



# Designing Interactive Reports

# Designing Interactive Reports

1 Basics

2 Details

3 Advanced

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1 Basics

2 Details

3 Advanced

# New Content with Viya 3.4

The presence of an orange triangle in the lower left corner of a slide means:

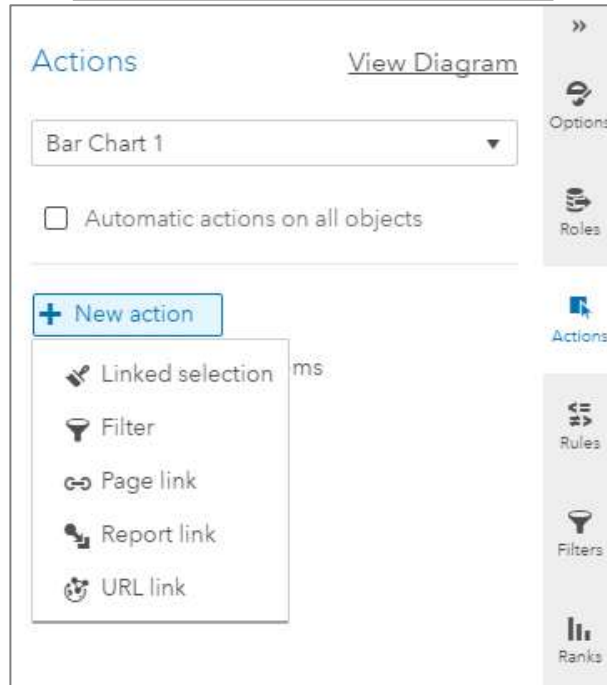
- This slide has new content that is specific to Viya 3.4
- This content either was not available or not supported with previous releases

This Orange Triangle

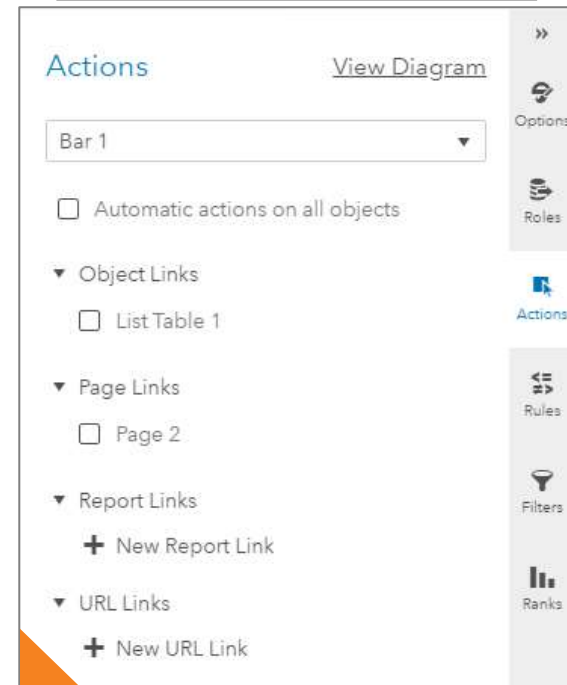
# VA 8.3 Features – Designing Interactive Reports

Complete redesign of the Actions Pane

VA 8.2 Actions Pane



VA 8.3 Actions Pane



# Designing Interactive Reports

## Industry Standard Requirement

Being able to respond to report viewers' needs and present information interactively has become a reporting fundamental. Several Visual Analytics features allow you to design interactive reports.



# Available Features

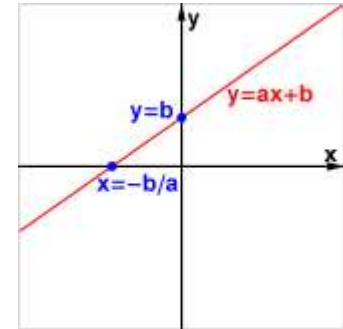
## *Control Object*



## *Action*



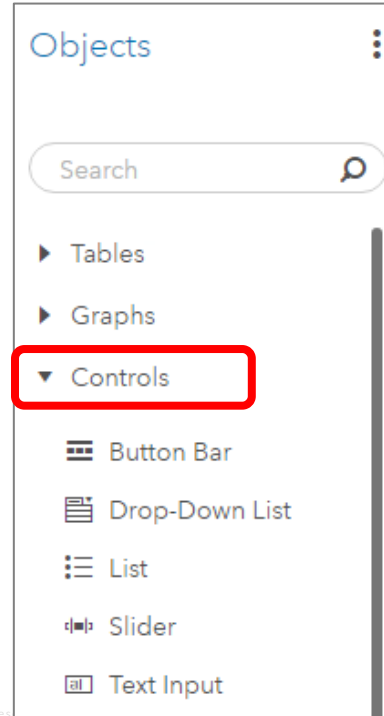
## *Parameter*



# Control Objects

## ***Control Object***

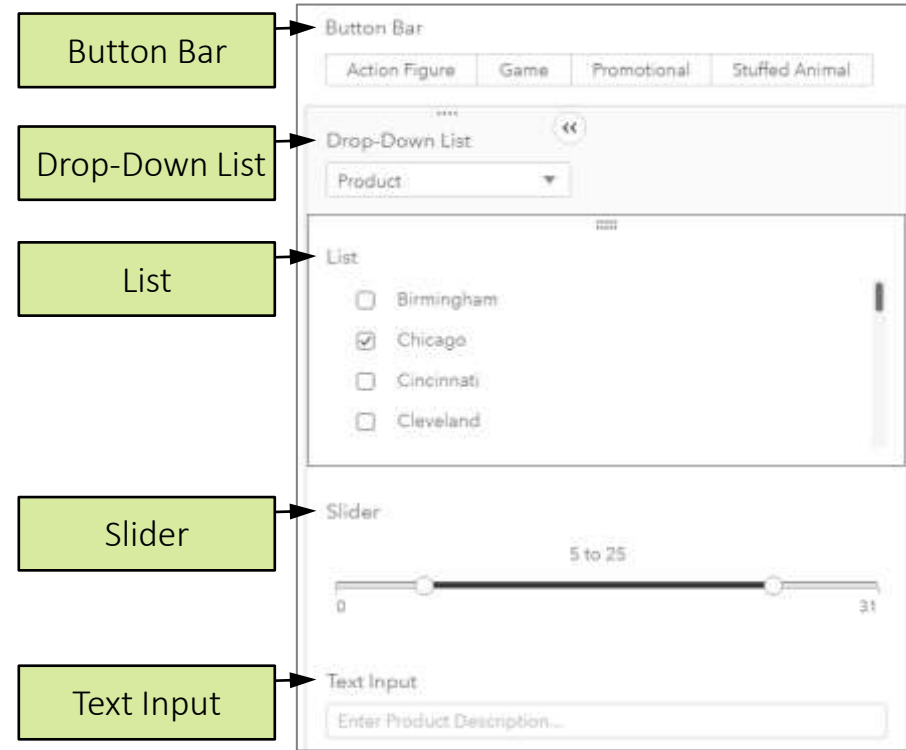
Control Objects are the mechanisms to prompt report viewers for values that can be used in action definitions.





# Control Objects for Reports

- All controls can be used in report canvas
- Slider supports
  - Fixed range
  - Dynamic minimum or dynamic maximum
- Must define an action to target object(s)
  - Linked Selection (data brushing)
  - Filter
    - Multiple filters are combined using the AND operator
- Supports mapping between different data sources





Demonstration:

Control Objects

Define Mapping  
for Multiple Data  
Sources

(Duration: 1:55)



# Control Objects for Report/Page Prompts

- Report/Page Prompt area hidden by default, use Overflow icon
- Requires control objects
- Supports auto controls including hierarchy support
- Supports mapping between different data sources
- Multiple filters combined with AND operator

## Report Prompts

Filters **all** objects in **all Pages** of report

## Page Prompts

Filters **all** objects in **current Page** only

The screenshot displays the SAS Visual Analytics interface for 'Report 1'. The left sidebar contains 'Data', 'Objects', and 'Outline' sections. The main workspace shows a 'Page 1' prompt area with a red circle around its overflow icon (three vertical dots). A context menu is open for 'Page 1', listing options: 'Rename page', 'Delete page', 'Hide page', 'Duplicate page', and 'Expand page controls' (which is highlighted with a red rectangle). A green callout box with an arrow points to this menu, containing the text 'Expand/Collapse for Page Prompts'. In the top right corner, there is another overflow icon (three vertical dots) circled in red. A green callout box with an arrow points to it, containing the text 'Expand/Collapse for Report Prompts'. The bottom right of the interface shows a 'Filters' section with a red rectangle around the 'Expand report controls' option.

Expand/Collapse for Page Prompts

Expand/Collapse for Report Prompts

Expand report controls

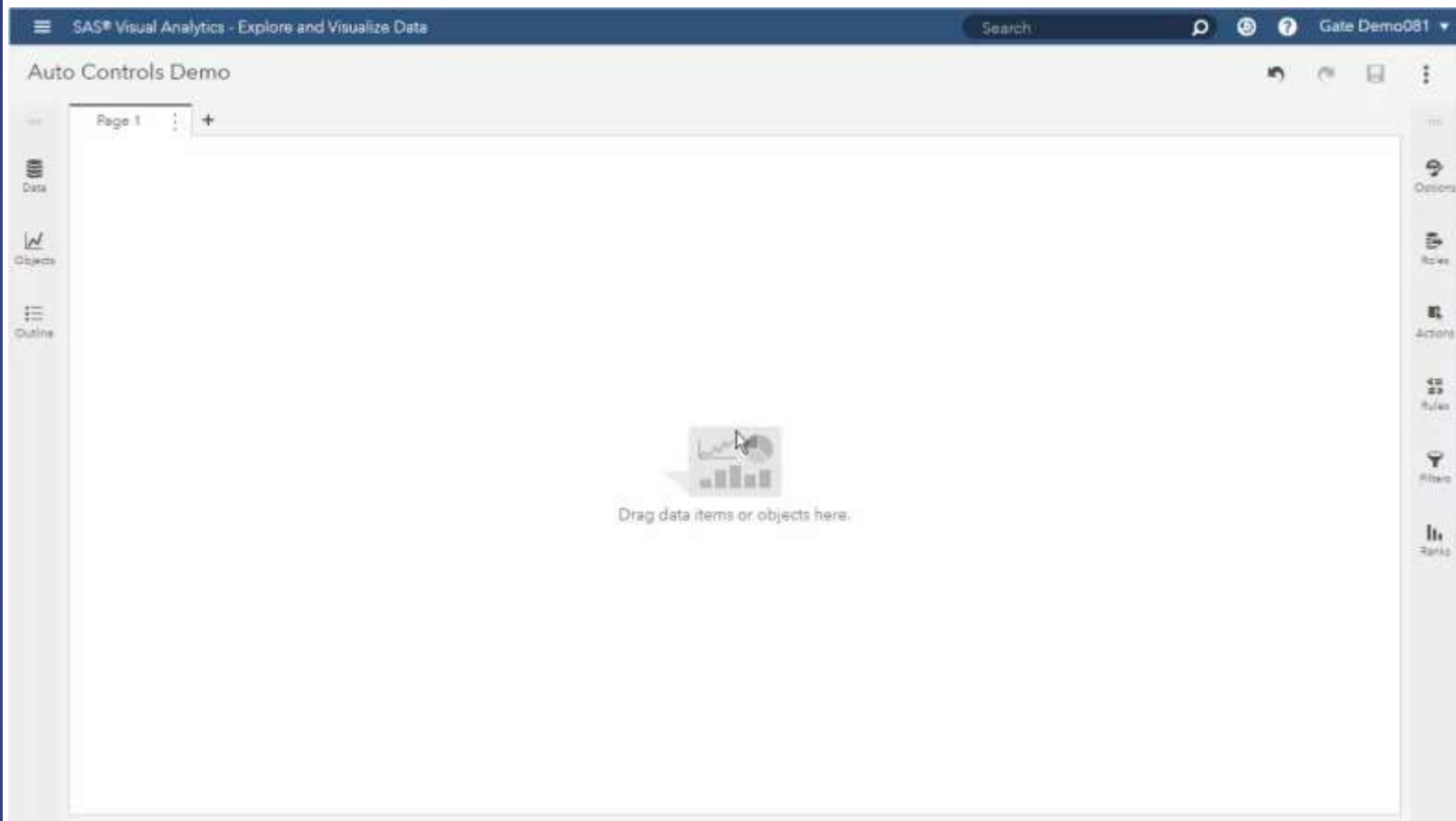


Demonstration:

