Getting Started with Microsoft Azure IoT Suite on Moxa UC-8100-LX Using NodeJS SDK

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Contents

1	Background	2
	Requirement	
3	Overview	
3.1	Preparing the Microsoft Azure Environment on the UC-8100-LX	3
3.2	Creating Resources in the Microsoft Azure IoT Suite	4
3.3	Connecting to the Microsoft Azure Cloud Service	7
4	Additional Reading	9

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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 <u>www.moxa.com</u>. You may also contact Moxa by email at <u>info@moxa.com</u>.

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Running the MS Azure IoT Suite on Moxa UC-8100-LX Using NodeJS SDK

The instructions in this tech note apply only to the UC-81XX series of computers. These instructions MAY NOT be suitable for use in other computers because of the different Debian distribution versions, hardware peripherals, and firmware versions.

The instructions in this document require familiarity with the Microsoft Azure Portal and Microsoft Azure IoT Suite. Additional details on the Microsoft Azure Portal and Microsoft Azure IoT Suite are available at: <u>https://azure.microsoft.com</u>

1 Background

The purpose of this document is to provide step-by-step instructions on how to run the Microsoft Azure software development kit (SDK) on the UC-8100-LX computer.

2 Requirement

- UC-8100-LX/ UC-8100-LX-ME
- Microsoft Azure Portal account

3 Overview

The UC 8100-LX computer comes preinstalled with the Debian Linux distribution. It is easy to support the NodeJS Software Development Kit (SDK) for Microsoft Azure suite on the UC 8100-LX computer by installing the required libraries and tools. This document does not go into the details of how to use the Microsoft Azure IoT Suite, instead, the focus is on how to run the NodeJS SDK provided by Microsoft to connect to the Microsoft Azure Cloud service.

Once you have installed all the libraries and tools required for this distribution, follow the instructions given under the following sections:

- 1. Preparing the Microsoft Azure SDK environment on the UC-8100-LX
- 2. Creating resources in the Microsoft Azure IoT Suite
- 3. Connecting to the Microsoft Azure Cloud service

Running the MS Azure IoT Suite on Moxa UC-8100-LX Using NodeJS SDK

3.1 Preparing the Microsoft Azure Environment on the UC-8100-LX

3.1.1 Libraries and Tools

You will need to first install NodeJS SDK and all the relevant libraries on the UC-8100-LX to be able to run the source code. To download the libraries and tools, make sure that the UC-8100-LX is connected to the Internet and run the following commands with **root** authentication:

- 1. #apt-get update
- 2. #apt-get upgrade
- 3. #apt-get install git -y
- 4. #apt-get install curl -y

Microsoft Azure SDK requires the NodeJS language and NPM packages to be installed on the UC-8100-LX. To install these packages, run the following commands:

- 1. #apt-get install nodejs -y
- 2. #update-alternatives --install /usr/bin/node nodejs /usr/bin/nodejs 100
- 3. #curl https://www.npmjs.com/install.sh | sh

3.1.2 Building the C Source Code

Microsoft Azure IoT SDK is available free of cost at: <u>https://github.com/Azure/azure-iot-sdks</u>

Figure 1

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iii cshar		Reverted Java Service Client to version 1.0.10.		cout with SVN using the web		
		Merge branch 'develop'	https://gith	ub.com/Azure/azure-iot-sd	iks.gi	
	p	Adjust ampp lower dependency for csharp nuspec	Open in D	esktop Downle	oad ZIP	
in doc		Device-specific instructions			/ days ago	
🖿 java		Merge branch 'develop'			15 days ago	
in javav	rapper	Fix javawrapper build scripts for Linux and Window	s		a month ago	
iin jenki	15	Always use Cmake			18 days ago	
in medi	a/add_requirement	Add requirements creation workflow and big chan	ges guidance to contri		a year ago	
in node		Merge branch 'master' into ga_release			16 days ago	
iii pythe	'n	Fix build_platform setting			16 days ago	
in tools		Version bumped for the upcoming release.			16 days ago	

