

The background of the image is a wide-angle photograph of a mountainous landscape. In the foreground, there are several green, densely forested hills. On the right side, a tall, thin power line tower stands on a hill, with multiple wires extending across the scene. The mountains in the background are layered and appear misty or hazy, creating a sense of depth. The overall color palette is dominated by various shades of green and blue.

# SystemLink Overview

# SystemLink Targeted Outcomes

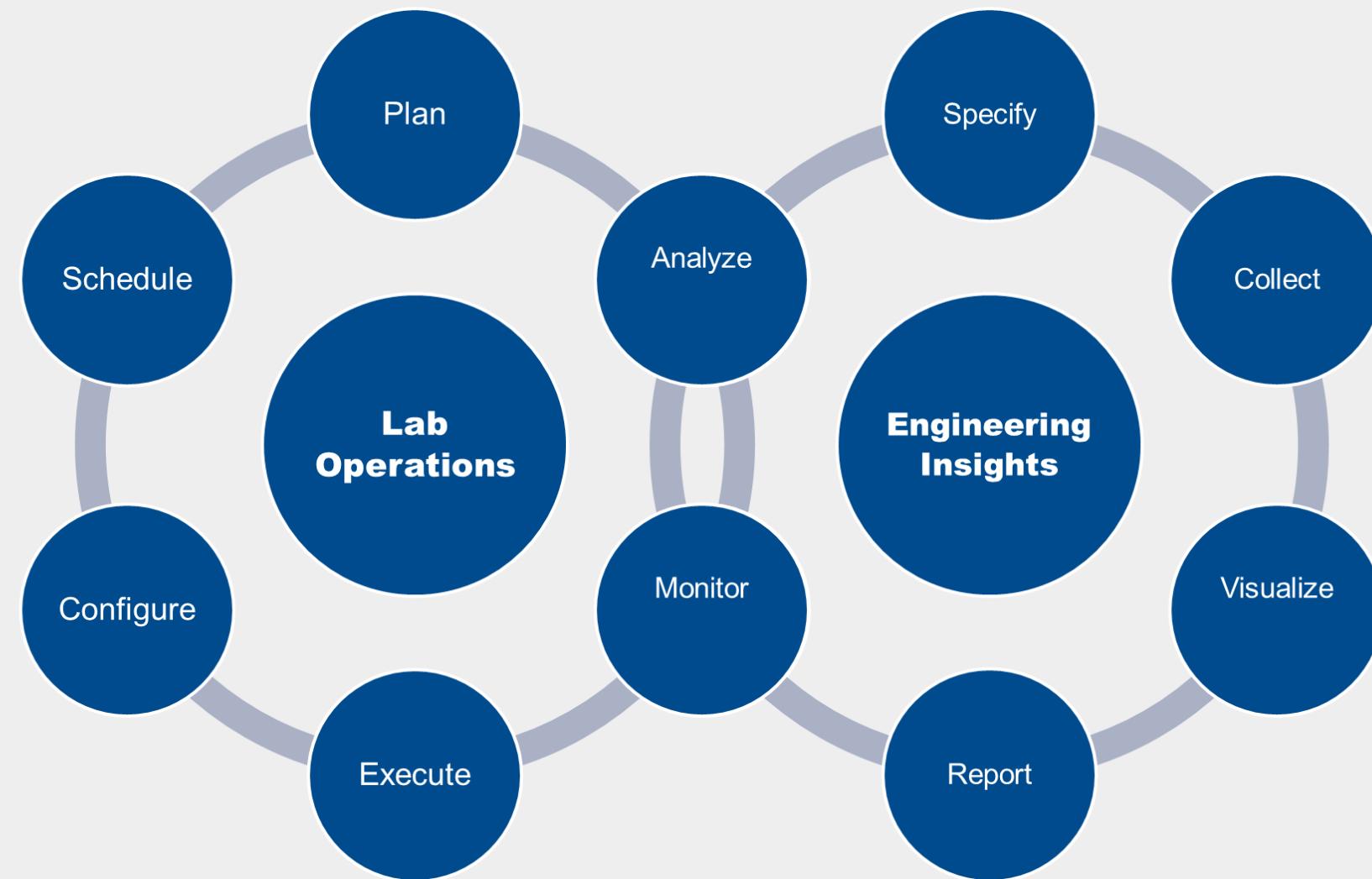
Streamline lab operations & amplify engineering insights

## Optimize Lab Operations

Coordinate and schedule test plans to increase lab throughput and increase the visibility for all stakeholders.

## Increase Lab Efficiency

Automate software deployment, track and manage assets/DUTs, and monitor system health to maximize asset utilization.



## Improve Test Coverage and Compliance

Elaborate product specifications, limits, and conditions. Link to test data to ensure product requirements are adequately tested and in compliance.

## Accelerate Product Insights

Monitor and analyze test results to quickly discover test and product issues and decrease design/test iteration time.

