HIDDEN GEMS IN COLDFUSION 2021, A YEAR LATER

Charlie Arehart, Independent Consultant

CF Server Troubleshooter

charlie@carehart.org

@carehart (Tw, Fb, Li, Slack, Skype, GitHub)

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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

TOPICS

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- 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*

LOGISTICS

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- 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

FINDING MORE ABOUT CF2021

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- I focus on CF server troubleshooting, as an independent consultant
  - Assist organizations of all sizes, experience levels
  - Work <u>remotely</u> 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! ☺

ABOUT ME

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CArehart.org
@carehart

Cloud

Microservices

Modernize
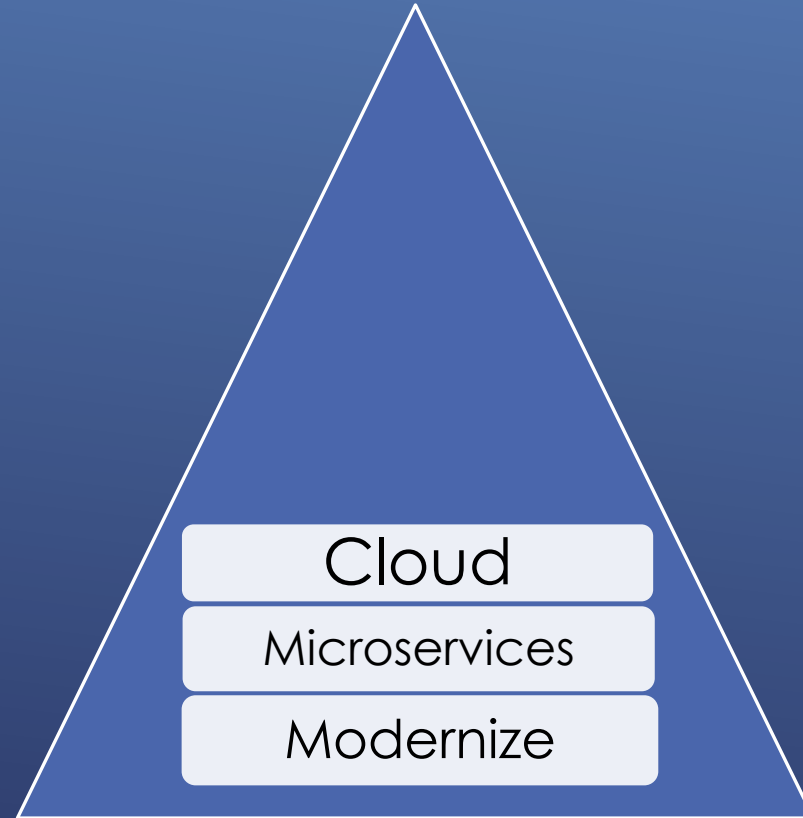
And note: all <u>new</u> features in 2021 are **supported in Standard as well as Enterprise**

MAJOR FEATURES OF CF2021

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- 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)

RICH CLOUD SUPPORT

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- 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

MOVES SUPPORTING DEVOPS

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- 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"

OTHER MAJOR FEATURES

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INSTALLATION, ADMINISTRATION, CONFIGURATION, MONITORING

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- 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

A PREFACE TO THIS SECTION

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- 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*
- <u>New info:</u> see my talk, "*Installing CF2021: choices, challenges, and solutions*"
  - *carehart.org/presentations/#installingcf2021*

INSTALLATION CHANGES

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- 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%**
  - *helpx.adobe.com/coldfusion/user-guide.html/coldfusion/using/coldfusion-package-manager.ug.html*
- Optional packages can be added or removed …

MODULAR DESIGN, SMALLER "CORE" ENGINE

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- 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)

INSTALLING "PACKAGES"

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- 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

- <u>New info</u>: see my talk: "*Migrating or Comparing CF Admin Settings, between instances, versions, and engines*"
  - *carehart.org/presentations/#migrating_admin*

CLI ADMIN CONFIG - *CFSETUP*

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- Was originally about writing AWS Lambda functions in CFML
  - See great CF Summit 2020 talk by Brian Klass
- Feature pulled days after CF2021 release
- <u>New info:</u> 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*

SERVERLESS DEPLOYMENT, VIA AWS LAMBDA

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- 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 behavor)
  - "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

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- 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

PERFORMANCE MONITORING TOOLSET (PMT) IMPROVEMENTS: CONFIGURATION

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- 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/*

IMPROVED CF DOCKER IMAGES

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- 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

OTHER ADMIN CHANGES: CONFIGURING MONGO, CLOUD SVCS

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These cloud DBs can now be configured in CF admin DSN page

AWS	Azure
Aurora MySQL Aurora PostgreSQL Oracle MySQL PostgreSQL SQL Server	MySQL PostgreSQL SQL Server

OTHER ADMIN CHANGES: SUPPORT FOR CLOUD RDS DATABASES

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- 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

OTHER ADMIN CHANGES: MISC

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- 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…

NEW ACTIVATION FEATURE

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DEVELOPER FEATURES

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- ▸ 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…

DON'T FORGET MAJOR FEATURES

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- 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
  - …

CORE LANGUAGE CHANGES

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- Property shorthand

- Merging structs

- "Destructuring assignment" feature for structs, arrays

- Dynamic switch case

- <u>New info</u>: 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*

CORE LANGUAGE CHANGES (CONT.)   27

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- 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
  - *https://bit.ly/3pKM12n*

CASE-SENSITIVE AND ORDERED STRUCTS
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- 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

NEW/CHANGED CFML TAGS/FUNCTIONS

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- ▶ 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 CFML ENHANCEMENTS

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OTHER CONSIDERATIONS

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CArehart.org
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- Just a few areas remain…
  - Deprecated/removed features
  - Compatibility issues
  - New info: Changes from CF2021 updates
  - And more

OTHER CONSIDERATIONS

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- 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…

DEPRECATED/REMOVED FEATURES

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- ▸ 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
  - ▸ <u>New info:</u> Also, "*What was new in CF 10, 11, and 2016 that you may have missed*"
  - ▸ *carehart.org/presentations#missed2016*
- ▸ …

COMPATIBILITY/MIGRATION ISSUES

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CArehart.org
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- 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*

COMPATIBILITY/MIGRATION ISSUES (CONT.)

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- 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*

COMPATIBILITY/MIGRATION ISSUES (CONT.)

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- Came out in Mar 2021

  - Along with updates for CF2018 and 2016 (final one)

- Security fix, bug fixes, version support updates

  - RHEL 8.3, WildFly 23, Tomcat 9.0.43,
    PostgreSQL 13, Oracle 19c (2018), MS SQL Server 2019

- *helpx.adobe.com/coldfusion/kb/coldfusion-2021-update-1.html*

NEW INFO: CF2021 UPDATE 1

- 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

NEW INFO: CF2021 UPDATE 2

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- ▶ 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)

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- 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*

AS FOR REMAINING TOPICS...

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- ▶ ColdFusion Security Code Analyzer now works with CF2021 Standard and Developer editions
  - ▶ *coldfusion.adobe.com/2021/07/coldfusion-security-analyzer-works-with-standard-and-developer/*
- ▶ 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/*

OTHER <u>NEW INFO</u>, AND MY BLOG POSTS ON EACH

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CArehart.org
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- ▸ 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
    - ▸ charlie@carehart.org
    - ▸ @carehart (Tw, Fb, Li, Slack, Skype, GitHub)
    - ▸ Slides: carehart.org/presentations

SUMMARY