

IBM Software Group

## Evaluating the Health of your IBM® HTTP Server

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WebSphere® Support Technical Exchange





#### Agenda

#### Main Focus – I.H.S. Health check

- Introduction
- User requirements
- Topology
- Site Maintenance
- Certificate Management
- Performance Monitoring
- Load Balancing
- IHSDIAG & Trace Management
- HTTPD Directives and Plugin Properties





#### Why Do A Health Check?



- Prevent future system issues.
  Ensure that the system is meeting these requirements:
  - System availability
  - Response time criteria
  - Concurrent users



## **Understanding IHS**

- Based off Apache.
  - Run command ./apachectl -V or apache -V to determine base Apache version and product fix pack level.
  - 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 with WebSphere Plugin
- 3<sup>rd</sup> party modules



## **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.
- Topology diagram should be available and up to date.
- Know what ports are in use and should not be blocked.

#### **Fix Packs**

- For web server, we are interested in I.H.S, Plugin, and WAS fix pack level.
  - I.H.S  $\rightarrow$  Shown in error.log and output of ./apachectl -V command:
    - [Tue Dec 06 10:45:40 2011] [notice] IBM\_HTTP\_Server/7.0.0.19 (Win32) configured -- resuming normal operations
    - Server version: IBM\_HTTP\_Server/7.0.0.19 (Win32)
  - $\blacktriangleright Plugin \rightarrow Shown in plugin.log$ 
    - PLUGIN: Bld version: 7.0.0.19
    - http://www-01.ibm.com/support/docview.wss?uid=swg27013332
  - WAS JVM → Shown in systemout.log and trace files.
    - WebSphere Platform 7.0.0.19
- Fix pack contents: http://www-01.ibm.com/support/docview.wss? rs=177&uid=swg27006973
- Plugin policy: https://www-304.ibm.com/support/docview.wss? uid=swg21160581



## **Applying Fixpacks**

- Prior to version 8, WebSphere maintenance installed via the IBM Update Installer.
  - http://www-01.ibm.com/support/docview.wss?uid=swg24020212
- Version 8 uses the IBM Installation Manager
  - Update Strategy for v8 http://www.ibm.com/support/docview.wss?uid=swg27023315
- Procedure to have I.H.S. temporarily mark your application servers down when applying maintenance to the application servers:

http://www-01.ibm.com/support/docview.wss?uid=swg21397422

## **Update Installer**

🕲 IBM Update Installer f	for WebSphere Software 7.0.0.19
	Welcome to the IBM Update Installer for WebSphere Software wizard.
WebSphere, software	This wizard installs or uninstalls maintenance packages, including interim fixes, fix packs, and refresh packs. The following products are supported:
	<ul> <li>IBM WebSphere Application Server Version 6.0.2.21 or higher</li> <li>IBM WebSphere Application Server Network Deployment Version</li> </ul>
	<ul> <li>IBM WebSphere Application Server - Express Version 6.0.2.21 or higher</li> </ul>
	<ul> <li>IBM Application Client for WebSphere Application Server Version</li> <li>6.1.0.0 or higher</li> <li>Web Server Plug-ins for WebSphere Application Server Version 6 or</li> </ul>
	higher IBM WebSphere Application Server V6.1 Feature Pack for Web Services
Section Section	<ul> <li>IBM WebSphere Application Server V6.1 Feature Pack for EJB 3.0</li> <li>IBM WebSphere eXtreme Scale Version 7.0 or higher</li> </ul>
ند اصاده بر دردا	WebSphere Virtual Enterprise 6.1 or higher     IBM HTTP Server Version 6 or higher
InstallShield	< <u>B</u> ack <u>N</u> ext > <u>C</u> ancel



## **Update Installer – Target Selection**

🕲 IBM Update Installer	for WebSphere Software 7.0.0.19	×
VebSphere. software	For WebSphere Software 7.0.0.19         Product Selection         Enter the installation location of the product that you want to update.         You can select a different directory from the drop-down list, specify a different directory, or click Browse to select a directory.         Directory path:         C:\Program Files\IBM\HTTPServer         Browse	
InstallShield	< <u>B</u> ack <u>N</u> ext > <u>C</u> ancel	



