How to use this deck

- Delete this slide before presenting
- If you require additional technical detail, add the charts at the back of the deck titled “Additional Technical Detail”

IBM Integration Bus

Name
Job role

<email>

Preface

IBM's statements regarding its plans, directions and intent are subject to change or withdrawal at IBM's sole discretion. Information regarding potential future products is intended to outline our general product direction, and it should not be relied on in making a purchasing decision. The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code or functionality. Information about potential future products may not be incorporated into any contract. The development, release, and timing of any future features or functionality described for our products remains at our sole discretion.

- IBM Confidential. Unless specifically advised otherwise, you should assume that all information presented in IBM product briefing sessions and contained in these presentations is 'IBM Confidential', and restrict access to this information in accordance with the terms and conditions of the applicable Non-disclosure or other agreement (e.g. the IBM WebSphere Inner Circle Participation Agreement).

- Content Authority. The workshops, sessions and materials have been prepared by IBM or the session speakers and reflect their own views. They are provided for informational purposes only, and are neither intended to, nor shall have the effect of being, legal or other guidance or advice to any participant. While efforts were made to verify the completeness and accuracy of the information contained in this presentation, it is provided AS-IS, without warranty of any kind, express or implied. IBM shall not be responsible for any damages arising out of the use of, or otherwise related to, this presentation or any other materials. Nothing contained in this presentation is intended to, nor shall have the effect of, creating any warranties or representations from IBM or its suppliers or licensors, or altering the terms and conditions of the applicable license agreement governing the use of IBM software.

- Performance. Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon many factors, including considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve results similar to those stated here.

- Customer Examples. All customer examples described are presented as illustrations of how those customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics may vary by customer. Nothing contained in these materials is intended to, nor shall have the effect of, stating or implying that any activities undertaken by you will result in any specific sales, revenue growth or other results.

- Availability. References in this presentation to IBM products, programs, or services do not imply that they will be available in all countries in which IBM operates.

Important disclaimer

- THE INFORMATION CONTAINED IN THIS PRESENTATION IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY.
- WHILST EFFORTS WERE MADE TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION CONTAINED IN THIS PRESENTATION, IT IS PROVIDED “AS IS”, WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED.
- IN ADDITION, THIS INFORMATION IS BASED ON IBM’S CURRENT PRODUCT PLANS AND STRATEGY, WHICH ARE SUBJECT TO CHANGE BY IBM WITHOUT NOTICE.
- IBM SHALL NOT BE RESPONSIBLE FOR ANY DAMAGES ARISING OUT OF THE USE OF, OR OTHERWISE RELATED TO, THIS PRESENTATION OR ANY OTHER DOCUMENTATION.
- NOTHING CONTAINED IN THIS PRESENTATION IS INTENDED TO, OR SHALL HAVE THE EFFECT OF:
  - **CREATING ANY WARRANTY OR REPRESENTATION FROM IBM (OR ITS AFFILIATES OR ITS OR THEIR SUPPLIERS AND/OR LICENSORS); OR**
  - **ALTERING THE TERMS AND CONDITIONS OF THE APPLICABLE LICENSE AGREEMENT GOVERNING THE USE OF IBM SOFTWARE.**

Trademark Statement

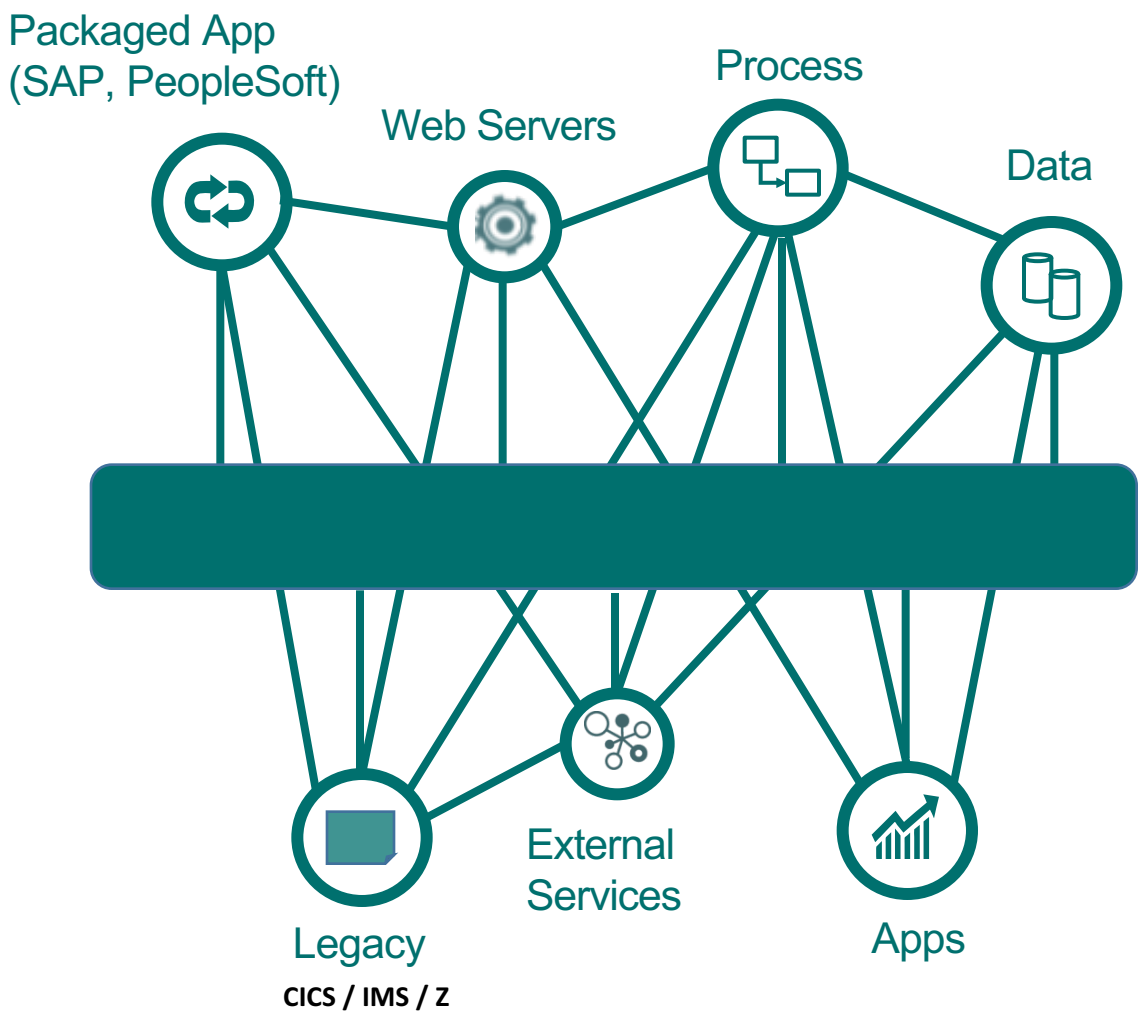
- IBM and the IBM logo are trademarks of International Business Machines Corporation, registered in many jurisdictions. Other marks may be trademarks or registered trademarks of their respective owners.
- Other company, product and service names may be trademarks, registered marks or service marks of their respective owners.
- References in this publication to IBM products and services do not imply that IBM intends to make them available in all countries in which IBM operates.

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….

6



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 fiving 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

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

REST

Modernization of existing interfaces; giving endpoints convenient access mechanisms (multi-channel architecture)

Bringing together batch and online worlds; creating a file-hub for a well-managed flexible file infrastructure

File

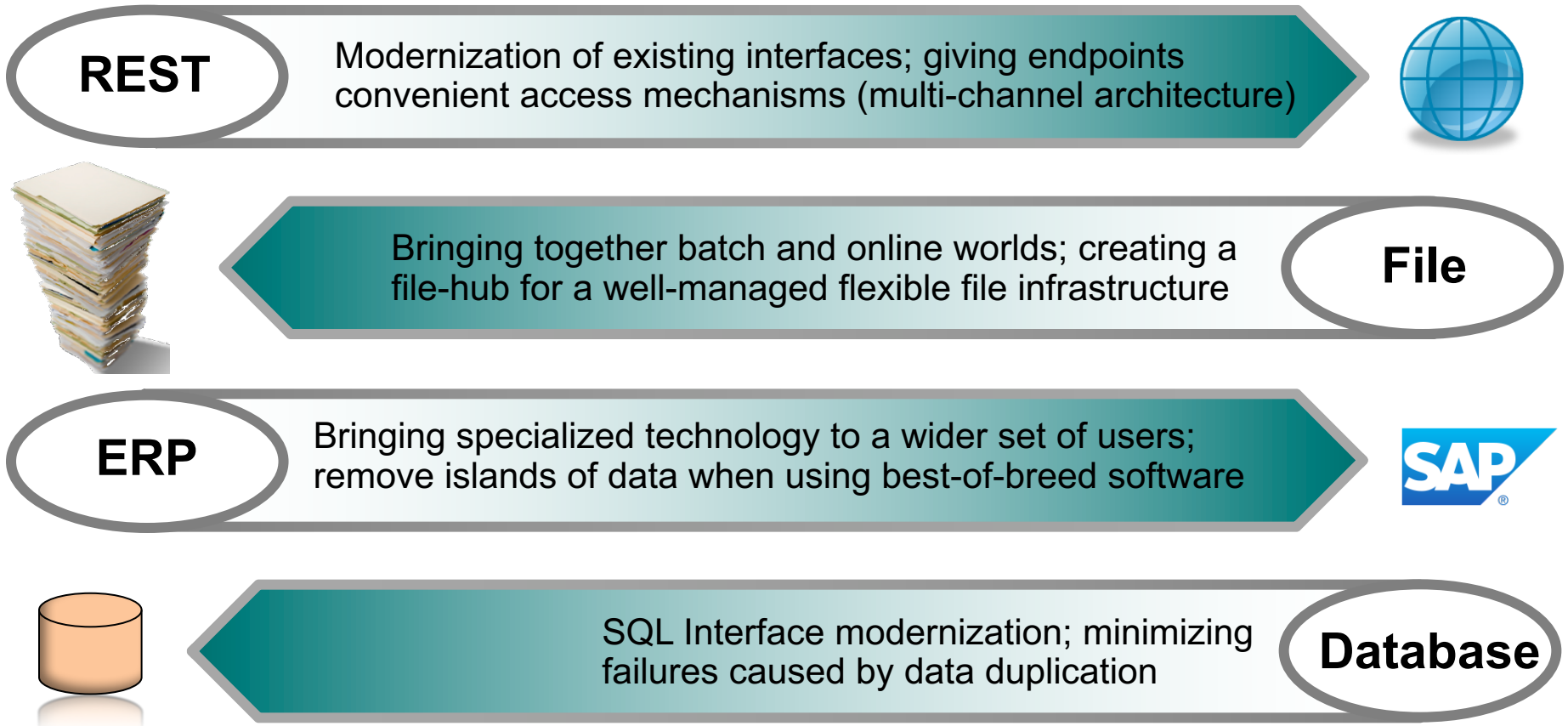
Data routing and transformation are key IIB use cases (cont'd)

REST — Modernization of existing interfaces; giving endpoints convenient access mechanisms (multi-channel architecture)

Bringing together batch and online worlds; creating a file-hub for a well-managed flexible file infrastructure — **File**

ERP — Bringing specialized technology to a wider set of users; remove islands of data when using best-of-breed software

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

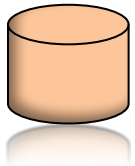


Data routing and transformation are key IIB use cases (cont'd)

REST — Modernization of existing interfaces; giving endpoints convenient access mechanisms (multi-channel architecture)

File — Bringing together batch and online worlds; creating a file-hub for a well-managed flexible file infrastructure

ERP — Bringing specialized technology to a wider set of users; remove islands of data when using best-of-breed software



Database — SQL Interface modernization; minimizing failures caused by data duplication

Mainframe — Making best use of existing solutions while making your IT environment platform agnostic

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 v10.0.0.3
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 v10.0.0.4
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)

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

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

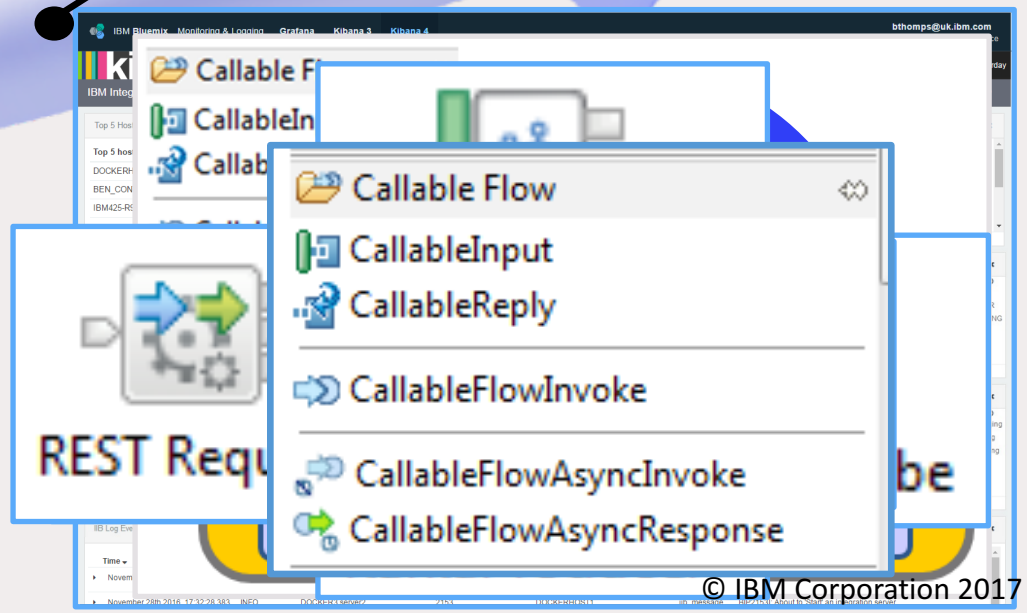
IIB v10.0.0.7
Q4 2016
Kafka Producer and Kafka Consumer nodes
Hybrid Connect – view IIB instances in Bluemix
Send IIB logs to Kibana dashboard in Bluemix
Pre-built Docker image on Bluemix Containers
Wildcards to simplify LDAP user authentication
Accounting & Stats CSV output
Windows 10 support

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

IIBvNext Closed Beta

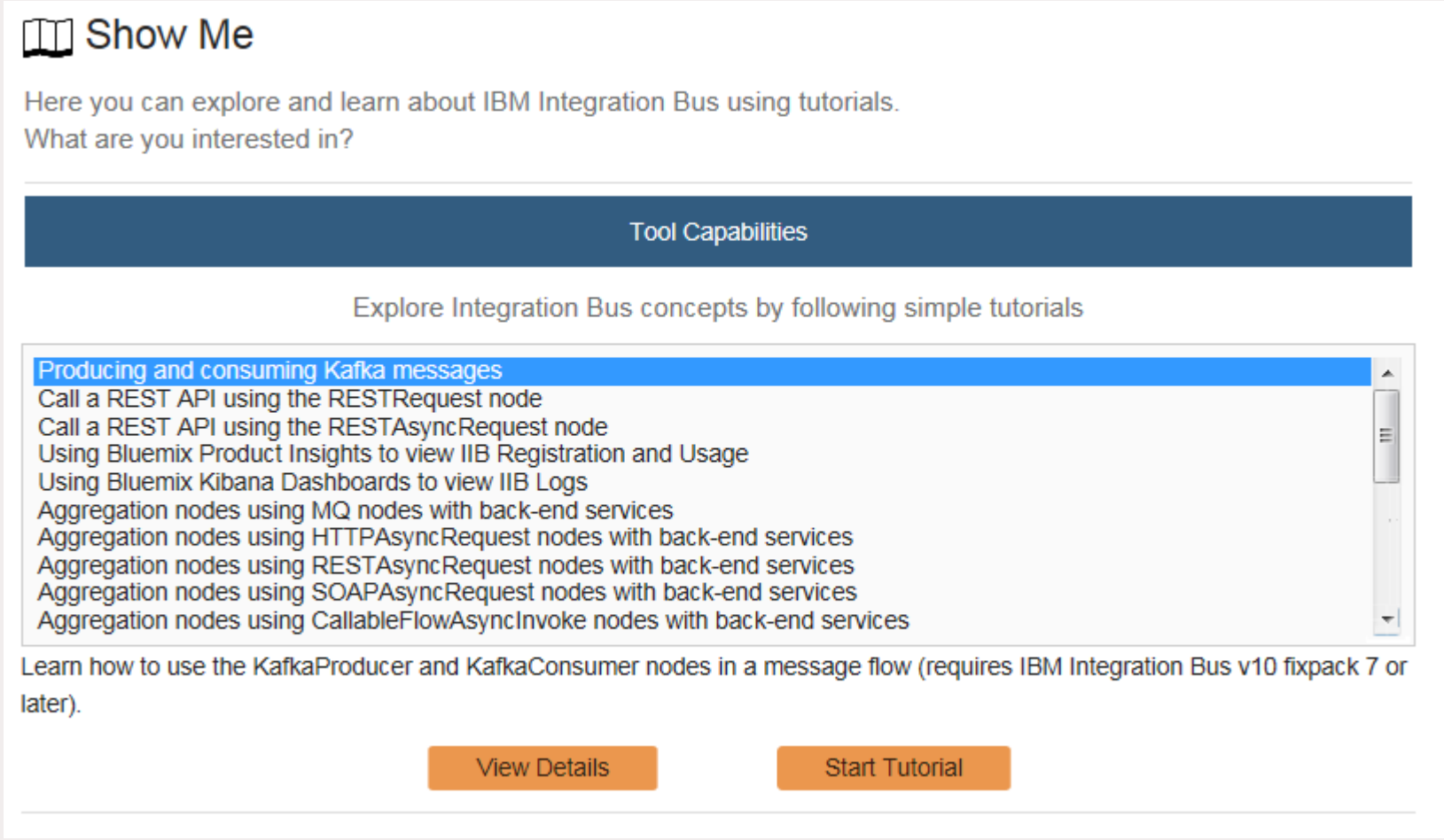
IIB on Cloud
Q3 2015
IBM Managed Service
Built on Docker containers
Runs on the Bluemix Container Service
Reuse artifacts built for IIB on-premise

IIB Manufacturing Pack
v1.0.0.2 Q3 2016
IIBv10 Compatability



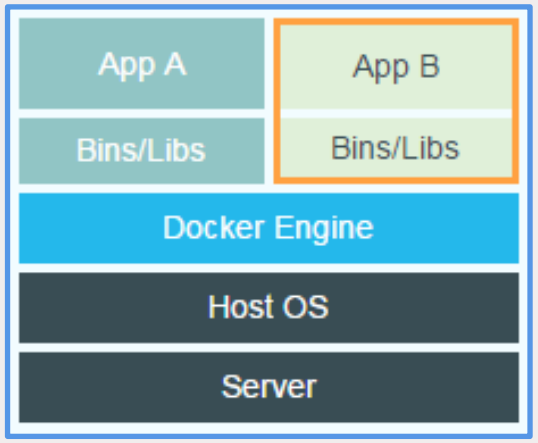
10 New IIB Tutorials Recently Added …

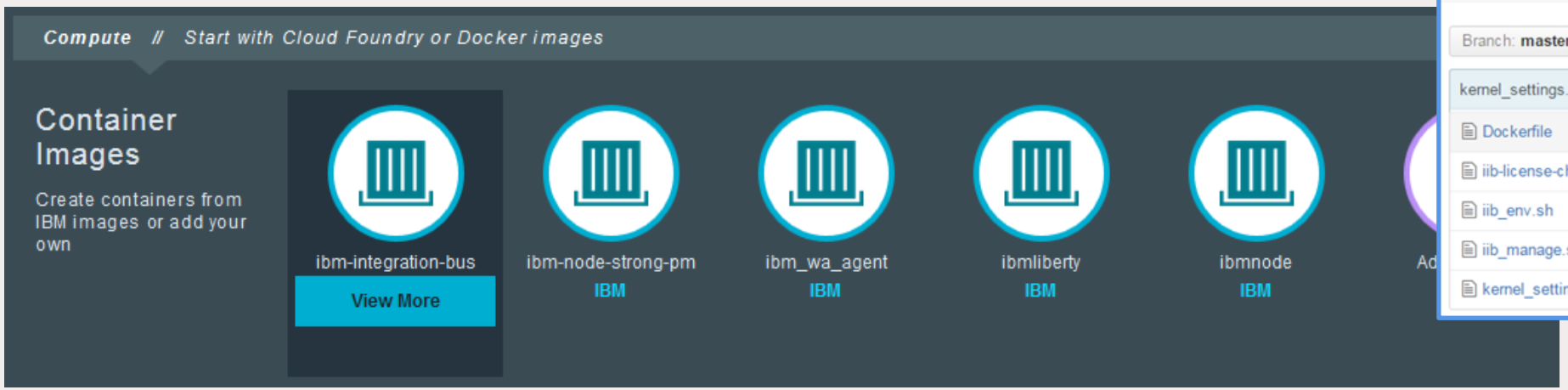
Kafka, Aggregation, REST, Callable Flows, Bluemix Product Insights!

