HHI-2121

InterConnect
2017

Docker and IBM Integration Bus

Geza Geleji
Development, IBM Integration Bus

Please note

IBM’s statements regarding its plans, directions, and intent are subject to change or withdrawal without notice 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.

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.

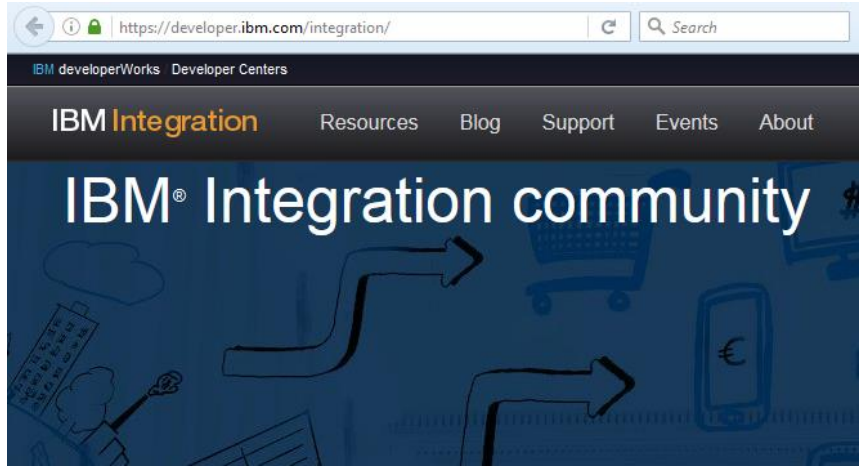
IIB Sessions at InterConnect 2017

Session	Who	Time
2110A What's New in IBM Integration Bus	BT	Monday 16:15 – 17:00
2141A IBM Integration Bus Futures and Strategy ***(Inner Circle only)***	BT	Tuesday 11:30 – 12:15
2158A Technical Introduction to IBM Integration Bus	GG	Tuesday 13:30 – 14:15
2118A Developing Integrations for IBM Integration Bus on Cloud	GG	Tuesday 14:30 – 15:15
2144A IBM Integration Bus Customer Roundtable	BT	Tuesday 15:45 – 16:30
2121A Docker and IBM Integration Bus	GG	Wednesday 09:00 – 09:45
2151A Effective Administration of IBM Integration Bus	SN	Wednesday 10:15 – 11:00
7445A Application Integration Suite Meet the Experts	BT	Wednesday 14:00 – 14:45
2144B IBM Integration Bus Customer Roundtable	BT	Wednesday 16:15 – 17:00
2124A Operational and Business Monitoring with IBM Integration Bus	SN	Thursday 09:30 – 10:15
2111A IBM Integration Bus and REST APIs	SN	Thursday 10:30 – 11:15
2166A IBM Integration Bus Version 10 Hands-On Scheduled Lab	GG+SN	Monday 13:00 – 14:45
2166B IBM Integration Bus Version 10 Hands-On Scheduled Lab	GG+DS	Thursday 08:30 – 10:15
9402 IBM Integration Bus Version 10 Hands-On Open Lab	None	Any Open Lab Session

