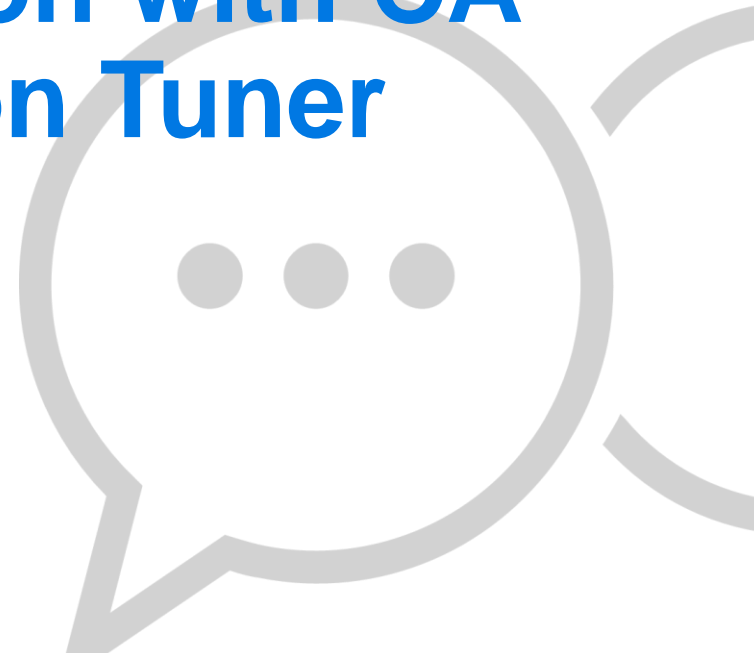




Mainframe Operational Intelligence Integration with CA Mainframe Application Tuner

Wolfram Muehlboeck – 2018/05/31 – 1.01



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Agenda

- 1 INTRODUCTION TO MAINFRAME OPERATIONAL INTELLIGENCE (MOI)
- 2 ARCHITECTURE OF MOI
- 3 CONFIGURATION FOR INTEGRATING MOI AND MAT
- 4 DESCRIPTION OF DEMO SCENARIO
- 5 LIVE DEMO
- 6 QUESTIONS AND ANSWERS

Introduction to Mainframe Operational Intelligence (MOI)



What if you could...

REDUCE MANUAL LABOR



> 40%

Enable generalists to triage issues and **engage only the experts needed** to address problem

PREDICT ISSUES



+2H earlier

Take action earlier with embedded intelligence that dynamically alerts to abnormal patterns of operation

