

Integrating HTMLRenderer in Win32 UI



Done!

```
'h'␣wc'HTMLRenderer' ('URL' 'c:\myapp\index.html')
```

Just kidding! You just discovered the second half of your career.



Disclaimer!

(Verbal)



Why HTMLRenderer?

really too many reasons to list...

CefSharp did not work :D

CEF - Chromium Embedded Framework

☐ WC integration with existing Win32 controls

☐ JSON provides for easy I/O

HTML5 - CSS3 - JS (the triad)

Modern UI/UX features scaling, responsiveness and touch.



Why HTMLRenderer?

really too many reasons to list...

Countless libraries, development tools and most important, developers

UI is very error tolerant

PDF Document Generation from single well structured HTML source

Web Components

```
<norbert-is-a-genius>  
      
</norbert-is-a-genius>
```

Futureproof - Write your desktop GUI as if it is running on a web server!



What took so long?

Stability

- Interpreter crashes were common in testing

Missing features
DoPopup

- No request method: GET, PUT, PATCH, ExecuteJavaScript,

Acceptance

- It's hard to give up control

Apprehension

- Old dogs can learn new tricks. I mentioned the **triad** (H5/CSS3/JS)

APL Framework
management

- Develop form handling, internal serialization and I/O

Data Structures
files!

- Move from binary storage to JSON - We were unable to save

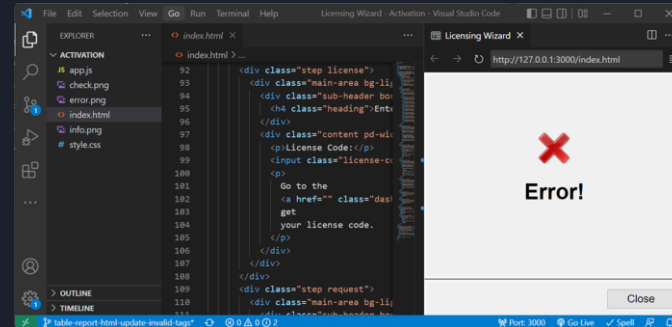
HTML5 -JS - CSS

- Rich interactive applications require a new set of skills.
Learn to think asynchronously in your UI

interactions.

Tooling

- VS Code
 - Supported by Windows, Unix and Mac
 - Online version
 - Plugins!
 - Live Server
 - Code Autocomplete
 - Chrome/Edge Dev tools
 - Linters
 - Spell Checkers
 - Git
 - Docker
 - Etc... Etc... Etc...
- External Resources
 - Developers





PDF and Document Generation

Single Source Printing

HTML for on screen display

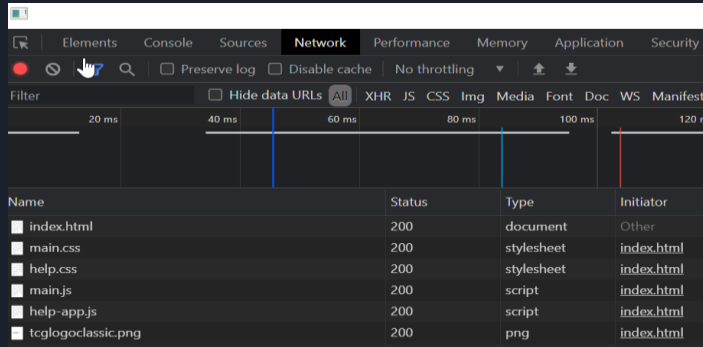
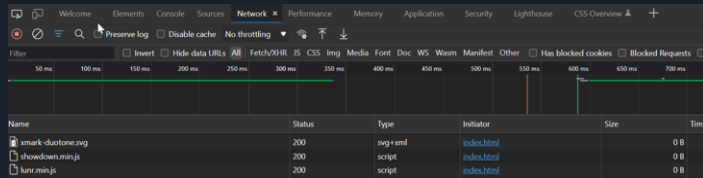
- Responsive (adjusts to your device)
- Portable

PDF is for documents

- Generate PDFs from well structured HTML source with print specific CSS
- Browser native printing lacks full support of CSS print specifications
- Third-part library (commercial) - full print media CSS support including headers, footers and page numbers.

