- Noting the major new features
- Less-heralded changes in many areas:
  - Installation, administration, configuration, and monitoring
  - Developer-oriented features and language changes
- Then other topics you should also consider:
  - Compatibility/migration issues
  - Updates to underlying libraries (their version numbers)
  - What’s new in Standard vs Enterprise
  - Pricing, end of life/support, licensing
  - And still more, including coming CFBUILDER 2021
- So, much more than just a “what’s new in CF2021” list
So much new in 2021
  - Could speak literally for a week on ALL the new features
  - Will review briefly key (and less key) new features, and any gems along the way
    - 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
- During prerelease, was a single PDF
  - Now folded into online docs
  - The docs are substantial, and nearly all have demo code!
See posts from me and Adobe listing links to docs
- carehart.org/blog/client/index.cfm/2020/11/10/
- community.adobe.com/t5/coldfusion/introducing-adobe-coldfusion-2021-release/td-p/11585468
Also available resources, listed later here
ABOUT ME

- 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

- Cloud
- Microservices
- Modernize
- Cloud Storage Svcs (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)

- And yes, all new features in 2021 are supported in Standard as well as Enterprise
- Optional smaller zip/Express installer
- Available package manager (cfpm)
- Available JSON-based admin configuration (cfsetup)
- Serverless deployment, via AWS Lambda
- Improvements to PMT (monitor)
- Improved Docker and WAR deployment

MOVES SUPPORTING DEVOPS
OTHER MAJOR FEATURES

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

- CF Summit 2020 presenters talked about major features, for those wanting more
  - I want to dig a bit into more practical aspects that apply to most
  - And share hidden gems along the way
INSTALLATION, ADMINISTRATION, CONFIGURATION, MONITORING
Some may be wondering why I start with this/elaborate topics
  - Sure, some folks are ONLY developers
  - But even most developers end up installing/configuring and may want to monitor CF
- Express/zip installer option (full/GUI installer still available)
  - Need to unzip that, then unzip what’s in that
  - Then run ColdFusion/bin/cfinstall
    - Which makes a few prompts to configure and optionally enable svc for CF
  - Note that it does NOT cause running of migration wizard on first Admin launch
    - See helpx.adobe.com/coldfusion/user-guide.html/coldfusion/using/install-coldfusion-2021.ug.html#main-pars_header_607718620

- 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
Now modular design reduces size (of Express installer) to a mere 147mb
- Implements “core” package/engine by default, option to add other packages
- Size on disk (for core packages) reduced by ~300%
  - Runtime memory (for core packages) reduced by ~350%
  - Startup time has decreased by ~400%
- Optional packages can be installed...
Can be done either from command line, via Admin, or as Docker env var

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

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

- 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” folder)
- Again, was demo’d during first keynote
  - Yes, similar to Commandbox CFConfig module
    - No, not as powerful as it (can’t use it across multiple engines or versions)
  - But it is valuable for what it does, and for use with CF2021 without adding anything
- Note that CF2021 Docker image has new importCFSettings to pull those in
Feature pulled days after release, seemingly about licensing issues
  - Expected to return at some point
- See great CF Summit 2020 talk by Brian Klass
  - Discussion and demos, showing process from start to finish, shares some “hidden gems”
    - Need to re-link the zip on any (and every) change to the deployed function
    - How to write to cloudwatch logs with coldfusion.log.CFLogs java object
    - Dealing with cold starts
    - His available “aws playbox” repo that makes it easier to work with
    - Working with AWS SAM (Serverless Application Model), and Paul Kukiel’s repo
    - Working with AWS xRay
    - And more
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
  - Note: even if disabled, still see info on respective “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 its updates (Settings>Server>Updates)
  - See Settings tab, and option to enable auto-check on login
    - And like CF Admin updates, 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 0)
  - Settings>Node>Monitoring>Advanced
IMPROVED CF DOCKER IMAGES

- 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 mentioned previously
  - `installModules` and `ImportModules`
  - `importCFSettings`
- And `importCFSettingsPassphrase` (if the json file is encrypted by CF)
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
These cloud DBs can now be configured in CF admin DSN page

