WHAT'S NEW AND DIFFERENT ABOUT COLDFUSION 10 ON TOMCAT
(UPDATED OCT 21, 2013)

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INTRODUCTION

• CF10 now comes bundled atop Apache Tomcat, instead of Adobe JRun
  • Should mostly be transparent to most CF users/admins
    • But there are some differences
  • Alternately, can also deploy CF on native Tomcat, as CF EAR/WAR
    • Most people will not do that. More of an advanced option. Not focus here

• 3 main messages I want to communicate:
  • CF as bundled with Tomcat differs in some ways from CF atop JRun
  • Some things about native Tomcat don’t apply to Tomcat underlying CF10
  • Lots more about Tomcat features than Adobe may ever document
INTRODUCTION (CONT.)

• 3 primary audiences:
  • For those familiar with CF running atop JRun
    • how CF is different running atop Tomcat
  • For those familiar with Tomcat
    • how Tomcat is different as bundled under CF10
  • For those familiar with CF but not Tomcat
    • what features of Tomcat may be useful to CFers

• This is indeed how the talk is organized, as sections for those audiences
ABOUT CHARLIE AREHART

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- Adobe Forum MVP, Doc wiki moderator
- Co-author CFWACK books: 8, 9, 10
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Web home at www.carehart.org
- 100+ presentations, 80+ articles, 400+ blog entries
- UGTV: recordings of 600+ presos by 300+ speakers
- CF411.com: 1800+ tools/resources, 150+ categories
- CF911.com: CF server troubleshooting resources
- Hosting courtesy of EdgeWeb Hosting
- Consulting: available for CF troubleshooting, tuning
  - Remote or on-site; on-demand, single instance is ok
NOTES BEFORE WE BEGIN

• These slides are available on my web site
  • Admittedly, rather text heavy
  • Want you to have details needed when viewing later
• There are recordings of me giving this talk last year
  • I’ve tweaked the session in a few ways since then of course
• I’ll show files/folders as in Windows
  • I trust Mac/Linux/Unix folks can determine the equivalents! :-)
• Finally, even if you’ve used CF10 for months
  • I hope that you’ll find you learn several useful new things!
FOR THOSE FAMILIAR WITH CF ATOP JRUN: HOW CF IS DIFFERENT RUNNING ATOP TOMCAT
INSTALLATION/DEPLOYMENT

- JVM as deployed within CF10:
  - Is 1.6.0_29 by default, as of initial release of CF10
    - Is located at [cf10]/jre
  - Adobe added support for using Java 7 in early 2013, via update feature
    - You would then install Java update, point CF to it in jvm.config
    - See any of many blog entries, including my own, for more on doing that
- Version of Tomcat in initial release of CF10: 7.0.23.0
  - Both shown on CF Admin “System Info” page (“i” in top right corner)
    - (Tomcat version not shown if CF 10 is deployed atop native Tomcat)
  - Update to later Tomcat versions, if/when supported by Adobe, should be possible through new update feature
INSTALATION/DEPLOYMENT (CONT)

• For all editions (Standard/Enterprise/Trial/Dev), initial “cfusion” instance
  • Logs, config files, etc. for the instance are in [cf10]\cfusion
• No longer separate Multiserver install option
  • Instead, use “Server” deployment option (on Ent/Trial/Dev)
    • Offers “Instance Manager” to create/manage instances/clusters
  • New instances no longer buried deep under many dirs
    • C:\JRun4\servers\instance1\cfusion.ear\cfusion.war\WEB-INF\cfusion\logs
    • but instead simply at [cf10][instance], as in
      • [cf10][instance]\logs
  • For remainder of talk, I refer to instance path as [cf10][instance]
• Option still offered during Ent/Trial/Dev installation to create EAR/WAR
  • To deploy on any of many supported JEE servers/servlet engines
OTHER MULTISERVER ENHANCEMENTS

- Each instance has its own JVM.config (yea!)
- Also, “Java & JVM page” now available within instances!
- New AdminAPI method to get instancename (versus old JRun API)
  - getInstanceName in runtime.cfc
  - http://www.carehart.org/blog/client/index.cfm/2012/6/30/getinstancename_in Cf10

- Of course, many other differences/changes in CF10
  - See my talk, “Hidden Gems in CF10” at carehart.org/presentations
OTHER MULTISERVER ENHANCEMENTS (CONT)