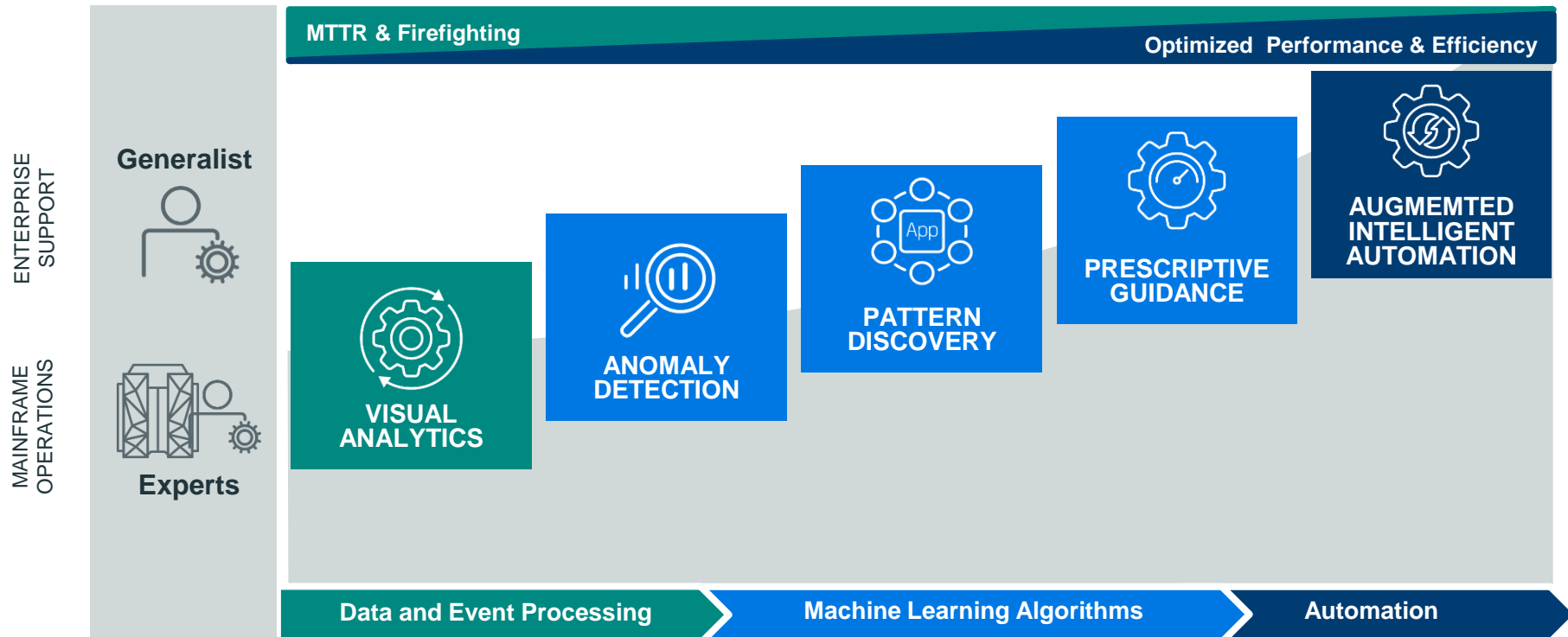
DIAGNOSE PROBLEMS



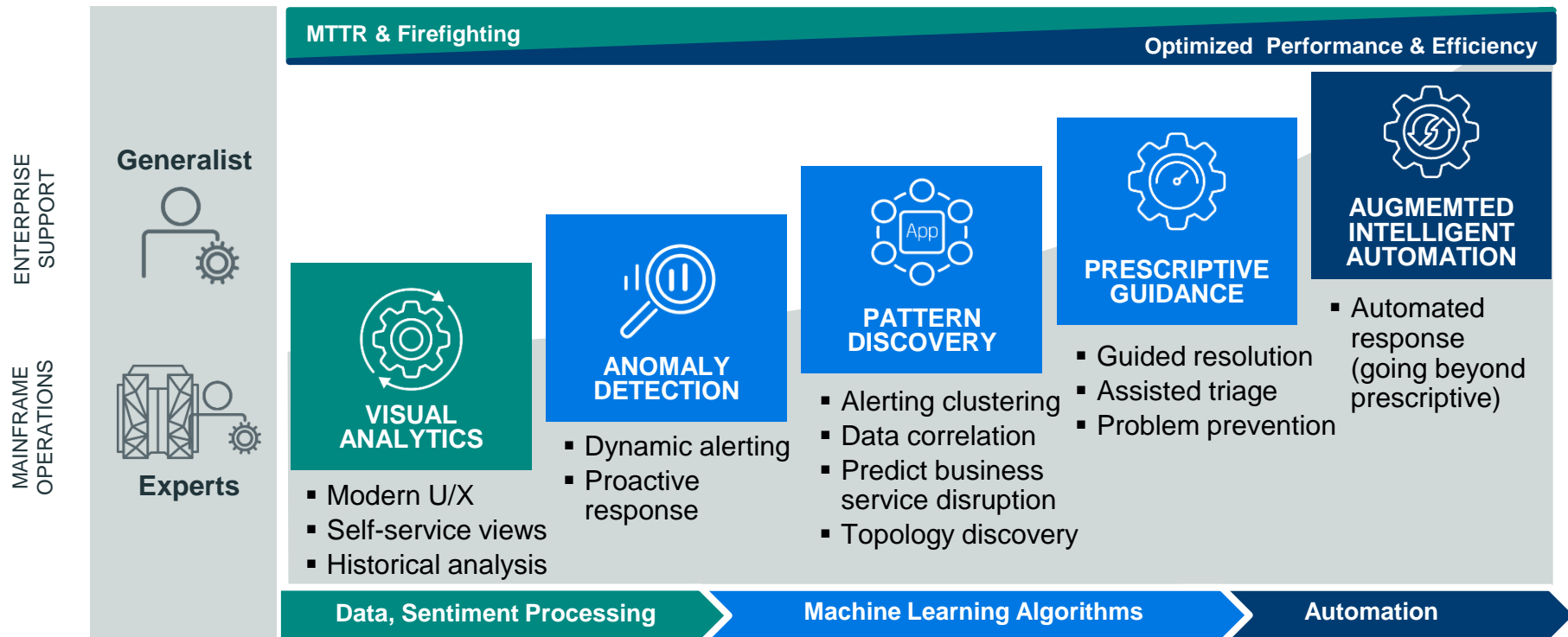
+5X Faster

Pinpoint **root cause faster** with multi-source data feeds and advanced machine learning algorithms

