



INTRODUCTION

Visual OPCTest™ was originally presented to the OPC Foundation Compliance Committee in October of 1999. It is an independent OPC tool capable of executing predefined test cases with the ability to easily extend every test case via simple scripting functions. The software was expanded over the years to provide full OPC client functionality by implementing all the functions of all the interfaces, whether required or optional. The scripting functions allow you to easily customize your testing needs beyond the **18,586 predefined test cases**. Visual OPCTest software has successfully participated in the OPC Interoperability Workshops to continually improve the functionality. Visual OPCTest Client architecture is based on four key components. **First**, it is a full-featured OPC client for the main OPC DCOM servers: Data Access, Data eXchange, Alarm & Events, Historical, Batch and Security. **Second**, it is capable of OPC-to-OPC bridge functionality to automatically synchronize multiple Data Access servers and to provide tag and alarm information to external DDE and NetDDE clients. **Third**, it provides over 18500 independent test cases for eleven (11) OPC Specifications: Data Access (1.0, 2.0x, 3.0), Data eXchange, Alarm & Events (1.0x and 1.1), Historical Data Access (1.0, 1.1, 1.2), Batch (1.0 and 2.0), Security, and Common. **Fourth**, it provides means to extend every single test case with over **600 scripting functions** that any QA Personnel, OPC Developer, Test Engineer, OPC User, Integrator, and Toolkit provider may implement and extend with ease. All this is available in one application, so try it out by downloading a free demo from **www.opctest.com**.

A series of free **Tech Notes** shows you how to setup a fully automatic test procedure, from data collection to report generation, and how to use scripting to configure server testing. Get the Tech Notes from www.opctest.com/tn.

What others are saying about Visual OPCTest Client...

"The breadth and depth of Visual OPCTest are astonishing. Furthermore, it found a number of clear specification violations, which had been overlooked by the OPC Foundation's Compliance Test tool. I'm sure that developers of OPC servers will find the purchase price of Visual OPCTest Client is repaid many times over."

Mike Dillamore
OPC Programmers' Connection

"I found Visual OPCTest to be a must have for OPC server testing."

Mark R. Drake
F.S.I. Systems, Inc.

"We have used Visual OPCTest as an additional tool in the development of our OPC Alarm & Events Server as well our OPC Data Access 2.0 Server, both included in the Smar System302. The tests done with Visual OPCTest Client permitted us to improve the robustness of our Servers."

Edner Ricardo Pontes
Electronic R&D Division
Smar



KEY FEATURES

- Fully functional client for OPC Data Access Servers
- Fully functional client for OPC Data eXchange Servers
- Fully functional client for OPC Alarm & Events Servers
- Fully functional client for OPC Batch Servers
- Fully functional client for OPC Historical Data Access Servers
- Fully functional client for servers implementing OPC Security features
- Test Cases for all required and all optional OPC Data Access 1.0a, 2.0x, 3.0 interfaces
- Test Cases for all required configuration OPC Data eXchange 1.00 interfaces
- Test Cases for all required and all optional OPC Alarm & Events 1.0x and 1.1 interfaces
- Test Cases for all required and all optional OPC Batch 1.0 and 2.0 interfaces
- Test Cases for all required and all optional OPC Historical Data Access 1.0, 1.1, 1.2 interfaces
- Test Cases for all required and all optional OPC Security 1.0 interfaces
- Test Cases for all required and all optional OPC Common 1.0 interfaces
- Total of 3944 predefined test cases for Data Access OPC servers
- Total of 464 predefined test cases for Data eXchange OPC servers
- Total of 1895 predefined test cases for Alarm & Events OPC servers
- Total of 9096 predefined test cases for Historical Data Access OPC server
- Total of 3187 predefined test cases for Batch OPC servers
- Unique approach to extending and customizing test cases via your definition of what is a good or bad parameter to an OPC function
- Validate Script Wizard for quick OPC Server validation setup
- Customize and automate test case execution with hundreds scripting functions
- Validate multiple OPC servers at the same time with thousands of predefined test cases

- OPC-to-OPC Bridge capability, synchronize multiple data access tags with multiple conversion types
- DDE and NetDDE data transfer to external applications, read and write data tags, monitor and acknowledge alarm conditions.

