Enterprise Architect

User Guide Series

Dynamic Charts

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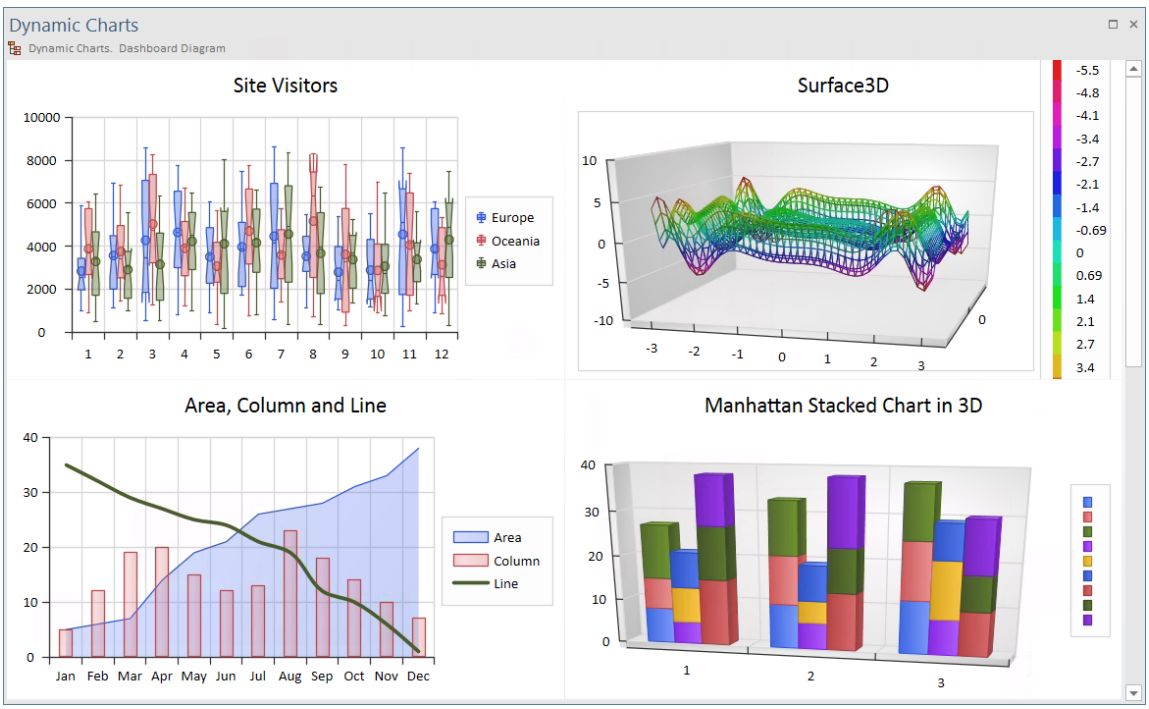
Dynamic Charts

Enterprise Architect features DynamicChart Artifacts, which are Chart elements that can be styled and rendered dynamically when the diagram opens. Dynamic Charts rely completely on code to define their series, style and content and are managed entirely through the Automation Interface by clients - typically Plug-ins and scripts. The Chart interfaces provide clients with the means to dynamically describe and populate a Chart when the diagram is viewed. The API is wide ranging and flexible, allowing you to illustrate many different scenarios graphically at runtime. The feature allows you to define any type of Chart you require using JavaScript either as code or JSON.



A good reference for the Chart interfaces and their use is the Package 'Reporting > Charts > Dynamic Charts' in the Enterprise Architect Example Model. This Package contains examples of many Charts, each described dynamically by

JavaScript clients. Each Chart example presents the two methods of rendering - a JavaScript coding method and a JSON datasource method.

Dynamic Charts are particularly useful for representing the results of Simulations, allowing you to:

- Save the results of your Simulation as visual Chart elements
- Easily include Charts populated by Simulation results in your reports
- Share user-friendly Simulation results with stakeholders without requiring any additional Simulation tools

Dynamic Charts are available in the Corporate, Unified and Ultimate editions of Enterprise Architect.

Chart Definition using JSON

Rather than code a Dynamic Chart yourself, you might want to provide a simple description of the Chart instead. Dynamic Charts can be designed and entirely defined by a single datasource; JSON is currently the preferred datasource format, but XML and others will be available in the future.

You define the Chart by providing a simple JSON data structure that adheres to the DynamicChart schema. The schema is available in the Schema Composer. It is also easily viewable in the Dynamic Charts Package of the Enterprise Architect Example Model.

(To view the DynamicChart Schema, select Develop > Schema Modeling > Schema Composer > Open Schema Composer, click on the ... button in the 'Profile' field, and select DynamicChartSchema.)

Datasources - JSON

To render a Chart using a JSON data structure, first select the DynamicChart Artifact element, then open the 'internal code' editor. For a selection in the Browser, right-click and choose 'Features > Edit Internal Code' or, for a selection on a diagram, right-click and choose 'Edit Chart Script'. These will open the editor for you to edit the Chart script. Create a JSON variable that defines the Chart to render, then compose your ConstructChart function.

The ConstructChart function takes as its single argument the

identity (a GUID string) of the Chart element being displayed on the opening diagram. You then call the built-in function ConstructChartFromJSON, passing the GUID as the first parameter and the JSON structure as the second argument, as illustrated in this example:

Example Datasource in JSON

```
var barChart2DJSON =
{
  "Category" : "BarSmart",
  "Type" : "Simple",
  "Title" : "Vehicle Expenses",
  "Series" :
  [
    {
          "Label" : "Fuel",
          "Data":
          {
              "Type" : "Column",
              "Points" :
              [
                  { "Category": "Jan", "Y": 1.0 },
                  { "Category": "Feb", "Y": 3.0 },
                  { "Category": "Mar", "Y": 7.0 },
                  { "Category": "Apr", "Y": 8.0 },
```

```
                { "Category": "May", "Y": 10.0 },
                { "Category": "Jun", "Y": 15.0 }
            ]
        }
    },
    {
        "Label" : "Taxes",
        "Data":
        {
            "Type" : "Normal",
            "Points" :
            [
                { "Y":10.0 },
                { "Y":12.0 },
                { "Y":16.0 },
                { "Y":17.0 },
                { "Y":10.0 },
                { "Y":12.0 }
            ]
        }
    },
    {
        "Label" : "Maintenance",
        "Data":
        {
```

```
            "Type" : "Normal",
            "Points" :
            [
                { "Y":5.0 },
                { "Y":2.0 },
                { "Y":6.0 },
                { "Y":7.0 },
                { "Y":1.0 },
                { "Y":2.0 }
            ]
        }
    },
    {
        "Label" : "Other",
        "Data":
        {
            "Type" : "Normal",
            "Points" :
            [
                { "Y":2.5 },
                { "Y":2.5 },
                { "Y":2.5 },
                { "Y":2.5 },
                { "Y":2.5 },
                { "Y":2.5 }
```

```
                ]
            }
        }
    ]
};

function ConstructChart(chartGuid)
{
    ConstructChartFromJSON(chartGuid,
barChart2DJSON);
}
```

