

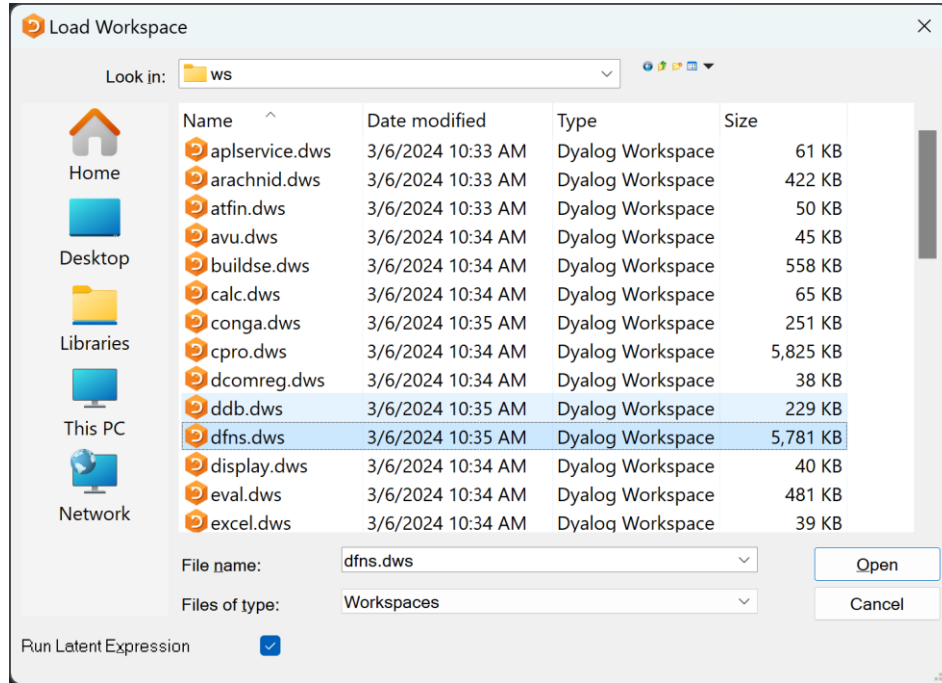


Dyalog North America Meetup, 11 April 2024

Leveraging Community Packages

Josh David

The Workspace



)LOAD

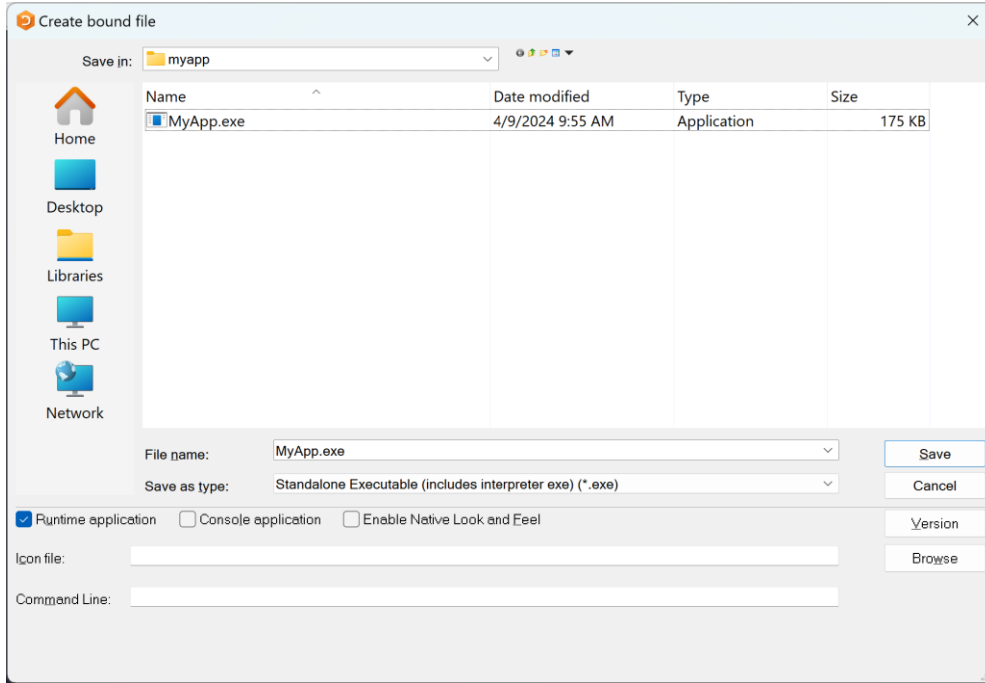
)XLOAD

)SAVE/ SAVE

)WSID/ WSID

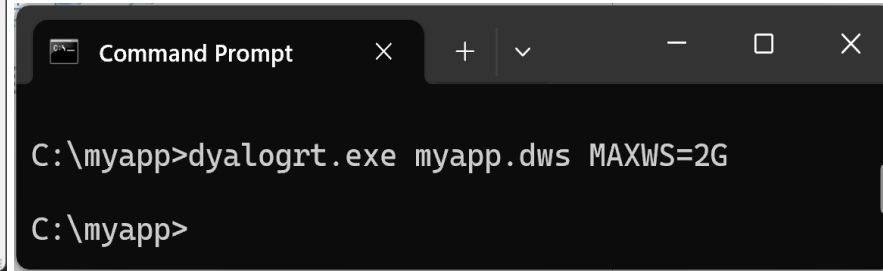
LOCK

Distribution Mechanism



LX

LOCK



Prefix explanations



)

