

Designing Interactive Reports in Power BI Desktop



Agenda

- Designing Interactive Reports
- Conditional Formatting
- Importing Custom Visuals
- Working with Bookmarks and Drillthrough
- Styling Reports using Themes
- Publishing Reports



Creating Reports

- Power BI Desktop project contains one report
 - Report within project can contain multiple pages
 - Report pages contains visuals
- Reports can be created using filters
 - You can add visual level filters
 - You can add page level filters
 - You can add drillthrough filters
 - You can add report level filters



Built-in Visualization Types

- Table and Matrix
- Bar charts and Column charts
- Pie charts and Doughnut chart
- Line chart and Area chart
- Scatter chart and Combo charts
- Card and Multi-row Card
- Treemap
- Ribbon chart
- Waterfall chart
- Funnel chart
- Gauge
- Map and Filled Map
- Slicer
- R script visual
- Shape map (in preview)



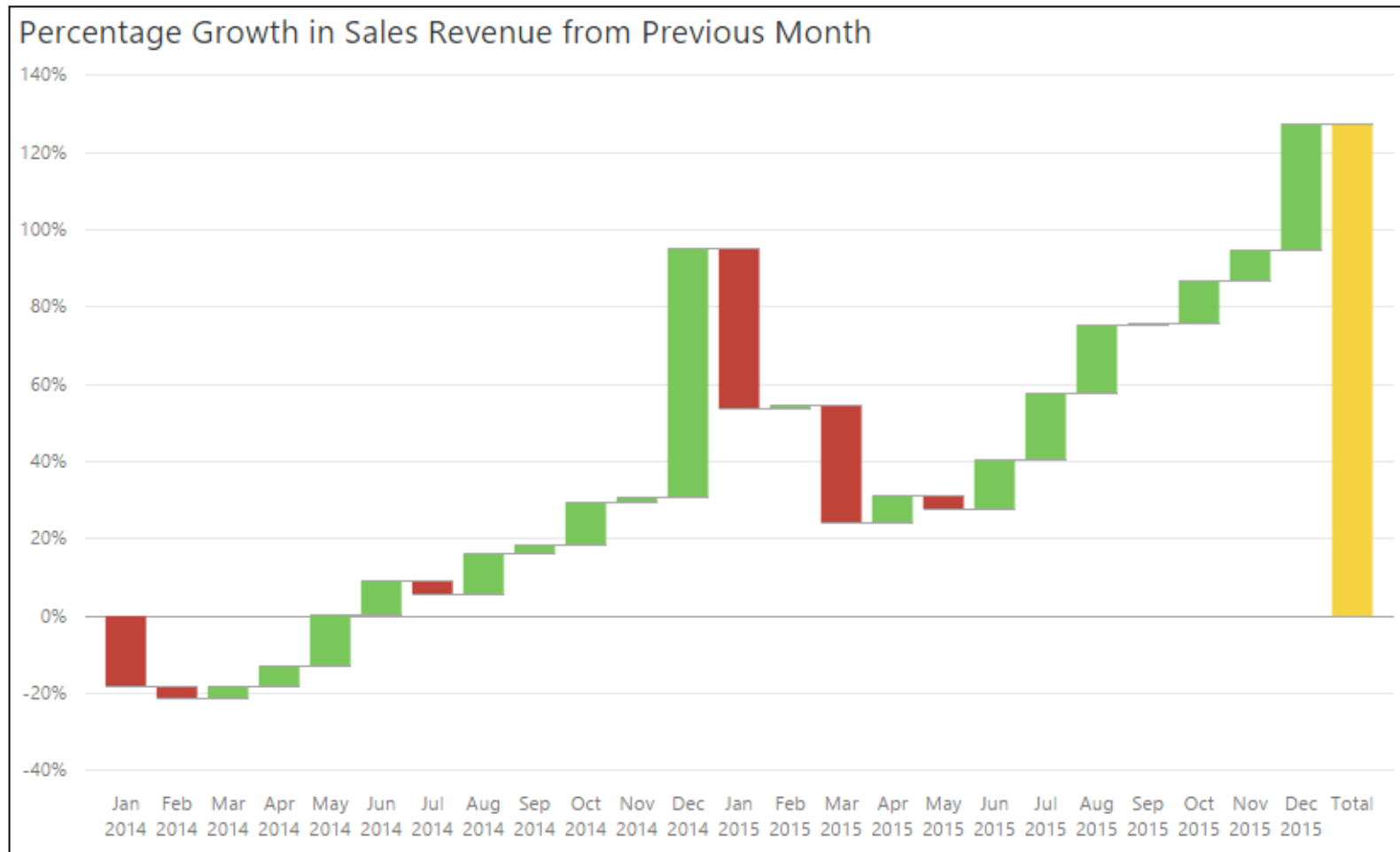
Example Visual 1: Funnel

- Visualizes distribution across categories as percentage of top value



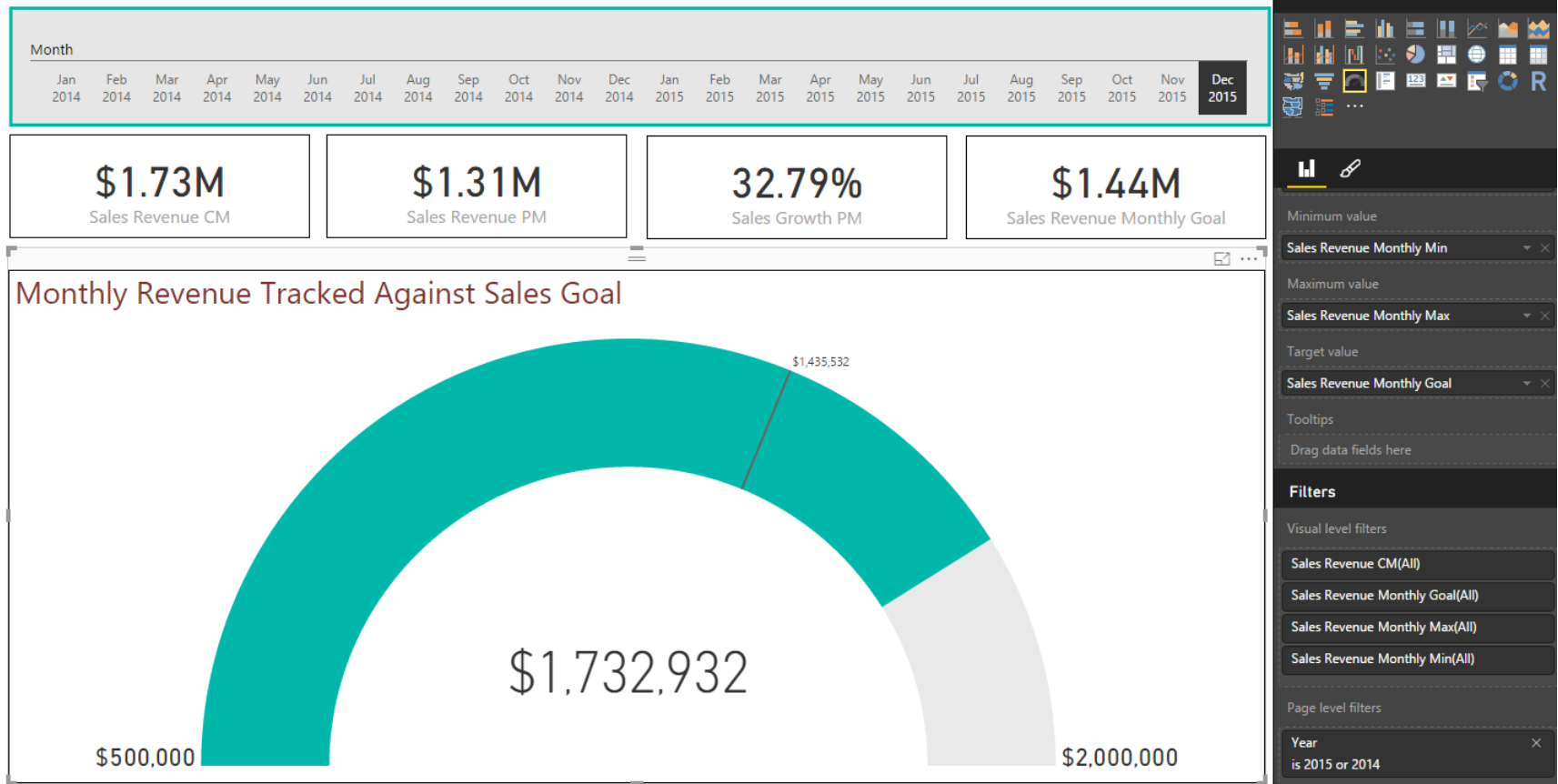
Example Visual 2: Waterfall

- Visualizes series-based data with positive and negative values

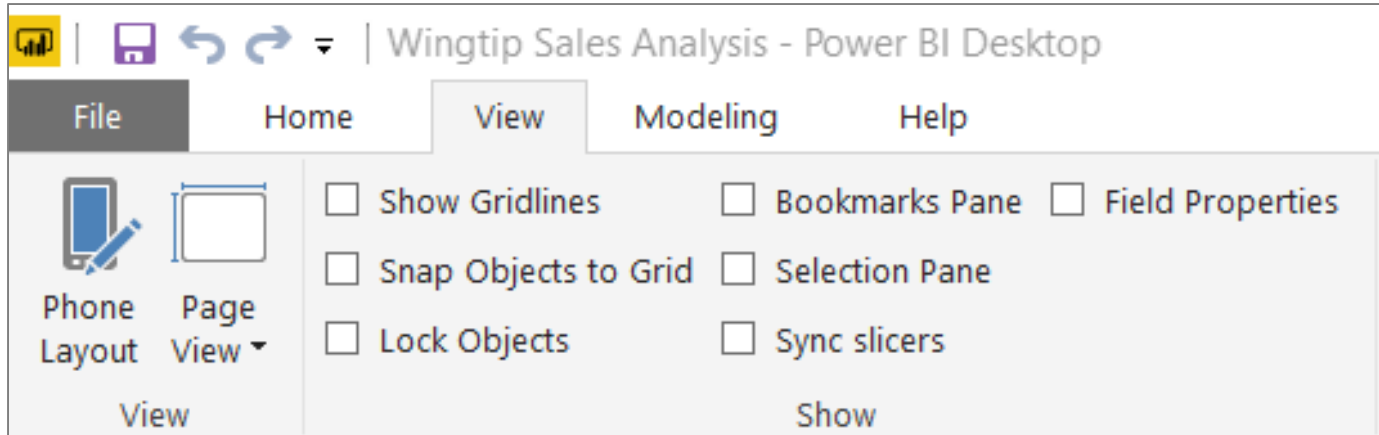


Example Visual 3: Gauge Visual

- Visualizes how measured value is tracking against goal or budget



Report Designer Modes and Panes



- **Show Gridlines** mode adds visual guides to report
- **Snap Objects to Grid** mode helps with object placement
- **Lock Objects** mode used to prevent accidental moving
- **Bookmarks Pane** used to create and manage bookmarks
- **Selection Pane** used to select, order, hide & show visuals
- **Sync slicers** pane used for advanced slicer control
- **Field Properties** used to add field description



Lock Objects Mode

- Prevents accident movement of report objects
 - Locks Objects setting is not saved at project level



Field Properties Pane

- Allows data model author to add field description

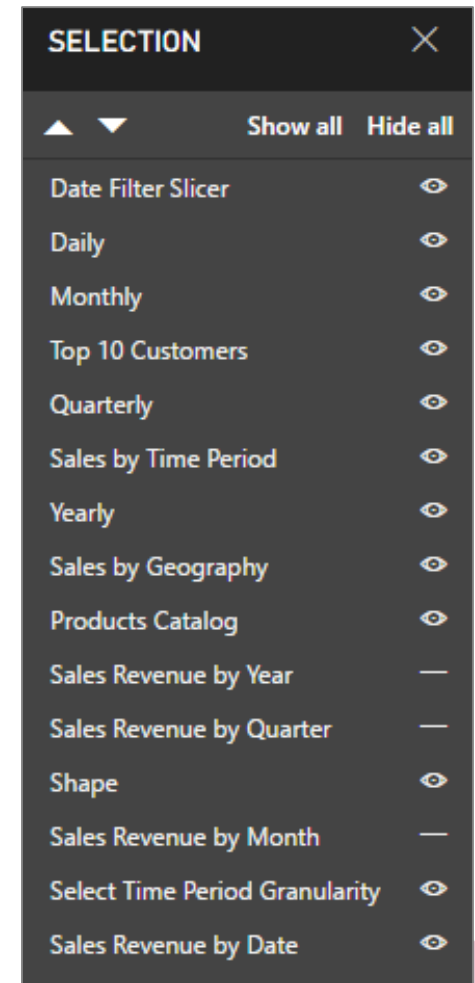
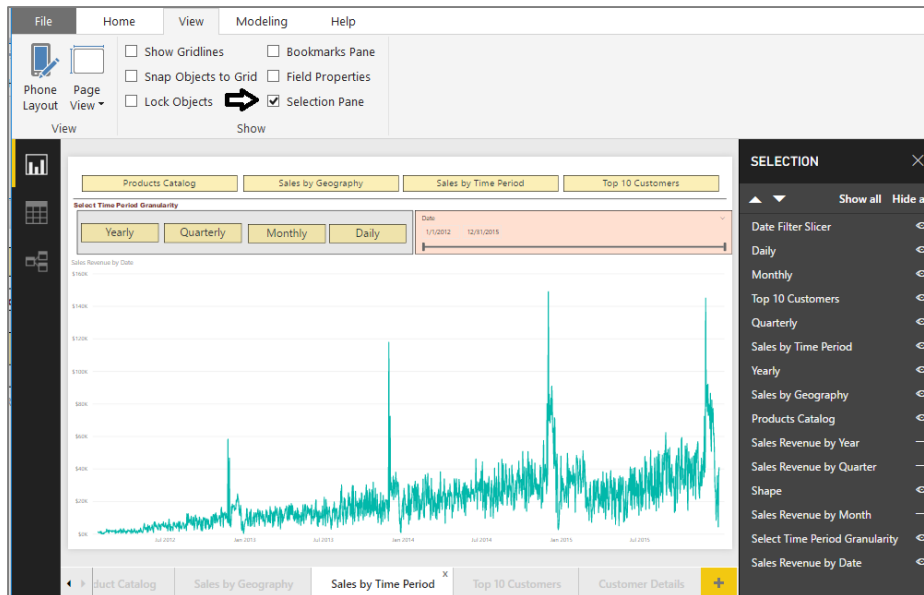


