# WildFly

## The artist formerly known as JBoss AS

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# WildFly?

- JBoss AS
- JBoss Community ~ 100 Projekte
- JBoss Enterprise Application Platform

# WildFly!

- Folgeversion von JBoss AS 7
- Community Version
- Open Source
- FAQ @ http://www.wildfly.org/faq/

# Highlights

- Java EE 7
- Undertow
- Ports--
- RBAC - Role Bases Access Control
- Patching

# Java EE 7

- Servlet 3.1
- Web Socket Support (JSR-356)
- JSON Processing API (JSR-353)
- JAX-RS 2.0
- Batch Processing (JSR-352)
- Concurrency (JSR-236)
- JMS 2.0
- CDI

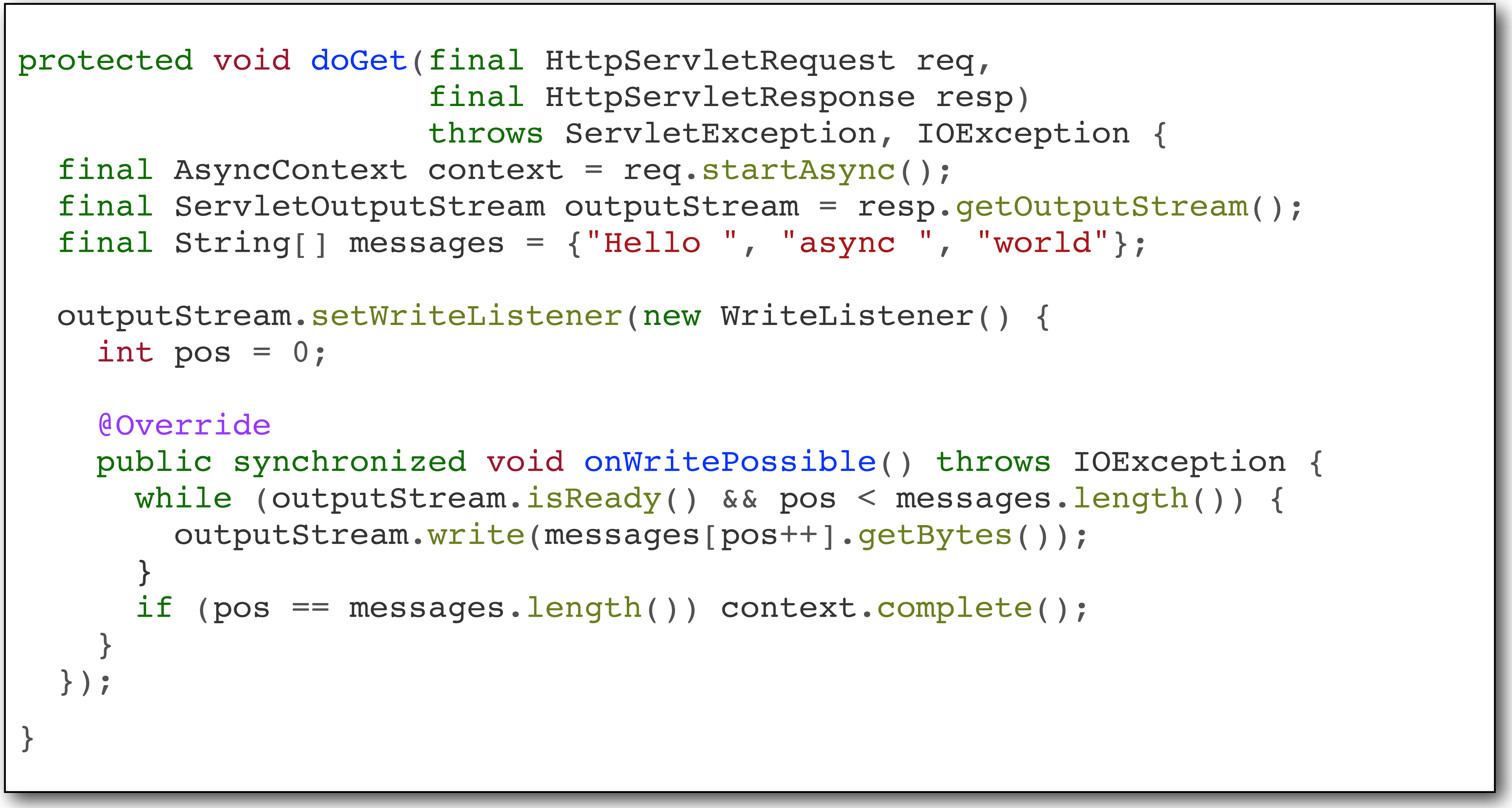
# Servlet 3.1

- Undertow: Servlet 3.1 Container
  - Async I/O Support (Non-Blocking Listeners)
  - HTTP Upgrade Support

