APL Source Code In Text Files

DYALOG

Elsinore 2017

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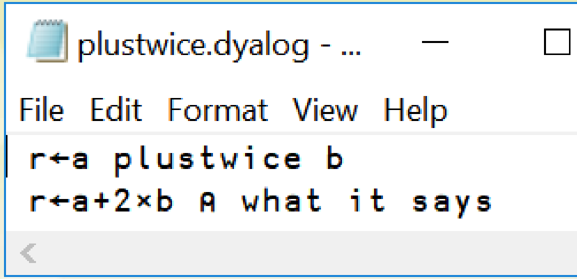
Before I Start...

1. How many people are already working with (or towards) storing APL Source in Text Files?
2. Are you familiar with the `]load` and `]save` user commands?
3. How do you feel about GitHub?
   a) Love GitHub ☺
   b) Loathe GitHub!
   c) What is GitHub?



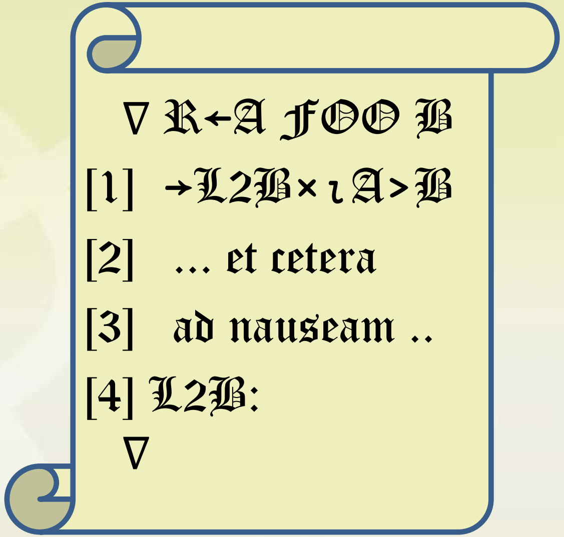
```
r←a plustwice b
r←a+2×b ⍝ what it says
```

APL Source Code – Historically

- Originally in the Workspace
  - Complete application – code and data - in one binary file, very convenient
  - (but versioning a complete nightmare)
- Next, homegrown systems based on APL Component Files
  - Many of them very good at versioning / sharing
- Then, Relational Data Bases (Oracle, flipdb)

And Now…

- (Unicode) Text Files!



```
  ∇ R←A FOO B
[1]  →L2B×⍳A>B
[2]   … et cetera
[3]   ad nauseam ..
[4] L2B:
  ∇
```

History of Text Support in Dyalog APL

- Dyalog.NET compiled ASP.NET source files
- SALT (Simple APL Library Toolkit) was introduced in version 12.x of Dyalog APL:

```
]load filename
⎕SE.SALT.Load 'filename'
```

- Version 15.0 added support to the interpreter:

```
2 ⎕FIX 'file://filename.dyalog'
)ed file://filename.dyalog
```

  Plus: Editing directly from Windows Explorer
- The requirement for SALT to be backwards compatible puts constraints on use of `⎕FIX`
- Hopefully SALT will use `⎕FIX` in v17.0 and the old code can fade away

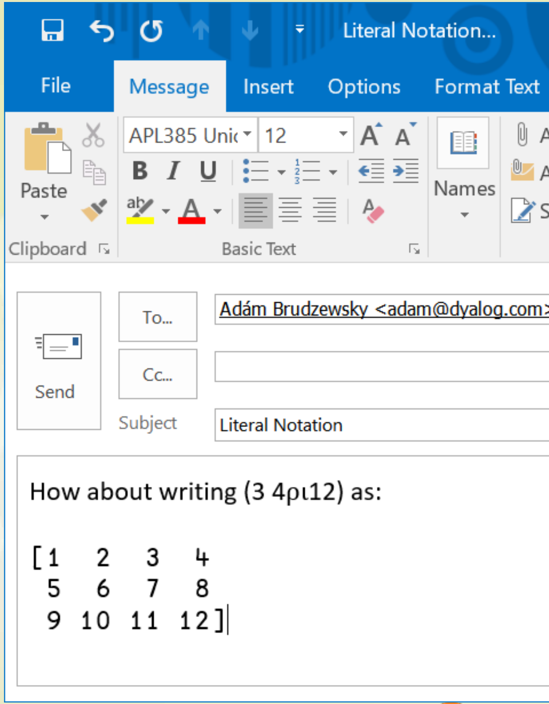
Usage of Text Source in Dyalog APL

- First just Morten and Dan (+ASP.NET samples)
- Gradually, all Tools Group work
  - Hopefully, the QA dept will soon follow
- Backed first by SubVersion, now Git/GitHub
  - DFS, MiServer, vecdb
  - Today, 25 projects including new utility libraries
- Today, major users of Dyalog APL are looking at adopting Git and other SCM systems
  - It is about to become "mainstream"
  - Time for everyone to learn about it!

This means you!

Benefits of Text Source

- Use mainstream source code management systems
  - SVN, GitHub, Mercurial, CVS, …
  - File "diff" tools etc
- Easily share code between APL versions
- Read, collaboratively write and exchange APL code without installing an APL IDE
  - Most operating systems display readable APL without installing APL fonts
  - Recent Linuxes even come with APL keyboard support built in (thanks to Geoff!)



