

# Rock Your Ops

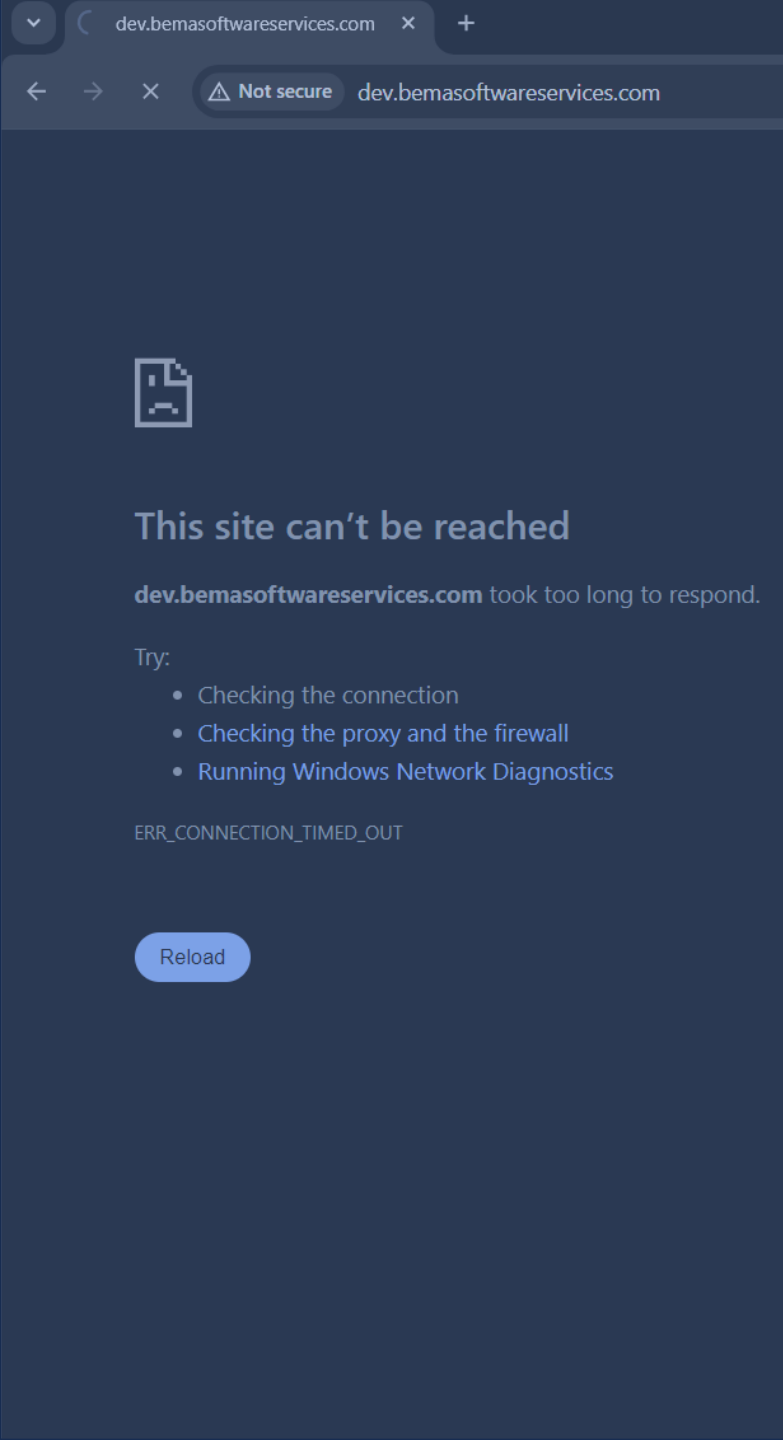
**Bill Deitrick**

[bemasoftwareservices.com/rockyouops](https://bemasoftwareservices.com/rockyouops)

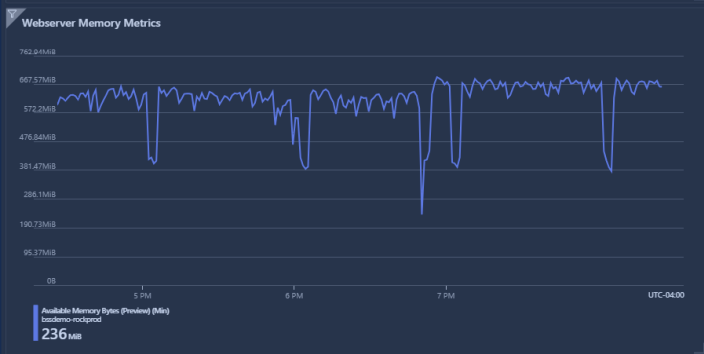
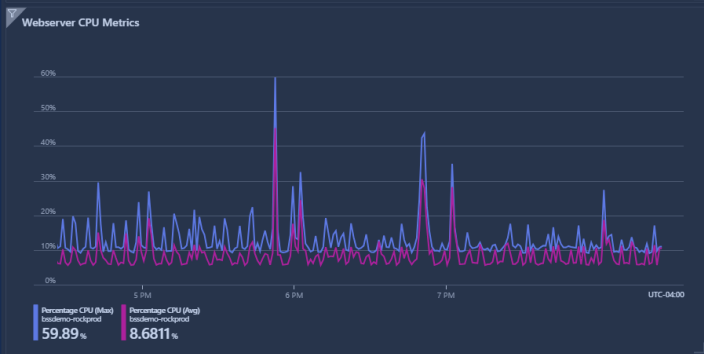
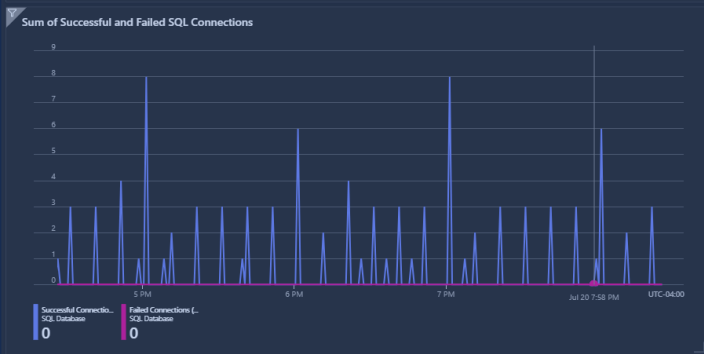
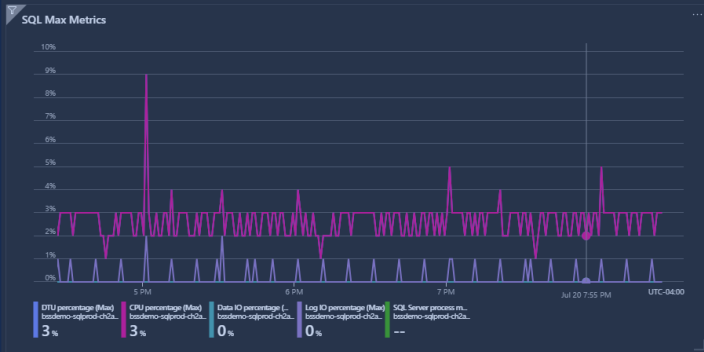