Further Examples

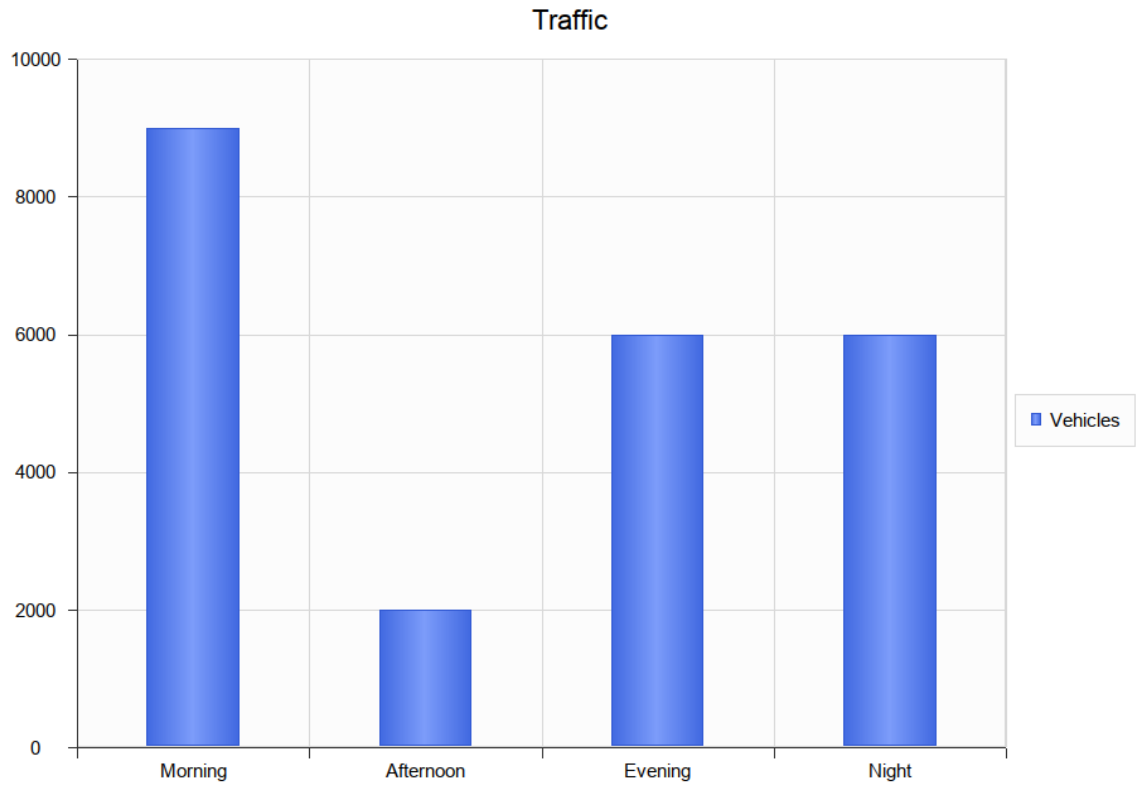
Further JSON examples are provided in the Example Model (see the Package 'Reporting > Charts > Dynamic Charts').

Each Chart example provides a Dashboard diagram and DynamicChart element. Select an element from any of these examples and press 'Alt+7' to view the behavior behind the Chart. Looking at the variety of Chart examples is the best way to get to know how to use JSON to produce the types of Chart you might be interested in.

Chart Definition using Simulation

Simulations are a fantastic tool for observing behavior. At any point in the Simulation it is easy to tell where we are and the state we are in. As we step through a Simulation this information is typically discarded. In a Simulation that shows us, say, traffic numbers over a 24 hour period, we might easily observe the number of vehicles traveling through a tunnel during various hours in the morning and evening. It might be useful to retain this information after the Simulation completes, and to use it to provide something meaningful. The DynamicChart feature in Simulation allows us to do just that. Taking the example above, we could record the amount of traffic during each step of the Simulation and use it to produce a Chart that would clearly show how much traffic went through the tunnel during the 24 hour period of the Simulation. Charts can in effect display for us either a timeline of a Simulation or the sum effect of one.

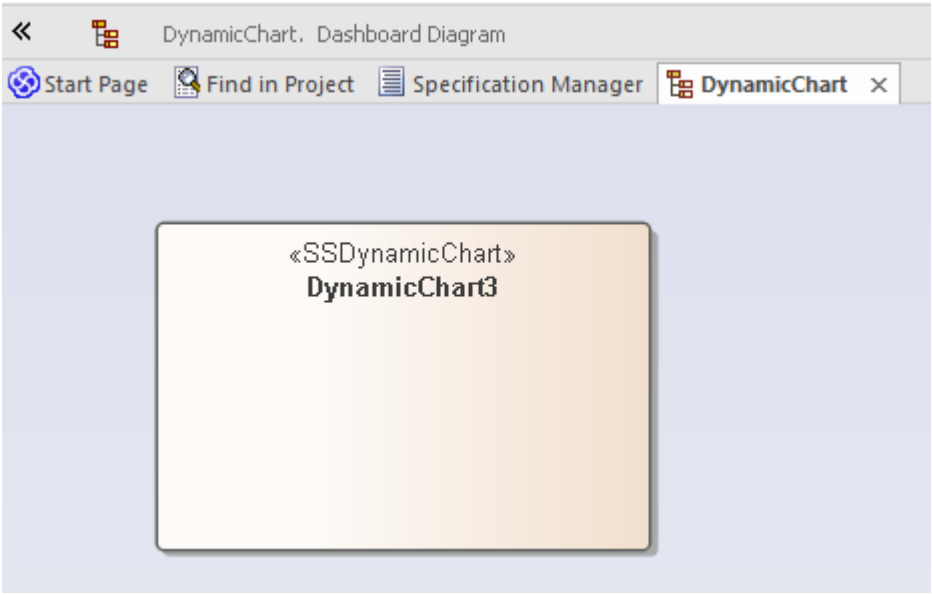
Producing Custom Charts in Simulation



You can fashion all sorts of Charts from any Simulation. Each time a Simulation is run, any DynamicChart elements referenced (by name) by the Simulation are updated. The Simulation will search for any named Chart in the same Package as the model.

