



The logo for NIDays Engineer Next is centered on a blue gradient background. It features the text "NIDays" in white, enclosed within a white rectangular border. To the right of this, the words "ENGINEER" and "NEXT" are stacked vertically in a large, bold, white sans-serif font. A yellow graphic element, consisting of three parallel lines forming a stylized arrow or chevron shape, is positioned between the two words. The background is decorated with several diagonal stripes: a wide green stripe, an orange stripe, and a red stripe on the left side, and several blue stripes of varying shades on the right side.

NIDays **ENGINEER**
NEXT

Managing Deployed and Distributed Systems

NI SystemLink EAR

Dr. Fabian Wehnekamp

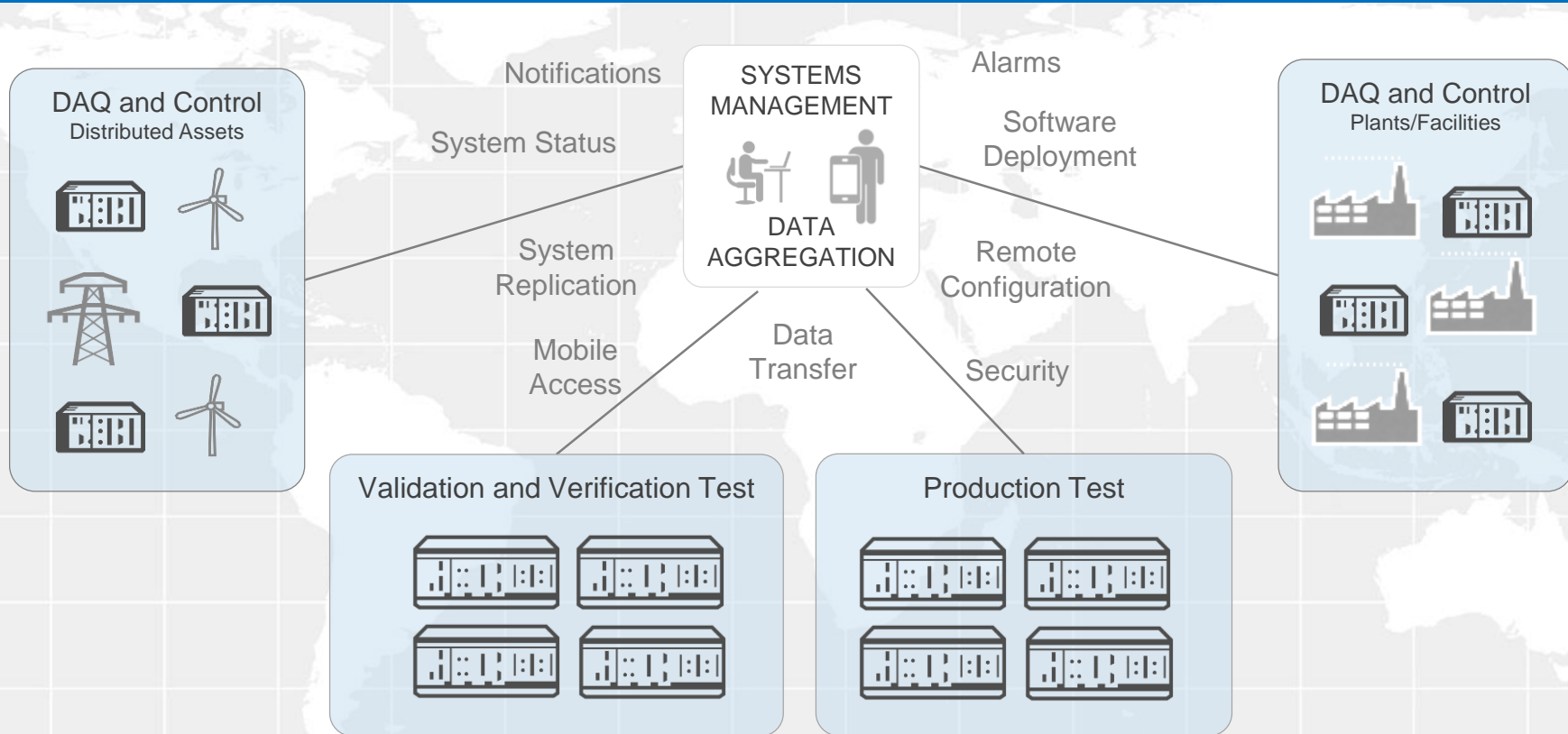
Applications Engineer

Agenda

- Introduction and Product Overview
- Demonstrations:
 - Systems Management
 - Data Communications
- Product Roadmap
- Release Outlook

