

# IBM Integration Bus

Name  
Job role

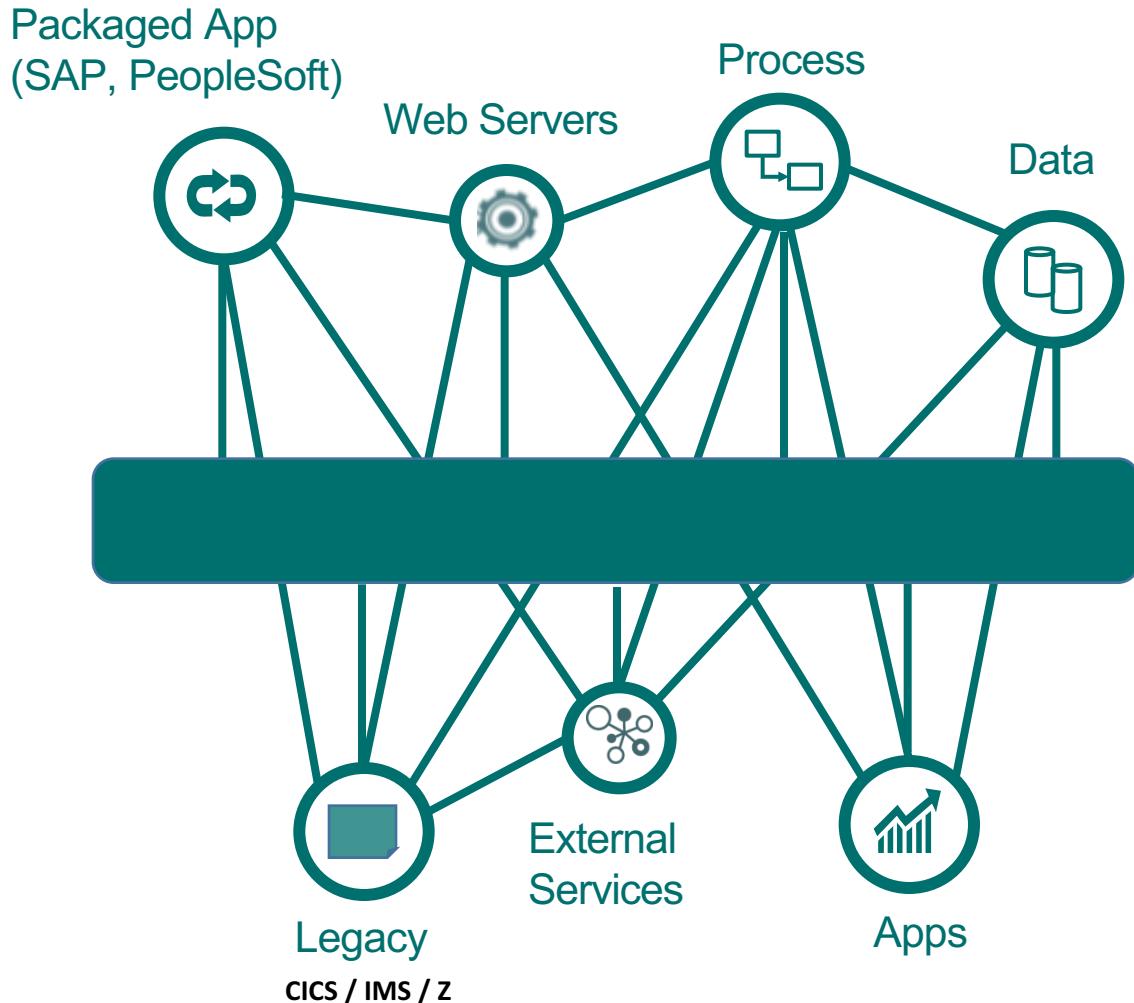
<email>



# What do we mean by ‘Integration’?



- Enterprise systems consist of many logical **endpoints**
  - Off-the-shelf applications, services, cloud apps (SaaS), web apps, devices, appliances, custom built software
  - Endpoints expose a set of **inputs and outputs** which compromise
  - Protocols – e.g. TCP/IP, HTTP, File System, FTP, MQ, SMTP, POP3, etc...
  - Message Formats, Binary (C/COBOL), XML, Industry (HL7, EDI), User-defined
- ‘Integration’ is connecting these endpoints in meaningful ways to achieve **interoperability**
  - Route, Transform, Enrich, Filter, Monitor, Distribute, Decompose, Correlate, Fire and Forget, Request/Reply, Publish/Sucscribe, Aggregation, Fan-in, Complex Event Processing....



## IBM Integration Bus connects endpoints in meaningful ways

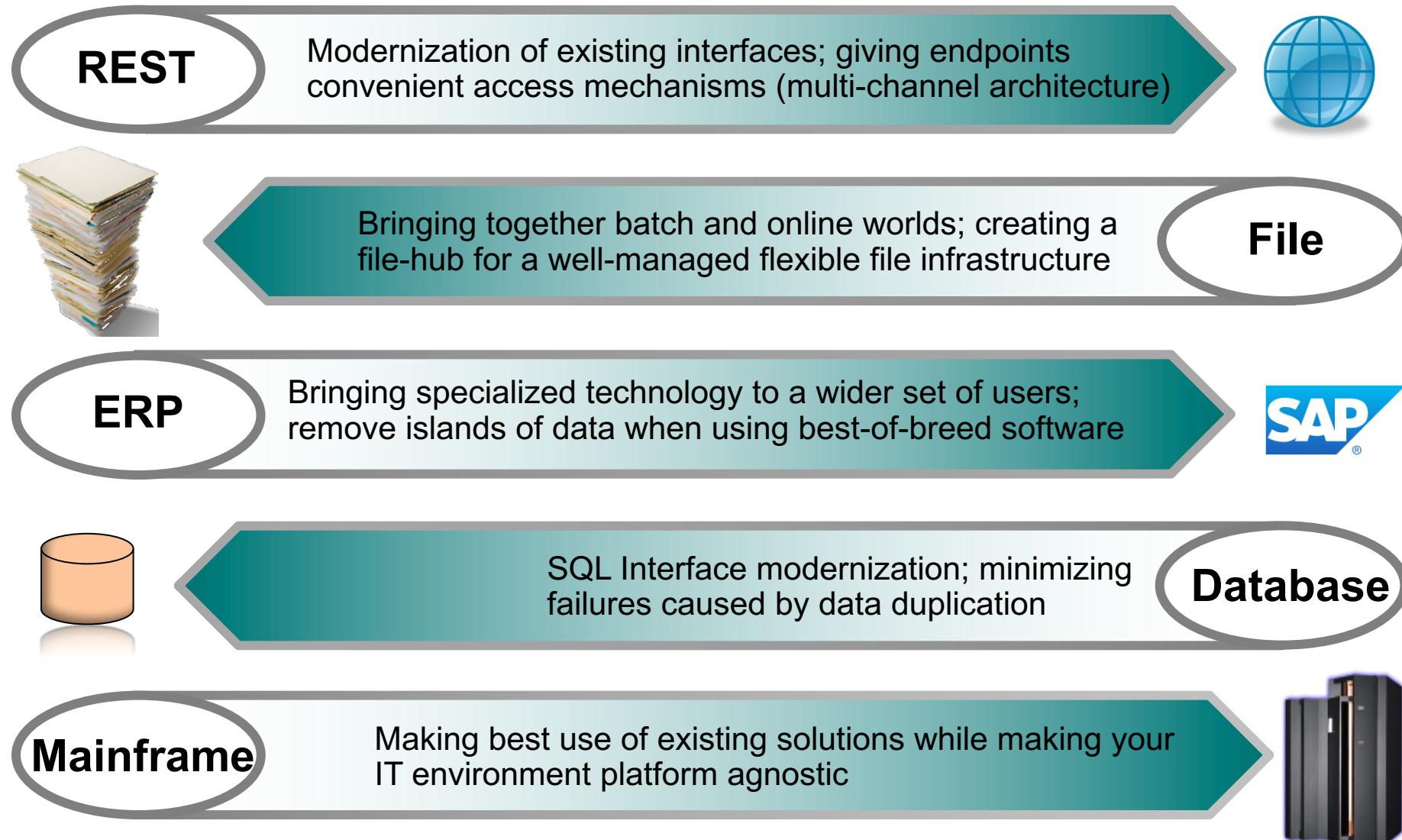
- ✓ **Avoids rewrites** in response to new integration requirements
- ✓ **Simplifies maintenance** by reducing expensive coupling
- ✓ **Adds Flexibility** introducing anonymity between producers and consumers of data
- ✓ **Provides insight** into applications and business value they bring

# IBM Integration Bus v10

- Simplified **Installation** Process
  - A single Install means you're ready to go in minutes!
- Removed the **IBM MQ** prerequisite
  - Removed core dependency on MQ giving greater flexibility
- Enhanced Web **User Interface**
  - Perform additional functions as well as view and manage integrations in a single place
- More options for processing **pub/sub** integrations
  - New connectors to build flows using MQTT
- **Shared** Libraries
  - Reference a library which is deployed independently of the resource using it
- **REST API** projects
  - Swagger implementation provides a “quick-start” to a REST API implementation within IIB
- The **Connector Framework**
  - Simple to build reusable endpoints
- Patterns and Samples stored on **GitHub**
- IIB in the **Cloud**



