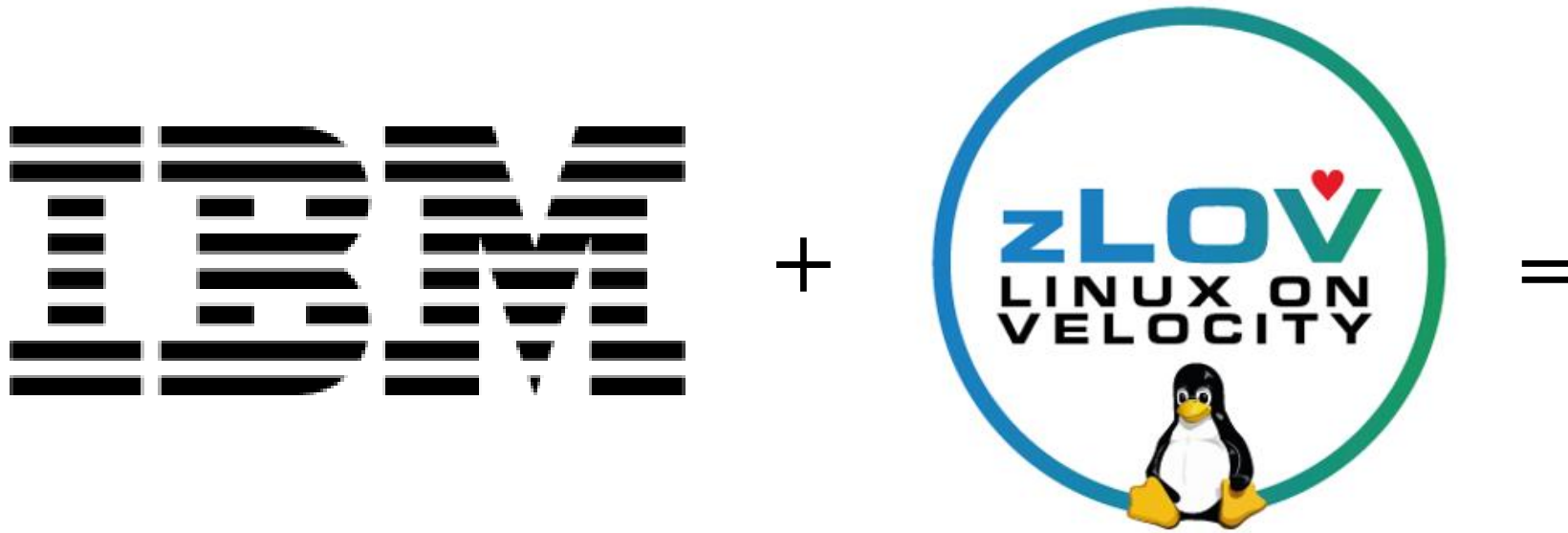


Optimizing the Value of Hybrid Clouds with zLOV

The Ongoing Results of a Partnership between IBM's COE, WSC and Velocity Software Inc. (VSI)



Center of Excellence (COE)
Washington System Center (WSC)

“If you can’t Measure it,
I am Just Not Interested™”

Barton Robinson’s quote that Velocity Software lives by



Optimizing the Value of Hybrid Clouds with zLOV

- **Optimizing workloads allows you to run more using less resources.**
- **Optimized workloads simplify managing operations with SLA's.**
- **Visualization with the right real time tools allows you to act quickly.**
- **Our agenda is to review why we started this partnership, what has been accomplished to date, and then continue to bring everyone along our journey optimizing workloads on IBM Z and LinuxONE systems.**

Why IBM and VSI Partnered For This Project

- **Customer requested help!**
- **And why do customers request Velocity Software's assistance?**
 - VSI works with, and are considered a trusted partner with our customers.
 - VSI simplifies and automates workload optimization on IBM Z and LinuxONE.
 - VSI is extremely light weight (very low resource consumption, less than 0.1% of a processor with no additional RHEL or other OS, JAVA or Database licenses required).
 - This really helps customers meet their consolidation with sustainability and TCO goals!
 - In this case, many customers use our tools already and know we work with IBM.
 - Plus, we have been able to deliver the custom dashboards required by their businesses.
- **Why work with IBM's COE and WSC?**
 - They have the environments.
 - They have all the required skills.
 - They have a keen interest in continued success of IBM Z and LinuxONE too.

