Solving problems in ways never before possible with FusionReactor 7 and FR CLOUD
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/NoSQL activity, Memory, CPU
  - **Request activity, history**, including recent, longest, and recently slow
    - Details on each request, including queries run within each request, relations, 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)
    - Logs are great for post-crash analysis
    - See available webinar on this, and still more on using logs, processing with Excel, etc
  - 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>ThreadPoo*l
- 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 of course for use in production
    - Very low overhead (LESS THAN 1 %), like all of FusionReactor

- Clearly 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 stacktrace a given thread – then DECOMPILE

- Why are these options to view details of non-request threads valuable?
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)

- Why are these options to view details of non-request threads valuable?
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 PageDuty, 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
Questions & Answers