### **Update Installer – Source Location**

🙆 IBM Update Installer	for WebSphere Software 7.0.0.19	
WebSphere, software	Maintenance Package Directory Selection Enter directory to list maintenance packages available for installation specify a directory or click Browse to select a path to maintenance package	n. You can ackage.
	Directory path:	
Sec.	C:\DownloadDirector	
	The latest maintenance packages are available online. Obtain main packages for WebSphere Application Server and all WebSphere App Server Feature Packs either by visiting the <u>Recommended fixes for V</u> <u>Application Server</u> webpage for a complete list or by using the <u>WebS</u> <u>Maintenance Download wizard</u> to find specific maintenance package Additional information can be found online at the <u>WebSphere Applic</u> <u>library</u> or <u>WebSphere Application Server information center</u> webpage	Browse tenance blication <u>VebSphere</u> sphere es. ation Server es.
InstallShield	< <u>B</u> ack <u>N</u> ext >	Cancel



### **Update Installer – Source Selection**

🕲 IBM Update Installer f	for WebSphere Software 7.0.0.19
	Available Maintenance Package to Install
WebSphere, software	Select maintenance packages to install:
	Select Recommended Updates Clear All Selections
PATT	▼ 7.0.0-WS-IHS-WinX32-FP0000023.pak
	7.0.0-WS-PLG-WinX32-FP0000023.pak - This product is not applicable.
	Each package selection might restrict remaining packages available for further selection.
	Multiple selections can be made for different products.
	Click Next to continue
InstallShield	
	< <u>B</u> ack <u>Next</u> <u>C</u> ancel



## **Update Installer - Completion**



## **Installation Manager**





## **Installation Manager - Update**

Installation Manager				
Jpdate Packages				1
Select a package group to find updates for.				E g
Package Group Name	Directory			
Reg IBM HTTP Server V8.0	C:\Program Files (x86)\IBM\HTTPServer			
Real IBM WebSphere Application Server V8.0	C:\Program Files (x86)\IBM\WebSphere\AppServer			
Update all				
Details				
BM HTTP Server V8.0				
Shared Resources Directory: C:\Program Files (x86)\IBM\SDPShared				
Installation Directory: C:\Program Files (x86)\IBM\HTTPServer				
Eclipse IDE: C:\Program Files (x86)\IBM\HTTPServer				
installed Packages and Fixes				
<ul> <li>IBM HTTP Server for WebSphere Application Server 8.0.0.0</li> </ul>				
<ul> <li>8.0.0.0-WS-WASJavaSDK-WinX64-IFPM61455 8.0.0.20120405_1403</li> </ul>				
	< Back	Next >	Update	ancel



### Installation Manager – Select Pkg

Ipdate Packages				F
elect a package group to find updates for.				E
Package Group Name	Directory			
Peas IBM HTTP Server V8.0         Peas IBM Software Delivery Platform         Peas IBM WebSphere Application Server V8.0	C:\Program Files (x86)\IBM\HTTPServer C:\Program Files (x86)\IBM\SDP C:\Program Files (x86)\IBM\WebSphere\AppServer			
Update all Netails 3M HTTP Server V8.0				
Shared Resources Directory: C:\Program Files (x86)\IBM\SDPShared				
Installation Directory: C:\Program Files (x86)\IBM\HTTPServer				
Eclipse IDE: C:\Program Files (x86)\IBM\HTTPServer				
IBM HTTP Server for WebSphere Application Server 8.0.0.0				
<ul> <li>8.0.0.0-WS-WASJavaSDK-WinX64-IFPM61455 8.0.0.20120405_140</li> </ul>	13			
	< Back	Next >	Update	Cance





