

FusionReactor Webinar:
What's new in FusionReactor 7 and 7.1

INTERGRAL
information solutions

 fusion
reactor™

Introductions



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(Focused on server troubleshooting)

Agenda

- Foreword
- About FR 7 and 7.1
- What's new, what's improved
- About FR Cloud
- Resources for learning more
- Questions & answers

Foreword

- Audience: presumed to already be using FR
 - May be using 7/7.1, but perhaps not using the latest features to fullest extent
 - May be using FR 6 or earlier, wondering what's new in latest releases
 - Even FR newcomers should be able to follow along (but see other webinars for more)
- Concepts apply generally to any Java/CFML server that FR can monitor
- Preso is being recorded, so you will be able to revisit details

About FR 7 and 7.1

- FR7 came out in July 2017, and 7.1 in Oct 2017
 - Will describe things as they are now available in 7.1 (more on updating to it in a moment)
- Not only new features, but also improvements to existing ones
 - We will cover many (though not all) of these new and improved features
- FR 7 also marked production release of FusionReactor Cloud
 - We'll conclude with a brief introduction to that
 - Covered already in-depth in another full webinar earlier in 2017
- Updating to FR 7.1
 - Users with current FR 7 subscriptions or paid maintenance can upgrade to 7.1 for free
 - If FR was installed with installer, simply download and run 7.1 installer to update in place
 - Otherwise if FR was installed by implementing JAR, simply download and put in place the 7.1 jar
 - Last update of 7.0 was 7.0.8

FR 7 and 7.1 added many new features

- Among new features, those which we will cover today:
 - CPU profiling/sampler
 - Thread visualization
 - Memory/heap profiling
 - JMX metric monitoring
 - AWS CloudWatch integration
- Note that while some of these are available via JVM tools
 - Note that with FR, all these things are accessed within browser
 - And no need of special JVM configuration, or opening special ports
 - Of course, FR as a web app is secure
 - FR login required to access FR
 - Non-standard ports used for FR's built-in web server

FR 7 and 7.1 added many enhancements

- And among those improvements to existing features that we will cover today:
 - Enhanced tracking of request/query errors, and of calls to external resources
 - Improvements to the interactive step debugger
 - Auto detection of datasource names
 - Support for more CFML and Java frameworks
 - Support for NoSQL data stores, streaming platforms like Apache Kafka
 - and more
- Let's dig in...

New Features in 7/7.1

CPU profiling/sampler (7.1)

FusionReactor 1 13:24:19 CET Windows

CPU Sampler

Search...

[Deltas](#)
[New Snapshot](#)
1 Seconds
[Set Home Page](#)