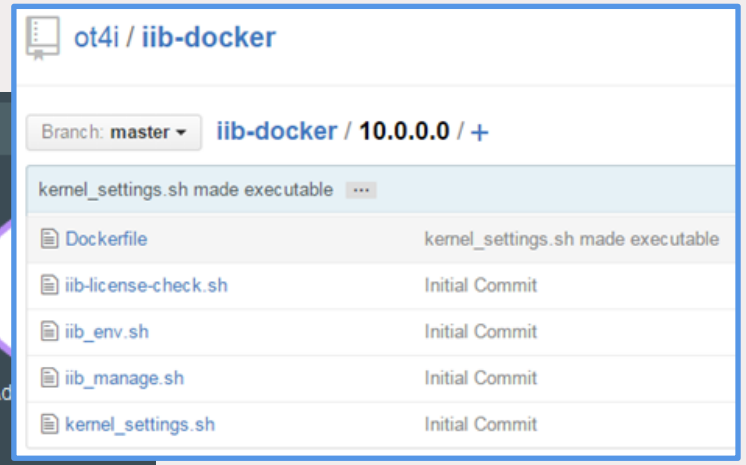


IIB in Docker (and on Bluemix Container Service)

- 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”



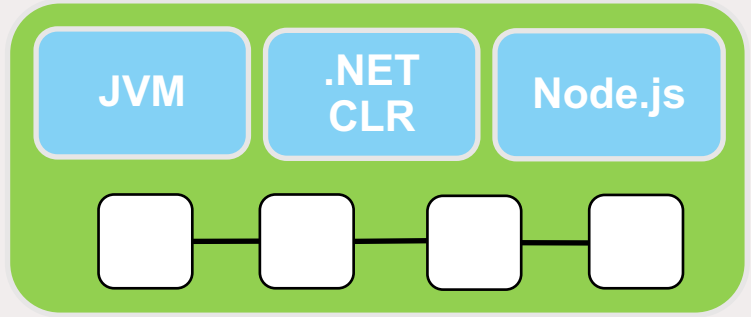




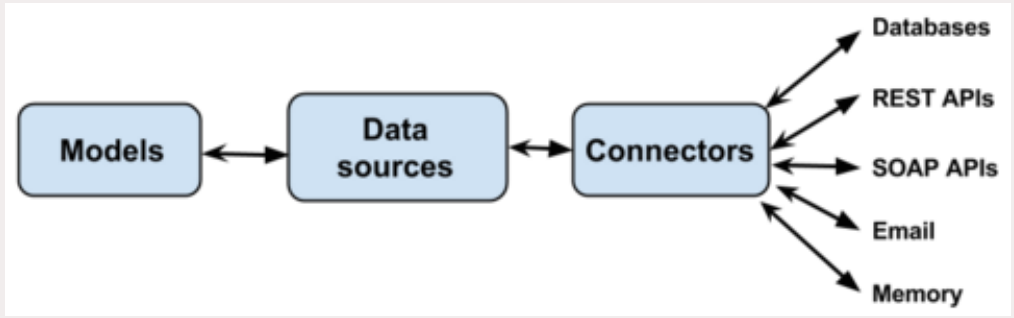
IIB Docker file available on Github: https://github.com/ot4i/iib-docker
Running IIB in the Bluemix Container Service: https://youtu.be/ybGOiPZO3sY
https://developer.ibm.com/integration/blog/2016/11/18/run-ibm-integration-bus-in-bluemix-in-3-easy-steps/

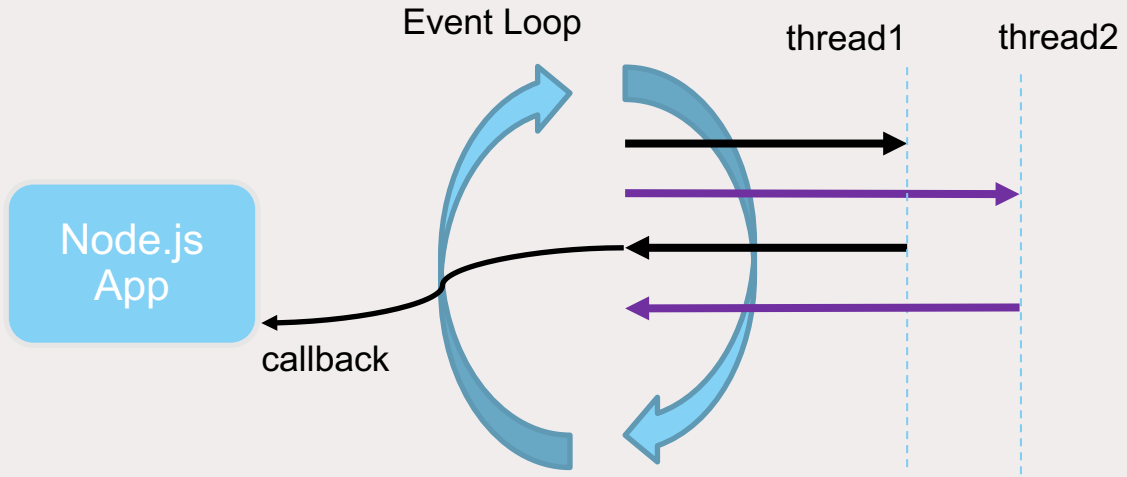
Embedded node.js – Uses and Direction

- 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



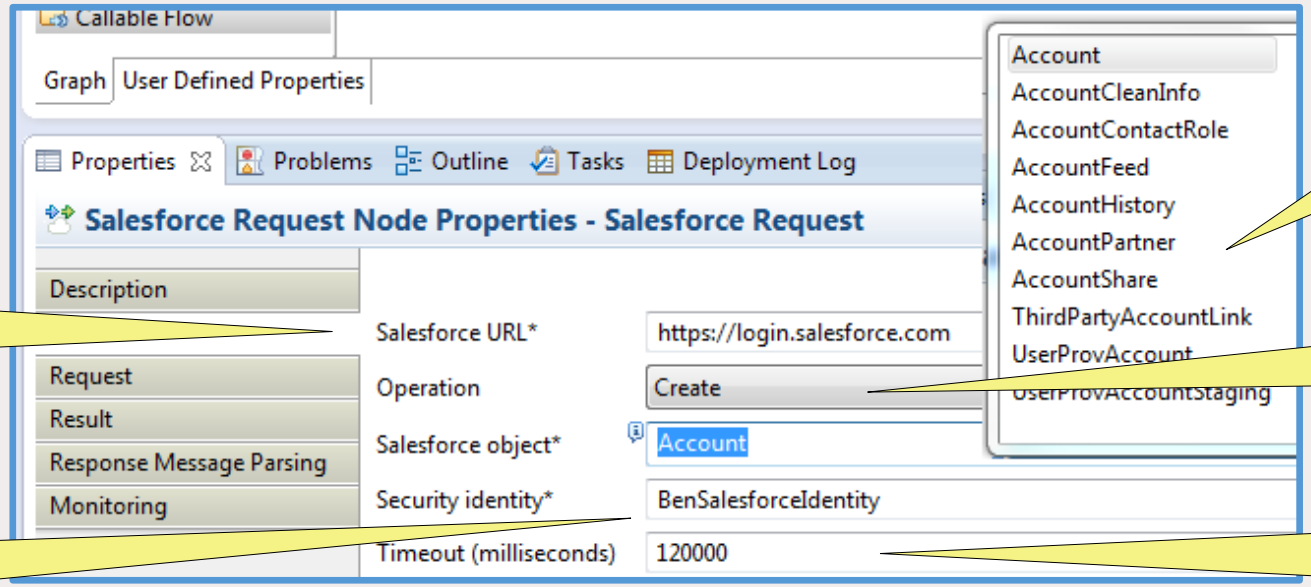
StrongLoop
An IBM Company





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.



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

The URL of the Salesforce system you are connecting to

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

The security identity used by mqsisetdbparms

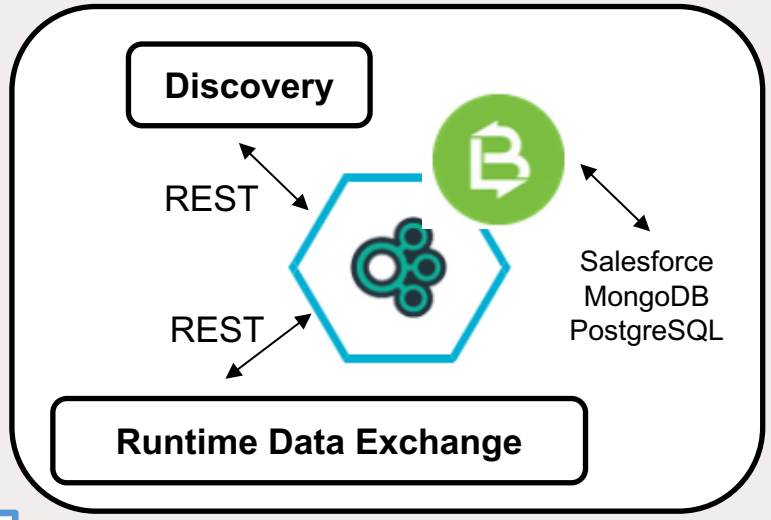
Timeout to wait for a response from Salesforce

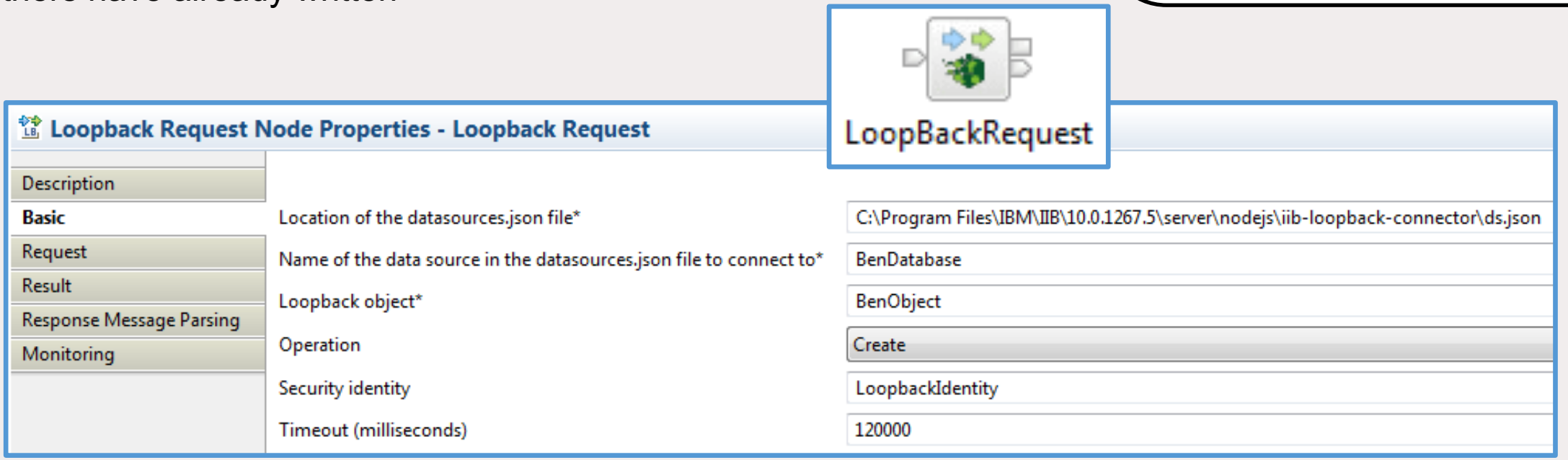
Using IIB for REST, Graphical Mapping & Salesforce: https://youtu.be/XIK6QvNSHdY

LoopBack Request node

IIB LoopBack Request node: https://youtu.be/rUK_OQ5-Anw
Using IIB to integrate with MongoDB and Cloudant: https://youtu.be/Is1pphngUIM

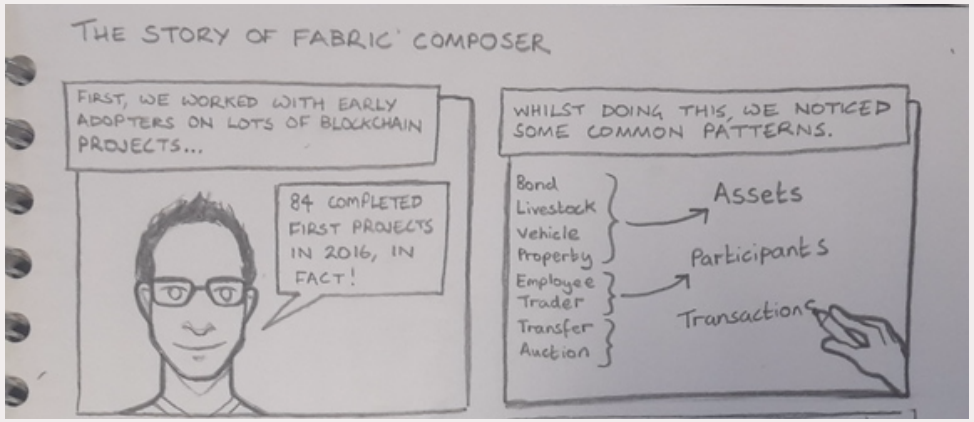
- Create, Retrieve, Update, Delete data records in external systems
- Interact with NoSQL databases such as MongoDB, Cloudant and PostgreSQL
- LoopBack is an Open Source node.js framework for authoring connectors – large open source catalog available on line
- npm tool helps you download and install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

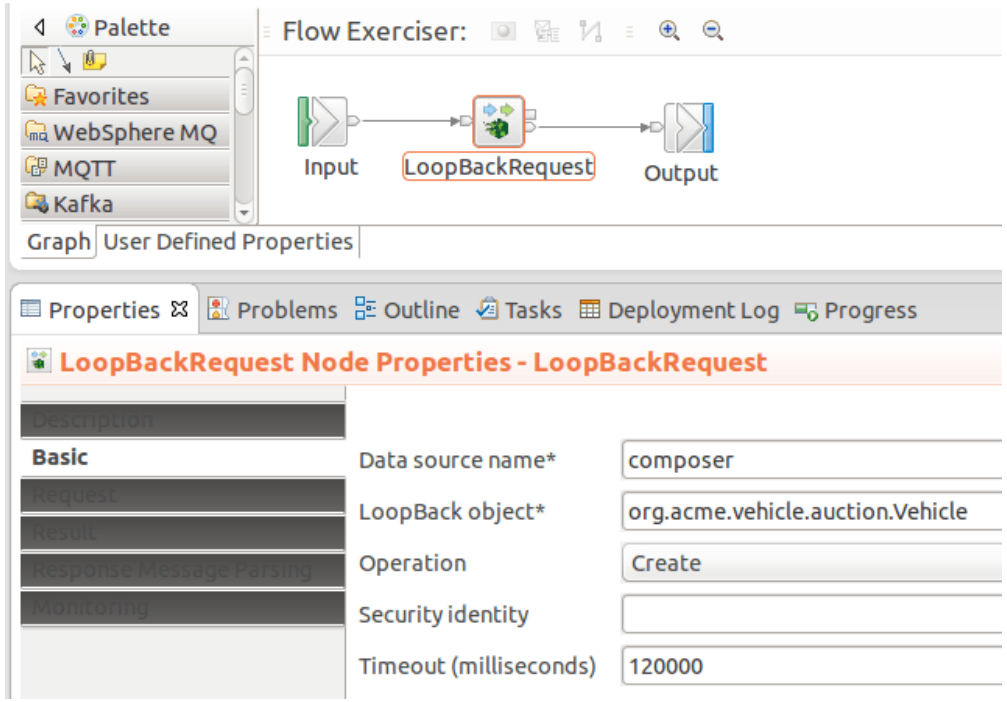


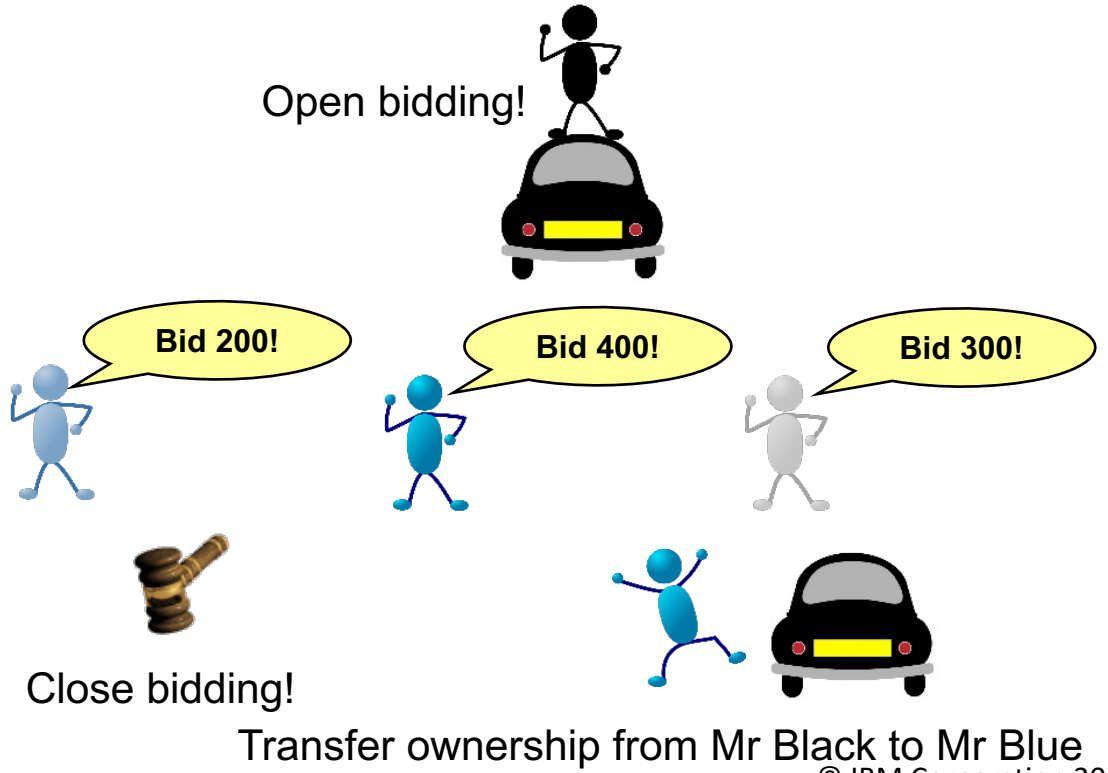


Using IIB, LoopBack and Blockchain

- **Blockchain:** A shared digital ledger for recording transactions in a distributed ledger
- **Hyperledger Fabric:** An open source blockchain implementation being developed under the Hyperledger project, which is managed by the Linux foundation.
- **Fabric Composer:** An open source project providing APIs, a modelling language and a programming model to quickly define and deploy business networks and apps which sit on top of Blockchain.