# About Me

# About You



# Rock is down... now what?



# Monitoring

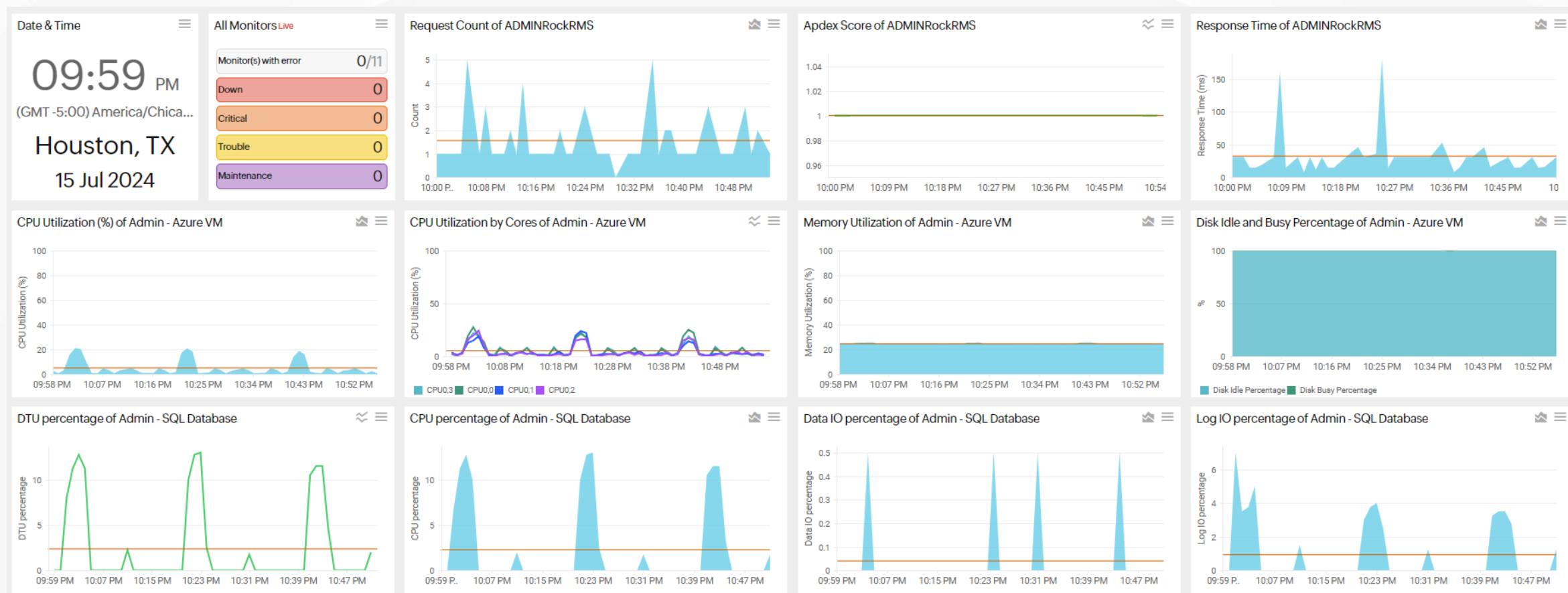
# Monitoring Types: White Box

- AKA Observability
- Common Metrics and Components
  - Response Time
  - Request Throughput
  - Error Rate
  - Apdex
  - Transactions
  - Traces
- Agent-Based vs. Open Telemetry

# Monitoring Types: Black Box

- External polling:
  - Response times
  - Internet infrastructure
  - TLS certificate monitoring
- Application server metrics:
  - CPU
  - Memory
  - Disk IO
  - Disk space
  - Network Throughput
  - Burst Credits
- SQL Database metrics
  - DTU Utilization
  - CPU Utilization
  - Data IO Percentage
  - Disk IO Percentage

# Single Pane of Glass





# Single Pane of Glass: Azure

Add [BEMA's dashboard](#) to your Azure environment!

- Displays data already collected by your Azure environment
- Dashboards are a no-cost Azure platform feature!



# The Troubleshooting Process

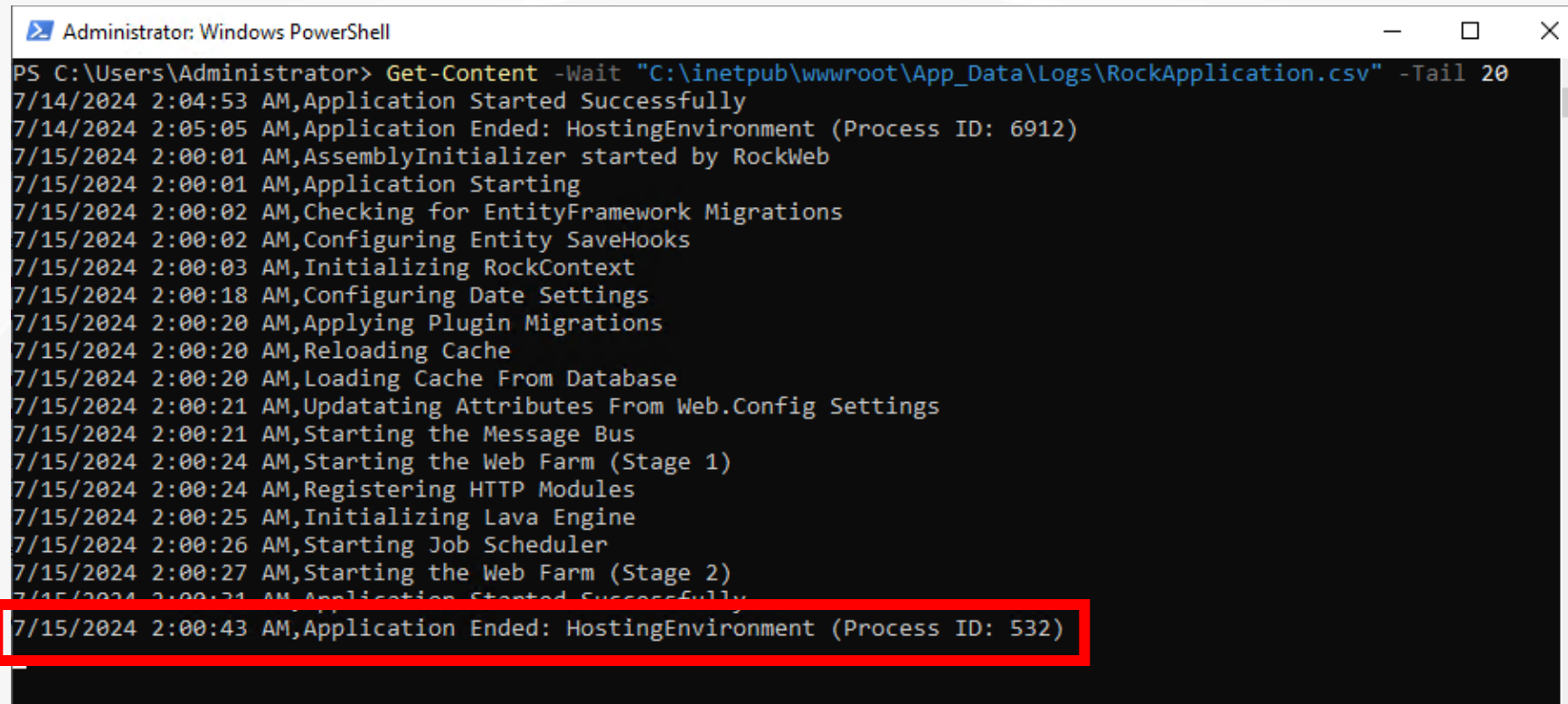
1. What am I seeing?
2. What can I learn from my monitoring tools?
3. What can I learn from my web server?
4. What can I learn from my database?

