Microsoft FileServer Protocol Test Suites Overview and Updates

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Agenda

- FileServer Protocol Test Suite Overview
  - Windows Protocol Test Suites
  - FileServer Test Suite Scope , Features & Test Approach
  - Test Environment for SMB3 IO Lab
- What's New for Release v4.20.9.0
  - Test Suites Cross Platform on .NET Core
  - New Tests for Chained Compression
  - Demo with Protocol Test Manager

FileServer Test Suite Overview

What is a Windows Protocol Test Suite

Evaluates whether a protocol implementation meets certain interoperability requirements.

- Originally developed for in-house testing of Microsoft Open Specifications.

- Used to test/verify Windows behavior.

- Also used to test 3rd-party implementations.

Do not cover every protocol requirement, and do not certify an implementation, but can be a useful indication of interoperability.

Windows Protocol Test Suites

Open Sourced most popular ones on GitHub since 2016

Category	Test Suite Name	Protocols	**https://github.com/Microsoft/WindowsProtocolTestSuites** **https://github.com/Microsoft/ProtocolTestFramework**
File Sharing	**FileServer**	MS-SMB2, MS-FSRVP, MS-SWN, MS-DFSC, MS-RSVD, MS-SQOS, MS-FSA, MS-HVRS	
	MS-SMB	MS-SMB	
	MS-SMBD	MS-SMBD	
	BranchCache	MS-PCCRC, MS-PCCRR, MS-PCCRTP, MS-PCHC, MS-CCROD	
Security	Kerberos	MS-KILE, MS-KKDCP, MS-PAC	
	MS-AZOD	MS-AZOD	
Active Directory	ADFamily	MS-ADTS-LDAP, MS-ADTS-PublishDC, MS-ADTS-Schema, MS-ADTS-Security, MS-APDS, MS-DRSR, MS-FRS2, MS-LSAD, MS-LSAT, MS-NRPC, MS-SAMR	
	MS-ADOD	MS-ADOD	
Remote Desktop	RDP Client/RDP Server	MS-RDPBCGR, MS-RDPEDISP, MS-RDPEDYC, MS-RDPEGFX, MS-RDPEGT, MS-RDPEI, MS-RDPEMT, MS-RDPEUDP, MS-RDPEUSB, MS-RDPEVOR, MS-RDPRFX, MS-RDPELE	
BYOD	MS-ADFSPIP	MS-ADFSPIP	

FileServer Test Suite Scope

Protocols

[MS-SMB2]:Server Message Block (SMB) Protocol Versions 2 and 3	[MS-FSA]: File System Algorithms
[MS-SWN]: Service Witness Protocol	[MS-RSVD]: Remote Shared Virtual Disk Protocol
[MS-FSRVP]: File Server Remote VSS Protocol	[MS-SQOS]: Storage Quality of Service Protocol
[MS-DFSC]: Distributed File System (DFS): Referral Protocol	[MS-HVRS]: Hyper-V Remote Storage Profile

Messages

Negotiate (Negotiate Contexts)	Session Setup
Tree Connect/Disconnect	Create/Close (Create Contexts)
IOCTL	Query Directory
Query Info/Set Info	…

FileServer Test Suite Features

Negotiate	Session Mgmt.	Tree Mgmt.	Create/Close	IOCtl
Credit Mgmt.	Signing	Leasing/Oplock	Durable Handle	Multi Channel
Persistent Handle	Replay	App Instance Id	Encryption	Compression