### Installation Manager – Confirm Pkg

Installation Manager			
Jpdate Packages The update will uninstall one or more fixes. To resolve an issue addres the details for a list of the fixes that will be uninstalled during the upda	sed by the fix that is ur te. <u>Show details</u>	installed, sele	ect another update or find a fix that addresses the issue. See
Update	Recommended	Vendor	
<ul> <li>IBM HTTP Server V8.0</li> <li>IBM HTTP Server for WebSphere Application Server 8.0.0.0</li> <li>IBM HTTP Server for WebSphere Application Server 8.0.0.0</li> </ul>	(Ir	IBM	
-			
Show recommended only			Select Recommended





## **Installation Manager – Summary**

Update Packages		F
Review the summary information.		
Update Packages Updates Licenses Features	Summary	
Target Location         Package Group Name:       IBM HTTP Server V8.0         Installation Directory:       C:\Program Files (x86)\IBM\HTTPServer         Shared Resources Directory:       C:\Program Files (x86)\IBM\SDPShared         Updates		
Features To Install	Features To Remove	
Disk Space Information		
Disk Space Information Total Available Space C: 362.55 GB Total Download Size: 127.93 MB Total Installation Size: 381.65 MB		
Disk Space Information Total Available Space C: 362.55 GB Total Download Size: 127.93 MB Total Installation Size: 381.65 MB > Repository Information		



## **Installation Manager - Completion**

IBM Installation Manager		
Update Packag	ges	
	The packages are updated. <u>View Log File</u>	
	Undate Installation Directory	
	Update     Installation Directory       %b IBM HTTP Server V8.0     C:\Program Files (x86)\IBM\       IBM HTTP Server for WebSphere Application Server 8.0.0.4     C:\Program Files (x86)\IBM\	HT
•	Note: If the packages support rollback, the temporary directory contains rollback files for installed packages. You can de the files on the <u>Files for rollback</u> preference page.	slete



#### 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



## **Inspecting Logs**

- Default I.H.S LogLevel is warn, and error for Plugin.
- Set to debug (I.H.S) or trace (plugin) for more detail.
- I.H.S error messages (error.log) are described at http://publib.boulder.ibm.com/httpserv/ihsdiag/errorlo g.html
- Plugin error messages (plugin.log) are described at https://www-304.ibm.com/support/docview.wss? uid=swg21381320
- Check access.log for unexpected http responses.



## 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



## Access.log HTTP Status Codes

- Status codes.
  - 1xx Informational
  - 2xx Sucessful
  - 3xx Redirection
  - 4xx Client error
  - 5xx Server error
- Common status codes
  - 500 server encountered an error
  - 404 file not found
- Webcast replay: HTTP Protocol Understanding Common Status Code



## 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.



## 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/httpserv/manual70/mod/core.html #errorlog
- Messages documented at http://publib.boulder.ibm.com/httpserv/ihsdiag/errorlog.html





## Plugin.log file

- Location identified by Name attribute in <Log> stanza of plugin-cfg.xml.
- LogLevel="Trace" to get detailed trace data. For load balancing, set LogLevel="Stats".
- Messages documented at https://www-304.ibm.com/support/docview.wss?uid=swg21381320



## Managing Log Files

- Don't let plugin get too big (2GB)
  - This can prevent web server from starting.
  - Typical editors don't respond well with large files.
- Log Rotation
  - error.log and access.log can be tailored to control size. Examples at http://publib.boulder.ibm.com/httpserv/ihsdiag/rotatelogs.html
- Ensure detailed tracing is turned off when not needed.
- Use LogFormat to control information written to access.log



## **Renewing Certificates**

- I.H.S uses SSL certificates to secure communications between clients and the web server.
- Both personal and signer certificates will expire and need to be renewed if still in use.
- I.H.S does not provide a utility program that monitors the certificate expiration date.
- The IKEYMAN utility is used to renew certificates.
  - https://www-304.ibm.com/support/docview.wss? uid=swg21045925

