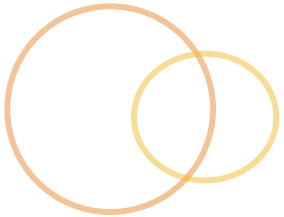
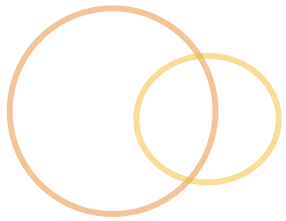
Introduction to Java Servlets



What are Servlets?

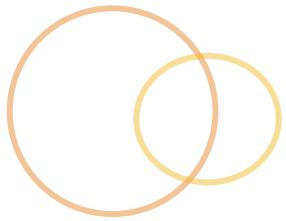


- Designed to provide dynamic functionality to any internet server service
  - HTTP servers
  - SMTP servers
  - FTP servers
- Opposite of Applets
  - Applets extend functionality of a web browser
  - Servlets extend the functionality of an internet service (HTTP server)

What are Servlets? [cont.]

- Server-centric Java objects
  - Developed using standard OO principles
  - Synchronous in nature
  - Conceptually stateless
- Simplify server development
  - Hide protocol details
  - Hide network communication details
  - Hide server implementation

Servlet Specification

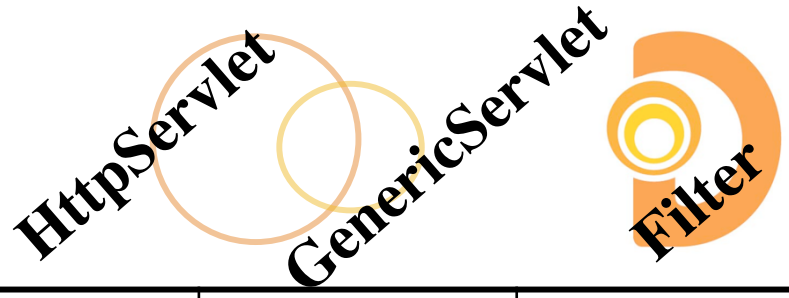


- Have own specification outside of Java EE specification
  - Current version is 2.5
  - Updated / matured independently of Java EE spec
- Specification creates WORA for internet services
- Achieved through definition of:
  - Servlet API
  - Servlet lifecycle
  - Servlet development requirements
  - Servlet packaging and configuration

Servlet API

- The Servlet API is based on two primary packages:
  - `javax.servlet` - Generic
  - `javax.servlet.http` - HTTP centric
- Leverages many Java SE core libraries

Servlet Types



Protocol	HTTP	Generic	Generic
Server Managed State	Y	Maybe	Maybe
Client Managed State	Y	Maybe	Maybe
Development Effort	Easy	More Difficult	Easy
Managed Lifecycle	Y	Y	Y
Error-prone	LTD	Somewhat	LTD
Run-time Configuration	Y	Y	Y
Development Style	Extend	Extend	Implement
Chaining	MAN	MAN	AUTO
Request Access	Y	Y	Y
Response Access	Y	Y	Y

Servlet Lifecycle

- Servlets have an explicitly defined lifecycle
- Goes beyond standard object lifecycle
- Consists of 4 primary phases:
  - Creation
  - Initialization
  - Servicing requests
  - Destruction

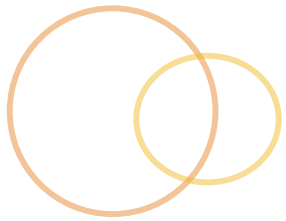
Servlet Development Requirements

- Follow semantics of any Java object
  - Can have constructor
  - Can have member variables
  - Can have methods
  - Can use other objects and classes
  - Typically no static methods
  - Limited use of static variables
- Required yet flexible class hierarchy
  - Must be considered a `javax.servlet.Servlet`
  - Can also be specialization of other types

Servlet Development Cycle

1. Create client; typically HTML form
2. Build servlet
   - Accept request data
   - Perform business logic
   - Return response data
3. Compile servlet
4. Package servlet
5. Deploy servlet
6. Test servlet
7. Repeat 2 - 6 until satisfied

Packaging Servlets

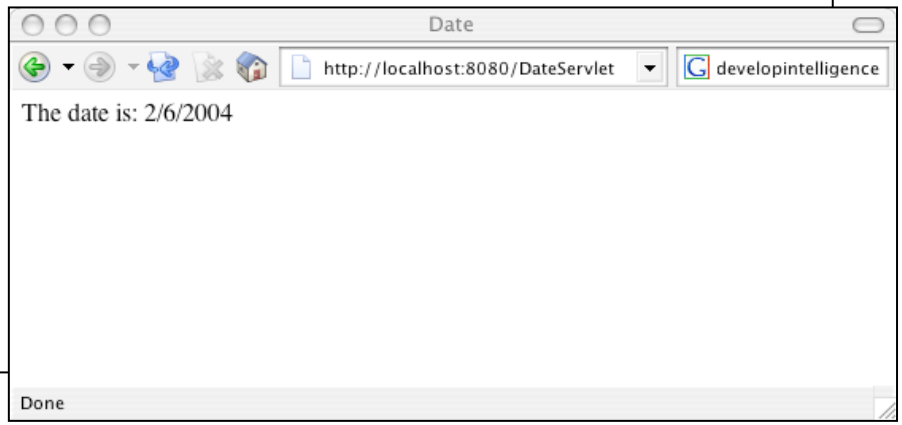


- Servlets are packaged within WAR files
- WAR file must contain application artifacts and configuration information
  - Servlet application artifact is a class
  - Servlet configuration is found in web.xml
- WAR filename becomes context

Servlet Example

DateServlet.java

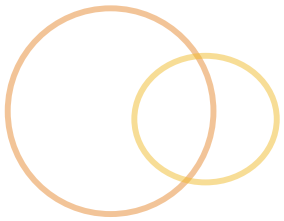
```
//"include" the APIs
import javax.servlet.http.*;
import java.util.Calendar;
import java.io.*;

public class DateServlet extends HttpServlet
{
    //helper
    public void doGet(HttpServletRequest request, HttpServletResponse response) throws IOException
    {
        PrintWriter out = response.getWriter();
        String date = getDate();
        out.println("<HTML><HEAD><TITLE>Date</TITLE></HEAD>");
        out.println("<BODY>");
        out.println("The date is: " + date);
        out.println("</BODY></HTML>");
    }
    //hidden behavior
    private String getDate() {
        Calendar date = Calendar.getInstance();
        int month = date.get(Calendar.MONTH)+1;
        int day = date.get(Calendar.DAY_OF_MONTH);
        int year = date.get(Calendar.YEAR);
        return (month + "/" + day + "/" + year);
    }
}
```



About DevelopIntelligence

- Founded in 2003
- Provides outsourced services to learning organizations in area of software development
- Represents over 35 years of combined experience, enabling software development community through educational and performance services
- Represents over 50 years of combined software development experience
- Delivered training to over 40,000 developers worldwide

Areas of Expertise



- Instruction
  - Java
  - J2EE
  - WebServices / SOA
  - Web Application Development
  - Database Development
  - Open Source Frameworks
  - Application Servers
- Courseware
  - Java Application Development
  - Java Web App Development
  - Enterprise Java Development
  - OOAD / UML
  - IT Managerial
  - Emerging Technologies and Frameworks

Contact Us

- For more information about our services, please contact us:
  - Kelby Zorgdrager
  - Kelby@DevelopIntelligence.com
  - 303-395-5340