SDC 20

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Real World Edge Workloads and Application & Storage Optimization

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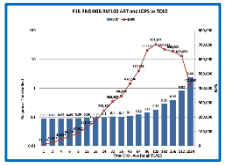
Abstract

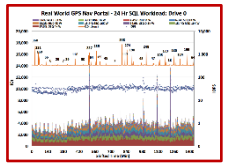
Real World Edge Workloads for

Application & Storage Optimization

- **Performance Depends on Your Workload**
- **Corner Case Synthetic Tests Stress Storage Outside the Range of Normal Operation**
- **Real World Edge Workloads are very Different from Synthetic Corner Case Workloads**
- **Storage & Applications Respond Differently to Different Workloads**
- **Real World Edge Workloads can help Optimize Your Storage & Applications**
- **See how to Capture, Analyze and Test Real World Edge Workloads**



Synthetic v Real World Workloads



Synthetic Workloads

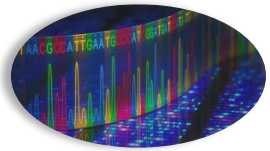
- Synthetic Corner Case workloads stress storage ***outside the range of normal usage***
- Corner Case Workloads are comprised of a ***single, or very few, IO Streams*** applied over a defined period of time
- Corner Case workloads have ***Traditional Transfer Sizes*** (0.5K, 4K, 8K, 16K, 32K, 64K, 128K, 256K, 512K, 1M, etc.)
- Corner Case workloads have a ***Fixed Demand Intensity***, or Queue Depth

Real World Edge Workloads

- RW Edge Workloads are comprised of ***constantly changing combinations of different IO Streams***
- RW Edge Workload have ***many IO Streams – hundreds to thousands -*** that change over the course of the workload
- RW Edge Workloads have ***Non Traditional Transfer Sizes*** (10b, 28b, 60b, 128b1K, 1.5K, 20K, 36K, 48K, 56K, 64.5K, 192K, 398K, etc.)
- RW Edge Workloads have a ***Constantly Changing Demand Intensity***

