



Solving Problems in ways never before possible
with FusionReactor 7 and FR CLOUD

INTERGRAL
information solutions

 fusion
reactor™

Introductions



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Agenda

- What is FusionReactor & what can it do for you ?
- What's New in FusionReactor 7
- Solving Problems in new ways with fully integrated "Error and Analysis" tools
 - Code Debugger, Code/Memory/CPU Profiler, Thread Vizualizer
- FusionReactor CLOUD (production release)
- Questions & answers

Who does this talk apply to?

- Anyone interested in troubleshooting/tuning servers; solving coding or quality issues
 - Admins, managers, developers, DEVOPS
- FusionReactor supports ColdFusion and much more:
 - All CFML engines - ColdFusion, Lucee, Railo, BlueDragon
 - All Java servers - Tomcat, JBoss, Wildfly, Jetty, WebSphere, GlassFish etc.
 - Any Java applications – Apache Solr, Redis, Kafka, Confluence, etc.
 - Most DB's (SQL/No-SQL) - Oracle, SQL Server, MYSQL, Hibernate, Cassandra, MongoDB etc.
- FusionReactor is implemented simply as a java agent
- And is a low-cost, low-impact, reliable tool
 - Trusted for over 12 years by thousands of companies (with over 5K customers and over 25K servers running FusionReactor in production)

What is FusionReactor & what can it do for you?

- Watch what is going on, what has gone on, where the issues are
 - **High-level metrics** page reporting current state of instance processing
 - Requests, JDBC (also NoSQL) queries, Memory, CPU
 - **Request activity, history**, including recent, longest, and recently slow
 - Details on each request, including queries run within each request, and more
 - **JDBC activity, history** (recent/longest/recently slow) across all requests
 - Many **CF-specific metrics** exposed (counts of sessions, query cache, more)
 - **Memory usage** within JVM (heap and more), and **garbage collection**
 - **All this is logged**, kept for 30 days by default (~400 mb per month)
 - And still more ...

What is FusionReactor & what can it do for you? (cont.)

- **System Monitor** – see details of underlying system – not just the server instance
- **User Experience Monitoring** – see end to end performance
- **Code Profiler** and **Production Debugger** – more on these later
- **Crash Protection** – increase resilience and receive alerts when conditions arise
- **Obfuscation** – to protect privacy data in logs, alerts, cloud
- **Enterprise Dashboard** – watch multiple servers from single screen
- **CFML line execution metrics** (for CF and Lucee)
- Again, these are just the things FR has had for a while!

What's new in FusionReactor 7

20 completely new core features

100 major improvements and bug fixes

Still more metrics – first, full support for JMX

- JMX = Java Management Extensions – manage & monitor apps, system objects, devices
- 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

Even more metrics: new framework support

- FR can now auto-detect , distinguish requests for popular CF Frameworks
 - ColdBox (and ProfileBox is an available implementation of FR within ColdBox!)
 - Framework One (FW/1)
 - Fusebox
 - Using your own Framework? No problem – just define the syntax in FR
- Has long supported also **Spring, Struts, Play** java frameworks
 - Now supports Eclipse vert.x 3, polyglot event-driven application framework
- NoSQL – NO PROBLEM
 - Additional metrics - queryplan/explain information for MongoDB
 - Instrumentation metrics for MongoDB 3.0 Async driver
 - Support for Apache Cassandra
 - Support for *Redis* is an open source, in-memory data structure store
- Added consumer metrics for Kafka™ distributed streaming pub/sub platform

See 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

Sometimes it's the little things: other recent changes

- FR now **auto-detects datasource names** for display with queries
 - No longer need to use DSN connectionstring arg to identify each datasource name
- Enhanced tracking of calls to external resources
 - See new *Transactions>External Resources*
- Enhanced error tracking for requests and queries
 - See new *Requests>* and *JDBC>Error History*
- New option to **pause** requests and threads
- Can now **profile a request anytime during its life** (not just from start)
- Can now **"watch" specific variables/expressions** while stepping
- But many of you have never seen the profiling and debugging features
 - Let's bring on David to discuss these and other powerful/new features!

Solving Problems in new ways:

Fully integrated, low overhead

“Error and Analysis” tools

FusionReactor 7 - Solving Problems in new ways....

