CHAPTER 1

Taking a First Look at Excel's Reporting Tools

This chapter provides you with an overview of Excel's reporting features. It shows you the principal types of Excel reports and how you can use them to satisfy many of the business requirements you may face. It covers some of the benefits of using Excel reports, including real-time access, simplified report updates, and reduced cost of ownership. It also highlights the various types of reporting tools included in Excel and the related components in other Microsoft applications.

In this first chapter, I try to give you a snapshot overview of PivotTable and PivotChart reports, Spreadsheet reports, parameter queries (how you can map parameters to stored procedure variables), and web queries, along with a quick look at some of the related Microsoft Office components, such as FrontPage, Access, and MapPoint.

Keep in mind that this chapter just helps you get started with the basics. As you work your way through the other chapters, you have the opportunity to dive into these topics in a lot more detail. So let's begin!

Why Use Excel for Reports?

Companies produce reports from enterprise software systems using numerous methods. A report might be generated from the native enterprise software program or from a standalone report development software program such as

Business Objects (formerly Crystal Reports). In other scenarios, the report data may be extracted to a delimited file that is loaded into a program such as Excel or Access. The number of enterprise software applications, the amount and level of internal expertise, and the degree of organizational leadership are just a few factors that can determine how reports are managed within a company.

NOTE **You might be asking yourself, "What is an enterprise software system, anyway?" Some popular enterprise software systems include SAP, PeopleSoft, Siebel, and Baan. These systems are used in all types of organizations to run the business more efficiently and effectively. Hospitals use medical information systems to track a patient's vital data and health care history. Companies such as Amazon.com or Barnes & Noble use warehouse management systems to reduce the time and labor expenses for shipping products to customers. The company I work for produces enterprise software for magazine and book publishers. More than 30 modules are available to perform business functions from advertising, billing, inventory, circulation, and payroll to conference management, web access, and customer relationship management.**

Although report development tools are often bundled with enterprise software applications, many organizations use a separate report development software application for creating and running reports. So why would an organization spend additional funds to purchase reporting software if it is already included as part of its enterprise software system? Learning and supporting the report development tools included with an enterprise software application can be both difficult and expensive. Furthermore, many organizations have numerous enterprise applications, so that work and cost can be magnified several times. Enhanced performance and standardization to a single system are major benefits for organizations seeking to reduce costs and maintain their report development skills. Instead of paying six employees to develop and manage reports using the report development tools in a few enterprise software applications, it may take only two employees to develop and manage equivalent reports for the same enterprise systems using a single report development software program.

Initially, information technology (IT) professionals and business managers unfamiliar with Excel's reporting capabilities are often skeptical about using Excel to produce reports from an enterprise system. However, even the most skeptical of IT decision-makers are generally convinced once they

- See Excel's powerful reporting tools
- Receive superb feedback from report users
- Witness the reduced software licensing feeds and support costs

Here are some of the top considerations for using Excel reports over competing report development software programs:

- **Excel reports can retrieve data from an Enterprise software application's OLTP database in real-time.** Many systems require reports to be run by first launching the application and then requesting it. If the report is exported to Excel, a second step is likely involved for actually importing and formatting the data. (Many software systems build interfaces to Excel.) In comparison, by using native Excel reporting functionality, you can accomplish all of this in a fraction of the time. With hardly more than a mouse click, data can be fetched directly from one or more databases to update an Excel report with the most up-to-date information.

- **Sorts, breaks, and totals can easily be applied, modified, and removed.** With only limited training, even a novice Excel user can add or remove subtotals, apply complex sorts, and insert page breaks or lines between various report groups. It can take days or weeks of training to be able to understand and perform this same type of task with competing report development software programs and enterprise reporting tools.

- **Some Excel report types, such as PivotTable reports, are very dynamic and powerful.** One report can replace dozens of traditional columnar reports. A PivotTable report can contain many more fields than what is actually displayed in a single view of the report. Inserting and removing fields, changing field locations, and applying filters are easily and readily performed.

- **Excel reports are cost effective.** Running and modifying reports from an enterprise software application or report development software program usually requires that the application be installed. This can add a considerable burden to support, training, and software licensing costs. In contrast, most computers already have Excel installed and users are often familiar with the basics of how this program works.

- **Report development time is often much faster than with competing reporting software applications.** Enterprise reporting tools and report development software programs can be very intricate and complex. Organizations regularly hire report programmers or consultants to help develop many of their reports. In contrast, learning and using Excel report development tools is simple. Reports can frequently be developed more quickly, and at a lesser cost, than competing report development software programs and enterprise reporting tools.