## Control Objects

Auto Controls  
for Report and  
Page Prompts

(Duration: 1:04)



# Report and Page Prompt Data Source Mappings

The screenshot displays the SAS Studio interface with a report canvas. A right-click context menu is open over a control object, with an arrow pointing to it from a green box labeled "Right-click on control object". The menu includes options like "New filter from selection", "Edit data source mappings...", "Selection", "Remove all role assignments", "Add title", "Delete", "Duplicate as", "New parameter...", and "Remove assigned parameter". On the left, a table lists data sources: "Mega Corp" (highlighted with a red box), "Product Line", "Game", and "Promotional". On the right, a table lists "Product Line Original" categories: "Game", "Figure", "Bead", and "Gift", each with a corresponding bar chart. A green box labeled "Different data sources" has arrows pointing to "Mega Corp" and "Insight Toy" (also highlighted with a red box). An "Edit Data Source Mapping" dialog box is open on the right, showing the mapping for "MEGA\_CORP - INSIGHTTOY\_R3V6S1\_SALES". It includes a checked "Enable data source mapping" option and dropdowns for "Source" (set to "Date by Year") and "Target" (set to "Transaction Year"). "OK" and "Cancel" buttons are at the bottom.

Right-click on control object

Mega Corp

Product Line

Game

Promotional

Insight Toy

Product Line Original

Game

Figure

Bead

Gift

Different data sources

Edit Data Source Mapping

MEGA\_CORP - INSIGHTTOY\_R3V6S1\_SALES

☒ Enable data source mapping

Source: Date by Year

Target: Transaction Year

OK Cancel

# Designing Interactive Reports

1 Basics

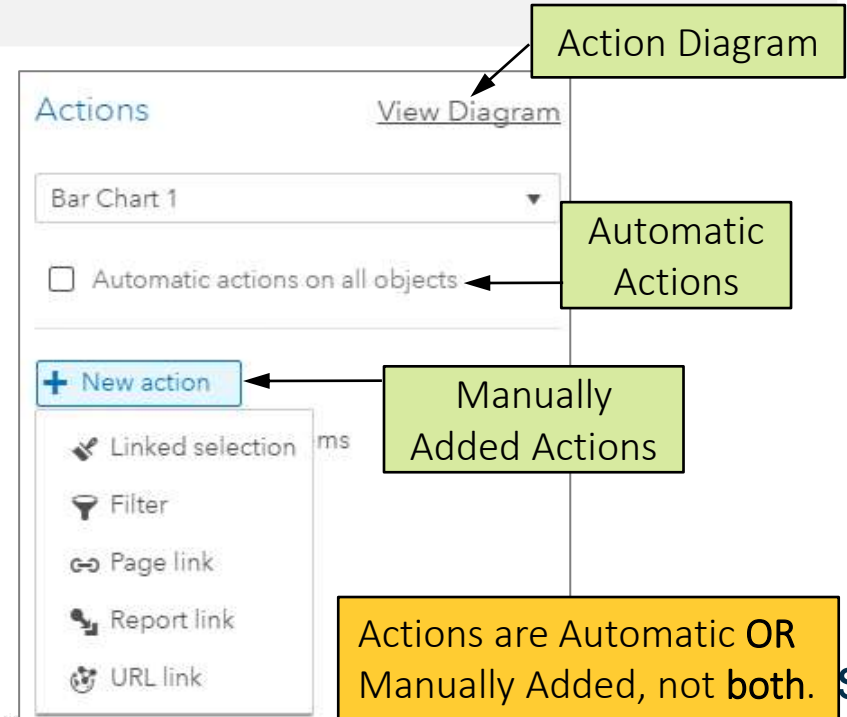
2 Details

3 Advanced

# Actions

## Action

Actions allow data to be subset to reduce the amount of data (filtered) and enable users to understand data within a particular context by a linked selection (brushing).



# Available Manual Actions

## Linked Selection



Shows the same data selected simultaneously (brushing) in two or more report objects.

## Filter

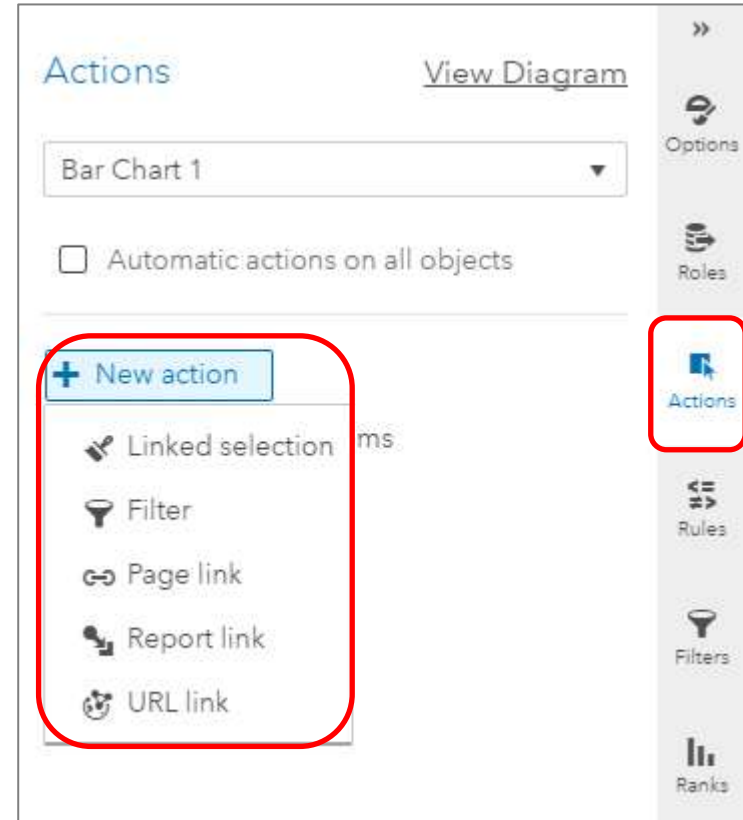


Restricts the data that is returned from a request to a data source.

## Link



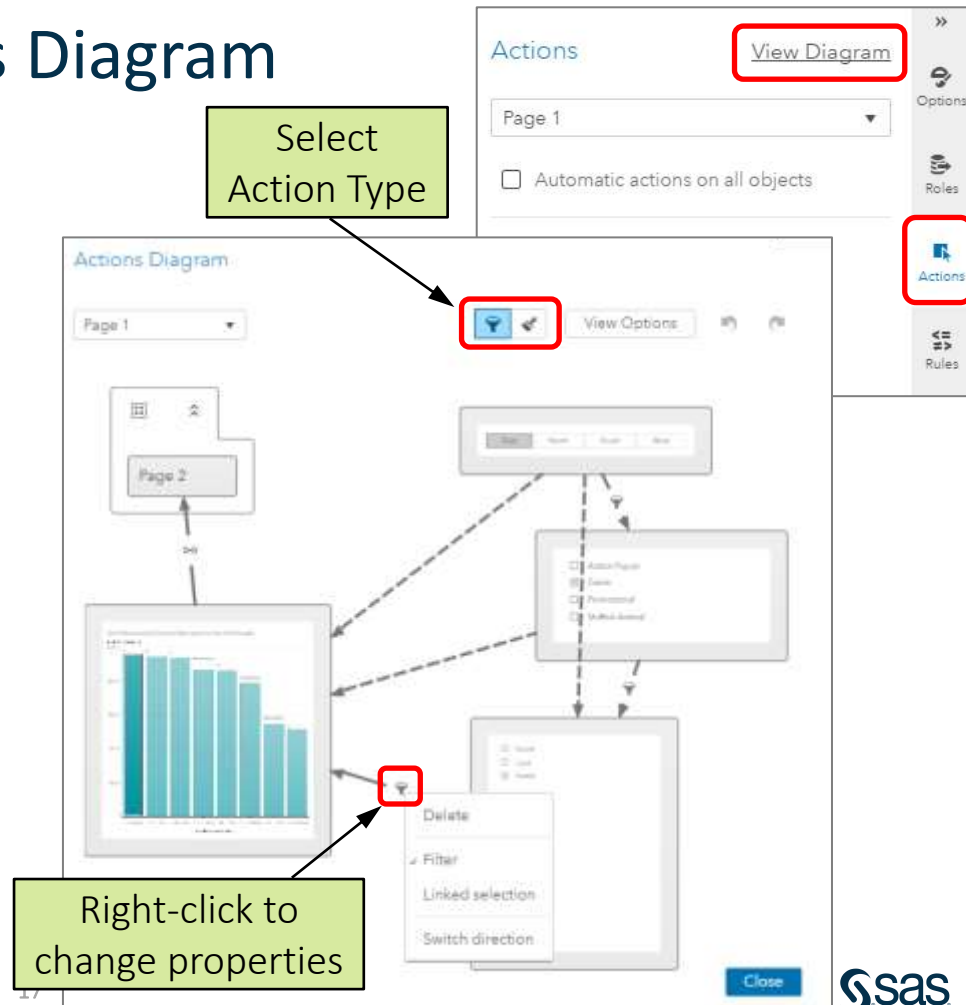
Enables single-step access to a report or web page that is related to a report that you are currently viewing. You can link to another report, to a specific page in the current report, or to an external URL. Linking will automatically filter the target objects by values that are selected in the source object.





# Actions Diagram

- Select the Action type you wish to create using the buttons at the top
- Draw a connection from the source object to the target
- Supports mapping between different data sources
- Use the **Data → Map data sources...** to define column mappings
- Derived Actions are represented by dashed lines



# Available Automatic Actions

The screenshot shows the SAS Actions panel. A green box at the top contains the text "Automatic actions apply to Pages" with an arrow pointing to the "Page 4" dropdown menu. A red box highlights the "Automatic actions on all objects" checkbox, the "One-way filters" dropdown, and the "Display filter breadcrumb" checkbox. Another red box highlights the "Actions" icon in the right-hand sidebar. A third red box highlights the "One-way filters", "Two-way filters", and "Linked selection" options in the bottom dropdown menu. An arrow points from the "One-way filters" dropdown in the red box to this bottom dropdown menu.