Follow this simple process:

1. Create a DynamicChart element for the Simulation.



2. In the initial step of the Simulation, use JavaScript to define a variable to hold the vehicle numbers.

```
//
//  the traffic variable will hold the traffic numbers as Simulation proceeds and is initially zero
//  each element of the array represents a period of the day, morning, afternoon, evening and night.
//
var traffic = [0,0,0,0];
```

3. Next write the JavaScript that describes, in JSON format, the Chart to produce.

```
//
// The JSON instance describing the chart to produce. (complies with the EA DynamicChart Schema)
//
   var chartData =
   {
    "Category" : "Column",
     "Type" : "Simple",
     "Title" : "Traffic",
```

```
    "Series" :
    [
        {   "Label" : "Vehicles",
            "Data" :
            {
                "Type" : "Column",
                "Points" :
                [
                    { "Category": "Morning", "Y" : 0 },//
The Y values of the axis are initially zero
                    { "Category": "Afternoon", "Y" : 0 },
  //  they will be filled in at end of Simulation
                    { "Category": "Evening", "Y" : 0 },
                    { "Category": "Night", "Y" : 0 }
                ]
            }
        }
    ]
  };
```

4. At various transitions in the Simulation update the traffic numbers.

```
//
// 2000 vehicles went through the tunnel in the afternoon
(element 1)
//
traffic[1] += 2000;
```

5. At the end of the Simulation, use the data captured during the run to fill the series.

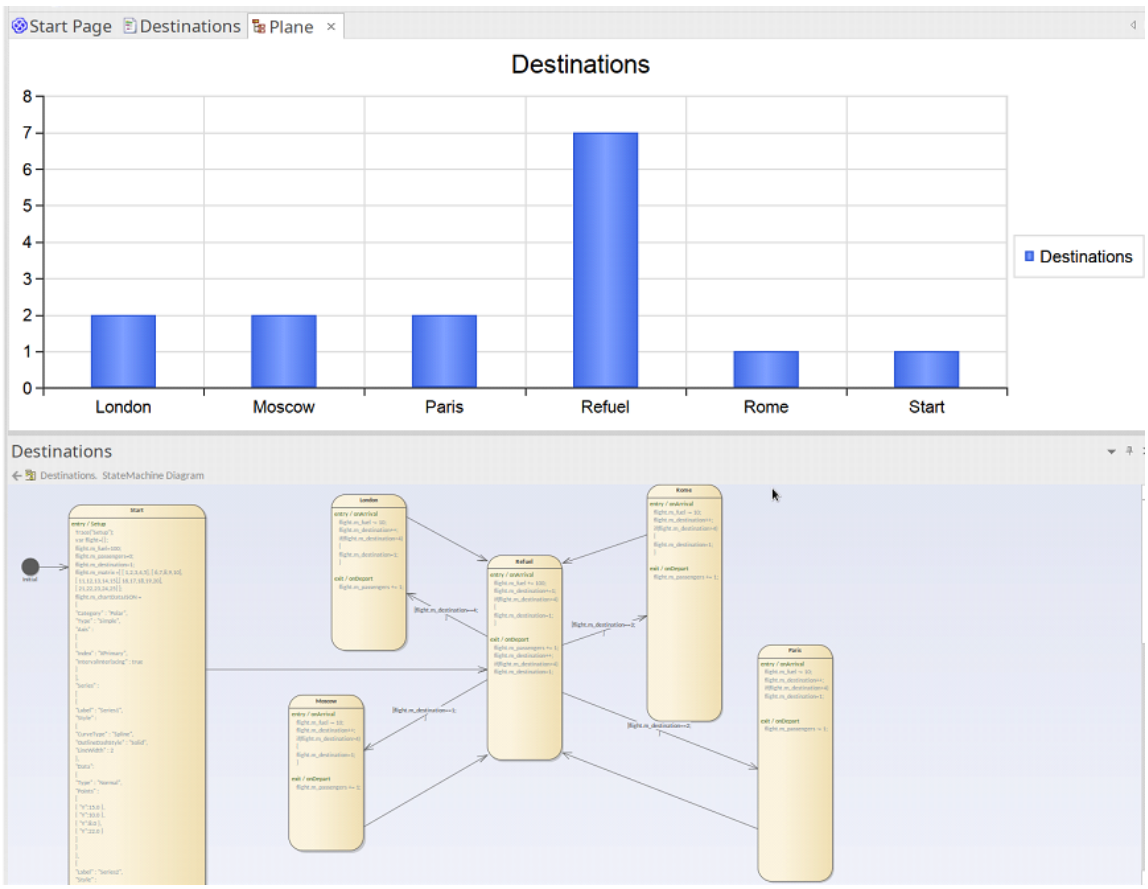
```
// fill points in series with the number of vehicles for each
```

```
part of the day
var dataPoints = chartData.Series[0].Data.Points;
for(var dp = 0; dp < traffic.length; dp++)
{
      dataPoints[dp].Y = traffic[dp];
}
```

6. Update the model.

```
// Call the EA function to populate the DynamicChart
element named 'Vehicles' with this data.
sim.GenerateChart( "Vehicles",
JSON.stringify(chartData));
```

Default Chart Produced by Simulation



In addition to Charts you specifically produce, a summary

Chart can be produced automatically by a simulation. All that is required is adding a DynamicChart Artifact to the Package and giving it the same name as the StateMachine. The default Chart summarizes the State transitions taken during execution of a simulation. If a default Chart is found when the simulation completes, that Chart's data is updated, and displayed automatically.

