
College of Information Studies

University of Maryland Hornbake Library Building College Park, MD 20742-4345

# PHP

Session 32

INST 346

Technologies, Infrastructure and Architecture

# Goals for Today

- Finishing up the Web
- (Starting on) PHP
- Analysis Team 8

# HTTP request message

- two types of HTTP messages: *request, response*
- HTTP request message:
  - ASCII (human-readable format)


* Check out the online interactive exercises for more examples: http://gaia.cs.umass.edu/kurose_ross/interactive/

# HTTP response message

status line (protocol status code status phrase)

header lines

data, e.g., requested HTML file

```
HTTP/1.1 200 OK\r\n
Date: Sun, 26 Sep 2010 20:09:20 GMT\r\n
Server: Apache/2.0.52 (CentOS)\r\n
Last-Modified: Tue, 30 Oct 2007 17:00:02
   GMT\r\n
ETag: "17dc6-a5c-bf716880"\r\n
Accept-Ranges: bytes\r\n
Content-Length: 2652\r\n
Keep-Alive: timeout=10, max=100\r\n
Connection: Keep-Alive\r\n
Content-Type: text/html; charset=ISO-8859-
   1\r\n
\r\n
data data data data data ...
```

* Check out the online interactive exercises for more examples: http://gaia.cs.umass.edu/kurose_ross/interactive/

# HTTP response status codes

- status code appears in 1st line in server-to-client response message.
- some sample codes:

**200 OK**

- request succeeded, requested object later in this msg

**301 Moved Permanently**

- requested object moved, new location specified later in this msg (Location:)

**400 Bad Request**

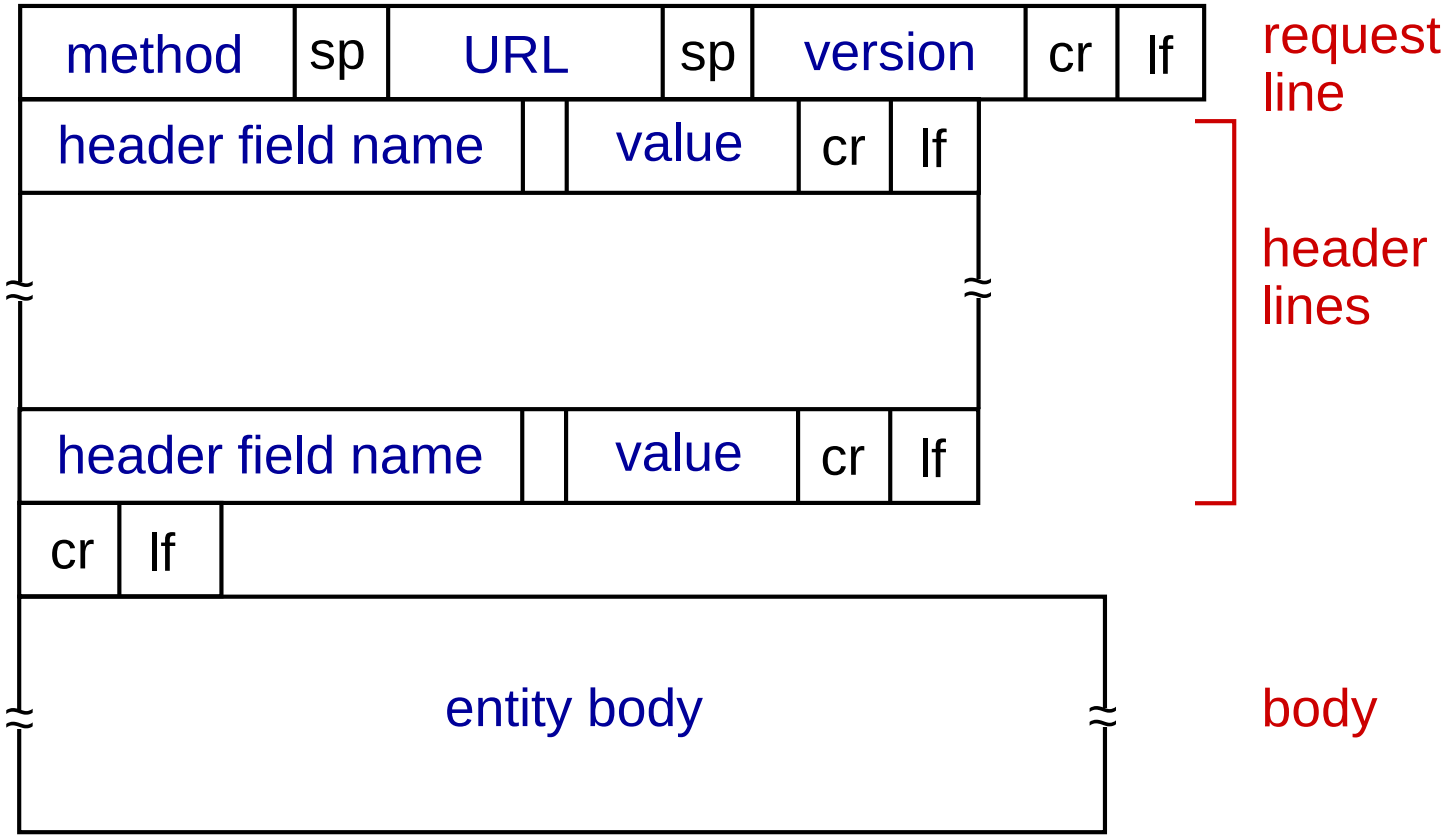
- request msg not understood by server

**404 Not Found**

- requested document not found on this server

**505 HTTP Version Not Supported**

# HTTP request message: general format



# Cookies

*what cookies can be used for:*

- authorization
- shopping carts
- recommendations
- user session state (Web e-mail)

