Irisity Performance and Validation Report on Dell Technologies PowerEdge* R750

Report

December 2022

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Revision History

Date	Revision	Description
December 2022	1.0	Initial release.

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1.0 Overview

This document provides an overview and performance results for validation of a production ready version of Irisity IRIS+ running on an enterprise server solution; Dell Technologies PowerEdge* R750.

The focus of this report will be performance results running Irisity's IRIS+ application and video analytics model on only the CPU.

Configuration for multi-stream in-process analytics includes a pipeline process of video decode, video analytics via AI model with video analytics metadata creation, and injection of metadata into reporting and visualization platform.

1.1 Objective

The objective of the validation process is to:

i. Validate and Size the system configuration for concurrent multi-stream video analytics.
.
ii. Validate that the application's inferencing model is evenly distributed across all compute units:
   - The balancing load across all CPU cores is validated

iii. Confirm that maximum video analytics channel density is achieved at 90-95% of maximum compute capacity:

iv. Confirm that overall software/hardware solution is steady and operates without fail(s) for the duration of the testing.

v. Measure and log key system running parameters:
   - Overall system CPU load: average and standard deviation.
   - Video analytic inference performance in frames per second and inference time captured in milliseconds.

1.2 Irisity Overview

In October 2021, Irisity acquired Agent Vi to become the leading global provider of open architecture, video analytics software. For almost 20 years, Irisity has been at the forefront of innovation in the video analytics marketplace, delivering high quality, cutting-edge video analytics products.

Irisity's products are successfully deployed at thousands of sites worldwide, with customers based in over 90 countries. The broad range of functionalities offered by Irisity serves diverse markets such as municipalities, transportation, critical infrastructure, central monitoring stations and more.

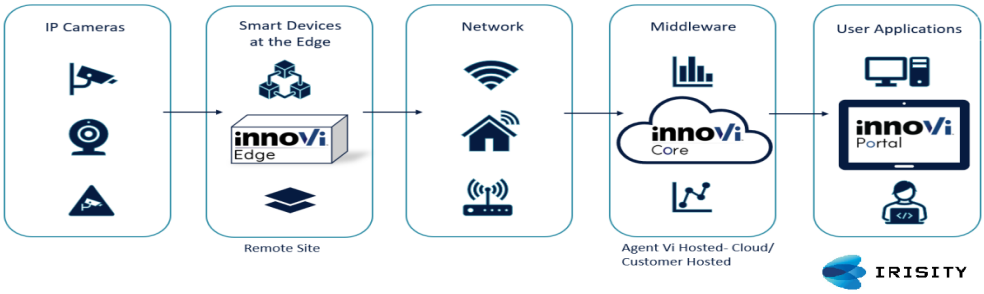
1.2.1 IRIS+

Irisity's next-generation, feature-rich AI-powered video analytics software platform IRIS+ provides a broad set of video analytics capabilities for enhanced security, safety, and business intelligence, such as real-time detection of events of interest, rapid search and analysis of recorded video, and extraction of statistical data.

Available as a cloud-based SaaS or as an on-premises software, IRIS+ capabilities meet the needs of any new or existing surveillance installation.

Its scalable robust architecture is applicable to installations of all sizes, with any number of cameras across multiple distributed sites, while offering the most attractive TCO.

Figure 1. IRIS+ Architecture



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2.0 System Configuration

Table 1. System Configurations

Components	System 1	System 2
Hardware		
Chassis	Dell Technologies PowerEdge R750	
CPU	2x Intel® Xeon® Gold 6338N CPU @ 2.20 GHz, 32 Core(s), 64 Logical Processor(s)	2 x Intel® Xeon® Gold 6348 CPU @ 2.60GHz, 28 Core(s), 56 Logical Processor(s)
Memory	Installed Physical Memory (RAM) of 256 GB	
Hard drives	512GB Total Storage but not leveraged for storage	
Network card	Intel® Ethernet Network Adapter E810-DA4 QP 25GbE SFP28 OCP 3.0	
Software		
BIOS	Dell Inc. 1.4.4	
iDRAC	5.00.20.00 (Build 22)	
Operating System	Ubuntu server 20.04.3 LTS	
Video Analytics Application	Irisity IRIS + Analytics Version: 2.1.4381	
OpenVINO™	OpenVINO™ Toolkit v.2021.3 LTS	
Others	Hyper Threading (Logical Processor in BIOS)	
Others	Enabled Dynamic CPU Frequency	