# Digging Deeper: Web Server

- Rock Exceptions UI
- Rock Application Log File
  - `C:\inetpub\wwwroot\App_Data\Logs\RockApplication.csv`

# Rock Application Log File

```
Get-Content -Wait "C:\inetpub\wwwroot\App_Data\Logs\RockApplication.csv" -Tail 100
```

A screenshot of a Windows PowerShell terminal window titled "Administrator: Windows PowerShell". The terminal displays a series of log entries from a Rock application. The entries are timestamped and include details about application startup, configuration, and migration processes. The final entry, "7/15/2024 2:00:43 AM,Application Ended: HostingEnvironment (Process ID: 532)", is highlighted with a red rectangular box.

```
Administrator: Windows PowerShell
PS C:\Users\Administrator> Get-Content -Wait "C:\inetpub\wwwroot\App_Data\Logs\RockApplication.csv" -Tail 20
7/14/2024 2:04:53 AM,Application Started Successfully
7/14/2024 2:05:05 AM,Application Ended: HostingEnvironment (Process ID: 6912)
7/15/2024 2:00:01 AM,AssemblyInitializer started by RockWeb
7/15/2024 2:00:01 AM,Application Starting
7/15/2024 2:00:02 AM,Checking for EntityFramework Migrations
7/15/2024 2:00:02 AM,Configuring Entity SaveHooks
7/15/2024 2:00:03 AM,Initializing RockContext
7/15/2024 2:00:18 AM,Configuring Date Settings
7/15/2024 2:00:20 AM,Applying Plugin Migrations
7/15/2024 2:00:20 AM,Reloading Cache
7/15/2024 2:00:20 AM,Loading Cache From Database
7/15/2024 2:00:21 AM,Updatating Attributes From Web.Config Settings
7/15/2024 2:00:21 AM,Starting the Message Bus
7/15/2024 2:00:24 AM,Starting the Web Farm (Stage 1)
7/15/2024 2:00:24 AM,Registering HTTP Modules
7/15/2024 2:00:25 AM,Initializing Lava Engine
7/15/2024 2:00:26 AM,Starting Job Scheduler
7/15/2024 2:00:27 AM,Starting the Web Farm (Stage 2)
7/15/2024 2:00:27 AM,Application Started Successfully
7/15/2024 2:00:43 AM,Application Ended: HostingEnvironment (Process ID: 532)
```

# Application Shutdown Reasons

BinDirChangeOrDirectoryRename	A change was made to the Bin folder or its contents. Typically a plugin install or update.
ConfigurationChange	Application configuration file was changed (web.config, web.ConnectionStrings.config)
InitializationError	The application was unable to initialize, likely due to an incorrect configuration (connection string, etc.).
UnloadAppDomainCalled	The “Restart Rock” button was clicked in the Rock UI.
HostingEnvironment	The hosting environment shut down the application domain (app pool recycle, other reasons).

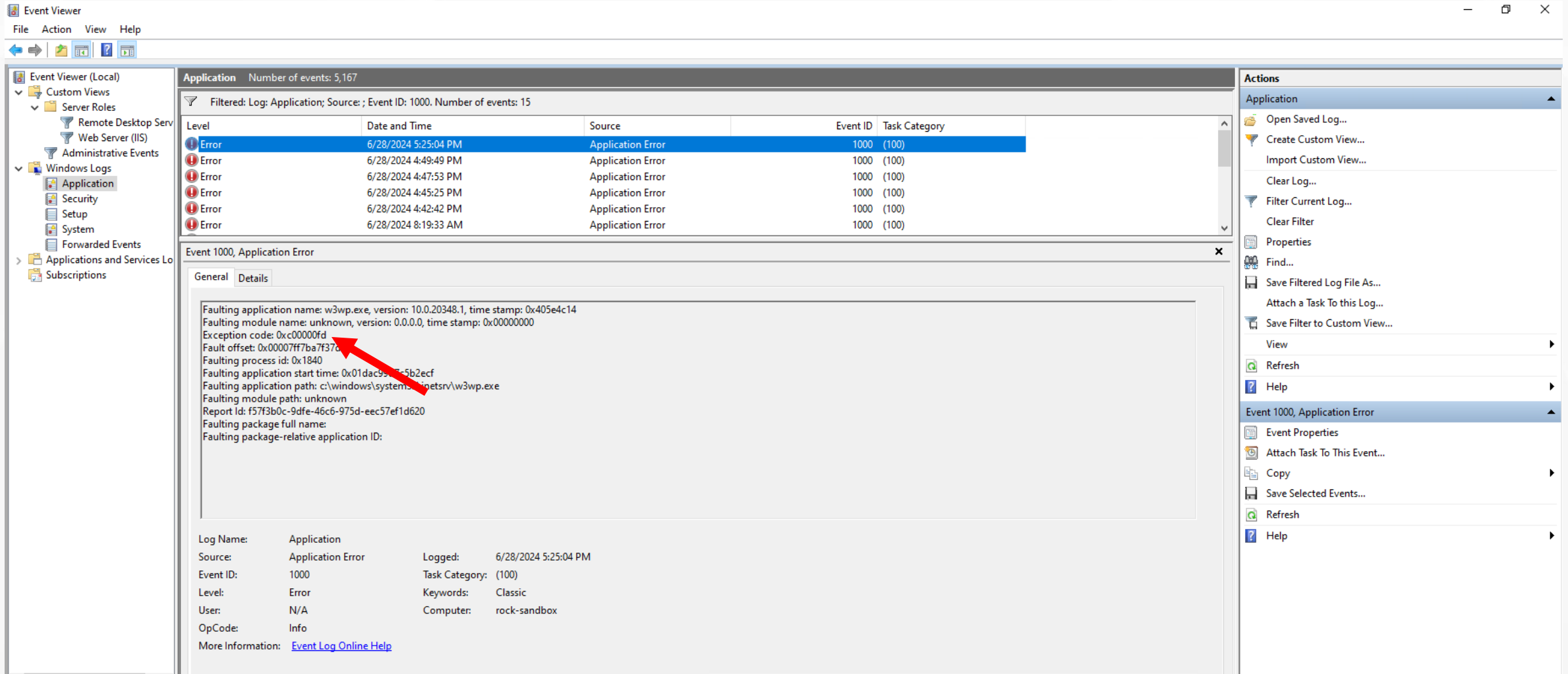
[ASP.NET Shutdown Reasons Enum](#)  
[Recommended AV Exclusions](#)

What if no “Application Ended” entry is logged?  
Application crash!

