

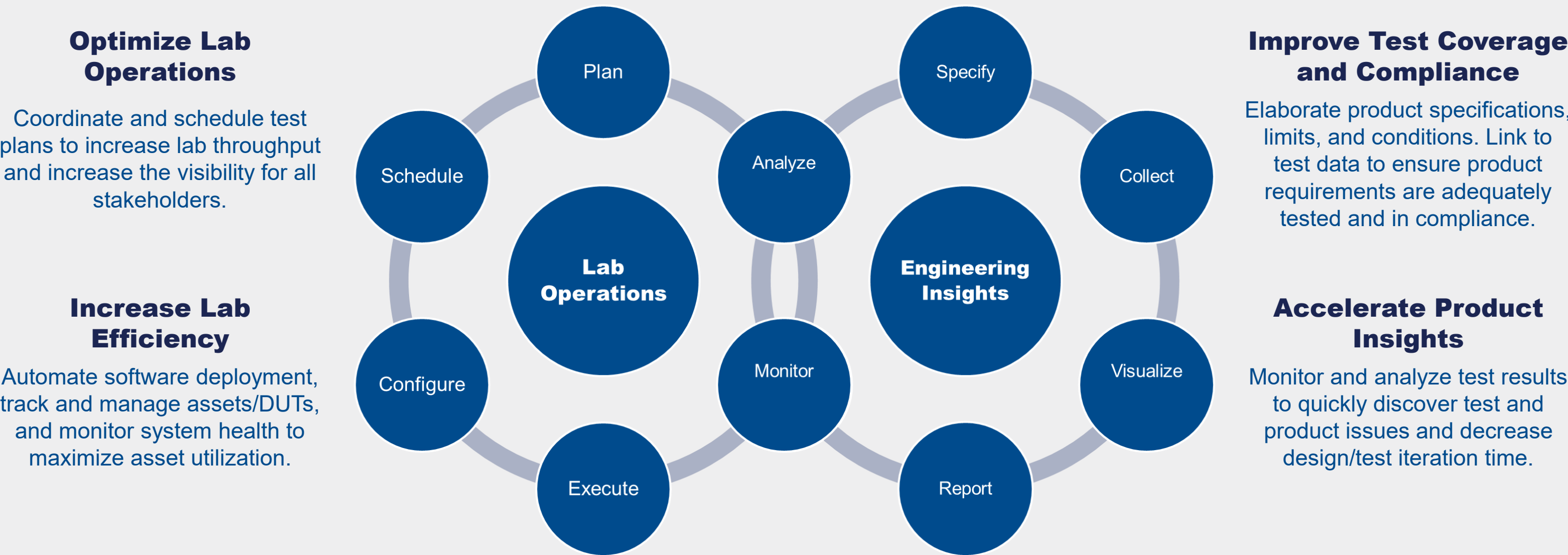


# **SystemLink Overview**



# SystemLink Targeted Outcomes

Streamline lab operations & amplify engineering insights



# SystemLink Architecture Fundamentals

## Standards-Based

Developed with industry-leading technologies, IP best practices

## Scalable

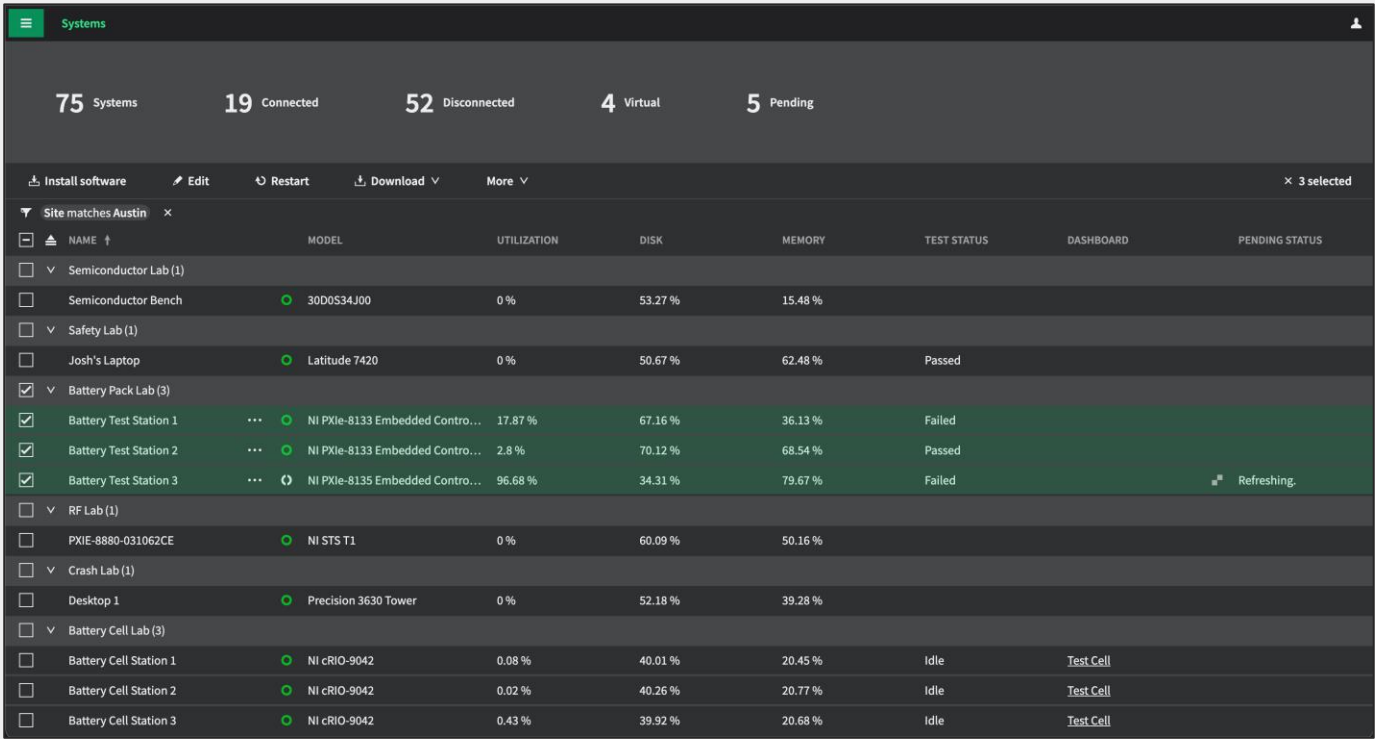
Megabytes to Petabytes of data from 1000s of data sources

## Extensible

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

## Secure

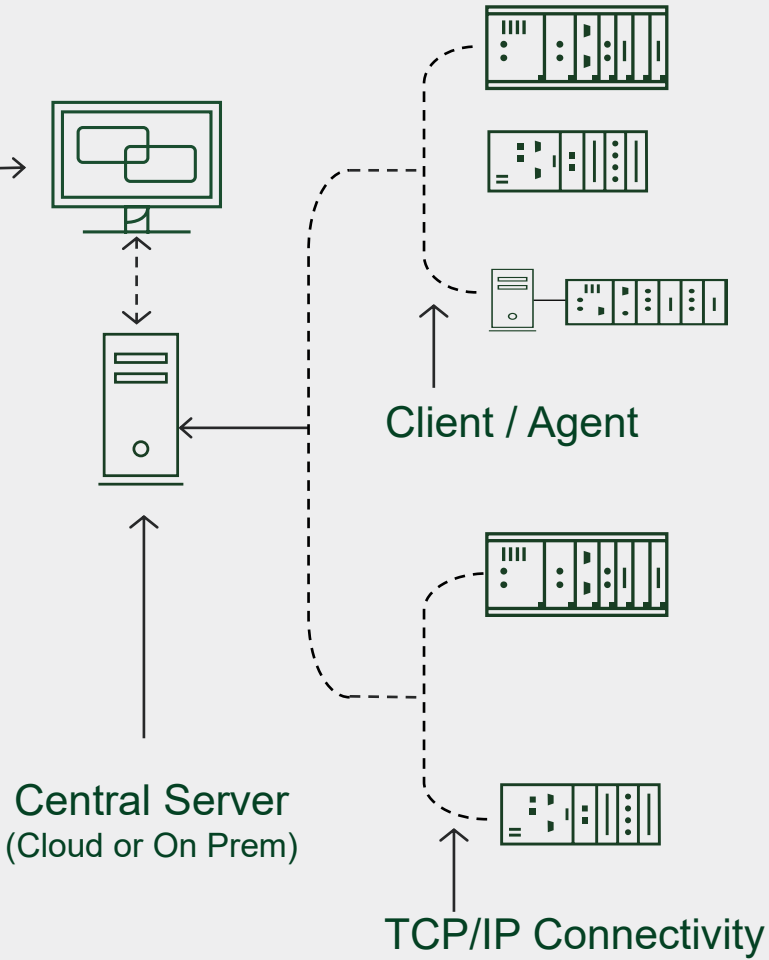
HTTPS / TLS data encryption; authentication & access control



