



GETTING STARTED





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CHAPTER 1

TAKE YOUR FIRST LOOK AT ACL

Learn how to view your data and find the tools that you need

ACL lets you analyze data in almost any format from almost any platform, and distill meaning from even vast amounts of data.

ACL meets the challenge of analyzing data in several unique ways. Here you will learn about accessing data, key *ACL* concepts, and the kinds of operations you can use to analyze data with *ACL*.

In this chapter...

What is *ACL*?

Applying *ACL* to your project

Viewing and modifying tables

Choosing commands

Viewing command results

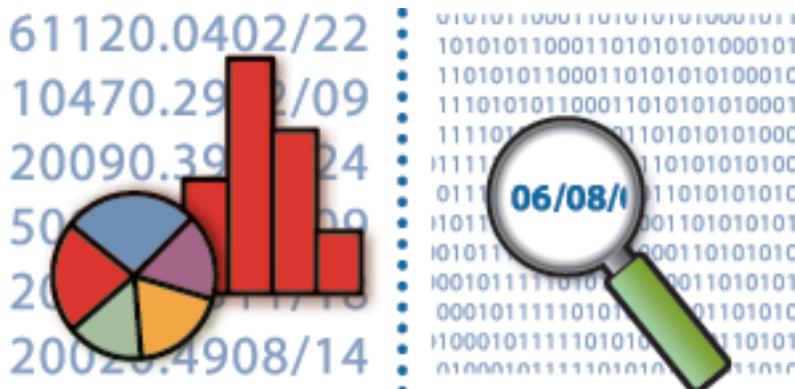
Filtering records

■ Making effective business decisions

Effective decision-making depends on timely access to information. This information may be hidden within vast data files, scattered across multiple databases, or stored in a variety of data types on different platforms. Decision makers and data analysts need tools that can help them access various data types, process large files, and ask intelligent questions about the data.

Data analysis has long depended on statistical methods. While statistics allow us to make useful generalizations about data, they rely on sampling and analyze only a small percentage of the total records. Conventional software, such as a spreadsheet application, analyzes only a limited number of records that have been converted to a form that the application can recognize. Most of the data remains unread.

You need more than a spreadsheet program to analyze data effectively. You need a tool that can read and analyze data in any form, and from any environment. You also need to be able to access data from multiple sources at the same time, and to be free of file-size limitations.



■ What can I use ACL for?

ACL provides access to virtually any data source, in most cases without advance preparation or conversion. You can readily perform queries and data manipulation on files that would require extensive manual preparation and conversion with other analysis software.

ACL also lets you combine data from dissimilar systems for conversion, reconciliation, and control. It can also be an integral component in systems integration. You can create a common view of data in different files and analyze it as though it existed in one file. In addition, *ACL* gives you powerful data cleansing and manipulation abilities and flexible reporting options.

? To learn more, select Help » Index and look up “uses of ACL.”

● Gather essential information for effective decision-making

● *ACL* can analyze even large amounts of data in their entirety. Unlimited file size capability and speed make it possible to analyze millions of records.

Access server data

You can access server data by networking *ACL* and *ACL* Server Edition to work in a client/server configuration, or by running *ACL* Server Edition in offline mode.

Ensure data integrity

ACL has read-only access to source data files. Because you cannot use *ACL* to alter source data, you can safely use it to access production files directly.

Process any data type

In addition to all of the common database formats, *ACL* lets you read the immense repositories of COBOL-supported data, and virtually any other “legacy” data in existence.

Process files of any size rapidly

ACL easily analyzes files that are measured in gigabytes. Files that are tens of megabytes in size are processed almost instantly.

■ How does ACL read data?

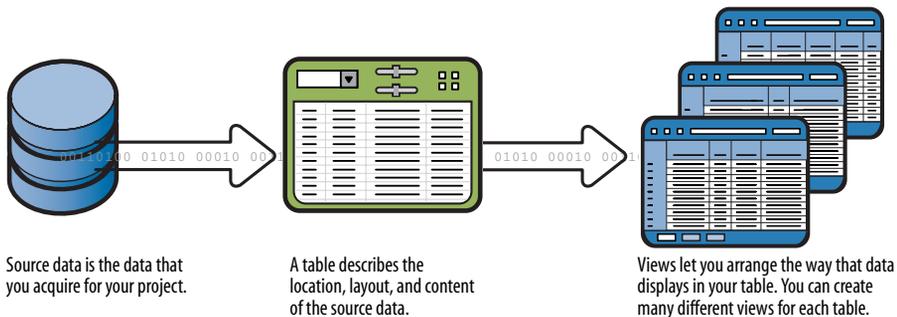
ACL uses *tables* to describe the location, layout, and content of the source data. You create *views* to display data in your tables. You can create many views for each table.

? To learn more ways to access data with ACL, select Help » Index and look up “accessing data.”

When you want to work with a new data source, you create a new table by:

- Using the Data Definition Wizard
- Defining data manually

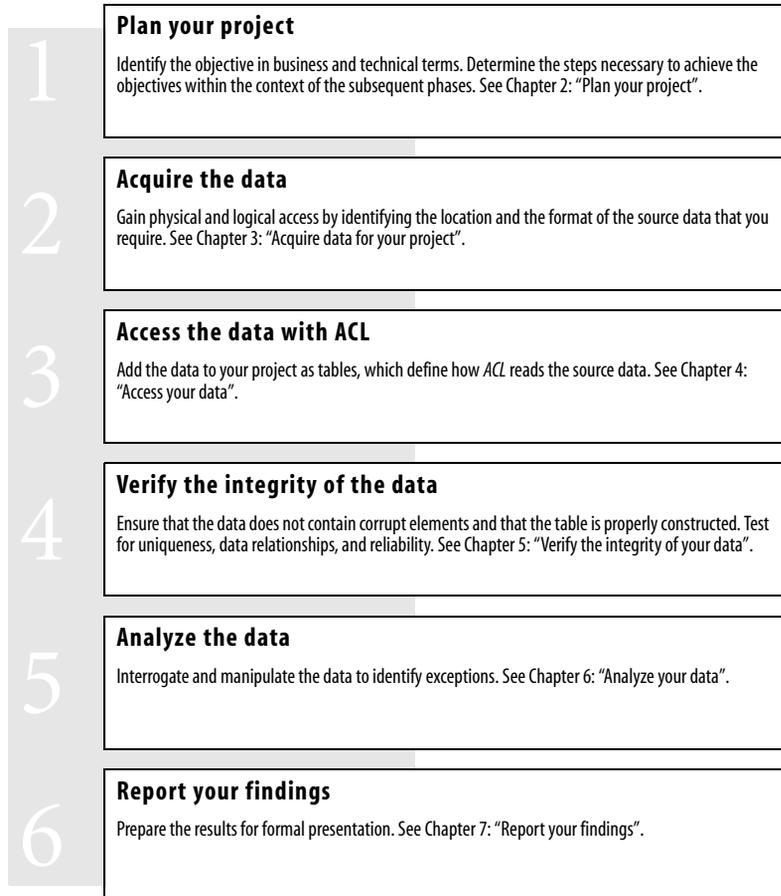
You can always edit the table layout later to add, delete, or modify the fields you want to analyze. You can also copy, link, and share tables among projects.



- **Create a table for your data**
- ACL walks you through the steps of creating a table for your data. See
- “Creating tables to access your data” on page 33.
-

■ How do I apply ACL to my project?

With *ACL*, you can manage your data analysis project from start to finish. In general, a project follows six phases: Plan, Acquire, Access, Verify, Analyze, and Report.



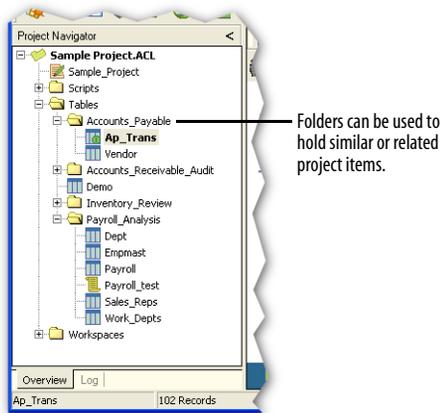
- **Learn more about the phases of a project**
- ACL Help is organized to help you follow these project phases. Select **Help » Index** and look up "phases of a project".

■ Organizing your project items

A project organizes your data analysis projects. There are several kinds of items associated with an *ACL* project: tables, views, scripts, indexes, logs, and folders.

In the **Project Navigator**, use the **Overview** tab to organize your project items. You can add folders and drag project items with your mouse from one folder to another.

? To find out how to create projects and project items, select **Help » Index** and look up “new”.



● Add your data to the Overview

To access your data with *ACL*, you create a *table* using the **Data Definition Wizard**. Select **File » New » Table**. To learn more about creating tables, see Chapter 4: “Access your data”.

● Add folders to the Overview

You can add as many folders as you need to keep your project items organized. Select **File » New » Folder**.

● Add other project items to the Overview

You can create new tables, scripts, and workspaces in the **Overview**. Select **File » New**, then choose **Table**, **Script**, or **Workspace**.

● View the details for any project item

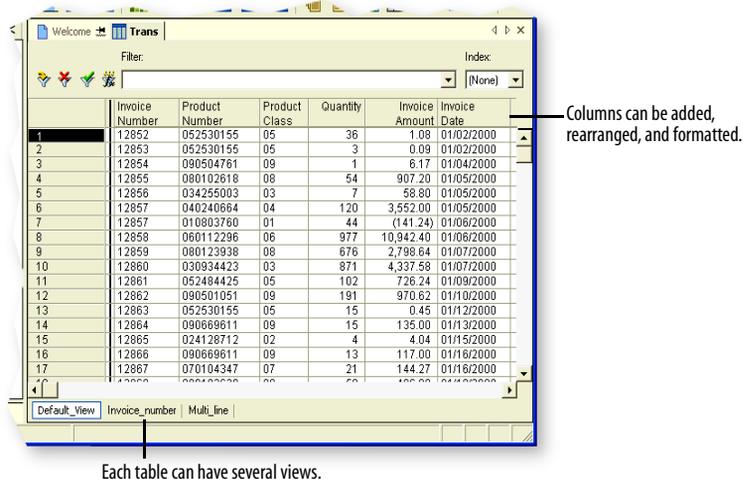
From the **Overview**, you can open the properties dialog box for any item and view details such as notes, file information, views, and table indexes. Right-click the item in the **Overview** and select **Properties**.

■ Viewing and modifying your tables

A view is a window that lets you arrange the way that *ACL* displays a table. You can create many views for each table. Views can contain any or all of the fields in the table, can have the fields arranged in any order, and can be individually formatted without changing other views or the data itself.

If you close a view or open another view, *ACL* prompts you to save the active view or to discard it.

? To find out how to customize a view, select a column and press F1.



● Open a table's default view

To open a table, double-click it in the **Overview**. When you create a table, *ACL* creates a *default view* of the table, which displays all defined fields. If you modify the default view, *ACL* lets you save your changes as a new view.

Switch between views

If you save more than one view for a table, each view has a tab at the bottom of the window. Click a tab to open the corresponding view.

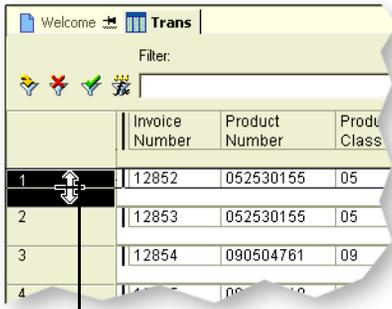
Changing the columns in a view

For each table, you can create as many views as you want. You can add and remove columns or modify the appearance, including:

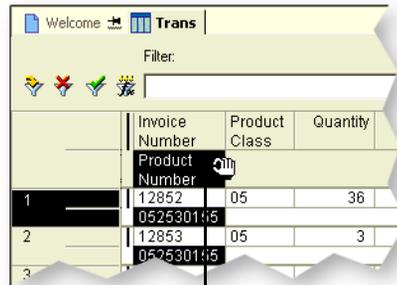
- Width
- Column title
- Display format
- Print options

? To learn more, select Help » Index and look up “columns”.

When you close a view that you changed, *ACL* prompts you to save the view. You can create a new view by saving it under a different name.



Drag this separator line down to add blank rows.



Drag columns to left, right, or onto another row.

● Add columns to the view

● Right-click in the view, select **Add Columns**, and choose fields from the **Add Columns** dialog box.

● Change how a column displays in the view

● To modify a column, double-click a column title in the view. You can size a column to the width of its visible display by double-clicking the right side of the column heading.

● Manage a table's views

● You can add, copy, rename, and delete views in the **Table Properties** dialog box. In the **Overview**, right-click the table icon and select **Properties**.

Adding a computed value as a column

The columns that you add to a view do not necessarily have to display a physical data field in your table. You can add columns that perform a calculation or manipulate field values in other ways, much like a formula in Microsoft Excel.

For example, you can add a column that converts an amount in US dollars to Euros. You can display the converted Euro amounts in a column next to the US dollar amounts for quick reference. The formula that you create to calculate this is called an *expression*.

? To learn how to create computed values, select Help » Index and look up “building expressions”.

	Invoice Number	Invoice Date	Product Class	Product Number	Quantity	Inv Amount (USD)	Inv Amount (EUR)
1	12852	01/02/2000	05	052530155	38	\$1.06	€1.03
2	12853	01/02/2000	05	052530155	3	\$0.09	€0.09
3	12854	01/04/2000	09	090504761	1	\$6.17	€5.86
4	12855	01/05/2000	08	080102618	54	\$907.20	€861.84
5	12856	01/05/2000	03	034255003	7	\$58.80	€55.86
6	12857	01/05/2000	04	040240664	120	\$3,552.00	€3,374.40
7	12857	01/06/2000	01	010803760	44	(\$141.24)	(€134.18)
8	12858	01/06/2000	06	060112296	977	\$10,942.40	€10,395.28
9	12859	01/07/2000	08	080123938	676	\$2,798.64	€2,658.71
10	12860	01/07/2000	03	030934423	871	\$4,337.58	€4,120.70
11	12861	01/09/2000	05	052484425	102	\$726.24	€689.93
12	12862	01/10/2000	09	090501051	191	\$970.62	€922.09
13	12863	01/11/2000	05	052530155	15	\$0.45	€0.43
14	12864	01/11/2000	09	090669611	15	\$135.00	€128.25
15	12865	01/11/2000	02	024128712	4	\$4.04	€3.84
16	12866	01/11/2000	09	090669611	13	\$117.00	€111.15
17	12867	01/11/2000	07	070104347	21	\$144.27	€137.06

A column can display a computed value, such as the conversion of a dollar value to Euros.