- **Excel reports are integrated with related Microsoft products, such as FrontPage, MapPoint, Access, Data Analyzer, and SQL Server.** The integration among the various Office programs becomes more seamless and feature-rich with each new release of Microsoft Office, allowing you to develop ever more powerful and innovative reporting solutions.

PivotTable Reports

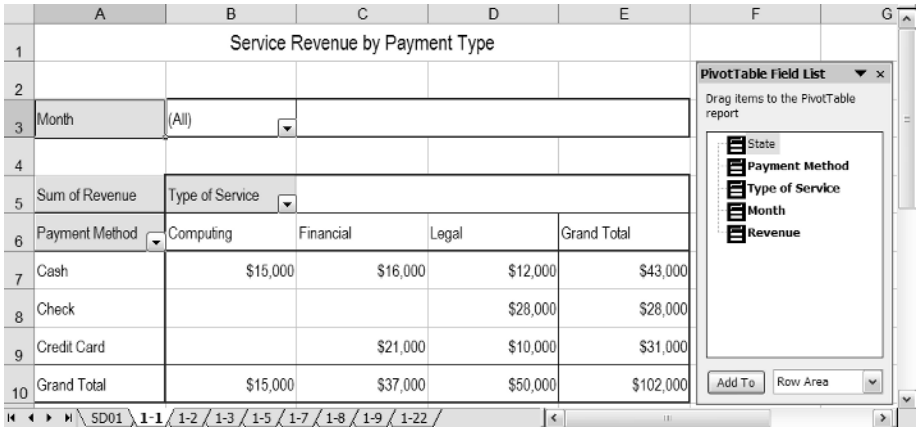
With PivotTable reports, you can interactively create and build cross-tabular reports from a list of available fields. These fields can be derived from another worksheet tab, a SQL or Oracle database, a text file, an OLAP cube, or some other external data source. After the PivotTable shape is created, users can move fields to different locations in the report, change the type of aggregation (for example, calculate an average amount instead of a total amount), apply filters to determine which items in a report field are displayed, and apply complex sorts based on aggregated values or other fields in the report.

Using PivotTable technology, report users can do the following:

- Produce a number of different views and reports
- Move fields to various locations in the report
- Determine which fields should be displayed
- Aggregate numerical fields in a variety of ways
- Use filters to control which values in a field are displayed
- Drill-down on numerical data to reveal the underlying data set
- Create multiple reports from a single PivotTable

The PivotTable in Figure 1.1 shows Total Revenue by Payment Method and Type of Service. Notice that State is another field in the PivotTable Field List window that is not shown in the report. With a few clicks of the mouse, the report can instantly be changed to instead show Average Revenue by Month and State (see Figure 1.2).

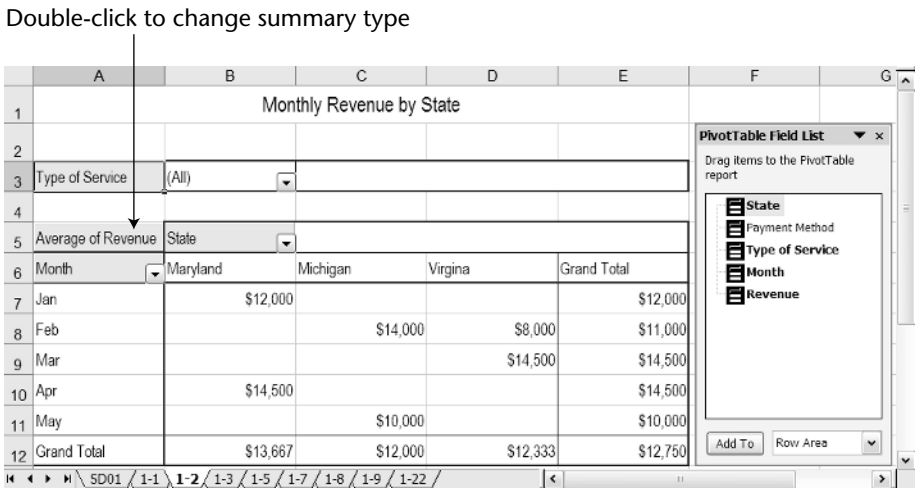
Do you want to display data for the first quarter only? Just click the drop-down arrow on Month to deselect the values Apr and May, as shown in Figure 1.3.



	A	B	C	D	E
1	Service Revenue by Payment Type				
2					
3	Month	(All)			
4					
5	Sum of Revenue	Type of Service			
6	Payment Method	Computing	Financial	Legal	Grand Total
7	Cash	$15,000	$16,000	$12,000	$43,000
8	Check			$28,000	$28,000
9	Credit Card		$21,000	$10,000	$31,000
10	Grand Total	$15,000	$37,000	$50,000	$102,000

Figure 1.1 A first view of the PivotTable.

