HIDDEN GEMS IN COLDFUSION 2021, A YEAR LATER

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We’ll note the major new features
Then focus on less-heralded changes in many areas:
  - Installation, administration, configuration, and monitoring
  - Developer-oriented features and language changes
Identify what’s changed since this talk as offered at CFSummit 2020
Touch on other topics you should consider:
  - Deprecated/removed features
  - Compatibility/migration issues
  - Changes per CF updates since original release
  - JVM changes since then
  - And still more
So much new in 2021

- Could speak literally for a week on ALL the new features
- See several sessions from CF Summit 2020
  - coldfusion.adobe.com/videos/

We'll review briefly key (and less key) new features

- Just want you to be aware of the opps and issues, to look into on your own

Slides available online for you now or later:

- carehart.org/presentations
See the few HUNDRED pages of docs for CF2021
- Nearly all have demo code!
- During prerelease, was a single PDF, then folded into online docs
See posts from me and Adobe listing links to docs
- carehart.org/blog/2020/11/10/the_many_new_and_improved_features_in_CF2021
- community.adobe.com/t5/coldfusion-discussions/introducing-adobe-coldfusion-2021-release/td-p/11585468
- helpx.adobe.com/coldfusion/using/whats-new.html
Also other available resources, listed later in this talk
I focus on 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)
- Solve most problems in less than an hour, teaching you also as we go
- Satisfaction guaranteed
- More on rates, approach, etc at carehart.org/consulting

But to be clear, I’m not selling anything in this session! 😊
MAJOR FEATURES OF CF2021

And note: all new features in 2021 are supported in Standard as well as Enterprise.
- Cloud storage services (AWS S3, Azure Blob)
- Cloud message queuing (AWS SQS, Azure Service Bus)
- AWS SNS (notifications) and SES (email)
- Multi-cloud RDS support
- Cloud noSQL support (Amazon DynamoDB, Azure Cosmos DB)
» Optional smaller zip/Express installer
» Available package manager (cfpm)
» Available JSON-based admin configuration (cfsetup)
» Serverless deployment, via AWS Lambda (more later)
» Improvements to PMT (monitor)
» Improved Docker deployment
OTHER MAJOR FEATURES

- SAML (single sign-on) support (configuring CF as an IDP or SP)
- MongoDB (noSQL) support
- Many new language features, and enhanced functions/script/tags
- And more

- Again, see CF Summit 2020 sessions and docs for more
- Let’s move on to what may be more “hidden gems”
INSTALLATION, ADMINISTRATION, CONFIGURATION, MONITORING
Some may be wondering why I start with/elaborate on these topics

- Sure, some folks are ONLY developers
- But even most developers end up installing/configuring CF
  - and may want to monitor it
- And some admin aspects relate to architecture, capabilities of CF
New Express/zip installer option

- Note: full/GUI installer still available, **may be best choice for most**
- With Express/zip approach, need to unzip that, then unzip what’s in that
- Then run ColdFusion/bin/cfinstall (prompts to configure, optionally enable svc for CF)
- Similarly, if this express installer is run on machine that had not yet run CF, need to install visual c++ 2012 redistributable run time
  - As indicated at top of the page above, though no link to it is offered
- With Express, migration wizard does NOT run on first Admin launch
  - See helpx.adobe.com/coldfusion/user-guide.html/coldfusion/using/install-coldfusion-2021.ug.html#main-pars_header_607718620

**New info**: see my talk, “Installing CF2021: choices, challenges, and solutions”

- carehart.org/presentations/#installingcf2021
Now modular design reduces size (of Express zip, Docker image) to mere 147mb

- Implements “core” package/engine by default, with option to add other packages
- Full/gui installer instead implements ALL packages by default

- Size on disk (for core engine/packages) reduced by \(~300\%\)
  - Runtime memory (for core packages) reduced by \(~350\%\)
  - Startup time has decreased by \(~400\%\)

- Optional packages can be added or removed …
Can be done either from command line, via Admin, or as Docker env var

1) Via cmd line, new cfpm script (cfpm.bat or sh, in cfusion/bin folder)
   - Can run interactively or not, with several commands (see prev docs page or cli help)
   - Available feature to scan your code to identify (and even install) needed packages
   - Available downloadrepo command, for those in offline environments

2) In CF Admin, new “package manager” section on lower left
   - See its two pages, “Packages” and “Settings”

