



Dyalog North America Meetup, 7 April 2025

Migrations

Morten Kromberg
Davin Church

Agenda

- Cross-Platform GUI with EWC
- Migrating Code from APL+Win to Dyalog
 - Overview of Automatic Code Translation
 - Example of a Development Workflow
- Δ WI – The \square WI Emulator
 - Brief Demo of Migrated Application
 - Davin Church on future plans

EWC – "Everywhere" WC

- A JavaScript (+APL) emulation of Dyalog's Win32 wrappers (□WC, □WG, □WS ...)
- "Everywhere" means
 - Windows, Linux, macOS Desktops
 - Dyalog APL on any platform acting as a Web Server
 - Adds IBM AIX, Raspberry Pi, Linux in the cloud..

EWC Target Audiences

1. Legacy Customers needing to move
 - To macOS or Linux (or Android)
 - To the Cloud / Network
 - (This potentially includes APL+Win users, since some of Δ WI can run on EWC)

FILE EDIT HOME DATA DEVELOPER HELP AI at BIG

Access Locks Macros Dashboard Archive Date Stock Exchange Share/option Comparative dynamics Black and Scholes Checking Prices VAR analysis Calculate Option Prices Overall Data Quality Local Data Quality Data Quality

- Shares
 - Portfolio
 - Market
 - SPECIFICATION
 - Prices
 - Fairy prices
 - Exchange Rates
 - Indices
 - Unified Rating
 - Federal Funds Rate
 - Synthetic Indices
 - Echelons
 - VAR (deltaN+EWMA)
 - Services
- Bonds
- Futures
- Foreign Exchange
- Derivatives
- Totals
- Risk
- Special reports
- Accounting
- System

List of Share and Option Prices -MMB5- 27/07/23

	Quote list	Volume Traded	Low	High	Close 27/07/23	Average	Price 1	Price 2	Quoted
1			na	na	na	na	na	na	
2			na	na	na	na	na	na	
3			na	na	na	na	na	na	
4			na	na	na	na	na	na	
5			na	na	na	na	na	na	
6			na	na	na	na	na	na	
7	Уровень 1		na	na	na	na	na	565,800000	
8	Уровень 1	4.103.356.276,40	2631,200000	2685,000000	2638,400000	2654,800000	na	2654,600000	
9	Уровень 3	133.614.988,00	343,800000	357,400000	349,800000	352,200000	na	352,200000	
10	Уровень 2	74.913.188,00	19408,000000	19798,000000	19450,000000	19610,000000	na	19610,000000	
11	Уровень 1	4.271.751.671,00	83,870000	86,260000	84,400000	85,140000	na	85,140000	
12			na	na	na	na	na	na	
13			na	na	na	na	na	na	
14			na	na	na	na	na	na	
15	Уровень 2	456.793.506,96	17,076000	18,980000	18,000000	17,966000	na	17,966000	
16			na	na	na	na	na	na	
17			na	na	na	na	na	na	
18	Уровень 3		na	na	na	na	na	na	
19	Уровень 3	38.400.621,00	2,230000	2,661000	2,411000	2,471000	na	2,471000	
20	Уровень 1	326.955.295,20	17,713000	17,878000	17,852000	17,805000	na	17,805000	
21	Уровень 2	76.185.277,00	70,825000	73,980000	72,705000	72,940000	na	72,940000	
22	Уровень 1	314.290.934,40	44,640000	45,200000	45,010000	44,930000	na	44,930000	
23			na	na	na	na	na	na	
24			na	na	na	na	na	na	
25			na	na	na	na	na	na	
26			na	na	na	na	na	na	
27	Уровень 1	#####	0,023545	0,025150	0,025005	0,024450	na	0,024450	
28	Уровень 3	231.628.650,00	1328,000000	1347,000000	1328,500000	1335,000000	na	1335,000000	
29	Уровень 3	57.472.497,50	1838,500000	1856,500000	1853,000000	1849,000000	na	1849,000000	
30	Уровень 3	679.036.134,00	28,660000	32,500000	29,910000	30,855000	na	30,855000	
31	Уровень 1	575.075.383,00	4854,000000	4951,000000	4908,000000	4889,000000	na	4889,000000	
32	Уровень 2	331.150.220,00	49440,000000	51540,000000	51400,000000	50640,000000	na	50640,000000	
33			na	na	na	na	na	na	
34	Уровень 3	18.548.510,00	536,000000	580,000000	566,000000	560,500000	na	560,500000	
35	Уровень 3	213.298.108,70	539,550000	546,400000	546,050000	542,800000	na	542,800000	
36	Уровень 1	2.569.289.497,20	171,350000	173,100000	172,030000	172,420000	na	172,420000	
37			na	na	na	na	na	na	
38	Уровень 3	137.560.890,00	913,500000	1047,000000	1015,000000	990,000000	na	990,000000	
39	Уровень 1	1.104.587.544,00	16182,000000	16344,000000	16220,000000	16274,000000	na	16274,000000	
40			na	na	na	na	na	na	
41	Уровень 1	203.981.329,70	774,000000	786,200000	784,000000	781,900000	na	781,900000	



List of Share and Option Prices -MMB5- 27/07/23

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5			na	na	na	na	na	na	
6			na	na	na	na	na	na	
7	Уровень 1		na	na	na	na	na	565,800000	
8	Уровень 1	4.103.356.276,40	2631,200000	2685,000000	2638,400000	2654,800000	na	2654,600000	
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17			na	na	na	na	na	na	
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23			na	na	na	na	na	na	
24			na	na	na	na	na	na	
25			na	na	na	na	na	na	
26			na	na	na	na	na	na	
27	Уровень 1	10.527.543.188,85	0,023545	0,025100	0,025005	0,024450	na	0,024450	
28	Уровень 3	231.628.650,00	1328,000000	1347,000000	1328,500000	1335,000000	na	1335,000000	
29	Уровень 3	57.472.497,50	1838,500000	1856,500000	1853,000000	1849,000000	na	1849,000000	
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39	Уровень 1	1.104.587.544,00	16182,000000	16344,000000	16220,000000	16274,000000	na	16274,000000	
40			na	na	na	na	na	na	
41	Уровень 1	203.981.329,70	774,000000	786,200000	784,000000	781,900000	na	781,900000	

