InterConnect 2016
The Premier Cloud & Mobile Conference

Evolving a monolithic Java EE application to microservices

Microservices meet legacy applications

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February 21 – 25
MGM Grand & Mandalay Bay
Las Vegas, Nevada

Agenda

Explore and demonstrate
how JEE applications
*can **evolve***
to a microservices architecture,
using Plants By WebSphere (PbW)
as a sample application.

- Introduction
- Rules of engagement
- Service decomposition
- An evolved image service
- Liberty app accelerator
- Summary and Questions

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Microservices

Background and Overview

PCM-2026: Microservices:
Buzzword Bingo or Real-World Problem-Solver?

Mandalay Bay Solution EXPO - **Engagement Center 232**
06:30 PM - 06:50 PM

Erin Schnabel / Isabell Sippli

Las Vegas, Nevada

Why microservices?

Microservices provide benefits…

- Strong Module Boundaries: Microservices reinforce modular structure, which is particularly important for larger teams.

- Independent Deployment: Simple services are easier to deploy, and since they are autonomous, are less likely to cause system failures when they go wrong.

- Technology Diversity: With microservices you can mix multiple languages, development frameworks and data-storage technologies.

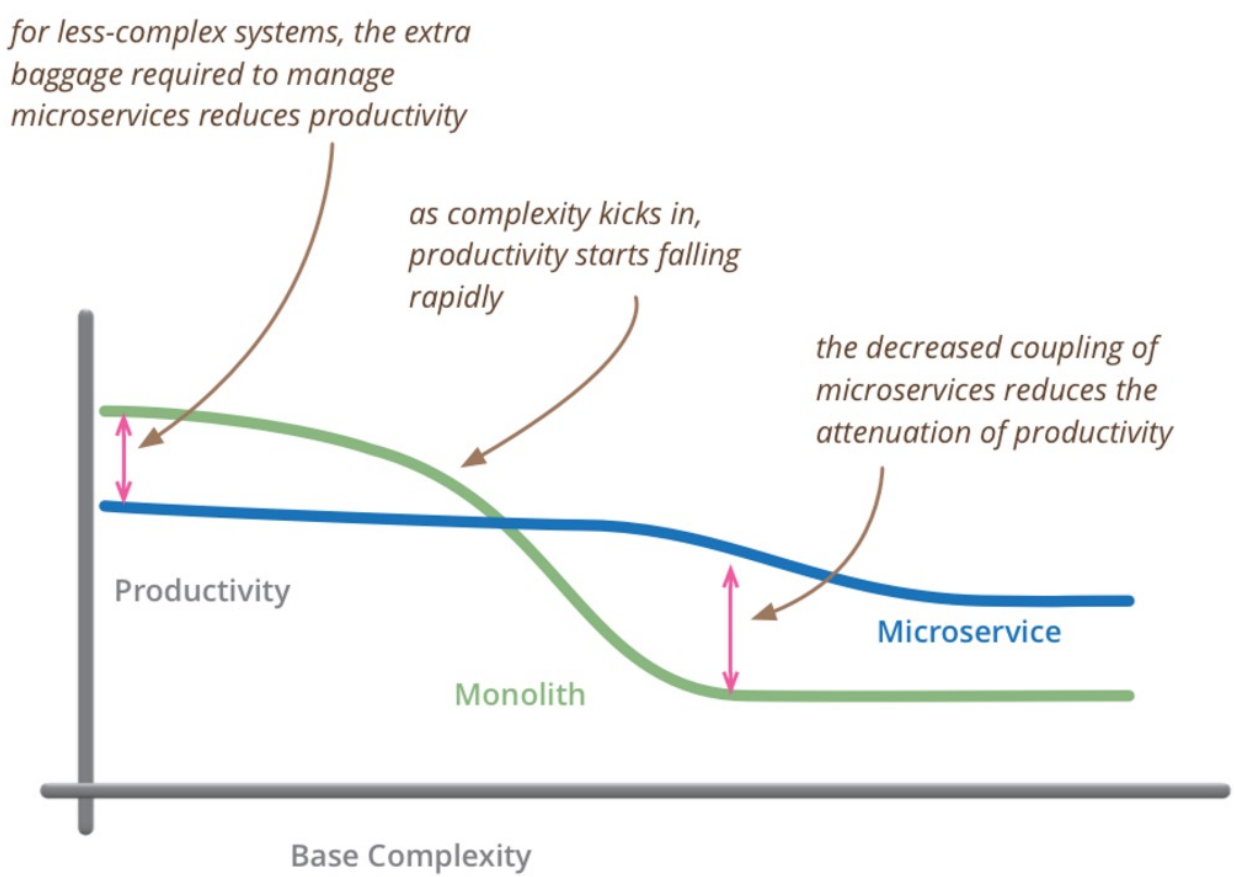
…but come with costs

- Distribution: Distributed systems are harder to program, since remote calls are slow and are always at risk of failure.

- Eventual Consistency: Maintaining strong consistency is extremely difficult for a distributed system, which means everyone has to manage eventual consistency.

- Operational Complexity: You need a mature operations team to manage lots of services, which are being redeployed regularly.

The Premium



but remember the skill of the team will outweigh any monolith/microservice choice

http://martinfowler.com/bliki/MicroservicePremium.html

