a4m36jee Pokročilé Java technologie: JBoss

Část 1. - Úvod, Java EE 7

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Agenda

- Introduction
- Course information
- Tools
- Java EE 7

Motivation

- Bring the latest information about Java EE technologies
- Provide information about JBoss projects
- Feedback NEEDED

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Organization

- 7 lessons
  - Presentation followed by practical training
    - Source code available in public
- Evaluation based on a homework project developed using Java EE 7 technologies
- Project is expected to be deployed and run on OpenShift PaaS

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Topics

- Introduction to Java EE 7
- CDI 1.1, EJB 3.2
- HTML5 – WebSockets, JSON, REST
- Datagrids, Infinispan
- Java EE security
- Clustering and scalability in WildFly 10
- Management and monitoring

Tools

- WildFly 10 Final
- JBoss Developer Studio 10.3
- Maven
- Git
- You can use any IDE you want
  - But only JBDS is supported by teachers

Java EE 7 (1/2)

- New/major upgrade specifications for web 2.0 apps
  - WebSocket 1.0
  - JSON-P 1.0
  - JAX-RS 2.0
- New/major upgrade specifications for backend
  - Batch Applications 1.0
  - Concurrency 1.0
  - JMS 2.0

Java EE 7 (2/2)

- Minor updates (not comprehensive)
  - CDI 1.1
  - JSF 2.2
  - Bean Validation 1.1
  - JPA 1.1
  - JTA 1.2
  - Servlet 3.1
- Other updates
  - EL 3.0

Concurrency Utilities 1.0 (1/2)

- Application managed multithreading
- Based on java.util.concurrent infrastructure
  - ExecutorService
  - ScheduleExecutorService
  - ThreadFactory

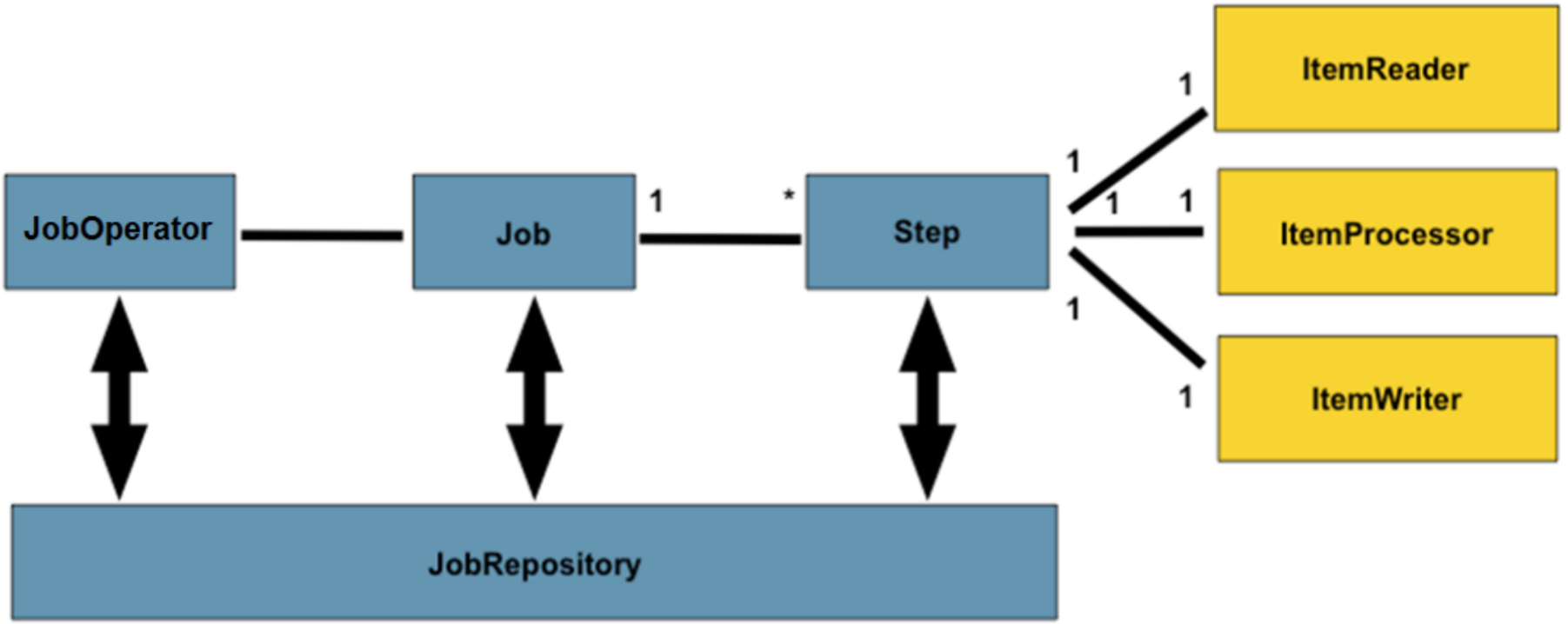
Concurrency Utilities 1.0 (2/2)

- Java EE 7 counterparts
  - ManagedExecutorService
  - ManagedScheduledExecutorService
  - ManagedThreadFactory
- Configured in container
  - @Resource
- ContextService
  - Allows execution of task in a context of current thread
    - e.g. security
- Tasks/threads run in its own transaction

Batch Applications 1.0 (1/8)

- For non-interactive long-running tasks
- Usually very big, running in the night
- Typical uses cases
  - Billing
  - Clearing (banks)
  - Bulk data processing
  - Mass customer operations

Batch Applications 1.0 (2/8)



