



Glasgow 2024

Migrating Your JWC GUI to Linux, macOS, and the Cloud



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Goals

- Show you how to install "Everywhere WC"
- Give you some time to play with it
- Get input on priorities – which missing features to attack first?

What is "Everywhere" WC?

An implementation of a **subset** of WC, which can run on any Dyalog platform

- Windows, Linux, MacOS Desktops using HTMLRenderer
- As a web server served up by any Dyalog interpreter

Also **extends** WC, adding

- A native Ribbon control
- ApexCharts Graphics
- "Any widget library you want"

Why EWC?

1. Protect existing investments

- ◆ Since 1990, EWC has made it possible for domain experts to be "full stack" developers
- ◆ EWC is perhaps the most important reason why Dyalog has been successful
- ◆ EWC is restricted to the Microsoft Windows desktop, which is fading

Why EWC?

2. Build New Applications

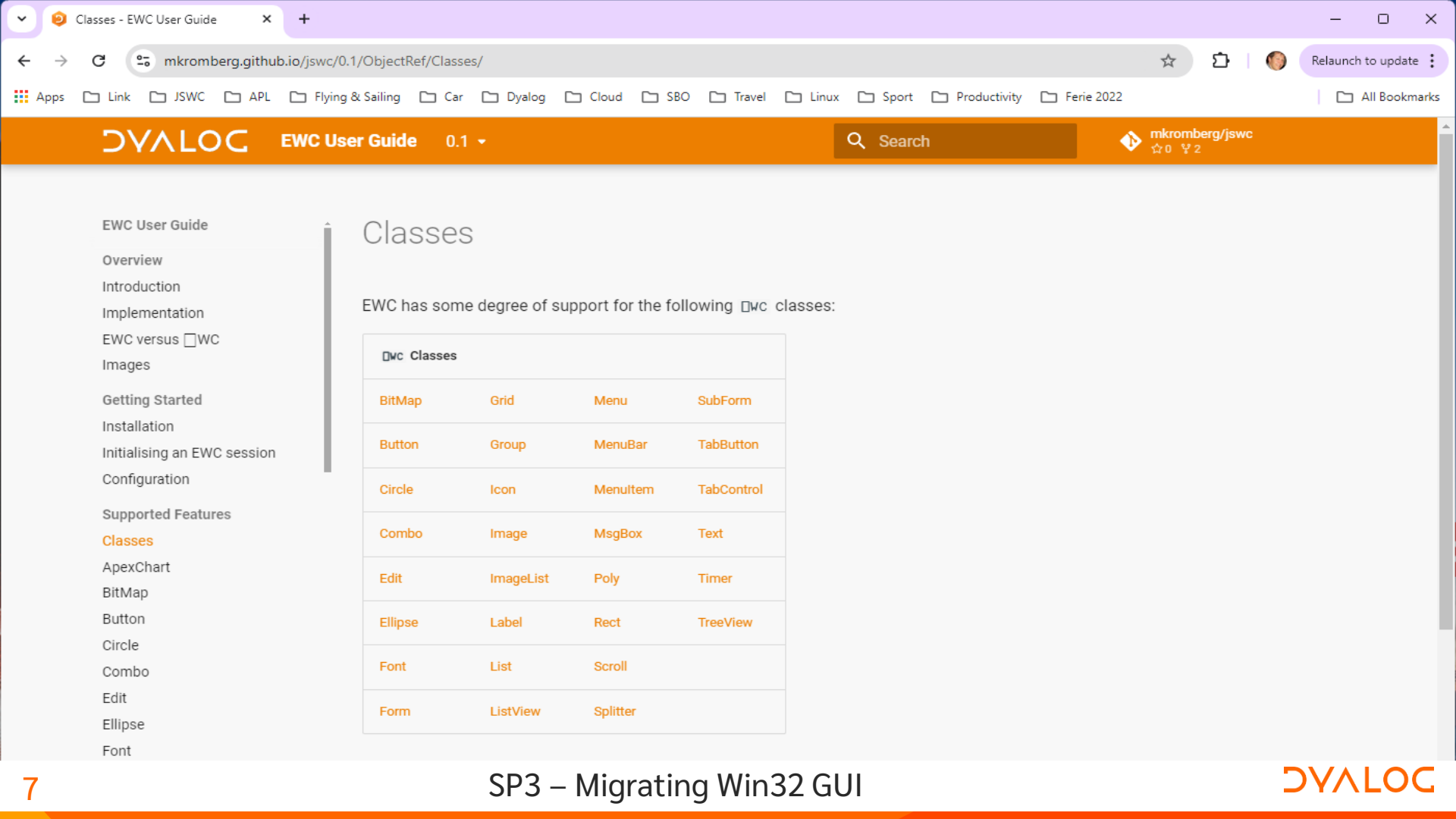
- ◆ EWC can easily be extended with JavaScript libraries
- ◆ Potential migration path for existing code to "responsive" layout
 - ◆ Replace Posn/Size with Flex CSS
- ◆ EWC is a uniquely interactive web development environment

Current Status

- Worked on prototype for 12 months with an external contractor
- Hired a full-time JavaScript developer – Welcome Neil!
- Free and Open Source
 - We will document how to create & share your own extensions
- We expect to add features quickly this winter
 - Send us sample apps / tell us what you need

Current Status

- ◆ Supported subset has been driven by the needs of two launch customers
 - ◆ One converting a mature asset management system which needs to move off the Windows desktop
 - ◆ One building new web components in APL to enhance an existing C#/JS based web app
 - ◆ Both of these should be up & running very soon
- ◆ Many features are still being developed
- ◆ NB: The list of missing & supported features is likely to be out of date within a few days of this workshop!



- EWC User Guide
- Overview
- Introduction
- Implementation
- EWC versus JWC
- Images
- Getting Started
- Installation
- Initialising an EWC session
- Configuration
- Supported Features
- Classes**
- ApexChart
- BitMap
- Button
- Circle
- Combo
- Edit
- Ellipse
- Font

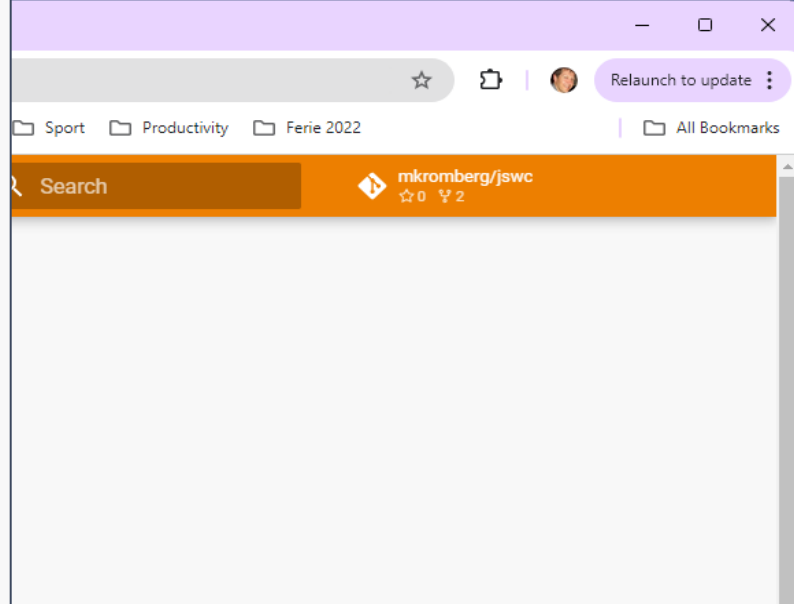
Classes

EWC has some degree of support for the following EWC classes:

EWC Classes			
BitMap	Grid	Menu	SubForm
Button	Group	MenuBar	TabButton
Circle	Icon	MenuItem	TabControl
Combo	Image	MsgBox	Text
Edit	ImageList	Poly	Timer
Ellipse	Label	Rect	TreeView
Font	List	Scroll	
Form	ListView	Splitter	

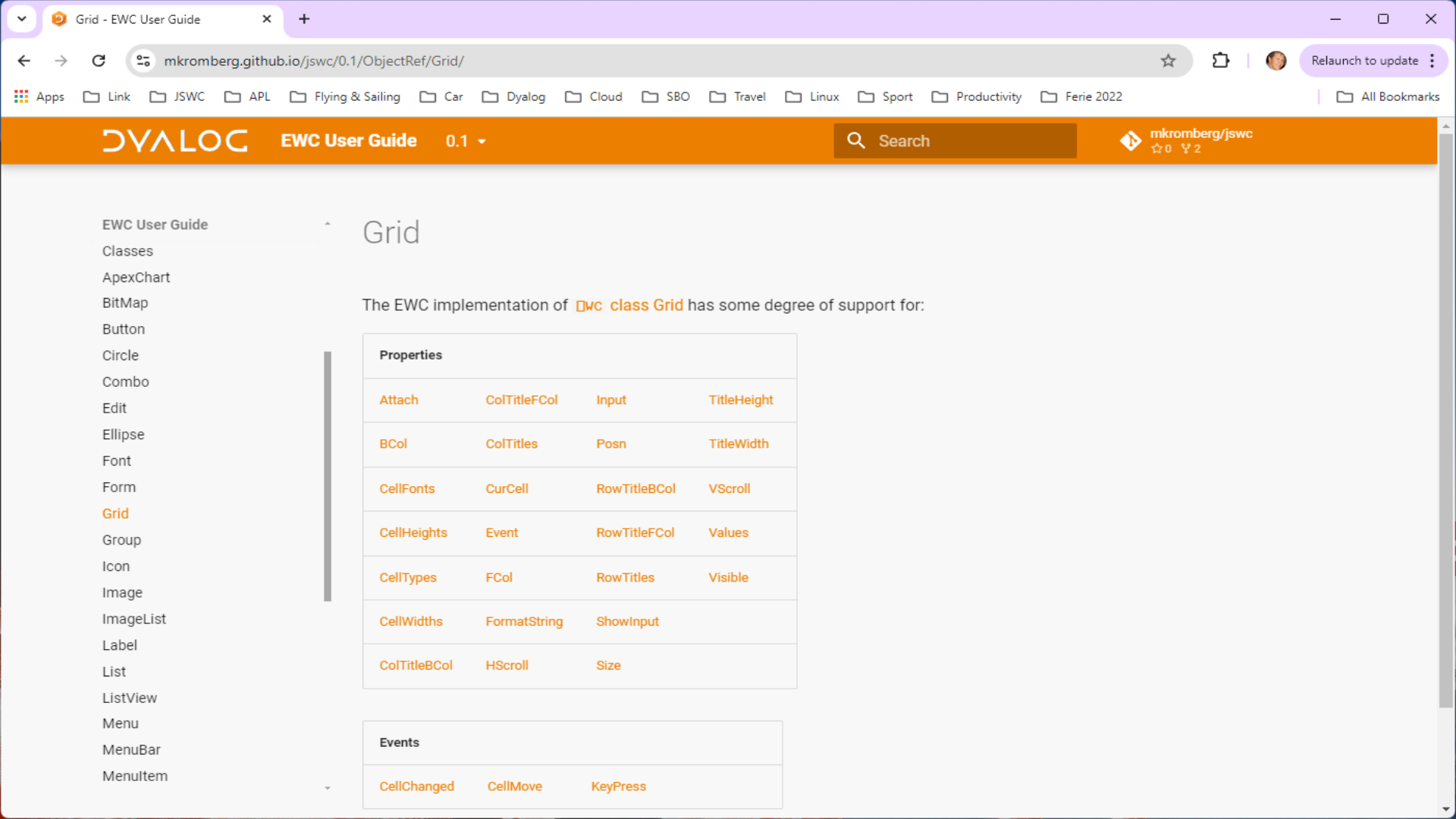
EWC has some degree of support for the following `QWc` classes:

<code>QWc</code> Classes			
BitMap	Grid	Menu	SubForm
Button	Group	MenuBar	TabButton
Circle	Icon	MenuItem	TabControl
Combo	Image	MsgBox	Text
Edit	ImageList	Poly	Timer
Ellipse	Label	Rect	TreeView
Font	List	Scroll	
Form	ListView	Splitter	



EWC adds the following classes not supported by `QWc` :

Additional		
ApexChart	RibbonButton	RibbonGroup
Ribbon	RibbonButtonGroup	RibbonGroupItem



EWC User Guide

Classes

ApexChart

BitMap

Button

Circle

Combo

Edit

Ellipse

Font

Form

Grid

Group

Icon

Image

ImageList

Label

List

ListView

Menu

MenuBar

MenuItem

Grid

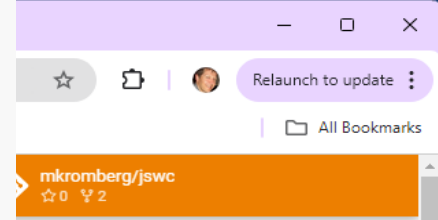
The EWC implementation of `QWc class Grid` has some degree of support for:

Properties			
Attach	ColTitleFCol	Input	TitleHeight
BCol	ColTitles	Posn	TitleWidth
CellFonts	CurCell	RowTitleBCol	VScroll
CellHeights	Event	RowTitleFCol	Values
CellTypes	FCol	RowTitles	Visible
CellWidths	FormatString	ShowInput	
ColTitleBCol	HScroll	Size	

Events		
CellChanged	CellMove	KeyPress

The EWC implementation of `class Grid` has some degree of support for:

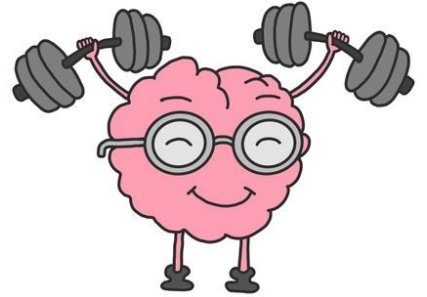
Properties			
Attach	ColTitleFCol	Input	TitleHeight
BCol	ColTitles	Posn	TitleWidth
CellFonts	CurCell	RowTitleBCol	VScroll
CellHeights	Event	RowTitleFCol	Values
CellTypes	FCol	RowTitles	Visible
CellWidths	FormatString	ShowInput	
ColTitleBCol	HScroll	Size	



Being added as applications need them.

Exercise 1 - Installation

- Clone the github repository
 - <https://github.com/dyalog/ewc>
- Or download and unzip the zip file from the repo (see next slide)



github.com/Dyalog/ewc

Apps Link JSWC APL Flying & Sailing Car Dyalog Cloud SBO Travel Linux Sport Productivity

Dyalog / EWC

<> Code Issues Pull requests Actions Projects Wiki Security

EWC Public Edit Pins Unwatch 7

main Go to file + <> Code

Local Codespaces

Clone ?

HTTPS SSH GitHub CLI

`https://github.com/Dyalog/EWC.git`

Clone using the web URL.

