



IBM Software Group

Introduction to Web Server Debugging in IBM® HTTP Server

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WebSphere® Support Technical Exchange



Agenda

- **Main Focus – IHS**

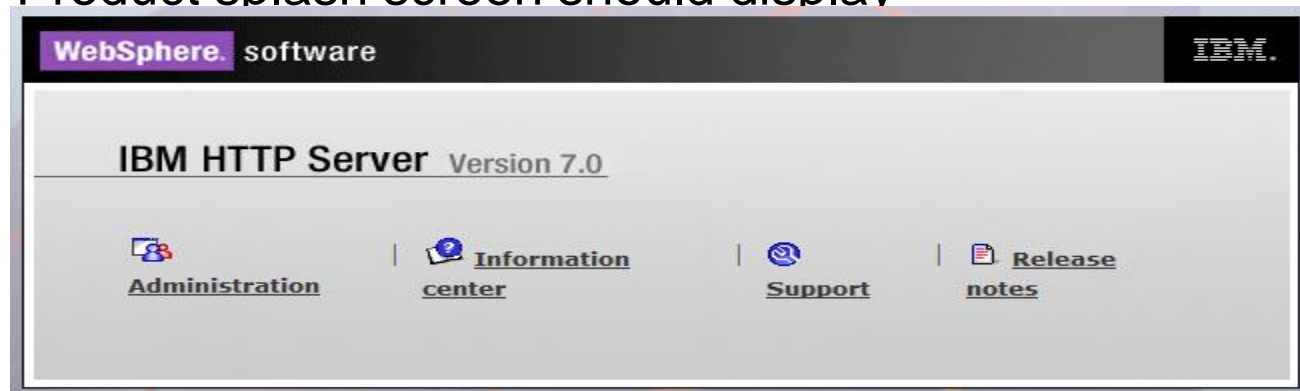
- ▶ **Introduction** – Brief overview of **IHS** and goal of this presentation
- ▶ **Topology**
- ▶ **Security**
- ▶ **SSL**
- ▶ **Determine if plugin or static**
- ▶ **HTTP status codes**
- ▶ **Hangs and performance tools**
- ▶ **Load Balancing**
- ▶ **IHS – Administration issues**

What is IHS?

- Based off Apache.
 - ▶ Run command `./apachectl -V` or `apache -V` to determine base Apache version.
 - ▶ WebSphere fix packs will include Apache security updates.
- Config files / Log files
 - ▶ `httpd.conf` – webserver
 - ▶ `plugin-cfg.xml` – WebSphere plugin
 - ▶ Logging directives – customizing, rotate logs
 - ▶ `Error.log` & `Plugin.log`
- Supported in front of WebSphere Application Server
- 3rd party modules

Checking the obvious

- Make sure web server is running and listening on appropriate ports.
 - ▶ Include “-e debug” parameter to display startup errors / or -t to run a syntax check on the config file.
 - ▶ Listen Directives should map to netstat -an output
 - ▶ Product splash screen should display



Access.log file

- CustomLog Directive
 - ▶ Identifies location of the access log and which format directive to use.
 - ▶ Contents can be piped to another process to support log rotation.
- LogFormat Directive
 - ▶ Identifies the information that will be written to the log file.
- http://httpd.apache.org/docs/current/mod/mod_log_config.html

Error.log file

- ErrorLog Directive
 - ▶ Identifies location of the access log and which format directive to use.
 - ▶ Contents can be piped to another process to support log rotation.
 - ▶ Use LogLevel directive to control the amount of information written to file.
- <http://publib.boulder.ibm.com/httperv/manual70/mod/core.html#errorlog>
- Messages documented at <http://publib.boulder.ibm.com/httperv/ihsdiag/errorlog.html>

Example entry in Access.log

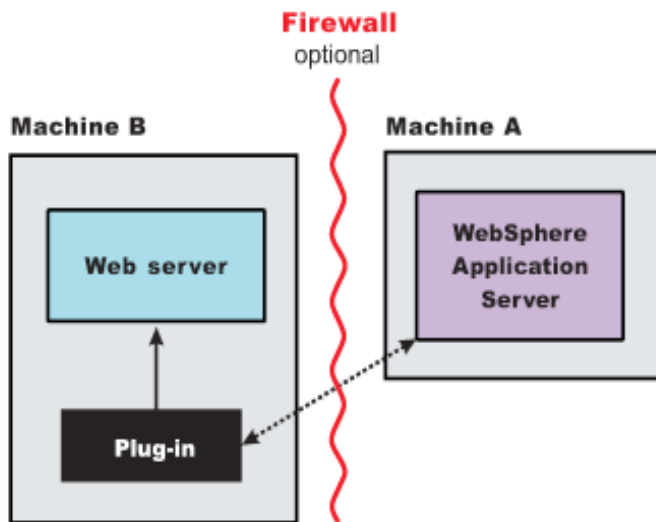
- Here's a sample entry found in the access.log file generated using the common LogFormat