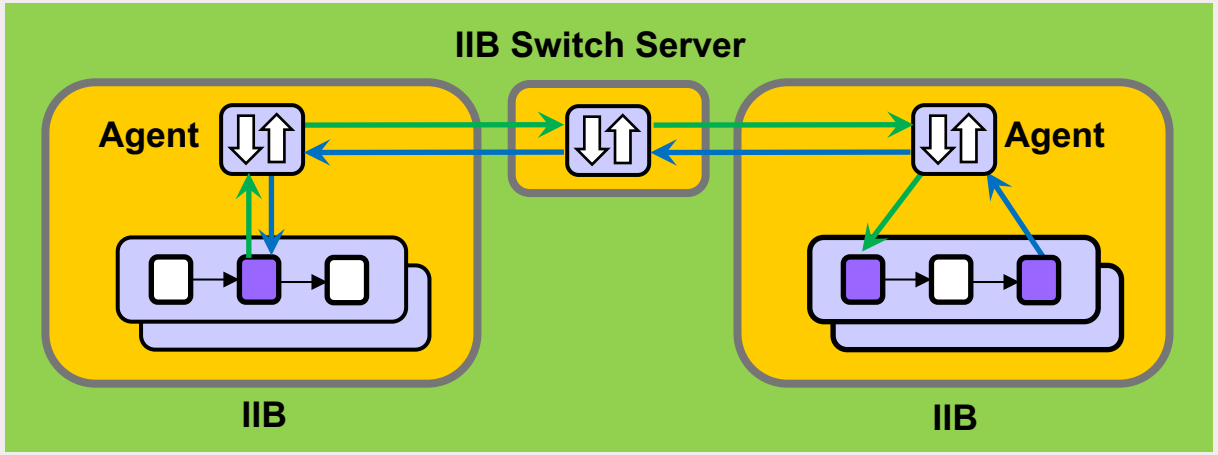


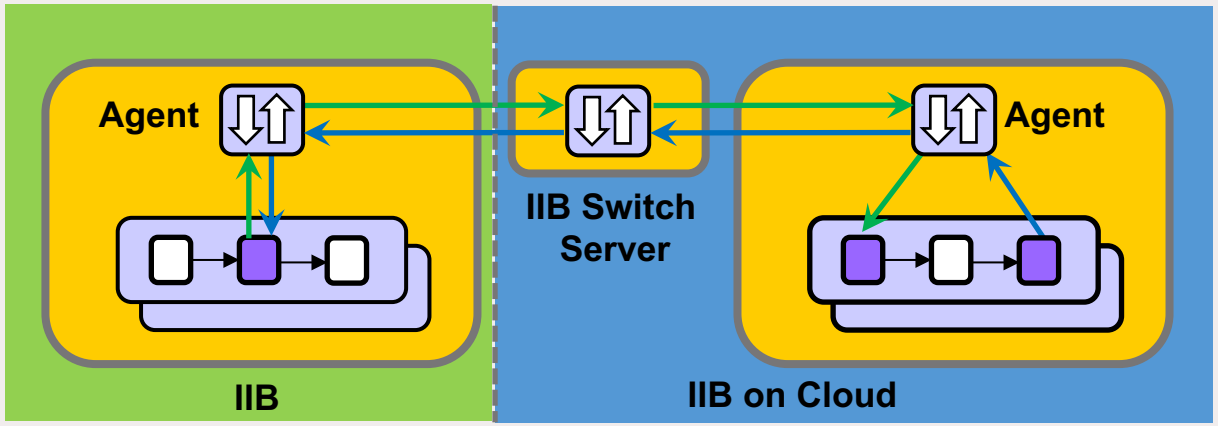




Hybrid Integration using the IIB Switch

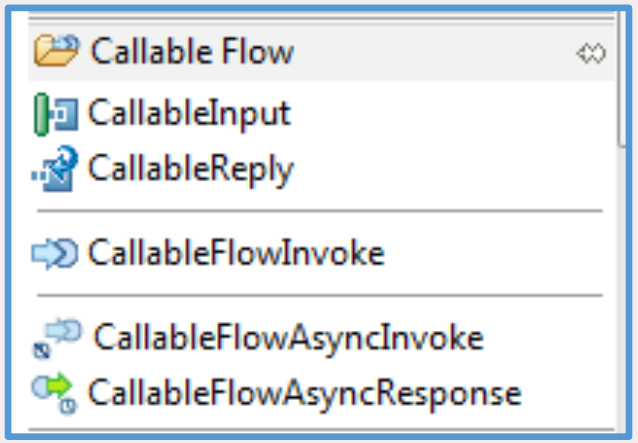
- Simpler to run IIB in a cloud architecture due to deployment processing and flow runtime all coordinated using a single OS process
- Split processing between different Integration Servers
- Flows communicate using a Switch server and connectivity agents
- If callable flows are deployed in IIB (on-prem, 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

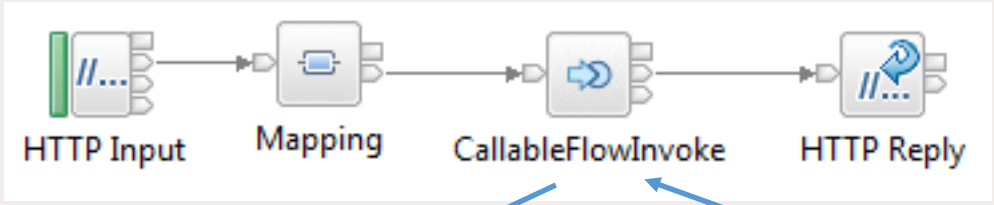


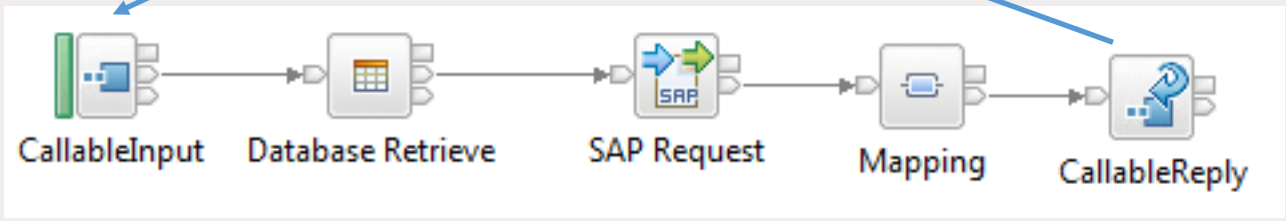


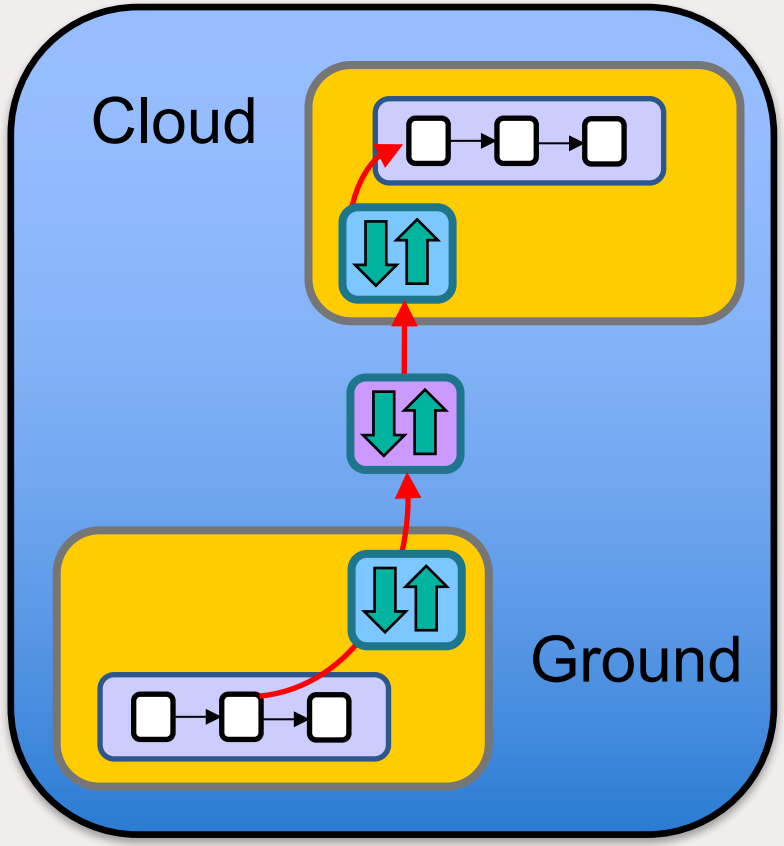
Callable Flows

- 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







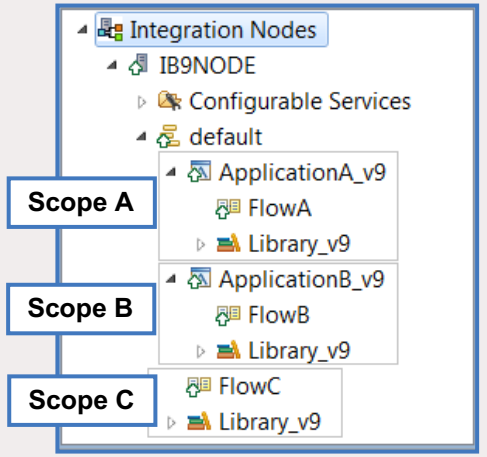


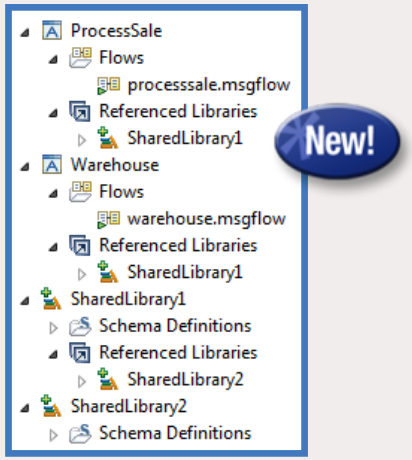
Shared Libraries

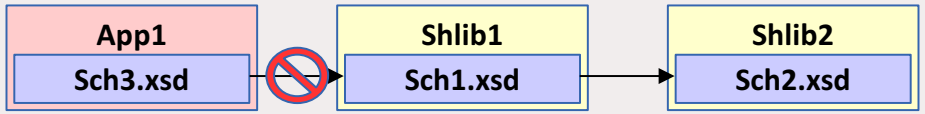
- **Apps / Libs were major features introduced in V8 and V9**
  - Enhanced to fulfil most popular user requests
  - Libraries can now be shared across multiple applications for a broad range of assets
  - Sub-flows are now independent artefacts, significant storage reduction, consistency

- **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.

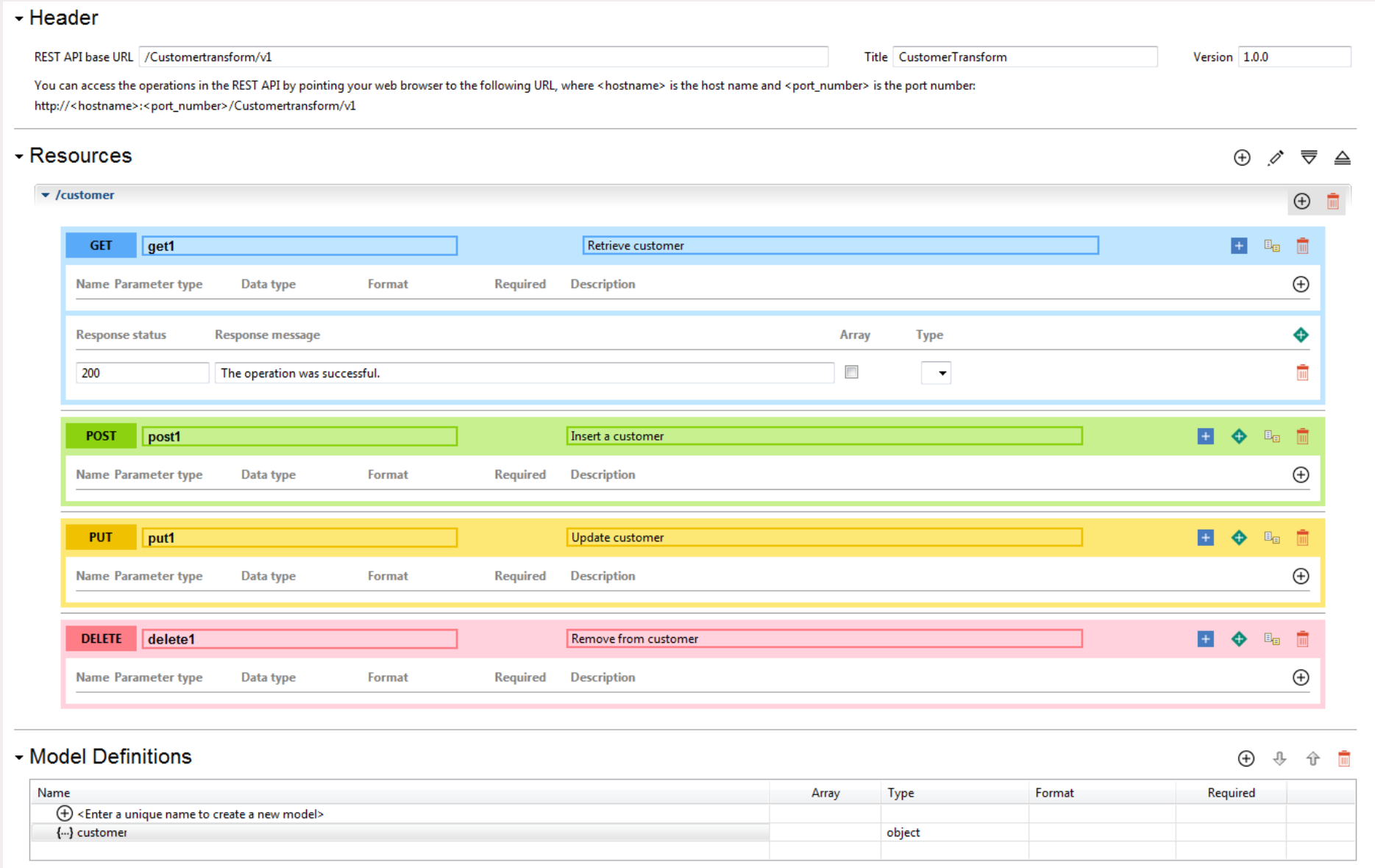
- **Shared Library Restrictions**
  - Subflows but not message flows are allowed in shared libraries, other minor subflow restrictions
  - Minor restrictions for ESQL (e.g. empty schema)
  - Application hosted schemas can’t import include schemas from shared libs
  - Java classes in shared libraries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



