

Rakuten ERT Production Monitoring

Production Monitoring with various tools

Version 2.5

NetCracker Technology Corporation



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Contents

1	Introduction	4
2	Production Monitoring Methods & Tools.....	5
2.1	iCinga Alerts	6
2.2	NewRelic Alerts	7
3	Alert Incoming Sources	10
4	Grafana Dashboard Monitoring	11
4.1	Rakuten ERT Dashboard	12
4.1.1	System Health Indicators:	12
4.1.2	ERT Dashboard KPIs.....	15
4.2	Rakuten ERT Dashboard Details	16
4.2.1	eCare Portal API Avg Response time	16
4.2.2	TOMS DB Response Time per Txn.....	17
4.2.3	TBAPI Response Time (avg)	18
4.2.4	Channel based TBAPI Response Time	18
4.2.6	TOMS DB Blocking Locks & Sessions	19
4.2.7	TOMS WL Hogging Threads.....	20
4.2.8	TOMS WL Stuck Threads	20
4.2.8	TOMS APP CPU Utilization %	21
4.2.9	eCare Active Sessions.....	21
4.2.10	TBAPI 500 Error per minute (stack)	22
4.2.11	Default Work Manager	22
4.2.12	TOMS DB Transactions per sec.....	23
4.2.13	TBAPI Calls per minute (stack)	24
4.2.14	NORC DB Blocking Locks.....	24
4.2.15	RB ECA WL Hogging Threads.....	25

4.2.16	TOMS DB CPU Utilization %	26
4.2.17	AMM DB Blocking Locks & Sessions	26
4.2.18	NORC DB Response Time per Txn	27
4.2.19	eCare Portal API Response time	28
4.2.20	RB ECA WL Stuck Theads	28
4.2.21	AMM DB Response Time per Txn.....	29
4.2.22	TBAPI Full GC per 10 min.....	30
4.2.23	TBAPI API Response time per API	31
4.2.24	Orchestrator Workmanagers.....	31
4.2.25	TOMS Free Regular MSISDN.....	33
4.2.26	TOMS POQueue Backlog of messages per node	33
4.2.27	Licenses and Certificates Monitoring	333
4.2.28	Message Queue AB for Tremeal backlog monitoring.....	33
4.2.29	TBAPI HEap After Full GC.....	34
4.3	Alert Handling Procedure	354
5	Version History	365

1 Introduction

The objective of this document is to understand the tools used for Rakuten production environment monitoring. This document contains...

- Monitoring methods & tools
- Type of Grafana dashboards to be monitored
- ERT dashboard – high level idea
- ERT dashboard – detailing of each graph
 - Understanding of each graph
 - What to monitor
 - How to monitor
 - When to escalate
- iCinga alerts
- NewRelic alerts

2 Production Monitoring Methods & Tools

Rakuten Production Monitoring entails observing overall health of various BSS components deployed on Totsuka Production Server. In case of any abnormalities in the System Health Indicators and/or threshold breach of critical metrics, ER Team is required to notify the relevant teams on Skype group as well as escalate to Duty Manager/Escalation Manager as per the guidelines.

Following tools are used by ERT team to monitor Rakuten Production Server.

- I. **Graffana:** This is a Graphical Monitoring UI tool, which comprises of System Health Indicators and other business critical metrics. ERT is required to continuously monitor the multiple dashboards installed on Graffana.
- II. **iCinga Email Alerts:** iCinga tool sends email alerts when a critical metrics crosses the defined thresholds.
- III. **NewRelic Monitoring Tool:** This tool provides in depth performance details of the various components deployed on the production server. It sends email notification only in case of critical issues (real P1/P2 issues).

Graffana and iCinga are being used by Netcracker, while NewRelic tool is being used by Rakuten, for production monitoring. ERT team will also start monitoring the NewRelic tool in near future.

2.1 iCinga Alerts

iCinga tool sends email alerts when a critical metrics crosses the defined thresholds.

Four types of severity raised via this iCinga tool, Sev-1 to Sev-4.

- Whenever Sev-1 or Sev-2 type of alert raised, IT HD team notifies it on Sev-1 Skype group. Concerned team (MSO) works on the alert and tries to fix it. IT HD team keep track of it and closely work with concern team to close the alert.
- Sev-3 & Sev-4 alerts are directly assigned to MSO team and they work on it and take it towards closure. IT HD team does not involve in it.

Note: Initially the alert was coming from IT Group hd@netcracker.com, but now after migration it has started coming via GTS gts@netcracker.com

Below are few examples of such iCinga alerts.



GTS ATTENTION!
P2 Rakuten rkttprod



GTS (ITMON-33559)
rkttprodportalapp03 i

2.2 NewRelic Alerts

This tool provides in depth performance details of the various components deployed on the production server. It sends email notification only in case of critical issues (real P1/P2 issues).

- This alert is very critical as the alert raised in case of P1/P2 issues.
- Inform L2 team to check fallouts if any
- If alert is for 3rd party then inform Rakuten to check if any issue or planned activity is in progress

1. Handling NewRelic Alert:

If any NewRelic alert turns out to be real issue having some impact (*High no. of errors, Performance degradation, KPI crossing thresholds*), we need to check if any old ticket already exists for that issue –

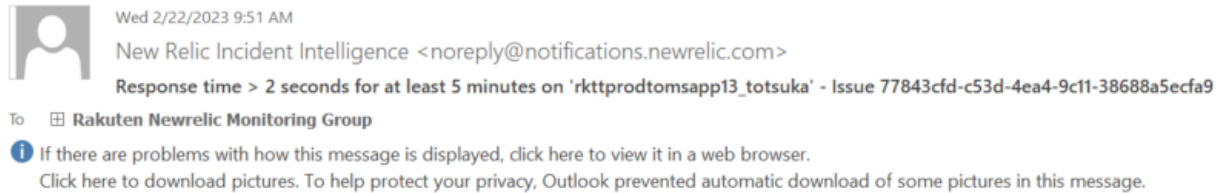
- **If ticket exists with status OPEN:** update the ticket with new occurrence and details
- **If old ticket exists with status CLOSED:** Reopen the ticket and update with new occurrence details
- **If ticket doesn't exist:** open a new ticket after collecting the issue details (from NewRelic tool /Greylog), logs (if required as advised by Duty manager, seek MSO help to collect the logs)

2. Creation of ticket:

- Consult with the duty manager about the issue
- If issue is related to performance impact (*CPU utilization is high, High DB response time, High eCare response time*) :
 - Create a **GTS ticket** and assign to **Oleg V.**
- If issue is functional (High no of business/application errors) :
 - Create a **TMS ticket** and assign to **Yuliia S. (L2 lead)**. Also inform L2 TOMS person in shift about the ticket

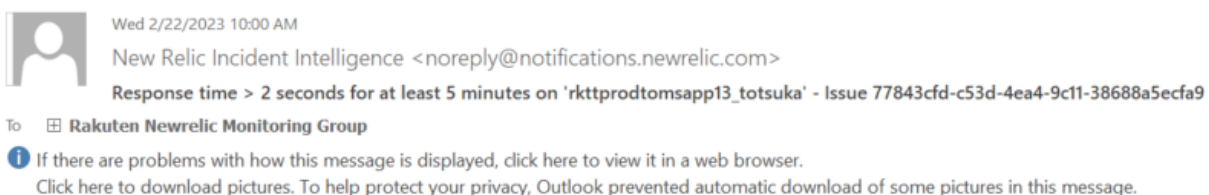
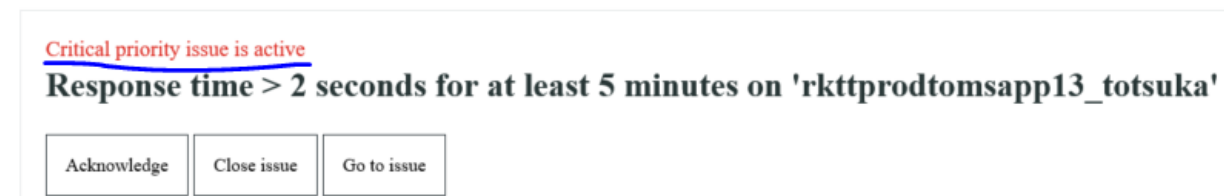
This is to note that we will receive two emails of each alert, with Opened & Closed state.

Sample alert screenshot: Same alert with **Opened** & **Closed** state.



Bing Maps

[External Email]



Bing Maps

[External Email]



Outlook configuration for this alert:

- Try to configure Outlook Rule as below.
- Alert will be received from New Relic Incident Intelligence
noreply@notifications.newrelic.com
- Set “display” in the “New Item Alert window”. The alert window will pop-up as soon as you will receive this alert email.
- Try to move it to some specific folder so that you can refer it easily whenever needed.

3 Alert Incoming Sources

ERT has to take action for any alert coming from below sources –

- **Rakuten ERT dashboard** :
 - Any System Health Indicator turning to **Yellow** or **Red** or **Purple**
 - Any threshold breach (crossing the **WARNING** or **CRITICAL** line) on the KPI graphs
- **Mailbox** : NewRelic email alert
- **Skype/Viber group** : Any issue reported on the group either by NC management or Rakuten IT/business

4 Grafana Dashboard Monitoring

Grafana is a graphical monitoring tool. This tool comprises of System Health indicators and other business critical metrics.

There are multiple dashboards available in Grafana tool to monitor health of system, portal, database, 3rd party solution response etc.

We will be mainly focusing on below two dashboards:

1) Rakuten Health Dashboard:

- This dashboard contains System Health indicators and around 90+ other graphs.
- It also includes the number of “Active Subscribers” and “Sales Orders”
- This dashboard is extended one where system, portal, database, sessions, TBAPI etc. all information available.
- Below is the link to access Rakuten Health dashboard.

<https://dashboard-prod.netcracker.com/d/h2al8i-Zz/rakuten-health-dashboard?orgId=1&refresh=1m>

2) Rakuten ERT Dashboard:

- This dashboard contains System Health indicators and **CRITICAL** business KPI metrics which needs to be closely monitored.
- The System Health indicators are related to LB (load balancer), DB, 3rd party integrations and about application nodes.
- Critical KPIs like, portal response, DB & App CPU utilization & responses, Hogging threads & stuck threads etc.
- Below is the link to access Rakuten ERT dashboard.

<https://dashboard-prod.netcracker.com/d/jwZnkejWk/rakuten-ert-dashboard?orgId=1>

4.1 Rakuten ERT Dashboard

As mentioned above, ERT dashboard is very critical and contains important metrics and system health indicators.

