How to talk to your mainframe about performance metrics utilizing open source software tools.

Marist ECC
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VICOM INFINITY

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Agenda:

Introductions and Company Overview
ZEBRA
- Use Case:VPAT
- Use Case: Grafana
- Use Case:VIVA
- Conclusion

Questions?

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DRIVING IBM Z INNOVATION AND PLATFORM LONGEVITY

THROUGH LINUX FOUNDATION OPEN MAINFRAME PROJECT LEADERSHIP AND CHAIRPERSONSHIP

Distributions

Supported Versions

ubuntu Supported by Canonical

SUSE

redhat

Community Versions

debian

openSUSE

fedora

CentOS

Virtualization

KVM

VM

LPAR

DPM

Docker)

LXD (Ubuntu)

THE LINUX FOUNDATION

Languages

python

Ruby

php

R

ERLANG

Scala

Clojure

JS

OCaml

Java

Swift

OPEN MAINFRAME PROJECT

Runtimes

nodeJS

RAILS

Zend framework (PHP)

OpenJDK

LLVM

Apache Tomcat

Management

CHEF

puppet labs

ANSIBLE

juju

openstack

kubernetes

vmware vRealize

urban{code}

Database

MariaDB

PostgreSQL

mongoDB

cassandra

IBM Cloudant

redis

MySQL

ORACLE Diamond Partner

DB2

Analytics

Spark

elasticsearch

Apache Solr

BLU Acceleration

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FULL RANGE OF SERVICES FOR IBM Z SYSTEMS

- Architect and Design
- Capacity Planning & Modeling
- Disaster Recovery Planning & Implementation
- Installation Planning & Implementation
- Software Migration & Installation
- System Upgrade, Migration, & Conversion Services
- Pervasive Encryption
- Parallel Sysplex
- IBM Maintenance Services
- IBM Software & Defect Support Services
- IBM Professional Services
- System Tuning
- Training
- Staff Augmentation
- Modernization

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THE LATEST INNOVATIONS WE ARE WORKING ON TODAY WILL BE MAINSTREAM SOLUTIONS TOMORROW

VIVA and NLP Interface

Secure Voice Assistant for Enterprise

- Adding Natural Language Interface to new and existing applications to control & automate Business Processes and Operations
- Winner of 2020 IBM TBG contest

Digital Assets and Hyper Protect Services

- **Provide Confidential Computing on–prem or hybrid with IBM Cloud**
- **Help Protect Digital Assets in most secure way with Hyper Protect Digital Assets Platform**

Modernizing DevOps on z/OS

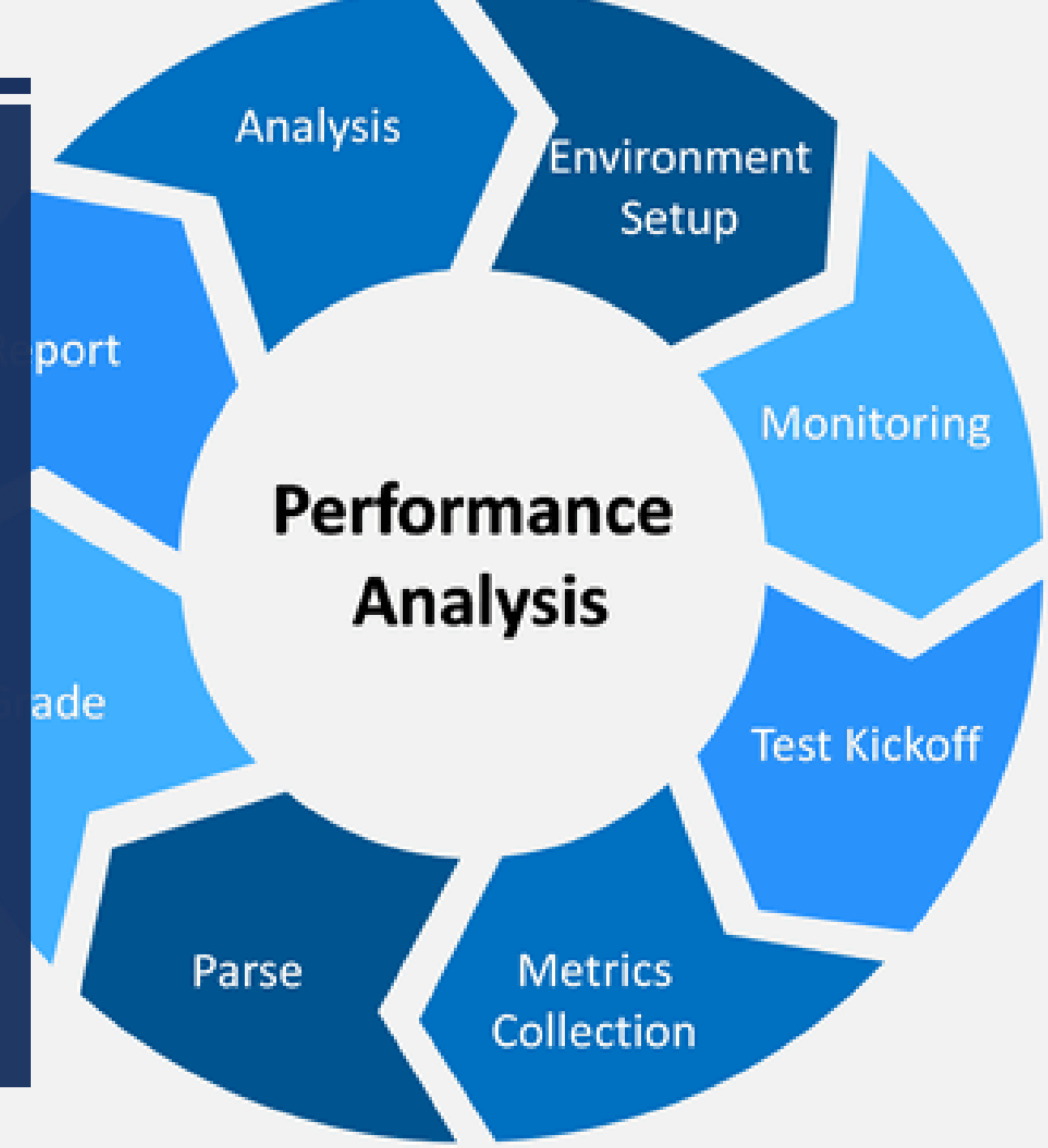
- Exploiting Cloud Native and Open Source for DevOps
- Assist with developing DevOps pipeline tooling such as Zowe, Jenkins, Ansible and Git
- **ZEBRA – Open-source SW enabling SMF data to data analytics**
- **VPAT – Easy to use Windows GUI for Performance/Capacity analysis**

Modernization and Transformation

- **Factory driven process to Transform Legacy applications to modern languages and data bases.**
- **Convert any mainframe language such as Cobol, PI/I, Assembler to Java.**
- **Convert non-relational file system such as VSAM or legacy Data Bases such as IMS, IDMS, ADABAS and Datacom to DB2 or other relational Databases**

WE VALUE PERFORMANCE METRICS

- Obtaining metrics is a crucial step in the performance analysis lifecycle
- With these metrics, we evaluate current architecture and plan future upgrades for clients
- We work with Resource Management Facility (RMF) data often
- Problem: hard to consistently manage and interpret so much data



THE LINUX FOUNDATION

OPEN MAINFRAME PROJECT

ANSWER: OPEN-SOURCE

- As active contributors to the Open Mainframe Project, we understand the importance of creating and adopting modern standards
- For RMF metrics, we found a great new standard in Zowe's ZEBRA project.

OPEN MAINFRAME PROJECT Zowe

ZEBRA – ZOWE EMBEDDED BROWSER FOR RMF AND APIS

ZEBRA is an open-source incubator for the Open Mainframe Project©'s Zowe.

The main goal of this project is to provide reusable and industry-compliant RMF data in JSON format.

The benefit of using JSON is that it is a modern standard that is very attractive to developers.

