Hybrid Cloud Integration: IBM Integration Bus What's New?

Ben Thompson
IIB Chief Architect
Hybrid Integration Development

Roadmap

IIB v10.0.0.1
Q2 2015
Maintenance only

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 v10.0.0.3
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 v10.0.0.5
Q2 2016
MQTT SSL and dynamic config
Bulk Push to API Connect
Callable Flows report properties

IIB Open Beta
Kafka Producer and Kafka Consumer nodes
Improved monitoring with Connect to Cloud

Hybrid Integration Themes

IIB v10.0.0.0
Q1 2015

Single Package install
Built in Unit Test
MQ Flexibility
Shared Libraries
GDM Schemaless maps
REST APIs
MQTT Connector

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 Manufacturing Pack
v1.0.0.2 Q3 2016
IIBv10 Compatability

IIB Manufacturing Pack
v1.0.0.1 Q4 2014
OSISoft PI Server Input and Read nodes
OPC DA Read and Output nodes
OPC UA Input and Read nodes
MQTT Publish and Subscribe nodes

IIB Healthcare Pack
v4.0.0.0 Q2 2015
Cross-Enterprise Document Sharing
FHIR XML ⇔ JSON Pattern
PIX Manager Pattern
PDQ Pattern

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 v10.0.0.4
Q1 2016
Callable Flows for linking to IIBoC
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)

IBM's plans, directions, and intent are subject to change or withdrawal

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IBM Integration Bus

Cloud

- IIB on Cloud Offering
- Production support on Docker
- Deploy on AWS, Azure, SoftLayer
- Salesforce and LoopBack Request
- CHEF scripts

Open and Available

- Free Developer Edition
- Integration Community
- Connector Framework
- GitHub Repository

Digital Transformation

- REST APIs and REST Request
- Push to API Connect
- Web Hooks to App Connect
- MQTT Connector including SSL for IoT

Productive & Intuitive

- Web administration
- Built-in unit testing
- Patterns and tutorials
- Business Transaction Monitoring

Analytics

- Analyse data in real-time
- Embedded ODM
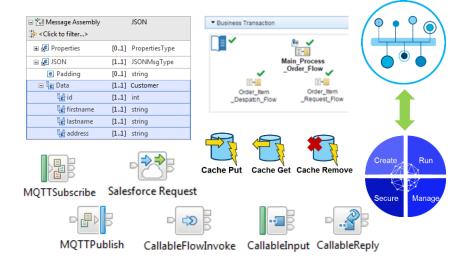- Analytics engine integration (incl. Github R node)

Enterprise Grade and Lean

- Zero pre-reqs
- Radically simplified, install < 10 mins
- Market leading performance
- MQ Flexibility
- Global Cache enhancements

Since IIBv10 … We've been busy!

- **Global Cache upgrade to WXSv8.6 (currency + XIO)**
- **Access the global cache from a graphical map**
- **Global Cache Performance and tuning enhancements**
- **1-click Push REST APIs to API Connect from the IIB Toolkit**
- **CICS Request node support for 2 Phase Commit**
- **TCPIP Report properties enhancements**
- **WESB Conversion tool enhancements**
- **Business Transaction Monitoring**
- **Oracle stored procedure support in a graphical map**
- **Callable Flows for Hybrid Cloud scenarios**
- **Salesforce Request node**
- **JSON Schema support for graphical maps**
- **Create a REST API without needing a Swagger document**
- **LDAP Authentication for administration changes**
- **Web UI Activity Log view for message flows**
- **MQTT SSL and dynamic configuration**
- **Bulk push REST APIs to API Connect from IIB Web UI**
- **REST Request, REST Async Request and LoopBack Request nodes**
- **HTTP and REST enhancements – Logging, YAML support, REST APIs with node-wide listener**
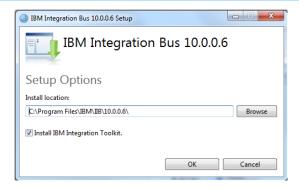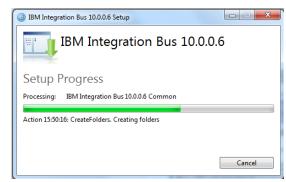
- Increased platform and OS support:
  - Docker v1.7.1 and above
  - RHELv7 (x86 and Power Big Endian)
  - Linux Power Little Endian
    - (RHELv7.1, SLESv12, Ubuntu 14.0.4)
  - SLESv12 (x86 and Z Systems)
  - OS/X Open Beta

IIBv10 – Install Simply, Quickly & Get Productive!

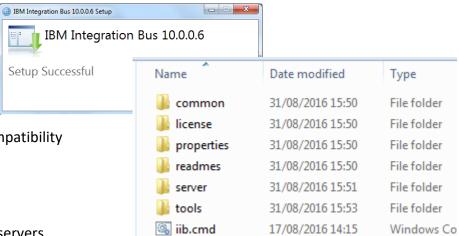- **Radically Simplified Packaging and Installation**
  - Full function, simple, single package install
  - Developer Operating Systems contain Toolkit and Server
    - Total size approx. 1.3 GB
  - Server Operating Systems contain only server
- **Other changes**
  - Full entitlement to MQ remains
  - MQ no longer packaged
    - **Default** queue manager for IB node for backwards compatibility
- **Built-in Unit Test Environment**
  - Developer tools have built-in unit test server
    - Fixed name of TESTNODE_<userid>
  - Started and stopped with tools
  - Can still test / deploy to manually created local and remote servers