2.1 Processor Details

System	Name	Processor	Current Speed	Core Count
1	CPU1	Intel® Xeon® Gold 6338N CPU @ 2.20 GHz	2.20 GHz	32
	CPU2	Intel® Xeon® Gold 6338N CPU @ 2.20 GHz	2.20 GHz	32
2	CPU1	Intel® Xeon® Gold 6348 CPU @ 2.60GHz	2.6 GHz	28
	CPU2	Intel® Xeon® Gold 6348 CPU @ 2.60GHz	2.6 GHz	28

2.2 Dell BIOS Settings

Dell iDRAC Processor Settings	
Logical Processor	Enabled
CPU Interconnect Speed	Maximum data rate
Virtualization Technology	Disabled
Directory Mode	Enabled
Adjacent Cache Line Prefetch	Enabled
Hardware Prefetcher	Enabled
DCU Streamer Prefetcher	Enabled
DCU IP Prefetcher	Enabled
Sub NUMA Cluster	Disabled
MADT Core Enumeration	Linear
UPI Prefetch	Enabled
XPT Prefetch	Enabled
LLC Prefetch	Disabled
Dead Line LLC Alloc	Enabled
Directory AtoS	Disabled
AVX P1	Normal
RAPL Prioritization (line18)	Disabled
AVX ICCP Pre-Grant License	Disabled
Number of Cores per Processor	All
Local Machine Check Exception	Disabled
Controlled Turbo (line 22)	Disabled

Optimizer Mode (line 23)	Auto
Embedded SATA Mode (line 24)	AHCI
Security Freeze Lock	Enabled
Write Cache	Disabled
BIOS NVME Driver	Dell Qualified Drives
Boot Mode (line 28)	UEFI
Boot Sequence Retry	Enabled
Generic USB Boot	Disabled
HDD Placeholder	Disabled
SysPrep Clean	None
SetBootOrderEn	AHCI.SL.6-2,Disk.USBBack.1-1
SetBootOrderDis	NIC.PxeDevice.1-1
PxeDev1EnDis	Enabled
PxeDev2EnDis	Disabled
PxeDev3EnDis	Disabled
PxeDev4EnDis	Disabled
HttpDev1EnDis	Disabled
HttpDev2EnDis	Disabled
HttpDev3EnDis	Disabled
HttpDev4EnDis	Disabled
USB Ports	All On
USB Managed Port	On
IntegratedNetwork1	Enabled
EmbNic1Nic2	Enabled
IoatEngine	Disabled
EmbVideo	Enabled
SnoopHldOff	Roll256Cycles
SriovGlobalEnable	Disabled
OsWatchdogTimer	Disabled
PCIRootDeviceUnhide	Disabled
MMIO Above 4GB	Enabled
MemoryMappedIOH	56TB
DellAutoDiscovery	Platform Default
Slot1	Enabled
Slot2	Enabled
Slot3	Enabled

