date	Time ID	Interval	No		No	.	.
readmit_days	Input	Nominal	No		No	.	.
readmit_discharge_date	Time ID	Interval	No		No	.	.
readmit_month	Input	Interval	No		No	.	.
readmit_number	Input	Interval	No		No	.	.

Explore...
OK
Cancel



Right click on “Cluster” node and click “Run”

The screenshot displays the SAS Enterprise Miner application window titled "Enterprise Miner - ANLY5050_U6A1". The interface includes a menu bar (File, Edit, View, Actions, Options, Window, Help), a toolbar, and a left-hand tree view showing the project structure: ANLY5050_U6A1, Data Sources, Diagrams (with U6A1 selected), and Model Packages.

The main workspace shows a workflow diagram with a node labeled "VILA_HEALTH_LOS_AND_..." connected to a "Cluster" node. A right-click context menu is open over the "Cluster" node, listing the following options: Edit Variables..., Update, Run (highlighted), Create Model Package..., Results..., Export Path as SAS Program, Cut, Copy, Delete, Rename, Select All, Select Nodes, Connect Nodes, and Disconnect Nodes.

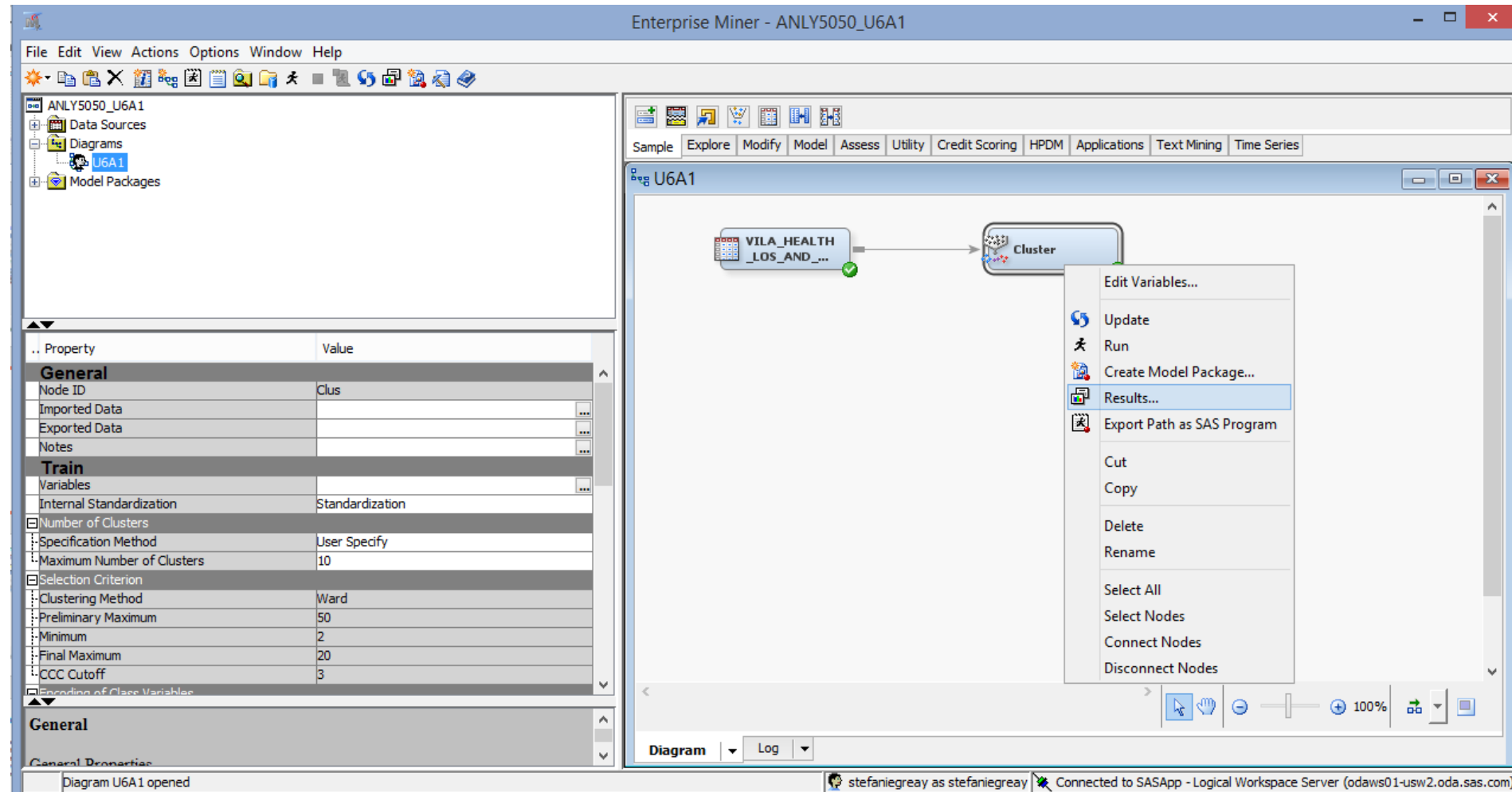
Below the diagram, a properties pane is visible, showing the "General" tab for the selected "Cluster" node. It contains a table of properties and values:

Property	Value
General	
Node ID	Clus
Imported Data	
Exported Data	
Notes	
Train	
Variables	
Internal Standardization	Standardization
Number of Clusters	
Specification Method	User Specify
Maximum Number of Clusters	10
Selection Criterion	
Clustering Method	Ward
Preliminary Maximum	50
Minimum	2
Final Maximum	20
CCC Cutoff	3
Encoding of Class Variables	
General	

The status bar at the bottom indicates "Diagram U6A1 opened" and shows the user "stefaniegray as stefaniegray" connected to the SASApp - Logical Workspace Server.



