



CONNECTING
THE WORLD



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CONNECTING
THE WORLD

Troubleshooting Niagara Applications

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Tools for Troubleshooting Niagara Applications

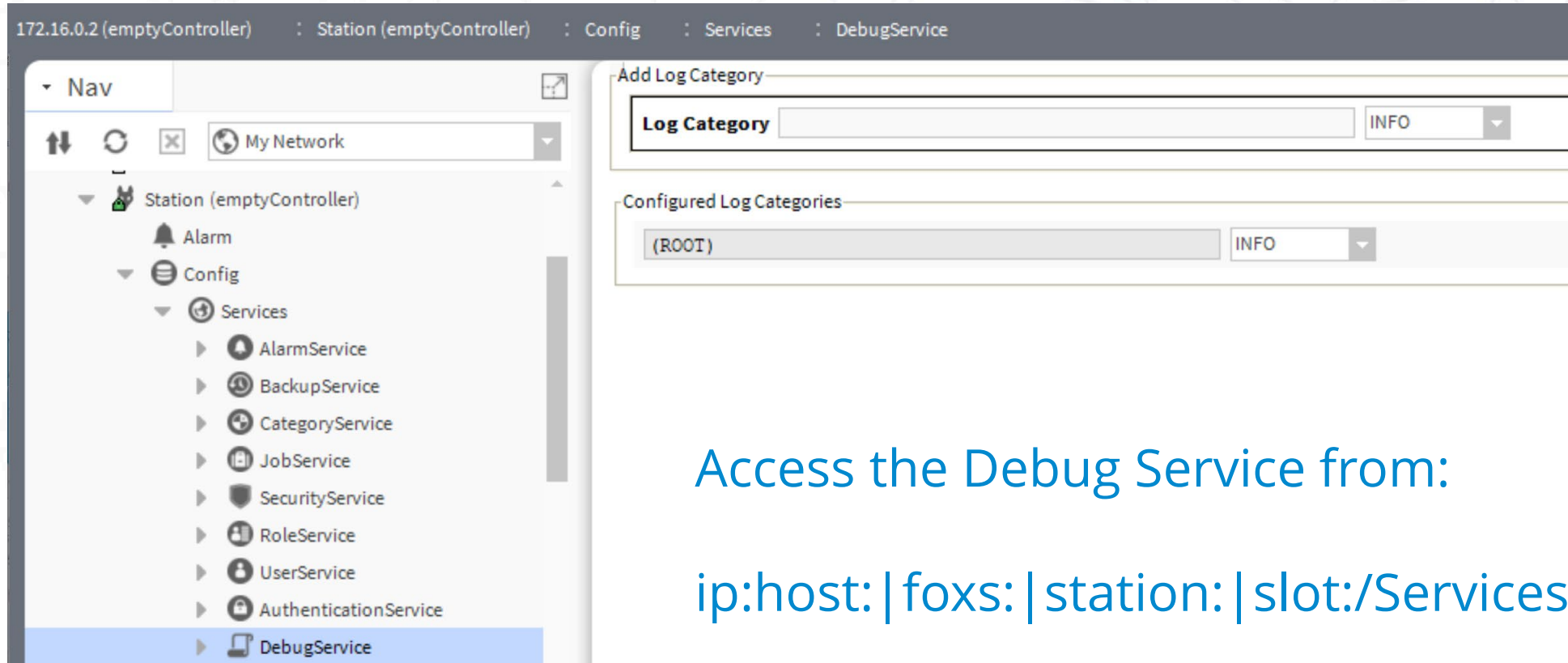
hello

- Logs and System Manager Access
- Niagara Engine Thread Manager
- Data Recovery Service Manager
- YourKit Integration

Accessing System Managers and Logs

hello

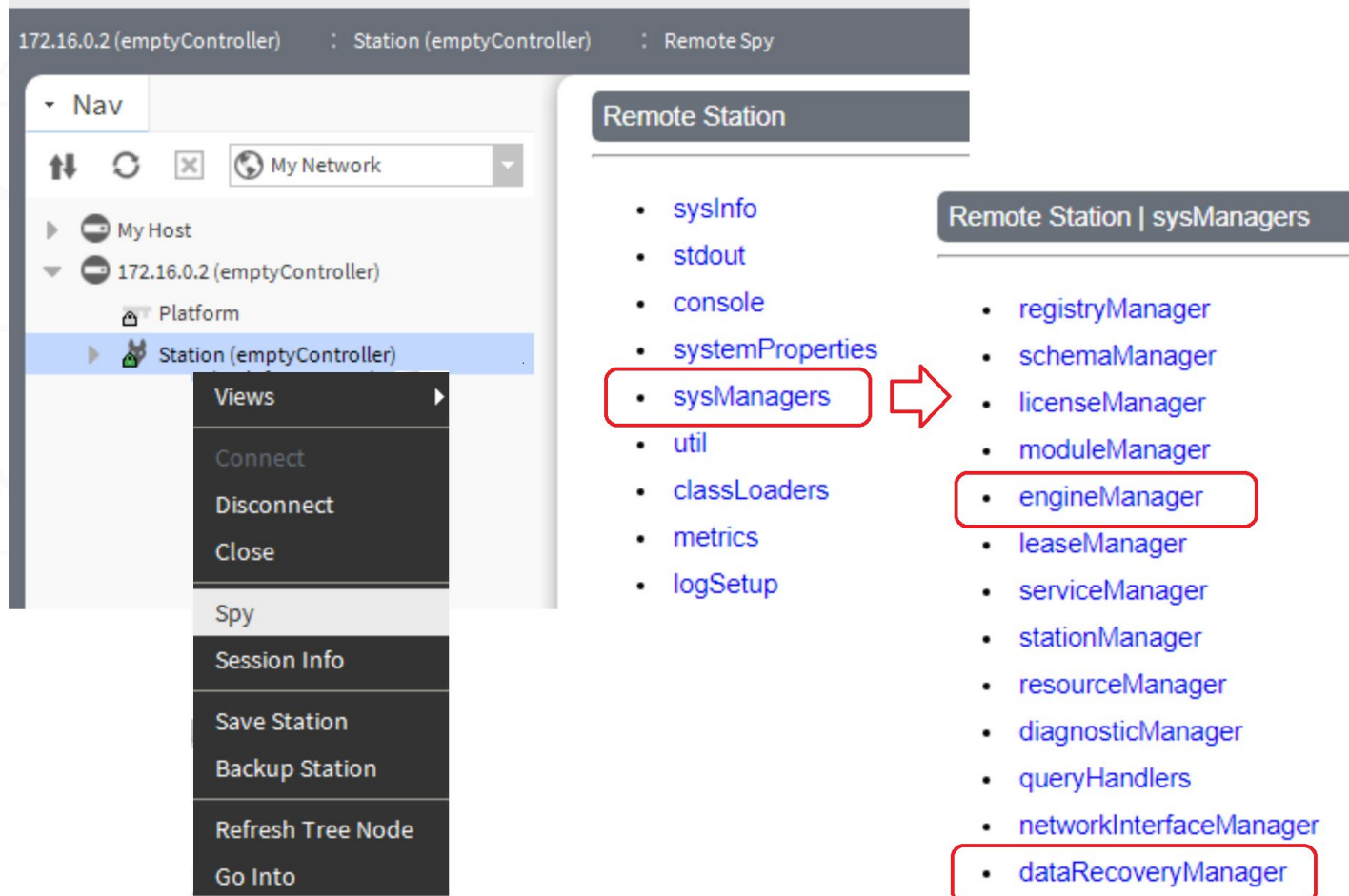
Log Service Access



Access the Debug Service from:

ip:host: | foxs: | station: | slot:/Services/LoggingService

System Manager Access



Access the System Managers
from a Remote Spy:

ip:host | foxs: | spy:/sysManagers

We will focus on:

engineManager
dataRecoveryManag

er

Engine Thread Troubleshooting

hello

Engine Thread

Administrator: Niagara Command Line - station windowsSupervisor

```
INFO [10:06:01 16-Jun-21 EDT][sys] *** Station Started (4437ms) [17529ms total] ***
```

```
niagara>threads
```

```
niagara>2021-06-16 10:06:03
```

```
Full thread dump Java HotSpot(TM) 64-Bit Server VM (25.271-b09 mixed mode):
```

```
"Nre:Engine" #19 daemon prio=5 os_prio=0 tid=0x000000001b9b8800 nid=0x16950 waiting on condition [0x000000001c9df000]
  java.lang.Thread.State: TIMED_WAITING (sleeping)
    at java.lang.Thread.$YJP$$sleep(Native Method)
    at java.lang.Thread.sleep(Thread.java)
    at com.tridium.sys.engine.EngineManager$EngineThread.run(EngineManager.java:903)
```

Station (emptyController) : Config : Folder

Wire Sheet

MultiVibrator
Multi Vibrator
Out true [ok]

NumericWrite
Numeric Write
Out 1.0 [ok] @ 10
In10 - [null]
In16 1.0 [ok]

NumericWrite
Numeric Write
Out 1.0 [ok] @ 10
In10 1.0 [ok]
In16 - [null]

BooleanWrite
Boolean Write
Out true [ok] @ 10
In10 true [ok]
In16 - [null]

BooleanWrite
Boolean Write
Out true [ok] @ 10
In10 true [ok]
In16 - [null]

```
/**
 * Control points should override this method to perform
 * whatever logic / operations necessary to update the output
 * based on inputs. Never modify the out property directly,
 * rather update the working variable parameter.
 */
public abstract void onExecute(BStatusValue out, Context cx);
```

What does it do?

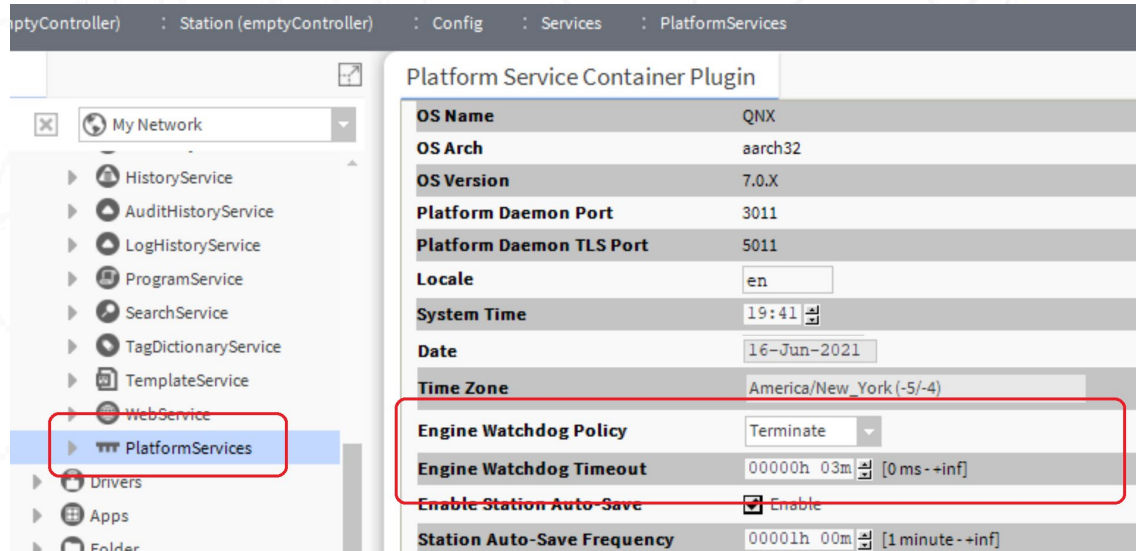
Runs all onExecute()
BControlPoint logic in your
system

Invoke Actions

Problem?

Running inappropriate actions
on the Engine Thread cause an
Engine Watchdog Timeout

Engine Watchdog Timeout



If the “Nre:Engine” thread is unresponsive, an Engine Watchdog Timeout occurs.

Available policies are:

Log
Terminate
Reboot (Controllers only)

```
INFO [21:42:24 08-Jun-21 UTC][stationRegistry] station va51tr21c startup complete
WARNING [13:33:37 11-Jun-21 UTC][stationRegistry] station va51tr21c ENGINE LOCKUP DETECTED
WARNING [13:33:52 11-Jun-21 UTC][stationRegistry] station va51tr21c ENGINE WATCHDOG - KILLING VM
INFO [13:33:52 11-Jun-21 UTC][stationRegistry] killing station va51tr21c
INFO [13:33:53 11-Jun-21 UTC][stationRegistry] station va51tr21c exited with status -119
SEVERE [13:33:53 11-Jun-21 UTC][stationRegistry] station va51tr21c failed, rc = -119
INFO [13:33:53 11-Jun-21 UTC][stationRegistry] station va51tr21c restarting
INFO [13:33:53 11-Jun-21 UTC][stationRegistry] station va51tr21c watchdog thread started [tid = 52]
INFO [13:33:53 11-Jun-21 UTC][stationRegistry] station va51tr21c starting
INFO [13:36:08 11-Jun-21 UTC][stationRegistry] station va51tr21c startup complete
```

Engine Thread Best Practices

No network calls

Never sleep

Never synchronize

Never wait

Never block

```
/**
 * Control points should override this method to perform
 * whatever logic / operations necessary to update the output
 * based on inputs. Never modify the out property directly,
 * rather update the working variable parameter.
 */
public abstract void onExecute(BStatusValue out, Context cx);
```

```
Edit Slots Imports Source
public void onStart() throws Exception
{
    // start up code here
}

public void onExecute() throws Exception
{
    // execute code (set executeOnChange flag on inputs)
}

public void onStop() throws Exception
{
    // shutdown code here
}
```