Current Scope and Focus - 2 Main Parts for MongoDB

- **Provide Platform Visualization**

- Today at most shops, MongoDB DBA's have no visualization into LinuxONE, and the Virtual Machines (VM) running on them.
- Velocity worked directly with MongoDB and prior to version 6 supported direct reporting through our interfaces. The removal of SNMP at v6 broke that support.
- Velocity has created a new MIB that gathers and reports MongoDB stats by querying the databases directly.
- This allows real time MongoDB stats to be shared via Grafana, in addition to being available from within Velocity's products where actions can be automated with them as well.

- **Optimize MongoDB**

- Many MongoDB deployments are looking to maximize LinuxONE's consolidation with sustainability goals.
- The proper number of vCPU's can be controlled through Velocity's Resource Manager (zVRM).
 - Too many vCPU's causes excessive waits and slows overall processing.
- Free memory can be managed by zVRM, but might not be aggressive enough.
- Testing MongoDB with zVRM has started. The teams first focus is providing visualization into the systems!

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Current LinuxONE Systems used for this Project

LinuxONE Rockhopper 3932-LA2(A00) used with z/VM:

- 68 IFLs, 16,224 GB RAIM storage
- 10x FICON-FCP FICON Express 32S
- LPAR: 01/NORMA01 (z/VM 7.3.0)
- 16 Shared IFLs, 228 GB Storage, 2x OSD OSA Express7S 25G

LinuxONE Emperor 3931-LA1(400) used in LPAR mode:

- 39 IFLs, 2,816 GB RAIM storage
- 6x FICON-FCP FICON Express 32S
- MongoDB LPAR: 06/OBMLPAR2 (RHEL 8.10, 8 IFLs, 8 GB Storage)
- OracleBM-LPAR1 (RHEL 8.10, 20 IFLs, 256 GB Storage)



Provisioning the Environment: z/VM Installation and Configuration

- z/VM 7.3 installed using IBM's Express System Install (ESI) process
- Deployment targeted at LinuxONE Rockhopper system under LPAR NORMA01
- DPM (Dynamic Partition Manager) used to streamline hardware management and provisioning of storage
- Ensured the system and guests had enough resources to support Linux guests for MongoDB benchmarking



Guest Creation For Environment

- Created directory entries for each Linux guest needed for MongoDB workloads
- Linux Guest used for MongoDB, Grafana, InfluxDB and Prometheus.
 - Containers were also looked at, but did not match customers system.
 - Future goal is to measure performance difference between the two.
- Coordination with storage team ensured FCP devices were accessible for Linux installs



Prometheus, Grafana, and InfluxDB on Linux Guests

- Dedicated Linux guests were provisioned to run open-source visualization tools
- InfluxDB configured as the time-series database to store performance data for Grafana
- DataPump & VSIPUMP used to collect and push z/VM CP monitor and MongoDB data into InfluxDB
- Imported z/VM dashboards to monitor system performance from Grafana



Operational Tasks and z/VM Administration

- Collaborated with Paul Novak to drive day to day z/VM system administration
- Installed Velocity Software zLOV stack, and upgraded components as required for new MongoDB stats
- Pulled performance data from z/VM using VMARC format for efficient transfer
- Packed and uploaded VMARC files to Velocity's site for analysis
- Validated data and ensured timestamps aligned with benchmark intervals