3) In 2021 Docker image, new installModules env var (comma-sep list of pkgs)
   - And related importModules (to leverage file created by cfpm export feature)
- New cfsetup script (in CF “config/cfsetup” folder, cfsetup.bat or .sh)
  - Can show, set, export, import admin settings from command-line/via automation
  - Can be used across multiple CF versions
- Yes, similar to Commandbox CFConfig module
  - Can’t be used with Lucee, obviously
- Note that CF2021 Docker image has new importCFSettings to pull in json config
  - As alternative to its existing feature to use a CAR file to configure container

- **New info:** see my talk: “Migrating or Comparing CF Admin Settings, between instances, versions, and engines”
  - carehart.org/presentations/#migrating_admin
- Was originally about writing AWS Lambda functions in CFML
  - See great CF Summit 2020 talk by Brian Klass
- Feature pulled days after CF2021 release
- **New info:** Returned to us in CF2021 update 2 (Sept 2021)
  - Now only allows CALLING AWS Lambda functions (in AWS supported languages)
  - See my blog post:
    - carehart.org/blog/2021/10/22/aws_lambda_support_in_coldfusion_2021_update_2
    - helpx.adobe.com/coldfusion/using/get-started-aws-lambda.html
PMT was added in CF2018, in Std and Ent, works with 2018 and 2021 only

New “cloud services” and “nosql datasources” sections on left
  ▶ Each with many pages and details that can be monitored, if enabled

New options to enable/disable cloud svc, noSQL and SQL db monitoring
  ▶ Off by default (db monitoring off by default in new behavior)
  ▶ “External services” monitoring also newly off by default
  ▶ Disable detailed tracking, still high-level db, svc monitoring on PMT “Overview” pages

New “active monitoring” options: current sessions, running async threads
  ▶ And tracking of active async/cfthread thread counts over time in “CF Metrics”
  ▶ And tracking of cfthread threads within a given request’s details

New “system memory” graph (max, used), on “system” tab of “CF Server” page

And several PMT configuration enhancements…

PERFORMANCE MONITORING TOOLSET (PMT) IMPROVEMENTS
- New page in PMT to **manage PMT updates** (Settings>Server>Updates)
  - Like CF Admin updates, see option to enable auto-check on login
    - Also option to set email address to be notified of updates
- Improvements for datastore connection: https and authentication options
- Improvements for deleting data from datastore, manually or on schedule
- New ability to clear PMT alerts (those raised if alert conditions reached)
- New ability to capture only requests exceeding a given duration (default is 0)
  - Settings>Node>Monitoring>Advanced
Adobe has released Docker images since CF2016
  - They’ve been updated for CF2021 (and with each CF update)
In 2021, they are **half the size and start twice as fast** as previous versions
New environment variables for features mentioned previously
  - installModules and ImportModules
  - importCFSettings
    - And importCFSettingsPassphrase (if the json file is encrypted by CF)
**New info**: still more new env vars, as of update 2 image
  - profile, deploymentType, allowedAdminIPList
**New info**: CF images now available on Dockerhub, Amazon ECR
  - See my post:
    - coldfusion.adobe.com/2021/09/adobe-coldfusion-2021-docker-image-now-available-dockerhub/
- New pages in “Data & Services”
- For Mongo, new “NoSQL Datasources” page
  - On giving DSN name and clicking “Add”, shown several config settings
- For cloud services
  - “Cloud Configuration”
    - Note how the “Add” button opens page of config settings, varying per svc
    - “Config Alias” can then be used to refer to that configuration
  - “Cloud Credentials”
    - Is more simply just the list of settings shown before clicking “Add”
    - “Profile” name can be used in code to refer to those credentials
These cloud DBs can now be configured in CF admin DSN page

<table>
<thead>
<tr>
<th>AWS</th>
<th>Azure</th>
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<tbody>
<tr>
<td>Aurora MySQL</td>
<td>MySQL</td>
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<td>Aurora PostgreSQL</td>
<td>PostgreSQL</td>
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<td>Oracle</td>
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<td>PostgreSQL</td>
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<td>SQL Server</td>
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</tbody>
</table>
OTHER ADMIN CHANGES: MISC

