Web Security
Section 5

Some Content borrowed from Google Code University

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XSS

- Idea: Place User provided data in the page
- Pros: makes pages more interactive and personal
- Cons: improperly used data could be interpreted as code
- Solutions: Make sure that user data is sanitized and validated with a whitelist approach

XSSI

- Idea: Some script content can be loaded in the context of the current domain, against the usual mechanism of the same domain policy
- Pros: Allows reuse of scripted code under the context of the current domain, allows for javascript services
- Cons: Attackers can provide malicious scripts or invoke services in the current domain's context
- Solution: Make sure the code comes from a trusted site

XSRF

- Idea: Have web services and accounts whose data can be changed via the web
- Pros: A website can be customized and made more user friendly
- Cons: Someone can make these calls for you with undesired results
- Solutions: inspect header, require user-provided secret, add nonce token to forms and verify legitimate requests

HTTP State

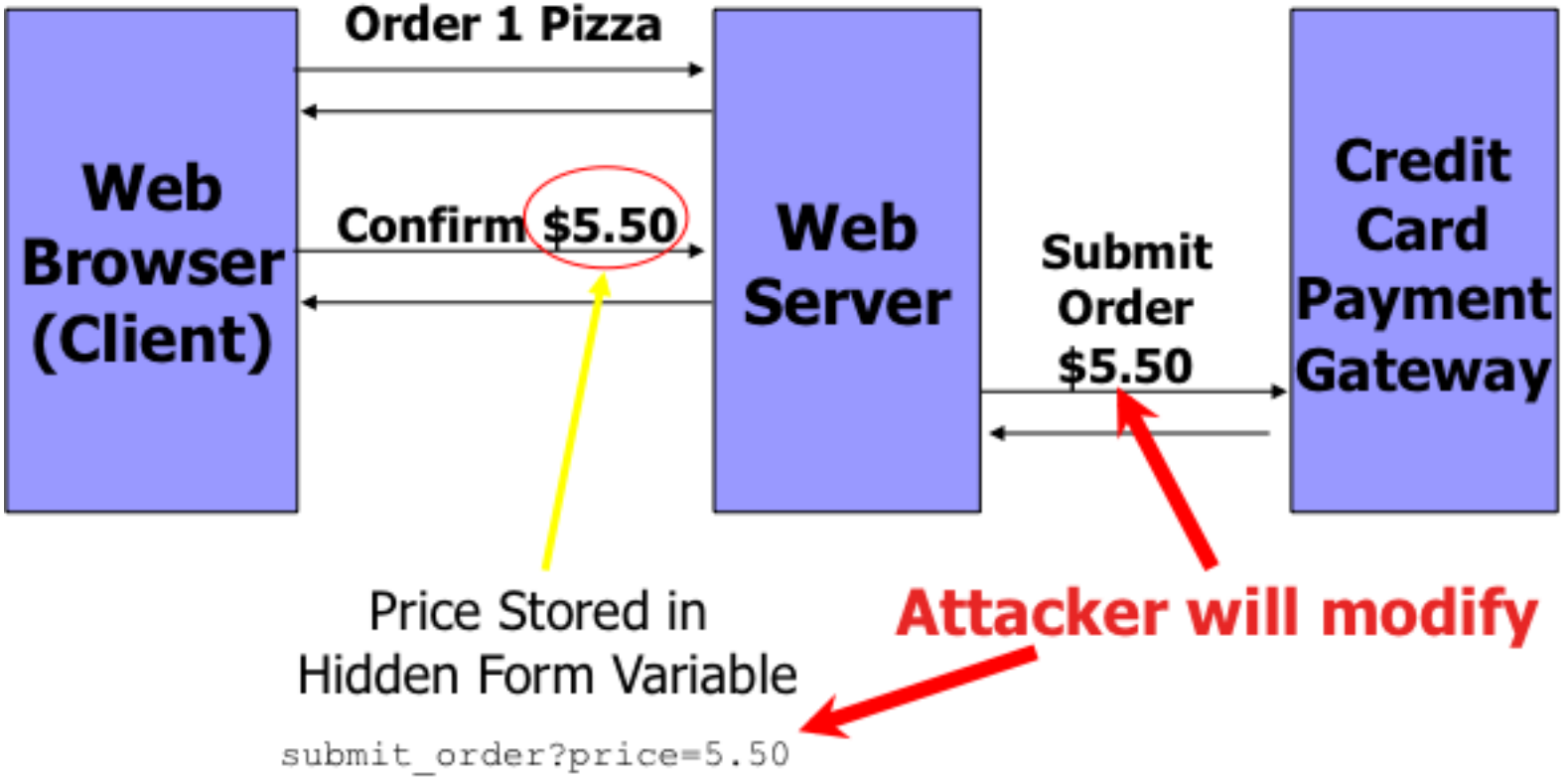
- HTTP is a stateless protocol
- This means the state machine for the protocol is very simplistic (request and response)
- However developers want state in order to build staged user experiences
- Solution: provide state to user and have them echo it back in future requests

