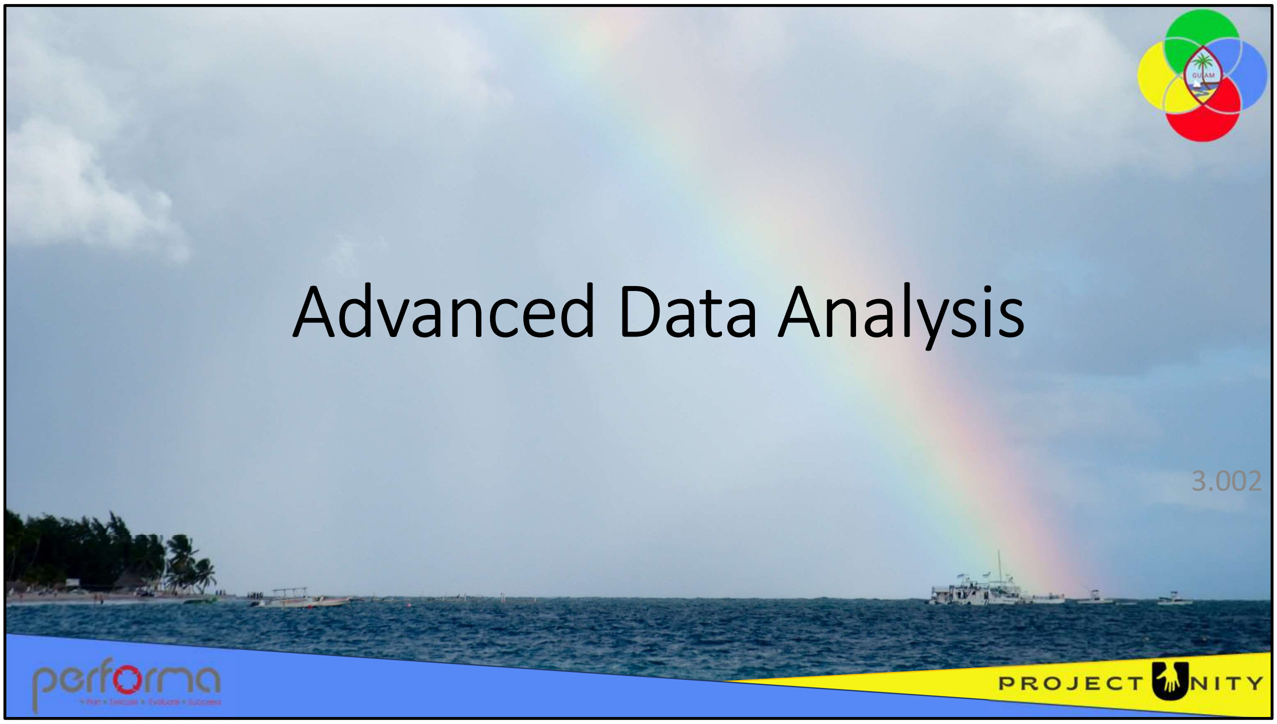
Advanced Data Analysis
3.002
performa
PROJECT UNITY

Lesson Details

Learning Objectives:	To provide users with a basic understanding of how to use the Analysis Cube to answer business questions.
Duration:	75 minutes
Pre-requisites:	None
Recommended:	None

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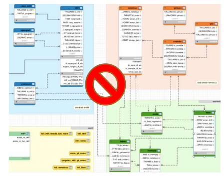
Analysis Cube

You do not need any knowledge of the underlying database tables and the relationships between them to extract data from the Analysis Cube using Excel.



Instead, you reference data using the Reference Data Set (RDS):

- Organization
- Fund
- Account
- Values (Appropriations, Allotments)
- Etc.

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Gaining Insight by Answering Questions

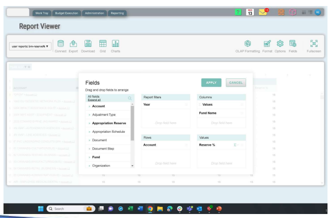
This allows you to pose questions in business terms, such as:

- What modifications have impacted this Account?
- What changes were made to my modifications between these two points-in-time?
- Which Organizations contributed to the change in Staff costs over the Budget Year?

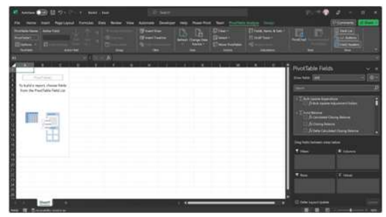
Pivot Tables

- Query large amounts of data in many user-friendly ways
- Subtotal and aggregate numeric data, summarizing data by categories and subcategories
- Expand and collapse levels of data to focus your results, and drill down to details from the summary data for areas of interest to you
- Move rows to columns or columns to rows ("pivoting") to see different summaries of the source data
- Filter, sort, group to focus on just the information you want.

BIDS Ad hoc Reporting



Excel Pivot Tables



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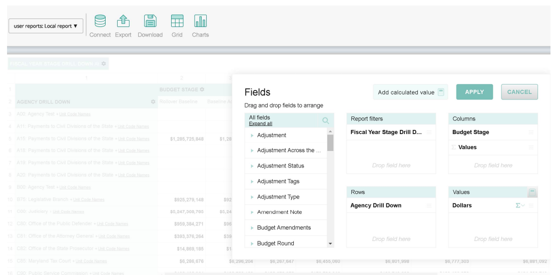
Pivot tables are one of the most powerful and useful features in reporting and analysis. Users can think of a pivot table as a report. However, unlike a static report, a pivot table provides an interactive view of your data. The goal of any analysis is to draw insight from the raw data. But when your data contains hundreds of tables with thousands of rows it's impossible to make sense from it just by looking at it with the naked eye and scrolling up and down. Drawing insight very often means that you will have to take out certain pieces of the data and wrangle the way they present their content, for example, through summary statistics. Summary statistics are used by data analysts to summarize a set of observations to communicate a large amount of information as simply as possible. With very little effort (and no formulas) you can look at the same data from many different perspectives, grouping data into categories, breaking down data into years and months, filtering data to include or exclude categories, and even building charts

The Budget module provides two different approaches to pivot tables:

- BIDS Ad hoc Reporting
- Excel Pivot tables
- Microsoft Excel

BIDS Ad hoc Reporting

- Pivot table component for web reporting
- Accessed through the BIDS web portal



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BIDS Ad hoc Reporting is a pivot table component for web reporting, accessed through the BIDS web portal, that provides the user with a simple interface to aggregate, filter, sort, and group data to focus on specific subsets. The user can drill up and down and pivot to see the data from different points of view.

Excel Pivot Tables

Data is extracted into an Excel PivotTable. You can then:

- Combine the data from the budget module with other data
- Employ the full functionality of Excel to consume and present the data.

Microsoft Excel provides users with functionality to create pivot tables against the cube inside an Excel workbook.

You can combine data from the budget module with data from other sources to provide more comprehensive reports.

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Introduction

Analysis Using BIDS Ad hoc Reporting

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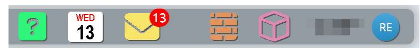
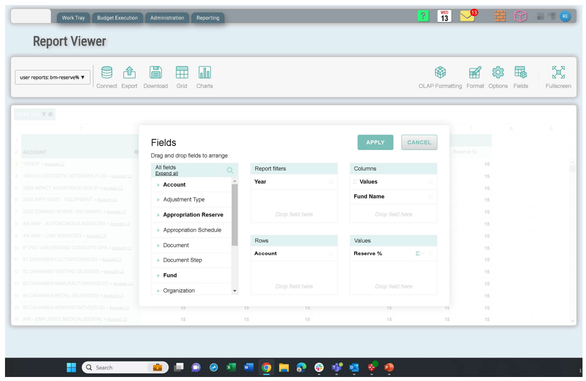
BIDS Ad hoc Reporting

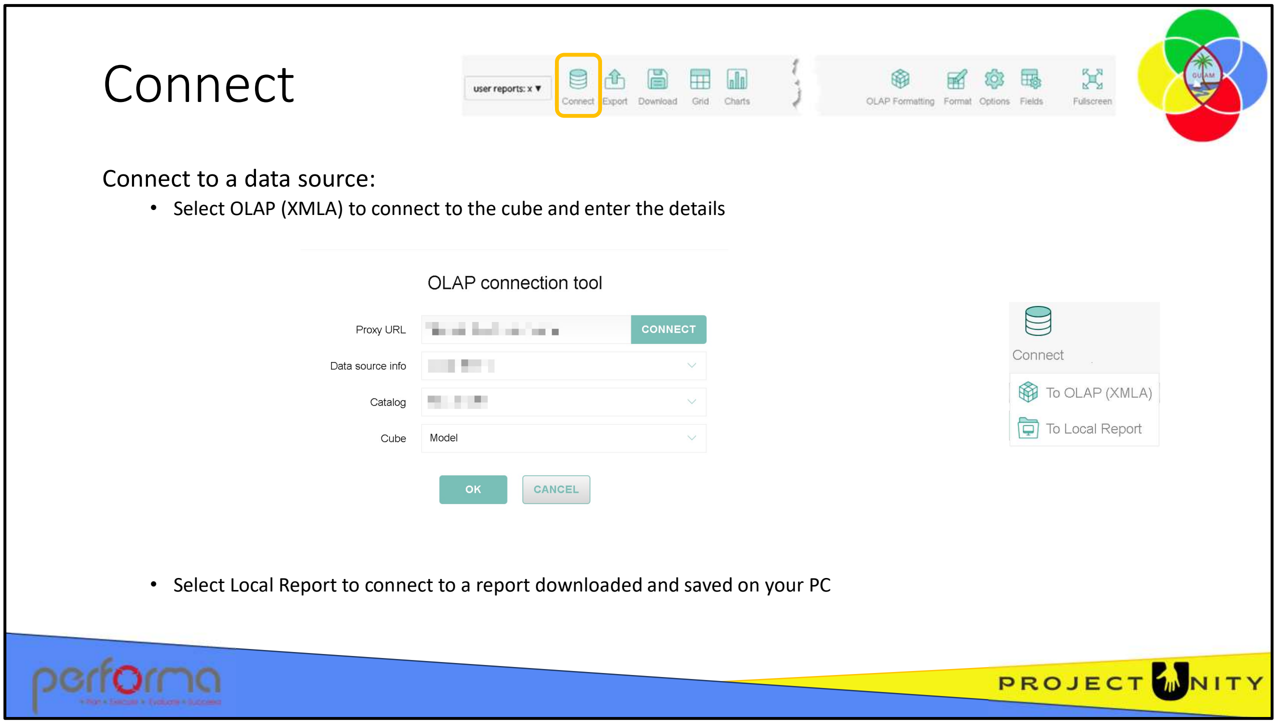
- Pivot table component for web reporting
- Accessed through the BIDS web portal





BIDS Ad hoc Reporting is a pivot table component for web reporting, accessed through the BIDS web portal, that provides the user with a simple interface to aggregate, filter, sort, and group data to focus on specific subsets. The user can drill up and down and pivot to see the data from different points of view.