System command



System function



]

User command

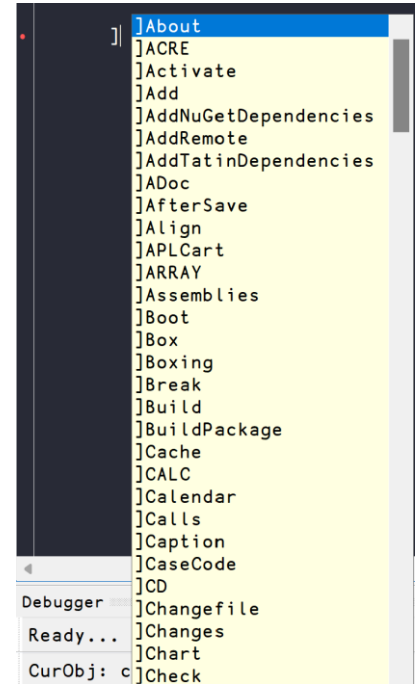
)WSID

□WSID

]runtime

User Commands

- “Add-ons” for your APL environment



UCMD Example - FIRE

<https://github.com/aplteam/fire>

The screenshot displays the FIRE tool interface. The main window shows search results for the pattern 'vv'. A 'Fire - Hit Report' window is open, displaying a table of results and a list of actions.

No	Name	Type	Actions
1	#.at	4.2	
2	#.attrib	3.2	
3	#.scripts.attrib	2.1	
4	#.notes.attrib	2.1	
5	#.notes.BST	2.1	
6	#.notes.cf	2.1	
7	#.Cut	4.2	
8	#.defs	3.2	
9	#.dfspan	3.2	
10	#.notes.dfspan	2.1	
11	#.notes.foldl	2.1	
12	#.H	4.2	
13	#.hexdump	3.2	
14	#.joy	3.2	
15	#.kk	3.2	
16	#.notes.kk	2.1	
17	#.kt	3.2	
18	#.scripts.kt	2.1	
19	#.notes.kt	2.1	
20	#.le	3.2	

```
α τ vv g w → ( α τ time ω ) ÷ α g time ω
f vv g w → ( f time ω ) ÷ g time ω

7. #.Cut
[19] Bk1-{0=#α:ω ÷ 0=#α:(1+α)((1+α)vv)ω ÷ (1+α)((1+α)vv)†
(←α)=[[]I0+α]~w
[20] Bk2-{0=#α:ω ÷ 0=#α:(1+α)((1+α)vv)ω ÷ (1+α)((1+α)vv)†
(←α)(αα p2)~w
[32] 2=ω:α αα°vv 1 Underω
[33] ~2=ω:α αα°(1+1)vv 2~ω
[34] 3=ω:(α t i ω)αα vv 0°2 15~ω
[35] ~3=ω:(α t j ω)αα vv 0°2 15~ω

8. #.defs
[189] }≤w A :: [';] + switches (X vv) names

9. #.dfspan
[6] ⇒ α vv/next,ctree A visiting each edge in order
[7] } A :: tree + vtx (vtx vv) tree

10. #.notes.dfspan
⇒ α vv/next,ctree A visiting each edge in order
} 0 + tree + vtx (vtx vv) tree
```

91 hits found in 34 of 907 APL objects from 3 containers; processing time: 2.46 seconds

Importing different types of files

◆)LOAD

- ◆ Workspaces (.dws)

◆ □ FIX

- ◆ Namespaces (.aplν)
- ◆ Classes (.aplc)
- ◆ Functions (.aplf)

Fetch data/code in many formats from local or remote sources
]Get <source>[:<ext>] [-only=<names>] [-target=<ns>] [-sync] [-unpack]

Examples:

```
]Get "C:\tmp\testme.apln"  
]Get 'file://C:\tmp\Take.aplf' -sync  
]Get C:\tmp\linktest  
]Get /tmp/myapp -sync  
]Get /tmp/ima.zip  
]Get github.com/mkromberg/apldemo/blob/master/Units.csv  
]Get github.com/Dyalog/Jarvis/blob/master/Distribution/Jarvis.dws  
]Get http://github.com/json5/json5/blob/master/test/test.json5  
]Get http://github.com/json5/json5/blob/master/test/test.json5:v  
]Get https://github.com/mkromberg/d18demo/tree/master/perfected  
]Get https://github.com/abrudz/Kbd  
]Get raw.githubusercontent.com/Dyalog/MiServer/master/Config/Logger.xml  
]Get ftp://speedtest.tele2.net/512KB.zip  
]Get '"C:\tmp\myarray.apla"  
]Get HttpCommand -target=□SE  
]Get dfns  
]Get display -only=DISPLAY -unpack  
]Get ]box  
]Get ]box:vtv
```


aplcart.info

X, Y, Z: any type array M, N: numeric array I, J: integer array A, B: Boolean array C, D: character array f, g, h: function ax: bracket axis s: scalar v: vector m: matrix

