Solving Problems in Ways Never Before Possible, with FusionReactor 7
Introductions

Charlie Arehart
Independent Consultant, CArehart.org
(Focused on server troubleshooting)
Agenda

▪ Foreword

▪ Major new FR 7 features/solutions
  ▪ Heap analysis, JMX metrics, AWS CloudWatch monitoring
  ▪ What problems can be solved by these new features

▪ Major new FR 7.1 features/solutions
  ▪ CPU Sampler, Threads Visualizer

▪ FR 7 extensions to existing features

▪ FusionReactor Cloud (production release)

▪ Reminders of other significant FR features

▪ Questions & answers
Who does this talk apply to?

- Anyone interested in troubleshooting/tuning servers; solving coding issues
  - Admins, managers, developers, devops

- Whether using any CFML engine
  - ColdFusion, Lucee, Railo, BlueDragon

- Or any Java application or server
  - Tomcat, JBoss, Wildfly, Jetty, WebSphere etc.
  - Or java applications: Solr, Confluence, Redis, etc.

- FusionReactor is implemented simply as a javaagent

- And is a low-cost, low-impact, reliable tool
  - Trusted for over 10 years by thousands of companies (over 30K servers world-wide)
Foreword

- Audience: presumed to already be using FR
  - But perhaps not using it—and especially newest features—to fullest extent
  - And those with problems, unaware there was a tool offering solutions

- Concepts apply generally to any Java/CFML server that FR can monitor

- Most discussion is about FusionReactor 7 (new this year)
  - Also introducing FR 7.1 (about to be released)

- Strong focus is on enabling in FR features that otherwise require additional tools
  - And those other tools typically require modification of JVM arguments
  - And such mods and tools are typically not used in production
    - **FR requires no such external tools or jvm args, and IS designed for production!**
  - All new features are available via the FusionReactor web interface
Major New FR 7 Features/Solutions
Want to resolve JVM memory leaks?

- FR 7 adds a memory profiler, allowing you to explore the heap
  - Use New *Memory* button on left (in Ultimate, Trial, Developer editions)
  - Explore GC roots
  - Take and compare snapshots over time

- All in the FR UI
  - No need to modify JVM arguments (such as to expose RMI)
  - No need to implement, learn different JVM tools or IDE extensions
  - Intended of course for use in production
    - Very low overhead, like all of FusionReactor

- Clearly can help spot JVM memory leaks...or cases of unexpected heap use
Wish you could understand JMX metrics better?

- FR 7 adds built-in support to view, explore, and graph JMX metrics
  - See new **Metrics>JMX Mbeans** feature (3 related pages)
  - Can browse them, choose ones to graph, and more

- Can of course be used to measure ANY aspect of your application/application server which may expose metrics via JMX
  - Can view all, can change those that are modifiable settings

- Again all in the FR web UI, with no JVM changes required

- Consider for instance tracking the Tomcat web server connector used by CF, Lucee
  - See **Catalina>GlobalRequestProcessor** metric for desired AJP thread
  - Also **Catalina>ThreadPool**

- Notice option to choose among selected metrics in top right of **Graphs** page
Want to watch your server's performance via AWS CloudWatch?

- FR 7 lets you export over 150 metrics to AWS CloudWatch
  - See new **Metrics>AWS CloudWatch Metrics** feature
- Can track about any selected FR metric, and also any selected JMX metric
- Once there, you can do further analysis, alerting via CloudWatch
Major New FR 7.1 Features/Solutions
CPU Sampler and Threads Visualizer

- Many know that FR 6 Ultimate added powerful request profiling
  - To understand which underlying java methods within a request spent the most time
- FR 7.1 adds thread profiling (across any and all threads)
  - New Profiler>CPU Sampler and related CPU Snapshots feature
  - And separate but related Resources>Threads Visualizer feature
- Can be useful to spot CPU use (and waits and blocks) in other than request threads
  - Sampler present same info and features in different views
- Both offer option to profile a given thread
  - Result appears in Profiler>Profile History

- Why are these options to view details of non-request threads valuable?
- More to come in FR 7.1, but let’s move on to changes of existing features in FR7
FR 7 Extensions to Existing Features
Improved capabilities

- New option to pause requests and threads
- Requests are now profiled for first 60 seconds, rather than entire request. Configurable
  - Can also now profile a request anytime during its life
- Enhanced error tracking for requests and queries
  - See new Requests> and JDBC>Error History
- Support for monitoring Kafka
- ...
Sometimes it’s the little things...

