



# SystemLink Enterprise Hands-On

*NI Connect*

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# An Overview of SystemLink

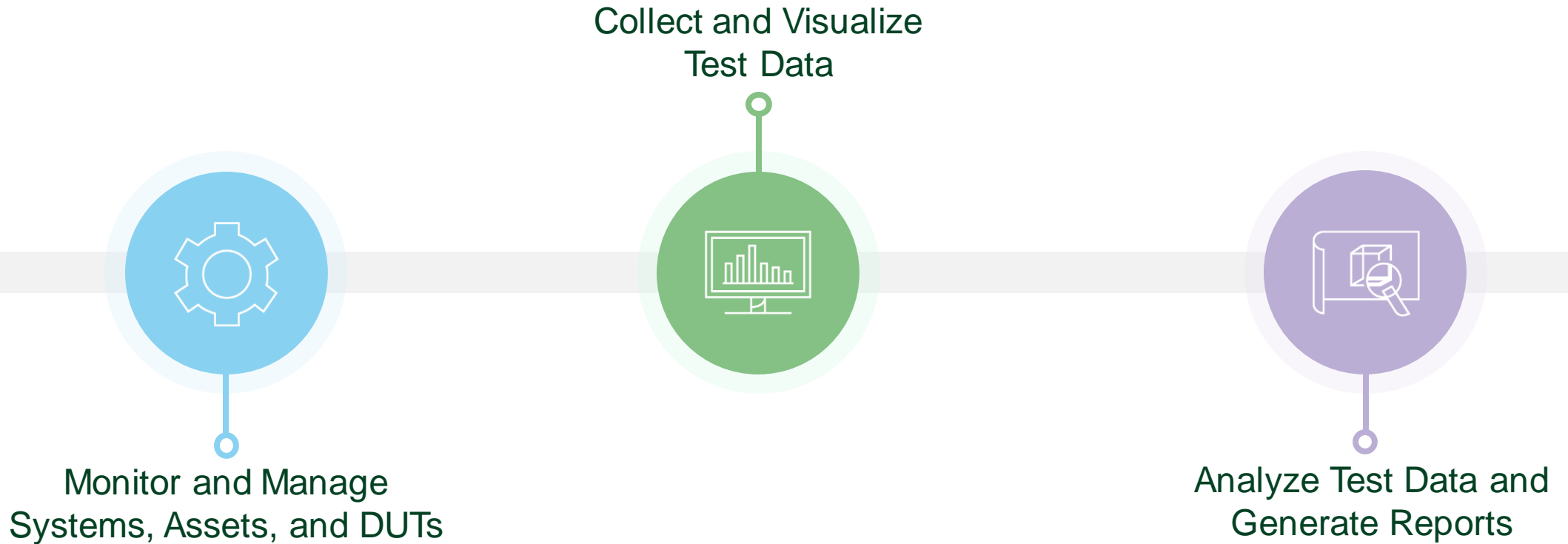


# What Is SystemLink Enterprise?



## SystemLink Enterprise (SLE)

A scalable, self-hosted enterprise product for managing systems, improving test operations, and analyzing test results.



## Systems Management

- Manage and install software for your entire test fleet
  - Reduce time required to keep test equipment up to date
- Monitoring test system health with support for alarms and notifications from customizable dashboards
  - Out of the box monitoring for CPU, Memory, and Disk Utilization
  - Extend health and monitoring capabilities with the SystemLink Tag API
- Manage and track the assets connected to your test systems
  - Execute remote diagnostics, such as self-test, self-calibrate, and device reset
  - Manage date/time, network settings, and admin passwords for RT systems

Manage your entire fleet of test system from a central web interface

The screenshot shows a web interface for managing test systems. At the top, it displays summary statistics: 112 SYSTEMS, 12 CONNECTED, 100 DISCONNECTED, and 9 PENDING. Below this is a table of systems with columns for Name, Model, System start time, Disk, Memory, Test Status, and Pending status. The table is filtered by workspace and lab. One system, 'JPREWITT5', is selected and highlighted in green, showing a 'Passed' test status.

Name	Model	System start time	Disk	Memory	Test Status	Pending status
Austin (2)						
Josh-9068	cRIO-9068	May 8, 2023	32.64 %	33.39 %		
JPREWITT5	Precision Tower ...	April 27, 2023	28.57 %	24.83 %	Passed	
Munich (2)						
NI-cRIO-9049-01234567	NI cRIO-9049	April 23, 2023	9.63 %	26.96 %	Idle	
PXIE-8880-031062CE	NI PXIe-8880	May 1, 2023	34.27 %	44.67 %	Passed	





## Asset Traceability

Automatic asset tracking for NI and 3<sup>rd</sup> party LXI, USB-TMC, and GPIB instruments

- Search and locate test assets across all systems
- Tracks asset connection and location history over time
- 3<sup>rd</sup> party assets through programmatic APIs and web interface
- Add custom properties and keywords to assets that can be used when grouping or filtering assets
- Export asset data for external reporting

	B	C	D	E	F	G	H	I
1	System	System Connection	Name	Vendor	Model	Serial Number	Bus Type	Resource URI
2	PXI-ATDEMO-1	Connected	PXIChassis1	National Instruments	NI PXIe-1062	V08X145D2	PciPxi	0/National Instruments/NI PXIe
3	PXI-ATDEMO-2	Connected	PXIChassis1	National Instruments	NI PXIe-1062	V08X191C9	PciPxi	0/National Instruments/NI PXIe
4	NI-WTS	Disconnected	PXIChassis2	National Instruments	NI PXIe-1071	154EE6D	PciPxi	0/National Instruments/NI PXIe
5	ATDEMOKITNIWK18	Disconnected	Chassis 1	National Instruments	NI PXIe-1082	16D9B99	PciPxi	0/National Instruments/NI PXIe
6	DESKTOP-NK98GAG	Connected	PXIChassis1	National Instruments	NI PXIe-1082	318EF6E	PciPxi	0/National Instruments/NI PXIe
7	ni-NI	Disconnected	Chassis 1	National Instruments	NI PXIe-1082	V08X18028	PciPxi	0/National Instruments/NI PXIe

Search and filter across all test assets to locate the relevant equipment records and required information..

The screenshot displays the 'Systems Management' interface. At the top, a summary bar shows: 607 assets, 63 active, 544 not active, 418 calibrated, 58 in use, and 367 alarms. Below this is a table of assets with columns for Name, Location, Workspa..., Model, Serial nu..., Calibrat..., Self calib..., Current L..., Presence, Status, and Alarms. A detailed view of a specific asset (cDAQ3) is shown, including its location (INTEL-REC-1), workspace (cDAQ1), model (National Instruments), and serial number (079479C). Below the asset details are two bar charts: 'Connection History' and 'Asset Utilization', both showing data from March 28 to April 18.





## Calibration Management

Track calibration status and calibration history

- Auto-discovers and reports calibration for NI devices
- Supports 3<sup>rd</sup> party calibration data via API and web interface
- View past calibration history and attach calibration certificates
- Get notifications when assets are approaching their calibration due date
- Export asset calibration data for offline reporting

View calibration data for connected and disconnected assets

The screenshot displays the 'Systems Management' interface for calibration management. At the top, a dashboard shows key metrics: 492 assets, 221 supports calibration, 2 calibration due soon, 119 calibration past due, 1 in use, and 145 alarms. Below this is a table of assets with columns for Name, Model, Serial number, Calibration due date, Last self calibration date, Self calibration temperature, Current temperature, and Status. A modal window titled 'Add calibration' is open, showing fields for External calibration date (4/22/2021), Recommended interval (12 months), Calibration due date (4/22/2022), and Temperature (25). A table at the bottom of the modal shows a list of calibration events with columns for Date, Type, Temperature, and User.

Name	Model	Serial number	Calibration due date	Last self calibration date	Self calibration temperature	Current temperature	Status
- Calibration past due (119)							
- DESTOP-SF06LJF (2)							
4130	NI PXIe-4130	0129962	Jan 20, 2009			29.78°C	
PXI2Shr7	NI PXIe-4309	01E71969	May 27, 2022	May 3, 2021, 2:49:01 AM		42.78°C	
- Measurement SDK Demo - DO NOT MESS (6)							
4139	NI PXIe-4139	0198A8F6	Sep 20, 2015	Nov 2, 2016, 3:27:27 PM		34.13°C	
PXI2Shr2	NI PXIe-4081	01F92990	Apr 21, 2023	Apr 21, 2021, 3:09:00 AM		32.69°C	
PXI2Shr4	NI PXIe-4309	01EACFAD	Jan 24, 2022	Jan 24, 2020, 12:36:25 PM		44.25°C	
PXI2ShrL2	NI PXIe-4135						
- NI PXIe-4135_Embedded_Con							
Asset1	NI PXIe-4135						
PCIShr2	NI PXIe-4135						
- XIDAX-Brady820 (6)							
cam0	NI PXIe-4135						
cDAQMod1...	NI PXIe-4143						
cDAQMod5...	NI PXIe-4143						
FlexLoggerC...	NI PXIe-4143						
FlexLoggerC...	NI PXIe-4143						
FlexLoggerC...	NI PXIe-4143						
- Precision_13600-SN-68E193							

