Generating the Server Response: HTTP Status Codes

Originals of Slides and Source Code for Examples:
http://courses.coreservlets.com/Course-Materials/csajsp2.html

Agenda

- Format of the HTTP response
- How to set status codes
- What the status codes are good for
- Shortcut methods for redirection and error pages
- A servlet that redirects users to browser-specific pages
- A front end to various search engines

HTTP Request/Response

- Request

```
GET /servlet/SomeName HTTP/1.1
Host: ...
Header2: ...
...
HeaderN:
    (Blank Line)
```

- Response

```
HTTP/1.1 200 OK
Content-Type: text/html
Header2: ...
...
HeaderN: ...
    (Blank Line)
<!DOCTYPE ...>
<HTML>
<HEAD>...</HEAD>
<BODY>
...
</BODY></HTML>
```

Setting Status Codes (SC)

- **response.setStatus(int statusCode)**
  - Use a constant for the code, not an explicit int. Constants are in HttpServletResponse
  - Names derived from standard message. E.g., SC_OK, SC_NOT_FOUND, etc.
- **response.sendError(int code, String message)**
  - Wraps message inside small HTML document
- **response.sendRedirect(String url)**
  - Sets status code to 302
  - Sets Location response header also

Common HTTP 1.1 Status Codes

- **200 (OK)**
  - Everything is fine; document follows.
  - Default for servlets.
- **204 (No Content)**
  - Browser should keep displaying previous document.
- **301 (Moved Permanently)**
  - Requested document permanently moved elsewhere (indicated in Location header).
  - Browsers go to new location automatically.
  - Browsers are technically supposed to follow 301 and 302 (next page) requests only when the incoming request is GET, but do it for POST with 303. Either way, the Location URL is retrieved with GET.

Common HTTP 1.1 Status Codes (Continued)

- **302 (Found)**
  - Requested document temporarily moved elsewhere (indicated in Location header).
  - ***Browsers go to new location automatically***.
  - Servlets should use sendRedirect, not setStatus, when setting this header. See example.
- **401 (Unauthorized)**
  - Browser tried to access password-protected page without proper Authorization header.
- **404 (Not Found)**
  - No such page. Servlets should use sendError to set this.
  - Problem: Internet Explorer and small (< 512 bytes) error pages. IE ignores small error page by default.
  - Fun and games: http://www.plinko.net/404/

More on Status code 302 (Found)

- browsers automatically follow the reference to the new URL given in the Location response header.
- Note that the browser reconnects to the new URL immediately; no intermediate output is displayed. This behavior distinguishes *redirects* from *refreshes* where an inter-mediate page is temporarily displayed
- With redirects, another site, not the servlet itself, generates the results.

Redirects

Redirects are useful for the following tasks:

- **Computing destinations**. If you need to look at the data before deciding where to obtain the necessary results, a redirection is useful. (see next example)

Redirect (2)

- **Tracking user behavior.** If you send users a page that contains a hypertext link to another site, you have no way to know if they actually click on the link. But perhaps this information is important in analyzing the usefulness of the different links you send them. So, instead of sending users the direct link, you can send them a link to your own site, where you can then record some information and then redirect them to the real site. For example, several search engines use this trick to determine which of the results they display are most popular.