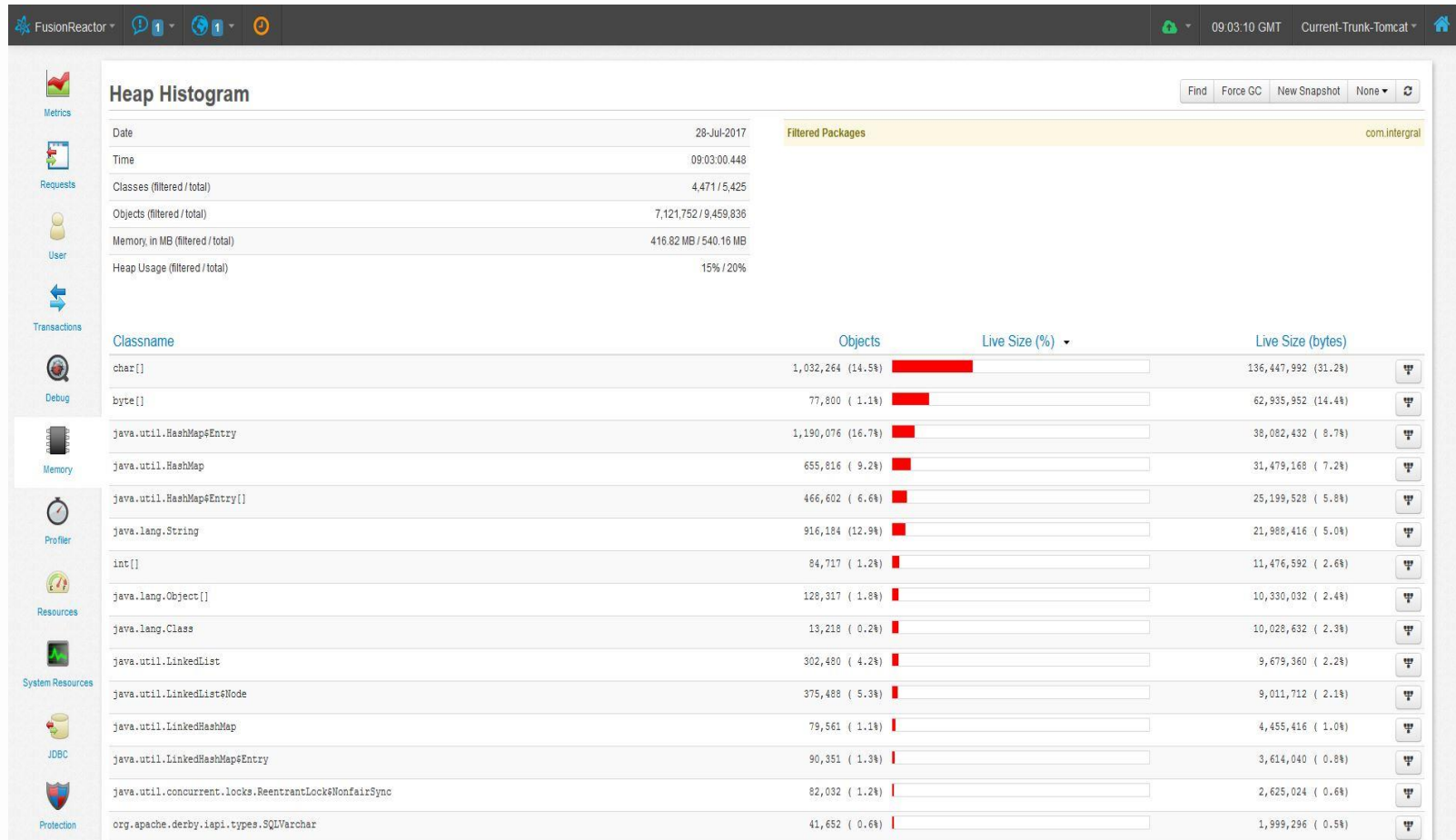
JVM Start Time	9-Nov-17 10:44:16.137
End Time	9-Nov-17 13:24:16.458
Threads	72
Total CPU Time (ms)	1.63M

Thread Id	Thread Info	Thread State	Thread CPU Time (%)	Thread CPU Time (ms)
67	http-nio-8080-exec-2 main	WAITING	<div style="width: 9.68%; height: 10px; background-color: red;"></div> 9.68%	157,810.61
81	http-nio-8080-exec-3 main	WAITING	<div style="width: 9.52%; height: 10px; background-color: red;"></div> 9.52%	155,174.19
88	http-nio-8080-exec-9 main	WAITING	<div style="width: 9.36%; height: 10px; background-color: red;"></div> 9.36%	152,522.18
87	http-nio-8080-exec-8 main	WAITING	<div style="width: 8.87%; height: 10px; background-color: red;"></div> 8.87%	144,503.73
53	FusionReactor APM/Metro - Metrics Gathering Timer FusionReactor	TIMED_WAITING	<div style="width: 8.41%; height: 10px; background-color: blue;"></div> 8.41%	137,062.48
86	http-nio-8080-exec-7 main	WAITING	<div style="width: 8.31%; height: 10px; background-color: red;"></div> 8.31%	135,502.47
63	http-nio-8080-exec-1 main	WAITING	<div style="width: 7.97%; height: 10px; background-color: red;"></div> 7.97%	129,855.23
84	http-nio-8080-exec-5 main	WAITING	<div style="width: 7.44%; height: 10px; background-color: red;"></div> 7.44%	121,197.18
85	http-nio-8080-exec-6 main	WAITING	<div style="width: 7.08%; height: 10px; background-color: red;"></div> 7.08%	115,347.14
89	http-nio-8080-exec-10 main	WAITING	<div style="width: 6.95%; height: 10px; background-color: red;"></div> 6.95%	113,303.53
82	http-nio-8080-exec-4 main	WAITING	<div style="width: 6.60%; height: 10px; background-color: red;"></div> 6.60%	107,656.29