aside

*cookies and privacy:*

- cookies permit sites to learn a lot about you
- you may supply name and e-mail to sites

*how to keep "state":*

- protocol endpoints: maintain state at sender/receiver over multiple transactions
- cookies: http messages carry state

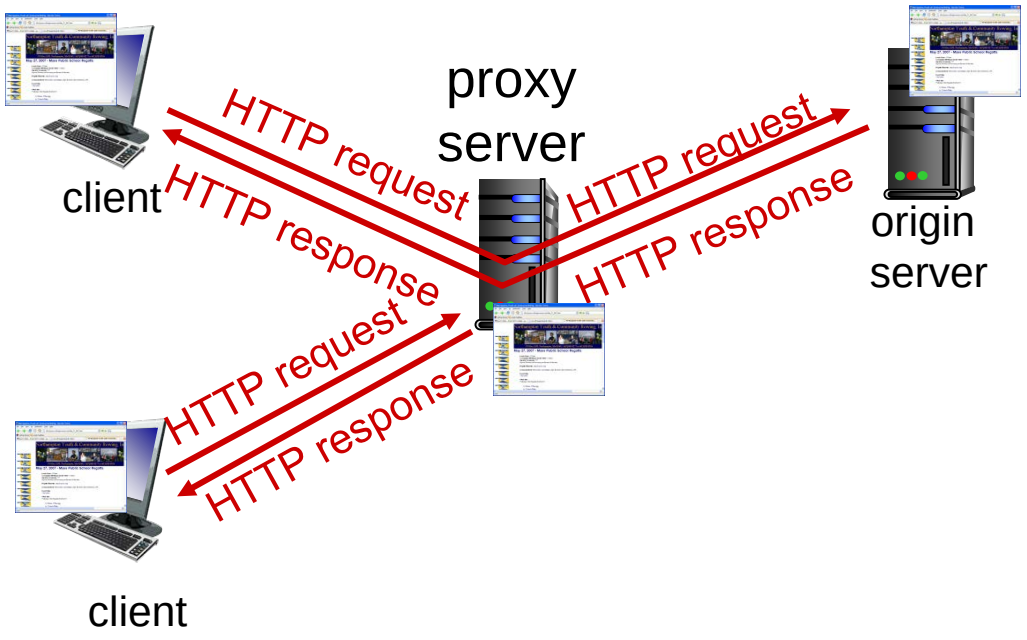
# Cookies


Client
Server
GET http://www.example.com/ HTTP/1.1
HTTP/1.1 200 OK
Set-Cookie: session-id=12345;
GET http://www.example.com/ HTTP/1.1
Cookie: session-id=12345;

# Web caches (proxy server)

*goal:* satisfy client request without involving origin server

- user sets browser: Web accesses via cache
- browser sends all HTTP requests to cache
  - object in cache: cache returns object
  - else cache requests object from origin server, then returns object to client



# Why Web caching

- reduce response time for client request
- reduce traffic on an institution's access link
- Internet dense with caches enables low-bandwidth content providers to effectively deliver content

# Caching example: without local cache

*assumptions:*

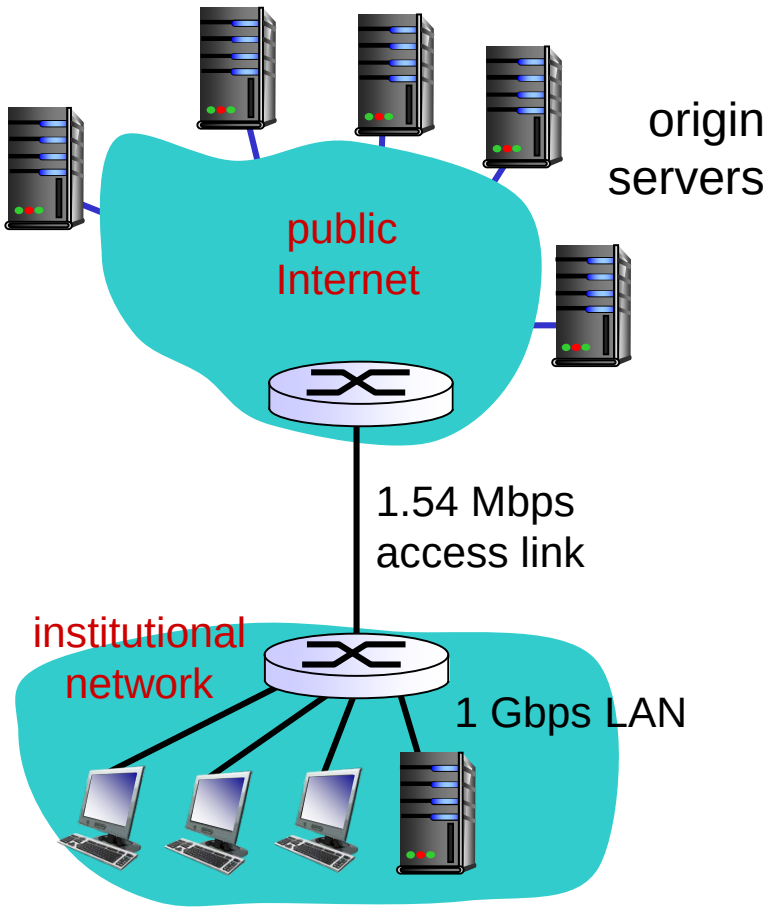
- avg object size: 100K bits
- avg request rate from browsers to origin servers:15/sec
- avg data rate to browsers: 1.50 Mbps
- RTT from institutional router to any origin server: 2 sec
- access link rate: 1.54 Mbps

