APL64 2023.0.13

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Overview

This document describes the updates and bug fixes incorporated into this 2023.0.13 production update of APL64.

Enhancements/Changes

APL64 Installer Enhancements

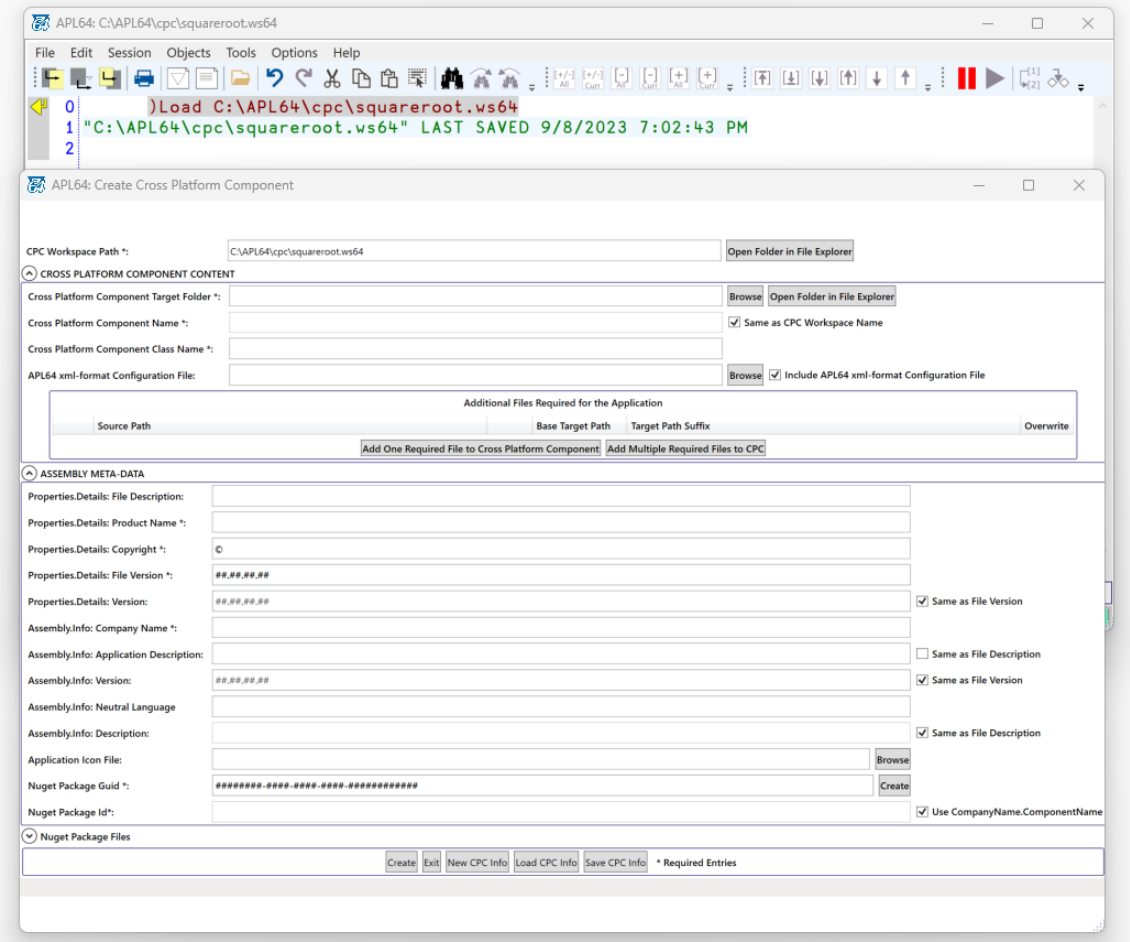
The APL64 installer now installs the APL+Win fonts

APL64 Developer GUI Enhancements

Create a Cross Platform Component Utility

An APL64 cross-platform component is a Nuget package containing a .Net Core assembly which exposes one or more APL64 programmer-defined 'public' functions in the workspace. This package may be used as part of a containing .Net application to support the APL business rules or algorithms of the application. Any .Net programming language may be used to access the APL64 cross-platform component in a hardware and operating system environment which supports Microsoft .Net Standard v2.1.

In APL64, refer to the menu **Help | Developer Version GUI | Create Cross-Platform Component** for the documentation and the menu **Options | Create .Net Runtime Assembly | Create Cross Platform Component** for the GUI to create the cross platform component.



New debugging with Watchpoints dialog

The feature is functionally like APL+Win but with an updated modernized GUI interface that is accessed with the menu **Session | Debug | Edit Watchpoints (Ctrl+W).** Refer to the **Debugging with Watchpoints** in the APL64 User Manual for the details.

