

Apache Royale

Moving a Flex app to Royale

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Your presenters

- **Alina Kazi - Apache Royale committer; headed the migration project we discuss here.**
- **Andrew Wetmore - Apache Royale committer working on documentation; editor/writer for the Apache Infrastructure team**



The challenge

DBIZ Solutions had a mission-critical Flex app of over 1456 .MXML files, 666 .AS files. Required the Flash Player or AIR (desktop Flash environment) to run.

With the end of Flash support they had to:

- rebuild the whole app in a new technology

OR

- move the app to something that would support their existing assets and team skills



The decision & Alina's journey

DBIZ Solutions chose to migrate from Adobe Flex to Apache Royale.

- Flex and Royale are very similar, requiring similar team skills
- For the differences in Royale, learning curve is gentle
- Both use .mxml and .as, so no need to learn a new code language
- Shorter time to develop the replacement app, with fewer risks



The steps

The migration took these steps

- API report
- The easy parts
- Create stubs
- Emulation
- Component set
- Compile - run - find bugs - fix - repeat
- Success!

API report

- What components does the app use?
- Which map to existing Royale components?
- Which need emulation?

<https://github.com/apache/royale-asjs/wiki/Generating-an-API-Report>

```
mx.charts.PlotChart:dataProvider      2
mx.charts.PlotChart:height           2
mx.charts.PlotChart:horizontalAxis   2
mx.charts.PlotChart:series           2
mx.charts.PlotChart:setStyle         8
mx.charts.PlotChart:showDataTips     2
mx.charts.PlotChart:width            2
mx.charts.renderers.ShadowLineRenderer 48
mx.charts.series.AreaSeries:yField   36
mx.charts.series.BarSeries           55
mx.charts.series.BarSeries:displayName 29
mx.charts.series.BarSeries:fill      9
mx.charts.series.BarSeries:stroke    9
mx.charts.series.BarSeries:styleName 6
mx.charts.series.BarSeries:xField    33
mx.charts.series.BarSeries:yField    33
mx.charts.series.ColumnSeries        73
mx.charts.series.ColumnSeries:dataTransform 16
mx.charts.series.ColumnSeries:displayName 42
mx.charts.series.ColumnSeries:fill   6
```

The easy parts

- Most ActionScript code from Flex "just runs" in Royale
- Simple to change namespaces

Flex: `xmlns:s="library:/ns.adobe.com/flex/spark"` becomes

Royale: `xmlns:s="library://ns.apache.org/royale/spark"`

- Replace `<mx:Script>` to `<fx:Script>`
- Replace `<mx:Component>` to `<fx:Component>`
- `<mx:beads>` `<js:ClassAliasBead />` `</mx:beads>`

Add this to the application file, and in every module file add basic Namespace at the top **`xmlns:js="library://ns.apache.org/royale/basic"`**



Less easy

Moving from Flash to Royale equivalents, or emulations:

- Flex: `flash.net.URLLoader` becomes
Royale: `org.apache.royale.net.URLLoader`
- Flex: `flash.core.UIComponent` becomes
Royale: `mx.core.UIComponent`
- Flex: `flash.display.DisplayObject` becomes
Royale: `mx.core.UIComponent` or `mx.core.IUIComponent`
- Flex: `flash.events.Event` becomes
Royale: `org.apache.royale.events.Event`

Less easy

- Flex: `flash.net.navigateToURL` becomes
Royale: `org.apache.royale.core.BrowserWindow`
- Flex: `flash.utils.getQualifiedClassName` becomes
Royale: `org.apache.royale.reflection.getQualifiedClassName`

These are just a few examples,

Find what you require to make your Application run (see in the API Report you generated) and find the equivalents in the Apache Royale SDK.



Create stubs

Create Royale components and functions that connect with the app but may not actually do everything the Flex component did, to let the app compile.

Then replace each stub with code that does what the app needs.