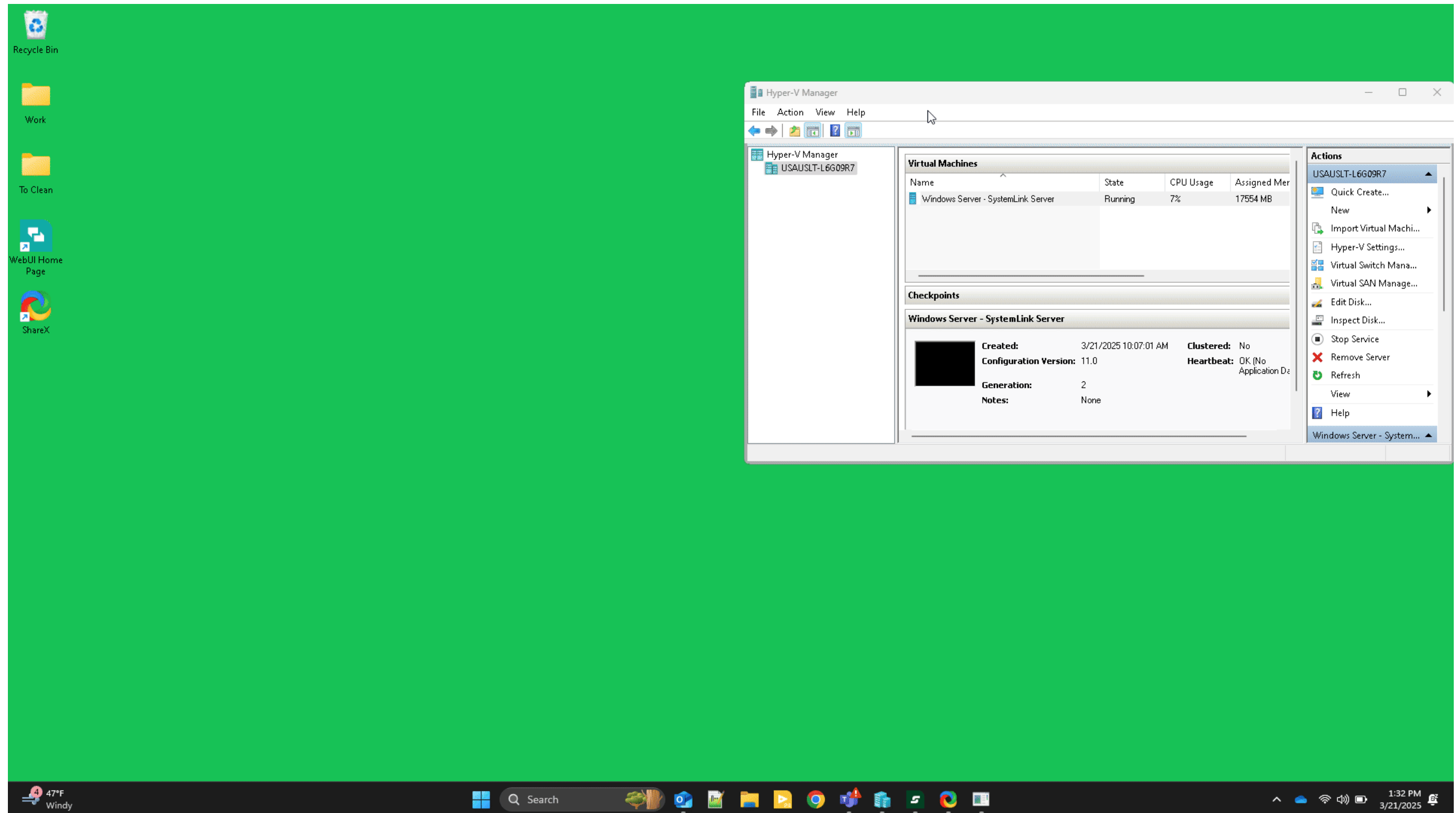
The screenshot shows the 'Systems' page in the SystemLink web application. At the top, there are summary statistics: 75 Systems, 19 Connected, 52 Disconnected, 4 Virtual, and 5 Pending. Below this is a toolbar with actions like 'Install software', 'Edit', 'Restart', 'Download', and 'More'. A table lists various systems with columns for NAME, MODEL, UTILIZATION, DISK, MEMORY, TEST STATUS, DASHBOARD, and PENDING STATUS. The table is filtered by 'Site matches Austin'. The 'Battery Pack Lab (3)' is expanded, showing three entries: 'Battery Test Station 1', 'Battery Test Station 2', and 'Battery Test Station 3'. The 'Battery Test Station 3' entry is highlighted in green and shows a 'Refreshing' status.

NAME	MODEL	UTILIZATION	DISK	MEMORY	TEST STATUS	DASHBOARD	PENDING STATUS
Semiconductor Lab (1)							
Semiconductor Bench	30D0S34J00	0 %	53.27 %	15.48 %			
Safety Lab (1)							
Josh's Laptop	Latitude 7420	0 %	50.67 %	62.48 %	Passed		
Battery Pack Lab (3)							
Battery Test Station 1	NI PXIe-8133 Embedded Contro...	17.87 %	67.16 %	36.13 %	Failed		
Battery Test Station 2	NI PXIe-8133 Embedded Contro...	2.8 %	70.12 %	68.54 %	Passed		
Battery Test Station 3	NI PXIe-8135 Embedded Contro...	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	