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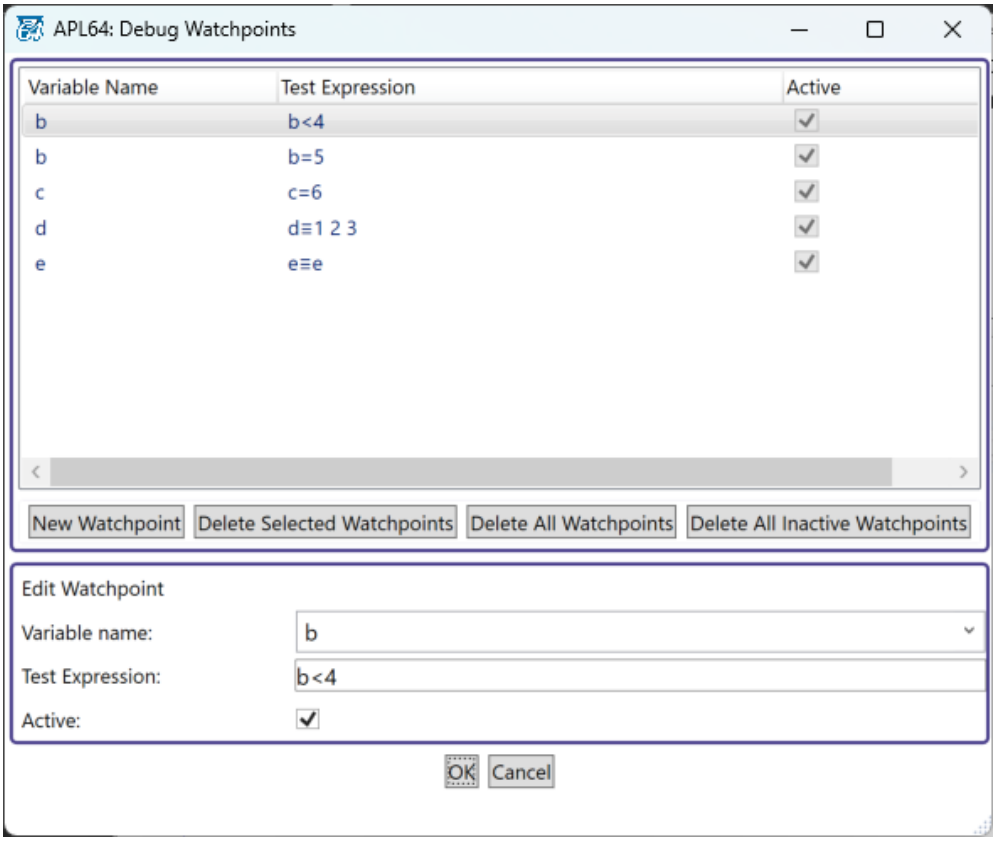

Syntax coloring and margin glyphs supported in editable classic history format

Syntax coloring and left margin glyphs are optionally available in the classic history pane. The new left margin delta glyph (Δ) indicates if a line in the classic history has been user-edited, but not executed. The enhancement is configured with the menu **Session | Classic History Format | Show Syntax Coloring When Editable**.

Note:

- The delta glyph will be displayed in the editable classic history for a blank line inserted with the Ctrl+Enter shortcut.
- The delta glyph will not be displayed in the editable classic history on the last line of the history if that line contains none or only space characters.
- The delta glyph will not be displayed in the editable classic history if a history line is user-edited and immediately executed and the line was not previously a delta line.
- Example: User editing of the output of an APL executable expression

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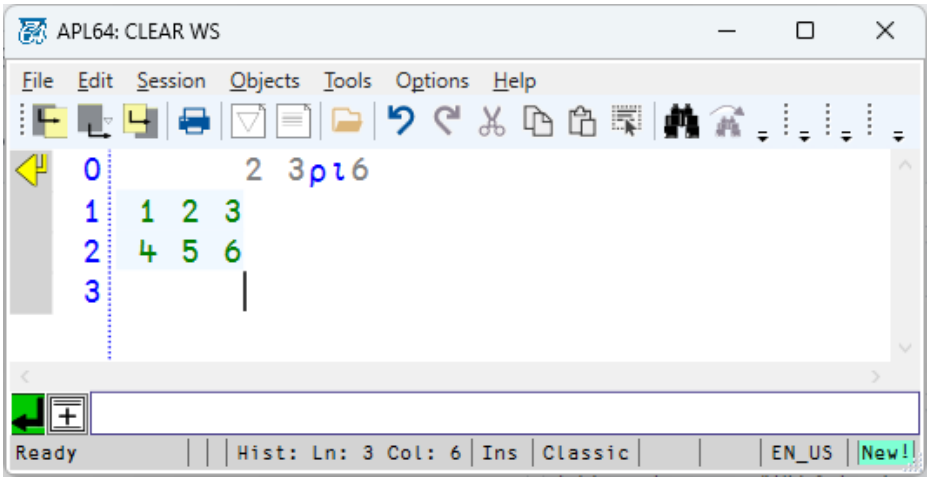
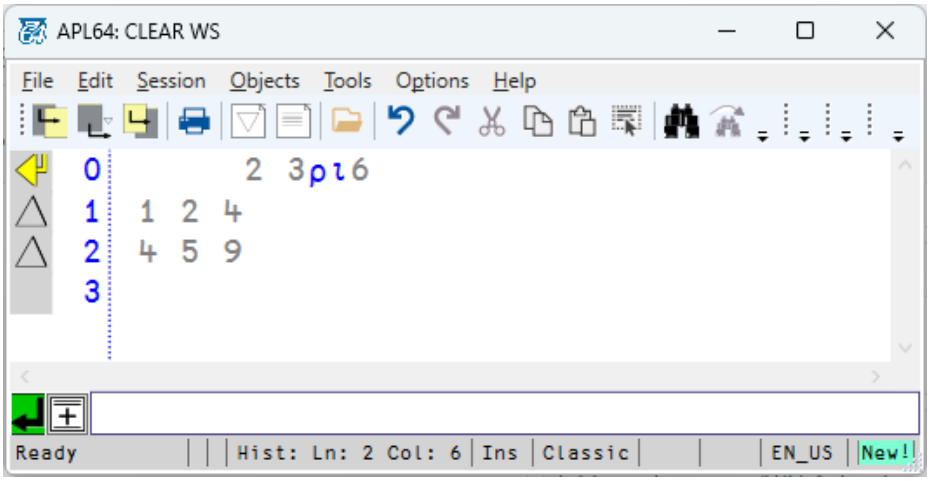
User executes: 2 3⍴⍳6 [Enter] in the classic history pane:



User modifies rows 1 (replace 3 with 4) and 2 (replace 6 with 9). The left margin delta glyph marks rows 1 and 2 as user-edited rows:



New Inline Comments: ⍝ ⍝

Inline comments are useful for "commenting out" multi-line blocks or inserted annotations in the middle of executable code. Inline comments begin and end with glyphs that look somewhat like sideways lamps: ⍝ ⍝

These glyphs are typed on the APL64 US keyboard as:

ALT+SHIFT+Z: ⍝
ALT+SHIFT+X: ⍝

Note: The keyboard short-cuts described in this document pertain to the EN-US keyboard definition in APL64. When using a different keyboard definition, some keyboard short-cuts may be different.

Wherever possible the APL glyph locations are the same for all APL64 keyboard definitions.
Unlike traditional comments, inline comments can optionally be terminated before the end of line using a closing comment "⍝" glyph.

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If a single opening comment glyph is used without a closing comment glyph, it behaves like a traditional comment and runs to the end of line:

```
      10 20 ⍝ 30 40 50 60
10 20
```

But if you terminate the comment it stops before the end of the line:

```
      10 20 ⍝ 30 40 ⍝ 50 60
10 20 50 60
```

You can also use inline comments to temporarily change part of an APL statement when experimenting or debugging code.

For example, consider the following statement:

```
(X+Y) Foo A B C D E
```

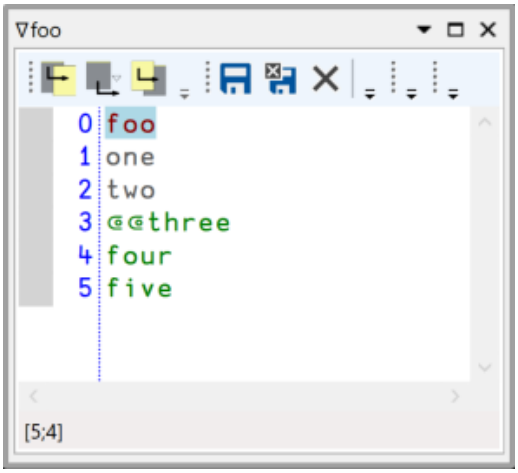
You might want to temporarily change this to something like the following

```
(X+Y) Foo A B T⍝C⍝ D E
```

Where argument C has been temporarily changed to T, but without discarding the original C character in the executable expression.

If you use two or more opening comment glyphs, the comment block can span multiple lines.

If you don't terminate the comment block, it runs to the end of the function, like this:



New Ctrl+F3 keyboard shortcut to search for a token under the caret

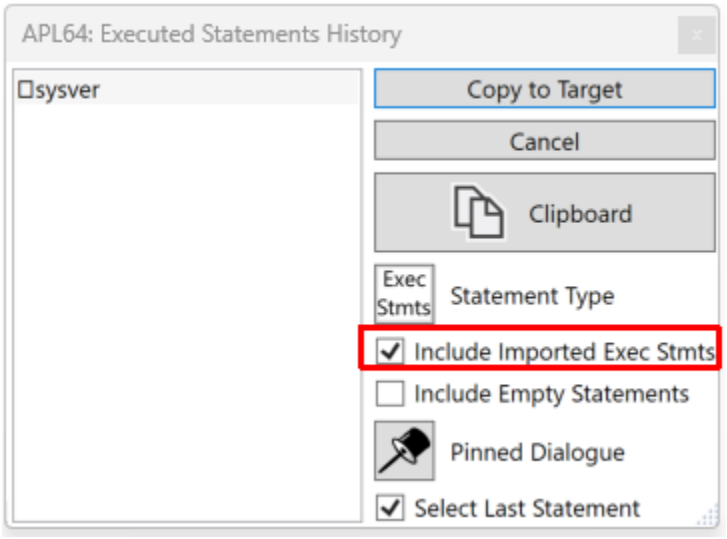
This feature is similar to APL+Win where the search is performed on the selection and the token under the caret when there is no selection.

[executed] statement history dialog

The [executed] statement history is now retained between APL64 sessions

*New **Include Imported Exec Stmts** option in the Executed Statements History dialog*

Check this option to include executed statements imported from the log file, if any, when the **Exec Stmts** statement type is selected.