Challenge: Managing Deployed Systems

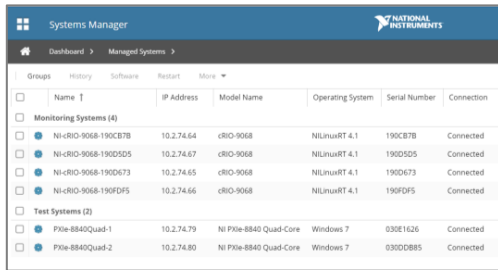
Customers with distributed systems often encounter challenges in the management of devices, software, and data



SystemLink™

EARLY ACCESS RELEASE

Manage distributed systems with web application software that enables mass software deployment, device management, and data communications.



The screenshot shows the 'Systems Manager' web interface with a table of connected systems. The table has columns for Name, IP Address, Model Name, Operating System, Serial Number, and Connection. It lists two groups: 'Monitoring Systems (4)' and 'Test Systems (2)'. The 'Monitoring Systems' group includes four NI cRIO-9068 units with various IP addresses and serial numbers, all connected. The 'Test Systems' group includes two NI PXIe-8840 Quad-Core units, one running Windows 7 and the other running Windows 7, both connected.

Groups	Name	IP Address	Model Name	Operating System	Serial Number	Connection
Monitoring Systems (4)						
<input type="checkbox"/>	NI-cRIO-9068-190C87B	10.2.74.64	cRIO-9068	NILinuxRT 4.1	190C87B	Connected
<input type="checkbox"/>	NI-cRIO-9068-190D5D5	10.2.74.67	cRIO-9068	NILinuxRT 4.1	190D5D5	Connected
<input type="checkbox"/>	NI-cRIO-9068-190D673	10.2.74.65	cRIO-9068	NILinuxRT 4.1	190D673	Connected
<input type="checkbox"/>	NI-cRIO-9068-190D6F5	10.2.74.66	cRIO-9068	NILinuxRT 4.1	190D6F5	Connected
Test Systems (2)						
<input type="checkbox"/>	PXIe-8840Quad-1	10.2.74.79	NI PXIe-8840 Quad-Core	Windows 7	030E1626	Connected
<input type="checkbox"/>	PXIe-8840Quad-2	10.2.74.80	NI PXIe-8840 Quad-Core	Windows 7	030DDB85	Connected

- Track and manage a group of connected systems
- Gain application access via web browser or mobile
- Install on premise or with a cloud service provider

PRODUCT FEATURES



DEVICE MANAGEMENT

Register hardware targets and classify systems through a shared interface.



SOFTWARE CONFIGURATION

Deploy software to multiple remote targets with upgrade, downgrade, and uninstall.

New module available in early 2018



SYSTEM HEALTH MANAGEMENT

Track and manage hardware health with alarms and notifications.