Flex SDK: <https://github.com/apache/flex-sdk>

Royale SDK: <https://github.com/apache/royale-asjs>



Emulation

When the app needs a component Royale does not yet have, create an equivalent component:

- remove dependencies on Flash
- follow Royale patterns such as strands and beads so the component can do what the app needs
- Not necessarily backward compatible with the existing Flex app

<https://github.com/apache/royale-asjs/wiki/emulation-components>



Component sets

- Flex components have bulky code to cover all sorts of possible uses
- Royale follows the **PAYG** principle
 - Strands and beads
- Existing Royale component sets range from very lightweight for quick demos to richer component sets like Jewel
- This project opted to emulate 80-90% of the components, and only used strands and beads in one area



Compile - run - find bugs - fix - repeat

- Patient, hard work by two developers
- Strong support and participation by the Royale community
- Found and fixed **hundreds** of bugs...

Bug:

Problem with
the dropdown
menu

E24												
A	B	C	D	E	F	G	H	I	J	K	L	
6	TS/ISB/ROL/001		All	System should not allow user to continue changes in entries without press OK or cancel button on warning/validation/confirmation messages.	AC	6	O	2				
7	TS/ISB/ROL/001		All	Buttons should be designed as clickable buttons like in flex system.	AC	6	O	2				
8	TS/ISB/ROL/001		All	System blinks on each saving and deletion of entries.	AC	6	O	2				
9	TS/ISB/ROL/001		All	There is blank left grid when there is no entry system should show rows with or without data.	AC	6	O	2				
10	TS/ISB/ROL/001		All	There should be a column separator.	AC	6	O	2				
11	TS/ISB/ROL/001		All	Username textbox should be same as password.	AC	6	O	2				
12	TS/ISB/ROL/001		All	Enter is not working for login.	AC	6	O	2				
13	TS/ISB/ROL/001		All	There should be dropdown arrow for submenu instead of question mark.	AC	6	O	2				
14	TS/ISB/ROL/001		All	There should be dropdown icon for sorting like in flex.	AC	6	O	2				
15	TS/ISB/ROL/001		All	If application is taking time to load page then there should be some indication for users to wait like ticking clock in flex application.	AC	6	O	2				
16	TS/ISB/ROL/001		All	Dropdown should be same as flex application.	AC	6	O	2				
17	TS/ISB/ROL/001		All	On clicking save button system should highlight all mandatory fields if user has not provided data in them.	FZ	6	O	2				
18	TS/ISB/ROL/001		All	Display code field disabled as in flex after saving.	FZ	6	O	2				
19	TS/ISB/ROL/001		All	Fix page resolution according to screen resolution.	FZ	6	O	2				
20	TS/ISB/ROL/001		All	Tab should shift cursor to next writeable field.	FZ	6	O	2				

Bug:

Need highlighting
for the text entry
field

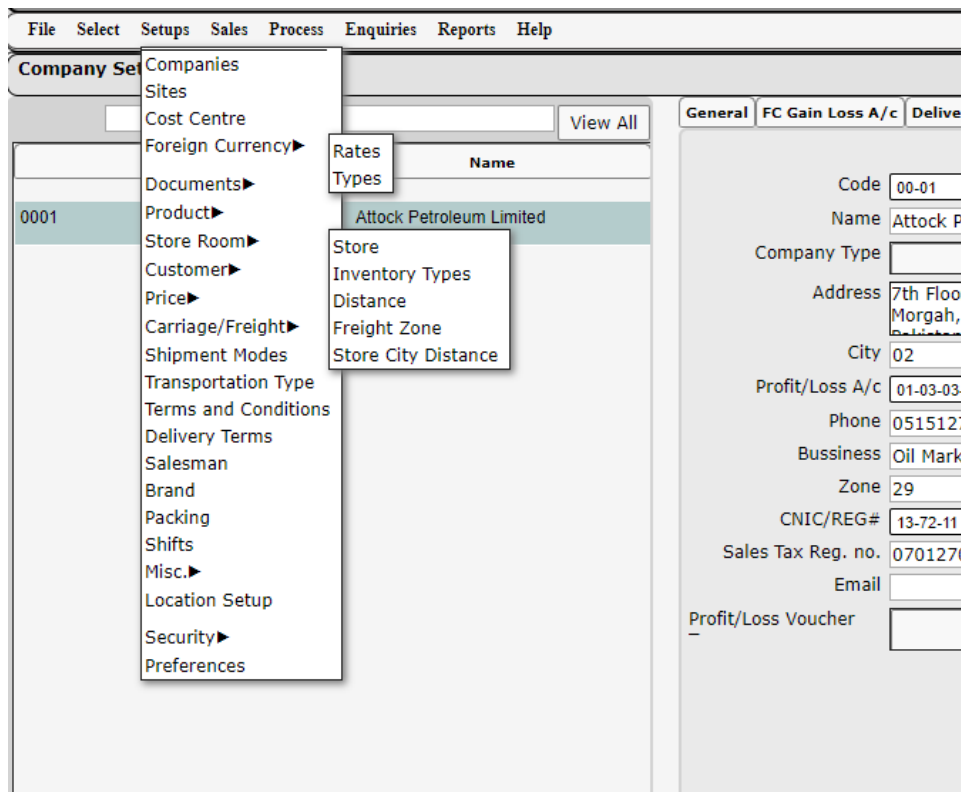
The screenshot displays the D-Biz Suite software interface. The title bar shows "D-Biz Suite" and the user is logged in as "SUPER". The main menu includes File, Select, Setups, Payment, Process, Enquiries, Reports, and Help. The current window is titled "Foreign Currency Types" and contains a table with the following data:

Code	Description
0001	Asset
0002	Liability
0003	Average

To the right of the table is a form for adding a new entry, with "Code" and "Description" fields highlighted by red rectangles. At the bottom of the interface, there are buttons for "Preview", "HTML", "PDF", "Excel", "New", "Save", "Undo", and "Delete".

Bug:

When you open a new submenu, any submenu that is already open should close.





Success!

- Royale version compiles and runs reliably and accurately.
- The original Flex app required **ten** full-time developers working for **13 years**. Porting to Royale took **two** developers (plus community help) just **two** years.
- The company, its staff, and its end users are happy

Success!

Menu in Royale Application


 D-Biz Suite

Welcome: SUPER (Logged on : 9/14/2020, 12:08:32 PM) User Site: RBT - Sihala Database: SHMA_APPS_FSBATM

File **Select** **Setups** **Payment** **Process** **Enquiries** **Reports** **Help**

Period
General Ledger
Fixed Assets
Purchase
Inventory
Sales
Accounts Receivable
Planning
Feasibility
Import
Retail Inspection

Menu in Flex Application

 D-Biz Suite

Welcome: SUPER (Logged on : Mon Sep 14 2020 01:26:00 PM) User Site: RBT - Sihala Database: SHMA_APPS_DEV

File **Select** **Setups** **Sales** **Process** **Enquiries** **Reports** **Help**

Period
General Ledger
Purchase
Accounts Payable
Inventory
Accounts Receivable
EIS - (Dashboard)
Planning
Feasibility
Import
Retail Inspection
Quality Assurance



Success!

D-Biz Suite Home, Help, Logout

Welcome: SUPER (Logged on: 9/14/2020, 12:08:32 PM) User Site: RBT - Sinala Database: SHMA_APPS_FSBATM Year: 2018-19(Temporary Close) Period: October

File Select Setups Payment Process Enquiries Reports Help

Supplier Setup General Delivery Addresses Others GL Accounts Information Department Structure

Code	Description
1	Supplier
1-01	Local
1-01-01	POL Products Supplier
1-01-01-0001	Associated Companies
1-01-01-0001-000	The Attock Oil Company Ltd
1-01-01-0001-000	Attock Refinery Limited
1-01-01-0001-000	Pakistan Oilfields Limited
1-01-01-0001-000	National Refinery Limited
1-01-01-0002	Other Companies
1-01-01-0002-000	Government of Pakistan
1-01-01-0002-000	Oil & Gas Development Co. Ltd
1-01-01-0002-000	Caltex Oil
1-01-01-0002-000	Pakistan State Oil Purchases
1-01-01-0002-000	Pak Arab Refinery Limited-Purchases
1-01-01-0002-000	Shell (Pak) Ltd Purchases

Preview HTML PDF Excel

Code: 1- - - - -
 Inactive

Name:

Type: Short Name:

Address 1:

Address 2:

City:

Fax: Phone:

Mobile: Allow Entry Against Cash:

Customer Type: Lic. No.:

Consmr. Reg. No.: WHT Type:

CNIC: E-mail:

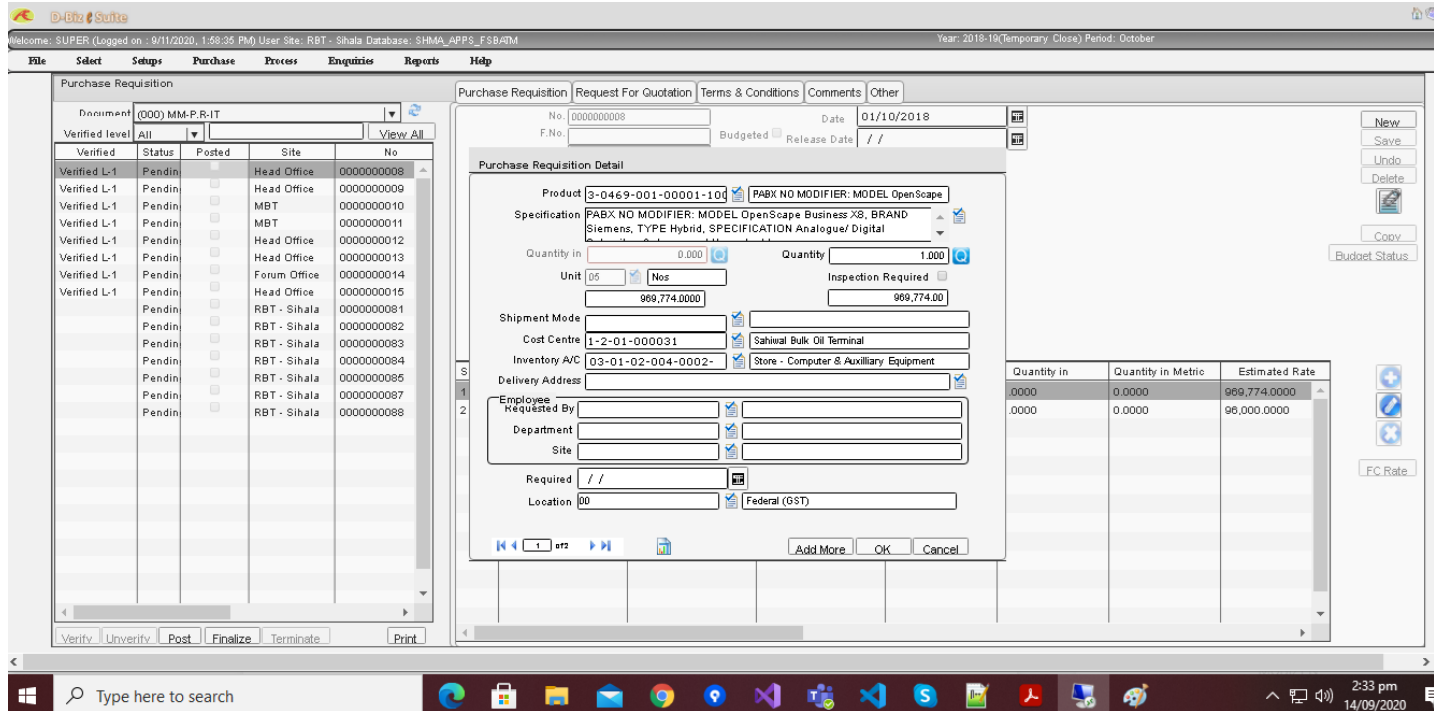
I.Tax Reg. No.: NTN:

Business Nature: Contact Person:

Default Price Title: Company Status:

[Franchise Fee](#) |
 [Terms and Conditions](#) |
 [Attachments](#) |
 [Check Balances](#) |
 [JL Products](#) |
 [Supplier Status](#)

Success!



The screenshot displays the Apache Royale software interface for a Purchase Requisition. The window title is "D:\Bt\ Suite". The user is logged in as "SUPER" on 9/11/2020 at 1:58:35 PM. The system is running on Site: RBT - Sihala, Database: SHMA_APPS_FSBATM, Year: 2018-19(Temporary Close), Period: October.

