

WHAT'S NEW IN CF 10, 11, AND 2016 THAT YOU MAY HAVE MISSED?



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- ▶ Introduction
- ▶ For each release:
 - ▶ Key major features
 - ▶ Key minor features, from coding to admin to security changes and more
 - ▶ Key changes introduced in some updates to that release
 - ▶ Licensing changes
 - ▶ Compat issues / gotchas
 - ▶ Resources, again all for each release

TOPICS

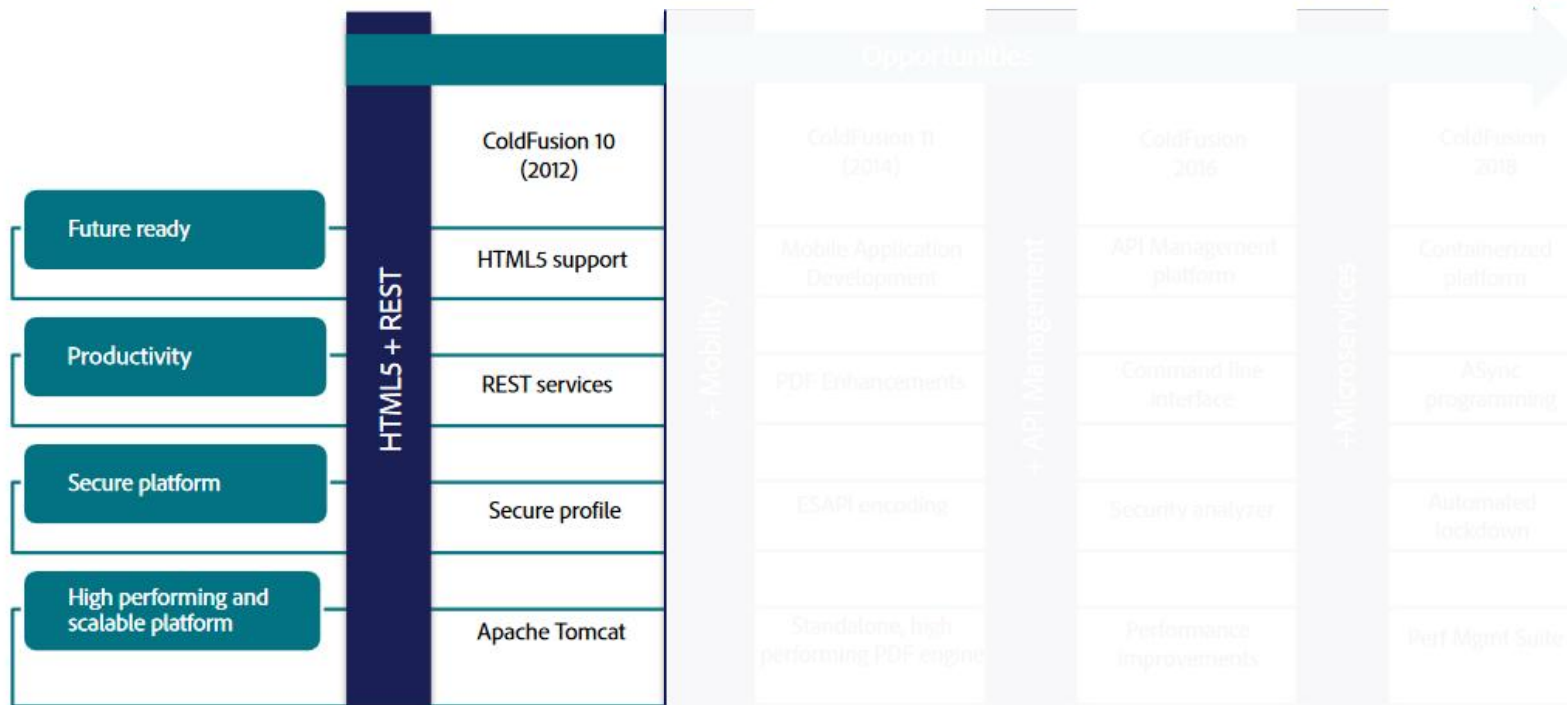
- ▶ Love to share info, with the community and my clients
 - ▶ Active blogger, speaker at nearly every CF conference the past 20 years
 - ▶ Contributor to/creator of many CF community resources
 - ▶ Online CFMeetup, CF411.com, UGTV, CF911.com, CFUpdate.com, and more
- ▶ My own focus is CF server troubleshooting, as an independent consultant
 - ▶ Assist organizations of all sizes, experience levels
 - ▶ Work remotely 99% of the time, safe, secure, easy (via shared desktop)
 - ▶ Focus is not just solving problems but educating you
 - ▶ Satisfaction guaranteed. More on rates, approach, etc at carehart.org/consulting

ABOUT ME

- ▶ Been chronicling CF feature changes since 3.0.1
- ▶ Can't cover here EVERY change in 10/11/2016, let alone demo them
 - ▶ See my hidden gems talk on each version
- ▶ Goal here: broad-brush review of **key** things
 - ▶ Across several common categories
- ▶ Success: **everyone comes away learning several things that they want to try**
- ▶ Slides carehart.org/presentations