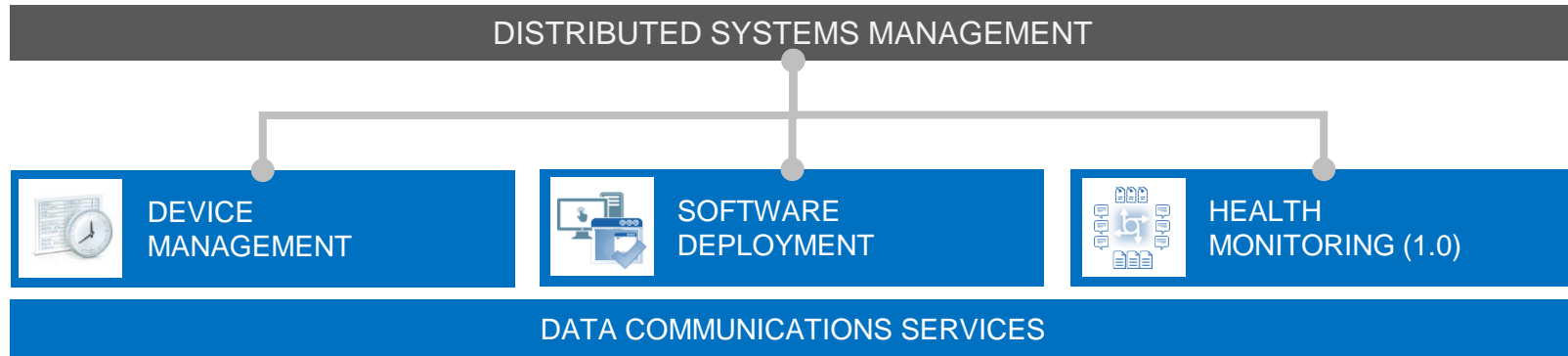


DATA COMMUNICATIONS

Automate data transfer among connected nodes using LabVIEW or web APIs.

SystemLink™ Capabilities

Achieve centralized administration and efficient management of devices, software, and data.



Aligned with enterprise standards and IoT best practices

Device Management

View and manage detailed system and device information

Search systems
across all groups

Track systems
through a central
web interface

Classify systems
into groups

Multiselect to
perform remote
functions in parallel
(e.g., install, restart)

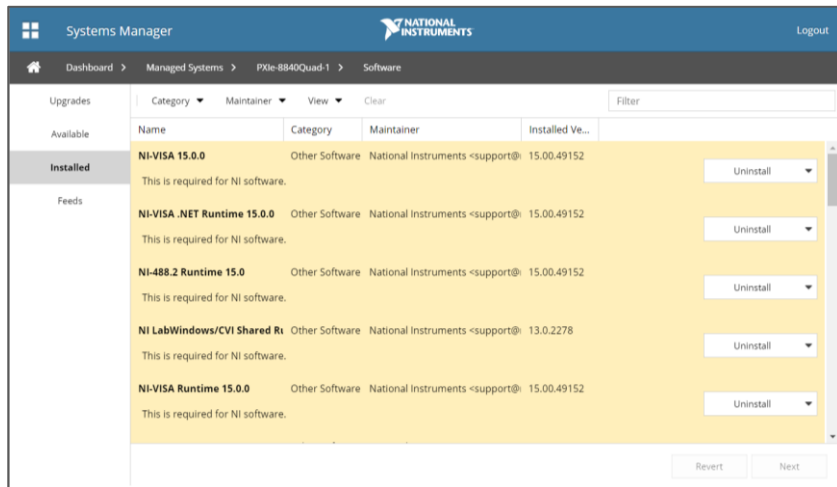
<input type="checkbox"/>	Name	IP Address	Model Name	Operating System	Serial Number	Connection	Comments
Automated Test Systems (2)							
<input type="checkbox"/>	PXIe-8840Quad-1	10.2.74.79	NI PXIe-8840 Quad-Core	Windows 7	030E1626	Connected	Test Station 1
<input type="checkbox"/>	PXIe-8840Quad-2	10.2.74.80	NI PXIe-8840 Quad-Core	Windows 7	030DDB85	Connected	Test Station 2
Control Systems (4)							
<input checked="" type="checkbox"/>	NI-cRIO-9068-190CB7B	10.2.74.64	cRIO-9068	NI Linux RT 4.1	190CB7B	Connected	Test Cell 1
<input checked="" type="checkbox"/>	NI-cRIO-9068-190D5D5	10.2.74.67	cRIO-9068	NI Linux RT 4.1	190D5D5	Connected	Test Cell 2
<input checked="" type="checkbox"/>	NI-cRIO-9068-190D673	10.2.74.65	cRIO-9068	NI Linux RT 4.1	190D673	Connected	Test Cell 3
<input checked="" type="checkbox"/>	NI-cRIO-9068-190FDF5	10.2.74.66	cRIO-9068	NI Linux RT 4.1	190FDF5	Connected	Test Cell 4