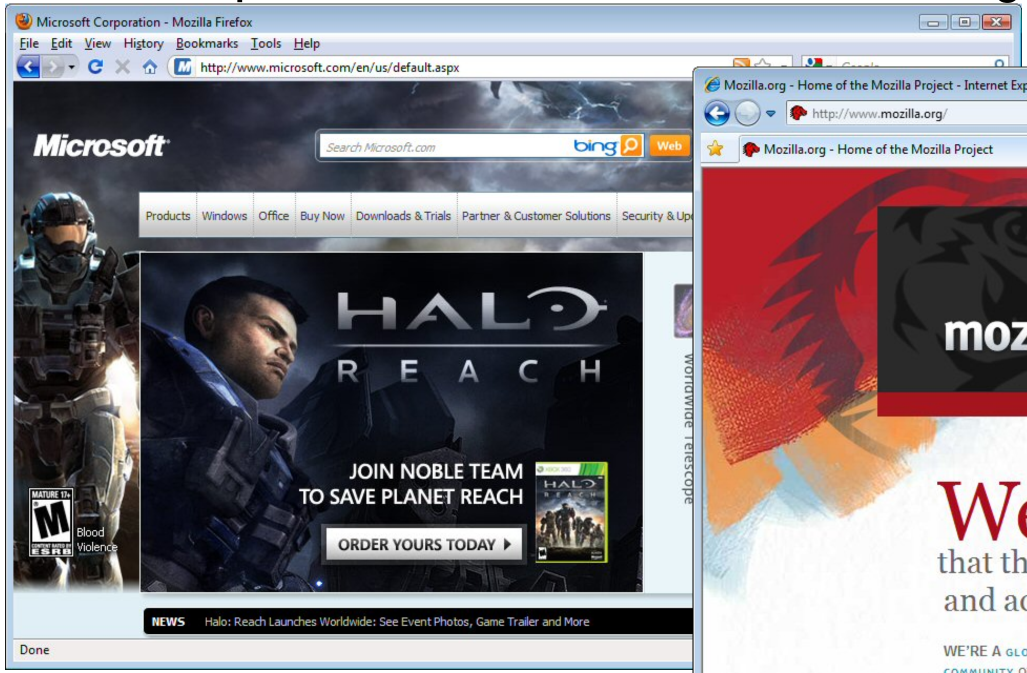
A Servlet That Redirects Users to Browser-Specific Pages

```
@WebServlet("/wrong-destination")
public class WrongDestination extends HttpServlet {
  public void doGet(HttpServletRequest request,
                    HttpServletResponse response)
      throws ServletException, IOException {
    String userAgent = request.getHeader("User-Agent");
    if ((userAgent != null) &&
        (userAgent.contains("MSIE")) {
      response.sendRedirect("http://home.mozilla.com");
    } else {
      response.sendRedirect("http://www.microsoft.com");
    }
  }
}
```

This servlet sends Internet Explorer users to the Netscape home page, and all other users to the Microsoft home page. The servlet accomplishes this task by using the **sendRedirect** method to send a 302 status code and a **Location** response header to the browser.

A Servlet That Redirects Users to Browser-Specific Pages

- **Original URL for *both***
  - http://localhost/status-codes/wrong-destination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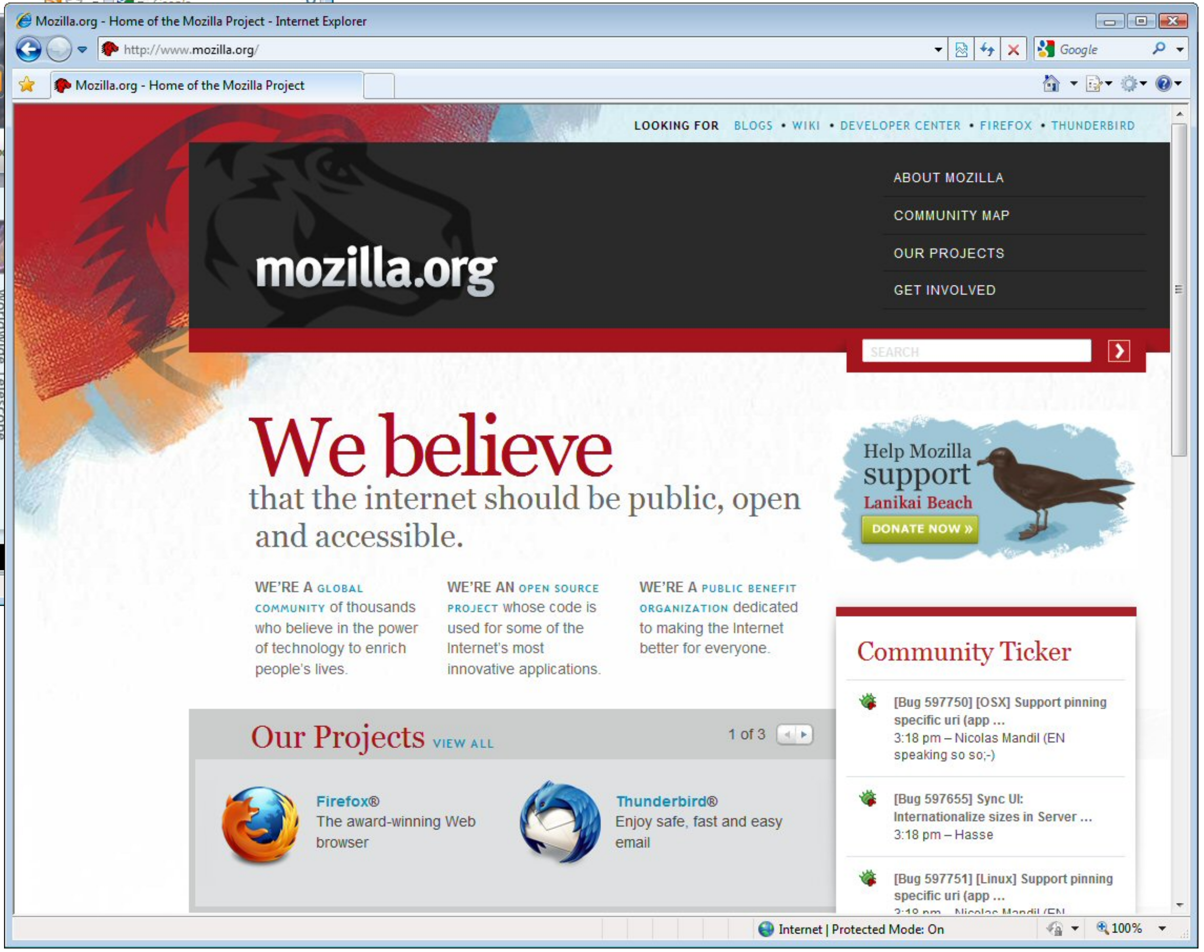
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A Front End to Various Search Engines