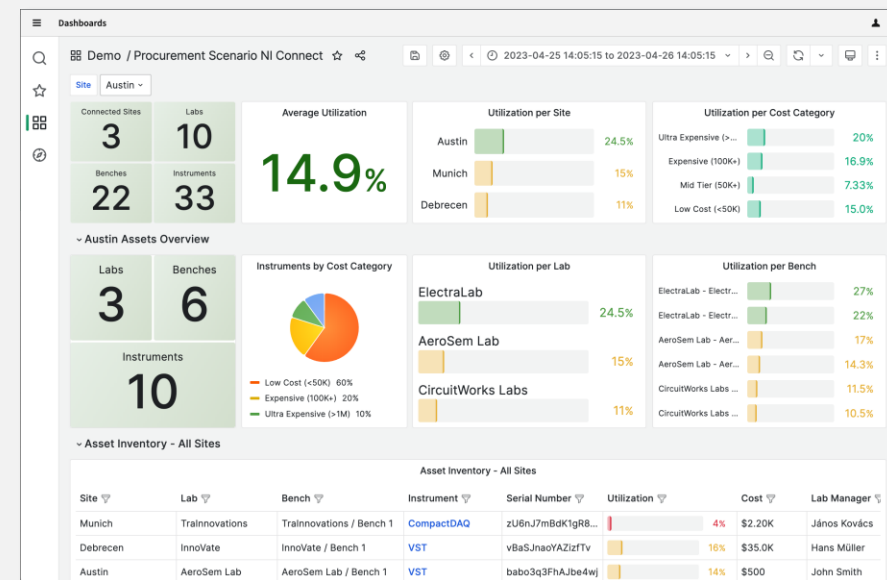




## Asset Utilization Tracking

- Low-level device utilization tracking based on actual instrument usage
- Granular, non-obtrusive, and highly performant
- Does not require modifying existing applications or additional manual user steps
- Supports NI and 3<sup>rd</sup> party instruments via NI-VISA including LXI, USB-TMC, and GPIB
- Identify types of usage, including testing and maintenance
- New highly customizable dashboards and out of the box reports (e.g. under utilized assets)
- PXI modules and DAQ support coming soon

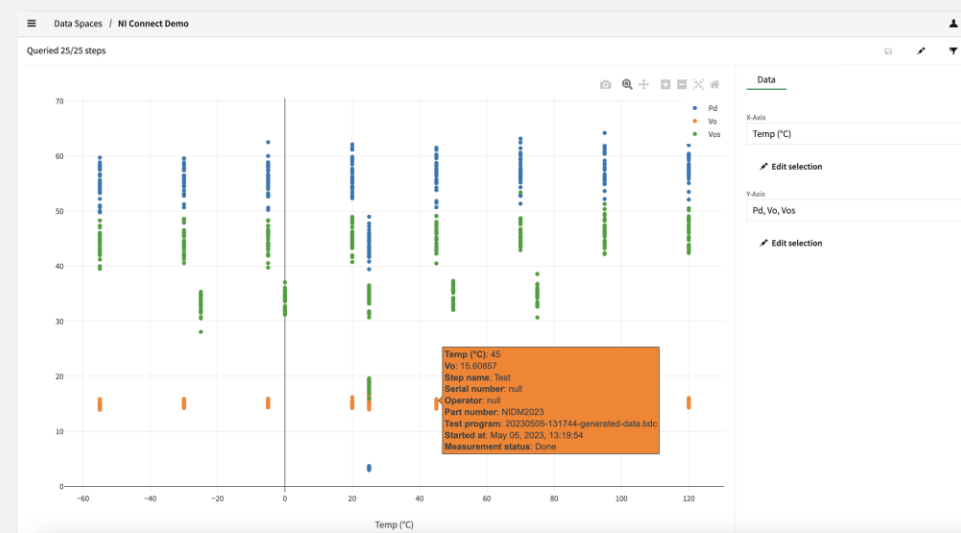
Reallocate under utilized assets to higher priority projects and maximize your capital investments



## Test Monitoring and Insights

- Collect and view test results, files and parametric data
  - Ingest data from TestStand or 3<sup>rd</sup> party sequencers using SystemLink's Test Monitor LV, Python, .NET, or HTTP APIs
- 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
- Track key project indicators
  - Leverage dashboard and customizable analytics to track KPIs such as throughput, utilization, first pass yield and overall equipment effectiveness

Trend parametric data by time, system, or other test parameters







# Analysis Automation and Reporting

- Develop analysis routines
  - Leverage SystemLink's fully integrated Jupyter Notebook development environment to create Python scripts to extract, transform, and analyze data
  - Publish notebooks to SL make them available for automated routines
- Automate data transformation and analysis
  - Interactively run notebooks on selected data sets
  - Automatically trigger notebooks when new data arrives
  - Schedule notebooks to run on a periodic basis
  - View notebook analysis in customizable dashboards

Develop interactive reports and analysis with this popular open-source Python tool.

The screenshot displays the Jupyter Notebook environment. The top panel shows the code editor with Python code for data analysis and plotting. The bottom panel shows the rendered output, including a bar chart titled 'Failures by Test'.

```
Imports
This example uses the TDMReader API to work with the bulk data and meta data of the given files. Matplotlib is used for plotting the graph. The
scrapbook is used to set and display the results in the analysis procedure results list.

[1]: import systemLink.clients.tdmreader as tdmreader
metadata_api = tdmreader.MetadataApi()
data_api = tdmreader.DataApi()

import matplotlib.pyplot as plt

import scrapbook as sb

[2]: def get_property(element, property_name):
    """Gets a property of the given element.
    The element can be a file, channel group, or channel.
```

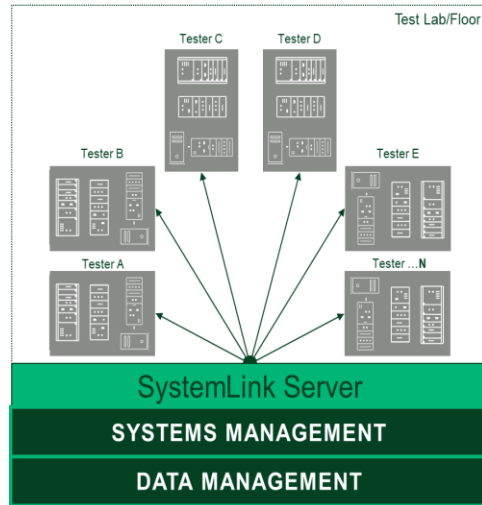
Test Type	Number of Runs
Keyboard Test	10
Keyboard Diagnostics	8
Keyboard Diagnostics	8
Keyboard Diagnostics	7
Keyboard Test	7





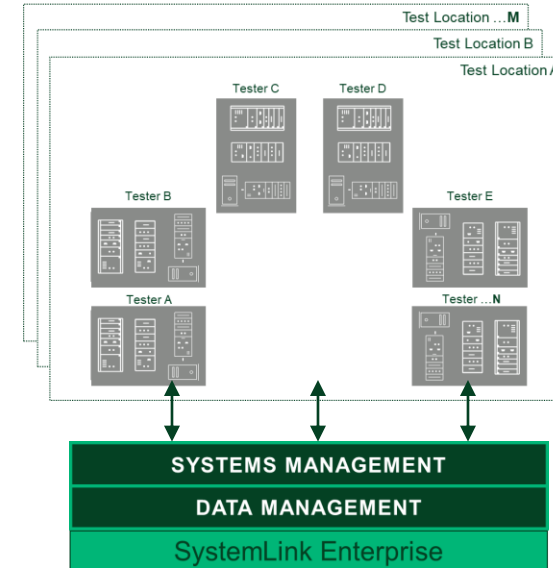
# SystemLink Deployment Options

## SystemLink Server



Designed for Individual Labs

## SystemLink Enterprise



Designed for Scalability

Scale of implementation and standardization

# SystemLink Product Summary



	SystemLink Server	SystemLink Enterprise
Deployment	On-prem, public/private cloud	Public/private cloud
Environment	Windows (Single-box)	Linux (Kubernetes)
Licensing	Perpetual or subscription	Subscription
Scalability – Systems/Users	One Lab	Multiple Labs
Scalability – Data	Less than 1TB	Petabyte scale
Systems management	✓	✓
Data storage and analytics	✓	✓
Index local network file shares	✓	
Analysis support	DIAdem & Jupyter (Python)	Jupyter (Python)