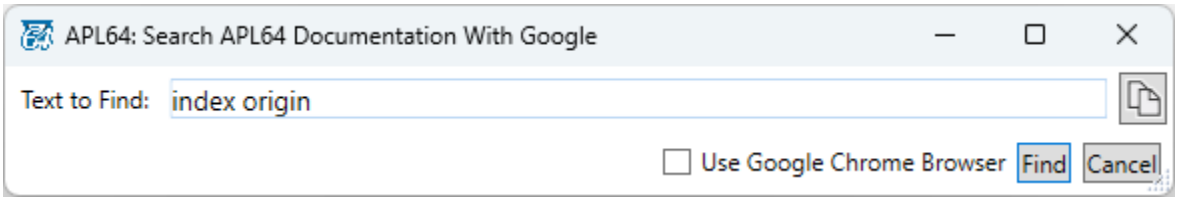
New options available for searching the APL64 user documentation

Menu Help / Search All Documentation with Adobe

Presents the online document "APL64 Developer Version User Documentation Wide Scope Search" with instructions on using the Advanced Search option in the Adobe Acrobat Reader to search within multiple Adobe documents that are stored on your machine.

Menu Help / Search All Documentation with Google

Uses the Google search engine to find user-selected text in the APL64 Developer version documentation on the APL64 server:



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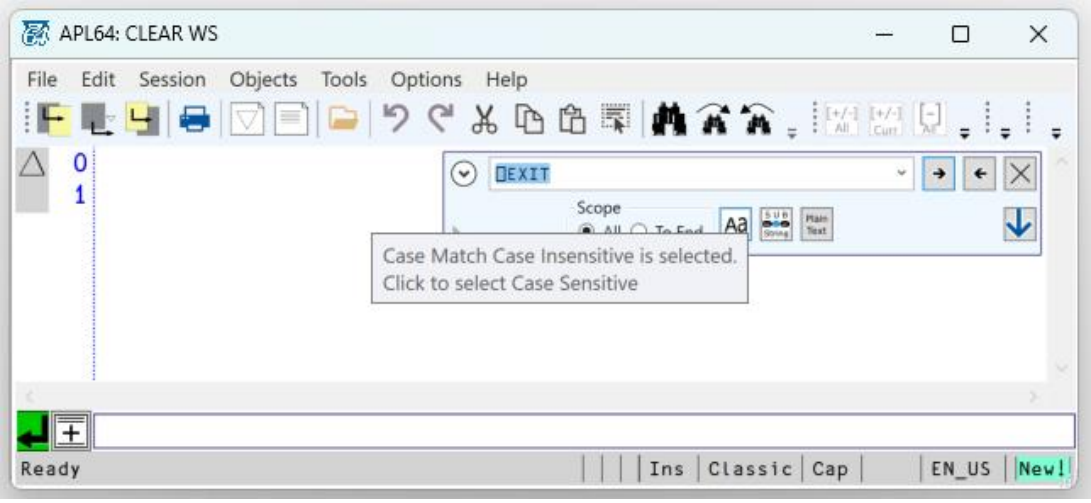
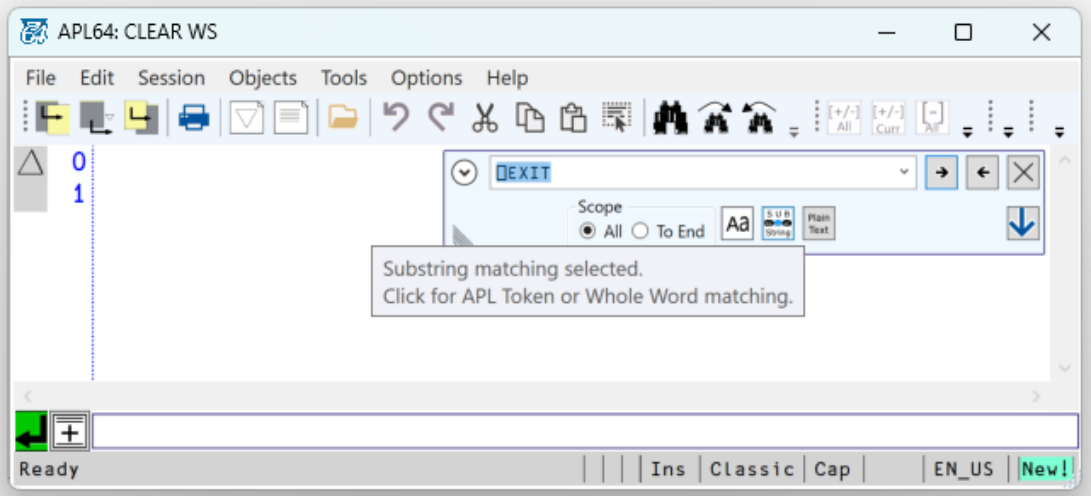
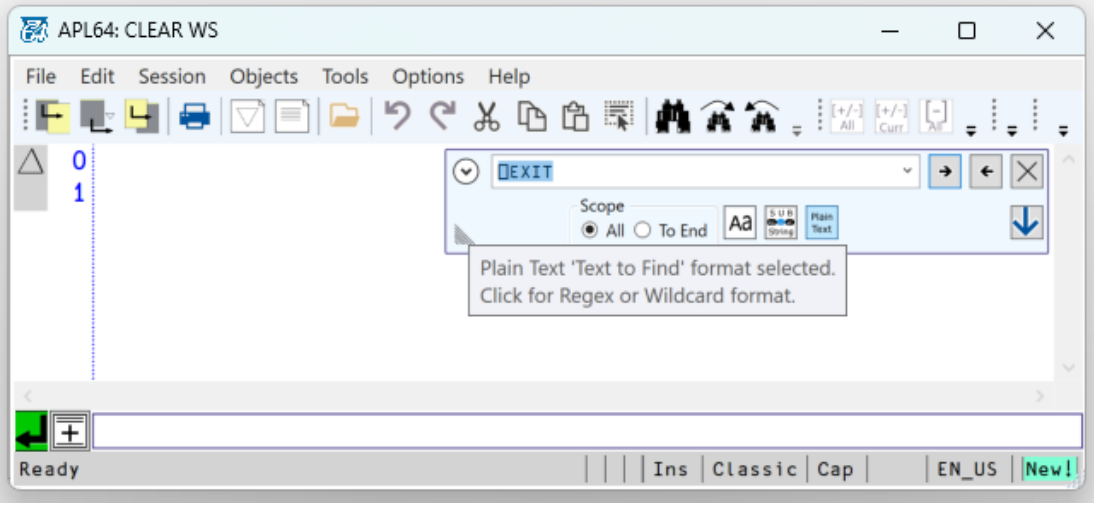
Find/Replace dialog button tooltips updated to clarify their intended purpose