LogFormat "%h %l %u %t \"%r\" %>s %b" common

```
127.0.0.1 - - [26/Sep/2011:10:35:38 -0400] "GET / HTTP/1.1"  
304 -
```

- Refer to http://httpd.apache.org/docs/current/mod/mod_log_config.html for full list of valid parameters.

How does it fit in network topology?



- What's between the client and web server?
- Typically, a load balancer routes requests to web server.
- Web server supported in front of WebSphere Application Server.
- Common for web server and application server to be on separate machines.
- Also likely to have Firewall protection between each machine.
- Try directing request directly to web server and application server for problem determination.

What security is provided with IHS?

- Secure access to I.H.S resources, http request methods, and SSL.
 - ▶ Prevent users from seeing directory structure within I.H.S directories.
 - ▶ Allow only specific HTTP methods.
 - ▶ Force users to send requests via SSL.
 - ▶ SSL Cyphers
 - ▶ http://httpd.apache.org/docs/current/misc/security_tips.html

Software Vulnerabilities

- Because IBM HTTP Server is based on the Apache HTTP Server, known software vulnerabilities which exist in native Apache, may trigger security warnings in some vulnerability scanning programs.
- These vulnerabilities are tracked using Common Vulnerabilities and Exposures (CVE) Ids
- See technote “Researching Known Vulnerabilities Resulting from a Scan for IBM HTTP Server”, <http://www-01.ibm.com/support/docview.wss?uid=swg21358695>
- `Apachectl -V` command to get list of included CVEs

SSL and Certificate management

- Securing communications between web servers and clients requires integrating SSL certificates into your web server configuration
- Certificate types
 - Self signed certificates versus Certificate Authority (CA)
 - Personal and signer certificates
- Certificate tools: IKEYMAN, GSK7CMD
- Common certificate errors found in error.log
 - Certificate validation
 - Certificate expiration
 - IP based virtual host naming

Guide to properly setting up SSL

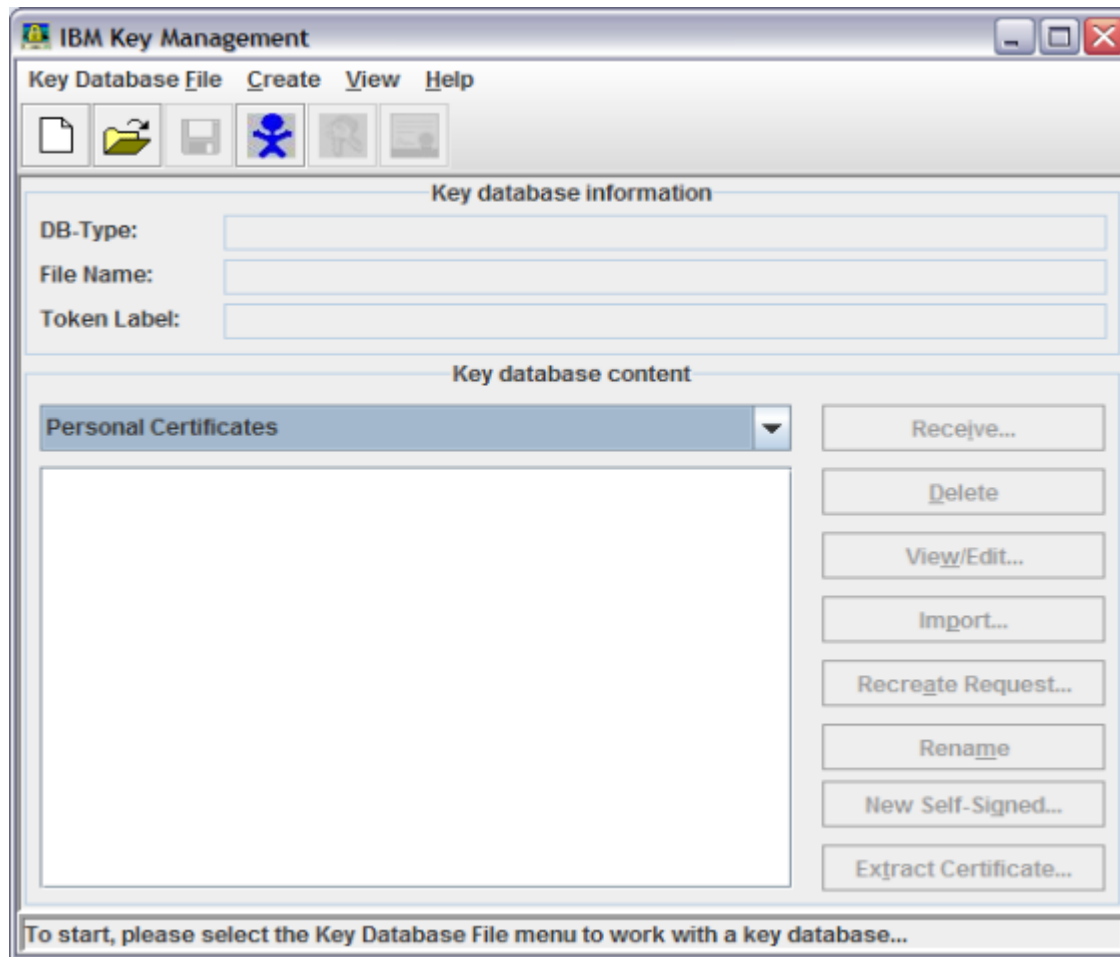
- Technote <http://www-01.ibm.com/support/docview.wss?uid=swg21179559>
 - 1. Confirm that the Global Security Kit (GSKit) is installed and meets the minimum requirements
 - 2. Create a key database file and certificates needed to authenticate the Web server during an SSL handshake
 - 3. Enable SSL directives within the IBM HTTP Server configuration file (httpd.conf)
 - 4. Other considerations when enabling SSL directives within the IBM HTTP Server configuration file (httpd.conf)