▶ name f+Y	? Modified Assignment (tradfns/tradops only)
▶ name+Y	? Assignment
▶ name[I]-Y	? Indexed Assignment
▶ name[I]f+Y	? Modified Indexed Assignment (tradfns/tradops only)
▶ (exp name)+Y	? Selective Assignment: exp is an expression that selects elements of "name"
▶ (exp name)f+Y	? Modified Selective Assignment: exp is an expression that selects elements of "name" (tradfns/tradops only)
▶ name[I]f+Y	? Modified Indexed Assignment (also dfns/dops)
▶ (exp name)f+Y	? Modified Selective Assignment: exp is an expression that selects elements of "name" (also dfns/dops)
Is (+f÷-)N	Is-wise rolling average
(+f÷#)N	Arithmetic mean of N
(#÷1±÷)N	Harmonic mean
(×f×÷#)N	Geometric mean
(+÷1[0±p)N	Row averages (0 if none)
(+÷1[+,≠0)N	Row averages of non-zero elements (0 if none)
(2×÷±1±×±÷#)N	Quadratic mean
▶ M((+f÷#)2×±-)N	Mean squared error
(+/÷,÷(×/p))N	Arithmetic mean value of all elements
Ms(-×÷±1±×±÷±0#)N	Generalised mean
(÷((+f÷#),#÷1±÷)×≡)Nv	Arithmetic-harmonic mean
(÷((+f÷#),×f×÷#)×≡)Nv	Arithmetic-geometric mean
(÷((×f×÷#),#÷1±÷)×≡)Nv	Geometric-harmonic mean
nvec=dfns.fibonacci num	? Tail-recursive Fibonacci
num=dfns.mean nvec	? Arithmetic mean
nvec={tolerance=□CT} dfns.cfracct numb	? Continued fraction approximation of real ω
pnum={fmt+1} (dfns.phinary) nums	? Phinary representation of numbers ω
Is{(+/[α]÷α>p)ω}N	Average (mean value) of elements of N along direction Is

X, Y, Z: any type array M, N: numeric array I, J: integer array A, B: Boolean array C, D: character array f, g, h: function ax: bracket axis s: scalar v: vector m: matrix

<code>name f←Y</code>	Modified Assignment (tradfns/tradops only)
<code>name←Y</code>	Assignment
<code>name[I]←Y</code>	Indexed Assignment
<code>name[I]f←Y</code>	Modified Indexed Assignment (tradfns/tradops only)
<code>(exp name)←Y</code>	Selective Assignment: exp is an expression that selects elements of "name"
<code>(exp name)f←Y</code>	Modified Selective Assignment: exp is an expression that selects elements of "name" (tradfns/tradops only)
<code>name[I]f←Y</code>	Modified Indexed Assignment (also dfns/dops)
<code>(exp name)f←Y</code>	Modified Selective Assignment: exp is an expression that selects elements of "name" (also dfns/dops)
<code>Is(+f÷←)N</code>	Is-wise rolling average
<code>(+f÷≠)N</code>	Arithmetic mean of N
<code>(≠÷1⊥÷)N</code>	Harmonic mean
<code>(×f×÷≠)N</code>	Geometric mean
<code>(+÷1[0⊥p)N</code>	Row averages (0 if none)

`]aplcart mean`

X,Y,Z:any M,N:num I,J:int A,B:Bool C,D:char f,g,h:fn ax:axis s:scal v:vec m:mat

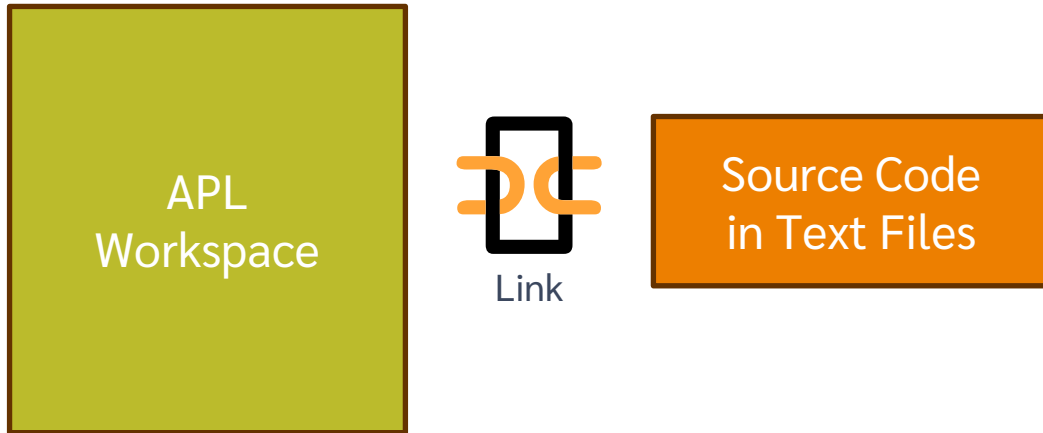
<code>name f←Y</code>	A Modified Assignment (tradfns/tradops only)
<code>name←Y</code>	A Assignment
<code>name[I]←Y</code>	A Indexed Assignment
<code>name[I]f←Y</code>	A Modified Indexed Assignment (tradfns/tradops only)
<code>(exp name)←Y</code>	A Selective Assignment: exp is an expression that selects elements of "name"
<code>(exp name)f←Y</code>	A Modified Selective Assignment: exp is an expression that selects elements of "name" (tradfns/tradops only)
<code>name[I]f←Y</code>	A Modified Indexed Assignment (also dfns/dops)
<code>(exp name)f←Y</code>	A Modified Selective Assignment: exp is an expression that selects elements of "name" (also dfns/dops)
<code>Is(+f÷←)N</code>	A Is-wise rolling average
<code>(+f÷≠)N</code>	A Arithmetic mean of N

