Mainz, April 30th 2024

# Mortens Favourite Version 19.0 Features

*Morten Kromberg, CTO*

# Mortens Favourite v19.0 Features

- Things that Morten has actually used
  since release ...

APL Germany e.V.  Spring '24

# Source Code Management

- **Link** 4.0 was included with v19.0. Highlights include:
  - Link a single namespace or class file
  - Default to current namespace if no namespace specified
  - Configuration files
  - Support for simple text vectors, vectors of text vectors, and character matrices in simple text files (rather than using array notation)
- The **Cider** project manager and the **Tatin** package manager are bundled with v19.0
- Dyalog is starting to distribute tools as **Tatin** packages

Link (source)

Cider (projects)

Tatin (packages)

News from Dyalog

APL Germany e.V.    Spring '24

| | | | |
|---|---|---|---|
| | | | github.com |
| aplteam-SMTP | SMTP client for sending emails from within Dyalog APL | 2 | github.com |
| aplteam-Snippets | Manage APL-code snippets | 1 | github.com |
| aplteam-Tester2 | Dyalog APL test framework | 1 | github.com |
| aplteam-WindowsEventLog | Tools to read from and write to the Windows Event Log | 1 | github.com |
| aplteam-WinReg | Tools for dealing with the Windows Registry | 1 | github.com |
| aplteam-WinRegSimple | Limited set of tools for dealing with the Windows Registry | 1 | github.com |
| aplteam-WinSCP_NET | Interface between Dyalog and the WINSCP .NET DLL | 1 | github.com |
| aplteam-WinSys | Windows-only OS calls and system infos | 1 | github.com |
| aplteam-ZipArchive | Zipping and unzipping with .NET on Windows and zip/unzip on other platforms | 2 | github.com |
| davin-DateTime | Easy calculations with dates | 1 | github.com |
| davin-FilePlus | Extend component files to use anything for a component number | 1 | github.com |
| davin-SQLFns | Easily create text SQL commands for use with any SQL program interface | 1 | github.com |
| davin-Tester | Simplified function-level testing of programs | 1 | github.com |
| dyalog-HttpCommand | Utility to execute HTTP requests | 1 | github.com |
| dyalog-Jarvis | JSON and REST Web Service Framework | 1 | github.com |
| dyalog-NuGet | Use NuGet packages from Dyalog APL | 1 | github.com |

Spring '24

3

| | Dyalog APL test framework | 1 | github.com |
|---|---|---|---|
| aplteam-WindowsEventLog | Tools to read from and write to the Windows Event Log | 1 | github.com |
| aplteam-WinReg | Tools for dealing with the Windows Registry | 1 | github.com |
| aplteam-WinRegSimple | Limited set of tools for dealing with the Windows Registry | 1 | github.com |
| aplteam-WinSCP_NET | Interface between Dyalog and the WINSCP .NET DLL | 1 | github.com |
| aplteam-WinSys | Windows-only OS calls and system infos | 1 | github.com |
| aplteam-ZipArchive | Zipping and unzipping with .NET on Windows and zip/unzip on other platforms | 2 | github.com |
| davin-DateTime | Easy calculations with dates | 1 | github.com |
| davin-FilePlus | Extend component files to use anything for a component number | 1 | github.com |
| davin-SQLFns | Easily create text SQL commands for use with any SQL program interface | 1 | github.com |
| davin-Tester | Simplified function-level testing of programs | 1 | github.com |
| dyalog-HttpCommand | Utility to execute HTTP requests | 1 | github.com |
| dyalog-Jarvis | JSON and REST Web Service Framework | 1 | github.com |
| dyalog-NuGet | Use NuGet packages from Dyalog APL | 1 | github.com |
| dyalog-APLProcess | Launch and manage processes on all platforms | | |

Coming Soon!