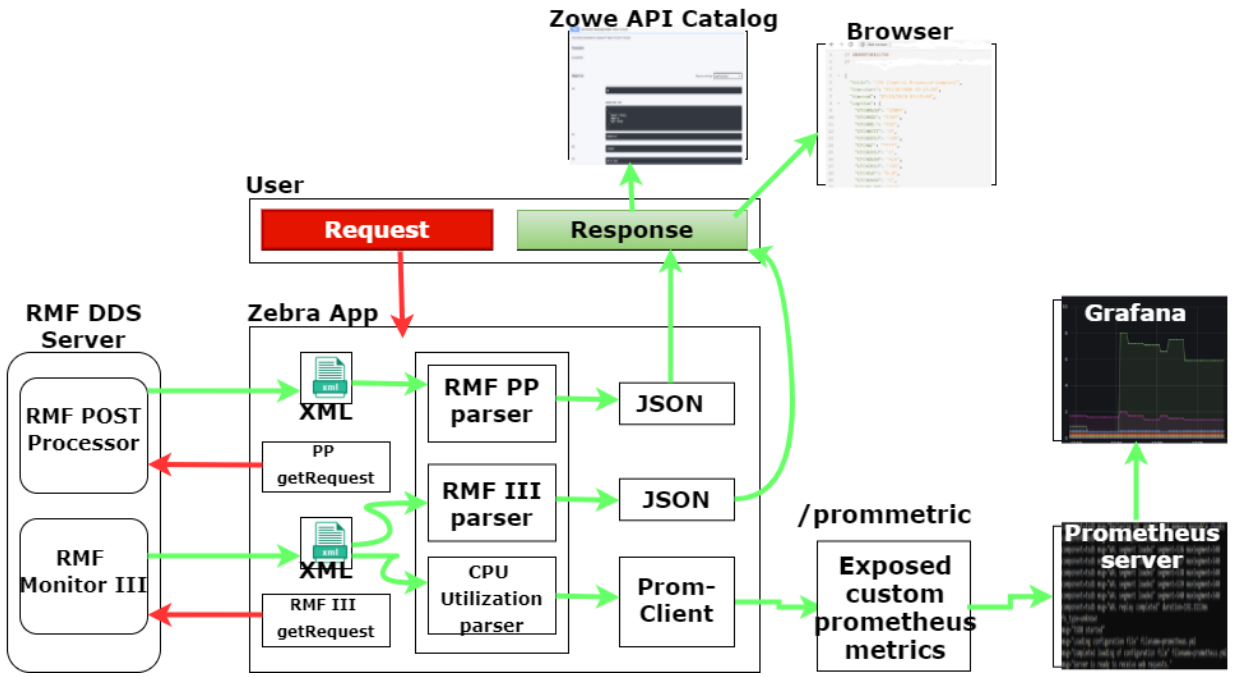
Because of this, there are many applications and use cases for third-party analysis and visualization tools to harvest ZEBRA's metrics.

HISTORY OF ZEBRA

- Started as OMP Internship Project
- Created by Alex Kim and Salisu Ali
- The goal: simple, standard JSON format for RMF data
- Adopted by Zowe as an incubator project in 2021

Alex Kim

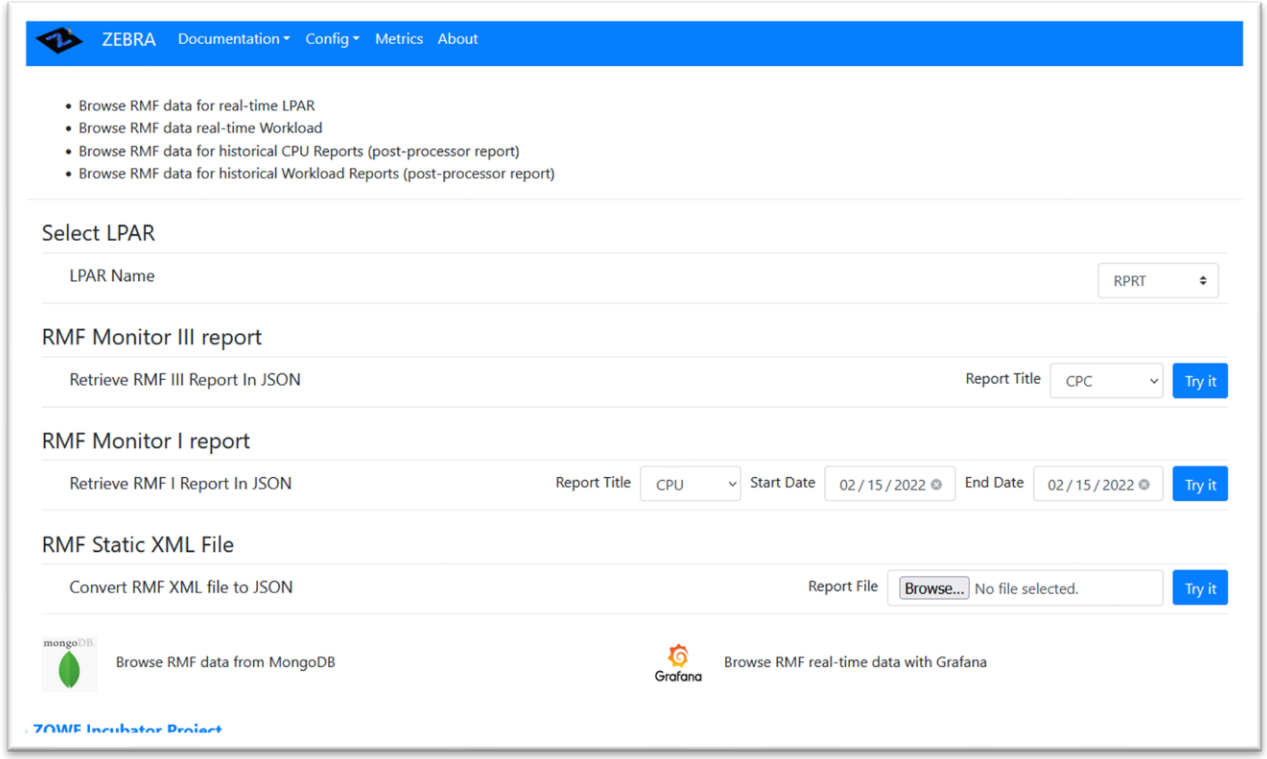
Salisu Ali



HOW ZEBRA WORKS

VISIT ZEBRA'S LIVE DEMO ENVIRONMENT TODAY

https://zebra.talktothemainframe.com:3390



ZEBRA FEATURE: RMF POSTPROCESSOR

HISTORICAL DATA

RMF POSTPROCESSOR: WLMGL REPORT

https://zebra.talktothemainframe.com:3390/v1/RPRT/rmfpp/WLMGL

RPRT

- The LPAR that is configured to report the RMF records

rmfpp

- The type of RMF report

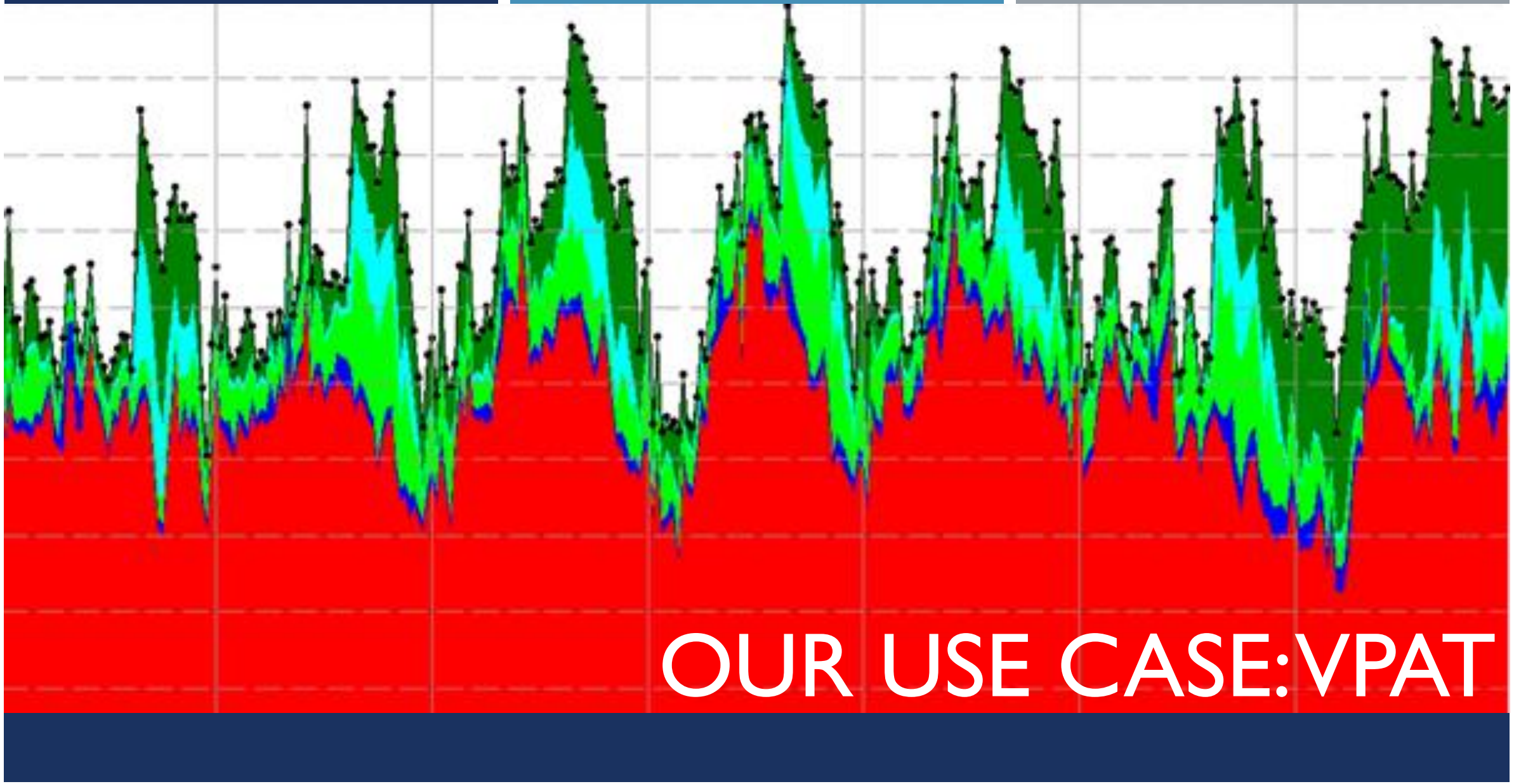
WLMGL

- The name of the RMF report

RMF POSTPROCESSOR: INTERPRETING THE DATA

https://zebra.talktothemainframe.com:3390/v1/RPRT/rmfpp/WLMGL

- Workload => STCHIGH
- Service Class => STCHIGH
- Period => 1
- Performance Index => 1.1
- Execution Velocity Goal => 50%
- Execution Velocity Actual => 45.8%