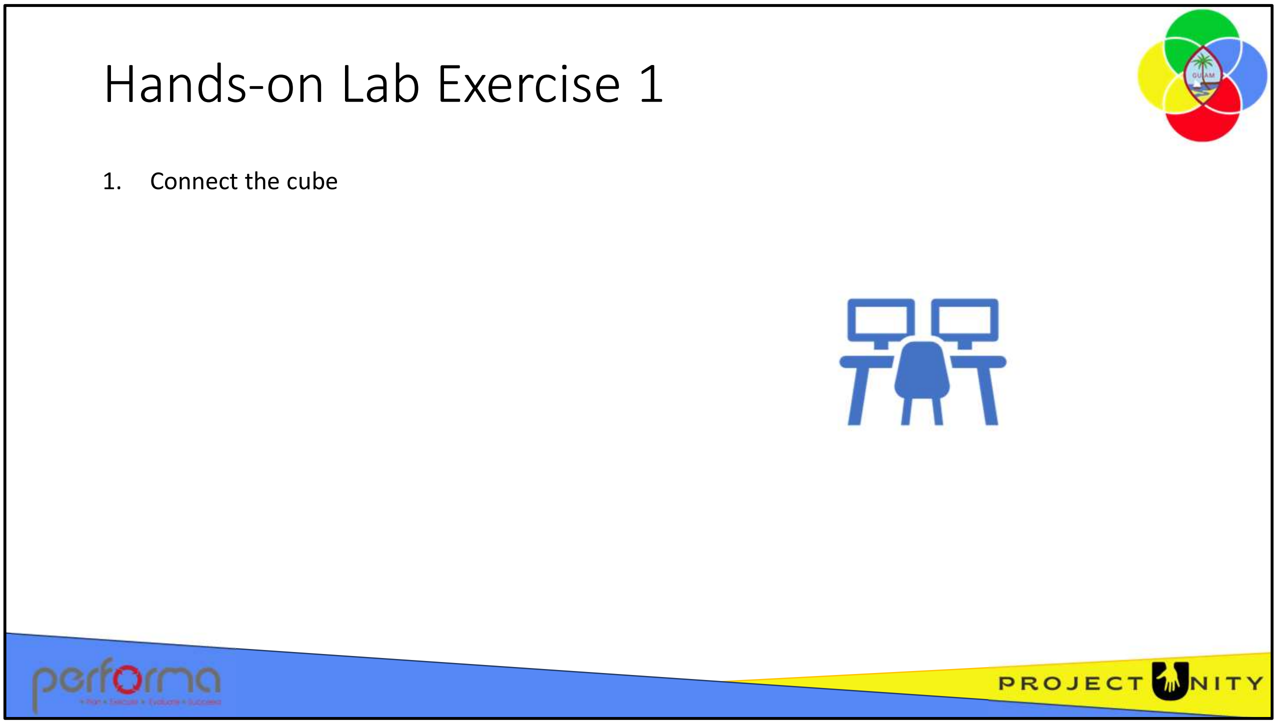
Click the cube icon on the toolbar to access this feature.



Click the Connect icon to connect to the source of the data that you want to include in your report. There are two options;

- OLAP (XMLA) which is a connection to an analytics cube. Enter these details to make the connection:
  - For this training session:
    - **Proxy URL**: /Budget-TRN/api/cube-basic.ashx (then click CONNECT)
    - **Data source info**: vm-as400-test
    - **Catalog**: Budget-TRN
    - **Cube**: Model (then click OK)
  - For Production:
    - **Proxy URL**: /Budget/api/cube.ashx (then click CONNECT)
    - **Data source info**: TBA
    - **Catalog**: Budget
    - **Cube**: Model (then click OK)

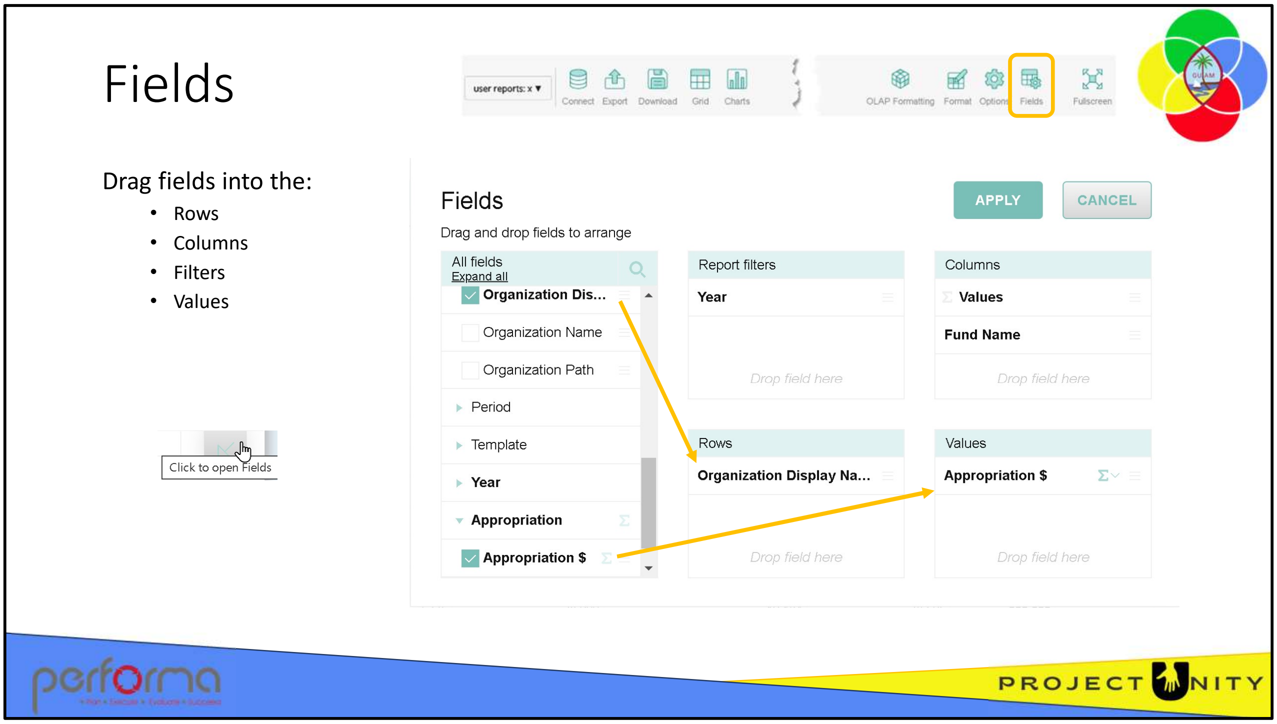
- Local Report which allows you to connect to a report that has been downloaded by you, or someone else, and saved on your PC.



Objective
1. Create a connection to the cube

Duration: 5 minutes

Process
Connect to the cube
1. Click the cube icon in the toolbar to access the BIDS Ad hoc Reporting page
2. Click the Connect icon and enter the following details
   - **a.** **Proxy URL**: /Budget-TRN/api/cube.ashx (then click CONNECT)
   - **b.** **Data source info**: vm-as400-test
   - **c.** **Catalog**: Budget-TRN
   - **d.** **Cube**: Model (then click OK)