# Data routing and transformation are key IIB use cases (cont'd)



# But IIB is about more than routing and transforming!

- Create, manage and socialize **APIs**
- **Mobile** and device integration
- **Security** policy enforcement
- Provide integration for **business processes**
- **Cloud** integration
- Understanding and tuning system **workloads**
- Gaining insight From **business data**
- Act upon **business rules**
- Applying **analytics** to in-flight data



# What's new in Version 10

## IIB v10.0.0.2

Q3 2015

Global Cache upgrade to WXSv8.6  
GDM access to Global Cache  
REST API integration with APIM  
CICS 2 Phase Commit  
TCPIP report properties enhancements  
WESB conversion enhancements

## IIB v10.0.0.4

Q1 2016

Callable Flows for linking to IBoC  
Create a REST API without Swagger  
JSON Schema support for GDM  
Salesforce Request node  
LDAP Authentication  
Web UI Activity Log  
SLESv12 (x86 and Z Systems)

## IIB v10.0.0.6

Q3 2016

REST Request node  
REST Async Request & Response nodes  
Loopback Request node  
MQ version 9 support  
Support for YAML format Swagger  
Support for REST APIs with node-wide listener  
HTTP Logging Enhancements  
HTTP Input Query Param split in LE

## IIB v10.0.0.7

Q4 2016

Kafka Producer and Kafka Consumer nodes  
Hybrid Connect – view IIB instances in Bluemix  
Send IIB logs to Kibana dashboard in Bluemix  
Pre-built Docker image on Bluemix Containers  
Wildcards to simplify LDAP user authentication  
Accounting & Stats CSV output  
Windows 10 support

## IIB v10.0.0.8

Q1 2017

IBM Cloud Product Insights in Bluemix  
Asynchronous Callable Flows  
JSON support for allOf, anyOf, oneOf  
Storing context for REST Async Request  
Message Keys for Kafka nodes  
10 New Product Tutorials  
Node.js and FTE upgrades

## IIB v10.0.3

Q4 2015

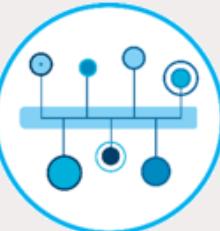
Business Transaction Monitoring  
CICS 2 Phase Commit on zOS  
Oracle stored proc in GDM  
Linux Power 8 Little Endian  
(RHEL7.1, Ubuntu14.0.0.4, SLES12)

## IIB v10.0.5

Q2 2016

MQTT SSL and dynamic config  
Bulk Push to API Connect  
Callable Flows report properties

## IIBvNext Closed Beta



## IIB on Cloud

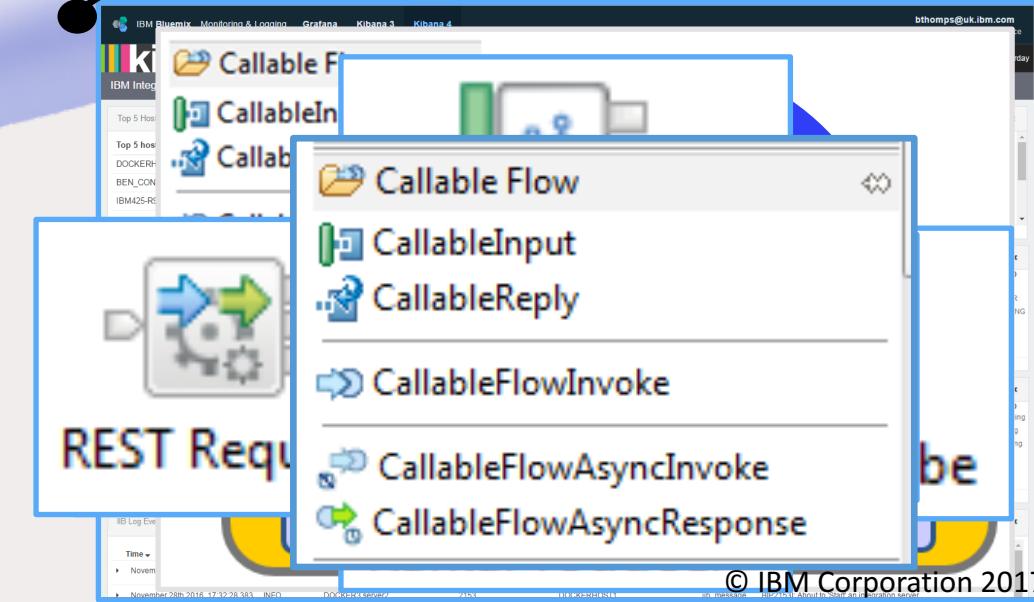
Q3 2015



IBM Managed Service  
Built on Docker containers  
Runs on the Bluemix Container Service  
Reuse artifacts built for IIB on-premise

**IIB Manufacturing Pack**  
**v1.0.0.2 Q3 2016**

IIBv10 Compatibility



# 10 New IIB Tutorials Recently Added ...

## Kafka, Aggregation, REST, Callable Flows, Bluemix Product Insights!

 Show Me

Here you can explore and learn about IBM Integration Bus using tutorials.  
What are you interested in?

Tool Capabilities

Explore Integration Bus concepts by following simple tutorials

**Producing and consuming Kafka messages**

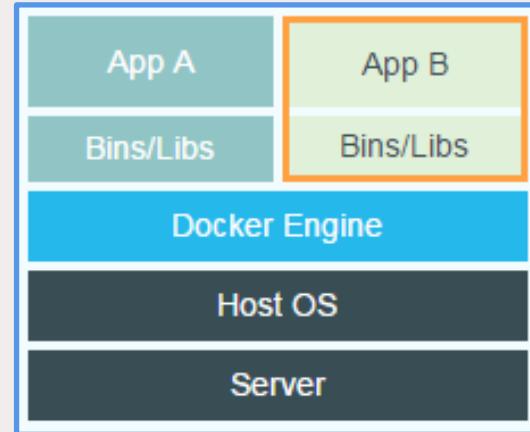
- Call a REST API using the RESTRequest node
- Call a REST API using the RESTAsyncRequest node
- Using Bluemix Product Insights to view IIB Registration and Usage
- Using Bluemix Kibana Dashboards to view IIB Logs
- Aggregation nodes using MQ nodes with back-end services
- Aggregation nodes using HTTPAsyncRequest nodes with back-end services
- Aggregation nodes using RESTAsyncRequest nodes with back-end services
- Aggregation nodes using SOAPAsyncRequest nodes with back-end services
- Aggregation nodes using CallableFlowAsyncInvoke nodes with back-end services

Learn how to use the KafkaProducer and KafkaConsumer nodes in a message flow (requires IBM Integration Bus v10 fixpack 7 or later).

[View Details](#) [Start Tutorial](#)

# IIB in Docker (and on Bluemix Container Service)

- IIB Docker image now available on the Bluemix Container Service
- It is fully supported to run IIB (including production usage) in Docker
  - Developer edition binaries linked from Github dockerfile
  - Docker containers securely isolate applications on a single host
  - No need for an entire Hypervisor / Virtual Machine for each container
  - Run many containers simultaneously and quickly scale
  - Launch when needed and then shut down when not!
- IIB runs in Docker as part of the IBM-managed service “IIB on Cloud”



Compute // Start with Cloud Foundry or Docker images

Container Images

Create containers from IBM images or add your own

ibm-integration-bus View More

ibm-node-strong-pm IBM

ibm\_wa\_agent IBM

ibmliberty IBM

ibmnode IBM

ot4i / iib-docker

Branch: master ▾ iib-docker / 10.0.0.0 / +

kernel_settings.sh made executable	...
Dockerfile	kernel_settings.sh made executable
iib-license-check.sh	Initial Commit
iib_env.sh	Initial Commit
iib_manage.sh	Initial Commit
kernel_settings.sh	Initial Commit

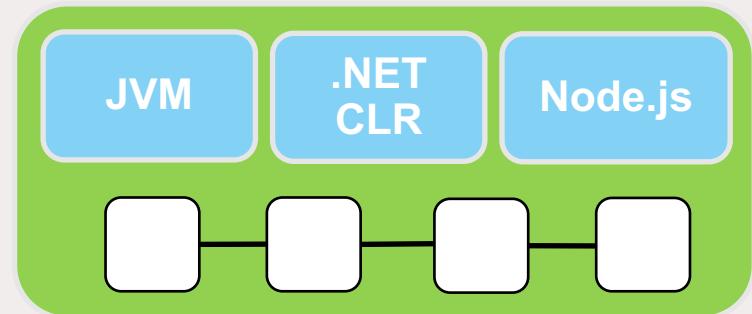
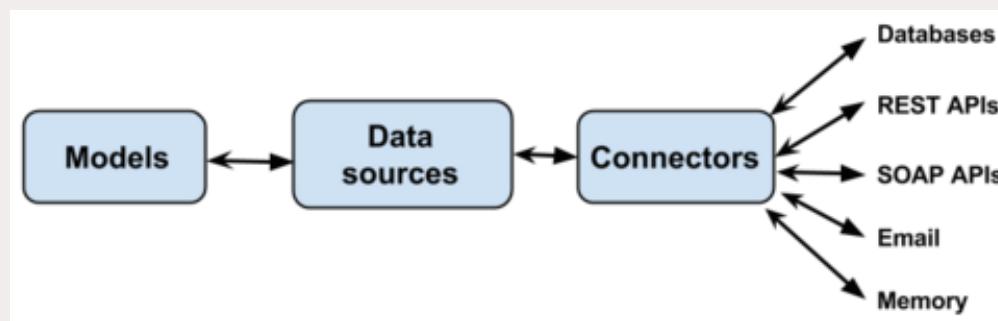
IIB Docker file available on Github: <https://github.com/ot4i/iib-docker>

