Microsoft

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File Server Test Suites Overview 2026

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Microsoft

Agenda

- File Server Test Suites Overview
- What's New
  - Performance Improvements
  - AI Transformations [Skills Package + Learn MCP]
- Questions

File Server Protocol Test Suites Overview

What is the Windows Protocol Test Suite?

A collection of testing tools that evaluate whether a protocol implementation meets certain interoperability requirements. Each test suite covers a family of protocols: File Server, RDP Server, RDP Client, Active Directory, etc.

What It Does

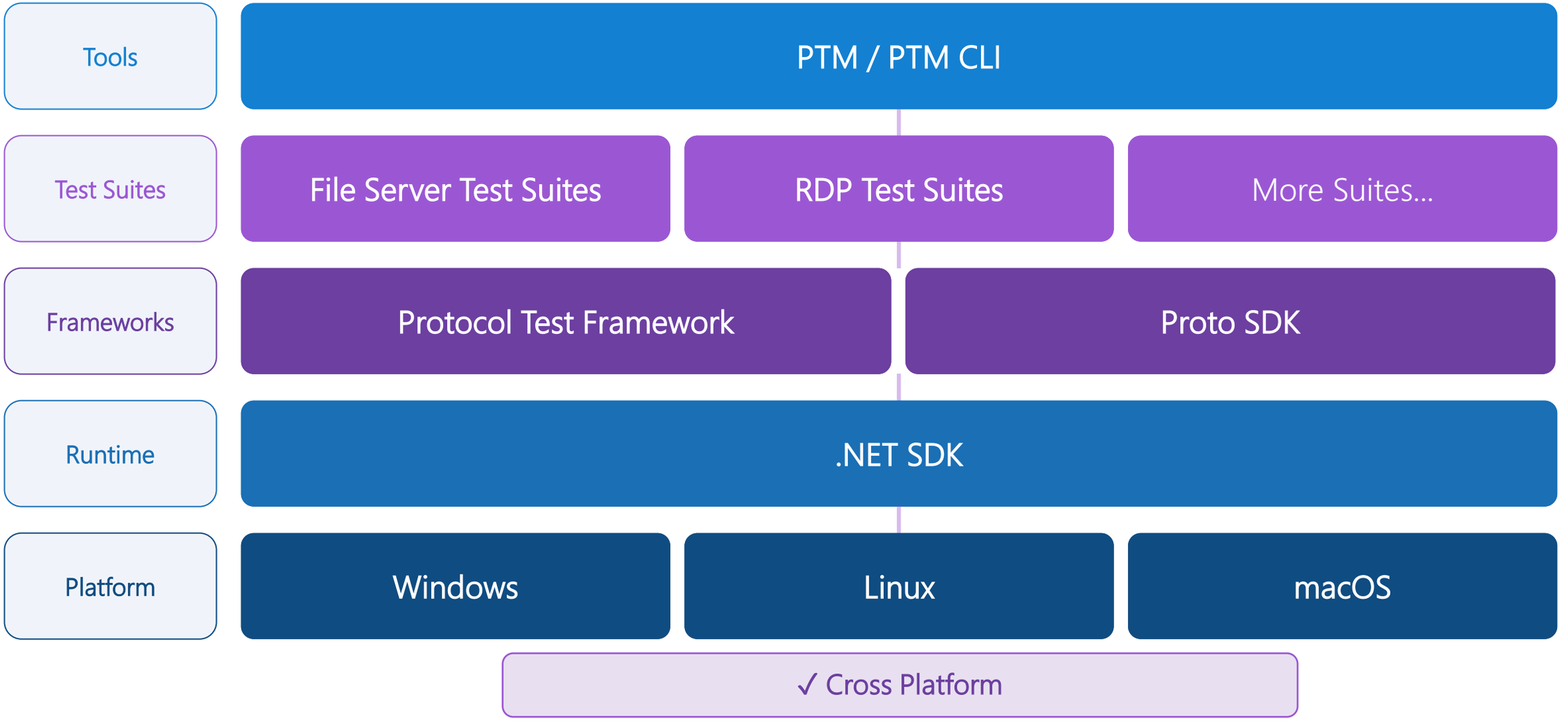
Evaluates whether a protocol implementation meets certain interoperability requirements.

