Tech Note 756 Configuring the MBTCP DAServer for Redundancy

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Introduction

DASMBTCP 2.0 provides the ability to assign redundant devices for fail-over in the event of device failure. Two identical devices are expected to be configured in the DAServer Manager having identical item syntax, connected to the same DAServer.

This Tech Note describes the configuration necessary to implement redundancy at the DAServer level.

Note: This Tech Note assumes you have a basic understanding of DAServers.

Redundancy Runtime Behavior

The DAS Engine will switch to the standby device when the active device fails to communicate.

The value of the **\$\$Y\$\$Status** attribute determines the communication failure. The value of the **\$\$Y\$\$Status** of the *standby* device must be TRUE in order to switch over to the standby device. Otherwise, a failover cannot occur.

When **\$SYS\$Status** shows a FALSE value at both active and standby devices, the DAS Engine will consider a complete communication failure and mark all the items subscribed to the redundancy device hierarchy with the current time and the appropriate OPC quality. The DAS Engine will activate the slow-poll mechanism to retry the communication to both devices until either one of the Ping Items returns to a good quality and updates its **\$SYS\$Status** item value to TRUE.

When the DAS Engine switches to the standby device, the standby device becomes active and the originally active device becomes the standby.

When the active device becomes the standby device the Ping Item is not deleted from the standby device. This ensures the standby can recover the communication again. The Ping Item must be a valid item in the controller for the failover to function properly.

The DAServer logs any failover activities. All other functionality such as diagnostics, enable/disable, and reset is performed exactly the same as it is performed for any other hierarchy node.

Create the Primary and Secondary PLC Objects

- 1. Start the System Management Console (SMC).
- 2. Expand ArchestrA.DASMBTCP.2.
- 3. Select Configuration.
- 4. Right-click **Configuration** then select **Add TCPIP_PORT Object**. Rename this object if desired.

- 5. Select, then right-click on the newly created port object then select **Add ModbusPLC Object**. Rename this object if desired and configure the object to access the **Primary PLC**.
- 6. Select, then right-click on the port object again and click **Add ModbusPLC Object**. Rename this object if desired and configure the object to access the **Secondary PLC**.

Figures 1 - 3 (below) show a sample Redundancy configuration.

🌠 SMC - [ArchestrA System Management Console (WIN-DX	VOI5QYFG3)\DAServer Manager\Default Group\Local	\ArchestrA.DASMBTCP.2\Configuration\P 💶 🗖 🗙
<u>File Action View H</u> elp		
🧇 🔿 🔟 💥 🔝 🖬		
 ArchestrA System Management Console (WIN-DXVOI5QYFG3) Imagement Console (WIN-DXVOI5QYFG3) Imagement Console (WIN-DXVOI5QYFG3) Imagement Console (WIN-DXVOI5QYFG3) 	I Node Type: ModbusPLC Delimi	iter:.
DAServer Manager Default Group	PrimaryPLC Parameters Device Groups Device Items	
E Cocal	Network address: 10.2.82.25	Port number: 502
	Reply timeout (sec): 3	Maximum outstanding messages: 4
Configuration	Use Concept data structures (Longs)	☑ Use Concept data structures (Reals)
E PrimaryPLC SecondaryPLC	Support multiple coil write	Support multiple register write
⊞ Log Viewer □	Close Ethernet connection when no activity.	Swap string bytes
	Bit order format: B1 B2 B16 💌	Register size (digits): 6
	String variable style Full length C C style C Pascal style	Register type
	_ Block I/O size	
	Discrete input/coil read: 1976	Coil write: 800
	Register read: 122	Register write: 100

FIGURE 1: PLC CONFIGURATION

Create and Configure the Redundant Device Object

- 1. Select, then right-click on Configure.
- 2. Click Add REDUNDANT_DEVICE Object. Rename this object if desired.
- 3. In the Redundant Device Object configuration window, click the Elipsis button (...) next to the **Primary Device** field.

Use the Device Browser to find the PrimaryPLC object.

4. Select this object then click OK.

Configuring the MBTCP DAServer for Redundancy



FIGURE 2: SELECT THE PRIMARY OBJECT

5. In the Redundant Device Object configuration window, click the Elipsis button next to the Secondary Device field.

Use the Device Browser to find the SecondaryPLC object.

6. Select this object, then click **OK**.

7. Type a **Ping Item**.

A ping item must be specified and be a valid tag in both the Primary and Secondary PLCs to determine the connection status. If the ping item is invalid or does not exist in the PLC, the failover operation may not function correctly.