- **Add a computed value as a column**
- Right-click in the view, select **Add Columns**, and click **Expr**. In the **Expression** box, type your expression (like a formula in Excel). For example, to convert the Amount field from US dollars to Euros, enter **Amount * 0.95**. This expression multiplies the value of the Amount field by the estimated conversion rate.

Adding a computed value as a field

The ability to add computed values to your view is a valuable asset — your views can include calculations and display more information than is recorded in the source data.

As you learn more about using *ACL*'s commands, however, you may want to perform tests on those computed values. In this situation, save your expression (your “formula”) as a *computed field*. You can manipulate fields in more ways than computed columns.

For example, if you save the expression `Amount * 0.95` as “Amount_in_Euros”, every field list for this table will include “Amount_in_Euros”. You can then run *ACL* commands on that field.

? To learn more about computed fields, select **Help » Index** and look up “computed fields”.

i Computed fields can also contain dates, characters, or logical (true/false) values.

Product Class	Count	Percent of Count	Percent of Field	Amount (in Euros)
01	39	11.5%	13.22%	37,774.52
02	52	15.34%	9.91%	28,314.28
03	34	10.03%	5.65%	16,136.3
04	25	7.37%	12.36%	35,298.5
05	51	15.04%	10.18%	29,080.24
06	12	3.54%	6.28%	17,943.23
07	8	2.36%	-0.59%	(1,690.36)
08	56	16.52%	12.06%	34,447.57
09	62	18.29%	30.93%	88,343.79
Totals	339	100%	100%	285,648.07

- **Add a computed value to your table**

- Right-click in the view, select **Add Columns**, and click **Expr**. In the **Expression** box, type your expression. In the **Save As** box, enter a short but descriptive name for the new field and click **OK**.

Modify your computed fields

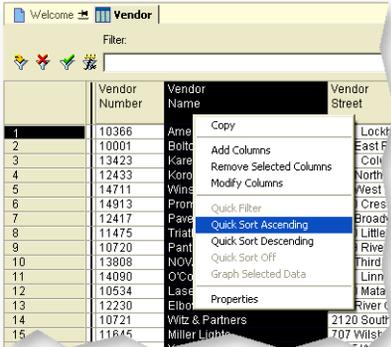
Computed fields are saved as part of your table's layout, which you can modify. Select **Edit » Table Layout** and double-click the name of the computed field that you want to modify.

Sorting a view with Quick Sort

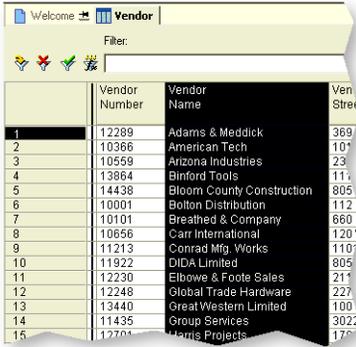
You can use Quick Sort to sort records on any field. Applicable only to the view, Quick Sort is a temporary means to view your records in ascending or descending order. When you are finished with Quick Sort, you can restore the normal sorting in the view.

Quick Sort applies to the view only and not to commands, which use the sort order of the table. To sort the records in the table, use the Sort command. To index the table by one or more fields, use the Index command.

? To find out how to use the Sort and Index commands, select Help » Index and look up "Sort" or "Index".



Right-click and choose one of the Quick Sort options.



ACL sorts the records in the view.

- **Sort a view by a column using Quick Sort**
- Right-click the column header and select either **Quick Sort Ascending** or **Quick Sort Descending**.
- **Restore the normal record order**
- Right-click a column header and select **Quick Sort Off**.

■ Getting answers from your data

To get answers from your data, you choose the appropriate commands and view the command results. As you work, you can execute commands, filter the records in the view, and review the log of your past activities.

According to the phases of data analysis in “How do I apply ACL to my project?” on page 5, the Planning phase requires you to choose the *ACL* commands that achieve your stated objectives. “Choosing the appropriate command” on page 13 helps you decide which *ACL* command best supports the test or operation that you are attempting.

Commands generate results in different formats from which you can choose. The most common, screen and graph, display results in formatted text or as a graph that you can edit for presentations. To learn more about creating graphs, see “Graphing data” on page 70.

You can apply filters to commands and views to help isolate records of interest. Although command filters temporarily exclude certain records, view filters allow you to isolate records and perform tests on those records.

When you complete your analysis, you can return to the command log to review your results. The command log records every step and can be used for reporting and automation.

 Learn how to use specific commands in Chapter 5: “Verify the integrity of your data” and Chapter 6: “Analyze your data”.

Choosing the appropriate command

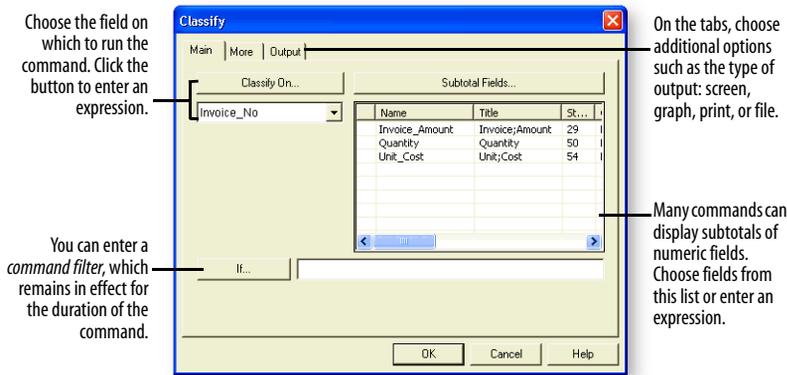
Test or Operation	Explanation	Commands	Appropriate Data Types
Confirmation & Discovery	Acquire general information about your table.	Verify	Character, Numeric, Date
		Count	Record-based
		Total	Numeric
		Statistics	Numeric, Date
Order	Test the records for sequential order. This test is useful as it may show that it is unnecessary to sort or index.	Sequence	Character, Numeric, Date
Completeness	Verify that all records in a sequence are present. For example, invoice numbers.	Gaps	Character, Numeric, Date
Uniqueness	Determine whether records have been included more than once. Also determine whether a particular field contains unique values.	Duplicates	Character, Numeric, Date
Concentration	Determine how many records and how much value is concentrated by time period, value range, or other record identifiers such as location codes.	Stratify	Numeric
		Classify	Character
		Age	Date
		Cross-tabulate	Character
		Summarize	Character, Date
Reordering	Change the order of the data in the active table or in a new table containing the same data.	Sort	Character, Numeric, Date
		Index	Character, Numeric, Date
Multi-table Associations	Associate or combine data from separate tables.	Extract/Append	Record- and Field-based
		Join	Character, Numeric, Date, Logical
		Relations	Character, Numeric, Date, Logical
Statistical Sampling	Draw samples from data populations and estimate the magnitude of errors.	Sample	Record-based
		Size	Record-based
		Evaluate	Record-based
Benford Analysis	Compare the actual distribution of leading digits with the Benford curve.	Benford	Numeric

Running a command

The commands in *ACL* let you ask questions of your data. When you approach your analysis, refer to “Choosing the appropriate command” on page 13 to help select the most effective test. Each type of test or operation is supported by at least one command.

Once you decide which command will produce the results you need, open the table and select the command from the menu. Command dialog boxes are straightforward and have a consistent layout to help you choose the right command options.

? While choosing the command options, press F1 for help.



① The Classify dialog box displays options that are typical of those that are found in most command dialog boxes.

Run a command

Select a command from the **Data**, **Analyze**, or **Sampling** menus. Specify the command options and click **OK**.

Limit the scope of a command

Most commands let you specify a command filter to limit the scope of the command. The filter tests each record to determine whether it matches your criterion. The command skips records that do not meet the filter criteria. For example, entering **Amount** \geq **0** ensures that records with negative values in the Amount field are excluded from the command results.

For help with command filters and other scope parameters, select **Help** » **Index** and look up “scope parameters”.

Viewing command results

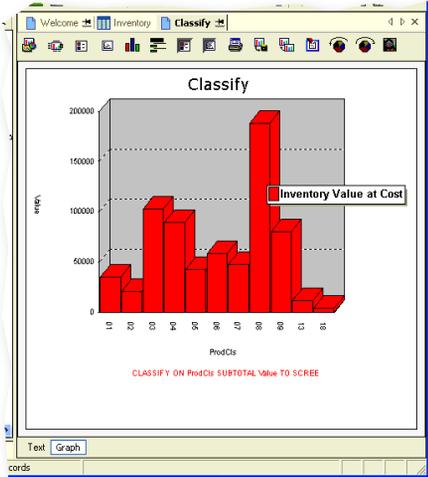
When you execute a command, *ACL* displays command results on tabs in the display area. Most commands display the results as a formatted table within the **Text** tab. Some commands also generate a graph, which you can view by clicking the **Graph** tab.

As of: 05/01/2003 14:33:20
 Command: CLASSIFY ON ProdCls SUBTOTAL Value TO SCREEN
 Table: Inventory

Product Class	Count	Percent of Count	Percent of Field	Inventory Value at Cost
01	17	11.18%	5.14%	34,954.68
02	19	12.5%	3.02%	20,544.2
03	20	13.16%	15.09%	102,702.76
04	17	11.18%	13.08%	89,018.95
05	13	8.55%	6.24%	42,479.36
06	17	11.18%	8.59%	58,479.6
07	7	4.61%	7%	47,609.1
08	19	12.5%	27.66%	188,230.86
09	21	13.82%	11.85%	80,646.05
13	1	0.66%	1.67%	11,352.48
18	1	0.66%	0.66%	4,461.9
Totals	152	100%	100%	680,479.94

Click these tabs to switch between text and graph output.

? To learn more about graphing select Help » Index and look up “graphing”.



- **Retain command results**

On the command results tab, click the push-pin icon to display subsequent commands in addition to the current results. Command results are always retained in the command log, whether or not you use the push-pin.

- **Drill down in the command results**

In the first column of the command results, click an entry. *ACL* sets the active filter to display the matching records in the view.

Using filters to isolate records of interest

For large tables, you often need to reduce the number of records to show only the ones that you want. In Excel, you do this by filtering by the contents of a column. In *ACL*, it is much the same — you filter records in the view.

A filter is a *logical expression* that you type in the view's **Filter** box, such as `Amount < 0`. For each record *ACL* asks “Is the value of Amount less than zero?” If the answer is yes, then the record remains visible. If not, *ACL* hides the record from the view.

When a filter is active, all subsequent commands are run on the visible records only.

? To learn more, select Help » Index and look up “filtering a view”.

i A logical expression is always evaluated as *true/false* or *yes/no*.

1

The unfiltered view shows all 339 records.

