

DYALOG

Elsinore 2019



## The Road Ahead

*Morten Kromberg, CTO, Dyalog Ltd.*

# Dyalog's Goals

Make it easier to ...

- ◆ Discover and Acquire Dyalog APL
- ◆ Learn how to Create and Deploy solutions
- ◆ Develop Competitive Solutions in APL
- ◆ Integrate ...
  - ◆ Solutions into other applications or frameworks
  - ◆ Dyalog APL into development processes
- ◆ Maintain ...
  - ◆ Applications written in APL
  - ◆ The APL system itself
- ◆ Have Fun, Make Money



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  - ◆ Applications written in APL
  - ◆ The APL system itself



# Easier to Discover & Learn Dyalog APL

- Adam's "APL Orchard"
  - Already brought several new people into the community (we hired one: Nathan)



J. Sallé @Adám question: can @ change the shape of an array? E.g.: I want to transform the vector 0 1 2 3 into 0 1 1 2 3; can I make it work with something like 2p@2+vector (this one gives me a length error)? Wed 20:47

dzaima @J.Sallé no, but Adám's had ideas for how it could do so

J. Sallé @dzaima hm, thanks. I think I've found a way to work around that an interleave primitive/function would come in handy right about now :/



Adám

39.8k

@J.Sallé Why not use replicate? (/) Wed 21:03

```
⊖←⊖2(⊖ρ)@2+0 1 2 3
```

Dyalog APL

@Adám 0 1 1 2 3

J. Sallé @Adám I don't think I can do that because I don't know what the mask (left arg) would be  
 @Adám this one might work though

Adám

```
⊖←{(ω/⊖2@2{1})ω}0 1 2 3
```

Dyalog APL

@Adám 0 1 1 2 3

all rooms site rooms

## The APL Orchard

Learn and teach, questions about both golfing and general coding. Email support@dyalog.com for write access. Enter /about for chatbot info.

[apl](#) [array-manipulation](#) [j](#) [k](#) [tips](#)

leave (all) | room | info



not the room you are looking for?

There are other rooms, with 47 users currently talking in 44 rooms.

starred [show 6 more](#) / [show all 98](#)

★ now i want n f\ to be ⊕⊖fn f/ :| - aug 5 at 6:54 by dzaima

★ 3 Slash-functions may only be in our trains when accompanied by a calming constant or a responsible operator. - jun 6 at 16:06 by Adám

★ 5 Introducing: ⍏ APLcart - may 3 at 16:42 by Adám

★ chat.stackexchange.com/transcript/message/49016235 #49016235 - jul 10 at 9:01 by Adám

[enable desktop notification](#)



send upload...



# Easier to Discover & Learn Dyalog APL

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- Open-Source APL Projects
  - Acre, Link, MiServer, JSONServer, RESTServer, many more to come





# Dyalog

Official Dyalog Repository tree (for Raspberry Pi specific repositories see <https://github.com/aplpi>)

United Kingdom <http://www.dyalog.com>

Repositories 53

Packages

People 19

Teams 28

Projects

Settings

Find a repository...

Type: All

Language: All

Customize pins

New

## TamStat Private

A cross-platform front end for the statistical software "TamStat". This was developed using MiServer/DUI. Installation-instructions to follow...

JavaScript 0 1 41 0 Updated 2 days ago



### Top languages

- APL
- JavaScript
- Shell
- C
- Python

## dyalog-jupyter-kernel

A Jupyter kernel for Dyalog APL

jupyter-kernels apl dyalog

Python 4 15 6 0 Updated 2 days ago



### Most used topics

Manage

- apl
- dyalog
- dyalog-apl
- dyalogapl

## MiServer

MiServer- an APL-based web server - requires Dyalog APL available from <http://www.dyalog.com>

