

# LXI Systems: Present and Future

Rob Purser  
Senior Team Lead  
The MathWorks



***LAN eXtensions for Instrumentation***

*[www.lxistandard.org](http://www.lxistandard.org)*

# Topics

- A walk through 3 user scenarios that show LXI strengths
- Show where current, planned, and needed LXI functionality contribute
- Q&A/Discussion



# The MathWorks?

- Many Test and Measurement problems require MATLAB for analysis
- Integrating Acquisition and Analysis is key to success for many applications
- Customers should be able to choose the “best fit” instruments to build a system



# Why Focus on LXI Systems?

- Customers using LXI can choose “best fit” instruments for their ***systems***
- When LXI provides ***system*** solutions, every customer benefits
- As LXI ***systems*** are created by our customers, every member of the consortia benefits



# What's an *LXI* System?

One (or more) general purpose computers

--- **Connected To** ---

One or more Instruments



LXI



# Three User Scenarios

1. Zero to Data in 60 seconds
2. Diagnostic & Debug
3. Decentralized Automation




# Zero to Data in 60 seconds

- Get users back to work fast
- Reduce *muda* and support costs
- Remove barriers to connecting applications with instrument





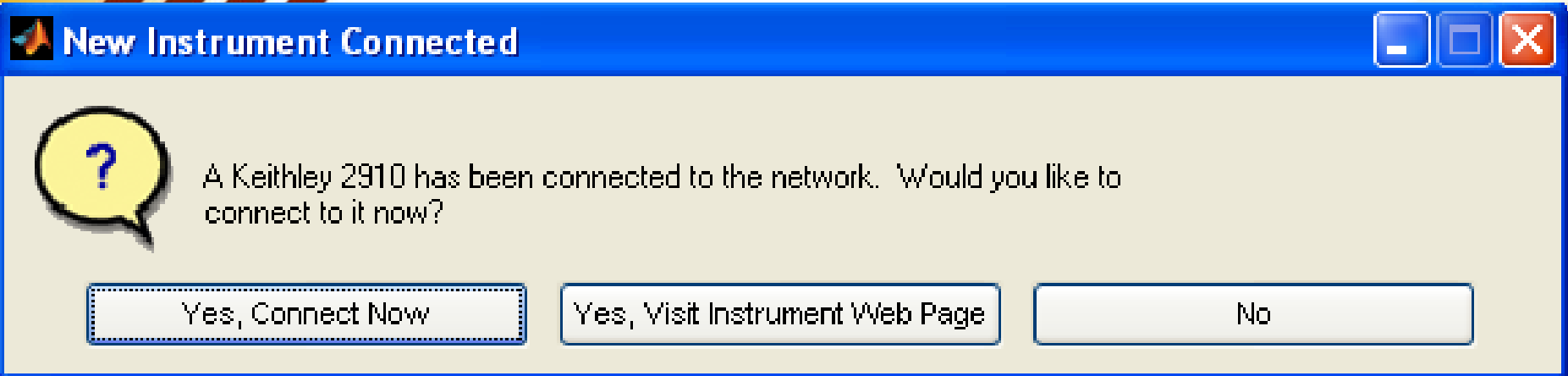
**New Instrument Connected**

 A Keithley 2910 has been connected to the network. Would you like to connect to it now?



**LAN eXtensions for Instrumentation**

[www.lxistandard.org](http://www.lxistandard.org)



LXI



**LAN eXtensions for Instrumentation**

[www.lxistandard.org](http://www.lxistandard.org)

# Zero to Data in 60 seconds: Requirements

- Adoption of mDNS/Bonjour discovery
- Adoption of LXI 1.2 Identification
- To allow automatic download:
  - Add a Field in LXI 1.2 Identification XML
  - Commitment by vendors to maintain a stable download location for installer files



# Diagnostic & Debug

- “View Only” Access to instruments while executing tests
- System-wide event log
- System-wide trigger and bus status interrogation
- Postmortem of trigger events (what happened when)





What Happened?

```

FSQ      Trigger out: LXI1
K2910    Trigger in: LXI1
00:07    DLM      Trigger out: LAN3
00:08    FSQ      Trigger in: LAN3
00:08    K2910    Trigger in: LAN3

```

LXI



**LAN eXtensions for Instrumentation**

[www.lxistandard.org](http://www.lxistandard.org)