Showing 10 of 39 matches (-list=<n> to show up to <n>; -list to show all)

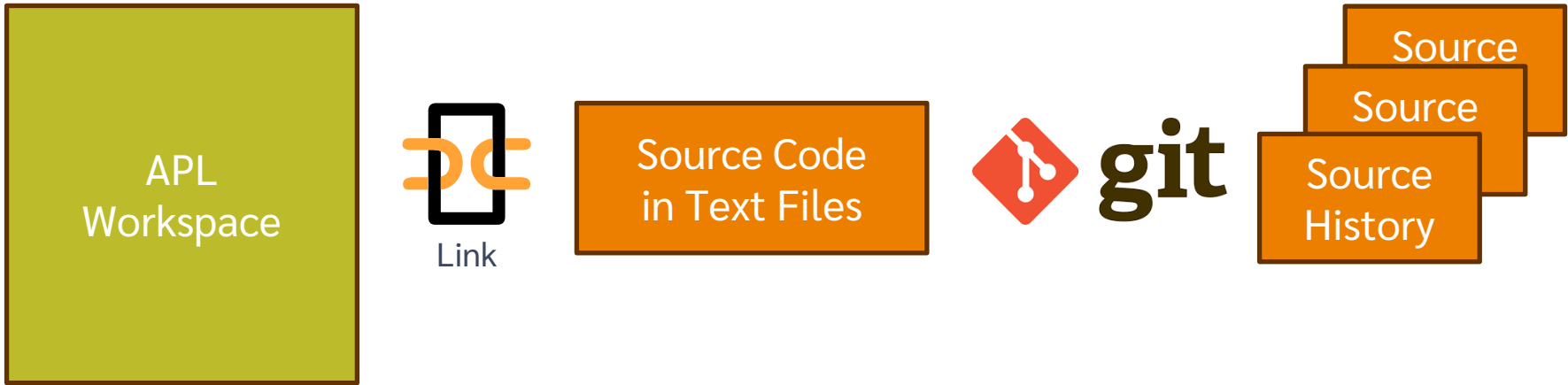
First There Was The Workspace



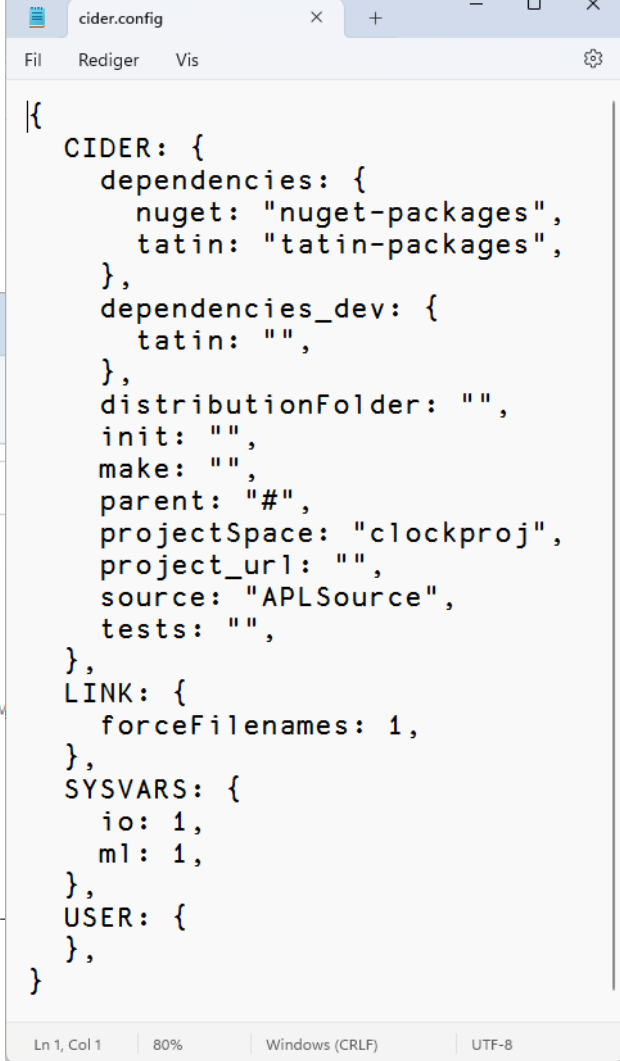
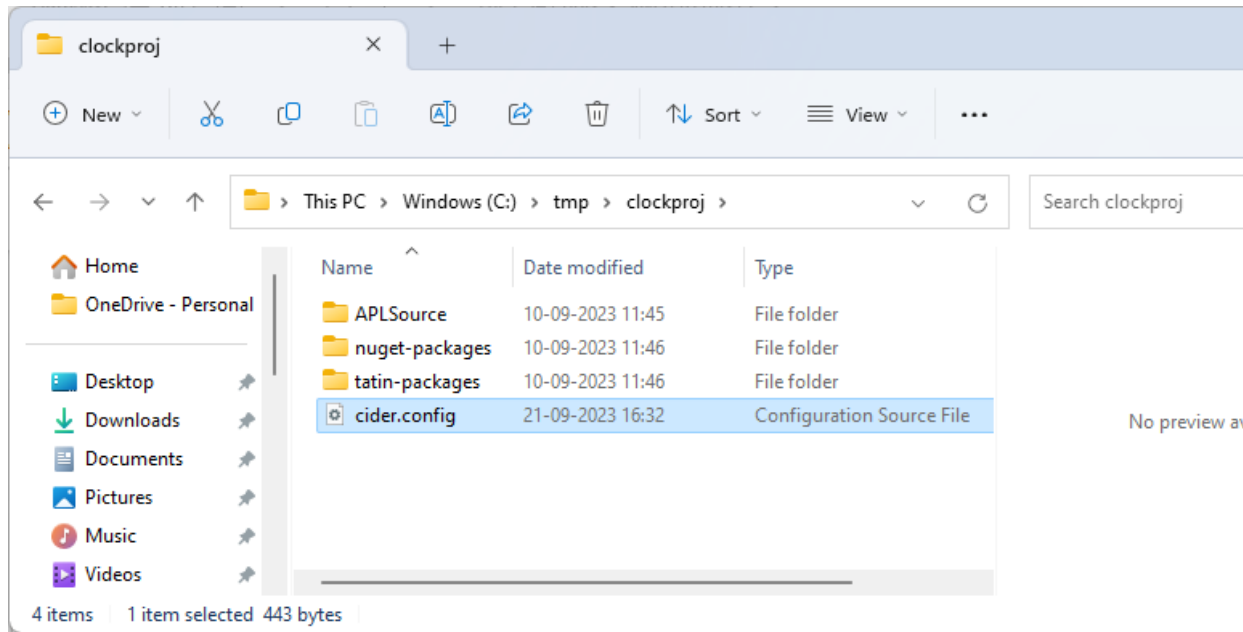
Then There was Link