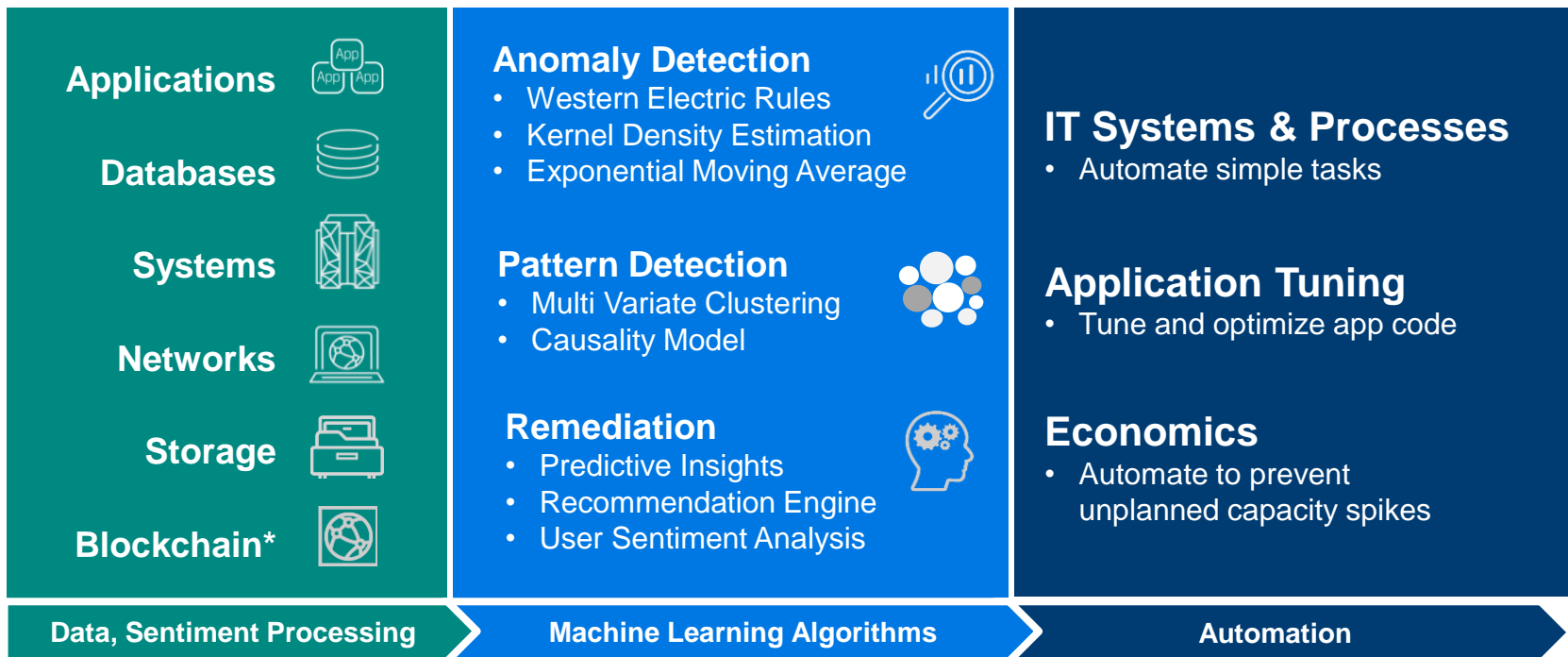
Evolving to a Self-Driven Mainframe Data Center