- **Objective**: make a “one-stop searching” site that lets users search **any** of the most popular search engines without having to remember many different URLs.
- Users enter a query, select the search engine, and then the servlet sends them to that search engine’s results page for that query.
- If users omit the search keywords or fail to select a search engine, you have no site to redirect them to, so you want to display an error page informing them of this fact.

A Front End to Various Search Engines

```
@WebServlet("/search-engines")
public class SearchEngines extends HttpServlet {
  public void doGet(HttpServletRequest request,
                    HttpServletResponse response)
      throws ServletException, IOException {
    String searchString =
      request.getParameter("searchString");
    if ((searchString == null) ||
        (searchString.length() == 0)) {
      reportProblem(response, "Missing search string");
      return;
    }
    searchString = URLEncoder.encode(searchString, "utf-8");
    String searchEngineName =
      request.getParameter("searchEngine");
    if ((searchEngineName == null) ||
        (searchEngineName.length() == 0)) {
      reportProblem(response, "Missing search engine name");
      return;
    }
```

A Front End to Various Search Engines (Continued)

```
    String searchURL =
      SearchUtilities.makeURL(searchEngineName,
                              searchString);
    if (searchURL != null) {
      response.sendRedirect(searchURL);
    } else {
      reportProblem(response,
                    "Unrecognized search engine");
    }
  }

  private void reportProblem(HttpServletResponse response,
                             String message)
      throws IOException {
    response.sendError(HttpServletResponse.SC_NOT_FOUND,
                       message);
  }
}
```

