common
EUROPE LUXEMBOURG
Modernisation des Applications IBM i & Open Source
(webinaire)
Jeudi 25 mars – 14h00 – 17h00

OpenShift & IBM i
Demonstration

https://github.com/bmarolleau/acmeair-customerservice-java-jdbc

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Replays & Presentations
https://ibm.biz/bma-wiki

IBM Garage - IBM Systems Center Montpellier

Survey 2: Cloud & AI

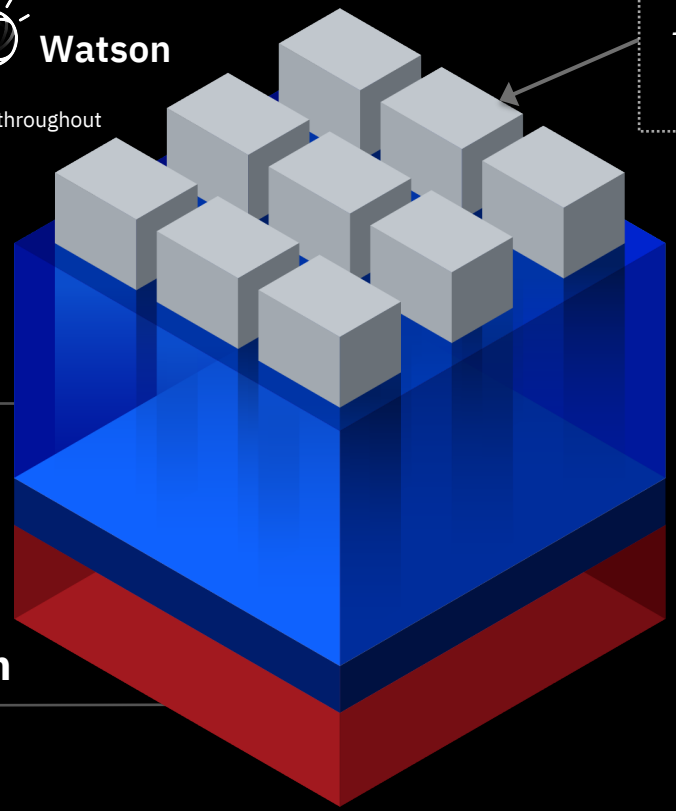
The IBM hybrid cloud approach

Hybrid cloud Applications

Integrated with Cloud Paks, on any cloud

Watson

Infuse AI for business throughout our software



Cloud Paks

Unify and simplify software experiences with seamless integration of related capabilities

Red Hat OpenShift **Hybrid cloud platform**

Enable software to run anywhere, on any cloud, as agile cloud-native services

IBM i

The Integrated Promise of IBM i :

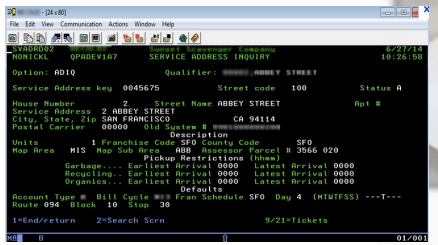
- Deliver high value platform for business apps
- Provide exceptional security and resiliency for critical business data
- Leverage IBM systems, storage and software technologies

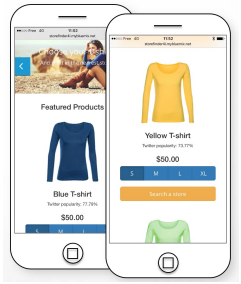
aws

IBM

Application Modernization

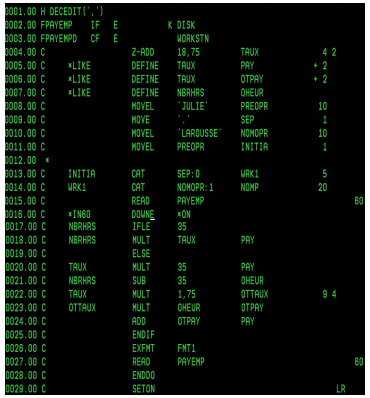
Extending Traditional Apps with Cloud Native





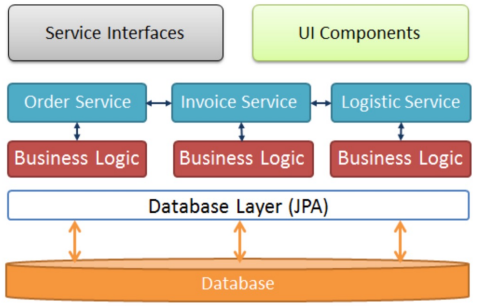
Why Microservices?
→Continuous Innovation vs. Business Needs

How?
→ Flexible User facing components (Micro-Services, 12-Factor,K8s)
→ Integrated with rock solid core Business apps.



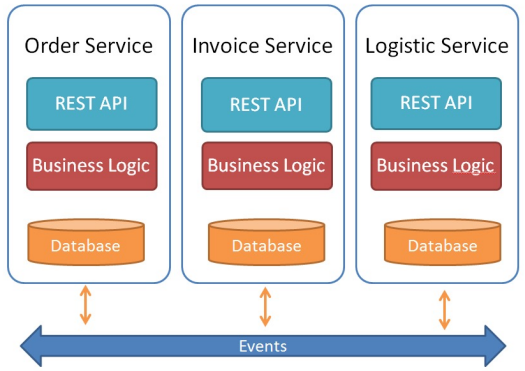
App Centric Monolith,
Single Program
Hard to Maintain & Change

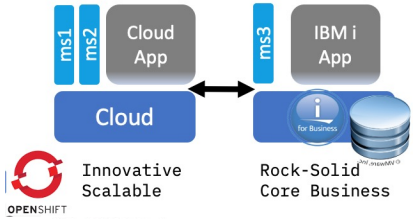
DevOps Ready



Data Centric, Modular & Layered,
Modern Tech, Design Patterns (MVC…)
Horizontal (technical) Layers

Verticals





Microservice, 12 Factor Design
Loosely coupled services
Vertical (business) layers

Micro-Service App : OpenShift + IBM i

Demonstration

Stateless & Distributed Front-end Apps

Unleash: Build new cloud-native solutions

OpenShift : Enterprise Kubernetes for Cloud Native

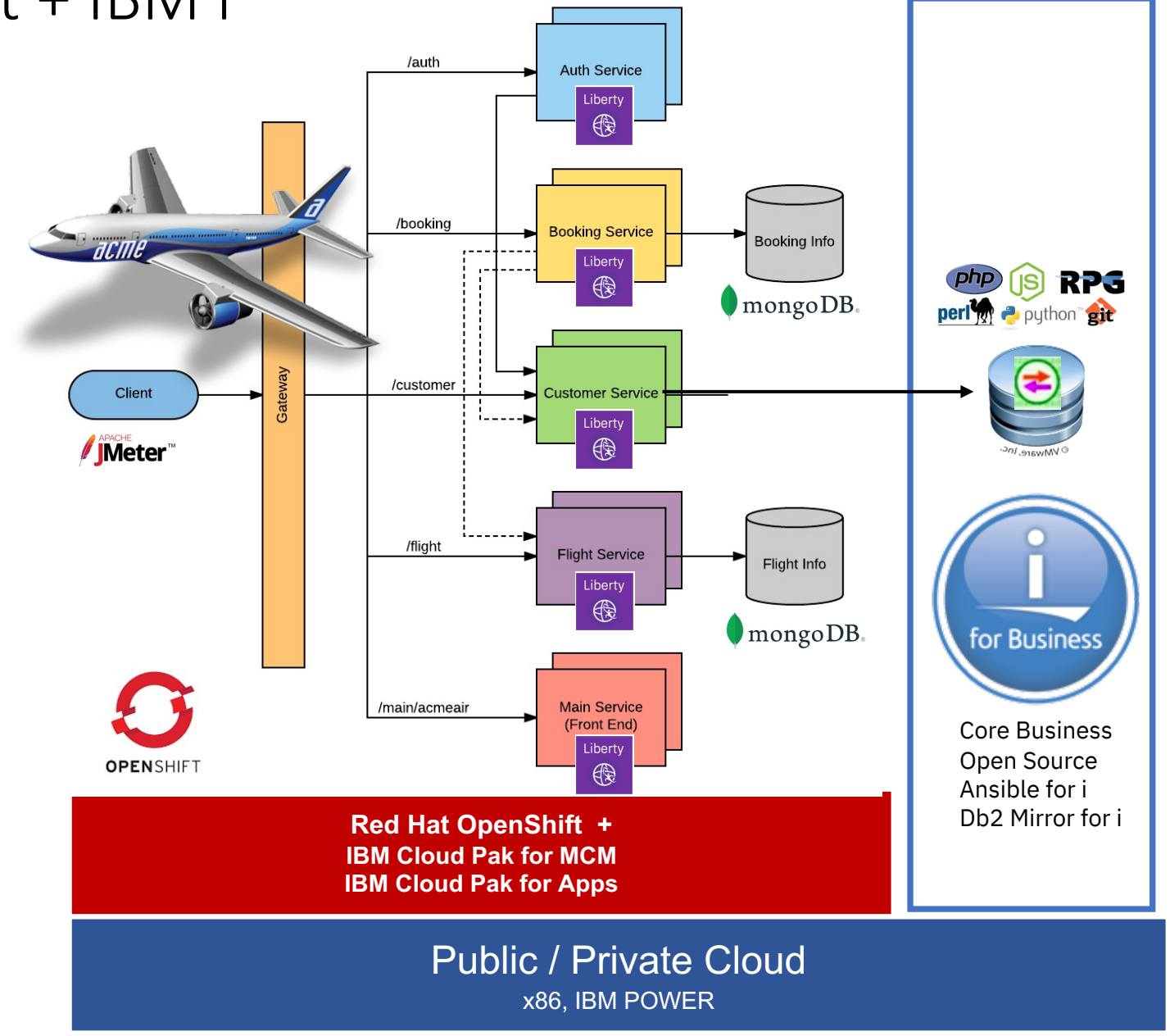
✓ OCP on Power: 2.5 X more container density vs. x86 and Unequaled Reliability
✓ IBM Cloud Pak for Apps for easy Re-platforming & DevOps

Stateful & Transactional Apps

Unlock: Modernize and leverage existing investments

IBM i : Unrivaled Application & Database Server

✓ Real time replication w/ **PowerHA**
✓ Zero downtime with **Db2 Mirror for i**
✓ Maximum Resilience, Security (CVS Reports)
✓ Modernize and Expose existing Business Logic (RPG, COBOL, Node.js, Python etc.)