Invoice Number	Invoice Date	Product Number	Product Class	Quantity	Invoice Amount
12852	01/02/2000	052530155	05	38	1.08
12853	01/02/2000	052530155	05	3	0.09
12854	01/04/2000	090504761	09	1	6.17
12855	01/05/2000	060103018	06	64	907.20
12856	01/05/2000	034255003	03	7	58.80
12857	01/05/2000	040245064	04	120	3,552.00
12857	01/06/2000	010803760	01	44	(141.24)
12858	01/06/2000	060112296	06	977	10,842.40
12859	01/07/2000	060123930	06	676	2,796.64
12860	01/07/2000	030934423	03	871	4,337.58
12861	01/08/2000	052484426	05	102	276.24
12862	01/10/2000	090501051	09	191	970.62
12863	01/11/2000	052530155	05	15	6.45
12864	01/12/2000	060666911	06	15	125.00
12865	01/15/2000	024128712	02	4	4.04
12866	01/16/2000	060666911	06	53	117.00
12867	01/16/2000	070104347	07	21	144.27
12868	01/16/2000	070104347	07	21	144.27
12869	01/16/2000	070104347	07	21	144.27
12870	01/16/2000	070104347	07	21	144.27
12871	01/16/2000	070104347	07	21	144.27
12872	01/16/2000	070104347	07	21	144.27
12873	01/16/2000	070104347	07	21	144.27
12874	01/16/2000	070104347	07	21	144.27
12875	01/16/2000	070104347	07	21	144.27
12876	01/16/2000	070104347	07	21	144.27
12877	01/16/2000	070104347	07	21	144.27
12878	01/16/2000	070104347	07	21	144.27
12879	01/16/2000	070104347	07	21	144.27
12880	01/16/2000	070104347	07	21	144.27
12881	01/16/2000	070104347	07	21	144.27
12882	01/16/2000	070104347	07	21	144.27
12883	01/16/2000	070104347	07	21	144.27
12884	01/16/2000	070104347	07	21	144.27
12885	01/16/2000	070104347	07	21	144.27
12886	01/16/2000	070104347	07	21	144.27
12887	01/16/2000	070104347	07	21	144.27
12888	01/16/2000	070104347	07	21	144.27
12889	01/16/2000	070104347	07	21	144.27
12890	01/16/2000	070104347	07	21	144.27
12891	01/16/2000	070104347	07	21	144.27
12892	01/16/2000	070104347	07	21	144.27
12893	01/16/2000	070104347	07	21	144.27
12894	01/16/2000	070104347	07	21	144.27
12895	01/16/2000	070104347	07	21	144.27
12896	01/16/2000	070104347	07	21	144.27
12897	01/16/2000	070104347	07	21	144.27
12898	01/16/2000	070104347	07	21	144.27
12899	01/16/2000	070104347	07	21	144.27
12900	01/16/2000	070104347	07	21	144.27
12901	01/16/2000	070104347	07	21	144.27
12902	01/16/2000	070104347	07	21	144.27
12903	01/16/2000	070104347	07	21	144.27
12904	01/16/2000	070104347	07	21	144.27
12905	01/16/2000	070104347	07	21	144.27
12906	01/16/2000	070104347	07	21	144.27
12907	01/16/2000	070104347	07	21	144.27
12908	01/16/2000	070104347	07	21	144.27
12909	01/16/2000	070104347	07	21	144.27
12910	01/16/2000	070104347	07	21	144.27
12911	01/16/2000	070104347	07	21	144.27
12912	01/16/2000	070104347	07	21	144.27
12913	01/16/2000	070104347	07	21	144.27
12914	01/16/2000	070104347	07	21	144.27
12915	01/16/2000	070104347	07	21	144.27
12916	01/16/2000	070104347	07	21	144.27
12917	01/16/2000	070104347	07	21	144.27
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12919	01/16/2000	070104347	07	21	144.27
12920	01/16/2000	070104347	07	21	144.27
12921	01/16/2000	070104347	07	21	144.27
12922	01/16/2000	070104347	07	21	144.27
12923	01/16/2000	070104347	07	21	144.27
12924	01/16/2000	070104347	07	21	144.27
12925	01/16/2000	070104347	07	21	144.27
12926	01/16/2000	070104347	07	21	144.27
12927	01/16/2000	070104347	07	21	144.27
12928	01/16/2000	070104347	07	21	144.27
12929	01/16/2000	070104347	07	21	144.27
12930	01/16/2000	070104347	07	21	144.27
12931	01/16/2000	070104347	07	21	144.27
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12936	01/16/2000	070104347	07	21	144.27
12937	01/16/2000	070104347	07	21	144.27
12938	01/16/2000	070104347	07	21	144.27
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12940	01/16/2000	070104347	07	21	144.27
12941	01/16/2000	070104347	07	21	144.27
12942	01/16/2000	070104347	07	21	144.27
12943	01/16/2000	070104347	07	21	144.27
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12946	01/16/2000	070104347	07	21	144.27
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12948	01/16/2000	070104347	07	21	144.27
12949	01/16/2000	070104347	07	21	144.27
12950	01/16/2000	070104347	07	21	144.27
12951	01/16/2000	070104347	07	21	144.27
12952	01/16/2000	070104347	07	21	144.27
12953	01/16/2000	070104347	07	21	144.27
12954	01/16/2000	070104347	07	21	144.27
12955	01/16/2000	070104347	07	21	144.27
12956	01/16/2000	070104347	07	21	144.27
12957	01/16/2000	070104347	07	21	144.27
12958	01/16/2000	070104347	07	21	144.27
12959	01/16/2000	070104347	07	21	144.27
12960	01/16/2000	070104347	07	21	144.27
12961	01/16/2000	070104347	07	21	144.27
12962	01/16/2000	070104347	07	21	144.27
12963	01/16/2000	070104347	07	21	144.27
12964	01/16/2000	070104347	07	21	144.27
12965	01/16/2000	070104347	07	21	144.27
12966	01/16/2000	070104347	07	21	144.27
12967	01/16/2000	070104347	07	21	144.27
12968	01/16/2000	070104347	07	21	144.27
12969	01/16/2000	070104347	07	21	144.27
12970	01/16/2000	070104347	07	21	144.27
12971	01/16/2000	070104347	07	21	144.27
12972	01/16/2000	070104347	07	21	144.27
12973	01/16/2000	070104347	07	21	144.27
12974	01/16/2000	070104347	07	21	144.27
12975	01/16/2000	070104347	07	21	144.27
12976	01/16/2000	070104347	07	21	144.27
12977	01/16/2000	070104347	07	21	144.27
12978	01/16/2000	070104347	07	21	144.27
12979	01/16/2000	070104347	07	21	144.27
12980	01/16/2000	070104347	07	21	144.27
12981	01/16/2000	070104347	07	21	144.27
12982	01/16/2000	070104347	07	21	144.27
12983	01/16/2000	070104347	07	21	144.27
12984	01/16/2000	070104347	07	21	144.27
12985	01/16/2000	070104347	07	21	144.27
12986	01/16/2000	070104347	07	21	144.27
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12989	01/16/2000	070104347	07	21	144.27
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13008	01/16/2000	070104347	07	21	144.27
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13015	01/16/2000	070104347	07	21	144.27
13016	01/16/2000	070104347	07	21	144.27
13017	01/16/2000	070104347	07	21	144.27
13018	01/16/2000	070104347	07	21	144.27
13019	01/16/2000	070104347	07	21	144.27
13020	01/16/2000	070104347	07	21	144.27
1					

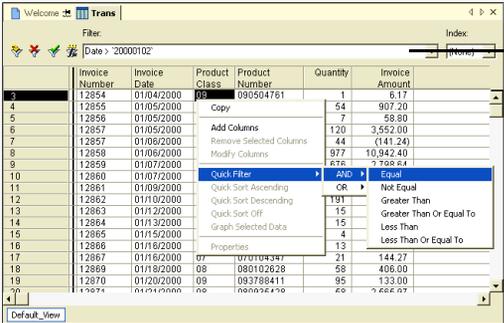
Applying view filters using Quick Filter

You can create a filter based on selected fields by using Quick Filter. This method is faster than entering the filter expression, and lets you interact directly with the data in the view. You can use Quick Filter on any data type.

? To learn more, select Help » Index and look up "Quick Filter".

For example, if you examine an accounts receivable table and want to see all of the records for customer number 795401, apply the **Equal** option on the customer number.

The resulting filter, `Customer = '795401'`, displays the records for that customer only. Alternatively, use the **Not Equal** option to exclude the customer's records from the view.



In this example, this filter becomes: `(Date > '20000102') AND (ProdcIs = '09')`. In other words, it will show only transaction records for that date and for product class 09.

- **Create a filter based on a single value**
- Select a value, then right-click, select **Quick Filter**, and choose the logical operator to use in your filter.

Create a filter based a range of values

Select a range of records by clicking a cell and dragging the mouse pointer. Right-click, select **Quick Filter**, then choose the logical operator to use in your filter.

To add to an existing filter using Quick Filter

With a filter already applied, select and right-click one or more values in the view. Select **Quick Filter**, choose **AND** or **OR**, and then choose a logical operator.

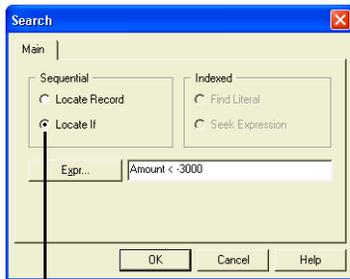
Searching for records

Use the Search command to locate:

- A specified record number
- The first record in a table that meet a specified condition
- The first record in an indexed table that either meets or exceeds a specified key value, where that value is a character string or character-type expression that may include references to fields or variables

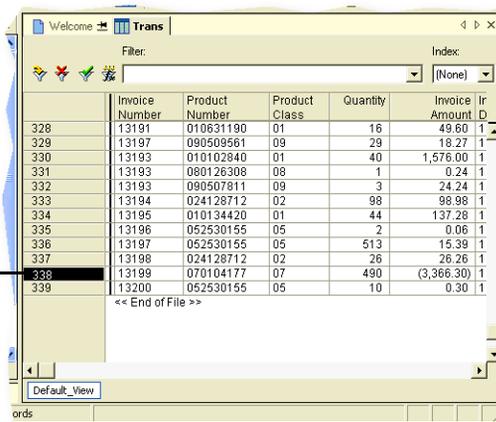
Once the record is found, you can choose to perform calculations on it or compare its contents to that of another record.

? To learn more about the Search command, select **Help » Index** and look up “Search command”.



You can search for the first record that matches your search expression.

ACL selects the matching record in the view.



• Search for a record

From the menu, select **Data » Search**.

• Use a filter to locate a record

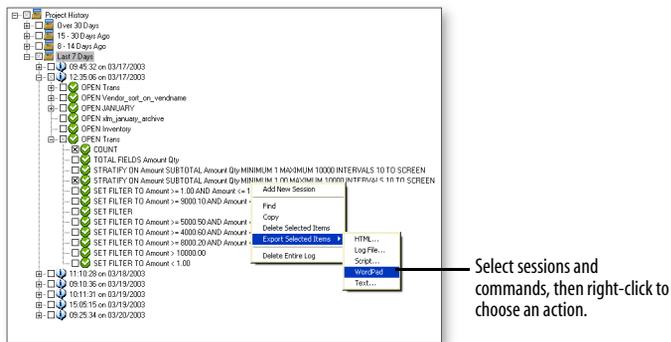
Filters are also quite effective for locating records. To learn more about using filters, select **Help » Index** and look up “filtering a view”.

Reviewing the log of your past activities

As you work in *ACL*, the command log keeps a record of your activities. The **Log** tab displays every session in a chronological view. You can expand and collapse branches of the log to explore the results obtained during your analysis.

From selected log entries, you can also export your analysis to an HTML file, WordPad, a text file, an *ACL* log file, or the Windows Clipboard to review past results or prepare reports. You can also save selected portions of the log as a script, which you can use to automate future analyses.

? To learn more, select Help » Index and look up “command log”



View the command log

Click the **Log** tab to view the log in the **Project Navigator**. To view the log in the larger results area, double-click the log icon in the **Overview**.

Label a series of commands for historical purposes

When you start a session, you can give it a descriptive name. When you later review your log, you can easily see the commands in each session, and the descriptive name reminds you of why you performed the commands. To start a new session, select **Tools » Add New Session**.

Export portions of the command log

Select the check boxes of the sessions and commands that you want to export. Right-click, select **Save Selected Items**, and choose the file format to which you are saving the log entries.

■ Finding help with ACL

If you need help while using *ACL*, you can find the answers you need in a number of locations.

- *ACL Help*. This is your complete guide to using *ACL*. To access ACL Help, select **Help » Contents**.
- *ACL dialog and window help*. Press **F1** in any dialog box or window to get help that is related to what you are doing in *ACL*.
- *ACL in Practice*. These tutorials introduce you to ACL-related concepts and demonstrate realistic scenarios.
- *The Data Access Guide*. This publication helps you understand the best ways to acquire and define data for use with *ACL*.
- *Online support*. The support web site provides answers to common questions, tips and tricks, product updates, and more. If you have access to the Internet, go to www.acl.com/supportcenter.
- *Global Help Desk*. Supported users can contact *ACL* for assistance from one of our support representatives.

? For tips on using ACL Help effectively, select Help » Contents and read “About ACL Help.”

● ● ● ● ● **Contact the ACL Global Help Desk**

The Americas
+1-604-669-4997

Asia and Pacific Rim
+65-6299-33-65

Europe, Middle East, and Africa
+32-2-642-22-95

Germany
+49-241-168-46-75

United Kingdom
+44-845-351-0077

Australia
1-800-203-879

New Zealand
0800-449-647

or e-mail us at support@acl.com.

CHAPTER 2

PLAN YOUR PROJECT

Identify your objectives and the steps needed to achieve them

Some would argue that the most important steps in a data analysis project come before you start using *ACL*. With careful planning, you can clarify your objectives and avoid potential technical pitfalls. The time that you spend to set milestones and identify major objectives can ultimately save valuable time.

In preparation for your data analysis project, you can identify the project objectives, the technical requirements, and the analytical procedures.

In this chapter...

- Project objectives
- Technical requirements
- Analytical procedures

■ Identifying the project objectives

You can begin your project with a pen and paper as you attempt to write clear, unambiguous statements of your project objectives. As you articulate your specific goals, you may discover that you can bring additional clarity to the process.

You can write several of these objectives, as long as you ensure that your objective statements are specific, rather than general. In your statement, identify both the process to be audited and the information that you expect to uncover. For example, a project objective could be, “Identify vendors charging more than agreed-upon amounts for supplies”. The more specific the statement is, the more easily you can clarify the steps and achieve the objective.

These objectives also influence the technical requirements of the project. If you want to include certain information in the final report, ensure that those data fields are present in the data that you acquire for the project.

■ Identifying the technical requirements

With your objective statements on hand, you can determine the technical steps that will support you in achieving your objectives. This can be an iterative process, as the technical requirements may depend on the availability of data files or fields.

Your technical assessment usually includes these activities.

- **Assess the feasibility**

- Based on your objective statements, which identify the type of information (the input) and the desired result (the output), you can then determine whether the type of analysis is feasible. There may be instances in which there is insufficient data to accomplish your objectives.

- **Identify the necessary data files**

- Identify which data files contain the data fields that you need. For example, to compare a vendor's contractual price with the invoice price, you need files with contractual prices as well as invoices with details of each product. You may need more than one data file to obtain all of the fields you need.

- **Ensure that you can accommodate the data files**

- Estimate as closely as you can the approximate size of the data that you are requesting. Consider the medium in which you'll receive the data and the capacity of your network server or local disk drive.

■ Identifying analytical procedures

With all the elements in place, you can now plan how to accomplish each objective. This involves specifying the source data, commands, expressions, and variables that will be employed.

Accomplishing an objective may require more than one step, so a detailed, step-by-step approach should be articulated and reviewed prior to beginning. This will help ensure that no unexpected events occur during the processing and that all possible outcomes have been taken into account. This also presents a comprehensive picture that allows you to identify processes that may be performed more efficiently with other functionality.

For example, performing the unit price comparison for the vendor audit example could involve the following steps:

- 1 Create a relation between the invoice detail table and inventory table with the product number as the key field.
- 2 Create a computed field that reveals the percentage of overpricing for each product in the invoice table compared to the standard unit price.
- 3 Run the Statistics command on this field for general information on the characteristics of the overpricing percentage.
- 4 Create a computed field that reveals the total dollar value of the overpricing for each transaction.
- 5 Run the Statistics command on this field for general information on the characteristics of the overpricing.
- 6 Run the Classify command on the vendor number accumulating this field to determine the distribution of the overpricing by vendor.

CHAPTER 3

ACQUIRE DATA FOR YOUR PROJECT

Obtain the data that you need for your analysis

Depending on the analysis that you intend to perform, you may have to rely on others to provide the data that you need.