Engine Manager Access

Remote Station | sysManagers

- registryManager
- schemaManager
- licenseManager
- moduleManager
- **engineManager**
- leaseManager
- serviceManager
- stationManager
- resourceManager
- diagnosticManager
- queryHandlers
- networkInterfaceManager
- dataRecoveryManager



Remote Station | sysManagers | engineManager

atSteadyState	true
suspended	false
scanCount	324519
runtime	6570495ms [1 hour, 49 minutes, 30.495 seconds]
totalTicksInsideScan	5250ms [5.250 seconds]
averageTime/scan	0.01617778928198349ms
averageTimeLast10Scan	0.0ms

Peak Scan Stats (time in scan)

engine.scan.peak[0]	77ms [77 ms] @ 09-Jun-21 5:09:45.749 PM UTC
engine.scan.peak[1]	46ms [46 ms] @ 09-Jun-21 6:32:19.063 PM UTC
engine.scan.peak[2]	37ms [37 ms] @ 09-Jun-21 5:37:52.299 PM UTC
engine.scan.peak[3]	21ms [21 ms] @ 09-Jun-21 5:05:25.456 PM UTC
engine.scan.peak[4]	16ms [16 ms] @ 09-Jun-21 5:21:11.340 PM UTC
engine.scan.peak[5]	12ms [12 ms] @ 09-Jun-21 5:01:09.172 PM UTC
engine.scan.peak[6]	11ms [11 ms] @ 09-Jun-21 5:00:39.088 PM UTC
engine.scan.peak[7]	10ms [10 ms] @ 09-Jun-21 5:00:45.351 PM UTC
engine.scan.peak[8]	9ms [9 ms] @ 09-Jun-21 5:56:53.333 PM UTC
engine.scan.peak[9]	9ms [9 ms] @ 09-Jun-21 5:50:58.041 PM UTC

Access the Engine Managers from a Remote Spy:

ip:host | foxs: | spy:/sysManagers/engineManager

Find Peak Scan Times
Find Engine Hogs
Find Expensive Actions

Engine Manager Logs

Config

Services

DebugService

Application Director

DebugService

Add Log Category

Log Category

INFO

Configured Log Categories

(ROOT)

INFO

platform.engineMonitor

FINEST

sys.engine

FINEST

Application Director

DebugService

Application Director

Connected to 172.16.0.2

Name	Type	Status	Details	Auto-Start	Restart on Failure
emptyController	station	Running	fox=n/a,foxs=4911,http=n/a,https=443	true	true

FINE [19:45:17 09-Jun-21 UTC][sys.engine] New Peak Scan entry 137 (peak 235) ms

FINE [19:46:17 09-Jun-21 UTC][sys.engine] New Peak Delta entry 93 (peak 207) ms

FINE [19:46:17 09-Jun-21 UTC][sys.engine] New Peak Delta entry 96 (peak 207) ms

FINEST [19:46:33 09-Jun-21 UTC][platform.engineMonitor] Updating engine watchdog shared memory with cycles 145840

FINEST [19:46:55 09-Jun-21 UTC][platform.engineMonitor] Updating engine watchdog shared memory with cycles 146943

FINEST [19:47:18 09-Jun-21 UTC][platform.engineMonitor] Updating engine watchdog shared memory with cycles 148045

FINEST [19:47:40 09-Jun-21 UTC][platform.engineMonitor] Updating engine watchdog shared memory with cycles 149152

FINEST [19:48:03 09-Jun-21 UTC][platform.engineMonitor] Updating engine watchdog shared memory with cycles 150257

FINE [19:48:13 09-Jun-21 UTC][sys.engine] New Peak Delta entry 96 (peak 207) ms

FINEST [19:48:25 09-Jun-21 UTC][platform.engineMonitor] Updating engine watchdog shared memory with cycles 151359

FINEST [19:48:48 09-Jun-21 UTC][platform.engineMonitor] Updating engine watchdog shared memory with cycles 152464

FINE [19:48:53 09-Jun-21 UTC][sys.engine] New Peak Delta entry 100 (peak 207) ms

FINEST [19:49:10 09-Jun-21 UTC][platform.engineMonitor] Updating engine watchdog shared memory with cycles 153567

Daemon Output Settings

org.bouncycastle.jsse.provider.ProvSSLSessionContext

INFO

org.bouncycastle.jsse.provider.ProvTlsServer

INFO

org.bouncycastle.jsse.provider.ProvX509KeyManager

INFO

org.bouncycastle.jsse.provider.ProvX509KeyManagerSimple

INFO

org.bouncycastle.jsse.provider.SignatureSchemeInfo

INFO

qnxosupdate

INFO

qnxwifi

INFO

reboot

INFO

security.initializer

INFO

security.keyMaterial

INFO

security.keyRing

INFO

security.niagaraPolicy

INFO

security.niagaraPolicy.permissions

INFO

security.systemPassphrase

INFO

sharedKey

INFO

stationRegistry

FINEST

sys.file

INFO

sys.file.lock

INFO

updatedaemon

INFO

webserver

INFO

OK

Output for platform daemon on 172.16.0.2

INFO [19:53:36 09-Jun-21 UTC][filteredlog] set "stationRegistry" log to FINEST

FINE [19:55:10 09-Jun-21 UTC][stationRegistry] WATCHDOG CHECK station emptyController end wd last cycles 162160 cycles 170817

FINE [19:58:10 09-Jun-21 UTC][stationRegistry] WATCHDOG CHECK station emptyController end wd last cycles 170817 cycles 179483

FINE [20:01:10 09-Jun-21 UTC][stationRegistry] WATCHDOG CHECK station emptyController end wd last cycles 179483 cycles 188165

FINE [20:04:10 09-Jun-21 UTC][stationRegistry] WATCHDOG CHECK station emptyController end wd last cycles 188165 cycles 196846

FINE [20:07:10 09-Jun-21 UTC][stationRegistry] WATCHDOG CHECK station emptyController end wd last cycles 196846 cycles 204439

FINE [20:10:10 09-Jun-21 UTC][stationRegistry] WATCHDOG CHECK station emptyController end wd last cycles 204439 cycles 213197

FINE [20:13:10 09-Jun-21 UTC][stationRegistry] WATCHDOG CHECK station emptyController end wd last cycles 213197 cycles 222174

FINE [20:16:10 09-Jun-21 UTC][stationRegistry] WATCHDOG CHECK station emptyController end wd last cycles 222174 cycles 230808

FINE [20:19:10 09-Jun-21 UTC][stationRegistry] WATCHDOG CHECK station emptyController end wd last cycles 230808 cycles 239722

FINE [20:22:10 09-Jun-21 UTC][stationRegistry] WATCHDOG CHECK station emptyController end wd last cycles 239722 cycles 248695

FINE [20:25:10 09-Jun-21 UTC][stationRegistry] WATCHDOG CHECK station emptyController end wd last cycles 248695 cycles 257667

FINE [20:28:10 09-Jun-21 UTC][stationRegistry] WATCHDOG CHECK station emptyController end wd last cycles 257667 cycles 266643

FINE [20:31:10 09-Jun-21 UTC][stationRegistry] WATCHDOG CHECK station emptyController end wd last cycles 266643 cycles 275616

FINE [20:34:10 09-Jun-21 UTC][stationRegistry] WATCHDOG CHECK station emptyController end wd last cycles 275616 cycles 284262

Pause Output

Clear Output

Close

Niagara Station Logs:

platform.engineMonitor
sys.engine

Niagara Daemon Logs:

stationRegistry

Troubleshooting Example 1

Use “Engine Hogs”...