# SystemLink Architecture Fundamentals

## Standards-Based

Developed with industry-leading technologies, IP best practices

## Scalable

Megabytes to Petabytes of data from 1000s of data sources

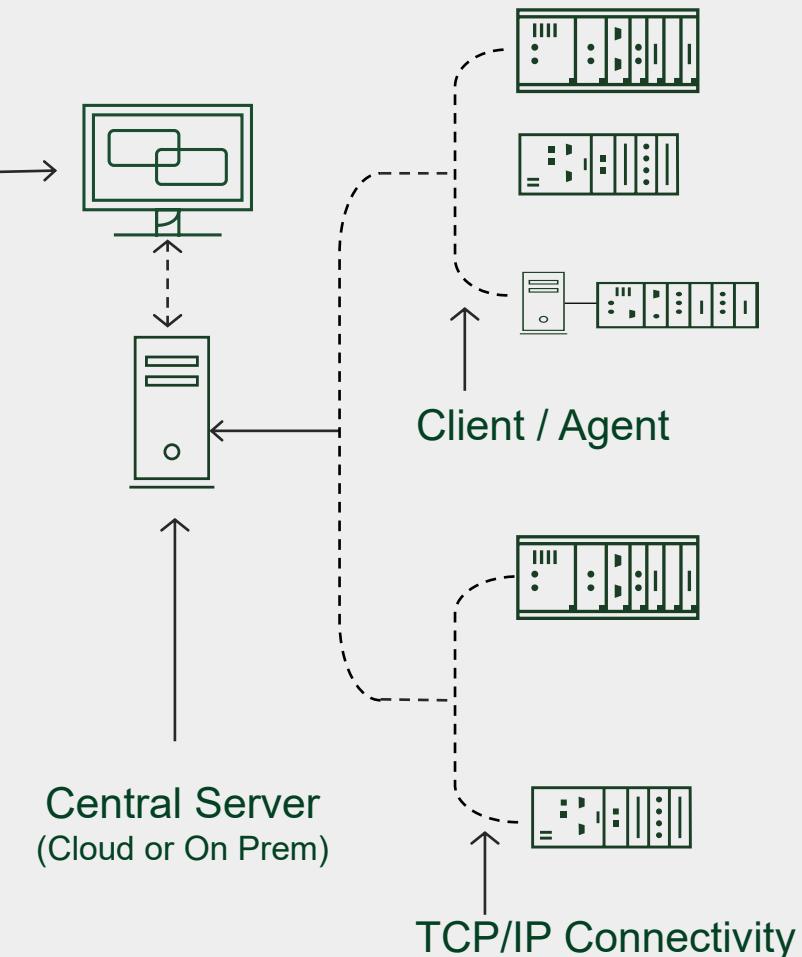
## Extensible

Config-based dashboards, plug-in applications, open APIs, partners

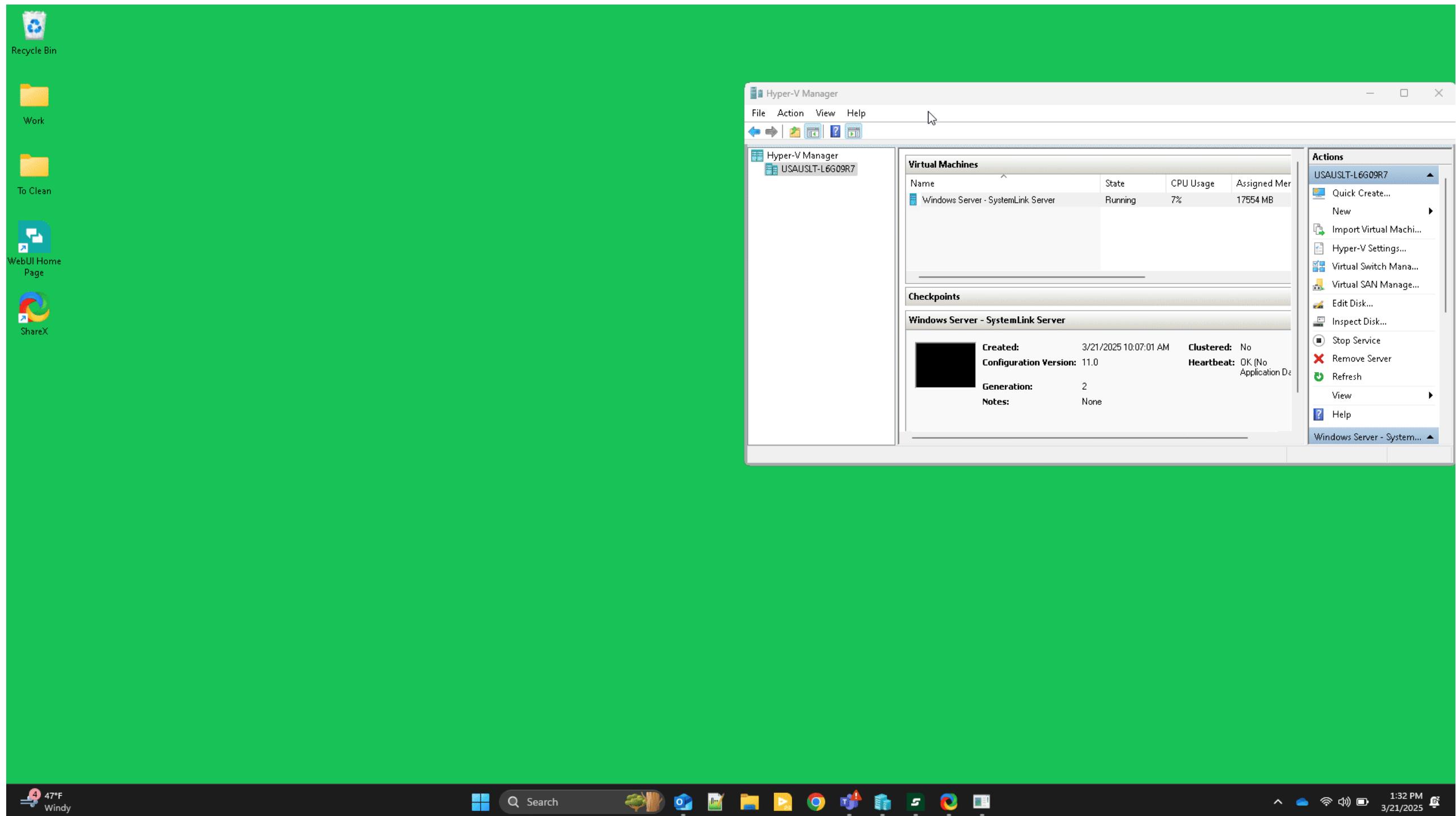
## Secure

HTTPS / TLS data encryption; authentication & access control

Systems							
75 Systems	19 Connected	52 Disconnected	4 Virtual	5 Pending			
Install software		Edit	Restart	Download	More	X 3 selected	
<b>Site matches Austin</b>							
NAME	MODEL	UTILIZATION	DISK	MEMORY	TEST STATUS	DASHBOARD	PENDING STATUS
Semiconductor Lab (1)	30D0S34J00	0 %	53.27 %	15.48 %			
Safety Lab (1)	Latitude 7420	0 %	50.67 %	62.48 %	Passed		
Battery Pack Lab (3)							
Battery Test Station 1	NI PXIe-8133 Embedded Control	17.87 %	67.16 %	36.13 %	Failed		
Battery Test Station 2	NI PXIe-8133 Embedded Control	2.8 %	70.12 %	68.54 %	Passed		
Battery Test Station 3	NI PXIe-8135 Embedded Control	96.68 %	34.31 %	79.67 %	Failed	Refreshing.	
RF Lab (1)							
PXIe-8880-031062CE	NI STS T1	0 %	60.09 %	50.16 %			
Crash Lab (1)							
Desktop 1	Precision 3630 Tower	0 %	52.18 %	39.28 %			
Battery Cell Lab (3)							
Battery Cell Station 1	NI cRIO-9042	0.08 %	40.01 %	20.45 %	Idle	Test Cell	
Battery Cell Station 2	NI cRIO-9042	0.02 %	40.26 %	20.77 %	Idle	Test Cell	
Battery Cell Station 3	NI cRIO-9042	0.43 %	39.92 %	20.68 %	Idle	Test Cell	

