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# 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?

# DRIVING IBM Z INNOVATION AND PLATFORM LONGEVITY THROUGH LINUX FOUNDATION OPEN MAINFRAME PROJECT LEADERSHIP AND CHAIRPERSONSHIP

Distributions	Virtualization	Languages	Runtimes	Management	Database	Analytics
<p>Supported Versions</p> <p>Supported by Canonical</p> <p>Community Versions</p>	<p>LPAR</p> <p>DPM</p> <p>Docker</p> <p>LXD (Ubuntu)</p>		<p>Zend framework (PHP)</p>	<p>ANSIBLE</p>	<p>ORACLE <b>Diamond Partner</b></p> <p><b>DB2</b></p>	

# 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

# 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



## 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**

## Digital Assets and Hyper Protect Services

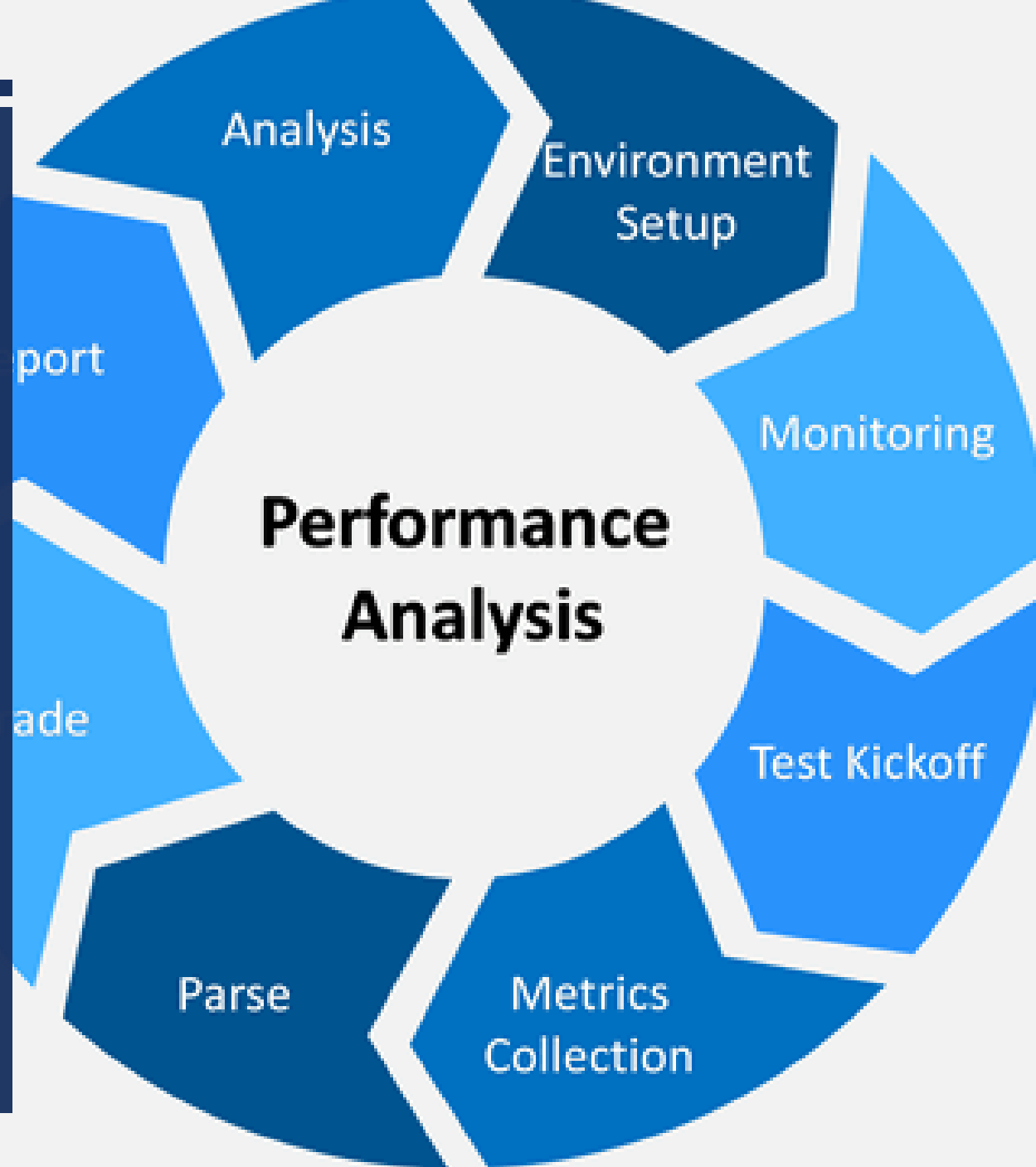
- Provide Confidential Computing on-prem or hybrid with IBM Cloud
- Help Protect Digital Assets in most secure way with Hyper Protect Digital Assets Platform

## Modernization and Transformation

- Factory driven process to Transform Legacy applications to modern languages and data bases.
- Convert any mainframe language such as Cobol, PL/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



