

Oracle® Retail Grade

User Guide

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Oracle Retail Grade User Guide, Release 13.2

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Primary Author: Melissa Artley

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Contents

Send Us Your Comments	vii
Preface	ix
Audience	ix
Documentation Accessibility	ix
Related Documents	x
Customer Support	x
Review Patch Documentation	x
Oracle Retail Documentation on the Oracle Technology Network	x
Conventions	xi
 1 Overview	
Introduction	1-1
Cluster Methods in Grade	1-2
Breakpoint	1-2
Index to Average	1-2
Batch Neural Gas Algorithm (BaNG)	1-2
BaNG vs Breakpoint	1-2
Grade in a Global Domain Environment	1-3
 2 Breakpoints Administration Workbook	
Creating a Breakpoints Administration Template Workbook	2-1
Breakpoint Administration Worksheet Overview	2-1
 3 Generate Breakpoint Grades Using the Breakpoints Method	
Opening the Generate Breakpoint Grades Template Wizard	3-1
Generating Breakpoint Grades Wizard	3-1
 4 Generate Clusters Using the Clustering Method	
Opening the Generate Clusters Template Wizard	4-1
Generating Clusters Wizard	4-1
 5 Cluster and Breakpoint Grade Review	
Opening the Cluster Review Template Workbook	5-1

Cluster Review Wizard	5-1
Select Grade Birth to Review.	5-1
Select Additional Measures to Include in the Workbook.	5-1
Optional Additional Measures	5-1
Cluster Review Workbook	5-2
Gen ID.....	5-2
Cluster Results Tab	5-3
Cluster Membership Worksheet.....	5-3
Cluster Statistics Worksheet.....	5-4
Cluster Centroid Statistics Worksheet	5-5
Source Data Worksheet.....	5-5
Cluster Input Summary Workbook Tab	5-6
Summary Worksheet.....	5-6

6 Delete Clusters

Opening the Delete Cluster Run Template Wizard	6-1
Delete Cluster Run Wizard	6-1

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Preface

The *Oracle Retail Grade User Guide* describes the application's user interface and how to navigate through it.

Audience

This document is intended for the users and administrators of Oracle Retail Grade. This may include merchandisers, buyers, and business analysts.

Documentation Accessibility

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Related Documents

For more information, see the following documents in the Oracle Retail Grade Release 13.2 documentation set:

- *Oracle Retail Grade Release Notes*
- *Oracle Retail Grade Configuration Guide*

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- Functional and technical description of the problem (include business impact)
- Detailed step-by-step instructions to re-create
- Exact error message received
- Screen shots of each step you take

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When you install the application for the first time, you install either a base release (for example, 13.1) or a later patch release (for example, 13.1.2). If you are installing the base release, additional patch, and bundled hot fix releases, read the documentation for all releases that have occurred since the base release before you begin installation. Documentation for patch and bundled hot fix releases can contain critical information related to the base release, as well as information about code changes since the base release.

Oracle Retail Documentation on the Oracle Technology Network

Documentation is packaged with each Oracle Retail product release. Oracle Retail product documentation is also available on the following Web site:

http://www.oracle.com/technology/documentation/oracle_retail.html

(Data Model documents are not available through Oracle Technology Network. These documents are packaged with released code, or you can obtain them through My Oracle Support.)

Documentation should be available on this Web site within a month after a product release.

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
<code>monospace</code>	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Grade is a clustering tool that provides insight into how various parts of a retailer's operations can be grouped together. Typically, a retailer may cluster stores over item sales to create logical groupings of stores based upon sales of particular products. This provides increased visibility to where products are selling, and it allows the retailer to make more accurate decisions in merchandising. Beyond this traditional use of clusters, Grade is flexible enough to cluster any business measure based on products, locations, time, promotions, customers, or any hierarchy configured in the solution.

