

# **IBM Integration Bus**

# Integration with IBM API Connect On Bluemix

Featuring:

Creating IBM Secure Gateway connection Deploying REST API within IIB Pushing REST API to IBM API Connect (APIc) Publishing an APIC product containing the REST API Testing the published REST API

November 2016 Hands-on lab built at product Version 10.0.0.6

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## 1. Introduction

This lab guide will show you how to publish a REST API that is deployed on **IBM Integration Bus** (IIB), using **IBM API Connect** (APIC) on **IBM Bluemix**, ready to be controlled from anywhere with an internet connection, through **IBM Datapower Gateway**, which is provided as part of the API Connect environment on Bluemix.

You will also be shown how to set up a secure connection between your IIB host and Bluemix, using a Bluemix **IBM Secure Gateway** service. This connection will be opened from the IIB host and will enable inbound REST API requests, originating from API users and routed by the IBM Datapower Gateway, to be received by the host.

You will see 3 different URLs used for the REST API:

1. A URL that is entered in a browser on the IIB host with the deployed REST API. It will have this format:

An example request will look like this:

http://192.168.126.205:7800/HR\_Services/resources/employees/ 000010

This URL requests the details of employee 000010 from the HRDB database and if successful, those details will be returned in the browser.

A URL referencing a cloud host and port, replacing the original host IP address and port. This
is configured on the IBM Secure Gateway service on Bluemix, which maps the URL to the
original one.

The URL will be used by the IBM DataPower Gateway and will have this format:

An example request will look like this:

```
http://caplonsgprd-3.integration.ibmcloud.com:15186/HR_Services/
resources/employees/000010
```

3. Finally, the published URL. This is made available to users of the REST API through applications which subscribe to a product created in IBM API Connect, containing the API.

The host IP address and port will again be replaced:

An example request will look like this:

https://api.eu.apiconnect.ibmcloud.com/iibtester99workshop-dev/sb/ HR\_Services/resources/employees/000010

This is used by API Connect to define access controls that can be implemented on the DataPower Gateway, which maps the URL to the previous one.

## 2. Tasks

In this lab, you will perform the following tasks:

#### Within Bluemix

- 1) Add an IBM Secure Gateway service
- 2) Add the IIB host system as a destination (the other end of a connection with the Secure Gateway) and determine the cloud host and port that will be used in the REST API

#### Within the IIB host system, as user iibadmin

- 1) Install the Secure Gateway client on the IIB host system
- 2) Create a connection to the Secure Gateway to allow inbound traffic to the REST API

#### Within IIB, as user iibuser

- 1) Import and deploy the REST API Service solution from the *Developing a REST API using a Swagger JSON document* lab to TESTNODE\_iibuser.
- 2) Test the service using a browser
- 3) Create a new URL for the service using the cloud host and port from the IBM Secure Gateway environment
- 4) Test the service with the new URL
- 5) Push the deployed REST API definition to IBM API Connect on Bluemix, using the new host and port details, and defining a new product for use in APIC

#### Within API Connect, as the API Manager:

- 1) Configure a test for the API, using the new product
- 2) Test the REST API
- 3) Derive the URL of the published REST API

#### As an API user (from a web browser)

1) Submit requests to the published REST API

**Please note**: this lab guide makes use of cloud-based IBM Bluemix services which are subject to change at any time. Whilst this document is updated from time to time to reflect these and other changes, it may not be fully up to date and therefore you may need to adapt the instructions it contains accordingly.

## 3. Prepare IBM Secure Gateway environment

In order to enable inbound connections to systems on the classroom network from outside, we shall be using IBM Secure Gateway.

A Secure Gateway client will be installed in the VM running IIB on your classroom PC. This client will be connected to a Secure Gateway service on Bluemix. The client will be configured to allow inbound connections to a specified port from outside the network.

#### Login to Windows as the user "iibadmin", password = "passw0rd".

You will need to be an administrative user in order to install the client in this section. Although you will not be installing the client until later in the section, the session will flow more smoothly if you do this now.

#### 3.1 Create IBM Secure Gateway on Bluemix

1. Determine the IP address of the VMware system running IIB, by running command ipconfig in a Windows command console.

It will be something like: 192.168.126.xxx . Save this in a notepad for use later.

Windows IP Configuration Ethernet adapter Local Area Connection:
Ethernet adapter Local Area Connection:
Connection-specific DNS Suffix .: localdomain Link-local IPv6 Address: <del>f=80e9c6.f1d8</del> 8297:ab8×10 IPv4 Address: 192.168.126.216 Subnet Mask: 192.168.126.2 Default Gateway: 192.168.126.2

2. In a browser, log on to your Bluemix account at

https://console.eu-gb.bluemix.net.

3. Click on the account details next to profile icon towards the upper right of the screen:



4. Change the region to *United Kingdom* if it is not already set to that. You may choose another region to work in, but latency will be increased during this lab if you do.

Then close the profile details by clicking outside this panel.

Matt Boult's Acco	ount   United Kingdom : boultm1 : dev
Account	Matt Boult's Account
Region	
riegion	United Kingdom
Organization	boultm1
Space	dev
	Manage organizations Create a space

Make a note of your Bluemix **Organization (**which may not be the same as your IBM ID) and **Space**. You will need these details later.