4

News from Dyalog

# Tatin and Cider included…

```
Dyalog APL/W Version 19.0.49074
Serial number: 000013
Tue Apr 16 13:34:28 2024


      ]tools.activate all
Rebuilding user command cache... done
Restart APL to complete activation.
cmddir set to: …;C:/…/Dyalog APL 19.0 Unicode Files/SessionExtensions/CiderTatin
```

News from Dyalog

# Tatin and Cider included...

```
Dyalog APL/W Version 19.0.49074
Serial number: 000013
Tue Apr 16 13:34:28 2024


      ]tools.activate all
Rebuilding user command cache... done
Restart APL to complete activation.
cmddir set to: …;C:/…/Dyalog APL 19.0 Unicode Files/SessionExtensions/CiderTatin


      ]tatin.loadPackages dyalog-Jarvis
1 package loaded into #
```

News from Dyalog

APL Germany e.V. Spring '24

# Tatin and Cider included...

```
Dyalog APL/W Version 19.0.49074
Serial number: 000013
Tue Apr 16 13:34:28 2024


      ]tools.activate all
Rebuilding user command cache... done
Restart APL to complete activation.
cmddir set to: …;C:/…/Dyalog APL 19.0 Unicode Files/SessionExtensions/CiderTatin


      ]tatin.loadPackages dyalog-Jarvis
1 package loaded into #


      ij←⎕NEW Jarvis
      ij.⎕nl ¯2
AcceptFrom AllowFormData AllowGETs AppCloseFn AppInitFn AuthenticateFn …
… SessionUseCookie UseZip ValidateRequestFn WaitTimeout ZipLevel
```

News from Dyalog

APL Germany e.V. Spring '24

# Tatin and Cider included…

```
Dyalog APL/W Version 19.0.49074
Serial number: 000013
Tue Apr 16 13:34:28 2024


      ]tools.activate all
Rebuilding user command cache... done
Restart APL to complete activation.
cmddir set to: …;C:/…/Dyalog APL 19.0 Unicode Files/SessionExtensions/CiderTatin


      ]tatin.loadPackages dyalog-Jarvis
1 package loaded into #


      ij←⎕NEW Jarvis
      ij.⎕nl -2
AcceptFrom AllowFormData AllowGETs AppCloseFn AppInitFn AuthenticateFn …
… SessionUseCookie UseZip ValidateRequestFn WaitTimeout ZipLevel
```
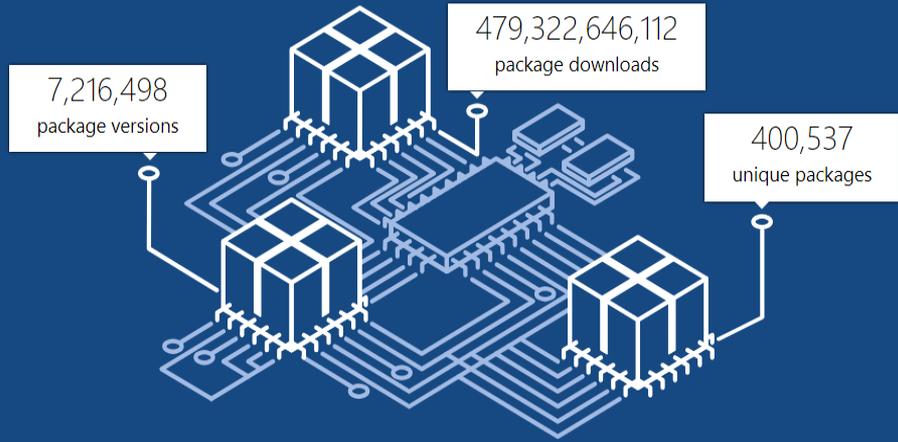
News from Dyalog

APL Germany e.V.    Spring '24

# The NuGet Tool...

NuGet is the .NET Package Manager.

News from Dyalog

APL Germany e.V. Spring '24

Apps    Link    JSWC    APL    Flying & Sailing    Car    Dyalog    Cloud    SBO    Travel    Linux    Sport    Productivity    Ferie 2022

nuget    Packages    Upload    Statistics    Documentation    Downloads    Blog    Sign in

# Create .NET apps faster with NuGet

Search for packages...