Defining SSL for multiple virtual hosts

- IP-Based Virtual Hosting must be used if configuring multiple SSL Virtual Hosts
 - ▶ Each VirtualHost stanza is configured with a different IP address.
 - ▶ The SSLServerCert directive must also be used if configuring multiple SSL Virtual Hosts.

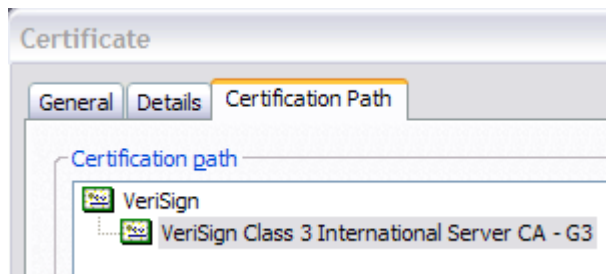
```
<VirtualHost 1.2.3.4:443>    <VirtualHost 1.2.3.5:443>
  SSLEnable                  SSLEnable
  SSLServerCert CertForHostA SSLServerCert CertForHostB
  ServerName www.hostA.com   ServerName www.hostB.com
</VirtualHost>              </VirtualHost>
```

IKEYMAN GUI



- Recommended tool to work with key files.
- I.H.S uses keystores having CMS format.
- Drop down list box allows controls to work with new certificate requests or existing personal and signer certificates.
- Key files are operating system independent.

Certificate Validation



- [error] SSL0208E: SSL Handshake Failed, Certificate validation error.
- Example showing a root and intermediate certificate chained together.
- Looking at intermediates Issued to and Issued by, you see the chain relationship.
- A personal certificate that includes this chain would have a Issued by matching the Issued to of the intermediate certificate.

The WebSphere Plugin

- Separately installed from I.H.S
- Used to direct requests to the back end WebSphere application server.
- Not compatible with other application servers.
- Plugin policy, <http://www-01.ibm.com/support/docview.wss?uid=swg21160581> states plugin must be at equal or higher maintenance level than the application server.