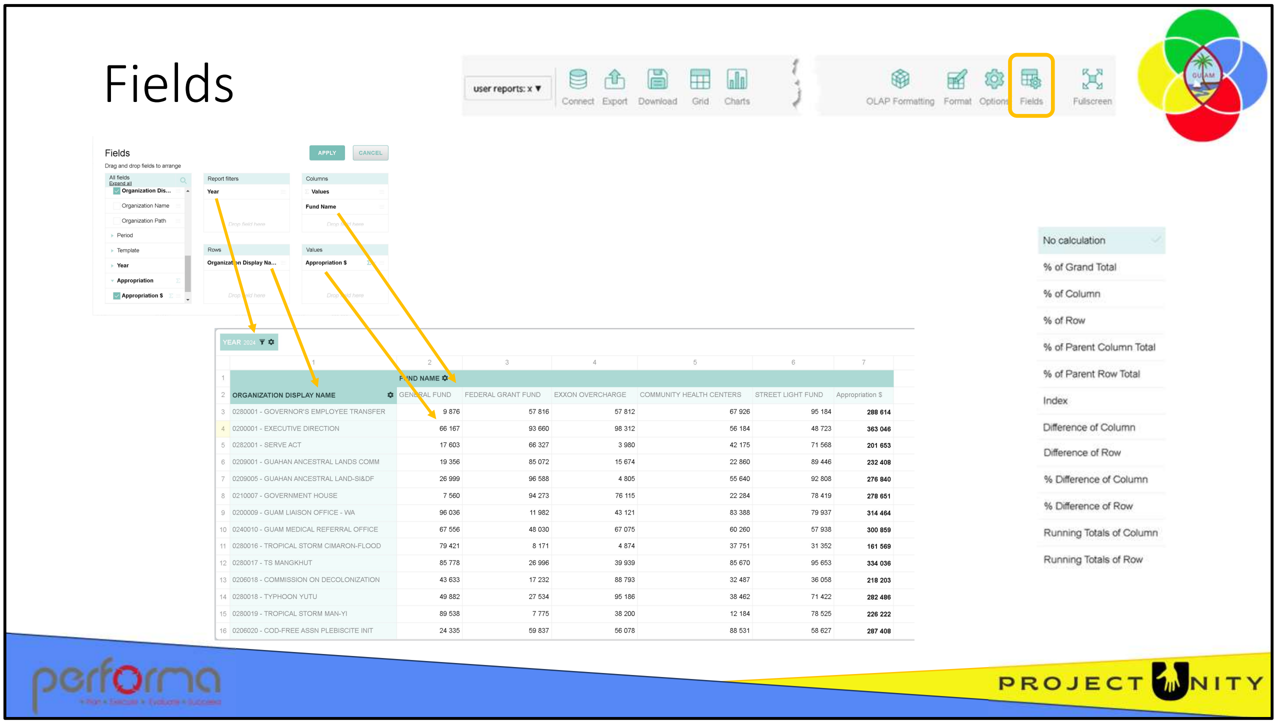


The Field icon opens the dialog where you define the how you want to set up the rows, columns, and filters for your report and the data values to display. You can also click the diagonal arrow in the upper-right corner of the grid or the charts. On the left of the Field dialog, you will see a box with all fields from the cube.

- When there are more than 50 fields in the cube, a search box is displayed
- When multilevel hierarchies are configured (such as Organization), or fields are grouped in folders, an Expand All option is displayed

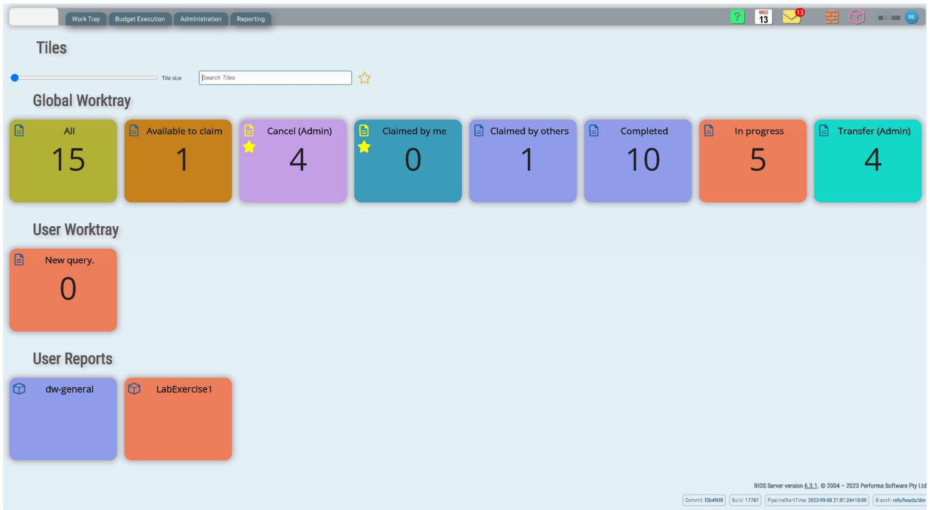
To create a report, you drag items from the Fields list into the Rows, Columns, Filters, and Values boxes. You can drag as many fields into each box as you need for your report. You can also include any level of a hierarchy such as Organization, allowing you to include JobNumber, Division, or Department.

Click the APPLY button once you've finished your layout to view the report.

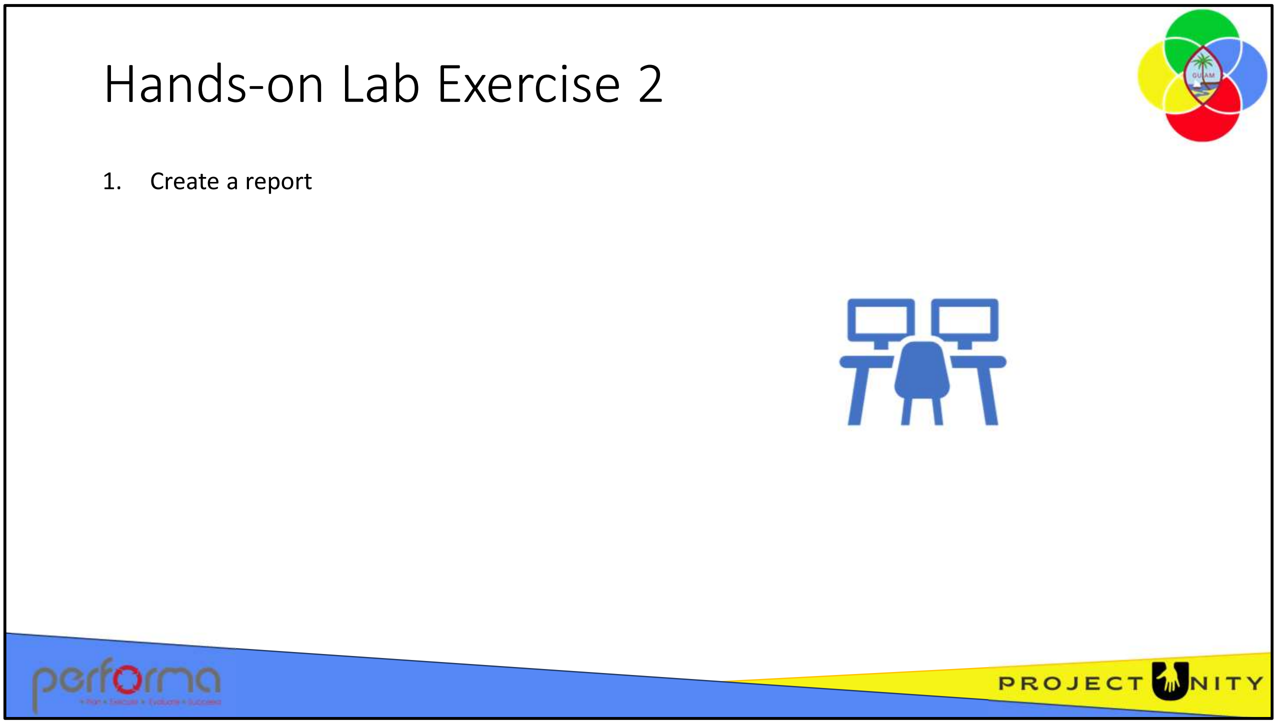


The layout we set up in the precious slide will produce a report like this. By default, the application will the display the value and sum the values in each row and column, but you can also choose one of the alternate aggregation options by clicking the sigma icon (Σ) in the Values box of the Fields dialog..

Tiles



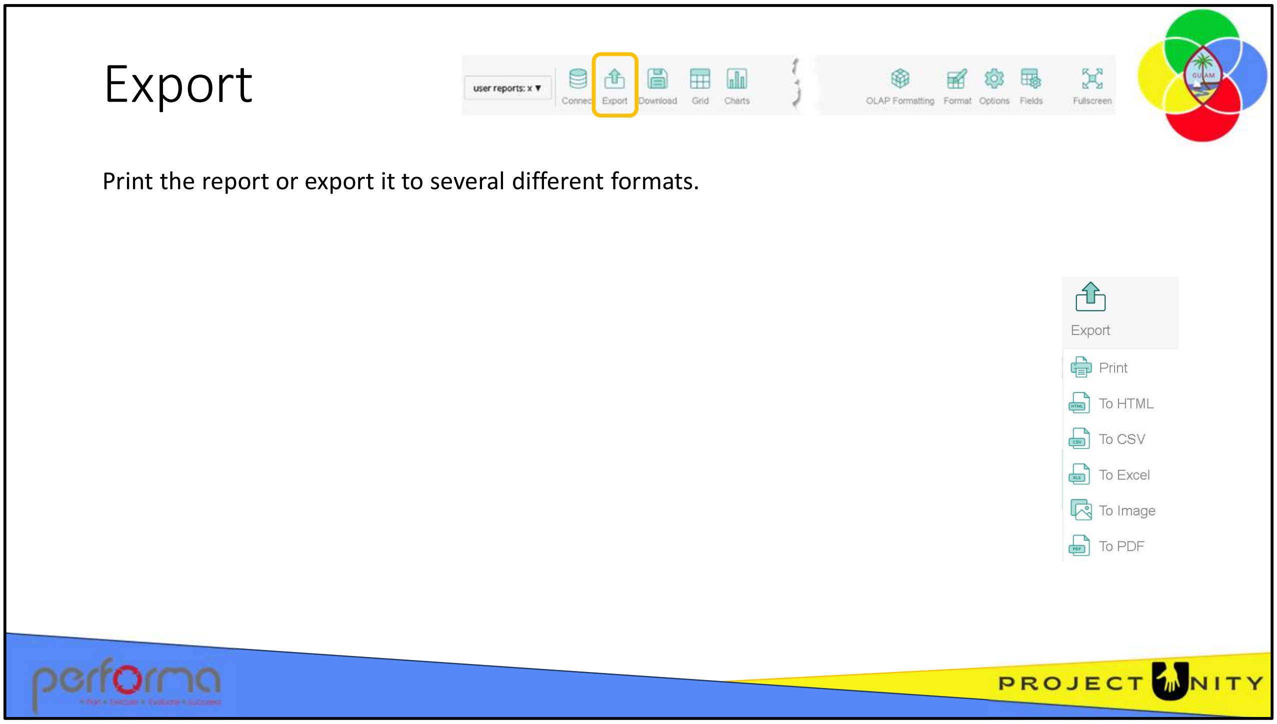
Once you've created and saved a report, it is listed on the Tiles page and you can open the report by clicking the title of the tile and also save it as a favorite.