To... Adám Brudzewsky <adam@dyalog.com>

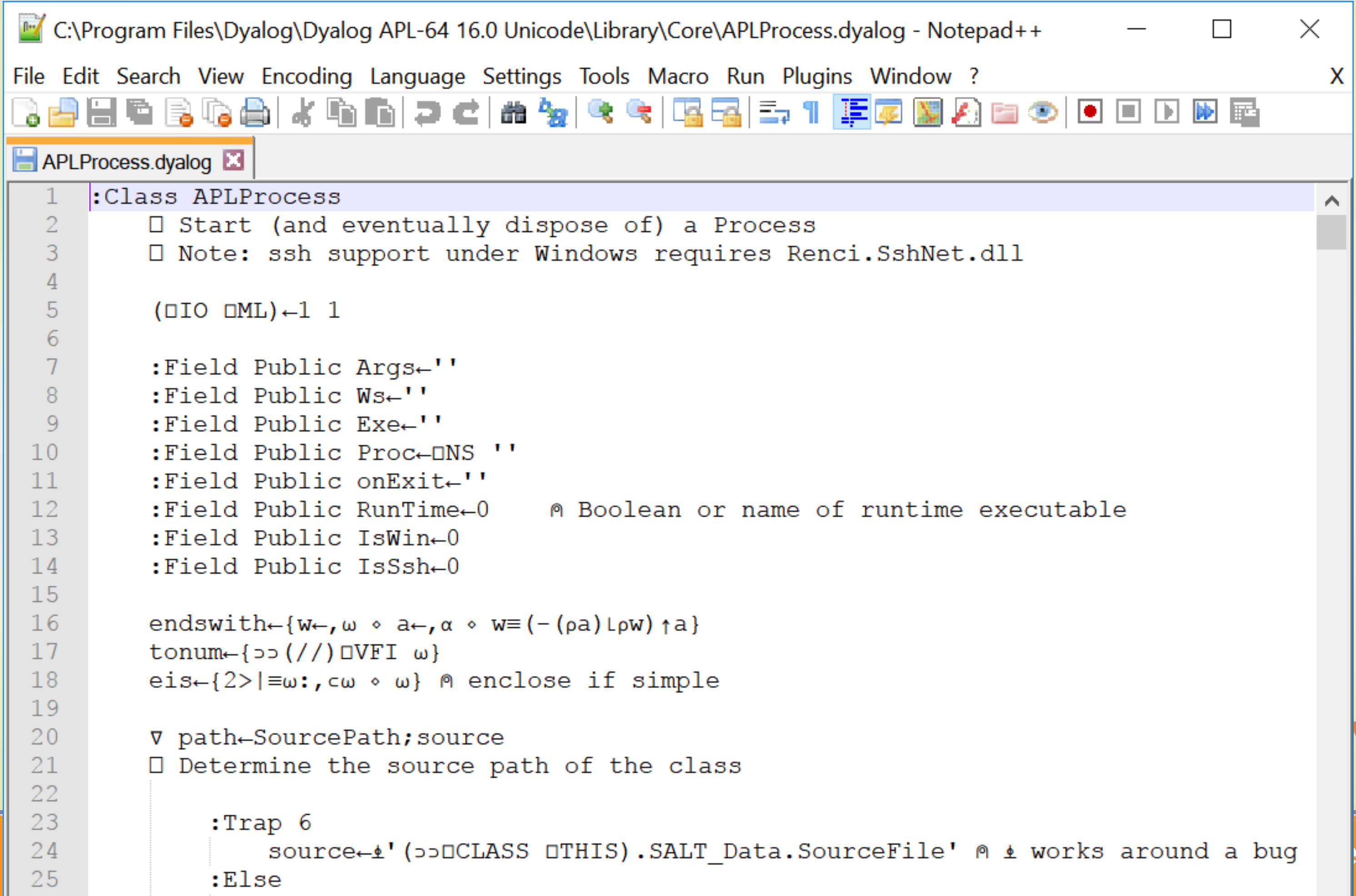
Cc...

Subject Literal Notation

How about writing (3 4⍴⍳12) as:

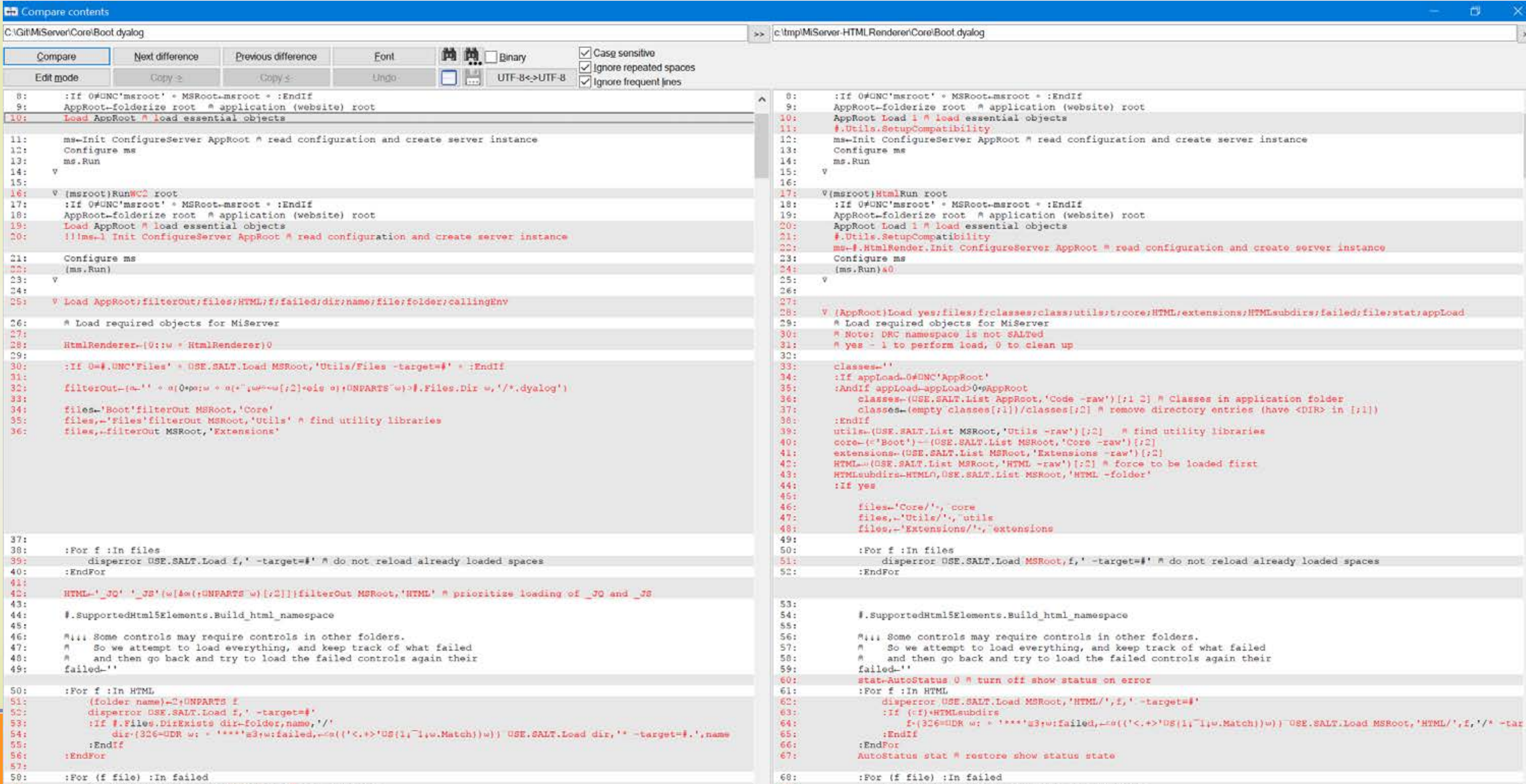
```
[1  2  3  4
 5  6  7  8
 9 10 11 12]
```