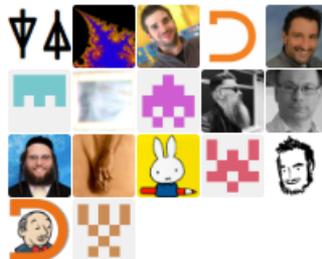
apl

APL MIT 8 25 7 0 Updated 3 days ago



### People

19 >



## link

Code for linking a namespace to a directory





Search

Sign in

Sign up



## The Carlisle Group, Inc

Dunmore, Pennsylvania

https://www.carlislegroup...

support@carlislegroup.com

Verified

Repositories 14

Packages

People

Projects

### Pinned repositories

#### Acre-Desktop

A simple Dyalog APL IDE plugin that introduces "projects" and allows you to keep your source code in Unicode text files.

● APL ★ 6 🍴 1

Find a repository...

Type: All ▾

Language: All ▾

#### Rumba

A Web Server for Dyalog APL

● APL 🍴 MIT 🍴 1 ★ 1 📄 9 🛠️ 1 Updated 3 hours ago

#### Top languages

● APL ● JavaScript

#### Most used topics

# Easier to Discover & Learn Dyalog APL

- ◆ Adam's "APL Orchard"
  - ◆ Already brought several new people into the community (we hired one: Nathan)
- ◆ Open-Source APL Projects
  - ◆ Acre, Link, MiServer, JSONServer, RESTServer, many more to come
- ◆ Webinars and Webcasts
  - ◆ Richard Park driving production of new training and marketing materials





Webinar Dyalog '18 Dyalog '17 Dyalog '16 Dyalog '15 Dyalog '14 Dyalog '13 Dyalog '12 Dyalog '11 APL Berlin 2010 Dyalog '09 Dyalog '08

Molecular Dynamics in Dyalog APL

```
LJmelt.ipynb Python.ipynb
```

```
phicutoff ← -/4+rcutoff*12 6  ⌘ Shifts the potential so E=0 when r/sig = 2.5  
ELJshift ← ELJ - phicutoff  
plot (←ELJ,r),(←ELJshift,r)
```

[4]:

Lennard-Jones potential

Play (k)

LJ plot LJ plot shifted



### Coming up

Molecular Dynamics in Dyalog APL  
Richard Park

### Previous Webinars

- Source Code Management with Dyalog v17.1  
Morten Kromberg
- Introducing the 2019 APL Problem Solving Competition  
Richard Park
- TryAPL - The Next Generation  
Richard Park
- Adventures in Advent of Code  
Jay Foad
- Jupyter Notebook support for Dyalog APL  
Adam Brudzewsky
- Cross-Platform Charting  
Brian Becker

# Easier to Discover & Learn Dyalog APL

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- ◆ Webinars and Webcasts
  - ◆ Richard Park driving production of new training and marketing materials
- ◆ Talks outside the APL Community
  - ◆ Marshall, Aaron, Morten, Roger at LambdaConf (Boulder, Colorado) and FunctionalConf (Bangalore)
  - ◆ Guest lectures at Universities