Rules of Engagement

General principles

Rules of Engagement: Development

- Know what you want to achieve:
  - Strangle / Create new
  - Cloud?
- Change as little business logic or function as possible
- Be prepared for a dynamic new future

Rules of Engagement: Testing

- Test for parity, not for correctness
  - Does the new thing work the same as the old thing?
  - Be consistent with the old monolith

- Unit/Functional tests are not the whole story
  - Performance/Throughput requirements
  - Existing Integration / QA environments

Rules of Engagement: Context

- What APIs are you going to create ?
  - Internal? External? $$?
- Where is your data and in what format
- How will you find your new services?
  - What is the wiring (gateways, proxies, …)?

Rules of Engagement: Java EE

- Many aspects of Java EE are inward facing
  - Assumptions about things contained within the module
- CDI or any other injection technology needs a second look
  - Do you know what is being injected?
  - Do you know what those things are having injected?

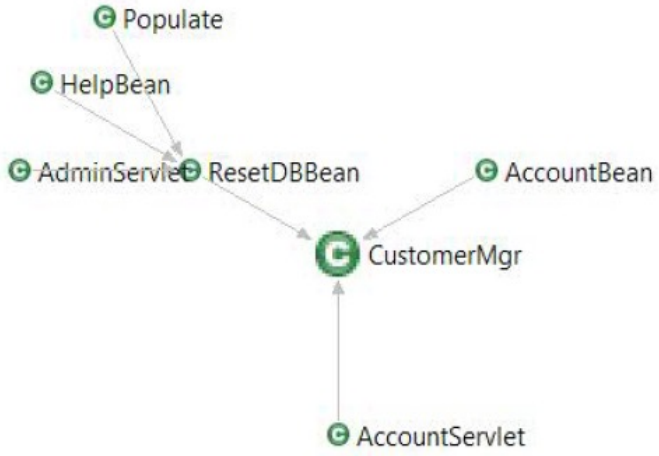
Service decomposition

Functional decomposition

- Decide what to move where based on what it does
- Traditional approach, often a good starting point
- **Relies on well defined component boundaries**

Technology-based decomposition

- Look at EE specific technologies
- Use the migration toolkit:
  - view class structures and
  - identify EE technologies in the application



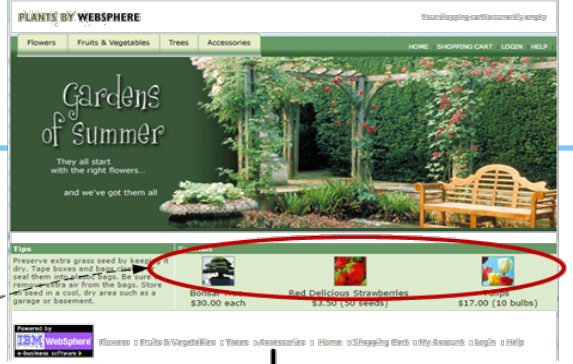
Web application technologies			
Java Servlet	✓	✓	✓
JavaServer Faces (JSF)	✓	✓	✓
JavaServer Pages/Expression Language (JSP/EL)	✓	✓	✓
Enterprise application technologies			
Contexts and Dependency Injection for	✓	✓	✓

Decomposition: Checkpoint

- Is what I have good enough?
- Is there sufficient return on investment ?
  - New API = new business ?
  - Hardware / software savings ?
- Do you have the right skills?