The main window is titled "Purchase Requisition" and contains several tabs: "Purchase Requisition", "Request For Quotation", "Terms & Conditions", "Comments", and "Other". The "Purchase Requisition" tab is active, showing a list of requisitions on the left and a detailed form on the right.

Purchase Requisition List (Left Panel):

Document	Verified level	Status	Posted	Site	No
(000) MM-P-R-IT	All				
Verified L-1	Pendin			Head Office	0000000008
Verified L-1	Pendin			Head Office	0000000009
Verified L-1	Pendin			MBT	0000000010
Verified L-1	Pendin			MBT	0000000011
Verified L-1	Pendin			Head Office	0000000012
Verified L-1	Pendin			Head Office	0000000013
Verified L-1	Pendin			Forum Office	0000000014
Verified L-1	Pendin			Head Office	0000000015
Pendin				RBT - Sihala	0000000081
Pendin				RBT - Sihala	0000000082
Pendin				RBT - Sihala	0000000083
Pendin				RBT - Sihala	0000000084
Pendin				RBT - Sihala	0000000085
Pendin				RBT - Sihala	0000000087
Pendin				RBT - Sihala	0000000088

Purchase Requisition Detail (Right Panel):

Product: 3-0469-001-00001-100 PABX NO MODIFIER: MODEL OpenScope
 Specification: PABX NO MODIFIER: MODEL OpenScope Business X8, BRAND Siemens, TYPE Hybrid, SPECIFICATION Analogue/ Digital
 Quantity In: 0.000 Quantity: 1.000
 Unit: 05 Nos Inspection Required:
 Shipment Mode: 969,774.0000
 Cost Centre: 1-2-01-000031 Sahiwal Bulk Oil Terminal
 Inventory A/C: 03-01-02-004-0002- Store - Computer & Auxiliary Equipment
 Delivery Address:
 Employee Requested By:
 Department:
 Site:
 Required: //
 Location: 00 Federal (GST)

Summary Table (Bottom Right):

Quantity in	Quantity in Metric	Estimated Rate
0.000	0.0000	969,774.0000
0.000	0.0000	96,000.0000

The interface includes standard menu options (File, Select, Setups, Purchase, Process, Enquiries, Reports, Help) and a toolbar with buttons for New, Save, Undo, Delete, Copy, Budget Status, FC Rate, Add More, OK, and Cancel.

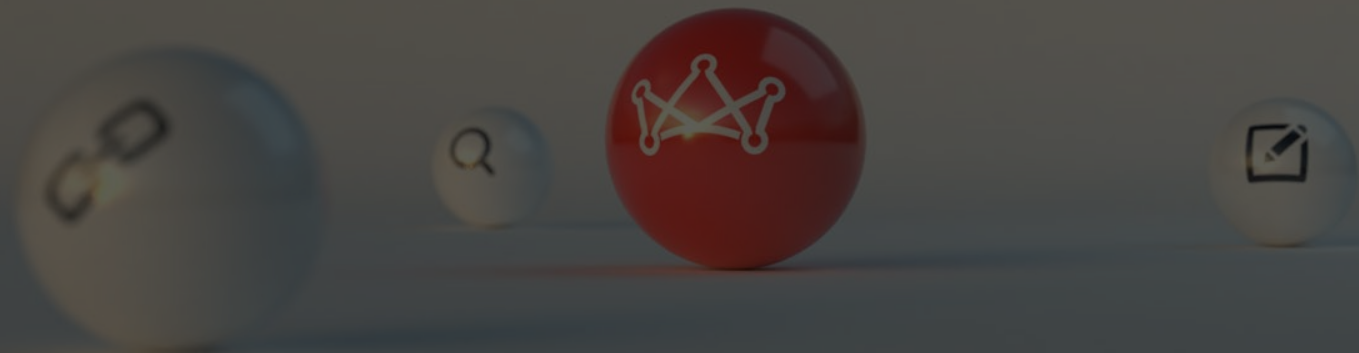


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- Alex Harui, PMC Member of Apache Royale, who helped a lot with the Emulation Components.
- The rest of the Royale developer community who devoted many hours to making the migration a success.
- My aunt Razia, my father, my mother, my husband, my kids, my sisters and my brothers

Thank *you* for your attention!

Questions?



royale.apache.org