# SLS vs. SLE Features & Availability

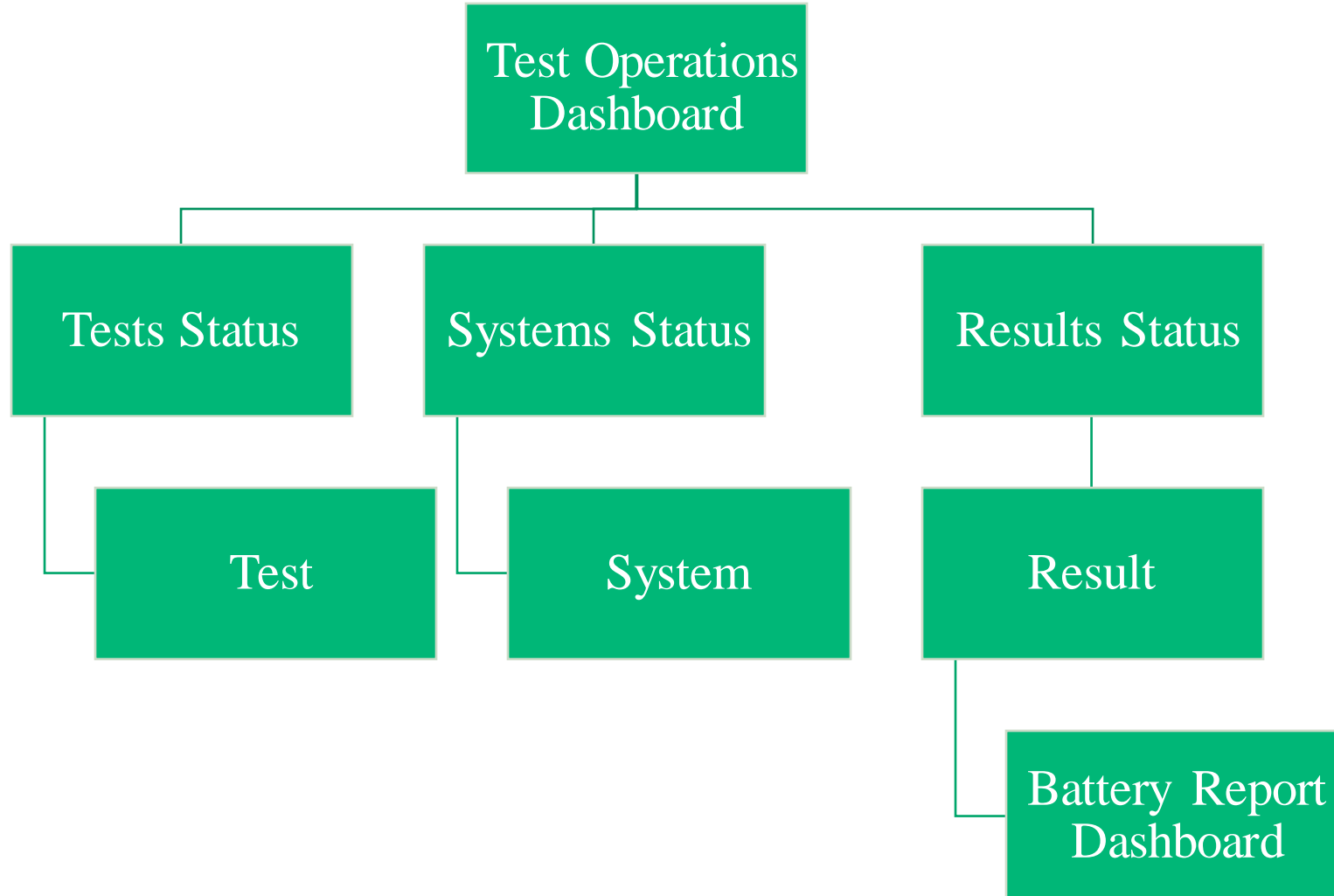
	Feature	Server	Enterprise
Systems & Assets Management	Connect systems	✓	✓
	View and manage assets	✓	✓
	Tags (health monitoring)	✓	✓
	Alarms and notifications	✓	2023 Q4
	Software deployment	✓	2023 Q3
	Package repository & states (system replication)	✓	2023 Q4
	OPC UA Client	✓	TBD
Data Management & Analytics	Files and file analysis	✓	✓
	Products and test results	✓	✓
	Data frame API and data frame analysis	✗	✓
	TDMS Management and Visualization	✓	2024
	Jupyter notebook analysis automation	✓	✓
	Triggered and scheduled routines (analysis procedures)	✓	✓
	Parametric data viewer	✓	2023 Q3
	Create PDF and HTML reports	✓	TBD
	Index files on remote network share (DataFinder)	✓	✗
Dashboards & Visualization	Dashboards	✓ (Proprietary)	✓ (Grafana)
	WebVI hosting	✓	2024
	DIAdem support	✓	TBD

# SystemLink Enterprise Hands On

# Workflow Example: Test Engineer Overseeing Multiple Sites

1. Planning and Coordination:
  1. Allocate appropriate resources
  2. Keep track of Operational Efficiency and specify tasks for each site
2. Test Environment Setup:
  1. Ensure that site has the necessary infrastructure and resources for testing.
  2. Coordinate with the site teams to set up the required hardware and software
3. Test Execution:
  1. Monitor the progress of testing activities across different sites
  2. Ensure that test results are documented accurately
4. Defect Management:
  1. Review and prioritize reported defects
  2. Conduct root cause analysis for critical defects
5. Test Reporting and Documentation:
  1. Consolidate test results and generate comprehensive reports
  2. Continuous Improvement

## Workflow Scenario: Test Engineer Overseeing Multiple Sites Flow



# Live Hands-On Session



# Workflow Example: Test Engineer Overseeing Multiple Sites

## 1. Planning and Coordination:

1. Allocate appropriate resources
2. Keep track of Operational Efficiency and specify tasks for each site

## 2. Test Environment Setup:

1. Ensure that site has the necessary infrastructure and resources for testing.
2. Coordinate with the site teams to set up the required hardware and software

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## 4. Defect Management:

1. Review and prioritize reported defects
2. Conduct root cause analysis for critical defects

## 5. Test Reporting and Documentation:

1. Consolidate test results and generate comprehensive reports
2. Continuous Improvement

## Accessing the Overall Dashboard

1. Type in SLE url, <https://test.lifecyclesolutions.ni.com/>, in browser
  1. If you are not logged in, please use following credential:
    - ID1: [maintainer1@corpc.com](mailto:maintainer1@corpc.com) PW: p@ssw0rd
    - ID2: [maintainer2@corpc.com](mailto:maintainer2@corpc.com) PW: p@ssw0rd
    - ID3: [maintainer3@corpc.com](mailto:maintainer3@corpc.com) PW: p@ssw0rd
    - ID4: [maintainer4@corpc.com](mailto:maintainer4@corpc.com) PW: p@ssw0rd
    - ID5: [maintainer5@corpc.com](mailto:maintainer5@corpc.com) PW: p@ssw0rd
2. Click Dashboards



# Accessing the Overall Dashboard

☰ General / Home 🖨

Dashboards

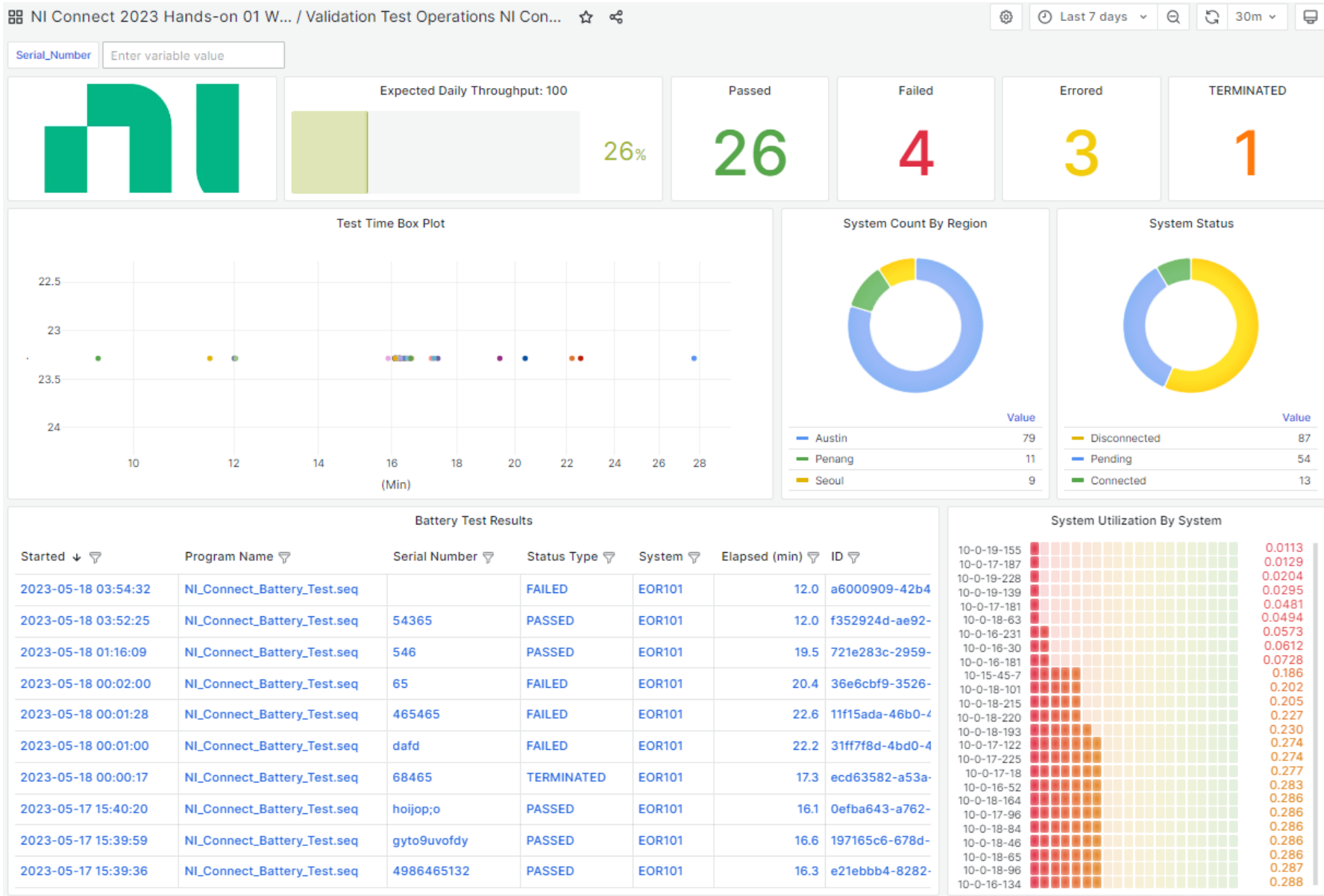
**Starred dashboards**

- Validation Test Operations NI Connect  
NI Connect 2023 Hands-on 01 Workspace ★