The source data can be on a mainframe computer, a minicomputer, or a personal computer. It can have any record structure, a variety of data types, and can be on hard disk, floppy disk, or other storage devices that can be read by your personal computer.

In addition, with *ACL Server Edition*, organizations can take advantage of the a client/server environment that provides direct access to server data through a network connection.

Obtaining the data that you need may require some planning on your part. You may need the assistance or permission of others to access certain data, especially if it is on a mainframe computer system.

In this chapter...

Guidelines

Files and file layouts

Data requests

Server data

PC data

■ Guidelines for acquiring data

Regardless of how you obtain data, the following guidelines apply:

- **Request your data as either ODBC or a flat file.**
Although ODBC is the preferred method for accessing data, the next best alternative is a flat, sequential file. If your data is in a relational database, convert it to a flat file before you download your data. If you have an information systems department, ask them to assist you. You can also use ODBC to read a relational database.

Alternatively, rather than flattening the database, you might want to generate a report from the data and use *ACL* to analyze the print-image file.
- **Use raw data.** *ACL* is compatible with all major mainframe and minicomputer data types, and reads EBCDIC.
- **Request a copy of the data.** Request a copy, not a backup, of the original tape file. The only way you can use a backup file is to first restore the data to a regular file, and then make a copy of the file to use with *ACL*.
- **Request a file description or layout.** The more details you have about the file, including its contents and organization, the better. Having this information makes it simpler to define the data.

? To learn more, select Help » Index and look up “preparing files.”

■ Requesting files and layouts

To obtain the files and layouts that you need for your project, make a comprehensive request for data. If you provide the detail outlined here in your data request, you can help ensure that all points have been covered.

File layouts that you receive should contain the following information:

- Name of the data file
- Record length
- Field name
- Field start position
- Field length
- Field type
- Field format
- Field description

This information assists you in creating the table for each data file.

A good question to ask your data provider is “What is the easiest format for you to deliver?” Not only will this expedite your request, but it will also establish that you are taking into consideration the opinions and recommendations of the IS team.

 Using ODBC to access data is among the easiest ways to recreate a database, as *ACL* can automatically create a table with this method.

■ Example of a request for data

When you make a request to your data provider, you can model your request on this form.

Attn:
Date:
From:
File or table requested:
Host system:
Records from (start date):
To (end date):
Delivery date:
Data access mode:
Data access medium:
Record length:
Record count:

Field name	Start position	Length	Type	Format	Description
ProdNo	1	7	Character		Product number
ProdDesc	8	20	Character		Description
UnitPrice	28	6	Numeric	9,999.99	Unit price
PriceDate	34	10	Date	mm/dd/yy	Price date

■ Obtaining data from a server

You can use one of these methods to obtain data stored on a server:

- Copy data to a personal computer's hard disk.
- Consider using the Server Edition, which allows you to access server data in a client/server environment.

For many server types, you can copy data directly from the server to your PC over a network connection. You may need to contact your network administrator to ensure that you have permissions to the server or specific folders on the server.

For mainframe data, the most common means of gaining access to data from a server is by either *downloading* or *terminal emulation*. In most cases, the personal computer emulates a terminal. You require software to download data to the personal computer from a mainframe.

You should also remember to leave enough space on your personal computer's hard disk to store the file being downloaded. In some cases, you will need to leave a significant amount of space.

? To learn more about client/server computing, select Help » Index and look up "about client/server."

■ Obtaining data from a PC

Here are some methods that you can use to obtain data stored on a PC:

- Transfer files to the personal computer on which *ACL* is installed. You can copy the files to any disk media, such as floppy disks, CDs, or Zip files.
- Install *ACL* on the personal computer in which the data files are located. Use this method if your data files are extremely large.

CHAPTER 4 ACCESS YOUR DATA

Create tables to access your source data

Before you work with a new data file, you need to tell *ACL* how to read and interpret the data it contains. You do this by adding tables to your project in *ACL*.

A table's layout describes the structure and content of source data, and specifies where the source data can be found. It describes the data in each field, identifies the fields that you want to analyze, and how to display and print that information. The Data Definition Wizard makes it easy for you to create tables for all common data types.

Before you can create a table, you need to open an existing *ACL* project or create a new project.

In this chapter...

- Starting a project
- Creating tables
- Using the Data Definition Wizard
- Editing a table layout
- Accessing data with client/server

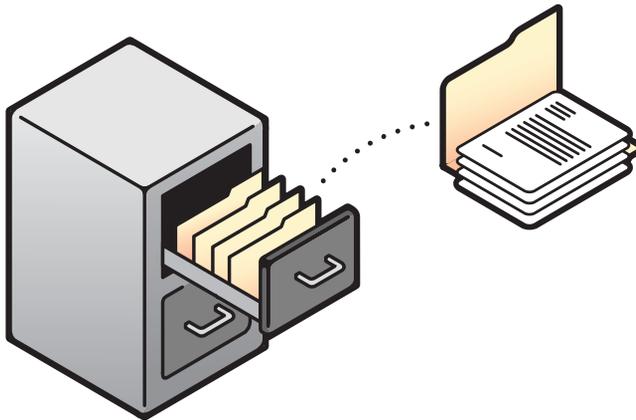
■ Starting a new project in ACL

A project gives you a way to organize your data analysis projects. Items associated with an *ACL* project include:

- Tables
- Views
- Scripts
- Indexes
- Command logs
- Folders

An *ACL* project is like a file cabinet: use it to store all related project items, such as tables, views, scripts, indexes, logs, and folders.

? To learn more about projects in *ACL*, select **Help » Index** and look up “projects”.



● Start a new project

● Select **File » New » Project**. It is good practice to keep different analyses in separate *ACL* projects.

● Your next step

● You are now ready to access your source data. Do this by adding tables to the project. See “Creating tables to access your data” on page 33.

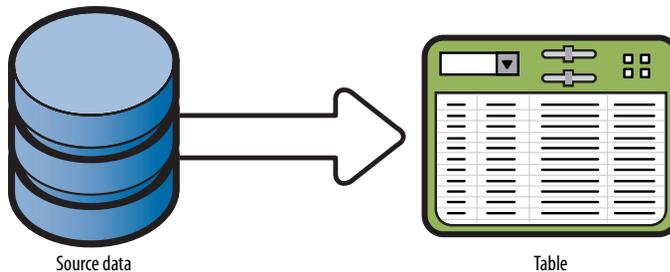
■ Creating tables to access your data

For each source of data that you want to analyze, you add a new table to your *ACL* project.

A table's layout describes the structure and content of source data, and specifies where the source data can be found. It describes the data in each field, identifies the fields that you want to analyze, and how to display and print that information.

The **Data Definition Wizard** makes it easy for you to create tables for all common data types.

? To learn more about creating tables, look up “new table” in the on-screen user guide.



Your source data is represented by a table in *ACL*. Depending on the type of source data, the table can be either a copy of the source data or a direct link to the source data.

● Create a table

Select **File » New » Table**. *ACL* opens the **Data Definition Wizard** to detect and define the source data. For help creating a table, press **F1** while using the wizard.

● Create a table for any kind of data

Although the wizard can identify a great many types of data, for less common formats, you can create a table manually by editing the table layout. Select **Help » Index** and look up “manually creating tables”.

● Find out how to identify and define common data types

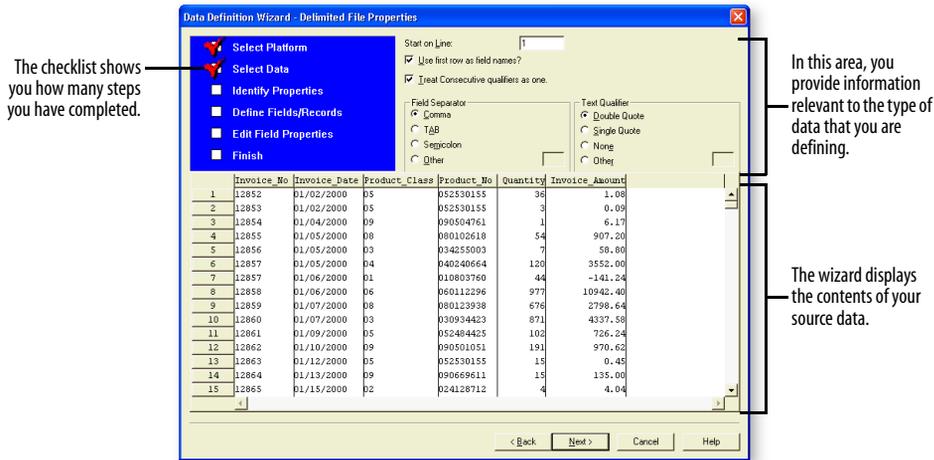
The Data Access Guide can help you define many types of data.

Accessing data with the wizard

The **Data Definition Wizard** guides you through the process of defining the source data and creating a table, so you can begin analyzing the data.

In most cases, you only need to specify the file or database location and select the database table you want to define. You can often accept the wizard's analysis and click **Next** all the way to the end.

? To learn more about creating tables, select **Help » Index** and look up “creating tables with the wizard”



Step through the wizard

The wizard adapts to the type of data that you define, and skips certain steps when it is appropriate to do so. In each wizard screen, make sure that you provide the correct information before clicking **Next**.

Use the wizard to turn a print-image file into a table

ACL can read print-image — also called “report files” — that have been generated by other applications. Often reports contain records or fields that span more than one line and have information in headings and other report elements. To find out how to define a print-image file, select **Help » Index** and look up “print-image file”.

Access your data through ODBC

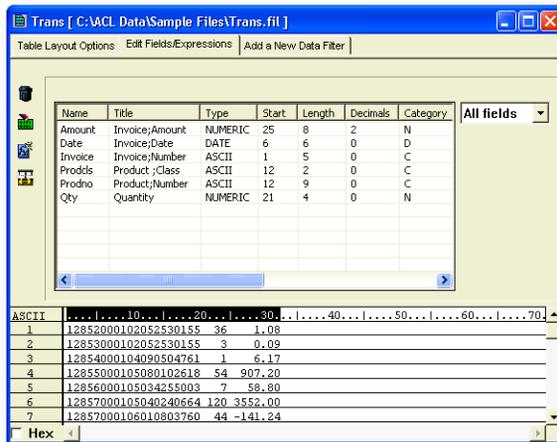
ODBC is an interface that allows access to database applications. With the correct drivers, you can use *ACL* to take advantage of ODBC data sources. To learn more, select **Help » Index** and look up “ODBC”.

Accessing data manually

You can create tables manually, and define the fields one at a time. You do not have to define all of the data fields during one session — you can define only the fields that you need at first, and define additional fields later if you need them.

? To learn more about editing the table layout, select Help » Index and look up “manually creating tables”.

In the **Table Layout** window, you can define new fields, create computed fields, and define data filters. Fields that you have already defined are listed in the **Edit Fields/Expressions** tab.



Continue from the wizard

To define a table manually, select **File » New » Table**, then choose the **Skip to Finish** option in the wizard when it comes available. In the **Overview**, double-click the table to open it, then select **Edit » Table Layout**.

Change the way in which fields and files are defined

At any time, you can change how a table reads your source data. You can redefine fields and records and define new fields. Select **Edit » Table Layout**.

Get help while you edit the table layout

The **Table Layout** window can seem complex the first time you use it. To get help with any screen, press **F1**.

■ Accessing data through client/server processing

ACL Server Edition introduces a significant advance in access to server data. Client/server computing with *ACL* provides several advantages:

- *ACL* reads files directly from the server.
- You can process files on the client or on the server.
- You can access server data through the familiar *ACL* interface.
- Multiple *ACL* users can access the server simultaneously.
- You acquire direct access to server processing power.

A client/server configuration distributes processing over two or more computers that are linked by a network. To set up a client/server environment for *ACL*, you need:

- One or more clients running *ACL* with the client/server option enabled.
- One or more servers running *ACL* Server Edition.
- A TCP/IP network connection to link the computers together. The connection can be direct, on a LAN, or by dial-up connection on a WAN.

● ● ● ● ● **Enable client/server in the *ACL* client**

To establish a client/server connection, you need to configure *ACL* to act as a client. You do this by enabling the client/server option in *ACL* and setting up a server profile. To find out how, select **Help » Index** and look up “Enable Client/Server option”.

Enable client/server on the server

Before *ACL* can connect to a server, you need to configure *ACL* Server Edition. To learn more about configuring the server, refer to the *ACL* Server Edition installation guide.

? To learn more about enabling a client/server environment, select **Help » Index** and look up “about client/server”.

? You can also process server data without using the *ACL* client by running *ACL* Server Edition in offline mode. To learn more, select **Help » Index** and look up “offline server scripts”.

CHAPTER 5

VERIFY THE INTEGRITY OF YOUR DATA

Ensure that your data is complete and valid

One of the first tasks in data analysis is to ensure that you have complete and valid data. Verification is especially important when working with data files that do not contain information about their own record layout.

You can use tests such as counting records, totalling fields, and verifying data to ensure that:

- Your files contain the correct number of records
- The numeric totals match the control totals provided by the data owner
- The fields contain only valid data

In this chapter...

Count command

Total command

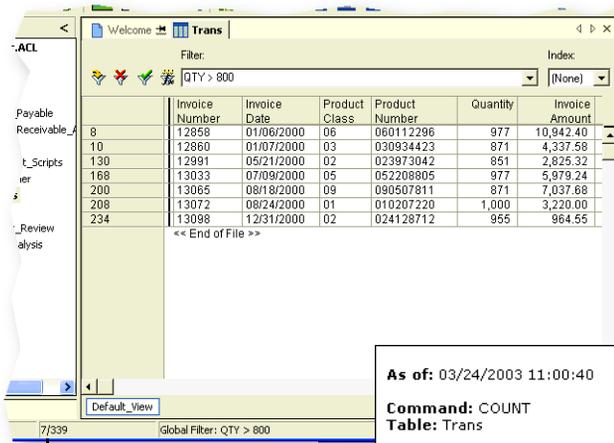
Verify command

Counting records

Use the Count command to count the number of records in the active table, or only those that meet a specified filter condition. Each time you use Count, *ACL* saves the result in the command log and displays it in the status bar.