To add a default Chart to your StateMachine simulation follow these steps:

1. Locate the Package containing the StateMachine on which to perform the simulation.
2. Create a Dashboard diagram as a child of that Package.
3. Add a DynamicChart Artifact to the Dashboard diagram, and give it the same name as the StateMachine.

When the simulation ends, simply open the Dashboard diagram to reveal the summary.

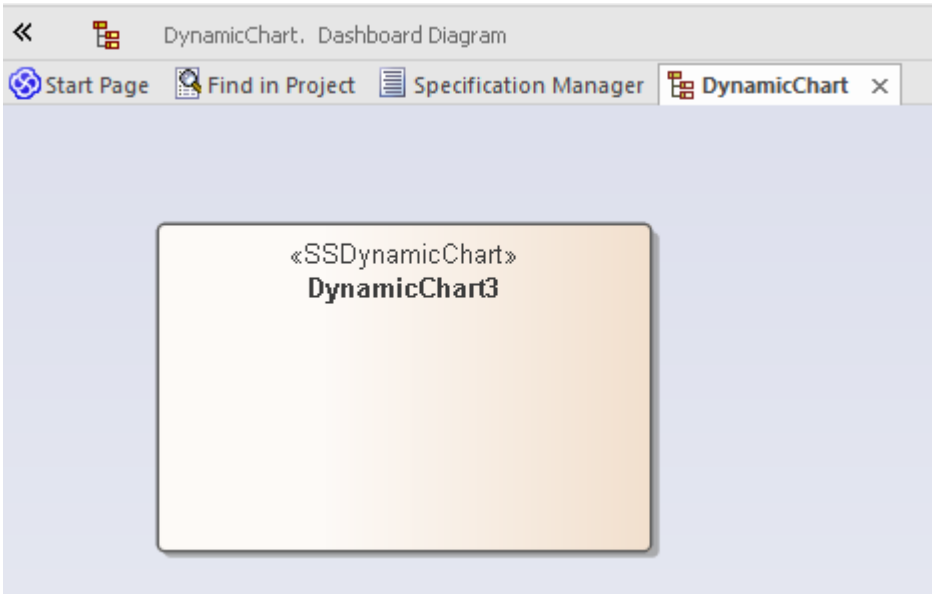
Chart Definition using JavaScript

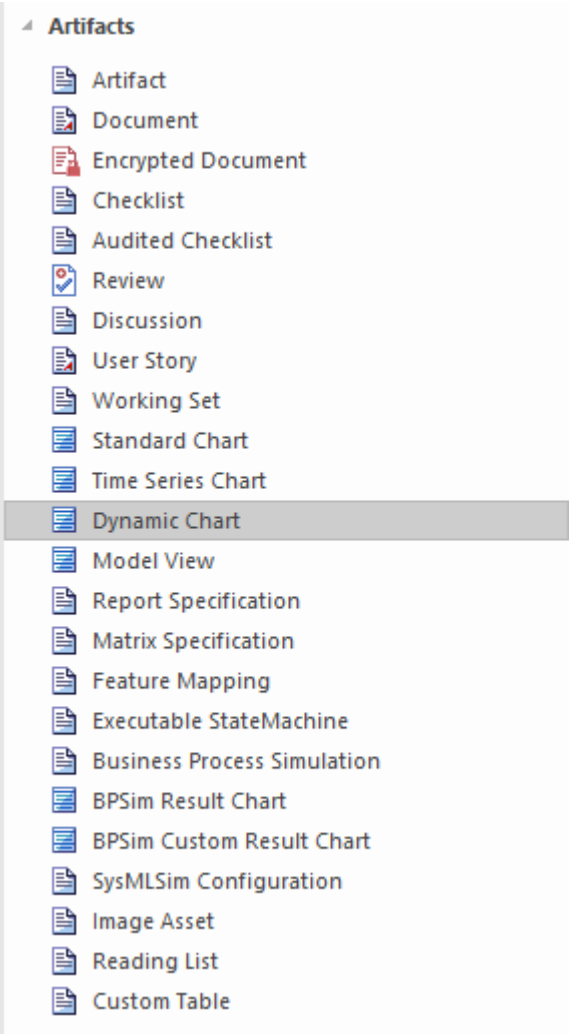
In this topic we discuss coding a DynamicChart Artifact using just JavaScript and the Chart automation interface.

Define a Chart through JavaScript

The first thing you do is create a Dashboard diagram in the appropriate Package. Right-click on the Package and select the 'New Diagram' option. This opens the 'Diagram Builder' tab page of the 'Model Builder' dialog.

On the 'Diagram Builder' tab page, click on the ≡ icon and select the perspective 'Publishing > Dynamic Charts'. In the 'Select From' panel, select 'Dynamic Charts' and in the 'Diagram Types' panel select 'DynamicChart'. Click on 'Create Diagram' to create the new diagram. When the empty diagram displays, drag the 'Dynamic Chart' icon onto it from the 'Charts' page of the Toolbox.





Now you write the JavaScript to style and render the Chart, starting with the ConstructChart function that will be invoked automatically whenever the diagram containing the DynamicChart Artifact is opened for viewing. The GUID of the element is passed to ConstructChart as a parameter. Within this function, it is entirely up to you what type of Chart to display, the style of the Chart, the number of series it contains, and the data points that make up the series. Using the Chart Package from the Automation Interface, it is possible to display almost any Chart you require.

In this example you will create a Grouped Column Chart that shows vehicle expenses over a few months. Each group will represent a month and will be broken down into the

different expenses incurred during that month.

To begin, click on the Artifact and press Alt+7, or click on the 'Edit Chart Script' context menu option; each method displays the Code Editor window. The code to use is provided here, followed by the Chart it will produce when the diagram is opened.