Web Application

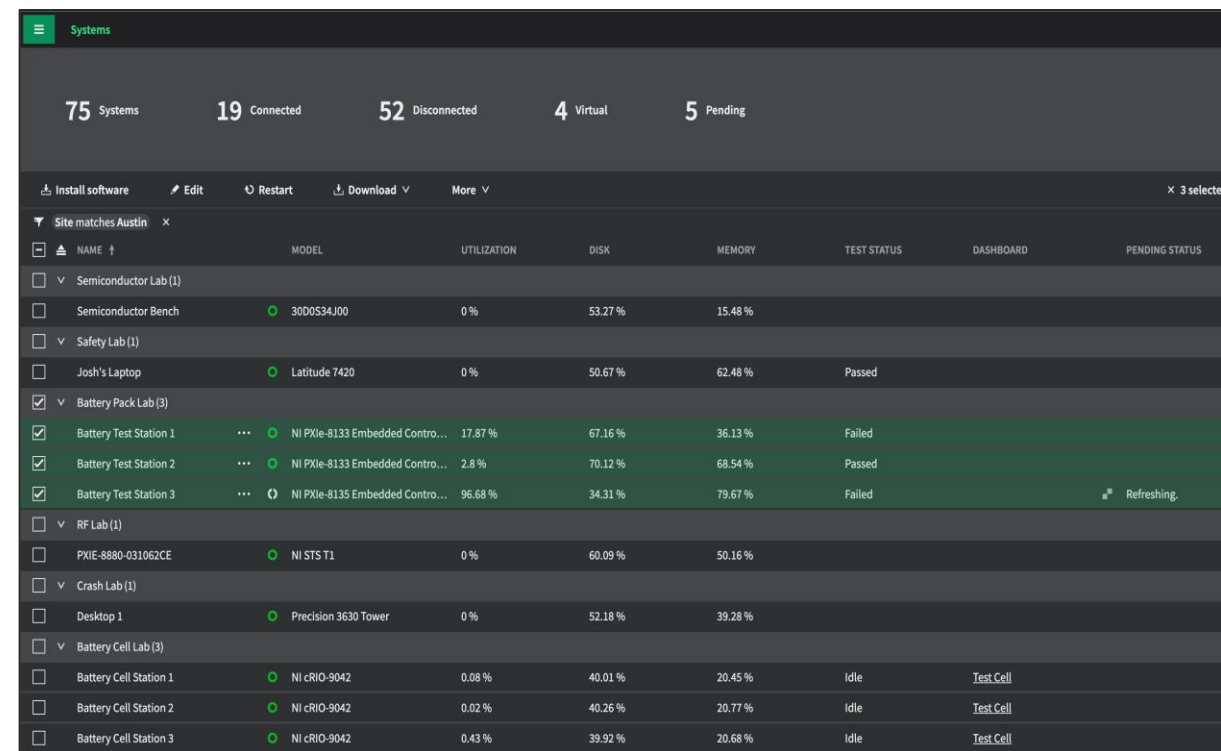


# Demo: Virtual Machine Server Setup



# Summary: Virtual Machine Server Setup

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



	NAME	MODEL	UTILIZATION	DISK	MEMORY	TEST STATUS	DASHBOARD	PENDING STATUS
75 Systems 19 Connected 52 Disconnected 4 Virtual 5 Pending								
Install software Edit Restart Download More 3 selected								
Site matches Austin								
<input type="checkbox"/>	Semiconductor Lab (1)							
<input type="checkbox"/>	Semiconductor Bench	3000S34J00	0 %	53.27 %	15.48 %			
<input type="checkbox"/>	Safety Lab (1)							
<input type="checkbox"/>	Josh's Laptop	Latitude 7420	0 %	50.67 %	62.48 %	Passed		
<input checked="" type="checkbox"/>	Battery Pack Lab (3)							
<input checked="" type="checkbox"/>	Battery Test Station 1	NI PXIe-8133 Embedded Contro...	17.87 %	67.16 %	36.13 %	Failed		
<input checked="" type="checkbox"/>	Battery Test Station 2	NI PXIe-8133 Embedded Contro...	2.8 %	70.12 %	68.54 %	Passed		
<input checked="" type="checkbox"/>	Battery Test Station 3	NI PXIe-8135 Embedded Contro...	96.68 %	34.31 %	79.67 %	Failed		Refreshing
<input type="checkbox"/>	RF Lab (1)							
<input type="checkbox"/>	PXIe-8880-031062CE	NI STS T1	0 %	60.09 %	50.16 %			
<input type="checkbox"/>	Crash Lab (1)							
<input type="checkbox"/>	Desktop 1	Precision 3630 Tower	0 %	52.18 %	39.28 %			
<input type="checkbox"/>	Battery Cell Lab (3)							
<input type="checkbox"/>	Battery Cell Station 1	NI cRIO-9042	0.08 %	40.01 %	20.45 %	Idle	Test Cell	
<input type="checkbox"/>	Battery Cell Station 2	NI cRIO-9042	0.02 %	40.26 %	20.77 %	Idle	Test Cell	
<input type="checkbox"/>	Battery Cell Station 3	NI cRIO-9042	0.43 %	39.92 %	20.68 %	Idle	Test Cell	

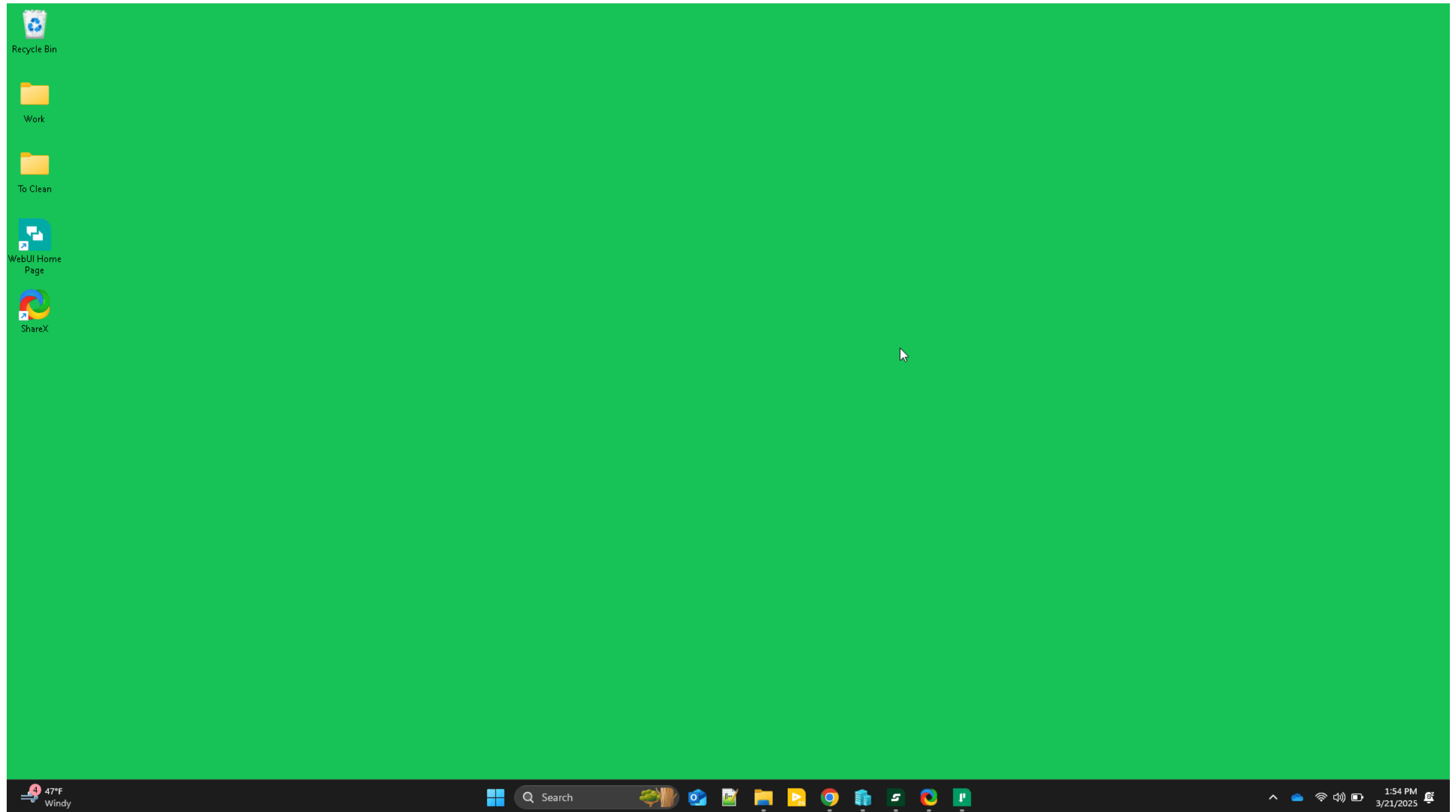
Web Application

Central Server  
(Cloud or On Prem)