Notepad++


C:\Program Files\Dyalog\Dyalog APL-64 16.0 Unicode\Library\Core\APLProcess.dyalog - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
X
APLProcess.dyalog

```
:Class APLProcess
    □ Start (and eventually dispose of) a Process
    □ Note: ssh support under Windows requires Renci.SshNet.dll

    (⎕IO ⎕ML)←1 1

    :Field Public Args←''
    :Field Public Ws←''
    :Field Public Exe←''
    :Field Public Proc←⎕NS ''
    :Field Public onExit←''
    :Field Public RunTime←0     ⍝ Boolean or name of runtime executable
    :Field Public IsWin←0
    :Field Public IsSsh←0

    endswith←{w←,⍵ ⋄ a←,⍺ ⋄ w≡(-(⍴a)⌊⍴w)↑a}
    tonum←{⊃⊃(//)⎕VFI ⍵}
    eis←{2>|≡⍵:,⊂⍵ ⋄ ⍵} ⍝ enclose if simple

    ∇ path←SourcePath;source
    □ Determine the source path of the class

        :Trap 6
            source←⍎'(⊃⊃⎕CLASS ⎕THIS).SALT_Data.SourceFile' ⍝ ⍎ works around a bug
        :Else
```

Total Commander



C:\Git\MiServer\Core\Boot.dyalog

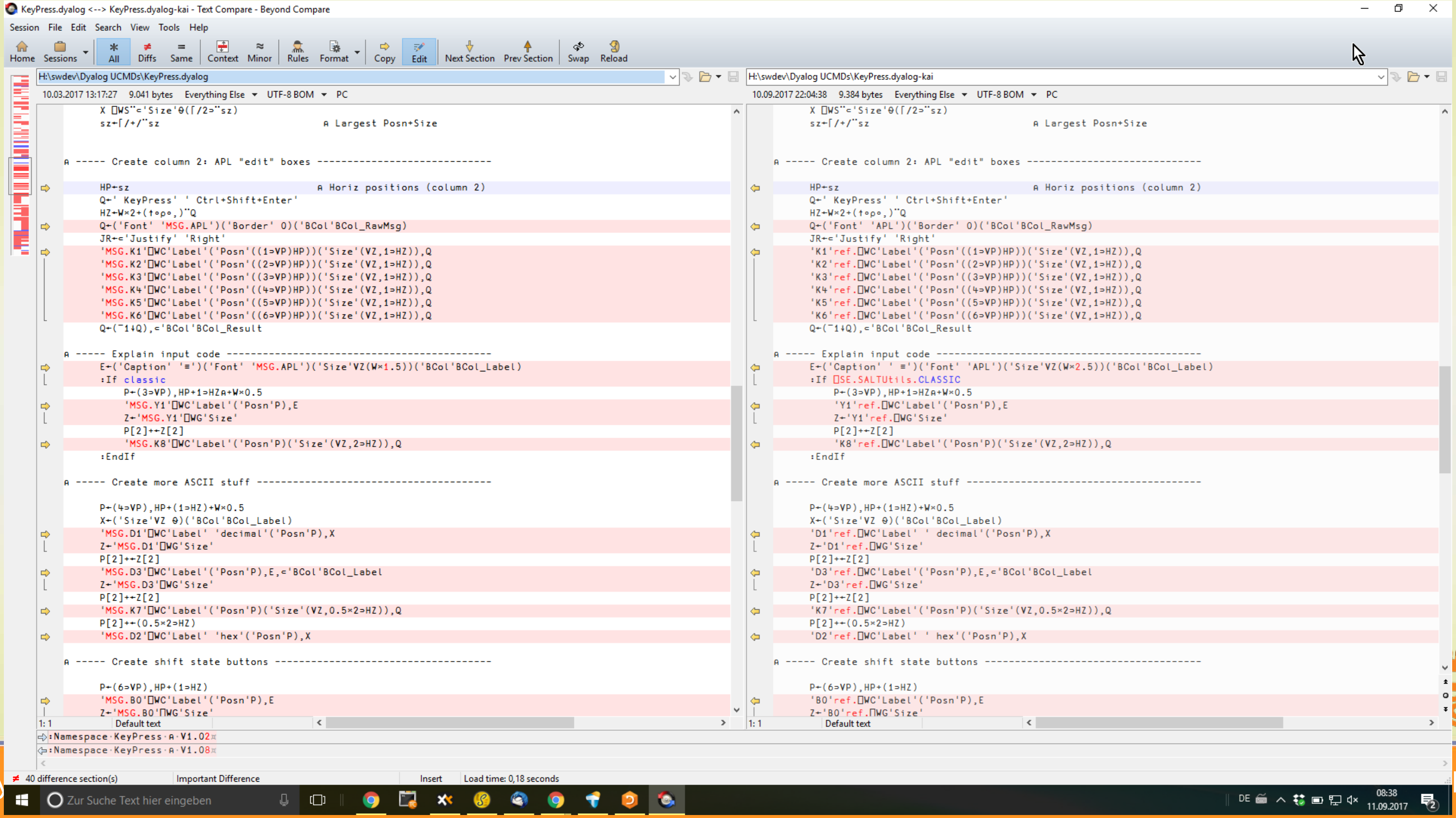
c:\tmp\MiServer-HTMLRenderer\Core\Boot.dyalog

