Quick look at Batch Applications for the Java Platform

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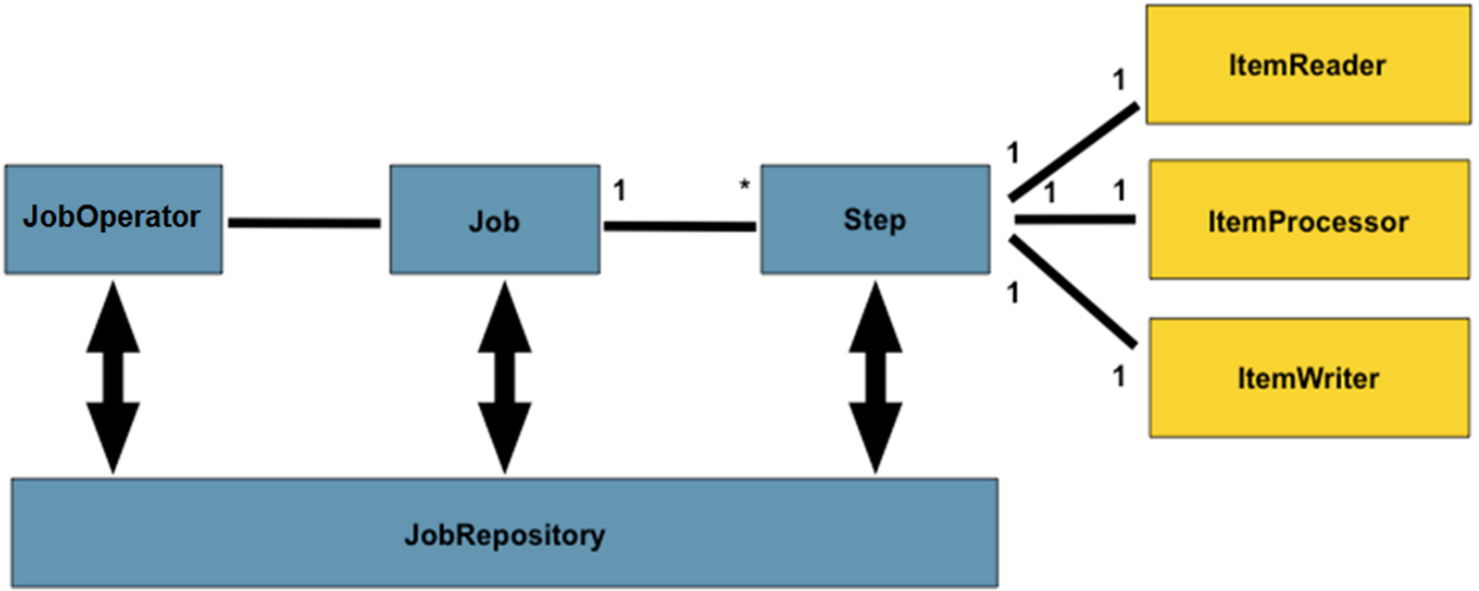
Batch Applications for the Java Platform