After the filter is applied, the report is automatically resized to show only the first three months, as shown in Figure 1.4.



	A	B	C	D	E
1	Monthly Revenue by State				
2					
3	Type of Service	(All)			
4					
5	Average of Revenue	State			
6	Month	Maryland	Michigan	Virgina	Grand Total
7	Jan	$12,000			$12,000
8	Feb		$14,000	$8,000	$11,000
9	Mar			$14,500	$14,500
10	Apr	$14,500			$14,500
11	May		$10,000		$10,000
12	Grand Total	$13,667	$12,000	$12,333	$12,750

Figure 1.2 A second view of the PivotTable showing Average Revenue by State and Month.

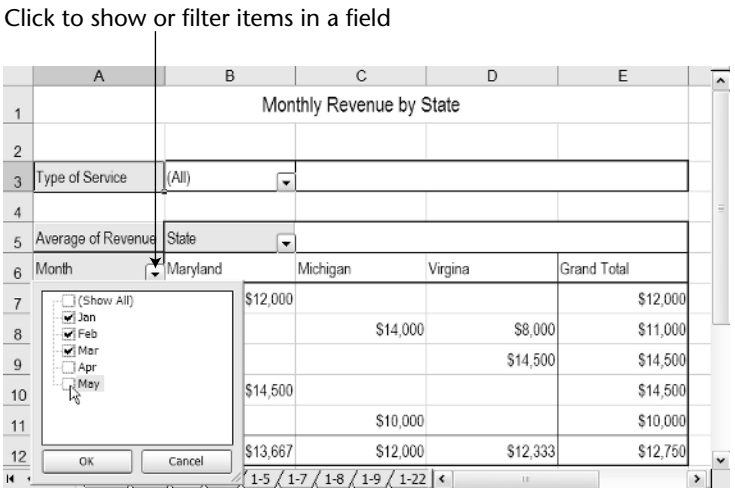


Figure 1.3 Clicking a drop-down arrow for a field shows a list of valid items that can be filtered.

One of the most powerful utilities of PivotTable Reports is the capability to drill down on the summarized report data. In Figure 1.4, double-clicking any cell value in the range B7:E10 creates a new worksheet with the full data set that makes up that cell. Figure 1.5 shows the underlying data for cell D9.

CROSS-REFERENCE **Be sure to read Chapter 2 to learn more about the basics of PivotTable reports, and then turn to Chapter 7 for a more complete analysis of PivotTable functionality.**

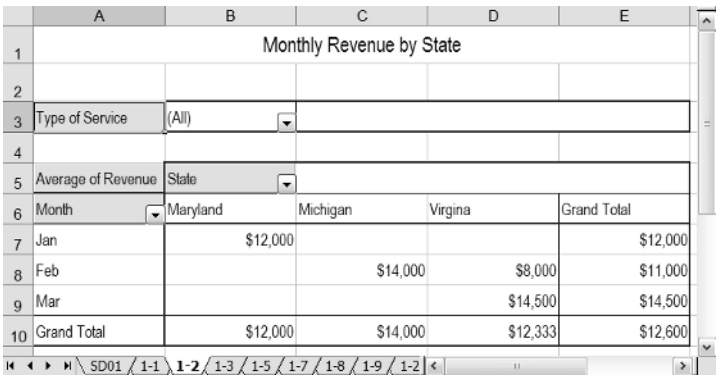
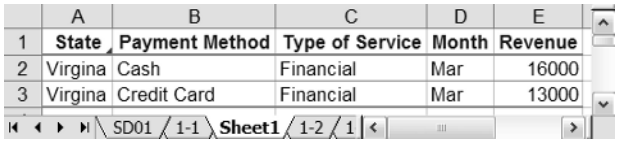


Figure 1.4 PivotTable reports are automatically resized once a filter is applied.



	A	B	C	D	E
1	State	Payment Method	Type of Service	Month	Revenue
2	Virgina	Cash	Financial	Mar	16000
3	Virgina	Credit Card	Financial	Mar	13000

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Figure 1.5 The supporting data set that makes up cell D9 in Figure 1.4.

PivotChart Reports

If you want to move fields easily to different locations, apply filters, and summarize numerical fields in a number of different ways, you can do so with a PivotChart. The main difference between PivotTables and PivotCharts is that with a PivotChart you can display data graphically, rather than only numerically, as is the case with a PivotTables.

Being able to visually view and analyze trends in data can be a big benefit of PivotCharts. Some users can see and appreciate the data better when analyzing it graphically than when viewing only the numerical data. I have found, however, that report developers typically use PivotCharts to complement, rather than replace, PivotTable reports. This makes linking your data to a PivotTable very valuable.

