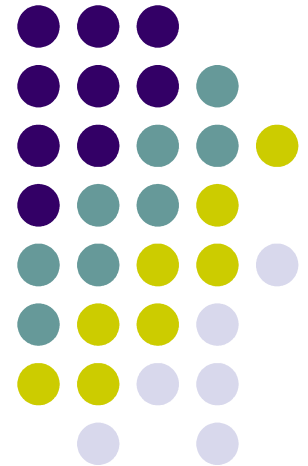


# Java Servlets

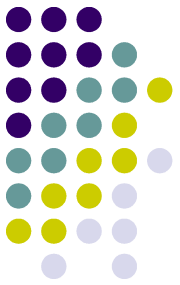
---

Marcin Werla

<marcin.werla@man.poznan.pl>

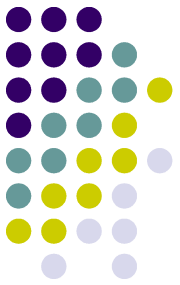


# Agenda



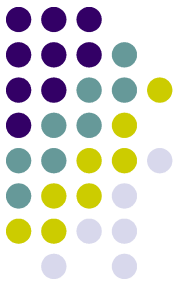
- What is a servlet?
- HTTP basics
- Servlets basics
- MVC & Templating with Velocity

# Agenda



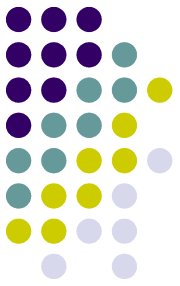
- **What is a servlet?**
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# What is servlet?



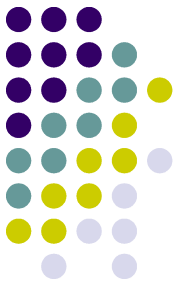
- Java Internet application
- GUI based on HTML
- Communication based on HTTP
- Very good for creating “thin client”

# Agenda



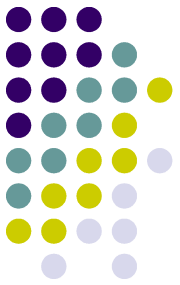
- What is a servlet?
- **HTTP basics**
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# HTTP Communication



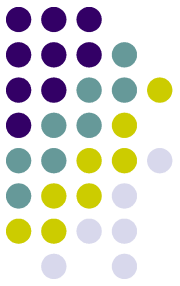
- Client - server request/response communication type
- Supports any data type
- Supports authorization
- Stateless protocol
- Response status codes (200, 404, 500, ...)

# HTTP Methods



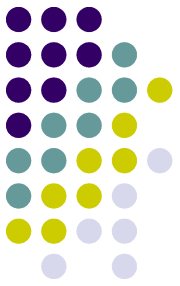
- GET
- POST
- HEAD
- PUT
- DELETE
- OPTIONS

# Cookies



- Holds short data
  - Name
  - Value
  - Expiration date
  - Valid domain & path
  - Requires secure connection?
- Stored by client

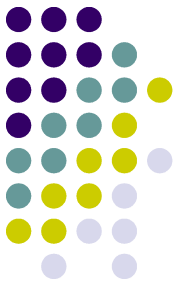
# Sending data with request



- Using GET method – in URL:

<http://www.google.pl/search?q=Java+Servlets&ie=UTF-8&hl=pl&btnG=Szukaj+z+Google&lr=>

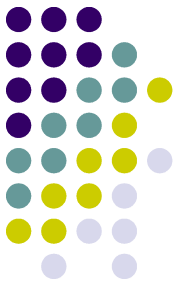
# Sending data with request



- Using POST method – HTML forms:

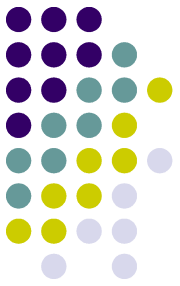
```
<form name="gs" method="POST" action="/search">  
  <input type="hidden" name="hl" value="pl">  
  <input type="hidden" name="ie" value="UTF-8">  
  <input type="text" name="q" size="41" maxlength="2048" value="Java  
    Servlets">  
  <input type="submit" name="btnG" value="Szukaj">  
  <input id="stw" type="radio" name="lr" value="" checked>  
  <input id="lrt" type="radio" name="lr" value="lang_pl" >  
</form>
```

# Agenda



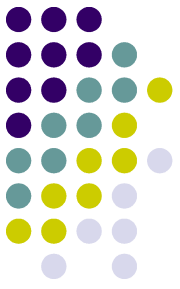
- What is a servlet?
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# Servlets



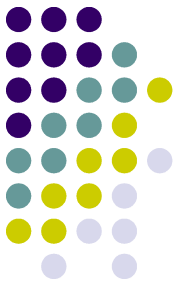
- Executed within a container (Apache Tomcat, Jetty, ...)
- HTTP request and response wrapped in Java objects
- XML configuration file
- Strict directories and files structure
- Packed in .war archives

# Servlet structure



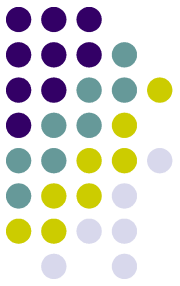
- /
  - WEB-INF/
    - classes/
    - lib/
    - web.xml
  - Other files

# web.xml



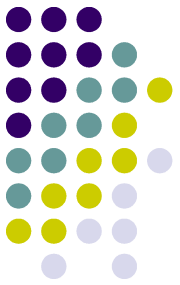
- Basic configuration file
- Minimum:
  - Servlet definition (name -> class)
  - Servlet mappings (name -> URL patterns)
- But also:
  - Servlet parameters
  - Authorization settings
  - ...