Debug Tools

Common UI for Chrome, Edge and HTMLRenderer Developer Tools





Integration Considerations

- No developer upgradeability
- Large distribution package
 - ~150MB added
- Clipboard integration
 - document.execCommand
- HTMLRenderer crashes tend to crash the interpreter
- Can't mix protocols file:// | http(s)://
- UI threading
 - Don't run UI in the main thread
- DOM Size
 - Data Tables use virtual scrolling
- Web Sockets
 - Roll your own protocol
- Images
 - Move to SVG



Use Cases

PDF Viewer Considerations

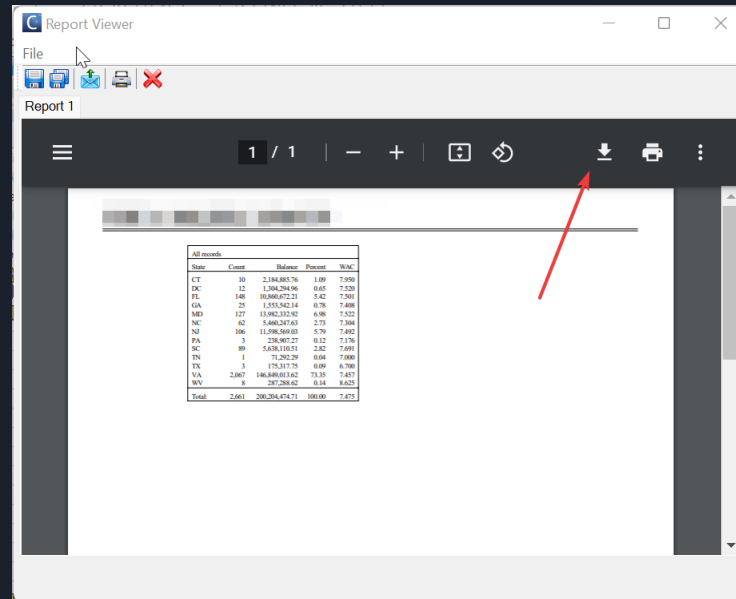
Download button

- Does not work if content loaded with file:// scheme
- Fires HTTPRequest event without context.

GET: http://dyalog_root/

Title

- Filename from file://
 - Looks bad for with funky temp names.



User Case - Splashscreen

SVG

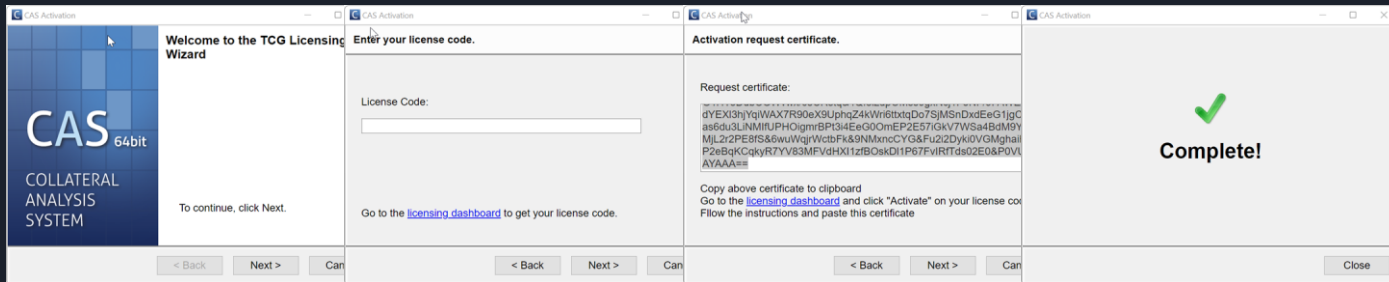
Scaling

CEF Startup



Use Case - Activation Wizard

- Solved DPI scaling issues of previous .NET 2 Wizard Control
- Forced to learn how to document an API
- Generate test data structures
- Application provides REST API
 - Outsourced developer
 - Self Contained