# Asnyc I/O

- Bisher
  - Ein Thread pro Verbindung
  - Blocking
  - Viele Verbindungen → viele Threads
- Non blocking I/O
  - Callback, wenn die Operation fertig ist
  - Ein Thread kann viele Verbindungen bedienen
  - Complexerer Code

# Asnyc Write



```java
protected void doGet(final HttpServletRequest req,
                     final HttpServletResponse resp)
                     throws ServletException, IOException {
  final AsyncContext context = req.startAsync();
  final ServletOutputStream outputStream = resp.getOutputStream();
  final String[] messages = {"Hello ", "async ", "world"};

  outputStream.setWriteListener(new WriteListener() {
    int pos = 0;

    @Override
    public synchronized void onWritePossible() throws IOException {
      while (outputStream.isReady() && pos < messages.length()) {
        outputStream.write(messages[pos++].getBytes());
      }
      if (pos == messages.length()) context.complete();
    }
  });

}
```

# HTTP Upgrade

- Multiplex verschiedener Protokolle über HTTP
- Standard definiert in HTTP/1.1 RFC
- HTTP Upgrade Header
- Einfachere Firewall Konfiguration
- Setup unterschiedlicher Ports entfällt

# HTTP Upgrade / WildFly

- Nur noch zwei Ports: 8080 und 9990
- EJB und JNDI → 8080
- Management → 9990
- Ziel: „One port to rule them all“

# HTTP Upgrade / EJB

## Client Request

```
GET / HTTP/1.1
Host: example.com
Upgrade: jboss-remoting
Connection: Upgrade
Sec-JbossRemoting-Key: dGhlIHNhbXBsZSBub25jZQ==
```

## Server Response

```
HTTP/1.1 101 Switching Protocols
Upgrade: jboss-remoting
Connection: Upgrade
Sec-JbossRemoting-Accept: s3pPLMBiTxaQ9kYGzzhZRbK+xOo=
```

# HTTP Upgrade

- Prüfen des Upgrade Headers
- Setzen des entsprechenden Response Headers
- HttpServletRequest.upgrade(Class<T> handlerClass)
- Wenn der Request beendet ist, übernimmt der Handler die Kontrolle

# HTTP Upgrade API

```
public class MyProtocolUpgradeFilter implements Filter {
  public void doFilter(ServletRequest request,
    ServletResponse response,
    FilterChain chain)
    throws IOException, ServletException {

    HttpServletRequest req = (HttpServletRequest) request;
    if("my-protocol".equals(req.getHeader("Upgrade"))) {
      HttpServletResponse resp =
        (HttpServletResponse) response;
      resp.setHeader("Upgrade", "my-protocol");
      req.upgrade(MyProtocolHandler.class);
      return;
    }
    chain.doFilter(request, response);
}
```