## Talks@Dyalog'19

**Tue 20:00 Richard Park**  
Molecular Dynamics in APL

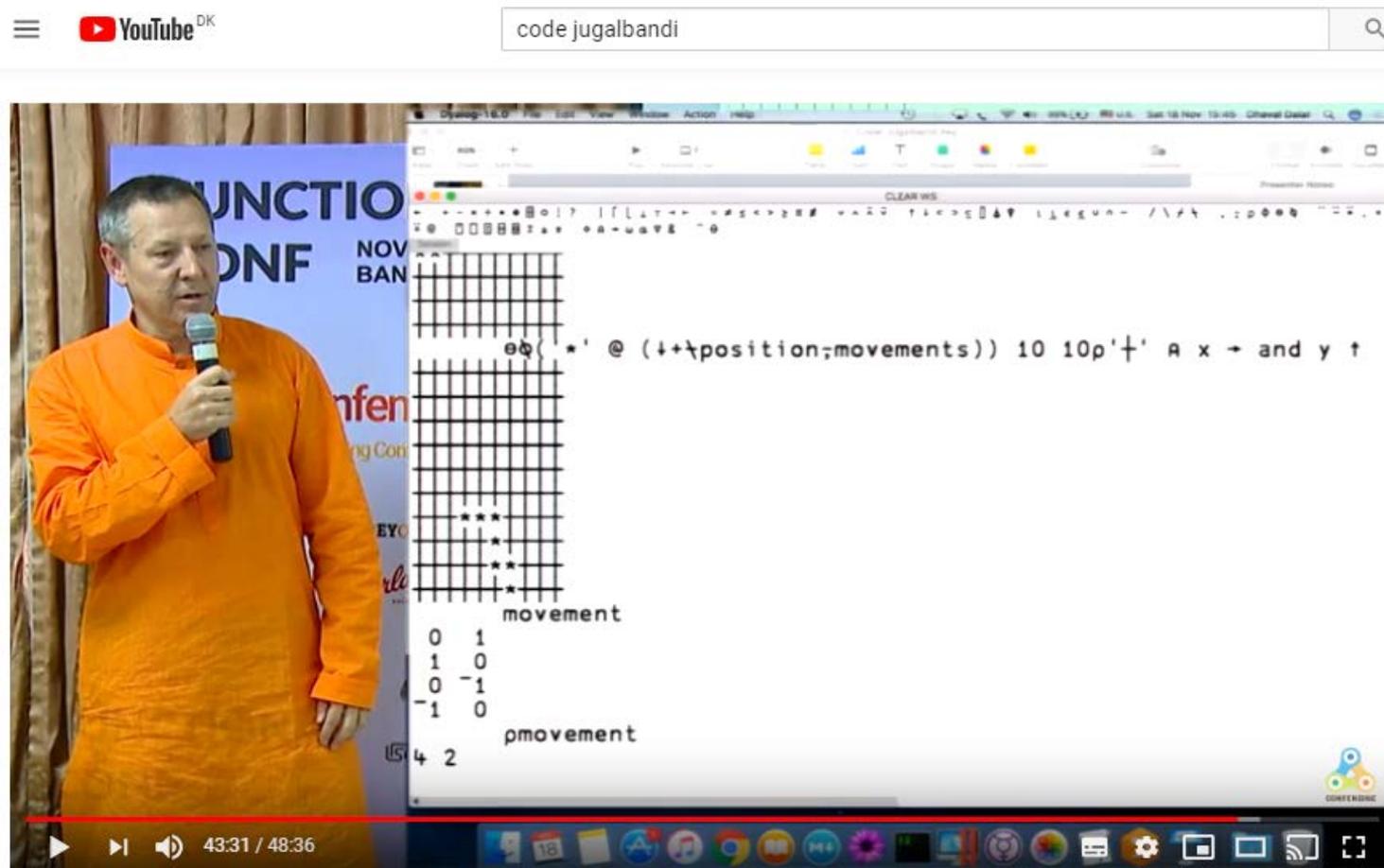
**Thu 09:30 Adam Brudzewsky**  
APLcart: A Novel Approach to  
Finding Your Way in APL

**Thu 10:00 Richard Park**  
Creating your first Dyalog  
Jupyter Notebook





 #dyalog19



Code Jugalbandi by Dhaval Dalal & Morten Kromberg at FnConf17



- Home
- About Us
- Meetings
- Information for Speakers
- Community

### Topic

**Array Oriented Functional Programming in APL**

### Speaker

**Morten Kromberg**

### When

**Tuesday, September 17, 2019 7:30 PM**

### Where

Marist College, **Hancock Center** (Building 14 on [map](#)), **Room 2023**. We thank Marist College for hosting the chapter's meetings. **Parking:** 1) Lot north of Hancock Center. We are permitted to park there in spite of the signs. 2) Lot on south-east corner of Route 9 and Fulton Street. Take staircase at south-west corner of lot, and tunnel under Route 9.