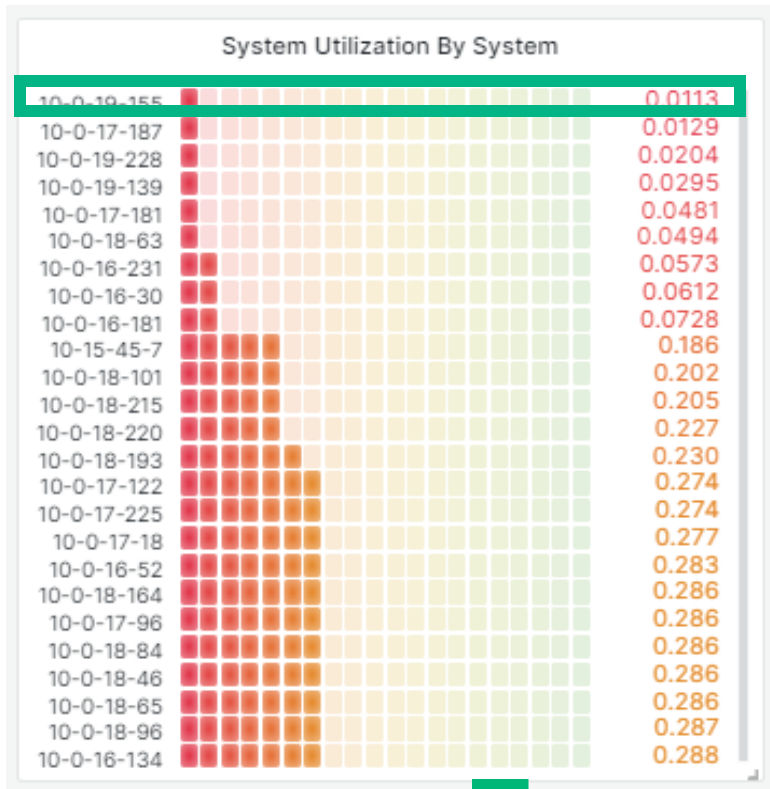
**Recently viewed dashboards**

- Validation Test Operations NI Connect  
NI Connect 2023 Hands-on 01 Workspace ★
- NI Connect Battery Report  
NI Connect 2023 Hands-on 01 Workspace ☆
- NI Connect Battery Test Data Report  
Demo Workspace ☆
- Demo Battery Analytics  
Demo Workspace ☆
- Validation Test Operations  
Demo Workspace ☆
- Manufacturing Test Operations  
Demo Workspace ☆
- Advanced Utilization - Lab Manager  
Demo Workspace ☆
- Battery Test Data Report  
NI Connect 2023 Hands-on 01 Workspace ☆
- Battery Cycle Dashboard  
Demo Workspace ☆

# Accessing the Overall Dashboard



# System Utilization and Accessing Each System



Systems / 10-0-19-155

Name	Connection status	Locked status	System start time
10-0-19-155	Disconnected	Unlocked	2023-05-16T22:29:05.233Z

Model	Vendor	Operating system	IP address
t3.medium	Amazon EC2	Microsoft Windows Server 2019 Datacenter	10.0.19.155

Workspace: Default

Assets | Tags | Software | Jobs | Files

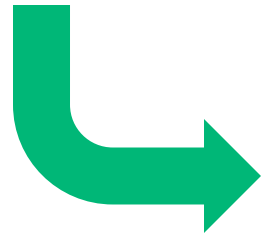
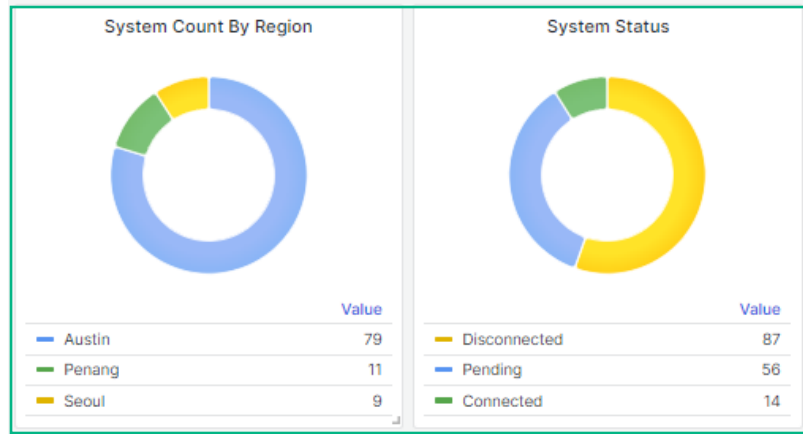
Add asset Refresh: 3 seconds

Name	Model	Serial number	Presence	Last self calibration date	Calibration due date	Current temperature
10-0-19-155	t3.medium	ec29f7c0-ba48-e7ef-4f...	Present			
10-0-19-155	t3.medium	ec27c176-3346-582c-...	Present			

# Workflow Example: Test Engineer Overseeing Multiple Sites

1. Planning and Coordination:
  1. Allocate appropriate resources
  2. Keep track of Operational Efficiency and specify tasks for each site
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  - 1. Ensure that site has the necessary infrastructure and resources for testing.**
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5. Test Reporting and Documentation:
  1. Consolidate test results and generate comprehensive reports
  2. Continuous Improvement

## Accessing the System by Region/Status



**Systems**

100 SYSTEMS    13 CONNECTED    87 DISCONNECTED    55 PENDING

Add systems Search

Workspace equals NI Connect 2023 Hands-on 01

Name	IP address	Model	Serial number	Workspace	System start time
^ NI Connect 2023 Hands-on 01 (11)					
USAUSLT-C87418L	10.0.160.87	20LES1AQ08	R90VREQP	NI Connect 2023 Hands-on 01	May 17, 2023
EOR101	192.168.0.217	20QD000LUS	PF20WLH0	NI Connect 2023 Hands-on 01	May 16, 2023
DESKTOP-Q4EQHFH	192.168.1.119	HP Elite Dragonfly	5CG9520DMR	NI Connect 2023 Hands-on 01	May 16, 2023
USAUSLT-WW474S9	192.168.0.91	Latitude 7400 2-in-1	BPFPM13	NI Connect 2023 Hands-on 01	May 16, 2023
ITRIGOLD-NB	192.168.188.54	Latitude 7420	FWB4QN3	NI Connect 2023 Hands-on 01	May 17, 2023
BRADT2-LT	172.19.224.1	Precision 7520	HHGQNN2	NI Connect 2023 Hands-on 01	April 27, 2023
kalabar	192.168.136.217	VMware7,1	VMware-56 4d da da 57 3b d6 ...	NI Connect 2023 Hands-on 01	May 18, 2023
Vaterlaus-SL-CI	10.0.0.7	Virtual Machine	0000-0017-3010-6751-7405-84...	NI Connect 2023 Hands-on 01	May 17, 2023
AmesenNICConnectTe...	172.25.227.25	Virtual Machine	3692-0374-4642-0824-3307-40...	NI Connect 2023 Hands-on 01	May 17, 2023
DarrenSLTest2	10.2.136.48	Virtual Machine	6349-4152-5581-5102-6116-81...	NI Connect 2023 Hands-on 01	May 17, 2023
USAUSVM-5O2OYVZ	10.2.136.75	Virtual Machine	8884-3639-8516-2655-9196-43...	NI Connect 2023 Hands-on 01	May 17, 2023

## Exercise 1: Connecting a **Test System** to SystemLink Enterprise

1. Type SystemLink Client in Windows Search Bar
2. Click NI SystemLink Client Apps to open.
3. Click "Connect to a SystemLink server"
4. Type in SLE hostname:  
test-salt.lifecyclesolutions.ni.com
4. Click "Apply"

NI SystemLink Client

Hostname	EOR101
Model Name	20QD000LUS
Serial Number	PF20WLH0
Minion ID	20QD000LUS--SN-PF20WLH0--MAC-4C-1D-96-AD-EE-63
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.