<table>
<thead>
<tr>
<th>AWS</th>
<th>Azure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aurora MySQL</td>
<td>MySQL</td>
</tr>
<tr>
<td>Aurora PostgreSQL</td>
<td>PostgreSQL</td>
</tr>
<tr>
<td>Oracle</td>
<td>SQL Server</td>
</tr>
<tr>
<td>MySQL</td>
<td></td>
</tr>
<tr>
<td>PostgreSQL</td>
<td></td>
</tr>
<tr>
<td>SQL Server</td>
<td></td>
</tr>
</tbody>
</table>
 Addition of SAML configuration in new pages under “Security” section
   ▶ IDP Configuration, SP Configuration
   ▶ Note that SAML can also be specified in application.cfc, instead
 Addition of AWS Elasticache, Azure Redis, as CF distributed caching options
   ▶ CF Enterprise only (only thing “new” in CF2021 that is Ent only, it seems)
 Addition of Azure Redis cache as CF session storage option
 New admin API features related to most of the new features above
 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
 Maxmetaspace jvm arg removed from CF2021 by default (as I lobbied for)
   ▶ carehart.org/blog/client/index.cfm/2020/2/24/solving_metaspance_errors
- Time for “the shoe to drop”
- When you put in a CF2021 license, that will need to be “activated”
  - Over the internet
  - And if a 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)
- Again this activation does NOT apply to Development or Trial
- Let’s move on to Developer features…
DEVELOPER FEATURES
- Of course, all the cloud services
- 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
  - ...

CORE LANGUAGE CHANGES
- Property shorthand
- Merging structs
- "Destructuring assignment" feature for structs, arrays
- Dynamic switch case
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 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 features
  - Compatibility issues
  - Updates to underlying libraries’ versions numbers
  - What’s new in Standard vs Enterprise
  - Pricing, licensing, end of life/support
  - CF Builder 2021 plans
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
  - As well as “What was new in CF 10, 11, and 2016 that you may have missed”
  - carehart.org/presentations

Issues learned since the release in mid-November:

- Mac OS Big Sur came out the same week: neither CF nor CFBuilder currently support it
- ...
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, the fact that D was capitalized was ignored and produces same result
   - But now such code will return the number of days in the year, rather than in the month!
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)

Example: bit.ly/3m3sLdR
carehart.org/blog/client/index.cfm/2020/11/24/breaking_change_in_cf2021_dateformat_D_vs_d
carehart.org/blog/client/index.cfm/2020/12/7/cf2021_hotfix_datemask_compatibility_issue
For “trusted authentication” for CF DSN to SQL Server
- Need to add new connectionstring value, AuthenticationMethod=ntlm
Antisamy 1.5.7 (OWASP security library)
- Axis 2 1.7.0 (web services library)
- Derby 10.15 (embedded DB)
- Ehcache 2.10.3 (caching library)
- Elasticache 5.6.16 (new caching option)
- Ext JS 6.6.0.258 (JS library underlying various UI tags)
- Esapi 2.2.1.1 (OWASP Enterprise Security API)
- Hibernate 5.2.11 (ORM library)
- HttpClient 4.5.9 (underlies CFHTTP and more)
- Java 11.0.1 (the JVM which underlies CF)
- JDBC Drivers 5.1 (the built-in Progress DB drivers, such as for SQL Server, Oracle, etc.)
- Jedis 2.9.0 (underlies Redis caching)
- Jetty 9.4.31 (underlies Solr and PDFg)
- jQuery 3.1.1 and jQuery UI 1.12.1 (JS library which underlies various UI tags and Admin interface features)
- Lucene 6.6.1 (underlies Solr search engine in CF)
- POI 4.1.2 (underlies MS Office Integration features)
- PostgreSQL 42.2.14 (db driver)
- Quartz 2.2.1 (underlies schedules tasks)
- Solr 5.2.1 (the embedded search engine, used by CFSEARCH/CFINDEX, etc.)
- Tomcat 9.0.37 (app server underlying CF, when deployed in traditional "Server" configuration)
- Zingcharts 2.8.4/2.8.6 (underlies cfchart)

See carehart.org/blog/client/index.cfm/2021/1/3/what_are_cf2021_embedded_library_version_numbers
Version numbers of the commercial Progress JDBC Drivers included with CF:

- Note: this is **not** about the VERSION OF THE DB supported, just the JDBC driver version
- DB2 Driver: 5.1.4.000278 (F000432.U000208)
- MySQL Driver: 5.1.4.000223 (F000438.U000209)
- Oracle driver: 6.0.0.000264 (F000695.U000370)
- SequeLink (Access/ODBC) Driver: 6.0.006707
- SQLServer Driver: 6.0.0.000367 (F000702.U000374)
- Sybase Driver: 5.1.4.000120 (F000411.U000196)