# Digging Deeper: Web Server

- Rock Exceptions UI
- Rock Application Log File
  - `C:\inetpub\wwwroot\App_Data\Logs\RockApplication.csv`
- Windows Application Logs
  - Application Log
  - Web Server (IIS) custom view

# Application Log



The screenshot displays the Windows Event Viewer interface. The left-hand pane shows the navigation tree with 'Application' selected under 'Windows Logs'. The main pane shows a list of application errors, with the most recent one selected. The details pane for this event is expanded, showing the following information:

Event 1000, Application Error

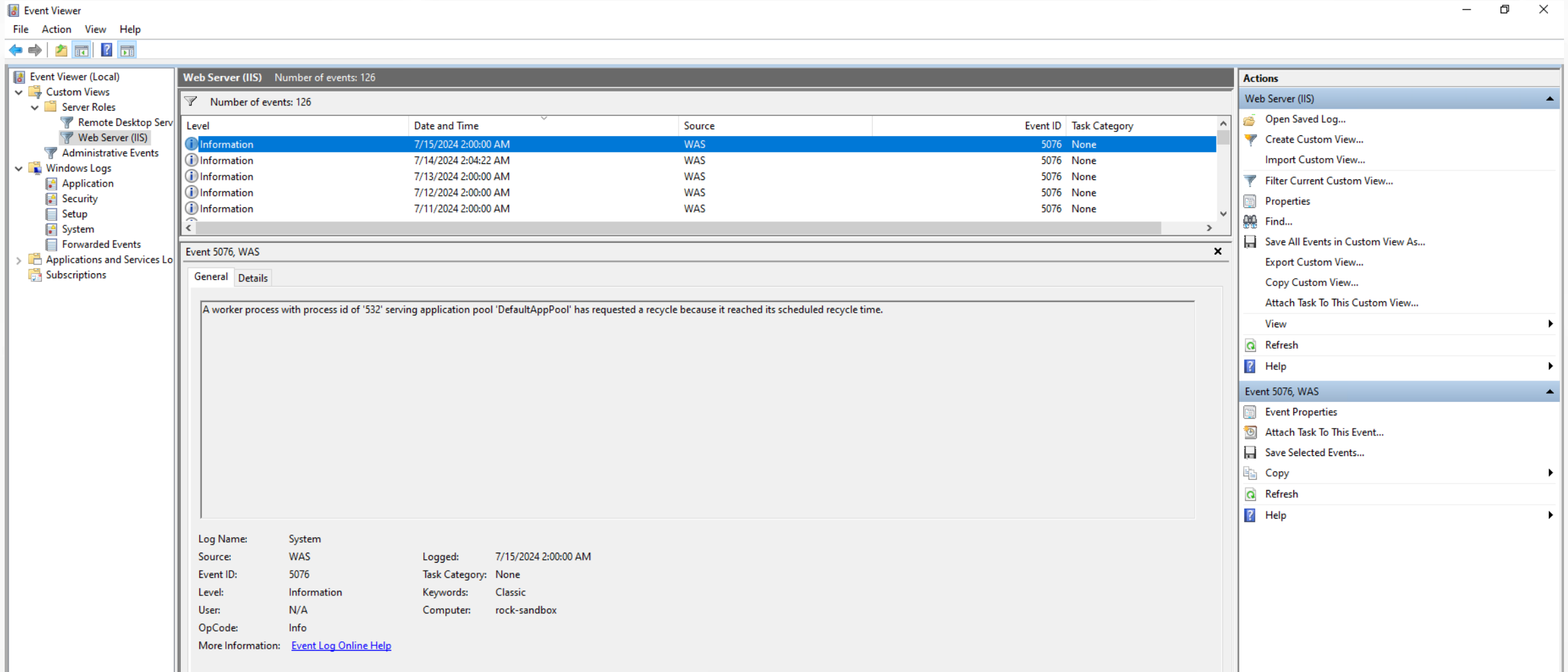
General Details

Faulting application name: w3wp.exe, version: 10.0.20348.1, time stamp: 0x405e4c14  
Faulting module name: unknown, version: 0.0.0.0, time stamp: 0x00000000  
Exception code: 0xc00000fd  
Fault offset: 0x00007ff7ba7f37d0  
Faulting process id: 0x1840  
Faulting application start time: 0x01dac950755b2ecf  
Faulting application path: c:\windows\system32\inetmgr\w3wp.exe  
Faulting module path: unknown  
Report Id: f57f3b0c-9dfe-46c6-975d-eec57ef1d620  
Faulting package full name:  
Faulting package-relative application ID:

Log Name: Application  
Source: Application Error  
Event ID: 1000  
Level: Error  
User: N/A  
OpCode: Info  
More Information: [Event Log Online Help](#)

Logged: 6/28/2024 5:25:04 PM  
Task Category: (100)  
Keywords: Classic  
Computer: rock-sandbox

# Web Server (IIS) Log



The screenshot displays the Windows Event Viewer application. The left-hand pane shows the navigation tree with 'Web Server (IIS)' selected under 'Server Roles'. The main pane shows a list of events for 'Web Server (IIS)' with 126 events. The selected event (ID 5076) is expanded to show its details.

Level	Date and Time	Source	Event ID	Task Category
Information	7/15/2024 2:00:00 AM	WAS	5076	None
Information	7/14/2024 2:04:22 AM	WAS	5076	None
Information	7/13/2024 2:00:00 AM	WAS	5076	None
Information	7/12/2024 2:00:00 AM	WAS	5076	None
Information	7/11/2024 2:00:00 AM	WAS	5076	None

**Event 5076, WAS**

**General** Details

A worker process with process id of '532' serving application pool 'DefaultAppPool' has requested a recycle because it reached its scheduled recycle time.