5. Click on the **Catalog** option, again towards the top right of the screen:



6. Scroll down to Services, Integrate and select Secure Gateway:



At the prompt, click **CREATE** to create the service.

7. Select the option to add a gateway:

Secure Gateway 📥	
	You don't have any gateways yet.
	Already know what to do and have a client below installed, then get right to it and add a gateway. Otherwise, go to the learn section to read what you can do with the service and how to do it.

8. Name the gateway and de-select the security options (for the sake of simplicity), then click **ADD GATEWAY**.

Vou don't have	any gatoways yot
Add Gateway	×
api-gateway	
Require security token to connect clients (1)	Token Expiration: 9() days (i)
	ADD GATEWAY CANCEL

9. At the next screen, you will see that an icon has been added for the new gateway. Click, on the cog symbol.



10. Make a note of the Gateway ID, e.g. by copying it to Notepad then close the window by clicking at the top right.

api-gateway deta	iils	×			
eyJhbGciOiJIUzI1NiIsInR5cC					
Gateway ID NTaUzY8spup_prod_eu-gb					
Node caplonsgprd-1.integration.ibmcloud.com					
Created by MATTHEW BOULT at 27/09/2016, 13:50:41					
Last modified by MATTHEW BOULT at27/09/2016, 13:50:41					
Security Regenerate Gateway Cert and Key ④					
EDIT	DISABLE	DELETE			

11. Click on the Gateway icon.

ത		٨
api-gateway Enabled		
Destinations: 0	٥	2

12. Then click the **Add Destination** symbol.



13. At the next screen ensure that the resource location is set to 'On-Premise' and click Next.



14. Add the IP address of the VM system running IIB that you noted in step 1 above. This is the system that will run the Secure Gateway client later on. Specify the port that REST API requests will be sent to (7800) and click **Next**.

	The Cloud		On Premise:	s Network
User/Application	Secure Gateway Servi	er Se	cure Gateway Client	Destination 192.168.221.129:7800
Previous 19	What is the hos	t and port of your c	lestination?	

15. Accept the default protocol and click Next.

+	What protocol will the U	Iser/Application use to c	onnect to your destination?	⇒
Previous		тср	-	Next
Advanced Setup				

16. Accept the default authentication (None) and click Next.

<b>4</b>	What kind of authentication does you	r destination enforce?	
Previous	None	-	Next
Advanced Setup			

17. At the next screen click Next.

Previous IP Addresses Ports
IP or IP Range Port or Port Range

18. At the next screen, provide a name to identify the destination and click **Finish**.

←	What would you like to name this destination?	⇒
Previous	IIB Host	Finish
Advanced Setup		

19. At the next screen, you should now see a symbol for the destination. Note the status at top right is currently 'Disconnected'. Click **Add Clients**.

<ul> <li>epi-gateway</li> <li>NTaUzY8spup_prod_eu-gb</li> </ul>	۰۰ ـ			+ Add Ctients	<b>O</b> Disconnected
O Current Connections		0	Total Inbound	O <sub>MB</sub> Total Outbound	۲
+ Add Destination	IIB Host Enabled Active Connections: 0	0 12			

20. At the next screen you are prompted to download the appropriate client for the destination. In the case of the workshop VM, this will be Windows. Download this and save it to a temporary folder, say C:\user\temp, but do not install the software just yet. Close the window when you have finished.

How would you like to connect this new gateway?				×	
	IBM IBM Installer	docker	IBM DataPower		
1 Click the download link below for your operating system Gateway ID	2 Locate the docum installation in the README.md file	entation for the Bluemix docs or the provided	3 Install the downloaded client		
NTaUzY8spup_prod_eu-gb		E.			
Software Installers	ad md5 12.89 MB				

21. At the next screen, click on left arrow to return to the Gateway view.

Api-gateway     NTaUzY8spup_prod_eu-gb	<b>4</b> -			+ Add Clients	0 Disconnected
O Current Connections		0.	Total Inbound	OMB Total Outbound	۲
Add Destination	IIB Host Enabled Active Connections: 0	0 13			

22. You should now see this. Note the destination counter is now '1'. Also note the interlocking red circles indicating that there are no connected destinations yet.

+	api-gateway
Add Gateway	Enabled
	Destinations: 1

## 3.2 Install and Configure IBM Secure Gateway client on the VM

1. If you have not already done so, log on to the IIB Virtual Machine as user *iibadmin*, with password *passw0rd*.

2. Now install the IBM Secure Gateway client that you saved to a folder earlier on (e.g. C:\user\temp).

Accept the default destination folder and click Next.