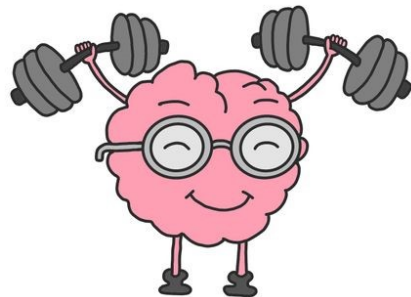
Open with GitHub Desktop

Download ZIP

Initial copy from mkromberg/jswc yesterday

mkromberg Correct link in Image

- EWC
- client
- demo
- docs
- .gitattributes
- .gitignore
- LICENSE



Exercise 1a - Installation

- Verify installation:

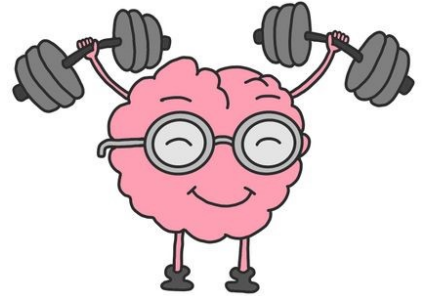
```
]link.create # /path/to/ewc
```

```
EWC.Version
```

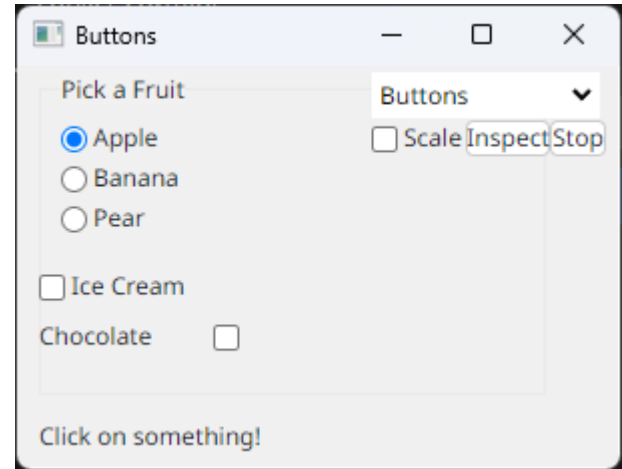
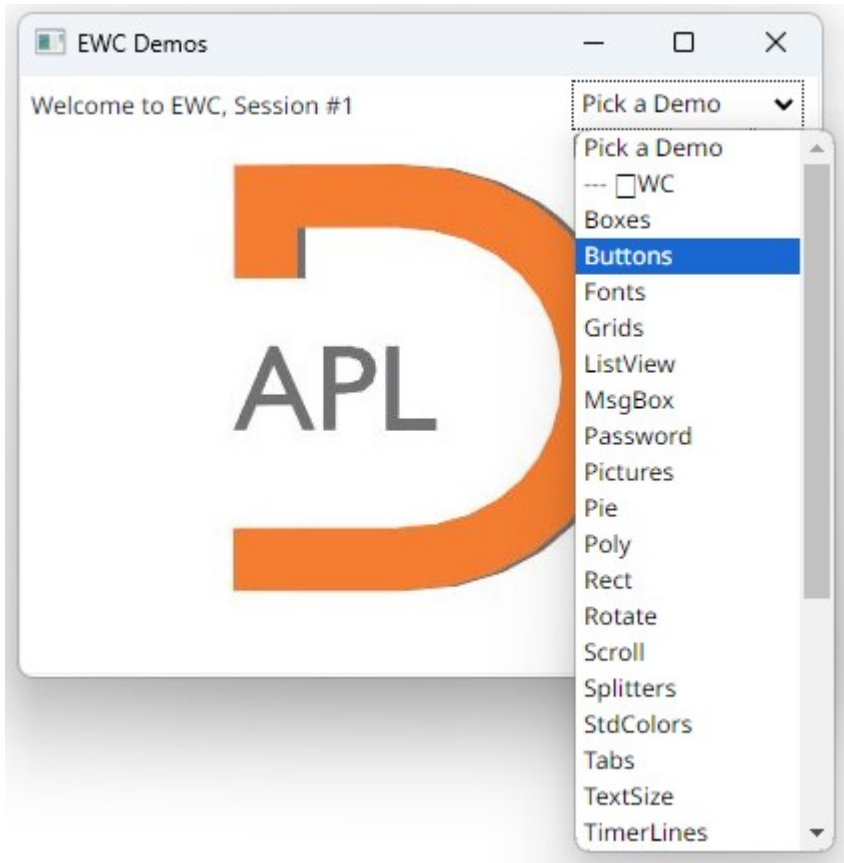
```
EWC Server: 0.1.1, Client: Unknown
```

```
demo.Run 'Desktop'
```

- NB: You *must* place EWC in the root (#.EWC)








```
Editor - [demo.DemoButtons in C:/devt/jswc/demo/DemoButtons.aplf]
File Edit Syntax Window Refactor View
Search...

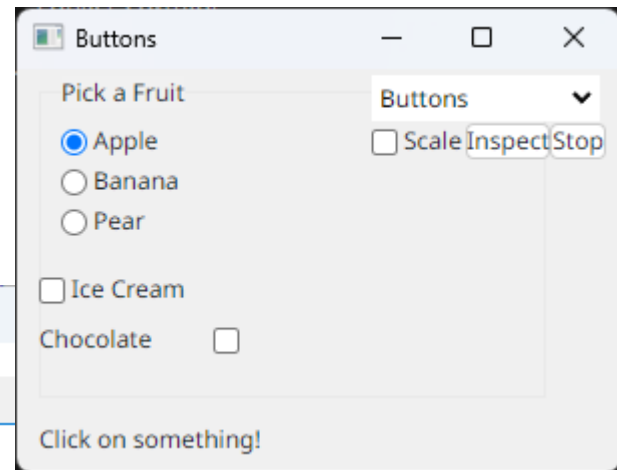
DemoButtons connected;F
EWC.CONNECTED+connected
PW+1000

F+'F1'
F eWC'Form' 'Buttons'(50 50)(200 300)('Coord' 'Pixel')

(F, '.FRUIT')eWC'Group' 'Pick a Fruit'('Posn'(10 10))('Size'(80 280))
(F, '.FRUIT.C1')eWC'Button' 'Apple'(13 10)(23 100)('Style' 'Radio')('Event' 'Select' 'CUpdateButtons')('State' 1)
(F, '.FRUIT.C2')eWC'Button' 'Banana'(33 10)(23 100)('Style' 'Radio')('Event' 'Select' 'CUpdateButtons')
(F, '.FRUIT.C3')eWC'Button' 'Pear'(53 10)(23 100)('Style' 'Radio')('Event' 'Select' 'CUpdateButtons')

(F, '.ICE')eWC'Button' 'Ice Cream'(100 10)(23 100)('Style' 'Check')('Event' 'Select' 'CUpdateButtons')('Align' 'Right')
(F, '.CHOKO')eWC'Button' 'Chocolate'(125 10)(23 100)('Style' 'Check')('Event' 'Select' 'CUpdateButtons')('Align' 'Left')

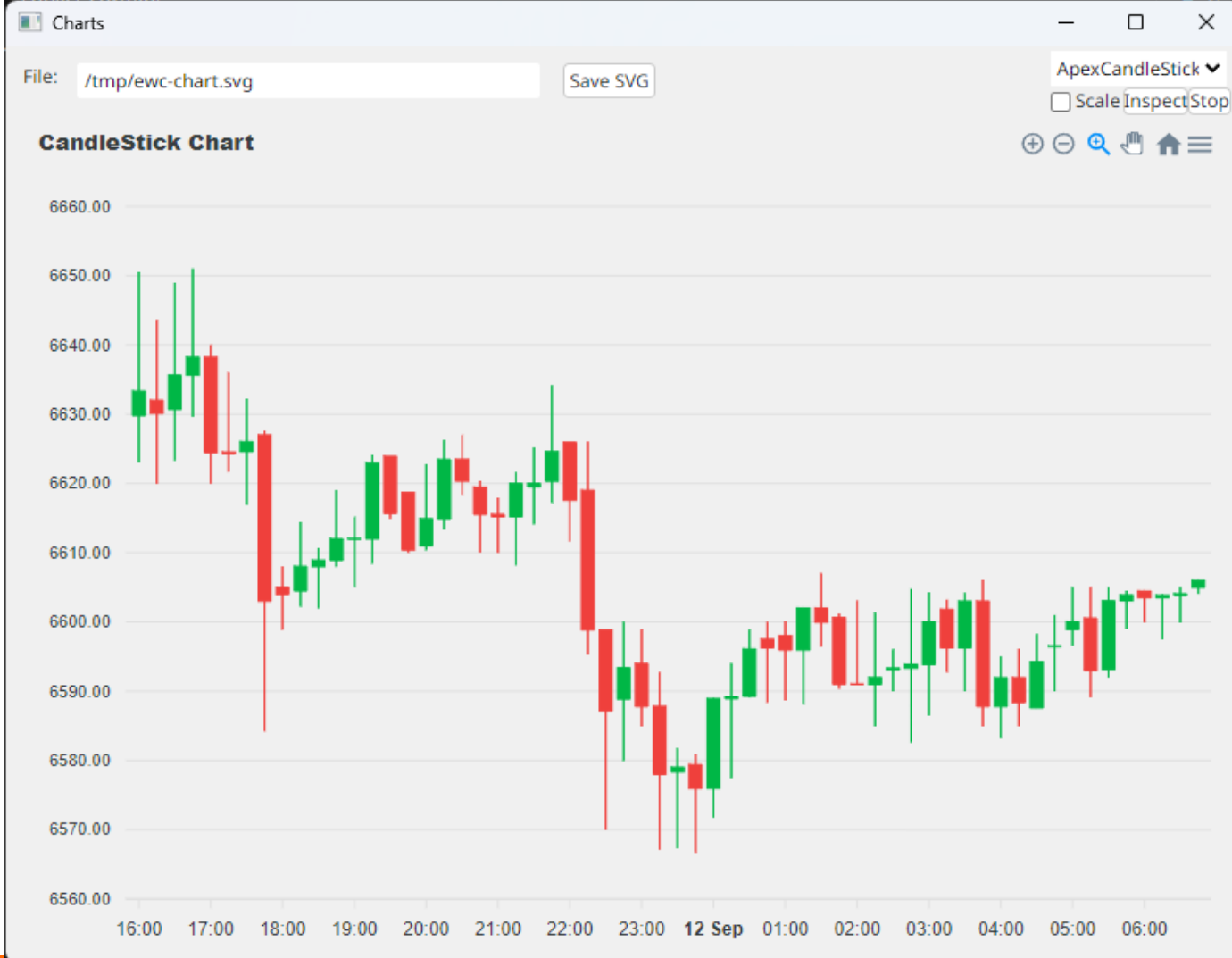
(F, '.STATUS')eWC'Label' 'Click on something!'(175 10)(23 300)
```



The Demo

🟠 Demos of Extensions

- Extras
- RibbonTabs
- Charts
- ApexCandleStick**
- ApexHorizontalBar
- ApexMovAvg
- ApexSineWave
- Flex
- FlexLogin



Exercise 1b – Find Documentation

- ◆ Navigate to <https://dyalog.github.io/EWC>
- ◆ Notice that when you click on the name of a property, it opens the □WC documentation.
- ◆ The EWC documentation describes differences between EWC and □WC

EWC User Guide

Overview

Introduction

Implementation

EWC versus □WC

Images

Getting Started

Installation

Initialising an EWC session

Configuration

Supported Features

Classes

ApexChart

BitMap

Button

Circle

Combo

Edit

Ellipse

Font

Form

Initialising an EWC session

Once you have a folder on your machine containing EWC, you can load it into a Dyalog APL session (18.2 or later is required):

```
]link.import # /path/to/ewc
```

Where `/path/to/ewc` is the name of the folder that you created during [installation](#).

EWC.Init

The function `EWC.Init` takes a right argument of the mode that you want to enable:

- 'Desktop' to run each form in an HTMLRenderer
- 'Browser' to allow a single session from a browser
- 'Multi' to allow multiple sessions from browsers (more about that later)

For example:

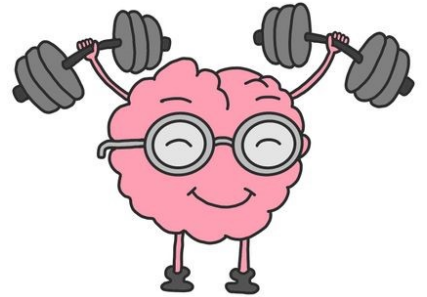
```
EWC.Init 'Desktop'
```

`EWC.Init` will also create cover-functions `ewc`, `ews` and so on, in the namespace from which `Init` was called. These are intended to be used as replacements for the system functions `□wc`, `□ws`, etc.

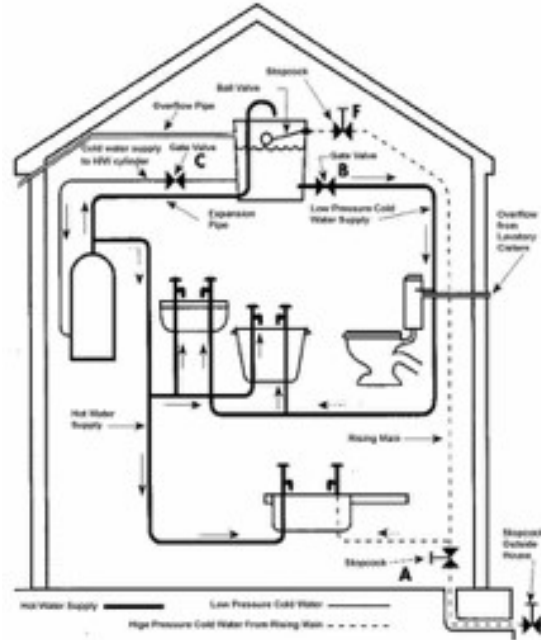
Exercise 2 – Hello World

- ◆ Create a new namespace for your application
- ◆ Write your own function which
- ◆ Calls `#.EWC.Init 'Desktop'`
- ◆ Creates a Form with a Button on it and a callback on Select
- ◆ NB: you want to experiment interactively rather than having your function call `eDQ`, you must set

```
EWC.NOIDQ←0  # Enable Interactive DQ
```

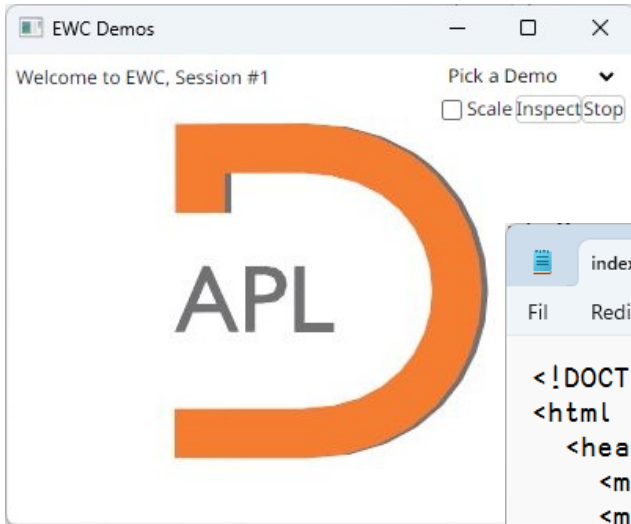


How does it work?