Real World Edge Workload Examples

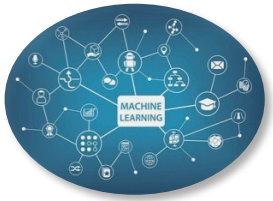
Artificial Intelligence



Genetics/Genomics

3D Animations

5G Edge Servers



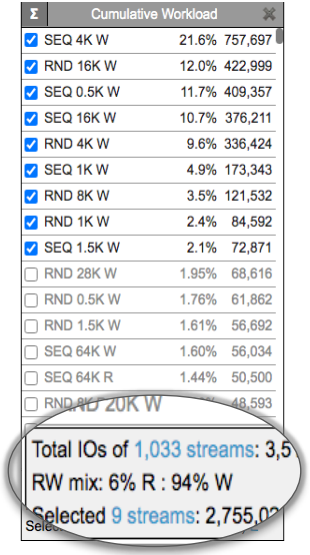
Machine Learning

Cloud Storage

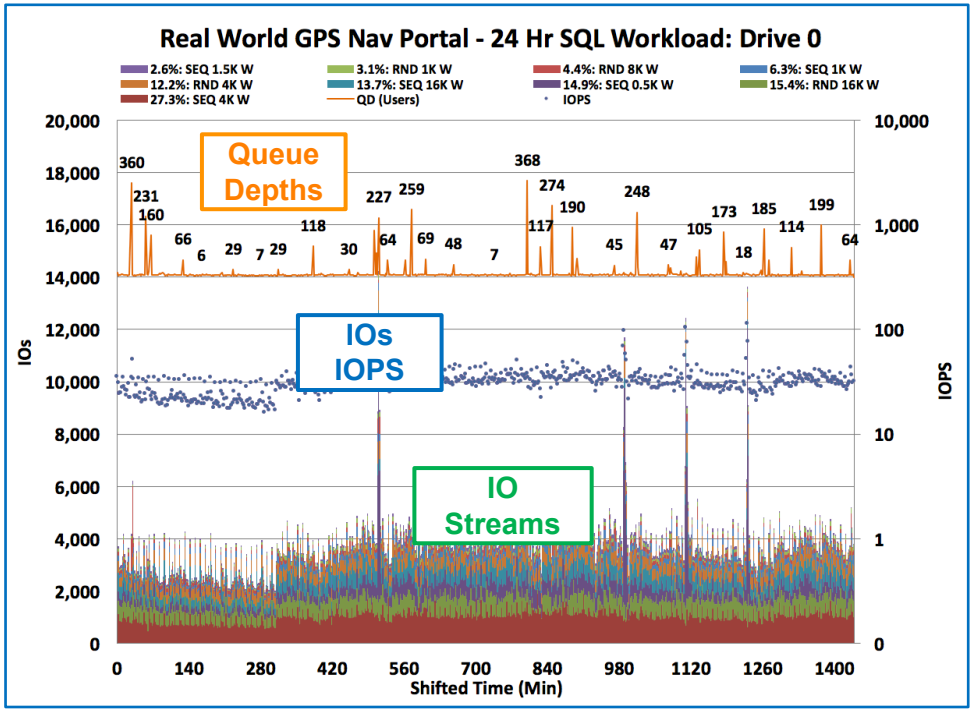
Big Data

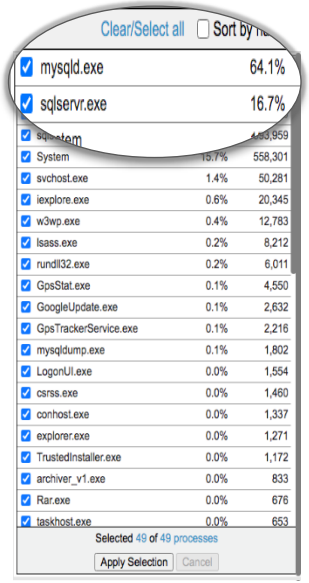
Web Portals

GPS Nav Edge Portal – 24 Hr IO Capture



IO Streams



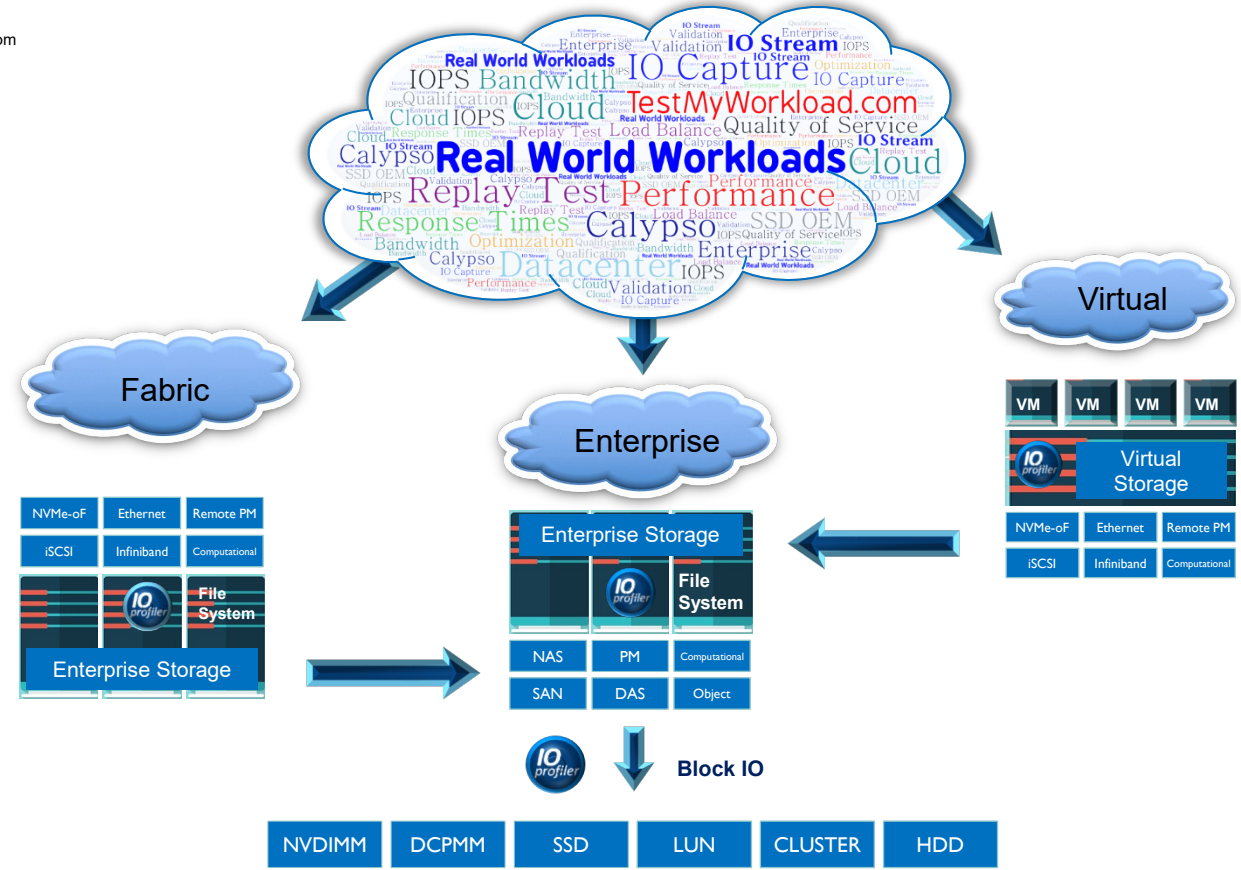


Process IDs

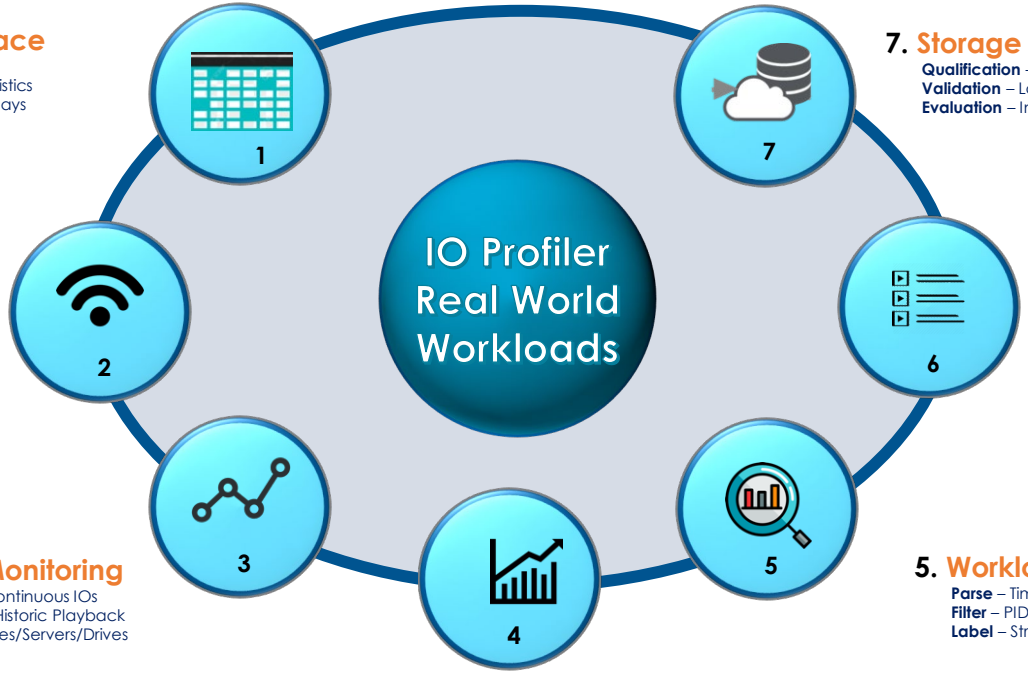
IO Stream Map – QDs, IOs, IO Streams

Workload Capture Location is Important

TestMyWorkload.com



AI Workload Capture, Curation, Optimization with IOProfiler



1. IO Profile v IO Trace
- **Secure** - No personal data
- **Step Data** – Tables of IO Statistics
- **Granularity** – uS, S, Min, Hr, Days

2. Edge Transmission
- **Portability** – Small file size
- **Real Time Telemetry** – Streaming Steps
- **Phone Home** – Automated Delivery

3. Continuous Monitoring
- **View** – Database of Continuous IOs
- **Replay** – Real Time or Historic Playback
- **Monitor** – Multiple Nodes/Servers/Drives

4. Key Performance Indicators
- **IO Streams** – IO Stream Combinations & QDs
- **Metrics** – PIDs, Performance, IO Bursts, IO Sequentiality
- **Spikes** – TRIMs, Bursts, QDs, Boot Storms