# Easier to Acquire Dyalog APL



- So you saw a presentation about APL... what next?
- From v17.1, Dyalog APL is available for experimentation *without* registration under W/L/M\*
- Public Linux Docker Containers available
  - Just type `$ docker run dyalog/dyalog`
  - Containers with pre-installed application frameworks: `dyalog/jsonserver`, `/miserver`, `/jupyter`, `/restserver`
- Dyalog APL is NOT FREE SOFTWARE, unregistered versions are for non-commercial use only!

\* W/L/M = Windows / Linux / macOS



# Easier to Acquire Dyalog

- ◆ So you saw a presentation about APL
- ◆ From v17.1, Dyalog APL is available *without* registration under W/L/M
- ◆ Public Linux Docker Containers available
  - ◆ Just type `$ docker run dyalog/`
  - ◆ Containers with pre-installed applications: `/jsonserver, /miserver, /jupyter`
- ◆ Dyalog APL is NOT FREE SOFTWARE. All versions are for non-commercial use

\* W/L/M = Windows / Linux / macOS

S

sales@dyalog.com

To sales@dyalog.com

↩
↶
→
⋮

02:17

There is a new application for a Personal licence.

Request filed: Thu 29 Aug 2019 01:17

Phoenix, AZ  
85029  
United States

t 0

Operating System: Windows  
GDPR Opt-in: no  
Additional comments:  
I regularly use and develop for all three systems (Windows, Linux, MacOS) and would appreciate licenses for all 3, if possible. I have just started learning APL and would appreciate the opportunity to ensure whatever code I write works "everywhere".



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**dyalog** [Edit profile](#)

Community Organization Dyalog Ltd Bramley, UK <https://www.dyalog.com> Joined January 5, 2018

### Repositories

Displaying 6 of 6 repositories

**dyalog/jupyter** 72 Downloads  
By [dyalog](#) • Updated a month ago  
[Container](#)

**dyalog/miserver** 939 Downloads  
By [dyalog](#) • Updated a month ago  
Dyalog MiServer  
[Container](#)



# Easier to Deploy Dyalog APL

v17.1:

- Public Docker Containers
- Support for "Headless" operations
- (RIDE for debugging headless processes)

v18.0:

- Cross-Platform Configuration Files
- Ability to launch APL directly from APL source files – no workspace required

**Talks@Dyalog'19**

**Mon 16:30 Geoff Streeter**

Shared Code Files

**Tue 20:00 Richard Smith**

Cross-Platform Configuration Files



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  - ◆ Solutions into other applications or frameworks
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  - ◆ Applications written in APL
  - ◆ The APL system itself



# Competitive Solutions in APL

v17.1:

- Portable UI: HTMLRenderer for Windows, macOS, Linux

v18.0

- A significant "performance release"