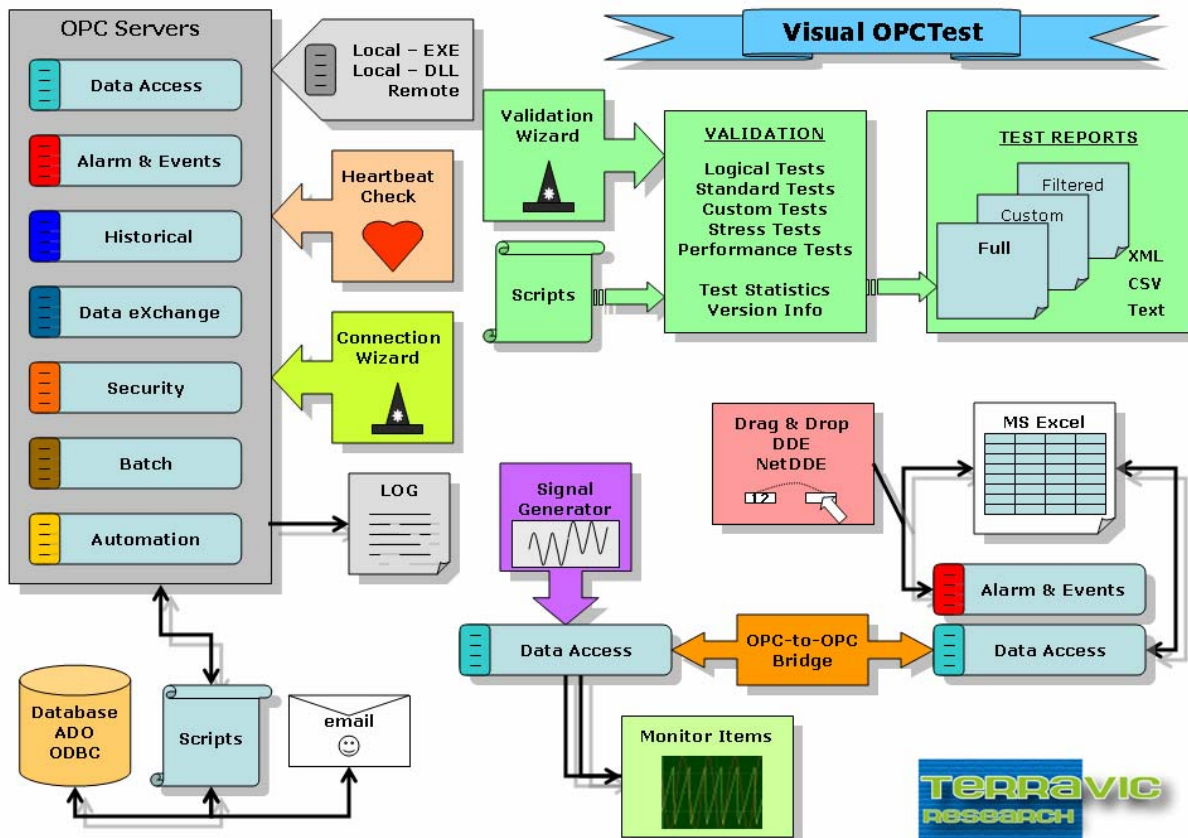
- Stop test case execution on fail or warning, or using Ctrl+Break keys
- Filtered and unfiltered test status report, Text, CSV, or XML
- Tag View Display Filtering
- 64-bit integer processing
- Complex Data Item Properties Processing
- Timer callback script processing for repetitive and timed script execution
- Connect to the same OPC server multiple times
- Connect to different OPC server types at the same time
- Signal Generator for writing data to OPC Servers, 9 functions
- Server heartbeat monitoring for one or all connected OPC Servers
- Graphically monitor up to 16 item value changes and pause display at any time
- Highlight Tags and Alarms for easy identification
- Group Reads and Writes using Async and Sync calls
- Display configuration options for Hex, UTC, and Quality
- On-demand OPC object status display in Status View
- Automatically run last script on application startup option
- Additional callback handling with scripting functions (send email, log info)
- Automatic creation of *Connection Script*, one-click to regenerate the server connections
- User configurable scripting menu and one-click script load and execute option
- Log all OPC calls, even when successful; and handle OPC, system and network errors
- Save Log and ScriptOut to Text, CSV, or XML files
- Free service pack upgrades and discounts for new version upgrades to licensed users
- Proven OPC Interoperability at numerous OPC Interoperability Workshop (USA and Europe)

THE GOOD, THE BAD, AND THE CUSTOMIZABLE

Visual OPCTest Client, as a client, checks its relationship with the server by politely releasing interfaces, freeing memory returned by the server, and passing valid parameters. You may use the client portion of the application as the initial test-bed for your OPC server development. Progressively, you may use its test cases to verify correctness and to gain insight into the OPC Specifications. When you feel that you are ready to:

- handle incorrect enumeration parameters
- handle forced interface releases
- handle incorrect and invalid handles
- stress test by adding and removing items, groups, and servers as many times as needed
- logical test of data types, and other parameters
- performance test your servers, groups, and items
- handle bad parameters from the logical and value perspective
- and many, many other impolite function calls from a client; feel free to unleash all the test cases on your server in the privacy of your test lab.