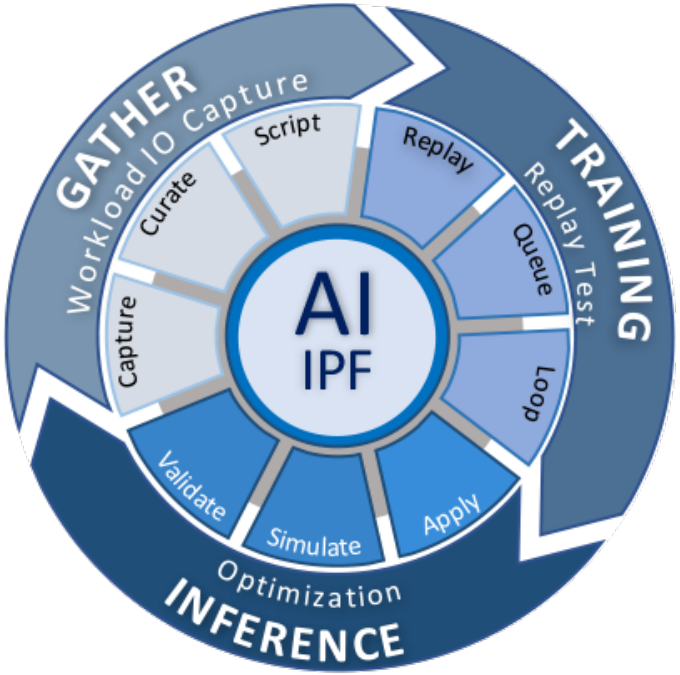
5. Workload Curation
- **Parse** – Time Ranges, PIDs, Storage LUNs
- **Filter** – PIDs, Performance, LBA Ranges
- **Label** – Structured Data, Applications

6. Replay Training
- **Loop** – AI Training Loops
- **Validate** – Continuous Check
- **Infer** – Optimized Performance

7. Storage Optimization
- **Qualification** – Storage Benchmark Performance
- **Validation** – Load Balance, Bottleneck Check
- **Evaluation** – Infrastructure Storage Selection