☐ Binary
☑ Case sensitive
☑ Ignore repeated spaces
☑ Ignore frequent lines

```
      :If 0≠⎕NC'msroot' ⋄ MSRoot←msroot ⋄ :EndIf
      AppRoot←folderize root  ⍝ application (website) root
      Load AppRoot ⍝ load essential objects

      ms←Init ConfigureServer AppRoot ⍝ read configuration and create server instance
      Configure ms
      ms.Run
    ∇

    ∇ (msroot)RunWC2 root
      :If 0≠⎕NC'msroot' ⋄ MSRoot←msroot ⋄ :EndIf
      AppRoot←folderize root  ⍝ application (website) root
      Load AppRoot ⍝ load essential objects
      !!!ms←1 Init ConfigureServer AppRoot ⍝ read configuration and create server instance

      Configure ms
      (ms.Run)
    ∇

    ∇ Load AppRoot;filterOut;files;HTML;f;failed;dir;name;file;folder;callingEnv

      ⍝ Load required objects for MiServer

      HtmlRenderer←{0::⍵ ⋄ HtmlRenderer}0

      :If 0=#.⎕NC'Files' ⋄ ⎕SE.SALT.Load MSRoot,'Utils/Files -target=#' ⋄ :EndIf

      filterOut←{⍺←'' ⋄ ⍺{0∊⍴⍺:⍵ ⋄ ⍺{⍵⌿⍨~⍵[;2]∊⍺}↑⎕NPARTS¨⍵}⊃#.Files.Dir ⍵,'/*.dyalog'}

      files←'Boot'filterOut MSRoot,'Core'
      files,←'Files'filterOut MSRoot,'Utils' ⍝ find utility libraries
      files,←filterOut MSRoot,'Extensions'


      :For f :In files
          disperror ⎕SE.SALT.Load f,' -target=#' ⍝ do not reload already loaded spaces
      :EndFor

      HTML←'_JQ' '_JS'{⍵[⍋⍺⍳(↑⎕NPARTS¨⍵)[;2]]}filterOut MSRoot,'HTML' ⍝ prioritize loading of _JQ and _JS

      #.SupportedHtml5Elements.Build_html_namespace

      ⍝↓↓↓ Some controls may require controls in other folders.
      ⍝    So we attempt to load everything, and keep track of what failed
      ⍝    and then go back and try to load the failed controls again their
      failed←''

      :For f :In HTML
          (folder name)←2↑⎕NPARTS f
          disperror ⎕SE.SALT.Load f,' -target=#'
          :If #.Files.DirExists dir←folder,name,'/'
              dir{326=⎕DR ⍵: ⋄ '***'≡3↑⍵:failed,←⊂⍺(('<.+>'⎕S(1↓¯1↓⍵.Match))⍵)}⎕SE.SALT.Load dir,'* -target=#.',name
          :EndIf
      :EndFor

      :For (f file) :In failed
```

```
      :If 0≠⎕NC'msroot' ⋄ MSRoot←msroot ⋄ :EndIf
      AppRoot←folderize root  ⍝ application (website) root
      AppRoot Load 1 ⍝ load essential objects
      #.Utils.SetupCompatibility
      ms←Init ConfigureServer AppRoot ⍝ read configuration and create server instance
      Configure ms
      ms.Run
    ∇

    ∇(msroot)HtmlRun root
      :If 0≠⎕NC'msroot' ⋄ MSRoot←msroot ⋄ :EndIf
      AppRoot←folderize root  ⍝ application (website) root
      AppRoot Load 1 ⍝ load essential objects
      #.Utils.SetupCompatibility
      ms←#.HtmlRender.Init ConfigureServer AppRoot ⍝ read configuration and create server instance
      Configure ms
      (ms.Run)&0
    ∇


    ∇ (AppRoot)Load yes;files;f;classes;class;utils;t;core;HTML;extensions;HTMLsubdirs;failed;file;stat;appLoad
      ⍝ Load required objects for MiServer
      ⍝ Note: DRC namespace is not SALTed
      ⍝ yes - 1 to perform load, 0 to clean up

      classes←''
      :If appLoad←0≠⎕NC'AppRoot'
      :AndIf appLoad←appLoad>0∊⍴AppRoot
          classes←(⎕SE.SALT.List AppRoot,'Code -raw')[;1 2] ⍝ Classes in application folder
          classes←(empty¨classes[;1])/classes[;2] ⍝ remove directory entries (have <DIR> in [;1])
      :EndIf
      utils←(⎕SE.SALT.List MSRoot,'Utils -raw')[;2]    ⍝ find utility libraries
      core←(⊂'Boot')~⍨(⎕SE.SALT.List MSRoot,'Core -raw')[;2]
      extensions←(⎕SE.SALT.List MSRoot,'Extensions -raw')[;2]
      HTML←∪(⎕SE.SALT.List MSRoot,'HTML -raw')[;2] ⍝ force to be loaded first
      HTMLsubdirs←HTML∩,⎕SE.SALT.List MSRoot,'HTML -folder'
      :If yes

          files←'Core/'∘,¨core
          files,←'Utils/'∘,¨utils
          files,←'Extensions/'∘,¨extensions

          :For f :In files
              disperror ⎕SE.SALT.Load MSRoot,f,' -target=#' ⍝ do not reload already loaded spaces
          :EndFor


          #.SupportedHtml5Elements.Build_html_namespace

          ⍝↓↓↓ Some controls may require controls in other folders.
          ⍝    So we attempt to load everything, and keep track of what failed
          ⍝    and then go back and try to load the failed controls again their
          failed←''
          stat←AutoStatus 0 ⍝ turn off show status on error
          :For f :In HTML
              disperror ⎕SE.SALT.Load MSRoot,'HTML/',f,' -target=#'
              :If (⊂f)∊HTMLsubdirs
                  f{326=⎕DR ⍵: ⋄ '***'≡3↑⍵:failed,←⊂⍺(('<.+>'⎕S(1↓¯1↓⍵.Match))⍵)}⎕SE.SALT.Load MSRoot,'HTML/',f,'/* -tar
              :EndIf
          :EndFor
          AutoStatus stat ⍝ restore show status state

          :For (f file) :In failed
```