Slot4	Enabled
Slot5	Enabled
Slot6	Enabled
Slot7	Enabled
Slot8	Enabled
SerialComm	Off
SerialPortAddress	Com1
FailSafeBaud	115200
ConTermType	Vt100Vt220
RedirAfterBoot	Enabled
SysProfile	PerfOptimized
PasswordStatus	Unlocked
TpmSecurity	On
Tpm2Hierarchy	Enabled
MemoryEncryption	Disabled
PwrButton	Enabled
AcPwrRcvry	Last
AcPwrRcvryDelay	Immediate
AcPwrRcvryUserDelay	60
UefiVariableAccess	Standard
InBandManageabilityInterface	Enabled
SmmSecurityMitigation	Disabled
SecureBoot	Disabled
SecureBootPolicy	Standard
SecureBootMode	DeployedMode
TpmPpiBypassProvision	Disabled
TpmPpiBypassClear	Disabled
Tpm2Algorithm	SHA1
RedundantOsLocation	None
MemTest	Disabled
MemOpMode	OptimizerMode
NodeInterleave	Disabled
MemoryTraining	MemoryTrainingFast

NOTES:

1. iDRAC = Integrated Dell Remote Access Controller.

3.0 Irisity System Configuration

3.1 Video Stream Configuration

Component	Settings	Comments
Video Analytic Input video stream parameters	See section 5.1 Analysis	High-resolution video stream
Number of input video streams for analytics (virtual cameras)	See section 5.1 Analysis	Each virtual camera stream has high-resolution and low-resolution videos
Video analytic inference framerate per video channel	8 fps	Each AI service is set to process the max amount
Number of active video analytics streams at maximum testing	See section 5.1 for details	Maximum Number of Streams where video analytics were applied

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4.0 Profiling

4.1 Validation Steps

1. Deploy and Configure Dell Technologies* PowerEdge* R750 Server.
2. Install Ubuntu* Operating System and Analytics Platform with Testing Criteria.
    a. Set up maximum virtual video streams with specified video sources for high-resolution streams.
    b. Set up Irisity* video analytics to process the virtual video streams.
3. Run the profiler tools to record hardware usage and other metrics over a given period of time.
4. Process results to generate tabulated data using multiple readings.
5. Analyze results and report.

4.2 Checklist for Results Validation

i. Irisity is utilizing the maximum amount of CPU without compromising the system accuracy.

ii. Processing frame rate is matching the expectations.

iii. CPU usage and Memory consumption values are consistent during the test.

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5.0 Performance Test Results

To measure system scalability, we sequentially increased the number of streams being processed in parallel while keeping records about hardware utilization and processing time for each stream.

5.1 Analysis

Test Profile	Dual 6348	Dual 6338N
CCD, Low Activity Scene, H264, 1080P, 15fps	115	112
CCD, Low Activity Scene, H264, 1080P, 30fps	93	90
CCD, Low Activity Scene, H264, 720P, 8fps	219	212
CCD, Low Activity Scene, H265, 1080P, 15fps	92	89
CCD, Low Activity Scene, H265, 1080P, 30fps	73	71
CCD, Low Activity Scene, H265, 720P, 8fps	189	182
CCD, Medium Activity Scene, H264, 1080P, 15fps	107	104
CCD, Medium Activity Scene, H264, 1080P, 30fps	90	87
CCD, Medium Activity Scene, H264, 720P, 8fps	165	160
CCD, Medium Activity Scene, H265, 1080P, 15fps	90	87
CCD, Medium Activity Scene, H265, 1080P, 30fps	73	71
CCD, Medium Activity Scene, H265, 720P, 8fps	153	148
CCD, High Activity Scene, H264, 1080P, 15fps	85	82
CCD, High Activity Scene, H264, 1080P, 30fps	73	71
CCD, High Activity Scene, H264, 720P, 8fps	113	109
CCD, High Activity Scene, H265, 1080P, 15fps	73	71
CCD, High Activity Scene, H265, 1080P, 30fps	62	60
CCD, High Activity Scene, H265, 720P, 8fps	109	105

6.0 Conclusion

Based on the analysis in this report, we have defined the specifications required per stream/camera to be deployed using the Dell Technologies PowerEdge R750 with the dual socket Intel® Xeon® Gold 6338N CPU and the Intel® Xeon® Gold 6348 CPU.

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