OUR USE CASE: VPAT

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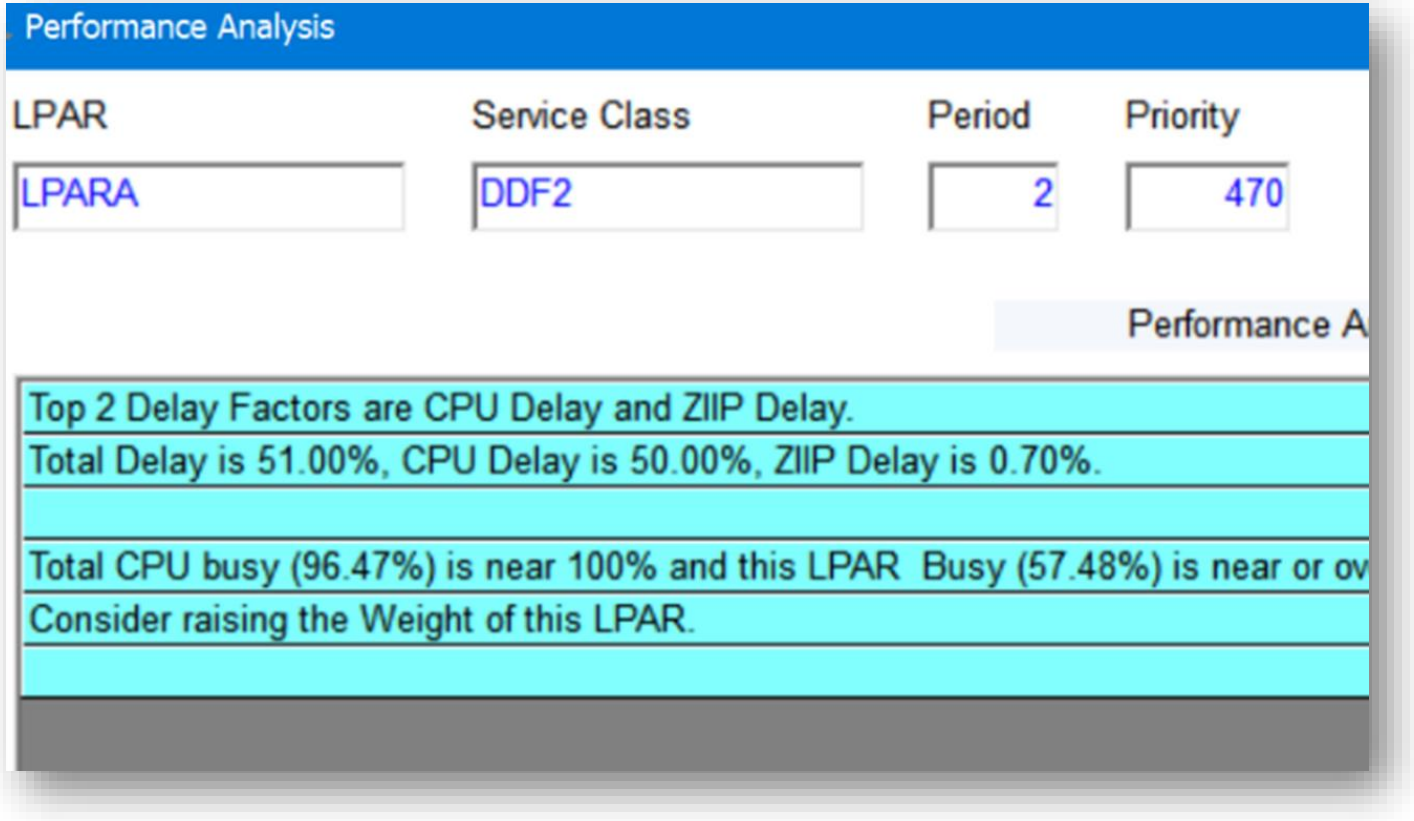
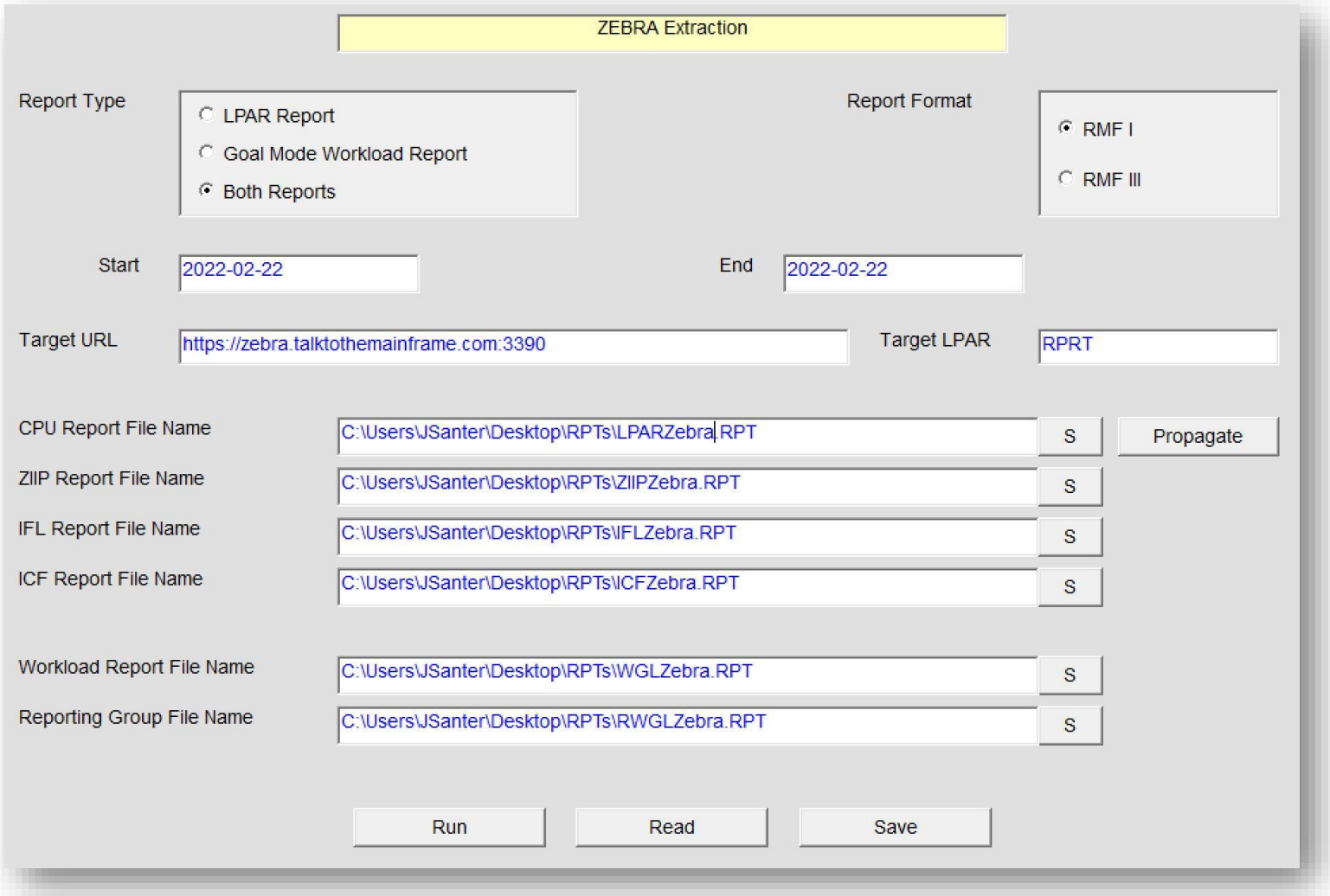
VICOM PERFORMANCE ANALYSIS TOOL