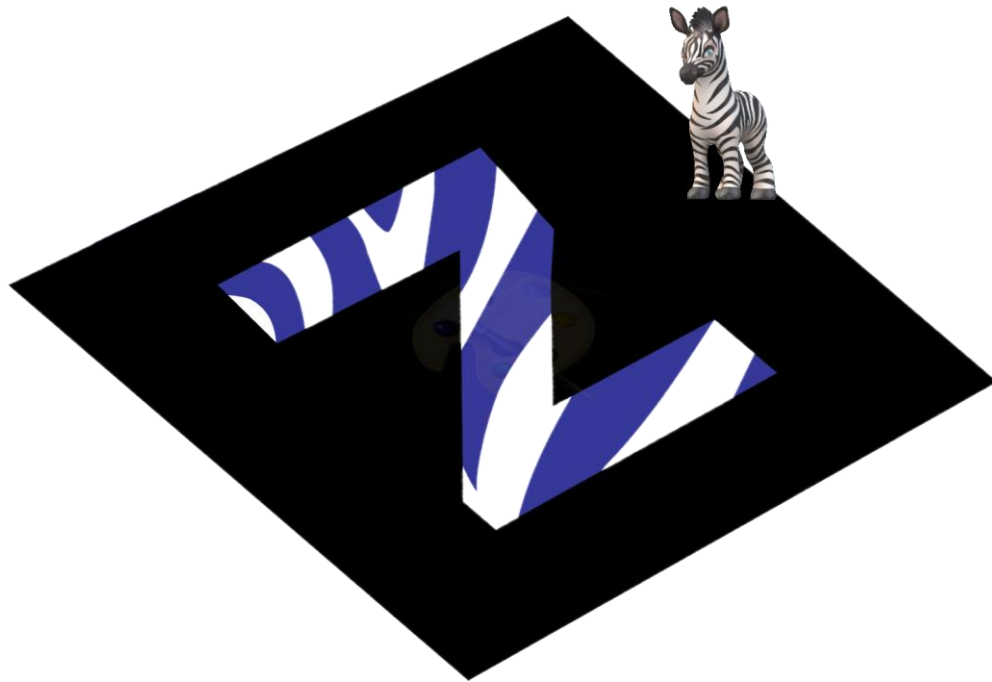


## ANSWER: OPEN-SOURCE

- 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.



# 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.

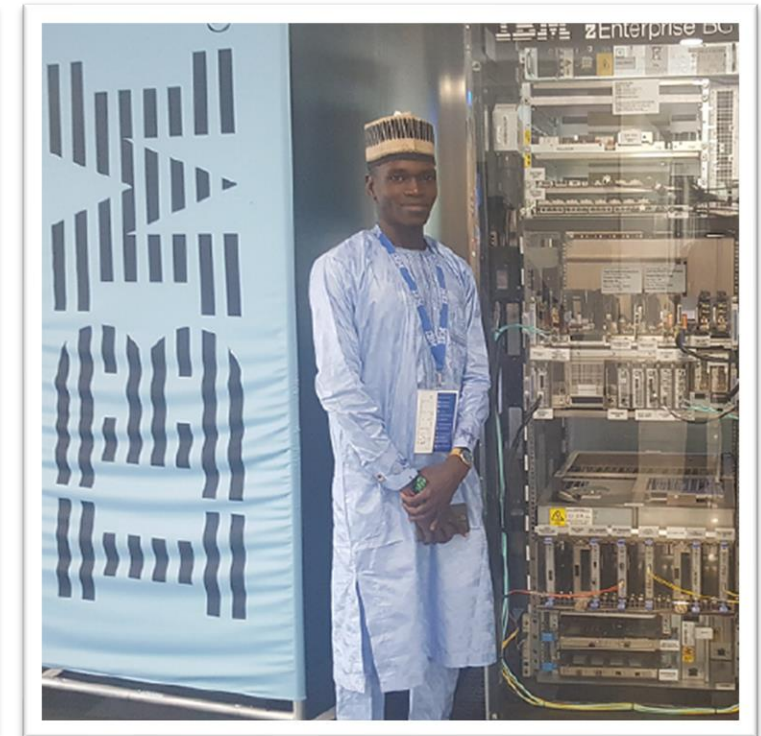


# HISTORY OF ZEBRA

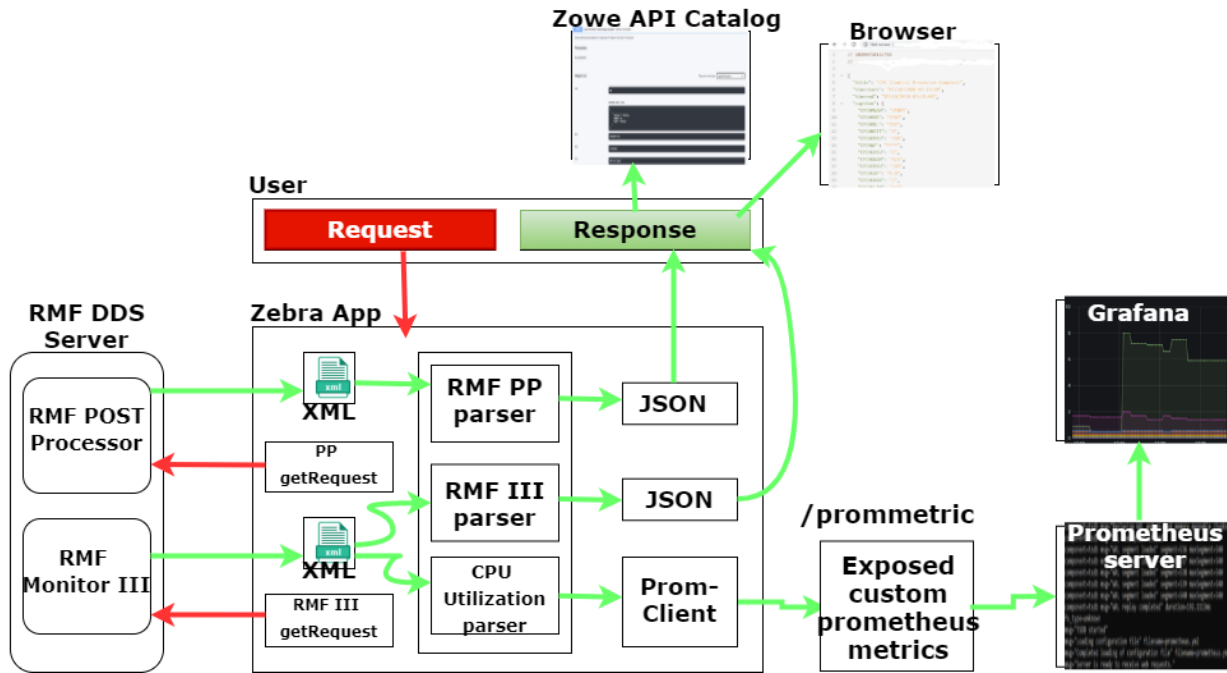
- Started as OMP Internship Project
- Created by Alex Kim and Salisu Ali
- The goal: simple, standard JSON format for RMF data
- Adopted by Zowe as an incubator project in 2021