Introduction

Key Grade functionality includes:

- Two methods of creating Grades/Clusters:
 - Breakpoints: the sorting of data points into groups based on user-defined indexes
 - Clustering, or the BaNG, Algorithm: the optimization of data points into clusters based on the user-defined number of clusters
- Group By capabilities: support the segmentation of clusters for more detailed and focused cluster generation
- Clustering statistics: provide insight into the relationship of members within a cluster and how all clusters relate to one another
- Cluster What-if'ing: allows user changes to members assigned to clusters and the review of recalculated clustering statistics

Regardless of the method employed to create clusters, Grade is designed to support the decision-making process necessary to create effective and actionable groupings of data. The following chapters describe the process to generate grades/clusters and analyze results. All of Grade's functionality exists in the following templates:

- Breakpoints Administration workbook
- Generate Breakpoint Grades wizard
- Generate Clusters wizard
- Cluster Review workbook
- Delete Clusters wizard

Information on the functionality of the previous templates is provided in the following sections.

Cluster Methods in Grade

Grade supports two cluster methods: Breakpoint and BaNG. The following sections describe these two methods.

Breakpoint

Breakpoint method clusters, or groups, data points based on user-defined thresholds, or breakpoints. Breakpoints are properly defined by entering a decreasing sequence of real numbers that terminate in a value of zero. Breakpoints are entered in the breakpoints administration workbook. Breakpoints are then used to cluster data points based on the index to average of each data point.

Example 1–1 Breakpoint

While clustering stores, if the user has entered the breakpoints 2.0, 1.5, 1.0, 0.5, and 0.0, the system will generate five grades. Stores that sell more than 2.0 times the average sales (over all stores) will be assigned to the highest grade, and stores that sell less than 0.5 times the average will be assigned to the lowest grade.

Index to Average

Index to Average is the average sales of the stores in each grade divided by the average sales of all stores. This value provides a relative indication of how well a grade performed compared to the total store average. A value of 1.00 indicates that average sales in the grade were the same as average sales across the chain. A value of 3.74, for example, indicates that average sales in the grade were 3.74 times the chain average.

Batch Neural Gas Algorithm (BaNG)

The BaNG algorithm automatically generates optimal clusters based on user-specified number of clusters and clustering criteria. The algorithm provides a means for clustering data based on data distributions. For example, while clustering on weekly store sales data, the BaNG algorithm considers the Euclidean distance of the individual Store/week level data points from a cluster center to determine the clusters. This is different from the Breakpoint method, where clustering is performed based on average sales.

The BaNG algorithm iteratively updates cluster centers while considering the distance of each data vector from the cluster centers and its contribution to each cluster center. For every data point, cluster centers are ranked based on their distance from the data point within each iteration.

Additionally, the cluster centers are guided, using a control parameter, to gradually spread from the center of the distribution to their optimal locations.

The BaNG algorithm is a non-trivial extension of the K-means clustering approach. It is usually faster than the K-means, and is guaranteed to converge.

BaNG vs Breakpoint

The BaNG algorithm generates statistically optimal clusters based on the number of clusters specified by the user. Breakpoint generates clusters based on user input breakpoints, and the number of clusters generated depends on the breakpoints.

In order to generate store clusters that vary by Dept, users need to specify a Group By option of Dept. Breakpoint will cluster stores based on the ratio of total store sales versus the average total store sales within each Group By intersection. BaNG can

consider an additional dimension for generating the clusters. For example, BaNG can cluster based on weekly sales of each stores within the Dept. Here, weekly sales are the coordinates over which the clustering is performed.

Grade in a Global Domain Environment

When implemented in a global domain environment, the following workbooks are available to be accessed from the Master domain:

- Breakpoint Administration

Note: The Breakpoint Administration workbook is accessible from the Master domain to allow for the centralized administration of breakpoints.

The remaining Grade workbooks can only be accessed from local domains. These include:

- Cluster Review
- Delete Cluster Run
- Generate Breakpoint Grades
- Generate Clusters

Breakpoints Administration Workbook

The Breakpoints Administration workbook is used with the breakpoints method of grading. In this workbook, the user sets the index to average for each breakpoint. This includes the ability to set multiple breakpoint configurations to allow for Grades to be produced and compared using different breakpoint settings.