Automatic actions apply to Pages

Actions

View Diagram

Page 4

☒ Automatic actions on all objects

One-way filters

☒ Display filter breadcrumb

+ New action

One-way filters

Two-way filters

Linked selection

Options

Roles

Actions

Rules

Filters

Ranks

## ***One-Way Filter Actions***

- Applied in the order in which you selected the objects
- If you change a selection, then all downstream filter, selections, and drills are removed

## ***Two-Way Filter Actions***

- When the object that initially had focus loses its focus, the same filter is applied to it as is applied to all of the other objects
- Deleting a filter does not impact the other filters because there is not a chain of filters

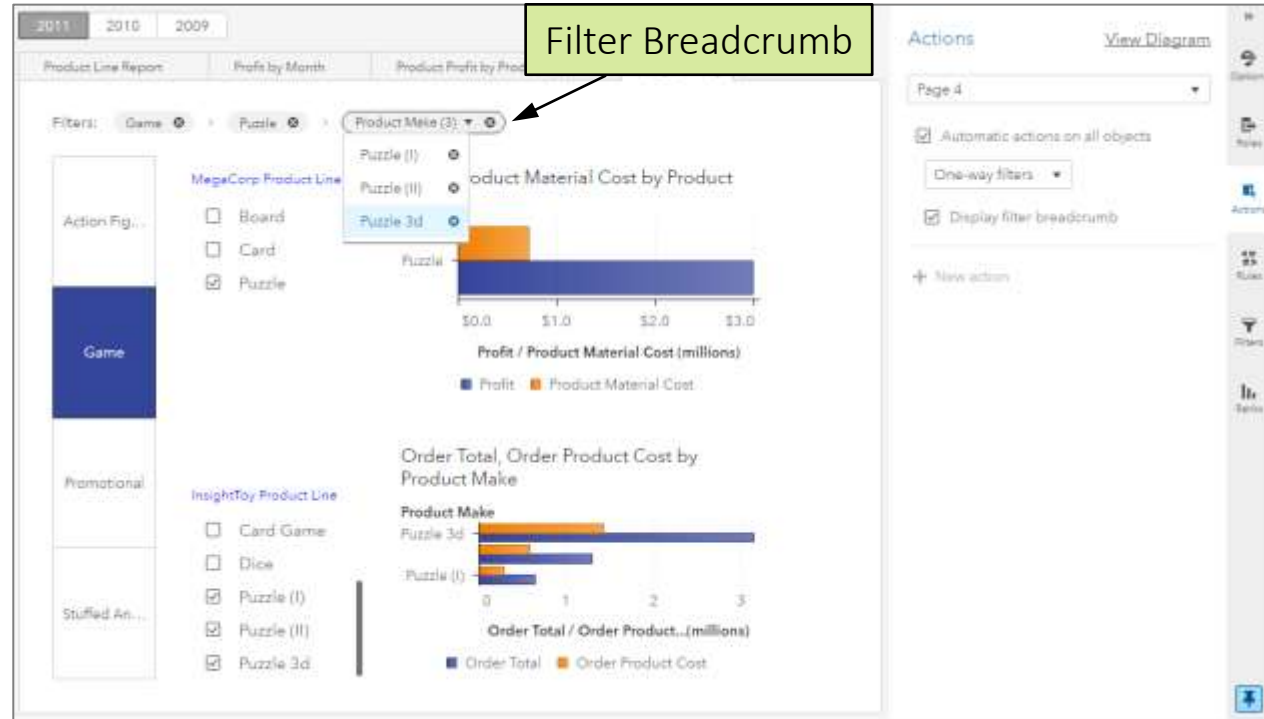
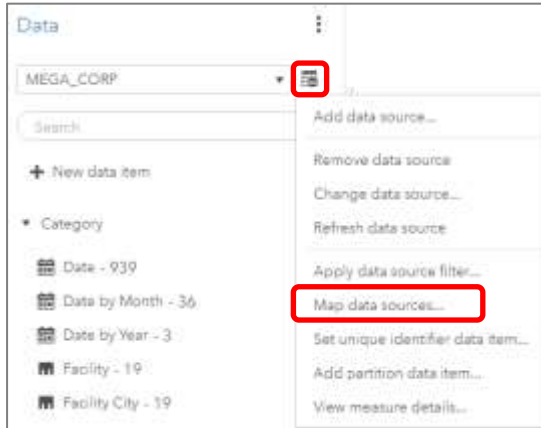
## ***Linked Selection Page Actions***

- When an object is selected, all other objects on the page will have linked selections
- When another object is selected, the previous selection is removed, and all other objects on the page will have linked selections

Only available for objects that support filters and linked selections.

# Automatic Actions for Multiple Data Sources

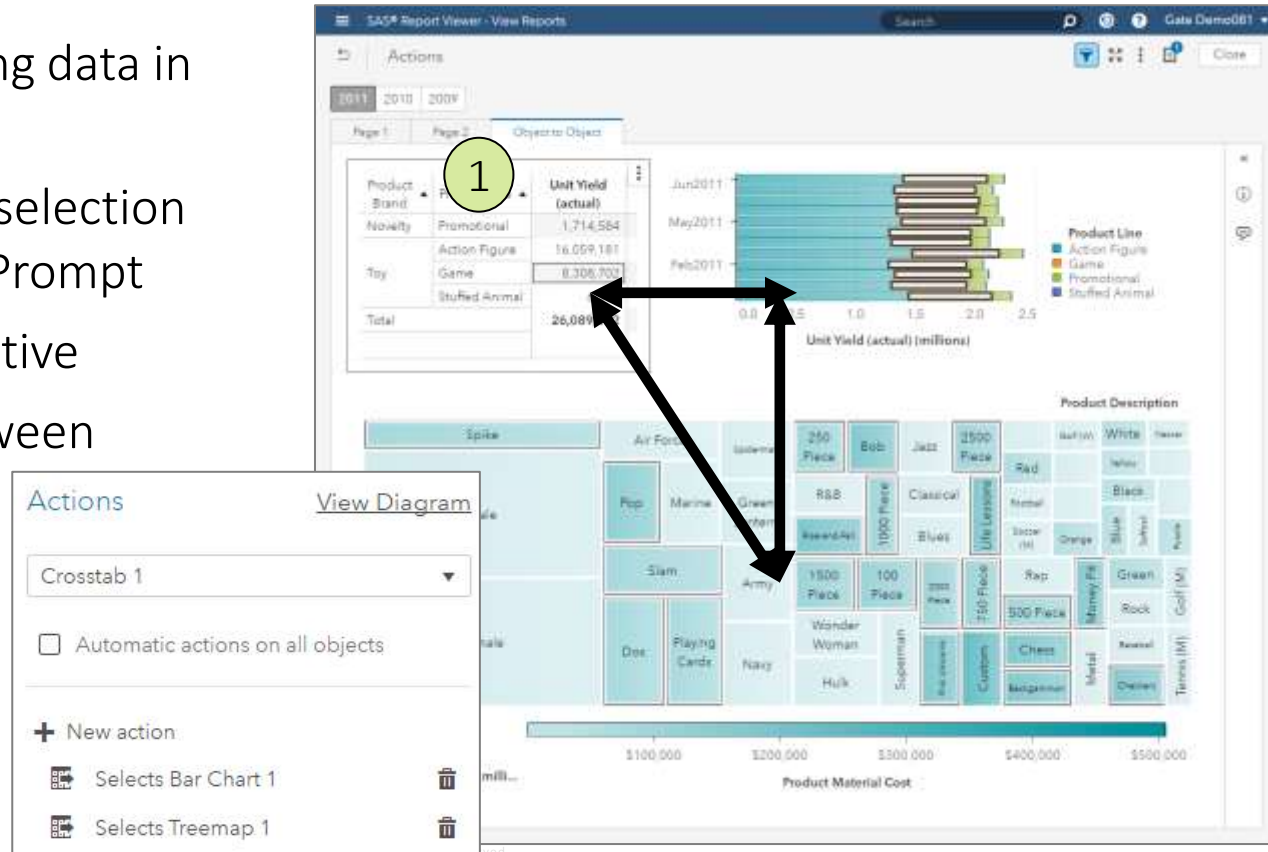
- Supports mapping between different data sources
- Use the **Data** → **Map data sources...** to define column mappings



# Action: Linked Selection

## Object to Object

- Highlights corresponding data in all defined objects
- Cannot define a linked selection from a Report or Page Prompt
- Bidirectional and Transitive
- Supports mapping between different data sources



# Action: Linked Selection

## Control to Control

- Used to create progressive filters
- Ideal for many-to-many relationships
- Bidirectional and Transitive
- Supports mapping between different data sources

1

Recommended to add a measure role to the control to see available values

| Product Brand | Product Line   | Product  | Unit Yield (actual) |
|---------------|----------------|----------|---------------------|
| Toy           | Stuffed Animal | Bear     | 493                 |
|               |                | Big Cats | 461                 |
|               |                | Cat      | 510                 |
|               |                | Dog      | 443                 |
|               |                | Elephant | 521                 |
|               |                | Horse    | 386                 |
|               |                | Primate  | 490                 |

Actions [View Diagram](#)

