Servlet Technology
Web Application Development

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2017

Common Gateway Interface

- CGI Program / Script
- PHP, C
- Generate HTML
- Started by the Web Server
- Create process for each HTTP Request
- Costly
Script Languages

**PHP**
- Most popular
  - Local companies use it.
  - Frameworks
    - Yii
  - Content Management Systems
    - Joomla
    - WordPress
  - Easy-to-start
  - Supported by web server hosting companies
  - Wikipedia

**Python**
- High-level, general purpose language
- Popular but not in Miskolc
- Easy-to-Learn
- Google, Youtube

**Ruby**
- Ruby on Rails Framework
- Not popular in Miskolc
- Twitter

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Object Oriented Languages

**Web Applications**
- Complex, Reliable, Stable
- Expensive Infrastructure
- Components can be separated easily
- Good, well-tested code (hopefully ☺)

**Development**
- Slow
- Standardized
  - Fixed roles
  - Methodologies
- Difficult
  - If you do it well ☺
  - Lots of technology
- Both Java and C# are used by local companies

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Overview

**Application**
**Middleware**
**Software Framework**
**Environment for Dynamic Web Applications**
**Contains**
  - Servlet Container
  - JSP
  - Enterprise JavaBeans
**Servers**
  - GlassFish, WildFly, Geronimo
  - WebSphere, WebLogic, JBoss

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Notes
Common Tasks

- Admin Console
- Deployment
- Scaling
  - Manage Nodes
  - Clustering
- Monitoring
  - Server
  - Applications
  - Resources
- Resource Management
  - JDBC
  - JNDI
  - JMS

Hints for Developers

- You are not a System Administrator.
- You should not operate an Application Server.
- Logging is essential.
- Log files grow quickly.
- Never run as root!

Usage as a Developer

- Local Deployment
- Manual Testing
- Demonstration
- Test Server

IDE Integration

- Eclipse
- IntelliJ IDEA
- NetBeans

Notes
Tomcat

- Apache Software Foundation
- Lightweight
- Servlet Container
- Versions
  - 8.0
    - Servlet 3.1
    - JSP 2.3
  - 8.5
    - HTTP/2
    - OpenSSL
- Popular among developers!

Directories
- bin
  - Script files
    - startup.sh
    - shutdown.sh
- conf
  - XML
    - server.xml
    - tomcat-users.xml
- webapps
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Tomcat for Developers

- IDE
  - IntelliJ IDEA
  - Eclipse
- Multiple Servers
- Local Configuration
  - Workspace
- Start/Stop Server
- Deployment
- Refresh / Restart

Tasks
- Run Locally
- Test Manually

See also
- Database Management
- Software Testing
- Operation Systems

Notes
Web Applications

Structure

Web ARchive

Notes
**WEB-INF**

Cannot be Accessed Directly!

- **classes**
  - `*.class` files
  - Compiled Servlet Classes
  - Package Structure

- **lib**
  - `*.jar` Files
  - 3rd Party Dependencies

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**Deployment Descriptor**

```xml
<web-app xmlns="...">
  <servlet>
    <servlet-name>greetings</servlet-name>
    <servlet-class>org.dummy.Greetings</servlet-class>
  </servlet>
  <servlet-mapping>
    <servlet-name>greetings</servlet-name>
    <url-pattern>/</url-pattern>
  </servlet-mapping>
</web-app>
```

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**Servlet Mapping**

- **servlet tag**
  - Identified by `name`
  - `servlet-class`
  - `Instance`
  - `init-param`
    - `Initialization`
  - `load`

http://host:port/WebAppName/path
Filters

- filter
  - filter-name
  - filter-class
  - Similar to Servlet
  - Preprocessing
  - Forwarding / Rejection

Filter-mapping
- filter-name
- Selection
- url-pattern
- servlet-name

Context-Param

```
<context-param>
  <param-name>
    contextConfigLocation
  </param-name>
  <param-value>
    /dispatcher-servlet.xml
    /applicationContext.xml
  </param-value>
</context-param>
```
Servlet

- javax.servlet
- Interface
- Generic Methods
  - init
  - service
  - destroy

HttpServlet

- javax.servlet.http
- Implements Servlet
- Run in Servlet Container
- Methods
  - doGet
  - doPost
  - doPut
  - doDelete

HttpServletRequest

- Request Information
  - getCookies
  - getSession
  - getHeaders
  - getParameter
  - getQueryString

```java
doGet (HttpServletRequest req, HttpServletResponse resp) {
    //do something
}
```
HttpServletResponse

- Servlet Response
- HTTP Header
- Cookies
  - add
  - sendError
  - getWriter
  - getOutputStream

Filter

- Preprocessing
- Methods
  - init
  - doFilter
  - destroy

Types
- Authentication Filters
- Logging and Auditing Filters
- Image conversion Filters
- Data compression Filters
- Encryption Filters
- Tokenizing Filters
- Filters that trigger resource access events
- XSL/T filters
- Mime-type chain Filter