IBM - Secure Gateway Client (1.5.0) Setup	_ 🗆 🗙
	6
Setup will install IBM - Secure Gateway Client (1.5.0) in the following folder. To ins different folder, click Browse and select another folder. Click Next to continue.	stall in a
Destination Folder         C:\Program Files (x86)\Secure Gateway Client         Browse.	
Space required: 38.1MB	
Space available: 13.6GB	
Nullsoft Install System v2.46-7	
Next >	Cancel

3. Choose the appropriate language for the CLI and click Next.

🕘 IBM - Secure Gateway Client (1.5.0) S	etup		_ 🗆 ×
			6
Please select the language for Command Line	Interface		
English			
Spanish			
French Italian			
Japanese			
Korean Portugese (Brazilian)			
Chinese			
Chinese (Traditional)			
Nullsoft Install System v2.46-7			
	< Back	Next >	Cancel

4. Do <u>not</u> start the client as a service. This way, you retain control over it and only connect to the Secure Gateway when you need to. Click **Next**.



5. Provide the Gateway ID that you copied in step 9 in the last section.

After you have installed the Secure Gateway client, you will need to create an ACL file for access control. You will create this file in the next step.

Provide a name for this file in the prompt and then proceed click Next.

BIBM - Secure Gateway Client (1.5.0) Setup				
Please provide configuration details for gateways you wish to run as part of Secure Gateway				
Windows Service.				
Enter the Gateway Ids, separated by spaces				
HzBHfbln7M6_prod_eu-gb				
Enter the Security tokens, separated by				
Enter the ACL files, separated by Please find the instructions to create an ACL file under				
'Access Control List (ACL) file' section of the README.				
ACLFile.txt				
Enter the log levels, separated by				
< Back Next > Cancel				

6. Click **Install**, accepting the default to use the Client UI.

IBM - Secure Gateway Client (1.5.0)	Setup		_ 🗆 ×
			6
Would you like to use the Client UI?	() es	O No	
Enter the password (optional)			
, Enter the port number for client UI			
9003			
Nullsoft Install System v2.46-7			
	< Back	Install	Cancel

7. Installation will take a few minutes, during which time you will see a command window open up temporarily. When it has completed, click Close.

👶 IBM - Secure Gateway Client (1.5.0) S	etup		
			0
Completed			
Show details			
Nullsoft Install System v2.46-7			
	< Back	Close	Cancel

8. When installation has been completed, create your ACL file in the installation folder of the Secure Gateway client. This will be as follows if you have accepted the default location:

C:\Program Files (x86)\Secure GatewayClient\ibm\securegateway\client

It should contain this single line to allow inbound connections to port 7800:

```
acl allow :7800
```

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#### 3.3 Start IBM Secure Gateway client

1. Now start the client by double-clicking on file **secgw.cmd** in the sub-folder shown.

Program Files (x86) ▼ Secure Gateway Client ▼ ibm ▼ securegateway ▼ client ▼				nt
Include in library   Share with   New folder				
Name A	Date modified	Туре	Size	
🐌 lib	31/05/2016 12:54	File folder		
🐌 licenses	31/05/2016 12:54	File folder		
👢 logs	31/05/2016 12:54	File folder		
👢 node_modules	31/05/2016 12:55	File folder		
package.json	26/05/2016 15:26	JSON File	3 KB	
SampleACLFile.txt	26/05/2016 15:26	Text Document	1 KB	
secgw.cmd	31/05/2016 12:54	Windows Comman	3 KB	
securegw_service.config	31/05/2016 12:54	XML Configuration File	1 KB	
securegw_win_service.cmd	31/05/2016 12:54	Windows Comman	2 KB	
🚳 windowsService.cmd	31/05/2016 12:54	Windows Comman	2 KB	

2. At the command line prompt, enter 'y':



3. The client should start successfully and display output like this, if you scroll down towards the end of the screen.

**Important** – this session needs to be kept running for the duration of this lab, otherwise Bluemix will not be able to reach the REST API. It can be ended later using Ctrl-C.

💁 sgclient_HzBHfbln7M6_Mqc	_ 🗆 🗙
<press command="" enter="" for="" line="" the=""></press>	
[2016-05-31 13:41:34.440] [INF0] (Client ID 5424) No password provided. The	UI w
ill not require a password for access	
[2016-05-31 13:41:34.472] [WARN] (Client ID 5424) UI Server started. The UI	is n
ot currently password protected	
[2016-05-31 13:41:34.472] [INF0] (Client ID 5424) Visit localhost:9003/dash	board
to view the UI.	
[2016-05-31 13:41:35.080] [INF0] (Client ID 6380) Setting log level to INF0	
[2016-05-31 13:41:35.111] [WARN] (Client ID 6380) The ACL file provided dur	ing s
tartup will not be imported until a connection has been established to your	gate
way.	
[2016-05-31 13:41:35.361] [INF0] (Client ID 6380) The Secure Gateway tunnel	is c
onnected	
[2016-05-31 13:41:35.471] [INF0] (Client ID HzBHfbln7M6_Mqc) Your Client ID	is H
zBHfbln7M6_Mqc	
[2016-05-31 13:41:35.486] [INF0] (Client ID HzBHfbln7M6_Mqc) The current ac	cess
control list is being reset and replaced by the user provided batch file: A	CLF11
e.txt	
[2016-05-31 13:41:35.486] [INFO] (Client ID HzBHfbln7M6_Mqc) The ACL batch	file
process accepts acl allow :7800	
HZBHtbln7M6_Mqc>	

4. A browser windows should also open like this to show the client is connected.



5. Go back to the Secure Gateway on Bluemix, refresh the screen and you should now see the status indicator is green to indicate an active client:



6. Click on this to display the destination and then click on the cog symbol.



7. In the resulting display, you will see the cloud host and port that will be substituted for the host and port of the IIB host in the REST API UTL. You will need these details later on when you are logged on as a different user. Copy these into a file e.g. in C:\user\temp. (In the VM environment, the **COPY** button may not copy the text to the clipboard and you may have to use Ctrl-C instead).