List 3 ▼

☐ Automatic actions on all objects

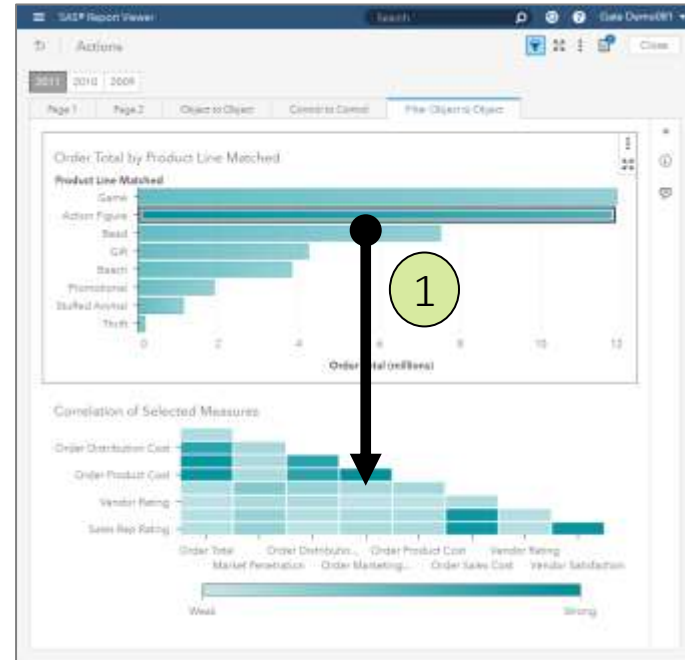
+ New action

- Selects List 4
- Selects List 5
- Selects List 6

# Action: Filter

## Object to Object

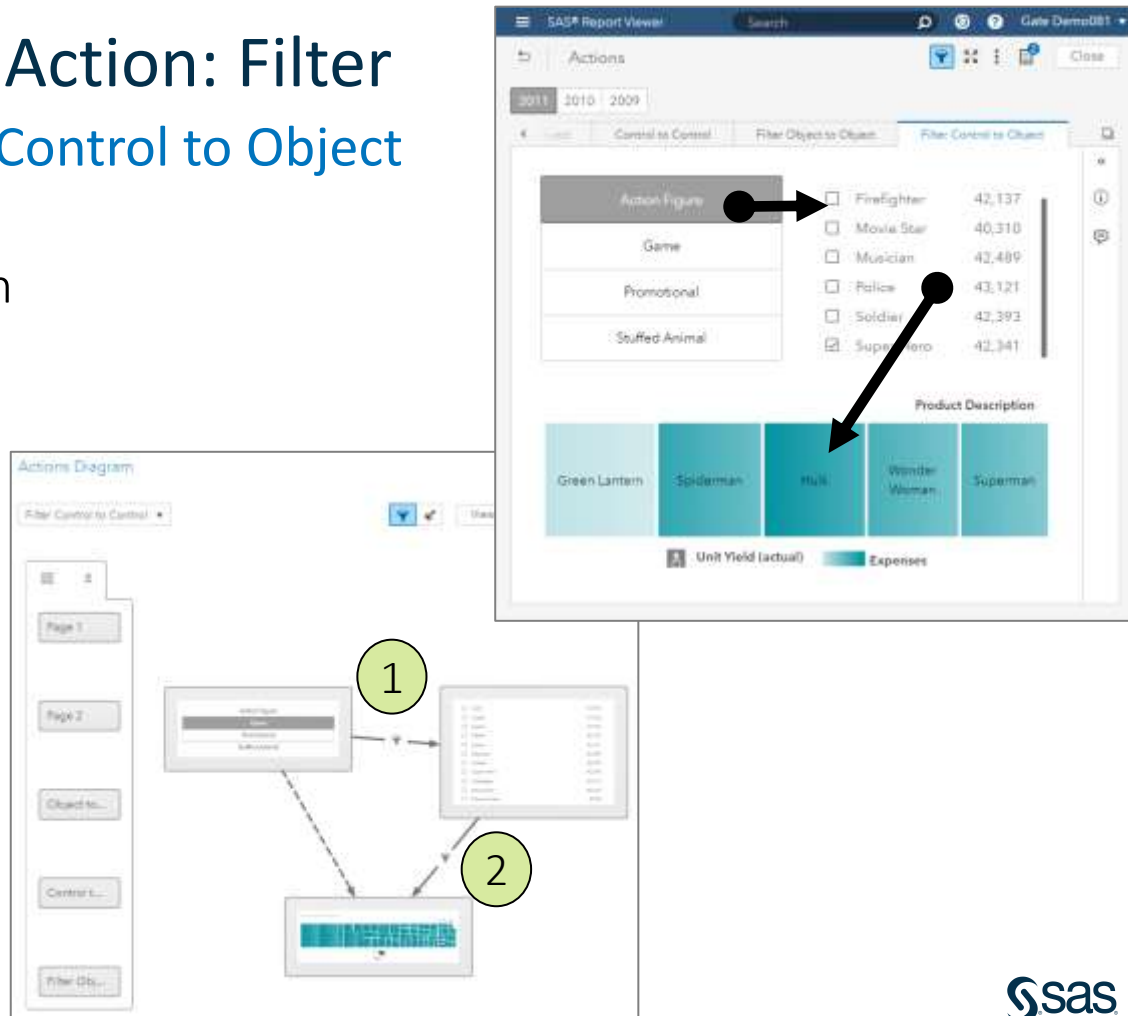
- Filters from a Report or Page Prompt are automatic, combined with an AND operator and cannot be removed
- Supports mapping between different data sources
- Unidirectional
- These objects cannot be the source:
  - List Tables
  - Bubble Plots without the Grouping role assigned
  - Scatter Plots that use detail data
  - Correlation Matrix\*
  - Heat Map\*



\* Not in documentation but found during course discovery

# Action: Filter Control to Object

- Set of rules or conditions to subset the data displayed in an object(s)
- Filters from a Report or Page Prompt are automatic, combined with an AND operator and cannot be removed
- Supports mapping between different data sources
- Unidirectional

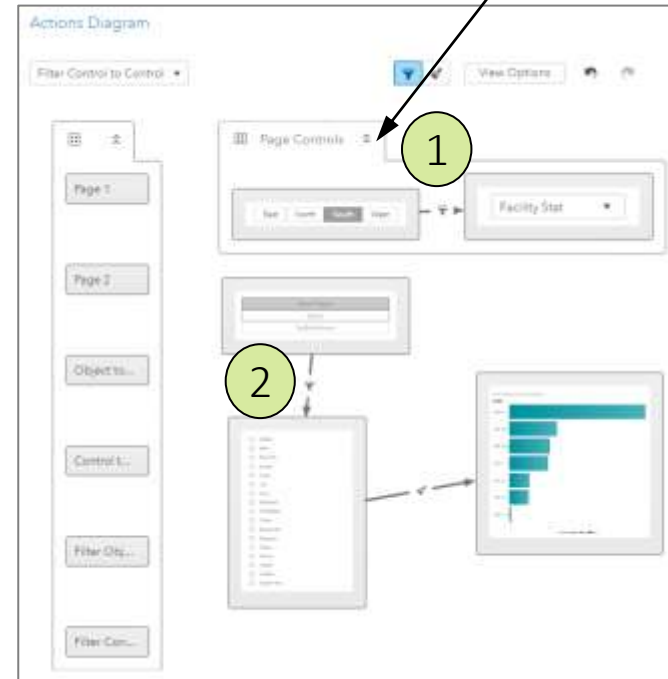
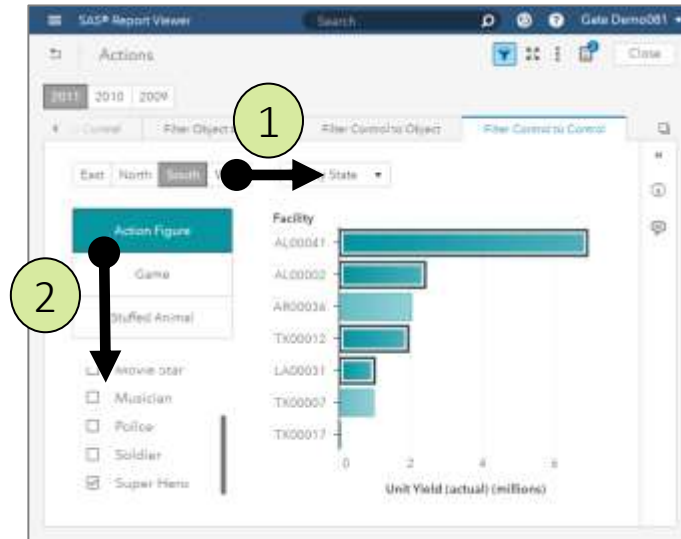


# Action: Filter

## Control to Control

- Used to create cascading prompts or filters
- Can be used in the report canvas and/or Report and Page prompt areas
- Supports mapping between different data sources
- Ideal for one-to-many relationships
- Unidirectional

Remember Report and Page Prompt areas support Auto Controls for hierarchy data items

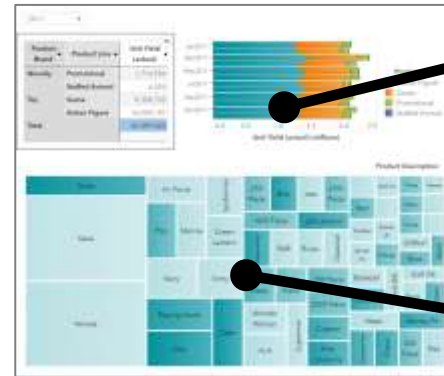




# Action: Links

## Reduce Clutter & Answer the Business Question

Using links allows the report designer to focus on creating meaningful and attractive reports without trying to squeeze extra objects and data onto the report canvas. A report should be designed to answer a single or distinct business question, refrain from trying to answer every question.



# Action: Links

## Available Links

|                           |  |
|---------------------------|--|
| <b><i>Page Link</i></b>   | Able to select a target Page within the <b>same</b> report. If Page is hidden then the Page will appear in a pop-up window/info window |
| <b><i>Report Link</i></b> | Able to select a target report   |
| <b><i>URL Link</i></b>    | Able to link to a URL, either fully qualified or relative and define parameter passing   |

# Link Navigation

Back Arrow, takes you to previous page

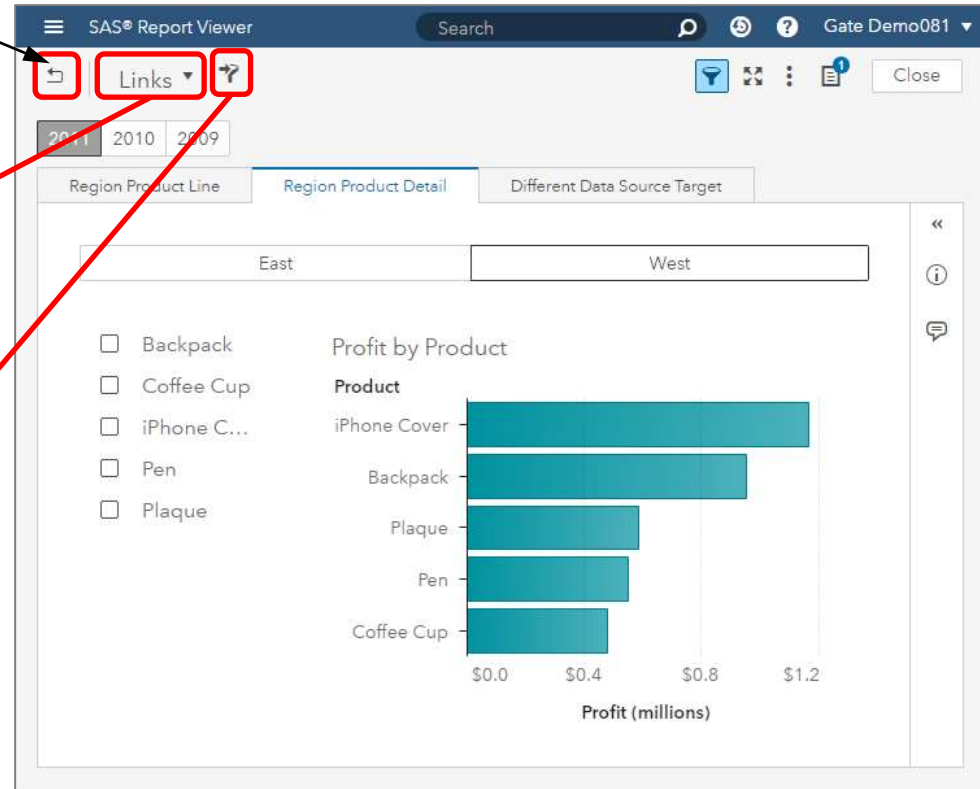
Lists the reports you can link to from current page

Shows incoming filters and values. Able to toggle off filter application.

Links - Region Product Line  
View all reports

Incoming Filters

☒ Page level  
Product Line = [Promotional]



# Link with Prompt Values

- Property controls whether to set the values for controls in the target Page or Report Prompt Bar
- Recall, previous default behavior was to filter all objects by incoming values

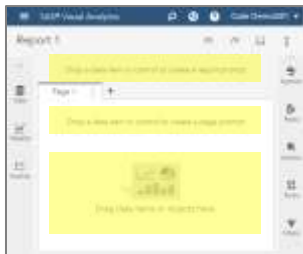
The image displays two overlapping dialog boxes from the SAS software interface. The top dialog, titled 'Edit Page Link Action', shows 'Source:' as 'Bar Chart 1' and 'Region Product Detail' as the target. A red rectangular box highlights the checkbox labeled 'Set the value for controls in the target page prompt bar'. The bottom dialog, titled 'Add Report Link Action', also shows 'Source:' as 'Bar Chart 1'. It includes a 'Target:' field with a 'Link Target' button and a 'Browse...' button. The 'Open page:' dropdown is set to 'Region Product Detail'. A red rectangular box highlights the checkbox labeled 'Set the value for controls in the target report prompt bar'.