- Data model consumer can see description as tooltip in fields list



Selection Pane

- Provides control over object on a page
 - You can control whether visual is visible or hidden
 - You can change ordering to control what is on top



Designing Reports with Interactive Filtering

- Slicers
 - Provide report consumers with intuitive filtering
- Visual Highlighting
 - Filtering applied when user clicks on a visual data element
- Drilldown Mode
 - Allows report consumer to drill into field hierarchy
e.g. Sales Region > State > City > Zipcode
- Drillthrough Pages
 - Allows report consumer to navigate to drillthrough page



Slicer with Text Field

- Slicer support List and Dropdown modes
 - Slicer create in List mode by default
 - Slicer switched to dropdown mode to conserve vertical space

State Name

- ☐ Alabama
- ☐ Arizona
- ☒ California
- ☐ Colorado
- ☐ Connecticut
- ☐ Florida
- ☐ Georgia
- ☐ Louisiana
- ☐ New Mexico
- ☐ New York
- ☐ North Carolina
- ☐ Ohio
- ☐ Oregon
- ☐ Pennsylvania
- ☐ Rhode Island

State Name

- ☐ Alabama
- ☐ Arizona
- ☒ California
- ☐ Colorado

List
Dropdown

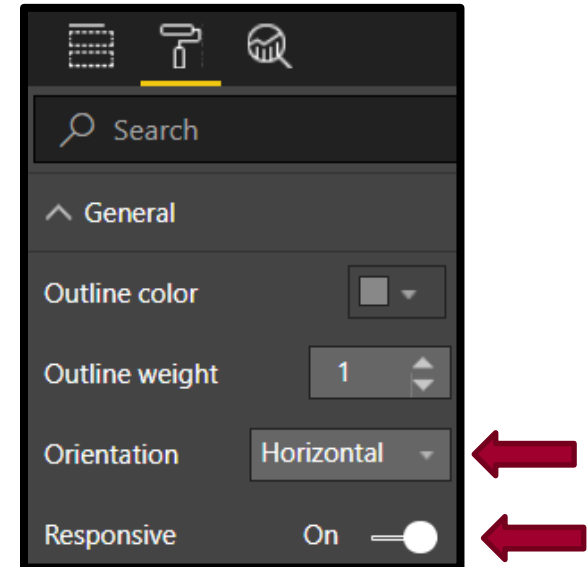
State Name

California



Horizontal Responsive Slicers

- Slicer **Orientation** can be set to **Horizontal**
 - Horizontal slicer supports **Responsive** mode
 - Makes it possible to show many slicer choices at once
 - provides best filtering experience for mobile devices



Slicers with Date Fields

- Slicers with Date fields provide 7 different modes
 - Between, Before and After provide sliders and date pickers



The image shows a date slicer interface. On the left is a vertical menu with seven options: 'Between' (highlighted), 'Before', 'After', 'List', 'Dropdown', and 'Relative'. To the right of the menu is a box titled 'First Purchase Date'. Inside this box, there are two date input fields: the first contains '4/1/2012' and the second contains '10/1/2012'. Below these fields is a horizontal slider with two circular handles, one positioned at the start of the range (4/1/2012) and the other at the end (10/1/2012).