Right click on the “Cluster” node and click “Results” to view the results.



Selecting the “Optimal” Number of Clusters

- There are many options to select the optimal number of clusters, and it is an art, not a science.
- My preferred method is using the CCC in SAS (the Cubic Cluster Criterion), and plot the change to identify a “good” stopping point for the number of clusters. More details about this criterion are available here:
<https://documentation.sas.com/?docsetId=emref&docsetTarget=n1dm4owbc3ka5jn11yjkod7ov1va.htm&docsetVersion=14.3&locale=en>
- SAS Enterprise Miner has many options for allowing it to select the optimal number of clusters, as well.



To manually specify the number of clusters to create, choose “User Specify” under the Specification Method and enter the desired number of clusters directly below.

The screenshot displays the SAS Enterprise Miner interface. On the left, a tree view shows the project structure with 'ANLY5050_U6A1' selected. Below this, a property window lists various settings for the 'U6A1' model. The 'Specification Method' is set to 'User Specify', and the 'Maximum Number of Clusters' is set to 10. The 'Clustering Method' is set to 'Ward'. The 'Selection Criterion' is set to 'CCC Cutoff'. The 'Encoding of Class Variables' is set to 'Maximum Number of Clusters'. The 'Maximum number of clusters' is set to 10. The 'Diagram' tab is active, showing a flowchart with a data source 'VILA_HEALTH_LOS_AND_...' connected to a 'Cluster' node. The status bar at the bottom indicates 'Diagram U6A1 opened' and 'Connected to SASApp - Logical Workspace Server (odaws01-usw2.oda.sas.com)'.

Property	Value
General	
Node ID	Clus
Imported Data	
Exported Data	
Notes	
Train	
Variables	
Internal Standardization	Standardization
Number of Clusters	
Specification Method	User Specify
Maximum Number of Clusters	10
Selection Criterion	
Clustering Method	Ward
Preliminary Maximum	50
Minimum	2
Final Maximum	20
CCC Cutoff	3
Encoding of Class Variables	
Maximum Number of Clusters	
Maximum number of clusters	10

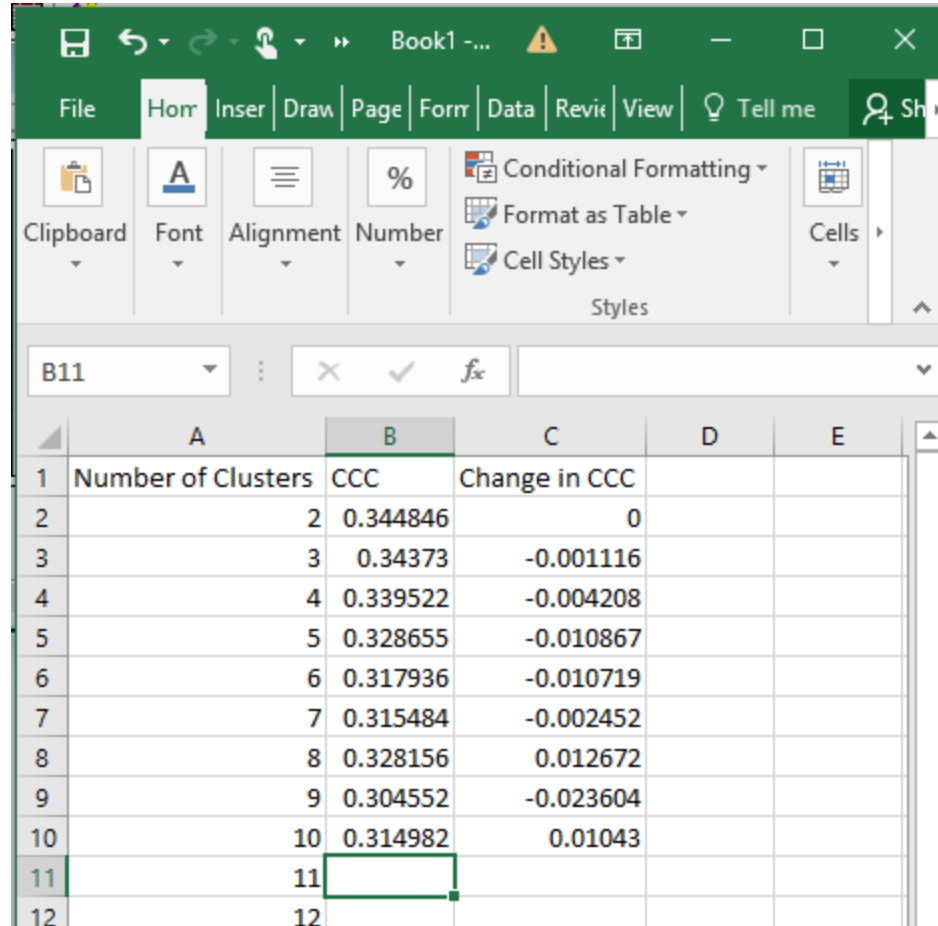


Using the CCC change to select the “Optimal” Number of Clusters

- To use the change in CCC to select the “optimal” number of clusters manually, set the specification method to “User Specify” and start at number of clusters equal to 2.
- Run the cluster node and go to the results.
- In the results, note the CCC in the top right pane.
- Create a spreadsheet with “number of clusters,” “CCC,” and “Change in CCC” as columns.
- Re-run this process, entering the number of clusters and associated CCC for each run, starting at 2 and increasing by 1 each run.
- Calculate the change in CCC value for each run by taking the CCC for each run and subtracting the CCC for the previous run.



