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

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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

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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

Apps web design Linux	:: [US] https://github.com/Azure/azure-ic Hacker 🧧 MOXA 📃 MUS Life 🎅 細胞的	ot-sclics Effi @ Debian.org @ Latest News @ Help				☆ 📕 🛪 🔽 💩 🔯 🥥 🍕
	Personal Open source	e Business Explore Pricing Blog :	Support This	repository Search	Sign in Sign up	
	Azure / azure-iot-sdks				Star 412 ¥ Fork 530	
	↔ Code ① Issues 56	(1) Pull requests 19 📃 Projects 1 🔶 Puls	e 🔟 Graph	s		
	SDKs for a variety of language sdks/	s and platforms that help connect devices to	Microsoft Azı	ure IoT services http://azu	ire.github.io/azure-iot-	
	@ 3,968 commits	$\ensuremath{\mathscr{V}}$ 34 branches	© 26 rel	eases	AL 84 contributors	
	Branch: master New pull requi	est		Fir	d file Clone or download •	
	S hegate committed on GitHub	Merge pull request #982 from neeraj-khanna/master 📧		Clone with HTTPS 💿		
	🖿 build	Reverted Java Service Client to version 1.0.10.		Use Git or checkout with SV	N using the web URL.	
	illi c	Merge branch 'develop'		https://github.com/Azur	re/azure-iot-sdks.gi	
	🖿 csharp	Adjust ampp lower dependency for csharp nu	ispec	Open in Desktop	Download ZIP	
	in doc	Device-specific instructions			/ days ago	
	🖿 java	Merge branch 'develop'			15 days ago	
	iavawrapper	Fix javawrapper build scripts for Linux and Wi	ndows		a month ago	
	iiii jenkins	Always use Cmake			18 days ago	
	im media/add_requirement	Add requirements creation workflow and big	changes guida	nce to contri	a year ago	
	🖿 node	Merge branch 'master' into ga_release			16 days ago	
	iii python	Fix build_platform setting			16 days ago	
	in tools	Version bumped for the upcoming release.			16 days ago	
	D altatedicatas	hump upging for plasse 2/16/2016			10 months and	

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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**.

<section-header></section-header>	Microsoft Azure IoT Suite				Jimmy Chen (陳永達) MOXA INC.
Solution details Creating a solution will result in the following Actus services being provisione din your Azare subscription at cost: • 1 Azure Active birectory application • 1 Azure App Service Web App for Website (F1 • Premium: 2 small) • 1 Azure App Service Web App for Website (F1 • Premium: 2 small • 1 Azure App Service Web App for Web jobs • 1 Azure App Service Web App for Web jobs • 1 Azure App Services web App for Web jobs • 1 Azure App Services web App for Web jobs • 1 Azure App Services web App for Web jobs • 1 Azure App Services web App for Web jobs • 1 Azure App Services web App for Web jobs • 1 - Services • 1 - Birlowing Azure Marketplace offering(I), which are subject to for a subscription • I addition to the above Az		Create Remote monitor	ing solution		
Creating a solution will result in the following Actuar services being provisioned in your Azure subscription at cost: 1 Azure Active Directory application 1 for Huh (S2 - Standard ter) 2 Stream Analytics Jos (1 streaming unit pri Jos) 2 Stream Analytics Jos (1 streaming unit pri Jos) 3 Stream Analytics Jos (1 streaming unit pri Jos) 4 Azure App Service Web App for Website (P1 - Premium: 2 small) 4 Azure App Service Web App for Website (P1 - Premium: 2 small) 4 Azure App Service Web App for Website (P1 - Premium: 2 small) 4 Azure App Service Web App for Website (P1 - Premium: 2 small) 4 Azure App Service Web App for Web Job (S1 - Standard 2 small) running 4 simulated 4 Azure App Services (P4 Bapp for Web Job (S1 - Standard 2 small) running 4 simulated 4 Azure App Services (P4 Bapp for Web Job (S1 - Standard 2 small) running 4 simulated 4 Azure App Services (P4 Bapp for Web Job (S1 - Standard 2 small) running 4 simulated 4 Azure App Services (P4 Bapp for Web Job (S1 - Standard 2 small) running 4 simulated 4 Azure App Services (P4 Bapp for Web Job (S1 - Standard 2 small) running 4 simulated 4 Azure App Services (P4 Bapp for Web Job (S1 - Standard 2 small) running 4 simulated 4 Azure App Services (P4 Bapp for Web Job (S1 - Standard 2 small) running 4 simulated 4 Azure App Services (P4 Bapp for Web Job (S1 - Standard 2 small) running 4 simulated 4 Azure App Services (P4 Bapp for Web Job (S1 - Standard 2 small) running 4 simulated 4 Azure App Services (P4 Bapp for Web Job (S1 - Standard 2 small) running 4 simulated 4 Azure App Services (P4 Bapp for Habpe of P4 For Job (S1 - Standard 2 small) running 4 simulated 4 Azure App Services (P4 Bapp for Fateprise (Internal Website Transactions Level 1); terms of use and privacy statement. Eing Maps API for Enterprise (Internal Website Transactions Level 1); terms of use and privacy stat		Solution details	Solution name		
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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