A revised image service

Evolutionary steps



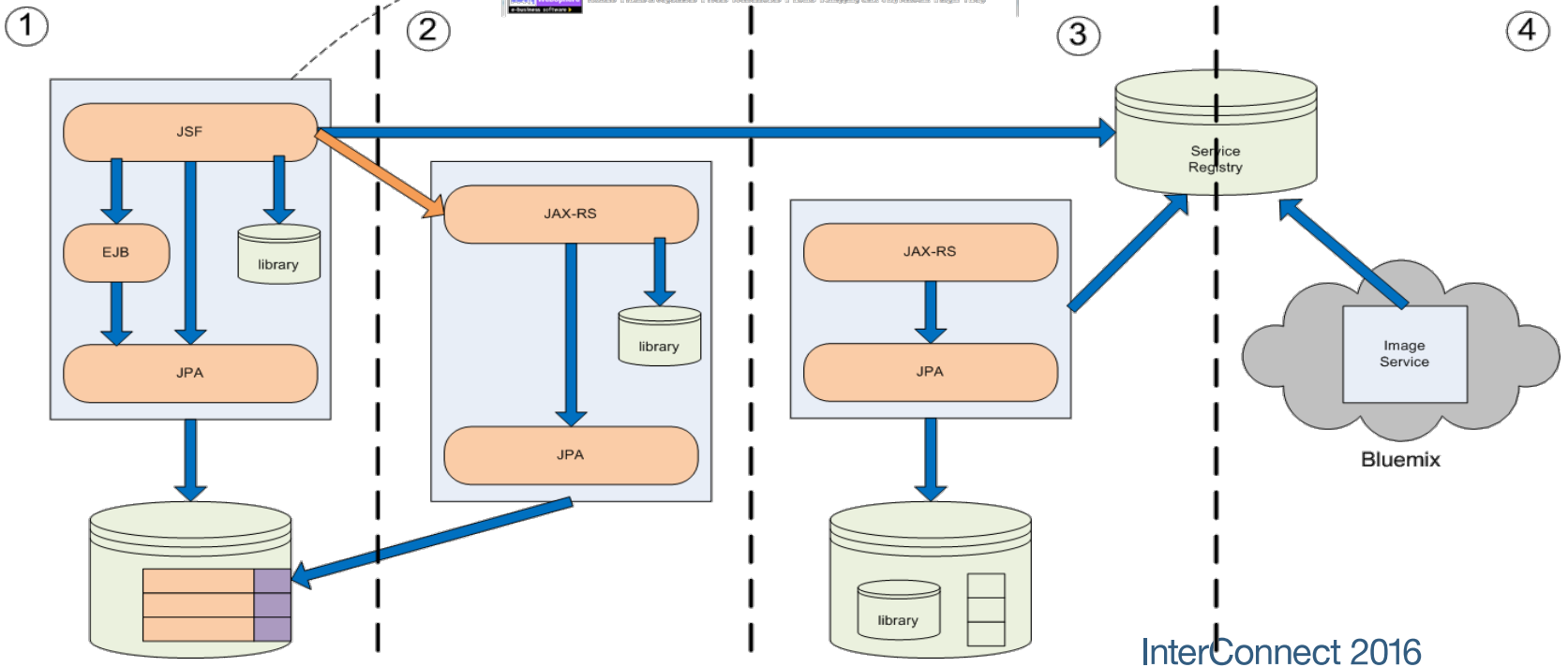


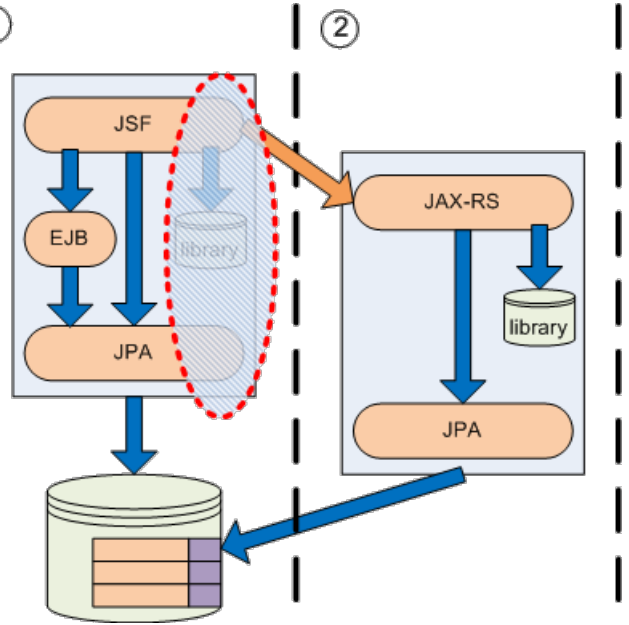
Image service

- Selected because
  - It is mostly static content
  - Not business critical
  - Contains no proprietary code or sensitive data

- Value
  - Storage / hardware savings (on prem) when moved to cloud
  - Potential re-use of the service in other applications

Image service with shared data (2)

- Developing a new API to expose image data
  - Built with the Liberty app accelerator
  - Database is still shared with the original application