- Originally developed for in-house testing of Microsoft Open Specifications
- Used to test and verify Windows behavior
- Also used to test 3rd-party implementations

Good to Know

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

Windows Protocol Test Suites Cross Platform



Windows Protocol Test Suites Open Source

Open sourced on GitHub since 2016

Category	Test Suite	Protocols
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 / 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

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Windows Protocol Test Suites

https://aka.ms/wpts

Protocol Test Framework

https://aka.ms/wptf

File Server Test Suites Scope

Protocols

[MS-SMB2]
Server Message Block Protocol v2/3

[MS-FSA]
File System Algorithms

[MS-SWN]
Service Witness Protocol

[MS-FSRVP]
File Server Remote VSS Protocol

[MS-RSVD]
Remote Shared Virtual Disk Protocol

[MS-SQOS]
Storage Quality of Service Protocol

[MS-DFSC]
DFS: Referral Protocol

[MS-HVRS]
Hyper-V Remote Storage Profile

Messages

- Negotiate
- Session Setup
- Tree Connect / Disconnect
- Create / Close
- IOCTL
- Query Directory
- Query Info / Set Info
- ...

File Server Test Suites Features

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

SMB Dialects

Dialect 2.0.2

Dialect 2.1

Dialect 3.0

Dialect 3.0.2

Dialect 3.1.1

File Server Test Suites Approach

Traditional Tests

Covers basic functionalities and scenarios

Focus Areas :

- Core protocol operations
- Feature validation
- End-to-end scenarios

Deterministic, hand-crafted test cases ensuring protocol correctness

Model-Based Tests

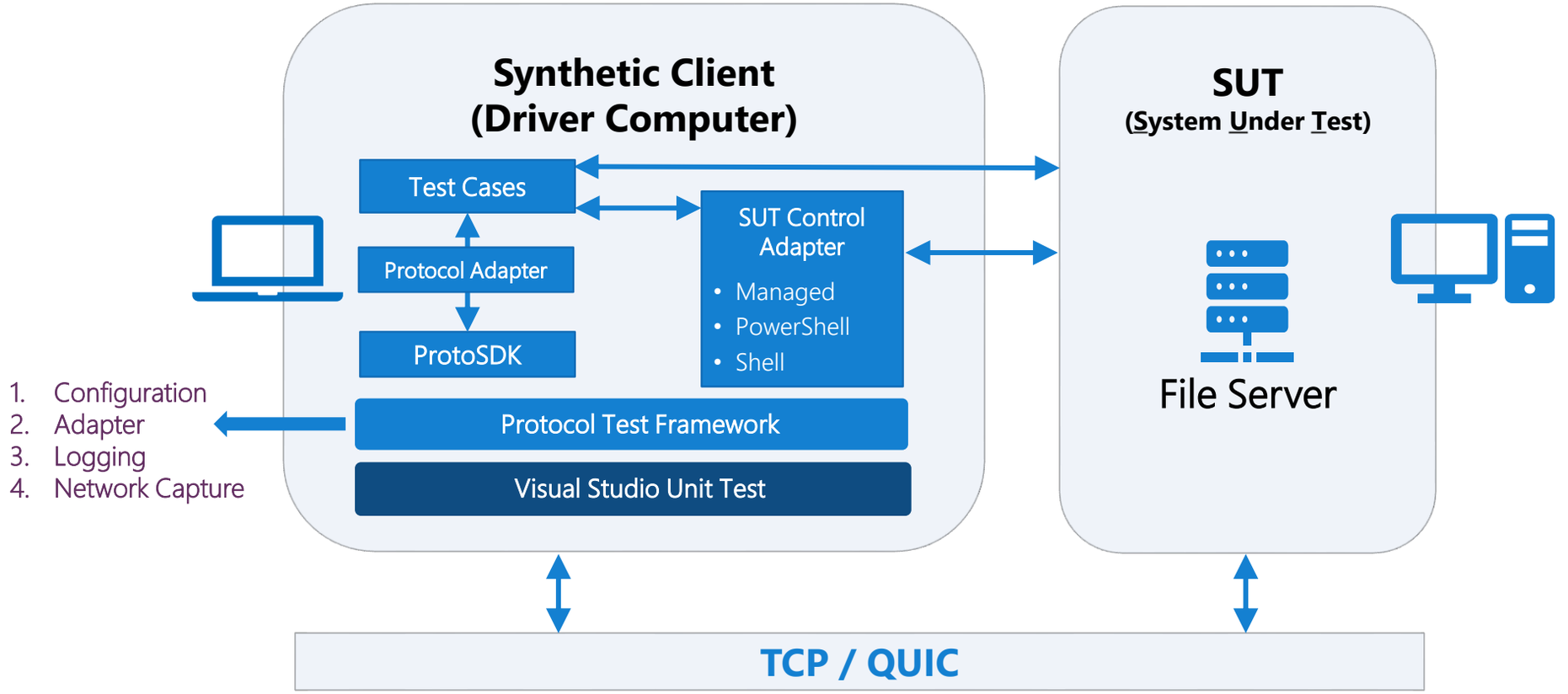
Automated generation from formal protocol models