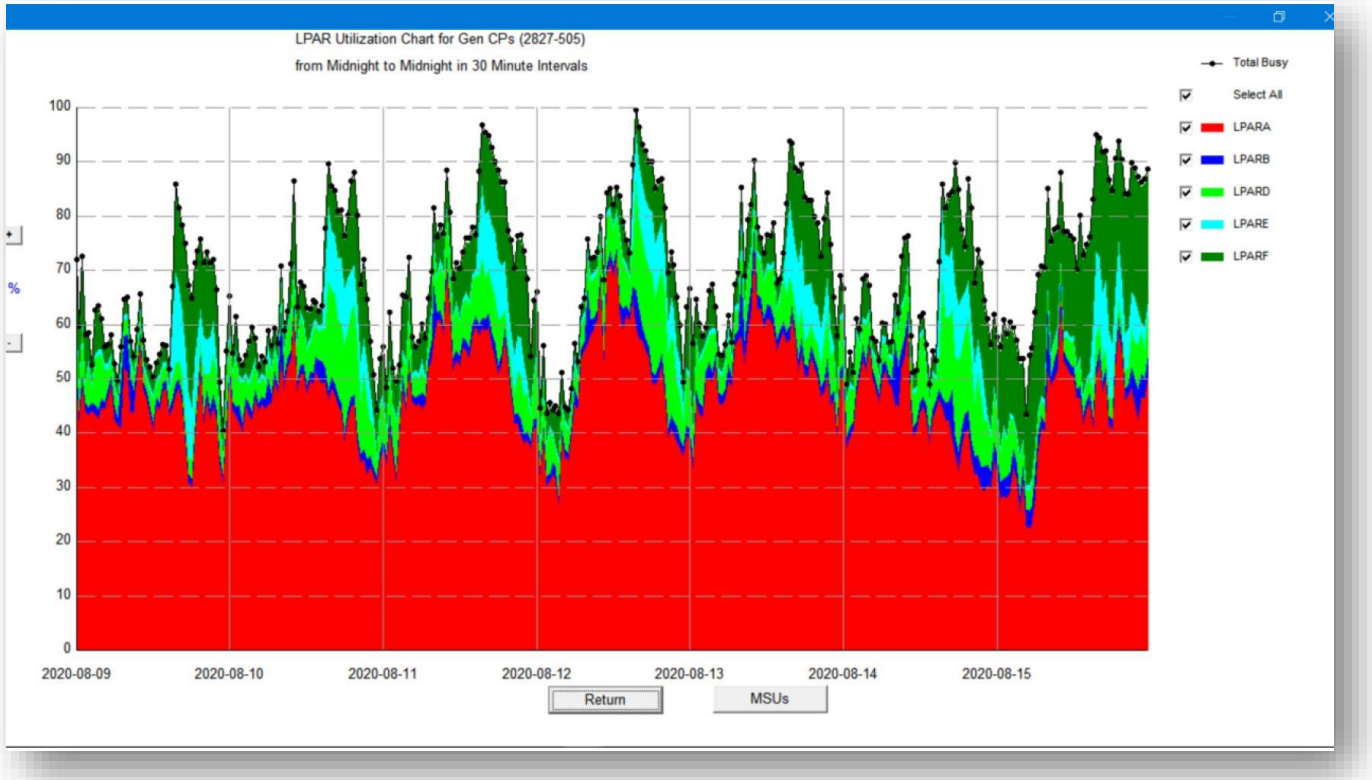
- Analyze utilization on LPAR level
- Breakdown utilization on a Workload level
- Diagnose poor performance with AI
- Plan capacity and model future processors
- Keep track of long-term utilization to find trends
- NEW: Integrates with ZEBRA to pull RMF data





USING ZEBRA AS A DATA SOURCE

- Before ZEBRA, the RMF reports for CPU and WLMGL had to be run manually and exported to a Windows machine
- Now, just point VPAT to an instance of ZEBRA to pull the metrics needed for analysis

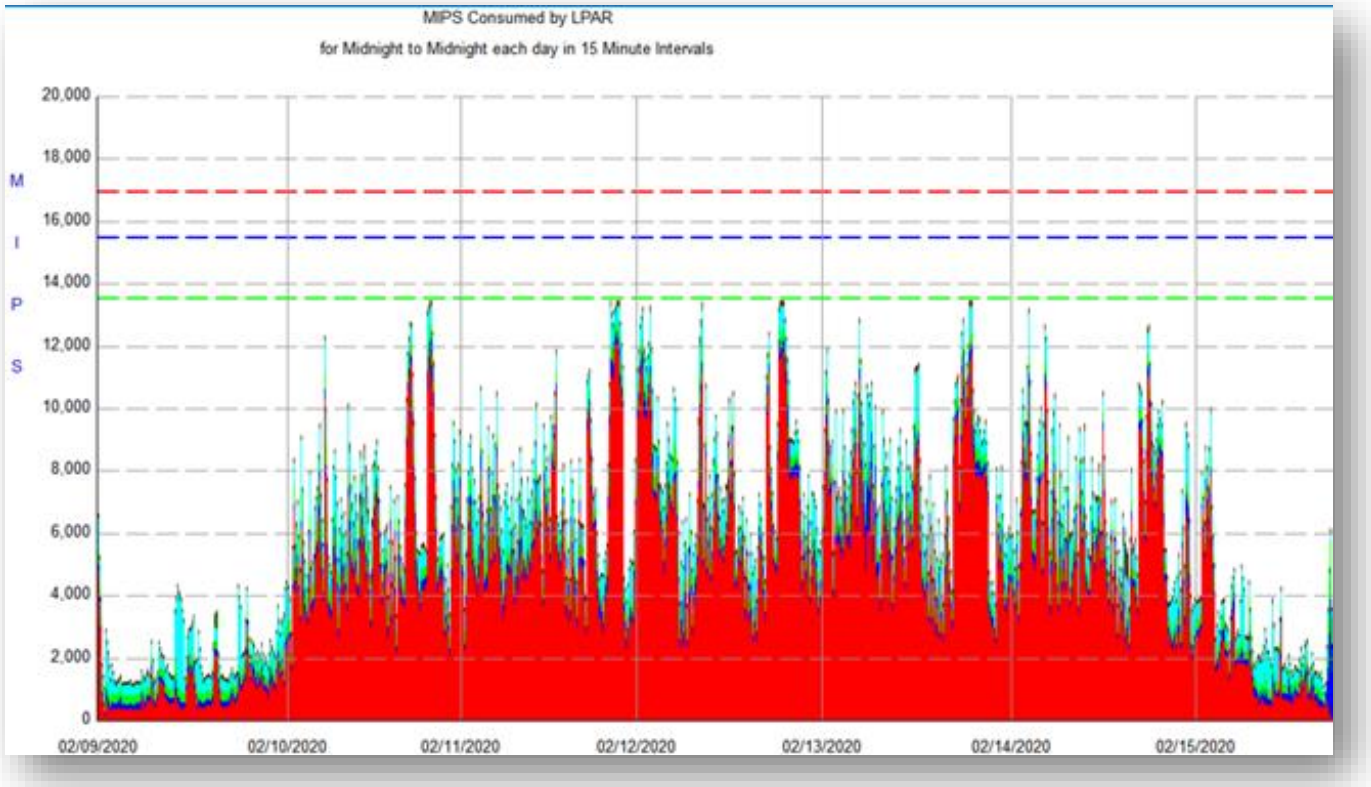


VPAT CAN ANALYZE UTILIZATION BY LPAR AND PROCESSOR TYPE.

EXAMPLE: COMPARING GENERAL CP USAGE BETWEEN 'LPARA' THROUGH 'LPARF'