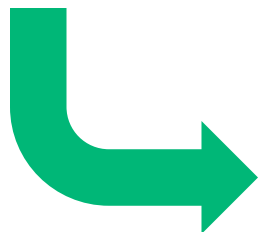
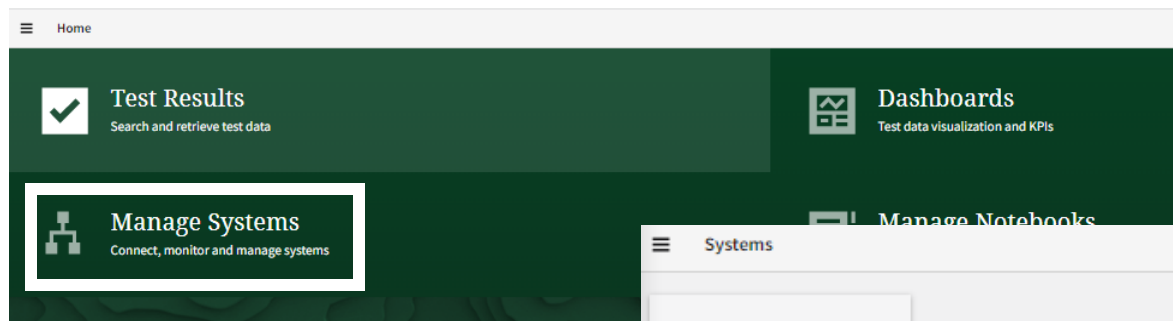
Server hostname and IP address failover list:

test-salt.lifecyclesolutions.ni.com

Apply Revert



# Connecting to SystemLink Enterprise



Systems

100 SYSTEMS    13 CONNECTED    87 DISCONNECTED    **55 PENDING**

Add systems Search

Workspace equals NI Connect 2023 Hands-on 01 ✕

<input type="checkbox"/>	Name		IP address	Model	Serial number	Workspace	System start time
^ NI Connect 2023 Hands-on 01 (11)							
	USAUSLT-C87418L	○	10.0.160.87	20LES1AQ08	R90VREQP	NI Connect 2023 Hands-on 01	May 17, 2023
	EOR101	○	192.168.0.217	20QD000LUS	PF20WLH0	NI Connect 2023 Hands-on 01	May 16, 2023
	DESKTOP-Q4EQHFH	○	192.168.1.119	HP Elite Dragonfly	5CG9520DMR	NI Connect 2023 Hands-on 01	May 16, 2023
	USAUSLT-WW474S9	○	192.168.0.91	Latitude 7400 2-in-1	BPFPM13	NI Connect 2023 Hands-on 01	May 16, 2023
	ITRIGOLD-NB	○	192.168.188.54	Latitude 7420	FWB4QN3	NI Connect 2023 Hands-on 01	May 17, 2023
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	USAUSVM-5O2OYVZ	○	10.2.136.75	Virtual Machine	8884-3639-8516-2655-9196-43...	NI Connect 2023 Hands-on 01	May 17, 2023

# Connecting to SystemLink Enterprise

Add pending systems

Minion ID	
<input checked="" type="checkbox"/> 10-0-16-10	
<input type="checkbox"/> 10-0-16-150	
<input type="checkbox"/> 10-0-16-169	
<input type="checkbox"/> 10-0-16-179	
<input type="checkbox"/> 10-0-16-201	
<input type="checkbox"/> 10-0-16-216	
<input type="checkbox"/> 10-0-16-23	
<input type="checkbox"/> 10-0-16-237	
<input type="checkbox"/> 10-0-16-241	
<input type="checkbox"/> 10-0-16-253	
<input type="checkbox"/> 10-0-16-71	
<input type="checkbox"/> 10-0-16-73	
<input type="checkbox"/> 10-0-16-90	
<input type="checkbox"/> 10-0-16-95	
<input type="checkbox"/> 10-0-17-109	
<input type="checkbox"/> 10-0-17-114	
<input type="checkbox"/> 10-0-17-127	
<input type="checkbox"/> 10-0-17-143	
<input type="checkbox"/> 10-0-17-15	
<input type="checkbox"/> 10-0-17-157	
<input type="checkbox"/> 10-0-17-159	
<input type="checkbox"/> 10-0-17-168	
<input type="checkbox"/> 10-0-17-187	
<input type="checkbox"/> 10-0-17-199	
<input type="checkbox"/> 10-0-17-200	
<input type="checkbox"/> 10-0-17-212	
<input type="checkbox"/> 10-0-17-224	

Cancel

Next

Add pending systems

Workspace  
NI Connect 2023 Hands-on 01

Cancel

Back

Add



# Workflow Example: Test Engineer Overseeing Multiple Sites

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# Accessing the Results by Status

Passed <b>26</b>	Failed <b>4</b>	Errored <b>3</b>	TERMINATED <b>1</b>
---------------------	--------------------	---------------------	------------------------



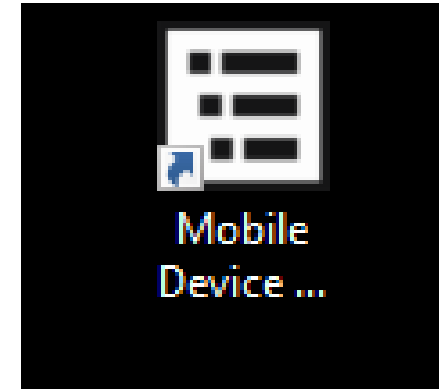
Refresh: 3 seconds  \*Pass

Search: ( NI Connect 2023 Hands-on 01 AND Test program contains Battery\_Test AND Status equals Passed ) ✕

<input type="checkbox"/>	Test program	Serial number	System	Elapsed time	Started ↓	●○	Status	Department
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	54365	EOR101	12.02 s	May 18, 2023, 3:52:25 AM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	546	EOR101	19.47 s	May 18, 2023, 1:16:09 AM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	hoijoppo	EOR101	16.1 s	May 17, 2023, 3:40:20 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	gyto9uvofdy	EOR101	16.56 s	May 17, 2023, 3:39:59 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	4986465132	EOR101	16.26 s	May 17, 2023, 3:39:36 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	8974565132198	EOR101	15.9 s	May 17, 2023, 3:39:12 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	464635465	EOR101	16.46 s	May 17, 2023, 3:38:50 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	78413651	EOR101	17.19 s	May 17, 2023, 3:34:46 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	hgo8uyfcghcmj	EOR101	16.59 s	May 17, 2023, 3:27:13 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	+985+6	EOR101	16.12 s	May 17, 2023, 3:25:36 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	4361321	EOR101	16.2 s	May 17, 2023, 3:25:15 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	5354351	EOR101	16.13 s	May 17, 2023, 3:24:53 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	5+656	EOR101	16.09 s	May 17, 2023, 3:24:31 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	5+646+654	EOR101	16.24 s	May 17, 2023, 3:21:55 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	46435	EOR101	16.09 s	May 17, 2023, 3:21:34 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	46+46516	EOR101	16.23 s	May 17, 2023, 3:20:11 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	684654	EOR101	16.14 s	May 17, 2023, 3:19:50 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	56846235132	EOR101	16.34 s	May 17, 2023, 3:19:26 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	46846	EOR101	16.35 s	May 17, 2023, 3:19:04 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	46854321231	EOR101	16.54 s	May 17, 2023, 3:18:42 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	y8iuoihiukg	EOR101	17.4 s	May 17, 2023, 3:17:53 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	8789	EOR101	16.1 s	May 17, 2023, 3:16:52 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	798465	EOR101	16.19 s	May 17, 2023, 3:16:08 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	4654	EOR101	16.41 s	May 17, 2023, 3:15:47 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	ashgasdas	EOR101	16.17 s	May 17, 2023, 3:15:26 PM	✓	Passed	Battery Validation
<input type="checkbox"/>	Nl_Connect_Battery_Test.seq	1324	EOR101	23.29 s	May 17, 2023, 3:13:10 PM	✓	Passed	Battery Validation

## Exercise 2: SLE + TestStand Integration

1. Double-Click "Mobile Device Test.seq - Shortcut" from your Desktop



## Exercise 2: SLE + TestStand Integration

NI TestStand (64-bit) - Sequence Editor [Edit]

File Edit View Execute Debug **Configure** Source Control Tools Window Help

Sequence Editor Options...  
 Station Options...  
 Search Directories...  
 External Viewers...  
 Adapters...  
 Environment...  
 IO Configuration Options...  
**Result Processing...**  
 Model Options...

Mobile Device Test seq

Steps: MainSequence

STEP

- Setup (2)
  - Allow user to select which components to fail
  - .N Simulation Dialog
  - .N Initialize Test Fixture
  - <End Group>
- Main (10)
  - C Power On Test
    - If the Power Test fails, do not test any additional com
    - f
    - C Battery Voltage Test
      - L LCD Video Test
        - RF Test
        - Audio Test
        - User Input Test
      - Else
        - Power Diagnostics
      - End
    - <End Group>
  - Cleanup (1)
    - .N Disconnect Test Fixture
    - <End Group>

Result Processing

Active Configuration: <Default for Inline Processing> Reset to Defaults... Advanced...