EWC Target Audiences

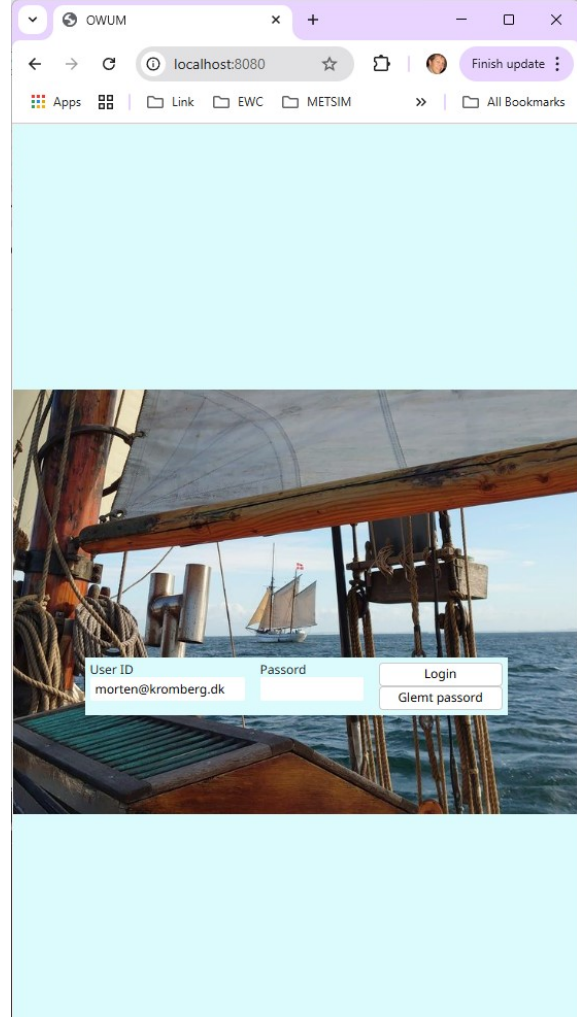
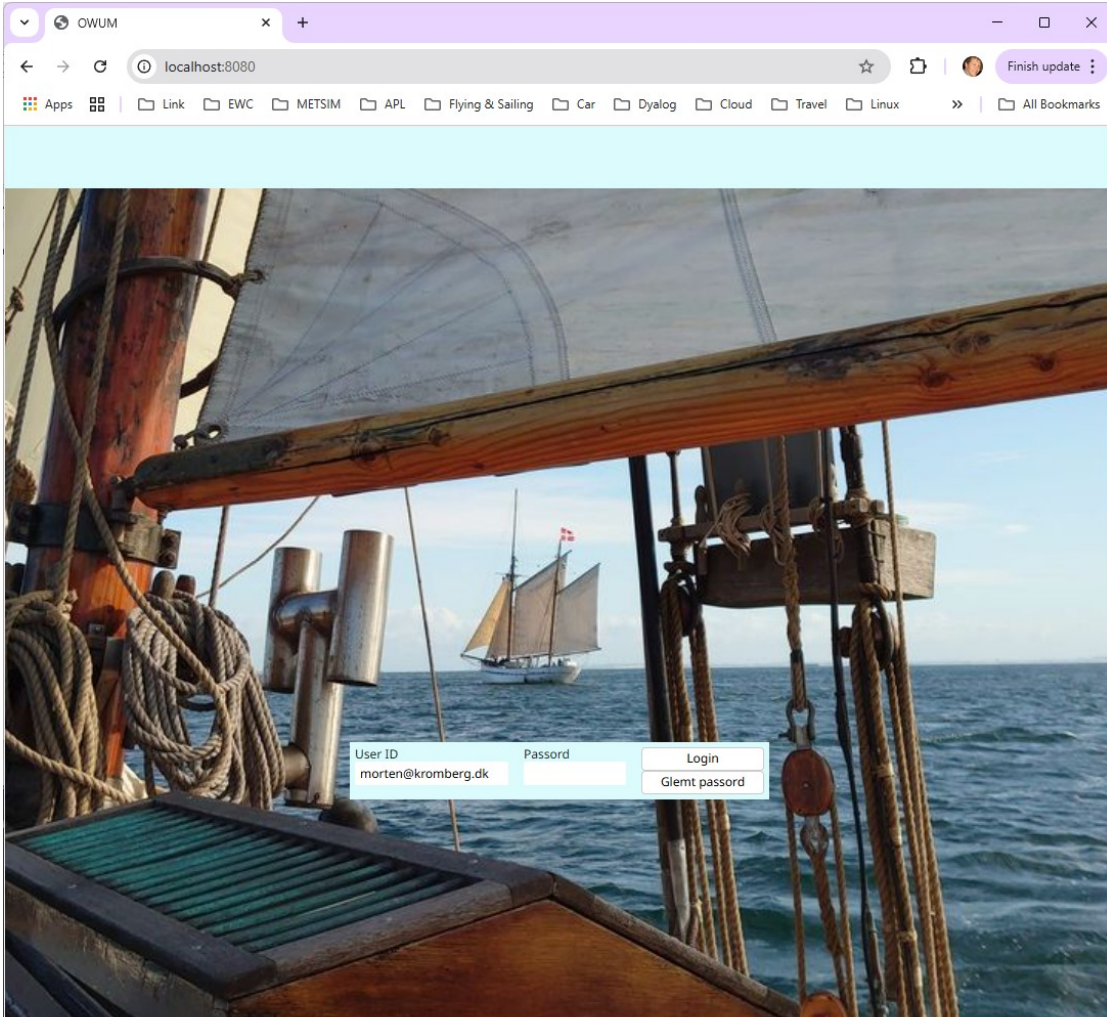
2. New "Full Stack" Applications



- ◆ What is required to make EWC an attractive platform for completely new applications?

The OWUM Admin App

- ◆ I am one of the skippers of the Anna Elise, which is owned by 20 people
- ◆ We need an Admin Application to keep track of work that needs to be done, sailing trips, etc.
- ◆ I thought I'd try to drink my own champagne:
 - ◆ GitHub: [mkromberg/owum](https://github.com/mkromberg/owum)
- ◆ OWUM? On the radio, our callsign is Oscar Whiskey Uniform Mike





Welcome, Morten Kromberg (MK) [Administrator] Log Out Change password  

- Overview
- Tasks
- Sailing
- Events
- Documents
- Misc
- Admin

Inden Pinse 2024

Search:

Selected #1:
Description: Ruftaget males færdigt (har fået 2 gange nu)

Enroll Start Create New Update Desc Send as E-mail

Delete



ID	Beskrivelse	Status	Hvem
1	Ruftaget males færdigt (har fået 2 gange nu)		
2	Skylights moteres.		
3	Glas i skylights kittes på plads		
4	Glidere til nedgangskappen moteres.		
5	Klap ved nedgangskappen monteres		
6	Ruftagenes kanter males med hvid og grå.		
7	Redningsvestekassen genmonteres.		
8	Gaskassen genmonteres.		
9	Gaskedningstilbehørens etableres		

OWUM localhost:8080

Apps Link EWC METSIM APL Flying & Sailing Car Dyalog All Bookmarks

Welcome, Morten Kromberg (MK) [Administrator]!

Log Out

Change password  

Overview Tasks Sailing Events Documents Misc Admin

Inden Pinse 2024

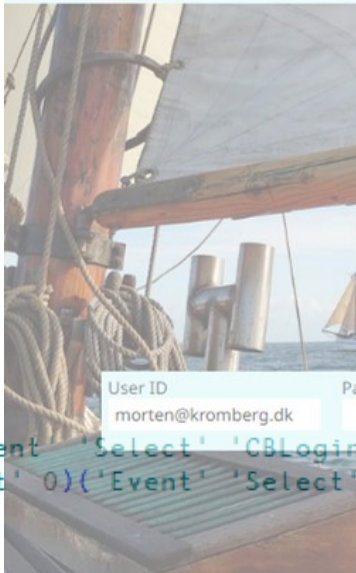
Search:

Selected #1:
Description:

Enroll Start Create New
Update Desc Send as E-mail Delete

ID	Beskrivelse
1	Ruftaget males færdigt (har fået 2 gange nu)
2	Skylights moteres.
3	Glas i skylights kittes på plads
4	Glidere til nedgangskappen moteres.
5	Klap ved nedgangskappen monteres
6	Ruftagenes kanter males med hvid og grå.

```
0] MakeLogin;image;bcol;USERID;background;formcss;rows;user;lang
1] A Create Login form
2]
3] image+ '/resources/images/ae-wide-frame.jpg'
4] bcol+219 252 252 A Pale blue
5] USERID+' A Global state
6]
7] background+'background-image: url("'",image,'"'), background-size: contain, background-position: center, ba
8] formcss+background,', flex-direction: row, align-items: center, justify-content: center'
9] rows+'flex-direction: row, flex-wrap: wrap, justify-content: space-between, gap: 5px, align-items: flex-s
10]
11] 'F1'eWC'Form' 'Please Login'('Coord' 'Pixel')('Flex' 'fill')('BCol'bcol')('CSS' formcss)
12] 2 eNQ 'F1' 'SetTitle' APPNAME
13]
14] 'F1.INPUT'eWC'SubForm'('Flex' 'row')('CSS' 'margin-top: calc(30%);')
15] 'F1.INPUT.CREDS'eWC'SubForm'('Flex' 'row')('CSS'rows)('BCol'bcol)
16]
17] user+1 2>(2 eNQ 'F1' 'GetCookie' 'OWUMUSER'),c'' ''
18] lang+1 2>(2 eNQ 'F1' 'GetCookie' 'OWUMLANGUAGE'),c'' ''
19]
20] LANGUAGE+(LANGUAGESi=lang)>(1+#LANGUAGES)pLANGUAGES
21] SelectLanguage LANGUAGE
22]
23] 'F1.INPUT.CREDS.USERID' 'User ID'LabelAbove'Edit' user('Size'(23 150))
24] 'F1.INPUT.CREDS.PWD' 'Passord'LabelAbove'Edit' ''('Size'(23 100))('Password' '*')
25]
26] 'F1.INPUT.CREDS.BTNS'eWC'SubForm'('Flex' 'column')
27] 'F1.INPUT.CREDS.BTNS.LOGIN'eWC'Button' (T 'Login')('Size'(23 120))('Default' 1)('Event' 'Select' 'CBLogin
28] 'F1.INPUT.CREDS.BTNS.FORGOT'eWC'Button' (T 'Glemt passord')('Size'(23 120))('Default' 0)('Event' 'Select'
29]
30] eNQ'F1.INPUT.CREDS.USERID' 'GotFocus'
```



User ID
morten@kromberg.dk

Passord

```
[23] 'F1.INPUT.CREDS.USERID' 'User ID'LabelAbove'Edit' user('Size'(23 150))  
[24] 'F1.INPUT.CREDS.PWD' 'Passord'LabelAbove'Edit' ''('Size'(23 100))('Password' '*')
```

app.LabelAbove in C:/devt/owum/APLSource/app/LabelAbove.aplf

File Edit Syntax Refactor View

Search...

```
left LabelAbove props;parts;label;sf  
A Create a Subform with a (translated) Label above some other cont  
  
(sf label)+left  
sf eWC 'SubForm' ('Flex' 'column')  
(sf, '.L') eWC 'Label' (T label)  
(sf, '.C') eWC props
```

Function Last saved by: mkrom: 16. mar

Note:
Some Sizes
No Positions

app.LabelBefore in C:/devt/owum/APLSource/app/LabelBefore.aplf

File Edit Syntax Refactor View

Search...

```
left LabelBefore props;parts;label;sf  
A Create a Subform with a (translated) Label to the left of some ot  
  
(sf label)+left  
sf eWC 'SubForm' ('Flex' 'row')('CSS' 'place-content: start')  
(sf, '.L') eWC 'Label' (T label)  
(sf, '.C') eWC props
```

Function Last saved by: mkrom: 16. marts 2025 12:06

```
'F1.INPUT.CREDS'eWC'SubForm'('Flex' 'row')('CSS'rows)('BCol'bcoll)
```

```
user+1 2>(2 eNQ 'F1' 'GetCookie' 'OWUMUSER'),c'' ''  
lang+1 2>(2 eNQ 'F1' 'GetCookie' 'OWUMLANGUAGE'),c'' ''
```

```
LANGUAGE+(LANGUAGES1=lang)>(1+#LANGUAGES)pLANGUAGES  
SelectLanguage LANGUAGE
```

```
'F1.INPUT.CREDS.USERID' 'User ID'LabelAbove'Edit' user('Size'(23 150))
```

```
'F1.INPUT.CREDS.PWD' 'Passord'LabelAbove'Edit' ''('Size'(23 100))('Password' '*')
```

```
'F1.INPUT.CREDS.BTNS'eWC'SubForm'('Flex' 'column')
```

```
'F1.INPUT.CREDS.BTNS.LOGIN'eWC'Button' (T 'Login')('Size'(23 120))('Default' 1)('Event' 'Select' 'CBLogin')
```

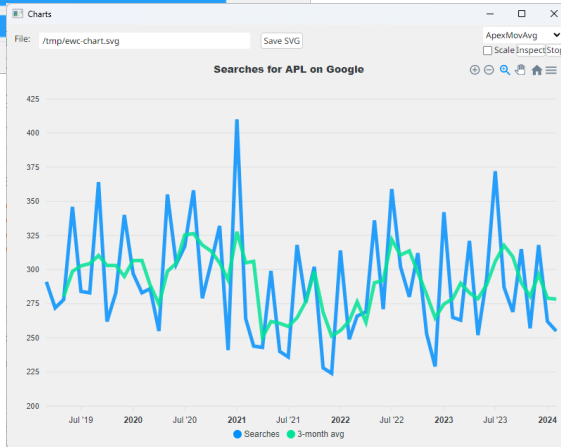
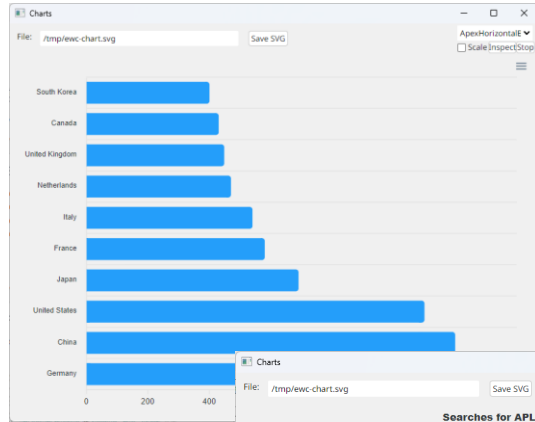
```
'F1.INPUT.CREDS.BTNS.FORGOT'eWC'Button' (T 'Glemt passord')('Size'(23 120))('Default' 0)('Event' 'Select' 'CBLogin')
```

We have
Cookies!

Additions to EWC

- New JavaScript Libraries as EWC Objects
 - ApexCharts, KendoChart, KendoGrid, ...
 - Only a few days work to add a new one
- Flex Layout – no positions (unless you want to)
- Use CSS to format any object
- Cookies, File Up- and Download
- Automatic testing of applications w/ Selenium

+ ApexCharts



+ KendoGrid

Browser tabs: EWC, localhost:22322

Browser bookmarks: AI, B2B, Jira, Mark's Dash, BitBucket, Pluralsight, Local, Google, Bluesky, Agent Login, History of English

KendoGrids

UserId:	Company Name:	Comp...	POS:	App V...	Daily S...	Applet Errors:
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
7983	Scottsdale Fine Jewelers Historical Data		EdgeSQL	5.002....	02:59 AM	
2855	Selman's Jewelers		EdgeSQL	4.013....	10:23 PM	There was an error when trying to create the c
2727	Di'Amore Fine Jewelers		EdgeSQL	4.011....	09:23 PM	
6898	Johnston Jewelers		EdgeSQL	5.002....	02:31 AM	
7974	Mountain West Inc. JM2000		JM2000	5.002....	11:53 PM	
1987	Habib Jewels Sdn Bhd		Jemisys			

app.ProcessMemberFile in C:/devt/owum/APLSource/app/ProcessMemberFile.aplf

File Edit Syntax Refactor View

Search...

```
[0] ProcessMemberFile tempfile;z=msg;cols:data;backup;filename
[1] z+#.XL2APL.Main.GetEntireWorkbook tempfile
[2] A /// Above was failing in .NET Core, awaiting fix to new .NET bridge
[3] A /// Please retest and remove this comment when possible
[4] :If 0#=(msg cols data)+ValidateMedlemsliste z A Check that workbook as the right format
[5] +0=msg DisplayPopup'Upload'('Listen er ikke opdateret: %1')'Error' 'OK'
[6] :Else
[7] MEMBERS VSET(tc)cols)data
[8] backup+(ROOT,'/Data/Archive/Members_',='YYYY-MM-DD'(1200)1 DT'J'),'.xlsx'
[9] 1 NDELETE backup
[10] backup NMOVE filename+ROOT,'/Data/Members.xlsx'
[11] filename NMOVE tempfile
[12] MEMBERS SaveCSV ROOT,'/Data/Members.csv'
[13] DisplayPopup'Upload' 'Medlemslisten er opdateret' 'Info' 'OK'
[14] :EndIf
```