TCP/IP Connectivity

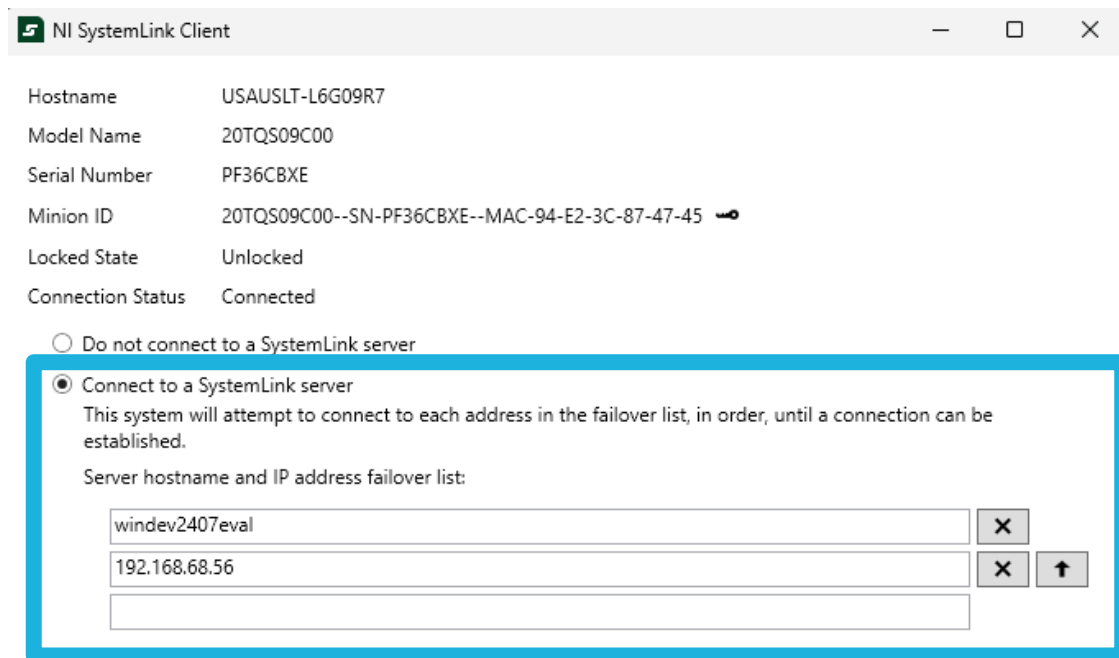
Client / Agent

# 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



NI SystemLink Client

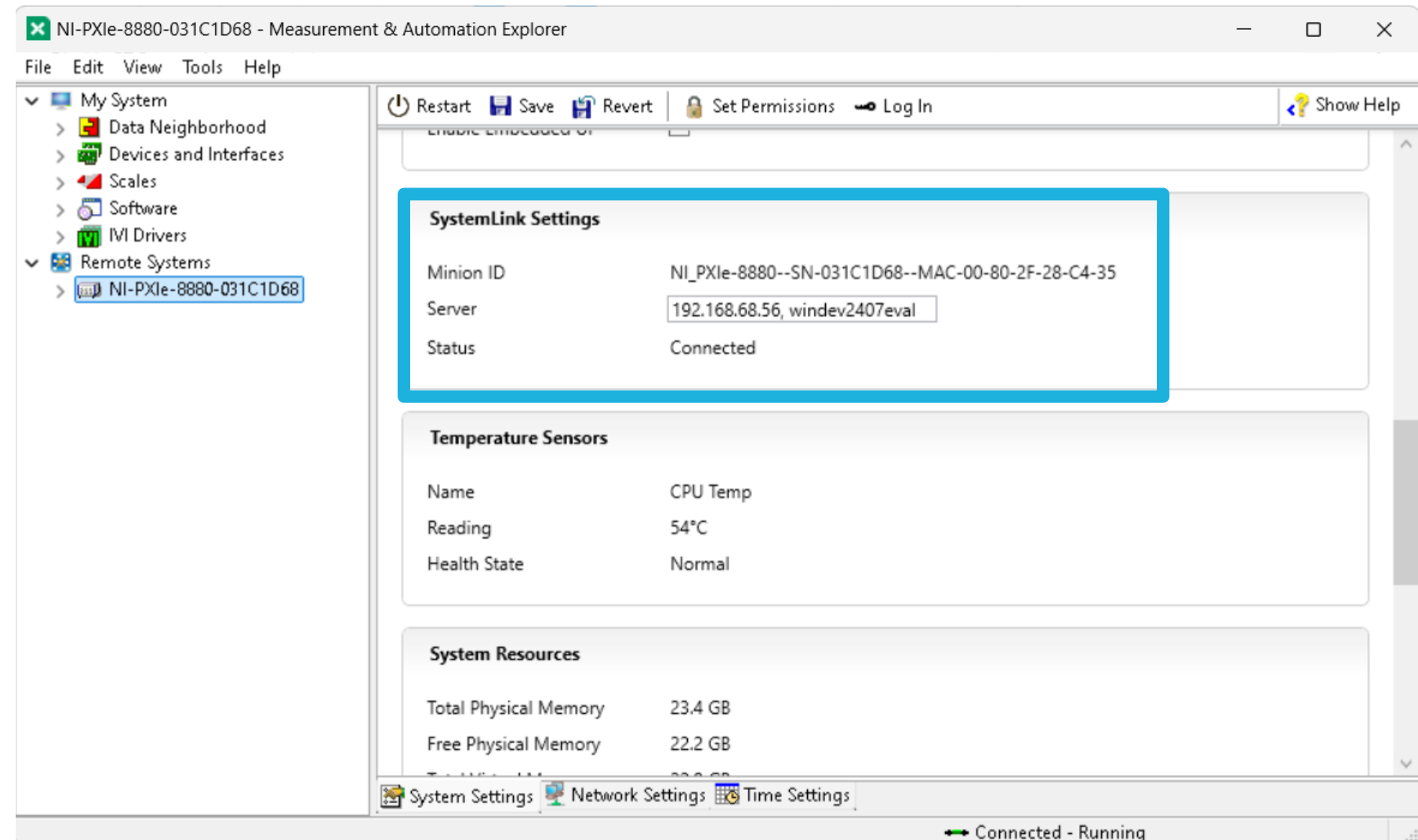
Hostname: USAUSLT-L6G09R7  
Model Name: 20TQS09C00  
Serial Number: PF36CBXE  
Minion ID: 20TQS09C00--SN-PF36CBXE--MAC-94-E2-3C-87-47-45  
Locked State: Unlocked  
Connection Status: Connected

☐ Do not connect to a SystemLink server

☒ Connect to a SystemLink server  
This system will attempt to connect to each address in the failover list, in order, until a connection can be established.

Server hostname and IP address failover list:

windev2407eval	X
192.168.68.56	X ↑



NI-PXle-8880-031C1D68 - Measurement & Automation Explorer

File Edit View Tools Help

Restart Save Revert Set Permissions Log In Show Help

**SystemLink Settings**

Minion ID	NI_PXle-8880--SN-031C1D68--MAC-00-80-2F-28-C4-35
Server	192.168.68.56, windev2407eval
Status	Connected

**Temperature Sensors**

Name	CPU Temp
Reading	54°C
Health State	Normal

**System Resources**

Total Physical Memory	23.4 GB
Free Physical Memory	22.2 GB

System Settings Network Settings Time Settings

Connected - Running

Systems

75 Systems

19 Connected

52 Discon

Install software

Edit

Restart

Download

Site matches Austin

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



USERNAME

PASSWORD

Login

## 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</b> (2)									
	USAUSLT-L6G09R7		<div></div> 192.168.68.61	20TQS09C00	PF36CBXE	Default	March 21, 2025		<div></div>
	NI-PXIe-8880-031C1D68		<div></div> 192.168.68.54	NI PXIe-8880	031C1D68	Default	March 3, 2025		<div></div>





## **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	
	^ <b>Empty</b> (2)								
	USAUSLT-L6G09R7		<div><div></div></div> 192.168.68.61	20TQS09C00	PF36CBXE	Default	March 21, 2025		<div><div></div></div>
	NI-PXIe-8880-031C1D68		<div><div></div></div> 192.168.68.54	NI PXIe-8880	031C1D68	Default	March 3, 2025		<div><div></div></div>



