

IBM Integration Bus

Modifying MQTT nodes using Node Policy

Featuring:

Node Policy MQTT IBM MessageSight

January 2016 Hands-on lab built at product Version 10.0.0.3

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1. Introduction

This lab guide provides a "hands on" introduction to the IIB support of MQTT and how the IIB V10 Node Policy support can provide a useful way of changing connection specific configuration related to an MQTT node without the need to redeploy a message flow.

In addition, it showcases two MQTT server technologies:

- the one provided with IBM WebSphere MQ
- **IBM MessageSight**. This is an appliance designed for the Internet of Things (IoT) and mobile environments. It provides a secure, DMZ-ready channel for lightweight, rapid, bi-directional messaging.

1.1 MQTT support in IIB V10

MQ Telemetry Transport (MQTT) is a lightweight publish/subscribe messaging protocol. IBM Integration Bus provides built-in input and output nodes for processing MQTT messages.

The MQTT messaging protocol provides robust messaging features for communicating with remote systems and devices, and also minimizes network bandwidth and device resource requirements.

The protocol is designed for devices in constrained environments, such as embedded systems, cell phones, and sensors with limited processing ability and memory, and for systems that are connected to unreliable networks.

MQTT uses the publish/subscribe style of messaging that enables the information provider (publisher) to be decoupled from the consumer of the information (subscriber). Consequently, the MQTT protocol is ideal for the machine-to-machine, or Internet of Things, world of communication.

IBM Integration Bus V10 provides support for MQTT through two MQTT nodes:

• MQTTPublish:

Provides an (outbound) interface for publishing data to MQTT endpoints (topic strings)

• MQTTSubscribe:

Provides an (inbound) subscription interface to obtain data from MQTT endpoints.

1.2 Node Policy support in IIB V10

The node policy support provided through IIB V10 allows for connection specific data applicable to nodes to be changed in real time without the need for development changes and redeployment of an application or Integration Service. The Node Policy can be generated from within Integration Toolkit.

1.3 Lab Guide overview

This lab guide provides an outline of how Node Policy support in IIB V10 can be used to change the connection specific data in MQTT nodes.



You will:

- Learn how to easily configure sample MQ Telemetry support in WebSphere MQ
- Learn how to configure an **IBM MessageSight** Appliance so that remote clients can publish and subscribe to the appliance.
- Create a simple message flow demonstrating how the IIB MQTT Publish node can be used.
- Generate an MQTT policy, and store it in the IIB Integration Registry (2) in the above diagram)
- Test how changes in the definition of a policy can affect message flows without the need to redeploy the flow. In *1) above*, MQTT data is first published to WebSphere MQ. After a change in policy, MQTT data is then published to IBM MessageSight (*3) above*).

1.4 Use of IBM WebSphere MQ throughout this lab guide

You will use the MQTT support in IBM WebSphere MQ as an example MQTT server. You will also use IBM WebSphere MQ to initiate the simple message flow you will create.

IIB V10 support of MQTT does not however have a pre-requisite to use IBM WebSphere MQ. Any MQTT Server can be used.

1.5 A note on IBM MessageSight terminology

In this lab guide you will use an IBM MessageSight appliance for the MQTT clients to communicate with. Full guidance is provided within the lab guide on how to configure the IBM MessageSight appliance. The following section gives a brief overview of the terminology that you will see when using the appliance:

Endpoints: are the entry points for clients to connect to the appliance on one or all configured ethernet interfaces, and a specific Port (the value of which can range between 1 and 65535). They are created on a message Hub, and must have at least one connection policy and one messaging policy defined/attached in order to work.

Connection policies: define how (and which type of) clients connect to the appliance for example using JMS, MQTT or both.

Messaging policies: define what clients can do once connected, which resources to use and how to use them. For example if they are able to access topics, or queues.

Message Hubs: are a method of organizing endpoints, connection policies and messaging policies. The ability to group endpoints and policies is intended to make management and monitoring of them easier.

2. Lab preparation

To run this lab you will need access to an IBM MessageSight appliance. On the June 2014 classroom machines a VMware copy of the IBM MessageSight appliance has been made available on your machines so each Lab machine will have its own private copy of the device.

2.1 Finding your IBM MessageSight appliance

This section is only relevant if you are following this lab guide using the supplied VMware machines for the IBM Integration Bus V10 beta class. If you are connecting to a remote IBM MessageSight appliance, you should already know the IP address of your appliance, continue to the next section.

The supplied VMware machines are designed for a classroom environment and configured to use DHCP. You can find the IP address of the IBM MessageSight appliance in your environment using the following steps:

1. In VMware workstation, the IBM MessageSight appliance will be started (The tab will say "IBM MessageSight"), select this tab and click the middle of the black background.

If you are prompted to sign on, use "admin" with a password of "admin" to sign on.

At the Console> prompt, type:

status ethernet-interface eth0

The ip address you will need later in this lab is "inet addr:" in the following:

🕞 HOST10 7-6-13 🗙 🎼 MessageSight 🗙
Last login: Tue Jun 11 10:32:26 on tty1 Welcome to IBM MessageSight 5725-F96
Copyright 2012, 2013 IBM Corp. Licensed Materials – Property of IBM. IBM and MessageSight are trademarks or registered trademarks of IBM, registered in many jurisdictions worldwide. Other product and service names might be trade
marks of IBM or other companies.
Console> status ethernet-interface eth0
generic MTU:1500 carrier:true flags:UP BROADCAST RUNNING MULTICAST
index:5
inet addr:192.168.52.133 flags PERMANENT mask:255.255.255.0
scope:GLOBAL
INETE AGGY: IEBO::20C:29IT:TETI:9f33 flags:PERMANENT
Mask: ffff:ffff:ffff:scope:LINR
ethernet Link:on MHC: 00:06:29:11:91:33 autoneg:on duplex:Full
port: 1P speed: 1000Mps
statistics collisions:0 Multicast:0 rx_0ytes:4/44 rx_compressea:0
rx_crc_errors:0 rx_uropped:0 rx_errors:0 rx_IIIO_errors:0
rx_irame_errors.orx_ireingin_errors.orx_misseu_errors.o
ty hutos: 2580 ty carrier arrors: 0 ty compressed to ty dropped:0
ty proversity of the proversion ty heartheat proversion
ty markets:28 ty window errors:9
Console>