  - Defines the externals that will be used by the monolith going forward
- REST: simple synchronous calls

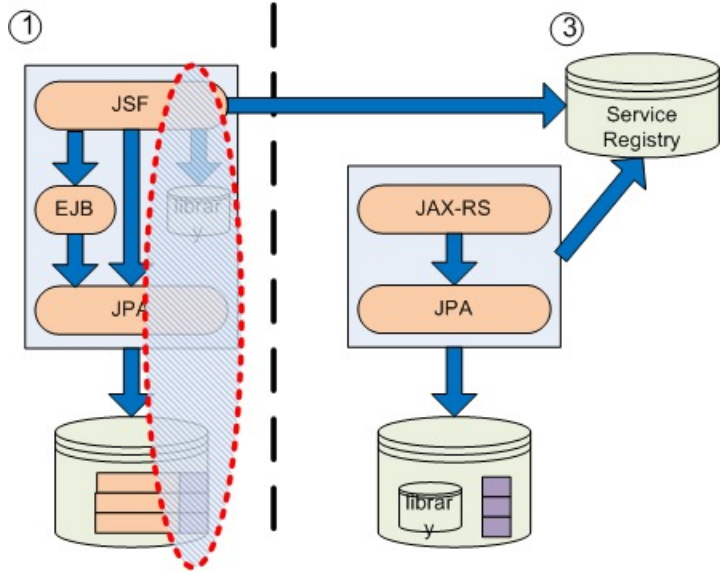


Separate image service (3)

- The service now properly owns its own data

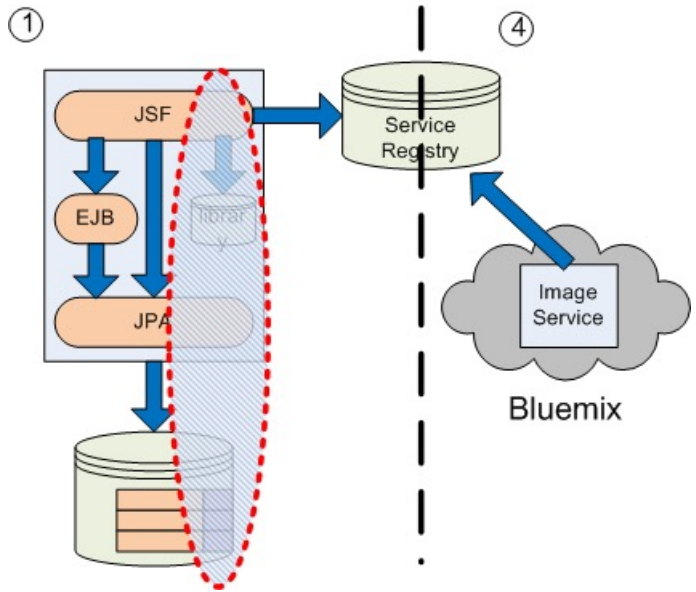
- Externalized location
  - Service discovery, or
  - Well-known location

- Considerations: *Protect the monolith*
  - API Gateway
  - Circuit breaker / bulkhead



Cloud-based image service (4)

- Image service hosted in Bluemix
  - Availability
  - Scalability
  - Management
  - Statistics
- Monolith
  - Remains on-premises
  - Move to the cloud (?!)