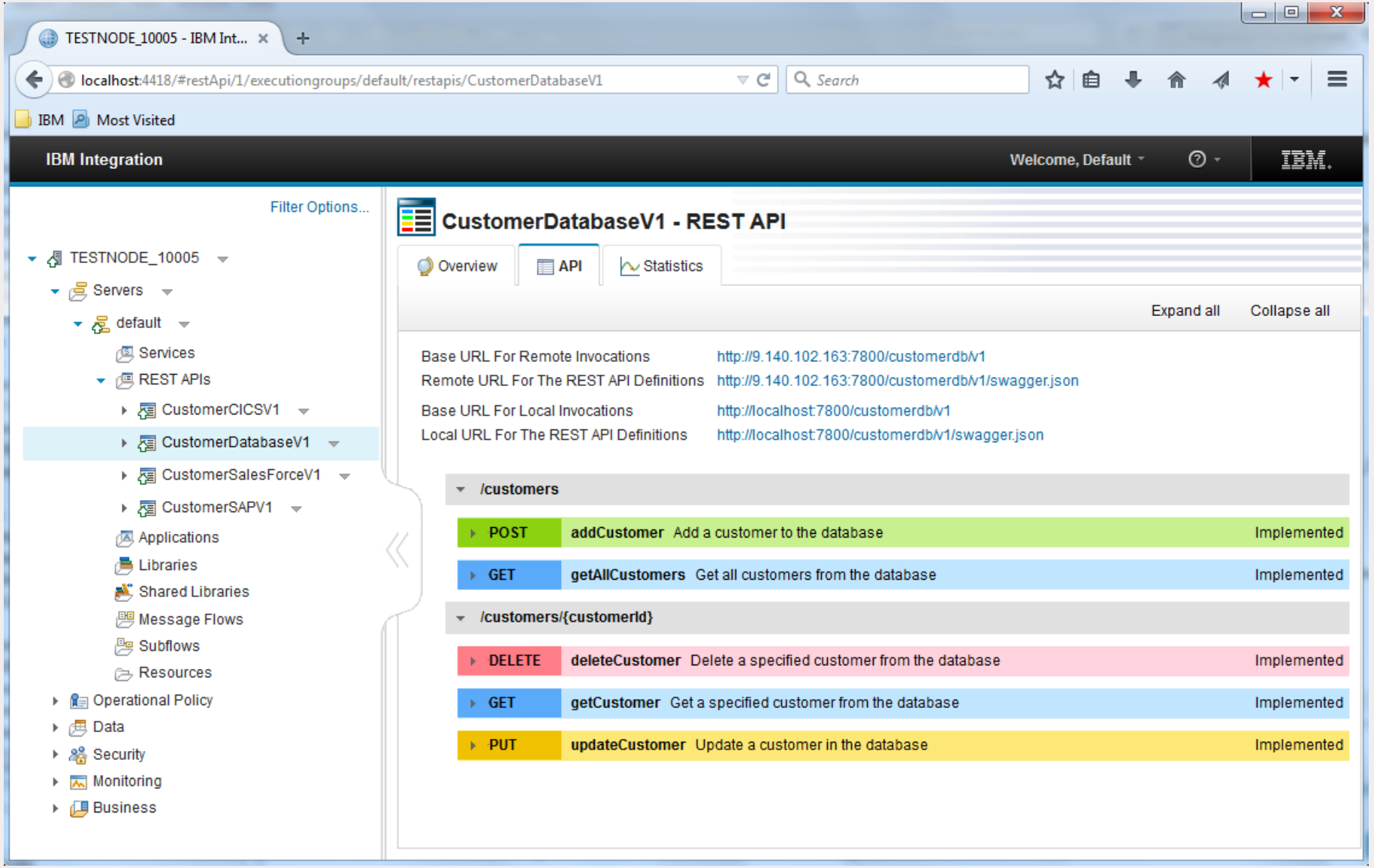




Exposing a REST API using IIB

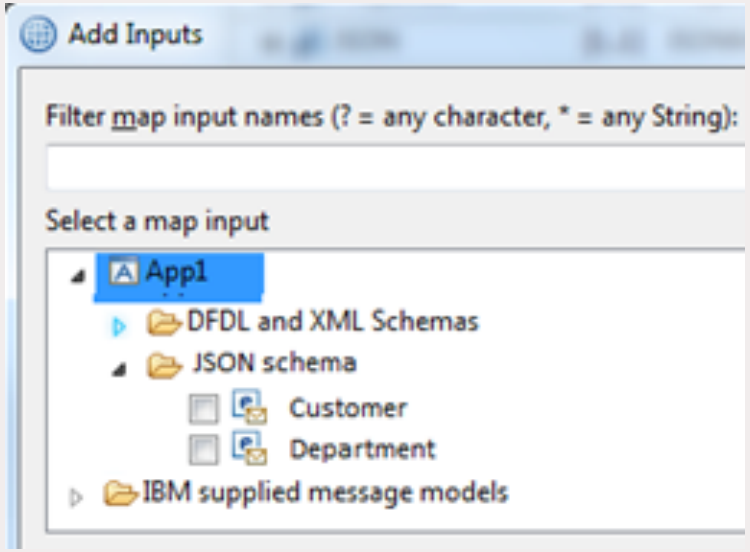


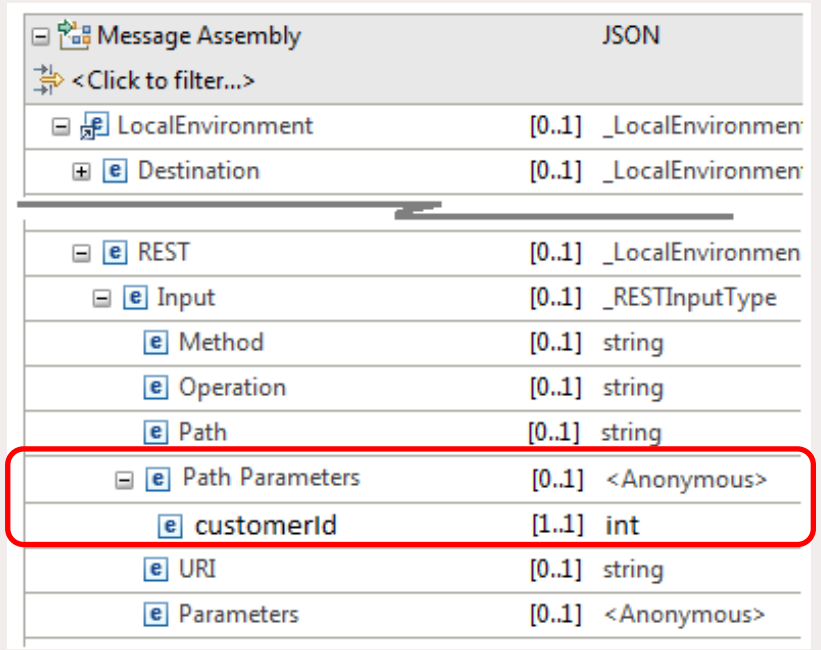
Administering an IIB REST API



JSON Schema in the Graphical Mapper

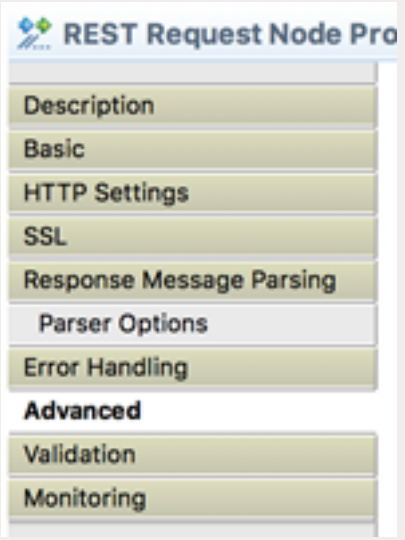
- Easy graphical map creation from JSON Schema
  - Select JSON types from Swagger for source or target
  - When creating maps in a REST API Operation subflow, populate source and target from JSON types
  - Automatic update and validate the Query Path parameters editted within a REST API and used in a map
  - Add new Path Parameters section to LocalEnvironment
- 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

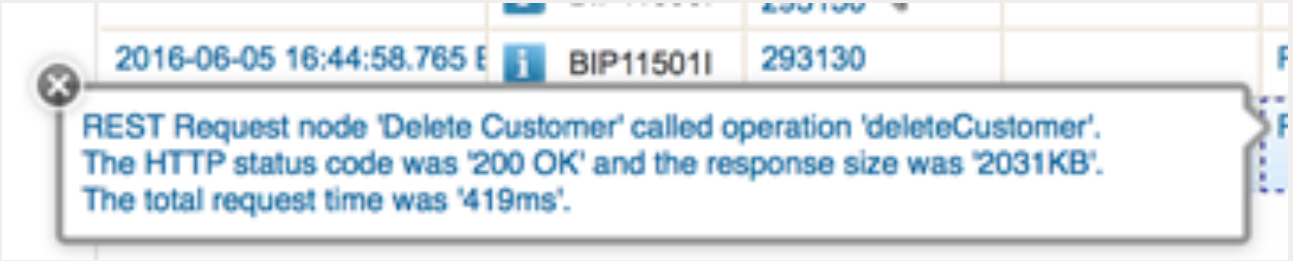




REST Request, REST Async Request and REST Async Response

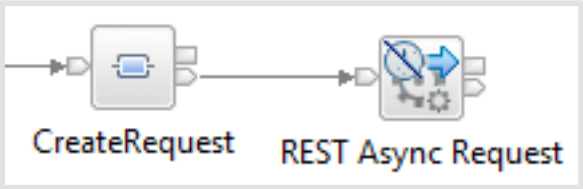
- Parameters specified using literals or extracted info from the input message
- Request and Response body data sourced from input message by default, but can be from elsewhere e.g. Environment tree
- Chain multiple REST Requests together without intervening transformations
- Accept header and Content-Type 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.

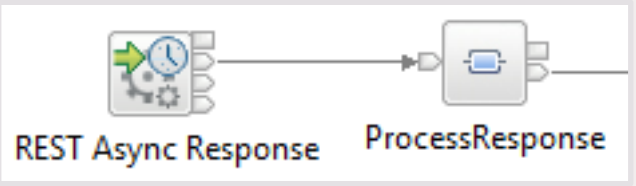




Thread 1

Thread 2





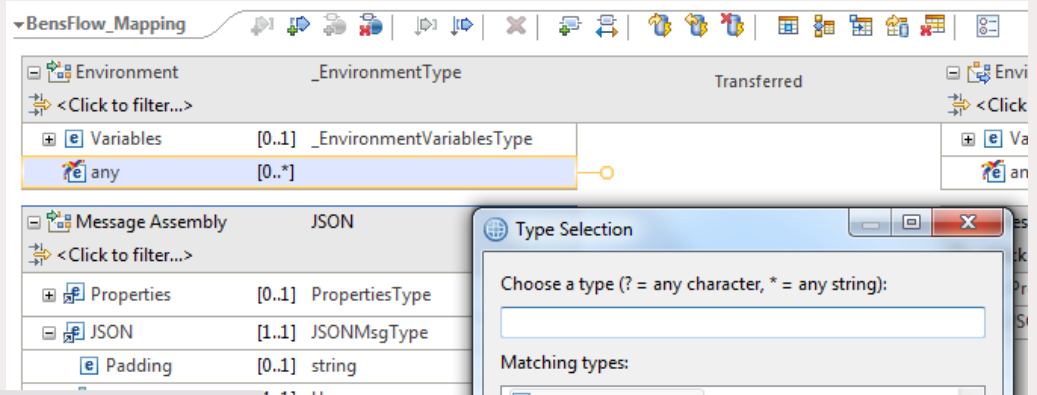
Name	Type	Description	Expression
Authorization	Header	Provide the authorization key that...	'suchASecretAuthKey'
customerId	Path	The ID of the customer to delete fr...	$Root/XMLNSC/Message/DeleteReq/customerId
clientName	Query	Provide the authorization key that...	LocalEnvironment.Variables.CLIENT_NAME

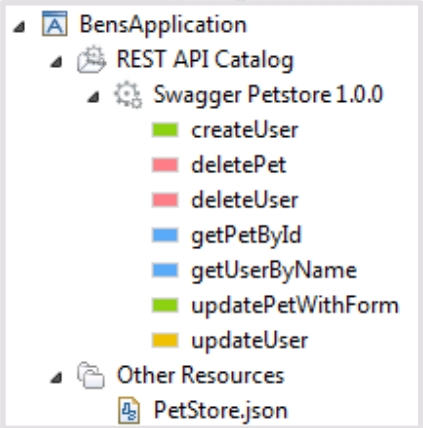
Consuming REST APIs using the IIB REST Request node: https://youtu.be/C_6gPlrCHZQ

Other new REST and HTTP Enhancements

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

- 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





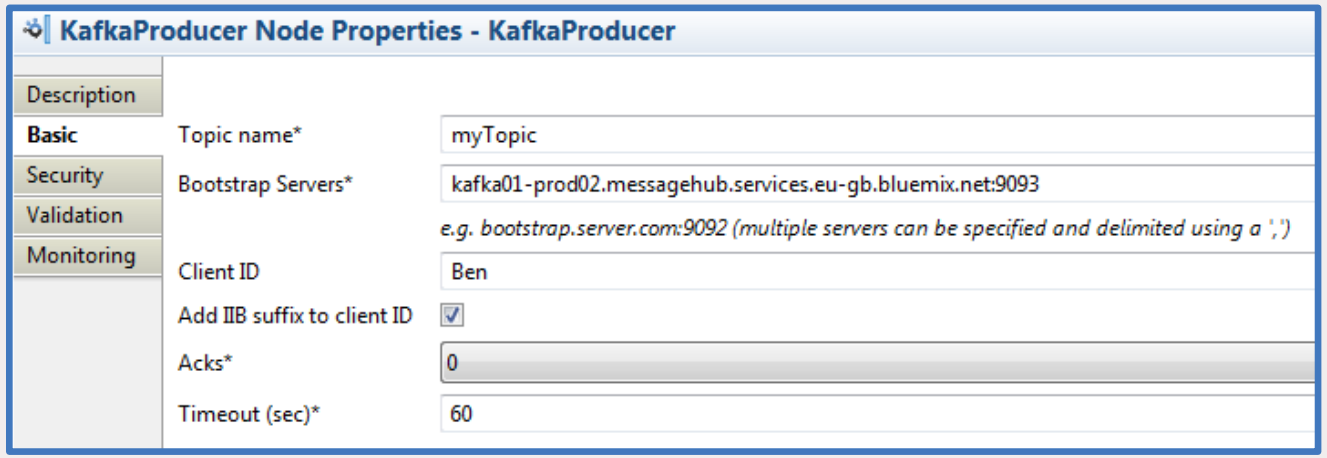
- When IIB responds to an inbound HTTP request, you can add a new X-IIB-Timing property to the HTTP Header to describe elapsed timings for the IIB processing of the request [accessLog = true]

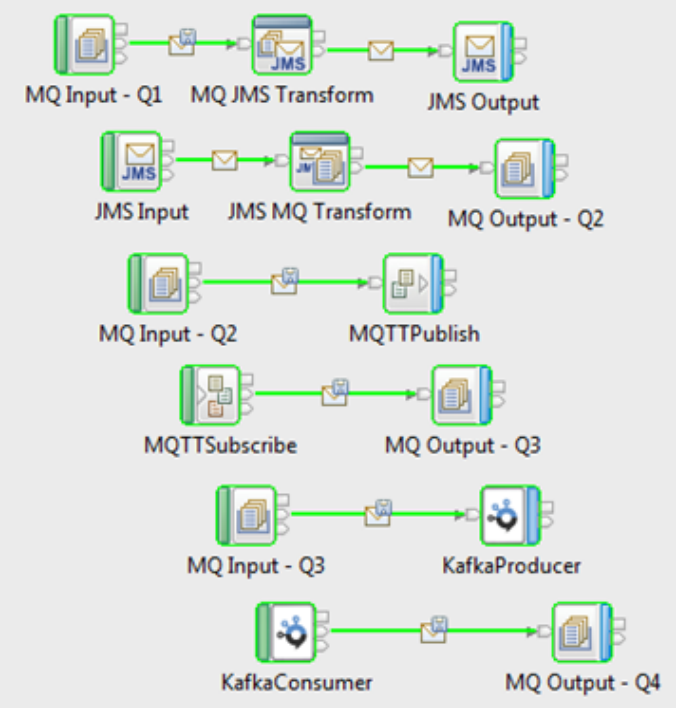
```
mqsichangeproperties TESTNODE_10006 -b httplistener -n accessLog -v true
```

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

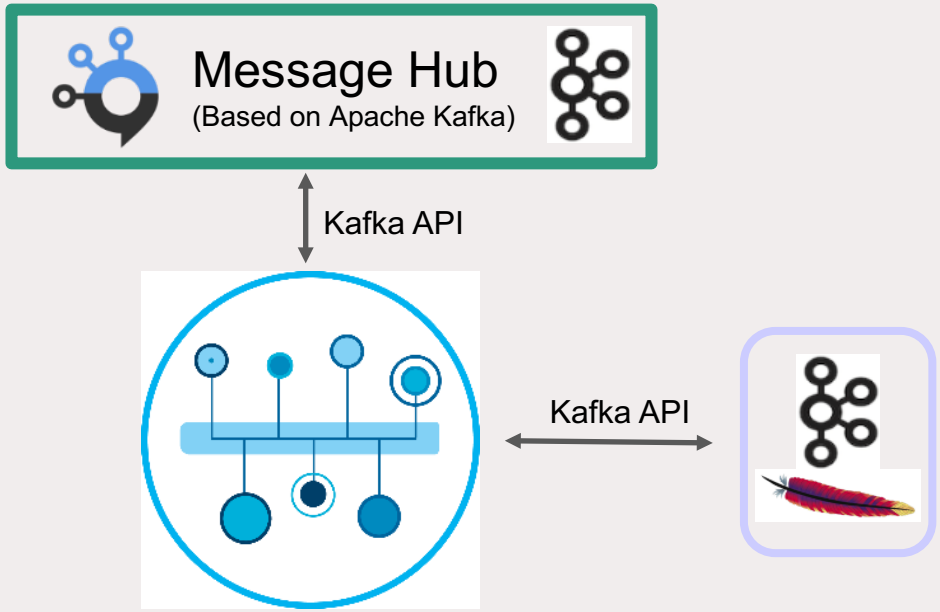
```
mqsichangeproperties TESTNODE_10006 -b httplistener -o HTTPConnector -n accessLogPattern -
v "%h %l %u %t '%r' %s %b '%{Referer}i' '%{User-Agent}i'  IIB:'%{X-IIB-Timing}o'"
```

IIB, Kafka and Message Hub





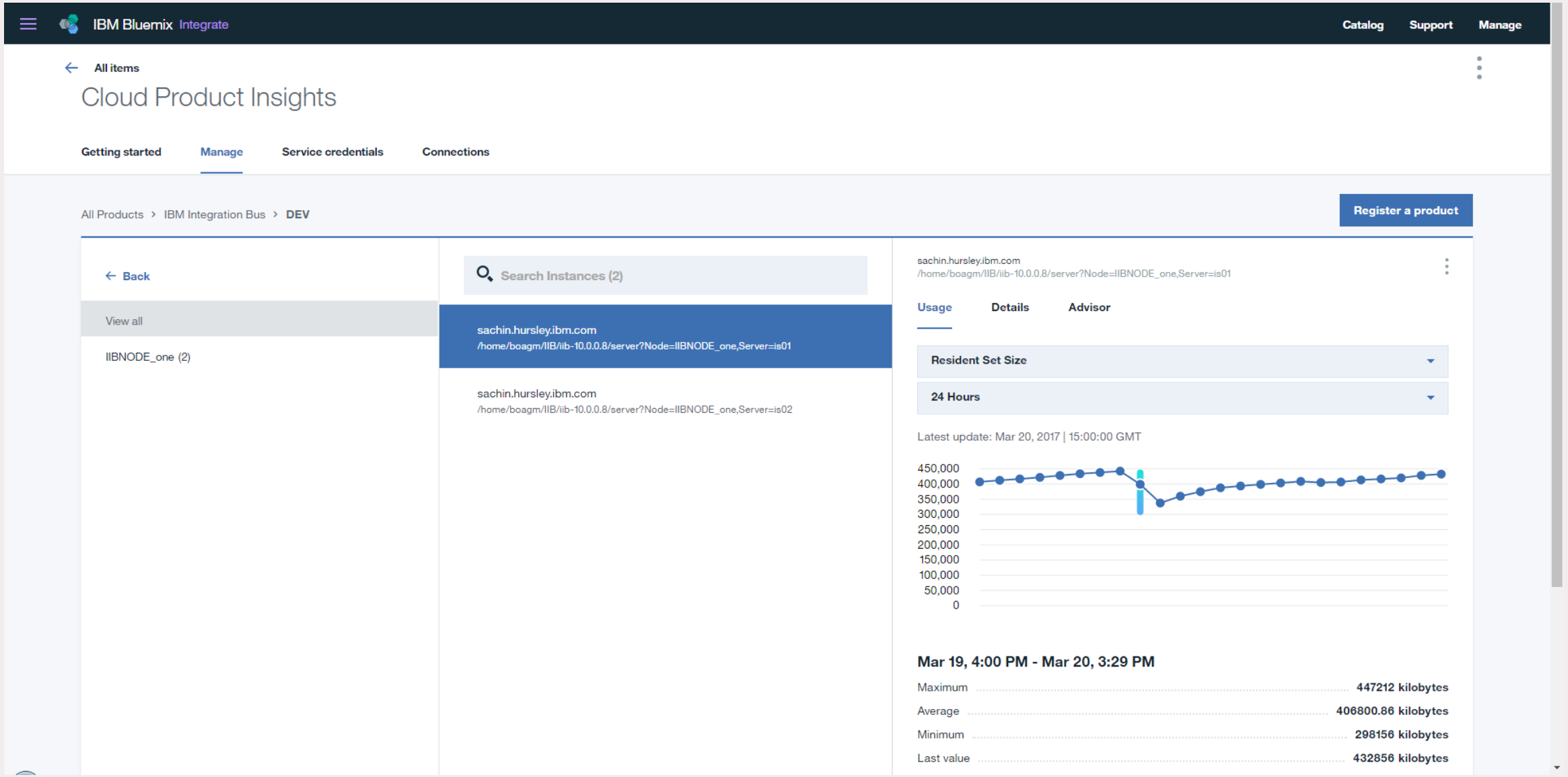
- Use IIB to interact with a Kafka Broker providing distributed commit log based messaging service
- KafkaProducer and KafkaConsumer nodes for connecting IIB message flows with Kafka
- Connect to either a private Kafka Server implementation or the IBM Bluemix MessageHub implementation
- Message flow 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
Using Kafka with IIB: https://youtu.be/kYv0crxL86Y