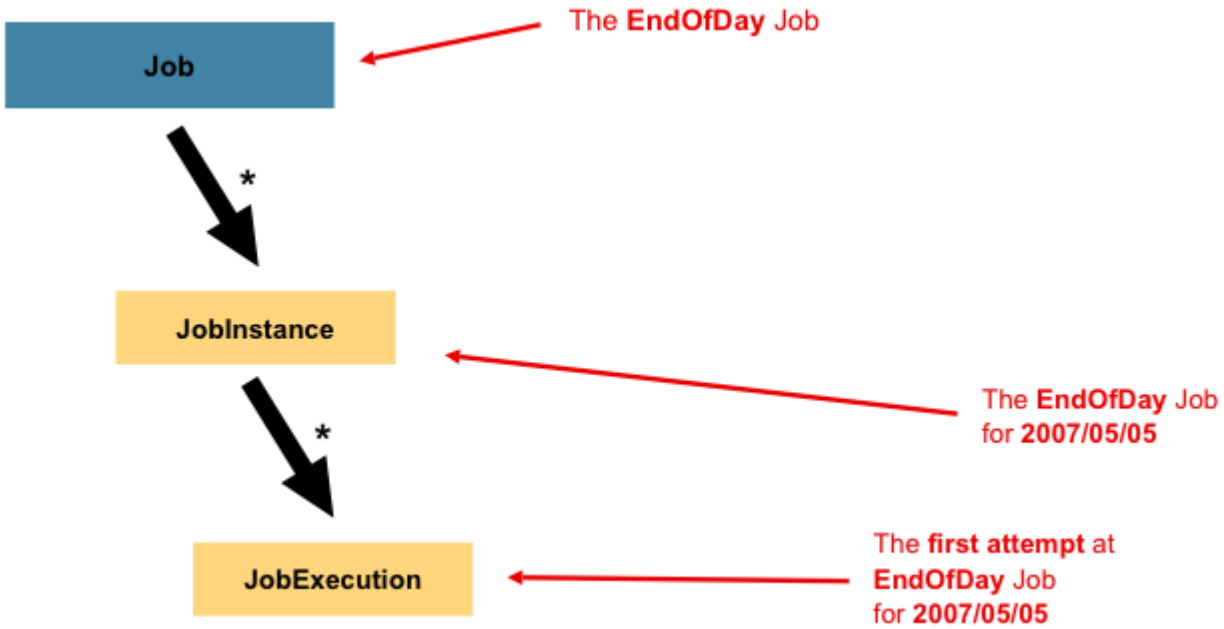
Overview

- New for Java EE 7, can be used in Java SE
- Standardizes batch processing for Java
  - Non-interactive, bulk-oriented, long-running
  - Data or computationally intensive
  - Sequentially or in parallel
  - Ad-hoc, scheduled or on-demand execution
- Led by IBM

Basic Components of Batch Processing



Batch Domain Language



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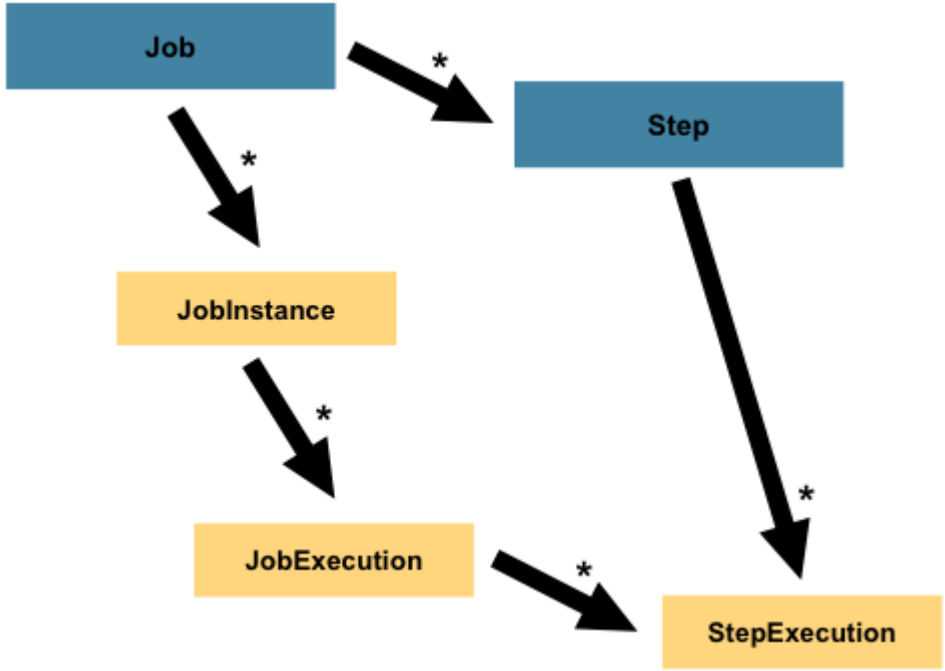
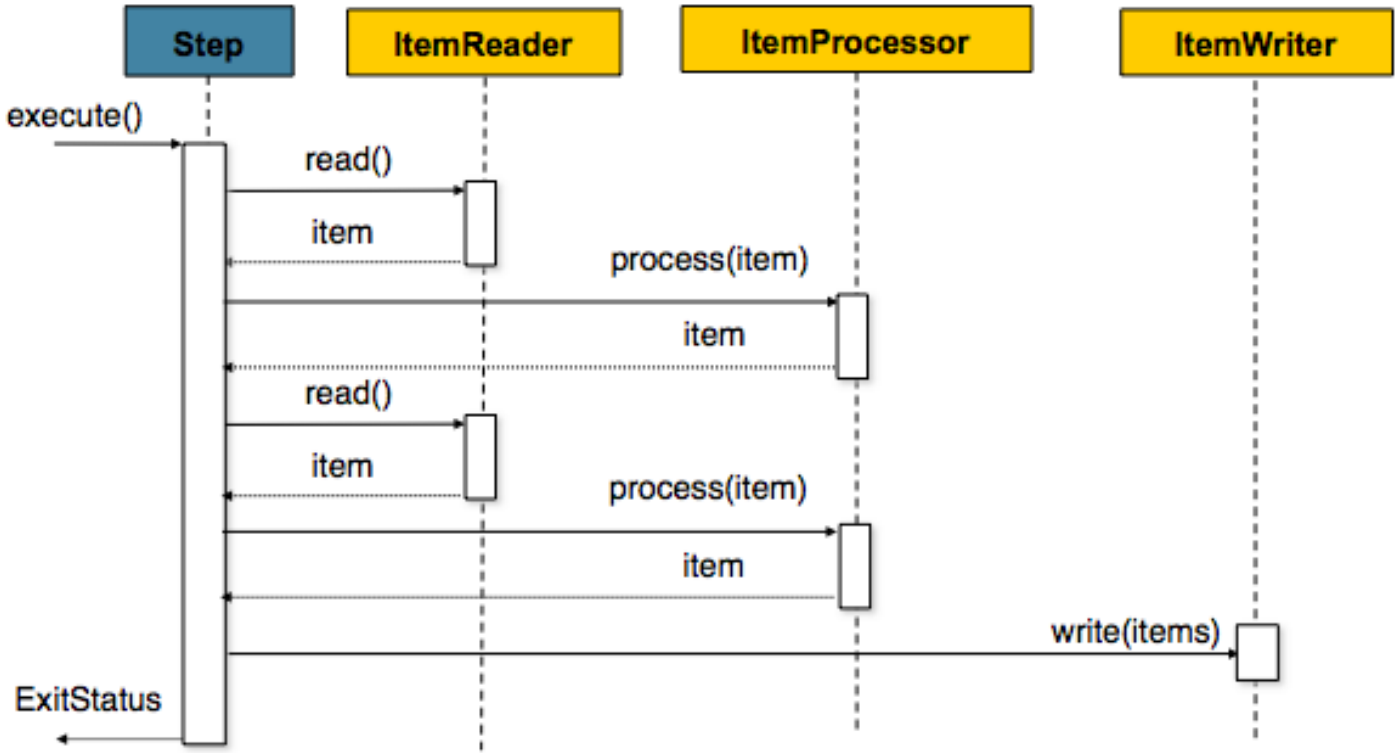