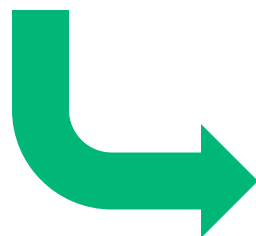
Output Name	Enabled	Display	Options	New Thread
Report	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ATML 5.00 Standards Report Document (tr5_hor	Yes
NI SystemLink Test Monitor Client	<input checked="" type="checkbox"/>		Data Reporting, Report Uploading, Status Tags	Yes
Database	<input type="checkbox"/>		Generic Recordset (NI)	Yes
Offline Results File	<input type="checkbox"/>		C:\Users\Public\Documents\National Instrument	Yes

Help  Show More Options OK Cancel

## Exercise 2: SLE + TestStand Integration

The 'Result Processing' dialog box is shown with the 'Active Configuration' set to '<Default for Inline Processing>'. The 'Offline Results File' row is selected in the table below. A context menu is open over the 'New Thread' column for this row, with 'NI SystemLink Test Monitor Client' highlighted.

Output Name	Enabled	Display	Options	New Thread
Report	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ATML 5.00 Standards Report Document (tr5_horizontal.xml)	Yes
Database	<input type="checkbox"/>		Generic Recordset (NI)	Yes
Offline Results File	<input type="checkbox"/>		C:\Users\Public\Documents\National Instruments\TestStand 2	Yes



The 'Result Processing' dialog box is shown with the 'Active Configuration' set to '<Default for Inline Processing>'. The 'NI SystemLink Test Monitor Client' row is selected in the table below. The 'Enabled' checkbox for this row is checked and highlighted with a green box. The 'OK' button at the bottom right is also highlighted with a green box.

Output Name	Enabled	Display	Options	New Thread
Report	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ATML 5.00 Standards Report Document (tr5_hor	Yes
NI SystemLink Test Monitor Client	<input checked="" type="checkbox"/>		Data Reporting, Report Uploading, Status Tags	Yes
Database	<input type="checkbox"/>		Generic Recordset (NI)	Yes
Offline Results File	<input type="checkbox"/>		C:\Users\Public\Documents\National Instrument	Yes

## Exercise 2: SLE + TestStand Integration

NI TestStand (64-bit) - Sequence Editor [Edit]

File Edit View Execute Debug Configure Source Control Tools Window Help

Mobile Device Test.seq

Step Types

Python

Tests

- Pass/Fail Test
- Numeric Limit Test
- Multiple Numeric Limit Test
- String Value Test

Action

FTP Files

Additional Results

Sequence Call

Statement

Property Loader

Label

Message Popup

Call Executable

Flow Control

Synchronization

Database

Data Streams

LabVIEW Utility

LabVIEW NXG Utility

SystemLink

Get Notification Strategies

Step: MainSequence

	DESCRIPTION	SETTINGS
- Setup (2)		
Allow user to select which components to fail		
.N Simulation Dialog	Action, NationalInstruments.TestStand.Examples.MobileDeviceD...	Batch
.N Initialize Test Fixture	Action, NationalInstruments.TestStand.Examples.MobileDeviceD...	
<End Group>		
- Main (10)		
C Power On Test	Pass/Fail Test, PowerOnTest (MobileDeviceTest.dll)	Pre Expression
If the Power Test fails, do not test any additional components		
** f	NOT FAIL: Power On Test	Result Recording: Disabled
C Battery Voltage Test	Numeric Limit Test, 3.65 <= x <= 3.8, volt, BatteryVoltageTest (M...	Pre Expression
L LCD Video Test	Multiple Numeric Limit Test, LCD Display Test.vi, Number of Meas...	
RF Test	Call RF Test in <Current File>	
Audio Test	Call Audio Test in <Current File>	
User Input Test	Call User Input Test in <Current File>	
Else		
Power Diagnostics	Call Power Diagnostics in <Current File>	
End		
<End Group>		
- Cleanup (1)		
.N Disconnect Test Fixture	Action, NationalInstruments.TestStand.Examples.MobileDevic...	
<End Group>		

UUT Information

Enter UUT Serial Number:

OK Stop



## Accessing Each Result

Started	Program Name	Serial Number	Status Type	System	Elapsed (min)	ID
2023-05-18 03:54:32	NI_Connect_Battery_Test.seq		FAILED	EOR101	12.0	a6000909-42b4
2023-05-18 03:52:25	NI_Connect_Battery_Test.seq	54365	PASSED	EOR101	12.0	f352924d-ae92-
2023-05-18 01:16:09	NI_Connect_Battery_Test.seq	546	PASSED	EOR101	19.5	721e283c-2959-
2023-05-18 00:02:00	NI_Connect_Battery_Test.seq	65	FAILED	EOR101	20.4	36e6cbf9-3526-
2023-05-18 00:01:28	NI_Connect_Battery_Test.seq	465465	FAILED	EOR101	22.6	11f15ada-46b0-4
2023-05-18 00:01:00	NI_Connect_Battery_Test.seq	dafd	FAILED	EOR101	22.2	31ff7f8d-4bd0-4
2023-05-18 00:00:17	NI_Connect_Battery_Test.seq	68465	TERMINATED	EOR101	17.3	ecd63582-a53a-
2023-05-17 15:40:20	NI_Connect_Battery_Test.seq	hoijop;o	PASSED	EOR101	16.1	0efba643-a762-
2023-05-17 15:39:59	NI_Connect_Battery_Test.seq	gyto9uvofdy	PASSED	EOR101		
2023-05-17 15:39:36	NI_Connect_Battery_Test.seq	4986465132	PASSED	EOR101		



Results / NI\_Connect\_Battery\_Test.seq

Test program	Workspace	Hostname
NI_Connect_Battery_Test.seq	NI Connect 2023 Hands-on 01	EOR101
Status	Dashboard	Author
✖ Failed	<a href="#">Dashboard Link</a>	Kangin Choi

Steps Files Data tables

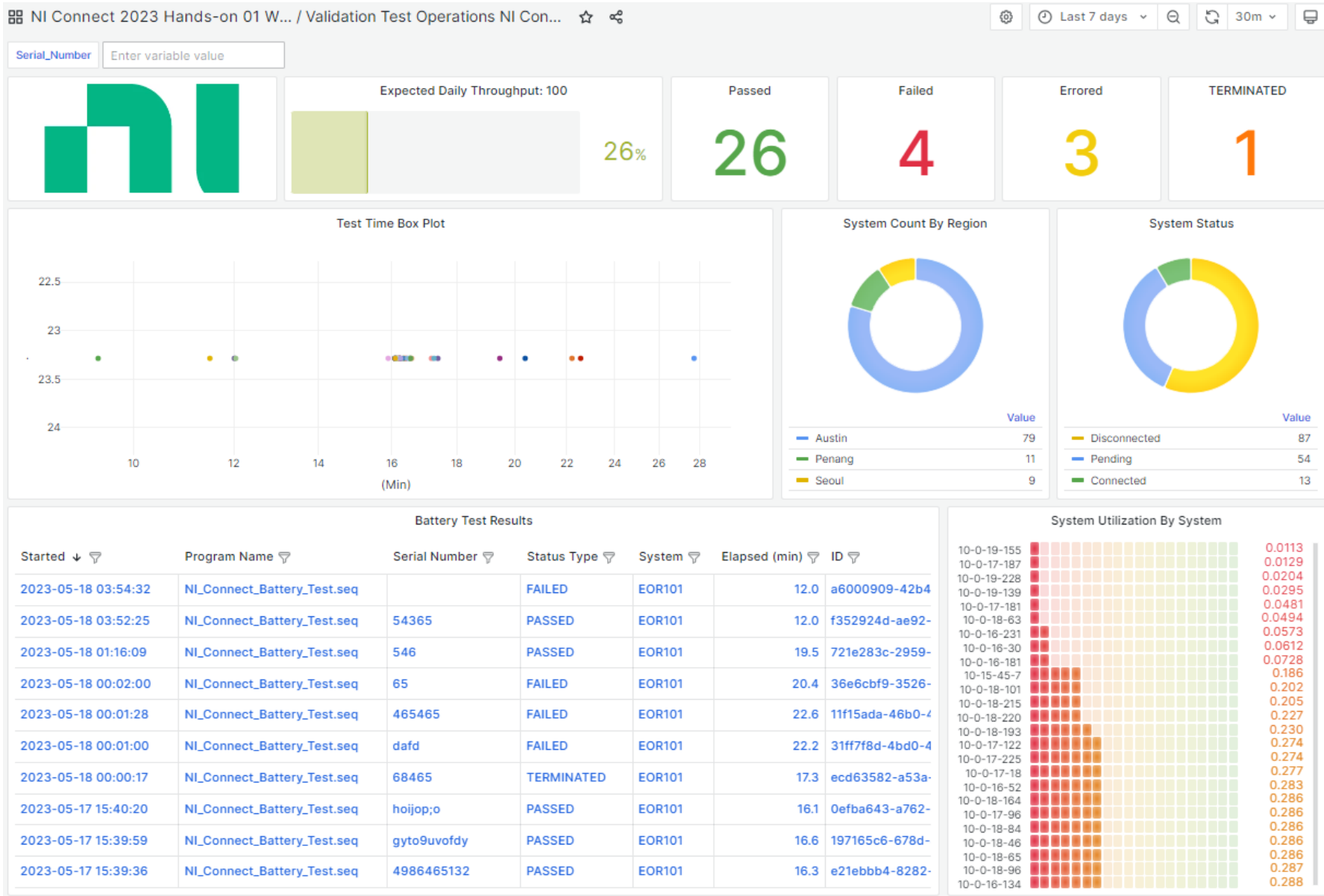
Steps (16)