Flexible MQ Topologies

- **Provide more flexible topology options for MQ access**
  - Many benefits include simplicity, scalability, availability & migration
  - Relationship evolves to the same as other resource managers – i.e. optional
  - Multiple Buses connected to a single Queue Manager
  - Corresponding updates for commands, CMP & Admin tools
- **Automated installation simplified**
  - MQ resources will not be installed at the same time
  - Reduces dependency management
  - Simplifies cloud-based installs
  - If MQ is installed, then IIB will detect this and configure appropriately
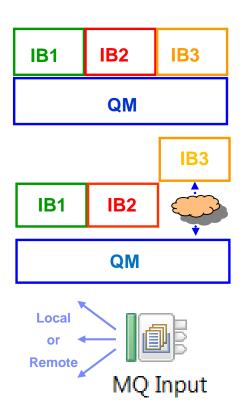- **IB now supports Local and Remote queue managers**
  - Allows IB to be remote from its queue manager
  - Works with single MQ IB support to further simplify MQ topology
  - Many other internal features within IB can exploit this flexibility
- **Many MQ Node related Enhancements**
  - Input node to support both local & remote queue managers
    - Includes easy-change policy based control of sources
    - Also applies to MQGet and MQOutput/MQReply nodes
- **When a queue manager is not available...**
  - Connection management and retry
- **Support for MQv9 added in IIBv10.0.0.6**

| IB1 | IB2 | IB3 |
| QM |

| IB1 | IB2 | IB3 |
| QM |

Local or Remote

MQ Input

MQ – Other important considerations

- **Administration and Security**
  - IIBv9 relies on access Control Lists held as permissions on MQ queue objects
  - IIBv10 will offer a file-based equivalent out of the box
  - mqsichangeauthmode command to select queue or file based
- **Publish Subscribe**
  - Alternative embedded MQTT based capability
  - Still publish to a default queue manager via MQ if provided
  - No extra install or moving parts required
  - Resource Statistics continue to work without MQ
- **IIB Integration API**
  - Admin interface changed to use Web Sockets, not MQ
  - New Java class for describing the connection
  - Web admin port provides single entry point, consolidated security model
- **High Availability**
  - An Integration Node can be controlled as an MQ Service
  - More Active/Active architectures now Node and Queue Manager link no longer required
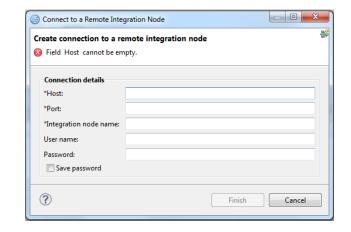- **Transactionality**
  - IIB can manage transactions, or use MQ to provide two-phase (XA) coordination
  - IIB managed transactions will continue to support all resource managers
  - Global 2PC provided by MQ (distributed) will continue to be supported.
  - Coordinating Queue Manager must be local, and designated as the only MQ resource
- **Some WebSphere MQ uses still remain**
  - Record & Replay
  - EDA nodes
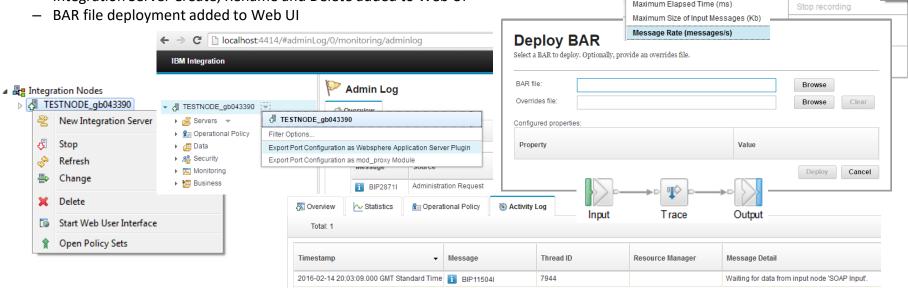 - Script provided to optionally create required MQ objects

Web UI Enhancements

- **IIB Web UI becomes the primary means of runtime administration**
  - Browser approach is lightweight and universal
  - Integration Bus Explorer no longer provided as part of IIBv10
- **Programmatic intervention using public Java and REST APIs**
- **Integration Bus Explorer admin capabilities re-located**
  - Policy Set configuration moved to the IIB Toolkit
  - Export Port Configuration for external HTTP listeners in Web UI
  - Integration Server Create, Rename and Delete added to Web UI
  - BAR file deployment added to Web UI

Test Data Capture

- **Improved Facilities for Unit Test and Regression Test**
  - Simple to understand
  - Fix and re-factor behaviour during development
  - Use to verify flow behaviours and migration
  - Continuous Integration with regression test
  - Invoke using Toolkit or via REST / JSON API
- **Client and direct injection options**
  - Import, view and edit test data
  - Inject messages over transports
  - Capture mock inputs for later replay
  - .ibtest client still supported but hidden
  - Build regression suites from test cases
- **Observe captured data paths**
  - Move back & forth (unlike real-time visual debuggers)
  - View all parts of the Message Assembly
  - Select from multiple injected messages in single data capture session
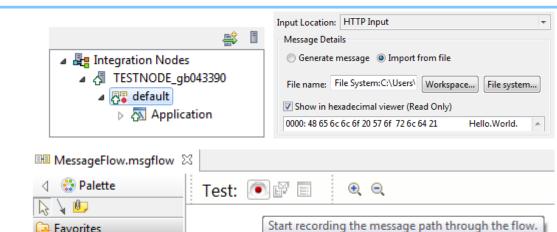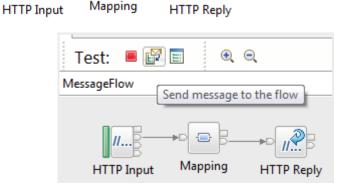- **Exploits REST/JSON API**
  - Initial experience is developer toolkit
  - APIs are foundational for bulk operations
  - Tools Integration with Jenkins, Maven, Ant etc
  - View, start and stop data recording using Integration Nodes view
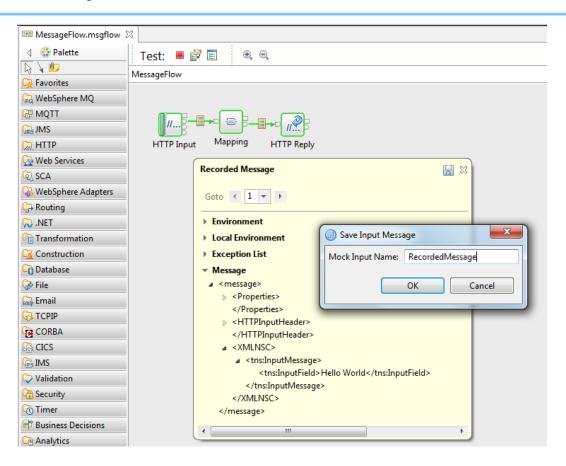
Test Data Capture
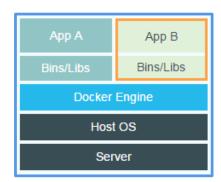
IBM Integration Bus and Docker!