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Liberty app accelerator

A quick start for Java-based microservices

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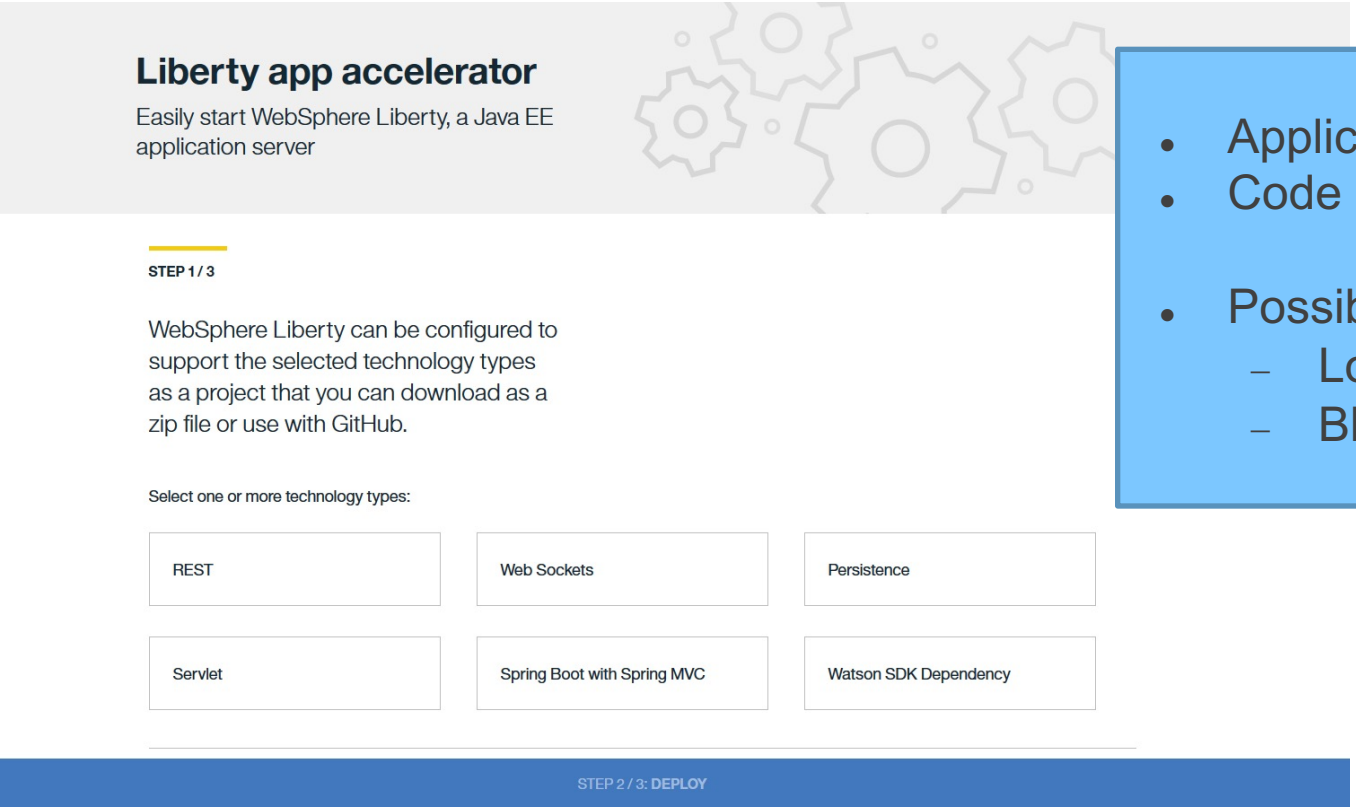
Liberty app accelerator: http://wasdev.net/accelerate