Importantly, note:

- The **!INC Local Scripts.ChartAutomation** statement; all Chart scripts must include this statement
- The ConstructChart function (7th line in)

Code

```
!INC Local Scripts.ChartAutomation

var monthNames = [ "Jan", "Feb", "Mar", "Apr", "May",
"Jun", "Jul", "Aug", "Sep", "Oct", "Nov", "Dec" ];

function Rand(min, max) {
  min = cephes.ceil(min);
  max = cephes.floor(max);
  return cephes.floor(cephes.drand() * (max - min)) + min; }

function ConstructChart( guid )
{
```

```
    var chart as EA.Chart;                          // The
script first of all
    var element = GetElementByGuid(guid);           //
declares the automation
    var series1 as EA.ChartSeries;                  // objects
it will use
    var series2 as EA.ChartSeries;
    var series3 as EA.ChartSeries;
    var series4 as EA.ChartSeries;

    chart = element.GetChart();

    var chartCategory = ChartCategory.Column();
    var chartType = ChartType.SIMPLE();
    chart.SetChartType( chartCategory, chartType, false,
true);

    chart.Title = "Vehicle Expenses";
    series1 = chart.CreateSeries("Fuel");          // The
script then obtains the Chart object and creates the
    series2 = chart.CreateSeries("Taxes");         // series.
A chart is composed of a number of series, and
    series3 = chart.CreateSeries("Maintenance");   // in
this example each series will represent a type of expense.
    series4 = chart.CreateSeries("Other");
```

series1.AddDataPoint3(monthNames[0], 14); // A series is composed of a number of datapoints and, here, the

series1.AddDataPoint3(monthNames[1], 4); // script adds the values for each of the points to each series.

```
series1.AddDataPoint3( monthNames[2], 3);
series1.AddDataPoint3( monthNames[3], 2);
series1.AddDataPoint3( monthNames[4], 1);

series2.AddDataPoint(10);
series2.AddDataPoint(12);
series2.AddDataPoint(15);
series2.AddDataPoint(17);
series2.AddDataPoint(12);

series3.AddDataPoint(5);
series3.AddDataPoint(7);
series3.AddDataPoint(11);
series3.AddDataPoint(14);
series3.AddDataPoint(19);

series4.AddDataPoint(2);
series4.AddDataPoint(3);
series4.AddDataPoint(5);
series4.AddDataPoint(3);
```

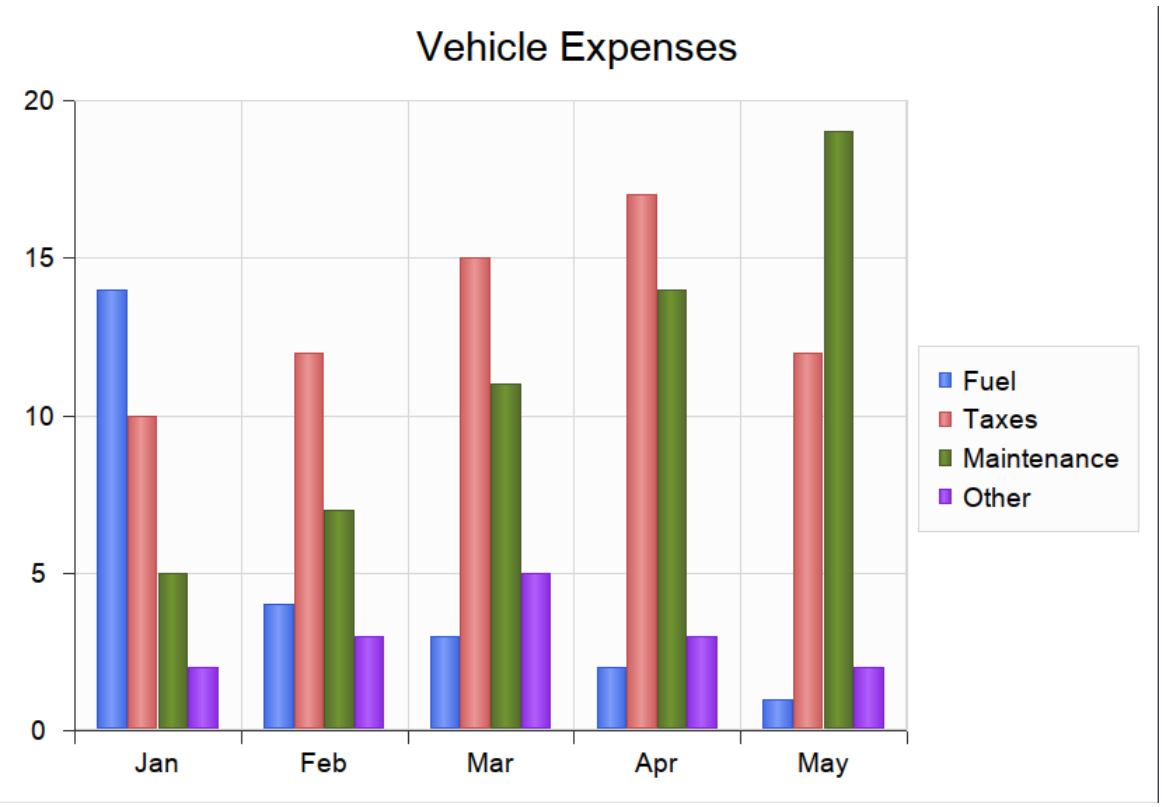
```
        series4.AddDataPoint(2);

        series1.SetGroupID(0);
        series1.SetGroupID(0);
        series3.SetGroupID(1);
        series4.SetGroupID(1);

        chart.Redraw();
}
```

Output

This is the Chart produced by the code.



Debugging a Dynamic Chart

After creating Dynamic Chart JavaScript, you can debug it as for any other code. Right-click on the Dynamic Chart in a diagram and select the 'Debug Chart Script' option. The script displays in the Debug View.

Further Examples

Further coding examples are provided in the Example Model (see the Package 'Reporting > Charts > Dynamic Charts'). Each Chart example provides a Dashboard diagram and a DynamicChart element. Select any of these elements and press Alt+7 to view the behavior code behind the Chart. Referring to these examples is the best way to understand how to code each type of Chart.

JavaScript is the primary language for coding Dynamic Charts using automation. However, it is certainly feasible for a third-party automation client to be involved in that process, the JavaScript host delegating tasks to the automation clients in languages such as C# and C++, which might be able to obtain data from outside the model in ways not available to scripts.

Dynamic Chart Resources

A number of resources are available to you to aid in constructing Charts dynamically in Enterprise Architect, as described in the *Resources* table.