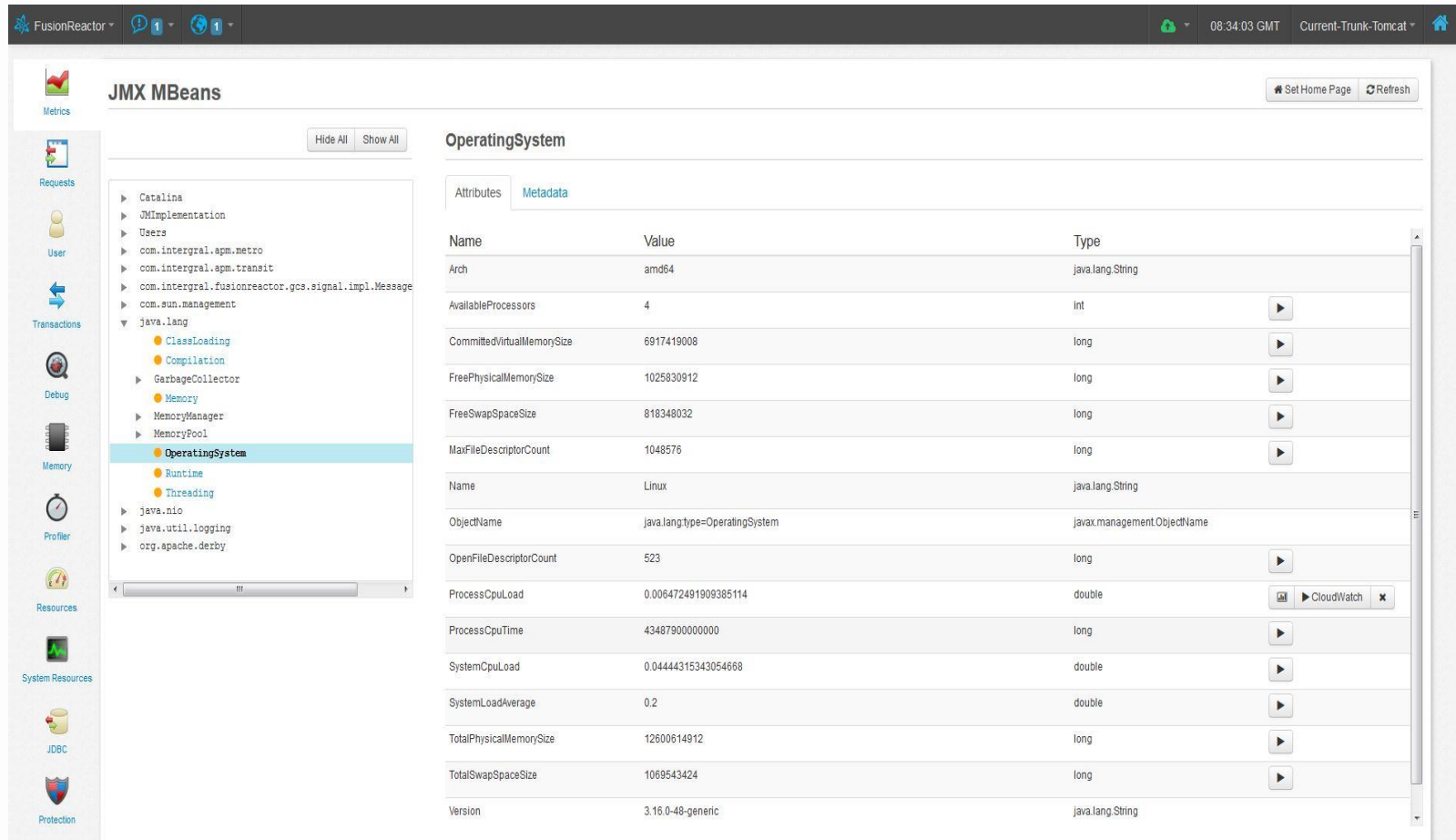
Thread visualization (7.1)