The dashboard is divided into two parts

- 1) **System Health Indicators**
- 2) **ERT Dashboard KPIs (Graphs)**

4.1.1 System Health Indicators:

System health indicators shows the current state of a system.

The indicators are for

1. **LB (load balancers)**: The accessibility of corresponding components from the load balancer.
2. **DB Health**: Health check of BSS Database Components.
3. **3p integrations**: Connectivity checks from BSS to 3rd Party Integrations
4. **Health**: Health check of the BSS individual node of particular component
5. **Sanda Health**

The indicator color changes if there is an issue observed. ERT has to take action if -

- Any System Health Indicator turning to **Yellow** or **Red** or **Purple**

Sometimes the indicators automatically turns back to Green from Red or Purple.

If any System Health Indicator is **Yellow** or **Red** or **Purple**

- Click on the indicator box, which would open iCinga dashboard, verify if the process status is yellow or red or purple there as well
- If it's Green, go back to the ERT dashboard, refresh and verify if the indicator turns back to green
- If it's Yellow/Red/Purple, click on the process box and "[Check now](#)" link on the process dashboard. Repeat this 3-4 times with a gap of few sec. If the status turns back to Green, go back to the ERT dashboard, refresh and verify if the indicator turns back to green
- If the status remains Yellow/Red/Purple even after multiple refresh, follow [Alert Handling Procedure](#).

Below newly component added under system health indicators

- API GW(MVNE) component in Totsuka
- Sanda Health
- 3p Integrations

Please find latest system health indicators dashboard view under ERT Dashboard

Below screenshot shows all the system health indicators.

Rakuten > Rakuten ERT Dashboard

LB

- CSR LB
- ECA LB
- MGW LB
- POS LB
- TBAPI LB
- TOMS LB
- eCare LB

DB

- AMM DB
- ActBroker DB
- NORC DB
- PORTAL DB
- RDB
- TOMS DB

3p Integrations

- INT ADDRESS
- INT APPENG
- INT BILL IMAGE
- INT CTI
- INT DEVICE COMPENSATION
- INT DMS
- INT FEMTOCELL
- INT FRAUD
- INT GEMALTO
- INT IDMS GAP
- INT INNOEYE
- INT LDAP
- INT NOC
- INT NOKIAFO
- INT OCR
- INT OTA
- INT PAYVAULT
- INT PGW
- INT RCS
- INT SITEFORGE
- INT SMDP
- INT TELEMATER
- INT THUNDERBIRD
- INT TREMEAL
- INT TREMEAL GAP

Health

- CSR1
- CSR2
- CSR3
- CSR4
- CSR5
- CSR6
- CSR7
- CSR8
- MobileGW1
- MobileGW2
- MobileGW3
- MobileGW4
- POS1
- POS2
- POS3
- POS4
- POS5
- POS6
- POS7
- POS8
- eCare1
- eCare2
- eCare3
- eCare4
- eCare5
- eCare6
- eCare7
- eCare8

Sanda Health

- Kafka1
- Kafka2
- Kafka3
- San CouchBase2
- San CouchBase3
- Sanda Rabbitmq1
- Sanda Rabbitmq2
- Sanda TBAPI1
- Sanda TBAPI2
- Sanda TBAPI3
- Sanda TBAPI4
- Sanda TBAPI5
- Sanda TBAPI6
- Sanda TBAPI7
- Sanda TBAPI8

Health

- AMM
- API GW01
- API GW02
- ActBroker1
- ActBroker2
- CouchBase1
- CouchBase2
- CouchBase3
- ECA11
- ECA21
- TBAPI1
- TBAPI2
- TBAPI3
- TBAPI4
- TBAPI5
- TBAPI6
- TBAPI7
- TBAPI8
- TOMS11
- TOMS12
- TOMS21
- TOMS22
- TOMS31
- TOMS32
- TOMS41
- TOMS42
- TOMS51
- TOMS52
- TOMS61
- TOMS62
- TOMS71
- TOMS72
- TOMS81
- TOMS82

3p Integrations

- PORTAL INT BANK
- PORTAL INT LDAP
- PORTAL INT RAE

4.1.2 ERT Dashboard KPIs

There are few important metrics (KPIs) available on this ERT dashboard which needs to be closely monitored.

These metrics are monitored by its defined **Warning** or **Critical** value. If any of the metrics crosses Warning or Critical level, then alert should be raised. Details of those values will be described in sub-sequent sections against each metrics (graphs).

The values of 'Warning' and 'Critical' thresholds of each KPI are maintained at -

https://sps.netcracker.com/intproject/RKTN.IM.BSS/Shared%20Documents/100_Managed_Services/Rakuten%20CSO/Procedures/Rakuten%20ERT%20KPIs.xlsx

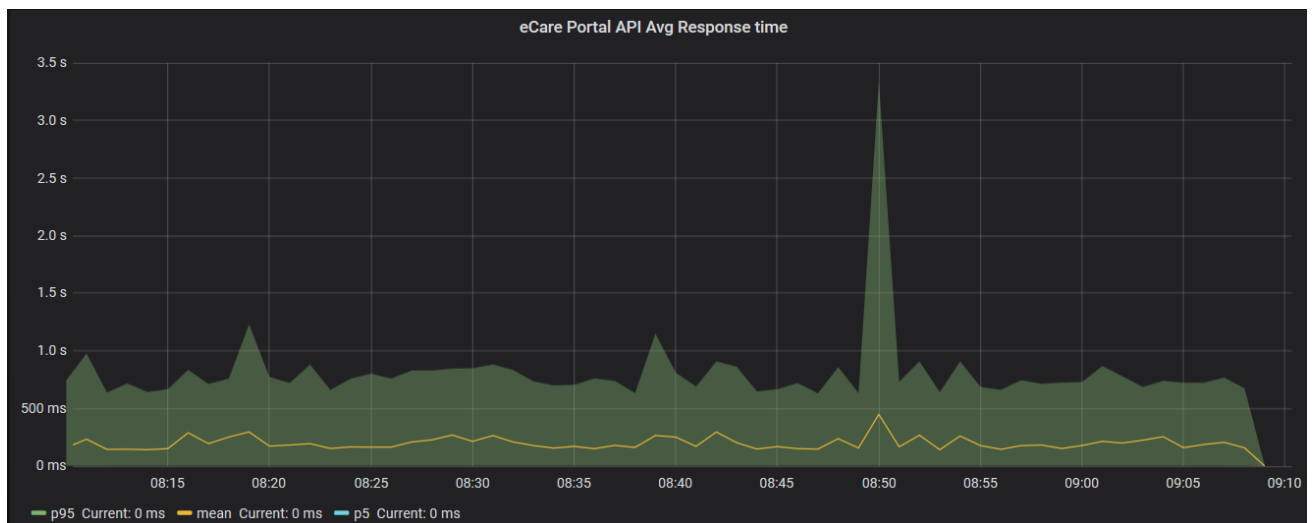
But in Grafana for each dashboard these values are indicated in the graph itself as Orange and Red line

Below is the list of Metrics (graphs) available on ERT Dashboard:

Sr. No.	Name of Graph (KPI)	Remark
1	eCare Portal API Avg Response time	Business Critical KPI
2	TBAPI Response Time (avg)	Business Critical KPI
3	TOMS DB Response Time per Txn	Business Critical KPI
4	eCare Portal API Response Time	
5	TOMS WL Hogging Threads	
6	TOMS WL Stuck Threads	
7	TOMS DB Blocking Locks & Sessions	
8	TOMS DB CPU Utilization %	
9	TOMS App CPU Utilization %	
10	Default Work Manager	
11	TOMS DB Tablespace Util%	
12	eCare Active Sessions	
13	TBAPI 500 Error per minute (stack)	
14	TBAPI Full GC per 10 min	
15	TBAPI Calls per minute (stack)	
16	NORC DB Blocking Locks	
17	AMM DB Blocking Locks & Sessions	
18	RB ECA WL Hogging Threads	
19	NORC DB Response Time per sec	
20	AMM DB Response Time per Txn	
21	RB ECA WL Stuck Thread	
22	TOMS DB Transaction per sec	
23	TBAPI API Response time per API	
24	Orchestrator Workmanagers	

4.2 Rakuten ERT Dashboard Details

4.2.1 eCare Portal API Avg Response time

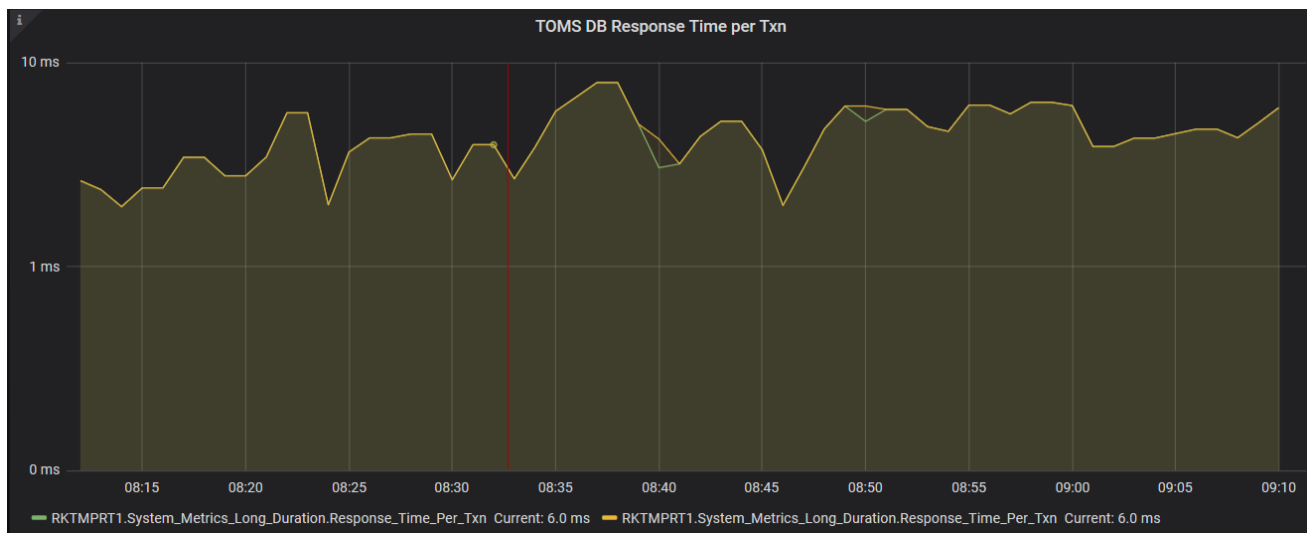


P95 – (95th Percentile) This means that if 95% of the values fall below this value. In short, we ignore Jitters and Spikes and consider only normal values.