Steps	Elapsed time	Measurement name
MainSequence Callback	✖ 12.05 s	

# Workflow Example: Test Engineer Overseeing Multiple Sites

1. Planning and Coordination:
  1. Allocate appropriate resources
  2. Keep track of Operational Efficiency and specify tasks for each site
2. Test Environment Setup:
  1. Ensure that site has the necessary infrastructure and resources for testing.
  2. Coordinate with the site teams to set up the required hardware and software
3. Test Execution:
  1. Monitor the progress of testing activities across different sites
  2. Ensure that test results are documented accurately
- 4. Defect Management:**
  - 1. Review and prioritize reported defects**
  - 2. Conduct root cause analysis for critical defects**
5. Test Reporting and Documentation:
  1. Consolidate test results and generate comprehensive reports
  2. Continuous Improvement

# Accessing the Overall Dashboard





## Filter Out Result

Battery Test Results						
Started ↓	Program Name	Serial Number	Status Type	System	Elapsed (min)	ID
2023-05-18 03:54:32	NI_Connect_Battery_Test.seq				12.0	a6000909-42b4
2023-05-18 03:52:25	NI_Connect_Battery_Test.seq	54365			12.0	f352924d-ae92-
2023-05-18 01:16:09	NI_Connect_Battery_Test.seq	546			19.5	721e283c-2959-
2023-05-18 00:02:00	NI_Connect_Battery_Test.seq	65			20.4	36e6cbf9-3526-
2023-05-18 00:01:28	NI_Connect_Battery_Test.seq	465465			22.6	11f15ada-46b0-4
2023-05-18 00:01:00	NI_Connect_Battery_Test.seq	dafd			22.2	31ff7f8d-4bd0-4
2023-05-18 00:00:17	NI_Connect_Battery_Test.seq	68465			17.3	ecd63582-a53a-
2023-05-17 15:40:20	NI_Connect_Battery_Test.seq	hoijop;o			16.1	0efba643-a762-
2023-05-17 15:39:59	NI_Connect_Battery_Test.seq	gyto9uvofdy			16.6	197165c6-678d-
2023-05-17 15:39:36	NI_Connect_Battery_Test.seq	4986465132	PASSED	EOR101	16.3	e21ebbb4-8282-

Filter by values: Tr

- (Blanks)
- +985+6
- 12361
- 123612
- 131631

Ok Cancel

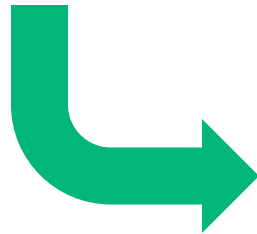
# Filter Out Result

Results / NI\_Connect\_Battery\_Test.seq

Test program	Workspace	Hostname
NI_Connect_Battery_Test.seq	NI Connect 2023 Hands-on 01	EOR101
Status	Dashboard	Author
✖ Failed	<a href="#">Dashboard Link</a>	Kangin Choi

Steps **Files** Data tables

- Steps (16)
- Steps
- MainSequence Callback



Results / NI\_Connect\_Battery\_Test.seq (54365)

Test program	Workspace	Hostname
NI_Connect_Battery_Test.seq	NI Connect 2023 Hands-on 01	EOR101
Status	Dashboard	Author
✔ Passed	<a href="#">Dashboard Link</a>	Kangin Choi

Steps **Files** Data tables

Upload files

<input type="checkbox"/>	Name	Extension	Created
<input type="checkbox"/>	SystemsSoftwareReport.csv	csv	May 18, 2023, 3:52:29 AM
<input type="checkbox"/>	Assets Report 202305180852286521.csv	csv	May 18, 2023, 3:52:28 AM
<input type="checkbox"/>	NI_Connect_Battery_Test_Report[35225AM][5182023].xml	xml	May 18, 2023, 3:52:04 AM
<input type="checkbox"/>	discharge.csv	csv	May 18, 2023, 3:51:56 AM

# Testing Time Box Plot



Results / NI\_Connect\_Battery\_Test.seq (123612)

Test program	Workspace	Hostname
NI_Connect_Battery_Test.seq	NI Connect 2023 Hands-on 01	EOR101
Status	Dashboard	Author
✘ Errored	<a href="#">Dashboard Link</a>	Kangin Choi

Steps | Files | Data tables

Steps (11)

Steps	Elapsed time	Measurement name
MainSequence Callback	✘ 27.72 s	

# Workflow Example: Test Engineer Overseeing Multiple Sites

1. Planning and Coordination:
  1. Allocate appropriate resources
  2. Keep track of Operational Efficiency and specify tasks for each site
2. Test Environment Setup:
  1. Ensure that site has the necessary infrastructure and resources for testing.
  2. Coordinate with the site teams to set up the required hardware and software
3. Test Execution:
  1. Monitor the progress of testing activities across different sites
  2. Ensure that test results are documented accurately
4. Defect Management:
  1. Review and prioritize reported defects
  2. Conduct root cause analysis for critical defects
- 5. Test Reporting and Documentation:**
  - 1. Consolidate test results and generate comprehensive reports**
  - 2. Continuous Improvement**

## Accessing Each Result

Battery Test Results						
Started ↓	Program Name	Serial Number	Status Type	System	Elapsed (min)	ID
2023-05-18 03:54:32	NI_Connect_Battery_Test.seq		FAILED	EOR101	12.0	a6000909-42b4
2023-05-18 03:52:25	NI_Connect_Battery_Test.seq	54365	PASSED	EOR101	12.0	f352924d-ae92-
2023-05-18 01:16:09	NI_Connect_Battery_Test.seq	546	PASSED	EOR101	19.5	721e283c-2959-
2023-05-18 00:02:00	NI_Connect_Battery_Test.seq	65	FAILED	EOR101	20.4	36e6cbf9-3526-
2023-05-18 00:01:28	NI_Connect_Battery_Test.seq	465465	FAILED	EOR101	22.6	11f15ada-46b0-4
2023-05-18 00:01:00	NI_Connect_Battery_Test.seq	dafd	FAILED	EOR101	22.2	31ff7f8d-4bd0-4
2023-05-18 00:00:17	NI_Connect_Battery_Test.seq	68465	TERMINATED	EOR101	17.3	ecd63582-a53a-
2023-05-17 15:40:20	NI_Connect_Battery_Test.seq	hoijop;o	PASSED	EOR101	16.1	0efba643-a762-
2023-05-17 15:39:59	NI_Connect_Battery_Test.seq	gyto9uvofdy	PASSED	EOR101		
2023-05-17 15:39:36	NI_Connect_Battery_Test.seq	4986465132	PASSED	EOR101		



Results / NI\_Connect\_Battery\_Test.seq

Test program	Workspace	Hostname
NI_Connect_Battery_Test.seq	NI Connect 2023 Hands-on 01	EOR101
Status	Dashboard	Author
✘ Failed	<a href="#">Dashboard Link</a>	Kangin Choi

Steps Files Data tables

Steps (16)

Steps	Elapsed time	Measurement name
MainSequence Callback	✘ 12.05 s	



# Accessing Each Result

Results / NI\_Connect\_Battery\_Test.seq

Test program	Workspace	Hostname
NI_Connect_Battery_Test.seq	NI Connect 2023 Hands-on 01	EOR101
Status	Dashboard	Author
✖ Failed	<a href="#">Dashboard Link</a>	Kangin Choi



Steps Files Data tables

Steps (16)

Steps

MainSequence Callback

NI Connect 2023 Hands-on 01 W... / NI Connect Battery Report

Table Id	6465e7bf7314d8cfd7e51e14	Metadata ID	6465e7d71634a2b4b67ac05		
Requestor	Test Engineer	Test Name	Battery ID	Test System	Battery Serial Num...
<b>KCHOI</b>	<b>Peter Bryant</b>	<b>DC_NI_EE_895</b>	<b>DC19513K41354</b>	<b>BTS02</b>	<b>DJLKJGH54989</b>

Voltage

Current

Temperature

Test Metadata	
Name	Value
SystemID	BTS02
CyclerID	None
CctID	SDI0856A
BatteryID	DC19513K41354
BatterySpec	DC_NI_EE_895
TestRequest	6/19/2020
TestEngineer	Peter Bryant
Project	Battery Pack
TestName	DC_NI_EE_895
DataFile	C_DHJ+456132
StartDate	6/19/2020
StartTime	4_45_12
Description	DC_NI_EE
PartNumber	NA
Manufacturer	NA
MaxVoltage	4.005
MinVoltage	3.45
MaxTemp	25
RatedCapacity	1.856487421
FirstActualCapacity	1.84455

# PA in Experience Lounge

## Test & Edge Orchestration

**Story:** Demonstrate the connection between orchestrating test, streaming data for observability, and using that data stream for action implementation

**Value:** An edge infrastructure designed around these principals gives product organizations the most reliable and fastest access to product-data, and therefore, the right framework for targeted improvements and automation.