Better Coverage On :

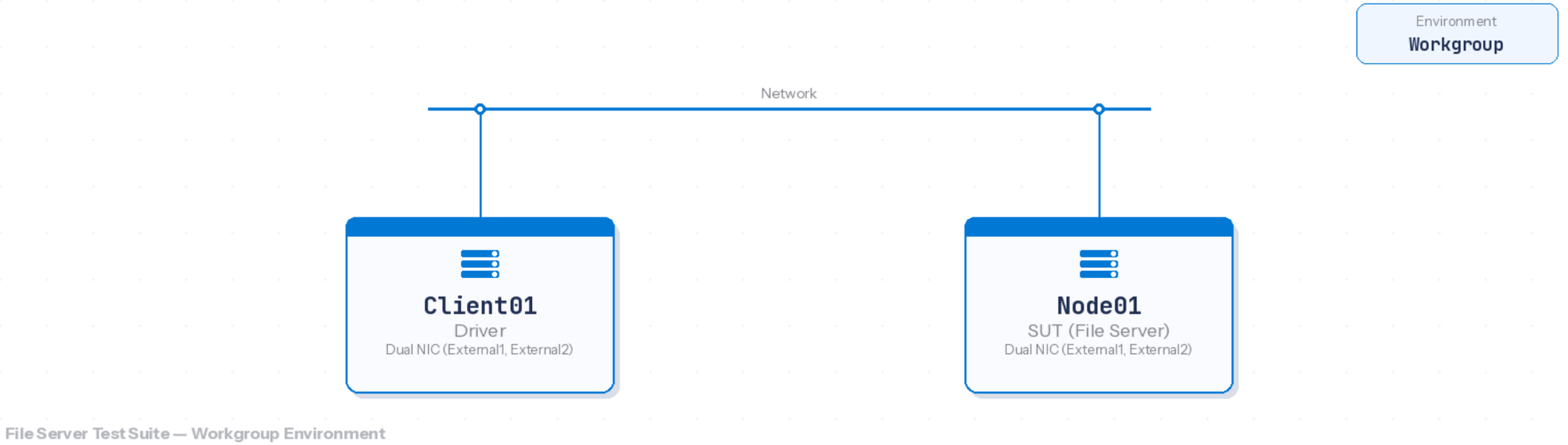
- Parameter combination
- Message sequence
- Negative tests