Alex Kim



Salisu Ali



# HOW ZEBRA WORKS

# VISIT ZEBRA'S LIVE DEMO ENVIRONMENT TODAY

<https://zebra.talktotheframe.com:3390>

The screenshot displays the ZEBRA application interface. At the top, there is a blue navigation bar with the ZEBRA logo and menu items: Documentation, Config, Metrics, and About. Below the navigation bar, a list of features is provided:

- Browse RMF data for real-time LPAR
- Browse RMF data real-time Workload
- Browse RMF data for historical CPU Reports (post-processor report)
- Browse RMF data for historical Workload Reports (post-processor report)

The main content area is divided into several sections:

- Select LPAR:** A form with an input field for "LPAR Name" and a dropdown menu for "RPRT".
- RMF Monitor III report:** A form with an input field for "Retrieve RMF III Report In JSON" and a "Report Title" dropdown set to "CPC", with a "Try it" button.
- RMF Monitor I report:** A form with an input field for "Retrieve RMF I Report In JSON", "Report Title" dropdown set to "CPU", "Start Date" and "End Date" fields both set to "02 / 15 / 2022", and a "Try it" button.
- RMF Static XML File:** A form with an input field for "Convert RMF XML file to JSON" and a "Report File" field with a "Browse..." button and "No file selected." text, with a "Try it" button.

At the bottom of the interface, there are two links:

- Browse RMF data from MongoDB
- Browse RMF real-time data with Grafana

The footer of the page includes the text "ZOWE Incubator Project".

# ZEBRA FEATURE: RMF POSTPROCESSOR

HISTORICAL DATA



# RMF POSTPROCESSOR:WLMGL REPORT

<https://zebra.talktotheframe.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

Report: "workload Activity Report"	
System:	"VPLEX"
Timestamp:	"02/15/2022-00.00.00"
Classes:	
0:	{-}
1:	{-}
2:	{-}
3:	
Name:	"Service Class STCHIGH"
Policy:	"QS390POL"
Workload:	"STCHIGH"
Service Class:	"STCHIGH"
Description:	"High Priority Started Tasks"
Resource Group:	"*NONE"
Critical:	"NONE"
Honor Priority:	"DEFAULT"
Transactions:	{-}
Transaction Time (HHH.MM.SS.FFFFFFF):	{-}
Transaction Application Time %:	{-}
Enclaves:	{-}
Service:	{-}
Service Time:	{-}
Application Time %:	{-}
Promoted Transactions:	{-}
DASD I/O:	{-}
Storage Frames:	{-}
Page-In Rates:	{-}
Goals/Actuals Summary:	
0:	
Period:	"1"
Importance:	"2"
Performance Index:	"1.1"
# of Transactions:	"0"
% of Transactions:	"0"
Response Time Goal:	""
Response Time Actual:	""
Response Time Total:	""
Execution Velocity % Goal:	"50"
Execution Velocity % Actual:	"45.8"
Total Using %:	"0.0"
Execution Delay %:	"0.0"
1:	{-}