Beyond Compare


KeyPress.dyalog <--> KeyPress.dyalog-kai - Text Compare - Beyond Compare
Session File Edit Search View Tools Help
Home Sessions All Diffs Same Context Minor Rules Format Copy Edit Next Section Prev Section Swap Reload
Zur Suche Text hier eingeben
DE 08:38 11.09.2017

H:\swdev\Dyalog UCMDs\KeyPress.dyalog

10.03.2017 13:17:27 9.041 bytes Everything Else UTF-8 BOM PC

```
      X ⎕WS¨⊂'Size'θ(⌈/2⊃¨sz)
      sz←⌈/+/¨sz                            ⍝ Largest Posn+Size


⍝ ----- Create column 2: APL "edit" boxes ----------------------------

      HP←sz                                ⍝ Horiz positions (column 2)
      Q←' KeyPress' ' Ctrl+Shift+Enter'
      HZ←W×2+(↑∘⍴∘,)¨Q
      Q←('Font' 'MSG.APL')('Border' 0)('BCol'BCol_RawMsg)
      JR←⊂'Justify' 'Right'
      'MSG.K1'⎕WC'Label'('Posn'((1⊃VP)HP))('Size'(VZ,1⊃HZ)),Q
      'MSG.K2'⎕WC'Label'('Posn'((2⊃VP)HP))('Size'(VZ,1⊃HZ)),Q
      'MSG.K3'⎕WC'Label'('Posn'((3⊃VP)HP))('Size'(VZ,1⊃HZ)),Q
      'MSG.K4'⎕WC'Label'('Posn'((4⊃VP)HP))('Size'(VZ,1⊃HZ)),Q
      'MSG.K5'⎕WC'Label'('Posn'((5⊃VP)HP))('Size'(VZ,1⊃HZ)),Q
      'MSG.K6'⎕WC'Label'('Posn'((6⊃VP)HP))('Size'(VZ,1⊃HZ)),Q
      Q←(¯1↓Q),⊂'BCol'BCol_Result

⍝ ----- Explain input code -------------------------------------------
      E←('Caption' '≡')('Font' 'MSG.APL')('Size'VZ(W×1.5))('BCol'BCol_Label)
      :If classic
          P←(3⊃VP),HP+1⊃HZ⍝+W×0.5
          'MSG.Y1'⎕WC'Label'('Posn'P),E
          Z←'MSG.Y1'⎕WG'Size'
          P[2]+←Z[2]
          'MSG.K8'⎕WC'Label'('Posn'P)('Size'(VZ,2⊃HZ)),Q
      :EndIf

⍝ ----- Create more ASCII stuff --------------------------------------

      P←(4⊃VP),HP+(1⊃HZ)+W×0.5
      X←('Size'VZ θ)('BCol'BCol_Label)
      'MSG.D1'⎕WC'Label' 'decimal'('Posn'P),X
      Z←'MSG.D1'⎕WG'Size'
      P[2]+←Z[2]
      'MSG.D3'⎕WC'Label'('Posn'P),E,⊂'BCol'BCol_Label
      Z←'MSG.D3'⎕WG'Size'
      P[2]+←Z[2]
      'MSG.K7'⎕WC'Label'('Posn'P)('Size'(VZ,0.5×2⊃HZ)),Q
      P[2]+←(0.5×2⊃HZ)
      'MSG.D2'⎕WC'Label' 'hex'('Posn'P),X

⍝ ----- Create shift state buttons -----------------------------------

      P←(6⊃VP),HP+(1⊃HZ)
      'MSG.B0'⎕WC'Label'('Posn'P),E
      Z←'MSG.B0'⎕WG'Size'
```