## Viewing Certificate in IKEYMAN

IBM Key Man	agement - [C:\Progr	am Files\IBM\ 💶 🗖 🔀	Key information for [SelfSignedCert]
Key Database Fil	e <u>C</u> reate <u>View</u> <u>He</u>	elp	SelfSignedCert
	J 😤 🕵 🔙		Key Size: 2048 Certificate Properties:
	Key database info	ormation	Version: X509 V3 Serial Number: 4F DE 70 81
DB-Type:	CMS		Issued to:
File Name:	C:\Program Files\IBM	I\HTTPServer\jpekey.kdb	CN=JPETPT61P.raleigh.ibm.com, OU=Software Group, O=WebSphere, L=RTP, ST=NC, POSTALCODE=27612
Token Label:			
	Key database c	ontent	Issued by:
Personal Certif	icates 💌	Receive	ST=NC, POSTALCODE=27612
* SelfSignedCer	rt	Delete	Volid from December 6, 2044 to December 5, 2042
		View/Edit	Validity: Valid from December 6, 2011 to December 5, 2012 Fingerprint (SHA1 Digest): 57:56:\\\\\December 17:\December 27:72:75:\\December 3:15:25:40:\DA:\DE-\A9:EA:76:7A
		(*************	Signature Algorithm: SHA1withRSA (1.2.840.113549.1.1.5)
		Export/Import	Subject Alternative Names: Email Address:
		Recreate Request	IP Address:
		Rena <u>m</u> e	DNS Name:
		New Self-Signed	<u>V</u> iew Details
		Extract Certificate	✓ Set the certificate as the default
The requested ac	ction has successfully	completed!	ΟΚ





#### **KDB** Password Expiration

- In addition to the certificate, the keystore (.kdb) the certificate is stored in may have a password that is set to expire.
- Prompted to set password during keystore creation.
- Newer versions of IKEYMAN allow you to check the password expiration date.

Password Prompt		BM Key Management - [C	VProgra ew Hel	Passwo	rd Expiry
Password:		<u>New</u>	CHI-N		Deserved emirations Are 20, 2042 44/20/24 AM
Confirm Password:		Den	CHI-O		Password expiry time: Apr 26, 2012 11:20:31 AM
<u>-</u>		Glose			OK
<u>Expiration time</u>	60 <u>D</u> ays	Save As	Ctri-S		
Stash password	to a file	Stash Password			
		Display Password Expiry	8		
<u>O</u> K	<u>R</u> eset <u>C</u> ancel	-			



### **Command Interface to Keystore**

- I.H.S includes the GSK7CAPICMD tool.
- Can be used to manage keys, certificates and certificate requests within the I.H.S keystores.
- -expiry option provides the keystore expiration date
  - gsk7capicmd -keydb -expiry -db key.kdb -pw <pwd> –details
- details option lists the detailed information for a specific certificate
  - sk7capicmd -cert -details -db key.kdb -pw <pwd> -label <label>



#### **Concurrent Processing**

- Default httpd.conf settings may not meet the expected load for the I.H.S web server
- IBM HTTP Server Performance Tuning
  - http://publib.boulder.ibm.com/httpserv/ihsdiag/ih s\_performance.html
- IBM Services can assist in configuring the server for performance.
  - http://www.ibm.com/developerworks/websphere/ services/



### Server Status - mod\_status

Provides current status of I.H.S web server, using url http://servername/server-status or