The sheet should look something like this.

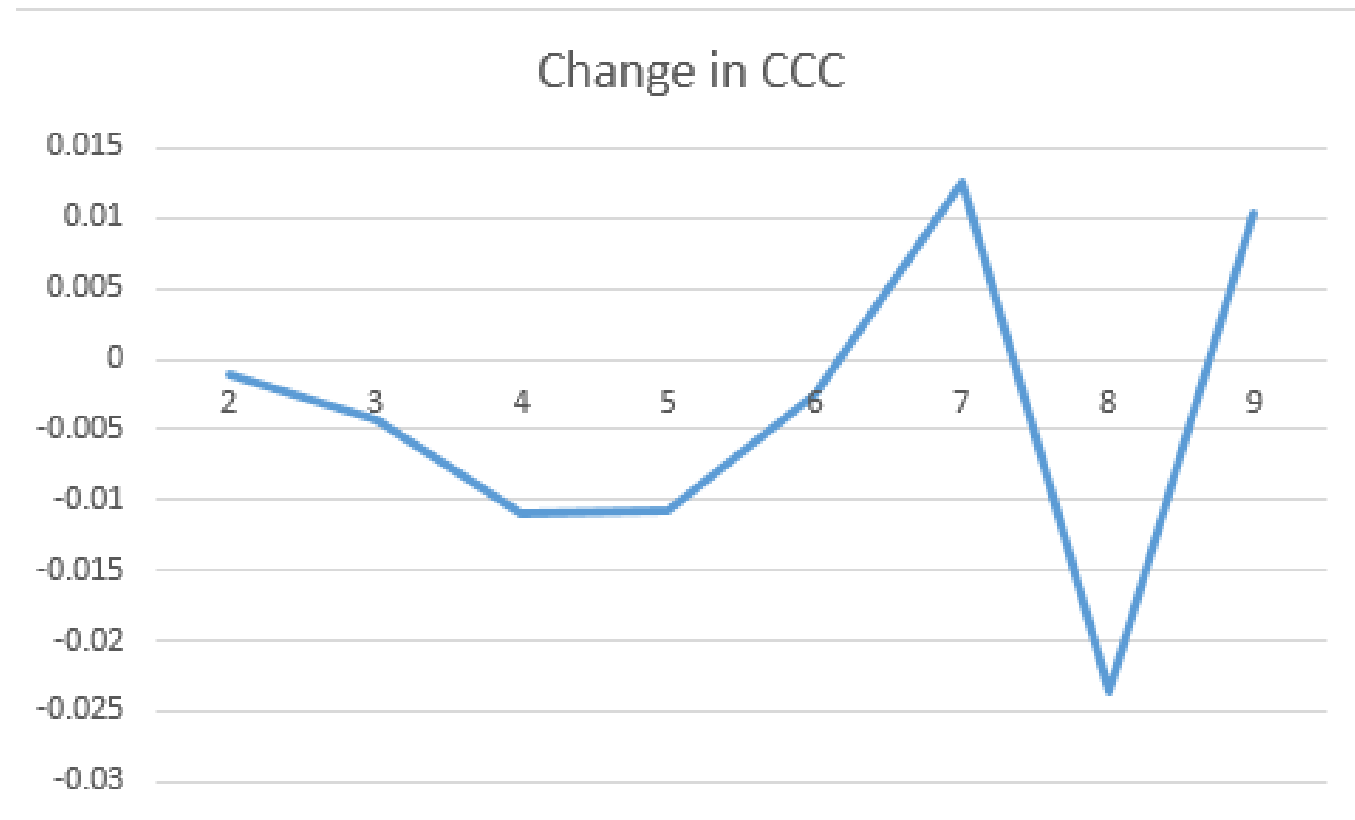


The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E
1	Number of Clusters	CCC	Change in CCC		
2	2	0.344846	0		
3	3	0.34373	-0.001116		
4	4	0.339522	-0.004208		
5	5	0.328655	-0.010867		
6	6	0.317936	-0.010719		
7	7	0.315484	-0.002452		
8	8	0.328156	0.012672		
9	9	0.304552	-0.023604		
10	10	0.314982	0.01043		
11	11				
12	12				



You can then graph (using a line graph) the change in CCC column, which should look something like this. One of the “elbows” or points of great change would be a good option for selecting a number of clusters.



After number of cluster identification/selection

- After you select or identify a number of clusters, re-run the cluster node with that specific number of clusters
- Then view/review the results to analyze and interpret the clusters themselves
- Two areas you will definitely want to review are:
 - The variables that contribute to the creation of each of the clusters
 - The aspects of those variables for the observations in each cluster (i.e. frequencies for categorical variables and summaries for numeric variables)



To allow SAS Enterprise Miner to determine the number of clusters to create, choose “Automatic” under the Specification Method and enter the selection options in the Selection Criteria section below that.