The Configure User Tools dialog Listview now supports Delete key actions

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Restart immediately when the OK button is clicked in the Apply Defaults Settings dialog

When selecting menu **Session | Configuration Settings | Apply Default Settings**, and clicking OK in the Apply Defaults Dialog, APL64 will immediately restart even with the menu **Session | Confirm Exit** setting is checked.

Editing large functions performance improved

Eliminated sluggishness in function editor for large functions with thousands of rows of code.

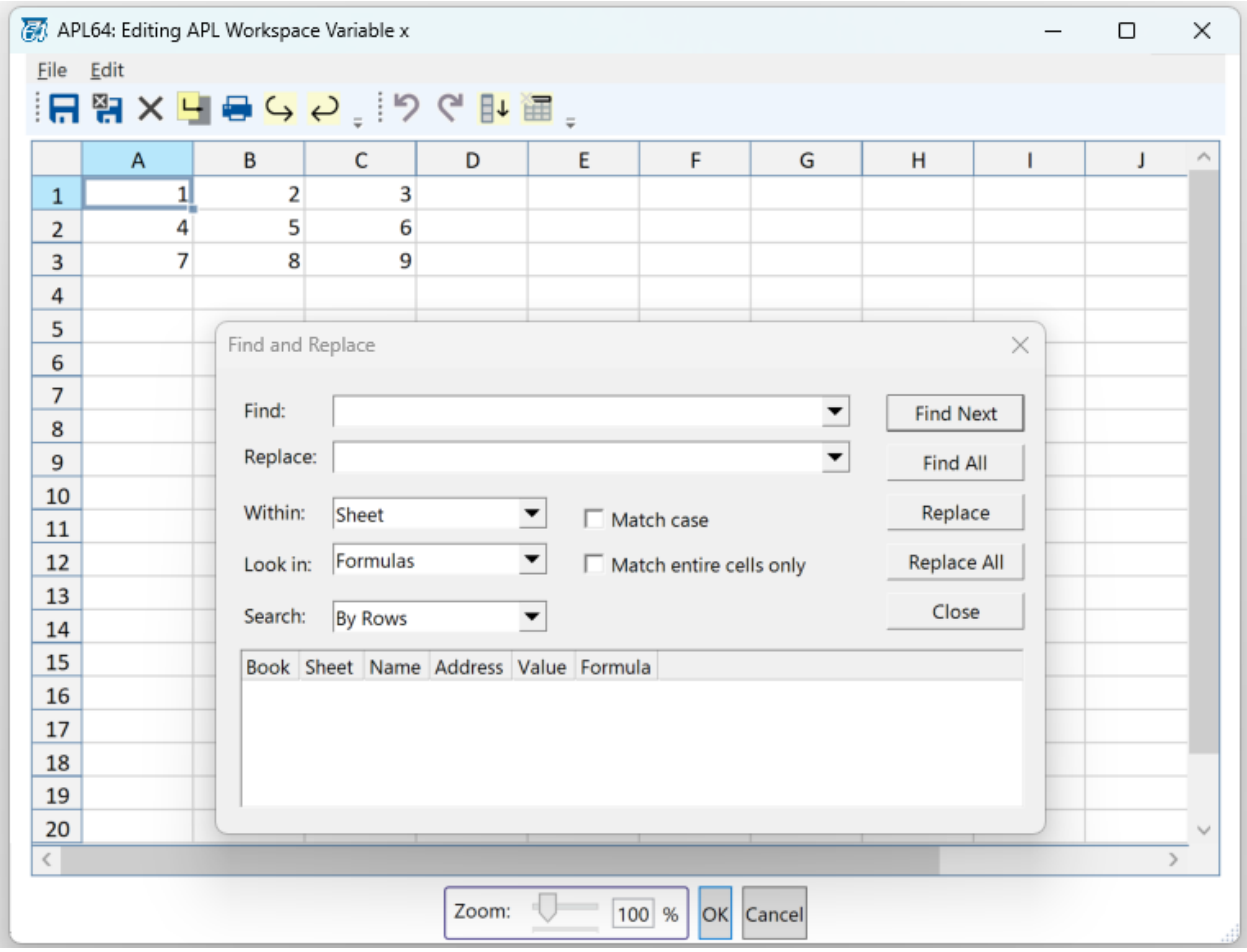
Session Log loading performance improved

Eliminated the sluggishness in the history at startup when loading a very large session log.