INTRODUCTION

ColdFusion - Transformation over the years

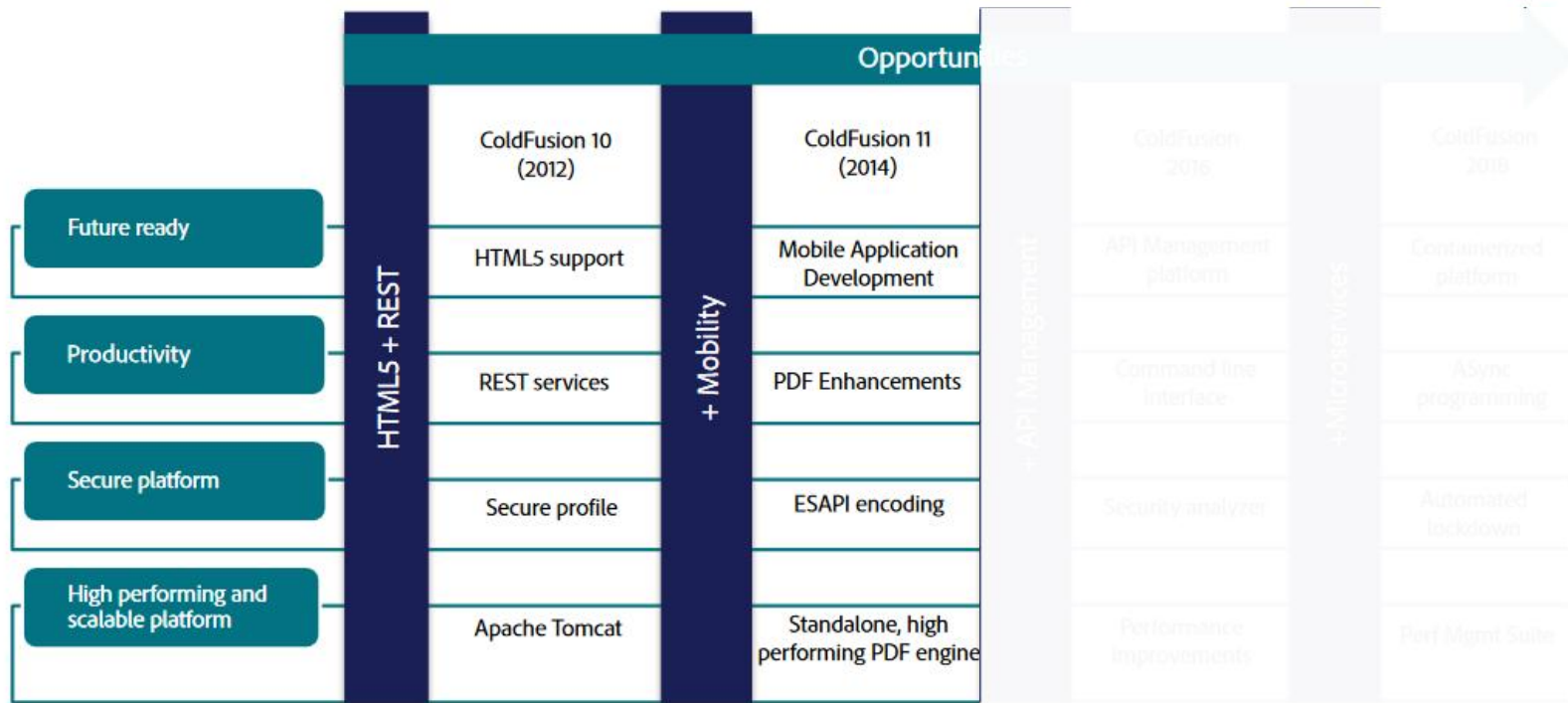


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KEY FEATURES OF THE 3 RELEASES (FROM ADOBE ROADMAP 2017)