• One feature lost, related to instances on CF10/Tomcat:
  • Can no longer create a CF instance, deploying an ear/war into it
  • For more, see “What’s the deal with Tomcat in CF10?”, Rupesh Kumar
• Again, can still deploy CF as EAR/WAR on any JEE server during install
  • Just no longer option in Instance Manager to use EAR/WAR when building a CF10 “instance”
LOGGING CHANGES

• Some other log locations are different
  • “Out” log(s), created when CF run as Windows service
    • previously in [jrun]\logs or [cf]\runtime\logs (but not [cf]\logs)
    • now in [cf10]\[instance]\logs, alongside other traditional CF logs
  • Web server connector logs: at/under [cf10]\config\wsconfig\n
• Also, two new kinds of logs…
NEW “METRICS” LOGGING

- Similar to JRun metrics; enabled in CF Admin
  - “Debugging output settings” page, “Enable metrics logging”
- Writes to [cf10]\[instance]\logs\metrics.log
  - Or console if CF started from cmd line
- Writes a line every minute
  - Sample line:
    - "Information","scheduler-2","08/06/13","16:08:50",,"Max threads: 150
      Current thread count: 4 Current thread busy: 1 Max processing time: 279876 Request count: 748 Error count: 3 Bytes received: 281578 Bytes sent: 7375153 Free memory: 120128728 Total memory: 442957824 Active Sessions: 9"
NEW “ACCESS” LOGS

- Enabled by default (in addition to your web server logs)
  - Stored in [cf10]\[instance]\runtime\logs
  - Name is in form: localhost_access_log.yyyy-mm-dd.txt
  - Format: [ip] - [date/time] "GET [path/file] HTTP/1.1" [statuscode] [bytessent]
- Written regardless of whether requests come from internal or external web server
  - (more on that in a moment)
- Can configure file location, extension, name pattern, request details logged
  - See later discussion of Tomcat Valves
- Solr access logs also enabled by default
  - In [cf10]\[instance]\jetty\logs\, name in form yyy_mm_dd.request.log
  - Configuration controlled similarly in [cf10]\[instance]\jetty\etc\jetty.xml
WEB SERVERS, INTERNAL AND EXTERNAL

- CF10, as before, asks during installation:
  - Whether to use external web server (IIS/Apache) or built-in one
  - In CF10, that internal one is Tomcat’s own web server
    - Unlike JRun’s built-in web server, Tomcat’s is not for dev-only
- Can enable/disable built-in web server even after install, as well as:
  - Change default web root from \cf10\[instance]\wwwroot
  - Add a virtual directory
  - Define custom error pages
  - Disabling directory browsing
- For more, see my blog entry on the topic
WEB SERVERS, INTERNAL AND EXTERNAL (CONT.)

- External web server support: IIS 5-7, Apache 2.2.21, IBM HTTPServer
  - Config tool in [cf10]\[instance]\runtime\bin (wsconfig.exe)
    - And of course via Start menu in Windows, though only for cfusion instance
    - Config tool within instance must be used to connect it to web server
  - Web server connector config files: [cf10]\config\wscconfig
    - Previously [cf9]\runtime\lib\wscconfig or [jrun4]\lib\wscconfig
    - One folder under this, per connection created
  - For more on configuration/use
    - See “Installing CF10” manual, section “Configuring web servers”
  - May also want to consider Bilal Soylu’s “IIS to Tomcat Connector”
    - http://tomcatiis.riaforge.org/
MORE ON TOMCAT-RELATED CF10 CHANGES

• In addition to resources mentioned so far, see also the following

• “Working with Tomcat as the built-in application server”, by Kavya Maiya, Adobe
  • Technically, applies to more than just CF 10 on Tomcat web server
  • http://www.adobe.com/devnet/coldfusion/articles/coldfusion-tomcat.html

• “Getting Started with Tomcat in ColdFusion 10”, by Asha Kasala of Adobe

• Also covered some in part of Chapter 2, *Installing ColdFusion 10*
FOR THOSE FAMILIAR WITH TOMCAT: HOW IT IS DIFFERENT AS BUNDLED UNDER CF10
SOME KEY DIFFERENCES FROM NATIVE TOMCAT

- There are key files that Tomcat users may often want to tweak
  - Where are they within CF (as bundled with Tomcat on CF10)?
  - `[cf10]\[instance]\runtime\conf\`
    - `server.xml`, `context.xml`, `web.xml`
    - `catalina.properties`
    - (More on these later, if you’re new to Tomcat)
- External web server connector properties
  - Again, `[cf10]\config\wsconfig\[n]\`
    - Where `[n]` is a number from 1 to # of sites/hosts configured by CF
    - Holds especially: `workers.properties`, `uriworkermap.properties`, `isapi_redirect.properties`
- Last key difference: “Manager” app cannot be enabled within CF10 atop Tomcat
SOME KEY TOMCAT MODIFICATIONS BY CF TEAM