USING THE ZEBRA DATA IN VPAT

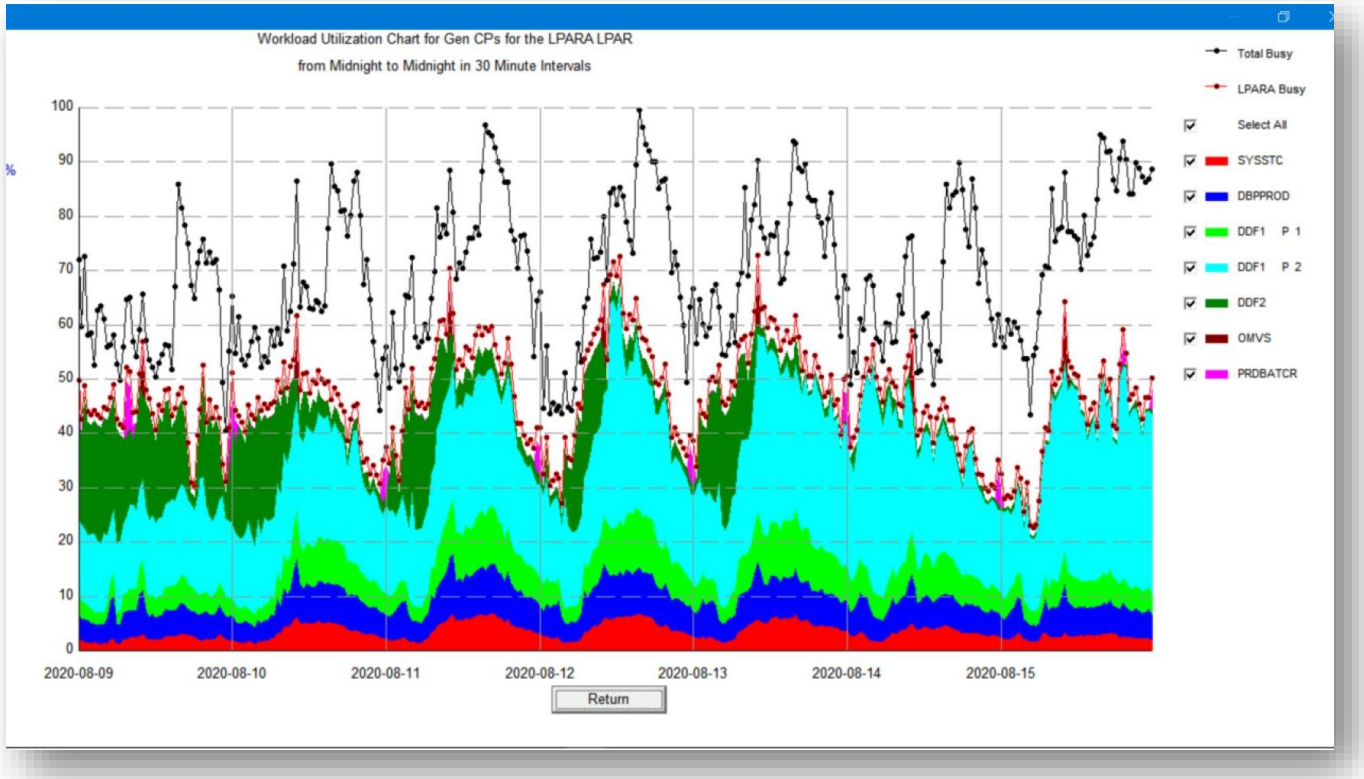
LPAR UTILIZATION



VPAT CAN ALSO SHOW THE MIPS CONSUMED BY AN LPAR

USING THE ZEBRA DATA IN VPAT

MIPS CONSUMED



ADDITIONALLY, VPAT CAN BREAKDOWN UTILIZATION BY WORKLOAD.

EXAMPLE: COMPARING THE USAGE BETWEEN WORKLOADS IN 'LPARA'

USING THE ZEBRA DATA IN VPAT

WORKLOAD UTILIZATION

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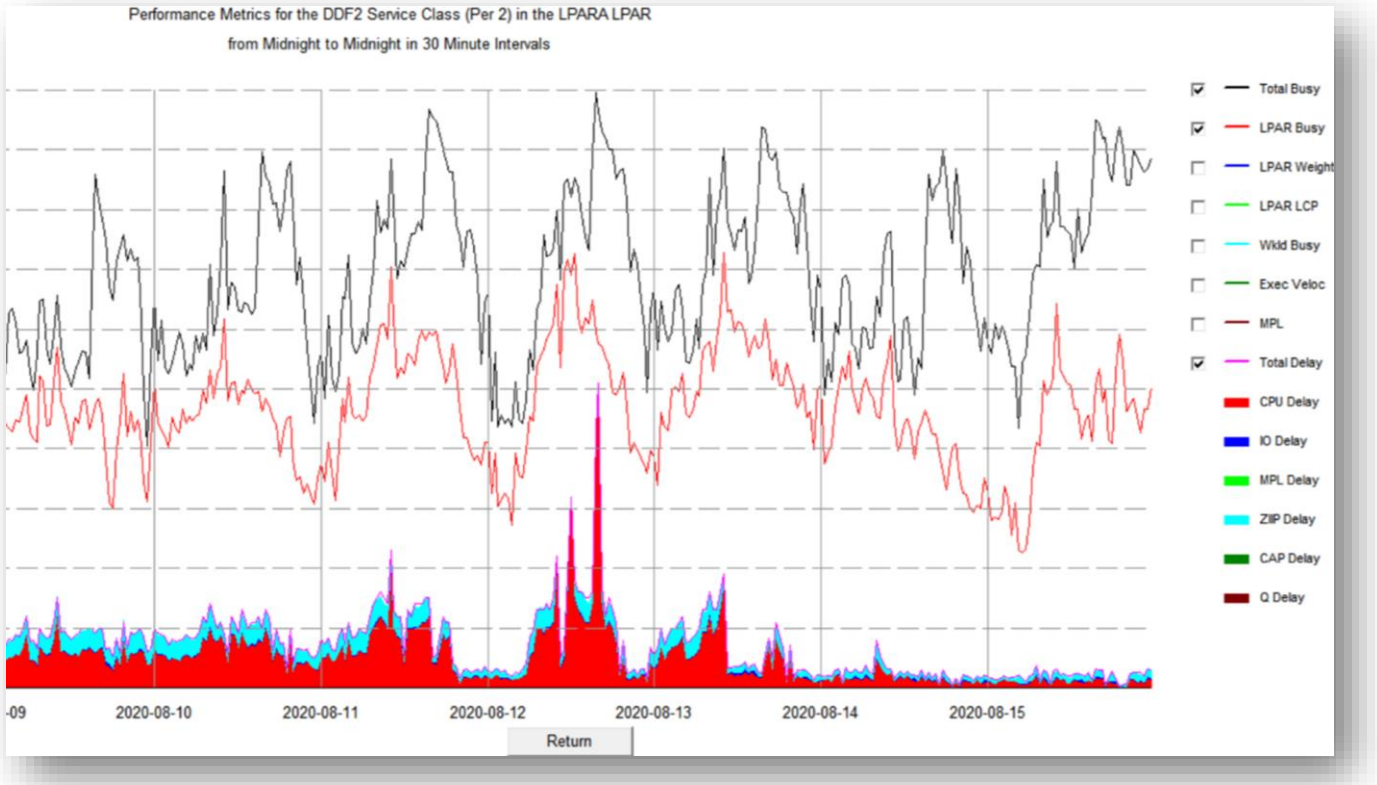

ALONG WITH UTILIZATION, YOU CAN ANALYZE DELAYS WITHIN WORKLOADS

EXAMPLE: TOTAL DELAY OF THE 'DDF2' SERVICE CLASS (PERIOD 2) IN 'LPARA'