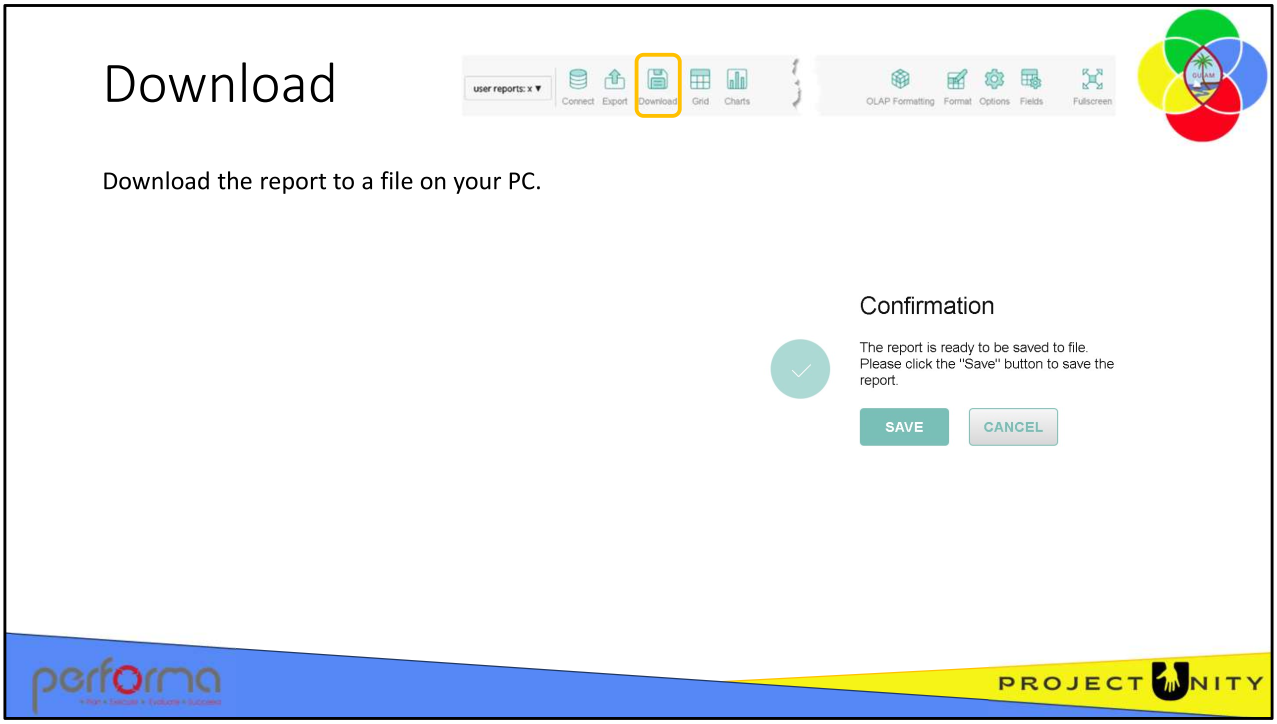
Objective
1. Create a basic report from the cube data

Duration: 10 minutes

Process
Create a basic report
1. Click the Fields icon
2. Drag these items from the Fields list:
    a. **Report filters**: Year
    b. **Columns**: Fund Name
    c. **Rows**: Organization Display Name
    d. **Values**: Appropriation $ (then click APPLY)
3. Keep this report open



Use the Export tab to print the current content or export it to HTML, CSV, Excel, Image, or PDF format.

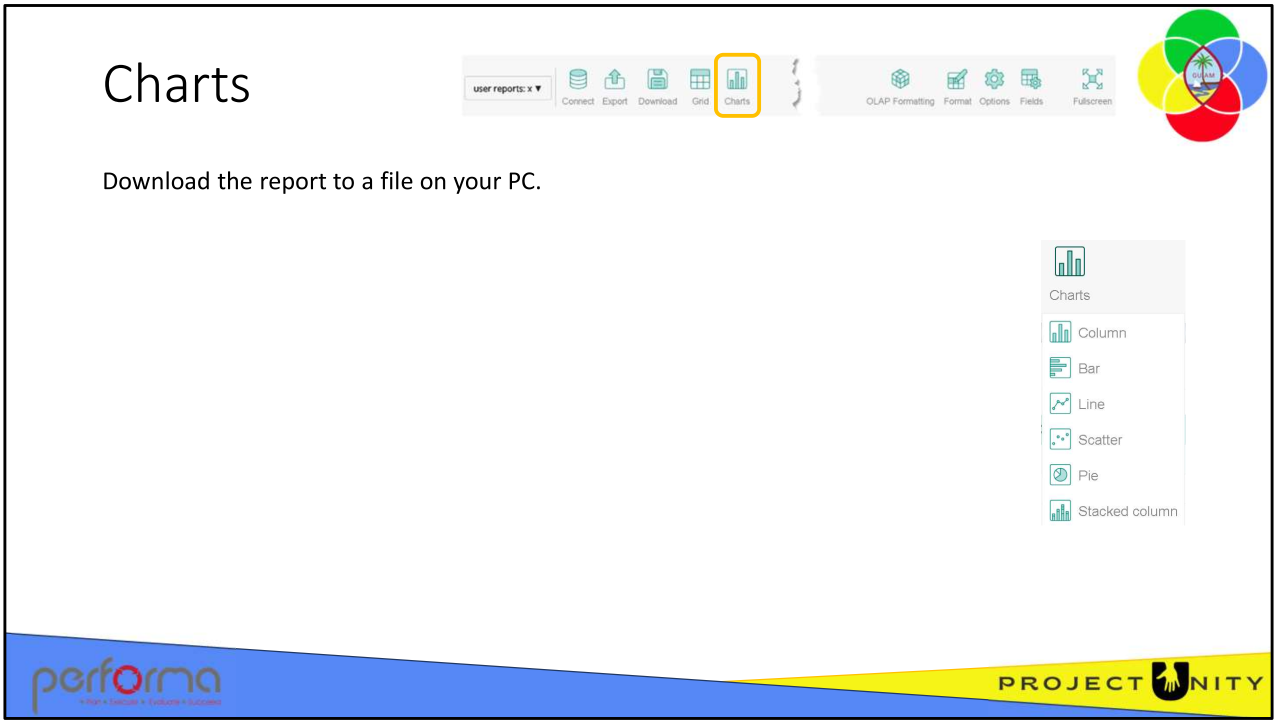


Click the Download icon to save the report to a file on your PC. Once the file has saved, you can distribute it to other users who can then open it using Local Report option under the Connect icon.

Grid

The Grid tab switches the view to the grid.

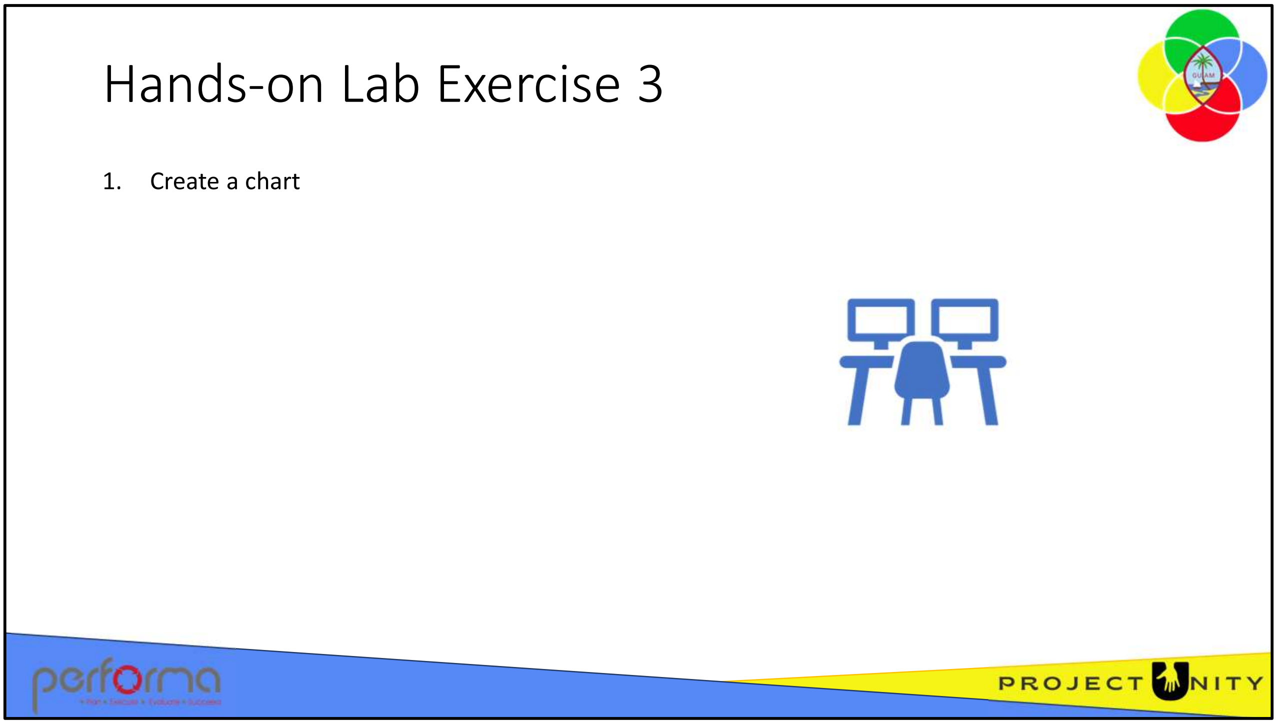
The Grid tab switches the view to the grid.