# Demo: Apply State for System Duplication

Systems

2

systems

2

connected

0

disconnected

0

pending

0

discovered

2

alarms

Default



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

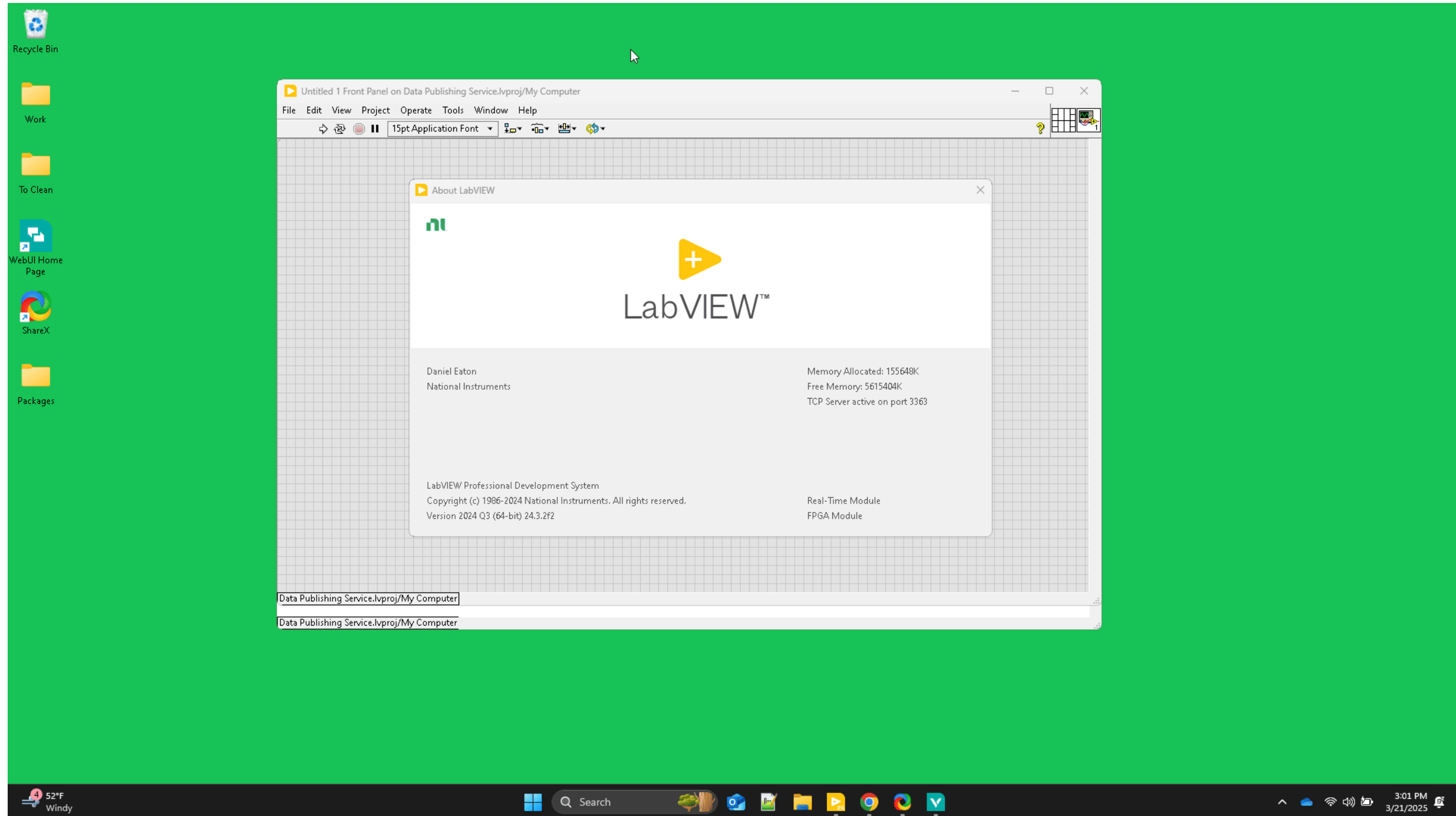




## **Summary: Create and Apply State for System Duplication**

- 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

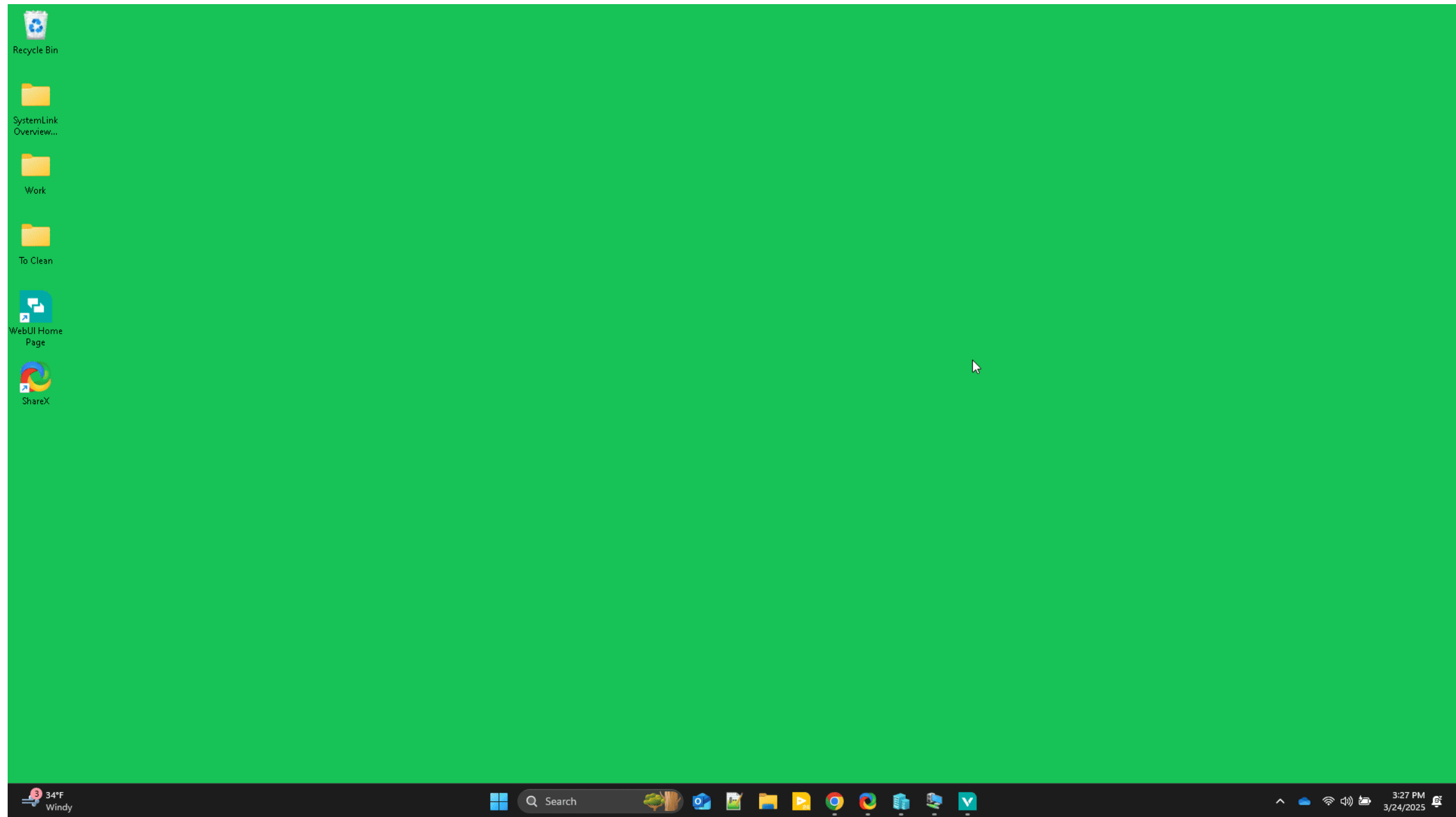