USING THE ZEBRA DATA IN VPAT

DELAY ANALYSIS

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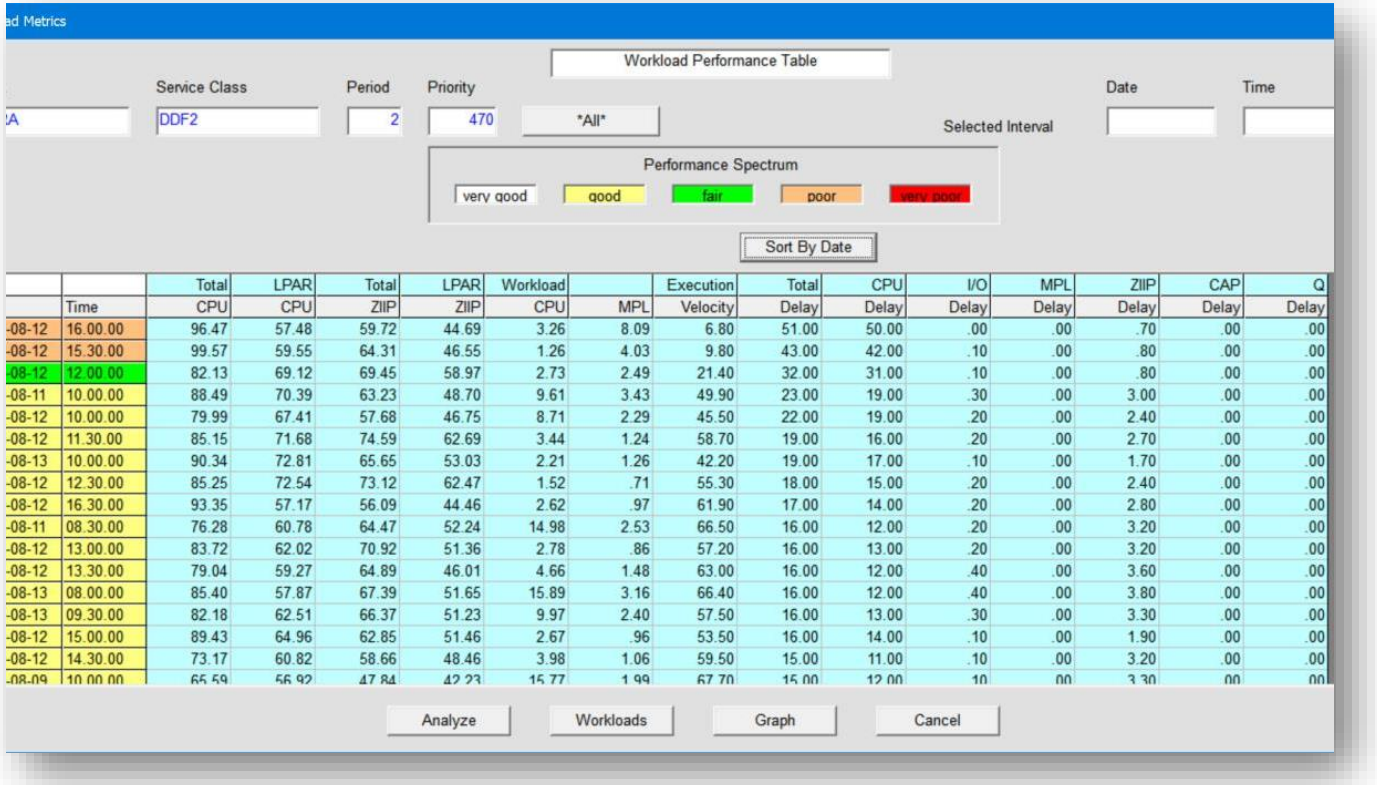
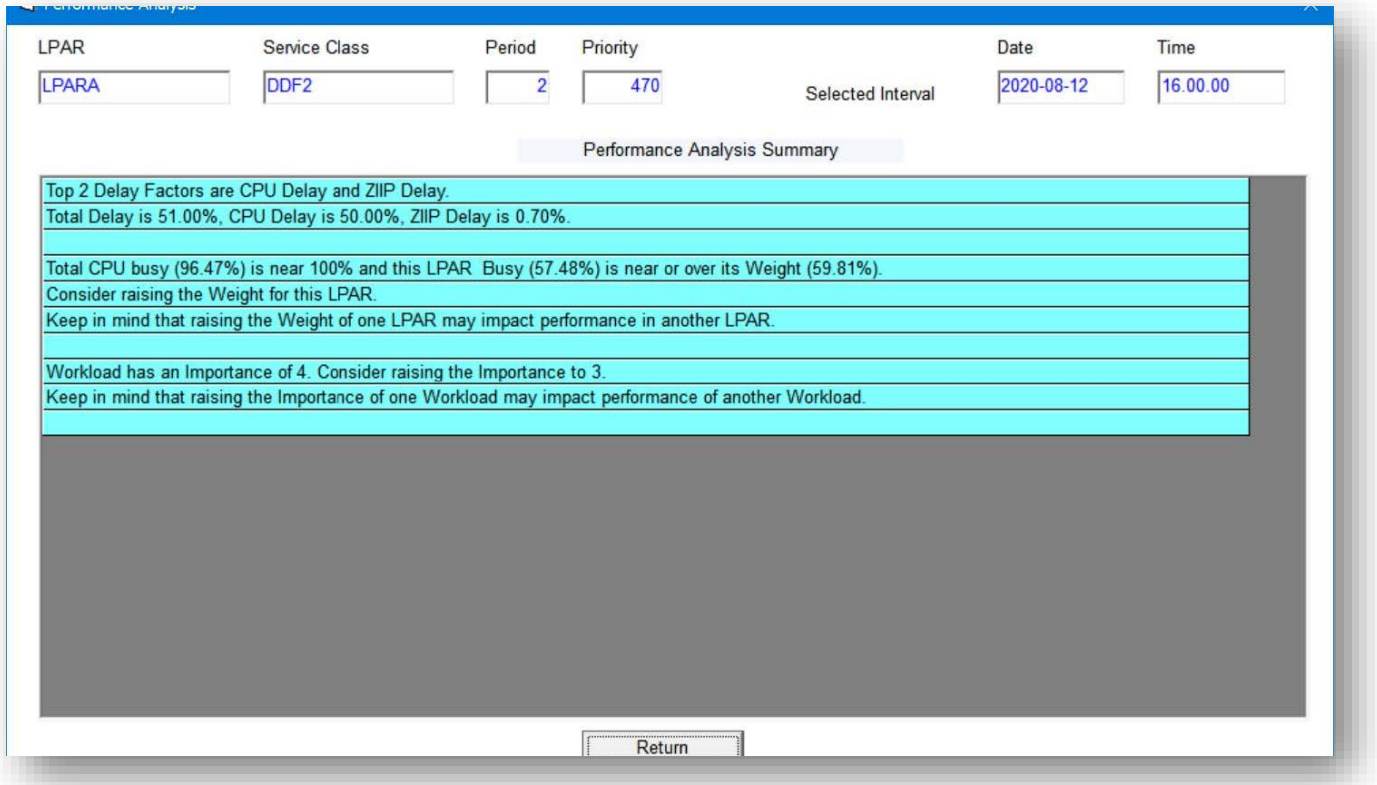


		Total	LPAR	Total	LPAR	Workload		Execution	Total	CPU	I/O	MPL	ZIIP	CAP	Q
	Time	CPU	CPU	ZIIP	ZIIP	CPU	MPL	Velocity	Delay	Delay	Delay	Delay	Delay	Delay	Delay
-08-12	16.00.00	96.47	57.48	59.72	44.69	3.26	8.09	6.80	51.00	50.00	.00	.00	.70	.00	.00
-08-12	15.30.00	99.57	59.55	64.31	46.55	1.26	4.03	9.80	43.00	42.00	.10	.00	.80	.00	.00
-08-12	12.00.00	82.13	69.12	69.45	58.97	2.73	2.49	21.40	32.00	31.00	.10	.00	.80	.00	.00
-08-11	10.00.00	88.49	70.39	63.23	48.70	9.61	3.43	49.90	23.00	19.00	.30	.00	3.00	.00	.00
-08-12	10.00.00	79.99	67.41	57.68	46.75	8.71	2.29	45.50	22.00	19.00	.20	.00	2.40	.00	.00
-08-12	11.30.00	85.15	71.68	74.59	62.69	3.44	1.24	58.70	19.00	16.00	.20	.00	2.70	.00	.00
-08-13	10.00.00	90.34	72.81	65.65	53.03	2.21	1.26	42.20	19.00	17.00	.10	.00	1.70	.00	.00
-08-12	12.30.00	85.25	72.54	73.12	62.47	1.52	.71	55.30	18.00	15.00	.20	.00	2.40	.00	.00
-08-12	16.30.00	93.35	57.17	56.09	44.46	2.62	.97	61.90	17.00	14.00	.20	.00	2.80	.00	.00
-08-11	08.30.00	76.28	60.78	64.47	52.24	14.98	2.53	66.50	16.00	12.00	.20	.00	3.20	.00	.00
-08-12	13.00.00	83.72	62.02	70.92	51.36	2.78	.86	57.20	16.00	13.00	.20	.00	3.20	.00	.00
-08-12	13.30.00	79.04	59.27	64.89	46.01	4.66	1.48	63.00	16.00	12.00	.40	.00	3.60	.00	.00
-08-13	08.00.00	85.40	57.87	67.39	51.65	15.89	3.16	66.40	16.00	12.00	.40	.00	3.80	.00	.00
-08-13	09.30.00	82.18	62.51	66.37	51.23	9.97	2.40	57.50	16.00	13.00	.30	.00	3.30	.00	.00
-08-12	15.00.00	89.43	64.96	62.85	51.46	2.67	.96	53.50	16.00	14.00	.10	.00	1.90	.00	.00
-08-12	14.30.00	73.17	60.82	58.66	48.46	3.98	1.06	59.50	15.00	11.00	.10	.00	3.20	.00	.00
-08-09	10.00.00	65.59	56.92	47.84	42.23	15.77	1.99	67.70	15.00	12.00	.10	.00	3.30	.00	.00

VPAT USES ARTIFICIAL INTELLIGENCE ON THE METRICS TO DETERMINE PERFORMANCE QUALITY

USING THE ZEBRA DATA IN VPAT

AI FUNCTIONALITY



SELECTING AN INTERVAL OF TIME WILL PROVIDE FURTHER ANALYSIS AND RECOMMENDATIONS TO IMPROVE PERFORMANCE

USING THE ZEBRA DATA IN VPAT

AI FUNCTIONALITY (CONT'D)

ZEBRA FEATURE: RMF MONITOR III

NEAR REAL-TIME DATA REPORTING

RMF MONITOR III: CPC REPORT

https://zebra.talktothemainframe.com:3390/v1/RPRT/rmf3/CPC

RPRT

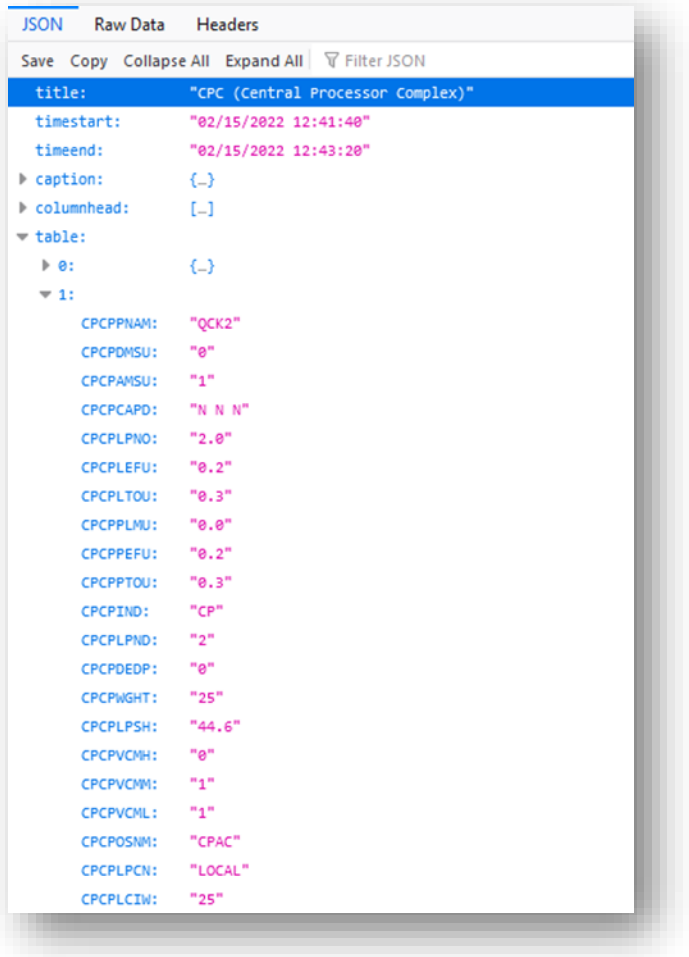
- The LPAR that is configured to report the RMF records