2. Go back to the IIB V10 VMware machine and type the following in a Firefox browser (remember to replace your specific IP address if it is different and note its https):

https://192.168.52.133**:9087**

NB before you can switch from the IBM MessageSight appliance VM, you may need to release the cursor by pressing <ctrl> and <Alt> keys simultaneously.

3. If you are prompted with the following, choose the option "I understand the Risks" and click the "Add Exception" button:



4. Click "Confirm Security Exception" on the "add security window":



5. When you see the following sign-on screen, you have confirmed the IBM MessageSight appliance IP address, book mark the link and note the IP address here:

* * * * * * * * * * * * * * * *	
IBM MessageSight IP address: <>	
* * * * * * * * * * * * * * * *	
🕹 IBM MessageSight Web UI - Log in - Mozilla Firefox	_
<u>File Edit View History Bookmarks Tools Help</u>	
IBM MessageSight Web UI - Log in	
← ▲ https://192.168.52.133:9087/login.html	🝷 Google 🛛 🔎 🖡
💮 Integration Bus Cons 🗌 🔛 WAS Admin Console 🌀 Worklight Console ⊕ Decision Center Enter ⊕ Rul	e Execution Serve
IBM [®] MessageSight™	IBM.
* User ID:	
* Password:	
Log in	
IBM, the IBM logo, and MessageSight are trademarks of IBM Corporation,	s.
logos are trademarks or registered trademarks of Oracle and/or its affiliates.	Java
	" COMPATIBLE
Licensed Materials - Property of IBM. 5725-F96 © Copyright IBM Corporation	2012, 2013.

3. MQ Telemetry set up

IIB V10 support of MQTT does not pre-req using IBM WebSphere MQ as an MQTT server. The MQTT server in IBM WebSphere MQ gives a convenient and quick way of providing an MQTT environment. You will now configure the MQ Telemetry feature in IBM WebSphere MQ. We will use it as an example of an MQTT server for the IIB MQTT Publish node to communicate with.

The MQ Telemetry feature in WebSphere MQ is enabled at a queue manager level. In this section you will use the MQ Explorer to enable MQ Telemetry and configure the MQTT Client Utility to communicate with the queue manager.

3.1 Set up the default MQTT configuration

WebSphere MQ provides a sample MQTT configuration through the WebSphere MQ Explorer. You will now define this sample configuration:

1. Open the WebSphere MQ Explorer.

Expand the <Queue Managers><IB10QMGR> and click on the Telemetry Folder:



Click on "Define sample configuration"

2. Review what the sample configuration will define and click Finish:

Define sample configuration	
Define a sample configuration	
Setup MQ Telemetry on this queue manager	
The following actions will be performed to create the sample configuration. Review these actions carefully a will significantly change the configuration and security settings of this queue manager.	as they
 Define the MQXR service Define the service SYSTEM.MQXR.SERVICE Start the MQXR service Start the service SYSTEM.MQXR.SERVICE Define the MQXR transmit queue Define the transmit queue SYSTEM.MQIT.TRANSMIT.QUEUE Sets the queue manager's default transmit queue to SYSTEM.MQIT.TRANSMIT.QUEUE Enables WebSphere MQ applications to send point to point messages to MQIT clients without the need to create a separate queue manager alias for every client. Messages destined for MQIT clients are routed through the MQIT transmit queue on the queue manager to the client whose client identifier matches the queue manager name that the message is sent to. Allow messages to be sent to clients attached to the MQIT Listener	X
? Finish C	ancel

3. When the configuration wizard has finished, the Status of the MQ Telemetry Service will change to "Started" and the MQTT Client Utility will open:

🕀 MQTT Clien	t Utility			
File Help				
Connection	nost 🖉 Der	4. 1992 – cia		
HOST: [Por		it identifier: [mqtt_t	DETAWORKSESB10_2
Status: Disco	onnected	Options	Connect	Disconnect
Client history				
Event	Topic	Message	QoS Retained	Time
	View me:	Clear histo	ry 🗌 Scroll lock	
-Subscription -				
Topic:	testTopic			-
Request QoS:	0 - At most once		▼ Subs	cribe Unsubscribe
Topic:	testTopic			_
Managar	Test Message			
message:				
QoS:	0 - At most once		💌 🗆 Reta	ained Publish

3.2 Test the default configuration with a basic test

The MQ TT Client Utility allows you to publish and subscribe to an MQTT server. You will now use this simple utility to test the default configuration.

1. Connect to the Queue manager by clicking the "Connect" button in the Utility. The Client Utility history table will be updated:

🕀 MQTT Client Uti	lity						
File Help							
Connection							
Host: localhost	Host: localhost Port: 1883 Client identifier: mqtt_BETAWORKSESB10_5						
			1				
Status: Connected	d	Options	Connect	Disconnect			
Client history							
Event	Topic	Message	QoS Retained	Time			
Connected				16/04/14 13:57			
	-						
, ·	View messa	rae Clear hist		· · · · · · · · · · · · · · · · · · ·			
	non moose						
Subscription							
Topic: tes	tTopic			_			
Request QoS: 0 -	At most once		▼ Subs	cribe Unsubscribe			
Dublication							
Tapica	tTopic						
Topic: tes	cropic						
Message:	st Message						
QoS: 0 -	At most once		▼ □ Ret	tained Publish			
L							

Note: the Port number that is shown the first time you open the MQTT Client Utility is correct for the latest set up in your environment. If you close the Client Utility and open it again, it will default to port 1883. You can check the default configuration port for your environment by looking for the Telemetry Channel called "PlainText" in <QMgrName><Telemetry><Channels>.