Log Name: System  
Source: WAS  
Event ID: 5076  
Level: Information  
User: N/A  
OpCode: Info  
More Information: [Event Log Online Help](#)

Logged: 7/15/2024 2:00:00 AM  
Task Category: None  
Keywords: Classic  
Computer: rock-sandbox

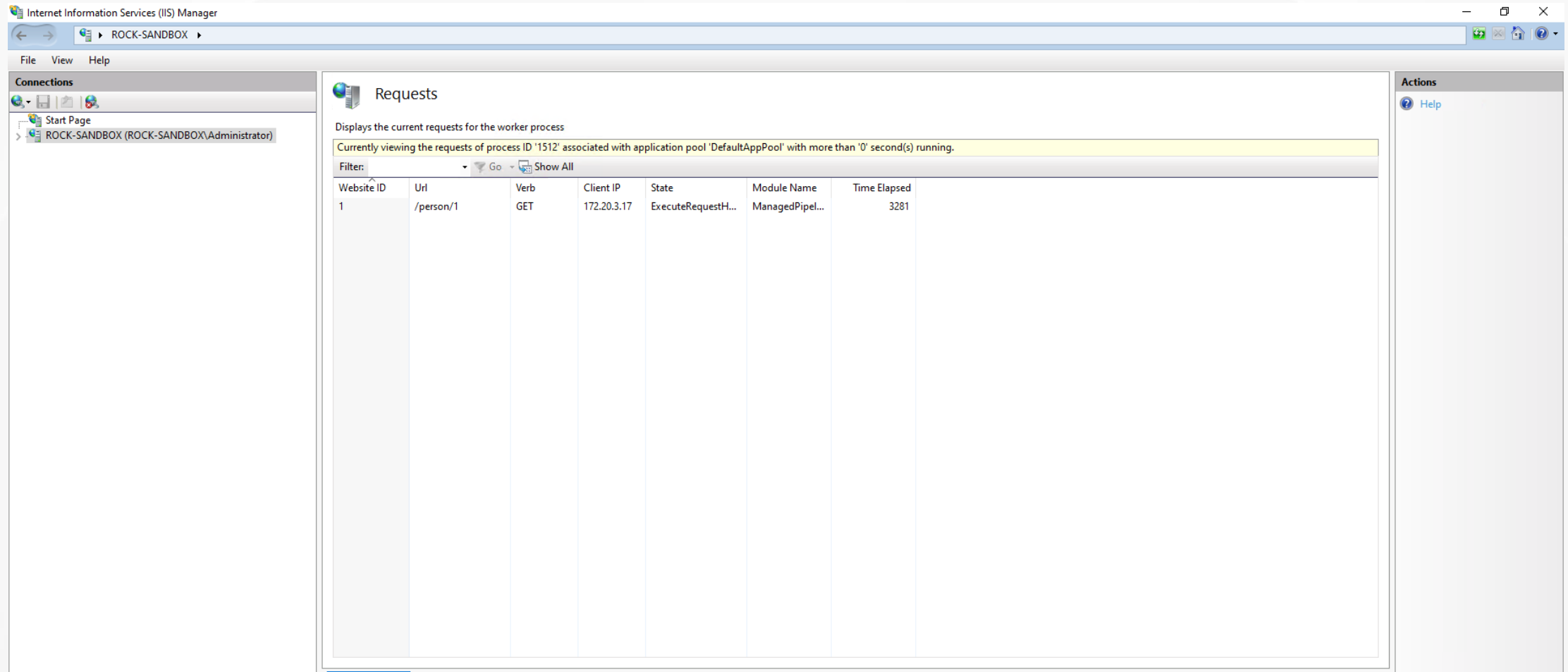


# Digging Deeper: Web Server

- Rock Exceptions UI
- Rock Application Log File
  - `C:\inetpub\wwwroot\App_Data\Logs\RockApplication.csv`
- Windows Application Logs
  - Application Log
  - Web Server (IIS) custom view
- Rock Exception Log File
  - `C:\inetpub\wwwroot\App_Data\Logs\RockExceptions.csv`
- IIS Logs
  - `C:\inetpub\logs\LogFiles\W3SVC1`
- IIS Worker Process Requests

# IIS Worker Process Requests

IIS Manager > [Server Name] > Worker Processes > [App Pool Name]



The screenshot shows the Internet Information Services (IIS) Manager interface. The main pane displays the 'Requests' view for a worker process. The title bar indicates the path: 'ROCK-SANDBOX'. The left pane shows the 'Connections' tree with 'ROCK-SANDBOX (ROCK-SANDBOX\Administrator)' selected. The main pane shows a table of requests for process ID '1512'.

Requests

Displays the current requests for the worker process

Currently viewing the requests of process ID '1512' associated with application pool 'DefaultAppPool' with more than '0' second(s) running.

Filter:  Go

Website ID	Url	Verb	Client IP	State	Module Name	Time Elapsed
1	/person/1	GET	172.20.3.17	ExecuteRequestH...	ManagedPipel...	3281

Actions

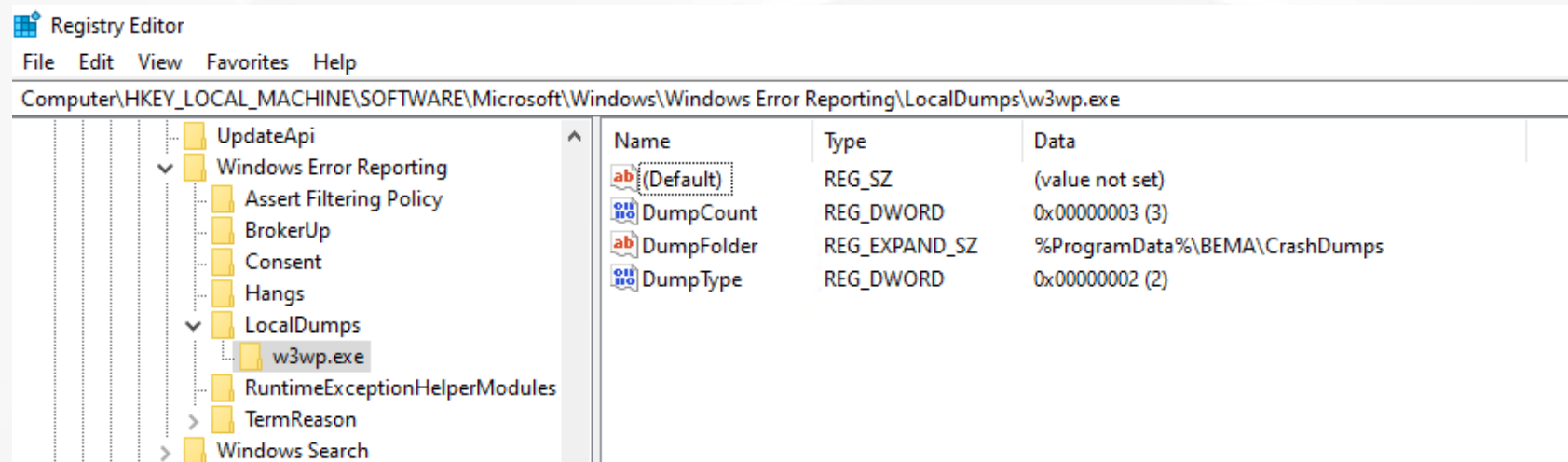
[Help](#)