## **Summary: Connecting Third-party Software**

- Connect any software / system to SystemLink through APIs

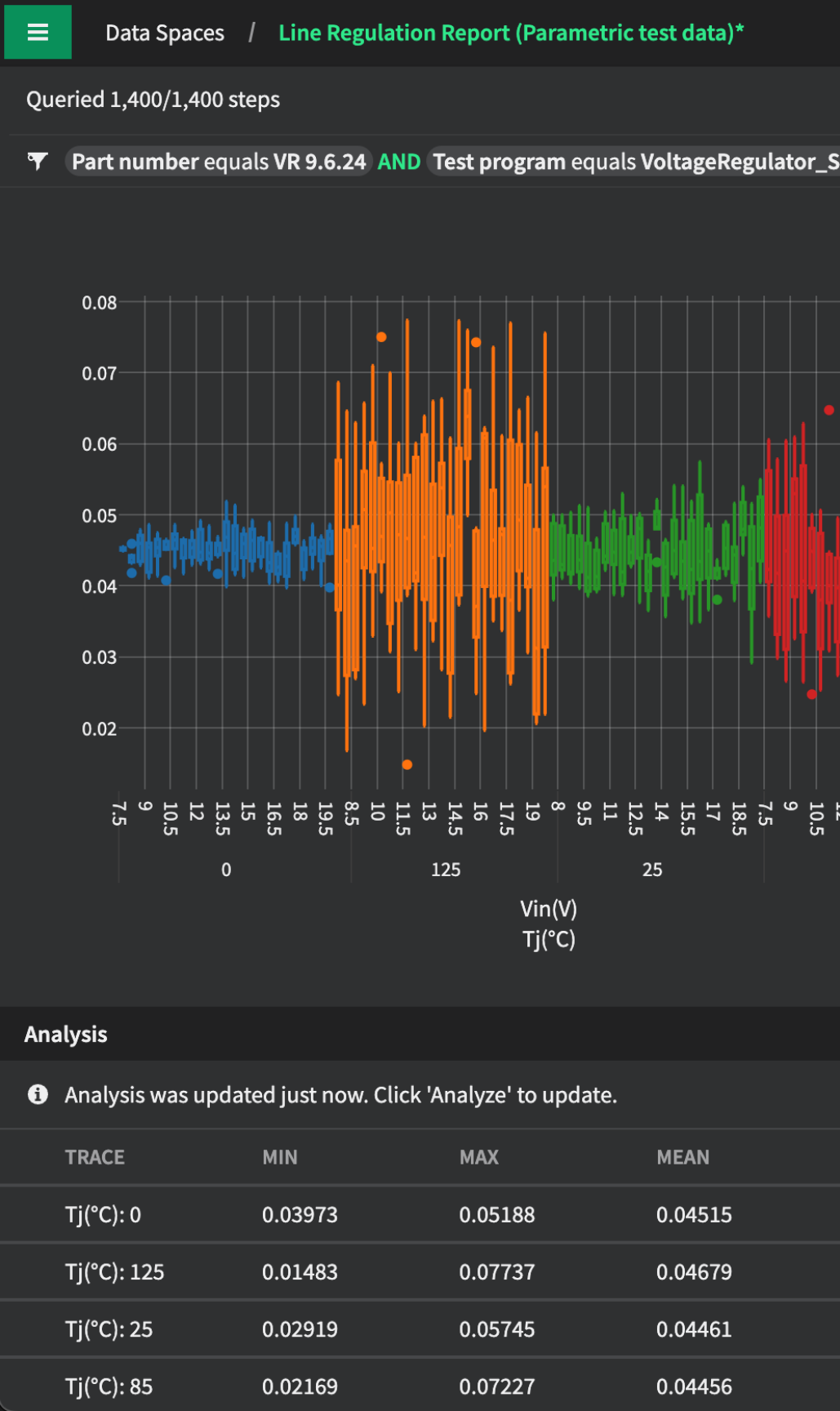


# Demo: Custom WebGUIs



## Summary: Custom WebGUIs

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

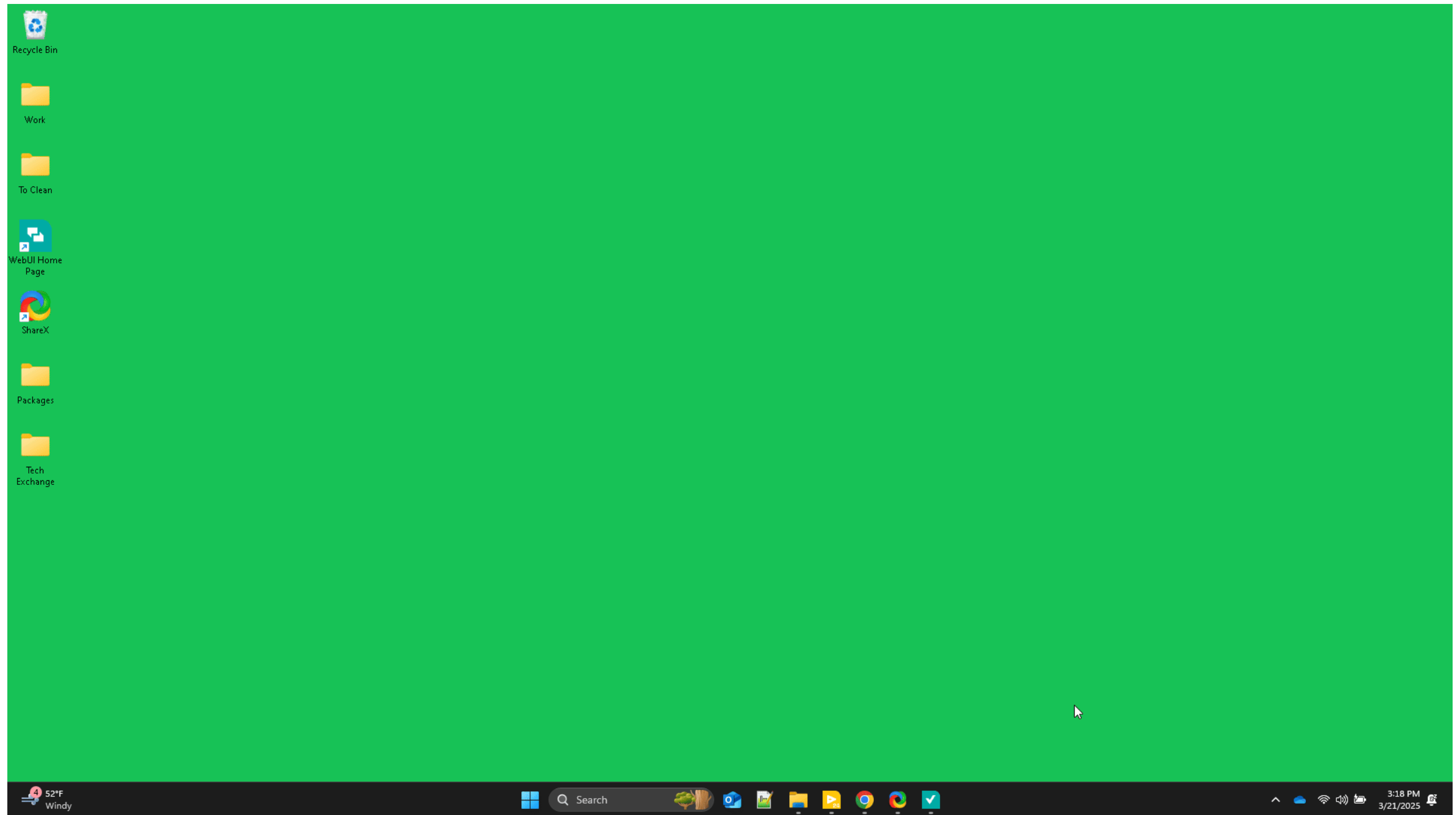


## Accelerate Product Insights

- 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



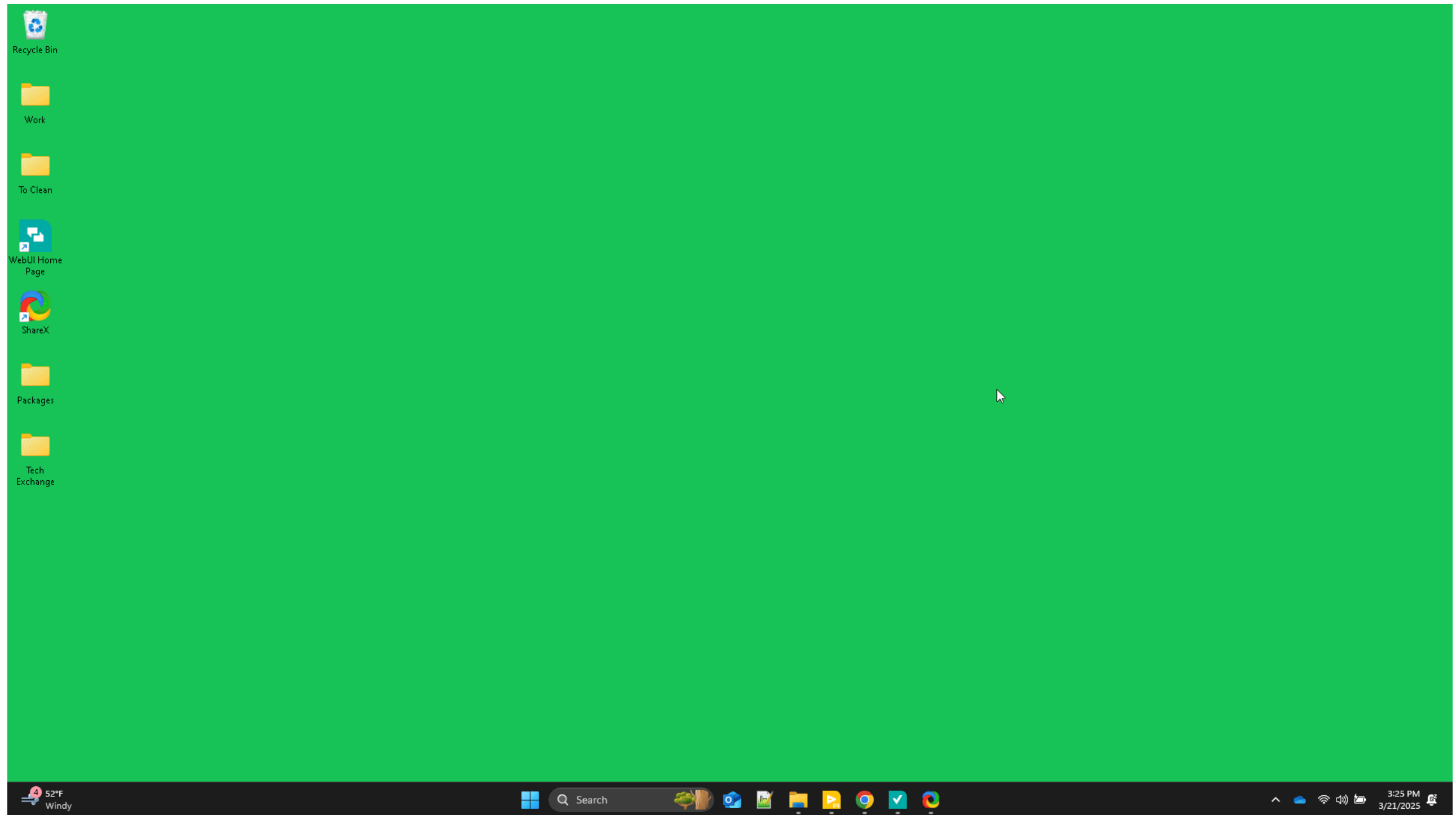
# Demo: Enable SystemLink TestMonitor in TestStand