Function Last saved by: mkrom: 16. marts 2025 08:54 Pos: 4/15,40

EWC Multi-User Mode

- Application Namespace is cloned for each connection
 - `#.app` → `#.app_1`, `#.app_2`, ...
- Separate APL thread to handle each user session

The screenshot shows the CLEAR WS (app) - Dyalog APL/W-64 20.0 Unicode application window. The window title bar includes the application name and standard window controls. The menu bar contains File, Edit, View, Window, Session, Log, Action, Options, and Tools. The toolbar includes icons for File, Edit, and Session. The main text area displays a list of threads with the following structure:

```
)si
-   -   □DQ
-   -   #.EWC.ΔDQ[52]
-   -   #.app_1.Initialise[6]
-   &10 (system thread:15688)
-   -   □DQ
-   -   #.EWC.ΔDQ[52]
-   -   #.app_2.DisplayPopup[5]
-   -   #.app_2.CBLogin[47]
-   -   #.app_2.Initialise[9]
-   &11 (system thread:19472)
-   #.DRC.Wait[7]
-   [#.EWC.[wss]] #.EWC.wss.Listen[2]
-   #.EWC.wss.Start[14]
&9
    #.app_1.USERID
    morten@kromberg.dk
    #.app_2.USERID
    gc@kromberg.dk
```

Orange brackets on the right side of the code block group the threads into two categories:

- Thread 10 User 1: Includes `□DQ`, `#.EWC.ΔDQ[52]`, `#.app_1.Initialise[6]`, and `&10 (system thread:15688)`.
- Thread 11 User 2: Includes `□DQ`, `#.EWC.ΔDQ[52]`, `#.app_2.DisplayPopup[5]`, `#.app_2.CBLogin[47]`, `#.app_2.Initialise[9]`, and `&11 (system thread:19472)`.

The status bar at the bottom shows "Ready..." and "Ins". The bottom-most bar displays system information: "CurObj: &:4", "□DQ:0", "□TRAP", "□SI:0", "□IO:1", and "□ML:1".

Conclusion - EWC

- ◆ Move existing apps to the cloud with minimal changes
 - ◆ Delete 'Posn' settings and replace with Flex directives
- ◆ Build new (multi-user) web apps without learning completely new skills

Source Code Migration

- ◆ With thanks to Alex Holtzapple at METSIM[®] International for permission to use these examples!
- ◆ Imagine you are working on migrating to Dyalog, but need to continue to support the APL+Win version for some time...

```
[0] MAIN;border;x;□wself;q;size;txh;z;Z;F;zz
[1] A Morten was here
[2] Δuom+Δuop+0 ◇ Z+ΔMDL,' \ICONS\METSIM.ICO' ◇ border++/2 16 32 64 A 256
[3] 0 0 WFORM 'METSIM' 'METSIM' border ('scale' 5)('icon' Z) A Main METSIM form
[4] METTIME
[5] :IF ΔSILENT=1
[6] 'METSIM' □wi ('style' 4) ◇ 'METSIM' □wi ('onWait' 'MSIL')
```

```
[0] FOPEN;F;Z
[1] A Morten was here too!
[2] →ΔMOP[11]/Δ10 ◇ →(File='Nofile')/Δ20
[3] :if FAS ◇ ON_CLOSE_MODEL ◇ :end
[4] :if (WYON 'EXISTING MODEL IN MEMORY WILL BE ERASED, I
[5] Δ10:XNIT
[6] Δ20:F+('Model Files ( *.sf ; *.sfw )!*.sf;*.sfw')
[7] :IF ~(0=Z+WGOLF(ΔDIR)(File)'SFW' ' F)
[8] FDIR Z ◇ →(0=ρFile)/0 ◇ FLOD ΔDIR,File
[9] □LIBD '41 ',ΔDIR
[10] DDE ← 3 FSRT DDE A added 7/23/18, fix to IO=3
[11] :if ΔRTS ◇ CheckIDs ◇ :end
```

Executing



```
<[METSIM;Wait]  
MAIN[45]
```

```
← )ed MAIN
```

```
← )ed FOPEN
```

```
← Stage 'MAIN' 'FOPEN'
```

```
Staging file: C:\TMP\GITSTAGING.TXT
```

```
Git folder : C:\Dev\metsim
```

```
Type Y to stage 2 functions:
```

```
Y
```

```
pushd C:\Dev\metsim && stage.bat "C:\TMP\GITSTAGING.TXT" &&
```

```
Linked: #.xfr ↔ "C:\Dev\AtfIn\APLSource\xfr"
Using C:/Dev/\metSIM\aplplus/atfmap.txt
Progress: f
1 files processed - 1 were replaced by rewrites
The following functions have been rewritten to Dyalog - please discuss:
    C:/Dev\metSIM\aplplus/MAIN.aplf
Staging files:

On branch avoid-crash-after-failed-connection
Your branch is up to date with 'origin/avoid-crash-after-failed-connection'.

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
    modified:   aplplus/FOPEN.aplf
    modified:   aplplus/MAIN.aplf
    modified:   dyalog/FOPEN.aplf
```


SOURCE CONTROL

CHANGES

Message (Ctrl+Enter to commit ...)

Commit

Staged Changes (3)

- FOPEN.aplf aplplus M
- MAIN.aplf aplplus M
- FOPEN.aplf dyalog M

Changes (4)

GRAPH

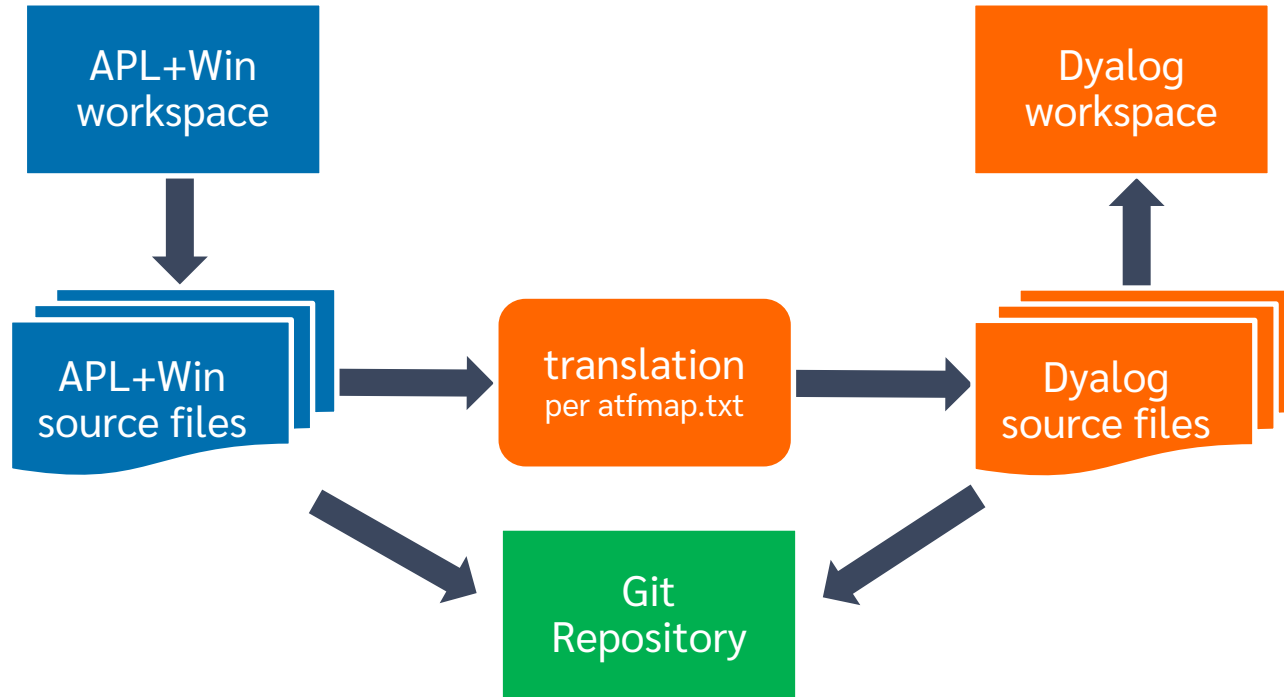
- Add fail... avoid-crash-after-...
- Improve comparison (SRVVerify)...
- Make Connection to APL+Win mo...
- Move CFCForm_ to the cfc directr...
- Always expunge all CFC variables...