- Relative mode filter based on current date (e.g. last 30 days)

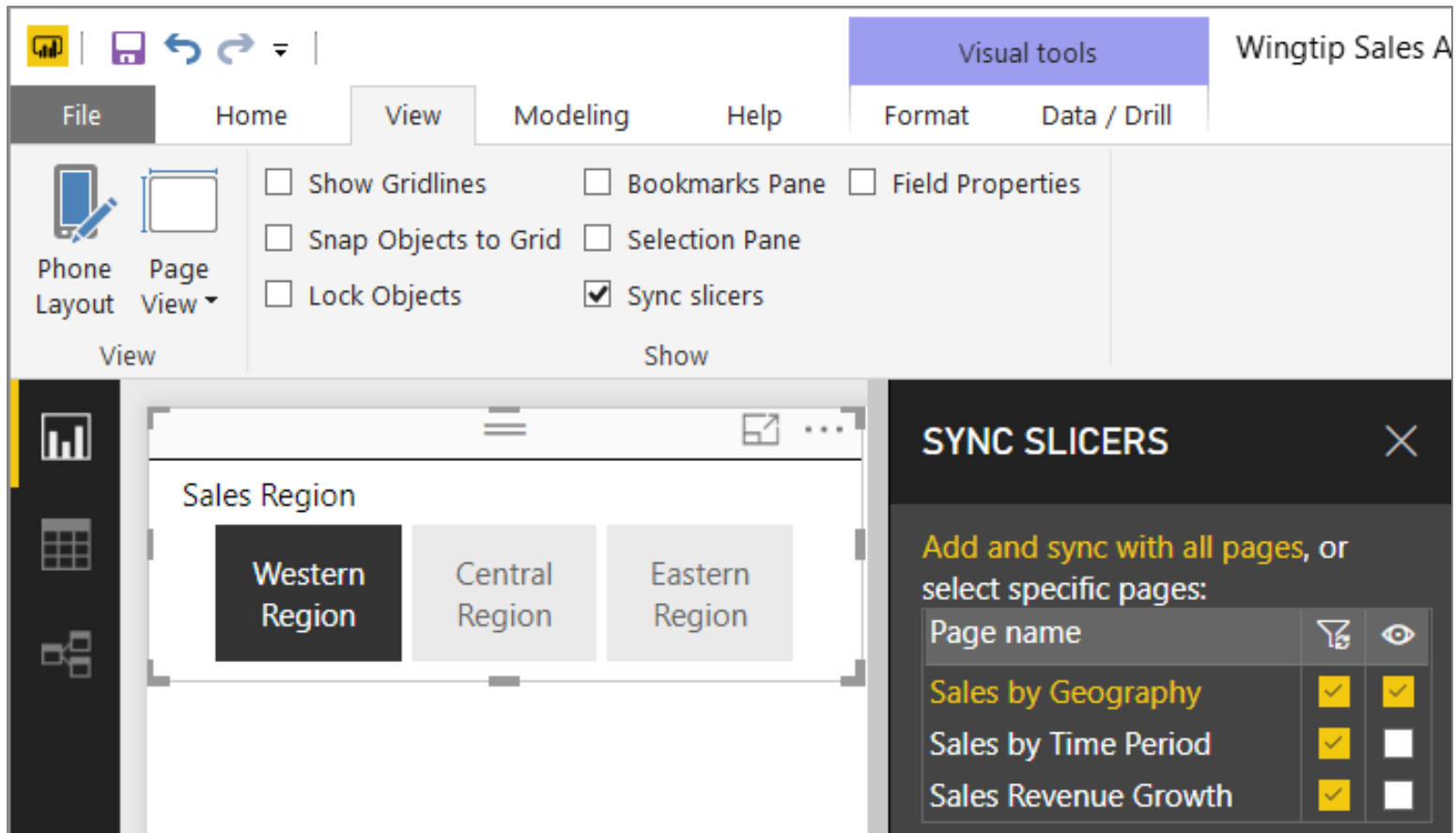


The image shows a date slicer interface in relative mode. It is titled 'First Purchase Date'. Below the title, there are three input fields: the first is a dropdown menu showing 'Last', the second is a text box containing '30', and the third is a dropdown menu showing 'Days'. Below these fields, there is a date range displayed as '3/31/2018 - 4/29/2018', preceded by a small calendar icon.



Slicer Sync

- Slicer visual & filtering can be synchronized across pages



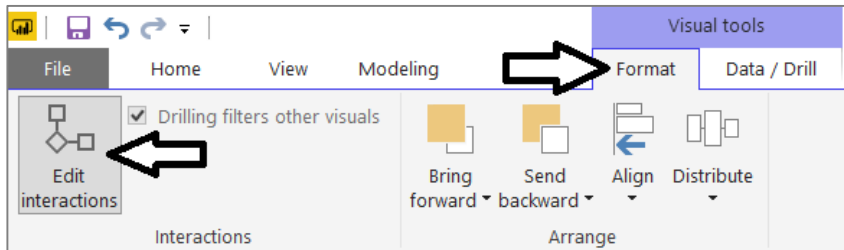
User Interaction with Slicers & Highlighting