Cloud Host : Port	
caplonsgprd-3.integration.ibmcloud.com:15186	COPY

## 4. Register for API Connect on Bluemix

For this section, you can remain logged in to Windows as the user "iibadmin.

1. Now select the Catalog option once more:



2. Scroll to the bottom of the page and then select API Connect under Services, APIs:

Services		
Data & Analytics		API Connect
Watson		Create, manage, enforce, and run APIs.
Internet of Things		
APIs	>	

At the prompt, click **CREATE** to create the service.

3. This may take a minute or so to set up and to log you on to API Connect.

You should now see the following information about Draft APIs.

Click Got it! when you have finished reading it.

Draft APIs
This page lists all of your draft APIs.
To create an API, click 'Add'. You can compose an API by specifying its details in the user interface or by importing an existing OpenAPI (Swagger) definition file.
Before your APIs become available to developers, you must include them in a Product; you can do this in the Products tab.
To view and edit the configuration of an API that you have added, click the API.
Got it!
Learn more about draft APIs

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4. You should now see the Draft API view in API Connect. Bookmark this or leave the tab open.

	ø	IBM <b>Bluemix</b>	APIs 🔻	Catalog Docs 290 MAT matthe	THEW	V BOULT It®uk.ibm.com ∣ dev-uk
♠	≡	Drafts		🔧 Try the developer toolkit	Get	tting Started $-X$
۲	Product	s 😋 API:	S		0	01 Import API
Ð	Add	Q Search AF	Pls		O Put	02 Generate and blish
	Start by	adding an API			Ø	03 Explore
	You can sample /	create a brand r API	new API, star	t with a soap service, import an existing OpenAPI or get started with the Climbing We	•	04 Test
					-di	05 Analytics

## 5. Prepare IIB environment

## 5.1 Configure TESTNODE\_iibuser for REST applications

The IIB support for the REST API requires some special configuration for the IIB node and server. Cross-Origin Resource Scripting (CORS) must be enabled for the IIB node to execute REST applications. This is also required when testing with the SwaggerUI test tool. See <a href="http://www.w3.org/TR/cors/?cm\_mc\_uid=09173639950214518562833&cm\_mc\_sid\_5020000=1">http://www.w3.org/TR/cors/?cm\_mc\_uid=09173639950214518562833&cm\_mc\_sid\_5020000=1</a> <a href="http://www.w3.org/TR/cors/?cm\_mc\_uid=09173639950214518562833&cm\_mc\_sid\_5020000=1">http://www.w3.org/TR/cors/?cm\_mc\_uid=09173639950214518562833&cm\_mc\_sid\_5020000=1</a> <a href="http://www.w3.org/TR/cors/?cm\_mc\_uid=09173639950214518562833&cm\_mc\_sid\_5020000=1">http://www.w3.org/TR/cors/?cm\_mc\_uid=09173639950214518562833&cm\_mc\_sid\_5020000=1</a> <a href="http://www.w3.org/TR/cors/?cm\_mc\_uid=09173639950214518562833&cm\_mc\_sid\_5020000=1">http://www.w3.org/TR/cors/?cm\_mc\_uid=09173639950214518562833&cm\_mc\_sid\_5020000=1</a> <a href="http://www.w3.org/TR/cors/?cm\_mc\_uid=09173639950214518562833&cm\_mc\_sid\_5020000=1">http://www.w3.org/TR/cors/?cm\_mc\_uid=09173639950214518562833&cm\_mc\_sid\_5020000=1</a> <a href="http://www.wasework.com"/>http://www.wasework.com"/>http://www.wasework.com</a> <a href="http://www.wasework.com"/>http://www.wasework.com</a> <a href="http://www.wasework.com"/>http://www.wasework.com"/>http://www.wasework.com</a> <a href="http://www.wasework.com"/>http://www.wasework.com</a> <a href="http://www.wasework.com"/>http://www.wasework.com</a> <a href="http://www.wasework.com"/>http://www.wasework.com"/>http://www.wasework.com</a> <a href="http://www.wasework.com"/>http://www.wasework.com</a> <a href="http://www.wasework.com"/>http://www.wasework.com</a> <a href="http://www.wasework.com"/>http://www.wasework.com</a> <a href="http://www.wasework.com"/>http://www.wasework.com</a> <a href="http://www.wasework.com"/>http://www.wasework.com</a> <a href="http://www.wasework.com"/>http://www.wasework.com"/>http://www.wasework.com</a> <a href="http://www.wasework.com"/>ht

In Windows, switch user and log in as "iibuser", password = "passw0rd".