GITLENS

orking Tree) M FOPEN.aplf (Index)

```
C: > devt > metSIM > dyalog > FOPEN.aplf
1 1 FOPEN;F;Z
2+ A Morten was here too! You, 53 seconds ago
2 3 →ΔMOP[11]/Δ10 ◇ →(File≡'Nofile')/Δ20
3 4 :if FAS ◇ ON_CLOSE_MODEL ◇ :end
4 5 :if (WYON 'EXISTING MODEL IN MEMORY WILL BE ERASE
5 6 Δ10:XNIT
6 7 Δ20:F←('Model Files ( *.sf ; *.sfw )|*.sf;*.sfw')
7 8 :IF ~(0≡Z←WGOLFN (ΔDIR)(File) 'SFW' ' ' F)
8 9 FDIR Z ◇ →(0=File)/0 ◇ FLOD ΔDIR,File
9 10 #.A2K.ΔLIBD '41 ',ΔDIR
10 11 DDE ← 3 FSRT DDE A added 7/23/18, fix to IO=3
11 12 :if ARTS ◇ CheckIDs ◇ :end
12 13 :ELSE ◇ WMETH ◇ :END
13 14
```

Source Code Migration



~%~

%

;[]ALX\b%;ΔQALX

;[]ELX\b%;ΔQELX

;[]WSELF\b%;ΔWSELF

(?![\wΔΔ]):catch (\s+)%:caselist(EMι999)ι⊆\1

(?![\wΔΔ]):catch%:else

(?![\wΔΔ]):catchall%:else

(?![\wΔΔ]):continueif([\^ορ]+)%:if\1ο:continueο:endif

(?![\wΔΔ]):endtry%:endtrap

(?![\wΔΔ]):leaveif([\^ορ]+)%:if\1 ο :leave ο :endif

(?![\wΔΔ]):nextcase%→2+[]LC

(?![\wΔΔ]):return\s*\$\$&

(?![\wΔΔ]):return\s*([\^ρ]*)%→0→(⊕▷'(\^|ο)\s*([\wΔΔ]+)\s*←'[]S'{}[]THIS.\w}\'[]UCP'1▷θρ[]NR▷θρ

(?![\wΔΔ]):return\s*[]novalue%→0→[]EX'(\^|ο)\s*([\wΔΔ]+)\s*←'[]S'\w}'[]UCP'1▷θρ[]NR▷θρ[]SI

(?![\wΔΔ]):returnif%→0/~

(?![\wΔΔ]):try%:trap 0

(?![\wΔΔ]):Verify%'ASSERTION FAILURE'[]SIGNAL 8↓~1≡ö,

(?![])\b([A-Za-zΔΔ][\wΔΔ_]*)\s*``\s*``\s*%\1 Each Each

(?![])\b([A-Za-zΔΔ][\wΔΔ_]*)\s*``\s*%\1 Each

(?!\d)[\^]/(?![\s*\[])% All

(?!\d)v/(?![\s*\[])% Any

((\^|ο|[\wΔΔ]\s*:\s*)←%\1{}

[]AI\b%#.A2K.ΔAI

[]AL\b%#.A2K.ΔAL

$\square FI \rightarrow \#.A2K.\Delta FI$

$\Delta FI \leftarrow \{ (1 + \square IO) \triangleright \square VFI \ \omega \}$

$v / \rightarrow \text{Any}$

$\text{Any} \leftarrow \{0 \neq \square \text{NC}' \alpha' : \alpha v / \omega \diamond 0 \in \rho \omega : 1 \in \ddot{\circ} 1 \vdash \omega \diamond v / \omega\}$

$\square SS \rightarrow \Delta SS$

$\Delta SS \leftarrow \{$

$\alpha \leftarrow \square \text{SIGNAL } 2 \text{ \&RARR; SYNTAX}$

$\text{Single} \leftarrow 1 \wedge . = \rho$

$\text{Vec} \leftarrow 1 = \neq \circ \rho$

$\alpha \tilde{\circ} (\text{Vec} \vee \text{Single}) \omega : \square \text{SIGNAL } 4 \text{ \&RARR; RANK}$

$\text{Char} \leftarrow 0 \text{ } 2 \in \tilde{\sim} 10 | \square \text{DR}$

$\alpha \vee \circ (\sim \text{Char}) \omega : \square \text{SIGNAL } 11 \text{ \&RARR; DOMAIN}$

$\omega \in \underline{\circ}, \alpha$

$\}$

□WCALL → ΔWCALL

▽ r←ΔWCALL args;fn;flags;f

:Select 1▷,⊆args

:Case 'W_Init'

r←'' '' (1↓ε' ','' 1↓2 □NQ '.' 'GetCommandLineArgs')

:Case 'MessageBox' # 0 question title ('MB_ICONQUESTION

flags←' '(≠⊆┐) 5▷args

f←+/(MB_FLAGS[;2],0)[MB_FLAGS[;1]└flags]

'fn'□NA'I user32|MessageBox* P <0T <0T I' # Associa

r←fn f@4┐1↓args

:Case 'ShellExecute'

f←(SW_FLAGS[;2],0)[SW_FLAGS[;1]└args[7]]

'fn'□NA'P shell32|ShellExecute* P <0T <0T P P I4'

r←fn f@6┐1↓args

→ Each

Each ← { A }

0 = 40 \square ATX 'α' : αα { A monadic

(3 ≠ 41 \square ATX 'αα') ^ 0 ∈ ρω : ω A userfn on empty

αα ω A primitive or non-empty

} ω

(3 = 41 \square ATX 'αα') ∨ α ∼ (0 ∈ ρ) ω : α αα ω A primitive

0 ∈ ρω : ω A empty ω

ω ρ ∼ ρα A empty α

}

~%~

%

;[]ALX\b%;ΔQALX

;[]ELX\b%;ΔQELX

;[]WSELF\b%;ΔWSELF

(?![\wΔΔ]):catch (\s+)%:caselist([]EMι999)ι⊆\1

(?![\wΔΔ]):catch%:else

(?![\wΔΔ]):catchall%:else

(?![\wΔΔ]):continueif([\^⊙⊙]+)%:if\1⊙:continue⊙:endif

(?![\wΔΔ]):endtry%:endtrap

(?![\wΔΔ]):leaveif([\^⊙⊙]+)%:if\1 ⊙ :leave ⊙ :endif

(?![\wΔΔ]):nextcase%→2+[]LC

(?![\wΔΔ]):return\s*\$\$&

(?![\wΔΔ]):return\s*([\^⊙]*)%→0→(⊕⊃'(\^|⊙)\s*([\wΔΔ]+)\s*←'[]S'{}[]THIS.\w\1←ω}'⊙'UCP'1⊃θρ[]NR⊃θρ

