



会话跟踪

JSP, Servlet, & Struts Training Courses: <http://courses.coreservlets.com>
Available in US, China, Taiwan, HK, and Worldwide

JSP and Servlet Books from Sun Press: <http://www.coreservlets.com>
*Available in English, Chinese (simplified and traditional script),
and 12 other languages*

2

议程

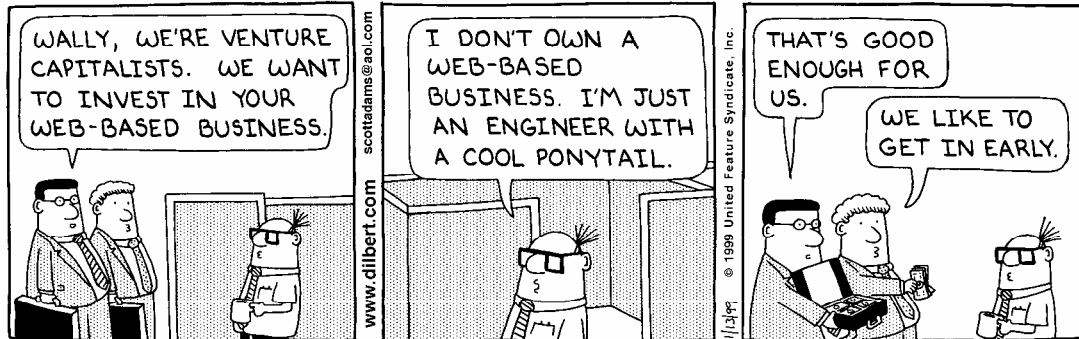
- 从零开始实现会话跟踪
- 使用基本的会话跟踪
- 了解会话跟踪API
- 区分服务器会话和浏览器会话
- URL编码
- 不可变对象和可变对象的存储
- 跟踪用户的访问计数
- 累计用户的购物
- 购物车的实现
- 构建在线商店

3

会话跟踪和电子商务

- **Why session tracking?**

- 当客户在在线商店中向他们的购物车中添加商品时，服务器如何才能知道购物车中已经有什么商品了呢？
- 当客户决定结账时，服务器如何能够确定客户对应之前创建的哪个购物车呢？



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进行会话跟踪：cookie

- **思想：把cookie与服务器上的数据关联起来**

```
String sessionId = makeUniqueString();
HashMap sessionInfo = new HashMap();
HashMap globalTable = findTableStoringSessions();
globalTable.put(sessionID, sessionInfo);
Cookie sessionCookie =
    new Cookie("JSESSIONID", sessionId);
sessionCookie.setPath("/");
response.addCookie(sessionCookie);
```

- **接下来要做的是：**

- 提取出存储会话标识符的cookie
- 为cookie设置合适的过期时间
- 将散列表与每个请求关联起来
- 生成唯一的会话标识符

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进行会话跟踪：URL重写

- 思想
 - 客户程序在每个URL的尾部添加一些额外的数据来标识会话
 - 服务器将这个标识符与它所存储的有关会话的数据关联起来
 - 例如，`http://host/path/file.html;jsessionid=1234`
- 优点
 - cookie被禁用或者根本不支持的情况下依旧能够工作
- 缺点
 - 必须对所有指向您的网站的URL进行编码
 - 所有页面必须动态生成
 - 不能使用预先记录下来的URL进行访问，或者从其他网站链接进行访问

6

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进行会话跟踪：隐藏的表单域

- 思想:
 - `<INPUT TYPE="HIDDEN" NAME="session" VALUE="...">`
- 优点
 - cookie被禁用或者根本不支持的情况下依旧能够工作
- 缺点
 - 涉及许多冗长的处理工作
 - 所有的页面必须是表单提交之后的结果

7

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Java的会话跟踪

- 会话对象生存于服务器上
- 会话自动通过cookie或URL重写与客户关联起来
 - 使用request.getSession来得到会话
 - 后台：系统检查cookie或附加在URL上的额外信息，看看是否与之前存储的会话对象的键相匹配。如果匹配，它返回该对象，如果不匹配，则创建新的对象，指定一个cookie或URL信息作为它的键，并返回新创建的会话对象。
- 类散列表机制允许我们将任何对象存储到会话中
 - setAttribute存储值
 - getAttribute读取值