Resources

Resource	Description
JavaScript Library	A library of JavaScript functions, with examples of coding Charts using the Automation Interface or using JSON as a data source for Charts. This library can be found in the 'Local Scripts' group of the Scripting control in Enterprise Architect.
Example Model	The Enterprise Architect Example Model contains a number of Chart examples, demonstrating the various types of Chart that can be created and styled dynamically when they are displayed. These are in the Package 'Reporting > Charts > Dynamic Charts'. Examples include 3D Surface and Wireframe Charts, Stock Charts with series showing price and volume fluctuations, Box Plot Charts showing

	visitor numbers, Manhattan Stack Charts, and many others. Each example is provided in two versions. The first version uses JavaScript code to style and fill the Chart. The second uses a JSON data source to describe and fill the Chart.
Chart Schemas	The Example Model contains a reference model for Dynamic Charts, including Class diagrams, a Schema Composer profile, and the JSON and XML schemas generated using the profile, as Artifacts that you can quickly view by double-clicking on them.

The Chart API

The Chart interface is the API object that provides methods for dynamically creating Charts. It can be used to construct any of the supported Chart types.

A Chart interface is obtained using the GetChart method on a DynamicChart element. A DynamicChart element can be created from the 'Charts' page of the Diagram Toolbox, and is typically used on a Dashboard diagram.

Chart Class

The Chart Class is the primary interface for Chart elements; it is used to create a series, add datapoints to a series and configure the chart appearance.

Chart Attributes

Attribute	Description
Title	String Notes: Read/Write The title of the chart.
Category	ChartCategory Notes: Read only The chart category; provided in the SetChartType method.
Type	ChartType Notes: Read only The chart type; provided in the SetChartType method.

Chart Methods

Method	Description
AddChartDataYXZ(double Y, double X, double Z, long seriesIndex)	long Adds a datapoint to an existing series. Parameters: • Y: double, the primary Y axis value • X: double, the primary X axis value • Z: double, the primary Z axis value • seriesIndex: long, the index of the series (returned by the CreateSeries methods)
AddChartDataYY1(string category, double Y, double Y1, long seriesIndex)	long Adds a datapoint to an existing series. Parameters: • category: string - the x axis group, column or label • Y: double, the primary Y axis value • Y1: double, the secondary Y axis value • seriesIndex: long, the index of the series (returned by the CreateSeries and CreateSeriesEx methods)
CreateSeries(string name)	LDISPATCH Adds a new series to the chart. Returns an interface that can be used to add data to

	the series and configure its appearance. Parameters: • name: string, the displayed name of the series
CreateSeriesEx(string name, long color, ChartType type, ChartCategory category)	LDISPATCH Creates a series of a particular chart category and type and returns an IChartSeries interface. This allows charts to form multiple series in various ways. The CombinedCharts in the EAExample Model are an example of this, displaying three series for the Area, Column and Line categories respectively. Parameters: • name: string, the name of the series • color: long, RGB color value,-1 for default • type: ChartType, one of the ChartType enumerations • category: ChartCategory, one of the ChartCategory enumerations
EnableResizeAxes(boolean bEnable)	void Grants or denies the ability to resize axes. Parameters: • bEnable: boolean

GetChartAxis (ChartAxisType type)	LDISPATCH Returns an IChartAxis interface for the specified axis. Parameters: • type: ChartAxisType, one of the ChartAxisType enumerations
GetDiagram3D()	LDISPATCH Returns an IChartDiagram interface that can be used to specify the rendering engine; Software or OpenGL.
GetSeries(long index)	LDISPATCH Returns an IChartSeries interface for the given index. Indices for series begin at zero. Parameters: • index: long
GetSeriesCount()	long Returns the number of series represented by the chart.
Redraw()	void Redraws the chart.
SetChartType (ChartType	void

type, ChartCategory category, boolean bRedraw, boolean bResizeAxis)	This is typically the first call made on the Chart interface. It defines the style and appearance of the Chart when it is rendered. Parameters: • type: ChartType • category: ChartCategory • bRedraw: Boolean • bResizeAxis: Boolean
SetCurveType(ChartCurveType type)	void Sets the interpolation method of drawing the curve. Parameters: • type: ChartCurveType, one of the ChartCurveType enumerations, such as Line, Spline or SplineHermite.
SetSeriesShadow(boolean bShow)	void Displays or hides shadows on series. Parameters: • bShow: Boolean
SetThemeOpacity(long percentage)	void Sets the opacity of the chart. Parameters: • percentage: long, chart transparency as

	a percentage
ShowAxis(long index)	void Shows the axis for the given index. Parameters: • index: long, one of the ChartAxisType enumerations
ShowDataLabels(boolean show, boolean border, boolean dropLineTomarker)	void Shows or hides data labels on the chart. Parameters: • show: Boolean, show or hide labels • border: Boolean, show or hide border on labels • dropLineTomarker: Boolean, changes position of label with respect to line
ShowDataMarkers(boolean show, long size, ChartmarkerShape shape)	void Shows or hides data markers on the chart. Also allows setting the appearance of markers. Parameters: • show: Boolean, show or hide markers • size: long, size of markers in pixels • shape: ChartmarkerShape, one of the ChartmarkerShape enumerations

Chart Enumerations

These enumerations, used specifically by methods in the Chart interface, are described in the topics of this section. Click on the enumeration name in the list to the left of this text.

ChartAxisCrossType

Enum Values

Enum	Value
Auto	value: 0
MaximumAxisValue	value: 1
MinimumAxisValue	value: 2
AxisValue	value : 3
Ignore	value: 4
FixedDefaultPos	value: 5

ChartAxisIndex

Enum Values

Enum	Value
Unknown	value: -1
X	value: 0
Y	value: 1
Z	value: 2

ChartAxisLabelType

Enum Values

Enum	Value
NoLabels	value: 0
NextToAxis	value: 1
High	value: 2
Low	value: 3

ChartAxisTickMarkType

Enum Values

Enum	Value
NoTicks	value: 0
Inside	value: 1
Outside	value: 2
Cross	value: 3

ChartAxisType

A set of constants that refer to the various axes used in charts.