If you apply a view filter, then Count will show the total number of records in the view.

i For help with the Count command, select Help » Index and look up “Count command”.



After you apply a filter, use Count to update the status bar.

Each time you use Count, *ACL* records an entry like this one in the command log.

Count all records in the active table

From the menu, select **Analyze » Count Records**. Add a command filter if you want and click **OK**.

Use Count after applying a view filter

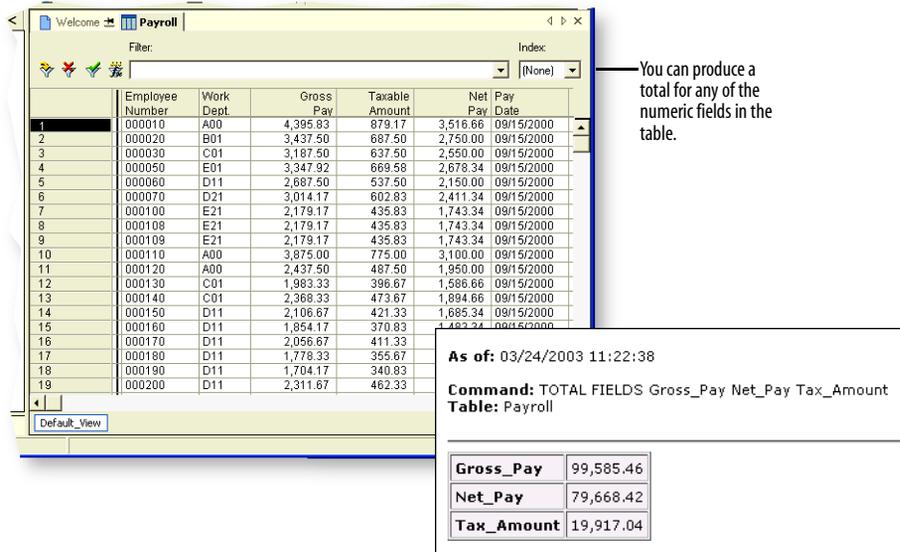
Count is useful for determining how many records pass test conditions, such as invoice amounts that are less than zero. Apply a filter to the view before counting the records. To find out how to use view filters, select **Help » Index** and look up “view filters”.

Totalling numeric fields

Use the Total command to total numeric fields or expressions in the active table.

 To learn more, select Help » Index and look up “Total command”.

You can use the Total command to prove the completeness and accuracy of the data and to produce control totals. Total finds the arithmetic sum of the fields or expressions specified.



You can produce a total for any of the numeric fields in the table.

Employee Number	Work Dept.	Gross Pay	Taxable Amount	Net Pay	Pay Date	
1	000010	A00	4,395.83	879.17	3,516.66	09/15/2000
2	000020	B01	3,437.50	687.50	2,750.00	09/15/2000
3	000030	C01	3,187.50	637.50	2,550.00	09/15/2000
4	000050	E01	3,347.92	669.58	2,678.34	09/15/2000
5	000060	D11	2,687.50	537.50	2,150.00	09/15/2000
6	000070	D21	3,014.17	602.83	2,411.34	09/15/2000
7	000100	E21	2,179.17	435.83	1,743.34	09/15/2000
8	000108	E21	2,179.17	435.83	1,743.34	09/15/2000
9	000109	E21	2,179.17	435.83	1,743.34	09/15/2000
10	000110	A00	3,875.00	775.00	3,100.00	09/15/2000
11	000120	A00	2,437.50	487.50	1,950.00	09/15/2000
12	000130	C01	1,983.33	396.67	1,586.66	09/15/2000
13	000140	C01	2,368.33	473.67	1,894.66	09/15/2000
14	000150	D11	2,106.67	421.33	1,685.34	09/15/2000
15	000160	D11	1,854.17	370.83	1,483.34	09/15/2000
16	000170	D11	2,056.67	411.33	1,645.34	09/15/2000
17	000180	D11	1,778.33	355.67	1,422.66	09/15/2000
18	000190	D11	1,704.17	340.83	1,363.34	09/15/2000
19	000200	D11	2,311.67	462.33	1,849.34	09/15/2000

As of: 03/24/2003 11:22:38
 Command: TOTAL FIELDS Gross_Pay Net_Pay Tax_Amount
 Table: Payroll

Gross_Pay	99,585.46
Net_Pay	79,668.42
Tax_Amount	19,917.04

- Obtain a total for a numeric field
- From the menu, select **Analyze » Total Fields** and choose one or more numeric fields to total. Select any additional options and click **OK**.

Total non-numeric fields

Some character fields, such as invoice numbers, may contain digits. To total this type of data, create a computed field that uses the VALUE() function to convert character data to numeric data. To learn more, select Help » Index and look up “VALUE()”.

■ Checking for validity errors

Use the Verify command to check for data validity errors in the active table. Verify ensures that data in a table conforms to the table layout and reports on any errors encountered.

All defined fields may be analyzed to ensure that the data is consistent with each field's data type as specified in the data definition. For example, Verify checks that character fields contain only character data and numeric fields contain only numeric data.

As well, *ACL* checks character fields for unprintable characters and checks numeric fields for improper numeric characters. For example, Verify checks for more than one preceding “+” or “-” sign or more than one decimal point.

i For help with the Verify command, select Help » Index and look up “Verify command”.

Select the fields that you want to verify.

As of: 03/24/2003 11:34:09
Command: VERIFY FIELDS InvoiceNo OrderQty Price Prodno ShipQty Total ERRORLIMIT 10 TO SCREEN
Table: Ap_Trans

The command results indicate where the invalid data appears in the table.

20	20	20	20	20	20	20	42	41	44	52	45	43
Invalid field data encountered in record 2 (field Total)												
20	20	20	20	20	20	20	36	2E	39	38	41	
Invalid field data encountered in record 4 (field Price)												
20	20	20	20	20	4E	4F	4E	45				
Invalid field data encountered in record 10 (field ShipQty)												
30	1A	30	32	34	31	37	35	34				
Invalid field data encountered in record 17 (field Prodno)												
30	38	30	31	C2	C4	02	30	20				
Invalid field data encountered in record 18 (field Prodno)												
5 data validity errors detected												

● Check for validity errors in one or more fields

From the menu, select **Data » Verify**. Select the fields that you want to verify and click **OK**.

● Verify fields every time you use a table

You can choose to have *ACL* verify all existing fields every time you use a table by selecting the **Verify Data** option in the application Options. Select **Tools » Options**, click **Numeric**, and select the **Verify Data** option.

CHAPTER 6

ANALYZE YOUR DATA

Apply ACL to achieve your objectives

ACL works with one table at a time. You can, however, work with multiple tables in several ways: by appending one table to another, by merging or joining them into a single new table, or by relating tables to one another so they can be analyzed as though they were a single table.

Once the data from multiple tables is related or combined by joining, merging, or appending, the resulting table can be analyzed with any of *ACL*'s commands.

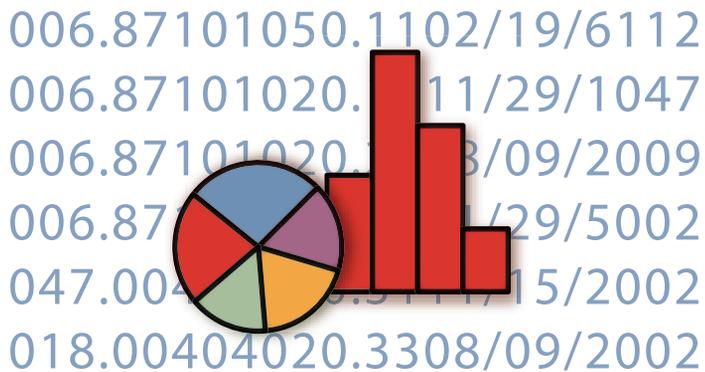
In this chapter...

- Summarizing data
- Examining sequential data
- Locating and isolating records
- Sorting and indexing
- Relating tables
- Joining, merging, and appending
- Sampling

■ Summarizing data

In *ACL* you can combine sorting and summarizing operations. Choose from these commands according to the type of summarizing operation that you want to perform:

- Use **Stratify** to summarize data according to numeric ranges.
- Use **Age** to summarize data according to date ranges.
- Use **Classify** to summarize data according to ranges based on unique values in a single character field.
- Use **Summarize** to produce a summary of the data according to ranges based on multiple character or date fields, and display the results with selected data from associated fields.
- Use **Cross-tabulate** to summarize by setting character fields in rows and columns and accumulating numeric values.

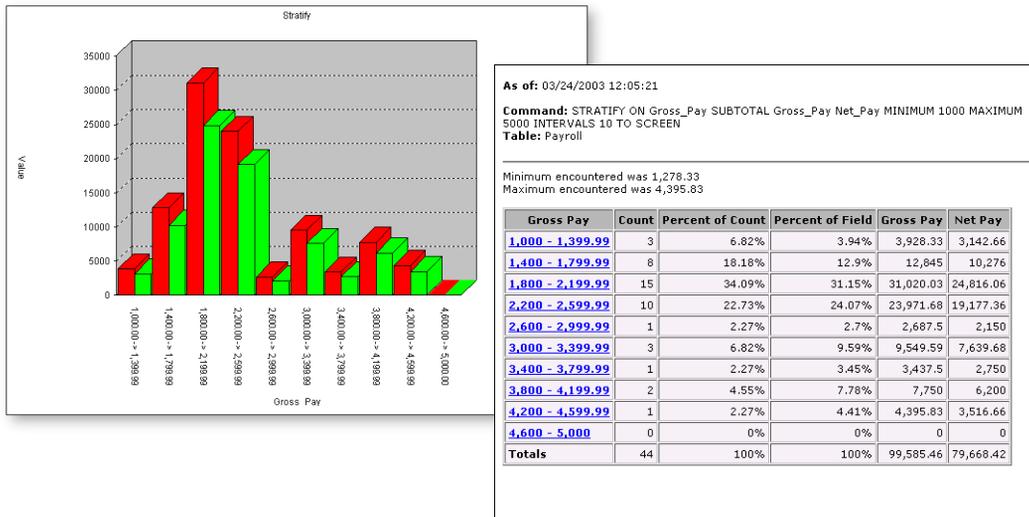


Producing a stratified summary

Use the Stratify command to count the number of records that fall into specified intervals — or *strata* — of numeric field or expression values, and to subtotal one or more fields for each stratum. *ACL* lists the record count for each stratum in a *COUNT* column in the command output.

The Stratify command works on unsorted tables and is particularly useful to quickly scan and summarize. Stratify allows you to count the number of records that fall into a specified number of even intervals, and provides totals by stratum for selected numeric fields. Alternatively you can specify the start points for the intervals to create custom intervals of any size.

? To learn more about the Stratify command, select Help » Index and look up “Stratify command”.



Count the number records within specified intervals

From the menu, select **Analyze » Stratify**. Choose the field on which to stratify, select any additional options if necessary, and click **OK**.

View the output as a graph

You can send the command output to a graph. In the **Stratify** dialog box, click the **Output** tab and select **Graph**.

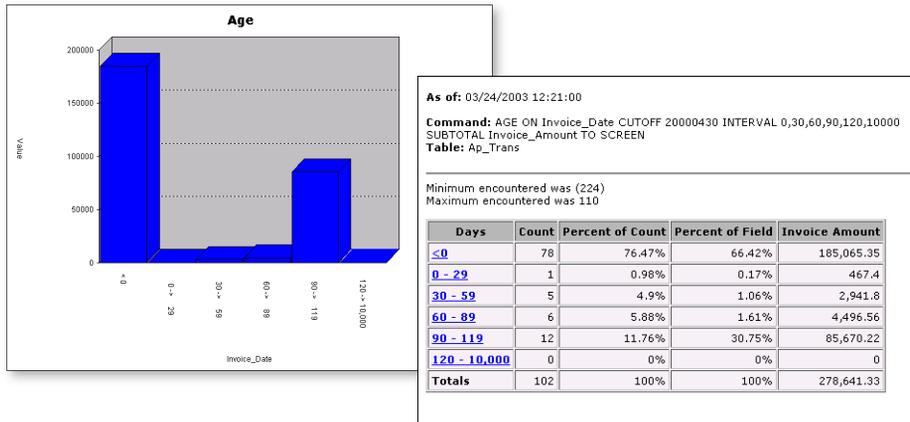
Producing aged summaries

Use the Age command to produce aged summaries of data. For example, you can evaluate sales trends, look at transaction volumes, and classify invoices by the number of days outstanding from a particular date.

? To learn more about the Age command, select Help » Index and look up “Age command”.

Age counts the number of records in a table and:

- Divides the records into intervals based on date or *aging periods*.
- Counts the number of records in each interval.
- Subtotals the values of one or more numeric fields for each interval.
- Calculates the percent of the total count and of the total value of a subtotaled field for each interval



Produce an aged summary

From the menu, select **Analyze » Age**. Choose the command options and click **OK**.

Specify the aging periods

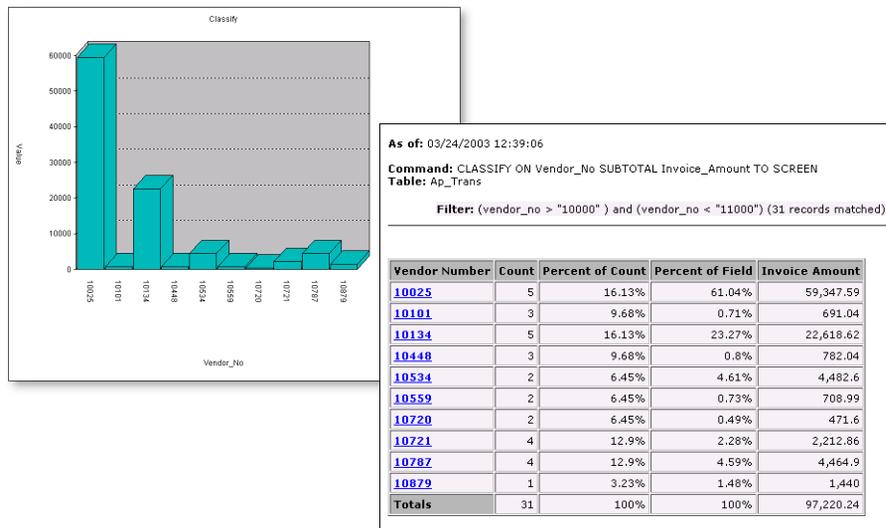
In the **Aging Periods** list, you can specify starting points such as 0, 90, 120, and so on for each aging period, or you can accept the default settings of 0, 30, 60, 90, 120, and 10,000 days.