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Figure 2

Running the MS Azure IoT Suite on Moxa UC-8100-LX Using NodeJS SDK

Download the Microsoft Azure IoT SDK and then use the **Git** tool to download the source code and dependent libraries to the UC-8100-LX/home/moxa directory on your UC-8100-LX using the following commands:

- 1. #cd /home/moxa
- 2. #npm install azure
- 3. #git clone https://github.com/Azure/azure-iot-sdks.git
- 4. #cd

[PATH_OF_SOURCE_CODE]/azure-iot-sdks/node/device/samples

5. #npm install

3.2 Creating Resources in the Microsoft Azure IoT Suite

Once you set up an account on <u>https://www.azureiotsuite.com/</u> and log in, you will be able to see detailed instructions and a wizard that will guide you through the process of creating a remote monitoring solution (Figure 2 to Figure 5).

1. Enter the **Solution name** "thingsprotest", specify the **Subscription** and **Region** details, and click **Create solution**.

Microsoft Azure IoT Suite				Jimmy Chen (陳永達) MOXA INC.
	Create Remote monitor	Solution name	•	
	Creating a solution will result in the following Azure services being provisioned in your Azure subscription at cost: 1 Azure Active Directory application 1 10 Fuhb (52 - Standard tier) 2 Event Hubs (Basic throughput unit) 1 Storage account (Standard-GRS) 3 Stream Analytics jobs (1 streaming unit per job) 1 Azure App Service Web App for Website (P1 - Premium: 2 small) 1 Azure App Service Web App for Website (P1 - Remium: 2 small) running 4 simulated devices by default Pricing information for these services can be found here subscription can be found in the Azure Portal. In addition to the above Azure services, creating a solut	Subscription Free Trial To continue creation, click Accept below solution will have a static map. To add an map. follow guidance in our FAQ. ☑ I Accept. Region West US e. Usage amounts and billing details for you	on interactive	
	Create solution Cancel Cancel	re subject to the following terms:		

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2. Select **Custom Device** and click **Add New**.

Figure 3



3. Select the Let me define my own Device ID.option and click Create.

Figure 4

Microsof	t Azur	IoT Suite - Remote Monitoring Solution		۲	jimmy_chen@moxa.com
DASHBOARD	÷	DD A CUSTOM DEVICE TEP 2 of 3			
DEVICES		How would you like to define the Device ID? DeviceID is case-sensitive)			
RULES		 Generate a Device ID for me Let me define my own Device ID 			
		Enter a Device ID	Check ID		
ADVANCED		□ Attach a SIM ICCID to the device			
		Create			
+ ADD A DEVICE					

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- 4. Copy the device credentials and click on **Done** to complete the wizard.
 - **NOTE** Copy the information in the **Device ID**, **IoT Hub Hostname**, and **Device Key** fields to a configuration file on your device so that it is available when you change your sample code.

Figure 5

Microsoft Az	ure IoT Suite - Remote Moni	toring Solution	۲	jimmy_chen@moxa.com ADMINISTRATOR
DASHBOARD	ADD A CUSTOM DEVICE STEP 3 of 3			
DEVICES	Copy credentials into	o the configuration file on the device		
	Device ID:	thingspro		6
ţ	IoT Hub Hostname:			6
	Device Key:			G.
	Done			
	Instructions for your Cust	om Device (opens in new tab)		
ADD A DEVICE				

Figure 6 shows how you can change the variable connectionString in the NodeJS sample program, remote_monitoring.js.