# Set Values for Controls in Target Prompt Bar

Unchecked



- Filters **ALL** Objects in all report areas

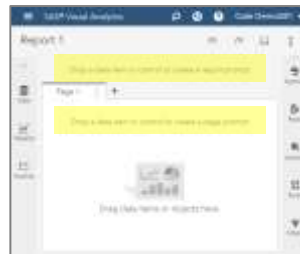


- Same data source:
  - Objects will be filtered automatically\*
- Different data source:
  - Option to **Enable data source mapping**
    - Unselected** links to target without passing data values, i.e. no filtering applied
    - Selected** passes values to be applied as filter

Checked



- Set values for Report or Page Controls



- Passed control value will be selected and all other values in control will be visible
- Only available for controls that use the **same** data item with **same** format
- No other filtering will be applied to report objects

# Page Links

- Able to define a link to another Page in the **same** report
- If the page is hidden, the linked Page will open in a Pop-up Window; aka Info Window
- The ☐ Set the value for controls in the target page prompt bar property controls the selected value passing behavior

The screenshot shows a SAS report with three tabs: "Region Product Line", "Region Product Detail", and "Word Cloud". A yellow box labeled "Visible" points to the "Region Product Line" tab, and a green box labeled "Hidden" points to the "Word Cloud" tab. Below the tabs, a table displays data for "Product Line", "Facility Region", "Profit", and "Profit Trend". A red box highlights the "Actions" button in the top right corner. Below the table, the "Add Page Link Action" dialog is open, showing a list of available pages: "List Table 1", "Region Product Detail", "Word Cloud", "Different Data Source Target", and "Set the value for controls in the target page prompt bar". A green box labeled "Hidden and Visible Pages Available" points to the list of pages.

Visible

Hidden

Region Product Line : Region Product Detail Word Cloud

LINKS

2011 2010 2009

Region Product Line Region Product Detail Word Cloud

| Product Line  | Facility Region | Profit         | Profit Trend |
|---------------|-----------------|----------------|--------------|
| Action Figure | North           | (\$228,376.29) |              |
| Action Figure | West            | (\$78,669.95)  |              |
| Action Figure | East            | (\$314,531.57) |              |
| Action Figure | South           | \$482,587.87   |              |
| Game          | West            | \$4,258,963.45 |              |

Actions

Add Page Link Action

Source:

List Table 1

☐ Select all

☐ Region Product Detail

☐ Word Cloud

☐ Different Data Source Target

☐ Set the value for controls in the target page prompt bar

Map data ▶

Hidden and Visible Pages Available

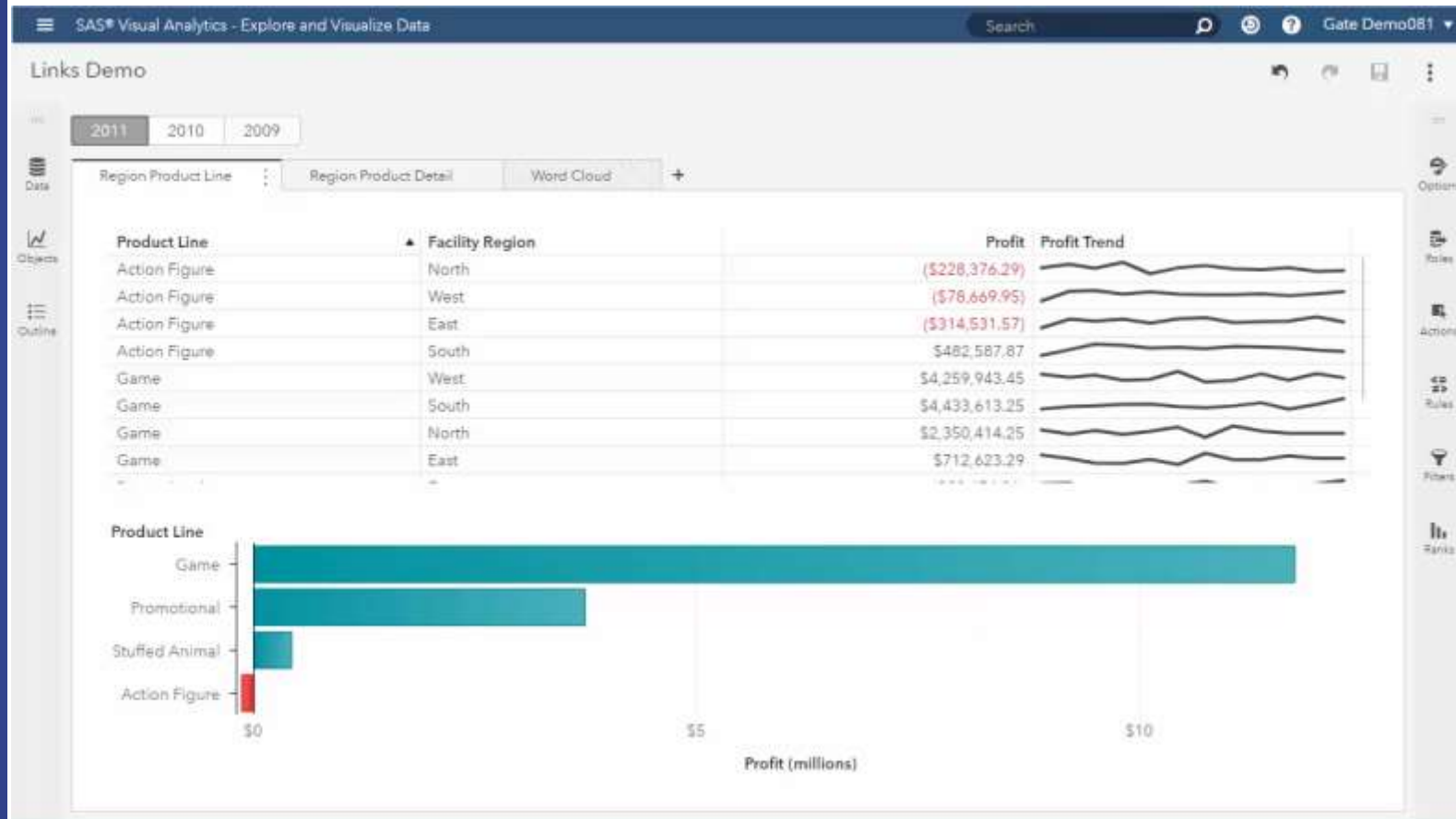


## Demonstration:

### Page Links:

- Hidden Page
- Unchecked set values
- Checked set values

(Duration: 3:08)



# Report Links

- Able to define a link to a different report
- If multiple pages exist, able to select which Page is to open
- The ☐ Set the value for controls in the target report prompt bar property controls the selected value passing behavior
- Different data source:
  - Custom Categories not available for mapping, duplicated data items are

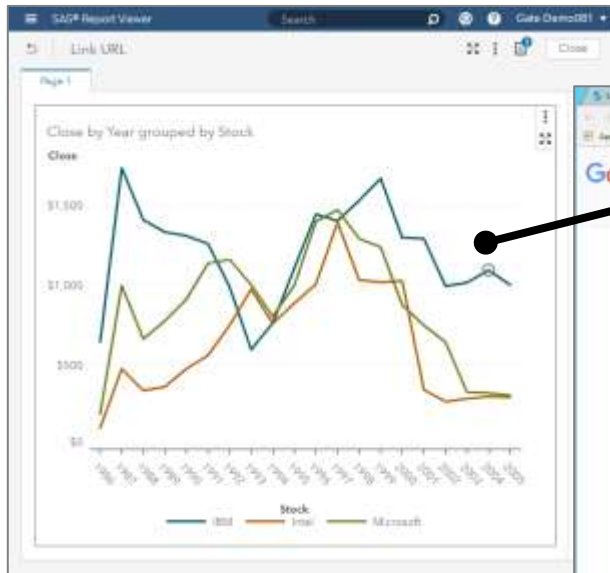
The screenshot shows the 'Add Report Link Action' configuration window. It includes a 'Source' section with 'List Table 1 (1)'. The 'Target' section has a 'Link Target' button and a 'Browse...' button. The 'Open page' section has a dropdown menu set to 'Different Data Source Target'. There is a checkbox for 'Set the value for controls in the target report prompt bar'. Below this is the 'Data Source Mappings' section, which shows 'INSIGHTTOY\_R3V6S1\_SALES' and a 'Map data' button with a right-pointing arrow.

Cannot test Report Links from Edit mode.  
Save report and use SAS Report Viewer



# URL Links

- Able to define link to a URL
- Able to pass name value pair parameters
- Parameter must be assigned to a role in the object



### Edit URL Link Action

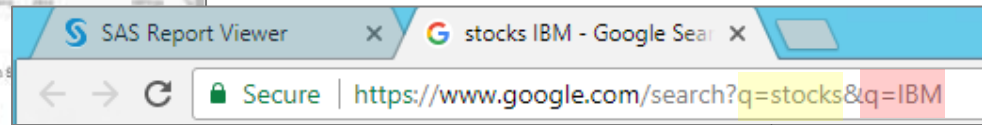
Source:  
Line Chart 1

Name:

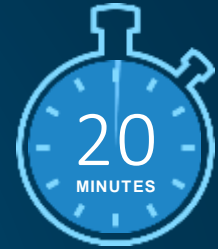
URL:

Parameters

|  |  |  |
|--|--|--|
| <input checked="" type="checkbox"/> Format | Source: <input type="text" value="Stock"/> | Target: <input type="text" value="q"/> |
|--|--|--|



Notice the compound search criteria using a static value combined with a parameter



# Hands-On Exercise

Complete the steps in:

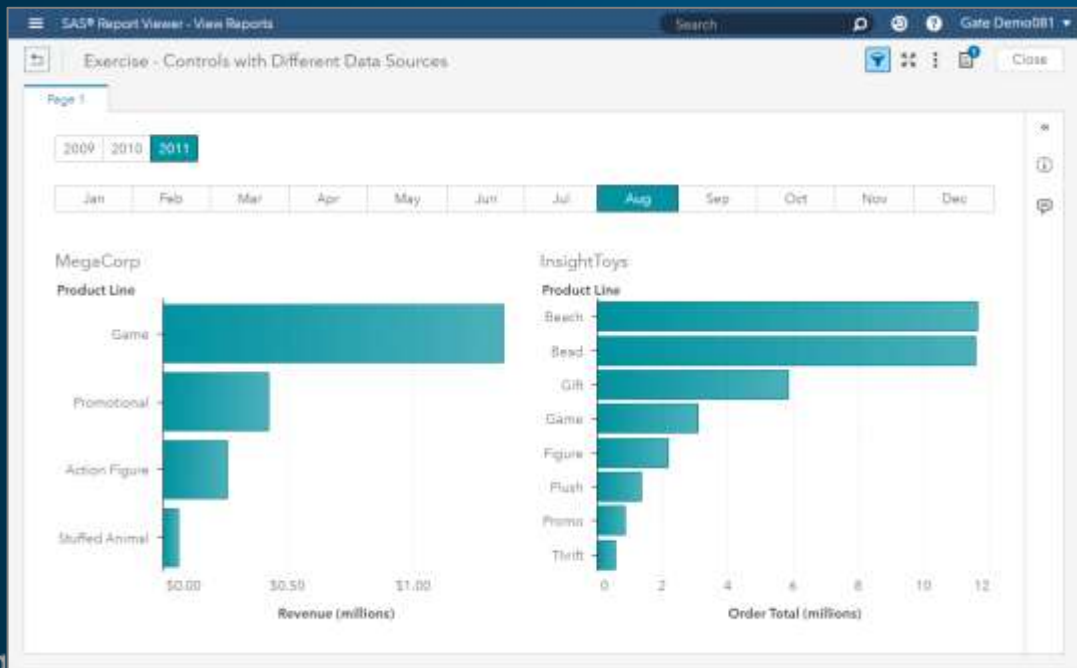
Desktop\Hands-On\VIYAVISUAL\GELVIYAVISUAL\_05DesigningInteractiveReports\_01ControlsAndActions

## Tasks:

- Create a report with two data sources
- Add two controls: map data and define Filter Action

What was the easiest way to assign roles when using two different data sources?

Both data sources used the Month format, but used different displays, was this a problem?