Dialect 2.002

Dialect 2.1

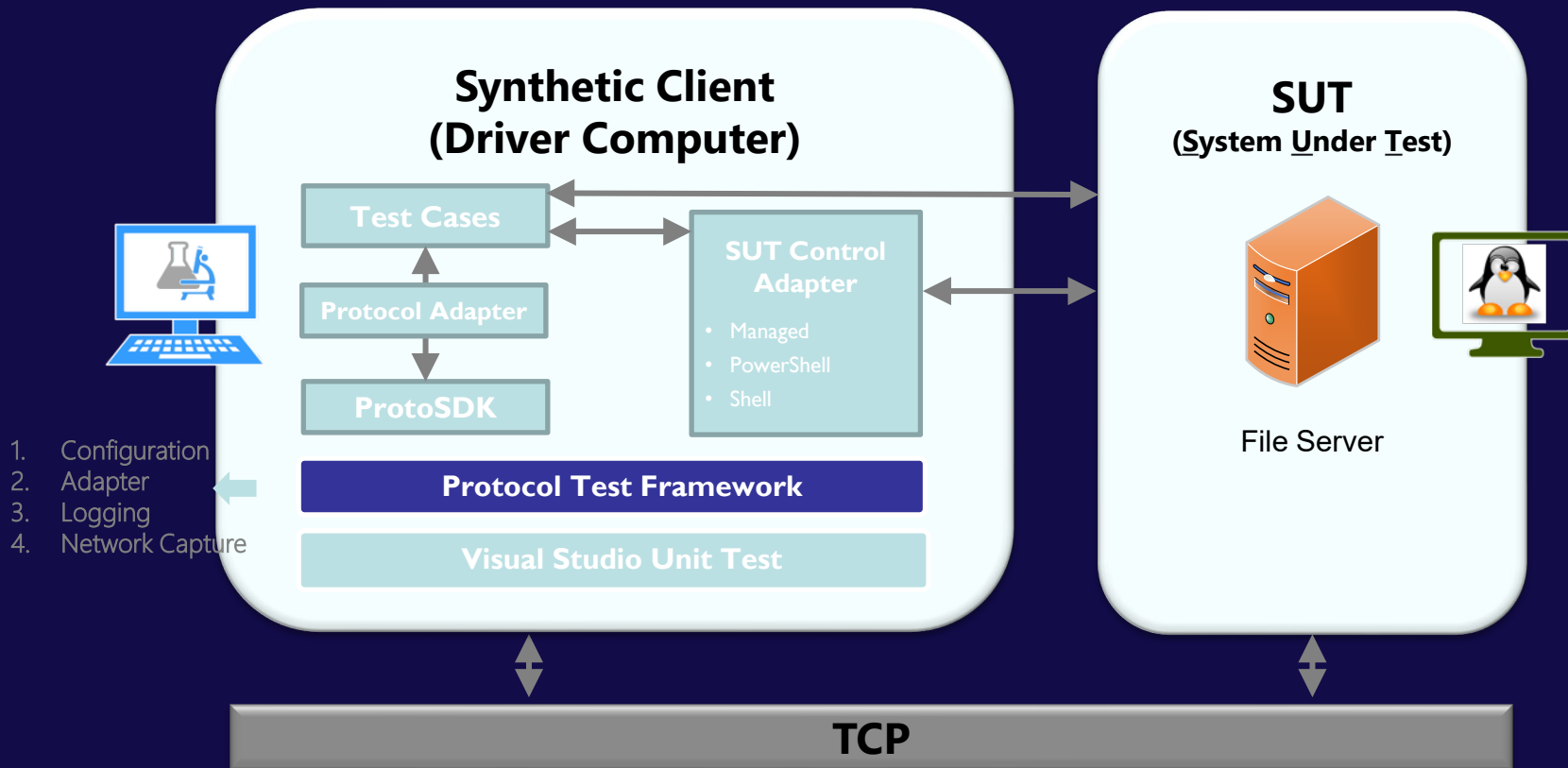Dialect 3.0

Dialect 3.02

Dialect 3.11

FileServer Test Suite Test Approach

- Traditional Test
  - Covers basic functionalities and scenarios

- Model Based Test
  - 2K+ test cases generated by 13 models
  - Better coverage on:
    - Parameter combination
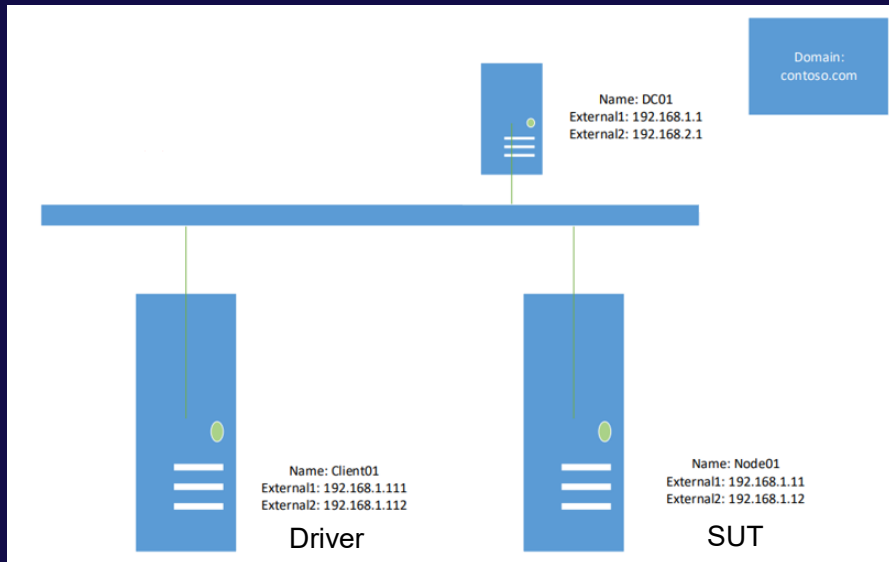   - Message sequence
    - Negative tests

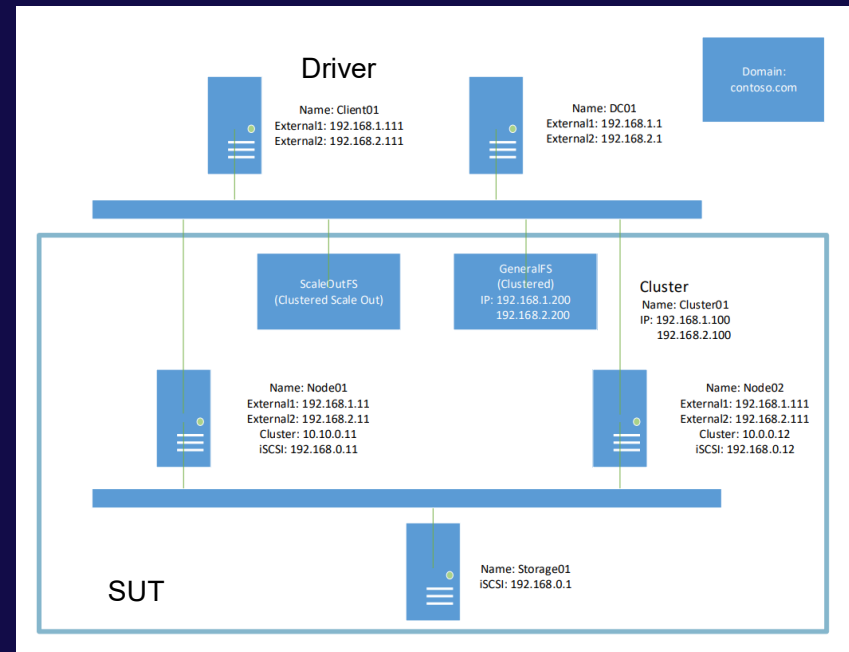# FileServer Test Suite Infrastructure

FileServer Test Suite Environments

FileServer Standard

Name: DC01
External1: 192.168.1.1
External2: 192.168.2.1

Domain:
contoso.com

Name: Client01
External1: 192.168.1.111
External2: 192.168.1.112

Driver

Name: Node01
External1: 192.168.1.11
External2: 192.168.1.12

SUT

FileServer Cluster

Driver

Name: Client01
External1: 192.168.1.111
External2: 192.168.2.111

Name: DC01
External1: 192.168.1.1
External2: 192.168.2.1

Domain:
contoso.com

ScaleOutFS
(Clustered Scale Out)

GeneralFS
(Clustered)
IP: 192.168.1.200
192.168.2.200

Cluster
Name: Cluster01
IP: 192.168.1.100
192.168.2.100

Name: Node01
External1: 192.168.1.11
External2: 192.168.2.11
Cluster: 10.10.0.11
iSCSI: 192.168.0.11