2. Click the "Subscribe" button (leave the Topic as "testTopic")

Note the Client Utility history is updated with the status (subscribed).

3. Write "Hello World" in the message box in the Publication section and click "Publish.

The Client Utility history is updated with the "Publish" and what was received as part of the "subscribe":

🕀 MQTT Clien	t Utility				_		
File Help							
Connection	Connection						
Host: local	Host: localhost 🔻 Port: 1883 🔽 Client identifier: mgtt BETAWORKSESB10_5						
Status: Connected Options Connect Disconnect							
Client history -							
Event	Topic	Message	QoS	Retained	Time		
Subscribed	testTopic	2	0		16/04/14 13:59		
Published 🦰	testTopic	Hello World	0	No	16/04/14 14:01		
Received	testTopic	E Hello World	0	No	16/04/14 14:01		
						-	
	View r	nessage Clear h	istory 🗌	Scroll lock			
Subscription							
Topic:	testTopic					•	
Request QoS:	0 - At most onc	e		Subs	Unsubso	ribe	
Publication							
Topic:	testTopic					•	
Message:	Hello World						
QoS:	0 - At most one	e		💌 🗆 Ret	ained Publis	h	

4. The MQTT Client Utility and the queue manager is now ready to receive publications from IBM Integration Bus.

3.3 Configure a basic MQTT application in IIB

You will now use IBM Integration Toolkit to define a simple application to publish data to "testTopic".

1. Open the IBM Integration Toolkit.

Create a new workspace called MQTTNodePolicy (use File > switch workspace >other)

Create an Application called "TTPOLICYLAB".

2. Create a flow called "mqttPublish":

Discrete a new mess Select a container for			
Container: Message flow name: Flow organization – I Use default bro Schema; (default 1	TTPOLICYLAB mqttPublish ker schema broker schema)		New
?		Finish	Cancel

3. Add an MQ Input node with queue name "MQTT.IN".

On the MQ Connection tab, set the Destination Queue Manager Name to IB10QMGR.

Add an MQTT Publish node with the following properties:

Client ID: FromMQTT.IN Topic name: testTopic Host name: localhost Port: 1883 (note this may be different *in your environment, you can check the default configuration port for your environment by looking for the Telemetry Channel called "PlainText" in <QMgrName><Telemetry><Channels>*)

Wire the Output terminal of the MQ input node to the Input terminal of the MQTTPublish node:

📧 *mqttPublish.msgflow 🔀								
Flow Exerciser: 💽 🚰 🚧 🛛 🔍 🗨								
MQ Input MQTTPublish								
Graph User Def	ined Properties							
Properties 2	ය 🖹 Problems 📴	Outline 🧟 Tasks	🖽 Deployment L					
MQTTPub	lish Node Proper	ties - MQTTPub	MQTTPublish Node Properties - MQTTPublish					
Description								
Description Basic	Client ID*	FromMQTT.IN						
Description Basic Validation	Client ID* Topic name*	FromMQTT.IN testTopic						
Description Basic Validation Policy Manifesting	Client ID* Topic name* Host name*	FromMQTT.IN testTopic localhost						
Description Basic Validation Policy Monitoring	Client ID* Topic name* Host name* Port*	FromMQTT.IN testTopic localhost 1883						
Description Basic Validation Policy Monitoring	Client ID* Topic name* Host name* Port* Quality of service*	FromMQTT.IN testTopic localhost 1883 0 - At most once						

- 4. Save the mqttPublish message flow.
- 5. Deploy the TTPOLICYLAB Application to the default server on the TESTNODE_iibuser node.

3.4 Test the TTPOLICYLAB Application

- 1. In WebSphere MQ Explorer, right click on the MQTT.IN queue and choose "Put test message" from the list of options.
- 2. Position the MQTT Client Utility where you can see it on the desktop. Ensure you are still subscribed to the "testTopic"
- 3. Write "Hello from MQTT.IN" in the message data:

Put test message	_ 🗆 ×
Put message to: Queue manager:	
IB 10QMGR	
Queue:	
MQTT.IN	
Message data:	
Hello from MQTT.IN	
(1) The queue which will receive the test message is on this computer. The message will be put directly on the queue.	
Put messag	e Close

Click the "Put message" button.

4. In the MQTT Client Utility the "Client history" will update with "Received" in the Event Column and the text you put to the queue MQTT.IN in the "message" column:

🕀 MQTT Client	t Utility			<u>_ ×</u>
File Help				
Connection Host: localh	iost 🔽 Port:	1883 Client ide	entifier: mqtt	
Status: Conn	ected	Options	Connect	Disconnect
Client history -				
Event	Topic	Message	QoS Re	etained Time
Published	testTopic	Hello World	0 No	o 16/04/14 14:
Received	testTopic	Hello World	0 No	0 16/04/14 14:
Received	testTopic	Hello from MQTT.IN	0 No	o 16/04/14 15: 🗩
Subscription	View mess	age Clear history	Scroll lock	:
Topic:	testTopic			•
Request QoS:	0 - At most once		▼ s	ubscribe Unsubscribe
Publication				
Topic:	testTopic			•
Message:	Hello World			
QoS:	0 - At most once		•	Retained Publish

5. Close the Put Test Message window.

6. Run another instance of the **MQTT Client Utility** by going to the MQ Explorer and navigating to IB10QMGR and clicking on the Telemetry folder, in the MQ Explorer – Content page there is a link to Run the MQTT Client Utility:



7. Connect the Client Utility to the queue manager with a Client Identifier of "Client2"

🕀 MQTT Client Utili	ty				_	
File Help						
Connection						
Host: localhost	Port: 1	1883 🔻 Client	identi	fier: Client	2	\supset
Status: Disconnecte	ed Op	otions	Cor	inect	Disconnect	
Client history				Ū		
Event	Topic	Message	QoS	Retained	Time	
	View message	Clear histor	у 🗆	Scroll lock		
Subscription						

8. Subscribe to "testTopic".

🕀 MQTT Client Utili	ty				_ 🗆	×
File Help						
Connection						
Host: localhost	Port: 1	.883 🔄 Client	identif	ier: Client	2	
Status: Connected	Op	otions	Con	nect	Disconnect	
Client history						
Event	Topic	Message	QoS	Retained	Time	
Connected					16/06/14 14:13	
Subscribed	testTopic)	0		16/06/14 14:13	
	View message	Clear histor	у 🗆	Scroll lock		
Subscription						
Topic: testT	opic				•	$\boldsymbol{\mathcal{V}}$
Request QoS: 0 - Af	t most once			▼ Subs	cribeUnsubscribe	
Publication	~~~~~			~~~~~		al

9. Position the two Clients so that you can see them both at the same time.

Write "Hello again from MQTT.IN" to the MQTT.IN queue using the put Test Message data feature in the WebSphere MQ Explorer.

10. Both Clients will be updated with the data that you wrote to the queue:

Shahara Loren		Ontions	6	nnast	Discon	nat I
Status: Con	nected	Opuons		nnecc	Discon	nect
Client history						
Event	Topic	Message	QoS	Retained	Time	
Received	testTopic	Hello World	0	No	16/04/14 14:	01
Received	testTopic	Hello from MQTT.IN	0	No	16/04/14 15:	15
Received	testTopic	Hello again from MQTT.IN	0	No	16/04/14 15:	26
1		In the second se		Consell la alc		_
		View message	ory	SCROILIOCK		
Subscription -						
Topic:	testTopic					•
Request QoS:	0 - At mos	t once		▼ Su	ibscribe Un	subscribe
Publication						
Topic:	testTopic					•
	Hello Worl	d				
Message:	Hello Worl	d				
Message: QoS: MQTT Client	Hello Worl	d t once		T R		Publish
Message: QoS: MQTT Client le Help Connection Host: localho	Hello Worl	t once	nt identifi	F R	Retained	Publish
Message: QoS: MQTT Client le Help Connection Host: localho Status: Conne	Hello Worl	t once Port: 1883 V Clier Options	nt identifi	er: Client2	Retained	Publish
Message: QoS: MQTT Client le Help Connection Host: Tocalho Status: Conne Client history	Hello Worl	t once Port: 1883 V Clier Options	nt identifi	er: Client2	Retained	Publish
Message: QoS: MQTT Client le Help Connection Host: localho Status: Conne Client history Event	Hello Worl	d t once Port: 1883 V Clier Options	nt identifi QoS Re	er: Client2	Retained	Publish
Message: QoS: MQTT Client le Help Connection Host: localho Status: Conne Client history – Event Connected	Hello Worl O - At mos Utility ost ected Topic	d t once Port: 1883 Clier Options Message	nt identifi QoS Re	er: Client2 Connect etained Tim 16,	Retained Disco	Publish
Message: QoS: MQTT Client le Help Connection Host: localho Status: Conne Client history Event Connected Subscribed	Hello Worl 0 - At mos Utility ost cted Topic testTopic	d t once Port: 1883 V Clier Options Message	nt identifi QoS Re	er: Client2 Connect etained Tim 16, 16,	Disco Disco 04/14 15:23 /04/14 15:25	Publish
Message: QoS: MQTT Client le Help Connection Host: localho Status: Connec Client history Event Connected Subscribed Received	Hello Worl O - At mos Utility Dost ccted Topic testTopic testTopic	Id t once Port: 1883 V Clier Options Message	nt identifi QoS Re 0 No	er: Client2 Connect etained Tim 16, 16, 0 16,	Disco Disco 04/14 15:23 /04/14 15:25 /04/14 15:26	Publish
Message: QoS: MQTT Client le Help Connection Host: localho Status: Conne Client history Event Connected Subscribed Received	Hello Worl O - At mos Utility Dost Cted Topic testTopic testTopic	d t once Port: 1883 Clier Options Message Hello again from MQTT.IN View message Clear histo	nt identifi QoS Re 0 No 0 No	er: Client2	Disco Disco 04/14 15:23 /04/14 15:25 /04/14 15:26	Publish
Message: QoS: MQTT Client le Help Connection Host: localho Status: Conne Client history Event Connected Subscribed Received	Hello Worl 0 - At mos Utility ost cted Topic testTopic testTopic	d t once Port: 1883 Clier Options Message Hello again from MQTT.IN View message Clear histo	nt identifi QoS Re 0 Nc 0 Nc	er: Client2 Connect etained Tim 16, 16, 16, 16, 16, 16, 16, 16, 16, 16,	Disco Disco 04/14 15:23 /04/14 15:25 /04/14 15:26	Publish
Message: QoS: MQTT Client le Help Connection Host: localho Status: Conne Client history Event Connected Subscribed Received	Hello Worl	d t once Port: 1883 V Clier Options Message Hello again from MQTT.IN	nt identifi QoS Re 0 Nc	er: Client2 Connect etained Tim 16, 16, 5 Scroll lock	Disco Disco 04/14 15:25 /04/14 15:25	Publish
Message: QoS: MQTT Client le Help Connection Host: Tocalho Status: Conne Client history Event Connected Subscribed Received Subscription Topic:	Hello Worl 0 - At mos Utility ost cted Topic testTopic testTopic testTopic	d t once Port: 1883 Clier Options Message Hello again from MQTT.IN View message Clear histe	nt identifi QoS Re 0 Nc	er: Client2 Connect Etained Tim 16, 16, 16, 16, 16, 16, 16, 16, 16, 16,	Disco Disco De 04/14 15:23 /04/14 15:25 /04/14 15:26	Publish
Message: QoS: MQTT Client le Help Connection Host: localho Status: Conne Client history Event Connected Subscribed Received Subscription Topic: [Request QoS: [Hello Worl 0 - At mos Utility ost cted Topic testTopic testTopic 0 - At most or	d t once Port: 1883 Clier Options Message Hello again from MQTT.IN View message Clear histe	nt identifi QoS Re 0 Nc	er: Client2 Connect Etained Tim 16, 16, 5 Scroll lock	Disco Disco 04/14 15:23 /04/14 15:25 /04/14 15:26	Publish
Message: QoS: MQTT Client le Help Connection Host: localho Status: Conne Client history Event Connected Subscribed Received Subscription Topic: [Request QoS:]	Hello Worl 0 - At mos Utility ost cted Topic testTopic testTopic 0 - At most or 0 - At most or	d t once Port: 1883 Clier Options Message Hello again from MQTT.IN View message Clear histo	nt identifi QoS Re 0 Nc	er: Client2 Connect etained Tim 16, 16, 5 Scroll lock	Retained	Publish
Message: QoS: MQTT Client le Help Connection Host: localho Status: Conne Client history Event Connected Subscribed Received Subscription Topic: Publication Topic:	Hello Worl 0 - At mos Utility ost cted Topic testTopic testTopic 0 - At most or testTopic	d t once Port: 1883 Clier Options Message Hello again from MQTT.IN View message Clear histe	nt identifi QoS Re 0 Nc	er: Client2 ionnect etained Tim 16, 16, Scroll lock	Disco Disco 04/14 15:23 /04/14 15:25 /04/14 15:26	Publish