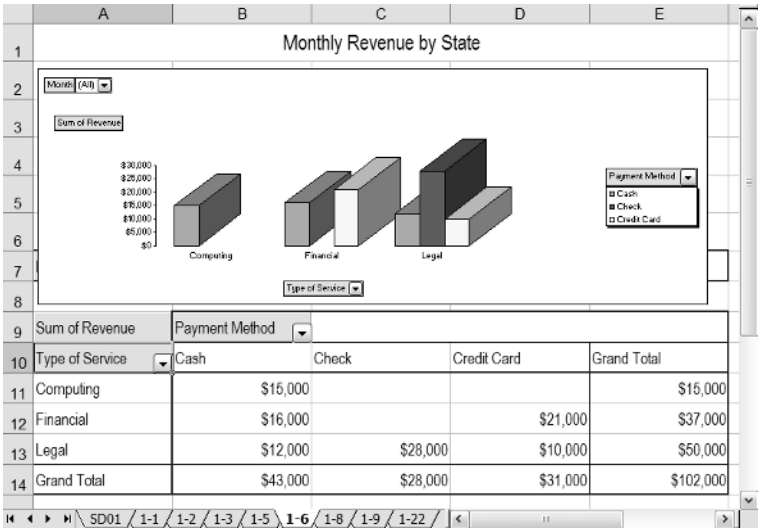
PivotCharts have much the same functionality as PivotTables. PivotCharts enable you to

- Produce a variety of chart types
- Move fields to various locations in the chart
- Determine which fields are included in the chart
- Graphically represent numerical aggregations in many different ways
- Use filters to control which values are charted
- Optionally link to a PivotTable Report

Figure 1.6 shows a sample PivotChart Report linked to a PivotTable.

There are several types of charts available with PivotCharts. You can choose from a simple two-dimensional bar, column, or pie chart, to a more complex three-dimensional area, bubble, or radar chart. There are also numerous functions for controlling how the data is displayed for each data element in the series.

CROSS-REFERENCE **To find out the details of creating and using PivotCharts, see Chapter 9.**



Sum of Revenue	Payment Method			
Type of Service	Cash	Check	Credit Card	Grand Total
Computing	$15,000			$15,000
Financial	$16,000		$21,000	$37,000
Legal	$12,000	$28,000	$10,000	$50,000
Grand Total	$43,000	$28,000	$31,000	$102,000

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Figure 1.6 A PivotChart linked to a PivotTable.

Spreadsheet Reports

Despite the powerful and dynamic features of PivotTables, sometimes you want to generate a more traditional type of report. Spreadsheet reports are designed to display data in a traditional columnar report format. This report type is particularly suited to display non-aggregated data in multiple columns. And, like most traditional columnar reports, you can apply sorts, filters, breaks, and totals. Unlike other traditional report development software, however, Spreadsheet reports enable you to use all the powerful tools and functions included with Excel. In addition, Spreadsheet reports

- Give you clear-cut functions for applying sorts, breaks, and totals
- Permit numerical fields to be aggregated many different ways
- Give you easy-to-use filters to control whether particular values are displayed
- Include features for applying conditional formatting.
- Update report data automatically at predefined intervals or when the report is opened

Figure 1.7 shows how a Spreadsheet report might extract and format data from an external database system. Notice that this report contains the same data as the PivotTable reports in the previous section of this chapter. It is, however, in a more traditional type of format. Don't be fooled by the simplicity of

the report layout. It offers many powerful features for creating subtotals or calculated fields, applying conditional field formats, or refreshing data at predefined intervals.

What if you want to show the data for checks and credit cards only? It's easy to apply a filter; just choose Data ➪ Filter ➪ Auto Filter to create drop-down boxes for each field in the Spreadsheet report, as shown in Figure 1.8.

Selecting Custom from the Payment Method drop-down box (see Figure 1.9) launches the Custom AutoFilter dialog box where you can define more advanced filters.

Selecting Check and Credit Card from the drop-down lists in the Custom AutoFilter dialog box, shown in Figure 1.10, is one method of applying a constraint. You can also use additional features, such as wildcards, to achieve the same result.

After the filter is applied, the Spreadsheet report is automatically adjusted, as shown in Figure 1.11.