*consequences:*

- LAN utilization: 15%
- access link utilization = 99%
- total delay = Internet delay + access delay + LAN delay

  = 2 sec + minutes + usecs

*problem!*

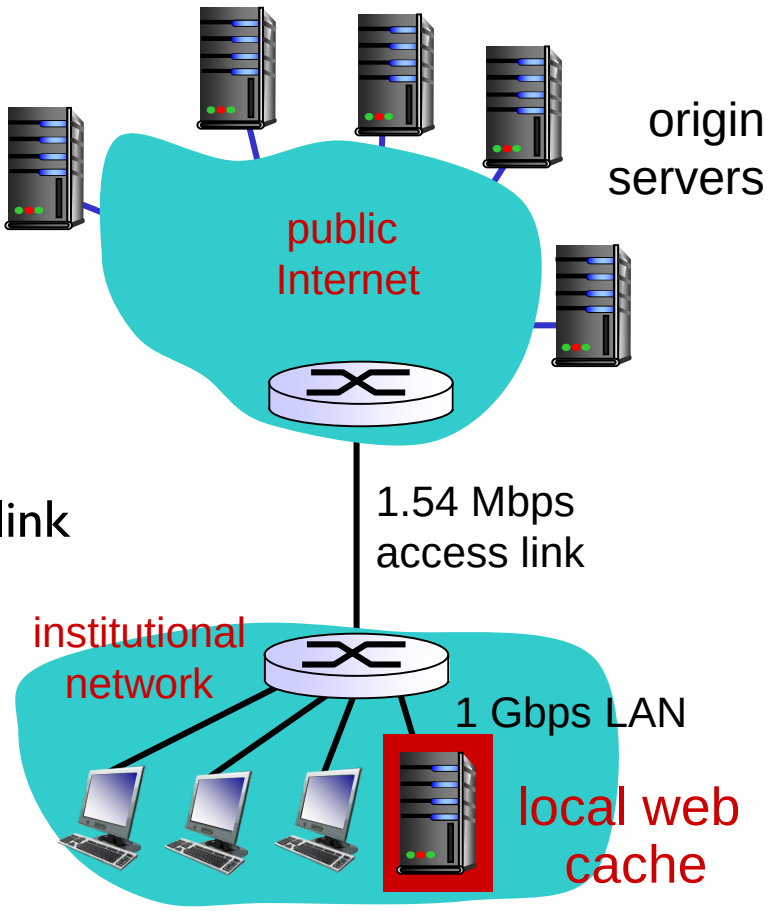


# Caching example: install local cache

*Calculating access link utilization, delay with cache:*

- suppose cache hit rate is 0.4
  - 40% requests satisfied at cache, 60% requests satisfied at origin
- access link utilization:
  - 60% of requests use access link
- data rate to browsers over access link

  = 0.6*1.50 Mbps = .9 Mbps
  - utilization = 0.9/1.54 = .58
- total delay
  - = 0.6 * (delay from origin servers) +0.4 * (delay when satisfied at cache)
  - = 0.6 (2.01) + 0.4 (~msecs) = ~ 1.2 secs