)EDSS and □EDSS

New Find and Replace dialog

The Ctrl+F keyboard shortcut now displays the Excel-like Find and Replace dialog of SpreadsheetGear.
Note: As with Microsoft Excel, F3 and shift+F3 do not perform the actions find next and find previous, respectively.



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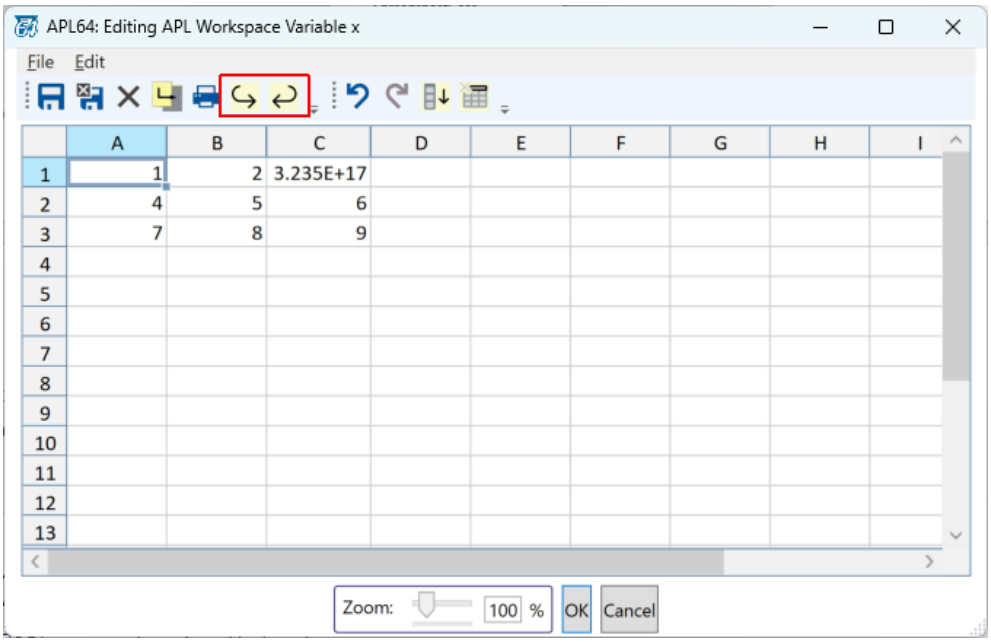
New Import worksheet and Export data to variable actions

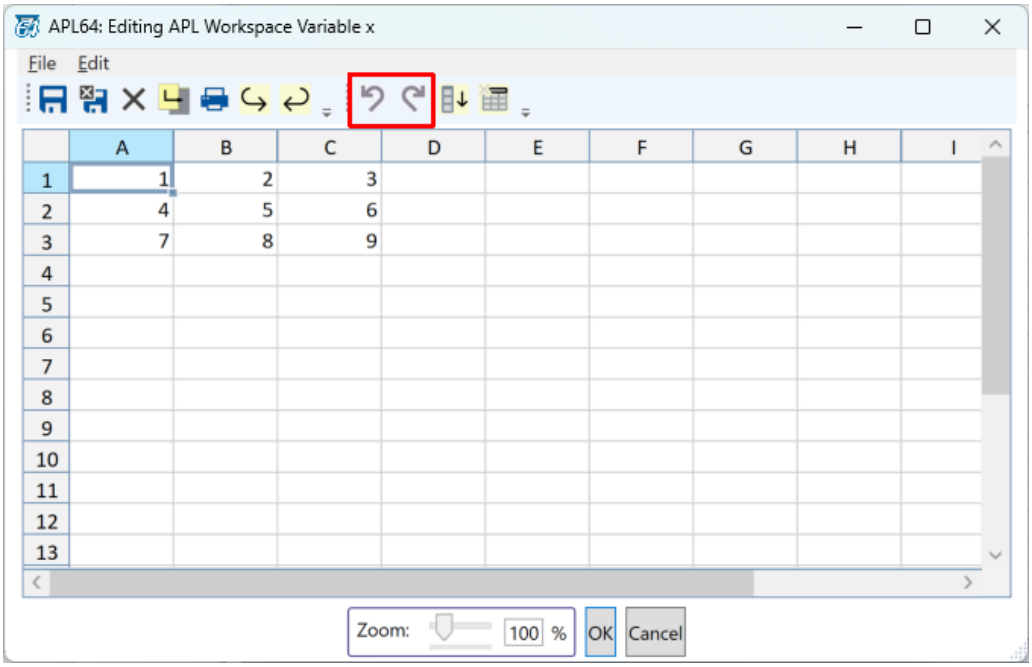


This toolbar button selects the worksheet to import from an existing workbook.