- CF team tweaked deployment of Tomcat, to be more familiar to CFers
- Many aspects of configuration added in Tomcat as it exists under CF:
  - Support for certain CGI scope variables
  - Multiple webroot support (internal CF webroot supplements external)
  - Session replication supported in cluster
  - Search-Engine Safe/SES URL support, long in CF, now added to Tomcat
- These are all discussed in:
  - “What’s the deal with Tomcat in ColdFusion 10?”
FEATURES LOST IF CF DEPLOYED ON NATIVE TOMCAT

• What if you decide to install CF WAR/EAR on Native Tomcat?
  • As opposed to normal deploy of CF (with Tomcat bundled under it)
• You lose those items mentioned previously:
  • some CGI vars, multiple webroot support, CF session replication, SES URLs
  • Still, can tweak web.xml to at least get SES to work
    • See Rupesh’s article for needed XML changes
• You do get things **not** in CF10’s bundled Tomcat, like the Manager app
• Issues related to which web connector you use (if running CF WAR/EAR on Tomcat)
  • If you use Tomcat web server, that’s supported
  • If you use Adobe’s modified Tomcat web server connectors, that’s supported
  • If you use Tomcat’s IIS/Apache connector, that’s **not** supported
3 STEPS TO INSTALLING CF ON TOMCAT

• Really pretty simple to do, if you’re interested, assuming default config options are acceptable
• 1) Download/install Java (required for Tomcat, whereas it’s provided by CF)
• 2) Download Tomcat (tomcat.apache.org)
  • Available either as installer, or a zip you simply extract
  • If using zip, set java_home env. variable pointing to your above-installed java JRE
    • For example set java_home=C:\Program Files\Java\jre7
  • Start Tomcat: in its \bin directory, run startup script
    • Test it as localhost:8080
• 3) Run CF Installer (CF7 or greater), choose option to create WAR file
  • From resulting directory created, copy cfusion.war file to Tomcat webapps dir
    • for example, C:\tomcat-7.0.27\webapps
  • After a few mins, test it as http://localhost:8080/cfusion/CFIDE/administrator/index.cfm
• See “Installing CF” manual for more details, alternative config options
• Caution: Some have found that an EAR/WAR created from CF Admin’s “Packaging & Deployment” feature does not install as readily
FOR THOSE FAMILIAR WITH CF BUT NOT TOMCAT: WHAT FEATURES OF TOMCAT MAY BE USEFUL TO CFERS
FIRST SOME FUNDAMENTALS

• Some terms you’ll hear
  • “Apache” is an overarching entity encompassing many projects
    • It’s also the name of the Apache web server. Don’t confuse these
  • Tomcat is a servlet container, includes a web server / can connect to others
  • JBoss
    • JEE Application Server which bundles Tomcat
• Main components underlying Tomcat
  • Catalina: servlet container (Tomcat engine)
  • Coyote: http connector (Tomcat’s built-in web server)
  • Jasper: JSP engine
• …
MORE TERMS

- Web server connectors: various choices
  - HTTP 1.1 (Tomcat’s built-in web server: Coyote)
  - AJP (used with external web servers)
- Great resources for learning more on Tomcat at http://tomcat.apache.org/
  - Including history of previous releases
  - Focus on v7: http://tomcat.apache.org/tomcat-7.0-doc/index.html
- Still, be careful in reading Tomcat resources. Many concepts don’t apply…
SOME THINGS TO CONSIDER WHILE READING ABOUT TOMCAT (AS A CF’ER)

1. Some things apply only on a **native** Tomcat deployment, not the version within CF
2. Some things may apply only to a **specific version** of Tomcat, perhaps earlier than 7
3. Some things apply only to using Tomcat’s **built-in web server** (vs IIS/Apache)
4. Some things can be used in Tomcat but maybe better configured in your **web server**
   • Such as SSL, compression, IP blacklists
5. Some things may exist in Tomcat from before JEE spec defined a **new approach**
   • Such as Valves vs Filters (more in a moment)
6. Some things refer to features of Tomcat already provided or handled by **CF**
   • JDBC connectivity, connection pooling, sessions, etc.
7. Some things refer to doing **native JEE development**
   • And don’t generally apply to CFers doing deployment of CF on Java…
JEE CONCEPTS THAT DON’T GENERALLY APPLY TO CF’ERS USING TOMCAT