- 1. Ensure that TESTNODE\_iibuser is started.
- 2. Check that CORS has been enabled on the IIB node by running the following command in an Integration Console:

```
mqsireportproperties TESTNODE_iibuser
   -e default
   -o HTTPConnector
   -r
```

3. If CORS is enabled, you will see the following lines (amongst others):

```
corsEnabled='true'
corsAllowOrigins='*'
corsAllowCredentials='false'
corsExposeHeaders='Content-Type'
corsMaxAge='-1'
corsAllowMethods='GET, HEAD, POST, PUT, PATCH, DELETE, OPTIONS'
corsAllowHeaders='Accept, Accept-Language, Content-Language, Content-
Type'
```

4. If CORS has not been enabled, run the following commands:

```
mqsichangeproperties TESTNODE_iibuser
   -e default
   -o HTTPConnector
   -n corsEnabled -v true
mqsistop TESTNODE_iibuser
mqsistart TESTNODE iibuser
```

## 5.2 Open IIB Log Monitor

A useful tool for IIB development on Windows is the IIB Log Monitor. This tool continuously monitors the Windows Event Log, and all messages from the IIB and WMB log are displayed immediately.

From the Start menu, click IIB Event Log Monitor. The Monitor will open; it is useful to have this always open in the background.

IIB Event Log Monitor
BIP3132I: < IB10NODE.server1 > The HTTP Listener has started listening on port
78007 for "http" connections. [10/3/2014 3:17:23 PM]
BIP21541: ( IB10NODE.server1 ) Execution group Finished with Configuration mess
ge. [10/3/2014 3:17:24 PM]
BIP2152I: < IB10NODE.server1 > Configuration message received from broker. [10/
/2014 5:07:36 PM]
BIP2153I: ( IB10NODE.server1 ) About to ''Change'' an execution group. [10/3/20
4 5:07:36 PM]
BIP2155I: ( IB10NODE.server1 ) About to ''create '' the deployed resource ''Emp
oyeeService_JSONClient'' of type ''.APPZIP''. [10/3/2014 5:07:37 PM]
BIP2155I: < IB10NODE.server1 > About to ''create '' the deployed resource ''gen
getEmployee_EmployeeService_EmpServClient_JSON1'' of type ''.SUBFLOW''. [10/3/2
14 5:07:37 PM1^
BIP2155I: < IB10NODE.server1 > About to ''create '' the deployed resource ''Emp
ervClient_JSON1'' of type ''.MSGFLOW''. [10/3/2014 5:07:37 PM]
BIP2154I: ( IB10NODE.server1 ) Execution group finished with Configuration mess
ge. [10/3/2014 5:07:43 PM]
BIP3132I: ( IB10NODE.HTTPListener ) The HTTP Listener has started listening on
ort ''7080'' for ''http'' connections. [10/3/2014 5:07:47 PM]
BIP21521: ( IB10NODE.server1 ) Configuration message received from broker. [10/
/2014 5:50:41 PM]
BIP21531: ( IB10NODE.server1 ) About to ''Change'' an execution group. [10/3/20
4 5:50:41 PM]
BIP2155I: ( IB10NODE.server1 ) About to ''delete '' the deployed resource ''Emp

This tool is not shipped as part of the IIB product; please contact us directly if you would like a copy.

#### 5.3 Configure TESTNODE\_iibuser to work with DB2

#### If you have already done Lab 1 in this series, you can skip this section.

To run this lab, the Integration Bus node must be enabled to allow a JDBC connection to the HRDB database and create the necessary security credentials for TESTNODE\_ibuser to connect to the database.

1. Open an IIB Command Console (from the Start menu), and navigate to

c:\student10\Create\_HR\_database

2. Run this command and accept the defaults:

```
3_Create_JDBC_for_HRDB
```

3. Run this command and accept the defaults:

4\_Create\_HRDB\_SecurityID

4. Stop and restart the node to enable the above definitions to be activated

mqsistop TESTNODE\_iibuser

#### mqsistart TESTNODE\_iibuser

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## 6. Prepare IIB REST Application

#### 6.1 Import and deploy pre-requisite IIB projects

1. Start the IIB toolkit from the Start menu and to ensure there are no conflicts with other components, switch to a new workspace, e.g.

#### c:\users\iibuser\IBM\IIB 10\workspace\_APIC

2. In the IIB Toolkit, import the Project Interchange file:

```
C:\student10\REST_API_HR_Service\solution\
HR_Service_getEmployee.10.0.0.6.zip
```

Import all 3 projects in the PI file.