This toolbar button exports the data in the active worksheet as an APL variable to the workspace.

New Undo and Redo actions

The undo and redo actions for the most recent cell edits in the active workbook are supported. They're accessible from the toolbar buttons, identified in the red rectangle in the image below, and keyboard shortcut keys, Ctrl+Z and Ctrl+Y, respectively.



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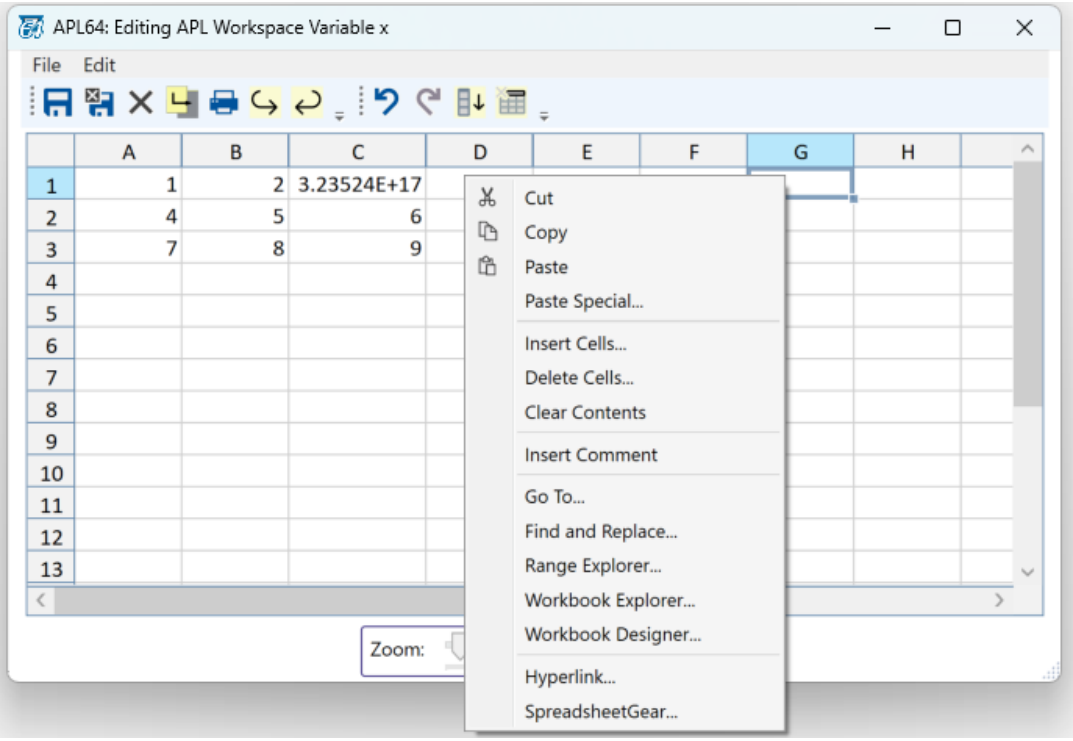
New context menu items implemented

- Go To…
- Find and Replace…
- Workbook Designer…



Use Autofit for worksheet rows

EDSS Limits

The maximum number of worksheets, columns and rows are the same as Microsoft Excel.

Session | Separated History Format menu: Tooltips updated

APL64 Interpreter Enhancements

New ⎕watchpoint System Variable

Watch points are maintained in a system variable ⎕watchpoints. Refer to the **Debugging with Watchpoints** in the APL64 User Manual for the details.

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□SQLx system functions Updated

□SQL Synonym datatype 'Int32' for 'Integer' added for the ExecInsertQuery' action

□SQL User documentation updated with additional examples

□SQLMicrosoft.Data.SqlClient for □SQL .Net component updated to v5.1.1

□SQLMy: MySql.Data for □SQLMy .Net component updated to v8.0.33

□SQLite: Microsoft.Data.Sqlite for □SQLite .Net component update to v7.0.5

□NFE Enhanced

New actions: 'ReadAllLines', 'ReadAllText', 'WriteAllLines', 'WriteAllText'

Improved exception messages for 'Read' and 'Write' actions

□MATHNET interface to MathNet linear algebra toolkit implemented

Refer to Help | APL Language | Using □MATHNET for details

Successfully load previously damaged workspaces.

Correctly reconstruct the SI stack when loading suspended or damaged workspaces

This especially pertain to workspaces that included □WI, □NI, □WCALL callouts or callbacks suspended on the SI stack

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Bug Fixes

APL64 Developer GUI Bug Fixes

Visible portion of a debugged function didn't remain visible when clicked with the mouse

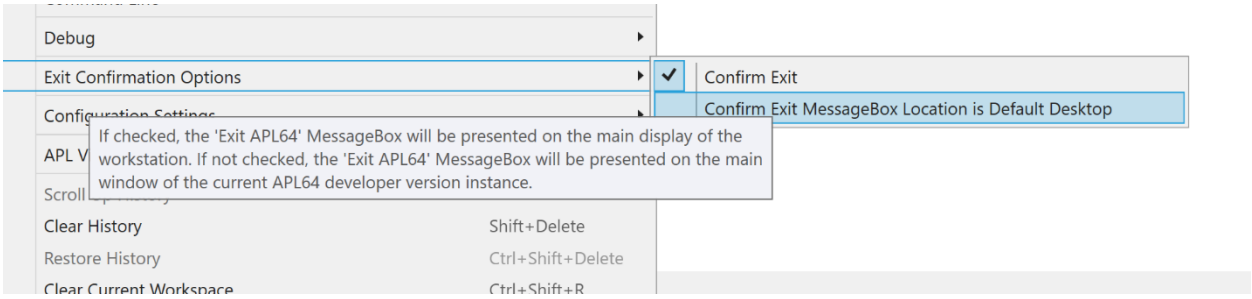
Debugger falsely activated when loading suspended workspace saved with □SAVE at top of SI