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Figure 6

<pre>// Copyright (c) Microsoft. All rights reserved. // Licensed under the MIT license. See LICENSE file in the project root for full license information.</pre>
'use strict';
<pre>var Protocol = require('azure-iot-device-http').Http;</pre>
<pre>var Client = require('azure-iot-device').Client;</pre>
<pre>var ConnectionString = require('azure-iot-device').ConnectionString; var Message = require('azure-iot-device').Message;</pre>
<pre>// String containing Hostname, Device Id & Device Key in the following formats: // "HostName=<iothub_host_name>;DeviceId=<device_id>;SharedAccessKey=<device_ke y="">"</device_ke></device_id></iothub_host_name></pre>
var connectionString = 'HostName=' azure-devices.net;DeviceId=t
hingspro; SharedAccessKey=====;;
<pre>var deviceId = ConnectionString.parse(connectionString).DeviceId;</pre>
// Sensors data
<pre>var temperature = 50;</pre>
<pre>var humidity = 50;</pre>
<pre>var externalTemperature = 55;</pre>
"remote_monitoring.js" 121L, 3688C 1,1 Top 🔻

3.3 Connecting to the Microsoft Azure Cloud Service

After installing all necessary tools and libraries and setting up the resources in Microsoft Azure Cloud, it is time to run the remote monitoring program using the following commands:

- 1. #cd [PATH_OF_SOURCE_CODE]/azure-iot-sdks/node/device/samples
- 2. #export NODE_PATH="'\$(npm root -g)'"
- 3. #nodejs remote_monitoring.js

In the Microsoft Azure IoT Suite solution window, click on the **Dashboard** item and choose thingsprotest in the **Device to View** field to see a history graph as shown below:

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Microsoft	Azure IoT Suite - Remote Monitoring Solution		jimmy_chen@moxa.com
DASHROARD		Device to View: [thingspro] Telemetry History • Temperature • Hundry • Extendemperature • Particional 50	
ACTIONS ACTIONS ADVANCED	And	40 m 30	
	Alarm History		
	12/06/2016 4:36:47 PM SampleDevice001_865 AlarmTemp 43:33	10	
	12/06/2016 SampleDevice001_865 AlarmTemp 44.46	0	4:36:58 PM 4:37:00 PM 4:37:02 PM
	12/06/2016 SampleDevice001_865 AlarmTemp 42.97	Max of device humidity Min of device humidity	Average of device humidity
ADD A DEVICE	¢	>	, ·

Now, log in to the Microsoft Azure Portal using the device credentials to monitor the device. You will see a dashboard. Wait for the dashboard to update. You are all set when the values on the dashboard start to change.

Microsoft Azure All resources > thingsprotestd2c57				🔎 Search resources × 📫 🐯 😳 🧿 jimmy_chen@moxa.c
≡	All resources	* _ ×	thingsprotestd2c57	* _ • ×
+	+ Add ≣≣ Columns ひ Refrest			🗲 Devices 🏟 Settings 🗴 Delete
	Subscriptions: Free Trial			Essentials A
	Filter by name		X Overview	Resource group Hostname thingsprotest 🖉 thingsprotestd2c57.azure-devices.net
()	13 items		··· ·	Status Pricing and scale tier
۲			Activity log	Active S2 - Standard Location IoT Hub units
8	thingspro	•••	Access control (IAM)	West US 1 Subscription name
ii.	thingsprotest		SETTINGS	Free Trial
	🔇 thingsprotest	•••	Properties Locks Automation script	ca7c653e-5323-4aa7-81ad-68e3bff756aa
	thingsprotest15c0f			Usage
•	thingsprotestd2c57			12/7/2016 UTC
-	thingsprotest-DeviceInfo	•••		THINGSPROTESTD2CS7
	thingsprotest-jobhost		GENERAL	1709,6м
~~>	thingsprotest-jobsplan		Shared access policies Messaging File upload Pricing and scale	0%, TOTAL DEWCES
•	📕 thingsprotest-plan			5
<u>e</u>	thingsprotest-Rules			Monitoring
	thingsprotest-Telemetry	•••		Monitoring
*	thingsprotestx		Operations monitoring	THINGSPROTESTD2CS7 Edit
۲	thisprooms		E IP Filter	
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2			SUPPORT + TROUBLESHOOTING	40 marked Verroved V
>			New support request	20
https://po	rtal azure com/			

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4 Additional Reading

- <u>https://github.com/Azure/azure-iot-sdks</u>
- <u>https://www.azureiotsuite.com/</u>
- <u>https://portal.azure.com</u>
- <u>http://www.moxa.com/product/uc-8100.htm</u>

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