- Maxmetaspace jvm arg removed from CF2021 by default (as I lobbied for)
  - carehart.org/blog/2020/2/24/solving_metaspace_errors
- URL for connector “heartbeat” has changed, for those aware of it:
  - Was /connector, now /__cf_connector_heartbeat__
  - Set in both workers.properties for connector and in wwwroot/WEB.INF/web.xml
- Addition of SAML configuration in new pages under “Security” section
  - IDP Configuration, SP Configuration (SAML can be specified in application.cfc, instead)
- Addition of AWS Elasticache, Azure Redis, as CF distributed caching options
  - CF Enterprise only (only “new” changed in CF2021 that is Ent-only, it seems)
- Addition of Azure Redis cache as CF session storage option
  - Ability to store CF sessions in Redis was added in CF2016
- New admin API features related to most of the new features mentioned
NEW ACTIVATION FEATURE

- Time for “the shoe to drop”
- When you put in a CF2021 license, that will need to be “activated”
  - Over the internet
  - If server doesn’t have internet access, will require manual activation
- New CF Admin section (last one on bottom left) to view/manage this
  - Including new page to view Docker image usage (with production license)
- Activation does NOT apply to Development or Trial (no license needed)
- Let’s move on to Developer features…
DEVELOPER FEATURES
Of course, can leverage all the cloud services, as well as...

- noSQL support
- Serverless support
- SAML
- Docker improvements
- All of which can make a developer’s life easier, but there’s much more…
See CF Summit 2020 session from Rakshith with demos of many/most of these

Improving how CFML can be written

- Support for parallel programming, including in arrays, structs, and queries
- Immediately invoked function expressions (IIFE)
- Iterable objects, via Spread and Rest operators
- Iterator support for CFCs
- Support for static fields and methods for CFCs
- Identity operator, "==", testing if items are of the same type
- ...
- Property shorthand
- Merging structs
- "Destructuring assignment" feature for structs, arrays
- Dynamic switch case

**New info**: these are some aspects of how CF and CFML have modernized over its 25 years
  - See my talk, “ColdFusion at 25: more modern than most realize”
  - carehart.org/presentations/#cf_at_25
Can use `structnew("casesensitive")`, and "ordered-casesensitive"
  - Or can use implicit notation ($)

Note that "ordered" structs were added in 2016 ("ordered"), or using [] vs {}
  - Can get confusing, as "ordered" does not mean "sorted" but "in insertion order"
  - There are also functions, `StructToSorted` (added in CF2016 update 3) and `structsort` (goes back at least to 4.5), which are quite different from each other

Examples
NEW/CHANGED CFML
TAGS/FUNCTIONS

- New bcrypt and scrypt functions, for creating password hashes (where scrypt adds more features) (were not in beta docs)
- Return type for cfquery and queryExecute (json/array, array, query)
  - And also (not documented originally): json/struct and struct
- New array methods/member functions: ArrayPush, ArrayPop, ArrayShift, ArrayUnshift
- Strings as collections:
  - StringSort, StringFilter, StringReduce, StringMap, StringEach, StringEvery, StringSome
- New "start" arg for replace/replaceNoCase functions
- Support for enhanced/nested savecontents in cfscript
- Label support for loops with break and continue
- Support for Base64Url encoding in binaryEncode/binaryDecode functions
- Set time zone for all requests in Application.cfc
- New Application.cfc values for many of the new features added in CF2021
- CF2021 lets you literally create and execute Java within CFML
  - And adds support for implementing/extending Java Interfaces
  - CFML has supported Java integration since CF 4.0.1, which added calling Java objects from CFML
    - And of course with CF6, CF was rewritten on Java entirely
    - And CF10 added things like application-level class loading
- ...and that’s it for language enhancements
OTHER CONSIDERATIONS
OTHER CONSIDERATIONS

- Just a few areas remain…
  - Deprecated/removed features
  - Compatibility issues
  - **New info**: Changes from CF2021 updates
  - And more
See:
- helpx.adobe.com/coldfusion/deprecated-features.html

**Removed:**
- Corba integration
- LCDS integration
- Flex integration
- Flashpaper type for cfdocument, cfpresentation
- cfschedule onmisfire="fire_now"