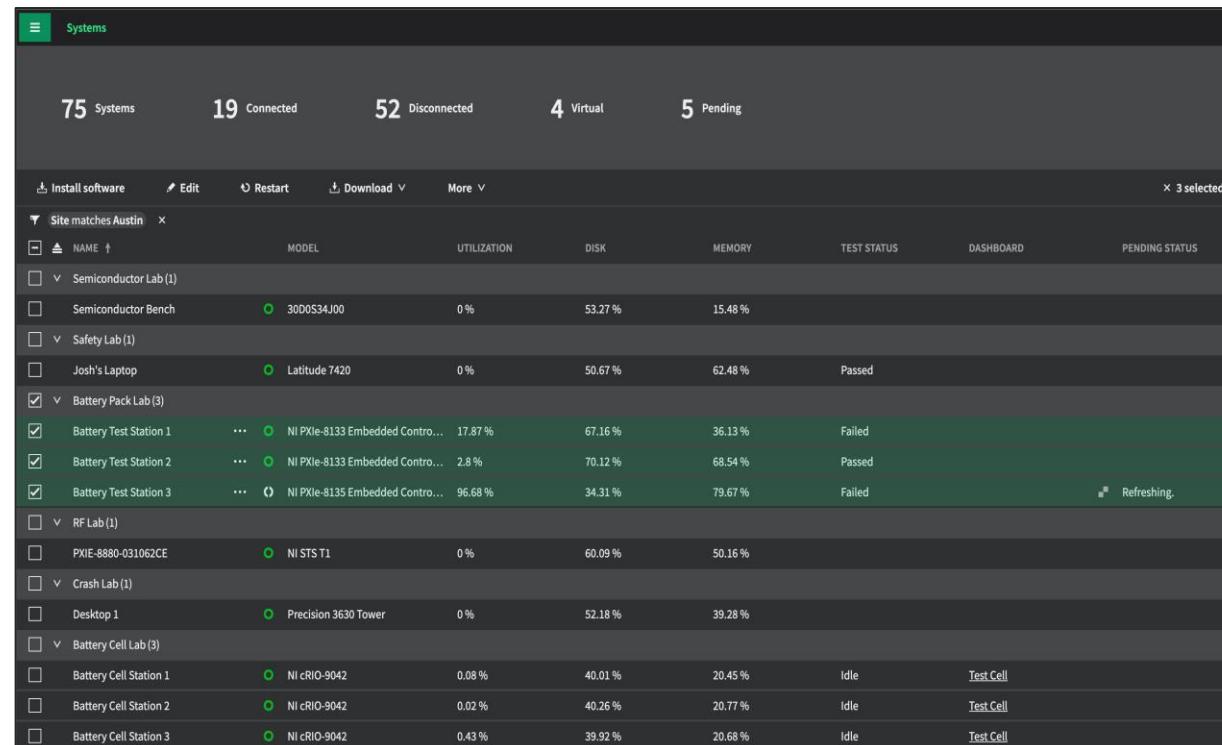


# Demo: Virtual Machine Server Setup

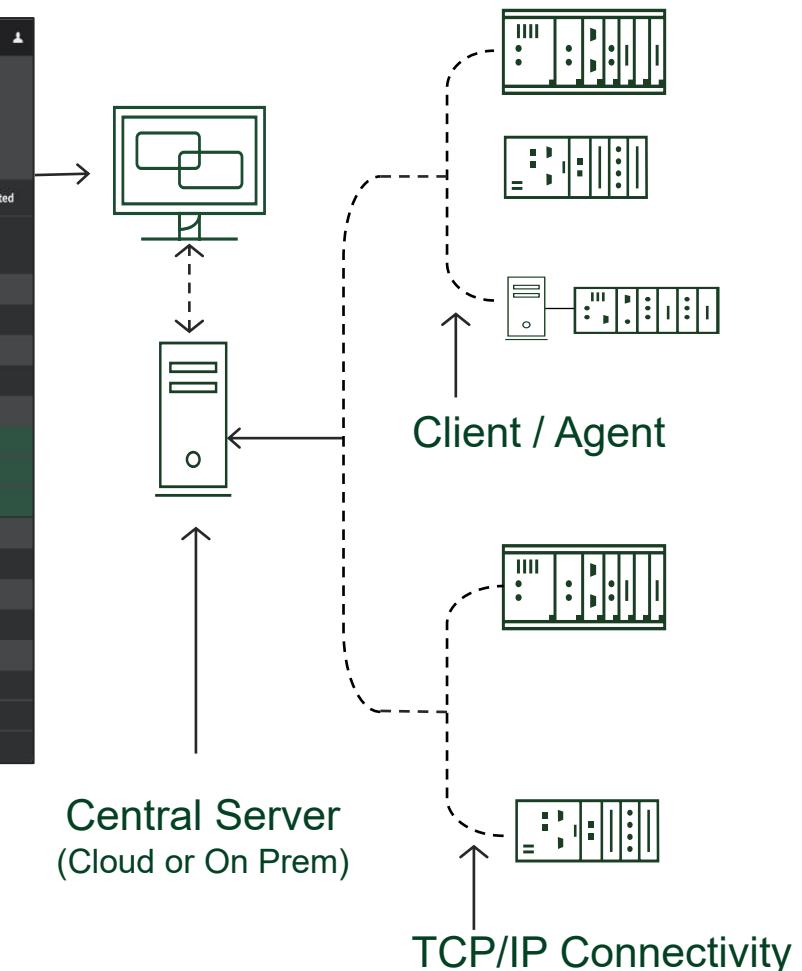


# Summary: Virtual Machine Server Setup

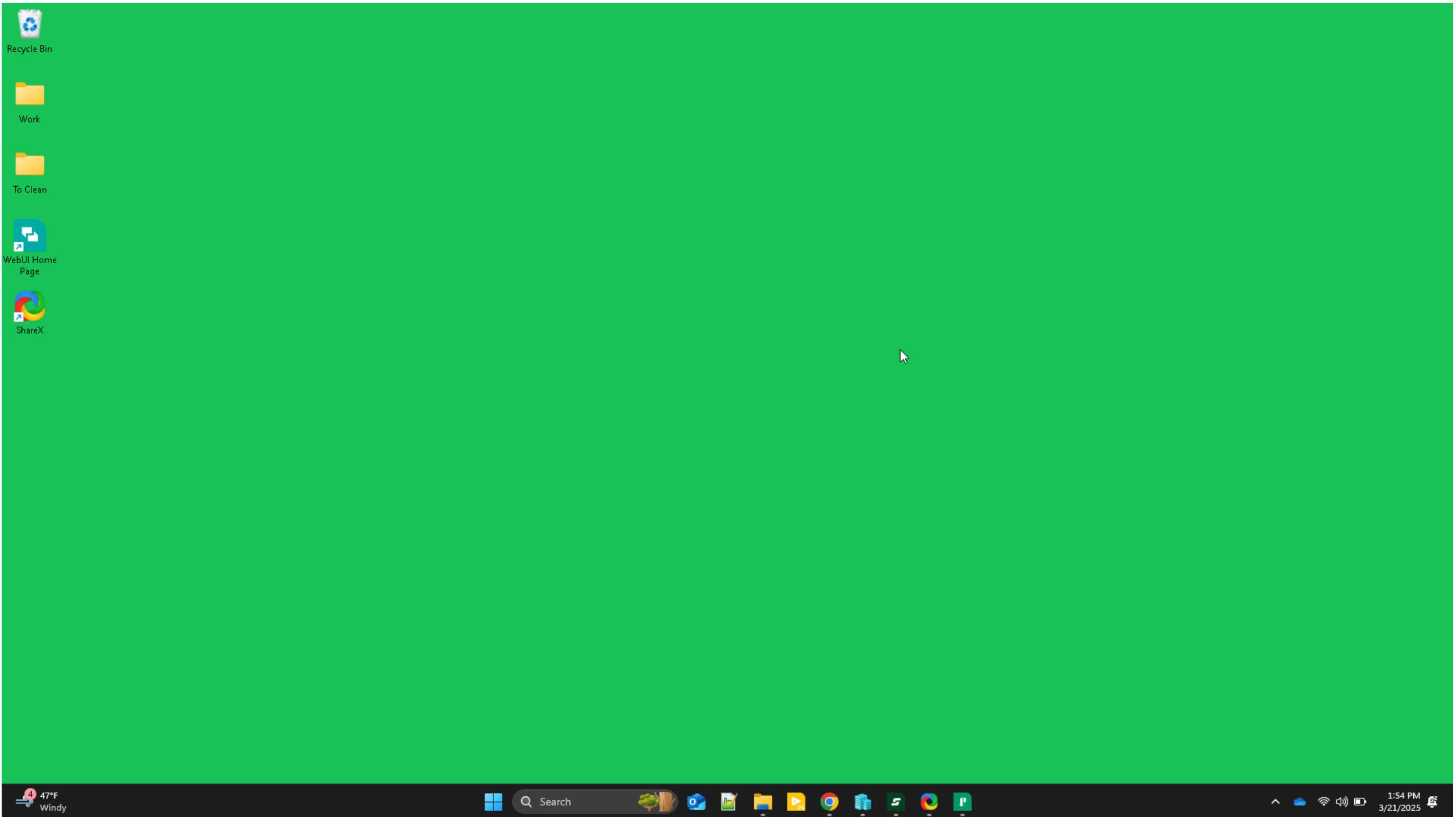
- SystemLink is hosted on a Server computer
- All interactions are Web-based
  - Native web pages
  - Native web APIs



Web Application

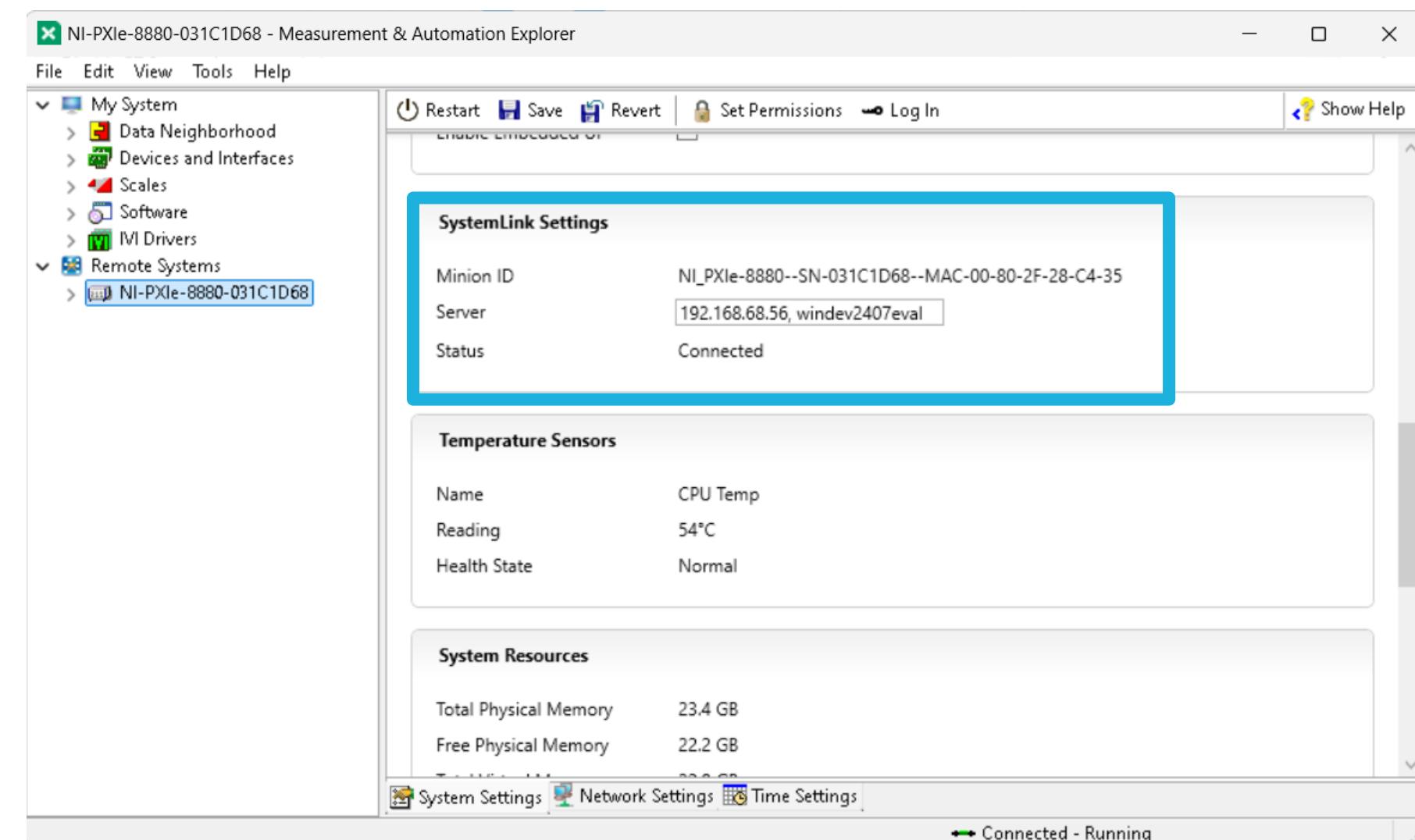
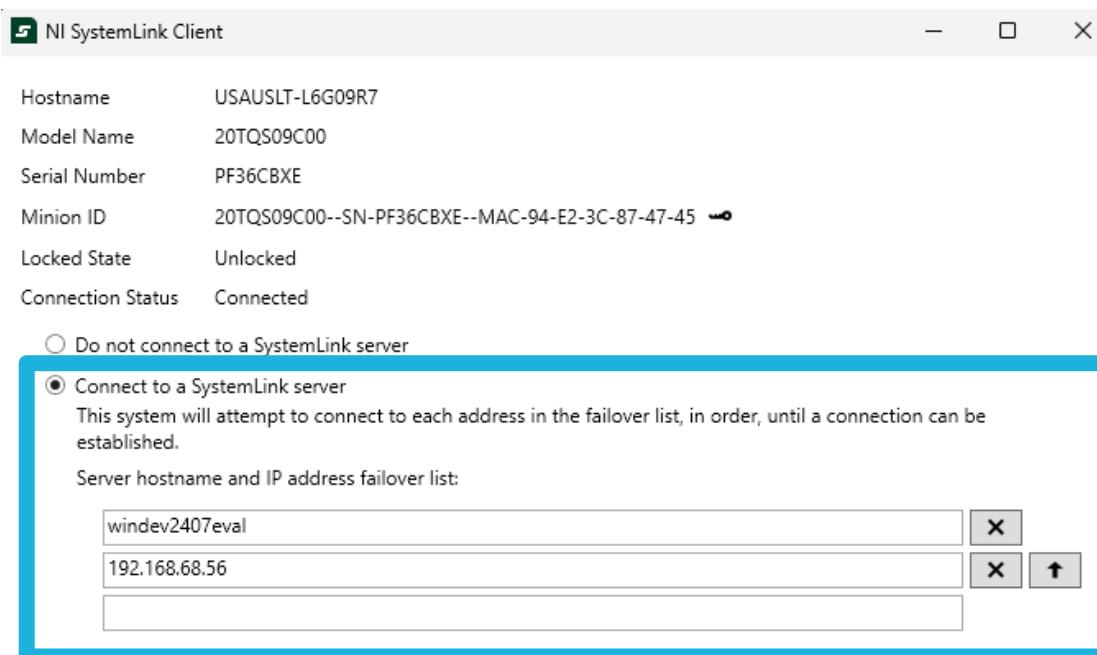


