# Tech Note 838 Resolving TCP Connection Restriction Issues for an Alarm Provider Running on a Workstation OS

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### Introduction

This Tech Note does the following:

- Explains what the Half-Open TCP Connections Limit is.
- Lists the OSs on which this Limit exists.
- Describes the potential connection issues for an Alarm Provider running on a Workstation with such Limit.
- Provides resolution options.

# **Application Versions**

• All versions of Application Server and InTouch, when either one or both of them is serving as an Alarm Provider

### **Operating Systems**

- Windows XP SP2 and SP3, Windows Vista SP1 or SP2 (with restriction registry enabled)
- Windows 7 (with restriction registry enabled)

# Half-Open TCP Connections Limit

With the release of Windows XP SP2, Microsoft introduced a limit of 10 outgoing TCP connections in order to restrict the number of allowed, simultaneous, outgoing, half-open TCP connections. The restriction was an attempt to prevent a virus or malicious program to make unlimited infectious connections to other systems when the PC is compromised. This limit also exists in Windows Vista RTM, with or without SP1.

Because of enhanced security features in both design and coding, the connection limit is removed beginning with Windows Vista SP2 and Windows 7, and does not exist in any of the Server OSs, such as Windows 2003 and 2008. However, the limit can still be enforced with a registry key added to the Windows Vista SP2 and Windows 7 Operating Systems.

# Impact on Wonderware Alarm Providers

The connection between an alarm client, such as AlarmViewer control in InTouch, and the alarm provider is TCP. This means that when an Alarm Provider is running on a Windows workstation such as Window XP SP2 or later where this Limit exists and is enforced, the maximum number of outbound TCP connections from the alarm provider will be less than 10, because there are always TCP connections created by the OS and third-party applications.

When the TCP connection limit is reached, in either the existing or newly opened alarm clients, you can see some or all of the following:

In Summary (query) mode, while the query is shown as 100%,

- · None of active alarms is showing, or
- · Only a subset of the active alarms are showing, or
- The alarms alternate randomly between appearing and disappearing.

In Historical (query) mode, while the query is shown as 100%,

- · None of the historical alarms and events is showing, or
- · Only a subset of the historical alarms and events are showing, or
- · The alarms and events alternate randomly between appearing and disappearing.

#### Diagnosing the TCP Connection Limitation

To identify when and if this Limit has been reached, the following methods should be used:

#### Check the System Event Viewer

When this Limit is reached, Event ID 4226 will be logged in the System Event log, with a message like

TCP/IP has reached the security limit imposed on the number of concurrent TCP connect attempts.

### Use the NETSTAT DOS Command

This command, with various parameters settings, will return a list of concurrent TCP connections, and their connection status.

C:\WINDOWS\system32\cmd.exe					🕰 C:\WINDOWS\system32\cmd. exe			
U:\>netstat					U:\>netstat -a			▲
Active Connections					Active Co	onnections		
Proto	Local Address	Foreign Address	State		Proto	Local Address	Foreign Address State	
TCP HED	IOMLKF35454W:1118	tsctinode1.wonderware.	com:microsoft-ds	ESTABLIS	TCP TCP	IOMLKF35454W:epmap IOMLKF35454W:microsoft	IOMLKF35454W.corp.com:0 LIS1 ds IOMLKF35454W.corp.com:0	TENING LISTENING
TCP	IOMLKF35454W:1127	tsctinode1.wonderware.	com:2095 ESTABLI	SHED	TCP	IOMLKF35454W:1037	IOMLKF35454W.corp.com:0 LIS1	TENING
TCP	IOMLKF35454W:1250	inusfoxxchmbx02.corp.c	om:10348 ESTABLI	SHED	TCP	IOMLKF35454W:3389	IOMLKF35454W.corp.com:0 LIST	TENING
TCP	IOMLKF35454W:1254	inusfoxxchmbx02.corp.c	om:10348 ESTABLI	SHED	TCP	IOMLKF35454W:5413	IOMLKF35454W.corp.com:0 LIST	TENING
TCP	IOMLKF35454W:1258	inusfoxxchpub01.corp.c	om:7547 ESTABLIS	HED	TCP	IOMLKF35454W:8081	IOMLKF35454W.corp.com:0 LIST	TENING
TCP	IOMLKF35454W:1262	inusfoxxchmbx02.corp.c	om:10348 ESTABLI	SHED	TCP	IOMLKF35454W:netbios-se	n IOMLKF35454W.corp.com:0 L	ISTENING
TCP	IOMLKF35454W:1302	inusfoxwdc01.corp.com:	53248 ESTABLISHE	D	TCP	IOMLKF35454W:1118	tsctinode1.wonderware.com.mic	crosoft-ds ESTABLIS
TCP	IOMLKF35454W:1304	inusfoxwdc01.corp.com:	53248 ESTABLISHE	D	HED			
TCP	IOMLKF35454W:1377	inusfoxwdc01.corp.com:	53248 ESTABLISHE	D	TCP	IOMLKF35454W:1127	tsctinode1.wonderware.com:209	95 ESTABLISHED
TCP	IOMLKF35454W:2115	tssiebapp101.wonderwar	e.com:http TIME_	WAIT	TCP	IOMLKF35454W:1250	inusfoxxchmbx02.corp.com:1034	+8 ESTABLISHED
TCP	IOMLKF35454W:2116	wwfilesur.corp.com:mic	rosoft-ds ESTABL	ISHED	TCP	IOMLKF35454W:1254	inusfoxxchmbx02.corp.com:1034	+8 ESTABLISHED
TCP	IOMLKF35454W:2121	tssiebapp101.wonderwar	e.com:http ESTAB	LISHED	TCP	IOMLKF35454W:1258	invsfoxxchpub01.corp.com:7547	7 ESTABLISHED
TCP	IOMLKF35454W:1037	localhost:1039	ESTABLISHED		TCP	IOMLKF35454W:1262	invsfoxxchmbx02.corp.com:1034	+8 ESTABLISHED
TCP	IOMLKF35454W:1039	localhost:1037	ESTABLISHED		TCP	IOMLKF35454W:1302	inusfoxwdc01.corp.com:53248	ESTABLISHED
TCP	IOMLKF35454W:1120	localhost:27015	ESTABLISHED		TCP	IOMLKF35454W:1304	inusfoxwdc01.corp.com:53248	ESTABLISHED
TCP	IOMLKF35454W:5152	localhost:1895	CLOSE_WAIT		TCP	IOMLKF35454W:1377	inusfoxwdc01.corp.com:53248	ESTABLISHED
TCP	IOMLKF35454W:27015	localhost:1120	ESTABLISHED		TCP	IOMLKF35454W:2116	wwfilesur.corp.com:microsoft	ds ESTABLISHED
					TCP	IOMLKF35454W:2121	tssiebapp101.wonderware.com:h	nttp TIME_WAIT
U:\>				-	TCP	IOMLKF35454W:2122	tssiebapp101.wonderware.com:h	nttp ESTABLISHED 🔽

FIGURE 1: LIST OF CONCURRENT TCP CONNECTION STATUS RETURNED FROM NETSTAT COMMAND

### **Resolution Options**

- Replace the Workstation OS with a Server OS for Alarm Provider computers.
- Consult Microsoft, or search the internet for Remove Half-Open TCP Connection Limit or Remove Concurrent TCP Connection Limit for solutions.

Note: Invensys does not support, nor is responsible for any of the solutions provided by third-parties.

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