# Crash Troubleshooting: Memory Dumps

- The best way to troubleshoot a crashing Rock instance
- Snapshot of the application state at a moment in time
- Capture with Windows Error Reporting

# WER Configuration

- HKLM\SOFTWARE\Microsoft\Windows\Windows Error Reporting\LocalDumps\w3wp.exe
- DumpCount (DWORD): Limit number of store dump files (Recommend 3-5 on production system)
- DumpFolder (Expandable String): Dump file location
- DumpType (DWORD): 2 (Full Dump)



[WER Configuration Reference](#)

# Memory Dump Analysis Tools

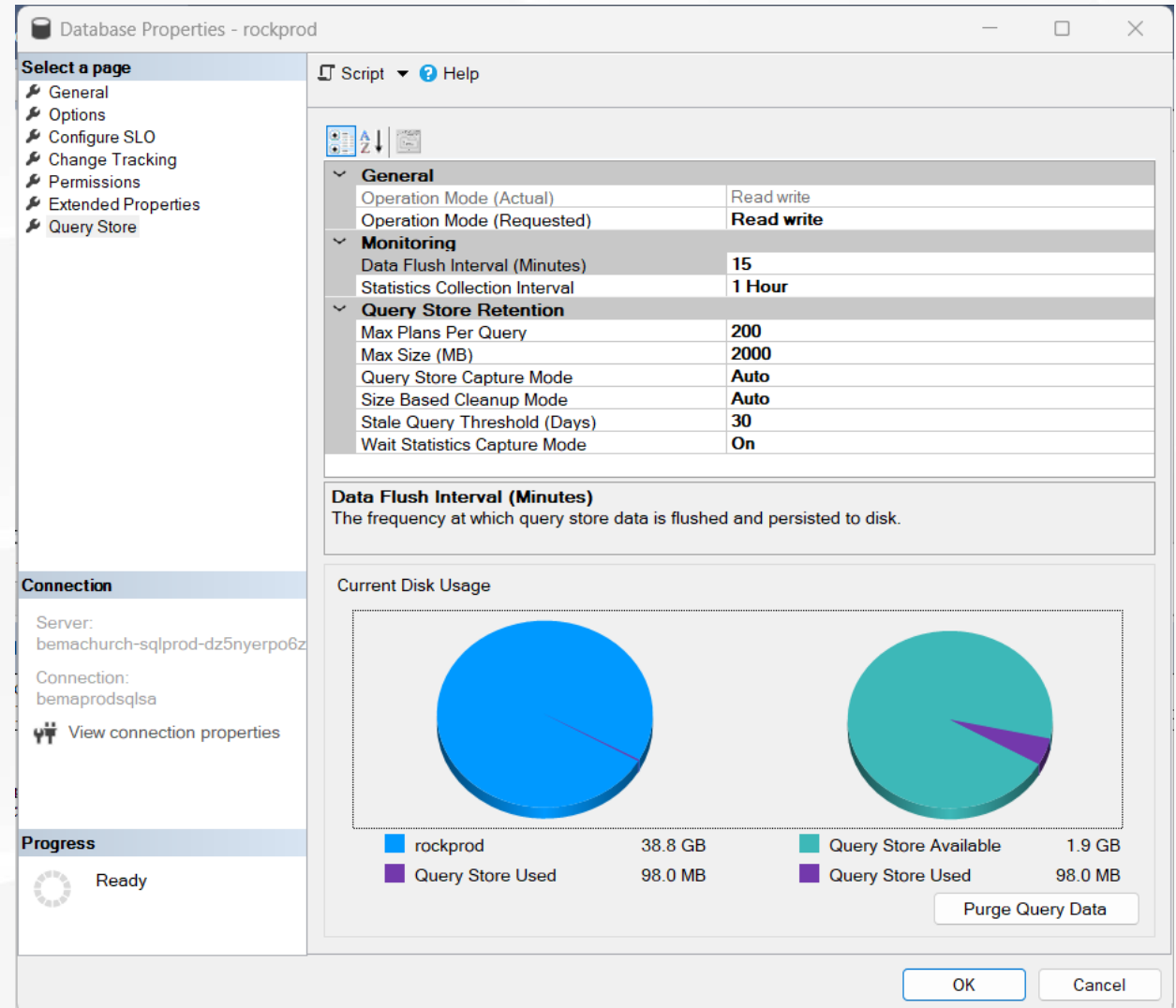
- [Debug Diagnostic Tool v2](#)
  - Easiest to get useful information without specialized knowledge. Pre-configured analyses that can be run on your memory dump file.
- [Visual Studio Enterprise](#)
  - The *Enterprise* edition of Visual Studio allows importing and analyzing memory dump files using the familiar debugging tools in Visual Studio.
- [WinDbg](#)
  - Low-level Windows debugging tool. Useful for finding answers you can't find with the other two tools (or if you don't have a Visual Studio Enterprise license).



# Digging Deeper: Database

- Query Store: database “black box”
- Key Settings
  - Max Size (MB) – consider 2 GB
  - Stale Query Threshold (Days)

[Microsoft Learn: Monitoring Performance with Query Store](#)



The screenshot shows the 'Database Properties - rockprod' window. The left sidebar lists configuration pages: General, Options, Configure SLO, Change Tracking, Permissions, Extended Properties, and Query Store. The main area displays the 'Query Store Retention' settings table.

Query Store Retention	
Max Plans Per Query	200
Max Size (MB)	2000
Query Store Capture Mode	Auto
Size Based Cleanup Mode	Auto
Stale Query Threshold (Days)	30
Wait Statistics Capture Mode	On