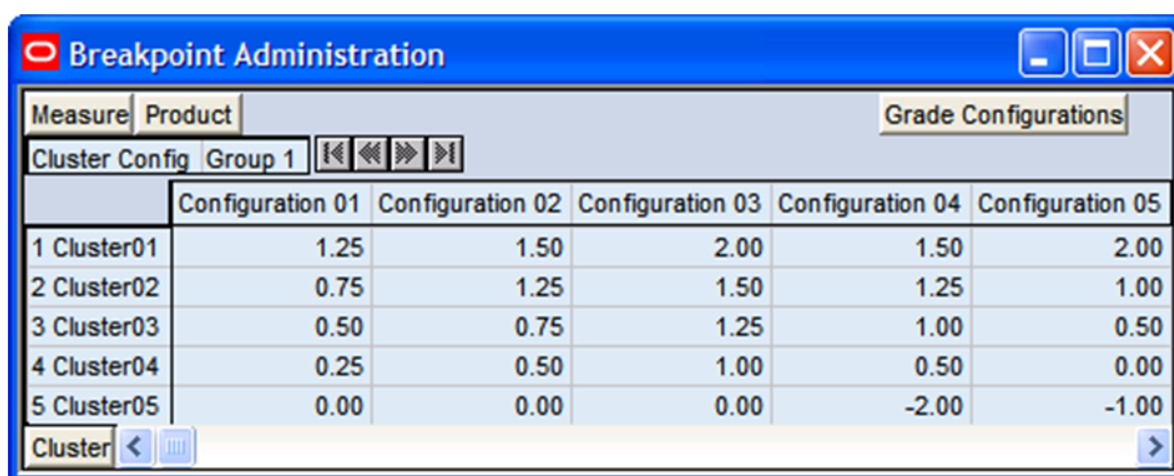
Creating a Breakpoints Administration Template Workbook

1. In the Simple or Local Domain, select **New** from the **File** menu.
2. Select the **Grade** tab to display a list of workbook templates.
3. Select **Breakpoints Administration**. Click **OK**.

Breakpoint Administration Worksheet Overview

If the breakpoints method is to be used to generate grades, you must go through the process of setting of the Index to Average for each grade's breakpoint range. [Figure 2-1](#) is an example of the Breakpoint Administration worksheet:

Figure 2-1 Breakpoint Administration Worksheet



The screenshot shows a software window titled "Breakpoint Administration". Inside, there's a "Grade Configurations" tab. Below it, a table lists five clusters (Cluster01 to Cluster05) across five configurations (Configuration 01 to Configuration 05). The values represent the index to average for each grade's breakpoint range. Navigation buttons for "Cluster" and "Group 1" are visible at the bottom.

	Configuration 01	Configuration 02	Configuration 03	Configuration 04	Configuration 05
1 Cluster01	1.25	1.50	2.00	1.50	2.00
2 Cluster02	0.75	1.25	1.50	1.25	1.00
3 Cluster03	0.50	0.75	1.25	1.00	0.50
4 Cluster04	0.25	0.50	1.00	0.50	0.00
5 Cluster05	0.00	0.00	0.00	-2.00	-1.00

On the Breakpoint Administration worksheet, for a Configuration/Cluster intersection, set the Index to Average to be used by the Breakpoints algorithm for sorting data points into grades. The number of configurations available in this worksheet is based on the Maximum Number of Clusters configured in the Grade Plug-In. Only one configuration is required for use with the breakpoints method.

Breakpoints should be set from high Index to Average to low Index to Average starting with the first Cluster ordered in the list of available clusters.

Note: The Cluster Labels may vary based on the configuration.

In the example in [Figure 2–1](#), the Index to Average is set as the following for Configuration 01:

- 1 Cluster01: 1.25
- 2 Cluster02: 0.75
- 3 Cluster03: 0.50
- 4 Cluster04: 0.25
- 5 Cluster05: 0.00

Using this example, the Breakpoints algorithm groups data based on the following:

Data	Description
1 Cluster01	Sort all data with an Index to Average at or above 1.25 into 1 Cluster01.
2 Cluster02	Sort all data with an Index to Average from 0.75 to 1.24 into 2 Cluster02.
3 Cluster03	Sort all data with an Index to Average from 0.50 to 0.74 into 3 Cluster03.
4 Cluster04	Sort all data with an Index to Average from 0.25 to 0.49 into 4 Cluster04.
5 Cluster05	Sort all data with an Index to Average from 0.00 to 0.24 into 5 Cluster05.
Junk Cluster	Using the above example, all data points with an Index to Average that is less than 0.00 will be sorted into the 'Junk Cluster'.
No Cluster	Any data points with null values in history (no loaded history) will not be graded. See the 'Cluster Review Workbook' for more information on Cluster Membership results.