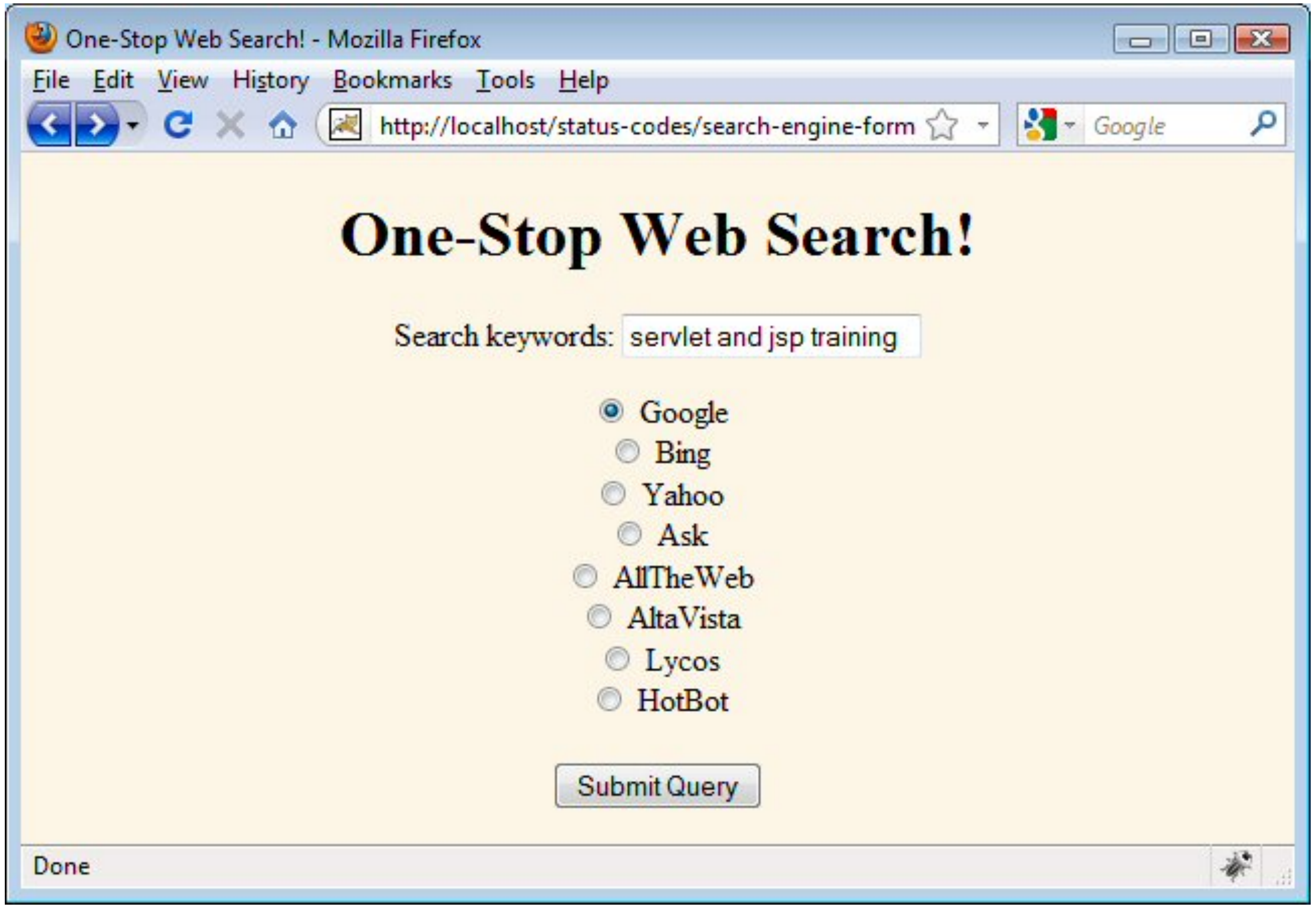
A Front End to Various Search Engines (Continued)

```
public class SearchSpec {

  /** Builds a URL for the results page by
   *  simply concatenating the base URL
   *  (http://...?someVar=") with the
   *  URL-encoded search string (jsp+training).
   */

  public String makeURL(String searchString) {
    return(baseURL + searchString);
  }
…
}
```

Front End to Search Engines: searchEngineForm.java


One-Stop Web Search! - Mozilla Firefox

http://localhost/status-codes/search-engine-form

One-Stop Web Search!