Import Settings dialog didn't include ToolBarTraysInfoForAPL64 when Select All was clicked

Typing the Enter key with text selected in the editor didn’t always break the text correctly

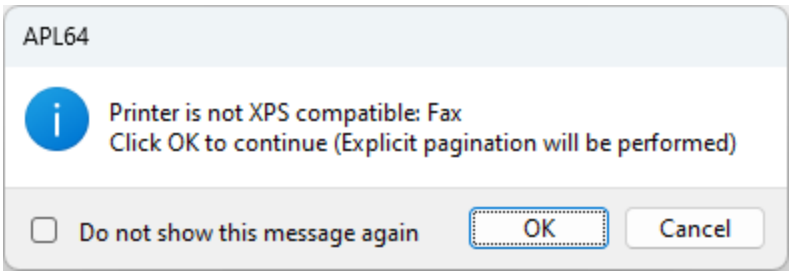
Session verify close dialog can be obscured by other Windows

Refer to the new menu **Session | Exit Confirmation Options | Confirm Exit MessageBox Location is checked Default Desktop** was added. Leave this unchecked if you observe this problem.



Cannot print to non-XPS compatible printers

APL64 could stop responding when printing to printers like the deprecated HP LaserJet Pro M201 and HP 8600 series printers. APL64 will now provide the user the option to continue or cancel printing:



If the user clicks OK to continue printing, APL64 will explicitly paginate the document to be printed and transmit it to the user selected printer with one or more of the following conditions:

- Printing performance for large documents may be reduced
- Glyphs which are not supported by the printer-embedded fonts may not be rendered correctly

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- The temporary file containing the paginated document cannot be automatically deleted

Typing Alt+Enter behaved like a normal Enter key press instead of a no-op like in APL+Win

Typed input prior to the ready state of a new session incorrectly displayed

When a new APL64 Developer GUI instance is being initialized, user typed input was partially displayed in the classic history pane and the command line.

APL64 Virtual Keyboard user-selected location not saved between APL654 GUI instances

Lengthy tooltips removed from history pane and command line

The Ctrl+F3 shortcut did not work for a selection

Find/Replace Tool

Found text highlighting incorrect in function editor after modifying 'text to find'

Replace tool reverted to Find tool after "Resume the search from the starting point?"

Permitted a multiline selection to be inserted and searched in the Find/Replace tool

*Typo (the **t** in Wildcar**t**) in the tooltip in the Plain Text button in the Find tool*

Single Undo button action not working

Find/Replace dialog Resize Cursor Not restored

When modifying the width of the find/replace tool window, the double-ended horizontal arrow cursor is not properly restored when the mouse pointer is not on the grip control.

The focus didn't appear in APL64 after closing the Autosaved Records Exist dialog

APL64 Interpreter Bug Fixes

Fixed unexpected result when catenating the integer value to ⎕UCS

⎕SPLIT ¨ (2 3 ⍴'A') (0 3⍴'') exception: SYSTEM ERROR:Aval.Categorize…

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⎕WCALL 'WaitMessage' utilized too much Windows CPU processing

Orphan APLNow32 processes

Orphan APLNow32 processes appeared in the Windows Task Manager after exiting APL64 with active ⎕wi forms opened

⎕WORDREPL didn’t work in)evlevel 1

Reduction operation exception: SYSTEM ERROR: Aval.Categorize…

The empty compression example, A←0 2⍴'' ⋄ ⍴A[;1]/A[;2], returned DOMAIN ERROR

⎕TYPE of an integer vector incorrectly returned 1's due to corrupted data in the variable

Incorrect exception message: ⎕WI OBJECT ERROR: Current object undefined

⎕DL didn’t allow ⎕WI events to fire like it did in APL+Win

System Error when execution was suspended

Execution was suspended during a For loop, saved in a workspace and the workspace was loaded. A System Error occurred when function execution was resumed.

APL64 was unresponsive when running the function foo defined as: ⎕def 'foo' 'in ∇foo'

Extraneous asterisks were reported in the output for ⎕SI

)SAVE and ⎕save commands with a library number

Executing the)SAVE or ⎕save commands with a library number sometimes didn’t include the library number in the reported ⎕WSID or APL64 session's caption

2⍟/2 4 erroneously returned SYSTEM ERROR:unknown scex code SXfffLog

Prevent silently exiting when unrecoverable System Errors were detected

APL64 now will remain running and attempt to report these failures in the Windows Event Viewer.

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APL64 may not start with the latest McAfee Total Protection antivirus program

The antivirus program falsely detected the file, APL64.dll, a threat and quarantined it, preventing APL64 from starting.

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