Name: Node02
External1: 192.168.1.111
External2: 192.168.2.111
Cluster: 10.10.0.12
iSCSI: 192.168.0.12

Name: Storage01
iSCSI: 192.168.0.1

SUT

CAshare:
\\scaleoutfs01\SMBClustered
\\generalFS01\SMBClustered

What's New

Windows Protocol Test Suites Updates

Windows Protocol Test Suites v4.20.9.0 Release

https://github.com/microsoft/WindowsProtocolTestSuites/releases/tag/4.20.9.0

.NET Core Migration

- Rewrote ProtoSDK, adapter and test suites code
- Enabled File Server and SMBD test suites on .NET Core

File Server Test Suites

- Support Windows Server v2004
- Added new tests for chained compression per [MS-SMB2] v20200304
- Added new test case to cover special characters in username for Kerberos authentication

Protocol Test Manager

- Added support to test suites based on .NET Core
- Added support to detect Windows Server v2004 for File Server plugin
- Added support to detect chained compression capability for File Server plugin

Test Suites Porting to .NET Core

- Test suites can now run on **Linux** and **macOS!**
- For more details, please attend our BoF session.

TUESDAY, SEPTEMBER 22ND Birds of a Feather (BoF) Sessions

3:00 - 4:00 PM **Windows File Server Protocol Test Suite Cross Platform Meetup**

Moderators:
Vivian Tian, Senior Software Engineer, Microsoft
Victor Ding, Software Engineer 2, Microsoft

Our new release of the Windows File Server Protocol Test Suite on .NET Core enables cross-platform support for testing scenarios. Join us to learn more and to give us feedback for future releases.

New Tests for Chained Compression

- ## Chained compression feature for Windows v2004
  - ### For details, please refer to [MS-SMB2] v20200304
- ## Added corresponding test cases for negotiate and compression
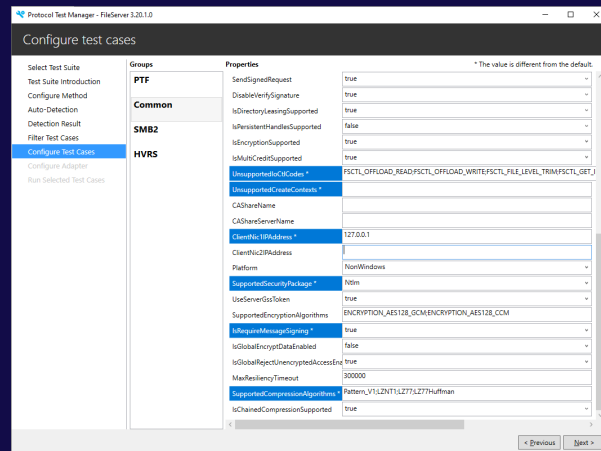 - ### New test configuration items, which can be auto-detected by PTM plugin
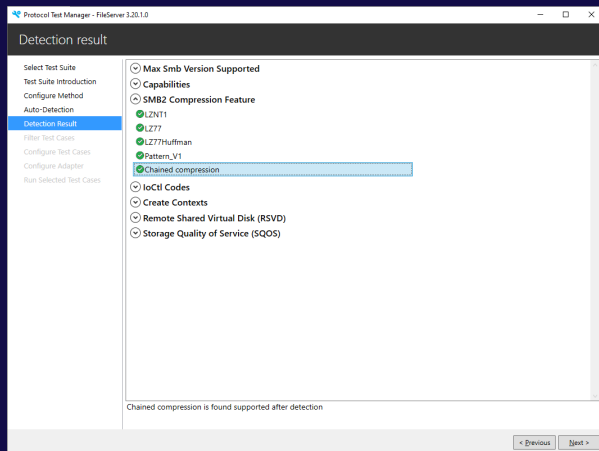
New Test Configuration

