

# CF SCHEDULED TASKS: THERE'S MORE THAN YOU MAY KNOW



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- ▶ Basic features of scheduled tasks
- ▶ Ways to create tasks
- ▶ Solving common problems running tasks
- ▶ Things CF scheduled tasks “can’t do”
- ▶ Additional/advanced task features
- ▶ Understanding task configuration files
- ▶ Controlling access to managing/running tasks
- ▶ Alternatives to scheduled tasks

# TOPICS

- ▶ I focus on CF server troubleshooting, as an independent consultant
  - ▶ Assist organizations of all sizes, experience levels
  - ▶ Work remotely: safe, secure, easy via **shared desktop** (zoom, meet, teams, etc.)
  - ▶ **Solve most problems in less than an hour**, teaching you also as we go
  - ▶ **Satisfaction guaranteed**
  - ▶ More on rates, approach, online calendar, etc at [carehart.org/consulting](https://carehart.org/consulting)
- ▶ But to be clear, I'm not selling anything in this session! 😊
  - ▶ Just sharing my experience, and that of others
- ▶ Presentation online at [carehart.org/presentations](https://carehart.org/presentations)



# ME.ABOUT()

- ▶ “Configuring and Administering CF” manual (or via ? Icon in CF Admin)
  - ▶ 4-page discussion of CF admin scheduled task page
  - ▶ [helpx.adobe.com/coldfusion/configuring-administering/using-the-coldfusion-administrator.html#scheduledtasks](https://helpx.adobe.com/coldfusion/configuring-administering/using-the-coldfusion-administrator.html#scheduledtasks)
- ▶ CFML Reference manual on cfschedule tag (7 pages)
  - ▶ [helpx.adobe.com/coldfusion/cfml-reference/coldfusion-tags/tags-r-s/cfschedule.html](https://helpx.adobe.com/coldfusion/cfml-reference/coldfusion-tags/tags-r-s/cfschedule.html)
- ▶ “Developing CF Applications” manual, on “newer” features (7 pages)
  - ▶ Discusses the major changes as of cf10 (2012)
  - ▶ [helpx.adobe.com/coldfusion/developing-applications/developing-cfml-applications/using-the-coldfusion-debugger/using-scheduler.html](https://helpx.adobe.com/coldfusion/developing-applications/developing-cfml-applications/using-the-coldfusion-debugger/using-scheduler.html)
- ▶ Adobe CF Summit 2019 preso on scheduled tasks by Suchika Singh
  - ▶ <https://youtu.be/3SgNF11p12o>

## ABOUT “PRIMARY” ADOBE RESOURCES

- ▶ Let's start with just the most basic features of setting up a scheduled task, in Admin
  - ▶ “Scheduled tasks” page, within “Server Settings” section (was in “Debugging” pre-cf10)
- ▶ Basic settings in creating a task
  - ▶ Name, start/end date, frequency, url
  - ▶ Optional username/password, proxy server/username/password, timeout
  - ▶ Option to publish task output to file
  - ▶ More on “additional settings” later
- ▶ Once created, can manage task in Admin (or wait for it to run)
  - ▶ Edit, delete, pause, run buttons (cf2018 added “pause all” tasks)
  - ▶ Status info
  - ▶ More features on that page, which we will discuss later

## BASIC FEATURES OF SCHEDULED TASKS

- ▶ Note this is an option for “when” the task should run
  - ▶ One of many features added in CF10, but never noticed by many
- ▶ Allows incredible flexibility in terms of controlling timing/frequency
  - ▶ Almost worthy of an entire talk
    - ▶ Indeed, there are many resources on it (it’s long been a Linux/Unix feature)
  - ▶ Traditionally format is: **minute, hour, day of month, month, day of week**
    - ▶ With additional special characters for added flexibility
      - ▶ ? (any), \* (all), - (range), # (n<sup>th</sup>), / (increments), L (“last”), W (weekday)
  - ▶ *baeldung.com/cron-expressions*
    - ▶ Examples: *baeldung.com/cron-expressions#2-cron-expression-examples*
- ▶ But the cron format for CF tasks is different...

## IT’S ABOUT “CRON” TIME

- ▶ CF tasks based on open-source Quartz framework
  - ▶ Its format (like cron format for Spring f/w) adds a leading “second” value
  - ▶ Format is: **second, minute, hour, day of month, month, day of week, year**
    - ▶ “second” value is required, as are the rest, but “year” is optional
  - ▶ [quartz-scheduler.org/documentation/quartz-2.2.2/tutorials/crontrigger.html](http://quartz-scheduler.org/documentation/quartz-2.2.2/tutorials/crontrigger.html)
- ▶ Free online tool
  - ▶ [freeformatter.com/cron-expression-generator-quartz.html](http://freeformatter.com/cron-expression-generator-quartz.html)