# Demo: SystemLink Client Setup



# Summary: SystemLink Client Setup

- Client install available for any Windows PC (open)
- Client supports multiple addresses
- NI RT systems come w/ client pre-installed
  - Enter server addresses in NI MAX



75 Systems

19 Connected

52 Discon

	NAME	MODEL	UTILIZATION
<input type="checkbox"/>	Semiconductor Lab (1)		
<input type="checkbox"/>	Semiconductor Bench	30D0S34J00	0 %
<input type="checkbox"/>	Safety Lab (1)		
<input type="checkbox"/>	Josh's Laptop	Latitude 7420	0 %
<input checked="" type="checkbox"/>	Battery Pack Lab (3)		
<input checked="" type="checkbox"/>	Battery Test Station 1	NI PXIe-8133 Embedd...	17.87 %
<input checked="" type="checkbox"/>	Battery Test Station 2	NI PXIe-8133 Embedd...	2.8 %
<input checked="" type="checkbox"/>	Battery Test Station 3	NI PXIe-8135 Embedd...	96.68 %
<input type="checkbox"/>	RF Lab (1)		
<input type="checkbox"/>	PXIe-8880-031062CE	NI STS T1	0 %
<input type="checkbox"/>	Crash Lab (1)		
<input type="checkbox"/>	Desktop 1	Precision 3630 Tower	0 %
<input type="checkbox"/>	Battery Cell Lab (3)		
<input type="checkbox"/>	Battery Cell Station 1	NI cRIO-9042	0.08 %
<input type="checkbox"/>	Battery Cell Station 2	NI cRIO-9042	0.02 %
<input type="checkbox"/>	Battery Cell Station 3	NI cRIO-9042	0.43 %
<input type="checkbox"/>	ADG (1)		
<input type="checkbox"/>	ateccgen2_host	NI PXIe-8880	

## Increase Lab Efficiency

- Mass deploy NI and test software for your entire fleet from a central web interface
- Monitor test systems and assets health with alarms and notifications as well as customizable dashboards
- Manage and track the assets calibration status, calibration history, and location history
- Track utilization for DUTs, assets, systems, and the entire lab

# Demo: Overview of Systems

NI SystemLink™

?



USERNAME

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PASSWORD

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Log in

## **Summary: Overview of Systems**

- View and manage any number of NI & third-party systems
- Systems contain:
  - Software
  - Tags
  - Alarms
  - Assets
  - Measurement Hardware
  - Files
- Software version management (including installation) through feeds and packages
- Tags enable live and historical data viewing

# Demo: Create & Subscribe to your own Software Feeds

Systems Management ?

Systems

2 systems    2 connected    0 disconnected    0 pending    0 discovered    2 alarms

Default

<input type="checkbox"/>	Name	IP address	Model	Serial number	Workspace	System start time	Pending status	☰
^ <b>Empty(2)</b>								
	USAUSLT-L6G09R7	● 192.168.68.61	20TQS09C00	PF36CBXE	Default	March 21, 2025		
	NI-PXIe-8880-031C1D68	● 192.168.68.54	NI PXIE-8880	031C1D68	Default	March 3, 2025		

## **Summary: Create & Subscribe to your own Software Feeds**

- Create package-based feeds
  - Packages can contain anything (third-party drivers, test files, etc)
- Create system subscriptions to feeds
- Install software to any number of NI & third-party systems
  - Including installing multiple softwares on multiple systems in one action

# Demo: Create State for System Duplication

Systems Management ? &

Systems

2 systems    2 connected    0 disconnected    0 pending    0 discovered    2 alarms

Default ▾  

<input type="checkbox"/>	Name	IP address	Model	Serial number	Workspace	System start time	Pending status	☰
Empty(2)								
	USAUSLT-L6G09R7	● 192.168.68.61	20TQS09C00	PF36CBXE	Default	March 21, 2025		
	NI-PXIe-8880-031C1D68	● 192.168.68.54	NI PXIe-8880	031C1D68	Default	March 3, 2025		

# Demo: Apply State for System Duplication

Systems Management ?

Systems

2 systems    2 connected    0 disconnected    0 pending    0 discovered    2 alarms