Evolving to a Self-Driven Mainframe Data Center



Augmented Human Intelligence and Automation



* Planned

From Reactive to Proactive

Significantly Reduce MTTR and False Alarms

Drowning
in data

Sea
of red

Reactive
fire fights

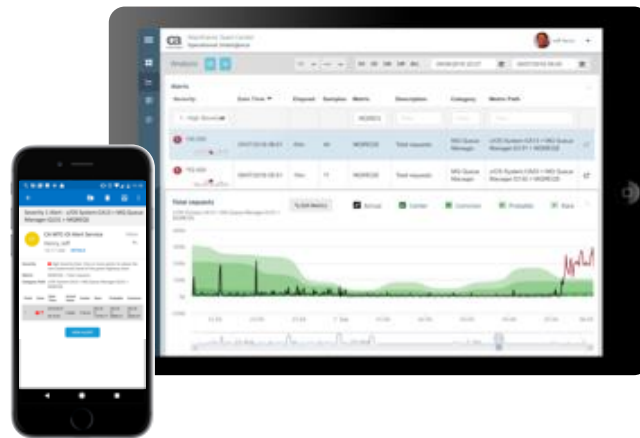


REACTIVE Network Ops
Center Patchwork Monitoring

Dynamic
alerting

Fewer false
positives

Faster MTTR
and RCA



PROACTIVE Dynamic Alerts
based on Machine Learning

Easily Visualize Data Relationships from Multiple Sources



Applications



Databases



Systems



Networks



Storage

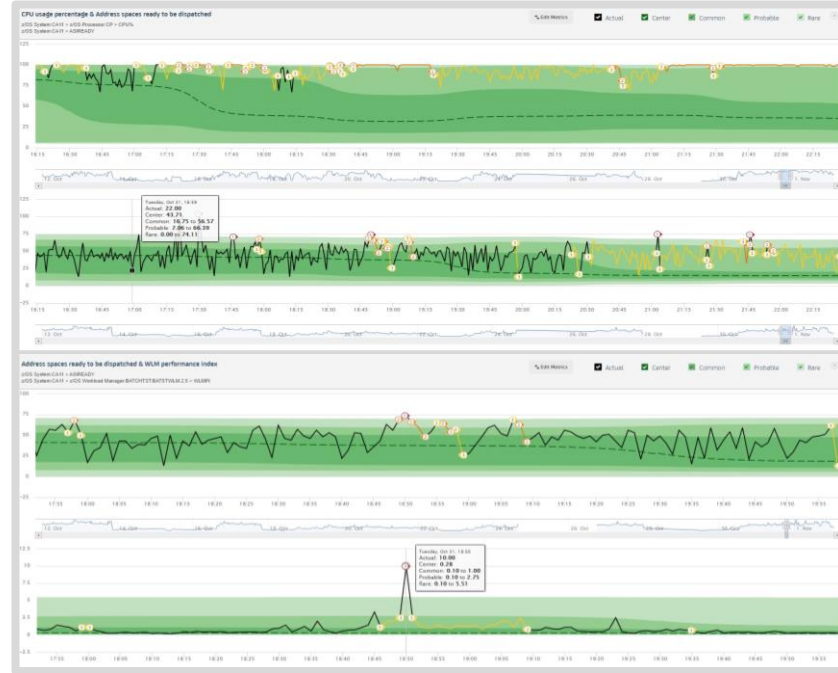


Blockchain*



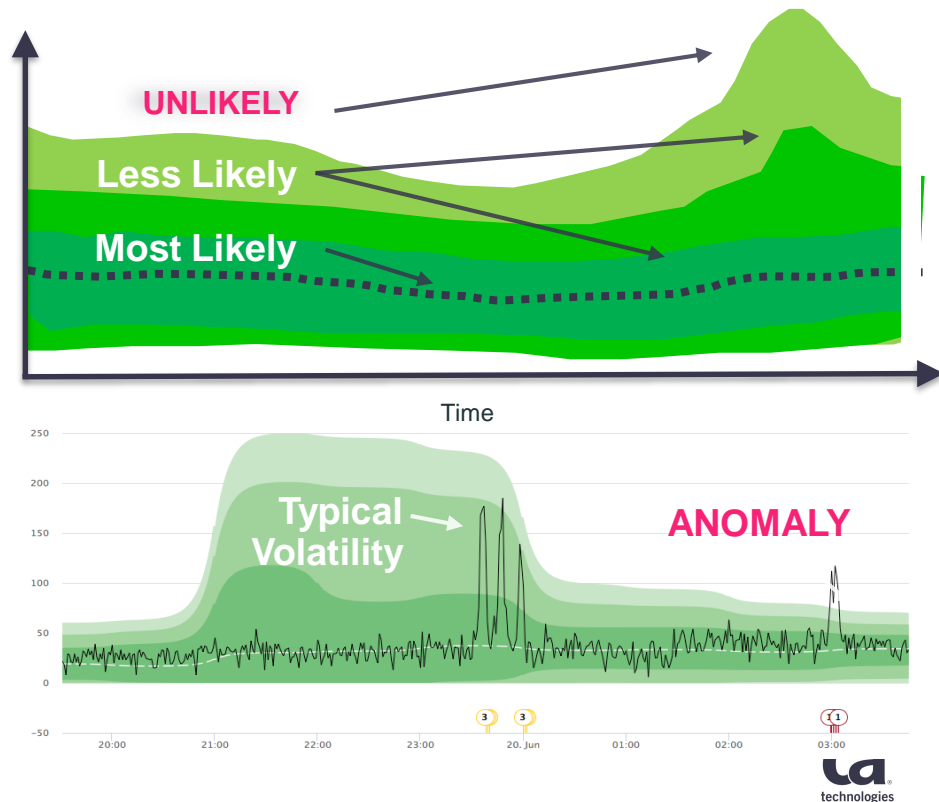
CA Products | SMF Data | Open API*

* In development



Proactively Detect Performance Anomaly

- Utilize historical data
- Define bands of *Likely* and *Unlikely*
- Map real-time metric streams
- Multi-point alerts generated using industry-standard Western-Electric rules
- Make static thresholds optional!