Actions	
currentComponent	null
currentAction	null
Async ActionQueue	0 (Peak 3)
Engine Hogs	
Reset Engine Hogs	
Reset Peak Scan Time	



Remote Station | sysManagers | engineManager | hogs

Engine Hogs					
Rank	Component	Type	Total Time	Total Count	Avg time
0	/Folder/MultiVibrator	kitControl:MultiVibrator	49725ms [49.725 seconds]	19	2617143 us
1	/Services/SecurityService/certificates/tridium/expiry	nss:CertificateExpiryPoint	4ms [4 ms]	2	2156 us

...to find slow BControlPoints

```
205     @Override
206     public synchronized void onExecute(BStatusValue o, Context cx)
207     {
208         //Purposefully delay execution to show up in the EngineHogs
209         try
210         {
211             Thread.sleep(2500);
212         }
213         catch (Exception ignored)
214         {}
215     }
```

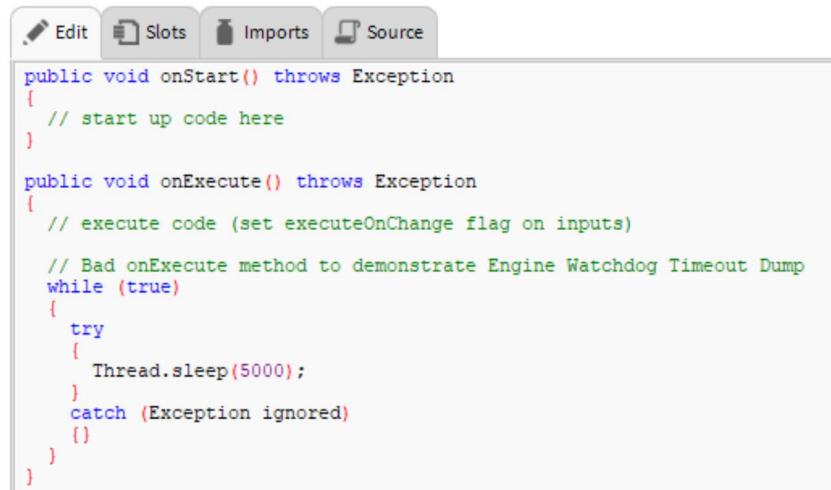

Use Application Director Thread Dump...

```
SEVERE [11:07:40 16-Jun-21 EDT] [platform.engineMonitor] Engine watchdog timeout elapsed, engine monitor entering fault state
Pausing the engine: 0 total seconds
ENGINE WATCHDOG TIMEOUT STACK DUMP @ Wed Jun 16 11:07:48 EDT 2021 Pausing the engine: 0 total seconds
niagara>2021-06-16 11:07:48
Full thread dump Java HotSpot(TM) 64-Bit Server VM (25.291-b32 mixed mode):

    Lots of threads omitted

"Nre:Engine" #15 daemon prio=5 os_prio=0 tid=0x000000001afdf000 nid=0xl67fc waiting on condition [0x000000001c68f000]
   java.lang.Thread.State: TIMED_WAITING (sleeping)
    at java.lang.Thread.sleep(Native Method)
    at Prog_f34df7887be44159b1061de942264e74.onExecute(Prog_f34df7887be44159b1061de942264e74.java:32)
    at com.tridium.program.BProgram.doExecute(BProgram.java:146)
    at auto.com.tridium_program_BProgram.invoke(AutoGenerated)
    at com.tridium.sys.schema.ComponentsSlotMap.invoke(ComponentsSlotMap.java:1908)
    at com.tridium.sys.engine.EngineUtil.doInvoke(EngineUtil.java:62)
    at com.tridium.sys.engine.EngineManager.asyncActions(EngineManager.java:470)
    at com.tridium.sys.engine.EngineManager.run(EngineManager.java:271)
    at java.lang.Thread.run(Thread.java:910)
```

..to find blocking code



Data Recovery Service Troubleshooting

hello

Data Recovery Service

Data Recovery Service Editor

Data Recovery Settings

- Service Enabled: ☒ true
- Service Status: Ready
- Last Station Save Time: 16-Jun-2021 12:41 PM EDT
- Last Station Save Successful: ☒ true
- Station Save Limit: 3 [1 - max]
- Station Save Limit Period: 00000h 15m [0 ms - +inf]
- Persistent Storage Size: 0.00 KB [0.00 - +inf]
- Generate Alert On Replay: ☐ false
- Platform Alarm Support: ☐

Blocks Configuration

- Total Size: 524288 B [0 - max]
- # Data Recovery Blocks: 3 [2 - 8]
- Full Policy: Flush
- Persistent Capacity: Unlimited

Data Recovery Blocks

Data Recovery Block 1

- Status: Active
- Capacity: 174762 B Used: 4956 B Overhead: 1060 B Free: 168746 B

Data Recovery Block 2

- Status: Idle
- Capacity: 174762 B Used: 0 B Overhead: 0 B Free: 174762 B

Data Recovery Block 3

- Status: Idle

Data Recovery Legend

- Used Space (Red)
- Overhead Space (Orange)
- Free Space (Green)

What does it do?

Recover data from the following spaces:

Component Space
History Space
Alarm Space

Problem?