Heap profiling (7.0)



JMX metric monitoring (7.0)



The screenshot displays the FusionReactor JMX MBeans monitoring interface. The top navigation bar includes the FusionReactor logo, notification icons, system status (green), time (08:34:03 GMT), and environment (Current-Trunk-Tomcat). The main content area is titled "JMX MBeans" and features a "Hide All" / "Show All" toggle. On the left, a sidebar lists various monitoring categories: Metrics, Requests, User, Transactions, Debug, Memory, Profiler, Resources, System Resources, JDBC, and Protection. The "OperatingSystem" MBean is selected and highlighted in the tree view. The main panel shows the "Attributes" tab for the "OperatingSystem" MBean, displaying a table of system metrics.

Name	Value	Type
Arch	amd64	java.lang.String
AvailableProcessors	4	int
CommittedVirtualMemorySize	6917419008	long
FreePhysicalMemorySize	1025830912	long
FreeSwapSpaceSize	818348032	long
MaxFileDescriptorCount	1048576	long
Name	Linux	java.lang.String
ObjectName	java.lang:type=OperatingSystem	javax.management.ObjectName
OpenFileDescriptorCount	523	long
ProcessCpuLoad	0.006472491909385114	double
ProcessCpuTime	43487900000000	long
SystemCpuLoad	0.04444315343054668	double
SystemLoadAverage	0.2	double
TotalPhysicalMemorySize	12600614912	long
TotalSwapSpaceSize	1069543424	long
Version	3.16.0-48-generic	java.lang.String

AWS CloudWatch integration (7.0)

FusionReactor 1 1 15:43:12 CEST DemoInstance

Metrics
AWS CloudWatch Metrics
Configure [Set Home Page](#) [Refresh](#)

Metric Selection

Filter Available Series

Available Series

- CPU - Core - 0 - The Combined CPU Usage for this core.
- CPU - Core - 1 - The Combined CPU Usage for this core.
- CPU Occupancy - All - Instance (%) - Tracks the occupancy of this instance on all cores.
- CPU Occupancy - All - Total (%) - Tracks the total occupancy of all processes on all cores.
- MBean - java/lang/OperatingSystem/ProcessCpuLoad - ProcessCpuLoad
- MBean - java/lang/OperatingSystem/ProcessCpuTime - ProcessCpuTime
- MBean - java/lang/OperatingSystem/SystemCpuLoad - SystemCpuLoad
- System - CPU - Nice - The Amount of the System CPU being used by Nice.
- System - CPU - System - The Amount of the System CPU being used by System.
- System - CPU - User - The Amount of the System CPU being used by User.
- System - CPU - Wait - The Amount of the System CPU being used by Wait.

Hold ctrl to select multiple series

AWS CloudWatch Dimensions

FusionReactor is sending 4 (of 139 available) metrics to AWS CloudWatch. Each metric sent may be billed by Amazon according to the current rate for CloudWatch Custom Metrics. Pricing for this service is available here: aws.amazon.com/cloudwatch/pricing/

Available

Metrics being sent to AWS CloudWatch

Metric Name	Metric Description	AWS Dimensions	AWS Metric Name	AWS Metric ID	Last Value Sent	
MBean - java/lang/OperatingSystem/FreePhysicalMemorySize	FreePhysicalMemorySize	instanceName=DemoInstance, hostname=demo-vm	Free Physical Memory Size	/com/intergral/fusionreactor/jmx/java/lang/OperatingSystem/FreePhysicalMemorySize	2.173066581333333E8	<input type="button" value="Remove"/>
MBean - java/lang/OperatingSystem/ProcessCpuLoad	ProcessCpuLoad	instanceId=demo-vmDemoInstance	Process Cpu Load	/com/intergral/fusionreactor/jmx/java/lang/OperatingSystem/ProcessCpuLoad	0.047779817012067086	<input type="button" value="Remove"/>

Enhancements in 7/7.1

Let's look at a few

- Enhanced tracking of request and query errors
 - New "Error" pages/links on left nav bar "Requests" and "JDBC" menus
 - New depiction of error counts in Metrics>Web Metrics and other time graphs
- Enhanced tracking of calls to external resources (new on "Transactions" menu)
- Auto detection of datasource names (no longer must use connectionstring)
- Support for Docker detection and reporting
 - <https://docs.fusion-reactor.com/display/FR70/Using+FusionReactor+in+Docker>
 - <https://www.fusion-reactor.com/news/screencast-intro-to-fusionreactor-cloud-docker-swarm-demo-brad-wood/>
- Ability to pause requests (really a facet of using FR Ultimate's step debugger) ...