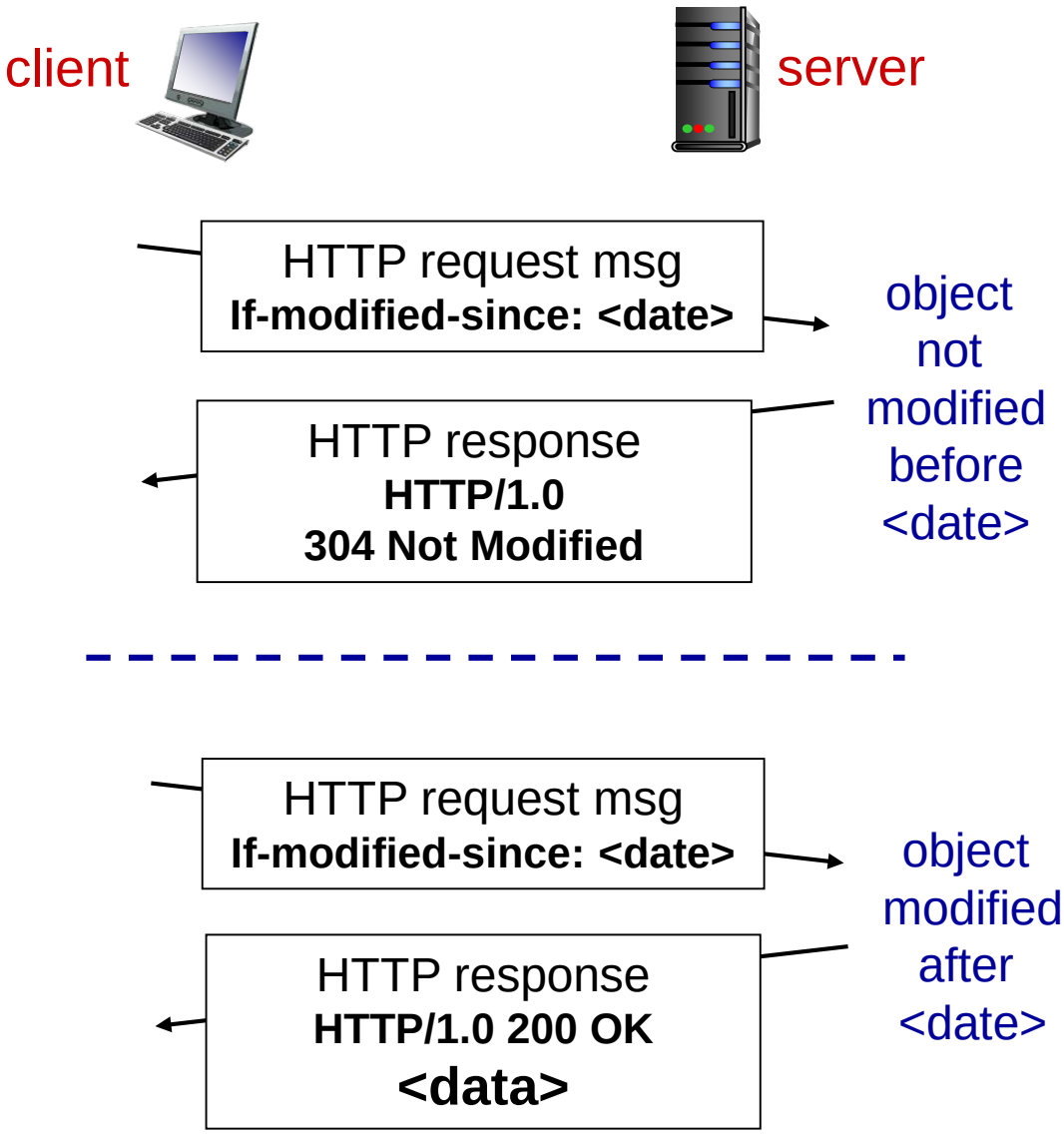


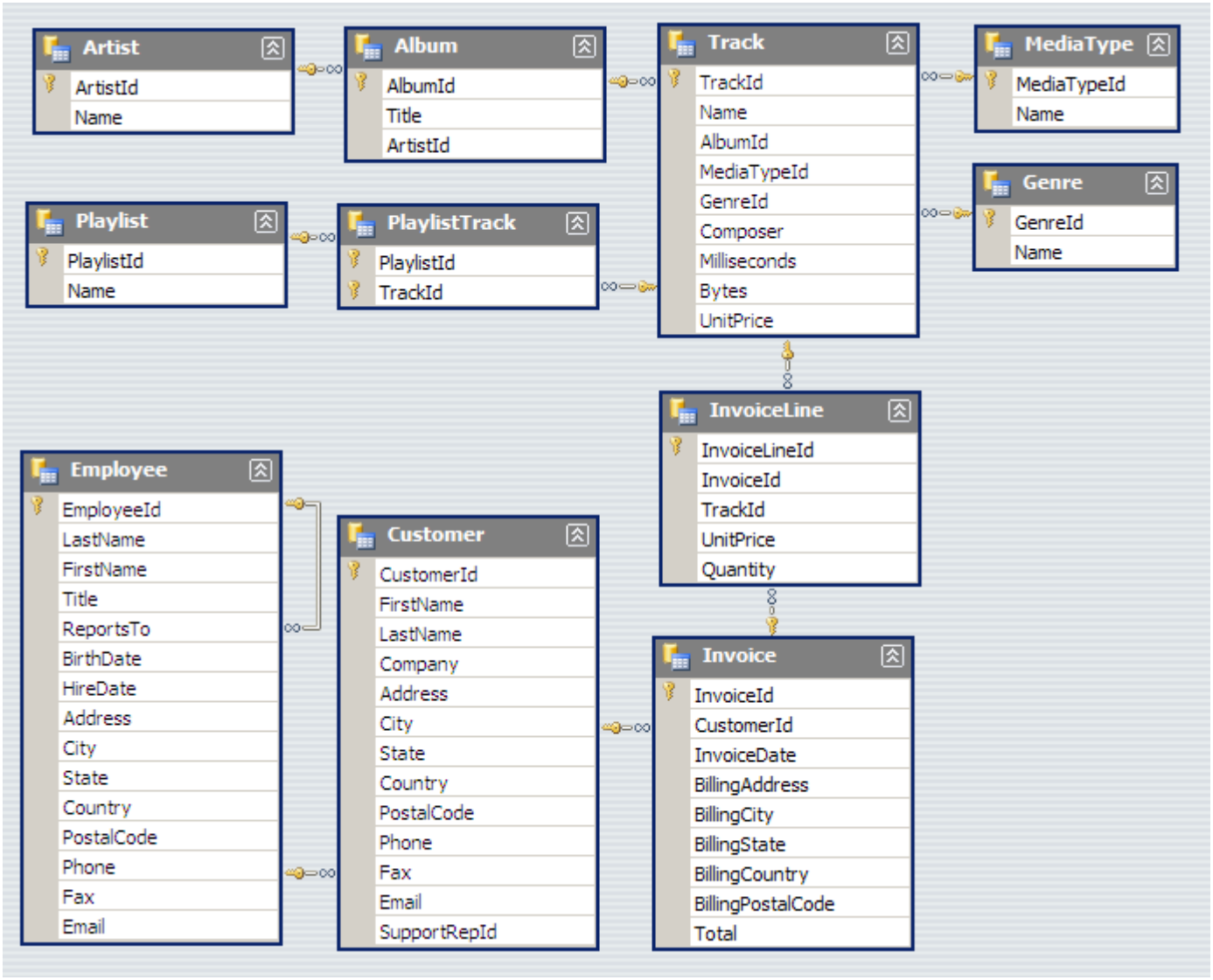
# Conditional GET

- *Goal:* don't send object if cache has up-to-date cached version
  - no object transmission delay