Create your own or customize each test using a set of script validation functions in a scripting language of your choice, such as VBScript, JavaScript, or ActivePerl; where you decide what are the good and bad parameters.



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Fig. 1. Overall functionality of Visual OPCTest Client.



DATA TRANSFER OPTIONS

OPC Bridge Link (OPC to OPC)

Linking and synchronizing multiple OPC Data Access servers is easily achieved with simple drag-and-drop operation or automatically through scripting. Several write methods and write scales are available.

OPC to/from Spreadsheet (DDE and NetDDE)

Visual OPCTest Client allows for bi-directional DDE communication between DDE Client and OPC server. Data collected from Data Access and Alarm & Events servers is available to DDE and NetDDE clients. Conversely, DDE and NetDDE clients may write data to OPC Data Access Server and acknowledge OPC Alarm & Events conditions.

Scripting

All the above data transfer methods may be accomplished through scripting.

VALIDATION TEST CASES

Visual OPCTest Client provides independent Test Cases for the following OPC Servers:

Data Access Server Test Cases

Interface	Number of Test Cases
LOGICAL	73
IOPCCommon	380
IOPCSecurityNT	6
IOPCSecurityPrivate	6
IOPCServer	598
IConnectionPointContainer	9
IOPCItemProperties	18
IOPCBrowse	346
IOPCBrowseServerAddressSpace	825
IOPCServerPublicGroups	28
IPersistFile	6
IOPCGroupStateMgt	475
IOPCGroupStateMgt2	36
IOPCItemDeadbandMgt	61
IOPCItemIO	136
IOPCItemSamplingMgt	55
IOPCPublicGroupStateMgt	4
IOPCSyncIO	60
IOPCSyncIO2	136
IOPCAsyncIO2	84
IOPCAsyncIO3	174
IOPCItemMgt	298
IOPCAsyncIO	90
IDataObject	12
IEnumOPCItemAttributes	28



VALIDATION TEST CASES (CONT)

Data eXchange Server Test Cases

Interface	Number of Test Cases
LOGICAL	22
IOPCCommon	380
IOPCSecurityNT	6
IOPCSecurityPrivate	6
IOPCConfiguration	50

Alarm & Events Server Test Cases

Interface	Number of Test Cases
LOGICAL	12
IOPCCommon	380
IOPCSecurityNT	6
IOPCSecurityPrivate	6
IOPCEventServer	163
IOPCEventServer2	173
IConnectionPointContainer	3
IOPCEventAreaBrowser	284
IOPCEventSubscriptionMgt	416
IOPCEventSubscriptionMgt2	452

Historical Data Access Server Test Cases

Interface	Number of Test Cases
LOGICAL	16
IOPCCommon	380
IOPCSecurityNT	6
IOPCSecurityPrivate	6
IOPCHDAServer	190
IOPCHDA_Browser	15
IConnectionPointContainer	3
IOPCHDA_SyncRead	865
IOPCHDA_SyncUpdate	3078
IOPCHDA_SyncAnnotations	9
IOPCHDA_AsyncRead	1379
IOPCHDA_AsyncUpdate	3080
IOPCHDA_AsyncAnnotations	11
IOPCHDA_Playback	58



VALIDATION TEST CASES (CONT)

Batch Server Test Cases in conjunction with Data Access Test Cases

Interface	Number of Test Cases
LOGICAL	25
IOPCBatchServer	3
IOPCBatchServer2	9
IEnumOPCBatchSummary	15
IOPCEnumerationSets	7
IOPCCommon	380
IOPCSecurityNT	6
IOPCSecurityPrivate	6
IOPCServer	598
IConnectionPointContainer	9
IOPCItemProperties	18
IOPCBrowseServerAddressSpace	825
IOPCServerPublicGroups	28
IPersistFile	6
IOPCGroupStateMgt	475
IOPCPublicGroupStateMgt	4
IOPCSyncIO	60
IOPCAsyncIO2	84
IOPCItemMgt	298
IOPCAsyncIO	90
IDataObject	12
IEnumOPCItemAttributes	28



TEST CASE INFORMATION

Visual OPCTest Client defines test case numbering system as a four-digit label separated by a period, for example: 3.1.2.1. The first digit represents an OPC object, the second digit represents an interface within the object, the third digit represents a function within the interface, and the fourth digit represents that function’s test case number. LOGICAL test cases start with a 1 as the first digit, followed by a server OPC object number, then function and its test case number, as in 1.3.1.1.