Format

[Reset to Default](#)

MMYYYY

MMYYYY

Month

Month, Day, Year

Year

Yes

June

YY 6

YY Jun

Format: June

MegaCorp

InsightToys

OK Cancel

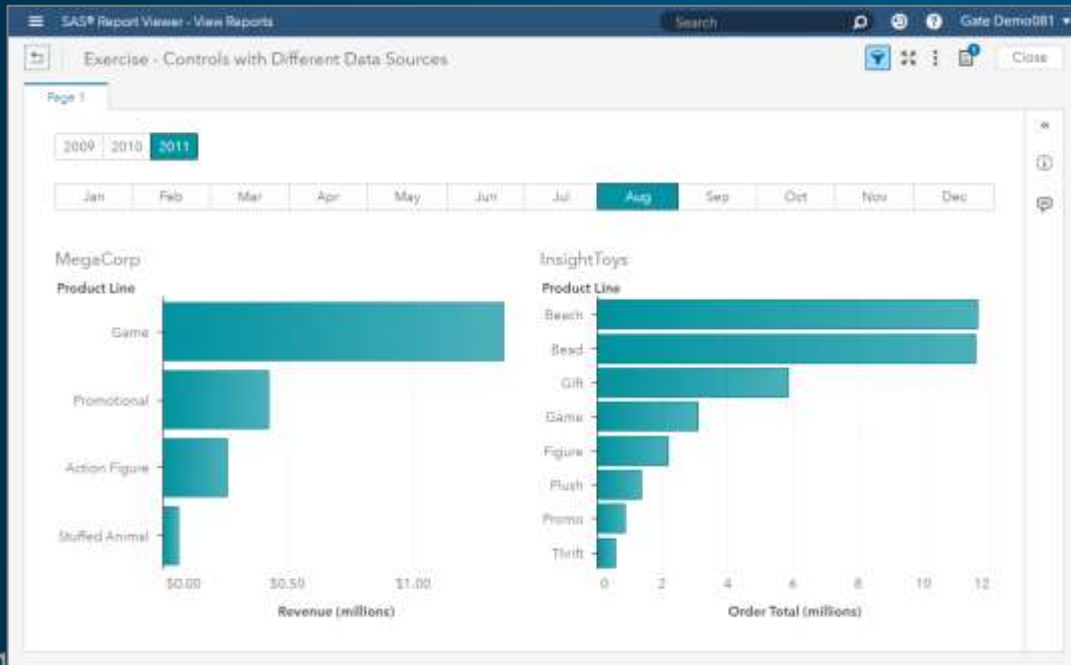
sas

What was the easiest way to assign roles when using two different data sources?

Use the Data pane to select which data source you want to use

When both data sources used the Month format, but used different displays, was this a problem?

Yes



Format

[Reset to Default](#)

MMYYYY

MMYYYY

Month

Month, Day, Year

Year

Yes

June

YY 6

YY Jun

Format: June

MegaCorp

InsightToys

OK Cancel

sas

# Designing Interactive Reports

1 Basics

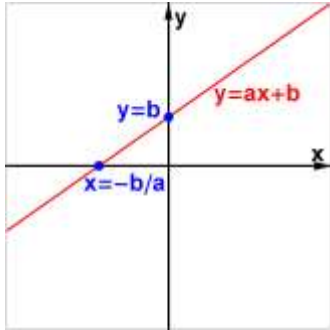
2 Details

3 Advanced

# Parameters

## Parameter

A parameter is a variable whose value can be changed and that can be referenced by other objects such as calculated data items, filters, ranks, and display rules.



**Edit Parameter**

Name: SelectedNumOfMonths

Type: Numeric

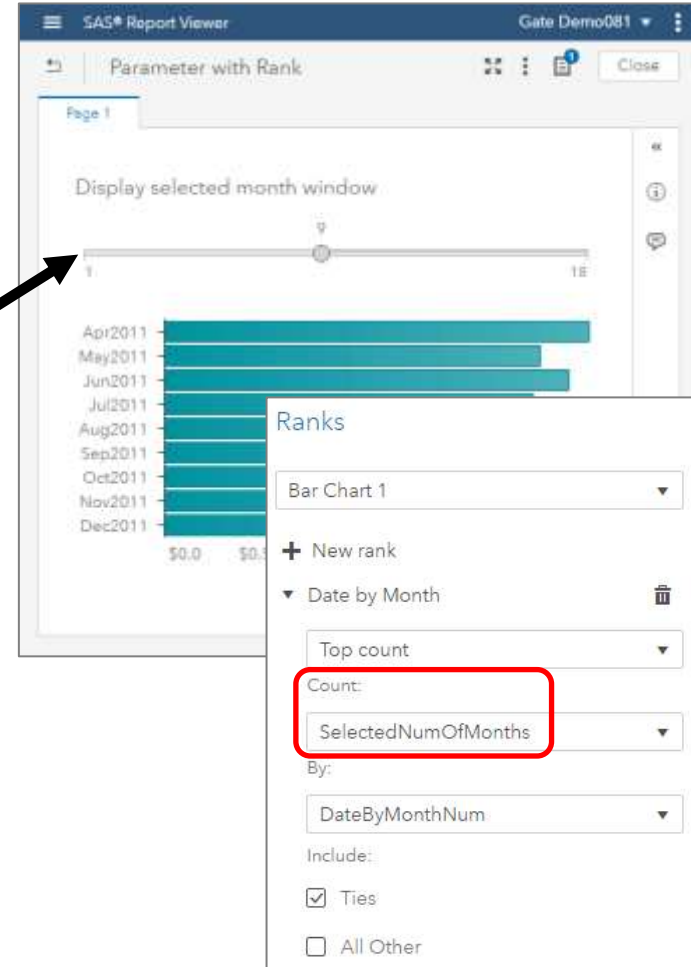
☐ Multiple values

Minimum value: 1

Maximum value: 18

Format: BEST12. (Numeric)

Current value: 9



# Parameter Types and Supported Controls

| Supported Control Objects  | Supported Parameters      |  |               |
|----------------------------|---------------------------|--|---------------|
|                            | Character                 | Numeric                                      | Date Datetime |
|                            | No default value required | Minimum, Maximum and Default values required |               |
| Drop-Down List             | Yes                       | Yes*   | Yes           |
| List (multi-value)         | Yes                       | Yes*   | Yes           |
| Button Bar                 | Yes                       | Yes*   | Yes           |
| Text Input                 | Yes                       | Yes  | No            |
| Slider (single-point only) | No                        | Yes  | Yes           |

\*Underlying category data values are numeric

New Parameter

Name: Parameter 1

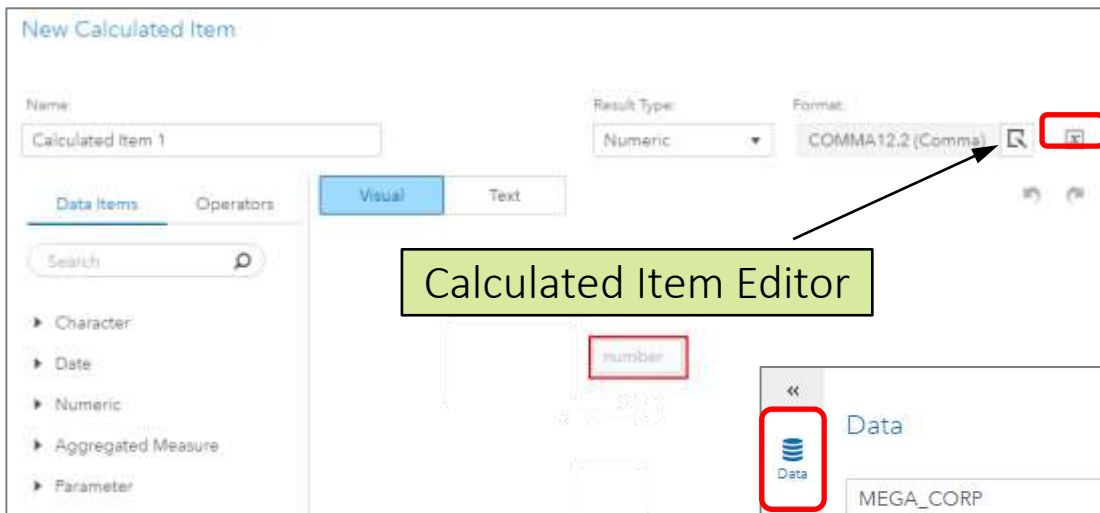
Type: Numeric ▼

☐ Multiple values

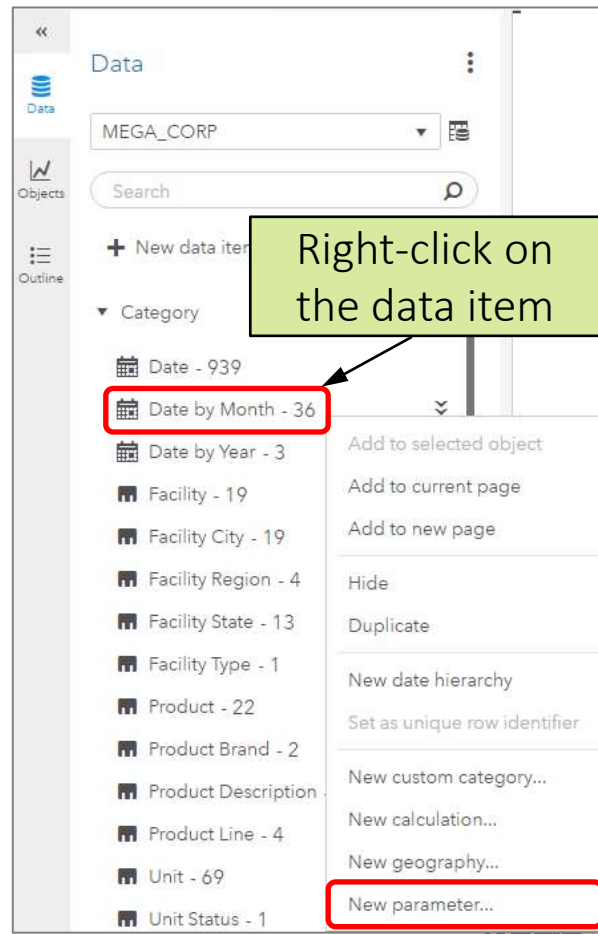
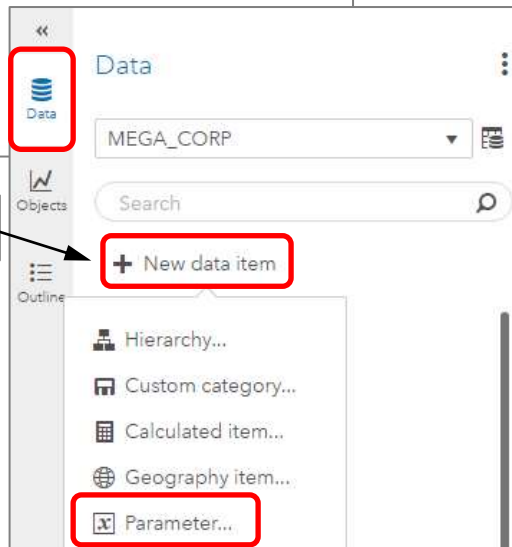
Character  
Numeric  
Date  
Datetime