Seemingly nothing deprecated or "retired", no new reserved words

Related to all this, let’s talk about other migration issues...
So it seems few will encounter any real problem migrating to CF2021...from 2018
  But with each version, there may be compat issues depending on your starting point
  If jumping to 2021, skipping CF2018, 2016, 11, or 10, there are compat issues each had
I’ve discussed these more in my “hidden gems” talks for each past CF version
  New info: Also, “What was new in CF 10, 11, and 2016 that you may have missed”
  carehart.org/presentations#missed2016
...
Potentially big deal for some: new dateformat mask of “D” was added
  - For “day in year”, along with some others, like M and Y (whose difference is unclear)
Problem is if you may have code using D or DD, where d should have been used
  - In prior releases, that capitalized D was ignored and produces same result as d, day of month
  - But now, such code will return the **day of the year**!
Example: `dateformat("11-23-20","MM-DD-YY")`
  - In 2018 and before, produces 11-23-2020
  - In 2021, produces instead 11-328-2020
Available fix made available in late Nov 2020, then folded into CF2021 Update 1 (in Mar 2021)
  - Requires use JVM arg to revert behavior
    - `Dcoldfusion.datemask.useDasdayofmonth=true`

`carehart.org/blog/2020/12/7/cf2021_hotfix_datemask_compatibility_issue`
Finally, for “trusted authentication” for CF DSN to SQL Server
  ▶ Need to add new connectionstring value, AuthenticationMethod=ntlm

New info: for more on migrating from CF2018, 2016, 11, or 10 to CF2021
  ▶ See my talk, “Migrating apps to ColdFusion 2021 from earlier versions”
  ▶ carehart.org/presentations/#cf2021_migration
Came out in Mar 2021
  - Along with updates for CF2018 and 2016 (final one)
  - Security fix, bug fixes, version support updates

helpx.adobe.com/coldfusion/kb/coldfusion-2021-update-1.html
- Came out in Sep 2021
  - Along with updates for CF2018 in Sep 2021
- Also new CF installer, with updates 1 and 2 applied, updated jvm (11.0.10)
- Security fix, bug fixes, cfsetup updates, version support updates
  - macOS Big Sur (v11.0) and Tomcat 9.0.50
- helpx.adobe.com/coldfusion/kb/coldfusion-2021-update-2.html
- Beware query of queries bug, with fix: tracker.adobe.com/#/view/CF-4212383
- Mentioned also new Docker image env vars, as of update 2
  - profile, deploymentType, allowedAdminIPList
See my blog posts on each JVM update since last Nov:

- Updates available for Java 8 and 11 (and 17), Oct 2021
  - coldfusion.adobe.com/2021/10/updates-available-java-8-11-17-oct-2021
- Updates available for Java 8 and 11, as of July 20, 2021
  - coldfusion.adobe.com/2021/07/java-updates-available-as-of-july-20-2021
- Updates available for Java 8 and 11, as of Apr 2021
  - coldfusion.adobe.com/2021/04/java-updates-apr-2021
- ColdFusion users should note and apply new Jan 2021 updates for Java 11 and Java 8
  - coldfusion.adobe.com/2021/01/coldfusion-users-note-apply-new-updates-java-11-java-8
- Also, a table of what Java versions can be used with what ColdFusion versions
  - coldfusion.adobe.com/2021/01/table-of-java-to-cf-versions

NEW INFO: JAVA UPDATES
(SINCE LAST TALK)
AS FOR REMAINING TOPICS...

- In my version of this talk at CF2020 Summit, I also covered:
  - Updates to underlying libraries' versions numbers
  - What's new in Standard vs Enterprise
  - Pricing, licensing, end of life/support
  - CF Builder 2021 plans (we’re still awaiting that)
- In the interest of time, I’ve removed these from this version
  - See that 2020 talk for the details on these things
  - carehart.org/presentations/#cf2021gems
- ColdFusion Security Code Analyzer now works with CF2021 Standard and Developer editions
- ColdFusion 2021 Lockdown Guide available, since Dec 2020
  - coldfusion.adobe.com/2021/04/coldfusion-2021-lockdown-guide-available/
- Adobe CF certification now only US$149, including many hours of training
  - coldfusion.adobe.com/2021/05/adobe-cf-certification-now-us149-including-many-hours-training/
So, lots of changes, right?
  - I count nearly 60 (major and minor)

Hope you may be more motivated—and informed—to consider CF2021
  - To understand if/how it may work for you
  - Or at least where things stand as of now

Again, my contact info for follow-up:
  - Charlie Arehart
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