

Demystifying Microservices for Java EE Developers



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About me



Ensoe Technology, LLC
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- David R. Heffelfinger
 - Independent consultant based in Fairfax, VA
 - Author of several books on Java, Java EE and related technologies
 - Frequent speaker at Java conferences
 - Named one of 39 Java experts you should follow on Twitter:
<https://techbeacon.com/java-leaders-you-should-follow-twitter>



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Session Outline

- What are microservices?
- Can Java EE do microservices?
- Migrating to microservices
- Microservices Demo
- Java EE 8, Java EE 9 and MicroProfile
- Summary



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What are microservices?

- Architectural style
 - Code deployed in small, granular modules
 - Low coupling, high cohesion
 - RESTful web services
 - Framework and programming language independent

Can Java EE do microservices?



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- Many Java EE application server vendors provide lightweight, embeddable application servers (e.g. Payara Micro)
- One application developed per instance of application server
- Several instances of the application server deployed to a server

Can Java EE do microservices? (cont'd)



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- Some application servers allow the creation of an “uber jar”
- Lightweight application servers can be added to a container image (i.e. Docker)
 - Applications can be deployed as thin wars, typically a few kilobytes in size.
- Modern, lightweight Java EE application servers suitable for microservices development



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Microservices Advantages

- Smaller codebases
- Microservices encourage good coding practices
 - Low coupling, high cohesion
- Resilience
- Scalability

Microservices Disadvantages



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- Additional operational and tooling overhead
- Increased debugging complexity
- Distributed transactions may pose a challenge
- Network latency
- Potential for complex interdependencies
- Susceptible to the fallacies of distributed computing



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Migrating to microservices

- Should we migrate?
 - Do the benefits outweigh the disadvantages?
 - Are there pressing business requirements?
- A migration to microservices may not provide much value to end users

Migrating to microservices(cont'd)



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- Iterative refactoring
 - Refactor an existing application one module at a time
 - Identify an existing module to refactor as a microservice
 - Client code for the refactored module would invoke the refactored code via HTTP requests
 - Identify a second module to refactor, then a third, etc, until the complete application has been refactored to follow the microservices architectural style

Migrating to microservices(cont'd)



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- Partial refactoring
 - Identify modules that may be reusable across applications
 - Refactor those (and only those) modules as microservices
 - Hybrid approach

Migrating to microservices(cont'd)



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- Implement new requirements as microservices
- Existing code invokes the newly developed microservices via HTTP requests
- Hybrid approach

Microservices Demo



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Java EE 8



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- Java API for JSON Binding (JSON-B)
 - Automatically populate Java objects from JSON
 - Automatically generate JSON from Java objects
- Java API for RESTful Web Services (JAX-RS) 2.1
 - JSON-B support
 - Server Sent Events
 - Improved CDI integration
 - Security improvements

Java EE 8 (cont'd)



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- CDI 2.0
 - Observer ordering
 - Asynchronous events
 - Configurators for major Service Provider Interface (SPI) elements

Java EE 8 (cont'd)



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- Bean Validation 2.0
 - Support for Java SE 8 Date/Time API
 - Ability to validate all members of a collection with a single annotation
 - Repeatable annotation support



- Project Jigsaw support
 - Java EE dependencies declared as modules
- Circuit Breaker design pattern support for JAX-RS
- New Event API
- NoSQL database support
- New State Management API

Microprofile



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- Collaboration between application server vendors and JUGs
 - IBM
 - Payara Services
 - Red Hat
 - Tomitribe
 - London Java Community
 - SouJava Brazilian JUG



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MicroProfile (cont'd)

- Does not compete with Java EE
 - “Feeds” the Java EE standard
- Currently supports JAX-RS, CDI, and JSON-P
- May come up with new APIs

Summary



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- Java EE is suitable for microservices
 - Java EE developers can leverage their expertise
 - Deploy Java EE compliant code to an embeddable application server
 - Traditional Java EE applications can be partially or completely refactored to microservices

Additional Resources



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- Demystifying Microservices for Java EE Developers Guide:

<http://info.payara.fish/demystifying-microservices-for-java-ee-developers>

- The Aquarium (Java EE 8/9 News):

<https://blogs.oracle.com/theaquarium/>

- MicroProfile: <https://micropattern.io/>

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