- **Creating IIB Docker images**
  - Developer edition binaries are automatically 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!
  - Docker containers spawned from one image offer great consistency for solving problems at scale
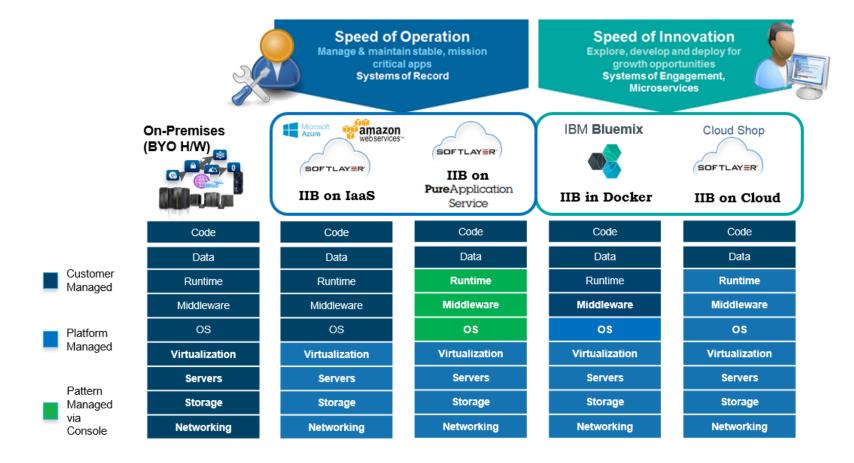
- **Running IIB in a Docker container**
  - Run iib commands against the running broker, eg use "docker exec bash -c mqsilist" with mqsiprofile set on login (or via ssh)
  - Retain a means of syslog message capture
  - Retain access to workpath directories for diagnostic purposes.
  - Use docker volumes for persistent data independent of container lifecycle

IIB and Cloudiness

Speed of Operation
Manage & maintain stable, mission critical apps
Systems of Record

Speed of Innovation
Explore, develop and deploy for growth opportunities
Systems of Engagement, Microservices

On-Premises (BYO H/W)

Microsoft Azure | amazon web services

SOFTLAYER

IIB on IaaS

SOFTLAYER

IIB on PureApplication Service

IBM **Bluemix**

IIB in Docker

Cloud Shop

SOFTLAYER

IIB on Cloud

| On-Premises	IIB on IaaS	IIB on PureApplication Service	IIB in Docker	IIB on Cloud
Code	Code	Code	Code	Code
Data	Data	Data	Data	Data
Runtime	Runtime	**Runtime**	Runtime	**Runtime**
Middleware	Middleware	**Middleware**	**Middleware**	**Middleware**
OS	OS	**OS**	**OS**	**OS**
Virtualization	**Virtualization**	**Virtualization**	**Virtualization**	**Virtualization**
Servers	**Servers**	**Servers**	**Servers**	**Servers**
Storage	**Storage**	**Storage**	**Storage**	**Storage**
Networking	**Networking**	**Networking**	**Networking**	**Networking**

Customer Managed

Platform Managed

Pattern Managed via Console
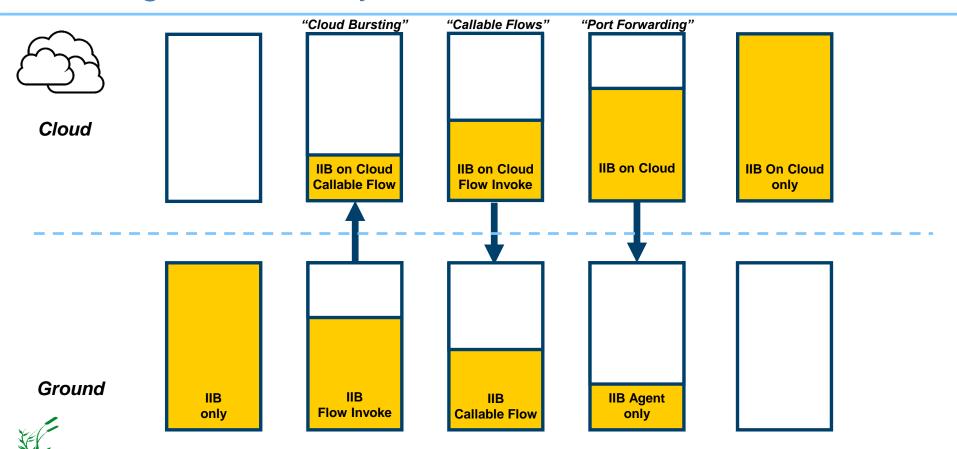
IIB on Cloud Available Nodes

- CallableFlowInvoke
- CallableInput
- CallableReply
- Compute
- Database
- DatabaseInput
- EmailInput
- EmailOutput
- Extract
- Filter
- FlowOrder
- HTTPAsyncRequest
- HTTPAsyncResponse
- HTTPHeader
- HTTPInput

- HTTPReply
- HTTPRequest
- Input
- JavaCompute
- Mapping
- MQGet
- MQInput
- MQOutput
- MQReply
- Mapping
- Output
- Passthrough
- RESTRequest
- RESTAsyncRequest
- RESTAsyncResponse

- ResetContentDescriptor
- Route
- RouteToLabel
- SOAPAsyncRequest
- SOAPAsyncResponse
- SOAPInput
- SOAPReply
- SOAPRequest
- Throw
- Trace
- TryCatch
- Validate
- XSLTransform