This is the most Important KPI.

- Shows the Time taken to get response from eCare web portal.
- High value shows website is taking longer to load.
- This is the higher value in above graph (Green Area).
- Mean or average value is also shown as a yellow solid line. Mean will always be lower than p95.

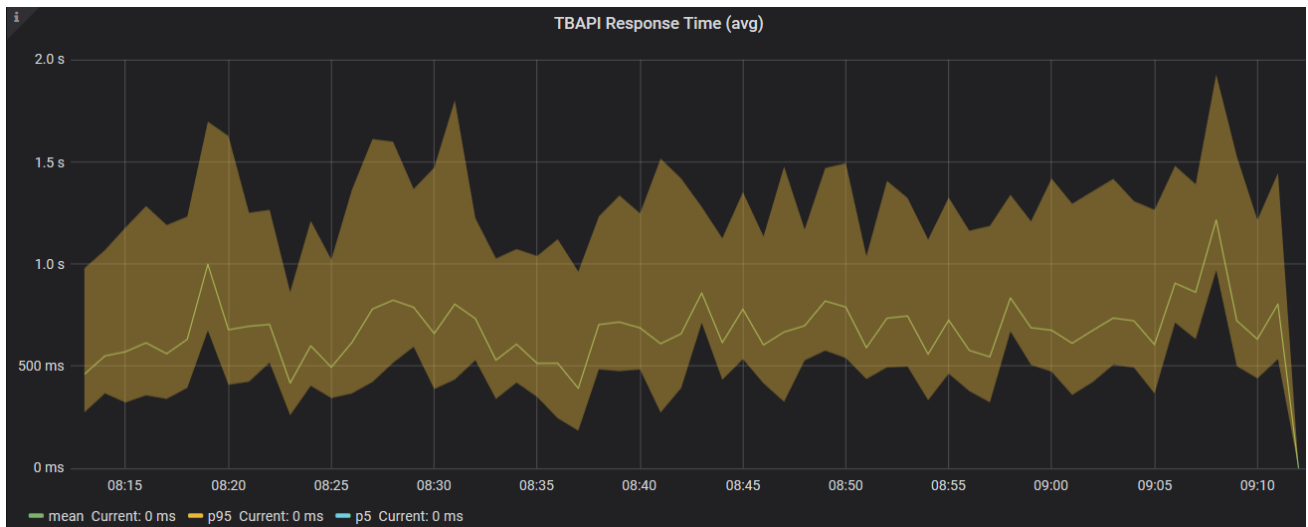
4.2.2 TOMS DB Response Time per Txn



This is the 3rd most important KPI.

- Average time taken per Database Transaction in TOMS DB.
- Lower the value, better.
- Higher value means Database response is slow and will affect the overall Performance of system.

4.2.3 TBAPI Response Time (avg)



What is TBAPI:

Telecom Business API known as Business Agility Layer.

High Level, business oriented, standard compatible, stable versioned API over all BSS.

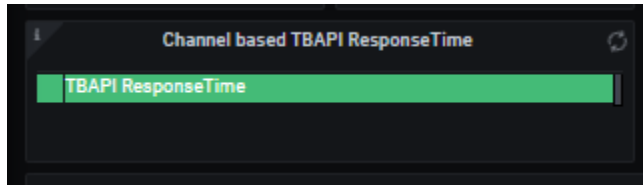
Think of it as a black box which has all business logic Implemented. We access those logic via API call.

Highly Cached. Uses **Couchbase** NoSql Database for Smart caching.

This is the 2nd most Important KPI

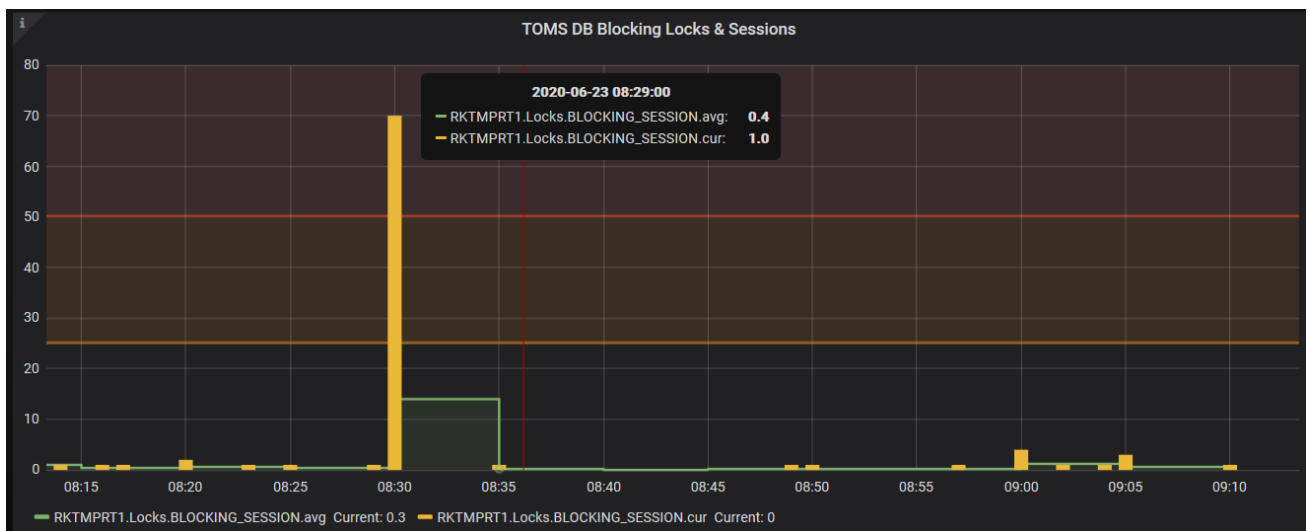
- Shows the Time taken to get response from TBAPI Layer. Lower value is better.
- High value shows that Business Layer is taking longer to respond, hence All dependent applications would run slower.
- **P95** – (95th Percentile) This means that if 95% of the values fall below this value. In short, we ignore Jitters and Spikes and consider only normal values.
- This is the higher value in above graph.
- Mean or average value is also shown as a solid line. Mean will always be lower than p95.

4.2.4 Channel based TBAPI Response Time



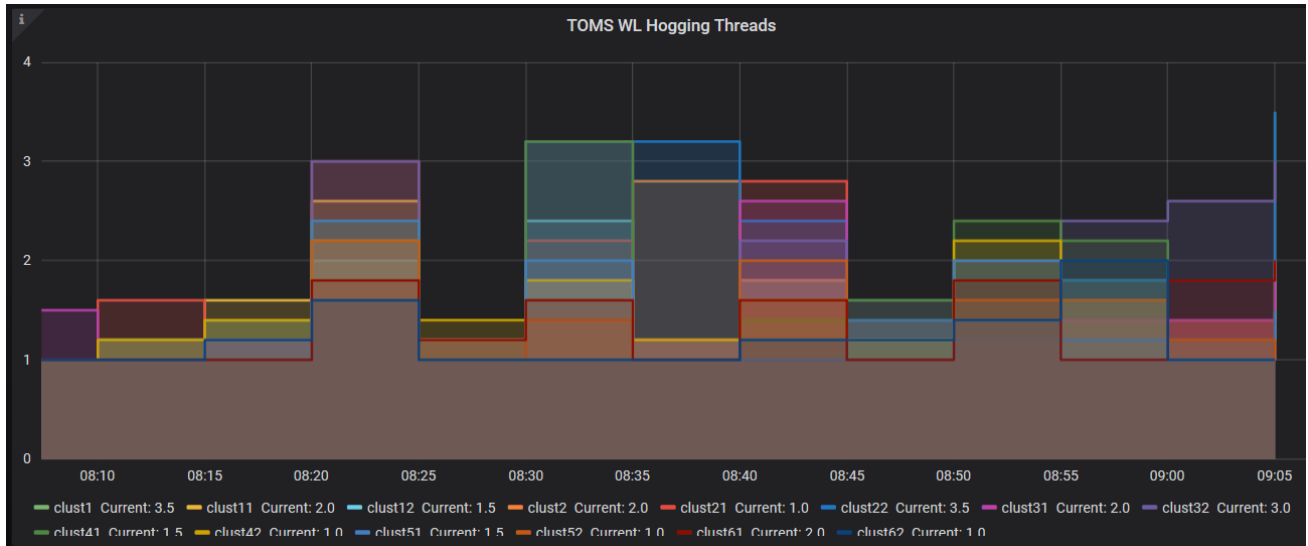
- This KPI is “supportive” to the main KPI – **TBAPI average response time**.
- But it’d help to indicate if there is any issue with specific TBAPI channel, so if there are huge spikes in TBAPI avg response time, you can check this KPI as well and visit TBAPI channel dashboard (attached mail) – <https://bass.netcracker.com/pages/viewpage.action?pagelId=1256314225> , to see which channel is impacted and provide this information to the stakeholders (on Webex or WR if its P1/P2 issue)
- There could be occurrence that TBAPI average response time is trending below thresholds with small spikes (as its average of all), but this KPI is crossing thresholds for specific channel. In this case, also you can visit TBAPI channel dashboard and report which channel is impacted.

