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#### About Moxa

Moxa is a leading manufacturer of industrial networking, computing, and automation solutions. With over 25 years of industry experience, Moxa has connected more than 30 million devices worldwide and has a distribution and service network that reaches customers in more than 70 countries. Moxa delivers lasting business value by empowering industry with reliable networks and sincere service for automation systems. Information about Moxa's solutions is available at <a href="https://www.moxa.com">www.moxa.com</a>. You may also contact Moxa by email at <a href="https://www.moxa.com">info@moxa.com</a>.

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Everyone has heard the old adage, "garbage in, garbage out," but the reality is that ensuring the quality and integrity of big data is not particularly easy. A cause for concern is the inevitable unexpected connection interruptions that plague any network, and which could result in data loss and expensive shutdowns of important business processes. Moxa's smart data acquisition method ensures data completeness by shrinking the amount of data that needs to be transmitted.



With the automatic data supplement function, after each network reconnection, MX-AOPC UA Logger will compare historical data stored on the SD cards located in individual Moxa ioLogik 2500 devices with the real time data it has already stored locally, and then supplement any missing data by requesting that the devices retransmit the lost data.

#### Moxa Tech Note

#### Ensure Data Completeness with Data Supplement's Auto Mode, on Demand, and on Schedule



We should point out, however, that automatic data supplement could fail due to unstable network conditions or a failure to access the database. To help avoid these problems, MX-AOPC Logger supports "on demand" and "on schedule" data supplement to allow users to manually trigger data supplement at any time or specify a fixed time for Logger to automatically execute a data supplement every day.

In this tech note, we illustrate how to set up different data supplement methods: automatic, on-demand, and on-schedule. For demonstration purposes, data supplement is implemented by exporting the data to an Excel file. To further understand how to build a public cloud-based solution, check the following links:

Tech note for public cloud-based solutions: http://www.moxa.com/support/sarch\_result.aspx?prod\_id=3049&type\_id=7&type=doc\_

Tech note title:

• How to Build a Public Cloud with MX-AOPC UA Server and Logger

Prerequisites for data completeness solution:

- 1. ioLogik 2500 series device with SD card
- 2. MX-AOPC UA Server & UA Logger software
- 3. IOxpress software

Only three steps are required to finish setting up the data supplement methods:

- Step 1. Install MX-AOPC UA Server & UA Logger on your PC
- Step 2. Configure you Moxa I/O device to send properly configured tags to MX-AOPC UA Server

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- Step 3. Configure MX-AOPC UA Server and Logger to implement one of the following functions:
  - 1. Automatic data completeness
  - 2. On-demand data supplement
  - 3. On-schedule data supplement

#### **1** Install MX-AOPC UA Server and Logger on your PC

The MX-AOPC UA Server and MX-AOPC UA Logger software can be downloaded for free from Moxa's website at the following software download page: http://www.moxa.com/product/MX-AOPC UA Suite.htm

Latest software versions:

- MX-AOPC UA Server v2.0
- MX-AOPC UA Logger v2.0

Refer to the user's manuals for MX-AOPC UA Server and MX-AOPC UA Logger for step-by-step installation instructions:

http://www.moxa.com/support/sarch\_result.aspx?prod\_id=3049&type\_id=7&type=doc

User's manual titles:

- MX-AOPC UA Server User's Manual
- MX-AOPC UA Logger User's Manual

### 2 Configure your ioLogik 2500 device to send tags to MX-AOPC UA Server

To configure your ioLogik 2500 device, IOxpress can be downloaded for free from Moxa's website:

Software download page:

https://www.moxa.com/support/sarch\_result.aspx?prod\_id=4133&type\_id=5&type=soft

Latest software versions:

• IOxpress Configuration Utility v2.1

Refer to the user's manuals of ioLogik 2500 on how to configure the device to send tags to MX-AOPC UA Server.