Classifying records by a character field

Use the Classify command to count the number of records relating to each unique value of a character field and to subtotal specified numeric fields for each of these unique values.

Classify works on unsorted data and is particularly useful to quickly scan and summarize data. You can use Classify in a wide variety of circumstances. For example, Classify can rapidly generate a trial balance from unsorted ledger transactions. Classify can also eliminate the need to perform separate Sort and Summarize operations.

? To learn more about the Classify command, select Help » Index and look up “Classify command”.



- **Classify records by a character field**
- From the menu, select **Analyze » Classify**. Select a field on which to classify the records, choose any additional options if necessary, and click **OK**.

Summarizing on character fields

Use the Summarize command to generate a record count and numeric field value totals for each distinct value of key character fields in a sorted table.

? To learn more about the Summarize command, select Help » Index and look up “Summarize command”.

Summarize allows you to subtotal numeric fields for each distinct value of the key character fields. The number of records belonging to each distinct value is displayed in an ACL-generated field named COUNT. Because it can report on an unlimited number of unique key character field values, Summarize is most effective for large tables.

As of: 03/24/2003 13:52:15
 Command: SUMMARIZE ON WorkDept SUBTOTAL Net_Pay Gross_Pay TO SCREEN PRESORT
 Table: Payroll

Work Dept.	Net Pay	Gross Pay	Count
A00	13,616.66	17,020.83	5
B01	2,750	3,437.5	1
C01	7,925.98	9,907.49	4
D11	18,441.38	23,051.69	11
D21	11,978.68	14,973.34	7
E01	2,678.34	3,347.92	1
E11	7,826	9,782.5	6
E21	13,121.38	16,401.69	8
E83	1,330	1,662.5	1
Totals	79,668.42	99,585.46	44

- **Summarize on character fields**
- From the menu, select **Analyze » Summarize**.
- **Use Summarize to remove duplicate records**

You can use Summarize to remove duplicate records from a table. To do this, specify the character field on which to summarize, do not subtotal any fields, select **Other Fields** and then select **Add All**, and send the output to a table. The new table will contain unique records only.

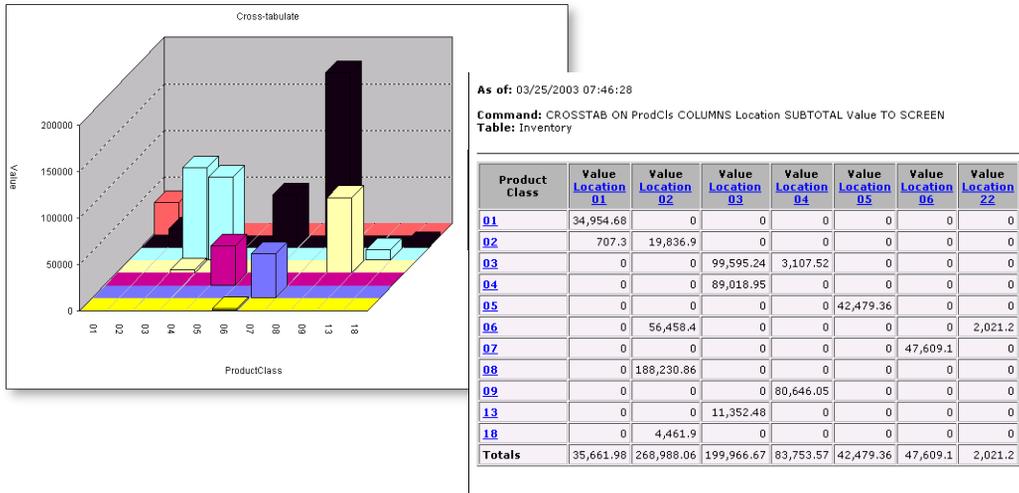
Cross-tabulating character fields

Cross-tabulate lets you analyze character fields by setting them in rows and columns. By cross-tabulating character fields, you can produce various summaries, explore areas of interest, and subtotal numeric fields. You can use Cross-tabulate to send the results to a table, the screen, or a graph.

? To learn more about Cross-tabulate, select Help » Contents and look up “Cross-tabulate command”.

Cross-tabulate counts the number of records in a table and:

- Counts each row value within each column value.
- Subtotals numeric fields for each row value within each column value.
- Totals the amounts for each column value.



● Cross-tabulate character fields

From the menu, select **Analyze » Cross-tabulate**. Specify the fields for the rows and a field for the columns. You can also specify numeric fields to subtotal and enter a command filter.

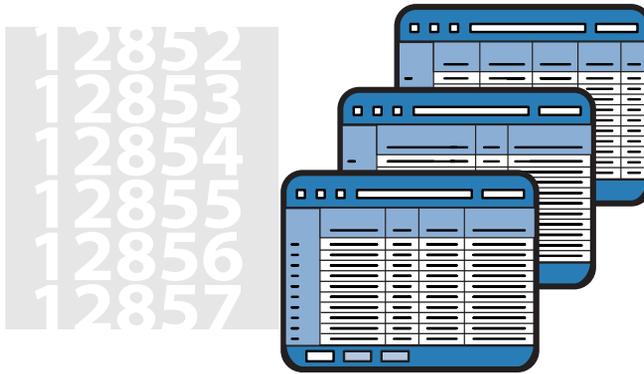
Cross-tabulate to a graph

You can create a graph from the Cross-tabulate command. In the **Cross-tabulate** dialog box, click the **Output** tab and select **Graph**.

■ Examining sequential data

There are three commands for analyzing fields containing sequential data, such as check numbers or dates. These fields can contain numeric or character data.

Because of differences in the command output, use all three commands to provide the greatest analytical insight.



Testing the sequential order of records

Use the Sequence command to determine whether key fields in the active table are in sequential order. If a table is sorted on the key field, the Sequence command does not find any errors.

? To learn more about the Sequence command, select Help » Index and look up “Sequence command”.

Name	Table	Start	Category	Length	Decimals	Type	If test
Amount	Invoice;Amount	25	N	8	2	NUMERIC	
Date	Invoice;Date	6	D	6	0	DATE	
Invoice	Invoice;Number	1	C	5	0	ASCII	
Prodccls	Product;Class	12	C	2	0	ASCII	
Prodno	Product;Number	12	C	9	0	ASCII	
Qty	Quantity	21	N	4	0	NUMERIC	

As of: 11/08/2005 16:03:14
 Command: SEQUENCE ON Invoice ERRORLIMIT 10 TO SCREEN
 Table: Trans

5 sequence errors detected

Sequence:

Record Number	Invoice Number
32	12893
69	12930
132	12993
229	13093
330	13193

In this test, Sequence reveals problems with these records.

- **Perform a sequence test**
- From the menu, select **Analyze » Examine Sequence**.
- **Correct a file with sequence errors**

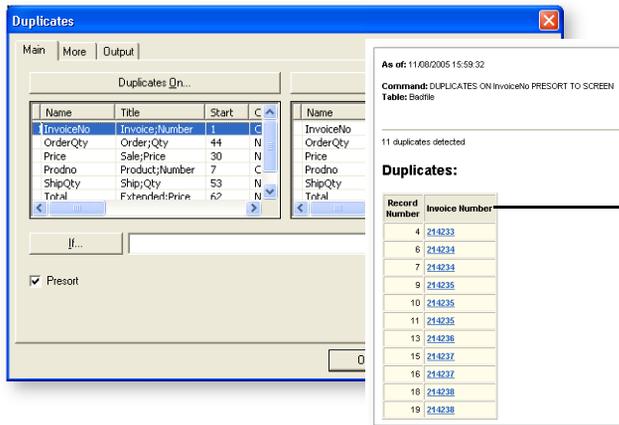
You can easily put records in sequential order with the Sort command. See “Sorting and indexing tables” on page 54.

Testing for gaps and duplicates in sequential data

Use the Gaps command to detect gaps in the key fields of the active table. If you run the Gaps command on a field that has characters mixed with numbers, for example “A12345”, *ACL* ignores characters and tests only numbers. For example, if the field in the next record is “B12346”, then *ACL* would report no gaps as the “A” and “B” in the fields are ignored.

The Duplicates command detects whether key fields in the active table contain duplicates in the sequence.

? To learn more, select Help » Index and look up “Gaps command” or “Duplicates command”.



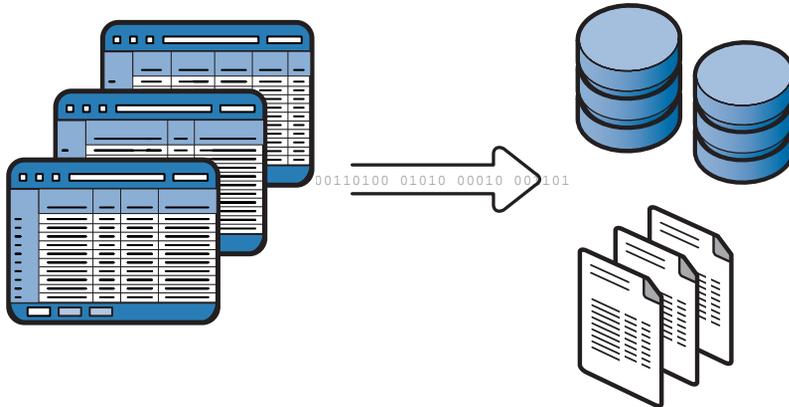
This test reveals several duplicate invoice numbers, which may require further investigation.

- **Test for gaps**
From the menu, select **Analyze » Look For Gaps**.
- **Test for duplicates**
From the menu, select **Analyze » Look For Duplicates**.

■ Extracting and exporting records

To help isolate records of interest, you can extract records from your table to a new table and continue your analysis with the new table. *ACL* can also export records to several file formats that can be used in other applications.

- **Extract** - You can extract the records displayed in a view to create a new table.
- **Export** - You can export the records in the view or all records in a table.

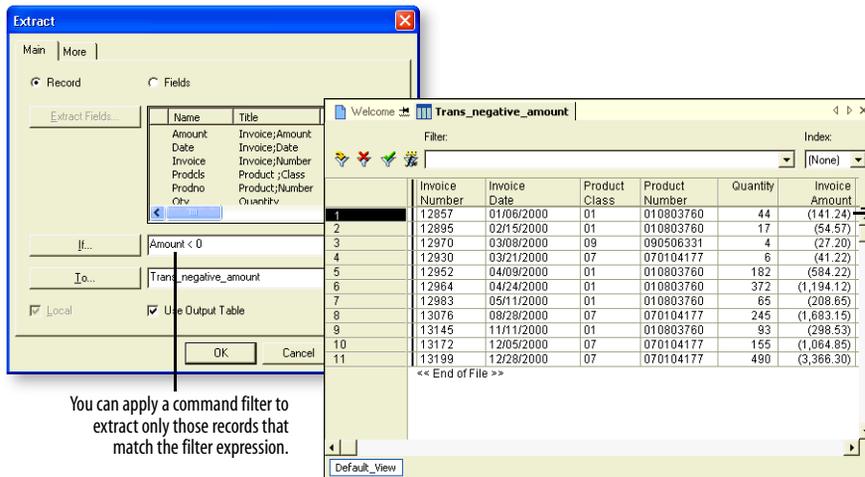


Extracting data to a new table

Use the Extract command to create a new table from selected fields or records in the active table. There are various reasons to use Extract to create a subset of a table. For example, you can use Extract before sorting to reduce the table size and processing time. You can also use Extract with filters to isolate unusual items in a separate table for further analysis.

You can extract entire records from the table, including any data stored in undefined gaps in the table layout. You can also extract specified fields from records.

? To learn more about extracting data to a new table, select Help » Index and look up “Extract command”.



You can apply a command filter to extract only those records that match the filter expression.

The new table contains only those records that match the filter expression — in this case, all records with a negative amount.

● Extract records from the active table

From the menu, select **Data » Extract Data**. Select **Record**, choose any additional options, and click **OK**.

● Extract fields from the active table

From the menu, select **Data » Extract Data**. Select **Fields**, select the fields to extract as well as any additional options, and click **OK**.

● Extract specific records to a new table

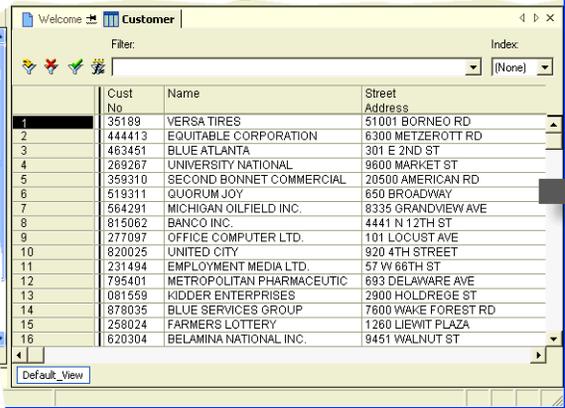
To extract specific records, you can either apply a view filter before you use Extract or apply a command filter in the **If** text box while you use Extract. See “Using filters to isolate records of interest” on page 16.

Exporting data to another application

Export allows you to use *ACL* as a data conversion tool, reading data from one package and producing an export file in a format readable by another application. For example, you can use Export to produce merge files for bulk mailing. You can also export data to several other file types, including Excel, Access, and XML.

Export provides two ways to export your data:

- Use the **Fields** option to select fields, create expressions, and choose the field order for the export file.
- Use the **View** option to export only the fields in the active view in the order in which they are displayed.