4.2.5 TOMS DB Blocking Locks & Sessions



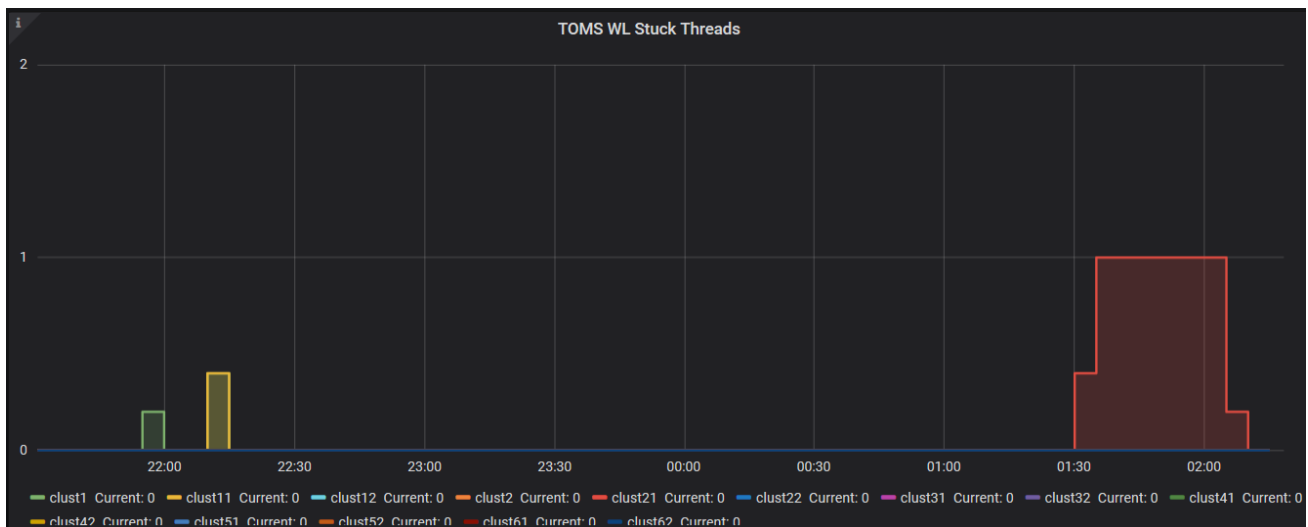
- Blocking session occurs when one session acquired an lock on an object and doesn't release it, another session (one or more) want to modify the same data. First session will block the second until it completes its job
- Number of Blocking Sessions in TOMS Database at any given time.
- Blocking sessions cause issue if present continuously for a long duration.

4.2.6 TOMS WL Hogging Threads



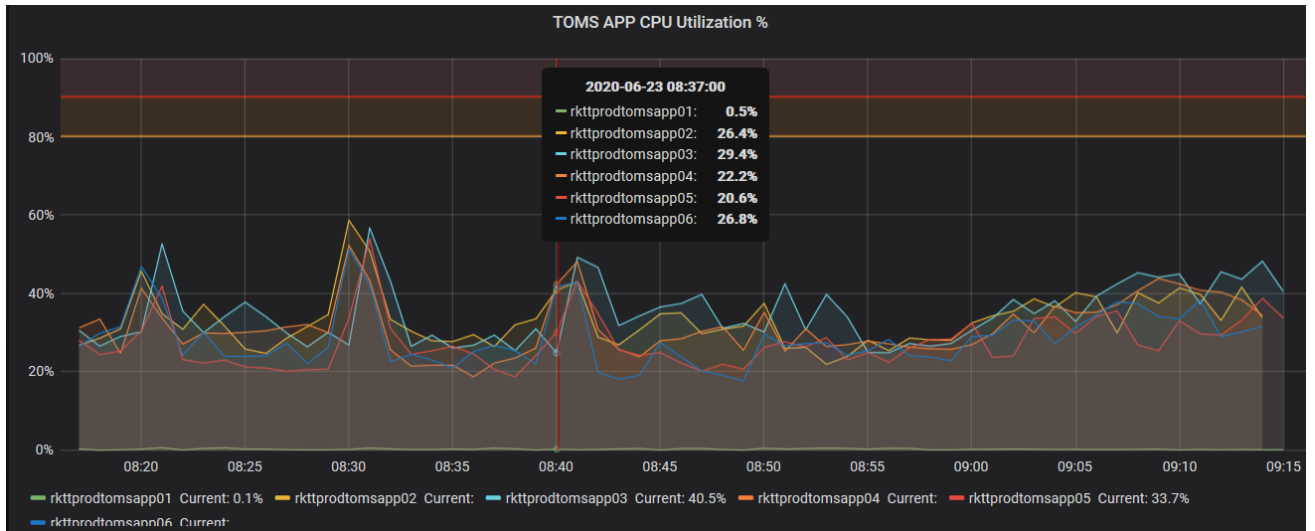
- A hogging thread is a thread which is taking more than usual time to complete the request (For example More than 10 Seconds) .
- The graph shows number of such treads for each cluster.

4.2.7 TOMS WL Stuck Threads



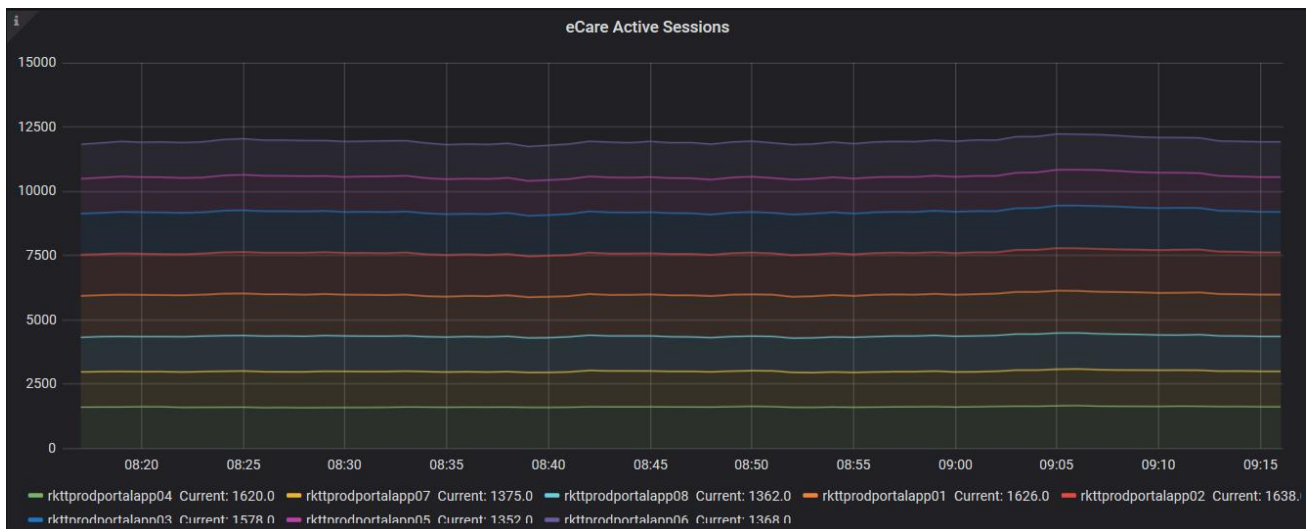
- A thread is declared as Stuck if it runs over 600 secs (default configuration which you can increase or decrease from Weblogic admin console).
- The graph shows number of such treads for each cluster.

4.2.8 TOMS APP CPU Utilization %



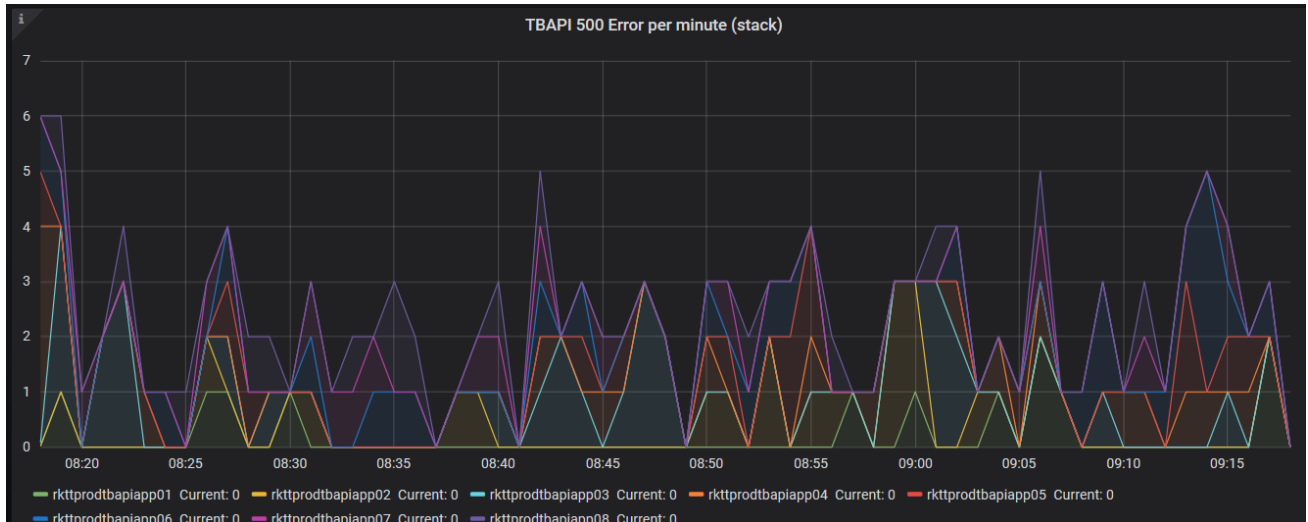
TOMS application host's CPU utilisation current percentage.

4.2.9 eCare Active Sessions



- Total number of Active sessions/connections to Rakuten eCare Web Portal.

4.2.10 TBAPI 500 Error per minute (stack)

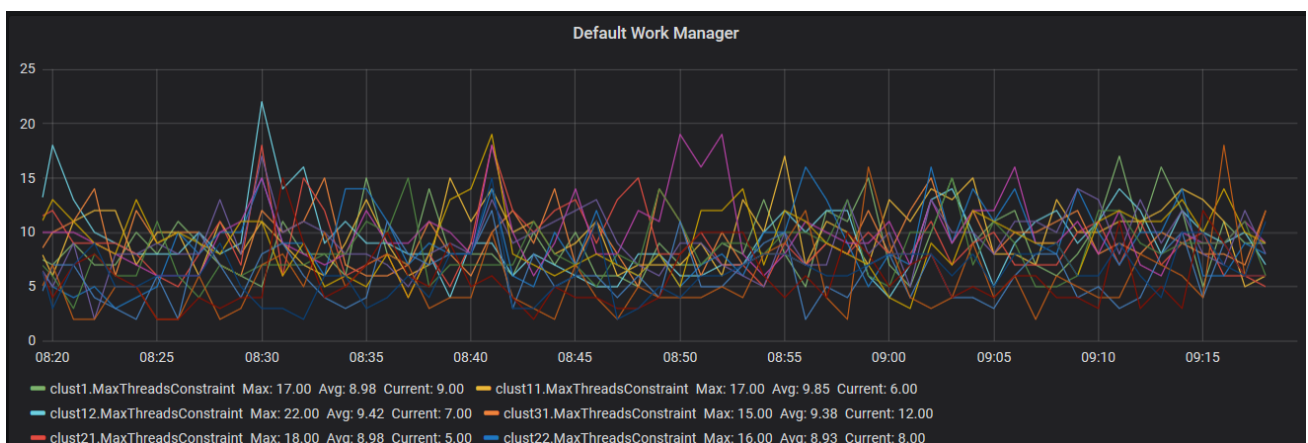


HTTP 500 - "Internal Server Error"

It is a very general HTTP status code that means something has gone wrong on the website's server, but the server could not be more specific on what the exact problem is.