rmf3

- The type of RMF report

CPC

- The name of the RMF report

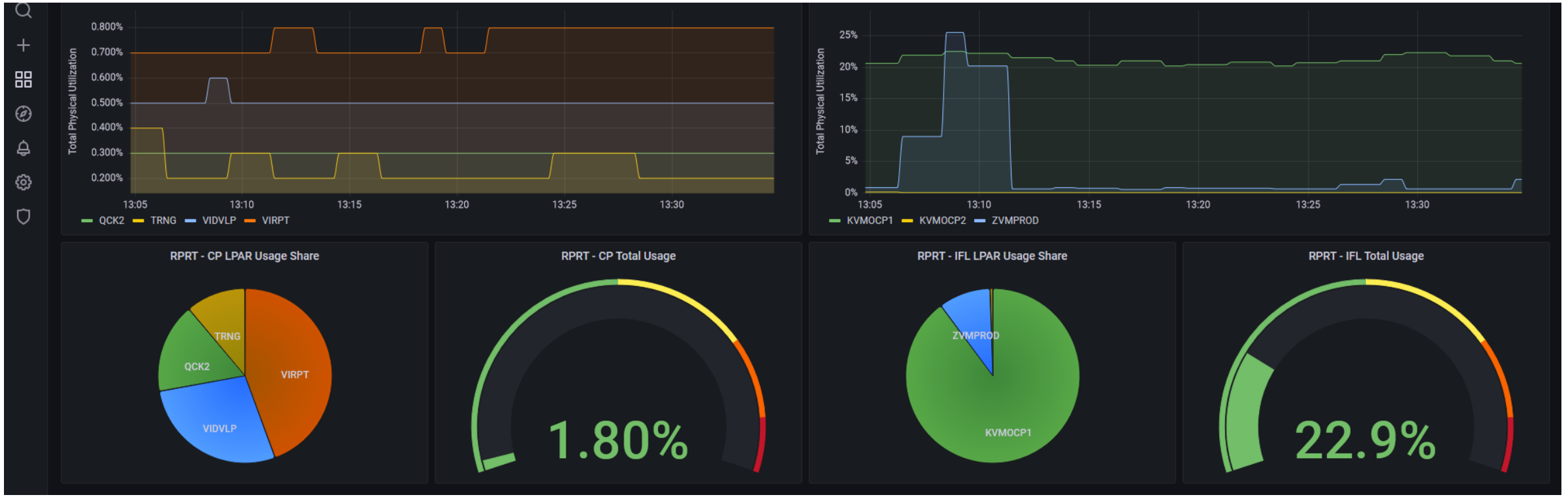


RMF MONITOR III: INTERPRETING THE DATA

https://zebra.talktothemainframe.com:3390/v1/RPRT/rmf3/CPC

- Partition Name: CPCPPNAM => QCK2
- Avg. # of Logical Processors: CPCPLPNO => 2
- Processor Type: CPCPIND => CP
- Logical Processor Total Utilization: CPCPLTOU => 0.3%
- Physical Processor Total Utilization: CPCPPTOU => 0.3%
- Partition Weight: CPCPPTOU => 25%

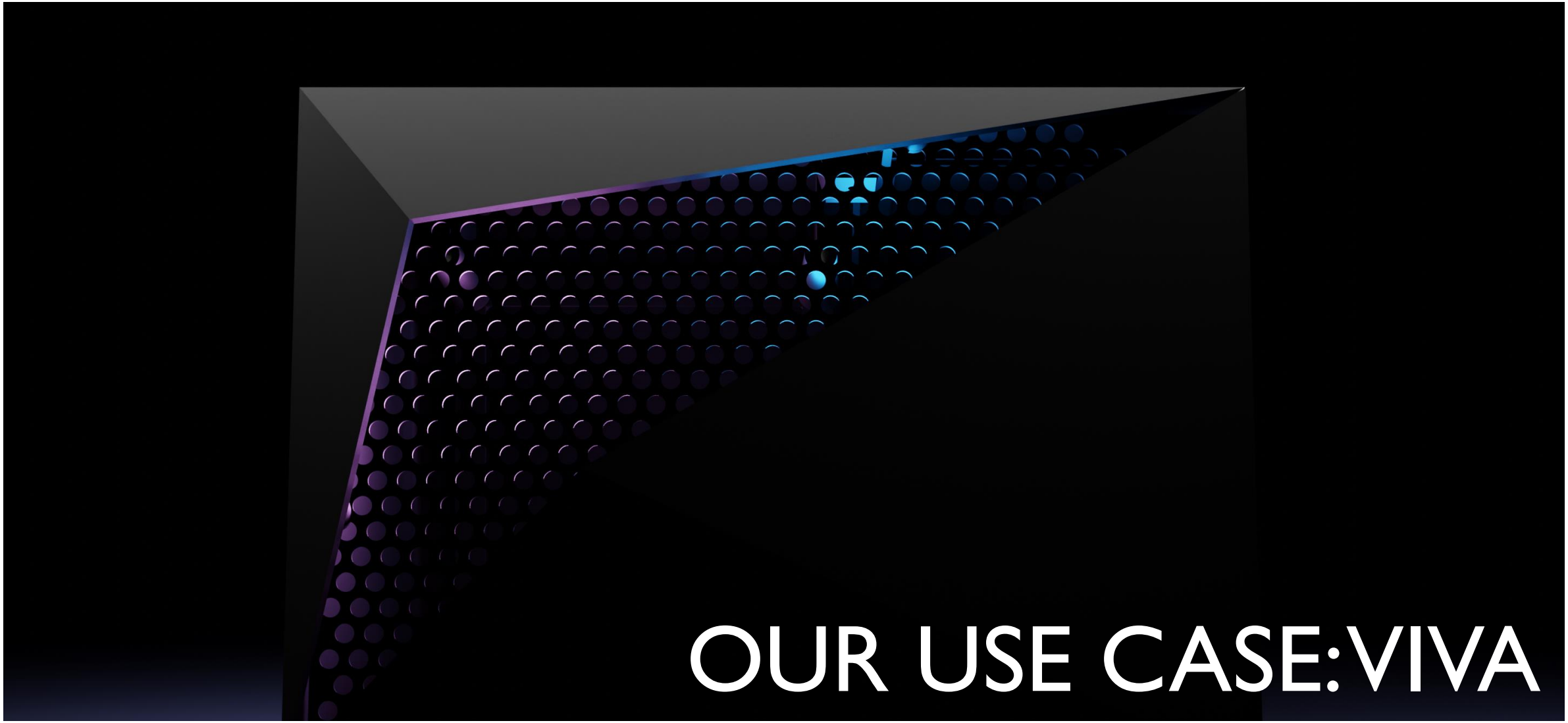

```
CPCPPNAM:   "QCK2"
CPCPDMSU:   "0"
CPCPAMSU:   "1"
CPCPCAPD:   "N N N"
CPCPLPNO:   "2.0"
CPCPLEFU:   "0.2"
CPCPLTOU:   "0.3"
CPCPPLMU:   "0.0"
CPCPPEFU:   "0.2"
CPCPPTOU:   "0.3"
CPCPIND:    "CP"
CPCPLPND:   "2"
CPCPDEDP:   "0"
CPCPWGHT:   "25"
CPCPLPSH:   "44.6"
CPCPVCMH:   "0"
CPCPVCMM:   "1"
CPCPVCML:   "1"
CPCPOSNM:   "CPAC"
CPCPLPCN:   "LOCAL"
CPCPLCIW:   "25"
```



COMMON USE CASE: VISUALIZATION WITH GRAFANA

REAL USER EXAMPLE:
FERNANDO ZANGARI – SENIOR IT CONSULTANT IN ARGENTINA

REAL USER EXAMPLE:
FERNANDO ZANGARI – SENIOR IT CONSULTANT IN ARGENTINA



OUR USE CASE: VIVA

DO YOU TRUST ALEXA AND GOOGLE HOME FOR ENTERPRISE DATA?

THERE'S NO TELLING WHERE THAT DATA IS GOING…

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VICOM INFINITY VOICE ASSISTANT

Secure & Enterprise-ready Voice Assistant gives freedom of processing your business conversation securely on-prem based VUI.

- Hey TJ, what's the current CPU utilization?
- Hey TJ, how is the outlook for my mainframe software bill for this month?
- Hey TJ, send me the snapshot of CPU reports for this week.
- Hey TJ, what is the software model for the current machine?
- Hey TJ, check the MCL versions on z systems if they are same.
- Hey TJ, how long did my batch job run today?