Improvements to the interactive step debugger

- Simplified breakpoint settings: can now pause/debug a request while running
 - Without need to set a breakpoint in advance
 - Can also debug threads, from FR pages showing running threads
- Improved UI: easier to view variables, also new option to watch variables
- Ability to step through stack frames (and see variables at that point in past)
- New and more helpful information when triggers are pending
- Again, the debugger runs in the browser, not in any IDE
- Resources:
 - <https://www.fusion-reactor.com/webinar/getting-the-most-out-of-fusionreactor-ultimate-identifying-the-most-elusive-issues/>
 - <https://www.fusion-reactor.com/blog/why-every-developer-needs-fusionreactors-production-debugger/>

Support for new platforms

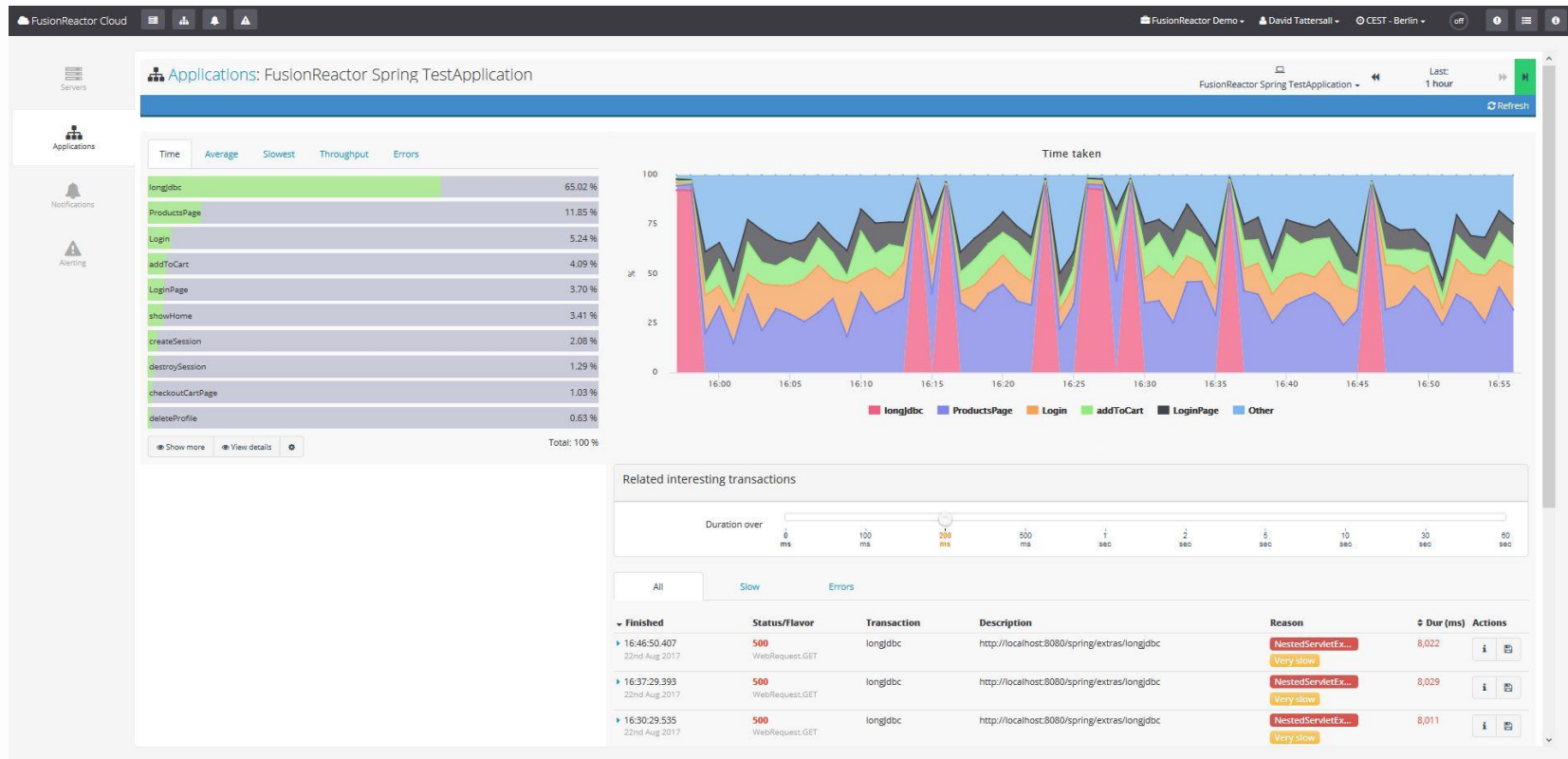
- Support for more CFML and Java frameworks
 - Already supported **in CFML**: ColdBox, ; **in Java**: Struts, Spring, Play
 - Added support (in FR 7.0) for FW/1, Fusebox
- Support for NoSQL data stores
 - Mongo, Cassandra , Redisson
- Support for streaming platforms like Apache Kafka
 - <https://www.fusion-reactor.com/evangelism/monitoring-kafka-consumer-applications/>