Generate Breakpoint Grades Using the Breakpoints Method

The Generate Breakpoint Grades wizard allows you to range the input data and hierarchies that will be used to produce grades based on the Breakpoints method.

Opening the Generate Breakpoint Grades Template Wizard

1. Within the Simple or Local Domain, select **New** from the **File** menu.
2. Select the **Grade** tab to display a list of workbook templates.
3. Select **Generate Breakpoints Grades**. Click **OK**.

Generating Breakpoint Grades Wizard

The following steps outline the wizard process required to use the Generate Breakpoint Grades wizard:

1. Select Source Measure for Cluster Analysis.

This wizard screen prompts the user to select the measure that will be used to generate clusters. The options include all source measures defined at the time of the configuration.

2. Select Hierarchy and Dimension to Cluster On.

The Cluster On dimension is the dimension that will be clustered. For example, while generating store clusters, store would be the Cluster On dimension. All positions in this dimension are sorted into grades based on the Breakpoints Configuration that will be selected later in this wizard process.

Note: The dimension chosen should be at or above the base intersection of the selected Source Measure.

3. **Optional:** Select Hierarchy and Dimension to Group By.

By Group is an optional setting that is used to partition data along a hierarchy dimension. This functionality allows for grades to be further segmented along multiple hierarchy dimensions. Grades are generated independently for each position within the selected dimensions. The dimensions displayed are equal to or higher than the Cluster On dimension.

For example, while clustering stores by Dept, that is., cluster stores by a Department at a time, the Cluster By Group is Department.

4. Select Products.

Select the products for which you want to generate clusters.

5. Select Locations.

Select the locations for which you want to generate clusters.

6. Select Calendar.

Select the time periods that you want to be considered when generating clusters.

7. Select Configuration Name.

Select the Breakpoint Configuration that will be used to produce the grades. These configurations must be set prior to generating grades using the Breakpoint Administration workbook.

8. Set Grade Run Name.

Assign a label that will be used to identify the clustering run.

9. Select **Next** or **Finish**.

If **Next** is selected, *Break Point Run Succeeded* displays once the grading process is completed. If **Finish** is selected this message is skipped.

Generate Clusters Using the Clustering Method

The Generate Clusters wizard allows you to range the input data and hierarchies that will be used to produce clusters based on the Clustering (BaNG) method.

Opening the Generate Clusters Template Wizard

1. Within the Simple or Local Domain, select **New** from the **File** menu.
2. Select the **Grade** tab to display a list of workbook templates.
3. Select **Generate Clusters**. Click **OK**.

Generating Clusters Wizard

The following steps outline the wizard process required to use the Generate Clusters wizard:

1. Select Source Measure for Cluster Analysis.

This wizard screen prompts the user to select the measure that will be used to generate clusters. The options include all source measures defined at the time of the configuration.

2. Select Hierarchy and Dimension to Cluster On.

The Cluster On dimension is the dimension that will be clustered. For example, while generating store clusters, store would be the Cluster On dimension.

Note: The dimension chosen should be at or above the base intersection of the selected Source Measure.

3. Select Hierarchy and Dimension to Cluster Over.

The Cluster Over dimension allows the user to define the dimension that will be used for clustering. The algorithm uses the positions in this dimension as the co-ordinates when clustering. Internally, data will be aggregated to this level before performing the clustering. For example, when using SKU/Store/week level sales data to generate store clusters, the user has the option of specifying a dimension, such as Week, to which sales data will be aggregated. In this case, the algorithm considers Store/Week positions and clusters stores based on their weekly sales.

Note: The dimension chosen should be at or above the base intersection of the selected Source Measure.

Note: The hierarchies presented in this wizard screen include all hierarchies associated with the base intersection of the source measure except the hierarchy and dimension chosen to Cluster On.