Micro-Service App : OpenShift + IBM i

Demonstration

The Acmeair microservices app is developed to analyze Cloud Environment performance.

Acmeair-CustomerService rewritten for IBM i

acmeair-mainservice-java
This service contains the front end of AcmeAir Microservices.
HTML Apache-2.0 49 17 0 0 Updated 5 days ago

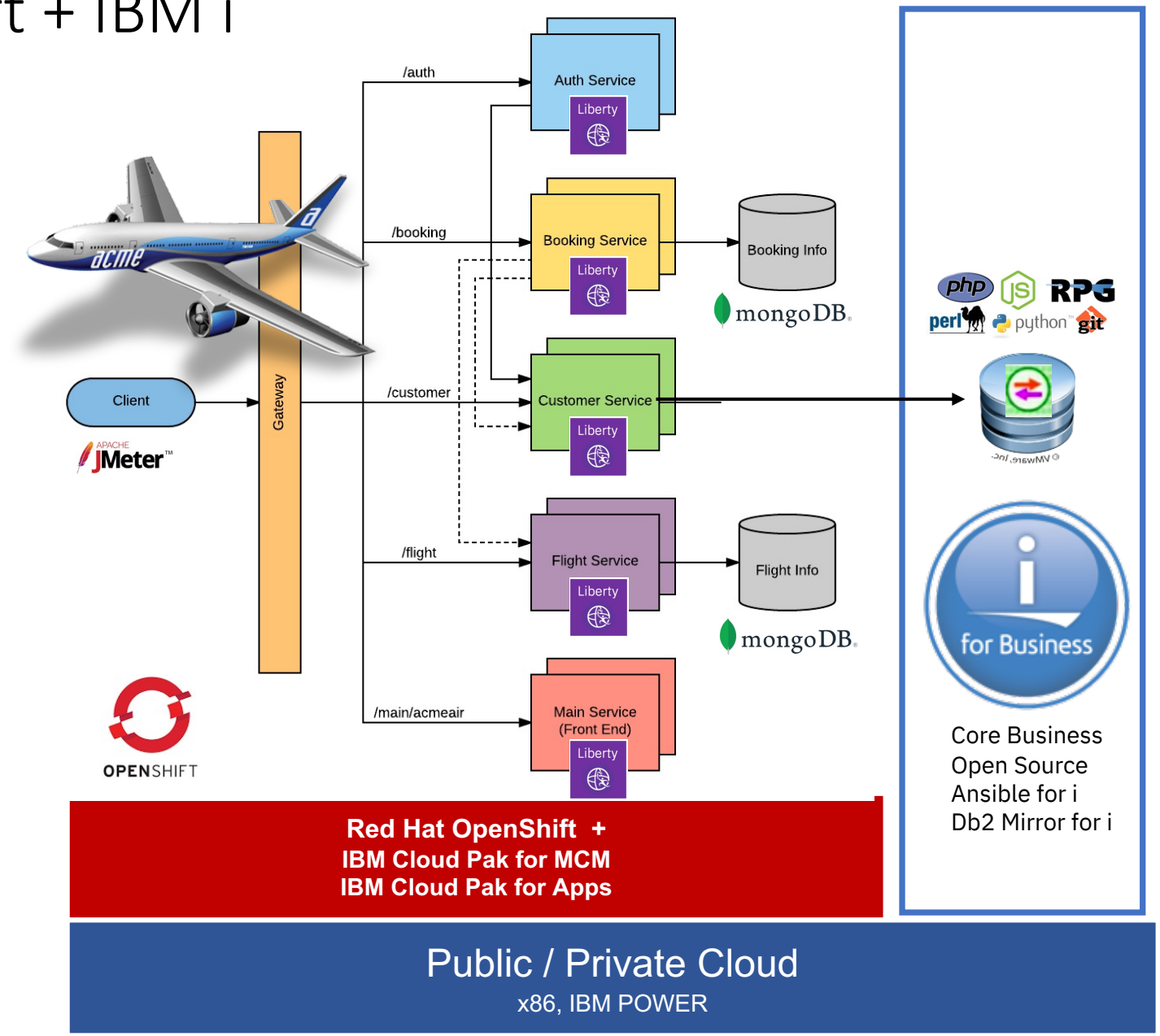
acmeair-flightservice-java
This service queries flights and reward miles.
Java Apache-2.0 23 0 0 0 Updated 5 days ago

acmeair-customerservice-java
This service handle getting and updating customer data.
Java Apache-2.0 23 0 0 0 Updated 5 days ago

acmeair-bookingservice-java
This service handles getting, making, and cancelling flight bookings.
Java Apache-2.0 24 1 0 0 Updated 5 days ago

acmeair-authservice-java
During the login it generates a JWT which will be used by booking and customer services to validate the user.
Java Apache-2.0 23 1 0 0 Updated 5 days ago

acmeair-driver
Forked from acmeair/acmeair-driver
A workload driver for the Acme Air Sample Application.
Java Apache-2.0 17 3 0 0 Updated on May 14



Source Code Version/ Branch used : microprofile-3.3
https://github.com/blueperf/

Micro-Service App : OpenShift + IBM i

Demonstration

App Modernization & Cloud Journey Showcase

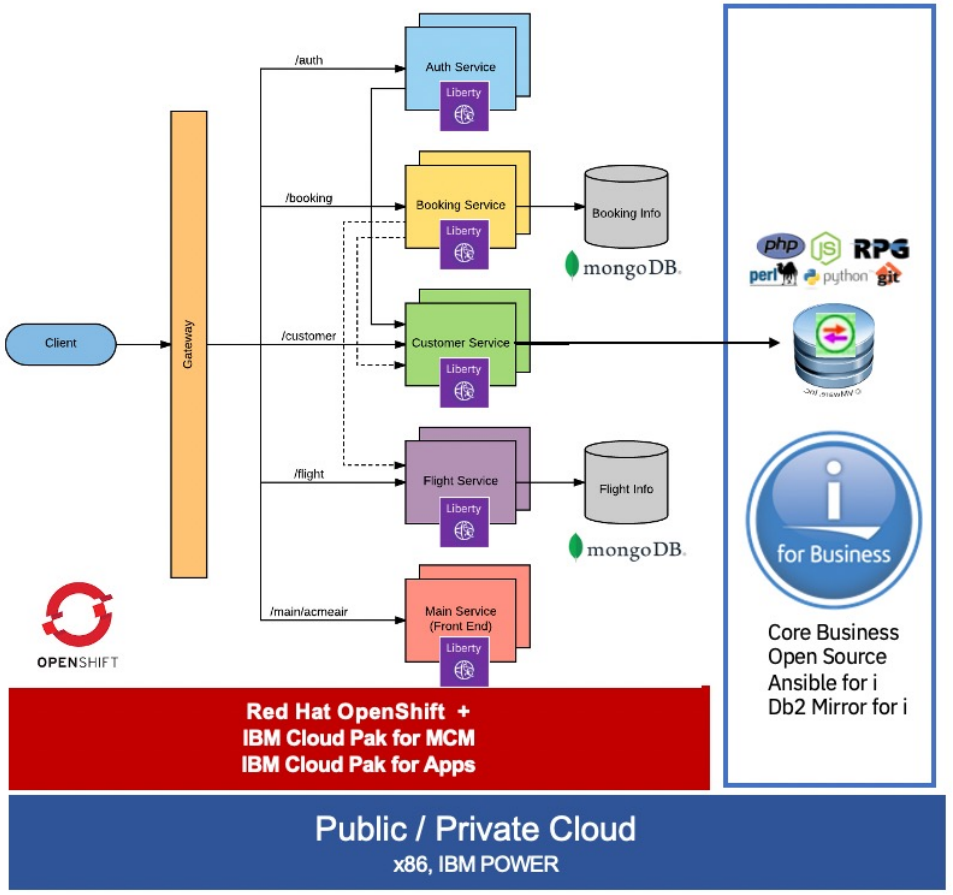
A day in the life of an IBM i shop

POWER9 & IBM i 7.4
Move to Cloud
Db2 Mirror

Dev:
- Cloud Pak for Applications
- OCP for IBM i applications
- DevOps : 3rd Party + CP4MCM

Ops:
- OpenShift vs. IBM i administration
- Cloud Pak for MCM (PVC/PVS)
- IBM i on PowerVS (IBM Cloud)

OPENSHIFT



Permanent Demo / Workshop environment

Dev:
- RDi
- Open Source (Vscode, Node.js...)
- APIm / Web Services (IWS, Loopback)
- Ansible for i

Ops:
- Db2 Mirror
- Ansible AWX/Tower (GUI with RBAC)
- PowerHA/NVMe/Storage

AI/ Analytics:
- Db2 Web Query (hybrid data sources)
- AI on IBM i (PASE) , H2O.ai

Security :
- IBM i + Qradar , IBM i Security

Micro-Service App : OpenShift + IBM i

Demonstration Scenario

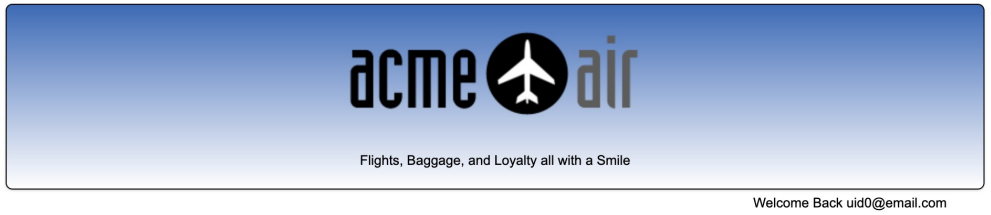
1. **Business Continuity & Multi-Cloud :** Db2 Mirror, PowerHA (IBM Cloud PVS Ready)
   → Workload injection on OCP+IBM i (Acmair Booking engine) while failing over / failing back
   → Showing the best of both worlds , IBM i Transactional & Stateless/OCP