ColdFusion - Transformation over the years

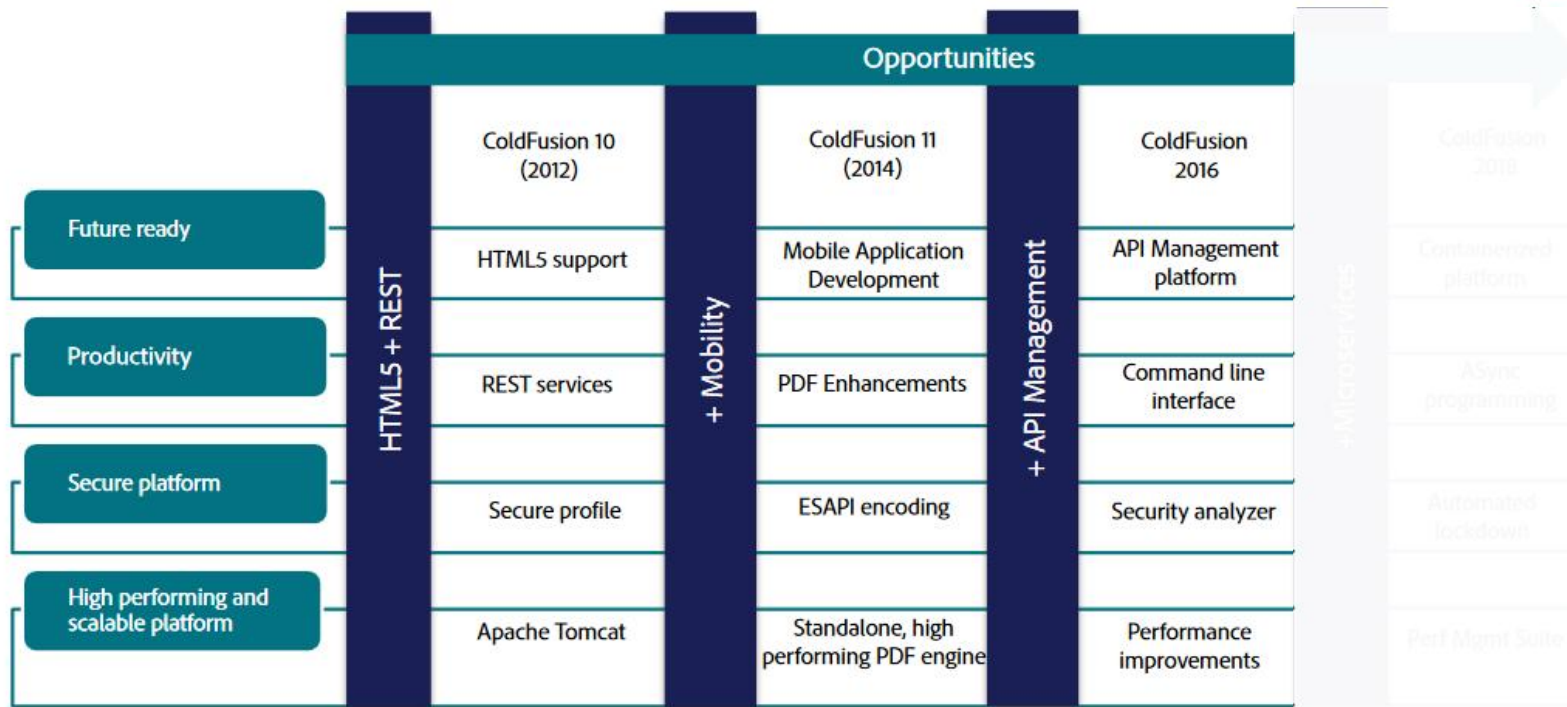


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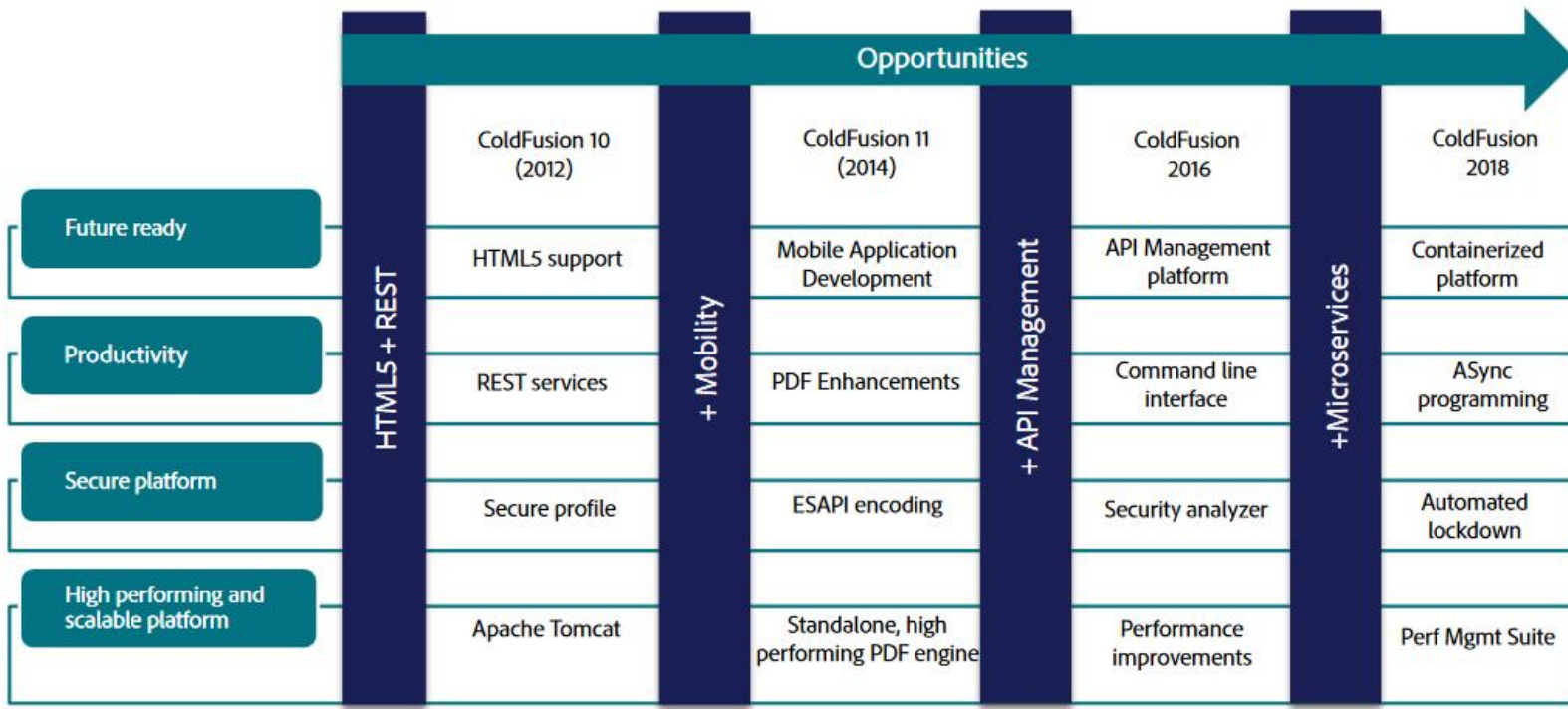
KEY FEATURES OF THE 3 RELEASES (FROM ADOBE ROADMAP 2017)