2,000+ test cases
generated by **13** models

File Server Test Suites Infrastructure



File Server Test Suites Workgroup Environment



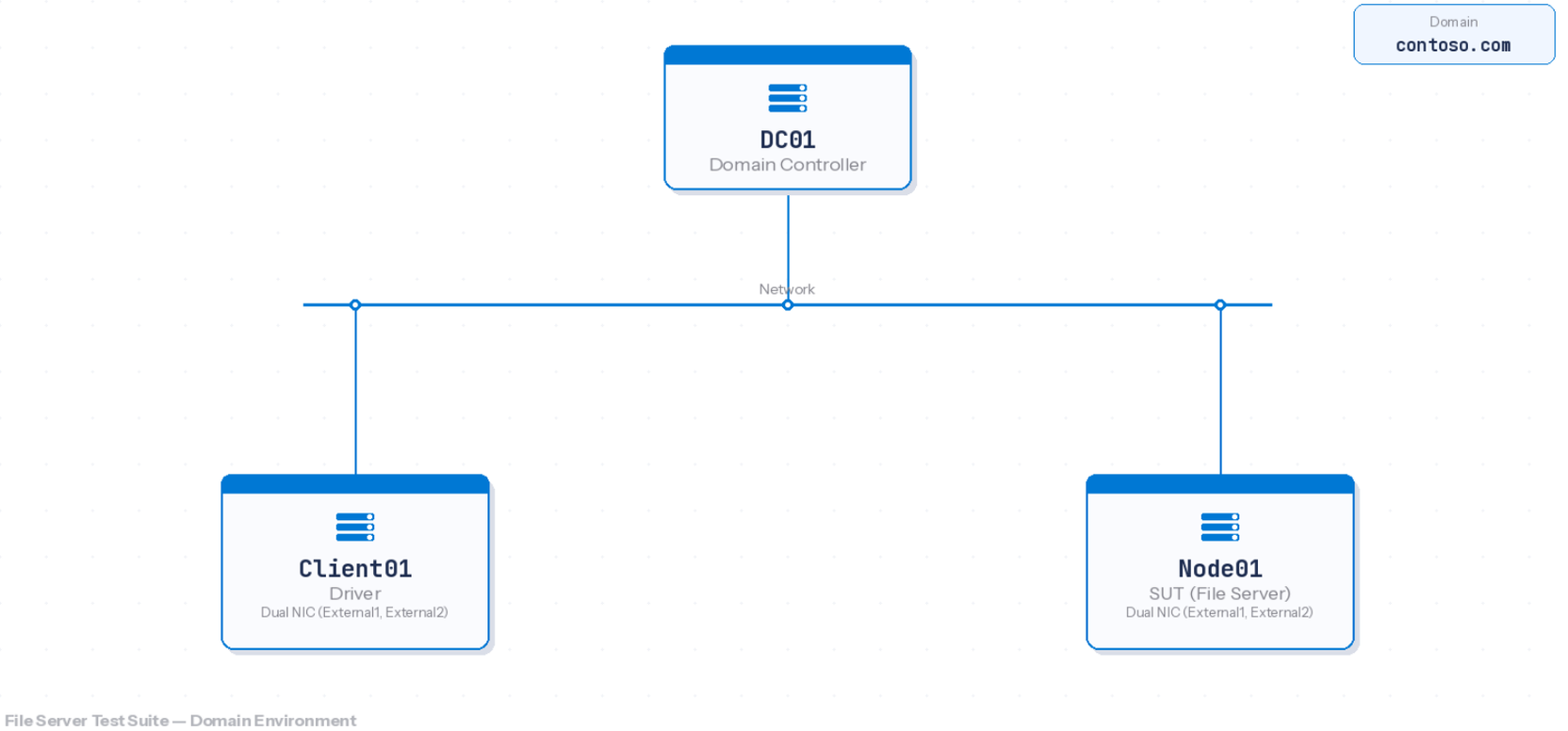
Standard (Workgroup) Environment

Environment 1 of 3

Single SUT and single Driver computer. The Driver and SUT communicate directly over the same network or able to reach each other on a network.

This is the environment referenced in previous slides.