1: 1 Default text

H:\swdev\Dyalog UCMDs\KeyPress.dyalog-kai

10.09.2017 22:04:38 9.384 bytes Everything Else UTF-8 BOM PC

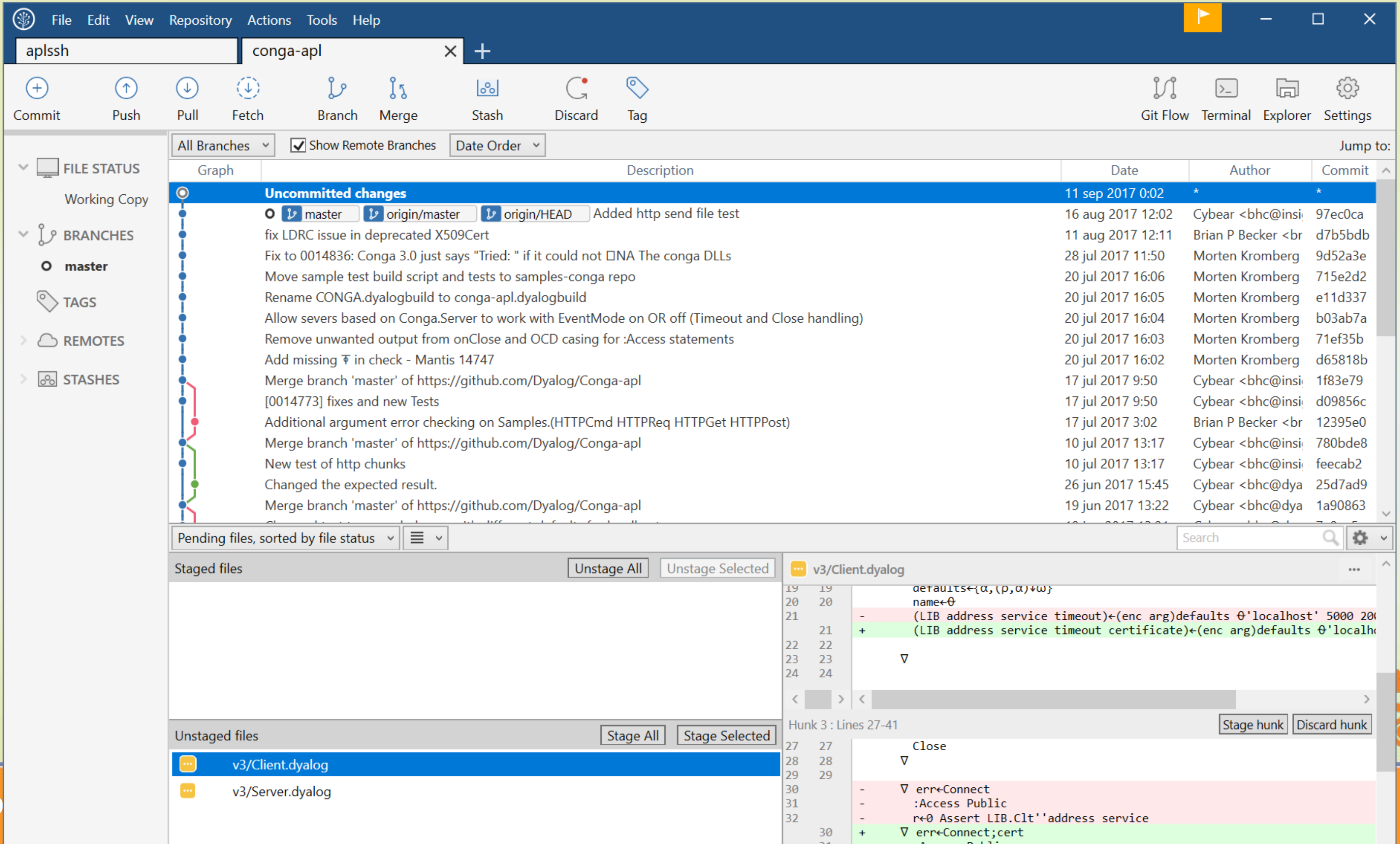
```
      X ⎕WS¨⊂'Size'θ(⌈/2⊃¨sz)
      sz←⌈/+/¨sz                            ⍝ Largest Posn+Size


⍝ ----- Create column 2: APL "edit" boxes ----------------------------

      HP←sz                                ⍝ Horiz positions (column 2)
      Q←' KeyPress' ' Ctrl+Shift+Enter'
      HZ←W×2+(↑∘⍴∘,)¨Q
      Q←('Font' 'APL')('Border' 0)('BCol'BCol_RawMsg)
      JR←⊂'Justify' 'Right'
      'K1'ref.⎕WC'Label'('Posn'((1⊃VP)HP))('Size'(VZ,1⊃HZ)),Q
      'K2'ref.⎕WC'Label'('Posn'((2⊃VP)HP))('Size'(VZ,1⊃HZ)),Q
      'K3'ref.⎕WC'Label'('Posn'((3⊃VP)HP))('Size'(VZ,1⊃HZ)),Q
      'K4'ref.⎕WC'Label'('Posn'((4⊃VP)HP))('Size'(VZ,1⊃HZ)),Q
      'K5'ref.⎕WC'Label'('Posn'((5⊃VP)HP))('Size'(VZ,1⊃HZ)),Q
      'K6'ref.⎕WC'Label'('Posn'((6⊃VP)HP))('Size'(VZ,1⊃HZ)),Q
      Q←(¯1↓Q),⊂'BCol'BCol_Result

⍝ ----- Explain input code -------------------------------------------
      E←('Caption' ' ≡')('Font' 'APL')('Size'VZ(W×2.5))('BCol'BCol_Label)
      :If ⎕SE.SALTUtils.CLASSIC
          P←(3⊃VP),HP+1⊃HZ⍝+W×0.5
          'Y1'ref.⎕WC'Label'('Posn'P),E
          Z←'Y1'ref.⎕WG'Size'
          P[2]+←Z[2]
          'K8'ref.⎕WC'Label'('Posn'P)('Size'(VZ,2⊃HZ)),Q
      :EndIf

⍝ ----- Create more ASCII stuff --------------------------------------

      P←(4⊃VP),HP+(1⊃HZ)+W×0.5
      X←('Size'VZ θ)('BCol'BCol_Label)
      'D1'ref.⎕WC'Label' ' decimal'('Posn'P),X
      Z←'D1'ref.⎕WG'Size'
      P[2]+←Z[2]
      'D3'ref.⎕WC'Label'('Posn'P),E,⊂'BCol'BCol_Label
      Z←'D3'ref.⎕WG'Size'
      P[2]+←Z[2]
      'K7'ref.⎕WC'Label'('Posn'P)('Size'(VZ,0.5×2⊃HZ)),Q
      P[2]+←(0.5×2⊃HZ)
      'D2'ref.⎕WC'Label' ' hex'('Posn'P),X

⍝ ----- Create shift state buttons -----------------------------------

      P←(6⊃VP),HP+(1⊃HZ)
      'B0'ref.⎕WC'Label'('Posn'P),E
      Z←'B0'ref.⎕WG'Size'
```

1: 1 Default text

```
:Namespace·KeyPress·⍝·V1.02¤
:Namespace·KeyPress·⍝·V1.08¤
```