User's manual download page:

https://www.moxa.com/support/sarch\_result.aspx?type=doc&prod\_id=4133&type\_id=7

User's manual titles:

• ioLogik 2500 User's Manual

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### **3** Configure MX-AOPC UA Server and Logger

Step 1. Run MX-AOPC UA Server from your PC's start menu, and then click the "Get Configuration from Server" icon on the menu bar. Devices that are uploading tags to the server will be listed in the left panel, and the tags you configured in Step 2 above will be listed in the right panel.

MX-AOPC UA Server le Edit View Tools Runtime Help		Allow the Building of	
	X 🖻 🖻 🔒	<b>1</b>	
Active Device List	Tag Name	Data Type Acces	ss Rights Description
AOPC-01 (00:90:e8:00:11:28) Server 00 (00:90:e8:25:12:84)	👒 Server 00.DI-00	Boolean Read	-only Desc
Modbus Device Group List	👒 Server 00.DI-01	Boolean Read	-only Desc
	👒 Server 00.DI-02	Boolean Read	-only Desc
	👒 Server 00.DI-03	Boolean Read	-only Desc
	👒 Server 00.SysMAC	String Read	-only Device MAC Address
	👒 Server 00.SysIPAddress	String Read	-only Device IP Address
	👒 Server 00.SysConnect-00	Boolean Read	-only System Connection

Step 2. Run MX-AOPC UA Logger from your PC's start menu, and then click **Help**  $\rightarrow$  **Logger Help** from the top menu bar. Follow the instructions in the "Server Management" section to connect MX-AOPC UA Logger to MX-AOPC UA Server.



Step 3. Click the "Connect" button on the menu bar to connect to MX-AOPC UA Server.

MX-AOPC UA Logger	The summaries have be commented in a later of	and the local diversion of
<u>File Server Logger Tools Runtime Help</u>		
1 T T T I I I I I I I I I I I I I I I I	🔒 🔕 🕲 🗟 😂 🚭	
□ ♥ Server Group Server 1(192.168.127.25:53192)	Server Endpoint: opc.tcp://192.168.127.25:5319	2/MXAOPC/UAServer
	Security Policy: None	
😫 Logger Group List	Security Mode: None	
	Subscription Settings	Monitored Item Settings
	Publish Interval: 1000 ms	Sampling Interval: 500 ms
	Keep Alive Count: 10	Queue Size: 10
	Lifetime Count: 1000	Discard Oldest: Yes

Step 4. Click the "Help" menu and follow the instructions in the "Logger Management" section to create a logger to send the tags to a local Excel file.

MX-AOPC UA Logger		Sector Contractor	😵 MX-AOPC UA Logger Help	
IM: AOPC UA Logger         File       Server         Logger       Tools         Runtime       He         Runtime       He         Server       Group         Server (192.168.127.100:5319.2)	Logger Help Licensing About Server Endpoint: Security Policy:	1000 ms Sampling I	He Bock Prit Gröne Contents Index Search DMC-AOPC UALogger Help Ditroduction Configuration Console Server Management Dictore Management Dictore Registration and Activation Configuration and Activation District District Registration and Activation District Registration Activation	
	Subscription Settings Publish Interval:	Monitored I 1000 ms Sampling I 10 Que	Sever Hanagement     Unager Hanagement     Unager Hanagement     Doger Group     Doger Group     Doger Hanagement     Looger Recording     Order Hanagement     Doger Hanage	Adding a Logger Group to a Logger Group List     Ensure the runtime service is stopped     Right click the Logger Group List and then click     New Logger Group in the popup menu, or click
Service Status : Stopped Time: 22:47:21			C	

#### Moxa Tech Note

#### Ensure Data Completeness with Data Supplement's Auto Mode, on Demand, and on Schedule

ogger Name	Logger 1	
	(max. ler	ngth = 30; only 20 if using Oracle Database)
Excel F	=ile:	
Root	Path:	C: \Users \Public \Documents \Moxa \MXAOPCLogger \Logger
File s	eparated e	very 60 vin.(default: 60)
Access		
Root	Path:	C: \Users \Public \Documents \Moxa \MXAOPCLogger \Logger
🔘 Datab	ase:	
Source	e Name:	Setting
Azure	IoT:	
Conn	ection Strin	g:

Step 5.1 Automatic data supplement setting

Click **Tools**  $\rightarrow$  **Data Supplement Settings** from the top menu bar. Click "Data supplement after network reconnection" to activate the automatic data supplement function.