File Server Test Suites Domain Environment

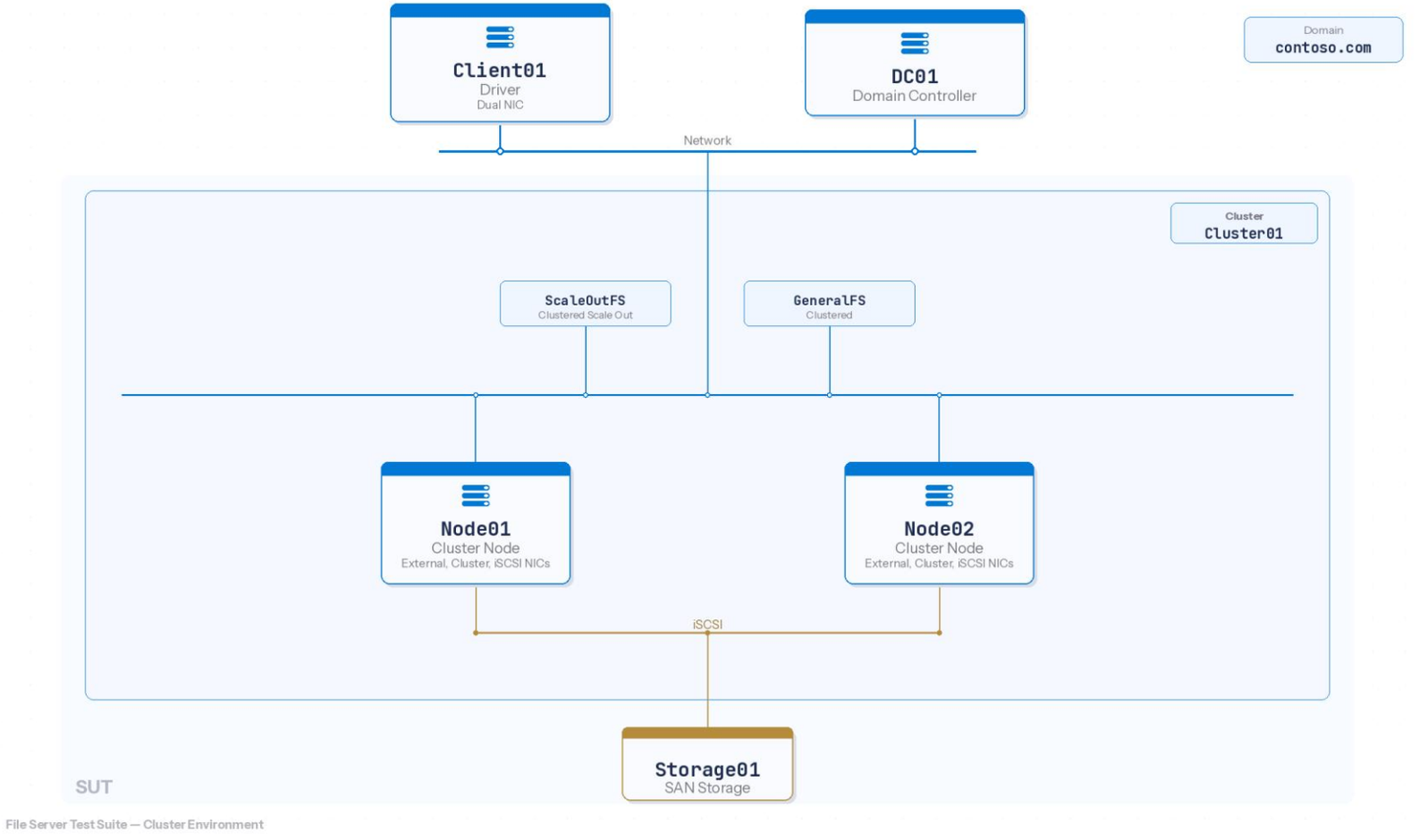


Standard (Domain) Environment

Same Standard setup with a single SUT and Driver, now joined to a Domain Controller for domain-authenticated testing scenarios.

Environment 2 of 3

File Server Test Suites Cluster Environment



Cluster Environment

The SUT is the entire Cluster

See the File Server User Guide on the Windows Protocol Test Suites GitHub repository for cluster setup details.

Environment 3 of 3

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What's New !