3.5 IBM MessageSight configuration

You will now define an IBM MessageSight Endpoint so that an instance of the MQTT Client Utility can subscribe to the endpoint.

1. In a browser, open the IBM MessageSight Administration UI by entering the IBM MessageSight ip address on port 9087 (*the ip address you found earlier in this lab*)

😜 IBM MessageSight Web UI - Log in - Mozilla Firefox - U× File Edit View History Bookmarks Tools Help IBM MessageSight Web UI - Log in x] IBM Integration +https://192.168.153.149:9087/login.jsp ☆ マ C 8 - Google Q J. IB10NODE 🔄 TESTNODE 🧾 MessageSight IB10NODE2 IBM[®] MessageSight[™] IEM User ID: admin Password: Log in IBM, the IBM logo, and MessageSight are trademarks of IBM Corporation, registered in many jurisdictions worldwide. Java and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates. Licensed Materials - Property of IBM. 5725-F96 © Copyright IBM Corporation 2012, 2013.

Sign on to the IBM MessageSight Administration UI (admin/admin)

2. The first screen you will see the "First Steps" configuration.

Cancel out of this configuration (don't change anything).

3. From the main menu choose <Messaging><Message Hubs>

From the "Message Hubs" page click the green plus sign to add a Message Hub, Call the Message Hub "MQTTPolicyLab":

Name: 🥐	MQTTPolicyLab	
Description:	MOTT Policy Lab Message Hub	

Click Save.

- 4. The Message Hub now requires three further definitions:
 - 1) Connection Policy
 - 2) Messaging Policy
 - 3) an Endpoint.

Highlight the MQTTPolicyLab Message Hub you have just added and click the Edit "pencil":

Message Hubs	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
Define, edit, or delete a message hub.					
+ × 🏠		Filt	er 📩		
Message Hub	Endpoints	Descripti	ion		
DemoHub	2	Demo Message Hub.			
MQTTPolicyLab	0 🔔	MQTT Policy Lab Message Hub			
Total: 2 Selected: 1		← 1 →	10 25 50 100 🕈		

5. On the Connection Policies Tab, Click the green plus sign to add a new Connection Policy: Give it a name of TTLABCP and select the Protocol – and MQTT check boxes.

Name: ? TTLABCP	Description:	Connection Policy to use with IIB II Lab
pecify one or more of the following criteria setricts connections to members of the gro	o restrict who can establish a connection. up. Restrict according to the following crite	. For example, selecting "Group ID" eria: ?
Client IP Address:	Client ID:	
User ID:	Group ID:	
Certificate Common Name:	Protocol:	DIMS ▼ MQTT
he defined policy allows access when:		
Protocol is "MQTT"		

Click the Save button.

6. Now switch to the Messaging Policy. Click the green plus sign to add a new **Messaging Policy**.

IBM [®] Message Sight™	Status -			
First Steps Home	Messaging 👻	Monitoring – 🗌 A	ppliance 🗸	
Return to Message Hubs				
MQTTPolicyLab	Edit	/		
MQTT Policy Lab Message	Hub			
Connection Policies	Messaging Policies	Endpoints		
A messaging policy allow	vs you to control what to	pics, queues, or glob	al-shared subscriptic	ons a client can access
Messaging Policy	Endpoints	Max Messages	Disconnected Client	Authority
			notification	
			No items to di	splay
Total: o Selected: o			← 1 →	

7. Specify the following on the Messaging Policy:

Name: TTLABMP Destination Type: Topic Authority: (tick) Publish (&) Subscribe Tick "Protocol" then "MQTT"