Enum Values

Enum	Value
CHART_Y_PRIMARY_AXIS	value: 0
CHART_Y_SECONDARY_AXIS	value: 1
CHART_X_PRIMARY_AXIS	value: 2
CHART_X_SECONDARY_AXIS	value: 3
CHART_Z_PRIMARY_AXIS	value: 4

CHART_Z_SECONDARY_AXIS	value: 5
CHART_Y_POLAR_AXIS	value: 6
CHART_X_POLAR_AXIS	value: 7
CHART_A_TERNARY_AXIS	value: 8
CHART_B_TERNARY_AXIS	value: 9
CHART_C_TERNARY_AXIS	value: 10

ChartBarShape

Enum Values

Enum	Value
Box	value: 0
Pyramid	value: 1
PyramidPartial	value: 2

ChartCategory

Enum Values

Enum	Value
chartDefault	value: 0
chartLine	value: 1
chartPie	value: 2
chartPie3D	value: 3
chartPyramid	value: 4
chartPyramid 3D	value: 5
chartFunnel	value: 6
chartFunnel3 D	value: 7
chartColumn	value: 8
chartBar	value: 9

chartHistogram	value: 10
chartArea	value: 11
chartStock	value: 12
chartBubble	value: 13
chartLongData	value: 14
chartHistoricalLine	value: 15
chartPolar	value: 16
chartDoughnut	value: 17
chartDoughnut3D	value: 18
chartTorus3D	value: 19
chartTernary	value: 20
chartColumn	

3D	value: 21
chartBar3D	value: 22
chartLine3D	value: 23
chartArea3D	value: 24
chartSurface3D	value: 25
chartDoughnutNested	value: 26
chartBoxPlot	value: 27
chartBarSmart	value: 28
chartBar3DSmart	value: 29

ChartColorMode

Enum Values

Enum	Values
Single	value: 0
Multiple	value: 1
Palette	value: 2
Custom	value: 3
Series	value: 4

ChartCurveType

Enum Values

Enum	Value
NoLine	value: 0
Line	value: 1
Spline	value: 2
SplineHermite	value: 3
Step	value: 4
ReversedStep	value: 5

ChartDashStyle

Enum Values

Enum	Value
Solid	value: 0
Dash	value: 1
Dot	value: 2
DashDot	value: 3
DashDotDot	value: 4
Custom	value: 5

ChartFrameStyle

Enum Values

Enum	Value
None	value: 0
Mesh	value: 1
Contour	value: 2
ContourMesh	value: 3

ChartGradientType

Enum Values

Enum	Value
None	value: 0
Horizontal	value: 1
Vertical	value: 2
DiagonalLeft	value: 3
DiagonalRight	value: 4
CenterHorizontal	value: 5
CenterVertical	value: 6
RadialTop	value: 7
RadialCenter	value: 8

RadialBottom	value: 9
RadialLeft	value: 10
RadialRight	value: 11
RadialTopLeft	value: 12
RadialTopRight	value: 13
RadialBottomLeft	value: 14
RadialBottomRight	value: 15
Bevel	value: 16
PipeVertical	value: 17
PipeHorizontal	value : 18

ChartMarkerShape

Enum Values

Enum	Value
Circle	value: 0
Triangle	value: 1
Rectangle	value: 2
Rhombus	value: 3

ChartStockSeriesType

Enum Values

Enum	Value
Bar	value: 0
Candle	value: 1
LineOpen	value: 2
LineHigh	value: 3
LineLow	value: 4
LineClose	value: 5
LineCustom	value: 6

ChartType

Enum Values

Enum	Value
chartTypeDEFAULT	value: 0
chartTypeSIMPLE	value: 1
chartTypeSTACKED	value: 2
chartType100STACKED	value: 3
chartTypeRANGE	value: 4

ChartWallOptions

Enum Values

Enum	Value
None	value: 0, 0x0000
FillLeftWall	value: 1, 0x0001
OutlineLeftWall	value: 2, 0x0002
FillRightWall	value: 4, 0x0004
OutlineRightWall	value: 8, 0x0008
FillFloor	value: 16, 0x0010
OutlineFloor	value: 32, 0x0020
DrawAll	value: 65535, 0xFFFF
DrawLeftWall	FillLeftWall | OutlineLeftWall

DrawRightWall	FillRightWall | OutlineRightWall
DrawFloor	FillFloor | OutlineFloor
DrawAllWalls	DrawLeftWall | DrawRightWall
OutlineAllWalls	OutlineLeftWall | OutlineRightWall
OutlineAll	OutlineAllWalls | OutlineFloor
FillAllWalls	FillLeftWall | FillRightWall
FillAll	FillAllWalls | FillFloor
Default	OutlineAll

ChartAxisIndex Class

ChartAxisIndex Attributes

Attribute	Description
Visible	Boolean Shows or hides the axis.

ChartAxisIndex Methods

Method	Description
EnableMajorUnitIntervalInterlacing(boolean binterlace)	void Turns interlacing on or off.
GetGuid()	string Returns the guid of the axis. Uniquely identifies an axis.
GetLabel()	string Returns the value of the label of the axis.

SetAxisName (string label, boolean showonaxis)	void Sets the label for the axis and whether it should be displayed on the chart. Parameters: • label: string, the text for the label • showonaxis: Boolean, a true value indicates that the label is displayed
SetCrossType(long type)	void Provides a directive or hint for use when calculating the position of labels on an axis. Parameters: • type: long, one of the ChartAxisCrossType enumerations
SetDataFormat(string format, boolean formatAsDate)	void Sets the format string for the conversion of values to strings (e.g. "%.4f"). If the datapoints represent datetime values, the formatAsDate argument should be true, and the format string set appropriately (e.g. "%H:%M") Parameters: • format: string, the format to use when converting datapoint values to string • formatAsDate: Boolean, a true value

	indicates the datapoint represent a datetime
SetDisplayUnits(double units)	void Sets the display units on the axis. Basically, the datapoint values are divided by this figure to give a major unit value. For example, if the datapoint contains meter values, a value of 1000 would result in kilometers being used as the major unit on the axis. Parameters: • units: double, the value of a single unit on the axis
SetFixedDisplayRange(double fmin, double fmax)	void Sets a fixed range for the axis. Parameters: • fmin: double, the minimum value • fmax: double, the maximum value
SetLabelType(long labelpos)	void Sets the position of labels on the axis. Parameters: • labelpos: long, one of the ChartAxisLabelType enumerations
SetTickMark	

(long tickmarkpos)	void Sets the position of tick marks on the axis. Parameters: • tickmarkpos: long, one of the ChartAxisTickMarkType enumerations
ShowMajorGridLines(boolean show)	void Shows or hides grid lines.

ChartDataValue Class

The ChartDataValue class provides an interface that allows values to be obtained from points in a series.