479,322,646,112
package downloads

7,216,498
package versions

400,537
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.

nuget.org/packages

# nuget

**Packages**   Upload   Statistics   Documentation   Downloads   Blog

Sign in

Search for packages...

## Frameworks ⓘ

There are 373,610 packages

Sort by [Relevance ▾]

Include compatible frameworks ☑

Framework Filter Mode ⓘ  [ALL] [ANY]

☐ .NET                    ▾
☐ .NET Core               ▾
☐ .NET Standard           ▾
☐ .NET Framework          ▾

### Package type

◉ All types
○ Dependency
○ .NET tool
○ Template

### Options

☑ Include prerelease

[Apply]   Reset

### Newtonsoft.Json ✓  by: dotnetfoundation jamesnk newtonsoft

[.NET 5.0] [.NET Core 1.0] [.NET Standard 1.0] [.NET Framework 2.0]

⬇ 4,599,211,003 total downloads   🕒 last updated 08/03/2023   🏳 Latest version: 13.0.3

🏷 json

Json.NET is a popular high-performance JSON framework for .NET

### Microsoft.Extensions.DependencyInjection ✓  by: aspnet dotnetframework Microsoft

[.NET 5.0] [.NET Core 2.0] [.NET Standard 2.0] [.NET Framework 4.6.1]

⬇ 3,270,537,332 total downloads   🕒 last updated 5 days ago   🏳 Latest version: 9.0.0-preview.3.24172.9

Default implementation of dependency injection for Microsoft.Extensions.DependencyInjection.

### Microsoft.Extensions.Logging ✓  by: aspnet dotnetframework Microsoft

[.NET 5.0] [.NET Core 2.0] [.NET Standard 2.0] [.NET Framework 4.6.1]

⬇ 3,046,756,343 total downloads   🕒 last updated 5 days ago   🏳 Latest version: 9.0.0-preview.3.24172.9

Logging infrastructure default implementation for Microsoft.Extensions.Logging.

### System.Text.Json ✓  by: dotnetframework Microsoft

[.NET 5.0] [.NET Core 2.0] [.NET Standard 2.0] [.NET Framework 4.6.1]

⬇ 2,074,912,442 total downloads   🕒 last updated 5 days ago   🏳 Latest version: 9.0.0-preview.3.24172.9

Provides high-performance and low-allocating types that serialize objects to JavaScript Object Notation (JSON) text and deserialize JSON text to objects, with UTF-8 support built-in. Also provides types to read... More information

System.Security.Cryptography.Pkcs.EnvelopedCms

**Newtonsoft.Json.Bson** ✅ by: dotnetfoundation jamesnk newtonsoft

.NET 5.0   .NET Core 1.0   .NET Standard 1.3   .NET Framework 4.5

⬇ 678,930,535 total downloads   🕐 last updated 29/06/2022   🚩 Latest version: 1.0.3-beta1

🏷 bson

Json.NET BSON adds support for reading and writing BSON

**Swashbuckle.AspNetCore.Swagger** by: domaindrivendev

.NET 5.0   .NET Core 2.0   .NET Standard 2.0   .NET Framework 4.6.1

⬇ 623,796,115 total downloads   🕐 last updated 11/01/2023   🚩 Latest version: 6.5.0

🏷 swagger documentation discovery help webapi aspnet aspnetcore

Middleware to expose Swagger JSON endpoints from APIs built on ASP.NET Core

**Swashbuckle.AspNetCore.SwaggerGen** by: domaindrivendev

.NET 5.0   .NET Core 2.0   .NET Standard 2.0   .NET Framework 4.6.1

⬇ 621,711,669 total downloads   🕐 last updated 11/01/2023   🚩 Latest version: 6.5.0

🏷 swagger documentation discovery help webapi aspnet aspnetcore

Swagger Generator for APIs built on ASP.NET Core

**AutoMapper** ✅ by: jbogard

.NET 6.0

⬇ 597,339,068 total downloads   🕐 last updated 2 months ago   🚩 Latest version: 13.0.1

A convention-based object-object mapper.