CROSS-REFERENCE **To find out the details of creating and using Spreadsheet reports, see Chapter 11.**

	A	B	C	D	E
1	Monthly Revenue by State				
2					
3	**State**	**Month**	**Type of Service**	**Payment Method**	**Revenue**
4	Maryland	Apr	Computing	Cash	$15,000
5	Maryland	Apr	Legal	Check	$14,000
6	Maryland	Jan	Legal	Cash	$12,000
7	**Maryland Total**				$41,000
8	Michigan	Feb	Legal	Check	$14,000
9	Michigan	May	Legal	Credit Card	$10,000
10	**Michigan Total**				$24,000
11	Virgina	Feb	Financial	Credit Card	$8,000
12	Virgina	Mar	Financial	Credit Card	$13,000
13	Virgina	Mar	Financial	Cash	$16,000
14	**Virgina Total**				$37,000
15	**Grand Total**				$102,000

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Figure 1.7 A Spreadsheet report displays data in a traditional columnar format.

	A	B	C	D	E
1	Monthly Revenue by State				
2					
3	**State**	**Month**	**Type of Service**	**Payment Method**	**Revenue**
4	Maryland	Apr	Computing	Cash	$15,000
5	Maryland	Apr	Legal	Check	$14,000
6	Maryland	Jan	Legal	Cash	$12,000

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Figure 1.8 The Auto Filter function automatically creates drop-down filters for each field in the Spreadsheet report.

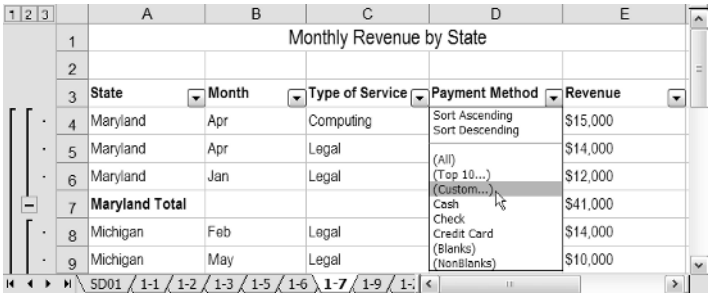


Figure 1.9 Several standard filters are available from the filter drop-down box. Selecting Custom lets you define a more advanced filter.

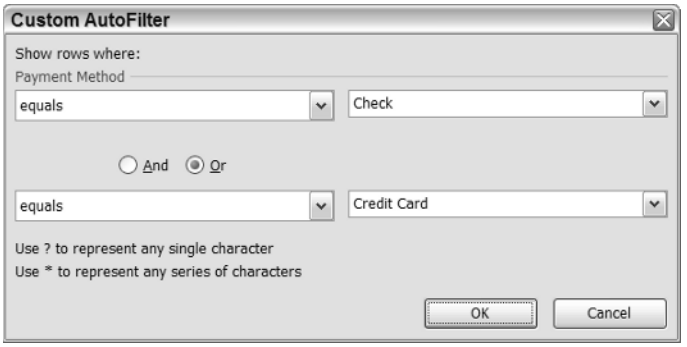


Figure 1.10 You can enter advanced filter conditions in the Custom AutoFilter dialog box.

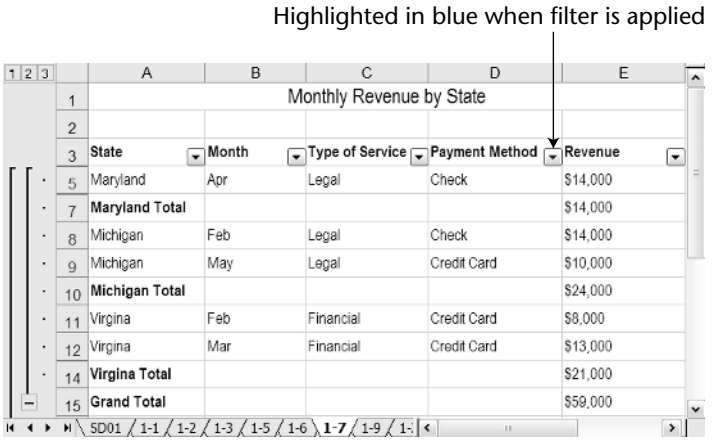


Figure 1.11 The Spreadsheet report filtered on payment types of Check and Credit Card.

Parameter Queries

In the previous section, you learned about using filters in Spreadsheet reports to restrict the type of data displayed. However, you apply this filter after the data is imported into the report. How can you limit the amount of data before it is imported? One possible method is to specify a constraint in the underlying SQL query. Unless the user can enter a different value each time the report is run, however, that constraint is static.

Static constraints might filter data to a particular product line, region, company division, or period of time (for example, the last 30 days). However, if the report user has to define the product line, region, company division, or period of time before the report is run, the underlying SQL query must be modified or a parameter query must be used. Most report users are not versed in SQL programming or databases, so parameter queries are the best way to satisfy this requirement.