Name. 🕐	TTLABMP	* Authority: 🥐	🗹 Publish
Description:			Subscribe
			Browse
Destination Type: 🥐	Topic 🔹		Receive
Destination: ?	*		Control
Max Messages: 🥐	5000	Disconnected Client Notification: ?	
ecify one or more of th lecting "Group ID" rest	e following criteria to restrict the m ricts the policy to members of the g	essaging actions defined in this roup. Restrict according to the	s policy to specific connected clients. For examp following criteria: ?
Client IP Address:		Client ID:	
User ID:		Group ID:	
		Protocol:	🔲 JMS 🗹 MQTT
Certificate Common			

8. The Messaging Policy "TTLABMP" will appear in the list of messaging Policies:

TT FOICy Lab Message F	Hub							
Connection Policies	Messaging Policies	Endpoints						
messaging policy allows ne messaging policy.	s you to control what top	ics, queues, or glob	al-shared subscrip	tions a client can ac	cess on IBM Message	Sight. Eac	h endpoint must have	at least
+ × /						Filter		÷+
+ × /	Endpoints	Max Messages	Disconnected Client Notification	Authority	Destination	Filter	Description	; +
Kessaging Policy	Endpoints	Max Messages	Disconnected Client Notification False	Authority Publish,Subscribe	Destination	Filter	Description Messaging Policy for T	Ţ Lab

9. Click the EndPoints Tab.

Click the green plus sign to add an Endpoint:

IBM [®] MessageSight™	Status 🔹				
First Steps Home	Messaging 👻	Мо	nitoring 👻	Appliance 👻	-
Return to Message Hubs					}
MQTTPolicyLab	Edit				
MQTT Policy Lab Message	Hub	_			}
Connection Policies	Messaging Polic	ces	Endpoints)	
An endpoint is a port that	client applications	can con	nect to. An end	dpoint must have	at least one
(+)× /				_	
Endpoint		Port	Enabled	Status	Connecti Policie
				No items to o	display

10. On the pop up window specify the endpoint as follows. (Note: the screen layout may be slightly different to that shown).

Name: **TTLABMSEndPoint** Enabled: (tick) Port: **9602** Protocol: (tick) JMS & MQTT

Name: 🥐	TTLABMSEndpoint	* Connection Policies ?		
Enabled:		(+)× + +		
Description:	Endpoint to be used with IIB V10 MOTT lab	Connection Policy	Desc	ription
* Port: 🥐	9602		No items to display	
* IP Address:	All 🔻	Total: o Selected: o	← 1 →	10 25 50 100 *
* Protocol:	ZMS ▼ MQTT	* Messaging Policies 🦻		
* Max Message Size: 🧿 Security Profile:	1024 KB	Messaging Policy	Destination Type	Destination
			No items to display	
		Total: o Selected: o	← 1 →	10 25 50 100 *

11. Use the green plus signs to add **TTLABCP** Connection policy to the endpoint definition.



12. Use the green plus signs to add **TTLABMP** messaging policy to the endpoint definition.

A messagin access on IE	g policy allows you to control w 3M MessageSight, Each endpo	/hat topics, queues, or global-s bint must have at least one mes	hared subscriptions a client can ssacing policy. If an endpoint has a
messaging topics.	policy for a global-shared subs	scription, it must also have a m	essaging policy for the subscribed
		Filter	
Add	Messaging Policy	Destination Type	Destination
	TTLABMP	Торіс	*
Total: 1		<1 →	10 25 50 100 +

13. When the Endpoint definition looks like this, click the Save button:

Name: 🥐	TTLABMSEndpoint	* Connection Policies ?		
Enabled:		+ x † +		
Description:	Endpoint to be used with <u>LIB</u> V10 MOTT	Connection Policy	Desc	ription
	lab	TTLABCP	Connection Policy to use with IE	B TT LAB
Port: 🥐	9602	Total: 1 Selected: 0	← 1 →	10 25 50 100 +
IP Address:	All 👻	* Messaging Policies 🥐		
Protocol:	MS SWL	+ x † +		
	MQTT	Messaging Policy	Destination Type	Destination
Max Message Size: 🥐	1024 KB	TTLABMP	Торіс	*
Security Profile:	None 💌	Total: 1 Selected: 0	<1→	10 25 50 100 +

14. TTLABMSEndPoint will appear in the list of Endpoints:

TTT Oncy Lab Messag	e Hub						
Connection Policies	Messaging Policies	Endpoints					
n endpoint is a port tha	at client applications can o	connect to. An end	lpoint must hav	e at least one conn	ection policy and	one messaging policy.	
+ × /						Filter	
Endpoin	t Port	Enabled	Status	Connection Policies	Messaging Policies	Description	
	9602	*	Ŷ	? 1	? 1	Endpoint to be used with TT La	b
TTLABMSEndPoint	5002						

3.6 Test the Simple IBM MessageSight configuration

You will test the IBM MessageSight configuration using one of the MQTT Client Utility by connecting to the endpoint defined above:

1. In the IBM MessageSight administration UI, click <Monitoring><Connections> The Connection chart will not show any active connections:

IBM	® Message Sight™	Status 🔹						admin *	7 ©
First	Steps Home	Messaging 👻	Monitoring 👻	Appliance -					
Cor	nection Monito	r							
Moni	tor live, aggregated con	nection data and q	uery best-performin	g and worst-performing c	onnections across	s several connec	ction statistics.		
Con	nection Chart								
Moni	tor the current number (of active and new c	onnections to the se	rver. To pause chart upda	ates, click the butto	on located benea	ath the chart.		
	1								1
suo									R
Inect									W CO
e Co									Inect
Activ									ions
	17,24,49	17,24,55	17.25.02	7.25.11 17.25.10	17.25.27	17-25-24	17.25.42	17.25.50	17:25:57
	17:04:46	1/104100	1/ 2000 1	Time	1/:33:27	1/:33:34	1/:00:42	11:33:30	1/:20:07
	Active connections	New connection	10						
			10 VVVV-V	~_~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				