Previous | Next

**nuget**

Packages    Upload    Statistics    Documentation    Downloads    Blog

Sign in

mail

# 1,819 packages returned for mail

Sort by    Relevance

## Frameworks ⓘ

Include compatible frameworks ☑

Framework Filter Mode ⓘ    **ALL** ANY

☐ .NET

☐ .NET Core

☐ .NET Standard

☐ .NET Framework

## Package type

◉ All types

○ Dependency

○ .NET tool

○ Template

## Options

☑ Include prerelease

Apply    Reset

### MailKit ✔   by: jstedfast

.NET 5.0   .NET Core 2.0   .NET Standard 2.0   .NET Framework 4.6.1

⬇ 108,379,307 total downloads   🕑 last updated 3 days ago   🏳 Latest version: 4.5.0

🏷 smtp pop3 imap mime security arc dkim smime s/mime openpgp More tags

MailKit is an Open Source cross-platform .NET mail-client library that is based on MimeKit and optimized for mobile devices. Features include: * HTTP, Socks4, Socks4a and Socks5 proxy support. * SASL... More information

### SendGrid ✔   by: twilio-api

.NET 5.0   .NET Core 1.0   .NET Standard 1.3   .NET Framework 4.0

⬇ 112,588,456 total downloads   🕑 last updated 14 days ago   🏳 Latest version: 9.29.3

🏷 Twilio SendGrid Email Mail Microsoft Azure Transactional .NET Core

C# client library and examples for using Twilio SendGrid API's to send mail and access Web API v3 endpoints with .NET Standard 1.3 and .NET Core support.

### MailChimp.Net.V3   by: brandonseydel

.NET 5.0   .NET Core 1.0   .NET Standard 1.3   .NET Framework 4.5

⬇ 4,222,840 total downloads   🕑 last updated 15/05/2023   🏳 Latest version: 5.5.0

🏷 MailChimp Mail Chimp 3.0 v3.0 MailChimp.Net.V3 MailChimpv3.0 MailChimpv3 MailChimp3

A .NET Wrapper for Mail Chimp v3.0 API

### NETCore.MailKit   by: jos_kl

.NET 5.0   .NET Core 3.0   .NET Standard 2.1

# The NuGet Tool...

Let's try MailKit....

```
]tatin.loadpackages dyalog-nuget
1 package loaded into #

]link.import c:\devt\nuget\APLSource\Tests
Imported: #.Tests ← c:\devt\nuget\APLSource\Tests

Tests.test 'mailkit' ⍝ Trace me
```

# Cider Project Manager

- A "project" is effectively

  - A folder containing source code, plus

  - A list of Tatin or NuGet dependencies

- When you open a project...