Determine if Plugin or IHS is serving files

- ▶ httpd.conf
 - LoadModule was_ap20_module "C:\HTTPServer\Plugins\bin\mod_was_ap20_http.dll"
 - WebSpherePluginConfig "C:\HTTPServer\Plugins\config\m698947t4\plugin-cfg.xml"
- ▶ Set the I H S Loglevel = detail
- ▶ Set the Plugin loglevel = Trace
- ▶ If plugin could not find request, back to i.h.s
 - ihs will look at directory and if local directory (htdocs) found or it will be some application server request and that directory path will not exist and throw file not found (404)

Taken from I H S and plugin trace

```
172.21.134.147 - - [03/Oct/2011:10:56:16 -0400] "GET  
/WorkplaceXT/FnJavaV1Files/daeja1/png/jiPngv2.class HTTP/1.1" 404 23564
```

```
[Mon Oct 3 10:56:16 2011] 00001672 e9b9fb90 - DETAIL: ws_common:  
websphereShouldHandleRequest: trying to match a route for: vhost='trsnycmpsd';  
uri='/WorkplaceXT/FnJavaV1Files/daeja1/png/jiPngv2.class'
```

```
[Mon Oct 3 10:56:16 2011] 00001672 e9b9fb90 - DEBUG: ws_common:  
websphereUriMatch: Found a match '/WorkplaceXT/*' to  
'/WorkplaceXT/FnJavaV1Files/daeja1/png/jiPngv2.class' in UriGroup:  
default_host_NYICMCL01_URIs with score 13, exact match 13
```

```
[Mon Oct 3 10:56:16 2011] 00001672 e9b9fb90 - DETAIL: GET  
/WorkplaceXT/FnJavaV1Files/daeja1/png/jiPngv2.class HTTP/1.1
```

```
[Mon Oct 3 10:56:16 2011] 00001672 e9b9fb90 - DETAIL: HTTP/1.1 404 Not Found
```

HTTP errors

- Status codes.
 - ▶ 1xx – Informational
 - ▶ 2xx – Successful
 - ▶ 3xx – Redirection
 - ▶ 4xx – Client error
 - ▶ 5xx – Server error

- Common status codes
 - ▶ 500 – server encountered an error
 - ▶ 404 – file not found



Hangs and Performance

- ▶ IHSDiag
 - Snap shot of process and threads repeated on 3 intervals
- ▶ mod_mpmstats
 - Keeps statistics of requests written to error.log
- ▶ Netstat -an
 - To determine what ports Listen
- ▶ Determining response time - access.log
 - Logformat %T %D
- ▶ Logged when request is completed using the time stamp when the request was issued

Load Balancing and fail over

Plugin function – Plugin-cfg.xml

Defined per cluster

Weighted Round Robin

Random

Session Affinity for stateful http sessions.

mod_mpmstats

```
[Mon Oct 03 06:02:25 2011] [notice] mpmstats: rdy 74 bsy 1 rd 0 wr 0 ka 1 log 0  
dns 0 cls 0
```

Plugin loglevel stats

```
[Mon Oct 3 10:55:13 2011] 00001656 eafa1b90 - STATS: ws_server:  
serverSetFailoverStatus: Server NYCEBAS01N01_NYCEBAS01S01 :  
pendingRequests 0 failedRequests 0 affinityRequests 31 totalRequests 47.
```

Fail over cont...

- If a server goes offline plugin will fail over
- ConnectTimeout – to prevent blocking connections
- ServerIOTimeout – If server takes too long to respond
- RetryInterval – when to try server again.

IHS Administration issues

- Managed nodes
 - ▶ Federated under a Deployment manager
 - ▶ node manager must be running on I H S server.
- Unmanaged nodes
 - ▶ I H S Admin agent must be running
- Colocated servers
 - ▶ I H S is installed on same server as application server
- Installation of Plugin creates script in..plugins/bin
 - ▶ ConfigXXXPlugin.bat

Summary

- This presentation's goal is to give beginner web administrators some basic problem diagnosing best practices.
- Additional resources
 - ▶ I.H.S common questions and answers:
<http://publib.boulder.ibm.com/httpserv/ihsdiag/questions.html>
 - ▶ I.H.S IBM DeveloperWorks forum:
<http://www.ibm.com/developerworks/forums/forum.jspa?forumID=287>

Additional WebSphere Product Resources

- Learn about upcoming WebSphere Support Technical Exchange webcasts, and access previously recorded presentations at:
http://www.ibm.com/software/websphere/support/supp_tech.html
- Discover the latest trends in WebSphere Technology and implementation, participate in technically-focused briefings, webcasts and podcasts at:
<http://www.ibm.com/developerworks/websphere/community/>
- Join the Global WebSphere Community:
<http://www.websphereusergroup.org>
- Access key product show-me demos and tutorials by visiting IBM Education Assistant:
<http://www.ibm.com/software/info/education/assistant>
- View a webcast replay with step-by-step instructions for using the Service Request (SR) tool for submitting problems electronically:
<http://www.ibm.com/software/websphere/support/d2w.html>
- Sign up to receive weekly technical My Notifications emails:
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Questions and Answers