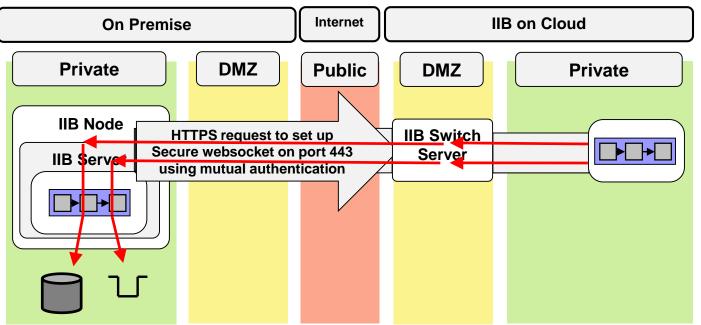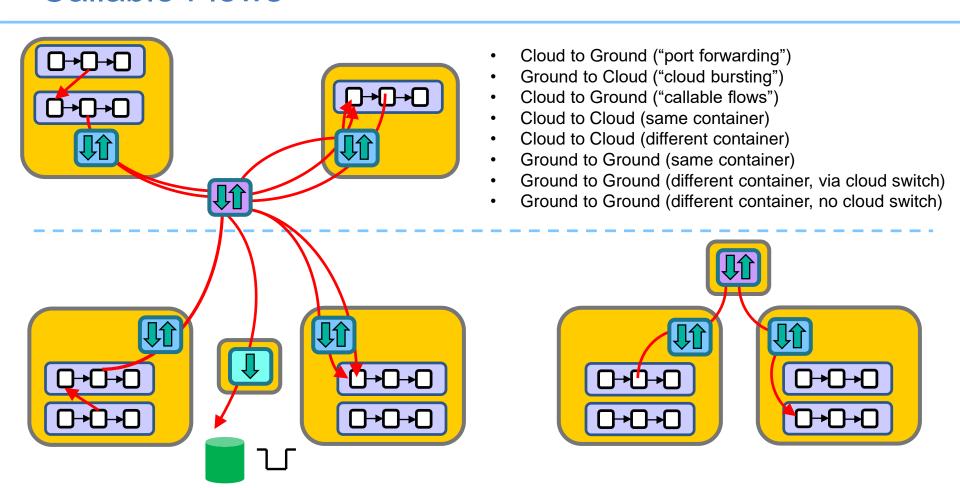# Moving IIB to the Hybrid Cloud

Cloud

Ground

"Cloud Bursting"   "Callable Flows"   "Port Forwarding"

IIB on Cloud Callable Flow

IIB on Cloud Flow Invoke

IIB on Cloud

IIB On Cloud only

IIB only

IIB Flow Invoke

IIB Callable Flow

IIB Agent only

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Securely connecting IIBoC back to on-premise
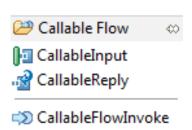
- **Uses mutual authentication using IIB provided certificates**
- **More options in future like user provided certificates**
- **Only explicitly configured on-premise endpoints are accessible**
- **No need to install DB2 or MQ clients nor run any IIB commands or create files like ODBC.ini**

On Premise	Internet	IIB on Cloud

Private	DMZ	Public	DMZ	Private

IIB Node

IIB Server

HTTPS request to set up
Secure websocket on port 443
using mutual authentication

IIB Switch Server

Callable Flows

- Cloud to Ground ("port forwarding")
- Ground to Cloud ("cloud bursting")
- Cloud to Ground ("callable flows")
- Cloud to Cloud (same container)
- Cloud to Cloud (different container)
- Ground to Ground (same container)
- Ground to Ground (different container, via cloud switch)
- Ground to Ground (different container, no cloud switch)

Callable Flows

Creating an IIB REST API
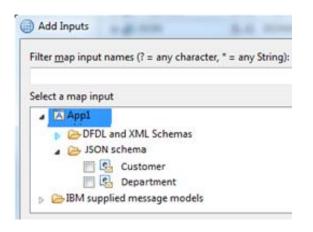
Administering an IIB REST API

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, offer to populate the source and target from JSON types
  – Automatic update and validate the Query Path parameters editted within a REST API and used in a map
  – Add new Path Parameters section to LocalEnvironment

IIB and API Connect

Private Cloud

Mainframe

Back-office Processes

Services

CRM

Databases

Analytics

IBM Integration Bus

DMZ

DataPower Gateway

Public Cloud

Partners

Websites/ Sensors

Internet TVs

Tablets

Connected Appliances

Create

Run

Secure

Manage

/appdevelopers

chris.bygrave-andre@gmail.com

5 Most Active Applications
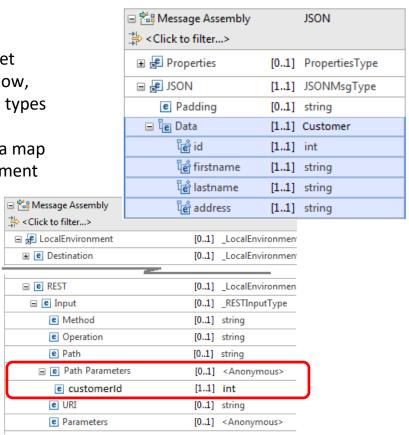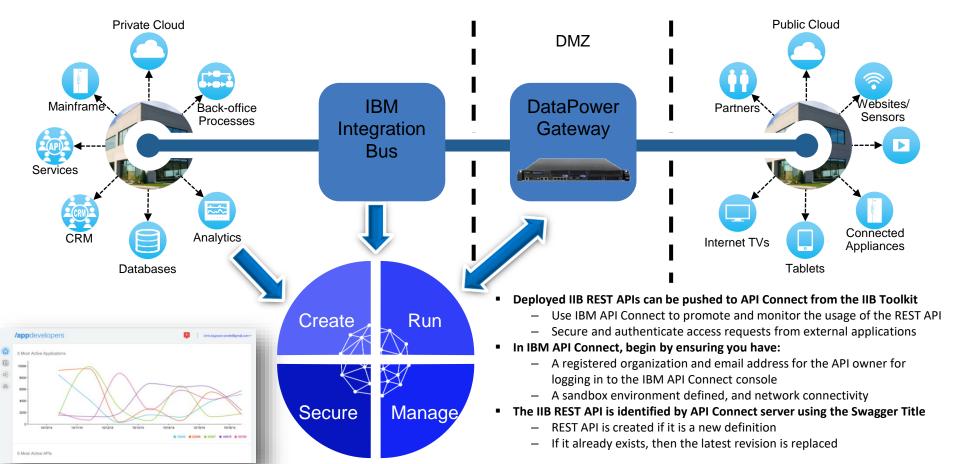
10/10/14 10/11/14 10/12/14 10/13/14 10/14/14 10/15/14 10/16/14