Software Deployment

Deploy software installs and updates

- ✓ LabVIEW applications
- ✓ NI drivers
- ✓ Non-NI software
- ✓ Supporting libraries, docs

- Mass deploy software to a group of systems simultaneously
- Update software at a component level
- Install with dependency awareness and install only the software necessary
- Manage version history to allow restoration to a previous software version



SystemLink™
Server



CompactRIO
(NI Linux Real-Time)



Install App

EXE

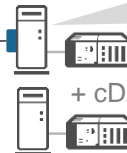
PXI (Windows)



Update Driver

Driver

Windows PC



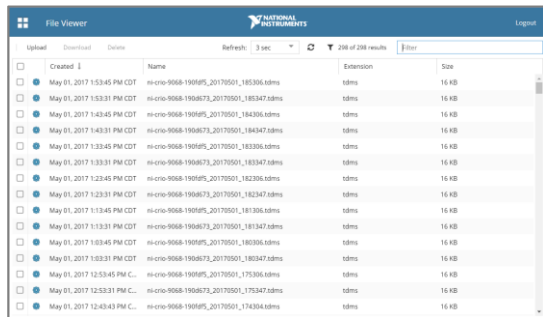
Update App

EXE

Data Communication

Automate and manage data transfer throughout distributed systems

Data Viewers for Files and Tags



Created	Name	Extension	Size
May 01, 2017 1:53:45 PM CDT	ni-cro-9068-1908f5_20170501_185306.adms	adms	16 KB
May 01, 2017 1:53:31 PM CDT	ni-cro-9068-1908f5_20170501_185347.adms	adms	16 KB
May 01, 2017 1:43:45 PM CDT	ni-cro-9068-1908f5_20170501_184306.adms	adms	16 KB
May 01, 2017 1:43:31 PM CDT	ni-cro-9068-1908f5_20170501_184347.adms	adms	16 KB
May 01, 2017 1:33:45 PM CDT	ni-cro-9068-1908f5_20170501_183306.adms	adms	16 KB
May 01, 2017 1:33:31 PM CDT	ni-cro-9068-1908f5_20170501_183347.adms	adms	16 KB
May 01, 2017 1:23:45 PM CDT	ni-cro-9068-1908f5_20170501_182306.adms	adms	16 KB
May 01, 2017 1:23:31 PM CDT	ni-cro-9068-1908f5_20170501_182347.adms	adms	16 KB
May 01, 2017 1:13:45 PM CDT	ni-cro-9068-1908f5_20170501_181306.adms	adms	16 KB
May 01, 2017 1:13:31 PM CDT	ni-cro-9068-1908f5_20170501_181347.adms	adms	16 KB
May 01, 2017 1:03:45 PM CDT	ni-cro-9068-1908f5_20170501_180306.adms	adms	16 KB
May 01, 2017 1:03:31 PM CDT	ni-cro-9068-1908f5_20170501_180347.adms	adms	16 KB
May 01, 2017 12:53:45 PM CDT	ni-cro-9068-1908f5_20170501_175306.adms	adms	16 KB
May 01, 2017 12:53:31 PM CDT	ni-cro-9068-1908f5_20170501_175347.adms	adms	16 KB
May 01, 2017 12:43:43 PM CDT	ni-cro-9068-1908f5_20170501_174304.adms	adms	16 KB

SystemLink™
Server



- Tag Service
- Message Service
- File Service

Web APIs (RESTful)

Tags

CompactRIO
(NI Linux Real-Time)

Messages | Files



Messages

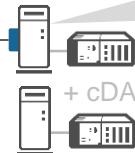
Tags | Files

PXI (Windows)