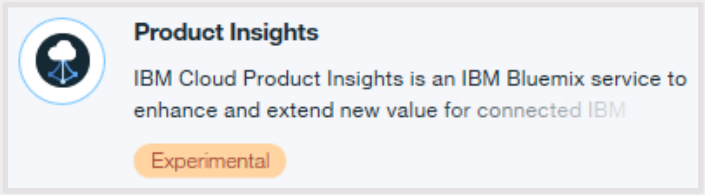
IIB and Product Insights: https://youtu.be/gWbxlooq3_g

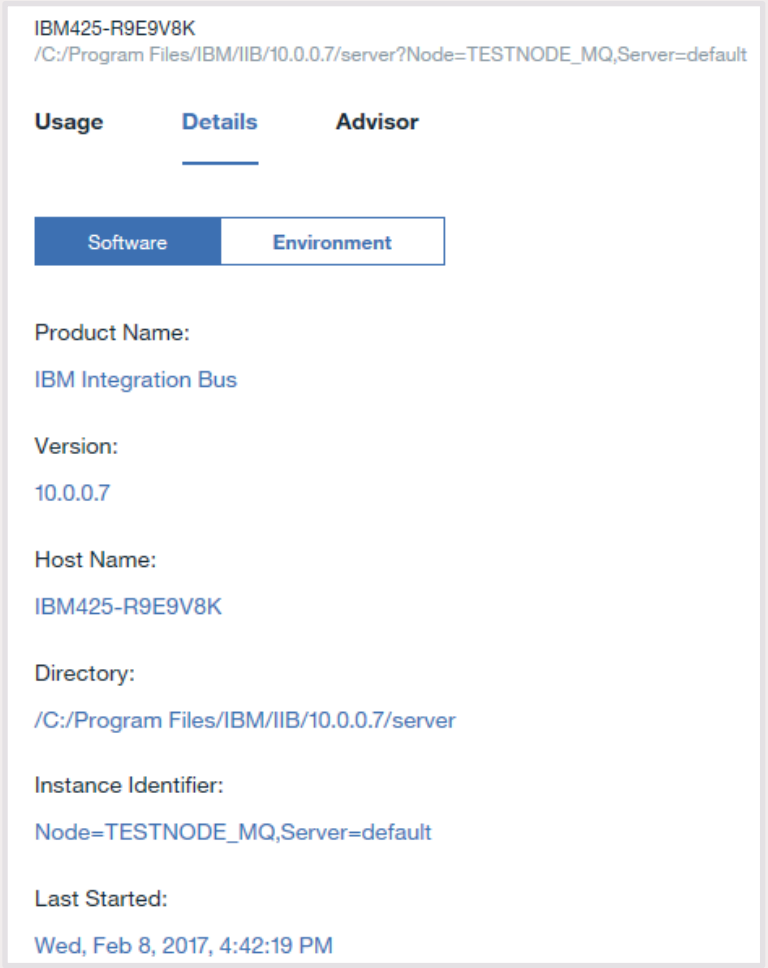
Introducing IBM Cloud Product Insights

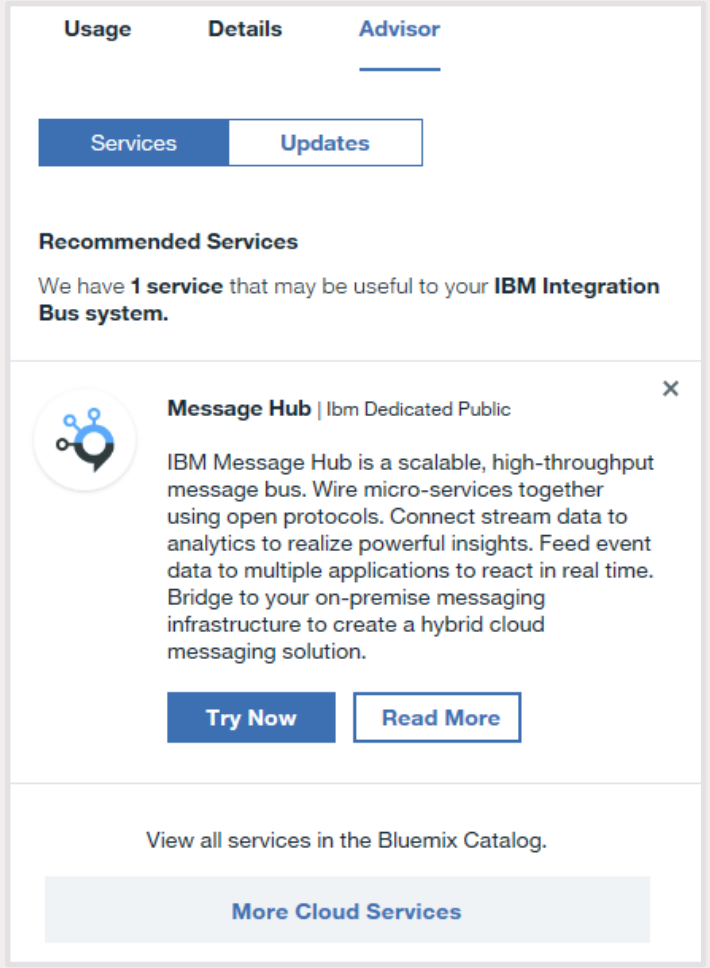


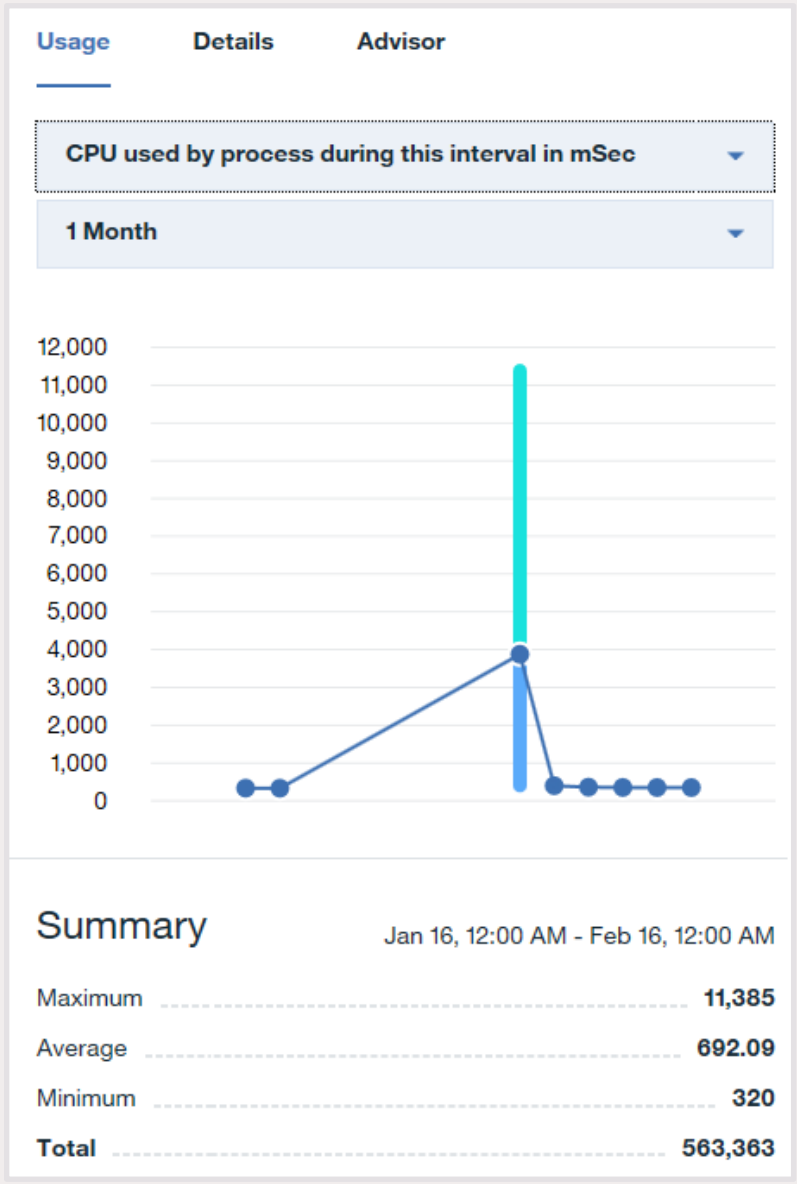
IIB and Product Insights: https://youtu.be/gWbxlooq3_g

Using Bluemix Product Insights to view IIB Registration and Usage

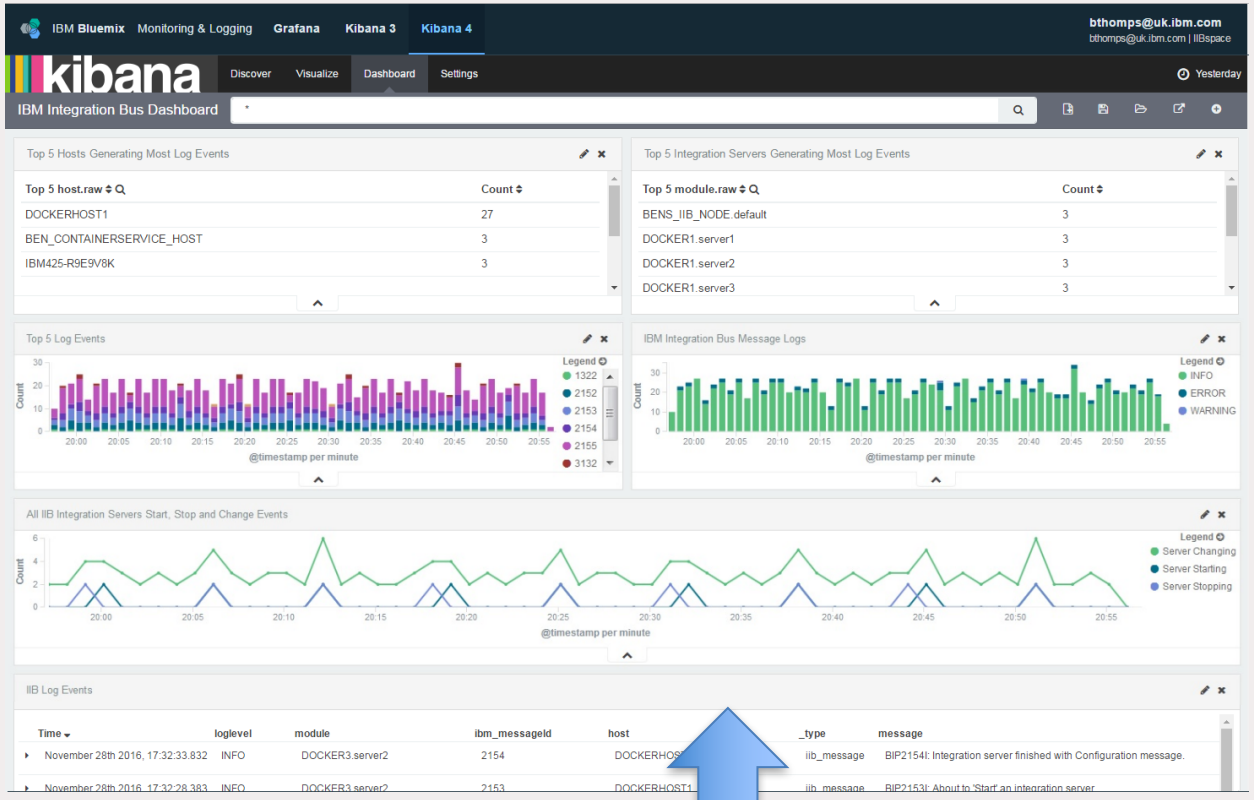








Using Bluemix Kibana dashboards to view IIB Logs



IIB and Kibana dashboards:
https://youtu.be/sCPrT2dHKSs

DOCKER1.Server1 DOCKER2.Server1 DOCKER3.Server1
DOCKER1.Server2 DOCKER2.Server2 DOCKER3.Server2
DOCKER1.Server3 DOCKER2.Server3 DOCKER3.Server3