The submenu of the Charts tab shows all available pivot charts.

Once you have selected a chart type, choose an active measure from the drop-down lists in the upper-left corner. By default, only one measure can be active at a time. To allow choosing more than one active measure, select the Multiple values checkbox in the Charts tab's submenu.
Open the filter view by clicking a field's name above the chart.

Access the context menu by right-clicking a graphical element.
Double-click a graphical element to drill through it and see non-aggregated data.
If there are several fields in rows, expand or collapse inner field values by clicking a member name on the X-axis. To expand fields in columns, use member names on the legend.
In the same way, you can drill up & down multilevel hierarchies in rows and columns.



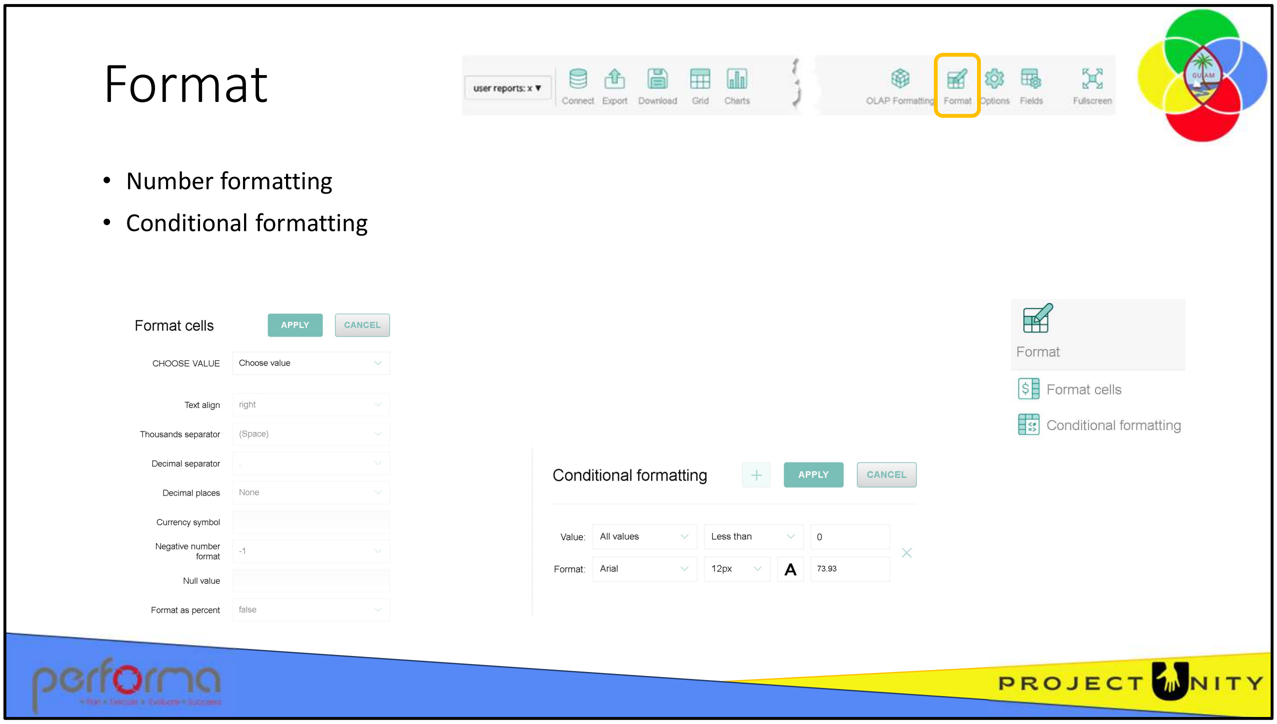
Objective

1. Create a basic chart from the report

Duration: 10 minutes

Process

1. Click the Chart icon select Column, then make the following selections from the dropdowns:
   - **a.** **Organization Display Name**: clear the Select all checkbox, then search for 0200 and select several JobNumbers beginning with 0200
   - **b.** **Fund Name**: clear the Select all checkbox, then select General Fund and Federal Grant Fund. You may also choose other funds if you wish.
2. Click the Fullscreen icon
3. Hover the cursor over one of the columns in the chart; a tooltip displays
4. Click the Fullscreen icon again, then the Grid icon. The report now reflects the selections made for the chart. You can save this layout by clicking the reports dropdown and selecting Save As.



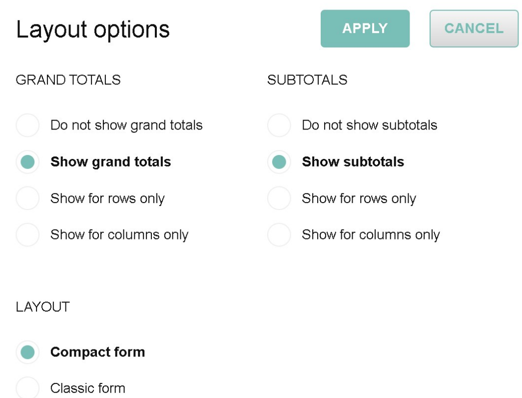
The Format tab provides two options: number formatting and conditional formatting.

Format cells allows you to modify any of the following properties: text alignment, thousand separator, decimal separator, decimal places, currency symbol, currency align, null value, and format as a percentage.

Conditional formatting provides basic formatting of values based on several conditions such as less than, greater than, equal, among other options. In the pop-up window, click the plus icon to **add a new condition**. You can apply the condition either to all values or to a specific measure from the drop-down list. Select the condition type and value, font family, and size. Click the A-letter icon to change the default font and background colors. Choose new colors from the color picker or enter their hex codes. Click **APPLY** to add these colors to the condition. You can see a preview of the result inside the box on the right. To see the result on the grid, click **APPLY**. You can remove the condition by clicking the recycle bin icon on the right of the condition.

Options

Manage treatment of Grand totals and Subtotals

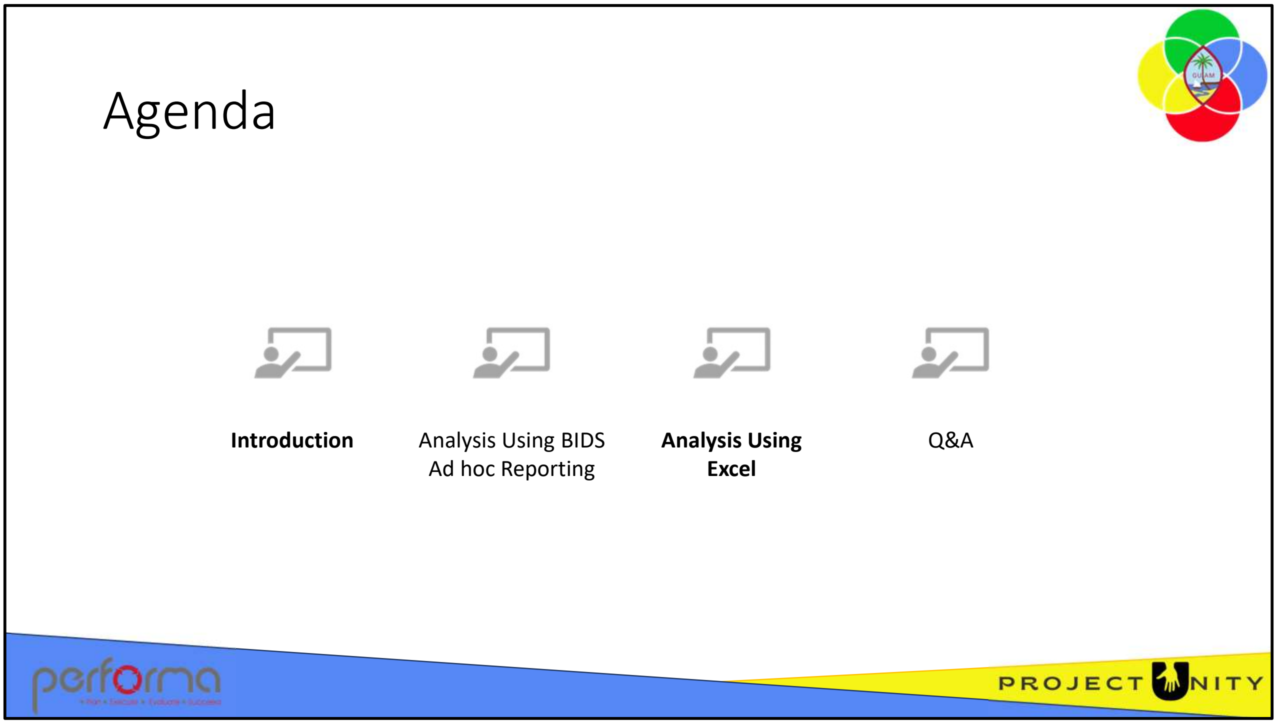


Click the Options icon to see a pop-up window with layout options such as grand totals and subtotals.

Fullscreen

Switch to the fullscreen mode. Exit this mode by pressing Esc.

Click Fullscreen and switch to the fullscreen mode. Exit this mode by pressing Esc.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Report Components

When you design an analysis report, you're creating a workbook that consists of:

- A Connection that specifies where to get the data
- A PivotTable that specifies what data to get
- Optionally, a report layout that specifies how to display the data using Excel's range of formatting and data presentation tools.

This module does not provide instruction on using Excel formatting and data presentation tools. Please refer to Microsoft or other third-party training courses.