Running IIB in the Bluemix Container Service: <https://youtu.be/ybGOiPZO3sY>

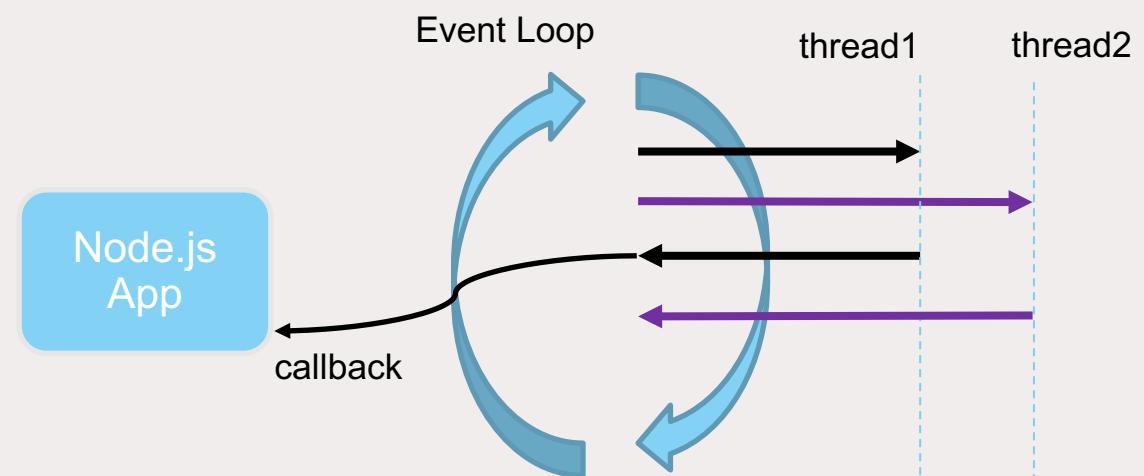
<https://developer.ibm.com/integration/blog/2016/11/18/run-ibm-integration-bus-in-bluemix-in-3-easy-steps/>

# Embedded node.js – Uses and Direction

- JavaScript growing as a language server-side, especially popular in the mobile dev community
  - Event-driven, non-blocking I/O model that makes node.js perfect for data-intensive, real-time applications
  - IIB embeds node.js within the Integration Server process on Windows and Linux
  - Currently we have three main uses for node.js within IIB but this will grow in future:
    - Salesforce Request node
    - LoopBack Request node
    - IIB Switch for secure access to IIB on Cloud

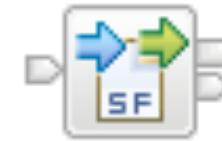


**StrongLoop** An IBM Company 



# Salesforce Request node (Application Integration Suite)

- Built on top of LoopBack technology
- Uses the Force.com REST API to create, retrieve, update, and delete Salesforce records through a LoopBack connector.
- Input and output messages are in JSON.
- Windows and Linux x64 only.



Salesforce Request

The screenshot shows the IIB interface with the 'Salesforce Request Node Properties - Salesforce Request' dialog open. The properties listed are:

- Salesforce URL\*: https://login.salesforce.com
- Operation: Create
- Salesforce object\*: Account
- Security identity\*: BenSalesforceIdentity
- Timeout (milliseconds): 120000

The URL of the Salesforce system you are connecting to

The security identity used by mqsisetdbparms

Choose from a list of Salesforce objects or specify a custom object.

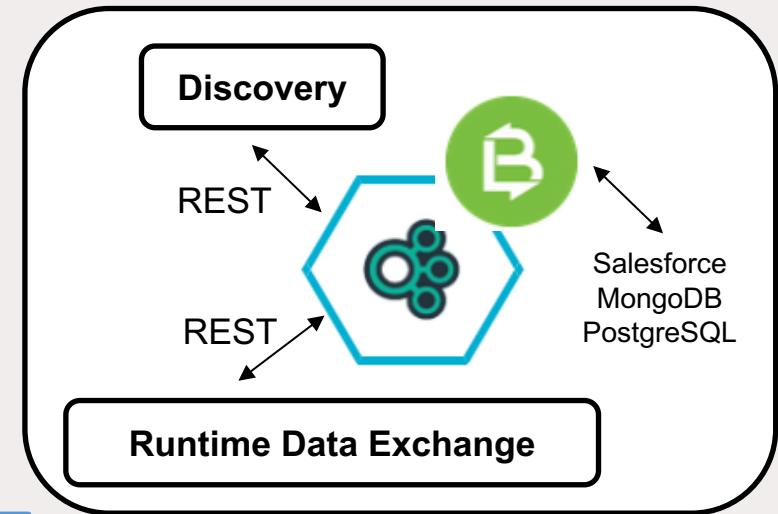
Create/Retrieve/Update/Delete operation can be performed on the object

Timeout to wait for a response from Salesforce

Using IIB for REST, Graphical Mapping & Salesforce: <https://youtu.be/XIK6QvNSHdY>

# LoopBack Request node

- Create, Retrieve, Update, Delete data records in external systems
- Interact with NoSQL databases such as MongoDB, Cloudant and PostgreSQL
- LoopBack is an Open Source node.js framework for authoring connectors – large open source catalog available on line
- npm tool helps you download and install LoopBack connectors which others have already written



**Loopback Request Node Properties - Loopback Request**

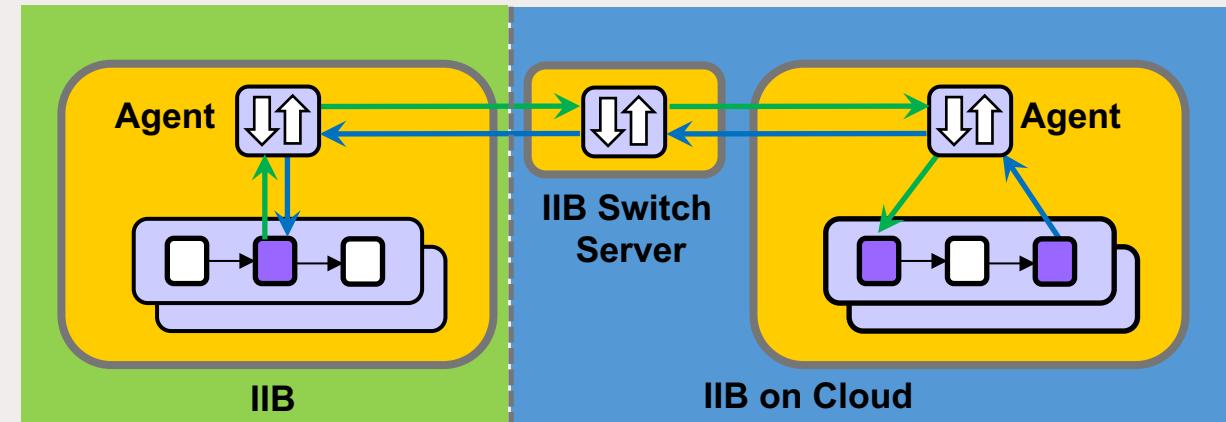
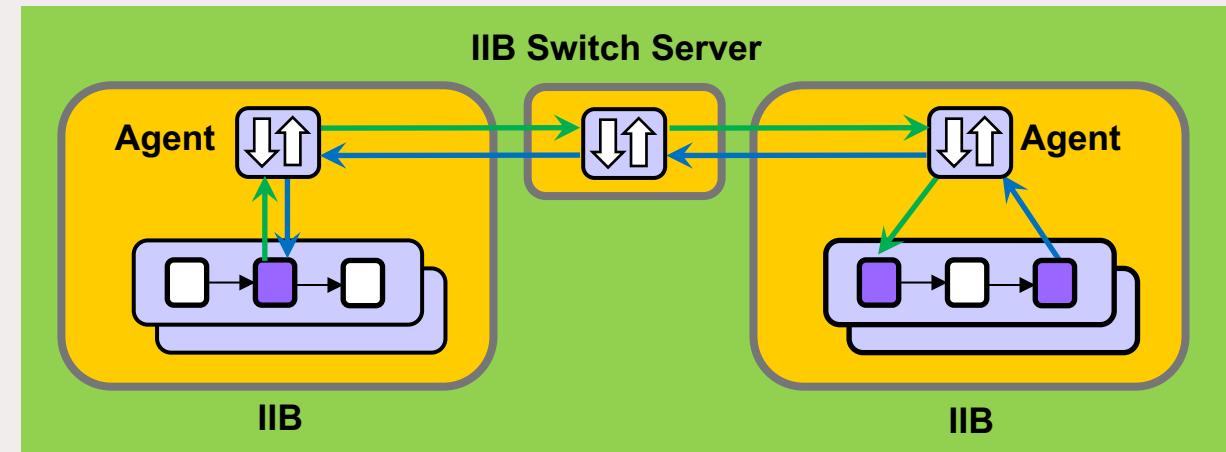
	LoopBackRequest
Description	
Basic	Location of the datasources.json file*
Request	Name of the data source in the datasources.json file to connect to*
Result	
Response Message Parsing	
Monitoring	