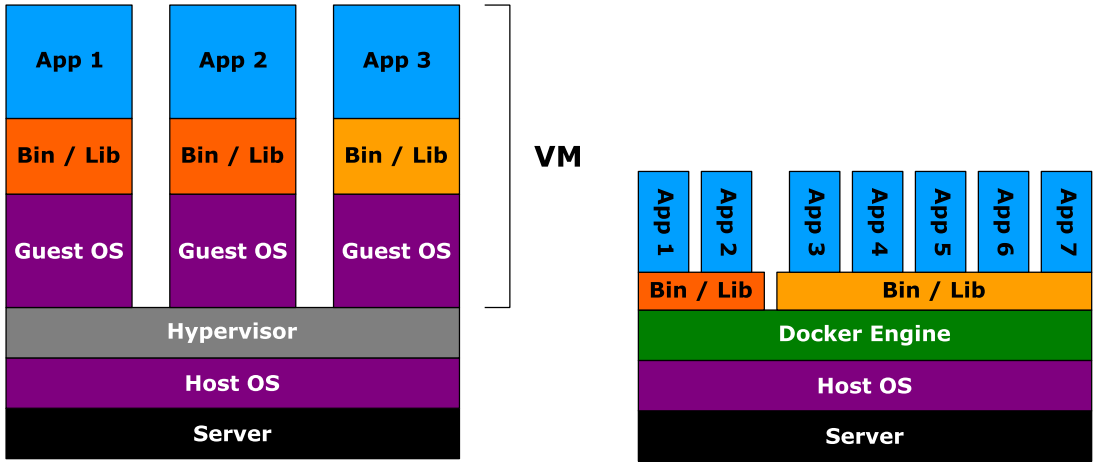
In case slide decks aren't your thing…

- 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.

Async Callable Flow Invoke Nodes	https://youtu.be/btFcvdleDMw
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/gWbxIooq3_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



What is Docker?



Virtual Machines

Containers

"Docker containers wrap a piece of software in a complete filesystem that contains everything needed to run: code, runtime, system tools, system libraries – anything that can be installed on a server. This guarantees that the software will always run the same, regardless of its environment."

***docker.com**, retrieved 1 Dec 2016*

commoditization and simplification of containers technology

Terminology (from docker.com):

- An *image* is a filesystem and parameters to use at runtime. It doesn't have state and never changes.
- A *container* is a running instance of an image.
- A *registry* is a storage and content delivery system, holding named Docker images, available in different tagged versions.

tooling (APIs, CLIs, services, training) to help manage the lifecycle of containers

Running an IIB Docker container

https://github.com/ot4i/iib-docker

```
# docker build -t iibdemo .
```

```
# docker run --name myNode -e LICENSE=accept -e NODENAME=MYNODE -P iibdemo
```

```
Sourcing profile

MQSI 10.0.0.6
/opt/ibm/iib-10.0.0.6/server

----------------------------------------
Version:      '10.0.0.6'
Product:      'IBM Integration Bus'
Build Number: '197'
IE02 level:   'ie02-L20140415-1143'
IB Level:     'ib1000-L160824.197_P'
Server level: 'S1000-L160823.10129'
Toolkit level:'20160819-1112' [not installed]
----------------------------------------
----------------------------------------
Node MYNODE does not exist...
Creating node MYNODE
BIP8071I: Successful command completion.
----------------------------------------
----------------------------------------
Starting syslog
Starting node MYNODE
BIP8096I: Successful command initiation, check the system log to ensure that the
component started without problem and that it continues to run without problem.
----------------------------------------
----------------------------------------
Running - stop container to exit
```

At this point, we have an IIB V10 node running!

- IBM Integration Bus runs in the background, as it would on bare metal
- We run a foreground process (`iib_manage.sh`)
  - When this process exits, the container stops
- View port mappings:

```
# docker port da975f82a0e2
4414/tcp -> 0.0.0.0:32769
7800/tcp -> 0.0.0.0:32768
```

- Access it as you would a normal node:
  - Web administration on mapped port for 4414
  - Connect the toolkit
  - Deploy a HTTP flow and use mapped port 7800 to put some traffic through it
  - Run `mqsi` commands against it:

```
docker exec da975f82a0e2 /bin/bash -c mqsilist
```

  - Access the `syslog`:

```
docker exec da975f82a0e2 tail -f /var/log/syslog
```

Building an IIB Docker Image

https://github.com/ot4i/iib-docker

```
FROM ubuntu:14.04

# [...]

# Install IIB V10 Developer edition
RUN mkdir /opt/ibm && \
    curl http://public.dhe.ibm.com/ibmdl/export/pub/software/websphere/integration/10.0.0.6-
IIB-LINUX64-DEVELOPER.tar.gz \
    | tar zx --exclude iib-10.0.0.6/tools --directory /opt/ibm && \
    /opt/ibm/iib-10.0.0.6/iib make registry global accept license silently

# [...]

# Expose default admin port and http port
EXPOSE 4414 7800

USER iibuser

# Set entry point to run management script
ENTRYPOINT ["iib_manage.sh"]
```