DOCKERHOST1

Docker

BENS_IIB_NODE.default

BEN_CONTAINERSERVICE_HOST

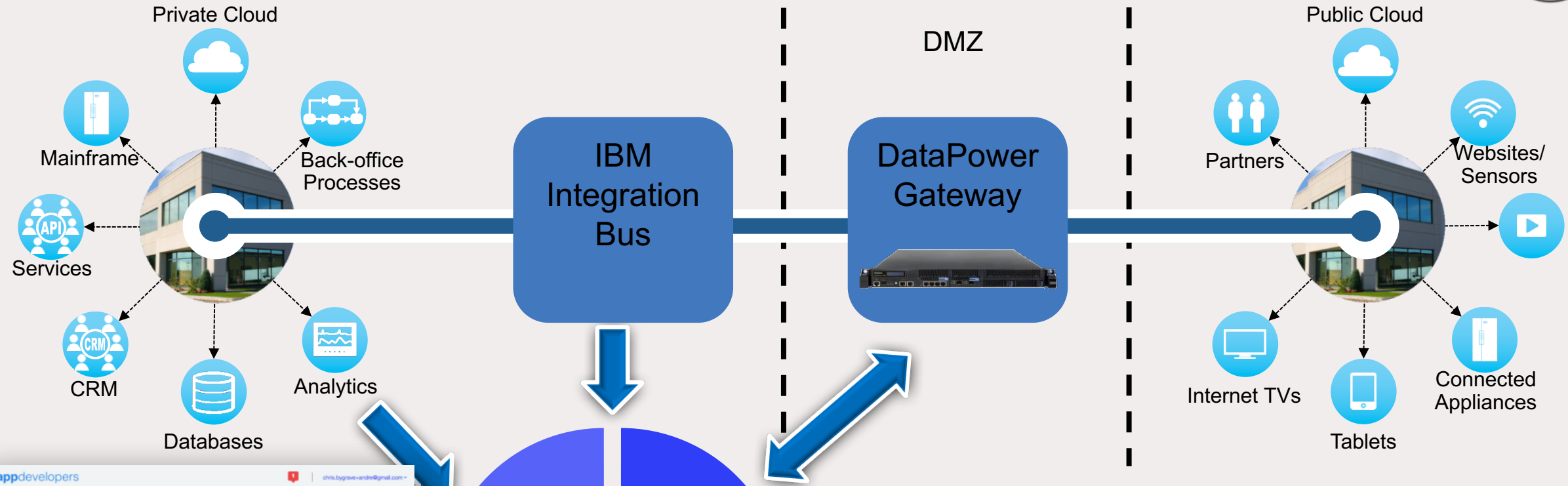
IBM Bluemix Containers

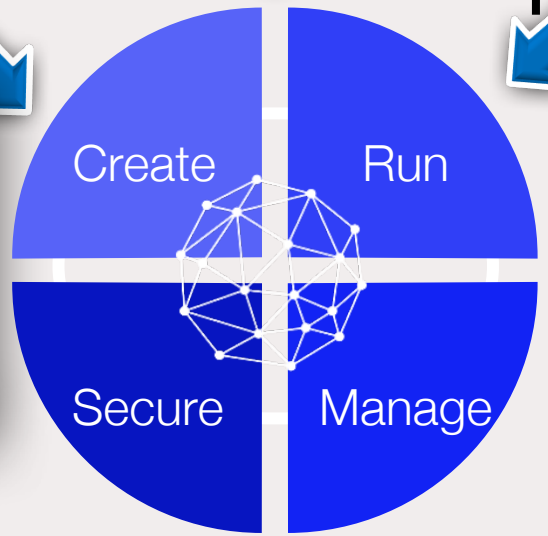
TESTNODE_BENLAPTOP.default

IBM425-R9E9V8K

Windows

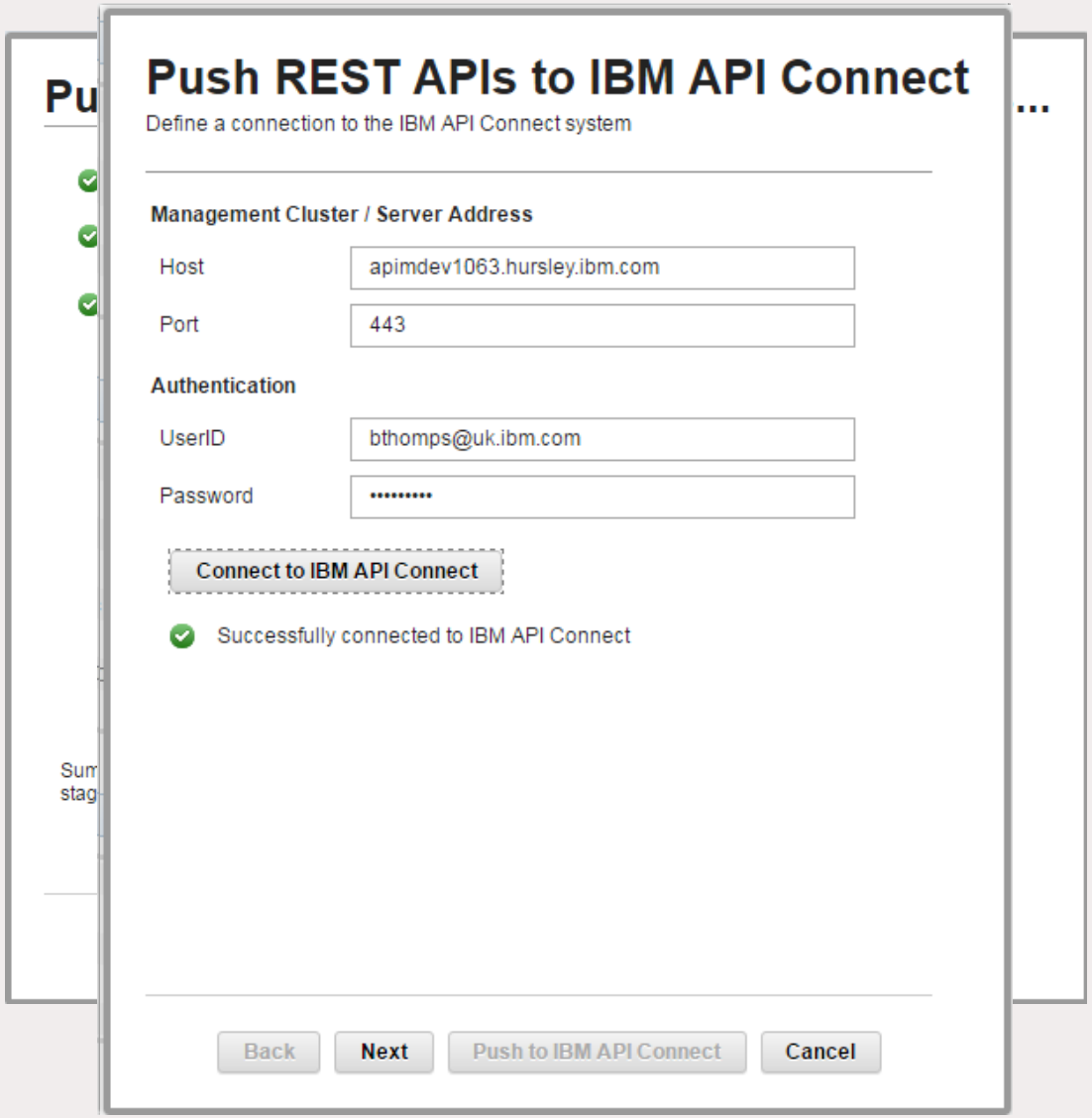
IIB and API Connect





- **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**

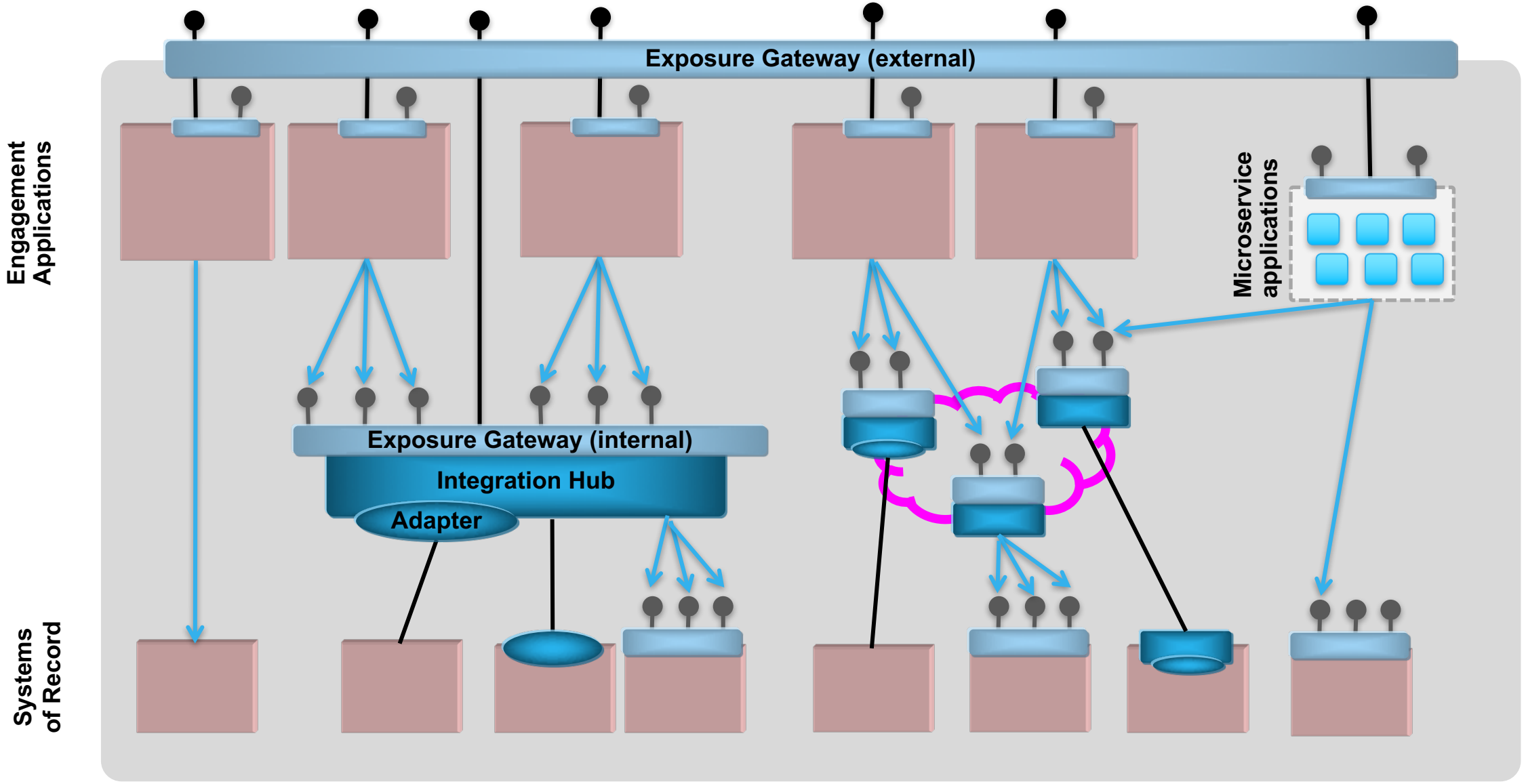
Bulk Push IIB REST APIs to API Connect



- 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

IBM Integration Bus Future and Strategy

Evolving Integration architectures and the impact of Microservices



Expansion of Integration user community

Business Users

Use integration tooling to automate my work day

Shadow IT

Speed the dev of new systems of engagement

Central IT

Unlock the systems of record for new business models

These worlds must converge

Enterprise Scale Combined with Start-up Speed

How do you…

- Protect your investment
- Maintain Security & Privacy
- Refocus your resources

You are slowed by…

- Technical Debt
- Disparate data & apps, Inflexible governance
- Skills gap

You need…

- Securely integrate across environments
- Transform existing services for digital to API's
- Easy to use open technologies

CIO Roles: Turn IT into a competitive advantage

- Speed Innovation
- Expand the brand
- Exploit partnerships

- Inability to scale
- Standalone initiatives
- Protecting intellectual capital

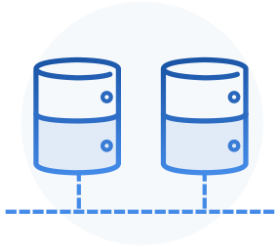
- Integrate & scale using new technologies (microservices)
- Implement lightweight governance with IT
- Consume API's via self service

LOB Roles: Innovate to Drive New Revenue

Purpose and Vision

Connect

Pre-built connectors for SaaS & on premise systems and other IBM integration and messaging solutions

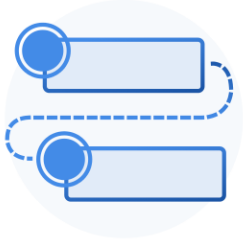


Transform

Graphical mapper for rapid transformation between source and target data formats

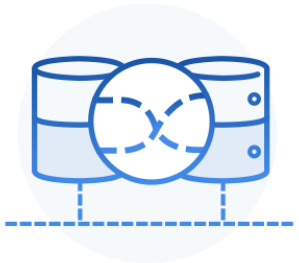
Design

Configuration-based tooling to implement integration logic with and without code



Manage

Web based management and monitoring of integrations



Remain Best in breed

- IBM Integration Bus has been catering to the needs of Enterprise customers for 18 years
- Consistently a leader in the enterprise application integration space.

Single Integrated Platform

- Connect seamlessly
- Bring together user experiences where appropriate
- Join up the power of IIB, IIBoC and App Connect

Enable Hybrid Cloud

- Container based management and orchestration
- Flexibility to run integration technologies across on-premise and cloud
- Avoid investment in new skills

Bringing cognitive computing to CRM

IBM and Salesforce are partnering to accelerate adoption of cognitive computing for customer management processes.

Both companies will initially deliver three solutions that will enable customers to further unlock and monetize data and intelligence so every company can make smarter, faster and more productive decisions.

The leader in

cloud and cognitive computing

The world's

#1 CRM company

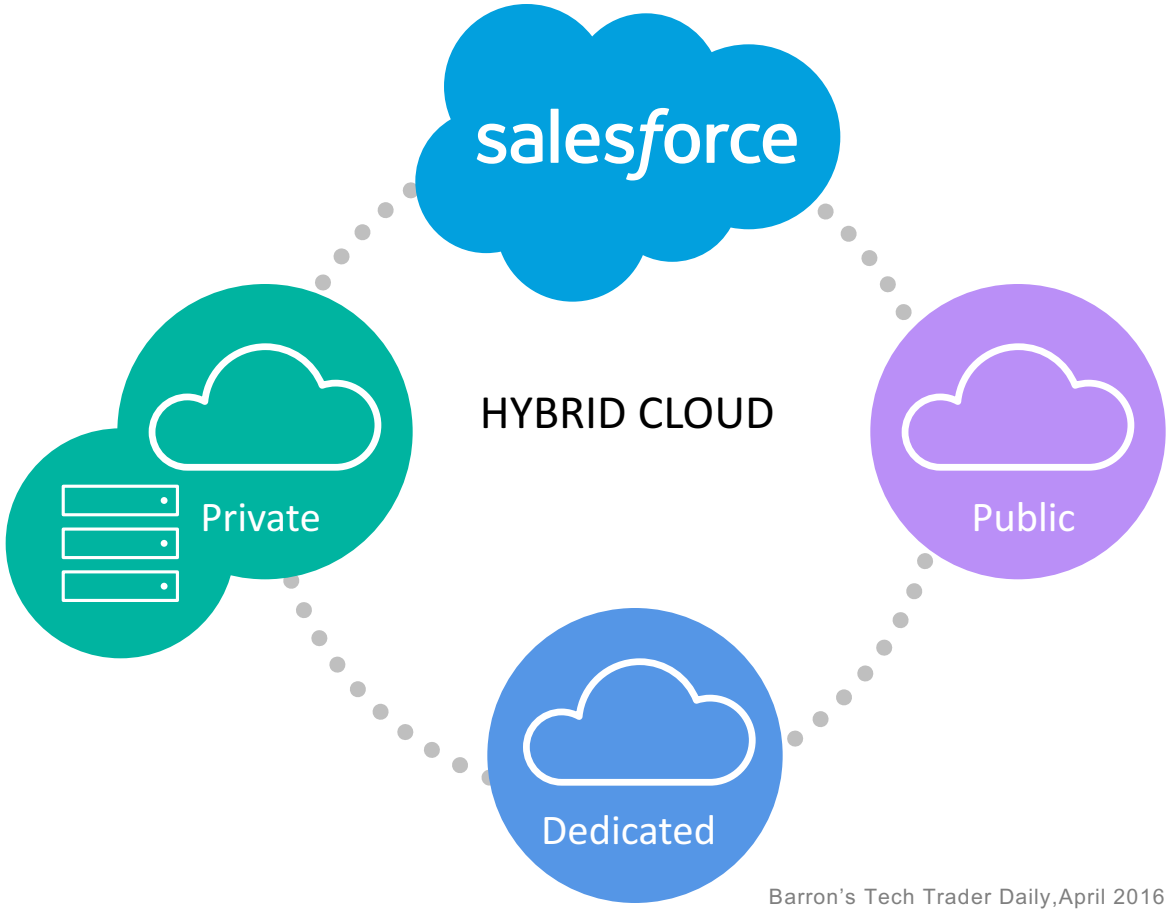
and the Intelligent Customer Success Platform

© IBM Corporation 2017

IBM Cloud Integration for Salesforce

New integrations enable customers to unlock data across multiple clouds and enterprises, making that data easily accessible with the Salesforce platform.

- Direct support for Salesforce message events
- Odata 4.0 support for multi-cloud integration
- Simplified API based integration
- Expanded “programming free” integration for Business Professionals



Barron’s Tech Trader Daily,April 2016

© IBM Corporation 2017

More information….

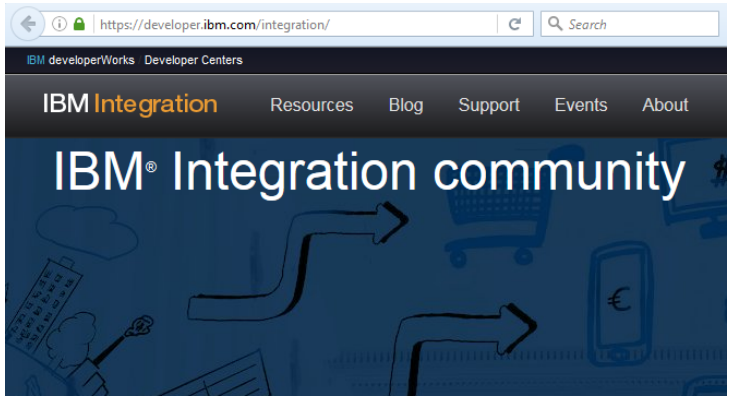
Get more information

- IIB v10 Overview: https://www.youtube.com/watch?v=CM9EBoJ4SDc
- IIBv10 Technical Overview: https://www.youtube.com/watch?v=9RyXxCIqlV8
- Recent video showcasing IIB Rest APIs and their integration with API Connect: https://www.youtube.com/watch?v=hIcTkEHlZgU
- Integration YouTube Channel https://www.youtube.com/user/IBMintegrationMedia
- Integration Twitter Handle: @IBMintegration
- Integration DeveloperWorks https://developer.ibm.com/integration/

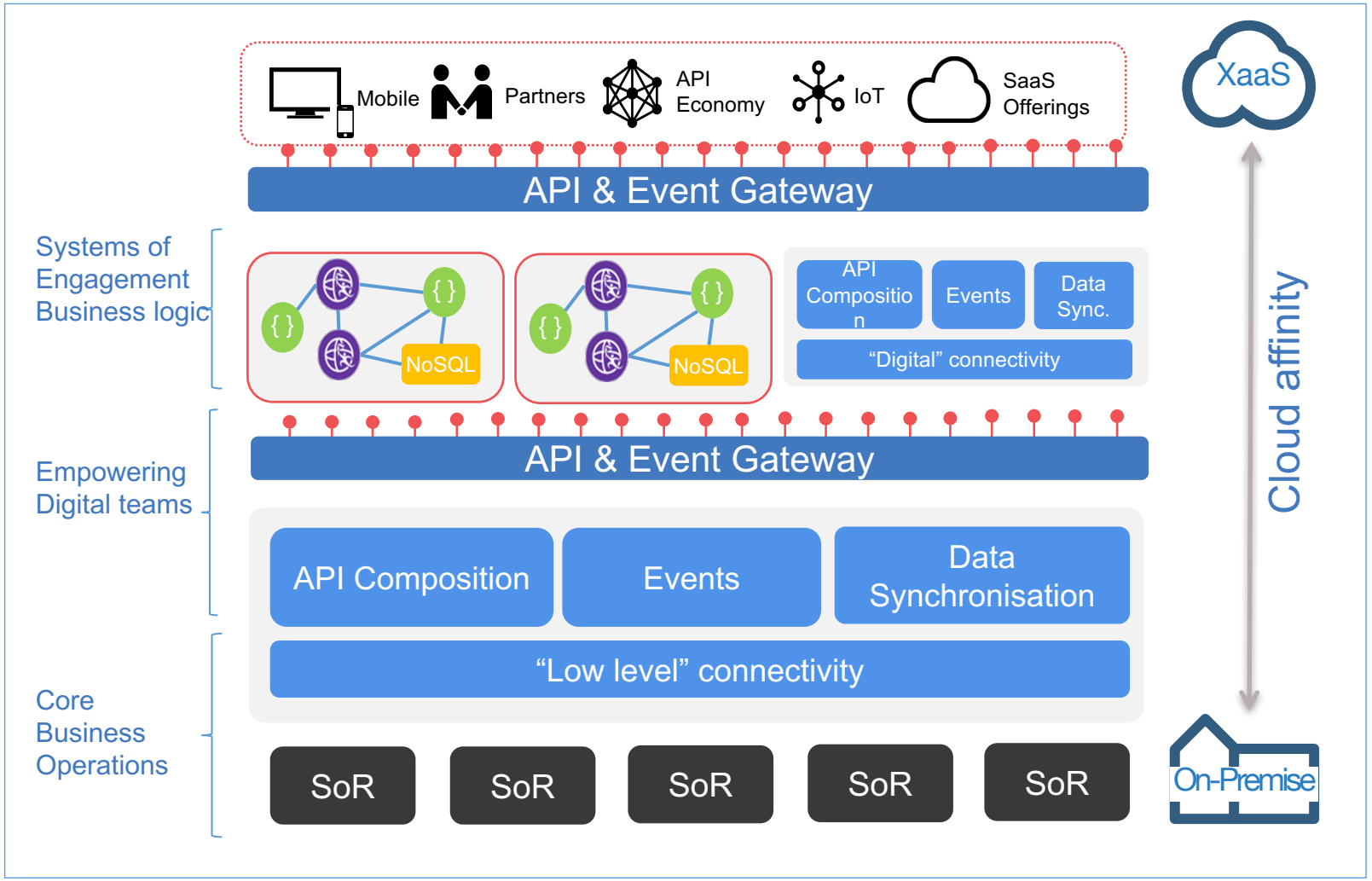
In case slides are not your thing …

- 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	https://youtu.be/ybGOiPZO3sY
IIB and Kibana dashboards	https://youtu.be/sCPrT2dHKSs
IIB and Hybrid Connect	https://youtu.be/gWbxlooq3_g
IIB and LDAP	https://youtu.be/HrqY9MyfzNs
IIB LoopBack Request node	https://youtu.be/rUK_OQ5-Anw
Using IIB to integrate with MongoDB and Cloudant	https://youtu.be/Is1pphngUlM
Using IIB for REST, Graphical Mapping & Salesforce	https://youtu.be/XIK6QvNSHdY
IIB, Kafka and Twilio SMS:	https://youtu.be/7mCQ_cfGGtU
Using Kafka with IIB	https://youtu.be/kYv0crxL86Y
Consuming REST APIs using the IIB REST Request node	https://youtu.be/C_6gPlrCHZQ
Easy demo of an IIB App Connect node	https://youtu.be/StwPbOiFKzk



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

Notices and disclaimers

U.S. Government Users Restricted Rights — use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM.

Information in these presentations (including information relating to products that have not yet been announced by IBM) has been reviewed for accuracy as of the date of initial publication and could include unintentional technical or typographical errors. IBM shall have no responsibility to update this information. **This document is distributed "as is" without any warranty, either express or implied. In no event shall IBM be liable for any damage arising from the use of this information, including but not limited to, loss of data, business interruption, loss of profit or loss of opportunity.** IBM products and services are warranted according to the terms and conditions of the agreements under which they are provided.

IBM products are manufactured from new parts or new and used parts. In some cases, a product may not be new and may have been previously installed. Regardless, our warranty terms apply."

Any statements regarding IBM's future direction, intent or product plans are subject to change or withdrawal without notice.

Performance data contained herein was generally obtained in a controlled, isolated environments. Customer examples are presented as illustrations of how those customers have used IBM products and the results they may have achieved. Actual performance, cost, savings or other results in other operating environments may vary.

References in this document to IBM products, programs, or services does not imply that IBM intends to make such products, programs or services available in all countries in which IBM operates or does business.

Workshops, sessions and associated materials may have been prepared by independent session speakers, and do not necessarily reflect the views of IBM. All materials and discussions are provided for informational purposes only, and are neither intended to, nor shall constitute legal or other guidance or advice to any individual participant or their specific situation.

It is the customer's responsibility to insure its own compliance with legal requirements and to obtain advice of competent legal counsel as to the identification and interpretation of any relevant laws and regulatory requirements that may affect the customer's business and any actions the customer may need to take to comply with such laws. IBM does not provide legal advice or represent or warrant that its services or products will ensure that the customer is in compliance with any law.

Notices and disclaimers continued

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products in connection with this publication and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products. IBM does not warrant the quality of any third-party products, or the ability of any such third-party products to interoperate with IBM's products. **IBM expressly disclaims all warranties, expressed or implied, including but not limited to, the implied warranties of merchantability and fitness for a particular, purpose.**

The provision of the information contained herein is not intended to, and does not, grant any right or license under any IBM patents, copyrights, trademarks or other intellectual property right.