Then There was Link (and git/svn etc)



A Cider Project



Projects: Cider

- Load other code that we **depend** on
- Run some code on **opening** the project
- Run a **build** function
- Decide **where** to load the code
- Run **tests**
- Set **Link options** to be used when loading the source code
- Set **IO, ML**

```
cider.config
x +
- □
File Rediger Vis
{
  CIDER: {
    dependencies: {
      nuget: "nuget-packages"
      tatin: "tatin-packages"
    },
    dependencies_dev: {
      tatin: "",
    },
    distributionFolder: "",
    init: "",
    make: "",
    parent: "#",
    projectSpace: "clockproj"
    project_url: "",
    source: "APLSource",
    tests: "",
  },
  LINK: {
    forceFileNames: 1,
  },
  SYSVARS: {
    io: 1,
    ml: 1,
  },
  USER: {
  },
}
Ln 1, Col 1 80% Windows (CRLF) UTF-8
```


A Project is...

Source Code +

- ◆ Dependencies (packages) loaded from a package manager
- ◆ Environment configuration
- ◆ Development tools and processes
- ◆ Can be opened and "set up" by a Project Manager (Cider)

A Package is...

A "build" of a project...

- ◆ In a standard format
- ◆ Can be **found, downloaded** and **installed** by a "Package Manager"
- ◆ Cider supports the development of Tatin Packages
- ◆ Cider can load Tatin + NuGet Packages



Python Bridge

Dyalog / pynapl Public

Notifications Fork 10 Star 75

Code Issues 13 Pull requests Actions Projects Wiki Security Insights

master 3 Branches 0 Tags Go to file Code

mkromberg Merge pull request #23 from rikedyp/netcore 7e47c04 · 2 years ago 192 Commits

demos	Update demo.	3 years ago
pynapl	fix .NET framework regression	2 years ago
.gitignore	Ignore VSCode settings.	3 years ago
LICENSE	Create LICENSE	4 years ago
MANIFEST.in	Update terminology	7 years ago
README.md	Add testing instructions	5 years ago
setup.py	bump up version number for all changes made yesterday	7 years ago

README MIT license

Py'n'APL: APL-Python interface

This is an interface between Dyalog APL and Python. It allows Python code to be accessed from APL, and vice versa.

About

Dyalog APL ↔ Python interface

python interface python3 bridge
python-3 python-2 apl python2
dyalog dyalog-apl apl-python-interface

Readme
MIT license
Activity
Custom properties
75 stars
15 watching
10 forks
Report repository

Releases

No releases published

Packages

No packages published

R Interface

The screenshot shows the GitHub repository page for 'kimmolinna/rsconnect'. The repository is public and has 5 stars, 0 forks, and 2 issues. The main content is a file list for the 'master' branch, showing various files and their commit history. The right sidebar contains repository metadata and statistics.

kimmolinna / rsconnect (Public)

