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The Java EE 7 Platform: Productivity++ and Embracing HTML5

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Java EE 6 Platform
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Java EE 6 – Key Statistics

- **50+ Million Java EE 6 Component Downloads**
- #1 Choice for Enterprise Developers
- #1 Application Development Platform
- Fastest implementation of a Java EE release

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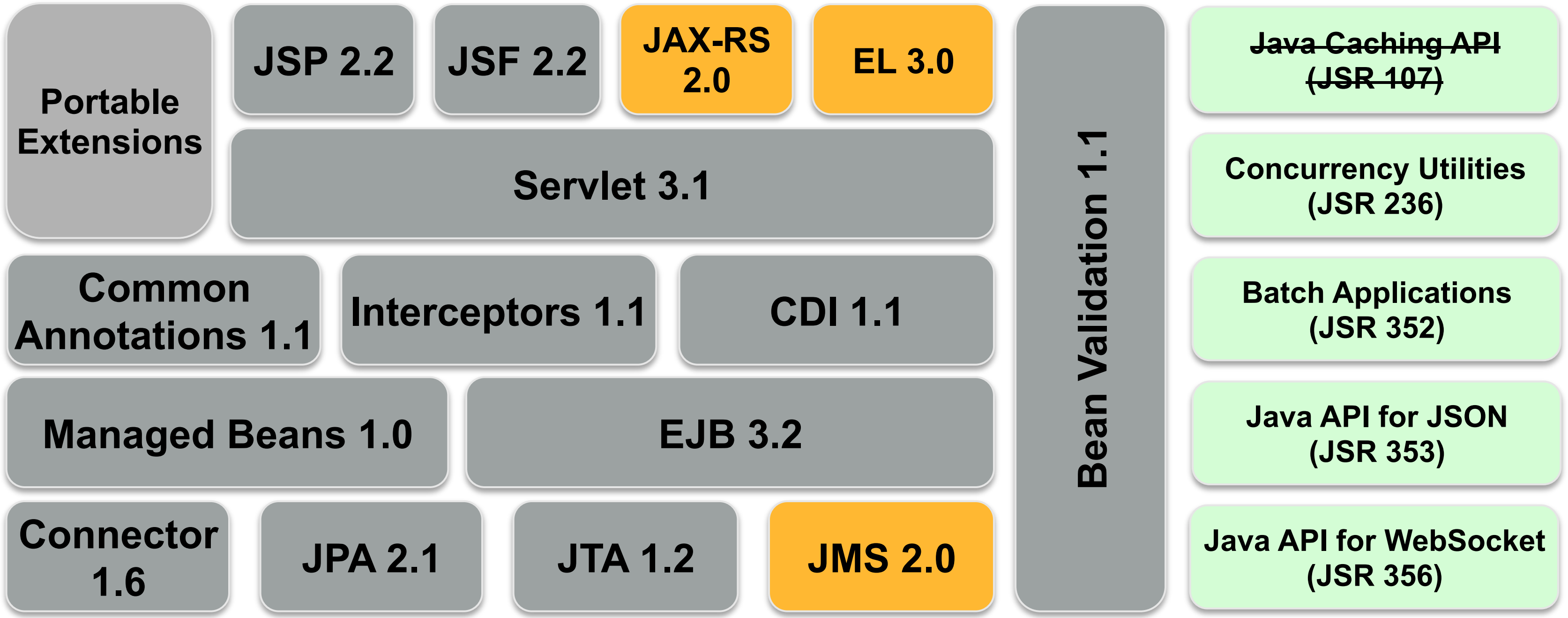
Java EE 7 Revised Scope

Productivity and HTML5

- Higher Productivity
  - Less Boilerplate
  - Richer Functionality
  - More Defaults
- HTML5 Support
  - WebSocket
  - JSON
  - HTML5 Friendly Markup

Java EE 7 – Candidate JSRs



🟩 New
🟧 Major Release
🟦 Updated

Java API for RESTful Web Services 2.0

- Client API
- Message Filters & Entity Interceptors
- Asynchronous Processing – Server & Client
- Hypermedia Support
- Common Configuration