Eile Server Logger Tools Buntime Help         Data Supplement Settings         Certificate Management         System Log         Change Password         Options         Retry Timeout 30         sec(s) (5 to 600, default: 30)         Triggering Event         Pata supplement after network reconnection         Data loss in the past 1         day(s) (1 to 7, default: 1)         Data supplement through Cellular Data Access         IP Address       0       0         Port       9400       (0 to 65535, default: 9400)	MX-AOPC UA Logger	the second se
Certificate Management         System Log         Change Password         Options         General Settings         Retry Timeout         Retries         Jogger Group List         Logger Group 1         Logger Group 1         Logger Group 1         Data Supplement after network reconnection         Data supplement on schedule         Everyday at         Everyday at         Data supplement through Cellular Data Access         IP Address       0.0.0.0	<u>File Server Logger Tools Runtime H</u> elp	
Server Group       System Log         Change Password       Options         Options       Retry Timeout         Image: Change Coroup List       30         Image: Change Coroup List       00 to 10, default: 30         Image: Change Coroup List       1000000000000000000000000000000000000		
Change Password         Options         Retry Timeout         Retries         Cogger Group List         Icogger Group 1         Icogger 1 </td <td>System Log</td> <td>Data Supplement Settings</td>	System Log	Data Supplement Settings
Folder for supplementary data Path C: \Users\Public\Documents\Moxa\MKAOPCL   Log Folder for Data Supplement on Demand	System Log System Log Change Password Options	General Settings         Retry Timeout       30         sec(s) (5 to 600, default: 30)         Retries       3         Triggering Event         Image: Triggering Event

**Note:** Data Supplement Settings can only be modified when the logger stops recording, and the data supplement process can be performed when the logger is recording.

Step 5.2 Click the "Help" menu and follow the instructions in "Testing the Data Supplement Function" section to test the automatic data supplement function.



Step 6.1 On demand data supplement setting

To trigger the data supplement process manually, click the "Data Supplement on Demand" button.



Step 6.2 Once the on-demand data supplement function has been triggered, the Logger icon will flash pink and gray light, indicating that the logger is performing the data supplement process. The progress of the data supplement process can be seen in the event log.

Date	Time	Event			
2018/03/26	19:33:30	Connecting to the device [MAC:00-90-e8-5f-10-a8] for retrieving log from 2018/03/26 08:51:40 to 2018/03/26 08:52:0			
2018/03/26	19:33:30	No data found [from 2018/03/26 08:49:27 to 2018/03/26 08:51:13] from the device [MAC:00-90-e8-5f-10-a8] for sup;			
2018/03/26	19:33:28	Connecting to the device [MAC:00-90-e8-5f-10-a8] for retrieving log from 2018/03/26 08:49:27 to 2018/03/26 08:51: :			
2018/03/26	19:33:28	No data found [from 2018/03/25 11:33:24 to 2018/03/26 08:48:58] from the device [MAC:00-90-e8-5f-10-a8] for sup;			
2018/03/26	19:33:26	Connecting to the device [MAC:00-90-e8-5f-10-a8] for retrieving log from 2018/03/25 11:33:24 to 2018/03/26 08:48:5			
2018/03/26	19:33:26	Trying to connect to the device.			
2018/03/26	19:33:26	Data supplement (Demand) begin.			
2018/03/26					
2018/03/26	19:33:16	Initializing database			
2018/03/26	19:33:14	MX-AOPC UA Logger runtime service is running.			
2018/03/26	19:33:01	Data supplement (Demand) end.			
2018/03/26	19:33:01	MX-AOPC UA Logger runtime service is stop.			
2018/03/26	19:32:52	No data found [from 2018/03/26 09:11:24 to 2018/03/26 10:12:58] from the device [MAC:00-90-e8-5f-10-a8] for supr			
<	III	• • • • • • • • • • • • • • • • • • •			
Service Status : R	Running Tim	e: 19:33:30 Data Supplement Queue: 0000			

