Hacking ASP.Net: Tips and Tricks

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- Principal Security Consultant at Secure Ideas
- .Net Developer Since the Beta Release
- SANS Instructor and Author
  - Dev544: Secure Coding in .Net
- Open Source Projects
  - Web Config Security Analyzer - http://sourceforge.net/projects/wcsa/
  - EventValMod - http://sourceforge.net/projects/eventvalmod
- Podcaster
  - Professionally Evil Perspective
  - Down the Rabbit Hole
- Blogs
  - .Net Security - http://www.jardinesoftware.net/
  - Gen. Security – http://blog.secureideas.net

Topics

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- ASP.Net
- RequestValidation
- ViewState
- EventValidation
- GET/POST & Postback
- Conclusion

ASP.Net

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

Versions

- 1.1
- 2.0
- 3.0
- 3.5
- 4.0
- 4.5 *

Editions

- WebForms
- MVC
- Web Pages
- Web API
- WCF

Testing ASP.Net

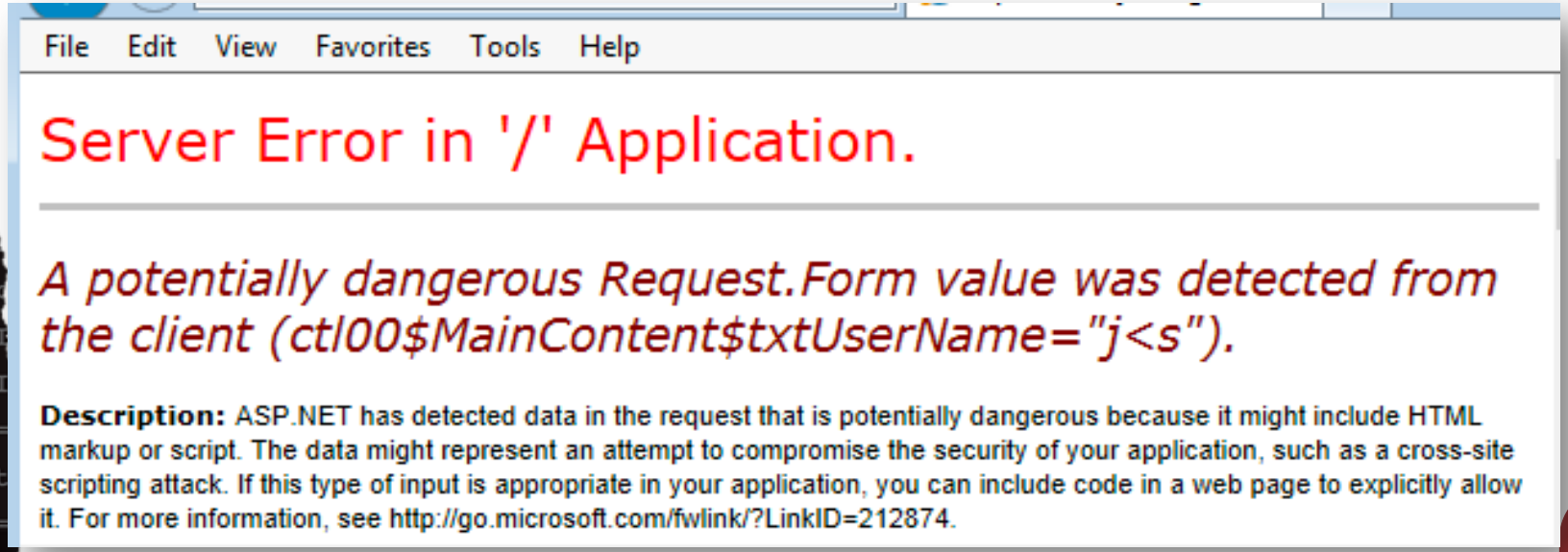
$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- Similar to other technologies
  - GETs/POSTs, etc
  - AJAX
  - Cookies, Hidden Fields, Forms
  - Session State, Authentication
- Differentiators
  - Request Validation
  - View State
  - Event Validation
  - Other Built In Controls

Request Validation

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- Attempt to block XSS Attacks
- In 2.0+ only works for **HTML** Context
  - <[char], <!, <?, </, &#
- Prior to 2.0 most likely disabled



Request Validation Bypass

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- Not Really!
- If database stores data as varchar (not nvarchar)
- Use unicode-wide %uFF1C (<)
- RequestValidation doesn't detect this but...