How Does it Work?

- Conga server is created listening on port 22322
- HTMLRenderer or Web Browser launched at <http://localhost:22322/index.html>

A screenshot of a web browser's developer tools showing the source code of the file "index.html". The code is HTML and includes a script tag for "index-a1c67c60.js" which is highlighted with a red box. The status bar at the bottom shows "Ln 11, Col 27 | 381 tegn", "30%", "Unix (LF)", and "UTF-8".

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <title>EWC</title>
    <script type="module" crossorigin src="/assets/index-a1c67c60.js"></script>
    <link rel="stylesheet" href="/assets/index-5981879a.css">
  </head>
  <body>
    <div id="root"></div>w
  </body>
</html>
```

```
index-ai1c6760.js
File Rediger Vis

((function(){const n=document.createElement("link").relList;if(n&&n.supports&&n.supports("modulepreload"))return;for(const g of document.querySelectorAll('link[rel="modulepreload"]'))o(g);new MutationObserver(g=>{for(const p of g){if(p.type==="childList")for(const C of p.addedNodes)C.tagName==="LINK"&&C.rel==="modulepreload"&&o(C)}.observe(document,{childList:!0,subtree:!0});function a(g){const p={};return g.integrity&&(p.integrity=g.integrity),g.referrerPolicy&&(p.referrerPolicy=g.referrerPolicy),g.crossOrigin==="use-credentials"?p.credentials="include":g.crossOrigin==="anonymous"?p.credentials="omit":p.credentials="same-origin",p}function o(g){if(g.ep)return;g.ep=!0;const p=a(g);fetch(g.href,p)}})( );var Ot=typeof globalThis<"u"?globalThis:typeof window<"u"?window:typeof global<"u"?global:typeof self<"u"?self:function A8(t){return t&&t.__esModule&&Object.prototype.hasOwnProperty.call(t,"default")}t.default=t;function Gr(t){if(t.__esModule)return t;var n=t.default;if(typeof n!="function"){var a=function o(){return this instanceof o?Reflect.construct(n,arguments,this.constructor):n.apply(this,arguments)};a.prototype=n.prototype}else a={};return Object.defineProperty(a, "__esModule", {value: !0}), Object.keys(t).forEach(function(o){var g=Object.getOwnPropertyDescriptor(t,o);Object.defineProperty(a,o,g.get?g:{enumerable:!0,get:function(){return t[o]}})}),a}var Il={exports:{}},jr={},Pl={exports:{}},_2={};/**
 * @license React
 * react.production.min.js
 *
 * Copyright (c) Facebook, Inc. and its affiliates.
 *
 * This source code is licensed under the MIT license found in the
 * LICENSE file in the root directory of this source tree.
 */var V8=Symbol.for("react.element"),jy=Symbol.for("react.portal"),Uy=Symbol.for("react.fragment"),
$y=Symbol.for("react.strict_mode"),Zy=Symbol.for("react.profiler"),Ky=Symbol.for("react.provider"),qy=Symbol.for("react.context"),Jy=Symbol.for("react.forward_ref"),Qy=Symbol.for("react.suspense"),tz=Symbol.for("react.memo"),ez=Symbol.for("react.lazy"),Ns=Symbol.iterator,function rz(t){return t===null||typeof t!="object"?null:(t=Ns&&t[Ns]||t["@@iterator"],typeof t=="function"?t:null)}var Dl={isMounted:function(){return!1},enqueueForceUpdate:function(){},enqueueReplaceState:function(){},enqueueSetState:function(){}},Nl=Object.assign,Ol={};function fe(t,n,a){this.props=t,this.context=n,this.refs=Ol,this.updater=a||Dl}fe.prototype.isReactComponent={};fe.prototype.setState=function(t,n){if(typeof t!="object"&&typeof t!="function"&&t!=null)throw Error("setState(...): takes an object of state variables to update or a function which returns an object of state variables.");this.updater.enqueueSetState(this,t,n,"setState");fe.prototype.forceUpdate=function(t){this.updater.enqueueForceUpdate(this,t,"forceUpdate");function RL(){RL.prototype=fe.prototype;function wa(t,n,a){this.props=t,this.context=n,this.refs=Ol,this.updater=a||Dl}var Ca=wa.prototype=new RL;Ca.constructor=wa;Nl(Ca,fe.prototype);Ca.isPureReactComponent=!0;var Os=Array.isArray,Tl=Object.prototype.hasOwnProperty,Sa={current:null},_l={key:!0,ref:!0,__self:!0,__source:!0};function Wl(t,n,a){var o,g={p:null,C:null;if(n!=null)for(o in n.ref!=void 0&&(C=n.ref),n.key!=void 0&&(p="+n.key"),n)Tl.call(n,o)&&_l.hasOwnProperty(o)&&(g[o]=n[o]);var S=arguments.length-2;if(S==1)g.children=a;else if(1<S){for(var H=Array(S),V=0;V<S;V++)H[V]=arguments[V+2];g.children=H}if(t&&t.defaultProps)for(o in S=t.defaultProps,S)g[o]==void 0&&(g[o]=S[o]);return{$$typeof:V8,type:t,key:p,ref:C,props:g,_owner:Sa.current}}function nz(t,n){return{$$typeof:V8,type:t,key:n,ref:t.ref,props:t.props,_owner:t._owner}}function Ma(t){return typeof t=="object"&&t!=null&&t.$$typeof===V8}function iz(t){var n={"":0,"":2};return n[""+t].replace(/[\s]/g,function(a){return n[a]});var Rs="/+/g;function V7(t,n){return typeof t=="object"&&t!=null&&t.key!=null?iz(""+t.key):n.toString(36)}function G5(t,n,a,o,g){var p=typeof t;(p=="undefined"||p=="boolean")&&(t=null);var C=!1;if(t===null)C=!0;else switch(p){case"string":case"number":C=!0;break;case"object":switch(t.$$typeof){case V8:case jy:C=!0;}if(C)return C=t,g(C),t,o===""?"+V7(C,0):o,Os(g)?(a="",t=null&&(a=t.replace(Rs,"$&/"+"/"),G5(g,n,a,"",function(V){return V})):g!=null&&(Ma(g)&&(g=nz(g,a+(!g.key||C&&C.key==g.key?"":(""+g.key).replace(Rs,"$&/"+"/")+t)),n.push(g)),1;if(C=0,o=o===""?"":o+":",Os(t))for(var S=0;S<t.length;S++){p=t[S];var H=o+V7(p,S),C=G5(p,n,a,H,g)}else if(H=rz(t),typeof H=="function")for(t=H.call(t),S=0;!(p=t.next()).done;)p=p.value,H=o+V7(p,S++),C=G5(p,n,a,H,g)}else if(p=="object")throw n=String(t),Error("Objects are not valid as a React child (found: "+(n=="[object Object]"?"object with keys {"+Object.keys(t).join(", ")+"}":n)+"). If you meant to render a collection of children, use an array instead.");return C}function w5(t,n,a){if(t==null)return t;var o=[],g=0;return G5(t,o,"",function(p){return n.call(a,p,g++)}),o}function az(t){if(t._status===-1){var n=t._result;n=n(n),n.then(function(a){(t._status===0||t._status===-1)&&(t._status===-1)&&(t._status=1,t._result=a)},function(a){(t._status===0||t._status===-1)&&(t._status=2,t._result=a)},t._status===-1&&(t._status=0,t._result=n)}if(t._status===1)return t._result.default;throw t._result}var u3={current:null},j5={transition:null},oz={ReactCurrentDispatcher:u3,ReactCurrentBatchConfig:j5,ReactCurrentOwner:Sa};_2.Children={map:w5,forEach:function(t,n,a){w5(t,function(){n.apply(this,arguments)},a)},count:function(t){var n=0;return w5(t,function(){n++}),n},toArray:function(t){return w5(t,function(n){return n})||[]},only:function(t){if(!Ma(t))throw Error("React.Children only expected to receive a single React element child.");return t}};_2.Fragment=Uy;_2.Profiler=Zy;_2.PureComponent=wa;_2.StrictMode=$y;_2.Suspense=Qy;_2.__SECRET_INTERNALS_DO_NOT_USE_OR_YOU_WILL_BE_FIRED=oz;_2.cloneElement=function(t,n,a){if(t==null)throw
```



```
(function(){const n=document.createElement("link").relList;if(n&&n.supports&&n.supports("modulepreload"))return;for(const g of document.querySelectorAll('link[rel="modulepreload"]'))o(g);new MutationObserver(g=>{for(const p of g){if(p.type==="childList")for(const C of p.addedNodes)C.tagName==="LINK"&&C.rel==="modulepreload"&&o(C)}.observe(document,{childList:!0,subtree:!0});function a(g){const p={};return g.integrity&&p.integrity=g.integrity,g.referrerPolicy&&(p.referrerPolicy=g.referrerPolicy),g.crossOrigin==="use-credentials"?p.credentials="include":g.crossOrigin==="anonymous"?p.credentials="omit":p.credentials="same-origin",p}function o(g){if(g.ep)return;g.ep=!0;const p=a(g);fetch(g.href,p)}})( );var Ot=typeof globalThis<"u"?globalThis:typeof window<"u"?window:typeof global<"u"?global:typeof self<"u"?self:{};function A8(t){return t&&t.__esModule&&Object.prototype.hasOwnProperty.call(t,"default")?t.default:t}function Gr(t){if(t.__esModule)return t;var n=t.default;if(typeof n==="function"){var a=function o(){return this instanceof o?Reflect.construct(n,arguments,this.constructor):n.apply(this,arguments)};a.prototype=n.prototype}else a={};return Object.defineProperty(a,"__esModule",{value:!0}),Object.keys(t).forEach(function(o){var g=Object.getOwnPropertyDescriptor(t,o);Object.defineProperty(a,o,g.get?g:{enumerable:!0,get:function(){return t[o]}})}),a}var Il={exports:{}},jr={},Pl={exports:{}},_2={};/**
```

A "React" application runs...

```
* @license React
* react.production.min.js
* Copyright (c) Facebook, Inc. and its affiliates.
* This source code is licensed under the MIT license found in the LICENSE file in the root directory of this source tree.
forward_ref"),Qy=Sym
?
ate:function()
takes an object of
e"));function RL(){
0,ref:!0,__self:!0,
.dren=H}
nz(t,n)
tion iz(t){var
null?
iz(""+t.key):n.toString(36)}function G5(t,n,a,o,g){var p=typeof t;(p==="undefined"||p==="boolean")&&(t=null);var C=!1;if(t===null)C=!0;else switch(p)
{case"string":case"number":C=!0;break;case"object":switch(t.$typeof){case V8:case jy:C=!0}if(C)return C===t,o===t?"":"+V7(C,0):o,Os(g)?(a="",t
=null&&(a=t.replace(Rs,"$&/")+"/"),G5(g,n,a,""),function(V){return V}):g:null&&(Ma(g)&&(g=nz(g,a+(
g.key|C&&C.key===g.key?"":(""+g.key).replace(Rs,"$&/")+"/")+t)),n.push(g)),1;if(C=0,o===t?"":":o+":",Os(t))for(var S=0;S<t.length;S++){p=t[S];var
H=+V7(p,S);C+=G5(p,n,a,H,g)}else if(H=rz(t),typeof H==="function")for(t=H.call(t),S=0;!(p=t.next()).done;)p=p.value,H=+V7(p,S++),C+=G5(p,n,a,H,g)}else if(p==="object")
throw n=String(t),Error("Objects are not valid as a React child (found: "+(n==="[Object Object]"?"object with keys {"+Object.keys(t).join(", ")+"}":n)+""). If you meant to
render a collection of children, use an array instead.");return C}function w5(t,n,a){if(t===null)return t;var o=[],g=0;return G5(t,o,"","",function(p){return
n.call(a,p,g+1)},o)function az(t){if(t._status===-1){var n=t._result;n=n(),n.then(function(a){(t._status===0||t._status===-1)&&(t._status=1,t._result=a)},function(a){(t
._status===0||t._status===-1)&&(t._status=2,t._result=a)}),t._status===-1&&(t._status=0,t._result=n)}if(t._status===1)return t._result.default;throw t._result}var u3
={current:null},j5={transition:null},oz={ReactCurrentDispatcher:u3,ReactCurrentBatchConfig:j5,ReactCurrentOwner:Sa};_2.Children={map:w5,forEach:function(t,n,a)
{w5(t,function(){}),o.apply(this,arguments)},a},count:function(t){var n=0;return w5(t,function(){}),n},toArray:function(t){return w5(t,function(n){return
n})||[]},only:function(t){if(!Ma(t))throw Error("React.Children.only expected to receive a single React element child.");return t};_2.Component=fe;_2.Fragment=Uy;_
2.Profiler=Zy;_2.PureComponent=wa;_2.StrictMode=$y;_2.Suspense=Zy;_2.__SECRET_INTERNALS_DO_NOT_USE_OR_YOU_WILL_BE_FIRED=oz;_2.cloneElement=function(t,n,a){if(t===null)throw
```

A WebSocket is Born

Log messages are timestamped mm.ss.ttt since session start. R=Receive, T=Transmit, C=Create

07:53.071 C: Session 1 created, socket 2, connected from [::1]:57082, key: LIZpDGotmvS+MjRF1uu//g==

JavaScript Client tells us something about it's environment:

07:53.077 R: #2: {"DeviceCapabilities":{"ViewPort":[301,401],"ScreenSize":[1440,2560],"DPR":1,"PPI":200}}

07:53.083 R: #2: {"Initialise":{"Version":"0.2.0","Name":"EWC Client","URL":"http://localhost:22322/"}}

APL Server says how it wants things (you can customise these):

07:53.127 T: {"Options":{"ID":"Mode","Properties":{"Desktop":1}}

07:53.134 T: {"Options":{"ID":"Locale","Properties":{"Decimal":".",

"LongDate":"D. MMMM YYYY","ShortDate":"DD-MM-YYYY","Thousand":","}}}

07:53.139 T: {"Options":{"ID":"Colors","Properties":{"Standard":[[-1,"Scrollbar",[200,200,200]],[-2,"Background",[0,0,0]],
[-3,"ActiveTitle",[153,180,209]],[-4,"InactiveTitle",[191,205,219]],blablabla,[-21,"ButtonHilight",[255,255,255]]]}}

07:53.190 T: {"Options":{"ID":"Fonts","Properties":{"Scale":1}}}

Typical Web Socket Traffic

```
'F1' eWC 'Form' 'Buttons' (50 50) (200 300) ('Coord' 'Pixel')
```

```
→ {"WC": {"ID": "F1",  
  "Properties": {"Caption": "Buttons", "Coord": "Pixel",  
  "Posn": [0,0], "Size": [200,300], "Type": "Form"}}}
```