## 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

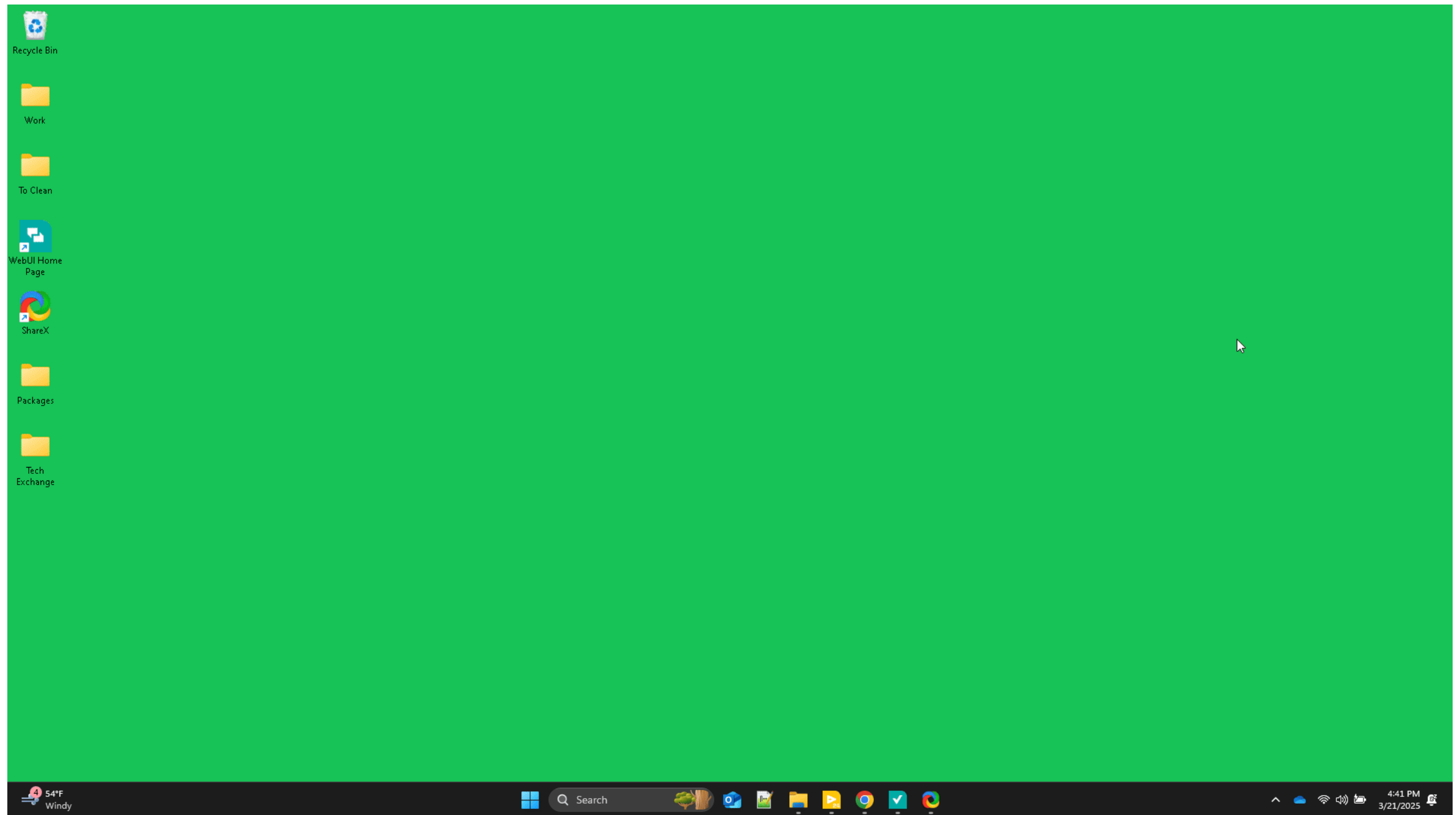
# Demo: Monitoring Automated Test from SystemLink



# 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

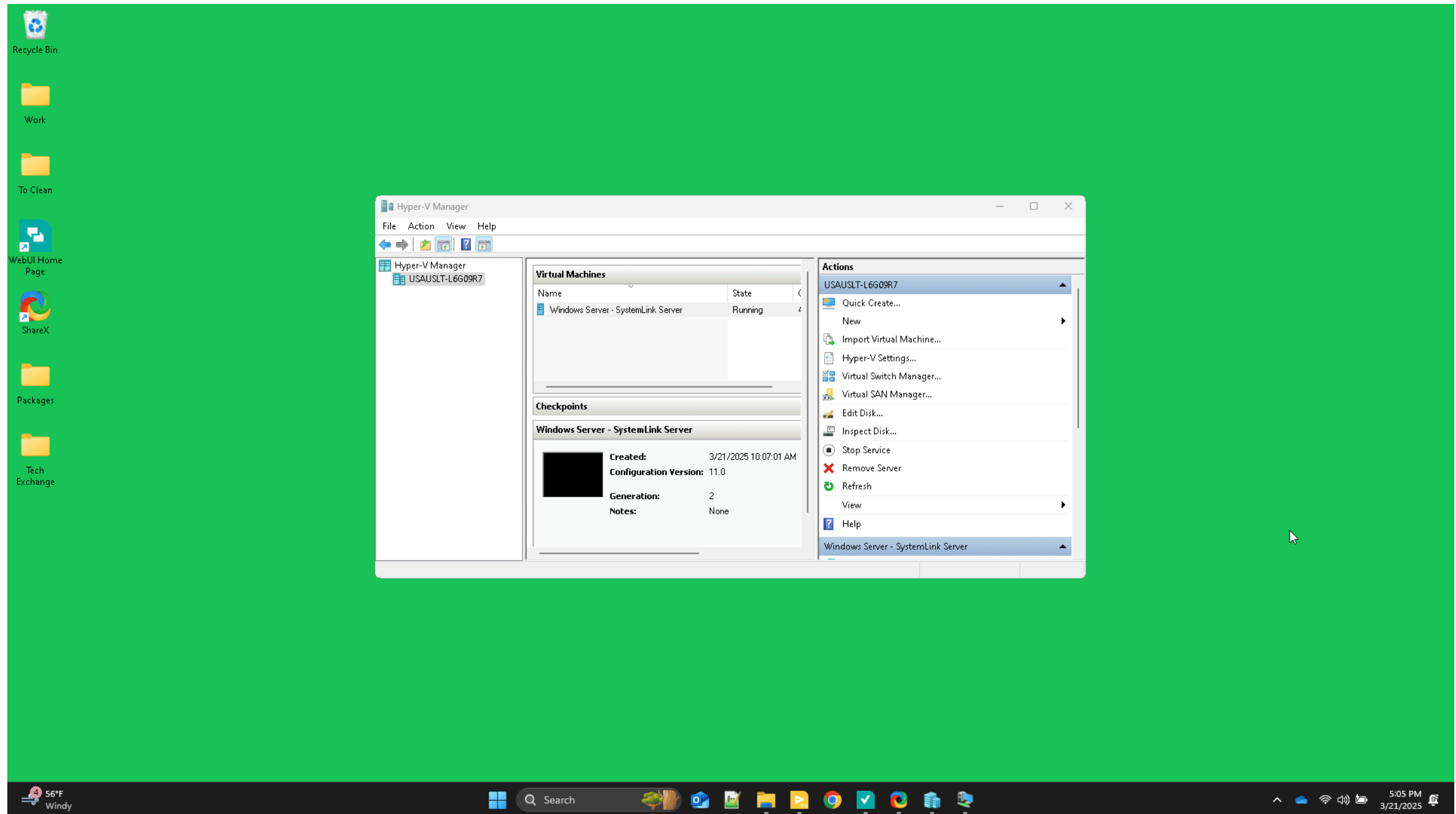


## **Summary: Review Automated Test Data from SystemLink**

- 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

Products / CWUU 18650 (B0CG1KL3RC)

