


CA RWA2 #2

Executive Summary (external)	<p>Problem statement summary:</p> <p><i>Customers were not able to</i></p> <ul style="list-style-type: none">- <i>view product inventory (empty prices on product sections pages);</i>- <i>view product variants available for purchase (on detailed page);</i>- <i>add product into the cart (as no variant could be selected).</i> <p>Impact:</p> <p><i>Noted by BU at 11:40a.m. (EST time) on Jan 5th, this issue started at 10:30a.m (based on logs).</i></p> <p><i>Until its resolution at 01:40p.m. (EST time), it lasted for 3h. So the affected time is <u>three hours</u>.</i></p>
Problem Statement (Internal/technical)	<p>Problem statement:</p> <ul style="list-style-type: none">● What: <i>Inventory and pricing data was absent on the brand site. This includes the following symptoms:</i> <ol style="list-style-type: none">1. Product prices are not shown on product section pages <div></div> <ol style="list-style-type: none">2. Product variants are not available on detailed product pages

Indiana Trophy Stripe Stretch Performance Polo

Color CRIMSON1



Size



[Size Chart](#)

1	▼	ADD TO CART
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3. Product cannot be added into a cart

Size



[Size Chart](#)

1	▼	ADD TO CART
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Failed to fetch

- **When:**

Started: Jan 05th 10:30a.m. EST

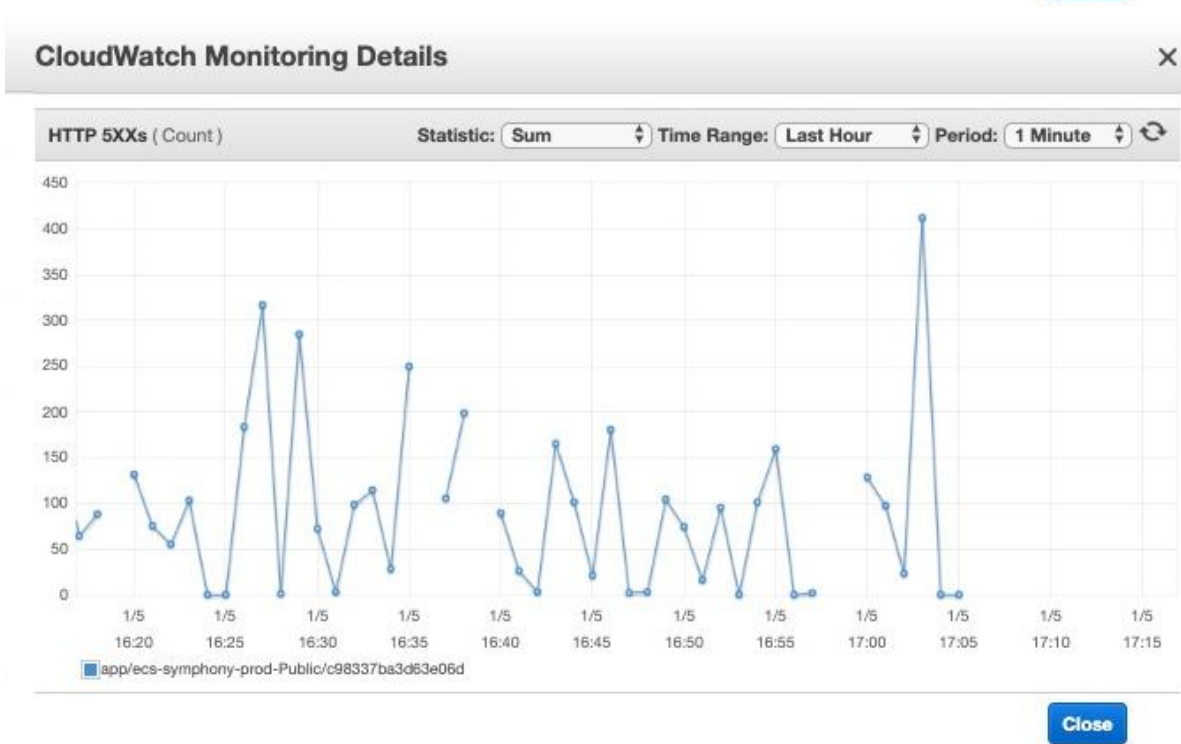
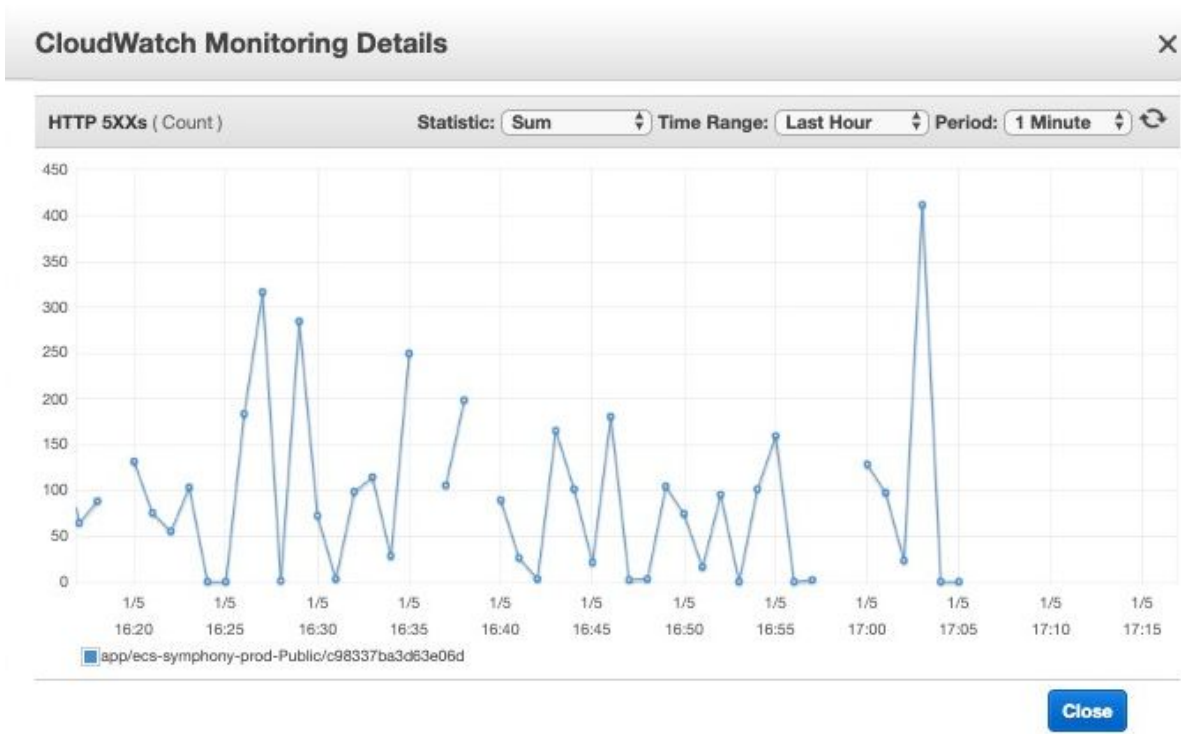
Ended: Nov 19th 01:40p.m. EST

Top 3 Symptoms:

- symptom1: product prices are not shown on product section pages
- symptom2: product variants are not available on detailed product pages
- symptom3: newrelic monitor with "org.apache.catalina.connector.ClientAbortException" and "java.io.IOExceptions: Connection reset by peer and Broken pipe" exceptions for productservice application

Root cause analysis (internal)

- Why 1:
- **Question:** Why were product inventories and prices not shown to customers?
 - **Reason:** Inventory and pricing requests to api.xxxxxx.com were failing with 504 Gateway Timeout Internal error
 - **Evidence:** Browser Network tab (filter “api method:GET”) and CloudWatch HTTP 5XXs monitor for for ecs-symphony-prod-Public ELB (managing api.petermillar.com requests)



Why 2:

- **Question:** Why were inventory and pricing requests failing with Internal errors?
- **Reason:** Because underlying productservice requests were incomplete (*timeouted*) and were throwing “org.apache.catalina.connector.ClientAbortException” and “java.io.IOException: Connection reset by peer and Broken pipe” exceptions
- **Evidence:** Newrelic error analytics for Productservice during that time