- The graph shows HTTP-500 Error counts per minute collected from Application Logs.
- The Graph Shows Error Count per minute for all Nodes.
- Also shows Error count for individual Nodes when you hover mouse over the graph.

4.2.11 Default Work Manager



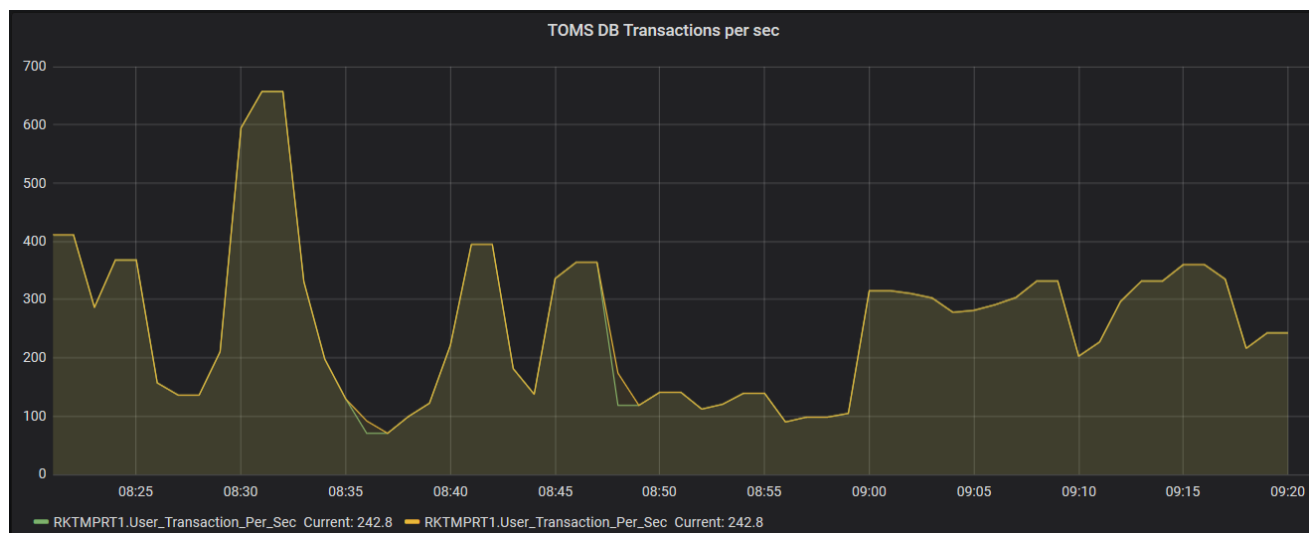
What is WorkManager:

WebLogic uses a concept called WorkManager in order to prioritize work and maintain threads and thread-pools.

The default WorkManager is implemented to handle thread management and perform self-tuning.

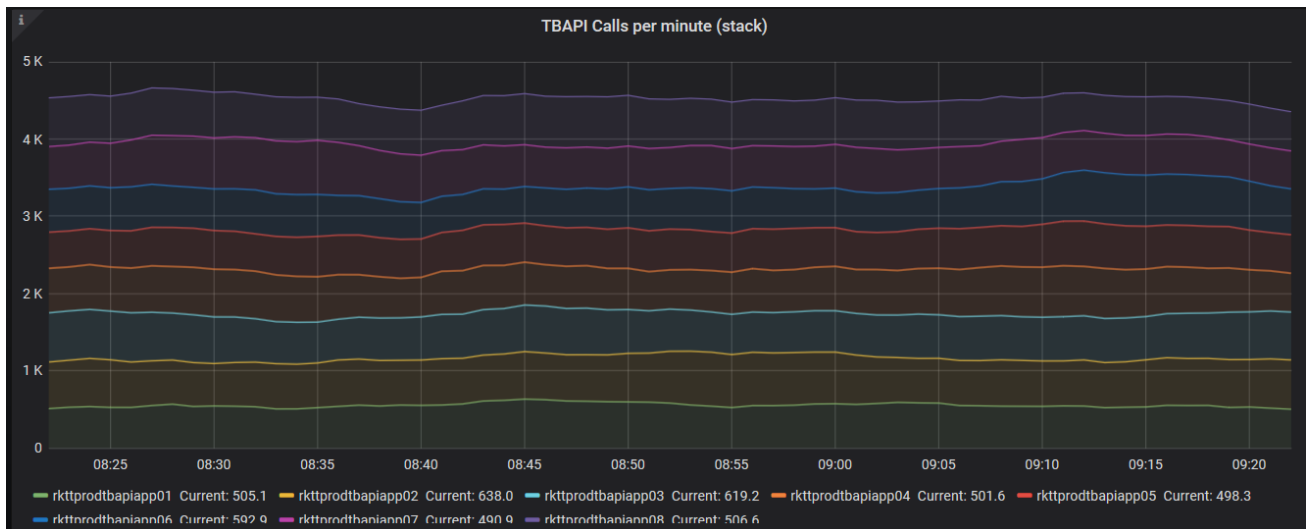
- The Graph Shows MaximumThread Count handled by each Node Of work manager.
- The Average and Current Thread counts are also mentioned Below the Graph.

4.2.12 TOMS DB Transactions per sec



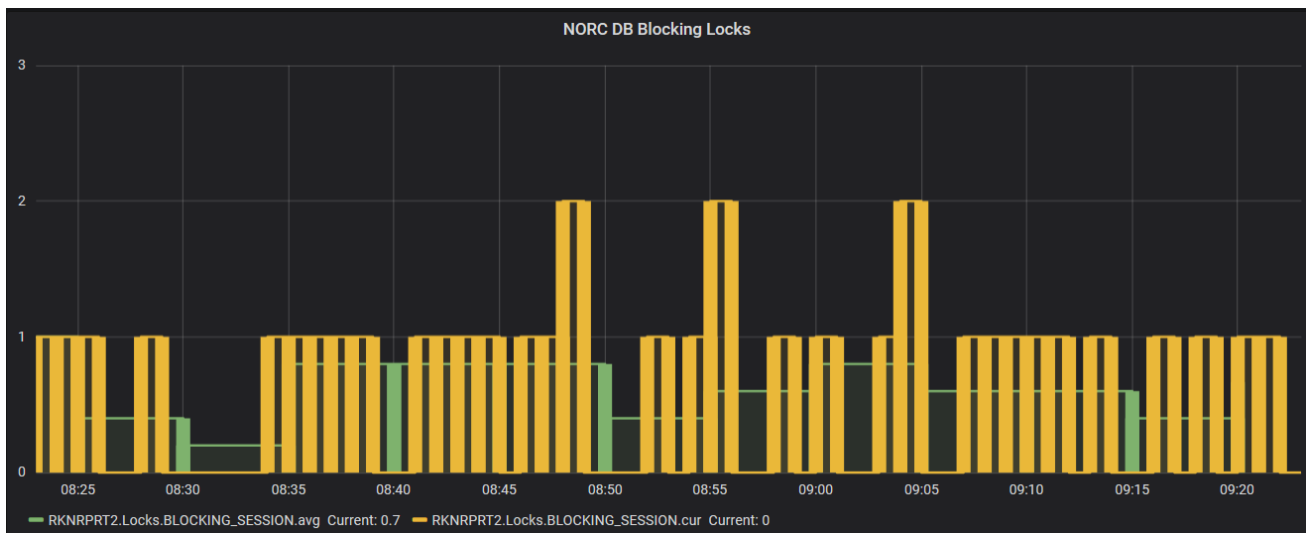
- The average number of Transactions happening every second on TOMS Database (Oracle).

4.2.13 TBAPI Calls per minute (stack)



- Shows total number of API calls to TBAPI at any given time.
- This is the sum of calls to all the individual APIs

4.2.14 NORC DB Blocking Locks

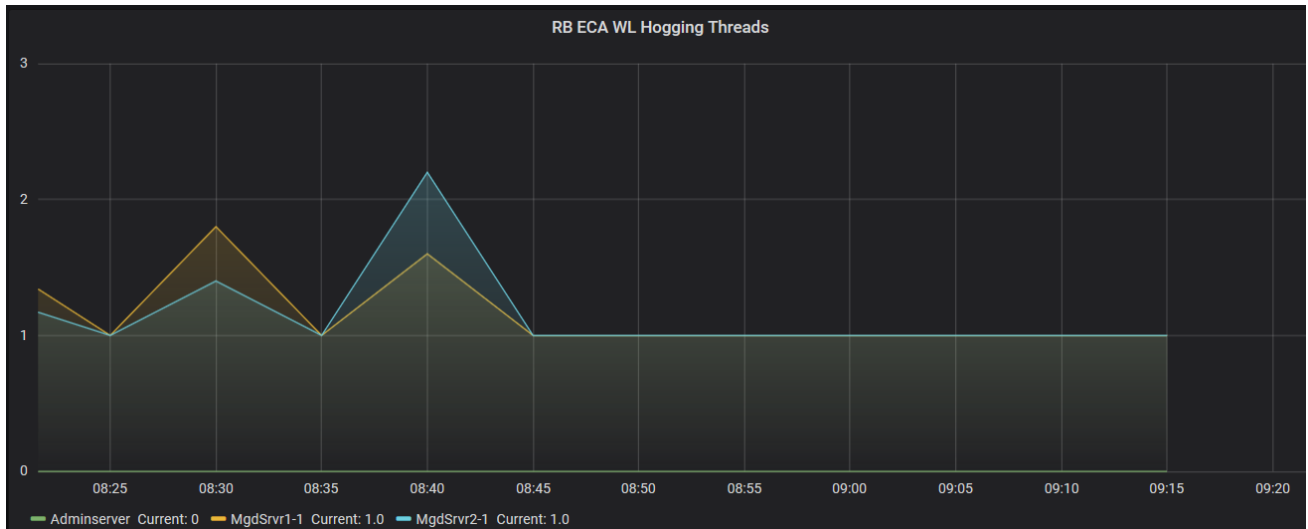


What is NORC:

NetCracker Online Rating and Charging. It is just another name for RBM

- Oracle DB blocked sessions on NORC. Blocked sessions can cause performance issue if block remains active for long duration.