### Planned Demos

1. Accel Utilization & Procurement

2. Edge Decisioning

3. CM Management

## Engineering & Design Analysis

**Story:** Demonstrate how the complexities of design collaboration across engineering and validation are simplified with a common platform for analysis

**Value:** A predefined data management tool for all engineering data enables faster and more effective analysis, leading to faster decisions, more innovation, and accelerated launch schedules.

1. DIY Analysis Toolset (Battery Analysis)

2. Canned Analysis Packages (Rajasthan for Semi)

## Production & Unit Analytics

**Story:** Demonstrate how the alignment, correlation, and modeling of product-data to process inputs is foundational for uncovering key insights to improve target production KPIs

**Value:** A Unified Data Model mapping genealogy of components, metadata of process events, and T&M product results unlocks deeper analytics correlations and models to enable activities that will have the biggest impact on the highest priority KPIs.

1. Wafer Classification

2. Line Optimization



# SystemLink Expert Panel and AMA (Ask Me Anything)

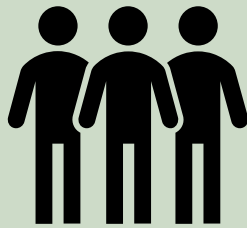
Join SystemLink experts from NI partners, R&D, product marketing, and services to discuss the current and future state of SystemLink. Hear perspectives on data management best practices, the role of AI in the future of test and measurement, and exciting features on the SystemLink roadmap.

**When:** Wednesday, May 24<sup>th</sup>  
3:30 to 4:30 PM

**Where:** Ballroom G, ACC

## Audience:

- Existing SystemLink customers interested in expanding their skills and hearing from experts on best practices
- Validation and production engineers interested in understanding more about data management, analytics, or asset management
- Anyone with curiosity or questions around the future of software-driven test, validation and production



## Panelists:

Joshua Prewitt, Chief Product Manager at NI

Barry Hutt, CRO and Co-Founder for Viviota Software

Matthew Vaterlaus, Chief Engineer for SystemLink

Matt Holt, Principal Solutions Architect

Panel Moderator: Zoe Bohnen, Manager of Customer Success

# Give us your feedback!

## Quick 2 Question Survey

In the mobile app, click into the session you would like to provide feedback for

The screenshot shows a mobile app interface for Tuesday, May 23. At the top, there are navigation icons (hamburger menu, funnel, magnifying glass) and a date selector showing 'Tue May 23' with 'MAY 22', 'MAY 23', and 'MAY 24' options. Below the date selector is a list of sessions:

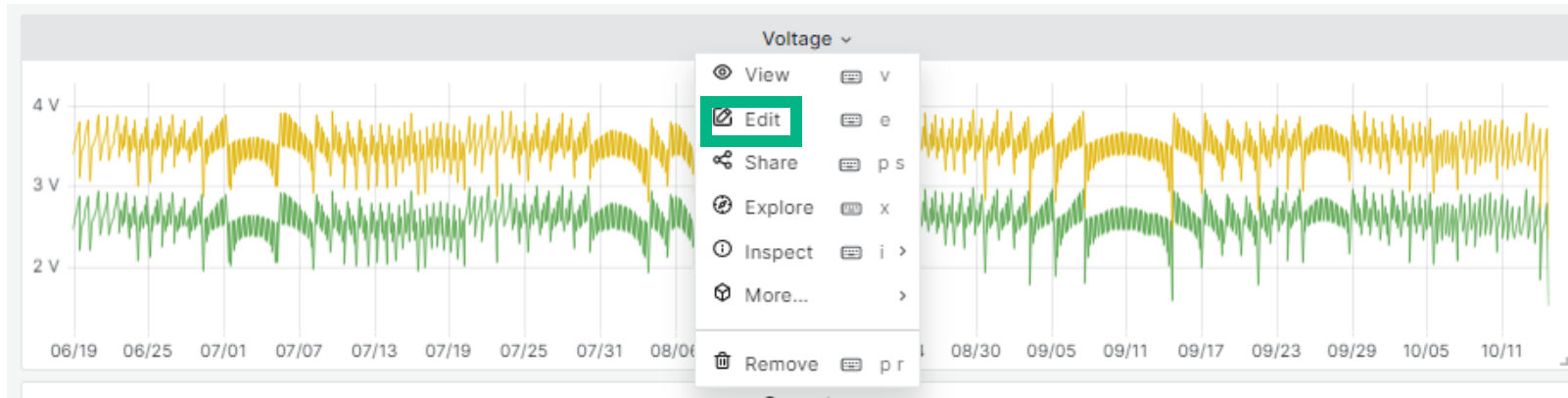
- 10:15 AM - 11:15 AM** Multichannel RF Data Recording and Analysis  
Meeting Room 19A  
Aerospace & Defense • Technical Session
- 10:15 AM - 11:15 AM** Optimizing Validation Processes: Building Complex Test Systems with Distributed I/O  
Meeting Room 19B  
Aerospace & Defense • Technical Session
- 10:15 AM - 11:15 AM** Panel: Continuous Integration (CI/CD)—Don't Leave Home without It  
Meeting Room 12A  
Programming Essentials • Technical Session
- 10:15 AM - 11:15 AM** Using Python and TestStand to Boost Your Test Development  
Ballroom G  
Product & Technology • Technical Session
- 10:15 AM - 11:15 AM** What Does Left Shifting Test Mean in the NI Ecosystem?  
Meeting Room 18A  
Transportation • Technical Session

The screenshot shows the details for the session 'Optimizing Validation Processes: Building Complex Test Systems with Distributed I/O' on Tuesday, May 23, from 10:15 AM to 11:15 AM. At the top, there are options to 'Add to Schedule', 'iCal', and 'Check In'. Below the session title, it shows the location 'Map Meeting Room 19B' and 'Aerospace & Defense • Technical Session'. A 'Surveys' section is visible, containing a button labeled 'Take Session Survey'. Below this, there is a paragraph of text:

In this session, learn to improve efficiency and reduce non-recurring engineering costs in validation labs by connecting multiple distributed line-replaceable unit (LRU) test systems. Also learn how to abstract LRUs and construct complex test systems faster and more efficiently using existing distributed I/O and edge computation technology.

Click “Take the Session Survey”

## Exercise 3 (Optional): Customizing your dashboard



Query 1 Transform 2

Data source SystemLink Data Frames ? > Query options MD = auto =

A (SystemLink Data Frames)

Id \$tableId

Columns ? Date\_Time x Voltage\_measured x ?

Decimation ? Current\_measured

Filter nulls ? Temperature\_measured

Use time range Current\_charge

Voltage\_charge

Capacity

ambient\_temperature

index

## Exercise 3 (Optional): Customizing your dashboard

Time series ▼ >

Q Search options

All Overrides

Panel options

Title

Voltage

Description

Transparent background



Q Search for... ^

Visualizations Suggestions Library panels

**Time series**  
Time based line, area and bar charts

**Bar chart**  
Categorical charts with group support

**12.4** **Stat**  
Big stat values & sparklines

**Gauge**  
Standard gauge visualization

**Bar gauge**  
Horizontal and vertical gauges

**Table**  
Supports many column styles

**Pie chart**  
The new core pie chart visualization

**State timeline**  
State changes and durations

# Exercise 3 (Optional): Customizing your dashboard

The screenshot shows the NI Connect interface with a voltage waveform and a metadata table. The top panel is titled "NI Connect Battery Re... / Edit Panel" and includes a "Time series" section with a search bar and "All" and "Overrides" tabs. The "Panel options" section has fields for "Title" (Voltage) and "Description". The "Transparent background" toggle is turned off. The "Panel links" and "Repeat options" sections are collapsed. The "Apply" button is highlighted with a green box. The bottom panel is titled "NI Connect 2023 Hands-on 01 W... / NI Connect Battery Report" and includes a "Query" section with "Query 1" and "Transform 2" buttons. The "Data source" is "SystemLink Data Frames". The "Table view" section shows "Table Id" and "Metadata ID" fields. The "Requestor" field is "KCHOI", "Test Engineer" is "Peter Bryant", "Test Name" is "DC\_NI\_EE\_895", "Battery ID" is "DC19513K41354", "Test System" is "BTS02", and "Battery Serial Num..." is "DJLKJGH54989". The "Voltage" waveform is shown below the metadata table. The "Test Metadata" table is shown to the right of the waveform.

Name	Value_
SystemID	BTS02
CyclerID	None
CctID	SDI0856A
BatteryID	DC19513K41354
BatterySpec	DC_NI_EE_895

# Exercise 3 (Optional): Customizing your dashboard