- Database will convert it to the < character

Of course output encoding does block this as well

Request Validation Bypass 2

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- Addition of % Character (<%tagname>)
- Reported to work in IE (I was unsuccessful)
- Reported by Zamir Paltiel (http://www.securityfocus.com/archive/1/524043)

- An older bypass was to use a null character like

  <%00tagname>
- Browser specific and doesn't really work anywhere

Of course output encoding does block this as well

Request Validation Config

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- Set in the Web.Config File

```
<system.web>
    <pages validateRequest="true" />
</system.web>
```

- Set at the Page Level

```
<%@ ValidateRequest="true" %>
```

Yes, It's Interesting

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

ViewState v2.0 compatible [MAC is not enabled]

ViewState

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- Base64 Encoded By Default
  - Can be encrypted
- Vulnerabilities
  - Parameter Tampering, XSS, Info Leakage

Request | Response

Raw | Headers | Hex | HTML | Render | ViewState

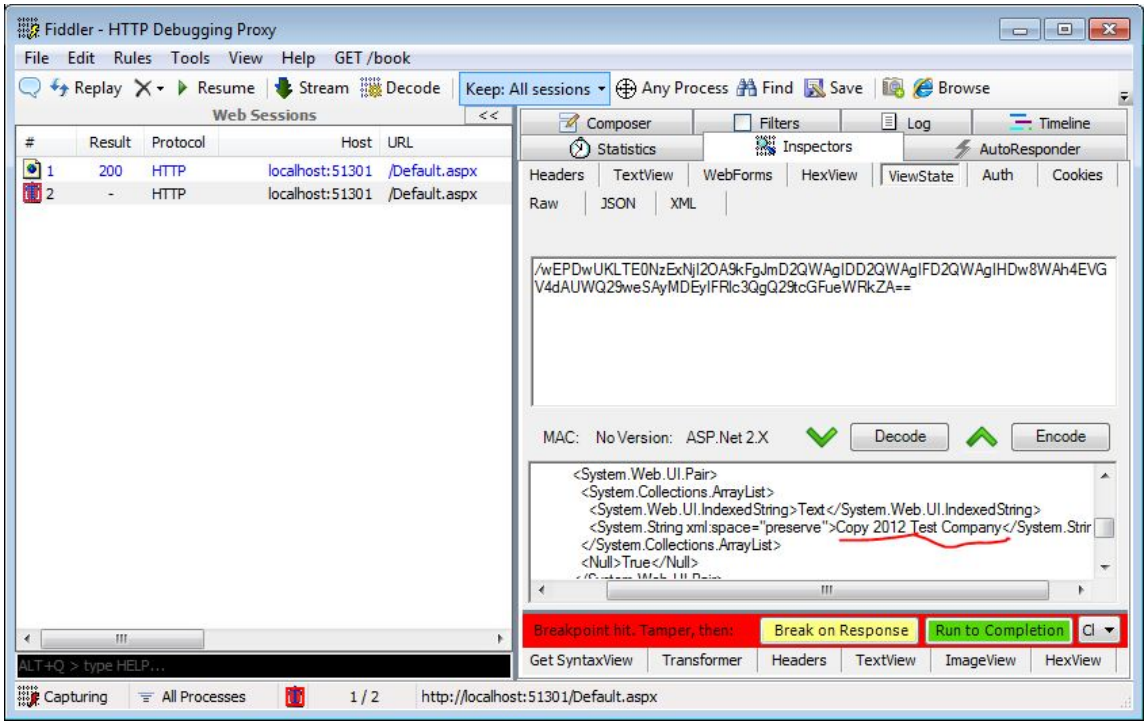
```
        <div id="content">
                <a name="pageContent"></a>
                <div id="pageContent">

    <form method="post" action="default.aspx" id="form1">
<div class="aspNetHidden">
<input type="hidden" name="__EVENTTARGET" id="__EVENTTARGET" value="" />
<input type="hidden" name="__EVENTARGUMENT" id="__EVENTARGUMENT" value="" />
<input type="hidden" name="__VIEWSTATE" id="__VIEWSTATE"
value="/wEPDwUJMTM5ODkwOTkyD2QWAmYPZBYCAgMPZBYCAgEPFCsAAg8WBB4ISW1hZ2VVcmwFHy9JbWFnZX
MvQmFubmVyL2Jhbm5lcl9zbWFsbC5qcGceDUFsdGVybmF0ZVRleHQFH0Zsb3JpZGEgRGVwYXJ0bWVudCBvZiB
FZHVjYXRpb25kEBYCZgIBFgIWCB4LSG90U3BvdE1vZGULKiVTeXN0ZW0uV2ViLlVJLldlYkNvbnRyb2xzLkhv
dFNwb3RNb2RlAR4LTmF2aWdhdGVVcmwFGGh0dHA6Ly93d3cubXlGbG9yaWRhLmNvbR4LQ29vcmRpbmF0ZXMFG
DAsNjAsIDc4NSwwHwEFH0Zsb3JpZGEgRGVwYXJ0bWVudCBvZiBFZHVjYXRpb24WAgICAgJkGAEFImN0bDAwJE
NvbnRlbnRQbGFjZUhvbGRlcjEkZ3ZfUnVsZXMPPCsADAEIAgFkWiR0Jd2Q0OkGSeiI8r9xL4+cqIW1OwWgq25
+quwPpVE= />
</div>
```