Files

Windows PC



+ cDAQ

Tags | Messages

LabVIEW APIs

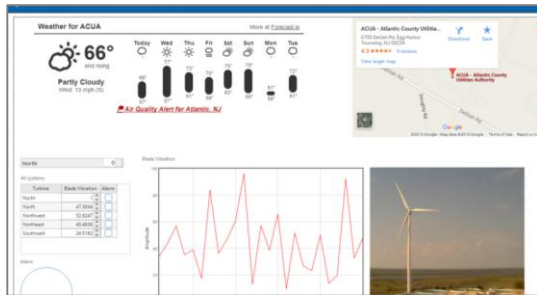
Supports LabVIEW 2014+

Tag API

Msg API

File API

Custom Web Applications



SystemLink™ Architecture



Open and Extensible

APIs for LabVIEW and web services

Compliance with several open-source standards



Cloud-Ready

Installation on premise or in the cloud

Cloud-centric developments on the horizon



Optimized for Distributed Nodes

System functions execute in parallel

Targets, server, and users can be on multiple networks



Secure

Data communications are encrypted via TLS

Secure user access: LDAP and AD integration

SystemLink™ Early Access Release (EAR)



Why Early Access?

- Start adding value for customers
- Allow time for NI software to migrate to packages
- Allow NI to limit marketing and focus on first wave of customers

Notable Package Limitations

- CompactRIO driver not in package format for deployment
- TestStand has limited options for deployment
- Support expanded in both cases in 2018

EAR Customer Benefits

Why should I get involved early?

- Product roadmap influence
- Unique access to product leadership (R&D and product management)
- Ability to deliver value to your business and establish competitive differentiation
- Product quality criteria is similar to the general release