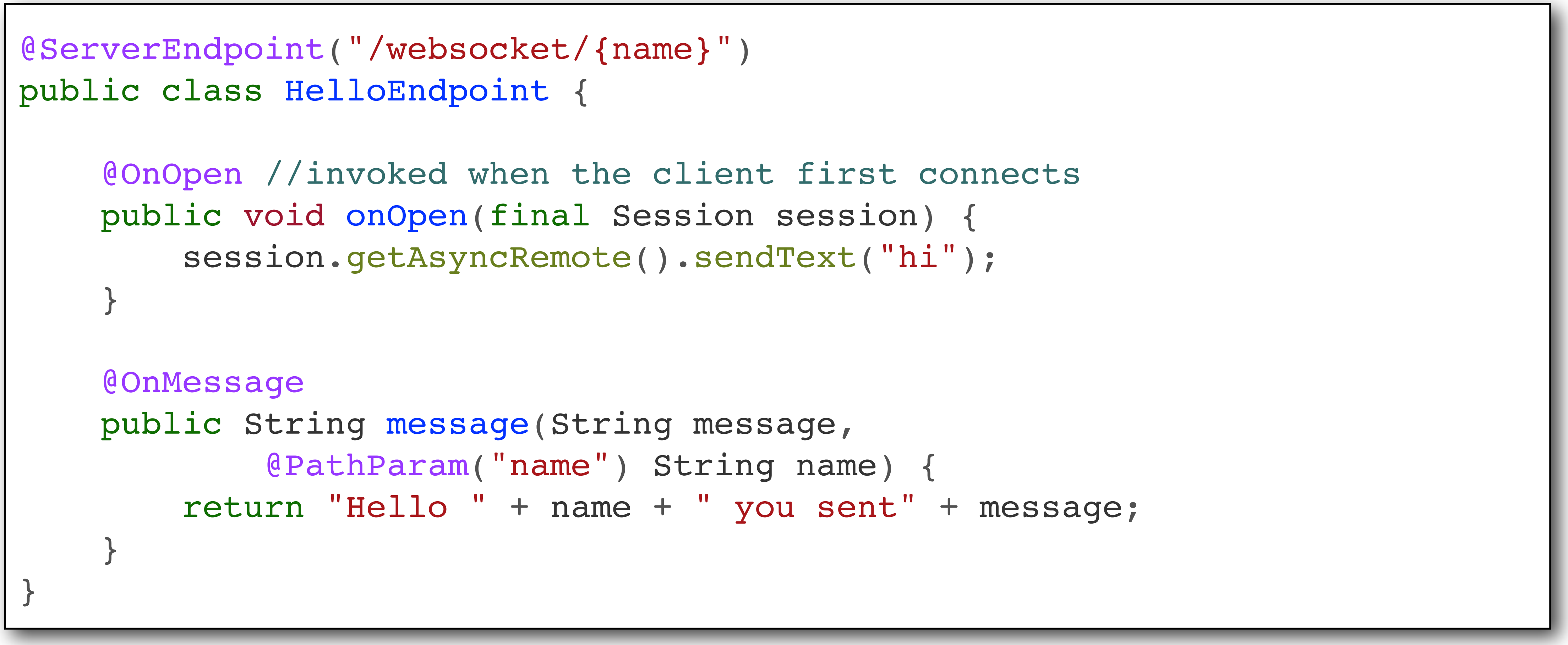
# HTTP Upgrade API

```java
public interface HttpUpgradeHandler {
  public void init(WebConnection wc);
  public void destroy();
}

public interface WebConnection extends AutoCloseable {
  public ServletInputStream getInputStream()
    throws IOException;

  public ServletOutputStream getOutputStream()
    throws IOException;
}
```

# Web Sockets

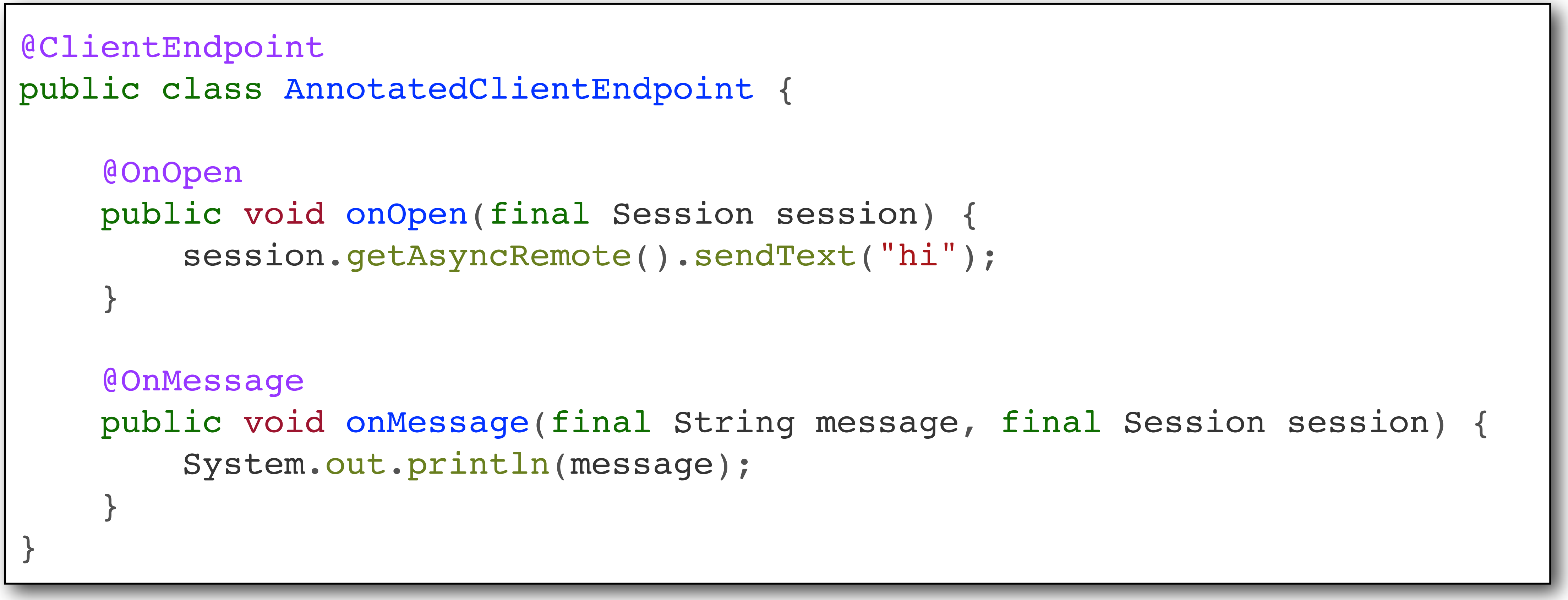
- Kommunikation in beide Richtungen möglich
- Verbindungsaufbau per HTTP Upgrade
- Implementiert in Undertow
- Java Web Socket API (JSR-356)
- Ermöglicht Einsatz von Frameworks wie Atmosphere