🌐 Import Project In	nterchange Contents	<u>_     ×</u>
Import Projects Import Projects from a	a zip file.	ļ
From zip file: Project location root:	vice\solution\HR_Service_getEmployee.10.0.0.6.zip	Browse
Gerren HRDB     Gerren HRDB_project     Gerren HRDB_project     Gerren HR_Service	t	
Select All Deselec	t All Select Referenced	
?	< Back Next > Finish	Cancel

- 3. Delete all deployed resources in the default server and then deploy first **HRDB** and then **HR\_Service** to server **default** on TESTNODE\_iibuser.
- 4. To test the REST API, use the following URL. A shortcut for this is provided in the REST folder in Firefox.

http://localhost:7800/HR\_Services/resources/employees/000010

If the REST API is working correctly, the details for employee 000010 should be returned:

( Iocalhost: 7800/HR_Services/resources/employees/000010	C Q Search	☆ 🖻		₽	⋒	9	≡
🔜 ODM 📑 IIB 🔄 WAS 📑 SDS 🔜 REST 📑 IOT 📑 Healthcare 📑 Registration 📑 Clo	oud 🔒 Build 🍶 Feedback						
<pre>{"DBResp":{"UserReturnCode":0,"RowsRetrieved":1},"Employee": [{"EMPNO":"000010","FIRSTNME":"CHRISTINE","MIDINIT":"I","LAST T00:00:002","JOB":"PRES ","EDEVEL":18,"SEX":"F","BIRTHDATE":"1963-08-24T00:00:00+01:0</pre>	NAME":"HAAS","WORKDEPT":"A00","PHONEN 10","SALARY":1.5275E+5,"BONUS":1E+3,	10":"3978' 'COMM":4.:	,"HIR 2E+3}	EDATE	.":"19	995-0:	1-01

5. Now change the URL, substituting the cloud host and port that you saved in section 3.3, for localhost:7800, so that the REST API can be accessed from outside the network. The format will be, e.g.

```
http://<cloud host>:<cloud port>/HR_Services/resources/employees/000010
```

Paste the resulting URL into a browser and confirm that it returns the same details as before. This shows that the Secure Gateway connection is working and that API Connect on Bluemix will be able to reach this REST API.

#### 6.2 Push REST API definition to IBM API Connect - Web UI

To push the REST API from definition using the Web User Interface, follow this section.

Alternatively, to push the definition from the Integration Console, skip this section and follow the next one instead.

1. From the Integration Toolkit, start the WebUI for node TESTNODE\_iibuser:



2. Expand **Servers** under node TESTNODE\_iibuser by clicking the twisty at the left and then click the down arrow to the right of the default server and select the option **Push REST APIs** to **IBM API Connect**.

▼	user 💌	🔊 Overview	✓ Statistics	
🔻 🗾 Servers 🔍		-		
🕨 🔁 default	▼ top			
▶ 👔 Operational I ▶ 🖪 Data	Stop All Applicat	tion Types	Vode	
Security	Stop All Messag	je Flows ent	rsion	•
<ul> <li>Monitoring</li> <li>Business</li> </ul>	Delete		lager	
	Deploy		t Broose	
L	Push REST AP	Is to IBM API Connec	t Frocess	טוי
	Statistics on			
	Statistics off		<b>.</b>	

•

- 3. The Push to API Management wizard will appear. Provide the following details:
  - Host. Enter one of the following, depending on the Bluemix region you are currently logged into:
    - eu.apiconnect.ibmcloud.com (United Kingdom)
    - us.apiconnect.ibmcloud.com (US South)
    - o au.apiconnect.ibmcloud.com (Sydney)
    - Port: leave this as 443.
  - User ID: your IBM ID
  - Password: your IBM password

and then click Connect to IBM API Connect.

You should see a successful connection message as shown here.

Now click **Next**.

	Auster / berver Address	
Host	eu.apiconnect.ibmcloud.com	
Port	443	
Authentication		
UserID	iibtester99@gmail.com	
Password	•••••	
Connect to	IBM API Connect	

4. In API Connect, a product is a set of APIs and Plans in one offering that you make available to your developers.

At the next screen, you are prompted to add a new product that will contain the REST API.

Give a title for the product.

The name and version will be generated for you.

Do not stage the product.

When the details have been entered, click Next.

select the target	organization
Organization	iibtester99_workshop (dev) *
Specify the produ	uct title, name, and version
Title	Employee
Name	Employee
Version	1.0.0
The draft p	roduct 'Employee' with version '1.0.0' will be created
Select the catalo	g where the product will be staged
Catalog	Do not stage in catalog 👻
The produc	t 'Employee' with version '1.0.0' will not be staged.

5. At the next screen, select the REST API, scroll down and then click Next.

Push REST A Connect Select the REST APIs to push to	PIS tO IBM AP	I	
REST API Name	Title	Version	
HR_Service	HR Employee and Department Services	3.0.0	

6. At the next prompt, enter the cloud host name and port from the Secure Gateway connection (saved in section 3.3) in the appropriate places for the http connection.

These details will be used in the configuration of the REST API in API Connect on Bluemix, so that inbound connections are permitted to the IIB host system.

Click Push	to IBM	API Connect.
------------	--------	--------------

Override the host and port used by IBM API Connect to invoke the APIs		
When or gat Conne	access to IBM Integration Bus from IBM API Connect is via a proxy eway, provide details of the host name and port that IBM API act must use to invoke the APIs. To use the value from the	
integr	ation server, leave the field blank.	
http://	caplonsgprd-3.integration.ibmcloud.com : 15186	
https://		

7. The push should be successful and a message displayed like the one shown below. Close the window when you are ready and skip the next section.