```
'F1.STATUS' eWC 'Label' 'Click on something!' (175 10) (23 300)
```

```
→ {"WC": {"ID": "F1.STATUS",  
  "Properties": {"Caption": "Click on something!",  
  "Posn": [175,10], "Size": [23,300], "Type": "Label"}}}
```

(user selects Ice Cream)

```
← {"Event": {"EventName": "Select", "ID": "F1.ICE"}}
```

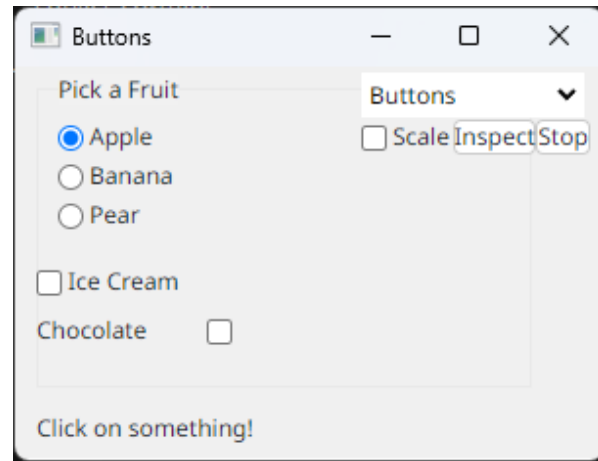
```
optstate←'F1.ICE' 'F1.CHOKO' eWG" <'State'
```

```
→ {"WG": {"ID": "F1.ICE", "Properties": ["State"], "WGID": "7"}}
```

```
← {"WG": {"ID": "F1.ICE", "Properties": {"State": 1}, "WGID": "7"}}
```

```
→ {"WG": {"ID": "F1.CHOKO", "Properties": ["State"], "WGID": "8"}}
```

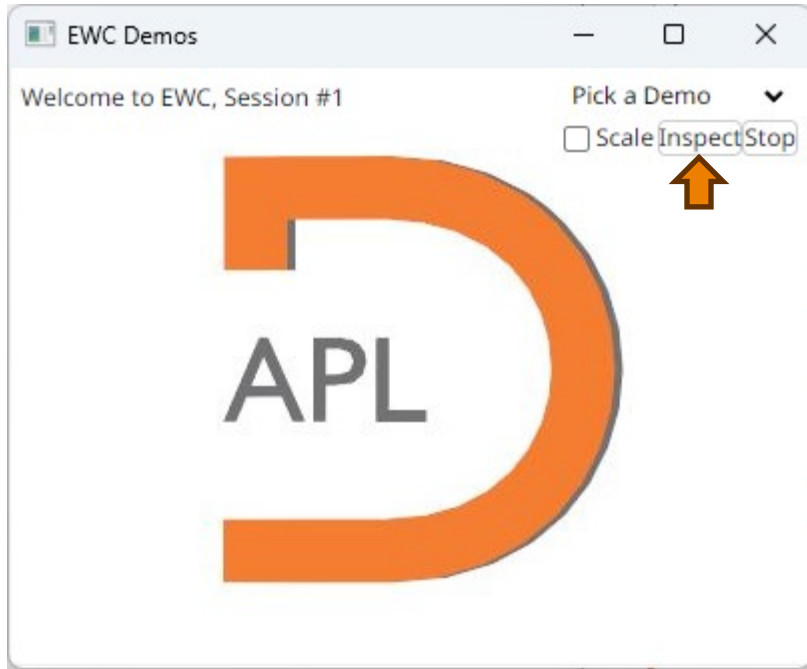
```
← {"WG": {"ID": "F1.CHOKO", "Properties": {"State": 0}, "WGID": "8"}}
```



⌘ Ask client for state of F1.ICE

⌘ State=1

For the really Curious



- Inspect what the React code has generated

For the really Curious



Inspect what the React code has generated



The screenshot shows the Chrome DevTools interface. The 'Elements' panel on the left displays the DOM tree with the following structure:

```
<!DOCTYPE html>
<html lang="en">
  <head>
  </head>
  <body style="overflow: hidden;">
    <div id="root">
      <div>
        <div id="F1" style="background: url('http://localhost:22322/images/dyalog-logo.jpg') center center no-repeat rgb(255, 255, 255); position: relative; border: 1px solid rgb(240, 240, 240); display: flex; justify-content: center; align-items: center; height: 300px; width: 400px; top: 0px; left: 0px;">
          <div id="F1.L1" style="position: absolute; height: 23px; width: 200px; top: 6px; left: 5px; font-size: 12px; text-decoration: none; display: block;">Welcome to EWC, Session #1</div>
          <div style="position: absolute; height: 23px; width: 114px; top: 0px; left: 276px; border-color: rgb(204, 204, 204); display: block;"></div>
          <div style="position: absolute; height: 18px; width: 35px; top: 26px; left: 276px; z-index: 1; display: block;">
            <div id="F1.STOP" style="position: absolute; height: 18px; width: 28px; top: 26px; left: 365px; border: 1px solid rgb(204, 204, 204); text-align: center; align-items: center; justify-content: center; background: white; border-radius: 4px; font-size: 12px; cursor: pointer; z-index: 1; display: flex;">Stop</div>
            <div id="F1.DEV" style="position: absolute; height: 18px; width: 42px; top: 26px; left: 323px; border: 1px solid rgb(204, 204, 204); text-align: center; align-items: center; justify-content: center; background: white; border-radius: 4px; font-size: 12px; cursor: pointer; z-index: 1; display: flex;">Inspect</div>
          </div>
        </div>
      </div>
    </body>
  </html>
```

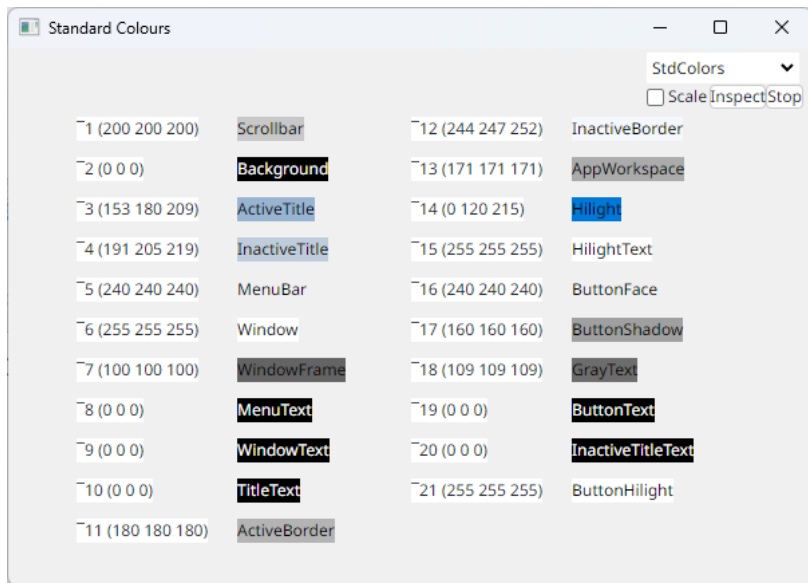
The 'Styles' panel on the right shows the styles for the selected 'Inspect' button:

```
element.style {
  background: url('http://localhost:22322/images/dyalog-logo.jpg') center center no-repeat rgb(255, 255, 255);
  position: relative;
  border: 1px solid rgb(240, 240, 240);
  display: flex;
  justify-content: center;
  align-items: center;
  height: 300px;
  width: 400px;
  top: 0px;
  left: 0px;
}
* {
  margin: 0;
  padding: 0;
  font-family: Noto Sans, Tahoma, Geneva, Verdana, sans-serif;
}
*, :after, :before {
  index-5981879a.css:9
```

Configuration

Changing the Colour Scheme

- This is a hack, need better method
- NB: EWC controls do not currently always use the correct colours

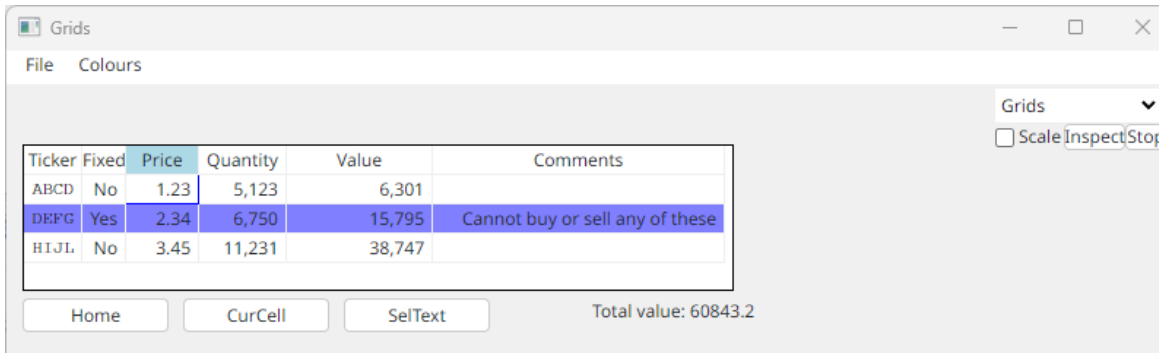


```
EWC.settings.Colors.Standard
-1 Scrollbar           200 200 200
-2 Background         0 0 0
-3 ActiveTitle        153 180 209
-4 InactiveTitle      191 205 219
-5 MenuBar            240 240 240
-6 Window             255 255 255
-7 WindowFrame        100 100 100
-8 MenuText           0 0 0
-9 WindowText         0 0 0
-10 TitleText          0 0 0
-11 ActiveBorder       180 180 180
-12 InactiveBorder     244 247 252
-13 AppWorkspace       171 171 171
-14 Highlight          0 120 215
-15 HighlightText     255 255 255
-16 ButtonFace         240 240 240
-17 ButtonShadow       160 160 160
-18 GrayText           109 109 109
-19 ButtonText         0 0 0
-20 InactiveTitleText 0 0 0
-21 ButtonHighlight    255 255 255
```

Changing Locale Settings

- Not terribly well tested
- But if it doesn't work, we will fix it 😊

```
JSON Compact 0-EWC.settings.Locale  
{  
  "Decimal": ".",  
  "LongDate": "D. MMMM YYYY",  
  "ShortDate": "DD-MM-YYYY",  
  "Thousand": ",",  
}
```



EWC User Guide

Overview

Introduction

Implementation

EWC versus WC

Images

Getting Started

Installation

Initialising an EWC session

Configuration

Supported Features

Classes

ApexChart

BitMap

Button

Circle

Combo

Edit

Ellipse

Font

Form

LOGMODES

This variable allows you to control the log messages that are output to the session while running EWC. At this stage in the development of EWC, all messages are output for diagnostic purposes. By default, all message types are output (`EWC.LOGMODES+A`). At the time that this text was written, the following modes existed:

- D: Debug
- E: Error
- F: Format Request
- W: Warning
- T: Transmit on WebSocket
- R: Receive on WebSocket
- C: Connect or Disconnect
- U: Unsupported feature
- N: Explicit NQ
- P: ProcessEvent
- G: WG processing

An up-to-date list can be found in the function `EWC.Log`.

Table of contents

[PORT](#)[FOLDER](#)[RESOURCES](#)[FONTMAP](#)[LOGMODES](#)[For Developers](#)[SHOWDEVTOOLS](#)[JSClientFolder](#)

EWC User Guide

Overview

Introduction

Implementation

EWC versus WC

Images

Getting Started

Installation

Initialising an EWC session

Configuration

Supported Features

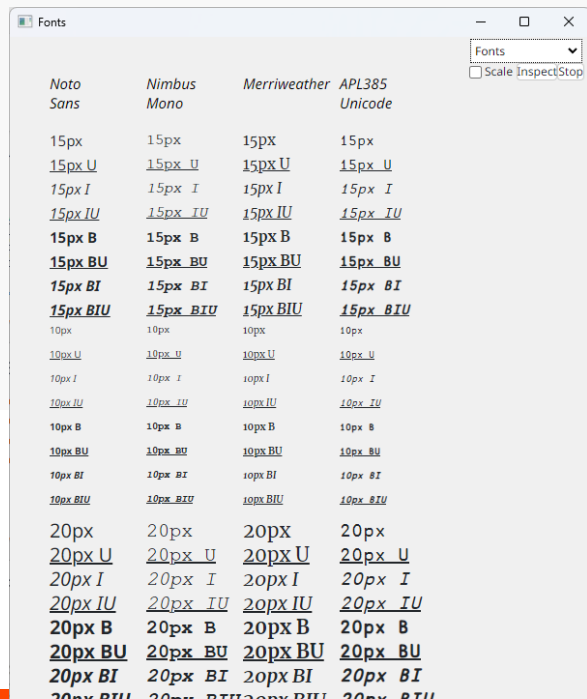
Classes

ApexChart

FONTMAP

EWC includes a number of free fonts. FONTMAP is a font substitution table, which can be used to map Windows font names used in existing applications to the free alternatives. If FONTMAP is not specified, FONTMAP is initialised from FontMap. At the time this text was written, FontMap was a 2-column matrix containing the following fonts:

Legacy Font	Free Font Substitute
Segoe UI	Merriweather
Times New Roman	Noto Sans
Courier New	Nimbus Mono



EWC User Guide

Overview

Introduction

Implementation

EWC versus WC

Images

Getting Started

Installation

Initialising an EWC session

Configuration

Supported Features

Classes

ApexChart

BitMap

Button

Circle

Combo

Edit

Ellipse

Font

Form

PORT

Sets the port number to be used by the server. Defaults to 22322.

FOLDER

If EWC was loaded using `Link.Create` on a machine with a file system watcher, EWC will be able to determine the folder that it was loaded from. In other situations, you need to set this variable so that EWC can locate the the demo application images, and the javascript client code.

For example:

```
EWC.FOLDER←'/git/ewc'
```

RESOURCES

Sets up virtual folders that contain images and other resources that your application might refer to. This is a 2-column matrix containing pairs of virtual folder names and real folders containing resource files. For example:

```
EWC.RESOURCES←1 2p'images' '/tmp/myapp/images'
```

This creates a virtual folder `/images/` that can be referred to when creating ImageLists and other objects created from image files.

You can define as many resources as you like, one per row.

Table of contents

PORT

FOLDER

RESOURCES

FONTMAP

LOGMODES

For Developers

SHOWDEVTOOLS

JSClientFolder

Images

- ◆ All images must reside on the server
- ◆ Adding hundreds or thousands of anonymous bitmap children to ImageList objects works fine on the desktop, but ...
- ◆ EWC ImageLists are simply a list of file names
 - ◆ This will require code changes
 - ◆ Hopefully only a few lines during startup
- ◆ More file types supported – anything a browser can render

Images

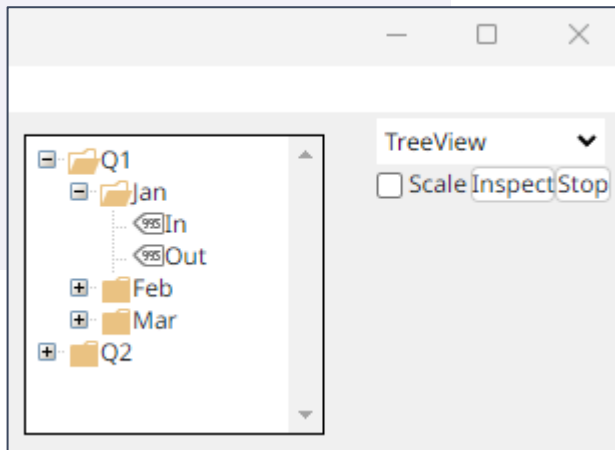
Common Image Formats

Here are the most common image file types, which are supported in all browsers (Chrome, Edge, Firefox, Safari, Opera):

Abbreviation	File Format	File Extension
APNG	Animated Portable Network Graphics	.apng
GIF	Graphics Interchange Format	.gif
ICO	Microsoft Icon	.ico, .cur
JPEG	Joint Photographic Expert Group image	.jpg, .jpeg, .jfif, .pjpeg, .jpp
PNG	Portable Network Graphics	.png
SVG	Scalable Vector Graphics	.svg

EWC ImageLists

```
DemoTreeView connected;...  
...  
...  
imagefiles+='/images/'o,'"Folder-Closed.png' 'Folder-Open.png' 'Price-Ticket.png'  
'IL' eWC 'ImageList'('Size'(16 16))('Masked' 2)('Files' imagefiles)  
...  
...  
'F1.Months' eWC 'TreeView' periods (10 500)(150 150)  
    ('Depth'(20p0,9p1 2 2))  
    ('ImageListObj' '#.IL')  
    ('ImageIndex' (imix+20p1,9p1 3 3)) ...
```



EWC User Guide

Overview

Introduction

Implementation

EWC versus `QWC`

Images

Getting Started

Installation

Initialising an EWC session

Configuration

Supported Features

Classes

ApexChart

BitMap

Button

Circle

Combo

Edit

Images

In EWC all images are defined using images files, which can be in any format supported by web browsers. You can not refer directly to image files on your local machine, the images must be served up by the web server which is embedded in EWC.

The location of your images must be declared by setting the variable `EWC.RESOURCES` before calling `EWC.Init`, for example:

```
EWC.RESOURCES += { 'images' : '/tmp/myapp/images' }
```

This creates a virtual folder `/images/` that can be referred to when using images.

The `ImageList` object has a new property `Files`, which contains a list of the file names that define the `ImageList`. It is not possible to populate an `ImageList` by creating child icons and bitmap objects, as in `QWC`.

The `File` property of an `Icon`, and the `Picture` property of a `Button`, `Form` and several other properties, are also affected by this.

See [Configuration](#) for more details.

```
Editor - [demo.DemoPictures]
File Edit Syntax Window Refactor View
Search...

DemoPictures connected;inputs;scores;TBL;GRID
EWC.CONNECTED+connected
PW+1000

'F1.eWC'Form>('BCol'(255 255 255))('Coord' 'F
'F1.L' eWC 'Label' 'Top Left' (27 37)

'LOGO'eWC'BitMap>('File' '/images/dyalog-logo.jpg')
'ICON'eWC'Icon>('File' '/images/dyalog-logo.ico')
'YES'eWC'BitMap>('File' '/images/yes.bmp')
'NO'eWC'BitMap>('File' '/images/no.bmp')
'UK'eWC'BitMap>('File' '/images/flags32/uk.png')
'DK'eWC'BitMap>('File' '/images/flags32/dk.png')

'F1.TILE' eWC 'SubForm'('Picture'('LOGO' 1))('Size'(250 500))('Posn'(0 400))
'F1.TILE.L' eWC 'Label' 'Tiled' (27 37)
'F1.SCALED' eWC 'SubForm'('Picture'('LOGO' 2))('Size'(250 400))('Posn'(250 0))
'F1.SCALED.L' eWC 'Label' 'Scaled' (27 56)
'F1.CENTER'eWC'SubForm'('Size'(250 500))('Posn'(250 400))
'F1.CENTER'eWS 'Picture'('LOGO' 3)
'F1.CENTER.L' eWC 'Label' 'Centered' (27 170)

'F1.YES'eWC'Button'('Picture' ('YES' 3))('Size'(40 40))('Posn'(10 250))
'F1.NO'eWC'Button'('Picture' 'NO')('Size'(40 40))('Posn'(50 250))
'F1.GRP'eWC'Group'('Picture' 'ICON')('Size'(55 55))('Posn'(100 250))
```

```
Editor - [demo.Run]
File Edit Syntax Window Refactor View
Search...

:If 0=#root+{>[]NPARTS ^14ω}>[]NPARTS 4>5179I=SI
:AndIf 0=#root+{6:;' EWC.FOLDER}0
'Please set EWC.FOLDER to point to the EWC installation folder' []SIGNAL 11
:EndIf

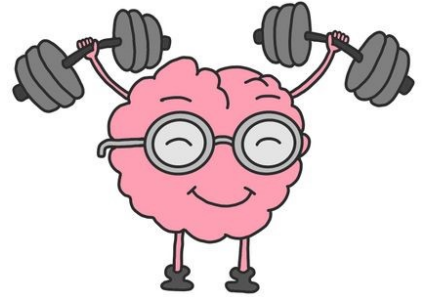
:If ~[]NEXISTS images+e1 []NPARTS root,'/demo/images'
('image folder "',images,'" not found') []SIGNAL 11
:EndIf

EWC.RESOURCES+1 2p'images' images

Function Pos: 21/67,0
```


Exercise 3 – Images

- ◆ Place an image in a folder
- ◆ Set `EWC.RESOURCES` to point to it **before** you call `EWC.Init`.
- ◆ Use `EWC.Stop` to shut down an existing server
- ◆ Add an object which uses your image
 - ◆ `ImageList BitMap Icon ...`
- ◆ Add something to the form which uses that
- ◆ Hint: See `DemoPictures` or `DemoTreeView`



Current Limitations / Differences

- Limited set of Classes & Props
- Coord Pixel only
- No direct assignment and reference to properties – everything must go through `WS` / `WG`
- No creation using `NEW`
- Close & Resize of `HTMLRenderer` not working under `eDQ`
- Images and `ImageLists` are handled differently (better!)
- Validation and Error Messages weaker / different
- `INQ` may not behave exactly as under Windows
- Callbacks returning new event codes is questionable
- `EWC` must be `#.EWC` and `eWC` is only instantiated in one place

Unsupported Features

- ◆ EWC tries to "ignore" use of missing features,
- ◆ Get something up and running and either modify your code or ask Dyalog to add support

- ◆ If you try to create an instance of an unsupported class

```
FOO[7] 'W0' eWC 'Widget' 'Hello World' ('Size' (300 400))  
40:32.702 W: *** Warning: at FOO[7] - WC W0 - unsupported class "widget"
```

- ◆ The following still creates a form, ignoring the unsupported feature:

```
FOO[7] 'F0' eWC 'Form' 'Hello World' ('Size' (300 400)) ('Dockable' 1)  
38:58.307 W: *** Warning: at FOO[7] - Unsupported on form: Dockable
```

Extensions

- Ribbon family of controls
- ApexCharts
- "Flex" instead of Posn + Size
- DIY Extensions (KendoUI)

EWC adds the following classes not supported by `jQuery`:

Additional

ApexChart

RibbonButton

RibbonGroup

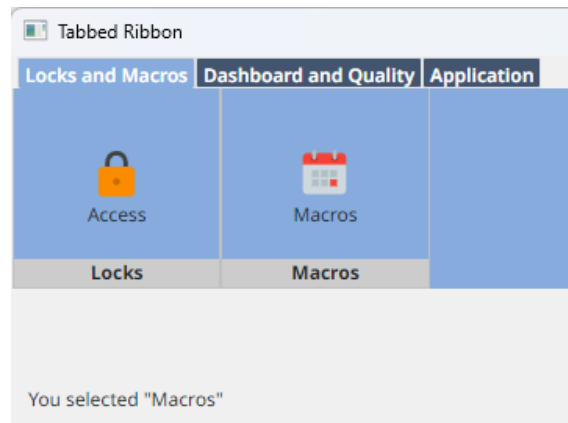
Ribbon

RibbonButtonGroup

RibbonGroupItem

Ribbons

DemoRibbonTabs



```
(tb+<'F1.TC.T1')eWC'TabButton'('Caption' 'Locks and Macros')('Event' 'Select' 'CBUpdateTabs')
(sf+<'F1.TC.SF1')eWC'SubForm'('TabObj'tb),=bcol
```

```
(rb+sf, '.Ribbon')eWC'Ribbon'fcol bcol titlebcol
```

```
(rb, '.Item1')eWC'RibbonGroup' 'Locks'('Size' 2)bordercol
```

```
(rb, '.Item1.GroupItem1')eWC'RibbonGroupItem' 12
```

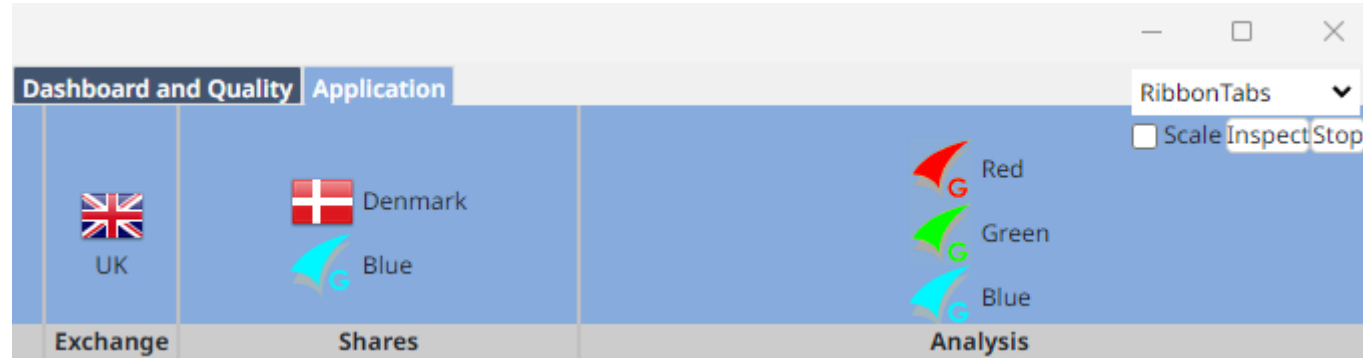
```
(rb, '.Item1.GroupItem1.LockButton')eWC'RibbonButton' 'Access' 'FcLock' 12 sel
```

```
(rb, '.Item2')eWC'RibbonGroup' 'Macros'('Size' 2)bordercol
```

```
(rb, '.Item2.GroupItem1')eWC'RibbonGroupItem' 12
```

```
(rb, '.Item2.GroupItem1.MacrosButton')eWC'RibbonButton' 'Macros' 'FcPlanner' 12 sel
```

Ribbons



```
(rb, '.Item3')eWC'RibbonGroup' 'Exchange'('Size' 1)bordercol
(rb, '.Item3.GroupItem1')eWC'RibbonGroupItem' 12
(rb, '.Item3.GroupItem1.StockExchangeButton')eWC'RibbonButton' 'UK'('Size' 12)sel('ImageListObj' 'IL32')('ImageIndex' 2)

(rb, '.Item4')eWC'RibbonGroup' 'Shares'('Size' 3)bordercol
(rb, '.Item4.GroupItem1')eWC'RibbonGroupItem' 12
(rb, '.Item4.GroupItem1.ButtonGroup1')eWC'RibbonButtonGroup'('Denmark' 'Blue')('ImageListObj' ('IL32' 'IL'))('ImageIndex'(1 3))sel

(rb, '.Item5')eWC'RibbonGroup' 'Analysis'('Size' 6)bordercol
(rb, '.Item5.GroupItem1')eWC'RibbonGroupItem' 12
(rb, '.Item5.GroupItem1.ButtonGroup1')eWC'RibbonButtonGroup'('Red' 'Green' 'Blue')('ImageIndex'(1 2 3))sel

eNQ'F1.TC.T1' 'Select'
```

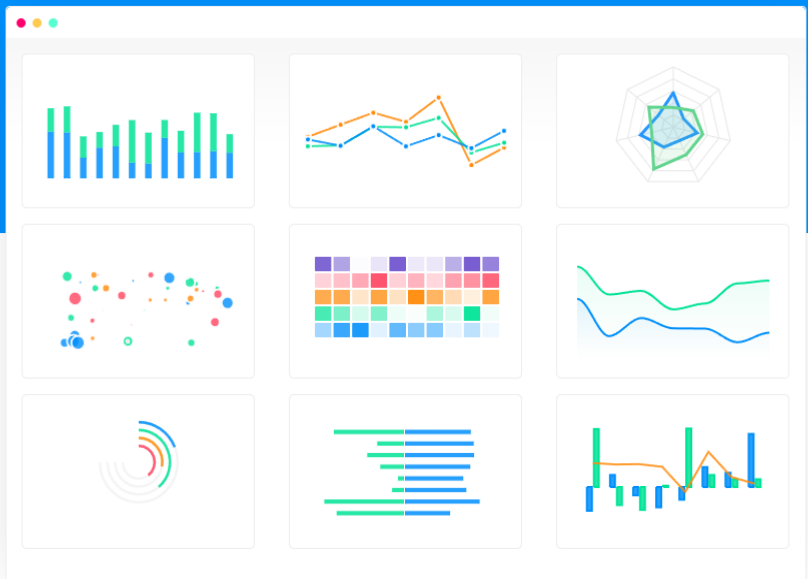


APEXCHARTS.JS

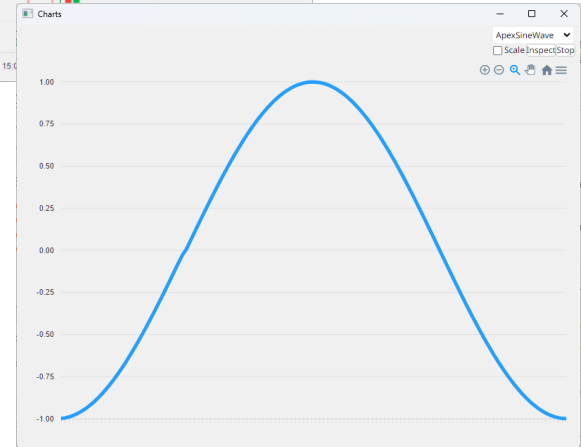
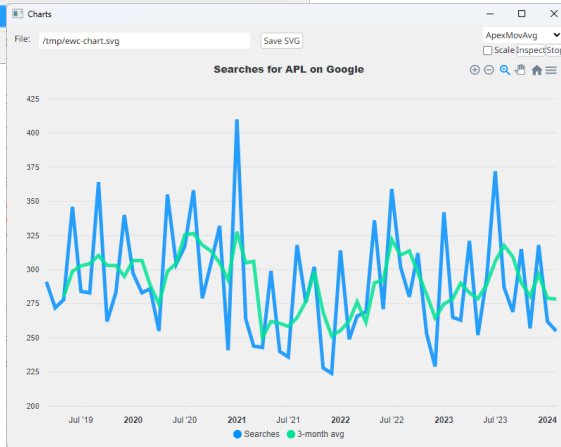
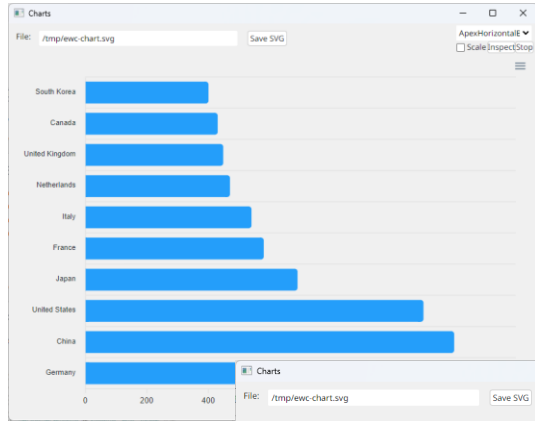
Modern & Interactive Open-source Charts

EXPLORE DEMOS

DOCS



ApexCharts – Four Demos