5 Most Active APIs

- **Deployed IIB REST APIs can be pushed to API Connect from the IIB Toolkit**
  - Use IBM API Connect to promote and monitor the usage of the REST API
  - Secure and authenticate access requests from external applications
- **In IBM API Connect, begin by ensuring you have:**
  - A registered organization and email address for the API owner for logging in to the IBM API Connect console
  - A sandbox environment defined, and network connectivity
- **The IIB REST API is identified by API Connect server using the Swagger Title**
  - REST API is created if it is a new definition
  - If it already exists, then the latest revision is replaced

Pushing IIB REST APIs to APIConnect

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

UserID   bthomps@uk.ibm.com

Password   •••••••••

[Connect to IBM API Connect]

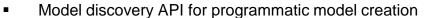✔ Successfully connected to IBM API Connect

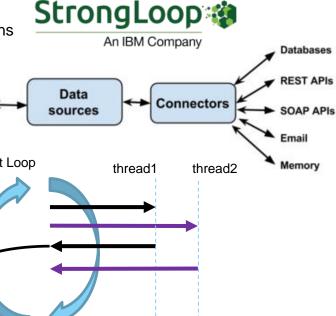[Back] [**Next**] [Push to IBM API Connect] [Cancel]

- IIBv10.0.0.2 introduced a new Toolkit action to push a REST API definition into the draft workspace of API Management (now API Connect)

- The next evolution of this feature is to provide a bulk push mechanism for the IIB Administrator, also allowing direct staging to an API Connect Sandbox environment

- The 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

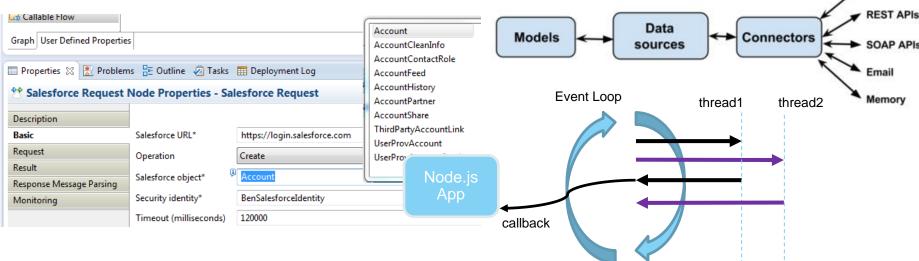- Associate multiple REST APIs underneath a Product definition

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Salesforce Request Node (Application Integration Suite)

- LoopBack is an extensible open-source Node.js framework
- Create dynamic REST APIs for back-end services with little or no coding
- Built-in access to data from relational databases, MongoDB, SOAP, REST
- Create custom connectors for other services
- A 'datasource' json file defines the connectivity to a service
- A 'model' json file defines the data to be exchanged with a service
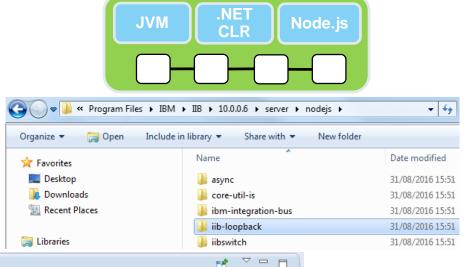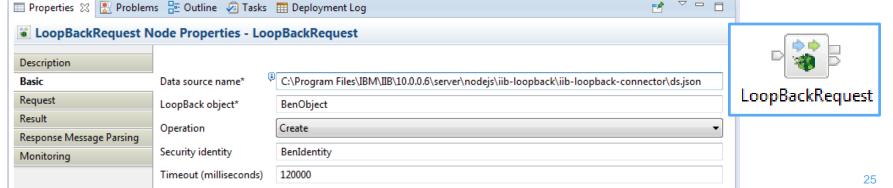- Each model comes with a predefined REST API for full CRUD operations
- Model discovery API for programmatic model creation

Salesforce Request

StrongLoop
An IBM Company

Callable Flow

Graph | User Defined Properties

Properties | Problems | Outline | Tasks | Deployment Log

Salesforce Request Node Properties - Salesforce Request

Description	
Basic	Salesforce URL* — https://login.salesforce.com
Request	Operation — Create
Result	Salesforce object* — Account
Response Message Parsing	Security identity* — BenSalesforceIdentity
Monitoring	Timeout (milliseconds) — 120000

Account
AccountCleanInfo
AccountContactRole
AccountFeed
AccountHistory
AccountPartner
AccountShare
ThirdPartyAccountLink
UserProvAccount
UserProv

Models ⟷ **Data sources** ⟷ **Connectors**

→ Databases
→ REST APIs
→ SOAP APIs
→ Email
→ Memory

Event Loop

thread1   thread2

Node.js App

callback

LoopBack Request Node

- **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**
- **Create, Retrieve, Update, Delete data records in external systems**
- **Interact with NoDQL 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**
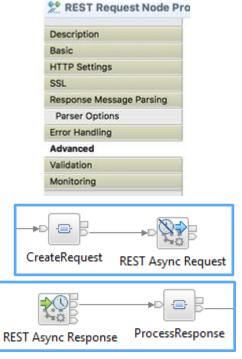
REST Request, REST Async Request and REST Async Response

- **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**
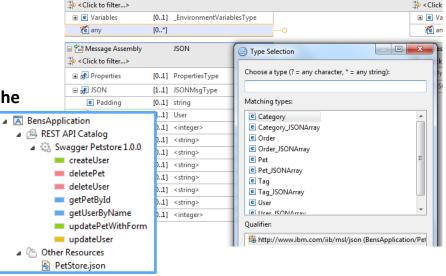- **Activity log for the message flow provides HTTP status code, response size, and total request time.**

REST Request Node Pro

Description
Basic
HTTP Settings
SSL
Response Message Parsing
  Parser Options
Error Handling
Advanced
Validation
Monitoring

2016-06-05 16:44:58.765 E BIP11501I 293130

REST Request node 'Delete Customer' called operation 'deleteCustomer'.
The HTTP status code was '200 OK' and the response size was '2031KB'.
The total request time was '419ms'.