8

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会话跟踪基础

- 访问会话对象
 - 调用request.getSession获取HttpSession对象
 - 这是一个与用户相关联的散列表
- 查找与会话相关联的信息
 - 调用HttpSession对象的getAttribute，将返回的值转换成合适的类型，要注意检查结果是否为null。
- 将信息存入会话
 - 使用setAttribute给出相应的键和值。
- 废弃会话数据
 - 调用removeAttribute废弃指定的值。
 - 调用invalidate废弃整个会话。
 - 调用logout将客户从Web/应用服务器注销。

9

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会话跟踪基础：示例代码

```
HttpSession session = request.getSession();
SomeClass value =
    (SomeClass) session.getAttribute("someID");
if (value == null) {
    value = new SomeClass(...);
    session.setAttribute("someID", value);
}
doSomethingWith(value);
```

- 如果被修改的值为同一对象，（在对值做出修改后）不需要再次调用setAttribute。但是，如果值是不可变的，那么修改后的值将会是新对象的引用，我们必须再次调用setAttribute。

10

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如果服务器使用URL重写有哪些变化？

- 会话跟踪代码：
 - 没有变动
- 生成链接到同一网站的超链接的代码：
 - 将URL传给response.encodeURL处理。
 - 如果服务器使用cookie，它原封不动地返回URL。
 - 如果服务器使用URL重写，它将会话信息附加到URL上。
 - 例如：

```
String url = "order-page.html";
url = response.encodeURL(url);
```
- sendRedirect到自己网站的代码：
 - 将URL传递给response.encodeRedirectURL

11

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HttpSession的方法

- **getAttribute**
 - 从会话对象中提取出一个之前存储的值。如果没有找到与给定名称相关联的值，则返回null。
- **setAttribute**
 - 把值与名称关联起来。更改的监控：让值实现HttpSessionBindingListener。
- **removeAttribute**
 - 移除与名称关联的值。
- **getAttributeNames**
 - 返回会话中所有属性的名称。
- **getId**
 - 返回惟一的标识符。

12

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HttpSession的方法 (续)

- **isNew**
 - 确定会话对于客户（不是针对页面）来说是否为新创建的
- **getCreationTime**
 - 返回会话初次创建的时间
- **getLastAccessedTime**
 - 返回客户端最近一次发送会话的时间
- **setMaxInactiveInterval, setMaxInactiveInterval**
 - 取得或设置在未被访问的情况下多长时间应该将会话置为无效
- **invalidate**
 - 废弃当前的会话
- **logout**
 - 废弃与用户相关联的所有会话

13

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显示客户访问计数的servlet

```
public class ShowSession extends HttpServlet {
    public void doGet(HttpServletRequest request,
                      HttpServletResponse response)
        throws ServletException, IOException {
        response.setContentType("text/html");
        HttpSession session = request.getSession();
        String heading;
        Integer accessCount =
            (Integer)session.getAttribute("accessCount");
        if (accessCount == null) {
            accessCount = new Integer(0);
            heading = "Welcome, Newcomer";
        } else {
            heading = "Welcome Back";
            accessCount =
                new Integer(accessCount.intValue() + 1);
        }
        session.setAttribute("accessCount", accessCount);
    }
}
```

