

MAX 2006 Beyond Boundaries

Unlocking the ColdFusion
Server Black Box

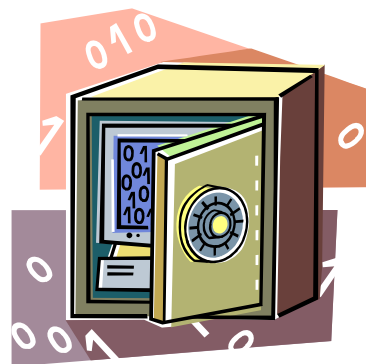
Ashwin J Mathew
Computer Scientist
Adobe Systems



Unlocking the ColdFusion Server Black Box



- How's my server doing?
- What's making it hang?
- What's eating memory?
- Which templates are running slow? Why?
- Which queries are running slow?
- How are the database connection pools doing?
- How well are the template and query caches performing?
- ... and lots more!



Introducing the ColdFusion Server Monitor



The screenshot displays the ColdFusion Monitoring Console interface. It features a left-hand navigation pane with sections for Request Statistics, Memory Usage, Database, Errors, Alerts and Snapshots, and Settings. The main area is divided into several panels:

- J/VM Memory Status:** A line graph showing Total Memory (92.07 MB) and Used Memory (47.36 MB) over time.
- Average Response Time:** A line graph showing the Average Response Time (ms) over time, with a current value of 2.253 ms.
- Reports:** A table listing various performance reports such as 'Requests with Errors', 'Requests slower than 3 secs', etc.
- Slowest Active Requests:** A table listing the top requests by time, including details like 'Template Path' and 'Time (secs)'.

Request ID	Template Path	Time (secs)
1	C:\cfm\bin\back2cfmserver.cfm	0.719
2	C:\cfm\bin\back2cfmserver.cfm	0.887
4	C:\cfm\bin\back2cfmserver.cfm	0.887
20	C:\cfm\bin\back2cfmserver.cfm	0.887
9	C:\cfm\bin\back2cfmserver.cfm	0.889
20	C:\cfm\bin\back2cfmserver.cfm	0.889
12	C:\cfm\bin\back2cfmserver.cfm	0.889
- Alerts:** A section showing active and recovered alerts, such as 'hungserver! Active at 12:54:33 PM' and 'slowserver! Active at 12:39:26 PM'.
- Last Error:** A section showing the most recent error: 'ColdFusion runtime: UndefinedElementException: Element USERID is undefined in REQUEST.'

At the bottom of the console, there is a footer with the text '2006 Adobe Systems Incorporated. All Rights Reserved.' and the Adobe logo.

Introducing the ColdFusion Server Monitor



- Developers can
 - Analyze problems during development
 - Pinpoint bottlenecks on production servers
- Administrators can
 - Monitor overall server health
 - Use monitor data to tune server settings
 - Get early notification of critical conditions
- Monitors requests arriving via all paths: template, CFC HTTP call, web service, gateway, Flash remoting
- Typically minimal performance overheads
- Switch on and off on a running server

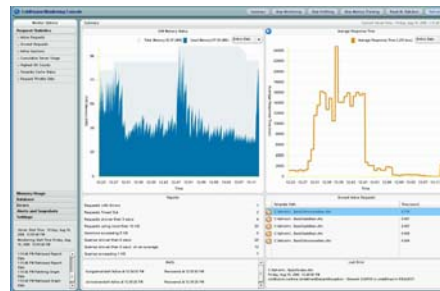
A smaller version of the ColdFusion Monitoring Console screenshot, showing the same interface as the main image above.



Summary Screen



- JVM Memory Utilization
- Average Server Response Time
- Requests per second
- Running/queued requests (standalone)
- Slowest Active Requests
- Last Error
- Alert conditions
- Report Summary



Active Request Report



- View details of active requests
 - Template path
 - Client IP address
 - Thread name
 - Time taken
 - Current CFML and Java stack trace
- Using CFML stack trace:
 - Find deadlocked requests
 - Find where a long running request is blocked
- Kill requests
- Single view of request graphs
 - Average server response time
 - Requests per second
 - Running/queued requests (standalone)