- Provides user with interactive filtering control

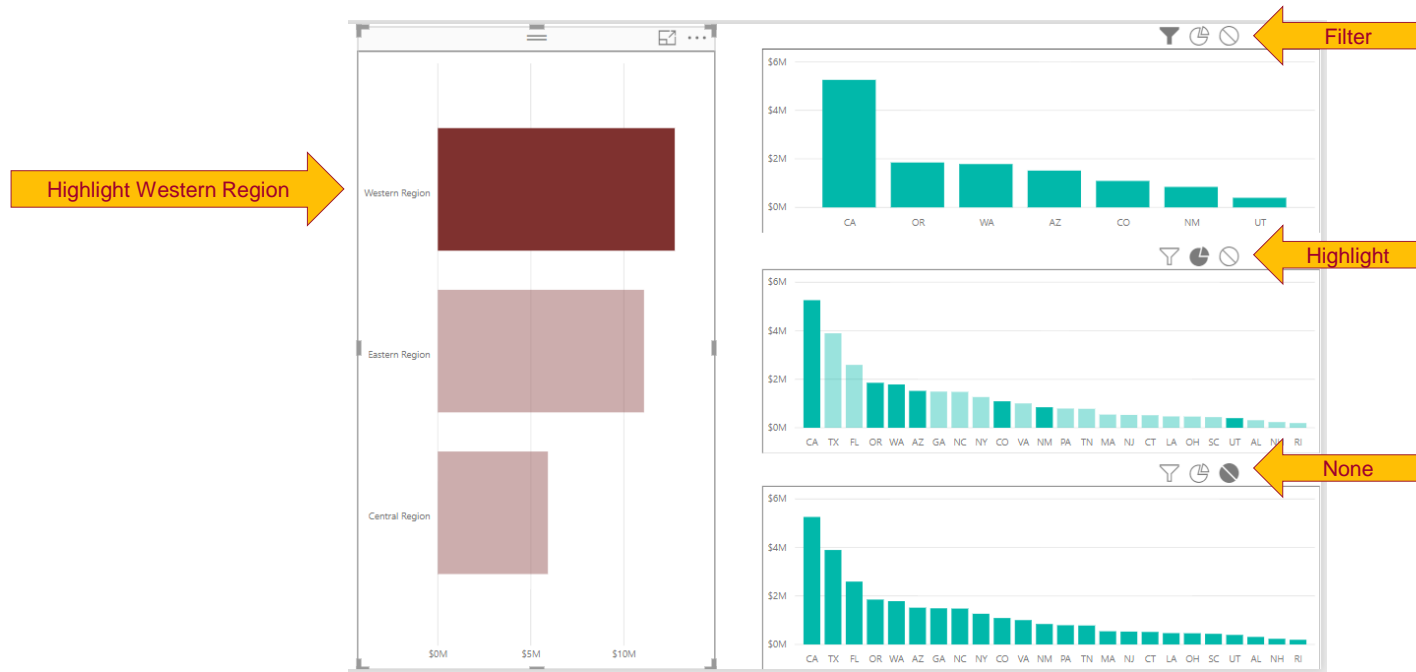


Edit Highlight Interactions Across Visuals

- Click **Edit interactions** button on **Format** tab of ribbon

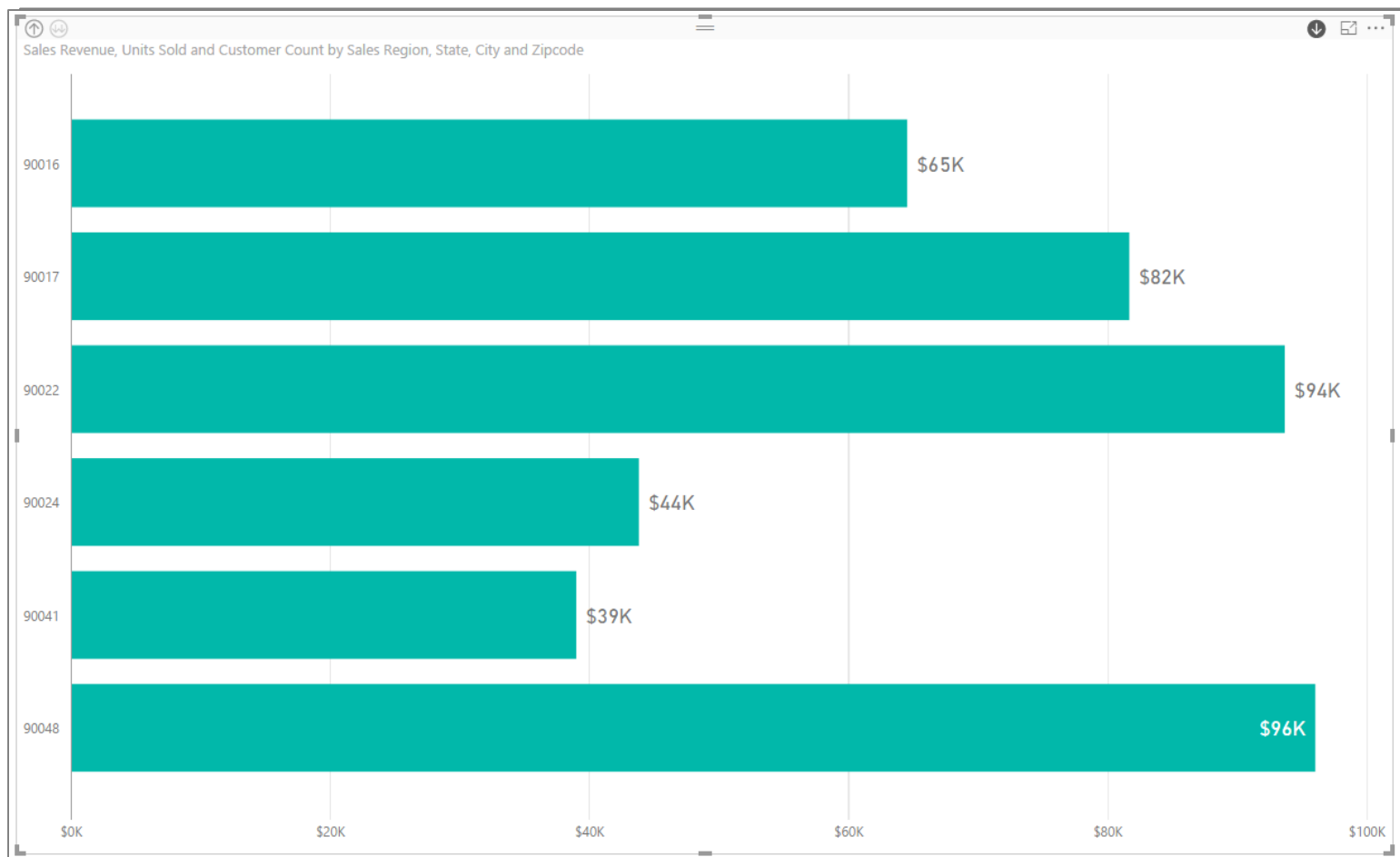


- Select a visual and then configure interactions with other visuals



User Interaction using Drill Actions

- Drill Actions supported when using hierarchies
 - You must enable drilldown mode in visual



Agenda

- ✓ Designing Interactive Reports
- Creating the Top 5 Products List
 - Working with Bookmarks and Drillthrough
 - Using Report Themes
 - Importing Custom Visuals
 - Designing Reports for Mobile Devices
 - Publishing Power BI Reports



Ranking Products By Sales using RANKX

- DAX provides RANKX function for ranking
 - Can be used to track top 5 products by sales revenue

```
Product Rank =  
RANKX(  
    ALL(Products),  
    CALCULATE( SUM(Sales[SalesAmount])) )  
)
```

- You can sort and filter on output of RANKX function

Product Rank ▲	Product	Sales Revenue
1	Flying Squirrel	\$3,828,783
2	Twitter Follower Action Figure	\$3,508,806
3	Godzilla Action Figure	\$2,970,735
4	Personal Commuter Chopper	\$2,613,193
5	Red Stomper Bully	\$2,538,233

Product Rank ▲

is less than or equal to...

Show items when the value:

is less than or equal to ▼

5

☒ And ☐ Or

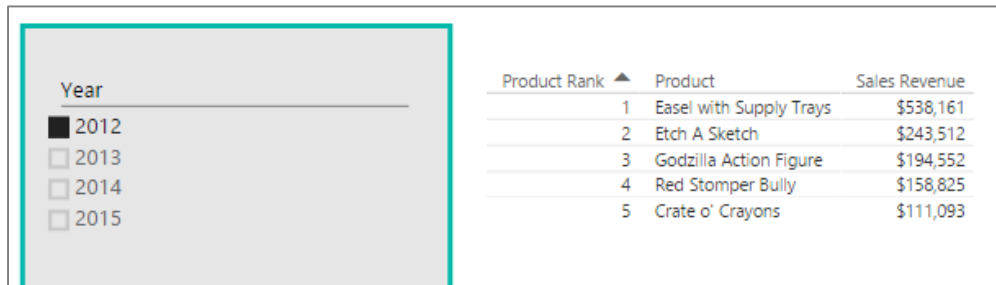
▼

Apply filter



Problems with the Filter Context

- RANKX function is affected by filter context
 - Sometimes you get the results you are expecting



The screenshot shows a filter panel on the left with a 'Year' section containing checkboxes for 2012, 2013, 2014, and 2015. The 2012 checkbox is selected. To the right is a table with three columns: 'Product Rank' (with an upward arrow), 'Product', and 'Sales Revenue'.

Product Rank	Product	Sales Revenue
1	Easel with Supply Trays	\$538,161
2	Etch A Sketch	\$243,512
3	Godzilla Action Figure	\$194,552
4	Red Stomper Bully	\$158,825
5	Crate o' Crayons	\$111,093

- Sometimes you might get unexpected results



The screenshot shows a filter panel on the left with two sections: 'Year' with checkboxes for 2012, 2013, 2014, and 2015, and 'Category' with checkboxes for Action Figures, Arts and Crafts, and Remote Control Vehicles. The 'Action Figures' checkbox is selected. To the right is a table with three columns: 'Product Rank' (with an upward arrow), 'Product', and 'Sales Revenue'.

Product Rank	Product	Sales Revenue
2	Twitter Follower Action Figure	\$3,508,806
3	Godzilla Action Figure	\$2,970,735



Writing Context Aware DAX Code

- When using RANKX...
 - It's recommended to call **HASONEVALUE** function
 - When calling ALL function, pass one or more columns

```
Product Rank =  
IF(  
    HASONEVALUE(Products[Product]),  
    RANKX(  
        ALL( Products[Subcategory], Products[Product] ),  
        CALCULATE( SUM(Sales[SalesAmount]) )  
    )  
)
```

- Ranking function now evaluates product ranking for specific Category










Product Rank	Product	Sales Revenue
1	Twitter Follower Action Figure	\$3,508,806
2	Godzilla Action Figure	\$2,970,735
3	Captain America Action Figure	\$855,607
4	Spiderman Action Figure	\$698,614
5	Perry the Platypus Action Figure	\$654,110



More Ranking Evaluation Problems

- Adding new column to table creates new problem
 - Ranking run separately for each separate Product Image
 - Every product has unique Product Image and is given rank of 1

Product Rank	Product	Product Image	Sales Revenue
1	Batman Action Figure		\$40,395
1	Black Power Ranger Action Figure		\$4,223
1	Captain America Action Figure		\$125,110
1	Crate o' Crayons		\$322,711
1	Crayloa Crayon Set		\$12,868
1	Easel with Supply Trays		\$928,620
1	Etch A Sketch		\$293,175

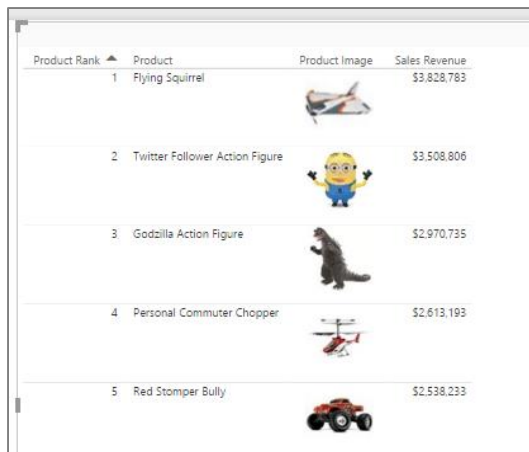


Getting It Right






- Call to RANKX must be modified again
 - You must specify which columns to factor into ranking

```
Product Rank =  
IF(  
    HASONEVALUE(Products[Product]),  
    RANKX(  
        ALL( Products[Subcategory], Products[Product], Products[Product Image] ),  
        CALCULATE( SUM(Sales[SalesAmount]) )  
    )  
)
```

- Context-aware DAX code corrects problems with visual



A screenshot of a Power BI table visual. The table has four columns: 'Product Rank' (with a sort arrow), 'Product', 'Product Image', and 'Sales Revenue'. It displays five rows of data, each representing a product. The products are ranked from 1 to 5 based on their sales revenue. Each row includes a small image of the product.