Extensibility

- Add your own, local product binaries
- Expose more ports/explicit ports using "`-p`"
- Manage state using volumes
  https://docs.docker.com/engine/userguide/containers/dockervolumes/
- Add in your own monitoring
- Run in the cloud! E.g. on IBM containers:
  https://developer.ibm.com/integration/blog/2016/11/18/run-ibm-integration-bus-in-bluemix-in-3-easy-steps/
  - Use pre-built IIB images hosted in BlueMix
  - Run as a hosted container with monitoring and access to other BlueMix services – e.g. monitoring, logging, alerting, service discovery

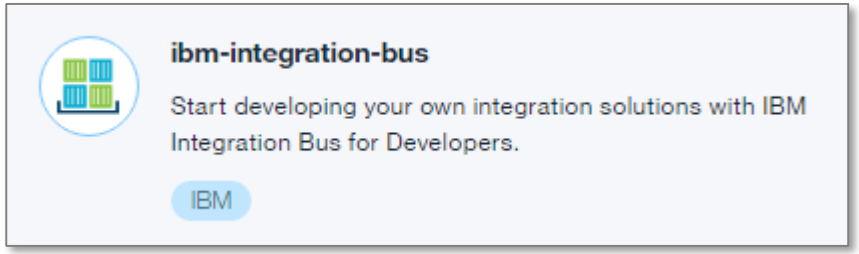
Futures

- Prebuilt images on IBM Containers
  - V10 only
  - V10 and MQ Server
  - V10 and MQ Client
- More examples on the community
- `Dockerfile` shipped with the product
- Prebuilt images on DockerHub

IIB V10 on Docker supported in production

http://www-969.ibm.com/software/reports/compatibility/clarity-reports/report/html/softwareReqsForProduct?deliverableId=1376392102308&osPlatform=Linux

- Linux kernel 3.10 or above
- Image OS must be supported for IIB
- Must be able to run `mqsi` commands and access syslog



Add MQ to your image

https://github.com/ibm-messaging/mq-docker

- MQ V8 is supported in Docker
- Build an MQ image
- Build your IIB image "`FROM`" the MQ one to use a default queue manager

Building an IIB Docker Image From an Existing Runtime Archive

- In order to avoid creating unnecessary filesystem layers, we use SSH within a shell script to download an image from within the local network

```
COPY *.sh *.mqsc id.rsa host.key /tmp/
```

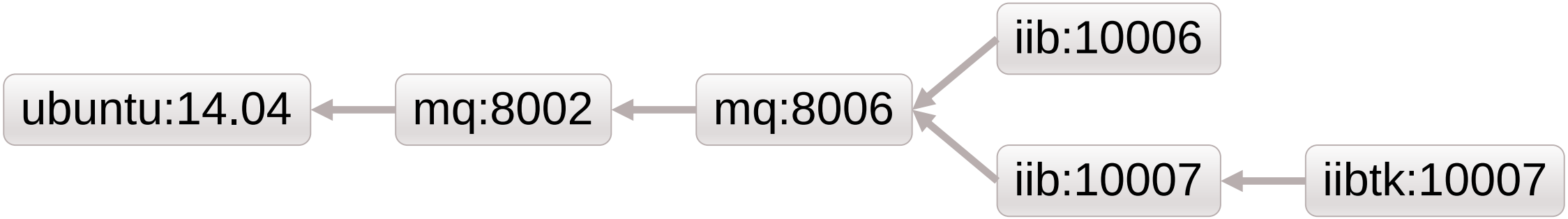
```
# set up SSH access for root
mkdir -m 700 ~/.ssh
cat /tmp/host.key | sed s/localhost/${HOSTIP}/ >> ~/.ssh/known_hosts
mv /tmp/id.rsa ~/.ssh/id_rsa
chmod 644 ~/.ssh/known_hosts
chmod 600 ~/.ssh/id_rsa
rm -rf /tmp/host.key
```

```
HOSTIP=`ip route show 0.0.0.0/0 | grep -Eo 'via \S+' | awk '{ print \$2 }'`
IIBIMAGEPATH="/media/cdrom"
IIBTAG="iib-10.0.0.7"
IIBIMAGE="${IIBTAG}.tar.gz"

cd /tmp
scp ${SSHUSER}@${HOSTIP}:${IIBIMAGEPATH}/${IIBIMAGE} .
```