ColdFusion - Transformation over the years



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ColdFusion - Transformation over the years



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KEY FEATURES OF THE 3 RELEASES (FROM ADOBE ROADMAP 2017)

CF 10



- ▶ Change from running on JRun to Tomcat
- ▶ Substantial increase in “tags as script”
- ▶ Many security and language enhancements (later here)
- ▶ Initial support for REST
- ▶ HTML5 charts and videos, geolocation support
- ▶ WebSockets
- ▶ Web services: AXIS 2, WSDL 2, SOAP 1.2, document literal wrapped support

CF10 KEY MAJOR FEATURES

- ▶ Implicit notation for arrays, structs
 - ▶ Option to use : separator for struct key assignment, as in var:value
- ▶ Implicit constructors for CFCs, implicit gettings/setters; method chaining
- ▶ Closures and inline functions
- ▶ Support for openauth: CFOauth (facebook, google, ms, github auth)
- ▶ Updates to embedded libraries (jvm, ehcache, solr, more)
- ▶ Amazon AMI

CF10 KEY MINOR FEATURES

- ▶ “Secure Profile” feature (choice at installation only, in CF10)
- ▶ Many security enhancements regarding XSS, CSRF, Session Fixation, etc
- ▶ New sessioninvalidate and sessionrotate functions
- ▶ New “Session Cookie Settings” on “Memory Variables” page
- ▶ Verification of mime type
 - ▶ Via optional STRICT attribute on CFFILE uploads, or fileGetMimeType() on any file
- ▶ CFPOP adds SECURE attribute for use of SSL/TLS
- ▶ New canonicalize, encodefor*, decodefor*, csrf*, decodeFromURL, hmac functions
- ▶ In admin:
 - ▶ New “Maximum number of POST request parameters” (Server Settings>Settings)
 - ▶ Can now restrict Admin Access by IP Address (also asked during installer)
 - ▶ Security>Allowed IP Addresses (bottom of page)
 - ▶ Can now disable creation of unnamed application scopes (Server Settings>Settings)

CF10 KEY SECURITY CHANGES

- ▶ Automated hotfix mechanism
- ▶ Scheduled tasks: many improvements
 - ▶ Also, location within Admin from Debugging to Settings
- ▶ New directory structure for CF: base instance is “cfusion”, as in `c:\coldfusion10\cfusion`
 - ▶ For Enterprise, Trial, developer editions, new instances created as sibling to that
 - ▶ And each instance has own `jvm.config` and “Java and JVM” admin page
- ▶ New `audit.log` tracks most changes made in CF Admin

CF10 KEY ADMIN CHANGES

- ▶ Old “out” log (from runtime/logs or jrun/logs) now in main logs folder
- ▶ New password reset scripts (in instance’s bin folder)
- ▶ New metrics logging feature (on “debugging output” page)
- ▶ Scheduled tasks moved to Settings section (from Debugging & Logging)
- ▶ New jQuery UI element for admin “browse” buttons
- ▶ Can now enable/disable RDS in Admin (versus knowing config file tweak)
- ▶ Several AdminAPI enhancements
- ▶ New Access log (tracking every request) [disabled by default in CF11+]

CF10 KEY HIDDEN GEMS: INSTALL/ADMIN

- ▶ CFImage INTERPOLATION attribute to help performance of “resize” action
- ▶ CFLoop GROUP attribute
- ▶ CFStoredproc TIMEOUT attribute: time for each action within SP, not all
- ▶ CFInclude RUNONCE attribute
- ▶ New onAbort method for application.cfc (to handle CFAbort/abort)
- ▶ Support in querynew/queryaddrow to add data directly, simply
- ▶ New datetimeformat (and lsdatetimeformat) function
- ▶ New getApplicationMetaData and sessionGetMetaData functions
- ▶ Several get... functions for obtaining system information
- ▶ Enhancements to java loading, S3, Exchange, ORM, SOLR, image processing