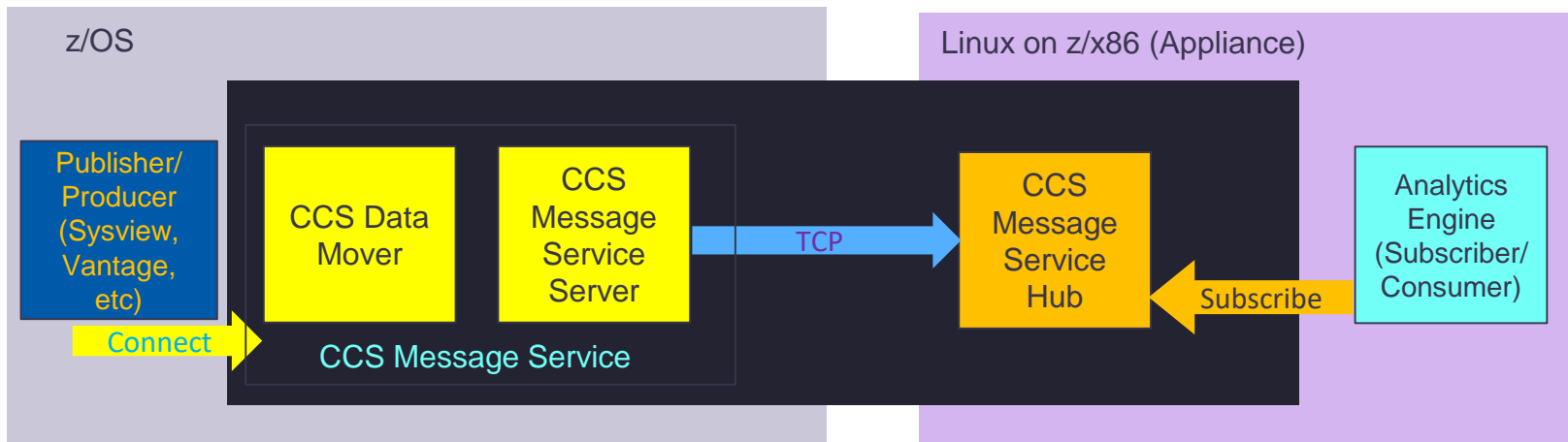


Architecture of MOI



Architectural Overview

Mainframe Operational Intelligence



- SYSVIEW as a producer of data publishes categories of data on Connect
- Analytics Engine as a consumer of data subscribes to categories of data
- Message Service Hub communicates subscription requests to Message Service Server
- CCS Data Mover is an interface between product and Message Service Server

Configuration for Integrating MOI and MAT



Prerequisites

- CA MAT Version 12.0.01 or later
- CA MAT GUI Version 12.0 or later
- PTFs applied for CA MAT Version 12:
 - RO99940 - Missing SMP/E Statements on RO99698
 - SO00390 - Obsolete SMP/E DDDEF for Mainframe Operational Intelligence
 - SO00527 - MOI Support PE
 - SO00528 - MOI Support PE

Notification member in MOI Appliance

```
EDIT /u/CADEMO/MOI/V201/X86/install/deploy/muewo01-moi/x86_64/properties/email.csv
Command ==>
***** Top of Data *****
000001 FOR_METRIC,GIVEN_MINIMUM_SEVERITY_ALERT,TAKE_ACTION
000002 cpu%lpar,high,email:muewo01@ca.com
000003 jobios,medium,alert:opsmvs
000004 tranrate,high,alert:opsmvs
000005 jobcput%,low,alert:mat
000006 jobcpt%,low,alert:mat
000007 jesjqueu,high,email:muewo01@ca.com
***** Bottom of Data *****
```

- This member is maintained in the ISPF MLSS Application
- It defines at which type of alert an activity should be executed:
 - Send a mail notification
 - Trigger an alarm in OPS/MVS
 - Initiate a CA MAT measurement for the causing Address Space

Message Server Options Member in CCS

```
EDIT          CADEMO.CCS.R141.CAW00PTV.M01(ZMSENV) - 01.10
Command ==>
000067 INSTALL_HOME=/u/CADEMO/CCS/R141/ccsuss1
000069 JAVA_HOME=/u/CADEMO/java/java64bt/v8r0m0/usr/lpp/java/J8.0_64
000070 MSZ_LOGLEVEL=TRACE
000072 MQ_HUB_PROTOCOL=TCP
000073 MQ_HUB_HOST='130.119.29.158'
000075 MQ_HUB_PORT='61616'
000076 MQ_SSL_TYPE='JKS'
000078 CCS_EM_INSTALL_HOME=/cai/nsmem/
000079 CCSOPJEXJAR_PATH=/u/CADEMO/CCS/R141/uss
000080 export INSTALL_HOME
000081 export JAVA_HOME
000082 export MSZ_LOGLEVEL
000083 # Adapter Activation Status
000084 DISCOVERY_ADAPTER_ACTIVATION_STATUS=ENABLED
000085 ZDM_ADAPTER_ACTIVATION_STATUS=ENABLED
000086 OPS_ADAPTER_ACTIVATION_STATUS=DISABLED
000087 OPS_OI_ALARM_ADAPTER_ACTIVATION_STATUS=ENABLED
000088 OPS_ADMIN_ADAPTER_ACTIVATION_STATUS=DISABLED
000089 MAT_ADAPTER_ACTIVATION_STATUS=ENABLED
*****
```

- In the general Message Server configuration file the MAT parameter must be set to ENABLED.

Notification member in MOI Appliance

```
EDIT /u/CADEMO/CCS/R141/ccsuss1/cfgb/instance/messageService/config/mat_config.yaml
Command ==>
***** ***** Top of Data *****
000001 #MAT_TOMCAT_SERVER_ADDRESS
000002 server: mvsde25.ca.com
000003 mat_server: MATUNER
000004 #MAT_TOMCAT_SERVER_PORT
000005 port: 55220
000006 #MAT_TOMCAT_USER
000007 user: DE25DM4
000008 #MAT_TOMCAT_PASS
000009 password: xxxxxxxxx
000010 baseURL: mat/api/mat
000011 filter: CICS0251,CICS0252
000012 ssl: false
***** ***** Bottom of Data *****
```

- This member in the Message Server USS config directory defines:
 - The IP name of the z/OS system and the Serverid of the MAT Started Task
 - The port and the base url of the MAT GUI Server STC
 - A valid userid/password for the MAT GUI
 - A filter for the Address Spaces to be measured