Microsoft Excel provides users with functionality to transform data into actionable intelligence that informs the organization's strategic and tactical business decisions. Pivot Tables enable users to access and analyze budget data and present analytical findings in reports, summaries, dashboards, graphs, charts, and maps to provide users with detailed intelligence about the state of the budget

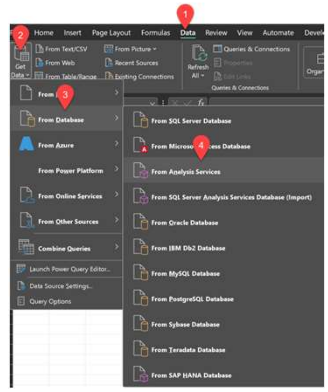
You can combine data from the budget module with data from other sources to provide more comprehensive reports.

Connection: Connecting to the Cube

In Excel 365:

1. Open the **Data** tab
2. Click **Get Data**
3. Click **From Database**
4. Click **From Analysis Services**

The Data Connection Wizard opens …



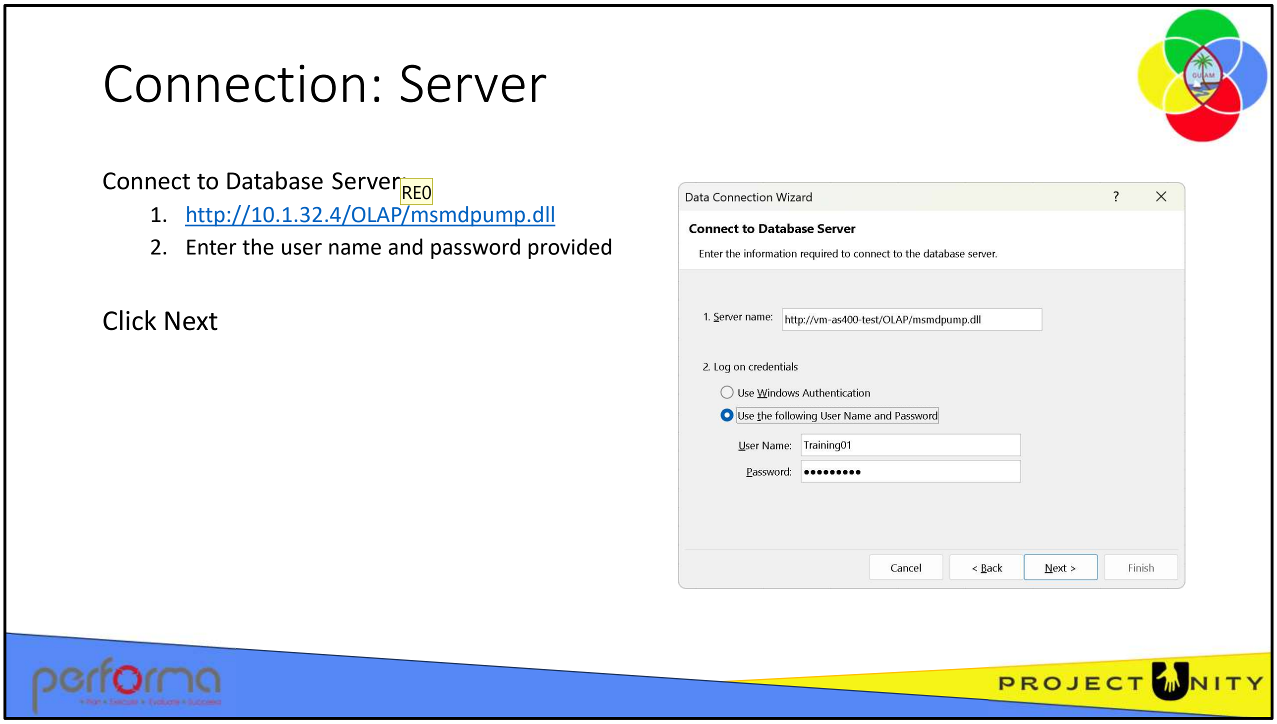
Other versions of Excel may look different but follow a similar procedure.

You need to create a Connection before you can extract data from the Analysis Cube. A Connection specifies how to connect to the cube.

In Office 365:

1. Open the **Data** tab
2. Click **Get Data**
3. Click **From Databases**
4. Click **From Analysis Services.**

This opens the Data Connection Wizard.



For the purposes of this training course, use the following information:

1. Server name: http://10.1.32.4/OLAP/msmdpump.dll
2. Select Use the following User Name and Password and enter the details provided.

Click Next to move to the next page.

Slide 29

RE0 What do we enter?
Ray Elliott, 2023-07-20T05:50:16.501

Connection: Cube

Select Database and Tables:

1. Select the database

Use the lookup to select the required database

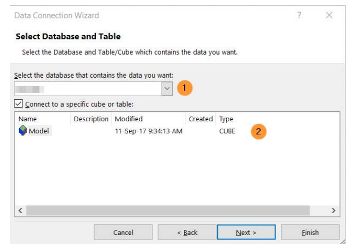
- For training: Select Budget-TRN

No tables!!

2. Connect to a specific cube

- For training: Select Model

3. Click Next



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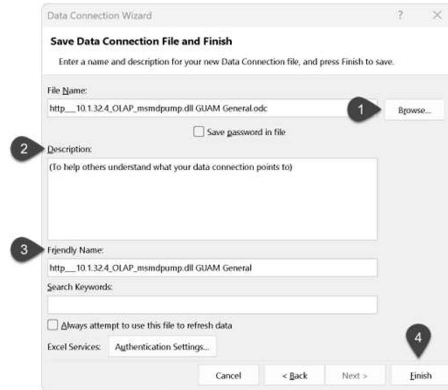
There are several databases on the server; Budget and DW (Datawarehouse); select one from the list.

You do not need any knowledge of the underlying database tables and the relationships between them to extract data from the Analysis Cube using Excel. Instead, you reference data using the Reference Data Set (RDS); such as Organization, Fund, Object, etc.; select the cube from the list.

Connection: Save and Finish

Save the connection details:

1. Save to a file on your PC or network
2. Enter a description
3. Enter a friendly name
4. Click Finish



You now save the connection details to a file on your PC or network. The default location is under your 'Documents' folder … This PC\Documents\My Data Sources.

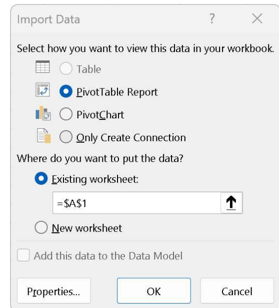
1. You can accept the default file name and location (This PC\Documents\My Data Sources) or edit the name and browse to a new location.
2. Optionally you can enter a Description which can be helpful for other users to understand your Connection definition. This is especially useful if you have entered a Friendly Name.
3. Optionally, you can enter a more user-friendly name for the Connection. This name will be displayed when you use this connection later.
4. Click Finish to save the connection and start the report building process.

Report: Import Data

1. View the data as a Pivot Table Report

2. Select which worksheet and cell you want the report to start

3. Click OK



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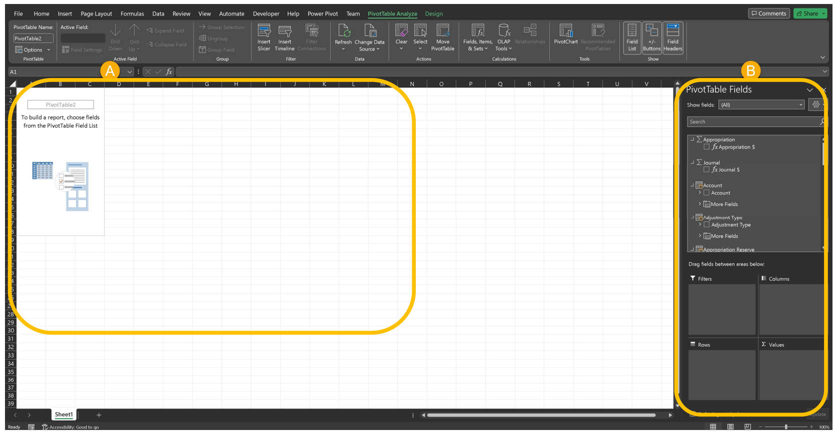
On the Import Data dialog you specify how you want to view the data, as a Pivot Table Report or Chart, or an Excel table. You also specify where you want Excel to start the data.

Report: Pivot Table

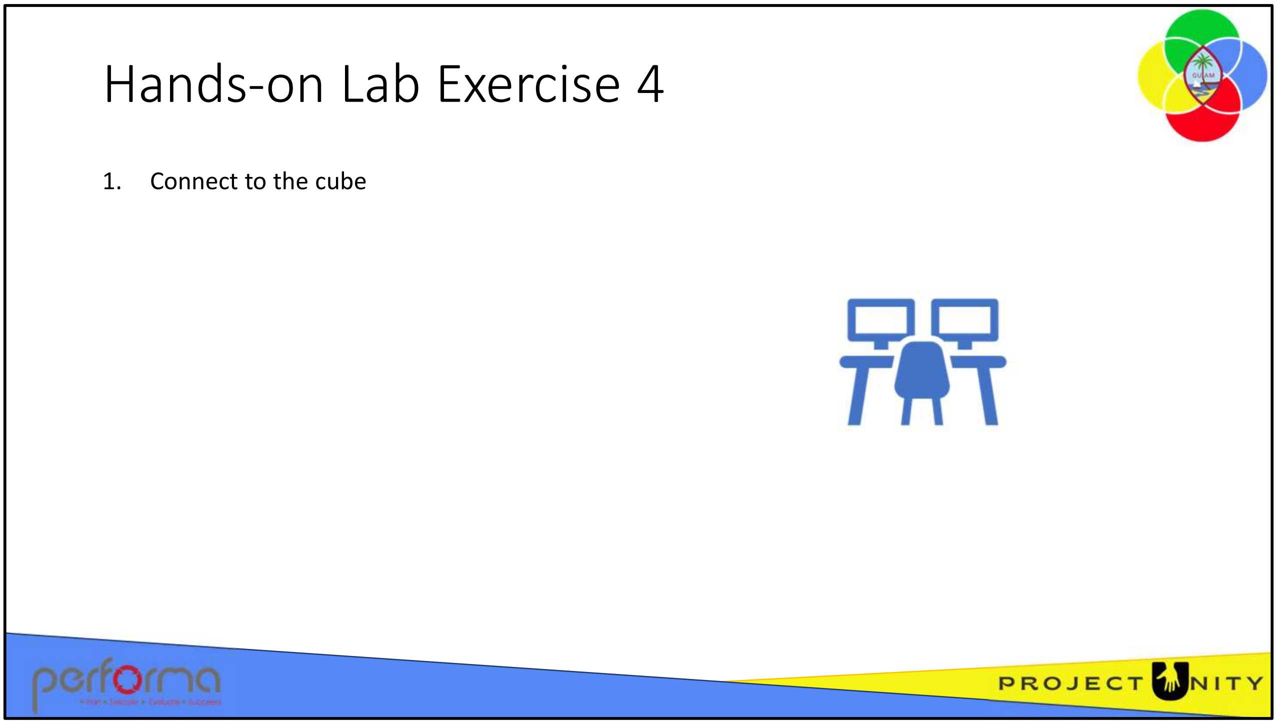
An empty pivot table report is created.