M

BROWSER

SYNTHETICS

MOBILE

PLUGINS

INSIGHTS

INFRASTRUCTURE


Maps

Alerts








Tools

Help

Search across accounts

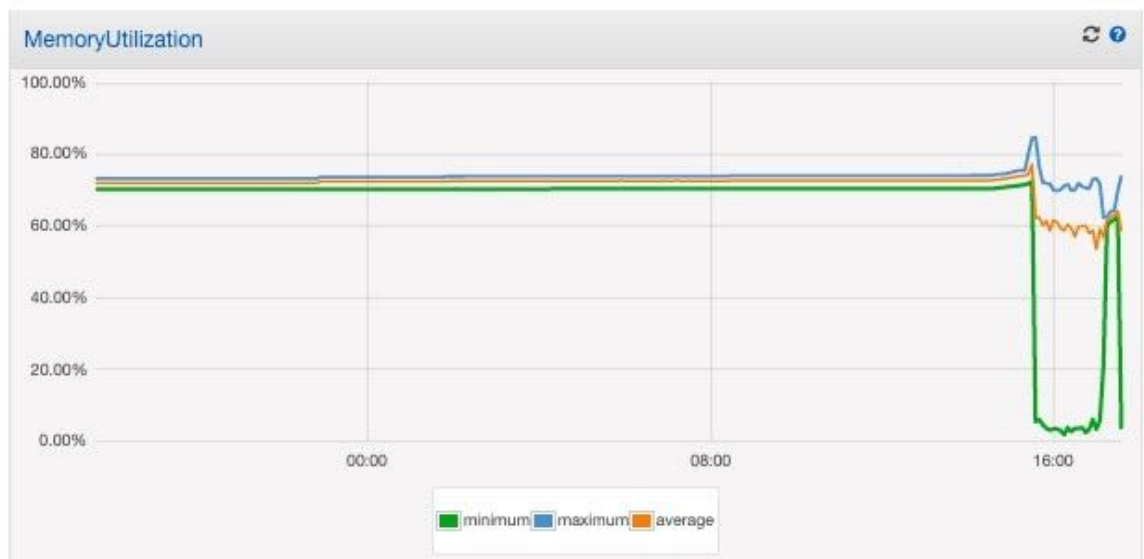
 Symphony C...

Key transactions

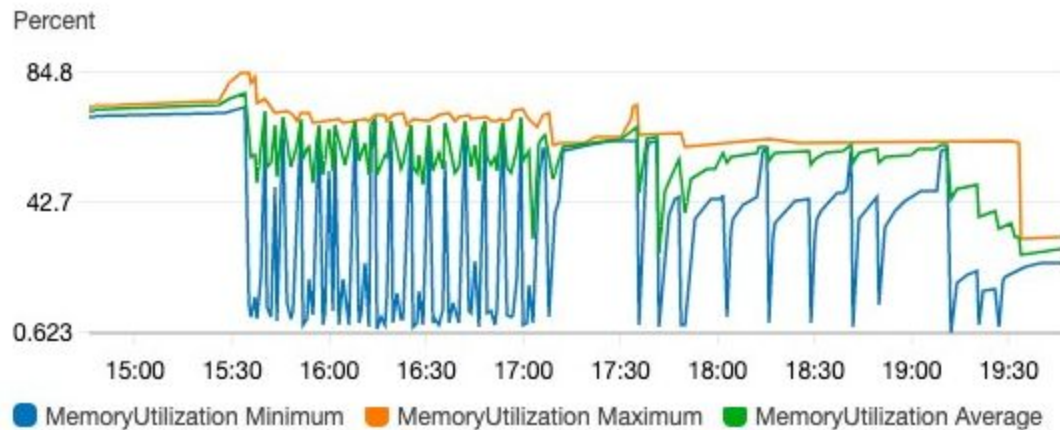
 First	 Last	 Tickets	 URL and type	 Message	  Count
11:03 am	11:30 am		Unknown org.apache.catalina.connector.ClientAbortException	java.io.IOException: Broken pipe	130
11:03 am	11:30 am		/v1/products/pricing (POST) org.apache.catalina.connector.ClientAbortException	java.io.IOException: Broken pipe	55
11:07 am	11:28 am		/v1/products/inventory (POST) org.apache.catalina.connector.ClientAbortException	java.io.IOException: Connection reset by peer	49
11:14 am	11:30 am		/v1/products/inventory (GET) org.apache.catalina.connector.ClientAbortException	java.io.IOException: Connection reset by peer	19
11:03 am	11:30 am		/v1/products/{id} (GET) org.apache.catalina.connector.ClientAbortException	java.io.IOException: Connection reset by peer	15
11:03 am	11:07 am		/v1/products/inventory (GET) HttpClientError 400	HttpClientError 400	3
11:21 am			/PricingController/list org.springframework.web.method.annotation.MethodArgumentTypeMismatchException	Failed to convert value of type 'java.lang.String' to required type 'java.util.List'; nested exception is java.lang.Numb... (more)	1