- Postgres driver version: 42.2

- Note that CF no longer includes a MySQL community driver

These are as of the initial release of CF2021, and may change with CF updates
- Apache Derby 10.11
- MySQL 5.7 and 8
- PostgreSQL 11
- And in CF Enterprise only:
  - IBM DB2 11.x
  - Oracle 12c, 18c, 19c (including RAC support)
  - Sybase Adaptive Server Enterprise 16
- Again, at least at initial release, and as documented (per updates) here:
  - helpx.adobe.com/pdf/coldfusion2021-support-matrix.pdf
- Correction: SQL Server 2019 IS supported. See Adobe comment here:
  - community.adobe.com/t5/coldfusion/introducing-adobe-coldfusion-2021-release/m-p/11591120#M186905
- Windows Server 2019
- Windows Server 2016 (Datacenter, Standard, Essentials)
- Windows Server 2012 R2
- Windows 10 (Home, Pro, Enterprise)
- Mac 10.15.x
- Red Hat Enterprise Linux 8.x
- Ubuntu 20.04
- CentOS 8.x
- SUSE 12.X
- Solaris 11.4
- Again, at least at initial release, and as documented (per updates) here:
  - helpx.adobe.com/pdf/coldfusion2021-support-matrix.pdf
- IIS 10, 8.5
- Apache 2.4.x
- Oracle Java 11
- JEE App servers
  - WebLogic 14c
  - WebSphere 9.0.5.x
  - Tomcat 9.0.x
  - WildFly 20.x
  - JBoss EAP 7.3 and later versions
- Again, at least at initial release, and as documented (per updates) here:
  - helpx.adobe.com/pdf/coldfusion2021-support-matrix.pdf
Only one thing **added in 2021** is Enterprise-only: new distributed caching options
- Feature was added in CF2018, supporting redis and memcached
- CF2021 adds Azure Cache for Redis and AWS ElastiCache
- CF Standard still supports long-standing ehCache and JCS (added in C2018)

To BE CLEAR: **I am NOT saying this is the ONLY difference** between CF2021 Standard and Enterprise
- I’m saying this is the only thing **ADDED** in 2021 that IS Enterprise-only
- I said originally nothing “new” in 2021 was Ent-only. Dist caching not “new” 😊

For more on differences between CF Std and Ent:
- [carehart.org/presentations/#differences_std_ent](http://carehart.org/presentations/#differences_std_ent)
Price for CF2021 has not changed compared to CF2018
  - Standard: US$ 2,499 (per 2 cores)
  - Enterprise US$ 9,499 (per 8 cores)
Upgrade discount for those on CF2018 (none for those on CF2016 or earlier)
Consider buying CF from resellers, for still more discounts
  - buy-cf.com (from makers of FusionReactor)

And what if you may still want to buy CF2018?
First, as happened with CF2016 when 2018 came out...

- Can no longer access CF2018 installers on Adobe public CF site
  - Look instead to cfmlrepo.com (community-run site)
- Can’t even license CF2018 anymore
  - Must buy CF2021 (if from Adobe, only via “volume licensing”)
    - and then request “backward license” to CF2018
  - At least was case in CF2018 with CF2016
    - blogs.coldfusion.com/post.cfm/adobe-coldfusion-backward-licensing
    - if CF2016 bought from a reseller, that COULD be backward-licensed
When does public support (providing updates) end, for each recent version?

- For CF2021, in 2025
- For CF2018, in 2023
- For CF2016, in 2021
- For CF11, in 2019

helpx.adobe.com/support/programs/eol-matrix.html
- No significant difference from CF2018, from my assessment
  - You and your lawyers should do a compare for yourself
- Finding EULA on your CF installation or online:
  - coldfusion.adobe.com/2018/01/finding-the-eula-end-user-licensing-agreement-for-your-installed-cf-version/
  - Updated for CF2021

- ...ok, onto last changed “feature”: what about CFBuilder 2021?
CF2021 UPDATE 1 RELEASED

- Came out along with updates for CF2018 and 2016 (final one) in Mar 2021
- Security fix, bug fixes, support for updated DB servers/app servers
- helpx.adobe.com/coldfusion/kb/coldfusion-2021-update-1.html
No new CFBuilder 2021 yet

But plans have been announced for next version to be VSCode-based
  - Prior versions were based on Eclipse

Said to be offered either as a VSCode plugin or as “stand-alone”
  - CFBuilder on Eclipse had offered same two options
  - Difference is that few CF developers were Eclipse users, so most used “stand-alone”
    - Never really knew it was based on Eclipse, was “just CFBuilder”
  - Today, many CF developers are VSCode users, so will likely favor plug-in approach
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 and how it may work for you
- Or at least where things stand regarding it 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