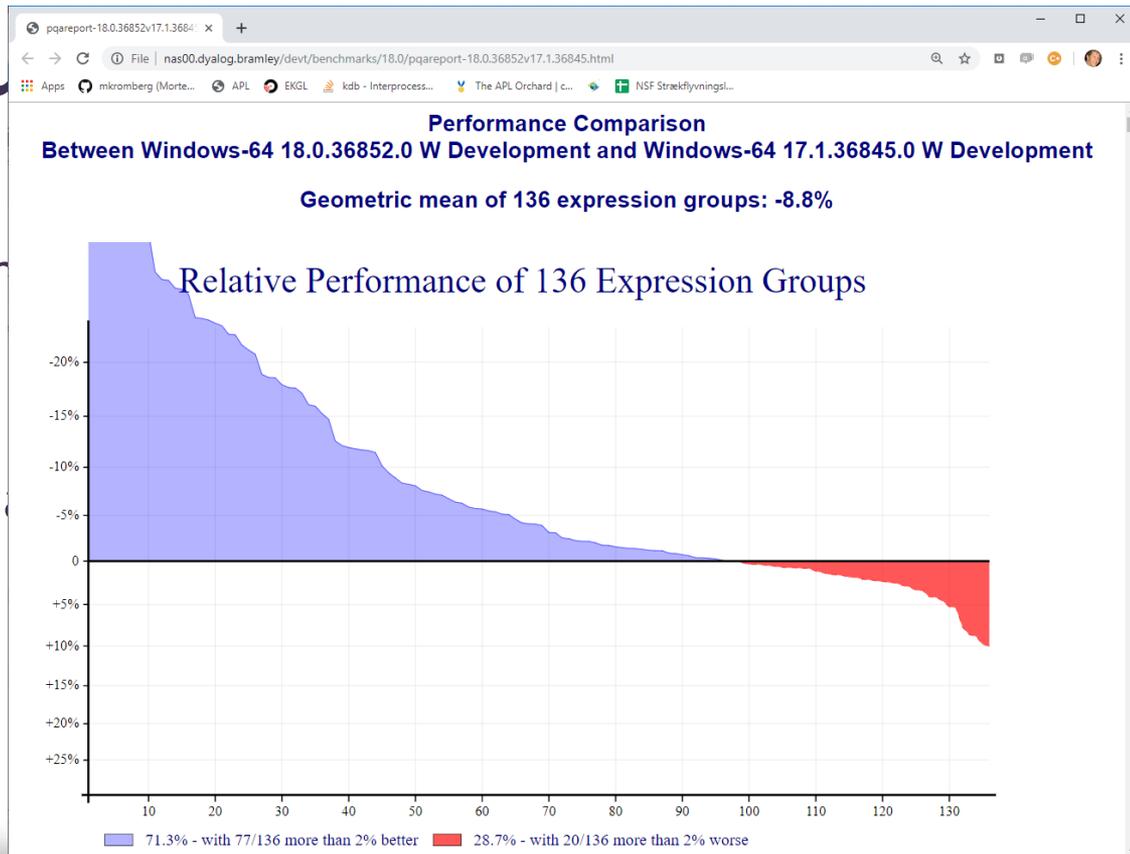
# Competitive Solution

v17.1:

- Portable UI: HTMLRender on macOS, Linux

v18.0

- A significant "performance



# Competitive Solutions in APL

v17.1:

- 🟡 Portable UI: HTMLRenderer for Windows, macOS, Linux

v18.0

- 🟡 A significant "performance release"
- 🟡 Date/Time conversion tools
- 🟡 Case mapping and folding
- 🟡 APL2XL Project

## Talks@Dyalog'19

**Mon 17:00 Richard Smith**

Is it Christmas Yet?

**Tue 09:00 Marshall Lochbaum**

Implementing Reduction

**Tue 15:00 Brian Becker**

Whats new with HTMLRenderer

**Tue 15:30 Josh David**

Easy Cross-Platform GUI

**Tue 17:00 Nathan Rogers**

Exporting Excel Tables from APL



# Dyalog's Goals

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  - ◆ ... and into development processes
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# Integrate with Apps and Frameworks

v17.1

- Tools to wrap APL code as a Shared Library *on any platform*
  - Easy inter-operation no longer limited to Microsoft COM/OLE or .NET
  - JSON\_APL.dll (or .JSON\_APL.so)
    - Provides a Foreign Function Interface to any APL application using JSON-encoded arguments and results.



# Integrate with ... .NET

- ◆ The **Microsoft.NET Framework** v1.0 was released in February 2002 for Windows XP
  - ◆ Supported by Dyalog APL v9.5 in September 2002
  - ◆ Current .NET Framework version numbers are v4.x
- ◆ The **Microsoft .NET Core** v1.0 was released in 2016 as an open source replacement targeting mobile devices, for W/L/M (Windows, Linux, macOS)
  - ◆ v3.0 is appearing now.
- ◆ **Microsoft .NET 5.0** (NB no "Core" or "Framework") will replace both of the above.