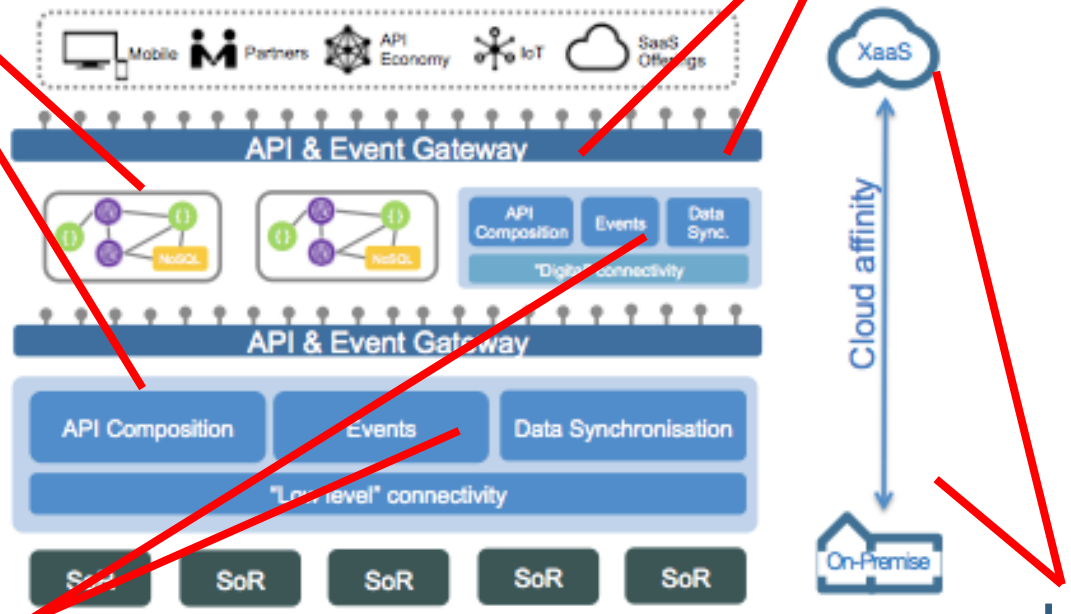
IBM, the IBM logo, ibm.com, Aspera®, Bluemix, Blueworks Live, CICS, Clearcase, Cognos®, DOORS®, Emptoris®, Enterprise Document Management System™, FASP®, FileNet®, Global Business Services®, Global Technology Services®, IBM ExperienceOne™, IBM SmartCloud®, IBM Social Business®, Information on Demand, ILOG, Maximo®, MQIntegrator®, MQSeries®, Netcool®, OMEGAMON, OpenPower, PureAnalytics™, PureApplication®, pureCluster™, PureCoverage®, PureData®, PureExperience®, PureFlex®, pureQuery®, pureScale®, PureSystems®, QRadar®, Rational®, Rhapsody®, Smarter Commerce®, SoDA, SPSS, Sterling Commerce®, StoredIQ, Tealeaf®, Tivoli® Trusteer®, Unica®, urban{code}®, Watson, WebSphere®, Worklight®, X-Force® and System z® Z/OS, are trademarks of International Business Machines Corporation, registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at: www.ibm.com/legal/copytrade.shtml.

Hybrid **User Communities**

Used by both IT as well as LOB who are adopting integration tooling to automate application interactions.

Hybrid **Integration Styles**

Combining **app** integration, **api** integration and **data** integration



Hybrid **Connectivity**

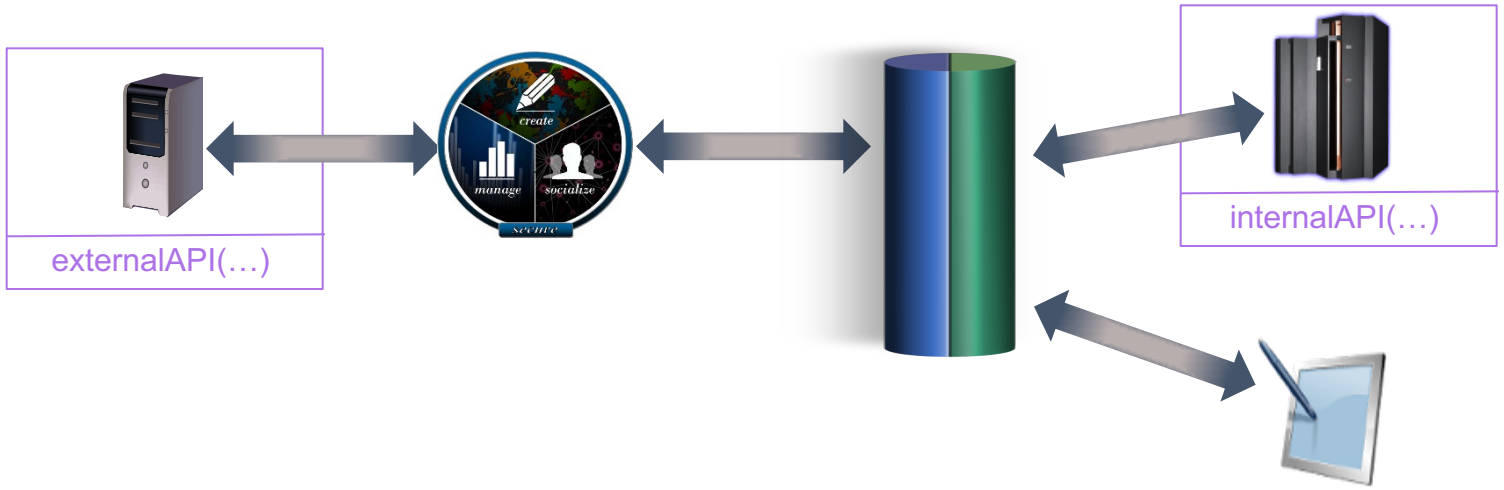
Reach across secure connections to get to data where it is from wherever you need

Hybrid **Deployment**

Software can be flexibly deployed on cloud and on-premises to optimize solution architecture

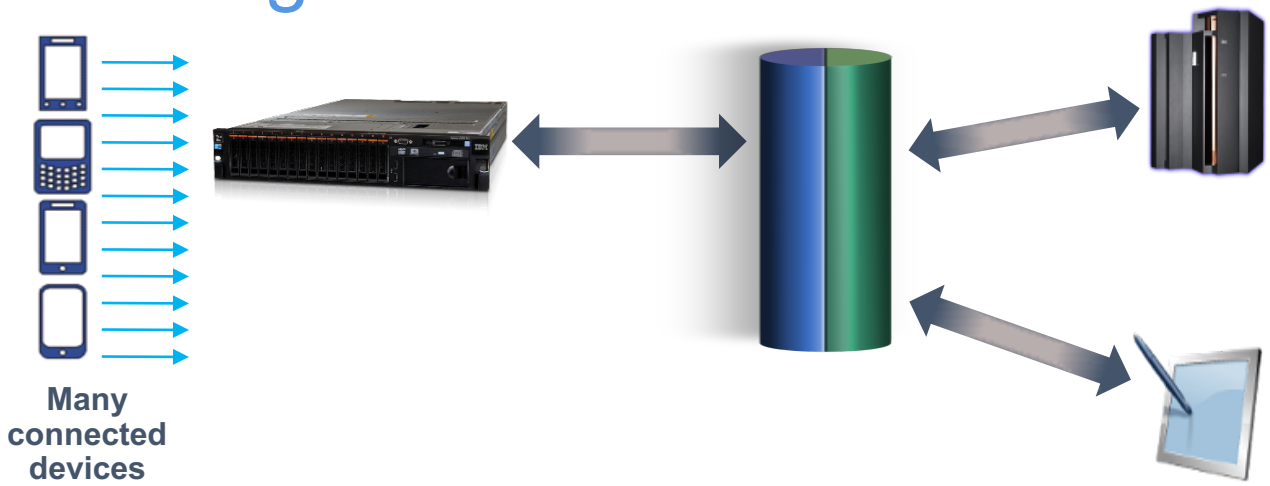
Additional Technical Detail

Create, manage and socialize APIs



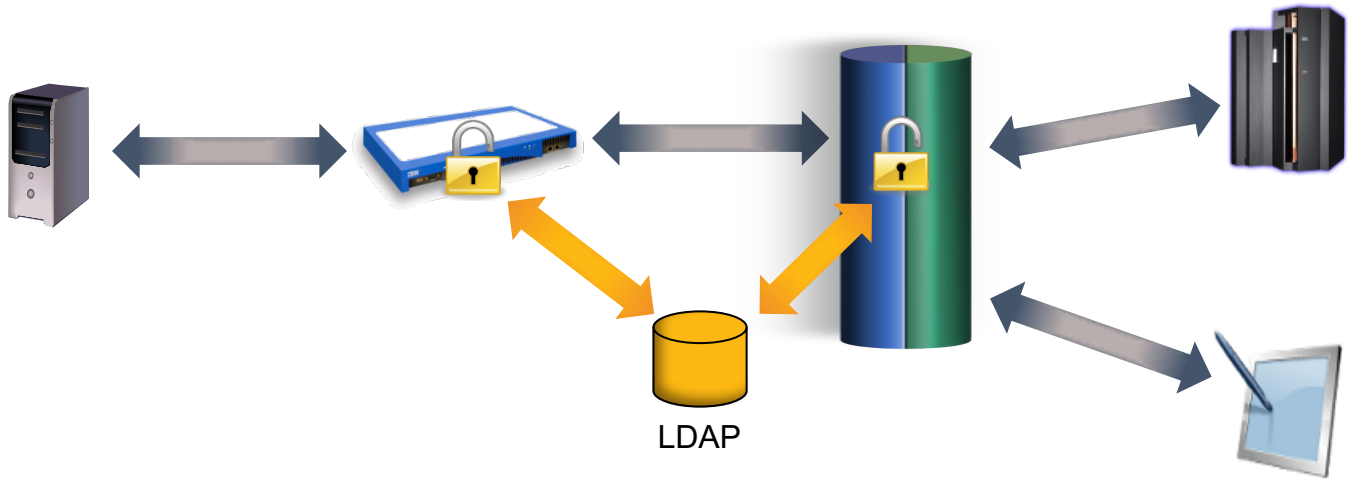
- Expose APIs to provide access to existing business capabilities to a wider set of users
  - Sell services through partners and customers
  - Ease collaboration with external development communities
  - Accelerate pace of delivering new services
- Use cases to bring together the whole lifecycle of APIs, for example:
  - API definition and mapping
  - Storage, search and retrieval
  - Management and deployment
  - Controlling access and entitlement
- Example: IBM API Connect

Mobile and device integration



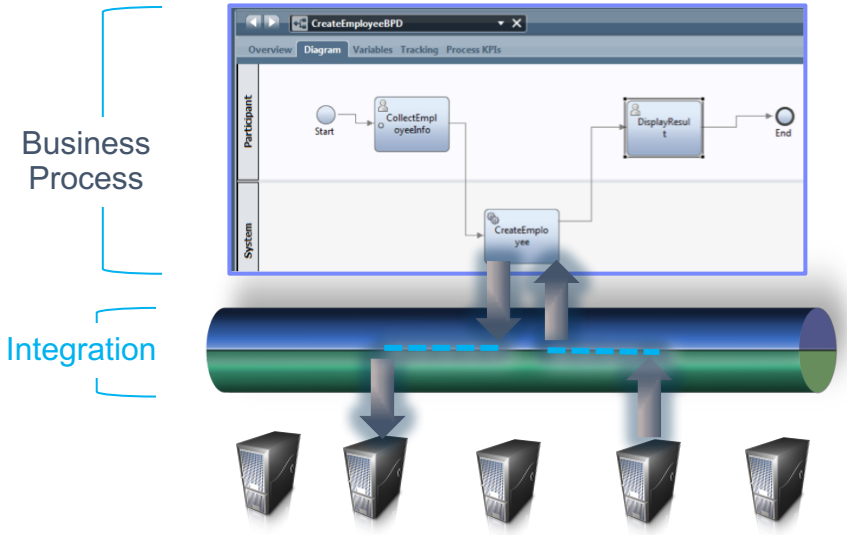
- "How do we get information from everywhere, understand it, and act?"
  - Development of mobile solutions for end-users, partners, employees
  - Industry specific issues: healthcare, energy and utilities, distribution, transport, gaming, etc.
- Typical challenges with mobile integration:
  - Range of devices, Pace of Innovation, Security, Back-end integration, Scale and latency
- Use of mobile/device gateways for standards based device integration
  - MQTT standard for small footprint client, embeddable, low bandwidth cost
- Use of cross-platform development environments for mobile solutions
  - Patterns for mobile-enabled variants of existing back-end services
- Examples: IBM MobileFirst, IBM MessageSight

Security policy enforcement



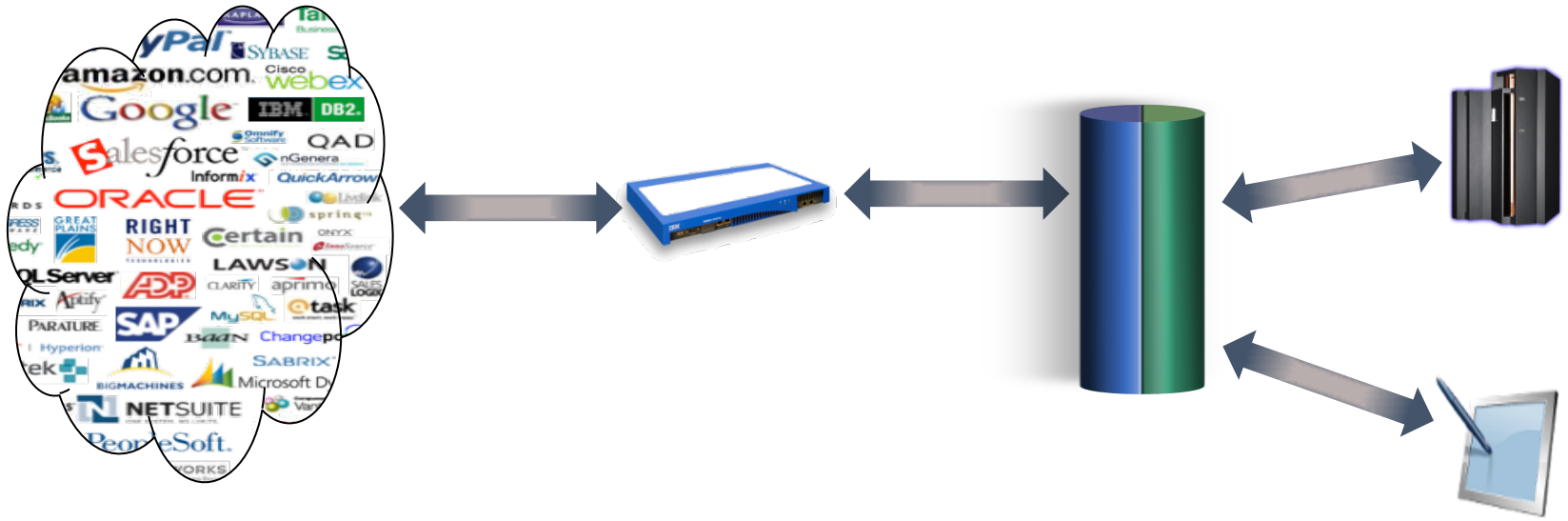
- Perform security policy enforcement either at gateway or on receipt of data from source
  - Gateway uses strengths of security hardened DMZ appliance
  - Consider whether all endpoints inside the ESB are “trusted”
- Common usage patterns cast integration technology as a convenient Policy Enforcement Point
  - Extract security token from input data
    - UserID/Password, X.509, SAML, Kerberos, LTPA, RACF pass ticket, etc.
  - Authorize and authenticate identity through Policy Decision Point (PDP)
    - LDAP, MS Active Directory, Tivoli Federated Identity Manager, WS-Trust, z/OS SAF, etc.
  - Map identities between security domains

Provide integration for business processes



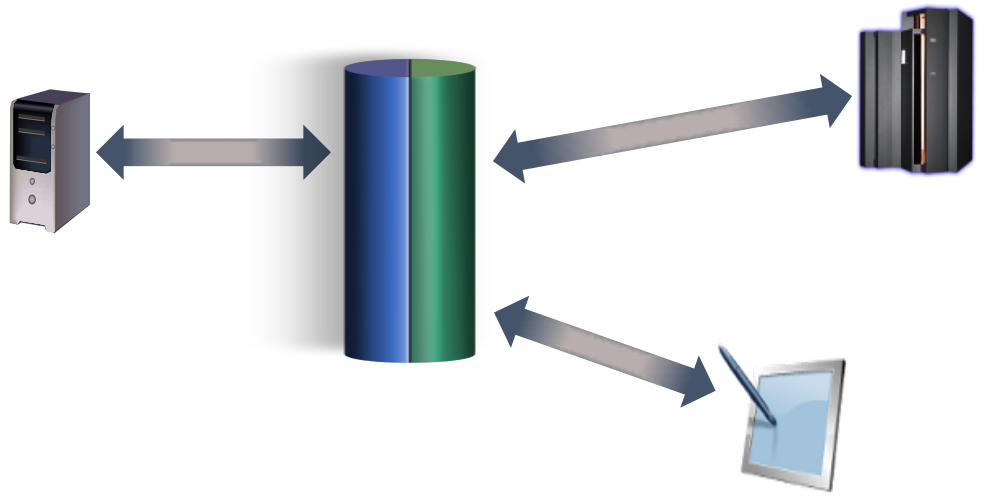
- Simplify BPM by abstracting business process from integration concerns
  - Business process focuses on the WHAT, integration on the HOW and WHERE
- Common Usage Patterns
  - Bottoms-up: Integration engine enables business process starting points. Identify event and initiate business process
  - Tops-down: Integration engine receives service request and routes, re-formats, interacts with provider
- BPM – Business Process Management

Make cloud work for you



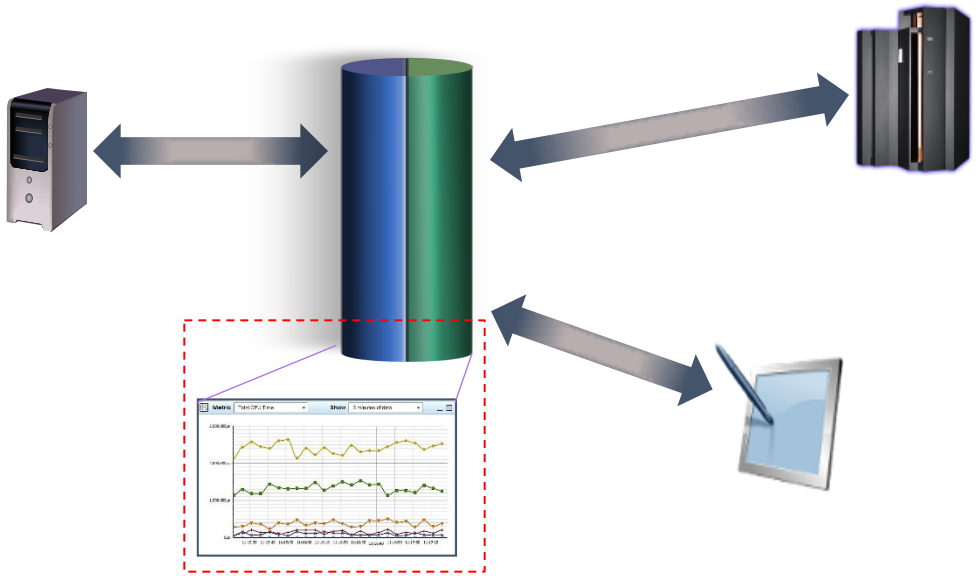
- Cloud represents a significant business growth opportunity
  - Allows faster innovation, developer empowerment, cost and time savings
- Key use cases for cloud integration
  - Leveraging Software as a Service: how to bridge off-premise with existing IT investment
  - Accelerating app development: making best use of dev communities and web solutions
  - Allowing more flexible on-premise IT: scaling off-premise in response to demand spikes
  - Enabling a utility model for middleware: rental of IT infrastructure, platform and software