GitHub Release 4.26.3.0

File Server Test Suites PTF Updates

Protocol Test Framework Performance Improvements

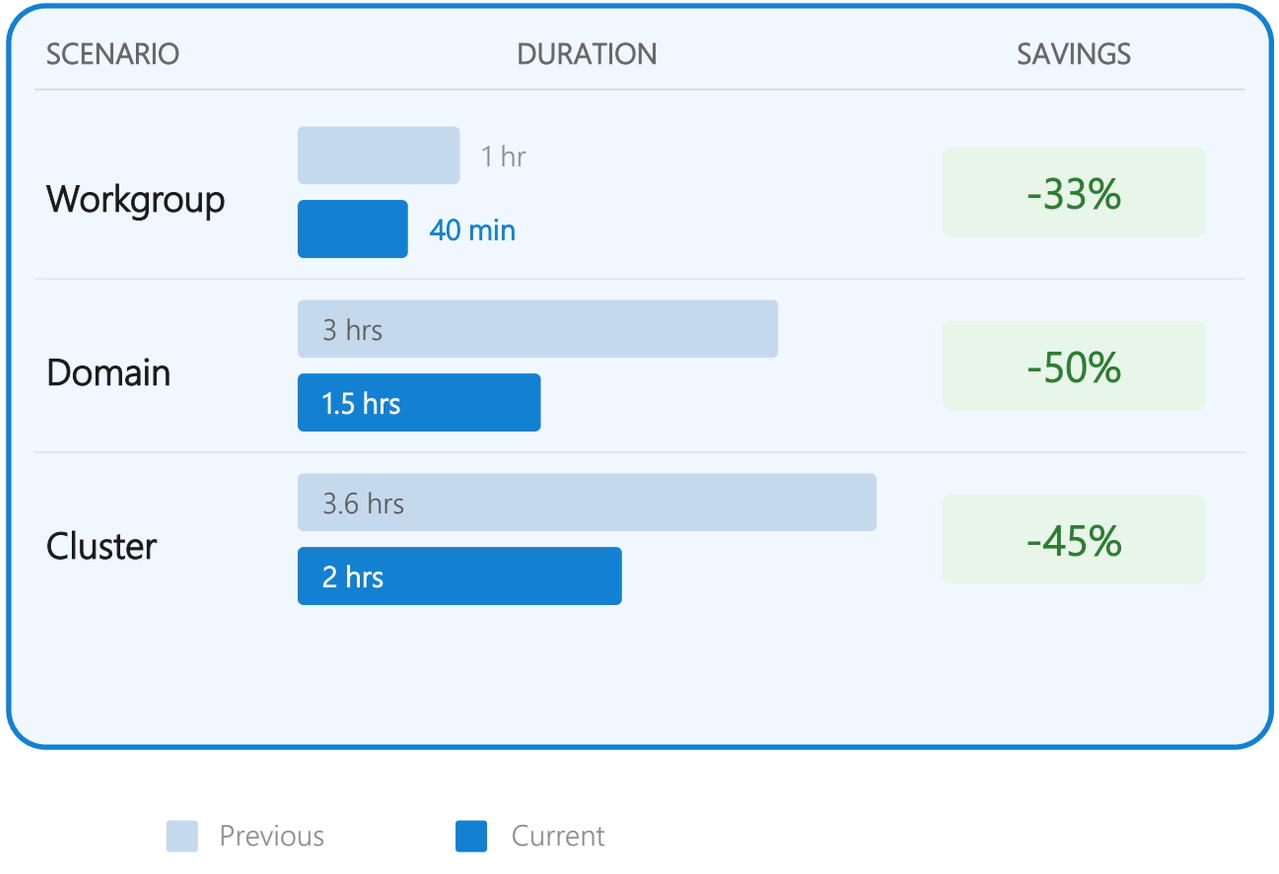
Multi-threading support

- Parallel execution of test framework operations in core library
- Logging, configurations, and assertions

~40% FASTER

avg. time savings

Test Execution Time Savings



File Server Test Suites Updates

Additional Test Cases

Coverage for changes in MS-SMB2 v83 and v85
[Cluster Scenario] Persistent Handle reconnect validation
[Cluster Scenario] Replay Eligibility flag

SMBD Support

MS-SMBD protocol test coverage for SMB Direct (RDMA) scenarios
Linux RDMA Adapter for MS-SMBD with C++/ C# wrapper and Linux CI build infrastructure

Bug and Security Fixes

Fixed Linux SUT failures caused by negative output buffer length
Security Patch for immutable (4.3.8)
Package Upgrades (ReDoS vulnerability)