<> Code Issues 2 Pull requests Actions Projects Security Insights

master 1 Branch 1 Tags

Go to file <> Code

File	Description	Commit Date	Commits
.RData	change of starting Rserve in Windows	1ed0010 - 2 weeks ago	55 Commits
.gitignore	r script to start Rserve by using Rserve()	3 years ago	
LICENSE	Create LICENSE	3 years ago	
Rserv.conf	separating start of Rserve	3 years ago	
cmd.md	Initial commit	3 years ago	
dt.md	Initial commit	3 years ago	
err.md	Initial commit	3 years ago	
readme.md	change of starting Rserve in Windows	2 weeks ago	
rsconnect.md	Initial commit	3 years ago	
rsconnect_test.md	Updated readme, ts, levels and set	3 years ago	
rserve.dyalog	change of starting Rserve in Windows	2 weeks ago	
rserve.r	r script to start Rserve by using Rserve()	3 years ago	
settings.json	change of starting Rserve in Windows	2 weeks ago	
xt.md	Initial commit	3 years ago	

About

R connection for Dyalog APL with Rserve.

r rserve dyalog-apl

- Readme
- MIT license
- Activity
- 5 stars
- 4 watching
- 0 forks

Report repository

Releases

1 tags

Packages

No packages published

Languages

APL 99.3% R 0.7%

Tatin



Package manager for Dyalog APL

A tasty way to package APLs

50 Packages

NuGet



Package manager for .NET

Related to "Chocolatey"

~~361,905~~ 372,765 Packages



```
]z←tatin.listPackages
{α,≠ω}⊔{(-1+ωι'-')↑ω}¨3↓z[;1]
aplteam 43
davin 4
dyalog 3
```

```
¨2↑z
dyalog-Jarvis 1
dyalog-NuGet 1
```

Finding Packages – www.tatin.dev



Tatin Registry

List of packages

Package name	Description	Major Versions	Project URL	OS	UC	Tags
aplteam-ADOC	Automated generation od documentation	1	github.com	Lin, Mac, Win	Yes	documentation
aplteam-APLGit2	Git interface from Dyalog APL via Git Bash	1	github.com	Lin, Mac, Win	Yes	apl-git-interface
aplteam-APLGUI	Collection of GUI utilities	1	github.com	Win		gui-tools,gui
aplteam-APLProcess	Start an APL process from within Dyalog APL	1	github.com	Lin, Mac, Win		process
aplteam-APLTreeUtils2	General utilities required by most members of the APLTree library	1	github.com	Lin, Mac, Win		tools,utilities
aplteam-Cider	A project manager for Dyalog APL that cooperates with Tatin	1	github.com	Lin, Mac, Win	Yes	project-management
aplteam-CodeBrowser	Tool useful for code reviews	1	github.com	Lin, Mac, Win	Yes	code-browsing,code-reviews
aplteam-CodeCoverage	Monitors which parts of an application got actually executed	1	github.com	Lin, Mac, Win		code-coverage,test-framework,unit-tests
aplteam-CommTools	Communication tools for interactions in the session: YesOrNo and Select	1	github.com	Lin, Mac, Win		communication-tools,yes-or-no,select-tool
aplteam-Compare	Allows comparing and merging objects in the workspace with a file or a file with another file	3	github.com	Lin, Mac, Win		comparison-tool,merge-tool
aplteam-CompareFiles	Cover for comparison utilities	1	github.com	Lin, Mac, Win	Yes	file-comparison,comparison-utilities

Finding Packages



Tatin Registry


List of packages

zip

Package name	Description	Major Versions	Project URL	OS	UC	Tags
aplteam-DotNetZip	Zippping and unzipping with .NET Core on all major platforms	2	github.com	Win		zip-tools
aplteam-SevenZip	Zip files with the Open Source tool 7Zip	1	github.com	Win		zip-tools
aplteam-ZipArchive	Zippping and unzipping with .NET on Windows and zip/unzip on other platforms	2	github.com	Lin, Mac, Win		zip-tools

Created by Tatin version 0.100.1+1627 from 2023-08-28 under Linux-64 18.2.45645.0 S Runtime — Bugs, questions, problems: info@tatin.dev

Finding Packages

 **Tatin Registry**

List of packages

Package name	Description	Major Versions	Project URL	OS	UC	Tags
aplteam-APLProcess	Start an APL process from within Dyalog APL	1	github.com	Lin, Mac, Win		process
aplteam-Execute	Start a process from within APL	1	github.com	Win		process,run-applications

50 packages is enough to (sometimes) make it difficult to decide which one to use (and "dyalog-APLProcess" is yet to come 😊)



Tatin Registry

Home page of group "dyalog"

The dyalog group

This group contains packages published and supported by Dyalog, LTD.

Single email address:

Edit

Packages owned by "dyalog"

Package name	Description	OS	UC*
dyaLog-HttpCommand	Utility to execute HTTP requests	Lin, Mac, Win	
dyaLog-Jarvis	JSON and REST Web Service Framework	Lin, Mac, Win	
dyaLog-NuGet	Use NuGet packages from Dyalog APL	Lin, Mac, Win	

* UC means "User Command"

Details of <aplteam-CodeCoverage-0.10.0>

```
{
  api: "CodeCoverage",
  assets: "",
  date: 20230323.182755,
  description: "Monitors which parts of an application got actually executed",
  documentation: "",
  files: "",
  group: "aplteam"
  io: 1,
  license: "MIT",
  lx: "",
  maintainer: "kai@aplteam.com",
  minimumApiVersion: "18.0",
  ml: 1,
  name: "CodeCoverage",
  os_lin: 1,
  os_mac: 1,
  os_win: 1,
  project_url: "https://github.com/aplteam/CodeCoverage",
  source: "APLSource/CodeCoverage.aplc",
  tags: "code-coverage,test-framework,unit-tests",
  userCommandScript: "",
  version: "0.10.0+55",
}
```



