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ArchestrA IDE Troubleshooting cannot be connected to any selected Galaxies

SUMMARY

To resolve the connection issue which provides the ability for the IDE to connect to a Galaxy, you need to configure IPv4 as the preferred communication mode over IPv6.

SITUATION

Unable to connect to any Galaxy from either the local GR node or a remote IDE.

SYMPTOMS

On an IDE node, you can obtain the Galaxy list from a selected Galaxy Repository (GR), but you cannot connect to any of the Galaxies on the list. The SMC logger on the GR node has a warning message (Figure 1 below).

Trace	CRLinkServer	==>Entering CQueue::PutBroadcastInQueue
Trace	CRLinkServer	PutBroadcastInQueue() function called. Operation ID: 0
CRLinkDisc...	CRLinkServer	CQueue::BroadCastData:Transfer to Disconnect Queue CID="(B1B51A77-59DE-42C0-9A0D-A937EBD8ECA5)" CNIN:
Warning	CRLinkServer	CQueue::BroadCastData Ping() hr:0x800706ba
Trace	CRLinkProtDCOM	Client Ping

Figure 1: SMC Warning displayed at the IDE node is related to the GR connection issue

ACTION

- Implementation
 - Go to HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Tcpip6\Parameters\ and backup the current settings.
 - Add a 32-bit DWORD item as DisabledComponents and set its value as 0x20.
 - Reboot the GR computer. After the GR is back, the IDE can be launched.
- Explanation
 - In the workaround implementation, set the DWORD value as 0x20.
 - Windows recognizes the value as IPv4 is preferred over IPv6 when a network connection is being established.
 - 0x20 is 00100000 equivalent.
 - The table (Figure 2 below) provides the purpose of each bit setting on DisabledComponents.
 - From the table, there is no need to disable IPv6. Instead, set the bit 5 to 1 for the given purpose.

Bit	Definition
0	Set this bit to 1 to disable all IPv6 tunnel interfaces—including ISATAP, Teredo, 6 to 4, and IP-HTTPS—or set it to 0 to leave all IPv6 tunnel interfaces enabled.
1	Set this bit to 1 to disable all 6to4 tunnel interfaces, or set it to 0 to leave all 6to4 tunnel interfaces enabled.
2	Set this bit to 1 to disable all ISATAP-based interfaces, or set it to 0 to leave all ISATAP-based interfaces enabled.
3	Set this bit to 1 to disable all Teredo-based interfaces, or set it to 0 to leave all Teredo-based interfaces enabled.
4	Set this bit to 1 to disable IPv6 for all nontunnel interfaces, including LAN and PPP interfaces, or set it to 0 to leave all nontunnel interfaces enabled.
5	Set this bit to 1 to configure the default prefix table so that IPv4 is preferred over IPv6 when attempting to establish a network connection, or set it to 0 to leave IPv6 as the preferred network layer protocol.
6	Leave this bit set to 0 because it is reserved for future use.
7	Set this bit to 1 to disable all IP-HTTPS-based interfaces, or set it to 0 to leave all IP-HTTPS-based interfaces enabled.

Figure 2: TCP/IP v6 bit definition table

Note: On Windows platforms, IPv6 is installed by default and cannot be uninstalled because it is a fundamental component of Tcpip.sys (the TCP/IP driver file on these platforms). IPv6 is also enabled by default for all connections in the **Network Connections** folder on a Windows computer.

IMPORTANT: Microsoft does not recommend disabling IPv6 for two main reasons:

- During the development of Windows platforms by Microsoft, services and applications were only tested with IPv6 enabled. As a result, Microsoft cannot predict what might be the consequences of disabling IPv6 on Windows.
- Some Windows features will not function if IPv6 is disabled. Examples of such features include DirectAccess and Remote Assistance.

For more details, refer to **Configuring IPv6/IPv4 interoperability** at www.microsoftpressstore.com/articles/article.aspx

SUPPORTING INFORMATION

Analysis:

1. Communication relationship between the IDE and the GR (Figure 3 below).

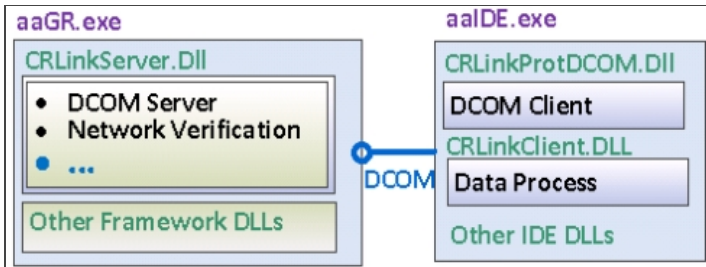


Figure 3: Communication relationship

2. The SMC warning message in Symptom area:
 - The Ping API call inside CRLinkServer.dll has **RPC Server unavailable** problem (0x800706ba). When the IDE connects to a Galaxy, the packet via Port 135 can be viewed.
 - The PRC packet is built on top of the TCP/IP protocol and therefore on top of IPv4 (Figure 4 below).

1661	ISystemActivat	1046	135	DCOM	59989	16	RemoteCreateInstance response
179	ISystemActivat	902	59989	Port	135	16	RemoteCreateInstance request
639	ISystemActivat	1046	135		59989	16	RemoteCreateInstance response
826	ISystemActivat	1046	135		59989	16	RemoteCreateInstance response
1811	ISystemActivat	1046	135		59989	16	RemoteCreateInstance response
583	TCP	60	59989		135	16	59989-135 [ACK] Seq=5937 Ack=6945 win=4
638	ISystemActivat	902	59989		135	16	RemoteCreateInstance request
1568	IOxidResolver	94	135		51662	30	ComplexPing response -> S_OK
1810	ISystemActivat	902	59989		135	16	RemoteCreateInstance request

```

# Frame 1661: 1046 bytes on wire (8368 bits), 1046 bytes captured (8368 bits) on interface 0
# Ethernet II, Src: vmware_07:23:78 (00:50:56:07:23:78), Dst: vmware_07:23:75 (00:50:56:07:23:75)
# Internet Protocol Version 4, Src: [redacted], Dst: [redacted]
# Transmission Control Protocol, Src Port: 135 (135), Dst Port: 59989 (59989), Seq: 25793, Ack: 22897, L
# Distributed Computing Environment / Remote Procedure Call (DCE/RPC) Response, Fragment: Single, FragLe
# ISystemActivator ISystemActivator Resolver, RemoteCreateInstance

```

Figure 4: SMC messages indicating IDE connections over TCP/IP

3. IPv4 is required while establishing a DCOM connection. Modern Windows are configured as dual-stack networks by default which can support both IPv4 and IPv6. Moreover, some Windows prefer native IPv6 over IPv4 connectivity, if both connection modes are available. Testing the GR node's loopback will confirm IPv4 is the preferred connection mode.

- CMD>ping localhost returns 127.0.0.1
 - From this return value, we know IPv4 is the precedence setting.
- CMD>ping localhost returns ::1
 - From this return, we know the IPv6 might be the precedence setting.

ATTACHMENTS

[http://okmgcs.km.invensys.com/resources/sites/KPKA/content/live/TN/10000/TN10138/en_US/~secure/{ "SECUREDRESOURCE": "Y" }](http://okmgcs.km.invensys.com/resources/sites/KPKA/content/live/TN/10000/TN10138/en_US/~secure/{)