#### Step 7.1 On schedule data supplement setting

Click **Tools**  $\rightarrow$  **Data Supplement Settings** from the top menu bar. Click "Data supplement on schedule" and specify the time and period; the data supplement process will start at the specified time.

MX-AOPC UA Logger	1				No.
<u>File</u> <u>Server</u> Logger <u>To</u>	ools <u>R</u> untime <u>H</u> elp				
	Data Supplement Settings	800		1	
- Server Group	Certificate Management			-	2
Server 1(19	System Log •	Data Supplement Sett	lings		
	Change Password	General Settings			
	Options	Retry Timeout	30	sec(s) (5 to 600, default: 30)	
🖃 😝 Logger Group List		Retries	3	(0 to 10, default: 3)	
LoggerGroup1		Triggering Event			
Logger 1		Data suppleme	ent after network reconnection	sec(s) (5 to 600, default: 30) (0 to 10, default: 3) 57, default: 1) (0 to 65535, default: 9400) xa\MXAOPCL	<u>^</u>
		V Data suppleme	ent on schedule		E
		Everyday at	15:40		
		Data loss in t	he past 1 day(s) (1	to 7, default: 1)	-
1					
		Data suppleme	ent through Cellular Data Access	5	
		IP Address	0.0.0.0		
		Port	9400	(0 to 65535, default: 9400)	
		Folder for suppler	mentary data		
		Path	C:\Users\Public\Documents\M	oxa\MXAOPCL:	
		Log Folder for Dat	ta Supplement on Demand		
			C: \Users\Public\Documents\M	oxa\MXAOPCLi 💿	
				OK Cancel	

Step 7.2 After the on-schedule data supplement process is complete, the event log will show how long the data supplement process took to perform and display the result of the supplement process.

Date	Time	Event	^		
2018/03/26 19:37:32 No data found [from 2018/03/26 08:51:40 to 2018/03/26 08:52:00] from the device [MAC:00-90-e8-5f-10-a8] for sup					
2018/03/26	19:37:30	Connecting to the device [MAC:00-90-e8-5f-10-a8] for retrieving log from 2018/03/26 08:51:40 to 2018/03/26 08:52:0			
2018/03/26	19:37:30	No data found [from 2018/03/26 08:49:27 to 2018/03/26 08:51:13] from the device [MAC:00-90-e8-5f-10-a8] for sup			
2018/03/26	19:37:28	Connecting to the device [MAC:00-90-e8-5f-10-a8] for retrieving log from 2018/03/26 08:49:27 to 2018/03/26 08:51:			
2018/03/26	19:37:28	No data found [from 2018/03/25 11:37:00 to 2018/03/26 08:48:58] from the device [MAC:00-90-e8-5f-10-a8] for sup			
2018/03/26	19:37:27	Connecting to the device [MAC:00-90-e8-5f-10-a8] for retrieving log from 2018/03/25 11:37:00 to 2018/03/26 08:48:			
2018/03/26	19:37:26	Trying to connect to the device.			
2018/03/26	19:37:26	Data supplement (Schedule) begin.			
2018/03/26	//26 19:36:25 LoggerGroup 1.Logger 1 sucessfully connected to database!				
2018/03/26	19:36:25	Initializing database			
2018/03/26	19:36:23	MX-AOPC UA Logger runtime service is running.			
2018/03/26	19:35:44	MX-AOPC UA Logger runtime service is stop.			
2018/03/26	19:34:25	Data supplement (Demand) end.	-		
•		M			
Service Status : R	unning T	ime: 19:39:25 Data Supplement Queue: 0000			

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