Tatin Registry

Dependencies of "aplteam-CodeCoverage-0.10.0"

Dependencies

[aplteam-APLTreeUtils2-1.1.3](#)

[aplteam-Tester2-3.3.1](#)

[aplteam-CommTools-1.3.0](#)

]Tatin.ListPackages

]Tatin.ListPackages -group=dyalog

Registry: <https://tatin.dev>

Group & Name	# major versions
-----	-----
dyalog-HttpCommand	1
dyalog-Jarvis	1
dyalog-NuGet	1

]Tatin.ListPackages -tag=crypto

Registry: <https://tatin.dev>

Group & Name	# major versions
-----	-----
aplteam-HashPasswords	1
aplteam-IniFiles	1

```
]tatin.listtags
tags from https://tatin.dev
-----
apl-git-interface
build
calculations
chm
code-browsing
code-coverage
code-reviews
command-generation
communication-tools
comparison-tool
comparison-utilities
components
config-files
converter
copy
cryptography
date
dates
...
...
utilities
validation
webservice
windows-event-log
windows-registry
winscp-interface
write
yes-or-no
zip-tools
```

Adding a Tatin Dependency

- Example: I use `HttpCommand` in just about every new project
- To add it to our Cider project:

```
]Cider.AddTatinDependencies HttpCommand  
1 Tatin dependency added:  
  dyalog-HttpCommand-5.2.0
```

- Since we did not specify a version, we get the latest.
- A reference is created to the loaded package within our project space:

```
D08.HttpCommand.Get 'www.dyalog.com'  
[rc: 0 | msg: | HTTP Status: 200 "OK" | #Data: 22580]
```

NuGet

- ◆ NuGet is the .NET package manager
- ◆ You can use NuGet packages from Dyalog APL, with .NET 6.0 or later

nuget Packages Upload Statistics Documentation Downloads Blog Sign in

Create .NET apps faster with NuGet

Search for packages...

6,261,988 package versions

380,701,196,969 package downloads

371,905 unique packages

What is NuGet?

NuGet is the package manager for .NET. The NuGet client tools provide the ability to produce and consume packages. The NuGet Gallery is the central package repository used by all package authors and consumers.

Finding NuGet Packages (HARD!!!)

The screenshot shows a web browser window with the NuGet Gallery search results for the query 'fun'. The browser's address bar shows 'nuget.org/packages?q=fun'. The NuGet Gallery header includes the 'nuget' logo, navigation links for 'Packages', 'Upload', 'Statistics', 'Documentation', 'Downloads', and 'Blog', and a 'Sign in' button. A search bar contains the text 'fun'. The main content area displays '11,706 packages returned for fun' and a 'Sort by' dropdown menu set to 'Relevance'. Two packages are listed:

- Microsoft.NET.Sdk.Functions** by Microsoft nugetazurefunctions
85,667,952 total downloads, last updated 5 months ago, Latest version: 4.2.0
Build SDK for Azure Functions
- Microsoft.Azure.Functions.Analyzers** by azure-sdk Microsoft
33,538,913 total downloads, last updated 21/05/2021, Latest version: 1.0.0
Azure Functions analyzers
This package provides development time code analysis for C# Azure Functions.

On the left side, there are filters for 'Frameworks' (listing .NET, .NET Core, .NET Standard, .NET Framework) and 'Package type' (listing All types, Dependency, .NET tool, Template).

Adding a NuGet Package

- Example: NuGet contains a very simple package called "Clock".
- We can add it to our Cider project (by default, we get the latest version):

```
]Cider.AddNuGetDependencies Clock  
Clock 1.0.3
```

- A reference to a namespace hosting the .NET package is created:

```
#.clockproj.Clock.UtcNow.(Hour Minute)  
14 43
```

- In fact, the namespace is empty except for `using`:

```
clockproj.Clock.using  
,c:/tmp/clockproj/nuget-packages/published/Clock.dll
```

NuGet support currently requires .NET 6.0, 7.0 or 8.0

Support for "Framework" packages MAY follow

Dependencies

```
]Cider.OpenProject C:\tmp\fleatest  
Project successfully loaded and established in "#.fleatest"
```

```
)cs fleatest  
#.fleatest
```

```
  [NL -9  
  CiderConfig CompareFiles ZipArchive
```