ViewState Manipulation

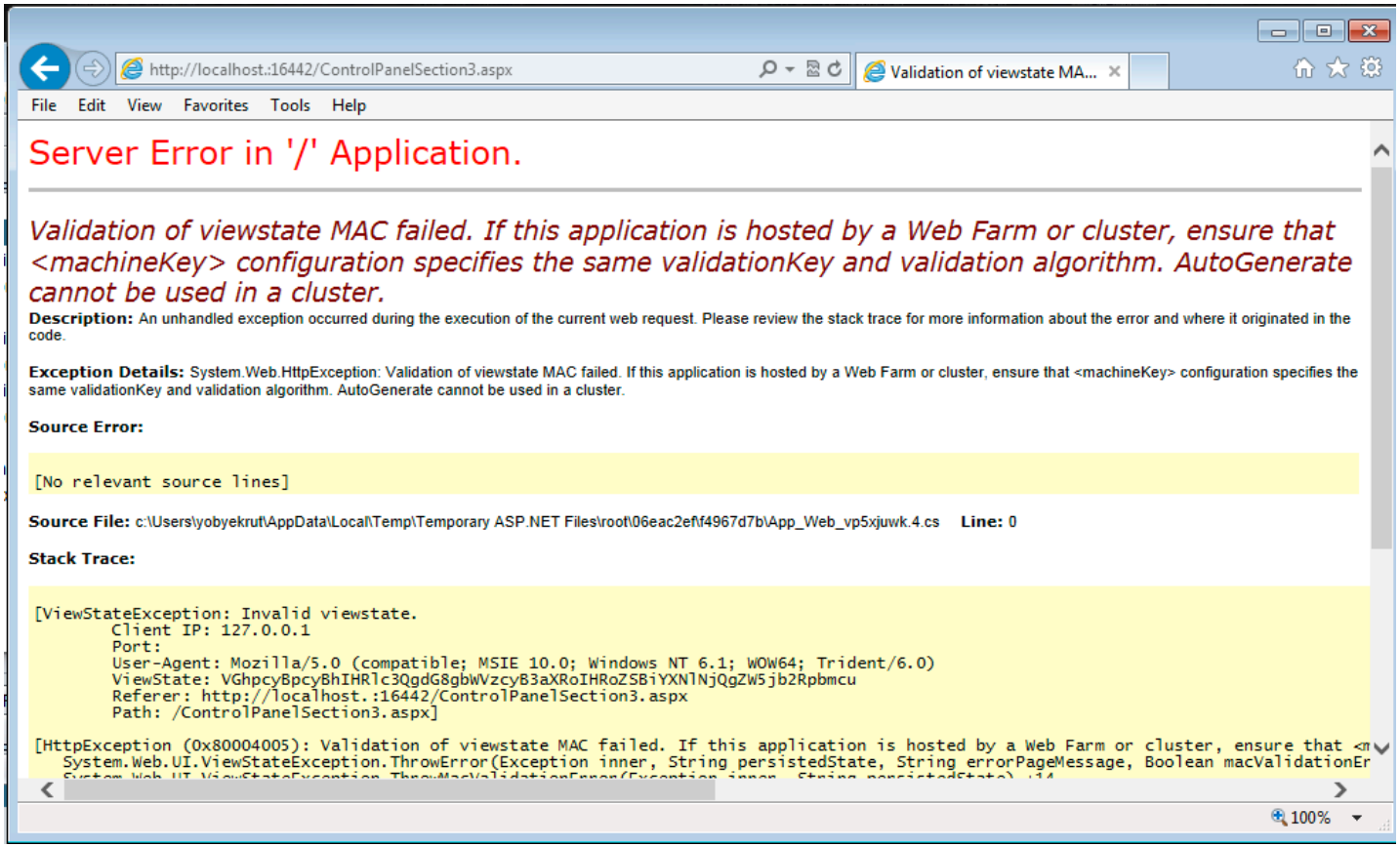
$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- ViewStateViewer - http://labs.neohapsis.com/2009/08/03/viewstateviewer-a-gui-tool-for-deserializingreserializing-viewstate/



ViewState - Protected

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php



The Problem

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

This is wrong common advice!!