2. **Modernization & Integration :**
   Ansible for i: integration IBM i playbooks / AWX or Tower in the demo
   Open Source & Integration : IBM i with exposed business logic in the demo
   Development & DevOps: Rdi , Partner tools in action
   PVS / Cloud – Multicloud management, ICC/Cloud Object Storage backup

Initial Acmeair App https://github.com/blueperf/
→ Time to rewrite & test a jdbc based micro-service for IBM i : 3 days

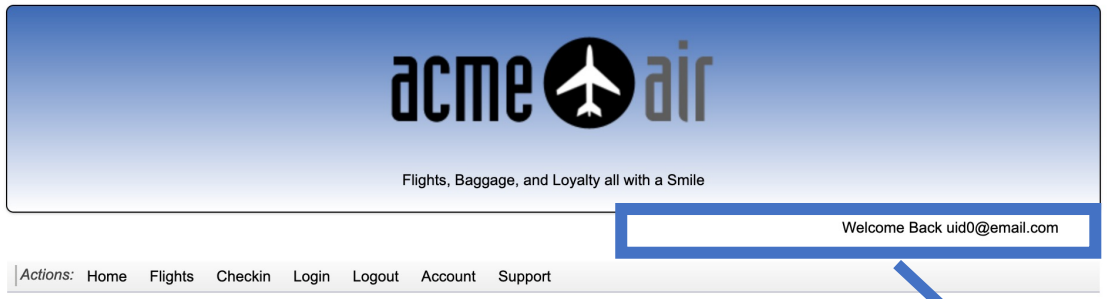
Micro-Service App: OpenShift + IBM i

Principle: Distributed data stores are not always the best choice



User Scenario:

- Login (Db2 for i customer data)
- Display & Update Account (Db2 for i)
- Book Flights
- Check-in
- Update
- Logout



Welcome to Acme Air

This is a sample application for performance test
the cloud.

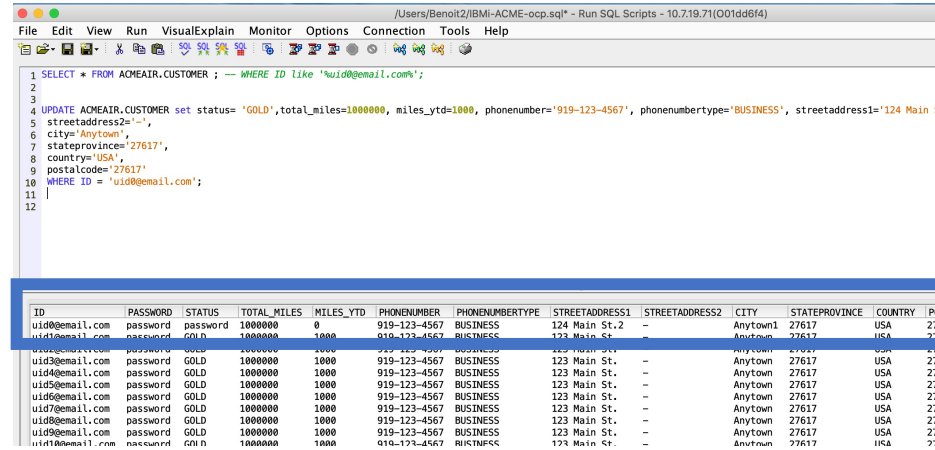
OPENSHIFT

Account Profile Information:

account id:	uid0@email.com
password:	

Contact Information:

Phone Number:	919-123-4567
Phone Type:	Business
Street Address:	124 Main St.2
Street Address 2:	-
City:	Anytown1
State (Province):	27617
Country:	USA
Postal Code:	27617



OpenShift & IBM i integration : K8s Service

- Several alternatives to consume IBM i services from OpenShift
  - Use of K8s Services, a reverse proxy network component / abstraction layer between K8s micro-services and IBM i
- IBM i integration:

Database server (jdbc, odbc)

Ex: HA with jdbc + Db2 Mirror aware

Application server (Logic & Web Services on IBM i)

Ex: HA/DR with REST API + PowerHA

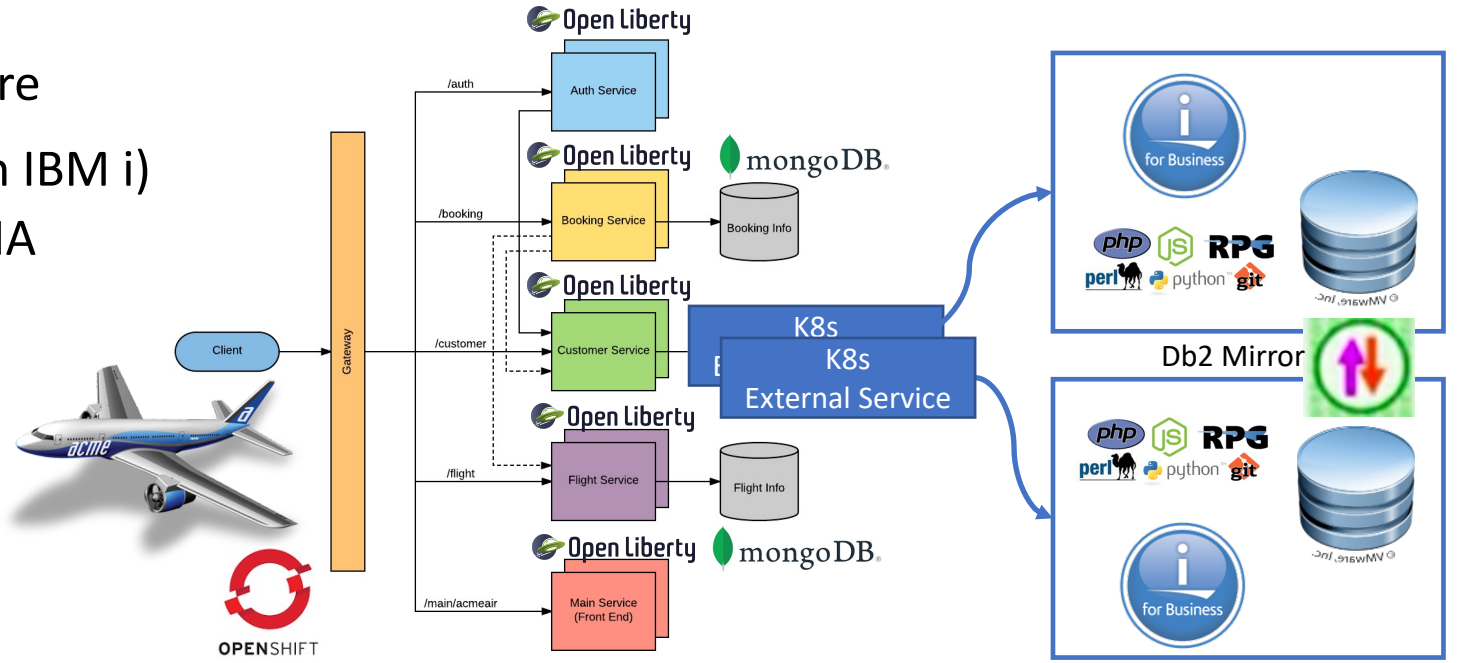
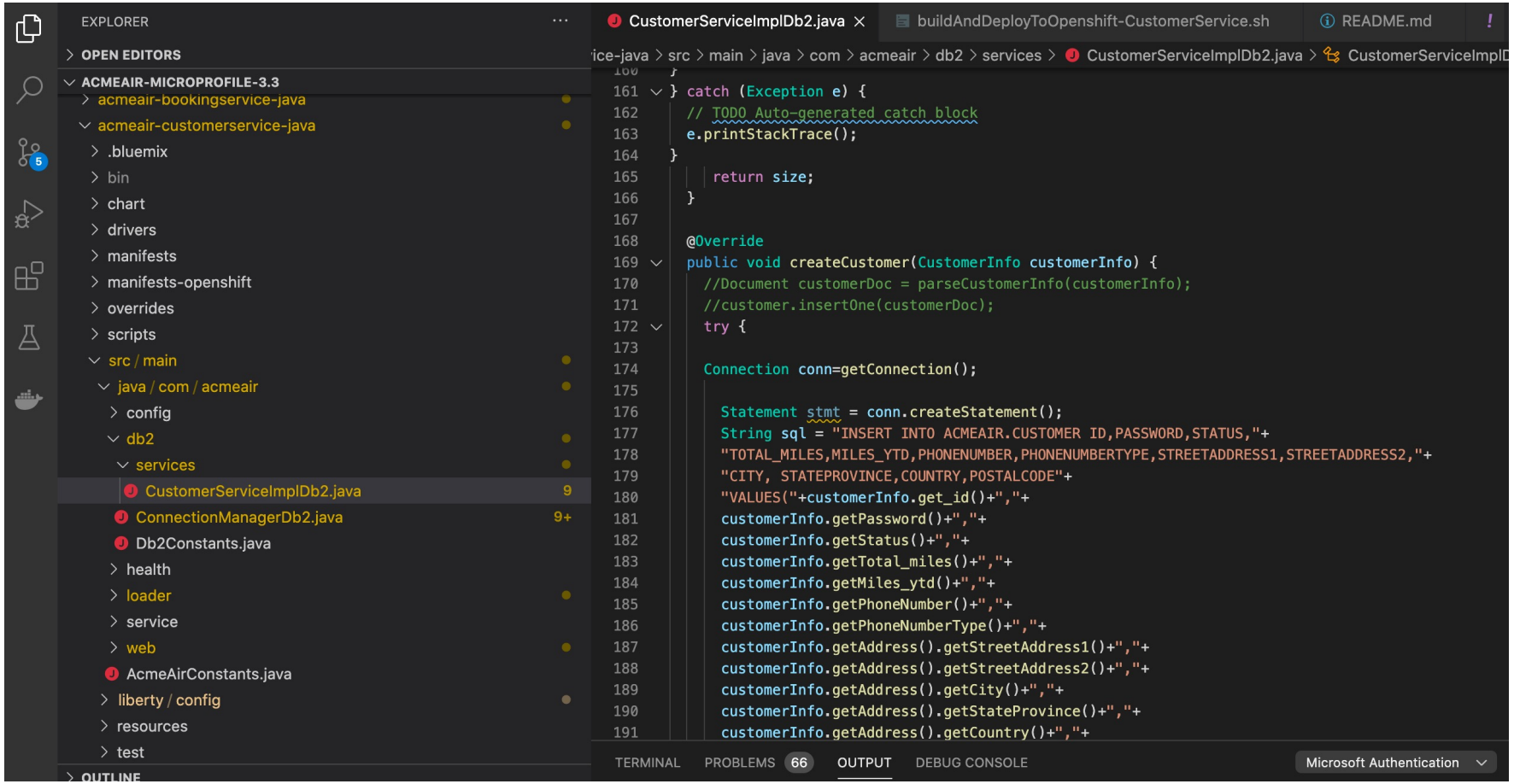