CF10 KEY HIDDEN GEMS: LANGUAGE

- ▶ Query caching now stored in ehcache by default
 - ▶ Can be changed in CF Admin or application.cfc
 - ▶ `this.cache.useinternalquerycache`, `this.cache.querysize`
- ▶ New CFQuery `cacheregion` and `cacheid` attributes for cache control mgt
 - ▶ Can remove via new `removeCachedQuery` function
- ▶ New caching functions: `cacheIdExists`, `cacheRegionNew`, `cacheRegionRemove`, `cacheRegionExists`, `cacheRemoveAll`
- ▶ Can now clear CF's template cache on per-folder basis, in Admin or Admin API
- ▶ Several VFS enhancements

CF10 KEY HIDDEN GEMS: CACHING

- ▶ Of course, each update contains either bug fixes or security updates, or both
 - ▶ And some contain several dozen bug fixes, which has been encouraging
 - ▶ As well as various updates to Tomcat, some of which are important
 - ▶ But some updates introduce fairly significant changes
- ▶ Update 11 added support for SQL Server 2012, MySQL 5.6, 64-bit COM
- ▶ Update 13 added support for OS X 10.9/Mavericks
- ▶ Update 14 added support for Java 8, Apache 2.4
- ▶ Update 18 added support for Windows 10, OS X 10.11/El Capitan
- ▶ ...

CF10 KEY CHANGES PER UPDATES

- ▶ Lists of updates, links to technotes, and offers jar download links!
 - ▶ helpx.adobe.com/coldfusion/kb/coldfusion-10-updates.html
- ▶ Also available for CF 11 and 2016:
 - ▶ helpx.adobe.com/coldfusion/kb/coldfusion-11-updates.html
 - ▶ helpx.adobe.com/coldfusion/kb/coldfusion-2016-updates.html
- ▶ Updates are cumulative, need only apply latest!
- ▶ If you have troubles applying CF updates in 10/11/2016, see my blog post:
 - ▶ carehart.org/blog/client/index.cfm/2016/9/6/solve_common_problems_with_CF_updates_in_10_and_above

ABOUT CF UPDATES

- ▶ New CF10 features that are Enterprise-only:
 - ▶ HTML 5 Charts (limitation lifted in CF11), ORM Search, Data import handler for Solr
 - ▶ Some aspects of new scheduler (chaining, listeners, exception handling, clustering, more)
 - ▶ Standard limits websockets to 100 simultaneous requests (limit lifted in CF11)
- ▶ ...

CF10 LICENSING CHANGES

▶ EULA changes

- ▶ CPU-based, CPU defined as 4 cores, CF licensed for 2 CPUs (so up to 8 cores)
- ▶ Testing, staging, development remain free (as introduced in 9), as are backup and DR
- ▶ VM licensing unchanged since 9, new Cloud licensing. Differences for Std vs Enterprise
- ▶ Observe distinctions about CF Standard vs Enterprise vs Developer edition
- ▶ For questions, email cfinstal@adobe.com
 - ▶ CF Product Mgr, Rakshith Naresh, rakshith@adobe.com
- ▶ More:
 - ▶ www.images.adobe.com/content/dam/acom/en/legal/licenses-terms/pdf/Adobe%20ColdFusion%C2%AE%2010.pdf
 - ▶ web.archive.org/web/20121223084925/http://blogs.coldfusion.com:80/post.cfm/coldfusion-10-eula
- ▶ cfmumbojumbo.com/index.cfm/coding/coldfusion-10-eula-changes/

CF10 LICENSING CHANGES (CONT.)

- ▶ Web server connector conflicts with CF9, 10 connector in same web server
- ▶ Possible need of web server connector tuning
- ▶ Verity text search engine removed, Solr carried forward from CF9
- ▶ Web services changes may break compat
 - ▶ See Admin-, application-, and code-level options to change wsversion, etc
- ▶ Single login at a time to CF Admin, for a given username (resolved in CF11)
- ▶ Need to “reconfigure” web server connectors after most CF10 updates (and 11)
- ▶ Challenges with 64-bit and MS Access, due to MS Jet Driver issues
- ▶ CF10 no longer updated, since May 2016

CF10 COMPAT ISSUES / GOTCHAS

▶ What's new in ColdFusion 10

▶ help.adobe.com/en_US/ColdFusion/10.0/Developing/WSd160b5fdf5100e8f639b4550129d6ce3d4f-8000.html

▶ With links to more substantial discussions for each set of new changes

▶ www.adobe.com/devnet/coldfusion/articles/coldfusion10-whatsnew.html

▶ tv.adobe.com/watch/coldfusion-10-deep-dives-for-developers/whats-new-in-coldfusion-10/

▶ Security

▶ helpx.adobe.com/coldfusion/developing-applications/developing-cfml-applications/securing-applications/security-enhancements-in-coldfusion-10.html

▶ www.adobe.com/devnet/coldfusion/articles/security-improvements.html

▶ www.images.adobe.com/content/dam/Adobe/en/products/coldfusion/pdfs/cf10/cf10-lockdown-guide.pdf

▶ ...