# Integrate with ... .NET

- Dyalog v18.0 will support .NET Core 3.0 and the future .NET 5.0 under W/L/M.
  - Perhaps Xamarin/Mono on Android
  - Not sure about IBM POWER Linux
- This will make a HUGE collection of libraries available for APL application development.



**Talks@Dyalog'19**  
**Mon 10:00 John Daintree**  
Cor(e) Blimey!  
What's He Up To Now?



# Integrate with Dev[Ops] Processes

APL needs to integrate with tools for

- Source Code Management (SCM)
- Building, Testing and Deploying

v17.1:

- Link replaces SALT as the recommended interface to SCM (also available for 17.0)

Next:

- Packaging the APL interpreter itself for "Continuous Integration" pipelines
  - Linux Apt-get, Windows NuGet(?)



github  
SOCIAL CODING



Jenkins



docker



# Integrate with Dev[Ops]: Link

- ◆ Dyalog is expecting widespread adoption of Link and the use of text files for APL source
- ◆ Next Steps
  - ◆ APL Package Repository
  - ◆ Dependency Management
  - ◆ [Unit] Test Framework
- ◆ Dyalog aims to participate in and co-fund collaborative open source projects



**Talks@Dyalog'19**

**Mon 13:15 Adam + Morten**

Link

**Mon 13:45 Paul Mansour**

A Git Workflow for Dyalog APL

**Also expect more Webinars!**



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# Easier to Maintain APL Applications

- ◆ RIDE vs Windows ODE
- ◆ Integration with VS Code and other popular development tools



File Explorer window showing the directory structure of a file named 'core'.

The left pane shows the file tree:

- inetpub
- OneDriveTemp
- PerfLogs
- Program Files
- Application Verifier
- Common Files
- dotnet
- Dyalog
  - Dyalog APL-64 16.0 Unicode
  - Dyalog APL-64 17.0 Unicode
  - Dyalog APL-64 17.1 Unicode
- aplfmt
- apltrans
- Base
- help
- Library
- locales
- PublicCACerts
- SALT
- core

The right pane shows the contents of the 'core' directory:

- Parser.dyalog
- SALT.dyalog
- SALTUtils.dyalog (selected)
- UnicodeFile.dyalog
- Utils.dyalog

The code editor displays the following APL code for SALTUtils.dyalog:

```

[0]  ▽ desc←{stem}describeSwitches switches;w;t;s;n;sn:
[1]  A Describe the switches in layman's terms
[2]  □ML+1 ◊ i++/s+t=1tt+rlb switches
[3]  line←(i>0)/i{6::'Accepts modifier',(1<α)/'s' ◊ s
[4]  :For w :In {w[Δtω]}rtb"set
[5]      :If (ps+w)≥i+[/wt'='ε'
[6]          s[i]←' ' ◊ n-ps+(i+</st'['=])ts A does th
[7]          :If n<pw
[8]              sn+1φ''''',1ts~['=]' A is ther
[9]          :If w[i]=' '
[10]             details,+εCR,"□PW Fold' Modifier
[11]          :ElseIf w[i]='ε'
[12]             details,+εCR,"□PW Fold' Modifier
[13]          :Else
[14]             details,+CR,'The default value o
[15]          :EndIf
[16]      :EndIf
[17]  :EndIf
[18]  :If □PW<1+(pline)+ps A exceeding □PW?
[19]      desc,+CR,line ◊ line+s A yes, start a ne
[20]  :Else
[21]      line,+ ' ',s A no, append to cu
[22]  :EndIf
[23]  :EndFor
[24]  desc,+((0=pt)≥CRdesc)↓CR,t+line,details
[25]  ▽

setFlag←{2 □NQ'.' 'SetDFlags'ω}

A This function splits the number of arguments from th
splitRule←{'^.=R+rlb ω:' ◊ (1fω)ε□d:rlb"R split
  
```

At the bottom of the window, the status bar shows: 5 items, 1 item selected, 102 KB, State: Shared.