40 difference section(s) Important Difference Insert Load time: 0,18 seconds

SourceTree



☑ Show Remote Branches

Graph	Description	Date	Author	Commit
	Uncommitted changes	11 sep 2017 0:02	*	*
	master origin/master origin/HEAD Added http send file test	16 aug 2017 12:02	Cybear <bhc@insi	97ec0ca
	fix LDRC issue in deprecated X509Cert	11 aug 2017 12:11	Brian P Becker <br	d7b5bdb
	Fix to 0014836: Conga 3.0 just says "Tried: " if it could not ⎕NA The conga DLLs	28 jul 2017 11:50	Morten Kromberg	9d52a3e
	Move sample test build script and tests to samples-conga repo	20 jul 2017 16:06	Morten Kromberg	715e2d2
	Rename CONGA.dyalogbuild to conga-apl.dyalogbuild	20 jul 2017 16:05	Morten Kromberg	e11d337
	Allow severs based on Conga.Server to work with EventMode on OR off (Timeout and Close handling)	20 jul 2017 16:04	Morten Kromberg	b03ab7a
	Remove unwanted output from onClose and OCD casing for :Access statements	20 jul 2017 16:03	Morten Kromberg	71ef35b
	Add missing ⍑ in check - Mantis 14747	20 jul 2017 16:02	Morten Kromberg	d65818b
	Merge branch 'master' of https://github.com/Dyalog/Conga-apl	17 jul 2017 9:50	Cybear <bhc@insi	1f83e79
	[0014773] fixes and new Tests	17 jul 2017 9:50	Cybear <bhc@insi	d09856c
	Additional argument error checking on Samples.(HTTPCmd HTTPReq HTTPGet HTTPPost)	17 jul 2017 3:02	Brian P Becker <br	12395e0
	Merge branch 'master' of https://github.com/Dyalog/Conga-apl	10 jul 2017 13:17	Cybear <bhc@insi	780bde8
	New test of http chunks	10 jul 2017 13:17	Cybear <bhc@insi	feecab2
	Changed the expected result.	26 jun 2017 15:45	Cybear <bhc@dya	25d7ad9
	Merge branch 'master' of https://github.com/Dyalog/Conga-apl	19 jun 2017 13:22	Cybear <bhc@dya	1a90863

Staged files

Unstaged files

- v3/Client.dyalog
- v3/Server.dyalog

v3/Client.dyalog

```
          defaults←{⍺,(⍴,⍺)↓⍵}
          name←⍬
-         (LIB address service timeout)←(enc arg)defaults ⍬'localhost' 5000 20
+         (LIB address service timeout certificate)←(enc arg)defaults ⍬'localh

        ∇

```

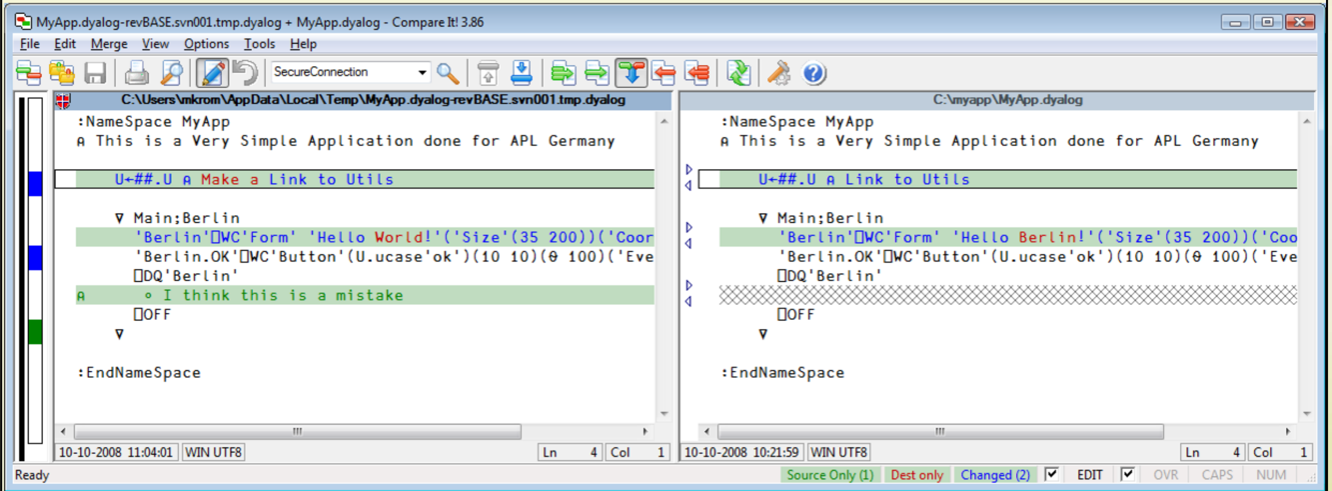
Hunk 3 : Lines 27-41

```
          Close
        ∇

-       ∇ err←Connect
-         :Access Public
-         r←0 Assert LIB.Clt''address service
+       ∇ err←Connect;cert
```

Compare It! (in 2008)

Source Code Mgt Demo

- All tools shown here downloaded from internet, none of them knew about APL in any way.



MyApp.dyalog-revBASE.svn001.tmp.dyalog + MyApp.dyalog - Compare It! 3.86

C:\Users\mkrom\AppData\Local\Temp\MyApp.dyalog-revBASE.svn001.tmp.dyalog

```
:NameSpace MyApp
⍝ This is a Very Simple Application done for APL Germany

    U←##.U ⍝ Make a Link to Utils

    ∇ Main;Berlin
      'Berlin'⎕WC'Form' 'Hello World!'('Size'(35 200))('Coor
      'Berlin.OK'⎕WC'Button'(U.ucase'ok')(10 10)(⍬ 100)('Eve
      ⎕DQ'Berlin'
⍝      ∘ I think this is a mistake
      ⎕OFF
    ∇

:EndNameSpace
```