CF10 RESOURCES

- ▶ Book: Adobe ColdFusion Web Application Construction Kit: ColdFusion 10 Enhancements and Improvements by Ben Forta, et al.
- ▶ www.akbarsait.com/cf10tutorials.cfm
- ▶ www.seguetech.com/upgrading-to-coldfusion-10-feature-review-part-1/
- ▶ My talk, "What's New and Different about CF 10 on Tomcat"
- ▶ www.carehart.org/blog/client/index.cfm/2012/3/7/charlie_aharts_ultimate_cf10_new_features_list
- ▶ And still more

CF10 RESOURCES (CONT.)

CF 11



- ▶ Mobile app development/CFCClient
- ▶ Full CFScript support
- ▶ Pixel-perfect PDF generation: CFHTMLtoPDF
- ▶ Many security and language enhancements (later here)

CF11 KEY MAJOR FEATURES

- ▶ App-specific datasources
- ▶ Charting enhancements (some compat issues, discussed later)
 - ▶ helpx.adobe.com/coldfusion/developing-applications/working-with-documents-charts-and-reports/creating-charts-and-graphs/charting-enhancements.html
- ▶ Functions as first-class citizens
- ▶ Member functions
- ▶ Elvis operator (?:)
 - ▶ `Name = userName ? "Anonymous";`

CF11 KEY MINOR FEATURES

- ▶ New dev/production/prod+secure profile install option
 - ▶ Can enable/disable secure profile via admin
 - ▶ If secure profile enabled, cflocation defaults to addtoken="no"
- ▶ Can lock down Admin by IP address (including Admin API, RDS)
- ▶ New Anti-Samy/ESAPI functions, issafehtml, getsafehtml
- ▶ New Generatepbkdf2key function
- ▶ XSS functions (encodefor...)
- ▶ CFMail encryption
- ▶ CFHttp AUTHTYPE for NTLM login
- ▶ CFZip PASSWORD and ENCRYPTIONALGORITHM attributes
- ▶ Change limiting what file extensions can be CFInclude'd
- ▶ www.adobe.com/devnet/coldfusion/articles/security-improvements-cf11.html

CF11 KEY SECURITY CHANGES

- ▶ New Express edition (not for production use)
- ▶ Can allow multiple concurrent logins to Admin by same user
- ▶ New secure profile page
- ▶ Support for session replication AND sticky sessions (separate options again)
- ▶ Auto-hotfix mechanism has new prompt to watch for success
- ▶ Web server connector offers new backup option
- ▶ Access log which was enabled in CF10 is disabled by default in CF11
- ▶ And more

CF11 KEY ADMIN/INSTALL CHANGES

- ▶ Support for signatures in PDF creation
- ▶ cf_socialplugin
- ▶ Spreadsheet, JSON, charting, websocket enhancements
- ▶ Over two dozen new functions
- ▶ New application.cfc variables: datasources[], strictNumberValidation, compileextforinclude
- ▶ ...

CF11 KEY HIDDEN GEMS

- ▶ Things formerly enterprise-only now in Standard
 - ▶ CF archive (car) mechanism (to move CF admin settings from server to server)
 - ▶ Security Sandbox (to lockdown what code in different directories can do)
 - ▶ Web socket limit lifted
 - ▶ HTML5 charts
- ▶ New CF11 features that are Enterprise-only
 - ▶ PDF signature support
 - ▶ Full DDX support
 - ▶ WebSocket cluster support
 - ▶ CFHTMLTOPDF cluster support
 - ▶ REST multisite support

CF11 KEY HIDDEN GEMS (CONT)

- ▶ Hundreds of bug fixes over all updates, of course
- ▶ Update 3 added support for Java 8, OS X 10.10/Yosemite, SQL Server 2014, more
- ▶ Update 3 also re-enabled long-dormant DBVARNAME on CFProcparam
 - ▶ Had been ignored since CF6, except briefly in 7.0.1
 - ▶ Problem: some DBs now require prefix to dbvarname value (“:” for Oracle and “@” for SQLServer)
 - ▶ You may have old code that just says dbvarname = “param1”; would now fail
 - ▶ For SQL Server, should be dbvarname = “@param1”
 - ▶ Update 4: new jvm arg to revert (jvm arg workaround NOT supported in CF2016)
 - ▶ -Dcoldfusion.ignoredbvarname=true
 - ▶ blogs.coldfusion.com/coldfusion-11-and-dbvarname-attribute/
- ▶ Update 7 added support for Windows 10 and OS X 10.11/El Capitan
- ▶ More: helpx.adobe.com/coldfusion/kb/coldfusion-11-updates.html