To run new tests, update the configuration first accordingly

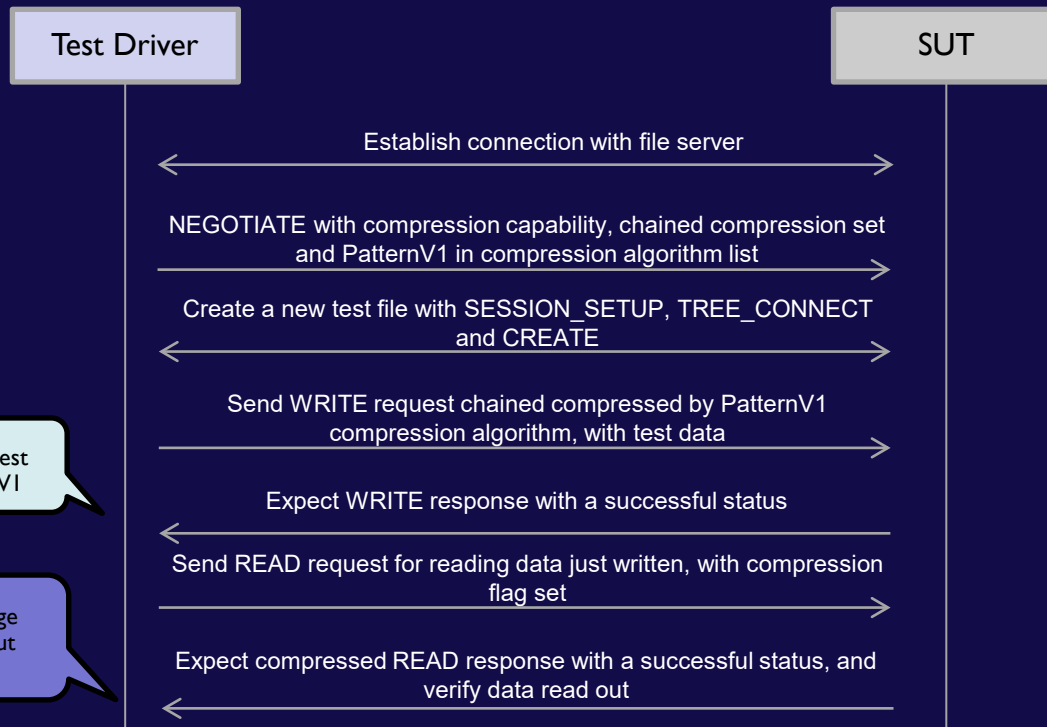| Configuration Name	Description
Platform	• Platform version of SUT • Set to WindowsServerV2004 or NonWindows
SupportedCompressionAlgorithms	• Compression algorithm list supported by SUT, separated by semicolons • Add Pattern_V1 if supported
IsChainedCompressionSupported	• Indicate whether SUT supports chained compression • Set to true if supported

File Server Plugin Updates

- Can detect platform and chained compression related configuration items automatically

Chained Compression Test Example

BVT_SMB2Compression_Chained_PatternV1

Test Driver

SUT

Establish connection with file server

NEGOTIATE with compression capability, chained compression set and PatternV1 in compression algorithm list

Create a new test file with SESSION_SETUP, TREE_CONNECT and CREATE

Send WRITE request chained compressed by PatternV1 compression algorithm, with test data

SUT should handle WRITE request chained compressed by PatternV1

Expect WRITE response with a successful status

Send READ request for reading data just written, with compression flag set

If compression/decompression and message processing of SUT is correct, data read out should be the same as written.

Expect compressed READ response with a successful status, and verify data read out

New Test for Kerberos Authentication

- ## KerbAuth_UserName_With_Special_Characters
    - Test case will do Kerberos authenticate against KDC using usernames with special characters
    - Can be customized by modifying SpecialUserNames in Auth_ServerTestSuite.deployment.ptfconfig

```xml
<Property name="SpecialUserNames" value="9L7!MNZ%}wq4iZ;p9jwB3A@U)i2z~LzTd;XJ(x1SjZ{INM!RpPrQ^c;$I1Q73_VjdSJ!vGn7Q;@0o2^w@w^-t%abwos31">
  <Description>
    Some user names with special characters separated by semicolon. Used in Kerberos Authentication cases.
  </Description>
</Property>
```

Demo

Questions?