

Improving Healthcare with VMware Horizon and NVIDIA GPU

Shane Limbach
Technical Systems Senior Engineer
S9162
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University of Nebraska
Medical Center



Nebraska
Medicine

Disclaimer

Sharing high level content

A more technical discussion is encouraged

Content taken from Dev environment

Some concepts may not be in production

Teamwork

Not an individual effort. It takes a team to make this work

Sharing what I have experienced

I am open to correction and discussion

All Data has been anonymized, no identifiable information



Who Am I

Shane Limbach

Technical Systems Senior Engineer
Nebraska Medicine
Omaha, Nebraska

14 Years of IT Experience

Academic/Healthcare
Public Power District
Construction

Experience

Vmware ESXi, Horizon, vSAN
Active Directory

Hobbies

LEGO
PC Gaming
Omaha VMUG Leader



Nebraska Medicine

Academic health organization consisting of hospitals, specialty clinics, and healthcare colleges

Founded in 1997, tracing its roots back to 1869

Nebraska's largest healthcare organization with more than 8000 employees and physicians

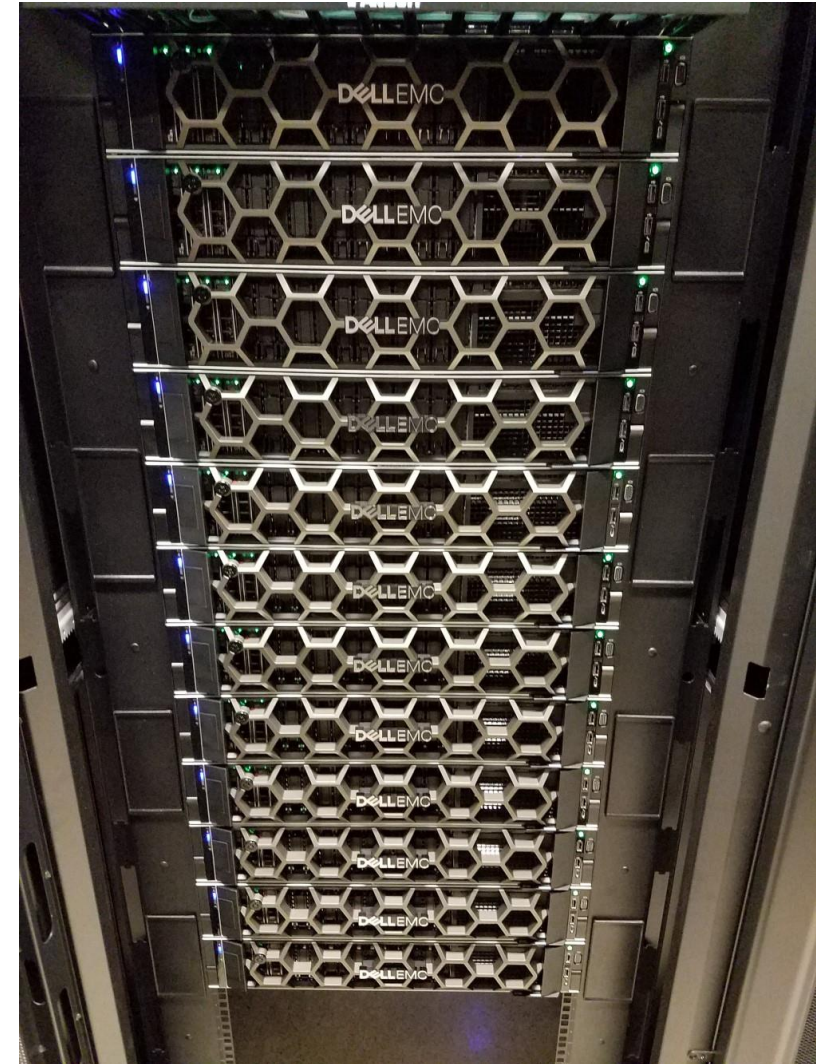
International reputation for breakthroughs in cancer care, organ transplantation, and treatment of infectious diseases



Hardware

Dell PowerEdge R740 vSAN ReadyNode
Dual Intel Xeon Gold 6150 @ 2.70 GHz
768 GB RAM per Host
~7TB SSD per Host
Dual 1600W power supplies
NVIDIA Tesla M10 GPU

Expandable to 2 physical GPUs per Host



Journey to GPU

Started project in December 2017

Project originally started as Hyperconverged POC for Horizon

vSAN - Dell

Nutanix - Lenovo

Simplivity - HPE

GPU not originally in scope, but it would be a disservice to not see the capabilities