Use Case - Application Help

Single Source Publishing

- Markdown
- JSON
- Open source tools
- Printing

The collage illustrates the Single Source Publishing workflow for CAS Help:

- Source Files:** A screenshot of a GitHub repository showing the `github-action-help-builder` directory. It lists files like `images`, `Data Dictionary.html`, `Data Dictionary.md`, `Data Reference.html`, and `Data Reference.md`.
- Raw HTML Output:** A screenshot of the raw HTML file generated from the source files, showing the content of the help page, including the welcome message and links to the help archive and contact support.
- Web Browser View:** A screenshot of the rendered help page in a web browser, showing the Carlisle Group logo, a search bar, and the main content area with the welcome message and links to the help archive and contact support.
- Printed Document:** A screenshot of the help page as it would appear when printed, showing the layout, margins, and a print button.

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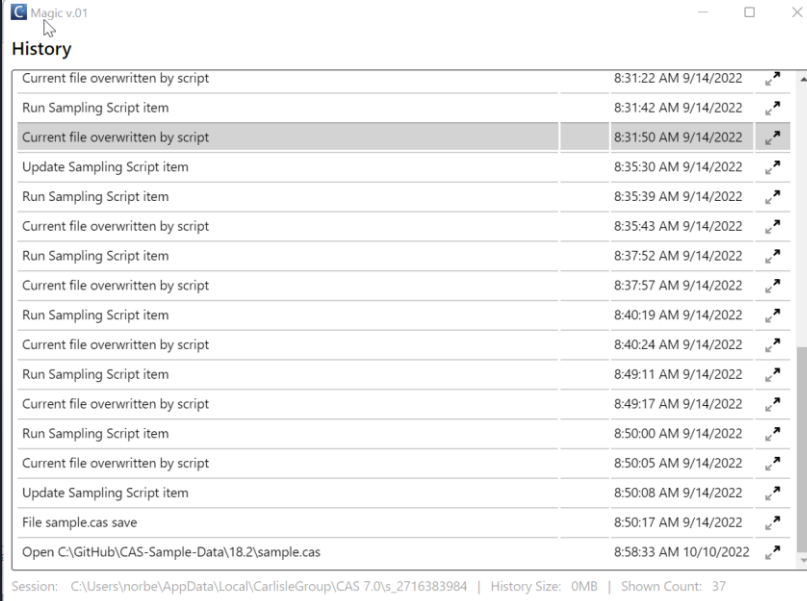
Use Case - Audit Log

Single Source

- Desktop
 - HTMLRenderer
- Windows Service
 - Browser Request

Simplicity

- HTML UI timer polls main application for changes
- Single UI displays event details and historical reports.



The screenshot shows a window titled "Magic v.01" with a "History" tab. It contains a table of events with columns for the event description, timestamp, and an icon. The events are listed in chronological order, with the most recent at the top. The table is scrollable, and a status bar at the bottom provides session and history information.

Event Description	Timestamp	Icon
Current file overwritten by script	8:31:22 AM 9/14/2022	🔗
Run Sampling Script item	8:31:42 AM 9/14/2022	🔗
Current file overwritten by script	8:31:50 AM 9/14/2022	🔗
Update Sampling Script item	8:35:30 AM 9/14/2022	🔗
Run Sampling Script item	8:35:39 AM 9/14/2022	🔗
Current file overwritten by script	8:35:43 AM 9/14/2022	🔗
Run Sampling Script item	8:37:52 AM 9/14/2022	🔗
Current file overwritten by script	8:37:57 AM 9/14/2022	🔗
Run Sampling Script item	8:40:19 AM 9/14/2022	🔗
Current file overwritten by script	8:40:24 AM 9/14/2022	🔗
Run Sampling Script item	8:49:11 AM 9/14/2022	🔗
Current file overwritten by script	8:49:17 AM 9/14/2022	🔗
Run Sampling Script item	8:50:00 AM 9/14/2022	🔗
Current file overwritten by script	8:50:05 AM 9/14/2022	🔗
Update Sampling Script item	8:50:08 AM 9/14/2022	🔗
File sample.cas save	8:50:17 AM 9/14/2022	🔗
Open C:\GitHub\CAS-Sample-Data\18.2\sample.cas	8:58:33 AM 10/10/2022	🔗

Session: C:\Users\Inorbe\AppData\Local\CarlisleGroup\CAS 7.0\s_2716383984 | History Size: 0MB | Shown Count: 37

Use Case - Data View

Threading Gotcha!