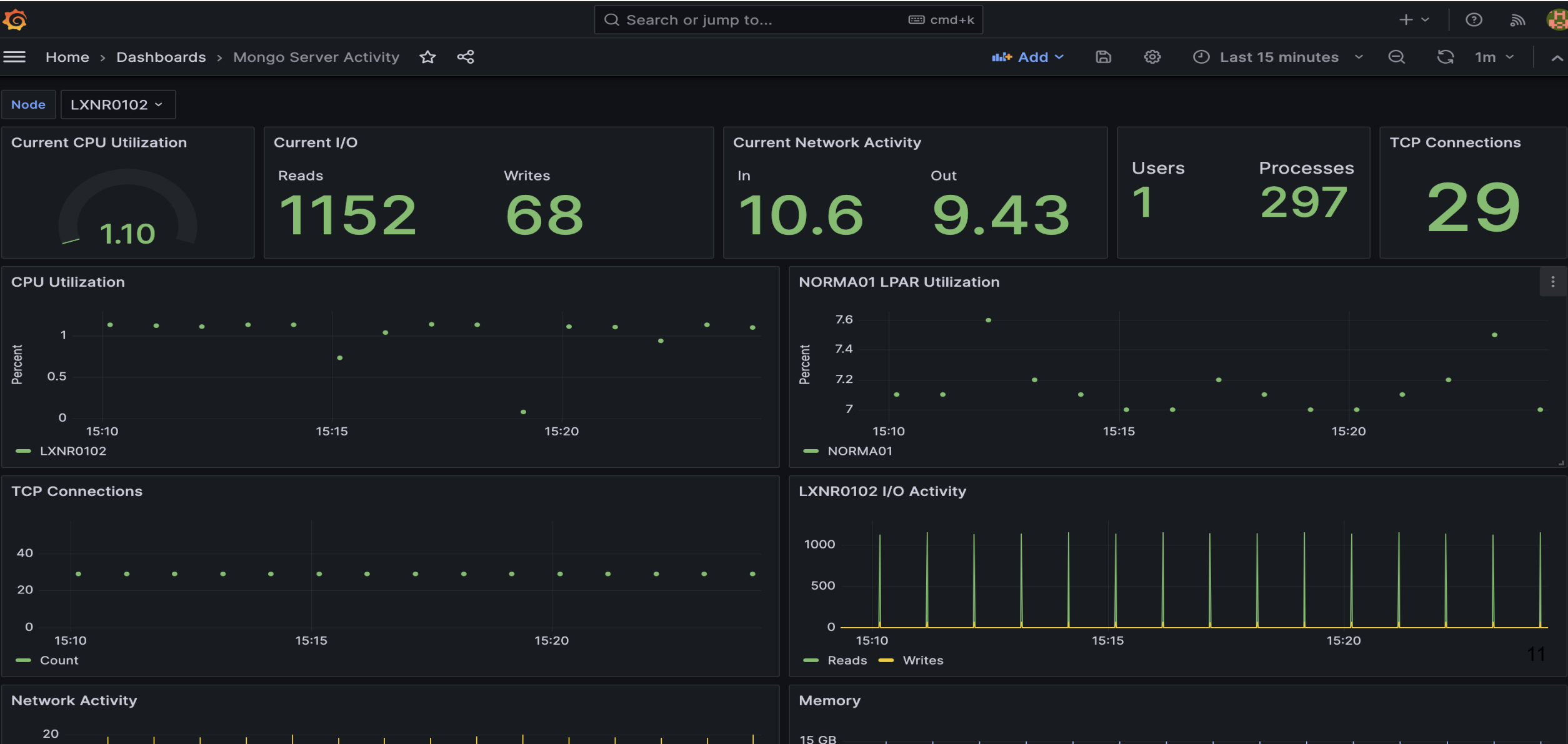


zVIEW - Velocity Software (WSCVML01)



VELOCITY
SOFTWARE

MongoDB Stats from Linux on z/VM



Introducing Data From Velocity's New MongoDB MIB

- As you can hopefully see, this is hot off the press
- It is still in test, but has been packed for testing with IBM
- And the team is learning a lot about MongoDB stats!