Parameter queries act as dynamic constraints, allowing the user to specify a value (or values) each time the report is run. Instead of importing a huge data set into Excel, Parameter Queries apply a filter to return only a subset of the records from the data source. With a smaller data set, the report can run much quicker because it uses fewer server resources. It also consumes less memory and disk space on the computer running the report, enhancing report manipulation performance and computer processing speed. Using parameter queries, you can

- Limit the amount of data that is displayed in a report before the data is imported into the report
- Integrate the parameters with SQL stored procedure arguments and/or SQL queries to restrict the type and amount of data that is returned
- Automatically re-query the data source when a parameter value is changed

Figure 1.12 shows how a parameter query can be used in conjunction with a Spreadsheet report to restrict the report data to a specific type of service. When the value is changed in this field from the drop-down box, the Spreadsheet report automatically queries that data source and refreshes the report.

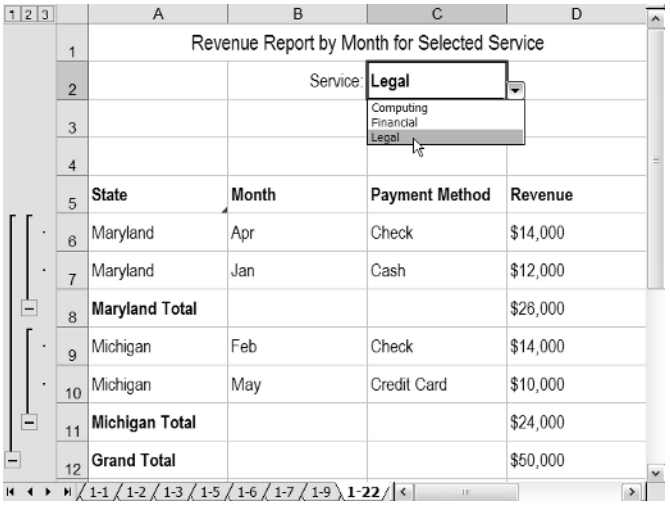


Figure 1.12 Parameter queries can automatically refresh the report as different values are selected.

CROSS-REFERENCE **To find out the details of creating and using Parameter Queries, see Chapter 11.**

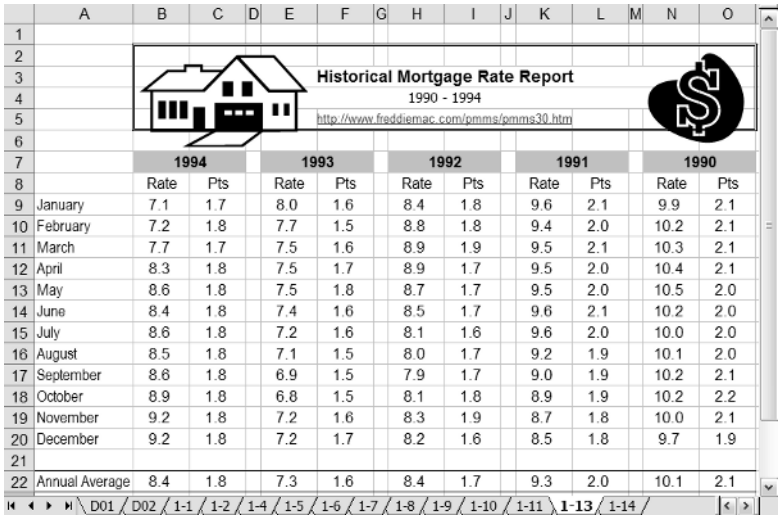
Web Queries

The web query feature is another exciting and novel reporting tool included as part of Microsoft Excel. Imagine getting the latest currency exchange rates or mortgage interest rates imported directly from the web into your Spreadsheet report. It's as easy as navigating to the web page within Excel and selecting the table (or tables) that you want to import. By simply clicking on the report and selecting the Refresh Data function, you can automatically refresh the report at predefined intervals.

Using this technology, you can

- Import data from the Internet and intranet web sites
- Update report data automatically at predefined intervals or when the report is opened

Figure 1.13 shows how a Historical Mortgage Rate Report might look. This report uses the `http://www.freddiemac.com/pmms/pmms30.htm` link at the Freddie Mac web site.