Cust No.	Name	Street Address
1	35189	VERSA TIRES
2	444413	EQUITABLE CORPORATION
3	463451	BLUE ATLANTA
4	269267	UNIVERSITY NATIONAL
5	359310	SECOND BONNET COMMERCIAL
6	519311	QUORUM JOY
7	564291	MICHIGAN OILFIELD INC.
8	815062	BANCO INC.
9	277097	OFFICE COMPUTER LTD.
10	820025	UNITED CITY
11	231494	EMPLOYMENT MEDIA LTD.
12	795401	METROPOLITAN PHARMACEUTIC
13	081559	KIDDER ENTERPRISES
14	878035	BLUE SERVICES GROUP
15	258024	FARMERS LOTTERY
16	620304	BELAMINA NATIONAL INC.



You can export data to other applications, including spreadsheets and mail merge files.

? To learn more about exporting data to another application, select Help » Index and look up “Export command”.

Export data to another file format

From the menu, select **Data » Export to Other Application**. From the **Export As** list, choose a data format: Delimited text, dBASE III PLUS, Lotus 1-2-3, Microsoft Access 2000, Microsoft Excel, Microsoft Word merge files, Plain text, Windows clipboard, WordPerfect merge files, or XML.

Create a merge file for bulk mailing

You can export information from a customer table to a Microsoft Word or Wordperfect merge file. In the **Export** dialog box, select name and address fields and choose a merge file format from the **Export As** list.

■ Sorting and indexing tables

Computers process files in sequence, starting with the first record, and many operations can be performed more quickly if the files are first sorted or indexed. Some operations, such as multiple table operations, require data to be sorted or indexed on key fields.

Use the Sort command to sort the active table in ascending or descending order based on specified key fields. Sort creates a new table that has been physically reorganized.

Use the Index command to create an index file that allows direct access to the records of a table in a logical rather than physical order.

? To learn more, select Help » Index and look up “Sort command” or “Index command”.

1

	Invoice Number	Invoice Date	Product Number	Quantity	Invoice Amount
1	12856	01/05/2000	034255003	7	58.80
2	12852	01/02/2000	052530155	36	1.08
3	12853	01/02/2000	052530155	3	0.09
4	12855	01/05/2000	080102618	54	907.20
5	12854	01/04/2000	090504781	1	6.17

The result of sorting and indexing appears similar: after sorting, ACL displays the new sorted table; after indexing, ACL displays the same table, but with an index applied.

2

	Invoice Number	Invoice Date	Product Number	Quantity	Invoice Amount
1	12852	01/02/2000	052530155	36	1.08
2	12853	01/02/2000	052530155	3	0.09
3	12854	01/04/2000	090504781	1	6.17
4	12855	01/05/2000	080102618	54	907.20
5	12856	01/05/2000	034255003	7	58.80

● Sort records in a table

From the menu, select **Data » Sort Records**. To learn more, click the **Help** button in the **Sort** dialog box.

● Create an index for a table

From the menu, select **Data » Create Index**. To learn more, click the **Help** button in the **Index** dialog box.

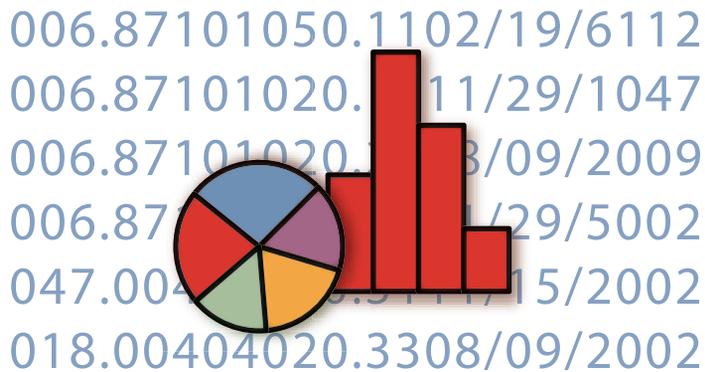
● Choose the best way to place records in sequential order

To find out how to decide between Sort and Index, select **Help » Index** and look up “Sort or Index”.

■ Surveying your data

Use these commands to get an overview of a table in advance of detailed processing. They can quickly highlight abnormalities in the table that you can explore through further analysis.

- **Statistics** provides a more complete overview of the significant properties of a numeric file.
- **Profile** can determine values for the Stratify, Histogram, and Sample commands.
- **Benford** digital analysis identifies anomalies in certain types of data.



Generating descriptive statistics on numeric fields

Use the Statistics command to calculate descriptive statistics on numeric fields in the active table.

? To learn more, select Help » Index and look up “Statistics command”.

The Statistics command is frequently used to get an overview of a table before detailed processing. It can quickly highlight abnormalities in the table, which can then establish a direction for your subsequent approach or analysis.

The screenshot shows a software window titled 'Trans' with a data table and a statistical summary panel. The data table has columns for Invoice Number, Product Class, Product Number, Quantity, and Invoice. The summary panel displays the command used and a table of statistics for the 'Amount' field.

Invoice Number	Product Class	Product Number	Quantity	Invoice
1	12852	05	052530155	36
2	12853	05	052530155	3
3	12854	09	090504761	1
4	12855	08	080102618	54
5	12856	03	034255003	7
6	12857	04	040240664	120
7	12857	01	010803760	44
8	12858	06	060112296	977
9	12859	08	080123938	676
10	12860	03	030934423	871
11	12861	05	052484425	102
12	12862	09	090501051	191
13	12863	05	052530155	15
14	17864	09	090669611	15

As of: 03/25/2003 12:21:08
 Command: STATISTICS ON Amount TO SCREEN NUMBER 5
 Table: Trans

Invoice Amount			
	Number	Total	Average
Range	-	41,261.3	-
Positive	327	309,346.09	946.01
Negative	11	(8,664.05)	(787.64)
Zeros	1	-	-
Totals	339	300,682.04	886.97
Abs Value	-	318,010.14	-

Highest	Lowest
37,895	(3,366.3)
13,091	(1,683.15)
10,942.4	(1,194.12)
10,045	(1,064.85)
8,416.4	(584.22)

- **Calculate statistics on numeric fields**
- From the menu, select **Analyze » Statistical » Statistics**. The results include:
- Range, Positive, Negative, Zeros, Totals, Absolute Value, and the Highest and Lowest values.

Calculate statistics on date fields

You can also use the Statistics command on date fields. The results include: Range, Positive, Zeros, and the Highest and Lowest values.

Generating summary statistics on numeric fields

Use the Profile command to provide summary statistics on one or more numeric fields in a table.

? To learn more, select Help » Index and look up "Profile command".

Profile provides the following information for numeric fields:

- Total value
- Absolute value
- Minimum value
- Maximum value

Use Profile primarily to determine minimum, maximum, absolute, and total field values before issuing the Stratify, Histogram, or Sample commands.

The screenshot shows a software window titled "Payroll" with a data table. The table has columns: Employee Number, Work Dept, Cheque Number, Gross Pay, Taxable Amount, and Net Pay. The data rows are numbered 1 through 14. An overlay window titled "As of: 03/25/2003 12:35:34" shows the command "PROFILE FIELDS Gross_Pay Tax_Amount Net_Pay" and the table "Payroll". Below this, a summary table is displayed:

Field Name	Total Value	Absolute Value	Minimum	Maximum
Gross Pay	99,585.46	99,585.46	1,278.33	4,395.83
Taxable Amount	19,917.04	19,917.04	255.67	879.17
Net Pay	79,668.42	79,668.42	1,022.66	3,516.66

- **Generate summary statistics on numeric fields**
- From the menu, select **Analyze » Statistical » Profile**.
-
-
-
-

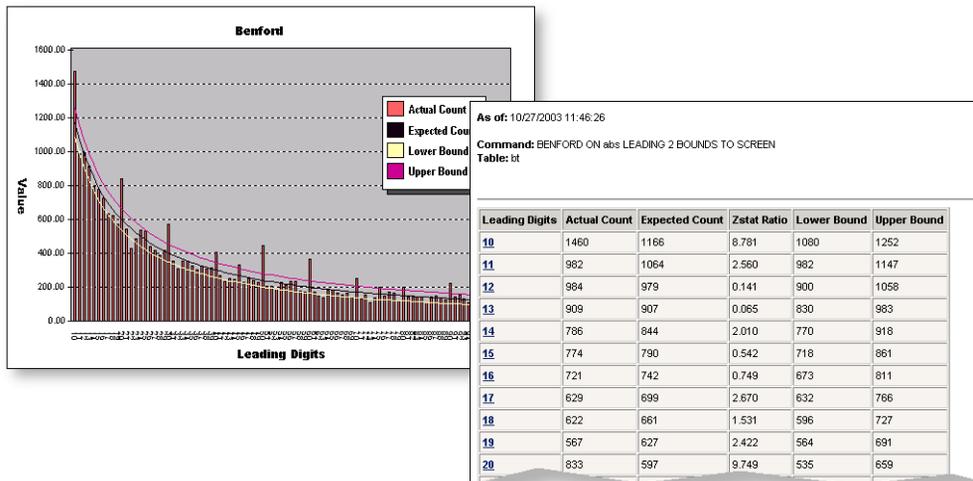
Performing Benford digital analysis

The Benford command allows you to generate digital analysis of numeric data by applying the Benford formula.

This command counts the number of times each leading digit or digit combination occurs in a data set, and compares the actual count to the expected count. The expected count is calculated by using the Benford formula. You can send the command output to a graph.

Digital analysis tools like the Benford command enable auditors and other data analysts to focus on possible anomalies in large data sets. They do not prove that error or fraud exist, but identify items that deserve further study on statistical grounds. Digital analysis complements existing analytical tools and techniques, and should be used in conjunction with them.

? To learn more about Benford digital analysis, select Help » Index and look up “Benford command”.



- Use the Benford command in ACL
- From the menu, select **Analyze » Perform Benford Analysis**.
- Find out more about Benford digital analysis

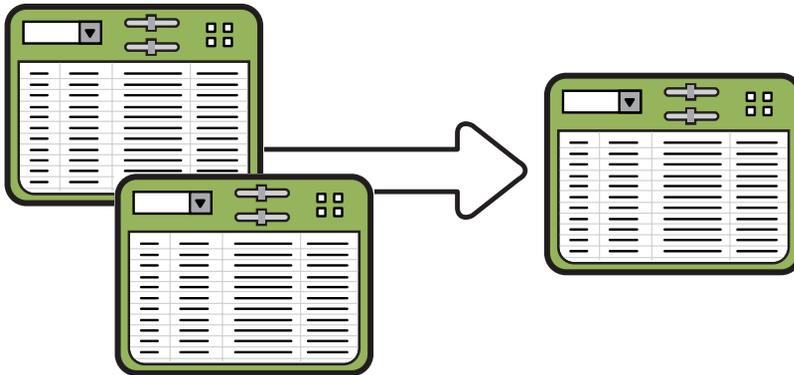
To learn more about digital analysis, see *Digital Analysis Using Benford's Law: Tests & Statistics for Auditors* by Mark J. Nigrini, Ph.D., published by Global Audit Publications.

■ Working with multiple tables

ACL lets you work with data from multiple tables in several ways by using:

- Relations command
- Join command
- Merge command
- Extract-and-append

Any two tables that you relate or join must have an identical character field in common, such as an employee number or an invoice number. This field is called a *key field*. Key fields must have the same field length, identical contents, and must have the same data structure. ACL's many functions let you edit fields so you can use them as key fields.



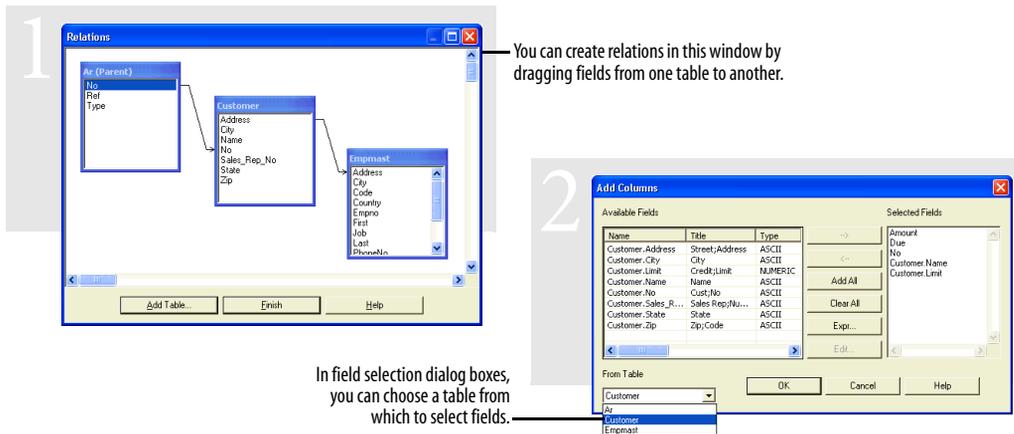
Relating two or more tables

The Relations command allows you to simultaneously access and analyze data from two or more tables. You can analyze the combined data as though it existed in a single table, and add fields from related tables to a view.

Because you are working with data from different tables, you can use Relations to examine expected relationships, and to discover unexpected relationships.

? To learn more, select Help » Index and look up “Relations command”.

i You can create a new table containing the related data fields using the Extract command.



Relate tables

- From the menu, select **Data » Relate Tables**. Add tables to the Relations work area and create relationships by dragging fields from one table to the corresponding field in another table.

Access fields in a related table

After establishing relations, you can access fields from related tables in the view, field selection dialog boxes, and the **Expression Builder** by using the **From Table** drop-down list. Fields are displayed in the format **relation name.fieldname** to show the table from which the fields came.

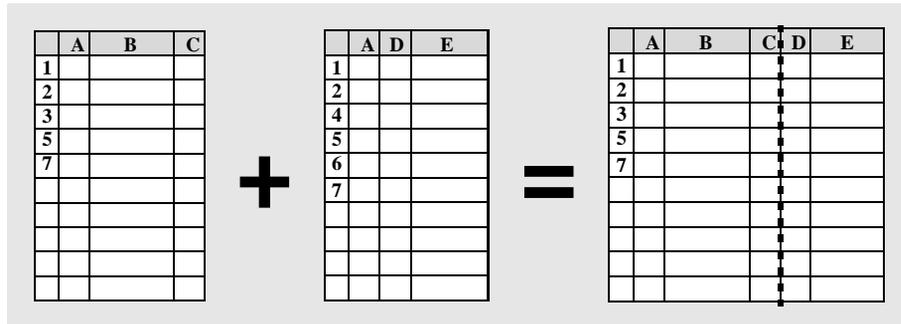
Joining tables

Use the Join command to combine fields from two tables into a third table.

