WHAT'S NEW AND DIFFERENT
ABOUT COLDFUSION 10 ON TOMCAT
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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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- 15+ yrs CF experience (30+ Enterprise IT)
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- 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!

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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

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INSTALLATION/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

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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/get_instancename_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

    - http://blogs.coldfusion.com/post.cfm/what-s-the-deal-with-tomcat-in-coldfusion-10

- 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"

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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\

- Also, two new kinds of logs…

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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

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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

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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\wsconfig
    - Previously [cf9]\runtime\lib\wsconfig or [jrun4]\lib\wsconfig
    - 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/

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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

  - http://blogs.coldfusion.com/post.cfm/getting-started-with-tomcat-in-coldfusion-10

- Also covered some in part of Chapter 2, *Installing ColdFusion 10*

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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

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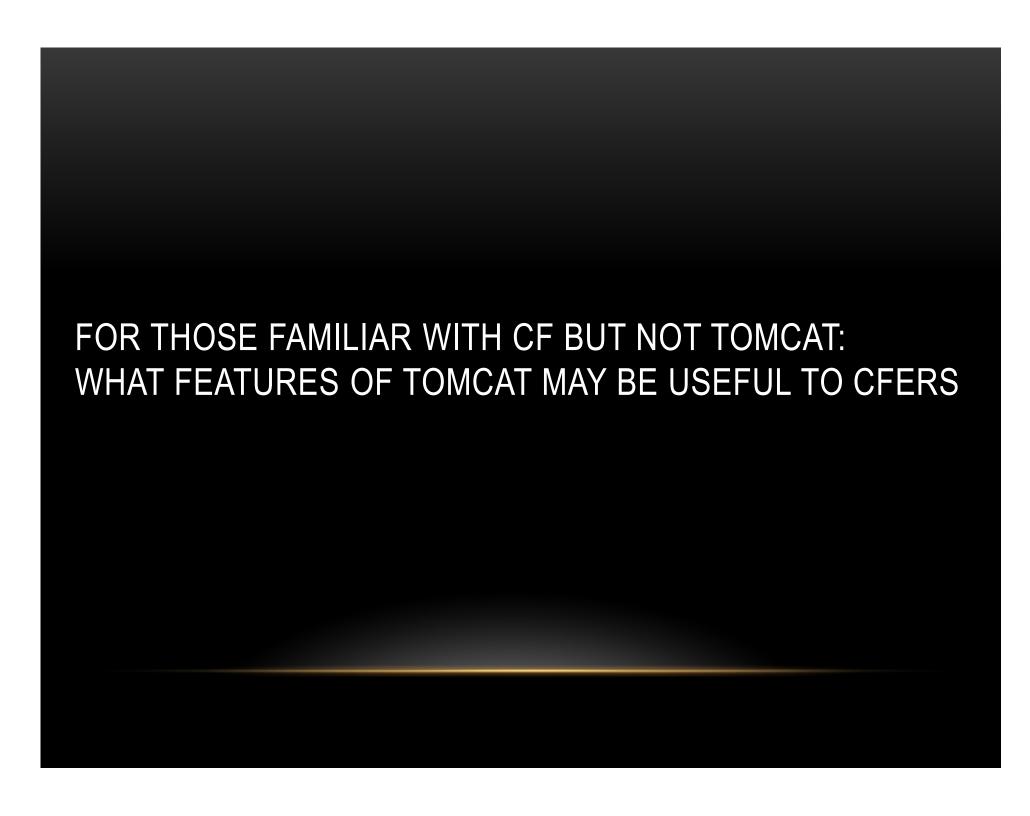
SOME KEY TOMCAT MODIFICATIONS BY CF TEAM

- 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?"

  - http://blogs.coldfusion.com/post.cfm/what-s-the-deal-with-tomcat-in-coldfusion-10

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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 <u>not</u> supported

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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 <u>native</u> Tomcat deployment, not the version within CF

2. Some things may apply only to a <u>specific version</u> of Tomcat, perhaps earlier than 7

3. Some things apply only to using Tomcat's <u>built-in</u> web server (vs IIS/Apache)

4. Some things can be used in Tomcat but maybe better configured in your <u>web server</u>

    - Such as SSL, compression, IP blacklists

5. Some things may exist in Tomcat from before JEE spec defined a <u>new approach</u>

    - Such as Valves vs Filters (more in a moment)

6. Some things refer to features of Tomcat already provided or handled <u>by CF</u>

    - JDBC connectivity, connection pooling, sessions, etc.