LXI



00:05 Trigger in: LXI1

00:08 Trigger in: LAN3



00:05 Trigger out: LXI1

00:08 Trigger in: LAN3



00:07 Trigger out: LAN3

# Diagnostic & Debug: What This Requires

- Adoption of Class B to ensure timestamp synchronization
- Minor Improvements to the IVI Event Log Retrieval
- Standard Log Entries



# Decentralized Automation

- Relies on “Smart Instruments”
- Requires computer & software, but it’s off the critical path – not a bottleneck
- Decrease instrument “dead time”

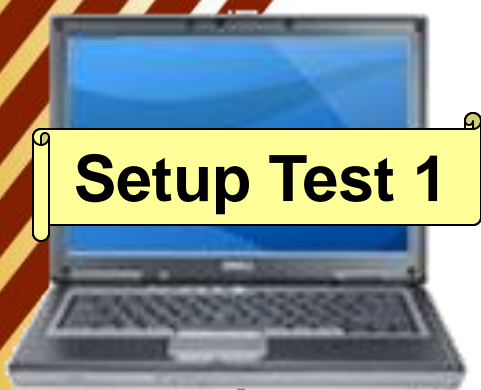




**Test 1 Results:**  
FSQ: Success  
K2910: Success  
DLM: Success

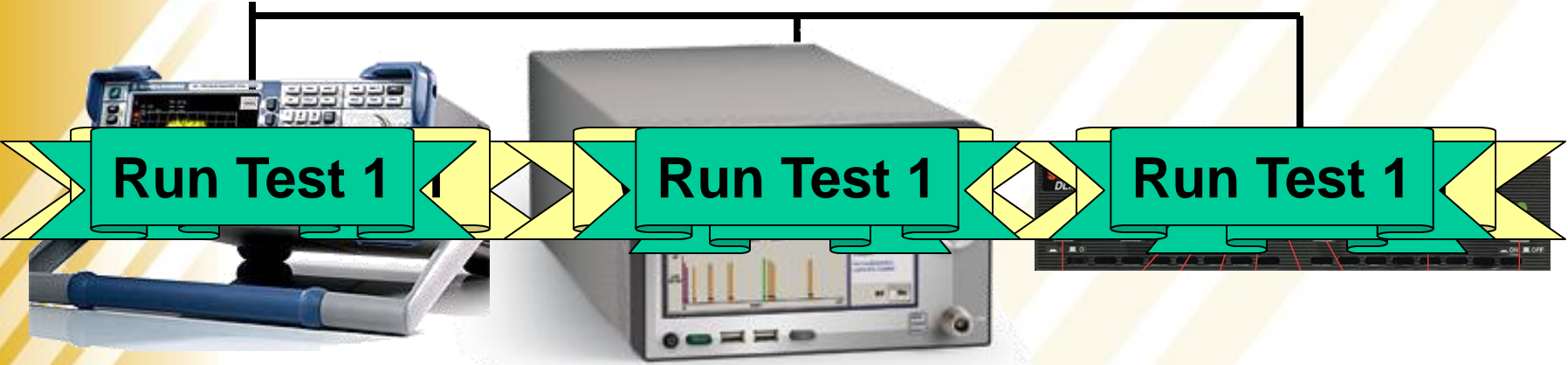
**LXI**





**Setup Test 1**

LXI



**LAN eXtensions for Instrumentation**

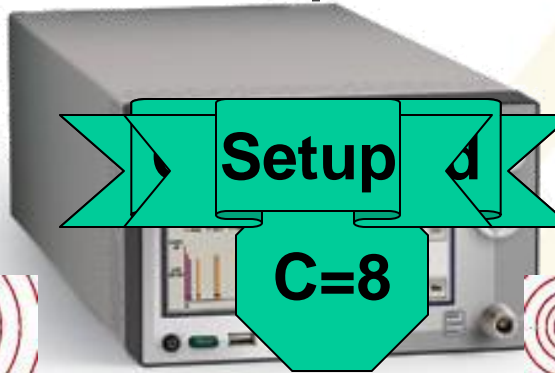
[www.lxistandard.org](http://www.lxistandard.org)