fig: OCP+ IBM i + Db2 Mirror

Dev: Micro-Service for IBM i

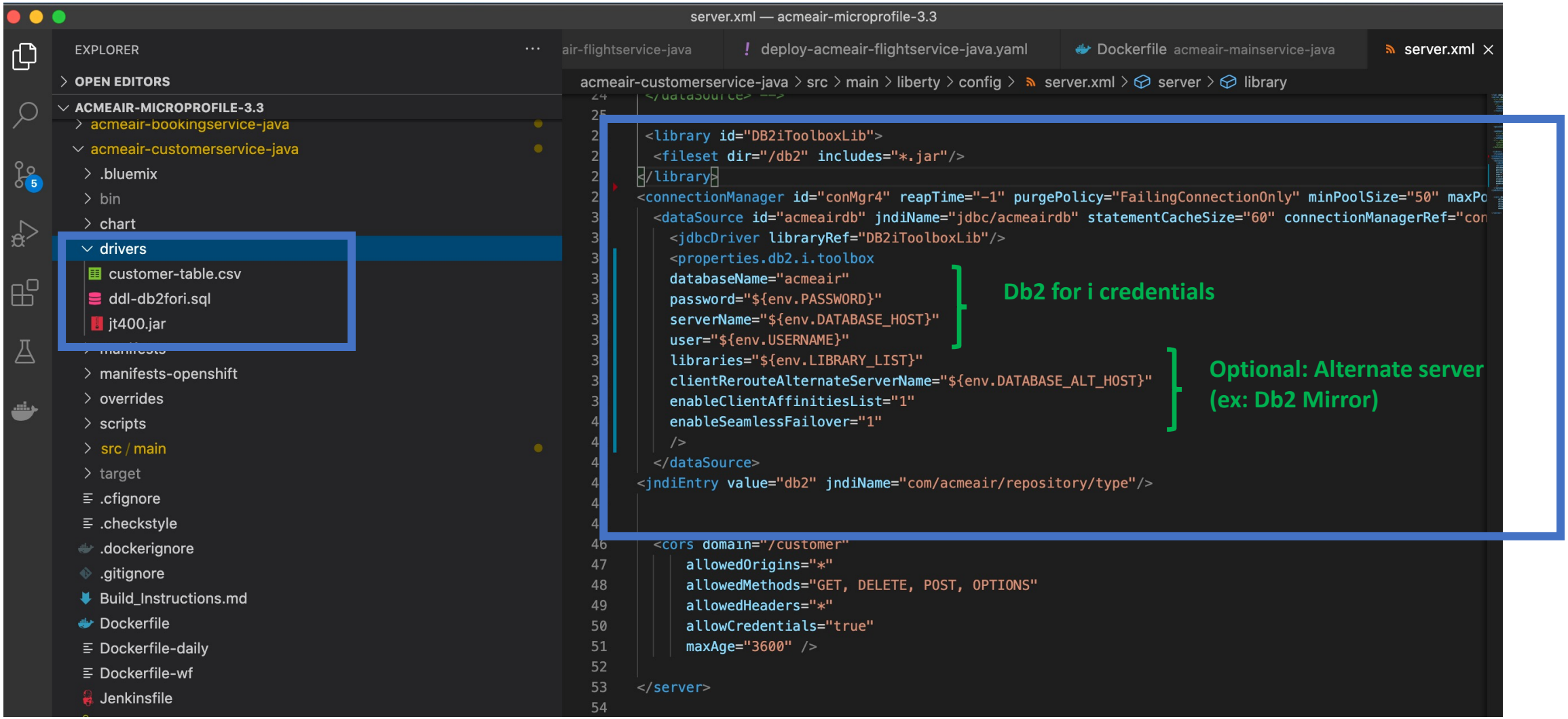
- IDE : Use of vscode or RDi for both micro-service (OCP) based and IBM i development (RPG, Python, Node.js…)

Simple micro-service implementation with Db2 for i integration (SQL, jdbc driver)



Build: Micro-Service for IBM i

JDBC based micro-service example: Settings for accessing the highly available acmeair customer DB hosted on IBM i



Build: Micro-Service for IBM i

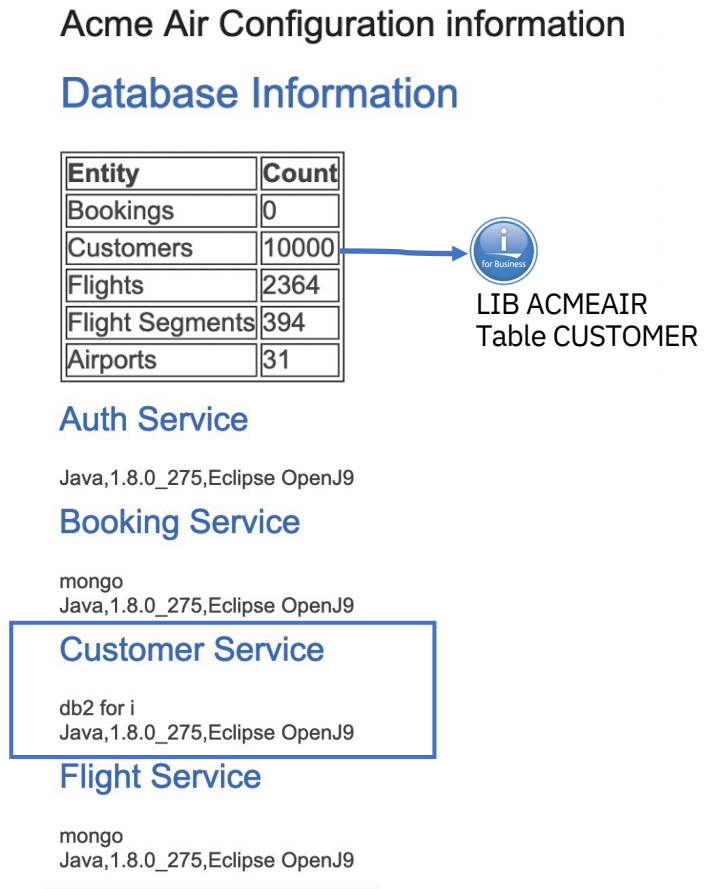
- Docker & microservice build

Injection of Db2 for i drivers in the “acmeair-customer-service” image

```
INFO] Server defaultServer package complete in /Users/Benoit2/acmeair-microprofile-3.3/acmeair-customerservice-java-jdbc/target/acmeair-customer
INFO] ------------------------------------------------------------------------
INFO] BUILD SUCCESS
INFO] ------------------------------------------------------------------------
INFO] Total time:  12.314 s
INFO] Finished at: 2020-12-08T20:57:07+01:00
INFO] ------------------------------------------------------------------------
ending build context to Docker daemon  227.4MB
tep 1/9 : FROM open-liberty:full
ull: Pulling from library/open-liberty
igest: sha256:ff9b703e6b6d99f15e4056508a4bcf4228547fbcf6f89c98fd6f03bc3584b449
tatus: Image is up to date for open-liberty:full
 ---> f01dbd22d389
tep 2/9 : COPY --chown=1001:0 src/main/liberty/config/server.xml /config/server.xml
 ---> 554d1715e619
tep 3/9 : COPY --chown=1001:0 src/main/liberty/config/server.env /config/server.env
 ---> 3ed4d667c26e
tep 4/9 : COPY --chown=1001:0 src/main/liberty/config/jvm.options /config/jvm.options
 ---> 5ceca45dedf5
tep 5/9 : COPY --chown=1001:0 target/acmeair-customerservice-java-3.3.war /config/apps/
 ---> 83777b9eb71a
tep 6/9 : COPY --chown=1001:0 drivers/jt400.jar /db2/jt400.jar
 ---> 101cd735dd8e
tep 7/9 : ARG CREATE_OPENJ9_SCC=true
 ---> Running in f74ead8cc333
emoving intermediate container f74ead8cc333
 ---> d4f0fc7e53c1
tep 8/9 : ENV OPENJ9_SCC=${CREATE_OPENJ9_SCC}
 ---> Running in b79d4cb321d1
emoving intermediate container b79d4cb321d1
 ---> 9cf51fa94c6b
tep 9/9 : RUN configure.sh
 ---> Running in 6210e26dffd2
```