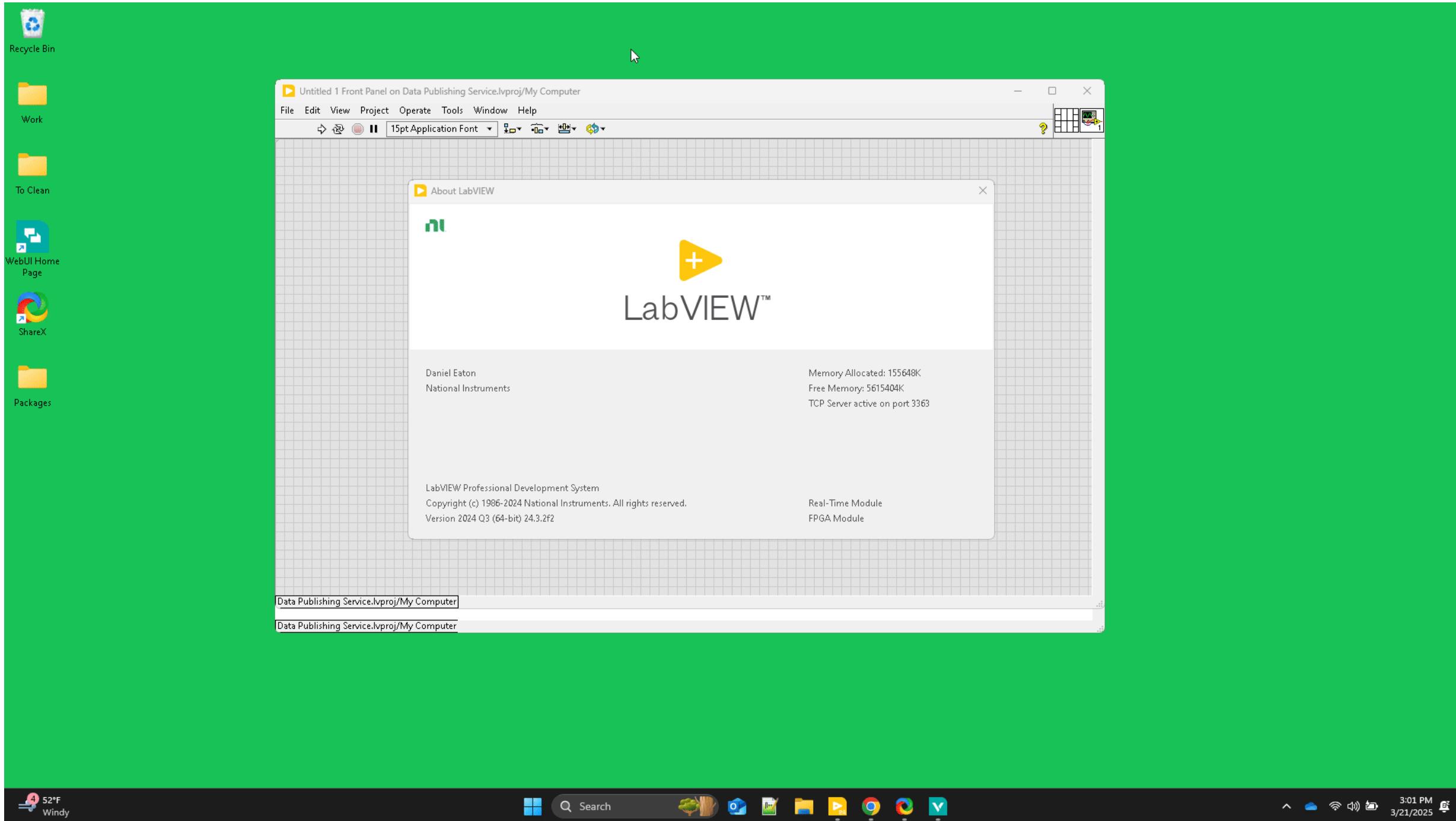
Default ▾

<input type="checkbox"/>	Name	IP address	Model	Serial number	Workspace	System start time	Pending status	☰
Empty (2)								
	USAUSLTL6G09R7	192.168.68.61	20TQS09C00	PF36CBXE	Default	March 21, 2025		
	NI-PXIe-8880-031C1D68	192.168.68.54	NI PXIe-8880	031C1D68	Default	March 3, 2025		

## **Summary: Create and Apply State for System Duplication**

- State is a versioned image / snapshot of a system
- Install on multiple systems in a single action
- Common example: Create “golden image” from a single RT target; install on multiple deployed systems