  - Cider uses Link to load the source

  - And Tatin or NuGet clients to load the dependencies

News from Dyalog

APL Germany e.V.    Spring '24

# Token Allocation

I needed a token for each thread dequeueing messages:

```
allocateTokens;z;t;i

t←'JSWC Synchronisation'

:Trap 2 ⍝ ⎕TALLOC will SYNTAX ERROR in v18.2
    z←↑⎕TALLOC 0                              ⍝ List all allocated ranges
    :If (≢z)≥i←z[;2]⍳⊂t                       ⍝ Do we already have a range?
        TOKENRANGE←z[i;1]                     ⍝ Yes: use it
    :Else
        TOKENRANGE←⎕TALLOC 1 t                ⍝ v19.0: Allocate a free range
    :EndIf
    TOKENSTEP←10*-⌈10⍟MAXSESSIONS+1           ⍝ e.g. step by 0.001 if MAXSESSIONS is 100
    (WG_TOKENBASE DQ_TOKENBASE)←TOKENRANGE+0.1 0.2 ⍝ Start at n.101 and n.2.01

:Else ⍝ Version 18.2 or earlier
    TOKENSTEP←1                 ⍝ Step by 1, and separate the ranges out
    (WG_TOKENBASE DQ_TOKENBASE)←(0 1×1+MAXSESSIONS)+30⌷⎕A⍳'EWC' ⍝ v18.2: Think of a number
:EndTrap
```
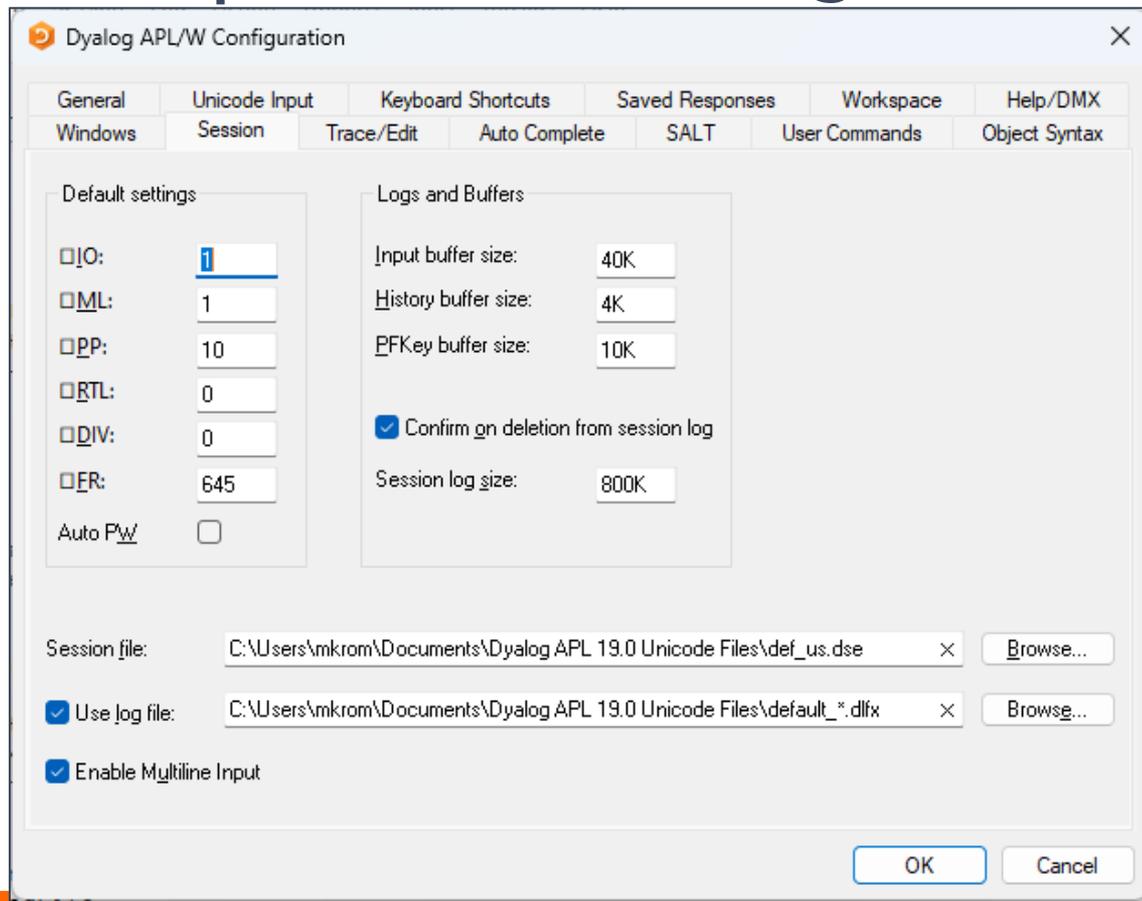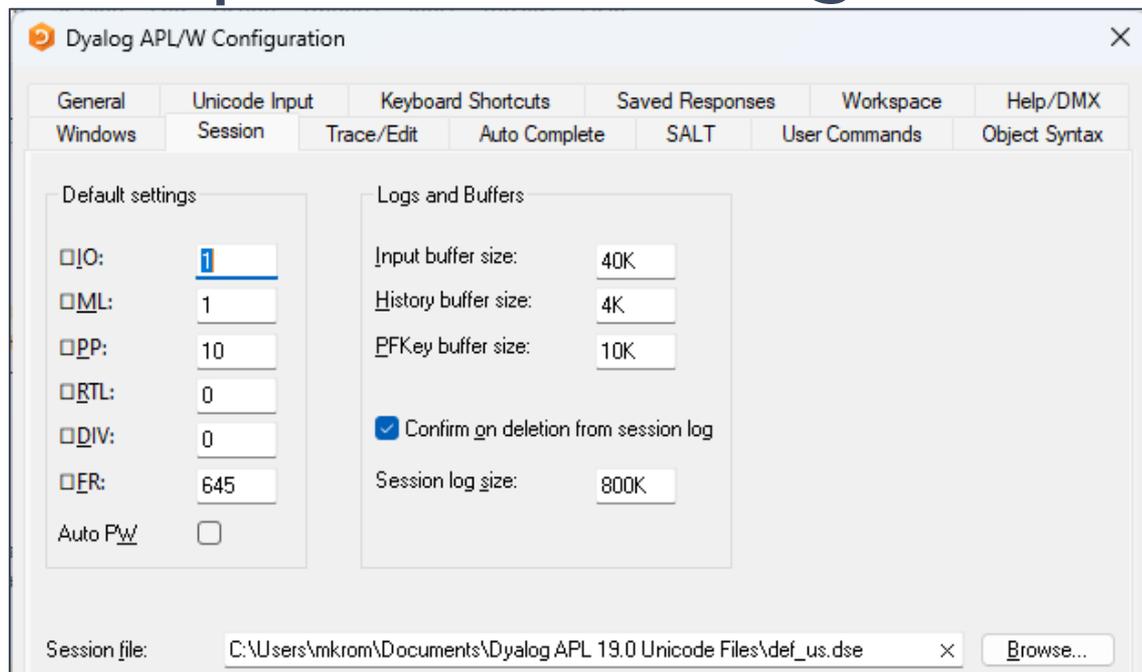
# Multiple Session Log Files