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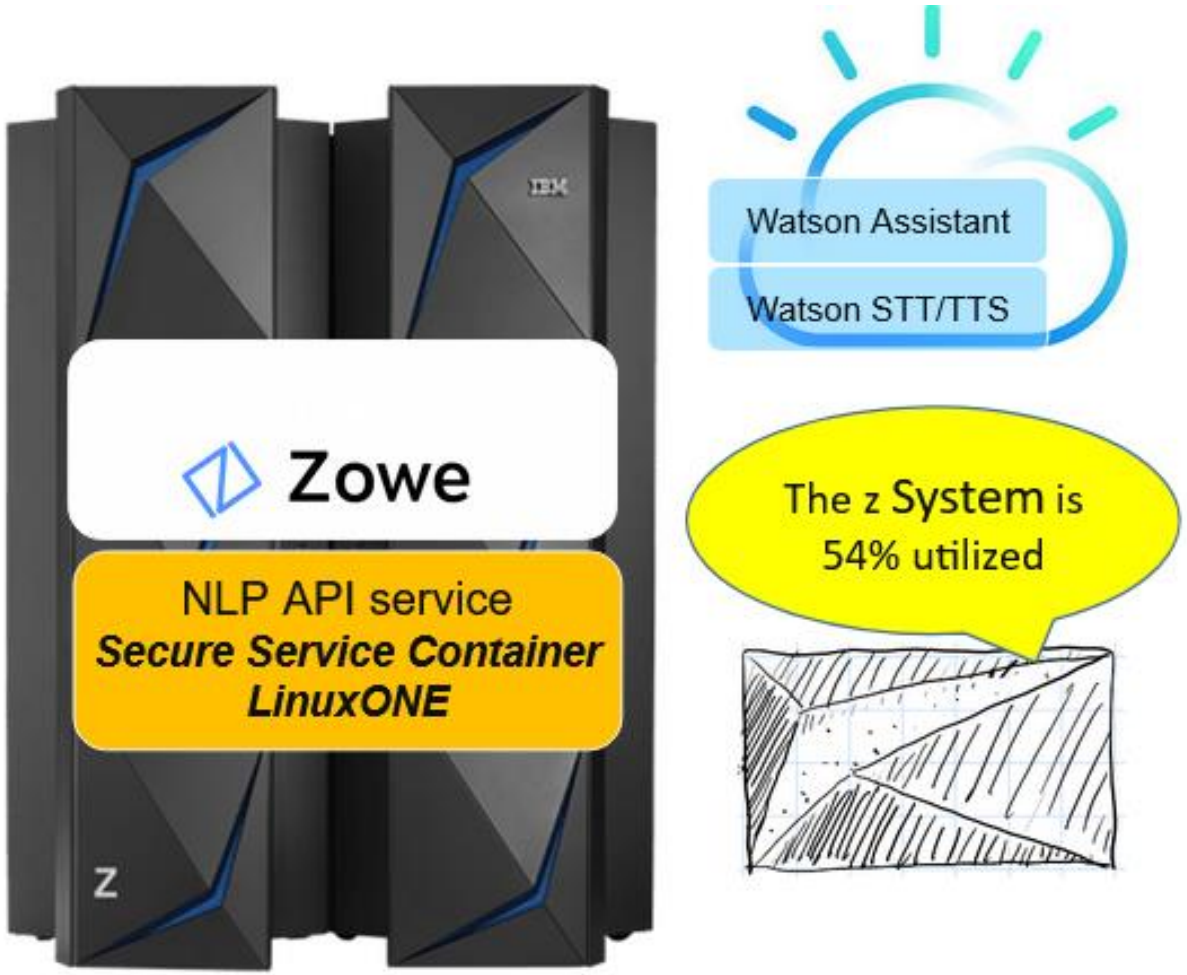
PROBLEM WITH OTHER VUIs

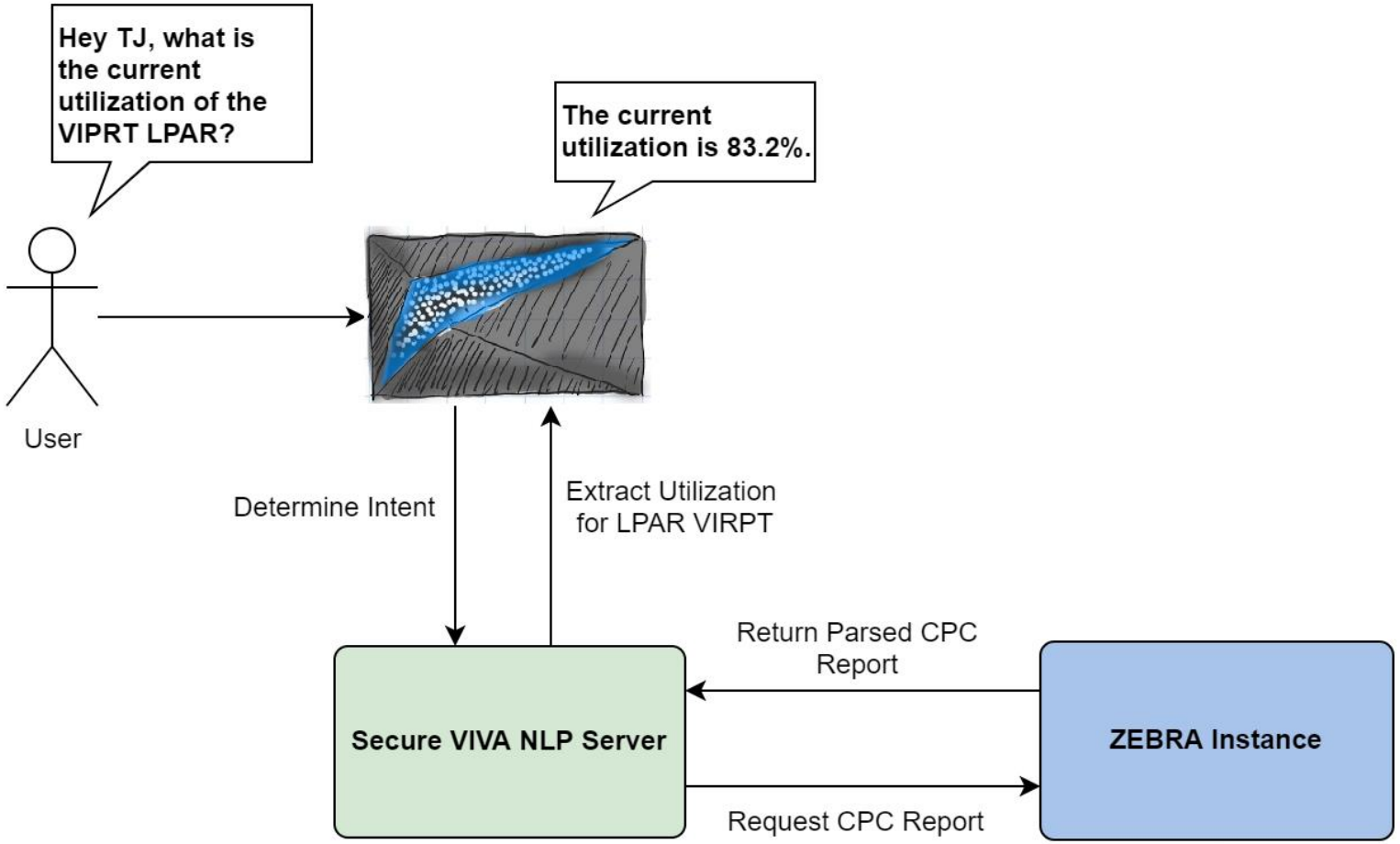
- Voice interface gives you a freedom of not touching keyboard for actions – but current consumer solutions only provide an option of storing your conversation/voice data on a public cloud.

VIVA'S SOLUTION

- Developed with maximum security in mind, Vicom Infinity Voice Assistant will store your conversation on-prem using IBM Watson, LinuxONE Secure Service Container with Zowe as easy and secure API Gateway for your Enterprise Applications.



HOW VIVA UTILIZES ZEBRA FOR PERFORMANCE METRICS



HOW VIVA UTILIZES ZEBRA FOR PERFORMANCE METRICS

Hey TJ, what processor are we using? →	*This system has an 8562-Z02 processor.*
Hey TJ, what LPARs in our system use central processors? →	*The LPARs that use CPs are TRNG, QCK2, VIRPT.*
Hey TJ, what is the current CPU utilization of the VIRPT LPAR? →	*The current utilization is 83.2%.*

ZEBRA – A POWERFUL TOOL

- ZEBRA is the perfect tool for RMF performance metric modernization
- We only showcased a few use cases – the possibilities are endless
- If interested in joining the project, please reach out or checkout the Zowe calender. We meet biweekly on Thursdays at 8:00AM EST through Zoom.
- Thank you for your time!

QUESTIONS?

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For More Information and/or to arrange PoT/PoC please contact…

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IBM Z Champion and Academic Initiative Leader, zCouncil and VM Workshop Sponsor, Ecosystem Advocate, Beta Tester
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