Solution 1

Sign Up to vote ★★★★★

Refer to the following thread for a discussion about this issue:

http://forums.asp.net/t/955145.aspx[^]

You can fix this by setting the `EnableViewStateMAC` property to false. Refer to more information about `EnableViewStateMAC` in the link given below:

http://msdn.microsoft.com/en-us/library/system.web.ui.page.enableviewstatemac.aspx[^]

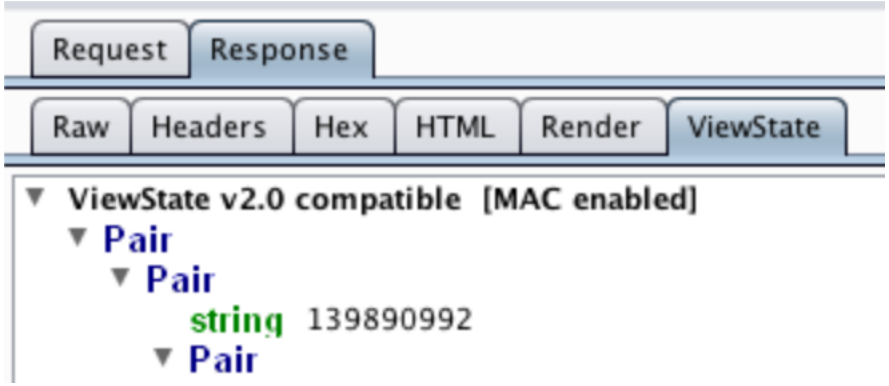
Posted 24-Sep-12 16:39pm Permalink

http://www.codeproject.com/Questions/464873/Validation-of-viewstate-MAC-failed

ViewStateMac

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- Provides Tamper Protection for:
  - ViewState
  - EventValidation



Web.Config

<pages enableViewStateMac="true"/>

Page Level

<%@ Page Language="C#" EnableViewStateMac="true"...

Event Validation

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

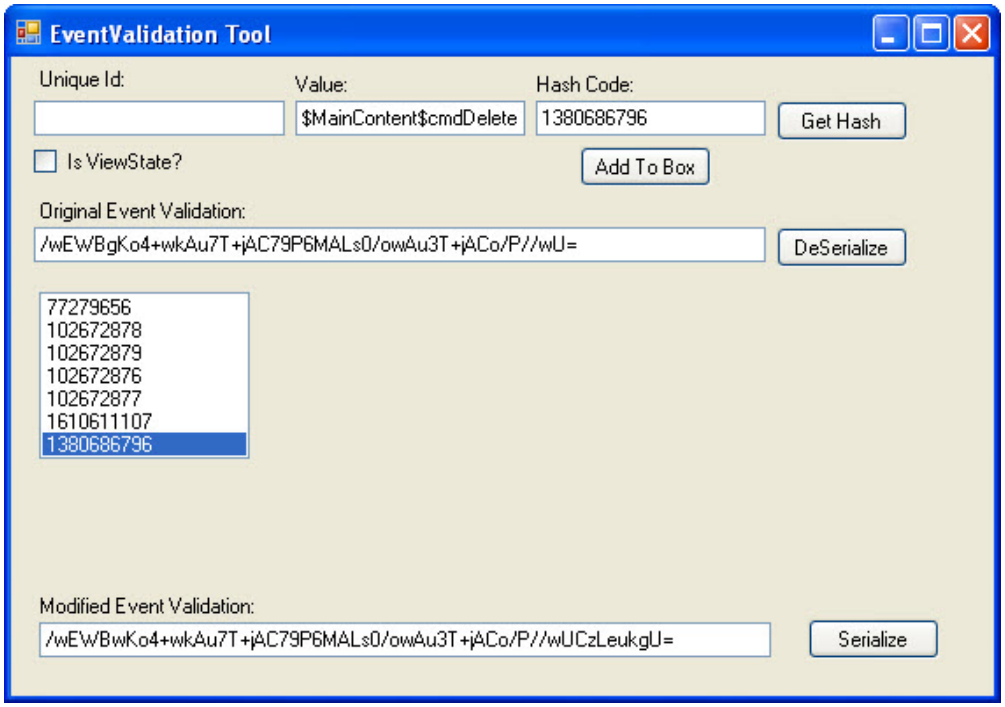
- Protects Drop Down Lists
- Protects against forged post backs
- Protected by ViewStateMac
- Creates an array of numeric hashes
- Not User Specific
  - Doesn't Protect against CSRF

```
<input type="hidden" name="__EVENTVALIDATION"
value="/wEWBALslL0qAu3wv7QBAqnOkfQNAoznisYG"/>
```