Tested both Tesla M10 and Tesla M60



Testing cases

Windows 10 1703

General Knowledge workers

1GB – 2GB GPU profile

IT Desktop

Epic Hyperspace 2018

Radiology workstations

McKesson Radiology (PACS)

2GB – 4GB GPU profile

Diagnostic stations

QC stations

Virtual GPU profiles used

M10-8Q

M10-4Q

M10-2Q

M10-1Q

NVIDIA Quadro Virtual Datacenter
Workstation (Quadro vDWS) License
for Education

VMware vROPs

NVIDIA vROPs plugin

VMware BLAST



Radiology Testing

What does the VM look like

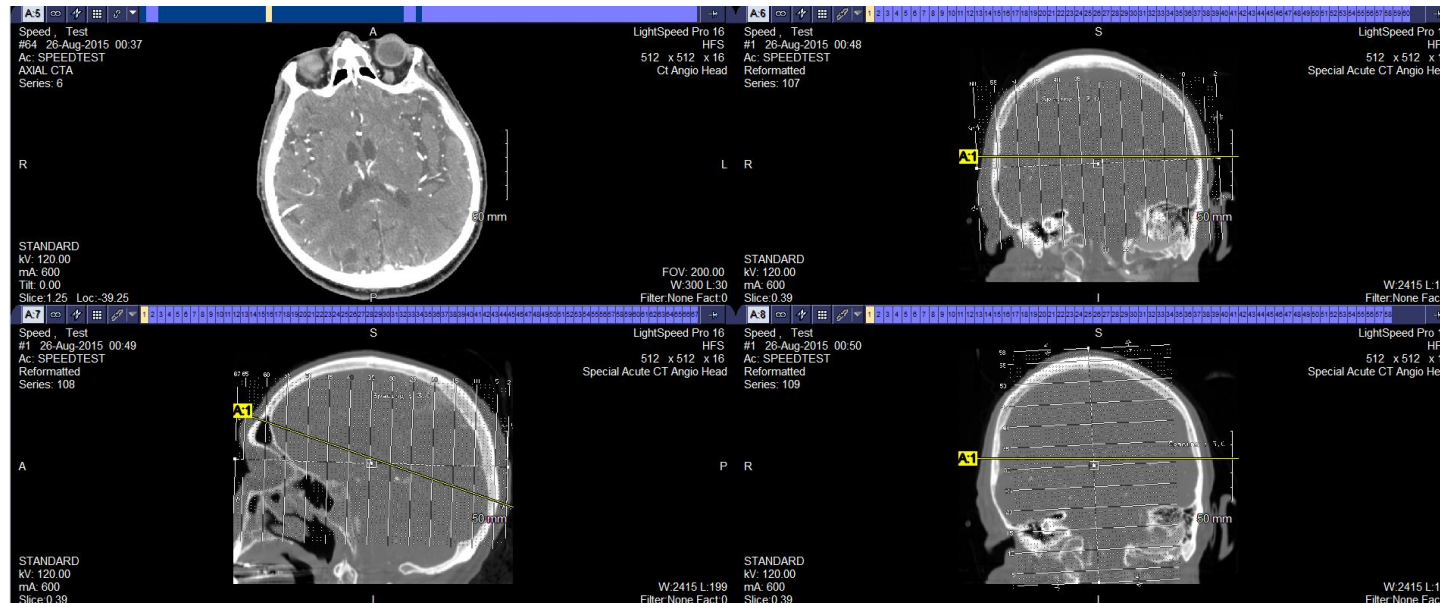
2 vCPU

8 GB RAM

2GB – 4GB GPU profile

Windows 10

Dr's and Rad Techs must be able to transition seamlessly between slices



System Information

VMware, Inc.
 VMware Virtual Platform (6.00)
 Host: VD-GPU02
 OS: Windows 10 Enterprise 1703
 CPU: Xeon Gold 6150 [2x @ 2.69GHz]
 Memory: 8 GB
 GPU: GRID M10-2Q (WDDM)
 GPU Memory: 2 GB
 VBIOS: 00.00.00.00.00
 Driver version: 391.81
 VMware Agent: 7.6.0