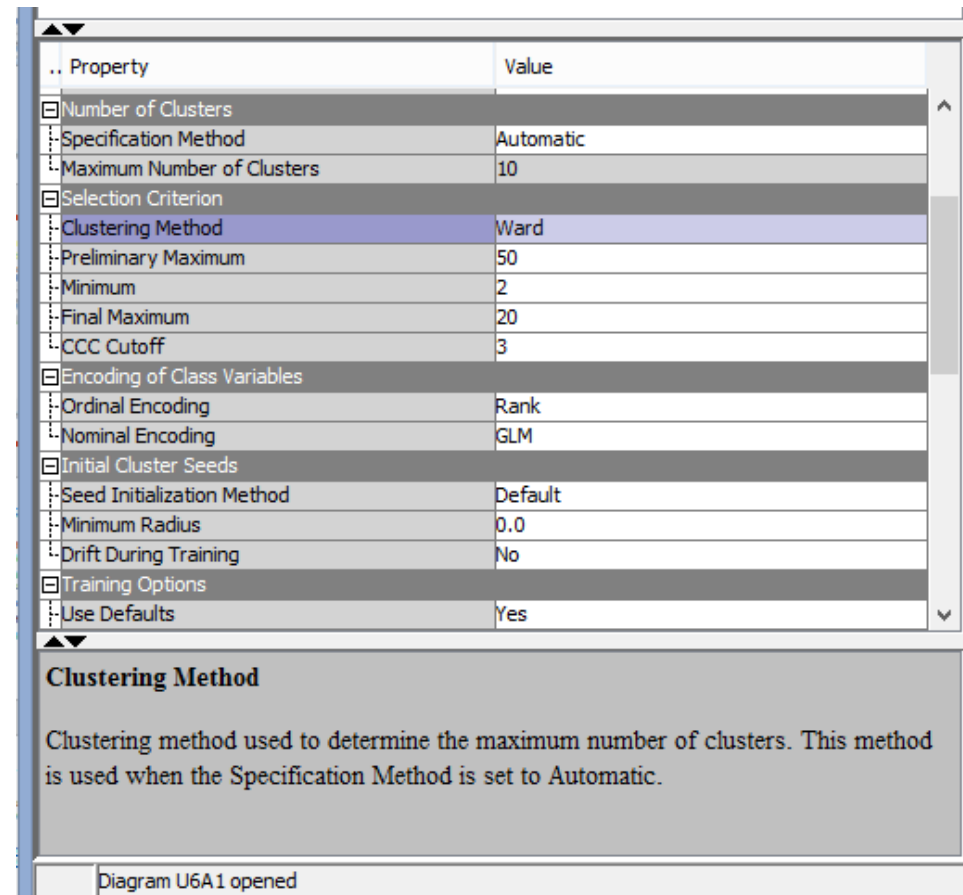
The screenshot displays the SAS Enterprise Miner interface. On the left, a tree view shows the project structure: ANLY5050_U6A1, Data Sources, Diagrams (containing U6A1), and Model Packages. Below this, the 'U6A1' diagram is selected, showing a flow from a data source 'VILA_HEALTH_LOS_AND_...' to a 'Cluster' node. The bottom-left pane shows the 'Clustering Method' properties, which are configured as follows:

Property	Value
Number of Clusters	
Specification Method	Automatic
Maximum Number of Clusters	10
Selection Criterion	
Clustering Method	Ward
Preliminary Maximum	50
Minimum	2
Final Maximum	20
CCC Cutoff	3
Encoding of Class Variables	
Ordinal Encoding	Rank
Nominal Encoding	GLM
Initial Cluster Seeds	
Seed Initialization Method	Default
Minimum Radius	0.0
Drift During Training	No
Training Options	

The bottom-right pane shows the 'Diagram' tab for 'U6A1', displaying the flow from the data source to the 'Cluster' node. The status bar at the bottom indicates the user is 'stefaniegreay as stefaniegreay' and is 'Connected to SASApp - Logical Workspace Server (odaws01-usw2.oda.sas.com)'.



If you click on the grey area of the specific option, a summary of that property is shown in the pane below the property pane we are editing. SAS's product help documentation for the Cluster Node goes into more detail for each of these options.



Considerations and Standards

- 1) Sample size and whether or not to subset into train/test/validate
- 2) Supervised vs Unsupervised
- 3) Variables to include (and whether to reduce the variables first, by using PCA, for example)
- 4) Number of clusters
- 5) Interpreting the clusters