# Server Endpoint



```java
@ServerEndpoint("/websocket/{name}")
public class HelloEndpoint {

    @OnOpen //invoked when the client first connects
    public void onOpen(final Session session) {
        session.getAsyncRemote().sendText("hi");
    }

    @OnMessage
    public String message(String message,
            @PathParam("name") String name) {
        return "Hello " + name + " you sent" + message;
    }
}
```

# Client Endpoint



```
@ClientEndpoint
public class AnnotatedClientEndpoint {

    @OnOpen
    public void onOpen(final Session session) {
        session.getAsyncRemote().sendText("hi");
    }

    @OnMessage
    public void onMessage(final String message, final Session session) {
        System.out.println(message);
    }
}
```

# Undertow

- Neuer Webserver in WildFly
- Servlet 3.1
- Web Socket Support (JSR-356)
- HTTP Upgrade
- None Blocking I/O
- Performance↑, Memory↓
- Integrierbar in Standalone & Testumgebungen

# Embedded Undertow

- Undertow ermöglicht einfaches Einbetten
- Fluent API
- „Eat your own dogfoot“

# Embedded Undertow

```java
public class HelloWorldServer {
  public static void main(final String[] args) {
    Undertow server = Undertow.builder()
      .addListener(8080, "localhost")
      .setDefaultHandler(new HttpHandler() {
        @Override
        public void handleRequest(final HttpServerExchange exchange)
            throws Exception {
          exchange.getResponseHeaders().put(
            Headers.CONTENT_TYPE, "text/plain");
          exchange.getResponseSender().send("Hello World");
        }
      }).build();
    server.start();
  }
}
```

# RBAC

- Zugriffschutz für Management Operationen
- „Seperation of Duties“
- Sieben vordefinierte Rollen
- Scoped Roles
  - Host
  - Servergruppen
- Benutzer und Gruppen → Rollen

# RBAC Rollen

| | Monitor | Operator | Maintainer | Deployer | Auditor | Admin. | SuperUser |
|---|---|---|---|---|---|---|---|
| Read Config & State | x | x | x | x | x | x | x |
| Read Sensitive Data | | | | | x | x | x |
| Modify Sensitive Data | | | | | | x | x |
| Read / Modify Audit Log | | | | | x | | x |
| Modify Runtime State | | x | x | x | | x | x |
| Modify Persistent Config | | | x | x | | x | x |
| Read / Modify Access Control | | | | | | x | x |

# RBAC Demo

# WildFly als Platform

- Apache Camel
  https://docs.jboss.org/author/display/wfcam/Home
- Escalante
  http://escalante.io/
- DMR.scala / DMR.repl
  https://github.com/hal/dmr.scala
  https://github.com/hal/dmr.repl

# Resources

- www.wildfly.org
- Downloads: http://www.wildfly.org/download
- Forum & Wiki: https://community.jboss.org/en/wildfly
- Docs: https://docs.jboss.org/author/display/WFLY8/
- Dev Mailing List: wildfly-dev@lists.jboss.org
- IRC on freenode: #wildfly and #wildfly-dev
- Code: https://github.com/wildfly/wildfly