Chunked Processing



Job Specification Language (JSL)

- Specifies the Steps in the order for execution to accomplish the Job.
- Powerful
  - Conditional execution of steps
  - Each step can have different properties, listeners etc.
  - Exception Handling
- Each application can have more than one JSL (job XMLfile)
- Job XML filename must be unique
- Placed in META-INF/batch-jobs directory

Batch Applications for the Java Platform

Step Example using Job Specification Language (JSL)

```
<step id="process">
  <chunk item-count="2"
        <reader    ref="simpleItemReader" />
        <processor ref="simpleItemProcessor"/>
        <writer    ref="simpleItemWriter" />
  <chunk/>
</step>
```

```
@Named
Public class simpleItemReader extends AbstractItemReader {
   @Inject
   private JobContext jobcontext;
   …
}
```

Chunked Processing: Reader, Processor, Writer

```
public interface ItemReader<T> {
  public void open(Externalizable checkpoint);
  public T readItem();
  public Externalizable checkpointInfo();
  public void close();
}

public interface ItemProcessor<T, R> {
  public R processItem(T item);
}

public interface ItemWriter<T> {
  public void open(Externalizable checkpoint);
  public void writeItems(List<T> items);
  public Externalizable checkpointInfo();
  public void close();
}
```

Checkpointing

- For data intensive tasks, long periods of time
  - Checkpoint/restart is a common design requirement
- Basically saves Reader, Writer positions
  - Naturally fits into Chunk oriented steps
  - `reader.checkpointInfo()` and `writer.checkpointInfo()` are called
  - The resulting `Externalizable` data is persisted
  - When the Chunk restarts, the reader and writer are initialized with the respective `Externalizable` data

Chunked Processing: Checkpoint

```
public interface ItemReader<T> {
  public void open(Externalizable checkpoint);
  public T readItem();
  public Externalizable checkpointInfo();
  public void close();
}

public interface ItemProcessor<T, R> {
  public R processItem(T item);
}

public interface ItemWriter<T> {
  public void open(Externalizable checkpoint);
  public void writeItems(List<T> items);
  public Externalizable checkpointInfo();
  public void close();
}
```

Handling Exceptions

```
<job id=...>
...
  <chunk skip-limit="5" retry-limit="5">
    <skippable-exception-classes>
      <include class="java.lang.Exception"/>
      <exclude class="java.io.FileNotFoundException"/>
    </skippable-exception-classes>
    <retryable-exception-classes>
      ...
    </retryable-exception-classes>
    <no-rollback-exception-classes>
      ...
    </no-rollback-exception-classes>
  </chunk>
...
</job>
```

Advanced Topics

- Partitioned Steps
- Advanced Partitioning Scenarios
  - Partition Mapper, Reducer, Collector, Analyzer
- Flow & Split
- Batchlet
- Batch Runtime Specification

Example: Simple Payroll Processing Application

- Simple payroll processing application.
- Demonstrates some of the key features of JSR 352
- SimplePayrollJob
  - Reading input data for payroll processing from CVS file
  - Each line contains employee ID and base salary
  - Calculates tax, bonus, and net salary
  - Finally write out the processed records into Database.

Resources

- Final Specification at : http://java.net/projects/jbatch/
- Questions and comments : public@jbatch.java.net