A. Canvas: The location where the data will be displayed

B. Pivot Table Pane: the panel used to drag/drop fields into the report



PROJECT UNITY



Objective

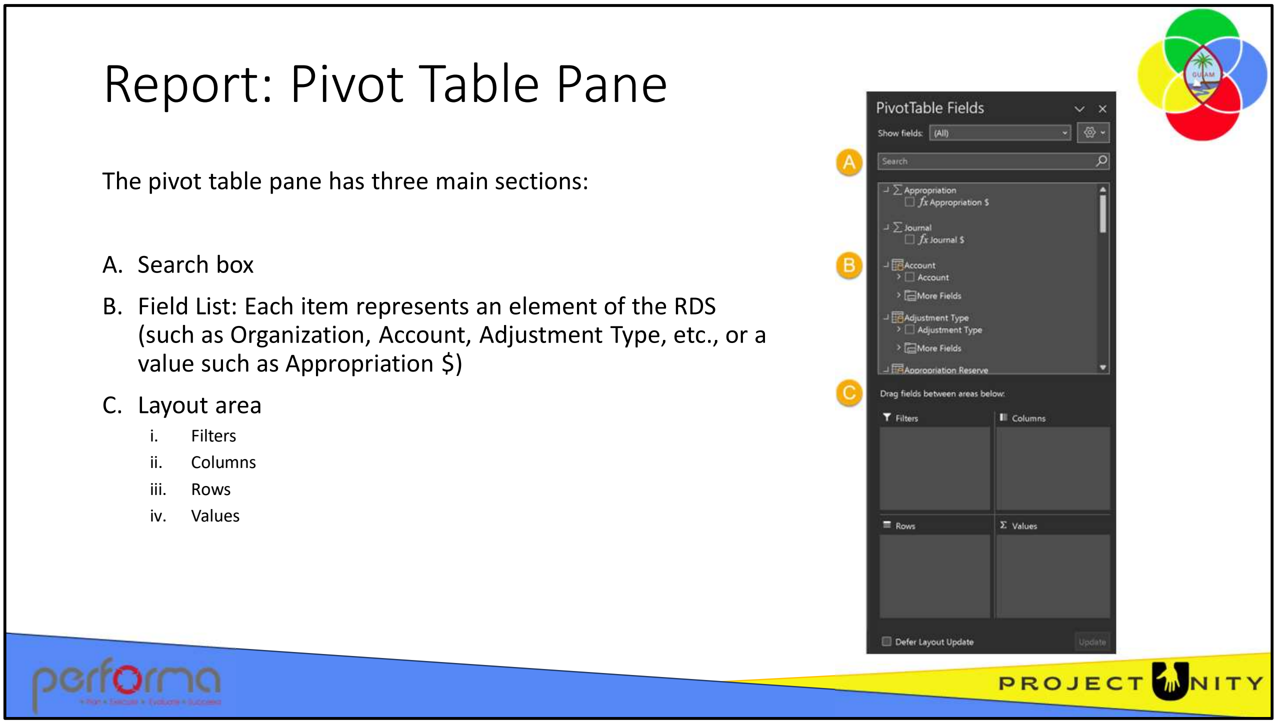
1. Create a connection to the cube

Duration: 5 minutes

Process

Connect to the cube

1. Open Excel
2. In the Data tab, click Get Data > From Database > From Analysis Services
3. Connect to Database Server
    - **a.** **Server name**: https://bids.uat.gfmis-nonprod-guam.com/OLAP/msmdpump.dll
    - **b.** **Use the following User Name and Password**: Select this option and enter the details you have been provided (then click Next)
4. Select Database and Table
    - **1.** **Database**: Budget-TRN
    - **2.** **Cube**: Model (then click Next)
5. Save Data Connection File and Finish: Click Finish
6. Import Data: Leave the defaults, click OK



The Pivot Table Pane is where you define the how you want to set up the rows, columns, and filters for your report and the data values to display. It has three main sections:

A. Search box:
B. Field List: Each item represents an element of the RDS, such as Organization, Account, Adjustment Type, etc., or a value such as Appropriation $. Values are indicated with a sigma (Σ) icon.
C. Layout Area
    i. Filters: Used for filter operation in a pivot table.
    ii. Columns: Displays as columns in a pivot table with Column Labels as the values for selected fields
    iii. Rows: Displays as rows in a pivot table with Row Labels as the values for selected fields.
    iv. Values: Displays the financial or statistical data for the selected fields.

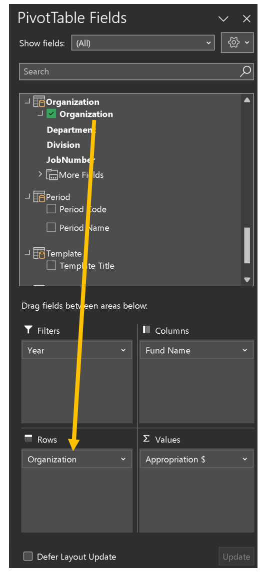
To create a report, you drag items from the Field list into the Rows, Columns, Filters, and Values boxes in the Layout area. You can drag as many fields into each box as you need for your report. You can also include any level of a hierarchy such as Organization, allowing you too include, JobNumber, Division, or Department.

Click the APPLY button once you’ve finished your layout to view the report.

Report: Pivot Table Pane

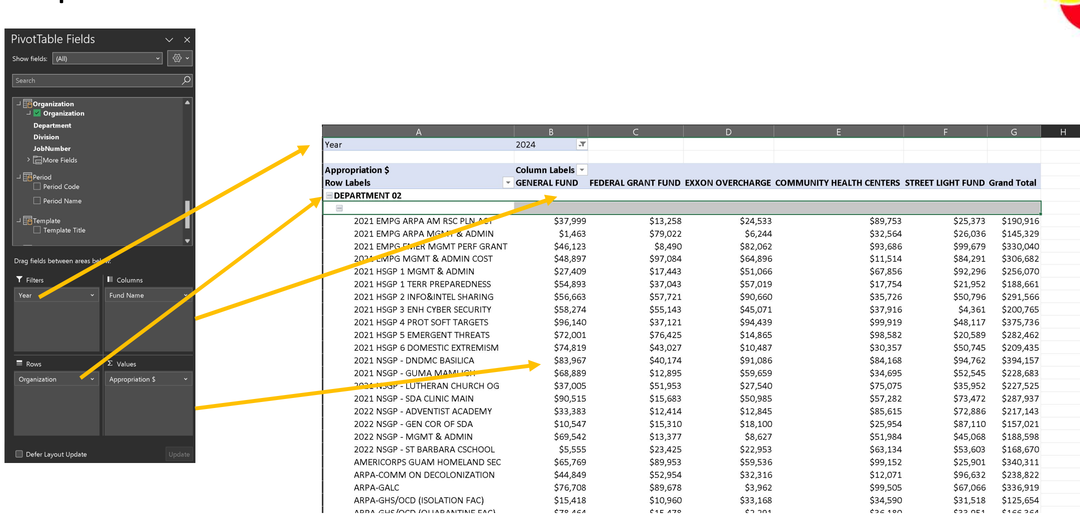
Drag fields into the:

- Rows
- Columns
- Filters
- Values



The layout we set up in the precious slide will produce a report like this. By default, the application will the display the value and sum the values in each row and column, but you can also choose one of the alternate aggregation options by clicking the sigma icon (Σ) in the Values box of the Fields dialog..

