



# **Irisity Performance and Validation Report on Dell Technologies PowerEdge\* R750**

**Report**

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*December 2022*



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## Revision History

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| Date          | Revision | Description      |
|---------------|----------|------------------|
| December 2022 | 1.0      | Initial release. |

## 1.0 Overview

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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.

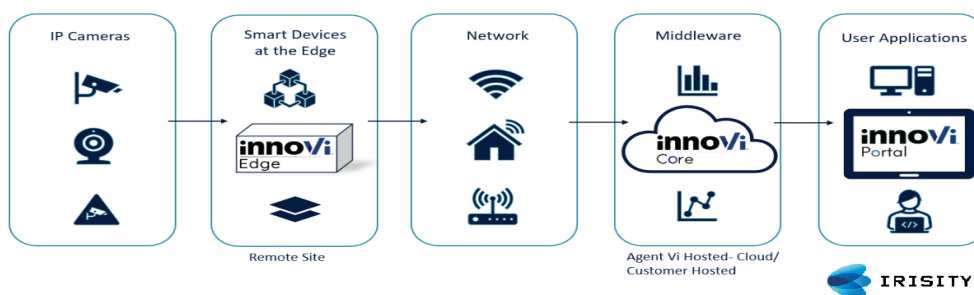
### 1.2.1 IRIS+

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



## 2.0 System Configuration

Table 1. System Configurations

| Components                  | System 1   | System 2  |
|-----------------------------|--|---|
| <b>Hardware</b>             |  |   |
| 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                |   |
| <b>Software</b>             |  |   |
| 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 +<br>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          |



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

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

**NOTES:**

1. iDRAC = Integrated Dell Remote Access Controller.

## 3.0 Irisity System Configuration

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### 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             |

## 4.0 Profiling

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### 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

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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**

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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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