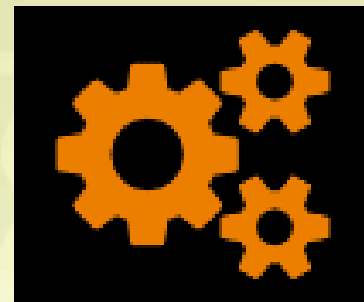


Introducing Dialog version 18.0




But First: Switching Gears








- Due to Corona virus lockdowns, many APL meetings have been cancelled or postponed
 - FinnAPL, SwedAPL, APL Germany, British APL Association, NYC Meetups...

- Dyalog will now run "webinars" every two weeks
 - We will also start producing "Web casts" to explain how to get started with new (and some old) features.



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April 2020

- 30 [Dyalog webinar](#): Morten presents **Introducing Dyalog version 18.0**

May 2020

- 4-5 [APL Germany spring conference](#) in Berlin, Germany POSTPONED
- 7 [BAA webinar](#): Adám Brudzewsky (Dyalog Ltd) presents **Meet the New APL Wiki**
- 14 [Dyalog webinar](#): Adám presents **Language Features of Dyalog version 18.0 in Depth**
- 21 [BAA webinar](#): Phil Last presents **Acre Source-code Manager Update**
- 28 [Dyalog webinar](#): RichardP presents **APL and Microsoft Excel**

...






October 2020

- 11-15 [Dyalog '20](#) in Olhão, Portugal


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Dyalog Version 18.0 - Themes

Platform Equivalence

- .NET Core Bridge
- Launch Source Files
- Configuration Files
- HTMLRenderer + RIDE enhancements

Easier to Build, Test, Deploy

- Launch source files
- Configuration Files
- Multi-Line Input

Performance

- "Performance QA" nearly 10% faster

Dyalog Version 18.0 - Themes

Platform Equivalence

- .NET Core Bridge
- Launch Source Files
- Configuration Files
- HTMLRenderer + RIDE enhancements

Easier to Build, Test, Deploy

- Launch source files
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- Multi-Line Input

Performance





























- "Performance QA" nearly 10% faster

Improving the Tool of Thought

- Operators ~ Constant, ~ Atop, ~ Over
- Function ≠ Unique Mask
- Case Folding with □C
- Date Conversions with □DT
- Multi-Line Input



NB: All Release Notes are on Line!

-  Welcome
-  Release Notes V18.0
 -  Introduction
 -  Version 18.0 Key Features
 -  Introducing Configuration Files
 -  Multi-line Session Input
 -  Extension to Where
 -  Extensions to Mix
 -  Regex Variant Option
 -  Serialising Namespaces
 -  Load
 -  LX
 -  Bug Fixes
 -  Announcements
 -  Configuration
 -  Language Reference Changes
 -  Object Reference Changes
 -  Installation and Configuration Guide
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 -  Language Reference Guide
 -  Object Reference
 -  UI Guide
 -  Interface Guide
 -  .NET Framework Interface Guide
 -  Old Release Notes
 -  Licences for third-party components
 -  Trademarks

Key Features

Installation and Configuration

- Version 18.0 introduces platform-independent configuration files. See [Introducing Configuration Files](#).

Running Script Files

- Version 18.0 provides the capability of launching the Dyalog program on script files. This is achieved by two new parameters which may be specified on the command-line. See [Load](#) and [LX](#).

New Language Features

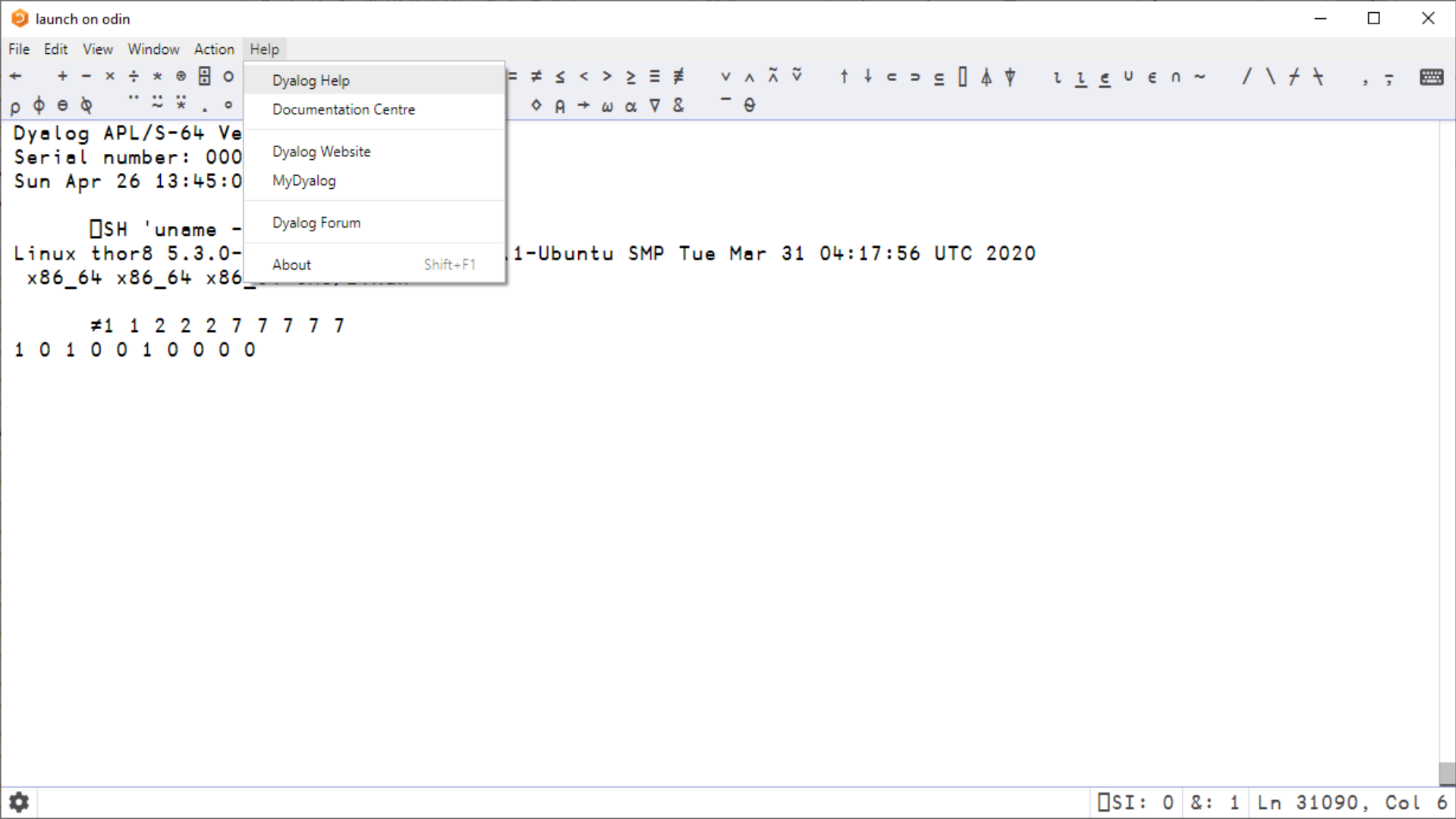
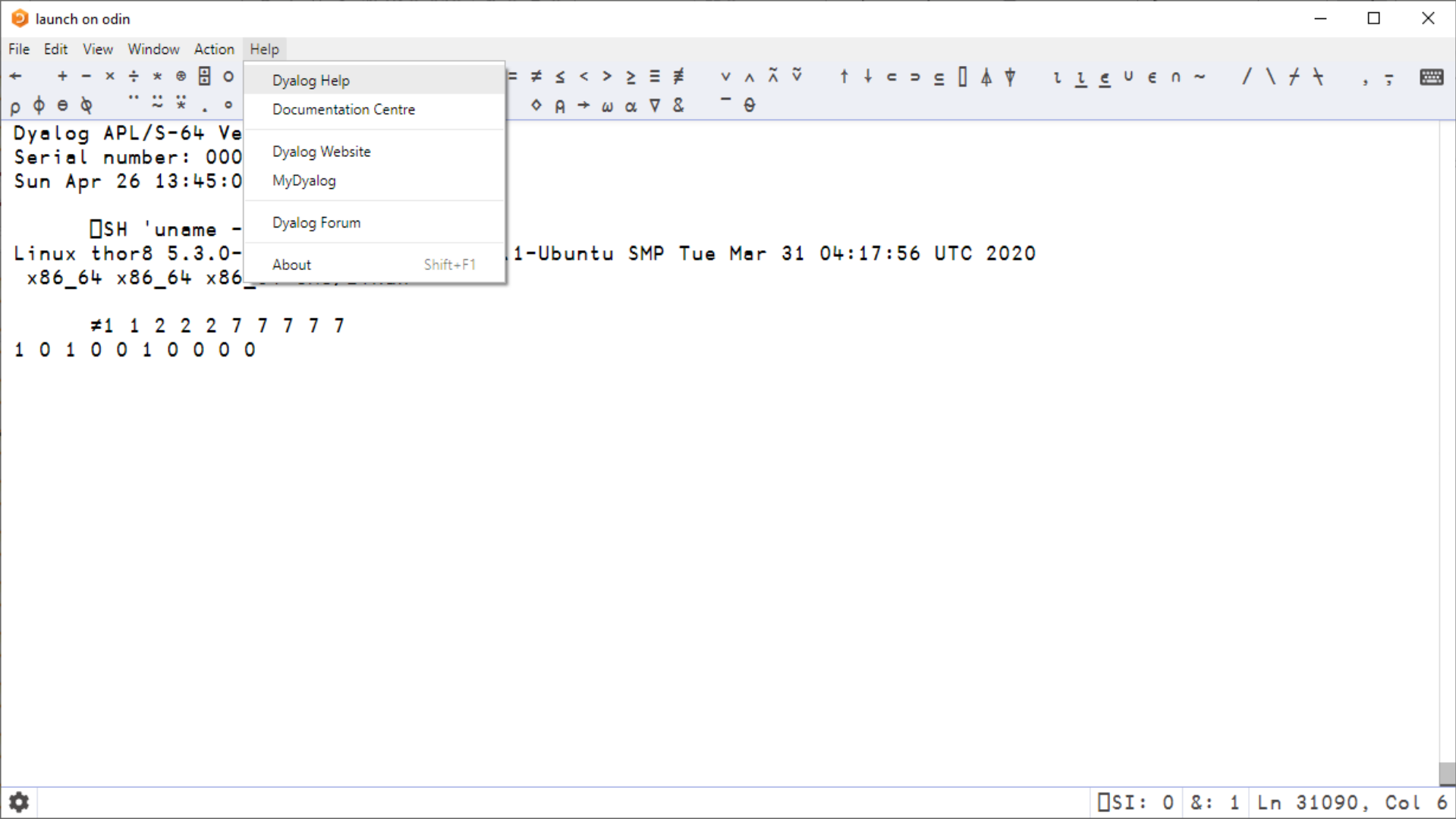
- New monadic \neq function. See [Unique Mask](#).
- New operators [Atop](#) and [Constant](#).
- New System Function [QC](#). This new function is intended to replace [819±](#) which is deprecated. See [Case Convert](#).
- New system function [QDT](#). See [Date-time](#).
- New i-beam function. See [Format Date-time](#).

Improved Language Features

- [QJSON](#) provides a new **HighRank** option to handle arrays with rank >1 automatically, and a new **Dialect** option that permits [JSON5](#) extensions.
- [QINPUT](#) provides a new **NEOL** option that specifies how embedded line separators are treated.
- The Where function (monadic [Q](#)), which previously accepted only a Boolean argument, has been extended to allow non-negative integers. See [Extension to Where](#).
- Partitioned enclose has been extended to permit empty result elements. See [Partitioned Enclose](#).
- Mix has been improved so that certain APL2 extensions which were provided only when [QML](#) ≥ 2 are now provided at all levels of [QML](#). See [Extensions to Mix](#).
- [QS](#) and [QR](#) now have a **Regex** Variant option that can be used to disable regular expression matching. See [Regex Variant Option](#).
- The rules concerning the serialisation of arrays that contain external references have been re-defined. See [Serialising Namespaces](#).

Documentation Changes

- The Composition operator, which was previously described in terms of 4 forms has been renamed [Beside](#) (forms I and IV) and [Bind](#) (forms II and III). Only the descriptions have changed, the features and functionality have not changed.
- The documentation for Run Time applications has been updated to take advantage of the new configuration files. See [Run-Time Applications and Components](#).



Dyalog version 18.0 - Version 18.0

help.dyalog.com/18.0/#RelNotes18.0/Key%20Features.htm

Apps mkromberg (Morte... APL kdb - Interprocess... The APL Orchard | c... Git Flying & Sailing Dyalog Cloud Exercises

DYALOG

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Key Features

Installation and Configuration

Running Script Files

New Language Features

Improved Language Features

Documentation Changes

Installation and Configuration

Version 18.0 introduces platform-independent configuration files. See [Introducing Configuration Files](#).

During installation, `setup.exe` associates a number of new file extensions with the Dyalog APL Editor `dyaedit.exe`. See [File Associations](#).

Running Script Files

Version 18.0 provides the capability of launching the Dyalog program on script files. This is achieved by two new parameters which may be specified on the command-line. See [Load](#) and [LX](#).

New Language Features

New monadic `⌘` function. See [Unique Mask](#).

New operators [Atop](#) and [Constant](#).

New System Function `⌈C`. This new function is intended to replace `819⌘` which is deprecated. See [Case Convert](#).

New system function `⌈DT`. See [Date-time](#).

New i-beam function. See [Format Date-time](#).

Improved Language Features

`⌈JSON` provides a new **HighRank** option to handle arrays with rank >1 automatically, and a new **Dialect** option that permits [JSON5](#) extensions.

`⌈INPUT` provides a new **NEOL** option that specifies how embedded line separators are treated.

The Where function (monadic `⌈`), which previously accepted only a Boolean argument, has been extended to allow non-negative integers. See [Extension to Where](#).

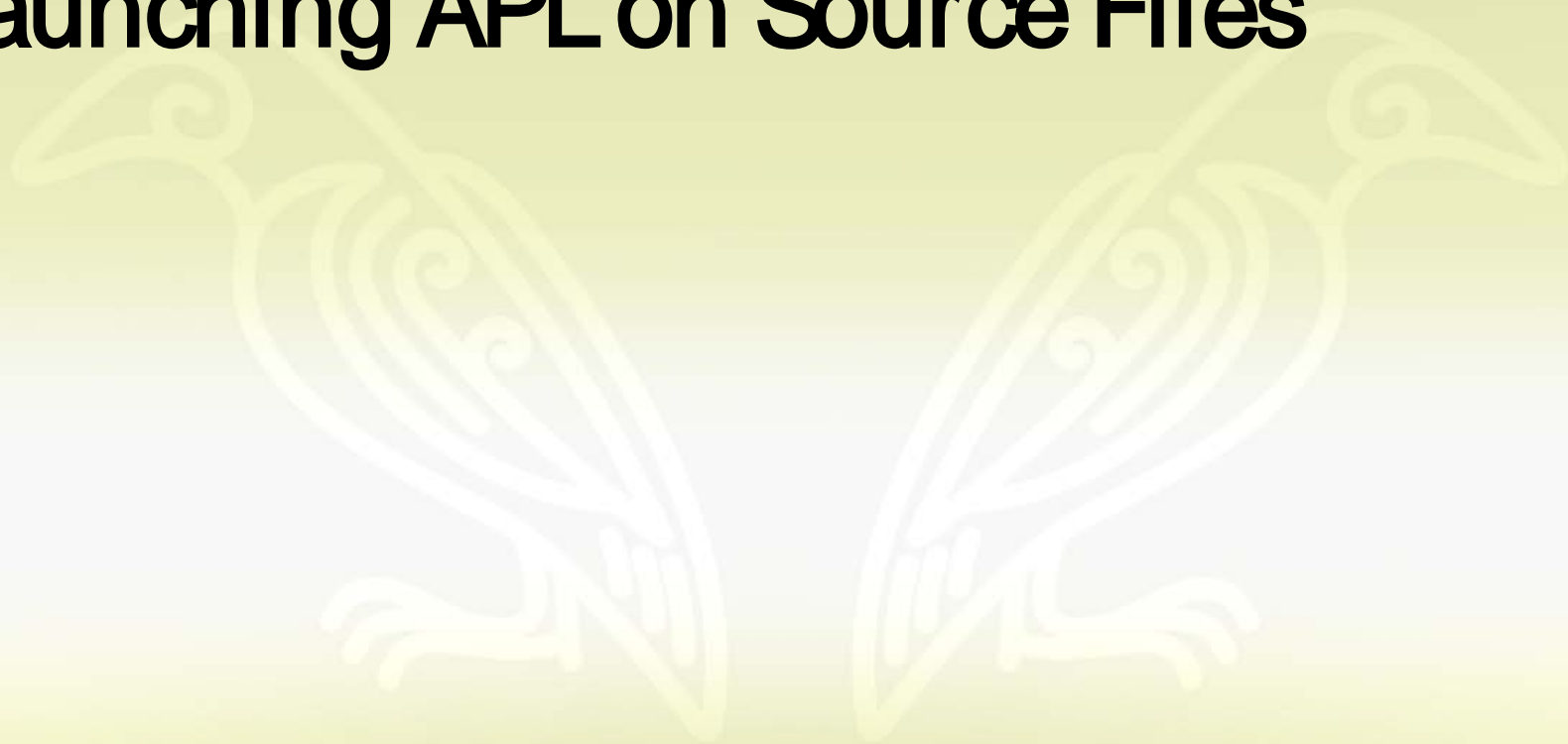
Partitioned enclose has been extended to permit empty result elements. See [Partitioned Enclose](#).

Mix has been improved so that certain APL2 extensions which were provided only when `⌈DML≥2` are now provided at all levels of `⌈DML`. See [Extensions to Mix](#).

`⌈S` and `⌈R` now have a **Regex** Variant option that can be used to disable regular expression matching. See [Regex Variant Option](#).

The rules concerning the serialisation of arrays that contain external references have been re-defined. See [Serialising Namespaces](#).

Launching APL on Source Files



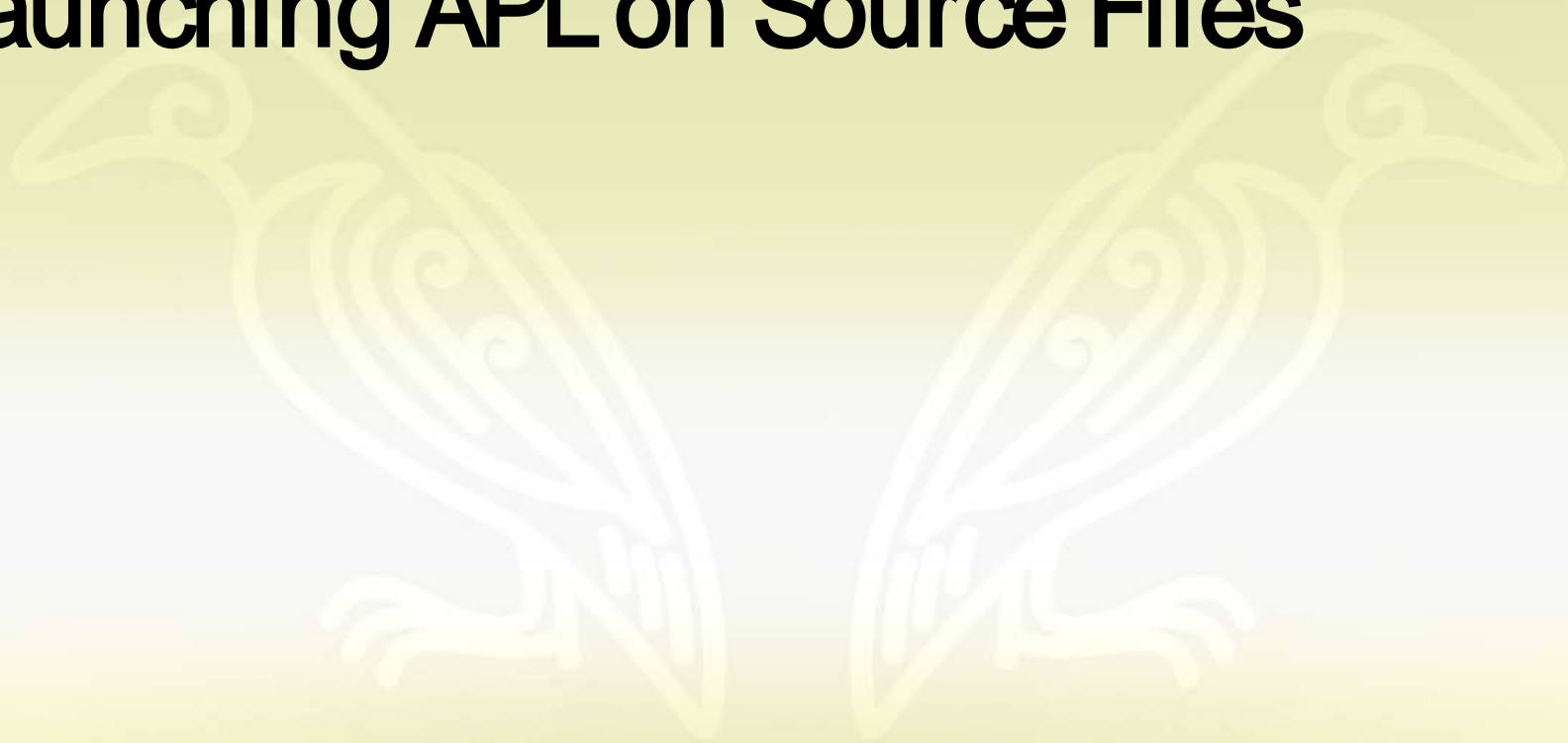
Launching APL on Source Files

- The interpreter can be launched on
 - a binary workspace (.dws)
 - a "dyalog application file" (.dyapp)

Launching APL on Source Files

- The interpreter can be launched on
 - a binary workspace (.dws)
 - a "dyalog application file" (.dyapp)
- Version 18.0 allows ANY APL source file
 - with special treatment of
 - Functions (.apl f)
 - Namespaces (.apl n)
 - Classes (.apl c)