Type of parameter must match the data type assigned to the Control Object

# Create Parameters



Data Pane's menu



Parameters can be created in three places

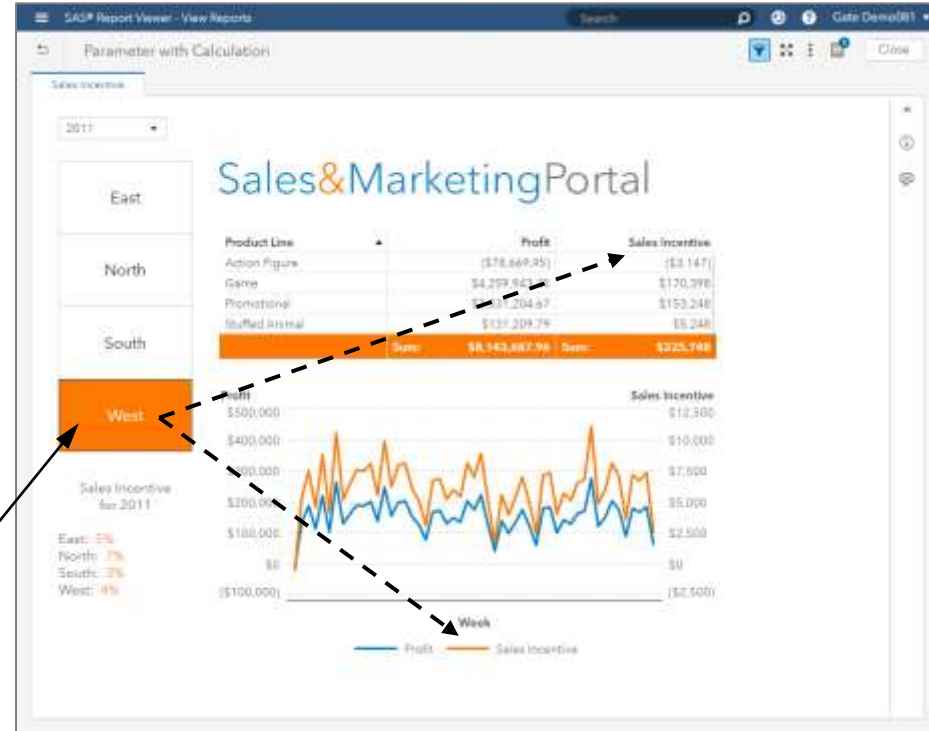


# Parameter Usage

Parameters can be used in:

- Calculations
  - Calculated Items and Aggregated Measures
- Filters
  - Detailed Filters, Aggregated Filters, and Data Source Filters
- Display Rules
- Ranks
- URLs

The selected Region is stored in a parameter that is used to calculate the Sales Incentive which is used in both the List Table and Line Chart



1. Create parameter(s)
2. Add control object(s)
3. Assign to Parameter Role
4. Use in calculations, filters and/or ranks

# Parameter Example 1

## Character Parameter

The screenshot illustrates the Qlik Sense interface with several key components highlighted by numbered circles:

- Circle 1:** The 'New Parameter' dialog box, showing the parameter name 'Selected Region' and type 'Character'.
- Circle 2:** The 'Button Bar' control object in the 'Parameter with Calculation' section.
- Circle 3:** The 'Data Roles' panel, showing the 'SelectedRegion' parameter assigned to the 'Facility Region' role.
- Circle 4:** The 'Edit Calculated Item' dialog box, showing the calculation logic for the 'Sales Incentive' item.

The main dashboard displays a 'Sales & Marketing Portal' with a table of product lines and a line chart showing profit and sales incentive over time. The 'SelectedRegion' parameter is used to filter the data by region (East, North, South, West).

**Table Data:**

| Product Line   | Profit         | Sales Incentive |
|----------------|----------------|-----------------|
| Action Figure  | \$482,567.87   | \$14,470        |
| Game           | \$4,439,613.29 | \$133,508       |
| Stuffed Animal | \$121,023.16   | \$5,631         |

**Chart Data:**

| Week | Profit      | Sales Incentive |
|------|-------------|-----------------|
| 1    | \$100,000   | \$0,000         |
| 2    | \$150,000   | \$1,000         |
| 3    | \$200,000   | \$2,000         |
| 4    | \$250,000   | \$3,000         |
| 5    | \$300,000   | \$4,000         |
| 6    | \$350,000   | \$5,000         |
| 7    | \$400,000   | \$6,000         |
| 8    | \$450,000   | \$7,000         |
| 9    | \$500,000   | \$8,000         |
| 10   | \$550,000   | \$9,000         |
| 11   | \$600,000   | \$10,000        |
| 12   | \$650,000   | \$11,000        |
| 13   | \$700,000   | \$12,000        |
| 14   | \$750,000   | \$13,000        |
| 15   | \$800,000   | \$14,000        |
| 16   | \$850,000   | \$15,000        |
| 17   | \$900,000   | \$16,000        |
| 18   | \$950,000   | \$17,000        |
| 19   | \$1,000,000 | \$18,000        |
| 20   | \$1,050,000 | \$19,000        |

**Calculation Logic:**

```
IF ( 'SelectedRegion'p = 'East' )  
RETURN ( 'Profit'n * 0.05 )  
ELSE (   
IF ( 'SelectedRegion'p = 'North' )  
RETURN ( 'Profit'n * 0.07 )  
ELSE (   
IF ( 'SelectedRegion'p = 'South' )  
RETURN ( 'Profit'n * 0.03 )  
ELSE ( 'Profit'n * 0.04 ) ) ) )
```

# Parameter Example 2

## Numeric Parameter

1. Create parameter(s)
2. Add control object(s)
3. Assign to Parameter Role
4. Use in calculations, filters and/or ranks

**Edit Parameter**

Name: SelectedNumOfMonths

Type: Numeric

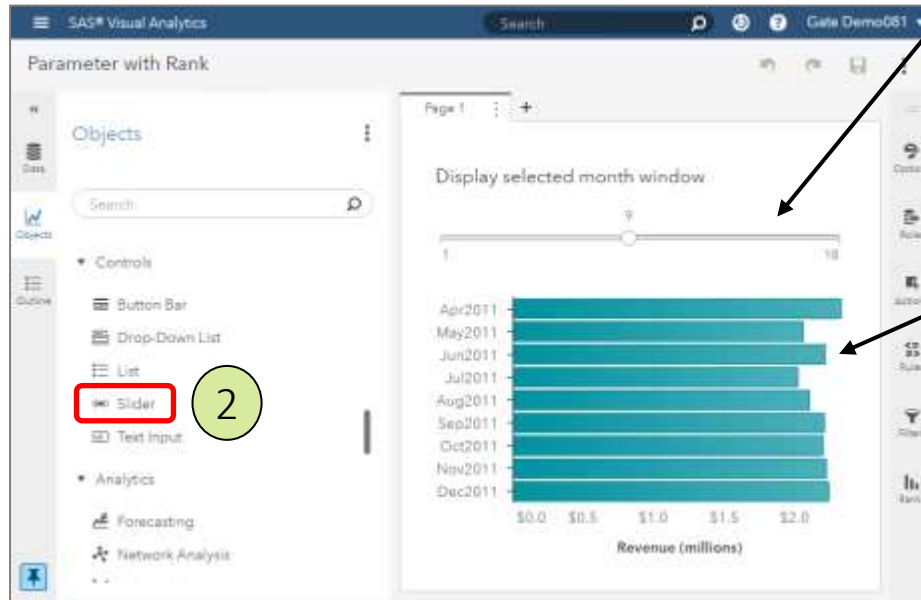
☐ Multiple values

Minimum value: 1

Maximum value: 18

Format: BEST12. (Numeric)

Current value: 9



**Data Roles**

Slider 1

Measure/Date

+ Add

Parameter

☒ SelectedNumOfMonths

Options

Roles

Actions

Rules

**Ranks**

Bar Chart 1

+ New rank

Date by Month

Top count

Count:

SelectedNumOfMonths

By:

DateByMonthNum

Include:

☒ Ties

☐ All Other

Options

Roles

Actions

Rules

Filters

Ranks

# Report URL Base

Base URL:

```
http://host/SASReportViewer/?reportName=My%20Report&  
reportPath=/Shared%20Data/VA%20Reports/
```

Minimum Requirements:

- reportName
- reportPath

Pro Tip: Use SAS  
Environment Manager  
to look up the report  
name and path values.

The screenshot displays the 'SAS Environment Manager - Manage Environment' interface. The 'Content' pane on the left shows a tree view with 'Reports' selected. A green box labeled 'reportName' points to the 'Name' field in the 'Basic Properties' pane, which contains the value 'Parameter with Calculation'. Another green box labeled 'reportPath' points to the 'Location' field, which contains the path '/gelcontent/Demo/VISUAL/Reports/Parameter with Calculation'. The 'URI' field shows a long alphanumeric string. The 'Type' field is set to 'Report'. The 'Advanced' section is partially visible at the bottom.

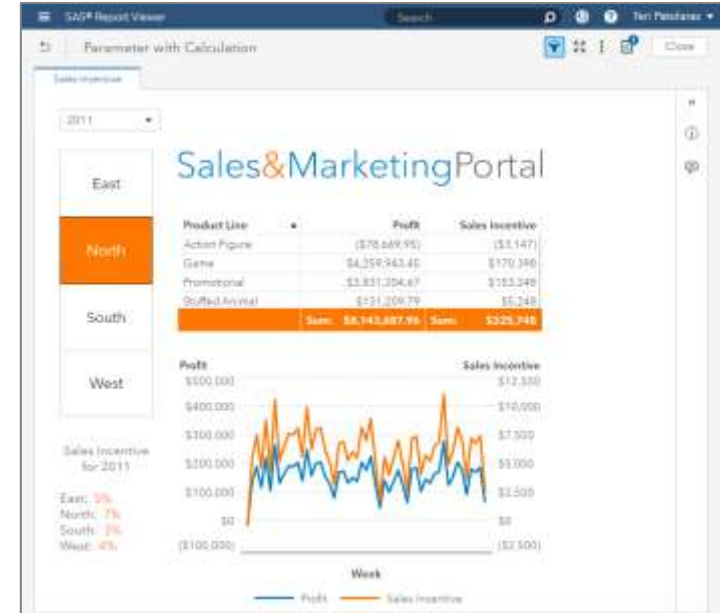
| Field       | Value  |
|-------------|--|
| Name        | Parameter with Calculation                                 |
| URI         | /reports/reports/486e6b8c-0492-4178-adbf-f6d8c602796d      |
| Description |  |
| Type        | Report   |
| Location    | /gelcontent/Demo/VISUAL/Reports/Parameter with Calculation |

# Report URL with Parameters

Pass Report Parameters using **name=value** pairs

|             |                                  |
|-------------|----------------------------------|
| reportName  | Parameter with Calculation       |
| reportPath  | /gelcontent/Demo/VISUAL/Reports/ |
| Parameter 1 | SelectedYear='2011'              |
| Parameter 2 | SelectedRegion=North             |