- Result

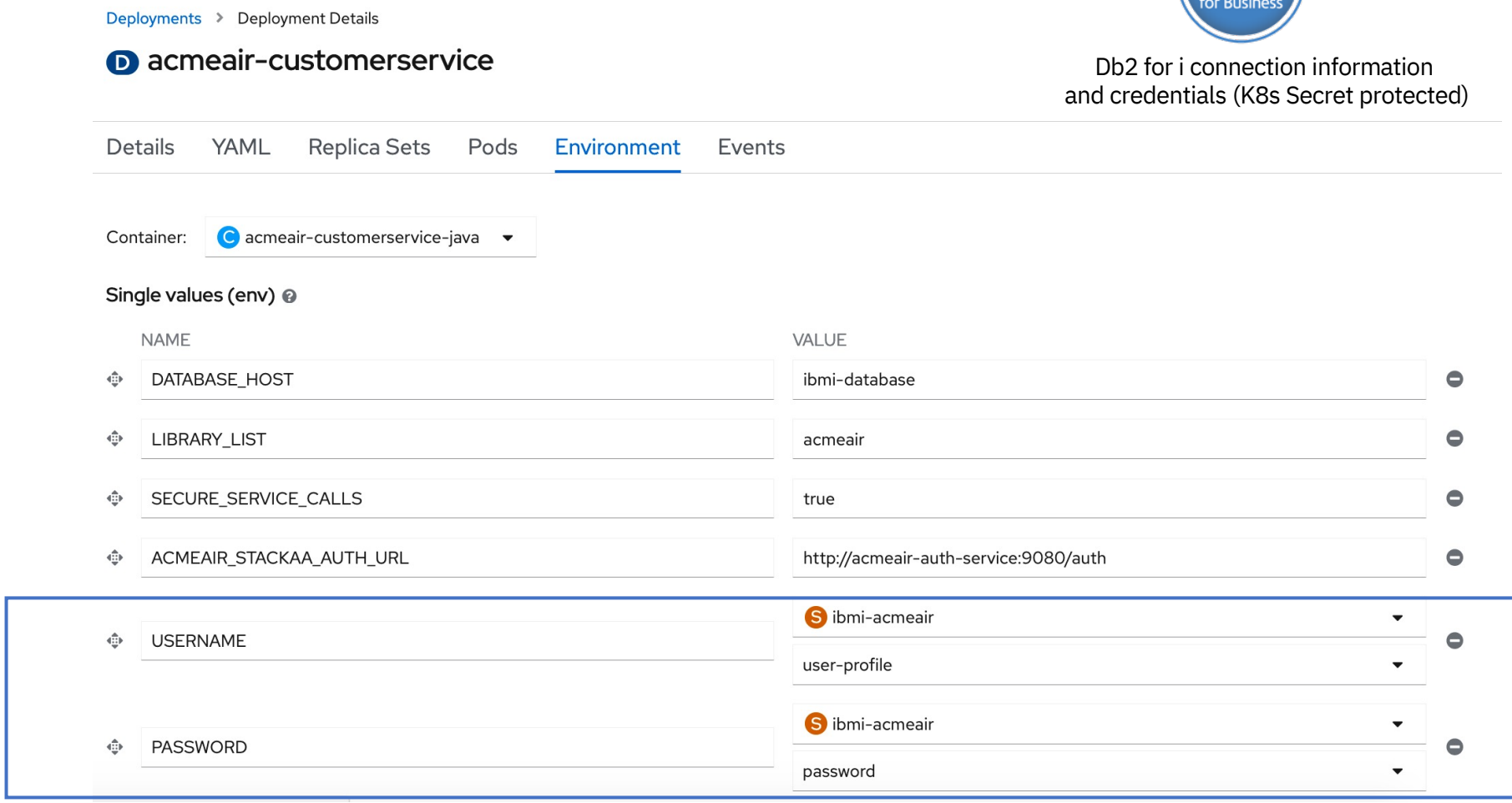
AcmeAir Web Page w/ microservices details



How to connect OpenShift to IBM i / Db2 for i ?

Environment variables are used by each micro-service
Credentials can be encoded (even encrypted) using K8s Secrets

Db2 for i connection information
and credentials (K8s Secret protected)



How to connect OpenShift to IBM i / Db2 for i ?

Like Internal resources, external resources can be reached through K8s services

service name used by the app →

real IBM i hostname →

```
kind: Service
apiVersion: v1
metadata:
name: ibmi-database
spec:
type: ExternalName
sessionAffinity: None
externalName: bendemo.10.7.19.71.nip.io
```

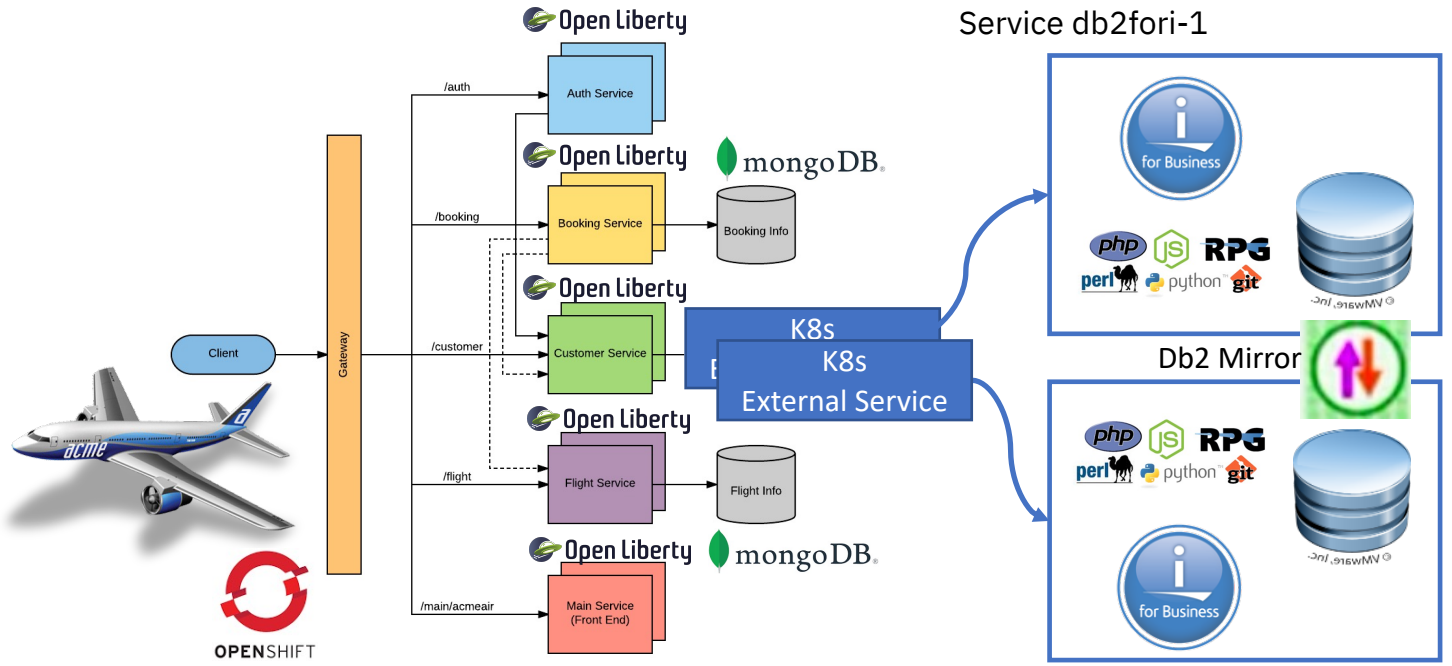
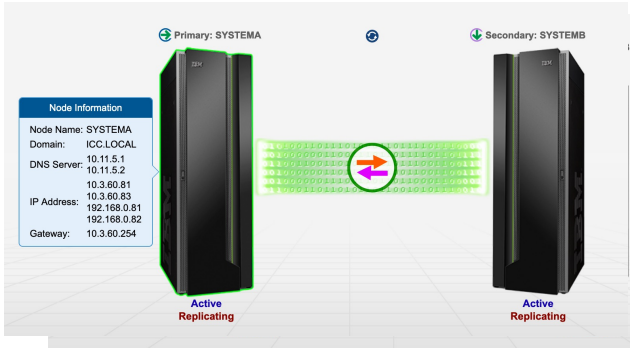
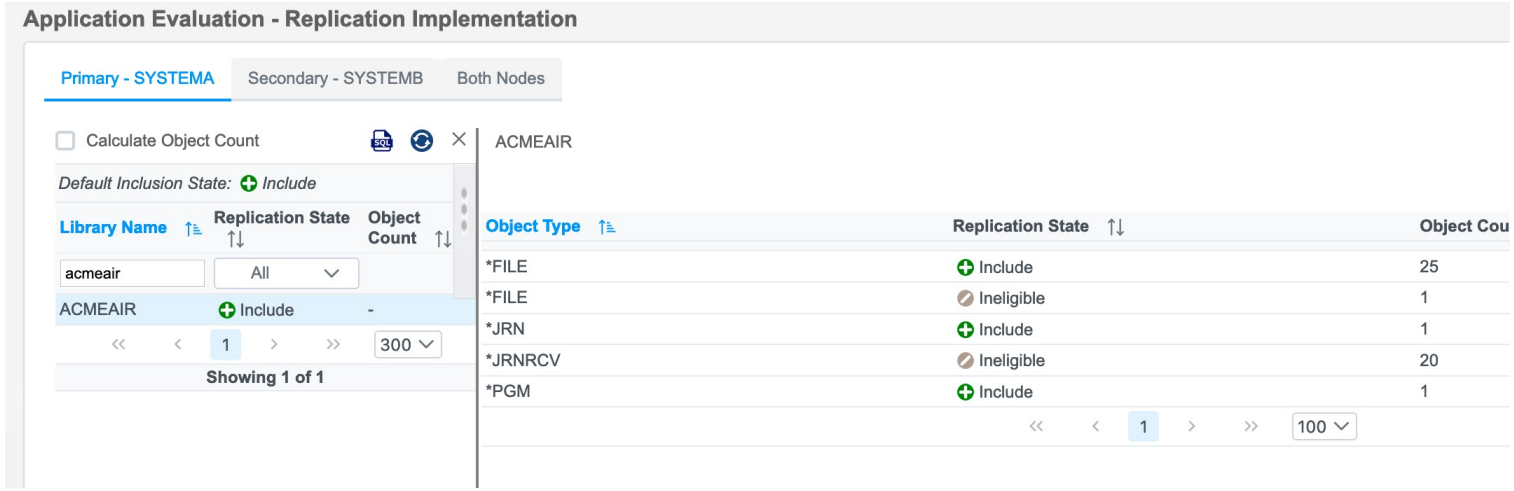