File Home Share View

Search... x

5 items 1 item selected 102 KB State:

- inetpub
- OneDriveTemp
- PerfLogs
- Program Files
- Application Verifier
- Common Files
- dotnet
- Dyalog
- Dyalog APL-64 16.0 Unicode
- Dyalog APL-64 17.0 Unicode
- Dyalog APL-64 17.1 Unicode
- aplfmt
- apltrns
- Base
- help
- Library
- locales
- PublicCACerts
- SALT
- core

```

MODE←24A8
A MODE is used to: 0=display ]? names
A 4=fixed column display, 8=by group,

APLV←'. 'WG'APLVersion'
WIN←'Win'≡OS←3↑1⇒APLV
▽ arm←ARM
  EX 'ARM'
  :If 'Lin'≡OS
    ARM←'arm'≡3↑⇒SH'uname -m'
  :Else
    ARM←0
  :EndIf
  arm←ARM
▽
UNICODE←~CLASSIC←82=DR ''
X86←~AMD64←'64'≡2↑1⇒APLV
BITS←32×1+AMD64
LINDEL←(~WIN)↓13 10
V14←14±{(2+\'.'=ω)/ω}2⇒APLV
FS←'/'[1+WIN] ♦ PATHDEL←':;'[1+WIN]
USERDIR←{ω:(↑~1-'\'i~φ)2⇒4070IΘ ♦ '/'
DIALOG←2 NQ'.' 'GetEnvironment' 'DYA
AZaz←' '.A.[0.1]'abcdefghijklmnopars
  
```

```

beSwitches switches;w;t:s;n:sn:
ches in layman's terms
tt+rlb switches
Accepts modifier',(1α)/'s' ♦ s
]}rtb"set
[/w'=':ε' A does th
♦ n+ps+(i+</st'='=)'ts A is the
'','',1ts~'=' A is ther
'','',1ts~'=' A the swi
[i]=''
etails,+εCR,"PW Fold' Modifier
If w[i]='ε'
etails,+εCR,"PW Fold' Modifier
etails,+CR,'The default value o
f
ine)+ps A exceeding [PW?
line ♦ line+s A yes, start a ne
,s A no, append to cu
desc)↓CR,t+line,details
SetDFlags'w}
the number of arguments from th
rlb w:' ♦ (1w)εD:rlb"R split
  
```



GITLENS

REPOSITORIES

- Link master 251 0t • ~4 -1 • Last fetched 9:29pm...
  - master 251 0t ⇌ origin/master
    - Over a month ago
      - Handle listing links with no linked members ...
      - Don't init globals +0 ~1 -0 • abrudz, 2 months...
      - Exception trap +0 ~1 -0 • abrudz, 2 months ago
      - Merge branch 'master' of https://github.com...
      - Add general casing util +0 ~1 -0 • abrudz, 2 ...
      - Actually apply the case code, not just remov...
      - Fix #74 +0 ~1 -0 • abrudz, 2 months ago
      - Fixes #75: Src files incorrectly updated after )...
      - Fixes #77: FileSystemWatcher threading issu...
      - M FileSystemWatcher.apln StartupS...**
      - Fixed #76: Add "ViewMetaData" +1 ~0 -0 • Y...
      - ... Show More Commits
    - 25 commits behind
    - 5 files changed
    - Compare master (working) with <branch, tag, ...