Event Validation - EventValMod

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

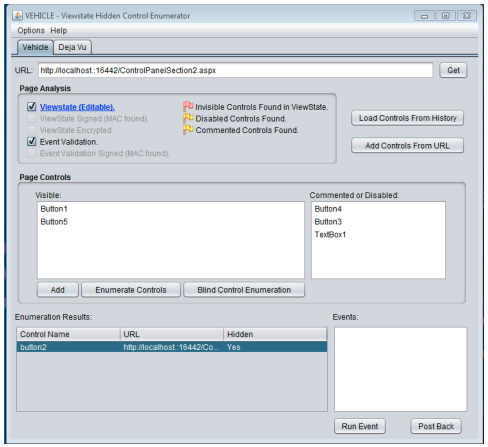
- Modifies the Event Validation field
- Stand Alone App / Written in .Net
- http://sourceforge.net/projects/eventvalmod



Event Validation - VEHICLE

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- ViewState Hidden Event Enumerator
  - Formerly known as ria-scip
- Works with ZAP
- Features
  - Event Execution of Disabled/Invisible Controls
  - Server Control Property Injection
  - Edit the ViewState Field
  - Error-Based Control Name Enum
  - ViewState/EventValidation Reconstruction
- https://github.com/hacktics/vehicle



EventValidation Config

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- Set in the Web.Config File

```
<system.web>
    <pages enableEventValidation="true" />
</system.web>
```

- Set at the Page Level

```
<%@ EnableEventValidation="true" %>
```

Bad, Bad, Bad!!

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

ViewState v2.0 compatible [MAC is not enabled]

ViewStateUserKey

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- Protects against Cross Site Request Forgery
  - Provides a user "salt" to ViewStateMac
- Not enabled by default
- Only works for requests with ViewState
  - http://www.testsite.mm/deleteuser.aspx?id=5 (doesn't work)

- Recommendation:

```
protected void Page_Init(object sender, EventArgs e)
{
        Page.ViewStateUserKey = Session.SessionId;
}
```

Postback

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- Webforms are based around "Postbacks"
- Caused by Events (ex. button_click)
- Triggered by __ViewState or __EventTarget

```
if (!Page.IsPostback){
    // Authorization/Populate Data
    lblCopy.Text = "copy 2013";
    if(!User.IsInRole("Admin"))
        Response.Redirect("Unauthorized.aspx");
}
else{
    // Execute Events
}
```

Postback Attacks

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- Authorization Bypass

```
if(!User.IsInRole("Admin"))
    Response.Redirect("Unauthorized.aspx");
```

Recommendation:
- Check Authorization on Every Request

- XSS (ViewState Tampering)

```
lblCopy.Text = "copy 2013";
```

Recommendation:
- Enable ViewStateMac
- Set text on every request

GET/POST Exchange

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- Server Control GETs and POSTs are Interchangeable
  - TextBox
  - ListBox
  - ViewState/EventValidation
  - Etc.
- Based on Request Type
- Can Call POST requests with GET
  - Good for CSRF
- Can Trigger Postback with GET request

GET/POST Fix

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- WebForms

  if(Request.RequestType == "POST")

- MVC

  [HTTPPost]

  void DoSomething()

Authentication Cookie

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- HTTPOnly (Hard Coded)
- Secure Flag may not be set
  - Sometimes there is an error if behind a Load Balancer that strips SSL
  - Should Recommend Manually setting this value
- Self-Contained – Not tracked on server
  - Timeout is key. Lives until the timeout expires on the cookie
  - FormsAuthentication.Logout only removes cookie from the browser (doesn't kill it)

Misc. Files

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- Trace.axd
- Elmah.axd

- Use URL Authorization in the Web.config

- Web.config (crown jewels) – GOOD LUCK!!
  - IIS is set up to not serve this file

Conclusion

$js_command_hist ?>); var last = 0; function key(e) { ?> va r current_line = 0; var command_hist = New array (<?php

- ASP.Net has good security features
  - You have to understand them
- ViewStateMac is IMPORTANT!
  - EventValidation
  - ViewState
  - ViewStateUserKey
- Developers are not up to speed on these things
  - Share this info with developers

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