Our Dependencies

CompareFiles

```
#.tatin.aplteam_CompareFiles_4_0_1.API
```

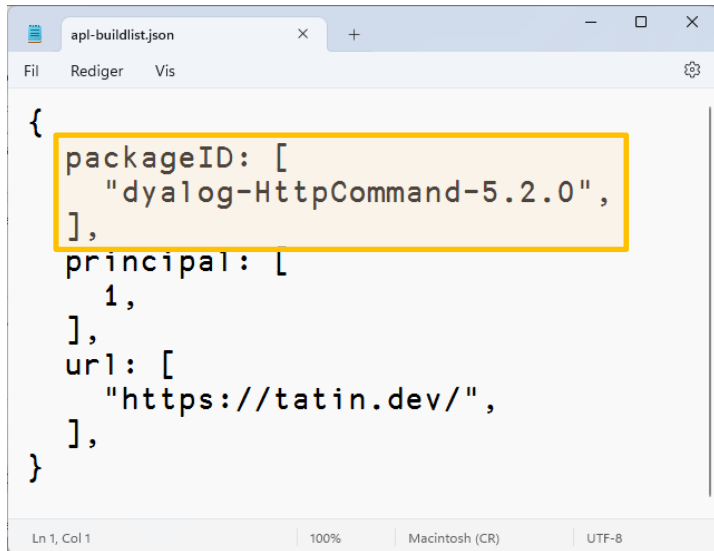
```
  ;#.tatin.[NL -9  
  aplteam_APLTreeUtils2_1_2_0  
  aplteam_CommTools_1_5_0  
  aplteam_CompareFiles_4_0_1  
  aplteam_DotNetZip_2_0_2  
  aplteam_FilesAndDirs_5_5_0  
  aplteam_OS_3_0_1  
  aplteam_ZipArchive_0_1_1
```

Dependencies of Dependencies

```
  #.tatin.aplteam_CompareFiles_4_0_1.[NL -9  
  API APLTreeUtils2 Admin CommTools ComparisonTools FilesAndDirs TatinVars
```

Similar but different

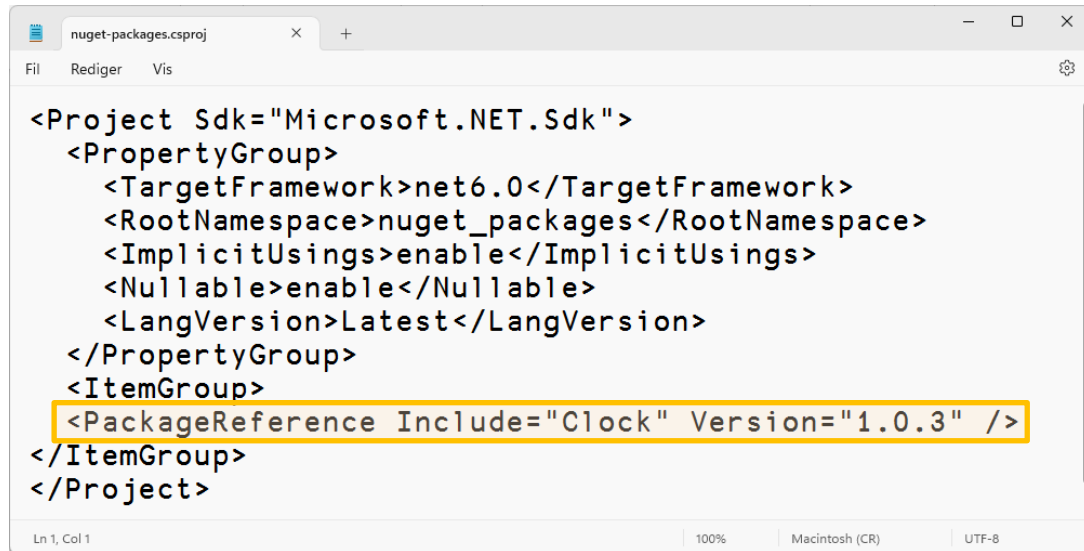
Tatin



```
{
  packageID: [
    "dyalog-HttpCommand-5.2.0",
  ],
  principal: [
    1,
  ],
  url: [
    "https://tatin.dev/",
  ],
}
```

#.projectSpace.HttpCommand

NuGet



```
<Project Sdk="Microsoft.NET.Sdk">
  <PropertyGroup>
    <TargetFramework>net6.0</TargetFramework>
    <RootNamespace>nuget_packages</RootNamespace>
    <ImplicitUsings>enable</ImplicitUsings>
    <Nullable>enable</Nullable>
    <LangVersion>Latest</LangVersion>
  </PropertyGroup>
  <ItemGroup>
    <PackageReference Include="Clock" Version="1.0.3" />
  </ItemGroup>
</Project>
```

#.projectSpace.Clock

Tools Mentioned



Link Synchronises Source Files and Workspace
The workspace and source files are "Linked"



Cider is a Project Manager
A Project is a linked source folder,
a config file, plus optional dependencies



Tatin is the APL Package Manager
A Package is a project wrapped up for consumption by others



NuGet is the .NET Package Manager
The Dyalog.NET Bridge allows APL to use .NET libraries



Tools to Develop/Manage APL Packages

- Tatin – <https://github.com/aplteam/Tatin>
 - The Tatin client allows you to incorporate APL packages and any dependencies they may have into your APL application.
 - Additionally, the client enables you to maintain and publish packages
 - A Tatin server exposes and hosts a registry where packages may be imported from or published to
 - You may run your own Tatin server, which exposes a or use the publicly available ones:
 - Production server: <https://tatin.dev>
 - Test server: <https://test.tatin.dev>
- Dado - <https://github.com/the-carlisle-group/Dado/>
 - A framework for helping manage and deploy APL projects
 - Centered around a GitHub-based workflow

Demo:

- Use community tools to analyze [this](#) file of eclipse data