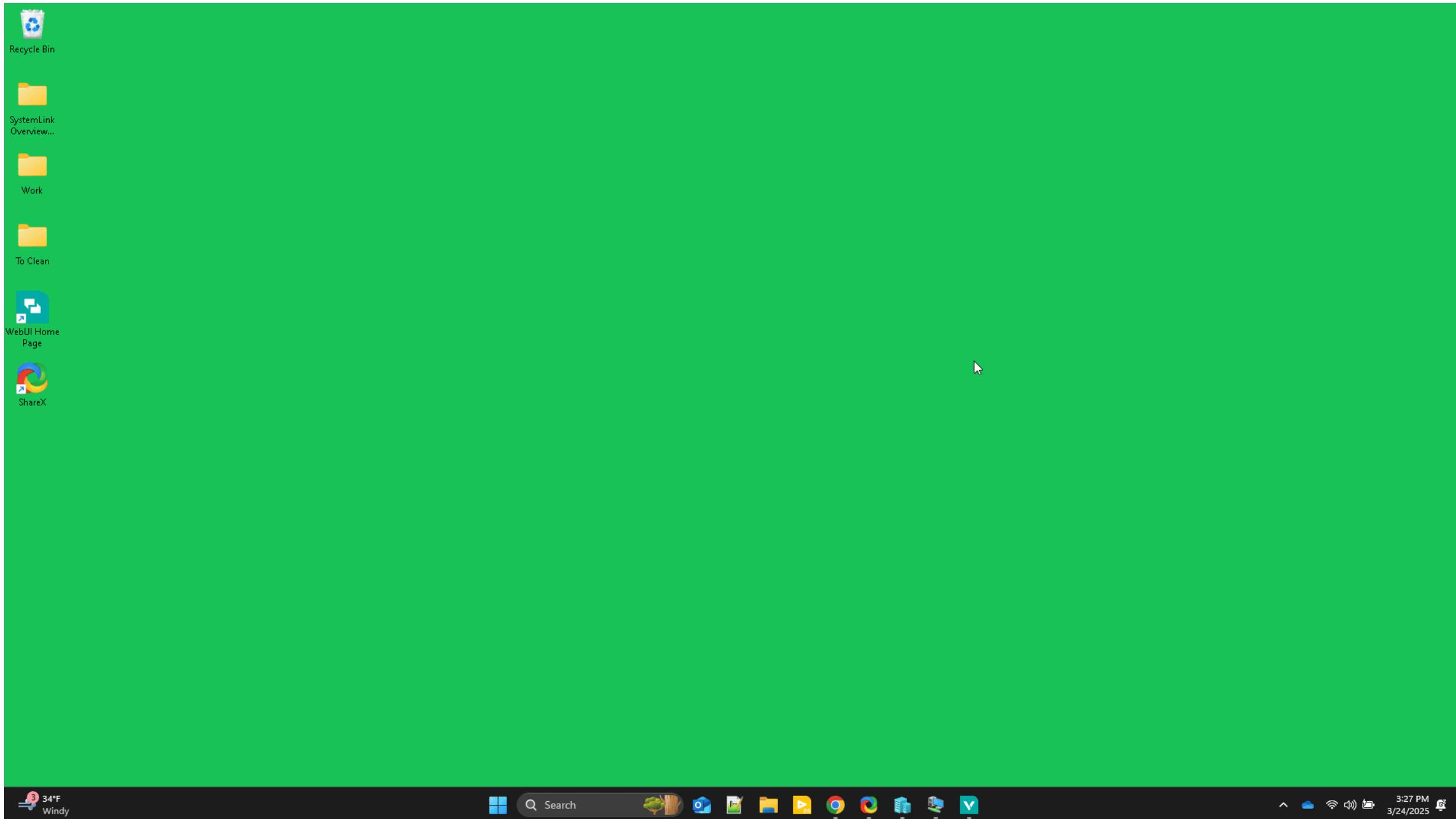
# Demo: Connecting Third-party Software



## **Summary: Connecting Third-party Software**

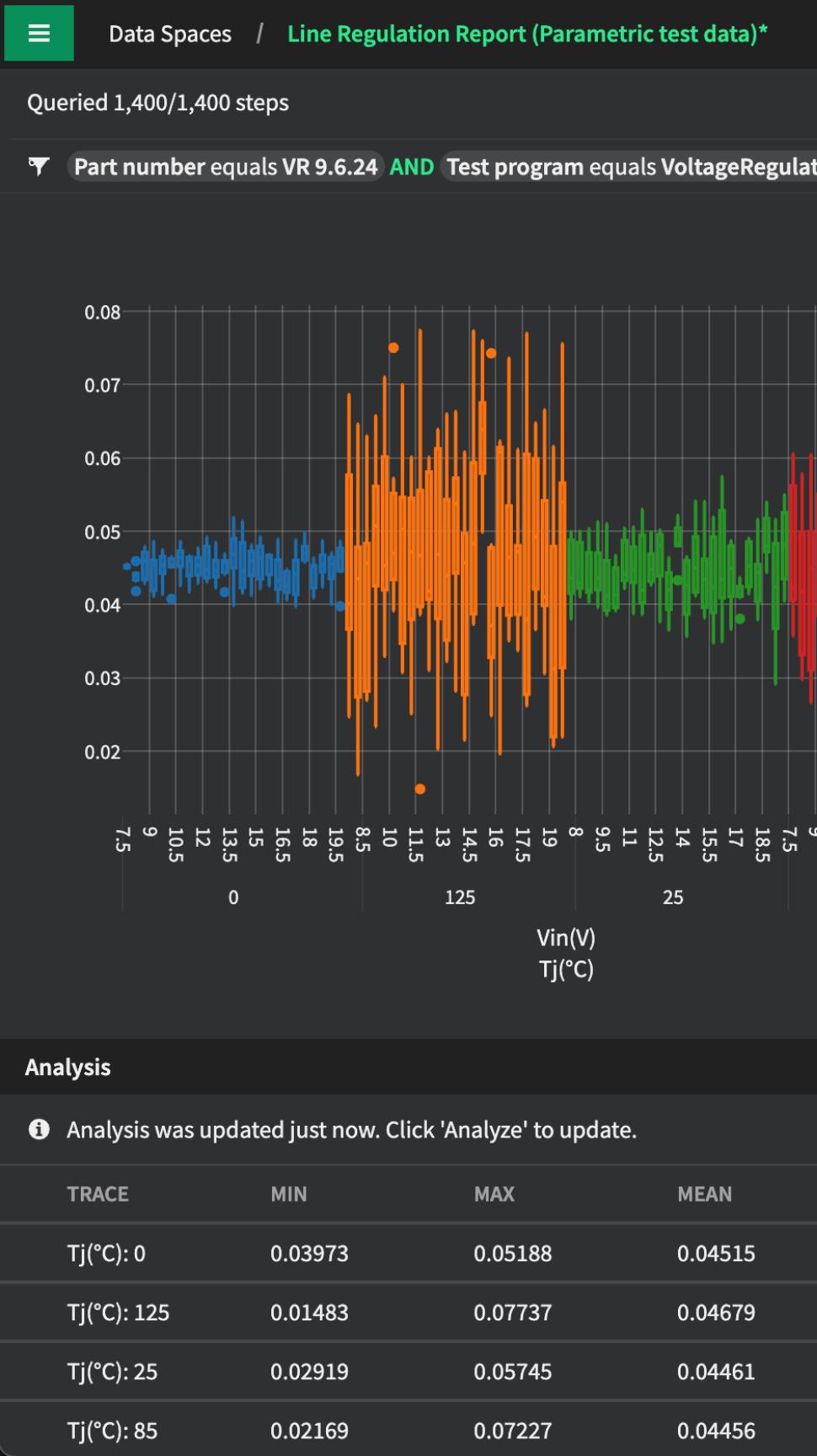
- Connect any software / system to SystemLink through APIs

# Demo: Custom WebGUIs



## **Summary: Custom WebGUIs**

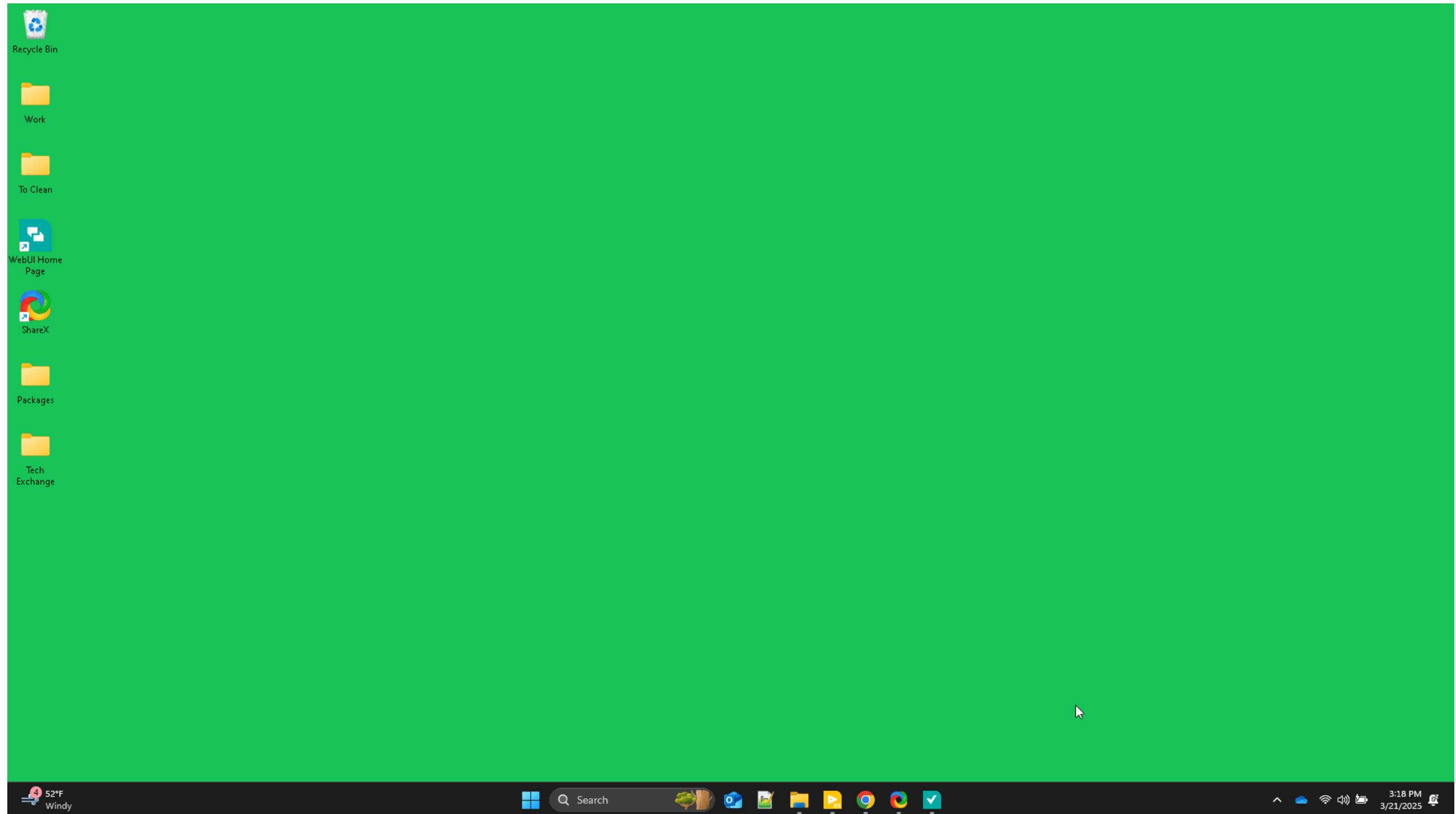
- Create web-based GUIs in webpage by linking to tags
- (Not Shown) In tool support for Grafana allows complex GUIs



## Accelerate Product Insights

- Collect, store and view test results, files, parametric and waveform data from LabVIEW, TestStand, FlexLogger and 3<sup>rd</sup> party test software
- Quickly search and filter data to analyze past results and gain additional insights
- View waveform and parametric measurement data from a web-based user interface
  - Plot and group measurement data across different conditions
  - View distributions using box and violin plots as well as histograms

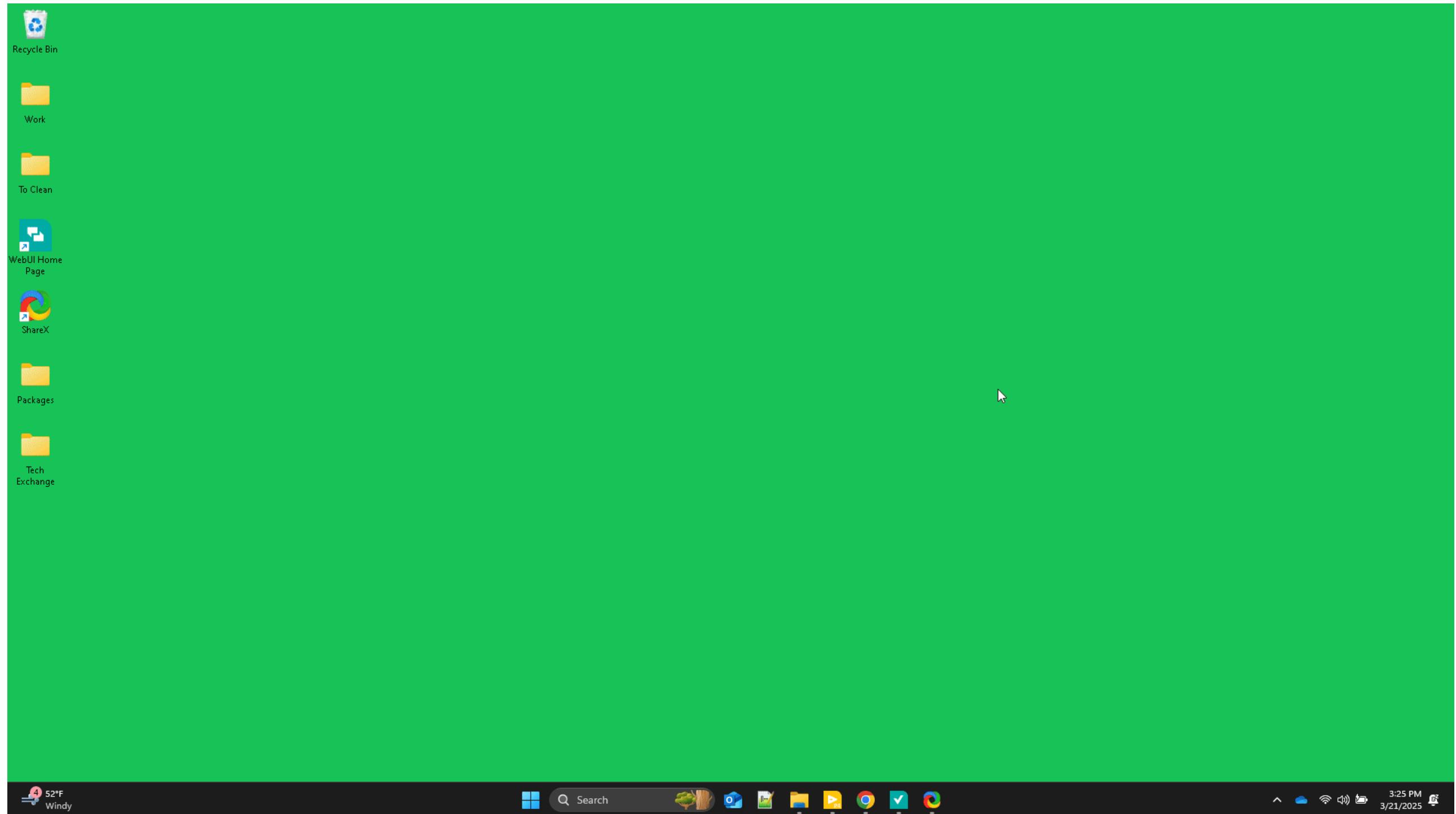
# Demo: Enable SystemLink TestMonitor in TestStand



