Device Conformance Testing

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October 10, 2018
Today's Topics:

• Conformance Testing process

• Changes and additions to Conformance Testing

• How to be ready for a Conformance Test

• Questions
Conformance Testing Process
Conformance Testing Purpose

• Because You Have To (TOU)

• Better Products at Release

• Benefits Your Customers and Ultimately You
Obtain/Maintain DOC

Fix Defects

Pass?

Conformance Test

Order Extra Hours or Full Re-Test

No

Vendor Development Process

START HERE

New Product

Update Product (Amend DOC)

Describe Changes to ODVA Conformance Authority (CA)

CA Decision

Yes

Test By Vendor Conformance Test
Changes and additions to Conformance Testing
New Tests in DeviceNet™ CT29/CT30

• New Common Service Test:
  • Get_Member Service Test for Basic and Extended Format
  • Get_Attribute_List / Set_Attribute_List Test
  • Set_Attributes_All for some CIP objects
• Port Object Test update (Associated Communication Objects attribute)
• Time Sync Object test update
• File Object Test update
• Circuit Breaker Profile and Circuit Breaker objects test
• Identity Object Test (new attributes)
• Support Parameter Group Object revision 2
Expectation: A device needs to execute Duplicate MAC ID detection process after a reset of the device or after a power cycle of the network power.
New Tests in EtherNet/IP™ CT15

Automated Test Enhancements

- New Common Service Test
- Connection Manager Object test enhancements
  - Updated Class 3 Duplicate 16-bit Sequence Count Test
  - Production Inhibit Time Network Segment in Milliseconds / Microseconds
  - I/O RPI configurable via stc interface
  - Speed up I/O tests when DUT supports multiple Priority levels
Automated Test Enhancements

- CIP Modbus Device and CIP Modbus Translator Device Profiles Test
- CIP Motion Test for Motion Controllers and Motion Devices
- SNMP Object Test
- File Object Test update
- Port Object Test update for Associated Communication Objects attribute
New Tests in EtherNet/IP™ CT15

• **Broadcast ListIdentity MaxResponseDelay Test**

“The receiver’s delay shall be a random value, in milliseconds, between 0 and the MaxResponseDelay specified in the ListIdentity request” [Vol2, Chapter 2, Section 2-4.2.3]
New Tests in EtherNet/IP™ CT16

Enhancements in CT16

- CT can be run from GUI or Command Line
- Circuit Breaker Profile and Circuit Breaker objects test
- Identity Object Test (new attributes)
- Support Parameter Group Object revision 2
- MDAO and Motion I/O test for new SEs
PRP Behavior Test

“Parallel Redundancy Protocol (PRP) is a network protocol standard for Ethernet that provides seamless failover against failure of any network component. This redundancy is invisible to the application.

“The PRP/HSR Protocol Object provides the CIP application-level interface to these protocols (PRP/HSR).”
Off-Link Routing Test

“If the destination is on a connected network, the datagram is sent directly to the destination host; otherwise, it has to be routed to a gateway on a connected network” [RFC 1122, Section 3.3.1]
Manual Test additions EtherNet/IP™ CT15/CT16

Default TTL Value of DUT = 1
Default Gateway Assigned to DUT

Multicast I/O Forward Open Request

Unicast I/O Forward Open Request

Unsuccessful off-subnet multicast I/O request

Successful off-subnet unicast I/O request and I/O packets
CIP Security Test: (in a separate app for CT16)

- I/O Test via DTLS session
- CIP security objects test via TLS session
- Configure and use PSK test
- Use default and non-default certificates test
- NULL ciphers and non-NULL ciphers test
Conformance Test ToolKit – Content Highlights

ODVA Test Framework

- To be released as part of CT-16 (but a separate installation package)
- Tools to aid in conformance testing:
  - Connections Tool
  - DHCP Server
  - CIP Motion I/O Validator
- Scripts to provide some automation for manual test processes
  - ACD
  - TTL/MCast
Conformance Test ToolKit – DHCP Server Tool

- Fully functional DHCP Server.
Conformance Test ToolKit – Connections Tool

- Encapsulation commands
- Explicit messaging
  - Connected
  - UCMM
- I/O Connections
  - Multiple connections
Conformance Test ToolKit – Motion I/O Validator

- Utility to validate CIP Motion I/O messages
Conformance Test ToolKit – Script Sequencer

Scripting Engine front end provides:

- Selection of installed scripts to be run
- Selection of DUT information (.STC)
- Visual feedback during test execution
- Automatic archiving of result data
Conformance Test ToolKit – Results Viewer

- Report shows result of each script step, as well as final result of test.
- Test data is stored as XML format.
- Report is generated as HTML for viewing
Getting ready for a Conformance Test
Getting ready for a Conformance Test

• Start early – submit your conformance test well in advance
• Read the ODVA Test Guidelines in the Conformance Test Details Form
• Review and run the manual tests
• First timers – encouraged to attend the test
• Ask Questions! – conformance@odva.org
QUESTIONS?
THANK YOU