Java API for RESTful Web Services 2.0

Client API - Now

```
// Get instance of Client
Client client = ClientFactory.newClient();

// Get customer name for the shipped products
String name = client.target(“../orders/{orderId}/customer”)
                    .resolveTemplate(”orderId", ”10”)
                    .queryParam(”shipped", ”true”)
                    .request()
                    .get(String.class);
```

Java Message Service 2.0

Simplify the existing API

- Less verbose
- Reduce boilerplate code
- Resource injection
- `Connection`, `Session`, and other objects are `AutoCloseable`
- Requires Resource Adapter for Java EE containers
- Simplified API in both Java SE and EE

Java Message Service 2.0

Sending a Message using JMS 1.1

```
@Resource(lookup = "myConnectionFactory”)
ConnectionFactory connectionFactory;

@Resource(lookup = "myQueue”)
Queue myQueue;

public void sendMessage (String payload) {
    Connection connection = null;
    try {
        connection = connectionFactory.createConnection();
        Session session = connection.createSession(false, Session.AUTO_ACKNOWLEDGE);
        MessageProducer messageProducer = session.createProducer(myQueue);
        TextMessage textMessage = session.createTextMessage(payload);
        messageProducer.send(textMessage);
    } catch (JMSException ex) {
        //. . .
    } finally {
        if (connection != null) {
            try {
                connection.close();
            } catch (JMSException ex) {

                //. . .
            }
        }
    }
}
```

Application Server Specific Resources

Boilerplate Code

Exception Handling

Java Message Service 2.0

Sending message using JMS 2.0

```
@Inject
JMSContext context;

@Resource(lookup = "java:global/jms/demoQueue”)
Queue demoQueue;

public void sendMessage(String payload) {
    context.createProducer().send(demoQueue, payload);
}
```

Java API for JSON Processing 1.0

- API to parse and generate JSON
- Streaming API
  - Low-level, efficient way to parse/generate JSON
  - Provides pluggability for parsers/generators
- Object Model
  - Simple, easy-to-use high-level API
  - Implemented on top of Streaming API
- Binding JSON to Java objects forthcoming

Java API for JSON Processing 1.0

Streaming API – JsonParser

```
{
    "firstName": "John", "lastName": "Smith", "age": 25,
  "phoneNumber": [
      { "type": "home", "number": "212 555-1234" },
      { "type": "fax", "number": "646 555-4567" }
   ]
}
```

```
Iterator<Event> it = parser.iterator();
Event event = it.next();                    // START_OBJECT
event = it.next();                          // KEY_NAME
event = it.next();                          // VALUE_STRING
String name = parser.getString();           // "John”
```

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Java API for WebSocket 1.0

- API for WebSocket Client/Endpoints
  - Annotation-driven (`@WebSocketEndpoint`)
  - Interface-driven (`Endpoint`)
  - Client (`@WebSocketClient`)
- SPI for data frames
  - WebSocket opening handshake negotiation
- Integration with Java EE Web container

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Java API for WebSocket 1.0

Hello World – POJO/Annotation-driven

```
import javax.websocket.*;

@ServerEndpoint("/hello")
public class HelloBean {

    @OnMessage
    public String sayHello(String name) {
        return “Hello “ + name;
    }
}
```

Java API for WebSocket 1.0

Chat Server

```
@ServerEndpoint("/chat")
public class ChatBean {
    static Set<Session> peers = Collections.synchronizedSet(…);

    @OnOpen
    public void onOpen(Session peer) {
        peers.add(peer);
    }

    @OnClose
    public void onClose(Session peer) {
        peers.remove(peer);
    }

    . . .
```

Java API for WebSocket 1.0

Chat Server (contd.)

```
    . . .

    @OnMessage
    public void message(String message, Session client) {
        for (Session peer : peers) {
            peer.getRemote().sendObject(message);
        }
    }
}
```

Bean Validation 1.1

- Open: Spec, Reference Implementation, TCK
- Alignment with Dependency Injection
- Method-level validation
  - Constraints on parameters and return values
  - Check pre-/post-conditions

Bean Validation 1.1

Method Parameter and Result Validation

Built-in

Custom

```
public void placeOrder(
        @NotNull String productName,
        @NotNull @Max("10") Integer quantity,
        @Customer String customer) {
            //. . .
}
```

```
@Future
public Date getAppointment() {
    //. . .
}
```