2. In the MQTT Client Utility with Client identifier "Client2" disconnect from the localhost connection and clear the Client history:

4	MQTT Client	Utility					_ D ×		
	Connection Host: localhost Port: 1883 Client identifier: Client2								
	Status: Connected Options Connect Disconnect								
Г	Client history –								
	Event	Topic	Message	QoS	Retained	Time			
	Connected					16/04/14 15:23			
	Subscribed	testTopic		0		16/04/14 15:25			
	Received	testTopic	Hello again from MQTT.IN	0	No	16/04/14 15:26			
			View message Clear his	tory	Scroll loc	*			

3. Connect the MQTT Client Utility to the IBM MessageSight configuration that you just added:

Specify:

- 1) Host ip address of the IBM MessageSight appliance
- 2) Port details of the Endpoint you defined above (9602)

The Client History should be updated with "Connected" in the Event Column:

HQTT Client	Utility					<u>_ </u>		
Connection Host: 192.168.153.149 Port: 9602 Client identifier: Client2								
Status: Conne	Status: Connected Options Connect Disconnect							
Client history								
Event	Topic	Message	QoS	Retained	Time			
Connected					17/04/14 10:56			
		View message Clear his	tory	Scroll loc	:k			

4. The Connection monitor should now show a new connection:



5. In the MQTT Client Utility:

- a) Subscribe to "testTopic" (note the Client History update when you do this)
- b) Publish a message to the testTopic from the Client Utility (note two updates for this action in the Client History: "Published" to the testTopic; "Received" (via the subscription) with the details of the message received:

MQTT Clien	HQTT Client Utility							
File Help								
Connection -								
Host: 192.	Host: 192.168.153.149 V Port: 9602 Client identifier: Client2							
Status: Conn	Status: Connected Options Connect Disconnect							
Client history	1							
Event	Topic	Message		QoS	Retained	Time		
Connected						17/04/14 10:56		
Subscribed	testTopic			0		17/04/14 11:01		
Published	testTopic	Test Messa	age to TTLA	0	No	17/04/14 11:01		
Received	testTopic	Test Messa	age to TTLA	0	No	17/04/14 11:01		
	5	iew message	ar history	croll lo	ock			
Subscription -								
Topic:	testTopic						_	
Topic.					_			
Request QoS:	0 - At most once				 Subs 	scribe Unsubsc	ribe	
Publication								
Topic:	testTopic							
	Test Message to							
Message:	reactivesage to	T CHOMOLITUR VITE						
QoS:	U - At most once						n	

- 6. This verifies your IBM MessageSight configuration is working.
- 7. Close any open MQTT Client Utility.

4. Modifying the IIB MQTT configuration using Node Policy

You will now define a node policy for the MQTT publish node that will allow you to dynamically change the connection specific details without the need to redeploy the message flow.

4.1 Generate and store a policy

So far the testing you have done to verify the MQTTPublish node is working has been based on properties statically defined in the MQTTPublish node. You will now generate a policy for the MQTTPublish node and store it in the Integration Registry associated with the TESTNODE_ibuser.

1. In the mqttPublish message flow, click the MQTTPublish node to show the properties window.

In the MQTTPublish node, (Select Policy section), click the "Generate new policy" button:

Properties S	🛛 🔝 Problem	is 📴 Outline	🧟 Tasks	🛄 Deployment Log		2	
MQTTPub	olish Node Pı	operties -	MQTTPub	lish			
Description	Use a policy node in the I	to control the o ntegration Too	perational b Ikit are used	behavior of the node a I to determine the dep	t run time. By default, the propert loyment settings at run time.	ties defined on th	e More
Basic							
Validation	Policy URL					<u>G</u> enerate ne	ew policy
Policy	1						
Monitoring							

If you are prompted to save the mqttPublish.msgflow, reply Yes.

The Policy Editor will open.

2. The Policy Editor window will open showing the current settings of the MQTT Publish node.

Type **myMQTTPolicy** in the short description followed by something suitable in the Long Description.

pecify description of	MQTT publish policy
Short description:	myMQTTPolicy MOTT Policy Generated by Toolkit
, and a second second	
Basic	
pecify basic set of p	roperties for MQTT publish
becify basic set of p Client ID:	FromMQTT.IN
pecify basic set of p Client ID: Topic name:	roperties for MQTT publish FromMQTT.IN testTopic
pecify basic set of p Client ID: Topic name: Host name:	roperties for MQTT publish FromMQTT.IN testTopic localhost
pecify basic set of p Client ID: Topic name: Host name: Port:	roperties for MQTT publish FromMQTT.IN testTopic localhost 1883

Ensure the details in the "Basic" section reflect the definition of your MQTT Publish node.

3. Click the save link.

Enter the Policy name "myMQTTPolicy".

Select the node where the policy will be saved - TESTNODE_iibuser.

Click Finish.

🌐 Save Policy	<u>- 🗆 ×</u>
Save Policy to Integration Registry	
Specify the policy name and select the integration node where the policy will be saved	
Policy name: myMQTTPolicy	
Policy URL: /apiv1/policy/MQTTPublish/myMQTTPolicy	
Attach the generated policy to the node	
TESTNODE_iibuser	
? Finish	Cancel

IIB Toolkit communicates with the Integration Registry using the same port and value used by the web ui. These values are "localhost" and "4421" respectively if you are using the VMware provided for this class lab guide.

4. Click OK to dismiss the message that pops up when the policy has been saved.



5. Save the message flow (ctrl s).

6. Switch to the "Integration Registries" hierarchical view (bottom left of the Integration Toolkit).

Expand the Integration Registry on TESTNODE_ibuser to show "Policies" and "Services". If **myMQTTPolicy** is not showing in the list, Right click on the "Integration Registry on TESTNODE_ibuser" and click "Refresh".