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Batch Applications 1.0 (3/8)

- Job is a sequence of Steps
- Step is
  - A simple Batchlet
  - Or a combination of reader/processor/writer
- JobOperator manages jobs (starts/stops) and is an interface to JobRepository
- JobRepository stores information about running and past Jobs
- Id of classes
  - CDI name (@Named)
  - XML file

Batch Applications 1.0 (4/8)

- Packaging
  - Class ids in
    - `META-INF/batch.xml`
  - Job definitions
    - `META-INF/batch-jobs/<jobname>.xml`
- API entry point
  - `BatchRuntime.getJobOperator()`

Batch Applications 1.0 (5/8)

- Batchlet processes everything in one phase
- Reader/processor/writer supports chunks
  - Processing and aggregation of subset of records in a single transaction
  - Checkpoints
    - Allows to restart a job from last processed chunk
    - Defined by item count, time or custom
  - Errors/exceptions
    - Could be ignored (skipped) or retried

Batch Applications 1.0 (6/8)

- Batchlet
  - Batchlet, AbstractBatchlet
- Reader
  - ItemReader, AbstractItemReader
- Processor
  - ItemProcessor
- Writer
  - ItemWriter, AbstractItemWriter
- Job/step can have property – defined in XML
- @BatchProperty

Batch Applications 1.0 (7/8)

- Injectable
  - @BatchProperty
  - JobContext
  - StepContext

Batch Applications 1.0 (8/8)

- Chunks can be executed in parallel – partition
- Jobs can contain complex processes
  - Flow
  - Split
  - Decision
  - Transition
  - Fail/End/Stop

JMS 2.0 (1/2)

- Aligned with Java 7 and CDI
- Much easier used and less verbose code
- Auto-closeable objects
  - Connection, Session, MessageProducer/Consumer
  - Significantly improves resource handling
- Admin object definitions
  - Simpler deployment – destinations and CF configurable in code
  - @JMSDestinationDefinition(s)
  - @JMSConnectionFactoryDefinition(s)

JMS 2.0 (2/2)

- New construct – JMSContext
  - @Inject
  - Replaces Connection, Session, MessageProducer/Consumer
  - Fully managed by container – no resource handling
- Further configurable with
  - @JMSConnectionFactory
  - @JMSPasswordCredential
  - @JMSSessionMode

EL 3.0 (1/2)

- Standalone API
  - Can use EL for application purpose
  - Works in Java SE
- New operators
  - += (string concatenation)
  - ; (expression chaining – like , in C)
- Can access static fields and methods
- Lambdas
  - Ported from Java 8
- Stream API

EL 3.0 (2/2)

- Lambdas
  - Ported from Java 8
  - Functions can be assigned to variables
  - FP-like features
- Stream API
  - Collection can be converted to stream, FP-like functions supported
  - filter, map, distinct, sorted, forEach
  - reduce, max, min, count, sum
  - anyMatch, allMatch, findFirst

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Servlet 3.1

- Support for NIO in async execution
  - Reads and writes are event based
    - ReadListener
    - WriteListener
- HTTP Protocol Upgrade Support
  - e.g. for HTTP → WebSocket

JTA 1.2

- Allows CDI bean methods to run in transaction context
  - @Transactional - required, requires new, etc.
  - Handled via CDI interceptors
- New CDI scope - @TransactionScoped
  - The bean's lifecycle is tied to a running transaction

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Bean Validation 1.1

- CDI Integration
  - Can @Inject Validator and ValidatorFactory
- Design by contract
  - Constructor and method params can be validated
- Support for EL in error messages
  - Incl. locales
- Group conversion
  - @ConvertGroup
  - Maps requested validation group to the group actually used

JPA 2.1 (1/2)

- Criteria API – bulk updates
  - createCriteriaUpdate
  - createCriteriaDelete
  - Portable way for big database changes
- Schema generation
  - Standardized across JPA providers

JPA 2.1 (2/2)

- Stored procedures
  - create(Named)StoredProcedureQuery
  - @NamedStoredProcedureQuery/ies
- Native FUNCTION call
  - Used in JPQL query
    - `FUNCTION(f_name {,args}*)`
  - Can execute any SQL native function
  - Potentially non-portable

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Java EE 8 (1/2)

- JSON-B 1.0
  - Supports standardized or customized serialization
- Java EE Security API
- Servlet API 4.0
  - HTTP 2.0
  - Servlet mappings discovery

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Java EE 8 (2/2)

- Bean Validation 2.0
  - Constraints on container element types
  - @Email, @Past, @Negative, ...
  - Java 8 types support (date/time, Optional)
- CDI 2.0
- JAX-RS 2.1
  - Reactive support
  - SSE (Server Sent Events) support

OpenShift

- Platform-as-a-Service
- IaaS, SaaS, PaaS
- http://www.openshift.com
- PHP hosting on steroids
- Controlled from JBDS or Git CLI

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WildFly Swarm

- http://wildfly-swarm.io/
- Microservices bandwagon
- Container as a fatjar
- Just a Maven plug-in
- Strip down WildFly to services only used
- Custom main()
- 3rd party integration
  - NetflixOSS, Spring
- Additional services
  - Logging – logstash
  - Management – Jolokia
  - Clustering - Consul

Setup IDE

- Download JBDS 11 from
  - https://developers.redhat.com/
- Download WildFly 10 from
  - http://www.wildfly.org/download/
- Unzip WildFly 10
- Install JBDS
  - java -jar ...
  - Direct JBDS to the directory with WildFly 10 during installation
- And you are done :-)

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