Mobile Analytics Kit Code Examples: iOS

Sybase Unwired Platform 2.1 ESD #2

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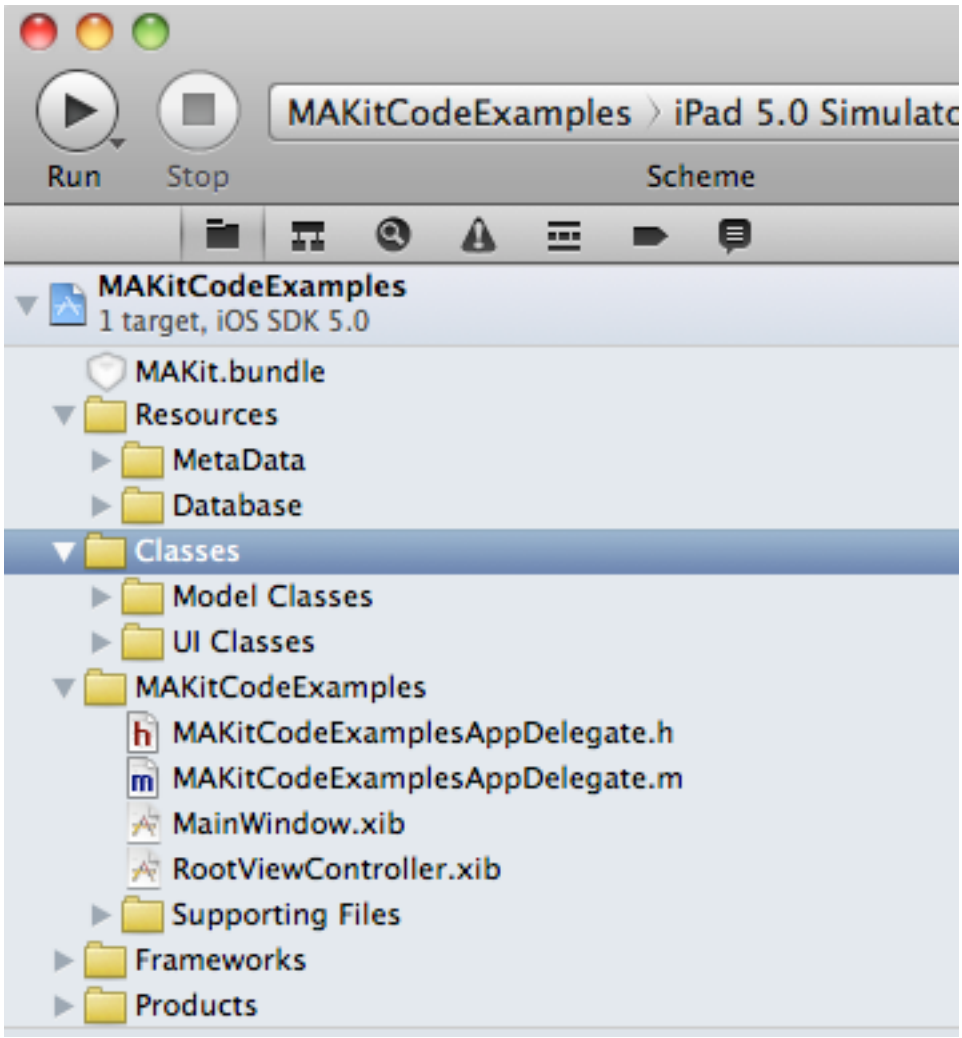
Introduction

The Mobile Analytics Kit (MAKit) code examples demonstrate the core features of MAKit charts, such as dashboard configuration, applying analytical capability to the charts using the dynamic analytic panels, chart drilldown and filtering, and semantic zooming. Additionally, all charts have a built-in e-mail sharing feature, which captures a snapshot image of the chart, and allows the device user to first annotate, then send the image via the configured e-mail application. MAKit can be used with the Sybase® Unwired Platform Hybrid Web Container.

Code Examples Setup

Note: These setup instructions are specific to the Xcode 4.0 IDE. For earlier versions of Xcode, the steps may differ.

1. Copy `MAKitCodeExamples.zip` to your Mac.
2. Unzip `MAKitCodeExamples.zip`. This creates a folder called `MAKitCodeExamples`.
3. In the Xcode IDE, double-click **MAKitCodeExamples.xcodeproj**. You should see a screen similar to:



- `Classes` – contains the application source code for the code examples.
- `XIB Files` – contains the Interface Builder files used in the code examples.
- `Database` – contains the SQLite® database `MAKitSampleDb.sqlite`, which is the datasource for the code examples.
- `MetaData` – has all the metadata files for each individual feature in the code examples.

All other folders are created by default for any Xcode 4.2 project.

4. To run the code example in iPad Simulator, select **Product > Run**, or click the **Run** toolbar button.

5. To run the code example on an Apple iPad, install a valid device provisioning profile in the Xcode IDE before deploying to the device.

Code Examples

Basic Dashboards

This section demonstrates the chart types supported by MAKit. You can group related charts together to create a meaningful dashboard, for example, a sales or stock information dashboard. See the "Dashboard_ChartTypes.xml" metadata file content to learn how to configure different chart types.

Configure all charts using the *<Dashboard>…</Dashboard>* tags.

Examples of Chart Configuration

```
<Chart Name="ColumnChart" Title="Region/Product Sales" ChartType="Column" Query="SalesOrder">
    <Category Format="" Column="Region" DisplayName="Region" />
    <Series Format="" Column="Product" DisplayName="Region" />
    <Values>
         <Value Format="Currency" Expression="SalesAmount" ValueSequence="1"
                DisplayName="Sales Amount" /> </Values>
</Chart>

<Chart Name="BarChart" Title="Salary By Dept/Gender" ChartType="Bar" Query="DeptSalary">
    <Category Format="" Column="Department" DisplayName="Department" />
    <Series Format="" Column="Sex" DisplayName="Gender" />
    <Values>
        <Value Format="Rounded2" Expression="Salary" ValueSequence="1" DisplayName="Salary" />
    </Values>
 </Chart>

<Chart Name="LineChart" Title="Number Of Sales Orders" ChartType="Line" Query="NumberOfOrders">
    <Category Format="" Column="Year" DisplayName="Year" />
    <Series Format="" Column="Region" DisplayName="Region" />
    <Values>
        <Value Format="Rounded0" Expression="OrderCount" ValueSequence="1"
               DisplayName="Number Of Orders" />
    </Values>
</Chart>

<Chart Name="PieChart" Title="Printer Sales" ChartType="Pie" Query="PrinterSales">
    <Category Format="" Column="SalesRep" DisplayName="Sales Rep" />
    <Series Format="" Column="Product" DisplayName="Type" />
    <Values>
        <Value Format="Currency" Expression="Sales" ValueSequence="1" DisplayName="Sales Amount " />
    </Values>
</Chart>

<Chart Name="BubbleChart" Title="US Crime Data" ChartType="Bubble" Query="CrimeData">
    <Category Format="" Column="State" DisplayName="State" />
    <Series Format="" Column="CrimeType" DisplayName="CrimeType" />
    <Values>
        <Value Format="Rounded2" Expression="Ratio" ValueSequence="1" DisplayName="Crime Ratio" />
        <Value Format="Rounded2" Expression="Ratio" ValueSequence="2" DisplayName="Crime Ratio" />
    </Values>
</Chart>
```

The metadata file also configures the dashboard layouts for either portrait or landscape mode.

Example of Dashboard Layout

```
<DashboardLayout>
       <Landscape>
            <Layout Name="ColumnChart" Top="1" Left="1" Width="49" Height="32" />
            <Layout Name="BarChart" Top="1" Left="51" Width="48" Height="32" />
            <Layout Name="LineChart" Top="34" Left="1" Width="49" Height="32" />
            <Layout Name="PieChart" Top="34" Left="51" Width="48" Height="32" />
            <Layout Name="BubbleChart" Top="67" Left="1" Width="98" Height="32" />
        </Landscape>
        <Portrait>
            <Layout Name="ColumnChart" Top="1" Left="1" Width="49" Height="32" />
            <Layout Name="BarChart" Top="1" Left="51" Width="48" Height="32" />
            <Layout Name="LineChart" Top="34" Left="1" Width="49" Height="32" />
            <Layout Name="PieChart" Top="34" Left="51" Width="48" Height="32" />
            <Layout Name="BubbleChart" Top="67" Left="1" Width="98" Height="32" />
        </Portrait>
  </DashboardLayout>
```

This dashboard layout configuration renders a chart similar to:

Dynamic Analytic Panel

This section demonstrates the dynamic analytic capabilities of MAKit. Dynamic analytics is a powerful feature that lets you interactively visualize reports by changing some parameters (“what-if” analysis) at runtime, and refreshing charts based on the new values.

The heart of dynamic analytics is the variable definition in the metadata, which constructs the value axis expressions using the variables. When the device user changes the variable value runtime, MAKit evaluates the value axis expression, and refreshes the charts based on the new value.

Define variables in the metadata using the *<Variables>……</Variables>* tags, and group them in the DAPanel metadata using the *<DAPanel>……</DAPanel>* tags. Configure the DAPanel using a dashboard layout that is similar to that used for configuring charts.

MAKit automatically generates UI controls to manipulate the values of these variables:

Variable Type	User Interface Generated by MAKit
integer	Slider control
float	PickerView control
boolean	Switch control
enum	PickerView control
datetime	Date Picker control

Example of Variable Definition

```
<Variables>

   <Variable Name="$salesdrive" DisplayName="Sales Promotion ?" VariableType="boolean" Value="0" />

   <Variable Name="$region" DisplayName="Sales Promotion in " VariableType="enum" Selection="0">
      <Choices>
          <Choice Display="Eastern" Value="Eastern" />
          <Choice Display="Western" Value="Western" />
          <Choice Display="Central" Value="Central" />
          <Choice Display="South" Value="South" />
          <Choice Display="Canada" Value="Canada" />
       </Choices>
  </Variable>
  <Variable Name="$dept" DisplayName="Pay Raise Department " VariableType="enum" Selection="0">
     <Choices>
         <Choice Display="R &amp; D" Value="R &amp; D" />
         <Choice Display="Sales" Value="Sales" />
         <Choice Display="Finance" Value="Finance" />
         <Choice Display="Marketing" Value="Marketing" />
         <Choice Display="Shipping" Value="Shipping" />
      </Choices>
   </Variable>
   <Variable Name="$hike" DisplayName="Pay Raise % " VariableType="float" Value="0" Min="0"
             Max="18" Decimals="1" />
</Variables>
```

The variables defined in the metadata are used in value expressions of chart configuration as shown here:

```
<Chart Name="ProductSales" Title="Region/Product Sales" ChartType="Column" Query="SalesOrder">
   <Category Format="" Column="Region" DisplayName="Region" />
   <Series Format="" Column="Product" DisplayName="Product" />
   <Values>
       <Value Format="Currency" Expression="if($salesdrive==1,SalesAmount+(SalesAmount *
                            0.30),if(Region==$region, SalesAmount+(SalesAmount * 0.80),SalesAmount))"
                     ValueSequence="1" DisplayName="Sales Amount" />
   </Values>
 </Chart>

<Chart Name="Orders" Title="Number Of Sales Orders" ChartType="Line" Query="NumberOfOrders">
   <Category Format="" Column="Year" DisplayName="Year" />
   <Series Format="" Column="Region" DisplayName="Region" />
   <Values>
      <Value Format="Rounded0" Expression="if($salesdrive==1,OrderCount * 2,
             if(Region==$region, OrderCount * 6,OrderCount))" ValueSequence="1"
                       DisplayName="Number Of Orders" />
      </Values>
</Chart>

<Chart Name="PayRaise" Title="Department Salary" ChartType="Bar" Query="DeptSalary">
    <Category Format="" Column="Department" DisplayName="Department" />
    <Series Format="" Column="Sex" DisplayName="Gender" />
    <Values>
       <Value Format="Rounded2" Expression="if(Department==$dept,(Salary + Salary *
                                ($hike/100)),Salary)" ValueSequence="1" DisplayName="Salary" />
    </Values>
</Chart>
```

DAPanel Configuration in Dashboard and DashboardLayout

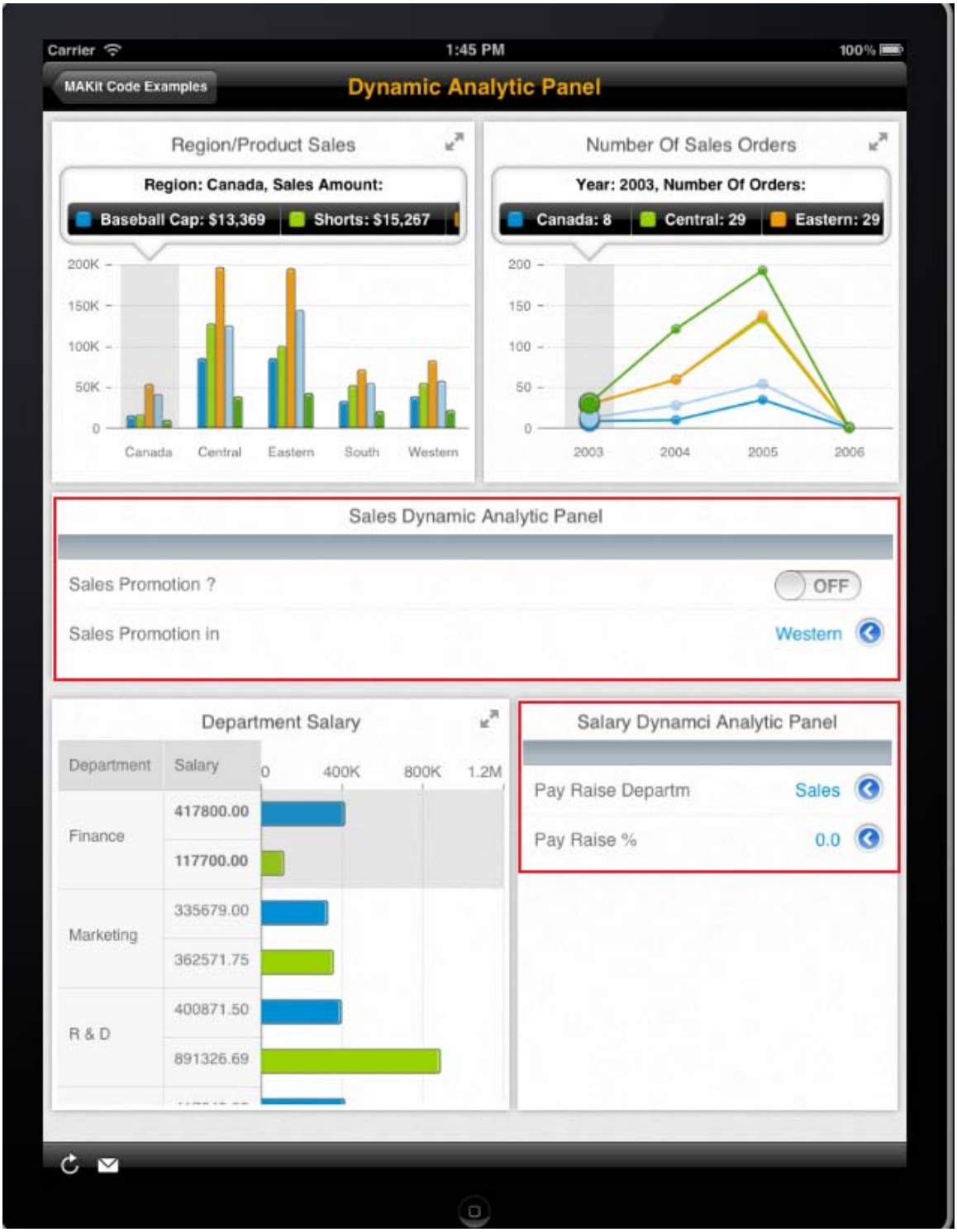
```
<DAPanel Name="SalesDA" Title="Sales Dynamic Analytic Panel">
    <VariableName Name="$salesdrive" Sequence="1" />
    <VariableName Name="$region" Sequence="2" />
</DAPanel>

<DAPanel Name="EmpDA" Title="Salary Dynamci Analytic Panel">
    <VariableName Name="$dept" Sequence="1" />
    <VariableName Name="$hike" Sequence="2" />
</DAPanel>
```

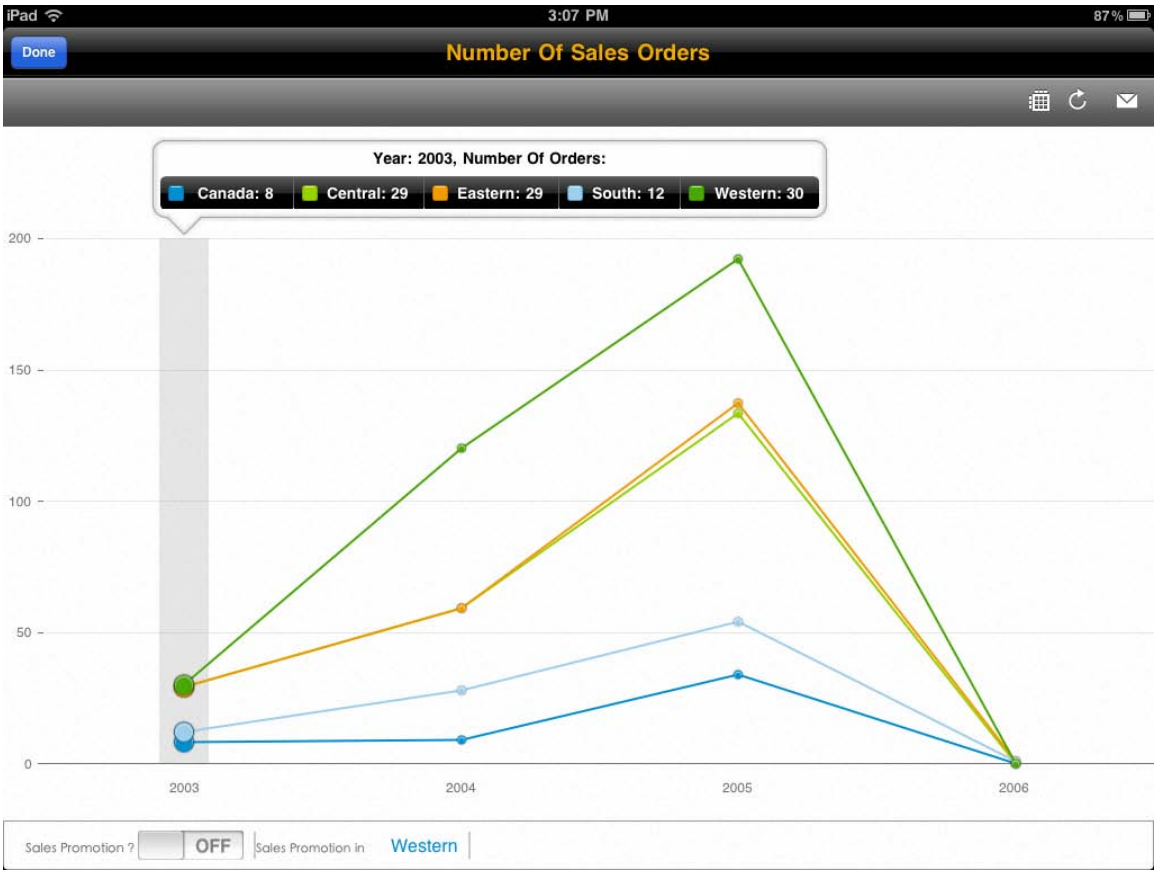
```
<DashboardLayout>
    <Landscape>
        <Layout Name="ProductSales" Top="1" Left="1" Width="49" Height="35" />
        <Layout Name="Orders" Top="1" Left="51" Width="48" Height="35" />
        <Layout Name="SalesDA" Top="37" Left="1" Width="98" Height="20" />
        <Layout Name="PayRaise" Top="60" Left="1" Width="53" Height="35" />
        <Layout Name="EmpDA" Top="60" Left="55" Width="44" Height="35" />
    </Landscape>

    <Portrait>
        <Layout Name="ProductSales" Top="1" Left="1" Width="49" Height="35" />
        <Layout Name="Orders" Top="1" Left="51" Width="48" Height="35" />
        <Layout Name="SalesDA" Top="37" Left="1" Width="98" Height="18" />
        <Layout Name="PayRaise" Top="57" Left="1" Width="53" Height="40" />
        <Layout Name="EmpDA" Top="57" Left="55" Width="44" Height="40" />
    </Portrait>
</DashboardLayout>
```

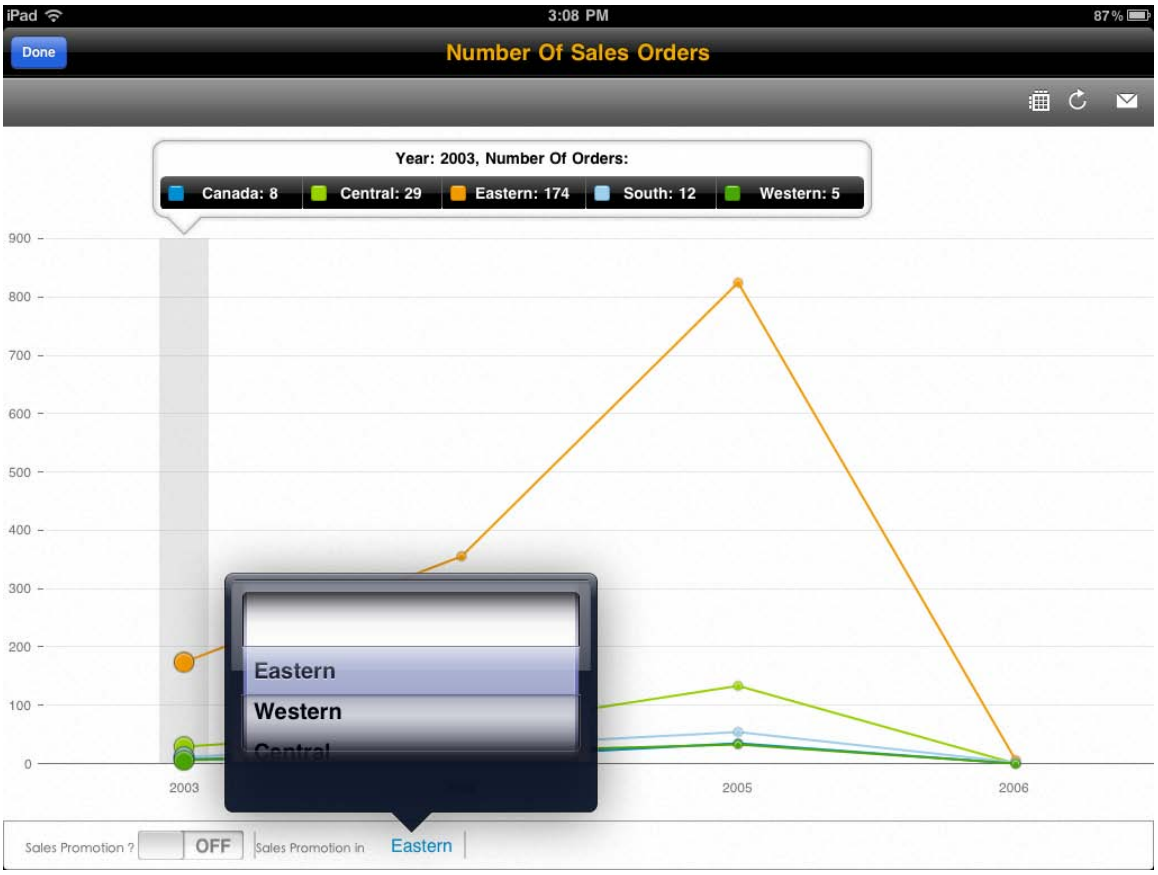
The Dynamic Analytic panel renders in the dashboard in the same manner as individual chart items. When variable values are changed, relevant charts are refreshed based on the expression evaluation.



The Dynamic Analytic panel appears when the chart is in full-view mode:



This figure shows the refreshed chart based on a new variable value ("Eastern"):



Drilldown Charts

MAKit lets you drill down ByCategory or BySeries, and both on a single chart. You can define any level of drilldown chart in the metadata definition.

You can drill down only when the chart is in full-view mode, by double-tapping the chart (drilldown ByCategory) or in the data grid table of the chart. Double-tap in the data grid table on the category value to drill down ByCategory; double-tap on the series value to drill down BySeries.

Configure the drilldown charts using `<DrillDownGroup>….</DrillDownGroup>` tags; configure individual charts at each level using `<Chart> …. </Chart>` tags.

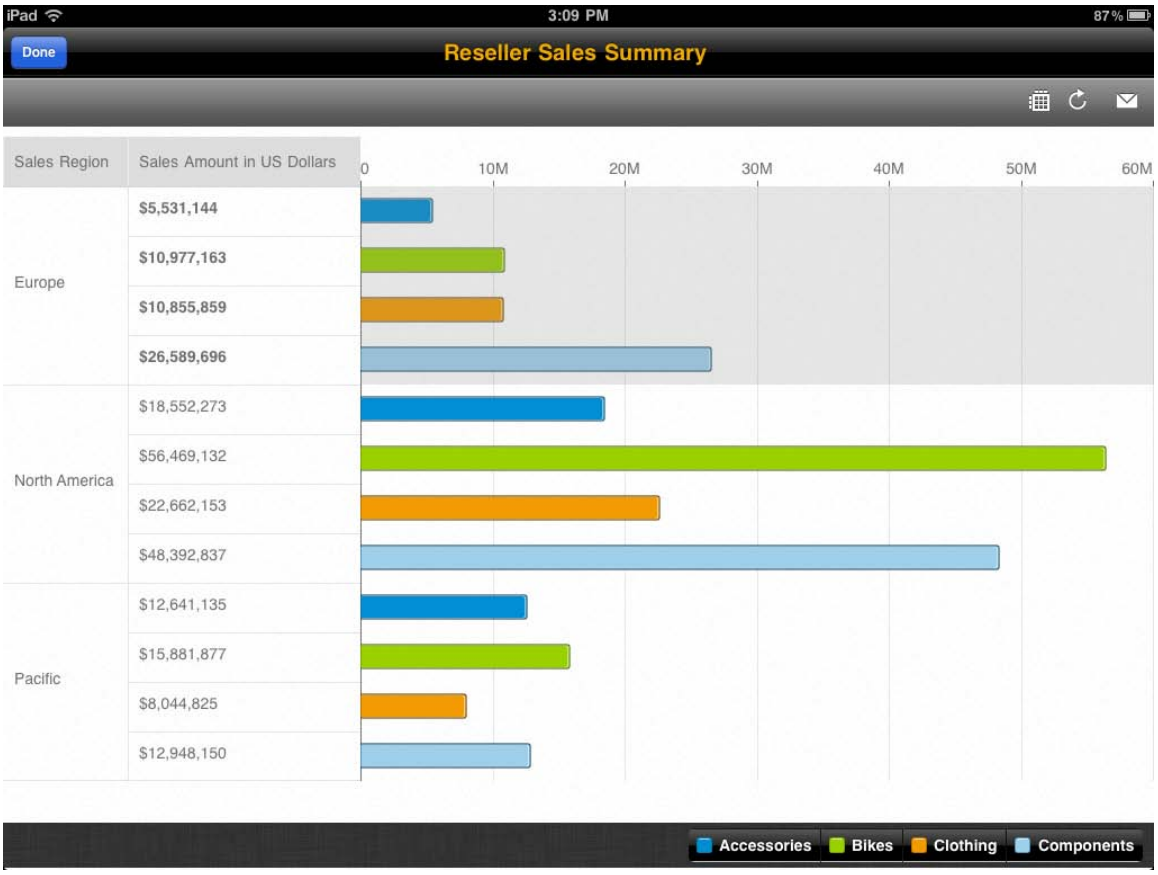
See the "Drilldown_Sales.xml" and "Drilldown_Energy.xml" metadata files in the code example to see the drilldown configurations.

Example of Drilldown Configuration

```
<DrillDownGroup Name="Reseller" Title="Reseller Drilldown Charts">
   <Chart Name="ResellerSales" Title="Reseller Sales Summary " ChartType="Bar" ChartSequence="1"
                                     Query="ResellerSummary" >
       <Category Format="" Column="Region" DisplayName="Sales Region" />
       <Series Format="" Column="ProductCategory" DisplayName="ProductCategory" />
       <Values>
         <Value Format="Currency" Expression="SalesAmount" ValueSequence="1"
                                  DisplayName="Sales Amount in US Dollars" />
        </Values>
    </Chart>
    <Chart Name="SalesByCountry" Title="Reseller Sales By Country" ChartType="Bar" ChartSequence="2"
                                       Query="ResellerByCountry" >
        <Category Format="" Column="Country" DisplayName="Country" />
        <Series Format="" Column="ProductCategory" DisplayName="Product Category" />
        <Values>
             <Value Format="Currency" Expression="SalesAmount" ValueSequence="1"
                                      DisplayName="Sales Amount in US Dollars" />
        </Values>
    </Chart>
    <Chart Name="SalesByCategory" Title="Sales By Product Category " ChartType="Bar" ChartSequence="3"
                                         Query="ResellerByCategory">
        <Category Format="" Column="ProductSubCategory" DisplayName="Product Sub Category" />
        <Series Format="" Column="Country" DisplayName="Country" />
        <Values>
            <Value Format="Currency" Expression="SalesAmount" ValueSequence="1"
                                     DisplayName="Sales Amount in US Dollars" />
         </Values>
     </Chart>
 </DrillDownGroup>
```

The Drilldown chart is rendered similarly to other charts configured in the dashboard layout:

Drilldown chart in full-view mode:



Drilldown ByCategory (double-tap “Europe” in the bar chart):

Drilldown BySeries (double-tap ”Bikes” in the table*)*:

Dashboard Filters

MAKit dashboard filters let you filter chart data using query arguments. Filters are global in nature and affect all charts associated with that filter. Data that does not fulfill the range or criteria specified is filtered out.

Filters are initially defined in the metadata using *<Dashboard> …. </Dashboard>* tags, and individual charts configured in the metadata can apply previously defined filters.

There are two types of filter: a range filter lets you specify an integer range, and a picklist filter lets you select discrete sets of data criteria.

Example of Filter Definition/Chart Filter Configuration

```
<!-- Filter Definition in Dashboard -->
<Filters>
  <Filter Name="Products" Sequence="1" SourceQuery="ResellerQry" FilterType="picklist"
              Column="ProductCategory" />
  <Filter Name="Region" Sequence="2" SourceQuery="ResellerQry" FilterType="picklist" Column="Region" />
  <Filter Name="Sales Reason" Sequence="3" SourceQuery="OnlineSalesQry" FilterType="picklist"
              Column="SalesReason" /
</Filters>


<!-- Configuring Charts with Filters -->

<Chart Name="ResellerSales" Title="Reseller Sales By Product" ChartType="Column" Query="ResellerQry">
    <Category Format="" Column="ProductCategory" DisplayName="Product Category" />
    <Series Format="" Column="Region" DisplayName="Sales Region"/>
    <Values>
       <Value Format="Currency" Expression="SalesAmount" ValueSequence="1" DisplayName=" " />
    </Values>
    <Filters>
        <FilterName Name="Products" />
        <FilterName Name="Region" />
    </Filters>
</Chart>

<Chart Name="OnlineSales" Title="Online Sales Drive" ChartType="StackedColumn" Query="OnlineSalesQry">
   <Category Format="" Column="SalesReason" DisplayName="Sales Reason" />
   <Series Format="" Column="Region" DisplayName="Sales Region"/>
   <Values>
      <Value Format="Currency" Expression="SalesAmount" ValueSequence="1" DisplayName="" />
   </Values>
   <Filters>
       <FilterName Name="Sales Reason" />
       <FilterName Name="Region" />
   </Filters>
</Chart>
```

Dashboard filters work only in the dashboard view; they are unavailable full-view mode.

The filters defined on the dashboard appear in the top row:

Picklist filter:

Result of filters applied*:*

Zooming Charts

Semantic zooming lets users view a large data set in different scales. Users can see an overview of a large chart by zooming out, and get every detail by zooming in.

Configure zooming charts, and the behavior of a chart at each zooming level in the metadata configuration file.

Like drilldown charts, zooming can be performed only in full-view mode, via hierarchy buttons.

Example of Zooming Chart Configuration

```
<Chart Name="ZoomingChart" Title="Sales By Product Category" ChartType="Column">
   <Category Format="" DisplayName="" />
   <Values>
     <Value Format="Rounded2" Expression="SalesAmount" ValueSequence="1" DisplayName="Sales Amount" />
    </Values>
    <ZoomingLevels>
         <ZoomingLevel Query="SalesByCategory" CategoryColumn="ProductCategory"
                       Title="ProductCategory" />
         <ZoomingLevel Query="SalesBySubCategory" CategoryColumn="SubCategory"
                       Title="ProductSubCategory" />
         <ZoomingLevel Query="SalesBySubCategoryAndYear" CategoryColumn="Year" Title="Year" />
     </ZoomingLevels>
</Chart>
```

Chart at ZoomLevel=1

Chart at ZoomLevel=2

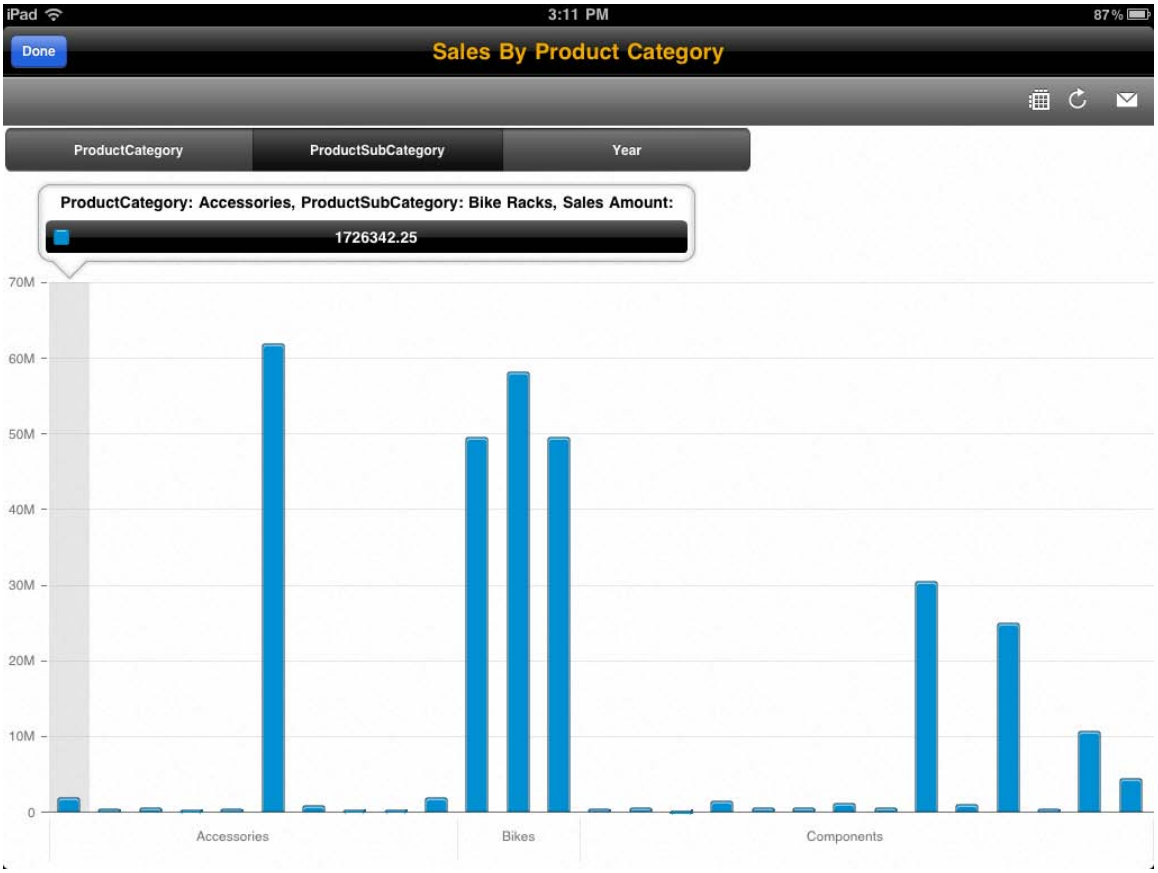
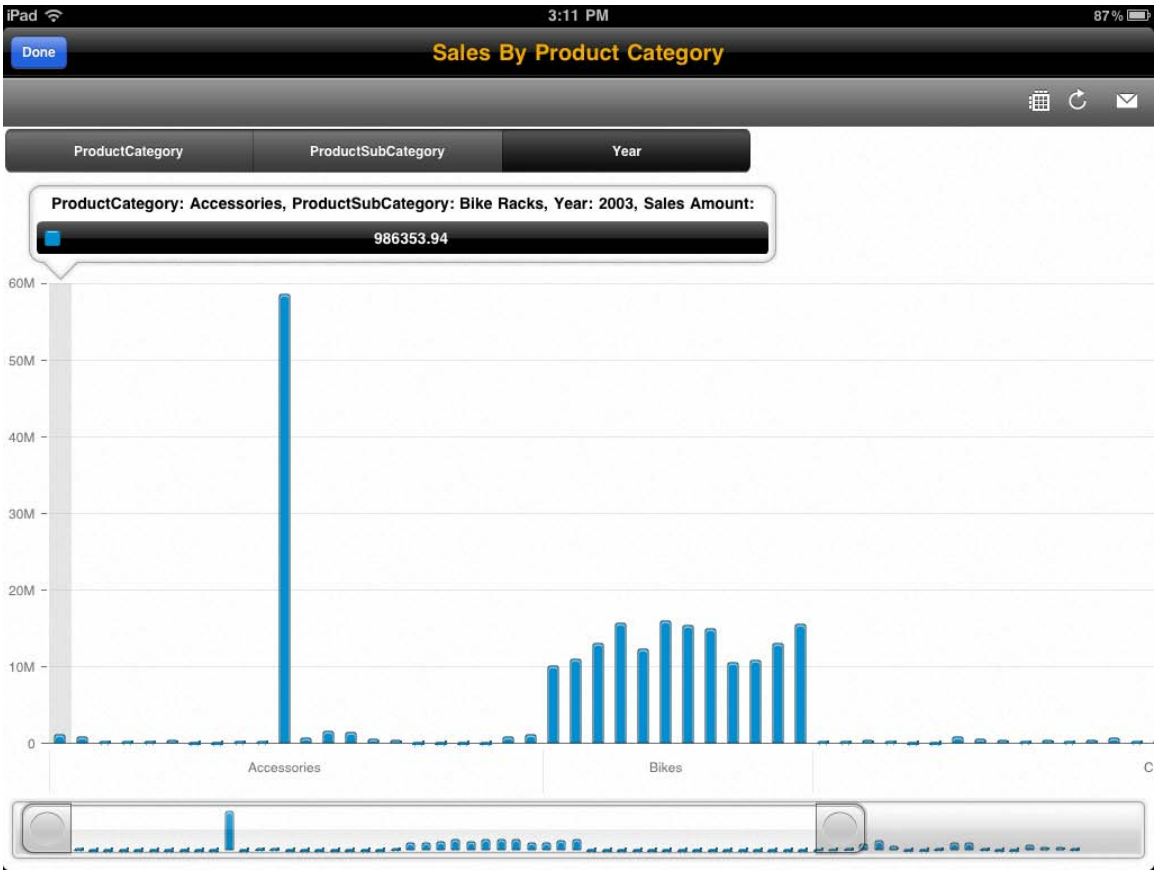


Chart at ZoomLevel=3



What-If Analysis

What-if analysis is similar to dynamic analytics. Both allow the user to change data behind the chart and immediately see the chart updated; both map the data to UI controls on the screen. However, dynamic analytics changes the variables defined in expressions, while what-if analysis changes data retrieved from the datasource.

Configure what-if analysis in the metadata, using what-if columns, which are used in value expressions in the chart configuration.

Configure what-if columns using *<WhatIfColumns>…</WhatIfColumns>* tags.

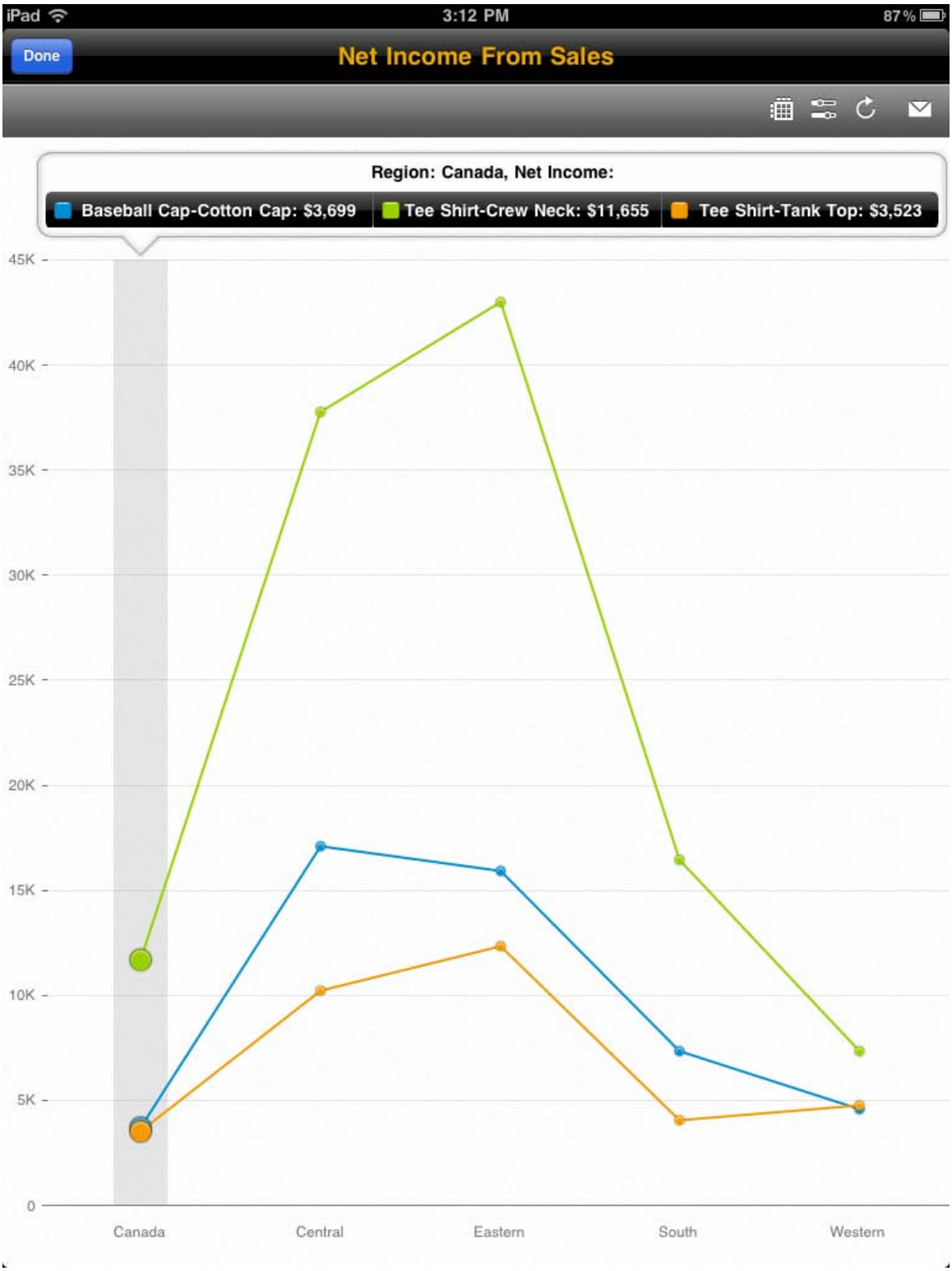
Example of What-If Analysis Configuration

```
<Chart Name="WhatIfChart" Title="Net Income From Sales" ChartType="Line" Query="ProductSales">
   <Category Format="" Column="Region" DisplayName="Region" />
   <Series Format="" Column="Product" DisplayName="Product" />
   <Values>
       <Value Format="Currency" Expression="((UnitPrice * Quantity) - ((Cost_Of_Revenue * Quantity) +
                           (RD_Cost * Quantity) + (Mkt_Cost * Quantity) + (Admin_Cost * Quantity)))"
                          ValueSequence="1" DisplayName="Net Income" />
  </Values>
  <!-- What If Columns -->
  <WhatIfColumns>
     <Column Name="UnitPrice" DisplayName="Unit Price" VariableType="float" Min="1.0" Max="110.0"
                            Step="1.0" Decimals="2" />
     <Column Name="Cost_Of_Revenue" DisplayName="Cost Of Revenue" VariableType="integer" Min="1"
                           Max="40" />
     <Column Name="RD_Cost" DisplayName="R &amp; D Cost" VariableType="integer" Min="1" Max="18"  />
     <Column Name="Mkt_Cost" DisplayName="Marketing Cost" VariableType="float" Min="1.0" Max="10.0"
                            Step="1.0" Decimals="2" />
  </WhatIfColumns>
</Chart>
```

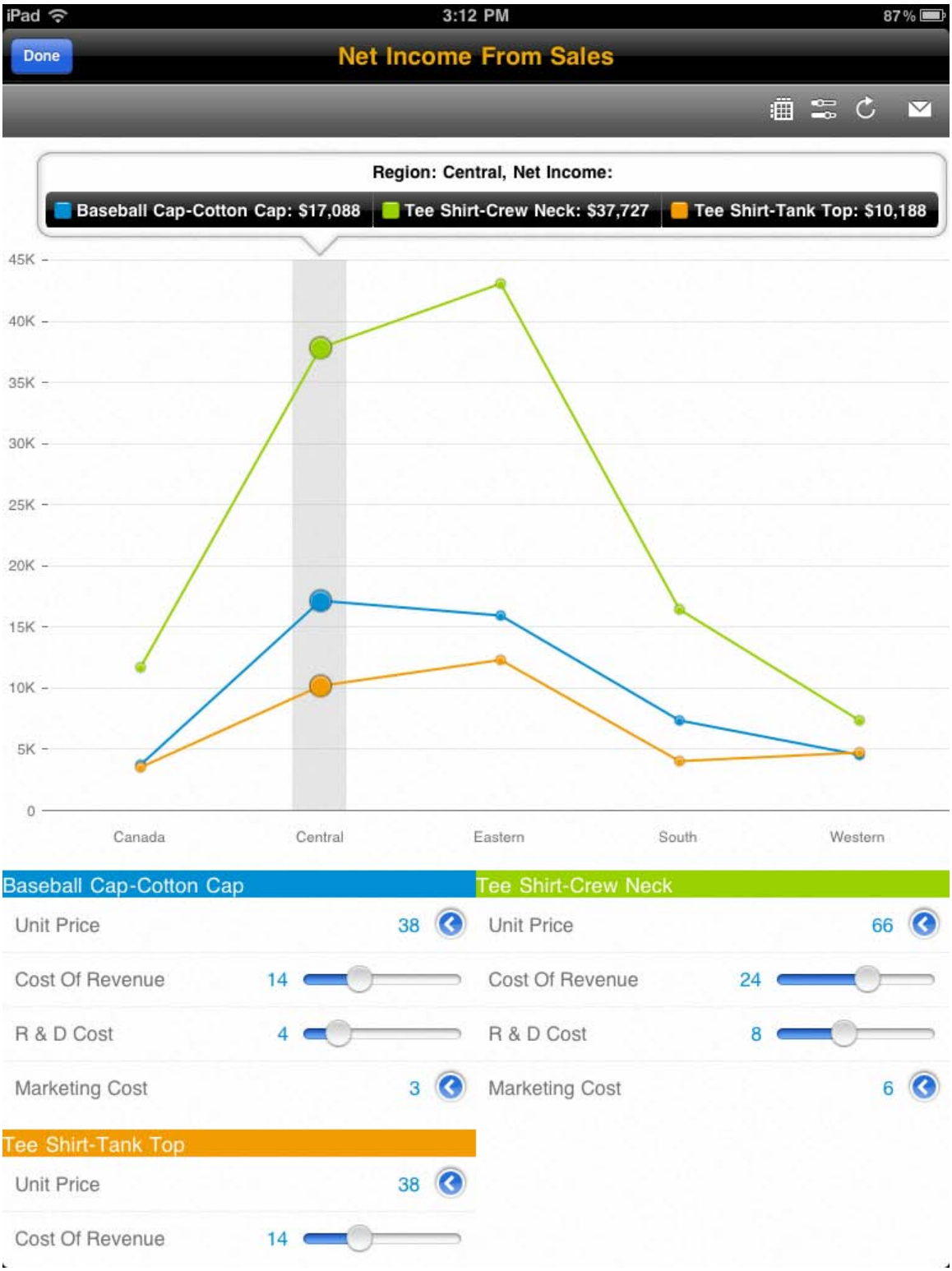
What-if analysis works only in full-view mode, rendering a UI control for each what-if column in the metadata.

To see what-if analysis behavior, select a category and tap the **W.I** button in the toolbar. Tap the **W.I** button again to close the What-If panel. When the What-If panel is open, changing the values in a what-if column immediately updates the chart for the selected category.

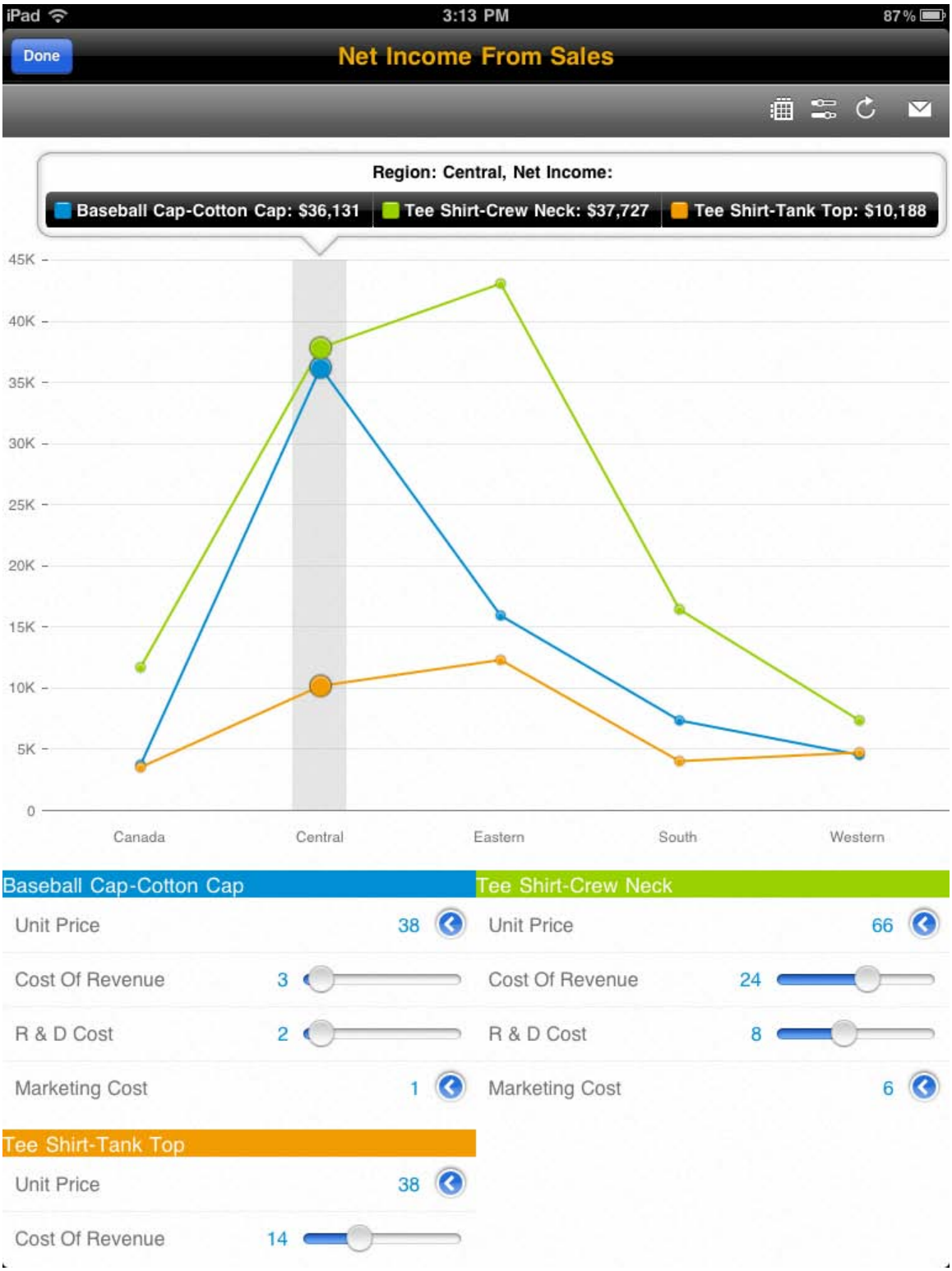
Chart in full-view mode before the W.I panel is invoked:



Tap the button to invoke the What-If panel for the selected category ("Central" region):



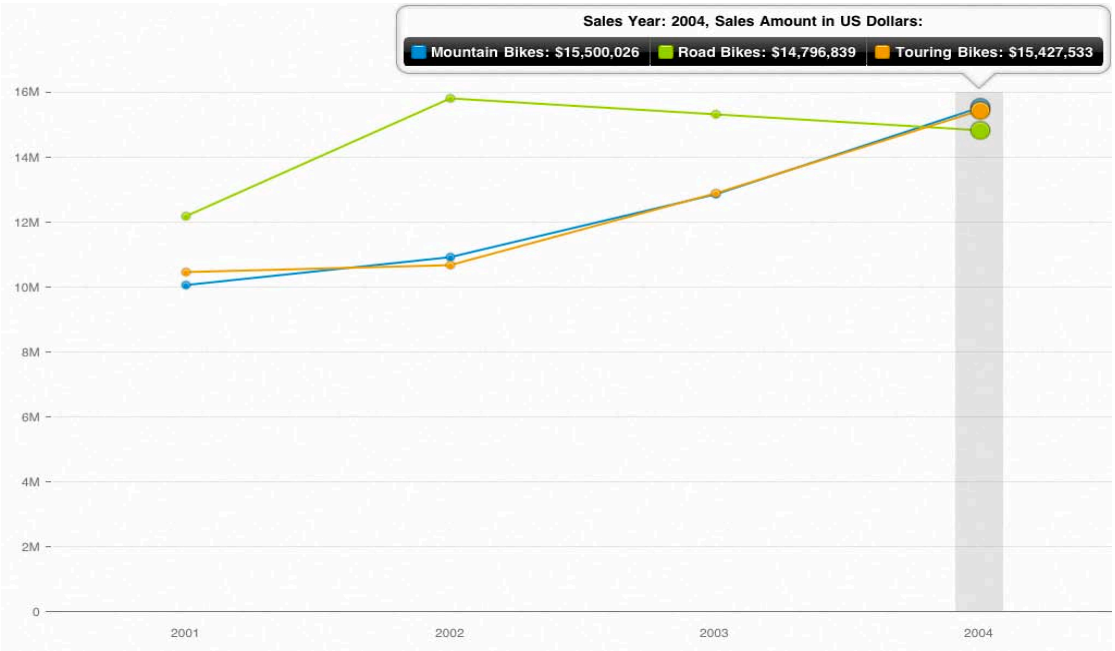
Changing the values for the What-If column updates the chart accordingly:



MAAnalyticChartView

Use the MAAnalytiChartView class to create a single-chart view using metadata definitions. Drilldown, semantic zooming, and what-if analysis are all available in the single-chart view.

Example of AnalyticChartView Configuration

The metadata definition is the same as that used to create dashboard view, but only the first chart in the metadata is used. Dashboard layout configurations defined in the metadata are not applicable.

```
<MobileAnalytic >
    <Dashboard>
        <!-- WhatIf Chart Configuration -->
        <Chart Name="WhatIfChart" Title="Net Income From Sales" ChartType="Line" Query="ProductSales">
            <Category Format="" Column="Region" Description="Region" />
            <Series Format="" Column="Product" Description="Product" />
            <Values>
                <Value Format="Currency" Expression="((UnitPrice * Quantity) - ((Cost_Of_Revenue *
Quantity) + (RD_Cost * Quantity) + (Mkt_Cost * Quantity) + (Admin_Cost * Quantity)))"

                ValueSequence="1" Description="Net Income" />
            </Values>
            <!-- What If Columns -->
            <WhatIfColumns>
                <Column Name="UnitPrice" Description="Unit Price" VariableType="float" Value="0.0"
Min="1.0" Max="110.0" Step="1.0" Decimals="2" />
                <Column Name="Cost_Of_Revenue" Description="Cost Of Revenue" VariableType="integer"
Value="0" Min="1" Max="40" />
                <Column Name="RD_Cost" Description="R &amp; D Cost" VariableType="integer" Value="0"
Min="1" Max="18"  />
                <Column Name="Mkt_Cost" Description="Marketing Cost" VariableType="float" Value="0.0"
Min="1.0" Max="10.0" Step="1.0" Decimals="2" />
            </WhatIfColumns>
        </Chart>

    </Dashboard>
</MobileAnalytic>
```