Screen: ESAMNG2 Velocity Software - VSIVM2 ESAMON 5.141 06/12 22:13-22:14
MongoDB Processing NODE MONG08* 8562 020F78

Time	Node	Host Name	Threads	Network (Bytes/s)		<-Disk (Bytes/s)>		<Cache (Bytes)>		<Wired Read	Tiger Cache (Pages)>			<-----Connections----->				
				In	Out	In	Out	Used	Max		RdCkpt	Written	Dirty	Open	Actv	Rejct	Avail	Total
22:14:00	mongo8pr	mongo8pr	93	2726	5232	469402	55772864	6426530	1078M	1406	134	2650	149	13	0	0	51187	32478
	mongo8s1	mongo8s1	197	357311	1425509	194628	678639	8136235	1078M	564	52	2110	274	120	1	0	51080	99092
	mongo804	mongo804	84	2105082	777382	50517	6436386	27494K	1078M	121	0	13702	85	42	1	0	51158	278146

Initial Samples from Direct MongoDB Queries

- Host=mongo804.velocitysoftware.com Version=8.0.4 pid=943
- Asserts: Regular=0, Warning=0, Msg=0, User=79627, Tripwire=0, Rollovers=0
- Connections: Current=6, Available=51194, Created=39854, Rejected=0, Active=2
- Operations: Insert=1023, Query=0, Update=0, Delete=8907392,
- Getmore=1023, Command=8907176
- OperationsRepl: Insert=1023, Query=2607904, Update=1023,
- Delete=13744208, Getmore=682, Command=1023
- Network: bytesin=1023 bytesout=6383516
- Memory: Resident=2612200, Virtual=1023

Driving Benchmarks for Testing

MongoDB Benchmark and Yahoo YCSB are being used.

- **50/50 read and write testing was mainly used as this closely mimics our target customer's workload.**
- **90/10 read and write testing was used for variations.**
- **Once MongoDB visualization and optimization phase is behind us, we plan to show the results of using compression from LinuxONE.**
- **Adding power usage and AI offload metrics are also being looked into.**



Still Pending x86 and a LinuxONE 5

- A VMware based environment is set up at the COE.
- This will be used for some upcoming Oracle and MongoDB benchmarking test.
- And IBM's COE has a new LinuxONE 5 being set up so we can see the increased value behind the latest generation of these systems.



VMware Environment

- **See David Simpson and Justice Heughan's Customer Experiences Running Data Bases with z/VM session in Alumni at 15:30 today!**

The Team

From Velocity Software Inc (VSI):

Barton Robinson
CTO and founder of VSI

Rich Smrcina
Lead zLOV & Grafana Specialist

Kevin Vincent
Lead MIB Specialist

Kurt Acker
zLOV Architect

Center of Excellence (COE)
Washington System Center (WSC)



From IBM:

Ernest Horn WW LinuxONE
Client Success Manager at the COE

Tony Avdiu
CPO Team Lead

David Simpson and Sam Amsavelu
Oracle and MongoDB on Z specialist at IBM

Scott Ratzloff
WSC Z Specialist

Justice Heughan
WSC z Specialist

Paul Novak
Cloud and Virtualization SME

Velocity Software's zLOV Suite

zVPS

PERFORMANCE SUITE

THE WORLD'S LEADING PERFORMANCE MANAGEMENT SOLUTION FOR Z/VM WITH LINUX AND/OR VSE. NEWLY ADDED SUPPORT FOR Z/OS PLUS NO-CHARGE MONITORING FOR X86 LINUX AND WINDOWS.



zPRO

CLOUD MANAGEMENT

SOLUTION FOR MODERNIZING THE Z/VM PLATFORM, ADDING ON-PREM CLOUD SUPPORT WITH WEB-BASED CONTROLS FOR Z/VM SYSTEM MANAGEMENT PLUS LPAR CLONING AND ANSIBLE PLAYBOOKS USING VELOCITY'S HIGHLY AVAILABLE SMAPI-FREE API'S.



zTUNE

SUPPORT SUBSCRIPTION

VELOCITY SOFTWARE'S ELITE PERFORMANCE SUPPORT SERVICE THAT CREATES AUTOMATED DAILY REPORTS WITH RECOMMENDED ACTIONS



zVRM

RESOURCE MANAGER

REAL-TIME MANAGEMENT FACILITY FOR Z/VM WITH LINUX THAT AUTOMATES SYSTEM SETTINGS USING KNOWLEDGE-BASED INTELLIGENCE TO TUNE WORKLOAD REQUIREMENTS AND OPTIMIZE OVERALL SYSTEM PERFORMANCE.



Questions?

Contact Velocity Software anytime

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