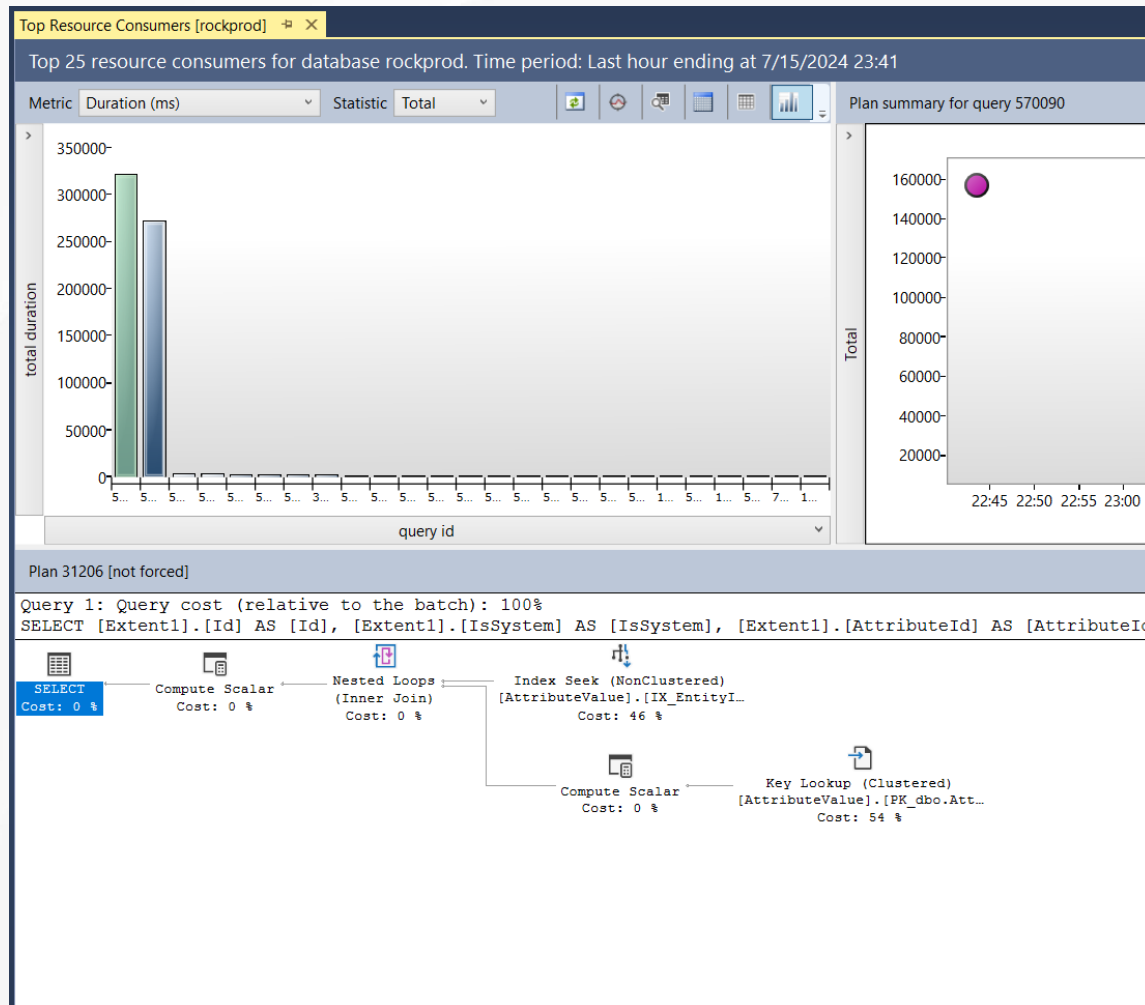
Below the table, the 'Data Flush Interval (Minutes)' is set to 15. A description states: 'The frequency at which query store data is flushed and persisted to disk.'

The 'Current Disk Usage' section contains two pie charts. The first chart shows the total disk usage for 'rockprod' at 38.8 GB. The second chart shows the Query Store usage, with 98.0 MB used and 1.9 GB available.

Category	Value
rockprod	38.8 GB
Query Store Available	1.9 GB
Query Store Used	98.0 MB

Buttons for 'Purge Query Data', 'OK', and 'Cancel' are visible at the bottom.

# Demo: Query Store

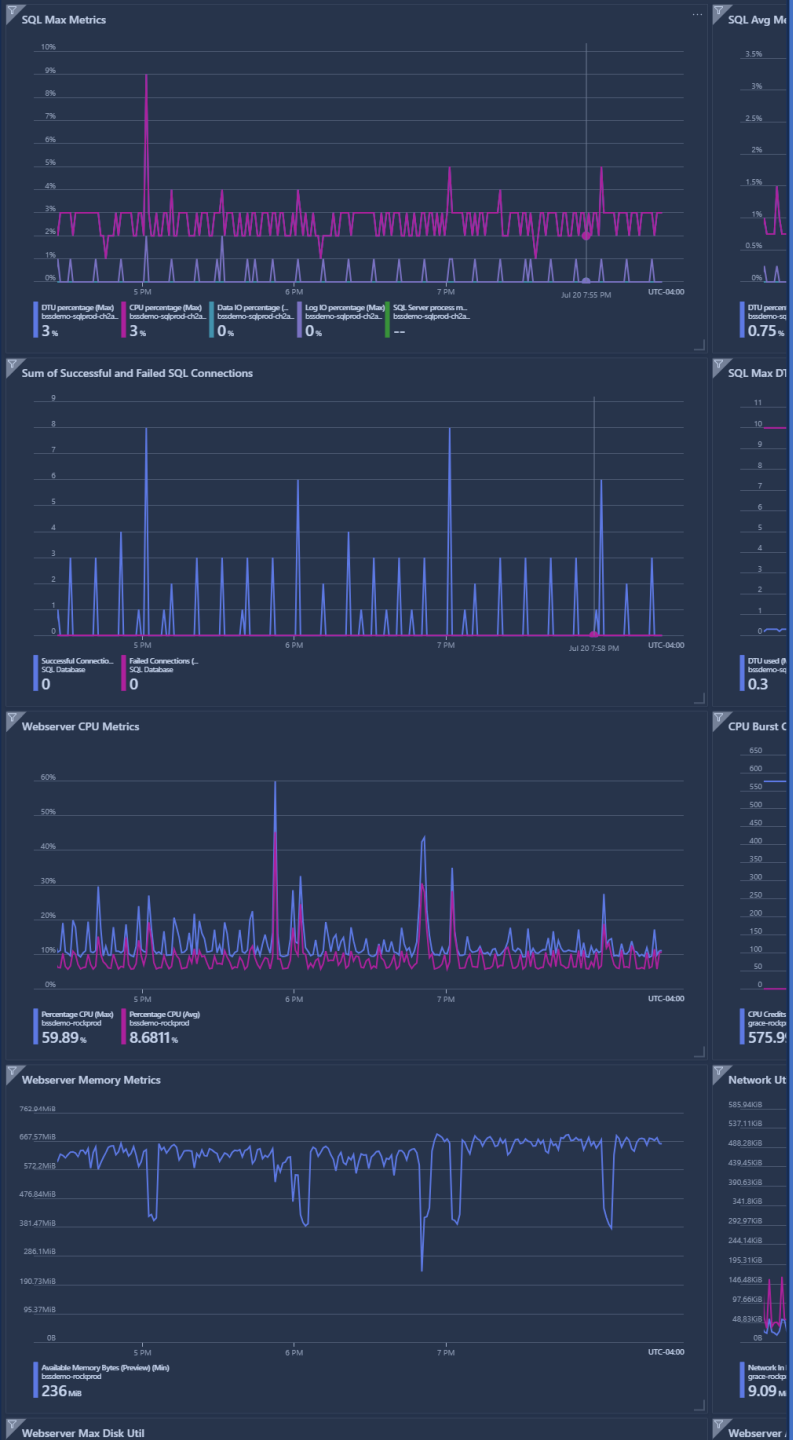


- Learn More:

- [SQL Skills Query Store Blog](#)
- [Erin Stellato: Why You Need Query Store](#)
- [Erin Stellato: Query Store Best Practices](#)



# Resolving Performance Issues



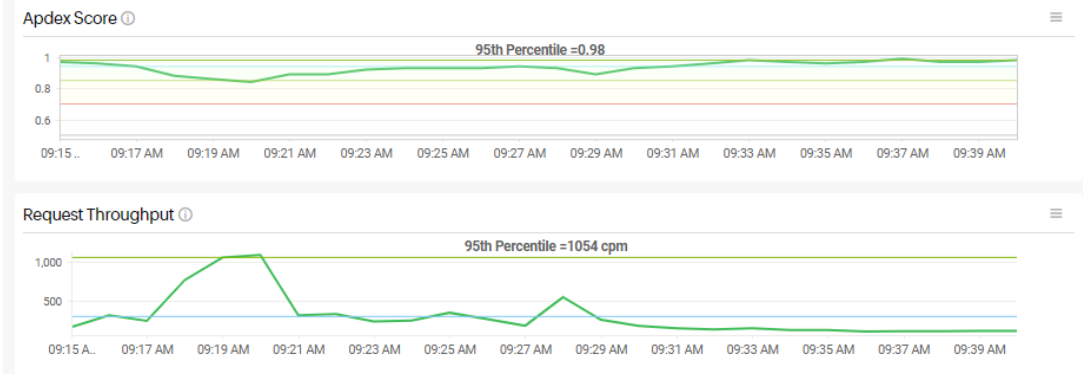
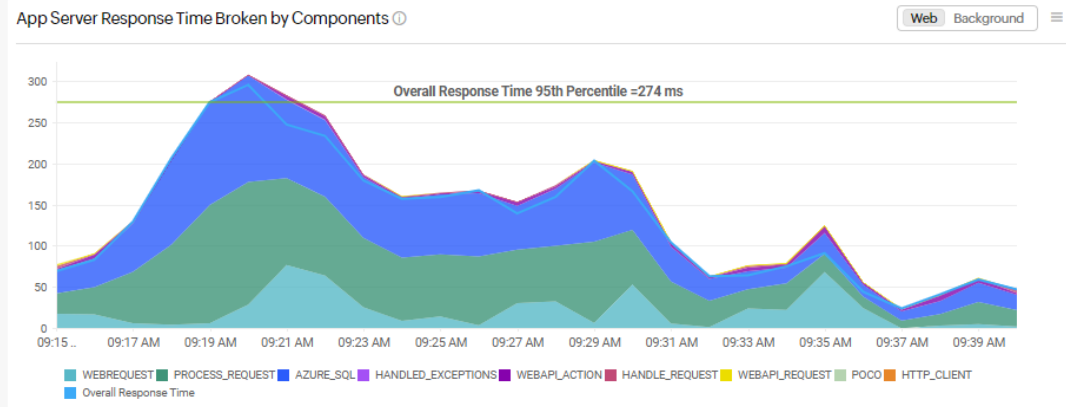
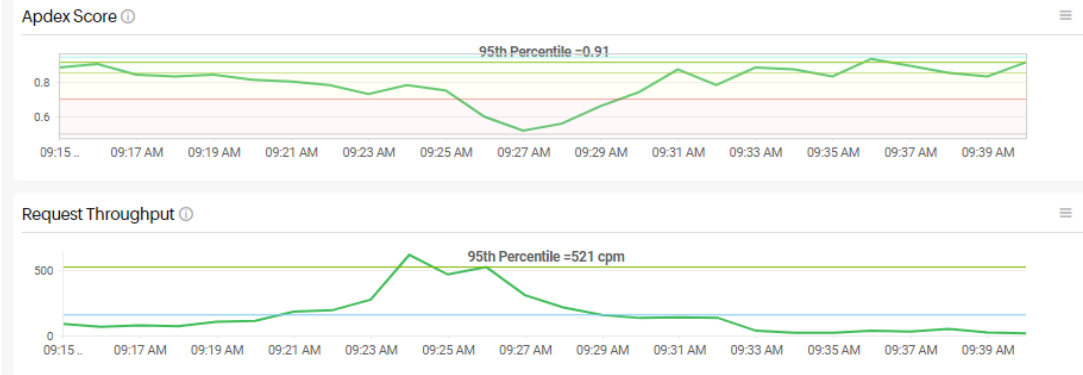
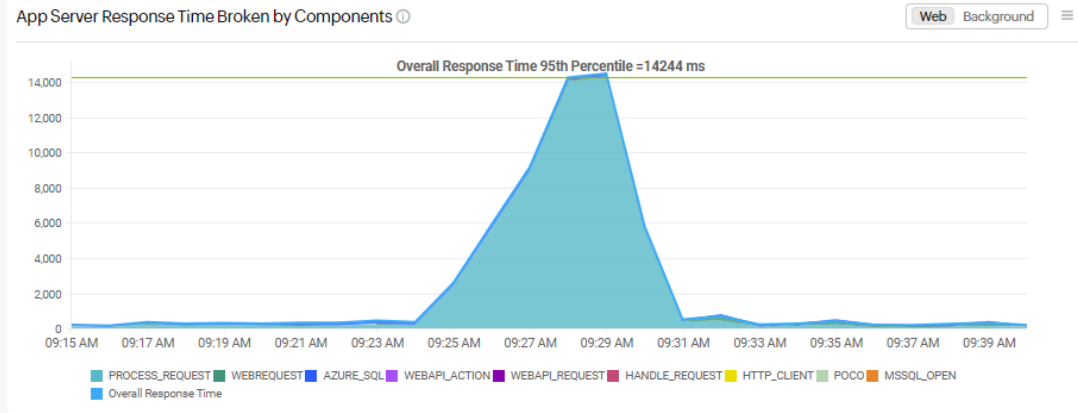
# Performance is a Feature

- Performance = Scalability
- Performance = Cost Savings
- Performance = Uptime
- Performance or provisioning problem?
  - Is it a broad/baseline issue or a specific feature/traffic problem?
  - Infrastructure design and code optimization work together

# The Hot Path: Perf-Critical Code

- Logic or code executed frequently or simultaneously by many sessions or users
- Optimization
  - Caching: Re-use work we've already done.
  - Persisted Datasets: Pre-computed data for data-heavy pages.
  - Lava / SQL Optimization
  - Traffic Offloading: Content Delivery Network (CDN)
    - [Cloudflare](#)
  - Load Testing
    - [Locust](#)

# The Hot Path: Case Study



**Q + A**

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