## IT'S ABOUT “CRON” TIME (CONT.)



- ▶ Besides that CF Admin “scheduled tasks” page, can create tasks with:
  - ▶ cfschedule tag
    - ▶ Let’s look at that CFML Ref doc, with examples and details
  - ▶ CF Admin api
  - ▶ Export/import between CF instances
    - ▶ CF Admin CAR feature
    - ▶ CLI tools: **cfsetup** (in CF2021 and above) and Ortus commandbox **cfconfig**
    - ▶ Migration wizard shown on first launch of CF Admin (on machine having a previous CF)
    - ▶ See my talk, “Migrating CF Admin settings between versions, safely”

# WAYS TO CREATE CF SCHEDULED TASKS



▶ **“Why does the task fail when I can visit the URL in my browser?”**

- ▶ CF tasks run from within CF, via java (httpClient under the covers)
- ▶ Your browser may have capabilities (or improvements) that CF (CF's java) does not
- ▶ Can hit such issues as https/tls problems, authentication issues
- ▶ Tip: try running the task URL from within a CFHTTP, dumping its result/error message
- ▶ [helpx.adobe.com/coldfusion/kb/coldfusion-mx-troubleshooting-scheduled-tasks.html](https://helpx.adobe.com/coldfusion/kb/coldfusion-mx-troubleshooting-scheduled-tasks.html)
- ▶ [coldfusion.adobe.com/2019/06/error-calling-cf-via-https-solved-updating-jvm/](https://coldfusion.adobe.com/2019/06/error-calling-cf-via-https-solved-updating-jvm/)

▶ **“How can I know if my tasks ran, and what was their result?”**

- ▶ “Publish” option saves task's resulting output if saved to directory that CF can write to
- ▶ Schedule task log, enabled in CF Admin “Logging Settings” page (confusing)

# SOLVING COMMON PROBLEMS RUNNING TASKS

- ▶ **“Why won’t my task run if the URL is protected by cloudflare?”**
  - ▶ [community.adobe.com/t5/coldfusion-discussions/scheduled-task-issue-error-code-1010/m-p/13621525#M194483](https://community.adobe.com/t5/coldfusion-discussions/scheduled-task-issue-error-code-1010/m-p/13621525#M194483)
- ▶ **“Why do I see my task results being created more than the one time it’s expected?”**
  - ▶ You may literally have tasks defined in two different CF servers/instances. Use that scheduler log!
  - ▶ Beware also that creating a new CF instance will duplicate tasks in the cfusion instance
- ▶ **“Why are my tasks not running when expected?”** (date vs time)
  - ▶ [bennadel.com/blog/2189-a-big-hole-in-my-understanding-of-coldfusion-scheduled-tasks.htm](http://bennadel.com/blog/2189-a-big-hole-in-my-understanding-of-coldfusion-scheduled-tasks.htm) and comments

## SOLVING COMMON PROBLEMS RUNNING TASKS (CONT.)

▶ **“Why are my tasks timing out?”**

- ▶ Consider timeout setting for task, and misfireThreshold in quartz.properties (more on such config settings later)
- ▶ If task is running a CF page, can control its timeout in Admin or code

▶ **“Why have my tasks all disappeared?”**

- ▶ Underlying neo-cron.xml sometimes corrupted (more later)

▶ **“I get an error about u=4 (or some number) when creating/editing tasks”**

- ▶ Recent problem, has to do with some browsers sending a “priority” header which CF confuses with optional priority field in scheduled task “additional settings” in UI
- ▶ Error may report: *‘An error occurred scheduling the task. For input string: "u=4“’*
- ▶ Fixed in Oct 2024 CF update (update 11 of CF2023, update 17 of CF2021)

# SOLVING COMMON PROBLEMS RUNNING TASKS (CONT.)

- ▶ You may hear folks complain about things CF scheduled tasks “can’t do”
- ▶ The following work, but in CF Enterprise only:
  - ▶ Can be chained/have dependencies
  - ▶ Can have intelligent error response/task triggers
  - ▶ Can have lifecycle methods
  - ▶ Can group tasks
  - ▶ Can call cfcs (rather than URLs)
- ▶ Since CF10, these are all in CF Enterprise, Dev edition, Trial edition, Commandbox
  - ▶ Are still withheld from CF Standard
  - ▶ Though still shown under “additional settings” button for a task in CF Admin

## THINGS CF SCHEDULED TASKS “CAN’T DO”

- ▶ Event handling CFC
- ▶ Date exclusions
- ▶ Exception handling (misfire, exception, retry count)
  - ▶ [youtube.com/watch?v=f39zZ7LQi9M](https://youtube.com/watch?v=f39zZ7LQi9M)
- ▶ Chaining (oncomplete)
- ▶ Clustering (ability to store scheduled tasks in a database, shared by CF instances)
- ▶ All these covered in the CF Dev Guide (on the features new since CF10)
- ▶ If you try to use these features in CF Standard:
  - ▶ Error: *"Advance Scheduling support is not available in this edition of ColdFusion server"*
  - ▶ Or in logs: *"coldfusion.**featurerouter**.FeatureNotAvailableException: Advance Scheduling support is not available in this edition of ColdFusion server"*