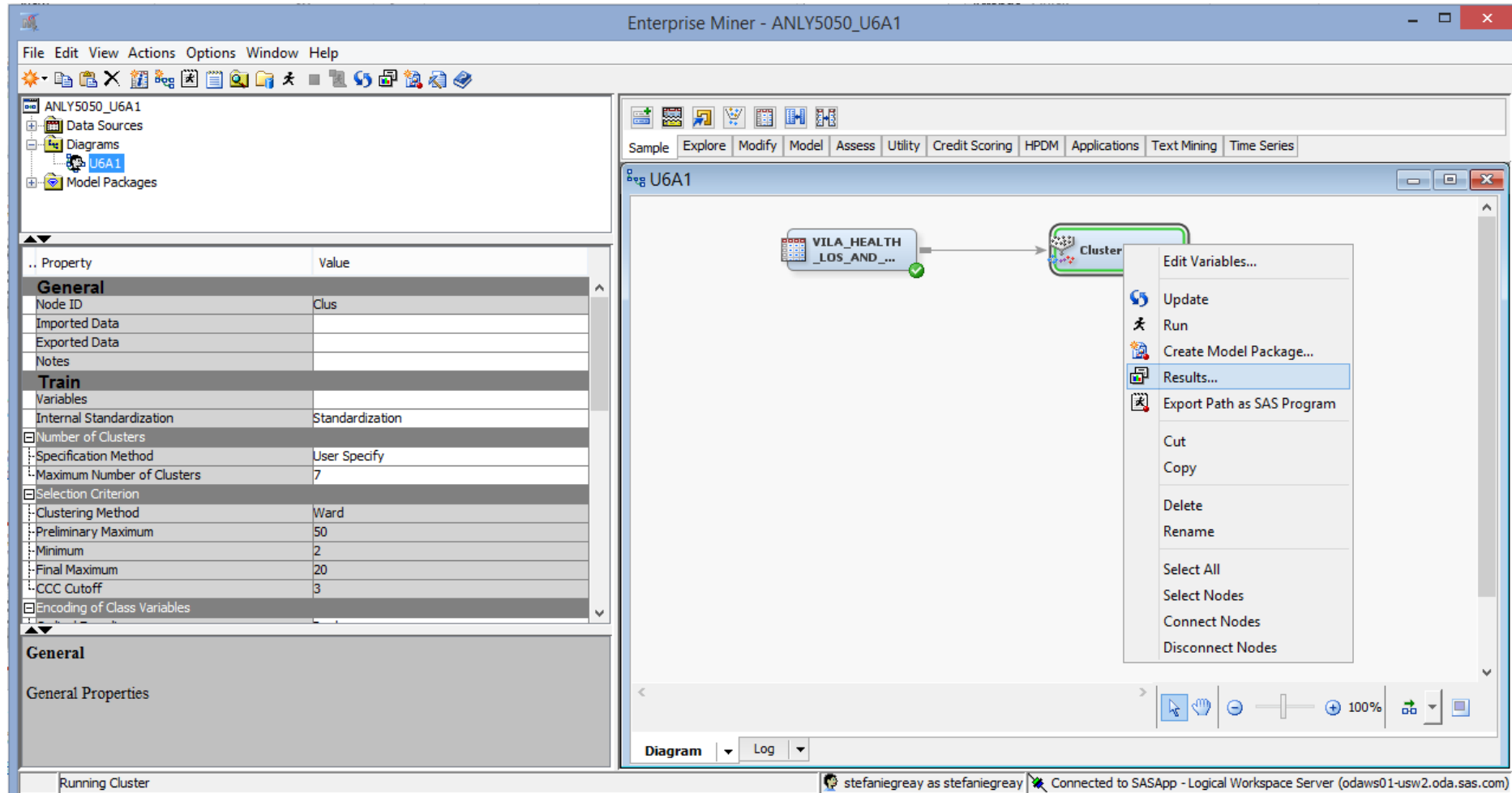
It's a bit older but here is a good review of some of the standards used in marketing (and whether they are supported in academic research):

Dolnicar, S. (2002). A review of unquestioned standards in using cluster analysis for data-driven market segmentation. Faculty of Commerce-Papers, 273.