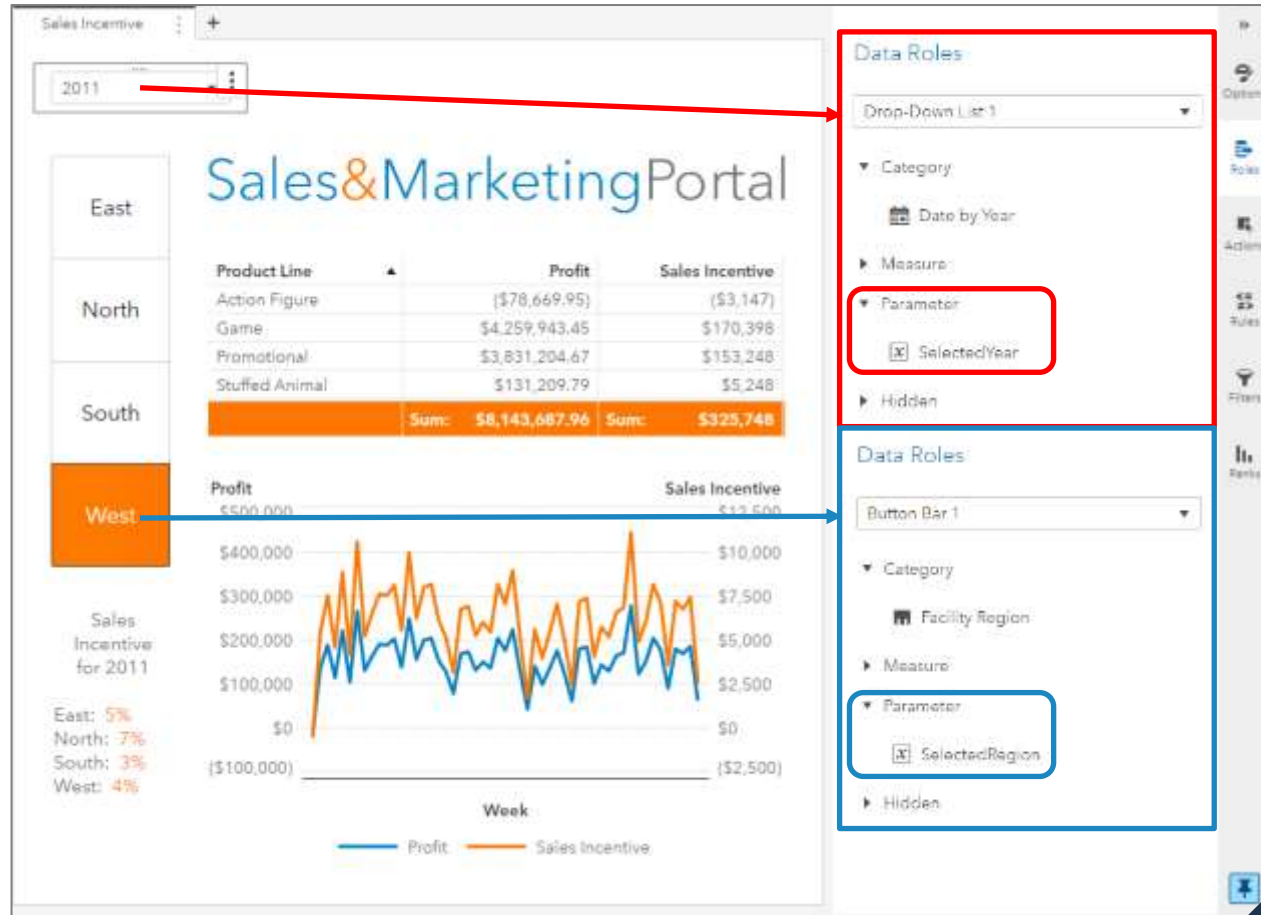
<http://sasviya01.race.sas.com/SASReportViewer/?reportName=Parameter%20with%20Calculation&reportPath=/gelcontent/Demo/VISUAL/Reports/&SelectedYear='2011'&SelectedRegion=North>

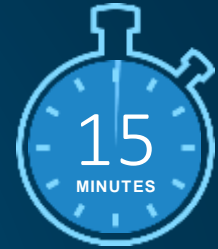


# Report URL with Parameters Limitations

Cannot pass a value to a Control Object directly

Must first create a parameter and assign it to the Control Object's Parameter Role





# Hands-On Exercise

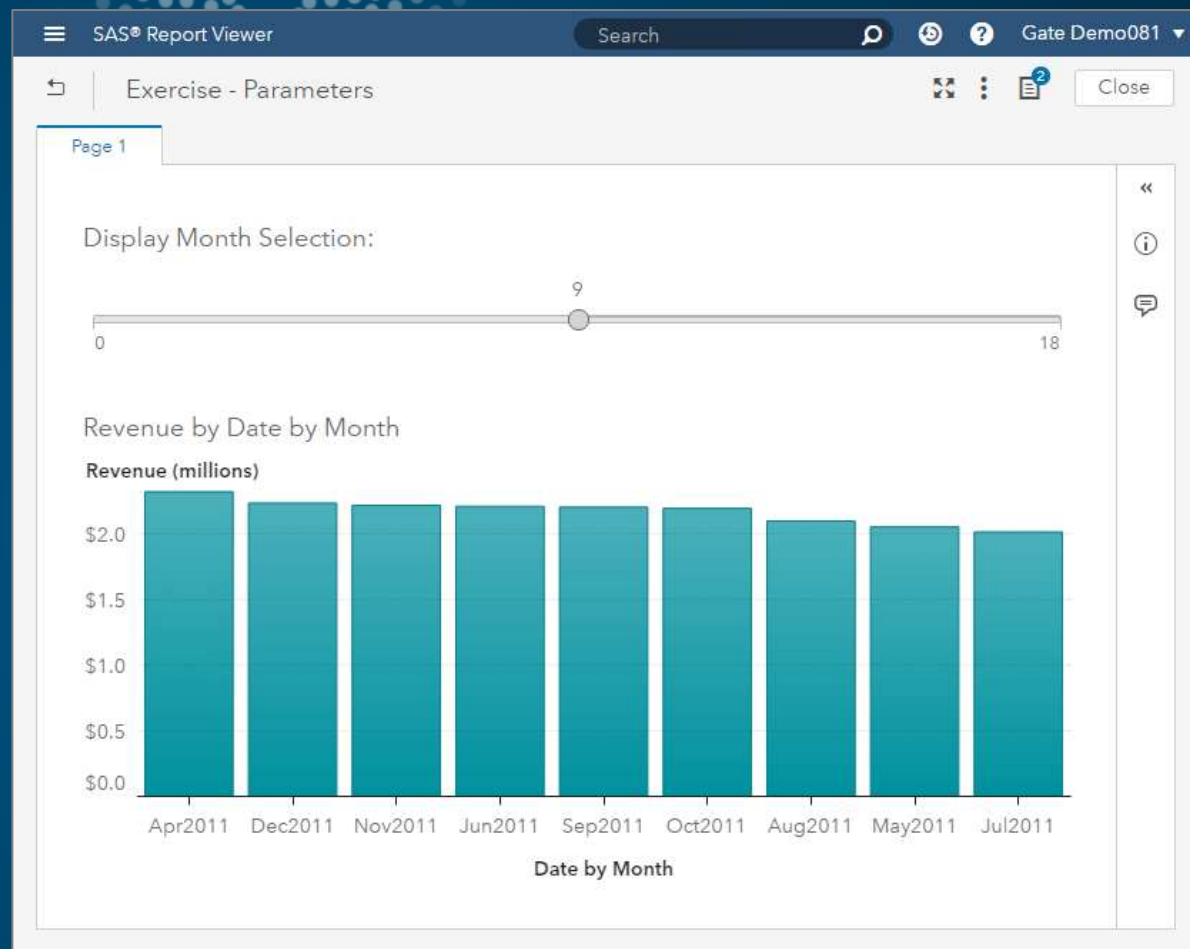
Complete the steps in:

Desktop\Hands-On\VIYAVISUAL\GELVIYAVISUAL\_05DesigningInteractiveReports\_02Parameters

Tasks:

- Create a Parameter
- Add a Control; assign Parameter
- Add Bar Chart
- Configure Rank to use Parameter selection

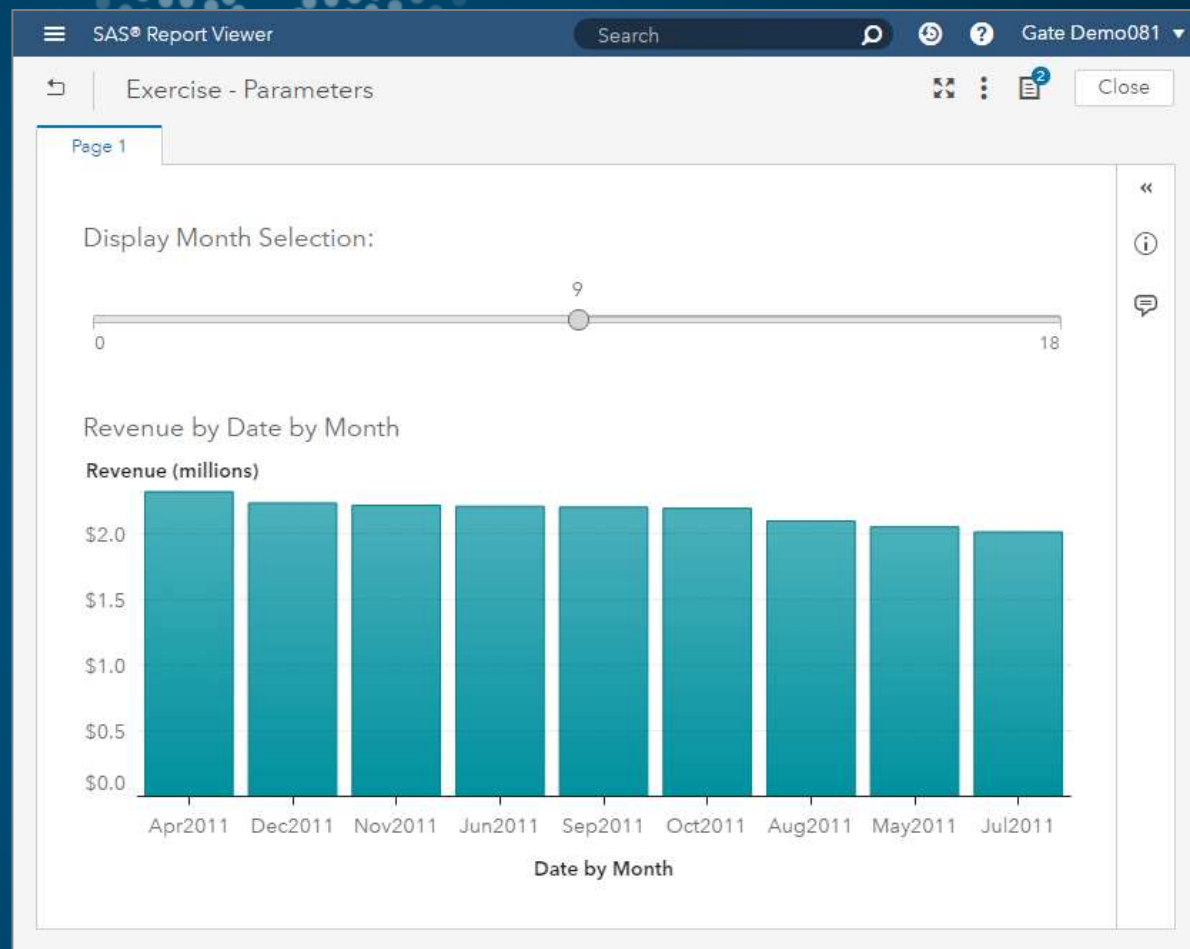
What other uses of parameters have you seen at your customers?





What other uses of parameters have you seen at your customers?

- Search criteria
- Simple What If Scenario, enter number for a calculation



# Additional Resources



## SAS® Visual Analytics 8.3 Documentation

- Working with Report Content
  - Working with Controls  
<http://pubshelpcenter.unx.sas.com:8080/test/?cdclId=vacdc&cdcVersion=8.3&docsetId=vaobj&docsetTarget=n11d8xohg1cc49n1d3ovjmgvdeu3.htm&locale=en>
- Working with Report Data
  - Working with Report Action and Links  
<http://pubshelpcenter.unx.sas.com:8080/test/?cdclId=vacdc&cdcVersion=8.3&docsetId=vareportdata&docsetTarget=p0qqtmobryw64un1922tyxumhv4a.htm&locale=en>
  - Working with Parameters in Reports  
<http://pubshelpcenter.unx.sas.com:8080/test/?cdclId=vacdc&cdcVersion=8.3&docsetId=vareportdata&docsetTarget=n1wv50n60ccq86n1nzp6zat1wj64.htm&locale=en>