## **Summary: Enable SystemLink TestMonitor in TestStand**

- SystemLink TestMonitor for TestStand includes:
  - Web-based test reports
  - Live step execution status
  - Automatically uploaded results and reports
  - TestStand functions for attaching files (including TDMS data file)
  - Basic analytics for querying results, yield, etc
- Enabled through a simple CheckBox

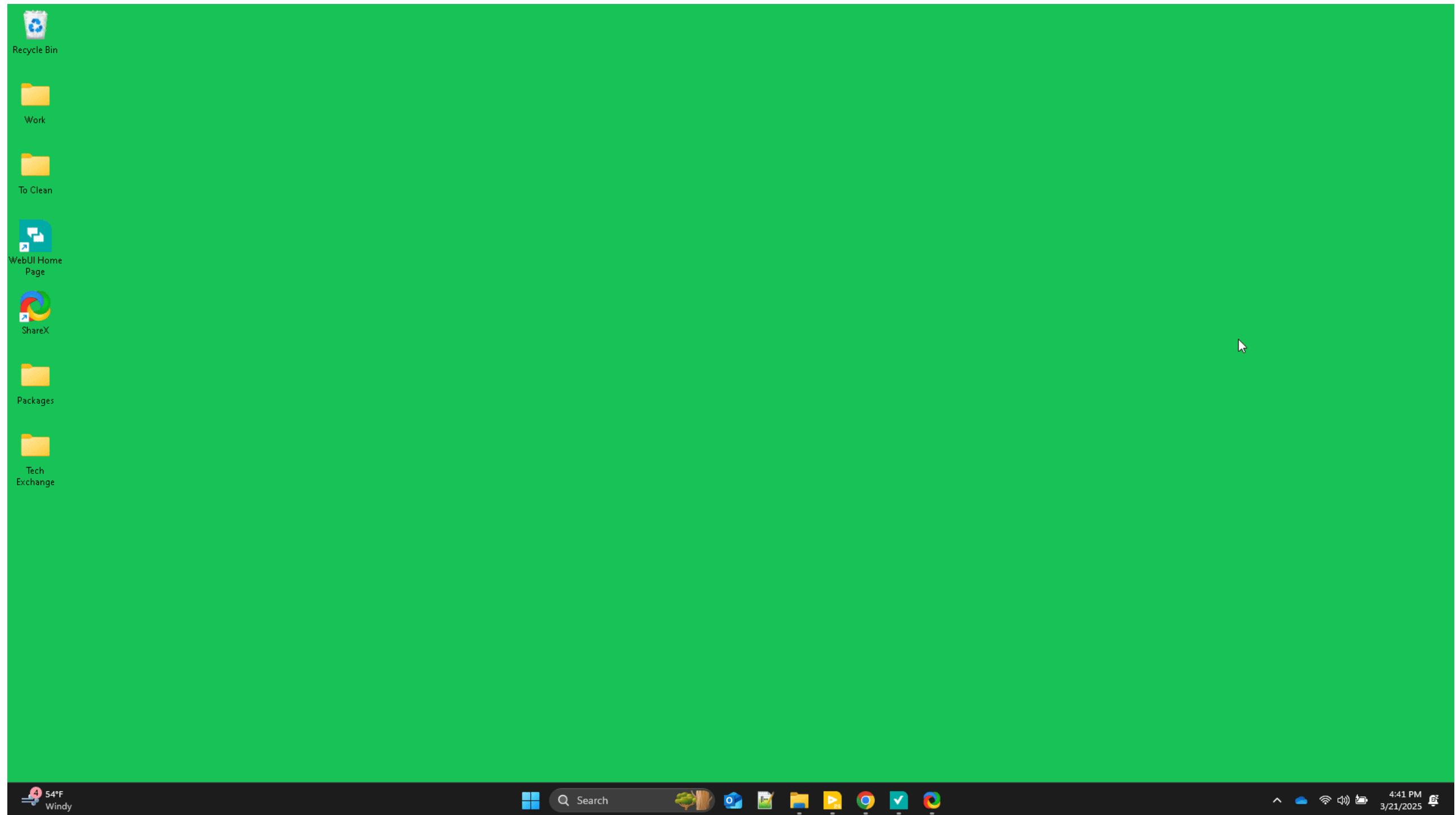
# Demo: Monitoring Automated Test from SystemLink



## **Summary: Monitoring Automated Test from SystemLink**

- SystemLink TestMonitor for TestStand includes:
  - Web-based test reports
  - Live step execution status
  - Automatically uploaded results and reports
  - TestStand functions for attaching files (including TDMS data file)
  - Basic analytics for querying results, yield, etc
- Support for third party automation and reports supported through APIs

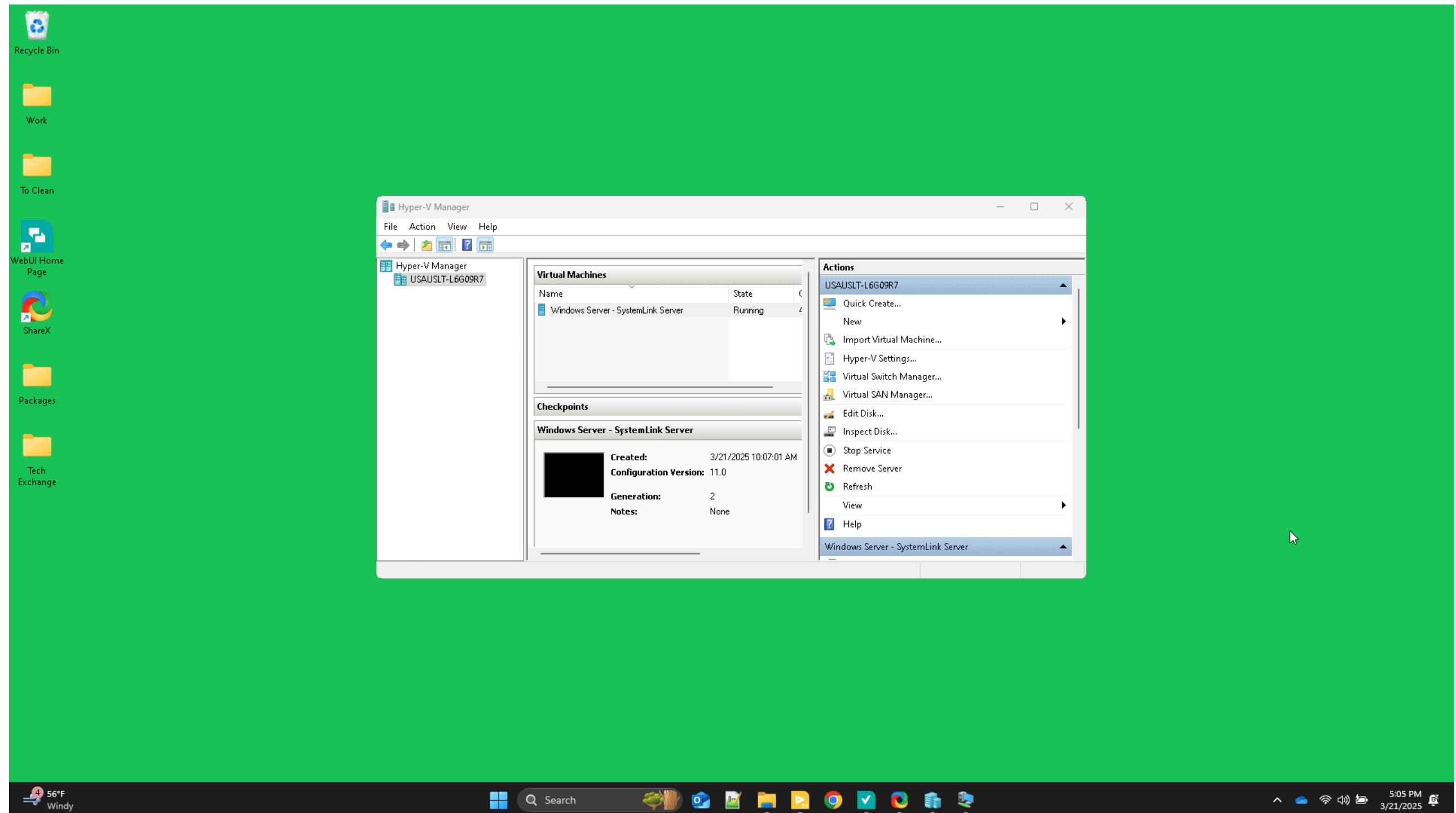
# Demo: Review Automated Test Data from SystemLink