14

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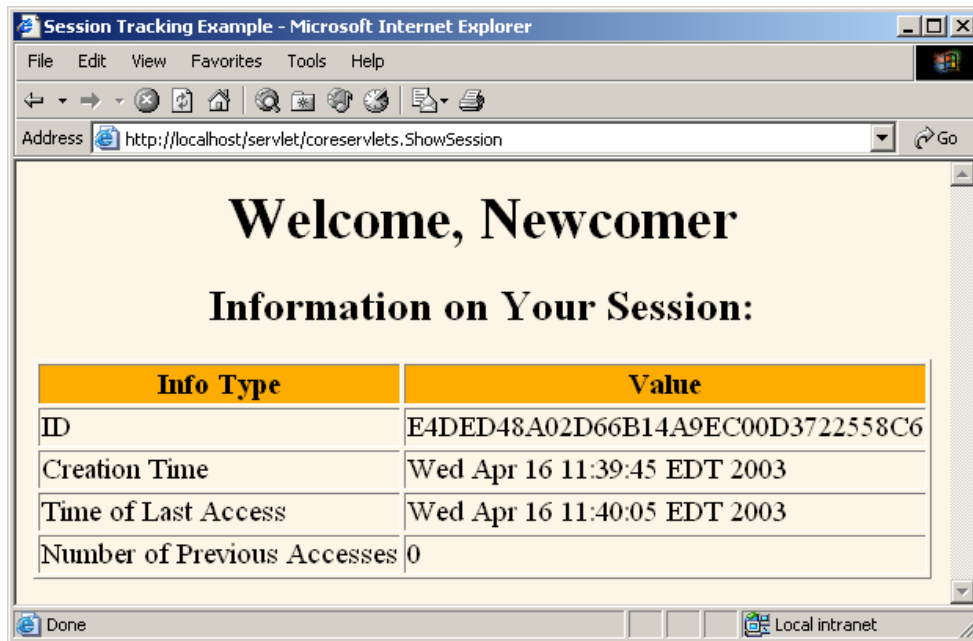
显示客户访问计数的servlet (续)

```
PrintWriter out = response.getWriter();
...
out.println
    (docType +
     "<HTML>\n" +
     "<HEAD><TITLE>" + title + "</TITLE></HEAD>\n" +
     "<BODY BGCOLOR=\"#FDF5E6\">\n" +
     "<CENTER>\n" +
     "<H1>" + heading + "</H1>\n" +
     "<H2>Information on Your Session:</H2>\n" +
     "<TABLE BORDER=1>\n" +
     "<TR BGCOLOR=\"#FFAD00\">\n" +
     "  <TH>Info Type<TH>Value\n" +
     ...
     "  <TD>Number of Previous Accesses\n" +
     "  <TD>" + accessCount + "\n" +
     "</TABLE>\n" +
     "</CENTER></BODY></HTML>");
```

15

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显示客户访问计数的servlet (结果1)