Launching APL on Source Files



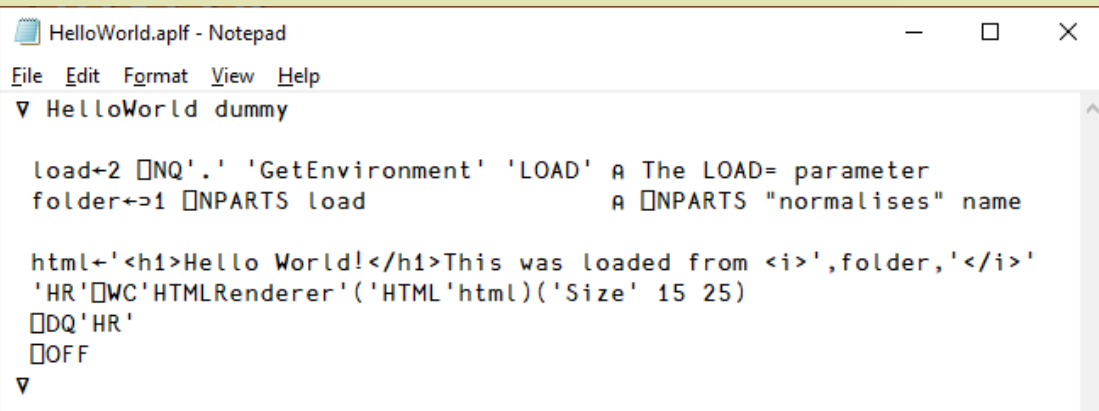
Launching APL

```
HelloWorld.aplf - Notepad
File Edit Format View Help
▽ HelloWorld dummy

load+2 ⎕NQ'.' 'GetEnvironment' 'LOAD' ⌈ The LOAD= parameter
folder↔1 ⎕NPARTS load ⌈ ⎕NPARTS "normalises" name

html←'<h1>Hello World!</h1>This was loaded from <i>',folder,'</i>'
'HR'⎕WC'HTMLRenderer'('HTML'html)('Size' 15 25)
⎕DQ'HR'
⎕OFF
⌵
```

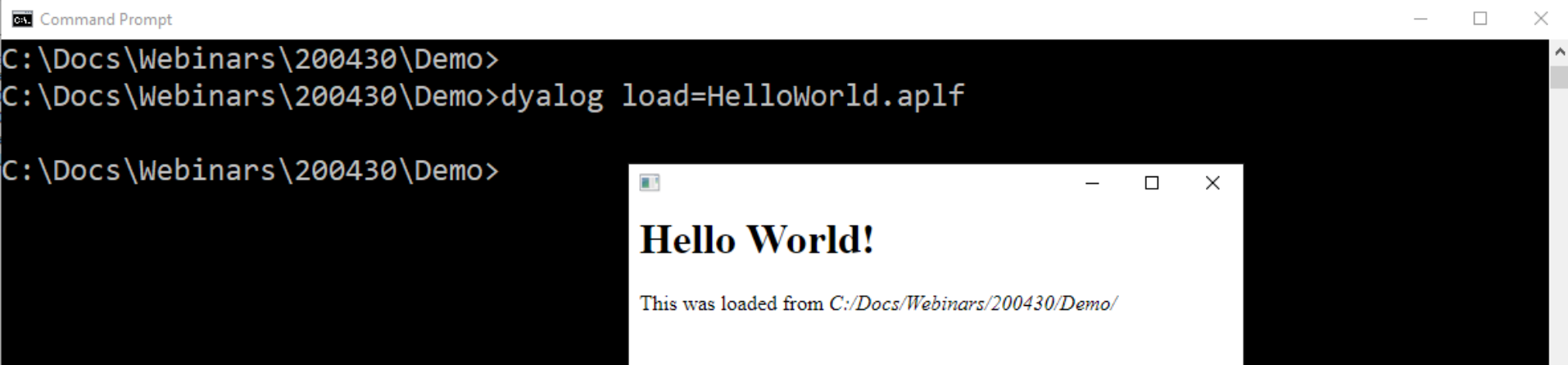

Launching APL



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HelloWorld.aplf - Notepad
File Edit Format View Help
▼ HelloWorld dummy

load+2 □NQ'.' 'GetEnvironment' 'LOAD' ⌈ The LOAD= parameter
folder↔1 □NPARTS load ⌈ ⌈NPARTS "normalises" name

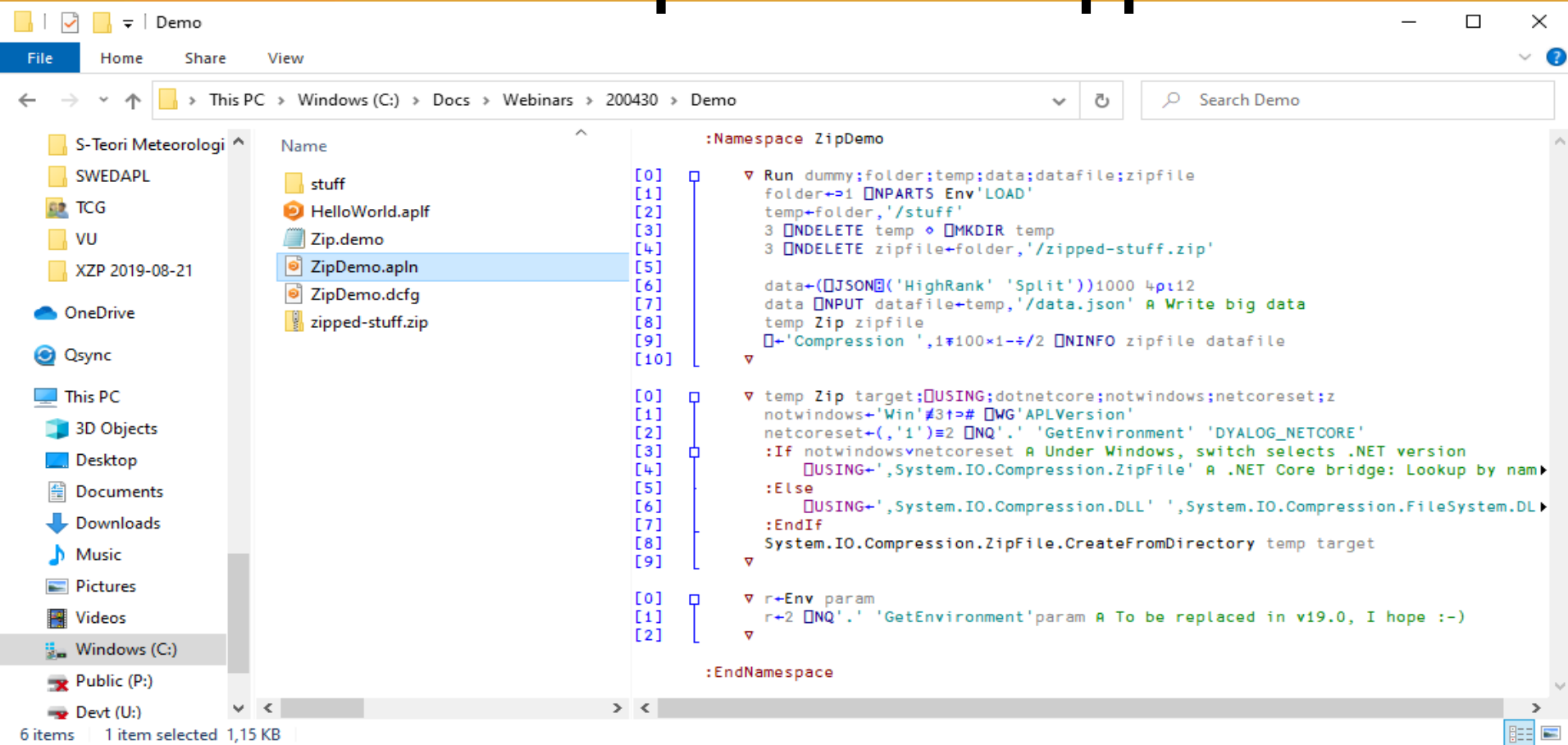
html←'<h1>Hello World!</h1>This was loaded from <i>',folder,'</i>'
'HR'□WC'HTMLRenderer'('HTML'html)('Size' 15 25)
□DQ'HR'
□OFF
▼
```



```
C:\Docs\Webinars\200430\Demo>
C:\Docs\Webinars\200430\Demo>dyalog load=HelloWorld.aplf
C:\Docs\Webinars\200430\Demo>
```

Hello World!

This was loaded from *C:/Docs/Webinars/200430/Demo/*



The screenshot shows a Windows File Explorer window with the address bar set to 'This PC > Windows (C:) > Docs > Webinars > 200430 > Demo'. The left sidebar shows the 'Demo' folder selected. The main pane displays a list of files and folders: 'stuff', 'HelloWorld.aplf', 'Zip.demo', 'ZipDemo.apln' (selected), 'ZipDemo.dcfg', and 'zipped-stuff.zip'. The right pane shows the contents of the selected file, 'ZipDemo.apln', which is a Dyalog APL script. The script is organized into two namespaces: ':Namespace ZipDemo' and ':EndNamespace'. The first namespace contains code for creating a dummy zip file and writing data to it. The second namespace contains code for creating a zip file from a directory.

```
:Namespace ZipDemo

[0] Run dummy:folder:temp:data:datafile:zipfile
[1] folder←1 ⎕NPARTS Env'LOAD'
[2] temp←folder,'/stuff'
[3] 3 ⎕DELETE temp ⎕MKDIR temp
[4] 3 ⎕DELETE zipfile←folder,'/zipped-stuff.zip'
[5]
[6] data←(⎕JSON⎕('HighRank' 'Split'))1000 4p12
[7] data ⎕INPUT datafile←temp,'/data.json' A Write big data
[8] temp Zip zipfile
[9] ⎕←'Compression ',1⌞100×1-÷/2 ⎕NINFO zipfile datafile
[10]

[0]
[1]
[2]
[3]
[4]
[5]
[6]
[7]
[8]
[9]

[0] temp Zip target;⎕USING;dotnetcore;notwindows;netcoreset;z
[1] notwindows←'Win'#3⌞# ⎕WG'APLVersion'
[2] netcoreset←(,1')≡2 ⎕NQ.' 'GetEnvironment' 'DYALOG_NETCORE'
[3] :If notwindows≠netcoreset A Under Windows, switch selects .NET version
[4]   ⎕USING←',System.IO.Compression.ZipFile' A .NET Core bridge: Lookup by nam
[5] :Else
[6]   ⎕USING←',System.IO.Compression.DLL' ',System.IO.Compression.FileSystem.DL
[7] :EndIf
[8] System.IO.Compression.ZipFile.CreateFromDirectory temp target
[9]

[0]
[1]
[2]

r←Env param
r←2 ⎕NQ.' 'GetEnvironment'param A To be replaced in v19.0, I hope :-)

:EndNamespace
```

File Home Share View

← → ↕ ↑ This PC > Windows (C:) > Docs > Webinars > 200430 > Demo

Search Demo

S-Teori Meteorologi
SWEDAPL
TCG
VU
XZP 2019-08-21
OneDrive
Qsync
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Windows (C:)
Public (P:)
Dev (U:)

6 items | 1 item selected 1,15 KB

Name

- stuff
- HelloWorld.aplf
- Zip.demo
- ZipDemo.apln
- ZipDemo.dcfg
- zipped-stuff.zip

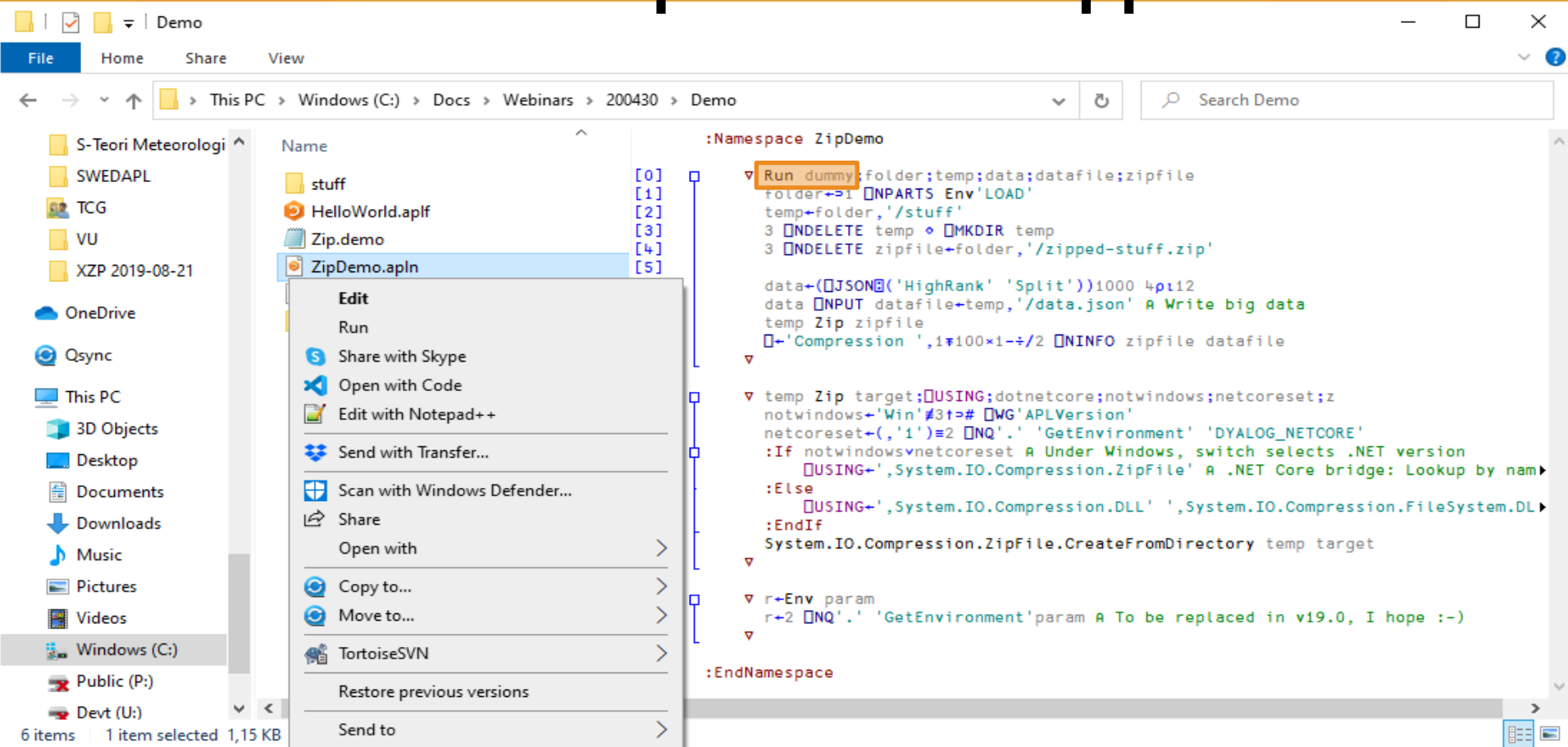
```
:Namespace ZipDemo

[0] Run dummy: folder: temp: data: datafile: zipfile
[1] folder←1 [NPARTS Env'LOAD'
[2] temp←folder, '/stuff'
[3] [NDELETE temp [MKDIR temp
[4] [NDELETE zipfile←folder, '/zipped-stuff.zip'
[5]
[6] data←([JSON@('HighRank' 'Split'))1000 4p12
[7] data [NPUT datafile←temp, '/data.json' A Write big data
[8] temp Zip zipfile
[9] [←'Compression ',1#100×1-÷/2 [NINFO zipfile datafile
[10]

[0] temp Zip target:[USING;dotnetcore;notwindows;netcoreset;z
[1] notwindows←'Win'#3÷# [WG'APLVersion'
[2] netcoreset←(,1')≡2 [NQ'. 'GetEnvironment' 'DYALOG_NETCORE'
[3] :If notwindows≠netcoreset A Under Windows, switch selects .NET version
[4] [USING←',System.IO.Compression.ZipFile' A .NET Core bridge: Lookup by nam
[5] :Else
[6] [USING←',System.IO.Compression.DLL' ',System.IO.Compression.FileSystem.DL
[7] :EndIf
[8] System.IO.Compression.ZipFile.CreateFromDirectory temp target
[9]

[0] r←Env param
[1] r←2 [NQ'. 'GetEnvironment'param A To be replaced in v19.0, I hope :-)
[2]

:EndNamespace
```



The screenshot shows a Windows File Explorer window titled "Demo". The address bar indicates the path: This PC > Windows (C:) > Docs > Webinars > 200430 > Demo. The left sidebar shows the "This PC" view with various locations like OneDrive, Qsync, and Windows (C:). The main pane displays a list of files and folders: stuff, HelloWorld.aplf, Zip.demo, and ZipDemo.apln. The ZipDemo.apln file is selected, and a context menu is open over it, showing options such as Edit, Run, Share with Skype, Open with Code, Edit with Notepad++, Send with Transfer..., Scan with Windows Defender..., Share, Open with, Copy to..., Move to..., TortoiseSVN, Restore previous versions, and Send to. The right pane shows the code for the ZipDemo namespace, which includes a Run dummy function and a Zip target function.

```
:Namespace ZipDemo

Run dummy: folder; temp; data; datafile; zipfile
  folder+=1 [NPARTS Env 'LOAD'
  temp+=folder, '/stuff'
  3 [NDELETE temp [MKDIR temp
  3 [NDELETE zipfile+=folder, '/zipped-stuff.zip'

  data+([JSON@('HighRank' 'Split'))1000 4p12
  data [INPUT datafile+=temp, '/data.json' A Write big data
  temp Zip zipfile
  [+= 'Compression ' 1*100*1-÷/2 [NINFO zipfile datafile

temp Zip target; [USING; dotnetcore; notwindows; netcoreset; z
notwindows+= 'Win' #3+=# [WG 'APLVersion'
netcoreset+= (, '1')=2 [NQ. ' 'GetEnvironment' 'DYALOG_NETCORE'
:If notwindows netcoreset A Under Windows, switch selects .NET version
  [USING+= 'System.IO.Compression.ZipFile' A .NET Core bridge: Lookup by nam
:Else
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System.IO.Compression.ZipFile.CreateFromDirectory temp target

r+=Env param
r+=2 [NQ. ' 'GetEnvironment' param A To be replaced in v19.0, I hope :-)

:EndNamespace
```

The screenshot displays the Dyalog APL/W-64 environment. On the left, a file explorer shows the directory structure, with 'ZipDemo.apln' selected. The main window is titled 'CLEAR WS - Dyalog APL/W-64' and contains a menu bar, a toolbar, and a language bar. The editor area shows the following text:

```
Dyalog APL/W-64 Version 18.0.38293  
Serial number: 000013 - pre-release software  
Tue Apr 28 08:38:46 2020  
Compression 98.2
```

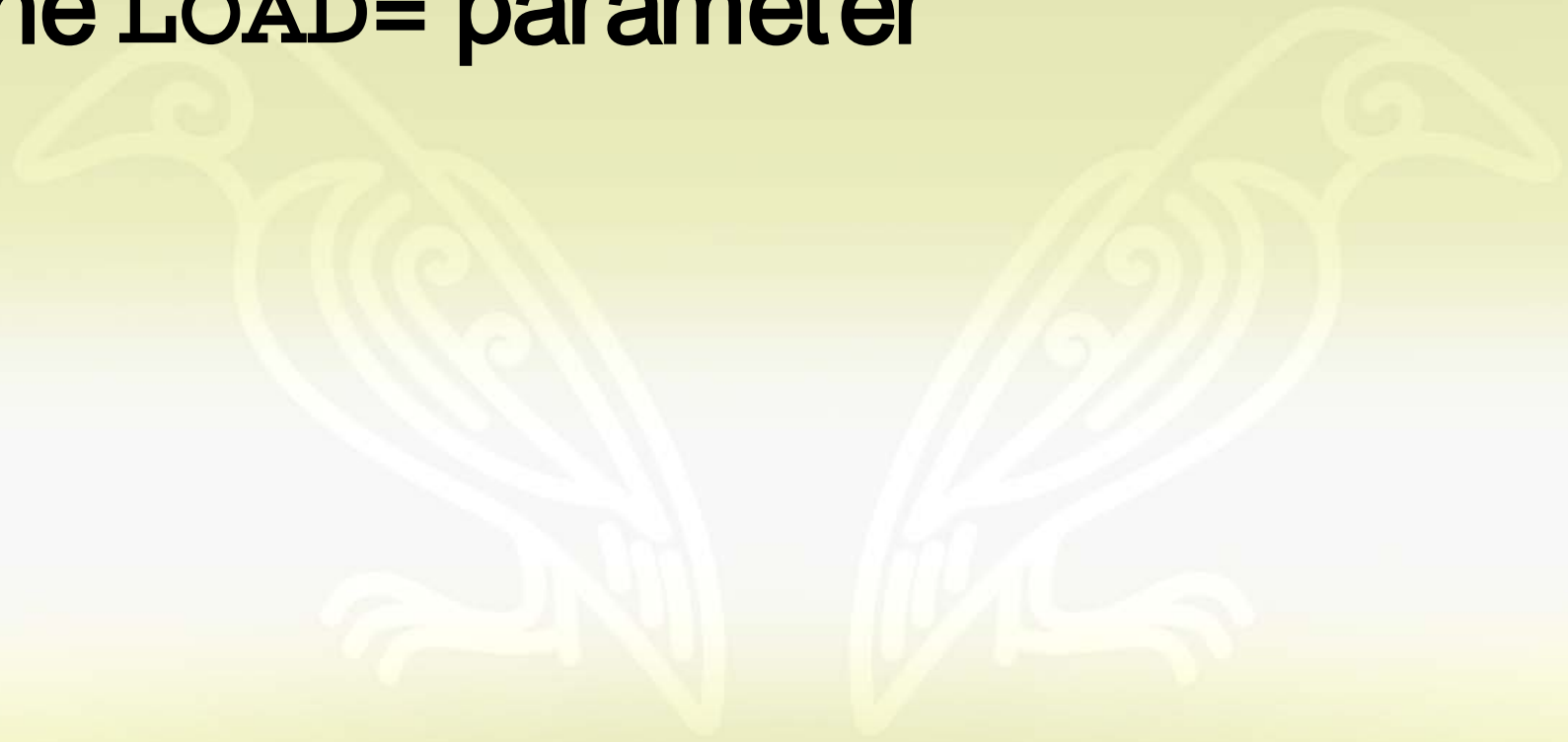
Below the editor is a debugger window with a status bar showing 'Ready...' and 'CurObj: 8:1'. The code editor shows a snippet of APL code:

```
r←Env param  
r←2 ⍵NQ'. 'GetEnvironment'param R To be replaced in v19.0, I hope :-)  
:EndNamespace
```

Who cares? I ***LIKE*** my Workspace!

- So keep using workspaces ...
- New users and modern organisations want to use:
 - Editors they already know
 - VS Code, Emacs, VIM
 - Source code management tools
 - Git[Hub], SVN, ...
 - Continuous Integration Pipelines
- Transparency: Text can be viewed, transmitted and edited by anyone
- No "Build" process (unless you want one, in which case it is now really easy to create one)

The LOAD= parameter



The `LOAD=` parameter

- Specifies the "artefact" to be used to start the APLsession

The `LOAD=` parameter

- Specifies the "artefact" to be used to start the APLsession
- Workspace files will be `⎕LOAD`'ed

The LOAD= parameter

- Specifies the "artefact" to be used to start the APLsession
- Workspace files will be `⎕LOAD`'ed
- All other files will be [attempted] `⎕FIX`ed into #

The LOAD= parameter

- Specifies the "artefact" to be used to start the APLsession
- Workspace files will be □LOAD'ed
- All other files will be [attempted] □FIXed into #
- For the following file extensions, a function is called w/ a right argument:
 - name.aplf (function): The function will be called
 - name.apln (namespace): Call **name.Run**
 - name.aplc (class): Call **name.Run** (*Shared Public*)

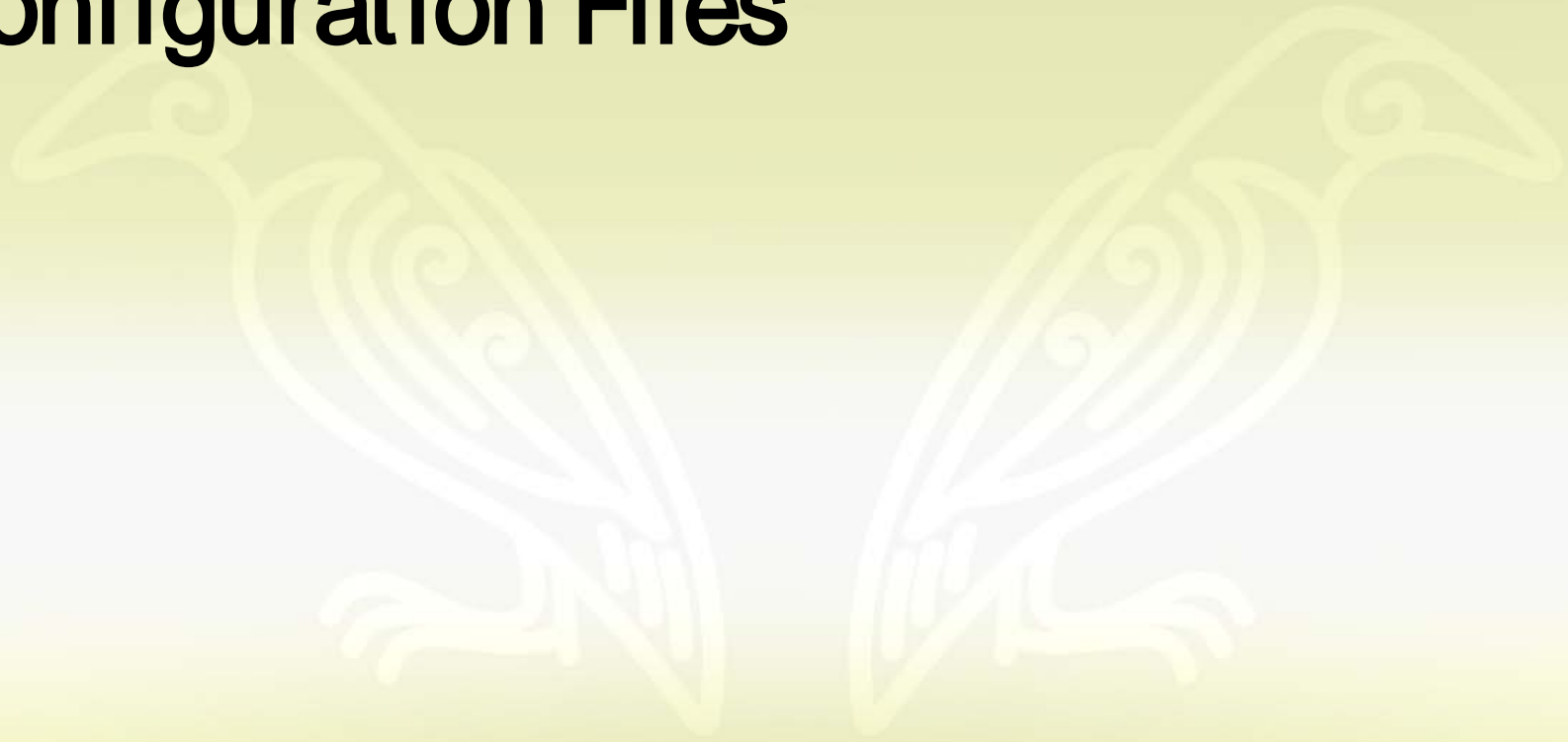
The LOAD= parameter

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- For any other file extension, nothing will run unless the `LX=` parameter is also set

The LOAD= parameter

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 - `name.aplc` (class): Call `name.Run` (*Shared Public*)
- For any other file extension, nothing will run unless the `LX=` parameter is also set
- DO NOT MAKE ANY ASSUMPTIONS about the contents form of the right argument!

Configuration Files



Configuration Files

➤ Imagine ...



Configuration Files

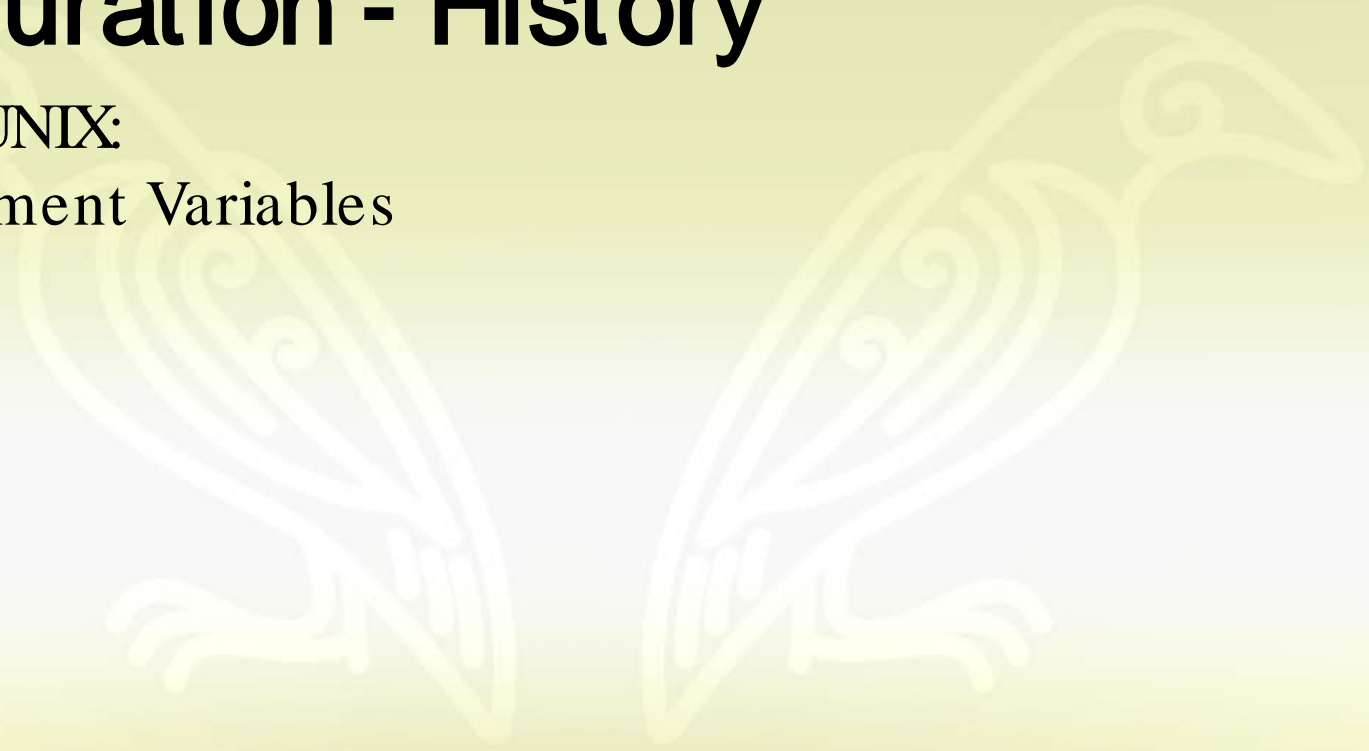
- Imagine ...
- ... if the application configuration could **ALSO* be just another text file...

Configuration - History



Configuration - History

- DOS & UNIX:
Environment Variables



Configuration - History

- DOS & UNIX:
Environment Variables

```
mkrom@thor8: ~  
6:*.ra=00;36:*.wav=00;36:*.oga=00;36:*.opus=00;36:*.spx=00;36:*.xspf=00;36:  
SSH_CONNECTION=192.168.6.113 54712 192.168.6.150 22  
LESSCLOSE=/usr/bin/lesspipe %s %s  
LANG=en_US.UTF-8  
XDG_SESSION_ID=2  
USER=mkrom  
PWD=/home/mkrom  
HOME=/home/mkrom  
SSH_CLIENT=192.168.6.113 54712 22  
XDG_DATA_DIRS=/usr/local/share:/usr/share:/var/lib/snapd/desktop  
SSH_TTY=/dev/pts/0  
MAIL=/var/mail/mkrom  
TERM=xterm  
SHELL=/bin/bash  
SHLVL=1  
LANGUAGE=en_US:en  
LOGNAME=mkrom  
DBUS_SESSION_BUS_ADDRESS=unix:path=/run/user/1000/bus  
XDG_RUNTIME_DIR=/run/user/1000  
PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr  
r/local/games:/snap/bin:/home/mkrom/.dotnet/tools  
LESSOPEN=| /usr/bin/lesspipe %s  
_=/usr/bin/env  
mkrom@thor8:~$
```

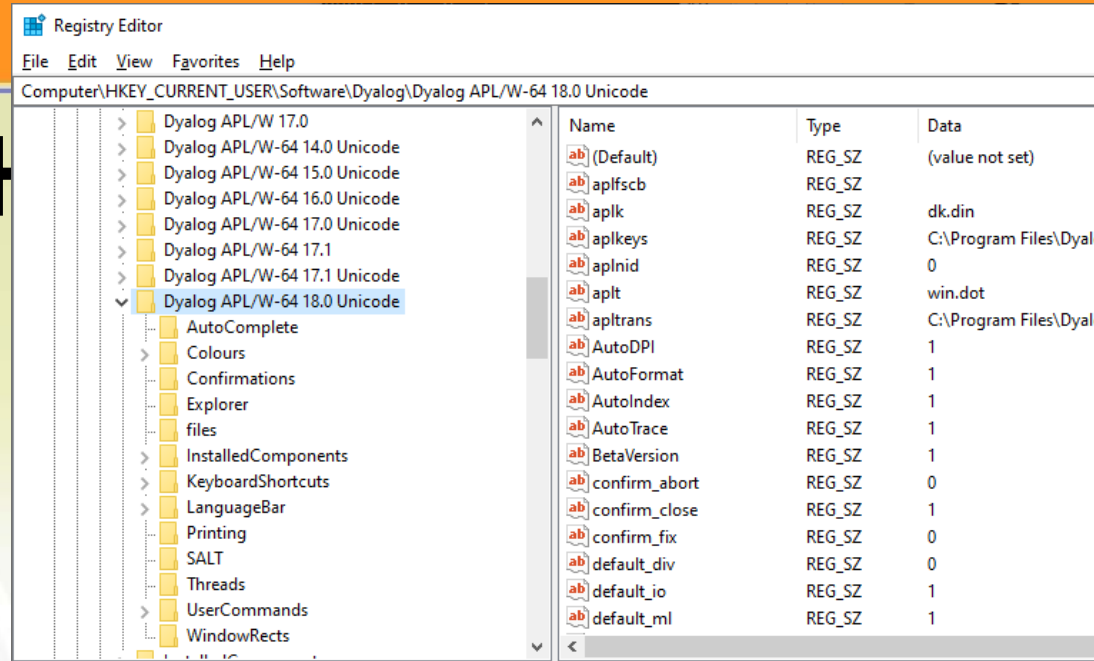
Configuration - History

- DOS & UNIX:
Environment Variables
- Windows:
 - "INI files"
 - Windows Registry

```
mkrom@thor8: ~  
6:*.ra=00;36:*.wav=00;36:*.oga=00;36:*.opus=00;36:*.spx=00;36:*.xspf=00;36:  
SSH_CONNECTION=192.168.6.113 54712 192.168.6.150 22  
LESSCLOSE=/usr/bin/lesspipe %s %s  
LANG=en_US.UTF-8  
XDG_SESSION_ID=2  
USER=mkrom  
PWD=/home/mkrom  
HOME=/home/mkrom  
SSH_CLIENT=192.168.6.113 54712 22  
XDG_DATA_DIRS=/usr/local/share:/usr/share:/var/lib/snapd/desktop  
SSH_TTY=/dev/pts/0  
MAIL=/var/mail/mkrom  
TERM=xterm  
SHELL=/bin/bash  
SHLVL=1  
LANGUAGE=en_US:en  
LOGNAME=mkrom  
DBUS_SESSION_BUS_ADDRESS=unix:path=/run/user/1000/bus  
XDG_RUNTIME_DIR=/run/user/1000  
PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr  
r/local/games:/snap/bin:/home/mkrom/.dotnet/tools  
LESSOPEN=| /usr/bin/lesspipe %s  
_=/usr/bin/env  
mkrom@thor8:~$
```

Configuration - 1

- DOS & UNIX:
Environment Variables
- Windows:
 - "INI files"
 - Windows Registry



Configuration - 1

➤ DOS & UNIX:

Environment Variables

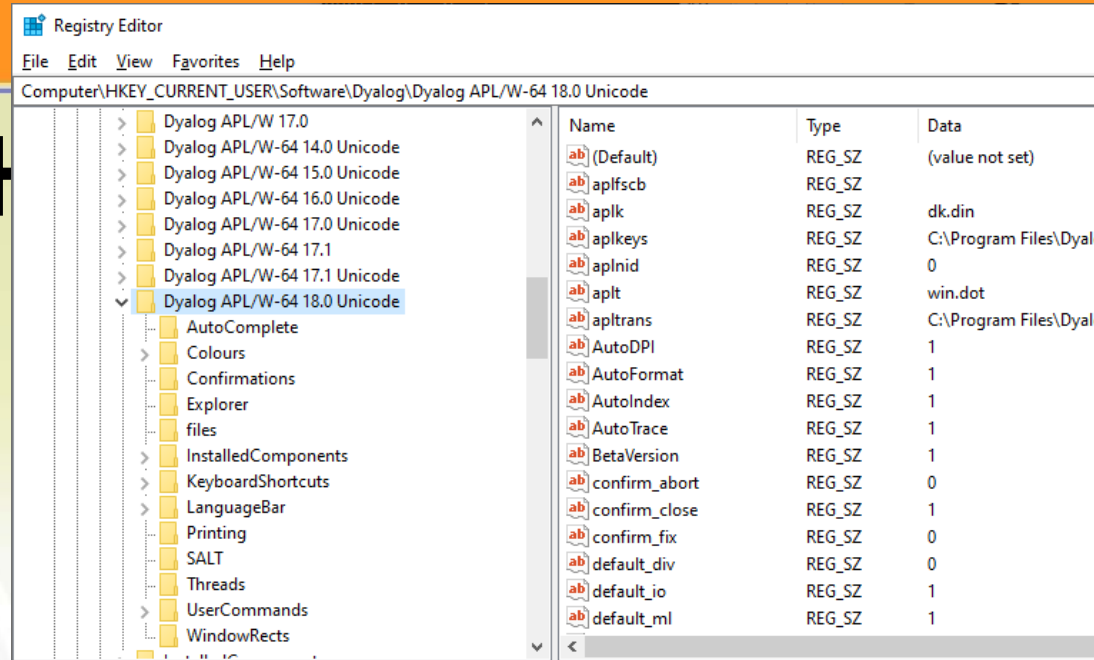
➤ Windows:

- "INI files"
- Windows Registry

➤ Command line switches:

Windows: `dyalog app.dws MAXWS=1G`

'Nix: `MAXWS=1G dyalog app.dws`

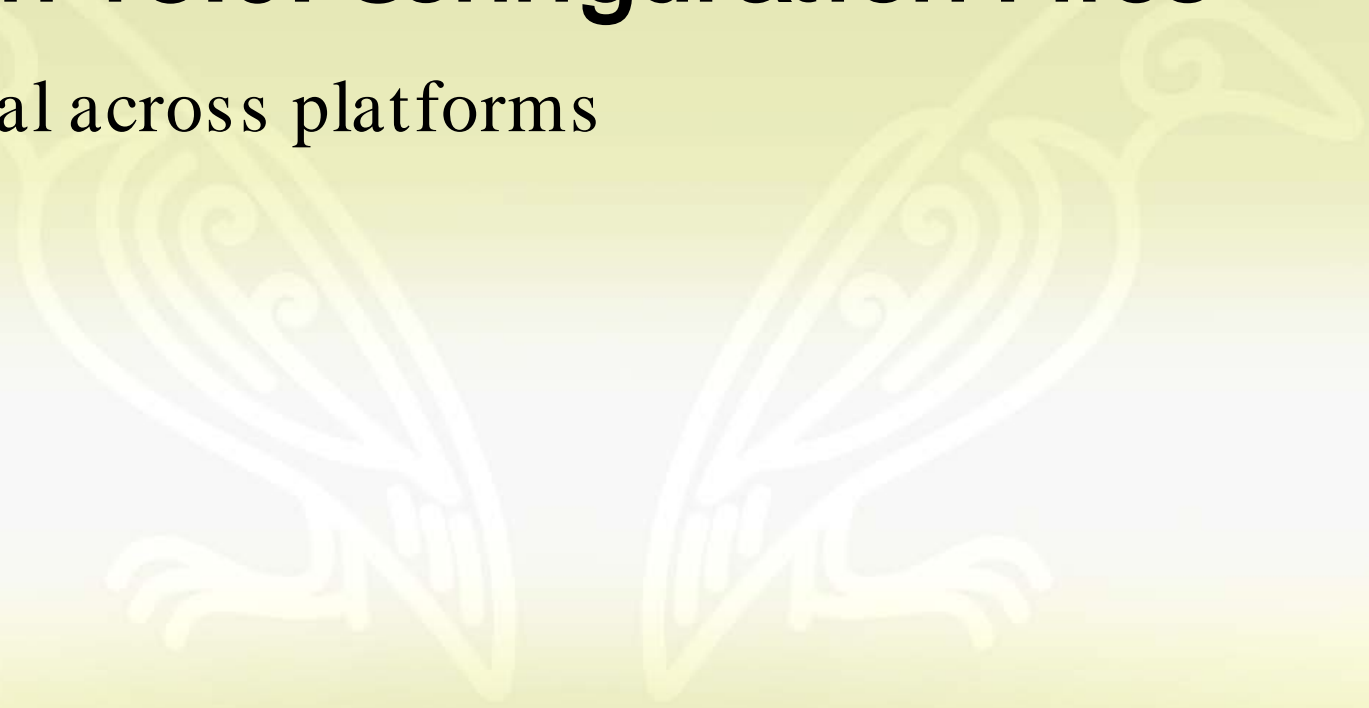


Version 18.0: Configuration Files



Version 18.0: Configuration Files

- Identical across platforms

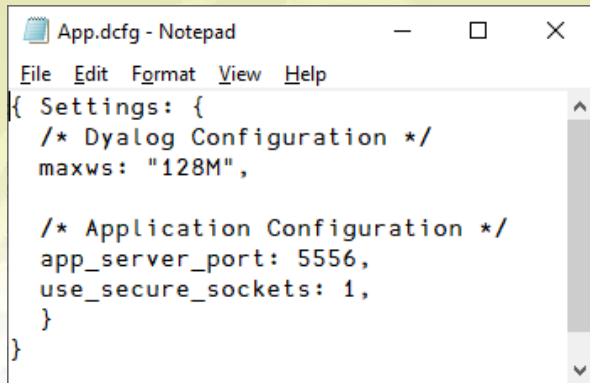


Version 18.0: Configuration Files

- Identical across platforms
- Easily readable & editable text files (sez Morten)

Version 18.0: Configuration Files

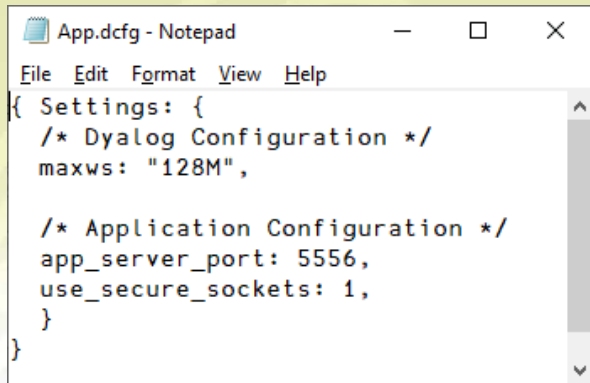
- Identical across platforms
- Easily readable & editable text files (sez Morten)

A screenshot of a Notepad window titled 'App.dcfg - Notepad'. The window displays a JSON configuration file with the following content:

```
{ Settings: {  
  /* Dyalog Configuration */  
  maxws: "128M",  
  
  /* Application Configuration */  
  app_server_port: 5556,  
  use_secure_sockets: 1,  
}
```

Version 18.0: Configuration Files

- Identical across platforms
- Easily readable & editable text files (sez Morten)
- Provide the ability to configure
 - each application
 - each version of APL
 - each user

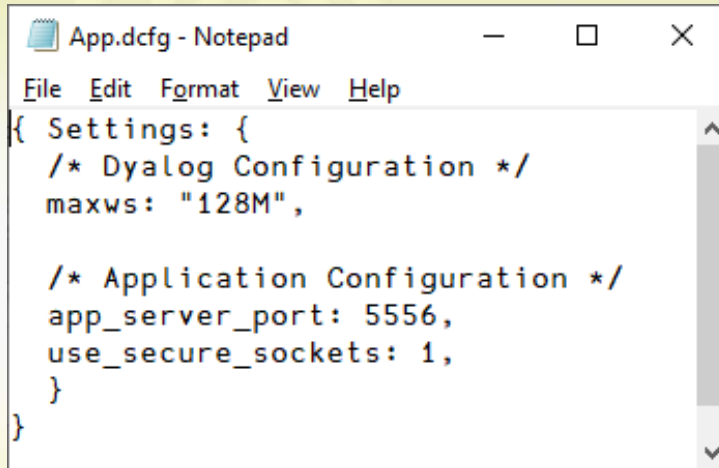


```
App.dcfg - Notepad
File Edit Format View Help
{ Settings: {
  /* Dyalog Configuration */
  maxws: "128M",

  /* Application Configuration */
  app_server_port: 5556,
  use_secure_sockets: 1,
}
}
```

Configuration Files: JSON5

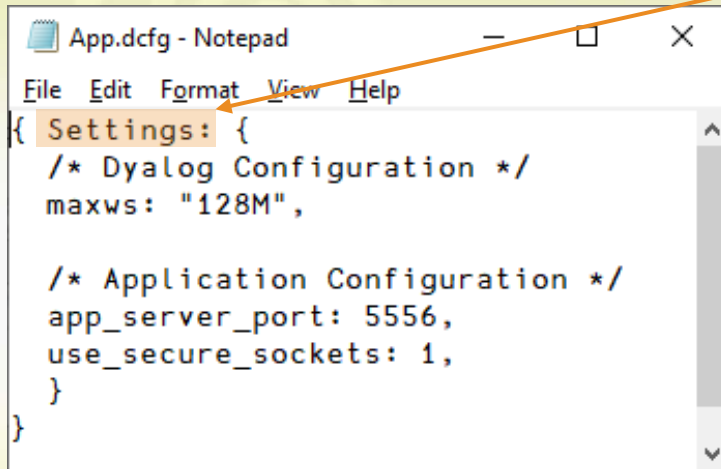
JSON5 allows
Unquoted names
Comments
A trailing comma



```
App.dcfg - Notepad
File Edit Format View Help
{ Settings: {
  /* Dyalog Configuration */
  maxws: "128M",

  /* Application Configuration */
  app_server_port: 5556,
  use_secure_sockets: 1,
}
}
```

Configuration Files: JSON5

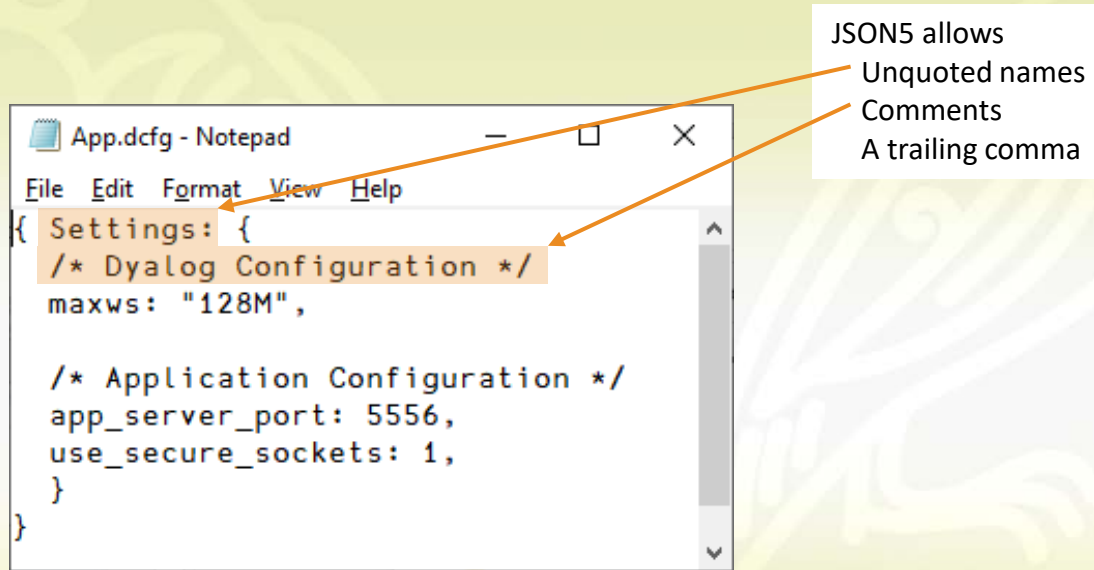


```
App.dcfg - Notepad
File Edit Format View Help
{ Settings: {
  /* Dyalog Configuration */
  maxws: "128M",

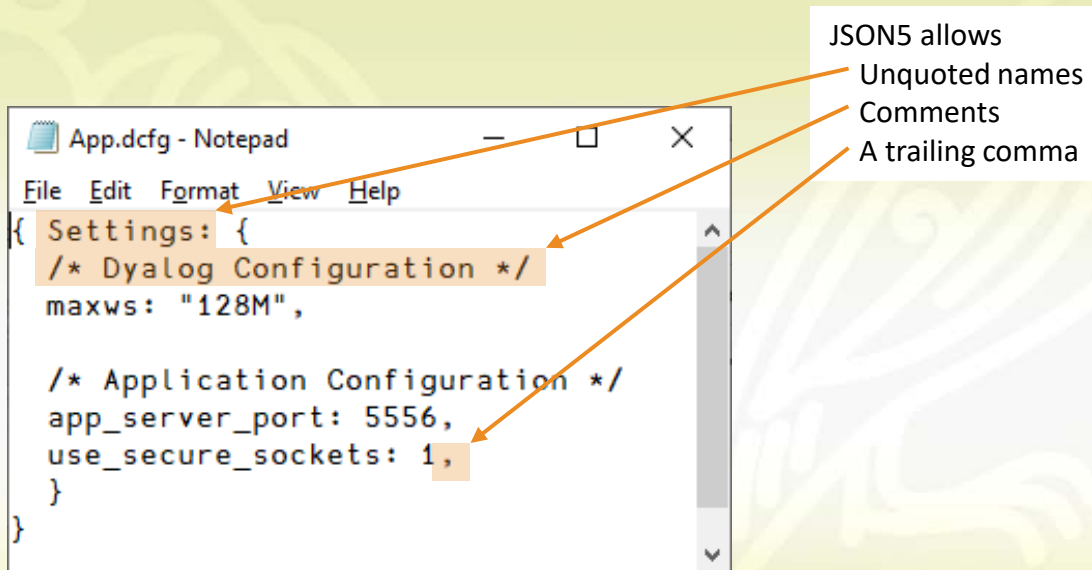
  /* Application Configuration */
  app_server_port: 5556,
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}
```

JSON5 allows
Unquoted names
Comments
A trailing comma

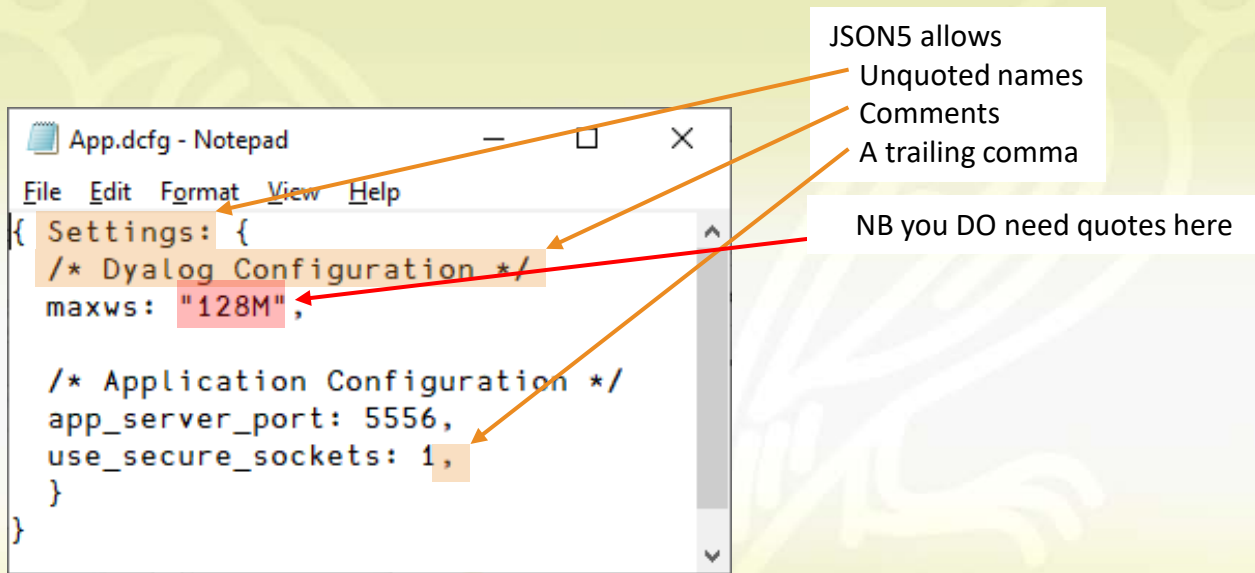
Configuration Files: JSON5



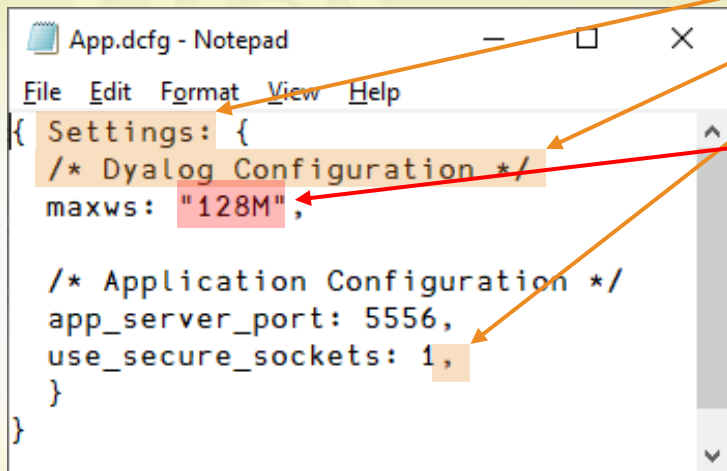
Configuration Files: JSON5



Configuration Files: JSON5



Configuration Files: JSON5



```
App.dcfg - Notepad
File Edit Format View Help
{ Settings: {
  /* Dyalog Configuration */
  maxws: "128M",

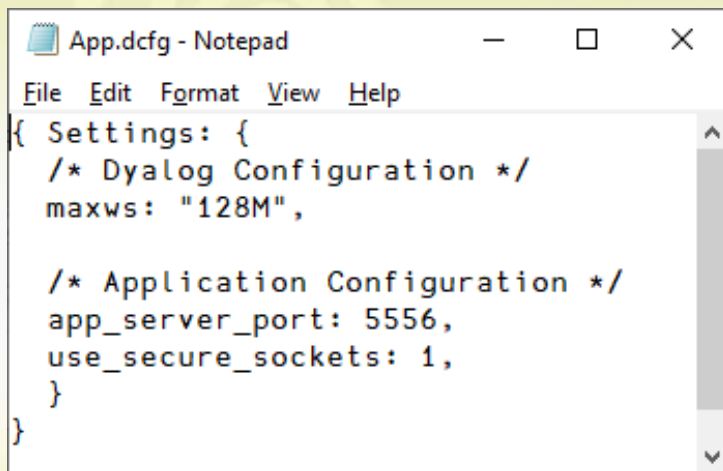
  /* Application Configuration */
  app_server_port: 5556,
  use_secure_sockets: 1,
}
```

JSON5 allows
Unquoted names
Comments
A trailing comma

NB you DO need quotes here

❑ JSON can read JSON5 files, but cannot
"round trip" files containing comments.

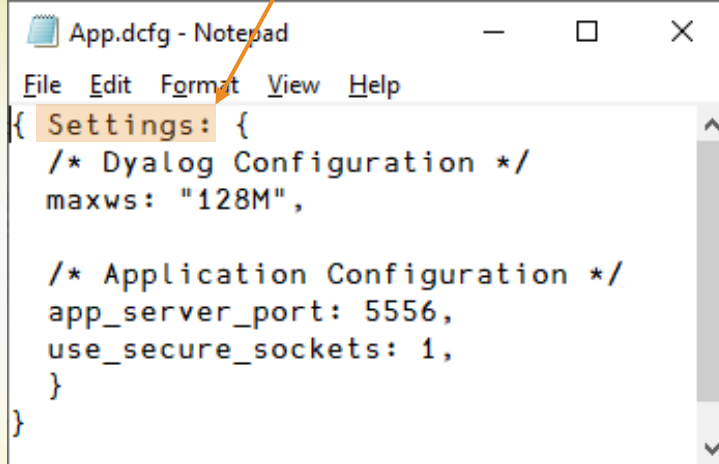
Configuration Files: JSON5



```
{ Settings: {  
  /* Dyalog Configuration */  
  maxws: "128M",  
  
  /* Application Configuration */  
  app_server_port: 5556,  
  use_secure_sockets: 1,  
}  
}
```

Configuration Files: JSON5

All parameters are within "Settings" (all names are case insensitive)

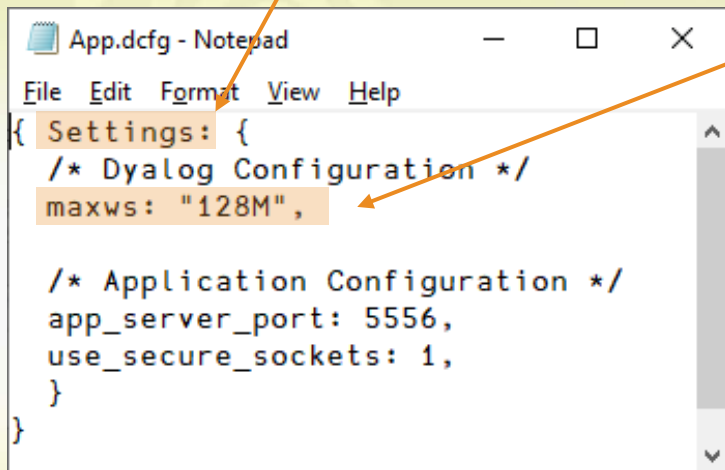


```
App.dcfg - Notepad
File Edit Format View Help
{ Settings: {
  /* Dyalog Configuration */
  maxws: "128M",

  /* Application Configuration */
  app_server_port: 5556,
  use_secure_sockets: 1,
}
```

Configuration Files: JSON5

All parameters are within "Settings" (all names are case insensitive)



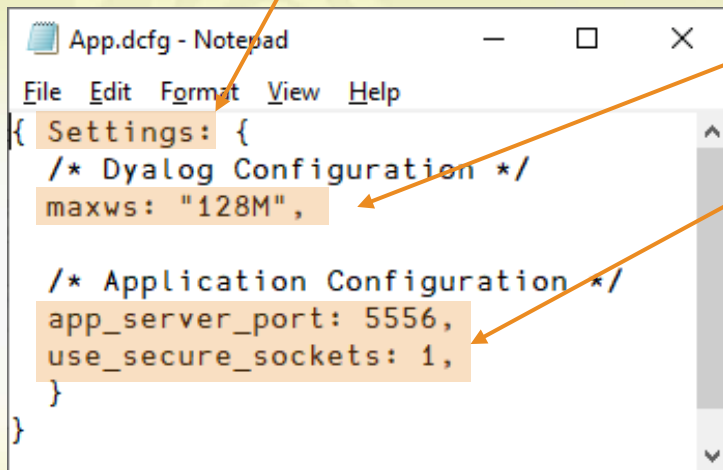
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App.dcfg - Notepad
File Edit Format View Help
{ Settings: {
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  app_server_port: 5556,
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}
}
```

You can set all Dyalog parameters

Configuration Files: JSON5

All parameters are within "Settings" (all names are case insensitive)



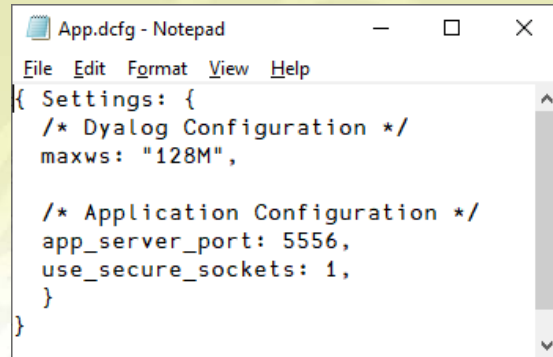
```
App.dcfg - Notepad
File Edit Format View Help
{
  Settings: {
    /* Dyalog Configuration */
    maxws: "128M",

    /* Application Configuration */
    app_server_port: 5556,
    use_secure_sockets: 1,
  }
}
```

You can set all Dyalog parameters

And your own application-specific parameters

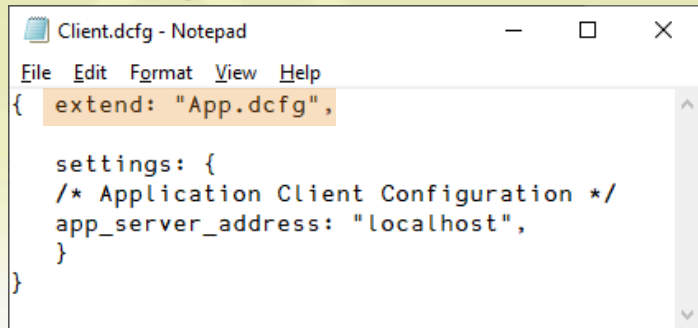
Configuration Files can *Cascade*



```
App.dcfg - Notepad
File Edit Format View Help
{ Settings: {
  /* Dyalog Configuration */
  maxws: "128M",

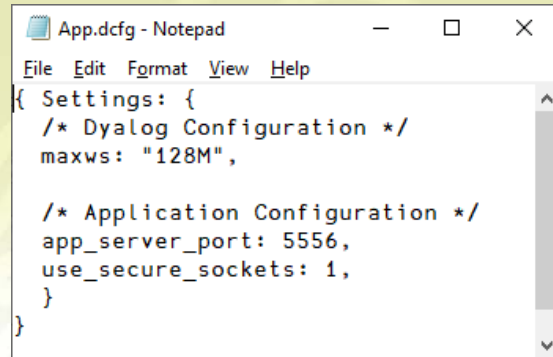
  /* Application Configuration */
  app_server_port: 5556,
  use_secure_sockets: 1,
}
}
```

Configuration Files can *Cascade*



```
Client.dcfg - Notepad
File Edit Format View Help
{ extend: "App.dcfg",

  settings: {
    /* Application Client Configuration */
    app_server_address: "localhost",
  }
}
```



```
App.dcfg - Notepad
File Edit Format View Help
{ Settings: {
  /* Dyalog Configuration */
  maxws: "128M",

  /* Application Configuration */
  app_server_port: 5556,
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}
}
```

Configuration Files can *Cascade*

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Client.dcfg - Notepad
File Edit Format View Help
{ extend: "App.dcfg",

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    /* Application Client Configuration */
    app_server_address: "localhost",
  }
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```

maxws
app_server_port
use_secure_sockets
are decided by
App.dcfg

```
App.dcfg - Notepad
File Edit Format View Help
{ Settings: {
  /* Dyalog Configuration */
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```


Configuration Files can *Cascade*

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Client.dcfg - Notepad
File Edit Format View Help
{ extend: "App.dcfg",
  settings: {
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maxws
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App.dcfg - Notepad
File Edit Format View Help
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Configuration Files can *Cascade*

```
Client.dcfg - Notepad
File Edit Format View Help
{ extend: "App.dcfg",

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```

maxws
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```
App.dcfg - Notepad
File Edit Format View Help
{ Settings: {
  /* Dyalog Configuration */
  maxws: "128M",

  /* Application Configuration */
  app_server_port: 5556,
  use_secure_sockets: 1,
}
}
```

```
Server.dcfg - Notepad
File Edit Format View Help
{ extend: "App.dcfg",

  settings: {
    /* Dyalog Configuration */
    maxws: "1G",

    /* Application Server Configuration */
    server_debug: 1,
  }
}
```

Configuration Files can *Cascade*

```
Client.dcfg - Notepad
File Edit Format View Help
{ extend: "App.dcfg",

  settings: {
    /* Application Client Configuration */
    app_server_address: "localhost",
  }
}
```

maxws
app_server_port
use_secure_sockets
are decided by
App.dcfg

app_server_address
by Client.dcfg

```
App.dcfg - Notepad
File Edit Format View Help
{ Settings: {
  /* Dyalog Configuration */
  maxws: "128M",

  /* Application Configuration */
  app_server_port: 5556,
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}
}
```