7. Some things refer to doing <u>native JEE development</u>

    - And don't generally apply to CFers doing deployment of CF on Java…

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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)

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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

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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\<u>context.xml</u>

        - 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

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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

  - http://tomcat.apache.org/tomcat-7.0-doc/config/systemprops.html

SOME TOMCAT FILES YOU MIGHT EXPLORE (CONT.)

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

  - http://tomcat.apache.org/tomcat-7.0-doc/config/index.html

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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

    - <u>Filters</u> are JEE spec approach, but Tomcat long had (still has) <u>valves</u>

    - More: http://tomcat.apache.org/tomcat-7.0-doc/config/valve.html

- 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)

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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 serversl/servlet containers

  - See my "Fun with Filters": http://www.carehart.org/articles/#2003_2

- Can consider other built-in Tomcat ones:

  - AddDefaultCharsetFilter, CSRFPreventionFilter, ExpiresFilter, RemoteAddrFilter, RemoteHostFilter, RemoteIpFilter, RequestDumperFilter, SetCharacterEncodingFilter, FailedRequestFilter

- These can be configured in [cf10]\[instance]\runtime\conf\web.xml

  - More at http://tomcat.apache.org/tomcat-7.0-doc/config/filter.html

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
  - http://tomcat.apache.org/tomcat-7.0-doc/cluster-howto.html
  - http://tomcat.apache.org/tomcat-7.0-doc/config/cluster.html
- Load Balancing
  - http://tomcat.apache.org/tomcat-7.0-doc/balancer-howto.html
  - http://tomcat.apache.org/connectors-doc/generic_howto/loadbalancers.html
- Virtual Hosting
  - http://tomcat.apache.org/tomcat-7.0-doc/virtual-hosting-howto.html
- Connectors (external web server connectors)
  - http://tomcat.apache.org/tomcat-7.0-doc/connectors.html

FINAL CONCEPT: "SESSION MANAGERS"

- Hidden gem in Tomcat (and CF10)

- Ability to <u>save sessions over restarts</u>. Yes!

    - Some important pros and cons to seriously consider

- Takes some knowledge of configuration within Tomcat (which you now have)

    - More: http://tomcat.apache.org/tomcat-7.0-doc/config/manager.html

    - Need to modify [cf10]\[instance]\runtime\conf\<u>context.xml</u>

- Adobe doc's brief discussion in "Installing CF 10" is confused, sadly

    - See p20, "Enabling persistent session" (sic)

        - Says to uncomment an already <u>uncommented</u> line of XML

    - Key is, if uncommented, MANAGER element must <u>not</u> have blank PATH, so:

        - Can either comment it (it's not commented by default in CF10, but PATH is blank)

        - Or can <u>set</u> 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 <u>lot</u> 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
  - More: http://tomcat.apache.org/tomcat-7.0-doc/config/manager.html

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FINALLY, MOBILE APPS FOR MONITORING TOMCAT

- Watchdog for Tomcat (IOS)

  - https://itunes.apple.com/us/app/watchdog-for-tomcat/id388474856

- Tomcat Administrator (Android)

  - https://play.google.com/store/apps/details?id=com.neven.tomcat

- FusionReactor also offers mobile monitoring apps

  - For monitoring both CF, and native Tomcat (any JEE server)

  - For both IOS and Andriod

  - 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

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WHERE TO LEARN MORE (CONT.)

- "Getting Started with Tomcat in ColdFusion 10", by Asha Kasala of Adobe
    - http://blogs.coldfusion.com/post.cfm/getting-started-with-tomcat-in-coldfusion-10
- "Working with Tomcat as the built-in application server", by Kavya Maiya, Adobe
    - http://www.adobe.com/devnet/coldfusion/articles/coldfusion-tomcat.html
- "What's the deal with Tomcat in ColdFusion 10?", by Rupesh Kumar, Adobe
    - http://blogs.coldfusion.com/post.cfm/what-s-the-deal-with-tomcat-in-coldfusion-10
- Matt Woodward's "Definitive Guide to Running CFML on Tomcat"
    - http://bit.ly/cfmlontomcat

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!

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