OPC Objects:

LOGICAL	1	HDA	5
COMMON	2	BATCH	6
DA	3	XML	7
AE	4	DX	8

Each test case may have one of six status codes: FAIL, WARNING, INCOMPLETE, PASS, NOT EXECUTED, or DISABLED

Each Test Case View shows a fully detailed window, with all the [in], [out], and [callback] parameters in numeric and formatted form, as well as, function return code, time stamp, execution time, memory usage signature, comment, user note, and test case status. The Test Case identification number, OPC Server information, and the interface-function being tested are also shown for each Test Case.

Test Case Parameters	Value
Server	DA1\\LOCAL\OPCSample.OpcDaServer.1
Interface::Function	IOPCCommon::GetErrorString
Test Case	2.1.4.27
OPC Spec Version	Common-Required; 1.0; 1.1
[in] HRESULT dwError	0xC0040203 (OPC_E_INVALID_PID)
[out, string] LPWSTR *ppString	The specified property ID is not valid for the item.
HRESULT	S_OK
Execution Timestamp	2004/02/06 15:38:44.555
Execution Duration	16 msec
Used Physical Memory Diff	0 bytes
Used Virtual Memory Diff	0 bytes
Comments	None
Note	Run this test 1000 times
Status	PASS

Fig. 2. Example of detailed information per executed test case.



CLIENT-SIDE SUPPORTED OPC INTERFACES

Visual OPCTest Client is a full-featured client as well, supporting the following OPC specifications:

- OPC Data Access 1.0a, 2.0, and 3.0 Specifications
- OPC Data eXchange 1.0 Specification
- OPC Alarms and Events 1.0x and 1.1 Specifications
- OPC Historical Data Access 1.0, 1.1, and 1.2 Specifications
- OPC Batch 1.0 and 2.0 Specifications
- OPC Security 1.0 Specification
- OPC Common 1.x Specification

Visual OPCTest Client client-side OPC interface support details:

OPC Data Access Interfaces

IOPCServer
IConnectionPointContainer
IOPCItemProperties
IOPCServerPublicGroups
IOPCBrowse
IOPCBrowseServerAddressSpace
IPersistFile
IOPCItemMgt
IOPCGroupStateMgt
IOPCGroupStateMgt2
IOPCPublicGroupStateMgt
IOPCSyncIO
IOPCSyncIO2
IOPCAsyncIO
IOPCAsyncIO2
IOPCAsyncIO3
IEnumOPCItemAttributes
IDataObject
IAdviseSink
IOPCItemDeadbandMgt
IOPCItemIO
IOPCItemSamplingMgt
IOPCDataCallback
IOPCShutdown

OPC Data eXchange Interfaces

IOPCConfiguration
IOPCShutdown

OPC Security Interfaces

IOPCSecurityNT
IOPCSecurityPrivate

OPC Batch Interfaces

IOPCBatchServer
IOPCBatchServer2
IEnumOPCBatchSummary
IOPCEnumerationSets
IOPCShutdown

OPC Alarm & Events Interfaces

IOPCEventServer
IOPCEventServer2
IOPCEventAreaBrowser
IOPCEventSubscriptionMgt
IOPCEventSubscriptionMgt2
IConnectionPointContainer
IConnectionPoint
IOPCEventSink
IOPCShutdown

OPC Historical Data Access Interfaces

IOPCHDAServer
IOPCHDA_Browser
IOPCHDA_SyncRead
IOPCHDA_SyncUpdate
IOPCHDA_SyncAnnotations
IOPCHDA_AsyncRead
IOPCHDA_AsyncUpdate
IOPCHDA_AsyncAnnotations
IOPCHDA_Playback
IOPCHDA_DataCallback
IOPCShutdown

OPC Common Interfaces

IOPCCommon



Visual OPCTest Client

Data Sheet 8.0.1000

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Download free demo from www.opctest.com

PROVEN INTEROPERABILITY

Visual OPCTest has participated in numerous OPC Interoperability Workshops (USA and Europe), and it has been successfully tested (client-side) with the following server vendors, just to name a few:

ABB	Honeywell	SST - Woodhead
Applicom International	National Instrument	Siemens AG
Canary Labs	Northern Dynamics	Siemens E&A
CimQuest	Omron	USDATA
CSI Pacific	Raytek	Wind River Systems
Cyberlogic Technologies	Rockwell Software	Yokogawa
Fisher-Rosemount	Smar	<i>and many, many others...</i>

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