4. Optional: Select Hierarchy and Dimension to Group By.

By Group is an optional setting that is used to partition data along a hierarchy dimension. This functionality allows for clusters to be further segmented along multiple hierarchy dimensions. Clusters are generated independently for each position within the selected dimensions. The dimensions displayed are equal to or higher than the 'Cluster On' and 'Cluster Over' dimensions.

For example, while clustering stores by Dept, that is, cluster stores by a Department at a time, the Cluster By Group is Department.

5. Select Products.

Select the products for which you want to generate clusters.

6. Select Locations.

Select the locations for which you want to generate clusters.

7. Select Calendar.

Select the time periods that you want to be considered when generating clusters.

8. Set Name of Clusters.

Assign a label that will be used to identify the clustering run.

9. Set Number of Clusters.

Define the number of clusters that are generated during the cluster generation process. If a Group By dimension was selected, this is the number of clusters that will be generated for each data partition within the dimension. The number of clusters that may be generated is based on the maximum number of clusters configured in the Grade configuration. See the Grade Configuration Guide for more information on Grade solution configuration.

10. Select **Next** or **Finish**.

If **Next** is selected, *Cluster Run Succeeded* displays once the grading process is completed. If **Finish** is selected, this message is skipped.

Cluster and Breakpoint Grade Review

The Cluster Review workbook is a view of grade or cluster results and statistics. This workbook supports grade/cluster What-if'ing; the re-assignment of members to grades/clusters on the fly and the recalculation of clustering statistics. In addition, measures from different cluster runs may be inserted into the workbook to compare results.

Opening the Cluster Review Template Workbook

1. Within the Simple or Local Domain, select **New** from the **File** menu.
2. Select the **Grade** tab to display a list of workbook templates.
3. Select **Cluster Review**. Click **OK**.

Cluster Review Wizard

The following sections outline the wizard process that is required to review grade and cluster results using the Cluster Review wizard:

Select Grade Birth to Review.

Select the Grade Birth you want to review.

Select Additional Measures to Include in the Workbook.

This wizard screen displays all measures in the domain with the Insertable measure property set to true. All measures generated as part of the clustering process for the birth date selected in the previous step are included in the base workbook template. These measures should not be selected in this wizard; however, measures associated with other cluster runs may be selected for comparison (for example, to compare results using Breakpoints versus the Clustering method). To compare cluster results in this workbook, it is required that the cluster runs measures are generated with the same Cluster On and Group By dimensions.

Optional Additional Measures

The following additional measures can be added to the workbook by selecting them from the Additional Measures wizard screen, in the Cluster Review Wizard.

Note: Once a cluster has been generated, all elements that have clustered together are referred to as members of the cluster in the following documentation. For example, while clustering stores, all stores that have been assigned to a cluster are its members.

Measure	Description
Aggregation Method	This is a read only measure that displays the Aggregation method used to aggregate Source data to the cluster over dimension for generating the clusters.
Cluster By Group Intersection	This is chosen by the user while generating the cluster run. For example, while clustering stores by time period, such as quarter, the Cluster By Group is Qtr (within the Calendar hierarchy). This means that clusters are generated one quarter at a time.
Cluster Method	The method used for clustering
Cluster Run Name	The name associated with the cluster run, entered by the user at cluster generation time.
Dimension to Cluster	The 'Cluster Over' dimension is the dimension that was used for clustering. The algorithm uses the positions in this dimension as the co-ordinates when clustering. Internally, data will be aggregated to this level before performing the clustering. For example, when using SKU/Store/week level sales data to generate store clusters, the user has the option of specifying a dimension, such as Week, that will be used to aggregate the sales data to. In this case, the algorithm considers Store/Week positions and clusters stores based on their weekly sales. Note: The dimension chosen should be at or above the base intersection of the selected Source Measure.
Mask Array for Clustering	A Boolean mask array indicating whether or not the element was used in the clustering run.

Cluster Review Workbook

The Cluster Review Workbook contains the following workbook tabs and worksheets:

Workbook	Worksheet
Cluster Results workbook tab	■ Cluster Membership worksheet ■ Cluster Statistics worksheet ■ Cluster Centroid Statistics worksheet ■ Source Data worksheet
Cluster Input Summary workbook tab	■ Summary worksheet

Gen ID

All measures that are specific to a given cluster run will have a Gen ID appended to them. This will allow users to store and review results from multiple cluster runs. Since the Cluster Review workbook allows users to review cluster results for a given cluster, most of the measures in this workbook will be appended by a Gen ID.