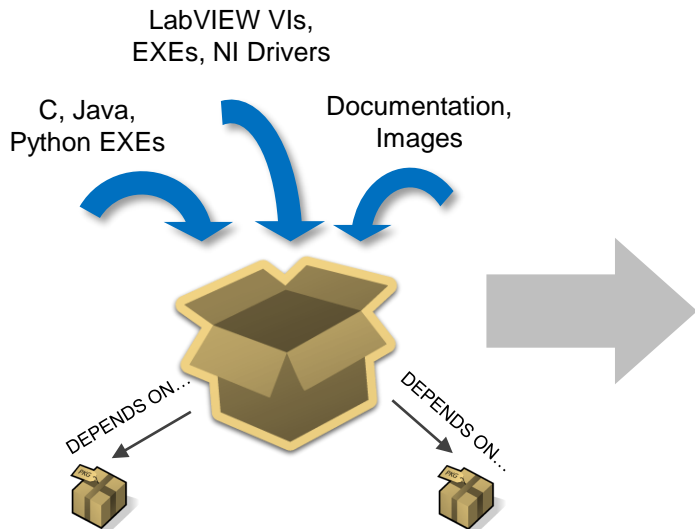
Handling Software Downloads

Software Deployment Process

Integration with package management framework

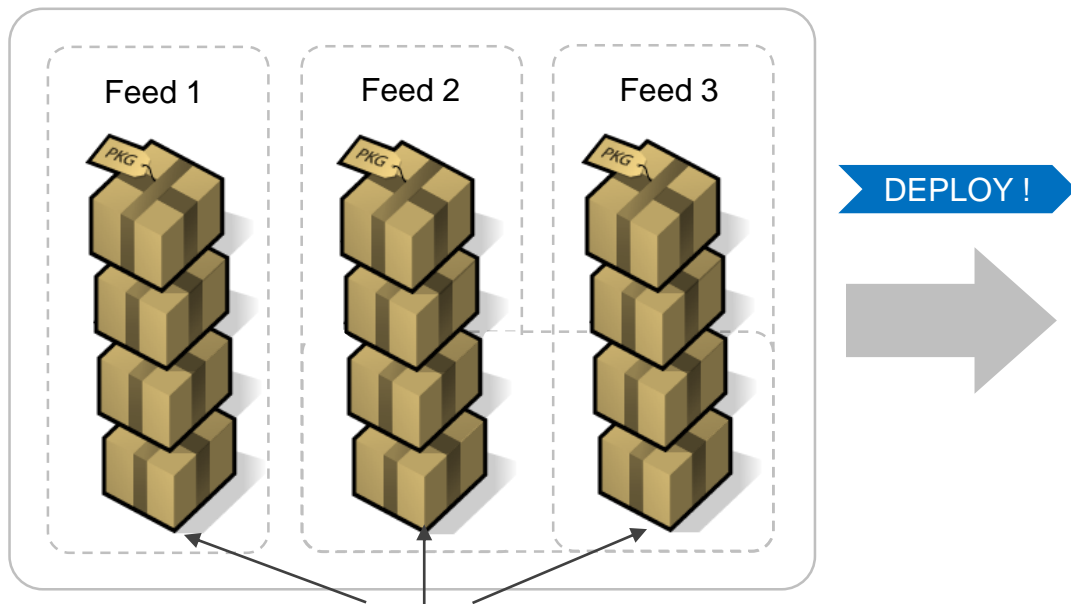
CREATE PACKAGES

A standard container framework for distributing and installing software



UPLOAD TO REPOSITORY

A central location to store software packages for distribution to hardware; typically the SystemLink™ server

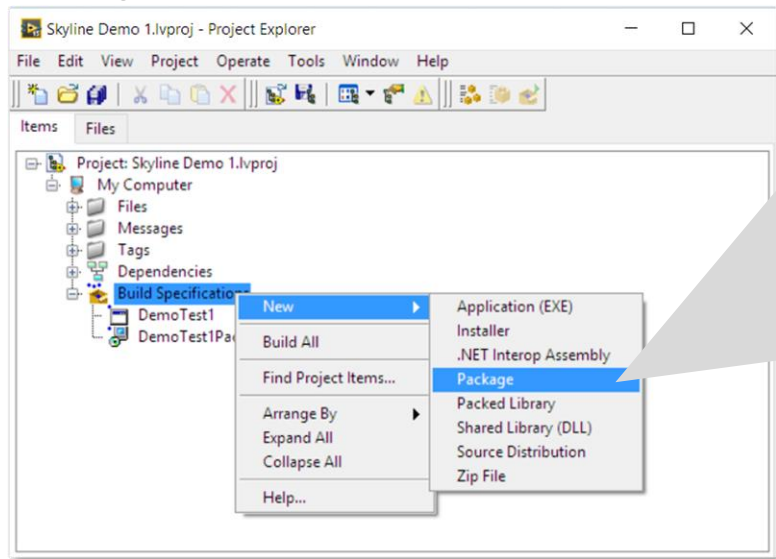


Feeds: Virtual collections of packages to associate with hardware targets

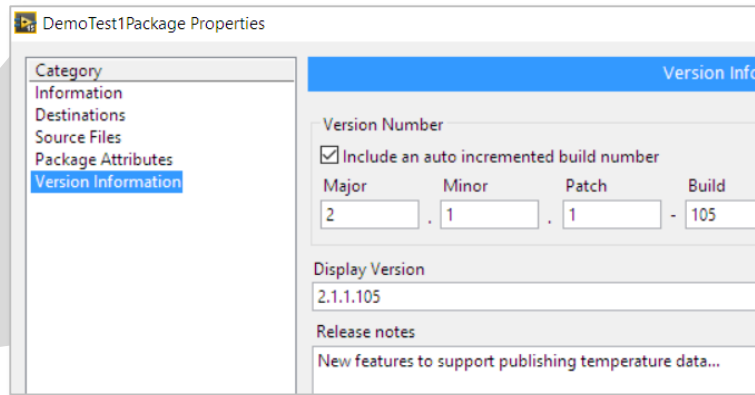
Software Deployment

Creating packages

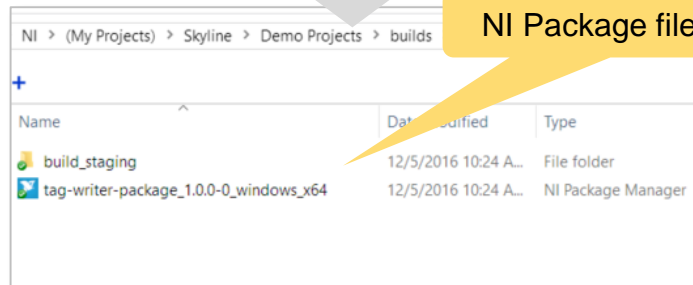
Package creation from LabVIEW:



An “NI Package” is created as a LabVIEW build specification



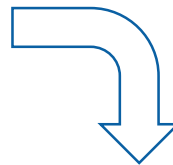
NI Package file on disk



A command-line interface is also available for package creation.