Properties:

- Location of the datasources.json file\*: C:\Program Files\IBM\IIB\10.0.1267.5\server\nodejs\iib-loopback-connector\ds.json
- Name of the data source in the datasources.json file to connect to\*: BenDatabase
- Loopback object\*: BenObject
- Operation: Create
- Security identity: LoopbackIdentity
- Timeout (milliseconds): 120000

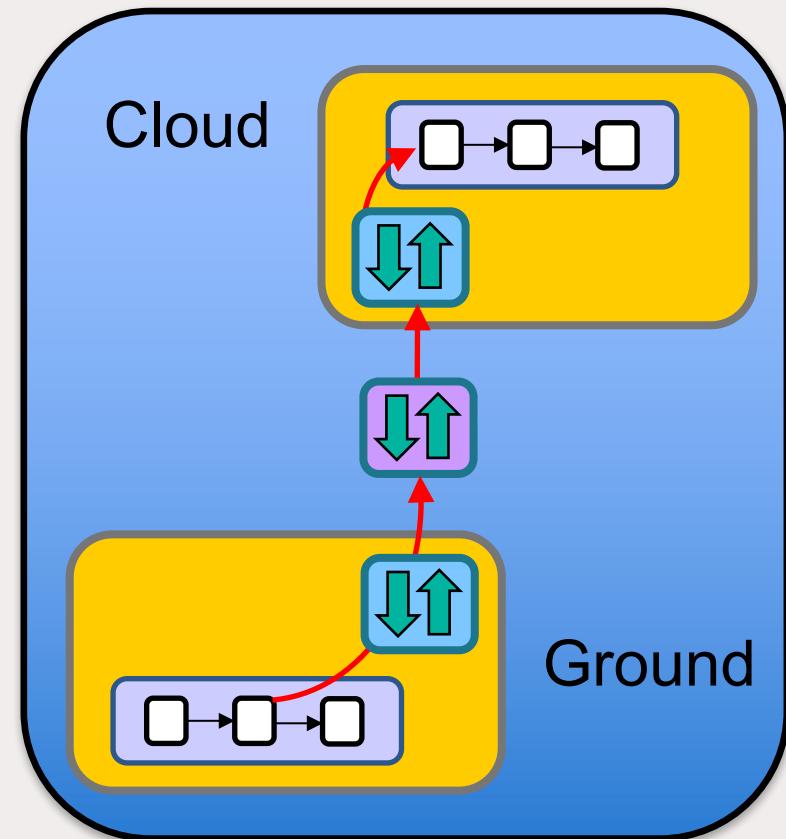
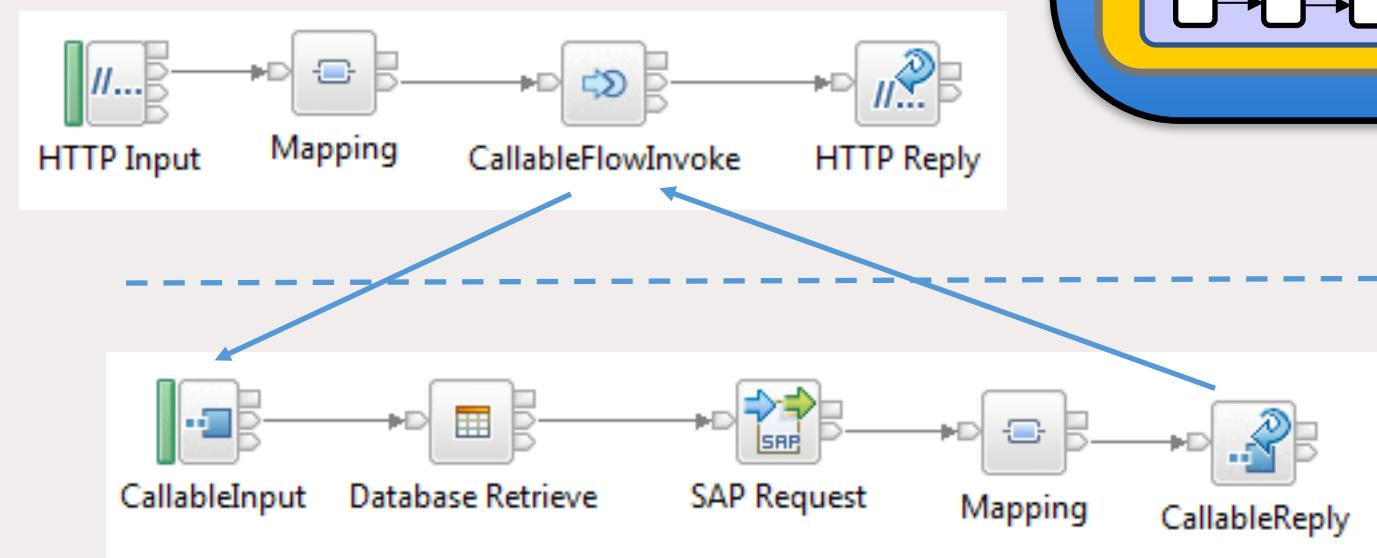
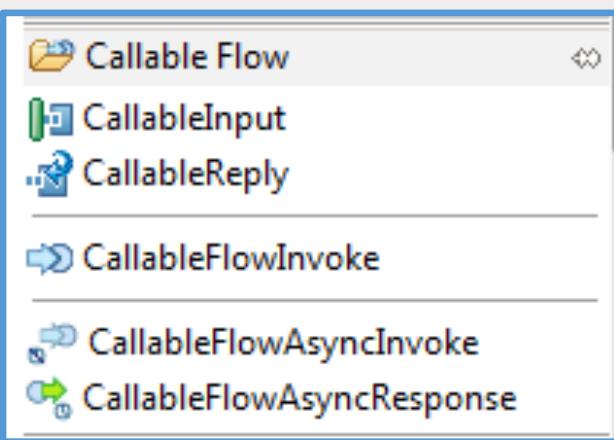
# Hybrid Integration using the IIB Switch

- Simpler to run IIB in a cloud architecture due to deployment processing and flow runtime all coordinated using a single OS process
- Split processing between different Integration Servers
- Flows communicate using a Switch server and connectivity agents
- If callable flows are deployed in IIB (on-prem, in Docker, or in another vendor's IaaS such as AWS or Azure) then the agent contains certificates to secure the web socket connections to the Switch server
- If splitting work between IIB and IIB on Cloud, the Switch server is created and managed for you in the cloud



# Callable Flows

- True Hybrid integration is achievable right now!
- Cloud burst workload when needed!
- Easily connect IIB running on ground with IIB on Cloud, and in Docker, pure application, other IaaS vendors etc.
- Dynamically control the CallableFlowInvoke node to route to different message flows for specific message traffic
- Dynamic behaviour is also useful for on-premise use cases
- CallableFlowAsyncInvoke and CallableFlowAsyncResponse added in v10.0.0.8



# Shared Libraries

- **Apps / Libs were major features introduced in V8 and V9**

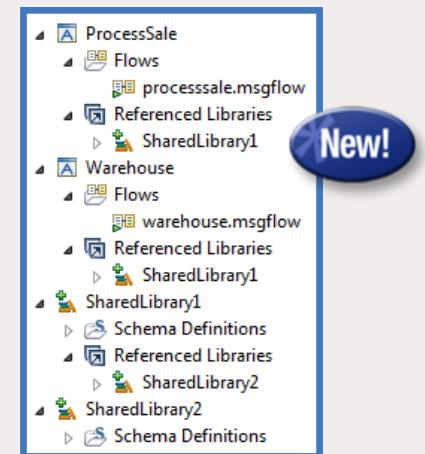
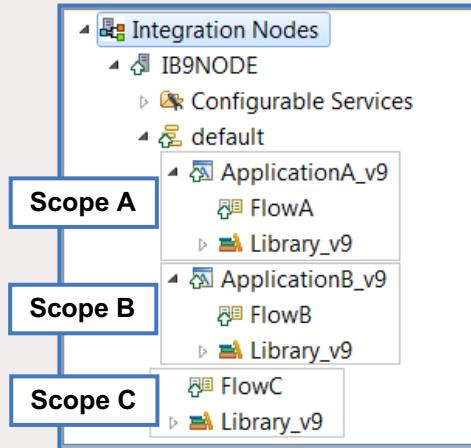
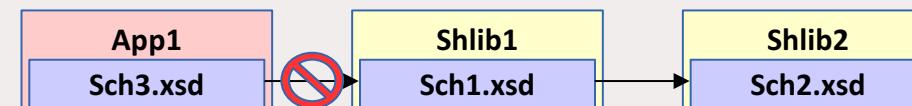
- Enhanced to fulfil most popular user requests
- Libraries can now be shared across multiple applications for a broad range of assets
- Sub-flows are now independent artefacts, significant storage reduction, consistency

- **Shared Libraries**

- Libraries can now be referenced by one or more applications
  - Libraries deployed independently of applications – “shared”!
  - Applications will not get “own copy”
  - Libraries can still reference other libraries
- Shared Library is the default library type
- Assets in multiple libraries within application are shared
  - Notably schemas, also Maps, ESQL, Java etc.