REST Request

Thread 1

CreateRequest   REST Async Request

Thread 2

REST Async Response   ProcessResponse

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 Paramater 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**

- **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]**
  ```
  mqsichangeproperties TESTNODE_10006 -b httplistener -n accessLog -v true
  ```
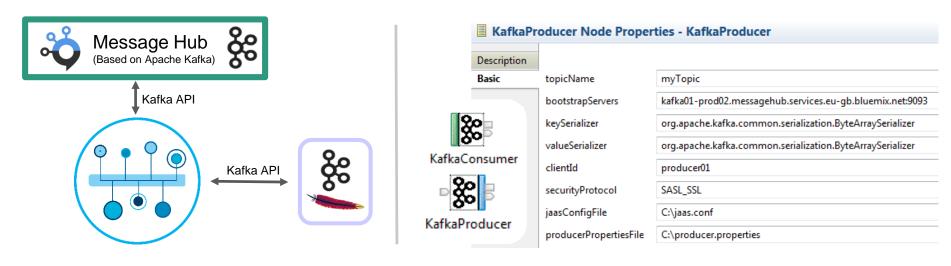- **Tomcat Access Log Valve feature is provided to add a new access log file to the IIB workpath [accessLogPattern]**
  ```
  mqsichangeproperties TESTNODE_10006 -b httplistener -o HTTPConnector -n accessLogPattern
  -v "%h %l %u %t '%r' %s %b '%{Referer}i' '%{User-Agent}i'  IIB:'%{X-IIB-Timing}o'"
  ```

Kafka Producer and Kafka Consumer (Open Beta)

KafkaProducer Node Properties - KafkaProducer

Description		
Basic	topicName	myTopic
	bootstrapServers	kafka01-prod02.messagehub.services.eu-gb.bluemix.net:9093
	keySerializer	org.apache.kafka.common.serialization.ByteArraySerializer
	valueSerializer	org.apache.kafka.common.serialization.ByteArraySerializer
	clientId	producer01
	securityProtocol	SASL_SSL
	jaasConfigFile	C:\jaas.conf
	producerPropertiesFile	C:\producer.properties

- Use IIB or IIB on Cloud 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 (name/value pairs)
- Core properties on the node, extended properties via a policy
- Security: SASL_SSL security protocol based upon TLSv1.2
- If multiple threads are assigned to a flow, then ordering within a Consumer Group is not be respected

Shared Libraries

- **Apps / Libs were major features introduced in V8 and V9**
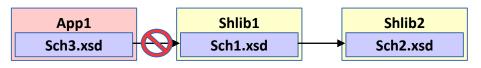 - Enhanced to fulfil most popular user requests
  - Libraries can now be shared across multiple applications for a broad range of assets
  - Sub-flows are now independent artefacts, significant storage reduction, consistency
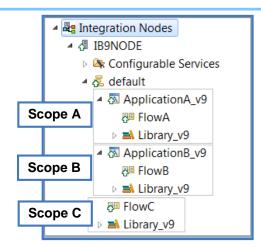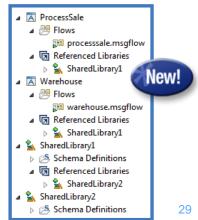- **Shared Libraries**
  - Libraries can now be referenced by one or more applications
    - Libraries deployed independently of applications – "shared"!
    - Applications will not get "own copy"
    - Libraries can still reference other libraries
  - Shared Library is the default library type
  - Assets 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)
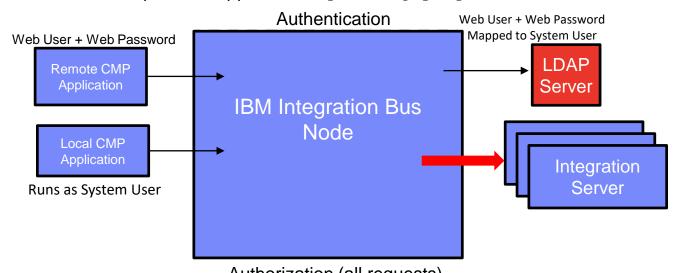
LDAP Authentication for IIB System Administration

- **All remote access to IIBv10 through the web port (REST, Toolkit, Web UI)**
  - Use the `mqsichangeauthmode` command to enable / disable administration security
  - Choose queue or file based authorization
- **Authenticate users against LDAP**
  - LDAP can help centralise user accounts for multiple applications, can control password complexity, timeout, invalidity etc.
  - Password parameter on the `mqsiwebuseradmin` command becomes optional
  - Location of LDAP endpoint is supplied via `mqsichangeproperties` command

Authentication

Web User + Web Password

Web User + Web Password
Mapped to System User

Remote CMP Application

Local CMP Application

Runs as System User

IBM Integration Bus Node

LDAP Server

Integration Server

Authorization (all requests)

New and Improved Nodes and Connectors

- **(S)FTP support has been added to the FileRead node**
  - FileRead extended to match FileInput and FileOutput and provide remote transfer of files into IIB via FTP and SFTP
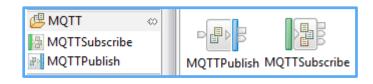
- **MQTT Connectors**
  - Delivered and supported by IIB in v10
  - Easy to use input and output connectors to MQTT servers
  - Uses open framework for platform independent connectors
  - V9 Source freely available on Github website under flexible EPL

- **Design, Deploy and Operational Policy**
  - Node properties form policy e.g. connection details, host, topic etc.
  - Generate Policy from node properties
    - Operationalized via Web UI and Commands
    - Store as document with URL
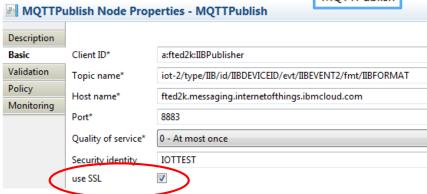   - Save to IIB runtime from IIB Toolkit

Integration with IBM Watson IoT using MQTT

- Static node property, and dynamic overrides via either LocalEnvironment or BAR file