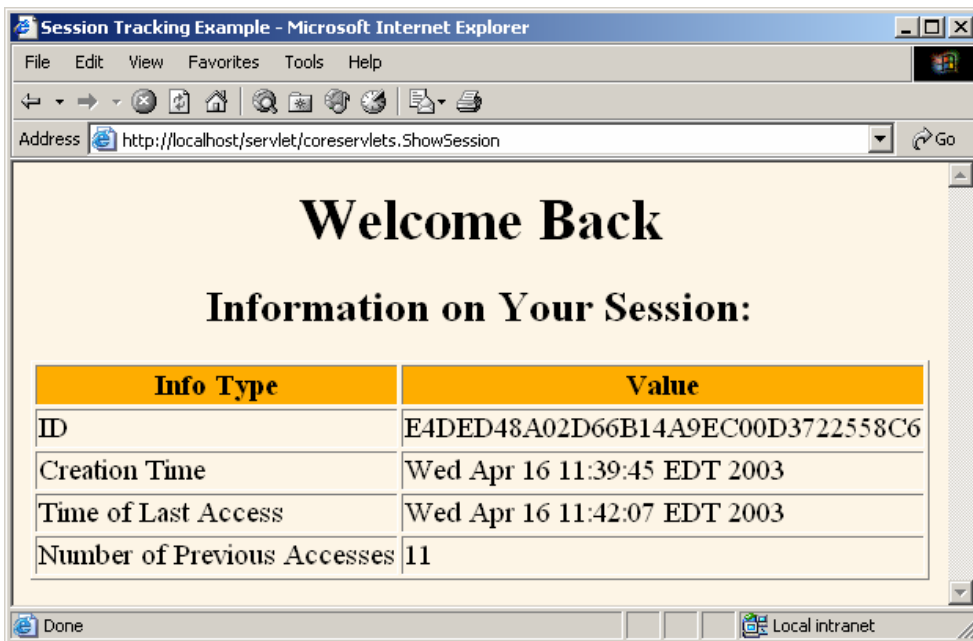


Info Type	Value
ID	E4DED48A02D66B14A9EC00D3722558C6
Creation Time	Wed Apr 16 11:39:45 EDT 2003
Time of Last Access	Wed Apr 16 11:40:05 EDT 2003
Number of Previous Accesses	0

16

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显示客户访问计数的servlet (结果2)



Info Type	Value
ID	E4DED48A02D66B14A9EC00D3722558C6
Creation Time	Wed Apr 16 11:39:45 EDT 2003
Time of Last Access	Wed Apr 16 11:42:07 EDT 2003
Number of Previous Accesses	11

17

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累积用户数据的列表

```
public class ShowItems extends HttpServlet {
    public void doGet(HttpServletRequest request,
                      HttpServletResponse response)
        throws ServletException, IOException {
        HttpSession session = request.getSession();
        ArrayList previousItems =
            (ArrayList)session.getAttribute("previousItems");
        if (previousItems == null) {
            previousItems = new ArrayList();
            session.setAttribute("previousItems",
                                previousItems);
        }
    }
}
```

18

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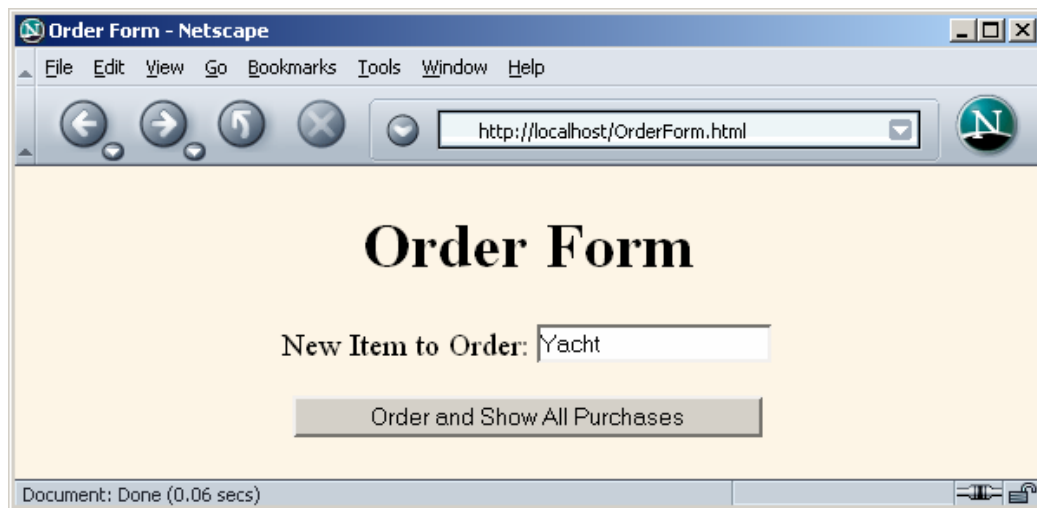
累积用户数据的列表 (续)

```
String newItem = request.getParameter("newItem");
PrintWriter out = response.getWriter();
...
synchronized(previousItems) {
    if (newItem != null) {
        previousItems.add(newItem);
    }
    if (previousItems.size() == 0) {
        out.println("<I>No items</I>");
    } else {
        out.println("<UL>");
        for(int i=0; i<previousItems.size(); i++) {
            out.println("<LI>" +
                        (String)previousItems.get(i));
        }
        out.println("</UL>");
    }
}
out.println("</BODY></HTML>");
}
```