- **Shared Library Restrictions**

- Subflows but not message flows are allowed in shared libraries, other minor subflow restrictions
- Minor restrictions for ESQL (e.g. empty schema)
- Application hosted schemas can't import/include schemas from shared libs
- Java classes in shared libraries are in separate classloaders (unless one shared library references another shared library)



# Exposing a REST API using IIB

**Header**

REST API base URL `/Customertransform/v1` Title `CustomerTransform` Version `1.0.0`

You can access the operations in the REST API by pointing your web browser to the following URL, where <hostname> is the host name and <port\_number> is the port number:  
`http://<hostname>:<port_number>/Customertransform/v1`

**Resources**

`/customer`

GET		get1			Retrieve customer				
Name	Parameter type	Data type	Format	Required	Description	+  			
Response status		Response message			Array	Type			
200		The operation was successful.							

POST		post1			Insert a customer				
Name	Parameter type	Data type	Format	Required	Description	+  			

PUT		put1			Update customer				
Name	Parameter type	Data type	Format	Required	Description	+  			

DELETE		delete1			Remove from customer				
Name	Parameter type	Data type	Format	Required	Description	+  			

**Model Definitions**

Name	Array	Type	Format	Required
 <Enter a unique name to create a new model>				
<code>{--&gt;} customer</code>		object		

# Administering an IIB REST API

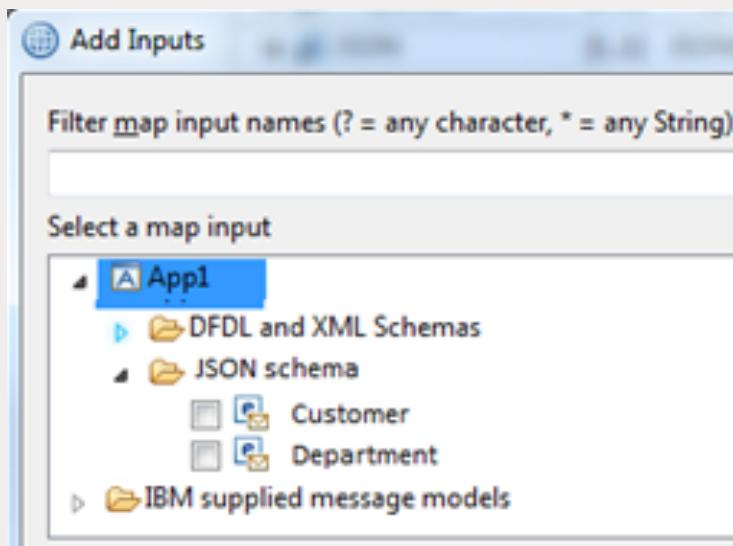
The screenshot shows the IBM Integration Bus (IIB) interface for managing REST APIs. The left sidebar displays the navigation tree under TESTNODE\_10005, with CustomerDatabaseV1 selected. The main panel shows the details for the CustomerDatabaseV1 - REST API, including its base URLs and the available endpoints and their implementations.

**CustomerDatabaseV1 - REST API**

Method	Endpoint	Description	Status
POST	/customers	addCustomer Add a customer to the database	Implemented
GET	/customers	getAllCustomers Get all customers from the database	Implemented
DELETE	/customers/{customerId}	deleteCustomer Delete a specified customer from the database	Implemented
GET	/customers/{customerId}	getCustomer Get a specified customer from the database	Implemented
PUT	/customers/{customerId}	updateCustomer Update a customer in the database	Implemented

# JSON Schema in the Graphical Mapper

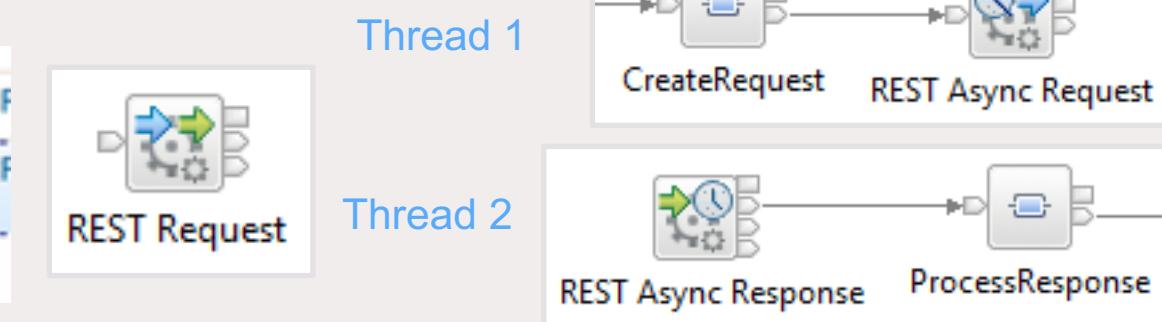
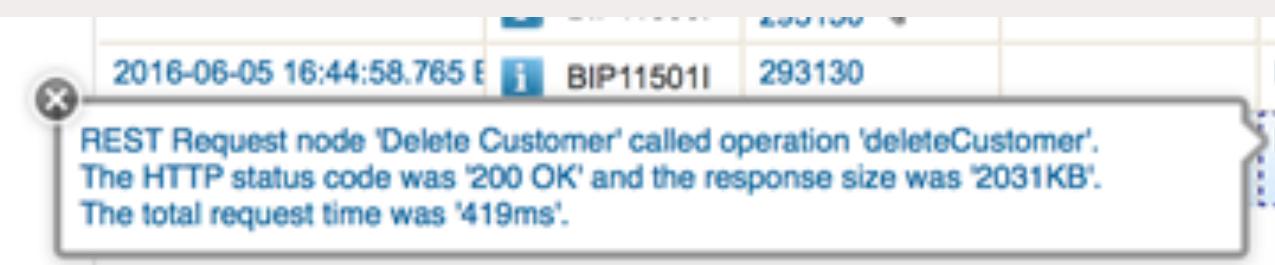
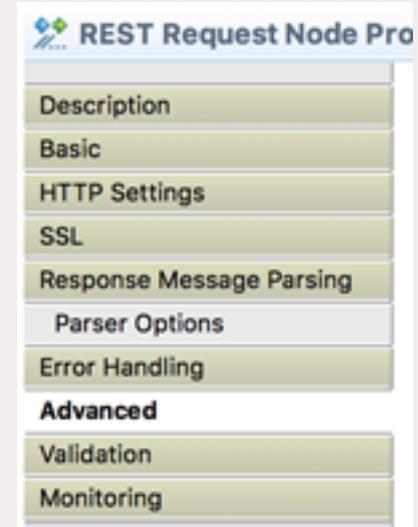
- Easy graphical map creation from JSON Schema
  - Select JSON types from Swagger for source or target
  - When creating maps in a REST API Operation subflow, populate source and target from JSON types
  - Automatic update and validate the Query Path parameters edited within a REST API and used in a map
  - Add new Path Parameters section to LocalEnvironment
- v10.0.0.0: Basic JSON schema support via user defined elements
- v10.0.0.4: JSON schema (from Swagger import) added
- v10.0.0.6: Hold JSON schema inside Application projects in a REST API Catalog folder
- v10.0.0.8: Support for JSON allOf, anyOf, and one of



Message Assembly		JSON
<Click to filter...>		
[+]	LocalEnvironment	[0..1] _LocalEnvironment
[+]	Destination	[0..1] _LocalEnvironment
<hr/>		
[+]	REST	[0..1] _LocalEnvironment
[+]	Input	[0..1] _RESTInputType
[+]	Method	[0..1] string
[+]	Operation	[0..1] string
[+]	Path	[0..1] string
<hr/>		
[+]	Path Parameters	[0..1] <Anonymous>
[+]	customerId	[1..1] int
[+]	URI	[0..1] string
[+]	Parameters	[0..1] <Anonymous>

# REST Request, REST Async Request and REST Async Response

- Parameters specified using literals or extracted info from the input message
- Request and Response body data sourced from input message by default, but can be from elsewhere e.g. Environment tree
- Chain multiple REST Requests together without intervening transformations
- Accept header and Content-Type rules interact with standard IIB message parsers as you would expect
- Split request / response processing into separate threads of execution using REST Async Request and Response nodes
- Activity log for the message flow provides HTTP status code, response size, and total request time.