```
Server.dcfg - Notepad
File Edit Format View Help
{ extend: "App.dcfg",

  settings: {
    /* Dyalog Configuration */
    maxws: "1G",

    /* Application Server Configuration */
    server_debug: 1,
  }
}
```

Server.dcfg
overrides
the maxws setting

Application and User Configuration



Application and User Configuration

- Application Configuration provides settings needed by the application
 - Specified using `CONFIGFILE=`
 - **Can be inferred:** if running `myapp.dws` or `myapp.aplf`, Dyalog looks for `myapp.dcfg` in the same folder (if `CONFIGFILE` is not set)

Application and User Configuration

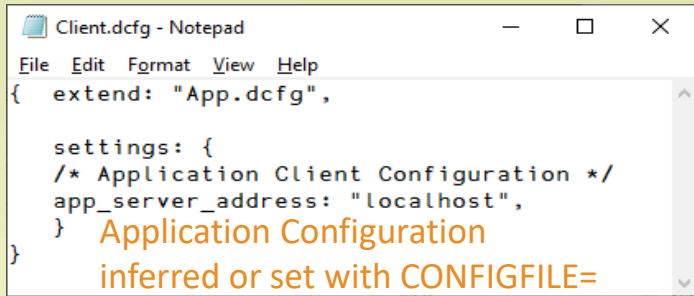
- Application Configuration provides settings needed by the application
 - Specified using `CONFIGFILE=`
 - **Can be inferred:** if running `myapp.dws` or `myapp.aplf`, Dyalog looks for `myapp.dcfg` in the same folder (if `CONFIGFILE` is not set)
- User Configuration usually manages the development environment
 - Specified using `USERCONFIGFILE=`
 - Defaults to `~/.dyalog/dyalog.180U64.dcfg`
 - ... except under Windows, where the default is to continue to use the Windows Registry

Application and User Configuration

- Application Configuration provides settings needed by the application
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- User Configuration usually manages the development environment
 - Specified using `USERCONFIGFILE=`
 - Defaults to `~/ .dyalog/dyalog.180U64.dcfg`
 - ... except under Windows, where the default is to continue to use the Windows Registry
- Version-independent User Configuration
 - All Dyalog-supplied User Config files *extend* `~/ .dyalog/dyalog.dcfg`

The Big Picture

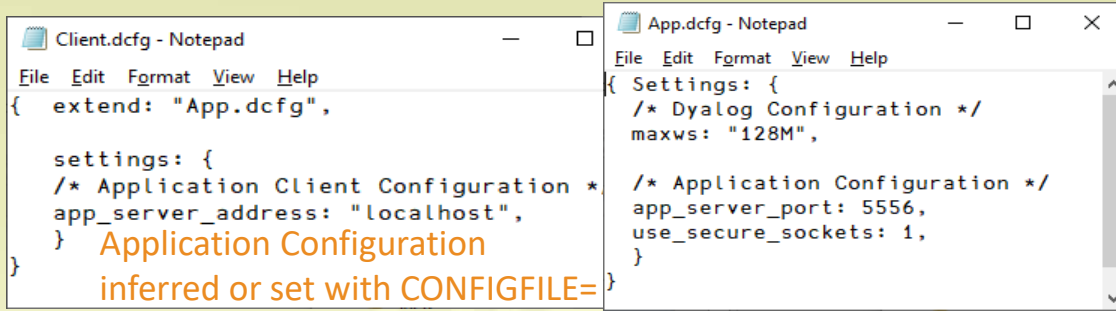




```
Client.dcfg - Notepad
File Edit Format View Help
{  extend: "App.dcfg",

    settings: {
      /* Application Client Configuration */
      app_server_address: "localhost",
    }
  }
  Application Configuration
  inferred or set with CONFIGFILE=
```

The Big Picture



```
Client.dcfg - Notepad
File Edit Format View Help
{ extend: "App.dcfg",

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File Edit Format View Help
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The Big Picture

The Big Picture

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Client.dcfg - Notepad
File Edit Format View Help
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App.dcfg - Notepad
File Edit Format View Help
{ Settings: {
  /* Dyalog Configuration */
  maxws: "128M",

  /* Application Configuration */
  app_server_port: 5556,
  use_secure_sockets: 1,
}
```

```
*dyalog.180U64.dcfg - Notepad
File Edit Format View Help
User Configuration (usually for devt environment)

{ extend: "dyalog.dcfg", settings: {

  /* Morten's Settings */
  MAXWS: "256M",

  /* Workspace search paths */
  WSPATH: [
    ".",
    "[DYALOG]/ws",
    "[DYALOG]/xflib",
    "[DYALOG]/Samples/004APL",
  ],

  /* Session file location */
  SESSION_FILE: "[DYALOG]/default.dse",

  /* Session log file location */
  LOG_FILE: "[DYALOG_CONFIGDIR]/session_log_[DYALOG_SHORTVERSION].dlf",

  /* SALT settings file */
```

The Big Picture

```
Client.dcfg - Notepad
File Edit Format View Help
{ extend: "App.dcfg",

  settings: {
    /* Application Client Configuration */
    app_server_address: "localhost",
  }
}

App.dcfg - Notepad
File Edit Format View Help
{ Settings: {
  /* Dyalog Configuration */
  maxws: "128M",

  /* Application Configuration */
  app_server_port: 5556,
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}
```

```
*dyalog.180U64.dcfg - Notepad
File Edit Format View Help
```

User Configuration (usually for devt environment)

```
{ extend: "dyalog.dcfg", settings: {

  /* Morten's Settings */
  MAXWS: "256M",

  /* Workspace search paths */
  WSPATH: [
    ".",
    "[DYALOG]/ws",
    "[DYALOG]/xflib",
    "[DYALOG]/Samples/004APL",
  ],

  /* Session file location */
  SESSION_FILE: "[DYALOG]/default.dse",

  /* Session log file location */
  LOG_FILE: "[DYALOG_CONFIGDIR]/session_log_[DYALOG_SHORTVERSION].dlf",

  /* SALT settings file */
```

```
*dyalog.dcfg - Notepad
File Edit Format View Help

{ settings: {

  /* Whether to start tracing on errors */
  TRACE_ON_ERROR: 1,

  /* Maximum workspace size */
  MAXWS: "512M",

}}
```

The Even Bigger Picture

All existing mechanisms for configuration continue to be supported.

Configuration files have been injected into the existing precedence rules:

- Command-line settings override
- *Application configuration file* settings, which override
- Environment variable settings, which override
- *User configuration file* settings, which override
- Settings in the registry (Windows only), which override
- Built-in defaults

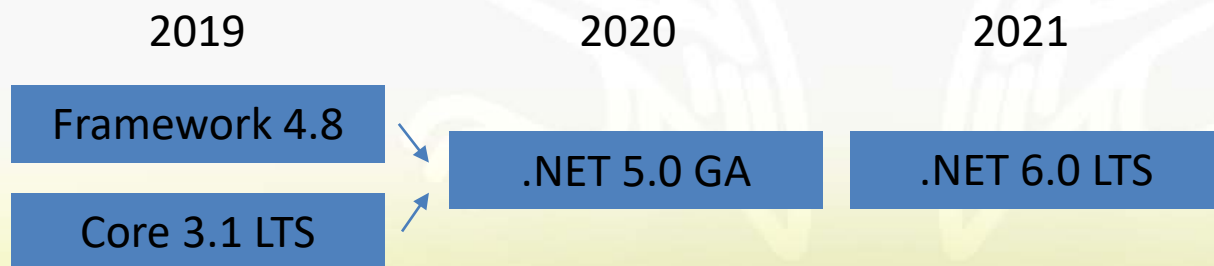
Dyalog hopes that config files will replace other mechanisms, especially environment variables and the Windows registry.

Configuration: Future Plans

- Consider user feedback
- Limit the use of the Windows Registry to settings related to the Development Environment
 - Move all "interpreter" settings to a USERCONFIGFILE
 - (as RIDE has it's own configuration)
- Provide a better tool to query configuration than
 - 2 □NQ ' .' 'GetEnvironment' [name]
- Ensure that APL will always work without any configuration on all platforms
- (Eventually, a tool to update config files)

Microsoft.NET Core Bridge

- Dyalog APL has had a bridge to the .NET Framework for ~20 years
 - .NET provides a vast library of useful application APIs
- The .NET "Core" is a new, open source, cross platform (Windows, Linux, macOS) implementation of .NET
- Version 18.0 adds a bridge to the .NET Core



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Download .NET

Downloads for .NET Framework and .NET Core, including ASP.NET and ASP.NET Core

ⓘ Not sure where to start? See the [Hello World in 10 minutes tutorial](#) to install .NET and build your first app.

WindowsLinuxmacOSDocker

.NET Core

.NET Core 3.1

.NET Core is a cross-platform version of .NET for building websites, services, and console apps.

Run Apps ⓘ

Build Apps ⓘ

Advanced ⓘ

Download .NET Core Runtime

Download .NET Core SDK

All .NET Core downloads...

.NET Framework

.NET Framework 4.8

.NET Framework is a Windows-only version of .NET for building any type of app that runs on Windows.

Run Apps ⓘ

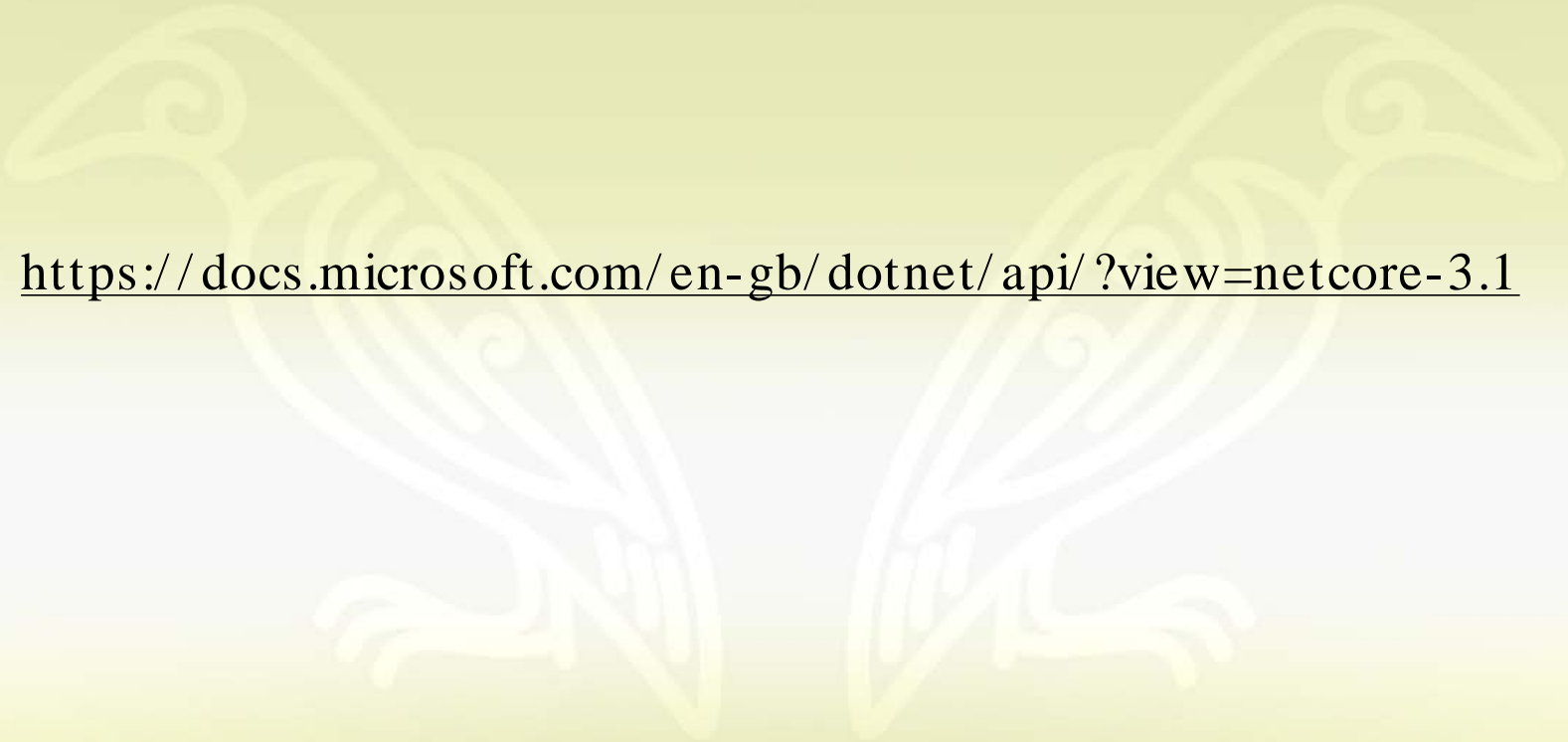
Build Apps ⓘ

Advanced ⓘ

Download .NET Framework Runtime

Download .NET Framework Dev Pack

All .NET Framework downloads...



<https://docs.microsoft.com/en-gb/dotnet/api/?view=netcore-3.1>



.net core zip




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ZipFile Class (System.IO.Compression) | Microsoft Docs

 <https://docs.microsoft.com/en-us/dotnet/api/system.io.compression.zipfile>

Provides static methods for creating, extracting, and opening **zip** archives. This example shows how to create and extract a **zip** archive by using the ZipFile class. It compresses the contents of a folder into a **zip** archive, and then extracts that content to a new folder. To use the ZipFile class, you must reference the System.IO.Compression ...

How to: Compress and extract files | Microsoft Docs

 <https://docs.microsoft.com/en-us/dotnet/standard/io/how-to-compress-and-extract-files>

The following example shows how to create and extract a compressed **.zip** file by using the ZipFile class. The example compresses the contents of a folder into a new **.zip** file, and then extracts the **zip** to a new folder. To run the sample, create a start folder in your program folder and populate it with files to **zip**.

Download .NET Core (Linux, macOS, and Windows)

 <https://dotnet.microsoft.com/download/dotnet-core>

Core is a cross-platform version of **.NET**, for building apps that run on Linux, macOS, and Windows. This site uses cookies for analytics, personalized content and ads. By continuing to browse this site, you agree to this use.



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C# ▾

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Version

.NET Core 3.1 ▾

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System.IO.Compression

▸ BrotliDecoder

▸ BrotliEncoder

▸ BrotliStream

CompressionLevel

CompressionMode

▸ DeflateStream

▸ GZipStream

▸ ZipArchive

▸ ZipArchiveEntry

ZipArchiveMode

▾ ZipFile

ZipFile

▸ Methods

▸ ZipFileExtensions

ZipFile Class

Namespace: [System.IO.Compression](#)Assembly: [System.IO.Compression.ZipFile.dll](#)

Provides static methods for creating, extracting, and opening zip archives.

C#

[Copy](#)

```
public static class ZipFile
```

Inheritance [Object](#) → [ZipFile](#)

Examples

This example shows how to create and extract a zip archive by using the [ZipFile](#) class. It compresses the contents of a folder into a zip archive, and then extracts that content to a new folder.

Tip

To use the [ZipFile](#) class, you must reference the [System.IO.Compression.FileSystem](#) assembly in your project.

C#

[Copy](#)

```
using System;  
using System.IO.Compression;  
  
class Program
```

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In this article

[Definition](#)[Examples](#)[Remarks](#)[Methods](#)[Applies to](#)[See also](#)

ZipFile.CreateFromDirectory Met

+

← → ↺ 🏠 🔒 https://docs.microsoft.com/en-us/dotnet/api/system.io.compression.zipfile.createfromdirectory?view=netc... 📄 ☆ ⚙️ 👤 ...

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.NET Core 3.1 ▾

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system.io.compression

➤ BrotliDecoder

➤ BrotliEncoder

➤ BrotliStream

CompressionLevel

CompressionMode

➤ DeflateStream

➤ GZipStream

➤ ZipArchive

➤ ZipArchiveEntry

ZipArchiveMode

▼ ZipFile

ZipFile

▼ Methods

CreateFromDirectory

ExtractToDirectory

Open

OpenRead

ZipFile.CreateFromDirectory Method

Namespace: [System.IO.Compression](#)

Assembly: [System.IO.Compression.ZipFile.dll](#)

Creates a zip archive that contains the files and directories from the specified directory.

Overloads

CreateFromDirectory(String, String)	Creates a zip archive that contains the files and directories from the specified directory.
CreateFromDirectory(String, String, CompressionLevel, Boolean)	Creates a zip archive that contains the files and directories from the specified directory, uses the specified compression level, and optionally includes the base directory.
CreateFromDirectory(String, String, CompressionLevel, Boolean, Encoding)	Creates a zip archive that contains the files and directories from the specified directory, uses the specified compression level and character encoding for entry names, and optionally includes the base directory.

CreateFromDirectory(String, String)

Creates a zip archive that contains the files and directories from the specified directory.

C#

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👎 No

In this article

[Definition](#)

[Overloads](#)

[CreateFromDirectory\(String, String\)](#)

[CreateFromDirectory\(String, String, CompressionLevel, Boolean\)](#)

[CreateFromDirectory\(String, String, CompressionLevel, Boolean, Encoding\)](#)

[Applies to](#)

Demo ZipFile Namespace



Dyalog .NET Bridge Road Map

- v18.0 supports basic use of .NET Core libraries
- v19.0 Goals include
 - Exporting APLcode as classes
 - Ability to use both Framework + Core

New / Improved Functionality over Framework Bridge, e.g.

- Better support for threading and "Async" patterns
- Generic classes and methods

Dyalog Version 18.0 - Themes

Platform Equivalence

- .NET Core Bridge
- Launch Source Files
- Configuration Files
- HTMLRenderer + RIDE enhancements

Easier to Build, Test, Deploy

- Launch source files
- Configuration Files
- Multi-Line Input

Performance

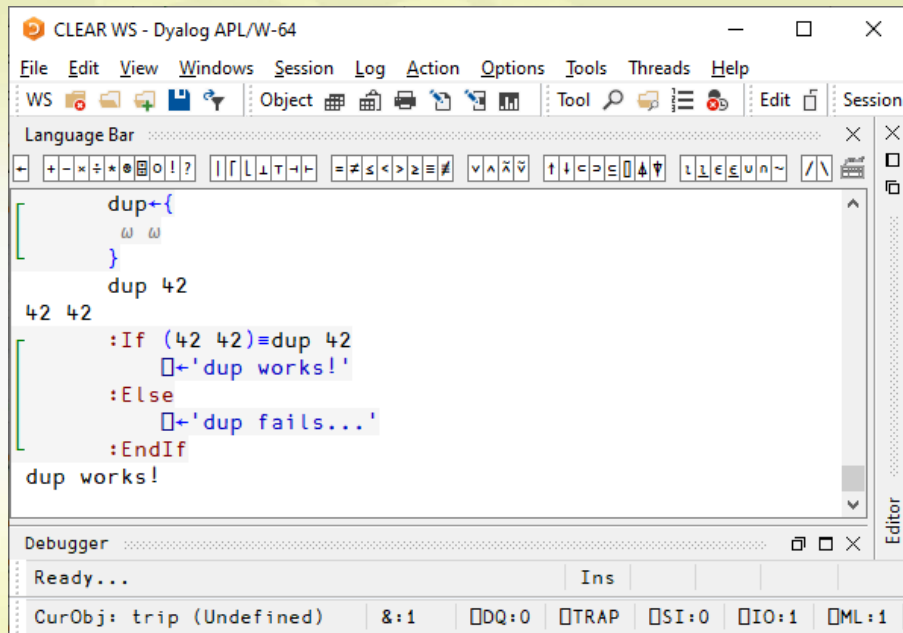
- "Performance QA" nearly 10% faster

Improving the Tool of Thought

- Operators ~ Constant, ¨ Atop ¨ Over
- Function ≠ Unique Mask
- Case Folding with □C
- Date Conversions with □DT
- Multi-Line Input

Multi-Line Input

➤ With `DIALOG_LINEEDITOR_MODE=1`



The screenshot shows the CLEAR WS - Dyalog APL/W-64 application window. The menu bar includes File, Edit, View, Windows, Session, Log, Action, Options, Tools, Threads, and Help. The toolbar contains icons for file operations, editing, and session management. The Language Bar at the top of the editor contains various APL and editing symbols. The main editor area displays the following APL code:

```
[
  dup←{
    ω ω
  }
  dup 42
42 42
  :If (42 42)≡dup 42
    ⎕←'dup works!'
  :Else
    ⎕←'dup fails...'
  :EndIf
dup works!
```

The bottom of the window features a Debugger section with a status bar showing 'Ready...' and a list of variables: CurObj: trip (Undefined), 8:1, ⎕DQ:0, ⎕TRAP, ⎕SI:0, ⎕IO:1, ⎕ML:1.

Supports:

- Multi-line dfns
- Tradfns (replaces DEL editor)
- Control Structures

Demo Multi-Line Input Mode

- Demo...
- NB: Experimental in v18.0
 - Not supported by RIDE
- A step on the path to making the running of APL scripts more powerful in version 19.0

Dyalog Version 18.0 - Themes

Platform Equivalence

- .NET Core Bridge
- Launch Source Files
- Configuration Files
- HTMLRenderer + RIDE enhancements

Easier to Build, Test, Deploy

- Launch source files
- Configuration Files
- Multi-Line Input

Performance

- "Performance QA" nearly 10% faster

Improving the Tool of Thought

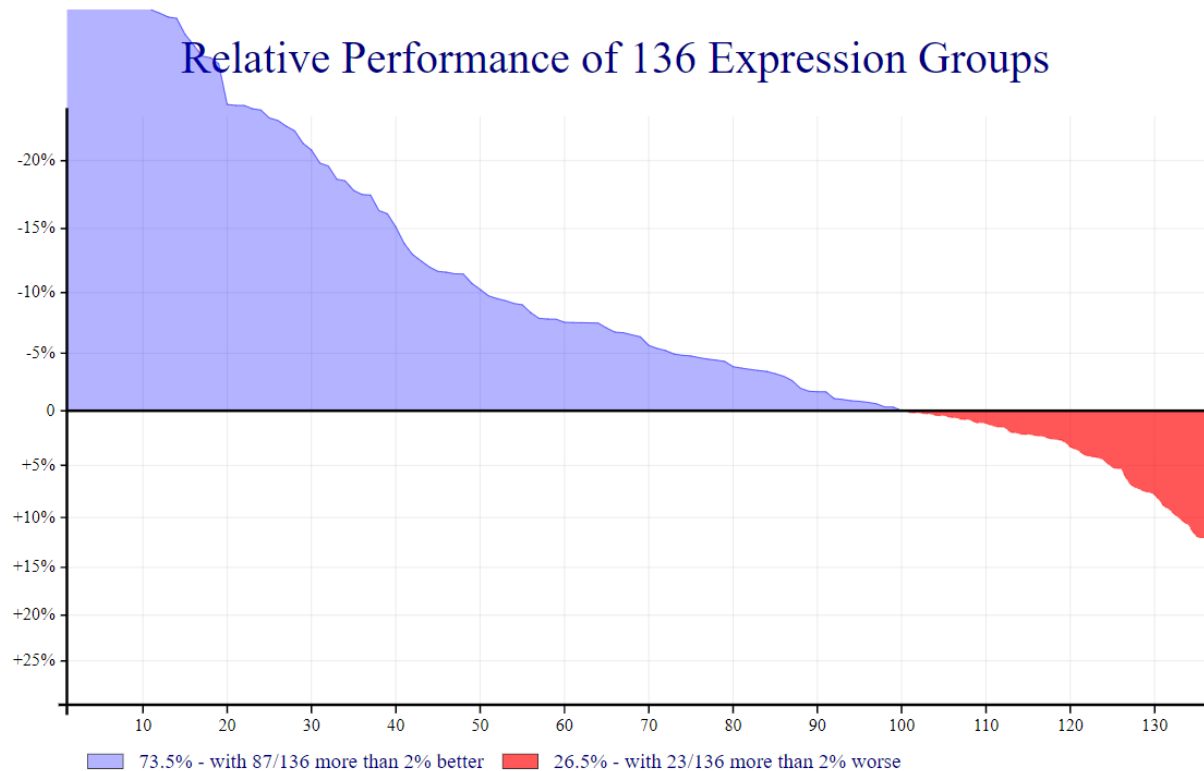
- Operators ~ Constant, ¨ Atop ¨ Over
- Function ≠ Unique Mask
- Case Folding with □C
- Date Conversions with □DT
- Multi-Line Input

Performance Comparison

Between Windows-64 18.0.38268.0 W Development and Windows-64 17.1.36845.0 W Development

Geometric mean of 136 expression groups: -10.2%

Relative Performance of 136 Expression Groups



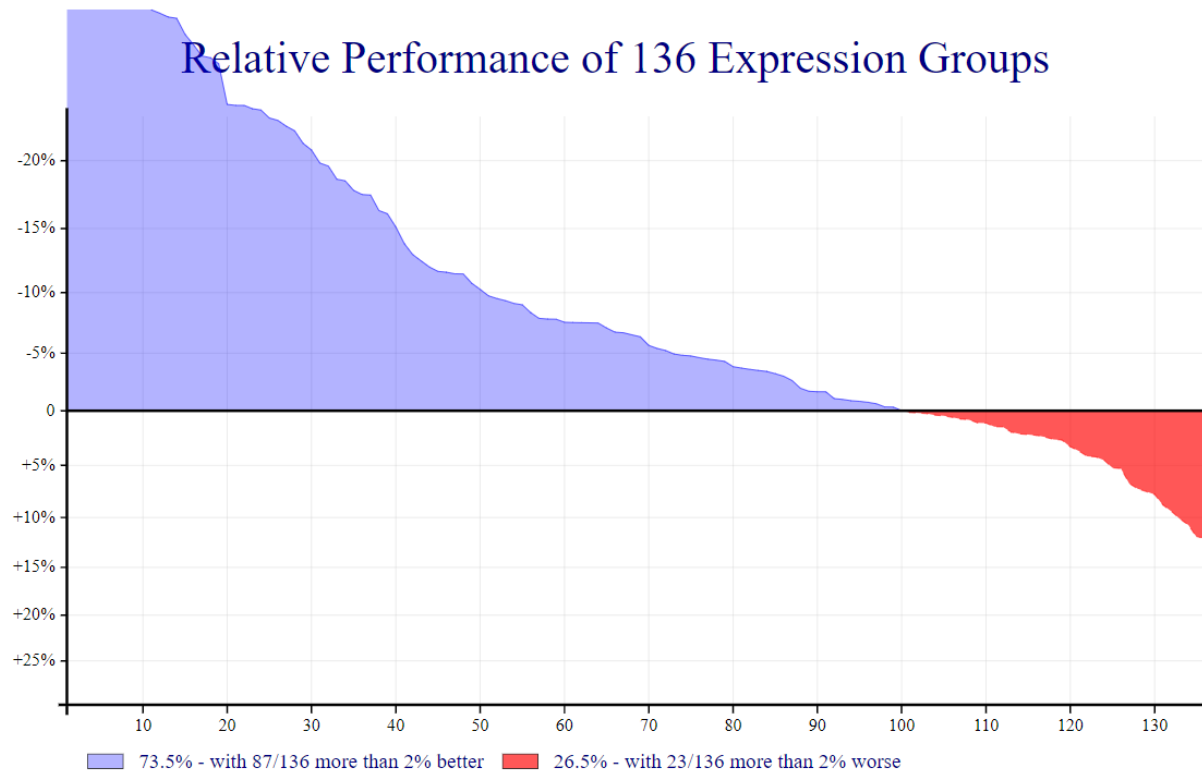
Focus Areas

Performance Comparison

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Relative Performance of 136 Expression Groups

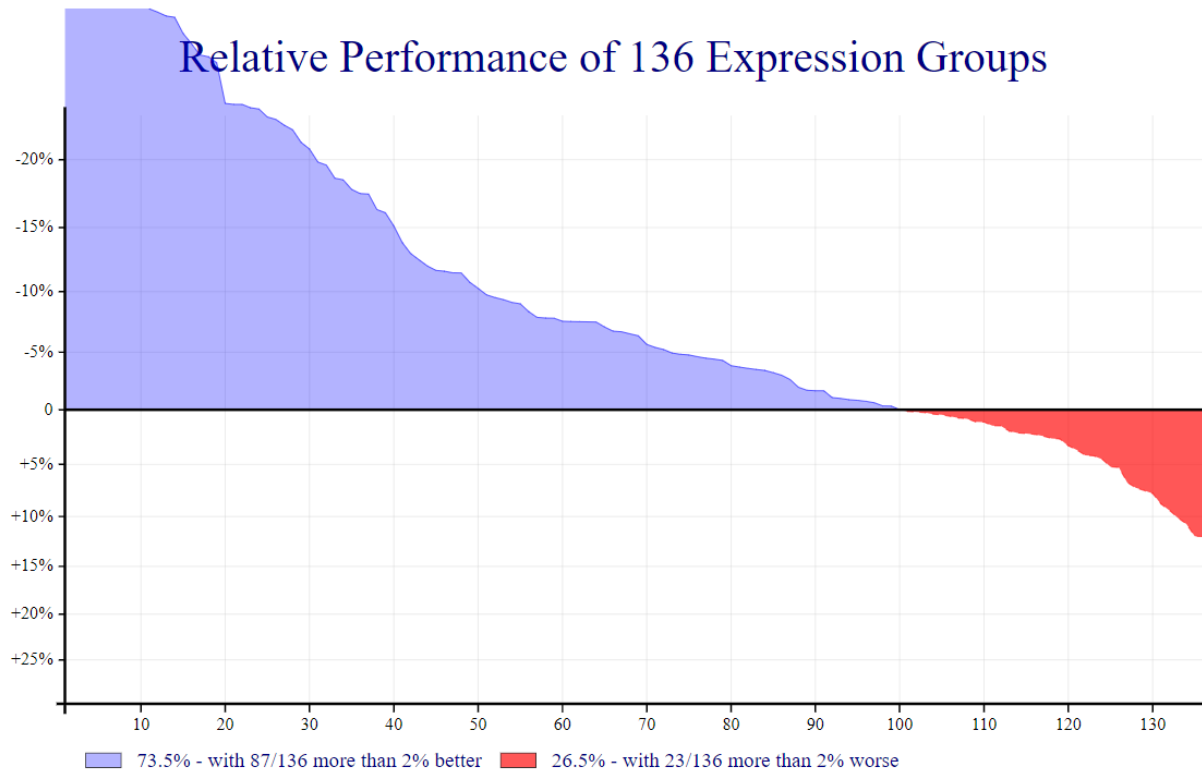


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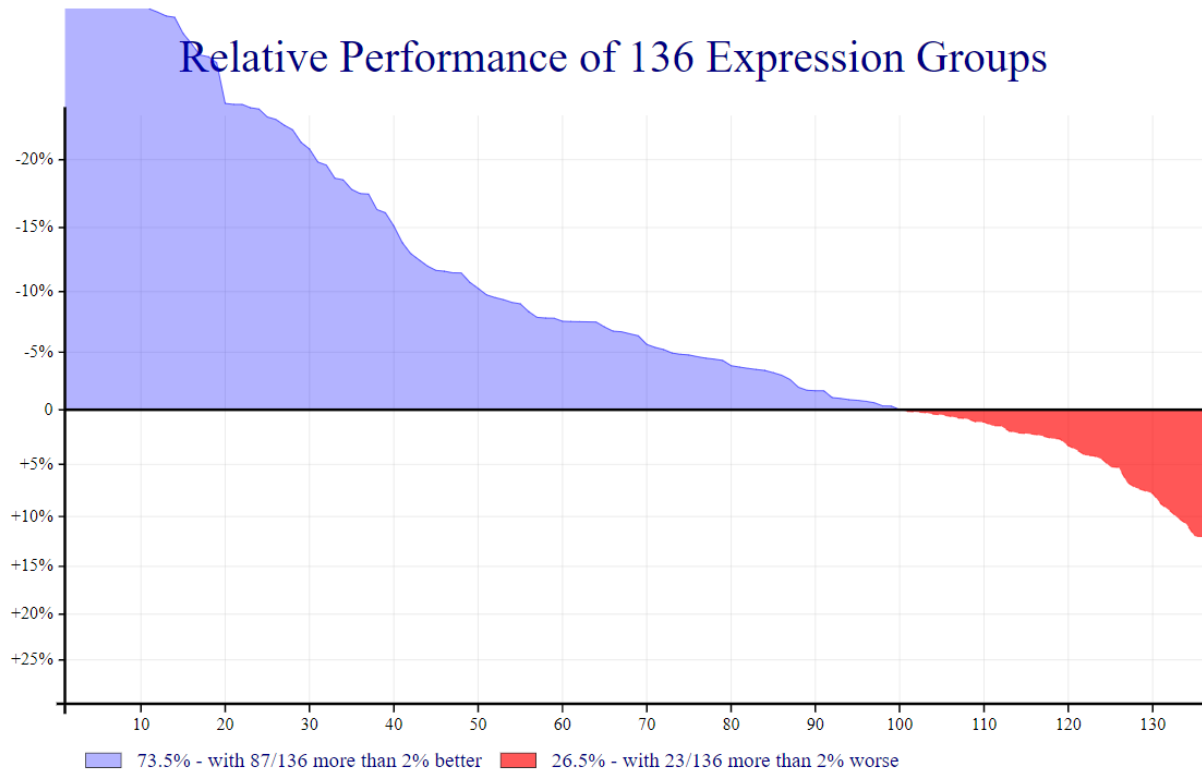
- Cache Usage

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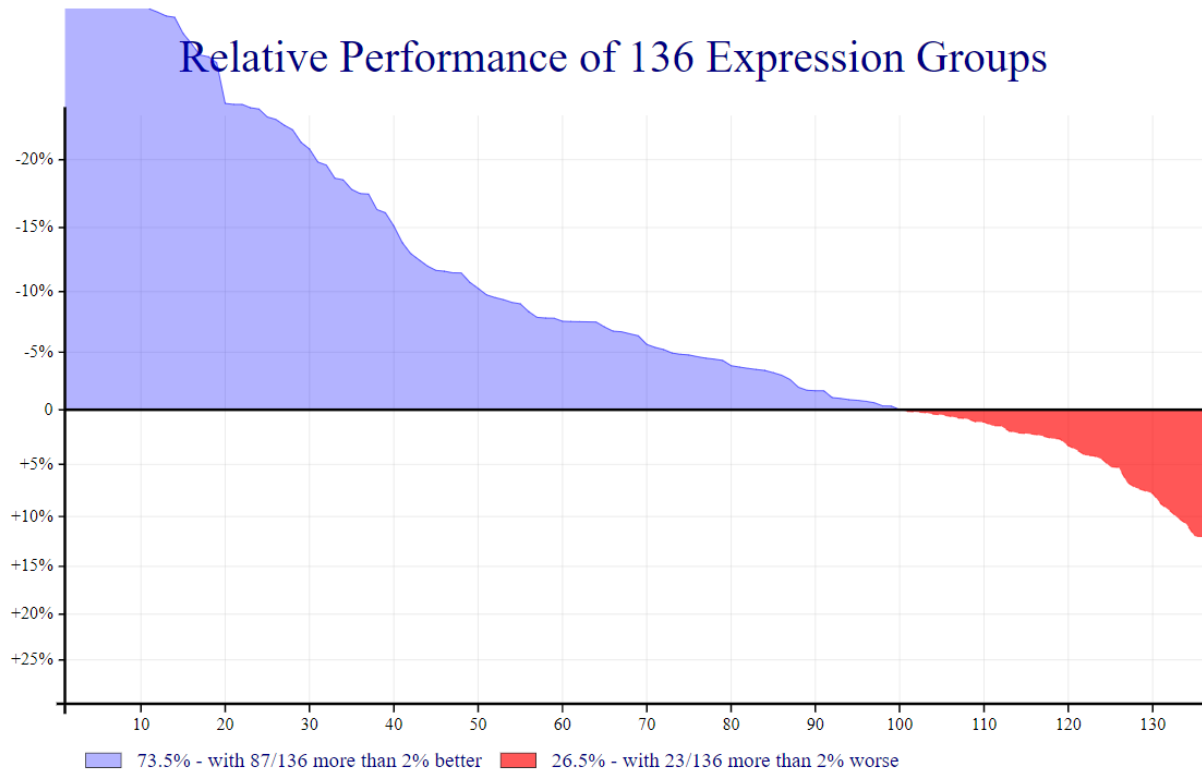
- Cache Usage
- Less Overhead

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Focus Areas

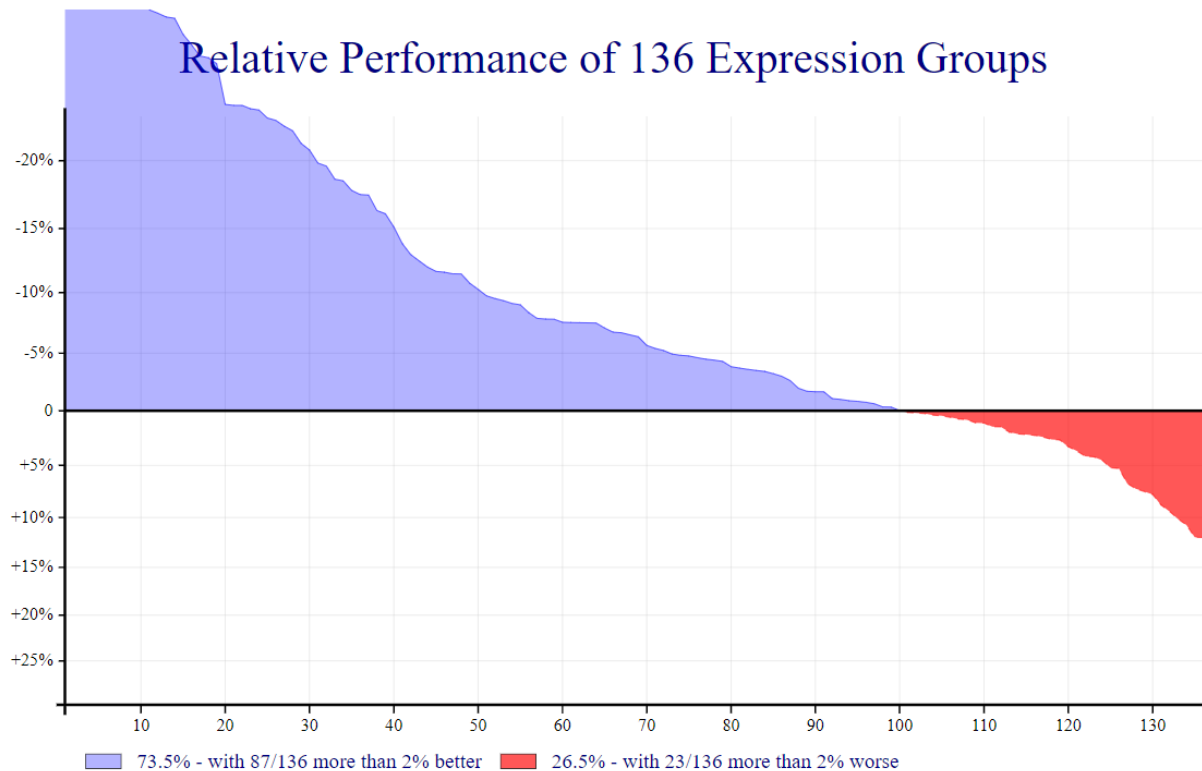
- Cache Usage
- Less Overhead
- Sets $\mathbb{Z} \times \mathbb{N} \cup \sim$

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Focus Areas

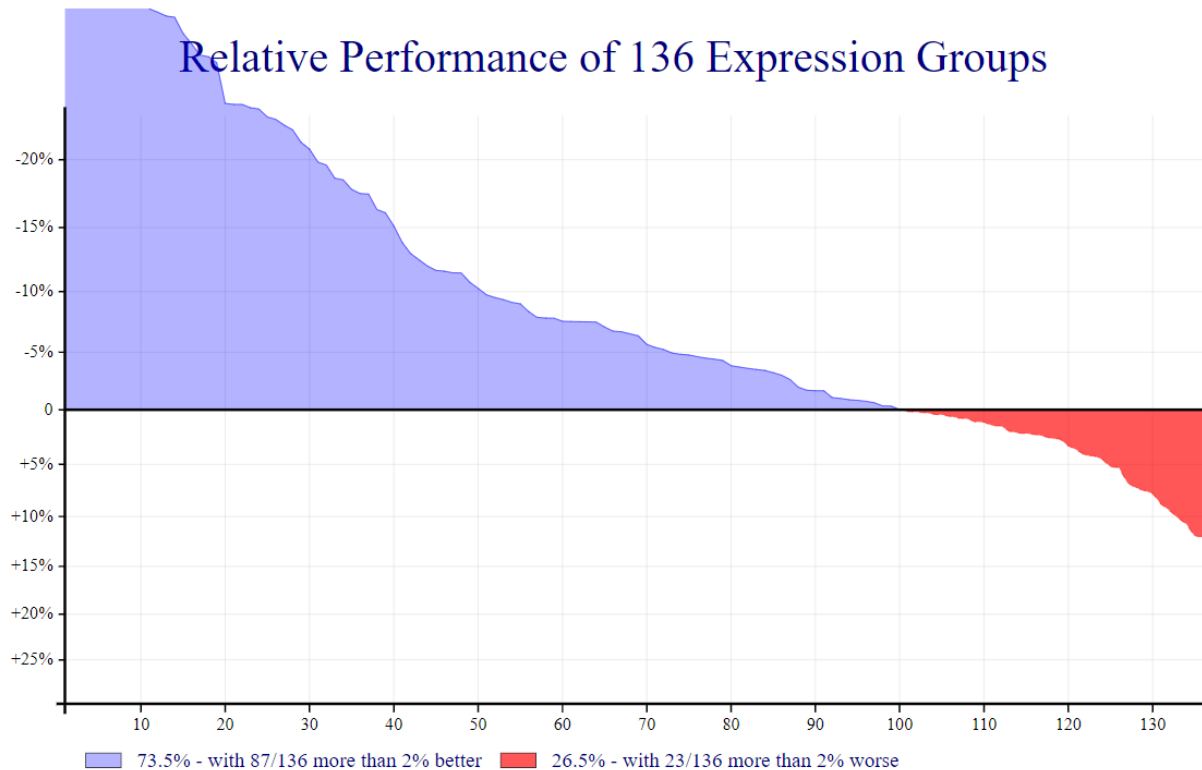
- Cache Usage
- Less Overhead
- Sets $\mathbb{Z} \times \mathbb{N} \cup \sim$
- Searches

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Relative Performance of 136 Expression Groups



Focus Areas

- Cache Usage
- Less Overhead
- Sets $\mathbb{Z} \times \mathbb{N} \cup \sim$
- Searches
- Sorts

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Performance

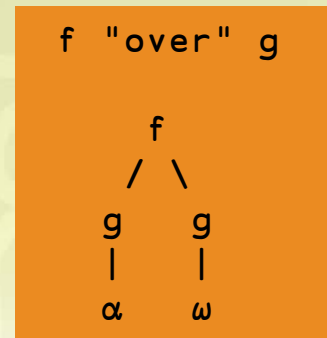
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v18 Operators: Over fög

Definition:

$$\alpha (f\ddot{o}g) \omega \leftrightarrow (g \alpha) f g \omega \leftrightarrow "f \text{ over } g"$$


1 2 3 =ö| 1 ^2 3 a Compare magnitudes
1 1 1

'Hello' 'World' (,ö⊆) 2 3p12 a Catenate enclosures

Hello	World	1 2 3
		4 5 6

v18 Operators: Atop $f \circ g$

f "atop" g



v18 Operators: Atop $f \ddot{ } g$

Definition:

$$\begin{aligned} (f \ddot{ } g) \omega &\leftrightarrow f \quad g \omega \\ \alpha (f \ddot{ } g) \omega &\leftrightarrow f \quad \alpha \quad g \omega \end{aligned}$$

f "atop" g



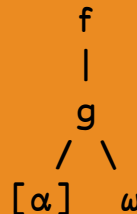
v18 Operators: Atop $f \ddot{ } g$

Definition:

$$\begin{aligned} (f \ddot{ } g) \omega &\leftrightarrow f \quad g \omega \\ \alpha (f \ddot{ } g) \omega &\leftrightarrow f \alpha g \omega \end{aligned}$$

Benefit: Simpler trains

f "atop" g



v18 Operators: Atop $f \ddot{ } g$

Definition:

$$\begin{aligned} (f \ddot{ } g) \omega &\leftrightarrow f \quad g \omega \\ \alpha (f \ddot{ } g) \omega &\leftrightarrow f \alpha g \omega \end{aligned}$$

Benefit: Simpler trains

$(([/ \neg), ([/ \vdash))$ α Can now be written ...
 $([/ \ddot{ } \neg, [/ \ddot{ } \vdash)$

f "atop" g



v18 Operators: Atop $f \ddot{ } g$

Definition:

$$\begin{aligned} (f \ddot{ } g) \omega &\leftrightarrow f \quad g \omega \\ \alpha (f \ddot{ } g) \omega &\leftrightarrow f \quad \alpha \quad g \omega \end{aligned}$$

Benefit: Simpler trains

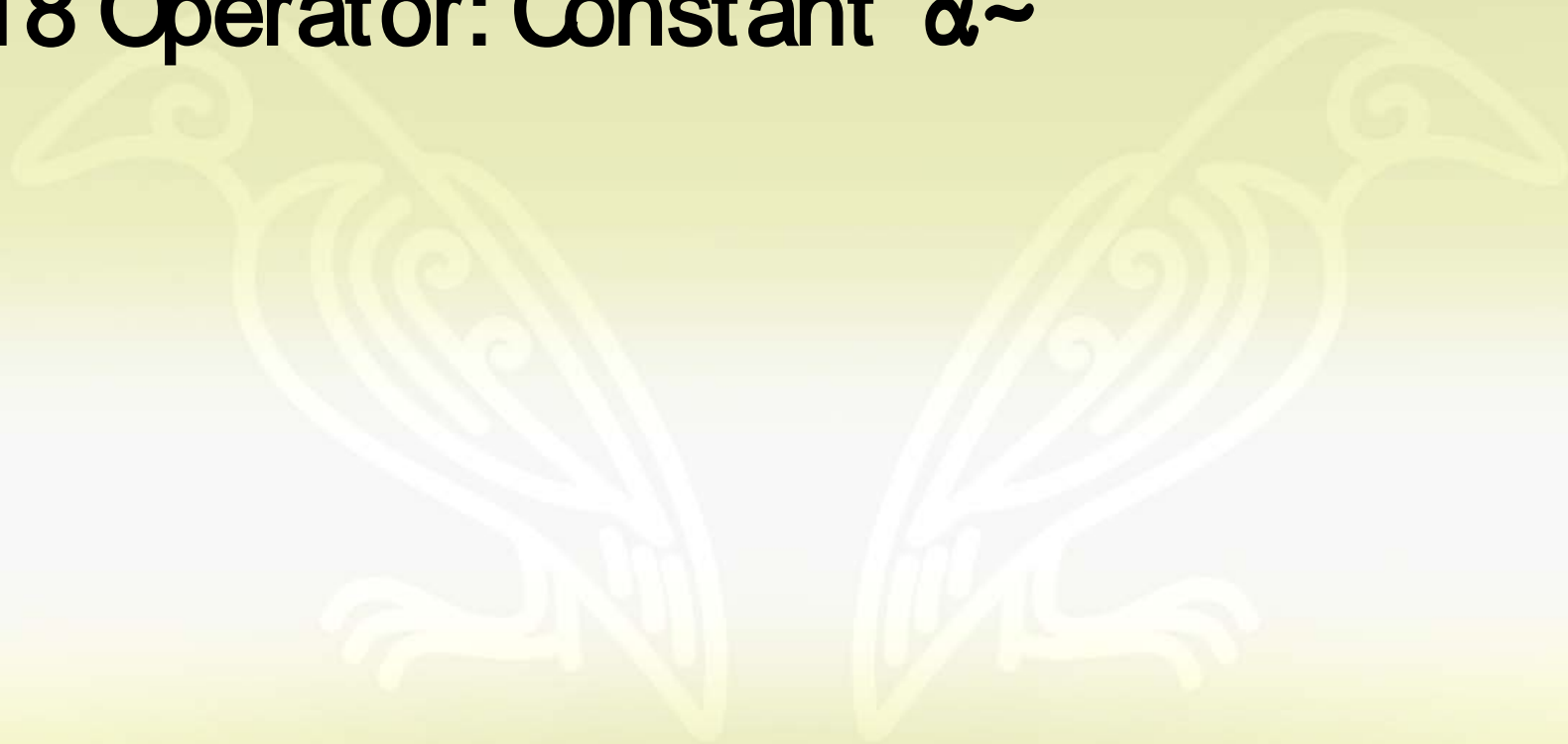
$((\lfloor / \neg), (\lceil / \vdash))$ A Can now be written ...
 $(\lfloor / \ddot{ } \neg, \lceil / \ddot{ } \vdash)$

$\{(\lfloor / \alpha), \lceil / \omega\}$ A Morten is a bit old fashioned

f "atop" g



v18 Operator: Constant $\alpha\tilde{}$



v18 Operator: Constant α