Capturing unneeded data can lead to performance issues

ip:host:|foxs:|station:|slot:/Services/PlatformServices/DataRecoveryService

Data Recovery Service Manager Access

Remote Station | sysManagers

- registryManager
- schemaManager
- licenseManager
- moduleManager
- engineManager
- leaseManager
- serviceManager
- stationManager
- resourceManager
- diagnosticManager
- queryHandlers
- networkInterfaceManager
- dataRecoveryManager



Remote Station | sysManagers | dataRecoveryManager

Data recovery Performance Metrics

Seconds Since Service Started / Last Reset	6790
Total Number Of Records Received	270
Average Size of Record Received	143.12222222222223
Total Bytes Received Since Start / Last Reset	38643
Average Bytes Received/Second	5.707419113141243
Total Bytes Flushed Since Start / Last Reset	0
Average Bytes Flushed/Second	0.0
Total Number of Times Flush Occurred	0
Average Bytes Flushed/Flush	0.0
Number of Too Large Events Encountered	0
Chunk FS	Statistics

Last 10 flushes

Access the Data Recovery Manager from Remote Spy:

ip:host | foxs: | spy:/sysManagers/dataRecoveryManager

Data Recovery Service Logs

Add Log Category

Log Category

FINE

Configured Log Categories

(ROOT)

INFO

alarm.dataRecovery

FINE

history.dataRecovery

FINE

platDataRecovery

FINE

sys.dataRecovery

FINE

Niagara Station Logs:

platDataRecovery
sys.dataRecovery
history.dataRecovery
alarm.dataRecovery

Application Director

Connected to 172.16.0.2

Name	Type	Status	Details	Auto-Start	Restart on Failure
emptyController	station	Running	fox=n/a,foxs=4911,http=n/a,https=443	true	true

FINE [19:22:48 09-Jun-21 UTC] [history.dataRecovery] Recording history event 'appended /emptyController/MultiVi

FINE [19:22:48 09-Jun-21 UTC] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVi

FINE [19:22:48 09-Jun-21 UTC] [alarm.dataRecovery] Recording alarm event '[Alarm Update] timestamp = 09-Jun-21

FINE [19:22:48 09-Jun-21 UTC] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVi

FINE [19:22:48 09-Jun-21 UTC] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVi

FINE [19:22:48 09-Jun-21 UTC] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVi

FINE [19:22:53 09-Jun-21 UTC] [history.dataRecovery] Recording history event 'appended /emptyController/MultiVi

FINE [19:22:53 09-Jun-21 UTC] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVi

FINE [19:22:53 09-Jun-21 UTC] [alarm.dataRecovery] Recording alarm event '[Alarm Append] timestamp = 09-Jun-21

FINE [19:22:53 09-Jun-21 UTC] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVi

FINE [19:22:53 09-Jun-21 UTC] [sys.dataRecovery.save.change] Recording component event 'changed /Services/Alarm

FINE [19:22:53 09-Jun-21 UTC] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVi

FINE [19:22:53 09-Jun-21 UTC] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVi

FINE [19:22:53 09-Jun-21 UTC] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVi

Best Practices Components

Use dataRecoveryManager to understand what Component data is being saved...

Remote Spy : sysManagers : dataRecoveryManager

Data recovery Sources

Source Ord

Source Type

Source Byte

Records Generated

Key Data Generated

Payload Data Generated

Total Data Generated

Average Key Size

Average Payload Size

Average Record Size

Additional statistics

station:

baja:ComponentSpace

1

2004

39093

63542

122675

19.50748502994012

31.70758483033932

61.21506986027944

station:

Remote Spy : sysManagers : dataRecoveryManager : baja\$3aComponentSpace

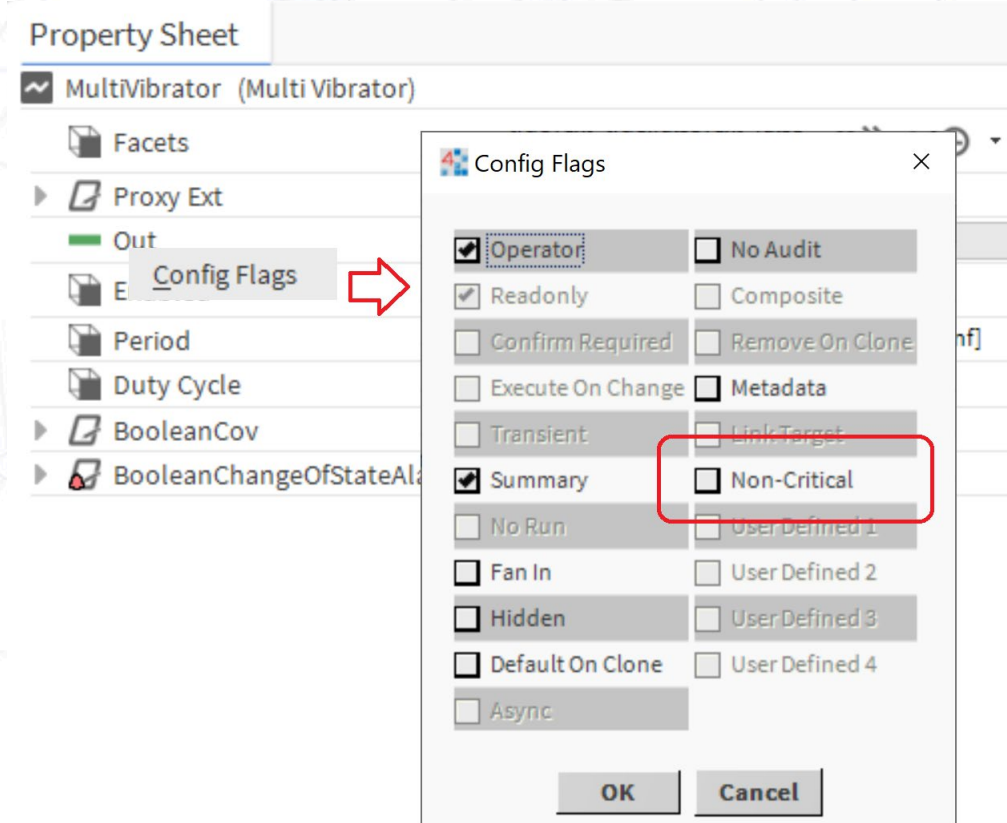
Remote Station | sysManagers | dataRecoveryManager | baja\$3aComponentSpace

156 Component Events Recently Recorded in Data Recovery

Occurrences	Total Bytes	Avg Bytes	Component Event
28	1316	47.0	changed /Folder/MultiVibrator/out/value[3,1]
28	1428	51.0	changed /Folder/MultiVibrator/out/status[3,0]
28	1372	49.0	changed /Folder/MultiVibrator/BooleanChangeOfStateAlarmExt/alarmState[3]
28	1512	54.0	changed /Folder/MultiVibrator/BooleanChangeOfStateAlarmExt/toOffnormalTimes/normalTime[8,2]
14	700	50.0	changed /Folder/MultiVibrator/BooleanChangeOfStateAlarmExt/toOffnormalTimes/count[8,3]
14	672	48.0	changed /Services/AlarmService/defaultAlarmClass/timeOfLastAlarm[6]
14	756	54.0	changed /Folder/MultiVibrator/BooleanChangeOfStateAlarmExt/toOffnormalTimes/alarmTime[8,0]
2	96	48.0	changed /Services/AlarmService/escalationTimeTrigger/lastTrigger[1]

Best Practices Components

...and ignore it at your discretion



Best Practices Histories

Use dataRecoveryManager to understand what History data is being saved...