(?![\wΔΔ]):return\s*[]novalue%→0→[]EX'(\^|⊙)\s*([\wΔΔ]+)\s*←'[]S'\w\1'⊙'UCP'1⊃θρ[]NR⊃θρ[]SI

(?![\wΔΔ]):returnif%→0/~/

(?![\wΔΔ]):try%:trap 0

(?![\wΔΔ]):Verify%'ASSERTION FAILURE'[]SIGNAL 8↓~1≡ö,

(?![])\b([A-Za-zΔΔ][\wΔΔ_]*)\s*``\s*``\s*%\1 Each Each

(?![])\b([A-Za-zΔΔ][\wΔΔ_]*)\s*``\s*%\1 Each

(?!\d)[\^⊙]/(?![\s*\[])% All

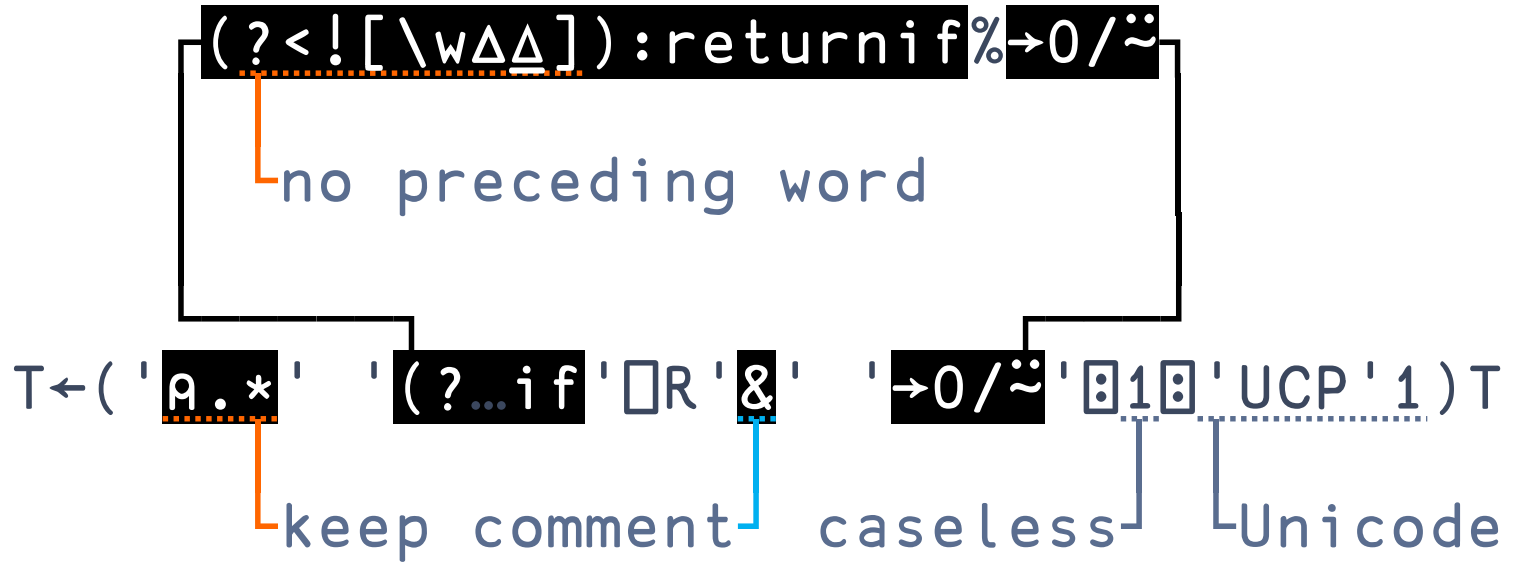
(?!\d)v/(?![\s*\[])% Any

([\^|⊙|[\wΔΔ]\s*:\s*)←%\1{}

[]AI\b%#.A2K.ΔAI

[]AL\b%#.A2K.ΔAL

How we do it



.. → Each



Double Quote Issues

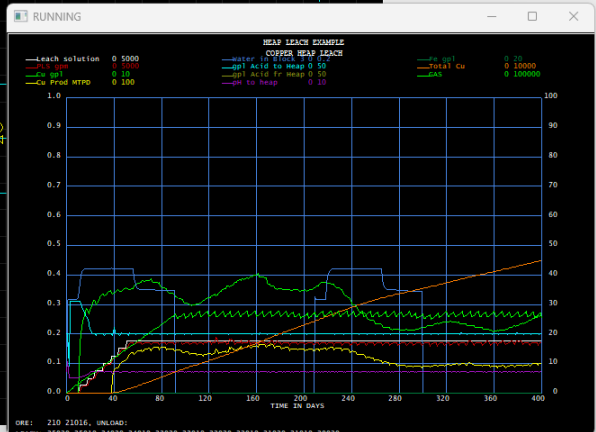
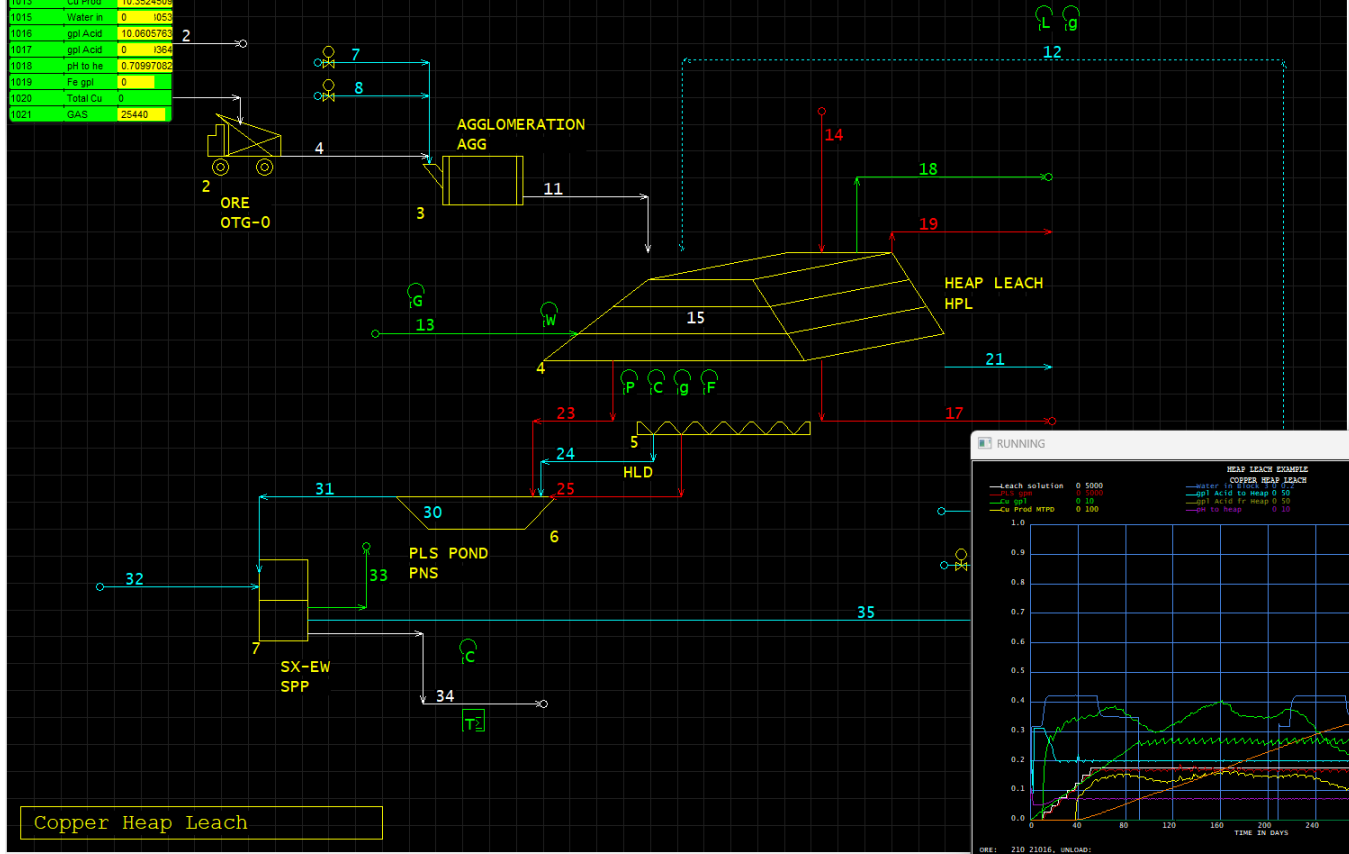
1. Normal "-delimited character literals are easy to convert
2. If they contain 's then double inner 's and replace outer "
`"SDL←FL€'''" → 'SDL←FL€'''''''''`
3. The '-delimited character literals containing "s are an issue:
`'r←''"',x,'''"' → 'r←''''''''',x,''''''''''`
4. Note that some inner "s are just decorative:
`'Running "tie" failed!'`