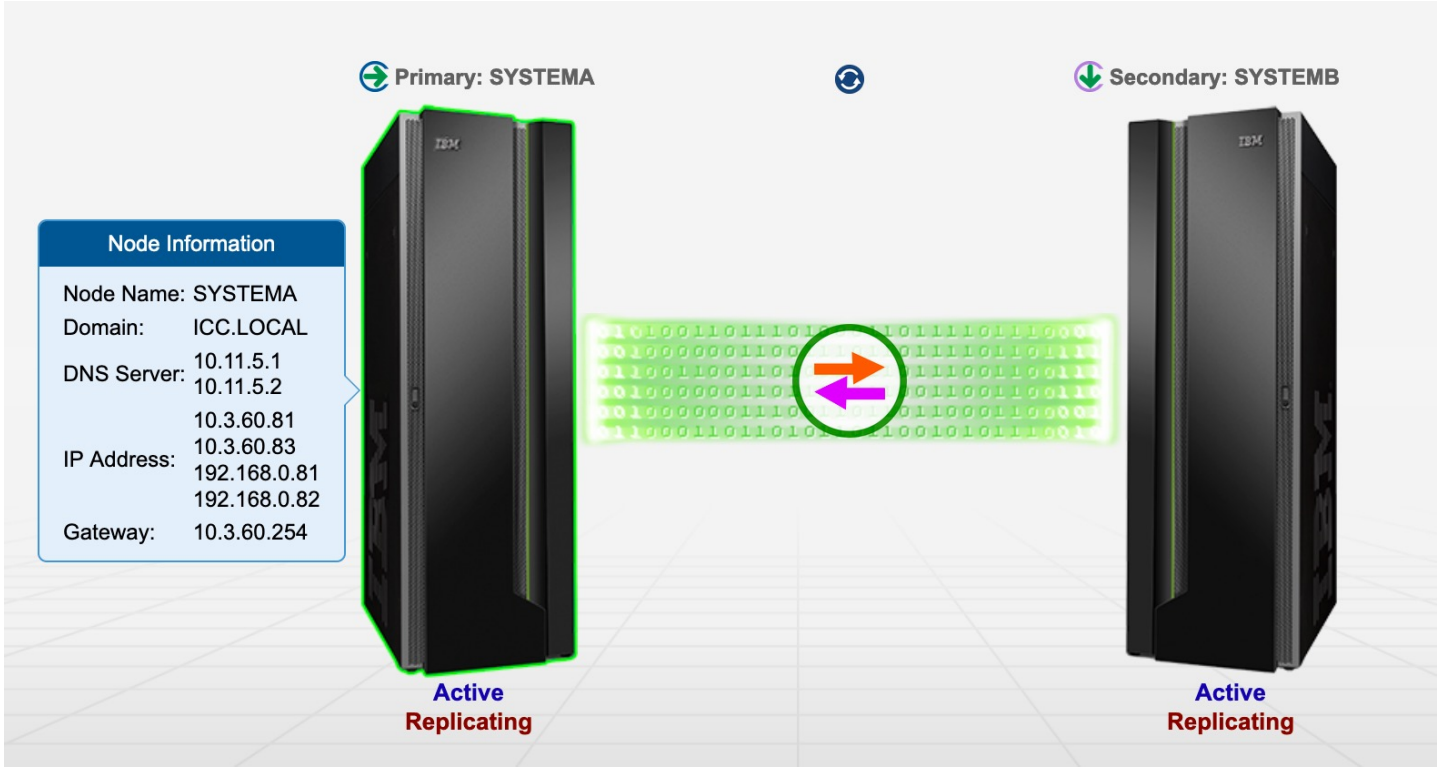
fig: OCP+ IBM i + Db2 Mirror



Need 24x7 availability?

IBM Db2 Mirror for i





Open standards and open source create the best cloud architecture

Enterprise-grade software on the most secure public cloud

Deep industry expertise

IBM

Built on Linux OS, delivered by Containers, managed by Kubernetes

Robust open source ecosystem

Red Hat

Transform, run, and manage your critical workloads — anywhere

Thanks !

Benoit MAROLLEAU – Cloud/AI Architect
IBM Systems - Montpellier, France
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#IBMi #IBMiOSS Fan

Modernization Journey on Power Systems

IBM Systems Technical Sales
Lab Services | IBM Garage for Systems

Workshops

Infrastructure Modernization - Ops Efficiency

Rehosting – **Replatforming** - Private/Public Cloud Automation – Business Continuity

Application & Data Integration

Standardized back-end integration, **Repackaging** - Master Data Mgt

App Modernization , DevOps & CI/CD

Maximize ROI (TCO), Digital transformation (UI/UX, **AI**) , **Refactoring** with DevOps toolchain & Micro-services

How ? IBM Systems Technology, and Open Source Software.
At scale with Red Hat & IBM Cloud Paks

Red Hat

IBM Cloud Pak

Examples of technology-specific workshop agenda : PVS on IBM Cloud, Ansible for i ...

Introduction: Application Modernization

DEMO PART 1 : Containerization / Replatforming using IBM Transformation Advisor

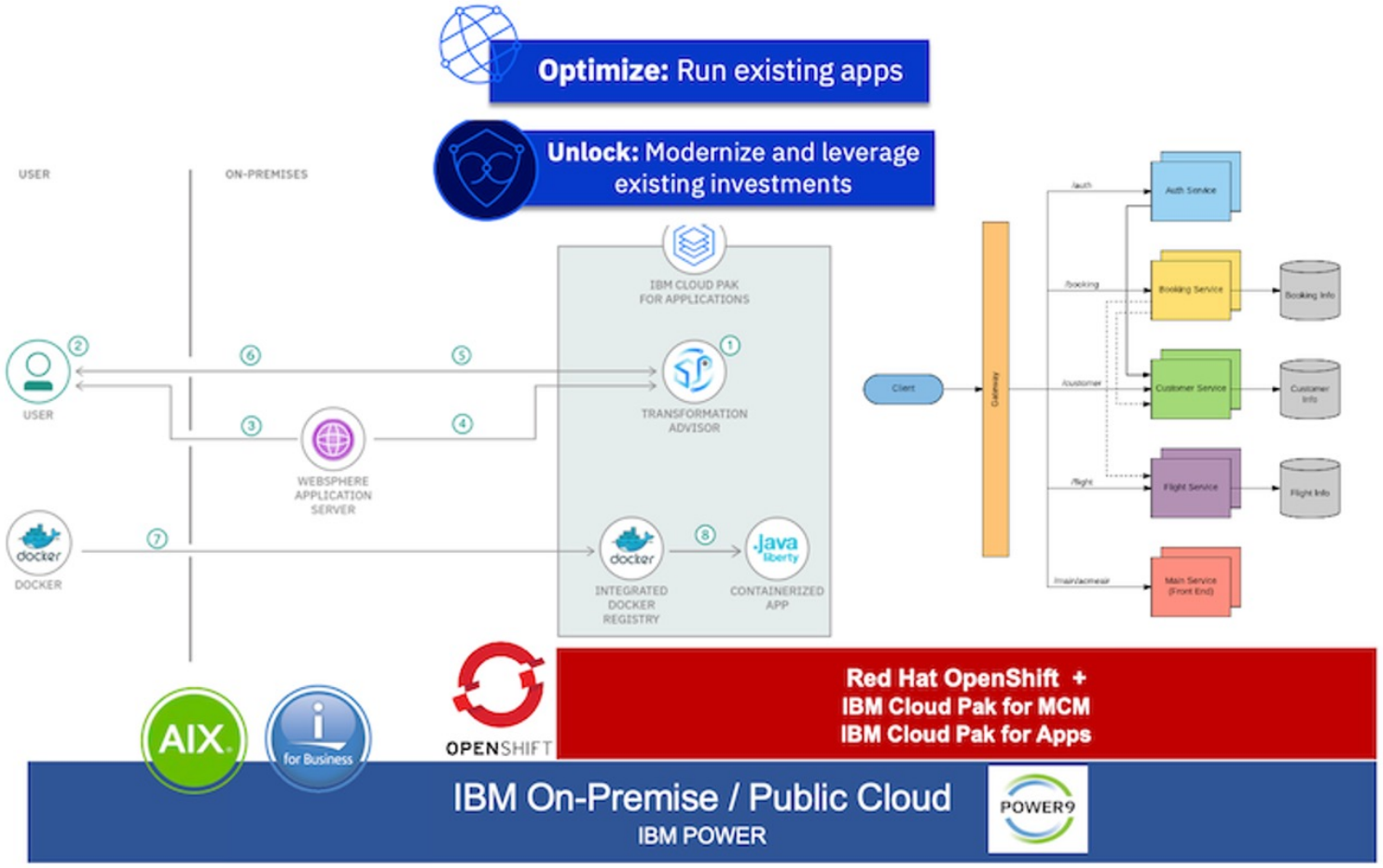
DEMO PART 2 : IBM i (VM) based apps Integration with OpenShift

DEMO PART 3 : Performance Management with RedHat OpenShift on Power Systems
HA/DR considerations

DEMO PART1 : Modernization with Containerization / Replatforming

Modernize your traditional on-premises app and deploy it as a containerized app on OpenShift

Find the original app (.war in the target dir) and the generate bundle here:
https://github.com/bmarolleau/acmeair_migrationBundle
Demo Video here: https://www.youtube.com/watch?v=tdStP9Ck



CP4A / Transformation Advisor

1. Developer uses IBM Transformation Advisor Local or on IBM Cloud Pak for Applications on the IBM managed OpenShift cluster.
2. Developer downloads a custom Data Collector from IBM Transformation Advisor
3. Developer runs the Data Collector on the traditional WebSphere Application Server host where application (to be migrated) is running. In this example, tWAS (WAS Base) version 9.0 with the Acmeair application running.
4. Data Collector analysis is uploaded (automatically or manually)
5. Developer reviews recommendations in Transformation Advisor and creates a migration bundle
6. Developer downloads migration bundle

OCP / S2i/ Multi-Arch :

7. Developer uses Docker to build an image and upload it
   to OpenShift Docker Registry
8. Developer creates an app using the pushed image
   and runs the containerized app

DEMO PART2 : Monolith to Micro-service

Integration of your traditional apps with OpenShift

Client

Acme Air Web Application

- Frontend controller and views
- Authentication component
- Customer component
- Flight Booking component

Database

DB

Agility ++

Client

Gateway

/auth

Auth Service

Liberty

/booking

Booking Service

Liberty

Booking Info

mongoDB.

