Tips and Tricks and Ideas for building new GUI features in your Powerbuilder Classic applications

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- PowerBuilder developer since 1992!
- Created many PowerBuilder tools for Eurelys/Novalys (PB Framework, security management tool)
- Created HTMLBridge 17 Years ago for building HTML Web App with the Webpb Technology
- Spent 10 years building Web/HTML applications with PowerBuilder
• Sagem, a Safran high-tech company
  • World or European leadership in optronics, avionics, electronics and critical software
  • Sagem Avionics LLC (Texas): Specialist in avionics for civil and military aircraft for North America
• Safran S.A. is a French multinational aircraft and rocket-engine, aerospace-component, and security company
• Revenue €14 billion
• Number of employees : 62,500
• Flight data analysis improving safety and facilitating maintenance.

• Used by: aircraft and helicopter manufacturers, 160 Airlines all over the world

Analysis Ground Station (AGS) Software
AGS lets you display flights’ data but more important, it enables companies to analyze those data and specify security rules to automatically detect aircraft security issues that may occur or that did occur (black-box data analysis).
• Development started in 1998
• New features/developments every years (V14)
• Main analysis Engine and generated code : MS C.
• Data in binary files and SQL Anywhere Database
• 3D rendering and Graphical Display: MS C++ ActiveX
• Graphical User Interface : PowerBuilder 9.0-12.1
• Statistical tool : Business Objects
Enhancing a PB application GUI

- Tabbed MDI management
- Gradients
- Master/detail tabs
- Google Earth
- Web page Presentation/scrolling

- Asking the pros
- Using colors and images
- Using left panels for enhanced criteria input
- Adding a Web module with Appeon
Could not wait for PB12.6 and dockable windows

- Made with a standard PB tab control
- Resizing the mdi_1
- Setting window coordinates to: – (title bar height)
How to know the size of the Pb menu bar and the Pb toolbar:

Mdi frame window open event:

```powershell
this.toolbaralignment=Floating!
il_menu_height= this.mdi_1.y
this.toolbaralignment=alignAtTop!
il_pb_toolbar_height = this.mdi_1.y - il_menu_height
this.toolbaralignment=alignAtleft!
il_pb_toolbar_width = this.mdi_1.x
getapplication().toolbartext = TRUE
il_pb_toolbar_width_text =  this.mdi_1.x
this.toolbaralignment=alignAtTop!
il_pb_toolbar_height_text = this.mdi_1.y - il_menu_height
getapplication().toolbartext = false
this.toolbaralignment=AlignAttop!
getapplication().toolbarusercontrol=false
```
Tip: How to know the size of window borders and window title bars:

Any window event:

```
ll_border_width = (this.width - this.workspacewidth())/2
ll_title_height = this.height - this.workspaceheight() - ll_border_width
```
Skinning your datawindows

- Using the new Gradient feature in grid datawindow
- Using odd/even row colors
- Removing 3D effects (no borders)
- Keeping the MS Windows selected theme colors (button face...)

Gradients
Skinning a Grid dw:

```c
//SKINS A GRID DATAWINDOW
int li_pos_tab
datawindow dw
string ls_objects, ls_object, ls_modify, ls_bond

// if adv.describe("datawindow.processing") = "1" THEN

     // background
     adv.modify("datawindow.color="#1073741824""
     adv.modify("datawindow.gradient Color="#134217728"
     adv.modify("datawindow.brushmode="#f"
     adv.modify("datawindow.gradient.focus="#55"
     adv.modify("datawindow.gradient.angle="#181"
     adv.modify("datawindow.scale="#100"

     // rows
     adv.modify("datawindow.detail.color="#1073741824"
     adv.modify("datawindow.detail.gradient.color="#134217728"
     adv.modify("datawindow.detail.brushmode="#0-if (mod(getrow(),2) = 1, 0, 4)"
     adv.modify("datawindow.detail.gradient.focus="#55"
     adv.modify("datawindow.detail.gradient.angle="#181"
     adv.modify("datawindow.scale="#100"

     // Headers
     adv.modify("datawindow.header.color="#134217728"
     adv.modify("datawindow.header.gradient.color="#1073741824"
     adv.modify("datawindow.header.brushmode="#2"
     adv.modify("datawindow.header.header.gradient.focus="#0"
     adv.modify("datawindow.header.gradient.angle="#80"

     // skin first column
     adv.modify("index.background.color="#134217728"
     adv.modify("index.background.gradient.color="#1073741824"
     adv.modify("index.background.brushmode="#1"
     adv.modify("index.background.gradient.focus="#0"
     adv.modify("index.background.gradient.angle="#80"
     adv.modify("index.border="#0"

// setting all headers with transparent background and no borders
ls_objects = adv.describe("datawindow.objects")
DO WHILE ls_objects <> ":" 
   ls_modify = ""
   li_pos_tab = pos(ls_objects,"/"
   IF li_pos_tab = 0 THEN li_pos_tab = len(ls_objects)
   ls_object = mid(ls_objects,1,li_pos_tab-1)
   ls_objects = mid(ls_objects,li_pos_tab+1)
   ls_band = adv.describe("ls_object+.band")
   IF pos(get,ls_objects,ls_band) THEN
      ls_modify = "-t+*" + ls_object+"+.background.mode="#1"
      ls_modify = "-t+*" + ls_object+".border="#0"
   END IF
   is_row = adv.modify(ls_modify)
   LOOP
```

Gradients
Using Tabular datawindows as Tab controls
Master/detail Tabs
Tab control tabular Datawindow

- Add selected computed columns to datasource
- Use a round rectangle with Gradient for tabs’ background and change color when selected

```
if(isnull(selected),rgb(192,192,192),rgb(50,50,50))
```

- Use png image with transparency for tab image
- Use transparency on data column and set escapement property to 2700 for vertical display
- Use text control for tab actions with webding font
- Synchronise tab with master dw (sharedata) and on rowfocuschange, set selected to 1

Almost no code needed ! ! !
Using the Google Earth Plugin with PB

- Insert a Web browser control in your window
- Generate an html file with javascript to display your data on Google Earth
- Navigate to this local page
Initial HTML File that displays Google Earth

```html
1. <html>
2. <head>
3. <title>Initial HTML File</title>
4. <script type="text/javascript" src="https://www.google.com/jsapi"></script>
5. <script type="text/javascript" src="http://earth-dev-samples.googlecode.com/svn/trunk/lib/kml/demos.js" type="text/javascript"></script>
6. <script type="text/javascript">
7. var g;
8. google.load("earth", "1");
9. 
10. function init() {
11. google.earth.createInstance('map3d', initCB, failureCB);
12. }
13. 
14. function initCB(instance) {
15. ge = instance;
16. ge.getWindow().setVisibility(true);
17. var navControl = ge.getNavigationControl();
18. navControl.setVisibility(ge.VISIBILITY_SHOW);
19. }
20. 
21. function failureCB(errorCode) {
22. 
23. google.setOnLoadCallback(init);
24. 
25. }
26. 
27. </html>
28. <body scroll="no" leftmargin="0px" topmargin="0px" marginwidth="0px" marginheight="0px">
29. <div id="map3d" style="height: 100%; width: 100%;"></div>
30. </body>
31. </html>
```

Integrating Google Earth
Add Javascript functions for generating Placemarks and that sets information in the Web Browser title when moving a Placemark (use your own XML format to communicate)

```javascript
// listen for mousemove on the globe
google.earth.addEventListener(google.earth.getGlobe(), 'mousemove', function(event) {
    var coord = '<EVENT>coordinates</EVENT>';
    function addToCoord(val, append1, append2) {
        coord += '<' + append1 + ' ' + val + ' ' + append2 + '/>' + append1 + ' ' + append2 + '/>';
    }
    if (dragInfo) {
        event.preventDefault();
        var point = dragInfo.placemark.getGeometry();
        point.setLatitude(event.getLatitude());
        point.setLongitude(event.getLongitude());
        point.setAltitude(event.getAltitude());
        addToCoord('placemark', dragInfo.placemark.getid());
        addToCoord('latitude', event.getLatitude());
        addToCoord('longitude', event.getLongitude());
        addToCoord('altitude', event.getAltitude());
        top.document.title=coord;
        dragInfo.dragged = true;
    }
});
```
To communicate from GE to PB, use the titlechange event of the IE control, get the information from the text argument.
For Communicating from PB to GE

- Create a new HTML Page that displays a Frameset with an invisible frame (size 0) and the Google Earth HTML Page in the visible frame.
- From PB, generate a new HTML File that only contains the needed javascript code to interact with GE.
- From PB, ask the IE control to display to the new HTML file in the hidden frame, with the navigate() function

```html
<FRAMESET COLS="0px,*" FRAMEBORDER=NO FRAMESpacing=0 BORDER=0>
<FRAME SRC="empty.htm" NAME="gauche" ID="gauche">
<FRAME SRC="ge.htm" NAME="droite">
</FRAMESET>
</HTML>

String Is_coordinates
Is_coordinates = string(Idb_latitude) + "," + string(Idb_longitude) + "," + string(Idb_elevation)

Is_command = "\r\nvar ls = Is_top_ref = \"ge.createLookAt\"(); \r\nls.set(Is_coordinates); Is_top_ref = \"ge.ALITUDE_RELATIVE_TO_GROUND, 0,0,700\"; \r\nls_top_ref = \"ge.getView\"().setAbstractView(Is);
```

```javascript
FileOpen(Is_file_path + \"cd.htm\", TextMode, Write, LockWrite, replace)
FileWriteEx(Is_fileNum, Is_html)
FileClose(Is_fileNum)

ole_1.object.navigate2(Is_file_path + \"cd.htm\",2,\"hidden_frame\",\"\",\"
```
Using Web Page Style presentation style

- Replace tabs by window scrolling
- Redesign your datawindows so that they look more like Web tables.
- Set the layout so that all your datawindows are one under the other.
- If not too many rows to display, resize datawindows so that they display rows with no scrolling (use detail.height attribute)
- Set the Vscroll attribute of your window to TRUE.
- Enable Vscrolling using the mouse wheel!
Using Web Page Style scrolling
Moving from Java to PB

- Old Java Application that displays new Airbus A350/A380 Aircrafts’ Flight Data
- Based on Java classes that do not support Windows 7 64 bits
- Poor/old fashion GUI!
How could we build a « wow » application from our 14 years old PB application ?

• Ask an external GUI Pro - Versus - Do it your self
• Most GUI pros are Web designers and Apple Machintosh GUI users !
• They interviewed end users to understand their needs and their GUI knowledge
• They provided us, for each window, a picture and a description of the user actions to implement.
• We evaluated the feasibility with PowerBuilder 12 and the cost to modify the existing windows.
PowerBuilder 12 can do it

- Most GUI features were nice looking graphics and well chosen colors (Png format and transparency support in PB12!)
- PowerBuilder is object oriented and it lets you create easily nice controls by using the Datawindow Technology!
- We had to modify some features that were too HTML5 oriented
- We only had a few weeks to do it! (Development cost)
Asking GUI Pros 29
Setting your Custom colors in the PowerBuilder IDE

- Get colors using image editors such as GIMP.
- Capture all needed colors with the color picker tool
- Get the rgb values and set them in the custom color editor in PowerBuilder
Ask a graphist for png format images

- Use transparency for icons and buttons
- To remove color backgrounds from icons, use the select by color tool, click on the image background, reverse selection, copy and paste as a new image
Building a web button with a datawindow

- Create a dataobject with the button image and the button text. Set cursor property as ‘hyperlink’.
- Create a standard datawindow userobject
- On mouse move event, modify the text color and start a timer.
- On timer event, if getfocus() <> datawindow_reference, change color to original value.
- In constructor, set text to the instance variable value is_button_text.

Using colors and images
Using Pictures in grid Datawindows

- In a grid datawindow column, add as many background images as there can be values for the column, and set the images’ visibility depending on the column value
- Add a pbm_lbuttonup event and ue_set_image to the dw control and post and event ue_set_image() from the pbm_lbuttonup event
- In the ue_set_image() event, set the size of the images to their default size and move the images to the center of the column
Some more advice they gave us:

- Use nice and colored fonts (Segoe UI)
- Add margins to your dw cells (make them look like html tables)
- Add odd/even colors
- Use flat style
Building a dynamic criteria list

- Use a tabular or treeview datawindow with an external datasource that includes a column ‘criteria_name’, all needed criteria should be declared in the datasource (1 per data row)
- Put all criteria in the detail and set their y computed attribute so that they all appear to the top
- Set their visible attribute so that they appear when the criteria column value is the criteria they relate to.
- Add 1 row in data tab for each criteria
- Set detail to 0 and check the autosize height option.

No code needed ! ! !

Using left panels for criteria input
Let your users

- Save and load criterias (database or saveas/import dw functions)
- show only active criterias... (filter dw function)

Almost no code needed !!!

Using left panels for criteria input
Let your users enter/select a single criterion value or select multiple values

- For the same criteria column, define a dddw and a ‘multilineedit’ control
- Show the multiline control only if criteria value includes CR, otherwise show editable dddw.
- To show the « ... » when there are more than 3 values displayed, create a global_function that counts the number of CR and set the « ... » text visible when there are more than 3 occurrences.

Almost no code needed ! ! !

Using left panels for criteria input
We need to provide a Statistical Dashboard feature that could be accessed by our customer’s managers.

The module should:

- Be accessed from the application and from the Web
- Be very good looking
- Guarantee data access security and privacy
- Enable collaborative work with comment and workflow features.
Considered solutions

1. Provide Business Object Web intelligence (We already provide a BO universe and a BO client module)

2. Build a PHP/javascript Web site with Java applets (we already have a Web site for our customers that use those technologies).

3. Use PowerBuilder and Appeon (Let see what we can do...)
Pro

• Made with PowerBuilder, we can do it ourselves quickly
• We can maintain and make it evolve easily (Rad tool)
• We can re-use some source code (mainly some datawindows, right management code...)
• We can deploy it on any platform (Web, tablet, Windows...)
• Can be deployed it on most Web/application server technologies and we don’t have to impose our own technology to our customers

Building a Web module with Appeon
Con

- Appeon is made for moving PB applications to the Web, not for building Web good looking applications
- Not open source and free technology. Licencing cost.
- PowerBuilder graph feature has not really evolved for 10 years. Very poor graphical possibilities.
The application should look like a Web application

- 1st difficulty: Provide a « page » oriented Gui with scrolling feature (oversized window)
- 2nd difficulty: Use color and images (png, transparency, dw overlay)
- 3rd difficulty: Make Pb graphs look nice (use color scheme)
- 4th Difficulty: Enable interactivity (Graphical data popup, Drilldown...)

Building a Web module with Appeon
Results

- Appeon/powerBuilder is more Powerful than we tought
- Needs to modify the way we think applications to make them look like a Web applications (Scrolling, colors, images...)
- Very easy to develop (just 2 days to learn how to use it and to build a prototype)
- Don’t need to know anything about Web/Tablet technologies, just be a PowerBuilder developer.
Appeon Supports almost all PowerBuilder graph features.
Appeon Supports almost all PowerBuilder table display features.

Appeon supports Png file format and object overlay.
• You can implement graph interactivity with tooltip
• You can implement Drill down /master detail features very easily from a graph to an other graph or to a grid
• You can implement sorting/filtering/querying very easily.
Web page scrolling:

- Oversized maximized sheet window
- Use datawindows for backgrounds (menus, tabs).
- Main background dw (dw_bg) used for scrolling (enable Vscrollbar)
- On resize event, adjust all dw size/position to window size.
- On pbm_mousemove for dw used for display, set focus on dw_bg so that the mouse wheel can make it scroll
- On every dw constructor event save the original y position.
- On dw_bg scrollvertical event, adjust all dw y position to simulate the scrolling (dw_xxx.y = ll_original_y - scrollpos)
Good looking graphs

- Use a custom color palette (never use the default PB palette)
- Palette must be changed after each data retrieval

```c
long ll_berry_palatte[] = {9055202,12211667,4286945,13047173,255,5055202,14315734,8087790,12583104,205,8388736}
long ll_excel_palatte[] = {1006431,10040166,16777164,13434879,6684774,16744576,26316,13421823,128,16711935,1676960,8312021,8388736,8388608,32896,255}
long ll_light_palatte[] = {15132416,16773385,16767673,1675885,16770273,15794168,15792383,16119285,16444375,14745599}
long ll_sem_trans_palatte[] = {16738665,6946665,698415,16777665,698415,16738115,13480053,16756635,11534325,11534325,16777135,11534335,16756735,14996917,10793094,8494785}
long ll_sea_green_palatte[] = {3055327,6737322,4620980,235723,62265268,3978097,4772306,11584734,9419915,8900331}

dw_gr_1.retrieve(long(date))
long ll_seriescount, ll_strng ls_series_name
ll_seriescount = dw_gr_1.SeriesCount("gr_1")
FOR i = 1 to ll_seriescount
   ls_series_name = dw_gr_1.SeriesName("gr_1", i)
dw_gr_1.SetSeriesStyle("gr_1", ls_series_name, foreground_of_get_class_color(ls_series_name))
dw_gr_1.SetSeriesStyle("gr_1", ls_series_name, shade_of_get_class_color(ls_series_name))
NEXT
```
Conclusion

- PowerBuilder 12.x can let you build « up to date » applications
- With very few lines of code, you can add very nice features
- PB developers should be trained to build better looking applications, we all have our tips and tricks, let's share them!
- What if we could add all those features in the PowerBuilder IDE painters? PB is a 4GL tool, we should not have to code them.
- What if we could get some material on the PowerBuilder DVD such as graphical libraries (this was the case with PB 2.0)