  - lower link utilization
- *cache:* specify date of cached copy in HTTP request

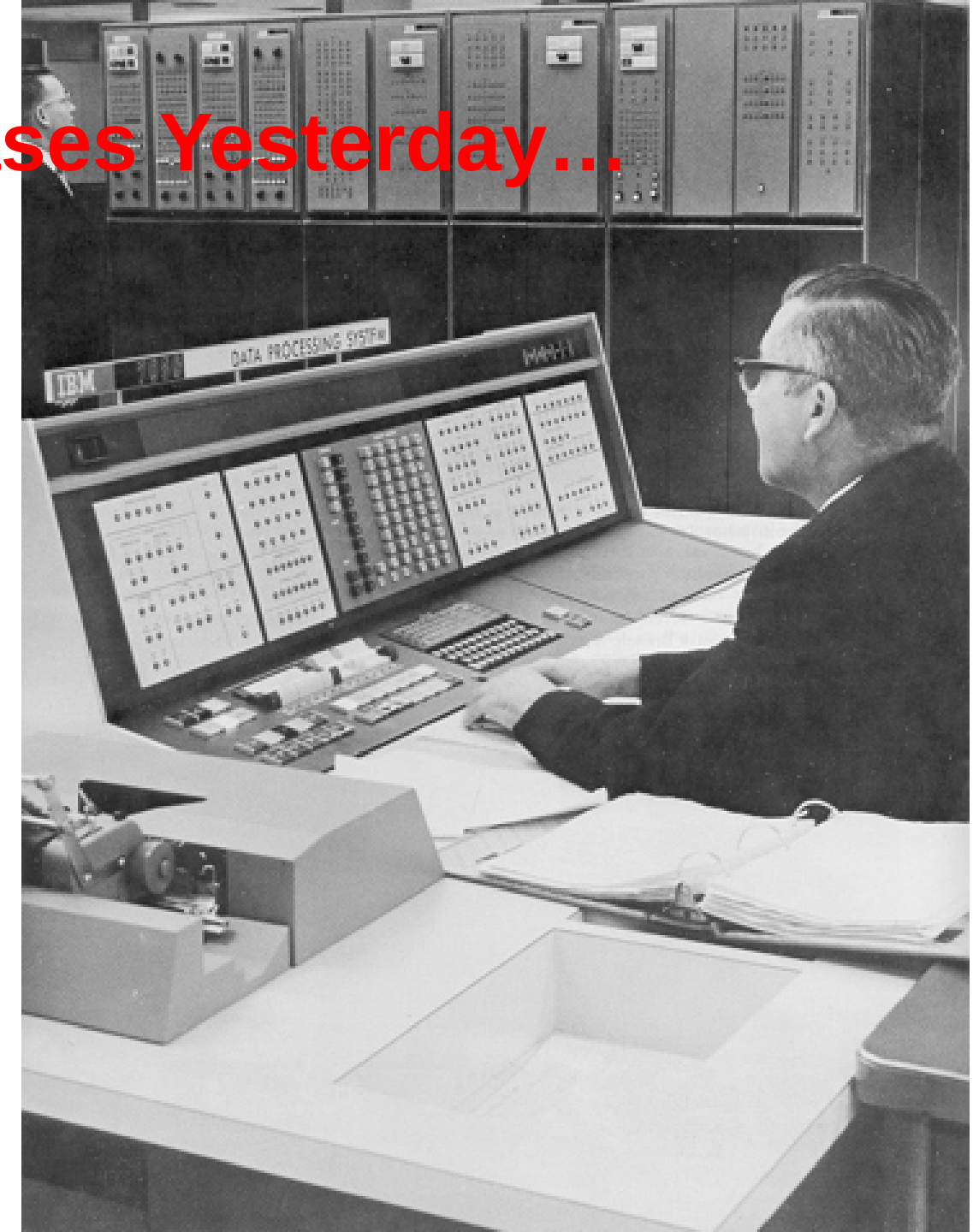
  **`If-modified-since: <date>`**
- *server:* response contains no object if cached copy is up-to-date:

  **`HTTP/1.0 304 Not Modified`**




Artist
ArtistId
Name
Album
AlbumId
Title
ArtistId
Track
TrackId
Name
AlbumId
MediaTypeId
GenreId
Composer
Milliseconds
Bytes
UnitPrice
MediaType
MediaTypeId
Name
Genre
GenreId
Name
Playlist
PlaylistId
Name
PlaylistTrack
PlaylistId
TrackId
InvoiceLine
InvoiceLineId
InvoiceId
TrackId
UnitPrice
Quantity
Employee
EmployeeId
LastName
FirstName
Title
ReportsTo
BirthDate
HireDate
Address
City
State
Country
PostalCode
Phone
Fax
Email
Customer
CustomerId
FirstName
LastName
Company
Address
City
State
Country
PostalCode
Phone
Fax
Email
SupportRepId
Invoice
InvoiceId
CustomerId
InvoiceDate
BillingAddress
BillingCity
BillingState
BillingCountry
BillingPostalCode
Total

# Databases Yesterday…



# Databases today…



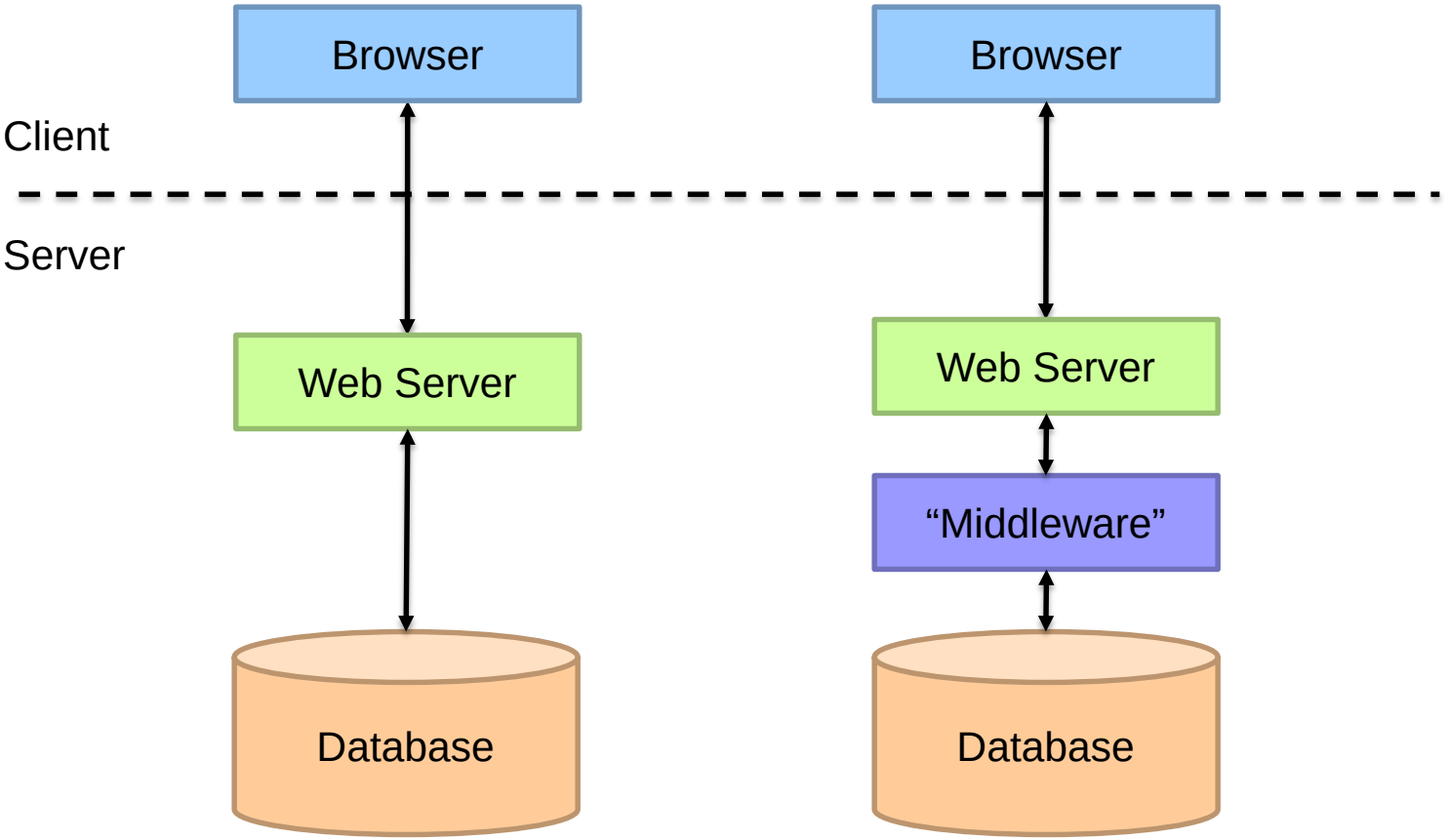




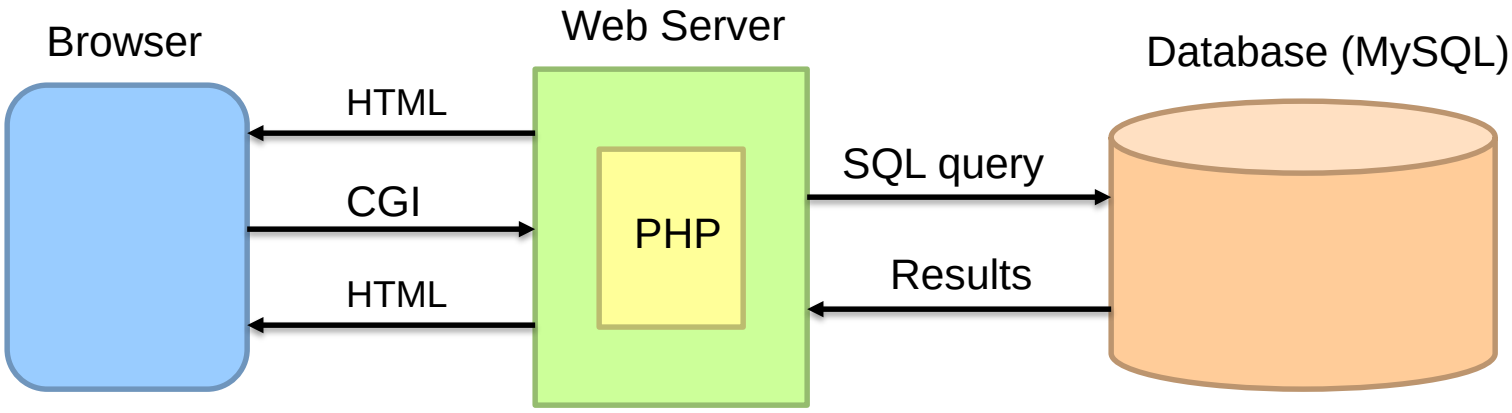



Wait, but these are websites

# Multi-Tiered Architectures



# Putting the Pieces Together…



# What is PHP?

- PHP is a server-side scripting language
  - **Must** run on a server (*not* in the browser)
  - More specifically, runs inside the web server
- Typical PHP script:
  - Fetches input from user forms
  - Executes SQL queries
  - Constructs an HTML page containing results
- Part of the “LAMP” stack
  - Linux, Apache, MySQL, PHP