Profiler Options

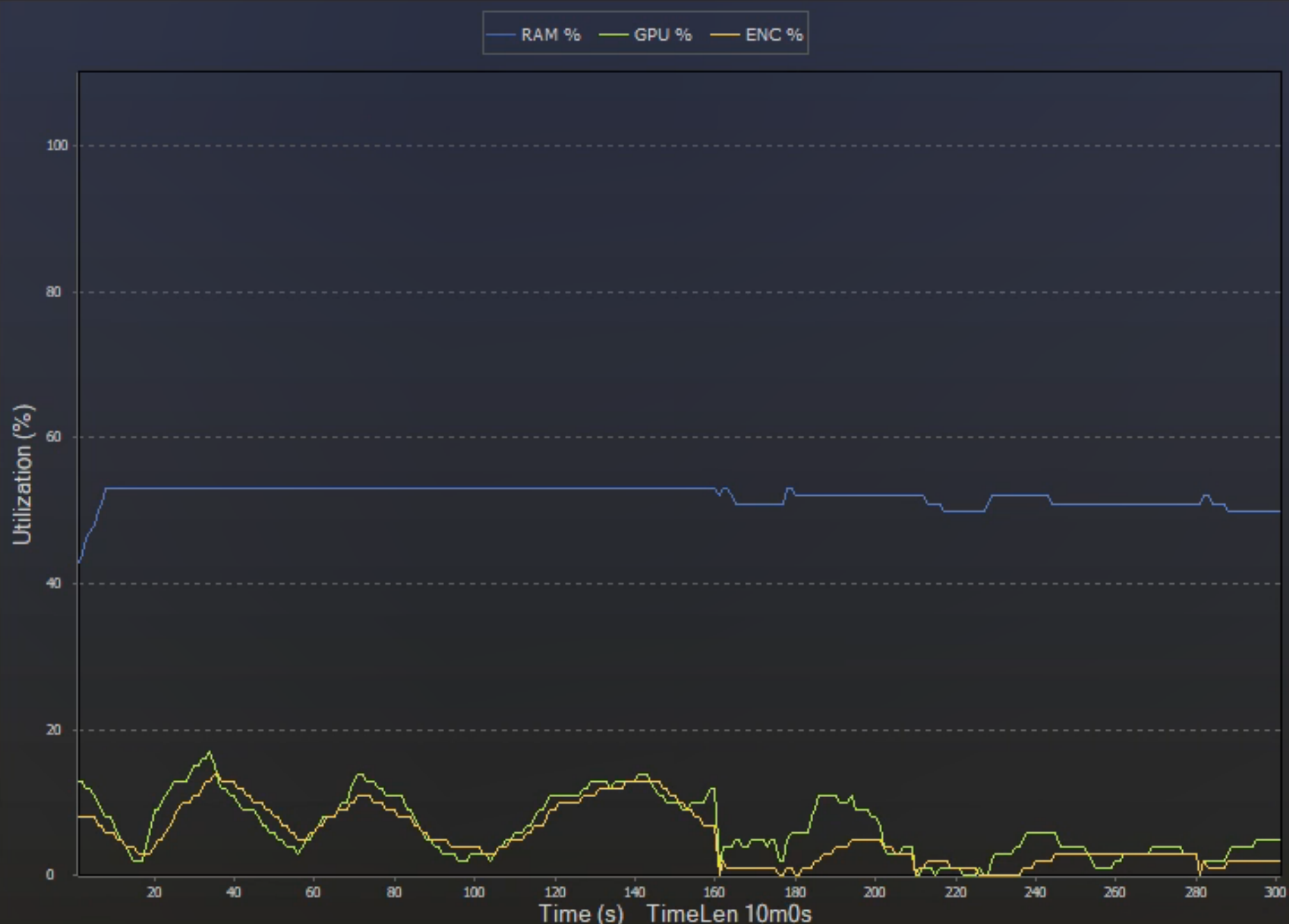
Sample interval: second
 Duration: minutes

Display Options

CPU (%) RAM (%)
 GPU (%) Framebuffer (%)
 Video Encode (%) Video Decode (%)

Process	GPU	MC	ENC	DEC
_TOTAL	5%	3%	2%	0%

Command Prompt



Future State

What does the future hold for healthcare and GPU?

MATLAB

BESA Research

Deep Learning

Utilizing GPU vMotion in vCenter 6.7u1

Drain hosts of vms to fully utilize the GPU



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Questions?



Thank You

Stay in touch

smlimbach@gmail.com

slimbach@nebraskamed.com

<https://www.linkedin.com/in/shane-limbach-a5646249>

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