• All these were also part of JRun
  • We didn’t need to worry about them then; don’t now
• JSPs and servlets: Java way of web application development
  • Our way: CFML
• Use of WAR/EAR packaging, application “deployment”, Tomcat’s “Admin” application (for deployment)
  • Advanced CF Admins may use these things, but pretty rare to hear
• Other general or detailed JEE concepts we can ignore, to start:
  • JNDI, JMS, JTA, JAXP, JAAS (generally don’t need to use)
  • APR, NIO (advanced features we don’t need to worry about initially)
  • Realms (security concept in Tomcat we don’t generally interact with)
SOME TOMCAT FILES YOU MIGHT EXPLORE

• You may want to explore some Tomcat-related configuration options/files
  • Server.xml
    • Found in `[cf10]\[instance]\runtime\conf\server.xml`
  • Note that Tomcat has a hierarchy of components, seen in that file
    • Server > service > engine > host > context
    • Configurable, may be useful to understand for some needs
  • More: http://tomcat.apache.org/tomcat-7.0-doc/config/server.html
    • http://tomcat.apache.org/tomcat-7.0-doc/config/service.html
    • http://tomcat.apache.org/tomcat-7.0-doc/config/engine.html
    • http://tomcat.apache.org/tomcat-7.0-doc/config/host.html
SOME TOMCAT FILES YOU MIGHT EXPLORE (CONT.)

• Context.xml
  • Lowest level of that hierarchy
    • Represents a web application (in our case, our ColdFusion code)
  • Found in [cf10]\[instance]\runtime\conf\context.xml
    • Nothing really interesting in there, though
  • See also other context configuration in:
    • [cf10]\[instance]\wwwroot\WEB-INF\web.xml
    • [cf10]\[instance]\runtime\conf\web.xml
  • More: http://tomcat.apache.org/tomcat-7.0-doc/config/context.html
SOME TOMCAT FILES YOU MIGHT EXPLORE (CONT.)

- Catalina.properties
  - Where various low-level (internals) configuration is done
    - Sessions, logging, security, and other things
  - In `[cf10]\[instance]\runtime\conf\catalina.properties`
SOME TOMCAT FILES YOU MIGHT EXPLORE (CONT.)

- Files related to web server config (created/configured by CF, may want to tweak)
  - *workers.properties*
    - `ln [cf10]\config\wsconfig\[n]\workers.properties`
  - *uriworkermap.properties*
    - Handles reception of requests from web server. Rules-based
    - `ln [cf10]\config\wsconfig\[n]\URIWorkermap.properties`
    - See also [http://tomcat.apache.org/connectors-doc/webserver_howto/iis.html](http://tomcat.apache.org/connectors-doc/webserver_howto/iis.html)
SOME TOMCAT CONCEPTS YOU MIGHT EXPLORE

- Valves and Filters
- Listeners
- Clustering and Load Balancing
- Virtual hosting
- Connectors
- Session Managers
- More on these, to follow. See also docs starting at:
VALVES

- General concept of valves and filters
  - They can inspect/modify incoming request, outgoing response
  - Similar in some ways to CF’s onrequeststart/onrequestend processing
  - Filters are JEE spec approach, but Tomcat long had (still has) valves

- We saw one valve enabled by default for CF10, AccessLogValve
  - Is listed in [cf10]\[instance]\runtime\conf\server.xml
  - Can tweak valve in various ways. See link above for its details
  - Might want to add time-taken (%D), request method (%m)
VALVES (CONT.)

- Consider also:
  - CrawlerSessionManagerValve
    - Sets requests from listed crawler “user agents” to share single session
  - ExtendedAccessLogValve, RemoteAddrValve (block/allow certain IPs), RemoteHostValve, SingleSignOn, RemoteIpValve
  - BasicAuthenticator, DigestAuthenticator, FormAuthenticator, SSLAuthenticator
  - StuckThreadDetectionValve – similar to CF Admin’s “log slow pages”
  - These could be configured in [cf10]\[instance]\runtime\conf\server.xml
  - Again, more at http://tomcat.apache.org/tomcat-7.0-doc/config/valve.html
FILTERS