Activation of MOI Interface for CA MAT STC

- Set MOISW option in TUNSSPxx to YES:

```
EDIT          CADEMO.CAMAT.V120.UTRPARM(TUNSSP00) - 01.01          Columns 00001 00080
Command ==> _____ Scroll ==> CSR
000948 *-----*
000949 * MOISW: Enables or disables MOI monitoring for CA MAT Server *
000950 * *
000951 * *
000952 * The default is MOISW=NO *
000953 * US357643 *
000954 *-----*
000955 MOISW=YES
000956
***** Bottom of Data *****
```

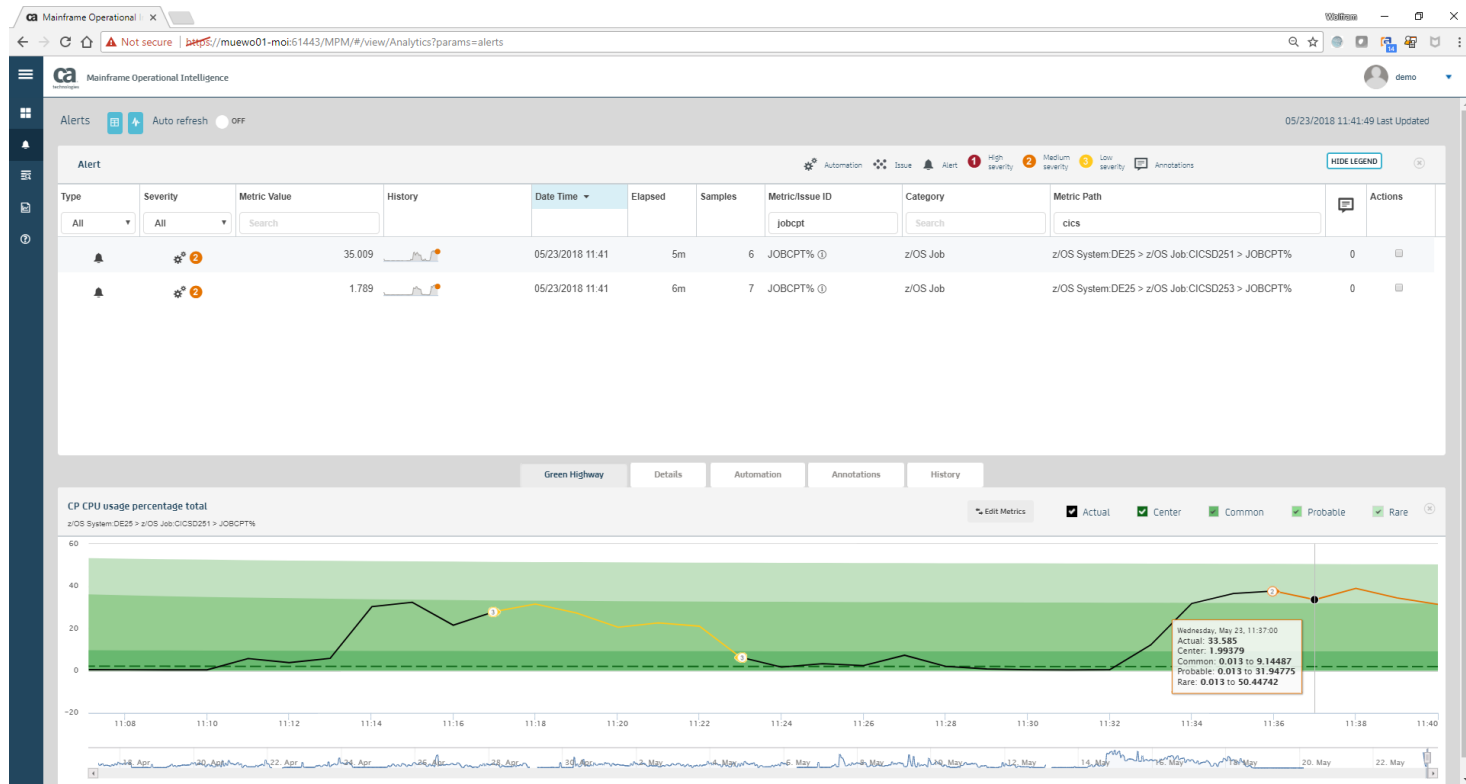
- Use MODIFY Command:

```
SYSVIEW 15.0 DE25 -----
Command ==> /f matuner,moi,yes _
-----
JobName   Jobid   Queue    DDName    StepName ProcStep ExecSys
MATUNER   STC01920 EXECUTE   JESMSGLG JES2      DE25
-----
06.25.58 STC01920 ---- TUESDAY, 22 MAY 2018 ----
06.25.58 STC01920 TN5147I MOI is : ACTIVE
*****
```

Description of Demo Example



Display Alarm in the MOI Web Interface



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Display Alarm in the MOI Web Interface