# RMF POSTPROCESSOR: INTERPRETING THE DATA

<https://zebra.talktothemainframe.com:3390/vI/RPRT/rmfpp/WLMGL>

Workload => **STCHIGH**

Service Class => **STCHIGH**

Period => **I**

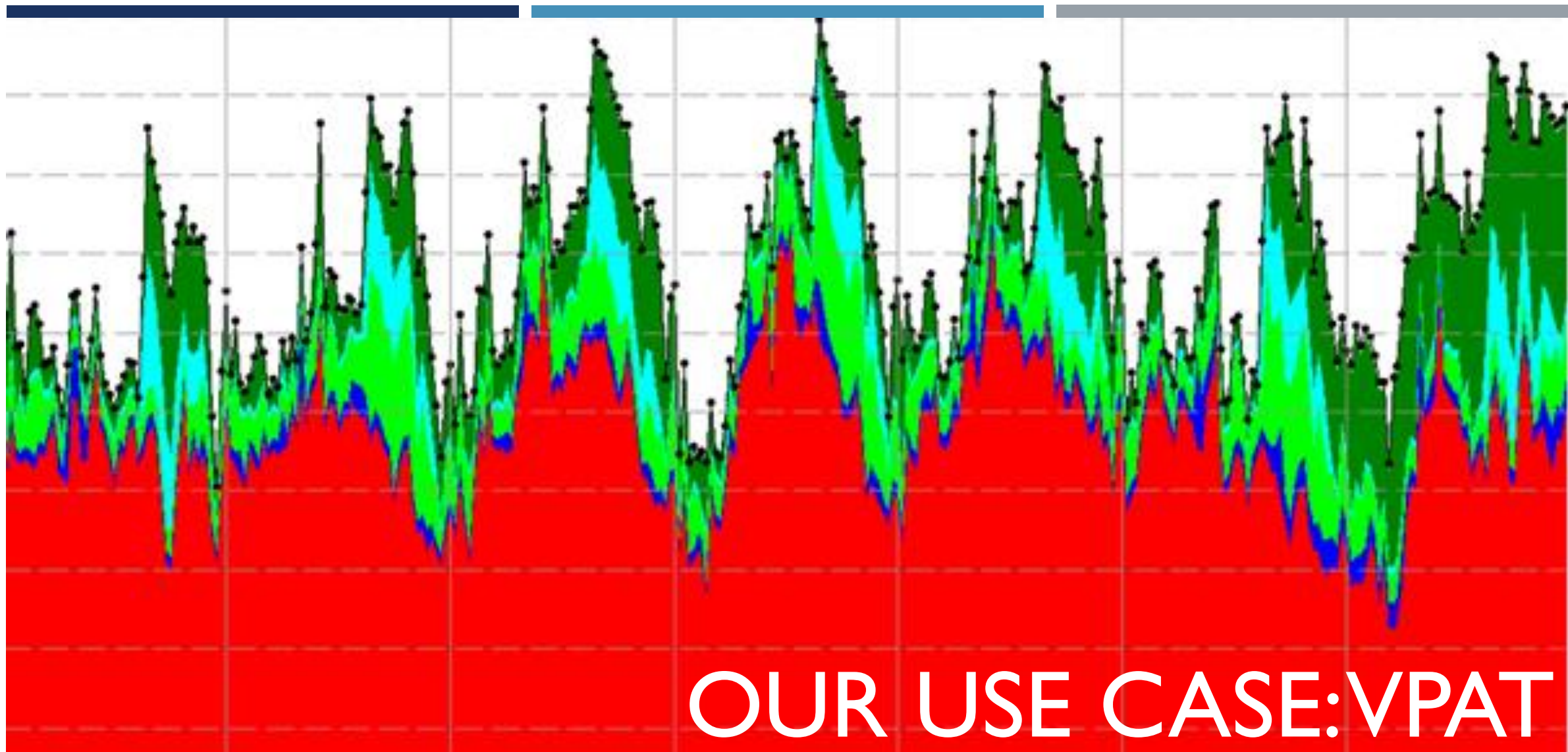
Performance Index => **1.1**

Execution Velocity Goal => **50%**

Execution Velocity Actual => **45.8%**

```

Name: "Service Class STCHIGH"
Policy: "QS390POL"
Workload: "STCHIGH"
Service Class: "STCHIGH"
Description: "High Priority Started Tasks"
Resource Group: "**NONE"
Critical: "NONE"
Honor Priority: "DEFAULT"
▶ Transactions: (-)
▶ Transaction Time (HHH.MM.SS.FFFFFFF): (-)
▶ Transaction Application Time %: (-)
▶ Enclaves: (-)
▶ Service: (-)
▶ Service Time: (-)
▶ Application Time %: (-)
▶ Promoted Transactions: (-)
▶ DASD I/O: (-)
▶ Storage Frames: (-)
▶ Page-In Rates: (-)
▼ Goals/Actuals Summary:
  ▼ 0:
    Period: "1"
    Importance: "2"
    Performance Index: "1.1"
    # of Transactions: "0"
    % of Transactions: "0"
    Response Time Goal: ""
    Response Time Actual: ""
    Response Time Total: ""
    Execution Velocity % Goal: "50"
    Execution Velocity % Actual: "45.8"
    Total Using %: "0.0"
    Execution Delay %: "0.0"
  ▶ 1: (-)
  
```



OUR USE CASE:VPAT

# 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

Performance Analysis

LPAR	Service Class	Period	Priority
<input style="width: 100%;" type="text" value="LPARA"/>	<input style="width: 100%;" type="text" value="DDF2"/>	<input style="width: 100%;" type="text" value="2"/>	<input style="width: 100%;" type="text" value="470"/>

Performance A

Top 2 Delay Factors are CPU Delay and ZIIP Delay.

Total Delay is 51.00%, CPU Delay is 50.00%, ZIIP Delay is 0.70%.

Total CPU busy (96.47%) is near 100% and this LPAR Busy (57.48%) is near or ov

Consider raising the Weight of this LPAR.