# Servlet lifecycle



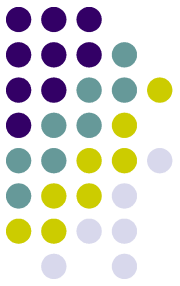
- Container creates servlet instances
- For each instance:
  - `init()` - once
  - `service(request, response)` – multiple times
  - `destroy()` - once

# Servlet data scope



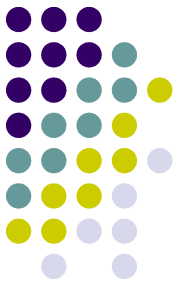
- Request
- Session
  - Per user
  - Session ID (cookies, url)
  - Expiration time
  - Must be synchronized
- Context
  - Per application
  - **Must be synchronized!!!**

# Listeners (since 2.3)



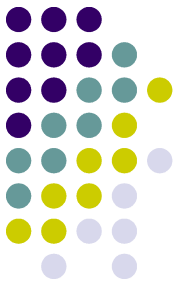
- ServletContextListener
  - contextDestroyed()
  - contextInitialized()
- ServletContextAttributeListener
  - attributeAdded()
  - attributeRemoved()
  - attributeReplaced()

# Listeners (since 2.3)



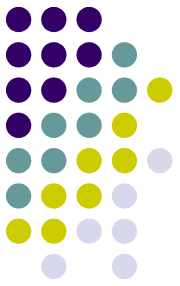
- HttpSessionListener
  - sessionCreated()
  - sessionDestroyed()
- HttpSessionAttributeListener
  - attributeAdded()
  - attributeRemoved()
  - attributeReplaced()
- HttpSessionBindingListener
- HttpSessionActivationListener

# Listeners (since 2.4)



- ServletRequestListener
  - requestDestroyed()
  - requestInitialized()
- ServletRequestAttributeListener
  - attributeAdded()
  - attributeRemoved()
  - attributeReplaced()

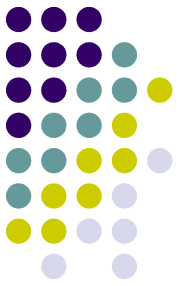
# Servlets communication



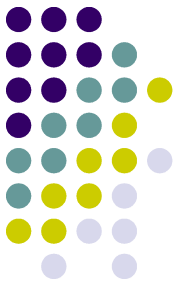
- Servlet name or path required
- Including
  - Entry servlet = exit servlet
  - Stack - like
- Forwarding
  - Entry servlet <> exit servlet
  - Queue - like

# Filters

- Request processing
- Can be chained
- Order is important
- Defined in web.xml

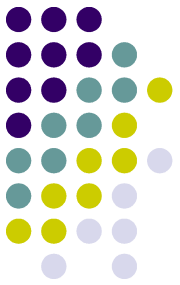


# Filters



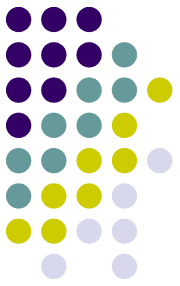
- Authentication Filters
- Logging and Auditing Filters
- Image conversion Filters
- Data compression Filters
- Encryption Filters
- Tokenizing Filters
- Filters that trigger resource access events
- XSL/T filters
- Mime-type chain Filter

# Agenda



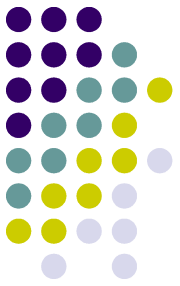
- What is a servlet?
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# MVC



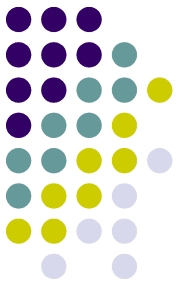
- Stands for:
  - Model
  - View
  - Controler
- Functions separation
- Less errors
- Easy to maintain

# Servlets and MVC



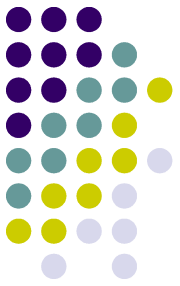
- Typical servlet:
  - HTML mixed in Java classes
- JSP
  - Special tags & tag libraries
  - Java code mixed in HTML
  - Finally converted to ugly servlets

# Templates



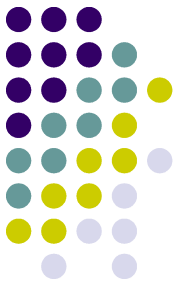
- Better HTML and Java separation
- Data classes = model
- Servlet = controller
  - Data -> Context
- Template files = view
  - Data <- Context
  - Simple operations (iteration, conditional processing, ...)
- Popular libraries: Velocity, Freemarker

# Push vs pull



- Push
  - Only simple operations
  - Better Java & HTML separation
- Pull
  - Advanced possibilities
  - Java code mixed with HTML again
  - Should not be abused

# Velocity



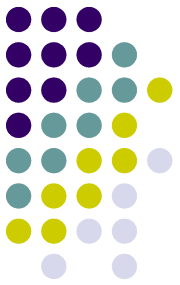
- Another library from Apache
- Supports push and pull
- Supports macros
- <http://jakarta.apache.org/velocity>

# Links



- Servlets homepage
  - <http://java.sun.com/products/servlet/>
- Tomcat
  - <http://jakarta.apache.org/tomcat/>
- Velocity
  - <http://jakarta.apache.org/velocity/>

# Links



- Eclipse Tomcat plugin
  - <http://www.sysdeo.com/eclipse/tomcatPlugin.html>
- Eclipse Velocity plugin
  - <http://propsorter.sourceforge.net/veloeclipse/>
- Popular Servlet frameworks (20+)
  - <http://java-source.net/open-source/web-frameworks>

# Java Servlets

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The end...