```
mat←2 3p12      A A small matrix
```

v18 Operator: Constant $\alpha\approx$

`mat←2 3p12` α A small matrix

`0 \approx mat` α Always 0: Not VERY useful

v18 Operator: Constant α ~

`mat←2 3p12` α A small matrix

`0 ~ mat` α Always 0: Not VERY useful

0

v18 Operator: Constant $\alpha \approx$

`mat←2 3p12` A A small matrix

`0 ≈ mat` A Always 0: Not VERY useful

0

`0 ≈ mat` A 0 for each item of mat: (pmat)p0

v18 Operator: Constant α

`mat←2 3p12` A A small matrix

`0 ~ mat` A Always 0: Not VERY useful

0

`0 ~ mat` A 0 for each item of mat: (pmat)p0

0 0 0

0 0 0

v18 Operator: Constant α

`mat←2 3p112` ρ A small matrix

`0 ~ mat` ρ Always 0: Not VERY useful

0

`0 ~:: mat` ρ 0 for each item of mat: $(\rho mat)\rho 0$

0 0 0

0 0 0

`1 ~1~::1←mat` ρ 2 columns with same number of rows as mat

v18 Operator: Constant α

`mat←2 3⍲12` A A small matrix

`0 ⍴ mat` A Always 0: Not VERY useful

0

`0 ⍴⍴ mat` A 0 for each item of mat: (pmat)p0

0 0 0

0 0 0

`1 ⍴1⍴⍴1←mat` A 2 columns with same number of rows as mat

1 -1

1 -1

v18 Functions: Unique Mask ≠ω

≠ 1 1 2 2 2 3 a Mask which would select unique items
 1 0 1 0 0 1

(≠,⊖) ↑2 3/'IBM' 'APL' a Works on Major Cells

1	IBM
0	IBM
1	APL
0	APL
0	APL

v18 Functions: Case Conversion ⌈C

```
⌈←A←'Hello' 'World' (,⌈) ⌈NULL
```

Hello	World	[Null]
-------	-------	--------

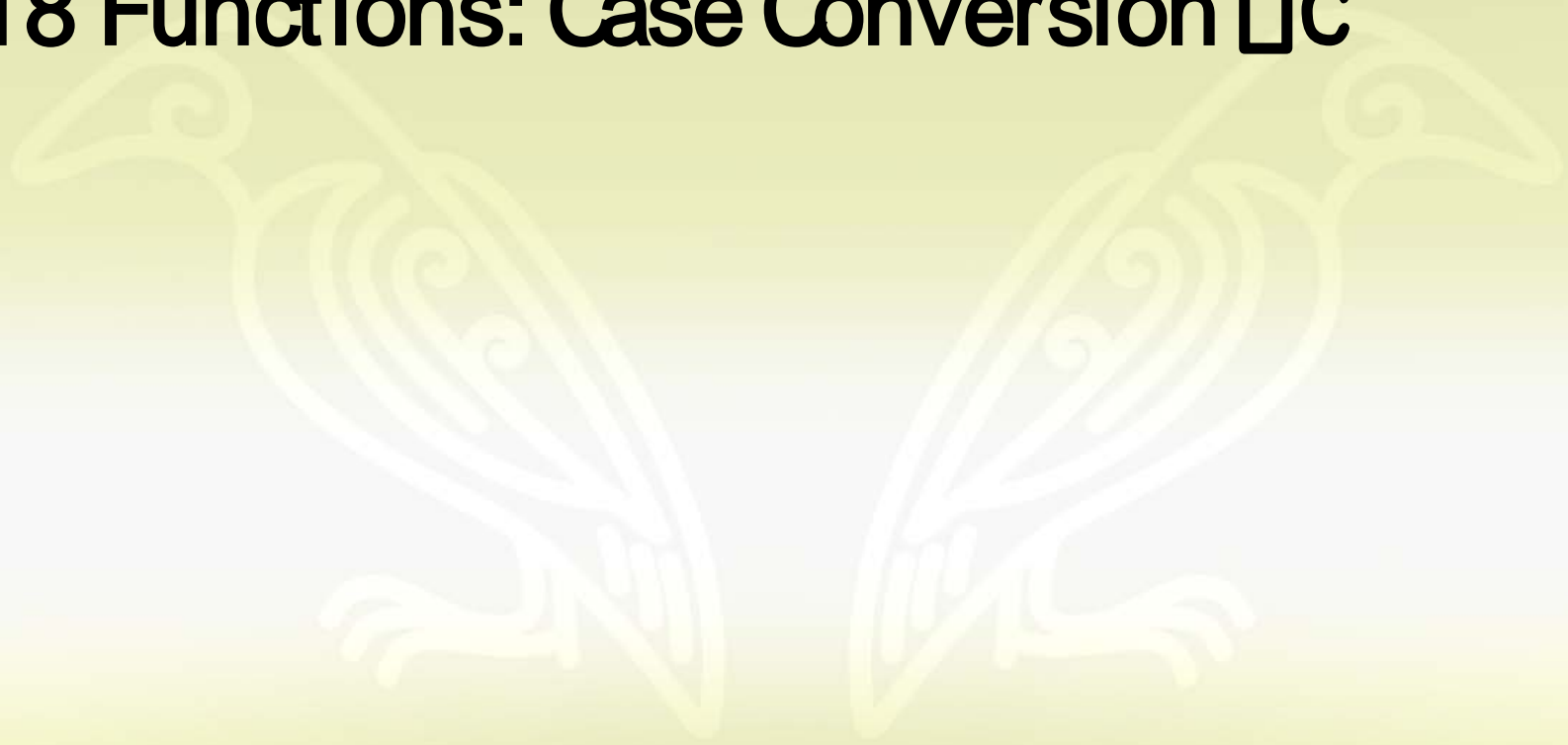
⌈C A A ⌈C replaces 819I.

hello	world	[Null]
-------	-------	--------

A Note that non-character elements are preserved

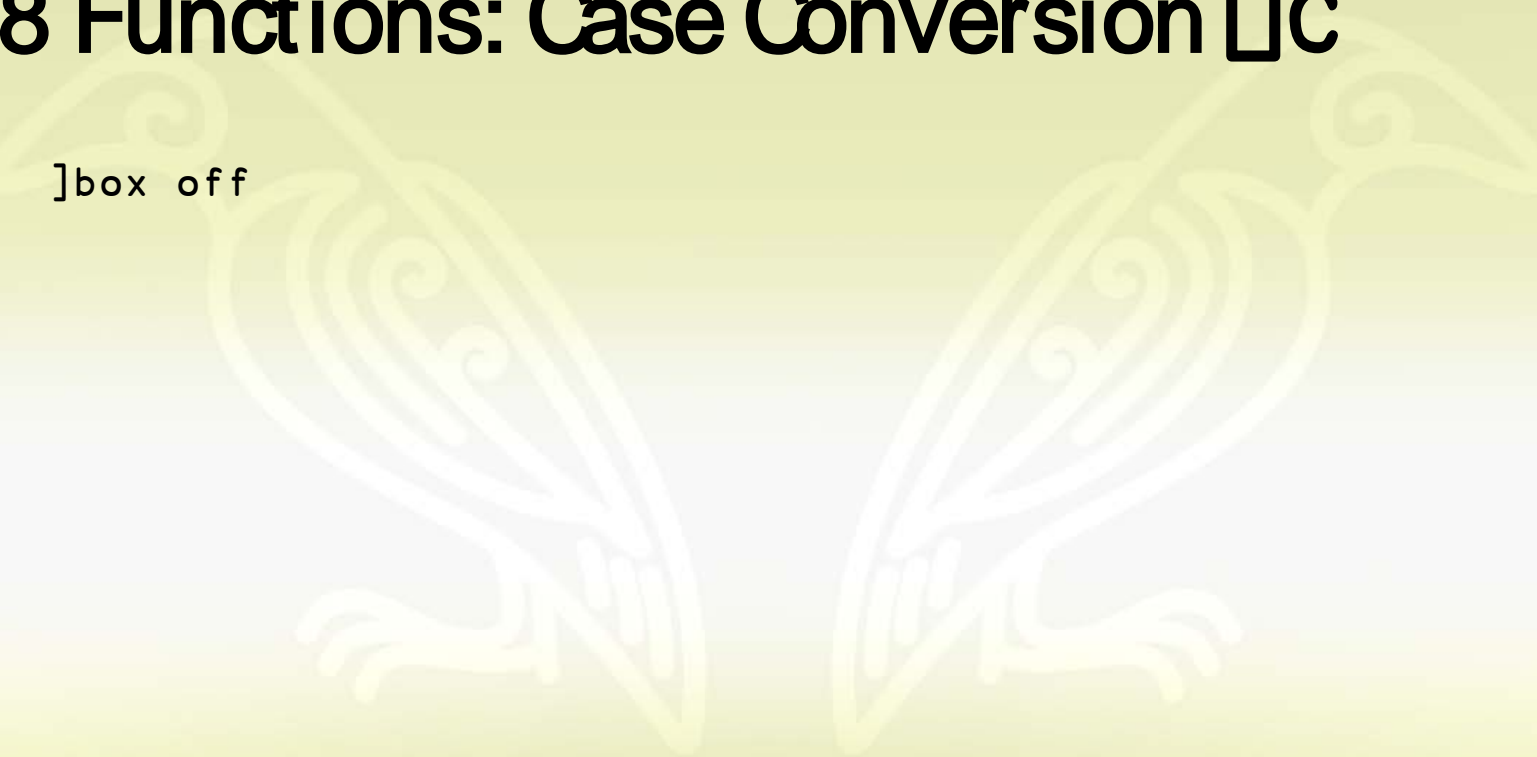
'hello' ≡⌈C 'Hello' A "over ⌈C" means case insensitive

v18 Functions: Case Conversion □C



v18 Functions: Case Conversion □C

`]box off`



v18 Functions: Case Conversion □C

```
]box off
```

```
1 □C 'hello' 'world' ⍺ α=1: Uppercase, 0: Lowercase
```

v18 Functions: Case Conversion □C

```
]box off
```

```
1 □C 'hello' 'world' a α=1: Uppercase, 0: Lowercase  
HELLO  WORLD
```

v18 Functions: Case Conversion □C

```
]box off
```

```
1 □C 'hello' 'world' ⍺ α=1: Uppercase, 0: Lowercase  
HELLO WORLD
```

```
1 0 □C 'hello' 'world' ⍺ Not a scalar function
```


v18 Functions: Case Conversion `⎕C`

```
]box off
```

```
1 ⎕C 'hello' 'world' ⍝  $\alpha$ =1: Uppercase, 0: Lowercase  
HELLO WORLD
```

```
1 0 ⎕C 'hello' 'world' ⍝ Not a scalar function  
DOMAIN ERROR: Invalid left argument
```

v18 Functions: Case Conversion `⎕C`

```
]box off
```

```
1 ⎕C 'hello' 'world' ⌘ α=1: Uppercase, 0: Lowercase  
HELLO WORLD
```

```
1 0 ⎕C 'hello' 'world' ⌘ Not a scalar function  
DOMAIN ERROR: Invalid left argument
```

```
1 (⎕C@(1 1)(2 1)) 'hello' 'world'
```

v18 Functions: Case Conversion `⎕C`

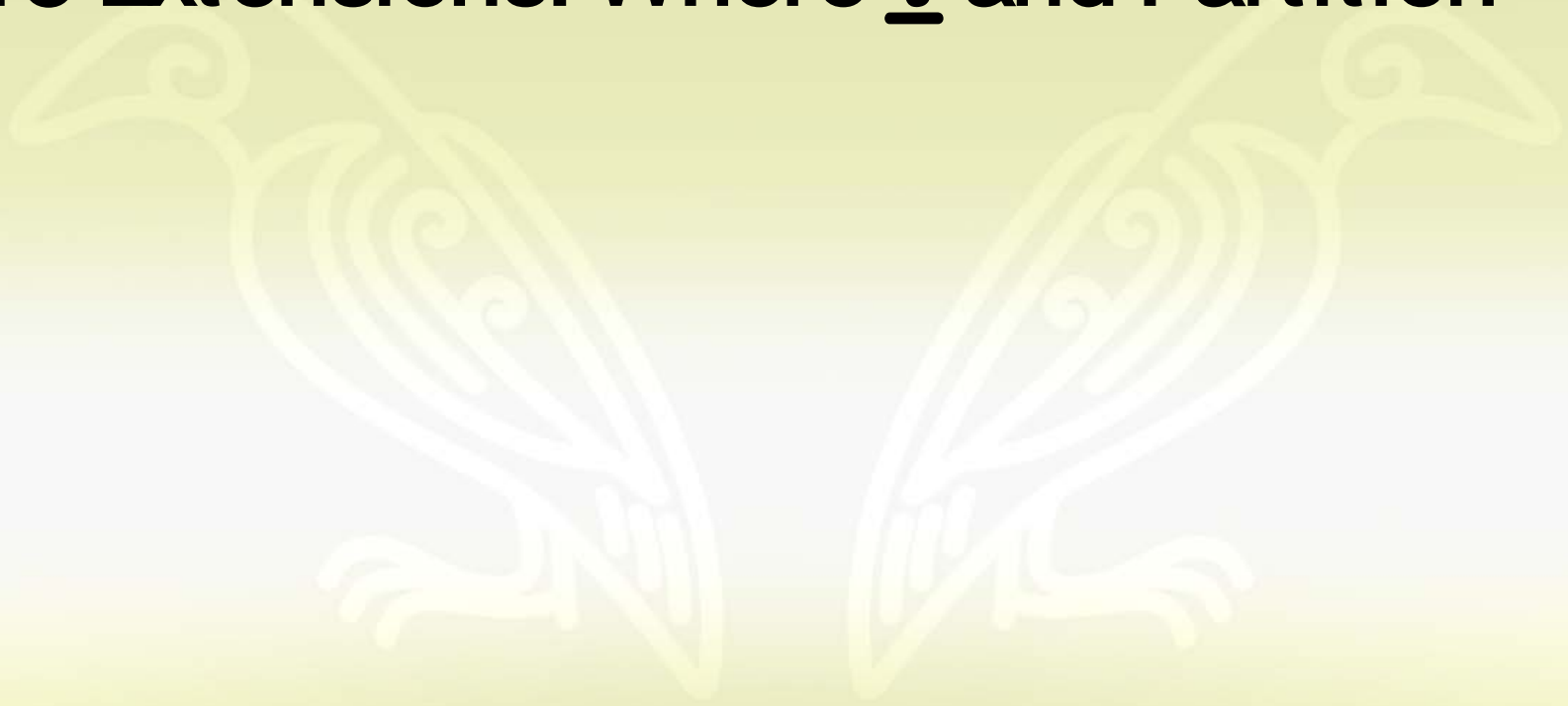
```
]box off
```

```
1 ⎕C 'hello' 'world' ⌘ α=1: Uppercase, 0: Lowercase  
HELLO WORLD
```

```
1 0 ⎕C 'hello' 'world' ⌘ Not a scalar function  
DOMAIN ERROR: Invalid left argument
```

```
1 (⎕C@(1 1)(2 1)) 'hello' 'world'  
Hello World
```

v18 Extensions: Where 1 and Partition \subset



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1 0 4

A Where on positive integers

v18 Extensions: Where 1 and Partition \subset

1 1 0 4
1 3 3 3 3

A Where on positive integers

v18 Extensions: Where $\underline{1}$ and Partition \subset

```

       $\underline{1}$  0 4      a Where on positive integers
1 3 3 3 3
( $\underline{1}^{\times-1}$ ) 1 3 3 3 3  a Inverse is "frequency count" (for  $\omega$  ascending)

```

v18 Extensions: Where $\underline{1}$ and Partition \subset

```

       $\underline{1}$  0 4      A Where on positive integers
1 3 3 3 3
      ( $\underline{1} \times -1$ ) 1 3 3 3 3  A Inverse is "frequency count" (for  $\omega$  ascending)
1 0 4

```


v18 Extensions: Where 1 and Partition \subset

```

      1 0 4      A Where on positive integers
1 3 3 3 3
      (1*-1) 1 3 3 3 3  A Inverse is "frequency count" (for  $\omega$  ascending)
1 0 4

      1 0 1 0  $\subset$  1 2 3 4  A 1 starts a new partition: This has "always worked"

```

v18 Extensions: Where $\underline{1}$ and Partition \subset

$\underline{1}$ 1 0 4 A Where on positive integers
 1 3 3 3 3
 ($\underline{1}^{\omega-1}$) 1 3 3 3 3 A Inverse is "frequency count" (for ω ascending)
 1 0 4

 1 0 1 0 \subset 1 2 3 4 A 1 starts a new partition: This has "always worked"


1	2	3	4
---	---	---	---

v18 Extensions: Where $\underline{1}$ and Partition \subset

$\underline{1}$ 1 0 4 A Where on positive integers
 1 3 3 3 3
 ($\underline{1} \times -1$) 1 3 3 3 3 A Inverse is "frequency count" (for ω ascending)
 1 0 4

 1 0 1 0 \subset 1 2 3 4 A 1 starts a new partition: This has "always worked"

1 2	3 4
-----	-----

 1 0 3 0 \subset 1 2 3 4 A $\alpha[i]$ decides how many elements are produced


v18 Extensions: Where $\underline{1}$ and Partition \subset

$\underline{1}$ 1 0 4 μ Where on positive integers
 1 3 3 3 3
 ($\underline{1} \times -1$) 1 3 3 3 3 μ Inverse is "frequency count" (for ω ascending)
 1 0 4

1 0 1 0 \subset 1 2 3 4 μ 1 starts a new partition: This has "always worked"

1	2	3	4
---	---	---	---

1 0 3 0 \subset 1 2 3 4 μ $\alpha[i]$ decides how many elements are produced

1	2			3	4
---	---	--	--	---	---

v18 Extensions: Where 1 and Partition ϵ

Partitioning based on a partition length vector which contains zeros:

v18 Extensions: Where 1 and Partition \Leftarrow

Partitioning based on a partition length vector which contains zeros:

```
plens←2 0 0 3 0      A Partition Lengths
```

v18 Extensions: Where 1 and Partition \Leftarrow

Partitioning based on a partition length vector which contains zeros:

`plens←2 0 0 3 0` \Leftarrow Partition Lengths

`+ \^1 ↓ □ IO, plens` \Leftarrow 1+Where empty cells need to go

v18 Extensions: Where 1 and Partition \Leftarrow

Partitioning based on a partition length vector which contains zeros:

```
plens←2 0 0 3 0      A Partition Lengths
```

```
+\"-1↓IO,plens      A 1+Where empty cells need to go
```

```
1 3 3 3 6
```

```
(1*-1) +\"-1↓IO,plens
```


v18 Extensions: Where 1 and Partition \leftarrow

Partitioning based on a partition length vector which contains zeros:

```
plens←2 0 0 3 0      A Partition Lengths
```

```
+ \^-1↓⊞IO,plens      A 1+Where empty cells need to go
```

```
1 3 3 3 6
```

```
(1*-1) + \^-1↓⊞IO,plens
```

```
1 0 3 0 0 1
```

v18 Extensions: Where 1 and Partition \leftarrow

Partitioning based on a partition length vector which contains zeros:

```
plens←2 0 0 3 0      A Partition Lengths
```

```
+ \^-1 ↓ □ IO,plens      A 1+Where empty cells need to go
```

```
1 3 3 3 6
```

```
(1 × ^-1) + \^-1 ↓ □ IO,plens
```

```
1 0 3 0 0 1
```

```
1 0 3 0 0 1 ← 'abcde'
```

v18 Extensions: Where 1 and Partition \leftarrow

Partitioning based on a partition length vector which contains zeros:

```
plens←2 0 0 3 0      A Partition Lengths
```

```
+ \^-1↓⊞IO,plens      A 1+Where empty cells need to go
```

```
1 3 3 3 6
```

```
(1×^-1) + \^-1↓⊞IO,plens
```

```
1 0 3 0 0 1
```

```
1 0 3 0 0 1 ← 'abcde'
```

ab			cde	
----	--	--	-----	--

Date/ Time Conversion: `DT`



Date/ Time Conversion: `⌈DT`

```
+2 ⌈NQ'.' 'DateToIDN' ⌈TS
```

Date/ Time Conversion: `⌈DT`

```
+2 ⌈NQ'.' 'DateToIDN' ⌈TS  
43949
```

Date/ Time Conversion: `⌈DT`

```
+2 ⌈NQ'.' 'DateToIDN' ⌈TS  
43949
```

```
1 ⌈DT <⌈TS ⌈ Left argument is "target type": 1 = day number
```

Date/ Time Conversion: \square DT

```
+2  $\square$ NQ'.' 'DateToIDN'  $\square$ TS  
43949
```

```
1  $\square$ DT  $\leftarrow$   $\square$ TS  $\P$  Left argument is "target type": 1 = day number  
43949.56179
```


Date/ Time Conversion: \square DT

```
+2  $\square$ NQ'.' 'DateToIDN'  $\square$ TS  
43949
```

```
1  $\square$ DT  $\leftarrow$ TS  $\wedge$  Left argument is "target type": 1 = day number  
43949.56179
```

```
 $\bar{1}$   $\square$ DT 43949.56179+0 1  $\wedge$   $\bar{1}$  =  $\square$ TS vector format
```

Date/ Time Conversion: \square DT

```
+2  $\square$ NQ'.' 'DateToIDN'  $\square$ TS  
43949
```

```
1  $\square$ DT  $\leftarrow$   $\square$ TS  $\wedge$  Left argument is "target type": 1 = day number  
43949.56179
```

```
 $\neg$ 1  $\square$ DT 43949.56179+0 1  $\wedge$   $\neg$ 1 =  $\square$ TS vector format
```

2020 4 29 13 28 58 656	2020 4 30 13 28 58 656
------------------------	------------------------

Date/ Time Conversion: \square DT

```
+2  $\square$ NQ'.' 'DateToIDN'  $\square$ TS
43949
```

```
1  $\square$ DT < $\square$ TS  $\wedge$  Left argument is "target type": 1 = day number
43949.56179
```

```
 $\sim$ 1  $\square$ DT 43949.56179+0 1  $\wedge$   $\sim$ 1 =  $\square$ TS vector format
```

2020 4 29 13 28 58 656	2020 4 30 13 28 58 656
------------------------	------------------------

```
3> $\square$ FRDCI 1 1
```

Date/ Time Conversion: \square DT

```
+2  $\square$ NQ'.' 'DateToIDN'  $\square$ TS
43949
```

```
1  $\square$ DT  $\leftarrow$   $\square$ TS  $\wedge$  Left argument is "target type": 1 = day number
43949.56179
```

```
 $\sim$ 1  $\square$ DT 43949.56179+0 1  $\wedge$   $\sim$ 1 =  $\square$ TS vector format
```

2020 4 29 13 28 58 656	2020 4 30 13 28 58 656
------------------------	------------------------

```
3 $\rightarrow$  $\square$ FRDCI 1 1
9.529003275E10
```

Date/ Time Conversion: \square DT

```
+2  $\square$ NQ'.' 'DateToIDN'  $\square$ TS
43949
```

```
1  $\square$ DT  $\leftarrow$   $\square$ TS  $\wedge$  Left argument is "target type": 1 = day number
43949.56179
```

```
 $\neg$ 1  $\square$ DT 43949.56179+0 1  $\wedge$   $\neg$ 1 =  $\square$ TS vector format
```

2020 4 29 13 28 58 656	2020 4 30 13 28 58 656
------------------------	------------------------

```
3 $\rightarrow$  $\square$ FRDCI 1 1
9.529003275E10
```

```
2  $\neg$ 1  $\square$ DT 3 $\rightarrow$  $\square$ FRDCI 1 1  $\wedge$  From 2 = FRDCI to  $\neg$ 1 =  $\square$ TS
```

Date/ Time Conversion: \square DT

```
+2  $\square$ NQ'.' 'DateToIDN'  $\square$ TS
43949
```

```
1  $\square$ DT  $\leftarrow$   $\square$ TS  $\wedge$  Left argument is "target type": 1 = day number
43949.56179
```

```
 $\neg$ 1  $\square$ DT 43949.56179+0 1  $\wedge$   $\neg$ 1 =  $\square$ TS vector format
```

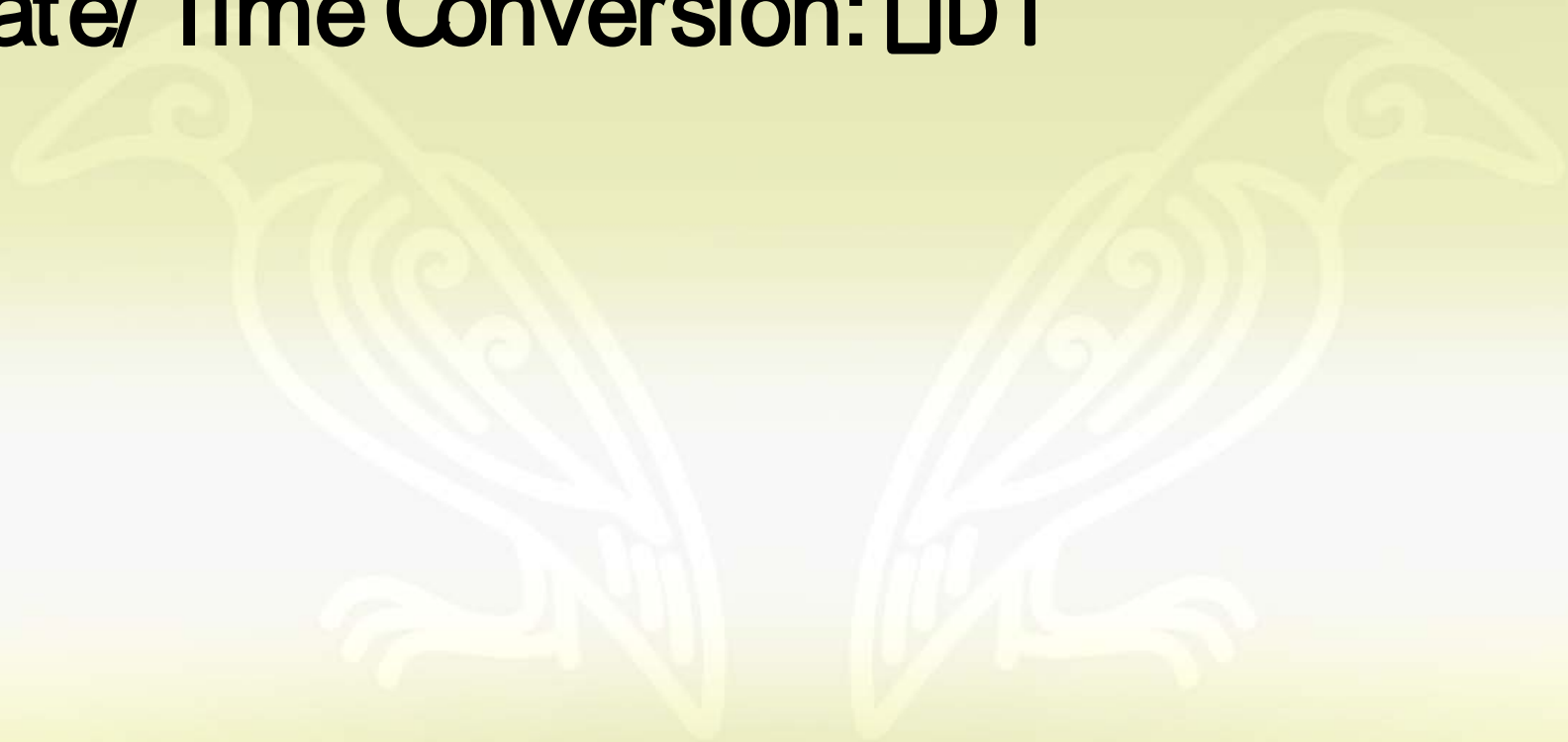
2020 4 29 13 28 58 656	2020 4 30 13 28 58 656
------------------------	------------------------

```
3 $\Rightarrow$  $\square$ FRDCI 1 1
9.529003275E10
```

```
2  $\neg$ 1  $\square$ DT 3 $\Rightarrow$  $\square$ FRDCI 1 1  $\wedge$  From 2 = FRDCI to  $\neg$ 1 =  $\square$ TS
```

2020 4 29 13 33 32 500

Date/ Time Conversion: `DT`



Date/ Time Conversion: `DT`

`>1 DT 'Z'` A Character Scalars represent Time Zones (Z = UTC)

Date/ Time Conversion: `DT`

`>-1 DT 'Z' A Character Scalars represent Time Zones (Z = UTC)`
`2020 4 29 11 35 49 911`

Date/ Time Conversion: `⌈DT`

`⌽⌈1 ⌈DT 'Z' ⌽ Character Scalars represent Time Zones (Z = UTC)`
`2020 4 29 11 35 49 911`

`↑⌈1 ⌈DT 'ZB' ⌽ Zulu (UTC) and Bravo (CET-Summer) time at ⌈TS`

Date/ Time Conversion: `⌈DT`

`⌽⌈1 ⌈DT 'Z' ⌽` Character Scalars represent Time Zones (Z = UTC)

```
2020 4 29 11 35 49 911
```

`⌽⌈1 ⌈DT 'ZB' ⌽` Zulu (UTC) and Bravo (CET-Summer) time at `⌈TS`

```
2020 4 29 11 36 46 713
```

```
2020 4 29 13 36 46 713
```

Date/ Time Conversion: `⌈DT`

`⌋-1 ⌈DT 'Z'` `⌈` Character Scalars represent Time Zones (Z = UTC)

```
2020 4 29 11 35 49 911
```

`↑-1 ⌈DT 'ZB'` `⌈` Zulu (UTC) and Bravo (CET-Summer) time at `⌈TS`

```
2020 4 29 11 36 46 713
```

```
2020 4 29 13 36 46 713
```

`24*-/1 ⌈DT 'JZ'` `⌈` Difference in hours between J = Local and Zulu

Date/ Time Conversion: `⌈DT`

`⌈-1 ⌈DT 'Z'` ⌈ Character Scalars represent Time Zones (Z = UTC)
2020 4 29 11 35 49 911

`⌈-1 ⌈DT 'ZB'` ⌈ Zulu (UTC) and Bravo (CET-Summer) time at `⌈TS`
2020 4 29 11 36 46 713
2020 4 29 13 36 46 713

`24*-/1 ⌈DT 'JZ'` ⌈ Difference in hours between J = Local and Zulu
2

Date/ Time Conversion: `⌈DT`

`⌈-1 ⌈DT 'Z'` `⌈` Character Scalars represent Time Zones (Z = UTC)

```
2020 4 29 11 35 49 911
```

`⌈-1 ⌈DT 'ZB'` `⌈` Zulu (UTC) and Bravo (CET-Summer) time at `⌈TS`

```
2020 4 29 11 36 46 713
```

```
2020 4 29 13 36 46 713
```

`24*-/1 ⌈DT 'JZ'` `⌈` Difference in hours between J = Local and Zulu

```
2
```

`⌈` Date/Time formatting (experimental)

Date/ Time Conversion: `⌈DT`

`⌈-1 ⌈DT 'Z'` `⌈` Character Scalars represent Time Zones (Z = UTC)

```
2020 4 29 11 35 49 911
```

`⌈-1 ⌈DT 'ZB'` `⌈` Zulu (UTC) and Bravo (CET-Summer) time at `⌈TS`

```
2020 4 29 11 36 46 713
```

```
2020 4 29 13 36 46 713
```

`24*-/1 ⌈DT 'JZ'` `⌈` Difference in hours between J = Local and Zulu

```
2
```

`⌈` Date/Time formatting (experimental)

```
'__da__Dddd, DDoo mmmm YYYY; hh:mm:ss' (1200⌈) tn
```

Date/ Time Conversion: `⎕DT`

`⌽-1 ⎕DT 'Z' ⌞ Character Scalars represent Time Zones (Z = UTC)`

```
2020 4 29 11 35 49 911
```

`↑-1 ⎕DT 'ZB' ⌞ Zulu (UTC) and Bravo (CET-Summer) time at ⎕TS`

```
2020 4 29 11 36 46 713
```

```
2020 4 29 13 36 46 713
```

`24×-/1 ⎕DT 'JZ' ⌞ Difference in hours between J = Local and Zulu`

```
2
```

`⌞ Date/Time formatting (experimental)`

`'__da__Dddd, DDoo mmmm YYYY; hh:mm:ss' (1200⌞) tn`

```
Onsdag, 13. februar 2019; 10:16:56
```


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Time Numbers

If a value in **X** is positive it indicates that a time number type is expected in **Y** or generated in **R**, as follows. Note that the last column indicated whether (Yes) or not (No) negative numbers are allowed.

Group	Code	Description	Category	Date and time ¹ represented by 0 (Epoch)	Negative values allowed? ⁸
Dyalog APL	1	Dyalog Date Number	Day count with fractional part	1899-12-31 00:00	Yes
	2	Dyalog component file time	Tick count 1÷60s ticks ²	1970-01-01 00:00	Yes
Other languages	10	J (J nanosecond time)	Tick count ³ 1ns ticks ²	2000-01-01 00:00	Yes
	11	K7	Tick count 1ms ticks ²	2024-01-01 00:00	Yes
	12	Javascript / D / Q	Tick count 1ms ticks ²	1970-01-01 00:00	Yes
	13	R (R chron format)	Day count with fractional part	1970-01-01 00:00	Yes
UNIX	20	Unix time	Tick count 1s ticks ²	1970-01-01 00:00	Yes
Microsoft	30	Microsoft DOS date/time	Encoded broken-down time 2s resolution	N/A	No
	31	Microsoft Win32 FILETIME	Tick count ³ 100ns ticks	1601-01-01 00:00	No

Dyalog version 18.0 - Datetime x +

help.dyalog.com/18.0/#Language/System%20Functions/dt.htm

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Application	42	Stata statistics package	1ms ticks ²	1960-01-01 00:00	Yes
	43	SPSS statistics package	Tick count 1s ticks ²	1582-10-14 00:00	No
	44	SAS	Tick count 1s ticks ²	1960-01-01 00:00	Yes
Julian Date and variants	50	Julian Date	Day count with fractional part	-4717-11-24 12:00	No
	51	J (J dayno)	Day count with fractional part	1800-01-01 00:00	No
	52	Reduced Julian Date	Day count with fractional part	1858-11-16 12:00	Yes
	53	Modified Julian Date	Day count with fractional part	1858-11-17 00:00	Yes
	54	Dublin Julian Date	Day count with fractional part	1899-12-31 12:00	Yes
	55	CNES Julian Date	Day count with fractional part	1950-01-01 00:00	Yes
Decimal encoded ⁹	56	CCSDS Julian Date	Day count with fractional part	1958-01-01 00:00	Yes
	60	Floating-point decimal encoded format Digits take the form yyyymmdd.hhmmss	Encoded broken-down time 1s resolution	N/A	No
	61	Integer decimal encoded format Digits take the form yyyymmddhhmmss(J digit time)	Encoded broken-down time 1s resolution	N/A	No

Version 18.0 – a MAJOR release!

Platform Equivalence

- .NET Core Bridge
- Launch Source Files
- Configuration Files
- HTMLRenderer + RIDE enhancements

Easier to Build, Test, Deploy

- Launch source files
- Configuration Files
- Multi-Line Input

Performance

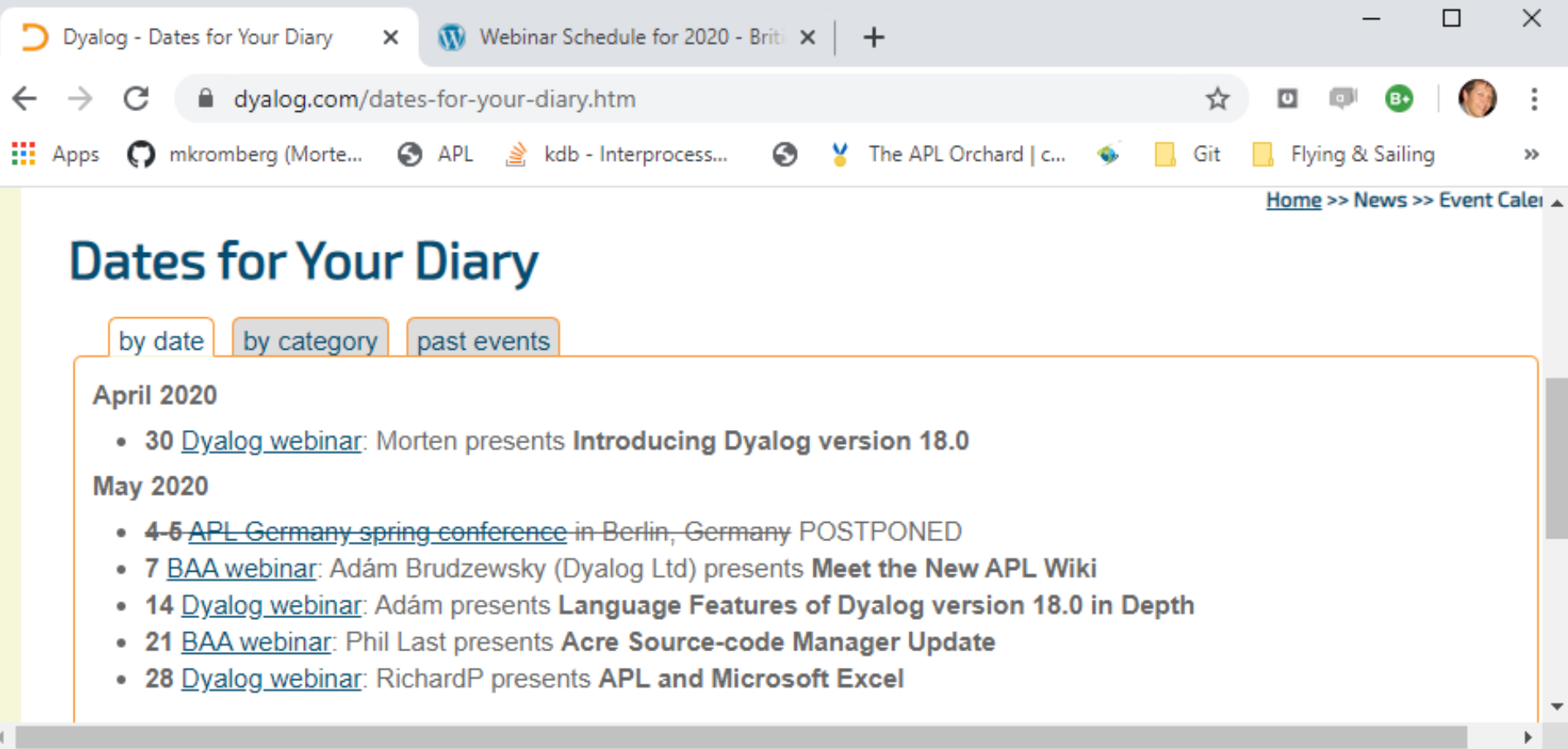
- "Performance QA" nearly 10% faster

Improving the Tool of Thought

- Operators ~ Constant, ∅ Atop, ∅ Over
- Function ≠ Unique Mask
- Case Folding with □C
- Date Conversions with □DT
- Multi-Line Input

Version 18.0 Availability

- In Beta Testing
- Release "In May"



Dyalog - Dates for Your Diary x Webinar Schedule for 2020 - Briti x +

dyalog.com/dates-for-your-diary.htm

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Dates for Your Diary

by date by category past events

April 2020

- 30 [Dyalog webinar](#): Morten presents **Introducing Dyalog version 18.0**

May 2020

- ~~4-5~~ [APL Germany spring conference](#) in Berlin, Germany POSTPONED
- 7 [BAA webinar](#): Adám Brudzewsky (Dyalog Ltd) presents **Meet the New APL Wiki**
- 14 [Dyalog webinar](#): Adám presents **Language Features of Dyalog version 18.0 in Depth**
- 21 [BAA webinar](#): Phil Last presents **Acre Source-code Manager Update**
- 28 [Dyalog webinar](#): RichardP presents **APL and Microsoft Excel**