- Enhanced tracking of calls to external resources
  - See new `Transactions>External Resources`
- FR now **auto-detects datasource names** for display with queries
  - No longer need to use DSN connectionstring arg to identify each datasource name
- **Production Debugger** UI improvements:
  - More easily view current variables at a breakpoint
  - View variable values **at different states per selected stack frame**
  - Now able to "**watch**" specific variables/expressions while stepping
- And more
- But let’s move on to FR Cloud
FusionReactor Cloud (production release)
Major new way to use, look at FusionReactor

- Extends the current on-premise/in-JVM FR deployment (java agent)
  - To now additionally send nearly all FR metrics (and profiles and more) to the cloud
- Not about YOU running in the cloud. FR is running in the cloud!
  - You then use a new FR Cloud UI for viewing information about servers, metrics
  - FR manages the cloud deployment details (database import, volume mgt)
- The new FR Cloud UI offers features not previously available in FR
  - Since it runs in cloud, with db backing, new features don’t add cost to JVM
- Consider for instance ...
Major new way to use, look at FusionReactor

- Can now view information across **up to 90 days** (not just since last restart)
  - Powerful **time selector** (let’s look)

- Also **much more powerful notifications features**
  - Can **alert on any of several metrics**
  - Can **notify any of many platforms**: PagerDuty, Slack, HipChat, email, and more

- Powerful **Applications view** (let’s look)

- Expect more and more features to be added to cloud over time
  - Don’t miss **change log icon** in top right corner

- FR Cloud is a separately purchased feature
Reminders of Other Significant FR features
Some other recent additions in FR 6

- The request profiling and production debugger mentioned previously
- Ability to view metrics by application (application drop down on many pages)
- Also new Requests>Applications page in FR 6, tracking activity per Application
  - And then per URL within the app, since startup!
- Enhanced Relations tab (in request details)
- Monitoring of NOSQL databases
- System Resources page
  - With details about total system resources (CPU, memory, disk) on box
- Obfuscation features (to protect privacy data in logs, cloud, alerts)
- CFML line execution metrics (for CF and Lucee)
- And more
All this is on top of what FR has long offered

- **High-level metrics** page reporting current state of instance processing
  - Requests, JDBC, Memory, CPU

- **Request activity, history**, including recent, longest, and recently slow
  - Details on each request, including queries run within each request, and more

- Also **JDBC activity, history** (recent/longest/recently slow) across all requests

- Various **CF-specific metrics** exposed (counts of sessions, query cache, more)

- **Crash protection** (emails to notify you when alert conditions arise)
  - Including details that make solving problems so much easier!

- **Logs** that track all this, for up to 30 days by default

- **Enterprise Dashboard**, to watch multiple servers from single screen

- Support for your deployment of monitored instances in cloud, docker, and more
Conclusion

- Phew, FR does a lot!
- And still more in latest versions
- FR 7 especially introduces more powerful deep analysis
  - Heap profiling
  - Request profiling
  - And in 7.1 thread CPU sampling and visualization
- FR7 also extends many long-existing features
- FR Cloud changes the game for FR monitoring capabilities
- All this on top of what FR has always done
- Simply no better solution for FR monitoring, troubleshooting, debugging
  - And again all meant for live production use, in even the most advanced deployments
Other FR resources

- **FR web site**: fusion-reactor.com
  - Downloads
    - Docs, webinars, videos, technotes, forums, and much more

- **Email**: sales@fusion-reactor.com, support@fusion-reactor.com

- **Phone**: (978) 496-9990 (sales)

- **Consulting assistance**: cfconsultant.com

- We welcome your feedback on these or the other webinars, or any you would like to see
Questions & Answers