4.2.15 RB ECA WL Hogging Threads

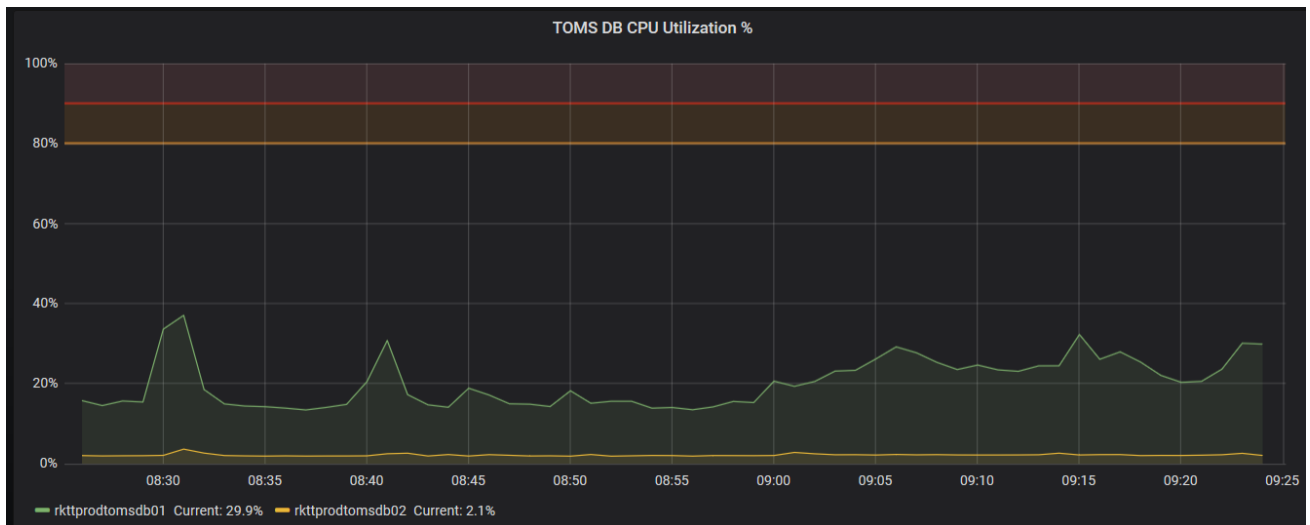


What is ECA:

Enhanced Care APIs are scalable and provided via Web Services. They provide an “integration ready” interface, allowing you to integrate external systems easily and rapidly with the Rating and Billing Manager system (RBM/NORC).

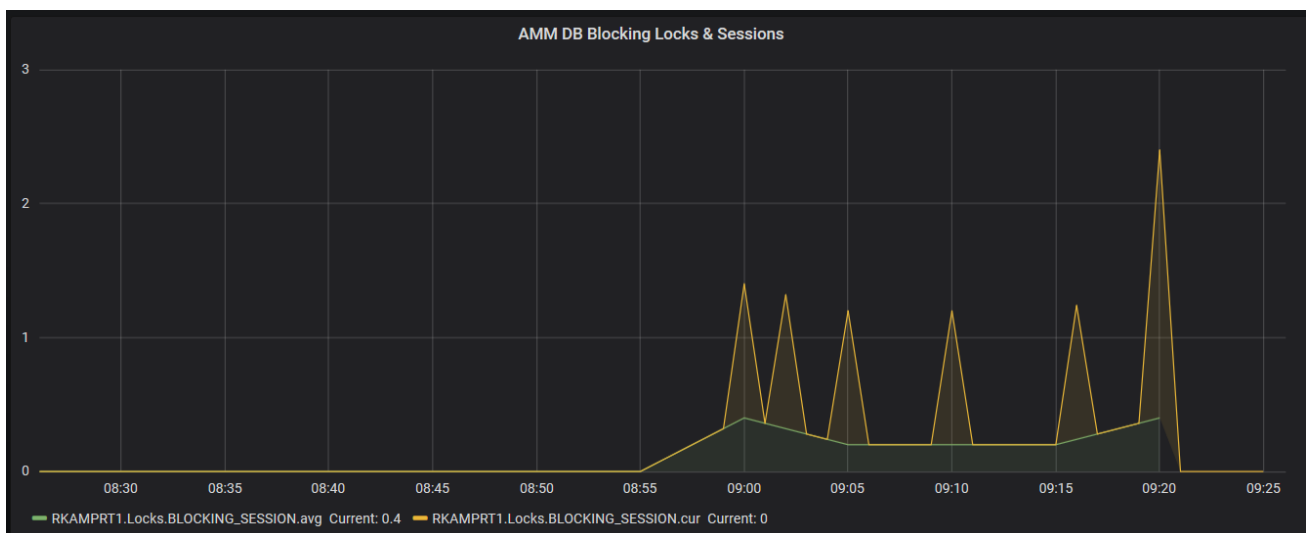
- KPI Shows Hogging Threads in Weblogic Server of RB ECA Server.

4.2.16 TOMS DB CPU Utilization %



- In a multi Core Oracle DB server. It is the ratio of Used Time/Total Time Available.
- For example, if you have 8 CPUs, then for any given minute in real time, you have 8 minutes of CPU time available.
- So, if 8 minutes are available and Oracle uses 4 minutes of that time, then you know that 50% of all CPU time is used by Oracle.

4.2.17 AMM DB Blocking Locks & Sessions



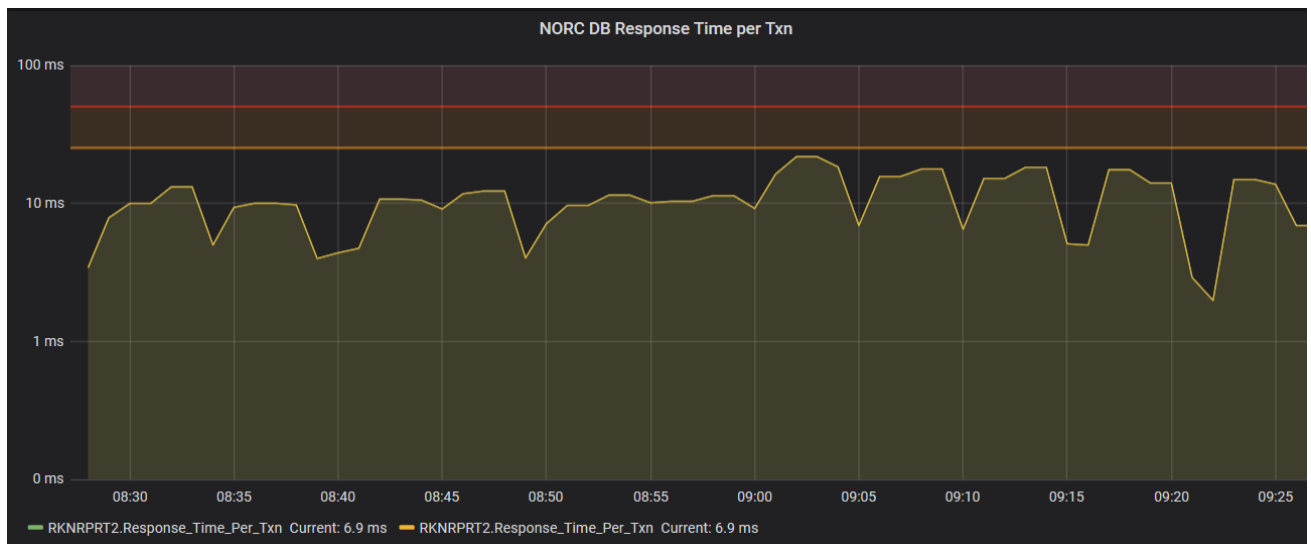
What is AMM:

Active Mediation to support Data exchange between any system In both Online (Real time) and Offline (file based) Modes.

Think of it as a ETL tool which supports both Realtime and File based Inputs.

- AMM has a DB for its own usage. This KPI shows number of blocking sessions at any given Time.

4.2.18 NORC DB Response Time per Txn

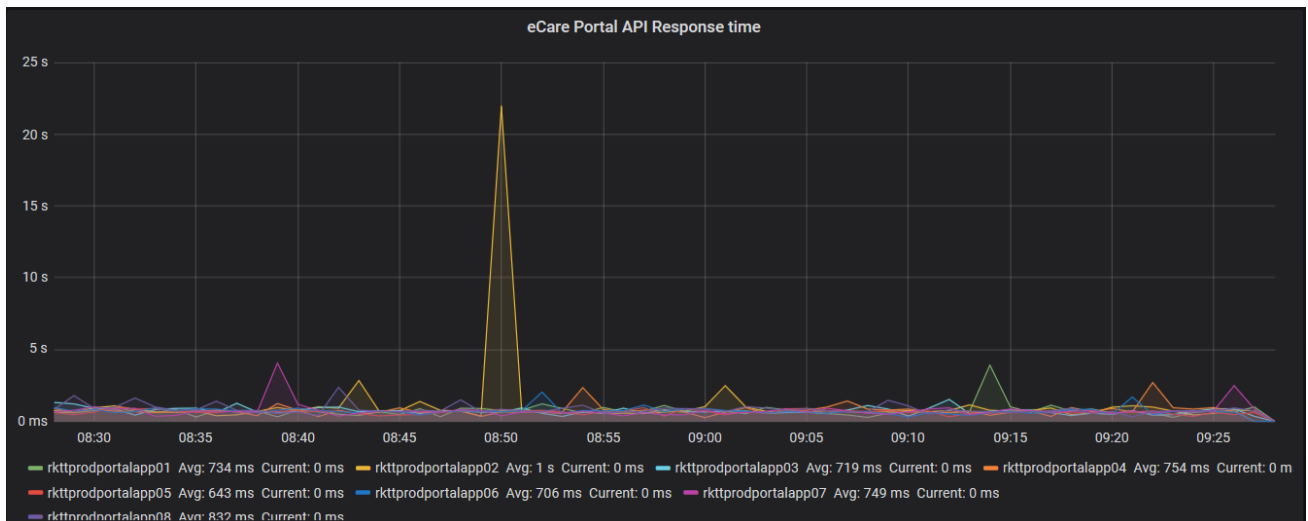


What is NORC:

NetCracker Online Rating and Charging (RBM)