Search keywords: servlet and jsp training

[✓ Google]
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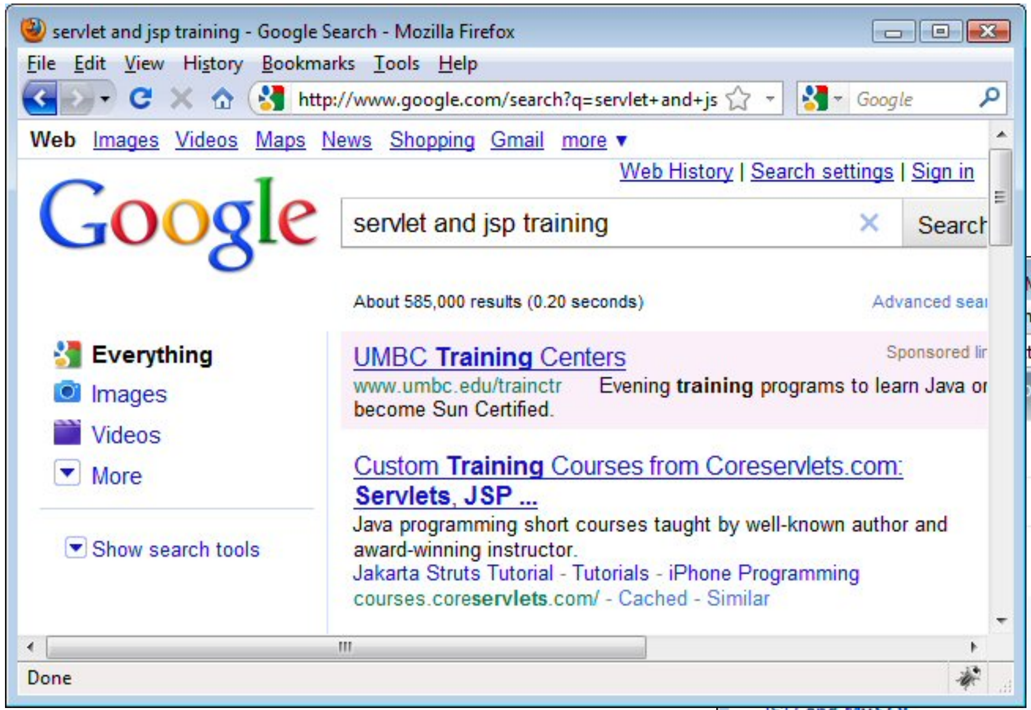
Yahoo
Ask
AllTheWeb
AltaVista
Lycos
HotBot

Submit Query

Done

Front End to Search Engines: Result for Valid Data



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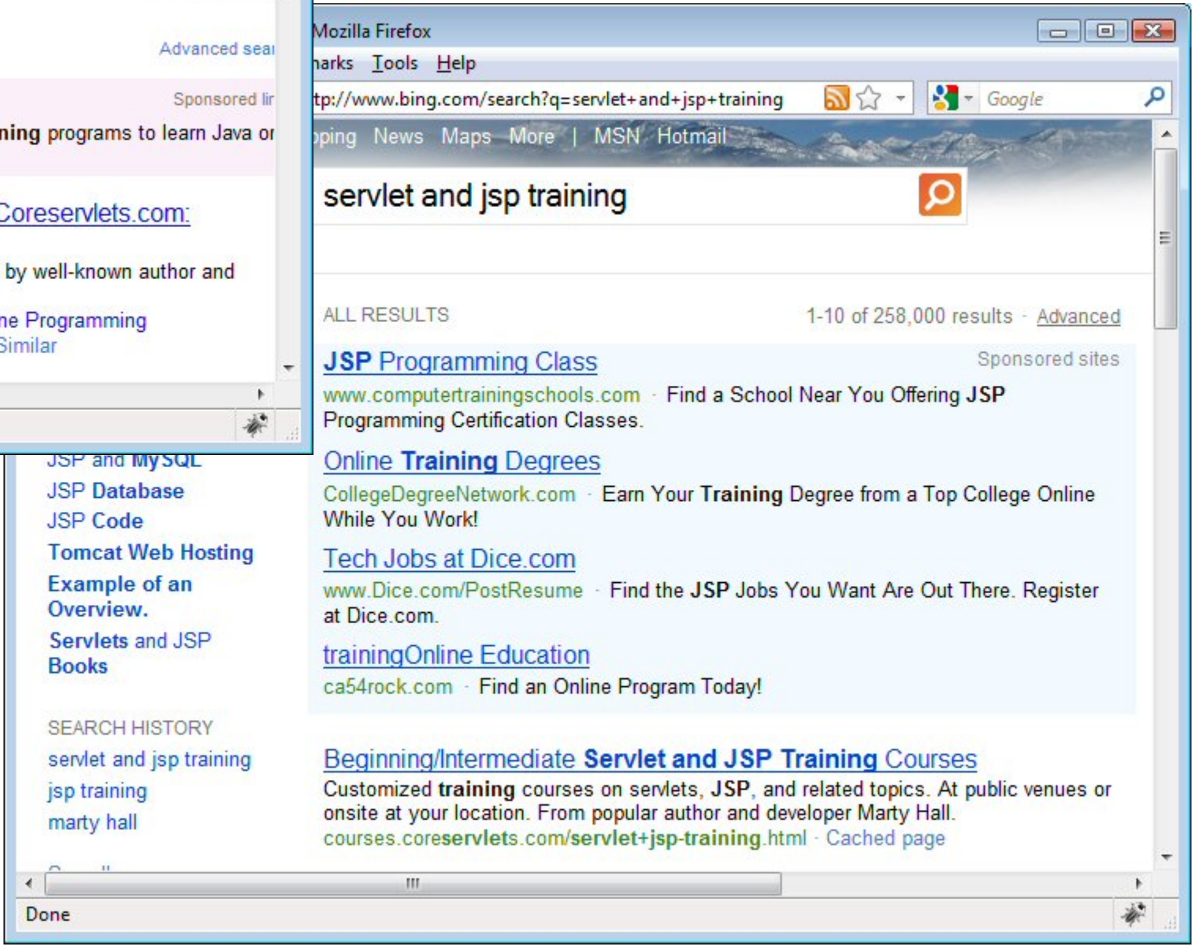