Understanding and tuning system workloads



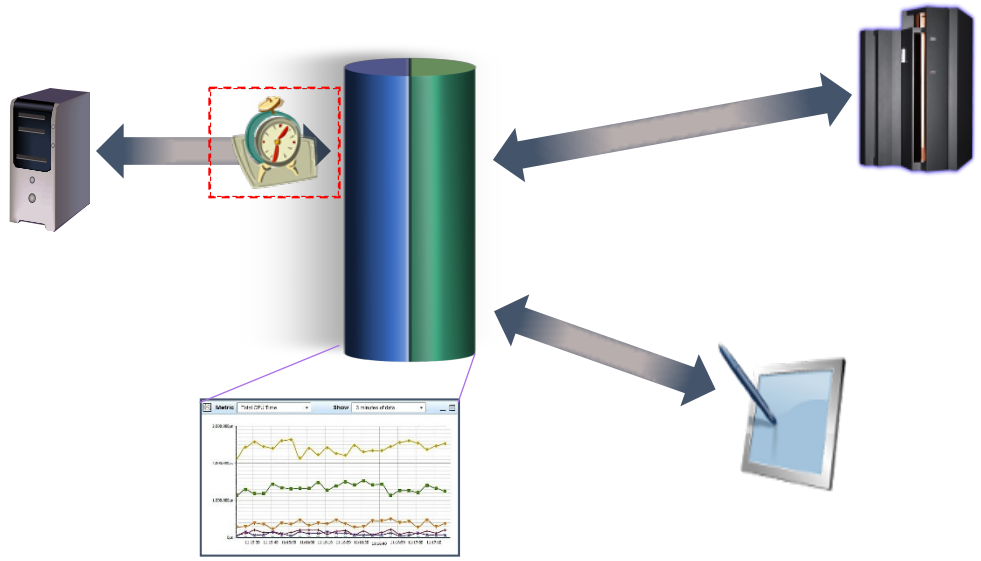
- Integration solutions can provide tools to improve overall responsiveness and reliability

Understanding and tuning system workloads (cont'd)



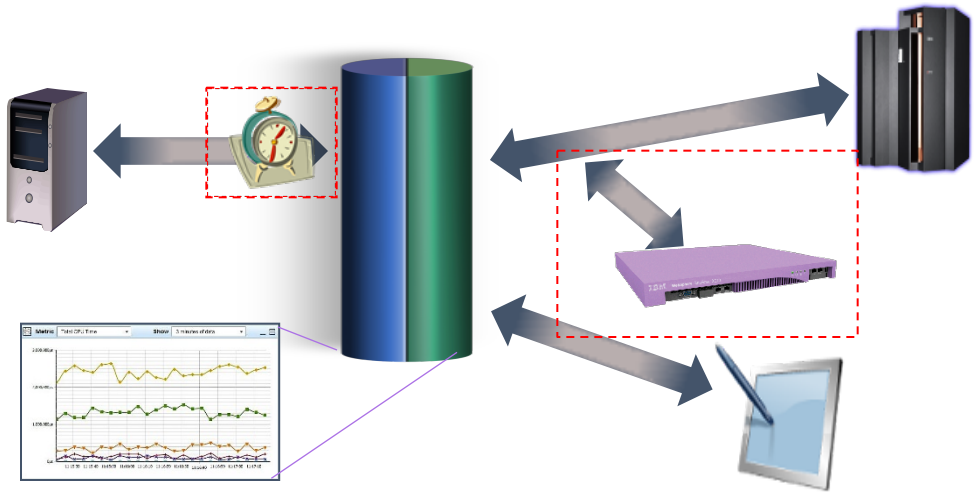
- Integration solutions can provide tools to improve overall responsiveness and reliability
- Technical monitoring
  - Understand throughput rates to anticipate spikes in demand for integration and IT services

Understanding and tuning system workloads (cont'd)



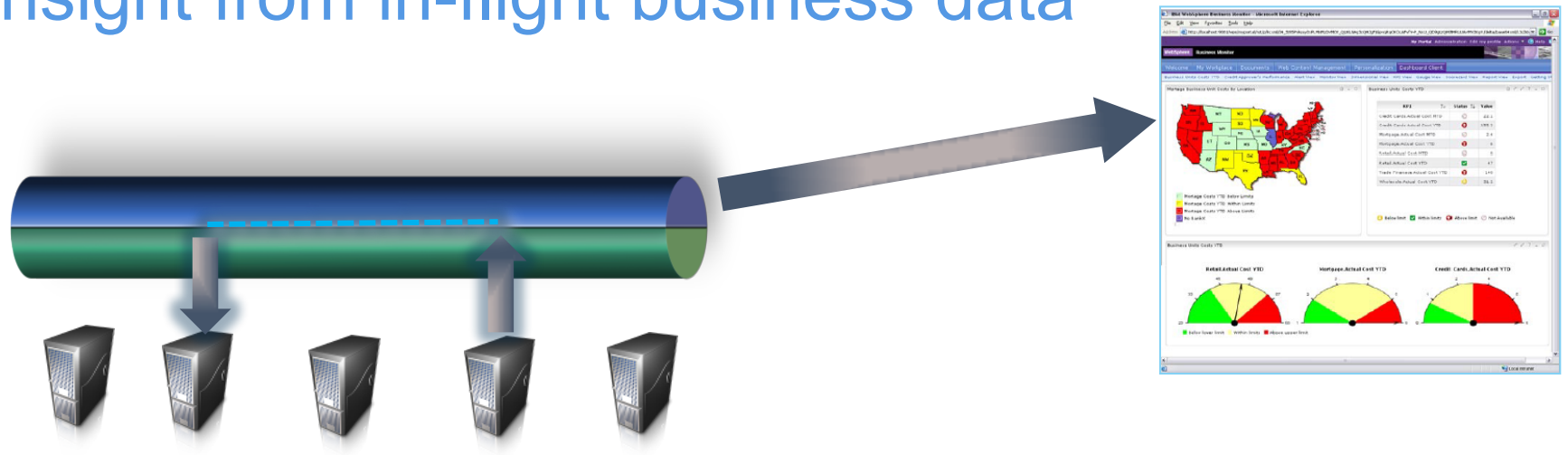
- Integration solutions can provide tools to improve overall responsiveness and reliability
- Technical monitoring
  - Understand throughput rates to anticipate spikes in demand for integration and IT services
- Workload management and detecting unresponsive flows
  - Shape workloads to prevent undue load on back-end systems
  - Detect and handle unresponsive systems

Understanding and tuning system workloads (cont'd)



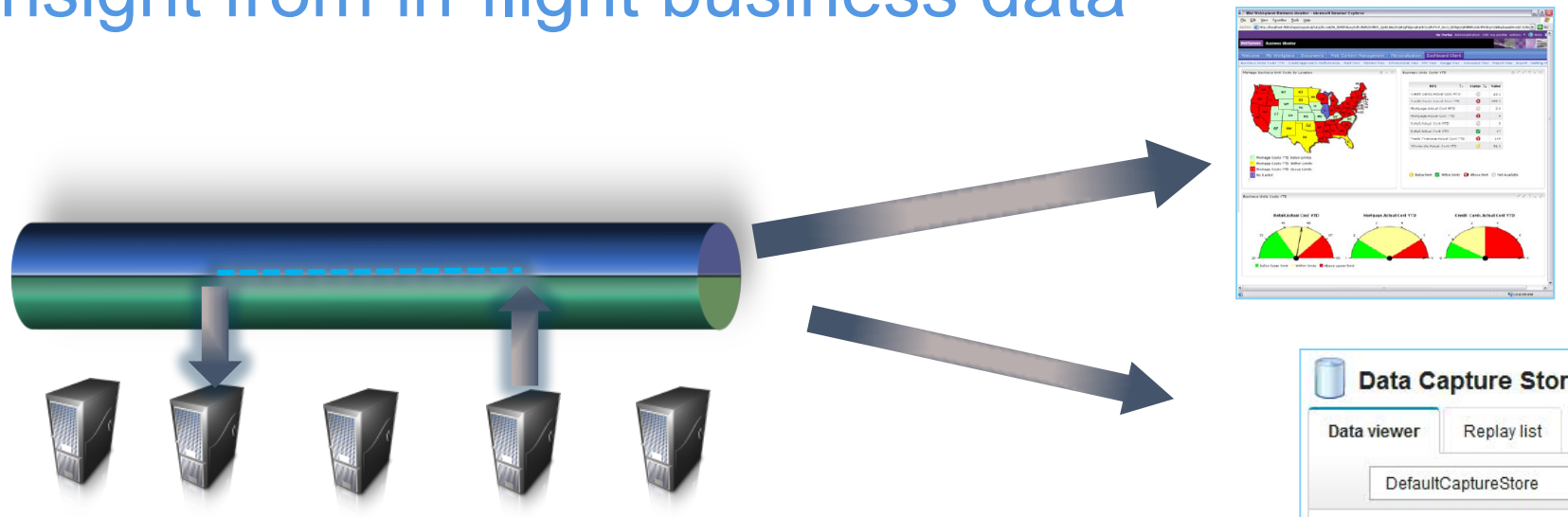
- Integration solutions can provide tools to improve overall responsiveness and reliability
- Technical monitoring
  - Understand throughput rates to anticipate spikes in demand for integration and IT services
- Workload management and detecting unresponsive flows
  - Shape workloads to prevent undue load on back-end systems
  - Detect and handle unresponsive systems
- Caching
  - Hold frequently used data separately to prevent load on critical systems
  - Store transient integration state in integration cache to assist with HA concerns
  - Cache can be part of the integration framework, or closer to the critical data

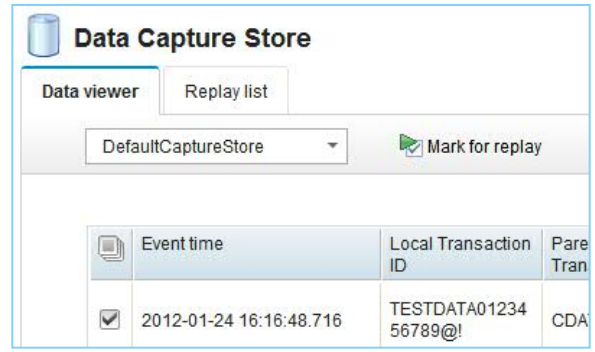
Gaining insight from in-flight business data



- Make best use of business data as it passes through the integration layer!
  - Typically enabled operationally on the integration server to ensure maximum coverage
- Business monitoring
  - Extract important data elements into business monitoring tools to drive KPIs etc.
  - Enable a “system of awareness” across all connected systems

Gaining insight from in-flight business data (cont'd)





- Make best use of business data as it passes through the integration layer!
  - Typically enabled operationally on the integration server to ensure maximum coverage
- Business monitoring
  - Extract important data elements into business monitoring tools to drive KPIs etc.
  - Enable a "system of awareness" across all connected systems
- Audit
  - Extract message payloads to prove delivery or receipt of business information
  - Query stored data based on business relevant fields, e.g. by transaction ID

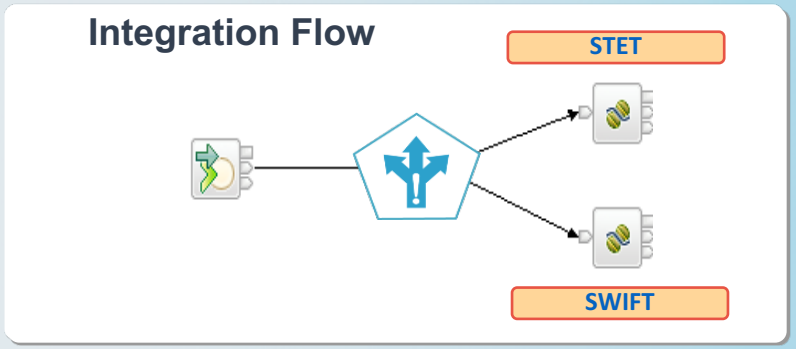
Gaining insight from in-flight business data (cont'd)

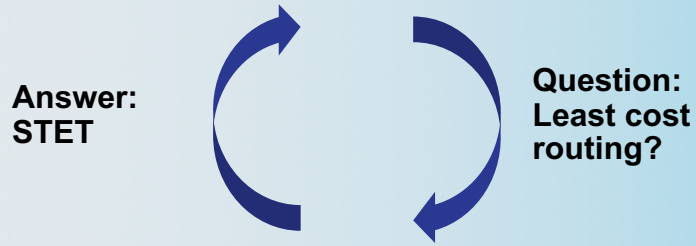
- Make best use of business data as it passes through the integration layer!
  - Typically enabled operationally on the integration server to ensure maximum coverage
- Business monitoring
  - Extract important data elements into business monitoring tools to drive KPIs etc.
  - Enable a "system of awareness" across all connected systems
- Audit
  - Extract message payloads to prove delivery or receipt of business information
  - Query stored data based on business relevant fields, e.g. by transaction ID
- Record and replay
  - Replay stored data through the integration server, or direct to back-end systems
  - Enables load and regression testing, and production recovery scenarios
  - Distinguish between successful and failed events, and treat accordingly

Act upon business rules

- Combine integration with Business Rules Management System (BRMS)
  - Adapt faster to ongoing change requirements
  - Reduce load on IT development
- BRMS augments integration engine
  - Augment and transform messages based on business decisions
  - Specify dynamic routing in intuitive business terms
  - Provide business level validation rules for messages
- Integration engine augments BRMS
  - Enrich decision requests with additional data prior to invoking decision
  - Transform Decision requests from multiple sources to a common format to invoke common decision services
  - Enable virtualization of decision services

Smart Routing Scenario:
Least Cost Routing for Finance Payments





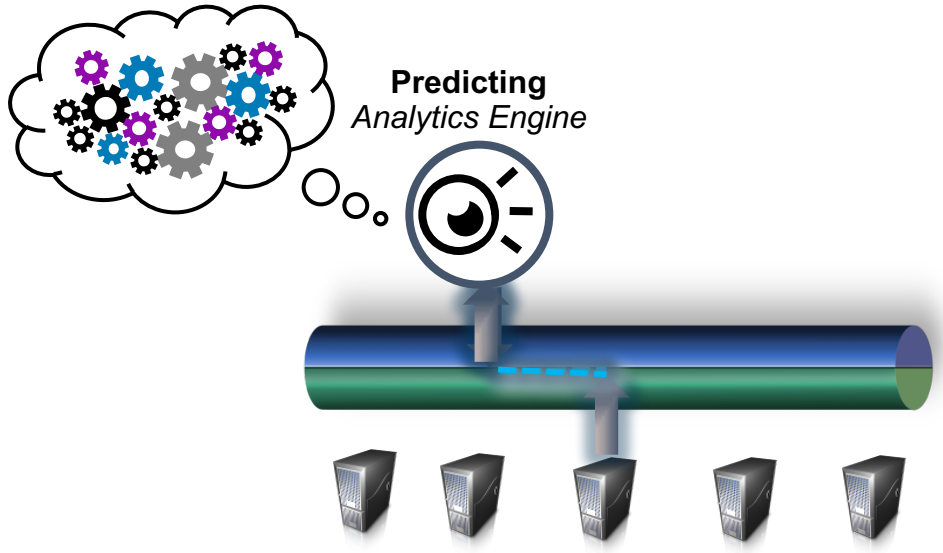
Business Rules

```
if all of the following conditions are true :
        - the currency of 'the transaction' is "EUR"
        - the receiver country of 'the transaction' is "FR"
then
    set the CSM of 'the transaction' to "STET";
    set the priority of 'the transaction' to 0.15;
```

Applying analytics to in-flight data

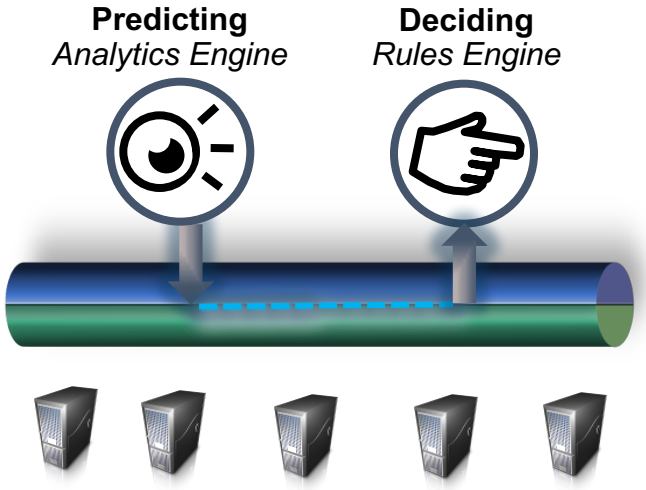
- Connect analytics engine to the integration platform for model-based decision making
  - Define the model in tools, deploy, use in real-time, update dynamically
  - Examples: SPSS, R, SAS, ODM Advanced
- Closely (but not necessarily) linked to business rules for acting on predictions
- Two initial use cases for using the model with real-time data
  - Scoring: Synchronous use of model to score live data (e.g. propensity to buy)
  - Observing: Comparing models with live data for divergence (e.g. SKU lower than expected)

Applying analytics to in-flight data (cont'd)



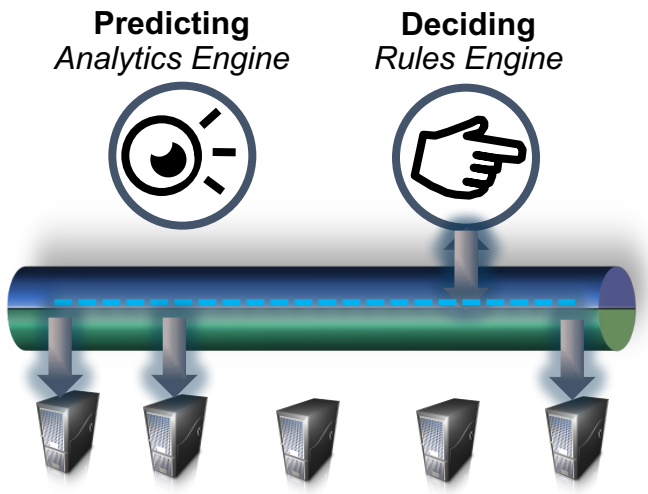
- Connect analytics engine to the integration platform for model-based decision making
  - Define the model in tools, deploy, use in real-time, update dynamically
  - Examples: SPSS, R, SAS, ODM Advanced
- Closely (but not necessarily) linked to business rules for acting on predictions
- Two initial use cases for using the model with real-time data
  - Scoring: Synchronous use of model to score live data (e.g. propensity to buy)
  - Observing: Comparing models with live data for divergence (e.g. SKU lower than expected)

Applying analytics to in-flight data (cont'd)



- Connect analytics engine to the integration platform for model-based decision making
  - Define the model in tools, deploy, use in real-time, update dynamically
  - Examples: SPSS, R, SAS, ODM Advanced
- Closely (but not necessarily) linked to business rules for acting on predictions
- Two initial use cases for using the model with real-time data
  - Scoring: Synchronous use of model to score live data (e.g. propensity to buy)
  - Observing: Comparing models with live data for divergence (e.g. SKU lower than expected)

Applying analytics to in-flight data (cont'd)



- Connect analytics engine to the integration platform for model-based decision making
  - Define the model in tools, deploy, use in real-time, update dynamically
  - Examples: SPSS, R, SAS, ODM Advanced
- Closely (but not necessarily) linked to business rules for acting on predictions
- Two initial use cases for using the model with real-time data
  - Scoring: Synchronous use of model to score live data (e.g. propensity to buy)
  - Observing: Comparing models with live data for divergence (e.g. SKU lower than expected)