

# Demystifying Microservices for Java EE Developers



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# About me



Ensende 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>

# Session Outline



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

# What are microservices?



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- 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

# Microservices Advantages



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- 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



# Migrating to microservices



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- 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



# Java EE 9



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- 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

# MicroProfile (cont'd)



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- 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



Ensode Technology, LLC  
<http://www.ensode.com>

- 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://microprofile.io/>
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