Name	Type	Description	Expression
Authorization	Header	Provide the authorization key that...	'suchASecretAuthKey'
customerId	Path	The ID of the customer to delete fr...	\$Root/XMLNSC/Message/DeleteReq/customerId
clientName	Query	Provide the authorization key that...	LocalEnvironment.Variables.CLIENT_NAME

## Other new REST and HTTP Enhancements

- Swagger can now be stored in Application and Library projects in addition to REST API projects
- YAML format Swagger is also supported
- Casts for JSON types in the Graphical Mapping node
- HTTP Input Query Parameter splitting into Local Env
- REST APIs can now be deployed to the IIB runtime to use the node-wide HTTP listener
- CORS support is added to the node-wide listener too



The screenshot shows the IIB graphical interface. On the left, the 'BensFlow\_Mapping' environment is displayed with nodes for 'Environment', 'Variables', and 'any'. In the center, the 'Message Assembly' node is expanded, showing 'Properties', 'JSON', and 'Padding'. On the right, a 'Type Selection' dialog is open, prompting the user to choose a type from a list of matching types, including 'User', 'Category', and 'Pet'. Below the dialog, a URL is shown: [http://www.ibm.com/iib/msl/json\(BensApplication/Pet\)](http://www.ibm.com/iib/msl/json(BensApplication/Pet)).

- When IIB responds to an inbound HTTP request, you can add a new **X-IIB-Timing** property to the HTTP Header to describe elapsed timings for the IIB processing of the request [accessLog = true]

```
mqsicchangeproperties TESTNODE_10006 -b httplistener -n accessLog -v true
```

- Tomcat Access Log Valve feature is provided to add a new access log file to the IIB workpath [accessLogPattern]

```
mqsicchangeproperties TESTNODE_10006 -b httplistener -o HTTPConnector -n accessLogPattern -v "%h %l %u %t '%r' %s %b '%{Referer}i' '%{User-Agent}i' IIB:'%{X-IIB-Timing}o'"
```

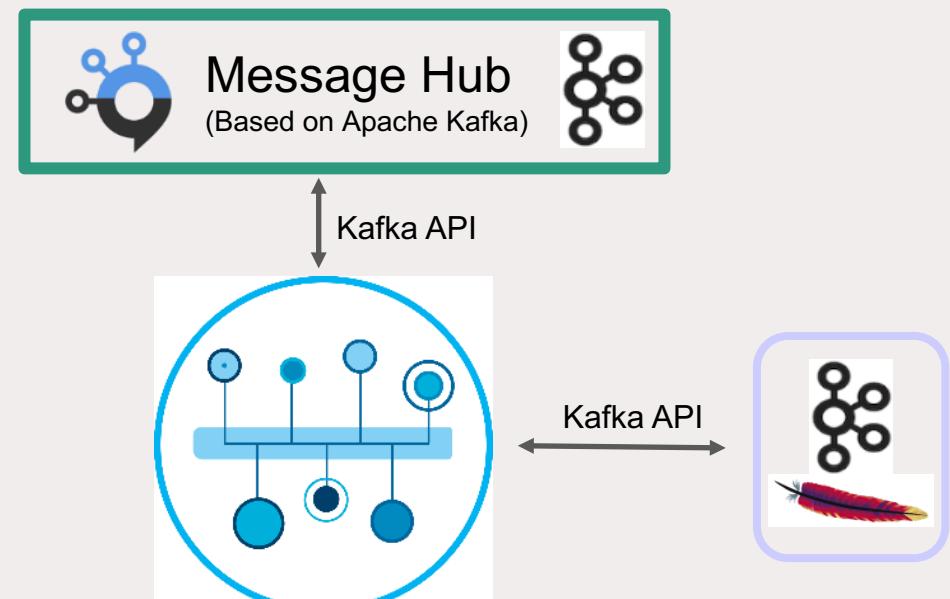
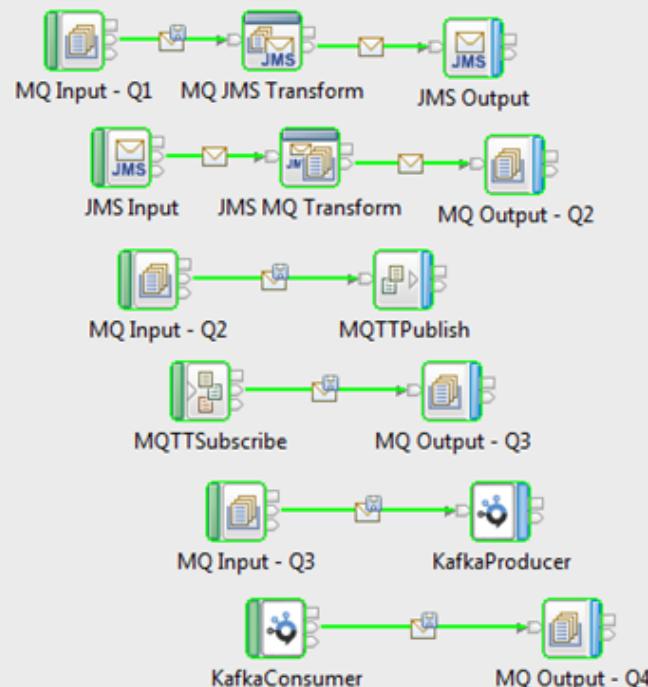
# IIB, Kafka and Message Hub

KafkaProducer Node Properties - KafkaProducer

Description	
Basic	Topic name* myTopic
Security	Bootstrap Servers* kafka01-prod02.messagehub.services.eu-gb.bluemix.net:9093 e.g. bootstrap.server.com:9092 (multiple servers can be specified and delimited using a ',')
Validation	Client ID Ben
Monitoring	Add IIB suffix to client ID <input checked="" type="checkbox"/>
Acks*	0
Timeout (sec)*	60

- Use IIB to interact with a Kafka Broker providing distributed commit log based messaging service
- KafkaProducer and KafkaConsumer nodes for connecting IIB message flows with Kafka
- Connect to either a private Kafka Server implementation or the IBM Bluemix MessageHub implementation
- Message flow developer provides Kafka consumer and producer configurations on the nodes
- Security: SASL\_SSL security protocol based upon TLSv1.2
- Message Key support added in v10.0.0.8

IIB, Kafka and Twilio SMS: [https://youtu.be/7mCQ\\_cfGGtU](https://youtu.be/7mCQ_cfGGtU)  
Using Kafka with IIB: <https://youtu.be/kYv0crxL86Y>



# Introducing IBM Cloud Product Insights

IBM Bluemix Integrate Catalog Support Manage

All items Cloud Product Insights

Getting started Manage Service credentials Connections

All Products > IBM Integration Bus > DEV Register a product

Back View all IIBNODE\_one (2)

Search Instances (2)

sachin.hursley.ibm.com /home/boagm/IIB/lib-10.0.0.8/server?Node=IIBNODE\_one,Server=is01

sachin.hursley.ibm.com /home/boagm/IIB/lib-10.0.0.8/server?Node=IIBNODE\_one,Server=is02

Usage Details Advisor

Resident Set Size 24 Hours

Latest update: Mar 20, 2017 | 15:00:00 GMT

Mar 19, 4:00 PM - Mar 20, 3:29 PM

Statistic	Value
Maximum	447212 kilobytes
Average	406800.86 kilobytes
Minimum	298156 kilobytes
Last value	432856 kilobytes

# Using Bluemix Product Insights to view IIB Registration and Usage

**Product Insights**



IBM Cloud Product Insights is an IBM Bluemix service to enhance and extend new value for connected IBM

Experimental

IBM425-R9E9V8K  
/C:/Program Files/IBM/IIB/10.0.0.7/server?Node=TESTNODE\_MQ,Server=default

Usage	Details	Advisor
<span style="border: 1px solid #0056b3; padding: 2px 10px; color: #0056b3;">Software</span> <span style="border: 1px solid #0056b3; padding: 2px 10px; color: #0056b3;">Environment</span>		

Product Name:  
IBM Integration Bus

Version:  
10.0.0.7

Host Name:  
IBM425-R9E9V8K

Directory:  
/C:/Program Files/IBM/IIB/10.0.0.7/server

Instance Identifier:  
Node=TESTNODE\_MQ,Server=default

Last Started:  
Wed, Feb 8, 2017, 4:42:19 PM

Usage      Details      Advisor

Services    Updates

**Recommended Services**

We have **1 service** that may be useful to your **IBM Integration Bus system**.



**Message Hub** | Ibm Dedicated Public

IBM Message Hub is a scalable, high-throughput message bus. Wire micro-services together using open protocols. Connect stream data to analytics to realize powerful insights. Feed event data to multiple applications to react in real time. Bridge to your on-premise messaging infrastructure to create a hybrid cloud messaging solution.