- Before v19.0, the default would be for all Dyalog processes to use the same log file

- This sometimes caused loss of useful log file data

- In the worst case, rare crashes when two processes tried to update the file at the same time

  - (typically when starting or stoppping many processes at once)

- Version 19.0 locks the log file and subsequent processes will open or create a new one

News from Dyalog

APL Germany e.V.  Spring '24

# Multiple Session Log Files…

Spring '24

# Multiple Session Log Files…

APL Germany e.V.     Spring '24

# Log Files – Intended Usage Pattern

- Users who always start the same set of interpreters at the start of a working session (Markos), for example:

  - Development

  - Test

  - Prod

- … will get the same log files each day

- Alternatively, create shortcuts without * in the log file name
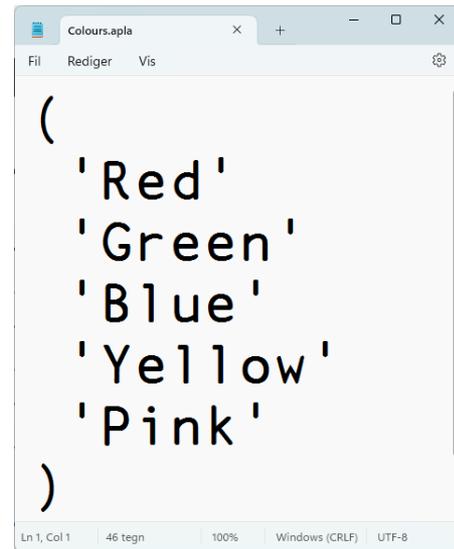
News from Dyalog