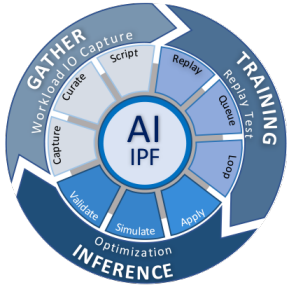
Artificial Intelligence & IOProfiler

1. GATHER

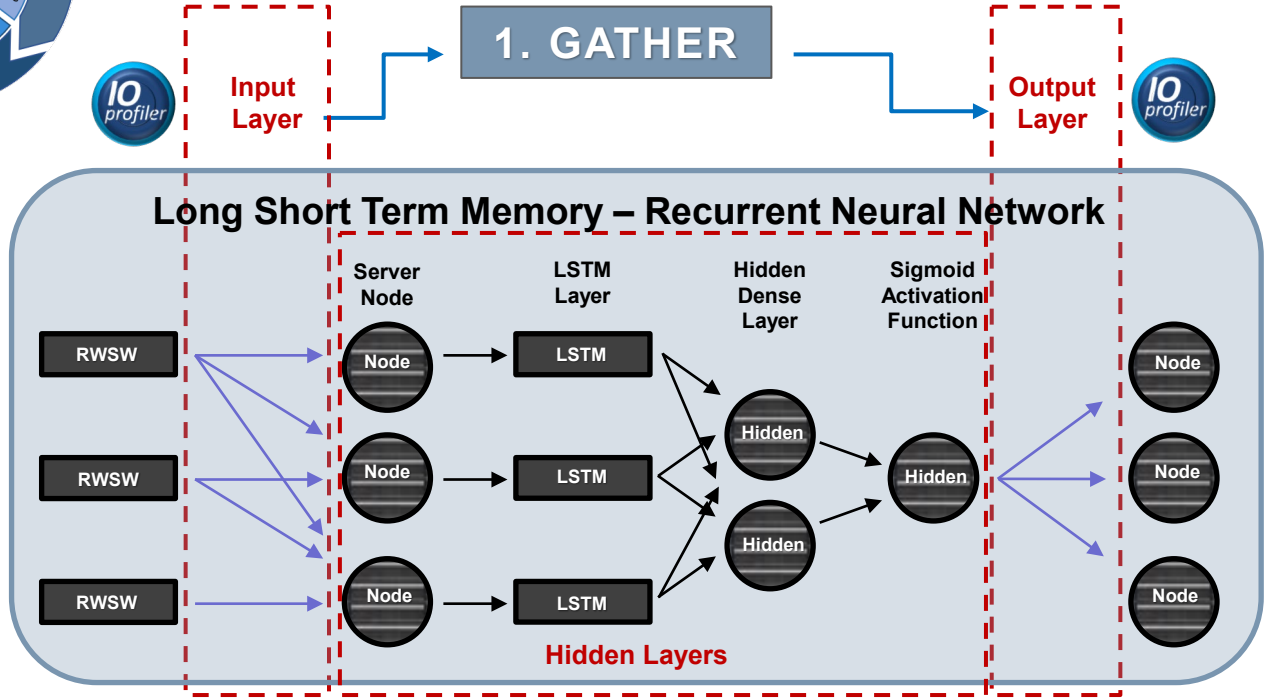


2. TRAINING

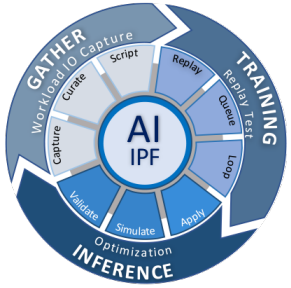
3. INFERENCE



1. Gather: LSTM-RNN Workload IO Capture

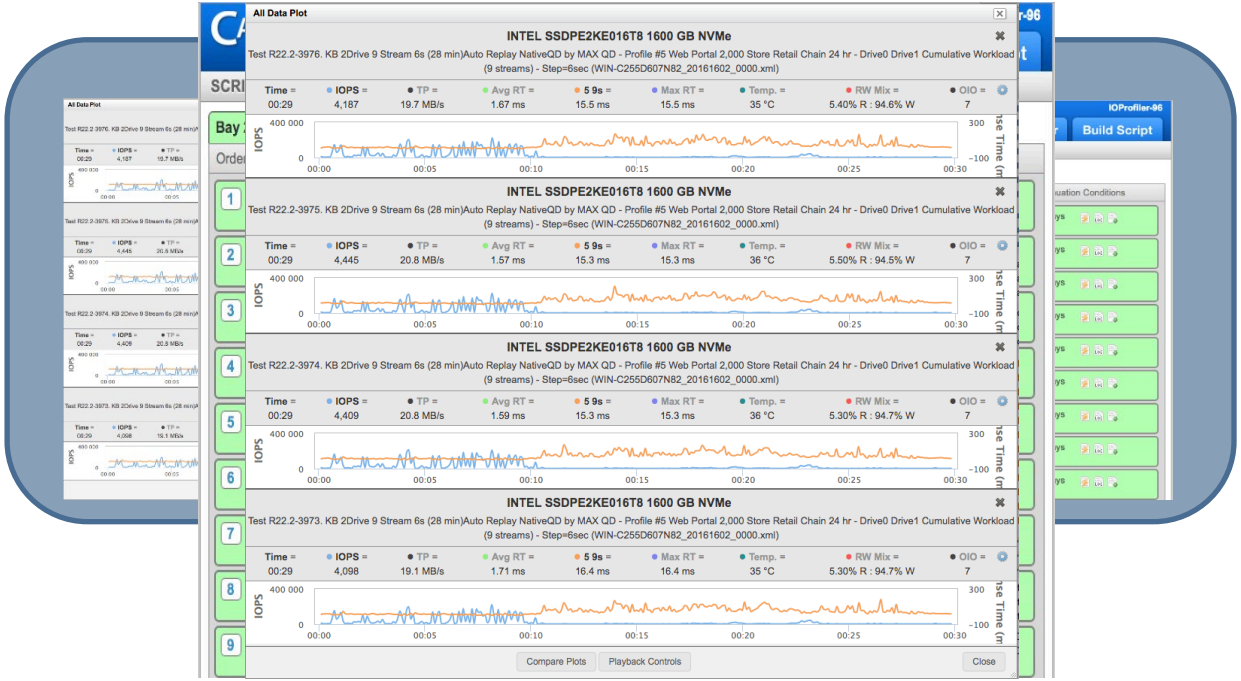


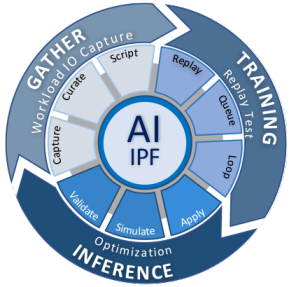
Capture – Edge Data IO Input & Output Layer
Curate – Select Key Performance Indicators – QDs, BS, RW
Script – Create Replay Script