CF11 KEY CHANGES PER UPDATES

▶ EULA changes

- ▶ More changes regarding cores, VMs
- ▶ Observe distinctions about CF Standard vs Enterprise vs Developer edition
- ▶ www.images.adobe.com/content/dam/Adobe/en/legal/licenses-terms/pdf/Adobe_ColdFusion-Multi-20140214_1311.pdf
- ▶ See comments, blogs.coldfusion.com/announcing-the-launch-for-coldfusion-11-and-coldfusion-builder-3/

CF11 LICENSING CHANGES

- ▶ CF10 installer was removed when CF11 was released. See cfmlrepo.com
- ▶ Again, as of update 3, `dbvarname` (in `cfprocparam`) is suddenly **honored**
 - ▶ See previous discussion
- ▶ CFChart issues
 - ▶ Some original charting issues solved by updates (3, 4, 5, 11, 12)
 - ▶ Removed: using XML to configure charts--now must pass json
 - ▶ Tool to help: `cfchart_xmltojson` (bat/sh)
 - ▶ helpx.adobe.com/coldfusion/cfml-reference/coldfusion-tags/tags-c/cfchart.html
- ▶ ...

CF11 COMPAT ISSUES / GOTCHAS

- ▶ CF11 update 11 broke CFTextArea richtext editor
 - ▶ Fix available: tracker.adobe.com/#/view/CF-4198259
- ▶ CF11 update 12 broke CFinput type="datefield"
 - ▶ Fix available: carehart.org/blog/client/index.cfm/2017/7/17/
- ▶ New, more aggressive deprecation/obsolescence
 - ▶ mostly really old tags, like cfgraph, cfservlet, etc.
 - ▶ wikidocs.adobe.com/wiki/display/coldfusionen/Deprecated+Features
 - ▶ webdevsourcerer.com/index.cfm/blog/post/slug/coldfusion-11-finally-deprecating-removing-things

CF11 COMPAT ISSUES / GOTCHAS (CONT.)

- ▶ wikidocs.adobe.com/wiki/display/coldfusionen/New+in+ColdFusion
- ▶ helpx.adobe.com/coldfusion/release-note/coldfusion-11-release-notes.html
- ▶ wikidocs.adobe.com/wiki/pages/viewpage.action?pageId=140968014
- ▶ wikidocs.adobe.com/wiki/display/coldfusionen/ColdFusion+Language+Enhancements
- ▶ www.adobe.com/devnet/coldfusion/articles/security-improvements-cf11.html
- ▶ www.adobe.com/content/dam/Adobe/en/products/coldfusion/pdfs/cf11/cf11-lockdown-guide.pdf
- ▶ www.akbarsait.com/cf11tutorials.cfm
- ▶ www.seguetech.com/coldfusion-11-review

CF11 RESOURCES

CF 2016



- ▶ Security code analyzer
- ▶ Performance improvements:
 - ▶ Option to change implicit scope search order
 - ▶ Option to change array passing to by reference vs default of by value
- ▶ External session storage (store CF sessions in REDIS)
 - ▶ Not J2EE sessions, but see blog.svajlenka.com/post/125784752315/redis-and-coldfusion-because-why-not
- ▶ API manager (really a separate application entirely)

CF2016 KEY MAJOR FEATURES

- ▶ Command line interface (cf.bat)
(helpx.adobe.com/coldfusion/2016/command-line-interface.html)
- ▶ PDF enhancements:
 - ▶ Redaction, sanitization, export/import comments/metadata
 - ▶ Archiving, attaching files, adding stamps
 - ▶ adobe.com/devnet/coldfusion/articles/pdf-enhancements.html
- ▶ NTLM support for cfoject/createobject, cfinvoke, cfsharepoint
- ▶ Generation of swagger docs from RESTful APIs
- ▶ More

CF2016 KEY MINOR FEATURES

- ▶ Safe navigation operator (?.) for handling non-existent variables/values
 - ▶ `<cfoutput>#employee?.firstname#</cfoutput>`
 - ▶ Not to be confused with elvis operator from CF11 (?:)
- ▶ Ordered/sorted collections
- ▶ Dozens of new, changed tags and functions, new member functions
- ▶ New CFLOOP item attribute, for looping over lists, arrays, or file contents
 - ▶ *Item* holds item being looped over, *index* (if any) holds index value
- ▶ CFMAILPARAM
 - ▶ New, optional **filename** attribute, to give different name for file attached to email when using **cfmailparam** file attribute
 - ▶ **File** points to name *as on server*, **filename** points to name *as shown in email*

CF2016 KEY LANGUAGE FEATURES

- ▶ Security Code Analyzer
 - ▶ Enterprise-only
- ▶ CF Admin (CFIDE folder) no longer accessible via external web server
 - ▶ cfscripts moved to separate folder which IS accessible
- ▶ CFOUTPUT
 - ▶ New **encodefor** attribute: names encoding type to be used for strings within its tags (for html, htmlattribute, url, javascript, css, xml, and so on)
 - ▶ Also offered as 2nd arg in writeoutput function
 - ▶ For other tags, script, use **encodefor** function added in CF10
- ▶ *[Helpx.adobe.com/coldfusion/2016/security-enhancements.html](http://helpx.adobe.com/coldfusion/2016/security-enhancements.html)*