## ZEBRA Extraction

Report Type

- LPAR Report  
 Goal Mode Workload Report  
 Both Reports

Report Format

- RMF I  
 RMF III

Start

2022-02-22

End

2022-02-22

Target URL

https://zebra.talktotheframe.com:3390

Target LPAR

RPRT

CPU Report File Name

C:\Users\JSanter\Desktop\RPTs\LPARZebra.RPT

S

Propagate

ZIIP Report File Name

C:\Users\JSanter\Desktop\RPTs\ZIIPZebra.RPT

S

IFL Report File Name

C:\Users\JSanter\Desktop\RPTs\IFLZebra.RPT

S

ICF Report File Name

C:\Users\JSanter\Desktop\RPTs\ICFZebra.RPT

S

Workload Report File Name

C:\Users\JSanter\Desktop\RPTs\WGLZebra.RPT

S

Reporting Group File Name

C:\Users\JSanter\Desktop\RPTs\RWGLZebra.RPT

S

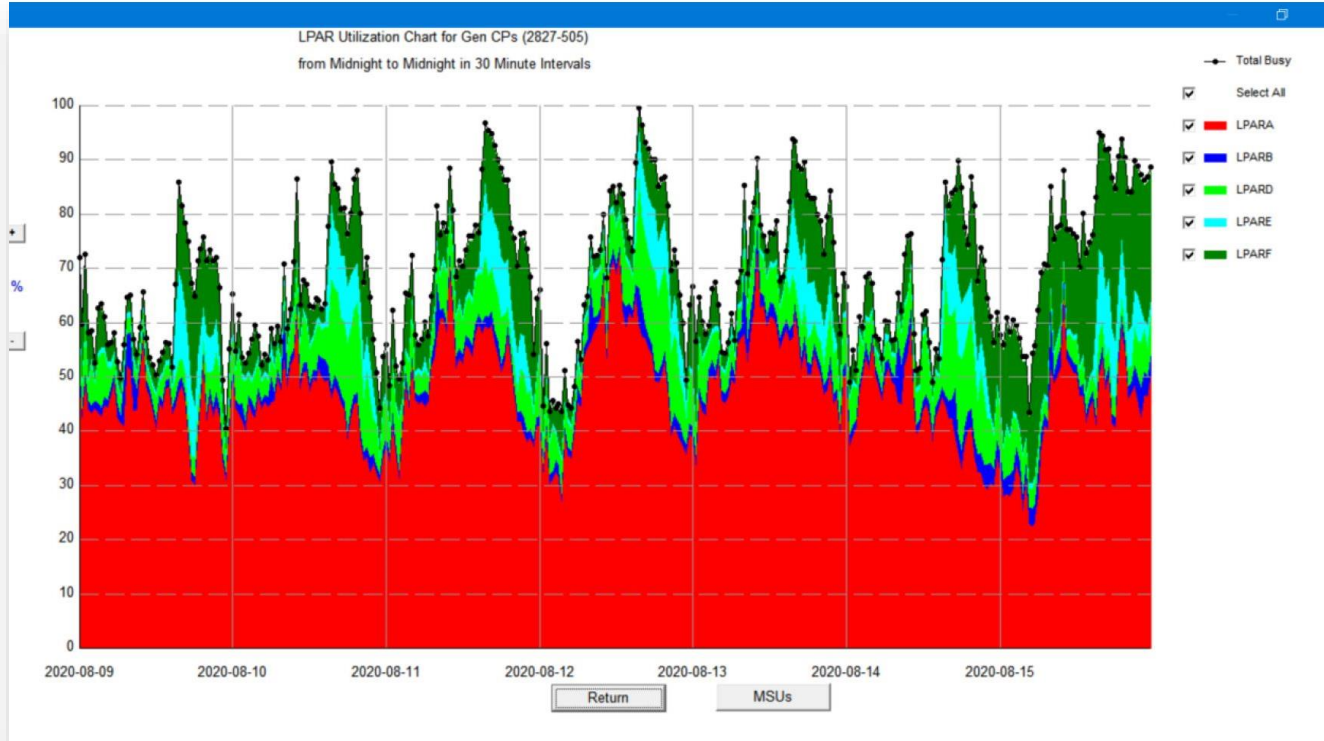
Run

Read

Save

## 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

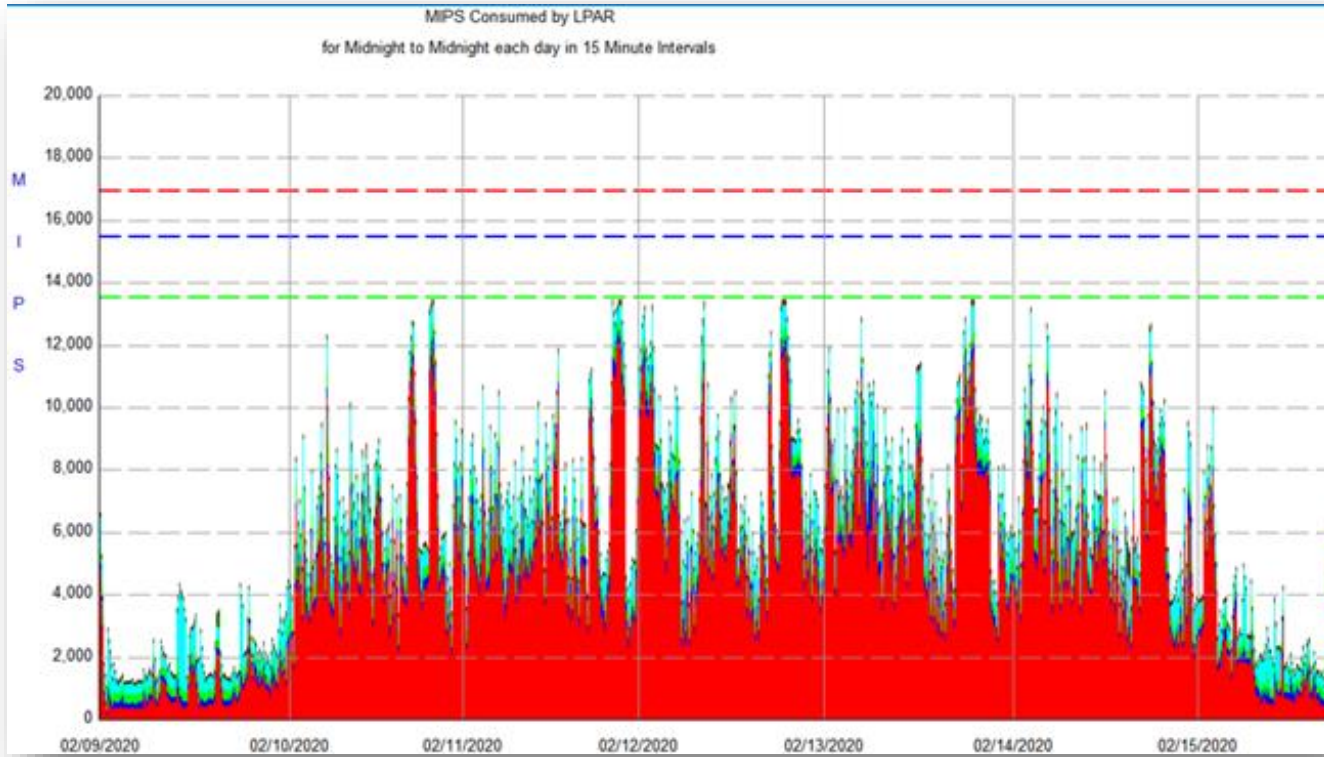


VPAT CAN ANALYZE UTILIZATION BY LPAR AND PROCESSOR TYPE.