Why 3:

- **Question:** Why were underlying productservice requests throwing mentioned exceptions?
- **Reason:** Because java process inside productservice container was starving for memory resource. Newrelic triggered several circuit break incidents that time, meaning java process had memory nearly exhausted (more than 80% of heap memory used). This even stops monitor agent from tracing transactions. Moreover, the whole ecs-symphony-prod ECS cluster experienced a high memory utilization level (*see evidence below*).
- **Evidence1 :** ECS productservice monitoring chart:

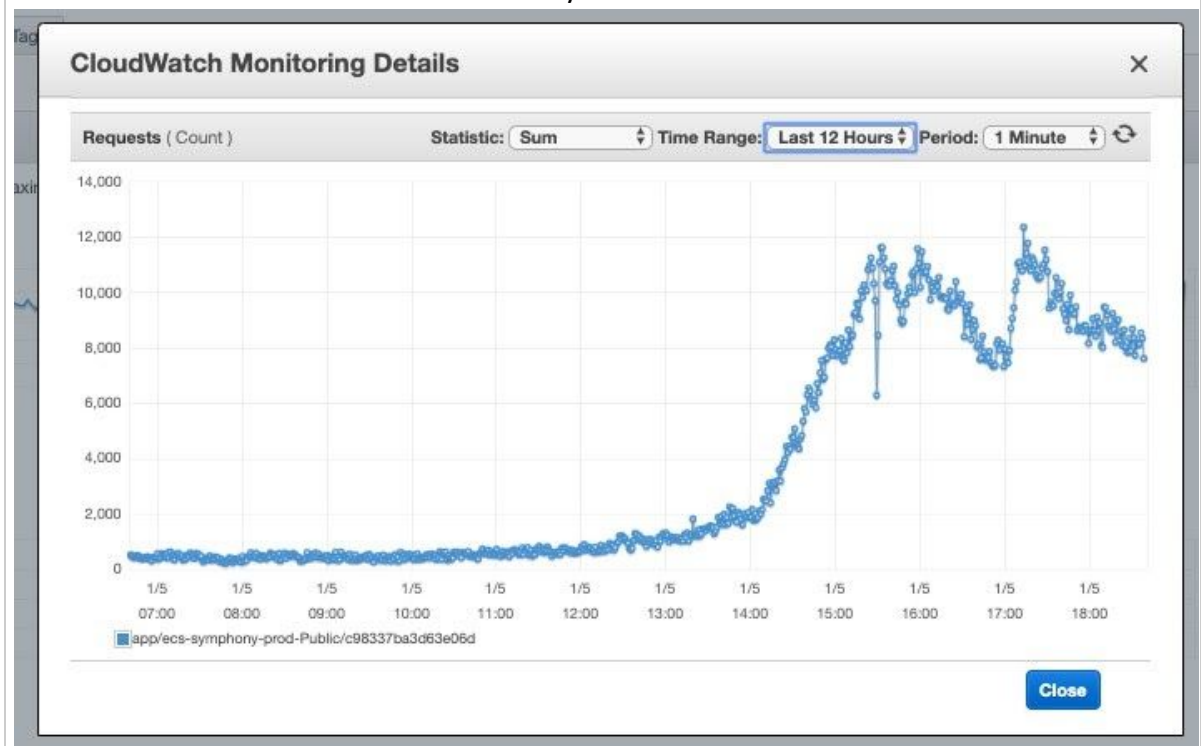


Evidence 2 Whole ecs-symphony-prod ECS cluster high memory utilization:



Why 4:

- **Question: Why did productservice java process starving for memory?**
- **Reason:** Each EC2 node in the ECS cluster is m4.xlarge with 16GB RAM and is supposed to be shared by more than 30 docker containers, including 8 docker containers for the productservice.
Each productservice docker container is configured to have a max memory limit of 2GB. We noticed that the traffic grew 5-6 times within a short span, which required additional memory to be allocated by the productservice containers. During this time, the productservice was attempting to use more than max available memory of 2 GB.
- **Evidence1:** Web Traffic increased by 5-6 times.



Evidence 2:


```

openjdk version "1.8.0_141"
OpenJDK Runtime Environment (build 1.8.0_141-8u141-b15-1~deb9u1-b15)
OpenJDK 64-Bit Server VM (build 25.141-b15, mixed mode)
root@ip-10-0-87-160:~# docker exec 757ed2ef093f java -XshowSettings:vm -version
VM settings:
  Max. Heap Size (Estimated): 3.48G
  Ergonomics Machine Class: server
  Using VM: OpenJDK 64-Bit Server VM

```

CONTAINER	MEM USAGE / LIMIT	MEM %
757ed2ef093f	808.2MiB / 2GiB	39.46%

Why 5:

- Question: [Insert question here]
- Reason / Root Cause: [Insert reason here]
- Evidence: 4 of the productservice containers allocated up to the whole 16GB of memory

```

root@ip-10-0-87-160:~# docker exec 143ae824ba62 java -XshowSettings:vm -version
VM settings:
  Max. Heap Size (Estimated): 3.48G
  Ergonomics Machine Class: server
  Using VM: OpenJDK 64-Bit Server VM

```

CONTAINER	MEM USAGE / LIMIT	MEM %
143ae824ba62	808.2MiB / 2GiB	39.46%

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```

CONTAINER	MEM USAGE / LIMIT	MEM %
757ed2ef093f	808.2MiB / 2GiB	39.46%

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OpenJDK Runtime Environment (build 1.8.0_141-8u141-b15-1~deb9u1-b15)
OpenJDK 64-Bit Server VM (build 25.141-b15, mixed mode)
root@ip-10-0-87-160:~# docker exec bd9e9012e8d2 java -XshowSettings:vm -version
VM settings:
  Max. Heap Size (Estimated): 3.48G
  Ergonomics Machine Class: server
  Using VM: OpenJDK 64-Bit Server VM

```

CONTAINER	MEM USAGE / LIMIT	MEM %
bd9e9012e8d2	841.9MiB / 2GiB	41.11%

```

openjdk version "1.8.0_141"
OpenJDK Runtime Environment (build 1.8.0_141-8u141-b15-1~deb9u1-b15)
OpenJDK 64-Bit Server VM (build 25.141-b15, mixed mode)
root@ip-10-0-87-160:~# docker exec 88ba42a92237 java -XshowSettings:vm -version
VM settings:
  Max. Heap Size (Estimated): 3.48G
  Ergonomics Machine Class: server
  Using VM: OpenJDK 64-Bit Server VM

```

CONTAINER	MEM USAGE / LIMIT	MEM %
88ba42a92237	1.122GiB / 2GiB	56.08%

```

openjdk version "1.8.0_141"
OpenJDK Runtime Environment (build 1.8.0_141-8u141-b15-1~deb9u1-b15)
OpenJDK 64-Bit Server VM (build 25.141-b15, mixed mode)
root@ip-10-0-87-160:~# free -m

```

	total	used	free	shared	buff/cache	available
Mem:	16046	6611	1808	168	7626	6764
Swap:	0	0	0			

Fix plan

Technical-fix: [Insert fix here]

Quality Bar for great root cause analysis

- Is the root cause at code level identified?
- Is the fix permanent?