ChartDataValue Methods

Method	Description
GetValue()	double Returns the value associated with the datapoint.
IsEmpty()	Boolean True if no value exists for the datapoint.
SetEmpty(boolean empty)	void Sets a datapoint on a series to be empty. Parameters: • empty: Boolean, true if the datapoint is to be considered as empty, having no value
SetValue(double value)	void Sets the value of a datapoint. Parameters: • value: double, the value of the

	datapoint; setting a value makes a datapoint non-empty

ChartDiagram3D Class

ChartDiagram3D Methods

Method	Description
SetDrawWallOptions(long options, boolean redraw)	void Sets the option for how walls and floors - if any - are displayed on the 3D chart. The options parameter is a bitmask of one or more values from the ChartWallOptions enum. Parameters: • options: Long, bitmask of wall and floor display options • redraw: Boolean, redraws the chart after the function completes
SetRenderingType(long engine)	void Parameters: • engine: long, 0 for software,1 for openGL

ChartFormatSeries Class

A helper class for the ChartSeries class that allows setting appearance options.

ChartFormatSeries Methods

Method	Description
SetCurveType(ChartCurveType type)	void Sets the graphic option for rendering lines. Parameters: • type: long, one of the ChartCurveType enumerations
SetSeriesLineWidth(long width)	void Sets the line width in pixels. Parameters: • width: long, a pixel value
SetSeriesOutlineDashStyle(ChartDashStyle dashstyle)	void Sets the dash style of the line on the chart/graph. Parameters: • dashstyle: ChartDashStyle, one of the ChartDashStyle enumerations

ChartSeries Class

ChartSeries Methods

Method	Description
AddBoxPlotData(double ave, double min, double q1, double q2, double q3, double max, double notched)	long For a chart having the BoxPlot category, adds a single datapoint to the series. Parameters: • ave: double, the mean value at this point • min: double, the minimum value at this point • q1: double, the first quartile value • q2: double, the second quartile value • q3: double, the third quartile value • max: double the maximum value at this point • notched: double, for a series with notched style, the notched value to express at this point
AddDataPoint(double Y)	long Adds a datapoint to the series. Returns the index of the point, which is the

	number of points -1. Parameters: • Y: double, the Y axis value
AddDataPoint2(double Y, double X)	long Adds a datapoint to the series. Returns the index of the point, which is the number of points -1. Parameters: • Y: double, the Y axis value • X: double, the X axis value
AddDataPoint3(string category, double Y)	long Adds a Y axis value for a given category on the X axis. Parameters: • category: string, the category or column name • Y: double, the value
AddStockData(double open, double high, double low, double closing, VARIANT timestamp)	void Adds data to a series for a chart of the Stock category. Parameters: • open: double, opening value • high: double, high value • low: double, low value

	• closing: double, closing value • timestamp: {datetime, double utcsecs} either VARIANT date value or double, in which case the value is interpreted as the number of seconds since midnight on January 1st, 1970, UTC time
AddSurfaceColors(VARIANT colors)	void Adds one or more colors to the series. Parameters: • colors: long, or long[], a single RGB color or an array of RGB color values
CloseShape(boolean close, boolean fill)	void Connects the first and last datapoints and fills the shape if 'fill' is true. Parameters • close: Boolean, if true closes the series • fill: Boolean, fills the shape
GetDataPointCount()	long Returns the number of datapoints in the series.
GetDataPointValue(long index)	LDISPATCH Returns a ChartDataValue interface for the datapoint with the given index.

	Parameters: • index: long, the index of the datapoint (typically returned by AddDataPoint functions; a value in the range 0 to n-1, where n is the number of points returned by the *GetDataPointCount* function)
GetSeriesFormat()	LDISPATCH Returns a ChartFormatSeries interface that allows the chart appearance to be changed.
SetBarShape(long barshape)	void Sets the shape for Bar charts, 0 for Box, 1 for Pyramid, 2 for PyramidPartial. Parameters: • barshape: ChartBarShape, one of the ChartBarShape enumerations
SetColorMapCount(long count)	void Sets the number of colors used when rendering the series. Typical values are 4, 8, 16 and 32 Parameters: • count: long, the number of colors to use
SetColorMod	void

e(ChartColorMode mode)	For 3D charts, sets the interpolation method for filling shapes. Single, for example, would result in the 3D object being filled by varying the color slightly. The level of variation will depend on the number of colors used by the chart (see *SetColorMapCount*). Parameters: • mode: ChartColorMode
SetDrawFlat(boolean flat)	void Draws the shape flattened when set to true. Parameters: • flat: Boolean, draw flat
SetFrameColor(long color)	void Sets the color of the frame for 3D objects. Parameters: • color: long, the RGB color value for coloring the frame
SetFrameStyle(ChartFrameStyle style)	void Sets the frame style for the chart - none, mesh, contour or both. Parameters: • style: ChartFrameStyle, one of the

	ChartFrameStyle enumerations
SetGradientType(long type)	void Sets the gradient type to use. Parameters: • type: long, one of the ChartGradientType enumerations
SetGroupID(long id)	void Groups series on a stacked chart having the same id. Must be a non-negative number. Parameters: • id: long, a non-negative number used to group the series on a chart
SetLevelRangeMode(long mode)	void Sets the mode for ranges in series. • 0 - Minimum and maximum for Series • 1 - Minimum and maximum for Y axis • 2 - Custom Parameters: • mode: long, either 0 or 1 supported
SetRelatedAxis(string axis, long index)	void Sets the related axis for a series. The related axis is created using the Split

	function of the ChartAxis interface. The axis is first created using Split, then a new series is created, and this function called on it to one of its axes. The axis is specified by the index parameter; the value is one of the ChartAxisIndex enumerations (0 for X, 1 for Y or 2 for Z) Parameters: • axis: string, the guid of the axis returned by a ChartAxis.Split method call; returned by the ChartAxis.GetGuid method • index: long, one of the ChartAxisIndex enumerations
SetStockSeriesType(ChartStockSeriesType type)	void For Stock charts, sets the graphic used to render the series. Parameters: • type: ChartStockSeriesType, one of the ChartStockSeriesType enumerations
SetWireFrame(boolean wired)	void Sets the wireframe option on or off. When set to true, the chart is no longer rendered as a solid object but is instead rendered as a frame composed of wires. Parameters:

	• wired: Boolean, displays as a wireframe object if true