[Try Now](#)    [Read More](#)

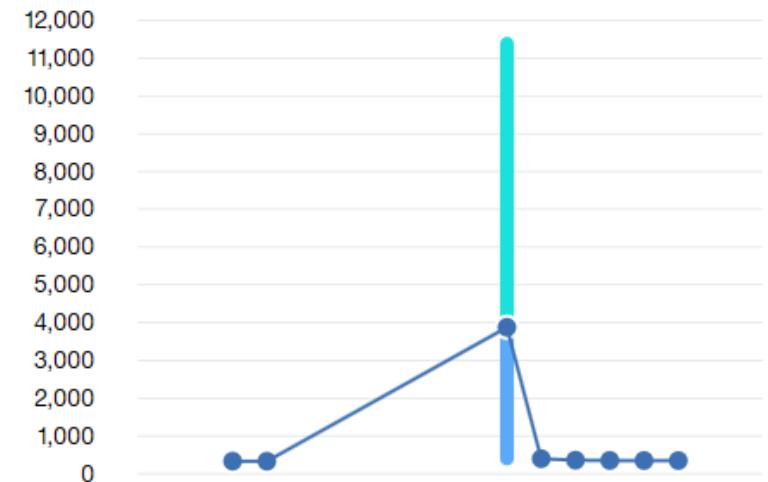
[View all services in the Bluemix Catalog.](#)

[More Cloud Services](#)

**Usage**      **Details**      **Advisor**

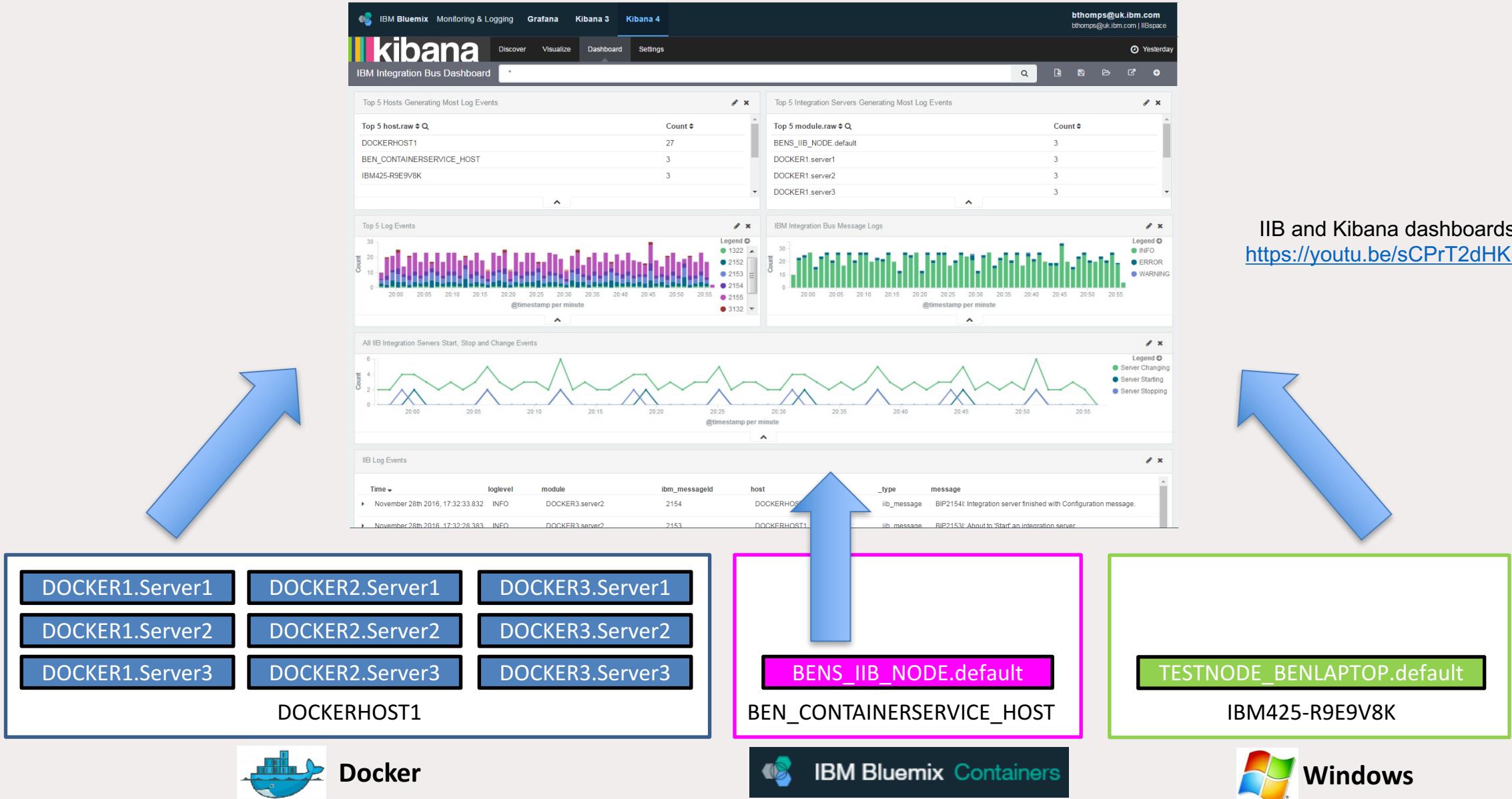
CPU used by process during this interval in mSec

1 Month



Summary	Jan 16, 12:00 AM - Feb 16, 12:00 AM
Maximum	11,385
Average	692.09
Minimum	320
Total	563,363

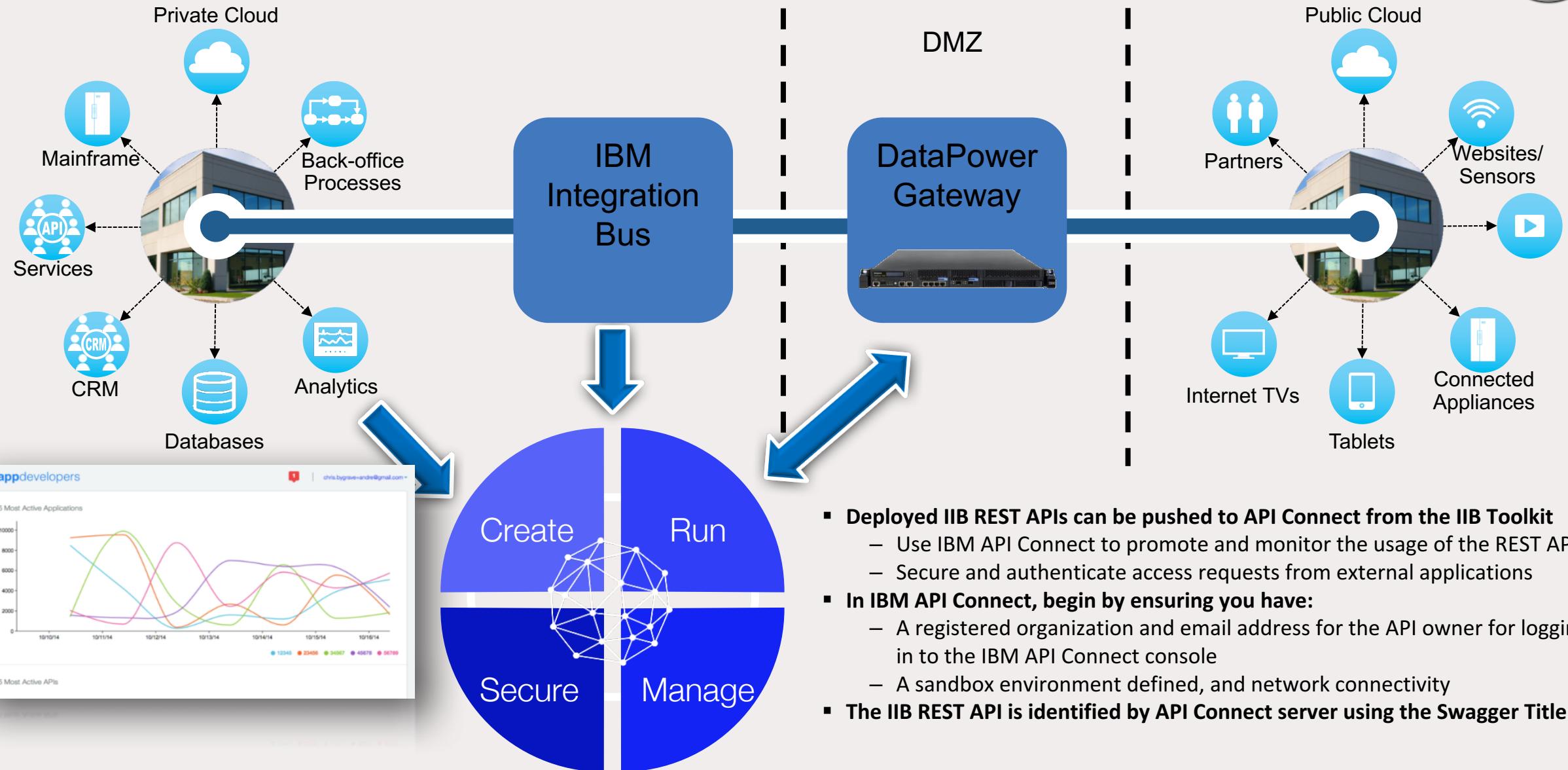
# Using Bluemix Kibana dashboards to view IIB Logs



IIB and Kibana dashboards:  
<https://youtu.be/sCPrT2dHKSz>



# IIB and API Connect



# Bulk Push IIB REST APIs to API Connect

**Push REST APIs to IBM API Connect**

Define a connection to the IBM API Connect system

Management Cluster / Server Address

Host: apimdev1063.hursley.ibm.com

Port: 443

Authentication

User ID: bthomps@uk.ibm.com

Password: .....  
.....