Cumulative Server Time Report

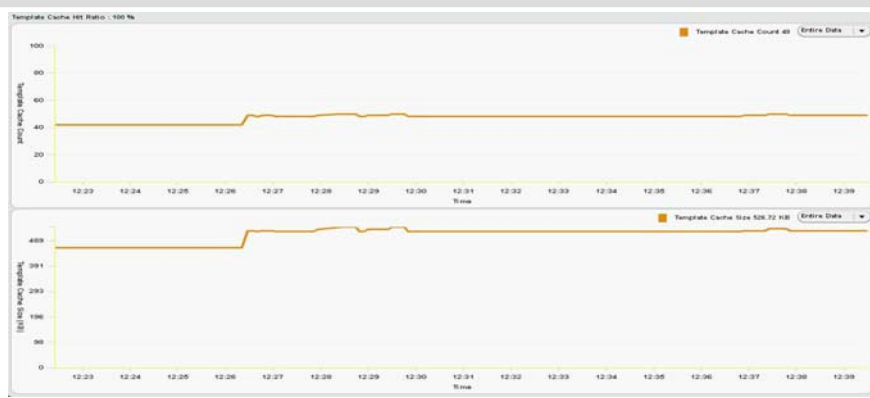


Template Path	% Server Time
C:\shwin\...\task2\showitems.cfm	44.138
C:\shwin\...\task2\additem.cfm	26.109
C:\shwin\...\task2\showoneitem.cfm	14.313
C:\shwin\...\task2\showcategories.cfm	3.664
C:\shwin\...\task2\payment.cfm	3.622
C:\shwin\...\task2\index.cfm	3.408
C:\shwin\...\task2\checkout.cfm	1.913
C:\shwin\...\task2\findcustomer.cfm	1.309
C:\shwin\...\adminapi\servermonitoring.cfm :: dumpSnapshot()	0.112
C:\shwin\...\adminapi\servermonitoring.cfm :: getRealtimeStats()	0.055

- Which requests are cumulatively taking the most server time?
- Even if a request executes rapidly, tuning it further may provide benefits



Template Cache Status



- Monitor cache hit ratio, number of templates in the cache, and estimated cache size
- If the cache hit ratio is too low, can the cache count be increased?



Slowest Queries



- **Slowest Queries**
 - Specific instances of a query that ran slow
 - SQL for the query instance available
 - Is there something special about the query conditions that slowed it down?
- **Slowest Queries by Average**
 - Queries which are running slow on average
 - Can the queries be tuned?
 - Can the queries be cached?
- These reports do not include cached queries

Template Path	C:\ehwin\work\ColFusion\id_main\fusion\wwwroot\back2showonitem.dfm	
Line #	4	Last Execution Time: 0.010 (secs)
Query Name	GetItem	Avg Execution Time: 0.002 (secs)
Data Source	ExampleKpps	Min Execution Time: 0 (secs)
Cached	No	Max Execution Time: 0.370 (secs)
Execution Count	5209	Avg Size: 1.25 (KB)
Last Executed	Friday, Aug 10, 2006 12:23:05 PM	Min Size: 1.10 (KB)
Time Taken	0.370 (secs)	Max Size: 1.42 (KB)
SQL		
SELECT ItemID,		
ItemName,		
PartNum,		
ItemCost,		
Teaser,		
ItemImage,		
ItemDescription,		
CategoryIDFK,		
Name		
FROM tblItems, tblManufacturers		
WHERE tblItems.ManufacturerID		
AND ItemID = 841E4755-7078-11D3-8C390004218682		



Queries By Memory Usage



Template Path	Data Source	Avg Size (KB)
C:\ehwin\... \back2\showcart.dfm	ExampleKpps	1.83
C:\ehwin\... \back2\showcategories.dfm	ExampleKpps	1.63
C:\ehwin\... \back2\showitems.dfm	ExampleKpps	1.58
C:\ehwin\... \back2\showitems.dfm	ExampleKpps	1.46
C:\ehwin\... \back2\payment.dfm	ExampleKpps	1.46
C:\ehwin\... \back2\showonitem.dfm	ExampleKpps	1.25
C:\ehwin\... \back2\showcart.dfm	ExampleKpps	1.21

- Which queries consume the most memory?
- Can the largest queries be tuned to reduce memory utilization per request?
- Can they be cached?
- This report does not include cached queries