http://localhost/server-status/?showmodule

Srv	PID	Acc	М	Module	CI	U	SS	Req	Conn	Child	Slot	Client	VHost	Request
0-0	4461	0/136/136	_		0.1	1	0	0	0.0	2.33	2.33	127.0.0.1	localhost.localdomain	GET /snoop/ HTTP/1.1
0-0	4461	0/135/135	Wr	mod_was_ap20_	http.c 0.0	)3	3	0	0.0	2.31	2.31	127.0.0.1	localhost.localdomain	GET /snoop/ HTTP/1.1
0-0	4461	0/135/135	Wr	mod_was_ap20_	http.c 0.1	5	3	0	0.0	2.31	2.31	127.0.0.1	localhost.localdomain	GET /snoop/ HTTP/1.1
0-0	4461	0/136/136	_		0.1	1	0	0	0.0	2.34	2.34	127.0.0.1	localhost.localdomain	GET /snoop/ HTTP/1.1
0-0	4461	0/134/134	_		0.1	5	0	0	0.0	2.31	2.31	127.0.0.1	localhost.localdomain	GET /snoop/ HTTP/1.1
0-0	4461	0/135/135	_		0.1	2	0	0	0.0	2.33	2.33	127.0.0.1	localhost.localdomain	GET /snoop/ HTTP/1.1
0-0	4461	0/133/133	Wr	mod_was_ap20_	http.c 0.1	0	3	0	0.0	2.29	2.29	127.0.0.1	localhost.localdomain	GET /snoop/ HTTP/1.1
0-0	4461	0/135/135	Wr	mod_was_ap20_	http.c 0.0	9	3	0	0.0	2.33	2.33	127.0.0.1	localhost.localdomain	GET /snoop/ HTTP/1.1

 Focus on SS (seconds since start of request) and module columns to find long running or hanging requests.



#### MPM Stats - mod\_mpmstats

- Gives a snapshot status view of I.H.S threads.
- Specify interval time in httpd.conf file to take snapshot.
- Tells how many threads are busy, and what state they are in: ready, read, write, close, keep alive, logging, or dns lookup.
- Can include active modules in output.
- Output written to error log.
- [Thu Aug 19 14:01:00 2004] [notice] mpmstats: rdy 712 bsy 312 rd 121 wr 173 ka 0 log 0 dns 0 cls 18
- [Thu Aug 19 14:02:30 2004] [notice] mpmstats: rdy 809 bsy 215 rd 131 wr 44 ka 0 log 0 dns 0 cls 40



## Measuring Response Time

- LogFormat directive contains format parameter which will include response time for each http request.
  - %T (Time in seconds)
  - %D (Time in milliseconds)
- Technote "IBM HTTP Server performance measurements" https://www-304.ibm.com/support/docview.wss? uid=swg21570830



## Load Balancing

# Plugin is responsible for load balancing.Defined per ServerCluster.

> Weighted round robin versus random.

#### Plugin will mark server down if:

- Cannot connect to server (ConnectTimeout)
- ServerIOTimeout triggers and value is negative
- Plugin log shows message "ws\_server: serverSetFailoverStatus: Marking %s down "
- "Understanding IBM HTTP Server plug-in Load Balancing in a clustered environment" https://www-304.ibm.com/support/docview.wss? uid=swg21219567



#### Load Balancing Stats

- LogLevel="Stats" will provide load balancing statistics for each plugin process.
- Number of plugin processes is tied to httpd.conf directive
  - [Mon Oct 3 10:55:13 2011] 00001656 eafa1b90 STATS: ws\_server: serverSetFailoverStatus: Server Server1 : pendingRequests 0 failedRequests 0 affinityRequests 31 totalRequests 47.



## **IHSDIAG Utility**

- I.H.S data collector used when encountering product hangs, crashes, high CPU problems, and startup failures.
- Provides scripts to invoke system tools.
- Periodically updated to help identify known issues.
  - Keep current to stay on top of known issues.
- Recommended to install and have ready to run before encountering a problem.

java -jar /path/to/ServerDoc.jar CheckPlatform

http://www-01.ibm.com/support/docview.wss? uid=swg24008409



#### Summary

This presentation's goal is to provide I.H.S web administrators information on how to check their system to ensure that it is performing within the set expectations.

Additional resources

I.H.S common questions and answers: http://publib.boulder.ibm.com/httpserv/ihsdiag/q uestions.html

I.H.S IBM DeveloperWorks forum: http://www.ibm.com/developerworks/forums/for um.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

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## **Questions and Answers**