- Utilises Integration Server trust store for storage of certificate chains (IoT messaging.pem)
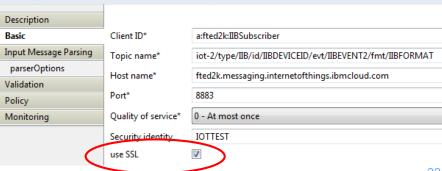
```
mqsichangeproperties TESTNODE -e default
    -o ComIbmJVMManager -n truststoreType -v JKS
mqsichangeproperties TESTNODE -e default
    -o ComIbmJVMManager -n truststoreFile -v
    "C:\Program Files\IBM\IIB\10.0.1267.5\key.jks"
mqsichangeproperties TESTNODE -e default
    -o ComIbmJVMManager -n truststorePass -v
    default::truststorePass
mqsisetdbparms TESTNODE -n default::truststorePass
    -u na -p changeit
```

- Security identity relates to mqsisetdbparms

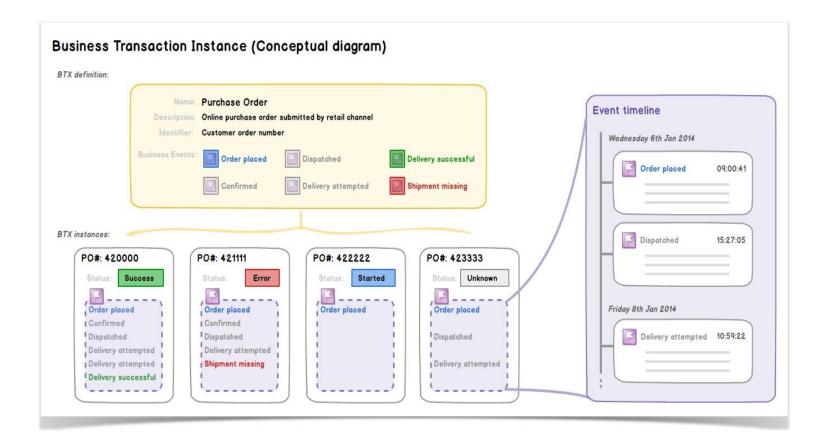- For IBM Watson IoT, Username is the IoT API Key and Password is the IoT Authentication token:

```
mqsisetdbparms TESTNODE -n mqtt::IOTFIdentity
    -u "a-fted2k-hal0xx3uam" -p ?P@RwOvS(hO(4wu3Bb
```

MQTTPublish Node Properties - MQTTPublish

Description		
Basic	Client ID*	a:fted2k:IIBPublisher
Validation	Topic name*	iot-2/type/IIB/id/IIBDEVICEID/evt/IIBEVENT2/fmt/IIBFORMAT
Policy	Host name*	fted2k.messaging.internetofthings.ibmcloud.com
Monitoring	Port*	8883
	Quality of service*	0 - At most once
	Security identity	IOTTEST
	use SSL	☑

MQTTPublish

MQTTSubscribe Node Properties - MQTTSubscribe

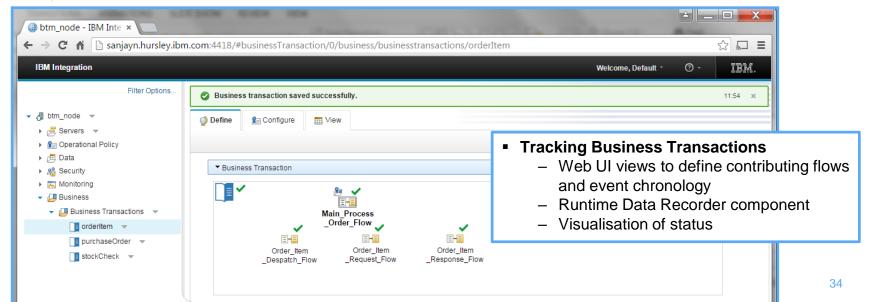| Description		
Basic	Client ID*	a:fted2k:IIBSubscriber
Input Message Parsing	Topic name*	iot-2/type/IIB/id/IIBDEVICEID/evt/IIBEVENT2/fmt/IIBFORMAT
parserOptions	Host name*	fted2k.messaging.internetofthings.ibmcloud.com
Validation	Port*	8883
Policy	Quality of service*	0 - At most once
Monitoring	Security identity	IOTTEST
	use SSL	☑

MQTTSubscribe

Business Transaction Monitoring Conceptual Model

Business Transaction Monitoring

- Business Transaction Monitoring tracks a message across multiple message flows
    - Report on the lifecycle of a message payload through an end-to-end enterprise transaction
    - Defines flows contributing to the transaction, and monitoring events for start, end or failure.
    - Aggregated view of business information on bus
    - Link flows and events to owning business transactions
    - Easily configured by developers or operators
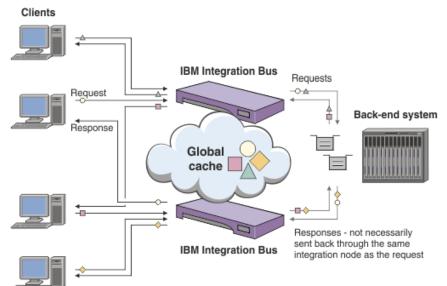   - Significant evolution of Record and Replay & WESB FEM
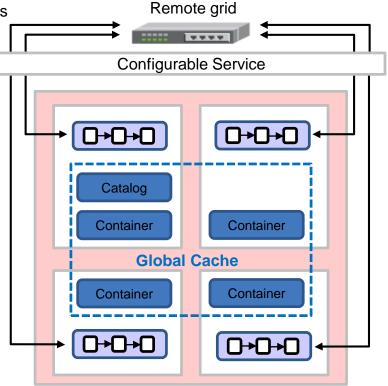
IIB Embedded Global Cache

- *IIB's embedded Global Cache provides an elastic, scalable, in-memory data grid for storing reusable data*