APL Germany e.V.    Spring '24

```
)ed foo[123]
```

In v19.0, if you add a line number after the a name, the editor will open on that line

# Arrays in "Plain" Text Files

🔶 Some character data doesn't map nicely to APL Array Notation:

- 🔶 Simple character vectors

- 🔶 Simple character matrices

- 🔶 Vectors of character vectors

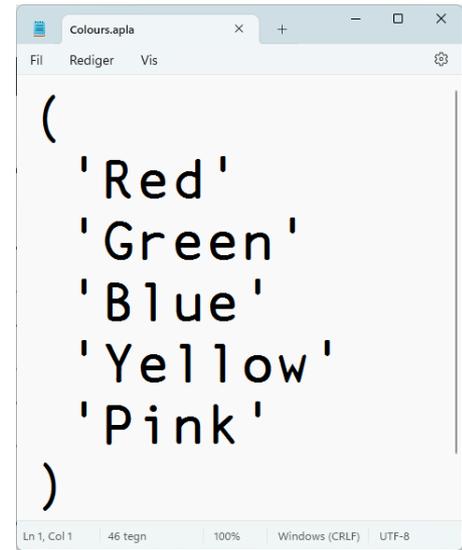Link v4.0 adds experimental support for storing such arrays in "plain" format



News from Dyalog

APL Germany e.V.    Spring '24

# -text=aplan (default)

Window title: Colours.apla — Fil Rediger Vis

```
(
  'Red'
  'Green'
  'Blue'
  'Yellow'
  'Pink'
)
```

Status bar: Ln 1, Col 1 — 46 tegn — 100% — Windows (CRLF) — UTF-8

```
      )ns MyApp
#.MyApp
      #.MyApp.Colours←'Red' 'Green' 'Blue' 'Yellow' 'Pink'
      ]link.create MyApp c:\tmp\myapp -arrays
Linked: #.MyApp ←→ c:\tmp\myapp [directory was created]
      ]open c:\tmp\myapp\Colours.apla
c:\tmp\myapp\Colours.apla
```

# -text=plain

Colours.vec.apla

Colours.vec.apla

Fil    Rediger    Vis

Red
Green
Blue
Yellow
Pink

Ln 1, Col 1    27 tegn    100%    Windows (CRLF)    UTF-8

```
      )ns MyApp
#.MyApp
      #.MyApp.Colours←'Red' 'Green' 'Blue' 'Yellow' 'Pink'
      ]link.create MyApp c:\tmp\myapp -arrays -text=plain
Linked: #.MyApp ←→ c:\tmp\myapp [directory was created]
      ]open c:\tmp\myapp\Colours.apla
c:\tmp\myapp\Colours.apla
```

News from Dyalog

APL Germany e.V.    Spring '24

# text=plain is experimental

● Design may be refined in next release cycle

| File Extension | Array Characteristics | Prohibited characters (⎕UCS) |
|---|---|---|
| .CR.apla | Simple vector with each line terminated by ⎕UCS 13 | 10 11 12 133 8232 8233 |
| .LF.apla | Simple vector with each line terminated by ⎕UCS 10 | 11 12 13 133 8232 8233 |
| .CRLF.apla | Simple vector with each line terminated by ⎕UCS 13 10 | 11 12 133 8232 8233 * |
| .vec.apla | Vector of simple character vectors (no scalar elements) | 11 12 13 133 8232 8233 |
| .mat.apla | Simple character matrix | 10 11 12 13 133 8232 8233 |

News from Dyalog

APL Germany e.V.

# Service Orientation

A rapidly increasing proportion of new APL code is delivered as services

- *Jarvis* wraps APL code as HTTP/JSON or RESTful services on any platform

  - https://github.com/dyalog/jarvis

- Off-the-shelf docker containers containing Dyalog APL (optionally with Jarvis)

- *HttpCommand* is our HTTP client

RESTful API
GET PUT POST DELETE

HTTP(s) / JSON

docker

News from Dyalog

APL Germany e.V.  Spring '24