Product Rank	Product	Product Image	Sales Revenue
1	Flying Squirrel		\$3,828,783
2	Twitter Follower Action Figure		\$3,508,806
3	Godzilla Action Figure		\$2,970,735
4	Personal Commuter Chopper		\$2,613,193
5	Red Stomper Bully		\$2,538,233



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- ✓ Creating the Top 5 Products List
- Working with Bookmarks and Drillthrough
 - Using Report Themes
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 - Publishing Power BI Reports



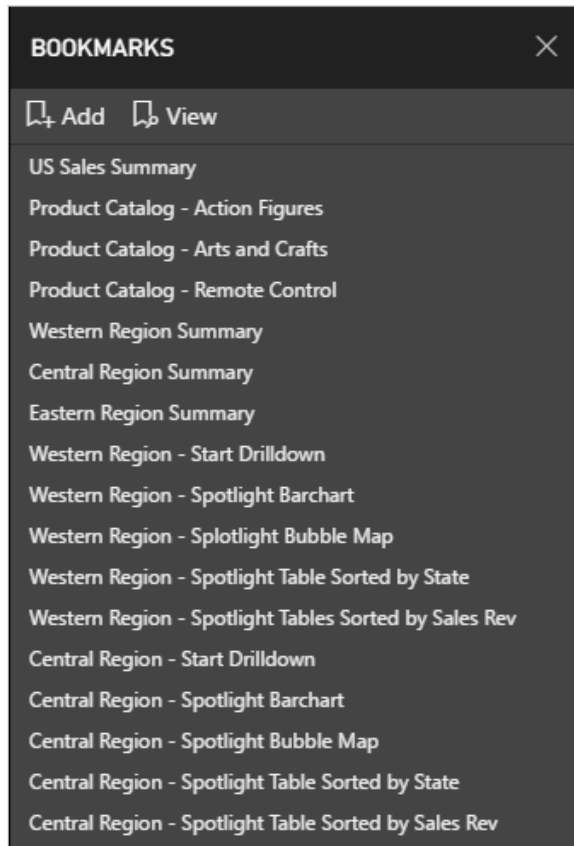
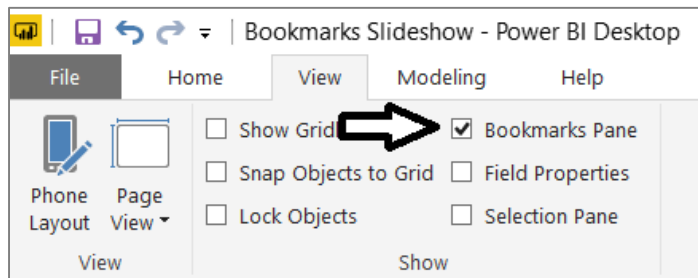
What are Bookmarks

- Snapshot of recorded settings which can include...
 - Current page
 - Filters
 - Slicers
 - Visual sort order
 - Drill location
 - Visibility
 - Spotlighting
- Bookmarks provide the foundation for story telling
 - Bookmarks are supported in reports only
 - Bookmarks are **NOT** supported in dashboards



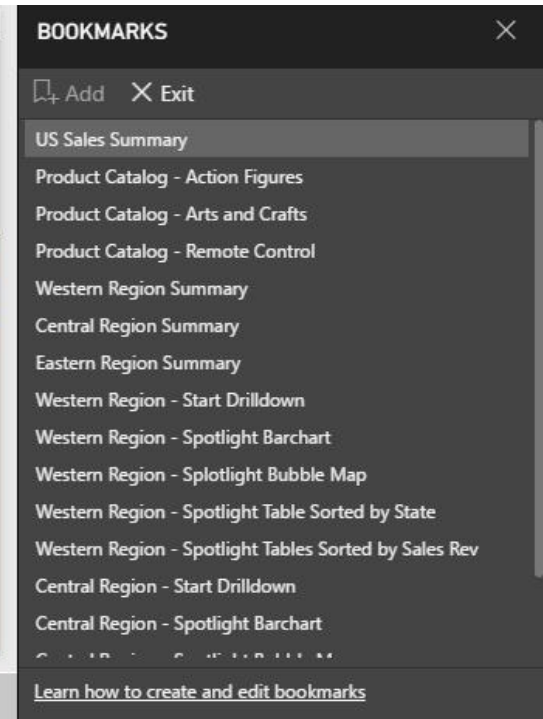
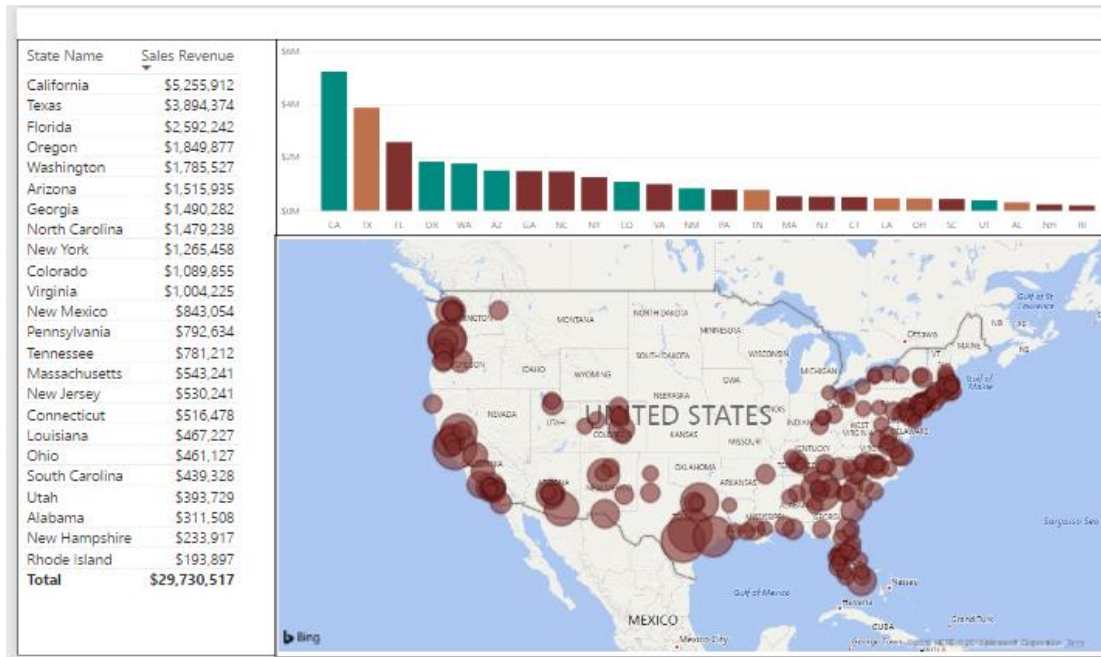
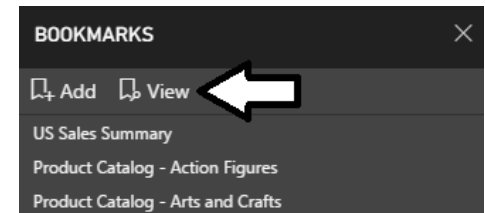
Bookmarks Pane

- Provide ability to create and manage bookmarks



Bookmarks as a Slide Show

- Bookmarks can be viewed as slide show
 - Start slide show by clicking View button
 - Consumer can step through one bookmark at a time