```

DemoApexMovAvg connected;window;months;data;smoothed;series;options
A Time series from https://github.com/yiyus/data-science-in-APL/blob/main/all.ipynb

window+3 A Moving average window size
months+~1 12 [DT 24~104,(2018+16)0.,112 A 2019-03 to 2024-02 in "Javascript data/time format"

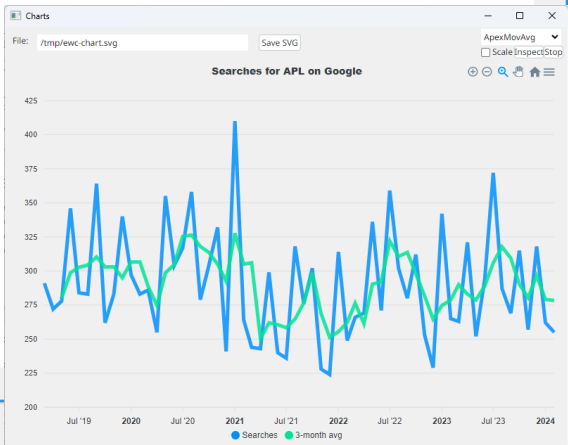
data+ 291 272 278 346 284 283 364 262 283 340 A 2019
data,+297 283 286 255 355 304 317 358 279 304 332 241 A 2020
data,+410 264 244 243 299 240 236 318 276 302 228 224 A 2021
data,+314 249 266 269 336 271 359 302 280 312 253 229 A 2022
data,+342 265 263 321 252 294 372 287 269 315 257 318 A 2023
data,+262 255 A 2024

smoothed+window÷window+/data A Compute the moving average

series+(data 'Searches' months) (smoothed '3-month avg' ((window-1)÷months))
A Triplets of (yvalues name xvalues)

options+ '{title: { text: "Searches for APL on Google", align: "center"},'
options,+ 'yaxis:{type:"numeric",stepSize:25, decimalsInFloat: 0},'
options,+ 'xaxis: { type: "datetime"},'
options,+ 'animations:{enabled: false}}'

'F1'eWC'Form' 'Charts'(50 50)(600 800)('Coord' 'Pixel')
addSaveChartButton 'F1.MOVAVG'
'F1.MOVAVG'eWC'ApexChart'(50 10)(540 780)('Series'series)('Options'options)
    
```



```
series+(data 'Searches' months) (smoothed '3-month avg' (((window-1)+months))
```

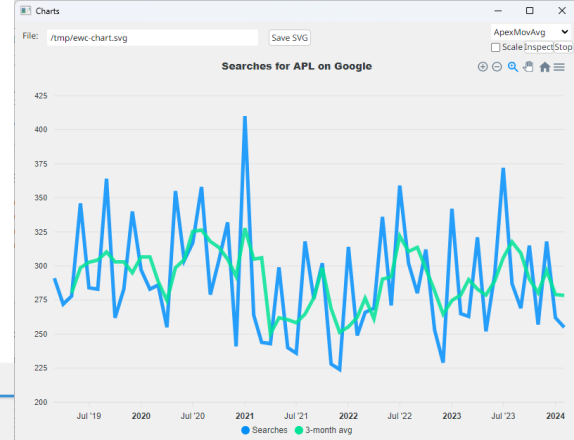
```
A Triplets of (yvalues name xvalues)
```

```
options+ '{title: { text: "Searches for APL on Google", align: "center"},'  
options,+ 'yaxis:{type:"numeric",stepSize:25, decimalsInFloat: 0},'  
options,+ 'xaxis: { type: "datetime"},'  
options,+ 'animations:{enabled: false}}'
```

```
'F1'eWC'Form' 'Charts'(50 50)(600 800)('Coord' 'Pixel')
```

```
addSaveChartButton 'F1.MOVAVG'
```

```
'F1.MOVAVG'eWC'ApexChart'(50 10)(540 780)('Series'series)('Options'options)
```



```
{"WC":{"ID":"F1.MOVAVG","Properties":  
{"Options":{"animations":{"enabled":false},"title":{"align":"center","text":"Searches for APL on Google"},  
"xaxis":{"type":"datetime"},"yaxis":{"decimalsInFloat":0,"stepSize":25,"type":"numeric"}},  
"Posn":[50,10],  
"Series":[{"data":[  
{"x":1551398400000,"y":291}, {"x":1554076800000,"y":272}, {"x":1556668800000,"y":278},  
{"x":1559347200000,"y":346}, {"x":1561939200000,"y":284}, {"x":1564617600000,"y":283},  
{"x":1567296000000,"y":364}, {"x":1569888000000,"y":262}, {"x":1572566400000,"y":283},  
...  
}]}}]}
```

ApexCharts

- ◆ This only took 1-2 days to set up(!)
- ◆ Options are passed straight through (JSON string or APL namespace)
- ◆ Series can be in several APL-friendly formats:

HorizontalBar

```
series+400 430 448 470 540 580 690 1100 1200 1380
```

CandleStick

```
cd+demodata.candledata  
time+1 12 □DT (1 □DT=4+□TS)++\0,(-1+≠cd)ρ÷96 A Every 15 minutes from last hour  
series+(≠cd) time A (Matrix of Open High Low Close values) (X values)
```

MovAvg

```
series+(data 'Searches' months) (smoothed '3-month avg' ((window-1)÷months))  
A Triplets of (yvalues name xvalues)
```

ApexCharts SVG Property

- The SVG property allows us to retrieve the SVG for the chart
- Use ApexCharts in an invisible HTMLRenderer to generate charts

```
    #svg←'F1.BAR' eWG 'SVG'  
29820
```

```
    4 80psvg  
<svg id="SvgjsSvg1006" width="780" height="540" xmlns="http://www.w3.org/2000/sv  
g" version="1.1" xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:svgjs="http://  
svgjs.dev" class="apexcharts-svg" xmlns:data="ApexChartsNS" transform="translate  
(0, 0)" style="background: transparent;"><foreignObject x="0" y="0" width="780"
```

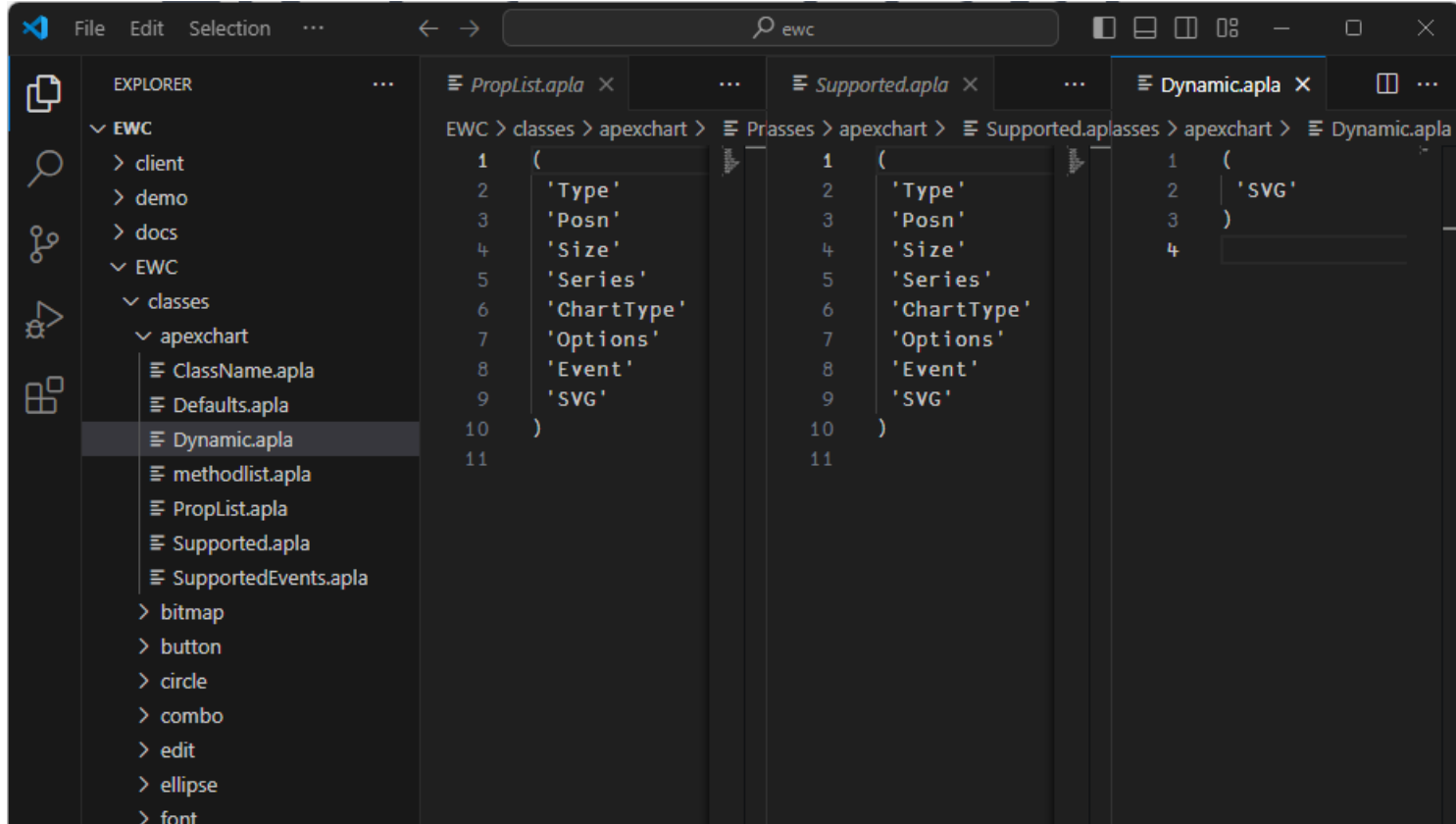


Extending EWC

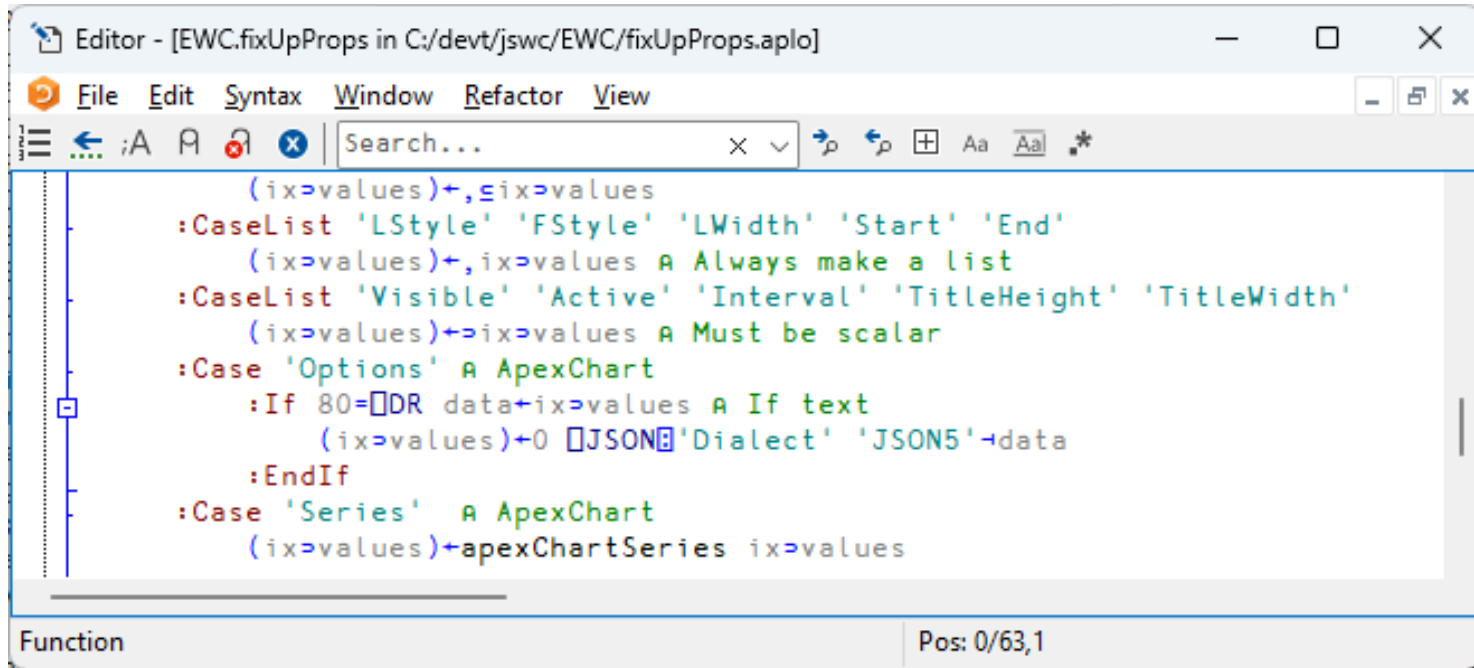
```
1 import ReactApexChart from 'react-apexcharts';
2 import { useAppData } from '../hooks';
3 import { setStyle } from '../utils';
4 import { useEffect, useRef } from 'react';
5
6 const Chart = ({ data }) => {
7   const { Options, Posn, Series, Size, ChartType, Event } = data?.Properties;
8
9   const { socket, handleData } = useAppData();
10  const styles = setStyle(data?.Properties);
11
12  const chartRef = useRef(null);
13
14  useEffect(() => {
15    if (chartRef.current) {
16      setTimeout(() => {
17        const chartInstance = chartRef.current.chart.paper();
18        const svg = chartInstance.svg();
19        if (svg) {
20          localStorage.setItem(data.ID, JSON.stringify(svg));
21          handleData(
22            {
23              ID: data?.ID,
24              Properties: {
25                SVG: svg,
26              },
27            },
28            'WS'
29          );
30        }
31      }, 500);
32    }
33  }, [chartRef.current]);
34
35
```