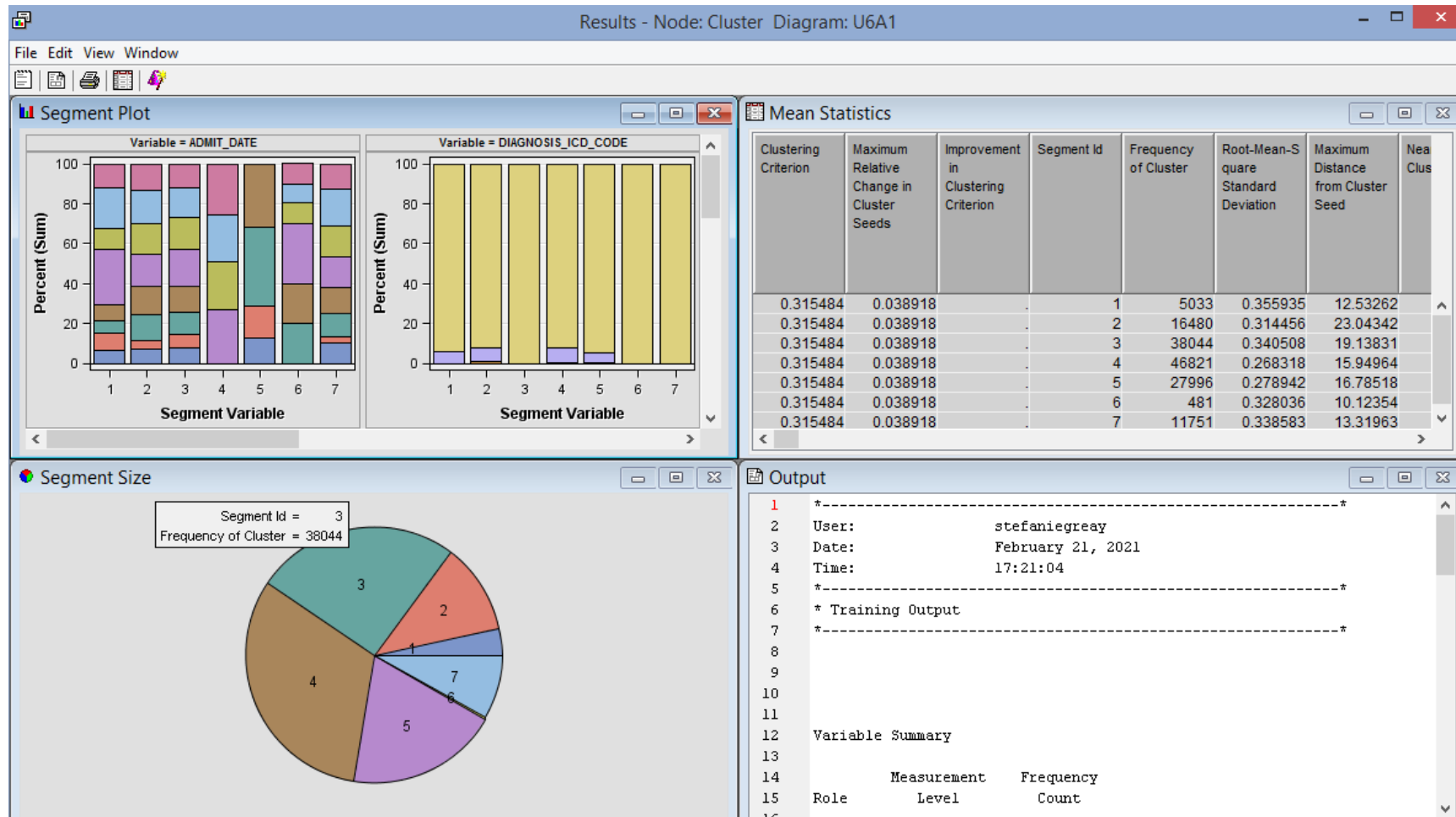
<http://ro.uow.edu.au/cgi/viewcontent.cgi?article=1286&context=commpapers>



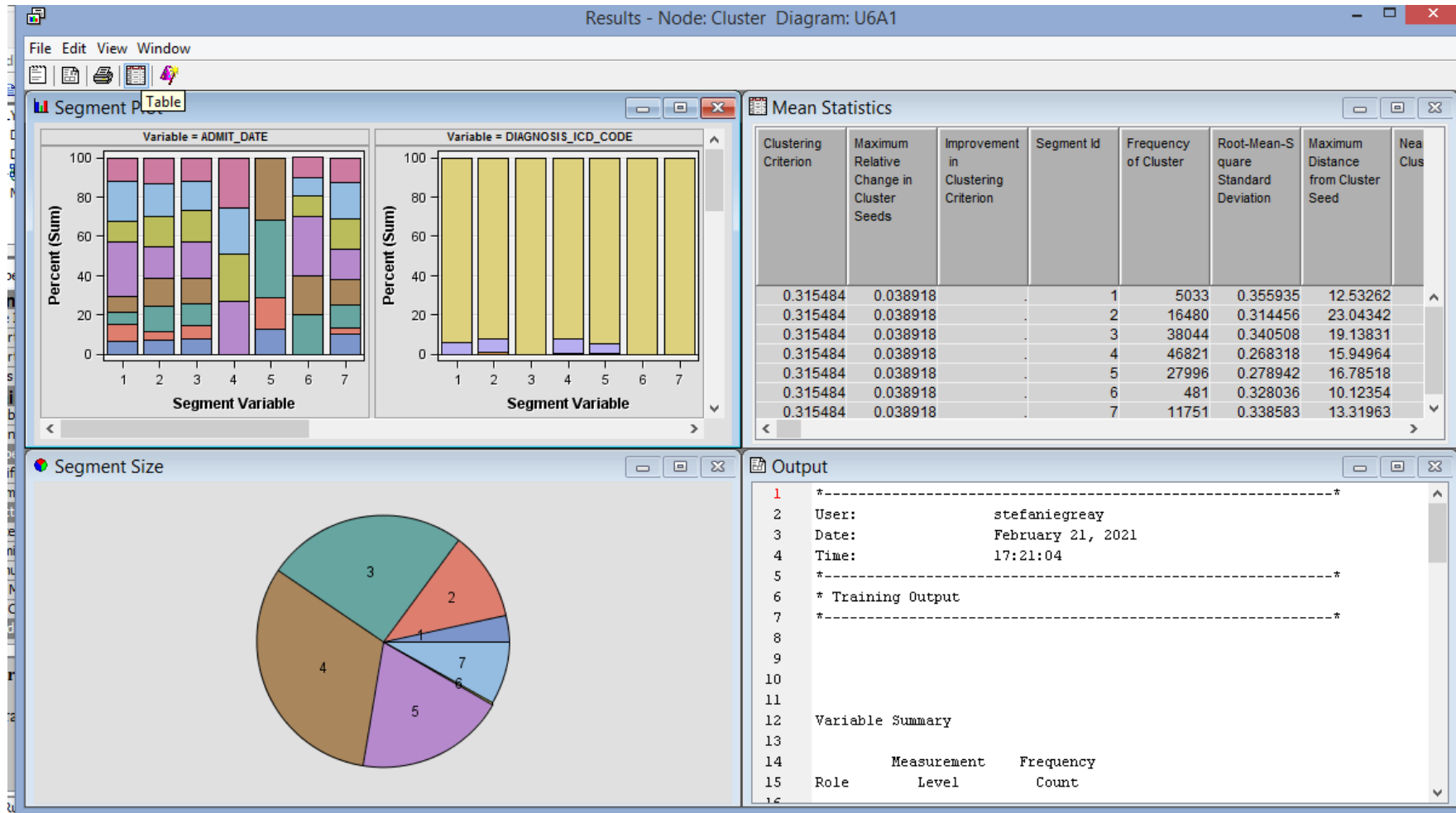
To review the results of the cluster analysis, right click on the “Cluster” node and select “Results.”