Frequently Run Queries

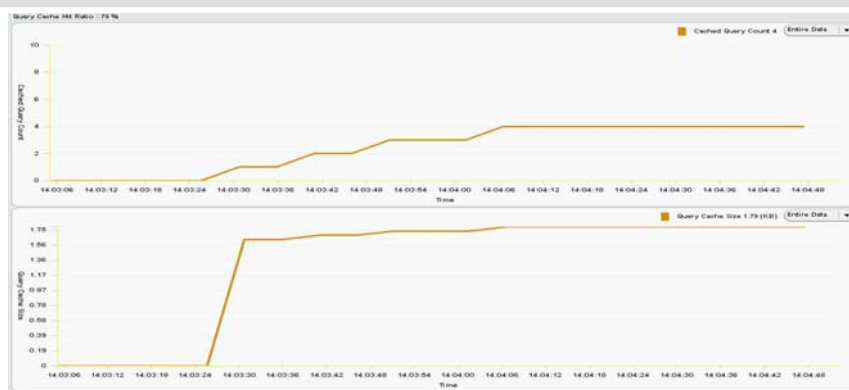


Template Path	Execution Count	Data Source
C:\ehwin\..._track2\showcart.dfm	15786	ExampleApps
C:\ehwin\..._track2\showcart.dfm	15765	ExampleApps
C:\ehwin\..._track2\showonitem.dfm	3908	ExampleApps
C:\ehwin\..._track2\showitems.dfm	3825	ExampleApps
C:\ehwin\..._track2\showitems.dfm	3825	ExampleApps
C:\ehwin\..._track2\payment.dfm	1753	ExampleApps
C:\ehwin\..._track2\payment.dfm	1753	ExampleApps
C:\ehwin\..._track2\showcategories.dfm	345	ExampleApps
C:\ehwin\..._track2\findcustomer.dfm	878	ExampleApps
C:\ehwin\..._track2\showitems.dfm	136	ExampleApps
C:\ehwin\..._track2\showitems.dfm	136	ExampleApps
C:\ehwin\...components\CartItemManager.dfm::addItem()	35	ExampleApps
C:\ehwin\...components\CartItemManager.dfm::addItem()	35	ExampleApps

- Which queries are run most frequently?
- Tuning queries with high frequency can provide a positive impact on performance
- This report does not include cached queries



Query Cache



- Monitor cache hit ratio, number of queries in cache and estimated cache size
- If the cache hit ratio is too low, can the cache count be increased?
- If the cache is too large, can some queries be moved out of the cache?



Query Cache



- List queries in the cache
 - Data source
 - Estimated size
 - Template and line number
 - Query name
 - Execution count
 - Execution time
 - SQL
- If the execution time is low, do you really need to cache it?
- If the execution count is high, tune cachedafter/cachedwithin settings

Template Path	Data Source	Size (KB)
C:\Users\...bak2\obvlers.dn	ExampleJps	1.05
C:\Users\...bak2\obvlers.dn	ExampleJps	1.05
C:\Users\...bak2\obvlers.dn	ExampleJps	1.05
C:\Users\...bak2\obvlers.dn	ExampleJps	1.05

Template Path: C:\Users\...bak2\obvlers.dn
 Data Source: ExampleJps
 Size: 0.05 (KB)
 Line #: 10
 Execution Count: 3

Query Name: GetCurrentCategory
 List Ended: Friday, Aug 10, 2006 2:04:04 PM
 Execution Time: 0 (ms)

```
SQL:
SELECT CategoryName FROM tblCategories
WHERE CategoryID = '5415E476-7D75-11D3-8C001000041689F'
```



Memory Usage Summary



- Summary of estimated memory used across all session, all application and server scopes
- Specific reports available for details of memory used by individual session, application and server scopes



Tracking Errors and Timeouts



Template Path C:\shwin\work\ColdFusion\cf_main\cfusion\wwwroot\tack2\additem.cfm
 Error Count 2 Last Error Occurred Friday, Aug 18, 2006 6:05:19 PM
 Last Error coldfusion.runtime.UndefinedElementException : Element ITEMNAME is undefined in REQUEST.