- Share data across separate integration servers and integration nodes
- Frequently used for storing correlation information and for caching semi-static data
- The embedded cache is easier to administer than a full external WebSphere eXtreme Scale grid
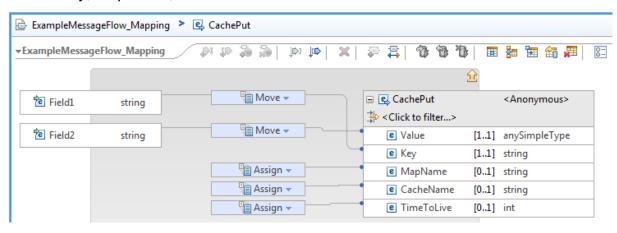

Remote grid

Configurable Service

Catalog

Container

Container

Global Cache

Container

Container

Clients

IBM Integration Bus

Requests

Request

Response

Global cache

Back-end system

IBM Integration Bus

Responses - not necessarily sent back through the same integration node as the request

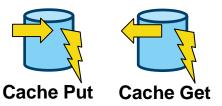# Using the Mapping Node to Access Global Cache

- **The Mapping node now provides interactions with the global cache**
  - Use a Cache Put transform to store data in the cache
  - Use a Cache Get transform to retrieve ddata from the cache (eg for processing or routing)
  - Use a Cache Remove transform to remove a key-value pair from the cache
  - You can add a Cache Failure transform to handle any exceptions returned by the cache transforms

- **The Mapping node now provides interactions with the global cache**
  - Input elements are dragged into the Cache transform
  - Edit the nested map
  - Output elements in Cache transform are prepopulated:
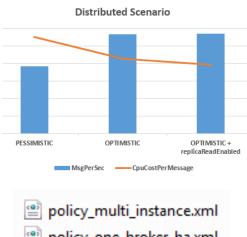   - Key, MapName, CacheName and TimeToLive

Cache Put　**Cache Get**

Cache Remove

Further Global Cache Enhancements

- **Embedded global cache capability (client and embedded grid) is upgraded to use WXSv8.6.0.8**
  - eXtreme IO transport (XIO). XIO replaces the Object Request Broker (ORB) protocol which was bound to native Java client apps. XIO offers better performance and throughput.
  - eXtreme Data Format (XDF). When using the XIO transport, XDF becomes the default serialization technology when storing keys and values in the data grid: Map copy mode is set to COPY_TO_BYTES in object_grid_xio.xml
- **From IIBv10.0.0.2, the embedded global cache can use an "Enterprise Data Grid" (XIO+XDF).**
  - Integration node must be at function level 10.0.0.2 or later.
  - If you have a multi-node cache topology – it is all or nothing; all nodes must be set to use an enterprise data grid, or all nodes must be set not to use the enterprise data grid.
  - Backwards compatability to use ORB stil available for existing IIB grids defined pre-10.0.0.2
- **From IIBv10.0.0.4:**
  - Change the lockStrategy property for a backingMap – PESSIMISTIC / OPTIMISTIC / NONE
  - Change the replicaReadEnabled property for a set of Maps
  - Compelling performance improvements possible with these new configuration options

Distributed Scenario

PESSIMISTIC	OPTIMISTIC	OPTIMISTIC + replicaReadEnabled

■ MsgPerSec — CpuCostPerMessage


```
policy_multi_instance.xml
policy_one_broker_ha.xml
policy_two_brokers.xml
policy_two_brokers_ha.xml
```

▼ Component Properties

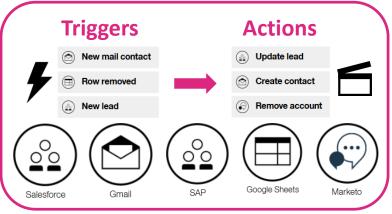| Security Cache - Cache Sweep Interval	300
Security Cache - Cache Timeout	60
Cache Manager - Policy	default
Cache Manager - Port Range	2920-2939
Cache Manager - Listener Host	

```
mqsichangebroker TESTNODE_v10
    –b C:\policy_two_brokers.xml

        mqsichangebroker TESTNODE_v10 –f 10.0.0.2
```

The App Connect 1 slide summary!

- A simple, cloud-based integration platform, running in a Bluemix environment, built on SDK for Node.js
- Utilises common architectural building blocks: Connector service, Message Hub, Bluemix Secure Gateway
- A "flow" listens to a single application and does something to another single application
- Two usage tiers:
  - Free (Free, up to 10 flows, 1000 actions per month, all cloud apps)
  - Paid Personal plan ($25 per month, unlimited flows, 5000 actions / month, all cloud apps & on-prem)
- App Connect can also connect apps if they are on a private network using the Bluemix Secure Gateway component (35MB client component runs on-premise – OS X, Windows or Linux)

Business Teams

IT Teams

Triggers

New mail contact
Row removed
New lead

Actions

Update lead
Create contact
Remove account

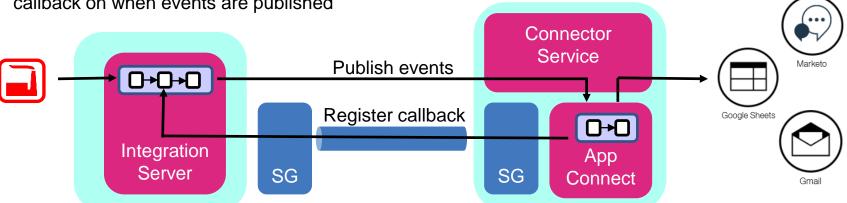Salesforce   Gmail   SAP   Google Sheets   Marketo

App Connect and IBM Integration Bus

- Webhooks is a simple HTTP notification pattern, allowing a user to define an HTTP callback (~"subscribe") for a given hook
  - E.g. /crm/cust/hook or /warehouse/stock/hook
- To create a webbook, POST to the URL {IIB root}/hookpath
- An id is returned to the post which uniquely identifies the subscription for further calls
- A callback object structure is used to provide a URL to callback on when events are published

REST operation	Webhook path	Description
POST	{IIB root}/{hookpath}/	Create a subscription
GET	{IIB root}/{hookpath}/	List subscriptions
GET	{IIB root}/{hookpath}/{id}/	Get a subscription
PUT	{IIB root}/{hookpath}/{id}/	Update a subscription
DELETE	{IIB root}/{hookpath}/{id}/	Delete a subscription

Thank you and Questions?