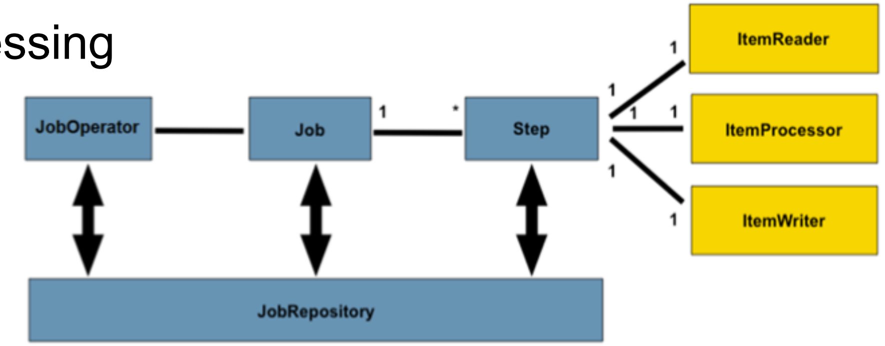
Batch Applications for the Java Platform 1.0

- Suited for non-interactive, bulk-oriented and long-running tasks
- Computationally intensive
- Can execute sequentially/parallel
- May be initiated
  - Adhoc
  - Scheduled
    - No scheduling APIs included

Batch Applications for the Java Platform 1.0

Concepts

- **Job**: Entire batch process
  - Put together through a Job Specification Language (XML)
- **Step**: Independent, sequential phase of a job
  - **ItemReader**: Retrieval of input for a step, one at a time
  - **ItemProcessor**: Business processing of an item
  - **ItemWriter**: Output of an item, chunks of items at a time
- **JobOperator**: Manage batch processing
- **JobRepository**: Metadata for jobs



Batch Applications for the Java Platform 1.0

Job Specification Language – Chunked Step

```
<step id=”sendStatements”>
  <chunk reader ref=”AccountReader”
     processor ref=”AccountProcessor”
     writer ref=”EmailWriter”
     chunk-size=”10” />
</step>
```

```
…implements ItemReader<Account> {
public Account readAccount() {
    // read account using JPA
}
```

```
…implements ItemProcessor<Account,Statement>
public Statement processAccount(Account account) {
    // calculate balance
}
```

```
…implements ItemWriter<Statement>
public void sendEmail(List<Statement> accounts) {
    // use JavaMail to send email
}
```

Java Persistence API 2.1

- Schema Generation
- Unsynchronized Persistence Contexts
- Bulk update/delete using `Criteria`
- User-defined functions using `FUNCTION`
- Stored Procedure Query

Servlet 3.1

- Non-blocking I/O
- Protocol Upgrade
- Security Enhancements

Servlet 3.1

Non-blocking IO - Traditional

```
public class TestServlet extends HttpServlet
  protected void doGet(HttpServletRequest request,
                       HttpServletResponse response)
                 throws IOException, ServletException {
    ServletInputStream input = request.getInputStream();
    byte[] b = new byte[1024];
    int len = -1;
    while ((len = input.read(b)) != -1) {
      . . .
    }
  }
}
```

Servlet 3.1

Non-blocking I/O: doGet Code Sample

```
AsyncContext context = request.startAsync();
ServletInputStream input = request.getInputStream();
input.setReadListener(
    new MyReadListener(input, context));
```

Servlet 3.1

Non-blocking I/O: MyReadListener Code Sample

```
@Override
public void onDataAvailable() {
  try {
    StringBuilder sb = new StringBuilder();
    int len = -1;
    byte b[] = new byte[1024];
    while (input.isReady() && (len = input.read(b)) != -1) {
      String data = new String(b, 0, len);
      System.out.println("--> " + data);
    }
  } catch (IOException ex) {
    . . .
  }
}
. . .
```

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Concurrency Utilities for Java EE 1.0

Goals

- Provide concurrency capabilities to Java EE application components
  - Without compromising container integrity
- Support simple (common) and advanced concurrency patterns

Concurrency Utilities for Java EE 1.0

Defining ManagedExecutorService using JNDI

- Recommended to bind in `java:comp/env/concurrent` subcontext

```
<resource-env-ref>
  <resource-env-ref-name>
    concurrent/BatchExecutor
  </resource-env-ref-name>
  <resource-env-ref-type>
    javax.enterprise.concurrent.ManagedExecutorService
  </resource-env-ref-type>
</resource-env-ref>
```