/customer

Customer Service

Liberty

/flight

Flight Service

Liberty

Flight Info

mongoDB.

/main/acmeair

Main Service (Front End)

Liberty

OPENSHIFT

ORACLE

DB2

VM

Core Business

for Business

AIX

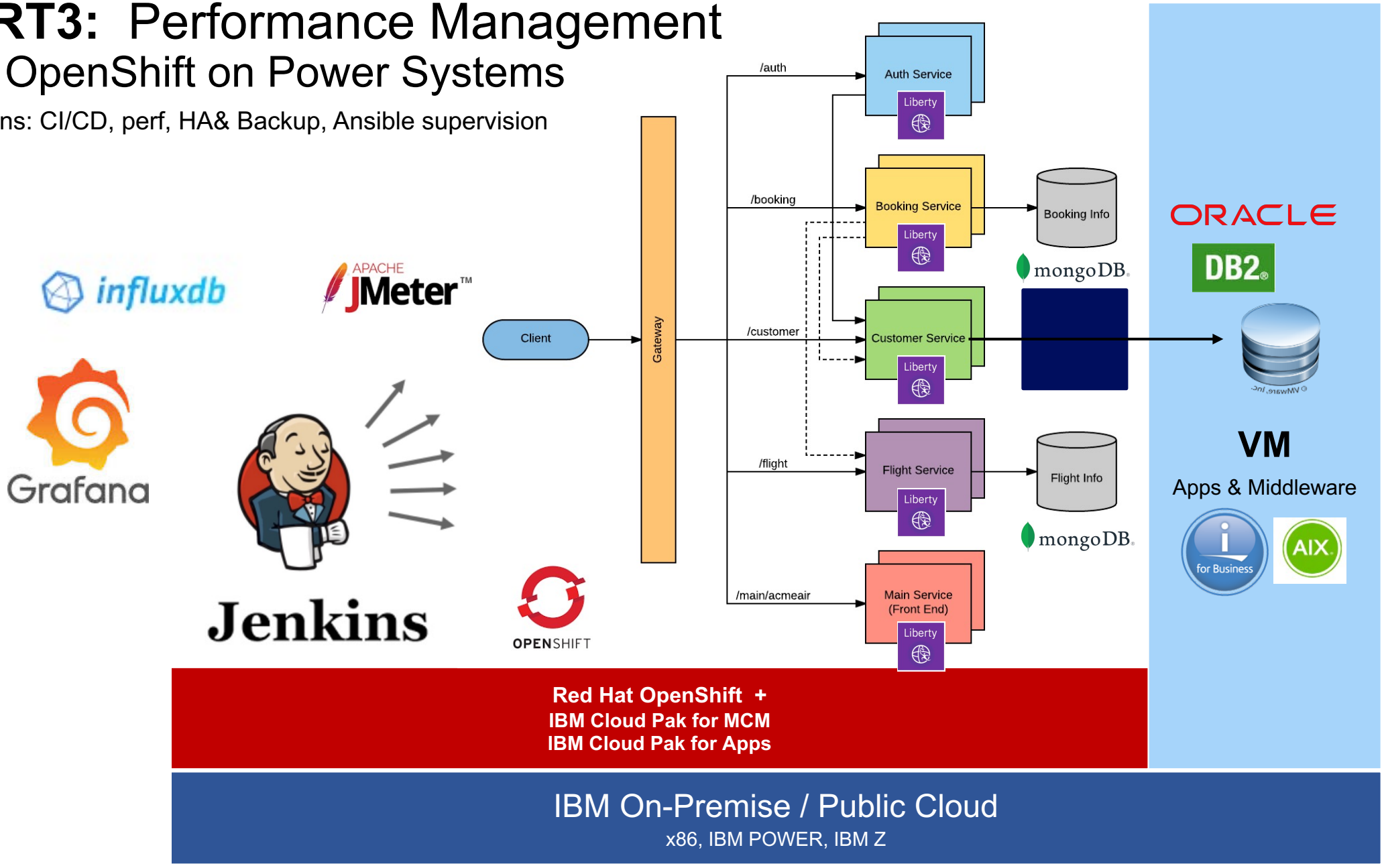
Red Hat OpenShift +
IBM Cloud Pak for MCM
IBM Cloud Pak for Apps

IBM On-Premise / Public Cloud

x86, IBM POWER, IBM Z

DEMO PART3: Performance Management
with RedHat OpenShift on Power Systems

Day to day Operations: CI/CD, perf, HA& Backup, Ansible supervision



Why OCP on Power?

Openshift on **IBM Power** Key differentiators

Performance & Scalability : Better performance vs x86

- 2 to 5 X more containers per core on POWER (Container density)
  → 8 thread per core (SMT8), Memory Bandwidth…
- **PowerVM Scalability** 500 containers/VM
- Unrivaled Power Server Performance with OCP
- 3.2X per core on OCP - MongoDB vs. Intel Xeon SP Gold 6150 Skylake

- **Java+MongoDB verified by a benchmark in Montpellier** → → →

2.6X throughput per core , 2.8x lower response times

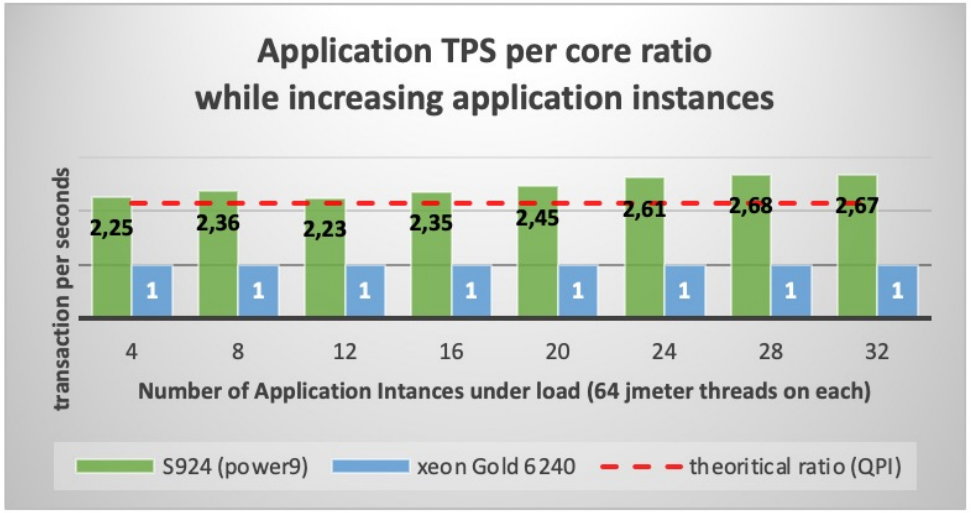
IBM S924:
2 sockets system
24 Power 9 cores / 384 GB Memory
10Gb/s Ethernet card
PowerVM

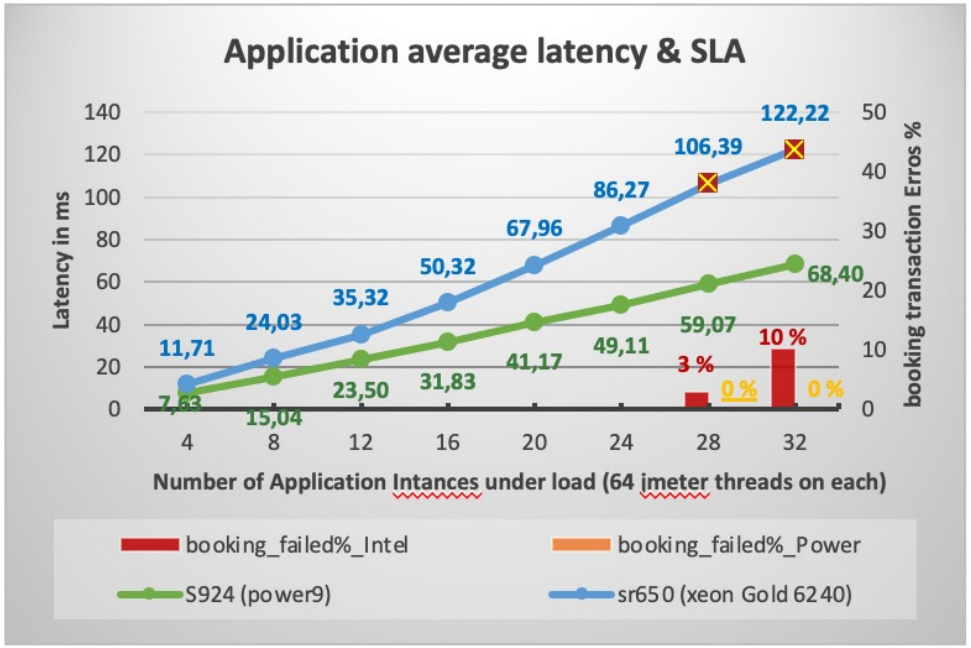
versus

Lenovo SR650:
2 sockets system
36 Xeon Gold 6240 @2.6Ghz / 384 GB Memory
10Gb/s Ethernet card
VMWare ESXi 6.7

x2.3 more Transactions /Core on Power

x1.5 more Transactions per $



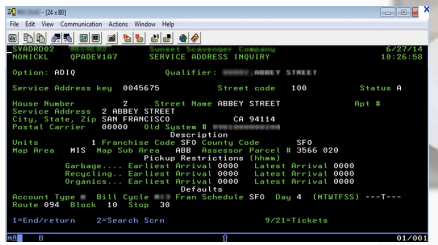


Real Life Testing : Microservice benchmark OCP + AcmeAir
x86 Cascade Lake vs. POWER9

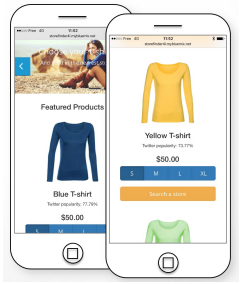
Why OCP + IBM i ?