```
35
36 const sendEvent = (event, chartConfig) => {
37   const obj = {
38     dataPointIndex: chartConfig?.dataPointIndex,
39     seriesIndex: chartConfig?.seriesIndex,
40     series: chartConfig?.config?.series,
41     xaxis: chartConfig?.config?.xaxis,
42     yaxis: chartConfig?.config?.yaxis,
43   };
44
45   const Event = JSON.stringify({
46     Event: {
47       ID: data?.ID,
48       EventName: event,
49       Info: [JSON.stringify(obj)],
50     },
51   });
52   socket.send(Event);
53 };
54
55 const options = {
56   ...Options,
57   chart: {
58     events: {
59       ...(Event?.some(item => item[0] === 'click') && {
60         click: (chartConfig) =>
61           sendEvent('click', chartConfig),
62       }),
63       ...(Event?.some(item => item[0] === 'legendclick') && {
64         legendClick: (chartConfig) =>
65           sendEvent('legendclick', chartConfig),
66       }),
67     },
68   },
69 };
70
71 return (
72   <div style={{ position: 'absolute', top: Posn && Posn[0], left: Posn && Posn[1], ...styles }}>
73     <ReactApexChart
74       ref={chartRef}
75       options={options}
76       width={Size && Size[1]}
77       height={Size && Size[0]}
78       type={ChartType}
79       series={Series}
80     />
81   </div>
82 );
83
84
85 export default Chart;
```

Add Metadata for new Class



+ Optional Property Handler

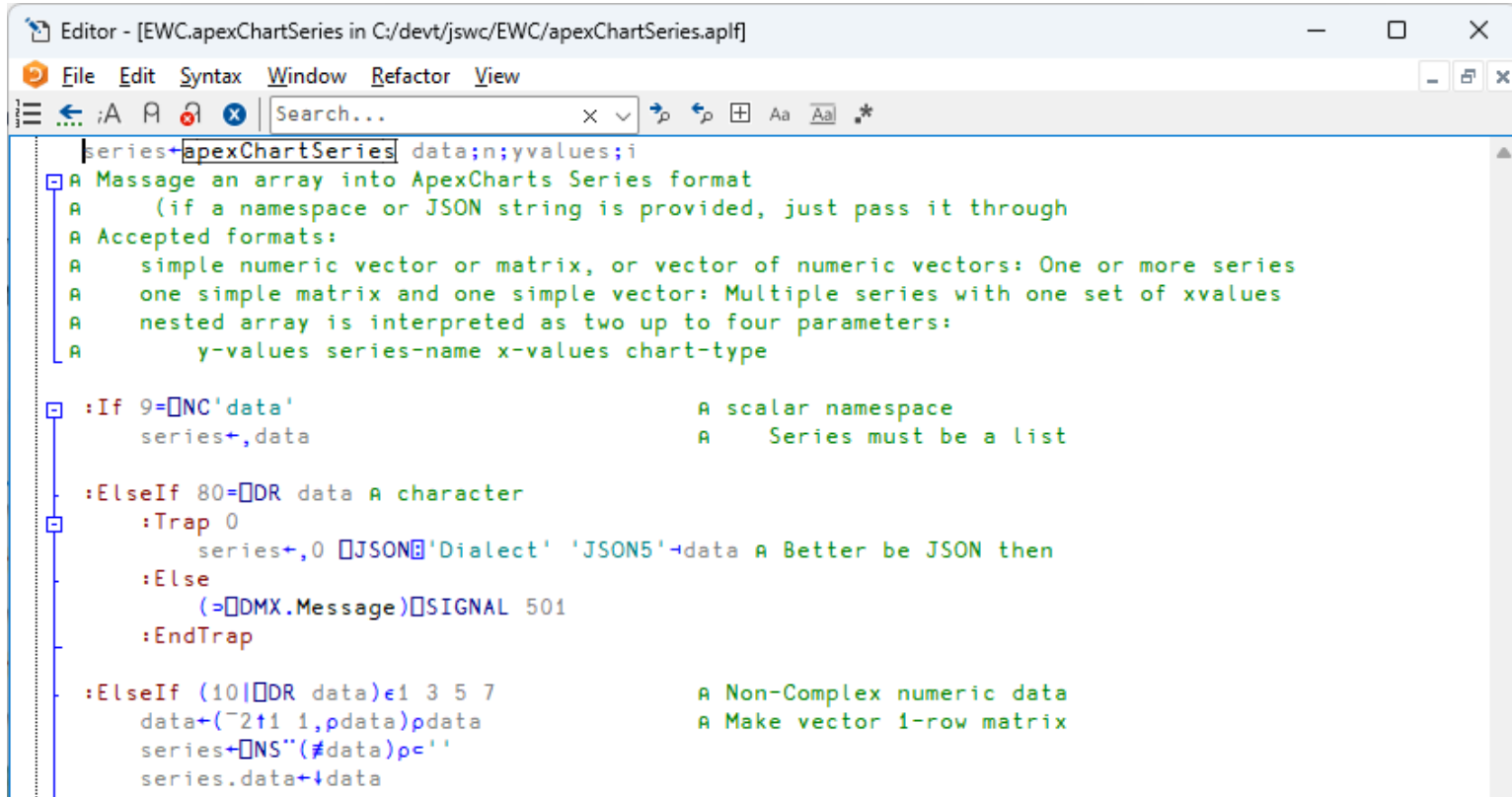


The screenshot shows an IDE window titled "Editor - [EWC.fixUpProps in C:/devt/jswc/EWC/fixUpProps.aplo]". The code is written in Apex and defines several property handlers for an ApexChart. The handlers are:

- `(ix>values)+,ix>values`: A CaseList handler for properties 'LStyle', 'FStyle', 'LWidth', 'Start', and 'End'. The comment is "Always make a list".
- `(ix>values)+,ix>values A Always make a list`: A CaseList handler for properties 'Visible', 'Active', 'Interval', 'TitleHeight', and 'TitleWidth'. The comment is "Must be scalar".
- `(ix>values)+=>ix>values A Must be scalar`: A Case handler for the property 'Options', which is an ApexChart. It contains an `:If` block for `80=DR data+ix>values A If text`, which sets the `Dialect` property to `JSON5` if the data is text. The `:EndIf` block ends the `:Case` block.
- `(ix>values)+apexChartSeries ix>values`: A Case handler for the property 'Series', which is an ApexChart. It sets the `apexChartSeries` property to the value of `ix>values`.

The status bar at the bottom of the IDE window shows "Function" and "Pos: 0/63,1".

+ Optional Property Handler



```
Editor - [EWC.apexChartSeries in C:/devt/jswc/EWC/apexChartSeries.aplf]
File Edit Syntax Window Refactor View
;A P X Search...
series+apexChartSeries data;n;yvalues;i
A Message an array into ApexCharts Series format
A (if a namespace or JSON string is provided, just pass it through
A Accepted formats:
A simple numeric vector or matrix, or vector of numeric vectors: One or more series
A one simple matrix and one simple vector: Multiple series with one set of xvalues
A nested array is interpreted as two up to four parameters:
A y-values series-name x-values chart-type

:If 9=NC'data' A scalar namespace
series+,data A Series must be a list

:ElseIf 80=DR data A character
:Trap 0
series+,0 JSON'Dialect' 'JSON5'->data A Better be JSON then
:Else
(=DMX.Message)SIGNAL 501
:EndTrap

:ElseIf (10|DR data)e1 3 5 7 A Non-Complex numeric data
data+(-2+1 1,pdata)pdata A Make vector 1-row matrix
series+NS"(#data)p='
series.data+data
```


+ Optional Property Handler

```
:ElseIf (1<.#=="data")^(10|DRεdata)ε1 3 5 7 A Vector of numeric arrays
  :If (2=pdata)^(2 1≠#p"data) A Matrix and vector?
    series+[]NS''
    series.data+[]NS''(#2>data)p<'
    series.data.x+2>data
    series.data.y+↓&>data

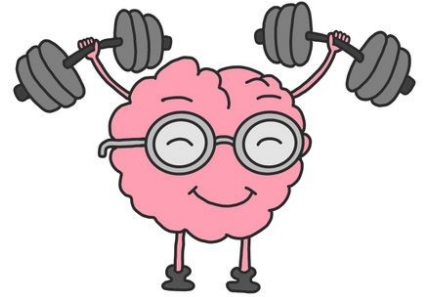
  :Else A Vector of vectors
    series+[]NS''(#data)p<'
    series.data+data
  :EndIf
series+,series

:ElseIf (1<.#=="yvalues")^(10|DRεyvalues+>"data)ε1 3 5 7 A 1st element of each vector is numeric
n+>"data
series+[]NS''(#data)p<'
series.data+{[]NS''(#w)p<'}"yvalues A One namespace per data point
series.data.y+yvalues
:If 0<#i+↓n≥2 A Got name?
  series[i].name+2>"data[i]
:AndIf 0<#i+↓n≥3 A Got x values?
  series[i].data.x+3>"data[i]
:AndIf 0<#i+↓n≥4 A Got chart type
  series[i].type+4>"data[i]
:EndIf

:ElseIf
  'Invalid series format'[]SIGNAL 501
:EndIf
```

Exercise 4 – ApexCharts

- Browse the ApexChart demos
- Add a Line chart to your application
- More than one line, with a legend?



<https://apexcharts.com/javascript-chart-demos/>

JAVASCRIPT CHART DEMOS

Explore the sample JavaScript charts created to show some of the enticing features packed in ApexCharts.
All examples here are included with source code to save your development time.

JS Angular Vue React

LINE AREA COLUMN

BAR MIXED RANGE AREA

Flex – Instead of Posn & Size

- ◆ Still VERY experimental – Feedback Please!
- ◆ The Flex property can be set on containers
 - ◆ 'Flex' 'fill'
Form should fill the available space (Forms only)
 - ◆ 'Flex' 'row'
Stack controls horizontally (Any container object)
 - ◆ 'Flex' 'column'
No comment
- ◆ By default, 'fill' sets column orientation
- ◆ CSS property allows you to add additional CSS styling

Understanding CSS Flexbox 1 2 3

CSS Flexbox is a powerful layout tool that provides a more efficient way to lay out, align, and distribute space among items in a container, even when their size is unknown or dynamic. Flexbox gives the container the ability to alter its items' width/height (and order) to best fill the available space (mostly to accommodate to all kind of display devices and screen sizes). A flex container expands items to fill available free space or shrinks them to prevent overflow.

Flex Container Properties

The parent element becomes a flex container when you apply `display: flex` or `display: inline-flex` to it. This activates the flex context for all its direct children, which are called flex items. Here are some key properties for the flex container:

CSS Flexbox is a powerful layout tool that provides a more efficient way to lay out, align, and distribute space among items in a container, even when their size is unknown or dynamic. Flexbox gives the container the ability to alter its items' width/height (and order) to best fill the available space (mostly to accommodate to all kind of display devices and screen sizes). A flex container expands items to fill available free space or shrinks them to prevent overflow.

Flex Container Properties

The parent element becomes a flex container when you apply `display: flex` or `display: inline-flex` to it. This activates the flex context for all its direct children, which are called flex items. Here are some key properties for the flex container:

- **flex-direction:** This establishes the main axis and dictates the direction in which flex items are placed in the flex container. It can be `row`, `row-reverse`, `column`, or `column-reverse`.
- **flex-wrap:** It controls whether the flex items should wrap or not when there isn't enough room for them on one line. The values can be `nowrap`, `wrap`, or `wrap-reverse`.
- **justify-content:** This defines the alignment along the main axis and helps distribute extra space left over when all flex items on a line are inflexible. It can take values like `flex-start`, `flex-end`, `center`, `space-between`, `space-around`, and `space-evenly`.
- **align-items:** It defines the default behavior for how flex items are laid out along the cross axis on the current line. Possible values include `stretch`, `flex-start`, `flex-end`, `center`, `baseline`, and `first baseline`.
- **align-content:** This aligns a flex container's lines within the flex container when there is extra space on the cross-axis. This property has an effect only on multi-line flexible containers (where `flex-wrap` is set to `wrap` or `wrap-reverse`).

Not Yet Supported

Flex Item Properties

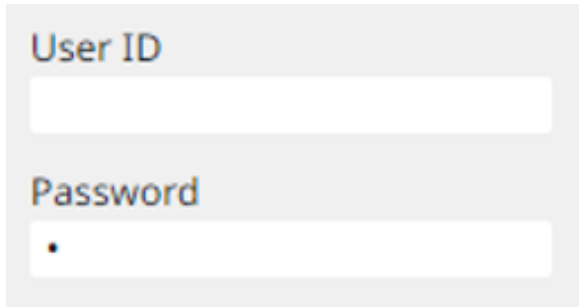
Flex items are direct children of the flex container and they can have their own set of properties:

- **order**: It controls the order in which they appear in the flex container.
- **flex-grow**: It defines the ability for a flex item to grow if necessary.
- **flex-shrink**: It defines the ability for a flex item to shrink if necessary.
- **flex-basis**: This defines the default size of an element before the remaining space is distributed.
- **flex**: This is the shorthand for `flex-grow`, `flex-shrink`, and `flex-basis` combined.
- **align-self**: This allows the default alignment to be overridden for individual flex items.

SubForm = "StackPanel"

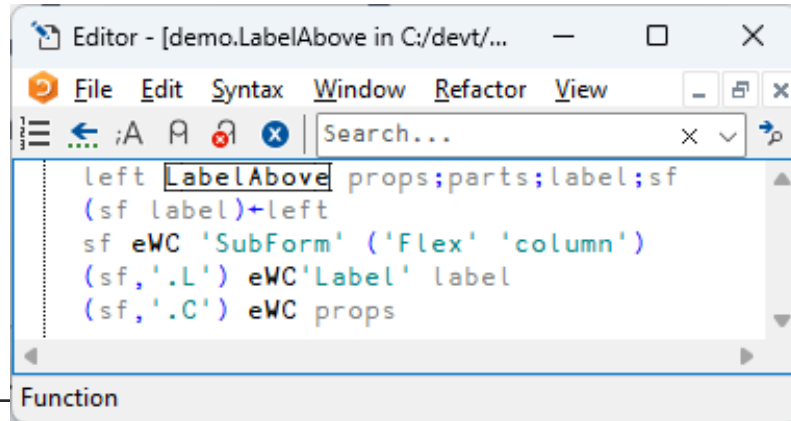
- ◆ A Subform with Flex becomes a "StackPanel"

```
'F1.INPUT.CREDS' eWC 'SubForm' ('Flex' 'column')  
'F1.INPUT.CREDS.USERID' 'User ID' LabelAbove 'Edit' ''  
'F1.INPUT.CREDS.PWD' 'Password' LabelAbove 'Edit' '' ('Password' '*')
```



User ID

Password



```
left LabelAbove props;parts;label;sf  
(sf label)+left  
sf eWC 'SubForm' ('Flex' 'column')  
(sf, '.L') eWC 'Label' label  
(sf, '.C') eWC props
```

FlexLogin

Editor - [demo.DemoFlexLogin in C:/devt/jswc/demo/DemoFlexLogin.aplf]

File Edit Syntax Window Refactor View

Search...