Last but not Least - ΔWI

UNIT	UNIT	VALUE	TOL	High	TI	CTI	Time
1210	Leach so	857.618592	-3	-3	400	400	40.273
1211	PLS gpm	856.803150					
1212	Cu gpl	2.83921047					
1213	Cu Prod	10.3524500					
1215	Water in	0.1050					
1216	gpl Acid	10.0605783					
1217	gpl Acid	0.1324					
1218	pH to hr	0.70997030					
1219	Fe gpl	0					
1220	Total Cu	0					
1221	GAS	25440					

HEAP LEACH EXAMPLE COPPER HEAP LEACH

Stream Number



1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49
50	51	52	53	54	55	56
57	58	59	60	61	62	63
64	65	66	67	68	69	70
71	72	73	74	75	76	77
78	79	80	81	82	83	84
85	86	87	88	89	90	91
92	93	94	95	96	97	98
99	100	101	102	103	104	105
106	107	108	109	110	111	112
113	114	115	116	117	118	119
120	121	122	123	124	125	126
127	128	129	130	131	132	133
134	135	136	137	138	139	140

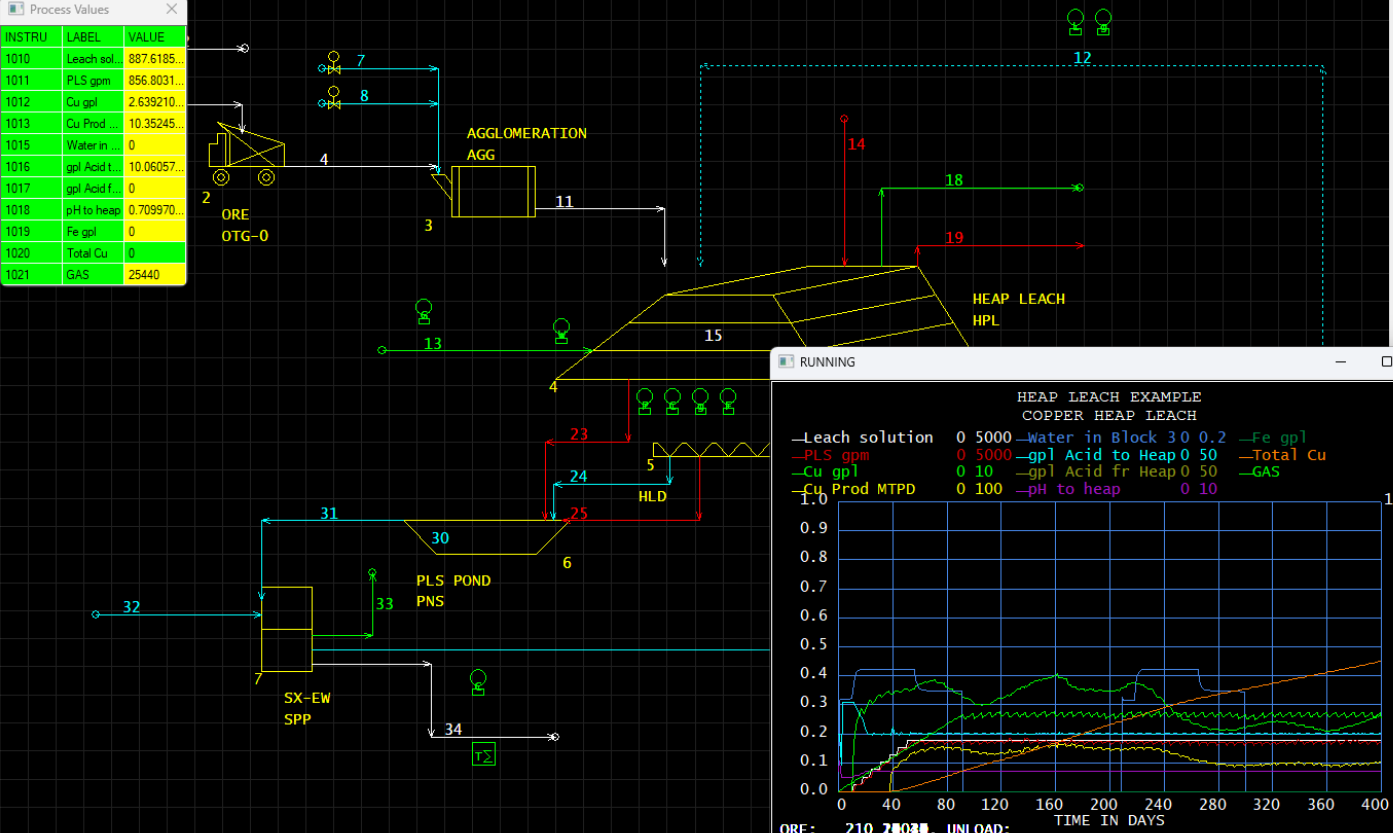
Copper Heap Leach

Run Parameter

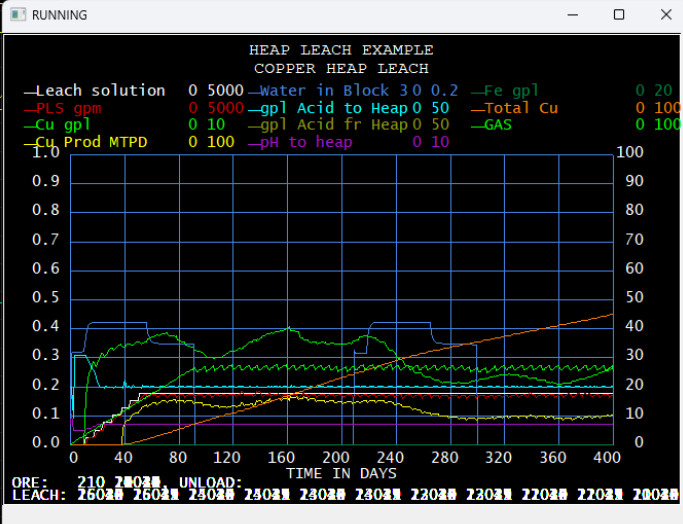
Start	UOP	Stop	Low	TOL	High	TI	CTI	Time
1	9	9	-3	-3	-3	400	400	15.589