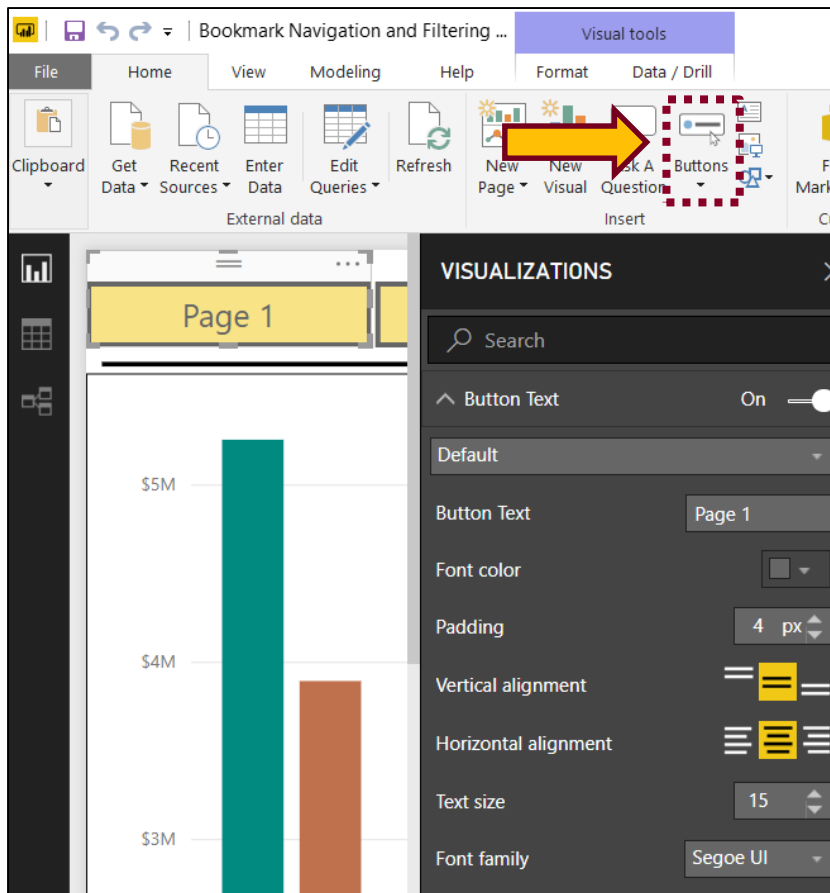
Bookmark 1 of 17

US Sales Summary



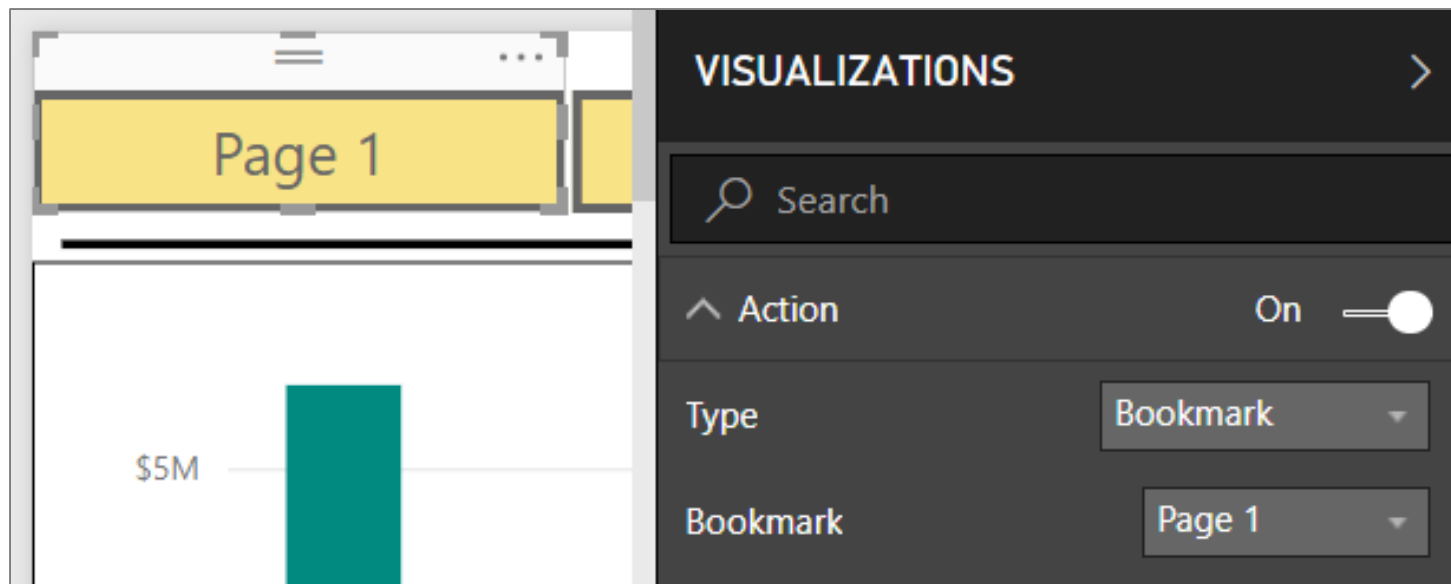
Creating a Button

- Buttons can be added to report pages to apply a bookmark
 - Button can be create with icon and/or text



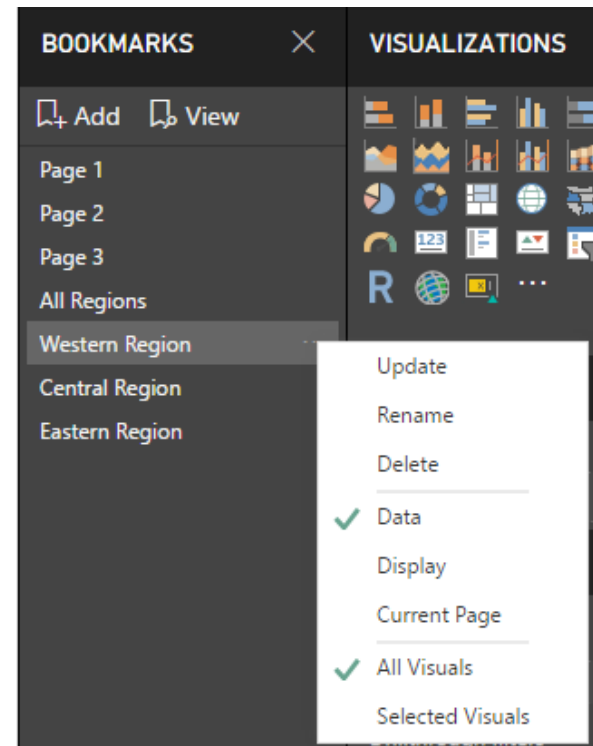
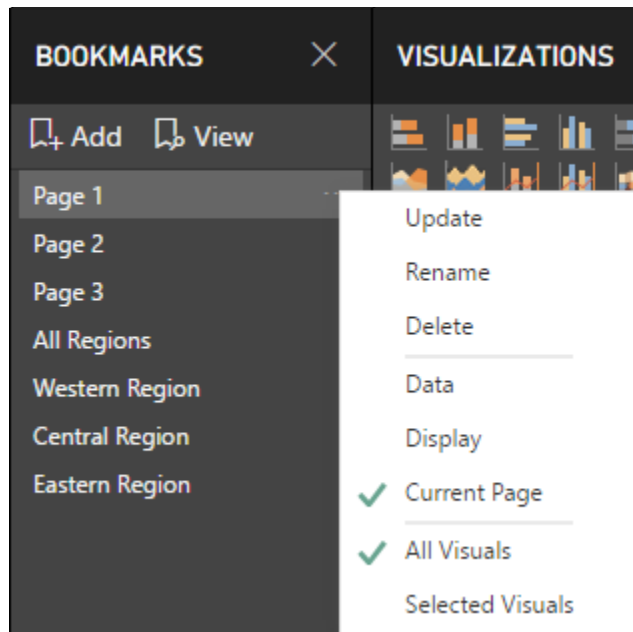
Button Action Used to Apply Bookmark

- Button action can apply a bookmark
 - Button responds to standard click in Power BI Service
 - Button requires CONTROL + click in Power BI Desktop



Bookmarks Types

- Bookmarks can capture or ignore certain types of data
 - Data (filtering and slicers)
 - Display (visible or hidden)
 - Current Page (page navigation)





DEMO

Working with Bookmarks and Drillthrough

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- ✓ Designing Interactive Reports
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- Using Report Themes
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Report Themes

- Report can be styled using report theme
 - Provides consistency across reports for styling and branding
 - Report theme defined using JavaScript Object Notation (JSON)
 - Today report themes must be defined using JSON editor
 - Microsoft plans to release WYSIWYG theme designer later in 2018

```
CPT Demo Report Theme.json  -P X
{
  "name": "CPT Demo Report Theme",
  "background": "#fff8dd",
  "foreground": "#9F1B30",
  "tableAccent": "#fbc737",
  "dataColors": [ "#9F1B30", "#D16B2C", "#FEBF0F", "#fdae61", "#abdda4", "#66c2a5",
    "#3288bd", "#5e4fa2", "#bbbbbb", "#999999", "#666666", "#333333" ],
  "visualStyles": {
    "*": {
      "*": {
        "*": [ {
          "fontSize": 8,
          "fontFamily": "Cambria Math",
          "color": {
            "solid": {
              "color": "#000000"
            }
          }
        }
      ]
    }
  }
}
```