Name

CWUU 18650

Family

Battery Cell

Results

Files

Specs

Test Plans

DUTs

Create test plan

Showing 41 of 41 most recently updated test plans

	NAME	STATE
<input type="checkbox"/>	Power test	Scheduled
<input type="checkbox"/>	Battery inspection	Pending a
<input type="checkbox"/>	Battery inspection	Scheduled
<input type="checkbox"/>	Battery inspection	In progres
<input type="checkbox"/>	Energy efficiency test	Scheduled
<input type="checkbox"/>	Energy efficiency test	Scheduled
<input type="checkbox"/>	Power test	Scheduled
<input type="checkbox"/>	Fast Charge Test	Scheduled
<input type="checkbox"/>	Dynamic test cycle	Scheduled
<input type="checkbox"/>	Battery inspection	Pending a
<input type="checkbox"/>	Battery inspection	Pending a
<input type="checkbox"/>	Battery inspection	In progres
<input type="checkbox"/>	Battery inspection	Scheduled
<input type="checkbox"/>	Battery inspection	Pending a
<input type="checkbox"/>	Continuous current limitations	Scheduled
<input type="checkbox"/>	Battery inspection	In progres

Create test plan

Select a test plan template

ID

NAME

↑

> 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

Schedule

Showing 20 of 20 test plans. Showing 72 systems, sorted in alphabetical order.

Today

<

>

February 2025

▼

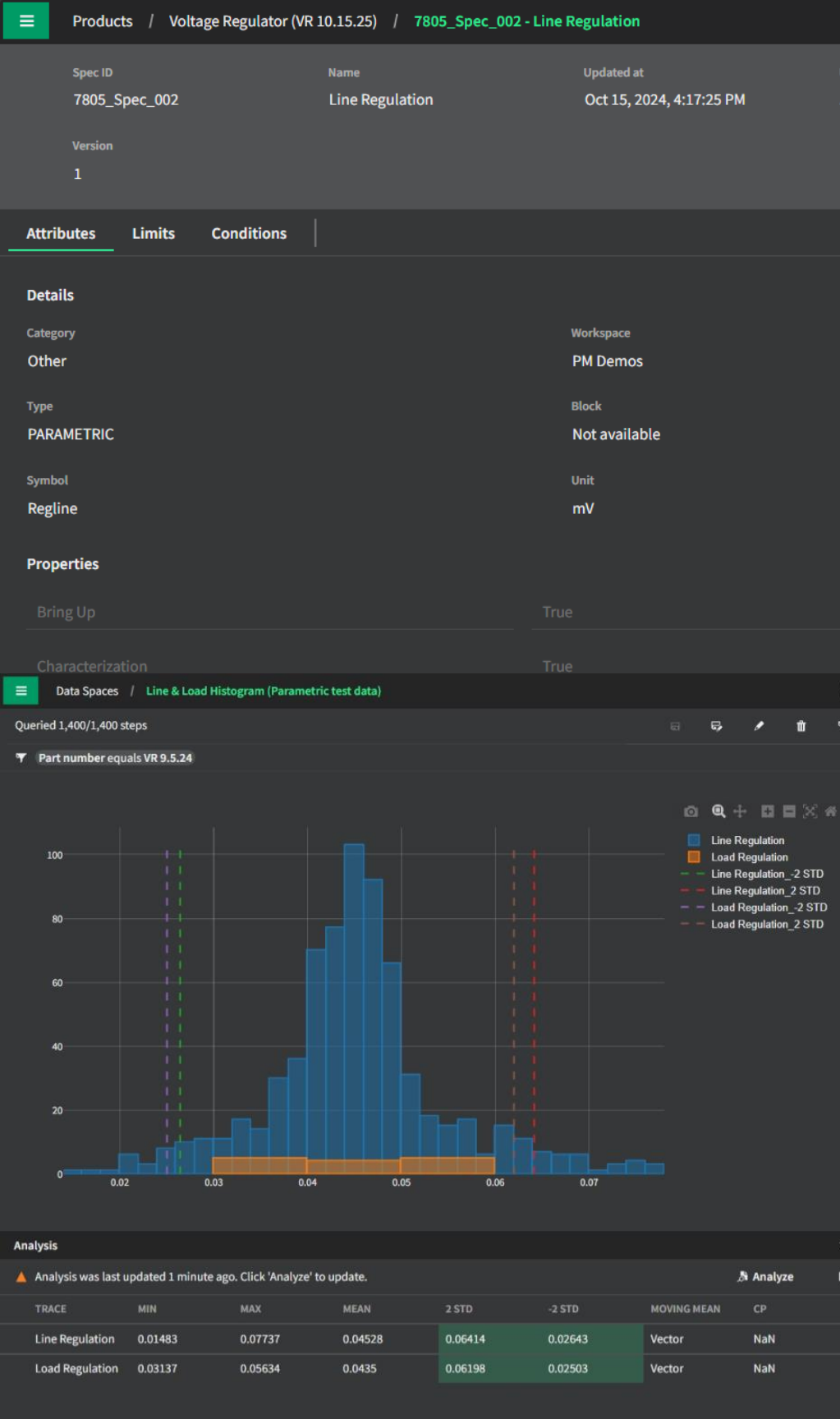
Month

▼

Systems	20 Thu	21 Fri	22 Sat	23 Sun	24 Mon	25 Tue	26 Wed	27 Thu
Battery Cell Station 1	Power test (860764) CWUU 18650 (B0CG1KL3RC) Feb 20, 2025, 12:00 AM - Feb 22, 2025, 12:00 AM							
Battery Cell Station 2				Energy efficiency test (905854) CWUU 18650 (B0CG1KL3RC) Feb 23, 2025, 9:00 PM - Feb 28, 2025, 9:00 AM				
Battery Cell Station 3				Dynamic test cycle (905864) CWUU 18650 (B0CG1KL3RC) Feb 23, 2025, 11:30 AM - Feb 27, 2025, 12:30 PM				
Battery Test Station 1	Battery inspection (805... TSM Sample (TSM 1.2) Feb 20, 2025, 12:00 AM - Feb 21... <div></div>	Fast Charge Test (905901) CWUU 18650 (B0CG1KL3RC) Feb 21, 2025, 7:00 PM - Feb 24, 2025, 1:30 PM						
Battery Test Station 2		Battery inspect... CWUU 18650 (B0CG1... Feb 21, 2025, 12:00 ... <div></div>	Energy efficiency test (905893) CWUU 18650 (B0CG1KL3RC) Feb 22, 2025, 1:15 AM - Feb 28, 2025, 12:00 PM					
Battery Test Station 3		Power test  (905918) CWUU 18650 (B0CG1KL3RC) Feb 21, 2025, 12:30 PM - Feb 23, 2025, 9:00 PM	Battery inspection (734435) NX 74205 Defiant (NX 74205 1) Feb 23, 2025, 11:15 PM - Feb 26, 2025, 12:15 AM	Battery inspection (4175... CWUU 18650 (B0CG1KL3RC) Feb 26, 2025, 10:00 AM - Mar 1...				
Battery Test Station 4					Battery inspection (... CWUU 18650 (B0CG1KL3RC) Feb 25, 2025, 3:30 PM - Fe...			

# 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