Still other enhancements

- In FR 7.1
 - Link to FR Cloud now offered within cloud icon/menu (for FR cloud customers)
 - Better explanation when a requested page is gone from FR request history
 - Websocket compression for data travelling to FusionReactor Cloud
 - Initial support for Clojure instrumentation
- In FR 7.0
 - Improved control over transaction naming, framework detection
 - <https://docs.fusion-reactor.com/display/FR71/Settings#Settings-TransactionNamingTransactionNaming>
 - Automatically obfuscates data which matches credit card number format
 - Support for “line performance” in Lucee
 - Improvements to manual license activation process
- Still more, including perf improvements and 115 bug fixes between 7.0-7.0.8 and in 7.1
 - Listed here: <https://www.fusion-reactor.com/support/kb/frs-431/>

FR Cloud released

FusionReactor CLOUD...



FusionReactor CLOUD (cont.)

- Cloud-based repository and interface alternative
 - Gives you all the benefits of FR on-premise plus extended data retention, application metrics and advanced alerting capability
- Historical metric data retention (up to 90 days)
- Enhanced alerting
 - Can alert on many more conditions than FR on-premise
 - Integration with alerting platforms such as PagerDuty, Slack, HipChat, and more
- More:
 - <https://www.fusion-reactor.com/fusionreactor-cloud/>
 - <https://www.fusion-reactor.com/webinar/fusionreactor-cloud/>

Resources

- Regarding FR 7/7/1, besides the online documentation, see also:
 - <https://www.fusion-reactor.com/news/announcing-fusionreactor-7/>
 - FR 7 Release notes : <https://www.fusion-reactor.com/support/kb/frs-431/>
 - <https://www.fusion-reactor.com/production-java-profiler/>
 - <https://www.fusion-reactor.com/memory-profiler/>
 - <https://www.fusion-reactor.com/production-debugger>
 - <https://www.fusion-reactor.com/feature-panel>

Conclusion

- Many new and improved features in FusionReactor 7 and 7.1
 - These extend FR's long-existing powers to help with troubleshooting, tuning, problem resolution
 - Powerful features like heap and cpu profiling, jmx metrics, etc
- Again, all these new features are accessed within the browser
 - No need of other JVM tools or related jvm configuration
- And enhancements to previously existing features
 - Always watch out for ways old features may have been vastly improved
- Updating is free for those on subscription or with current maintenance
 - Is an in-place upgrade from prior releases

Other webinars

- www.fusion-reactor.com/webinars
 - Register for any newly added ones
 - Watch recordings of past ones

Other FR resources

- **FR web site: fusion-reactor.com**
 - Downloads
 - Docs, 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