Cluster Results Tab

Cluster Membership Worksheet

Figure 5–1 Cluster Membership Worksheet

	Cluster Membership Genk	Squared Distance from
Barcelona	2 Cluster02	12568.89
Berlin	1 Cluster01	16561.50
Boston	3 Cluster03	982.50
Catalog Store	0	0.00
Chicago	2 Cluster02	61785.11
Dusseldorf	2 Cluster02	10983.89
E-Osk	0	0.00
E-Store	0	0.00
Lille	2 Cluster02	8238.89
London-Kensington	2 Cluster02	9749.89
London-Oxford Street	1 Cluster01	2925.50
Madrid	2 Cluster02	65448.89
Minneapolis	4 Cluster04	0.00

Field	Description
Cluster Membership	Displays the positions that are assigned to a cluster or grade. Positions may be reassigned to another cluster and the cluster statistics will recalculate based on these user changes. If changes are made to Cluster Membership, the data must be committed for changes to be stored.
Squared Distance from Centroid	A measure that quantifies how close an element is to its statistical centroid. It is calculated as the square of the Euclidian distance of all each elements being clustered from its centroid. One example of a situation where the Squared Distance from Centroid measure would be used is if the user were to cluster stores using the SKU/Store/Week level data, with a cluster over dimension as week (that is, the user clusters stores based on weekly store level sales). In this example, the Squared Distance from Centroid is the square of the Euclidian distance of each store from its centroid, where weekly sales form the coordinates, or dimensions, over which this distance is computed. Note: Euclidian distance is a metric that quantifies the straight line distance between two data points. It is the square root of the differences between coordinates of the two data points.

Cluster Statistics Worksheet

Figure 5–2 Cluster Statistics Worksheet

Cluster	Closest Cluster GenId (02)	Cluster Cohesion GenId (02)	Cluster Portion GenId (02)	Squared Closest Cluster Distance
1 Cluster01	4	200289.76	0.24	518688.04
2 Cluster02	3	25.00	0.10	14515.11
3 Cluster03	4	31.56	0.29	140375.11
4 Cluster04	3	0.00	0.05	140375.11
5 Cluster05	2	83295.10	0.33	336897.33

Field	Description
Closest Cluster	This a read only measure that displays for each cluster the cluster ID that is statistically closest to its centroid. Valid only for clusters generated using the Clustering (BaNG) method.
Cluster Cohesion	A measure that quantifies how tight the cluster is, that is, how similar elements in the cluster are. For example, clustering stores using the SKU/Store/Week level, with a cluster over dimension as week, that is, cluster Stores based on weekly store level sales. First, calculate the Store/week level sales. Next, calculate the Squared Euclidian distance between each Store and its cluster centroid. Finally, calculate the average of this Squared Euclidian distance across all stores that belong to this cluster. Valid only for clusters generated using the Clustering (BaNG) method.
Cluster Portion	The ratio of the number of members in a cluster compared to all members being clustered. For example, while clustering stores, this is the ratio of the number of stores in a cluster to the total number of stores being clustered. Valid only for clusters generated using the Clustering (BaNG) method.
Squared Closest Cluster Distance	The squared Euclidian distance of all data points used for clustering, from the centroid of its nearest cluster. Valid only for clusters generated using the Clustering (BaNG) method.

Cluster Centroid Statistics Worksheet

Figure 5–3 Cluster Centroid Statistics Worksheet

Product	Cluster
100Grocery	1 Cluster01 2 Cluster02 3 Cluster03 4 Cluster04 5 Cluster05
Cluster Centroid GenId (02/08/2008 10:55:14)	470054.50 336243.11 217681.50 142886.00 0.00

Field	Description
Cluster Centroid	The average of the source data measure calculated across all cluster members; calculated by first aggregating the source data to the cluster on dimension for each member. For example, while clustering stores using the SKU/Store/Week level sales history, the centroid is calculated as the average of the total historic sales of each store in the cluster.
Cluster Centroid to Average Ratio	The ratio of the cluster centroid, to the average of all data points used for the cluster run; calculated by first aggregating the source data to the cluster on dimension for each member. For example, while clustering stores using the SKU/Store/Week level sales history, the Cluster to Average Ratio is calculated as the ratio of the Cluster Centroid to the average of the total historic sales for all stores being clustered. Valid only for clusters generated using the Clustering (BaNG) method.