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

# USING THE ZEBRA DATA IN VPAT

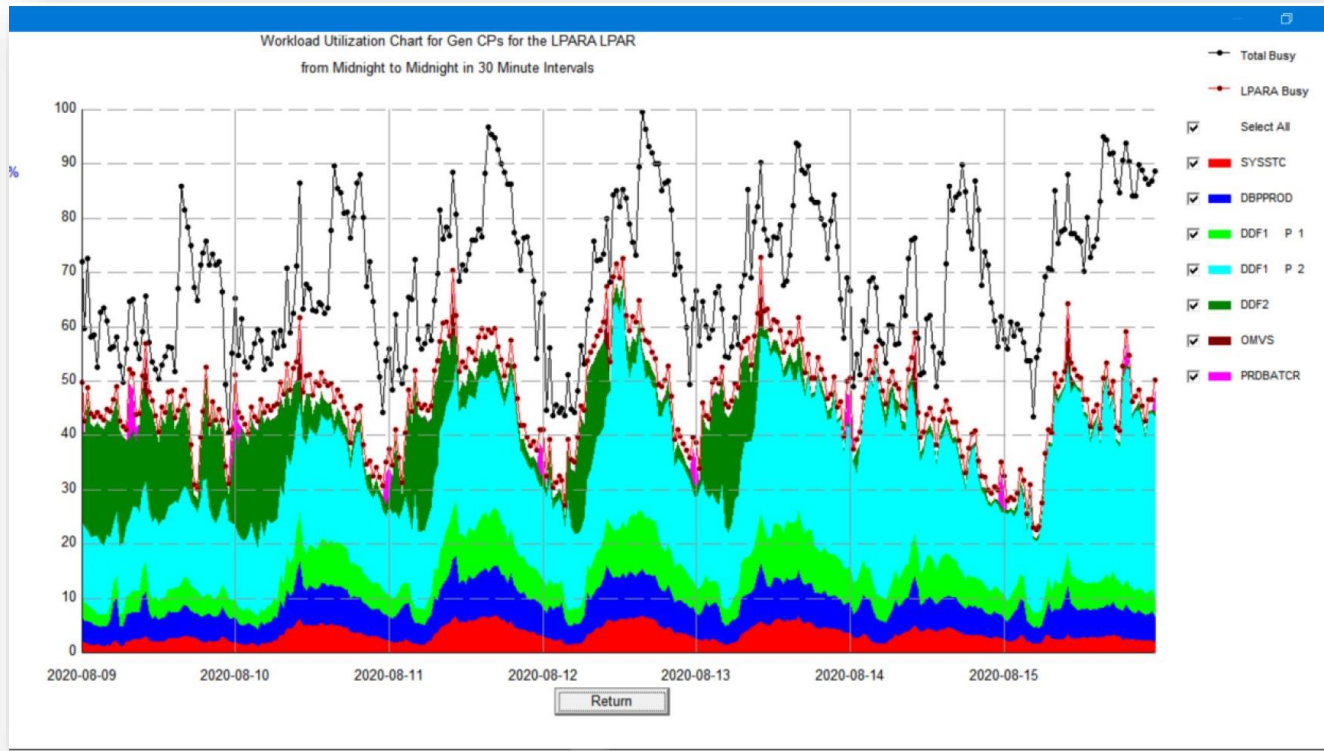
LPAR UTILIZATION



VPAT CAN ALSO SHOW THE MIPS  
CONSUMED BY AN LPAR

# USING THE ZEBRA DATA IN VPAT

MIPS CONSUMED

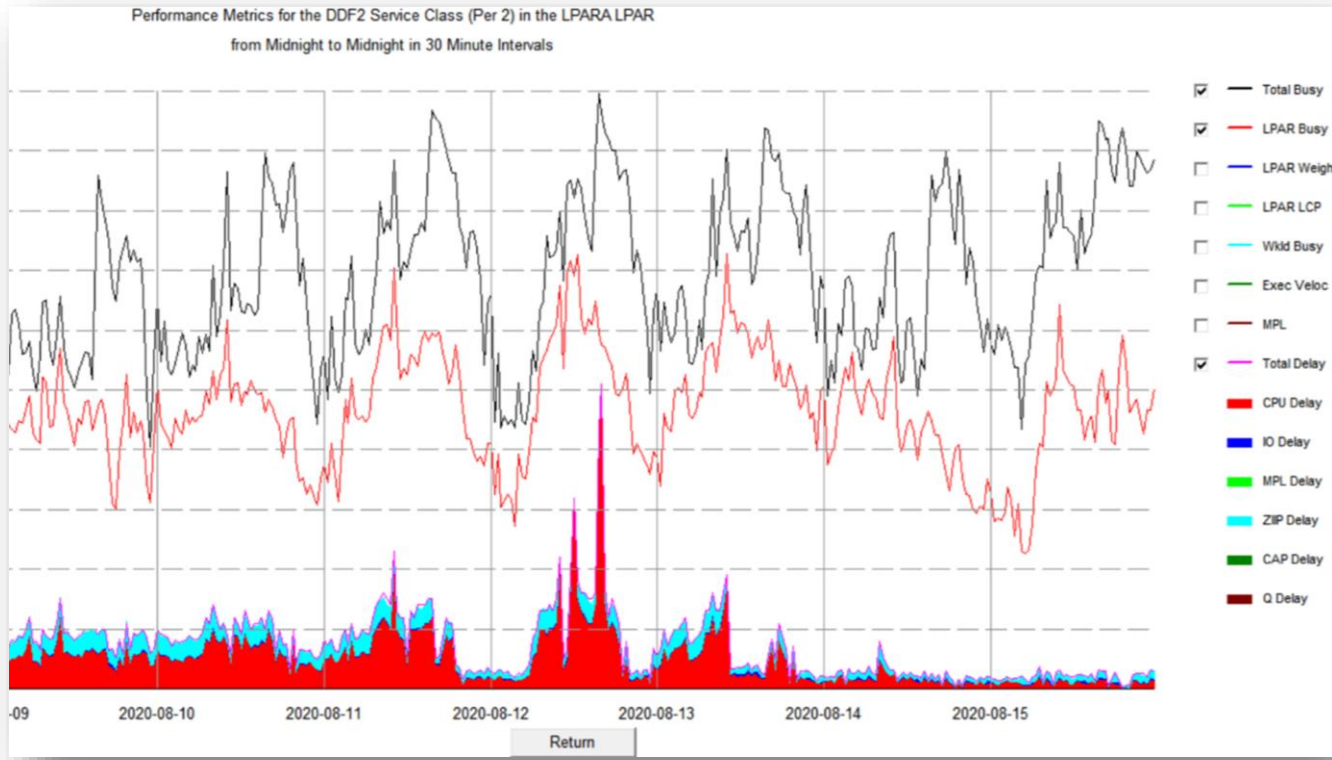


ADDITIONALLY, VPAT CAN  
BREAKDOWN UTILIZATION BY  
WORKLOAD.