DEMO

Working with Report Themes

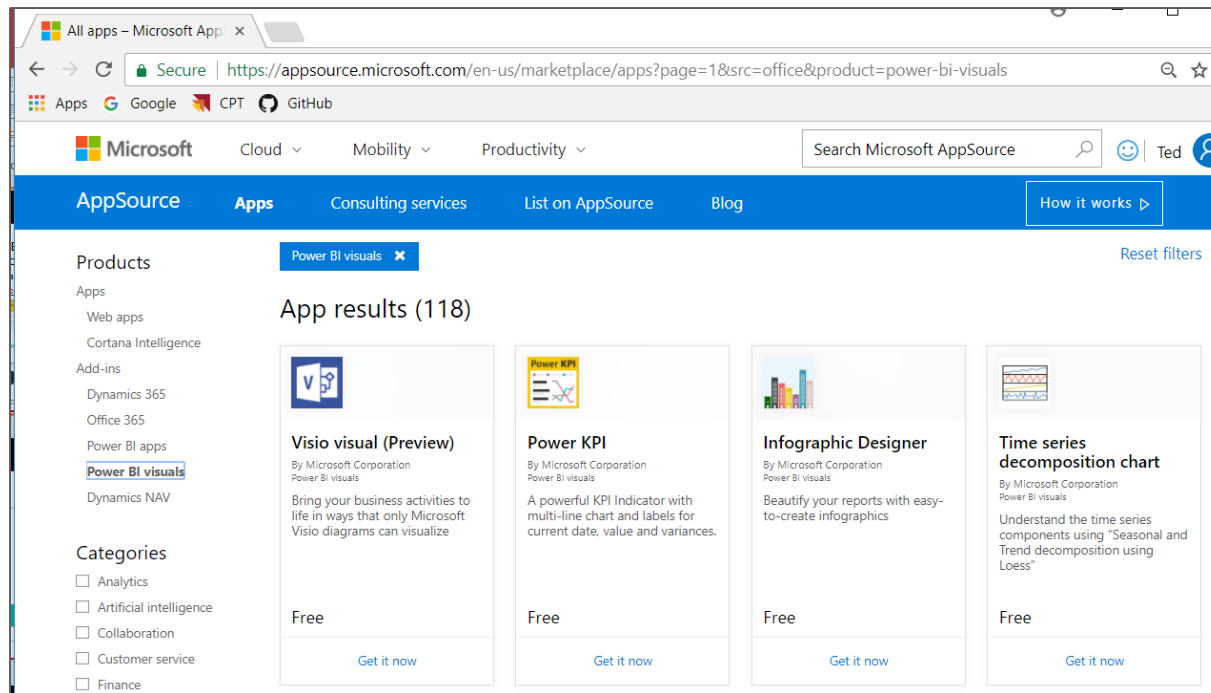
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Custom Visuals for Power BI

- Power BI Framework for Visuals is Extensible
 - Developers can extend Power BI with Custom Visuals
 - Microsoft Hosts gallery of custom visuals
 - Gallery located at <https://appsource.microsoft.com>



Histogram

- Custom Visual Example 1



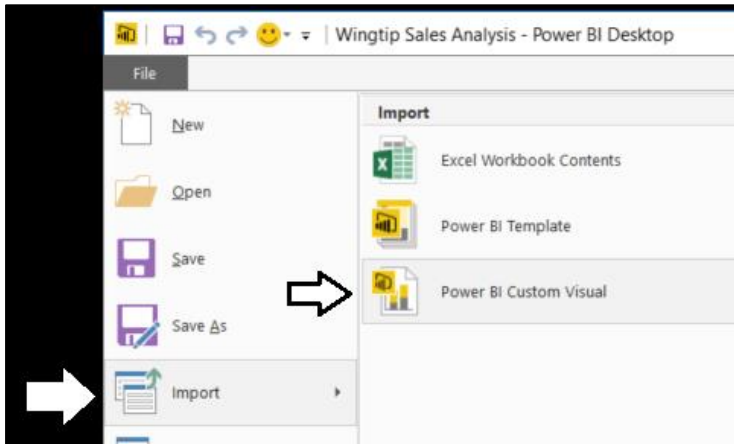
Hierarchy Slicer

■ Custom Visual Example 2

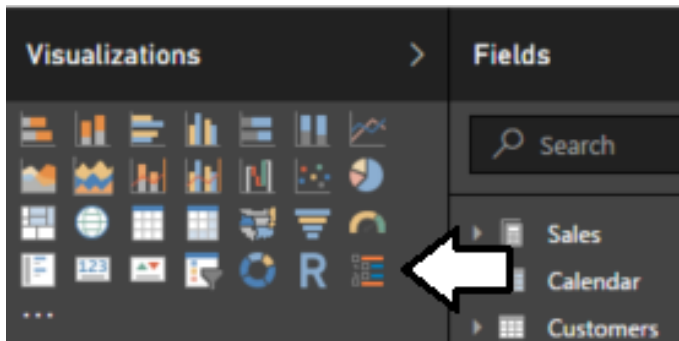


Importing a Custom Visual

- Import custom visual into Power BI Desktop project
 - Execute **Import > Power BI Custom Visual** menu command



- After import, Custom Visual appears in **Visualizations** list



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Designing Reports for Mobile Devices

- Many reports will not render properly on mobile devices
 - Phone Layout used to create separate version for mobile devices

The screenshot shows the Power BI Desktop interface with the 'Phone Layout' view selected. The report is titled 'Sales by Geography' and displays the following data:

Summary:

- Western Region: \$29.73M Sales Revenue
- Central Region: 4.55M Units Sold
- Eastern Region: 63.68K Customer Count

Sales by State Table:

Category	Action Figures		Arts and Crafts		Remote Control Vehicles		Total	
State	Sales Revenue	Units Sold	Sales Revenue	Units Sold	Sales Revenue	Units Sold	Sales Revenue	Units Sold
AL	\$115,136	50,679	\$20,888	1,386	\$175,484	4,317	\$311,508	56,382
AZ	\$512,156	190,023	\$256,268	14,402	\$747,510	19,222	\$1,515,935	223,647
CA	\$1,621,015	490,843	\$1,136,783	66,102	\$2,408,114	66,315	\$5,255,912	623,260
CO	\$379,595	147,279	\$143,922	8,307	\$566,339	14,383	\$1,089,855	169,969
CT	\$185,683	71,866	\$37,469	2,439	\$293,326	7,452	\$516,478	81,757
FL	\$934,648	396,900	\$204,652	13,693	\$1,452,942	35,574	\$2,592,242	446,167
GA	\$548,586	246,620	\$131,695	8,781	\$810,002	20,090	\$1,490,282	275,491
LA	\$162,391	69,535	\$39,844	2,568	\$264,993	6,563	\$467,227	78,666
MA	\$205,388	86,600	\$31,860	2,256	\$305,994	7,609	\$543,241	96,465
NC	\$540,442	228,619	\$106,212	7,378	\$832,584	20,203	\$1,479,238	256,200
NH	\$84,804	31,318	\$14,161	887	\$134,952	3,307	\$233,917	35,512
NJ	\$188,994	83,148	\$37,337	2,602	\$303,910	7,482	\$530,241	93,232
NM	\$280,740	105,006	\$165,194	9,747	\$397,120	10,448	\$843,054	125,201
NY	\$477,540	209,098	\$77,665	5,421	\$710,253	17,437	\$1,265,458	231,956
OH	\$168,576	73,143	\$37,521	2,463	\$255,029	6,077	\$461,127	81,683
OR	\$562,622	166,093	\$454,751	26,015	\$832,503	22,355	\$1,849,877	214,463
PA	\$296,812	139,982	\$59,193	3,850	\$436,630	10,766	\$792,634	154,598
RI	\$67,866	28,098	\$14,107	887	\$111,924	2,718	\$193,897	31,703
SC	\$157,590	70,976	\$30,168	2,079	\$251,570	6,140	\$439,328	79,195
TN	\$281,596	125,995	\$65,521	4,281	\$434,095	10,712	\$781,212	140,988
TX	\$1,356,394	556,775	\$446,156	27,700	\$2,091,825	52,486	\$3,894,374	636,961
UT	\$144,779	51,083	\$51,798	2,982	\$197,152	5,039	\$393,729	59,104
VA	\$366,582	158,584	\$73,218	5,024	\$564,425	13,356	\$1,004,225	176,964
WA	\$526,719	136,764	\$386,958	22,875	\$871,850	22,842	\$1,785,527	182,481
Total	\$10,166,653	3,915,027	\$4,023,339	244,125	\$15,540,525	392,893	\$29,730,517	4,552,045

Visualizations:

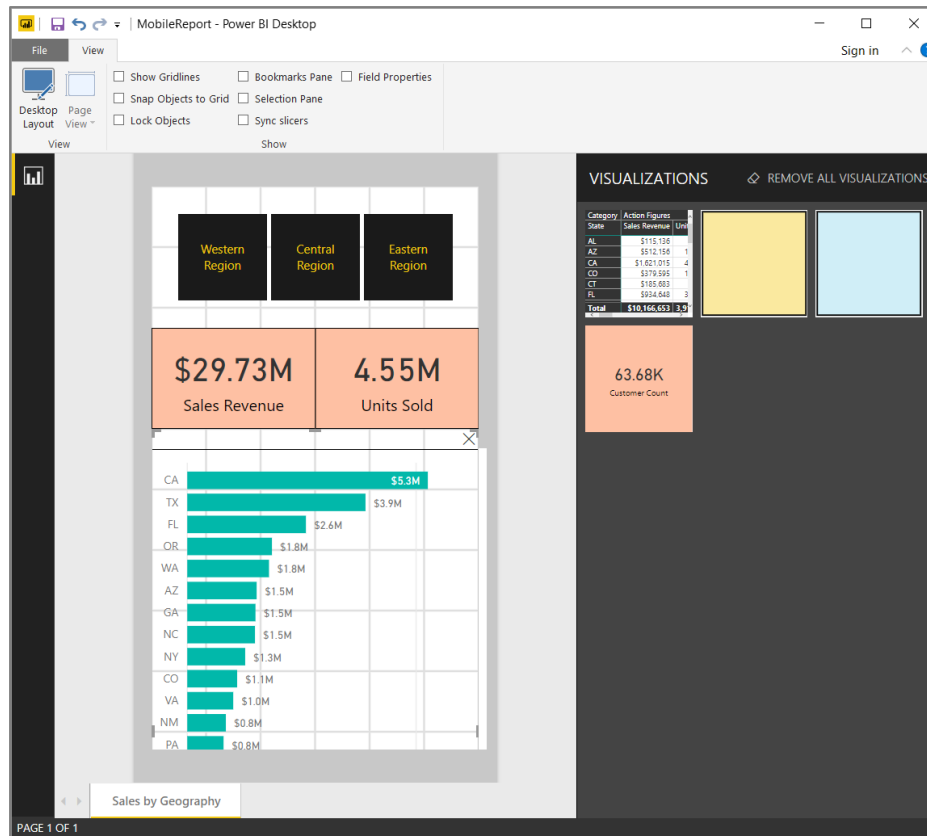
- Horizontal bar chart showing Sales Revenue by State. The top states are CA (\$5.3M), TX (\$3.9M), FL (\$2.6M), and OR (\$1.8M).

Navigation:

- Left sidebar: Visualizations, Fields, Filters.
- Bottom: Sales by Geography, PAGE 1 OF 1.

Designing a Phone Layout

- Phone layout view allows you to select specific visuals
 - Only include report visuals that render correctly on mobile devices
 - You position visuals according to form factor of mobile device



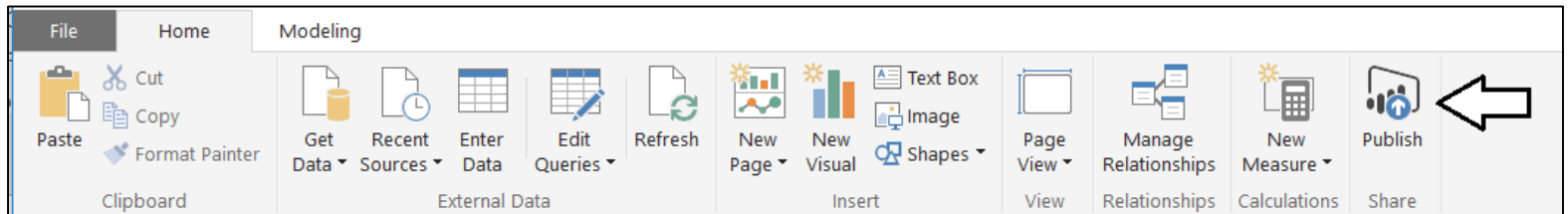
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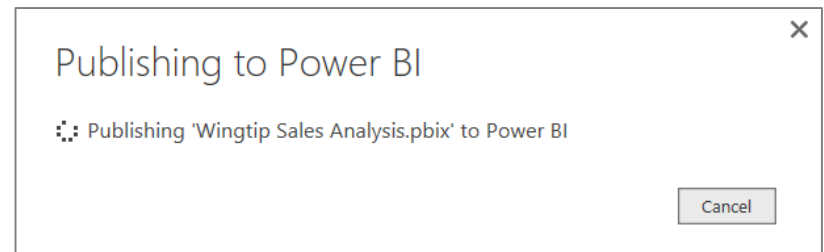
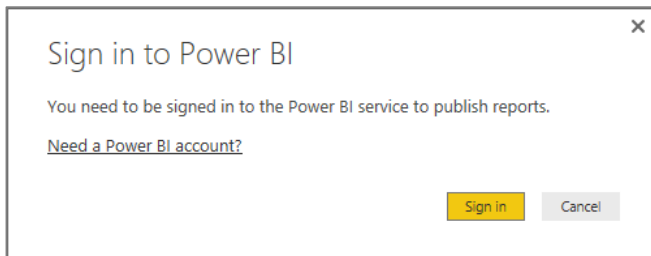


Publishing a Power BI Desktop Project

- Power BI Desktop provides **Publish** command
 - Used to publish project to Power BI service



- Requires logging into your Office 365 account

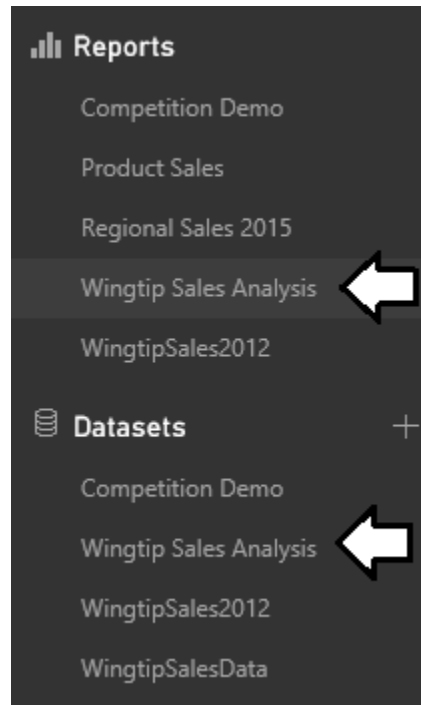


- Published articles added to a specific workspace



Examining What's Been Published

- What does project publishing add to workspace?
 - One dataset with same name as project
 - One report with same name as project



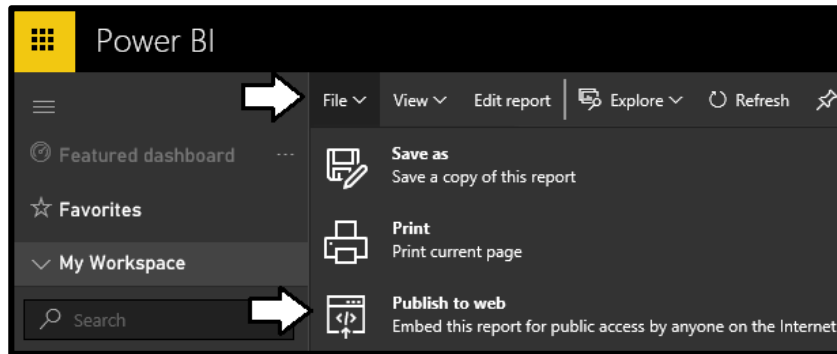
Dataset Configuration

- You can configure Dataset after its been published
 - Configure data source credentials
 - Configure refresh schedule
 - Configure Row-level Security

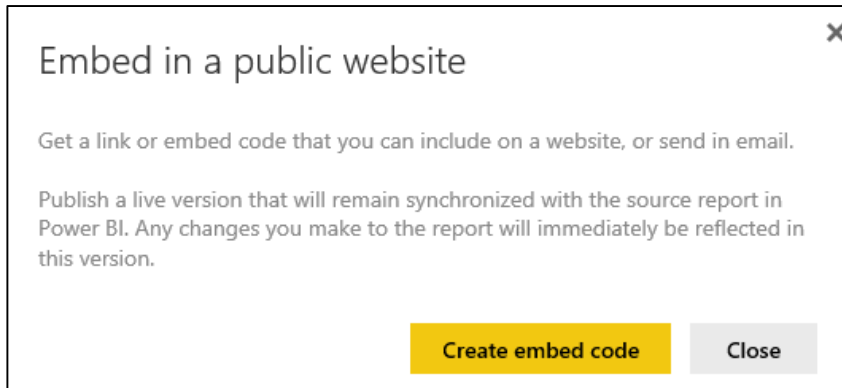


Publish to Web

- **Publish to Web** command available on reports
 - Not supported for reports and datasets which implement RLS



- **Publish to Web** command used to generate embed codes



Generating Embed Codes

- Used to provide anonymous access to report
 - Provide link which can be posted, emailed or texted
 - Provides **iFrame** HTML element for embedding in public web site

A screenshot of a white dialog box with a close button (X) in the top right corner. The dialog contains the text "Success!" in a large font. Below it, the text "Link you can send in email" is followed by a text box containing the URL "https://app.powerbi.com/view?r=eyJrIjojYTM3YjlkNzctNWY5My00YTUyL". Below this, the text "Html you can paste into your blog or website" is followed by a text box containing the HTML code "<iframe width='933' height='700' src='https://app.powerbi.com/view?r=eyJrIjojYTM3YjlkNzctNWY5My00YTUyL'". At the bottom left, the label "Size" is next to a text box showing "933 x 700 px" with a dropdown arrow. At the bottom right is a "Close" button.





DEMO

Using the Publish to Web and Publish to SharePoint Features

Summary

- ✓ Designing Interactive Reports
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- ✓ Importing Custom Visuals
- ✓ Designing Reports for Mobile Devices
- ✓ Publishing Power BI Reports