CFML Stack Trace

C:\shwin\work\ColdFusion\cf_main\cfusion\wwwroot\tack2\components\CartManager.cfm:ADDITEM:36
 at C:\shwin\work\ColdFusion\cf_main\cfusion\wwwroot\tack2\additem.cfm:9

Template Path C:\shwin\work\ColdFusion\cf_main\cfusion\wwwroot\tack2\additem.cfm
 # of times 72 Last Executed Friday, Aug 18, 2006 12:55:00 PM
 Last Response Time 4.032 (secs) Last Request Size 4.91 (KB)

CFML Stack Trace

C:\shwin\work\ColdFusion\cf_main\cfusion\wwwroot\tack2\components\CartManager.cfm:ADDITEM:36
 at C:\shwin\work\ColdFusion\cf_main\cfusion\wwwroot\tack2\additem.cfm:9

- Requests with Errors Report
 - Template, error count, last occurred at, CFML and Java stack traces
- Requests Timed Out Report
 - Template, # time outs, last response time, last executed, last request size, CFML stack trace



Using the Profiler



Top 10 Variables By Highest Memory

Variable Name	Variable Scope	Variable Type	Declared in	Avg Size (bytes)	Last Size (bytes)
GETITEMS	VARIABLES	QUERY	C:\shwin\..._track2\showitems.cfm	3798	3798
GETCATEGORIES	VARIABLES	QUERY	C:\shwin\..._track2\showcart.cfm	1672	1672
GETCARTITEMS	VARIABLES	QUERY	C:\shwin\..._track2\showcart.cfm	1239	1239
APP	REQUEST	STRUCT	C:\shwin\..._track2\global_vars.cfm	240	240
GETCURRENTCATEGORY	VARIABLES	QUERY	C:\shwin\..._track2\showitems.cfm	112	112
TOTALCOST	VARIABLES	SIMPLE	C:\shwin\..._track2\showcart.cfm	40	40
CFQUERY.EXECUTIONTIME	VARIABLES	SIMPLE	C:\shwin\..._track2\showitems.cfm	16	16
CFQUERY.EXECUTIONTIME	VARIABLES	SIMPLE	C:\shwin\..._track2\showcart.cfm	16	16

- Find bottlenecks in your application during development
- Turn on all the switches – monitoring, profiling and memory tracking
- Turn the Slowest Request and Requests By Memory Usage report thresholds down to zero
- Run your templates
- For each request find:
 - Slowest tags and functions from Slowest Requests report
 - Largest variables from Requests By Memory Usage report



Filtering Requests



Monitor CF Admin pages: (CF Admin pages are not monitored by default)

Any path you specify below will not be monitored by the monitoring service

Exclude Path

- C:\Fusion\037\server\framework
- C:\Fusion\037\server\shoppingcart
- C:\Fusion\037\server\validation

Any path you specify below will be monitored by the monitoring service

Include Path

- C:\Fusion\037\framework\security
- C:\Fusion\037\framework\database

- Exclude and include requests to templates under specified paths
- Especially useful for restricted monitoring on production systems



... and more



- **Active Sessions**
 - Provides session Id, estimated size, application name, elapsed time and session contents
- **Active Queries**
 - Provides template/line no, query name, SQL, and more
- **Database Connection Pool Status**
 - Provides connections in use, total connections, max connections, and more
- **Request Throttle Data**
 - Provides URI, throttle size and more for throttled requests
 - Graphs of throttle memory and size
- **Highest Hit Counts**
 - Provides template, hit count, average execution time and average request size
 - Chart provides breakup of requests by type: template, CFC HTTP call, web service, flash remoting, gateway
- **Refresh Interval**
 - Refresh interval for graphs and reports can be customized
- **Graph filters**
 - All time-based graphs can be filtered to show all data, or a configurable period of recent data



Switches



Start Monitoring Start Profiling Start Memory Tracking

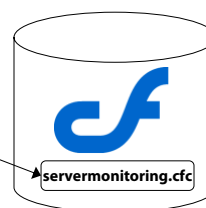
- Monitoring is the big switch, turns everything on and off
- Profiling turns on monitoring of individual tag, function and query execution times.
- Memory Tracking switches on measurement of memory consumed in various scopes. If profiling is on, memory used by individual tags, functions and queries will also be tracked.
- Data is gathered for different reports have data based on which switches are turned on.
- Performance impact with monitoring and profiling turned on is minimal.
- Performance impact with memory tracking turned on can be significant.



Admin API



Flash Remoting



- All server monitor reports, and more, are accessible via Admin API
- Roll your own server monitor using servermonitoring.cfc



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