EXAMPLE: COMPARING THE USAGE  
BETWEEN WORKLOADS IN 'LPARA'

# USING THE ZEBRA DATA IN VPAT

WORKLOAD UTILIZATION



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

Workload Performance Table

Service Class: DDF2, Period: 2, Priority: 470, \*All\*

Performance Spectrum: very good, good, fair, poor, very poor

Sort By Date

	Time	Total CPU	LPAR CPU	Total ZIIP	LPAR ZIIP	Workload CPU	MPL	Execution Velocity	Total Delay	CPU Delay	I/O Delay	MPL Delay	ZIIP Delay	CAP Delay	Q
-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

Analyze Workloads Graph Cancel

VPAT USES ARTIFICIAL INTELLIGENCE ON THE METRICS TO DETERMINE PERFORMANCE QUALITY

# USING THE ZEBRA DATA IN VPAT

AI FUNCTIONALITY

Performance Analysis

LPAR:  Service Class:  Period:  Priority:  Date:  Time:

Selected Interval

Performance Analysis Summary

Top 2 Delay Factors are CPU Delay and ZIIP Delay.  
Total Delay is 51.00%, CPU Delay is 50.00%, ZIIP Delay is 0.70%.

Total CPU busy (96.47%) is near 100% and this LPAR Busy (57.48%) is near or over its Weight (59.81%).  
Consider raising the Weight for this LPAR.  
Keep in mind that raising the Weight of one LPAR may impact performance in another LPAR.

Workload has an Importance of 4. Consider raising the Importance to 3.  
Keep in mind that raising the Importance of one Workload may impact performance of another Workload.

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.talktotheframe.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

JSON	Raw Data	Headers
Save	Copy	Collapse All Expand All Filter JSON
title:		"CPC (Central Processor Complex)"
timestart:		"02/15/2022 12:41:40"
timeend:		"02/15/2022 12:43:20"
caption:		{-}
columnhead:		{-}
table:		{-}
0:		{-}
1:		CPCPPNAM: "QCK2" CPCDMSU: "0" CPCPMSU: "1" CPCPCAPD: "N N N" CPCPLPNO: "2.0" CPCPLEFU: "0.2" CPCPLTOU: "0.3" CPCPLMU: "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"

# RMF MONITOR III: INTERPRETING THE DATA

<https://zebra.talktotheframe.com:3390/v1/REPORT/rmf3/CPC>

Partition Name: **CPCPPNAM** => **QCK2**

Avg. # of Logical Processors: **CPCPLPNO** => **2**

Processor Type: **CPCPIND** => **CP**

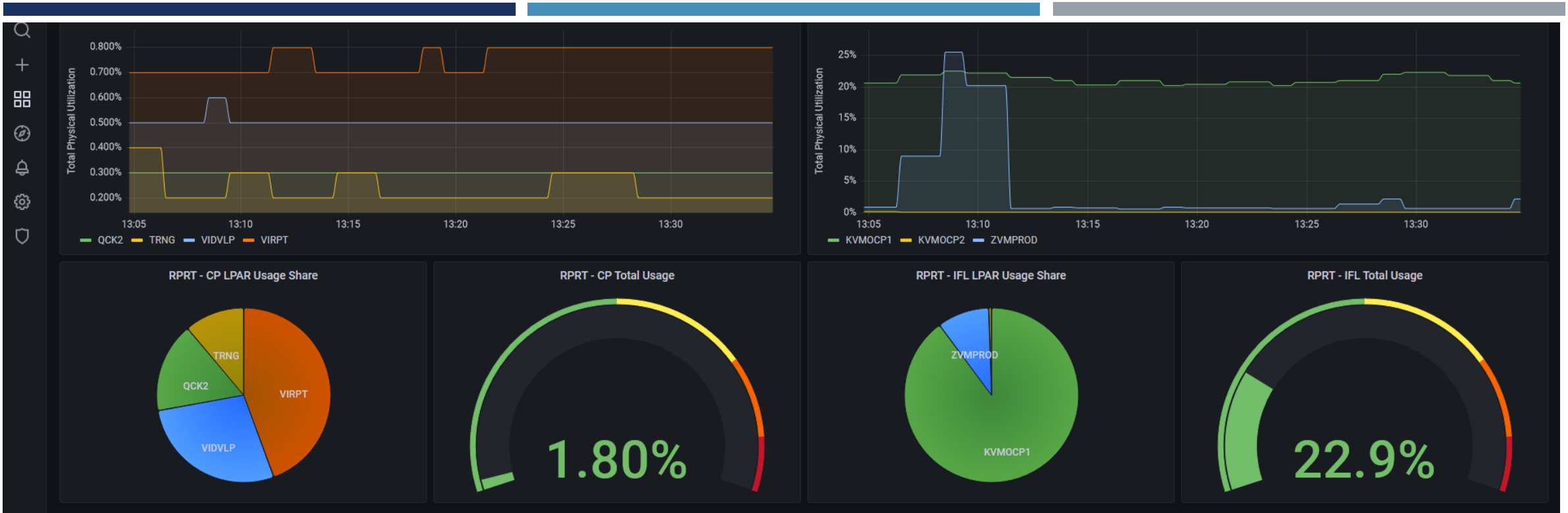
Logical Processor Total Utilization: **CPCPLTOU** => **0.3%**

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"
CPCPLMU: "0.0"
CPCPEFU: "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...