Report: Pivot Table Pane



Year	2024					
Appropriation $	Column Labels					
Row Labels	GENERAL FUND	FEDERAL GRANT FUND	EXXON OVERCHARGE	COMMUNITY HEALTH CENTERS	STREET LIGHT FUND	Grand Total
DEPARTMENT 02						
2021 EMPG ARPA AM RSC PLN A[illegible]	$37,999	$13,258	$24,533	$89,753	$25,373	$190,916
2021 EMPG ARPA M[illegible] & ADMIN	$1,463	$79,022	$6,244	$32,564	$26,036	$145,329
2021 EMPG [illegible]ER MGMT PERF GRANT	$46,123	$8,490	$82,062	$93,686	$99,679	$330,040
20[illegible] EMPG MGMT & ADMIN COST	$48,897	$97,084	$64,896	$11,514	$84,291	$306,682
2021 HSGP 1 MGMT & ADMIN	$27,409	$17,443	$51,066	$67,856	$92,296	$256,070
2021 HSGP 1 TERR PREPAREDNESS	$54,893	$37,043	$57,019	$17,754	$21,952	$188,661
2021 HSGP 2 INFO&INTEL SHARING	$56,663	$57,721	$90,660	$35,726	$50,796	$291,566
2021 HSGP 3 ENH CYBER SECURITY	$58,274	$55,143	$45,071	$37,916	$4,361	$200,765
2021 HSGP 4 PROT SOFT TARGETS	$96,140	$37,121	$94,439	$99,919	$48,117	$375,736
2021 HSGP 5 EMERGENT THREATS	$72,001	$76,425	$14,865	$98,582	$20,589	$282,462
2021 HSGP 6 DOMESTIC EXTREMISM	$74,819	$43,027	$10,487	$30,357	$50,745	$209,435
2021 NSGP - DNDMC BASILICA	$83,967	$40,174	$91,086	$84,168	$94,762	$394,157
2021 NSGP - GUMA MAM[illegible]	$68,889	$12,895	$59,659	$34,695	$52,545	$228,683
[illegible] - LUTHERAN CHURCH OG	$37,005	$51,953	$27,540	$75,075	$35,952	$227,525
2021 NSGP - SDA CLINIC MAIN	$90,515	$15,683	$50,985	$57,282	$73,472	$287,937
2022 NSGP - ADVENTIST ACADEMY	$33,383	$12,414	$12,845	$85,615	$72,886	$217,143
2022 NSGP - GEN COR OF SDA	$10,547	$15,310	$18,100	$25,954	$87,110	$157,021
2022 NSGP - MGMT & ADMIN	$69,542	$13,377	$8,627	$51,984	$45,068	$188,598
2022 NSGP - ST BARBARA CSCHOOL	$5,555	$23,425	$22,953	$63,134	$53,603	$168,670
AMERICORPS GUAM HOMELAND SEC	$65,769	$89,953	$59,536	$99,152	$25,901	$340,311
ARPA-COMM ON DECOLONIZATION	$44,849	$52,954	$32,316	$12,071	$96,632	$238,822
ARPA-GALC	$76,708	$89,678	$3,962	$99,505	$67,066	$336,919
ARPA-GHS/OCD (ISOLATION FAC)	$15,418	$10,960	$33,168	$34,590	$31,518	$125,654

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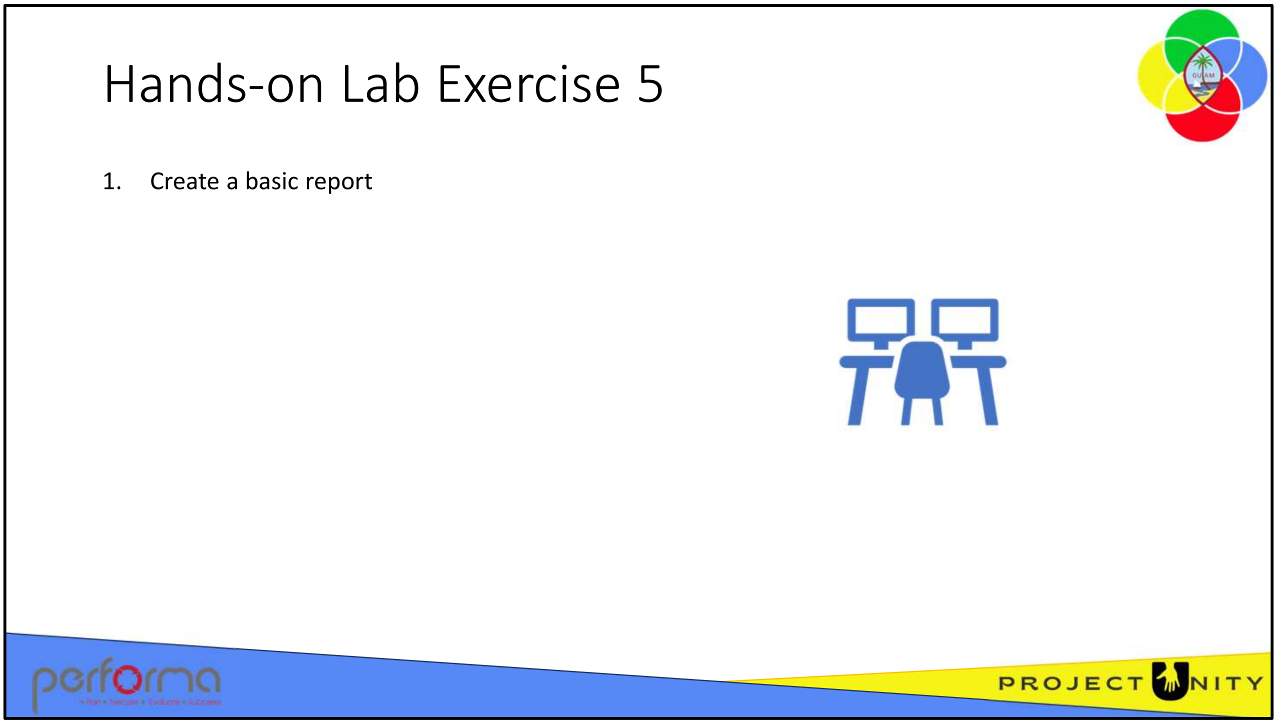
The layout we set up in the precious slide will produce a report like this. By default, the application will the display the value and sum the values in each row and column.

If you selected a hierarchical filed such as Organization you will be able to drill drown from the summary level to the detail JobNumbers.



Objective

1. Create a basic report

Duration: 5 minutes

Process

Create a basic report

In the PivotTable Fields pane:

1. Drag these items from the Fields list:
    a. **Report filters**: Year
    b. **Columns**: Fund Name
    c. **Rows**: Organization
    d. **Values**: Appropriation $
2. In cell B1, select 2024 from the dropdown

The report is showing the total Appropriation for Department 02, by Fund. We can drilldown into Divisions, and even, JobNumbers, by clicking the + icon net to the Row label in column A.

Pivot Table Do’s and Don’ts

DO

- Always select *Values* and *Filters* first. Then *Rows* and *Columns* This will help ad hoc run faster as it is not looking for as much data.
- In general, there should be no more than around 20 columns of data for an Ad Hoc to function properly.
- Delve in! Get creative! Ad hoc is a very powerful analytical, tracking, and review tool for budgeting.

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Pivot Table Do's and Don'ts

DON'T

- Do not place a field in columns that has a lot of individual values. For example, if Comptroller Subobject Code is dragged to the column then hundreds of columns will be generated, and the ad hoc will slow down or fail to load.
- Do not try to use two different drill downs ("Agency Drill Down" and "Object Drill Down") in the same ad hoc. Drill downs use a lot of Excel processing power, and with two in the same table the result will likely be a failure to load or Excel freezing.
- Make sure that the *Values* you have selected has all the characteristics of your other selections. For instance, if Fund Dollars is the *Value* and Subprogram is on the *Row*, that will create issues since Revenue information is not designated at the Subprogram level.

***General Rule** – if an Ad Hoc pivot table is taking more than 30 seconds to update, it is likely because the options chosen don't go well together. Press "Esc" on your keyboard to cancel.

Pivot Table Components

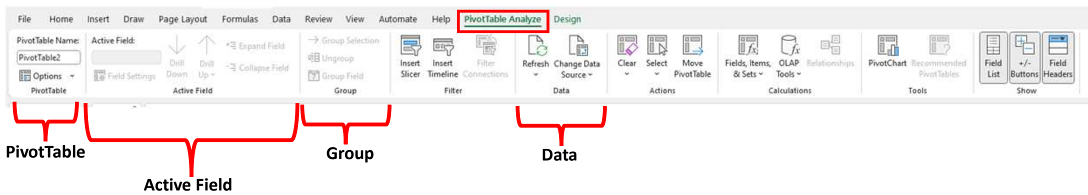
PivotTable Analyze tab: Contains commands that will enable you to explore the data in the PivotTable

PivotTable
- PivotTable Name
- Options

Active Field
- Active Field
- Field settings
- Expanding Field
- Collapsing Field

Group Selection
- Grouping
- Ungrouping
- Group Field

Data
- **Refresh**



Please refer to Microsoft documentation, or the many on-line pivot table tutorials, for additional information .

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PivotTable Analyze tab contains commands that will enable you to explore the data in the PivotTable.

Once you have created your report and saved the workbook, you can click the Refresh icon to update the data from the database.

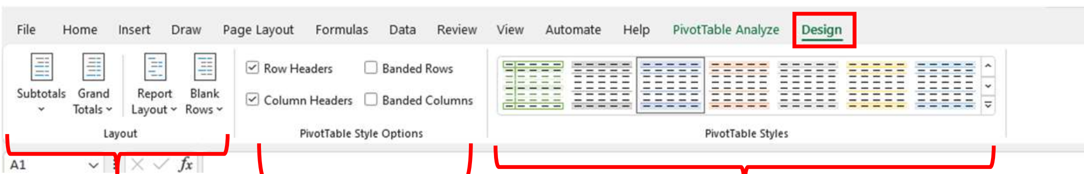
Pivot Table Components

Design tab: Contains commands used to structure the PivotTable with various report options and style options.

Layout
- Subtotals
- Grand Totals
- Report Layout
- Blank Rows

PivotTable Style Options
- Row Headers
- Column Headers
- Banded Rows
- Banded Columns

PivotTable Styles



Layout

PivotTable Style Options

PivotTable Styles

Please refer to Microsoft documentation, or the many on-line pivot table tutorials, for additional information .

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The Design tab contains commands used to structure the PivotTable with various report options and style options.

Agenda

Introduction

Analysis Using BIDS Ad hoc Reporting

Analysis Using Excel

Q&A

Thank you for undertaking the lesson:
Advanced Data Analysis

Please complete the survey: