

怎样实现动态界面（C/S和 B/S方式）

2020-01-30

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浏览器上动态界面绘制的技术讨论

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Web前端UI标准化的必要性和可行性

动态用户界面的总体设计思路

WebDW的技术架构说明

C/S 客户端

PB

VB

VC

VB.net

C#

JAVA

PYTHON

Electron

B/S客户端

JS

H5

FLEX

GWT

MOBILE

Android

Web开发UI技术路线简史

➤ 静态页面 ➤ 动态页面 ➤ AJAX时代 ➤ 前后端分离 ➤ H5时代 ➤ 多屏融合时代

ASP

JavaScript

JQuery

Vue

Cavans

Electron

HTML

JSP/Servlet

Ajax

React

Andorid

Applet
(已废弃)

PHP

Angular

IOS

ActiveX
(基本废弃)

Flex
(退休中)

秦始皇推行的标准化工程



- ▶ 书同文
- ▶ 车同轨
- ▶ 度量衡

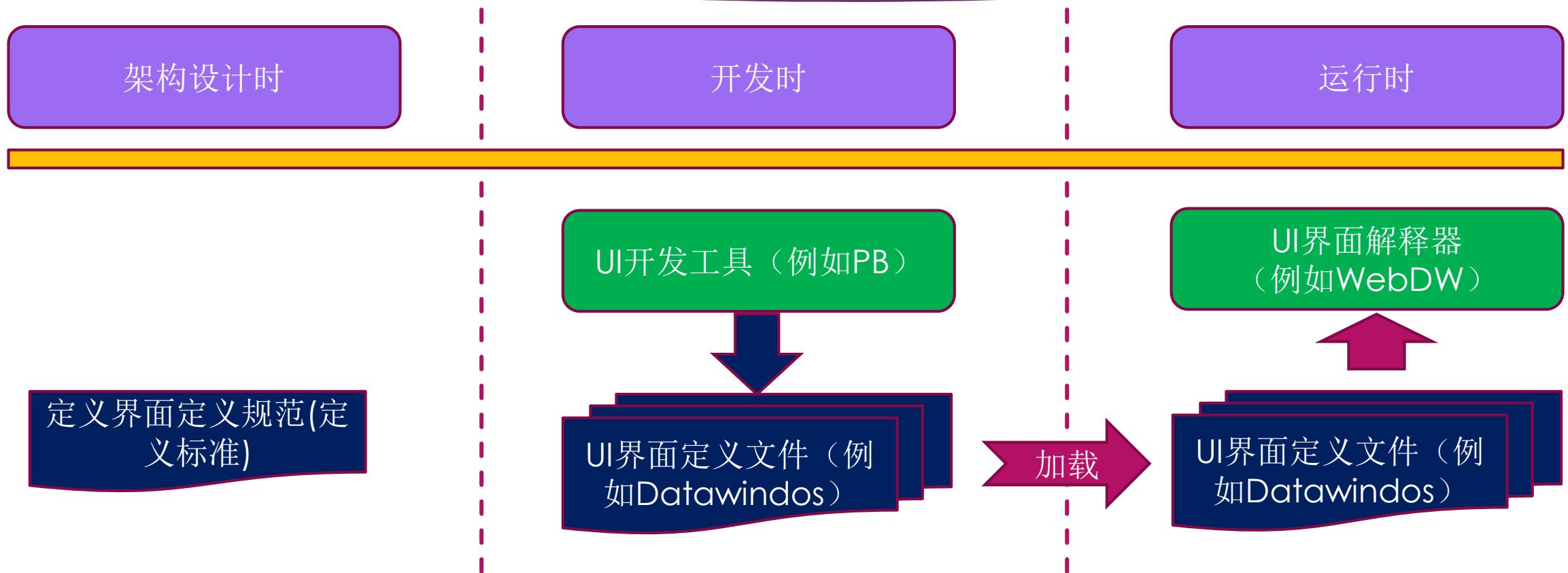
为什么需要在浏览器上动态绘制用户界面

- ▶ 所有的应用系统都需要提供用户界面给最终用户使用
- ▶ 用户界面的开发量占用了巨大的时间和成本，维护起来非常困难
- ▶ 如果可以用统一的方式来定义用户界面，并在运行执行时自动生成，将可以降低用户界面的开发维护成本
- ▶ 统一的用户界面可以在不同开发语言，不同设备上同样得到渲染展示，这样就可以保护前期的系统研发投入，不必每换一次开发语言就推倒重来一次。

不同方式用户界面的比较

比较项目	静态用户界面	动态定义用户界面
用户界面标准	采用开发语言定义标准，每种语言和工具各不相同，互不兼容	采用自定义的标准用户界面标准，在不同语言环境下采用统一界面标准
用户界面配置定义	非常困难	容易
用户界面定义工具	需要自行设计开发	可以选用第三方标准软件来定义用户界面，例如VB, PB, 也可以自开发
开发效率	非常低	高
BUG	很容易存在BUG	BUG很少
是否支持录频记录	非常困难，需要额外开发	容易，选用标准接口来实现录频
界面美观程度	美观	待优化
开发成本	高	低

动态用户界面的总体思路



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浏览器上动态界面绘制的技术讨论

WebDW的技术架构说明

WebDW 1.0技术架构

WebDW 2.0技术架构

WebDW 2.0 服务器端技术架构

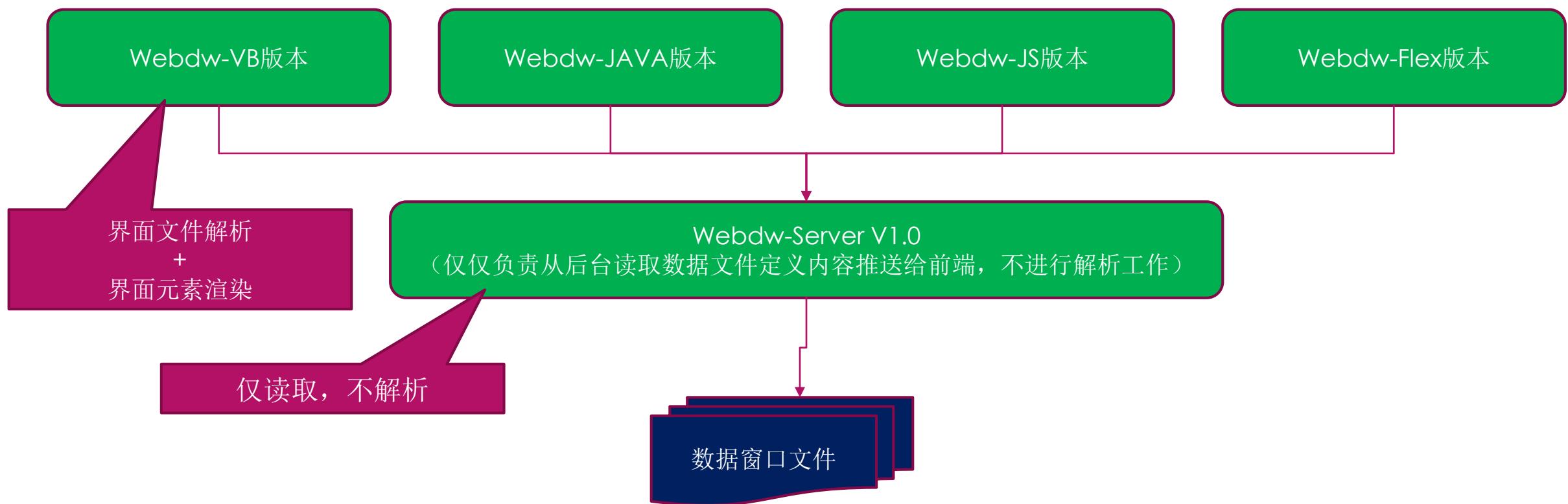
WebDW 2.0 客户端技术架构

C/S客户端

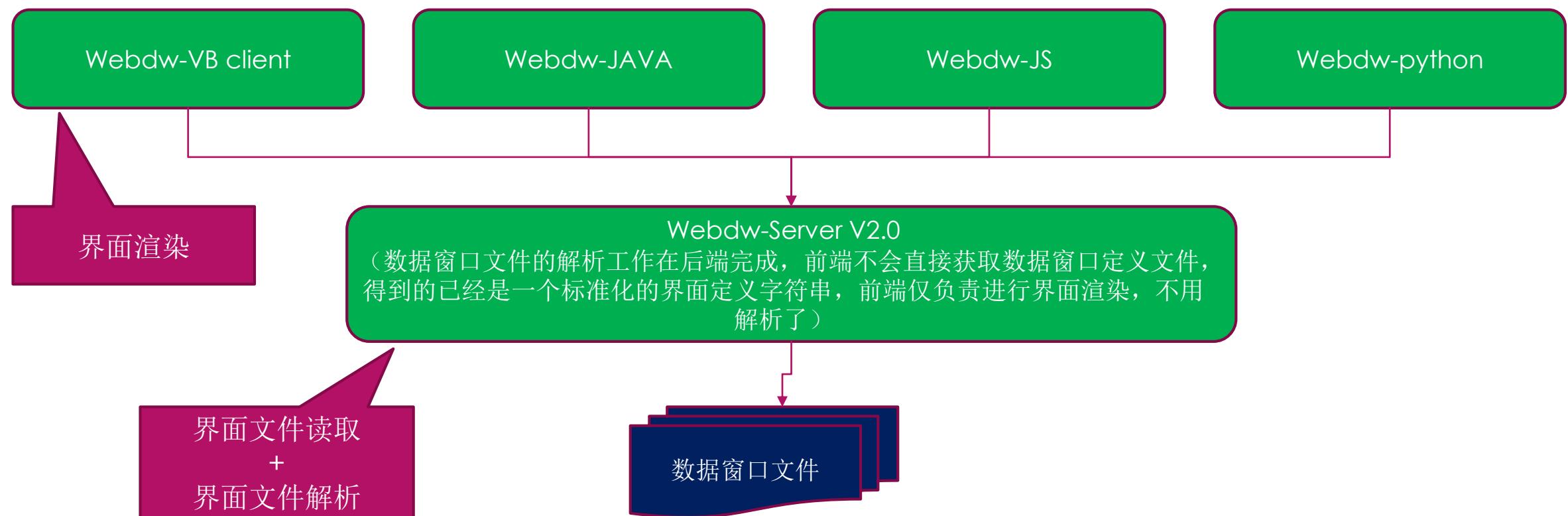
B/S客户端

Mobile客户端

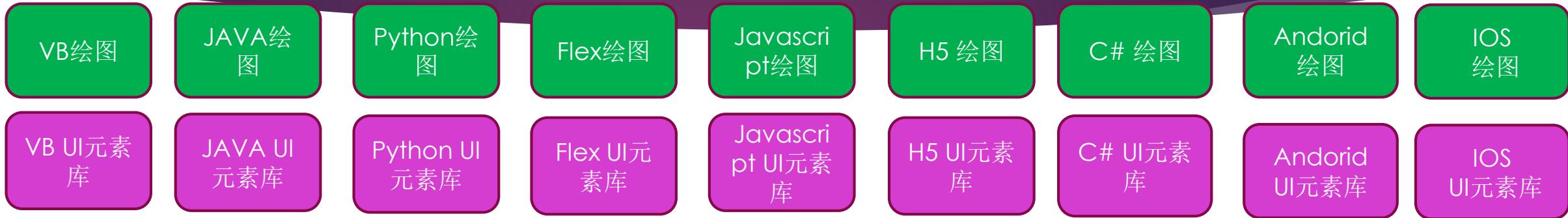
WebDW1.0的设计架构



WebDW2.0的系统架构（1）



WebDW2.0的系统架构（2）



网络通讯服务

Webdw-Server V2.0
(数据窗口文件的解析工作在后端完成，前端不会直接获取数据窗口定义文件，
得到的已经是一个标准化的界面定义字符串，前端仅负责进行界面渲染，不用
解析了)



图例

- 自开发部分
- 标准组件、第三方组件
- 工具生成

WebDW2.0的优势

- ▶ 最大限度重用了后端的界面解析代码
- ▶ 将界面的解析和界面的渲染两者进行分离，适应目前的前后端分离总体趋势
- ▶ 前端拿到的是一个已经解析完毕的界面结果，所需要做的工作只是渲染，安全有效，不会对后端的数据进行任何的修改变化
- ▶ 采用多种编程语言对同一界面结果进行渲染成为可能，使得应用系统跨语言迁移成为可能
- ▶ 前端更易于开发，实现和维护
- ▶ 前端（广义前端，不限定语言和技术）的标准化定义与实现

在浏览器环境中实现界面渲染的方案 (针对标准化的界面数据进行渲染)

方案编号	技术方案	备注
方案1	将输入的界面元素，渲染成标准的HTML DOM元素，界面样式通过CSS定义控制	已部分实现
方案2	将输入的界面元素，选择特定的JS UI组件库，使用UI组件库进行渲染，样式由UI组件库控制实现	已部分实现
方案3	将输入的界面元素，通过CANVAS绘图的方式，自行绘制出一个一个界面元素进行渲染，需要自行开发UI界面库	已部分实现
方案4	将输入的界面元素，选择指定的JS UI组件库，通过在CANVAS上绘图的方式来进行渲染，样式由选定的组件库控制是心啊	待实现

前后端界面标准属性定义

元素类型	id	name	type	Left top width height	Text value	font	其他属性	备注
文本标签	元素ID	元素名称，同元素ID	Label	位置信息	文本值	字体定义		用来定义文本标签
文本框	元素ID	元素名称，同元素ID	Text	位置信息	文本值	字体定义		用来定义文本框
线	元素ID	元素名称，同元素ID	Line	位置信息	-	-		用来在界面上画直线
单选钮	元素ID	元素名称，同元素ID	RadioButton	位置信息	选中值	字体定义		定义单选按钮
复选框	元素ID	元素名称，同元素ID	CheckBox	位置信息	选中值	字体定义		定义复选按钮
下拉框	元素ID	元素名称，同元素ID	Dropdown Box	位置信息	选中值	字体定义		定义下拉框

PowerBuilder

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浏览器上动态界面绘制的技术讨论

WebDW的技术架构说明

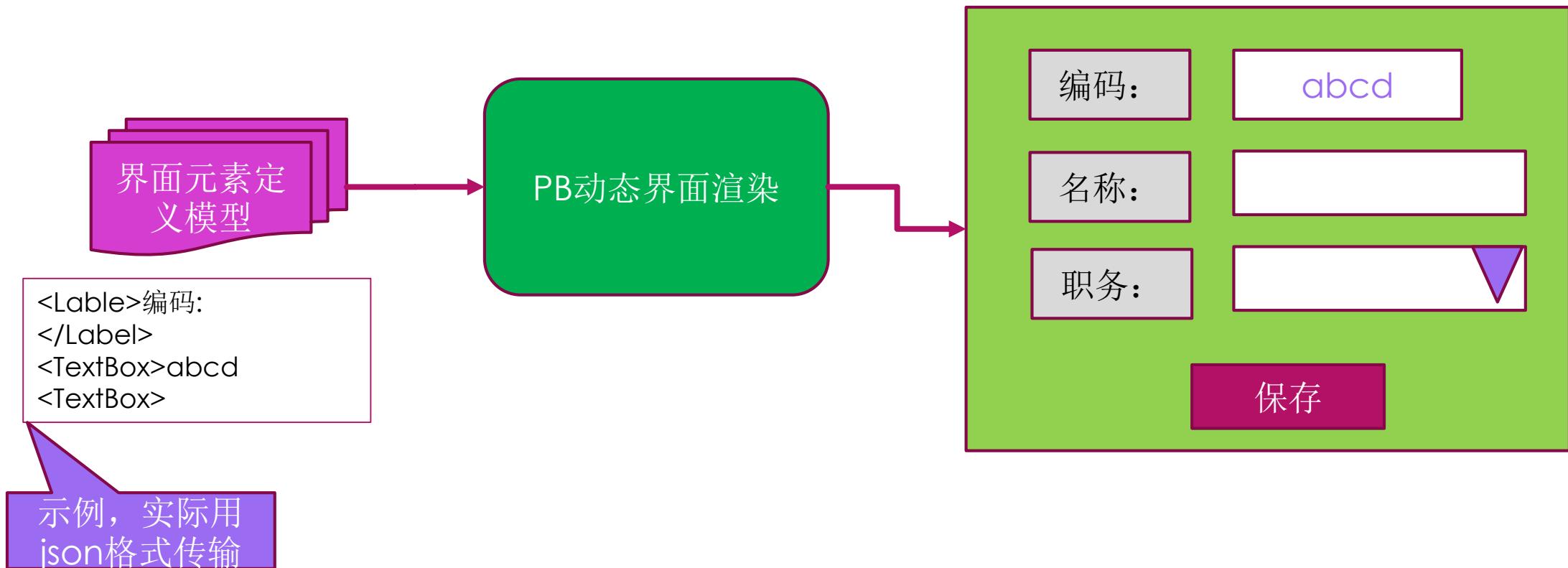
WebDW PB客户端的设计实现

PB客户端的总体IPO

PB客户端的技术选型

PB客户端具体实现

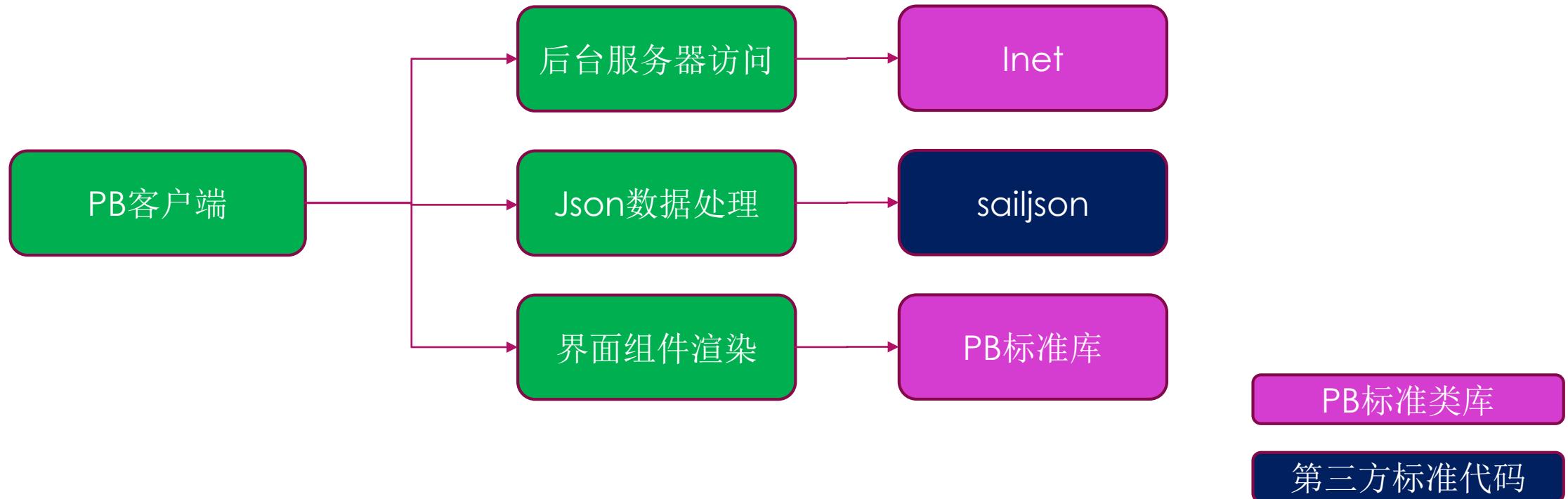
PB界面绘图总体IPO



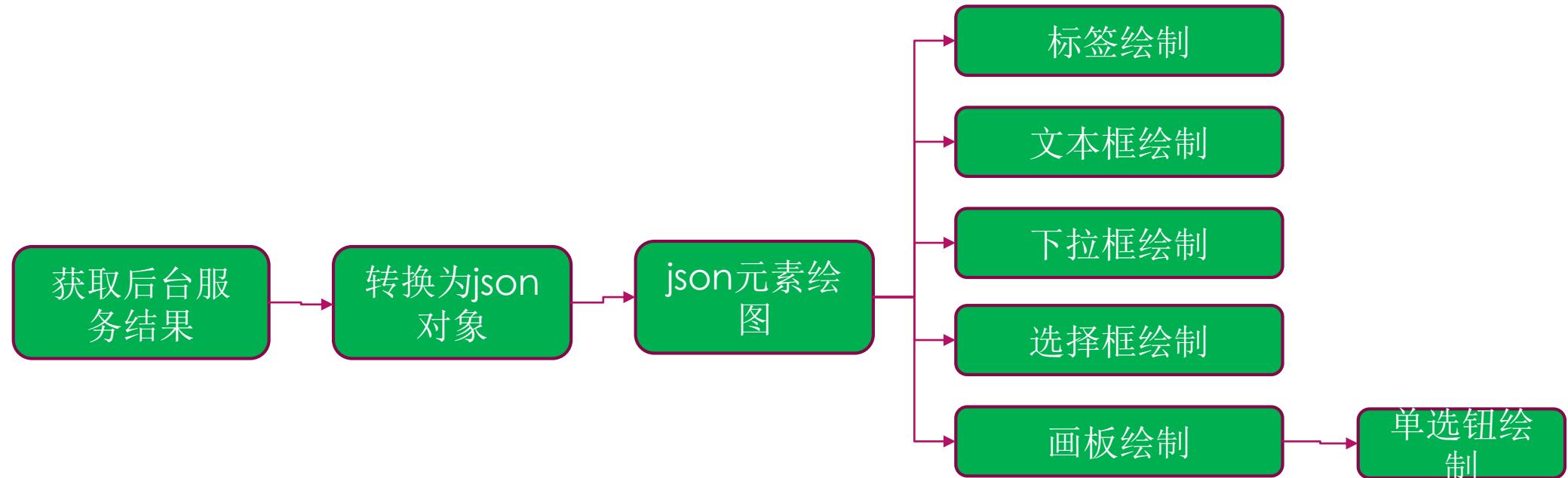
PB界面绘图和VB界面绘图的不同

比较项	VB	PB	备注
json数据格式支持	标准的VB不支持JSON数据格式，因此需要引入Script Controller来进行解析	标准的PB也不支持JSON数据格式，因此需要引入新的对象定义来解析	
Ajax后台服务调用	通过引入XMLHttpRequest 来调用	通过使用内置Inet对象来支持	
界面元素渲染组件	通过VB标准库来提供支持	通过PB标准库来提供支持，部分元素需要进行二次封装	
事件回调	通过自定义调用器实现	如果使用标准库则无法回调，事件回调需要使用自定义对象	
基本设计模式	面向对象，基于组件	面向对象，基于组件	
二次封装	容易，可封装为ActiveX	容易，代码层次复用	

PB客户端的技术选型（使用PB7）



PB webdw客户端设计



PB界面模型与VB界面模型的不同之处

比较项目	VB	PB	备注
创建新对象	form.controls.Add()	win. OpenUserObject()	
新对象存储位置	form.controls	win.control	都是一个存放对象的数组
是否支持父容器对象	支持,可放置在 PictureBox,Frame中	不支持父容器对象	
对象基类	VB标准对象	需要使用UserObject进行 包装才能使用, 标签除外	
对象组织	层次型结构	平摊结构	
对象继承	不支持	支持	
界面基本元素	VB标准对象	基于标准对象生成的子类 UserObject	
元素限定条件	Name属性不可重复	无	

PB界面模型层次图



PB界面绘制-标签对象

```
//绘制标签对象
if classname = 'JLabel' then
    StaticText st_a
    win.OpenUserObject(st_a,"statictext",x,y)

    st_a.width = width
    st_a.height = height
    st_a.text = text
    return 0
end if
```

绘制标签对象

PB界面绘制-绘制文本框对象

```
    return 0
end if

//绘制文本框对象，统一用单行文本框模拟
if classname = 'JTextField' then
    ue_textbox  sle_a
    win.OpenUserObject(sle_a,"ue_textbox",x,y)

    sle_a.width = width
    sle_a.height = height
    sle_a.of_settext(text)
    sle_a.visible = true
    return 0
end if
```

绘制文本框对象

PB界面绘制-绘制下拉框对象

绘制下拉框对象

```
//绘制下拉框对象,使用自定义用户对象进行模拟处理
messagebox("",classname)
if classname = 'JComboBox' then
    ue_ddlb ddlb_1
    win.OpenUserObject(ddlb_1,"ue_ddlb",x,y)
    ddlb_1.of_setwidth(width)
    ddlb_1.width = width
    //ddlb_1.text = text
    ddlb_1.visible = true
    ddlb_1.enabled = true
    ddlb_1.additem('aaa')
    messagebox('', 'creat ok')
    return 0
end if
```

PB界面绘图-绘制复选框

```
return 0
end if

//绘制复选框对象
if classname="JCheckBox" then
    //messagebox('', 'draw checkbox')
    uo_CheckBox cb_1
    win.OpenUserObject(cb_1, "uo_checkbox", x, y)
    cb_1.of_settext(text)
    return 0
end if
```

绘制复选框对象

PB界面绘图-绘制单选钮对象

绘制单选按钮对象，每次需要指定到不同的对象名中去，这样就会动态生成不同子类型

```
//绘制单选按钮
if classname1 = 'JRadioButton' then
    messagebox('','radio')
    rb_index ++
    if rb_index = 1 then
        win.OpenUserObject(rb_1,'uo_radiobutton',x1,y1)
        rb_1.wf_settext(text1)
        rb_1.y = y1
        rb_1.height = height1
    end if
    if rb_index = 2 then
        win.OpenUserObject(rb_2,'uo_radiobutton',x1,y1)
        rb_2.wf_settext(text1)
        rb_2.y = y1
        rb_2.height = height1
    end if
    if rb_index = 3 then
        win.OpenUserObject(rb_3,'uo_radiobutton',x1,y1)
        rb_3.wf_settext(text1)
        rb_3.y = y1
        rb_3.height = height1
    end if
end if
```

PB客户端运行界面

PowerBuilder and WebDW

setdw dw1 setdw dw2 setdw dw3 setdw dw4

Product	Product	ID	Size	Color	Qty	Unit	Picture Name
Tank Top3333	Tee Shirt111	300	Small	White	30	10	tshirtw.bmp
Cotton Cap	Baseball Cap	400	One size fits all	Black	92	9	capb.bmp
Wool cap	Baseball Cap	401	One size fits all	White	12	10	capw.bmp
Cloth Visor	Visor	500	One size fits all	White	36	7	visorw.bmp
Plastic Visor	Visor	501	One size fits all	Black	28	7	visorb.bmp
Hooded Sweatshirt	Sweatshirt	600	Large	Green	39	24	sshirtq.bmp
Zipped Sweatshirt	Sweatshirt	601	Large	Blue	33	25	sshirtb.bmp
Cotton Shorts	Shorts	700	Medium	Black	80	15	shortsb.bmp
a	a	701	a	a	100	100	aa.bmp

PB客户端运行界面

PowerBuilder and WebDW

setdw dw1 setdw dw2 setdw dw3 setdw dw4

Product	Product	Product Description	Size	Color	Quantity	Unit Price	Picture
Tank Tr	Tee Shirt	111	300		30	10	tshirtw.bmp
Cotton	Baseball Cap	400			92	9	caob.bmp
Wool c	Baseball Cap	401			12	10	caow.bmp
Cloth V	Visor	500			36	7	visorw.bmp
Plastic	Visor	501			28	7	visorb.bmp
Hooded	Sweatshirt	600			39	24	sshirta.bmp
Zinned	Sweatshirt	601			33	25	sshirtb.bmp
Cotton	Shorts	700			80	15	shortsb.bmp
a	a	701			100	100	aa.bmp

PB客户端运行界面

PowerBuilder and WebDW

setdw dw1 setdw dw2 setdw dw3 setdw dw4

Employee ID	Department	Zip Code	Phone	Status	Sex
101	200	100001	1391057777	<input type="radio"/> Active <input type="radio"/> Terminated <input type="radio"/> On Leave	<input type="radio"/> Male <input type="radio"/> Female
103	500	100004	1391234567	<input type="radio"/> Active <input type="radio"/> Terminated <input type="radio"/> On Leave	<input type="radio"/> Male <input type="radio"/> Female

PB客户端运行界面（有乱码）

PowerBuilder and WebDW

setdw dw1 setdw dw2 setdw dw3 setdw dw4

近咗糧鑊? 101

鐘船情況 Active Terminated On leave

鑑別性別 Male Female

鎮革标记 Health Insur.

閏 故繩

近咗糧鑊? 103

鐘船情況 Active Terminated On leave

鑑別性別 Male Female

鎮革标记 Health Insur.

閏 故繩

PB版本WebDW待完成工作

- ▶ 解决utf-8乱码问题
- ▶ 自定义控件事件监听处理
- ▶ 自定义控件显示样式美化
- ▶ 其他

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Microsoft
Visual Basic



浏览器上动态界面绘制的技术讨论

WebDW的技术架构说明

WebDW VB客户端的设计实现

需求定义：总体IPO

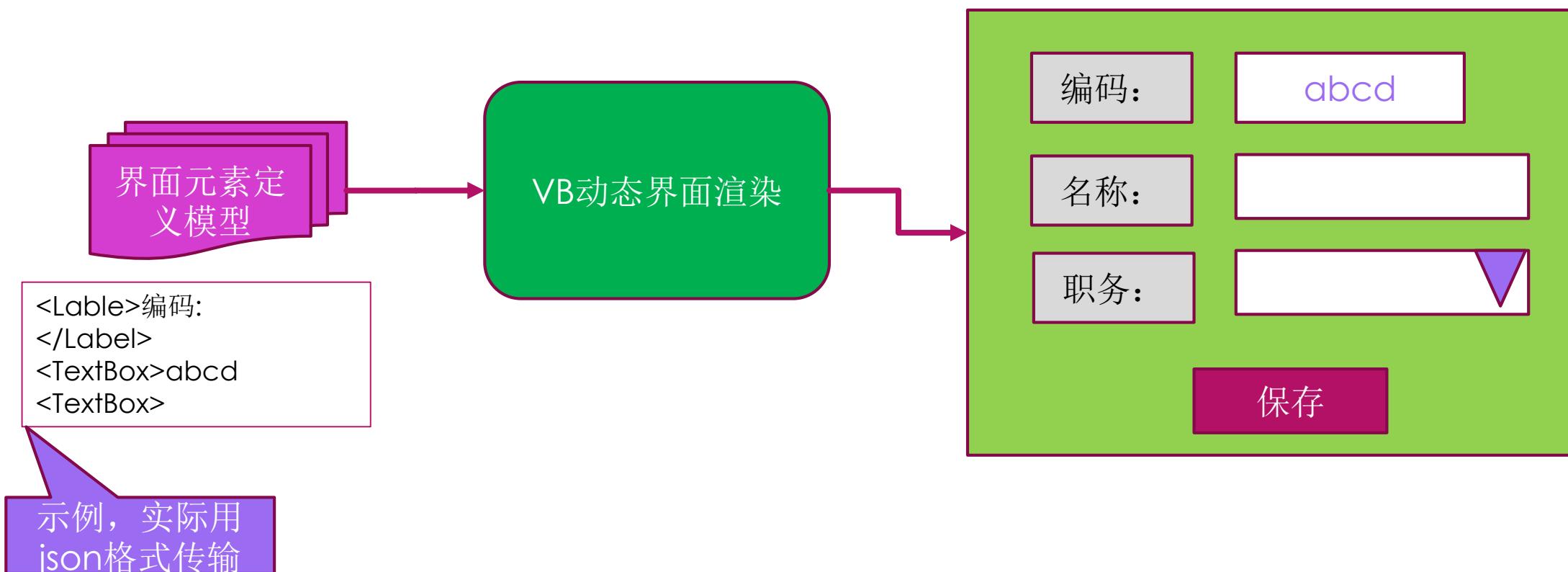
基于MVC模式的功能分解

技术路线选型：使用VB标准控件

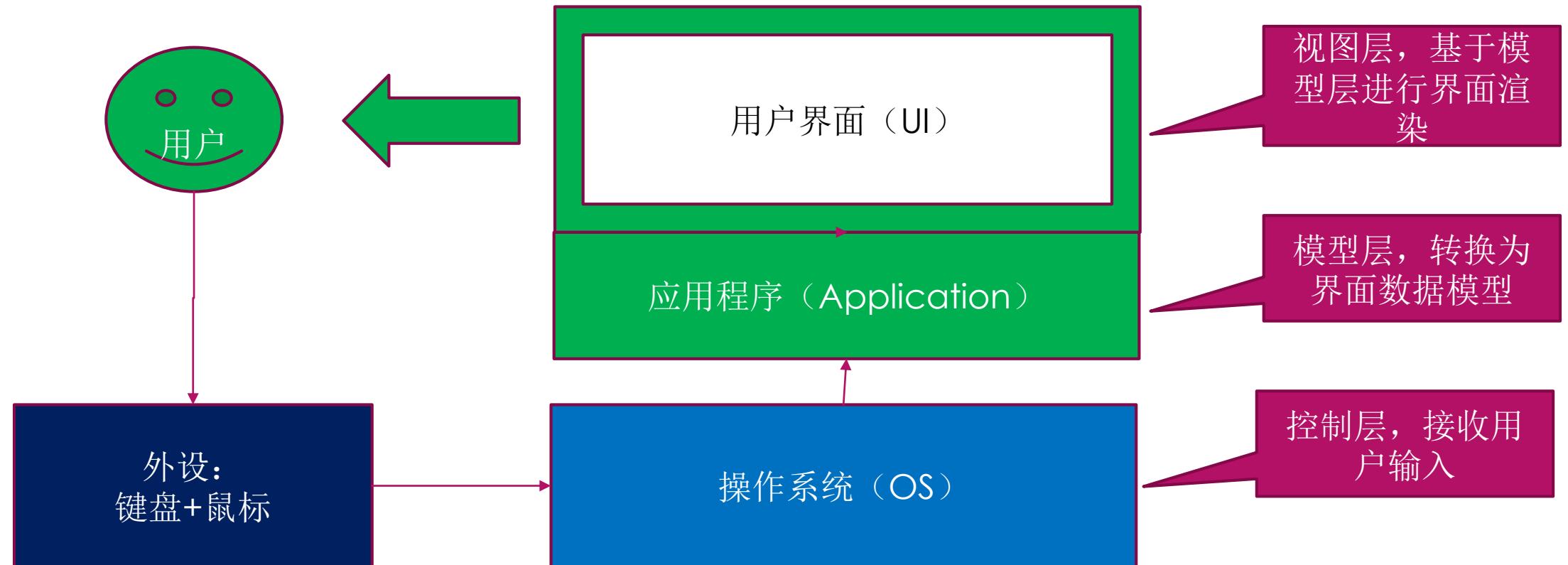
VB的第一个版本：纯文本标签

VB的第二个版本：多编辑风格实现

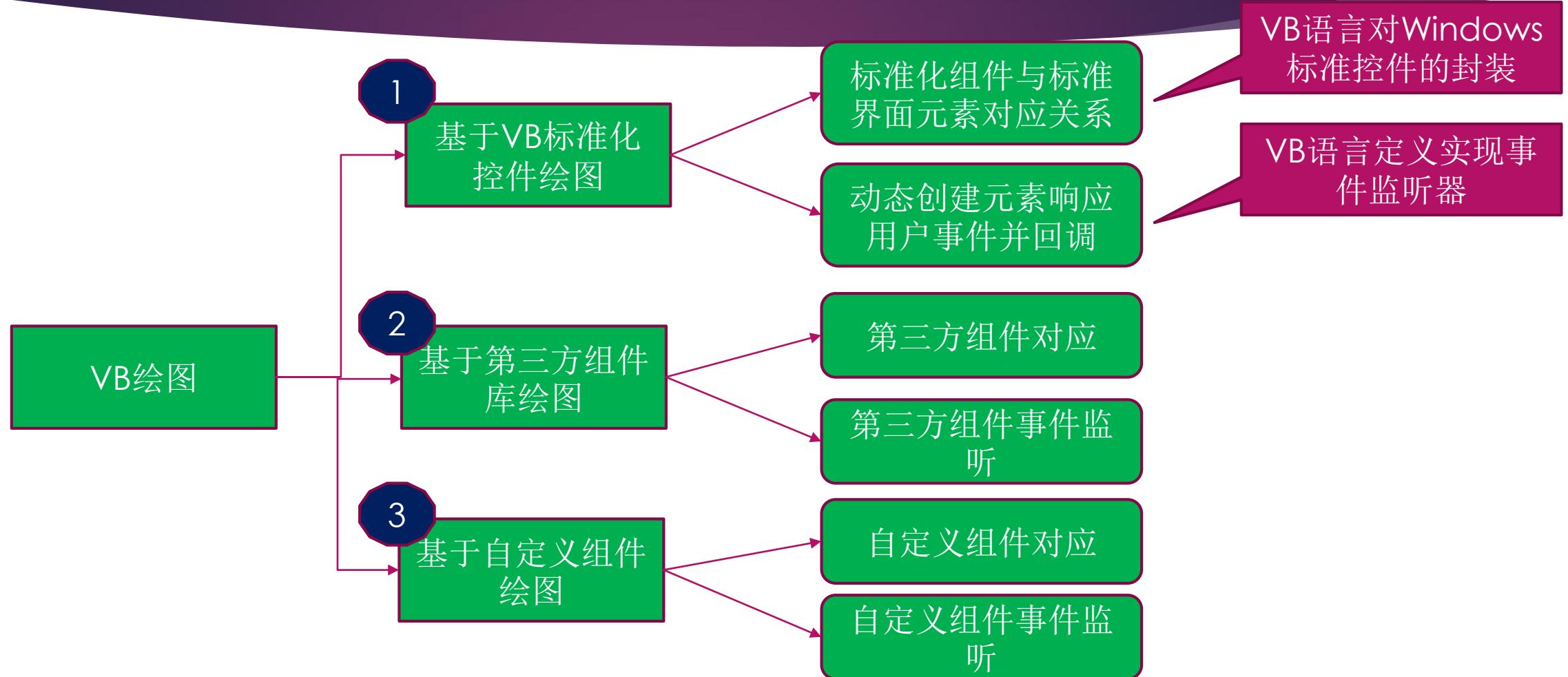
VB界面绘图：整体IPO



VB动态界面绘制的MVC模式



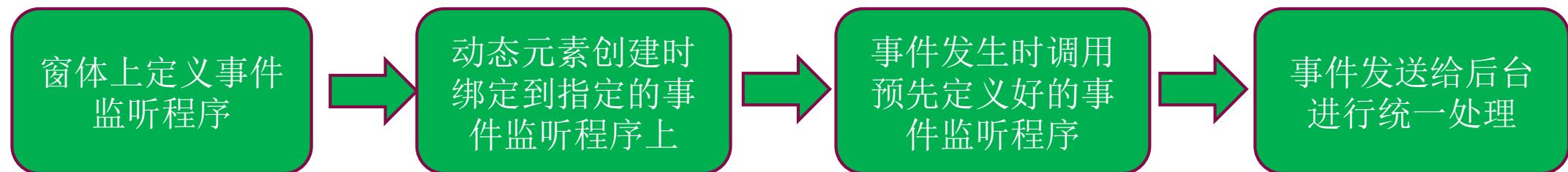
VB动态界面绘制可选技术路线



VB标准控件和界面定义元素之间的对应

界面标准元素	VB标准控件	备注
Line 直线	Line 线型	
Textbox 文本框	TextBox 文本框	
Label 标签	Label 标签	
Radio 单选按钮	Radio 单选按钮	需要设置到同一个分组里面
CheckBox 复选框	CheckBox 复选框	
Combo 下拉框	Combo 下拉框	

VB标准控件动态创建以后的事件监听



VB绘制的第一个版本

WebDW2.0 Demo http://webdw.vicp.net

这个窗口演示了VB如何和后台服务器通讯获取界面描述，并动态绘制成所需要的数据窗口

访问后台地址为: http://localhost/webdw/retrieve?dname=d_products&args=

检索测试

Product Description	Product Name	ID	Size	Color	Qty	Unit Price	Picture Name
Tank Top3333	Tee Shirt111	300	Small	White	29	9	tshirtw.bmp
Crew Neck	Tee Shirt222	302	One size fits all	Black	72	14	tshirtb.bmp
Cotton Cap	Baseball Cap	400	One size fits all	Black	92	9	capb.bmp
Wool cap	Baseball Cap	401	One size fits all	White	12	10	capw.bmp
Cloth Visor	Visor	500	One size fits all	White	36	7	visorw.bmp
Plastic Visor	Visor	501	One size fits all	Black	28	7	visorb.bmp
Hooded Sweatshirt	Sweatshirt	600	Large	Green	39	24	sshirtg.bmp
Zipped Sweatshirt	Sweatshirt	601	Large	Blue	32	24	sshirtb.bmp
Cotton Shorts	Shorts	700	Medium	Black	80	15	shortsb.bmp

第一个版本功能有限，仅仅将所有的返回元素统一按照Label方式进行渲染，渲染方式为在 PictureBox上进行直接文本输出绘制

VB第一个版本的核心绘图代码

访问后台服务器，获取返回的界面定义字符串，返回为json格式

调用Script Controller来进行json格式数据的解析处理

var json = sret.uiobjList,
定义一个新的json对象

Json对象转换为本地ui对象定义

Ui对象绘图显示

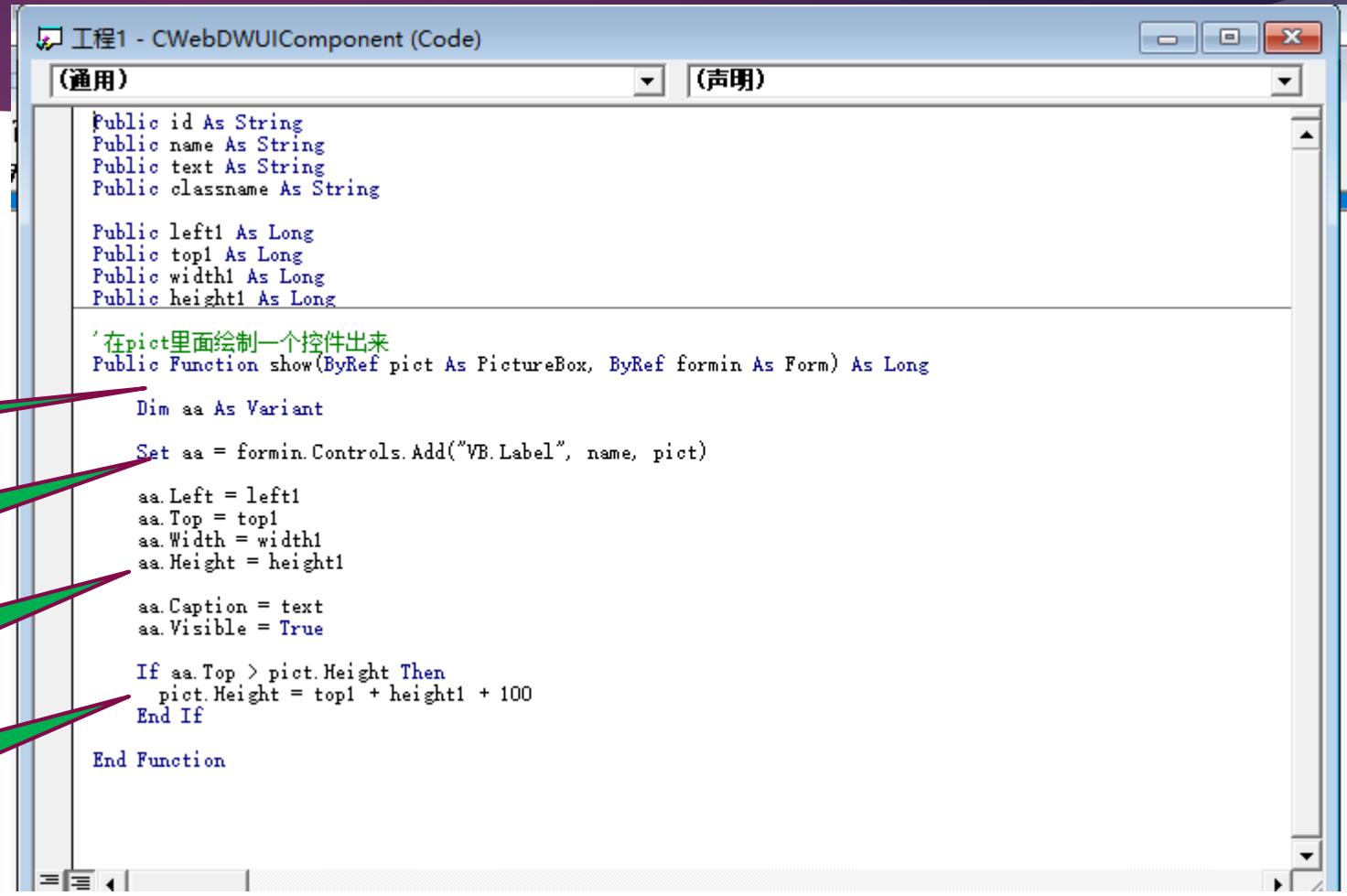
```
Private Sub Command1_Click()
    Dim sret As String
    Dim i As Long
    iCount = iCount + 1
    sret = sqlca.ExecuteSelect(i)
    MsgBox sret
    Dim uiArray(10000) As CWebDWUIComponent

    Dim rowid As Integer
    Dim cmd As String
    Dim rate As Double
    rate = 4

    With ScriptControl1
        .Reset
        .Language = "javascript"
        .AddCode "var json = " & sret & ".uiobjList;"
        For rowid = 0 To .Eval("json.length") - 1
            MsgBox ("rowid:" & rowid)
            Set uiArray(rowid) = New CWebDWUIComponent
            cmd = "json[" & rowid & "].id"
            uiArray(rowid).id = .Eval(cmd)

            cmd = "json[" & rowid & "].name"
            uiArray(rowid).name = .Eval(cmd)
            cmd = "json[" & rowid & "].text"
            uiArray(rowid).text = .Eval(cmd)
            'MsgBox uiArray(rowid).text
            cmd = "json[" & rowid & "].left"
            uiArray(rowid).left1 = .Eval(cmd) * rate
            cmd = "json[" & rowid & "].top"
            uiArray(rowid).top1 = .Eval(cmd) * rate
            cmd = "json[" & rowid & "].width"
            uiArray(rowid).width1 = .Eval(cmd) * rate
            'MsgBox uiArray(rowid).width1
            cmd = "json[" & rowid & "].height"
            uiArray(rowid).height1 = .Eval(cmd) * rate
            i = uiArray(rowid).show(Picture2, Form1)
        Next
    End With
```

VB第一个版本UI对象绘图的方法



```
工程1 - CWebDWUIComponent (Code)
(通用) (声明)

Public id As String
Public name As String
Public text As String
Public classname As String

Public left1 As Long
Public top1 As Long
Public width1 As Long
Public height1 As Long

'在pict里面绘制一个控件出来
Public Function show(ByRef pict As PictureBox, ByRef formin As Form) As Long
    Dim aa As Variant
    Set aa = formin.Controls.Add("VB.Label", name, pict)
    aa.Left = left1
    aa.Top = top1
    aa.Width = width1
    aa.Height = height1
    aa.Caption = text
    aa.Visible = True
    If aa.Top > pict.Height Then
        pict.Height = top1 + height1 + 100
    End If
End Function
```

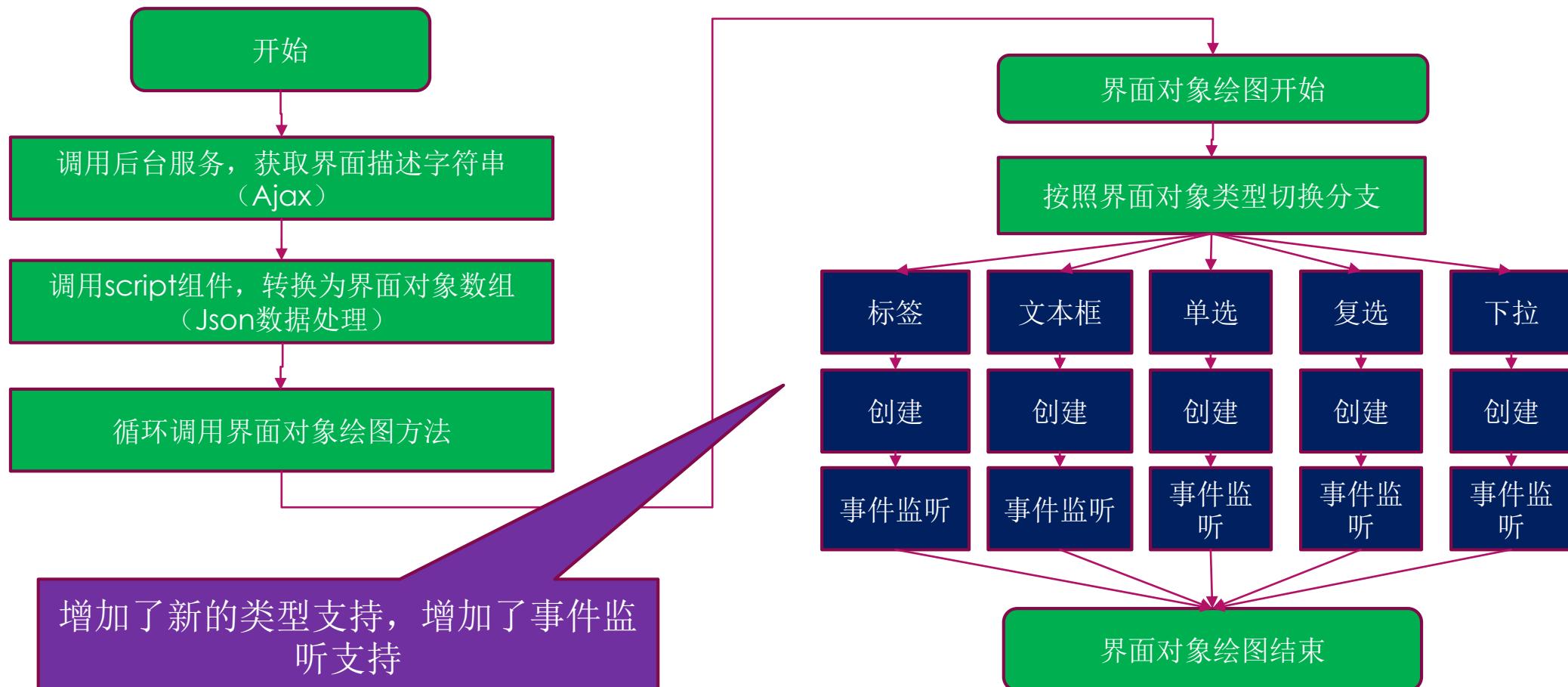
绘图方法入口，参数为：
1.PictureBox 2.Form容器

容器中添加一个Label对象，父对象为指定的
PictureBox

设置新对象的基本属性，并开始显示

动态设置PictureBox的高度，容纳下所有的对
象

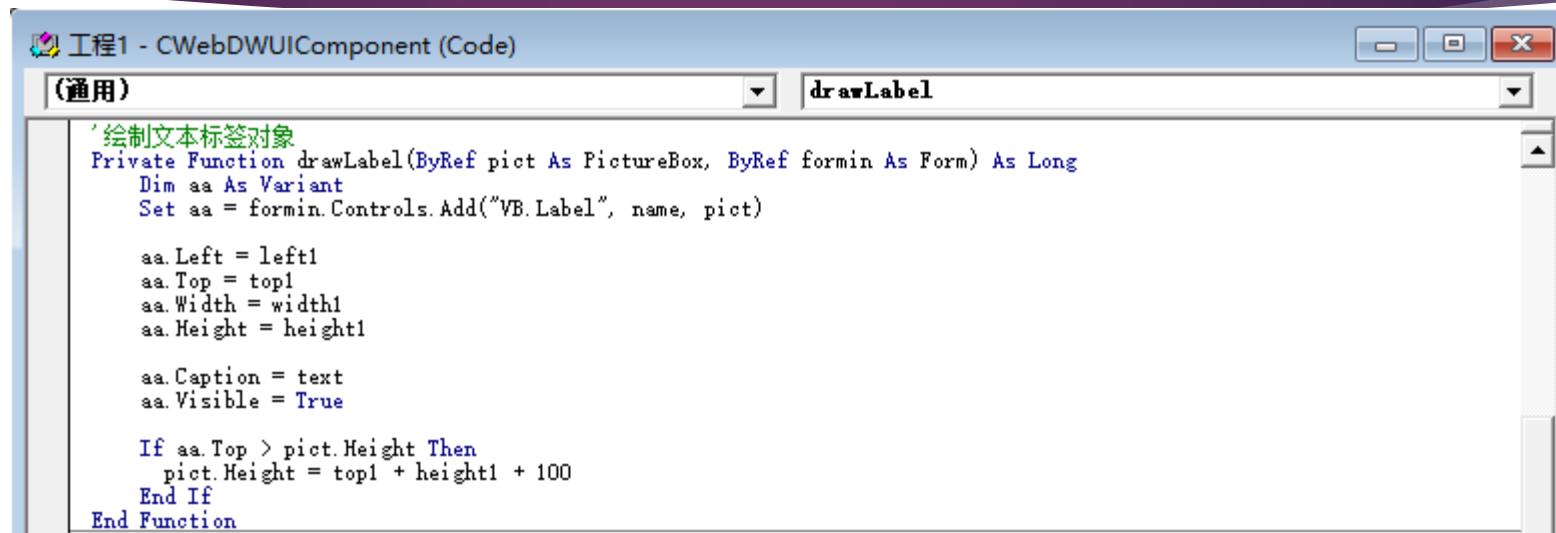
VB绘图程序流程图（升级版本）



VB绘图-通用属性映射

输入UI对象属性	VB CWebDWUIComponent	标签对象属性	备注
classname	classname	-	根据不同classname来绘制不同的VB对象
id	id	-	此属性对VB各对象均无效
name	name	name	对象名称
left	left1	Left	左边距
top	top1	Top	顶部边距
width	width1	Width	宽度
height	height1	Height	高度

VB 标签绘制代码



工程1 - CWebDWUIComponent (Code)

(通用) drawLabel

```
' 绘制文本标签对象
Private Function drawLabel(ByRef pict As PictureBox, ByRef formin As Form) As Long
    Dim aa As Variant
    Set aa = formin.Controls.Add("VB.Label", name, pict)

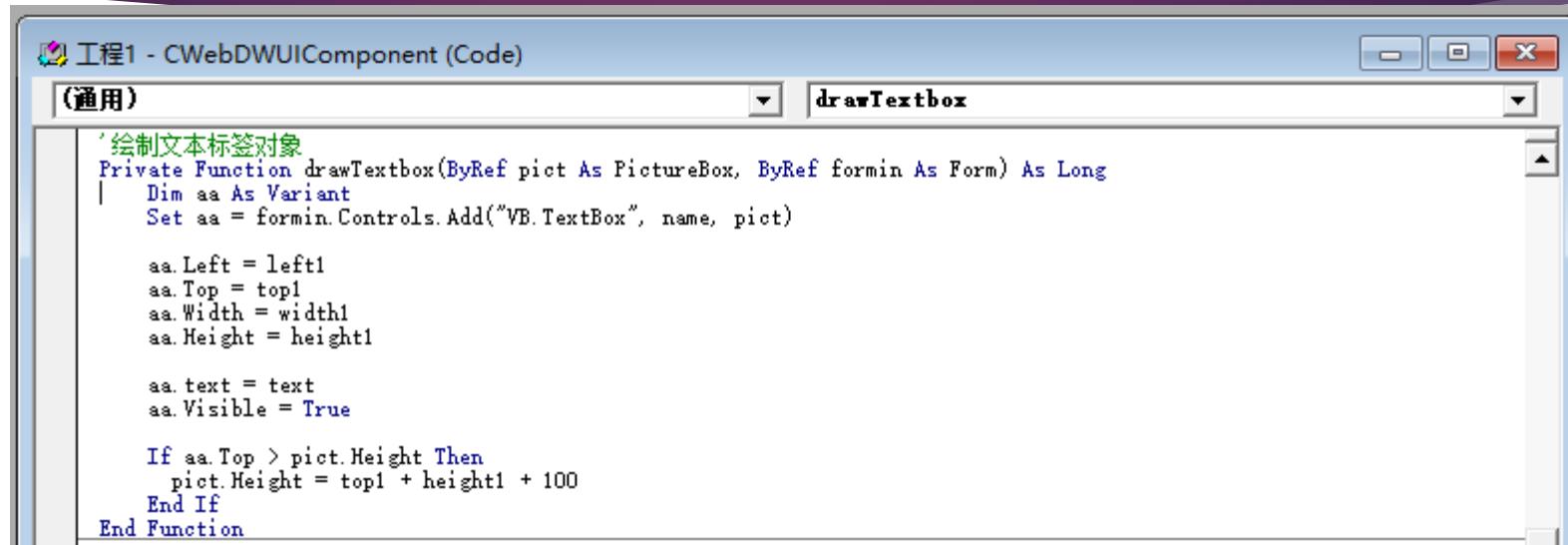
    aa.Left = left1
    aa.Top = top1
    aa.Width = width1
    aa.Height = height1

    aa.Caption = text
    aa.Visible = True

    If aa.Top > pict.Height Then
        pict.Height = top1 + height1 + 100
    End If
End Function
```

输入UI对象属性	VB CWebDWUIComponent	标签对象属性	备注
classname	classname	-	Jlabel,映射为VB.Label对象
text	Text	Caption	文本显示

VB 文本框绘制代码



工程1 - CWebDWUIComponent (Code)

(通用) drawTextbox

```
' 绘制文本标签对象
Private Function drawTextbox(ByRef pict As PictureBox, ByRef formin As Form) As Long
    Dim aa As Variant
    Set aa = formin.Controls.Add("VB.TextBox", name, pict)

    aa.Left = left1
    aa.Top = top1
    aa.Width = width1
    aa.Height = height1

    aa.Text = text
    aa.Visible = True

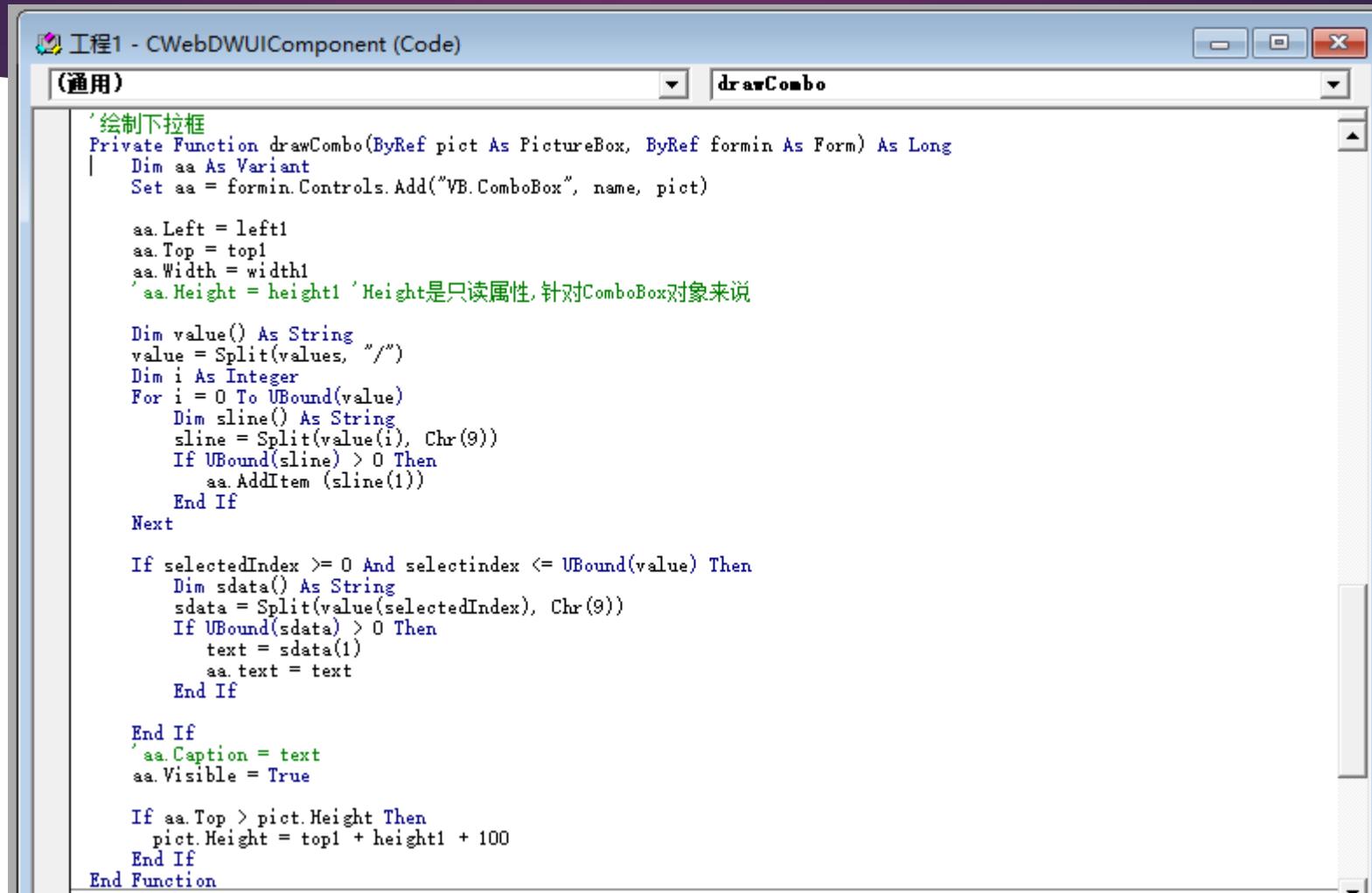
    If aa.Top > pict.Height Then
        pict.Height = top1 + height1 + 100
    End If
End Function
```

输入UI对象属性	VB CWebDWUIComponent	标签对象属性	备注
classname	classname	-	JTextBox,映射为VB.TextBox对象
text	Text	Text	文本显示

VB绘图-动态下拉框属性映射

输入UI对象属性	VB CWebDWUIComponent	标签对象属性	备注
classname	classname	-	JComboBox,映射为VB.ComboBox对象
text	Text	Text	文本显示,需要从列表中选择指定值来显示(需要转换)
values	values	List	转换为对应对象的List属性
selectedIndex	selectedIndex	-	转换为对应对象的Text属性

VB 下拉框绘制代码



工程1 - CWebDWUIComponent (Code)

(通用) drawCombo

```
'绘制下拉框
Private Function drawCombo(ByRef pict As PictureBox, ByRef formin As Form) As Long
    Dim aa As Variant
    Set aa = formin.Controls.Add("VB.ComboBox", name, pict)

    aa.Left = left1
    aa.Top = top1
    aa.Width = width1
    'aa.Height = height1 'Height是只读属性,针对ComboBox对象来说

    Dim value() As String
    value = Split(values, "/")
    Dim i As Integer
    For i = 0 To UBound(value)
        Dim sline() As String
        sline = Split(value(i), Chr(9))
        If UBound(sline) > 0 Then
            aa.AddItem (sline(1))
        End If
    Next

    If selectedIndex >= 0 And selectindex <= UBound(value) Then
        Dim sdata() As String
        sdata = Split(value(selectedIndex), Chr(9))
        If UBound(sdata) > 0 Then
            text = sdata(1)
            aa.text = text
        End If
    End If
    'aa.Caption = text
    aa.Visible = True

    If aa.Top > pict.Height Then
        pict.Height = top1 + height1 + 100
    End If
End Function
```

VB 面板 绘制代码

子节点绘制递归调用

```
工程1 - CWebDWUIComponent (Code)
(通用) drawPanel

' 绘制Panel对象
Private Function drawPanel(ByRef pict As PictureBox, ByRef formin As Form) As Long
| Dim aa As VB.Frame

Set aa = formin.Controls.Add("VB.Frame", name, pict)

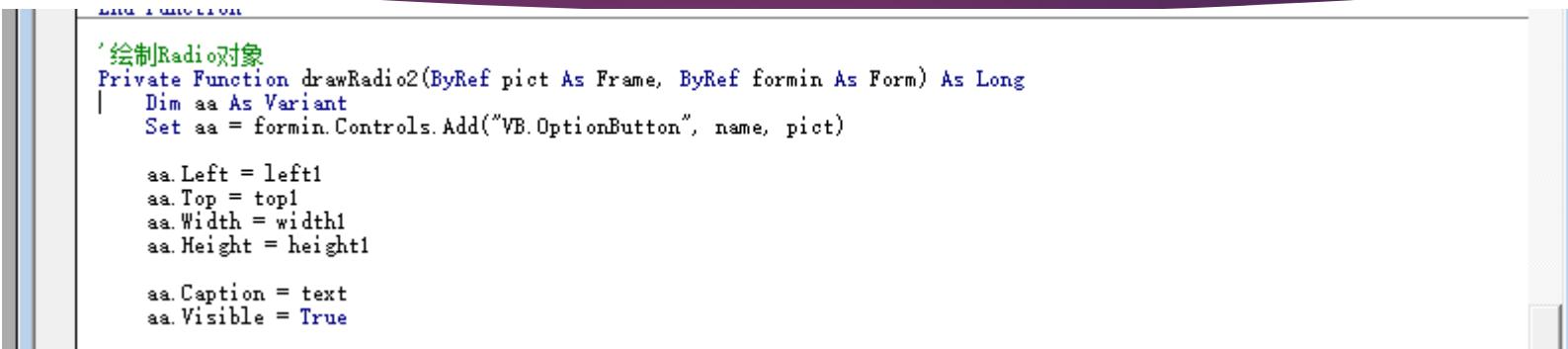
aa.Left = left1
aa.Top = top1
aa.Width = width1
aa.Height = height1

aa.Caption = text
aa.Visible = True

Dim childId As Long
Dim i As Long
For childId = 0 To UBound(childElement) - 1
If childElement(childId) Is Nothing Then
    'DO NOTHING
Else
    i = childElement(childId).showOnPanel(aa, formin)
End If
Next
If aa.Top > pict.Height Then
    pict.Height = top1 + height1 + 100
End If
End Function
```

输入UI对象属性	VB CWebDWUIComponent	标签对象属性	备注
classname	classname	-	JPanel,映射为VB.Frame对象
text	Text	Caption	标签文本
childElements	childElement(1000)	-	定义了面板内的子对象，需要递归调用进行绘图

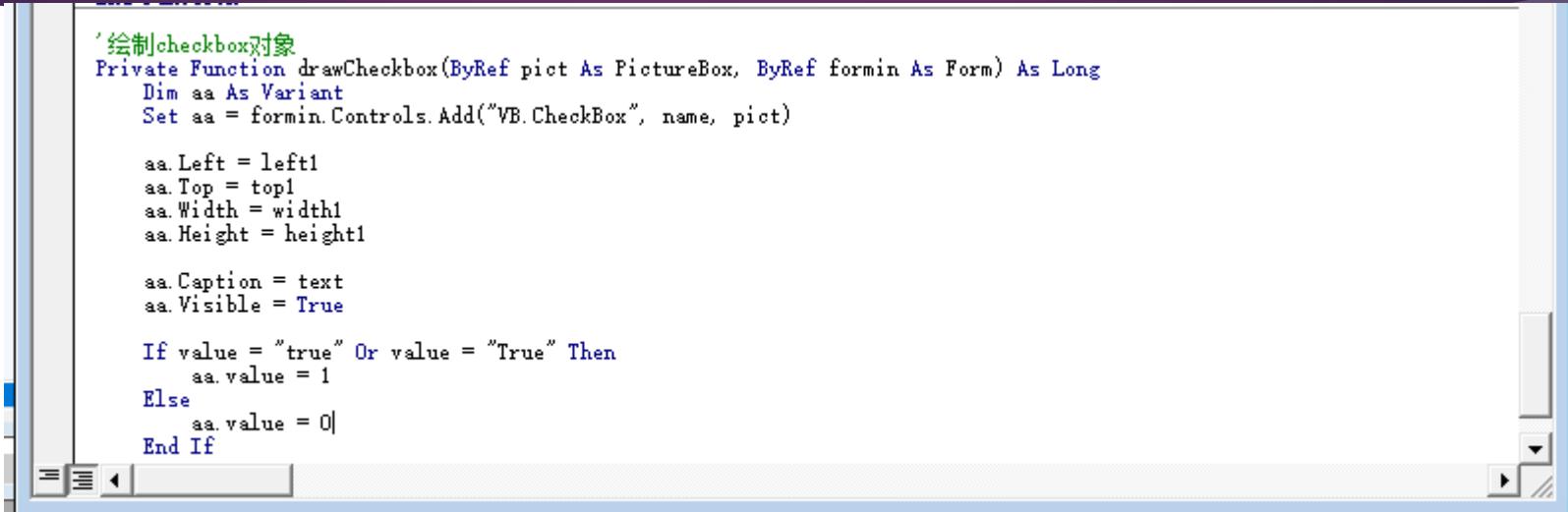
VB 单选按钮绘制代码



```
'绘制Radio对象
Private Function drawRadio2(ByRef pict As Frame, ByRef formin As Form) As Long
    Dim aa As Variant
    Set aa = formin.Controls.Add("VB.OptionButton", name, pict)
    aa.Left = left1
    aa.Top = top1
    aa.Width = width1
    aa.Height = height1
    aa.Caption = text
    aa.Visible = True
End Function
```

输入UI对象属性	VB CWebDWUIComponent	标签对象属性	备注
classname	classname	-	JRadioButton,映射为VB.OptionButton对象
text	Text	Caption	标签显示值

VB复选框绘制代码



```
'绘制checkbox对象
Private Function drawCheckbox(ByRef pict As PictureBox, ByRef formin As Form) As Long
    Dim aa As Variant
    Set aa = formin.Controls.Add("VB.CheckBox", name, pict)

    aa.Left = left1
    aa.Top = top1
    aa.Width = width1
    aa.Height = height1

    aa.Caption = text
    aa.Visible = True

    If value = "true" Or value = "True" Then
        aa.value = 1
    Else
        aa.value = 0
    End If
End Function
```

输入UI对象属性	VB CWebDWUIComponent	标签对象属性	备注
classname	classname	-	JRadioButton,映射为VB.OptionButton对象
text	Text	Caption	标签显示值
Value	Value	Value	输入Value是字符型 设置Value是整数型 True → 1 false → 0

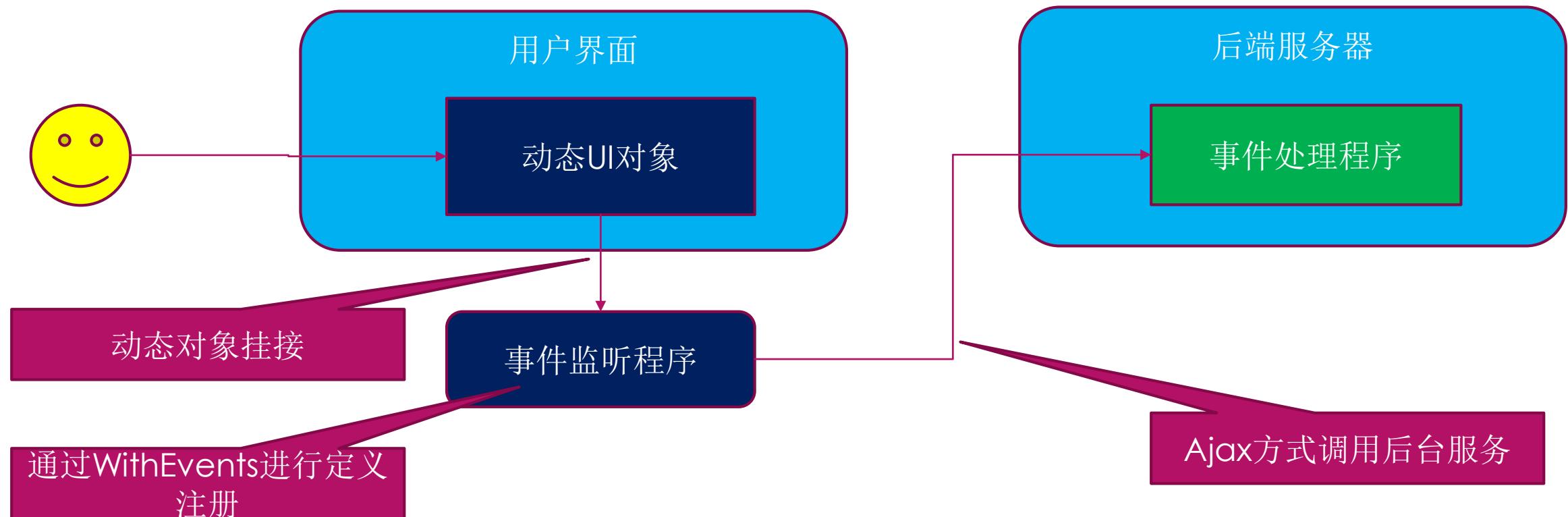
VB 标准控件界面元素转换汇总

输入UI元素	输入UI元素属性值	VB标准控件	VB标准控件属性值	备注
JLabel	text	VB.Label	Caption	文本标签，字体属性暂未支持
JTextBox	text	VB.TextBox	Text	文本框，字体属性暂未支持
JComboBox	values selectedIndex	VB.ComboBox	List Text	下拉选择框 Text = List(selectedIndex)
JPanel	text	VB.Frame	Caption	分块对象，下面包含子对象 暂时只支持一级子对象
JRadioButton	text	VB.OptionButton	Caption	
JCheckBox	value	VB.CheckBox	value	输入value: true/false/True/False 输出value:1/0/1/0

UI的定义元素

UI的实现元素

VB UI对象事件回调响应机制



VB UI元素事件响应设计

VB UI对象	响应事件	事件处理逻辑
VB.Label	-	不响应用户事件
VB.TextBox	文本值变化	更新数据窗口的数据值
VB.ComboBox	下拉值变化	更新数据窗口的数据值
VB.Pabel	-	不响应用户事件
VB.OptionButton	选择值变化	更新数据窗口的数据值
VB.CheckBox	选择值变化	更新数据窗口的数据值

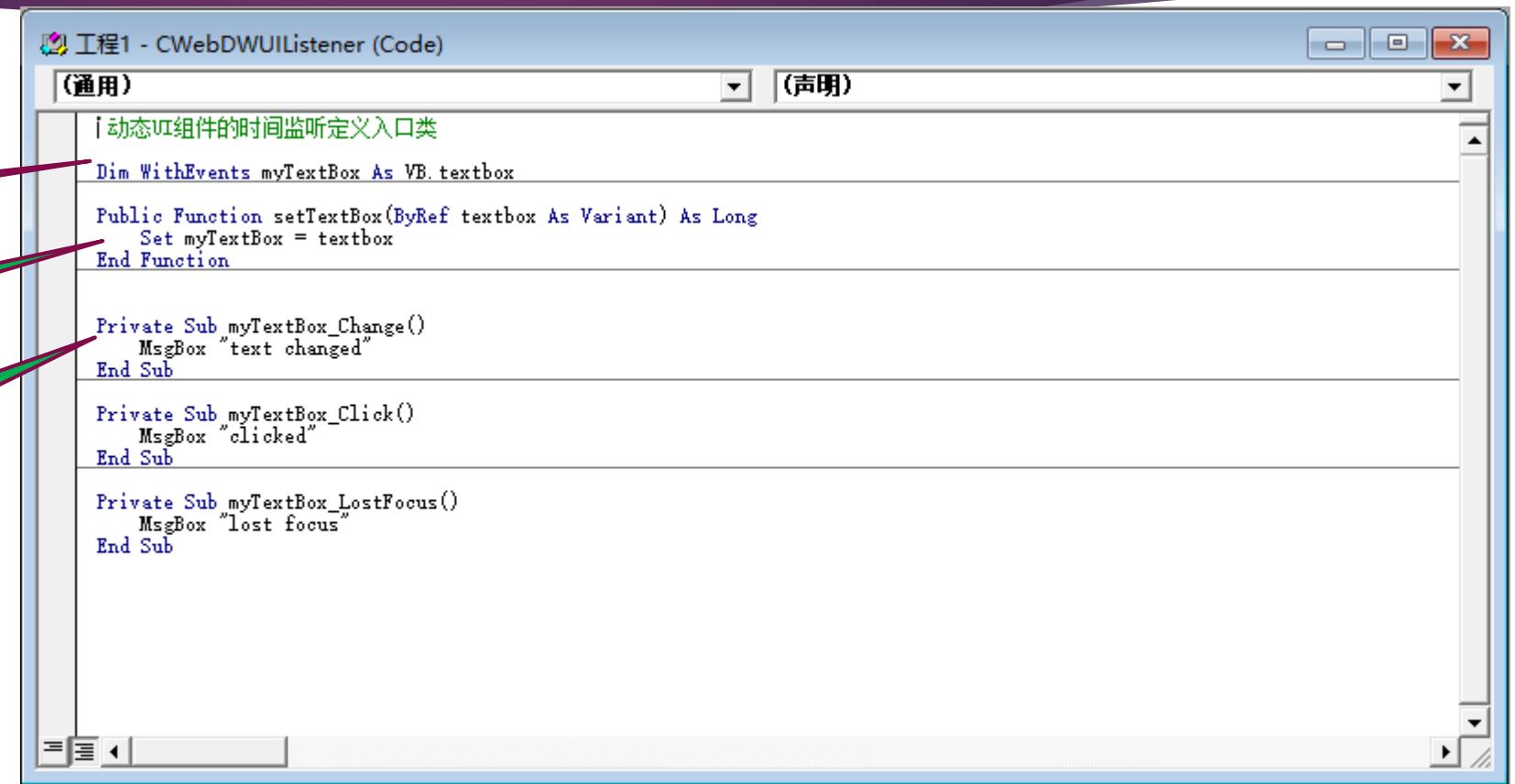


UI元素产生的事件



数据窗口对象存储在
服务器的内存里面，
响应UI元素的事件而
发生变化

VB事件监听器定义（使用WithEvents）



工程1 - CWebDWUIListener (Code)

(通用) (声明)

```
「动态UI组件的时间监听定义入口类
Dim WithEvents myTextBox As VB.textbox
Public Function setTextBox(ByRef textbox As Variant) As Long
    Set myTextBox = textbox
End Function

Private Sub myTextBox_Change()
    MsgBox "text changed"
End Sub

Private Sub myTextBox_Click()
    MsgBox "clicked"
End Sub

Private Sub myTextBox_LostFocus()
    MsgBox "lost focus"
End Sub
```

定义要监听的对象类型

监听对象挂载方法

监听事件处理程序

VB事件监听器使用

The image shows two side-by-side code editors from a VB IDE. Both windows have the title "工程1 - CWebDWUIComponent (Code)".

Left Editor (通用声明):

```
' 元素的变量定义, 输入使用
Public id As String
Public name As String
Public text As String
Public classname As String

Public left1 As Long
Public top1 As Long
Public width1 As Long
Public height1 As Long

Public value As String
Public values As String
Public selectedIndex As Integer

' 如果是 JPanel 定义, 那么就会存在子对象定义
Private childElement(100) As CWebDWUIComponent

' 定义监听器
Private myListener As New CWebDWUICLListener
```

Right Editor (drawTextbox):

```
' 绘制文本标签对象
Private Function drawTextbox(ByRef pict As PictureBox, ByRef formin As Form) As Long
    Dim aa As Variant
    Set aa = formin.Controls.Add("VB.TextBox", name, pict)

    aa.Left = left1
    aa.Top = top1
    aa.Width = width1
    aa.Height = height1

    aa.Text = text
    aa.Visible = True

    If aa.Top > pict.Height Then
        pict.Height = top1 + height1 + 100
    End If

    ' 挂载事件监听
    myListener.setTextBox aa

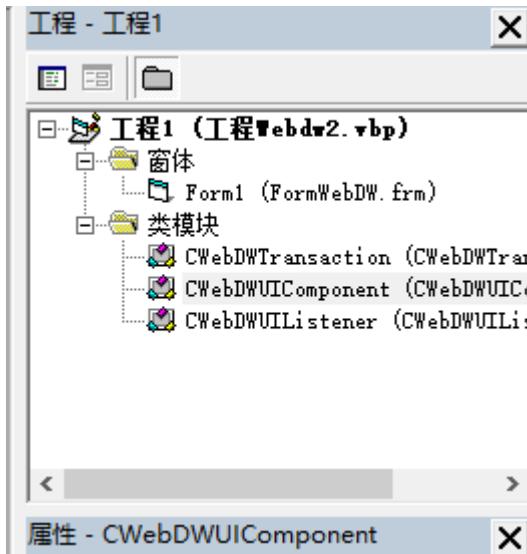
End Function
```

A green callout box on the left points to the line "Private myListener As New CWebDWUICLListener" with the text "在通用声明中定义一个监听器对象". A green callout box on the right points to the line "myListener.setTextBox aa" with the text "在绘制文本框时挂载此对象到事件监听处理器".

在通用声明中定义一个监听器对象

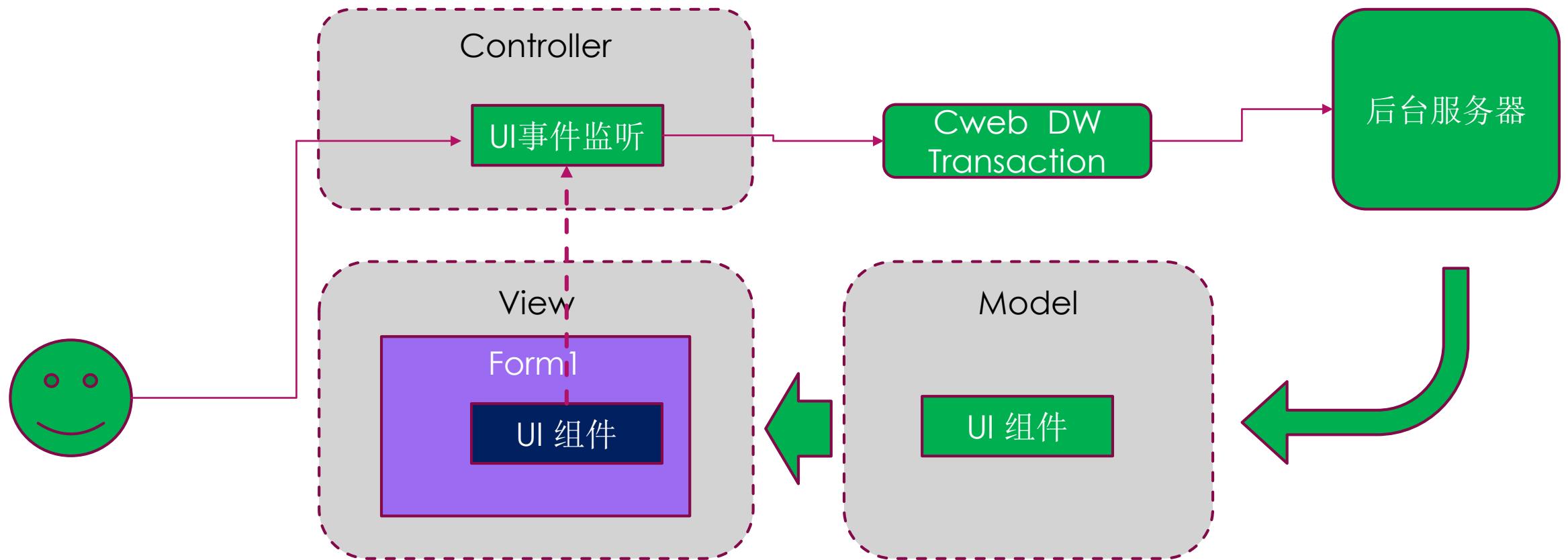
在绘制文本框时挂载此对象到事件
监听处理器

VB 项目文件说明



- ▶ FormWebDW: 客户端的显示窗体
- ▶ CWebDWTransaction: 负责与后台服务器通讯，以Ajax方式发送请求，检索数据，或者执行回调请求
- ▶ CWebDWUICOMPONENT: UI组件的统一封装
- ▶ CWebDWUILISTENER: UI组件的事件监听器，监听动态创建的UI对象产生的事件，回调服务器接口来更新数据

VB-WebDW的MVC模式



VB-WebDW界面示例

WebDW2.0 Demo http://webdw.vicp.net

这个窗口演示了VB如何和后台服务器通讯获取界面描述，并动态绘制出所需要的数
访问后台地址为：
http://localhost/webdw/retrieve?token=0dname=d_products&args=

Product Description	Product Name	ID	Size	Color	Qty	Unit Price	Picture Name
Tank Top3333	Tee Shirt111	300	Small	White	30	10	tshirtw.bmp
Cotton Cap	Baseball Cap	400	One size fits all	Black	92	9	capb.bmp
Wool cap	Baseball Cap	401	One size fits all	White	12	10	capw.bmp
Cloth Visor	Visor	500	One size fits all	White	36	7	visorw.bmp
Plastic Visor	Visor	501	One size fits all	Black	28	7	visorb.bmp
Hooded Sweatshirt	Sweatshirt	600	Large	Green	39	24	sshirtg.bmp
Zipped Sweatshirt	Sweatshirt	601	Large	Blue	32	25	sshirtb.bmp
Cotton Shorts	Shorts	700	Medium	Black	80	15	shortsb.bmp

WebDW2.0 Demo http://webdw.vicp.net

这个窗口演示了VB如何和后台服务器通讯获取界面描述，并动态绘制出所需要的数
访问后台地址为：
http://localhost/webdw/retrieve?token=0dname=d_products&args=

EmployeeID	Department	Zip Code	Phone	Status	Sex
101		aaa	aaa	<input type="radio"/> Active <input type="radio"/> Terminated <input type="radio"/> On Leave	<input type="radio"/> Male <input type="radio"/> Female
103		bbb	bbb	<input type="radio"/> Active <input type="radio"/> Terminated <input type="radio"/> On Leave	<input type="radio"/> Male <input type="radio"/> Female

WebDW2.0 Demo http://webdw.vicp.net

这个窗口演示了VB如何和后台服务器通讯获取界面描述，并动态绘制出所需要的数
访问后台地址为：
http://localhost/webdw/retrieve?token=0dname=d_products&args=

人员号:	状态:	性别:	医疗保险:	邮编编码:	人员号:	状态:	性别:	医疗保险:	邮编编码:
101	<input type="radio"/> Active <input type="radio"/> Terminated <input type="radio"/> On Leave	<input type="radio"/> Male <input type="radio"/> Female	<input type="checkbox"/> Health Insurance	100001	103	<input type="radio"/> Active <input type="radio"/> Terminated <input type="radio"/> On Leave	<input type="radio"/> Male <input type="radio"/> Female	<input type="checkbox"/> Health Insurance	100001

VB客户端界面渲染-标签和文本框

WebDW2.0 Demo http://webdw.vicp.net

这个窗口演示了VB如何和后台服务器通讯获取界面描述，并动态绘制成所需要的数

访问后台地址为：
http://localhost/webdw/retrieve?token=0&username=d_products&args=

Product Description	Product Name	ID	Size	Color	Qty	Unit Price	Picture Name
Tank Top3333	Tee Shirt111	300	Small	White	30	10	tshirtw.bmp
Cotton Cap	Baseball Cap	400	One size fits all	Black	92	9	capb.bmp
Wool cap	Baseball Cap	401	One size fits all	White	12	10	capw.bmp
Cloth Visor	Visor	500	One size fits all	White	36	7	visorw.bmp
Plastic Visor	Visor	501	One size fits all	Black	28	7	visorb.bmp
Hooded Sweatshirt	Sweatshirt	600	Large	Green	39	24	sshirtg.bmp
Zipped Sweatshirt	Sweatshirt	601	Large	Blue	33	25	sshirtb.bmp
Cotton Shorts	Shorts	700	Medium	Black	80	15	shortsb.bmp
a	a	701	a	a	100	100	aa.bmp

VB客户端渲染-下拉列表

WebDW2.0 Demo http://webdw.vicp.net

这个窗口演示了VB如何和后台服务器通讯获取界面描述，并动态绘制成所需要的数

访问后台地址为：
http://localhost/webdw/retrieve?token=0&username=d_products&args=

Product ID	Product Name	Product Description	Size	Color	Quantity	Unit Price	Picture Name
Tank Top	Tee Shirt111	300	Small	White	30	10	tshirtw.bmp
Cotton C	Baseball Cap	400	One size fits all	Black	92	9	capb.bmp
Wool cap	Baseball Cap	401	One size fits all	White	12	10	capw.bmp
Cloth Vi	Visor	500	One size fits all	White	36	7	visorw.bmp
Plastic Vi	Visor	501	One size fits all	Black	28	7	visorb.bmp
Hooded S	Sweatshirt	600	Large	Green	39	24	sshirtg.bmp
Zipped S	Sweatshirt	601	Large	Blue	33	25	sshirtb.bmp
Cotton S	Shorts	700	Medium	Black	80	15	shortsb.bmp
a	a	701			100	100	aa.bmp

VB客户端渲染-单选按钮

WebDW2.0 Demo http://webdw.vicp.net

这个窗口演示了VB如何和后台服务器通讯获取界面描述，并动态绘制成所需要的数
访问后台地址为：
http://localhost/webdw/retrieve?token=0&name=d_products&args=

Employee	Department	Zip Code	Phone	Status	Sex
101	200	100001	1391057777	<input checked="" type="radio"/> Active <input type="radio"/> Terminated <input type="radio"/> On Leave	<input type="radio"/> Male <input checked="" type="radio"/> Female
103	500	100004	1391234567	<input type="radio"/> Active <input checked="" type="radio"/> Terminated <input type="radio"/> On Leave	<input type="radio"/> Male <input checked="" type="radio"/> Female

VB客户端渲染-复选框

WebDW2.0 Demo http://webdw.vicp.net

这个窗口演示了VB如何和后台服务器通讯获取界面描述，并动态绘制成所需要的数

访问后台地址为：
http://localhost/webdw/retrieve?token=0&name=d_products&args=

dw_1 dw_2 dw_3 dw_4

Retrieve Insert Delete Save

人员号:

状态:

Active
 Terminated
 On Leave

性别:

Male
 Female

医疗保险: Health Insurance

邮政编码:

人员号:

状态:

Active
 Terminated
 On Leave

性别:

Male
 Female

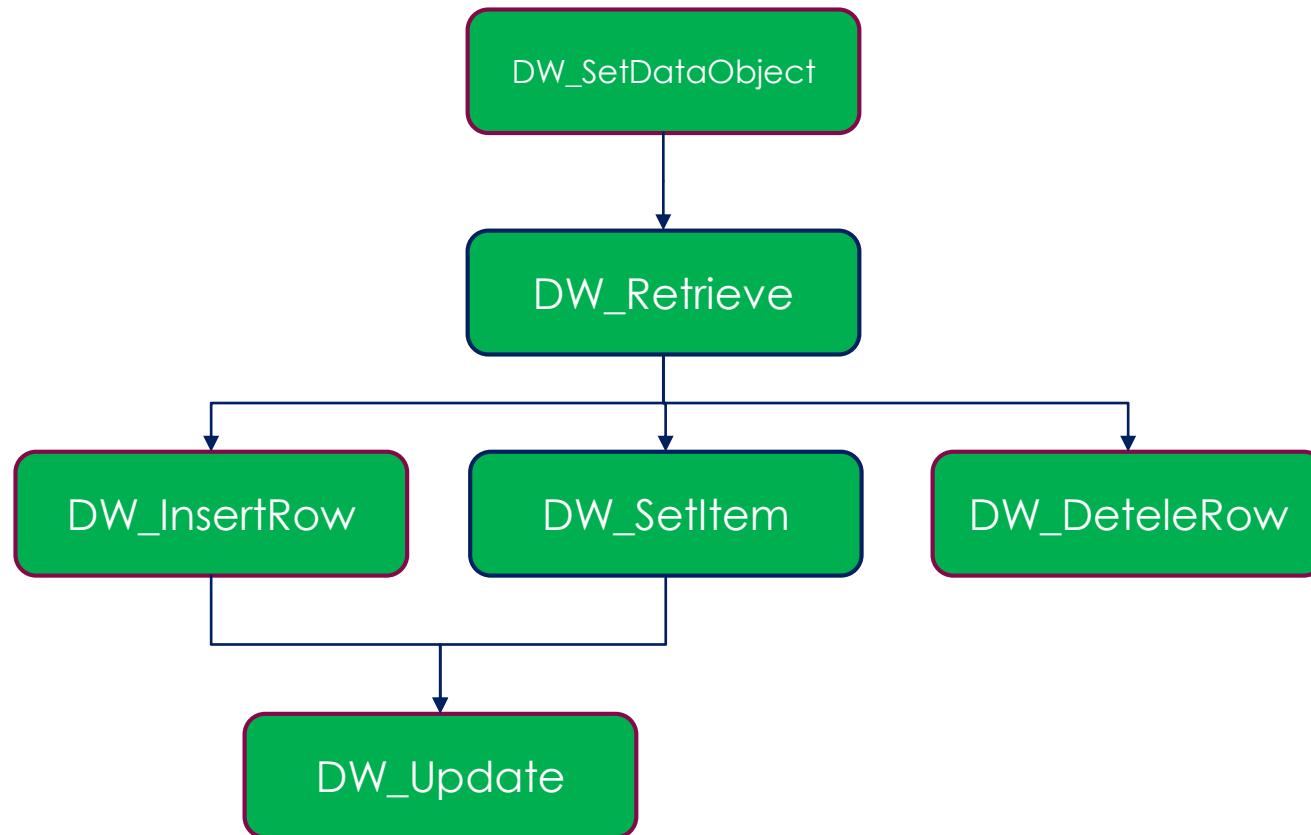
医疗保险: Health Insurance

邮政编码:

VB-WebDW的后台服务器调用接口说明

序号	调用URL	参数说明	备注
1	/webdw/setdataobject?token=0&dwname=d_products	token: 用户token, 预留未来做权限验证控制, 默认为0 dwname: 数据窗口名称	
2	/webdw/retrieve?token=0&dwname=d_products&args=	token:默认为0 dwname:数据窗口名称 args:数据窗口的查询参数, json字符串, 待扩展	查询参数待修改
3	/webdw/insertrow?token=0&uuid=1234567890	token:默认为0 uuid:数据检索成功以后, 后台服务器设定的uuid, 映射到内存中进行数据管理	插入行时不更新数据库
4	/webdw/deleterow?token=0&uuid=12345678&rowid=1;	token:默认为0 uuid:数据窗口后台实例的唯一标识 rowid:要删除的行号	删除以后直接刷新数据库
5	/webdw/update?token=0&uuid=12345678	token:默认为0 uuid:数据窗口后台实例的唯一标识	更新数据窗口内容到数据库
6	/webdw/setitem?uuid=0&rowid=1&colid=1&data=abcdefg	token:默认为0; uuid: 数据窗口后台唯一标识 rowid:数据窗口行号 colid :数据窗口列号 data: 要设置的数据窗口值	只更新内存, 不更新数据库
7			

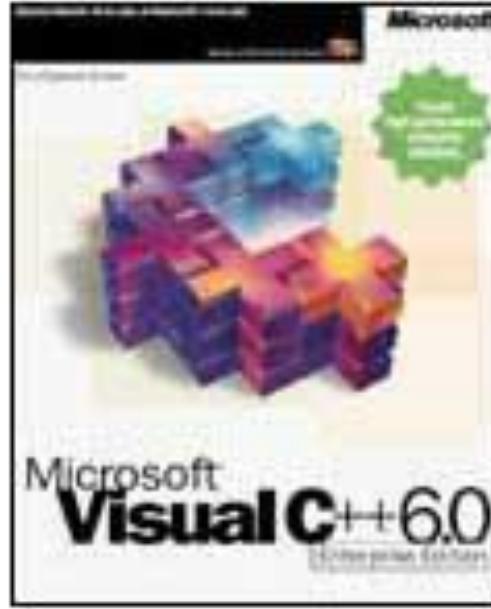
VB-WebDW后台接口调用序列



VB客户端尚未完成的工作 (2019-10-13)

- ▶ 文本框的事件监听修改刷新
- ▶ 下拉框的事件监听
- ▶ 单选按钮的事件监听
- ▶ 复选按钮的事件监听
- ▶ 其他界面增强渲染，字体，配色等
- ▶ 其他界面元素增强

目录



浏览器上动态界面绘制的技术讨论

WebDW的技术架构说明

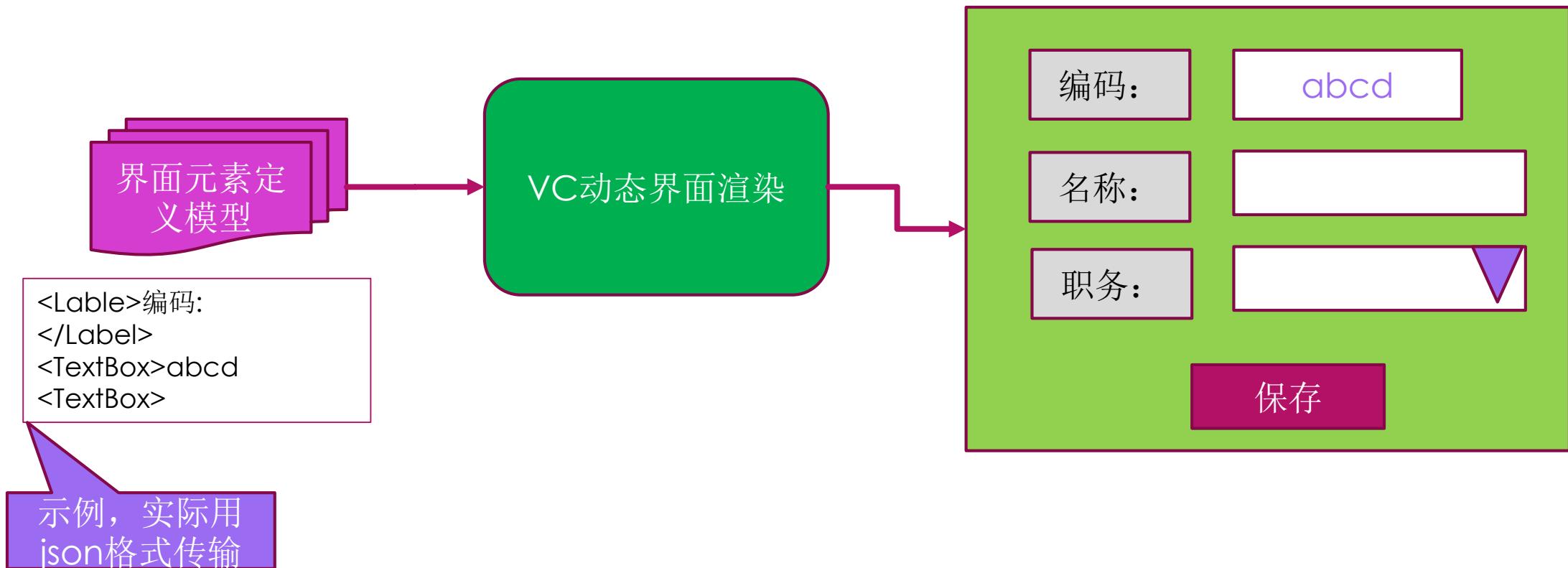
WebDW VC客户端的设计实现

VC客户端的总体IPO

VC客户端的技术选型

VC客户端具体实现

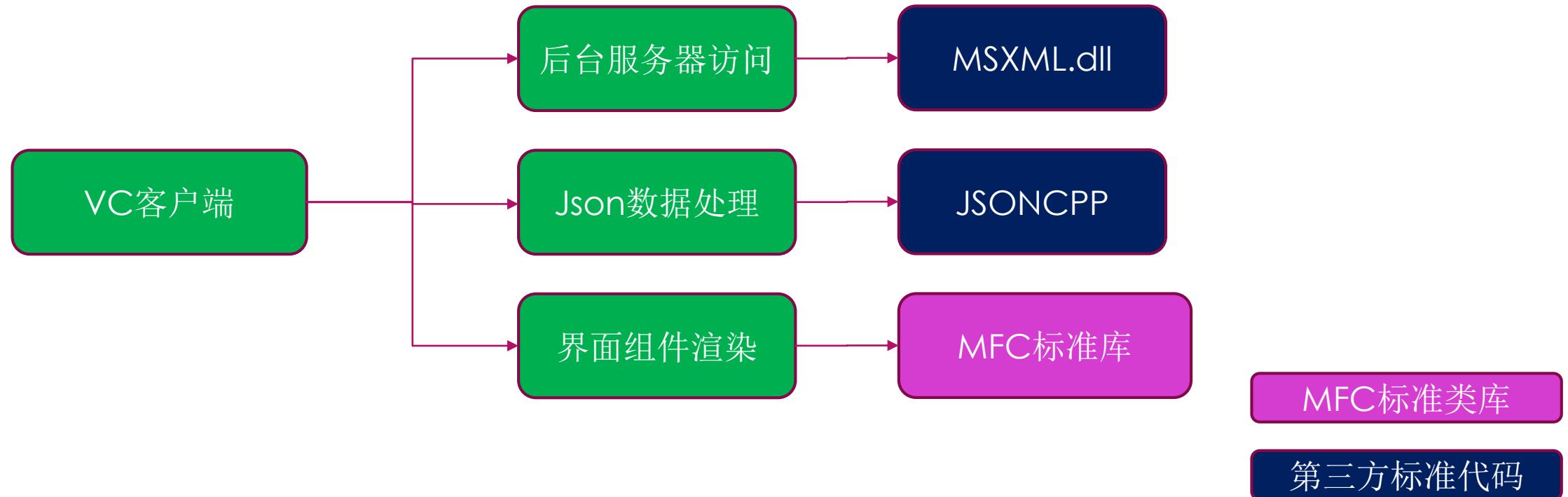
VC界面绘图总体IPO



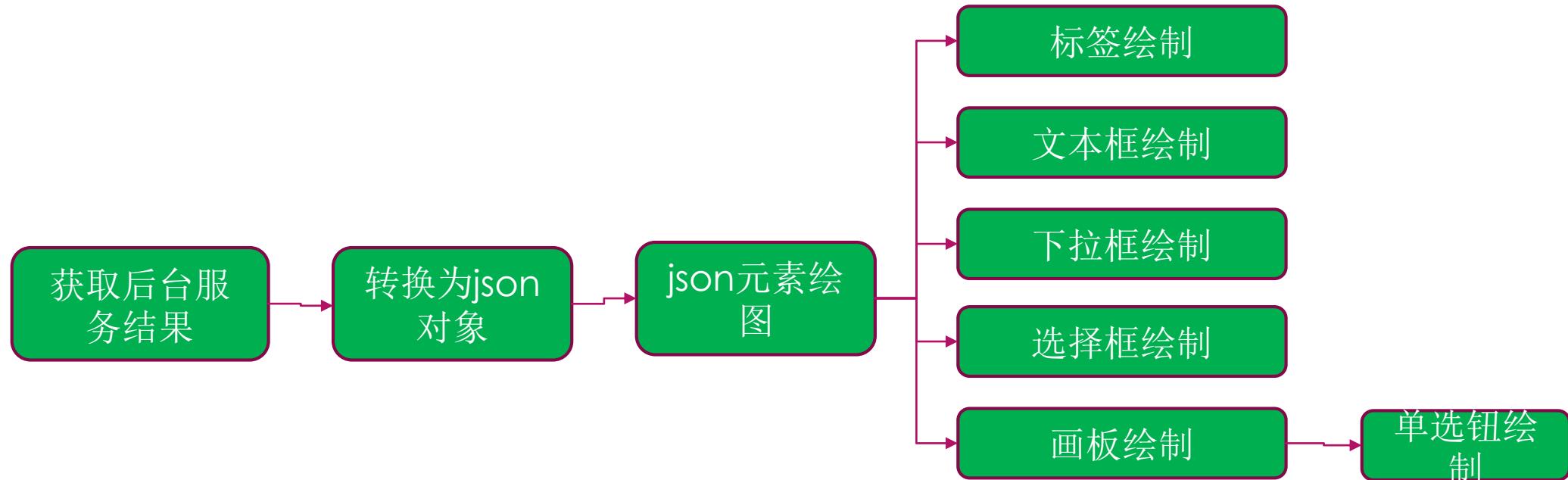
VC界面绘图和VB界面绘图的不同

比较项	VB	VC	备注
json数据格式支持	标准的VB不支持JSON数据格式，因此需要引入Script Controller来进行解析	通过引入开源JSONCPP代码来解析JSON格式	
Ajax后台服务调用	通过引入XMLHttpRequest来调用	通过COM方式调用MSXML6.dll来实现	
界面元素渲染组件	通过VB标准库来提供支持	通过MFC标准库提供支持	
事件回调	通过自定义调用器实现	元素库作为标准工具来支持	
基本设计模式	面向对象，基于组件	面向对象，基于组件	
二次封装	容易，可封装为ActiveX	容易，可封装为类和控件	
线程支持	单线程	单线程	

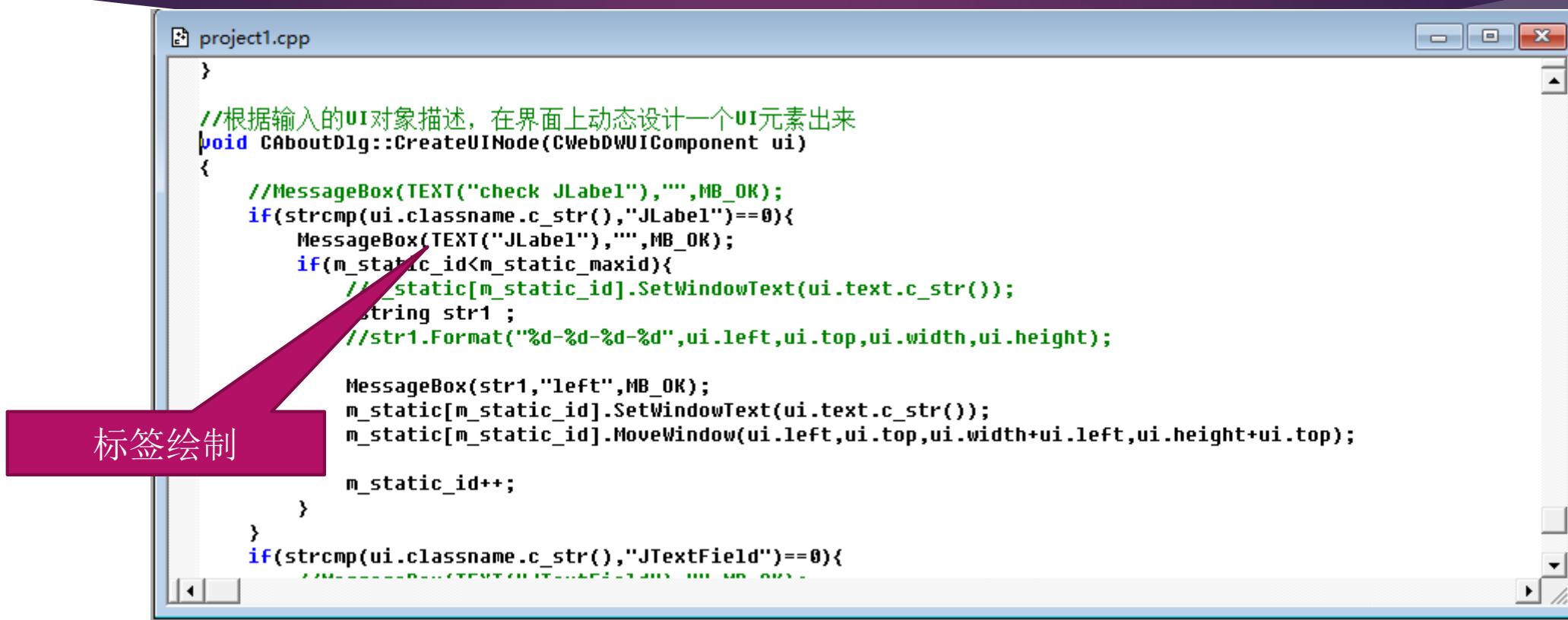
VC客户端的技术选型



VC webdw客户端设计



VC绘图： 标签绘制



```
project1.cpp

}

//根据输入的UI对象描述，在界面上动态设计一个UI元素出来
void CAboutDlg::CreateUINode(CWebDWUIComponent ui)
{
    //MessageBox(TEXT("check JLabel"), "", MB_OK);
    if(strcmp(ui.classname.c_str(),"JLabel") == 0){
        MessageBox(TEXT("JLabel"), "", MB_OK);
        if(m_static_id < m_static_maxid){
            //m_static[m_static_id].SetWindowText(ui.text.c_str());
            string str1;
            //str1.Format("%d-%d-%d-%d",ui.left,ui.top,ui.width,ui.height);

            MessageBox(str1,"left",MB_OK);
            m_static[m_static_id].SetWindowText(ui.text.c_str());
            m_static[m_static_id].MoveWindow(ui.left,ui.top,ui.width+ui.left,ui.height+ui.top);

            m_static_id++;
        }
    }
    if(strcmp(ui.classname.c_str(),"JTextField")){
        //-----CREATE STATIC CONTROL HERE
    }
}
```

标签绘制

VC绘图：文本框绘制

project1.cpp

```
        }
    }
    if(strcmp(ui.classname.c_str(),"JTextField") == 0){
        //MessageBox(TEXT("JTextField"), "", MB_OK);
        if(m_static_id < m_static_maxid){
            //m_static[m_static_id].SetWindowText(ui.text.c_str());
            CString str1;
            str1.Format("%d-%d-%d-%d", ui.left, ui.top, ui.width, ui.height);

            //MessageBox(str1, "left", MB_OK);
            m_static[m_static_id].SetWindowText(ui.text.c_str());
            m_static[m_static_id].MoveWindow(ui.left, ui.top, ui.width+ui.left, ui.height+ui.top);
            m_static_id++;
        }
    }
}
```

标签绘制

VC运行界面

Product Description	Product Name	ID	Size	Color	Qty	Unit Price	Picture Name	确定
Tank Top3333	Tee Shirt111	300	Small	White	30	10	tshirtw.bmp	
Cotton Cap	Baseball Cap	400	One size fits all	Black	92	9	capb.bmp	
Wool cap	Baseball Cap	401	One size fits all	White	12	10	capw.bmp	
Cloth Visor	Visor	500	One size fits all	White	36	7	visorw.bmp	
Plastic Visor	Visor	501	One size fits all	Black	28	7	visorb.bmp	
Hooded Sweatshirt	Sweatshirt	600	Large	Green	39	24	sshirtg.bmp	
Zipped Sweatshirt	Sweatshirt	601	Large	Blue	33	25	sshirtb.bmp	
Cotton Shorts	Shorts	700	Medium	Black	80	15	shortsb.bmp	
a	a	701	a	a	100	100	aa.bmp	

JSONCPP是C++编写的解析json的开源库

The screenshot shows a web browser window with the URL <https://sourceforge.net/projects/jsoncpp/>. The page is for the 'json-cpp' project on SourceForge. The header includes the SourceForge logo, navigation links for Open Source Software, Business Software, Services, and Resources, and social media sharing buttons. A search bar is also present. An advertisement for TestRail is displayed above the project details. The main content area shows the project summary, which includes a star rating of 4.5 stars from 66 reviews, weekly downloads of 259, and a last update date of 2015-03-02. It features a large 'Download' button and links for Get Updates and Share This. Below the summary, there are tabs for Summary, Files, Reviews, Support, Wiki, Mailing Lists, Tickets, News, Discussion, and Code. A note at the bottom states: 'THIS PROJECT HAS MOVED TO GITHUB.' At the very bottom, a footer note says: 'jsoncpp is an implementation of a JSON (<http://json.org>) reader and writer in C++. JSON (JavaScript Object Notation) is a lightweight data-

VC版本下一步工作

- ▶ 目前支持标签、文本框
- ▶ 需要考虑支持下拉框、单选框、复选框
- ▶ 下一步在具体项目中进行开发支持

目录

Microsoft®
Visual Basic® .NET
Standard



浏览器上动态界面绘制的技术讨论

WebDW的技术架构说明

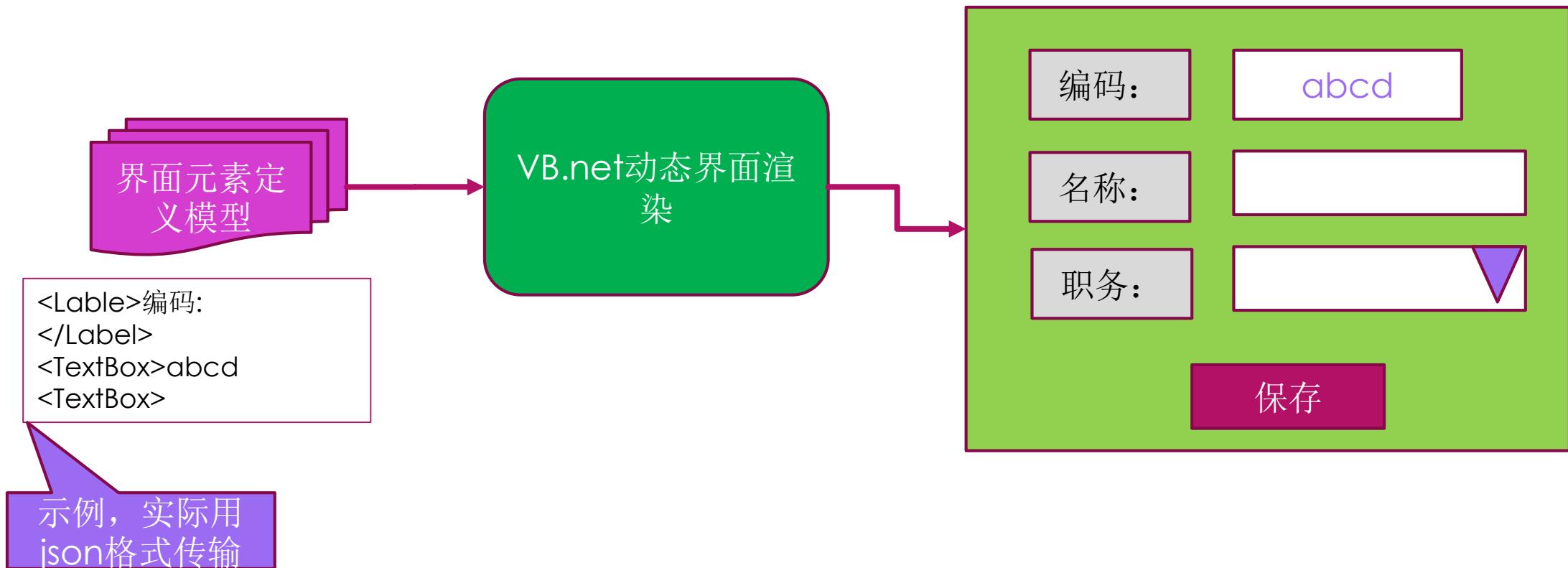
WebDW VB.net客户端的设计实现

VB.net客户端的总体IPO

VB.net客户端的技术选型

VB.net客户端具体实现

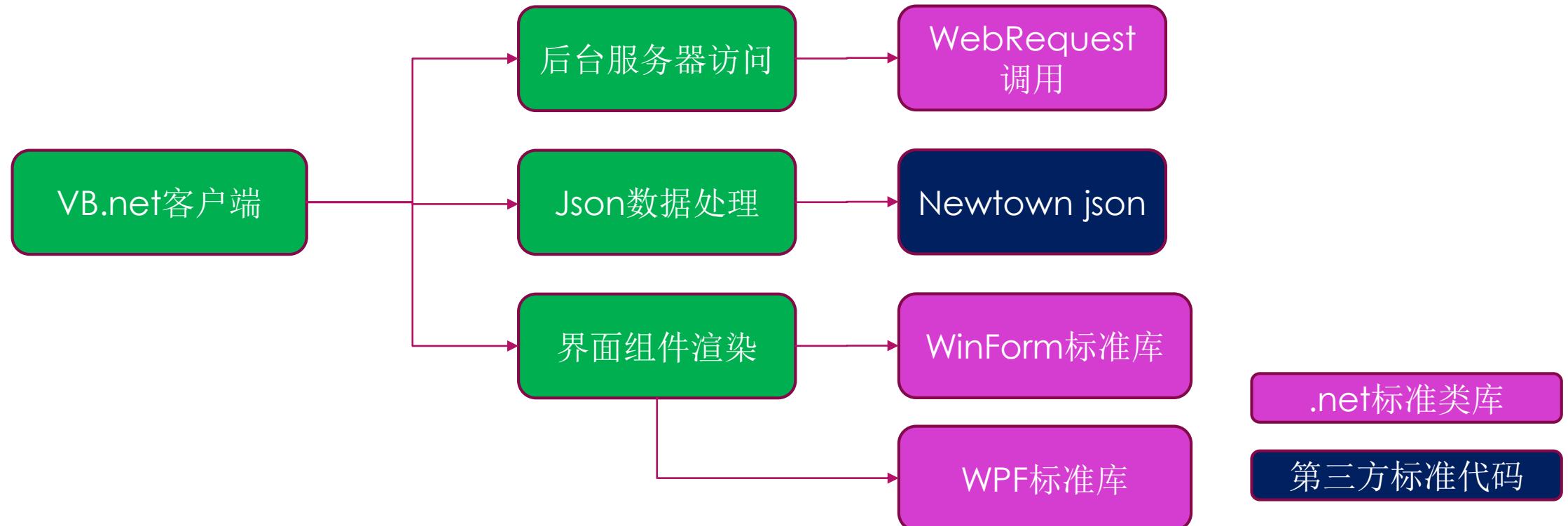
VB.net界面绘图总体IPO



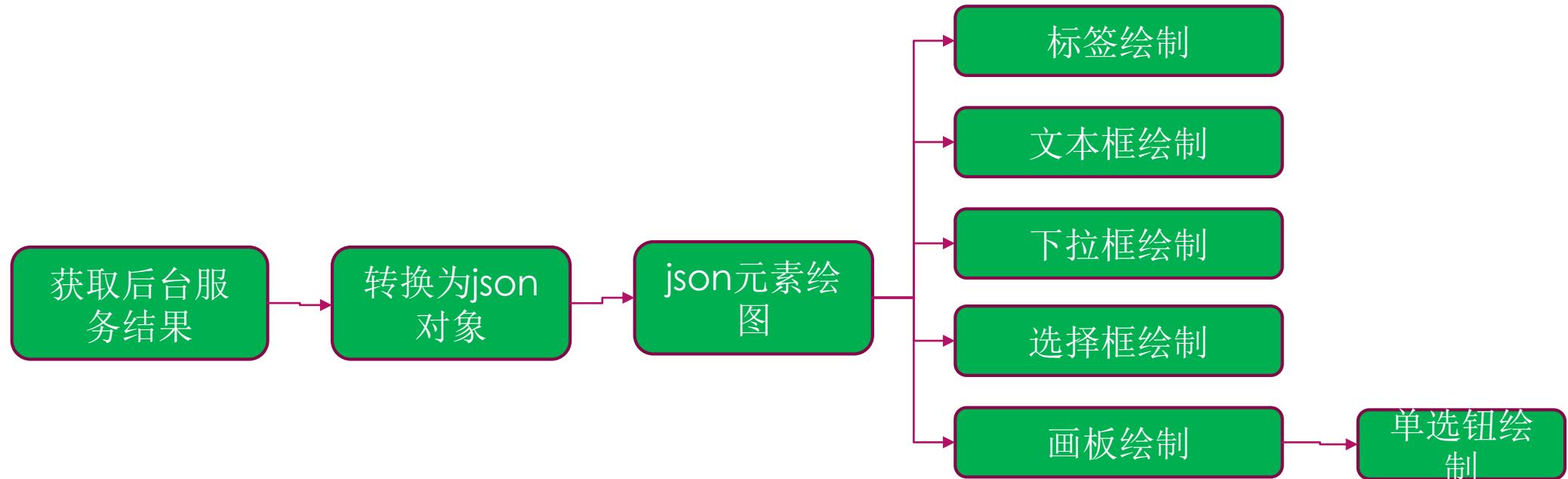
VB.net界面绘图和VB界面绘图的不同

比较项	VB	VB.net	备注
json数据格式支持	标准的VB不支持JSON数据格式，因此需要引入Script Controller来进行解析	通过引入Newtown的JSON库来支持JSON	
Ajax后台服务调用	通过引入XMLHttpRequest来调用	通过引入system.net包来支持WebRequest	
界面元素渲染组件	通过VB标准库来提供支持	通过WinForm标准库提供支持	
事件回调	通过自定义调用器实现	元素库作为标准工具来支持	
基本设计模式	面向对象，基于组件	面向对象，基于组件	
二次封装	容易，可封装为ActiveX	容易，可封装为类和控件	
线程支持	单线程	单线程	

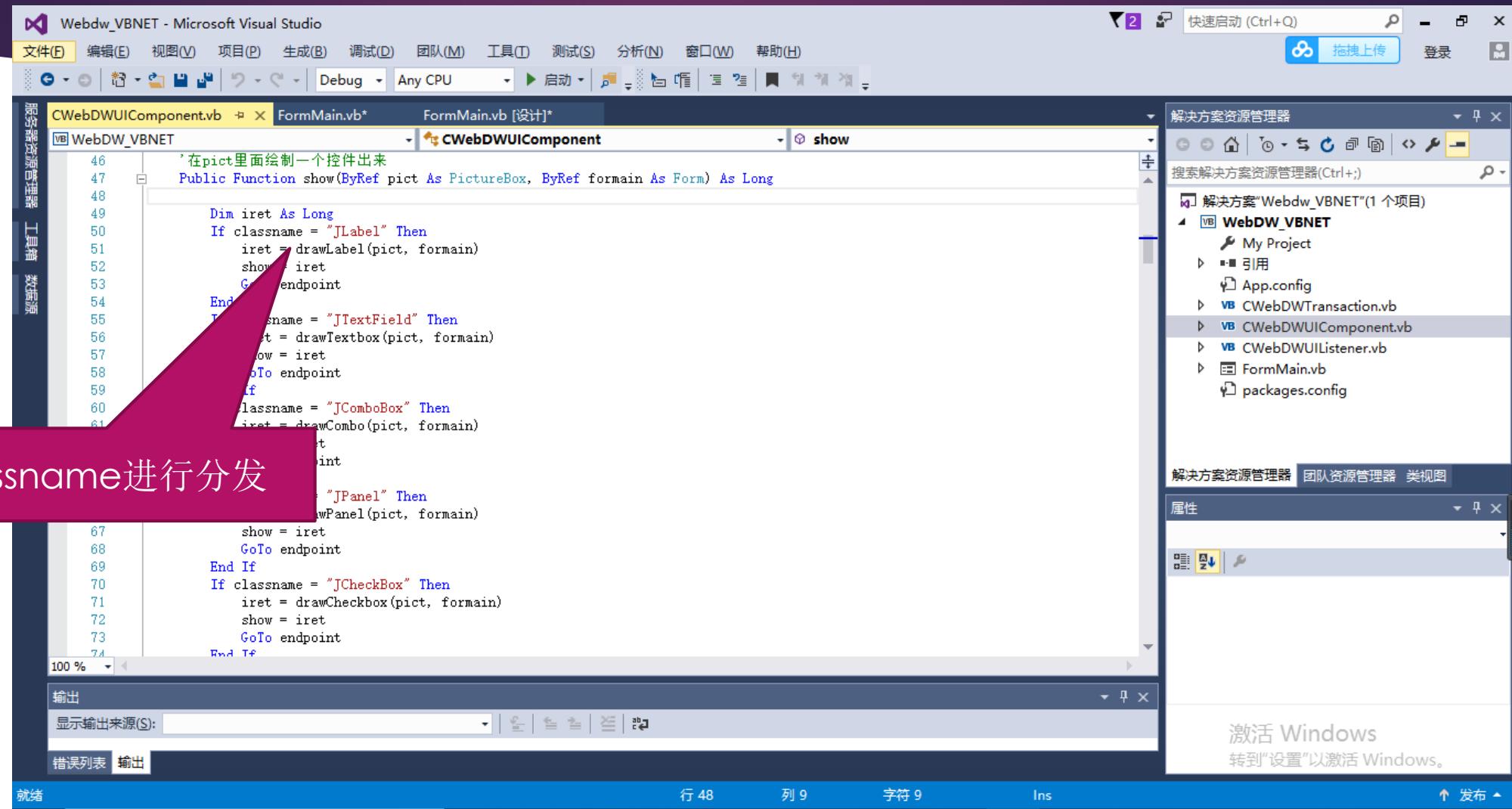
VB.net客户端的技术选型



VB.net webdw客户端设计



VB.net绘图入口功能分发



The screenshot shows the Microsoft Visual Studio IDE interface. The title bar reads "Webdw_VBNET - Microsoft Visual Studio". The menu bar includes "文件(F)", "编辑(E)", "视图(V)", "项目(P)", "生成(B)", "调试(D)", "团队(M)", "工具(T)", "测试(S)", "分析(N)", "窗口(W)", and "帮助(H)". The toolbar contains icons for file operations like Open, Save, and Build. The status bar at the bottom shows "行 48 列 9 字符 9 Ins" and "50°C 22:11".

The main code editor window displays the file "CWebDWUIComponent.vb" with the following code:

```
46     '在pict里面绘制一个控件出来
47     Public Function show(ByRef pict As PictureBox, ByRef formain As Form) As Long
48
49         Dim iret As Long
50         If classname = "JLabel" Then
51             iret = drawLabel(pict, formain)
52             show = iret
53             GoTo endpoint
54         End If
55         If classname = "JTextField" Then
56             iret = drawTextbox(pict, formain)
57             show = iret
58             GoTo endpoint
59         End If
60         If classname = "JComboBox" Then
61             iret = drawCombo(pict, formain)
62             show = iret
63             GoTo endpoint
64         End If
65         If classname = "JPanel" Then
66             iret = drawPanel(pict, formain)
67             show = iret
68             GoTo endpoint
69         End If
70         If classname = "JCheckBox" Then
71             iret = drawCheckbox(pict, formain)
72             show = iret
73             GoTo endpoint
74         End If
    
```

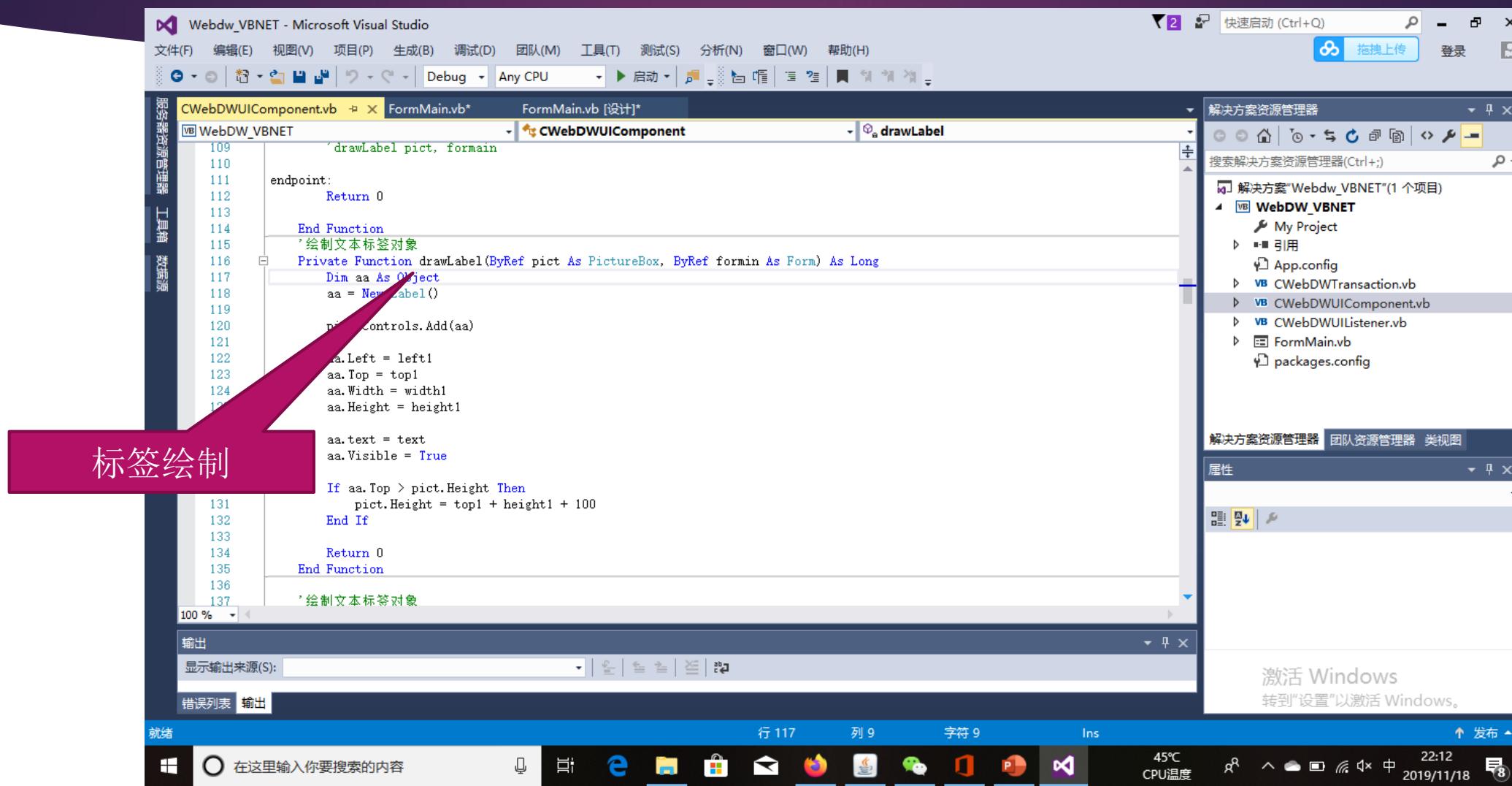
The code implements a function named "show" that takes a "PictureBox" and a "Form" as parameters and returns a long integer. It uses a series of "If" statements to check the value of "classname" and call different drawing methods based on the class name. A red arrow points from the text "根据classname进行分发" to the first "If" statement.

The Solution Explorer on the right shows the project structure:

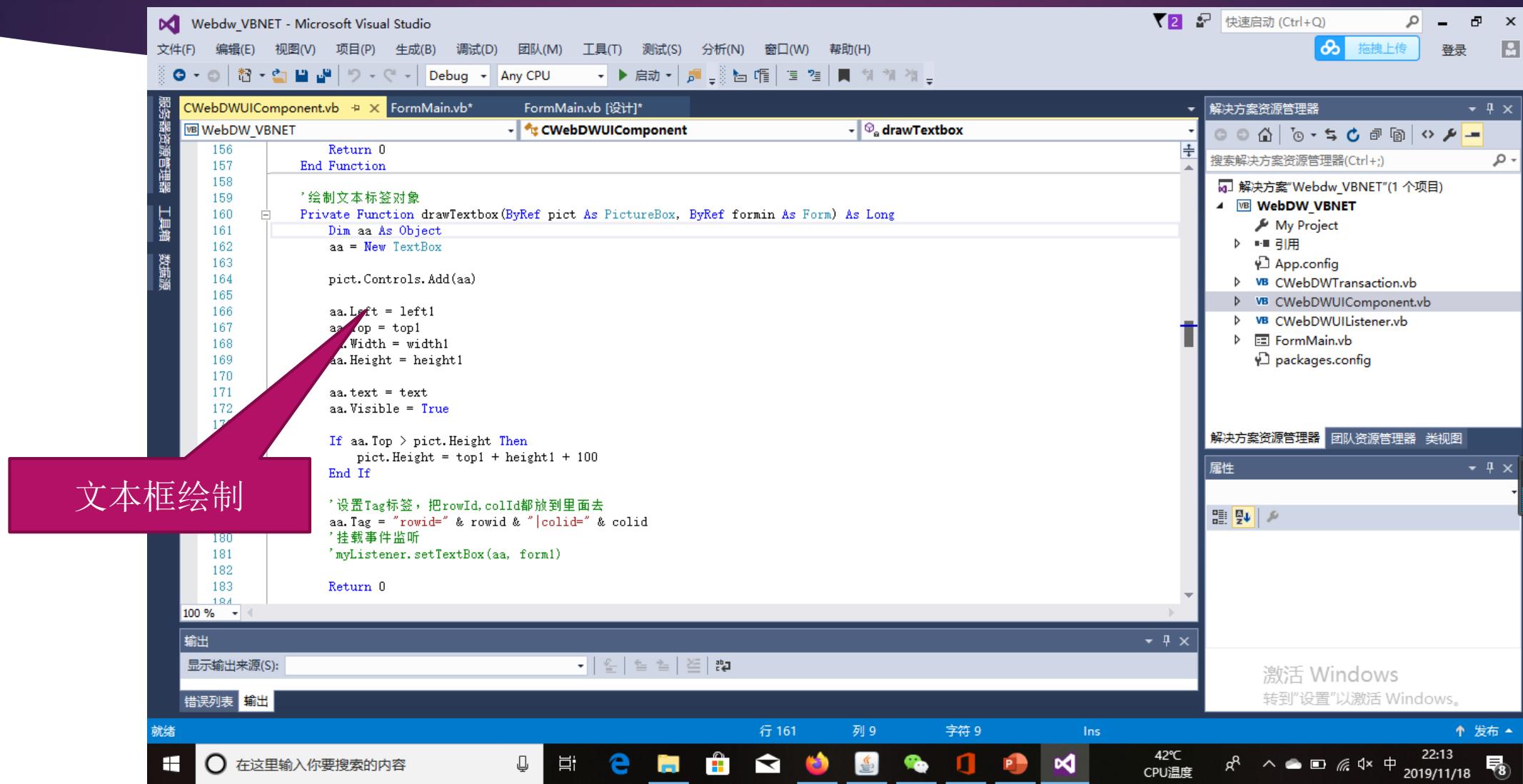
- 解决方案 "Webdw_VBNET" (1 个项目)
- WebDW_VBNET
- My Project
- 引用
- App.config
- CWebDWTransaction.vb
- CWebDWUIComponent.vb
- CWebDWUIListener.vb
- FormMain.vb
- packages.config

The Properties window is also visible on the right.

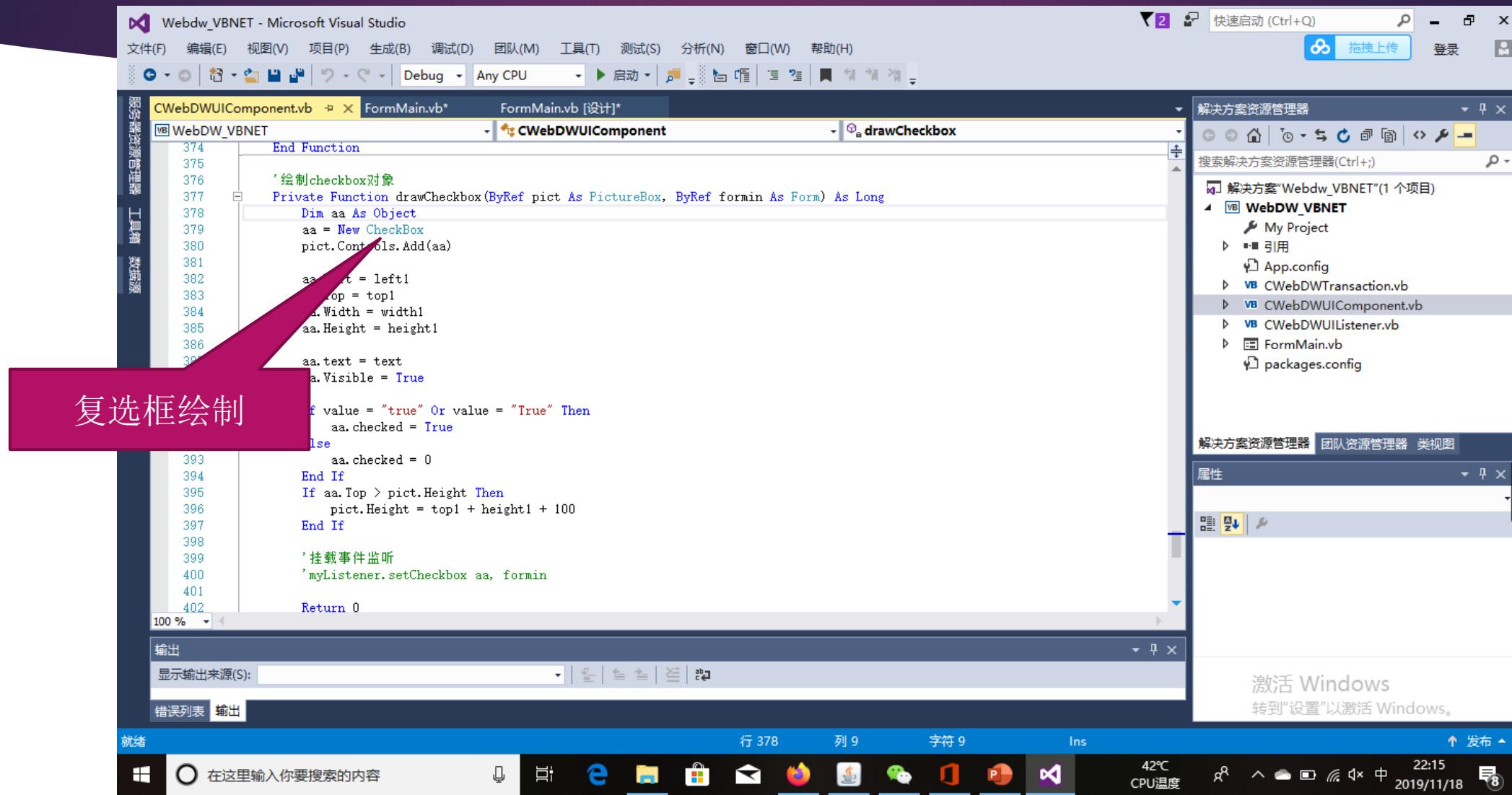
VB.net绘图： 标签绘制



VB.net绘图：文本框绘制



VB.net绘图：复选框绘制



VB.net绘图：下拉框绘制

下拉框绘制

```
208  
209  
210  
211     ' 绘制下拉框  
212     Private Function drawCombo(ByRef pict As PictureBox, ByRef formin As Form) As Long  
213         Dim aa As Object  
214         aa = New ComboBox  
215         pict.Controls.Add(aa)  
216  
217         aa.Left = left1  
218         aa.Top = top1  
219         aa.Width = width1  
220         aa.Height = height1 'Height是只读属性,针对ComboBox对象来说  
221  
222         value() As String  
223         value = Split(values, "/")  
224         Dim i As Integer  
225             0 To UBound(value)  
226             sline() As String  
227             ne = Split(value(i), Chr(9))  
228             If UBound(sline) > 0 Then  
229                 aa.AddItem(sline(1))  
230             End If  
231         Next  
232  
233         If selectedIndex >= 0 And selectedIndex <= UBound(value) Then  
234             Dim sdata() As String  
235             sdata = Split(value(selectedIndex), Chr(9))  
236             If UBound(sdata) > 0 Then
```

输出

显示输出来源(S):

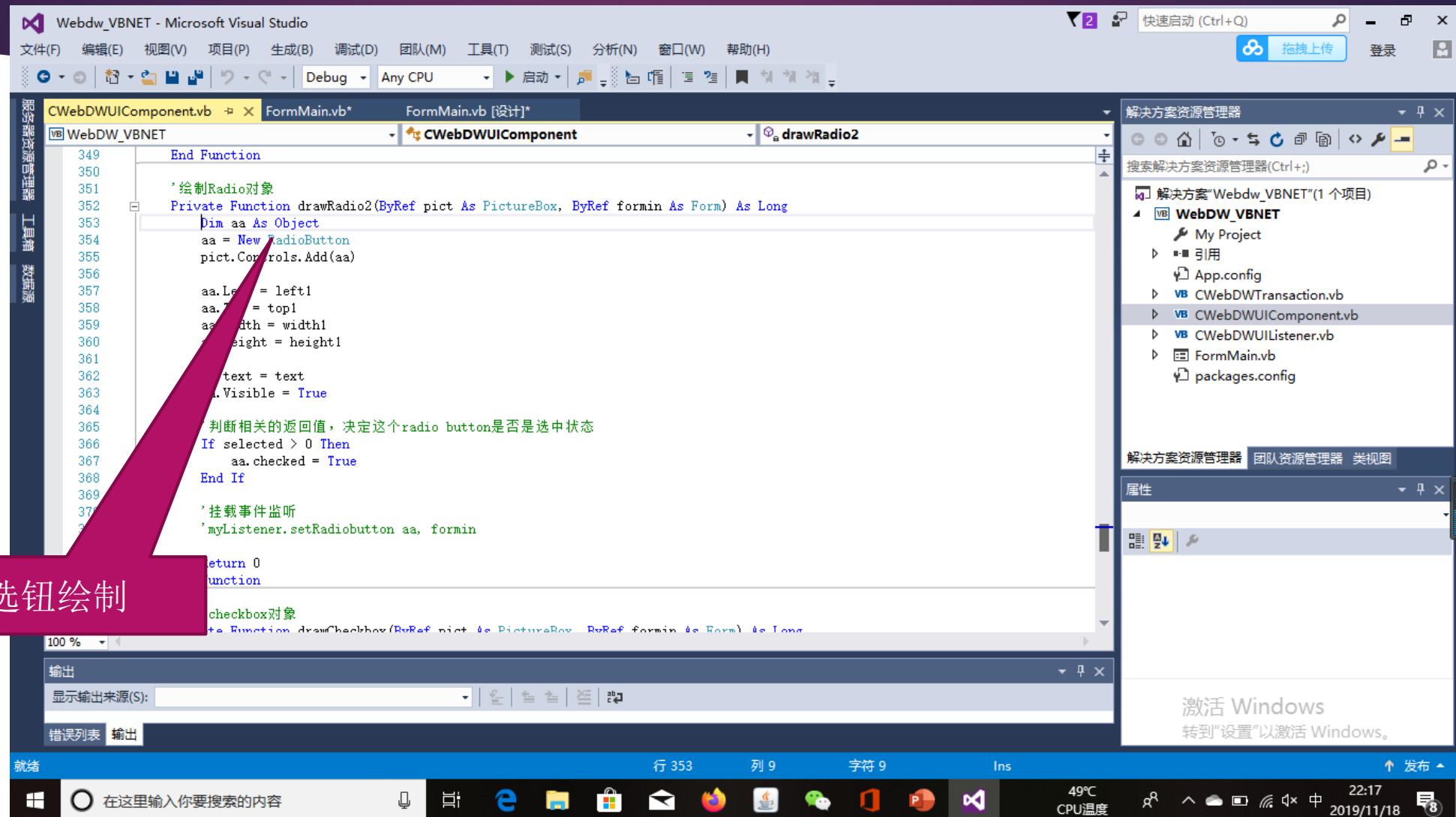
错误列表 输出

就绪 行 213 列 9 字符 9 Ins

激活 Windows 转到“设置”以激活 Windows。

42°C CPU温度 22:16 2019/11/18

VB.net绘图： 单选钮绘制（有Bug）



VB.net运行界面

这一程序演示了如何使用VB.net做为客户端来调用WebDW服务器，来动态绘制界面

Product Description	Product Name	ID	Size	Color	Qty	Unit Price	Picture Name
Tank Top3333	Tee Shirt111	300	Small	White	30	10	tshirtw.bmp
Cotton Cap	Baseball Cap	400	One size fits all	Black	92	9	capb.bmp
Wool cap	Baseball Cap	401	One size fits all	White	12	10	capw.bmp
Cloth Visor	Visor	500	One size fits all	White	36	7	visorw.bmp
Plastic Visor	Visor	501	One size fits all	Black	28	7	visorb.bmp
Hooded Sweatshirt	Sweatshirt	600	Large	Green	39	24	sshirtg.bmp
Zipped Sweatshirt	Sweatshirt	601	Large	Blue	33	25	sshirtb.bmp
Cotton Shorts	Shorts	700	Medium	Black	80	15	shortsb.bmp
a	a	701	a	a	100	100	aa.bmp

VB.net运行界面

这一程序演示了如何使用VB.net做为客户端来调用WebDW服务器，来动态绘制界面

Product ID	Product Name	Product Description	Size	Color	Quantity	Unit Price
Tank Top3	Tee Shirt111	300	Small	White	30	10
Cotton Cap	Baseball Cap	400	One size fits all	Black	92	9
Wool cap	Baseball Cap	401	One size fits all	White	12	10
Cloth Vis.	Visor	500	One size fits all	White	36	7
Plastic V.	Visor	501	One size fits all	Black	28	7
Hooded Sw.	Sweatshirt	600	Large	Green	39	24
Zipped Sw.	Sweatshirt	601	Large	Blue	33	25
Cotton Sh.	Shorts	700	Medium	Black	80	15
a	a	701			100	100

VB.net运行界面

这一程序演示了如何使用VB.net做为客户端来调用WebDW服务器，来动态绘制界面

Setdw dw1 Setdw dw2 Setdw dw3 Setdw dw4

Employee >ID	Department >ID	Zip Code	Phone	Status	Sex
101	200	100001	1391057777	<input checked="" type="radio"/> Active <input type="radio"/> Terminated <input type="radio"/> On Leave	<input type="radio"/> Male <input checked="" type="radio"/> Female
103	500	100004	1391234567	<input type="radio"/> Active <input checked="" type="radio"/> Terminated <input type="radio"/> On Leave	<input type="radio"/> Male <input checked="" type="radio"/> Female

VB.net运行界面

这一程序演示了如何使用VB.net做为客户端来调用WebDW服务器，来动态绘制界面

人员号:

状态:

Active
 Terminated
 On Leave

性别:

Male
 Female

医疗保险: Health Insurance

邮政编码:

人员号:

状态:

Active
 Terminated
 On Leave

性别:

Male
 Female

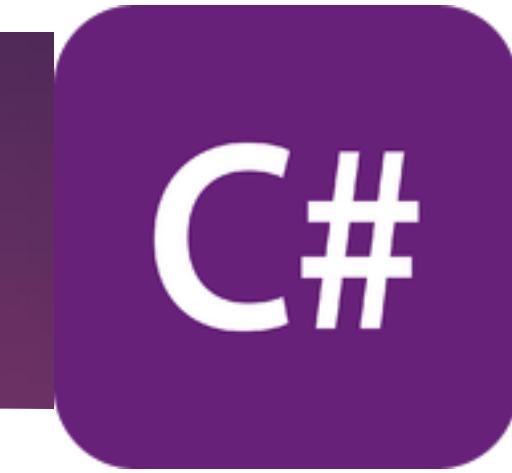
医疗保险: Health Insurance

邮政编码:

VB.net版本下一步工作

- ▶ 尝试不同风格的显示效果

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浏览器上动态界面绘制的技术讨论

WebDW的技术架构说明

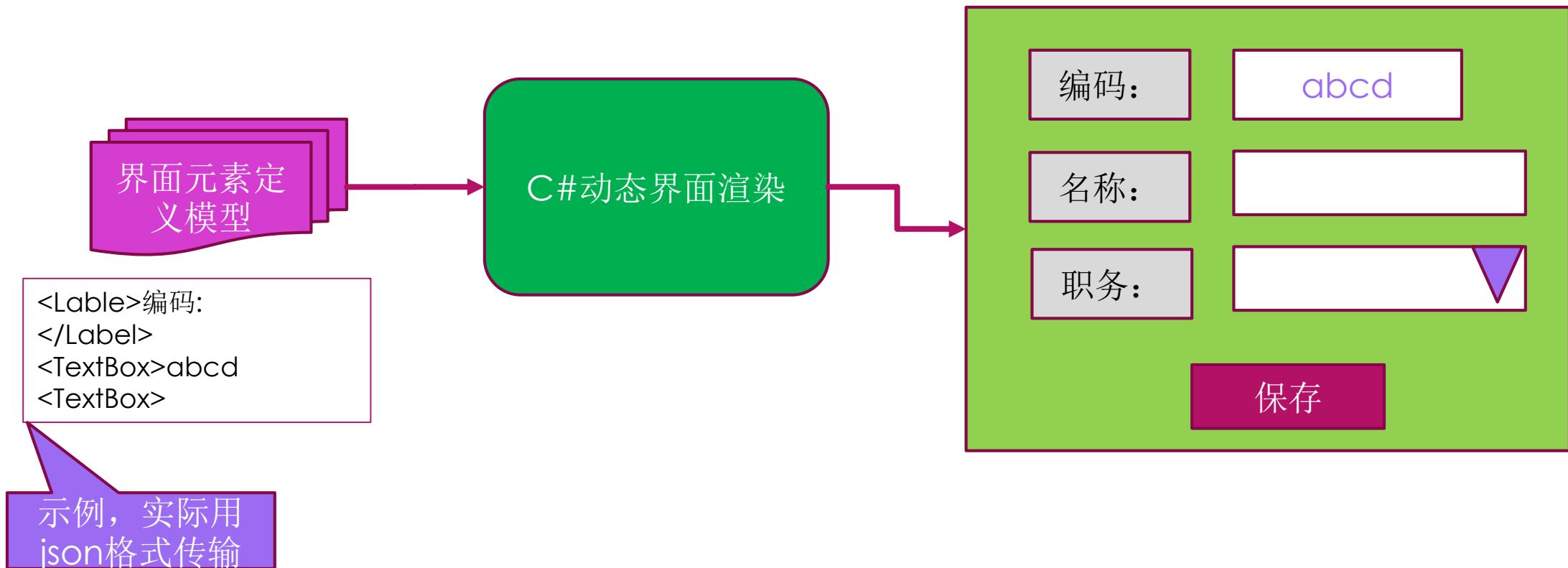
WebDW C#客户端的设计实现

C#客户端的总体IPO

C#客户端的技术选型

C#客户端具体实现

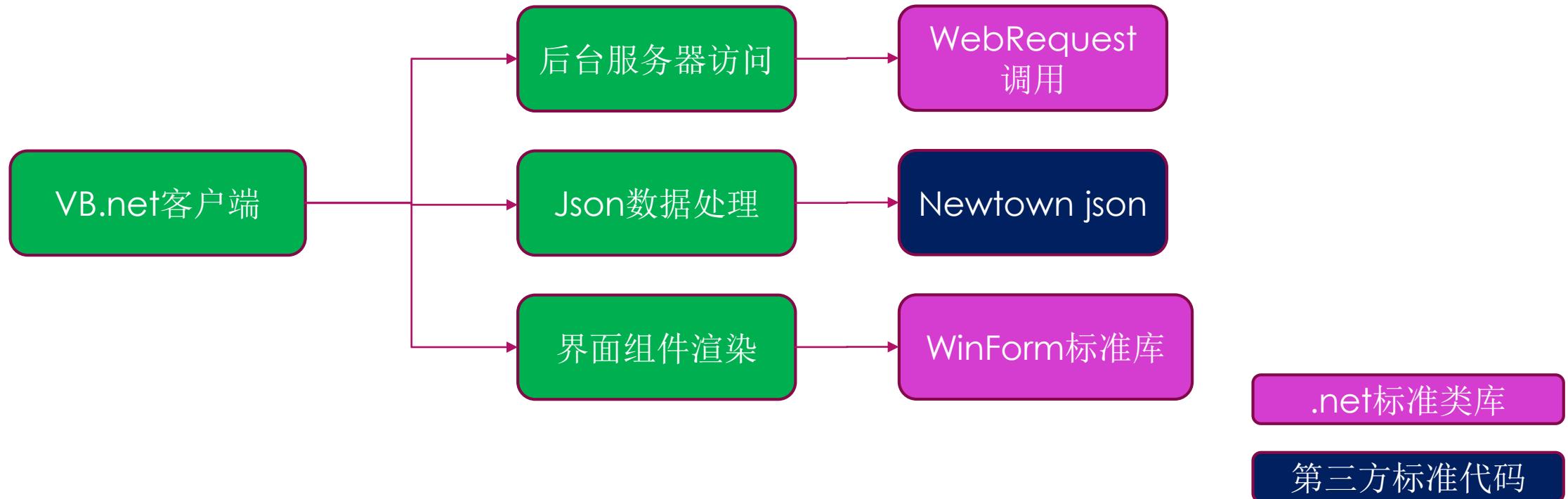
C#界面绘图总体IPO



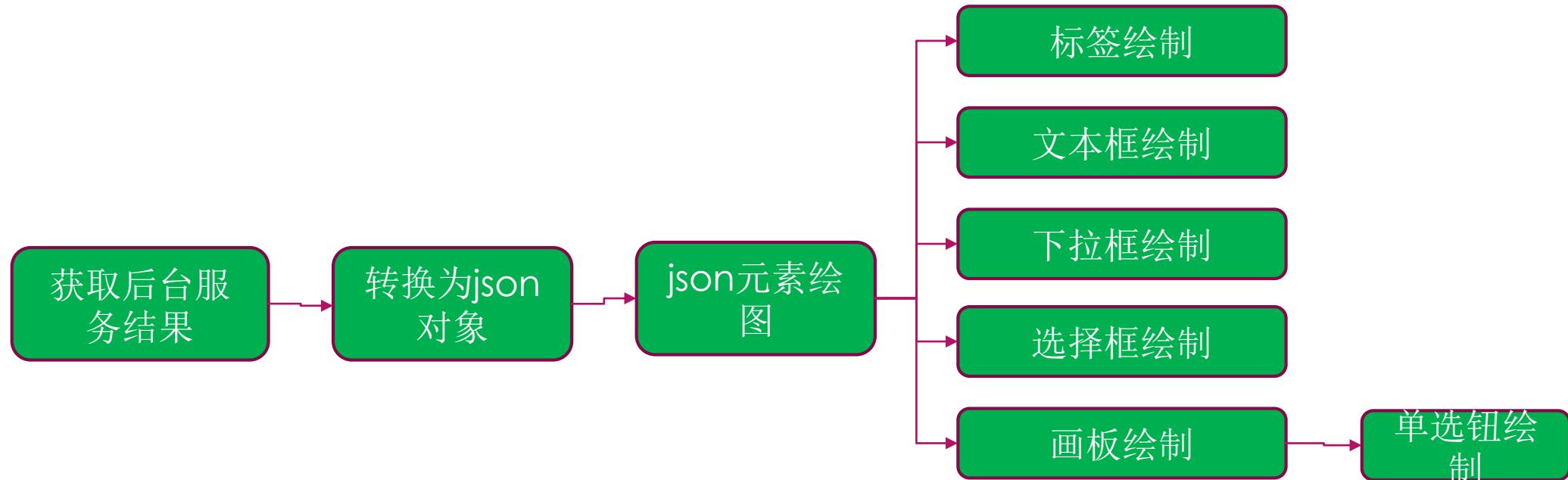
C#界面绘图和VB界面绘图的不同

比较项	VB	C#	备注
json数据格式支持	标准的VB不支持JSON数据格式，因此需要引入Script Controller来进行解析	通过引入Newton的JSON库来支持JSON	
Ajax后台服务调用	通过引入XMLHttpRequest来调用	通过引入System.Net包来支持WebRequest	
界面元素渲染组件	通过VB标准库来提供支持	通过WinForm标准库提供支持	
事件回调	通过自定义调用器实现	元素库作为标准工具来支持	
基本设计模式	面向对象，基于组件	面向对象，基于组件	
二次封装	容易，可封装为ActiveX	容易，可封装为类和控件	
线程支持	单线程	单线程	

C#客户端的技术选型（与VB.net类似）



C#webdw客户端设计



C#客戶端界面

Form2

set dw receive set dw2 set dw3 set dw4

Product Description	Product Name	ID	Size	Color	Qty	Unit Price	Picture Name
Tank Top3333	Tee Shirt111	300	Small	White	30	10	tshirtw.bmp
Cotton Cap	Baseball Cap	400	One size fits all	Black	92	9	capb.bmp
Wool cap	Baseball Cap	401	One size fits all	White	12	10	capw.bmp
Cloth Visor	Visor	500	One size fits all	White	36	7	visorw.bmp
Plastic Visor	Visor	501	One size fits all	Black	28	7	visorb.bmp
Hooded Sweatshirt	Sweatshirt	600	Large	Green	39	24	sshirtg.bmp
Zipped Sweatshirt	Sweatshirt	601	Large	Blue	33	25	sshirtb.bmp
Cotton Shorts	Shorts	700	Medium	Black	80	15	shortsb.bmp
a	a	701	a	a	100	100	aa.bmp

< >

C#客戶端界面

Form2

set dw receive set dw2 set dw3 set dw4

Product ID	Product Name	Product Description	Size	Color	Quantity	Unit Price
Tank Top3	Tee Shirt111	300	▼	▼	30	10
Cotton Ca	Baseball Cap	400	▼	▼	92	9
Wool cap	Baseball Cap	401	▼	▼	12	10
Cloth Vis	Visor	500	▼	▼	36	7
Plastic V	Visor	501	▼	▼	28	7
Hooded Sw	Sweatshirt	600	▼	▼	39	24
Zipped Sw	Sweatshirt	601	▼	▼	33	25
Cotton Sh	Shorts	700	▼	▼	80	15
a	a	701	▼	▼	100	100

C#客戶端界面

Form2

set dw receiveve set dw2 set dw3 set dw4

Employee >ID	Department ID	Zip Code	Phone	Status	Sex
101	200	100001	1391057777	<input type="radio"/> Active <input type="radio"/> Terminated	<input type="radio"/> Male <input type="radio"/> Female
103	500	100004	1391234567	<input type="radio"/> Active <input type="radio"/> Terminated	<input type="radio"/> Male <input type="radio"/> Female

C#客户端界面

Form2

set dw receive set dw2 set dw3 set dw4

人员号: 101

状态:

Active
 Terminated

性别:

Active
 Terminated

医疗保险: Health Insurance

邮政编码:

人员号: 103

状态:

Active
 Terminated

性别:

Male
 Female

医疗保险: Health Insurance

C#客户端尚未完成的工作

- ▶ 各界面元素的界面监听
- ▶ 未来根据具体项目需要来进行功能的丰富和扩展

目录



浏览器上动态界面绘制的技术讨论

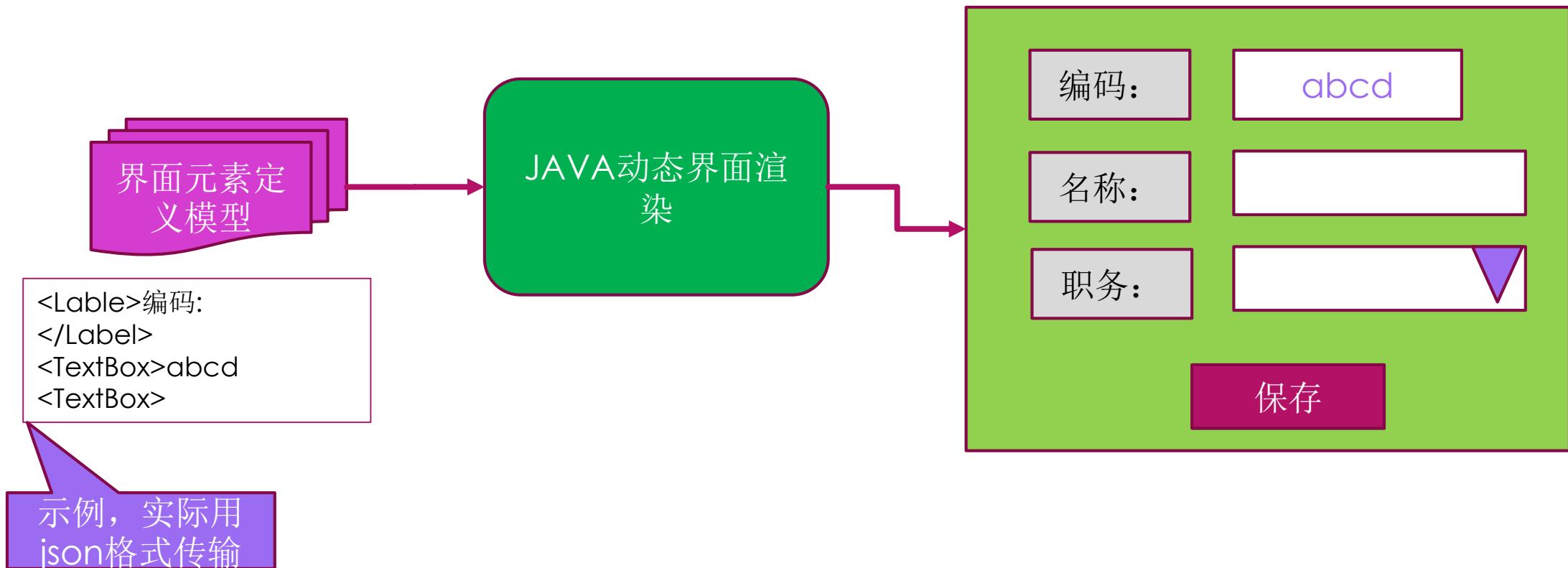
WebDW的技术架构说明

WebDW JAVA客户端的设计实现

JAVA客户端的总体IPO

JAVA客户端的技术选型

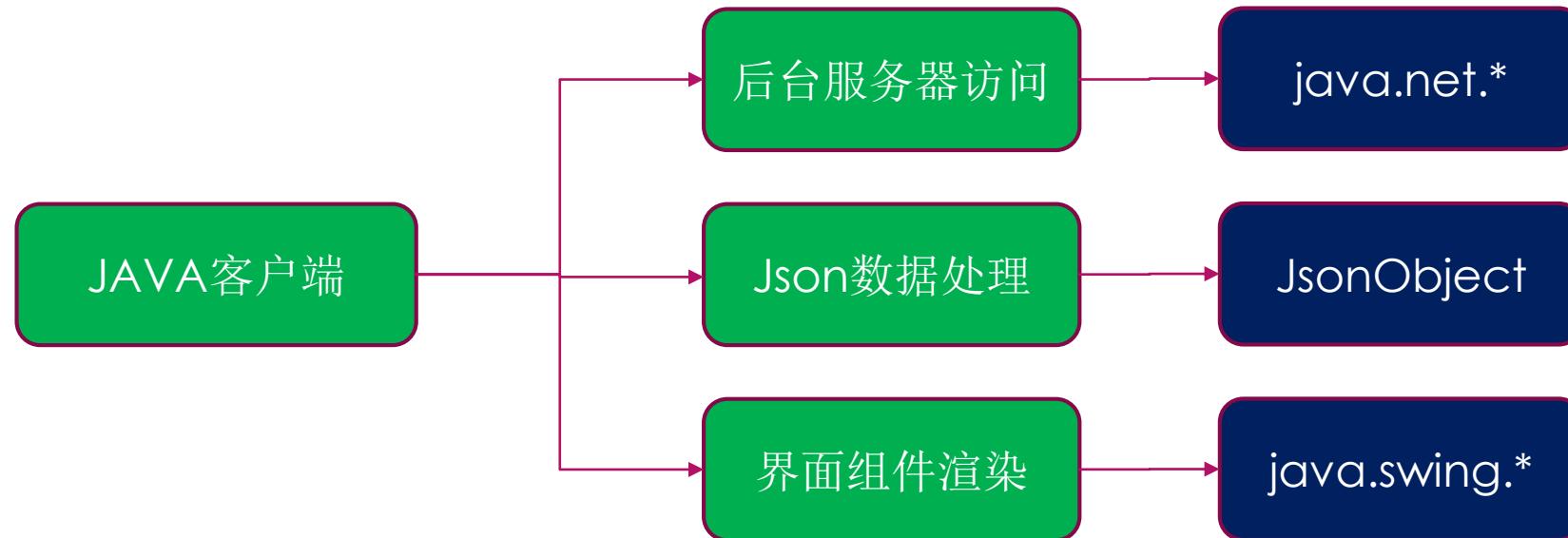
JAVA界面绘图总体IPO



JAVA界面绘图和VB界面绘图的不同

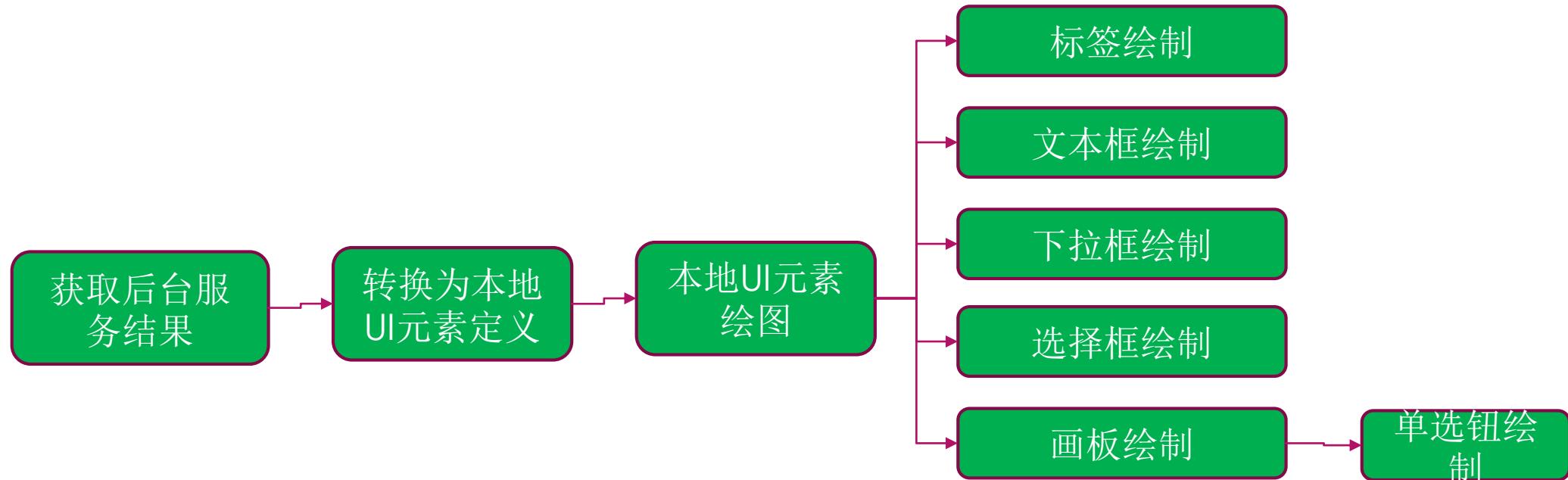
比较项	VB	JAVA	备注
json数据格式支持	标准的VB不支持JSON数据格式，因此需要引入Script Controller来进行解析	通过引入JSON相关类库支持Json数据读取	
Ajax后台服务调用	通过引入XMLHttpRequest来调用	通过引入java.net包来进行标准网络读取	
界面元素渲染组件	通过VB标准库来提供支持	选用JAVA标准库Swing来做渲染	
事件回调	通过自定义调用器实现	JAVA标准UI元素支持事件回调	VB是基于windows的事件机制进行封装处理 JAVA是跨平台的事件处理
基本设计模式	面向对象，基于组件	面向对象，基于组件	小型项目用函数比较简单 大型项目用对象比较简单
二次封装	容易，可封装为ActiveX	封装为标准类库来调用	

JAVA客户端的技术选型



第三方标准库

JAVA webdw客户端设计



JAVA客户端运行界面

JWebDW2.0 Demo Application.

Product Description	Product Name	ID	Size	Color	Qty	Unit Price	Picture Name
Tank Top3333	Tee Shirt111	300	Small	White	30	10	tshirtw.bmp
Cotton Cap	Baseball Cap	400	One size fits all	Black	92	9	capb.bmp
Wool cap	Baseball Cap	401	One size fits all	White	12	10	capw.bmp
Cloth Visor	Visor	500	One size fits all	White	36	7	visorw.bmp
Plastic Visor	Visor	501	One size fits all	Black	28	7	visorb.bmp
Hooded Sweatshirt	Sweatshirt	600	Large	Green	39	24	sshirtg.bmp
Zipped Sweatshirt	Sweatshirt	601	Large	Blue	33	25	sshirtb.bmp
Cotton Shorts	Shorts	700	Medium	Black	80	15	shortsb.bmp

set dw1 set dw2 set dw3 set dw4
retrieve insert row delete row Update

激活 Win
转到“设置”以

JAVA客户端运行界面

JWebDW2.0 Demo Application.

Product...	Product Name	Product Description	Size	Color	Quantity	Unit Price	Picture Name
Top3333	Tee Shirt111	300	Small	White	30	10	tshirtw.bm
Cotton Cap	Baseball Cap	400	Small	White	92	9	capb.bm
Wool cap	Baseball Cap	401	Small	White	12	10	capw.bm
Cloth Visor	Visor	500	Small	White	36	7	visorw.bm
astic Visor	Visor	501	Small	White	28	7	visorb.bm
Sweatshirt	Sweatshirt	600	Small	White	39	24	sshirtg.bm
Sweatshirt	Sweatshirt	601	Small	White	33	25	sshirtb.bm
ton Shorts	Shorts	700	Small	White	80	15	shortsb.bm

set dw1 set dw2 set dw3 set dw4
retrieve insert row delete row Update

JAVA客户端运行界面

JWebDW2.0 Demo Application.

Employee...	Department<...	Zip Code	Phone	Status	Sex
101		aaa	aaa	<input type="radio"/> Active <input type="radio"/> Terminated <input type="radio"/> On Leave	<input type="radio"/> Male <input type="radio"/> Female
103		bbb	bbb	<input type="radio"/> Active <input type="radio"/> Terminated <input type="radio"/> On Leave	<input type="radio"/> Male <input type="radio"/> Female

set dw1 set dw2 set dw3 set dw4
retrieve insert row delete row Update

激活 Wind
转到“设置”以

JAVA客户端运行界面

JWebDW2.0 Demo Application.

		set dw1	set dw2	set dw3	set dw4
		retrieve	insert row	delete row	Update
人员号:	101				
状态:	<input type="radio"/> Active <input type="radio"/> Terminated <input type="radio"/> On Leave				
性别:	<input type="radio"/> Male <input type="radio"/> Female				
医疗保险:	<input type="checkbox"/> Health Insurance				
邮政编码:	100001				
人员号:	103				
状态:	<input type="radio"/> Active <input type="radio"/> Terminated <input type="radio"/> On Leave				
性别:	<input type="radio"/> Male <input type="radio"/> Female				
医疗保险:	<input type="checkbox"/> Health Insurance				
邮政编码:	100001				

激活 Windows
转到“设置”以

JAVA客户端尚未完成的工作（2019-10-13）

- ▶ 文本框的事件监听修改刷新
- ▶ 下拉框的事件监听
- ▶ 单选按钮的事件监听
- ▶ 复选按钮的事件监听
- ▶ 其他界面增强渲染，字体，颜色等
- ▶ 其他界面元素增强

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浏览器上动态界面绘制的技术讨论

WebDW的技术架构说明

WebDW python客户端的设计实现

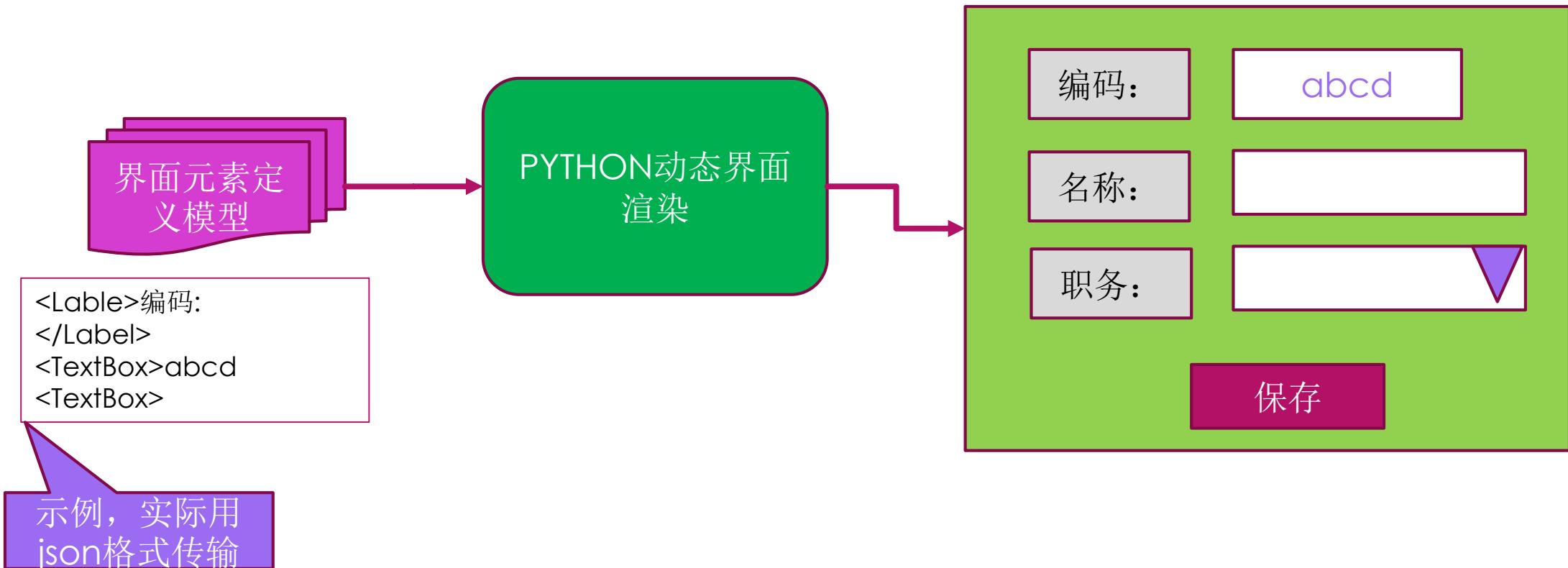
python客户端的总体IPO

python客户端的技术选型

python客户端第一版

python客户端第二版

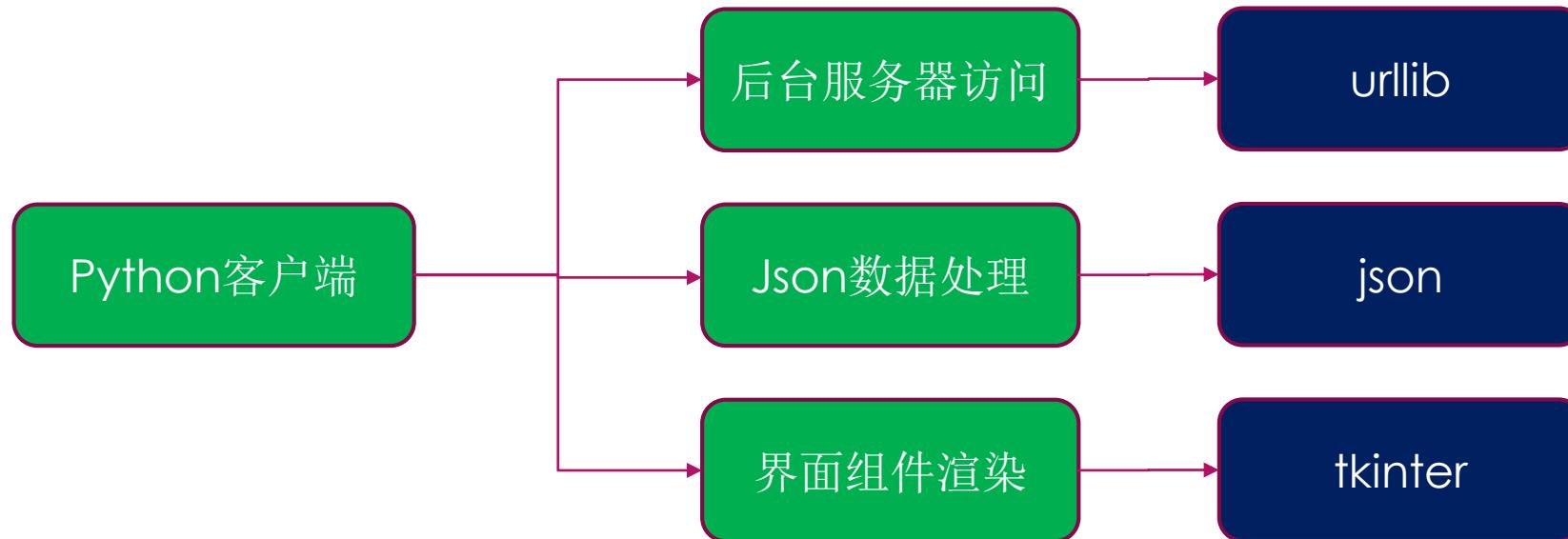
Python界面绘图总体IPO



PYTHON界面绘图和VB界面绘图的不同

比较项	VB	PYTHON	备注
json数据格式支持	标准的VB不支持JSON数据格式，因此需要引入Script Controller来进行解析	通过引入python标准库{json}来进行支持 Python基本是以原生格式来支持json的	VB需要编译执行， Python是解释执行， 语法上更加灵活和简单
Ajax后台服务调用	通过引入XMLHttpRequest来调用	通过引入python标准库{url}来进行服务调用	Python调用更简化一些
界面元素渲染组件	通过VB标准库来提供支持	通过调用第三方图形库来进行支持，例如tkinter	Python支持多种图形库 VB的可用UI组件库不多
事件回调	通过自定义调用器实现	元素库作为标准工具来支持	VB是基于windows的事件机制进行封装处理 Python是跨平台的事件处理
基本设计模式	面向对象，基于组件	函数编程，基于函数调用	小型项目用函数比较简单 大型项目用对象比较简单
二次封装	容易，可封装为ActiveX	封装为标准函数调用	

Python客户端的技术选型



第三方标准库

Python客户端第一版：仅渲染为文本标签

```
webdw-python-v1.py - G:\webdw2.0-work\webdw2.0-PYTHON\webdw-python-v1.py (3.7.4)
File Edit Format Run Options Window Help
import urllib.request
import json
from tkinter import *
import tkinter.messagebox

with urllib.request.urlopen('http://localhost/webdw/retrieve?token=0&dwname=d_products&args=' ) as response:
    html= response.read()
    svalue = html.decode('utf-8')
    print(svalue)
    array = json.loads(svalue)
    print(len(array))
    array = array['uiobjList']
#show information you get
for item in range(0, len(array)):
    print(item)
    print(array[item])

#begin draw the ui interface
class Application(Frame):
    def __init__(self, master=None):
        Frame.__init__(self, master)
        self.place(x=20, y=20, width=800, height=600)
        self.createWidgets()

    def createWidgets(self):
        self.quitButton = Button(self, text='Quit', command=self.quit)
        self.quitButton.place(x=0, y=0, anchor='nw')
        for item in range(0, len(array)):
            print(array[item])
            data = array[item]
            # print(data['classname'])
            tkinter.messagebox.showinfo(title=None, message=data['classname'])
            self.newone = Label(self, text= data['text'])
            convertrate = 0.3
            self.newone.place(x=data['left']*convertrate ,y=data['top']*convertrate +20, width=data['width'])

app = Application()
# set title
app.master.title('Python Webdw Demp. http://webdw.vicp.net')
# msg loop
app.mainloop()
```

Ln: 29 Col: 30

引入所需要的类库

向后台发送ajax请求，检索数据

定义绘制界面的frame

定义退去按钮

界面元素定义循环

界面元素渲染为Label

Python客户端第一版界面

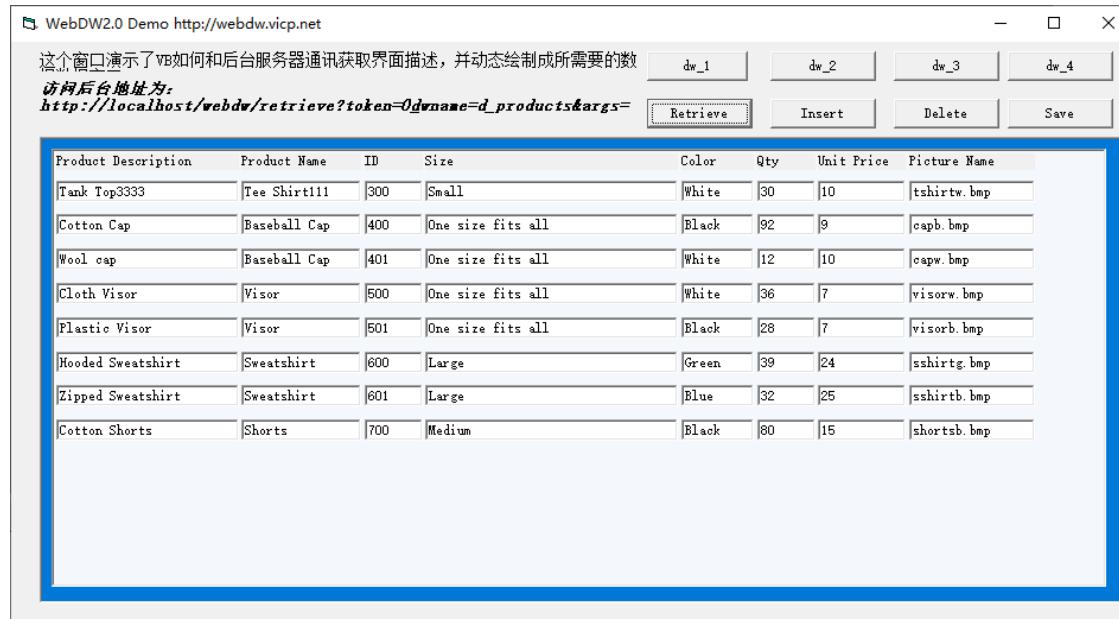


Python Webdw Demp. http://webdw.vicp.net

Product Description Product Name ID Size Color Qty Unit Price

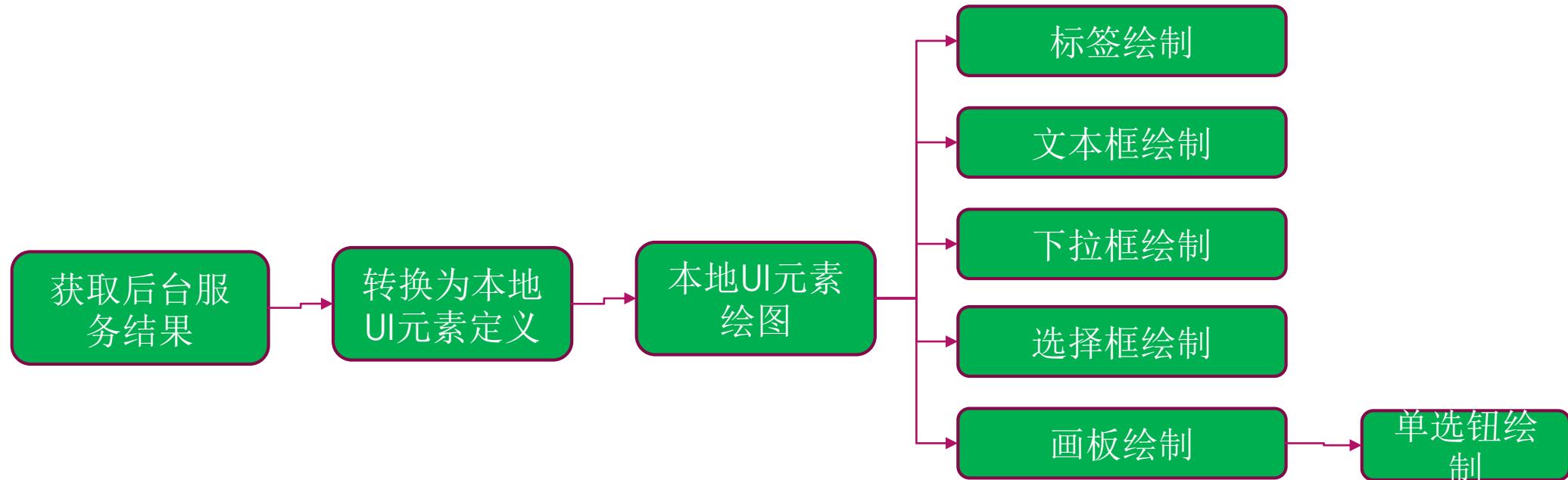
Product Description	Product Name	ID	Size	Color	Qty	Unit Price
Tank Top3333	Tee Shirt111	300	Small	White	30	10
Cotton Cap	Baseball Cap	400	One size fits all	Black	92	9
Wool cap	Baseball Cap	401	One size fits all	White	12	10
Cloth Visor	Visor	500	One size fits all	White	36	7
Plastic Visor	Visor	501	One size fits all	Black	28	7
Hooded Sweatshirt	Sweatshirt	600	Large	Green	39	24
Zipped Sweatshirt	Sweatshirt	601	Large	Blue	32	25
Cotton Shorts	Shorts	700	Medium	Black	80	15

VB渲染界面与Python渲染界面对比



Python Webdw DEMP. http://webdw.vicp.net						
Product Description	Product Name	ID	Size	Color	Qty	Unit Price
Tank Top3333	Tee Shirt111	300	Small	White	30	10
Cotton Cap	Baseball Cap	400	One size fits all	Black	92	9
Wool cap	Baseball Cap	401	One size fits all	White	12	10
Cloth Visor	Visor	500	One size fits all	White	36	7
Plastic Visor	Visor	501	One size fits all	Black	28	7
Hooded Sweatshirt	Sweatshirt	600	Large	Green	39	24
Zipped Sweatshirt	Sweatshirt	601	Large	Blue	32	25
Cotton Shorts	Shorts	700	Medium	Black	80	15

Python webdw客户端第二版本设计



Python绘图入口分发

得到输入json对象的
classname属性

根据classname不同
切换到不同分支

```
def drawdw(self, arg1):
    array=self.array
    for item in range(0, len(array)):
        print(array[item])
        data = array[item]
        # print(data['classname'])
        # tkinter.messagebox.showinfo(titile=None, message=data['classname'])
        classname = data['classname']

        if classname == 'JLabel':
            self.drawLineLabel(data)
            continue
        if classname == 'JTextField':
            self.drawTextBox(data)
            continue
        if classname == 'JComboBox':
            self.drawComboBox(data)
            continue
        if classname == 'JCheckBox':
            self.drawCheckBox(data)
            continue
        if classname == ' JPanel':
            self.drawRadioButton(data)
            continue
```

Python UI绘图-标签

定义标签

放置标签

存储标签（删除用）

```
#绘制为标签对象
def drawLabel(self, data):
    newone = Label(self, text= data['text'], font = ("Arial, 11"))
    newone.place(x=data['left']*self.convertrate ,y=data['top']*self.convertrate)
    self.childs.append(newone)
```

Python UI绘图-文本框

定义文本框

放置文本框

存储文本框

```
#绘制为文本框对象
def drawTextBox(self, data):
    m_str_var = tkinter.StringVar()
    newone = Entry(self, textvariable= m_str_var)
    m_str_var.set(data['text'])
    newone.place(x=data['left']*self.convertrate ,y=data['top']*self.convertrate)
    self.childs.append(newone)
```

Python UI绘制-下拉框

定义

```
#绘制为下拉框对象
def drawComboBox(self,data):
    m_listbox_var = tkinter.StringVar()
#根据输入值来初始化下拉列表数据
    values = data['values'].split('/')
    valuelist = []
    for item in range(0,len(values)):
        datas = values[item].split('\t')
        if len(datas)>1:
            valuelist.append(datas[0])

    m_listbox_var = tuple(valuelist)

    newone = ttk.Combobox(self, textvariable=m_listbox_var)
    newone['values']=valuelist

    selectedindex = int(data['selectedIndex'])
    if selectedindex >=0:
        tkinter.messagebox.showinfo(titile=None,message=selectedindex)
        newone.current(selectedindex)

    newone.place(x=data['left']*self.convertrate ,y=data['top']*self.convertrate)
    self.childs.append(newone)
```

放置

存储

Python UI绘制-单选按钮

记录总偏移量

绘制单选按钮

```
#绘制为单选按钮对象
def drawRadioButton(self,data):
    tkinter.messagebox.showinfo(title=None,message='drawRadioButton')
    xstart = data['left']
    ystart = data['top']

    v = IntVar()
    #获取子元素数组
    childelement = data['childElements']
    for item in range(0,len(childelement)):
        child = childelement[item]
        if(child['classname'] == 'JRadioButton'):
            newone = Radiobutton(self,text=child['text'],variable=v,value=child['value'])
            newone.place(x= (xstart + child['left'])*self.convertrate ,y=(ystart + child['top'])*self.convertrate)
            self.childs.append(newone)
```

Python UI绘制- 复选框

```
#绘制为复选框对象
def drawCheckBox(self,data):
    m_str_var = tkinter.StringVar()
    var = IntVar()
    var = 0
    tkinter.messagebox.showinfo(title='value',message=data['value'])
    if data['value']:
        var = 1

    tkinter.messagebox.showinfo(title='var',message=var)
    newone = Checkbutton(self,text= data['text'],variable=var)
    newone.place(x=data['left']*self.convertrate ,y=data['top']*self.convertrate)
    if data['value']:
        newone.select()
    self.childs.append(newone)
```

绘制复选框

Python 客户端运行界面

Python Webdw Demp. http://webdw.vicp.net

Product Description	Product Name	ID	Size	Color	Qty	Unit Price	Picture Name
Tank Top3333	Tee Shirt111	300	Small	White	30	10	tshirtw.bmp
Cotton Cap	Baseball Cap	400	One size fits all	Black	92	9	capb.bmp
Wool cap	Baseball Cap	401	One size fits all	White	12	10	capw.bmp
Cloth Visor	Visor	500	One size fits all	White	36	7	visorw.bmp
Plastic Visor	Visor	501	One size fits all	Black	28	7	visorb.bmp
Hooded Sweatshirt	Sweatshirt	600	Large	Green	39	24	sshirtg.bmp
Zipped Sweatshirt	Sweatshirt	601	Large	Blue	33	25	sshirtb.bmp
Cotton Shorts	Shorts	700	Medium	Black	80	15	shortsb.bmp
a	a	701	a	a	100	100	aa.bmp

Python Webdw Demp. http://webdw.vicp.net

Quit setdw dw1 setdw dw2 setdw dw3 setdw dw4

Product	Product Name	Product Description	Size	Color	Quantity	Unit Price
Tank Top3	Tee Shirt111	300	Medium	Black	30	10
Cotton Cap	Baseball Cap	400	Medium	Black	92	9
Wool cap	Baseball Cap	401	Medium	Black	12	10
Cloth Visor	Visor	500	Medium	Black	36	7
Plastic Viso	Visor	501	Medium	Black	28	7
Hooded Sw	Sweatshirt	600	Medium	Black	39	24
Zipped Swe	Sweatshirt	601	Medium	Black	33	25
Cotton Sho	Shorts	700	Medium	Black	80	15
a	a	701	Medium	Black	100	100

Python 客户端运行界面

Python Webdw Demp. http://webdw.vicp.net

Quit setdw dw1 setdw dw2 setdw dw3 setdw dw4

ployee
partment

101	200	100001	1391057777
-----	-----	--------	------------

Zip Code Phone Status Sex

103 500 100004 1391234567

<input type="radio"/> Active	<input type="radio"/> Male
<input checked="" type="radio"/> Terminated	<input checked="" type="radio"/> Female
<input type="radio"/> On Leave	

<input type="radio"/> Active	<input type="radio"/> Male
<input type="radio"/> Terminated	<input checked="" type="radio"/> Female
<input checked="" type="radio"/> On Leave	

Python 客户端运行界面

Python Webdw Demp. http://webdw.vicp.net

人员号:

状态: Active
 Terminated
 On Leave

性别: Male
 Female

医疗保险: Health Insurance

邮政编码:

人员号:

状态: Active
 Terminated
 On Leave

性别: Male
 Female

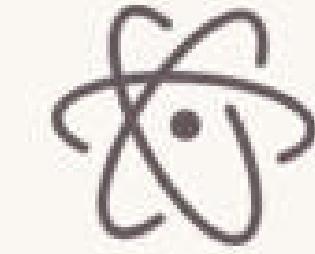
医疗保险: Health Insurance

激活 Windows
转至设置中心激活

Python客户端待完成工作

- ▶ 文本框事件监听
- ▶ 单选按钮事件监听
- ▶ 复选按钮事件监听
- ▶ 下拉框事件监听
- ▶ UI元素界面美化
- ▶ 新UI元素加入渲染

目录



浏览器上动态界面绘制的技术讨论

WebDW的技术架构说明

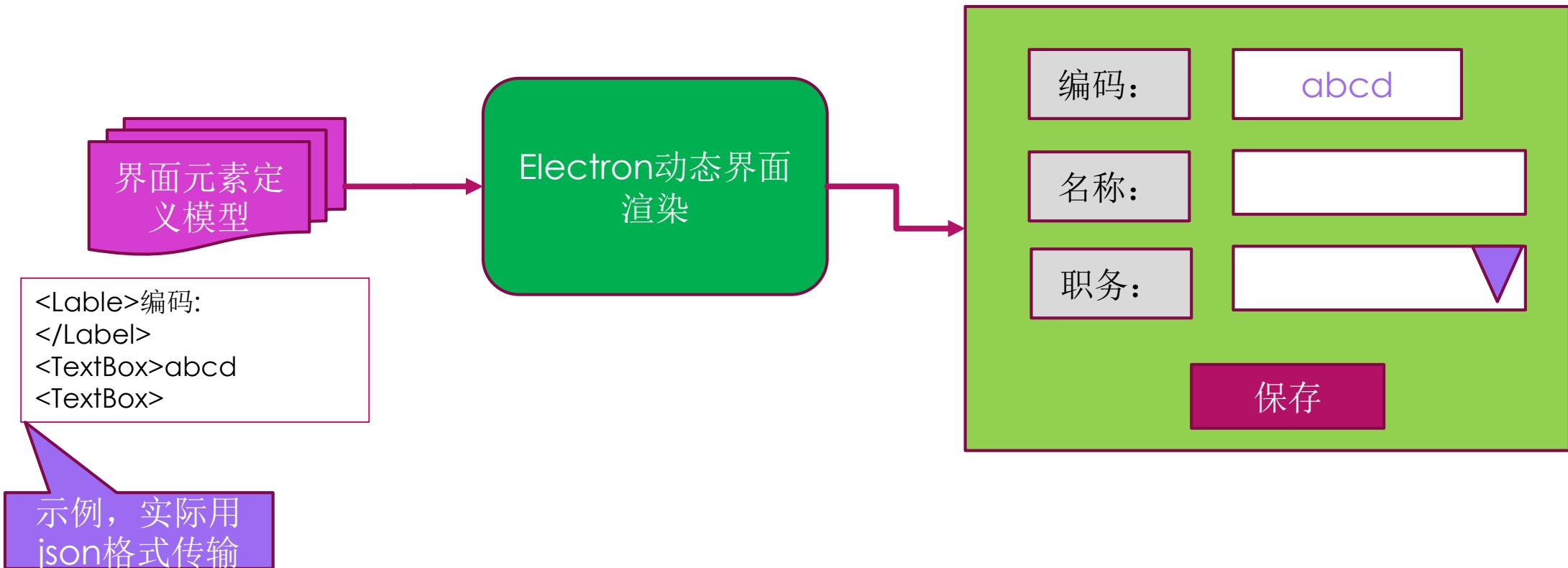
WebDW Electron客户端的设计实现

Electron客户端的总体IPO

Electron客户端的技术选型

Electron客户端具体实现

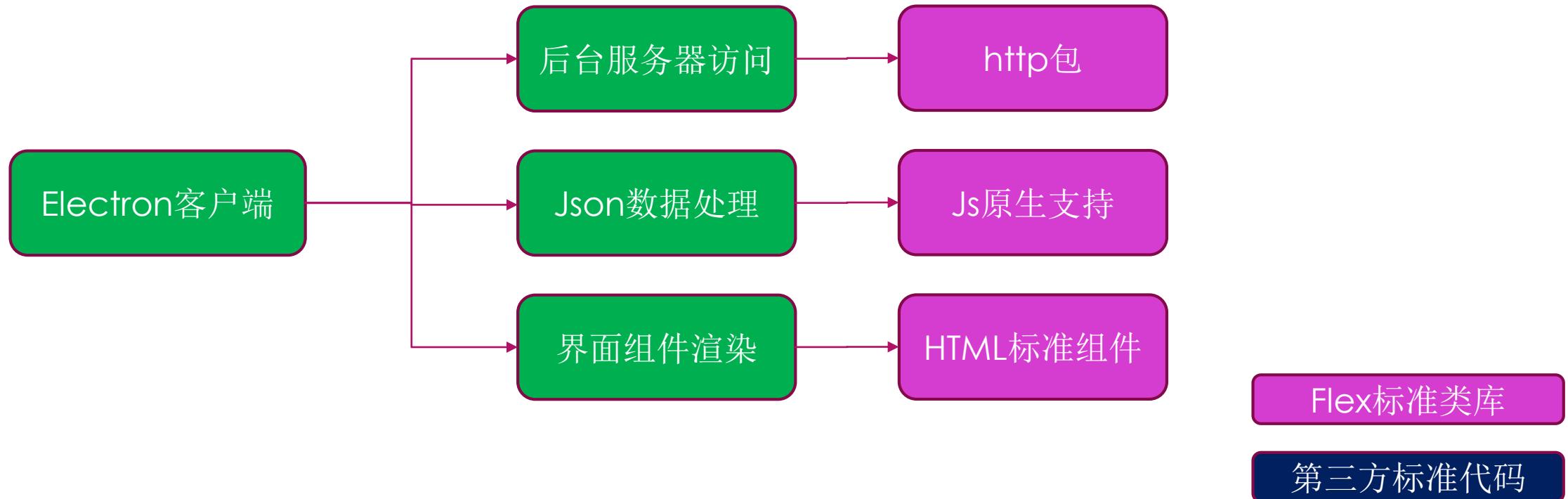
Electron界面绘图总体IPO



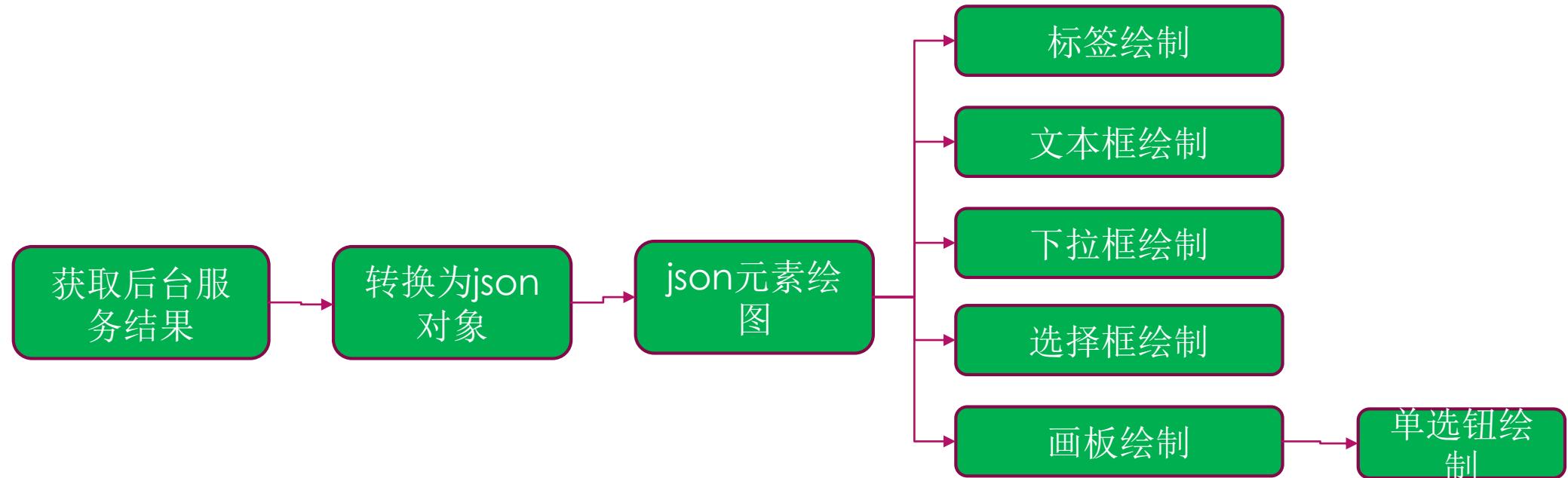
Electron界面绘图和VB界面绘图的不同

比较项	VB	Electron	备注
json数据格式支持	标准的VB不支持JSON数据格式，因此需要引入Script Controller来进行解析	Javascript语言原生直接支持JSON格式	
Ajax后台服务调用	通过引入XMLHttpRequest来调用	Node.js通过加入http包来实现请求调用	
界面元素渲染组件	通过VB标准库来提供支持	通过浏览器元素来支持界面元素渲染	
事件回调	通过自定义调用器实现	浏览器元素本身支持事件回调	
基本设计模式	面向对象，基于组件	面向对象，基于DOM对象	
二次封装	容易，可封装为ActiveX		
线程支持	单线程	单线程支持	

Electron客户端的技术选型



Electron webdw客户端设计



Electron客户端界面

Hello World!

File Edit View Window Help

Hello World!

We are using Node.js 12.4.0, Chromium 76.0.3809.146, and Electron 6.0.11.

加载网络资源:

Load Test Set DW1 Set DW2 Set DW3 Set DW4

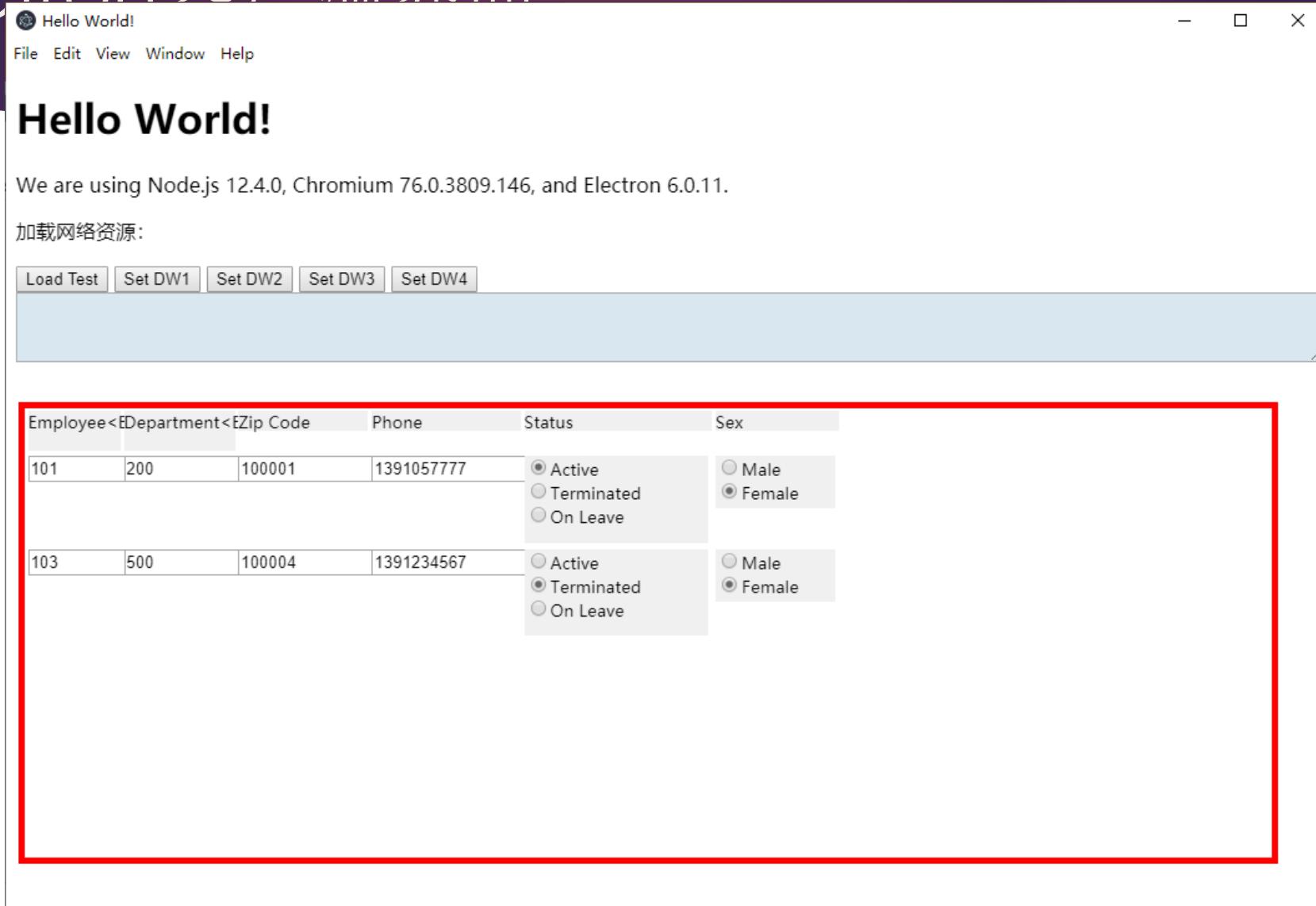
Product Description	Product Name	ID	Size	Color	Qty	Unit Price	Picture Name
Tank Top3333	Tee Shirt111	300	Small	White	30	10	tshirtw.bmp
Cotton Cap	Baseball Cap	400	One size fits all	Black	92	9	capb.bmp
Wool cap	Baseball Cap	401	One size fits all	White	12	10	capw.bmp
Cloth Visor	Visor	500	One size fits all	White	36	7	visorw.bmp
Plastic Visor	Visor	501	One size fits all	Black	28	7	visorb.bmp
Hooded Sweatshirt	Sweatshirt	600	Large	Green	39	24	sshirtg.bmp
Zipped Sweatshirt	Sweatshirt	601	Large	Blue	33	25	sshirtb.bmp
Cotton Shorts	Shorts	700	Medium	Black	80	15	shortsb.bmp
a	a	701	a	a	100	100	aa.bmp

Electron客户端界面

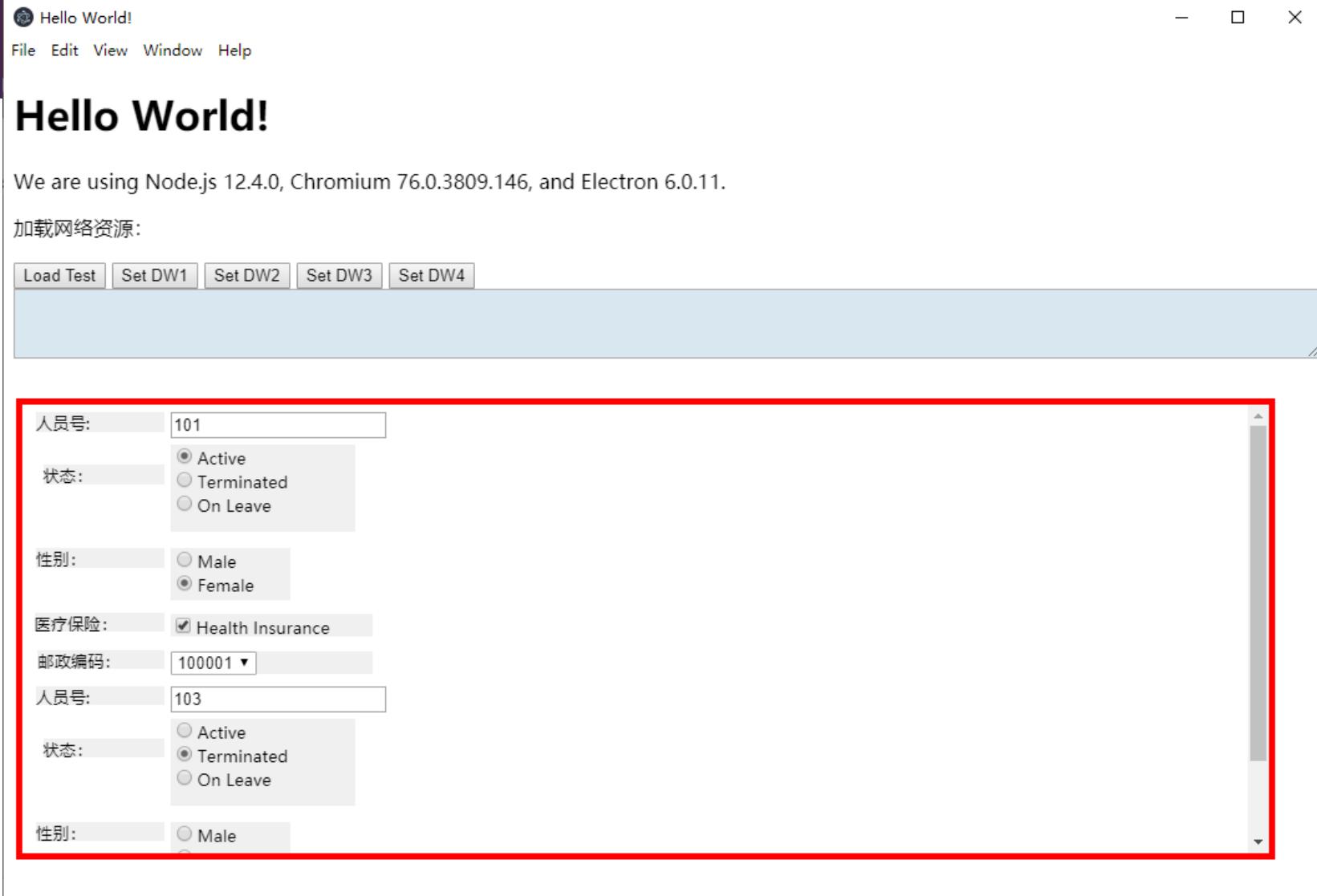
The screenshot shows a window titled "Hello World!" with a dark blue header bar. The menu bar includes File, Edit, View, Window, and Help. The main content area displays the text "Hello World!" and "We are using Node.js 12.4.0, Chromium 76.0.3809.146, and Electron 6.0.11." Below this, there is a section labeled "加载网络资源:" with several buttons: Load Test, Set DW1, Set DW2, Set DW3, and Set DW4. A large table is displayed, with its first row highlighted by a red border. The table columns are Product ID, Product Name, Product Description, Size, Color, Quantity, Unit Price, and Picture Name. The data rows include:

Product ID	Product Name	Product Description	Size	Color	Quantity	Unit Price	Picture Name
Tank Top3	Tee Shirt111	300	Small ▾	White	30	10	tshirtw.bmp
Cotton Ca	Baseball Cap	400	One size fits all ▾	Black	92	9	capb.bmp
Wool cap	Baseball Cap	401	One size fits all ▾	White	12	10	capw.bmp
Cloth Viso	Visor	500	One size fits all ▾	White	36	7	visorw.bmp
Plastic Vis	Visor	501	One size fits all ▾	Black	28	7	visorb.bmp
Hooded S	Sweatshirt	600	Large ▾	Green	39	24	sshirtg.bmp
Zipped Sw	Sweatshirt	601	Large ▾	Blue	33	25	sshirtb.bmp
Cotton Sh	Shorts	700	Medium ▾	Black	80	15	shortsb.bmp
a	a	701	▪		100	100	aa.bmp

Electron 客户端界面



Electron客户端界面



目录



浏览器上动态界面绘制的技术讨论

WebDW的技术架构说明

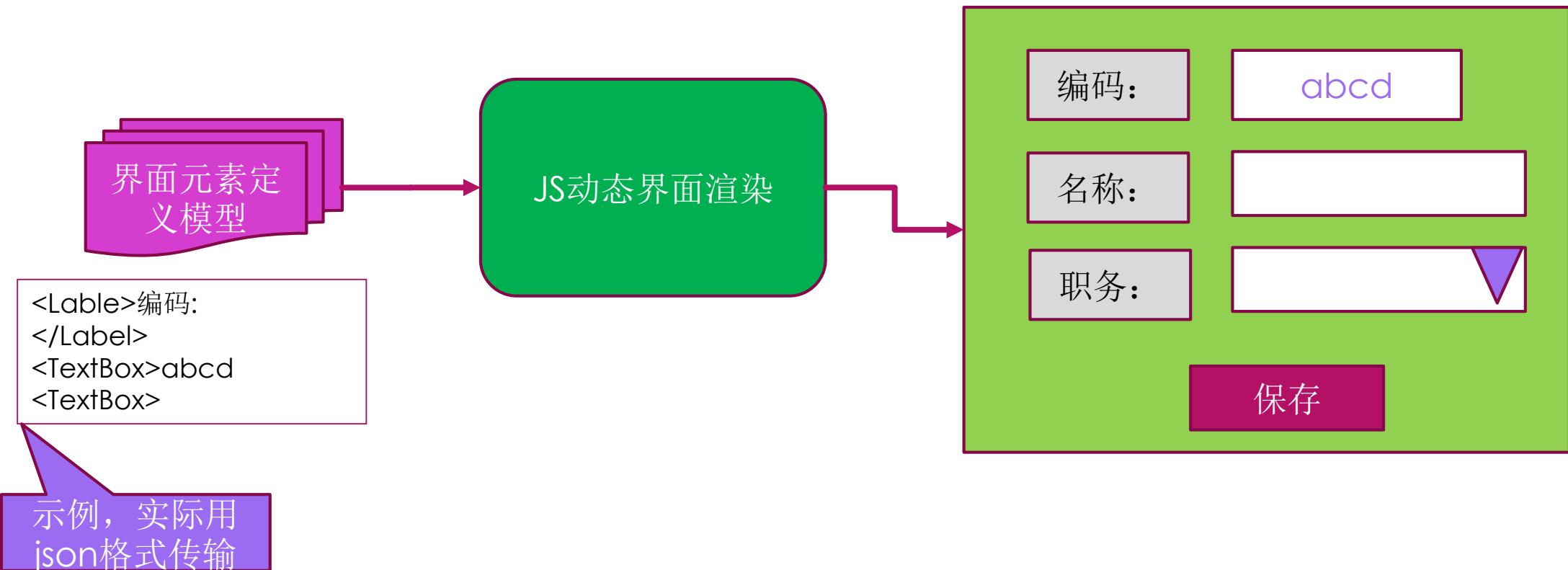
WebDW JS客户端的设计实现

JS客户端的总体IPO

JS客户端的技术选型

JS客户端具体实现

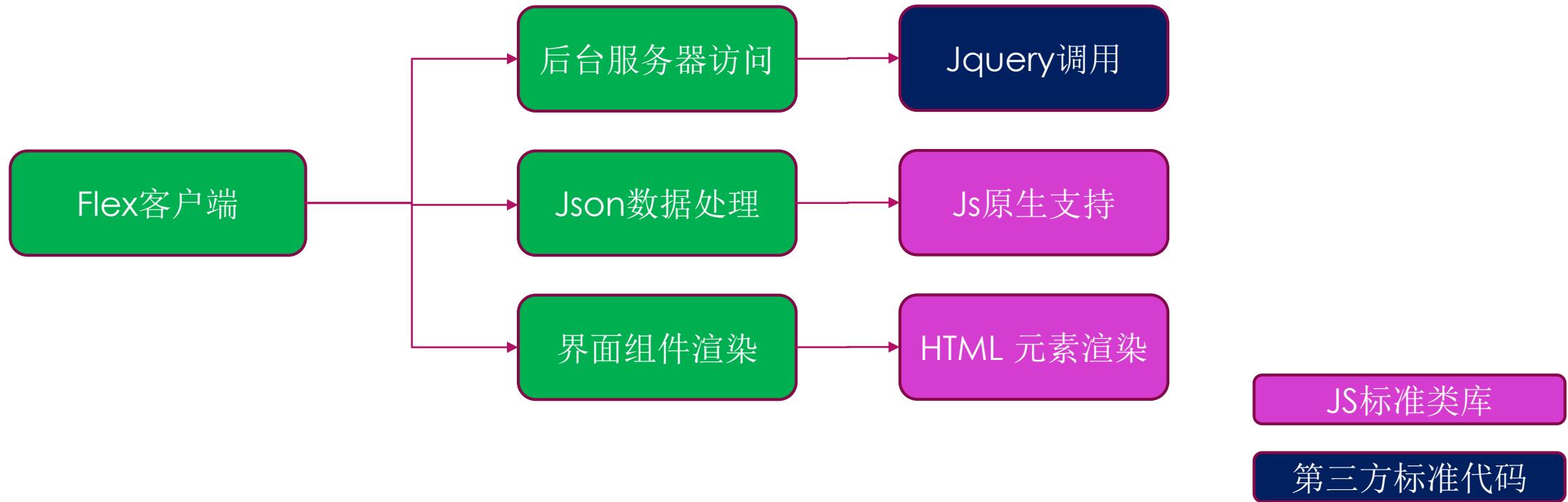
JS界面绘图总体IPO



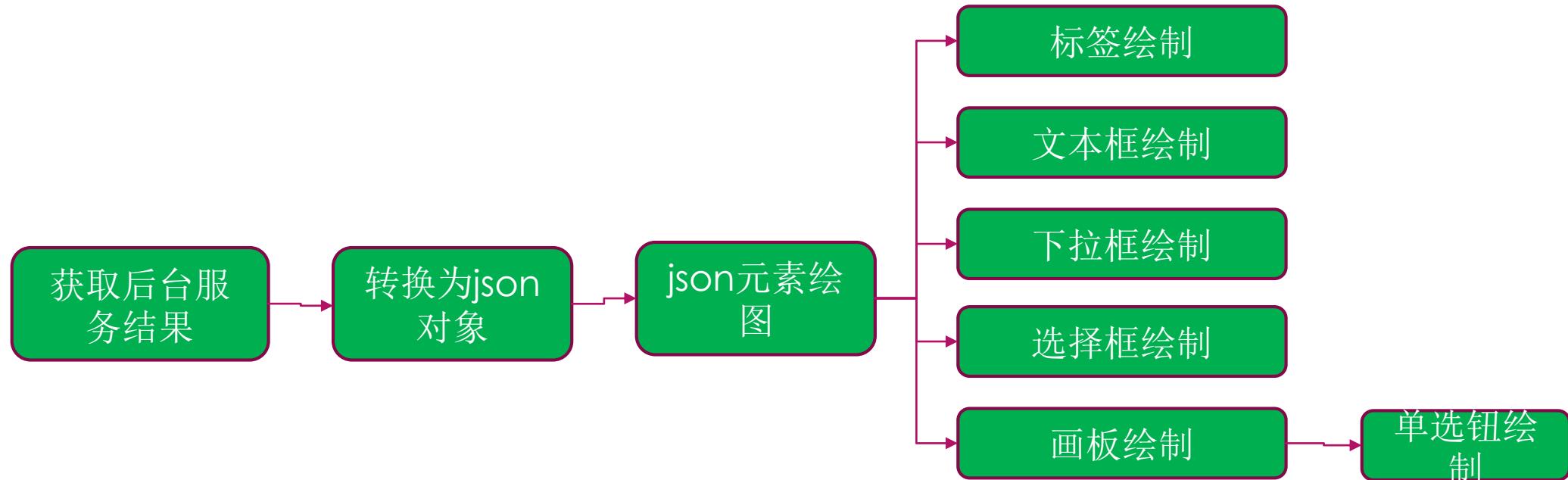
JS界面绘图和VB界面绘图的不同

比较项	VB	JS	备注
json数据格式支持	标准的VB不支持JSON数据格式，因此需要引入Script Controller来进行解析	JS原生支持json格式	
Ajax后台服务调用	通过引入XMLHttpRequest来调用	通过Jquery封装来发起Ajax调用	
界面元素渲染组件	通过VB标准库来提供支持	通过HTML元素进行渲染	
事件回调	通过自定义调用器实现	HTML元素支持事件回调	
基本设计模式	面向对象，基于组件	面向对象	
二次封装	容易，可封装为ActiveX	封装为JS对象和UI组件	
线程支持	单线程	单线程	

JS客户端的技术选型



JS webdw客户端设计



JS WebDW客户端界面

The screenshot shows a web browser window displaying the JS WebDW client interface. The title bar reads "Insert title here" and the address bar shows "localhost/webdw-js/jswebdw_index2.html". The main content area displays a welcome message "Welcome to JSWebDW's world! Version2.0" and instructions: "操作说明: 先点击“设置数据窗口对象按钮”，再点击“检索后台数据”按钮，看看执行效果如何". Below this, there is a toolbar with buttons for "设置数据窗口对象" (highlighted in yellow), "插入记录", "删除一行", and "保存". A horizontal menu bar below the toolbar contains five items: "产品清单, 文本框", "产品清单, 带下拉框", "产品清单, 自由格式" (highlighted in blue), "人员列表, 带单选按钮", and "人员列表, 带复选按钮". The main content area features a table with a red border around its entire body. The table has columns: Product Description, Product Name, ID, Size, Color, Qty, Unit Price, and Picture Name. The data rows are:

Product Description	Product Name	ID	Size	Color	Qty	Unit Price	Picture Name
Tank Top3333	Tee Shirt111	300	Small	White	30	10	tshirtw.bmp
Cotton Cap	Baseball Cap	400	One size fits all	Black	92	9	capb.bmp
Wool cap	Baseball Cap	401	One size fits all	White	12	10	capw.bmp
Cloth Visor	Visor	500	One size fits all	White	36	7	visorw.bmp
Plastic Visor	Visor	501	One size fits all	Black	28	7	visorb.bmp
Hooded Sweatshirt	Sweatshirt	600	Large	Green	39	24	sshirtg.bmp
Zipped Sweatshirt	Sweatshirt	601	Large	Blue	33	25	sshirtb.bmp
Cotton Shorts	Shorts	700	Medium	Black	80	15	shortsb.bmp
a	a	701	a	a	100	100	aa.bmp

JS WebDW客户端界面

Insert title here

localhost/webdw-js/jswebdw_index2.html

Welcome to JSWebDW's world! Version2.0

操作说明：先点击“设置数据窗口对象按钮”，再点击“检索后台数据”按钮，看看执行效果如何

设置数据窗口对象 插入记录 删除一行 保存

产品清单, 文本框 产品清单, 带下拉框 产品清单, 自由格式 人员列表, 带单选按钮 人员列表, 带复选按钮

Product Name	Product Description	Size	Color	Quantity	Unit Price	Picture Name	
Tank Top3	Tee Shirt111	300	Small	White	30	10	tshirtw.bmp
Cotton Ca	Baseball Cap	400	One size fits all	Black	92	9	capb.bmp
Wool cap	Baseball Cap	401	One size fits all	White	12	10	capw.bmp
Cloth Viso	Visor	500	One size fits all	White	36	7	visorw.bmp
Plastic Vis	Visor	501	One size fits all	Black	28	7	visorb.bmp
Hooded S	Sweatshirt	600	Large	Green	39	24	sshirtg.bmp
Zipped Sw	Sweatshirt	601	Large	Blue	33	25	sshirtb.bmp
Cotton Sh	Shorts	700	Medium	Black	80	15	shortsb.bmp
a	a	701	Small	White	100	100	aa.bmp

JS WebDW客户端界面

The screenshot shows a web browser window displaying the JS WebDW client interface. The title bar reads "Insert title here" and the address bar shows "localhost/webdw-js/jswebdw_index2.html". The main content area displays a heading "Welcome to JSWebDW's world! Version2.0" and a note: "操作说明: 先点击“设置数据窗口对象按钮”, 再点击“检索后台数据”按钮, 看看执行效果如何". Below this are several buttons: "设置数据窗口对象" (highlighted in red), "插入记录", "删除一行", "保存", "产品清单, 文本框", "产品清单, 带下拉框", "产品清单, 自由格式", "人员列表, 带单选按钮" (highlighted in red), and "人员列表, 带复选按钮". A table follows, with a red border around its entire body. The table has columns: Employee
Department
Zip Code, Phone, Status, and Sex. The first row contains values: 101, 200, 100001, 1391057777. The status dropdown shows radio buttons for Active (selected), Terminated, and On Leave. The sex dropdown shows radio buttons for Male and Female (Female selected). The second row contains values: 103, 500, 100004, 1391234567. The status dropdown shows radio buttons for Active, Terminated (selected), and On Leave. The sex dropdown shows radio buttons for Male and Female (Female selected).

Employee Department Zip Code	Phone	Status	Sex	
101	200	100001 1391057777	<input checked="" type="radio"/> Active <input type="radio"/> Terminated <input type="radio"/> On Leave	<input type="radio"/> Male <input checked="" type="radio"/> Female
103	500	100004 1391234567	<input type="radio"/> Active <input checked="" type="radio"/> Terminated <input type="radio"/> On Leave	<input type="radio"/> Male <input checked="" type="radio"/> Female

JS WebDW客户端界面

Insert title here

localhost/webdw-js/jswebdw_index2.html

Welcome to JSWebDW's world! Version2.0

操作说明：先点击“设置数据窗口对象按钮”，再点击“检索后台数据”按钮，看看执行效果如何

设置数据窗口对象 插入记录 删除一行 保存

产品清单, 文本框 产品清单, 带下拉框 产品清单, 自由格式 人员列表, 带单选按钮 人员列表, 带复选按钮

人员号: 状态: Active Terminated On Leave

性别: Male Female

医疗保险: Health Insurance

邮政编码: 人员号:

状态: Active Terminated On Leave

101

103

目录



浏览器上动态界面绘制的技术讨论

WebDW的技术架构说明

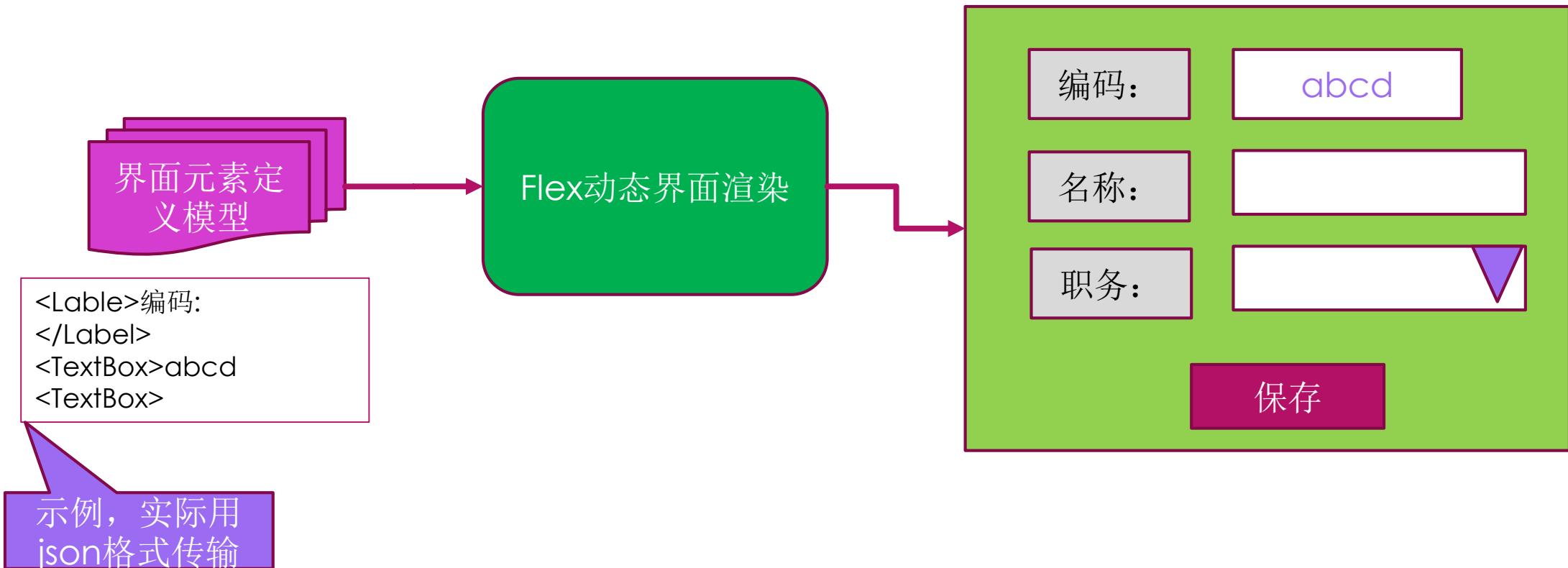
WebDW FLEX客户端的设计实现

Flex客户端的总体IPO

Flex客户端的技术选型

Flex客户端具体实现

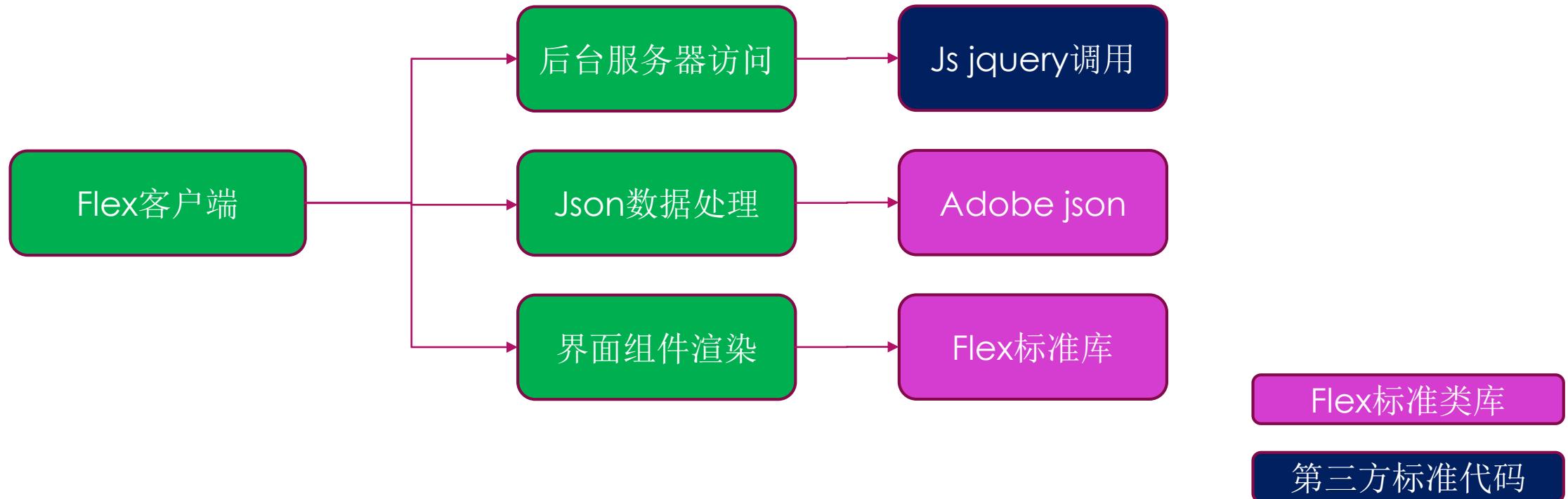
Flex界面绘图总体IPO



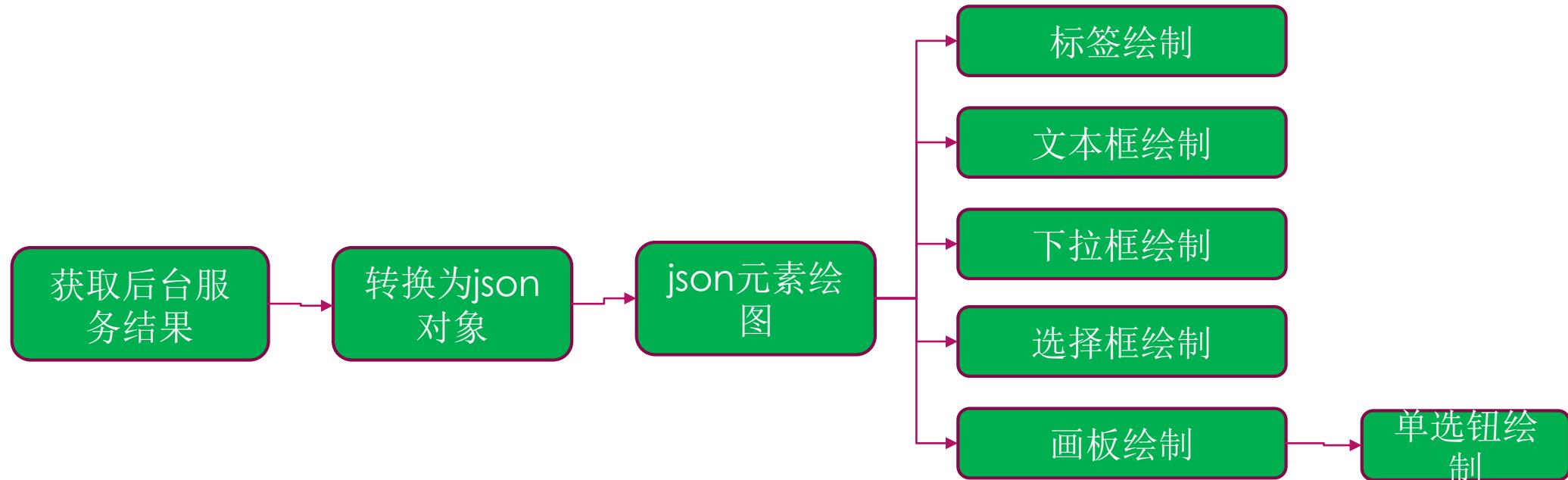
Flex界面绘图和VB界面绘图的不同

比较项	VB	Flex	备注
json数据格式支持	标准的VB不支持JSON数据格式，因此需要引入Script Controller来进行解析	ActionScript原生支持json数据格式	
Ajax后台服务调用	通过引入XMLHttpRequest来调用	Flex通过外部的JavaScript调用来执行Ajax请求	VB是同步调用 Flex是异步调用回调
界面元素渲染组件	通过VB标准库来提供支持	通过Flex标准库提供支持	
事件回调	通过自定义调用器实现	元素库作为标准工具来支持	
基本设计模式	面向对象，基于组件	面向对象，基于组件	
二次封装	容易，可封装为ActiveX	封装为标准Flash组件来支持调用	
线程支持	单线程	多线程支持	

Flex客户端的技术选型



Flex webdw客户端设计



Flex与JS相互调用：回调与调用

The screenshot shows the Flash Builder IDE interface. The title bar reads "FB Flash - fwebdw2/src/fwebdw2.mxml - Flash Builder". The menu bar includes "文件(F)", "编辑(E)", "源代码(S)", "浏览(N)", "搜索(A)", "项目(P)", "数据(D)", "运行(R)", "窗口(W)", and "帮助(H)". The toolbar contains various icons for file operations like Open, Save, Find, and Paste. The left sidebar shows the "包资源管理器" (Package Explorer) with a project named "fwebdw2" containing files like "fwebdw2.css", "fwebdw2.mxml", and "My JPanel.mxml". Below it is the "Flex 4.6.0" section. The main workspace displays the MXML file "fwebdw2.mxml" in "源代码" (Source) view. The code includes:

```
        trace(m);
    }

    protected function button2_clickHandler(event:MouseEvent):void
    {
        // TODO Auto-generated method stub
        ExternalInterface.addCallback("drawAllChild",myFunc);
        callWrapperRetrieve("d_products");
    }

    protected function setdw2_clickHandler(event:MouseEvent):void
    protected function setdw3_clickHandler(event:MouseEvent):void
    protected function setdw4_clickHandler(event:MouseEvent):void
    public function callWrapperRetrieve(dwname:String):void {
        var f:String = "retrieve";
        var m:String = ExternalInterface.call(f,dwname);
    }

    public function cleanAllObject():void{
        //清除所有动态绘制的对象
        panel1.removeAllElements();
    }
}
```

Annotations in Chinese are overlaid on the interface:

- A callout bubble points to the "callWrapperRetrieve" function in the code with the text "Flex 定义 js 的回调函数" (Flex defines JS callback functions).
- Another callout bubble points to the "ExternalInterface" calls in the code with the text "Flex 调用 js 编写的函数" (Flex calls JS written functions).

The bottom status bar shows "0个错误, 1个警告, 0其他" (0 errors, 1 warning, 0 others), "可写" (Writable), "插入" (Insert), and "1 : 1".

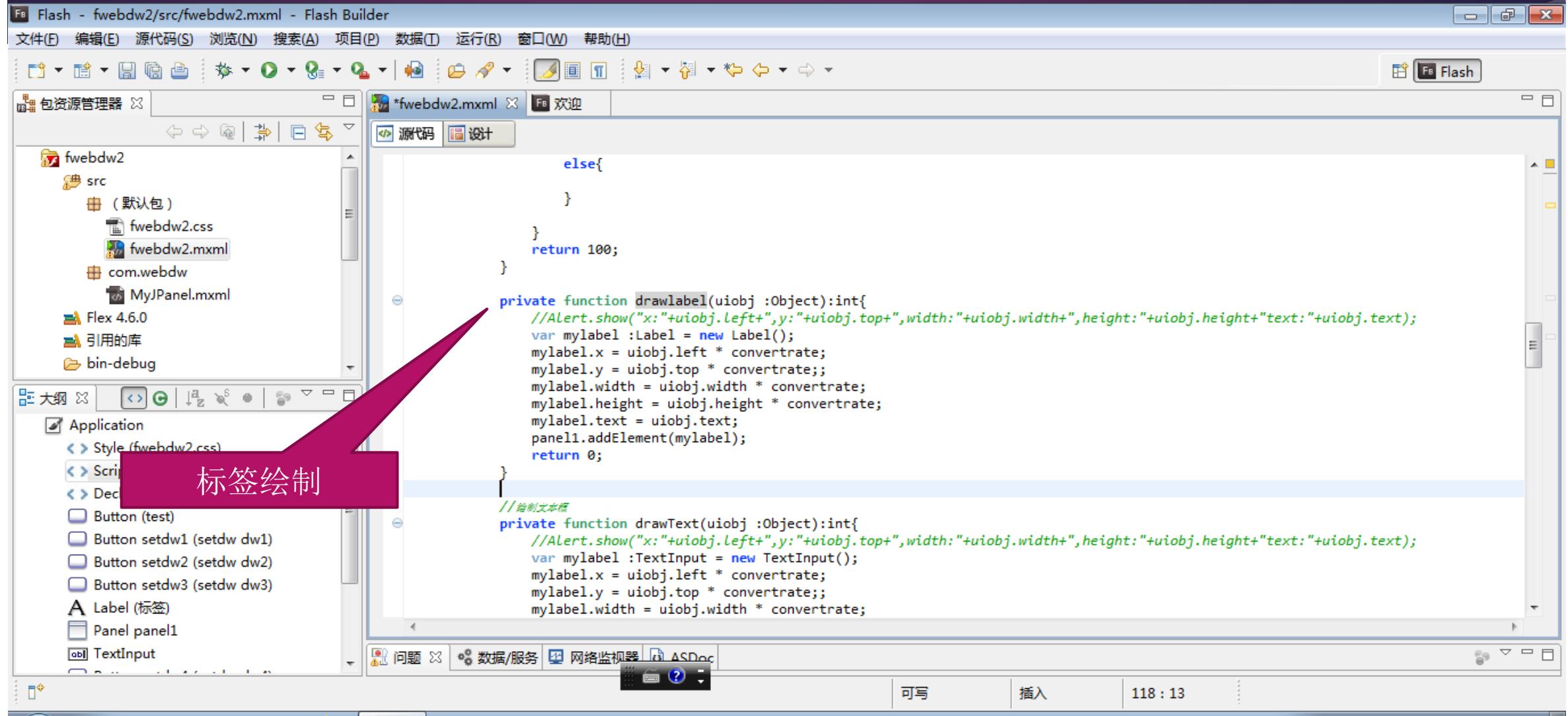
Flex绘图入口功能分发

The screenshot shows the Flash Builder IDE interface. The title bar reads "FB Flash - fwebdw2/src/fwebdw2.mxml - Flash Builder". The menu bar includes "文件(F)", "编辑(E)", "源代码(S)", "浏览(N)", "搜索(A)", "项目(P)", "数据(D)", "运行(R)", "窗口(W)", and "帮助(H)". The toolbar contains various icons for file operations like open, save, and search. The left sidebar shows the project structure under "包资源管理器": fwebdw2 (src: fwebdw2.css, fwebdw2.mxml; com.webdw: MyJPanel.mxml), Flex 4.6.0, 引用的库, and bin-debug. Below it are "字符串转json" and "根据classname进行分发" callouts pointing to the code. The main workspace displays the MXML file "fwebdw2.mxml" and the corresponding ActionScript code. The code defines a function "myFunc" that takes a string "uiDesc" and processes it to draw UI elements based on their class names:

```
public function myFunc(uiDesc:String):Number {
    //first clean all element
    this.cleanAllObject();
    // 利用字符串来对Flex进行绘图
    var jsonRet:Object = com.adobe.serialization.json.JSON.decode(uiDesc);
    var uiElements:ArrayCollection = new ArrayCollection(jsonRet.uiobjList);
    //Alert.show("Length:"+uiElements.length)
    var i:int=0;
    for(i=0;i<uiElements.length;i++)
    {
        var ui:Object = uiElements[i];
        if(ui.classname == 'JLabel'){
            //绘制标签
            drawlabel(ui);
        }else if (ui.classname == 'JCheckBox'){
            //绘制复选框
            drawCheckBox(ui);
        }else if(ui.classname == 'JTextField'){
            //绘制文本框
            drawText(ui);
        }else if(ui.classname == 'JComboBox'){
            //绘制文本框
            drawComboBox(ui);
        }else if(ui.classname == 'JPanel'){
            //绘制文本框
            drawPanel(ui);
        }
    }
}
```

The bottom status bar shows "可写" and "插入" buttons, and the page number "98 : 1".

Flex绘图：标签绘制



Flex绘图：文本框绘制

The screenshot shows the Flash Builder IDE interface. The title bar reads "Flash - fwebdw2/src/fwebdw2.mxml - Flash Builder". The menu bar includes "文件(F)", "编辑(E)", "源代码(S)", "浏览(N)", "搜索(A)", "项目(P)", "数据(D)", "运行(R)", "窗口(W)", and "帮助(H)". The toolbar contains various icons for file operations like Open, Save, and Cut. The left sidebar shows the project structure under "包资源管理器": fwebdw2 (src: fwebdw2.css, fwebdw2.mxml), com.webdw (MyJPanel.mxml). Below it are Flex 4.6.0, 引用的库, and bin-debug. The "大纲" (Outline) panel lists components: Application, Style (fwebdw2.css), Script, Declaration, Button (t), Button setdw1 (setdw dw1), Button setdw2 (setdw dw2), Button setdw3 (setdw dw3), Label (标签), Panel panel1, and TextInput. A large red arrow points from a pink box containing the text "文本框绘制" towards the "Script" section of the outline. The main workspace shows the MXML code for "fwebdw2.mxml" and the corresponding ActionScript code in the "Script" tab. The ActionScript code defines functions for drawing text boxes and checkboxes.

```
mylabel.x = uiobj.left * convertrate;
mylabel.y = uiobj.top * convertrate;;
mylabel.width = uiobj.width * convertrate;
mylabel.height = uiobj.height * convertrate;
mylabel.text = uiobj.text;
panel1.addElement(mylabel);
return 0;

//绘制文本框
private function drawText(uiobj :Object):int{
    //Alert.show("x:"+uiobj.left+",y:"+uiobj.top+",width:"+uiobj.width+",height:"+uiobj.height+"text:"+uiobj.text);
    var mylabel :TextInput = new TextInput();
    mylabel.x = uiobj.left * convertrate;
    mylabel.y = uiobj.top * convertrate;;
    mylabel.width = uiobj.width * convertrate;
    mylabel.height = uiobj.height * convertrate;
    mylabel.text = uiobj.text;
    panel1.addElement(mylabel);
    return 0;
}

//绘制复选框
private function drawCheckBox(uiobj :Object):int{
    var myCheckBox :CheckBox = new CheckBox();
    myCheckBox.x = uiobj.left * convertrate;
    myCheckBox.y = uiobj.top * convertrate;;
```

Flex绘图：复选框绘制

The screenshot shows the Flash Builder IDE interface. The title bar reads "Flash - fwebdw2/src/fwebdw2.mxml - Flash Builder". The menu bar includes "文件(F)", "编辑(E)", "源代码(S)", "浏览(N)", "搜索(A)", "项目(P)", "数据(D)", "运行(R)", "窗口(W)", and "帮助(H)". The toolbar contains various icons for file operations. The left sidebar shows the project structure under "包资源管理器": fwebdw2 (src: fwebdw2.css, fwebdw2.mxml), com.webdw (MyJPanel.mxml), Flex 4.6.0, 引用的库, bin-debug. Below it is the "大纲" view showing components like Application, Style (fwebdw2.css), Script, Declarations, Button (test), Button setdw1 (setdw dw1), Button setdw2 (setdw dw2), Button setdw3 (setdw dw3), Label (标签), Panel panel1, and TextInput.

A large red arrow points from a callout box containing the text "复选框绘制" (Drawing Checkboxes) towards the code editor area.

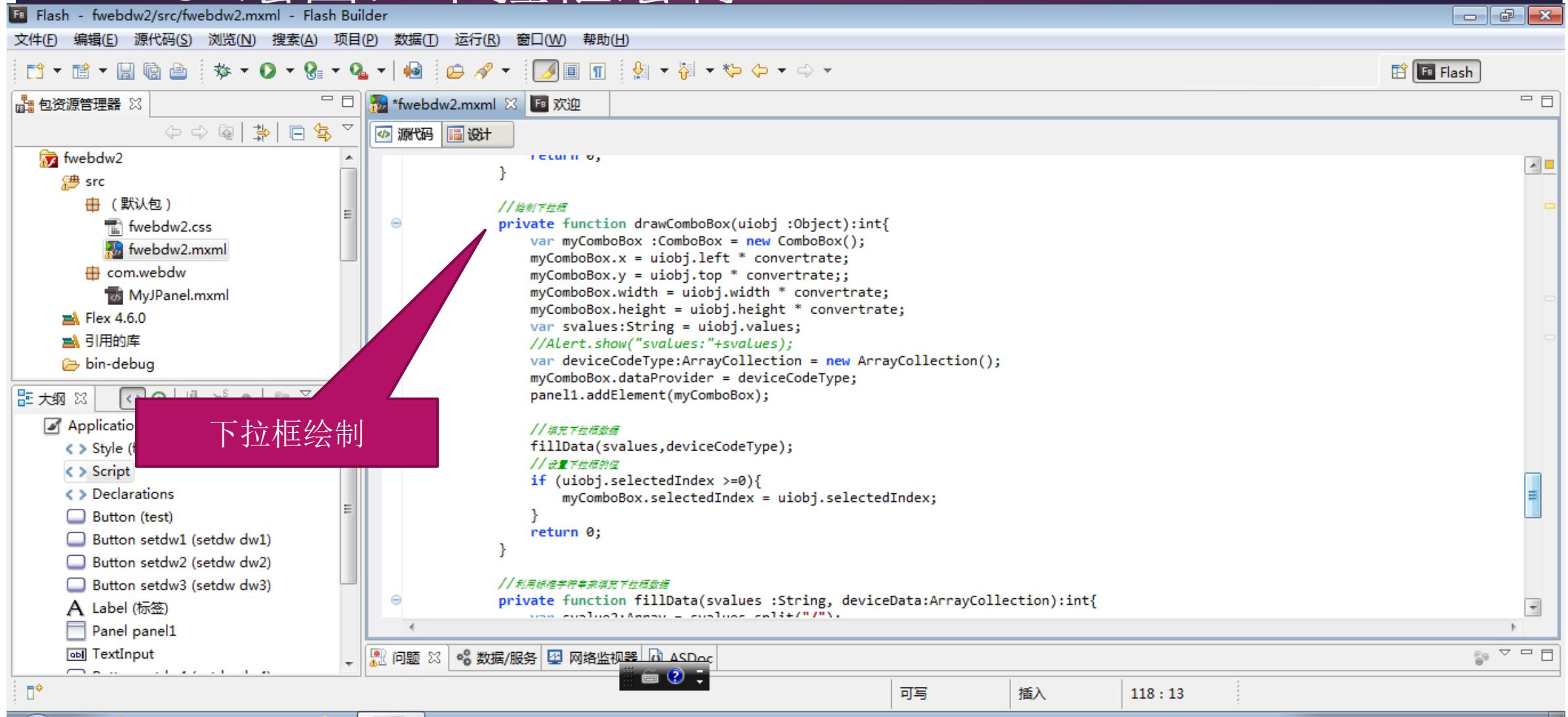
The code editor displays the following ActionScript 3.0 code:

```
    }
    //绘制复选框
    private function drawCheckBox(uiobj :Object):int{
        var myCheckBox :CheckBox = new CheckBox();
        myCheckBox.x = uiobj.left * convertrate;
        myCheckBox.y = uiobj.top * convertrate;;
        myCheckBox.width = uiobj.width * convertrate;
        myCheckBox.height = uiobj.height * convertrate;
        myCheckBox.label = uiobj.text;
        var ischecked:Boolean = uiobj.value;
        if(ischecked){
            myCheckBox.selected = true;
        }
        panel1.addElement(myCheckBox);
        return 0;
    }

    //绘制Panel 以及下属的单选按钮
    private function drawPanel(uiobj:Object):int{
        //TODO:此处应用使用Frame,而不是Group
        //时间精力有限,暂时先这么凑合凑合,以后有真正需要的时候再修改吧
        //使用Panel,定义需要把按钮整理办法去掉,暂时找不到合适的方法
        var mygroup :Group = new Group();
        mygroup.x = uiobj.left * convertrate;
        mygroup.y = uiobj.top * convertrate;;
        mygroup.width = uiobj.width * convertrate;
```

The status bar at the bottom indicates "可写" (Writable) and "插入" (Insert) modes, with the page number "118 : 13".

Flex绘图：下拉框绘制



Flex绘图：单选钮绘制（有Bug）

The screenshot shows the Flash Builder IDE interface. The title bar reads "FB Flash - fwebdw2/src/fwebdw2.mxml - Flash Builder". The menu bar includes "文件(F)", "编辑(E)", "源代码(S)", "浏览(N)", "搜索(A)", "项目(P)", "数据(D)", "运行(R)", "窗口(W)", and "帮助(H)". The toolbar contains various icons for file operations like Open, Save, and Run.

The left sidebar shows the "包资源管理器" (Package Explorer) with a project named "fwebdw2" containing "src", "(默认包)", "fwebdw2.css", "fwebdw2.mxml", "com.webdw", "My JPanel.mxml", "Flex 4.6.0", "引用的库", and "bin-debug". The "大纲" (Outline) panel lists components: Application, Style (fwebdw2.css), Script, Declaration, Button (selected), Button setdw1 (setdw dw1), Button setdw2 (setdw dw2), Button setdw3 (setdw dw3), Label (标签), Panel panel1, and TextInput.

The main workspace displays the MXML file "fwebdw2.mxml" in the "设计" (Design) tab. The code is as follows:

```
private function drawPanel(uiobj:Object):int{
    //TODO:此处应该使用Frame,而不是Group//时间精力有限,暂时先这么凑合凑合,以后有真正需要的时候再修改吧//使用Panel来定义需要把标题栏想办法去掉,暂时找不到合适的方法
    var mygroup :Group = new Group();
    mygroup.x = uiobj.left * convertrate;
    mygroup.y = uiobj.top * convertrate;;
    mygroup.width = uiobj.width * convertrate;
    mygroup.height = uiobj.height * convertrate;
    //mygroup.styleName ="mypanel";
    panel1.addElement(mygroup);
    //开始绘制Panel的下属节点,目前仅支持RadioButton
    var child:Element = uiobj.childElements;
    var i:int = 0;
    for(i=0;i<child.length;i++){
        var child:Object = child[i];
        //Alert.show(child.classname);
        var myRadio :RadioButton = new RadioButton();
        myRadio.x = child.left * convertrate ;
        myRadio.y = child.top * convertrate;
        myRadio.width = child.width * convertrate;
        myRadio.height = child.height * convertrate;
        myRadio.label = child.Text ;
        //TODO:设置RadioButton的选中状态
        var selected :Boolean = child.selected;
        if(selected){ myRadio.selected = true; }
        mygroup.addElement(myRadio);
    }
}
```

A red callout box points from the text "单选钮绘制" in the outline to the "RadioButton" component in the code. The status bar at the bottom right shows "172 : 61".

Flex运行界面

The screenshot shows a Firefox browser window with the address bar set to `localhost/bin-release/fwebdw2.htm`. The main content area displays a data grid with the following columns: Product Description, Product Name, ID, Size, Color, Qty, and Unit Price. The data rows are as follows:

Product Description	Product Name	ID	Size	Color	Qty	Unit Price
Tank Top3333	Tee Shirt111	300	Small	White	30	10
Cotton Cap	Baseball Cap	400	One size fits all	Black	92	9
Wool cap	Baseball Cap	401	One size fits all	White	12	10
Cloth Visor	Visor	500	One size fits all	White	36	7
Plastic Visor	Visor	501	One size fits all	Black	28	7
Hooded Sweatshirt	Sweatshirt	600	Large	Green	39	24
Zipped Sweatshirt	Sweatshirt	601	Large	Blue	33	25
Cotton Shorts	Shorts	700	Medium	Black	80	15
a	a	701	a	a	100	100

Flex运行界面

The screenshot shows a Flex application running within a web browser window. The browser's title bar reads "localhost/bin-release/fwebdw2.htm". The main content area displays a data grid with the following columns: Product ID, Product Name, Product Description, Size, Color, and Quantity. The data grid contains the following rows:

Product ID	Product Name	Product Description	Size	Color	Quantity
Tank Top3	Tee Shirt111	300	Small	White	30
Cotton Ca	Baseball Cap	400	One size fits all	Black	92
Wool cap	Baseball Cap	401	One size fits all	White	12
Cloth Viso	Visor	500	One size fits all	White	36
Plastic Vis	Visor	501	One size fits all	Black	28
Hooded S	Sweatshirt	600	Large	Green	39
Zipped Sw	Sweatshirt	601	Large	Blue	33
Cotton Sh	Shorts	700	Medium	Black	80
a	a	701			100

The browser interface includes standard navigation buttons (back, forward, search, etc.), a toolbar with icons like search and refresh, and a status bar at the bottom.

Flex运行界面

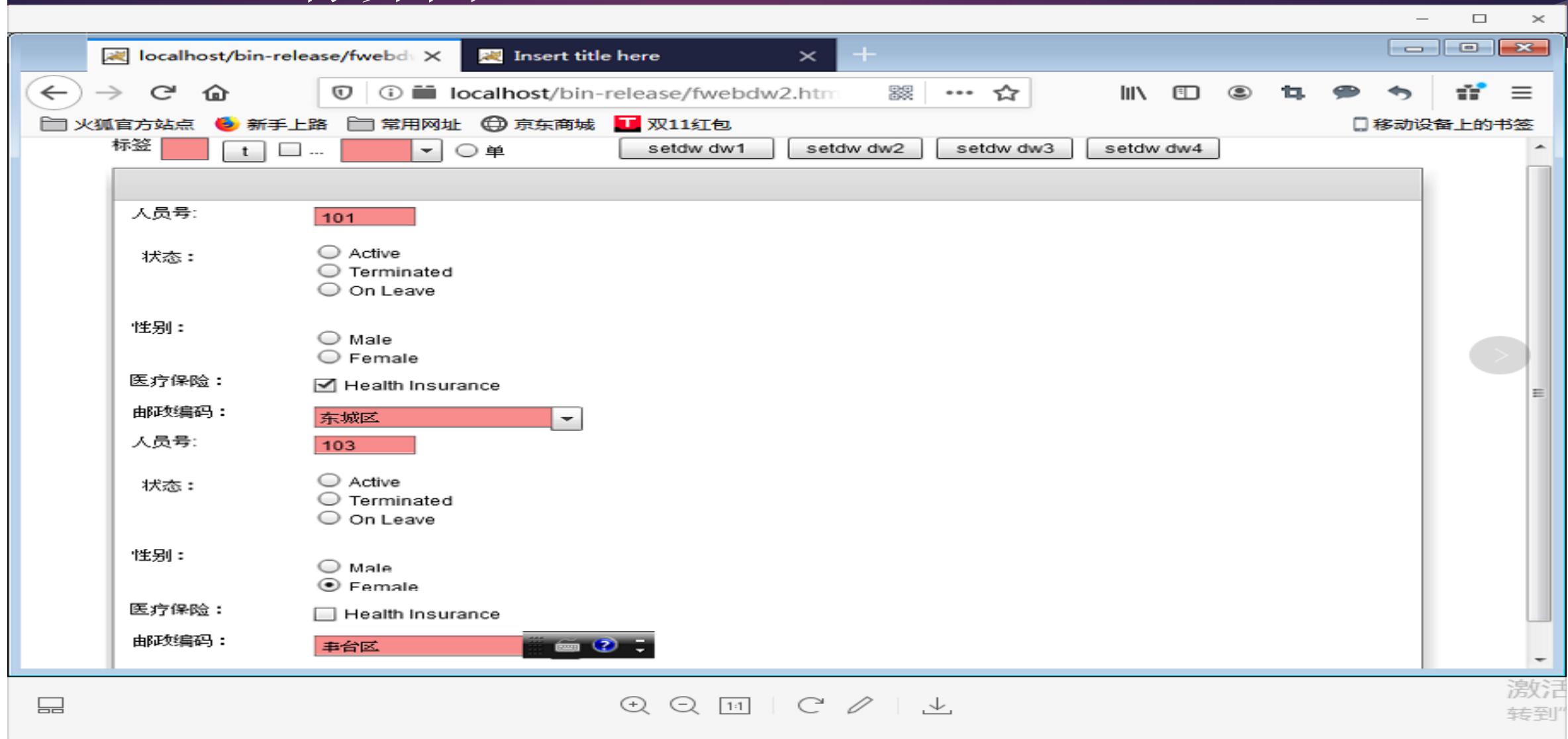
The screenshot shows a Flex application running within a Firefox browser window. The browser's title bar reads "localhost/bin-release/fwebdw2.htm". The application interface includes a toolbar with various icons, a navigation bar with links like "火狐官方站点" and "京东商城", and a main content area displaying employee data in a grid format.

The main content area has a header row with columns: Employee, Department
, Zip Code, Phone, Status, and Sex. Below this are two data rows:

Employee	Department 	Zip Code	Phone	Status	Sex
101	200	100001	1391057777	<input type="radio"/> Active <input type="radio"/> Terminated <input type="radio"/> On Leave	<input type="radio"/> Male <input type="radio"/> Female
103	500	100004	1391234567	<input type="radio"/> Active <input type="radio"/> Terminated <input checked="" type="radio"/> On Leave	<input type="radio"/> Male <input checked="" type="radio"/> Female

At the bottom of the application window, there is a toolbar with icons for file operations and a status bar at the very bottom.

Flex运行界面



Flex版本下一步工作

- ▶ 修复RadioButton显示的Bug
- ▶ 尝试不同风格的显示效果
- ▶ 将Flex封装为JS调用的标准显示库，JS负责交互，而Flex负责界面渲染

Flex作为组件显示的优点与缺点

- ▶ 优点是界面比较美观，具有良好的定制性
- ▶ 相对专业的IDE支持
- ▶ 缺点1：依赖Flash插件支持，chrome将于2020年12月停用
- ▶ 缺点2：开发难度比较大，对开发人员要求比较高
- ▶ 缺点3：Flex Builder需要购买才能使用，价格较高

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浏览器上动态界面绘制的技术讨论

WebDW的技术架构说明

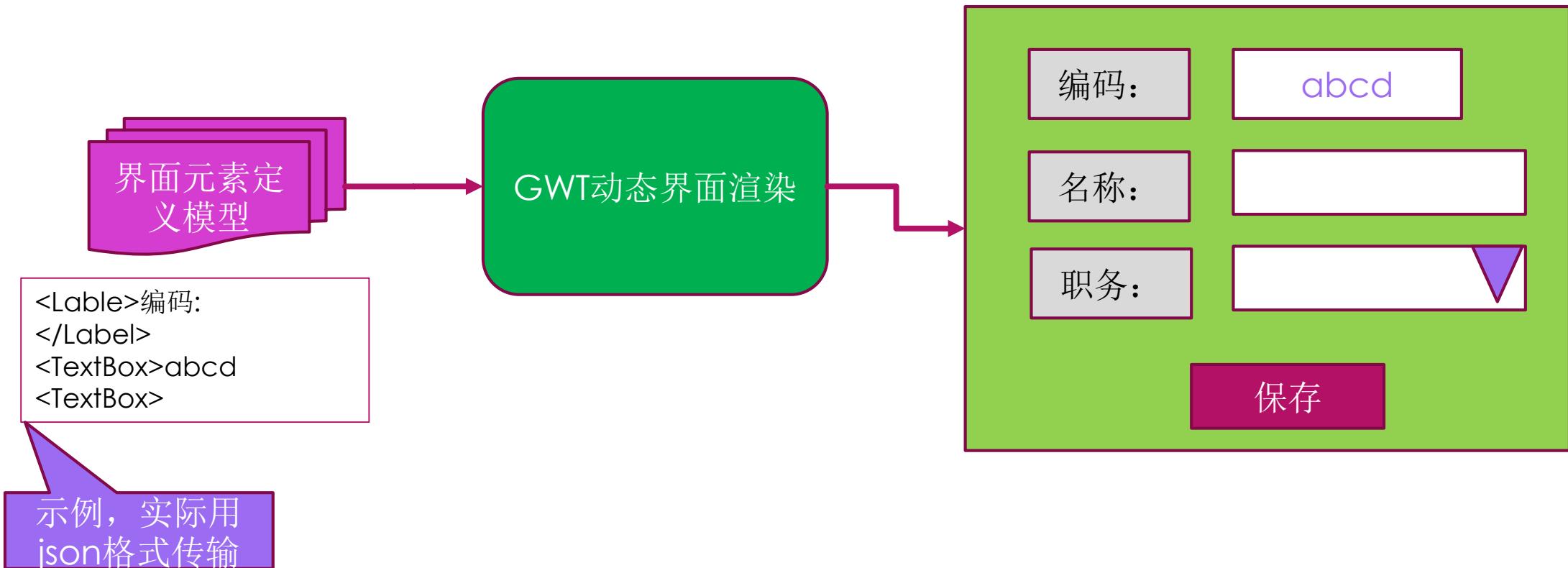
WebDW GWT客户端的设计实现

GWT客户端的总体IPO

GWT客户端的技术选型

GWT客户端具体实现

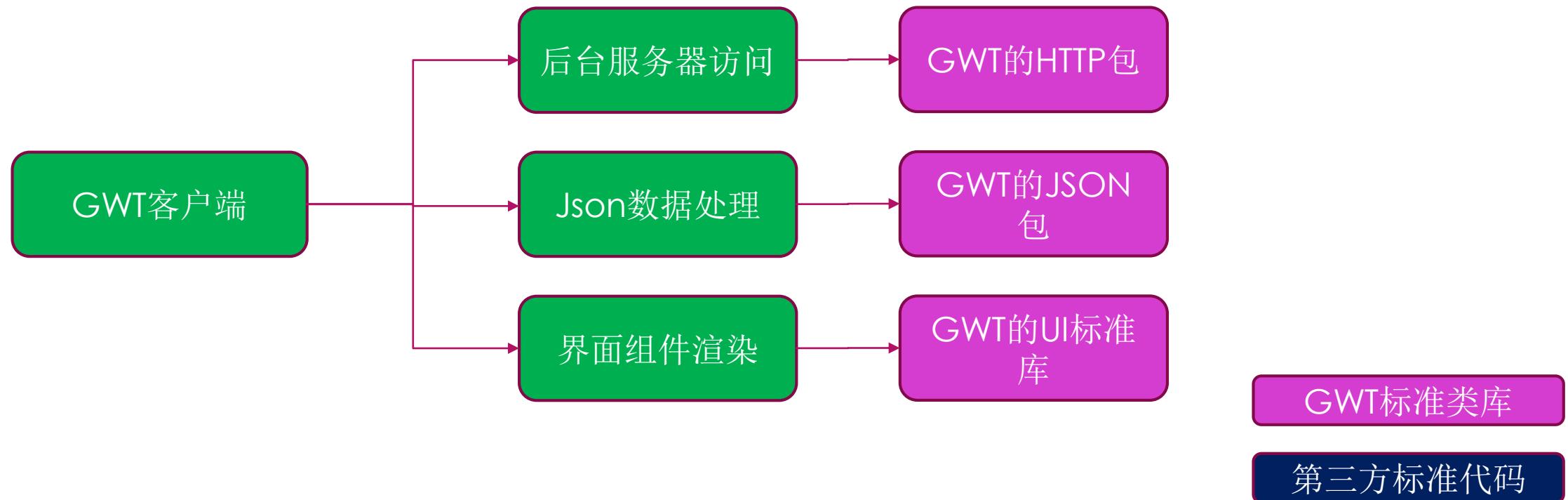
Flex界面绘图总体IPO



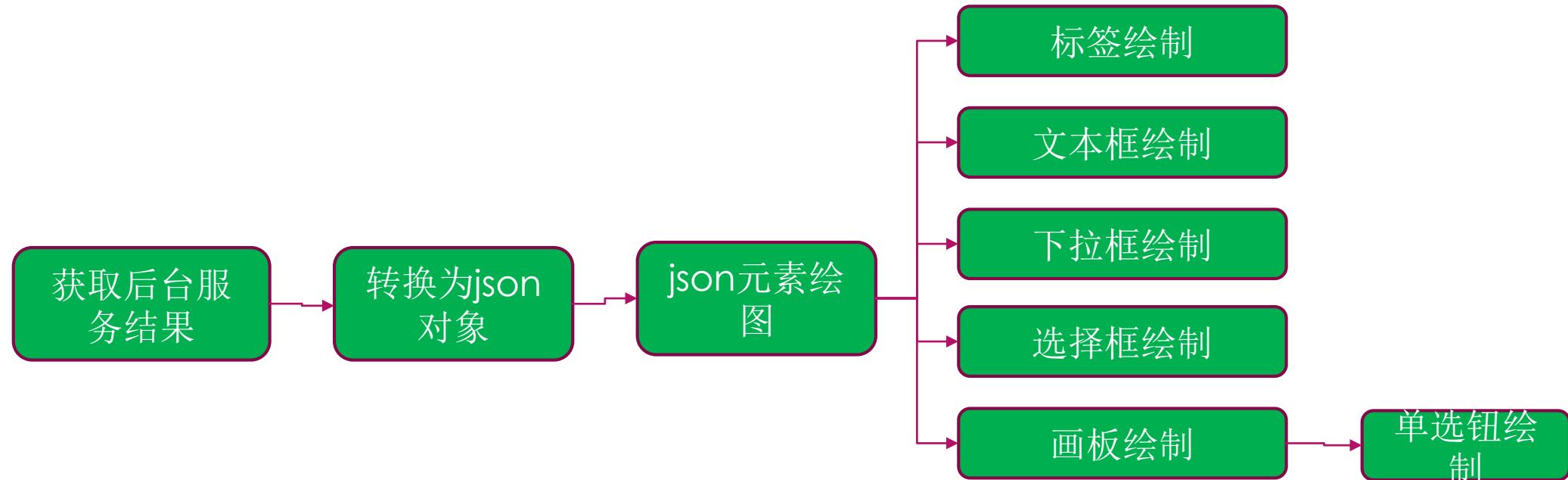
GWT界面绘图和VB界面绘图的不同

比较项	VB	GWT	备注
json数据格式支持	标准的VB不支持JSON数据格式，因此需要引入Script Controller来进行解析	客户端采用com.google.gwt.json.JSON来支持	
Ajax后台服务调用	通过引入XMLHttpRequest来调用	服务端采用com.google.gwt.http.HTTP包来支持	
界面元素渲染组件	通过VB标准库来提供支持	通过GWT标准UI库来支持	
事件回调	通过自定义调用器实现	GWT标准UI库支持事件回调	
基本设计模式	面向对象，基于组件	面向对象，基于JAVA类	
二次封装	容易，可封装为ActiveX	可封装为GWT标准Widget来复用	
线程支持	单线程	多线程支持	GWT切分为客户端与服务器端

GWT客户端的技术选型



GWT webdw客户端设计



GWT运行界面

Web Application Starter Proj +

localhost/webdw-gwt/

火狐官方站点 新手上路 常用网址 京东商城 移动设备上的书签

Web Application Starter Project

Please enter your name:

GWT User SendSend

Product Description	Product Name	ID	Size	Color	Qty	Unit Price	Picture Name
Tank Top3333	Tee Shirt111	300	Small	White	30	10	tshirtw.bmp
Cotton Cap	Baseball Cap	400	One size fits all	Black	92	9	capb.bmp
Wool cap	Baseball Cap	401	One size fits all	White	12	10	capw.bmp
Cloth Visor	Visor	500	One size fits all	White	36	7	visorw.bmp
Plastic Visor	Visor	501	One size fits all	Black	28	7	visorb.bmp
Hooded Sweatshirt	Sweatshirt	600	Large	Green	39	24	sshirtg.bmp
Zipped Sweatshirt	Sweatshirt	601	Large	Blue	33	25	sshirtb.bmp
Cotton Shorts	Shorts	700	Medium	Black	80	15	shortsb.bmp

GWT版本下一步工作

- ▶ 多种编辑风格支持扩展
- ▶ 标准化Widget封装尝试
- ▶ 在实际项目中试用并扩展功能

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浏览器上动态界面绘制的技术讨论

WebDW的技术架构说明

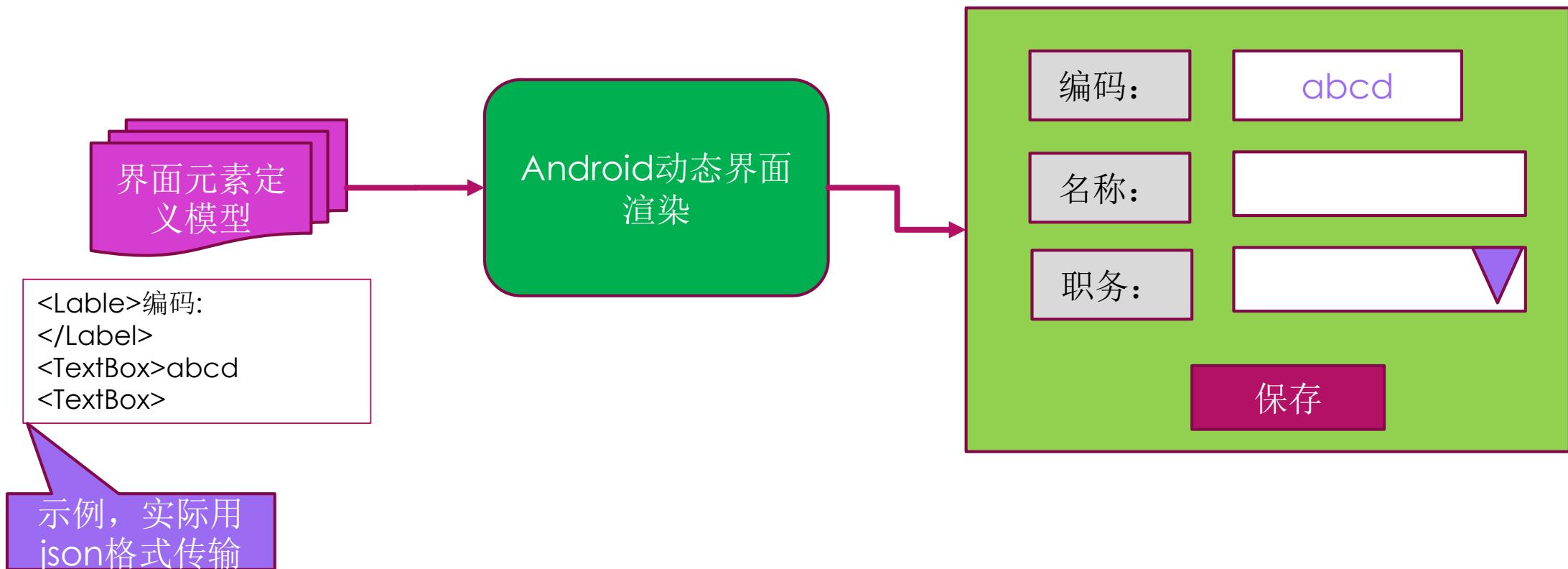
WebDW Android客户端的设计实现

Android客户端的总体IPO

Android客户端的技术选型

Android客户端具体实现

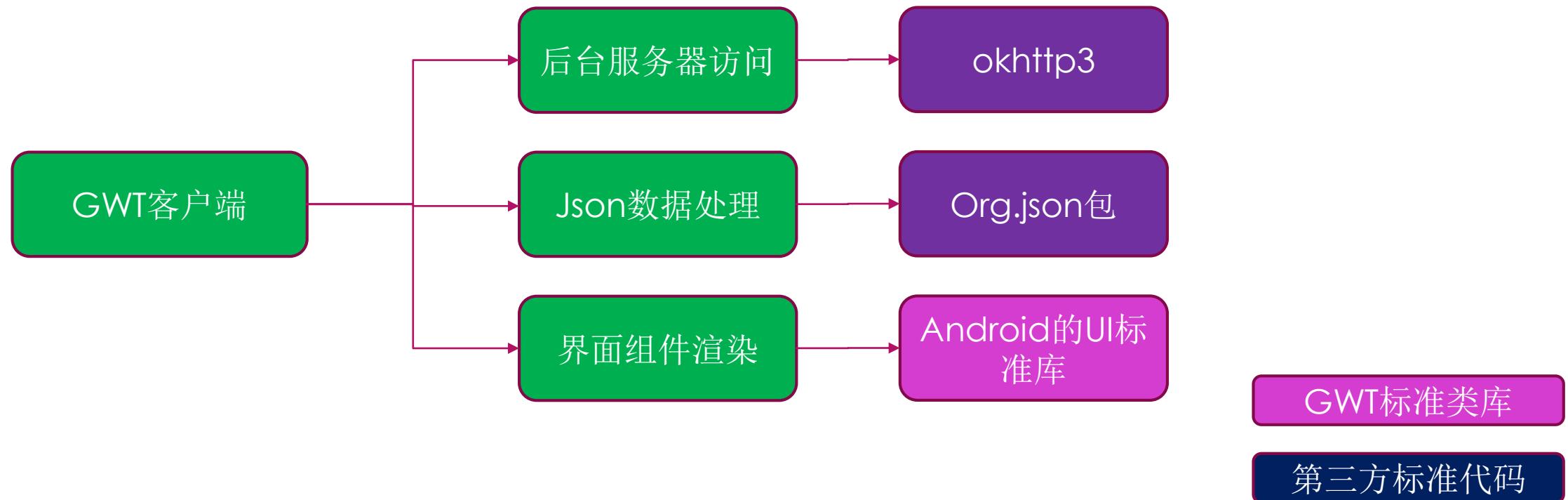
Android界面绘图总体IPO



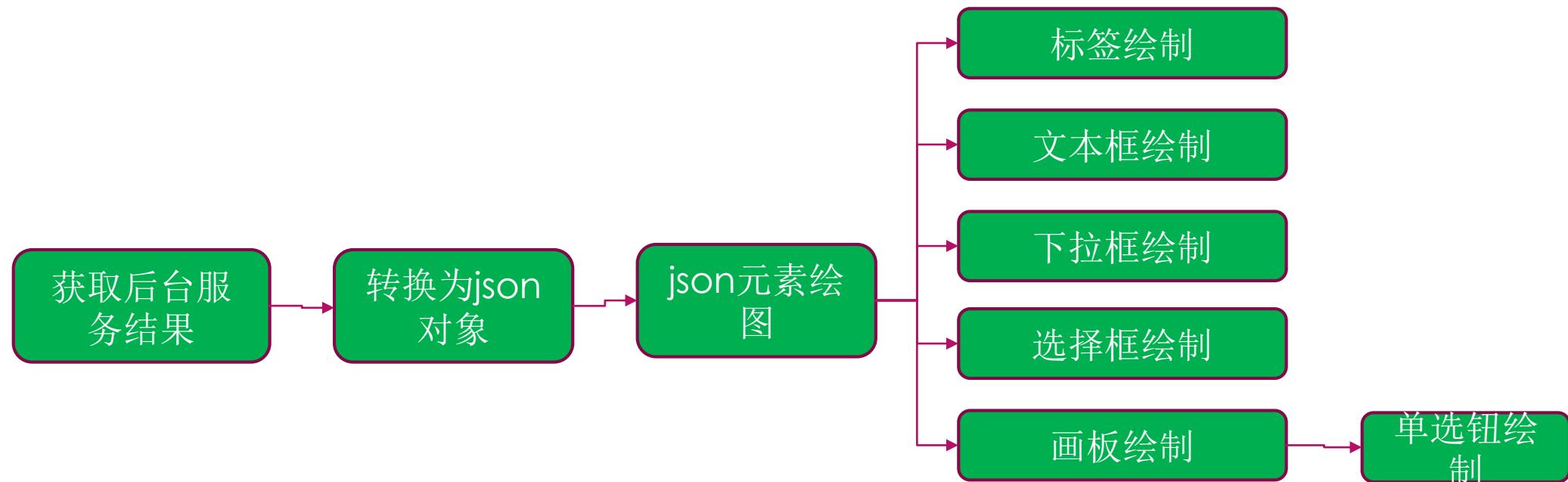
Android界面绘图和VB界面绘图的不同

比较项	VB	Android	备注
json数据格式支持	标准的VB不支持JSON数据格式，因此需要引入Script Controller来进行解析	使用org.json组件包来进行json数据解析	
Ajax后台服务调用	通过引入XMLHttpRequest来调用	利用okhttp来访问后台web服务	
界面元素渲染组件	通过VB标准库来提供支持	使用Android原生控件来进行渲染	
事件回调	通过自定义调用器实现		
基本设计模式	面向对象，基于组件	面向对象，基于JAVA类	
二次封装	容易，可封装为ActiveX		
线程支持	单线程	多线程支持	

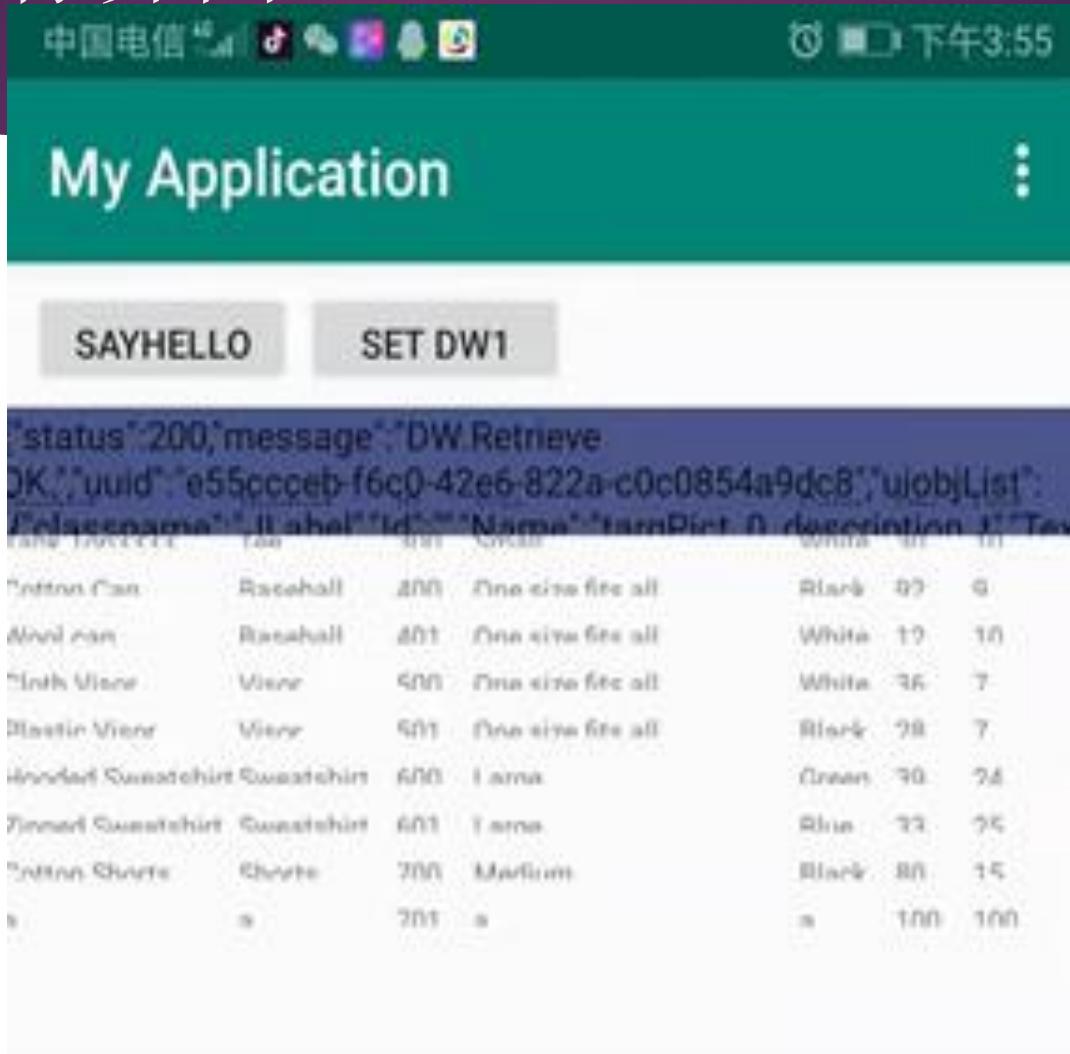
Android客户端的技术选型



Android webdw客户端设计



Android运行界面



Android版本下一步工作

- ▶ 多种编辑风格支持扩展
- ▶ 标准化Widget封装尝试
- ▶ 在实际项目中试用并扩展功能