Remote Spy

sysManagers

dataRecoveryManager

Source Ord

Source Type

Source Byte

Records Generated

Key Data Generated

Payload Data Generated

Total Data Generated

Average Key Size

Average Payload Size

Average Record Size

Additional statistics

history:

history:LocalHistoryDatabase

2

411

10156

70

14336

24.710462287104622

0.170316301703163

34.880778588807786

history:



Remote Station sysManagers dataRecoveryManager history\$3aLocalHistoryDatabase			
60 History Events Recently Recorded in data recovery			
Occurrences	Total Bytes	Avg Bytes	Last History Event of its Type
60	1200	20.0	appended /emptyController/3: 09-Jun-21 7:34 PM UTC false {ok}

Best Practices Histories

...and ignore it at your discretion

Property Sheet

MultiVibrator (Multi Vibrator)

Facets trueText=true,falseText=false >> ⌚

Proxy Ext null

Out true {alarm,unackedAlarm}

Enabled true

Period 00000h 00m 10.000s [200 ms - +inf]

Duty Cycle 50 [0 - 100]

BooleanCov Boolean Cov History Ext

Status {ok}

Fault Cause

Enabled true

Active Period Days of week ☒ Sun ☒ Mon ☒ Tue ☒ Wed ☒ Thu ☒ Fri ☒ Sat
Time Range 12:00:00 AM EDT to 12:00:00 AM EDT

Active true

History Name \$parent.name\$

History Config Interval: irregular, Re

Id /emptyController/Mul

Source Config Flags on: /slot:/E

Time Zone UTC (+0)

Record Type history

Capacity Record Count

Full Policy Roll

Config Flags

☒ Operator ☐ No Audit

☒ Readonly ☐ Composite

☐ Confirm Required ☐ Remove On Clone

☐ Execute On Change ☐ Metadata

☐ Transient ☐ Link Target

☒ Summary ☐ Non-Critical

☐ No Run ☐ User Defined 1

☐ Fan In ☐ User Defined 2

☐ Hidden ☐ User Defined 3

☒ Default On Clone ☐ User Defined 4

☐ Async

OK Cancel

Best Practices Alarms

Use dataRecoveryManager to understand what Alarm data is being saved...

Remote Station | sysManagers | dataRecoveryManager

Source Ord	alarm:
Source Type	alarm:FileAlarmDatabase
Source Byte	3
Records Generated	5
Key Data Generated	0
Payload Data Generated	3066
Total Data Generated	3116
Average Key Size	0.0
Average Payload Size	613.2
Average Record Size	623.2
Additional statistics	alarm:



Remote Station | sysManagers | dataRecoveryManager | alarm\$3aFileAlarmDatabase

5 Alarm Events Recently Recorded in Data Recovery

Event	Occurrences	Total Bytes	Avg Bytes
Append	3	1842	614.0
Update	2	1224	612.0

Events Encountered	
Event Size	
621	[Alarm Append] timestamp = 12-May-23 4:22 PM EDT, sourceState = Offnormal, ackS
612	[Alarm Append] timestamp = 12-May-23 4:22 PM EDT, sourceState = Fault, ackState
614	[Alarm Update] timestamp = 12-May-23 4:22 PM EDT, sourceState = Normal, ackStat
610	[Alarm Update] timestamp = 12-May-23 4:22 PM EDT, sourceState = Normal, ackStat
609	[Alarm Append] timestamp = 12-May-23 4:22 PM EDT, sourceState = Fault, ackState

Best Practices Alarms

...but Alarms can not be ignored!

Troubleshooting Example

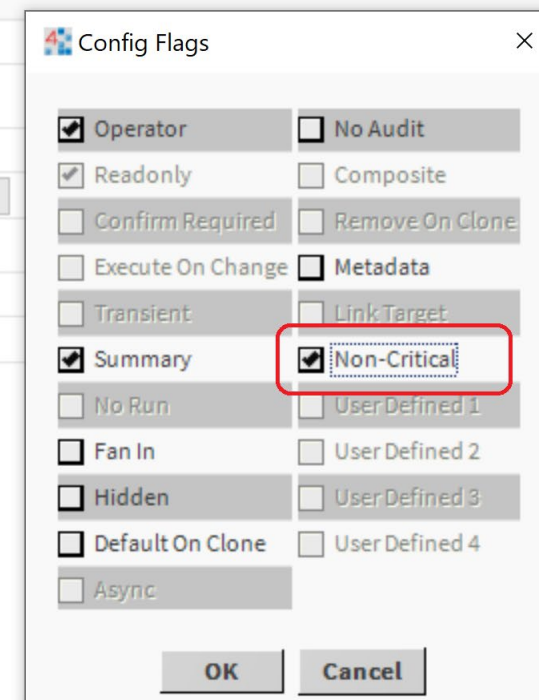
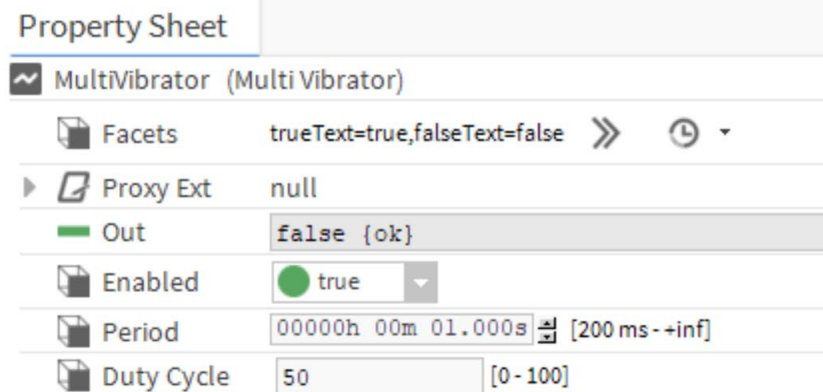
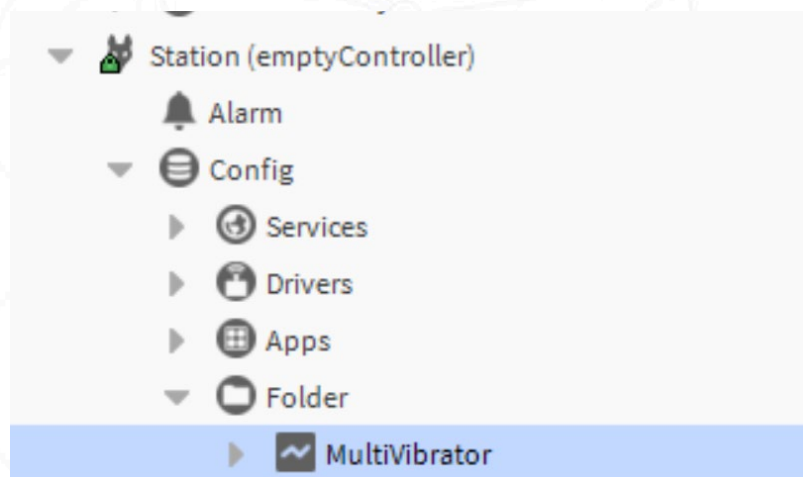
Use dataRecoveryManager and logs to find a noisy point...