In this example we use the first holding register in the PLC (400001).

FIGURE 3: PING ITEM COMMON TO BOTH PLCs

8. Select the **Device Groups** tab and type a device group name and update interval. In this example **PLC** is the device group with a 1000 ms update interval.

Testing the Configuration

Configuring the MBTCP DAServer for Redundancy

For this example, WWClient will be used for testing. Information and download links for WWClient can be found on the Wonderware Technical Support Website: WWClient Information

- 1. After the DAServer has been configured, activate **DASMBTCP**.
- 2. Start WWClient.
- 3. Using WWClient, click Connections/Create from the main menu, then connect to the DASMBTCP Redundant device group.

Wonderware Client								
File Script Connections Item Window Help								
Connections								
Node	Application	Topic	Туре	Handle	#Items	#Data	#Writes	
localhost	dasmbtcp	plc	SL	0x00a5ba08	0	0	0	17
	Create	Connectio	n				1	
	12							
L	Node	e: To	ocalhost			-		
	Appli	ication: d	asmbtcp			-		
	12.12	_						
	Topic: plc							
C DDE C IDI C IDI - Thread								
-								

FIGURE 4: WWCLIENT TEST: CREATE CONNECTION

- 4. Select Item from the main menu then type a valid PLC register.
- 5. Click AdviseEx (Figure 5 below).

Wonderw-	are Client	m Window	Helo				
Node localhost	ons Application dasmbtcp	Topic plc	Type Har SL 0x00a	ndle /#Ite 5ba08 1	ms #Data 13	#Writes 0	
	Item V Item 400002	'iew - \\loca Time 09:44.06.	alhost\dasmbt Date 0512 03/09/2	cp plc Quality 0x00c0	Value		
	Item Conne Sub Item Item 400 Value 45	ections boalhost\dasn	nbtcplplc 0x00a	s5ba08	Reg Adv Unac Req Unres Advis Advis	ister rise Ivise gister gister seEx riseEx	

FIGURE 5: Advise I TEM CONFIGURATION

You can also monitor the following system items that are specific to Redundancy:

System Item	Description			
\$sys\$ActiveDevice	Current runtime active device.			
\$sys\$StandbyDevice	Current runtime standby device.			
\$sys\$PrimaryDeviceStatus	Status of the primary device. 0 =Error communicating with the device, 1 =Connection to the device is good.			
\$sys\$SecondaryDeviceStatus	Status of the secondary device. 0 =Error communicating with the device, 1 =Connection to the device is good.			
\$sys\$FailoverTime	Time at which a failover occurred. Time is in UTC.			
\$sys\$FailoverReason	Reason for Failover			

file:///C|/inetpub/wwwroot/t002534/t002534.htm[3/10/2011 8:31:49 AM]

\$sys\$ForceFailover

Wonder	vare Client								
File Script	Connections Item Window	Help							
Connect	ions								
Node	Application Topic	Type Handle	#Items	#Data	#Writes				
localhost	dasmbtcp plc	SL 0x00c5ba0	8 8	838	1				
100									
	VItem View - \\localhost\dasmbtcp plcX								
	Item	Time	Date	Quality	Value				
\$sys\$ActiveDevice		10:16.49.0061	03/09/2	0x00c0	Port.PrimaryPLC				
	\$sys\$FailoverReason		03/09/2	0x00c0	Value poked to system item \$SYS\$ForceFailover				
	\$sys\$FailoverTime	10:16.49.0061	03/09/2	0x00c0	3/9/2011 6:16:49 PM				
	\$sys\$ForceFailover	10:16.49.0040	03/09/2	0x00c0	1				
	\$sys\$PrimaryDeviceStatus	09:46.23.0758	03/09/2	0x00c0	1				
	\$sys\$SecondaryDeviceStatus	09:46.23.0758	03/09/2	0x00c0	1				
	\$sys\$StandbyDevice	10:16.49.0061	03/09/2	0x00c0	Port.SecondaryPLC				
	400002	10:20.49.0143	03/09/2	0x00c0	112				

FIGURE 6: REDUNDANCY MONITORING IN WONDERWARE CLIENT

Testing the Failover

You can test the Failover by setting **\$sys\$ForceFailover** to 1.

You can also test Failover by shutting down the primary PLC or unplugging the Ethernet cable from the primary PLC.

Figure 6 (above) shows the system tags contents just after a force failover event from the secondary PLC back to the primary PLC.

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Back to top

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