Running an IIB Docker Container

```
REPOSITORY    TAG      IMAGE ID        CREATED              SIZE
iibtk         10007    686ab9d1f704    About an hour ago    3.58 GB
iib           10006    86d5a78d95d3    9 days ago           2.68 GB
iib           10007    3e727e7c136b    2 weeks ago          2.69 GB
mq            8006     6013fa8e3e54    2 weeks ago          1.75 GB
mq            8002     cad6d603d50a    2 weeks ago          799 MB
ubuntu        14.04    b969ab9f929b    7 weeks ago          188 MB
```



Running an IIB Docker container with MQ and volumes

```
docker run
  --name myNode
  -e LICENSE=accept

  -e QMGRNAME=QMGR1
  -p 1414:1414
  -v mqdata:/var/mqm

  -e NODENAME=NODE1
  -e SVRNAME=server1
  -p 4414:4414
  -p 7800:7800
  -v iibdata:/var/mqsi

  iib:10006
```

```
---------------------------------------
Name:         WebSphere MQ
Version:      8.0.0.6
Level:        p800-006-170117
BuildType:    IKAP - (Production)
Platform:     WebSphere MQ for Linux (x86-64 platform)
```

```
---------------------------------------
WebSphere MQ queue manager created.
```

```
---------------------------------------
WebSphere MQ queue manager 'QMGR1' starting.
```

```
AMQ8021: Request to start WebSphere MQ listener accepted.
2 MQSC commands read.
No commands have a syntax error.
All valid MQSC commands were processed.
[…]
10 MQSC commands read.
No commands have a syntax error.
All valid MQSC commands were processed.
[…]
```

Running an IIB Docker container with MQ and volumes

```
----------------------------------------
Version:      '10.0.0.6'
Product:      'IBM Integration Bus'
[…]
----------------------------------------
Starting syslog
```

```
----------------------------------------
Node NODE1 does not exist...
Creating node NODE1 with QMGR1 as default queue manager
BIP8071I: Successful command completion.
```

```
----------------------------------------
Starting node NODE1
BIP8096I: Successful command initiation, check the system log to ensure that the component started
without problem and that it continues to run without problem.
```

```
----------------------------------------
Configuring node NODE1...
BIP1124I: Creating integration server 'server1' on integration node 'NODE1'...
BIP1117I: The integration server was created successfully.

The integration node has initialized the integration server.
BIP8071I: Successful command completion.
[…]
BIP8096I: Successful command initiation, check the system log to ensure that the component started
without problem and that it continues to run without problem.
```

```
----------------------------------------
Running -- remove /var/lock/iib-manage.sh.lock to stop
```

Building and Deploying a BAR File

- Call shell scripts from within a Dockerfile to perform build tasks in ephemeral containers
- State can be persisted to Docker shared volumes

```
cd ~
mkdir git
cd git
```

```
git clone ssh://geleji@$HOSTIP/home/geleji/git/InterConnect2017.git
```

```
cd ~/git/InterConnect2017/Docker
ls -al
cd ~/git
```

```
xvfb-run mqsicreatebar -data ~/git/InterConnect2017/Docker/
        -b ~/git/mqecho.bar -a MQEcho -deployAsSource
```

```
mqsideploy NODE1 -e server1 -a ~/git/mqecho.bar -m
```

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.

Thank you!

InterConnect
2017