Pus Cor	shing REST APIs to IBM API nnect	×
0	Successfully pushed REST API 'HR_Service' to IBM API Connect	
0	Successfully added REST API 'HR_Service' to product 'Employee' in IBM API Connect	

#### 6.3 Push REST API definition to IBM API Connect - CLI

Do not perform this section if you have pushed the REST API definition using the Web UI.

To push the REST API definition using the Integration Console, follow this section.

We will use the mqsipushapis command, which has the following syntax:

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Integration with IBM API Connect on Bluemix

# mqsipushapis <integration node> -e <integration server> -t <API Connect host> -g <API Connect port> -u <API Connect user ID> -a <API Connect password> -o <API Connect organization> -r <product name> -k <API Name> -x <API host>:<API port>

Note:

- the **product name** specified with the **-r** flag is a name assigned by the user to the new product in API Connect that will contain the API.
- **API Connect host**: you will use one of the following, depending on the Bluemix region you are currently logged into:
  - eu.apiconnect.ibmcloud.com (United Kingdom)
  - us.apiconnect.ibmcloud.com (US South)
  - au.apiconnect.ibmcloud.com (Sydney)
- the API Connect organization is constructed in our case as follows:
   <Bluemix Organization> (<Bluemix Space>). See section 3.1, if you don't have this information. Note the space between the two parts and that Bluemix Space needs to be placed in brackets, e.g, for a user with Bluemix Organization *iibtester99\_workshop* and Bluemix Space *dev*, this would be: *iibtester99\_workshop* (*dev*).

 To help you, we have provided a script, deploy\_to\_APIConnect.cmd, in C:\student10\IIB\_APIC\commands.

In an Integration Console, change to this directory and run the command, entering appropriate values in the prompt. For a fictitious user, IBM ID *iibtester99@gmail.com*, in Bluemix Organization *iibtester99 workshop* and Bluemix Space *dev*, the output could look like this.



This results in the following command being run:

mqsipushapis TESTNODE\_iibuser -e default -t eu.apiconnect.ibmcloud.com -g 443 -u iibtester99@gmail.com -a passw0rd -o "iibtester99\_workshop (dev-uk)" -r Employee -k HR\_Service -x caplonsgprd-3.integration.ibmcloud.com:15186

2. Check that the command runs successfully. If it does not, make corrections and try again. The response should look something like this:

BIP9356I: Successfully created API 'HR\_Service' in IBM API Connect. BIP9358I: Successfully created Product 'Employee' and added API 'HR\_Service' to it in IBM API Connec t. BIP9366I: Product 'Employee' was not staged for Organization 'matthew\_boult@uk.ibm.com (dev-uk)' in IBM API Connect as staging was not requested when the command was run. BIP8071I: Successful command completion.

## 7. View REST API in IBM API Connect

For this section, you can remain logged in to Windows as the user "iibuser" or switch back to user "iibadmin" and continue with your running Bluemix session.

1. If you are still logged into API Connect from before, then jump to step 6.

Go to https://new-console.eu-gb.bluemix.net/apis/apiconnect

Log on with your IBM ID and password.

You are now logged on to IBM API Connect as an API manager.

Click on the menu symbol

2.



#### 3. Then Drafts



4. You should now see the following screen with information on API Connect Products.

Click Got it! when you have finished reading it.

Products
This page lists all of your Products.
A Product is a collection of APIs that are grouped together in Plans. Use Products to manage access to your APIs.
Before your Product is available to developers, you must stage it to a Catalog and then publish it to the Developer Portal. Staging takes place within the Product editor, and publication is done from the appropriate Catalog.
To create a Product, click 'Add'. To view and edit the configuration of an existing Product, click the Product.
Got it! Learn more about Products

5. At the next screen, click **APIs.** 



6. If you were already logged on to API Connect from before, refresh the screen.

The **Employee Service** API should be displayed. This is the API that you pushed into IBM API Connect.

Click on HR Department and Employee Services to show the details of the API.

♠ ≡	Drafts	🔧 Try the developer toolkit	🕖 Explore	۹	0
Product	s 😋 APIs				
⊕ Add	Q Search APIs				Ŧ
Title		Last Modified	Туре		
HR Employ	yee and Department Services 3.0.0	5 minutes ago	REST	1	* 🗉

7. Before you get to the API Editor, you will see the following pop-up. Again, click **Got it!** after reading.



8. Explore the design of the API by navigating the left panel, or scrolling down the page at the right.

♠ ≡	HR Emplo	oyee and De	partment Services 3.0.0	🔧 Try the developer toolkit	🧭 Explore	۵	0
←All APIs	@ Design	<> Source	T# Assemble			<b>A</b> E	
Info Schemes Host Base Patr	1	Info	Title * HR Employee and Department Services Name *				Ē
Consume Produces	'5		hr-employee-and-department-services Version * 3.0.0				
Lifecycle Policy Ass	embly		Description		Edit Preview	0	
Security D Security Extension	s		This is the HR Swagger document for the Employee and Department and JSON model definitions.	Services used by the IIB BetaWorks REST labs. It contains	resource definitions	В	

9. Navigate to the **Schemes** section under the **Design** tab and note the **https** tick box alone is selected, as shown below. This ensures the published URL will be secured using https.