# PHP Scripts

- Are just like normal HTML pages
- With the exception of code between <?php … ?>
- Variables begin with dollar signs
  - E.g., $a, $b
- Use “echo” to output HTML
  - Just like document.writeln(…) in JavaScript
- Use “.” to concatenate string
  - E.g., “here is” . “ some text”
  - Just like “here is” + “ some text” in JavaScript

# Making PHP

----- HTML stuff -----

<?php

----- PHP stuff -----

?>

----- HTML stuff -----

---

http://---URL stuff---/xxxxx.php

# Sample PHP Script

1. Get input from user from
2. Connect to the database
3. Execute SQL query
4. Process results to generate HTML

# Using PHP with (X)HTML Forms

```
<form action="formResponseDemo.php", method="post">
    email: <input type="text", name="email", value="<?php echo $email ?>", size=30 />
    <input type="radio", name="sure", value="yes" /> Yes
    <input type="radio", name="sure", value="no" /> No
    <input type="submit", name="submit", value="Submit" />
    <input type="hidden", name="submitted", value="TRUE" />
</form>
```

---

```
if (isset($_POST["submitted"])) {
    echo "Your email address is $email.";
} else {
    echo "Error: page reached without proper form submission!";
}
```

# Connecting PHP to MySQL

- On XAMPP:

$dbc=mysql_connect (‘localhost’, ‘userid’, ‘password’);

- On unix:

$dbc=mysql_connect(‘:/export/software/otal/mysql/run/mysqld.sock’,
‘userid’, ‘password’);

```
<?php # Script 8.1 - mysql_connect.php
// Set the database access information as constants.
DEFINE ('DB_USER', 'tester');
DEFINE ('DB_PASSWORD', 'tester');
DEFINE ('DB_HOST', 'localhost');
DEFINE ('DB_NAME', 'sitename');

// Make the connection.
$dbc = @mysql_connect (DB_HOST, DB_USER, DB_PASSWORD) OR die ('Could not connect to
MySQL: ' . mysql_error() );

// Select the database.
@mysql_select_db (DB_NAME) OR die ('Could not select the database: ' . mysql_error() );

// Create a function for escaping the data.
function escape_data ($data) {
	// Address Magic Quotes.
	if (ini_get('magic_quotes_gpc')) {
		$data = stripslashes($data);
	}
	// Check for mysql_real_escape_string() support.
	if (function_exists('mysql_real_escape_string')) {
		global $dbc; // Need the connection.
		$data = mysql_real_escape_string (trim($data), $dbc);
	} else {
		$data = mysql_escape_string (trim($data));
	}
	// Return the escaped value.
	return $data;
} // End of function.
?>
```

```php
<?php # Script 9.15 - login.php (7th version after Scripts 9.1, 9.3, 9.6, 9.10. 9.13 & 9.14)
// Send NOTHING to the Web browser prior to the session_start() line!
// Check if the form has been submitted.

if (isset($_POST['submitted'])) {
  require_once ('../mysql_connect.php'); // Connect to the db.
  $errors = array(); // Initialize error array.

  // Check for an email address.
  if (empty($_POST['email'])) {
    $errors[] = 'You forgot to enter your email address.';
  } else {
    $e = escape_data($_POST['email']);
  }

  // Check for a password.
  if (empty($_POST['password'])) {
    $errors[] = 'You forgot to enter your password.';
  } else {
    $p = escape_data($_POST['password']);
  }
```

```
if (empty($errors)) { // If everything's OK.
    /* Retrieve the user_id and first_name for that email/password combination. */
    $query = "SELECT user_id, first_name FROM users WHERE email='$e' AND password=SHA('$p')";
    $result = @mysql_query ($query); // Run the query.
    $row = mysql_fetch_array ($result, MYSQL_NUM); // Return a record, if applicable.
    if ($row) { // A record was pulled from the database.
      // Set the session data & redirect.
      session_name ('YourVisitID');
      session_start();
      $_SESSION['user_id'] = $row[0];
      $_SESSION['first_name'] = $row[1];
      $_SESSION['agent'] = md5($_SERVER['HTTP_USER_AGENT']);
      // Redirect the user to the loggedin.php page.
      // Start defining the URL.
      $url = 'http://' . $_SERVER['HTTP_HOST'] . dirname($_SERVER['PHP_SELF']);
      // Check for a trailing slash.
      if ((substr($url, -1) == '/') OR (substr($url, -1) == '\\') ) {
        $url = substr ($url, 0, -1); // Chop off the slash.
      }
      // Add the page.
      $url .= '/loggedin.php';
      header("Location: $url");
      exit(); // Quit the script.
    } else { // No record matched the query.
      $errors[] = 'The email address and password entered do not match those on file.'; // Public message.
      $errors[] = mysql_error() . '<br /><br />Query: ' . $query; // Debugging message.
    }
  } // End of if (empty($errors)) IF.
  mysql_close(); // Close the database connection.
} else { // Form has not been submitted.
  $errors = NULL;
} // End of the main Submit conditional.
```

```
// Begin the page now.
$page_title = 'Login';
include ('./includes/header.html');

if (!empty($errors)) { // Print any error messages.
   echo '<h1 id="mainhead">Error!</h1>
   <p class="error">The following error(s) occurred:<br />';
   foreach ($errors as $msg) { // Print each error.
      echo " - $msg<br />\n";
   }
   echo '</p><p>Please try again.</p>';
}

// Create the form.
?>

<h2>Login</h2>
<form action="login.php" method="post">
   <p>Email Address: <input type="text" name="email" size="20" maxlength="40" /> </p>
   <p>Password: <input type="password" name="password" size="20" maxlength="20" /></p>
   <p><input type="submit" name="submit" value="Login" /></p>
   <input type="hidden" name="submitted" value="TRUE" />
</form>

<?php
include ('./includes/footer.html');
?>
```

# Statements in PHP

- Sequential

  {…; …;…;}

  Semicolons are required at the end of every statement
- Conditional

  if (3==i) {…} else {…}
- Loop

  foreach ($array as $key => $value) {…}

  while ($row=mysql_fetch_array(…)) {…}

  For ($i=0; $i<10; $i++) {…}
- Braces are optional around a single statement

# Arrays in PHP

- A set of key-element pairs

  $days = array(“Jan”->31, “Feb”=>28, …);

  $months = explode(“/”, “Jan/Feb/Mar/…/Dec”);

  $_POST

- Each element is accessed by the key
  - $months[0];
  - {$days[“Jan”]}

- PHP unifies arrays and hashtables
  - Elements may be different types

# Functions in PHP

- Declaration

  ```
  function multiply($a, $b=3){return $a*$b;}
  ```

- Invoking a method

  ```
  $b = multiply($b, 7);
  ```

- All variables in a function have only local scope
  - Unless declared as “global” in the function