## ENTERPRISE “ADDITIONAL SETTINGS”

- ▶ Neo-cron.xml
  - ▶ Our need to protect it: [tracker.adobe.com/#/view/CF-4200009](https://tracker.adobe.com/#/view/CF-4200009)
  - ▶ Recovering default/stock version of such neo files
    - ▶ [carehart.org/blog/2021/9/13/finding\\_default\\_cf\\_admin\\_config\\_files\\_now\\_at\\_cfmlrepo\\_dot\\_com](https://carehart.org/blog/2021/9/13/finding_default_cf_admin_config_files_now_at_cfmlrepo_dot_com)
- ▶ CF Scheduled tasks based on open-source Quartz framework, since CF10
  - ▶ Quartz version in CF2023 (at release) is 2.4.0
  - ▶ quartz.properties settings (in cfusion\lib\quartz) unchanged from cf10-2023
  - ▶ Interesting “plugins” options...

# UNDERSTANDING TASK CONFIGURATION FILES

- Possibly interesting Quartz plugins to consider
  - `org.quartz.plugins.history.LoggingTriggerHistoryPlugin`
  - `org.quartz.plugins.history.LoggingJobHistoryPlugin`
  - `XMLSchedulingDataProcessorPlugin`
  - `ShutdownHookPlugin`
  - for both, see *[nurkiewicz.com/2012/04/quartz-scheduler-plugins-hidden.html](http://nurkiewicz.com/2012/04/quartz-scheduler-plugins-hidden.html)*
    - correct links are like:
      - *[quartz-scheduler.org/documentation/quartz-2.3.0/configuration/ConfigPlugins.html](http://quartz-scheduler.org/documentation/quartz-2.3.0/configuration/ConfigPlugins.html)*
      - *[quartz-scheduler.org/api/2.3.0/org/quartz/plugins/history/LoggingTriggerHistoryPlugin.html](http://quartz-scheduler.org/api/2.3.0/org/quartz/plugins/history/LoggingTriggerHistoryPlugin.html)*

## UNDERSTANDING TASK CONFIGURATION FILES (CONT.)



- ▶ You may want to explore these (I have not, yet):
  - ▶ [github.com/fabioformosa/quartz-manager](https://github.com/fabioformosa/quartz-manager)
  - ▶ [quartzdesk.com](https://quartzdesk.com) (free and commercial)
  - ▶ [github.com/lucidsoftware/piezo](https://github.com/lucidsoftware/piezo)

## SOME ADDITIONAL QUARTZ TOOLS

- ▶ Application- vs Server-level tasks
- ▶ Granting CF admin access to different users
- ▶ Controlling access to cfschedule via sandboxing
- ▶ And now finally...

# CONTROLLING ACCESS TO MANAGING/RUNNING TASKS

- ▶ Linux Cron, Windows Task Scheduler
- ▶ cfhttp
- ▶ ColdBox scheduled tasks
  - ▶ [coldbox.ortusbooks.com/digging-deeper/scheduled-tasks](https://coldbox.ortusbooks.com/digging-deeper/scheduled-tasks)
  - ▶ [cfcasts.com/series/into-the-box-2021/videos/scheduling-tasks-the-human-way!-brad-wood](https://cfcasts.com/series/into-the-box-2021/videos/scheduling-tasks-the-human-way!-brad-wood)
- ▶ cbq ("q" for queue), "A protocol-based queueing system for ColdBox"
  - ▶ [cbq.ortusbooks.com](https://cbq.ortusbooks.com)
- ▶ BoxLang's Scheduled Tasks Framework
  - ▶ [boxlang.io/key-features-of-boxlang/scheduling-task-framework](https://boxlang.io/key-features-of-boxlang/scheduling-task-framework)
  - ▶ [youtube.com/watch?v=OpU-\\_0YbgJQ](https://youtube.com/watch?v=OpU-_0YbgJQ)
- ▶ Lucee scheduled tasks
  - ▶ [docs.lucee.org/reference/tags/schedule.html](https://docs.lucee.org/reference/tags/schedule.html)

## ALTERNATIVES TO SCHEDULED TASKS

- ▶ Hope you agree now there is much more to scheduling than many realize
- ▶ And while there can be challenges, there are useful diagnostics
- ▶ Also many resources available to help, from Adobe and others
- ▶ If you hit other challenges, reach out to me
  - ▶ Or the community. See my resource list at [cf411.com/cfsocialhelp](http://cf411.com/cfsocialhelp)
- ▶ And I'm certainly open to feedback about this presentation

## SUMMARY