**Connect to IBM API Connect**

Successfully connected to IBM API Connect

Sum  
stag

Back Next Push to IBM API Connect Cancel

- IIBv10.0.0.2 introduced an IIB Toolkit action to push a REST API definition into the draft workspace of API Management (now called API Connect)
- The next evolution of this feature provided a bulk push mechanism for the IIB Administrator, also allowing direct staging to an API Connect Sandbox environment
- The Open API Swagger (v2) metadata describing the IIB REST APIs is pushed to API Connect
- Use API Connect to manage the REST APIs (from IIB and other products within your enterprise) including definition of security policies, access rules, SLAs and usage analytics
- Associate multiple REST APIs underneath a Product definition

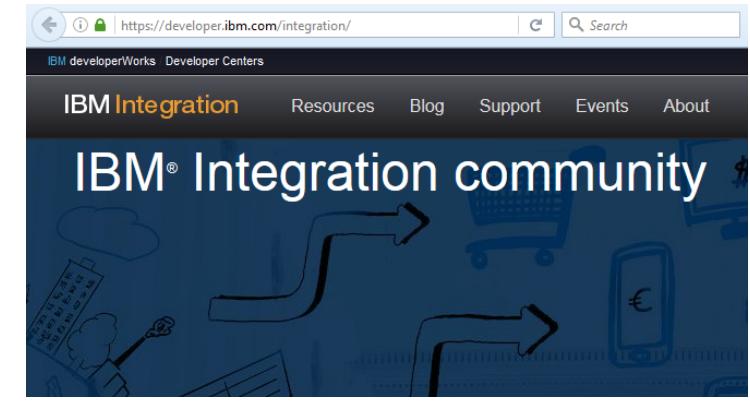
# Get more information

- IIB v10 Overview: <https://www.youtube.com/watch?v=CM9EBoJ4SDc>
- IIBy10 Technical Overview: <https://www.youtube.com/watch?v=9RyXxClqlV8>
- Recent video showcasing IIB Rest APIs and their integration with API Connect:  
<https://www.youtube.com/watch?v=hIcTkEHIZgU>
- Integration YouTube Channel <https://www.youtube.com/user/IBMinTEGRATIONMedia>
- Integration Twitter Handle: @IBMinTEGRATION
- Integration DeveloperWorks <https://developer.ibm.com/integration/>

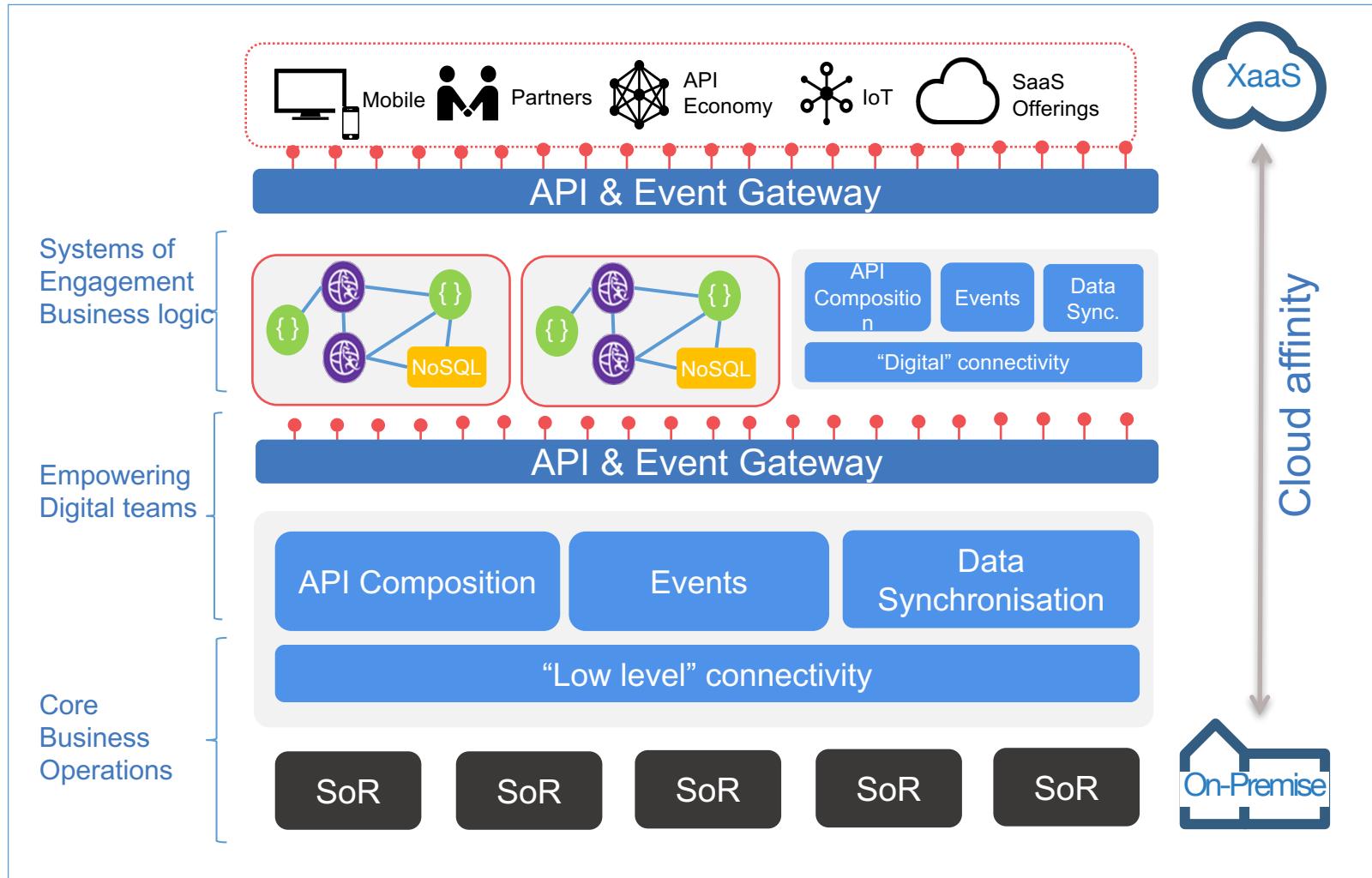
# In case slides are not your thing ...

- <https://developer.ibm.com/integration>
- Lots of Blog entries, regular updates and links to product demo videos! All our recent enablement material is on youtube

Running IIB in Bluemix Container Service	<a href="https://youtu.be/ybGOiPZO3sY">https://youtu.be/ybGOiPZO3sY</a>
IIB and Kibana dashboards	<a href="https://youtu.be/sCPrT2dHKsS">https://youtu.be/sCPrT2dHKsS</a>
IIB and Hybrid Connect	<a href="https://youtu.be/gWbxlooq3_g">https://youtu.be/gWbxlooq3_g</a>
IIB and LDAP	<a href="https://youtu.be/HrqY9MyfzNs">https://youtu.be/HrqY9MyfzNs</a>
IIB LoopBack Request node	<a href="https://youtu.be/rUK_OQ5-Anw">https://youtu.be/rUK_OQ5-Anw</a>
Using IIB to integrate with MongoDB and Cloudant	<a href="https://youtu.be/lS1pphngUIM">https://youtu.be/lS1pphngUIM</a>
Using IIB for REST, Graphical Mapping & Salesforce	<a href="https://youtu.be/XIK6QvNSHdY">https://youtu.be/XIK6QvNSHdY</a>
IIB, Kafka and Twilio SMS:	<a href="https://youtu.be/7mCQ_cfGGtU">https://youtu.be/7mCQ_cfGGtU</a>
Using Kafka with IIB	<a href="https://youtu.be/kYv0crxL86Y">https://youtu.be/kYv0crxL86Y</a>
Consuming REST APIs using the IIB REST Request node	<a href="https://youtu.be/C_6gPIrCHZQ">https://youtu.be/C_6gPIrCHZQ</a>
Easy demo of an IIB App Connect node	<a href="https://youtu.be/StwPbOiFKzk">https://youtu.be/StwPbOiFKzk</a>



# Hybrid Integration Reference Architecture



# Get more information

## Hybrid Integration Reference Architecture

- Developer works article: <https://www.ibm.com/developerworks/library/mw-1606-clark-trs/index.html>
- Video: <https://developer.ibm.com/integration/blog/2016/09/19/a-reference-architecture-for-hybrid-integration/>
- Redbook: <http://www.redbooks.ibm.com/redbooks/pdfs/sg248351.pdf>