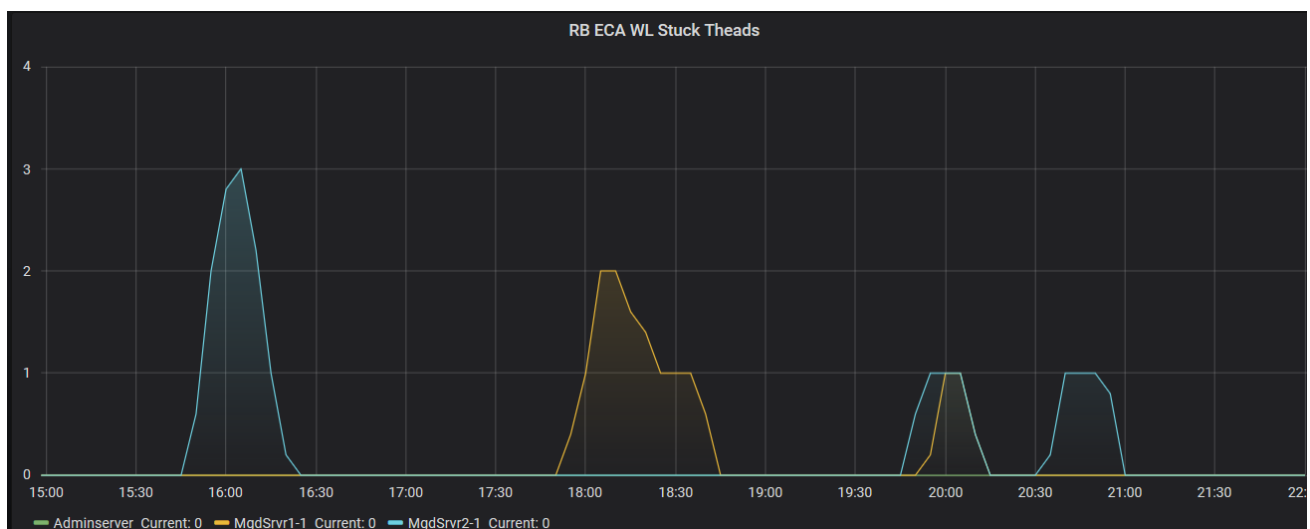
- This KPI Shows Oracle DB average response time on NORC.
- Higher Response time Degrades the Database and System performance.

4.2.19 eCare Portal API Response time



- Shows the Time taken to get response from eCare web portal for each Node.
- High value shows website is taking longer to load.
- This KPI can be used to Find Which node caused issue and a

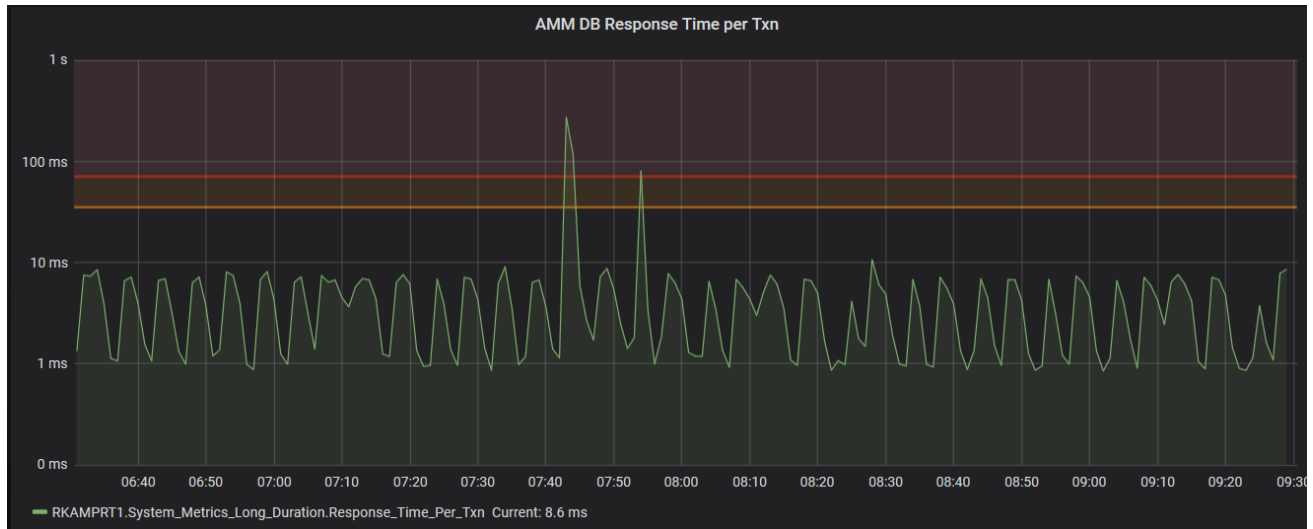
4.2.20 RB ECA WL Stuck Threads



What is ECA : Enhanced Care APIs are scalable and provided via Web Services. They provide an “integration ready” interface, allowing you to integrate external systems easily and rapidly with the Rating and Billing Manager system (RBM/NORC).

- Stuck Threads in Weblogic Server of RB ECA Server.

4.2.21 AMM DB Response Time per Txn



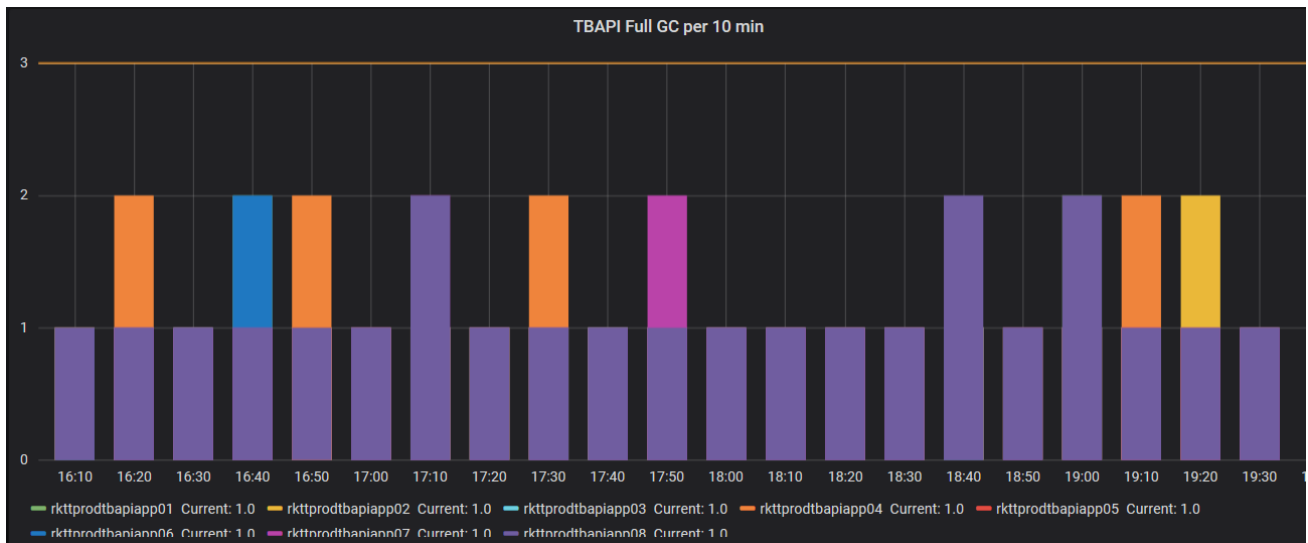
What is AMM:

Active Mediation to support Data exchange between any system In both Online (Real time) and Offline (file based) Modes.

Think Of It as a ETL tool which supports both Realtime and File based Inputs.

- AMM has a DB for its own usage. The Average response time can be seen in Response time per Transaction.

4.2.22 TBAPI Full GC per 10 min

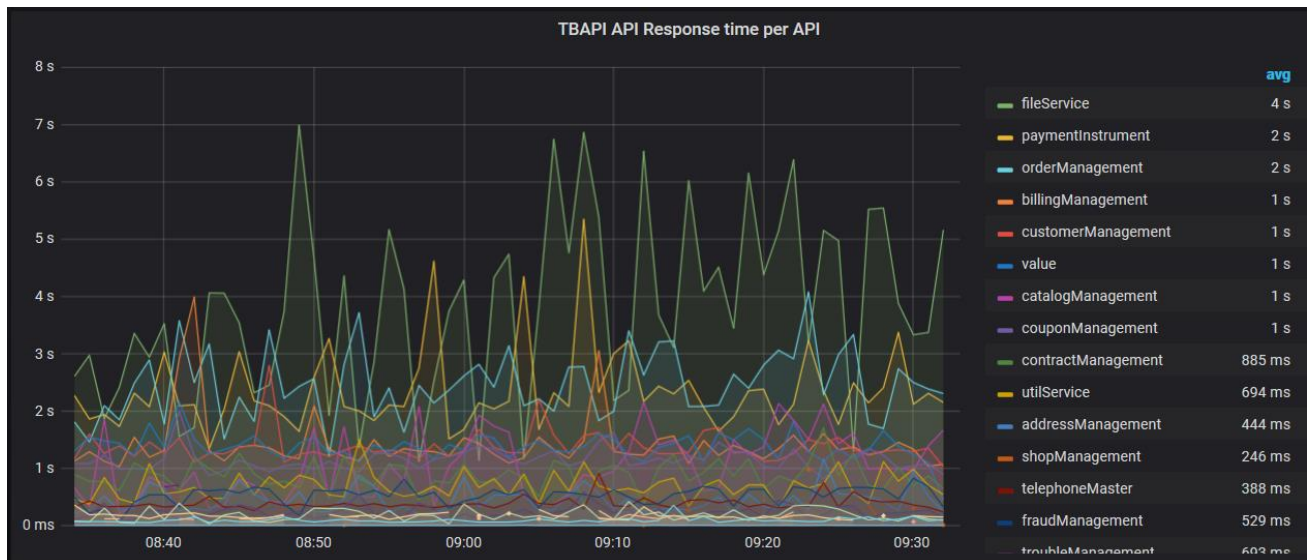


Java Garbage Collection

Java garbage collection is the process by which Java programs perform automatic memory management. Java programs compile to bytecode that can be run on a Java Virtual Machine, or JVM for short. When Java programs run on the JVM, objects are created on the heap, which is a portion of memory dedicated to the program. Eventually, some objects will no longer be needed. The garbage collector finds these unused objects and deletes them to free up memory.

- Garbage collection occurrence count over last 10 mins. More count means more /rapid memory usage.

4.2.23 TBAPI API Response time per API



- Average Response time for each API in TBAPI. This graph can be very useful to find out reason behind TBAPI avg response time.
Few APIs are listed below:-

- 1.1. orderManagement
- 1.2. fileService
- 1.3. paymentInstrument
- 1.4. customerManagement
- 1.5. contractManagement

4.2.24 Orchestrator Workmanagers

This graph is responsible for POS orders. It shows the number of threads on each cluster for POS requests.