Concurrency Utilities for Java EE 1.0

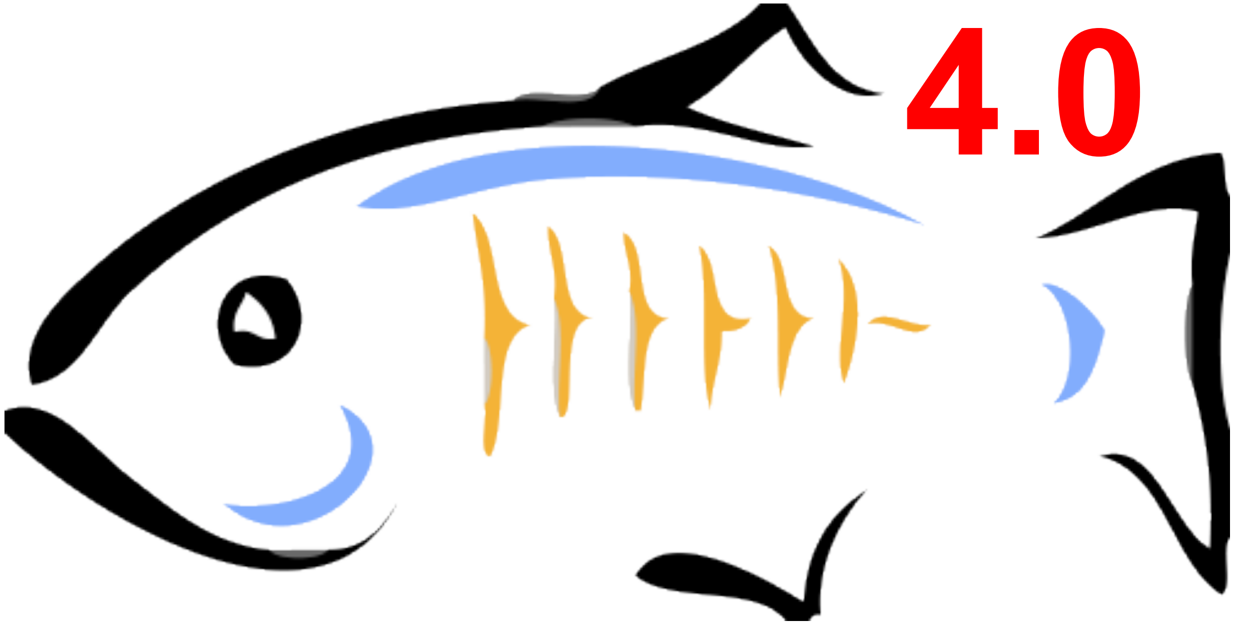
Submit Tasks to ManagedExecutorService using JNDI

```
public class TestServlet extends HTTPServlet {
  @Resource(name="concurrent/BatchExecutor")
  ManagedExecutorService executor;

  Future future = executor.submit(new MyTask());

  class MyTask implements Runnable {
    public void run() {
      . . .  // task logic
    }
  }
}
```

JavaServer Faces 2.2

- Flow Faces
- Resource Library Contracts
- HTML5 Friendly Markup Support
  - Pass through attributes and elements
- Cross Site Request Forgery Protection
- Loading Facelets via `ResourceHandler`
- File Upload Component