Application Modernization

Extending Traditional Apps with Cloud Native



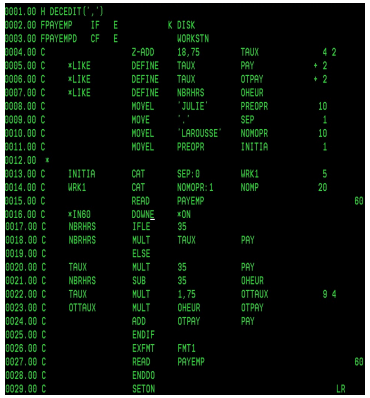
Capacity to Innovate vs. Risk



Why Microservices?
→Continuous Innovation vs. Business Needs

How?
→ Flexible User facing components (Micro-Services, 12-Factor,K8s)
→ Integrated with rock solid core Business apps.

DevOps Ready



App Centric Monolith,
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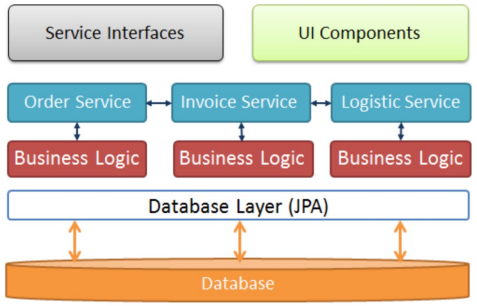
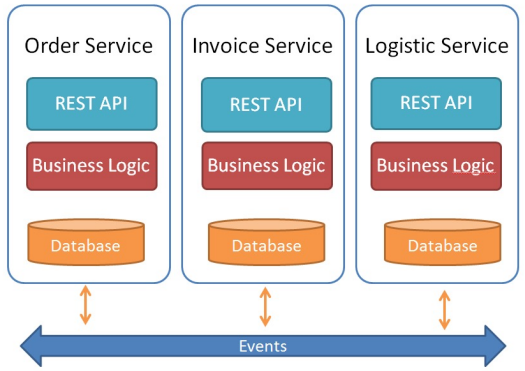
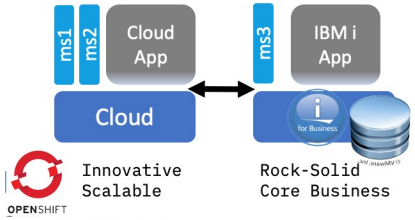


Data Centric, Modular & Layered,
Modern Tech, Design Patterns (MVC…)
Horizontal (technical) Layers

Verticals





Microservice, 12 Factor Design
Loosely coupled services
Vertical (business) layers

Traditional Apps & Cloud Native Apps

Everything is at your finger tips for building Cloud Native & Microservices solutions integrated with any traditional applications.

Modernize your apps on IBM i !

1. Upgrade your Traditional environment (HW/SW)
2. Re-discover , map your apps & data

(using IBM or Third party tooling)

1. Modernize with free open source & latest IBM i / Db2 features **on IBM i**

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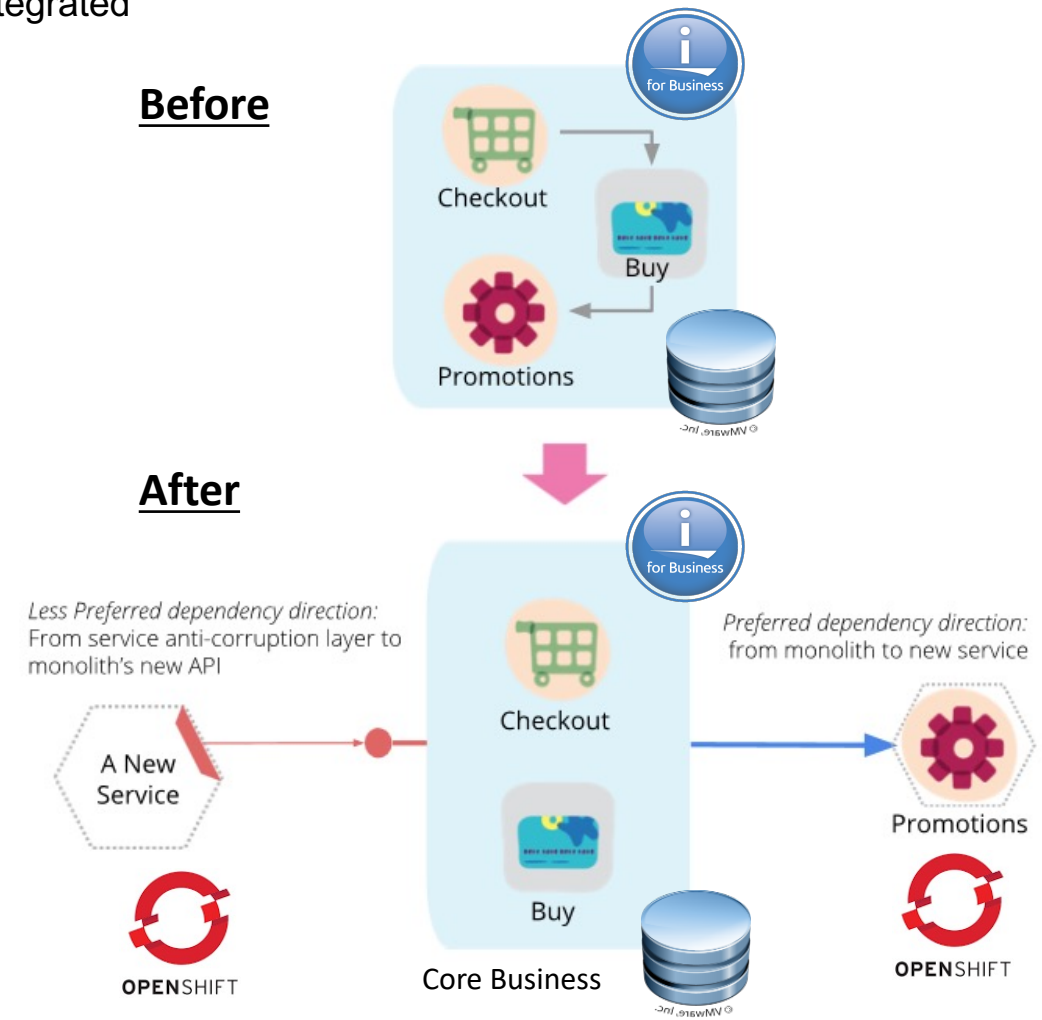
2. Need to create inovative/continuously changing services/apps ? cloud native technologies: OpenShift Container Platform
3. Need full support & Enterprise middleware? Evaluate IBM Cloud Paks on OCP



Why CP4Apps ?

Cloud Pak for Applications

Optimize: Run existing apps

WebSphere Application Server

WebSphere ND | WebSphere Base

Liberty Core | Mobile Foundation

JBoss Enterprise Application Platform

Unlock: Modernize and leverage existing investments

IBM Modernization & Developer Tools

Included with all components

- **Transformation Advisor**
- **Mono2Micro***
- **Application Navigator**
- **WebSphere Migration Toolkit**

Enterprise Dev tools & extensions for local IDE's

Supported when used with Cloud Pak for Applications, no charge

**open beta*

Perpetual and Term licensing options available w/ no functional restrictions to OpenShift

Unleash: Build new cloud-native solutions

Accelerators for Teams & Enterprise Governance

Frictionless cloud-native development for multi-disciplinary teams. Enable developers to rapidly innovate knowing they comply with your unique operational, security, and technology standards.

Red Hat CodeReady Workspaces

Collaborative OpenShift-native IDE

Enterprise Runtimes

- Traditional WebSphere
- Liberty
- Mobile Foundation
- Open Liberty
- JBoss EAP
- Quarkus
- Node.js
- Spring Boot
- JBoss WS
- Vert.x
- Cloud Functions (Serverless)
- OpenJDK

Distributed Data | **SSO** | **Messaging**

Red Hat OpenShift Container Platform

Modernize AIX/IBM i Apps with the Cloud Pak for Applications on OpenShift on Power

6x lower TCO than AWS,
2x lower TCO than x86
(on-premises)

Cloud Pak for Applications

Build, deploy and run applications

Red Hat OpenShift 4.3

Marry AIX / IBM i applications with cloud-native services to modernize one microservice at a time. Develop apps once, run anywhere.

- Improve agility, innovate faster with Kubernetes container based PaaS
  - WebSphere Liberty, node.js, NGINX
  - Red Hat Runtimes, JBOSS, Service Mesh
  - Developer productivity, Ops efficiency
- Proven Enterprise Server Attributes
  - Secure, Scalable, Resilient, Performant
  - Lower Cloud TCO – 6x less that AWS and 2x less than x86 private cloud (on-

✓ *Learn more* ✓ *Try it now*

Solution Stack / Config Type	Proof-of-Concept	Entry Production
Cloud Native DevOps stack	Cloud Pak for Apps on OCP 4.3	Cloud Pak for Apps on OCP 4.3
Cores: Master-Infra / Worker	1 x Master: 2c, 32GB VM 3 x Workers: 6c, 96gb VM	3 x Masters: 2c, 16 gb / VM each 3 x Workers: 2c, 16 gb VM each 1 x Shared Svc: 2c, 32GB VM
IBM Servers	1 x Power System L922s 20c @ 2.9GHz, 256GB	3 x Power System L922s 16c @ 3.4GHz, 256GB
Storage (internal per server)	2x1TB SSD, 2x2TB HDD	8x480GB SSD, 2x128GB HDD
Storage (external)	1 TB NFS storage	1 TB NFS storage
IBM System SW	PowerVM	PowerVM
Operating System	Red Hat CoreOS	Red Hat CoreOS
List price for system stack	*Insert local price for L922+PowerVM (OpenShift 4.3 included in Cloud Pak)*	*Insert local price for L922s+PowerVM (OpenShift 4.3 included in Cloud Pak)*