Microsoft	Azure IoT Suite - Remote Monitoring Solution	۲	jimmy_chen@moxa.com ADMINISTRATOR
DASHBOARD	← ADD A CLISTOM DPLICE STEP 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 		
¢ ACTIONS	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		
≻ RULES	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

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// Copyright (c) Microsoft. All rights reserved. // Licensed under the MIT license. See LICENSE file in the project root for full license information.	
'use strict';	
<pre>var Protocol = require('azure-iot-device-http').Http; var Client = require('azure-iot-device').Client; 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 v="">"</device_ke></device_id></iothub_host_name></pre>	
<pre>var connectionString = 'HostName=' azure-devices.net;DeviceId=t hingspro;SharedAccessKey=' deviceId='; var deviceId = ConnectionString.parse(connectionString).DeviceId;</pre>	
// Sensors data	
var temperature = 50 ;	
var externalTemperature = 55;	-
"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 A	zure IoT Suite - Remote Monitoring Solution	
DASHBOARD Devices	Device to V Telemetry Telemetry Telemetry Telemetry Telemetry Telemetry Telemetry Telemetry Telemetry Telemetry Telemetry	iew: [thingspro] History • Hamiday • Extensitemperature • Partitionaid
	to the second se	
	Design Design Design Design Design Design Design Alarm History	
-	12/06/2016 SampleDevice001_865 AlarmTemp 44.46 0 12/06/2016 SampleDevice001_865 AlarmTemp 43.97	43652 PM 43654 PM 43656 PM 43658 PM 43700 PM 43702 PM
+ ADD A DEVICE	4:33:45 PM JoungleCleanderOl2_003 Addititeting 42:37	uumidity Min of device humidity Average of device humidity

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.

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	Subscriptions: Free Trial			Essentials ^
	Filter by name		N. 6. 1	Resource group Hostname
()	13 items		C Overview	Status Pricing and scale tier
۲	57		Activity log	Active 52 - Standard Location IoT Hub units
8	thingspro	•••	Access control (IAM)	West US 1 Subscription name
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	thingsprotest	•••	Properties	ca7c653e-5323-4aa7-81ad-68e3bff756aa
<u> </u>	thingsprotest15c0f		Locks	Usage
	thingsprotestd2c57		Automation script	12/7/2016 UTC
-	thingsprotest-DeviceInfo	•••		THINGSPROTESTD2C57
-	thingsprotest-jobhost		GENERAL	1709 / 6М
~~>	thingsprotest-jobsplan		Y Shared access policies	U% TOTAL DEWCES
•	📕 thingsprotest-plan		Messaging	5
<u> </u>	thingsprotest-Rules		File upload	Monitoring
-	thingsprotest-Telemetry	•••	Pricing and scale	Monitoring
*	thingsprotestx		Operations monitoring	THINGSPROTESTD2CS7 Edit
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>			New support request	20
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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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