ORE TYPES

INSTRU	LABEL	VALUE
1010	Leach sol.	887.6185...
1011	PLS gpm	856.8031...
1012	Cu gpl	2.639210...
1013	Cu Prod	10.35245...
1015	Water in ...	0
1016	gpl Acid 1...	10.06057...
1017	gpl Acid f...	0
1018	pH to heap	0.709970...
1019	Fe gpl	0
1020	Total Cu	0
1021	GAS	25440



GEN	MIN	MTL	COM	BEN
HYD	HBS	GAS	IAS	MIS
STL	ADV	DDV	ANC	



Alarms

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49
50	51	52	53	54	55	56
57	58	59	60	61	62	63
64	65	66	67	68	69	70
71	72	73	74	75	76	77
78	79	80	81	82	83	84
85	86	87	88	89	90	91
92	93	94	95	96	97	98
99	100	101	102	103	104	105
106	107	108	109	110	111	112
113	114	115	116	117	118	119
120	121	122	123	124	125	126
127	128	129	130	131	132	133
134	135	136	137	138	139	140



HEAP LEACH EXAMPLE COPPER HEAP LEACH



- MTRX Edit/Copy Matrix to Clipboard
- FIXES APPLY SPECIAL FIXES TO MODEL
- DSTRp Delete Duplicate Stream Points
- RTXT Replace Text String on this page
- LTXT Locate Text String
- SFNC Write User Function to .CR
- RFNC Read In User Functions
- TRCY Show Recycle Links
- TERR Look for Stream Errors
- TUSN Unused Stream Numbers
- FZER Zero Data in Unused Streams
- IDDE Input DDE Data Exchange
- TDDE Test DDE Data Exchange
- IFCOM Configure Data for Output Files
- TFCOM Test File Communication Exchange
- TSAV Create Backup Data
- TCOM Compare Section Streams with Backup
- TCOM Compare All Streams with Backup
- TRES Restore to Backup Data
- TDEL Delete Backup Data
- SRVV Verify Dyalog Model Content
- SRVC Copy Files from APL+Win METSIM



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SCREEN

Differences between APL+Win and Dyalog versions of "Copper Heap Leach.sfw"

STQ Single additional trailing blank in 29 cells, for example '1 ' vs '1 '
Difference of (0 0.3) in 22 cells, for example (60 603.6) vs (60 603.3)

- IFCOM Configure Data for Output Files
- TFCOM Test File Communication Exchange
- TSAV Create Backup Data
- TCOM Compare Section Streams with Backup
- TCOM Compare All Streams with Backup
- TRES Restore to Backup Data
- TDEL Delete Backup Data
- SRVV Verify Dyalog Model Content
- SRVC Copy Files from APL+Win METSIM

The screenshot shows a Windows File Explorer window titled "Open" with the address bar set to "This PC > Windows". The left sidebar shows navigation options like Desktop, Downloads, Documents, Pictures, Music, and Videos. The main pane displays a list of files with columns for Name and Size. A "Browse For Folder" dialog is open, showing the "Desktop" folder selected. A "File Transfer Completed" dialog is also open, displaying the message: "Created 'C:\Users\mkrom\Downloads\Ammonia Equilibrium.sfw'. Size is 1 17 66288." with an "OK" button. At the bottom of the File Explorer, the "File name" field contains "Ammonia Equilibrium" and the file type is set to "Model Files (*.sfw)".

Name	Size
Ammonia Equilibrium.sfw	79 KB
Autoclave.sfw	158 KB
Bayer Process.sfw	153 KB
Carbon in Pulps.sfw	437 KB
Coal Prep Circuit.sfw	285 KB
Comminution C.sfw	235 KB
Copper Heap Le.sfw	687 KB
Copper SXEW Circ.sfw	151 KB
Crystallizer Exampl.sfw	120 KB

- SRVV Verify Dyalog Model Content
- SRVC Copy Files from APL+Win METSIM

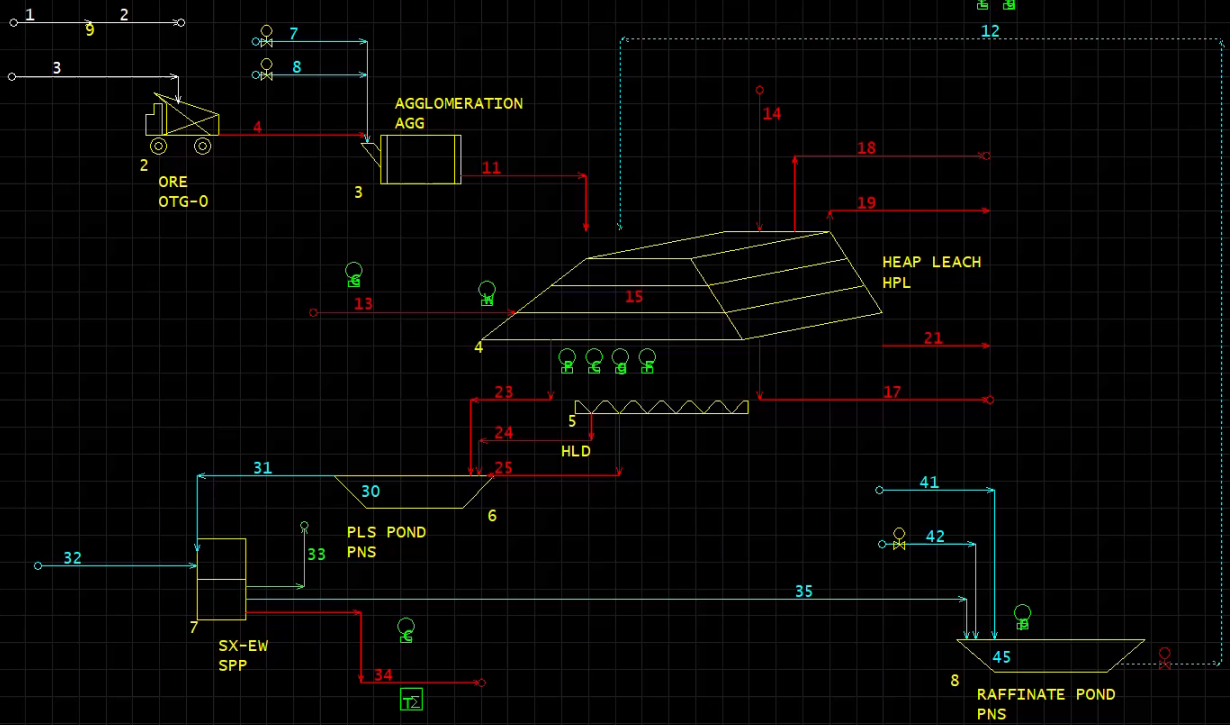
2025

SEN	MIN	MTL	COM	REN
SBS	GAS	IAS	AMS	
STI	AMV	DEW	ANC	

HEAP LEACH EXAMPLE COPPER HEAP LEACH

Stream Number

ORE TYPES
PIX



Copper Heap Leach



Also Worth Mentioning

- ◆ Many applications running on ΔWI will run on EWC and be able to run in the cloud

Before I hand over to Davin...

- ◆ Code translation and ΔWI prototype have been sufficient for the first project (METSIM[®])
- ◆ NOT ready for advanced sophisticated $\square WI$ UI
 - ◆ Davin will be thoroughly reworking ΔWI
 - ◆ DPC Consulting (Germany) also participating
- ◆ Work on code translation continues
 - ◆ Will probably add static analysis to the toolkit
- ◆ Contact us to run feasibility studies in 2025!

Davin's Slide

- The Δ WI prototype needs refactoring
- Differences in GUI processing
- Interpretation will be better than compilation
- Reasonably complete support possible
- ActiveX will be supported in 32-bit Windows
- Imbedding Dyalog native controls possible
- Questions?