Remote Station sysManagers dataRecoveryManager baja\$3aComponentSpace			
196 Component Events Recently Recorded in Data Recovery			
Occurrences	Total Bytes	Avg Bytes	Component Event
183	8601	47.0	changed /Folder/MultiVibrator/out/value[3,1]
2	96	48.0	changed /Services/AlarmService/escalationTimeTrigger/lastTrigger[1]
1	24	24.0	removed /Drivers/NiagaraNetwork/sysDefProvider/CategoryTest
1	35	35.0	removed /Services/UserService/userPrototypes/defaultPrototype/web_WebProfileConfig/module
1	35	35.0	removed /Services/UserService/userPrototypes/defaultPrototype/web_MobileWebProfileConfig/
1	134	134.0	added /Services/UserService/userPrototypes/defaultPrototype/web_MobileWebProfileConfig/mr
1	49	49.0	changed /Drivers/NiagaraNetwork/localStation/persistTask/lastSuccess[4]
1	134	134.0	added /Services/UserService/userPrototypes/defaultPrototype/web_WebProfileConfig/moduleD
1	35	35.0	removed /Services/UserService/admin/web_WebProfileConfig/moduleDependenciesFacets
1	35	35.0	removed /Services/UserService/admin/web_MobileWebProfileConfig/moduleDependenciesFac
1	134	134.0	added /Services/UserService/admin/web_MobileWebProfileConfig/moduleDependenciesFacets
1	134	134.0	added /Services/UserService/admin/web_WebProfileConfig/moduleDependenciesFacets
1	49	49.0	changed /Drivers/NiagaraNetwork/localStation/persistTask/lastAttempt[5]

```
FINE [11:42:18 16-Jun-21 EDT] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVibrator/out/value[3,1], true'
FINE [11:42:19 16-Jun-21 EDT] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVibrator/out/value[3,1], false'
FINE [11:42:19 16-Jun-21 EDT] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVibrator/out/value[3,1], true'
FINE [11:42:20 16-Jun-21 EDT] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVibrator/out/value[3,1], false'
FINE [11:42:20 16-Jun-21 EDT] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVibrator/out/value[3,1], true'
FINE [11:42:21 16-Jun-21 EDT] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVibrator/out/value[3,1], false'
FINE [11:42:21 16-Jun-21 EDT] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVibrator/out/value[3,1], true'
FINE [11:42:22 16-Jun-21 EDT] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVibrator/out/value[3,1], false'
FINE [11:42:22 16-Jun-21 EDT] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVibrator/out/value[3,1], true'
FINE [11:42:23 16-Jun-21 EDT] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVibrator/out/value[3,1], false'
FINE [11:42:23 16-Jun-21 EDT] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVibrator/out/value[3,1], true'
FINE [11:42:24 16-Jun-21 EDT] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVibrator/out/value[3,1], false'
FINE [11:42:24 16-Jun-21 EDT] [sys.dataRecovery.save.change] Recording component event 'changed /Folder/MultiVibrator/out/value[3,1], true'
```


Troubleshooting Example

...and prevent it from entering the service



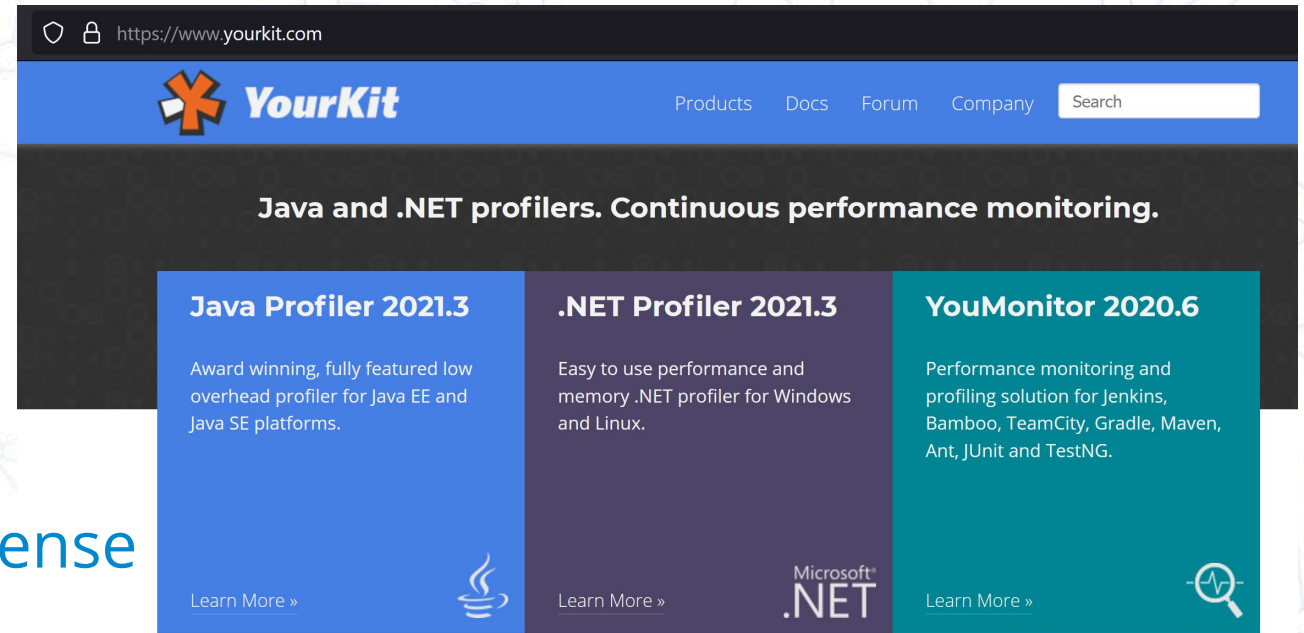
YourKit Integration

hello

YourKit Prerequisites

Only available for Windows or Linux
Development environments

Add the “developer” feature to your license



Administrator: Niagara Command Line

```
c:\niagara\niagara-4.10.0.154>station -@agentpath:"C:\Program Files\YourKit Java Profiler\bin\win64\yjpagent.dll" windowsSupervisor
INFO [nre] Launching Niagara Runtime Environment
FATAL: Can not use Java agent argument '-agentpath:C:\Program Files\YourKit Java Profiler\bin\win64\yjpagent.dll' without a 'developer' feature in license.
```


Starting YourKit Agent

Attach to Niagara Station:

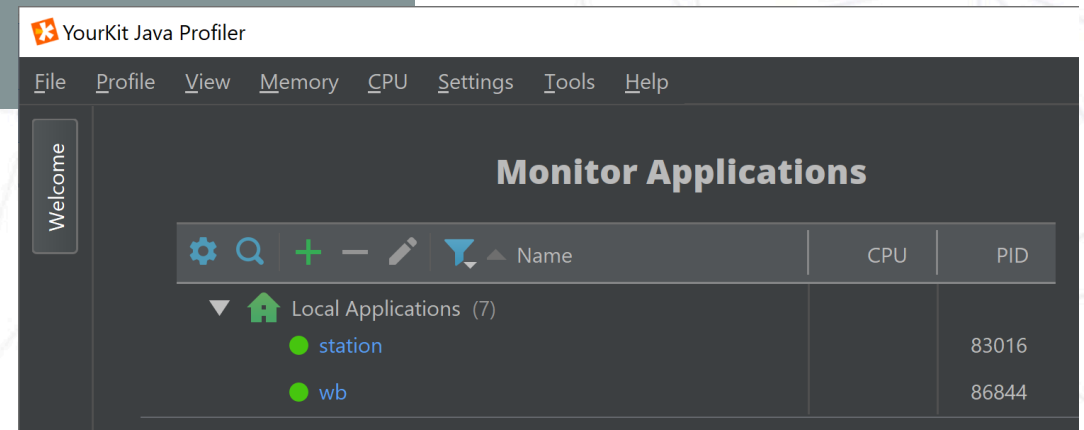
Administrator: Niagara Command Line - station -@agentpath:"C:\Program Files\YourKit Java Profiler\bin\win64\yjpagent.dll" windowsSupervisor

```
c:\niagara\niagara-4.10.0.154>station -@agentpath:"C:\Program Files\YourKit Java Profiler\bin\win64\yjpagent.dll" windowsSupervisor
INFO [nre] Launching Niagara Runtime Environment
[YourKit Java Profiler] Log file: C:\Users\Niagara\.yjp\log\station-44680.log
INFO [13:17:29 09-Jun-21 EDT][nre] Booting
INFO [13:17:29 09-Jun-21 EDT][sys] Logging initialized
INFO [13:17:31 09-Jun-21 EDT][sys.registry] Up-to-date [106ms]
```

Attach to Niagara Workbench:

Administrator: Niagara Command Line - wb -@agentpath:"C:\Program Files\YourKit Java Profiler\bin\win64\yjpagent.dll"

```
c:\niagara\niagara-4.10.0.154>wb -@agentpath:"C:\Program Files\YourKit Java Profiler\bin\win64\yjpagent.dll"
INFO [nre] Launching Niagara Runtime Environment
[YourKit Java Profiler 2019.8-b142] Log file: C:\Users\Niagara\.yjp\log\wb-45500.log
INFO [13:22:27 09-Jun-21 EDT][nre] Booting
INFO [13:22:28 09-Jun-21 EDT][sys] Logging initialized
INFO [13:22:30 09-Jun-21 EDT][sys.registry] Up-to-date [98ms]
```



Niagara Applications In YourKit

View all kinds of data:

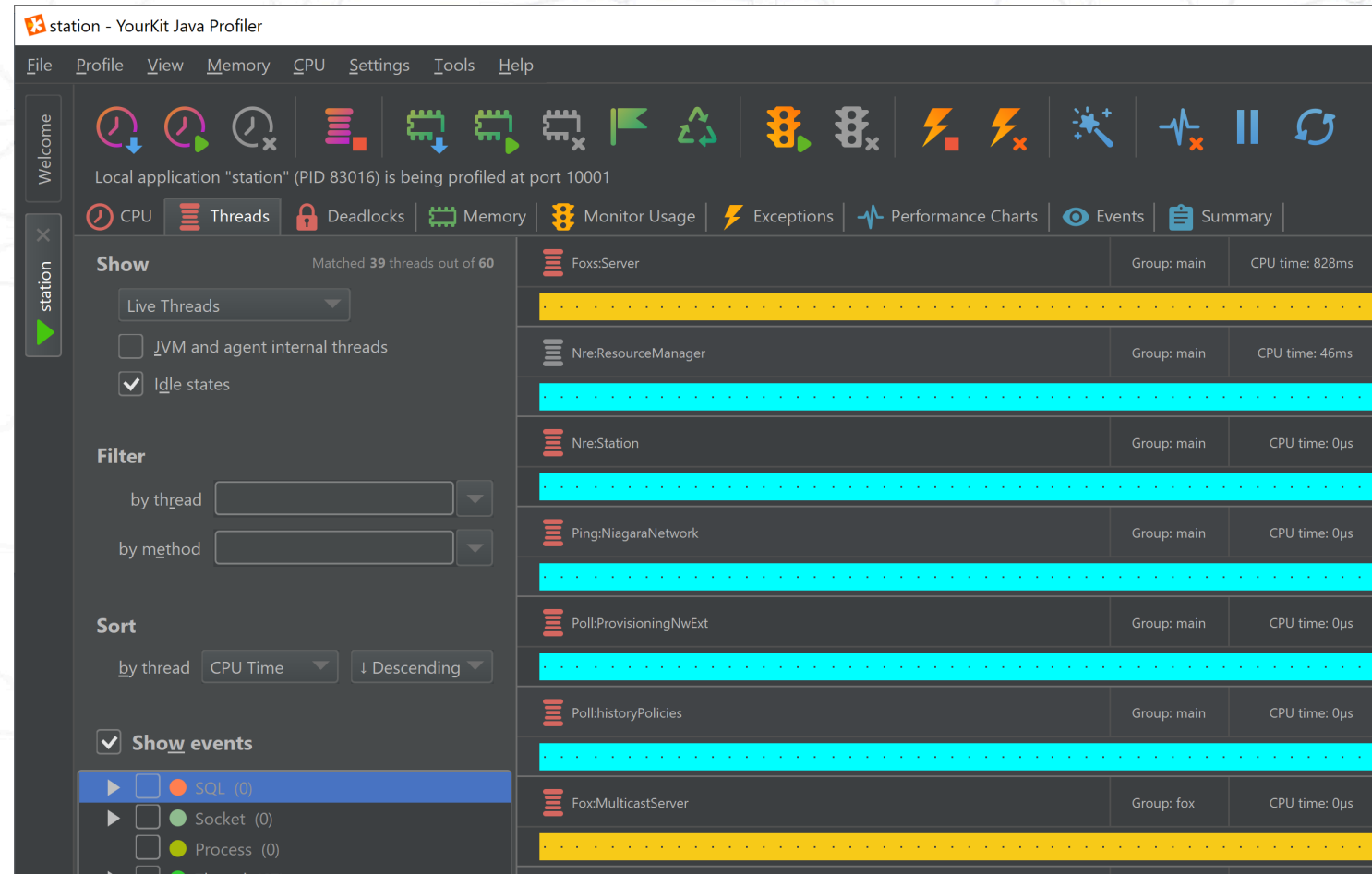
Threads

Deadlocks

Monitor Contention

Exceptions

Memory Allocations



Questions?

Please write them down!

hello



CONNECTING
THE WORLD