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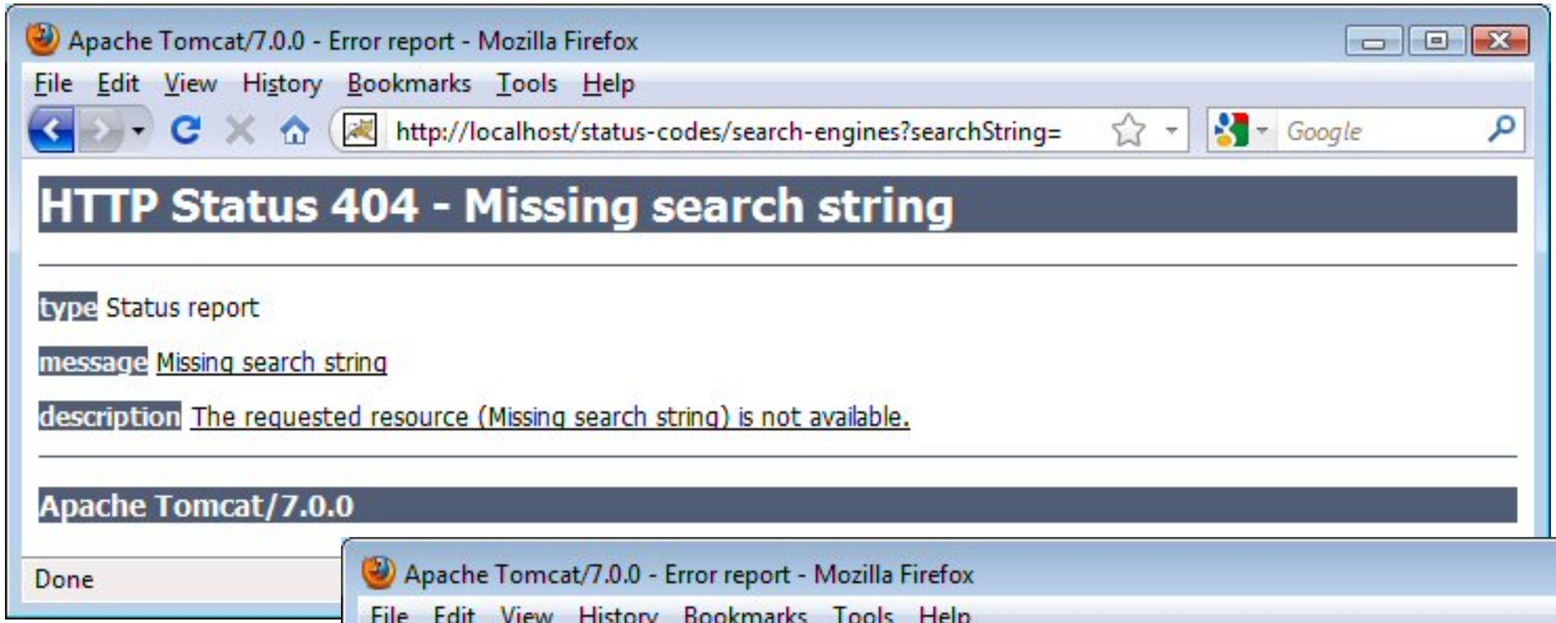
Front End to Search Engines: Result for Invalid Data