Attempt 1: Hidden Fields

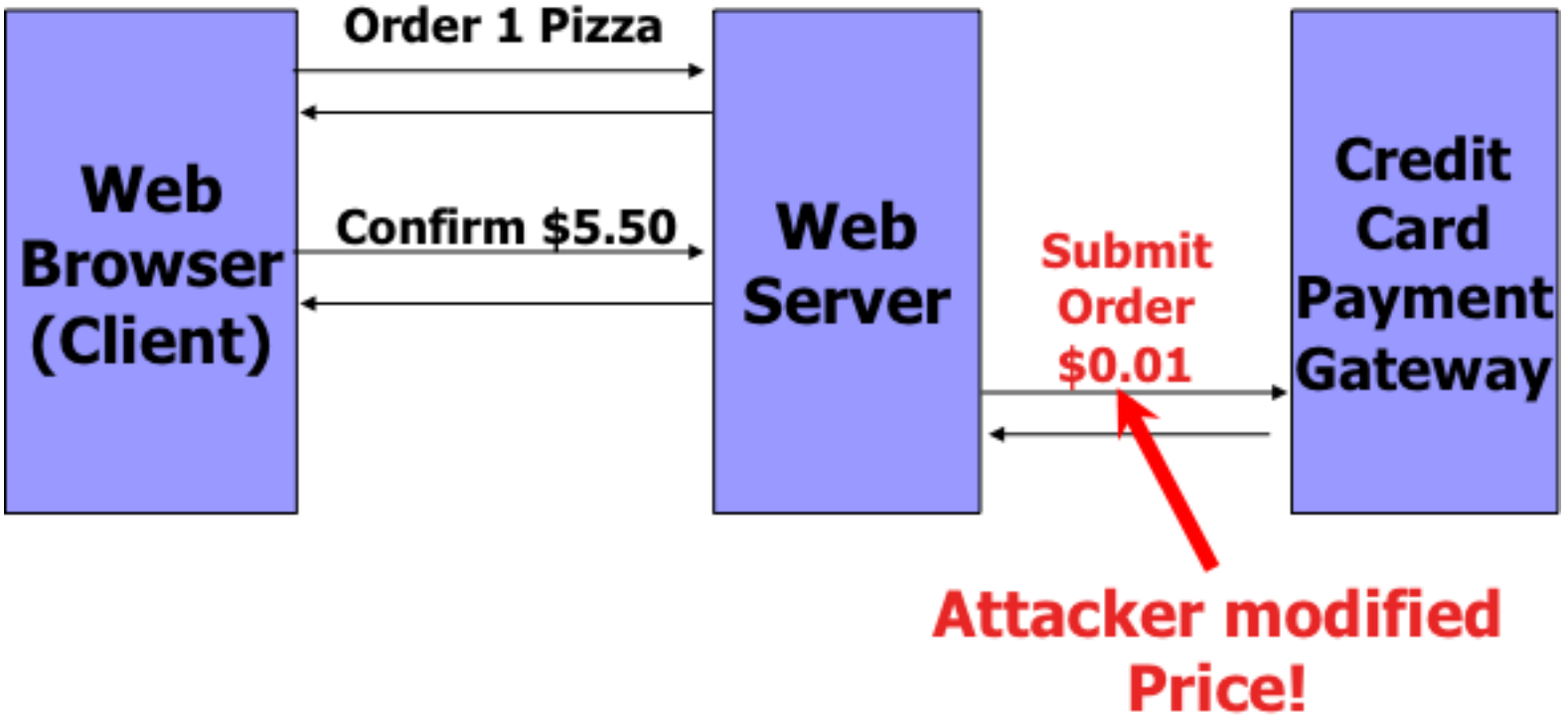
- Let's give the user hidden fields that will hold state variables for us to use on later requests

```
<html>
    <head>
        <title>Pay for Pizza</title>
    </head>
    <body>
        <form action="submit_order" method="GET">
            <p> The total cost is 5.50. Are you sure you
            would like to order? </p>
            <input type="hidden" name="price" value="5.50">
            <input type="submit" name="pay" value="yes">
            <input type="submit" name="pay" value="no">
        </form>
    </body>
</html>
```

Attempt 1: Problems



Attempt 1: Problems



Attempt 2: Cookies

- Let's store state on the client side, but in a special file that can only be accessed by code from the same domain

```
<script type=”text/javascript”>
      document.cookie = “price=$5.00”;
</script>
```

Attempt 2: Problems

- Cookies can still be sniffed from HTTP requests
- Cookies can still be stolen from injected scripts
- So not much improvement except that the parameters are not directly visible in Get requests

Attempt 3: Sessions

- Let's store state on the server side and only give the user an identifier for it
- If we place this identifier in a cookie it will be harder to gather
- If we make the session id a hash of the user's ip address and a nonce it will be harder to spoof

```
<?php
	session_start();
	$_SESSION['price'] = 5.0;
?>
```

Attempt 3: Problems

- All user state is stored server side, this can be a ton of data
- Search for user session data can be a bottleneck in the response time
- Sessions need to expire or else sessions can be reused by attackers
- Placing the session id in cookies does not eliminate XSRF attacks