Mass Deployment of Software

Systems Manager					
Dashboard > Managed Systems > Software (NI-cRIO-9068-190CB7B, NI-cRIO-90...					
Summary	Filter				
System Name	IP Address	Created	Last Updated	Pending Status	
NI-cRIO-9068-190CB...	10.2.74.64	June 27, 2017 5:25:59 PM CDT	June 27, 2017 5:25:59 PM CDT	Installing software	
NI-cRIO-9068-190D5...	10.2.74.67	June 27, 2017 5:25:59 PM CDT	June 27, 2017 5:25:59 PM CDT	Installing software	
NI-cRIO-9068-190D6...	10.2.74.65	June 27, 2017 5:25:59 PM CDT	June 27, 2017 5:25:59 PM CDT	Installing software	
NI-cRIO-9068-190FD...	10.2.74.66	June 27, 2017 5:25:59 PM CDT	June 27, 2017 5:25:59 PM CDT	Installing software	



Systems Manager					
Dashboard > Managed Systems > Software (NI-cRIO-9068-190CB7B, NI-cRIO-90...					
Filter					
Summary					
System Name	IP Address	Created	Last Updated	Pending Status	
NI-cRIO-9068-190CB...	10.2.74.64	June 27, 2017 5:25:59 PM CDT	June 27, 2017 5:26:03 PM CDT	✓ Software installation succeeded	
NI-cRIO-9068-190D5...	10.2.74.67	June 27, 2017 5:25:59 PM CDT	June 27, 2017 5:26:03 PM CDT	✓ Software installation succeeded	
NI-cRIO-9068-190D6...	10.2.74.65	June 27, 2017 5:25:59 PM CDT	June 27, 2017 5:26:03 PM CDT	✓ Software installation succeeded	
NI-cRIO-9068-190FD...	10.2.74.66	June 27, 2017 5:25:59 PM CDT	June 27, 2017 5:26:03 PM CDT	✓ Software installation succeeded	

Architecture

Open-Source Technology

SystemLink™ incorporates best-in-class, open-source software technology

Web UI Framework



JavaScript application design

Message Bus



Centrally brokered messaging

Remote Configuration

SALTSTACK

Remote execution engine

Systems Manager



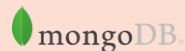
System & Data Security
User Authentication
Data Processing



Web Server



Database



In-Memory Cache



Client
Communication



Supported Platforms

SystemLink Server



Windows Server

- Windows Server 2008 R2, SP1
- Windows Server 2012 R2
- Windows Server 2016



Windows PC

- Windows 7+

SystemLink Clients (Targets)



NI PXI

- Windows 7+



CompactRIO

- NI Linux RT 2017



Windows PC

- Windows 7+



LabVIEW

- 2014–2017 (32-bit and 64-bit)

Real-Time Module

- 2017

LabVIEW NXG

- 2.0 (end of year)

Note: Windows Server and targets must be 64-bit OS.

Software Roadmap

Roadmap

Expanded Deployment

- CompactRIO driver
- LabVIEW RT run time
- TestStand

Deployment Enhancements

- Deployment schedules
- Install and process prioritization
- Job queues for online/offline

System Asset Management

- Utilization reporting
- Inventory and audit history
- Configuration reporting

2018

System Health Management

- Alarms | notifications
- Status and trend
- Visualization

Access and Permissions

- By system node
- By data object (tag/file)

2017

Cloud Marketplace

- Amazon AWS
- Microsoft Azure

2018

Tag Data Visualization

- Standard UI controls
- No programming required

Demonstration

Stay Connected



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youtube.com/nationalinstruments

You do have Questions? Or need more Information?



Always talk to...



NI Staff

OR: Leave a message...

Please add your name, check your request and give it to the event staff:

Company: _____ Full Name: _____
Mobile Phone: _____ Email: _____

Need a call, visit, quote or solution?

☐ Call ☐ Visit ☐ Quote ☐ Solution

Notes: Please leave your comments or specific requirements here, thanks!

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