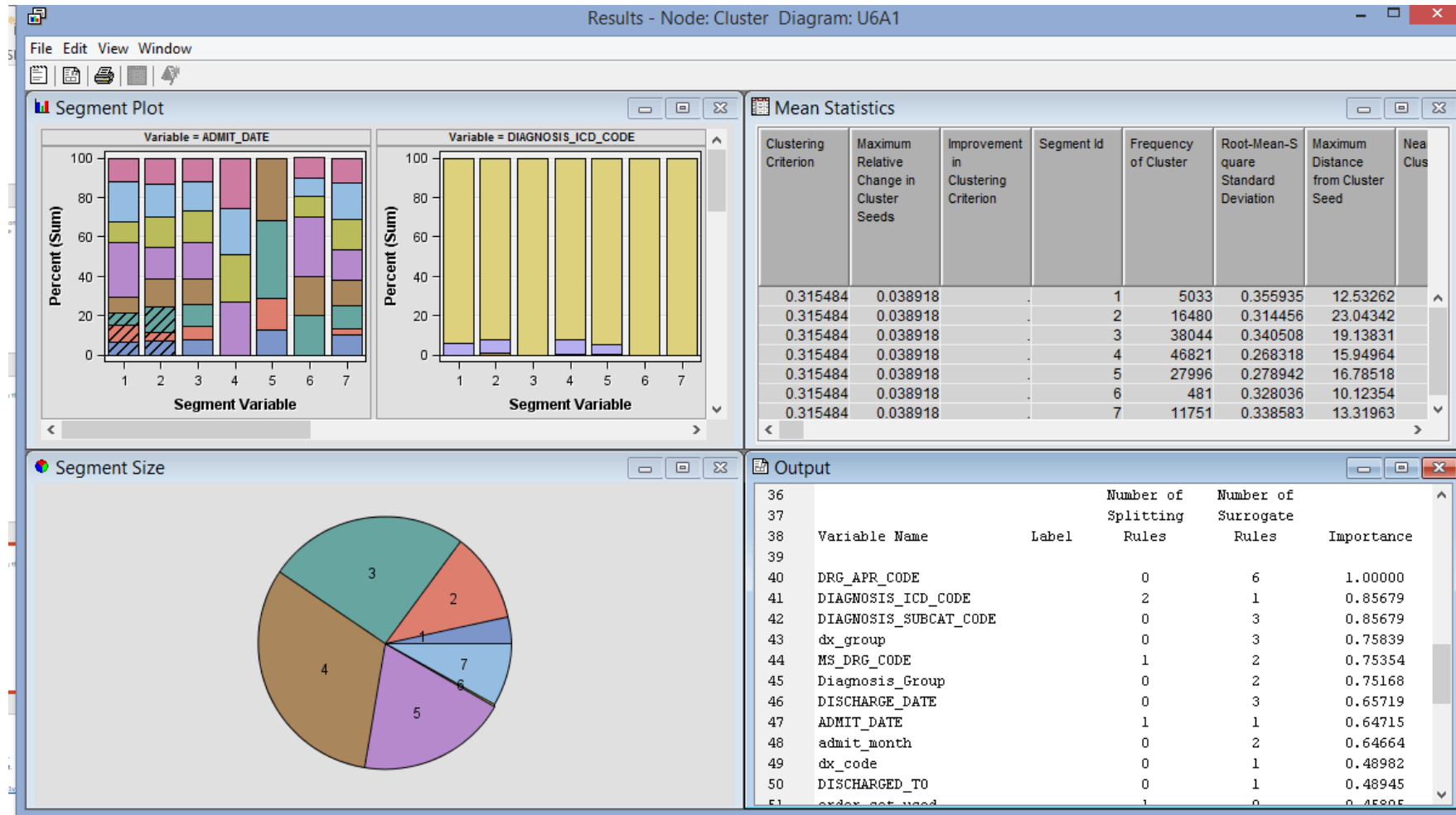
The segment chart in the bottom left will show how many observations fall into each segment/cluster if you hover over each slice, so will the top right table. Use this to summarize the size of the clusters.



Clicking on “Table” (the picture of a table) on the top left will display the table of the segment plot.



Scrolling down in the Output pane, you can see the importance of the variables in creating the clusters.