The screenshot displays the Mainframe Operational Intelligence (MOI) web interface. The browser address bar shows the URL: <https://muewo01-moi61443/MPM/#/view/Analytics?params=alerts>. The interface features a sidebar with navigation icons and a main content area. The top of the main area shows 'Alerts' with a search bar and a 'Auto refresh' toggle. Below this is a table of alerts. The first alert is titled 'CP CPU usage percentage total' and is categorized as 'z/OS System:DE25 > z/OS Job:CICSD251 > JOBCPT%'. The table has columns for Type, Severity, Metric Value, History, Date Time, Elapsed, Samples, Metric/Issue ID, Category, Metric Path, and Actions. The first alert has a severity of 2 (Medium), a metric value of 35.009, and a date time of 05/23/2018 11:41. The second alert has a severity of 2 (Medium), a metric value of 1.789, and a date time of 05/23/2018 11:41. Below the table, there are tabs for 'Green Highway', 'Details', 'Automation', 'Annotations', and 'History'. The 'Details' tab is selected, showing a table with columns for Detection, Date Time, Metric Value, and Severity reason. The table shows three rows: 'First Detected' (05/23/2018 11:36, 37.672), 'Last Detected' (05/23/2018 11:41, 35.009), and 'Highest Detected' (05/23/2018 11:38, 38.944). The severity reason is '2 - Medium Severity - Two out of three consecutive data points are above the probable or less likely zone (95th percentile)'. A link 'Open Alert in Explore and Analyze' is visible in the top right corner of the details section.

Type	Severity	Metric Value	History	Date Time	Elapsed	Samples	Metric/Issue ID	Category	Metric Path	Actions
All	All	Search					jobcpt	Search	cics	
	2	35.009		05/23/2018 11:41	5m	6	JOBCPT% (i)	z/OS Job	z/OS System:DE25 > z/OS Job:CICSD251 > JOBCPT%	0
	2	1.789		05/23/2018 11:41	6m	7	JOBCPT% (i)	z/OS Job	z/OS System:DE25 > z/OS Job:CICSD253 > JOBCPT%	0

Detection	Date Time	Metric Value	Severity reason
First Detected	05/23/2018 11:36	37.672	2 - Medium Severity - Two out of three consecutive data points are above the probable or less likely zone (95th percentile)
Last Detected	05/23/2018 11:41	35.009	
Highest Detected	05/23/2018 11:38	38.944	

Display Alarm in the MOI Web Interface

The screenshot displays the Mainframe Operational Intelligence (MOI) web interface. The top navigation bar shows the URL <https://muewo01-moi61443/MPM/#/view/Analytics?params=alerts>. The main content area is titled 'Alerts' and features a table of active alerts. The table has columns for Type, Severity, Metric Value, History, Date Time, Elapsed, Samples, Metric/Issue ID, Category, Metric Path, and Actions. Two alerts are listed, both with a severity of 2 (Medium) and a metric value of 0. The first alert is for 'JOB CPT%' with a date time of 05/23/2018 11:41 and a category of 'z/OS Job'. The second alert is for 'JOB CPT%' with a date time of 05/23/2018 11:41 and a category of 'z/OS Job'. Below the table, there are tabs for 'Green Highway', 'Details', 'Automation', 'Annotations', and 'History'. The 'Automation' tab is selected, showing a section for 'CP CPU usage percentage total' with a metric path of 'z/OS System.DE25 > z/OS Job.CICSD251 > JOBCPT%'. Below this, there are sections for 'Insights Sharing', 'Event Management Responses', and 'Application Tuner Responses'. The 'Application Tuner Responses' section shows a response from 05/23/2018 11:35: 'Sent to Application Tuner for analysis'.

Type	Severity	Metric Value	History	Date Time	Elapsed	Samples	Metric/Issue ID	Category	Metric Path	Actions
All	All	Search					jobcpt	Search	cics	
🔔	2	35.009		05/23/2018 11:41	5m	6	JOBCPT% ①	z/OS Job	z/OS System.DE25 > z/OS Job.CICSD251 > JOBCPT%	0
🔔	2	1.789		05/23/2018 11:41	6m	7	JOBCPT% ①	z/OS Job	z/OS System.DE25 > z/OS Job.CICSD251 > JOBCPT%	0

CP CPU usage percentage total
z/OS System.DE25 > z/OS Job.CICSD251 > JOBCPT%

Insights Sharing
No response available for this alert.

Event Management Responses
No response available for this alert.

Application Tuner Responses 1
05/23/2018 11:35: Sent to Application Tuner for analysis