Form hosts HTMLRenderer

Not easy to get content of HTMLRenderer

when switching windows

HttpRequest and WebSocketReceive blocked
from processing

JS framework data binding does a PUT on every
change. Host always has latest data.

The screenshot shows a web application window titled "View". On the left is a tree view with the following items: CAS File, Selection Criteria, View, Calculations, Drill-Down, Reports and Programs, System Folders, Deleted Items, CAS Items, and Script Samples. The main area contains several sections:

- Standard**: A row of buttons: "Entire File", "By Value", "First ...", and a text input field containing "10".
- Custom**: A section with a "Selection" dropdown set to "Global" and a text input field containing "first 10".
- Field List**: A section with "Select Fields" and "Run" buttons, and a checkbox "Show stats on select" which is checked.
- Table**: A grid of buttons representing data fields. The buttons are arranged in 5 rows and 10 columns. The fields include: LOANID, POOL, NAME, ADDRESS, CITY, STATE, ZIP, COUNTY, GRADE, OWN, LOANPURP, PROPTYPE, PMICCODE, LOANTYPE, RATETYPE, AMTYPE, UNITS, ORIGTERM, LTV, CLTV, ORIGDATE, FPDATE, MTDATE, ORIGBAL, RATE, PANDI, CURBAL, PTDATE, RTERM, AGE, SFEE, DELQ, PAYHIST, APPVAL, INDEX, ORAT, RFREQ, PFREQ, FRADATE, NRADATE, NPADATE, MARGIN, PERCAP, LIFECAP, F, NEGAM, NEGAMCAP, PAYCAP, ASOFDATE, INDEXCODE, FNMAAGE, BALLOON, PMILEVEL, PROGRAM, SPRICE, FICO1, FICO2, FICO3, DTI, and STATE1. The "COUNTY" and "STATE1" buttons are highlighted in red.
- Footer**: A section with icons for a pencil, a text input field, and a menu icon. Below this, it says "Field Details: FICO3".



My thoughts and observations



- Not user upgradable
 - Seems to be getting fixed
- Windows Update can remove mandatory installation files
 - No evidence caused by Windows Defender
 - Something we're still investigating but have seen this in more than one instance now.
- Threading - Not really a bug but Dyalog can make this easier
 - Main thread DQ prevents event callbacks from being processed. XMLHttpRequest, WebSocketReceive, etc
- Windows use WebView2
 - Skip the 150mb of extra files.
- Authentication
- Authorization
- Terminology Grid => Datatable in JS

<= These are not the same thing!



New Development

```
'h'␣wc'HTMLRenderer' ('URL' 'c:\myapp\index.html')
```



New Development

```
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```



Web Server

Jarvis | Rumba |

Your own because you're an APL
developer and couldn't help but to reinvent the
wheel (again).



New Development

Web Server
Jarvis | Rumba |
Your own because you're an APL
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wheel (again).

Why you ask?

- Separation of UI and Business Logic
- Testing... much easier testing an API (tools!)
- Easier to scale resources
- Cloud, Docker, Serverless, VM, Lambda
- UI/UX LIBRARIES!
- Native browser Responsiveness (PC, Phone, Tablet,... TV)

[HTML Responsive Web Design \(w3schools.com\)](https://www.w3schools.com/html/html_responsive.php)

“Responsive web design is about creating web pages that look good on all devices!

A responsive web design will automatically adjust for different screen sizes and viewports.”



Demo!