19

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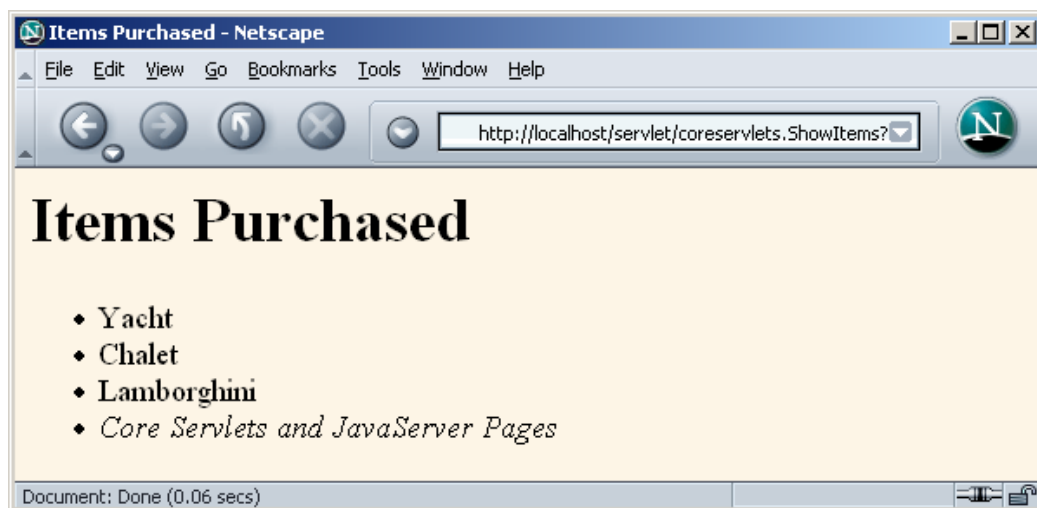
累积用户数据的列表 (前端)



20

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累积用户数据的列表 (结果)



21

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在线书店

- 会话跟踪代码和简单示例中所使用的代码相同
- 购物车类相对复杂
 - 用唯一的分类ID来标识每个商品
 - 在购物车中并不重复出现同一商品
 - 相反，每个条目拥有一个关联的计数
 - 如果计数到达0，则从购物车中删除该商品
- 页面根据含有书籍描述的对象自动构建

22

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在线书店

The image displays two side-by-side screenshots of a web application. The left screenshot shows a page titled "All-Time Best Children's Fantasy Books" with a list of books including "The Chronicles of Narnia by C.S. Lewis (\$19.99)", "The Prydain Series by Lloyd Alexander (\$19.99)", and "The Harry Potter Series by J.K. Rowling (\$59.99)". Each book entry includes a brief description and an "Add to Shopping Cart" button. The right screenshot shows a page titled "All-Time Best Computer Books" with entries for "Core Servlets and JavaServer Pages 2nd Edition (Volume 1) by Marty Hall and Larry Brown (\$39.95)" and "Core Web Programming, 2nd Edition by Marty Hall and Larry Brown (\$49.99)". These entries also include descriptions and "Add to Shopping Cart" buttons. Both screenshots are taken from a Microsoft Internet Explorer browser window.

23

在线书店

Item ID	Description	Unit Cost	Number	Total Cost
alexander001	The Prydain Series by Lloyd Alexander	\$19.95	4	\$79.80
rowling001	The Harry Potter Series by J.K. Rowling	\$59.95	1	\$59.95
lewis001	The Chronicles of Narnia by C.S. Lewis	\$19.95	1	\$19.95
hall001	Core Servlets and JavaServer Pages 2nd Edition (Volume 1) by Marty Hall and Larry Brown	\$39.95	52	\$2,077.40
hall002	Core Web Programming, 2nd Edition by Marty Hall and Larry Brown	\$49.99	23	\$1,149.77

Proceed to Checkout

<http://www.coreservlets.com>

24

小结

- 会话并不跨网络传递
 - 传递的只是唯一标识符
- 获取会话
 - request.getSession
- 从会话中提取数据
 - session.getAttribute
 - 进行类型转换，并注意检查结果是否为null
- 将数据存入会话
 - session.setAttribute

25



问题?

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