Skills Document for Independent Test Creation

Detailed in next slide

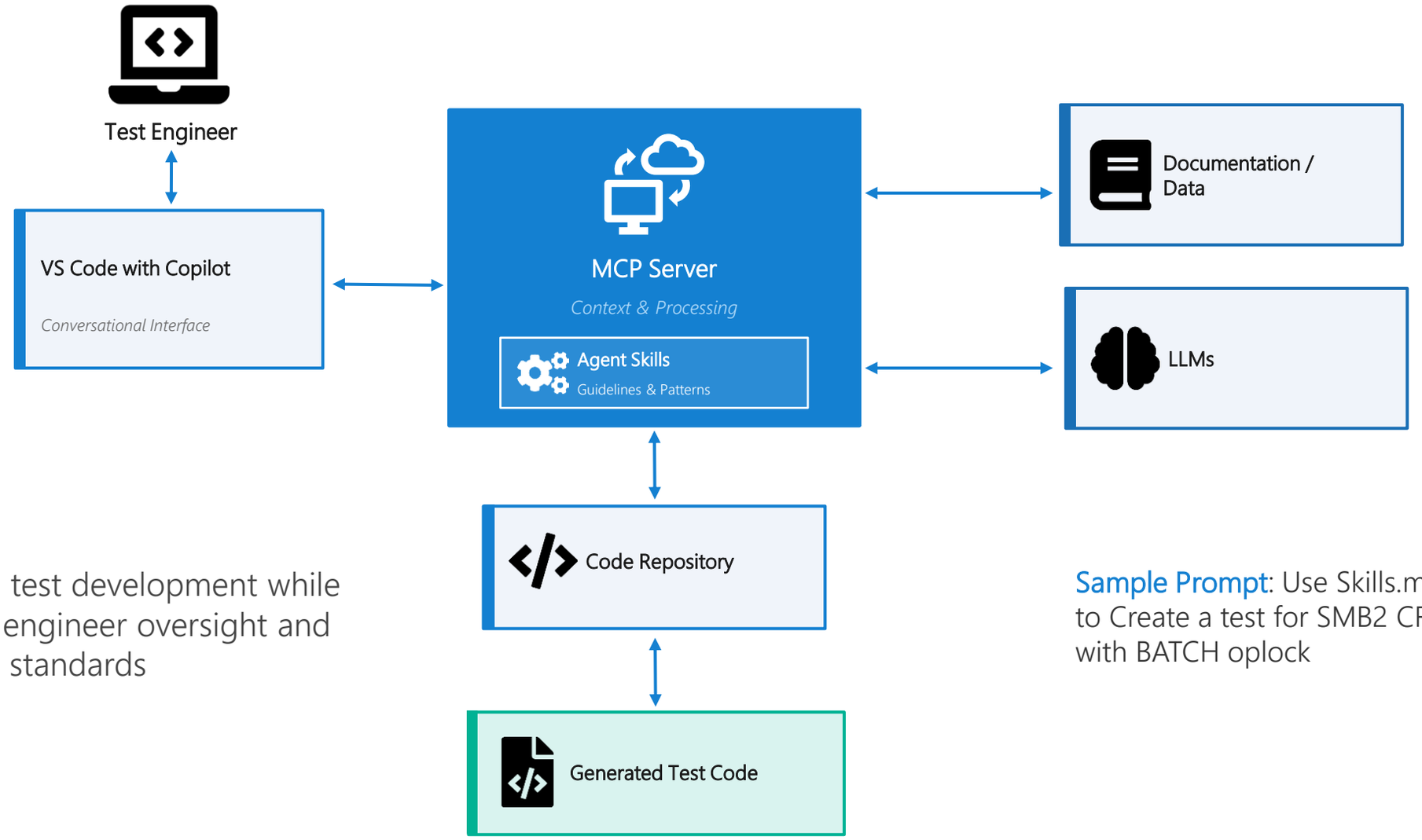
IaC Templates for Test Environment Deployments

Detailed in next slide

Protocol Document Diffs Release

Detailed in next slide

Windows Protocol Test Suites File Server Skills



Accelerating test development while maintaining engineer oversight and code quality standards

Sample Prompt: Use Skills.md as a guideline to Create a test for SMB2 CREATE request with BATCH oplock

File Server Test Suites IaC Deployment

The Challenge

Creating test environments:

⏳ Time-consuming
🔨 Complex set up
🔒 No access to customer's private env

Partner Example

First time IO Lab attendees:

🪡 Had custom images
💻 No on-site dev machines
💰 Costly Azure hosted marketplace image

The Solution

BICEP templates

- Rapid deployment- Days to under 1 HR
- Easy Setup – Less errors
- Standardized
- Self-configuring test environments
- Remediation and validation

< 1hr	Secure	Automated
vs days	Own Azure env	Self-Configuring

Windows Protocol Test Suites Diffs Release

LATEST

v85

Protocol Specification

v85 → **v84**	`85__84_diff.xlsx`	*Latest vs Previous*
v85 → **v83**	`85__83_diff.xlsx`	*Latest vs v82*
v85 → **v82**	`85__82_diff.xlsx`	*Latest vs v81*
v85 → **v81**	`85__81_diff.xlsx`	*Latest vs v80*

• • •

v85 → **v72**	`85__72_diff.xlsx`	*Latest vs Oldest*

NEW Diffs are now generated between the latest spec and **all** prior available releases — compare against the exact version you implemented, not just the two most recent. We'd love your feedback on this feature!

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Questions

Reach out : dochelp@microsoft.com