Apache Tomcat/7.0.0 - Error report - Mozilla Firefox
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Done

http://localhost/status-codes/search-engines?searchString=

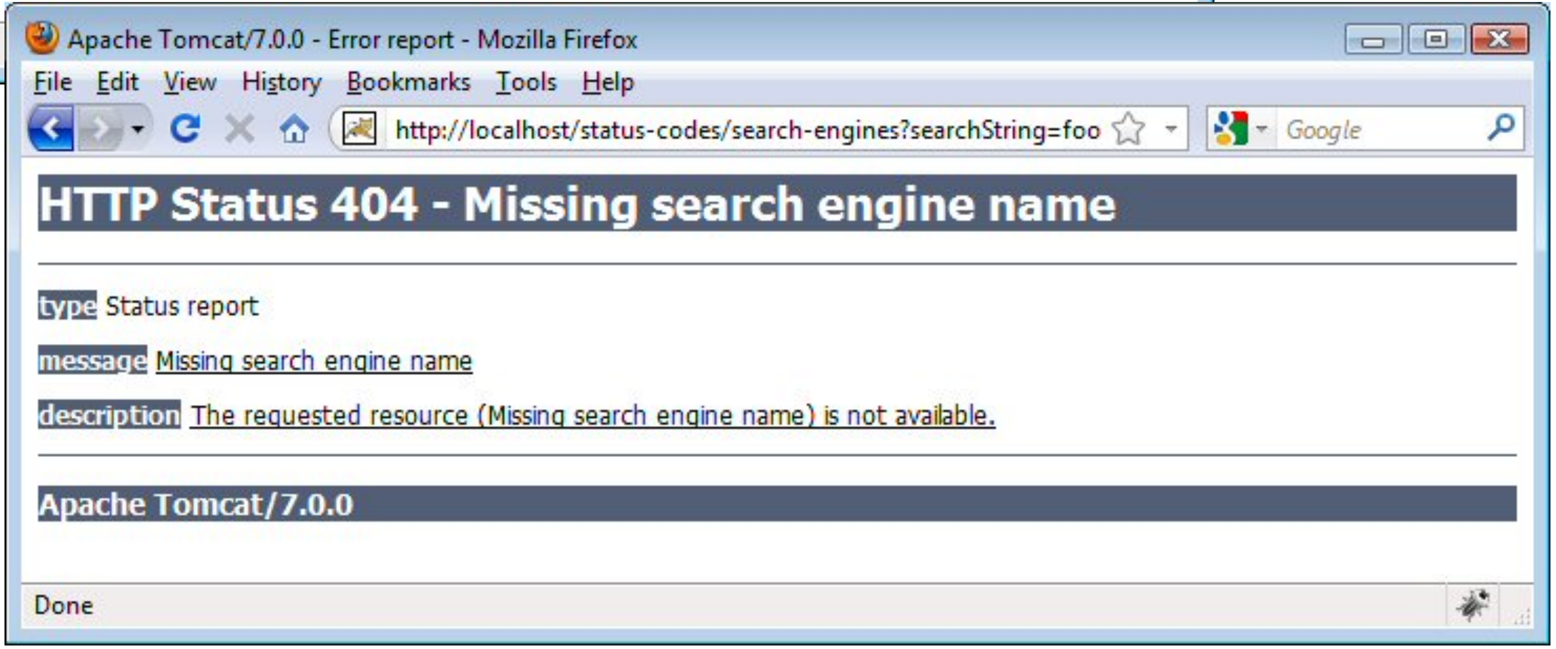
HTTP Status 404 - Missing search string

type Status report

message Missing search string

description The requested resource (Missing search string) is not available.

Apache Tomcat/7.0.0


Apache Tomcat/7.0.0 - Error report - Mozilla Firefox
File Edit View History Bookmarks Tools Help
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Done

http://localhost/status-codes/search-engines?searchString=foo

HTTP Status 404 - Missing search engine name

type Status report

message Missing search engine name

description The requested resource (Missing search engine name) is not available.

Apache Tomcat/7.0.0

Summary

- **HTTP is important**
  - Many servlet tasks can *only* be accomplished with HTTP status codes
- **Setting status codes**
  - Redirect user with response.sendRedirect(someURL)
    - If you insert user-supplied data into the URL, encode with URLEncoder.encode
  - Send 404 error pages with sendError
  - In general, set via response.setStatus
- **Most important status codes**
  - 200 (default)
  - 302 (forwarding; set with sendRedirect)
  - 401 (password needed)
  - 404 (not found; set with sendError)

Questions?