# Setup Test 2

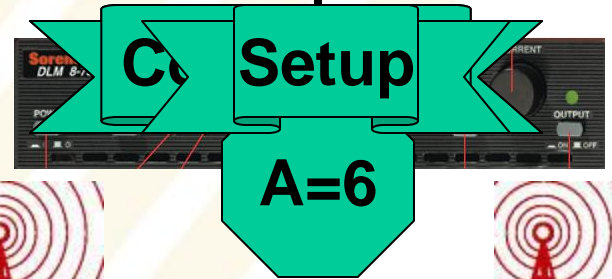
LXI



**Setup**  
**B=3**



**Setup**  
**C=8**

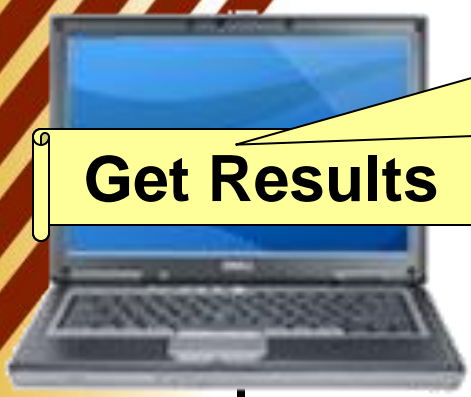


**Setup**  
**A=6**

$A+B > C$   
 $6+3 > 8$   
Success

$A+B > C$   
 $6+3 > 8$   
Success

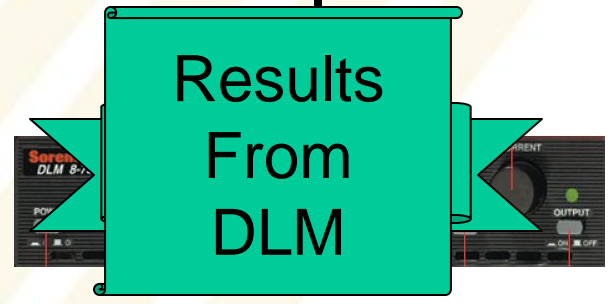
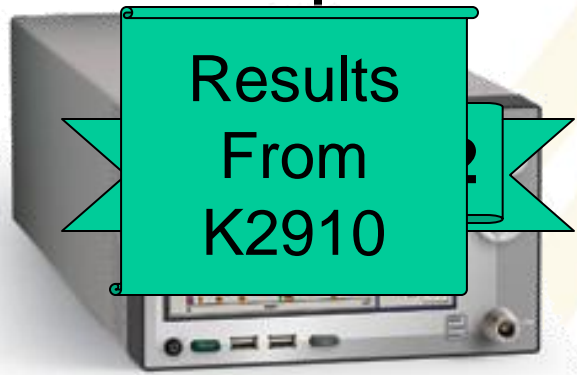
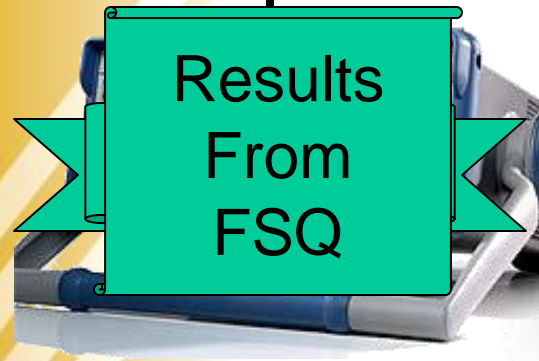
$A+B > C$   
 $6+3 > 8$   
Success



**Get Results**

**Test 1 Results:**  
FSQ: Success  
K2910: Success  
DLM: Success

**LXI**



# What This Requires

- Adoption of LXI Class A&B
- Keep track of 3 tests at once
- While Running
  - Accept configuration for the next test
  - Retrieve Results from the previous test
- Scripting
  - Sequencing
  - Simple Conditionals and Loops
  - Ability to transmit and receive variables
- If you can't do it, let the test exec know!



# Summary: Requirements

- Adoption of mDNS/Bonjour discovery
- Adoption of LXI 1.2 Identification
- Adoption of LXI Class A&B
- Standardized Log Entries
- Keep track of 3 tests at once
- Accept configurations & Retrieve Results while Running
- Scripting
- Ability to transmit and receive variables



# Summary

- Present and future LXI capabilities provide ***system solutions***
- When LXI provides ***system solutions***, every customer benefits
- As the LXI Standard is adopted by our customers, every member of the consortia benefits



# Q, A, & Discussion



**LAN eXtensions for Instrumentation**

[www.lxistandard.org](http://www.lxistandard.org)