? To learn more, select Help » Index and look up “Join command”.

You typically use Join to match records in a transaction table with those in a master table. You can, for example, match invoice data in an accounts receivable table to data in a master customer table, or you can compare the contents of two table.

Tables to be joined must belong to the same *ACL* project. Similarly, when you use *ACL* Server Edition, you can log on to only one server at a time so the tables to be joined must reside on the same server. Consequently, you cannot join a client table to a server table.



For each matching record, you join fields from primary file with fields in secondary file.

Identify the primary and secondary tables

When you join a transaction table and a master table, the transaction table is usually the primary table, and the master table is the secondary table. Carefully identify your primary and secondary tables because results differ if you reverse the tables, depending on the type of join.

Join two tables

From the menu, select **Data » Join Data Files**.

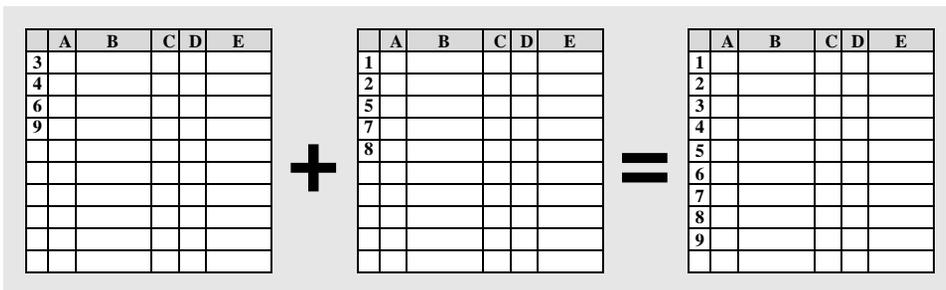
Merging two tables

Use the Merge command to combine two sorted tables with identical record layouts into a third table. Use this new table for further analysis and reporting with *ACL*.

For example, you can use Merge to combine two tables with identical record layouts from different time periods, different company branches, and so on.

Merge places the merged output records from both the primary and secondary tables into a third output table. All aspects of the records remain unaltered and the sort sequences are maintained. For each key field value, the records of the primary table are placed before those of the second.

? To learn more, select Help » Index and look up “Merge command”.



For sorted tables with identical layouts, the Merge command combines the records and maintains the record sorting.



Merge two tables

From the menu, select **Data » Merge Tables**.

Ensure that your tables are sorted

To verify that your tables are sorted before you merge them, use the Sequence command. See “Testing the sequential order of records” on page 49.

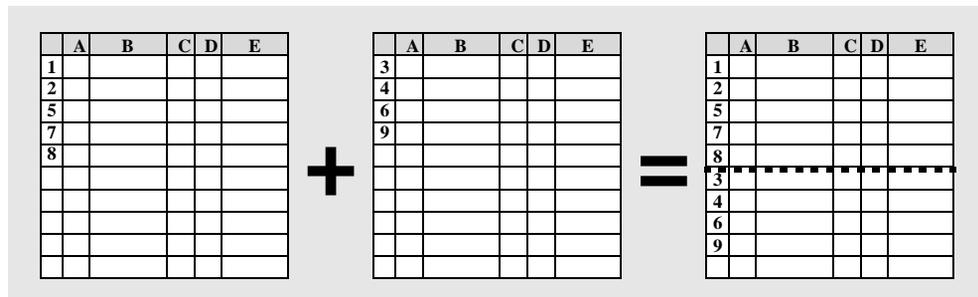
Using Extract-and-append

As an alternative to the Merge command, use the Extract command with the **Append to Existing Table** option to add records from the active table to the end of another table. Unlike the Merge command, this method can be performed on unsorted files.

For example, if you have monthly tables in which transaction records are sorted by customer number rather than by date, you can append one table to the other. In the resulting table, the records maintain the sort order within each month.

? To learn more about the Extract command, select Help » Index and look up “Extract command”.

i The layout of the two tables must be identical in order to use Extract-and-append.



Use Extract-and-append to add the records from the active table to another table with an identical record layout. The results are not sorted.

- **Compare table layouts**
- Before you Extract-and-append, verify that the tables have identical layouts.
- Select **Window » Show Command Line**. Open a table, enter **DISPLAY** on the command line, then click the push-pin icon on the **Display** tab. Repeat this for the other table and compare the layouts.

Extract records and append to another table

Select **Data » Extract Data**. Choose the fields to export or select **Records** to export all records and fields. Click the **To** button to locate the table to which you are appending the records. On the **More** tab, select **Append to Existing File**.

■ Adding notes to records

With the new Record Notes feature, you can attach notes to individual records within *ACL* tables. These notes can be edited, and can be used to store information for reporting purposes and to share with your team. You can add the RecordNote field to the view, just as you would any other field after you create the first note for that table.

? To learn more about how to add or edit record notes in a table and how to extract record notes in *ACL*, select Help » Index and look up “record notes”.

	Invoice Number	RecordNote
1	12852	
2	12853	
3	12854	
4	12855	
5	12856	
6	12857	
7	12857	
8	12858	
9	12859	Follow up on this transaction with account manager.
10	12860	
11	12861	
12	12862	
13	12863	
14	12864	
15	12865	
16	12866	
17	12867	
18	12869	
19	12870	
20	12871	

■ Sampling with ACL

Sampling can help you reach a statistically valid conclusion about a data population from a relatively small number of samples. *ACL* supports two common sampling techniques:

- **Monetary unit sampling** (MUS) uses the absolute value of a field in the record to determine which records are selected. When using a monetary unit base, the likelihood that a given record will be selected is directly proportional to the size of the item, unless that item is affected by top stratum cutoff.
- **Transaction sampling**, also called record sampling, in which the population consists of the number of records. A record base treats each record equally, using a nominal value of 1. This results in a sample that is not biased by being based on the values in a record, so each record has an equal chance of being selected.

You can choose one of these methods to select the items in the sample:

- **Fixed interval** sampling
- **Random interval** sampling, also called **cell** sampling
- **Random** sampling

You can sample the entire population, a subset of the population, or use filters to perform conditional sampling.

ACL has three commands for statistical sampling:

- **Size** determines statistically appropriate sample sizes and intervals
- **Sample** draws samples from a population
- **Evaluate** determines the effect of errors detected in your samples

● ● ● ● ● Use the sampling commands effectively

The theory behind statistical sampling is complex. If you are not familiar with the critical judgements required when performing statistical sampling, we recommend that you consult a statistics specialist before using the **Size**, **Sample**, and **Evaluate** commands.

? To learn more about sampling with *ACL*, select Help » Index and look up “Sample command”.

CHAPTER 7

REPORT YOUR FINDINGS

Produce reports and graphs from your data

With *ACL*, you can generate view-based reports and create graphs from commands and views. *ACL* also integrates with Crystal Reports®, which lets you present your findings by using Crystal Reports templates.

In this chapter...

Using Crystal Reports

Reporting from a view

Using the Report command

Graphing data

■ Using ACL with Crystal Reports

With *ACL*, you can take advantage of the reporting capabilities of Crystal Reports®.

? To learn more, select Help » Index and look up “Crystal Reports.”

You can use *ACL* to update report templates with data from an *ACL* table. In this way, organizations can standardize reporting by designing and distributing a set of custom templates for use with *ACL*.

	Invoice Number	Product Class	Product Number	Quantity	Invoice Amount
1	12852	05	052530155	36	1.08
2	12853	05	052530155	3	0.09
3	12854	09	090504761	1	6.17
4	12855	08	080102618	54	907.20
5	12856	03	034255003	7	58.80
6	12857	04	040240664	120	3,552.00
7	12857	01	010803760	44	(141.24)
8	12858	06	060112296	977	10,942.40
9	12859	08	080123938	676	2,798.64
10	12860	03	030934423	871	4,337.58
11	12861	05	052484425	102	726.24
12	12862	09	090501051	191	970.62
13	12863	05	052530155	15	0.45
14	12864	09	090609611	14	134.00



For each table, start a Crystal Reports template with *ACL* then edit it using the full version of Crystal Reports.

Crystal Reports templates are updated with data from your table.

● Design a Crystal Reports template

- Open a table and select **Data » Crystal Reports » Create Template**. Add the fields to the template and save it, then edit the file with the full version of Crystal Reports.

● Generate reports based on the custom template

Provided that you have a template that was completed by using Crystal Reports, you can generate reports using *ACL*. Open the table for which the template was designed and select **Data » Crystal Reports » Update Template**.

● View and print your reports

After you generate a report from a custom template, launch the Crystal Reports viewer by selecting **Data » Crystal Reports » View Report**.

■ Designing and printing reports

Reports in *ACL* are based on views. The report specifications are “saved” as part of the view. For your reports, you create views, format them as reports, and name them in a way that indicates the report’s content.

? To learn more, select **Help » Index** and look up “Report command”.

There are three steps to producing a formatted report: formatting the view, designing the report layout, and printing the report.

i You can also save reports as text or HTML (Hypertext Markup Language) files.

The screenshot shows the ACL software interface. On the left, a window titled 'Welcome Demo' displays a table with columns: Branch, GI, Batch, Type, Company, Dp, Misc. The table contains 18 rows of data. On the right, a window titled 'Branch Report for ABC Corp.' displays a formatted report with columns: Branch, GI, Batch, Date, Amount, Dp, Type, Company, Misc. The report shows a summary for Branch 01 and a detailed list of transactions for Branch 11.

Branch	GI	Batch	Type	Company	Dp	Misc
1	01	101	70005	T	01	00 000600
2	01	101	70016	T	01	00 000600
3	01	101	70016	T	01	00 000600
4	01	101	70017	T	01	00 000600
5	01	101	30001	T	01	00 015400
6	01	101	30012	T	01	00 015900
7	01	101	30012	T	01	00 015900
8	01	101	30012	T	01	00 015900
9	01	101	30012	T	01	00 015900
10	01	101	30012	T	01	00 015900
11	01	101	30012	T	01	00 015900
12	01	101	30012	T	01	00 015900
13	01	101	30012	T	01	00 015900
14	01	101	30012	T	01	00 015900
15	01	101	30012	T	01	00 015900
16	01	101	30012	T	01	00 015900
17	01	101	30012	T	01	00 015900
18	01	101	30012	T	01	00 015900

Branch	GI	Batch	Date	Amount	Dp	Type	Company	Misc
01	101	30072	12/31/2003	(404,302.85)	00	T	01	019900
101	20014	12/31/2003		9,302.03	00	T	01	005800
101	30078	12/31/2003		808,605.70	00	T	01	020500
101	30078	12/31/2003		(1,622.00)	00	T	01	020500
101	30006	11/30/2003		233,333.33	08	T	01	016400
101	30004	11/30/2003		(233,333.33)	08	T	01	016400
101	30012	12/31/2003		721,664.16	08	T	01	017800
101	30012	12/31/2003		232,520.19	08	T	01	017800
101	30047	12/31/2003		(577.33)	08	T	01	019300
105	30040	12/31/2003		35,000.00	00	T	01	018800
107	00000	10/31/2003		349.61	00	G	01	999800
107	00000	11/30/2003		572.21	00	G	01	999800
107	00000	12/31/2003		634.81	00	G	01	999800
108	30054	12/31/2003		(6,192.00)	00	T	01	019400
108	30072	12/31/2003		6,192.00	00	T	01	019900
01				4,270,465.46				
11	101	30008	10/31/2003	(122,429.12)	00	T	01	015500
101	99999	10/31/2003		(19,426.17)	00	S	01	003100
101	99999	10/31/2003		254,982.83	00	S	01	003200
101	30000	11/30/2003		(235,556.66)	00	T	01	016300
101	99999	11/30/2003		(45,213.39)	00	S	01	003100

- **Format the view**

- Display a view and specify the field formatting that you want for the report. This includes display formats, break columns, and options such as suppressing duplicates and zero values. Select **Help » Index** and look up “formatting views”.

- **Design the report layout**

- After formatting the view, select **Data » Report** and format your report pages. Press **F1** in the **Report** dialog box for help.

- **Preview and print the report**

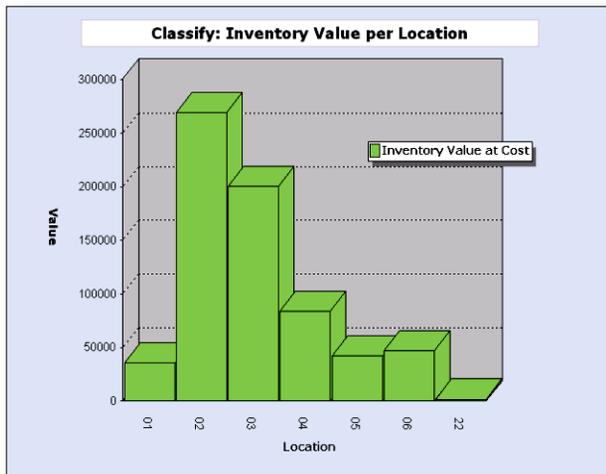
- *ACL* offers several options for printing your report, including the page setup, margins, numbering, and date and time stamping. To learn more about your printing options, select **Help » Index** and look up “printing a report”.

■ Graphing data

Graphs provide a visual overview of a table's contents. There are several ways to produce graphs in *ACL*.

After generating a graph, you can then change the graph type, save it as a bitmap file, copy it to the Windows Clipboard, or send it to a printer.

? To learn more, select Help » Index and look up “generating graphs.”



● Graph from a view

Select one or more numeric fields in a view and choose **Graph Selected Data** from the context menu.

Graph from commands

Graph from commands that produce graphable numeric output. Choose the **Graph** option from the command's dialog box, or click the **Graph** tab in the command results.

Graph using the Histogram command

Produce a bar graph of the distribution of records over the values of a field or an expression. Select **Analyze » Histogram**.

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