- Filters are similar in concept to valves. Just the JEE spec equivalent
  - Can often find ones created by various JEE developers
    - and which should work across all JEE servers/servlet containers
  - See my “Fun with Filters”: http://www.carehart.org/articles/#2003_2
- Can consider other built-in Tomcat ones:
- These can be configured in [cf10]\[instance]\runtime\conf\web.xml
LISTENERS

- Components that fire on given events
  - Some already implemented in CF10:
    - AprLifecycleListener, GlobalResourcesLifecycleListener
    - JreMemoryLeakPreventionListener: provides work-arounds for known jvm classloading leaks
  - Others to consider:
    - SecurityListener, ThreadLocalLeakPreventionListener, JmxRemoteLifecycleListener
  - These would be configured in [cf10]\[instance]\runtime\conf\server.xml
  - Details at http://tomcat.apache.org/tomcat-7.0-doc/config/listeners.html
AND ALSO THOSE OTHER CONCEPTS LISTED...

- Clustering
- Load Balancing
- Virtual Hosting
- Connectors (external web server connectors)
FINAL CONCEPT: “SESSION MANAGERS”

- Hidden gem in Tomcat (and CF10)
- Ability to save sessions over restarts. Yes!
  - Some important pros and cons to seriously consider
- Takes some knowledge of configuration within Tomcat (which you now have)
  - Need to modify [cf10]\[instance]\runtime\context.xml
- Adobe doc’s brief discussion in “Installing CF 10” is confused, sadly
  - See p20, “Enabling persistent session” (sic)
    - Says to uncomment an already uncommented line of XML
  - Key is, if uncommented, MANAGER element must not have blank PATH, so:
    - Can either comment it (it’s not commented by default in CF10, but PATH is blank)
    - Or can set a PATH value. PATH=“sessions.ser” would save sessions to sessions.ser file
      - In [cf10]\[instance]\runtime\work\Catalina\localhost\tmp
PERSISTENT SESSIONS (CONT.)

• CF needs to be restarted after change to take effect
  • Test: config/restart/create sessions/restart again/test if saved
• Good news: even complex variables persist (queries, CFCs, structs, etc.)
• Gotcha: only saves sessions at normal CF shutdown
  • If CF crashes/is killed, sessions are NOT saved/restored
  • But then no different than things are now. Just bad if you “expect” save
• Also, can be a lot of I/O at shutdown, then startup, esp. if many sessions
  • You may have more sessions than you think, due to spiders, bots, etc.
• May confuse you: sessions.ser file will not appear while CF is up
  • Is created on shutdown, deleted after startup
PERSISTENT SESSIONS (CONT.)

- Yet another opportunity:
  - Tomcat has several different “managers” (session managers)
    - Default is StandardManager
  - Can instead enable PersistentManager
    - Configuring it causes persistence of sessions during run of CF/Tomcat
      - Saves one file per session instead of all in one file
      - Can also be configured to save to a database. Much better performance
  - Both options still have potential I/O, shutdown/startup considerations
FINALLY, MOBILE APPS FOR MONITORING TOMCAT

- Watchdog for Tomcat (IOS)
- Tomcat Administrator (Android)
- FusionReactor also offers mobile monitoring apps
  - For monitoring both CF, and native Tomcat (any JEE server)
  - For both IOS and Android
  - http://www.fusion-reactor.com/fr/mobile/
WHERE TO LEARN MORE

• Tomcat docs
  • http://tomcat.apache.org/

• Tomcat books
  • Apress has “Apache Tomcat 7” by Vukotic and Goodwill (modern, slim)
  • Wrox had “Pro Apache Tomcat 6”, by Chopra, et al (really useful info)
  • O’Really had “Tomcat: The Definitive Guide”, not updated since 2007
WHERE TO LEARN MORE (CONT.)

- “Getting Started with Tomcat in ColdFusion 10”, by Asha Kasala of Adobe
- “Working with Tomcat as the built-in application server”, by Kavya Maiya, Adobe
- “What’s the deal with Tomcat in ColdFusion 10?”, by Rupesh Kumar, Adobe
- Matt Woodward’s “Definitive Guide to Running CFML on Tomcat”
CONCLUSION

• Hope you feel that there’s a lot more to CF10 on Tomcat than you thought
  • How many features/resources do you think we covered?
  • Over 100!

• How many were valuable to you?
  • Share your opinion by your applause! :-) and please do your evals

• With that, enjoy the rest of the event!
  • Questions, if we have time?
  • And if I can help you with CF Server Troubleshooting, contact me below!