FILE HISTORY

LINE HISTORY

COMPARE

SEARCH COMMITS

```

c: > Devt > Link > StartupSession > Link > FileSystemWatcher.apln
27 r+LJNEW Disposable watcher A wrap a de: 27 r+LJNEW Disposable watcher A wrap
28 r.ODF 1φ'] [' , ##.U.WinSlash>args 28 r.ODF 1φ'] [' , ##.U.WinSlash>args
29 29
30 :Class Disposable 30 :Class Disposable
31 :Field Public Object 31 :Field Public Object
32 32
33 :Access Public 33 :Access Public
34 :Implements Constructor 34 :Implements Constructor
35 Object+ref 35 Object+ref
36 36
37 37
38 :Trap 0 38 :Trap 0
39 ref.Dispose 39 ref.Dispose
40 :EndTrap 40 :EndTrap
41 41
42 - ▾ dispose;tid 42 + ▾ dispose You, 2 months a
43 :Implements Destructor 43 :Implements Destructor
44 Object.EnableRaisingEvents+0 44 Object.EnableRaisingEvents+0
45 - tid+do_dispose&Object 45 + do_dispose Object
46 46
47 :EndClass 47 :EndClass
48 :EndNamespace 48 :EndNamespace
49 49

```

# Easier to Maintain The APL System

- Updates to Dyalog v17.1 for Windows will be MSP files.
  - Can update all files in a Windows installation
  - Old "patch" workspace available for a year or two
- Dyalog for macOS: Install & Update using .pkg files
- Linux: .deb & .rpm installers
- Raspberry Pi + Coming on Intel Linux
  - apt-get install|update dyalog



## Easier to Verify Installation

- All executables are signed under Microsoft Windows
- Hashes / signatures available for executables on all other platforms



# Summary

Version 17.1 is easier to

- ◆ Get hold of – download and install – no registration required
- ◆ Verify, and maintain once installed
- ◆ Integrate into other applications and into development processes

Version 18.0 will bring

- ◆ Significant performance enhancements
- ◆ A cross-platform .NET bridge
- ◆ Cross-platform, cascading configuration files
- ◆ Easy launching of Dyalog APL solely from text source
- ◆ System Functions for Dates & Timestamps, and Text Case-ing



# Critical Focus Areas

## Dyalog

- ◆ SCM: APL Packages, Dependency Management
- ◆ Invest in tools and interfaces for cloud computing (ODATA, OAUTH)
- ◆ Understand whether .NET 5.0 really will achieve widespread adoption
- ◆ Performance

## You (if I may be so bold)

- ◆ Get your source code into text files!
  - ◆ Everything else gets so much easier...
- ◆ Think about how you will add encryption and security to your application to make it cloud ready
- ◆ Take apprentices!



# New Faces at Dyalog

Documentation, Samples, Webinars:

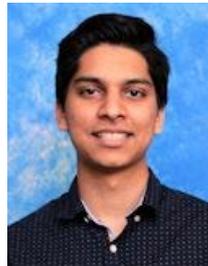
- Richard Park joined us late last year



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- Richard Park joined us late last year  
United States Consulting Team
- Josh David
- Nathan Rogers



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Documentation, Samples, Webinars:

- Richard Park joined us late last year

United States Consulting Team

- Josh David
- Nathan Rogers

Interpreter Development

- We expect to have a new C developer on board before the end of 2019



# And Finally, a World Premiere...



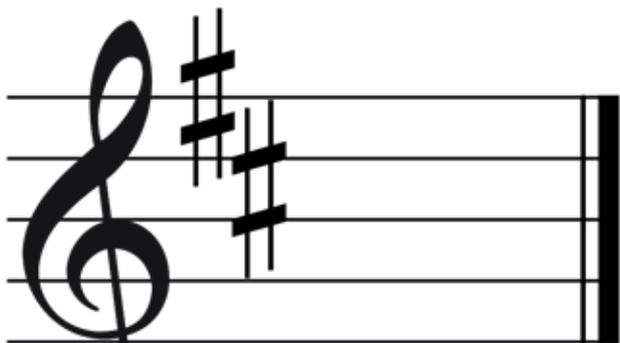
# The Dyalog Jingle



Keynote:  major



# The Dyalog Jingle



Keynote:



major

Original Composition by  
Stefano Lanzavecchia