Historical Mortgage Rate Report
1990 - 1994
http://www.freddiemac.com/pmms/pmms30.htm

		1994		1993		1992		1991		1990	
		Rate	Pts	Rate	Pts	Rate	Pts	Rate	Pts	Rate	Pts
9	January	7.1	1.7	8.0	1.6	8.4	1.8	9.6	2.1	9.9	2.1
10	February	7.2	1.8	7.7	1.5	8.8	1.8	9.4	2.0	10.2	2.1
11	March	7.7	1.7	7.5	1.6	8.9	1.9	9.5	2.1	10.3	2.1
12	April	8.3	1.8	7.5	1.7	8.9	1.7	9.5	2.0	10.4	2.1
13	May	8.6	1.8	7.5	1.8	8.7	1.7	9.5	2.0	10.5	2.0
14	June	8.4	1.8	7.4	1.6	8.5	1.7	9.6	2.1	10.2	2.0
15	July	8.6	1.8	7.2	1.6	8.1	1.6	9.6	2.0	10.0	2.0
16	August	8.5	1.8	7.1	1.5	8.0	1.7	9.2	1.9	10.1	2.0
17	September	8.6	1.8	6.9	1.5	7.9	1.7	9.0	1.9	10.2	2.1
18	October	8.9	1.8	6.8	1.5	8.1	1.8	8.9	1.9	10.2	2.2
19	November	9.2	1.8	7.2	1.6	8.3	1.9	8.7	1.8	10.0	2.1
20	December	9.2	1.8	7.2	1.7	8.2	1.6	8.5	1.8	9.7	1.9
22	Annual Average	8.4	1.8	7.3	1.6	8.4	1.7	9.3	2.0	10.1	2.1

Figure 1.13 A Spreadsheet report that uses a table from an intranet or Internet web page as its data source.

Related Office Components

Some Microsoft Office programs include tools and components that can be interfaced with your Excel reports. The integration among the Microsoft Office programs seems to become more feature-rich and seamless with each new release of Office. Some of the Office programs and components that work with Excel include the following:

- Microsoft MapPoint
- Microsoft FrontPage
- Microsoft Access

I've included the following sections to familiarize you with some of the capabilities and features available in these related Microsoft Office software programs. Additionally, in Chapter 12, I cover how you can embed Excel reports in a web page and edit them with Microsoft FrontPage. This editing simply uses an OLE DB, so the interface with Microsoft Access is the same. I include this peripheral information here so that you know it exists.

Microsoft MapPoint

Microsoft MapPoint allows you to graphically represent your data on a map. You can choose from many types of plotting options to display data. In Figure 1.14, you can see how a corporate profitability report might use a Pivot Table, a PivotChart, and a Map object created from the MapPoint program to analyze revenue, expenses, and profits across its various sales offices. The pie charts in the MapPoint object graphically display Revenue, Expenses, and Net Profit for each sales office across the country.

MapPoint automatically converts and reads any geographical data such as city, county, and country names, postal codes, and longitudinal/latitudinal coordinates. With this program, you can zoom in on various locations and plot data elements individually by using unique graphical indicators such as pushpins, charts, and shaded circles. You can even create driving directions and calculate the distance and time it takes to travel from one location to the next. Several other features useful for reporting and analysis are also included in this program and are covered in the program's user manual. If this program in installed on your computer, you can insert the MapPoint object into Excel using OLE DB.

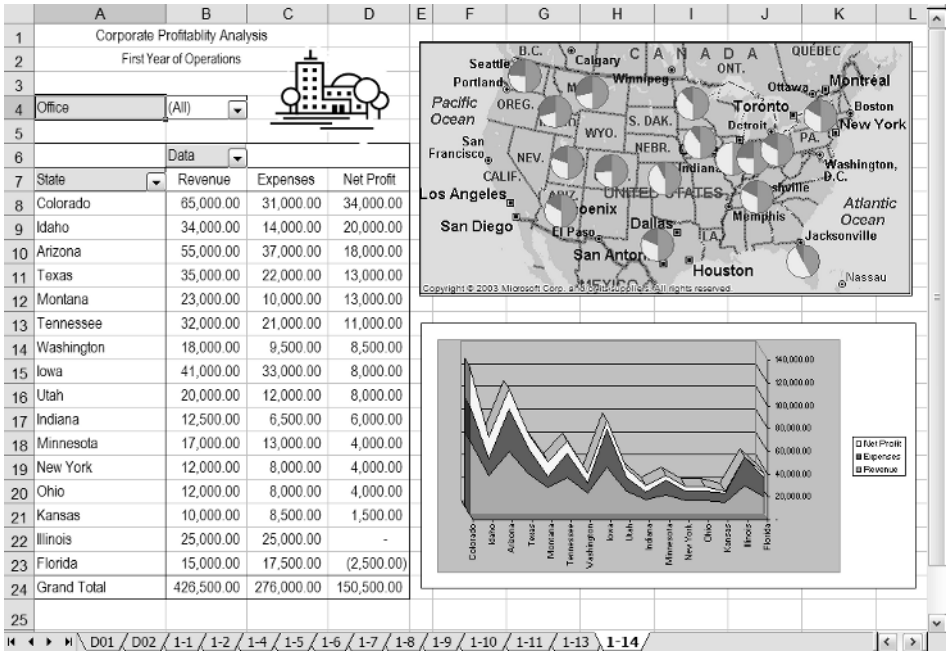


Figure 1.14 A PivotTable report linked with a PivotChart and a Microsoft MapPoint object.