2. Training: Replay Test

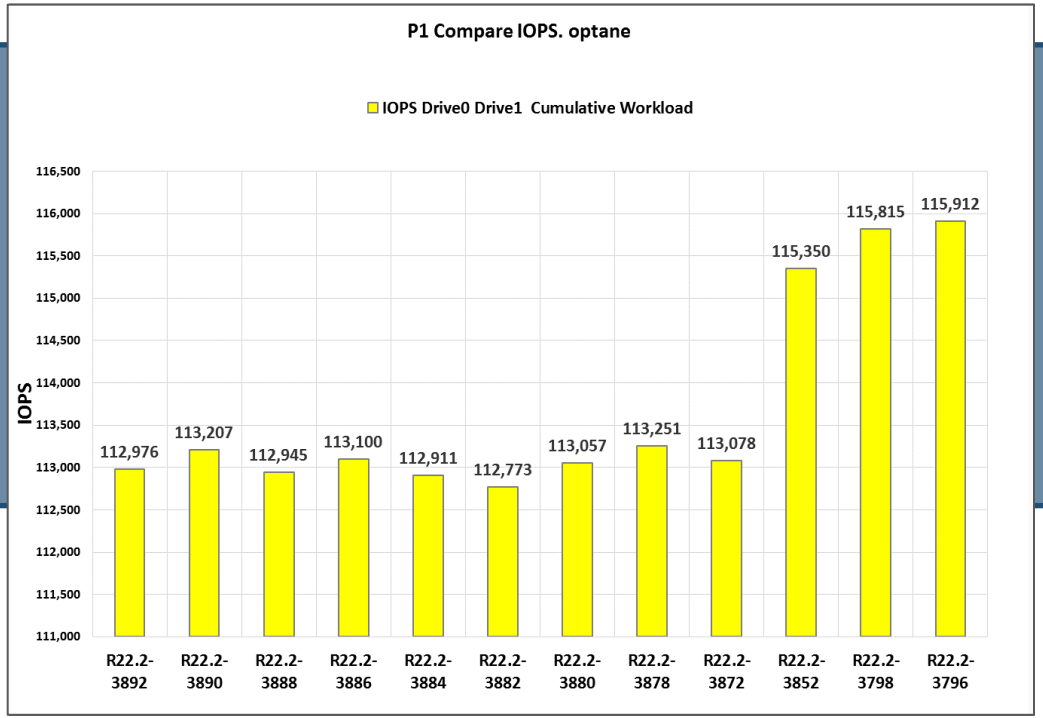
2. TRAINING

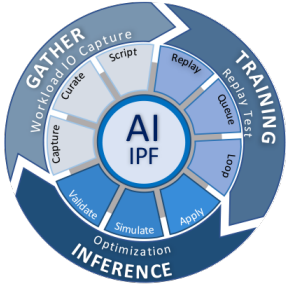




3. Inference: Optimization

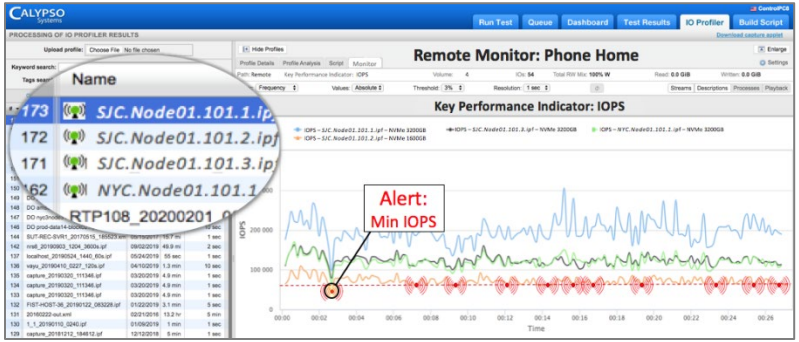
3. INFERENCE





Real Time Monitoring – Edge Workloads

KPI Alerts from multiple Edge Servers / Nodes



KPI Monitoring of Node IOPS, TP, LAT, QDs, Transfer Sizes, PIDs

Phone Home KPI Alerts

Key Performance Indicator Monitoring

Summary

- Applications & Storage Performance depends on the Workload
- Workloads Change as they traverse the IO and SW Stack
- Real World Edge Workloads are very different than Synthetic lab workloads
- You can capture Real World Workloads with free IO Capture tools at TestMyWorkload.com
- Curate and Train AI Workloads using the IOProfiler toolset
- Optimize Your Applications & Storage by monitoring and curating Key Performance Indicators

Thank You.

Questions can be sent to:

info@calypsotesters.com

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