10-10-2008 11:04:01 | WIN UTF8 | Ln 4 | Col 1

C:\myapp\MyApp.dyalog

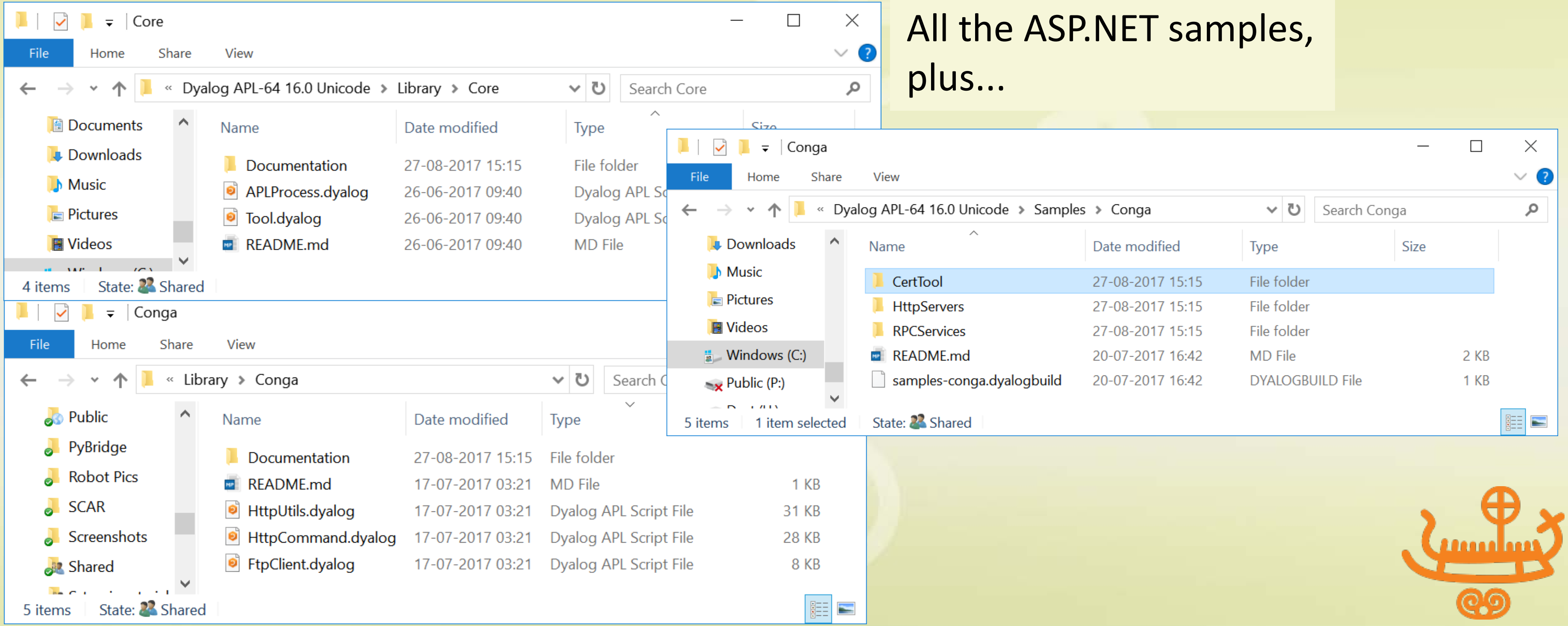
```
:NameSpace MyApp
⍝ This is a Very Simple Application done for APL Germany

    U←##.U ⍝ Link to Utils

    ∇ Main;Berlin
      'Berlin'⎕WC'Form' 'Hello Berlin!'('Size'(35 200))('Coo
      'Berlin.OK'⎕WC'Button'(U.ucase'ok')(10 10)(⍬ 100)('Eve
      ⎕DQ'Berlin'

      ⎕OFF
    ∇

:EndNameSpace
```

10-10-2008 10:21:59 | WIN UTF8 | Ln 4 | Col 1

Ready

Text Sources Shipped with v16.0

All the ASP.NET samples, plus…



« Dyalog APL-64 16.0 Unicode › Library › Core

Name	Date modified	Type
Documentation	27-08-2017 15:15	File folder
APLProcess.dyalog	26-06-2017 09:40	Dyalog APL Sc
Tool.dyalog	26-06-2017 09:40	Dyalog APL Sc
README.md	26-06-2017 09:40	MD File

4 items State: Shared

« Library › Conga

Name	Date modified	Type	
Documentation	27-08-2017 15:15	File folder	
README.md	17-07-2017 03:21	MD File	1 KB
HttpUtils.dyalog	17-07-2017 03:21	Dyalog APL Script File	31 KB
HttpCommand.dyalog	17-07-2017 03:21	Dyalog APL Script File	28 KB
FtpClient.dyalog	17-07-2017 03:21	Dyalog APL Script File	8 KB

5 items State: Shared

« Dyalog APL-64 16.0 Unicode › Samples › Conga

Name	Date modified	Type	Size
CertTool	27-08-2017 15:15	File folder	
HttpServers	27-08-2017 15:15	File folder	
RPCServices	27-08-2017 15:15	File folder	
README.md	20-07-2017 16:42	MD File	2 KB
samples-conga.dyalogbuild	20-07-2017 16:42	DYALOGBUILD File	1 KB

5 items 1 item selected State: Shared

Demo / worked example

- See 1.txt
- Show APLProcess & HttpCommand examples
- Look at the secure conga Client code change in APL
- View it from SourceTree
- Run]dbuild and]dtest after looking at the scripts
- Commit change to github
- Show download from GitHub zip file

Dyalog needs to

- Sort out final differences between SALT and (2 ⎕FIX) (in v17.0).
  - Specific problem `:Require` vs `⍝∇Require`
- Move our QA scripts to text
- Move]dbuild and]dtest from being models to industrial strength tools
  - Rushed out due to internal need (CONGA 3.0)
- Add a package manager and define conventions for integration of libraries
- Work on tools to quickly load & save large bodies of code.

Dyalog needs to

- Develop a literal notation for multi-dimensional / deep constants, for example:

```
mat←(1  2  3  4
     5  6  7  8
     9 10 11 12)
```

- Support localisation on other lines than [0]

YOU need to...

- Get used to the idea and start making a long term plan to move towards text source(!)
- Talk to your IT people about the SCM system used internally and how APL can integrate with it
- Try to get comfortable with GitHub
  - Look at our projects there and comment
- Participate in design of]dbuild /]dtest
- Ask me questions – now!

This means you!