Info	Schemes	http	Ittps	wss	ws
Schemes					

10. Access to the REST API may be restricted by use of a Client ID and Client Secret which can be defined in the Security Definitions section and referenced in the Security section below it.

Scroll past these, as we shall not be using security definitions in this lab.

←All APIs	Source Assemble	• • ••
Consumes		-
Produces	Security Definitions	(+)
Lifecycle	No security definitions defined	
Policy Assembly		
Security Definitions		
Security	Security	$\oplus$
Pronerties	No security definitions available	ſ

#### 11. Click the **Assemble** tab.

♠ ≡	HR Emplo	yee and D	epartment Serv	ices 3.0.0
←All APIs	Design	<> Source	<b>₩</b> Assemble	]

12. You will see that an assembly flow has been created with a proxy node. Click on this node.

♠ ≡	HR Employee and Department Services 3.0.0					
←All APIs	🗬 Design		<> S	ourc	e 🕶 Assemble	
Q, Filter		Ŧ	<	►	Q. Search	
Logic	^	-			_	
operation-switch		ргоху		ргоху		
swite	h	Ξ				

13. IBM API Connect must be proxy the requests for the REST API into IBM Integration Bus. The details of the cloud host and port were given when the REST API was pushed from IIB and will be of the form:

```
http://<cloud host>: <cloud port>$(request.path)
```

To see the full URL, click the maximize symbol as shown.

When you have finished, close the window.

<b>proxy</b>	⊗ <> 🖭 ×
Title	
proxy	Ξ
Description	
URL *	
http://caplonsgprd-1.integ	gration.ibmcloud.com:1
The URL to be invoked.	

## 8. Test REST API

#### 8.1 Set up and run the test

1. Click the arrow button to start the test.



2. In the navigation pane at the left, click **Republish product**.

Test	×
Setup	
Sandbox, Employee 1.0.0, using automatic subscription           Republish product         Change set	tup

3. Now choose an operation to invoke by clicking the down arrow at the right.



4. Scroll down and choose the get /employees/{employeeNumber} operation.



5. Now, under the Parameters section, enter an employee number to retrieve, e.g.: 000010 and click **Invoke**.

	Parameters
C	employeeNumber 000010
	Repeat
	Repeat the API invocation a set number of times, or until the stop button is clicked
	Stop after: Stop on error
	Invoke

6. If successful, data will be returned in the body of the response:

Test
Body:
<pre>{     "DBResp": {         "UserReturnCode": 0,         "RowsRetrieved": 1     },     "Employee": [</pre>
<pre>{     "EMPNO": "000010",     "FIRSTNME": "CHRISTINE",     "MIDINIT": "I",     "LASTNAME": "HAAS",     "WORKDEPT": "A00",     "PHONENO": "3978",</pre>

Integration with IBM API Connect on Bluemix

## 8.2 Determine URL of published REST API

1. Navigate to the Sandbox catalog by clicking on the menu icon (



and then selecting Dashboard.

	A Back to Overview
	★ Favorites
(	📰 Dashboard
	🖌 Drafts
	🔍 Admin

2. If this is the first time you have navigated here, you will the following screen with information about the Dashboard.

Scroll down, if necessary to Click Got it! when you have finished reading it.

Dashboard	
This page lists your Catalogs and Apps.	
You publish your Products, which contain your Plans and APIs, to a Catalog to make them available to developers through a Developer Portal. In earlier versions of API Connect, Catalogs were called Environments. You publish your LoopBack applications to an App; an App provides the runtime for the API endpoints in a LoopBack application. Click a Catalog or an App to view and edit its details. Click 'Add' to create a new Catalog or App.	
When you edit a Catalog, you can configure the portal, developer accounts, and approve or deny developers' requests to use your APIs.	
San <b>Got it!</b>	

3. Click on the Sandbox icon and then Settings.

♠ ≡	Sandbox						
← Dashboard	Products	<ul> <li>Approvals</li> </ul>	# Developers	Subscriptions	II Analytics	🌣 Settings	

4. Select the Endpoints option from the menu at the left and note the API Endpoint Base URL.

← Dashboard	Products	✓ Approvals	🟩 Community	III Analytics	Settings			
Info Gateway Endpoints Portal		API Endpoint Base URL: https://api.eu.apiconnect.ibmcloud.com/matthewboultukibmcom-dev-uk/sb Custom Gateway URL						
Permissions Extensions		Custom API URL						
		Portal API Endport	oint eloper Portal API Calls					

5. The published URL will be of the form.

<API Endpoint Base URL>/HR\_Services/resources/employees/{employeeNumber}

Construct a URL in this form, using your API Endpoint Base URL and a test employee number.

An example URL with a test employee number of 000020 is:

https://api.eu.apiconnect.ibmcloud.com/iibtester99workshop-dev/sb/ HR\_Services/resources/employees/000020

Enter this URL in a browser and you should see a response showing the relevant employee's details:



You have now accessed the published REST API successfully as an API user.

#### END OF LAB GUIDE