Microsoft FrontPage

Microsoft FrontPage includes tools for publishing your PivotTable reports to an intranet or Internet web site. Thus, many of the features included with Excel PivotTables are still available through an Internet Explorer browser window. You can also configure options to allow users to download the report to their local machine running Excel. Instead of complicated and expensive report and distribution processes, users can simply traverse their company's intranet to access and manage their reports.

NOTE **Publishing PivotTable reports to a centrally located corporate intranet server can also reduce the problems associated with configuration management. The master report version can be stored on this server, so changes do not have to be made to multiple files.**

The Corporate Profitability Report from Figure 1.14 is represented as an Internet report in Figure 1.15. Notice that the report and the PivotTable Field List are still available, even though the report is accessed through a browser program.

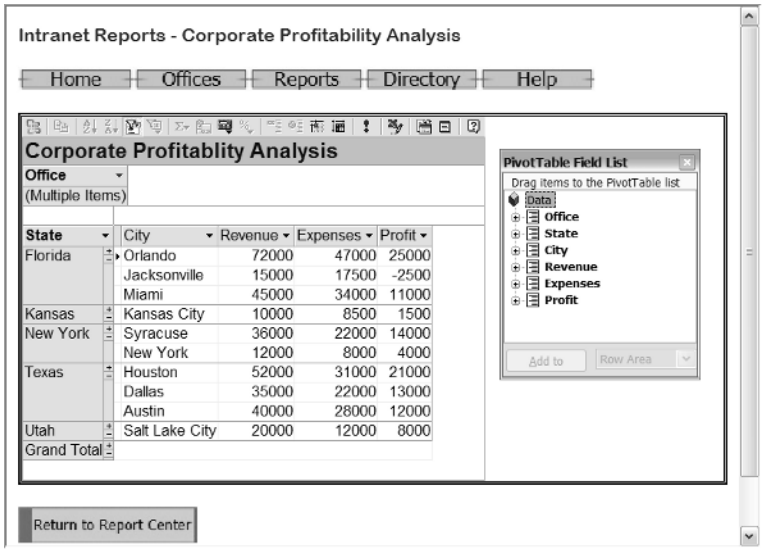


Figure 1.15 PivotTable reports can be accessed from intranet and Internet web sites.

Microsoft Access

With Microsoft Access, you can create reporting systems that automatically control how and what data is displayed in a PivotTable. Instead of manually dragging fields or customizing the PivotTable, users can click buttons to change report views, apply filters, or change the report layout. A sample Access Reports Management System for the Corporate Profitability example is shown in Figure 1.16.

You can program Access buttons to control how data is displayed in the PivotTable. In this example, the buttons are customized to apply filters and produce different types of report views. Instead of using the typical static reports in Access, you can enhance your current database programs with this interactive and dynamic reporting capability.

Chapter Review

This chapter provided an introduction to some of the principal types of Excel reports and highlighted some of the innovative tools and features included with each report type. It highlighted some of the features available in the numerous types of Excel reporting tools, including PivotTable reports, PivotChart reports, Spreadsheet reports, parameter queries, and web queries. It also introduced you to a few of the related components that can be interfaced with Excel's reporting tools, such as MapPoint, FrontPage, and Access.

The next chapter provides a more comprehensive look at PivotTable reports. Chapter 2 is where you learn how the data is organized and the purpose of each area in a PivotTable.

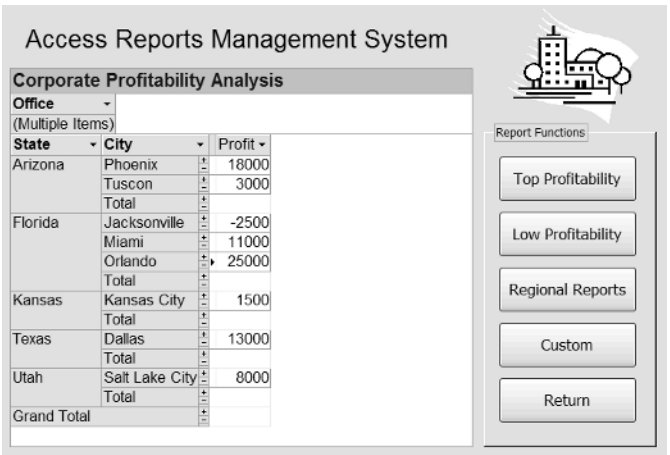


Figure 1.16 A PivotTable inserted into a Microsoft Access form.