# 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?



## PROBLEM WITH OTHER VUIs

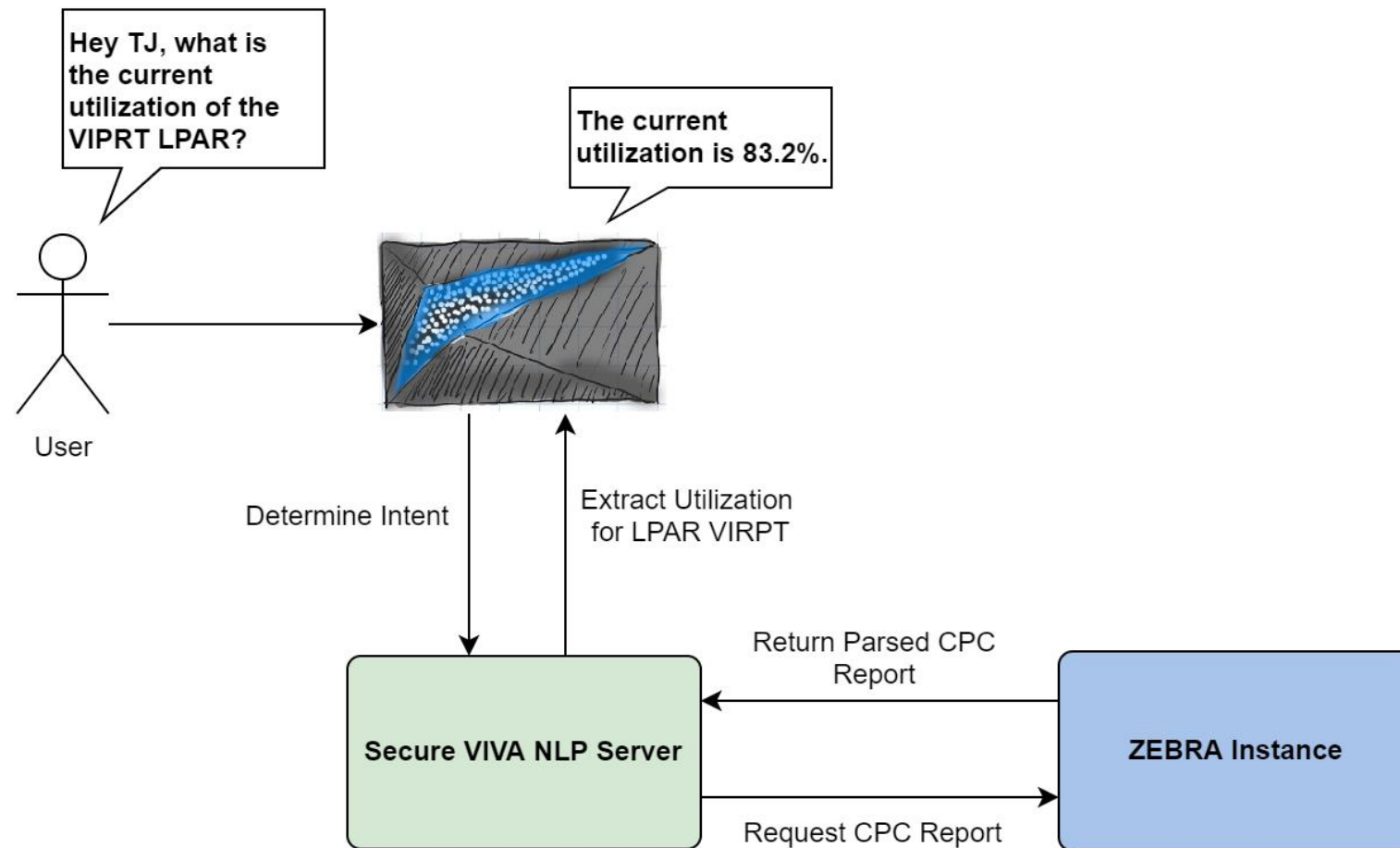
- Voice interface gives you a freedom of not touching keyboard for actions – but current consumer solutions only provide an option of storing your conversation/voice data on a public cloud.

## 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?

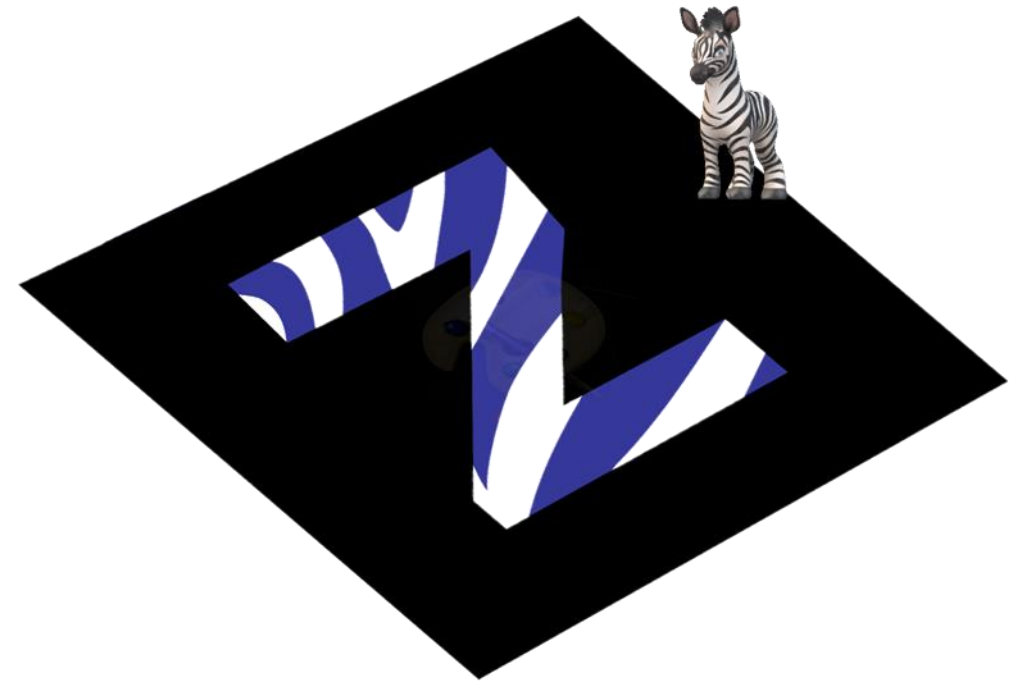
*The LPARs that use CPs are TRNG, QCK2, VIRPT.*

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?

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

**Len Santalucia**

**CTO & Business Development Manager**

**Vicom Infinity, Inc.**

**917-856-4493 mobile**

[Leonard.Santalucia@convergetp.com](mailto:Leonard.Santalucia@convergetp.com)



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Red Hat Advanced Build Partner

Professional IT Architectural Services and IBM Tier I Services Provider

Offer Leasing & Financing and IT Staffing & IT Project Management

Linux Foundation Open Mainframe Project – Chair

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

Converge Acquisition

[www.VicomInfinity.com](http://www.VicomInfinity.com)

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