MyMQTTPolicy will appear in the list:

🔀 Integr 🔀 Integr 🔀	ಕ⊐ Data Pr	韻 Data S	
			S.
Integration Registries	ry on TESTNODE_ sh/myMQTTPolicy	iibuser ,	

- 7. Redeploy the "TTPOLICYLAB" application to the default server on TESTNODE_iibuser.
- 8. Stop and restart the server "default" Integration Server.

4.2 Modify the Policy in the Integration Registry

We will now modify the stored policy in the Integration Registry associated with TESTNODE_ibuser, so that the MQTTPublish node, publishes to the IBM MessageSight device that you configured earlier instead of the MQ MQTT server on port 1883.

1. In a web browser, go the bookmarked IIB web administration utility, expand the Operational Policy section at the left under the TESTNODE_ibuser integration node, then locate and highlight the policy that was created earlier, myMQTTPolicy.

IBM Integration		Welcome	e, Default → (୭ -	IBM.
Filter Options	Operational Policy - MQTTPublish	: myMQTTPolicy			
▼	Overview				
 Derational Policy 			🔛 Save 🛛 🗟 S	ave As	🔗 Revert
▶ A Configurable Services	Use a policy to control the operational behavi	or of a message flow node at run time. [Mor	Dec 31, 2015, 4	1:08:43 PM	×
MQTTPublish v	Policy URL	/apiv1/policy/MQTTPublish/my/MQTTPolicy		7	
MOTTSubscribe	▼ Description				
 Data Security 	Short description	myMQTTPolicy			
 Monitoring Business 	Long description				
	▼ Basic				
ſ	Client ID	FromMQTT.IN			
	Topic name	testTopic			
	Hostname	localhost			
	Port	1883	-	¥.	
	Quality of service	0 - At most once		*	

2. Change the IP address to reflect the configuration of your IBM MessageSight and the port to **9602** (the port value specified for the Endpoint that you configured on the IBM MessageSight appliance).

Then click the save button. You are now ready to test the changes to the Policy.

IBM Integration		Welcome, Default 👻 🕐 👻
Filter Options	Coperational Policy - MQTTF	ublish : myMQTTPolicy
	Øverview	Save A
 MQEndpoint MQTPublish myMQTTPolicy 	Use a policy to control the operation	onal behavior of a message flow node at run time. [Mor Dec 31, 2015, 4-08-4 /apiv1/policy/MQTTPublish/myMQTTPolicy
 ▶ ∰ MQTTSubscribe ↓ ▶ ∰ WorkloadManagement ↓ > ∰ Data 	 ▼ Description Short description 	myMQTTPolicy
 Security Monitoring Business 	Long description	
	Client ID Topic name	FromMQTT.IN testTopic
	Host name	192.168.126.45
	Port	9602
	Quality of service	0 - At most once 👻

4.3 Testing the result of a Policy Change

1. Open two MQTT Clients by clicking Run MQTT Client Utility (on the content window of the Telemetry folder) in MQ Explorer as you did previously.

Using the Client Identifier field, call the clients Client1 and Client2 respectively.

2. Connect Client1 to the default MQTT server on **IB10QMGR** by connecting to port **1883** on Localhost.

When connected subscribe to "testTopic":

MQTT Client Utility								
Connection Host: localhost v Port: 1883 Client identifier: Client1								
Client history								
Event	Topic	Message	QoS	Retained	Time			
Connected					29/05/14 17:04			
Subscribed	testTopic		0		29/05/14 17:11			
	View messag	e Clear histor	уГ	Scroll lock				
Subscription								
Topic:	testTopic				▼			
Request QoS:) - At most once			▼ Subs	cribe Unsubscribe			
Publication								
Topic:	testTopic				•			
Message:	Test Message							
QoS:) - At most once			💌 🗖 Ret	ained Publish			

3. Connect Client2 to your IBM MessageSight appliance by connecting to port **9602** on the ip address of your local IBM MessageSight.

🕀 MQTT Client Utility - 🗆 🗵 File Help Connection Host: 192.168.225.141 -Port: 9602 T Client identifier: Client2 Status: Connected Options... Disconnect Client history Event Message QoS Retained Time Topic Connected 29/05/14 17:08 Subscribed testTopic 0 29/05/14 17:08 View message, Clear history Subscription Topic: testTopic • Request QoS: 0 - At most once • Subscribe Unsubscribe Publication Topic: testTopic • Test Message Message: 🔻 🗌 Retained Publish QoS: 0 - At most once

When connected also subscribe to "testTopic" :

- 4. Position the **Client 2** below **Client 1** so that you can see what each Client Utility receives.
- 5. Using the MQ Explorer, "put test message" feature, initiate the flow by writing "**Test After Policy Change**" in a test message to **MQTT.IN.**
- 6. Note that **Client2** (the Client Utility connected to the IBM MessageSight appliance) receives the publication and Client1 does not:

🕀 MQTT Client	Utility					_ 🗆 🗵
File Help						
Connection						
Host: 192.168.225.141 Port: 9602 Client identifier: Client2						
Status: Connected Options			Connect		Disconnect	
Client history						
Event	Topic	Message	QoS	Retained	Time	
Connected					29/05/14 17:20	
Subscribed	testTopic		0		29/05/14 17:20	
Received	testTopic	Test After Policy Change	0	No	29/05/14 17:20	
View message Clear history Scroll lock						

In Summary the Change in the "myMQTTpolicy" configuration to point to the IBM MessageSight Endpoint resulted in:

- a) the message being published to the IBM MessageSight Endpoint.
- b) this resulted in Client2 (which was connected and subscribing to the same IBM MessageSight Enpoint) to receive the message.

The change in connection was done using Node Policy configuration changes which did not require message flow deployment.

END OF LAB GUIDE