```
Demoflexlogin connected;formsize;rows;menucss;purple

formsize+350 300

USERID+' ' A Global state

rows+'flex-direction: row, flex-wrap: wrap, justify-content: space-between, gap: 5px, align-items: end

'F1.eWC'Form' 'Please Login'(50 50)formsize('Coord' 'Pixel')('Flex' 'fill')('CSS' rows)

'F1.INPUT'eWC'SubForm'('Size'(100,14formsize))('Border' 1)('Flex' 'row')

'F1.INPUT.CREDS' eWC 'SubForm' ('Flex' 'column') A Credentials box - UserID above
'F1.INPUT.CREDS.USERID' 'User ID' LabelAbove 'Edit' ''
'F1.INPUT.CREDS.PWD' 'Password' LabelAbove 'Edit' '' ('Password' '*')

purple+193 153 190
menucss+'padding: 5px, gap: 5px'
'F1.INPUT.DEMO' eWC 'SubForm' ('Flex' 'column')('BCol' purple) ('CSS' menucss) A Make container for Demo Menu

'F1.INPUT.DATA' 'Data' LabelAbove 'Edit' (¶?12p100) ('Size' (23 200))

'F1.INPUT.BTNS' eWC 'SubForm' ('Flex' 'column') A Buttons also together
'F1.INPUT.BTNS.LOGIN' eWC 'Button' 'Login' ('Size'(23 80))('Event' 'Select' 'CBLogin')
'F1.INPUT.BTNS.CHART' eWC 'Button' 'Chart' ('Size'(23 80))('Event' 'Select' 'CBLogin')
```

Function Last saved by: mkrom: 10-09-2024 Pos: 0/25,1

Please Login

User ID

Password

FlexLogin

Scale

Stop

Inspect

Data

1 16 23 44 75 26 36 56 10 80 5 58

Login

Chart

Hello morten

User ID
morten

Password
.....

FlexLogin Scale
Stop
Inspect

Data
73 13 49 80 70 34 64 51 23 89 22 2:

Login
Chart

Index	Value
1	73
2	13
3	49
4	80
5	70
7	34
8	64
9	51
10	23
10	89
11	22
12	23

Hello morten

User ID
morten

Password
.....

FlexLogin Scale
Stop
Inspect

Data
73 13 49 80 70 34 64 51 23 89 22 2:

Login
Chart

Index	Value
1	73
2	13
3	49
4	80
5	70
7	34
8	64
9	51
10	23
10	89
11	22
12	23

Hello morten

User ID
morten

Password
.....

FlexLogin Scale
Stop
Inspect

Data
73 13 49 80 70 34 64 51 23 89 22 2:

Login
Chart

Index	Value
1	73
2	13
3	49
4	80
5	70
7	34
8	64
9	51
10	23
10	89
11	22
12	23

SP3 – Migrating

Exercise ?

- ◆ No Flex Exercise
- ◆ Design still subject to change
- ◆ We can play with this at the end if we have time

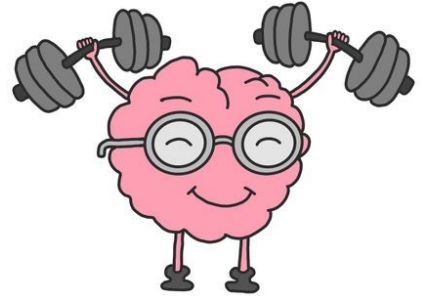
Browser Mode

- ◆ Intended for single-user web applications and testing
- ◆ In **Desktop** mode, each Form or modal object like a MsgBox appears in a separate HTMLRenderer window
- ◆ In **Browser** mode (after `EWC.Init 'Browser'`)
 - ◆ You connect a browser and the UI appears in it
 - ◆ You can currently only have one Form at a time
 - ◆ You can still pop up modal objects like MsgBox

Exercise 5 – Browser mode

- Try `demo.Run 'Browser'`
- Connect a browser and run some demos, notice how everything looks (kind of) the same
- Stop the demo
- Now run `EWC.Init 'Browser'` and reconnect the browser
- Note that nothing happens (but you should see log messages)
- Try some interactive uses of `eWC`, for example

```
'F1' eWC 'Form' 'Hello Browser' (10 10)(300 499)('Bcol' (193 153 190))
```



Multi Mode

Intended for multi-user applications.

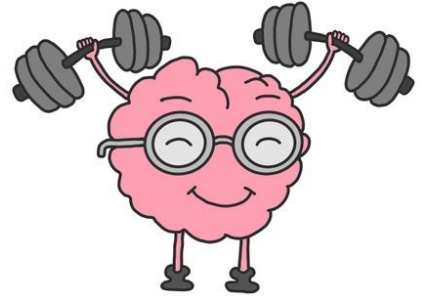
```
EWC.Init 'Multi'
```

- Must be called from a namespace which contains a function names `Initialise`
- Initialise MUST create and `eDQ` a Form (and `demo.Run` will do this)
- This namespace will be cloned for each new Browser connection, and `Initialise` will be called on a new thread
- Notice each user is suspended in `ΔDQ` in a namespace named `demo_n`.

```
demo.Run 'Multi'  
(lots of output as two sessions connect)  
  
    )si  
    . #.EWC.ΔDQ[42]  
    . #.demo_1.Initialise[13]  
    &5  
    . #.EWC.ΔDQ[42]  
    . #.demo_2.Initialise[13]  
    &6  
    [#.EWC.[LIB]] #.EWC.Conga.LIB.Wait[8]  
    [#.EWC.[wss]] #.EWC.wss.Listen[2]  
    #.EWC.wss.Start[14]  
&4
```

Exercise 6 – Multi mode

- Write a function called `Initialise` which creates and eDQ's a form which displays (☞ THIS)
- Run `EWC.Init 'Multi'`
 - Connect two browsers at the same time
- Experiment with using `)TID` to switch into the two threads and inspect the contents, and perhaps modify your form using `eWS`.

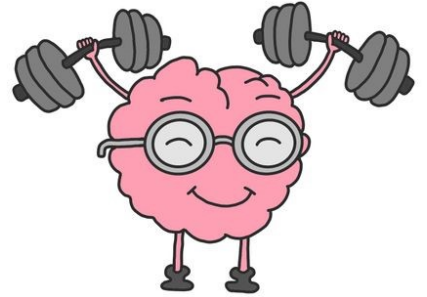


QUERY and HDRS

- ◆ When your application namespace is duplicated, a namespace called `_EWC` is injected
- ◆ It contains (amongst other things)
 - ◆ URL: the URL that the browser navigated to
 - ◆ QUERY: A 2-column matrix of query parameter names and values
 - ◆ HDRS: A 2-column matrix of header names and values
- ◆ You can use HDRS for authentication and QUERY to drive the initial behaviour of the application
- ◆ For example, the demo application supports e.g. `http://localhost:22322?Demo=Buttons`

Exercise 7 – QUERY

- Modify your Initialise function to create a grid with content decided by `_EWC.QUERY`
- Launch two browser sessions with different queries and verify the behaviours
- Also inspect the contents of `_EWC.HDRS` (and the rest of `_EWC`)



Selenium Testing

- ◆ Selenium is a framework for testing HTML-based applications
- ◆ Michael Baas has been experimenting with testing first MiServer/DUI and now EWC
- ◆ The same names used to create objects (e.g. ' F1 . BTN1 ') can be found in the HTML "DOM"
- ◆ It is "straightforward" to have automated testing of EWC frontends
- ◆ Next Year, perhaps a workshop on Selenium?



Selenium Testing

The image shows a Selenium IDE debugger window with the following code:

```
00 r--TestButtons sink;[]TRAP;fruit;addon;t;z;lbl;f_status;fruit_name;c;exp;addon_ids;addons;addon_names;sel_a
01 r--' o slow=2 o dl=2
02 :If 0=f_status=#.S.Find'F1.STATUS'
03 r='Cannot find F1.STATUS (#136)'
04 end # not much we can sensibly test w/o the ability to control the feedback!
05 :EndIf
06 addon_ids='F1.ICE' 'F1.CHOKO'
07 # label follows or precedes control:
08 addon_names=((('XPath'#.S.Find'//input[@id=","w,"']following-sibling::div | //input[@id=","w,"']/precedin
09 :For fruit :In (c'F1.FRUIT.C'),'~"i3
10 {0:0 o c+#.S.Find w o c.Selected:c.Click}"addon_ids # make sur
11 :If fruit#'
12 z+#.S.Click fruit o [DL dl
13 lbl='XPath'#.S.Find'//input[@id=","fruit,"']following-sibling::div' # the div
14 fruit_name=lbl.Text # read lab
15 exp='You selected ',fruit_name
16 res=f_status #.S.WaitFor exp
17 :If 'Check res
18 r,='Click on ',fruit,' did not generate expected ",exp," message but "',res,'"
19 :EndIf
20 :EndIf
21 :For addon :In ~1+1(#addon_ids)*2
22 {0:0 o c+#.S.Find w o c.Selected:c.Click}"addon_ids # make sur
23 sel_a=2 2+addon # a bit flag
24 :For c :In sel_a/addon_ids
25 :If 1 Check #.S.Click c # a click th
26 r,='could not select addon "',c,'"
27 :EndIf
28 [DL dl
29 :EndFor
30 exp='You selected ',fruit_name,(0<+/sel_a) with ',~5+sel_a/addon_name
31 res=f_status #.S.WaitFor exp
32 :If 'Check res
33 r,c='Status ≠ ',exp,' - found value "',t,'"
34 :EndIf
35 :EndFor
36 dl*+=slow++1
37 :EndFor
38 end:
39 :If 0<#r
40 r--1+e(sr),'UCS 10
41 :EndIf
```

The 'Buttons' dialog box is open, showing a list of items:

- Apple
- Banana
- Pear
- Ice Cream
- Chocolate

Buttons: Scale, Inspect, Stop

Click on something!

Migrating - Live

- ◆ Four participants declared the intention to bring code for "live" conversion
- ◆ Three of them used a lot of either `NEW` or assignment of properties
- ◆ All of them will be used to prioritise continued development
- ◆ One of them looked "easy"

flatview

The screenshot shows the flatview application interface. At the top, the menu bar includes File, Edit, Selection, and View. The search bar contains the text 'WC'. Below the search bar, a list of search results is shown, with 'eWC' selected. A dialog box titled 'Replace All' is open in the center, displaying the message 'Replace 6 occurrences across 1 file with 'eWC?'. The dialog has 'Replace' and 'Cancel' buttons. The background shows a code editor with several lines of code, where 'WC' is highlighted in red and 'eWC' is highlighted in green. The status bar at the bottom shows 'ewc-conversion' and some icons.

SEARCH

WC

eWC

files to include

files to exclude

6 results in 1 file - [Open in editor](#)

Run.aplf APLSource 6

```
'fnt' WC eWC'Font'('PName' 'System')('Fixed' 1)
'F' WC eWC'Form' 'Define Fixed Record Length Data'
'F.E' WC eWC'Edit'('Style' 'Multi')('Posn' 10 10)('Size' 30 50)('Text'DATA)('Event' 'MouseUp' 'Selected')('HScroll' 1)('FontObj'f...
'F.G' WC eWC'Grid'('Values'(0 0p< '))('Posn' 50 10)('Size' 30 50)('ColTitles'TITLES)
'F.B1' WC eWC'Button'('Style' 'Check')('Posn' 10 65)('Size' 5 20)('Caption' 'Headers in Row 1')('Event' 'Select' 'ModifyHeader...
'F.B2' WC eWC'Button'('Style' 'Push')('Posn' 20 65)('Size' 5 10)('Caption' 'Undo')('Event' 'Select' 'UndoAction')('Active' 0)
```

ewc-conversion

'Coord' 'Pixel' only

```
'F.G' WC'Grid'('Values'(0 0pc' '))('Posn' 50 10)('Size' 30 50)  
'F.B1' WC'Button'('Style' 'Check')('Posn' 10 65)('Size' 5 20)  
'F.B2' WC'Button'('Style' 'Push')('Posn' 20 65)('Size' 5 10)
```

→ Fake it

```
size+ [.5x>EWC.DevCaps A Half available space  
Size+ {'Size' (size*w÷100)} A Simulate "Prop" Size  
Posn+ {'Posn' (size*w÷100)} A Simulate "Prop" Posn
```

```
'F.G' eWC'Grid'('Values'(0 0pc' '))('Posn' 50 10)('Size' 30 50)  
'F.B1' eWC'Button'('Style' 'Check')('Posn' 10 65)('Size' 5 20)  
'F.B2' eWC'Button'('Style' 'Push')('Posn' 20 65)('Size' 5 10)
```

No Edit 'Style' 'Multi'

```
'F.E' eWC 'Edit' ('Style' 'Multi') ('Posn' 10 10) ('Size' 30 50) ('Text' DATA)
('Event' 'MouseUp' 'Selected') ('HScroll' -1) ('FontObj' fnt) ('Border' 1)
```

→ Create editable Grid instead

```
'F.I' eWC 'Grid' ('Posn' 10 10) ('Size' 30 50) ('Values' (, +DATA)) ('CellWidths' (, 500)) ('TitleWidth' 0)
'F.I.E' eWC 'Edit' ''
'F.I' eWS ('Input' (, 'F.I.E')) ('CellFonts' (, 'fnt')) ('CellTypes' (((≠DATA), 1) p1))
```

No MouseUp on Edit

```
'F.E'□WC'Edit'('Style' 'Multi')('Posn' 10 10)('Size' 30 50)('Text' DATA)  
('Event' 'MouseUp' 'Selected')('HScroll' -1)('FontObj' fnt)('Border' 1)
```

→ Create an extra button to click on 😊

No Direct Property Manipulation

```
:If 0<pCUTS
  F.B2.Active+1
  F.B2.Caption+'Undo (',(¬pCUTS),')'
:Else
  F.B2.Active+0
  F.B2.Caption+'Undo'
:EndIf
```

→ Use eWG / eWS

```
:If 0<pCUTS
  'F.B2' eWS 'Active' 1
  'F.B2' eWS 'Caption' ('Undo (',(¬pCUTS),')')
:Else
  'F.B2' eWS 'Active' 0
  'F.B2' eWS 'Caption' 'Undo'
:EndIf
```


Significant Problems

- 'Coord' 'Prop' not supported
- 'Style' 'Multi' not supported on Edit
- No 'MouseUp' event on Edit
- Direct property assignment & references

Less Significant Problems

EWC.LOGMODES ← 'EW' # Errors and Warnings only

```
07:00.682 W:    *** Warning: at Run[4] Start[9] - Unsupported on font: Fixed
07:01.164 W:    *** Warning: at Run[18] Start[9] - Unsupported on button: Active
07:01.170 W:    *** Warning: at Run[19] Start[9] - Unsupported on button: Active
```