- Java-based microservice using Liberty built and deployed in < 10min



- Application configuration
- Code snippets

- Possible deployment options:
  - Local
  - Bluemix

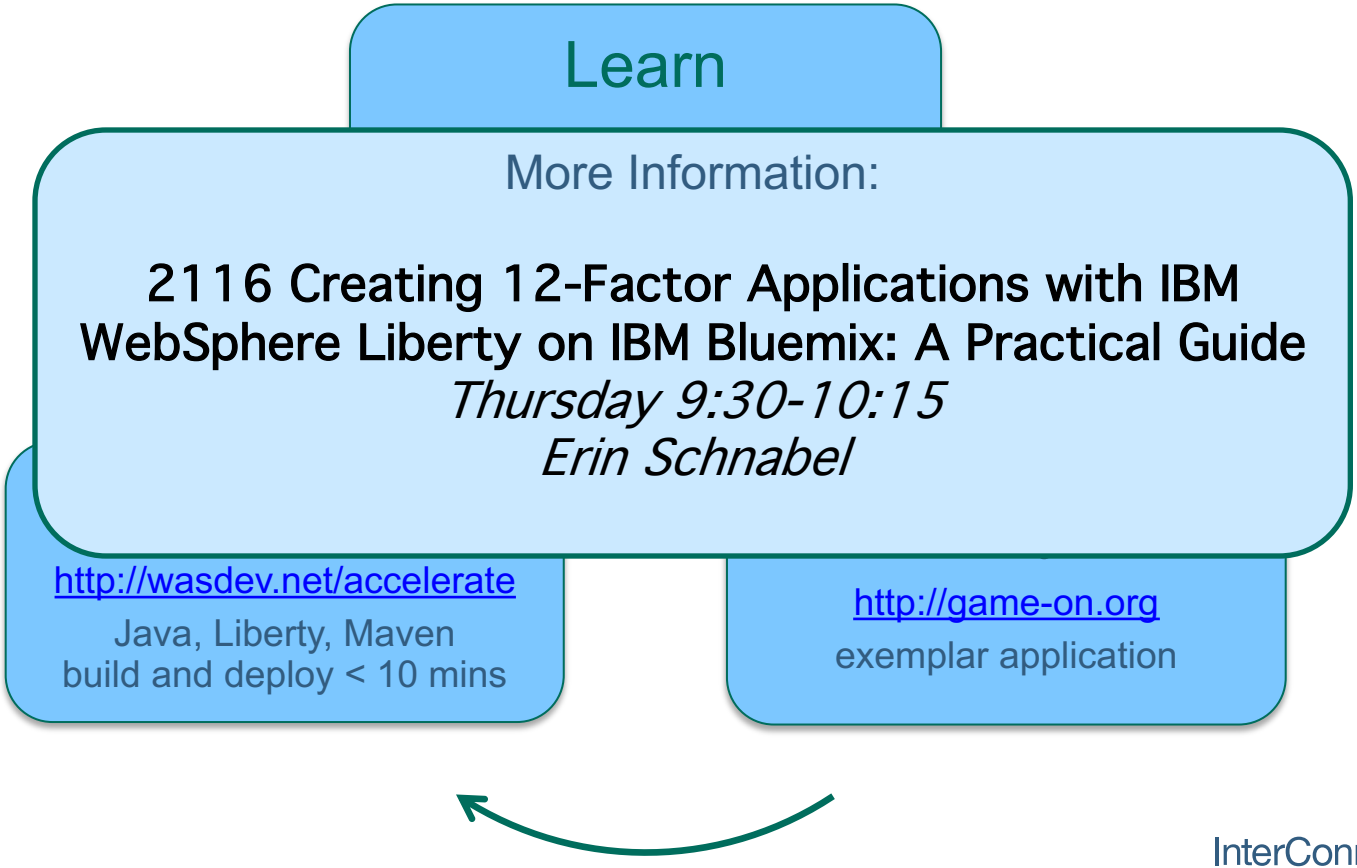
Summary

Summary

- Microservices are not free
- You can build microservices with Java EE
- Microservices != Cloud

- Resources:
  - http://wasdev.net for all the things
    - http://wasdev.net/docs/microservices
  - Github Samples: https://github.com/wasdev?query=pbw
  - Liberty app accelerator: http://wasdev.net/accelerate

Create: Cloud native apps and microservices



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