## **Summary: Review Automated Test Data from SystemLink**

- Access all your test reports from anywhere
- View test data in the web page
- Download test results to your local machine for analysis
- (Not shown) In web analysis options are available as well
- (Not shown) Data can be ingested from any system / software (not just TestStand)

# Demo: Download Test Data and Process in Diadem



## **Summary: Download Test Data and Process in Diadem**

- Diadem allows:
  - Quick plotting for massive data sets
  - Data interrogation
  - Comprehensive analysis functions
  - Quick report building
  - Python based automated scripts / analysis
- (Not shown) In web analysis options are available as well

The screenshot displays a software application for managing laboratory operations. At the top, a navigation bar includes 'Products' and the specific product code 'CWUU 18650 (B0CG1KL3RC)'. Below this, a left sidebar lists 'Results', 'Files', 'Specs', 'Test Plans' (which is the active tab), and 'DUTs'. A 'Create test plan' button is located at the top of the main content area.

The main content area is titled 'Create test plan' and 'Select a test plan template'. It shows a list of available templates:

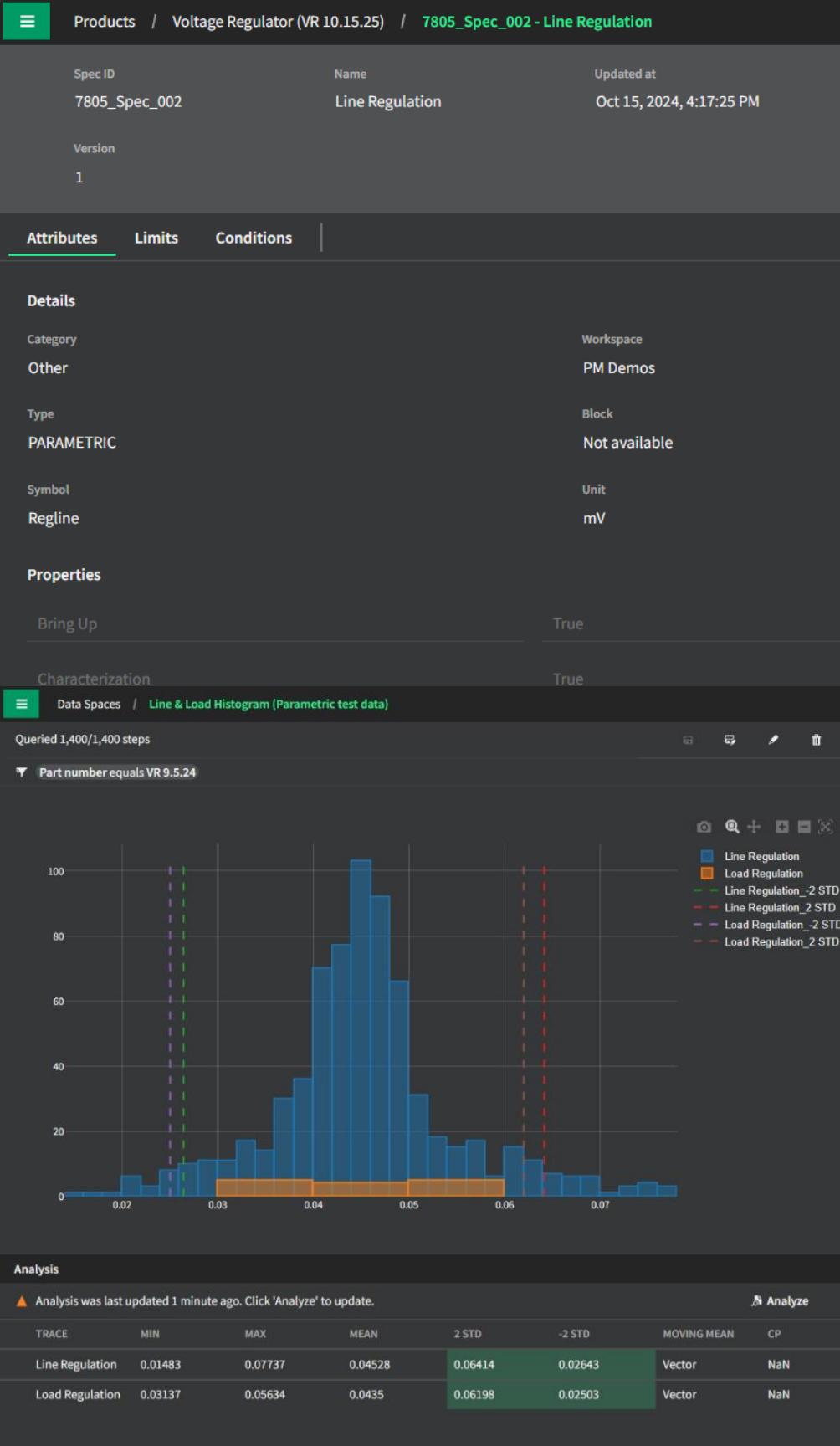
- > Blank Template (1)
- Characterization Tests (4)
  - 1067 Charge/discharge thermal test
  - 1069 Continuous current limitations
  - 1070 Energy efficiency test
  - 1068 OCV test
- Durability Tests (5)
  - 1063 Cycle test
  - 1066 Dynamic test cycle
  - 1065 Fast charge test
  - 1064 Life length test
  - 1062 Power test
- Functional (1)
  - 1044 Battery inspection

Below this, a section titled 'Showing 41 of 41 most recently updated test plans' lists various test entries, such as 'Power test', 'Battery inspection', and 'Energy efficiency test', each with a status (e.g., 'Scheduled', 'Pending', 'In progress') and a due date.

At the bottom, a 'Schedule' section shows a calendar for February 2025. It lists scheduled tests for four stations: 'Battery Cell Station 1', 'Battery Cell Station 2', 'Battery Cell Station 3', 'Battery Test Station 1', 'Battery Test Station 2', 'Battery Test Station 3', and 'Battery Test Station 4'. Each station has one or more tasks assigned to specific dates and times, such as 'Power test (860764)' on Feb 20 and 'Battery inspection (805...' on Feb 21.

# Optimize Lab Operations

- Plan and schedule systems, assets, and DUTs to be used for testing
- Define customizable test parameters and custom actions that can be integrated with both NI and 3<sup>rd</sup> party systems
- Define, manage, schedule, deploy, remotely start, and monitor tests
- Monitor test execution and measurements in real-time and get immediate updates as test result data is available



# Improve Test Coverage and Compliance

- Import and store product specifications in a central repository with a web UI
- Map specs to measurement data stored in SystemLink parametric and waveform stores.
- Compute compliance and coverage using Specifications + Test Data
  - Compliance: Did the product behavior match specifications?
  - Coverage: Did I test enough unique DUTs to be confident moving to production?
- Customize specification compliance statistics and measurement analysis