CF2016 KEY SECURITY CHANGES

- ▶ Requirement to use Akamai downloader removed
- ▶ Connector changes
 - ▶ No need to remove/add connector after updates (needed only once update 4)
 - ▶ New "update" option within WSCONFIG UI
 - ▶ UI now offers all 3 tunable args (adds pool size, timeout)
 - ▶ Better defaults, on Windows at least, for a 2-site setup (500/250)
 - ▶ Now offers option to configure "all" sites (to use one connector) or "all - individually" (each with own connector)
 - ▶ Fixed to properly support multiple instances
 - ▶ New "Advanced Settings" option to "skip iis custom errors"
- ▶ New applicationintent field, in DSN settings for SQL Server
- ▶ New admin setting to disable "REST discovery" by API Manager

CF2016 KEY ADMIN CHANGES

▶ Update 2

- ▶ Added some new minor language elements, and ckeditor in favor of fckeditor for cftextarea, etc (does not yet seem to be happening in CF11)

▶ Update 3

- ▶ Added more minor language enhancements
- ▶ Added support for IIS 10 (in Windows 10), Websphere 9
- ▶ Many tag/function enhancements

▶ Update 4

- ▶ Broke CFinput type="datefield"
 - ▶ Fix available: carehart.org/blog/client/index.cfm/2017/7/17

CF2016 KEY CHANGES PER UPDATES

- ▶ New installer in Dec 2016
 - ▶ Split off of API manager from CF installer. No longer GB+ in size
 - ▶ Removed portlets, spry, YUI toolkit
 - ▶ YUI used by cfcalendar, cfinput "autosuggest"/"datefield", cfmenu, cftooltip, cfsprydataset
 - ▶ These will now break. Libraries can be added back, link offered here:
 - ▶ helpx.adobe.com/coldfusion/deprecated-features.html
 - ▶ Includes update 3 by default, and updated JVM
 - ▶ blogs.coldfusion.com/coldfusion-2016-installer-refreshed/
- ▶ New installer in May 2017 (64-bit Win only) adds Windows Server 2016 support
 - ▶ blogs.coldfusion.com/coldfusion-2016-support-for-windows-server-2016/

NEW INSTALLERS ADDING FEATURES

▶ EULA

- ▶ Observe distinctions about facets related to whether CF Standard vs Enterprise vs Developer edition
- ▶ www.images.adobe.com/content/dam/acom/en/legal/licenses-terms/pdf/ColdFusion-2016.pdf

CF2016 LICENSING CHANGES

- ▶ CF11 installer was removed when CF2016 was released
 - ▶ To “buy” CF11: blogs.coldfusion.com/post.cfm/adobe-coldfusion-backward-licensing
- ▶ Deprecated features (nothing obsolete)
 - ▶ CFMEDIAPLAYER, CFTABLE, CFCHART format=“flash”, CFFILEUPLOAD Flash component
 - ▶ Report Builder
 - ▶ helpx.adobe.com/coldfusion/deprecated-features.html
 - ▶ carehart.org/blog/client/index.cfm/2016/2/22/cf2016_deprecated_features
- ▶ Update 3 DID remove support for portlets, spry, and YUI-based features
 - ▶ Can be added back manually
 - ▶ See bottom of helpx.adobe.com/coldfusion/deprecated-features.html
- ▶ CF2016 docs:
 - ▶ Web docs lack any navigational features (left nav, breadcrumb, next/prev page, etc.)
 - ▶ PDF no longer available (poor at first, being revamped)

CF2016 COMPAT ISSUES / GOTCHAS

- ▶ adobe.com/devnet/coldfusion/articles/whats-new-cf-2016.html
- ▶ helpx.adobe.com/coldfusion/whats-new.html
- ▶ helpx.adobe.com/coldfusion/2016/topics/features.html
- ▶ helpx.adobe.com/coldfusion/2016/language-enhancements.html
- ▶ helpx.adobe.com/coldfusion/2016/other-enhancements.html
- ▶ helpx.adobe.com/coldfusion/release-note/coldfusion-2016-release-notes.html
- ▶ helpx.adobe.com/coldfusion/home.htm (CF2016 docs)
- ▶ Video on CF2016 (8-minute overview): youtube.com/watch?v=Bm6dJjNSPNg
- ▶ adobe.com/devnet/coldfusion/articles/language-enhancements-cf-2016.html
- ▶ www.images.adobe.com/content/dam/acom/en/products/coldfusion/pdfs/coldfusion-2016-lockdown-guide.pdf

CF2016 RESOURCES

- ▶ Phew, that's a lot new in 10, 11, 2016! **So did I meet my goal?**
 - ▶ Did you learn at least a few new things you want to try?
- ▶ Again, my contact info for follow-up:
 - ▶ Charlie Arehart
 - ▶ charlie@carehart.org
 - ▶ @carehart (Tw, Fb, Li, Sk, Slack, Git)

SUMMARY