Source Data Worksheet

Figure 5–4 Source Data Worksheet

Product	Measure	Calendar
10000010Leather Loafer - Black 6 B	Clustering Data Source GenId	1/2/1998 1/9/1998 1/16/1998 1/23/1998 1/30/1998 2/6/1998
Barcelona	0.60 0.00 0.30 0.60 0.30 0.60	
Berlin	1.00 0.00 0.50 1.00 0.50 1.00	
Boston	0.40 0.00 0.20 0.40 0.20 0.40	
Catalog Store	1.20 0.00 0.60 1.20 0.60 1.20	
Chicago	0.60 0.00 0.30 0.60 0.30 0.60	
Dusseldorf	0.00 0.00 0.30 0.60 0.30 0.60	

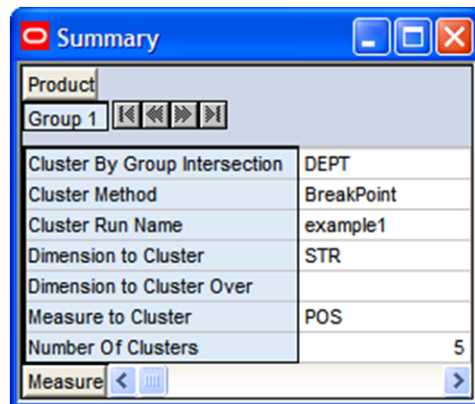
Field	Description
Clustering Data Source	The data used to generate the clusters or grades.

Cluster Input Summary Workbook Tab

The Cluster Input Summary workbook tab is a view to the settings used to generate the grades/clusters being reviewed in the workbook.

Summary Worksheet

Figure 5–5 Summary Worksheet



Field	Description
Cluster By Group Intersection	Displays Group By dimensions if selected during the cluster generation process. For example, while clustering stores by time period, such as quarter, the Cluster By Group is Qtr (within the Calendar hierarchy). This means that clusters are generated one quarter at a time.
Cluster Method	Displays the method used to generate the grades or clusters. Breakpoint or BaNG are valid methods.
Cluster Run Name	Displays the name assigned by the user to the cluster run at the time the clusters were generated.
Dimension to Cluster	Displays the Cluster Over dimension selected by the user during the cluster generation process. The algorithm uses the positions in this dimension as the coordinates when clustering. Internally, data will be aggregated to this level before performing the clustering. For example, when using the SKU/Store/week level sales data to generate store clusters, the user has the option of specifying a dimension, such as Week, that will be used to aggregate the sales data to. In this case, the algorithm considers Store/Week positions and clusters stores based on their weekly sales. A value will only be displayed in this field if the BaNG method was used.
Measure to Cluster	Displays the measure selected as the clustering Data Source during the cluster generation process.
Number of Clusters	Displays the number of clusters used during the cluster generation process.

Delete Clusters

The Delete Cluster Run wizard allows you to delete clusters from the system based on Cluster Run Label and generation date (birth date).

Opening the Delete Cluster Run Template Wizard

1. Within the Simple or Local Domain, select **New** from the File menu.
2. Select the Grade tab to display a list of workbook templates.
3. Select Delete Cluster Run. Click **OK**.

Delete Cluster Run Wizard

The following steps outline the wizard process required to use the Delete Cluster Run wizard:

1. Select Cluster Run to Delete.

This wizard screen is a single select pick-list that includes the Cluster Run Label and the date/time stamp (birth date) for all cluster runs currently stored in the system. Select the Cluster Run Label to be deleted.

2. Select **Next** or **Finish**.

If **Next** is selected, *Delete Cluster Run Succeeded* displays once the cluster deletion process is completed. If **Finish** is selected this message is skipped.