<https://muewo01-moi61443/Analytics/#>

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Display Alarm in the MOI Web Interface

```

JobName  Jobid  Queue  DDName  StepName  ProcStep  ExecSys
MATUNER  STC00537 EXECUTE JESMSG LG JES2      DE25
-----
05.36.18 STC00537 TN6013I Profile: CICSD251 Userid:          Monitor request queued
05.36.18 STC00537 TN0496I CA MAT CICS 69 packet initialized at 07ECD000
05.36.18 STC00537 +-----+
05.36.18 STC00537 TN0495I Profile: CICSD251 CA MAT ECSA packet initialized at 07EE0000
05.36.18 STC00537 TN0101I Profile: CICSD251 now monitoring STC: CICSD251 PGM: DFHSIP
05.36.18 STC00537 TN0102I Profile: CICSD251 USERID:          Data set: STCOMVS.CICSD251.D2018143.T0536186
05.36.18 STC00537 TN0104I Profile: CICSD251 Initial Observation rate: 0010, Observations: 003000, Elapsed: 00030
05.36.18 STC00537 TN0496I Profile: CICSD251 CA MAT DB2 B1 packet initialized (STC00575) at 07EB2000 for DA25
05.36.52 STC00537 TN8090I Profile: CICSD251 Monitoring completed for STC: CICSD251
05.36.52 STC00537 TN8091I Profile: CICSD251 Monitor counters: 003000/003007/000000/000000/000000
05.36.52 STC00537 TN0106I Profile: CICSD251 Final Observation rate: 0010, Observations: 003000, Elapsed: 00030
05.36.52 STC00537 TN0108I Profile: CICSD251 ECSA Used: 275792 (bytes); SRB CPU time: 00:00:00.216
05.36.52 JOB00719 $HASP100 MAT12B8D ON INTRDR MAT-BATCH FROM STC00537 MATUNER
05.36.52 STC00537 TN0999I Job JOB00719 submitted on system DE25 to create an XML file for Profile: CICSD251
***** End of Data *****

```

- A MAT measurement is initiated by the MOI Alarm
- At the end of the measurement a job is submitted to prepare the results for MOI
- Data Mover shows the transfer of the results back to MOI

```

JobName  Jobid  Queue  DDName  StepName  ProcStep  ExecSys
ZDMVPROC STC00527 EXECUTE JESMSG LG JES2      DE25
-----
05.39.47 STC00527 ZDMV2028I Provider connection established 692
692 Jobname: MAT12B8D
692 Job ID: JOB00719
692 Owner: CA
692 Product: MAT
692 Component: TUCCSVPS
692 Release: C0
692 Instance: INST
05.39.47 STC00527 ZDMV2029I Provider connection terminated 693
693 Jobname: MAT12B8D
693 Job ID: JOB00719
693 Owner: CA
693 Product: MAT
693 Component: TUCCSVPS
693 Release: C0
693 Instance: INST
*****

```


Review MAT results in MOI

The screenshot displays the Mainframe Operational Intelligence (MOI) interface. At the top, the header shows the CA Technologies logo and the text "Mainframe Operational Intelligence". On the right, there is a user profile icon labeled "demo". Below the header, a table lists job results. The table has columns for job ID, date, duration, count, job name, system, and status. The third row is highlighted in blue. Below the table, there are tabs for "Green Highway", "Details", "Automation", "Annotations", and "History". The "Automation" tab is selected. Below the tabs, there are sections for "Real storage", "Insights Sharing", "Event Management Responses", and "Application Tuner Responses". The "Application Tuner Responses" section shows a list of responses with a "SHOW" button.

Job ID	Date	Duration	Count	Job Name	System	Status
5914624	11/29/201...	3m	4	JOBRSTG	z/OS System:CA31 > z/OS Job:ZDMV...	Closed
5877760	11/29/201...	1m	2	JOBRSTG	z/OS System:CA31 > z/OS Job:ZDMV...	Closed
5873664	11/29/201...	0m	1	JOBRSTG	z/OS System:CA31 > z/OS Job:ZDMV...	Closed

Real storage
z/OS System:CA31 > z/OS Job:ZDMVPROC > JOBRSTG

Insights Sharing
No response available for this alert.

Event Management Responses
No response available for this alert.

Application Tuner Responses 0

11/29/2017 18:22: Analysis for: D12ADB1 DSN: APM.QATT.V1202.D12ADB1.T0730416 **SHOW**

Review MAT results in MOI

ca Mainframe Operational Intelligence

demo

AllHighSearchJOBSTGSEARCHZDMVPROCAll

1

5914624

11/29/201...

3m

4

JOBSTG ①

z/OS Job

z/OS System:CA31 > z/OS Job:ZDMV...

0

Closed

1

5877760

11/29/201...

1m

2

JOBSTG ①

z/OS Job

z/OS System:CA31 > z/OS Job:ZDMV...

0

Closed

1

5873664

11/29/201...

0m

1

JOBSTG ①

z/OS Job

z/OS System:CA31 > z/OS Job:ZDMV...

0

Closed

Green Highway

Details

Automation

Annotations

History

Real storage

z/OS System:CA31 > z/OS Job:ZDMVPROC > JOBSTG

JOBNAME: D12ADB1

TCB TIME: 00:00:00.00

START DATE: 2017/11/29

PROGRAM: DSNYASCP

SRB TIME: 00:00:00.53

START TIME: 07:30:41

DURATION: 00:00:11

Delay Type	Module	Csect	Offset	Csect Description	Stmt	Active%	Wait%	Total%
Waiting for CPU	.NUCLEUS	D12AMSTR	005C28D6	In MVS nucleus		0	99.45	99.45

Delay Type	Module	Csect	Offset	Csect Description	Stmt	Active%	Wait%	Total%
Wait/Waitr SVC	DSNYASCP	.OTHERWT	00001A68	Some other wait		0	0.55	0.55

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Live Demo



Questions and Answers





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Thank You.