- FR is NOT only about capturing metrics and logging/alerting !
- FusionReactor is all about **SHORTENING time needed to IDENTIFY DEFECTS and PERFORMANCE ISSUES** with our integrated, low overhead, production safe - '**Error & Analysis Tools**' –
 - FusionReactor Ultimate – contains - **Code Debugger, Code Performance Profiler, Memory Analyzer and Thread Profiler**
 - Compare with developer tools like Eclipse, FusionDebug, JProfiler, JVisualVM – but FusionReactor is **LOW OVERHEAD** and can be used **SAFELY in PRODUCTION !**

Want to isolate JVM memory leaks?

- FR 7 adds a memory profiler, allowing you to explore the heap in “REAL TIME”
 - 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 for production use (LESS THAN 1 % Overhead)
- Can help spot JVM memory leaks...or cases of unexpected heap use

Understand and see what a threads are “really” doing

- FR 7 adds thread profiling (across any and all threads) + thread Visualizer
 - 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
 - See how much “real CPU time” has been spent processing a thread
- Both offer option to profile a given thread
 - Result appears in **Profiler>Profile History**
- Thread Visualizer will also let you stack trace a given thread

Want to identify code performance bottlenecks?

- Code profiler identifies how much time is being spent in specific methods
 - Shows real time in ms and percentage of time spent
 - ***Profiler>Active Profiling and Profiler>Profile History***
- Profiler is really a “catch all” for performance issues
- On by default for all requests/transactions which run longer than 3 seconds
- Profiles are created by aggregating stack-trace snapshots (~ 1 millisecond)
 - Typically a profile may only cost <10 ms on top of the request – but this is really worth it

Production Debugger – easily detect production errors

- Integrated “IDE Style” debug capability
- Set a breakpoint (TRIGGER) –
 - On exception | On Method Entry | Source File / Line # | On variable value / set
- Control this breakpoint
 - By time – fire and hold the breakpoint for X seconds
 - By IP address – only fire if I call you
 - By call frequency – e.g. only trigger a breakpoint one time – SINGLE THREAD
- Initiate various actions when a TRIGGER occurs
 - Open a fully integrated step debugger (no bother of setting up an IDE)
 - Send an Email – Includes Stack Trace + Variable Scope (forget CFDUMP)

Announcing FusionReactor CLOUD

FusionReactor CLOUD – additional features/benefits

- Extends the current on-premise JVM FR deployment - **SAME java agent !**
- Not about YOU running in the cloud. FR is running in the cloud!
- FR **pushing metrics**, profiles and “Interesting Transactions” to the cloud (**each minute**)
- **Data packs** sent to the cloud **are tiny !** Data is fully compressed
- Licensing – Server/Host **Reservations** + **On-Demand** (great for container usage)
- FR CLOUD is available as Enterprise (30 days) and Ultimate (90 days)
- A cloud license **INCLUDES** the on-premise license
- FR Cloud is **available** as **Enterprise** (\$99 month) or **Ultimate Edition** (\$149 month)

Key Features

- View **historical** information **up to 90 days on ULT – 30 days ENT**
- **Save transactions, profiles, JDBC data** to review with peers
- **See what's going on from an Application Perspective**
 - Combine data coming from multiple instances into a single Application view
- Fully featured **Alerting Engine**
 - Alert based on group/instance/application metrics
 - Define – how you're alerted – seamless integration with PagerDuty, Slack, Hipchat, email etc.
- On-Demand licensing makes it easy to support dynamic (containerized) environments
 - **See Brad Wood's video – (google) Deploying FusionReactor with Docker Swarm –**
- Expect more and more features to be added to cloud over time
- FR Cloud is available as Enterprise (\$99 month) or Ultimate Edition (\$149 month)

Conclusion

- Phew, FR does a lot!
- And still more in latest versions
- FR 7 especially introduces more powerful deep analysis
 - Heap profiling
 - Request profiling
 - 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, YouTube Channel and much more
- **Email: sales@fusion-reactor.com, support@fusion-reactor.com**
- **Phone: (978) 496-9990 (sales)**
- **Consulting assistance: cfconsultant.com**

A photograph of several people in a dimly lit office or control room. They are looking at large computer monitors displaying data and charts. One person in the foreground is resting their chin on their hand, looking intently at the screen. The scene is illuminated by desk lamps, creating a focused and professional atmosphere.

Questions & Answers