To view the cluster numbers merged back to the original dataset, so that you can identify and analyze the observations within the clusters, right click on the Cluster node, then click the elipses next to output data.

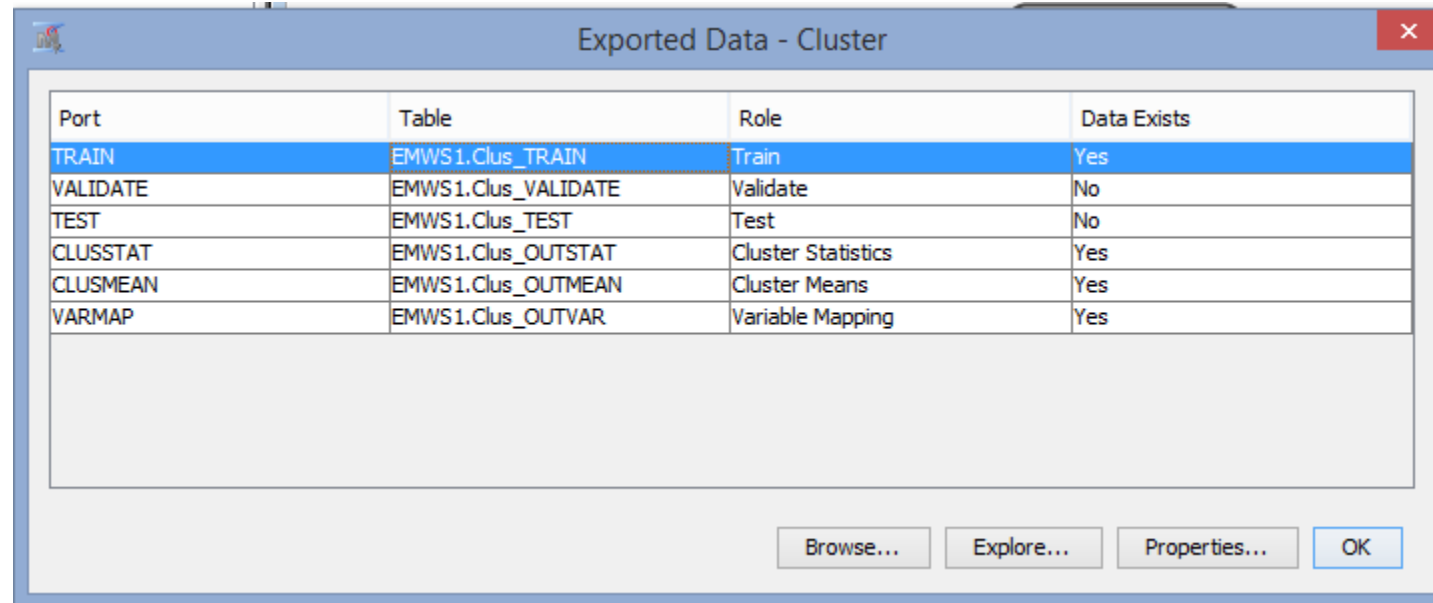
The screenshot displays the SAS Enterprise Miner interface. The main window, titled "Enterprise Miner - ANLY5050_U6A1", shows a workflow diagram with two nodes: "VILA_HEALTH_LOS_AND_..." and "Cluster". The "Cluster" node is highlighted, and its properties are visible in the left-hand panel. The properties panel is divided into sections: General, Train, and Exported Data. The "Exported Data" section is currently selected, showing a table with the following data:

Property	Value
Node ID	Clus
Imported Data	
Exported Data	
Notes	

The "Exported Data" section also includes a "Set of tables exported by this node." field. The bottom status bar indicates the user is "stefaniegreay as stefaniegreay" and is "Connected to SASApp - Logical Workspace Server (odaws01-usw2.oda.sas.com)".



The EMWS1.Clus_TRAIN dataset has the original data with the cluster number and description included in it. You can explore that by clicking on “Explore,” review the properties of it by clicking on “Properties,” or may access this data in a code node.



Port	Table	Role	Data Exists
TRAIN	EMWS1.Clus_TRAIN	Train	Yes
VALIDATE	EMWS1.Clus_VALIDATE	Validate	No
TEST	EMWS1.Clus_TEST	Test	No
CLUSSTAT	EMWS1.Clus_OUTSTAT	Cluster Statistics	Yes
CLUSMEAN	EMWS1.Clus_OUTMEAN	Cluster Means	Yes
VARMAP	EMWS1.Clus_OUTVAR	Variable Mapping	Yes

Browse... Explore... Properties... OK



Analyzing the clusters

- 1) You may use a data step to create a separate dataset with the observations from each cluster, and analyze it that way, or
- 2) You may use proc freq and proc univariate with the appropriate types of variables with by statements for the cluster variable, which has a label of “Segment ID” but you can check the specific variable name in the properties of that dataset.
- 3) You can technically do this for every variable used in the creation of the clusters, but it’s often only useful to do so for the top x number of contributing variables, as this usually is most helpful for explaining/describing each cluster and it’s contents.



SAS Documentation Reference

The link below brings you to the SAS Documentation on the Cluster Node, which has an example, including interpretation of the output.

<https://documentation.sas.com/?docsetId=emref&docsetTarget=n1vjatb74dundbn12d2ecb09juak.htm&docsetVersion=14.3&locale=en>