Hence if thread utilization remains consistently high or saturate then it will directly start impacting POS user experience

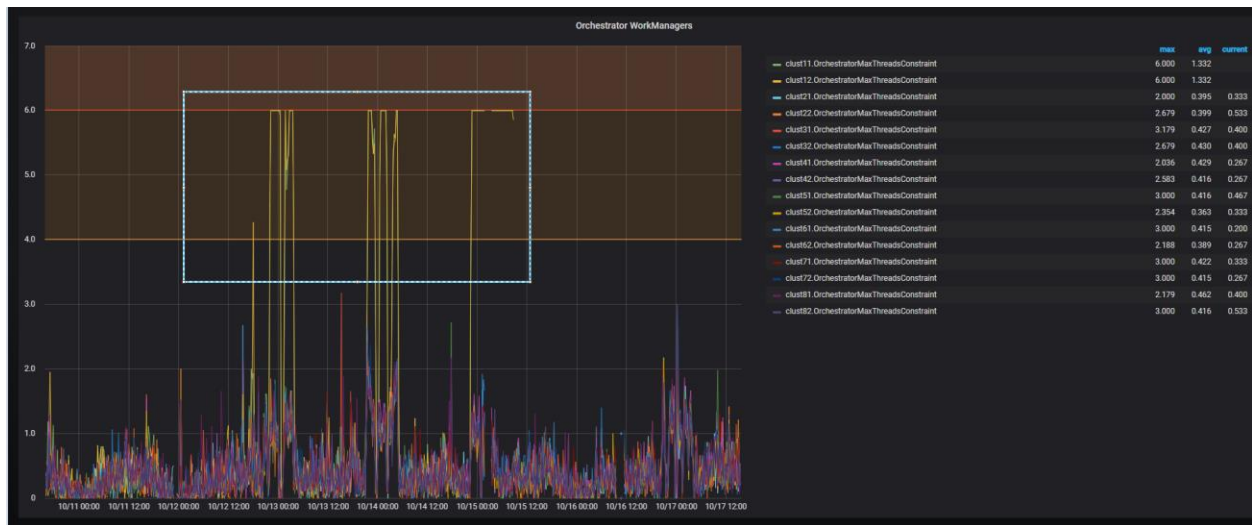
Threshold:

- **Warning : 4**
- **Critical : 6**

If any cluster crosses **Warning** or **Critical** for consistently **15 mins** then it should be treated as Sev2 and Sev1 respectively.



Below screenshot showing Critical scenario.

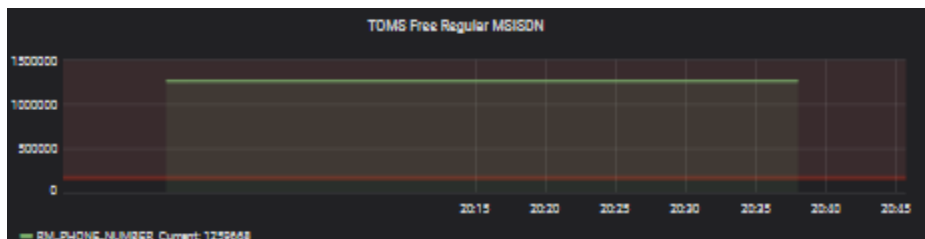


4.2.25 TOMS Free Regular MSISDN

Guideline:

If the value drops below **150000** benchmark, post the graph on SEV 1 skype group and alert **@Anastasiya/@Prerit/@Vivek/@Maria**, informing them that the value has dropped **150000** benchmark

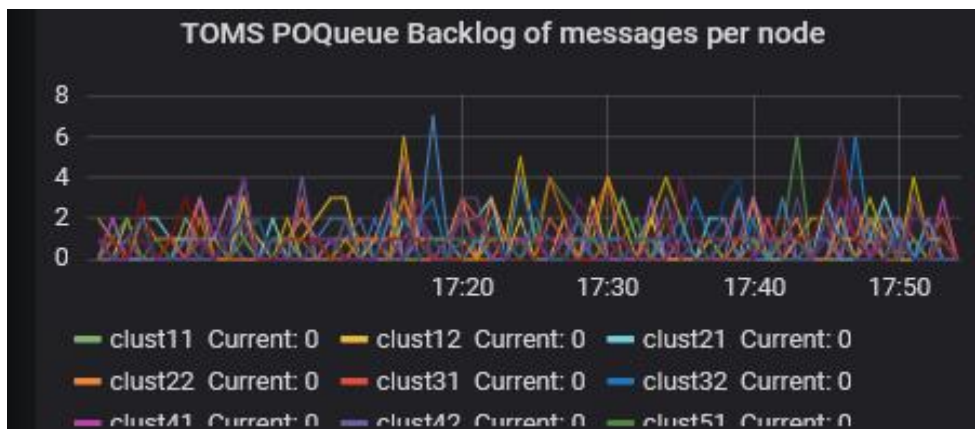
We will have to inform above mentioned focal if it is single spike or consistent on the given threshold. Red threshold line is available to verify it.



4.2.26 TOMS POQueue Backlog of messages per node

Guideline:

This graph is to monitor backlog of requests to be processed by Process Orchestrator. Grafana reflects count of each TOMS node as a line with a different color.



Thresholds –

Warning: 30 (If spike remains consistent 3 mints on this value)

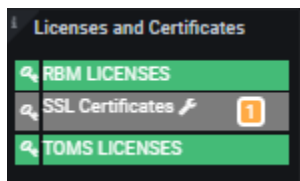
Critical: 50 (If spike remains consistent 5 mins on this value)

If the graphs are crossing above mentioned thresholds, reach out to **Oleg V.** as 1st POC and then MSO.

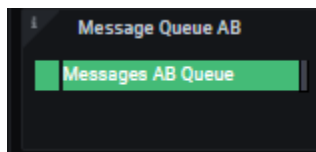
4.2.26 Licenses and Certificates Monitoring

Guideline:

This Alert is configured to monitor if any license or certificate is being expired. We need to escalate this when it turns into warning or critical to MSO L2 team.



4.2.27 Message Queue AB for Tremeal backlog monitoring



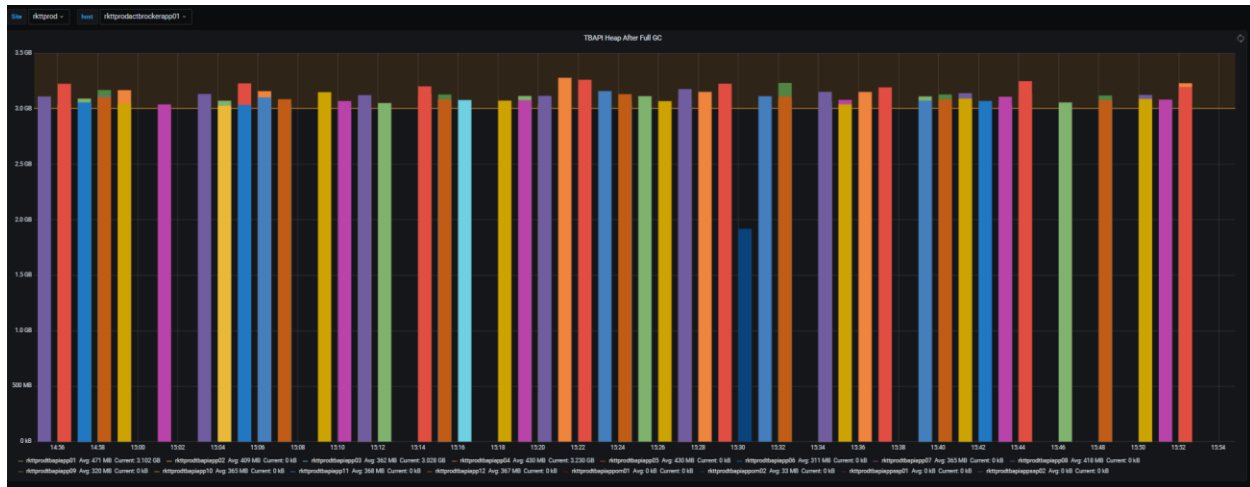
Guideline:

Whenever the SHI turns yellow/red, ERT will notify on Webex and ask MSO EA to check and report the queue size and TOMS L2 to investigate

If the indicator remains yellow/red for more than 30 min, P1 callout will be raised

4.2.28 TBAPI Heap After Full GC

We should monitor another metric TBAPI Heap after Full GC.



Guideline:

- 1) We should closely monitor TBAPI Heap After Full GC graph and when heap size will be constantly between 3GB and 4GB we should plan midnight restart.
- 2) In case if any TBAPI will constantly touch 4GB we should open SEV1 internal bridge and ask Incident manager for next actions.

4.3 Alert Handling Procedure

This document describes procedure to be followed for handling any alert (spike) in Rakuten ERT dashboard

Refer below given SharePoint link to understand the detailed [Alert Handling Procedure](#).

https://sps.netcracker.com/intproject/RKTN.IM.BSS/layouts/15/WopiFrame.aspx?sourcedoc=/intproject/RKTN.IM.BSS/Shared%20Documents/100_Managed_Services/Rakuten%20CSO/Procedures/Rakuten%20ERT%20Alert%20Handling%20Process.docx&action=default

5 Version History

<u>Version</u>	<u>Change Description</u>	<u>Created By</u>	<u>Date</u>
1.0	Original document	Rajesh Shah/ Sunil Parida	30-Jun-2020
2.1	Revised NewRelic Alert process	Rajesh Shah	29-Jul-2020
2.2	Added new graph details - 4.2.23	Rajesh Shah	17-Oct-2020
2.3	Added new graph details – 4.2.24	Rajesh Shah	25-Nov-2020
2.4	Added new graph details – 4.2.25	Rajesh Shah	08-Dec-2020
2.5	Updated Section 4.1.1. – with below 1.Newly added Health Indicator name 2. Latest system health indicators dashboard view/Screen shot	Jaydeep Chaudhari	09-Dec-2020
2.6	Updated graph as per new guideline – 4.2.25	Rajesh Shah	17-Dec-2020
2.4	Added new monitoring for Licenses – 4.2.26	Anuradha Kalekar	15-Jan-2022
2.4	Added new monitoring for Tremeal – 4.2.27	Anuradha Kalekar	18-Jan-2022
2.4	Added new graph for TBAPI Heap After Full GC – 4.2.28	Anuradha Kalekar	11-Feb-2022
4.2	Added new monitoring for Channel Based TBAPI Respose Time	Anuradha Kalekar	25-Feb-2022