Java EE 7 – Implementation Status



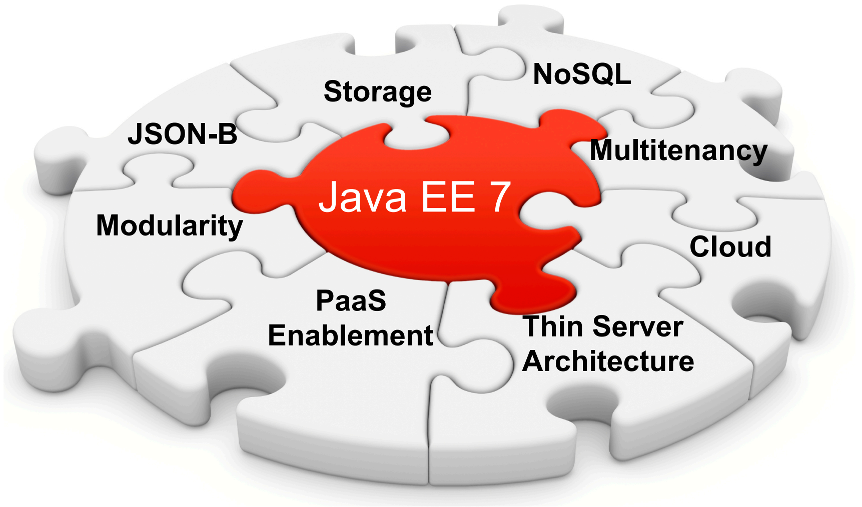
4.0

download.java.net/glassfish/4.0/promoted/

Java EE 8 and Beyond

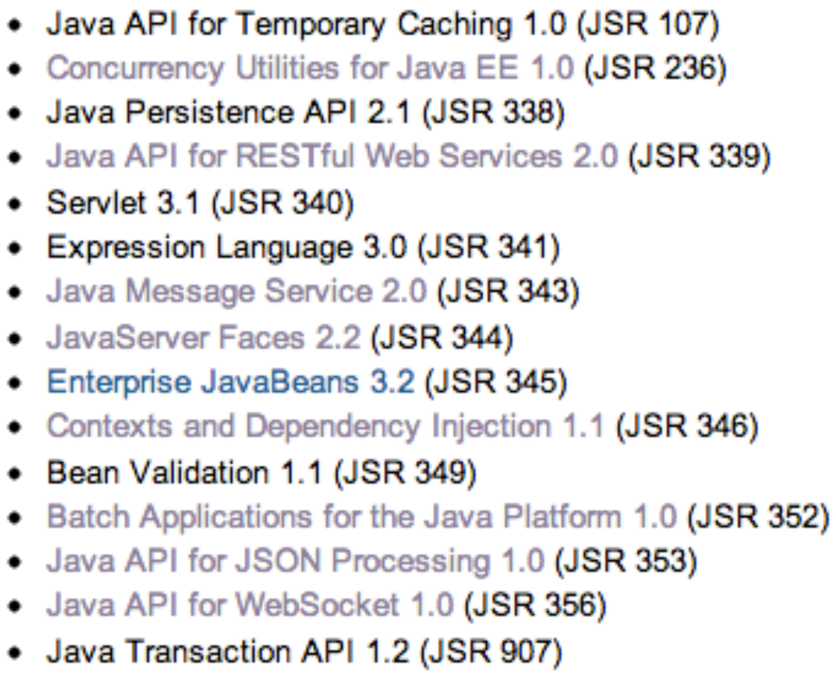
Standards-based cloud programming model

- Deliver cloud architecture
- Multi tenancy for SaaS applications
- Incremental delivery of JSRs
- Modularity based on Jigsaw



Adopt-a-JSR

How do I get started ? – glassfish.org/adoptajsr



- Java API for Temporary Caching 1.0 (JSR 107)
- Concurrency Utilities for Java EE 1.0 (JSR 236)
- Java Persistence API 2.1 (JSR 338)
- Java API for RESTful Web Services 2.0 (JSR 339)
- Servlet 3.1 (JSR 340)
- Expression Language 3.0 (JSR 341)
- Java Message Service 2.0 (JSR 343)
- JavaServer Faces 2.2 (JSR 344)
- Enterprise JavaBeans 3.2 (JSR 345)
- Contexts and Dependency Injection 1.1 (JSR 346)
- Bean Validation 1.1 (JSR 349)
- Batch Applications for the Java Platform 1.0 (JSR 352)
- Java API for JSON Processing 1.0 (JSR 353)
- Java API for WebSocket 1.0 (JSR 356)
- Java Transaction API 1.2 (JSR 907)

Adopt-a-JSR

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SPEAK UP, BE HEARD

IF YOU DON’T SAY A WORD, EVERYTHING WILL STAY THE SAME

Gothenburg JUG

Call to Action

- Specs: **javaee-spec.java.net**
- Implementation: **glassfish.org**
- The Aquarium: **blogs.oracle.com/theaquarium**
- Adopt a JSR: **glassfish.org/adoptajsr**
- NetBeans: **wiki.netbeans.org/JavaEE7**

Q&A

Hardware and Software

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